APPENDIX C

REGULATORY IMPACT REVIEW

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Appendix C

1.0 REGULATORY IMPACT REVIEW

1.1 Introduction

Management of the Federal groundfish fishery located off Alaska in the 3 to 200 nautical mile U.S. Exclusive Economic Zone (EEZ) is carried out under the Fishery Management Plan (FMP) for the Groundfish Fishery of the Bering Sea and Aleutian Islands Area (BSAI) and the FMP for the Groundfish of the Gulf of Alaska (GOA). These FMPs and their amendments are developed under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). The purpose of the FMPs is to manage the groundfish fisheries for optimum yield (OY) and to allocate harvest among user groups. The FMPs, their amendments and regulations (found at 50 CFR part 679), must also comply to other applicable Federal laws and executive orders, notably the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), the Marine Mammal Protection Act, Executive Order (E.O.) 12866, and the Regulatory Flexibility Act (RFA).

This Regulatory Impact Review (RIR) evaluates the proposed Steller Sea Lion Protection Measures restricting pollock, Pacific cod and Atka mackerel fishing in the Bering Sea and Aleutian Islands (BSAI) and the Gulf of Alaska (GOA) so as to protect the endangered western stock of Steller sea lions. A detailed discussion of the environmental and management context within which this action is proposed is contained in the SEIS, which precedes this RIR. The economic and socioeconomic context is presented in the following sections.

1.1.1 Statutory Authority

Under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) the United States has exclusive fishery management authority over all marine fishery resources found within the exclusive economic zone (EEZ), which extends between 3 and 200 nautical miles from the baseline used to measure the territorial sea. The management of these marine resources is vested in the Secretary of Commerce (Secretary) and in the Regional Fishery Management Councils. In the Alaska region, the North Pacific Fishery Management Council (Council) has the responsibility to prepare fishery management plans (FMPs) for the marine fisheries it finds that require conservation and management. The National Marine Fisheries Service (NMFS) is charged with carrying out the federal mandates of the Department of Commerce with regard to marine fish.

The groundfish fisheries in the Exclusive Economic Zone (3 to 200 miles offshore) off Alaska are managed under the Fishery Management Plan for the Groundfish Fisheries of the Gulf of Alaska and the Fishery Management Plan for the Groundfish Fisheries of the Bering Sea and Aleutian Islands Area. Both fishery management plans (FMPs) were developed by the North Pacific Fishery Management Council (Council). The Gulf of Alaska (GOA) FMP was approved by the Secretary of Commerce and became effective in 1978 and the Bering Sea and Aleutian Islands Area (BSAI) FMP became effective in 1982.

Actions taken to amend fishery management plans or implement other regulations governing the groundfish fisheries must meet the requirements of Federal laws and regulations. In addition to the Magnuson-Stevens Fisheries Conservation and Management Act (Magnuson-Stevens Act), the most important of these are the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), the Marine Mammal Protection Act (MMPA), Executive Order (E.O. 12866), the Regulatory Flexibility Act (RFA), and the American Fisheries Act (AFA).

1.1.2 Regulatory Impact Review Requirements

This Regulatory Impact Review (RIR) provides the analysis required under Executive Order (E.O.) 12866. The following statement from the E.O. summarizes the requirements of an RIR:

> In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating. Costs and benefits shall be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nevertheless essential to consider. Further, in choosing among alternative regulatory approaches, agencies should select those approaches that maximize net benefits (including potential economic, environment, public health and safety, and other advantages; distributive impacts; and equity), unless a statute requires another regulatory approach.

Executive Order 12866 requires that the Office of Management and Budget review proposed regulatory programs that are considered to be "significant". A "significant regulatory action" is one that is likely to:

1. Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;

2. Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

3. Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or

4. Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order.

1.1.3 Purpose and Need

The primary purpose of the proposed action is to modify the BSAI and GOA pollock, Pacific cod and Atka mackerel fisheries such that the reconfigured fisheries do not jeopardize the continued existence of Steller sea lions or adversely modify their critical habitat. If more than one alternative accomplishes the primary purpose of this action, a secondary objective is to modify the fisheries such that the reconfiguration minimizes the economic and social costs that will be imposed on the commercial fishing industry and associated coastal communities.

The need for this federal action stems from several sources. First, the Council and NMFS have a responsibility to insure that fishing activities authorized under the FMPs and implementing regulation do not jeopardize the continued existence of any listed species or adversely modify its critical habitat. Second, in order for the pollock, Pacific cod, and Atka mackerel fisheries to commence on January 1, 2002, NMFS must implement a suite of Steller sea lion protection measures, be it the RPA from the 2000 Biological Opinion or some other alternative, because the emergency rules governing BSAI pollock, Pacific cod, and Atka mackerel fishing expire on December 31, 2001. Without any action by NMFS, important Steller sea lion protection measures regulating the pollock, Pacific cod, and Atka mackerel fisheries will cease to exist.

Finally, new information about Steller sea lion movements based on telemetry studies and new analysis of Steller sea lion scat samples have become available since the issuance of the 2000 Biological Opinion. An examination of that information as it relates to necessary protection measures is warranted.

This analysis evaluates alternatives to mitigate potential adverse effects as a result of competition for fish between Steller sea lions and the BSAI and GOA pollock, Pacific cod, and Atka mackerel fisheries under a no action alternative as well as four other alternatives that would substantially reconfigure these fisheries.

In 1990, the Steller sea lion was listed as threatened as defined by the ESA (62 FR 24345) throughout its range (55 FR 12645, 55 FR 13488, 55 FR 49204, 55 FR 50005). Justification was based on evidence of a major decline in their abundance throughout most of their range, but most acutely in the core region from the Kenai Peninsula to Kiska Island (Braham *et al.*, 1980; Merrick *et al.*, 1987). In this region, counts of adult and juvenile Steller sea lions had declined by about 80% since the population size was estimated in the late 1950s. On May 5, 1997, NMFS reclassified Steller sea lions into two distinct population segments under the ESA. The reclassification was based on biological information collected since the species was listed as threatened in 1990. The Steller sea lion population segment west of 144°W longitude (near Cape Suckling, Alaska) was reclassified and listed as endangered; the remainder of the U.S. Steller sea lion population remains listed as threatened.

On November 30, 2000, NMFS released a comprehensive Biological Opinion on the groundfish fisheries of the BSAI and GOA, pursuant to section 7 of the Endangered Species Act (NMFS, 2000a). The Biological Opinion concluded that fisheries for pollock, Pacific cod, and Atka mackerel jeopardize the continued existence of Steller sea lions and adversely modify their critical habitat due to competition for prey and modification of their prey field. To mitigate this situation, the Biological Opinion included a set of sea lion protective measures (termed the Reasonable and Prudent Alternative, RPA), which included closure areas, limitations on the amount of pollock, Pacific cod, or Atka mackerel that could be harvested, establishment of seasonal harvest limitations, and a long-term experimental monitoring program. A one-year phase-in of these measures was imposed by Senator Ted Steven's rider to the fiscal year 2000 appropriations bill (Pub.L. 106-554).

The 2000 Biological Opinion is based on the following perspectives: "At present, the leading hypothesis to explain the continued decline of the western population of Steller sea lions is primarily the nutritional stress of juveniles and to a lesser extent adult females (Merrick *et al.*, 1987; Pitcher *et al.*, 1998; Rosen and Trites, 2000a; Alaska Sea Grant, 1993). Such nutritional stress indicates decreased foraging success, potentially as a consequence of environmentally-driven changes in prey availability, but also as a consequence of competition with the BSAI and GOA commercial groundfish fisheries." As alluded to above, "the groundfish fisheries reduce prey availability on several scales, resulting in range-wide, regional, and local depletion of prey. Fishing activity may also preclude some sea lions from certain important foraging areas simply by disturbance, or the presence of fishing vessels, gear, and activity. Since sea lions and the fisheries may well target the same aggregations of prey, such interference may reduce foraging success even when local prey are relatively abundant." (NMFS, 2000a).

The 2000 Biological Opinion concluded the following: "After analyzing the cumulative, direct and indirect effects of the Alaska groundfish fisheries on listed species, NMFS concludes that the fisheries do not jeopardize any listed species other than Steller sea lions. The 2000 Biological Opinion concludes that the fisheries do jeopardize Steller sea lions and adversely modify their critical habitat due to competition for prey and modification of their prey field. The three main prey species that Steller sea lions and these fisheries compete for are pollock, Pacific cod, and Atka mackerel. The biological opinion provides a reasonable and

prudent alternative to modify the fisheries in a way that avoids jeopardy and adverse modification." (NMFS, 2000a).

The 2000 Biological Opinion included a RPA to avoid jeopardy and adverse modification of critical habitat in the above noted western region. The overall approach of the RPA involved the following strategy: 1) protect a substantial number of the rookeries and haulouts used by Steller sea lions and the marine environment immediately offshore of these areas from disturbance associated with commercial fishing for the three primary prey species (i.e., walleye pollock, Atka mackerel, and Pacific cod), 2) protect a substantial portion of critical habitat from the effects of commercial fishing on the three primary prey species, 3) ensure that adequate forage resources are available to sustain a population of Steller sea lions in excess of 34,600 animals, and 4) in areas where fishing is allowed, ensure that fishing does not create areas where Steller sea lions are not able to successfully forage (NMFS, 2000a).

Prior to NMFS' implementation of the RPA contained within the 2000 Biological Opinion, the President signed Public Law 106-554. In essence, Pub. L 106-554 at § 209(c)(2) legislated that while the 2001 BSAI and GOA groundfish fisheries will be managed in a manner consistent with the RPA contain in the Biological Opinion and as modified by other provisions of section 209, the provisions of the RPA will be phased in during the 2001 fishing year. It further legislated that the RPA contained in the Biological Opinion will become effective in its entirety on January 1, 2002, unless revised as necessary and appropriate based on independent scientific review or other new information. In accordance with Pub. L. 106-554, and starting on January 1, 2001, the 2001 BSAI and GOA groundfish fisheries were initially managed in accordance with the fishery management plans and federal regulations in effect for such fisheries prior to July 15, 2000. This initial management regime was subsequently replaced via an emergency rule issued by NMFS January 22, 2001, under the Magnuson-Stevens Act and effective on January 18, 2001 (66 FR 7276). The emergency rule contained a suite of management measures that phased-in certain provisions of the RPA. This emergency rule was extended and modified by NMFS on July 17, 2001 (66 FR 37167).

1.1.4 Steller Sea Lion Protection Measure Alternatives

At its June 2001 meeting, the Council received a report from its RPA Committee on recommendations for an alternative RPA. The Council adopted a set of final alternatives, to be examined in this SEIS/RIR. The Council's RPA Committee's recommended alternative was included as Alternative 4. A brief list of these alternatives, and options, is provided below, and more thoroughly described in Section 2.3 of this SEIS.

Alternative 1 No action. Regulatory measures implemented by emergency rule, and designed to protect Steller sea lions, would expire. *Note this alternative is presumed to violate the Endangered Species Act.*

Alternative 2 The low and slow approach. This alternative is derived from the Draft Programmatic SEIS for the Alaska groundfish fisheries (NMFS 2001a). Essentially, the approach is to establish lower total allowable catch levels (TACs) for pollock, Pacific cod, and Atka mackerel, prohibit trawling in critical habitat, and implement measures to spread out catches through the year.

Alternative 3 The restricted and closed area approach. This alternative is the RPA detailed in the November 30, 2000, Biological Opinion. Essential elements of this approach are to establish large areas of critical habitat where fishing for pollock, Pacific cod, and Atka mackerel is prohibited, and to restrict catch levels in remaining critical habitat areas.

Alternative 4 The area and fishery specific approach. This alternative was developed by the Council's RPA Committee. This approach allows for different types of management measures in the three areas (AI, BS, and GOA). Essential measures include fishery specific closed areas around rookeries and haulouts, together with seasons and catch apportionments. Three options for closure areas are examined for this alternative.

Option 1: Chignik small boat exemption.
Option 2: Unalaska small boat exemption.
Option 3: Gear specific zones for GOA Pacific cod fisheries.

Alternative 5 The critical habitat catch limit approach. This alternative is derived from the suite of RPA measures that were in place for the 2000 pollock and Atka mackerel fisheries, and measures considered for the Pacific cod fishery that include seasonal apportionments and harvest limits within critical habitat. Essentially, this alternative limits the amount of catch within critical habitat to be in proportion to estimated fish biomass.

1.2 Description of the Fisheries

The groundfish fisheries off Alaska are an economically important segment of the U.S. domestic fishing industry. Commercial groundfish catches off Alaska totaled approximately 1.7 million tons (mt) in 1999, compared to 1.9 million mt in 1998. The value of the catch at ex-vessel, *excluding* the value added by processing, was estimated at $483 million in 1999, an increase from $416 million in 1998.

Groundfish accounted for the largest share of the ex-vessel value of all commercial fisheries off Alaska in 1999 (39%), while the Pacific salmon fisheries were second, at $346 million (28% of the total value). The ex-vessel value of the shellfish catch amounted to $271 million (22% of the total).

The value of the 1999 catch, after primary processing, was approximately $1.2 billion. This estimate *includes* the "value added" by at-sea and shoreside processors, typically characterized as representing the "first wholesale" gross product value.

1.2.1 The Harvesting Sector

Alaska pollock has consistently been the dominant species in the commercial groundfish catch off Alaska.[1] The 1999 pollock catch of 1.09 million mt accounted for, on the order of two-thirds of the total groundfish harvest (down approximately 13% from a year earlier). The next major species, Pacific cod, accounted for 242,500 mt (or almost 15% of the total 1999 groundfish catch in the EEZ off Alaska). The 1999 Pacific cod catch was also down, about 6%, from a year earlier. Atka mackerel represents a much smaller portion of the total groundfish catch. In 1999, the total Atka mackerel harvest was reportedly 56.5 t, down about 1.5% from 1998. Mackerel harvests ranged from 53,000 mt to 103,867 mt between 1995 and 1999.[2]

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[1]At least since the establishment of the U.S. Exclusive Economic Zone in 1976.

[2]Catch statistics for the 2000 fisheries are not reported here (in part) because of the "confounding" effect of the SSL critical habitat trawl ban on catch and landings, associated with the Federal Court's injunction, which was put in place in the 2000 fishing year. The preliminary 2000 catch data are reflected in the following set of tables, however, for completeness.

Trawling accounts for, on average, approximately 90% of the total groundfish catch, and hook and line gear accounts for another 7.9%. Commercial landings of pollock and Atka mackerel are (for all practical purposes) exclusively made by operators using trawl gear. Pacific cod is harvested by trawls (in 1999, 44% or 105,000 t); by hook and line gear (in 1999, 41% or 101,000 t); and by pots (in 1999, 15% or 35,000 t). Estimates of the numbers of vessels participating in the hook and line, pot, and trawl gear fisheries, for the three primary species of interest in the present action are presented in Table C-1.

Table C-1 Number of vessels that caught Pacific cod, pollock, or Atka mackerel by area, vessel category, target fishery, and gear, 1995-2000

Gear	Species	Year	GOA		BSAI		All Alaska	
			CV	CP	CV	CP	CV	CP
Hook and Line	Pacific Cod	95	386	20	57	44	430	46
		96	210	16	51	39	252	41
		97	394	14	31	38	412	39
		98	345	8	22	36	357	36
		99	398	22	39	38	427	41
		00	497	14	68	41	538	42
Pot	Pacific Cod	95	184	3	116	8	255	8
		96	146	0	92	13	206	13
		97	145	0	75	13	193	13
		98	166	1	71	7	211	7
		99	200	11	89	13	254	13
		00	247	5	92	9	300	11
Trawl	Pollock	95	129	8	116	45	155	45
		96	94	3	118	40	158	40
		97	119	6	106	34	173	35
		98	120	2	100	38	168	39
		99	112	0	114	17	160	17
		00	82	0	102	16	163	16
	Pacific Cod	95	143	14	86	40	185	43
		96	108	16	108	39	191	41
		97	136	6	85	41	185	43
		98	117	13	85	36	171	36
		99	106	9	81	26	170	27
		00	95	6	85	26	174	26
	Atka Mackerel	95	0	2	0	17	0	18
		96	0	9	0	17	0	18
		97	0	0	0	12	0	12
		98	0	0	0	14	0	14
		99	0	0	0	17	0	17
		00	0	0	0	12	0	12

Source: Preliminary 2001 Groundfish SAFE Report; Table 27, pages 54-55.

Over the five years (1995-1999)[3], catcher vessels (CV) took 43% of the total groundfish catch, while catcher processor (C/P) vessels took the remaining 57%, for the BSAI and GOA, as a whole. CVs took about 48% of the total, in 1999 [an increase due, in part, to American Fisheries Act (AFA) provisions which increased the share of the BSAI pollock TAC allocated to inshore processors]. Preliminary 2000 SAFE Report catch data suggest that C/Ps harvested 53.3% of the aggregate statewide groundfish catch, with the balance (46.7%) credited to CVs, in that year.

The distribution of catch, between CVs and C/P vessels, differs substantially by species and area. For Atka mackerel, effectively 100% of the commercial catch is made by C/Ps. For pollock, in the GOA[4], 100% is landed inshore. In the BSAI management area, in 1999, approximately 44% of the total pollock catch was harvested by C/Ps, with the balance caught by catcher vessels (delivering either to shoreside plants or to motherships). According to the preliminary SAFE Report, 2000 pollock catches in this area were divide 45.5% C/Ps, 54.5% CVs (with the latter total including deliveries to inshore and mothership processors).

For Pacific cod, the pattern is more complex. In 1999, in the BSAI, 100% of the longline caught Pacific cod was reportedly taken by C/Ps. In 2000, preliminary catch statistics indicate that something just over 1.0% of this catch was taken by CVs, with the balance (98.9%) landed by C/Ps. In the GOA (where 90% of the Pacific cod TAC is reserved for the inshore sector under Inshore/Offshore), in 1999 about 82% was reportedly taken by CVs, with the balance going to C/Ps. In 2000, the figure for CV catch jumped to 91.7%.

Over 81% of the BSAI pot-caught Pacific cod was taken by CVs in 1999, while in 2000 that figure was up to just over 84%. In the Gulf, in 1999, CVs accounted for 73.7% of the pot-caught Pacific cod, rising to over 94% in 2000.

Finally, in the BSAI, trawl-caught Pacific cod was more nearly evenly split, with C/Ps accounting for just over 47% of the total landings in 1999, 44.6% in 2000. In the Gulf, trawl CVs accounted for 94.6% of Pacific cod landings, while in 2000 they recorded 92% of that catch..

Alaska continues to lead all states in volume (4.9 billion pounds in 1998) and value ($951.5 million) of fisheries landings. (For perspective, Louisiana was second in that year, in both categories, at 1.1 billion pounds and $291.9 million.) Unalaska/Dutch Harbor was the leading U.S. port in quantity of commercial landings, with Kodiak third, and Seattle, Washington fifth. Dutch Harbor was also the leading U.S. port in terms of value, with Kodiak again third, nationally, in that year. Pollock ranked number one, by quantity, and fifth in value, of all U.S. commercially landed species, accounting for fully 30% of total U.S. commercially landed catch weight and 6.0% of total U.S. commercial fishery value.

1.2.2 The Processing Sectors

In this section, a general overview of the three operational sectors of the pollock, Pacific cod, and Atka mackerel *processing* industry is presented (i.e., "Inshore", "Catcher/Processors", "Motherships"). These data and statistics provide a 'baseline' description of the physical plant and activity of each of the principal processing segments of the primary target fisheries of concern in this action (e.g., BSAI pollock, Atka mackerel, and Pacific cod; WGOA and CGOA pollock and Pacific cod)

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[3]Catch statistics for the 2000 fishery were distorted by the temporary trawl ban in SSL CH imposed during the latter half of the fishing year, brought about by the Federal court's injunction.

[4]As provided for under the Inshore/Offshore FMP Amendment 51 (64 *FR* 3653).

An annual average of 576,000 mt of product was produced from groundfish taken from the BSAI and GOA between 1992 and 1999. This equated to an average utilization rate (product tons divided by reported tons) of 28%. The estimated average annual wholesale value of production was approximately $1.2 billion, between 1992 and 1999, or ,on average, approximately $583 per reported metric ton of harvest.

1.2.2.1 Inshore Processors

Inshore plants include traditional shorebased plants that process Alaska groundfish and several floating processors that are moored or anchored nearshore in protected bays and harbors. The discussion which follows addresses the activities of plants engaged in primary processing of groundfish only (i.e., it does not include plants in Alaska or elsewhere that are engaged in secondary manufacturing activities, such as converting surimi into analog products [imitation crab], or further processing of other groundfish products into ready-to-cook meals or products). Within the context of the SSL Protection Measure action, under consideration herein, 'three' groupings of the inshore processing sector are examined, based primarily on their location. The group containing Bering Sea *pollock* inshore plants is the exception, being alternatively defined principally because of the scale of these groundfish operations, compared to other processing sectors. The three inshore processing categories, which are mutually exclusive, are defined as follows:

1. Bering Sea *pollock* inshore plants. [These include the four major shorebased BSAI pollock processors in Dutch Harbor/Unalaska and Akutan. Also included are two inshore floating processors—*Arctic Enterprise* and *Northern Victor*—that have had substantial pollock history and function from a single location in state waters off Unalaska and Akutan Islands.]

2. Alaska Peninsula and Aleutian Islands inshore plants. [These include all shore plants in the Aleutians East Borough and all shore plants in the Aleutians West Census Area, excluding all Bering Sea pollock inshore plants, referenced immediately above. These plants are much smaller than the Bering Sea pollock-inshore plants, do not have the same level of focus on pollock, and in some cases produce more salmon than groundfish.]

3. Kodiak Island inshore plants. [These include all shore plants on Kodiak Island. Many of these plants focus on groundfish, but some also process salmon and halibut, and others focus on salmon and halibut, but also process some limited amounts of groundfish.]

1.2.2.2 Mothership Processors

Motherships are intermediate (in some respects) between the Inshore plants (located at a fixed site) and Catcher/Processors (discussed below), which are highly mobile, and enjoy the added capability of catching, as well as processing. [This operational classification includes all motherships operating in the EEZ, but does not include floating processors that operate exclusively within state waters.]

Motherships receive catch 'over-the-side' from a fleet of catcher vessels which (typically) do not take their catch onboard. Instead, the codend containing the catch is passed from the catcher boat to the mothership, and the latter operator hauls the fish onboard the processing platform. Motherships have, from time to time, been employed in several groundfish fisheries off Alaska (e.g., Pacific cod, flatfish), however, they are primarily involved in the Bering Sea pollock fishery.

Three motherships were in operation in 1999 (as well as in 2000). All three have ownership or business affiliations with large Japanese-owned processing companies, and are further affiliated with some of their delivering catcher vessels.

Activities of inshore processors and motherships in the North Pacific groundfish fisheries, excluding those in areas outside the range of the western Steller sea lion population, are summarized in Table C-2.

Table C-2 BSAI and GOA inshore and mothership processor activities in all groundfish fisheries, 1991-1999

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999
Groundfish Facilities and Reported Groundfish Tons (Retained and Discarded)									
Number of Facilities	70	77	66	68	66	62	61	60	61
Thousands of Metric Tons	853.2	834.4	808.5	807.4	804.7	775.6	789.7	754.3	777.6
Total Ex-vessel Value in Major Alaska Fisheries ($Millions and Percent of Total)									
Groundfish	211.3	271.3	176	209.6	263.5	230.7	267.0	183.7	NA
Non-groundfish[a]	378.7	472.4	371.1	431.0	381.1	319.1	320.9	266.4	NA
Groundfish (% of Total)	35.8	36.5	32.2	32.7	40.9	42.0	45.4	40.8	NA
Facilities Tons by Species Groups as a Percent of Total Groundfish									
Atka m. [w/RSO]	3.6	3.5	3.2	2.9	3.1	3.5	3.2	3.2	3.2
Flatfish	7.3	5.0	3.5	4.7	5.4	4.8	6.5	2.4	2.7
Pacific Cod	12.6	11.0	10.6	11.0	15.5	16.9	16.3	12.6	12.2
Pollock	76.5	80.5	82.7	81.4	76.0	74.8	74.0	81.9	81.9
Reported Tons From FMP Subareas as a Percent of Total Groundfish									
BSAI	78.2	77.9	76.0	77.5	79.7	81.6	76.1	72.6	76.8
GOA	21.8	22.1	24.0	22.5	20.3	18.4	23.9	27.4	23.2
Ex-vessel Value Paid to Catcher Vessel Types as a Percent of Total Groundfish									
AFA Trawl with CE	23.4	23.5	20.5	21.8	20.1	18.8	19.5	18.0	NA
AFA Trawl without CE	30.1	37.4	33.2	30.6	29.5	26.0	28.5	29.6	NA
60 ft Trawl ≥	7.1	7.2	7.4	5.3	5.4	6.9	7.1	7.7	NA
< 60 ft Trawl	3.5	3.3	3.6	3.3	2.4	4.4	4.9	5.0	NA
Pot	3.2	2.9	2.9	3.0	5.2	6.1	4.3	4.3	NA
Longline	8.3	5.7	5.8	6.8	13.1	13.1	12.0	11.5	NA
Fixed-gear 33–59 ft	23.4	19.3	25.5	28.3	24.0	24.2	23.4	23.5	NA
Fixed-gear ≤ 32 ft	0.6	0.6	1.1	0.9	0.3	0.5	0.4	0.5	NA
Total Production, Product Utilization Rate, Product Value, and Value Per Ton of Round Weight									
Product (1000s of Tons)	NA	231.6	223.7	239.1	252.1	244.8	244.7	234.9	253.6
Utilization Rate (%)	NA	27.8	27.7	29.6	31.3	31.6	31.0	31.1	32.6
Product Value ($millions)	NA	609.2	408.0	502.6	640.4	547.2	560.7	504.0	503.5
Value per Ton ($)	NA	730.1	504.6	622.5	795.8	705.5	710.0	668.2	647.5

Notes: AFA – American Fisheries Act.
RSO – All rockfish species, sablefish, and 'other' groundfish, as defined in Fishery Management Plans.
CE – Crab endorsement.
NA – Data not available.
Data Sources: NMFS blend data and NMFS Weekly Processor Report data.
Modified from Original Source: Chapter 3 - Draft Programmatic SEIS (NMFS 2001a).

1.2.2.3 Catcher/Processors

A catcher/processor is a fishing vessel that uses various gear types to catch fish, and then processes that catch into products onboard the vessel. American-owned catcher/processors began operating in Alaska waters in

about 1983. Five different catcher/processor sectors are identified in this analysis[5], based on predominant product or gear type. These operational sectors, which for reporting purposes here are mutually exclusive, include:

- Surimi trawl catcher/processors. These factory trawlers have the necessary processing equipment to produce surimi from pollock and other groundfish. They are generally the largest of all catcher processors.

- Fillet trawl catcher/processors. These trawl vessels have the processing equipment to produce fillets from pollock, Pacific cod, and other groundfish. They are, in general, smaller than the surimi C/P vessels.

- Head-and-gut trawl catcher/processors. These factory trawlers do not process more than incidental amount of fillets. Generally they are limited to headed and gutted (H&G) products or kirimi. In general, they do not focus their efforts on pollock, but instead target flatfish, Pacific cod, and Atka mackerel. H&G C/Ps are among the smallest of the trawl catcher processors.

- Pot catcher/processors. These vessels have been used primarily in the crab fisheries of the North Pacific and Bering Sea, but increasingly have participated in the Pacific cod fisheries. They generally use pot gear, but may also use longline gear. They produce whole or H&G groundfish products, some of which may be frozen in brine, rather than blast frozen.

- Longline catcher/processors. These vessels, also known as freezer longliners, use longline gear, and focus on Pacific cod. Most longline catcher processors are limited to H&G products and, in general, are somewhat smaller than H&G trawler C/Ps.

Activities of domestic catcher/processors in <u>all</u> North Pacific and Bering Sea groundfish fisheries are summarized in Table C-3. The number of active catcher/processors peaked at 137 in 1992, then declined to 89 in 1999. The decline in catcher/processors from 1998 to 1999 is directly related to the AFA, which removed nine trawl catcher/processors from the fishery. Earlier declines were most likely the result of declining opportunities for catcher/processors, primarily as a result of inshore-offshore pollock and Pacific cod allocations.

Between 1991 and 1998, catcher/processors harvested an average of 62% of all groundfish in the North Pacific and Bering Sea, but in 1999 catcher/processors accounted for only 52% of the total. That decline was primarily a result of the shift of BSAI pollock quotas to inshore operators, mandated by provisions of the AFA. Almost 60% of all groundfish catches reported by catcher/processors since 1991, have been composed of pollock, while flatfish accounted for more than 17%, and Pacific cod approximately 13%. On the order of 95% of all catcher/processor harvests have come from the BSAI.

Between 1992 and 1999, catcher/processors generated an average of 355,000 mt of product, with an average annual wholesale value of $712 million. The average catcher/processor generated product valued at $570 per metric ton. Over the eight years from 1992 to 1999, catcher/processors improved their average utilization rate (the proportion of product weight to round weight) from less than 24% to 32%.

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[5]Catcher/Processor definitions employed here are consistent with those used in the Draft Programmatic SEIS (NMFS 2001a).

Table C-3 BSAI and GOA catcher/processor activities in all groundfish fisheries, 1991–1999

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999
Vessels Landing Groundfish and Retained Groundfish Tons									
Number of Vessels	118	137	121	118	118	114	110	99	89
Thousands of Metric Tons	1,543	1,432	1,331	1,370	1,338	1,270	1,268	1,110	874
Reported Tons of Species Groups as a Percent of Total Groundfish									
Atka Mackerel (w/RSO)	5.6	9.7	10.9	9.5	10.5	13.0	9.8	10.1	13.5
Flatfish	13.9	17.2	17.0	18.3	16.4	18.7	23.2	18.5	18.9
Pacific Cod	10.5	13.0	10.1	10.9	14.2	13.8	15.5	14.6	16.5
Pollock	70.0	60.0	61.9	61.2	58.9	54.6	51.6	56.8	51.2
Reported Tons from FMP Subareas as a Percent of Total Groundfish									
BSAI	94.8	94.3	95.6	96.4	96.1	95.5	97.0	96.7	94.9
GOA	5.2	5.7	4.4	3.6	3.9	4.5	3.1	3.3	5.1
Total Production, Product Utilization Rate, Product Value, and Value per Ton of Round Weight									
Product (thousands of metric tons)	NA	338.8	321.5	331.3	345.7	355.1	355.3	316.4	279.6
Utilization Rate (%)	NA	23.7	24.2	24.2	25.8	28.0	28.0	28.5	32.0
Product Value ($millions)	NA	812.0	584.8	622.9	747.7	681.1	639.0	543.9	488.2
Value Per Ton ($)	NA	567.1	439.5	454.6	558.7	536.5	503.9	490.3	558.8

Notes: RSO – All rockfish species, sablefish, and 'other' groundfish, as defined.
NA – Data not available.
Sources: NMFS Blend data and NMFS Weekly Processor Report data.
Modified from Original Source: Chapter 3 - Draft Programmatic SEIS (NMFS 2001a).

The following section will examine each of the primary "*processing*" sectors in greater individual detail. Between 1991 and 1994, *groundfish* delivered to inshore processors and motherships accounted for approximately 34% of the total ex-vessel value of deliveries (i.e., groundfish and non-groundfish, such as salmon, crab, halibut, and herring). From 1995 through 1998, the relative importance of groundfish to these operators increased to more than 42% of the total ex-vessel value of all delivered harvests.

Between 1991 and 1998, inshore processors and motherships received catches which accounted for an average of 38% of all groundfish harvested in the North Pacific, with the balance accruing to at-sea processors. But in 1999, the inshore and motherships processors' share accounted for 48% of the total. The increase in 1999 is primarily a result of the shift of BSAI pollock quotas to inshore operators, under the AFA. Almost 79% of all groundfish deliveries reported by inshore and mothership processors since 1991 has been pollock, while Pacific cod accounted for more than 13%, and Atka mackerel (grouped with RSO) and flatfish species accounted for less 5.0% each. Approximately 69% of all harvests delivered to inshore processors and motherships have come from the BSAI.

Inshore processors and motherships have generated an average of 240,000 mt of product, with an average annual first wholesale value of $534 million, between 1992 and 1999. The average ton of output produced by inshore processors and motherships has generated a price of $670.00. Over an 8-year period, inshore processors and motherships improved their utilization rate (the proportion of product weight to round weight) from less than 27.8% in 1992, to 32.6% in 1999.

In the BSAI, WGOA and CGOA management areas, 29 facilities contributed to the inshore and mothership processing total, in 1999. The six Bering Sea *pollock* inshore plants were the most substantial contributors, producing 53% of the estimated total wholesale value. Processors in Kodiak accounted for an estimated 15% of the wholesale value. Shore plants in south-central Alaska reported only 1.5% of total catch by volume, but because of their focus on high-value species, generated 5.0% of total value. Motherships generated 8.0%

of the total processed product value of these combined sectors, accounting for approximately 13% of the total harvest.

Bering Sea 'Pollock' Inshore Plants

Description of this Operational Category

These facilities include the major onshore plants at Unalaska/Dutch Harbor and Akutan, as well as the two large floating pollock processing platforms that are typically anchored near Unalaska Island. These shorebased and nearshore plants are the primary markets for groundfish catcher vessels operating in the BSAI, particularly those harvesting pollock. The plants operate year-round, processing almost all species harvested in the Bering Sea, Aleutian Islands, and western GOA FMP subareas. Pollock is the largest species processed at these plants, in both volume and value. Pacific cod is the next most important groundfish species, with flatfish and sablefish representing much smaller proportions of harvest and value. These plants also process large amounts of crab from the BSAI, substantial amounts of halibut, but very little salmon.

Participation in Groundfish Fisheries

Inshore plants processing Bering Sea pollock are summarized in Table C-4. From 1991 through 1999, six Bering Sea pollock inshore plants were in operation—three at Dutch Harbor, one at Akutan, and two floating processors. From 1992 to 1999, five of the six plants produced surimi. While all the facilities have the capacity to produce fillets, three have a much more significant history in fillet production and tend to produce pollock and Pacific cod fillets. The other three process much higher percentages of surimi and tend to produce headed and gutted or salted products, rather than fillets, from Pacific cod. In 1999, these processors received deliveries in excess of 477,400 round weight tons of groundfish. Pollock accounted for 90% of this total and Pacific cod accounted for 8.0%. Between 1991 and 1999, all six processors reported receiving fish from the Bering Sea every year. In addition, most processors reported receiving fish every year from the Aleutian Islands, western GOA, and central GOA management areas. In 1999, approximately 99% of the groundfish processed in the Bering Sea pollock inshore sector came from the eastern Bering Sea.

Ex-vessel Payments to Catcher Vessels

Bering Sea pollock inshore processors historically have purchased more groundfish than non-groundfish species from catcher vessels. The percentage of total ex-vessel value paid for groundfish has fluctuated between 50% and 70% of total ex-vessel payments, for the period 1991–1998. Approximately 57% of the total ex-vessel payments in 1998 were for groundfish species. Crab, which accounted for 40% of the total ex-vessel value paid to catcher vessels in 1998, is the other important species for this operational category of Bering Sea inshore processors. Total ex-vessel payments for groundfish in the sector were almost $75 million, in 1998. The total wholesale gross product value for these plants from groundfish resources, in 1999, was equal to $268 million. Half of this total value came from surimi.

Table C-4 Bering Sea pollock inshore plants, 1991–1999

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999
Groundfish Facilities and Reported Groundfish Tons (Retained and Discarded)									
Number of Facilities	6	6	6	6	6	6	6	6	6
Thousands of Metric Tons	527.7	474.3	477.0	493.3	494.0	474.5	462.0	417.9	477.4
Total Ex-vessel Value in Major Alaska Fisheries ($Millions and Percent of Total)									
Groundfish	82.9	128.2	70.6	85.6	111.6	90.4	105.6	68.5	NA
Non-groundfish[a]	65.7	68.8	68.5	58.1	52.7	44.6	44.4	52.8	NA
Groundfish (% of Total)	55.8	65.1	50.8	59.6	67.9	66.9	70.4	56.5	NA
Facilities Tons by Species Groups as a Percent of Total Groundfish									
Flatfish	3.6	2.3	1.7	3.7	3.8	3.6	6.0	1.5	1.6
Atka mackerel [w/RSO]	1.2	0.9	0.6	0.5	0.7	0.9	0.9	0.9	0.5
Pacific Cod	9.5	6.2	6.8	8.3	11.2	12.3	12.1	9.4	7.7
Pollock	85.7	90.6	90.9	87.5	84.3	83.2	81.0	88.2	90.2
Reported Tons from FMP Subareas as a Percent of Total Groundfish									
Aleutian Islands	1.4	3.3	3.8	3.9	3.9	2.5	1.9	2.0	0.1
Bering Sea	91.0	91.7	92.3	94.2	92.2	97.1	95.0	95.5	99.2
Western GOA	7.5	3.8	2.5	1.6	3.7	0.3	2.9	2.2	0.6
Central GOA	0.1	1.2	1.4	0.4	0.2	0.1	0.2	0.3	0.1
Eastern GOA	0.0	b	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ex-vessel Value Paid to Vessel Types as a Percent of Total Groundfish									
Trawl AFA with CE	42.9	38.0	39.8	41.4	36.8	38.2	38.6	36.6	NA
Trawl AFA without CE	45.6	53.4	54.7	53.1	53.3	51.0	51.7	55.6	NA
Trawl ≥ 60 ft	5.2	4.0	2.1	1.9	1.6	2.2	1.6	0.4	NA
TCV < 60 ft	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.1	NA
Pot	0.6	1.3	1.0	2.5	4.7	6.1	5.1	5.0	NA
Longline	2.8	1.7	1.3	0.7	2.4	1.6	2.3	1.7	NA
Fixed-gear 33–59 ft	2.1	1.3	1.0	0.4	1.1	0.8	0.6	0.4	NA
Fixed-gear ≤ 32 ft	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.1	NA
Total Production, Product Utilization Rate, Product Value, and Value per Ton of Round Weight[c]									
Product (thousands of metric tons)	NA	141	137.3	160.3	168.2	160.5	155.2	144.4	164.8
Utilization Rate (%)	NA	29.7	28.8	32.5	34.1	33.8	33.6	34.5	34.5
Product Value ($millions)	NA	337.4	185.3	259.8	340.4	286.5	283.9	253.9	268.4
Value per Ton ($)	NA	711.4	388.5	526.7	689	603.8	614.5	607.6	562.2

Notes: [a]Salmon, crab, halibut, and other.
[b]Number cannot be released because of confidentiality restrictions. Estimate was added to central GOA total.
[c]Production data for inshore plants in 1991 were incomplete, therefore estimates for 1991 are not available.
AFA – American Fisheries Act.
RSO – All rockfish species, sablefish, and other groundfish, as defined.
CE – Crab endorsement.
NA – Data not available.

Sources: NMFS Blend data and NMFS Weekly Processor Report data.
Modified from Original Source: Chapter 3 - Draft Programmatic SEIS (NMFS 2001a).

Alaska Peninsula and Aleutian Islands Inshore Plants

Description of this Operational Category

This sector includes inshore plants located along the Alaska Peninsula, and in the Aleutian Islands, and Pribilof Islands, that process groundfish from the BSAI management areas. The geographic area extends from Chignik, westward to Adak, and north to Saint Paul Island. This group of processing facilities also includes several smaller non-AFA plants in Unalaska/Dutch Harbor. These facilities were separated from the former group because of their substantially lower processing capacity, compared to the Bering Sea *pollock* inshore plants category, and the differences in primary target species.

Participation in Groundfish Fisheries

Inshore plants processing groundfish on the Alaska Peninsula and Aleutian Islands are summarized in Table C-5. In 1999, there were ten Alaska Peninsula and Aleutian Islands inshore plants participating in the groundfish fishery. Between 1991 and 1999, the number ranged from six to ten facilities. Over the same period, almost all of these operations reported receiving fish every year from the BSAI management area. Most of these processors also reported receiving fish from the western and central GOA management areas. In 1999, these facilities processed 66,635 round weight mt, of which 43,646 mt (66%) was pollock and 19,402 mt (30%) was Pacific cod. Also in 1999, 36,652 mt (55% of the total) came from the western GOA and 21,643 mt (32%) came from the BSAI.

Ex-vessel Payments to Catcher Vessels and Product Value

Each year, from 1991 through 1998, groundfish accounted for less than 30% of ex-vessel value for these operations. In 1998, crab accounted for 44% of total ex-vessel value and salmon accounted for 30%, while groundfish (all species) accounted for only 23% of the total. Total ex-vessel payments for groundfish in the Alaska Peninsula and Aleutian Islands sector were less than $20 million in 1998. Total groundfish product value was estimated to be $50 million in 1998 and $57 million in 1999. In 1999, 21% of the total groundfish product value came from head-and-gut and whole products, while 79% of the total product value came from fillets, surimi, roe, and other products.

Alaska Peninsula and Aleutian Islands facilities tend to buy more of their fish from trawl catcher vessels than from other gear types. In 1998, for example, trawl catcher vessels received roughly 70% of the total ex-vessel value paid for groundfish, by this sector (with the under 60-ft LOA vessels being the largest single recipient).

Table C-5 Alaska Peninsula and Aleutian Islands inshore plants, 1991–1999

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999
Groundfish Facilities and Reported Groundfish Tons (Retained and Discarded)									
Number of Facilities	7	8	7	7	7	6	7	7	10
Thousands of Metric Tons	33.3	44.0	57.2	58.3	73.2	73.7	70.5	68.6	66.6
Total Ex-vessel Value in Major Alaska Fisheries ($Millions and Percent of Total)									
Groundfish	14.4	16.4	12.2	13.0	21.3	22.5	22.2	16.7	NA
Non-groundfisha	78.8	107.0	92.3	111.9	98.3	60.4	59.0	56.4	NA
Groundfish (% of Total)	15.5	13.3	11.7	10.4	17.8	27.1	27.4	22.8	NA
Facilities Tons by Species Groups as a Percent of Total Groundfish									
Flatfish	8.2	4.6	3.3	5.2	1.8	2.4	2.2	1.2	2.7
Atka Mackerel [w/RSO]	6.6	3.8	1.8	1.4	1.8	1.9	1.4	2.0	2.6
Pacific Cod	68.6	63.7	39.7	37.6	27.6	42.5	38.2	31.8	29.1
Pollock	16.7	27.9	55.2	55.9	68.8	53.2	58.2	65.0	65.5
Reported Tons from FMP Subareas as a Percent of Total Groundfish									
BSAI	17.0	29.9	51.1	38.6	54.4	37.9	27.1	15.0	32.5
Western GOA	63.3	45.0	35.4	37.1	34.2	50.6	b	b	55.0
Central GOA	19.7	25.0	13.5	24.2	11.3	11.5	72.9	85.0	12.5
Eastern GOA	b	0.0	0.0	0.0	0.0	0.0	b	b	b
Ex-vessel Value Paid to Vessel Types as a Percent of Total Groundfish									
Trawl AFA with CE	11.8	6.0	9.5	18.1	25.9	15.0	15.4	11.9	NA
Trawl AFA without CE	15.7	23.6	29.1	22.4	21.3	15.4	15.6	16.3	NA
Trawl ≥ 60 ft	9.6	11.2	15.7	7.6	4.5	6.6	6.5	8.0	NA
TCV < 60 ft	32.4	35.1	33.1	35.8	15.9	28.9	40.3	37.2	NA
Pot	4.3	4.7	2.1	3.3	9.1	14.0	6.1	2.3	NA
Longline	13.1	8.4	5.9	6.3	12.3	10.4	5.1	7.1	NA
Fixed-gear 33–59 ft	12.8	10.7	4.5	5.3	10.5	9.2	10.6	16.8	NA
Fixed-gear ≤ 32 ft	0.2	0.3	0.1	1.2	0.3	0.4	0.4	0.4	NA
Total Production, Product Utilization Rate, Product Value, and Value per Ton of Round Weight[c]									
Product (thousands of metric tons)	NA	12.1	15.3	12.5	15	17.1	21	20.9	26.2
Utilization Rate (%)	NA	27.5	26.8	21.4	20.5	23.3	29.8	30.4	39.3
Product Value ($millions)	NA	36.6	32.6	31.5	46.2	45.2	46.6	50.4	56.7
Value per Ton ($)	NA	830	569	540.7	631.7	612.5	661.1	735.3	851.6

Notes: [a]Salmon, crab, halibut, and other.
[b]Number cannot be released due to confidentiality restrictions. Estimate was added to central GOA total.
[c]Production data for inshore plants in 1991 was incomplete, therefore estimates for 1991 are not available.
AFA – American Fisheries Act..
RSO – All rockfish species, sablefish, and 'other' groundfish, as defined.
CE – Crab endorsement.
NA – Data not available.

Sources: NMFS Blend data and NMFS Weekly Processor Report Data.
Modified from Original Source: Chapter 3 - Draft Programmatic SEIS (NMFS 2001a).

Kodiak Island Inshore Plants

Description of this Operational Category

This sector includes processing facilities on Kodiak Island. Inshore plants on Kodiak Island processing groundfish are summarized in Table C-6. While there has been year-to-year variation, the number of Kodiak Island plants processing groundfish has generally trended down over the period 1991 to the present. In 1999, there were ten facilities processing groundfish; in 1998, there were only nine, but in 1992, there were as many as fifteen.

Participation in Groundfish Fisheries

Most plants process all four of the major species groups, e.g., pollock, Pacific cod, Atka (w/RSO), and flatfish, every year, although the number of plants processing pollock is generally smaller than the number processing other species. In 1999, all of the facilities processed Pacific cod and the Atka (w/RSO) group. In addition, nine of the ten processed pollock and flatfish. In total, these ten facilities processed 101,354 round weight mt of groundfish in 1999; 51% of which was pollock and 30% of which was Pacific cod. All of the plants receive fish from the central GOA management area every year. Most of the plants also receive fish from the western GOA (and eastern GOA) management areas.

Ex-vessel Payments to Catcher Vessels by and Product Value

From 1991 through 1998, groundfish accounted for less than 50% of total ex-vessel value each year, though the percentage increased from just over 30% in 1991. In 1998, groundfish accounted for 46% of the total ex-vessel value in the Kodiak sector, salmon accounted for 39%, and halibut accounted for 11%. Total ex-vessel payments for groundfish were less than $30 million, in 1998. Total groundfish product value was estimated to be $70 million in 1998 and $74 million in 1999. Approximately 62% of the wholesale production value of groundfish products, in 1999, came from fillets and 14% came from surimi.

A greater share of the total ex-vessel payments from Kodiak inshore plants went to trawls, than to other vessel gear types, although fixed-gear vessels (primarily those 33'–59' LOA) also accounted for a significant portion of total ex-vessel value. In 1998, for example, trawl catcher vessels received just over 60% of the total ex-vessel payments in the Kodiak sector.

Table C-6 Kodiak Island inshore plants, 1991–1999

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999
Groundfish Facilities and Reported Groundfish Tons (Retained and Discarded)									
Number of Facilities	14	15	14	12	11	9	9	9	10
Thousands of Metric Tons	83.0	92.2	111.9	98.9	76.8	66.0	83.7	96.8	101.4
Total Ex-vessel Value in Major Alaska Fisheries ($Millions and Percent of Total)									
Groundfish	30.2	32.9	26.9	26.0	28.7	25.9	30.7	25.7	NA
Non-groundfish[a]	64.1	57.0	49.2	44.7	59.0	42.0	37.1	31.0	NA
Groundfish (% of total)	32.0	36.6	35.4	36.8	32.7	38.1	45.3	45.3	NA
Facilities Tons by Species Groups as a Percent of Total Groundfish									
Flatfish	16.1	16.0	15.0	13.0	16.2	23.0	18.2	8.7	8.5
Atka Mackerel (w/RSO)	7.0	6.3	5.6	4.5	6.6	12.6	9.4	7.7	9.7
Pacific Cod	27.5	18.5	19.8	16.2	40.9	35.8	34.9	24.8	30.3
Pollock	49.4	59.2	59.6	66.3	36.3	28.6	37.5	58.8	51.4
Reported Tons from FMP Subareas as a Percent of Total Groundfish									
BSAI	0.2	5.9	1.7	0.6	0.3	0.5	0.0	0.0	0.1
Western GOA	0.5	0.1	b	b	0.8	0.2	b	b	b
Central GOA	99.3	93.9	98.3	92.9	97.9	98.9	99.6	99.7	99.7
Eastern GOA	0.1	0.1	b	6.6	1.0	0.4	0.4	0.3	0.2
Ex-vessel Value Paid to Vessel Types as a Percent of Total Groundfish									
Trawl AFA with CE	4.1	5.5	5.9	8.0	3.4	2.7	3.7	5.7	NA
Trawl AFA without CE	34.0	31.5	30.8	29.4	19.1	14.4	23.3	22.8	NA
Trawl ≥ 60 ft	19.1	24.5	26.2	23.5	27.6	33.4	34.4	33.6	NA
Trawl < 60 ft	3.4	4.1	4.4	4.6	6.5	8.7	4.8	4.4	NA
Pot	10.7	7.5	7.5	7.6	10.7	10.2	5.2	9.1	NA
Longline	9.2	6.6	7.5	7.7	11.5	11.4	10.2	6.3	NA
Fixed-gear 33–59 ft	19.3	19.8	17.6	18.9	21.0	17.3	17.6	17.1	NA
Fixed-gear ≤ 32 ft	0.3	0.5	0.2	0.3	0.2	1.8	0.8	1.0	NA
Total Production, Product Utilization Rate, Product Value, and Value per Ton of Round Weight[c]									
Product (thousands of metric tons)	NA	23.9	28.9	25.8	24.3	20.5	21.5	24.1	27.7
Utilization Rate (%)	NA	26	25.8	26.1	31.6	31	25.7	24.9	27.3
Product Value ($millions)	NA	69	72.3	77.5	84	63.4	62.9	70.4	74
Value per Ton ($)	NA	748.4	645.8	783.9	1,093.7	960.5	751.5	727.2	729.9

Notes: [a]Salmon, crab, halibut, and other.
[b]Number cannot be released because of confidentiality restrictions. Estimate was added to central GOA total.
[c]Production data for inshore plants in 1991 were incomplete, therefore estimates for 1991 are not available.
AFA – American Fisheries Act.
RSO – All rockfish species, sablefish, and other groundfish, as defined.
CE –Crab endorsement.
NA – Data not available.

Sources: NMFS Blend data and NMFS Weekly Processor Report data.
Modified from Original Source: Chapter 3 - Draft Programmatic SEIS (NMFS 2001a).

Motherships

Description of this Operational Category

This processor category was identified separately from the others above, because vessels in this category form a distinct processing sector (not only operationally, but under regulation, e.g., AFA). Motherships are highly mobile operations, which move freely in the EEZ, along with a small fleet of trawl catcher vessels which provides raw fish to the onboard processing lines.

Participation in Groundfish Fisheries

Mothership participation in the groundfish fisheries is summarized in Table C-7. In 1999, there were three motherships participating in the region's groundfish fisheries. This number is down considerably from a high of 12 in 1991, and from 7 in 1995. In recent years, all motherships participating in the fishery reported processing all major species of groundfish. All the ships reported receiving fish from the Bering Sea Aleutian Islands, while only a portion reported receiving fish from the GOA. This processing sector does not participate, to any significant degree, in other non-groundfish fisheries. In 1999, motherships processed 101,384 mt of groundfish, 100,388 mt of which (99%) was pollock. Confidentiality constraints make it impossible to report exactly what percentage of the volume came from the BSAI and what came from the GOA areas.

Table C-7 Motherships, 1991–1999

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999
Groundfish Facilities and Reported Groundfish Tons (Retained and Discarded)									
Number of Facilities	10	12	4	5	7	6	4	4	3
Thousands of Metric Tons	177.4	187.3	125.1	119.0	128.9	132.7	133.8	129.3	101.4
Total Ex-vessel Value in Major Alaska Fisheries ($Millions and Percent of Total)									
Groundfish	25.4	41.2	17.8	17.8	22.5	21.4	25.8	17.9	NA
Non-groundfish[a]	NA	NA	NA	NA	NA	NA	NA	NA	NA
Groundfish (% of Total)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Facilities Tons by Species Groups as a Percent of Total Groundfish									
Flatfish	14.6	6.5	0.2	2.3	7.5	1.2	1.9	0.3	0.5
Atka Mackerel (w/RSO)	1.1	1.6	0.2	0.1	0.3	0.2	0.2	0.0	0.1
Pacific Cod	2.6	4.7	0.6	2.4	6.2	6.2	6.3	1.0	0.4
Pollock	81.7	87.2	99.0	95.2	86.0	92.4	91.5	98.7	99.0
Reported Tons from FMP Subareas as a Percent of Total Groundfish									
BSAI	98.1	96.4	100.0	100.0	98.1	99.3	100.0	100.0	100.0
GOA	1.9	3.6	c	c	1.9	0.7	c	0.0	c
Ex-vessel Value Paid to Catcher Vessel Types as a Percent of Total Groundfish									
Trawl AFA with CE	59.9	44.4	45.1	52.7	53.3	46.7	49.8	51.9	NA
Trawl AFA without CE	27.2	38.8	44.2	38.0	40.6	46.3	47.6	47.9	NA
Trawl ≥ 60 ft	12.9	16.8	10.7	9.3	6.1	6.9	2.6	0.2	NA
Trawl < 60 ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA
Pot	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA
Longline	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA
Fixed-gear 33–59 ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA
Fixed-gear ≤ 32 ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA
Total Production, Product Utilization Rate, Product Value, and Value per Ton of Round Weight[c]									
Product (thousands of metric tons)	NA	39.5	27	26.2	30.5	33.1	29.9	26.6	21.1
Utilization Rate (%)	NA	21.1	21.6	22	23.6	24.9	22.3	20.6	20.8
Product Value ($millions)	NA	100.2	45.2	54.2	80.2	70.6	75.9	50.6	40.1
Value per Ton ($)	NA	535.2	361.3	455.2	622.3	532.3	567.2	391.3	395.2

Notes: [a]Motherships may have participated in non-groundfish fisheries, but data for ex-vessel values of deliveries of non-groundfish species were not available. Motherships are also known to participate in the Pacific whiting fishery.
[b]Number cannot be released because of confidentiality restrictions. Estimate was added to BSAI total.
[c]Production data for motherships in 1991 was to be incomplete, therefore estimates for 1991 are not available.
AFA – American Fisheries Act.
RSO – All rockfish species, sablefish, and other groundfish, as defined.
CE – Crab endorsement.
NA – Data not available.

Sources: NMFS Blend data and NMFS Weekly Processor Report data.
Modified from Original Source: Chapter 3 - Draft Programmatic SEIS (NMFS 2001a).

Catcher/Processors

Catcher/processor activities, by operational class, for 1999, are summarized in Table C-8. Of 89 catcher/processors, 40 were trawl catcher/processors, and 49 used longlines or pots. The 12 surimi trawl catcher/processors had the highest total catch and generated more than 40% of the estimated total wholesale value. H&G trawler catcher/processors generated 31% of total wholesale value, among C/Ps. Longline catcher/processors accounted for 44% of the vessels, and 21% of total wholesale value.

Table C-8 BSAI and GOA catcher/processor activities, 1999

Catcher/Processor	Vessel Counts	Reported Harvest—Retained and Discarded (Thousands of Metric Tons)				Wholesale Value ($Millions)
Vessel Category		Pollock	Pacific Cod	Atka Mackerel (w/RSO)	Flatfish	
Surimi Trawl	12	333.8	3.2	1.7	14.9	199.0
Fillet Trawl	4	79.8	9.9	0.3	1.0	55.2
H&G Trawl	24	29.4	28.1	98.4	143.2	124.3
Longline	40	3.9	95.5	17.0	6.0	102.7
Pot	9	0.0	7.4	0.1	0.0	7.0
All Catcher/ Processors Total	89	446.9	144.1	117.5	165.1	488.2

Notes: RSO – All rockfish species, sablefish, and 'other' groundfish, as defined.
Modified from Original
Source: Chapter 3 - Draft Programmatic SEIS (NMFS 2001a).

Each catcher/processor operational category is described in more detail in the following subsections. The summary profiles are condensed versions of detailed profiles (found in Northern Economics August 2000).

Surimi Trawl Catcher/Processors

Description of this Operational Category

Surimi trawl catcher/processors range from 224' to 386' LOA, have an average rating of more than 500 gross tons, 6,200 horsepower, and are capable of harvesting 400 mt or more of fish daily, producing 100 mt or more of frozen surimi or fillets per day. They typically have a full processing deck below the main deck, plus a lower deck of freezer holds. The size of these vessels enables them to continue to operate, even during very poor weather and sea conditions.

These vessels now operate in a pollock cooperative, under provisions of the AFA, which, along with the resulting quasi-property rights, allows them to modify operations in terms of when they fish and what they process, to better account for changing weather/sea conditions , condition of the fish, markets, bycatch considerations, and management restrictions.

Participation in Groundfish Fisheries

In 1999, 12 of these vessels reported groundfish landings in the BSAI, down from a high of 20 in the early and mid-1990s (Table C-9). This reduction was due to a combination of excess capacity in pollock surimi production, reduced offshore sector quotas, and vessel decommissioning under the AFA. All 12 vessels reported harvests in all four groundfish species groups. This fact is primarily a function of incidental catches

of other species within the pollock fishery, rather than targeted efforts for non-pollock species (as may be observed from the reported volumes, cited in Table C-9).

Groundfish Landings by Species

In 1991, vessels in this group processed 756,268 round weight tons, and in 1999, only 353,587 round weight tons. Pollock typically accounted for 90% or more of total tons reported. In 1999, for example, pollock represented 94% of total tons (up from 90% in 1998). Total wholesale production value fluctuated between $193 million in 1998 and $397 million in 1992. Total wholesale product value of groundfish resources in 1999, was $199 million, with surimi at $90 million, fillets at $61 million, and pollock roe at $33 million.

Table C-9 Surimi trawl catcher/processors

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999
Vessels Landing Groundfish and Retained Groundfish Tons									
Number of Vessels	19	20	18	20	20	18	16	16	12
Thousands of Metric Tons	756.3	669.9	513.9	601.2	586.1	507.4	480.7	452.5	353.6
Reported Tons of Species Groups as a Percent of Total Groundfish									
Flatfish	2.8	3.6	4.0	5.7	6.3	10.3	7.5	6.2	4.2
Atka Mackerel (w/RSO)	1.4	2.1	0.6	2.1	2.2	2.1	3.0	2.1	0.5
Pacific Cod	2.2	1.7	1.3	1.7	2.7	1.5	0.9	1.4	0.9
Pollock	93.6	92.6	94.1	90.5	88.7	86.1	88.7	90.3	94.4
Reported Tons from FMP Subareas as a Percent of Total Groundfish									
Aleutian Islands	11.1	6.8	6.4	8.2	9.1	4.9	5.4	5.2	0.4`
Bering Sea	86.8	92.7	93.6	91.8	90.8	95.0	94.6	94.8	99.6
GOA	2.2	0.5	0.1	0.0	0.1	0.2	0.0	0.0	0.0
Total Production, Product Utilization Rate, Product Value, and Value per Metric Ton of Round Weight									
Product (thousands of metric tons)	NA	119.2	95.5	120.2	125.7	115.7	103.2	98.3	93.0
Utilization Rate (%)	NA	17.8	18.6	20.0	21.4	22.8	21.5	21.7	26.3
Product Value ($millions)	NA	397.4	200.0	257.5	351.3	246.9	259.1	192.8	199.0
Value per Metric Ton ($)	NA	593.3	389.2	428.3	599.4	486.7	538.9	426.0	562.9

Notes: [a]Includes skipper, crew, and support staff.
[b]Includes estimates for residents of other regions.
RSO – All rockfish species, sablefish and 'other' groundfish, as defined.
NA – Data not available.
Sources: NMFS Blend data and NMFS Weekly Processor Report data.
Modified from original source: Chapter 3 - Draft Programmatic SEIS (NMFS 2001a).

Fillet Trawl Catcher/Processors

Description of this Operational Category

Fillet trawl catcher/processors are defined as a distinct sector because they do not have the capability to produce surimi, and because of their focus on (generally) higher value, but more labor-intensive, fillet production.

Vessels in this fleet average 240 ft LOA (second in size only to surimi vessels), and average more than 460 gross tons and 4,200 horsepower. They are equipped with a full processing deck below the main deck, plus a lower deck of freezer holds (similar to surimi trawl catcher/processors). Because they rely almost entirely on fillet production, they target larger pollock, found at the bottom of the water column. Reportedly, smaller fish cannot be easily utilized by fillet operations and are often made into fishmeal and oil (because discarding them is no longer an option under IR/IU). The sector's requirement for larger fish also makes it more likely

that these vessels will have greater incidental catches of non-pollock species, although with the requirement that only pelagic gear may be used to harvest pollock, bycatch rates are "relatively low", as compared to most other trawl fisheries.

Participation in Groundfish Fisheries

Four fillet catcher/processors reported landings in 1999, roughly one-fifth of the peak number of 21 in 1993. The AFA (which allows these vessels to add capacity to produce fillets) and declining quotas for the offshore sector (resulting from inshore-offshore allocations) were factors that combined to reduce the number of vessels in this category. Because of fishing season regulations in the BSAI FMPs, fillet catcher/processors operate from mid-January through March or April, and then again from July through October. All vessels reporting landings from 1991 through 1999 reported landings of all four groundfish species groups.

Groundfish Landings by Species

These vessels processed 467,323 round weight tons of groundfish in 1991. Production declined steadily from 1991 through 1999, with 90,963 round weight tons reported in 1999 (Table C-10). Pollock typically accounted for almost 90% of total tons reported. In 1999, pollock accounted for 88 of total tons. Total wholesale product value of groundfish output was $171 million in 1991, and declined steadily until 1999, when total value was $55 million. In 1999, fillets accounted for $42 million of total product value (for groundfish resources), and minced products accounted for $7 million.

Table C-10 Fillet trawl catcher/processor, 1991-1999

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999
Vessels Landing Groundfish and Retained Groundfish Tons									
Number of Vessels	23	18	21	15	13	14	13	12	4
Thousands of Metric Tons	467	350	411	306	277	264	243	222	91
Reported Tons of Species Groups as a Percent of Total Groundfish									
Flatfish	15.2	21.8	12.1	12.6	8.6	6.6	11.6	2.2	1.1
Atka Mackerel (w/RSO)	6.2	8.8	8.3	2.0	1.6	2.3	1.5	2.1	0.4
Pacific cod	7.7	10.8	7.3	6.7	8.7	10.0	11.2	8.0	10.8
Pollock	70.9	58.7	72.4	78.7	81.2	81.1	75.8	87.7	87.7
Reported Tons from FMP Subareas as a Percent of Total Groundfish									
Aleutian Islands	5.5	8.3	9.6	4.0	4.2	5.2	8.8	7.4	10.0
Bering Sea	88.6	88.1	87.7	94.7	93.4	91.3	89.5	90.5	90.0
GOA	6.0	3.5	2.7	1.2	2.4	3.5	1.8	2.1	0.0
Total Production, Product Utilization Rate, Product Value, and Value per Metric Ton of Round Weight									
Product (thousands of metric tons)	NA	70.9	83.3	57.9	49.5	53.1	47.7	44.2	20.7
Utilization Rate (%)	NA	20.3	20.3	18.9	17.9	20.1	19.6	19.9	22.8
Product Value ($Millions)	NA	171.6	165.7	125.7	128.9	137	122.1	114.9	55.2
Value per Ton ($)	NA	490.3	403.2	411.3	465.3	518.8	502.8	517.9	606.5

Notes: RSO – All rockfish species, sablefish, and 'other' groundfish, as defined.
NA – Data not available.
Sources: NMFS Blend data and NMFS Weekly Processor Report data.
Modified from Original Source: Chapter 3 - Draft Programmatic SEIS (NMFS 2001a).

Head-and-Gut Trawl Catcher/Processors

Description of this Operational Category

The head-and-gut sector is the only trawl catcher/processor group that does not focus on pollock. This fleet typically targets flatfish species, such as yellowfin sole and rock sole, with primarily Atka mackerel and rockfish and Pacific cod important secondary target species. Vessels average 170 ft LOA and have an average rating of about 370 gross tons and 1,700 horsepower. Below the fishing deck is the fish processing deck, with plate freezers, where the catches are headed, gutted, cleaned, sized, and frozen into blocks, each weighing about 40 lbs. Freezer holds on the vessels can store 200 mt to 500 mt of frozen product.

Participation in Groundfish Fisheries

The number of head-and-gut catcher/processors decreased from 28 in 1992 to 24 in 1999, or about a 15% decline. With few exceptions, these vessels process all four major species groups on an annual basis. The Bering Sea is clearly the focus of these vessels' harvests, but most traditionally also participate to some extent in the Aleutian Islands, western GOA, and central GOA FMP areas. Many fewer head-and-gut catcher/processors participate in the eastern GOA. These vessels target a number of species and operate for longer periods during the fishing year, than the surimi and fillet vessels, which focus on pollock. A fishing rotation in this sector might include: Atka mackerel and pollock (for roe) in January; rock sole in February; rock sole, Pacific cod, and flatfish in March; rex sole in April; yellowfin sole and turbot in May; yellowfin sole in June; rockfish in July; and yellowfin sole and some Atka mackerel from August to December. The target fisheries are usually limited by bycatch regulations or market constraints. Only rarely are these vessels able to catch the entire TAC of target species, available to them.

Groundfish Landings by Species

Vessels in this fleet reportedly harvested 299,057 round weight tons of groundfish in 1999, 48% of which was flatfish and 33% of which was Atka mackerel (w/RSO) (Table C-11). Reported harvests in recent years ranged from 351,533 round weight tons in 1994, to 216,369 round weight tons in 1991. Fish from the Bering Sea and Aleutian Islands subareas constitute most head-and-gut activities. In 1999, approximately 63% of the reported tons were harvested in the Bering Sea FMP subarea and 26% in the Aleutian Islands subarea. The head-and-gut fleet generated a total wholesale value of $124 million in 1999, with head-and-gut products accounting for 67% (approximately $82 million) of the total.

Table C-11 Head-and-Gut Trawl Catcher/Processors, 1991–1999

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999
Vessels Landing Groundfish and Retained Groundfish Tons									
Number of Vessels	30	28	26	26	31	28	30	23	24
Thousands of metric tons	216	275	309	352	339	367	382	298	299
Reported Tons of Species Groups as a Percent of Total Groundfish									
Flatfish	54.5	51.8	47.8	49.6	44.9	43.8	58.0	54.6	47.9
Atka mackerel (w/RSO)	16.5	28.5	30.0	27.3	32.0	37.0	23.5	27.0	32.9
Pacific cod	11.7	8.5	9.0	8.5	11.3	8.7	8.3	10.2	9.4
Pollock	17.2	11.2	13.3	14.7	11.7	10.5	10.2	8.2	9.8
Reported Tons from FMP Subareas as a Percent of Total Groundfish									
Aleutian Islands	9.5	14.3	23.6	22.3	27.1	34.4	18.7	22.9	26.5
Bering Sea	75.8	66.2	64.2	66.9	62.3	54.7	73.9	68.1	63.2
Western GOA	4.7	6.7	2.7	1.7	1.3	1.7	1.5	1.8	2.4
Central GOA	9.4	10.5	8.6	8.3	8.2	8.2	5.0	6.7	7.2
Eastern GOA	0.7	2.3	0.9	0.9	1.1	1.0	0.9	0.6	0.7
Total Production, Product Utilization Rate, Product Value, and Value per Metric Ton of Round Weight									
Product (thousands of metric tons)	NA	93.7	107.1	110.1	117.6	133.6	141	121.1	114.2
Utilization Rate (%)	NA	34.1	34.6	31.3	34.7	36.4	36.9	40.6	38.2
Product Value ($Millions)	NA	139.7	143.4	155.5	174.8	197.6	161.3	122.9	124.3
Value per Ton ($)	NA	508	463.8	442.4	515.2	538.1	421.9	412.4	415.5

Notes: RSO – All rockfish species, sablefish and 'other' groundfish, as defined.
NA – Data not available.
Sources: NMFS blend data and NMFS Weekly Processor Report data.
Modified from Original Source: Chapter 3 - Draft Programmatic SEIS (NMFS 2001a).

Pot Catcher/Processors

Description of this Operational Category

Vessels in the pot catcher/processor sector use predominantly pot gear to harvest Bering Sea and GOA groundfish, but primarily Bering Sea crab. Groundfish harvest and production are typically secondary activities. Vessels average about 135 ft LOA, have an average rating of about 400 gross tons and 1,250 horsepower, and are equipped with deck cranes for moving crab pots. Most pot vessel owners use their pot gear for harvesting groundfish. However, some owners change gear and participate in longline fisheries. These vessels typically have a processing deck and freezer holds, which enable them to process and freeze groundfish harvests.

Participation in Groundfish Fisheries

The number of pot catcher/processors participating in the groundfish fishery has varied over the past 9 years, reaching a peak of 14 vessels in 1992 and a low of 3 vessels in 1993 and 1994 (Table C-12). Their success in the crab fisheries influences the number participating in the groundfish fishery. In poor crab seasons, more vessels participate in groundfish fisheries. In recent years, the historically high prices of Pacific cod have made the groundfish fishery more attractive: in 1999, nine of these vessels processed groundfish. Pot catcher/processors tend to target Pacific cod and harvest other groundfish species as bycatch. In recent years, the number of vessels processing flatfish (eight in 1999) exceeded the number processing pollock (four in 1999), but trailed the number reporting Pacific cod and Atka mackerel (w/RSO) (nine in 1999 for both). Nearly all pot catcher/processors are active in the Bering Sea, while only one-third to two-thirds of them are active in other FMP areas (Table C-12).

Groundfish Landings by Species

Pacific cod accounts for the largest volume of species harvested, nearly 98% of groundfish harvests in some years. In 1999, pot catcher/processors reported 7,420 round weight tons of Pacific cod (98% of the total harvest), 108 round weight tons of Atka mackerel (w/RSO) (roughly 1.0% of the total), 36 round weight tons of flatfish, and 9 round weight tons of pollock. In most years, most of the harvest comes from the BSAI. In 1999, the harvest was split almost equally between the BSAI (3,560 round weight tons) and the GOA (4,014). Total wholesale product value in 1999 was $7 million, all of which came from head-and-gut products. Total product value in 1999 was higher than any other year during the period 1992–1999.

Table C-12 Pot catcher/processors, 1991–1999

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999
Vessels Landing Groundfish and Reported Groundfish Tons									
Number of Vessels	7	14	3	3	6	9	6	5	9
Thousands of Metric Tons	5.4	9.3	0.6	1.7	4.9	8.0	4.5	3.5	7.6
Reported Tons of Species Groups as a Percent of Total Groundfish									
Flatfish	1.1	0.1	a	a	0.4	0.8	0.7	2.2	0.5
Atka Mackerel (w/RSO)	12.8	4.5	1.1	2.7	2.1	1.7	0.9	1.1	1.4
Pacific Cod	86.1	95.4	98.7	97.3	97.5	97.4	97.7	96.6	98.0
Pollock	0.0	0.0	a	0.0	0.0	0.1	0.7	b	0.1
Reported Tons from FMP Subareas as a Percent of Total Groundfish									
BSAI	100.0	98.9	100.0	100.0	100.0	100.0	100.0	100.0	47.0
GOA	a	1.1	0.0	a	a	0.0	0.0	a	53.0
Total Production, Product Utilization Rate, Product Value, and Value per Ton of Round Weight									
Product (thousands of metric tons)	NA	3.8	0.3	0.7	2.2	3.7	2.2	1.5	3.6
Utilization Rate (%)	NA	40.8	52.4	43.5	45.5	46.5	48.1	42.1	47.2
Product Value ($millions)	NA	6.5	0.4	1.2	2.9	6.5	3.1	3.2	7
Value per Ton ($)	NA	701.2	700.2	726.1	603.1	810.7	693.5	901.7	926.9

Notes: [a]Number cannot be released due to confidentiality restrictions.
RSO – All rockfish species, sablefish, and 'other' groundfish, as defined.
NA – Data not available.
Sources: NMFS Blend data and NMFS Weekly Processor Report data.
Modified from Original Source: Chapter 3 - Draft Programmatic SEIS (NMFS 2001a).

Longline Catchers/Processors

Description of this Operational Category

Vessels in the longline catcher/processors sector use predominantly longline gear to harvest Bering Sea and GOA groundfish resources. Vessels in this class are about the same size as head-and-gut trawl vessels and produce headed and gutted products, as well. The longline catcher/processors evolved because regulations applying to this gear type provide more fishing days than are available to other gear types. These vessels can produce relatively high-value products that compensate for the relatively low catch volumes. These vessels average just over 130 ft LOA and most are equipped with gear that enables them to bait and haul about 30,000 hooks to 40,000 hooks per day. Generally, they are not built to standards that would permit them to be loadline certified, a requirement to produce fillets.

Participation in Groundfish Fisheries

In 1992, 57 vessels were in the longline catcher/processors group; in 1999, there were 40 vessels (Table C-13). They tend to target Pacific cod, with sablefish and certain flatfish species (especially Greenland turbot) as important secondary target species. Many vessels reported harvesting all four groundfish species groups

each year from 1991 through 1999. Most harvesting activity has occurred in the Bering Sea, but these vessels operate in all FMP subareas. In 1999, 39 of the 40 active vessels reported harvests in the Bering Sea, 23 in the Aleutian Islands, 24 in western GOA, 19 in central GOA, and 10 in the eastern GOA.

Groundfish Landings by Species

In 1999, the total volume of groundfish (retained and discarded) was 122,400 mt, near the average of 125,000 mt per year for the period 1992–1999 (Table C-13). Total production in 1999 was also near the long-term average of 48,700 mt (for final product from groundfish resources). Of the total reported tons in 1999, approximately 97,500 (78% of the total) were Pacific cod and 17,000 mt (14% of the total) were Atka mackerel (w/RSO). Total wholesale product value in 1999 was approximately $103 million, $100 million of which came from head-and-gut products. Total wholesale product value in 1999 was higher than in any other year during the period 1992–1999.

Table C-13 Longline catcher/processors, 1991–1999

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999
Vessels Landing Groundfish and Reported Groundfish Tons									
Number of Vessels	39	57	53	54	48	45	45	43	40
Thousands of Metric Tons	97	128	96	110	131	123	158	134	122
Vessels Landing Groundfish and Reported Groundfish Tons									
Flatfish	3.8	2.8	8.8	3.7	4.4	5.7	5.3	7.2	4.9
ARSO	11.0	12.4	16.3	14.1	11.4	9.7	10.3	13.0	13.9
Pacific cod	82.3	82.3	72.6	79.5	81.7	82.2	81.5	77.3	78.0
Pollock	2.8	2.5	2.2	2.6	2.6	2.4	2.9	2.5	3.2
Reported Tons from FMP Subareas as a Percent of Total Groundfish									
Aleutian Islands	5.7	19.2	22.6	9.4	4.7	6.3	5.8	12.7	9.5
Bering Sea	90.5	71.3	67.1	83.6	88.5	87.5	90.3	83.3	82.8
Western GOA	1.7	5.9	6.4	3.7	5.5	4.5	3.1	3.0	5.9
Central GOA	1.4	2.6	2.9	2.7	0.9	1.3	0.5	0.7	1.5
Eastern GOA	0.7	0.9	0.9	0.6	0.5	0.4	0.2	0.3	0.3
Total Production, Product Utilization Rate, Product Value, and Value per Ton of Round Weight									
Product (thousands of metric tons)	NA	51.2	35.3	42.4	50.7	49	61.2	51.3	48.1
Utilization Rate (%)	NA	40.1	36.8	38.5	38.7	39.9	38.8	38.4	39.3
Product Value ($millions)	NA	96.8	75.3	83	89.8	93.1	93.4	110.1	102.7
Value per Ton ($)	NA	757.9	784.4	754.5	685.7	757.6	591.3	823.3	839

Notes: RSO – All rockfish species, sablefish, and 'other' groundfish, as defined.
NA – Data not available.
Sources: NMFS Blend data and NMFS Weekly Processor Report data.
Modified from Original Source: Chapter 3 - Draft Programmatic SEIS (NMFS 2001a).

1.3 Analysis of the Alternatives

Except in the specific case of differential impacts on gross revenues, attributable to each of the five primary alternatives (treated in Section 1.3.4.1), the ability within this analysis to quantitatively distinguish between the effects of the suite of SSL Protection Measure Alternatives (and options) is exceedingly limited. With the single exception noted above, the balance of the regulatory impact analysis will be primarily constrained to characterizing the nature and probable 'direction' of attributable economic and operational impacts, accruing from these alternatives.

1.3.1 Approach in this Analysis

NMFS guidance for preparation of RIRs provides that, *"At a minimum, the RIR ... should include a good qualitative discussion of the economic effects of the selected alternatives. Quantification of the effects is desirable, but the analyst needs to weigh such quantification against the significance of the issue and available studies and resources."* (NMFS, 2000(d), page 2).

Research results and data on many key topics pertaining to the current SSL action are limited. Almost no empirical data are available, for example, concerning the cost and operating structure of the several sectors of the pollock, Pacific cod, and Atka mackerel groundfish fishing industry; the linkages between changes in fishing behavior and catch per unit of effort, bycatch rates, and operational safety; or the economic characteristics and parameters of demand, both domestic and international, for the numerous primary and ancillary product forms deriving from these fisheries. Indeed, because the proposed action may require the industry to operate during times, and in areas, with which they have little historical experience, it is probable that even the industry itself, cannot fully anticipate the cost, earning, and operational impacts they may incur as they adjust to the Steller Sea Lion Protection Measures' (SSL Protection Measures) requirements, for the 2002 fishing year and beyond. By necessity, therefore, much of this analysis is qualitative, although impacts have been quantified and monetized where possible.

There are two principal parts to the analysis presented here. The first sections (1.3.2 through 1.3.6) of this analysis presents potential costs and benefits attributable to or deriving from the alternative SSL Protection Measures under consideration by NMFS and the Council. This analysis is conducted from the point of view of all citizens of the United States (i.e., what is likely to be the 'net benefit to the nation'?).

The costs and the benefits from this aspect of the proposal are, however, not homogeneously distributed across that population. Many of the costs, in particular, are highly concentrated on the groundfish fishing industry that operates in the Gulf of Alaska and in the Bering Sea and Aleutian Islands, on fishing communities dependent on that industry, and sectors of the economy which supply goods and services to, or otherwise support, this industry. Therefore, the second part of the analysis (beginning in Section 1.4 of this chapter) reviews and evaluates, to the extent practicable, distributional issues and implications of the Council's SSL Protection Measures alternatives.

The analysis in Sections 1.3.2 to 1.3.6 has been broken into four components, corresponding to different categories of SSL Protection Measure-attributable benefits and costs. These categories are:

1. Non-use and non-market benefits accruing from anticipated improvements in the ESA-status and abundance of the western Steller sea lion stock (Section 1.3.2).
2. Changes in industry costs associated with Steller sea lion recovery efforts (Section 1.3.3)
3. Costs to consumers from changes in groundfish production (Section 1.3.4)
4. Changes in fishery management costs (Section 1.3.5)

Costs and benefits from all these components of the SSL Protection Measures alternatives have been summarized in Section 1.3.6.

The distributional impacts of the SSL Protection Measures alternatives are summarized in three sections.

1. Catcher boat ex-vessel dependency (Section 1.4.1)
2. Processor gross revenue effects (Section 1.4.2)
3. Dependent communities impacts (Section 1.4.3)

1.3.2 Benefits Associated with Western Steller Sea Lion Recovery Efforts

1.3.2.1 Existence Benefits

While it is the case that no "market" (in the traditional economic sense) exists within which Steller sea lions are traded, these animals nonetheless have economic value. In general, it can be demonstrated that society places economic value on (relatively) unique environmental assets, whether or not those assets are ever directly exploited. For example, society places real (and potentially measurable) economic value on simply "knowing" that Steller sea lion populations are flourishing in their natural environment (i.e., society values their '*existence*'). Society also places economic value (among other forms) on the immediate (or optional future) opportunity to directly "use" (either in a consumptive, or non-consumptive way) the western Steller sea lion resource.

Because, in the present case, the western Steller sea lion population is a natural resource asset which is held "in common", by all citizens of the United States (some would argue, by all citizens of the world), the way society regards the stewardship and exploitation of this natural asset is fundamentally different than, say, an asset to which private property rights and ownership institutions apply. Economists define the former class of assets as "public goods". A "pure" public good has the features that: (1) no one can be prevented from 'enjoying' it, once it is produced, and (2) one person's enjoyment of the good does not detract from enjoyment by another person.

Under these conditions, there is a tendency for private markets and actions to produce too little of the good. After all, a private firm would have a hard time making a profit if it could not prevent people from 'consuming' (i.e., taking enjoyment from) the good, once produced. Moreover, from society's point of view, if one person's enjoyment of the good does not reduce another person's opportunity to enjoy it, one might not want to restrict or otherwise ration access, once produced. For these reasons, private behavior will tend to produce less of a public good than is socially optimal (e.g., private behavior will not protect endangered species sufficiently).

The absence of a traditional economic market for a public good, like species preservation and enhancement, also makes it hard for economists to place monetary values on, in this context, the proposed Steller Sea Lion Protection Measures, whether in the aggregate or with respect to any one of the suite of potential actions under consideration by the Council, within the scope of this SEIS/RIR. The term 'value' is used here in the sense used in a cost-benefit analysis (e.g., what would people be willing to give up to preserve the species). One way to estimate non-market (e.g., existence) values is by surveying people to find out what the proposed action is worth to them. This approach is termed the "contingent value" method or, alternatively, CV or CVM, and a substantial literature has developed which describes the application of this technique to the valuation of natural resource assets.

Empirical research on '*existence value*', within the broad context of natural resources, suggests that these economic values may be substantial. For example, a survey conducted for the U.S. Fish and Wildlife Service found a national existence (and option - see the next section) value associated with the recovery of grizzly bear populations in the Bitterroot ecosystem of Montana to be on the order of $40 million to $60 million a year (expressed in 1996 dollars). This was reportedly a net value, reflecting both the negative valuations of persons who were opposed to reintroduction, as well as, the positive values of those who favored reintroduction. (USFWS, pages 4-23 to 4-28).

There has been, however, no study published concerning the existence value of the western Steller sea lion resource, although one such study is reportedly underway by researchers at the University of Alaska Fairbanks. Therefore, at present, this cost-benefit analysis is unable to place a monetary value on the *'existence value'* which might be associated with one or another of the alternative proposed SSL Protection Measures included in this action.

Notwithstanding this limitation on the present analysis, Metrick and Weitzman (1998) provide one framework within which to think about the *'existence value'* of a species. They suggest, for example, that the value of efforts to preserve a species will depend on several characteristics of that species. These authors identify the following important factors:

- People may place value on a species for it own sake. The values people place on the preservation of a species change from species to species. Metrick and Weitzman provide evidence that people often place higher values on certain well-known larger animals ("charismatic megafauna"). (Op. cit., page 554).
- People may value the genetic distinctiveness of the species. Distinctiveness means the number of genes acquired since the species split off from its nearest common-ancestor. (Op. cit., page 546). For Steller sea lions, the question might be, how genetically distinct are, say, the eastern and western populations in Alaska.
- The value of efforts to preserve a species will depend on the extent to which the efforts will contribute to an increased likelihood of survival for the species.
- Finally, the value of the survival of the species will depend on the cost incurred to preserve it. (This cost is discussed in subsequent sections of this RIR.)

In one sense, through provisions of the Endangered Species Act (ESA), Congress implicitly appears to impute a very high social value (e.g., existence value) to protection and enhancement of endangered species. The ESA, for example, requires the listing and protection of endangered species <u>without</u> consideration of cost.[6]

While it is not possible at this time to provide an empirical point estimate of the non-use value attributable to protection (and enhancement) of the western Steller stock, it is implicit in the SSL Protection Measures proposal that each of the alternatives to the "status quo" (i.e., Alternative 1) would yield an incremental benefit in this regard over the baseline condition. This is so, because: (1) the status quo alternative was determined in the 2000 Biological Opinion to result in "jeopardy" for the western Steller stock, and (2) each of the alternatives to the status quo have been designed with the expectation (on the part of their authors) that

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[6]The ESA does contain provisions for a cabinet-level "endangered species committee" that may override the provisions of an RPA, if it determines that the action will be too costly. However, this committee has not been convened in the case of the western Steller sea lion. Subsequent to a listing decision, the ESA contains provisions allowing a consideration of costs, for example, in the designation of critical habitat for a listed species. Recovery plans may also include estimates of the costs to implement the measures (Huppert).

they provide "at least" the minimum necessary protection to the SSL to allow the alternative to meet the "no jeopardy" test. That is, the authors and/or proponents of each alternative assert that their alternative to the status quo provides a management framework within which these fisheries may be prosecuted, without negatively impacting the western Steller resource or adversely modifying its critical habitat.

To the extent that each does meet this threshold expectation, each is '*preferred*' to the status quo alternative, on this criterion. It is not, however, possible, with the information available, to 'rank order' Alternatives 2 through 5, relative to one another, on the basis of their respective potential to enhance non-use value. That is, while it is (theoretically) possible to project how each alternative may affect the future abundance, and even rate of recovery, of the western stock of Steller sea lions, how those variable rates and total numbers might actually be reflected in the "willingness-to-pay" bids for each alterative, by those holding non-use values for these animals, cannot be directly imputed from the available information.

Table C-14 Ranking relative to non-use (e.g., existence)

Alternative 1 (No Action)	**Alternative 2** (Low and Slow)	**Alternative 3** (Restricted and Closed Areas)	**Alternative 4** (Area and Fishery Specific)	**Alternative 5** (CH Catch Limit)
Fails to meet minimum jeopardy threshold	Expected to meet minimum jeopardy threshold	Expected to meet minimum jeopardy threshold	Expected to meet minimum jeopardy threshold	Expected to meet minimum jeopardy threshold
5th	1st	1st	1st	1st

1.3.2.2 Use Benefits

Existence (and bequest) value is often referred to as a "non-use" value, because it does not depend on (actual or even potential) interaction between the person holding the value and the resource being valued. Persons may also place a value on the actual direct exploitation of the resource; here, the western Steller sea lion (including the 'option' to use the resource at some future point in time).

Two classes of such "use" values are identified for the western Steller sea lion stock:

- Subsistence harvest values (non-market use)
- Eco-tourism values (non-consumptive use)

Subsistence

The Subsistence Division of the Alaska Department of Fish and Game (ADF&G) has surveyed subsistence hunters about their Steller sea lion harvests since 1992. During that period, statewide subsistence harvests have reportedly dropped, from an estimated 549 animals in 1992, to an estimated 178 animals in 1998. (More recent survey information is not available at this time from the ADF&G.)

Subsistence analysts at ADF&G suggest that the decline in Steller sea lion harvest is connected to, (a) increased scarcity and consequent reductions in subsistence harvest success per unit of effort, and (b) conservation related concerns about the health of Steller populations among subsistence hunters. (Wolfe, 1999. Pages 64-69).

As noted above, an estimated 178 sea lions were harvested statewide in 1998 (with a 95% confidence interval, the range for the estimate is 137 to 257 animals). Of this estimated total (178 animals) *taken* for subsistence, 131 sea lions were actually harvested, while 47 were struck and lost. The estimated regional distribution of these *takes* was:

- Pribilof Islands: 78 sea lions (about 44% of the state take) [likely, western SSL stock]
- Aleutian Islands: 37 sea lions (about 21% of the state take) [likely, western SSL stock]
- North Pacific Rim: 29 sea lions (16%) [likely, western SSL stock]
- Kodiak Islands: 18 sea lions (10%) [western stock, w/likelihood of some from eastern stock]
- South Alaska Peninsula: 9 sea lions (about 5%) [Sand Point/Shumagins/Chignik, western stock]
- Southeast Alaska: 8 sea lions (about 4%) [eastern SSL stock, w/likelihood of some western][7]

Wolfe describes sea lion hunting as a "relatively specialized" activity among Alaska subsistence households. In 1998, out of 2,569 subsistence households statewide, only 111 (or approximately 4%) hunted for sea lions. This pattern was similar to that seen in 1992, at the start of the series of surveys. In 1992, out of 3,712 subsistence households, only 199 (or just over 5%) hunted sea lions. As these data, in the list above suggest, subsistence household participation in sea lion hunting varies considerably between different regions of the state. At St. Paul, in the Pribilof Islands, an estimated 23.3% of the Native households hunted sea lions. (Wolfe, 1999, pages 34, 37, C-97.)

Actual "use-benefit" from the sea lion harvest is believed to be more widespread than these hunting figures suggest. As Wolfe indicates, "Highly-productive hunters commonly distributed marine mammal products among a wider range of households, through non-commercial systems of sharing and trade." (Wolf, 1999, page 37) A sense of the wider involvement of households in the sea lion harvest, and of the variation of involvement among communities, can be conveyed by community-specific estimates of the percentages of households receiving and using sea lions.

- In St. Paul (Pribilofs), 23.3% of the households hunted sea lions, 13.7% of the households harvested sea lions, 10.9% of the households gave away sea lions, 60.5% of the households received sea lions, and 63.5% of the households used sea lions. (Wolfe, 1999, page C-97).
- At Atka in the Aleutians, 41.2% of the households hunted sea lions, 23.5% of the households harvested sea lions, 47.1% of the households gave away sea lions, and 100% of the households both received and used sea lions. It is unclear from Wolfe how more households gave away sea lions than harvested them. Possibly households passed on sea lion products that they received. Possibly, the figures also represent gifts and trades between communities. (Wolfe, 1999, C-89).
- At False Pass, no subsistence households harvested or were otherwise involved in subsistence seas lion hunting activity in 1998. (Wolfe, 1999, C-77)
- At Kodiak City, 10% of subsistence households hunted sea lions in 1998, none harvested sea lions, 10% gave away sea lions, and 20% received and used sea lions. (Wolfe, 1999, page C-61) These figures suggest trade between communities.

Changes in the abundance and availability of Steller sea lions to subsistence communities have economic implications. First, declining Steller stocks can reasonably be assumed to increase costs of the actual

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[7] Lowell Fritz, "Personal Communication," AFSC, 7600 Sand Point Way NE, Seattle, WA 98115, March 2001. Hypothesized SSL stock affiliation.

subsistence harvest. Wolfe suggests that reductions in the sea lion population have meant that successful harvesters had to invest more time and cash in the hunts. Time and money, of course, are limited, valuable resources and the need to use more of each would reduce the net value of the sea lions to the persons harvesting them, all else equal.

A second effect of reductions in Steller sea lion abundance is, of course, that fewer sea lions are harvested, in total. The resulting reductions in food stuffs, and other products derived for sea lions, would have to be made up in some way. It is not clear from the available data the extent to which other subsistence activities could be substituted for hunting sea lions. However, even if substitution is possible, the fact that sea lion hunting would have been *'preferred'*, suggests that there is a welfare loss attributable to the reduced harvests and that there would be welfare gains if the harvests again increased.

These impacts cannot be monetized with the information available. If they could be monetized, the actual aggregate nominal dollar value might appear relatively small, because of the modest population size involved. However, the broader national community may well have an interest in preserving subsistence traditions and communities. Such an interest may be inferred from the superior ranking "subsistence-use" has in Federal (and State of Alaska) statutes, relative to "commercial" or "recreational use", when allocating access to scarce fish and game resources, as well as the importance attached to maintaining cultural diversity within our society. If these interests could be measured empirically, the aggregate dollar value attached to subsistence harvests might increase considerably. The same tools used to monetize non-market non-use values of the Steller sea lion stocks could be used for this purpose. No research on this issue, however, is currently available.

Because each (and every one) of the proposed alternatives to the 'status quo' is (are) assumed to provide essentially comparable protection for the Steller sea lions, and their critical habitat, each would be expected to yield a potential positive benefit stream to subsistence users, under provisions of the proposed action. Nonetheless, if as suggested, "abundance" is directly correlated with subsistence value, based upon the expected rate of change (i.e., rate of improvement in abundance) in the western Steller sea lion stock, the alternatives rank (ordinally) as follows, on this criterion:[8]

Table C-15 Ranking relative to non-market use (i.e., subsistence)

Alternative 1 (No Action)	**Alternative 2** (Low and Slow)	**Alternative 3** (Restricted and Closed Areas)	**Alternative 4** (Area and Fishery Specific)	**Alternative 5** (CH Catch limit)
Expected to fail to achieve minimum jeopardy threshold; no improvement in SSL stock	Expected to result in most rapid rate of improvement in SSL stock among all alternatives	Expected rate of improvement in SSL stock below that of alternatives 2 & 4	Expected rate of improvement in SSL stock below only that of alternative 2	Expected to result in slowest rate of improvement in SSL stock among alternatives to the status quo
5th	1st	3rd	2nd	4th

[8]According to ordinal ranking, by NMFS Protected Resources, of the competing alternatives on the basis of expected 'rate of change' in SSL stock abundance.

Eco-tourism

Persons interested in the operation of eco-tourism firms, as well as persons interested in participating in eco-tourism, themselves, may place an economic value on (as well as maintaining the *option* for future) use of the western Steller sea lion resource for viewing, photography, or other non-consumptive uses. The difficulties in estimating these economic values are similar to those for estimating non-use (e.g., *existence)* values. No research is available on the size of these potential values for the western Steller sea lion stock, although it is virtually certain that such values do exist and that they are "positive". Indeed, eco-tourism may represent one of the more obvious areas of potential economic growth for communities in these relatively remote and isolated regions.

As in the case of 'subsistence use', because each (and every one) of the proposed alternatives to the 'status quo' is (are) assumed to provide essentially comparable protection for the Steller sea lions, and their critical habitat (i.e., result in a 'no jeopardy' determination), each would be expected to yield a positive benefit stream to eco-tourism users, under provisions of the proposed action. Assuming that "abundance" is directly correlated with non-consumptive use value, based upon the expected rate of change (i.e., rate of improvement in abundance) in the western Steller sea lion stock, the alternatives likely rank (ordinally) as follows, on this criterion:

Table C-16 Ranking relative to non-consumptive Use (e.g., eco-tourism)

Alternative 1 (No Action)	**Alternative 2** (Low and Slow)	**Alternative 3** (Restricted and Closed Areas)	**Alternative 4** (Area and Fishery Specific)	**Alternative 5** (CH Catch Limit)
Expected to fail to achieve minimum jeopardy threshold; no improvement in SSL stock	Expected to result in most rapid rate of improvement in SSL stock among all alternatives	Expected rate of improvement in SSL stock below that of alternatives 2 & 4	Expected rate of improvement in SSL stock below only that of alternative 2	Expected to result in slowest rate of improvement in SSL stock among alternatives to status quo
5th	1st	3rd	2nd	4th

1.3.3 Industry costs associated with Steller sea lion recovery efforts

1.3.3.1 Industry revenue and aggregate output impacts

Revenues from seafood production may change for several reasons, due to provisions of any one of the suite of proposed alternative SSL Protection Measure actions. These would include:

- if fewer fish are harvested, the price per unit of the fish which are caught and delivered to market may increase. A price increase would tend to increase revenue per unit catch.
- if fewer fish are harvested, fewer can be sold; this may reduce total revenues.
- if fewer fish are supplied to the market by the industry, secondary processors, marketers, and consumers, may adapt to the reduced supply by 'substituting' other products (or sources of supply), and markets could be permanently lost.

Each of these factors is examined in greater detail below.

Harvests and fish prices

The economic "law of supply and demand" suggests that (assuming all other factors are held constant) if fewer units of a good or service are supplied (in this context, if fewer fish are harvested in the commercial fisheries targeting pollock, Pacific cod, and Atka mackerel), their individual unit price would be expected to rise. This means that, within the limits of this model, fishermen should receive more for each unit of fish they continue to deliver to the market, all else equal.

The increase in price that would actually occur would depend on, among other things, how responsive the price consumers are willing to pay is to changes in the quantity of fish supplied.[9] Very little empirical information is available, at this time, as to the responsiveness of demand for these species and product forms, although some preliminary analysis is reported in the appendix to this report, "Market Analysis of Alaska Groundfish Fisheries."

Alaska pollock are processed into a wide variety of product forms sold in different markets around the world. The most valuable of these are surimi, fillets, and roe. Whether the per unit price of pollock will rise in response to a contraction in supply depends upon the combined effect on these markets.

Surimi from Alaska is sold primarily to markets in Japan, and the United States is by far the leading country providing pollock surimi to Japanese markets. Furthermore, surimi made from pollock is considered to be superior to most, if not all, other surimi: there are no close substitutes (at least for the 'premium' grades). Therefore, a change in quantity of pollock surimi supplied would result in a noticeable change in per unit cost.

The almost identical story can be reported for pollock roe. Japan is the primary market destination and Alaska-based pollock roe dominates other supplies in Japan. There are no close substitutes for pollock roe in the marketplace. Thus, a change in the quantity of pollock roe supplied would result in a change in per unit cost.

The fillet market is quite different from surimi and roe. Nearly all of the fillets (deep-skin and other forms) produced from pollock, end up in domestic markets, and the demand in the United States far exceeds the current supply of fillets. But the domestic fillet market is fairly competitive in terms of product form (IQF, block, and twice-frozen), supplying country (China and Russia play major roles), and fillets from other species, including, for example, hakes and hoki. As a result, it would be expected that the per unit price for pollock fillets will rise only if there were a large change in the amount of pollock fillets supplied to the marketplace.

These three product forms, taken together, account for more than 90% of the product value from this fishery (these fisheries). The net result, in terms of the price of raw pollock, is the expectation of a per unit price increase, as the quantity is reduced.

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[9] In other words, are pollock, Pacific cod, and Atka mackerel products "must have" items, so that consumers will bid up prices in response to reduced supply? Or, are there lots of close substitutes in the marketplace for these items, so that consumers may readily substitute away from these species, as supplies drop, without bidding up prices to any great extent? Consumers are often assumed to be less responsive in the short run than they are in the longer term. That is, the price increase caused by a reduction in production may be larger in the first year or so and then decline through time.

Pacific cod also enters an international market, but much of the product stays in the United States. More than half of the harvested amount is processed as H&G and sold to China, Japan, and in Europe. Some of that sold to China is reprocessed and returns to the United States as "twice-frozen" blocks. Fillets, as IQF and block, represent the next largest product form (and about a third of the value), and are sold in domestic markets to fancy (e.g., 'white tablecloth') and family restaurants, institutions, and retail fish markets. As Atlantic cod stocks and landings in the United States, Canada, and the North Atlantic fluctuated during the last decades, Pacific cod effectively filled the product supply void. However, the United States continues to import Atlantic cod (from Iceland, Canada, and Norway), serving a primarily 'east coast' market.

What this implies about Pacific cod is that the product forms are diverse, and serve as an effective substitute for Atlantic cod, whose stocks (and therefore supplies to the market) have been very volatile over the preceding decades, rising and falling very dramatically. But markets are well-established, both domestically and internationally, for Atlantic cod. If the quantity of Pacific cod is reduced, the per unit price may roughly hold steady (due to the very close substitutional relationship between Atlantic and Pacific species in the marketplace), or rise slightly, depending largely on world supplies and stock conditions of Atlantic cod, at the time.

Atka Mackerel is usually processed into H&G, almost entirely exported, with nearly all of it going to either Japan or South Korea. It is a unique and popular product in those countries, with few substitutes. If the supply is reduced, the per unit price will very likely rise. (For greater detail on the 'market dynamics' of these species, see Appendix D).

Increased revenue accruing from such a 'per unit' price rise would be a *benefit* to primary producers (e.g., fishermen), offsetting some of the costs they would be expected to incur through adoption of any one of the proposed SSL Protection Measures alternatives to the 'status quo'.

It should be pointed out, however, that to the extent that these fishery products are consumed in the United States, this producer benefit would be completely offset by a reduction in consumer welfare (i.e., surpluses) from the increase in price. That is, the benefit to the industry would simply be the result of a transfer from consumers. Thus, under these conditions, this hypothesized supply-induced price increase would create no "net" benefits, that could be revealed in a cost-benefit analysis, for domestically consumed fish.

Alternatively, to the extent that these fish are exported and consumed outside of the United States, any supply induced price increase would create an attributable net benefit improvement, from a cost/benefit perspective. This is because the price increase would accrue, in the form of increased revenues, to U.S. producers, while the loss in consumer welfare would be imposed on citizens of other countries.[10] Such changes would (all else equal) result in a 'net' benefit to the nation (e.g., increases in producer surpluses, with no equivalent attributable reduction in U.S. consumer surpluses).

The remainder of this section will examine the impact on industry gross revenues attributable to fewer fish being harvested (aside from the price impact), including the potential risk of loss of market share.

Revenue changes due solely to the volume of fish (excluding price changes)

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[10] Under OMB guidelines, changes in consumer (and for that matter, producer) surpluses, attributable to a proposed action, which accrue to persons (or firms) from other than the United States, are excluded from the benefit and cost calculations performed in an impact assessment.

Accurate estimates of the change in gross revenues from reductions in production associated with the SSL Protection Measure alternatives require information on: (1) the volume of production coming from restricted fishing areas for each of the fleet sectors, (2) the extent to which each fleet sector would redirect its operations into other fishing areas, and (3) the productivity of the fleet sectors in the new areas. Currently, it is only possible to estimate the first of these (i.e., the volumes of production coming from areas that will no longer be available to fishermen under each of the alternatives).

However, estimates of the volumes of production coming from fishing areas restricted by the SSL Protection Measures, under the competing alternatives, combined with data on ex-vessel and/or first wholesale prices, will allow estimates of the gross revenues for each fleet sector that are potentially placed "at risk", under the different alternatives. These estimates can provide a crude measure of the potential economic impact of the alternatives on different fleet sectors. Moreover, if it is assumed that harvest foreclosed to a fleet sector in one area, by an alternative, cannot be made up elsewhere by that fleet sector, the "at risk" estimate becomes an approximation of the 'worst case' estimate of foregone gross revenues attributable to the proposed action.

It is also possible to take a further step. Having estimated the maximum revenues that might be lost, for each fleet segment, on the assumption that the fleet is unable to make up impacted harvests by fishing in other areas, it is possible to gradually relax that assumption. That is, the assumption could be relaxed so that the fleet segment is assumed to be able to make up, say, 10% of the harvest elsewhere; or 20% elsewhere, etc. This is done without specifying where else the fleet segment might operate (or at what cost), except to assume that the effort is redistributed to remaining open areas, during remaining open periods. With this information available for each fleet segment, readers may apply their own assumptions about the extent to which each fleet segment would be able to "make up" its catch elsewhere, under the differing temporal and geographic constraints and limitations provided across competing SSL Protection Measure alternatives, thus producing their own estimates of the gross revenues that might be foregone, under each. Most of the discussion relevant to this approach can be found in Section 1.4.2, which deals with the differential impacts of the alternatives on the respective components of the industry gross revenues.

The gross revenues "at risk" were estimated using information about: (1) projected fleet segment TACs for the 2001 fishing year, assuming the provisions of each alternative 'had been' in place in that year; (2) the actual proportions of harvest of different allocations, by different groups of vessels [e.g., vessel length, gear-type, area, processing mode, target species], based upon historical catch patterns for 1999; (3) information about the proportions of the sea surface area closed by the respective SSL Protection Measure alternatives in different management areas; (4) estimated product mix and first wholesale product values for the most recent year that these data are available.

Future allocations were projected on the basis of known harvests, information on allocations contained in the 2001 specifications, and informed judgements by NMFS in-season management staff. In many cases, TAC specification projections had to be allocated among fleet sectors. For example, the Gulf pollock and Pacific cod allocations in specifications are for inshore and offshore fleet sectors, only. These had to be further subdivided among the different gear and vessel size categories. These subdivisions were made on the basis of historical catch records of the proportions of the harvest taken by the different vessel groupings.

To move from the TAC specifications, by species, to estimates of the actual harvest by species, it was necessary to determine what proportion of the specification (of each target species) was potentially "at risk", based upon temporal and geographic dispersion provisions of each SSL Protection Measure alternatives. To do this, landings data for each fleet segment were estimated for each State of Alaska statistical area. GIS techniques were then employed to determine what proportion of the physical surface area of each of these

statistical areas had restrictions placed on which target fishery, under each of the alternatives. The landings from each of these statistical areas were then prorated to "restricted" or "unrestricted" status in proportion to the physical surface area of the statistical areas that were specified as restricted or unrestricted. This was done for the unique restrictions appropriate to each of the five SSL Protection Measures alternatives. The total landings restricted under each of the alternatives could then be estimated by summing restricted landings for each statistical area, for each relevant vessel group, gear type, target species, processing mode, geographic area, and fishing period.

Finally, the harvest tonnages "at risk" were valued using first wholesale product value from the2000 fishing year. First wholesale values are the revenues received by the first level of processors (i.e., inshore plants receiving deliveries from catcher vessels, catcher/processors, and motherships). They are not the same as ex-vessel prices. They were estimated by dividing the total wholesale value of production for a species, by estimated deliveries of each species of fish, to yield a "round weight per ton of catch" equivalent value. Implicit in this procedure is the assumption that changes in harvest levels will not change the composition of product output from the plant (i.e., product mix, for example, fillets, surimi, H&G, etc.) at the first wholesale level.

There are many ways in which the alternatives may lead to reductions in industry revenues. The most important ways are likely to be:

- Reductions in the overall TACs due to specific limits or global control rules
- Changes in the timing of TAC apportionment releases to the fishing operations. These may force fishing to take place when the fish are less valuable and/or less available
- Closure of critical habitat to fishing by specified classes of vessels
- Limits placed on harvests from critical habitat areas that remain open to fishing
- Closure of fisheries in areas with TACs that are too small to manage safely

The analysis of the gross revenue impacts of the alternatives in this section is conducted in terms of several gross revenue categories. The first is the potential maximum gross revenues that could be generated by the alternative. This is simply the gross revenues that would be generated by the TACs associated with an alternative, if the entire TACs could be caught. These may differ between the alternatives if the TACs differ, or if constraints in the alternatives affect the timing of the harvests and, as a result, the price that would be received for the harvest.

The second general category of gross revenues is gross revenues "at risk," under the different alternatives. Various restrictions in the alternatives can prevent fleets from harvesting fish at accustomed times and places. The affected fishing fleets may or may not be able to make up the fish and the gross revenues that are lost, because of these restrictions, by fishing elsewhere. Because different fleets may potentially be able to recover some or all of these gross revenues, these catches cannot be described as "lost." They have been described here as "at risk." Only if it is assumed that harvest foreclosed to a fleet sector in one area by an alternative cannot be made up elsewhere by that fleet sector, will "at risk" revenues be an estimate of lost gross revenues.

Accurate estimates of the abilities of fleets to make up a reduction in harvests in one area by fishing in another require information on : (1) the volume of production impacted by the various restrictions, (2) the extent to which each fleet sector would redirect its operations into other fishing areas, and (3) the productivity of the fleet sectors in the new areas. Currently it is only possible to estimate the first of these, i.e., the reductions in the TACs and the volumes of production coming from areas that will no longer be available to fishermen under each of the alternatives.

Revenues are placed "at risk" in three ways, corresponding to three different kinds of limitations the alternatives impose on fishing in critical habitat. An alternative may absolutely prohibit fishing activity for pollock, Pacific cod, and Atka mackerel, by a vessel class within an area of critical habitat. In these instances the critical habitat is referred to here as "closed" and the revenues that might have been generated by fishing in that closed critical habitat are placed at risk.

An alternative may also permit fishing for these species by a vessel class within a portion of critical habitat, but *limit* the amount that may be taken. If, based upon historical use patterns, that fleet would otherwise have been expected to harvest a larger amount than provided for under the restricted CH limit, the amount over the limit is assumed to be placed "at risk", in this "restricted open" critical habitat.

Finally, one alternative (i.e., Alternative 2) absolutely prohibits all trawl fishing in critical habitat, whether the target is pollock, Pacific cod, or Atka mackerel (the focus of the other provisions), or whether it is some other groundfish species or species group, e.g., rocksole, rockfish. In this case, the catch and revenues "at risk" accrue to a potentially much broader segment of the domestic groundfish fishing industry operating off Alaska, and well may impact employers and employees, dependent communities and families which are, by-in-large, not effected by the somewhat more narrowly focused provisions of the other alternatives (i.e., those which limit regulations to pollock, Pacific cod, and/or Atka mackerel target fisheries).

As noted above, revenues "at risk" are only foregone if a fishing fleet is unable to modify its operation to accommodate the imposed limits and, thus, cannot make up displaced catches elsewhere (either in remaining open fishing areas or during alternative open fishing periods). Having estimated the maximum revenues that might be lost, for each fleet segment, on the assumption that the fleet is unable to make up impacted harvests, it is possible to incrementally relax this assumption and assess the effects. Because the 'model' is linear in its parameters, evaluating an alternative assumption about the total foregone catch is straight forward. For example, if one assumes that a given fleet segment is able to make up 10% of the harvest elsewhere, the estimated "at risk" gross revenue impact, reported in the table below, would be multiplied by 0.90; if the assumption is that, say, 20% is made up elsewhere, the total is multiplied by a factor of 0.80, and so forth. This is done without specifying where (or when) else the fleet segment might operate (or at what cost). With this information available for each fleet segment, the reader is able to apply his or her own assumptions about the extent to which each fleet segment would be able to "make up" its catch elsewhere, thus producing their own estimates of the gross revenues that might be foregone, under each alternative. Most of the discussion relevant to this approach can be found in Section 1.4.2, which deals with the different ways individual fleet sectors may be affected by each of the alternatives.

The changes in gross revenue, attributable to each of the SSL Protection Measure alternatives were estimated in the following manner. TACs were estimated for each management area and were divided among the different fleet segments (e.g., catcher vessels under 60 feet using fixed gear, AFA catcher/processors) within the management area, on the basis of historical catch and/or specifications. The percentage of the harvest by each fleet segment coming from within an alternative's open or closed critical habitat was determined on the basis of historical information. The fleet segment share in the management area was then multiplied by this percentage to determine how much the fleet segment might lose due to each alternative's respective 'open' and 'closed' critical habitat restrictions. Although the basic approach is simple, a mass of details add complexity. These details are discussed below under the following headings:

- Estimating the TACs
- Gross revenue reductions associated with the TACs
- Movement of TAC within the year
- Allocating an area TAC among vessel and gear classes

- Defining a base year
- Revenues "at risk"in 'open' critical habitat
- Revenues "at risk" in 'closed' critical habitat
- Prices used in the analysis

Estimating the TACs: TACs were estimated using information on allowable biological catches and the distribution of biomass in 2001. That is, the TACs associated with each alternative are estimates of the TACs that would have been in place in 2001, had the subject alternative been adopted. The year 2001 was chosen because it is the most recent year for which reasonably complete information is available.

Gross revenue reductions associated with the TACs: Overall reductions in fish TACs are an important component of many of the alternatives. They play a very important role, for example, in Alternative #2, "Low and Slow." Reductions in TACs represent an absolute diminution in the fish that fishing operations have available to them. That is, reduced TAC amounts mean fishing operations cannot make up foregone harvests by fishing elsewhere during that year. In this sense, the revenues associated with these fish are not simply placed "at risk," they are completely "lost".

The analysis accounts for this source of lost revenues by estimating the first wholesale value of the allowable TACs under each alternative and treating these as a maximum potential amount of first wholesale revenues for the fishing operations, associated with that particular alternative. Comparison of these 'maximum" potential revenues, across alternatives, will indicate the unique impact of the changes in TAC between the alternatives. (The choice of the prices used to "monetize" the TACs is discussed below.)

Movement of TAC within the year: One structural subtlety, associated with the TAC issue, is the use of quarterly, biannual, or other TAC release/apportionment arrangements within the different alternatives to limit the amount of fish that may be taken in any given period of the year. Because these arrangements are often associated with shifts in TAC, that allow more fish to be taken during an alternative part of the year, the effect is to "move" the harvest of fish from one period to another. Because the value of fish can change substantially over the course of the year, this movement of harvest within the fishing year can affect gross revenues - even if the overall annual TAC remains unchanged.

There are a large number of complex seasonal arrangements incorporated into the different alternatives. In order to make evaluation of the alternatives comparable (and make the analytical problem tractable), the fishing year was treated as if it were divided into two parts. One part is assumed to begin at the start of January (correctly reflecting current regulations on 'official' opening dates, by fishery) and runs until June 15. The other part begins on June 15 and ran until the end of the year (again, as provided for in current regulation). June 15 was chosen because it was about mid-year, and many of the seasons in the alternatives begin or end on or about that date.

TACs specified for seasons which fall (predominately or completely) before June 15, were assigned to the first half of the year, while TACs specified for seasons after that date were assigned to the second half, for modeling purposes. All the parameters for calculating the revenues placed "at risk" by closed critical habitat restrictions and open critical habitat limits were prepared separately for the first and the second half of the year. Average first wholesale prices were likewise estimated separately for the first and second half of the year (i.e., to appropriately reflect product mix and value differentials, such as recovery of roe in the pollock and Pacific cod target fisheries).

In this way, the model was run twice for each alternative - once for the first half of the year and once for the second half. This allowed the model to pick up the impact of a shift of TAC apportionment from the first to the second half of the year. To the extent that the movement of fish from the first half of the year to the

second led to lower prices received for the product (because of the loss of revenues from a change in product mix) this is reflected in the estimated gross revenues. The model lacks the subtlety to pick up price impacts associated with movements of fish between seasons within the first or second half of the year. For example, a forced movement of pollock harvest from the first to the second *quarter* of the year may reduce the value of the fish, because the end of the roe fishery would take place before June 15. This would not be reflected in the model. For this reason, the model, with its current bifurcated seasonal structure, probably understates (to an unknown degree) the revenue losses associated with those alternatives which provide for seasonal rearrangement of harvests within the first or second halves of the fishing year.

Allocating an area TAC among vessel and gear classes: Many different classes of vessels harvest Atka mackerel, pollock, and Pacific cod from the various management areas regulated under this proposed action. It was important to examine the economic and operational impacts on the individual vessel classes, for three reasons. First, the classes have very different activity patterns. They fish in different ways, on different stocks, in different area, at different times. It is necessary, therefore, to take explicit account of these differences in evaluating the impacts of the provisions in each of the alternatives. An important way this issue manifests itself in this analysis is through the different levels of historical activity, inside critical habitat, reported for each target fishery, by the different fleet segments. Because each historically differs in their CH fishing behavior, a provision restricting activity in critical habitat may have differential impacts on different fleets.

Second, the gear classes (including processing modes) produce different products, even when they are harvesting the same species. Thus, the first wholesale prices received per metric ton of retained harvest may differ, depending on the vessel and gear class used to harvest the fish. These price differences will affect the estimated gross revenue impacts of the various alternatives.

Third, those associated with each of the different fleet sectors will be interested in the particular impacts of the various alternatives on themselves. Although this section of the RIR focuses on overall gross revenue impacts - consistent with its intention to provide a cost-benefit analysis from the point of view of the nation as a whole - Section 1.4.2, "Gross revenues effects" summarizes what has been learned about the respective impacts of the suite of SSL Protection Measure alternatives on the different components of the industry.
A TAC for an area and a half of the year was allocated among the gear groups on the basis of allocations laid out in the specifications, or on the basis of historical patterns of landings. Pollock and Atka mackerel were primarily allocated among gear groups using the first criterion, Pacific cod was primarily allocated using the second criterion.

Defining a base year: All the alternatives are evaluated by looking at the implications they would have had for harvesting activity in 1999, had they been in place in that year. For each alternative and each management area, GIS tools were used to estimate the amount of harvest that would have come from open critical habitat and from closed critical habitat, had the alternative been in place in 1999.

A large number of possible historical periods could have been used as the "base." The year 1999 was chosen because: (1) a complete database on historical catch that incorporated retained harvests by all groundfish vessel classes was available for the year; (2) historical catch and participation patterns were not (potentially) 'distorted' by the Federal Court's CH trawling injunction, imposed during the second half of the 2000 fishing year; (3) the BSAI pollock fishery reflects the fleet allocations of the AFA, and the BSAI catcher/processors' activity patterns reflect early AFA experience.

Revenues "at risk" in 'closed' critical habitat: To move from the TAC specifications, by species, to estimates of the actual harvest, by species, it was necessary to determine what proportion of the specifications was "at risk" in closed critical habitat, for each of the alternatives. To do this, landings data for each fleet segment were estimated for each State of Alaska statistical area. GIS techniques were then used to determine what proportion of the physical surface area of each of these statistical areas had fishing restrictions, under each of the alternatives. The landings from each of these statistical areas were then prorated to closed critical habitat and other areas in proportion to the physical surface area of the statistical areas that were restricted and unrestricted. (Atka mackerel fishing in the Aleutians was prorated inside and outside of critical habitat on the basis of observer reports; not on the "surface area" approach described here..) This was done for the unique restrictions appropriate to each of the alternatives. The total landings restricted under each of the alternatives could then be estimated by summing restricted landings for each statistical area.

Revenues "at risk" in 'open' critical habitat: Not all critical habitat is closed. Under provisions of some of the alternatives, critical habitat can remain open to fishing. In these cases, there are, however, limits on the amount of fish that may be taken from the critical habitat zone. Restrictions on open critical habitat are important parts of Alternatives 3 and 5. They also occur in more limited circumstances in other alternatives; for example, Alternative 1 has limits on Atka mackerel harvests from critical habitat in Aleutian Islands districts.

These limits have the potential to restrict traditional fishing activity within open critical habitat, thereby placing revenues "at risk." Revenues placed "at risk" in this way are functionally similar to those placed at risk by outright closure of critical habitat. That is, they would be lost, unless the fishing operations were able to make them up by changing their fishing patterns to fish in other, open, areas. When an alternative allows fishing in critical habitat, subject to fishing limits, it is necessary to estimate the amount of fish harvest that might be precluded within critical habitat by the limit. Estimates of projected harvests in the absence of the limits are prepared on the basis of historical fishing patterns and overall management area TACS, and these are compared to the landings limits appropriate to the open critical habitat within the management area. If the projected harvest is greater than the limit imposed in the alternative, the difference is treated as harvest and revenues placed "at risk" by the proposed action.

Prices used in the analysis: All harvest tonnages were valued using first wholesale prices for 2000. The first wholesale prices were estimated by dividing the total wholesale value of production for a species by estimated deliveries of each species of fish to yield a "round weight per ton of catch" equivalent value. These values were calculated separately for the first and second half of the year to account for seasonal product mix variation (e.g., roe). First wholesale prices are the prices received by the first level of inshore processors, or by the catcher/processors and motherships. They reflect the 'value added' by the initial processor of the raw catch. They are not, therefore, the same as ex-vessel prices.

The wholesale values were obtained from State of Alaska Commercial Operators' Annual Reports (COAR reports). Implicit in this procedure is the assumption that changes in harvest levels will not change the composition of products (fillets, surimi, etc.) at the first wholesale level. The first wholesale values used in this analysis are summarized in Table C-17.

Table C-17 Value per round metric ton of retained catch by species, vessel type, gear (Pacific cod only) and area (in dollars)

Species	Vessel type and gear	January-June 2000		July-December 2000	
		BSAI	GOA	BSAI	GOA
Atka Mackerel	Catcher/Processor	474.3		480.7	470.0
	Catcher Vessel	1101.9			
Pacific Cod	Longline Catcher/Processor	1177.4	1245.3	1293.5	
	Pot Catcher/Processor	1345.5	1184.1		
	Trawl Catcher/Processor	1148.8	1367.6	1055.0	1045.4
	Catcher Vessel	1187.8	1517.3	575.3	1351.9
Pollock	AFA Catcher/Processor	1062.3		454.0	
	non-AFA Catcher/Processor	671.3	389.2	343.3	261.2
	Catcher Vessel	893.4	745.5	577.3	388.0

Notes: Values were generated by dividing the total processed-product value of the catch by the total round weight of retained catch. Product values were generated using 2000 COAR prices. Weight data are from blend estimates. Value data are from weekly and annual processor reports.
Source: National Marine Fisheries Service. REFM. Sand Point, Seattle, WA.

Anecdotal information suggests groundfish prices have trended upward, perhaps sharply, since 2000, especially for Pacific cod and pollock (although at differing rates). Other anecdotal information suggests that the approach to estimating prices, used here, tends to understate the revenues generated in the BSAI "headed and gutted" (H&G) trawl fleet. If this latter assertion is correct it would particularly affect the Atka mackerel revenue estimates, included in this report. Nonetheless, the analysis reflects the best "official" data on price and value currently available. To the extent that prices have risen since 2000, the gross revenues estimated here, for the various alternatives, likely understate (to an unknown degree) the true gross revenue impacts that may accrue from adoption and implementation of one or another of these management regimes.

The use of 2000 prices may also be problematic because of the large changes in aggregate harvests of some species associated with some of these alternatives. Alternative 2, in particular, is likely to result in large reductions in harvests. Reductions in aggregate harvest of a species should bring about increases in the first wholesale prices for that species, all else equal. This price increase should offset some of the impact of the harvest reduction on gross revenues. This issue is not addressed in the quantitative analysis conducted here. For a more detailed treatment of this particular issue, the reader is directed to the discussion of "Harvests and fish prices", presented earlier in the current section of this RIR (Section 1.3.3.1) and to the Market Analysis of Alaska Groundfish Fisheries (Appendix D).

The gross revenue impacts associated with the alternatives (with separate estimates for Alternative 4 and a variant of Alternative 4 - Option 3) are summarized in Table C-18. All reported values are rounded to the nearest million dollars.

Table C-18 Comparison of the gross revenue effects of the alternatives in 2002 (millions of dollars)

	Alternatives					
	1	2	3	4	4 (w/opt. 3)	5
Potential gross revenues given TACs	1,358	973	1,337	1,333	1,333	1,332
Revenues "at risk" from closed critical habitat	20	295	235	74	79	51
Revenues "at risk" in open critical habitat	8	0	137	1	1	82
Additional revenues "at risk" due to total groundfish trawl ban in critical habitat	0	33	0	0	0	0
Total of revenues "at risk"	28	328	372	75	80	133
Difference between gross revenues for the listed alternative and gross revenues for the Alternative 1 baseline	0	-385	-21	-25	-25	-26
Difference between revenues "at risk" for the listed alternative and Alternative 1 revenues "at risk"	0	300	344	47	52	105

On the basis of the "adverse effect on gross product value" criteria, Alternative 1 imposes the smallest potential impact. This alternative only retains provisions to protect Steller sea lions that are incorporated into permanent regulations (as of 1999). All SSL mitigation provisions implemented by emergency regulations are assumed to be eliminated, under this alternative. Essentially, this puts fishery regulation in the posture in which it stood in 1998, plus permanent regulations restricting the Atka mackerel and pollock fisheries that were implemented in 1999. The Pacific cod and pollock fisheries are not regulated to protect Steller sea lions under this alternative. The reader is referred to Section 2.3.1 of this SEIS for a detailed discussion of Alternative 1.

Maximum gross revenues under Alternative1 are estimated to be $1.358 billion. The revenues placed "at risk" by the restrictions on fishing in critical habitat under this alternative total just $28 million. As noted earlier, the industry may be able to make up some of the revenues placed at risk by altering fishing activity to fish at other times or places. Alternative1 places limits on Atka mackerel harvests in open critical habitat in the central and western Aleutian Islands fishing areas (Areas 542 and 543).

Alternative 2, the "Low and slow" alternative, is the most restrictive, on the basis of these 'gross revenue' criteria. It is based on an alternative in the Draft Programmatic SEIS (NMFS, 2001a) prepared in the summer of 2000, that was meant to provide maximum protection for Steller sea lions. (The reader is referred to

Section 2.3.2 of this SEIS for a detailed description of Alternative 2.) These analytical results suggest that it does so at a large cost to the groundfish fishing and processing industry in forgone revenues.

This alternative imposes large reductions on the fishing TACs in different areas, and imposes a strict system of seasonal TAC allotments, meant to spread fishing out in time. These fishing constraints are much stricter than those contained in the other alternatives. The maximum gross revenues from this alternative are $973 million. This is $385 million less than the maximum estimated for Alternative 1. No other alternative comes close to these reductions in gross revenues.

Two elements in Alternative 2 may mean that the actual reduction in revenues due to TAC restrictions may be even greater than estimated. First, a large number of seasonal TAC allotments, combined with reduced overall TACs, means that fishery managers may be faced with managing fisheries with very small harvest targets. There is a real possibility that managers may not be able to safely open fisheries for some TAC allotments. Thus, TAC allotments technically available under this proposal may, in fact, be forgone for management reasons.

Alternative 2 also has a provision requiring exclusive area registration for operations fishing pollock, Atka mackerel, and Pacific cod. Fishing operations may tend to register for areas with relatively large TAC allotments, and refrain from registering to fish in areas with smaller allotments. This may also result in some technically available allotments not being fished.

In addition to the reductions in harvest associated with the TAC restrictions, Alternative 2 contains relatively stringent limits on fishing activity in critical habitat. The model suggests that the limits on pollock, Atka mackerel, and Pacific cod fishing place $295 million, in fishery gross revenues, "at risk." Only Alternative 3, based on the RPAs from NMFS's November 2000 Biological Opinion, comes close to this level "at risk" gross revenues.

Alternative 2 contains a further provision that is not found in the other alternatives. Under Alternative 2, groundfish trawling for all species would be prohibited inside critical habitat. This is a considerable extension of Steller sea lion protection measures over those contained in the other alternatives, in so far as the focus of the action has principally been the pollock, Pacific cod, and Atka mackerel target fisheries. Adoption of a complete ban on trawling would extend the reach of this action to include many more groundfish species and species groups, including turbot, Pacific Ocean perch, rockfish, rocksole, sablefish, other flatfish, and yellowfin (among others).

The revenues placed "at risk" from this provision of Alternative 2 were calculated by estimating the proportions of the total catches of the relevant species coming from critical habitat in 1999, applying these proportions to the 2001 TACs for these species, and converting the results into first wholesale 'gross revenues', using 2000 first wholesale weighted round ton equivalent values. Excluding the impacts on pollock, Pacific cod, and Atka mackerel trawlers, which are fully accounted for in the previous estimates of "at risk" revenues due to closure of CH, the trawl ban provision of Alternative 2 places an additional (approximately) $24.5 million "at risk", in the BSAI, and a further $8.3 million "at risk", in the GOA; or a total of approximately $33 million.

Alternative 3, "The restricted and closed area approach", is the RPA detailed in the November 30, 2000 Biological Opinion. The essence of this approach is the establishment of large areas of critical habitat where fishing for pollock, Pacific cod, and Atka mackerel is prohibited, and the restriction of catch levels in

remaining critical habitat areas. The reader is referred to Section 2.3.3 of this SEIS for a detailed description of Alternative 3.

Alternative 3 appears to be the second most restrictive alternative, after Alternative 2, on the basis of this criterion. The maximum gross revenue permitted by the TAC levels under this alternative are $1.337 billion. This is actually close to the levels estimated under Alternative 1 (the 'no action' baseline alternative). However, this alternative places $235 million at risk through closure of critical habitat to different types of fishing activity, and it places another $137 million at risk through limits on the amounts of fish that may be taken during various periods, by fishing activities in open critical habitat. The total gross revenue placed at risk through these two types of restrictions, under Alternative 3, is estimated at $372 million. Alternative 2 is stricter than Alternative 3 when the impacts of the lower TAC and the gross revenues "at risk" are both considered.

Alternative 4, "The area and fishery specific approach", traces its lineage to the work of the NPFMC's Steller sea lion RPA committee, in the winter and spring of 2001. The reader is referred to Section 2.3.4 of this SEIS for a detailed description of Alternative 4.

Alternative 4 actually appears to impose fewer TAC related restrictions on the fishery than Alternative 1. Maximum gross revenues under Alternative 4 are estimated at $1.333 billion; this is $25 million less than the maximum under Alternative 1. Alternative 4 also places considerably more gross revenues at risk from closed critical habitat, $75 million as compared to $28 million. Alternative 4 contains provisions limiting pollock harvest in open critical habitat in the Bering Sea. However, these limits do not appear to constrain the fishery when contrasted with its harvest patterns in earlier years (i.e., do not represent a binding operational constraint).

Alternative 4 contains three suboptions, of which Option 3 is analyzed here. Option 3 substitutes a system of continuous 'bands' along the coast of the GOA. Bands closer to the coast impose stricter limitations on fishing, by gear type, than bands further from the coast. The reader is referred to Section 2.3.4 of this SEIS for a detailed description of Alternative 4's Option 3. The 'band" approach used in Option 3 is somewhat more restrictive than the approach in the basic version of Alternative 4. The maximum gross revenues are the same, because the overall TACs and their distribution through time are unchanged. However, the introduction of the bands increases the gross revenues placed at risk in closed critical habitat by about $5 million dollars (to $80 million in total).

Alternative 5, "The critical habitat catch limit approach," is derived from the suite of RPA measures that were in place for the 2000 pollock and Atka mackerel fisheries, and measures considered by the Council and NMFS for the Pacific cod fishery, that include seasonal apportionments and harvest limits within critical habitat. Essentially this alternative limits the amount of catch within critical habitat to be in proportion to estimated stock biomass. The reader is referred to Section 2.3.5 of this SEIS for a detailed description of Alternative 5.

Alternative 5 constrains potential maximum harvest somewhat, as compared to the baseline no action alternative. The maximum harvest of $1.332 billions is about $26 millions smaller than the maximum projected under Alternative 1. The real impact on gross revenues comes , however, through the prohibitions on fishing activity in closed critical habitat (placing approximately $51 million in gross revenues at risk), and through limits on the amounts of fish that may be taken in open critical habitat (about $82 million at risk). The total placed at risk under this alternative is $133 millions.

In summary, the alternatives differ considerably in their likely impact on first wholesale gross revenues. The alternatives likely rank ordinally as shown below. The rankings are based on the difference between maximum gross revenues and gross revenues placed "at risk."

Table C-19 Ranking relative to impact on gross revenues

Alternative 1 (No Action)	**Alternative 2** (Low and slow)	**Alternative 3** (Restricted and Closed Areas)	**Alternative 4** (Area and Fishery Specific)	**Alternative 5** (CH Catch Limit)
Relatively little impact on 'historical' maximum gross revenues; least revenues placed at risk; constitutes analytical 'baseline'	Largest reduction in maximum gross revenues; second largest revenues placed "at risk"	Relatively little impact on maximum gross revenues, as compared to the no action; largest revenues placed "at risk"	Largest projected maximum gross revenues; intermediate level of gross revenues placed "at risk"	Relatively little impact on maximum gross revenues, as compared to the no action; intermediate level of gross revenues placed "at risk" (greater than Alternative 4)
1st	5th	4th	2nd	3rd

Possible long-term market changes

Significant reductions in product output may cause (both intermediate and final) buyers to look elsewhere for supplies, or switch to substitute products. Through time, users may alter their consumption patterns (e.g., tastes and preferences) and, as a result, buying habits, in response to higher prices, reduced supplies, or changes in real or perceived product quality. These may be behavioral changes that cannot be overcome easily, if and when supplies return to their previous levels. That is, the result may be permanent structural damage to markets and loss of market-shares to competing suppliers from other regions or nations.

A thorough treatment of this issue is beyond the capabilities of this analysis. Nonetheless, it should be noted, virtually all of the product forms deriving from GOA and BSAI pollock, Pacific cod, and Atka mackerel catches trade in world markets, where supply and demand relationships are further complicated and confounded by macroeconomic influences. Markets are very dynamic institutions. Changes in supply on the order of those which may be associated with several of the proposed SSL Protection Measures could certainly result in price, market share, and demand substitutional responses, which cannot be quantitatively anticipated.[11] Each has the potential to impose substantial and lasting adverse economic impacts on the U.S. domestic groundfish industry operating in the EEZ off Alaska, and could impact the United States' balance of trade unfavorably (e.g., export sale decline, imports increase).

[11] Changes in the product mix or the amounts of individual products on the market are difficult to anticipate or value. Further complicating the attempt to estimate impacts is the fact that a significant share of total output from BSAI and GOA fisheries is exported. Changes in consumer surplus (and, for that matter, producer surplus) attributable to a regulatory action, but which accrue to non-U.S. consumers (producers), are not to be included in regulatory impact estimates, according to OMB direction.

The products forms that derive from the three species are varied, and enter different market environments. As such, the long-term damage to market share will be more or less significant, depending upon the product form and principal market in question. For pollock, surimi and roe are sold predominantly to Japanese markets, but there are (in general) no close substitute products and limited alternate supplies from other countries.

The same cannot be said for pollock fillets. Several large fast food retailers in the United States depend upon supplies of deep-skin fillets, and use pollock primarily because of its reliability of supply and uniformity of portion and quality. If that supply were to be interrupted, a shift would likely take place, perhaps permanently, to other supplying countries, product forms, and/or substitute species.

A similar circumstance might befall U.S. producers of Pacific cod products, which must compete in well-established markets characterized by long-standing relationships. The inroads that Pacific cod suppliers have made in filling the void left by the declining Atlantic cod supplies could very well be lost, at least for some time. Recovery of market share, once lost to a competitive supplier or substitute species, is not certain, simple, nor costless.

1.3.3.2 Product Quality and Revenue Impacts

The suite of SSL Protection Measure alternatives, proposed in lieu of the 'status quo', impose restrictions on the timing and location of vessel operation which might lead to a decline in product quality and associated reductions in the price industry receives for fishery products. Changes in product quality may occur for several reasons:

- fishermen may be required to fish farther away from processors, necessitating their traveling greater distances to deliver their catch.
- fishermen may be impelled to fish on stocks of sub-optimal sized fish.
- fishermen may be induced to target on stocks during periods when fish are not in optimal physical condition (e.g., post-spawning).

Longer travel to deliver fish

The interval between catching and initiation of processing is, reportedly, negatively correlated with product quality (and, thus, value). Some reports suggest that, on a 'product for product' basis, the quality of Pacific cod and pollock harvested and processed at-sea is uniformly higher than that of product produced onshore, owing primarily to the significant difference in the interval of time between catch and processing.[12] For those vessels which do not have the capability to process their own catch, given a fixed catch rate and hold capacity, any action which substantially increases the time between catch and delivery imposes costs, both on the harvester and the processor. Beyond some point (which varies by vessel size, configuration, condition of the target fish, and weather/sea conditions) delivery of a "usable" catch (i.e., one with an economic value to the fisherman and processor) is not feasible.

In this latter connection, a concern common to all operators delivering catch ashore for processing is the effective time limit which exists from "first catch onboard", until offloading must take place to deliver a "salable" catch. Informed sources in the industry place the maximum interval at 72 hours (at least in the case of pollock). Clearly, if fishing grounds which remain open under one or another of the SSL Protection

[12]Per. comm. Bill Atkinson, July 2000

Measure alternatives are more remote from sites of inshore processing facilities, greater portions of this 72 hour window will be consumed in transporting catch from the grounds to the plant. For smaller vessels, with more limited holding capacity and slower running speeds, this limit will impose relatively greater constraints (i.e., operational burdens). The result may be an effective intra-sectoral redistribution of catch share. That is, while in some instances sector-specific apportionments of TAC have been provided for in regulation (e.g., BSAI Pacific cod allocations, by gear and processing mode), closures (or other operational restrictions) of fishing grounds adjacent to inshore processing facilities may inadvertently redistribute the catch within a sub-sector, from the smaller, least operationally mobile vessels, to the larger, faster, more seaworthy elements of the fleet. In the longer run, this may have the added (undesirable) effect of inducing further 'capital stuffing' behavior within the industry, as those disadvantaged small boat owners perceive the need to invest in added capacity to continue to participate profitably in the fishery.

Several of the alternatives to the 'status quo', under consideration herein, contain explicit provisions which appear to have the potential to mitigate some (but clearly not all) of these adverse effects. These alternatives are "ranked", on a relative scale, in terms of this (and the following cost and benefit) criteria in Table C-22. The SSL protection provisions (which differ in detail among the several alternatives) appear, nonetheless, to recognize the potential disproportionate burden which could be imposed upon those specific operations with limited mobility (e.g., boats less than 60', dependent upon delivering catch to onshore processors immediately adjacent to one or more of the proposed 'limited fishing zones'), should the regulatory provisions be uniformly imposed, without recognition of the inherent differences in capacity and capability reflected in the fleet.

Change in average size of fish

A corollary effect of altering the timing and/or location of catch (which each of the four alternatives to the status quo does to one degree or another) might accrue, should the average size of fish in the catch fall below the "minimum" requirement for specific product forms (e.g., deep-skin fillets). These minimums are often dictated by the marketplace, but may also be directly linked to the technical limits of the available processing technology.[13] It is the case that these impacts could accrue to any or all segments of the fishery. For example, on average, fillet production "requires" a larger pollock than does, say, surimi production. If temporal and/or spatial dispersion (provided for in any specific alternative under review) results in a significant decline in the average size of fish harvested by a given operation, there could be adverse effects on product mix, quality, grade, and value.

There was some preliminary information, compiled during the American Fisheries Act analysis, which suggested that during the "A" season, in the EBS, pollock harvested outside of the CH-CVOA were somewhat smaller, on average, than those taken inside that area. The difference did not appear to be "significant" enough to represent a serious economic or operational burden to the industry, at that time. However, this result may not be indicative of the outcomes under (some of) the present proposed actions. This may be so because the catch composition "difference", cited from the AFA analysis, while reflecting "area" differentials (i.e., inside CH-CVOA versus outside), did not include any attributable change in fish size associated with temporal changes in fishing patterns, which might be prescribed under one or another of the SSL action (e.g., Alternative 2, prescribing four equal season allocations, with no rollover). It is the case that data on commercial catch composition, for the areas and times into which the pollock, Pacific cod, and Atka

[13]For an extensive discussion of this topic, see the Final EA/RIR prepared for the Improved Retention/Improved Utilization (IR/IU) FMP for the Bering Sea Groundfish Fisheries, NPFMC. September 1996.

mackerel fisheries may be displaced under the SSL Protection Measure alternatives, are not readily available. In many respects, the alternative area openings and closures, zonal restrictions, and schedule changes in timing of TAC releases do not coincide with recent historical commercial fishing experience. As a result, there are no empirical data upon which to "predict", or even "speculate" about probable fish size (among other attributes of the harvest) in these areas and at these times.

In the limit, of course, some operations may be unable to produce any marketable product from a significant portion of their catch, should average fish size drop below market or technical limits (e.g., a "fillet-only" boat might be unable to utilize much of its catch if its average size-per-fish was below the production specified minimum size). In such cases, given the prohibition under IR/IU on discarding Pacific cod or pollock, such a vessel would, in effect, face an operational shut down, being simultaneously unable to "utilize" its (herein assumed, undersized) catch, or legally to "discard" any of it.[14]

While Atka mackerel is not governed by IR/IU restrictions, those close to the industry suggest that there currently exists a "marketable minimum size" for this species; and if the average size fish falls, due to, for example, temporal or geographic displacement of fishing effort prescribed by the SSL Protection action, one can anticipate increased discards, with associated higher operating costs per unit of retained catch and product output.[15]

Targeting post-spawning fish

Traditionally, two of the three target fisheries of concern here (i.e., pollock, and Pacific cod) tend to focus effort on spawning aggregations, containing high concentrations of "roe-bearing" fish, in the late winter and early spring of the year. The post-spawning fish themselves (not considering the absence of roe and milt) are reported to be of lower value. For example, it has long been asserted by the industry that, at least in the BSAI,[16] post-spawn pollock are of poorer physical condition (e.g., soft flesh, high water content) and, thus, of significantly lower value than winter fish, or those taken later in the fall fishery. Cod fishermen report equivalent reductions in flesh quality, post-spawning, and accompanying dramatically diminished value. Both species reportedly "improve" in quality (and value), the later into the second half of the year they are taken. Therefore, any action which displaced catch from periods of relatively high fish quality (e.g., January through perhaps March), to periods where the average quality is lower (e.g., June and July), would impose costs. In fact, aspects of several of the proposed alternatives to the status quo make provisions for release of significant portions of TAC during (in the case of pollock and cod) the post-spawn/pre-recovery (and in the case of Atka, during the summer spawn) seasons. The greater the departure from the traditional exploitation patterns in these target fisheries (in terms of availability of TAC amounts, as well as timing of TAC releases) the more potentially adverse the economic consequences for the industry.

Under an open access management structure (which, at present, largely prevails in these fisheries) the difficulty is, even when it is clear to all concerned that there are real economic gains to be had from postponing initiation of fishing until, in this example, the flesh quality improves, this outcome will not likely

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[14] Currently, both pollock and Pacific cod are governed by provisions of the IR/IU program, which requires full retention of all pollock and Pacific cod catches, in all groundfish fisheries in the U.S. EEZ off Alaska. Only in cases where fish are "tainted", and thus unsuited for use in production, may pollock and Pacific cod be discarded. And then, the reason for, and quantity of, any such discards must be logged and reported by the operator.

[15] John Henderschedt, "Personal Communication," Groundfish Forum, 4215 21st Avenue West, Seattle, WA 98199, June 2001.

[16] Informed sources suggest that in the GOA there is not the same concern about pollock taken in the post-spawn period (Chris Blackburn, "Personal Communication," P.O. Box 2298, Kodiak, AK 99615, 1998).

emerge. Each operator, seeking to maximizes his or her 'share' of the take from the common pool, will be compelled to begin fishing before the fish have returned to optimal condition, despite the potential collective benefit from a delay. Behavior which is in the sector's or industry's (and society's) collective best interest is individually irrational, under these conditions. That is, while the "best" solution might be a voluntary delay by everyone in initiating the fishery, the underlying 'race-for-fish' likely will induce all participants to beginning fishing as soon as regulations permit and before the stocks have recovered. This will result in harvesting fish of lower quality and value, and may mean a further attributable loss to consumers. None of the proposed SSL Protection Measure alternatives address this fundamental structure problem, inherent in open access fishing.

1.3.3.3 Operating Cost Impacts

The discussion in the two preceding sections examined the potential '*revenue*' impacts associated with the suite of SSL Protection Measure alternatives. Several possible impacts were addressed: (1) higher prices, (2) reduced production, (3) long term structural changes in markets and market share, and (4) product quality impacts. It is also true, however, that any regulatory action that requires an operator to involuntarily alter his or her fishing pattern (whether in time or space) will impose *'costs'*. The restrictions included among the proposed SSL Protection actions, will almost certainly affect the operating costs of the fishing fleets exploiting the Pacific cod, pollock, and Atka mackerel resources, as compared to the status quo condition. The following section addresses this issue.

Variable costs

Economists tend to divide costs into two general categories, 'fixed' and 'variable', where fixed costs tend to arise from investment decisions and variable costs arise from (short run) production decisions. As the terms imply, fixed costs are those which do not change in the short run, no matter what the level of activity. Variable costs, on the other hand, are those costs which do change directly with the level of activity, recognizing that variable inputs must be used if production exceeds zero.

While empirical data on operating cost structure, at the vessel or plant level, are not available, "cost trends" for key inputs may shed some light on the probable impacts of the suite of proposed SSL Protection Measure alternatives on the industry, in the aggregate and on average. One such "trend analysis" is presented below.

Of all the categories of variable factor costs, 'fuel' ranks at or near the top of the list of operating expenses in the fisheries under consideration in this action. Furthermore, even a qualitative evaluation of the elements of the suite of SSL Protection actions (e.g., time and area closures, no fishing zones, no transit zones, modified patterns of TAC releases) suggest that the proposed regulatory changes will likely result in: (1) more total trips between port and fishing grounds in response to increased numbers of 'openings' during the fishing year; (2) longer average trip duration; and (3) greater total distances traveled per trip (perhaps under more extreme operating conditions).

Projecting how changes in fuel usage will impact operating costs (and thus the net revenues of the operator) actually depends on two factors. The first is how much fuel must be burned, per unit catch. While it is not possible to place a numerical estimate on this factor, it is reasonable to conclude that (on average) total fuel consumption will *increase* (although likely to differing degrees), relative to the status quo, under each and every one of the proposed alternatives.

The second factor determining the effect on this variable cost component is the price paid for each gallon of fuel. Given that total gallons consumed will (likely) increase, fuel cost per gallon will largely determine how substantial will be the economic burden of additional operating time, for any given vessel. One can chart the recent path of fuel prices in the region, which may provide a gross "indicator"of this impact (at least in the short term).

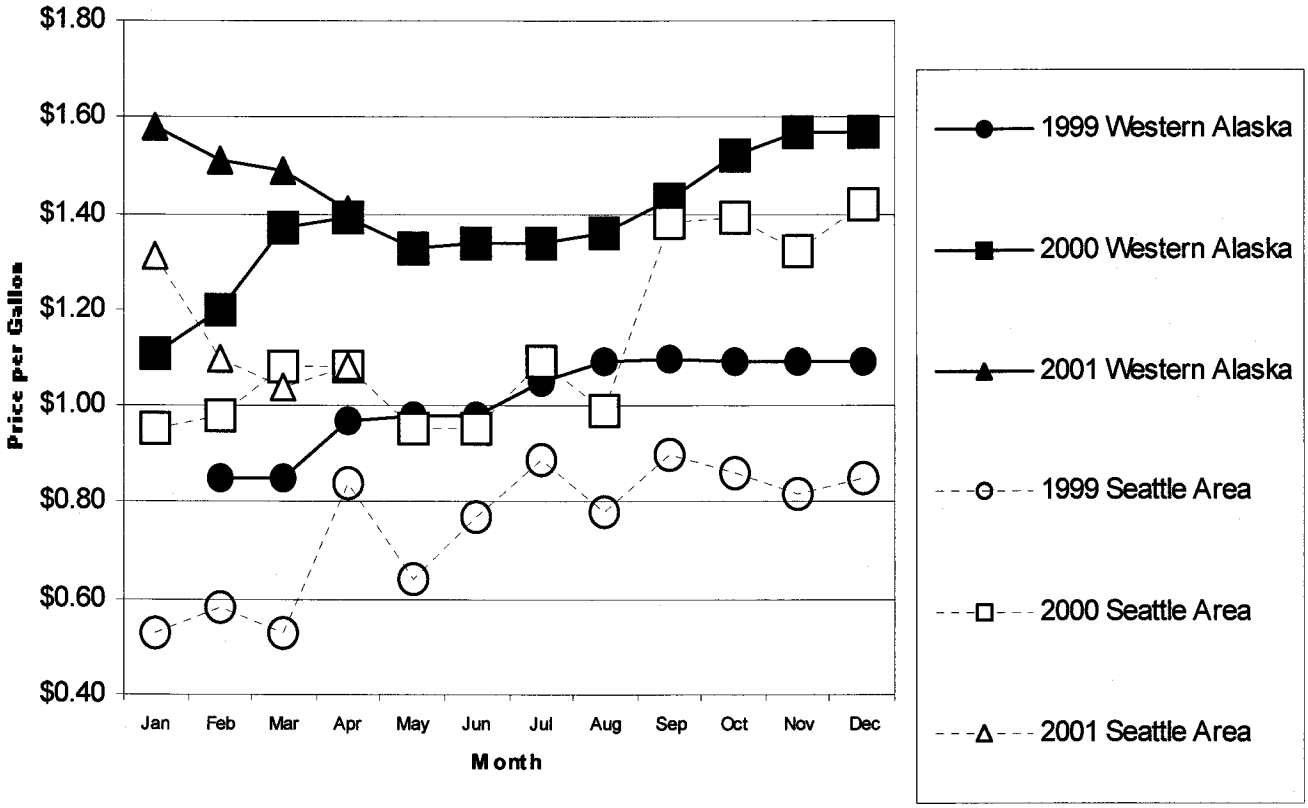
Port by port surveys of fuel suppliers, conducted by the Pacific States Marine Fisheries Commission, Economic Data Program, suggest that fuel prices have been trending up, strongly, over the past several seasons. There is reason to expect that this pattern will continue through the near term. Regional fuel prices (for #2 marine diesel) for Seattle and for ports in central and western Alaska (including the Bering Sea) are summarized in Tables C-20 and C-21, and Figures C-1 and C-2.

Table C-20 Average marine fuel price, by region

2001	Jan	Feb	Mar	Apr	May	Jun
Western Alaska	$1.58	$1.51	$1.49	$1.41	**	**
Seattle Area	$1.31	$1.10	$1.04	$1.08	**	**
2000	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**
Western Alaska	$1.11	$1.20	$1.37	$1.39	$1.33	$1.34
Seattle Area	$0.95	$0.98	$1.08	$1.08	$0.95	$0.95
	Jul	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Western Alaska	$1.34	$1.36	$1.43	$1.52	$1.57	$1.57
Seattle Area	$1.09	$0.99	$1.38	$1.39	$1.32	$1.42
1999	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**
Western Alaska	**	$0.85	$0.85	$0.97	$0.98	$0.98
Seattle Area	$0.53	$0.58	$0.53	$0.84	$0.64	$0.77
	Jul	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Western Alaska	$1.05	$1.09	$1.10	$1.09	$1.09	$1.09
Seattle Area	$0.89	$0.78	$0.90	$0.86	$0.82	$0.85

Note: **Data not collected.
Source: Pacific States Marine Fisheries Commission, Economic Data Program.

Figure C-1 Average before-tax cash price based on purchases of 600 gallons of #2 marine diesel



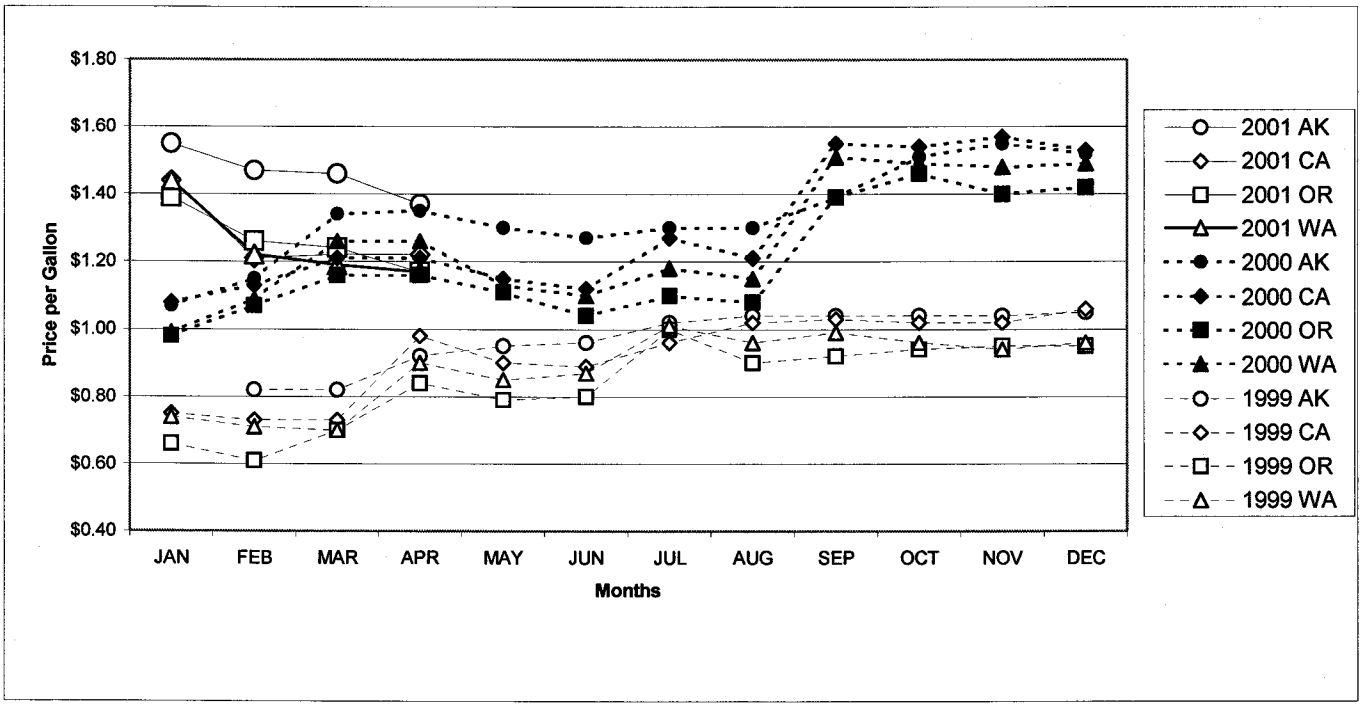
Source: Pacific States Marine Fisheries Commission, Economic Data Program

Table C-21 **Average marine fuel price, by west coast state**

2001	Jan	Feb	Mar	Apr		
AK	$1.55	$1.47	$1.46	$1.37		
CA	$1.44	$1.21	$1.22	$1.22		
OR	$1.39	$1.26	$1.24	$1.17		
WA	$1.44	$1.22	$1.19	$1.17		
2000	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**
AK	$1.07	$1.15	$1.34	$1.35	$1.30	$1.27
CA	$1.08	$1.13	$1.21	$1.21	$1.15	$1.12
OR	$0.98	$1.07	$1.16	$1.16	$1.11	$1.04
WA	$0.99	$1.09	$1.26	$1.26	$1.13	$1.10
	Jul	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
AK	$1.30	$1.30	$1.39	$1.51	$1.55	$1.52
CA	$1.27	$1.21	$1.55	$1.54	$1.57	$1.53
OR	$1.10	$1.08	$1.39	$1.46	$1.40	$1.42
WA	$1.18	$1.15	$1.51	$1.49	$1.48	$1.49
1999	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**
AK	**	$0.82	$0.82	$0.92	$0.95	$0.96
CA	$0.75	$0.73	$0.73	$0.98	$0.90	$0.89
OR	$0.66	$0.61	$0.70	$0.84	$0.79	$0.80
WA	$0.74	$0.71	$0.70	$0.90	$0.85	$0.87
	Jul	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
AK	$1.02	$1.04	$1.04	$1.04	$1.04	$1.05
CA	$0.96	$1.02	$1.03	$1.02	$1.02	$1.06
OR	$1.00	$0.90	$0.92	$0.94	$0.95	$0.95
WA	$1.01	$0.96	$0.99	$0.96	$0.94	$0.96

Note: Data not collected.
Source: Pacific States Marine Fisheries Commission, Economic Data Program

Figure C - 2 Average before-tax cash price based on purchases of 600 gallons of #2 marine diesel



Source: Pacific States Marine Fisheries Commission, Economic Data Program.

Fixed costs

As suggested earlier, many costs confronting operators in these fisheries are fixed; that is, they do not change with the level of production. Fixed costs include such expenses as debt payments, the opportunity cost of the investment in the vessel (or plant), the cost of having the vessel or plant ready to participate in the fisheries, some insurance costs, property taxes, and depreciation. Following an action which negatively affects, for example, CPUE, these costs must be distributed across a smaller volume of product output, raising the average fixed cost per unit of production.

As previously noted, available information on the cost structure of operations fishing for and processing groundfish is very limited. This is largely so because cost information is often considered highly proprietary by industry members and is, under the best of circumstances, expensive to collect and analyze. Only scattered anecdotal information at the operation level, is available on groundfish fishing costs. It is, therefore, impossible in the balance of this section to do more than provide a qualitative discussion of the impact of the proposed SSL Protection Measure alternatives on "operating costs".

The Principal Sources of Direct Cost Impacts

It has been suggested by some in the industry that fishing costs may increase so much, as a result of the provisions contained in one or another of the SSL alternative actions, that fishermen will not be able to completely harvest the TACs, for some target species, at least in some areas or during some open periods.

The loss of the revenues in these instances has been discussed above (and gross revenue "at risk" estimates, by SSL Protection Measure Alternative, are presented in Section 1.4.2).

On the cost-side, it is the case that those revenue losses may be offset, to an unknown extent, by associated reductions in the variable operating costs these operations would otherwise have incurred, in the absence of the proposed regulatory change. From the operator's perspective, for example, fewer days fishing would mean reductions in variable costs (e.g., stores, bait, lubricants and fuel expense), reduced wear and tear on vessels and gear, and reduced processing, packaging, and storage expenses for the product. It would also mean reduced payments to labor (although the other side of that coin reflects foregone wages to the skipper and crew, as well as the social value of other goods and services the fishermen might have produced).

On the other hand, the cost of fishing for what continues to be caught will tend to *increase,* for several reasons. This will reduce the net value of each pound harvested and processed. These reasons include:

- Increased travel time to and from more distant fishing grounds
- Costs of learning new grounds
- Costs of undertaking bycatch avoidance measures, or premature closure due to excessive bycatch, if these efforts are unsuccessful
- Reduced CPUE due to less concentrated target stocks;
  (including a discussion of "platooning" as a possible partially mitigating response)
- Costs of stand-downs and lay-ups
- Maximum daily catch limits
- Potential gear conflicts
- Costs of fishing Pacific cod, pollock, or Atka, when other economically important fisheries are open
- Processing facilities built for higher throughput
- Reduced safety of fishing operations (dealt with in detail under its own heading at Section 1.3.4.4)
  Increased travel time to and from more distant fishing grounds

Vessels that had formerly been able to fish areas nearer shore, and in relative proximity to their port of operation, may now be pushed farther offshore and/or into more remote fishing areas, as a result of specific provisions contained in the suite of SSL alternatives under consideration by the Council. Simply 'running' to one of the remaining open fishing areas, prospecting for harvestable concentrations of Pacific cod, pollock, or Atka mackerel, then (depending on operating mode) running back to port with catch or product will, as previously noted, require increased expenditures of fuel and other consumable inputs, as well as more time on the water (i.e., trips may be longer, all variable operating costs and wear and tear on equipment and crew will increase).

These structural changes in fleet operating patterns will likely require a greater total number of days for a given vessel to take its 'share' of the available TAC, all else equal.[17] How many additional days may be required would vary by stock and ocean conditions, rates of success in locating fishable concentrations of the target species in remaining open areas or time periods, operational mode and capacity, the level of aggregate effort exerted by the fleet or sub-sector in the remaining open areas, etc. But clearly, as catch per unit effort declines, cost per unit of catch will increase.

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[17] In the limit, of course, the potential clearly exists for one or more sectors to fail to catch 100% of its allocation. Indeed, under existing RPA restrictions, implemented in 1999 for the Atka mackerel fishery in the Aleutians, significant portions of the allocated TAC were not harvested, reportedly, due to imposition of CH-area restrictions, resulting in significantly diminished CPUE, as well as excessive bycatch of rockfish.

Travel costs may be increased by rules prohibiting the transiting of critical habitat by fishing vessels (a provision which each of the five SSL Protection Measure alternatives explicitly contains). In the limit, smaller vessels may be so disadvantaged by the distances that must be traversed between port and open fishing grounds, when intervening areas are closed to transit, that they may be unable to operate economically (perhaps even physically) under these circumstances. These vessels could be effectively closed out of the fishery.

Even vessels which have the capacity to circumnavigate "no transit zones" to reach open fishing grounds may incur prohibitively high operating costs (e.g., excessive fuel consumption), increased risk (e.g., should sea or weather conditions change unexpectedly), and reduced product quality (i.e., as hold-time increases). Anecdotal reports offered at the December 2000 Council meeting (specific to the proposed BiOp RPA open, closed, and "no transit" zones) suggested that, in some cases, a vessel wishing to participate in a commercial opening might be required to sail from port to one open area, then (depending upon success, available quota, etc.) be required to retrace its route, back to the vicinity of the original point of departure, before sailing to an alternative open area, even though a much shorter direct route was available, albeit through a designated "no transit zone." In an open access fishery especially, the old adage "time is money" is fundamentally true, thus longer distances and more time in transit mean higher operating costs and less time "fishing".

Costs of learning new grounds

It is axiomatic, but fishermen fish when and where they believe the fish are most valuable and most readily available. Under provisions of the suite of SSL measures under consideration by the Council, open and close areas, timing (and size) of TAC releases, gear restrictions, and mobility constraints will compel operators to significantly alter the timing, location, and pattern of operation they would (as profit maximizing entities) voluntarily choose to undertake. That is, in many instances, fishermen will be required to fish on grounds with which they are unfamiliar, and at times of the year when they haven't previously fished for the target species. Fishermen will face a learning curve on these new grounds and at these new times. They will have to become accustomed to a new physical geography underwater and perhaps more extreme and/or exposed sea surface conditions; to new fish locations, behaviors, and habits; and to new patterns of bycatch. While they learn to operate within these new parameters, they will likely incur increased operating costs. Gear may be lost or damaged more frequently, catch per unit of effort (CPUE) will likely be lower, and bycatch of other species may be higher. Higher bycatch may force early closures of fishing grounds, and with fewer optional 'open' fishing areas available, it will be more difficult (and thus more costly) for operators to move off 'hot spots' to reduce or avoid bycatch. Even if the bycatch is composed of species for which there is no potential risk of regulatory 'closure', the additional resources required to land, sort, and discard unwanted catch will increase operating costs.

Because, in many instances, large volumes of fish will have to be taken in places and at times when they have never been taken before, there is little available information for fishermen to use to make inferences about these issues, beforehand. Thus, they will have very little opportunity to 'avoid' incurring the costs of prospecting new areas (at new times) even if, subsequently, the effort proves uneconomical, from the standpoint of catch success.[18]

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[18] Note, elsewhere it has been argued that, "...operating costs may be reduce (avoided), as production levels decline..." While possible for, say, a processing plant, which may take a portion of its capacity off-line in a cost

(continued...)

Costs of bycatch avoidance measures

While the selectivity of the gear fished for these target species varies, groundfish fishermen unavoidably take other species, as incidental catch, when they fish for pollock, Pacific cod, and Atka mackerel. In some instances (e.g., bycatches of halibut, salmon, herring, and crabs), groundfish fishermen are subject to limitations on the amounts of bycatch that they may take. When the bycatch limits (or caps) are reached, the fishery is closed. Fishermen can, to a greater or lesser degree, reduce bycatch by modifying their gear, or the way they use it, and by learning the times and places when unacceptably large bycatches might take place. Both bycatches, and the avoidance measures that they make necessary, impose costs on the operations.

BSAI Pacific cod pot operators suggest that, for example, if they are pushed north, out of eastern Bering Sea (EBS) critical habitat areas, their crab bycatch rates will become prohibitive and they will actually be forced to forego significant amounts of Pacific cod catch.[19] Similarly, Pacific cod trawlers and longline operations report halibut, salmon, and crab bycatches become prohibitive when fishing from late-spring through early-fall months (periods into which several of the SSL alternatives would reapportion significant shares of the annual Pacific cod TAC, thus effectively compelling effort to follow).

Pollock operations, while not typically concerned with crab and halibut bycatch (at least since the prohibition of 'bottom trawling'), may face problems with salmon bycatch, when fishing farther to the north and west (outside EBS SSL CH and SCA), and in later periods of the year (e.g., mid- to late-summer). The Council has, in recent years, put increasing pressure on the Bering Sea pollock trawl fleets to reduce Chinook salmon bycatches. It has been even more aggressive concerning "other"(primarily chum) salmon bycatch, more recently, because of the critical problems with returns of chums in Western Alaska and A-Y-K.[20]

Under provisions contained in the AFA, Bering Sea pollock fishing cooperatives have been able to established a "salmon savings plan", proposed to facilitate attainment of the Council's objectives for salmon bycatch reduction. If pollock trawling is largely excluded from historically traditional fishing grounds in the EBS (e.g., CHCVOA, SCA), salmon bycatch may be higher than if the fleet has (fleets have) more flexibility to move away from salmon bycatch 'hot spots'.

Except for relatively small quantities of halibut, PSC bycatch has not traditionally been a serious concern in the Atka mackerel fishery, with this fishery never having been closed on the basis of "PSC bycatch".[21] It should be noted, however, that according to the NMFS' in-season managers, bycatches of sharpchin/northern rockfish (SCNO) were of sufficient concern in this fishery in 2001 that the industry, itself, asked for a closure of the "A" season fishery, so they could be assured of having enough SCNO to support their "B" season fishery in the eastern Aleutian management area, where Atka traditionally bring a much higher price. SCNO, which is composed predominately of northern rockfish, is generally discarded in the Aleutians, because of size and processing constraints (although it is typically retained in the Gulf). In any case, bycatch caps for

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[18](...continued)
savings effort to adjust optimal through-put to changing levels of fish deliveries, the fishing vessel operator must commit the majority of his/her variable input resources "before" obtaining any feedback as to probable return (i.e., it is much less likely operating costs can be avoided or significantly reduced, in this case, short of tying the vessel up).

[19] Arni Thompson, "Personal Communication," 3901 Leary Way NW, Suite 6, Seattle, WA 98107, July 2000.

[20] ADF&G's "Arctic-Yukon-Kuskakwim" fishery management area.

[21] Mary Furuness, "Personal Communication," NMFS, Alaska Region, P.O. Box 21668, Juneau, AK 99802, April 11, 2001.

this complex, in effect, work as a prohibited species cap in the Atka mackerel target fishery.[22] Industry sources suggest that SCNO bycatch is a real concern, under any of the alternatives, as rockfish are much more abundant (and therefore bycatches will potentially be much higher) outside of CH, in the Aleutians, than inside.[23] This increases the likelihood of SCNO-induced closures of the Atka fishery, unless effective avoidance measures can be developed and implemented.

Finally, with temporal and geographic dispersion provisions associated with the SSL action, there is the potential for increased interactions with other 'protected species' (e.g., short-tailed albatross, ESA listed PNW Chinook salmon)[24], which could require Section 7 consultation (with the potential to trigger further and more extensive fishing closures). This is especially of concern with respect to two of the target fisheries under review in connection with the SSL Protection Measures, but is not necessarily limited to these fisheries. Specifically, the Pacific cod freezer longline fleet has reported that, when that fishery is moved north (onto the 'flats') and into the summer months, the frequency of gear encounters with seabirds (and of particular concern, the short-tailed albatross) increases, as does the risk of a "take".

The second is the pelagic groundfish trawl fisheries (e.g., EBS pollock) which appear to have the greatest potential risk for interception of ESA listed PNW Chinook salmon. Chinook salmon interceptions are relatively high in both the winter season (January through April) and then again in the late fall fishing period (September-December). (Incidental bycatches of chum salmon would be expected to be highest in the fall fishery). Were a 'take' of a listed species to occur in these (or any other fishery), economic impacts could potentially extend to fleets targeting species other than pollock, Pacific cod, or Atka mackerel.

Reduced CPUE due to less concentrated target stocks

The economic, operational, and socioeconomic response of (and resultant outcomes for) individual operators may take several forms, following adoption of the finally determined SSL protection action. For example, anecdotal information supplied by the industry in public meetings and through individual contacts, suggest that CPUE may decline, in some cases substantially, as a result of significant fishing effort being forced into unfamiliar or unfavorable areas (or periods of the year). The effect of these declines, while perhaps present for all fishing sectors, will not likely be uniformly distributed across each management area, gear type, processing mode, or vessel size category and, thus, may carry with them very different implications for profitability, economic viability, and sustained participation in these fisheries.

For example, historically the Pacific cod fishery, for all gear groups, has been widely distributed (geographically) during the summer and early fall, because of the "post-spawn" dispersion of the cod resource, itself. In the period extending from 1995 through 1999, when there were no CH restrictions on Pacific cod fishing, significant amounts of longline catch occurred northwest of the Pribilofs and north of the SCA.

Pacific cod trawl fishing occurred both inside and outside SSL CH, although the summer trawl Pacific cod fishery is traditionally very small, reportedly because of low CPUE, owing to an absence of cod

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[22] Andy Smoker, "Personal Communication," NMFS, Alaska Region, P.O. Box 21668, Juneau, AK 99802, April 12, 2001

[23] John Henderschedt, "Personal Communication," June 2001.

[24] Cod longliners report interactions with albatross become a serious concern when fishing extends into late-spring and summer months.

concentrations. Indeed, according to industry testimony before the Council, trawl gear is, by-in-large, ill suited to targeting Pacific cod after the late-winter and early-spring nearshore spawning aggregations break up.

Empirical evidence supporting this assertion is present in the patterns of trawl sector allocations of cod TAC which are "rolled over" to fixed gear operators in the latter part of the fishing year. This occurs, reportedly, because Pacific cod catch rates are too low to sustain profitable effort with trawl gear. Incidentally, Pacific cod pot operators report the same problem. Namely, once cod spawning aggregations disperse, the catch rates for pot gear are, for the majority of operations, no longer sufficient to support an economically viable target fishery.

This may imply that the predicted 'adverse' economic effects imposed upon these two gear-specific sectors of the cod fishing industry (attributable to provisions of the SSL alternatives which tend to 'shift' catch into the latter half of the year) may not be as great (in this regard) as may first appear to be the case. That is, if Pacific cod trawlers and pot operators are traditionally, by-in-large, only marginally involved in the fishery during the second half of the year, in any case, then the proposed SSL Protection Measures may, in some respects, impose a smaller actual impact on these operators than has been suggested above.

Of course, this tentative conclusion rests on the implicit assumption that the Pacific cod pot and trawl sectors are able to prosecute economically viable fisheries, under the resulting regulatory constraints of whichever SSL action is finally adopted and implemented, during their traditional late-winter early-spring fishing period, when cod are aggregated and susceptible to pots and trawls. If that does not prove to be the case, then moving most, or even much, of the annual Pacific cod TAC release into periods when trawler and pot operators cannot economically prosecute a commercial fishery (e.g., unsustainably low CPUEs), will amplify, not diminish, the burden on these two gear sectors. That is, this anticipated "latter season decline in CPUE" carries with it economic implications which, while not primarily due to the provisions of the SSL action, may nonetheless in some ways be aggravated by it. Cod trawl and pot operators may take smaller shares (in both relative and absolute terms) of the TAC. Assuming the hook and line sector is able to exploit its natural advantage (during the period when cod are dispersed), there would be an expected inter-sectoral transfer of catch share and value, from trawler and pot operators, to hook and line operations, associated with this action. If the latter sector was not able to fully exploit this opportunity, some portion of the TAC would be foregone, representing a net loss to society. It is not possible to quantify this effect, nor to disaggregate the contributing parts, on the basis of available information.

Pollock, too, while perhaps more readily available outside of critical habitat and later in the fishing year than are Pacific cod, are found in less concentrated aggregations during the later-spring, summer, and early-fall period. Furthermore, even when fishable concentrations are available during this period, industry sources report that the fish tend to be of lesser value (e.g., smaller size, non-roe bearing, poorer flesh quality). CPUE is clearly lower than late winter/early spring fisheries, when pollock are in spawning aggregations. Thus, to the extent that the proposed SSL action redistributes effort (and pollock TAC amounts) into the late-spring and summer periods, and out of 'preferred' (e.g., nearer shore CH) areas, greater amounts of effort will be required to fully utilize the available TAC.

It is also widely reported (and apparently supported by catch data for periods following adoption of the SSL RPAs for this fishery) that Atka mackerel may be, in general, less readily available outside of areas designated as critical habitat in the Aleutians, where the fishery has traditionally been focused. The industry has asserted that CPUE for this fishery, in remaining open areas and during open periods, may be sufficiently reduced so as to make directed fishing uneconomical for some or all of the fleet. While this remains largely an empirical question, recent catch tends, especially in the western Aleutian's Atka mackerel target fishery,

post-SSL RPAs, suggests that a significant portion of the TAC has not been harvested. For example, in the western AI area, in 1999, almost 40% of the Atka mackerel TAC was unharvested (approximately 9,200 mt). In 2000, there was an estimated 68% (approximately 18,800 mt) of the TAC left (again, in the western AI) when the trawl CH closure went into effect on September 7.[25] On the order of 88% and 90% of the apportioned TAC was harvested in the eastern and central Aleutian areas, respectively, in 2000 (leaving approximately 1,900 mt and 2,300 mt unharvested, respectively).

Platooning of the western and central AI Atka mackerel fleets

As part of its recommended SSL Protection Measure alternative (i.e., Alternative 4), the Council's RPA committee included a special programmatic provision, in response, at least in part, to the recent adverse experiences of the Atka mackerel fishing fleet, cited above (for a detailed treatment of this element, see Section 4.11.2 of the SEIS). That provision of Alternative 4 proposes a rather unique approach, under which a system of "platoon" management would be implemented for critical habitat fishing in Areas 542 and 543 (central and western AI). Assuming, as the proposal does, that the annual Atka mackerel TAC would be split into two equal season allocations (made available January 20 through April 15 and September 1 through November 1), and further that the TAC would be apportioned inside CH and outside CH in a 60% : 40% ratio, respectively (and no fishing for Atka mackerel would be allowed in CH east of 178 degrees W. longitude, which includes Area 541 and a small portion of eastern Area 542), vessels would be required to register with NMFS to fish scheduled A or B seasons. Each such vessel would be randomly assigned to one of two "platoons" (or teams) within an area. Each platoon would, in effect, be allotted half[26] of the available TAC "inside CH", for each of these two management areas, establishing two directed fisheries, per area, per season. Each platoon will be authorized to fish in the assigned directed fishery in an area for a time period dependent upon the respective area's TAC apportionment and the fishing capacity of the vessels in the platoon. A vessel may register and be randomly assigned to a platoon in both 542 and 543. Vessels registered to fish during a season in both 542 and 543 would switch areas after the closure of the first directed fishery.

According to representatives from this sector[27], this proposal represents a conscious operational and economic "trade-off" by the industry, in several respects. First, without these 'effort' and 'TAC' apportioning provisions (that slow the fishery and allow it to fish for more than the current 40% of TAC in CH), the available amount of harvestable mackerel would not be sufficient to support a commercial fishery, given the much reduced CPUEs outside of CH in the Central AI and Western AI management areas; high bycatch rates of rockfish outside CH (which will lead to premature closures of the directed fishery before the TAC is attained); and the catching capacity of the C/Ps which fish this resource. This would likely mean that some

[25] It should also be noted that, non-CDQ trawling for Atka mackerel was closed in this management area for the rest of the 2000 fishing year, effective September 20, 2000, due to bycatch of sharpchin and northern rockfish.

[26] The "platoon's" TAC share would be proportional to the number of vessels in each platoon, if the numbers were not "equal".

[27] Per. comm., John Henderschedt, Groundfish Forum, Inc., June 26, 2001.

or all of this capacity would be displaced (again, according to informed sources[28]) into the flatfish fisheries, with significant and immediate adverse economic and structural implications for those existing fleets.

Second, platooning balances the need (desire) for a larger share of the mackerel TAC to come from CH, with the requirement that instantaneous effort and removal levels within CH, in any given statistical area, be controlled. Platooning, as recommended by the RPA Committee, helps to reduce effort levels in CH to approximately half of its maximum potential level, based on the number of vessels which choose to participate in a given opening, thus yielding the requisite SSL conservation and protection objectives which underlie the proposed SSL Protection Measure proposal.

A third example of the conscious economic "trade-off" being made by those supporting the Atka target "platooning" scheme, may be found in the way in which observer coverage requirements would be modified, under the provisions of Alternative 4. It is generally accepted that a higher level of observer coverage will be needed to provide data for effective in-season management of the fishery under the proposed platoon management scheme. In the words of a spokesman for those proposing a platoon system for this fishery, "Based on the industry's experience with earlier SSL CH closures and restrictions, the only way a viable fishery will be possible, especially given rockfish bycatch rates encountered outside of CH in 542 and 543, which likely will result in premature closures and even more foregone Atka TAC, is if a substantial portion of the area TAC's can be made available 'within' CH. To accomplish this, while simultaneously adhering

to the SSL conservation constraints, the industry is willing to carry two observers, per vessel, during the entire period when CH is open to the Atka target fleet."[29]

This is not a trivial additional operating cost to impose on these vessels (see Section 1.3.5, which contains information on additional observer costs. Carrying two certified observers fully doubles the traditional fishery observer expenditures, for each vessel. The expectation is, however, that the value of access to the mackerel resource inside CH in management areas 542 and 543 (in terms of improved CPUE, bycatch avoidance, and thus increase potential for TAC attainment) will more than compensates for the additional observer outlays.

Costs of stand-downs and lay-ups

One of the fundamental tenets of the original effort to develop a Steller sea lion RPA proposal was the recognition of the need for temporal dispersion of effort, during the course of the fishing year. In this connection, it was proposed that TACs be seasonally apportioned, distributing available allowable catch among multiple and, most importantly, distinct seasons. In the latter regard, it was recognized that, to be effective, seasonal TAC releases must be separated by *meaningful* closed periods. That is, without mandatory and enforceable intervals of 'no fishing' between each scheduled opening, it was argued, it might be possible for the industry to strategically manage each release in such a way as to effectively combine two 'periodic' (e.g., quarterly) releases into a single extended fishing period. It was further asserted, by proponents of a strict temporal separation of seasons, that the potential to do this was enhanced in those areas, and for those fisheries, where the ability to fish "cooperatively" exists, within a given sector (e.g., EBS pollock inshore and at-sea sectors), so that the 'race-for-fish' can be (largely) avoided. The absence of this (or some other)

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[28] Per. comm., John Gauvin, Groundfish Forum, Inc., June 7, 2001 and September 17, 2001.

[29] Per. comm., John Gauvin, Groundfish Forum, Inc., September 20, 2001.

cooperative mechanism (e.g., in the GOA) probably diminishes the risk of this potential strategic behavior to near zero.

Nonetheless, any effective combination of TAC release would, it was argued, be in direct conflict with the stated objectives of the temporal dispersion principle for protecting Steller sea lions. This line of reasoning continues to be reflected (either implicitly or explicitly) in the current suite of SSL Protection Measure alternatives. Most directly, Alternative 2 prescribes (in combination with four seasons for pollock, Pacific cod, and Atka mackerel, each with equal seasonal TAC apportionments) a schedule of mandatory "two-week stand-downs ... between seasons, with no rollover of TAC allowed".

Whether formal "stand-downs" (as prescribed in Alternative 2) or widely separated TAC releases (as proposed under several of the other alternatives), from the perspective of the fishing industry, mandatory idle periods between openings impose costs. Clearly, the longer the duration of imposed idleness (and the more numerous these periods) the greater their potential economic and operational burden.

Presumably, there exists some form of a "step function" which characterizes these potential adverse impacts. That is, it may be likely that a mandatory stand-down of 24 hours, or 48 hours, or even 72 hours, would impose costs which could be readily absorbed by most operators participating in the pollock, Pacific cod, or Atka mackerel target fisheries (although all would likely prefer to avoid them). Indeed, over such a relatively brief interval, an operator might keep the crew productively employed with maintenance and/or other forms of preparation for the anticipated re-opening. Nonetheless, it is the case that over any such period, the plant or vessel must continue to pay its variable costs (e.g., wages and salaries, food and housing expenses, fuel and other "consumable" input costs, etc.) while producing no marketable output, and therefore earning no revenues.

Under such circumstances, at some point in time, each operator will reach a "break point", or threshold, beyond which the cost of "standing-by" becomes a significant economic burden. Precisely where this break point lies will likely vary, operation by operation. At present, no empirical information is available with which to predict when these thresholds might be attained by any given plant or vessel. However, when the threshold is reached, the operator will face a series of decisions with potentially significant economic costs and operational consequences.

These costs may be characterized as "staging expenses". For example, transporting crews, by air, to and from remote Alaska locations four times in a fishing year (rather than once or twice, as has historically been required) can represent a significant additional operating expense. In association with analysis of the Bering Sea Pollock/Steller RPA analysis, undertaken in late 1999 and early 2000, the At-sea Processors Association reported that each C/P which participates in the pollock target fishery carries a crew of 100 to 125 members. Motherships and inshore plants in that same fishery have at least as many transient employees. The Atka mackerel and Pacific cod target fisheries in both the BSAI and GOA, as well as the GOA pollock fishery, operate at a smaller scale, per operation, and thus have fewer employees per vessel, however, the total number of participating operations is vastly larger than in the EBS pollock fishery. Repeated movement of crew, on the scale suggested by these estimates, to and from staging areas in remote Alaska ports in response to stand down periods, clearly represent a potentially significant economic (and logistical) burden for these fleets (and plants).

Similarly, moving fishing supplies and support materials to and from the vessel's staging port (or onshore plant location) two or more times each season, as well as providing for secure stand-down status of the vessel (or plant) and its equipment between openings, could impose considerably higher operating costs (and thus

smaller profit margins). Moorage slips, especially for the larger vessels in these fleets, may be in short supply, given the limited physical facilities which currently exist in ports and harbors adjacent to these fishing areas. If entire fleets must lay-up for weeks (or even longer periods) between openings, existing moorage facilities may be overwhelmed. Even if adequate space can be found, it is probable that rental/leasing costs for that space will be bid up significantly. In the long run, this induced demand may result in investment in additional port and harbor facilities. Should subsequent changes in fishing patterns occur which substantially reduce demand for transient stand down moorage, some or all of these investments may be stranded (i.e., become excess capacity).

As suggested, onshore plants could experience equivalent logistical costs, depending upon their relative level of operational diversification, geographic location, length of current operating season, etc. It may, in fact, be the case, as was reported in testimony before the Council at its December 2000 meeting, that volumes of fish available for processing from reduced seasonal TACs, or widely separated openings, may be insufficient to justify the start-up and operational costs; and some plants may simply choose not to participate in one or more of the SSL regulated fisheries (or openings). This would not only adversely affect the revenues of the plant, but could result in losses to the fishermen, if alternative markets for their catch could not be found. Presumably, there exists a balance-point between the minimum necessary volume of deliveries of catch to a plant, the duration of idleness between delivery flows, and the ability to operate a facility at all. While likely varying from plant to plant, operator to operator, even species to species delivered, it is clear that if a plant cannot cover its variable operating costs, it is better off (from an economic perspective) to cease operation, altogether. As staging cost (e.g., moving crews and supplies to and from the facility) increase, this operating margin shrinks. Data limitations preclude estimating which plants can (or will choose to) operate under any given set of scheduled TAC releases or associated stand-downs. It is apparent, however, that extended mandatory "stand-downs", or significant indirectly induced "lay-ups", between fishery openings (as provided for under several of the proposed SSL Protection Measure alternatives) will increase the likelihood that some may not.

Additionally, substantial operating losses may be expected to accompany these actions (i.e., those which impose strict "stand-down" periods or even significantly delayed openings of the target fishing seasons), especially if these coincided with periods when the targeted fish are at their peak economic value (e.g., during the height of the roe season, or late in the fall when fish size and flesh quality enhance fillet or surimi production, or otherwise increase market value).

It should be noted that the availability of community development quota (CDQ) for Atka mackerel, Pacific cod, and pollock in the BSAI management area(s) may enable operators with CDQ partners (or linkages) to bridge some portion of the "lay-up" periods that will inevitably occur when seasonal TAC apportionments are taken before the scheduled ending date of a given season. This mechanism may allow these operators to avoid some of the duplicative staging costs, associated with "lay-ups" between TAC releases, but likely, not all. Neither will this solution be available to all potentially affected operations. Furthermore, because the mandatory "stand-down" provisions, such as are contained in Alternative 2, do not provide for an exemption for CDQ fisheries, the operational staging costs imposed by mandated "stand-downs" will not be avoided or reduced by association with a CDQ group.

Impacts of Maximum Daily Catch Limits

Each of the proposed SSL Protection Measure alternatives under consideration by the Council rely upon some (more or less unique) combination of management tools to achieve the conservation objectives set out for this action. Among these are time and area closures, global control rules and strict TAC ceilings, season and sectoral allocations of TAC, vessel size and gear limitation, and VMS requirements. In addition to this list,

Alternative 2 would include fishery and area specific 'maximum daily catch limits' in the management mix. While monitoring and enforcement considerations of such a provision are treated elsewhere in the analysis (see Section 4.11.2 of this SEIS), the purely economic implications of such limits require some attention here.

To place this issue in context, it must be acknowledged that the 'race-for-fish', induced by open access management in the U.S. EEZ (as elsewhere), has created a well documented range of problems for the development, exploitation, and conservation of the nation's living marine resources. Among these are tendencies for: (1) excess capacity and over-capitalization; (2) inefficiencies and waste in both the harvesting and processing of the target catch; (3) excessive bycatch of both non-target and "prohibited" species; (4) loss of product quality and consumer value, as the need to move large catch volumes through processing lines, at peak throughput rates, prevented use of techniques which could increase recovery, enhance product quality, and improve revenue flows; among other effects. While not unique to the BSAI and GOA groundfish fisheries, all these undesirable traits have been present in their recent histories (and many continue today).

Nonetheless, recent efforts have been made to reduce these open access induced 'tendencies', and in so doing, to increase the economic and operational efficiency of the harvesting and processing sectors (e.g., reduce waste, avoid bycatch, and improve product recovery rates and quality). The clearest example may be reflected in the fishing "co-operatives", provided for under the AFA, for both inshore and at-sea pollock operators in the BSAI. Other efforts, for example, informal agreements among operators to voluntarily move off bycatch 'hot spots', IR/IU, sablefish IFQs, etc., have contributed to movement (albeit, slight movement in some instances) towards a more "rationalized", more economically efficient commercial fishing sector.

In the face of both formal and informal efforts to slow and control the 'race-for-fish' (and with it, all the undesirable and inefficient aspects of 'open access' management) a regulatory provision which imposes "binding"[30] aggregate maximum daily catch limits on a fishery would tend, all else equal, to have exactly the opposite effect. That is, binding limits would tend to accelerate the race for access to the limited available catch, inducing behavior which would likely adversely affect operational efficiency, reduce recovery rates, diminish both the quality and quantity of output per unit of catch, restrict the variety of products supplied, and reduce incentives to avoid bycatch. If the maximum daily catch limits are sufficiently constraining, relative to the effective capacity in the fleet (at least in the short run), catch will once again go to the fastest, largest, most technologically sophisticated operations, at the direct and immediate expense of the smaller elements of the fleet.

In the limit, of course, if the maximum daily catch limits are too small to support a commercial fishery on a scale anything like those currently conducted (and to which the present harvesting and processing sectors are scaled), then either the available TAC will not be utilized (with all the adverse economic implications for consumers, fleet sectors, dependent communities, etc., discussed above), or, perhaps more likely, a much smaller fleet will ultimately emerge, scaled to the size of the available resource. This would not be an instantaneous, nor costless, transition. Among the myriad effects of such a down-scaling would be concerns about where the displaced capacity might migrate and with what economic and operational implications for those areas and fishing fleets (see also Section 1.3.4.5 Effects on related fisheries).

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[30] If the maximum daily catch limit was set at a level which exceeded the rate at which the fishery would be voluntarily prosecuted, it would, of course, result in no adverse modification of the fishing patterns and behavior of the fleet. Only in the case where the limit was "binding" (e.g., imposed limits below the rate at which the fishery would voluntarily be prosecuted) would economic and operational costs be imposed.

In conclusion, it appears that 'binding' maximum daily catch limits have the potential to counteract exiting regulatory and management efforts (e.g., AFA, IR/IU) to increase economic efficiency, reduce waste and improve utilization, enhance economic rationalization, and reduce the 'race-for-fish' in the BSAI and GOA pollock, Pacific cod, and Atka mackerel fisheries.

Potential gear conflicts

Concerns have been expressed, from a variety of sources, about the economic effects of forcing gear-specific effort out of 'traditional' operating areas and into proximity with other gear groups and/or target fisheries. Trawl gear, pot gear, and longline gear are incompatible, when fished simultaneously in a given area. Gear damage or loss is a common outcome when these competing fishing technologies come into contact with one another on the fishing grounds. Each gear group perceives itself as facing "unique" operating challenges, with respect to such conflicts.

For example, the Pacific cod pot harvesting sector has reported that it faces several problems and constraints, peculiar to successful prosecution of their fishery. Pot boats tend, reportedly, to set their gear very near shore, in generally small and well defined areas. According to informed sources[31], often, in practice, these are immediately adjacent to Steller sea lion rookeries and haulouts. For example, a major pot fishery has traditionally been prosecuted near the rookeries in Unimak Pass. The pot operators reportedly do this principally because of the high cost (and frequency) of gear conflicts with other gear operator (e.g., longliners, but especially trawlers) when the several gear groups attempt to fish the same waters. By voluntarily isolating themselves, in well defined and generally recognized specific areas, they insulate all from the high cost (and frustration) associated with gear conflicts.

A fully rigged Pacific cod pot costs $650.00, according to industry sources. Gear conflicts which result in the loss of even a single pot per day, or serious damage to even a small number of pots, can quickly exceed the value of the expected Pacific cod catch for an operator in this sector, industry members report.

Similarly, gear conflicts between trawls (targeting any species) and longlines impose damage, loss, and potentially significant costs to these other gear operators, as well. At present, as noted, pot gear operators tend to set in specific near-shore areas, known to trawlers and longliners. The other two gear groups reportedly routinely avoid those areas, intentionally in order to minimize the potential for gear conflict (and thus avoid the associated economic and operational cost of damage and loss). Should the proportionally substantial and geographically extensive portions of the nearshore areas be closed, as provided for in literally all of the proposed alternatives, the potential for gear conflicts (and associated economic loss) will increase, all else equal.

Recent reports from the BSAI opilio crab fishing sector suggest that these gear-conflict losses will not be exclusively a problem for the three groundfish target fisheries under discussion here. Indeed, RPA closures of Steller sea lion CH, during the first half of 2001, reportedly forced pollock CVs and C/Ps farther offshore, and into areas where crab pots were set. The reported gear conflicts were said to have resulted in very significant economic losses for the opilio crab pot operators, attributable to both severely damaged and lost pots, lines, and buoys.[32] This report (if accurate) provides direct empirical evidence of the kinds of adverse

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[31] Arni Thompson, "Personal Communication," December 2000.
[32] Captain Gary Cobban, Jr., "Personal Communication," F/V Rebel, P.O. Box 2441, Kodiak, AK 99615, 2/20/01 (email).

financial consequences (in the form of gear conflicts) which may accompany displacing effort from CH areas into areas traditionally utilized by other fishing sectors, gear groups, etc.

This suggests that an increased potential for gear conflicts may be an unanticipated result of imposing structural changes on these fisheries of the kind envisioned in the suite of SSL Protection Measure alternatives, because each, to varying degrees, closes nearshore areas to some or all of the primary gear-types utilized to harvest pollock, Pacific cod, and Atka mackerel. To the extent, then, that any combination of the pollock, cod, and/or Atka fisheries are pushed into proximity with one another (or, as suggested by the skipper of the opilio crab vessel, with gear operators targeting other commercial species) as area closures displace effort, potentially costly and disruptive adverse interactions among gear types may be expected.

Costs of fishing when other important fisheries are 'open'

A large part of the groundfish fleet that would be directly regulated by the SSL Protection Measure alternatives is made up of operationally diverse vessels, sequentially fishing a suite of fisheries over the course of the year. This operational diversification potentially increases the revenues available to the fishing operation, and distributes the overall risk (and fixed cost) of the fishing business over a broader base.

Under provisions contained in one or more of the proposed alternative actions which shift significant portions of the annual TAC releases for the three primary target species of concern (e.g., Alternative 2's provision for a strict four season apportionment of TAC, no rollovers, and 25% released in each season), vessel operators may be forced to choose between fishing later in the year than normal for pollock, cod, or Atka, or participating in other economically (and culturally) valuable fisheries (e.g., salmon). Traditionally, the scheduled openings of these alternative fisheries would not have been in substantial conflict with the target Pacific cod, pollock, or Atka mackerel fisheries. If the seasonal quotas and scheduled TAC releases, provided for under the various SSL alternatives, move substantial portions of the allowable catch out of the winter and into later seasons, when other economically important fisheries normally take place, vessel operators may have to give up the revenues from those other fisheries in order to fish for pollock, Pacific cod, and Atka mackerel (or forego participation in some or all of these groundfish fisheries). Lost revenues could be an important cost imposed on these diversified, multi-fishery components of the groundfish fleet. These lost revenues do not represent actual "out-of-pocket" dollar expenditures by the fishermen. Nevertheless, they reflect a real social cost that must be considered in a cost-benefit analysis. Unfortunately, they can be treated only qualitatively here, due to data constraints. (The reader is directed to Section 1.4.1, however, where information is presented pertaining to the 'relative' dependence of various segments of the pollock, cod, and Atka fleets on a range of alternative commercial fisheries.)

Among the clearest examples of this potential tradeoff may be the case of trawl vessels under 60 feet, which are active in (especially) the Pacific cod fishery (many of which fish from small ports along the Alaska Peninsula, e.g., Sand Point, King Cove, as well as from Kodiak and other ports in the GOA). These vessels are typically constructed primarily to meet the needs and regulatory limitations (58' LOA) for participation in the Alaska salmon seine fishery (thus, the common reference to this class of vessels as 'limit seiners'). Salmon seining is principally a summer fishing activity, but these vessel operators have increasingly diversified their operations to include cod fishing, in the early-spring and fall fisheries.
Small hook and line vessels, under 32 feet, from many of these same small ports, are another good example of the tendency of the fleet of vessels currently active in 'groundfish' (principally cod), to be operationally diversified. This particular fleet has traditionally been employed in the salmon gillnet fisheries, and is increasingly used for halibut fishing, as well as for the groundfish fisheries. Hook and line vessels from 33

feet to 59 feet are typically fished for salmon, crab, and halibut in the summer. (Northern Economics, pages 3.10-32, 3.10-36, 3.10-38).

To the extent that specific provisions of the several SSL alternatives significantly alter the size and timing of TAC release and scheduled openings, pushing pollock, Atka, and especially Pacific cod fishing into the summer, they would clearly increase the costs for these classes of operations. How these fleets might accommodate these changes is largely beyond the capabilities of this analysis to predict. However, given the traditionally substantially higher unit value of catches in the salmon, halibut, and even crab fisheries, it is likely that a significant portion of this sector of the fleet will exit the groundfish fisheries, at least during the summer portion of the fishing year. This may mean, either larger shares of the total groundfish catch will accrue to other elements of the fleet (redistribution from the smallest boats to larger vessels), or some portion of the available cod, pollock, or Atka TAC will not be taken (a net loss to the fishery and society).

Processors built for higher throughput

As, (1) fewer vessels (and/or gear types) participate in the directed fishery, (2) CPUE's decline, and (3) fishing is more geographically dispersed, the aggregate rate of catch may slow significantly. This implies that the rate of delivery to processors will also decline. Because existing processing plant capacity has been built, in many cases, for "peak through-put" (i.e., maximize the rate at which catch is received and processed, in response to the "race-for-fish" on the grounds), lower and slower deliveries may not supply sufficient quantities of raw fish for plants to operate profitably. That is, plants have been designed, configured, and operated to exploit 'economies-of-scale' in production (i.e., moving an optimal volume of fish through the processing plant at the most efficient, most cost effective rate, given the capacity of the facility and expectations of catch and delivery rates from the CV fleet). If operated at rates which significantly deviate from those for which the plant was designed, these "economies" are lost, and a plant may quickly become unprofitable to operate.

Indeed, anecdotal testimony before the Council, at the December 2000 meeting, suggested that some inshore processing plants might not find it operationally profitable to purchase and process groundfish, during some periods of the 2001 fishing season, because projected aggregate deliveries were too small, or the pace of deliveries was anticipated to be too slow, to justify plant operation. This is, of course, an empirical question, but if a plant cannot cover its variable operating costs (e.g., running at the reduced rate of CV deliveries and plant through-put, as projected by some), the operator would find it in the firm's economic interest to cease operation, altogether, rather than incur losses imposed by such inefficiencies.

Effects on plant operation and profitability, associated with 'economies-of-scale' considerations, could be further confounded by considerations of, for example, multiple plant start-up costs (made necessary by required 'stand-downs', or induced 'lay-ups' in the fisheries, i.e., no fish available for processing for extended periods); loss of access to significant portions of the TAC during periods of highest fish value (e.g., roe-bearing cod and pollock); and reduced quality of raw fish deliveries (e.g., as boats must travel greater distances, holding fish longer, or fish are in poorer physical condition during post-spawn recovery, etc.). Each of these considerations is addressed in greater detail, elsewhere in this analysis, however, the nature of these interactive and compounding relationships is important to keep in mind. None of these economic, operational, or logistical elements works in isolation from one another.

1.3.3.4 Safety Impacts

Commercial fishing is a dangerous occupation. Lincoln and Conway, of the National Institute of Occupational Safety and Health (NIOSH), estimate that, from 1991 to 1998, the occupational fatality rate in commercial

fishing off Alaska was 116/100,000 (persons/full time equivalent jobs), or about 26 times the national average of 4.4/100,000.[33] Fatality rates were highest for the Bering Sea crab fisheries. Groundfish fishing fatality rates, at about 46/100,000 were the lowest of the major fisheries identified by Lincoln and Conway(Lincoln and Conway). Even this relatively lower rate was about ten times the national average (Lincoln and Conway, page 692-693).[34]

The danger inherent in commercial groundfish fishing was underscored by two accidents in March and April of 2001. In March, two men were lost when the 110 foot cod trawler Amber Dawn sank in a storm, near Atka Island. In April, 15 men were lost when the 103 foot trawler-processor Arctic Rose sank about 200 miles to the northwest of St. Paul Island in the Bering Sea, while fishing for flathead sole. Existing or proposed SSL measures were not a factor in either of these cases. The Amber Dawn was operating close to shore (within 10 miles) and the Arctic Rose was operating on traditional flathead sole grounds, the choice of which was not driven by SSL concerns.

However, during most of the 1990s, commercial fishing appeared to become (relatively) safer. While annual vessel accident rates remained comparatively stable, annual fatality per incident rates (case fatality rates) dropped. The result was an apparent decline in the annual occupational fatality rate.[35] From 1991 to 1994, the case fatality rate averaged 17.5% a year; from 1995 to 1998 the rate averaged 7.25% a year. Lincoln and Conway report that, "The reduction of deaths related to fishing since 1991 has been associated primarily with events that involve a vessel operating in any type of fishery other than crab." (Lincoln and Conway, page 693.) Lincoln and Conway described their view of the source of the improvement in the following quotation.

"The impressive progress made during the 1990s, in reducing mortality from incidents related to fishing in Alaska, has occurred largely by reducing deaths after an event has occurred, primarily by keeping fishermen who have evacuated capsized (sic.) or sinking vessels afloat and warm (using immersion suits and life rafts), and by being able to locate them readily, through electronic position indicating radio beacons." (Lincoln and Conway, page 694).

There could be many explanations for this improvement. Lincoln and Conway point to improvements in gear and training, flowing from provisions of the Commercial Fishing Industry Vessel Safety Act of 1988, that were implemented in the early 1990s. Other causes may be improvements in technology and in fisheries management. Technological improvements may include advances in Emergency Position Indicating Radio Beacon (EPIRB, sometimes also called an "ELT" or Emergency Locator Beacon) technology. Current 406 MHz EPIRBs are more effective as a means of communicating distress than the 121.5 MHz EPIRBs in use

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[33] To make accident rates easier to read and to compare across industries, all rates have been standardized in terms of the hypothetical numbers of accidents per 100,000 full time equivalent jobs in the business. The numerator, 116, is not the number of actual deaths; the denominator, 100,000, is probably at least five times the total number of full time equivalent jobs each year in the Alaska fishing industry. In decimal form, this is a rate of .00116.

[34] The NIOSH study does not cover 1999-2001. Results updated through 1999 should be published in the summer of 2001; however, these results are not available at this writing. (Lincoln, pers. comm.). The rates are based on an estimate of 17,400 full time employees active in the fisheries. This estimate of the employment base was assumed constant over the time period. However, various factors may have affected this base, including reductions in the size of the halibut and sablefish fleets due to the introduction of individual quotas. These estimates must therefore be treated as rough guides. The updated results due in the summer of 2001 should include an updated estimate of the number of full time equivalent employees, as well.

[35] This result is based on an examination of the years from 1991-1998. It does not reflect the losses in the winter of 2001.

in the early 1990s, in that they now transmit a unique identification code in addition to position information, which allows USCG personnel ashore to quickly identify the vessel, use point of contact telephone numbers, and more effectively filter out false alarms.

Fishery management improvements may include the introduction of individual quotas in the halibut and sablefish fisheries. The introduction of co-ops in the pollock fisheries in 1999 and 2000 would not be reflected in these statistics, but by rationalizing pollock fishing in the BSAI, they may lead to safety improvements.

The Lincoln-Conway study implies that safety can be affected by management changes that effect the vulnerability of fishing boats, and thus the number of incidents, and by management changes that effect the case fatality rate. These may include changes that affect the speed of response by other vessels and the USCG. Starting in 1997, the Coast Guard's Seventeenth District instituted a practice of forward deploying a long range search helicopter to Cold Bay, Alaska, to improve agency response time during the Bristol Bay red king crab fishery. This practice was expanded in 1998 to cover the Opilio crab fishery. In 1999, approximately 11 lives were saved, in a 6 day period of bad weather, when the forward deployed helicopter responded to several vessel sinkings and other marine casualties in short order.

Fishing farther offshore

Changes in fishery management regulations that result in vessels, particularly smaller vessels, operating farther offshore, appear likely to increase the risk of property loss, injury to crew members, and loss of life. Steller sea lion regulations that close (or severely restrict fishing in) nearshore critical habitat to operations targeting pollock, Pacific cod, and Atka mackerel, or other groundfish, could compel vessel operators to choose between assuming these increased risks or exiting these fisheries for some or all of the fishing season.

Weather and ocean conditions, especially in the BSAI, but also in the GOA, are among the most extreme in the world. The region is remote, sparsely populated, with relatively few developed ports, and the groundfish fisheries are conducted over vast geographic areas. While many vessels in these fisheries are large and technologically sophisticated, many more are relatively small vessels with limited operational ranges. Smaller vessels may be at risk in the summer, as well as in the winter. As the Council's RPA committee noted in its April 2001 minutes, "*Although summer weather in the Bering Sea is certainly less threatening than winter weather, smaller boats are at risk when they must travel far from land and far from processing facilities.*" (One, presumably, can make the same observation about elements of these fisheries in the central and western GOA, as well).

Several factors associated with fishing farther from shore can reduce the safety of fishing operations by increasing the likelihood of emergency incidents. Vessels will probably have to spend more time at sea in order to take a given amount of fish. It will take more time to travel between port and the fishing grounds. Operations are also likely to be fishing in less familiar conditions and on stocks that may be less highly aggregated, thus reducing CPUE. Increases in the time spent at sea increase the length of time fishermen are potentially exposed to accidents. Furthermore, longer trips are likely to increase fatigue and thus the potential for mistakes and accidents.

Other factors may tend to increase the case fatality rate. Fishing vessels will be farther from help if an accident occurs. In many cases, the initial response to trouble comes from other fishermen. If fishing farther offshore, on more extensive fishing grounds, increases the dispersion of the fishing fleet, assistance from other fishermen may not be as readily available. In addition, regulatory actions that force fishing vessels to work farther offshore may turn what would normally have been a "request for assistance" search and rescue

(SAR) case into an emergency or life threatening situation. Many SAR cases, involving fatalities, start as a casualty to the vessel that degrades its stability or survivability, but does not immediately threaten the vessel or crew. After the initial casualty, other environmental factors (e.g., heavy seas, winds, freezing spray, etc.) may quickly cause the situation to deteriorate. The ability to render assistance early is essential. Vessels fishing farther from shore and/or in more remote locations may experience additional delays before help can arrive. In a similar respect, the ability to satisfactorily treat personnel injuries is often determined by the speed with which that person can receive adequate medical attention.

While these factors may affect all operations, they are likely to be most serious for the smaller vessels, based in Alaska ports, that have tended to fish relatively close to the shore, in the past. For example, it is reported that small vessels operating out of Kodiak or Alaska Peninsula communities typically seek at least 48 hours of stable weather to initiate a Pacific cod trip. This 48 hour window of opportunity allows a run from port, time spent fishing, and time for returning to port. The "weather window" is often attainable between the steady series of low pressure system storms that pass through the region from West to East, at all times of the year (with greater frequency and severity in the winter). With the combined effects of a longer run to fish in more distant waters, plus longer fishing times caused by reduced catch rates, a much longer window of opportunity to conduct a fishing trip will be required.

The effect of this new situation may vary. It may result in fewer trips and lowered harvest levels for Pacific cod, because there are likely to be fewer good weather periods of longer duration. However, as noted below, fishing vessel owners will face economic pressures on their fishing operations due to diminished revenues and increased costs. There is a reasonable likelihood for a tendency to try and 'squeeze' longer trips into marginal weather conditions. The result of this new fishing pattern will be an increased level of risk to vessels and crews, albeit an increase which cannot be empirically estimated, *a priori*.

Reduced profitability

As discussed throughout Section 1.3.3 of this RIR, proposed restrictions on fishing to protect Steller sea lions and their critical habitat may reduce the profitability of many operations, including many of the smaller operations. Reduced profitability may be an indirect cause of higher accident rates. Fishermen facing a profit squeeze may defer needed maintenance on vessels and equipment. They may reduce operating costs by cutting back on safety expenditures. They may scale back the size of their crew in order to reduce crew share expenses. Remaining crew would have expanded responsibilities and could risk greater fatigue, increasing the likelihood of accidents. Finally, these operators may find it necessary to fish more aggressively, even in marginal conditions, in an effort to recoup lost revenues. These factors may affect the incident rate and the case fatality rate.

Changes in risk from the alternatives

Each of the factors described above increase risk. To some extent, the potential for increased risk may be offset by changes in fleet behavior. An increase in risk effectively increases the cost of each additional day of fishing and may contribute to reduced fishing days by smaller vessels. If this leads to a safety induced reallocation of harvest from smaller to larger vessels, risk calculations may be affected. Smaller crew sizes mean that fewer people on a vessel are exposed to danger. Skippers who have less invested in safety gear

may have an incentive to behave more cautiously or conservatively in other respects, in order to offset some of their perceived increased risk.[36]

Very little is known about factors that might increase risk, or that might offset risk increases, for fishermen in the North Pacific and Bering Sea. Even the best estimates of statistics as fundamental as the occupational fatality rate are not precise and are not available at all for recent years. Rough estimates of the relative ranking of occupational fatality rates in different fisheries are known, however, little more than qualitative speculation is available on the factors that affect the rates in the different fisheries. Available information does not permit quantitative modeling of changes in these rates in response to changes in fishery management regulations. In the present instance, the proposed SSL Protection Measures could push fishing activity, by a given vessel class, beyond the range of activity observed in the past. Vessels may be forced to fish in areas where little fishing effort has traditionally occurred and, until experience is gained in these areas, the implications for operational safety will be unknown. The actual net impact of the suite of proposed operational changes, measured in increased incident rates, and increased case fatality rates, cannot be determined.

For these reasons, it is impossible to make numerical estimates of the changes in the occupational fatality rates that would be caused by the different alternatives.[37] The following discussion of changes in risk, while qualitative, is associated with the mechanisms discussed above: (a) an alternative that tends to force operations (particularly smaller operations) farther off shore and/or requires that longer distances be transited between 'open' fishing grounds and delivery/home ports will be deemed to impose more risk; (b) alternatives that put more pressure on profits and cash flow (particularly for smaller operations) will be assume to impose more risk.

Evidence from the simulation model (used to estimate the potential exposure of the different fleets to reductions in their gross revenues from the suite of SSL alternatives) may also be used to address the relative risk to fishermen imposed by these five alternatives. On the basis of these results, Alternative 4 seems less likely than any of the remaining alternatives to the status quo to reduce operational profitability and to push fishermen off of their accustomed fishing grounds. This alternative appears to reduce some (although not all) of the more onerous aspects of Alternatives 2, 3, and 5, with respect to the proximity of open fishing areas and operating ports. It specifically contains provisions which reduce some requirements which otherwise would force effort farther offshore, especially for the smaller segments of the SSL Protection Measure regulated fleets. For example, Alternative 4 proposes to incorporate existing 'exemption' provisions (originally adopted as part of the American Fisheries Act), which were intended to accommodate the physical and operational limitations of pollock catcher vessels, delivering inshore in the EBS, during the parts of the fishing year when weather and ocean conditions are most severe. Under this proposed provision of Alternative 4, NMFS will monitor catch (by sector) and close the SCA to directed fishing for pollock, by any given industry sector, when NMFS determines that its specified SCA limit has been reached. However, inshore catcher vessels less than or equal to 99' (30.2 m) LOA would be exempt from SCA closures during the fall and winter months unless the cap for the inshore sector has been attained. To achieve this management result, NMFS has separated the inshore fishery into 'cooperative' and 'non-cooperative' sector allocations. For each sector, NMFS announces the closure of the SCA to catcher vessels over 99' (30.2 m) LOA, before the inshore sector SCA limit is reached. In this way, NMFS seeks to implement the closure in a manner intended to leave sufficient remaining quota within the SCA to support directed fishing for pollock

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[36]As noted above, reduced profitability may provide an incentive for more aggressive fishing. The existence of both incentives in not self-contradictory. It is hard to determine their relative magnitudes and ultimate result.
[37]Although the focus in this discussion is on occupational fatality rates, fishermen risk injury and property loss, as well.

by vessels less than or equal to 99' (30.2 m) LOA, for the duration of the inshore sector opening. As provided for under AFA, this element of Alternative 4, if adopted, will be in force during the fall and winter seasons only, and is justified solely on the basis of vessel safety considerations, during the time periods of most extreme operating conditions in this management area.

By adopting this and other special 'exemption' provisions, recognizing the differing physical and operational capabilities of the smaller elements of the effected fishing fleets, Alternative 4 likely imposes a relatively lower risk of accident and injury, to the extent that occurrence of accidents are highly correlated with seasonality, fishing distances offshore, vessel size, etc., than does any of the other alternatives to the 'no action' alternative.

Alternatives 3 and 5 are very similar in structure, and therefore share many attributes in terms of their expected impacts on the "safety" criterion. Both, for example, rely heavily on time and area restrictions, TAC reapportionments, and CH closures, which would substantially alter the duration, location, and timing of these fisheries, as compared to traditional patterns. Both, therefore, are equally likely to present a high potential to increase risk of accident and injury, if adopted.

Alternative 2 would likely result in the largest structural change to the baseline operational patterns of these fisheries. This alternative, if adopted, would: (1) impose management restrictions requiring vessel operators to transit substantially greater distances between port and open fishing grounds; (2) likely displace fishing activity farther offshore than has traditionally been the case; and (3) aggravate the open access "race-for-fish", with all its associated economic and operational perils. Alternative 2 also contains an absolute CH trawling ban provision which, in and of itself, substantially extends the distribution of potential risk and injury, beyond the pollock, Pacific cod, and Atka mackerel fleets, to which all the other alternatives limit themselves.

One could, perhaps, argue that this alternative, through its provisions for very significantly reducing TACs and extremely restrictive daily catch limits (which in combination may preclude managers from opening some areas to fishing), actually will so dramatically reduce fishing vessel days of operation, that it may result in an effective "risk reduction", in terms of accident and injury. This may, however, be a classic example of a "back-handed compliment". While Alternative 2 does contain several provisions which either directly or indirectly offer a modicum of relief for the smallest elements of the effected fleets, it probably imposes additional risk of accident and injury only slightly smaller than those associated with Alternatives 3 and 5.

Role of the U.S. Coast Guard

In Alaska, the Coast Guard primarily responds to SAR cases with helicopters, fixed-wing aircraft, and the medium and high endurance cutters, assigned to patrol the area. Coast Guard aircraft normally provide the initial response for emergency SAR cases in Alaska. Coast Guard aircraft in western Alaska operate from Air Station Kodiak on Kodiak Island, but may also be deployed from patrolling cutters or from forward deployment sites at Cold Bay, St. Paul, and other remote locations in the region. The same aircraft and cutters that respond to SAR emergencies, also carry out the Services' other operational missions, such as fisheries law enforcement and marine environmental protection. While the number of aircraft assigned to Kodiak has remained stable for the past decade, fixed-wing aircraft operating hours have declined by about 40%. The number of medium and high endurance cutters-days assigned to the fishery law enforcement mission in the BSAI and GOA has declined by 40% in the last 6 years.

SAR is the Coast Guard's primary mission in Alaska, and it takes priority over other missions. To date, the ability of the service to respond to SAR within its internal response requirements has been maintained in

Alaska, despite an overall reduction of funding at the national level. This reduction of funding translates to a loss of operating hours for aircraft and operating days for cutters at the Alaska regional level. The Service's SAR response capabilities have been maintained, while reducing the resources available to conduct other missions.

The effect of requiring fishing vessels to work farther offshore, may or may not increase the frequency of their need for Coast Guard assistance. It would likely, however, increase the severity of many of those SAR cases that do occur, which will cause the Coast Guard to expend more of its resources to that mission. The Coast Guard response to vessels and fishermen in grave danger is greater and quicker than to a routine notification of breakdown/non-emergency distress. For example, a fishing vessel that becomes disabled while fishing in sheltered waters, close to shore, may notify the Coast Guard and arrange, itself, for a nearby vessel to assist or tow it to port. The Coast Guard would maintain communications with the vessel to monitor the situation, and may divert a cutter , if one was within a realistic response range, to escort. That same vessel, disabled further offshore is at greater risk, may be farther from assistance, is more exposed to weather, and will likely require a greater response from the Coast Guard, including the launching of aircraft.

1.3.3.5 Impacts on Related Fisheries

Changes induced by the SSL Protection Measures in the pollock, Pacific cod, and Atka mackerel target fisheries may have impacts on other fisheries (beyond the gear conflict issue addressed earlier). Some of these impacts may impose costs on these other fisheries. Among the possibilities identified are:

- Increases in non-target catches of cod and pollock
- Effects of displacing capacity
- Increased cost of gearing up
- Topping off behavior
- Increased bait costs in crab fisheries

Displacement of target catch

Under provisions of the previously cited IR/IU [38] regulations, even operations which are targeting groundfish species other than pollock or Pacific cod, must nonetheless retain 100% of their pollock and cod bycatches, up to an amount of each, equal to 20% of the retained catch of groundfish species, other than cod or pollock, onboard (i.e., 'maximum retainable bycatch' or MRB levels). The intent of this requirement was to eliminate 'economic' discarding of Pacific cod and pollock, and reduce, to the maximum extent consistent with management requirements, 'regulatory' discards of these species.

It is possible that actions which are taken in connection with the current proposed SSL action could have unanticipated (and undesirable) economic impacts for other groundfish fisheries, in connection with the interplay of IR/IU and the proposed SSL Protection alternatives. As an example, if substantial portions of the TAC for pollock and/or Pacific cod, in particular, were not harvested in the directed fisheries (perhaps because of considerably reduced CPUE, or conflicting season openings), bycatch rates of these species in fisheries for other groundfish may increase. Because, under IR/IU rules, <u>all</u> pollock and cod must be retained

[38] The Improved Retention/Improved Utilization amendments were implemented in the BSAI and GOA groundfish fisheries in January, 1998, and set out (relatively) ambitious goals for reducing bycatch discards and increasing utilization. Under the law's provisions, those operations which are targeting pollock and cod must also retain 100% of their cod and pollock catches (with a few specific exceptions).

(at least up to MRB levels), these bycatches will, by necessity, displace hold space intended for the 'target' species. In some cases, the value of the retained bycatch may exceed that of the target species, in which case, the operator may (depending on market access) benefit from the increased abundance of the bycatch species.[39] In other situations, however, inflated rates of bycatch of cod, and especially pollock, which must be retained, will imposed costs that the operator targeting other species of groundfish will be unable to avoid. In addition to displacing target catch in the holds, increases in operating costs associated with handling (e.g., sorting), processing, and holding product forms for which the operation is not primarily configured, may be substantial.

For example, it has been widely reported that bycatch of pollock is significant (and largely unavoidable) in many groundfish trawl fisheries. It is the case for some operations that retention of incidentally-caught pollock will impose significant costs on the harvesting vessel (e.g., Pacific cod H&G vessels) by displacing more valuable target species in the limited available hold space of these boats. To the extent that adoption of the SSL Protection Measure action results in geographic and/or temporal dispersion of effort in the directed pollock fishery, producing higher rates of bycatch of pollock in non-target fisheries which may continue to fish in areas from which (and at times when) the pollock fishery has been excluded, operational costs may be imposed.

Bycatches of Pacific cod are, similarly, significant and largely unavoidable in many groundfish trawl fisheries. To the extent that adoption of the SSL Protection Measure action results in geographic and/or temporal dispersion of effort targeting cod, producing higher rates of bycatch of Pacific cod in non-target fisheries which may continue to fish in areas (and at times) from which the cod fishery has been excluded, higher operating costs may be imposed on these non-Pacific cod target groundfish sectors. Whether these costs are offset by the value of the retained IR/IU fish (i.e., cod and pollock) will depend on a number of factors. These include (among others), the condition of the cod and/or pollock bycatch (e.g., 'summer' fish are generally of lower quality, and Pacific cod or pollock taken in a 'codend' of flatfish are reported to be in very poor physical condition); the holding and/or processing capability of the intercepting vessel; the duration of the fishing trip for the 'target' species (i.e., how long the pollock and/or cod bycatch must be held before offloading); and the nature and availability of a market for the resulting pollock or Pacific cod output.

The marketplace will largely determine whether, and by how much, retaining incidentally-caught pollock and Pacific cod are an economic and operational burden to vessels fishing other groundfish species. According to industry sources, headed and gutted (H&G) pollock, which was characterized as having "no economic value whatsoever", during the IR/IU debate, subsequently found a 'profitable' market, albeit only briefly.[40] Since that time, H&G pollock has cycled between being marketable and being unmarketable, several times. Currently, H&G pollock prices are "below the cost of production.... although there is always hope that markets for this product will rebound, in the future".[41]

These markets are volatile and this new information suggests that the hypothesized "spill over" effect may be of real economic and operational concern, should bycatch rates increase, as a result of the proposed action.

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[39] It is, in point of fact, fairly common practice in some fisheries (e.g., flatfish) for an operator to complete his or her fishing trip by 'topping off' the target catch with Pacific cod, up to the MRB limit, thus increasing the total landed value for the trip.

[40] Teressa Kandianis, "Personal Communication," Kodiak Fish Company, 2977 Fox Road, Ferndale, WA 98248, April 1999

[41] Teressa Kandianis,"Personal Communication," March 19, 2001

Effects of displacing capacity

While AFA sideboard provisions and LLP constraints seek to manage and control transference of effort and capacity across fisheries, they are not absolute barriers to this phenomenon. Indeed, it is reported that, should TACs (or area apportionments thereof) be too constraining to support existing levels of effort, it is probable that effectively displaced capacity will redistribute to remaining 'open' target fisheries, imposing significant costs upon the fleets that currently prosecute them. The principal example cited for this outcome, within the current SSL context, involves the Atka mackerel and flatfish fisheries. At present, the Atka mackerel target fishery is prosecuted by eight moderate sized catcher processors. Should the final SSL action contain provisions which substantially reduce the TAC of mackerel (e.g., the Alternative 2 requirement that mackerel TAC not exceed 33.3% of maximum ABC, with a daily catch limit of 300 mt.), industry sources predict that this fishery would cease to exist, for all practical purposes. That is, a dramatically reduced TAC, widely separated season releases, highly restrictive daily catch limits, and/or very limited allowances for fishing in CH, could not support the eight boats which presently constitute the Atka fleet. Most, if not all of these C/P vessels, it is predicted, would be compelled to forego an Atka mackerel target fishery and, instead, shift into the flatfish fisheries.

If this were to occur, these eight vessels would represent a huge potential capacity increase (e.g., estimated to fully 'double' the existing capacity in the flatfish fishery); they would likely displace current participating vessels (many of which are smaller and less operationally efficient than the Atka mackerel C/Ps, so would be 'out competed' on the grounds); and they could severely aggravate the existing race-for-fish in this fishery.

With substantially greater effort brought to bear on the available flatfish resource, daily aggregate catch rates would presumably rise substantially. This has a two-fold potential consequence. First, with the potential for fully a 100% increase in current fishing capacity in the flatfish fishing sector, for any given flatfish TAC, each vessel's 'share' would, by necessity, be smaller, all else equal. But, if these eight boats are indeed more operationally efficient, all else will not be equal, and it is likely they will take a proportionally larger share of the total catch, imposing even greater losses on the current flatfish fleet members.

Second, as noted, with this degree of additional capacity and associated effort, the 'race-for-fish' will be intensified. Traditionally, PSC bycatch (especially halibut) has been a limiting factor in attaining the various flatfish TACs, both in the BSAI and GOA regions.[42] With a significantly intensified flatfish fishery, considerations like PSC bycatch avoidance (e.g., moving off 'hot spots') will be less likely to influence fishing behavior. In effect, with more vessels, fishing more aggressively (i.e., less efficiently in the aggregate), there will be less room under the PSC cap to take the flatfish TAC and the fishery may be closed earlier. In effect, in addition to 'dividing the pie' among a greater number of vessels, accelerated rates of PSC bycatch could substantially reduce the 'size of the pie', in total, leaving all concerned less well off.

Increased costs of gearing up

In business planning, uncertainty imposes costs. It is likely that a number of elements contained in the suite of alternatives under consideration as part of the proposed SSL action will impose a degree of operational uncertainty on the fishing sectors, which may result in alteration of employment patterns and opportunities in the commercial fisheries, the processing sector, as well as in support and service sectors throughout the Central and Western Gulf, Aleutian Islands, and Eastern Bering Sea. Because crews are traditionally drawn

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[42] Andy Smoker, "Personal Communication," July 18, 2001.

from an even wider geographic region, these effects may, in fact, extend well beyond western Alaska (e.g., the Puget Sound and greater Pacific Northwest of the United States). Anecdotal information, provided in testimony at the December 2000 NPFMC, indicated that the uncertainty surrounding the 2001 pollock, Pacific cod, and Atka mackerel fishing seasons (in connection with the RPA debate) had, at that time, resulted in a number of delays in hiring fishing and processing crews, increasing the operating cost of affected firms, and imposing hardships on prospective employees (and, by extension, their families and communities).

One vessel operator testified before the Council at that meeting that, owing to widespread uncertainty surrounding the Steller action, and especially projected small CH quotas provided under the proposed RPA, he had not hired his crew for the 2001 fishery. By that time in the fishing cycle, he reported, he normally would have extended offers to crew members, made travel arrangements for all, purchased bait and other provisions, and would have been in final preparation for the opening. At the time of his testimony, he had done none of these things. He reported further that, should he subsequently "gear-up" to fish, the cost of doing so would be much higher than normal (e.g., bait prices on the 'spot market' are significantly higher than 'contracted' supplies, discounted airfares based upon advanced purchase were no longer an option, etc.). This pattern may be the "norm" (at least in the short run, as the industry makes necessary adjustments to a new SSL regulatory environment) for many operators, faced with the structural changes in these fisheries which may be imposed as part of the Council's SSL Protection Measure action, whatever its final form.

The degree to which these potential adverse effects are actually realized cannot be assessed, *a priori*. They, nonetheless, represent potentially significant sources of economic uncertainty and operational disruption for these fisheries and dependent coastal communities.

Topping off fishery

There may, reportedly, be another "spill-over" effect attributable to the SSL Protection Measure action, which is somewhat unique to the GOA management area. Industry sources familiar with this region suggest that, in the GOA, one potential response to the proposed SSL Protection Measures, specifically as it pertains to Pacific cod, may be a tendency for the industry to shift away from a "directed" Pacific cod fishery, and towards a "topping-off" bycatch fishery for this species (thus, avoiding the more onerous operational burdens and constraints associated with the Steller sea lion regulatory action, while continuing to exploit Pacific cod, albeit at the MRB 20% rate). The extent to which this is economically feasible is an empirical question. However, the GOA groundfish fisheries tend, on average, to be much more "mixed" target and diverse than, say, are the EBS groundfish fisheries.

Increased bait costs in crab fisheries

Another element of this discussion of 'attributable economic costs' pertains to the reported practice, by many operators of Pacific cod pot vessels, of taking cod early in the calendar year for use by these same operations as bait, for their subsequent crab fisheries. Industry sources suggest that over half of the combination crab/Pacific cod fleet (on the order of 125 boats) depend operationally and economically upon the ability to "bait fish" cod, before the crab opening(s). Loss of this source of high quality "fresh" bait would, they submit, have a very significant adverse impact on crab CPUE, operating costs and, thus, economic value of the crab fisheries these vessels participate in.

Frozen bait is said to be significantly inferior to "fresh" Pacific cod, and costs roughly $0.50/lb, "...when it is available".[43] An average crab trip for this fleet is seven to ten days in duration, during which time each vessel typically use 8,000 pounds of bait (ca. $4,000 per vessel, per trip, bait replacement cost). While Pacific cod taken for "own-use bait" purposes is not landed, processed, or sold, it does represent an economically important "product form" for this segment of the industry, which could be put at risk under provisions of several of the proposed SSL alternatives to the status quo.

"Own-use bait" simultaneously represents a potentially significant source of Pacific cod removal that is largely unaccounted for, by current landings recording methods. Determining the amount of Pacific cod that is harvested for bait, but not reported, is difficult. Amendment 46 to the BSAI FMP attempted to provide a rough estimate. Two different methodologies were used to make those calculations. The first looked at "bycatch" of Pacific cod in crab fisheries (NPFMC 1996). It was assumed that those bycaught fish would be used, by the catching vessel, as bait in subsequent sets. Estimates indicated that 8,452 mt and 5,428 mt of Pacific cod were taken during the years 1994 and 1995, respectively. These estimates were made by assuming that the average cod taken as bycatch in these crab fisheries weighed 10 pounds, and the number of fish were multiplied by the assumed average weight.

The second method assumed that 10 pounds of bait cod were used for each crab pot pull that occurred in the BSAI (NPFMC 1996). During 1993, 2.7 million pot pulls were reported in the BSAI crab fishery. That equates to about 12,000 mt of bait. Fewer pots were pulled during the 1996 and 1997 BSAI crab fisheries. During those years, 1.2 million and 1.3 million pots were pulled. So, less than half the amount (5,500 mt to 6,000 mt) of bait was calculated to have been utilized in these years. Given these estimates of the amount of bait used, it appears that much of the bait harvested by fixed gear vessels is not reported. However, the projections referenced here might be regarded as an upper-bound estimate, because, presumably, not all bait used in the crab fisheries is Pacific cod, and not all cod bait is caught by the vessel using it (e.g., 'bait' is commercially targeted, landed, and sold for use in crab fisheries and therefore would be accounted for in catch estimates).

1.3.3.6 Summary of Impacts on Industry Revenues and Costs

Changes in industry revenues and costs have been discussed under five general headings.

- revenue change from output level
- revenue change from quality composition
- increased operating costs
- safety considerations
- impacts on related fisheries

It is anticipated that reductions in production, shifts in product mix, and potential deterioration in product quality may lead to reductions in industry revenues, under various provisions contained among the suite of alternatives of the SSL Protection Measure action. These revenue losses could be offset, to an unknown extent, by increases in prices received per unit of production, depending upon the underlying nature of demand for these outputs (see Appendix D, Market Analysis of Alaska Groundfish Fisheries).

If the SSL action ultimately adopted by the Council significantly reduces the quantity of fish harvested and processed, it could lead to some savings in production costs. However, it is also expected that the cost of

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[43] Lance Farr, "Personal Communication,"8941 179th Place SW, Edmonds, WA 98026, July 7, 2000.

taking the remaining harvest will rise. There are a number of reasons for this. Some of these include the increased costs of travel between more distant fishing grounds and delivery/processing ports; reduced CPUE (owing to unaccustomed fishing grounds, smaller fish, or disaggregated schools); increased costs of bycatch avoidance measures or the loss of TAC if bycatch avoidance measures are unsuccessful or inadequate; potential gear conflicts; and the increased opportunity costs of fishing for pollock, cod, or Atka when other economically important fisheries (e.g., halibut, salmon) are open. The increased risk of property loss, crew member injury, or fishing fatalities also imposes an important potential cost, attributable to modifications imposed by adoption of SSL Protection Measures in the BSAI and GOA pollock, cod, and Atka mackerel fisheries.

Most of the foregoing economic and operational impacts cannot be readily quantified, given available data sources. Nonetheless, they represent real costs, appropriately attributed to the proposed SSL Protection Measures action. In the case of (potential) 'gross revenue' impacts, it has been possible to make quantitative estimates of the differential effects of the competing alternatives, albeit under a strict series of "simplifying" assumptions.

Notwithstanding these caveats and the analyst's best efforts, projections of gross product value effects may still be biased for a variety of reasons. For example, if the proposed action results in substantial reductions in the quantity of production of pollock, Pacific cod, and/or Atka mackerel, product prices independent of changes in quality might be expected to increase. Increases in prices (and the extent to which they offset the decreases in quantity) depend on demand elasticities, of which there is uncertain. While the model implicitly assumes a constant product mix, processors might reasonably be expected to alter product mix (although in unknown patterns) to maximize changes in relative product prices, or differential responses among "markets" (e.g., foreign versus domestic) which might tend to further offset effects of reductions in quantities. Countering these influences may be sacrifices in processing efficiencies, associated with loss of 'economies-of-scale', as plants designed and configured for one set of operating parameters must be employed to accommodate a dramatically different one. All these factors argue for 'care' in interpreting the gross revenue impact estimates, although they currently reflect "the best information available" on this subject.

1.3.4 Costs to Consumers from Changes in Groundfish Production

Ultimately, fish are harvested, processed, and delivered to market because consumers place a value on them, over and above what they have to pay to buy them.[44] A person who buys something, often would have been willing to pay more than they did for the good. The difference between what they would have been willing to pay and what they had to pay is treated by economists as an approximation of the value the good has to the consumer and as one component of its social value.

If the price of the good rises, the size of this benefit will be reduced, all else equal. If the amount of the good available for consumption is reduced, the size of this benefit is also reduced.[45] Provisions of the proposed SSL action are likely to reduce the value consumers receive from the fishery, for several reasons: (1)

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[44] Economists refer to this value as a "consumers' surplus." This is a key category in cost and benefit analysis. It is measured as the area under the (compensated) demand curve for a good and above the market clearing price that must be paid for it. It approximates the amount of satisfaction consumers get from consuming a good at a certain price.

[45] As previously noted, under guidance from the U.S. Office of Management and Budget, measurement of the change in consumer surpluses, associated with a proposed U.S. fishery management action, should not include any changes in welfare experienced by foreign consumers (e.g., Japanese consumers of surimi products).

consumers may be supplied fewer fish products; (2) consumers may have to pay a higher price for the fish products they do consume; (3) various factors may reduce the quality of fish supplied by the fishing industry and, thus, the value consumers place on (and receive from) them.

The (domestic) consumer losses will fall into two parts. One part, corresponding to the loss of benefits from fish products that are no longer produced, will be a total loss to society. This is often referred to as a "deadweight" loss. The second part, corresponding to a reduction in consumer benefits, because consumers will have to pay higher prices for the fish they continue to buy, will be offset by a corresponding increase in revenues to industry (i.e., producers' surplus gains). This second part should not be treated as a "loss to society". It is a measure of the benefit that consumers used to enjoy, but which now accrues to industry, in the form of increased prices and additional revenues.

The deadweight loss cannot be measured with current information about the fishery. Estimation would require better empirical information about domestic consumption of the different groundfish species and products, and information about the responsiveness of consumers to the reduction in the supply (e.g., their willingness and ability to 'substitute' other available sources of protein).

The second part of the loss in consumer surplus consists of a transfer from consumers to producers, due to the higher prices consumers would pay, when supplies of pollock, Pacific cod, and Atka mackerel products were reduced. As just suggested, this transfer is not a net loss from a social cost-benefit perspective.

Consumers may, however, incur losses from impacts in addition to the change in the volume of fish that are harvested and supplied to the market. As discussed above (see section 1.3.4.2), the SSL Protection Measure regulatory action may lead to reductions in product quality, as well as changes in product mix. This will also lead to reductions in the value consumers receive from consuming these seafood products. The welfare loss to consumers from this source cannot currently be estimated.

1.3.5 Management and Enforcement Costs

Management and enforcement considerations, as they pertain to groundfish fisheries in the EEZ off Alaska, are treated in detail in Sections 2.3, 3.11, and 4.11 of this SEIS. The reader is referred to that section for detailed discussions.

In terms of both management and enforcement costs, NMFS anticipates that Alternatives 2, 3, 4, and 5 would require increases in staff and budget for NMFS Enforcement and the In-Season Management Branch of the Alaska Regional Office's Sustainable Fisheries Division. The alternatives would all require increased enforcement of complex closed areas, directed fisheries, and would require management of additional quotas. In addition, Alternatives 2 and 4 involve implementation of new management systems that require pre-registration and authorization by NMFS for seasonal exclusive registration areas (Alternative 2) or pre-registration for the Atka mackerel fishery (Alternative 4). Although the alternatives would affect fishery monitoring efforts of the U.S. Coast Guard as well, that agency considers all activities to support the groundfish fisheries off Alaska as part of a national budget and did not estimate additional costs associated with these alternatives.

Additional NMFS enforcement and in-season management costs

NMFS monitors harvests during the year and closes fisheries in response to attainment of a TAC or TAC apportionment, harvest of a prohibited species bycatch allowance, or harvest of an incidentally caught species

limit. Alternatives 2, 3, 4, and 5 rely heavily on time and area closures to achieve their conservation and management objectives. These closures are monitored and enforced by NMFS and the U.S. Coast Guard.

Under provisions of an earlier Steller sea lion management actions, vessel monitoring systems (VMS) are required for trawl catcher/processors participating in the Aleutian Islands Atka mackerel fishery. VMS provides real-time information on vessel location and can be useful for enforcing area closures and other elements of the fisheries management program.

As described in Section 4.11.3 of the SEIS, many of the measures to protect Steller sea lions that are incorporated into Alternatives 2 through 5 depend heavily on the strict regulation of the timing and location of fishing activities targeting pollock, Pacific cod, and Atka mackerel. Traditional methods of monitoring compliance with fishing regulations do not fully meet NMFS' need to monitor fishing activities, especially as envisioned under the SSL Protection Measure actions. An electronic "vessel monitoring systems", or VMS, is generally acknowledged to be an essential component of monitoring and management for these measures.

As a result, Alternatives 2 through 5 would require extension of VMS coverage beyond that currently imposed on catcher processors fishing for Atka mackerel in the AI. Under these alternatives, all vessels with a federal groundfish permit, that fish for pollock, Atka mackerel, and Pacific cod in the GOA and BSAI would be required to carry VMS. This extension of the VMS program would impose additional fishery management costs on NMFS (Sustainable Fisheries in-season managers and Enforcement), as well as on the fishing industry, itself.

VMS data will have to be received and interpreted by the Alaska Enforcement Division (AED). This will require staff in Enforcement's Regional Office consisting of a VMS Program Manager, a Computer Specialist, and an Enforcement Technician. In addition, a Special Agent will need to be assigned to VMS oversight in the Regional Office to develop protocols for response, as well as procedures for investigation and case package requirements. This Agent will be the first response to potential violations and decide the course of action to take, depending on the situation. Because follow-up investigations will occur from VMS data, AED will also require two additional Special Agents; one in Dutch Harbor and one in Kodiak.

The following is the estimated costs for the four positions required for VMS implementation:

VMS Program Manager	GS-0343-12	$ 85,000
Computer Specialist	GS–0334-11	$ 77,000
Enforcement Technician	GS-1802-09	$ 60,000
Special Agents (3)	GS-1811-11	$330,000
	TOTAL	$552,000

The types of measures contained in this SEIS increase the complexity of in-season fishery management. Increasing numbers of quotas directly impact staff that track fisheries and write and process regulatory actions to close fisheries. Increasing the number of quotas also results in smaller quotas which are more difficult to manage.

A minimum of three additional staff are needed, one to have responsibility for operations and information extraction for the management VMS system and two to manage fisheries, track quotas and write closure regulatory actions, for an estimated annual cost of $300,000.

Additional private sector VMS costs

As noted, the extension of the VMS program would also impose costs on the fishing industry. The average costs of investment, annual maintenance costs, and annual transmission costs are detailed in the SEIS in Section 4.11.3.6 "Cost of VMS." The numbers of vessels that would be subject to the VMS restrictions can be determined from Tables 4.11-2 and 4.11-3 in Section 4.11.3.5. These data are used here to estimate the attributable total cost of the VMS program on industry.

As noted in Section 4.11.3.3 of the SEIS, VMS is critical to effective implementation of area restrictions contained in Alternatives 2 through 5. The cost analysis here has been conducted on the assumption that VMS would be required for all vessels active in the federal pollock, Pacific cod, and Atka mackerel fisheries.

VMS is already required in the Atka mackerel fisheries, therefore there is no additional cost imposed upon operations participating in that fishery. In addition, 98 pollock catcher vessels have already installed VMS. Moreover, the Council's preferred alternative (Alternative 4) does not contemplate critical habitat restrictions for jig vessels. VMS may therefore not be required for this fleet segment. The analysis has been performed with and without inclusion of the jig vessels in the VMS program.

Including the jig vessels, but excluding vessels already using VMS, the total initial investment in VMS equipment, installation and set-up, etc., would be about $1.0 million. Aggregate annual costs, across all effected fleets, for maintenance and transmission are expected to be about $240,000.

A multi-year program is contemplated, however there is a great deal of uncertainty about the length of such a program. To provide some sense of the total cost which may be incurred by the private sector, over the entire duration of a VMS program, it is assumed the program will extend for five years.[46] The discounted present value of such a VMS program, accruing to the private sector, was estimated to be on the order of $2.3 million.

Without inclusion of the jig vessels, the initial investment is approximately $1.0 million, annual costs are $200,000, and the discounted present value is on the order of $1.9 million.

As noted in the SEIS (Section 4.11.3.6) the NOAA Office for Law Enforcement (OLE) expects it would be in their best interest to fund all costs associated with VMS. This includes purchase, installation and operation of a VMS. However, absent timely federal funding support, the cost of VMS would be the responsibility of the vessel operator. The question of the funding source raises two issues: (a) the impact on the cost of implementing the program, and (b) the distribution of the costs among different sectors of the economy.

Whether the 'private' sector or the 'public' sector pays for the VMS, there would be a cost imposed on society. There is reason to expect that this cost would be larger if the public sector paid. The reason is the "excess burden" of the taxes used to raise the public funds; "excess burden" is the cost of social distortions

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[46] The discounted present values have been calculated using a real discount rate of 5.11%. This rate was calculated using an estimate of the nominal rate appropriate to fishing and an estimate of the projected inflation rate. As a result of an empirical analysis of Alaska limited entry permit markets, Karpoff estimated a risk premium for fisheries loans of 5.05% over the rate on U.S. government three month Treasury bills (an almost riskless rate). (Karpoff, page 1165). In late August 2001, the three month rate on Treasury bills was 3.426%. The combination of the riskless interest rate and the risk premium gives a nominal interest rate of 8.53%. CPI data suggests that the inflation rate from June 2000 to June 2001 was 3.2%. This rate was used as an estimate of the inflation rate over the next five years. The nominal rate was adjusted appropriately to calculate the real rate of 5.11%.

created by taxation. OMB cost-benefit guidelines state that a sensitivity analysis should be performed on public investment to reflect a 25% marginal excess burden for federal tax revenues (OMB, Section 11.a). This reflects empirical estimates of the excess burden available in the early 1990s. This 25% excess burden adjustment suggests that the total discounted present value of the costs might be $2.9 million (or $2.4 million if jig is excluded), if the federal government paid for the VMS.

Federal payment of the VMS costs would change the distribution of the program costs. With private payment, the costs would fall on the vessel operators in the first instance. To some extent these costs may be reflected in subsequent crew shares. They are unlikely to be passed on to consumers in most instances.[47] If the Federal government assumed payment, the costs would be shared by all U.S. taxpayers. One possible argument for Federal payment would be that the benefits of saving the Steller sea lions accrue to all U.S. citizens. Private payment of VMS costs imposes the VMS cost of saving the sea lions primarily on the fishing industry. If this argument led to the conclusion that it would be fairer to have everyone share the costs, the tradeoff under consideration would be the increased fairness at a cost to society of about $500,000 (the value of the excess burden). An alternative argument could be made, however, that these commercial operations are exploiting a 'public' resource (namely, the pollock, Pacific cod, and Atka mackerel stocks of the BSAI and GOA), for which they pay no 'rents' to the resource owners, under current management arrangements. Thus, requiring vessel operators to provide an effective means to monitor their exploitation of this 'public' resource, may be regarded as a small cost for this 'privilege'. Both arguments have merit. NMFS takes neither side in this debate, but simply includes both perspectives here for 'completeness'.

Section 4.11.3.7 of the SEIS notes that electronic logbooks have been suggested as an alternative to a VMS system. Because electronic logbook systems are not as tamper resistant as a VMS, and because they would not provide data in as timely a manner as a VMS, NMFS does not expect that electronic logbooks can substitute for VMS for monitoring vessel activity in restricted areas. Since electronic logbooks are not currently a part of the alternatives, their costs have not been evaluated here.

Additional private sector observer costs

The observer program is conducted by NMFS, AFSC. Under provisions of this management program, the industry contracts directly with authorized "Observer Provider" companies. These firms supply observers to fishing vessel operators (as well as, to shoreside plants) under contract. The fishing vessel operator pays for the observer services, as required, based upon the coverage level specified in regulation.

Two of the SSL Protection Measure alternatives under consideration contain provisions requiring supplemental observer coverage, in one or more of the pollock, Pacific cod, and Atka mackerel fisheries. The first, Alternative 2, for example, would require observer coverage on all vessels under 60 feet LOA, utilizing fixed gear (hook and line, pots, or jigs) in the Pacific cod target fisheries, while such vessels are fishing within SSL critical habitat, in the BSAI or GOA. At present, all such vessels are 'exempted' from observer coverage requirements. This proposal has been interpreted to require a 30% coverage level. This decision was taken, because current regulations mandate 30% observer coverage for all vessels between 60' and 124' (LOA). Thus, imposition of a higher level of coverage than this, for the smallest members of the fleet, would impose a disproportionate (and potentially significant) burden, that could not be justified on the basis of the additional observer information obtained.

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[47]This conjecture is predicated on a relatively inelastic supply and a relatively elastic demand.

NMFS commonly uses an estimated daily contract rate of $300/ observer. This rate probably underestimates the true cost of acquiring observer coverage, incurred by the fishing vessel operator, because the contracts between the observer provider company and vessel operator typically also include payments for the observers' logistical and transportation expenses.

Table 4.11.3 in the SEIS indicates that 75 hook and line (HAL), 14 pot, and 129 jig vessels participated in the Pacific cod target fisheries in the BSAI and/or GOA management areas, in 2000. Information on the extent to which they operated inside or outside of critical habitat is not available. For this analysis, it is assumed these small boats operated exclusively *within* critical habitat. While this assumption potentially imparts an upward bias to the cost estimates, it may nonetheless be justified on several grounds. First, a boat under 60' (LOA), fishing 'fixed gear', has an exceedingly limited operating range, especially given the remoteness of BSAI and GOA fishing areas outside of CH, and the extreme sea and weather conditions during much of the P.cod fishing season.

Second, the majority of these vessels rely upon inshore processing facilities to receive and process their catch. With exceedingly limited holding capacity, and physical constraints on running-speed and range, most will have prosecuted the fishery as near shore and near port, as feasible. Given the distribution of existing inshore processing facilities, relative to SSL CH, it is probable that the vast majority of effort, from this segment of the Pacific cod fleet, took place in (or very near) CH.

Third, the height of the cod season (i.e., when CPUEs are at their peak) traditionally has focused on times and areas when the fish are in spawning aggregation. This typically occurs in late-winter and 'near shore'. To the extent that historical fishing patterns for these smallest members of the Pacific cod fixed gear fleet are relied upon to predict future behavior, it is likely the vast majority of their effort has (and will) take place with CH. Thus, as suggested, the simplifying assumption cited above, may be reasonable.

For vessels <60' LOA, targeting Pacific cod, with:

- *HAL:* Examination of fish tickets suggests that these hook-and-line vessels typically took 6.5 trips of 2.7 days each. Since all of these were assumed to be within critical habitat, they are all assumed to require 30% coverage, or an observer's services for 5.3 days per vessel per year. Total annual cost for all 75 HAL boats is estimated to be about $118,000. The discounted present value of these costs, over a five year period, is estimated to be about $537,000[48].
- *Pot:* Examination of fish tickets suggests that these pot vessels typically took 10 trips of 2.1 days each. Since all of these were assumed to be within critical habitat, they are all assumed to require 30% coverage, or an observer's services for 6.3 days per vessel per year. Total annual cost for all 15 pot vessels is estimated to be about $26,000. The discounted present value of these costs, over a five year period, is estimated to be about $120,000.
- *Jig:* Examination of fish tickets suggests that these jig vessels typically took 4.4 trips of 1.4 days each. Since all of these were assumed to be within critical habitat, they are all assumed to require

[48] The discounted present values have been calculated using a real discount rate of 5.11%. This rate was calculated using an estimate of the risk-adjusted nominal rate appropriate to fishing and an estimate of the projected inflation rate. As a result of an empirical analysis of Alaska limited entry permit markets, Karpoff estimated a risk premium for fisheries loans of 5.05% over the rate on U.S. government three month Treasury bills (an almost riskless rate). [Karpoff, page 1165]. In late August 2001, the three month rate on Treasury bills was 3.426%. The combination of the riskless interest rate and the risk premium gives a nominal interest rate of 8.53%. CPI data suggests that the inflation rate from June 2000 to June 2001 was 3.2%. This rate was used as an estimate of the inflation rate over the next five years. The nominal rate was adjusted appropriately to calculate the real rate of 5.11%.

30% coverage, or an observer's services for 1.8 days per vessel per year. Total annual cost for all 129 jig vessels is estimated to be $72,000. The discounted present value of these costs, over a five year period, is estimated to be about $324,000.

Total annual costs across all three fixed gear groups are about $200 thousand; the total discounted present value of these costs over a five year period is about $1.0 million.[49] Note, again, these estimates may systematically understate the actual total outlay for observer services, attributable to this provision of Alternative 2, because of the other contractual cost elements, earlier identified.

The second alternative which explicitly changes observer coverage requirements is Alternative 4. If adopted, this alternative would require two NMFS certified observers on catcher-processors, fishing for Atka mackerel, during the entire period when CH areas are open to Atka mackerel target fishing in Areas 542 and 543. After CH is closed, the "two observer" requirement would be lifted, and coverage would revert to current levels, for the balance of the Atka target fishery opening, in these areas.

Table 4.11.2 in the SEIS indicates that 12 trawl catcher-processors participated in the 2000 Aleutian Islands Atka mackerel fisheries. NMFS in-season managers estimate that the Atka mackerel season will be about 12 weeks in 2002. This analysis assumes that each of the catcher-processors will fish for that full period. Clearly, not all of this fishing effort will take place in CH, although the actual division of fishing days 'inside' and 'outside' CH cannot readily be estimated, given available information. Galen Tromble, Alaska Region Sustainable Fisheries staff, when consulted on this matter, had the following response:

> *"Based on the pace of the (Atka) fishery this year, and the increased CH quota next year, 12 weeks is a generous (probably too generous) estimate of the amount of time that a vessel might fish in CH. It's almost certainly on the high end.*
>
> *Another way to estimate the time is to take the anticipated inside CH quota for next year in 542 and 543 -- around 40,000 mt - and divide that by the fleet daily catch rate, which is about 1,000 mt. That gives just under 6 weeks.*
>
> *I've talked some more with the in-season staff, and I think the lower estimate is more likely, given the way the platoon system will operate, with fixed season openings based on maximum catch capacity. However, another factor on the observer coverage is that vessels aren't going to be able to obtain and get rid of observers on a day by day basis. It is likely that a vessel with two observers will have the extra observer during additional days in between CH openings, or while in transit between 542 and 543. That could easily add a week or two.*
>
> *I have high confidence that the actual amount of time that an Atka mackerel vessel next year would have two observers is bounded by the 6 week and 12 week estimates, and think that the lower end of that range is more likely than the upper."* [50]

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[49] The apparent discrepancies between annual cost and discounted present value, over five years, is due to rounding errors.

[50] Per. comm., Galen Tromble, NMFS Alaska Region, September 27, 2001.

Adopting this suggested procedure will produce a range of potential observer services costs for this sector. It may be the case, that even the lower end of the range may overstate the true observer costs, because some of the operations may choose not fish the full available period. Some, for example, may not fish in Western Aleutians Area 543. Others may opt to fish the "A" season, but not the "B" season, or visa versa. With these limiting assumptions in mind, a vessel fishing for "12 weeks" could be active for as many as 84 days. At $300/observer day, this operator would incur an "*additional*" observer expense of approximately $25,000. The emphasis on "additional" is important here, because each of these vessels already is expending at least an equivalent amount for the current observe, they are required to carry. On this basis, the full Atka mackerel fleet would incur an "additional" annual expense of about $300,000, for the second mandatory observe, under this proposal. The present value of this expense, over five years, would be about $1.4 million.

If we assume, alternatively, that the period during which the second observer will be required to be carried aboard these operations is six weeks, the "additional" observer cost, per vessel, would be approximately $12,600. On the basis of this lower-bound estimate, the full Atka mackerel fleet would incur an "additional" annual expense of about $151,000, for the second mandatory observe, under this provision of Alternative 4. The present value of this expense, over five years, would be approximately $700,000.

As noted, the cost estimates above do not include the logistics and transportation expenses incurred by the observers. These expenses would be billed, on top of the assumed $300/day observer costs, to the fishing vessel operators. But, in addition, these fishing operations incur economic and operational impacts that are not directly reflected in the money they must spend on observer coverage. For example, fishing vessel operators may have to alter their travel plans and schedules to pick up or drop off observers; the observers take up limited (and valuable) space on vessels which (especially in the class of vessels under 60 feet) may be at a premium. That is, provisions must be made to accommodate the necessary work of the observe on deck (e.g., observing gear setting and retrieval, recording and sampling of catch and bycatch). The observer also occupies "living space" aboard, which otherwise could have housed additional crew members. These operational impacts may be reflected in both increased operating expenses and reduced harvests and revenues. It is not possible, with available information, to quantify these effects, but they may represent a substantial additional cost of operation for this class of vessels.

The discussion above was predicated on a set of costs that reflect experience in the current 100% and 30% observed fleets. There are a number of reasons to expect that the costs of supplying certified observers to the small boat fleet (which, as noted, has heretofore been exempted from observer coverage requirements) will be higher, on average, than the costs of supplying observers to the larger vessel fleet.

These may include (among others):

- Observers are likely to find the working and living conditions more difficult on the smaller boats; they will have fewer amenities, more restricted living and working space, and may not be as safe as when assigned to larger vessels. Wages may have to be higher to continue to attract sufficient numbers of qualified observers to meet the new demand associated with extending coverage requirements to this segment of the industry. These higher wage costs (should they emerge) are not reflected in the present estimates.
- Moreover, the logistical expenses are likely to be higher to supply observers for these small boats. Many operate out of small, remote ports, with limited (if any) commercial transportation support, making it more expensive to get the observers to their assigned vessels.
- Smaller vessels tend to take shorter (but more frequent) trips than their larger counterparts, in these fisheries. Because only 30% observer coverage will be required under this proposed alternative, this means that observers will spend more time transferring between operations (and perhaps locations),

as each deployment is made for a shorter "trip" duration. The logistical and transportation costs are likely to be much higher, per unit observer coverage, than under present conditions.

- In addition to these higher costs, it may be harder for observer provider companies to supply observers to small operations in a timely manner; thus, fishermen may lose fishing time and profits due to an inability to obtain required observer coverage.
- These problems may be exacerbated by the increased demand for observers, in light of existing shortages of "qualified observers" to meet even current demand.

The platoon management system for Atka mackeral under Alternative 4 presents additional complexity, including a registration system, intense in-season monitoring of quotas, additional closure notices, and an expected heavy load of data analysis and communication with the industry. Implementation of this measure would add a fourth position to the management requirements, for an estimated total cost of $400,000.

Summary of management and enforcement costs

Additional NMFS enforcement and in-season management expenses were expected to be about $952 thousand per year for Alternative 4, about $852 thousand per year for alternatives 2, 3, and 5, and nothing for Alternative 1. Additional private sector VMS costs were estimated to have a five year present value of about $1.9 million for alternatives 2, 3, 4 and 5, and nothing for alternative 1. Additional private sector observer costs were estimated to have a cost of about $200 thousand a year for Alternative 2 (which required extension of 30% observer coverage to vessels under 60 feet), $300 thousand for Alternative 4 (which required a second observer on vessels fishing Atka mackerel), and nothing for the other alternatives. The $200 thousand estimate for the extension of the 30% coverage to the small boats was assumed to be a low estimate of true costs for reasons explained in the document. These cost estimates suggest the following cost ranking of these alternatives:

- Alt 1: no additional management and enforcement costs (baseline)
- Alt 3, 5: additional costs for NMFS enforcement and VMS
- Alt 2, 4: Alt. 2 includes the same additional NMFS and VMS costs as alternatives 3 and 5, and adds costs for 30% observer coverage on vessels under 60 feet targeting Pacific cod. Alt 4 includes the same additional NMFS and VMS costs as alternatives 2, 3, and 5, and adds costs for additional observers on Atka mackerel vessels. Since the observer costs for Alternative 2 may be underestimated, it is not certain that it is a lower cost option than Alternative 4.

1.3.6 Summary of Costs and Benefits

Until an alternative is selected and implemented, and the industry has an opportunity to adjust fishing patterns and behavior in accordance with the new regulatory parameters, it is unlikely that even the industry members, themselves, can fully anticipate the size and distribution of effects of the SSL Protection Measure package. With that caveat, as noted, although much of the foregoing analysis has been qualitative, some quantitative estimates are provided. It was, for example, possible to make a monetary estimate of the gross revenues placed "at risk," from the reduction in production, under alternative provisions of the suite of SSL Protection Measure alternatives before the Council.

The 'relative' rankings of the individual alternatives, to the degree that they could be meaningfully distinguished, are present below, for the principal cost and benefit categories, treated in greater detail above.

Table C-22 Summary of Benefits and Costs by Alternative

BENEFIT OR COST CATEGORY	ALTERNATIVE 1 (No action)	ALTERNATIVE 2 (Low and slow)	ALTERNATIVE 3 (Restricted and close areas)	ALTERNATIVE 4 (Area and fishery specific)	ALTERNATIVE 5 (CH catch limits)
SSL Existence value	Fails to remove jeopardy; **not a viable alternative**	Each is expected (by its proponents) to meet "minimum" jeopardy thresholds and is, therefore, "superior" to the status quo. It is not possible, with available information, to distinguish among these four alternatives on the basis of this criterion.			
SSL Use values	Fails to remove jeopardy; **not a viable alternative**	Expected to result in most rapid rate of improvement in SSL stock among alternatives. Ranks 1st among alternatives on this criterion.	Expected rate of improvement in SSL stock below that of alternatives 2 & 4. Likely ranks 3rd, among alternatives, on this criterion.	Expected rate of improvement in SSL stock below only that of alternative 2. Likely ranks 2nd, among alternatives, on this criterion.	Expected to result in slowest rate of improvement in SSL stock among alternatives. Likely lowest ranking among the alternatives to the status quo, on this criterion.
Gross revenues	Relatively little impact on 'historical' maximum potential gross revenues; least gross revenues placed at risk; constitutes analytical 'baseline'; likely ranks 1st among alternatives on this criterion.	Largest reduction in maximum potential gross revenues; second largest gross revenues placed "at risk"; likely is the most burdensome, ranking 5th on this criterion.	Relatively little impact on maximum potential gross revenues, as compared to the status quo; largest gross revenues placed "at risk"; likely ranks 4th on this criterion.	Largest projected maximum potential gross revenues; intermediate level of gross revenues placed "at risk"; likely ranks 2nd on this criterion.	Relatively little impact on maximum potential gross revenues, as compared to the status quo; intermediate level of gross revenues placed "at risk" (greater than Alt. 4); likely ranks 3rd on this criterion.

Table C-22 (Cont.) Summary of Benefits and Costs by Alternative

BENEFIT OR COST CATEGORY	ALTERNATIVE 1 (No action)	ALTERNATIVE 2 (Low and slow)	ALTERNATIVE 3 (Restricted and close areas)	ALTERNATIVE 4 (Area and fishery specific)	ALTERNATIVE 5 (CH catch limits)
Operating costs	Baseline condition (i.e., no change in cost and earnings)	Likely yields highest adverse operating cost and earnings impacts among the alternatives, by imposing the most restrictive set of management measures and structural changes (e.g., sharply reduced TACs, four equal season apportionments, total CH trawl ban, area exclusive registration, AI pollock closure, maximum daily catch limits, VMS, etc.). Ranks lowest among alternatives, on this criterion.	Based upon the 2000 BiOp RPA, imposes significant structural limits, (e.g., establishes large areas of CH closed to pollock, cod, and mackerel fishing, and restrict limits on remaining CH catch.) Designed to protect SSL and provide monitoring to assess effects, with minimal consideration of fishery impacts. May have nearly as great an adverse effect on costs and earnings as alternative 2, with greater potential burden on smallest operations. Likely ranks 3rd among alternatives to the status quo, on this criterion.	Designed by the RPA committee to be "less restrictive" in terms of regulatory burdens imposed and operational flexibility provided (as compared to provisions of alternative 2, 3, or 4), while meeting SSL objectives. Likely imposes lowest operating costs and earnings impacts, overall. Seeks to reduce economic and operational impacts on small operations, especially if options 1, 2, and/or 3 are included. Ranks 1st among alternatives to the status quo, on this criterion.	Similar in structure to alternative 3, imposes less restrictive universal closures on rookeries and haulouts. More restrictive in AI pollock. With fewer elemental components, this alternative appears less complex and thus potentially less burdensome. Likely falls between alternatives 3 and 4, in terms of relative impact, i.e., likely ranking 2nd, on this criterion.
Safety	Baseline condition (i.e., no change safety)	Results in largest operational changes (e.g., transit greater distances between port and open fishing grounds, fish farther offshore, aggravate race-for-fish). High potential to increase the risk of accidents and injury. While difficult to judge, likely ranks a distant 2nd (or perhaps 3rd) to alternative 4, on this criterion, among alternatives to the status quo.	Closes large areas of SSL CH to pollock, P.cod, and Atka mackerel fishing, while strictly limiting fishing in remaining CH, displacing effort into areas more distant from shore and more remote from ports and traditional operating areas. High potential to increase the risk of accidents and injury. Likely ranks lowest among alternatives to the status quo, on this criterion.	Appears to reduce some of the more onerous aspects of Alternatives 2, 3, and 5, with respect to proximity of open fishing areas and operating ports. Reduces some requirements which force effort farther offshore (especially for the smaller segments of fleets) and should, therefore, impose a relatively lower risk of accident and injury, to the extent that occurrence of accidents and injuries are highly correlated with fishing distance offshore, vessel size, etc. Likely ranks 1st among alternatives to the status quo, on this criterion.	Similar in structure to alternative 3, relies heavily on time and area restrictions, TAC apportionments, and CH closures. Likely to result in equivalent outcomes to alternative 3 on this criterion (i.e., relatively high potential to increase the risk of accidents and injury). Likely ranks 3rd (or perhaps 4th) among alternatives to the status quo, on this criterion.

Table C-22 (Cont.) Summary of Benefits and Costs by Alternative

BENEFIT OR COST CATEGORY	ALTERNATIVE 1 (No action)	ALTERNATIVE 2 (Low and slow)	ALTERNATIVE 3 (Restricted and close areas)	ALTERNATIVE 4 (Area and fishery specific)	ALTERNATIVE 5 (CH catch limits)
Consumers impacts	Baseline condition (i.e., no change in consumer welfare)	Likely results in the (relatively) largest adverse impact on aggregate seafood production, in the form of supply contraction, potential loss of quality, and/or higher prices, all of which will adversely impact consumers. Ranks lowest among alternatives to the status quo, on this criterion.	Likely results in (relatively) very large adverse impacts on aggregate seafood production, in the form of supply contraction, potential loss of quality, and/or higher prices, all of which will adversely impact consumers. Likely ranks 3rd among alternatives to the status quo, on this criterion.	Likely results in the (relatively) lowest adverse impact on aggregate seafood production, in the form of supply contraction, potential quality, and/or higher prices, all of which will adversely impact consumers. Likely ranks 1st among alternatives to the status quo, on this criterion.	Likely results in moderate impacts on consumer supply, quality, and price. Some of the required regulatory adjustments have been successfully incorporated (e.g., AFA pollock). Others largely impact non-domestic consumers (e.g., Atka markets) and would not be counted here. Uncertainty about the actual 'form' of cod restrictions make judgement here difficult. Likely ranks 2nd among alternatives to the status quo, on this criterion.
Management and Enforcement costs	Baseline condition (i.e., no change in management and enforcement costs)	Alts. 2 and 4 are higher cost than 3 and 5; difference between 2 and 4 unclear.	There is effectively no discernable difference between Alt. 3, and 5 on the basis of this criterion.	Alts. 2 and 4 are higher cost than 3 and 5; difference between 2 and 4 unclear.	There is effectively no discernable difference between Alt. 3, and 5 on the basis of this criterion.

1.4 Distributional Impacts

A benefit-cost analysis is principally focused on questions of aggregate "net benefits to the nation". However, a program which has positive net benefits for the nation, as a whole, may nonetheless leave some persons or groups worse off than before. For equity reasons, it is common to accompany a benefit-cost analysis with a distributive analysis, that looks at the impacts of a proposal on specific impacted groups.

The discussion of distributional impacts in this section is divided into three parts. Section 1.4.1 examines the relative dependence of different segments of the fleet on the target fisheries impacted by the proposed alternatives (i.e., pollock, Atka mackerel, and Pacific cod) and on fisheries (such as salmon and halibut) that are not directly regulated by the alternatives, but which may, nonetheless, experience 'spill-over' effects from them. Section 1.4.2 provides a highly disaggregate presentation of the outputs from the gross revenues simulation model, used earlier to project the first wholesale earnings "at risk", for the different alternatives. Section 1.4.3 provides a discussion of the impacts of these SSL Protection Measure alternatives on the adjacent 'fishery dependent' communities and regions of western Alaska, including detailed descriptions of the communities most likely to be affected.

1.4.1 Catcher Vessel Ex-vessel Dependency

When considering new fishery management or regulatory restrictions for the fishing industry operating in the Bering Sea and Gulf of Alaska, it is important to understand how contemplated changes may affect the financial viability of fishing businesses operating in these areas. This section provides analysis of the relative level of dependence of fishing operations, which will be directly regulated under proposed SSL Protection Measures, on several fisheries. The specific focus is on the 'ex-vessel' level of the industry, that is: 1) catcher vessels targeting pollock, 2) catcher vessels targeting Pacific cod, and 3) catcher vessels targeting Atka mackerel.

The fisheries were divided into three general areas: the Bering Sea (including the Aleutian Islands), the Central Gulf, and the Western Gulf. The Bering Sea incorporates statistical areas 500 through 538. The Central Gulf is comprised of statistical areas 620 and 630. The Western Gulf is comprised of statistical area 610.

The analyses were based upon the State of Alaska fish ticket files, as well as license files from the Commercial Fisheries Entry Commission, for various years. The analyses were limited to catcher vessel records. The steps in the process are outlined below.

- data were selected for the years 1995 through 2000.
- vessels were separated into the following length categories:
  - vessels 32 feet or less
  - vessels between 33 and 59 feet
  - vessels between 60 and 124 feet, and
  - vessels 125 feet and over
- gear categories include: longline, pot, trawl, jig and other
- the ex-vessel value, which is a fishing operator's gross revenue, was calculated using the number of round pounds landed with each fish ticket delivery, matched with the estimated ex-vessel value for that species, area and year from Commercial Fisheries Entry Commission data files.
- a targeting analysis was completed to define targeted and non-targeted catch. The targeting

routine utilized by the NPFMC looks at each fish ticket and allocates the targeted species to the species with the highest proportion of harvest for the statistical area being reported. The exception to this method is halibut, because halibut is determined as the target fishery at lower levels of proportional harvest.

- the number of unique fishing vessels participating in each fishery was determined, along with the total revenue from that fishery.
- catches and earnings are confidential data, and cannot be released where there are four or fewer participants in a grouping. To protect the confidential status of the income data and still achieve the goal of showing relative dependence upon the respective target species, the dependence tables (Tables C-23 through C-54) are presented in relative percentages of total gross revenue for each vessel group. The number of unique vessels that are included in the group and the total level of gross fishing revenue are discussed in the respective sections below.

As noted above, the focus of this section is on vessels targeting pollock, Pacific cod and Atka mackerel. The fishing income, by year, area, gear type, and vessel length was separated for each of these target species. The levels of income groupings were as follows:

- targeted catches and ex-vessel values for (pollock, Pacific cod, and Atka mackerel) in the respective area (Bering Sea, Central Gulf, Western Gulf).
- non-targeted catches and ex-vessel values for (pollock, Pacific cod, and Atka mackerel) in the respective area (Bering Sea, Central Gulf, Western Gulf).
- catches and values for all other groundfish within the same specific area
- catches and values for all groundfish harvested in all Alaskan waters, excepting only the specific area (Bering Sea, Central Gulf, Western Gulf) being analyzed.
- catches and values for other species. The other grouping is comprised of salmon, herring, crab and halibut fisheries. Dependence upon the other species incomes tends to be highest for the small and mid-length vessels.

The basic question this section addresses is, "*For catcher vessels in the Bering Sea, Central Gulf and Western Gulf (targeting pollock, Pacific cod or Atka mackerel), what is the relative dependence on the target species and other fisheries, as a proportion of total fishing gross income?*" It is important to recognize that the vessel groups showing catches and values by target species are not mutually exclusive. For example, when looking at vessel catches and values for those vessels targeting on pollock, the 'other groundfish' harvested in the area may include Pacific cod or Atka mackerel. Similarly, the catches and values for Pacific cod include pollock and Atka mackerel in the 'other groundfish' category. Vessels targeting both pollock and Pacific cod will appear in the vessel group categories for both species.

Also note that the State of Alaska fish ticket file for 2000 is not fully completed. It does not yet include catches and values for halibut. For example, Table C-23 shows small vessels operating in the Bering Sea in 2000 had a 0.0% contribution from other species, primarily halibut, for this fleet group. When the year 2000 fish ticket file is fully complete, the analysis would likely show that the relative contribution to income from the other species category is in line with prior years.

1.4.1.1 Pollock

Tables C-23 through C-38 portray the relative dependence of the respective fishing fleets on targeted and non-targeted pollock fishing revenues. The relative dependence is shown by the percentage contribution to total gross revenue from the fishery categories outlined above.

Table C-23 shows the relative dependence on pollock by vessels 32 feet and less utilizing longline gear. As might be expected, pollock earnings contribute almost nothing to this vessel group. Most earnings are from the traditional species included in the other category, predominantly salmon and halibut. There are just a few vessels in this category in the Bering Sea and Western Gulf areas. In the Central Gulf, the numbers of vessels range between 32 and 60, with gross fishing revenues ranging from $1.5 million to $6.5 million.

Table C-24 shows the relative dependence on pollock by vessels 32 feet and less utilizing pot gear. There are just a few of these vessels, focusing primarily on salmon in the Central Gulf.

Table C-25 shows the relative dependence on pollock by vessels 32 feet and less utilizing jig gear. There are modest numbers of vessels in this group. In the Bering Sea, the numbers of vessels in this group range from five to twenty-two. In the Central Gulf, the number of these vessels is higher, and range from 12 to 42 vessels. In the Western Gulf, the number of vessels in the group ranges from two to fourteen. Fishing income for this group comes primarily from salmon, with halibut contributing a smaller proportion to total fishing revenues. In the Central Gulf, total revenues for the group range from $500 thousand to $1.3 million.

Table C-26 shows the relative dependence on pollock of vessels 32 feet and less utilizing other gear. Again, pollock plays almost no role in overall fishing revenues for this category of vessels. There are very few vessels in this grouping, fewer than 10 vessels in the Bering Sea and Western Gulf. In the Central Gulf, there the number of vessels ranges between six and fifteen. Earnings for this group are primarily from other groundfish within the same area, salmon and halibut.

Table C-27 shows the relative dependence on pollock of vessels between 33 and 59 feet utilizing longline gear. Pollock contributes almost nothing to the overall revenues for this group. Most of the pollock earnings are from non-targeted catches. Earnings for this group come predominantly from Alaska groundfish outside the area and from other species, including salmon and halibut. There is a large fleet in this group operating in the Central Gulf, ranging between 315 and 397 vessels. In the Bering Sea and Western Gulf, the number of vessels varies from 13 to 39, and from 35 to 45, respectively. Gross earnings for this group in the Central Gulf ranges between $59 million and $94 million, over the period of analysis.

Table C-28 shows the relative dependence on pollock of vessels between 33 and 59 feet utilizing pot gear. Pollock contributes very little to the total earnings of these vessel groups. Most earnings are from a relatively even distribution of fisheries, including other groundfish, salmon and halibut, with a proportionally smaller contribution from crab and herring. In the Bering Sea, the number of vessels in this category varies between two to sixteen In the Central Gulf, the numbers vary between 49 and 85 and in the Western Gulf, the number of vessels varies between 34 and 69. Gross earnings from fishing in the Central Gulf range from $13 million to $32 million.

Table C-29 shows the relative dependence on pollock of vessels between 33 and 59 feet utilizing trawl gear. This group includes the "limit salmon seiners" that have added trawl gear. Pollock is a modestly important species to this vessel group, generally ranging between 3% and 9% of total fishing revenue. Other important fisheries include other groundfish, as well as the traditional other species of salmon and halibut. The numbers

of participants in this group vary considerably in the Bering Sea and Central Gulf, from two to fifteen vessels and from 10 to 53 vessels, respectively, for the period from 1995 through 2000. In the Western Gulf, participation remains more constant, varying only between 39 to 41 vessels. In the Central Gulf, total fishing revenues range between $3.6 million and $22 million.
Table C-30 shows the relative dependence on pollock of vessels between 33 and 59 feet utilizing jig gear. Pollock is not an important contributor to fishing revenues for this group. Most earnings come from other species, predominantly salmon and halibut. Other groundfish, both within the area and statewide, contribute important shares of revenue to this group, particularly in the Bering Sea. In the Bering Sea, the numbers of vessels range from four to eighteen. In the Central Gulf, the numbers of vessels in this category range from 42 to 126. In the Western Gulf, the number of these vessels ranged from 13 to 23. Total revenues in the Central Gulf ranged from $2.4 million to $11 million, over this period.

Table C-31 shows the relative dependence on pollock of vessels between 33 and 59 feet utilizing other gear types. There are no vessels in this group for the Bering Sea. In the Central Gulf and Western Gulf, the number of vessels in this group is relatively small, fewer than ten in most years. Most fishing revenues are from participation in the salmon fishery. Pollock catches and earnings are near zero for this group.

Table C-32 shows the relative dependence on pollock of vessels between 60 and 124 feet utilizing longline gear. Pollock contributes a very small proportion of total fishing revenues for this group, primarily from non-targeted bycatch. There has been a downward trend in the number of vessels participating in this group over the period from 1995 to 2000. In the Bering Sea, the number of vessels has varied between 22 and 40. In the Central Gulf, the number of vessels ranges between 92 and 134. In the Western Gulf, this group has included 35 to 53 vessels, over the interval of analysis. Total earnings for the Central Gulf fishery have been between $35 million and $82 million, for the 1995 to 2000 period.

Table C-33 shows the relative dependence on pollock of vessels between 60 and 124 feet utilizing pot gear. There are very limited earnings from pollock within this group. The focus is predominantly on other groundfish (primarily Pacific cod) and crab. Over the 1995-2000 period, the numbers of vessels in this group have varied between 50 and 87 in the Bering Sea, 38 and 68 in the Central Gulf, and between 18 and 35 in the Western Gulf. In the Bering Sea, total ex-vessel revenues for the group have ranged from $39 million to $79 million, for the 1995 through 2000 period.

Table C-34 shows the relative dependence on pollock of vessels between 60 and 124 feet utilizing trawl gear. Pollock revenues contribute a large share of total revenues for this group, particularly for those fishing in the Bering Sea, where it accounts for 26% to 33%. The largest number of current participants in this group is in the Bering Sea, where the number of vessels has varied between 65 and 83. The number of vessels in this group within the Central Gulf has recently declined slightly, varying to the lower end of the 54 to 83 vessel range. Similarly, the numbers of vessels in the Western Gulf have declined to the lower end of the 17 to 55 vessel range. The total revenues for the Bering Sea fleet have varied from $66 million to $135 million.

Table C-35 shows the relative dependence on pollock of vessels between 60 and 124 feet utilizing jig gear. There are very few vessels in this group, with almost no income from pollock. Table C-36 shows the relative dependence on pollock of vessels between 125 feet and greater utilizing longline gear. There are few vessels in this group, with almost no earnings from pollock. Most earnings come from other groundfish or halibut.

Table C-37 shows the relative dependence on pollock of vessels between 125 feet and greater utilizing pot gear. Income for this group comes primarily from other groundfish and crab. The numbers of vessels in this group in the Bering Sea have varied between 15 and 25, with total earnings ranging from $17 million to $28 million. There are fewer than ten each of these vessels, respectively, in the Central and Western Gulf areas.

Table C-38 shows the relative dependence on pollock of vessels between 125 feet and greater utilizing trawl gear. As would be expected, pollock is a very important fishery for this vessel group. In the Bering Sea, 41% to 46% of total revenues come from targeted pollock fishing in the area. "Groundfish" is the predominant source of revenue in all three areas, with pollock landings within the Central and Western Gulf areas contributing a lesser proportion of total earnings. The numbers of vessels in the Bering Sea have ranged from 22 to 36, over the 1995 through 2000 period. In the Central Gulf, the numbers of vessels have ranged between five and eleven, while the number of vessels in the Western Gulf ranged between two and twenty-three. Total revenues for the Bering Sea group have varied between $90 million and $206 million.

Table C-23 Relative dependence on pollock as a percentage of total gross revenue by vessel length, gear and area 1995-2000; vessels 32 feet or less using longline gear

vessel length	gear	area	year	targeted pollock	non-targeted pollock	other groundfish in area	Alaska groundfish outside area	other species	total gross revenue
32 or less	longline	Bering Sea	1995	0.0%	0.0%	1.1%	6.8%	92.1%	100.0%
32 or less	longline	Bering Sea	1996	0.0%	0.0%	26.5%	30.1%	43.4%	100.0%
32 or less	longline	Bering Sea	1997	0.0%	0.0%	2.1%	9.7%	88.1%	100.0%
32 or less	longline	Bering Sea	1998	0.0%	0.0%	6.1%	18.9%	75.0%	100.0%
32 or less	longline	Bering Sea	1999	0.0%	0.0%	0.6%	0.6%	98.9%	100.0%
32 or less	longline	Bering Sea	2000	0.0%	0.0%	50.0%	50.0%	0.0%	100.0%
32 or less	longline	Central Gulf	1995	0.0%	0.0%	3.6%	7.0%	89.4%	100.0%
32 or less	longline	Central Gulf	1996	0.0%	0.0%	11.5%	20.0%	68.5%	100.0%
32 or less	longline	Central Gulf	1997	0.0%	0.0%	10.8%	12.0%	77.1%	100.0%
32 or less	longline	Central Gulf	1998	0.0%	0.0%	10.4%	13.5%	76.1%	100.0%
32 or less	longline	Central Gulf	1999	0.0%	0.0%	5.4%	6.3%	88.4%	100.0%
32 or less	longline	Central Gulf	2000	0.0%	0.0%	26.5%	27.3%	46.2%	100.0%
32 or less	longline	Western Gulf	1995	0.0%	0.0%	0.3%	2.3%	97.4%	100.0%
32 or less	longline	Western Gulf	1996	0.0%	0.0%	4.8%	39.0%	56.2%	100.0%
32 or less	longline	Western Gulf	1997	0.0%	0.0%	0.1%	13.6%	86.3%	100.0%
32 or less	longline	Western Gulf	1998	0.0%	0.0%	0.6%	45.7%	53.7%	100.0%
32 or less	longline	Western Gulf	1999	0.0%	0.0%	10.4%	32.4%	57.2%	100.0%
32 or less	longline	Western Gulf	2000	0.0%	0.0%	15.4%	15.4%	69.2%	100.0%
Source: State of Alaska fish ticket files (including halibut) and Commercial Fisheries Entry Commission Vessel License Files.									
Data analysis by Elaine Dinneford, NPFMC Fisheries Analyst, May 2001.									

Table C-24 Relative dependence on pollock as a percentage of total gross revenue by vessel length, gear and area 1995-2000; vessels 32 feet or less using pot gear

vessel length	gear	area	year	targeted pollock	non-targeted pollock	other groundfish in area	Alaska groundfish outside area	other species	total gross revenue
32 or less	pot	Bering Sea	2000	0.0%	0.0%	11.5%	11.5%	76.9%	100.0%
32 or less	pot	Central Gulf	1995	0.0%	0.0%	4.5%	4.5%	90.9%	100.0%
32 or less	pot	Central Gulf	1996	0.0%	0.0%	1.4%	1.4%	97.1%	100.0%
32 or less	pot	Central Gulf	1997	0.0%	0.0%	1.0%	1.0%	98.0%	100.0%
32 or less	pot	Central Gulf	1999	0.0%	0.0%	7.5%	7.5%	85.0%	100.0%
32 or less	pot	Central Gulf	2000	0.0%	0.0%	50.0%	50.0%	0.0%	100.0%
32 or less	pot	Western Gulf	1995	0.0%	0.0%	5.3%	5.3%	89.4%	100.0%
32 or less	pot	Western Gulf	1997	0.0%	0.0%	0.5%	0.5%	98.9%	100.0%
Source: State of Alaska fish ticket files (including halibut) and Commercial Fisheries Entry Commission Vessel License Files.									
Data analysis by Elaine Dinneford, NPFMC Fisheries Analyst, May 2001.									
Table 6.3.1.3: Relative Dependence on Pollock as a Percentage of Total Gross Revenue by Vessel Length, Gear and Area 1995-2000									

Table C-25 Relative dependence on pollock as a percentage of total gross revenue by vessel length, gear and area 1995-2000; vessels 32 feet or less using jig gear

vessel length	gear	area	year	targeted pollock	non-targeted pollock	other groundfish in area	Alaska groundfish outside area	other species	total gross revenue
32 or less	jig	Bering Sea	1995	0.0%	0.0%	14.7%	19.3%	66.0%	100.0%
32 or less	jig	Bering Sea	1996	0.0%	0.0%	19.1%	33.8%	47.1%	100.0%
32 or less	jig	Bering Sea	1997	0.2%	0.0%	12.3%	32.1%	55.4%	100.0%
32 or less	jig	Bering Sea	1998	0.0%	0.0%	21.9%	23.9%	54.2%	100.0%
32 or less	jig	Bering Sea	1999	0.0%	0.0%	34.2%	35.5%	30.3%	100.0%
32 or less	jig	Bering Sea	2000	0.0%	0.0%	6.3%	23.1%	70.6%	100.0%
32 or less	jig	Central Gulf	1995	0.0%	0.0%	7.9%	16.1%	76.0%	100.0%
32 or less	jig	Central Gulf	1996	0.0%	0.0%	6.6%	11.8%	81.7%	100.0%
32 or less	jig	Central Gulf	1997	0.0%	0.0%	20.3%	29.1%	50.7%	100.0%
32 or less	jig	Central Gulf	1998	0.0%	0.0%	22.5%	28.7%	48.8%	100.0%
32 or less	jig	Central Gulf	1999	0.0%	0.0%	17.0%	17.0%	66.0%	100.0%
32 or less	jig	Central Gulf	2000	0.0%	0.0%	32.7%	34.2%	33.1%	100.0%
32 or less	jig	Western Gulf	1995	0.0%	0.0%	13.8%	25.9%	60.4%	100.0%
32 or less	jig	Western Gulf	1996	0.0%	0.0%	13.6%	30.1%	56.3%	100.0%
32 or less	jig	Western Gulf	1997	0.0%	0.0%	10.4%	22.7%	67.0%	100.0%
32 or less	jig	Western Gulf	1998	0.0%	0.0%	14.6%	26.8%	58.5%	100.0%
32 or less	jig	Western Gulf	1999	0.0%	0.0%	9.2%	14.0%	76.8%	100.0%
32 or less	jig	Western Gulf	2000	0.0%	0.0%	20.0%	26.9%	53.1%	100.0%
Source: State of Alaska fish ticket files (including halibut) and Commercial Fisheries Entry Commission Vessel License Files.									
Data analysis by Elaine Dinneford, NPFMC Fisheries Analyst, May 2001.									

Table C-26 Relative dependence on pollock as a percentage of total gross revenue by vessel length, gear and area 1995-2000; vessels 32 feet or less using other gear types

vessel length	gear	area	year	targeted pollock	non-targeted pollock	other groundfish in area	Alaska groundfish outside area	other species	total gross revenue
32 or less	other	Bering Sea	1996	0.0%	0.0%	49.8%	50.2%	0.0%	100.0%
32 or less	other	Bering Sea	1997	0.0%	0.0%	50.0%	50.0%	0.0%	100.0%
32 or less	other	Bering Sea	1998	0.0%	0.0%	9.5%	39.6%	50.9%	100.0%
32 or less	other	Bering Sea	1999	0.0%	0.0%	32.7%	67.3%	0.0%	100.0%
32 or less	other	Bering Sea	2000	0.0%	0.0%	39.4%	60.6%	0.0%	100.0%
32 or less	other	Central Gulf	1995	0.0%	0.0%	32.2%	32.2%	35.5%	100.0%
32 or less	other	Central Gulf	1996	0.0%	0.0%	14.5%	14.5%	71.0%	100.0%
32 or less	other	Central Gulf	1997	0.0%	0.0%	18.7%	18.7%	62.7%	100.0%
32 or less	other	Central Gulf	1998	0.0%	0.0%	25.4%	25.4%	49.2%	100.0%
32 or less	other	Central Gulf	1999	0.0%	0.0%	5.4%	5.4%	89.2%	100.0%
32 or less	other	Central Gulf	2000	0.0%	0.0%	9.2%	9.2%	81.5%	100.0%
32 or less	other	Western Gulf	1995	0.0%	0.0%	50.0%	50.0%	0.0%	100.0%
32 or less	other	Western Gulf	1996	0.0%	0.0%	0.7%	99.3%	0.0%	100.0%
32 or less	other	Western Gulf	1997	0.0%	0.0%	50.0%	50.0%	0.0%	100.0%
32 or less	other	Western Gulf	1998	0.0%	0.0%	29.8%	35.9%	34.3%	100.0%
32 or less	other	Western Gulf	1999	0.0%	0.0%	4.7%	4.8%	90.5%	100.0%
32 or less	other	Western Gulf	2000	0.0%	0.0%	32.8%	67.2%	0.0%	100.0%

Source: State of Alaska fish ticket files (including halibut) and Commercial Fisheries Entry Commission Vessel License Files.

Data analysis by Elaine Dinneford, NPFMC Fisheries Analyst, May 2001.

Table C-27 Relative dependence on pollock as a percentage of total gross revenue by vessel length, gear and area 1995-2000; vessels 33 to 59 feet in length using longline gear

vessel length	gear	area	year	targeted pollock	non-targeted pollock	other groundfish in area	Alaska groundfish outside area	other species	total gross revenue
33 to 59	longline	Bering Sea	1995	0.0%	0.0%	6.2%	65.5%	28.4%	100.0%
33 to 59	longline	Bering Sea	1996	0.0%	0.0%	3.6%	56.4%	40.0%	100.0%
33 to 59	longline	Bering Sea	1997	0.0%	0.0%	4.8%	54.0%	41.2%	100.0%
33 to 59	longline	Bering Sea	1998	0.0%	0.0%	6.6%	47.7%	45.7%	100.0%
33 to 59	longline	Bering Sea	1999	0.0%	0.0%	3.5%	40.1%	56.3%	100.0%
33 to 59	longline	Bering Sea	2000	0.0%	0.0%	8.7%	89.2%	2.1%	100.0%
33 to 59	longline	Central Gulf	1995	0.0%	0.0%	14.3%	35.5%	50.2%	100.0%
33 to 59	longline	Central Gulf	1996	0.0%	0.0%	15.6%	35.7%	48.7%	100.0%
33 to 59	longline	Central Gulf	1997	0.0%	0.0%	15.5%	33.5%	51.0%	100.0%
33 to 59	longline	Central Gulf	1998	0.0%	0.0%	15.3%	29.9%	54.8%	100.0%
33 to 59	longline	Central Gulf	1999	0.0%	0.0%	13.1%	24.7%	62.2%	100.0%
33 to 59	longline	Central Gulf	2000	0.0%	0.0%	26.3%	51.1%	22.6%	100.0%
33 to 59	longline	Western Gulf	1995	0.0%	0.0%	8.1%	61.6%	30.3%	100.0%
33 to 59	longline	Western Gulf	1996	0.0%	0.0%	6.8%	53.4%	39.8%	100.0%
33 to 59	longline	Western Gulf	1997	0.0%	0.0%	6.2%	47.3%	46.5%	100.0%
33 to 59	longline	Western Gulf	1998	0.0%	0.0%	6.9%	43.4%	49.8%	100.0%
33 to 59	longline	Western Gulf	1999	0.0%	0.0%	7.1%	35.6%	57.3%	100.0%
33 to 59	longline	Western Gulf	2000	0.0%	0.0%	15.4%	75.6%	8.9%	100.0%
Source: State of Alaska fish ticket files (including halibut) and Commercial Fisheries Entry Commission Vessel License Files.									
Data analysis by Elaine Dinneford, NPFMC Fisheries Analyst, May 2001.									

Table C-28 Relative dependence on pollock as a percentage of total gross revenue by vessel length, gear and area 1995-2000; vessels 33 to 59 feet in length using pot gear

vessel length	gear	area	year	targeted pollock	non-targeted pollock	other groundfish in area	Alaska groundfish outside area	other species	total gross revenue
33 to 59	pot	Bering Sea	1995	0.0%	0.0%	6.1%	13.8%	80.1%	100.0%
33 to 59	pot	Bering Sea	1996	0.0%	0.0%	34.6%	48.0%	17.4%	100.0%
33 to 59	pot	Bering Sea	1997	0.0%	0.0%	1.4%	46.2%	52.4%	100.0%
33 to 59	pot	Bering Sea	1998	0.0%	0.0%	4.0%	14.2%	81.8%	100.0%
33 to 59	pot	Bering Sea	1999	0.0%	0.0%	2.2%	24.6%	73.2%	100.0%
33 to 59	pot	Bering Sea	2000	0.0%	0.0%	4.3%	52.4%	43.2%	100.0%
33 to 59	pot	Central Gulf	1995	0.0%	0.0%	20.7%	21.3%	58.1%	100.0%
33 to 59	pot	Central Gulf	1996	0.0%	0.0%	22.3%	29.5%	48.3%	100.0%
33 to 59	pot	Central Gulf	1997	0.0%	0.0%	25.4%	26.6%	47.9%	100.0%
33 to 59	pot	Central Gulf	1998	0.0%	0.0%	23.7%	24.1%	52.2%	100.0%
33 to 59	pot	Central Gulf	1999	0.0%	0.0%	23.9%	24.5%	51.6%	100.0%
33 to 59	pot	Central Gulf	2000	0.1%	0.0%	34.9%	35.5%	29.5%	100.0%
33 to 59	pot	Western Gulf	1995	0.0%	0.0%	6.5%	8.0%	85.5%	100.0%
33 to 59	pot	Western Gulf	1996	0.0%	0.0%	17.3%	36.7%	46.0%	100.0%
33 to 59	pot	Western Gulf	1997	0.0%	0.0%	23.4%	24.8%	51.8%	100.0%
33 to 59	pot	Western Gulf	1998	0.0%	0.0%	17.8%	18.1%	64.0%	100.0%
33 to 59	pot	Western Gulf	1999	0.0%	0.0%	17.4%	20.3%	62.3%	100.0%
33 to 59	pot	Western Gulf	2000	0.0%	0.0%	31.3%	32.6%	36.2%	100.0%
Source: State of Alaska fish ticket files (including halibut) and Commercial Fisheries Entry Commission Vessel License Files.									
Data analysis by Elaine Dinneford, NPFMC Fisheries Analyst, May 2001.									

Table C-29 Relative dependence on pollock as a percentage of total gross revenue by vessel length, gear and area 1995-2000; vessels 33 to 59 feet in length using trawl gear

vessel length	gear	area	year	targeted pollock	non-targeted pollock	other groundfish in area	Alaska groundfish outside area	other species	total gross revenue
33 to 59	trawl	Bering Sea	1995	4.0%	0.0%	0.1%	44.2%	51.6%	100.0%
33 to 59	trawl	Bering Sea	1996	2.2%	0.0%	0.2%	82.0%	15.6%	100.0%
33 to 59	trawl	Bering Sea	1997	2.6%	0.0%	0.1%	75.9%	21.4%	100.0%
33 to 59	trawl	Bering Sea	1998	3.2%	0.0%	1.2%	71.4%	24.1%	100.0%
33 to 59	trawl	Bering Sea	1999	3.3%	0.0%	1.2%	56.2%	39.3%	100.0%
33 to 59	trawl	Bering Sea	2000	6.6%	0.0%	0.1%	65.5%	27.8%	100.0%
33 to 59	trawl	Central Gulf	1995	2.5%	0.0%	13.6%	27.7%	56.2%	100.0%
33 to 59	trawl	Central Gulf	1996	2.0%	0.1%	18.7%	46.1%	33.2%	100.0%
33 to 59	trawl	Central Gulf	1997	9.3%	0.1%	12.9%	48.9%	28.8%	100.0%
33 to 59	trawl	Central Gulf	1998	9.2%	0.0%	9.9%	42.5%	38.4%	100.0%
33 to 59	trawl	Central Gulf	1999	3.7%	0.1%	7.9%	43.8%	44.5%	100.0%
33 to 59	trawl	Central Gulf	2000	2.7%	0.2%	23.9%	54.3%	19.0%	100.0%
									0.0%
33 to 59	trawl	Western Gulf	1995	5.8%	0.0%	9.8%	23.1%	61.3%	100.0%
33 to 59	trawl	Western Gulf	1996	9.1%	0.0%	22.1%	43.5%	25.3%	100.0%
33 to 59	trawl	Western Gulf	1997	7.6%	0.0%	24.1%	45.7%	22.5%	100.0%
33 to 59	trawl	Western Gulf	1998	5.9%	0.0%	20.8%	37.3%	36.1%	100.0%
33 to 59	trawl	Western Gulf	1999	8.4%	0.1%	21.5%	32.8%	37.3%	100.0%
33 to 59	trawl	Western Gulf	2000	8.1%	0.0%	29.7%	40.7%	21.5%	100.0%
Source: State of Alaska fish ticket files (including halibut) and Commercial Fisheries Entry Commission Vessel License Files.									
Data analysis by Elaine Dinneford, NPFMC Fisheries Analyst, May 2001.									

Table C-30 Relative dependence on pollock as a percentage of total gross revenue by vessel length, gear and area 1995-2000; vessels 33 to 59 feet in length using jig gear

vessel length	gear	area	year	targeted pollock	non-targeted pollock	other groundfish in area	Alaska groundfish outside area	other species	total gross revenue
33 to 59	jig	Bering Sea	1995	0.0%	0.0%	15.7%	17.0%	67.3%	100.0%
33 to 59	jig	Bering Sea	1996	0.0%	0.0%	24.7%	25.5%	49.8%	100.0%
33 to 59	jig	Bering Sea	1997	0.0%	0.0%	39.0%	45.5%	15.5%	100.0%
33 to 59	jig	Bering Sea	1998	0.0%	0.0%	28.9%	28.9%	42.2%	100.0%
33 to 59	jig	Bering Sea	1999	0.0%	0.0%	11.7%	13.7%	74.6%	100.0%
33 to 59	jig	Bering Sea	2000	0.0%	0.0%	14.6%	48.5%	36.9%	100.0%
33 to 59	jig	Central Gulf	1995	0.0%	0.0%	12.9%	14.6%	72.5%	100.0%
33 to 59	jig	Central Gulf	1996	0.0%	0.0%	11.8%	12.7%	75.5%	100.0%
33 to 59	jig	Central Gulf	1997	0.0%	0.0%	11.4%	11.5%	77.1%	100.0%
33 to 59	jig	Central Gulf	1998	0.0%	0.0%	6.0%	6.1%	87.9%	100.0%
33 to 59	jig	Central Gulf	1999	0.0%	0.0%	7.0%	7.2%	85.8%	100.0%
33 to 59	jig	Central Gulf	2000	0.0%	0.0%	14.7%	15.8%	69.5%	100.0%
33 to 59	jig	Western Gulf	1995	0.0%	0.0%	2.1%	10.5%	87.5%	100.0%
33 to 59	jig	Western Gulf	1996	0.0%	0.0%	4.7%	13.6%	81.7%	100.0%
33 to 59	jig	Western Gulf	1997	0.0%	0.0%	3.6%	4.1%	92.3%	100.0%
33 to 59	jig	Western Gulf	1998	0.0%	0.0%	4.5%	5.7%	89.8%	100.0%
33 to 59	jig	Western Gulf	1999	0.0%	0.0%	7.6%	8.2%	84.2%	100.0%
33 to 59	jig	Western Gulf	2000	0.0%	0.0%	10.1%	16.5%	73.4%	100.0%
Source: State of Alaska fish ticket files (including halibut) and Commercial Fisheries Entry Commission Vessel License Files.									
Data analysis by Elaine Dinneford, NPFMC Fisheries Analyst, May 2001.									

Table C-31 Relative dependence on pollock as a percentage of total gross revenue by vessel length, gear and area 1995-2000; vessels 33 to 59 feet in length using other gear types

vessel length	gear	area	year	targeted pollock	non-targeted pollock	other groundfish in area	Alaska groundfish outside area	other species	total gross revenue
33 to 59	other	Central Gulf	1995	0.0%	0.0%	11.5%	14.2%	74.3%	100.0%
33 to 59	other	Central Gulf	1996	0.0%	0.0%	3.0%	3.2%	93.8%	100.0%
33 to 59	other	Central Gulf	1997	0.0%	0.0%	10.3%	10.3%	79.4%	100.0%
33 to 59	other	Central Gulf	1998	0.0%	0.0%	1.0%	1.0%	97.9%	100.0%
33 to 59	other	Central Gulf	1999	0.0%	0.0%	5.0%	5.0%	90.0%	100.0%
33 to 59	other	Central Gulf	2000	0.0%	0.0%	33.7%	33.7%	32.6%	100.0%
33 to 59	other	Western Gulf	1995	0.1%	0.0%	0.0%	0.1%	99.9%	100.0%
33 to 59	other	Western Gulf	1996	0.0%	0.0%	0.5%	0.5%	99.0%	100.0%
33 to 59	other	Western Gulf	1997	0.0%	0.0%	0.7%	0.7%	98.5%	100.0%
33 to 59	other	Western Gulf	1998	0.0%	0.0%	0.4%	0.4%	99.1%	100.0%
33 to 59	other	Western Gulf	1999	0.0%	0.0%	0.6%	0.6%	98.9%	100.0%
Source: State of Alaska fish ticket files (including halibut) and Commercial Fisheries Entry Commission Vessel License Files.									
Data analysis by Elaine Dinneford, NPFMC Fisheries Analyst, May 2001.									

Table C-32 Relative dependence on pollock as a percentage of total gross revenue by vessel length, gear and area 1995-2000; vessels 60 to 124 feet in length using longline gear

vessel length	gear	area	year	targeted pollock	non-targeted pollock	other groundfish in area	Alaska groundfish outside area	other species	total gross revenue
60 to 124	longline	Bering Sea	1995	0.0%	0.0%	3.5%	62.1%	34.5%	100.0%
60 to 124	longline	Bering Sea	1996	0.0%	0.0%	2.9%	53.5%	43.7%	100.0%
60 to 124	longline	Bering Sea	1997	0.0%	0.0%	13.7%	50.5%	35.8%	100.0%
60 to 124	longline	Bering Sea	1998	0.0%	0.0%	2.6%	46.2%	51.2%	100.0%
60 to 124	longline	Bering Sea	1999	0.0%	0.0%	2.2%	29.3%	68.4%	100.0%
60 to 124	longline	Bering Sea	2000	0.0%	0.0%	3.1%	89.4%	7.5%	100.0%
60 to 124	longline	Central Gulf	1995	0.0%	0.0%	14.4%	38.0%	47.6%	100.0%
60 to 124	longline	Central Gulf	1996	0.0%	0.0%	15.8%	38.8%	45.4%	100.0%
60 to 124	longline	Central Gulf	1997	0.0%	0.0%	14.4%	42.4%	43.2%	100.0%
60 to 124	longline	Central Gulf	1998	0.0%	0.0%	16.7%	35.3%	48.1%	100.0%
60 to 124	longline	Central Gulf	1999	0.0%	0.0%	11.2%	24.0%	64.9%	100.0%
60 to 124	longline	Central Gulf	2000	0.0%	0.0%	28.1%	60.3%	11.6%	100.0%
60 to 124	longline	Western Gulf	1995	0.0%	0.0%	8.8%	55.2%	36.0%	100.0%
60 to 124	longline	Western Gulf	1996	0.0%	0.0%	9.5%	52.5%	38.0%	100.0%
60 to 124	longline	Western Gulf	1997	0.0%	0.0%	9.3%	53.1%	37.6%	100.0%
60 to 124	longline	Western Gulf	1998	0.0%	0.0%	7.9%	48.2%	43.9%	100.0%
60 to 124	longline	Western Gulf	1999	0.0%	0.0%	5.6%	34.2%	60.1%	100.0%
60 to 124	longline	Western Gulf	2000	0.0%	0.0%	11.6%	79.8%	8.5%	100.0%
Source: State of Alaska fish ticket files (including halibut) and Commercial Fisheries Entry Commission Vessel License Files.									
Data analysis by Elaine Dinneford, NPFMC Fisheries Analyst, May 2001.									

Table C-33 Relative dependence on pollock as a percentage of total gross revenue by vessel length, gear and area 1995-2000; vessels 60 to 124 feet in length using pot gear

vessel length	gear	area	year	targeted pollock	non-targeted pollock	other groundfish in area	Alaska groundfish outside area	other species	total gross revenue
60 to 124	pot	Bering Sea	1995	0.0%	0.0%	6.4%	8.5%	85.1%	100.0%
60 to 124	pot	Bering Sea	1996	0.0%	0.0%	13.0%	15.2%	71.9%	100.0%
60 to 124	pot	Bering Sea	1997	0.0%	0.0%	11.2%	12.4%	76.4%	100.0%
60 to 124	pot	Bering Sea	1998	0.0%	0.0%	7.0%	9.8%	83.2%	100.0%
60 to 124	pot	Bering Sea	1999	0.0%	0.0%	6.9%	11.0%	82.1%	100.0%
60 to 124	pot	Bering Sea	2000	0.0%	0.0%	11.6%	19.9%	68.4%	100.0%
60 to 124	pot	Central Gulf	1995	0.0%	0.0%	9.3%	15.8%	74.9%	100.0%
60 to 124	pot	Central Gulf	1996	0.0%	0.0%	14.4%	20.5%	65.1%	100.0%
60 to 124	pot	Central Gulf	1997	0.0%	0.0%	13.9%	23.0%	63.0%	100.0%
60 to 124	pot	Central Gulf	1998	0.0%	0.0%	20.9%	23.1%	56.1%	100.0%
60 to 124	pot	Central Gulf	1999	0.0%	0.0%	11.1%	16.1%	72.9%	100.0%
60 to 124	pot	Central Gulf	2000	0.1%	0.0%	26.0%	28.3%	45.5%	100.0%
60 to 124	pot	Western Gulf	1995	0.0%	0.0%	2.8%	11.4%	85.8%	100.0%
60 to 124	pot	Western Gulf	1996	0.0%	0.0%	4.7%	29.2%	66.2%	100.0%
60 to 124	pot	Western Gulf	1997	0.0%	0.0%	4.1%	21.6%	74.3%	100.0%
60 to 124	pot	Western Gulf	1998	0.0%	0.0%	2.3%	14.2%	83.5%	100.0%
60 to 124	pot	Western Gulf	1999	0.0%	0.0%	3.1%	13.4%	83.5%	100.0%
60 to 124	pot	Western Gulf	2000	0.0%	0.0%	8.8%	18.6%	72.6%	100.0%

Source: State of Alaska fish ticket files (including halibut) and Commercial Fisheries Entry Commission Vessel License Files.

Data analysis by Elaine Dinneford, NPFMC Fisheries Analyst, May 2001.

Table C-34 Relative dependence on pollock as a percentage of total gross revenue by vessel length, gear and area 1995-2000; vessels 60 to 124 feet in length using trawl gear

vessel length	gear	area	year	targeted pollock	non-targeted pollock	other groundfish in area	Alaska groundfish outside area	other species	total gross revenue
60 to 124	trawl	Bering Sea	1995	33.5%	0.2%	9.5%	53.6%	3.2%	100.0%
60 to 124	trawl	Bering Sea	1996	30.2%	0.1%	13.4%	54.1%	2.2%	100.0%
60 to 124	trawl	Bering Sea	1997	28.8%	0.1%	13.7%	52.3%	5.1%	100.0%
60 to 124	trawl	Bering Sea	1998	26.3%	0.3%	12.8%	53.4%	7.2%	100.0%
60 to 124	trawl	Bering Sea	1999	27.7%	0.2%	10.0%	54.3%	7.9%	100.0%
60 to 124	trawl	Bering Sea	2000	29.2%	0.2%	13.4%	53.8%	3.4%	100.0%
60 to 124	trawl	Central Gulf	1995	9.2%	0.1%	15.0%	68.8%	6.9%	100.0%
60 to 124	trawl	Central Gulf	1996	8.0%	0.1%	22.9%	60.4%	8.6%	100.0%
60 to 124	trawl	Central Gulf	1997	13.0%	0.2%	22.4%	57.8%	6.6%	100.0%
60 to 124	trawl	Central Gulf	1998	18.2%	0.1%	15.8%	58.2%	7.8%	100.0%
60 to 124	trawl	Central Gulf	1999	17.0%	0.1%	19.2%	57.2%	6.6%	100.0%
60 to 124	trawl	Central Gulf	2000	15.0%	0.2%	23.3%	60.2%	1.4%	100.0%
60 to 124	trawl	Western Gulf	1995	4.4%	0.0%	3.0%	85.6%	7.0%	100.0%
60 to 124	trawl	Western Gulf	1996	7.2%	0.0%	3.6%	84.0%	5.2%	100.0%
60 to 124	trawl	Western Gulf	1997	4.1%	0.0%	4.5%	83.9%	7.5%	100.0%
60 to 124	trawl	Western Gulf	1998	4.2%	0.0%	4.8%	79.2%	11.8%	100.0%
60 to 124	trawl	Western Gulf	1999	5.8%	0.0%	5.8%	71.6%	16.7%	100.0%
60 to 124	trawl	Western Gulf	2000	10.4%	0.0%	11.9%	72.9%	4.9%	100.0%
Source: State of Alaska fish ticket files (including halibut) and Commercial Fisheries Entry Commission Vessel License Files.									
Data analysis by Elaine Dinneford, NPFMC Fisheries Analyst, May 2001.									

Table C-35 Relative dependence on pollock as a percentage of total gross revenue by vessel length, gear and area 1995-2000; vessels 60 to 124 feet in length using jig gear

Vessel Length	Gear	area	year	targeted pollock	non-targeted pollock	other groundfish in area	other groundfish outside area	other species	total gross revenue
60 to 124	jig	Bering Sea	1995	0.0%	0.0%	2.3%	2.3%	95.4%	100.0%
60 to 124	jig	Bering Sea	1996	0.0%	0.0%	2.4%	2.4%	95.2%	100.0%
60 to 124	jig	Central Gulf	1998	0.0%	0.0%	50.0%	50.0%	0.0%	100.0%
60 to 124	jig	Central Gulf	1999	0.0%	0.0%	13.2%	14.2%	72.5%	100.0%
60 to 124	jig	Central Gulf	2000	0.0%	0.0%	50.0%	50.0%	0.0%	100.0%
60 to 124	jig	Western Gulf	1997	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
60 to 124	jig	Western Gulf	1998	0.0%	0.0%	1.2%	1.2%	97.7%	100.0%

Source: State of Alaska fish ticket files (including halibut) and Commercial Fisheries Entry Commission Vessel License Files.
Data analysis by Elaine Dinneford, NPFMC Fisheries Analyst, May 2001.

Table C-36 Relative dependence on pollock as a percentage of total gross revenue by vessel length, gear and area 1995-2000; vessels 125 feet or greater using longline gear

vessel length	gear	area	year	targeted pollock	non-targeted pollock	other groundfish in area	Alaska groundfish outside area	other species	total gross revenue
125 or greater	longline	Bering Sea	1996	0.0%	0.0%	4.5%	95.5%	0.0%	100.0%
125 or greater	longline	Bering Sea	1997	0.0%	0.0%	42.9%	51.9%	5.2%	100.0%
125 or greater	longline	Bering Sea	1999	0.0%	0.0%	2.3%	6.5%	91.2%	100.0%
125 or greater	longline	Bering Sea	2000	0.0%	0.0%	2.7%	22.4%	74.9%	100.0%
125 or greater	longline	Central Gulf	1995	0.0%	0.0%	6.7%	12.4%	80.9%	100.0%
125 or greater	longline	Central Gulf	1997	0.0%	0.0%	1.1%	1.1%	97.8%	100.0%
125 or greater	longline	Central Gulf	1998	0.0%	0.0%	0.1%	0.1%	99.8%	100.0%
125 or greater	longline	Central Gulf	1999	0.0%	0.0%	0.1%	0.1%	99.9%	100.0%
125 or greater	longline	Central Gulf	2000	0.0%	0.0%	0.2%	0.2%	99.6%	100.0%
125 or greater	longline	Western Gulf	1996	0.0%	0.0%	5.6%	5.7%	88.8%	100.0%
125 or greater	longline	Western Gulf	1997	0.0%	0.0%	10.7%	44.7%	44.6%	100.0%
125 or greater	longline	Western Gulf	1998	0.0%	0.0%	0.3%	0.3%	99.3%	100.0%
125 or greater	longline	Western Gulf	1999	0.0%	0.0%	0.0%	0.0%	99.9%	100.0%
125 or greater	longline	Western Gulf	2000	0.0%	0.0%	0.0%	0.4%	99.6%	100.0%
Source: State of Alaska fish ticket files (including halibut) and Commercial Fisheries Entry Commission Vessel License Files.									
Data analysis by Elaine Dinneford, NPFMC Fisheries Analyst, May 2001.									

Table C-37 Relative dependence on pollock as a percentage of total gross revenue by vessel length, gear and area 1995-2000; vessels 125 feet or greater using pot gear

vessel length	gear	area	year	targeted pollock	non-targeted pollock	other groundfish in area	Alaska groundfish outside area	other species	total gross revenue
125 or greater	pot	Bering Sea	1995	0.0%	0.0%	4.4%	4.8%	90.8%	100.0%
125 or greater	pot	Bering Sea	1996	0.0%	0.0%	6.8%	7.7%	85.5%	100.0%
125 or greater	pot	Bering Sea	1997	0.0%	0.0%	9.7%	10.2%	80.1%	100.0%
125 or greater	pot	Bering Sea	1998	0.0%	0.0%	4.0%	4.5%	91.5%	100.0%
125 or greater	pot	Bering Sea	1999	0.0%	0.0%	6.0%	7.3%	86.6%	100.0%
125 or greater	pot	Bering Sea	2000	0.0%	0.0%	17.3%	17.8%	64.9%	100.0%
125 or greater	pot	Central Gulf	1995	0.0%	0.0%	1.6%	1.6%	96.7%	100.0%
125 or greater	pot	Central Gulf	2000	0.0%	0.0%	11.4%	11.4%	77.2%	100.0%
125 or greater	pot	Western Gulf	1995	0.0%	0.0%	1.3%	1.7%	97.0%	100.0%
125 or greater	pot	Western Gulf	1996	0.0%	0.0%	3.4%	9.7%	86.9%	100.0%
125 or greater	pot	Western Gulf	1997	0.0%	0.0%	2.9%	12.7%	84.4%	100.0%
125 or greater	pot	Western Gulf	1998	0.0%	0.0%	1.5%	7.5%	91.0%	100.0%
125 or greater	pot	Western Gulf	1999	0.0%	0.0%	0.6%	3.8%	95.6%	100.0%
125 or greater	pot	Western Gulf	2000	0.0%	0.0%	8.0%	17.1%	74.9%	100.0%
Source: State of Alaska fish ticket files (including halibut) and Commercial Fisheries Entry Commission Vessel License Files.									
Data analysis by Elaine Dinneford, NPFMC Fisheries Analyst, May 2001.									

Table C-38 Relative dependence on pollock as a percentage of total gross revenue by vessel length, gear and area 1995-2000; vessels 125 feet or greater using trawl gear

vessel length	gear	area	year	targeted pollock	non-targeted pollock	other groundfish in area	Alaska groundfish outside area	other species	total gross revenue
125 or greater	trawl	Bering Sea	1995	43.3%	0.0%	2.6%	52.6%	1.5%	100.0%
125 or greater	trawl	Bering Sea	1996	43.4%	0.0%	4.0%	51.1%	1.5%	100.0%
125 or greater	trawl	Bering Sea	1997	41.0%	0.2%	6.3%	51.8%	0.8%	100.0%
125 or greater	trawl	Bering Sea	1998	42.5%	0.1%	3.0%	51.6%	2.9%	100.0%
125 or greater	trawl	Bering Sea	1999	45.0%	0.1%	2.1%	49.0%	3.9%	100.0%
125 or greater	trawl	Bering Sea	2000	46.6%	0.0%	2.3%	49.9%	1.2%	100.0%
125 or greater	trawl	Central Gulf	1995	3.2%	0.0%	4.8%	90.0%	2.1%	100.0%
125 or greater	trawl	Central Gulf	1996	0.2%	0.0%	2.8%	93.1%	3.9%	100.0%
125 or greater	trawl	Central Gulf	1997	2.6%	0.0%	4.2%	91.9%	1.3%	100.0%
125 or greater	trawl	Central Gulf	1998	8.5%	0.0%	1.0%	87.4%	3.1%	100.0%
125 or greater	trawl	Central Gulf	1999	1.9%	0.0%	0.3%	92.7%	5.1%	100.0%
125 or greater	trawl	Western Gulf	1995	3.8%	0.0%	0.7%	92.7%	2.7%	100.0%
125 or greater	trawl	Western Gulf	1996	4.7%	0.0%	0.0%	90.3%	4.9%	100.0%
125 or greater	trawl	Western Gulf	1997	4.7%	0.0%	1.0%	93.1%	1.2%	100.0%
125 or greater	trawl	Western Gulf	1998	6.4%	0.0%	0.0%	91.4%	2.2%	100.0%
125 or greater	trawl	Western Gulf	1999	2.5%	0.0%	0.3%	86.7%	10.6%	100.0%
125 or greater	trawl	Western Gulf	2000	0.0%	0.0%	3.4%	96.5%	0.0%	100.0%
Source: State of Alaska fish ticket files (including halibut) and Commercial Fisheries Entry Commission Vessel License Files.									
Data analysis by Elaine Dinneford, NPFMC Fisheries Analyst, May 2001.									

1.4.1.2 Pacific Cod

Tables C-39 through C-54 portray the relative dependence of the respective fishing fleets on targeted and non-targeted Pacific cod fishing revenues. The relative dependence is shown by the percentage contribution to total gross revenue from the fishery categories outlined above.

Table C-39 shows the relative dependence on Pacific cod of vessels 32 feet and less utilizing longline gear. With the regulatory incentive of the inshore waters fishery, it should be expected that the relative importance of Pacific cod for this group will have increased in recent years, and Table C-55 shows this to be the case. Aside from Pacific cod, most earnings for this vessel group are from salmon and halibut. The numbers of vessels in the Bering Sea (one to twelve) and the Western Gulf (fewer than 10 vessels) are much lower than the Central Gulf. In the Central Gulf, the numbers of vessels are relatively stable, varying only between 54 and 60, for the period from 1995 through 2000. In the Central Gulf fishing revenues range from $1.9 million $6.5 million.

Table C-40 shows the relative dependence on Pacific cod of vessels 32 feet and less utilizing pot gear. There are very few of vessels in this group, focusing primarily on salmon in the Central Gulf.

Table C-41 shows the relative dependence on Pacific cod of vessels 32 feet and less utilizing jig gear. Pacific cod clearly is an important species to this group, with Pacific cod earnings providing up to 32% of total revenues. There are modest numbers of vessels in this group. In the Bering Sea, the numbers of vessels in this group range from five to twenty-two. In the Central Gulf, the numbers of vessels are much higher, ranging from 12 to 42 vessels. In the Western Gulf, the number of vessels in the group ranged from one to fourteen Aside from Pacific cod, fishing revenues for this group come primarily from salmon, with halibut contributing a smaller proportion to total fishing revenues. In the Central Gulf, total revenues for the group ranges from $550 thousand to $1.3 million.

Table C-42 shows the relative dependence on Pacific cod of vessels 32 feet and less utilizing other gear. Pacific cod plays a modest role in overall fishing revenues for this category of vessels ranging from zero percent to 50%. There are very few of this category of vessels in the Bering Sea and Western Gulf (fewer than 10 in both instances). In the Central Gulf, they number between six and fifteen. Earnings for this group are primarily from other groundfish, within the same area, salmon and halibut, and ranged between $20 thousand and $115 thousand.

Table C-43 shows the relative dependence on Pacific cod of vessels between 33 and 59 feet utilizing longline gear. Pacific cod contributes a modest percentage to the overall revenues for this group. Earnings for this group come predominantly from Alaska groundfish, outside the area, and from other species, including salmon and halibut. This is a large fleet in the Central Gulf, ranging between 318 and 397 vessels. In the Bering Sea and Western Gulf, the number of vessels ranges from 13 to 39, and from 35 to 45, respectively. Gross earnings for this group in the Central Gulf varies between $59 million and $92 million.

Table C-44 shows the relative dependence on Pacific cod of vessels between 33 and 59 feet utilizing pot gear. Pacific cod is a very important species for this group, with percentage contributions ranging up to one quarter of total earnings. Aside from Pacific cod, other earnings come from a relatively even distribution of fisheries, including other groundfish, salmon and halibut, with a proportionally smaller contribution from crab and herring. In the Bering Sea, the numbers of vessels range between two and sixteen, for the period from 1995 to 2000. In the Central Gulf, the number of vessels ranged between 49 and 85. In the Western Gulf, the number of vessels ranged between 34 and 69. Gross earnings from fishing, for this group in the Central Gulf, varied from $14 million to $32 million, over this period.

Table C-45 shows the relative dependence on Pacific cod of vessels between 33 and 59 feet utilizing trawl gear. This group includes the limit salmon seiners, that have added trawl gear. Pacific cod is a very important species for this vessel group, providing up to one quarter of total fishing revenue. In addition to Pacific cod, other important fisheries include other groundfish, as well as the traditional other species of salmon and halibut. The number of participants in this group varied considerably in the Bering Sea and Central Gulf, from two to fifteen vessels, and from 10 to 55 vessels, respectively, for the period from 1995 through 2000. In the Western Gulf, participation remained almost constant, only varying between 39 to 41 vessels. In the Central Gulf, fishing revenues ranged between $3.6 million and $22 million.

Table C-46 shows the relative dependence on Pacific cod of vessels between 33 and 59 feet utilizing jig gear. Pacific cod has been an important species for this group throughout the 1995 through 2000 period in the Bering Sea. In the Central and Western Gulf, earnings from Pacific cod have grown steadily during the 1995 trough 2000 period, peaking in 2000. Aside from Pacific cod, most earnings come from other species, predominantly salmon and halibut. Other groundfish, both within the area and statewide, contribute important shares of revenues to this group, particularly in the Bering Sea. In the Bering Sea, the numbers of vessels range from five to eighteen. In the Central Gulf, the number of vessels ranged from 42 to 126. In the Western Gulf, the number of vessels ranged from 13 to 28. Total revenues in the Central Gulf ranged from $2.4 million to $11 million.

Table C-47 shows the relative dependence on Pacific cod of vessels between 33 and 59 feet utilizing other gear types. There are no vessels in this group for the Bering Sea. In the Central Gulf, Pacific cod earnings have played an increasingly important role in overall fishing income, peaking in 2000 with a 32.2% contribution. In both the Central Gulf and Western Gulf, the number of vessels was relatively small, fewer than ten in most years. In addition to Pacific cod, most fishing revenues are from participation in the salmon fishery.

Table C-48 shows the relative dependence on Pacific cod of vessels between 60 and 124 feet utilizing longline gear. Pacific cod contributed a relatively small proportion of total revenues to this group. There has been a downward trend in the number of vessels in each of the areas over the period from 1995 through 2000. In the Bering Sea, the number of vessels has declined from 40 to 22. In the Central Gulf, the numbers have declined from 134 to 92. In the Western Gulf, this group has declined from 50 to 35 vessels. Total earnings for the Central Gulf fishery has been between $35 million and $82 million for the 1995 through 2000 period.

Table C-49 shows the relative dependence on Pacific cod of vessels between 60 and 124 feet utilizing pot gear. Pacific cod is an important species for this vessel group, contributing up to 20% of total fishing earnings. Aside from Pacific cod, this group focuses predominantly on crab. Over the 1995-2000 period, the number of vessels in this group has varied between 50 and 87 in the Bering Sea, 31 and 68 in the Central Gulf, and between 18 and 36 in the Western Gulf. In the Bering Sea, total ex-vessel revenues for the group range from $39 million to $79 million for the 1995 through 2000 period.

Table C-50 shows the relative dependence on Pacific cod of vessels between 60 and 124 feet utilizing trawl gear. Pacific cod revenues contributed a modest share of total revenues for this group, ranging from 3.0% to 12%. In the Bering Sea, the number of vessels within this group varied between 65 and 83. The numbers in this group within the Central Gulf have recently declined slightly, varying to the lower end of the 54 to 83 vessel range. Similarly, their numbers in the Western Gulf have declined to the lower end of the 17 to 55 vessel range. The total revenues for the Bering Sea fleet varied from $66 million to $135 million.

Table C-51 shows the relative dependence on Pacific cod of vessels between 60 and 124 feet utilizing jig gear. There are very few vessels in this group. In the Central Gulf, the vessels in this group are highly dependent upon Pacific cod for up to 50% of total fishing earnings.

Table C-52 shows the relative dependence on Pacific cod of vessels between 125 feet and greater utilizing longline gear. There are few vessels in this group with generally low levels of earnings from Pacific cod, with a couple of isolated exceptions. Most earnings for this vessel group come from other groundfish or halibut.

Table C-53 shows the relative dependence on Pacific cod of vessels between 125 feet and greater utilizing pot gear. Income from Pacific cod is of moderate importance to this vessel group, with an increasing trend for 2000 earnings. The largest share of total income for this group comes primarily from crab catches. There are fewer than 10 vessels in this group in each of the areas.

Table C-54 shows the relative dependence on Pacific cod of vessels between 125 feet and greater utilizing trawl gear. Pacific cod is a modest contributor to total earnings for this vessel class. In the Bering Sea, Central Gulf, and Western Gulf, the percent contribution from Pacific cod ranges from zero to a maximum of 4.2%. The numbers of vessels in the Bering Sea range from 22 to 36, over the 1995 through 2000 period. In the Central Gulf, the numbers ranged between five and eleven, while the numbers of vessels in the Western Gulf ranged between two and twenty-three Total revenues for the Bering Sea group have varied between $90 million and $206 million.

Table C-39 Relative dependence on Pacific cod as a percentage of total gross revenue by vessel length, gear and area 1995-2000; vessels 32 feet or less using longline gear

vessel length	gear	area	year	targeted P. cod	non-targeted P. cod	other groundfish in area	Alaska groundfish outside area	other species	total gross revenue
32 or less	longline	Bering Sea	1995	1.0%	0.0%	0.1%	6.8%	92.1%	100.0%
32 or less	longline	Bering Sea	1996	1.5%	0.0%	24.9%	30.1%	43.4%	100.0%
32 or less	longline	Bering Sea	1997	0.0%	0.1%	2.1%	9.7%	88.1%	100.0%
32 or less	longline	Bering Sea	1998	0.0%	0.0%	6.1%	18.9%	75.0%	100.0%
32 or less	longline	Bering Sea	1999	0.0%	0.1%	0.5%	0.6%	98.9%	100.0%
32 or less	longline	Bering Sea	2000	44.8%	5.2%	0.0%	50.0%	0.0%	100.0%
32 or less	longline	Central Gulf	1995	2.1%	0.1%	1.4%	7.0%	89.4%	100.0%
32 or less	longline	Central Gulf	1996	5.1%	0.0%	6.3%	20.0%	68.5%	100.0%
32 or less	longline	Central Gulf	1997	8.8%	0.1%	1.9%	12.0%	77.1%	100.0%
32 or less	longline	Central Gulf	1998	9.1%	0.2%	1.2%	13.5%	76.1%	100.0%
32 or less	longline	Central Gulf	1999	4.5%	0.2%	0.6%	6.3%	88.4%	100.0%
32 or less	longline	Central Gulf	2000	20.1%	0.4%	6.0%	27.3%	46.2%	100.0%
32 or less	longline	Western Gulf	1995	0.3%	0.1%	0.0%	2.3%	97.4%	100.0%
32 or less	longline	Western Gulf	1996	4.8%	0.0%	0.0%	39.0%	56.2%	100.0%
32 or less	longline	Western Gulf	1997	0.0%	0.1%	0.1%	13.6%	86.3%	100.0%
32 or less	longline	Western Gulf	1998	0.2%	0.2%	0.2%	45.7%	53.7%	100.0%
32 or less	longline	Western Gulf	1999	0.0%	0.0%	10.4%	32.4%	57.2%	100.0%
32 or less	longline	Western Gulf	2000	15.3%	0.1%	0.0%	15.4%	69.2%	100.0%
Source: State of Alaska fish ticket files (including halibut) and Commercial Fisheries Entry Commission Vessel License Files.									
Data analysis by Elaine Dinneford, NPFMC Fisheries Analyst, May 2001.									

Table C-40 Relative dependence on Pacific cod as a percentage of total gross revenue by vessel length, gear and area 1995-2000; vessels 32 feet or less using pot gear.

vessel length	gear	area	year	targeted P. cod	non-targeted P. cod	other groundfish in area	Alaska groundfish outside area	other species	total gross revenue
32 or less	pot	Bering Sea	2000	11.5%	0.0%	0.0%	11.5%	76.9%	100.0%
32 or less	pot	Central Gulf	1995	4.5%	0.0%	0.0%	4.5%	90.9%	100.0%
32 or less	pot	Central Gulf	1996	1.4%	0.0%	0.0%	1.4%	97.1%	100.0%
32 or less	pot	Central Gulf	1997	1.0%	0.0%	0.0%	1.0%	98.0%	100.0%
32 or less	pot	Central Gulf	1999	6.3%	0.0%	1.1%	7.5%	85.0%	100.0%
32 or less	pot	Central Gulf	2000	0.0%	0.0%	50.0%	50.0%	0.0%	100.0%
32 or less	pot	Western Gulf	1995	5.3%	0.0%	0.0%	5.3%	89.4%	100.0%
32 or less	pot	Western Gulf	1997	0.5%	0.0%	0.0%	0.5%	98.9%	100.0%

Source: State of Alaska fish ticket files (including halibut) and Commercial Fisheries Entry Commission Vessel License Files.
Data analysis by Elaine Dinneford, NPFMC Fisheries Analyst, May 2001.

Table C-41 Relative dependence on Pacific cod as a percentage of total gross revenue by vessel length, gear and area 1995-2000; vessels 32 feet or less using jig gear

vessel length	gear	area	year	targeted P. cod	non-targeted P. cod	other groundfish in area	Alaska groundfish outside area	other species	total gross revenue
32 or less	jig	Bering Sea	1995	14.2%	0.0%	0.4%	19.3%	66.0%	100.0%
32 or less	jig	Bering Sea	1996	17.0%	0.0%	2.1%	33.8%	47.1%	100.0%
32 or less	jig	Bering Sea	1997	10.0%	0.0%	2.5%	32.1%	55.4%	100.0%
32 or less	jig	Bering Sea	1998	19.7%	0.0%	2.1%	23.9%	54.2%	100.0%
32 or less	jig	Bering Sea	1999	32.2%	0.7%	1.3%	35.5%	30.3%	100.0%
32 or less	jig	Bering Sea	2000	6.3%	0.0%	0.0%	23.1%	70.6%	100.0%
32 or less	jig	Central Gulf	1995	0.0%	0.0%	7.9%	16.1%	76.0%	100.0%
32 or less	jig	Central Gulf	1996	0.1%	0.0%	6.5%	11.8%	81.7%	100.0%
32 or less	jig	Central Gulf	1997	12.9%	0.1%	7.3%	29.1%	50.7%	100.0%
32 or less	jig	Central Gulf	1998	16.3%	0.3%	5.9%	28.7%	48.8%	100.0%
32 or less	jig	Central Gulf	1999	14.0%	0.3%	2.7%	17.0%	66.0%	100.0%
32 or less	jig	Central Gulf	2000	28.4%	0.2%	4.1%	34.2%	33.1%	100.0%
32 or less	jig	Western Gulf	1995	0.1%	0.0%	13.6%	25.9%	60.4%	100.0%
32 or less	jig	Western Gulf	1996	0.0%	0.0%	13.6%	30.1%	56.3%	100.0%
32 or less	jig	Western Gulf	1997	0.9%	0.5%	9.0%	22.7%	67.0%	100.0%
32 or less	jig	Western Gulf	1998	2.5%	0.2%	11.9%	26.8%	58.5%	100.0%
32 or less	jig	Western Gulf	1999	7.7%	0.1%	1.4%	14.0%	76.8%	100.0%
32 or less	jig	Western Gulf	2000	15.5%	0.1%	4.4%	26.9%	53.1%	100.0%
Source: State of Alaska fish ticket files (including halibut) and Commercial Fisheries Entry Commission Vessel License Files.									
Data analysis by Elaine Dinneford, NPFMC Fisheries Analyst, May 2001.									

Table C-42 Relative dependence on Pacific cod as a percentage of total gross revenue by vessel length, gear and area 1995-2000; vessels 32 feet or less using other gear types

vessel length	gear	area	year	targeted P. cod	non-targeted P. cod	other groundfish in area	Alaska groundfish outside area	other species	total gross revenue
32 or less	other	Bering Sea	1996	49.8%	0.0%	0.0%	50.2%	0.0%	100.0%
32 or less	other	Bering Sea	1997	50.0%	0.0%	0.0%	50.0%	0.0%	100.0%
32 or less	other	Bering Sea	1998	3.3%	0.0%	6.2%	39.6%	50.9%	100.0%
32 or less	other	Bering Sea	1999	0.0%	0.0%	32.7%	67.3%	0.0%	100.0%
32 or less	other	Bering Sea	2000	0.0%	0.0%	39.4%	60.6%	0.0%	100.0%
32 or less	other	Central Gulf	1995	2.2%	0.0%	30.1%	32.2%	35.5%	100.0%
32 or less	other	Central Gulf	1996	0.0%	0.0%	14.5%	14.5%	71.0%	100.0%
32 or less	other	Central Gulf	1997	7.1%	0.2%	11.3%	18.7%	62.7%	100.0%
32 or less	other	Central Gulf	1998	20.6%	0.3%	4.5%	25.4%	49.2%	100.0%
32 or less	other	Central Gulf	1999	3.7%	0.0%	1.7%	5.4%	89.2%	100.0%
32 or less	other	Central Gulf	2000	9.2%	0.0%	0.0%	9.2%	81.5%	100.0%
32 or less	other	Western Gulf	1995	50.0%	0.0%	0.0%	50.0%	0.0%	100.0%
32 or less	other	Western Gulf	1996	0.7%	0.0%	0.0%	99.3%	0.0%	100.0%
32 or less	other	Western Gulf	1997	50.0%	0.0%	0.0%	50.0%	0.0%	100.0%
32 or less	other	Western Gulf	1998	10.5%	0.0%	19.3%	35.9%	34.3%	100.0%
32 or less	other	Western Gulf	1999	1.4%	0.0%	3.3%	4.8%	90.5%	100.0%
32 or less	other	Western Gulf	2000	0.0%	0.0%	32.8%	67.2%	0.0%	100.0%

Source: State of Alaska fish ticket files (including halibut) and Commercial Fisheries Entry Commission Vessel License Files.
Data analysis by Elaine Dinneford, NPFMC Fisheries Analyst, May 2001.

Table C-43 Relative dependence on Pacific cod as a percentage of total gross revenue by vessel length, gear and area 1995-2000; vessels 33 to 59 feet in length using longline gear

vessel length	gear	area	year	targeted P. cod	non-targeted P. cod	other groundfish in area	Alaska groundfish outside area	other species	total gross revenue
33 to 59	longline	Bering Sea	1995	1.8%	0.0%	4.4%	65.5%	28.4%	100.0%
33 to 59	longline	Bering Sea	1996	0.1%	0.0%	3.5%	56.4%	40.0%	100.0%
33 to 59	longline	Bering Sea	1997	0.1%	0.0%	4.6%	54.0%	41.2%	100.0%
33 to 59	longline	Bering Sea	1998	0.2%	0.0%	6.4%	47.7%	45.7%	100.0%
33 to 59	longline	Bering Sea	1999	0.2%	0.0%	3.3%	40.1%	56.3%	100.0%
33 to 59	longline	Bering Sea	2000	1.5%	0.0%	7.2%	89.2%	2.1%	100.0%
33 to 59	longline	Central Gulf	1995	1.7%	0.1%	12.5%	35.5%	50.2%	100.0%
33 to 59	longline	Central Gulf	1996	2.5%	0.0%	13.1%	35.7%	48.7%	100.0%
33 to 59	longline	Central Gulf	1997	3.1%	0.1%	12.4%	33.5%	51.0%	100.0%
33 to 59	longline	Central Gulf	1998	3.2%	0.1%	12.0%	29.9%	54.8%	100.0%
33 to 59	longline	Central Gulf	1999	3.9%	0.1%	9.2%	24.7%	62.2%	100.0%
33 to 59	longline	Central Gulf	2000	7.6%	0.2%	18.6%	51.1%	22.6%	100.0%
33 to 59	longline	Western Gulf	1995	0.0%	0.0%	8.1%	61.6%	30.3%	100.0%
33 to 59	longline	Western Gulf	1996	0.3%	0.0%	6.5%	53.4%	39.8%	100.0%
33 to 59	longline	Western Gulf	1997	0.0%	0.0%	6.2%	47.3%	46.5%	100.0%
33 to 59	longline	Western Gulf	1998	0.0%	0.0%	6.8%	43.4%	49.8%	100.0%
33 to 59	longline	Western Gulf	1999	0.1%	0.0%	6.9%	35.6%	57.3%	100.0%
33 to 59	longline	Western Gulf	2000	0.0%	0.0%	15.4%	75.6%	8.9%	100.0%
Source: State of Alaska fish ticket files (including halibut) and Commercial Fisheries Entry Commission Vessel License Files.									
Data analysis by Elaine Dinneford, NPFMC Fisheries Analyst, May 2001.									

Table C-44 Relative dependence on Pacific cod as a percentage of total gross revenue by vessel length, gear and area 1995-2000; vessels 33 to 59 feet in length using pot gear

vessel length	gear	area	year	targeted P. cod	non-targeted P. cod	other groundfish in area	Alaska groundfish outside area	other species	total gross revenue
33 to 59	pot	Bering Sea	1995	6.1%	0.0%	0.0%	13.8%	80.1%	100.0%
33 to 59	pot	Bering Sea	1996	1.1%	0.0%	33.6%	48.0%	17.4%	100.0%
33 to 59	pot	Bering Sea	1997	1.1%	0.0%	0.3%	46.2%	52.4%	100.0%
33 to 59	pot	Bering Sea	1998	4.0%	0.0%	0.0%	14.2%	81.8%	100.0%
33 to 59	pot	Bering Sea	1999	2.2%	0.0%	0.0%	24.6%	73.2%	100.0%
33 to 59	pot	Bering Sea	2000	4.3%	0.0%	0.0%	52.4%	43.2%	100.0%
33 to 59	pot	Central Gulf	1995	20.6%	0.0%	0.1%	21.3%	58.1%	100.0%
33 to 59	pot	Central Gulf	1996	20.6%	0.0%	1.7%	29.5%	48.3%	100.0%
33 to 59	pot	Central Gulf	1997	24.7%	0.0%	0.7%	26.6%	47.9%	100.0%
33 to 59	pot	Central Gulf	1998	23.1%	0.0%	0.6%	24.1%	52.2%	100.0%
33 to 59	pot	Central Gulf	1999	23.8%	0.0%	0.2%	24.5%	51.6%	100.0%
33 to 59	pot	Central Gulf	2000	34.6%	0.0%	0.4%	35.5%	29.5%	100.0%
33 to 59	pot	Western Gulf	1995	6.5%	0.0%	0.0%	8.0%	85.5%	100.0%
33 to 59	pot	Western Gulf	1996	12.2%	0.0%	5.1%	36.7%	46.0%	100.0%
33 to 59	pot	Western Gulf	1997	23.2%	0.0%	0.2%	24.8%	51.8%	100.0%
33 to 59	pot	Western Gulf	1998	17.8%	0.0%	0.0%	18.1%	64.0%	100.0%
33 to 59	pot	Western Gulf	1999	17.4%	0.0%	0.1%	20.3%	62.3%	100.0%
33 to 59	pot	Western Gulf	2000	31.3%	0.0%	0.0%	32.6%	36.2%	100.0%
Source: State of Alaska fish ticket files (including halibut) and Commercial Fisheries Entry Commission Vessel License Files.									
Data analysis by Elaine Dinneford, NPFMC Fisheries Analyst, May 2001.									

Table C-45 Relative dependence on Pacific cod as a percentage of total gross revenue by vessel length, gear and area 1995-2000; vessels 33 to 59 feet in length using trawl gear

vessel length	gear	area	year	targeted P. cod	non-targeted P. cod	other groundfish in area	Alaska groundfish outside area	other species	total gross revenue
33 to 59	trawl	Bering Sea	1995	0.0%	0.1%	4.0%	44.2%	51.6%	100.0%
33 to 59	trawl	Bering Sea	1996	0.1%	0.1%	2.2%	82.0%	15.6%	100.0%
33 to 59	trawl	Bering Sea	1997	0.0%	0.1%	2.6%	75.9%	21.4%	100.0%
33 to 59	trawl	Bering Sea	1998	1.2%	0.0%	3.2%	71.4%	24.1%	100.0%
33 to 59	trawl	Bering Sea	1999	0.1%	0.0%	4.3%	56.2%	39.3%	100.0%
33 to 59	trawl	Bering Sea	2000	0.0%	0.0%	6.6%	65.5%	27.8%	100.0%
33 to 59	trawl	Central Gulf	1995	11.9%	0.4%	3.9%	27.7%	56.2%	100.0%
33 to 59	trawl	Central Gulf	1996	13.3%	0.5%	6.9%	46.1%	33.2%	100.0%
33 to 59	trawl	Central Gulf	1997	10.0%	0.5%	11.8%	48.9%	28.8%	100.0%
33 to 59	trawl	Central Gulf	1998	8.0%	0.5%	10.6%	42.5%	38.4%	100.0%
33 to 59	trawl	Central Gulf	1999	6.5%	0.3%	4.8%	43.8%	44.5%	100.0%
33 to 59	trawl	Central Gulf	2000	17.5%	1.7%	7.5%	54.3%	19.0%	100.0%
33 to 59	trawl	Western Gulf	1995	9.7%	0.1%	5.8%	23.1%	61.3%	100.0%
33 to 59	trawl	Western Gulf	1996	21.9%	0.1%	9.2%	43.5%	25.3%	100.0%
33 to 59	trawl	Western Gulf	1997	24.0%	0.1%	7.7%	45.7%	22.5%	100.0%
33 to 59	trawl	Western Gulf	1998	20.7%	0.1%	5.9%	37.3%	36.1%	100.0%
33 to 59	trawl	Western Gulf	1999	21.4%	0.1%	8.5%	32.8%	37.3%	100.0%
33 to 59	trawl	Western Gulf	2000	29.6%	0.1%	8.2%	40.7%	21.5%	100.0%
Source: State of Alaska fish ticket files (including halibut) and Commercial Fisheries Entry Commission Vessel License Files.									
Data analysis by Elaine Dinneford, NPFMC Fisheries Analyst, May 2001.									

Table C-46 Relative dependence on Pacific cod as a percentage of total gross revenue by vessel length, gear and area 1995-2000; vessels 33 to 59 feet in length using jig gear

vessel length	gear	area	year	targeted P. cod	non-targeted P. cod	other groundfish in area	Alaska groundfish outside area	other species	total gross revenue
33 to 59	jig	Bering Sea	1995	15.7%	0.0%	0.0%	17.0%	67.3%	100.0%
33 to 59	jig	Bering Sea	1996	24.6%	0.0%	0.0%	25.5%	49.8%	100.0%
33 to 59	jig	Bering Sea	1997	39.0%	0.0%	0.1%	45.5%	15.5%	100.0%
33 to 59	jig	Bering Sea	1998	28.9%	0.0%	0.0%	28.9%	42.2%	100.0%
33 to 59	jig	Bering Sea	1999	11.7%	0.0%	0.0%	13.7%	74.6%	100.0%
33 to 59	jig	Bering Sea	2000	14.6%	0.0%	0.0%	48.5%	36.9%	100.0%
33 to 59	jig	Central Gulf	1995	0.9%	0.0%	12.0%	14.6%	72.5%	100.0%
33 to 59	jig	Central Gulf	1996	1.1%	0.0%	10.7%	12.7%	75.5%	100.0%
33 to 59	jig	Central Gulf	1997	8.9%	0.1%	2.4%	11.5%	77.1%	100.0%
33 to 59	jig	Central Gulf	1998	4.9%	0.0%	1.1%	6.1%	87.9%	100.0%
33 to 59	jig	Central Gulf	1999	6.6%	0.0%	0.4%	7.2%	85.8%	100.0%
33 to 59	jig	Central Gulf	2000	12.1%	0.1%	2.6%	15.8%	69.5%	100.0%
33 to 59	jig	Western Gulf	1995	1.1%	0.0%	1.0%	10.5%	87.5%	100.0%
33 to 59	jig	Western Gulf	1996	1.5%	0.0%	3.2%	13.6%	81.7%	100.0%
33 to 59	jig	Western Gulf	1997	3.0%	0.0%	0.5%	4.1%	92.3%	100.0%
33 to 59	jig	Western Gulf	1998	3.8%	0.0%	0.7%	5.7%	89.8%	100.0%
33 to 59	jig	Western Gulf	1999	7.0%	0.1%	0.5%	8.2%	84.2%	100.0%
33 to 59	jig	Western Gulf	2000	8.5%	0.1%	1.6%	16.5%	73.4%	100.0%
Source: State of Alaska fish ticket files (including halibut) and Commercial Fisheries Entry Commission Vessel License Files.									
Data analysis by Elaine Dinneford, NPFMC Fisheries Analyst, May 2001.									

Table C-47 Relative dependence on Pacific cod as a percentage of total gross revenue by vessel length, gear and area 1995-2000; vessels 33 to 59 feet in length using other gear types.

vessel length	gear	area	year	targeted P. cod	non-targeted P. cod	other groundfish in area	Alaska groundfish outside area	other species	total gross revenue
33 to 59	other	Central Gulf	1995	0.0%	0.0%	11.5%	14.2%	74.3%	100.0%
33 to 59	other	Central Gulf	1996	0.0%	0.0%	3.0%	3.2%	93.8%	100.0%
33 to 59	other	Central Gulf	1997	3.3%	0.3%	6.8%	10.3%	79.4%	100.0%
33 to 59	other	Central Gulf	1998	0.1%	0.0%	0.9%	1.0%	97.9%	100.0%
33 to 59	other	Central Gulf	1999	4.6%	0.0%	0.4%	5.0%	90.0%	100.0%
33 to 59	other	Central Gulf	2000	32.2%	0.0%	1.5%	33.7%	32.6%	100.0%
33 to 59	other	Western Gulf	1995	0.0%	0.0%	0.1%	0.1%	99.9%	100.0%
33 to 59	other	Western Gulf	1996	0.0%	0.0%	0.5%	0.5%	99.0%	100.0%
33 to 59	other	Western Gulf	1997	0.5%	0.0%	0.2%	0.7%	98.5%	100.0%
33 to 59	other	Western Gulf	1998	0.4%	0.0%	0.0%	0.4%	99.1%	100.0%
33 to 59	other	Western Gulf	1999	0.6%	0.0%	0.0%	0.6%	98.9%	100.0%
Source: State of Alaska fish ticket files (including halibut) and Commercial Fisheries Entry Commission Vessel License Files.									
Data analysis by Elaine Dinneford, NPFMC Fisheries Analyst, May 2001.									

Table C-48 Relative dependence on Pacific cod as a percentage of total gross revenue by vessel length, gear and area 1995-2000; vessels 60 to 124 feet in length using longline gear

vessel length	gear	area	year	targeted P. cod	non-targeted P. cod	other groundfish in area	Alaska groundfish outside area	other species	total gross revenue
60 to 124	longline	Bering Sea	1995	0.3%	0.0%	3.1%	62.1%	34.5%	100.0%
60 to 124	longline	Bering Sea	1996	0.4%	0.0%	2.5%	53.5%	43.7%	100.0%
60 to 124	longline	Bering Sea	1997	10.1%	0.0%	3.6%	50.5%	35.8%	100.0%
60 to 124	longline	Bering Sea	1998	0.0%	0.0%	2.6%	46.2%	51.2%	100.0%
60 to 124	longline	Bering Sea	1999	0.2%	0.0%	2.0%	29.3%	68.4%	100.0%
60 to 124	longline	Bering Sea	2000	0.0%	0.0%	3.1%	89.4%	7.5%	100.0%
60 to 124	longline	Central Gulf	1995	0.5%	0.0%	13.9%	38.0%	47.6%	100.0%
60 to 124	longline	Central Gulf	1996	0.3%	0.0%	15.5%	38.8%	45.4%	100.0%
60 to 124	longline	Central Gulf	1997	0.1%	0.0%	14.3%	42.4%	43.2%	100.0%
60 to 124	longline	Central Gulf	1998	0.4%	0.0%	16.2%	35.3%	48.1%	100.0%
60 to 124	longline	Central Gulf	1999	0.4%	0.1%	10.7%	24.0%	64.9%	100.0%
60 to 124	longline	Central Gulf	2000	1.9%	0.1%	26.2%	60.3%	11.6%	100.0%
60 to 124	longline	Western Gulf	1995	0.0%	0.0%	8.8%	55.2%	36.0%	100.0%
60 to 124	longline	Western Gulf	1996	0.1%	0.0%	9.4%	52.5%	38.0%	100.0%
60 to 124	longline	Western Gulf	1997	1.5%	0.0%	7.8%	53.1%	37.6%	100.0%
60 to 124	longline	Western Gulf	1998	0.0%	0.0%	7.9%	48.2%	43.9%	100.0%
60 to 124	longline	Western Gulf	1999	0.0%	0.0%	5.6%	34.2%	60.1%	100.0%
60 to 124	longline	Western Gulf	2000	0.0%	0.0%	11.6%	79.8%	8.5%	100.0%

Source: State of Alaska fish ticket files (including halibut) and Commercial Fisheries Entry Commission Vessel License Files.

Data analysis by Elaine Dinneford, NPFMC Fisheries Analyst, May 2001.

Table C-49 Relative dependence on Pacific cod as a percentage of total gross revenue by vessel length, gear and area 1995-2000; vessels 60 to 124 feet in length using pot gear

vessel length	gear	area	year	targeted P. cod	non-targeted P. cod	other groundfish in area	Alaska groundfish outside area	other species	total gross revenue
60 to 124	pot	Bering Sea	1995	6.4%	0.0%	0.0%	8.5%	85.1%	100.0%
60 to 124	pot	Bering Sea	1996	12.9%	0.0%	0.0%	15.2%	71.9%	100.0%
60 to 124	pot	Bering Sea	1997	11.2%	0.0%	0.0%	12.4%	76.4%	100.0%
60 to 124	pot	Bering Sea	1998	7.0%	0.0%	0.0%	9.8%	83.2%	100.0%
60 to 124	pot	Bering Sea	1999	6.8%	0.0%	0.1%	11.0%	82.1%	100.0%
60 to 124	pot	Bering Sea	2000	11.2%	0.0%	0.5%	19.9%	68.4%	100.0%
60 to 124	pot	Central Gulf	1995	9.2%	0.0%	0.1%	15.8%	74.9%	100.0%
60 to 124	pot	Central Gulf	1996	14.4%	0.0%	0.1%	20.5%	65.1%	100.0%
60 to 124	pot	Central Gulf	1997	13.7%	0.0%	0.2%	23.0%	63.0%	100.0%
60 to 124	pot	Central Gulf	1998	20.6%	0.0%	0.2%	23.1%	56.1%	100.0%
60 to 124	pot	Central Gulf	1999	11.0%	0.0%	0.0%	16.1%	72.9%	100.0%
60 to 124	pot	Central Gulf	2000	25.9%	0.0%	0.2%	28.3%	45.5%	100.0%
60 to 124	pot	Western Gulf	1995	2.7%	0.0%	0.0%	11.4%	85.8%	100.0%
60 to 124	pot	Western Gulf	1996	4.7%	0.0%	0.0%	29.2%	66.2%	100.0%
60 to 124	pot	Western Gulf	1997	4.1%	0.0%	0.0%	21.6%	74.3%	100.0%
60 to 124	pot	Western Gulf	1998	2.3%	0.0%	0.0%	14.2%	83.5%	100.0%
60 to 124	pot	Western Gulf	1999	3.1%	0.0%	0.0%	13.4%	83.5%	100.0%
60 to 124	pot	Western Gulf	2000	8.8%	0.0%	0.0%	18.6%	72.6%	100.0%
Source: State of Alaska fish ticket files (including halibut) and Commercial Fisheries Entry Commission Vessel License Files.									
Data analysis by Elaine Dinneford, NPFMC Fisheries Analyst, May 2001.									

Table C-50 Relative dependence on Pacific cod as a percentage of total gross revenue by vessel length, gear and area 1995-2000; vessels 60 to 124 feet in length using trawl gear

vessel length	gear	area	year	targeted P. cod	non-targeted P. cod	other groundfish in area	Alaska groundfish outside area	other species	total gross revenue
60 to 124	trawl	Bering Sea	1995	8.1%	0.4%	34.7%	53.6%	3.2%	100.0%
60 to 124	trawl	Bering Sea	1996	12.6%	0.4%	30.7%	54.1%	2.2%	100.0%
60 to 124	trawl	Bering Sea	1997	12.4%	0.2%	29.9%	52.3%	5.1%	100.0%
60 to 124	trawl	Bering Sea	1998	12.4%	0.3%	26.7%	53.4%	7.2%	100.0%
60 to 124	trawl	Bering Sea	1999	9.8%	0.1%	27.9%	54.3%	7.9%	100.0%
60 to 124	trawl	Bering Sea	2000	13.2%	0.1%	29.5%	53.8%	3.4%	100.0%
60 to 124	trawl	Central Gulf	1995	9.4%	0.7%	14.1%	68.8%	6.9%	100.0%
60 to 124	trawl	Central Gulf	1996	10.3%	0.4%	20.3%	60.4%	8.6%	100.0%
60 to 124	trawl	Central Gulf	1997	11.6%	1.1%	22.9%	57.8%	6.6%	100.0%
60 to 124	trawl	Central Gulf	1998	8.3%	1.0%	24.7%	58.2%	7.8%	100.0%
60 to 124	trawl	Central Gulf	1999	13.4%	1.2%	21.6%	57.2%	6.6%	100.0%
60 to 124	trawl	Central Gulf	2000	9.5%	3.2%	25.6%	60.2%	1.4%	100.0%
60 to 124	trawl	Western Gulf	1995	2.9%	0.0%	4.4%	85.6%	7.0%	100.0%
60 to 124	trawl	Western Gulf	1996	3.5%	0.1%	7.2%	84.0%	5.2%	100.0%
60 to 124	trawl	Western Gulf	1997	3.3%	0.1%	5.2%	83.9%	7.5%	100.0%
60 to 124	trawl	Western Gulf	1998	4.7%	0.1%	4.2%	79.2%	11.8%	100.0%
60 to 124	trawl	Western Gulf	1999	5.7%	0.0%	5.9%	71.6%	16.7%	100.0%
60 to 124	trawl	Western Gulf	2000	11.5%	0.1%	10.6%	72.9%	4.9%	100.0%
Source: State of Alaska fish ticket files (including halibut) and Commercial Fisheries Entry Commission Vessel License Files.									
Data analysis by Elaine Dinneford, NPFMC Fisheries Analyst, May 2001.									

Table C-51 Relative dependence on Pacific cod as a percentage of total gross revenue by vessel length, gear and area 1995-2000; vessels 60 to 124 feet in length using jig gear

vessel length	gear	area	year	targeted P. cod	non-targeted P. cod	other groundfish in area	Alaska groundfish outside area	other species	total gross revenue
60 to 124	jig	Bering Sea	1995	2.3%	0.0%	0.0%	2.3%	95.4%	100.0%
60 to 124	jig	Bering Sea	1996	2.4%	0.0%	0.0%	2.4%	95.2%	100.0%
60 to 124	jig	Central Gulf	1998	48.9%	0.0%	1.1%	50.0%	0.0%	100.0%
60 to 124	jig	Central Gulf	1999	13.0%	0.1%	0.2%	14.2%	72.5%	100.0%
60 to 124	jig	Central Gulf	2000	50.0%	0.0%	0.0%	50.0%	0.0%	100.0%
60 to 124	jig	Western Gulf	1997	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
60 to 124	jig	Western Gulf	1998	1.2%	0.0%	0.0%	1.2%	97.7%	100.0%
Source: State of Alaska fish ticket files (including halibut) and Commercial Fisheries Entry Commission Vessel License Files.									
Data analysis by Elaine Dinneford, NPFMC Fisheries Analyst, May 2001.									

Table C-52 Relative dependence on Pacific cod as a percentage of total gross revenue by vessel length, gear and area 1995-2000; vessels 125 feet or greater using longline gear

vessel length	gear	area	year	targeted P. cod	non-targeted P. cod	other groundfish in area	Alaska groundfish outside area	other species	total gross revenue
125 or greater	longline	Bering Sea	1996	2.6%	0.0%	1.9%	95.5%	0.0%	100.0%
125 or greater	longline	Bering Sea	1997	36.8%	0.9%	5.2%	51.9%	5.2%	100.0%
125 or greater	longline	Bering Sea	1999	2.3%	0.0%	0.0%	6.5%	91.2%	100.0%
125 or greater	longline	Bering Sea	2000	2.6%	0.0%	0.0%	22.4%	74.9%	100.0%
125 or greater	longline	Central Gulf	1995	0.0%	0.0%	6.7%	12.4%	80.9%	100.0%
125 or greater	longline	Central Gulf	1997	0.0%	0.0%	1.1%	1.1%	97.8%	100.0%
125 or greater	longline	Central Gulf	1998	0.0%	0.0%	0.1%	0.1%	99.8%	100.0%
125 or greater	longline	Central Gulf	1999	0.0%	0.0%	0.0%	0.1%	99.9%	100.0%
125 or greater	longline	Central Gulf	2000	0.0%	0.0%	0.1%	0.2%	99.6%	100.0%
125 or greater	longline	Western Gulf	1996	0.0%	0.0%	5.6%	5.7%	88.8%	100.0%
125 or greater	longline	Western Gulf	1997	5.6%	0.0%	5.1%	44.7%	44.6%	100.0%
125 or greater	longline	Western Gulf	1998	0.0%	0.0%	0.3%	0.3%	99.3%	100.0%
125 or greater	longline	Western Gulf	1999	0.0%	0.0%	0.0%	0.0%	99.9%	100.0%
125 or greater	longline	Western Gulf	2000	0.0%	0.0%	0.0%	0.4%	99.6%	100.0%
Source: State of Alaska fish ticket files (including halibut) and Commercial Fisheries Entry Commission Vessel License Files.									
Data analysis by Elaine Dinneford, NPFMC Fisheries Analyst, May 2001.									

Table C-53 Relative dependence on Pacific cod as a percentage of total gross revenue by vessel length, gear and area 1995-2000; vessels 125 feet or greater using pot gear

vessel length	gear	area	year	targeted P. cod	non-targeted P. cod	other groundfish in area	Alaska groundfish outside area	other species	total gross revenue
125 or greater	pot	Bering Sea	1995	4.4%	0.0%	0.0%	4.8%	90.8%	100.0%
125 or greater	pot	Bering Sea	1996	6.8%	0.0%	0.0%	7.7%	85.5%	100.0%
125 or greater	pot	Bering Sea	1997	9.7%	0.0%	0.0%	10.2%	80.1%	100.0%
125 or greater	pot	Bering Sea	1998	4.0%	0.0%	0.0%	4.5%	91.5%	100.0%
125 or greater	pot	Bering Sea	1999	6.0%	0.0%	0.0%	7.3%	86.6%	100.0%
125 or greater	pot	Bering Sea	2000	17.2%	0.0%	0.1%	17.8%	64.9%	100.0%
125 or greater	pot	Central Gulf	1995	1.6%	0.0%	0.0%	1.6%	96.7%	100.0%
125 or greater	pot	Central Gulf	2000	11.4%	0.0%	0.0%	11.4%	77.2%	100.0%
125 or greater	pot	Western Gulf	1995	1.3%	0.0%	0.0%	1.7%	97.0%	100.0%
125 or greater	pot	Western Gulf	1996	3.4%	0.0%	0.0%	9.7%	86.9%	100.0%
125 or greater	pot	Western Gulf	1997	2.9%	0.0%	0.0%	12.7%	84.4%	100.0%
125 or greater	pot	Western Gulf	1998	1.5%	0.0%	0.0%	7.5%	91.0%	100.0%
125 or greater	pot	Western Gulf	1999	0.6%	0.0%	0.0%	3.8%	95.6%	100.0%
125 or greater	pot	Western Gulf	2000	8.0%	0.0%	0.0%	17.1%	74.9%	100.0%
Source: State of Alaska fish ticket files (including halibut) and Commercial Fisheries Entry Commission Vessel License Files.									
Data analysis by Elaine Dinneford, NPFMC Fisheries Analyst, May 2001.									

Table C-54 Relative dependence on Pacific cod as a percentage of total gross revenue by vessel length, gear and area 1995-2000; vessels 125 feet or greater using trawl gear

vessel length	gear	area	year	targeted P. cod	non-targeted P. cod	other groundfish in area	Alaska groundfish outside area	other species	total gross revenue
125 or greater	trawl	Bering Sea	1995	1.3%	0.2%	44.4%	52.6%	1.5%	100.0%
125 or greater	trawl	Bering Sea	1996	3.2%	0.3%	44.0%	51.1%	1.5%	100.0%
125 or greater	trawl	Bering Sea	1997	2.3%	0.3%	44.9%	51.8%	0.8%	100.0%
125 or greater	trawl	Bering Sea	1998	2.5%	0.3%	42.7%	51.6%	2.9%	100.0%
125 or greater	trawl	Bering Sea	1999	1.8%	0.2%	45.2%	49.0%	3.9%	100.0%
125 or greater	trawl	Bering Sea	2000	1.9%	0.2%	46.8%	49.9%	1.2%	100.0%
125 or greater	trawl	Central Gulf	1995	4.2%	0.0%	3.8%	90.0%	2.1%	100.0%
125 or greater	trawl	Central Gulf	1996	2.8%	0.0%	0.2%	93.1%	3.9%	100.0%
125 or greater	trawl	Central Gulf	1997	0.7%	0.1%	6.0%	91.9%	1.3%	100.0%
125 or greater	trawl	Central Gulf	1998	0.9%	0.1%	8.5%	87.4%	3.1%	100.0%
125 or greater	trawl	Central Gulf	1999	0.3%	0.0%	1.9%	92.7%	5.1%	100.0%
125 or greater	trawl	Western Gulf	1995	0.7%	0.0%	3.9%	92.7%	2.7%	100.0%
125 or greater	trawl	Western Gulf	1996	0.0%	0.0%	4.7%	90.3%	4.9%	100.0%
125 or greater	trawl	Western Gulf	1997	1.0%	0.0%	4.7%	93.1%	1.2%	100.0%
125 or greater	trawl	Western Gulf	1998	0.0%	0.0%	6.4%	91.4%	2.2%	100.0%
125 or greater	trawl	Western Gulf	1999	0.2%	0.0%	2.5%	86.7%	10.6%	100.0%
125 or greater	trawl	Western Gulf	2000	3.4%	0.0%	0.0%	96.5%	0.0%	100.0%
Source: State of Alaska fish ticket files (including halibut) and Commercial Fisheries Entry Commission Vessel License Files.									
Data analysis by Elaine Dinneford, NPFMC Fisheries Analyst, May 2001.									

1.4.1.3 Atka Mackerel

The data analyses showed almost no catches of Atka mackerel by catcher vessels in the various length and gear categories discussed above. A few sporadic catches appeared for several years, showing relatively low volume and very low prices, and indicating sales of incidentally caught Atka mackerel. This species is a targeted fishery of the catcher/processor fleet and, therefore, does not appear in the analysis of catcher boat landings and earnings.

1.4.2 Gross Revenue Effects

The overall analysis of the impacts of the alternatives on gross revenues was summarized in the cost-benefit analysis in Section 1.3.3.1 of this RIR. As noted there, the alternatives provide for (potential) maximum gross revenues ranging between $973 million and $1.358 billion; and placed from $28 million to $372 million in gross revenues "at risk", because of limitations on fishing in critical habitat.

Refer to section 1.3.3.1 for a detailed discussion of the approach used to estimate the changes in gross revenues. However, the "Benefit/Cost" overview in Section 1.3.3.1 was highly aggregated and did not break the impacts out by species, management area, or fleet segment. This section of the distributional analysis provides a much more disaggregated presentation of the results.

This section is divided into three subsections, corresponding to the three main categories of gross revenues impacts reviewed in the gross revenues analysis. While the alternatives contain numerous provisions that may impact the profitability of the fishing fleets and fish processors, the gross revenues analysis focused on these three categories, because: (a) these were thought to be the most significant impacts, and (b) because they lent themselves to estimation. The three impacts were: (1) the impact that the alternative had on the overall TAC allowed in a management area; (2) the impact of preventing vessels of different categories from fishing within critical habitat; (3) the impact of limiting the catch that vessels of different categories could take from critical habitat.

Each of the alternatives has different implications for TACs. Several alternatives contain global control rules, or other rules that could reduce harvests below the TACs that might otherwise be allowed. Alternatives also contain provisions imposing quarterly or other seasonal harvest limits within a year. These can often have the effect of "moving" retained harvest from one season to another. This movement can have gross revenue implications because prices received for fish can be much higher at one season of the year than another. Fish taken during the winter roe season at the start of the year can be much more valuable than fish taken later in the year. One subsection in this section presents the results of the impacts of the alternatives on TACs.

The analysis evaluates two categories of fishery effects associated with critical habitat. These categories are defined by the type of restrictions imposed on fishing in these areas. In the first, 'closed' critical habitat, no fishing activity is permitted, (depending upon the alternative) by one or more vessel categories.
In the second, 'open' critical habitat, fishing is allowed, subject to harvest limits specially designed for that area of critical habitat. Fish production from these areas would be constrained to the extent that the harvest limit is below the amounts that the fishermen would have taken if the limit had not been in place.

Two separate subsections of this section look at (a) the gross revenue impacts of the restrictions in 'closed' critical habitat, and (b) the implications for gross revenues of harvest limits imposed in 'open' critical habitat.

In this document, gross revenues that are impacted in critical habitat, whether the habitat is 'open' or 'closed', are described as "at risk." The revenues are treated as "at risk", rather than "foregone", because they may be made up (to a greater or lesser extent) by fishing operations that change their patterns of activity and fish more heavily outside of critical habitat. This treatment of revenue impacts, from 'critical habitat limits',

differs from the treatment of revenue impacts caused by explicit TAC provisions. Reduced revenues resulting from stricter TAC provisions are treated as "foregone." In other words, the revenues associated with a given set of TAC provisions are considered the 'maximum potential revenues' associated with the alternative. A comparison of two alternatives, such as Alternatives 1 and 2, on the basis of TAC impacts, is a comparison of maximum potential revenues from each alternative.

Impacts of TAC limitations on gross revenues

Tables C-55 and C-56 summarize information on the impacts of the TAC provisions in the alternatives on the maximum potential harvests, and gross revenues, that may be taken by the different fleets. Table C-55 provides the information for fleets operating in the GOA, while Table C-56 provides similar information for fleets operating in the BSAI. Detailed descriptions of the TAC provisions may be found in Section 2.3 of this SEIS.

Tables C-55 and C-56 have the same format. The two columns along the left hand side sort the fleets by their target species, gear type, and processing mode. CDQ operations are not broken out by gear type; harvests and gross revenues for all gear types have been treated together, in one category, for each species.
The vessel class descriptions are followed by six columns, summarizing the maximum potential gross revenue estimate for that fleet, under the five alternatives (as well as, Option 3 associated with Alternative 4). These were obtained by estimating the tons of fish that would be available under each of the alternatives and by monetizing those tons with a price reflecting the first wholesale price per retained ton of harvest. Tons were valued with prices that varied, depending on the half of the year during which the fish were projected to be harvested.

Finally, the last five columns in these tables calculate the difference between the gross revenues projected for each fleet under Alternative 1, and the gross revenues projected under each of the other alternatives. The gross revenues for each alternative were subtracted from the gross revenues for Alternative 1. This approach effectively treats Alternative 1, "No action," as a baseline from which the relative impacts of the other alternatives may be determined.

In the GOA, the potential maximum gross revenues from Alternatives 1, 4, and 5 are very similar. While Alternative 5 contains a global control rule, it doesn't bind in this instance. Alternatives 4 and 5 do not depend heavily on TAC limits to protect the Steller sea lions. As a practical matter, it is difficult to say that there is any significant difference on the basis of this criterion between these alternatives. The differences that appear in these tables are probably dwarfed by the margin of error for each of the estimates. Alternative 3 appears to limit harvests and revenues somewhat more than Alternatives 1, 4, and 5, however the difference is still relatively small and may also be inconsequential when compared to the likely margin for error.

GOA Alternative 2, however, imposes strict TAC limits on the fishery and goes to great lengths to evenly distribute the flow of harvest during the year. This results in lower harvests overall, and significant "movement" of harvests from the first half of the year to the second. This latter impact means that fishermen can expect to receive a lower price for their fish. The result is that Alternative 2 leads to a large decrease in gross revenues during the year, compared to the other alternatives. Alternative 2 yields an estimated gross revenue which is about $52 million less than that estimated for Alternative 1.

Table C-56 summarizes the maximum potential gross revenue information for the BSAI. The pattern of results appears to be very similar, albeit on a substantially larger scale, to that revealed for the Gulf. Overall, the estimated gross revenues for Alternatives 1, 4, and 5 are sufficiently close together that it is hard to say there are significant differences between them. Alternative 3 also seems to be fairly close to Alternatives 1, 4, and 5. However Alternative 2, again, imposes large reductions in annual TACs and its provisions to even out the harvest over the year mean that less fish are harvested in the winter, when the price is higher. This

combination of provisions leads to a large reduction in the estimated maximum potential gross revenues, under Alternative 2. Alternative 2 leads to a reduction in maximum gross revenues of about $332 million, as compared with the estimate for Alternative 1 (or about a 27% decline).

Table C-55 GOA TAC impacts

Species	Fleet	Maximum Potential Gross Revenues by Alternative						Difference Between Alternative 1 gross and gross for Listed Alternative (Alt 1 - Alt X)				
		Alt 1	Alt 2	Alt 3	Alt 4	Alt 4.3	Alt 5	Alt 2	Alt 3	Alt 4	Alt 4.3	Alt 5
Atka mack.	CDQ	0	0	0	0	0	0	0	0	0	0	0
	Jig	0	0	0	0	0	0	0	0	0	0	0
	Trawl Catcher/Processor	0	0	0	0	0	0	0	0	0	0	0
Pacific Cod	CDQ	0	0	0	0	0	0	0	0	0	0	0
	Fixed<60	25.76	13.34	18.68	22.48	22.48	18.68	12.42	7.08	3.28	3.28	7.08
	Jig	1.21	3.43	6.52	4.78	4.78	6.52	-2.22	-5.31	-3.56	-3.56	-5.31
	Longline Catcher Vessel	1.02	0.63	1.12	1.07	1.07	1.12	0.39	-0.10	-0.05	-0.05	-0.10
	Longline Catcher/Processor	2.44	0.77	0.98	1.48	1.48	0.98	1.68	1.46	0.97	0.97	1.46
	Pot Catcher Vessel	9.16	8.45	13.75	12.23	12.23	13.75	0.71	-4.60	-3.08	-3.08	-4.60
	Pot Catcher;/Processor	3.75	4.84	7.10	5.16	5.16	7.10	-1.09	-3.35	-1.41	-1.41	-3.35
	Trawl Catcher Vessel - S	11.82	3.85	5.19	7.53	7.53	5.19	7.97	6.63	4.29	4.29	6.63
	Trawl Catcher Vessem - M	18.17	8.90	16.56	16.97	16.97	16.56	9.27	1.62	1.20	1.20	1.62
	Trawl Catcher Vessel - L	0.54	0.15	0.25	0.38	0.38	0.25	0.39	0.28	0.16	0.16	0.28
	Trawl Catcher/Processor - AFA	0.01	0	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	Trawl Catcher/Processor - H&G	0.97	0.92	1.88	1.35	1.35	1.88	0.05	-0.90	-0.38	-0.38	-0.90
Pollock	CDQ	0	0	0	0	0	0	0	0	0	0	0
	Catcher Vessel - shoreside	48.09	25.22	43.48	56.31	56.31	54.53	22.87	4.61	-8.21	-8.21	-6.44
	Catcher/Processor	0	0	0	0	0	0	0	0	0	0	0
	Mothership	0	0	0	0	0	0	0	0	0	0	0
Column Totals		122.96	70.51	115.53	129.74	129.74	126.58	52.45	7.43	-6.79	-6.79	-3.62

Note: Values are reported in millions of dollars.

Table C-56 BSAI TAC impacts

Species	Fleet	Maximum Potential Gross Revenues by Alternative						Difference Between Alternative 1 gross and gross for listed alternative (Alt 1 - Alt X)				
		Alt 1	Alt 2	Alt 3	Alt 4	Alt 4.3	Alt 5	Alt 2	Alt 3	Alt 4	Alt 4.3	Alt 5
Atka mack.	CDQ	2.48	0.82	2.49	2.48	2.48	2.48	1.66	-0.01	-0.01	-0.01	0
	Jig	0.08	0.03	0.06	0.08	0.08	0.08	0.05	0.02	0	0	0
	Trawl Catcher/Processor	30.54	10.08	30.58	30.54	30.54	30.54	20.46	-0.04	0	0	0
Pacific Cod	CDQ	22.68	12.51	40.81	24.9	24.9	40.81	10.17	-18.13	-2.22	-2.22	-18.13
	Fixed<60	0.10	0.17	0.13	0.1	0.1	0.13	-0.06	-0.02	0	0	-0.02
	Jig	0.22	0.38	0.39	0.24	0.24	0.39	-0.16	-0.17	-0.02	-0.02	-0.17
	Longline Catcher Vessel	1.99	0.32	0.88	1.89	1.89	0.88	1.67	1.11	0.1	0.1	1.11
	Longline Catcher/Processor	112.79	106.17	130.57	114.73	114.73	130.57	6.62	-17.78	-1.94	-1.94	-17.78
	Pot Catcher Vessel	15.36	7.68	11.56	14.9	14.9	11.56	7.68	3.80	0.46	0.46	3.80
	Pot Catcher/Processor	5.63	4.14	7.20	5.81	5.81	7.20	1.49	-1.56	-0.18	-0.18	-1.56
	Trawl Catcher Vessel - S	0.01	0	0	0.01	0.01	0	0	0	0	0	0
	Trawl Catcher Vessel - M	37.38	16.60	21.03	35.4	35.4	21.03	20.78	16.35	1.98	1.98	16.35
	Trawl Catcher Vessel - L	9.35	3.45	4.84	8.84	8.84	4.84	5.90	4.51	0.51	0.51	4.51
	Trawl Catcher/Processor - AFA	6.89	2.24	2.81	6.52	6.52	2.81	4.66	4.08	0.37	0.37	4.08
	Trawl Catcher/Processor - H&G	12.32	7.49	7.55	11.76	11.76	7.55	4.83	4.77	0.56	0.56	4.77
Pollock	CDQ	101.88	79.00	99.28	97.62	97.62	97.62	22.88	2.60	4.26	4.26	4.26
	Catcher Vessel - shoreside	435.07	310.45	432.36	425.53	425.53	425.53	124.63	2.72	9.55	9.55	9.55
	Catcher Processor	352.04	272.99	342.75	337.33	337.33	337.33	79.06	9.29	14.71	14.71	14.71
	Mothership	88.01	68.26	85.69	84.33	84.33	84.33	19.75	2.32	3.68	3.68	3.68
Column total		1,234.83	902.76	1,220.98	1,203.01	1,203.01	1,205.69	332.06	13.84	31.81	31.81	29.14

Note: Values are reported in millions of dollars.

'Closed' Critical Habitat Impacts

Tables C-57 and C-58 summarize information on the impacts of the provisions in the alternatives that close critical habitat areas to different classes of vessels. Table C-57 provides the information for fleets operating in the GOA, while Table C-58 provides similar information for fleets operating in the BSAI. Detailed descriptions of the TAC provisions that close critical habitat areas to different vessel classes may be found in Section 2.3 of this SEIS.

The format of Tables C-57 and C-58 is like the format in Tables C-55 and C-56 on the TAC impacts. Two columns on the right identify the target species and the fleet. The next six columns summarize the total gross revenues placed "at risk" by specific provisions of each alternative that prevent certain classes of vessels from fishing within critical habitat (i.e., this critical habitat is 'closed' to these vessels). The next five columns compare the gross revenues placed "at risk" by Alternatives 2 to 5, with the gross revenues placed "at risk" by Alternative 1. Alternative 1 is the "no action" alternative. It is treated here as a baseline against which the other alternatives are compared. Note that the reported values in this column were calculated by subtracting the gross "at risk" from each alternative from the gross "at risk" from Alternative 1. Because Alternatives 2 through 5 tend to place larger amounts of gross revenues "at risk" in 'closed' areas than Alternative 1, the values in the last five columns of Tables C-57 and C-58 tend to be negative. All of the column totals are negative.

In the GOA, the Alternative 2 has the greatest impact, followed by Alternatives 3, 4.3, 4 and 5. Estimation errors may be larger than the difference in revenues "at risk" between any two alternatives next to each other in the ranking. Alternative 2 is the "Low and slow" alternative, designed to provide strong protection for Steller sea lions. Alternative 3 is the RPA associated with the November 2000 NMFS Biological Opinion. Alternative 4.3 is a version of the alternative proposed by the NMFMC Steller sea lion committee in the Spring of 2001. This version includes a GOA option for Pacific cod that establishes a system of bands along the coast. Bands are associated with different levels of restriction on fishing activity, by different vessel classes. The restrictions become tighter for bands closer to the shore. Alternative 4 is the NPFMC's RPA committee's proposal. The elements in it reflect an effort by the different fishing sectors to maintain their production, as much as possible, while eliminating jeopardy for the sea lions. Alternative 5 represents the fishery as it was in 2000, without the trawl closure, but with some additional constraints on the Pacific cod fishery.

In the BSAI, Alternatives 2 and 3 also appear to impact gross revenues more than Alternatives 4 and 5. The provisions in the GOA, that differentiate 4 from 4.3 there, do not affect the BSAI. Thus, in the BSAI, 4.3 has the same estimated impact as 4. While the pattern of effects are very similar in the GOA and the BSAI, the scale is much larger in the BSAI. Alternative 2 places about $246 million more revenues "at risk", than Alternative 1, while Alternative 3 appears to place about $187 more "at risk", there.

Table C-57 GOA closed critical habitat impacts

Species	Fleet	Gross Revenues Placed "at risk" by Alternative						Difference Between Alternative 1 Gross and Gross for Listed Alternative (Alt 1 - Alt X)				
		Alt 1	Alt 2	Alt 3	Alt 4	Alt 4.3	Alt 5	Alt 2	Alt 3	Alt 4	Alt 4.3	Alt 5
Atka Mackerel	CDQ	0	0	0	0	0	0	0	0	0	0	0
	Jig	0	0	0	0	0	0	0	0	0	0	0
	Trawl CP	0	0	0	0	0	0	0	0	0	0	0
Pacific Cod	CDQ	0	0	0	0	0	0	0	0	0	0	0
	Fixed<60	0.15	1.14	6.79	2.20	1.49	0.06	-0.99	-6.64	-2.06	-1.34	0.09
	Jig	0.03	0.70	1.73	0	0	0.04	-0.66	-1.70	0.03	0.03	-0.01
	Longline Catcher Vessel	0	0.06	0.28	0.11	0.46	0.01	-0.06	-0.28	-0.11	-0.46	-0.01
	Longline Catcher/Processor	0	0.39	0.50	0.21	0.59	0	-0.39	-0.50	-0.21	-0.59	0
	Pot Catcher Vessel	0.03	0.94	8.59	4.56	0	0.01	-0.91	-8.56	-4.53	0.03	0.02
	Pot Catcher/Processor	0.01	0	0.95	0.11	0	0.01	0.01	-0.94	-0.10	0.01	0.01
	Trawl Catcher Vessel - S	0.32	2.59	0.89	1.05	5.32	0.13	-2.27	-0.57	-0.73	-5.00	0.19
	Trawl Catcher Vessel - M	0.26	3.07	2.90	1.88	7.13	0.37	-2.82	-2.65	-1.63	-6.88	-0.12
	Trawl Catcher Vessel - L	0.02	0.09	0.07	0.08	0.23	0.01	-0.07	-0.05	-0.06	-0.21	0.01
	Trawl Catcher/Processor - AFA	0	0	0	0.01	0	0	0	0	0	0	0
	Trawl Catcher/Processor - H&G	0.06	0.19	0.24	0.06	0.37	0.07	-0.14	-0.19	-0.01	-0.31	-0.01
Pollock	CDQ	0	0	0	0	0	0	0	0	0	0	0
	Catcher Vessel - Shoreside	0.42	21.00	4.98	6.34	6.34	9.99	-20.58	-4.55	-5.91	-5.91	-9.57
	Catcher/Processor	0	0	0	0	0	0	0	0	0	0	0
	Mothership	0	0	0	0	0	0	0	0	0	0	0
Column Total		1.30	30.18	27.93	16.62	21.93	10.70	-28.88	-26.63	-15.32	-20.63	-9.40

Note: Values are reported in millions of dollars.

Table C-58 BSAI closed critical habitat impacts

Species	Fleet	Gross Revenues Placed "at risk" by the Alternative						Difference Between Altermatove 1 Gross and Gross for Listed Alternative (Alt 1 - Alt X)				
		Alt 1	Alt 2	Alt 3	Alt 4	Alt 4.3	Alt 5	Alt 2	Alt 3	Alt 4	Alt 4.3	Alt 5
Atka Mackerel	CDQ	0.06	0.47	1.30	0.17	0.17	0.06	-0.41	-1.24	-0.11	-0.11	0
	Jig	0	0	0	0	0	0	0	0	0	0	0
	Trawl Catcher/Processor	0.07	5.75	15.66	6.69	6.69	0.07	-5.68	-15.59	-6.62	-6.62	0
Pacific Cod	CDQ	0.05	1.95	5.10	0.41	0.41	0.06	-1.90	-5.05	-0.36	-0.36	-0.01
	Fixed<60	0	0.01	0.09	0.01	0.01	0	-0.01	-0.09	-0.01	-0.01	0
	Jig	0	0.01	0.16	0	0	0	-0.01	-0.16	0	0	0
	Longline Catcher Vessel	0.07	0.02	0.34	0.32	0.32	0.03	0.05	-0.26	-0.25	-0.25	0.05
	Longline Catcher/Processor	0.31	14.41	17.62	4.38	4.38	0.39	-14.10	-17.31	-4.08	-4.08	-0.08
	Pot Catcher Vessel	0.12	0.19	8.62	2.01	2.01	0.21	-0.07	-8.49	-1.89	-1.89	-0.08
	Pot Catcher/Processor	0.07	0.03	2.36	1.04	1.04	0.75	0.04	-2.28	-0.96	-0.96	-0.68
	Trawl Catcher Vessel - S	0	0	0	0	0	0	0	0	0	0	0
	Trawl Catcher Vessel - M	0.93	14.18	16.60	0.46	0.46	0.70	-13.25	-15.67	0.47	0.47	0.23
	Trawl Catcher Vessel - L	0.36	2.57	1.80	0.32	0.32	0.19	-2.21	-1.44	0.05	0.05	0.18
	Trawl Catcher/Processor - AFA	0.77	0.74	0.19	1.01	1.01	0.27	0.03	0.59	-0.24	-0.24	0.51
	Trawl Catcher/Processor - H&G	1.42	4.23	0.69	1.24	1.24	0.73	-2.81	0.73	0.18	0.18	0.69
Pollock	CDQ	2.68	26.37	5.98	8.48	8.48	3.14	-23.70	-3.30	-5.81	-5.81	-0.47
	Catcher Vessel - Shoreside	3.35	127.31	109.71	16.39	16.39	23.89	-123.96	-106.36	-13.03	-13.03	-20.54
	Catcher/Processor	6.83	51.53	19.48	11.01	11.01	8.21	-44.71	-12.66	-4.18	-4.18	-1.38
	Mothership	2.05	15.34	1.13	2.99	2.99	1.95	-13.29	0.92	-0.94	-0.94	0.10
Column Total		19.14	265.11	206.83	56.93	56.93	40.65	-245.99	-187.66	-37.78	-37.78	-21.48

Note: Values are reported in millions of dollars.

'Open' Critical Habitat Impacts

Tables C-59 and C-60 summarize information on the impacts of the provisions in the alternatives that place limits on harvests in critical habitat areas that remain 'open' to harvest. Table 1.4.2-5 provides the information for fleets operating in the GOA, while Table C-60 provides similar information for fleets operating in the BSAI. Detailed descriptions of the TAC provisions that place these limits on harvests may be found in Section 2.3 of this SEIS.

The format in these tables is like the format in the earlier tables (Tables C-57 and C-58) on 'closed' critical habitat. That is, the two columns on the right identify the target species and the fleet. The next six columns summarize the total gross revenues placed "at risk." The next five columns compare the gross revenues placed "at risk" by Alternatives 2 through 5 with the gross revenues placed "at risk" by Alternative 1. Again, note that these estimates were calculated by subtracting the gross "at risk" from each alternative from the gross "at risk" from Alternative 1. Because Alternatives 2 through 5 tend to place larger amounts of gross revenues "at risk" in 'closed' areas, than Alternative 1, the values in the last five columns of these tables tend to be negative. All of the column totals are negative. All values in these tables are in millions of dollars. Rows at the bottom of the tables provide column sums.

Alternatives 1, 3, and 5 contain the most important 'open' critical habitat limits. Alternative 1 contains 'open' critical habitat limits on Atka mackerel harvests in the Aleutian Islands areas 541 and 542. Alternatives 4 and 4.3 also contain limits on harvests from 'open' critical habitat in the Bering Sea SCA and on Atka mackerel harvests in 541 and 542.

Limits on harvests from 'open' critical habitat are central to Alternatives 1, 3 and 5 and, as shown in tables C-59 and C-60, do appear to impose significant constraints on fishery harvests. In the GOA, these provisions place gross revenues "at risk" to a significant extent under Alternative 3. They place a smaller share of GOA gross revenues "at risk" under Alternative 5.

In the BSAI, the 'open' area harvest limits in Alternatives 3 and 5 place large amounts of gross revenues "at risk." Alternative 3 places about $118 million at risk; most of this, about $82 million, is placed "at risk" for AFA inshore catcher vessels. Alternative 5 places smaller amounts of gross revenue "at risk", than Alternative 3, but the total is still considerable. About $70 million is placed "at risk," with about $44 million placed "at risk" for AFA inshore catcher vessels. Alternatives 1, 4, and 5 place Atka mackerel revenues "at risk."

Table C-59 GOA open critical habitat impacts

Species	Fleet	Gross Revenues Placed "at risk" by the Alternative						Difference Between Alternative 1 Gross and Gross for Listed Alternative (Alt 1-Alt X)				
		Alt 1	Alt 2	Alt 3	Alt 4	Alt 4.3	Alt 5	Alt 2	Alt 3	Alt 4	Alt 4.3	Alt 5
Atka Mackerel	CDQ	0	0	0	0	0	0	0	0	0	0	0
	Jig	0	0	0	0	0	0	0	0	0	0	0
	Trawl Catcher/Processor	0	0	0	0	0	0	0	0	0	0	0
Pacific Cod	CDQ	0	0	0	0	0	0	0	0	0	0	0
	Fixed<60	0	0	2.99	0	0	0.37	0	-2.99	0	0	-0.37
	Jig	0	0	5.43	0	0	2.44	0	-5.43	0	0	-2.44
	Longline Catcher Vessel	0	0	0.05	0	0	0	0	-0.05	0	0	0
	Longline Catcher/Processor	0	0	0	0	0	0	0	0	0	0	0
	Pot Catcher Vessel	0	0	0.90	0	0	0	0	-0.90	0	0	0
	Pot Catcher Processor	0	0	0.03	0	0	0.04	0	-0.03	0	0	-0.04
	Trawl Catcher Vessel - S	0	0	1.34	0	0	0.71	0	-1.34	0	0	-0.71
	Trawl Catcher Vessel - M	0	0	0.28	0	0	0.44	0	-0.28	0	0	-0.44
	Trawl Catcher Vessel - L	0	0	0	0	0	0.01	0	0	0	0	-0.01
	Trawl Catcher/Processor- A FA	0	0	0	0	0	0	0	0	0	0	0
	Trawl-Catcher/processor-H&G	0	0	0	0	0	0	0	0			
Pollock	CDQ	0	0	0	0	0	0	0	0	0	0	0
	Catcher Vessel - Shoreside	0	0	7.29	0	0	0	0	-7.29	0	0	0
	Catcher/Processor	0	0	0	0	0	0	0	0	0	0	0
	Mothership	0	0	0	0	0	0	0	0	0	0	0
Column Total		0	0	18.31	0	0	4.01	0	-18.31	0	0	-4.01

Note: Values are reported in millions of dollars.

Table C-60 BSAI open critical habitat impacts

Species	Fleet	Gross Revenues Placed "at risk" by the Alternative						Difference Between Alternative 1 Gross and Gross for Listed Alternative (Alt 1 - Alt X)				
		Alt 1	Alt 2	Alt 3	Alt 4	Alt 4.3	Alt 5	Alt 2	Alt 3	Alt 4	Alt 4.3	Alt 5
Atka Mackerel	CDQ	0.50	0	0	0.22	0.22	0.60	0.50	0.50	0.28	0.28	-0.10
	Jig	0	0	0	0	0	0	0	0	0	0	0
	Trawl Catcher/Processor	7.47	0	0	0.85	0.85	6.99	7.47	0	6.62	6.62	0.48
Pacific Cod	CDQ	0	0	0.52	0	0	1.92	0	-0.52	0	0	-1.92
	Fixed<60	0	0	0.02	0	0	0	0	-0.02	0	0	0
	Jig	0	0	0.31	0	0	0.17	0	-0.31	0	0	-0.17
	Longline Catcher Vessel	0	0	0.02	0	0	0	0	-0.02	0	0	0
	Longline Catcher/Processor	0	0	0	0	0	1.73	0	0	0	0	-1.73
	Pot Catcher Vessel	0	0	1.08	0	0	0.40	0	-1.08	0	0	-0.40
	Pot Catcher/Processor	0	0	0	0	0	0	0	0	0	0	0
	Trawl Catcher Vessel - S	0	0	0	0	0	0	0	0	0	0	0
	Trawl Catcher Vessel - M	0	0	0.98	0	0	9.84	0	-0.98	0	0	-9.84
	Trawl Catcher Vessel - L	0	0	1.42	0	0	2.58	0	-1.42	0	0	-2.58
	Trawl Catcher/Processor - AFA	0	0	0.62	0	0	0.45	0	-0.62	0	0	-0.45
Pollock	Trawl Catcher/Processor - H&G	0	0	2.44	0	0	0.95	0	-2.44	0	0	-0.95
	CDQ	0	0	15.52	0	0	0	0	-15.52	0	0	0
	Catcher Vessel - Shoreside	0	0	81.71	0	0	43.65	0	-81.71	0	0	-43.65
	Catcher/Processor	0	0	5.42	0	0	8.30	0	-5.42	0	0	-8.30
	Mothership	0	0	9.04	0	0	0.37	0	-9.04	0	0	-0.37
Column Total		7.97	0	119.1	1.07	1.07	77.95	7.97	-118.32	6.9	6.9	-70.0

Note: Values are reported in millions of dollars.

1.4.3 Impacts on Dependent Communities

Many of the communities of coastal Alaska, adjacent to the BSAI and GOA, are closely linked to, and highly dependent upon, the commercial groundfish fisheries off Alaska. Fish processing facilities are located in many of these communities, while other (mostly smaller) communities serve as home port for fishing vessels and/or supply crew to the fleet and/or plants. Sixty-five CDQ communities and nine Alaska non-CDQ communities (Unalaska/Dutch Harbor, Sand Point, King Cove, Chignik, Cordova, Seward, Homer, Adak, and Kodiak) are most clearly and directly involved in and dependent upon the BSAI and/or GOA pollock, Pacific cod, and Atka mackerel fisheries. In addition, Seattle, Washington (and the adjacent Puget Sound metropolitan area) has a substantial and direct involvement in these fisheries.

With the exception, obviously, of the Seattle-metro region, there are very few alternative economic opportunities available in these communities. Unemployment is chronically high, well above the national average, and the potential for economic diversification of these largely remote, isolated, local economies is very limited. Indeed, it is this absence of economic opportunity which has historically resulted in a high level of transient, seasonal labor and an unstable population base in many of these towns and villages. Closure of substantial portions of critical habitat to fishing for pollock, Pacific cod, and Atka mackerel, as provided for under virtually all of the proposed SSL Protection Measure alternatives under consideration, could further reduce employment and business opportunities, especially in communities with significant investment in onshore processing capacity and fleet services, further destabilizing these rural coastal communities.

From firms with direct and obvious linkages to the fisheries, such as maritime equipment purveyors, fuel pier operators, cold storage and bulk cargo transhipping firms; to local hotels, restaurants, bars, grocery stores; and commercial air carriers serving these communities, all will be impacted by the proposed structural changes in pollock, Pacific cod, and Atka target fisheries, attributable to the SSL Protection Measure action. While not readily amenable to quantitative estimation at present, over all, many of these (relatively) isolated, rural, fishery-dependent communities will likely experience a significant loss in economic and social welfare, as reflected through a general decline in the 'quality-of-life' for their residents.

Beyond the private sector effects, local government jurisdictions will likely be adversely impacted, as well. Most of these coastal fishing communities rely heavily upon tax revenues associated with "fishing" activities, in all its myriad forms, for operating and capital funds (e.g., fish landings taxes, business and property taxes, sales taxes).

1.4.3.1 Effects on Tax Revenue

Diminished activity in the fisheries translates directly and immediately into reduced revenues to the local governmental jurisdictions, in the current context, at the very time economic and socioeconomic dislocation in the fisheries may increase demands for social services in these rural communities. Taxes, accruing to each Alaska region from fisheries (in this instance, groundfish fisheries), provide an important source of capital and operating revenue for "local" governments.[51] The communities and regions vary in the way that direct revenue is collected on fishery-related transactions that occur within their respective jurisdictions. For communities (and boroughs) in the western Alaska regions, a 'local' fish tax is often a significant source of revenue. For other regions, tax revenue benefits are more closely tied to distributions made from the State of Alaska fish tax. Information is provided below for three major geographic regions (the first two of which would likely be heavily affected by the SSL RPA action, the third likely less so) on shared fishery tax revenues and the role of state shared fish tax in relation to these other taxes.

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[51]Data were drawn from the Alaska Department of Revenue (ADOR), DCED, and local sources.

As suggested, there is considerable variability from region to region, jurisdiction to jurisdiction. Also apparent is the regional differentiation in the importance of the relatively new fishery resource landing tax. This source of revenue comes from the *offshore* sectors of the groundfish fishery and was designed to capture some of the economic benefits of offshore activity for adjacent coastal Alaska regions. Because of the sheer size of the adjacent offshore activity, this source of tax revenues is far more important to the government jurisdictions of the Alaska Peninsula and Aleutian Islands region, than for the other regions listed here.

Alaska Peninsula and Aleutian Islands Region

Commercial fisheries-related taxes are important to this region in absolute and relative terms. Akutan, King Cove, Sand Point, and Unalaska all have local raw fish taxes, and the first three have a borough raw fish landing tax. Fisheries-related shared taxes accounted for 99.7% of all the shared taxes and fees coming to the region from the state in 1999, and total fisheries-related tax revenues exceeded $7 million. The offshore processing component paid more than $2 million in fisheries resource landing tax in 1999. This tax is considerably more important in this region (in both absolute and relative) terms than for any other Alaska region.

Kodiak Island Region

The City of Kodiak and the Kodiak Island Borough are the primary taxing entities in this region. City or community services outside the city are quite limited, or are supplied by the borough or private organization. The borough levies a property tax of 9.25 mils, a 5.0% accommodations tax, and a 0.925% severance tax on natural resources. Other communities within the region levy limited taxes. The region also depends on income from state fisheries taxes. The region's share of the fisheries business tax and fishery resource landing tax amounted to $1,330,856, in 1999.

Southcentral Alaska Region

None of the southcentral Alaska groundfish processing communities has a local or borough fish tax. At $1,521,569, in fiscal year 1999, 73.3% of the region's shared taxes and fees were fisheries-related. This is a higher amount than the Kodiak region received (although derived to a lesser extent from groundfish).

1.4.3.2 Other Community Impacts

As populations "adjust" to structural changes of the magnitude associated with the suite of alternatives contained in the proposed SSL Protection Measure management regimes, emigration will likely impose burdens on local social service agencies. For example, school districts depend, for economic support, upon State and Federal revenues based upon per capita enrollment. Because few, if any, viable alternative sources of economic activity exist in most of these rural coastal Alaska communities, the prospects for mitigating these adverse impacts, at least in the foreseeable future, do not appear promising.

Fishing is the economic base in many of these communities. Moreover, these communities are generally very "fragile", in the sense that they do not have well-developed secondary economic sectors. The cost of doing business in these communities is high and few retail or other firms find it economically advantageous to locate in them. As a result, local residents often have no choice but to spend a large part of their incomes outside the communities. In addition, many who work in the fishing and/or processing sector in these communities are transient laborers who take a large part of their incomes outside of the communities, at the end of the season.

Anything which tends to diminish economic activity in such a setting (e.g., reduction in groundfish fishing activity and associated exports) can do disproportionate damage to an already limited infrastructure in these communities. For example, revenues from transporting groundfish products from plants in these remote communities and villages to market, may generate increased shipping traffic into and out of small rural communities. This traffic might then, in effect, *underwrite* the delivery of other goods and services on "back-hauls", which otherwise could not occur (economically). In addition to the related maritime and stevedoring jobs this activity creates, the ancillary commercial traffic may contribute to a substantial improvement in the material quality of life in many of these towns and villages. However, many of these communities may become vulnerable to loss of transportation service, due to disruptions in these key groundfish fisheries, attributable to SSL Protection associated regulations. While the relationship is likely not perfectly linear, the most significant the structural change associated with the final alternative adopted (e.g., the smaller the available TAC, especially adjacent to these communities; the more temporally dispersed the fishery openings) the greater will likely be the adverse effects on community stability, social welfare, and quality of life.

Even relatively large communities, such as Kodiak, reportedly, expect to see a direct and immediate reduction in maritime transportation services, attributable to the ESA-SSL induced structural changes in these fisheries. Testimony before the Council, at its December 2000 meeting, suggested that, without the transhipment of groundfish products from community plants, it was expected that "in-bound" barge traffic, which supplies fresh food (milk, bread, fruits and vegetables, etc.) and bulk goods to Kodiak would revert to "pre-groundfish fishery" patterns; meaning, just one, rather than two or three barge-calls per week. This will, according to these community sources, produce a direct and measurable decline in the quality of life in the community. As one resident of Kodiak put it, "*We'll be back to the days when, from time to time, there was simply no milk to be had in town. One might have to wait several days before the next barge arrived and stores could be re-stocked.*"

Communities which support and depend upon these commercial fisheries will likely incur substantial adverse economic, socioeconomic, and cultural impacts as they adjust to changes in the timing and total magnitude of fishery related activities, associated with newly imposed requirements of the SSL Protection management regime (as those reflected among the suite of proposed alternatives to the status quo). Because much of the economic infrastructure of rural Alaska coastal communities has developed in support of commercial fishing (especially, most recently, that of groundfish) secondary (adverse) effects on businesses which supply goods and services to the fleet will also be widespread.

1.4.3.3 Regional Fishery Dependence Profiles

The following section provides an overview of the "relative value" of the species landed in fishing communities in the Bering Sea, Aleutian Islands, and Gulf of Alaska. Note that these estimates include only fish delivered to inshore processors for 'processing' (i.e., ex-vessel), but do not reflect deliveries of processed fish products to these ports from catcher/processors or motherships. Due to confidentiality restrictions, processor information cannot be reported unless there are data from three or more processing companies in the 'category' (e.g., community) being treated.

To maintain confidentiality, the community information presented in the following section has been combined and presented in three aggregate groupings, as follows:

1) Unalaska/Dutch Harbor
2) Kodiak
3) "Other" communities, including: Adak, Akutan, Chignik, Cordova, Homer, King Cove, Sand Point, and Seward

The ex-vessel value of fish landed at each of these ports (or port groupings) was calculated using data from the State of Alaska fish ticket files, as well as license files from the Commercial Fisheries Entry Commission, for various years. Ex-vessel value, which is a catcher vessel operator's gross revenue, was calculated using the number of round pounds landed with each fish ticket delivery, matched with the estimated ex-vessel value for that species, area, and year, from Commercial Fisheries Entry Commission data files.

The proportional share then represents the "ex-vessel value of landings" from each of the following species/species groups: pollock, Pacific cod, Atka mackerel, other groundfish, salmon, halibut, crab, herring, and "other". The analysis was completed for 1999, since that is the most recent year for which fish ticket files that include revenues from halibut, are available. Data for the years 1993 through 2000 were examined to investigate trends or changes in the relative contribution from the various species.

Figure 1.1 shows the respective ex-vessel value for fish landed at Unalaska in 1999. As noted in the figure, crab provided the largest overall contribution to ex-vessel value, accounting for 49% of the total. Pollock landings accounted for 36% of the total, while Pacific cod accounted for 5.0%. Atka mackerel provided a 'zero' contribution to the value of fish landed at Unalaska,, in 1999. The ex-vessel value of all species landed at Unalaska in 1999 totaled approximately $176 million.

Pollock contributed a large share of the ex-vessel value of fish landed at Unalaska during the period from 1993 through 2000, varying from a low of 34.5%, in 1993, to a high of 57.4%, in 2000. The change in relative importance of pollock in 2000 was due to the combined effect of high ex-vessel values for landings of pollock and low ex-vessel values for landings of crab.

Pacific cod landings at Unalaska account for an important share of total ex-vessel value, although the proportional share is much smaller than for pollock. During the period from 1993 through 2000, the relative share of total ex-vessel landings of Pacific cod varied from a low of just under 3.6%, in 1993, to a high of 11.7%, in 1996. In 2000, Pacific cod accounted for 6.6% of the total ex-vessel fish value landed at Unalaska.

Atka mackerel contributed a consistent 'zero' percent of the total ex-vessel value for landings of fish at Unalaska for the period from 1993 through 2000. As noted elsewhere in this report, Atka mackerel are only occasionally landed at shore plants, typically only as bycatch, with a very low value.

Other groundfish, including all groundfish landed at Unalaska except pollock, Pacific cod and Atka mackerel, accounted for a very small share of total ex-vessel value for the years 1993 through 2000. The range for other groundfish ranged from 1.09%, in 1999, to a high of 3.69%, in 1997.

The ex-value of crab landed at Unalaska accounted for a consistently large proportion of the total for the period from 1993 through 2000. The proportional share varied from a low of 30.9%, in 2000, to a high of 53%, in 1998. The ex-vessel value of crab landed at Unalaska in 2000 was much lower than in other years during the 1993 through 2000 period. This change was primarily due to the low harvests of C. opilio tanner crab in 2000.

Salmon accounts for a relatively minor share of the total ex-vessel value of fish landed at Unalaska. During the period from 1993 through 2000, the relative share from salmon varied from a low of 2.27%, in 1997, to a high of 7.9%, in 1994. Unalaska fish processors receive salmon deliveries from the local 'Area M' salmon fishery, but most of the salmon processed in Unalaska comes from Bristol Bay and occasionally other areas.

Halibut also accounts for a relatively minor share of the total ex-vessel value of fish landed at Unalaska. For the period from 1993 to 1999 (as noted above, the 2000 values for halibut are not yet available), the relative

share from halibut landings in Unalaska varied from a low of 1.91%, in 1998, to a high of 6.24%, in 1997. Herring and other species account for a very minor share of the total ex-vessel value of fish landed at Unalaska.

For the period from 1993 through 2000, the total ex-vessel value for fish landed at Unalaska varied from a low of $120.9 million, in 1998, to a high of $176.0, in 1999. Not including halibut, the ex-vessel value for all fish landed at Unalaska in 2000 totaled $138.8 million.

Figure 1.2 shows the respective ex-vessel value for fish landed at Kodiak. As shown in that figure, salmon provided the largest overall contribution to ex-vessel value, with 29% of the total. Pacific cod landings accounted for 26% of the total. Pollock accounted for roughly 13% of total ex-vessel value, while Atka mackerel provided a 'zero' contribution to the aggregate value of fish landed at Kodiak, in 1999. The value for all species landed at Kodiak in 1999, totaled approximately $96 million.

During the period from 1993 through 2000, pollock accounted for an important component of total ex-vessel fish value at Kodiak. The contribution from pollock ranged from a low of 5.84%, in 1996, to a high of 18.2%, in 2000. There were only two years during this period (1995 and 1996) where the respective contribution from pollock was less than 10%. The high proportional share in 2000 was caused by a low value for salmon landings that year, as well as the omission of halibut landed values.

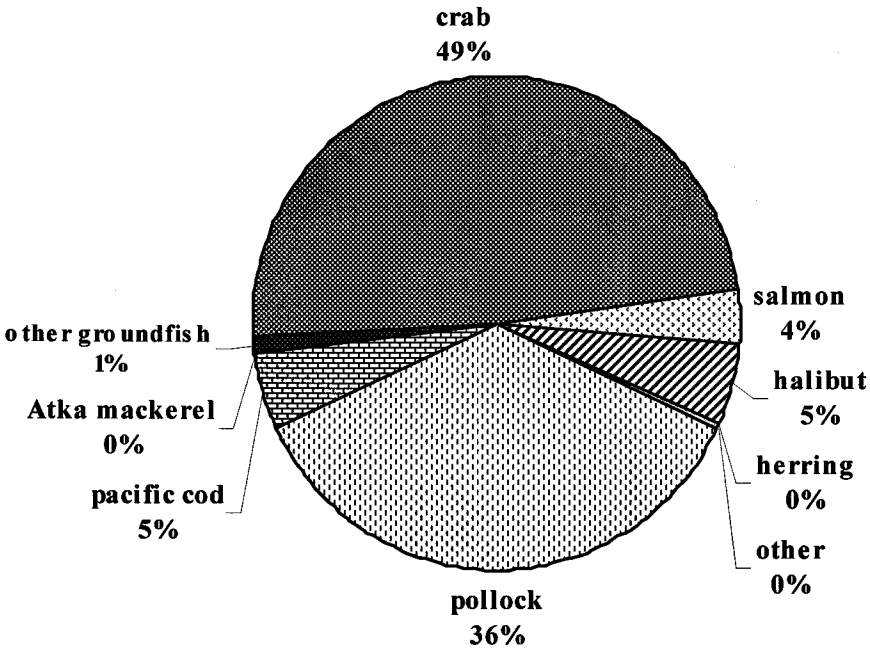
Pacific cod was a very important species in Kodiak during the period from 1993 through 2000. Pacific cod's proportional contribution to total ex-vessel value for fish landed varied during this period from a low of 8.5%, in 1994, to a high of 27.3%, in 2000. There was a steady upward trend in the proportional contribution of Pacific cod at Kodiak over this period. Atka mackerel provided a 'zero' percent share of total ex-vessel landed value, at Kodiak ,for the years 1993 through 2000. The only recorded value for Atka mackerel appears to be a very small amount of bycatch. Other groundfish, including all groundfish landed at Kodiak, except pollock, Pacific cod and Atka mackerel, accounted for a similar proportion of total ex-vessel landed value. The percentage share for other groundfish varied, from a low of 8.23%, in 1999, to a high of 19.05%, in 1996.

Crab contributed a relatively modest share of total ex-vessel landed value for Kodiak fisheries during the period from 1993 through 2000. The proportional contribution from crab varied from a low of 2.37%, in 1998, to a high of 10.52%, in 1993. In 2000, crab accounted for 10.44% of total ex-vessel landed value, again noting that halibut landings are not included for that year. When Kodiak's 2000 halibut landings are added in, the respective share from crab will diminish.

Salmon provides the largest share of the total ex-vessel landed value in Kodiak. For the period from 1993 through 2000, the proportional share from salmon varied from a low of 20.7%, in 1997, to a high of 43.6%, in 1995. In 2000, salmon accounted for 27.4% of total ex-vessel landed value at Kodiak. Halibut is also an important species. During the 1993 through 1999 period, halibut accounted for 14.27% (1995) to 27.62% (1997) of total ex-vessel landed value. Herring and other species account for a small share of total ex-vessel landed value in Kodiak. Herring accounted for a share of total ex-vessel value ranging from less than one percent to 6.14%, in 1996. The contribution to total ex-vessel landed value from other species was less than one percent.

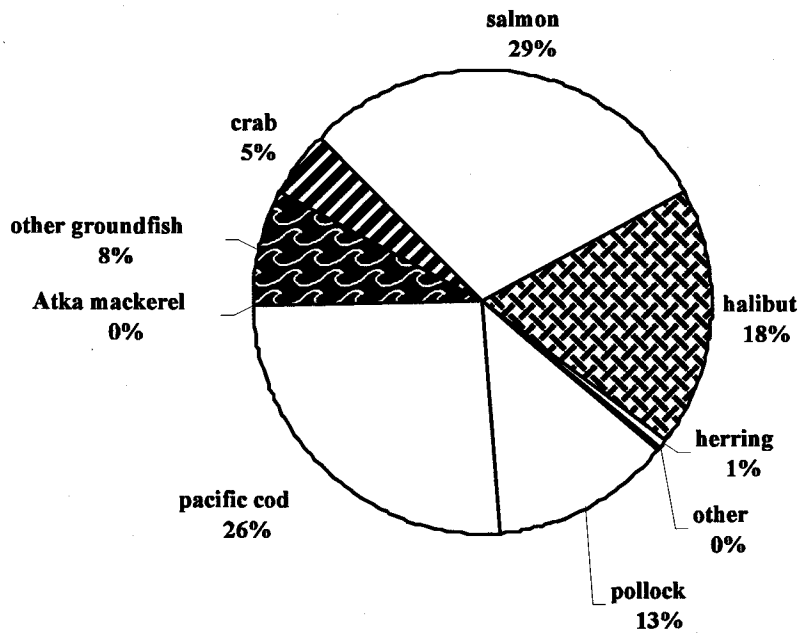
From 1993 through 2000, the total ex-vessel value for fish landed at Kodiak ranged from $67.3 million, in 2000, to a high of 94.9 million, in 1995. When halibut values are included for 2000, the total ex-vessel landed value for that year will be increased by a considerable (but, presently unknown) amount. The 1993 to 1999 value for landings of halibut in Kodiak ranged from $10 million to $22 million, so it is likely that the ex-vessel value for 2000 will account for a similar amount.

Figure C-3 Relative value of various species landed at unalaska in 1999



Source: data files provided by the North Pacific Fishery Management Council

Figure C-4 Relative value of various species landed at Kodiak in 1999



Source: data files provided by the North Pacific Fishery Management Council

Figure C-5 shows the respective ex-vessel value for fish landed at the third grouping of communities (i.e., Adak, Akutan, Chignik, Cordova, Homer, King Cove, Sand Point, and Seward). As noted, while reflecting a very dissimilar and diverse group of processors and plants, confidentiality constraints make this aggregation necessary.

Salmon provides the largest overall contribution to ex-vessel value for these communities, with 37% of the total. Pollock landings accounted for 15% of total ex-vessel value, while Pacific cod landings accounted for 12%. Atka mackerel provided a 'zero' contribution to the value of fish landed at these communities, in 1999. The value for all species landed in the group of other communities, in 1999, totaled $223 million.

During the period from 1993 through 2000, pollock accounted for an important component of total ex-vessel fish value for the community grouping of Adak, Akutan, Chignik, Cordova, Homer, King Cove, Sand Point, and Seward. The contribution represented by pollock ranged from a low of 9.27%, in 1993, to a high of 30%, in 2000. Pacific cod is also an important species to this categorical grouping. During the period from 1993 through 2000, the contribution to aggregate total ex-vessel landed value, from Pacific cod, ranged from a low of 6.55%, in 1993, to a high of 14.03%, in 1997. The proportional share of total ex-vessel landed value from Pacific cod, in 2000, was 10.66%. As was the case in Unalaska and Kodiak, there was effectively a 'zero' percent contribution from Atka mackerel for this community grouping.

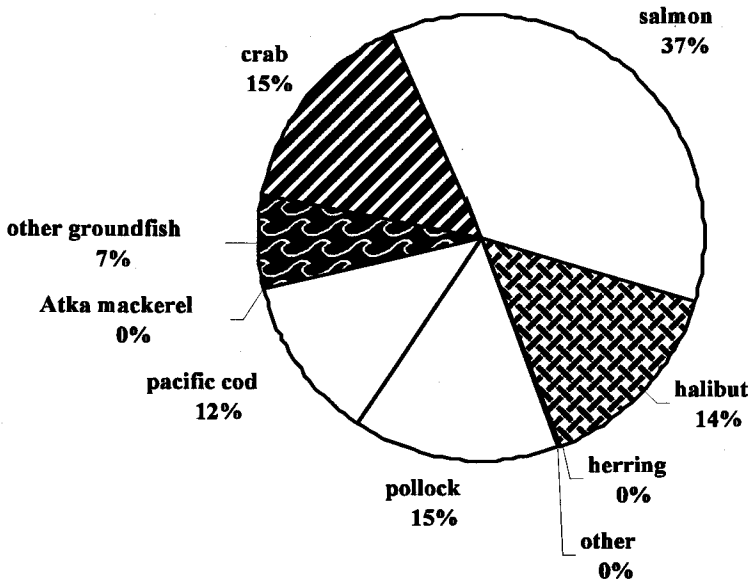
Other groundfish, including all groundfish landed at this group of communities except pollock, Pacific cod and Atka mackerel, accounted for an important proportion of total ex-vessel landed value. The percentage share for other groundfish varied from a low of 6.52%, in 1999, to a high of 14.35%, in 1995.

Crab also contributed an important share of total ex-vessel landed value for the community grouping of Adak, Akutan, Chignik, Cordova, Homer, King Cove, Sand Point, and Seward during the period from 1993 through 2000. The range for the proportional contribution from crab varied from a low of 9.92%, in 1997, to a high of 24.47%, in 1993. In 2000, crab accounted for 14.95% of total ex-vessel landed value, noting that halibut landings are not included for that year.

Salmon provides the largest share of the total ex-vessel landed value for the community grouping of Adak, Akutan, Chignik, Cordova, Homer, King Cove, Sand Point, and Seward during the period from 1993 through 2000. The proportional share from salmon varied from a low of 30.41%, in 1997, to a high of 42.03%, in 1993. In 2000, salmon accounted for 31.27% of total ex-vessel landed value at the respective communities in this group.

Halibut is an important species for this group of communities. During the 1993 through 1999 period, halibut accounted for 6.66% (1995) to 14.28% (1999) of total ex-vessel landed value. Herring and other species accounted for a small share of total ex-vessel landed value for this group of communities.
From 1993 through 2000, the total ex-vessel value for fish landed at the community group comprised of Adak, Akutan, Chignik, Cordova, Homer, King Cove, Sand Point, and Seward ranged from $132.8 million, in 1998, to a high of 223.5 million, in 1999. When halibut values are included for 2000, the total ex-vessel landed value for these communities will be increased substantially.

Figure C-5: Relative value of various species landed at other communities in 1999



Source: data files provided by the North Pacific Fishery Management Council

1.4.3.4 Impacts on Community Development Quota Groups and Communities

The Western Alaska Community Development Quota (CDQ) Program was created by the North Pacific Fishery Management Council (Council) in 1992, in connection with the inshore/offshore allocation of pollock in the Bering Sea and Aleutian Islands. The purpose of the CDQ Program was to help western Alaska communities to diversify their local economies and to provide new opportunities for stable, long-term employment.

Currently, 65 communities are eligible to participate in the CDQ Program. The CDQ communities are located within 50 nautical miles of the Bering Sea coast or on an island in the Bering Sea. Approximately 27,000 people live in the CDQ communities, which are small communities populated predominantly by Alaska Native people (Table 2.5-5 of this SEIS lists the 65 CDQ communities). These 65 communities have formed the following six non-profit corporations, called "CDQ groups", to manage and administer their CDQ allocations, investments, and economic development projects:

Aleutian Pribilof Island Community Development Association (APICDA)
Bristol Bay Economic Development Corporation (BBEDC)
Central Bering Sea Fishermen's Association (CBSFA)
Coastal Villages Region Fund (CVRF)
Norton Sound Economic Development Corporation (NSEDC)
Yukon Delta Fisheries Development Association (YDFDA)

Through the CDQ Program, a portion of the Bering Sea and Aleutian Islands area (BSAI) TACs for crab, halibut, groundfish, and prohibited species are allocated to eligible western Alaska communities. The percentage of each catch limit allocated to the CDQ Program is determined by the American Fisheries Act (AFA) for pollock (10%), the Magnuson-Stevens Act for crab (7.5%), the Fishery Management Plan for the Groundfish Fisheries of the Bering Sea and Aleutian Islands area (FMP) for all other groundfish and prohibited species (7.5%, except 20% for fixed gear sablefish), and 50 CFR 679 for halibut (20% to 100%). These allocations to the CDQ Program are called "CDQ reserves." Table 2.5-6 of this SEIS summarizes the 2001 CDQ reserves.

With the addition of the remainder of the groundfish species and the prohibited species allocations in 1998, NMFS implemented regulations combining the two separate CDQ fisheries (pollock and fixed gear halibut and sablefish) with the new groundfish and prohibited species into the multispecies groundfish and halibut CDQ fisheries. The CDQ groups are required to manage their catch to stay within all of their CDQ allocations. NMFS implemented this system of strict quota accountability because the Council recommended that all bycatch in all of the CDQ fisheries should accrue against the CDQ allocations and none of this catch should be subtracted from the portion of the quotas available to the non-CDQ fisheries.[52]

In 2000, approximately 180,000 metric tons of groundfish, 3 million pounds of halibut, and 3 million pounds of crab were allocated to the CDQ Program. The primary source of income for the CDQ groups is royalties from leasing their CDQ allocations. In 2000, the six CDQ groups earned $63 million in total revenues, of which about $40 million (63 percent) was from royalties. The remaining 37 percent of revenues was from income from partnerships, interest income, sale of property, leases, loan repayment, and other income.

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[52]The allocation of squid to the CDQ Program was removed in 1999 under an emergency rule and permanently in 2001, so that the bycatch of squid in the pollock CDQ fisheries would not prevent the CDQ groups from fully harvesting their pollock CDQ allocations.

Pollock is the most valuable species to the CDQ groups, contributing about $33 million in royalties in 2000 (83 percent of royalties). Since 1992, the six CDQ groups have accumulated assets worth approximately $187 million, including ownership of small local processing plants, catcher vessels, and catcher/processors that participate in the groundfish, crab, salmon, and halibut fisheries. The CDQ groups have used their CDQ allocations to develop local fisheries, invest in a wide range of fishing businesses outside the communities, and provide residents with education, training, and job opportunities in the fishing industry (State of Alaska, 2001).

In terms of the pollock, Pacific cod, and Atka mackerel fisheries, the CDQ groups lease quota both to vessels they own and to independent vessels. If CDQ is leased to vessels owned by the CDQ group, they receive both royalties from lease of the quota, as well as a share of any profits (or loss) made by the vessel. If CDQ is leased to independent vessels, the CDQ group receives just the royalties. All of the CDQ groups own a share of catcher/processors or a mothership that participate in the pollock fisheries, and most of their pollock allocations are harvested by these partners. Four of the six groups own a share of longline catcher/processors that participate in the BSAI Pacific cod fisheries. These vessels harvest all of the groups' Pacific cod CDQ, except an amount reserved by the groups as incidental catch in other CDQ fisheries. None of the CDQ groups have purchased vessels that participate in the Atka mackerel fisheries, so all of the Atka mackerel CDQ is leased to vessels that are independent of the CDQ groups. In addition to royalties and profit sharing, the CDQ groups also employ community residents on vessels, in processing plants, and in the offices of the vessels and processors they partner with. Table C-61 lists the vessels and processors owned by CDQ groups that participate in the pollock or Pacific cod fisheries.

Any management measure that decreases the value of the pollock, Pacific cod, or Atka mackerel fisheries in general, also will negatively affect the CDQ groups through reduced royalties, reduced profit-sharing, or increased costs. Individual community residents who already work for CDQ industry partners may be negatively affected if they earn less, because the value of a fishery decreases, or they work fewer days because quotas have decreased. Future workers from CDQ communities may be negatively impacted if fewer jobs are available in the fishing industry.

One of the reasons that the CDQ allocations are valuable is because these quotas are available to fish during times when the non-CDQ fisheries are closed. In addition, the CDQ allocations are not harvested on a competitive basis, as are many of the non-CDQ fisheries. These allocations are made to a specific

Table C-61. Community Development Quota groups' investments in vessels or processors that participate in the pollock or Pacific cod fisheries off Alaska.

CDQ Group	Vessel or Processor Name	Fishery	Percent CDQ Owns
APICDA	Bering Pacific Seafoods in False Pass	Pacific cod	100%
APICDA	Bering Prowler, longline catcher/processor	Pacific cod	25%
APICDA	Prowler, longline catcher/processor	Pacific cod	25%
APICDA	Ocean Prowler, longline catcher/processor	Pacific cod	25%
APICDA	Golden Dawn, trawl and pot catcher vessel	Pollock, crab	25%
APICDQ	Starbound, trawl catcher/processor	Pollock	20%
BBEDC	Bristol Leader, longline catcher/processor	Pacific cod	50%
BBEDC	Neahkanie, trawl catcher vessel	Pollock	20%
BBEDC	Arctic Fjord, trawl catcher/processor	Pollock	20%
CBSFA	American Seafoods, 7 trawl catcher/processors	Pollock, cod, flatfish	3.47%
CVRF	Ocean Prowler, longline catcher/processor	Pacific cod	20%
CVRF	American Seafoods, 7 trawl catcher/processors	Pollock, cod, flatfish	22.6667%
NSEDC	Glacier Fish Company, 2 trawl catcher/processors, 1 longline catcher/processor, salt cod processing facility	Pollock, cod, halibut, sablefish	50%
YDFDA	Golden Alaska, mothership	Pollock	19.8%
YDFDA	Alakanuk Beauty, trawl catcher vessel	Pollock	75%
YDFDA	Emmonak Leader, trawl catcher vessel	Pollock	75%
YDFDA	Lisa Marie, multi-gear catcher vessel	Pacific cod, halibut	100%

CDQ group and, within some very limited seasonal restrictions, the CDQ group decides when and how to harvest its quota. Because the CDQ allocations are reserved for a particular CDQ group and may be harvested during times when the non-CDQ fisheries are closed, the industry partners do not want to harvest CDQ while they have an opportunity to harvest fish in a non-CDQ fishery. Therefore, with the exception of the AFA pollock fisheries, CDQ harvests occur outside of the time of the directed fisheries. The pollock AFA fisheries operate under a cooperative structure and, in recent years, the CDQ and AFA allocations have been harvested at almost the same time, with vessels sometimes alternating between CDQ and AFA hauls in the

same day. Pacific cod CDQ is harvested almost exclusively by longline catcher/processors during in the late spring and summer and again after the non-CDQ fisheries close in the late fall or winter. The Atka mackerel CDQ allocations generally are harvested by one or two trawl catcher/processors in the late spring and early summer.

1.4.3.4.1 CDQ Allocations Under the Alternatives

Table C-62 summarizes the allocations to the CDQ Program under each of the alternatives. Section 2.5 of this SEIS contains a more detailed explanation of how the TAC limits and CDQ reserves are calculated under each alternative. Under Alternative 2 and Alternative 3, the many subdivisions of the TACs result in some relatively small CDQ reserves. For example, under Alternative 2, the Pacific cod CDQ reserve in the Aleutian Islands would be about 100 mt and Atka mackerel CDQ reserves in the Bering Sea/Eastern Aleutian Islands would be 89 mt per season. Under Alternative 3, some of the inside critical habitat area catch limits for the CDQ fisheries are very small (e.g., 21 mt for Aleutian Islands pollock).

Each of the CDQ reserves shown in Table C-62 would be further allocated among the six CDQ groups using the percentage allocations shown in Table C-63 (allocations for 2001 and 2002). Application of these percentage allocations would result in some very small CDQ allocations to individual groups, particularly under Alternatives 2 and 3. Some of these quota amounts are less than could be harvested in a single trawl haul. Very small annual CDQ allocations to individual groups are of concern because it would be difficult for the CDQ groups to manage their catch within their allocations. The groups would have to decide whether to forego harvest of CDQ in the area or risk an overage, which is a violation of NMFS regulations and subject to penalties.

Alternative 2 would divide the BSAI Pacific cod TAC into five area TACs, as described in Section 2.3. Once the Pacific cod CDQ reserve is allocated among the groups, individual groups would receive CDQ allocations for the Central Aleutian Islands of between 10 mt and 20 mt for the year. The largest Pacific cod CDQ allocations would occur in the east of 170° west longitude area, and would range from 200 mt to 300 mt per CDQ group for the year. In contrast, the 2001 BSAI Pacific cod CDQ allocations to individual groups range from 1,400 mt to about 2,600 mt and can be fished in any open area of the BSAI at any time during the year. The Atka mackerel CDQ allocations to individual groups in the Bering Sea and Eastern Aleutian Islands also would be quite small, ranging from seven metric tons to 27 mt. The 2001 Atka mackerel allocations in this area range from 47 mt to 100 mt per CDQ group.

Under Alternative 3, some of the seasonal inside critical habitat area catch limits to individual CDQ groups also would be quite small. The A season inside critical habitat allocation of pollock would range from 1 mt to 5 mt. Other critical habitat area catch limits for Pacific cod and Atka mackerel also would be less than 20 mt for each of the CDQ groups (e.g. AI C season Pacific cod and BS/EAI A season Atka mackerel).

Table C-62 Estimated amount of pollock, Pacific cod, and Atka mackerel allocations to the CDQ program under each alternative

Alternative 1					
	A	**B**	**Total**		
Seasons	1/20-4/15	9/1-11/1			
BS Pollock	63,000	77,000	140,000		
AI Pollock	2,380		2,380		
BSAI Pacific Cod	na	na	14,100		
BS/EAI Atka Mackerel	na	na	585		
CAI Atka Mackerel	na	na	2,520		
Inside CH	na	na	1,008		
WAI Atka Mackerel	na	na	2,093		
Inside CH	na	na	837		
Alternative 2					
	A	**B**	**C**	**D**	**Total**
	1/20-3/15	4/1-6/1	6/15-8/15	9/1-12/31	
Bering Sea Pollock					
East of 170 W	17,840	15,438	13,380	13,380	60,038
West of 170 W	16,467	18,869	20,927	20,927	
AI Pollock	No Directed Fishing of Pollock in the Aleutian Islands				
Pacific Cod					
East of 170 W	2,079	1,293	1,293	1,597	6,262
West of 170 W	456	1,242	1,242	938	3,878
EAI (541)	128	128	128	128	10,140
CAI (542)	100	100	100	100	401
WAI (543)	118	118	118	118	471
BS/EAI Atka Mackerel	89	89	89	89	356
CAI Atka Mackerel	384	384	384	384	1,536
WAI Atka Mackerel	319	319	319	319	1,276
Alternative 3					
	A	**B**	**C**	**D**	**Total**
Season	1/20-4/1	4/1-6/10	6/10-8/21	8/21-11/1	
Bering Sea Pollock	56,000		84,000		140,000
Limit Inside Area 7	10,220	6,440	1,260	1,960	19,880
Aleutian Islands Pollock	952		1,428		2,380
Limit Inside CH-RFRPA	21	24	43	40	128
BS Pacific Cod	4,963		7,445		12,408
Limit Inside CH-RFRPA	856	161	310	744	2,071
AI Pacific Cod	677		1,015		1,692
Limit Inside CH-RFRPA	232	125	74	164	595
BS/EAI Atka Mackerel	234		351		585
Limit Inside CH-RFRPA	88	88	130	130	436
CAI Atka Mackerel	1,008		1,512		2,520
WAI Atka Mackerel	837		1,256		2,093

Table C-62 Estimated amount of pollock, Pacific cod, and Atka mackerel allocations to the CDQ program under each alternative (Cont.)

Alternative 4					
	A	**B**	**Total**		
Bering Sea Pollock					
Season	1/20-6/10	6/10-11/1			
Seasonal Allocation	56,000	84,000	140,000		
Inside SCA	42,000		42,000		
Aleutian Islands Pollock			2,380		
BSAI Pacific Cod					
Seasons (Longline)	**1/1-6/10**	**6/10-12/31**			
Seasons (Pot)			**1/1 - 12/31**		
Seasons (Trawl)					
Seasonal Allocation	8,460	5,640	14,100		
BSAI Atka Mackerel seasons	**1/20-4/15**	**9/1-11/1**			
BS/EAI Atka Mackerel	293	293	586		
CAI Atka Mackerel	1,260	1,260	2,520		
Inside CH	882	882	1,764		
WAI Atka Mackerel	1,046	1,046	2,092		
Inside CH	732	732	1,464		
Alternative 5					
	A	**B**	**C**	**D**	**Total**
Seasons	1/20-4/1	4/1-6/10	6/10-8/20	8/20-11/1	
Bering Sea Pollock	56,000		84,000		140,000
Limit Inside SCA	34,720	11,480	11,760	19,320	77,280
Aleutian Islands Pollock	No Directed Fishing for Pollock				
	A	**B**			
Pacific Cod					
Seasons	1/20-5/1	5/1-11/1	Total		
BS Seasonal Allocation	4,963	7,445	12,408		
BS Limit Inside CH-RFRPA	2,482	447	2,929		
AI Seasonal Allocation	677	1,015	1,692		
AI Limit Inside CH-RFRPA	338	817	1,155		
BS/EAI Atka mackerel	na	na	585		
CAI Atka mackerel	na	na	2,520		
Inside CH	na	na	1,008		
WAI Atka mackerel	na	na	2,093		
Inside CH	na	na	837		

Notes:
BSAI = Bering Sea and Aleutian Islands Area
BS = Bering Sea
AI = Aleutian Islands
EAI = Eastern Aleutian Islands (541)
CAI = Central Aleutian Islands (542)
WAI = Western Aleutian Islands (543)
CH = Steller sea lion critical habitat
SCA = Steller sea lion conservation area
CH-RFRPA = Steller sea lion critical habitat under the Revised Final Reasonable and Prudent Alternative in NMFS's 2000 Biological Opinion

Table C-63 Percentage Allocations of Pollock, Pacific Cod, and Atka Mackerel to the CDQ Groups in 2001.

	Percentage Allocations to Each CDQ Group in 2001		
CDQ Group	**Pollock**	**Pacific Cod**	**Atka Mackerel**
APICDA	14	16	30
BBEDC	21	20	15
CBSFA	4	10	8
CVRF	24	17	15
NSEDC	23	18	14
YDFDA	14	19	18

Source: State of Alaska, Department of Community and Economic Development. Western Alaska Community Development Quota Handbook. Published by the Division of Community and Business Development, CDQ Program Office, Juneau, Alaska. June, 2001. 228 p.

Overall, Alternatives 2 and 3 appear to be the most costly to the CDQ groups because they create so many smaller quota categories. These small quotas would be difficult for the CDQ groups to manage, may result in foregone catch, and may generate lower royalties because they will be more costly to harvest and they represent very little additional fishing time for potential partners.

1.4.3.4.2 Seasonal Allocations of Atka Mackerel and Pacific Cod Under Alternative 4

Although not specifically stated in the description of Alternative 4 in the SEIS, it was assumed that the seasons and seasonal allocations of Atka mackerel and Pacific cod would apply to the CDQ fisheries. Seasonal allocations have applied to the pollock CDQ reserve since implementation of the pollock CDQ Program in 1992. However, the seasonal allocations for Steller sea lion protection that have been in effect since 1999 for Atka mackerel and 2001 for Pacific cod have not applied to the CDQ reserves for these species. The proposed rule for Steller sea lion protection measures in the Atka mackerel fisheries (63 FR 60288; November 9, 1998) states that the reason the seasonal allocation was not applied to the CDQ reserve was because "jig gear and CDQ fishing occur outside the time period of the open access trawl fishery, and ...are too small, widely dispersed, and slowly paced to lead to localized depletions of Atka mackerel." Rulemaking implementing the seasonal allocation of Pacific cod in 2001 did not specifically address why the seasonal allocation did not apply to the CDQ reserve for Pacific cod (66 FR 7276; January 22, 2001).

Atka Mackerel: Alternative 4 would apply the seasonal allocation of Atka mackerel to the CDQ fisheries. The Atka mackerel CDQ allocation to each group would be allocated 50 percent to the "A" season (January 20 through April 15) and 50 percent to the "B" season (September 1 through November 1), and would prohibit directed fishing for Atka mackerel by the CDQ groups between April 15 to September 1. This alternative would significantly reduce the time available for the CDQ groups to harvest their Atka mackerel allocations as compared to the 1999 through 2001 CDQ fisheries. Table C-64 summarizes the seasonal distribution of Atka mackerel catch in the 1999 through 2001 CDQ fisheries (2001 data is through 9/16/01). Figure C-6 shows the timing of Pacific cod catch by the CDQ and non-CDQ fisheries by week in 2000.

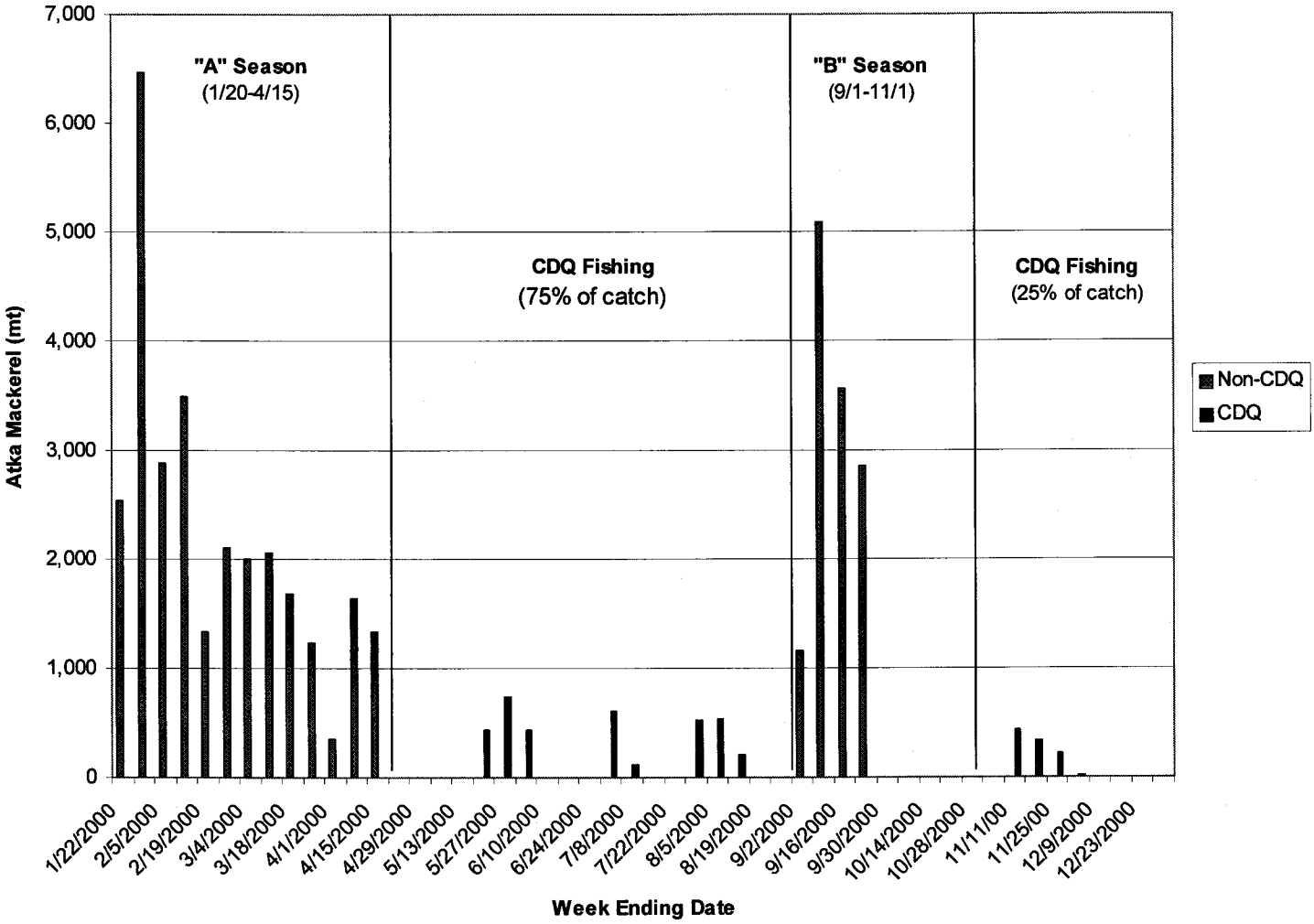
The CDQ groups caught almost zero Atka mackerel between January 1 and April 15, because these are the times that their partner vessels are participating in open access Atka mackerel, flatfish, and cod fisheries. In 1999, the CDQ groups caught 78 percent of their annual Atka mackerel catch between April 15 and September 1 and in 2000, they caught 75 percent of the Atka mackerel in this period. They caught 12 percent (in 1999) and 0 percent (2000) of their Atka mackerel during the "B" season (September 1 through November 1). The groups caught the remainder of their Atka mackerel between November 1 and December 31 (9 percent in 1999 and 25 percent in 2000).

Table C-64. Catch of Atka mackerel in the CDQ fisheries by season, 1999, 2000, and 2001 through September 16, 2001

Season and Annual Totals	1999	2000	2001
1/20 - 4/15 Catch (% of total)	0	12 (0.25%)	0
4/15 - 9/1 Catch (% of total)	2,026 (78%)	3,596 (75%)	3,466
9/1 - 11/1 Catch (% of total)	317 (12%)	0	182 (thru 9/16/01)
11/1 - 12/31 Catch (% of total)	244 (9%)	1,179 (25%)	
Annual total catch	2,588 (100%)	4,787 (100%)	3,648 (thru 9/16/01)
Annual allocation	4,980	5,309	5,198
% of annual allocation harvested	52%	90%	70% (9/16/01)

(values in metric tons and percentages of total annual catch).

Figure C-6 Catch of Atka Mackerel in the BSAI Trawl Fisheries in 2000 CDQ vs Non-CDQ by Week



Pacific cod:

Alternatives 4 is assumed to apply seasons and seasonal allocations to the Pacific cod CDQ allocations. However, it is not clear in the current description of Alternative 4 what seasons and seasonal allocations should apply to the CDQ fisheries. Alternative 4 proposes different seasons and allocations for various gear and vessel types, including trawl catcher vessels, trawl catcher/processors, longline and jig gear, and pot gear. This makes sense for the non-CDQ fisheries, because the Pacific cod TAC is allocated among these gear and vessel types. However, the CDQ reserve is not allocated among gear types. Although the CDQ groups have historically used longline catcher/processors to harvest their Pacific cod allocations, they are not required to do so, and they may decide to use other gear types in the future. The only specific reference to the CDQ fisheries in Alternative 4's Pacific cod seasons, was that "pot CDQ" has a season from January 1 through December 31.

NMFS is assuming that, if the Council desires to apply seasonal allocations to the Pacific cod CDQ reserve, it would be appropriate to use the seasons and seasonal allocations that apply to vessels using longline gear. This would allow vessels using longline, pot, and jig gear to fish at any time from January 1 through December 31, but would allocate the cod CDQ reserve 60 percent to January 1 through June 10 and 40 percent from June 10 through December 31. The CDQ groups would be prohibited from using trawl gear to directed fish for Pacific cod before January 20 and after November 1.

The seasonal allocation would prohibit the CDQ groups from catching more than 60 percent of their Pacific cod allocations before June 10. However, "roll-over" provisions for the seasonal allocations would allow the CDQ groups to catch less than 60 percent in the A season and carry forward any remaining quota to be harvested during the B season. Therefore, Alternative 4 would have a negative impact on the CDQ fisheries if they wished to catch more than 60 percent of their Pacific cod allocations prior to June 10.

Table C-65 summarizes the seasonal distribution of Pacific cod catch in the 1999 through 2001 CDQ fisheries (2001 data is through 9/16/01). Figure C-7 shows the distribution of the Pacific cod catch in the CDQ and non-CDQ fisheries by week in 2000. I

In 1999, the CDQ groups caught about 40 percent of their Pacific cod allocation between January 1 and June 10 and the remaining 60 percent after June 10. In 1999, the non-CDQ fisheries were open between January 1 and April 17; between September 15 and October 19, and again between December 6 and December 31. The last December opening was as a result of reallocating unused Pacific cod from the trawl to non-trawl sector. This type of reallocation often occurs because vessels using trawl gear cannot fully harvest their cod allocations. When this occurs, it makes the non-CDQ longline fishing season longer, thereby reducing the available days to harvest CDQ Pacific cod.

In 2000, the CDQ groups harvest about 60 percent of their Pacific cod allocations between January 1 and June 10 and 40 percent between June 10 and December 31 (see also Figure C-X2). The non-CDQ longline cod fishery was open between January 1 and March 10, and closed about five weeks earlier than in 1999, providing more time for CDQ fishing in the spring of 2000. CDQ fishing continued through the summer right up until the opening of the non-CDQ fisheries again on September 1, 2000. The non-CDQ fisheries were open between September 1 and December 9, 2000. NMFS reallocated about 11,000 mt of Pacific cod from the trawl to non-trawl sectors on October 27, 2000 which contributed to the long fall/winter opening for Pacific cod.

Table C-65. Catch of Pacific cod in the CDQ fisheries by season, 1999, 2000, and 2001 through September 16, 2001

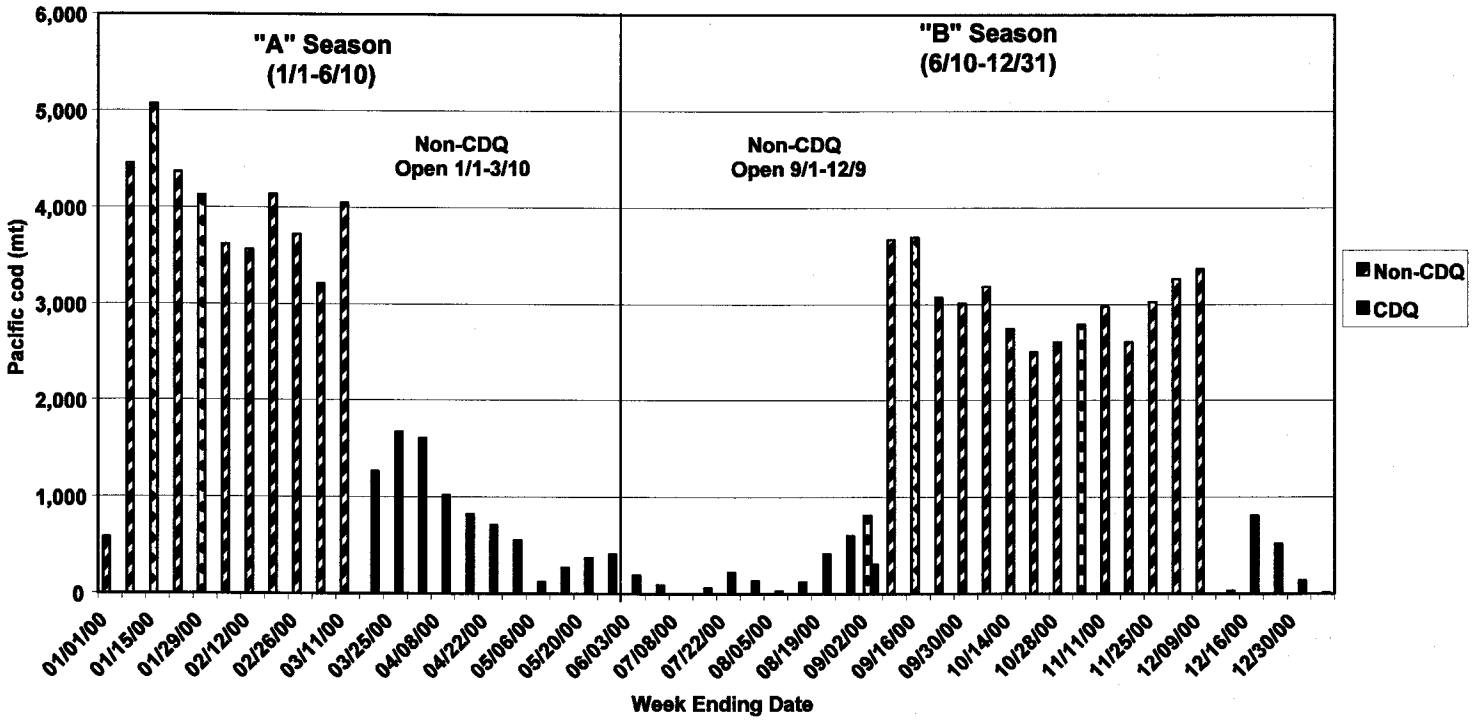
Season and Annual Totals	1999	2000	2001
1/1 - 6/10 Catch (% of total)	4,854 (39%)	9,305 (69%)	7,821
6/10 - 12/31 Catch (% of total)	7,641 (61%)	4,222 (31%)	2,024 (thru 9/16/01)
Annual total catch	12,495 (100%)	13,527 (100%)	9,845 (thru 9/16/01)
Annual allocation	13,275	14,527	14,100
% of annual allocation harvested	94%	93%	70% (thru 9/16/01)

(values in metric tons and percentages of total annual catch).

In 2001, the CDQ groups harvested about 55 percent of their Pacific cod CDQ allocation before June 10. They had a somewhat shorter window of time than in 2000 to harvest cod in the spring and summer because the non-CDQ cod fisheries were open from January 1 to March 25 and re-opened on August 15.

Applying the seasonal allocation to Pacific cod CDQ may make it more difficult for the CDQ groups to find sufficient opportunities to harvest Pacific cod than under current regulations, if they want to be able to harvest more than 60 percent of their cod allocation before June 10, as they did in in 2000. The open seasons for non-CDQ cod fishing by longline catcher/processors are longer than for the trawl fisheries for pollock and Atka mackerel, and fishermen do not want to target Pacific cod for CDQ or non-CDQ quotas in the mid-summer due to high bycatch and low product quality. In the last three years, the opening date for second season cod fisheries has been progressively earlier (September 15 to September 1 to August 15), and the non-CDQ longline fisheries usually are extended by reallocations of cod from the trawl sector. These factors increase the chance that the CDQ groups may not have enough time in the "B" season to fully harvest the cod CDQ allocations.

Figure C-7 Catch of BSAI Pacific Cod by Vessels Using Longline Gear in 2000 CDQ vs Non-CDQ Catch by Week



1.4.4.3 Regional Socioeconomic Profiles

A detailed overview of the small communities and villages dependent upon groundfishing in general, and Pacific cod, pollock, and Atka mackerel related activities in particular, may be found in Section 3.12.2 of this SEIS, and this information is supplemented by Appendix F(1) of this document. These regional summaries and community profiles are updates of the Sector and Regional Profiles of the North Pacific Groundfish Fisheries (in press) that were originally prepared in connection with the much broader Programmatic SEIS for the Bering Sea, Aleutian Islands, and Gulf of Alaska groundfish fisheries. They provide a useful overview of these dependent regions and communities, placing the proposed SSL Protection Measure action in a clearer context and are not recapitulated here.

1.5 Consistency with National Standards

The following section addresses issues raised by the National Standards, as contained in the Magnuson-Stevens Act (Act), including a brief discussion of the consistency of the proposed alternatives with each, where applicable.

National Standard 1 - Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery

Pacific cod, pollock, and Atka mackerel fisheries will continue to be managed to achieve the TAC, without overfishing. Pacific cod and pollock stocks in the GOA, and cod, pollock and Atka mackerel stocks in the BSAI are not currently in danger of overfishing and are considered stable. Overall yields, from one or more of the stocks, may be affected by the suite of proposed actions. In terms of achieving 'optimum yield' from the fishery, the Act defines 'optimum', with respect to yield from the fishery, as the amount of fish which:

(A) will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, and *taking into account the protection of marine ecosystems*; (emphasis added)

(B) is prescribed as such on the basis of the maximum sustainable yield from the fishery, as reduced by any relevant economic, social, or *ecological factor*; (emphasis added) and,

(C) in the case of an overfished fishery, provides for rebuilding to a level consistent with producing the maximum sustainable yield in such fishery.

Overall benefits to the Nation may be affected by these trade-offs, though the agency's current ability to quantify those effects is quite limited. While differential distributional impacts among fishing vessels and processing sectors are implied by a comparison of the alternatives, overall net benefits to the Nation should be enhanced by the SSL Protection Measure alternatives under consideration, especially in light of society's implicit "non-use" value, as reflected in ESA language concerning listed species restoration and protection, as well as (emphasized) elements of subheading (A) and (B), immediately above.

National Standard 2 - Conservation and management measures shall be based upon the best scientific information available.

Information in this analysis represents the most current, comprehensive set of information available to the agency (and the Council), recognizing that some information (such as operational costs) is unavailable. Each of the alternatives was analyzed based on information that appears to be consistent with this standard to the fullest extent practicable.

National Standard 3- To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.

The suite of SSL Protection Measure alternatives to the status quo appears to be consistent with this standard. The BSAI Pacific cod, pollock, and Atka mackerel stocks will continue to be managed as a unit throughout their respective ranges, consistent with the agency's understanding of the dynamics of these three stocks. GOA pollock and Pacific cod resources will continue to be managed in an equivalent manner. Where appropriate, separate quotas for each sector will be monitored in-season by NMFS to assure adherence to and consistency with this National Standard.

National Standard 4 - Conservation and management measures shall not discriminate between residents of different states. If it becomes necessary to allocate or assign fishing privileges among various U.S. fishermen, such allocation shall be (A) fair and equitable to all such fishermen, (B) reasonably calculated to promote conservation, and (C) carried out in such a manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.

The suite of SSL alternative actions makes no explicit or implicit differentiation among residents of different states, nor does it have as its purpose or intent to allocate or assign fishing privileges.

National Standard 5 - Conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources, except that no such measure shall have economic allocation as its sole purpose.

The wording of this standard was changed in the recent Magnuson-Stevens Act authorization, to 'consider' rather than 'promote' efficiency. Efficiency in the context of this change refers to economic efficiency, and the reason for the change has been interpreted as an effort to de-emphasize, to some degree, the importance of economics relative to other considerations (Senate Report of the Committee on Commerce, Science, and Transportation on S. 39, the Sustainable Fisheries Act, 1996). The analysis presents information relative to these perspectives, but does not point to a preferred alternative in terms of this standard. National Standard 5 recognizes the importance of various other issues, in addition to economic efficiency, not the least of which, in the current case, is the objective of, "*the protection of marine ecosystems*" (e.g., the western stock of Steller sea lions and the habitat upon which it depends).

National Standard 6 - Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.

Limitations imposed by the SSL Protection Measure alternative (no matter which among the suite of options before the Council is ultimately selected), will likely reduce the flexibility of fishermen to respond to variations among pollock, Pacific cod, and Atka mackerel fisheries, fisheries resources, and catches. While, as required, the proposed alternatives take these effects into account, they are balanced with the requirement to achieve the primary objective of the action, to protect and enhance the recovery of the western stock of Steller sea lions.

National Standard 7 - Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.

The proposed SSL Protection action appears to be consistent with this standard, as it builds on the RPA, original SSL ER program (in place for the 2001 fishing year), and the work of the Council's Steller Sea Lion RPA Advisory Committee. Building upon the regulatory framework and management experience of the 2001 emergency rule should help to minimize unnecessary duplication and minimize implementation costs.

National Standard 8 - Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.

Many of the coastal communities in Alaska and the Pacific Northwest participate in these GOA and BSAI groundfish fisheries, in one way or another, whether it be as host to processing facilities and support businesses, or as the harbor/home/operating port to vessel operators, fishermen, and processing workers. Major groundfish ports in Alaska that process catch from the Bering Sea include Dutch Harbor, St. Paul, Akutan, Sand Point, King Cove, and Kodiak. Additionally, the Seattle, Washington area is home port to many catcher and catcher/processor vessels operating in these fisheries. Summary information on 126 of these coastal communities is provided in "*Faces of the Fisheries*" (NPFMC 1994). A more recent set of profiles of the key Alaska coastal communities, associated with the fisheries of concern in the current action, is contained above, in the RIR analysis.

In terms of potential impacts resulting from the proposed suite of SSL Protection Measure alternatives for the pollock, Pacific cod, and Atka mackerel fishery, the analysts reviewed data on (1) harvest levels, by vessels in each sector; (2) price and revenues resulting from that harvest; (3) where those harvests are traditionally delivered for processing or for first wholesale (in the case of catcher/processors), and (4) the home port of vessels engaged in each fishery. This information is detailed in Section 1.4 of this analysis. Much of the information used in the detailed economic and socioeconomic analysis cannot be presented, in its disaggregate form, due to confidentiality restrictions, but is summarized qualitatively. The information presented here does not attempt to trace the full economic impact of these revenue changes through the communities involved, nor does this analysis attempt to predict changes in such economic activity from the proposed alternatives; rather, it is provided as a broad indicator of the relative importance of the Pacific cod, pollock, and Atka target fisheries to vessels from these communities, in the recent past.

National Standard 9 -Conservation and management measures shall, to the extent practicable, (A) minimize bycatch, and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.

Sections 3.5 and 4.5 of this SEIS present information on historical bycatch patterns in the pollock, Pacific cod, and Atka mackerel target fisheries. In summary, bycatch rates in the Pacific cod fixed gear fisheries are relatively low, overall, as are rates in the pollock trawl fishery (especially since the prohibition on 'bottom trawling' for pollock). Atka and Pacific cod trawl bycatch rates are significantly higher. Provisions among one or more of the SSL alternatives to the status quo could have several undesirable effects on bycatch rates, as effort is displaced into areas and times which are historically associated with increased bycatch. All of these associations and implications are treated at length in the RIR. Regulatory provisions which are in place, at present (e.g., IR/IU, PSC caps), are anticipated to serve as incentives for the fleets to "minimize bycatch and mortality of such bycatch", to the maximum extent practicable.

National Standard 10 - Conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

The suite of alternatives which comprise the SSL Protection Measure proposal, before the Council, appears to be consistent with this standard, to the extent practicable, while simultaneously achieving the ESA mandate to avoid SSL jeopardy or adverse modification of SSL habitat. None of the changes in the proposed alternatives would substantially change safety 'requirements' for fishing vessels. Nonetheless, fishing in the Bering Sea, Aleutian Islands, and Gulf of Alaska is a high risk enterprise, fraught with potential risk. Provisions of the suite of SSL alternatives under consideration here, which provide exemptions to the smallest vessel classes, from some time and area closures, reflects an explicit effort to be responsive to the requirements of this National Standard, while achieving the primary objective of this action.

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APPENDIX D

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1.0 INTRODUCTION

1.1 Background and Setting

One of the most significant transformations in the Alaska fishing industry in the past hundred years has been the emergence of the target species category known as groundfish. As recent as 1980, domestic harvests of groundfish were less than 6,000 of the total quarter million metric tons domestically harvested, and only 0.2 percent of the total value.[1] In terms of value, groundfish now are the largest segment of fishery harvest from Alaskan waters, representing over $1.3 billion annually in product value. This extraordinary growth in the fishery can be substantially traced to the Fishery Conservation and Management Act of 1976, and fishery allocation measures in the late 1980s and early 1990s that led to the so-called Americanization of the fisheries. Groundfish harvested from Alaskan waters include such economically important species as Alaska pollock, Pacific cod, sablefish, rockfish, and a large variety of flatfishes.

Coinciding with these changes in harvest allocation over the past decade have been changes in the marketplace for groundfish, in terms of tastes and preferences, product forms, the competing environment, other species of fish, and economic conditions in countries of major product demand. Most of the products that are produced from Alaskan groundfish enter into an international market. The raw fish may be processed and reprocessed into different forms and final products.

Despite the tremendous economic role that groundfish play in the seafood sector of the economy of the United States in general and Alaska in particular, there is little public knowledge or understanding of the market for groundfish. What products are produced and who buys them? Who are the competitors in terms of countries providing the same species? What species of groundfish will serve as substitutes for one another, and for what products? What is the role of secondary processing abroad? In the domestic market, what is the role of imports? Do they supplement domestic production, or compete with it?

Without a framework or understanding of the product flows, market structure, and market dynamics, it is difficult – if not impossible – to determine the impacts of factors influencing the demand for groundfish, or decisions affecting the management of the fishery resource.

The two most important groundfish stocks harvested from waters off Alaska in terms of value[2] are Alaska pollock and Pacific cod. Most of these stocks are harvested within the United States' jurisdiction in the Gulf of Alaska, the Bering Sea, and near the Aleutian Islands. A third groundfish of interest, also harvested in the Bering Sea and Aleutians, is Atka mackerel. Under many circumstances, fishery management policies that will affect the prosecution of fisheries for pollock and cod also likely impact Atka mackerel fisheries.

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[1] Draft Programmatic SEIS, p. 3.10-3.

[2] "Value" is defined in terms of "first wholesale price," a useful measure from the National Marine Fisheries Service (NMFS) as "value per unit of the fishery resource following the first level of processing."

1.1.1 Steller Sea Lion

The National Marine Fisheries Service (NMFS) is in the process of preparing an Environmental Impact Statement (EIS) on groundfish, incorporating a Regulatory Impact Review (RIR). A central component of the EIS is the development of protective measures for Steller sea lions and their critical habitat, including "reasonable and prudent alternatives" (RPAs). The western population of Steller sea lion is listed as "endangered" under the federal Endangered Species Act (ESA). Commercial fisheries harvest several fish species, including Alaska (Walleye) pollock, that sea lions rely upon for food, and the relationship of commercial fishing to sea lions is not fully understood.

Determining the economic consequences of actions designed to protect the Steller sea lion requires an understanding of the market for Alaska groundfish. In particular, proposed protective measures will affect the management of fisheries and both the manner and timing in which commercial harvesters catch pollock, Pacific cod, and Atka mackerel. In order to determine and estimate the economic effect on the industry, related communities, and the nation's welfare, it is necessary to understand the relationships among factors affecting the supply and demand for these economically important groundfish.

1.2 Purpose

The purpose of this study is two-fold. First, it is to describe and characterize the markets for Alaska pollock, Pacific cod, and Atka mackerel. The second purpose is to use the market descriptions and models to determine the effects of specific proposed protective measures for the Steller sea lion. These effects are to be measured in terms of consumer welfare in the United States, beyond "first wholesale," in order to satisfy the provisions of the National Environmental Policy Act (NEPA).

1.3 Scope

The scope of the study is limited to markets associated with the groundfish species of Alaska pollock, Pacific cod, and Atka mackerel that are caught in Alaskan waters in the eastern Bering Sea, near the Aleutian Islands, and in the Gulf of Alaska.

1.4 Organization of the Report

This report contains five additional primary sections. Section 2 provides a brief overview of the Alaska fishing industry. This is followed by more detailed discussions of the market structure and products associated with Alaska pollock, Pacific cod, and Atka mackerel. Section 3 contains a discussion of data and data sources, availability, and limitations.

In Section 4, we examine the conditions affecting the world market for groundfish, and those affecting the Alaska fishing industry. This is followed by an analysis of recent and future trends that are expected to affect market conditions for the three species of interest.

In Section 5, we use the trend analysis to examine the impacts of protective measures for the Steller sea lion. Three alternatives and the impacts of the protective measures on the markets for products from the three species of interest are examined.

2.0 REGIONAL AND INDUSTRY CHARACTERISTICS

2.1 Overview of the Alaska Fishing Industry and Markets

Commercial landings by U.S. fishermen were 4.2 million metric tons in 1999 valued at $3.5 billion. Of this amount, finfish accounted for 84 percent of landings, but only 45 percent of value. Alaska led all states with 2.0 million metric tons – 43 percent of the nation's total – and $1.4 billion in value.[3] A sizable share of U.S. landings and processed seafood is exported, playing a significant role in the nation's balance of trade. Some 37 percent (by volume) of U.S. exports are imported by Japan, and products from Alaskan waters lead all other states in exports.

In this section, the products and markets for Alaska pollock, Pacific cod, and Atka mackerel are outlined and discussed. Each subsection provides an overview of supply and landings, product forms, and marketing channels. For Alaska pollock and Pacific cod, the product forms vary and enter into different markets. The role of each product form and its major market areas are identified.

2.2 Alaska Pollock

Alaska pollock (*Theragra chalcogramma*), also known as Walleye pollock, is the most abundant groundfish species in the world. Its range is widely distributed throughout the North Pacific Ocean in temperate and subarctic waters. Though it is found off the coast of Oregon, Washington, Canada, Korea, and Japan, by far the largest volume is harvested in the seas near Alaska and Russia. World harvests of Alaska pollock reached a high in the mid-1980s at some 7 million metric tons (MT) annually, but have since declined to just under 4 million MT in recent years.[4]

Pollock[5] is also the most abundant species within the eastern Bering Sea, second most abundant groundfish in the Gulf of Alaska (GOA), and supports the largest fishery in Alaskan waters. It represents about two-thirds of the state's total ex-vessel value of groundfish. Primary products produced from pollock include surimi, fillets, roe, and, to a lesser extent, meal and mince, and are sold in many different markets worldwide. The processed products compete with production by other nations not only of Alaska pollock but of other species as well. The characteristics of the market for pollock are presented in this section.

2.2.1 Brief History of the Pollock Fishery in Alaska Waters

The development of surimi processing in the 1960s and 1970s is responsible for the start of the fishing effort for pollock. The fishery in the Bering Sea was developed primarily by Japan and to a lesser extent by the former Soviet Union and Korea. The implementation of the 200-mile U.S. Exclusive Economic Zone (EEZ) as a result of the Fishery Conservation and Management Act of 1976 led to the phasing out of fishing by

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[3] NMFS, *Fisheries of the United States, 1999*, Office of Science and Technology, Fisheries Statistics and Economics Division, October 2000.

[4] Sjøholt, Trond, *The World Market for Groundfish*, FAO/GLOBEFISH Research Program, Vol. 57, Rome, FAO, November, 1998, p. 9.

[5] In this report, the term "pollock" is used interchangeably with Alaska pollock, and is distinguished from the two pollocks of the Atlantic, *Pollachius pollachius*, and *P. virens*, also known as saithe.

foreign vessels in favor of joint venture operations, with the pollock fishery focusing on surimi and roe production. Most of the product was sold to markets in Japan. Joint ventures were phased out by American investment in catcher/processor vessels, capable of both catching and processing pollock at sea.

By 1990, an estimated 80 percent of the harvest was caught by catcher/processor vessels.[6] Companies, mostly Japanese owned, began constructing processing plants on shore. Controversy developed over how the annual pollock catch should be distributed between the inshore and offshore processors, and in 1991 the North Pacific Fishery Management Council (Council), the fishery management advisory board, developed a formula for allocating catch. As a result, the distinctions of an "inshore sector" and "offshore sector" became significant, and remain important in the analysis of markets for pollock.

During the 1990s, the increased American investment in the groundfish fishery led to a largely overcapitalized, open-access fishery. Though there was a set allocation among inshore and offshore processors, within each sector, the fishery was managed as an "Olympic" system: an overall quota was set, but no limit was set on the amount of harvest by an individual vessel or company. This led to a "race" for fish, as harvesters and processors increased capacity in an effort to garner their share of the catch. At the same time, the number of catcher vessel, catcher/processors, and motherships steadily declined, from 1,895 in 1992 to 1,343 in 1998.[7] In response, and with the support of most processors, Congress enacted the American Fisheries Act of 1998. Among other things, it effectively eliminated the race for fish by enabling vessels in each sector to form cooperatives, each with their own allocation of fish to be subdivided among member boats. The Act also revised the share of the allocation in favor of inshore processors to the following distribution:[8]

Boats harvesting pollock for inshore plants	50.0%
Boats harvesting pollock for motherships	10.0%
Factory trawlers	36.6%
Catcher boats assisting factory trawlers	3.4%

The catcher/processors formed a cooperative before the start of the 1999 season. Both the inshore processors and offshore motherships were authorized to form, and subsequently established, cooperatives in the winter/spring season of 2000.

2.2.2 Supply and Harvests

U.S. harvests of Alaska pollock have averaged about 1.1 million tons annually in recent years, down from a peak of more than 1.4 million tons in 1993 (see Figure 2.1). Almost all harvests occur in Alaska waters, with the largest share of the catch coming from the Bering Sea.

Alaska pollock is harvested not only in Alaska waters, but also in other parts of the North Pacific Ocean. U.S. harvests account for slightly more than one-third of total worldwide harvests. Russia accounts for more than half of total world harvests, and vessels of other nations fishing in Russian waters also catch significant

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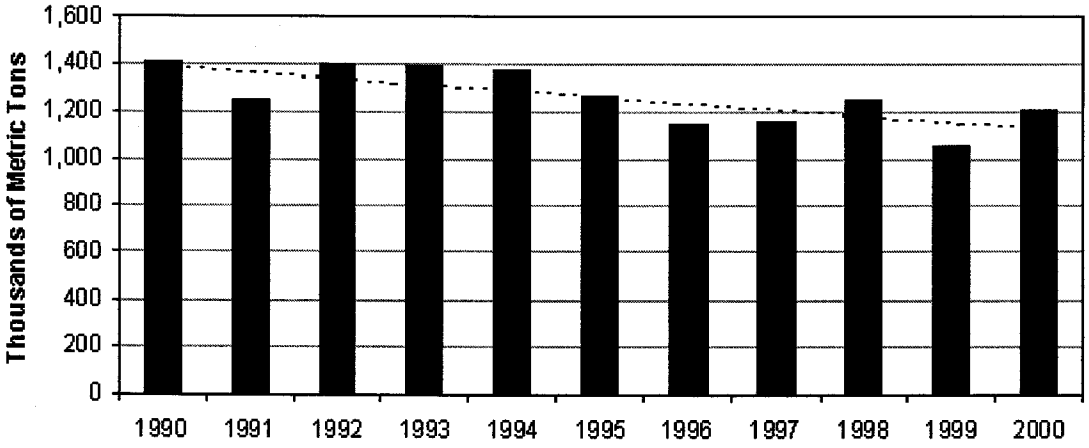
[6] General Accounting Office, "Fishery Management: American Fisheries Act Produces Benefits," GAO/RCED-00-176, June 29, 2000, p. 5.

[7] Draft Programmatic SEIS, p. 3.10-13.

[8] As discussed in Loy, Wesley, "Dividing the Fish," *Pacific Fishing*, November 2000, p. 1.

volumes (see Figure 2.2). The Total Allowable Catch (TAC) in Russia has been over 2.2 million MT in the late 1990s,[9] but has fallen steeply over the past few years to well under 2.0 million MT.[10] These foreign harvests compete directly with U.S. harvests in international markets for Alaska pollock products.

Figure 2.1 U.S. Alaska Pollock Landings



Source: Personal communication, NMFS, Fisheries Statistics and Economics Division, Silver Spring, MD; and (2000 data) NMFS Alaska Region website (http://www.fakr.noaa.gov/).

Harvests of Alaska pollock from Russian waters have declined substantially in recent years. Russian resources are generally believed to have been substantially overfished and fishing pressure too high to maintain a sustainable yield. It is likely that harvests from Russian waters will decline even further before they stabilize; one estimate suggests it may be at least 2005 before stocks recover from overfishing.[11]

Japan is third in harvest volume, lagging far behind the United States and Russia. In recent years, the harvest has been just over 300,000 MT, scarcely eight percent of world harvest.[12] Japan previously caught large quantities of Alaska pollock on both the North American and Asian side of the Pacific. When 200-mile EEZs were introduced in several countries in the 1970s, Japanese access to these waters was severely restricted. Japan responded by engaging in joint-venture arrangements for a time,[13] then later invested in and built processing plants in coastal Alaska communities. Thus, although Japanese harvest is relatively small, Japan plays a considerable role in processing, access to the resources, and (as will be demonstrated below) control of the market.

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[9] Sjøholt, p. 10.

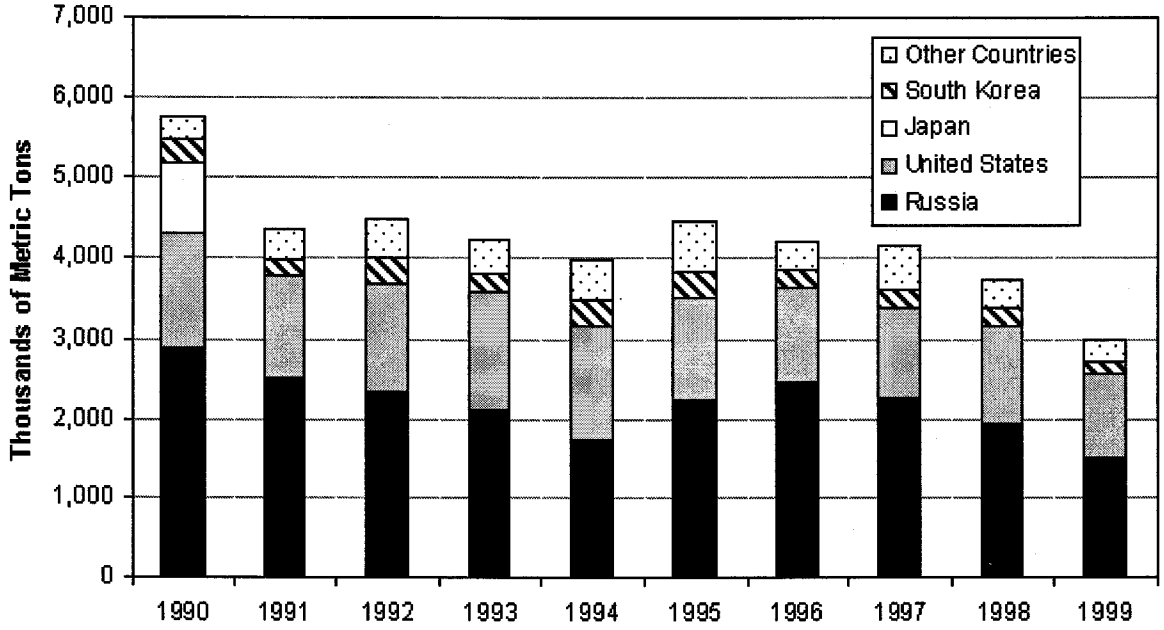
[10] Based on reports of TINRO in *Bill Atkinson's News Report*, March 21, 2001.

[11] Pacific Research Institute of Fisheries and Oceanography, as cited in Sjøholt, p. 11.

[12] FAO, FishStat database, 2000.

[13] Lemieux, Jason, Lewis E. Queirolo, and Richard S. Johnston, "Restricting Trade in Resource Access: Consequences for Foreign Direct Investment in Seafood Processing," unpublished working paper, p. 6.

Figure 2.2 World Harvests of Alaska Pollock



Source: FAO, "FishStat" database.

China, South Korea, and Poland account for most of the remaining world harvest of Alaska pollock. All three countries have intergovernmental agreements with the Russian government to fish in Russian waters, and both China and Poland receive quotas in exchange for not fishing in the international waters of the Sea of Okhotsk, off the coast of Russia.[14]

2.2.3 Product Forms

Alaska pollock are processed into a wide variety of products which are sold in many different markets worldwide, competing with production by other nations that includes not only Alaska pollock, but other species as well. The most valuable of these products are surimi, roe, and fillets.

NMFS estimates of U.S. production of Alaska pollock primary products from Alaska waters are shown in Table 2.1. Primary product is defined as the product form after initial processing following harvest of live fish. This form is consistent with calculations by NMFS of first wholesale price.

During the 1990s, surimi accounted for 51 percent of the total product volume (by weight), and 50 percent of total product first wholesale value. Roe accounted for only 5 percent of total product volume but 22 percent of first wholesale value. Fillet products, both deep-skin and other fillets, accounted for 19 percent of total product volume and 22 percent of first wholesale value. All other products, including minced fish, fish

[14] Sjøholt, p. 12.

meal, H&G (headed and gutted), whole fish, and oil, accounted for 26 percent of product volume but just 7 percent of first wholesale value. Pollock is a fragile fish that deteriorates rather quickly after harvest, so very little is sold fresh.

Table 2.1 Production of Alaska Pollock Products in the Fisheries off Alaska

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Volume (1,000 MT)											
Surimi	177.1	139.8	162.8	150.4	182.0	178.2	160.9	159.9	148.0	153.5	191.0
Roe	12.7	21.7	17.5	11.9	11.8	15.9	14.5	18.7	12.8	11.6	16.3
Fillets	74.9	72.2	42.3	68.0	54.8	59.6	60.2	45.4	66.7	58.5	62.2
Deep-skin fillets					19.5	34.9	36.8	29.3	31.5	36.9	31.6
Other fillets	74.9	72.2	42.3	68.0	35.3	24.7	23.4	16.1	35.2	21.6	30.6
Minced fish	13.6	10.7	14.8	16.4	10.9	9.8	14.2	9.5	17.5	9.8	13.2
Fish meal	57.2	57.3	59.9	54.0	52.1	50.9	46.9	46.4	48.1	50.9	52.2
Other products	9.0	12.3	16.0	17.0	14.7	18.8	17.3	15.6	24.3	28.9	29.2
Total	**344.4**	**314.0**	**313.3**	**317.7**	**326.3**	**333.2**	**314.0**	**295.5**	**317.4**	**313.2**	**364.1**
Value ($ millions)											
Surimi	277.2	452.2	544.7	251.0	369.7	439.8	298.3	363.2	285.1	332.9	
Roe	96.9	213.8	200.9	126.4	134.0	217.5	176.2	167.3	84.4	139.9	
Fillets	171.4	214.6	112.7	130.3	119.2	147.7	153.1	114.0	184.8	190.2	
Deep-skin fillets	0.0	0.0	0.0	0.0	49.0	87.9	100.1	81.2	95.5	129.9	
Other fillets	171.4	214.6	112.7	130.3	70.2	59.8	53.0	32.8	89.3	60.3	
Minced fish	15.8	16.8	16.6	14.3	9.1	8.9	15.2	9.3	20.0	11.0	
Fish meal	31.6	32.2	31.3	27.0	25.5	28.4	28.2	28.1	44.3	32.4	
Other products	5.0	4.6	7.7	4.0	5.2	8.7	9.0	7.8	14.3	14.9	
Total	**597.9**	**934.2**	**913.9**	**553.0**	**662.7**	**851.0**	**680.0**	**689.7**	**632.9**	**721.3**	

Source: NMFS, "Economic Status of the Groundfish Fisheries off Alaska," various reports. Data for 2000 production volume from NMFS Alaska Region, "Pacific Cod and Pollock Products Reports," http://www.fakr.noaa.gov/.

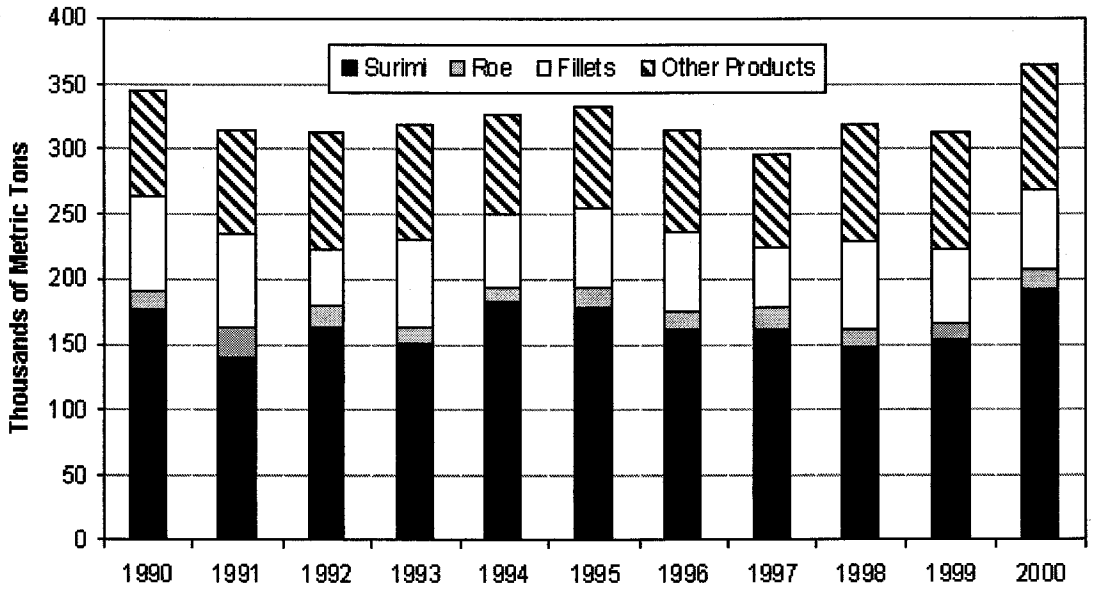
Secondary or "value-added" processing is defined as any processing that takes place after a primary product form. Secondary product forms from pollock include breaded items (such as nuggets, fish sticks, breaded fillets, and fish burgers) from mince and fillets, a wide range of *neriseihin*[15] products from surimi for sale principally in the Japanese market, and analogs from surimi such as imitation crab. Most pollock harvested is exported in primary product form. The product that remains in the domestic market may be reprocessed

[15] Foods made from fish-paste, such as *kamaboko*, a traditional Japanese dish, and fish hams and sausages.

before reaching the retail market. However, little if any secondary processing takes place in Alaska;[16] most takes place at secondary processing plants in the Puget Sound area.[17]

Figures 2.3 and 2.4 show changes over time in total pollock production and value. The volume of production of surimi, roe and fillets has fluctuated from year to year, reflecting differences in total harvest volume, the mix of products produced by processors, and product recovery rates. However, the value of different pollock products has fluctuated much more from year to year than the volume. Changes in value result in part from changes in product volume, but also from changes in average prices.

Figure 2.3 Volume of Production of Pollock Products from Alaska Waters



Source: NMFS, "Economic Status of the Groundfish Fisheries off Alaska," various reports. Data for 2000 production volume from NMFS Alaska Region, "Pacific Cod and Pollock Products Reports," http://www.fakr.noaa.gov/.

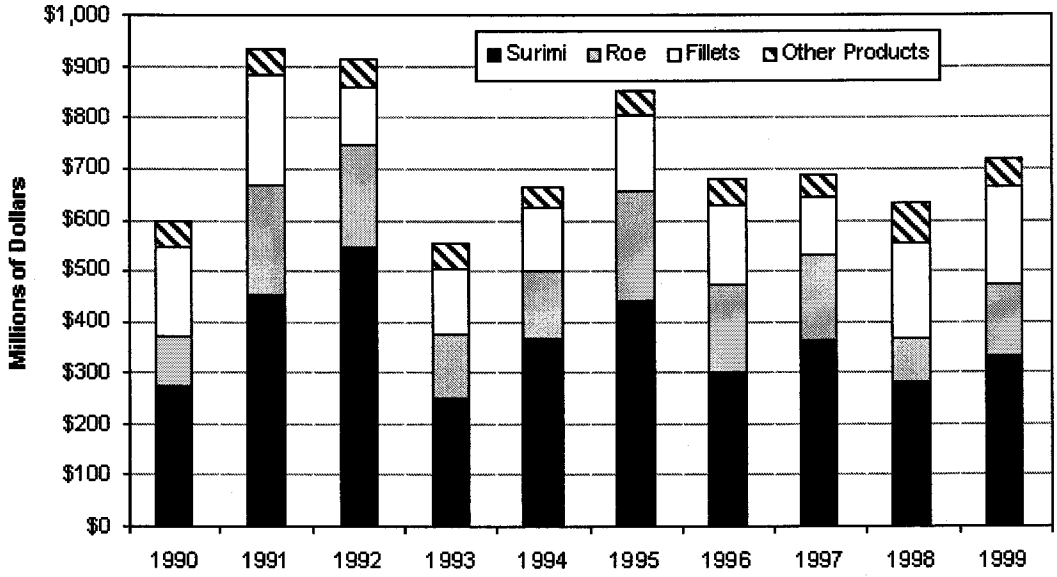
Figure 2.5 shows average first wholesale prices for pollock products for the years 1990 to 1999, calculated by dividing NMFS estimates of total first wholesale value by total product volume. In general, prices were high in 1991 and 1992, dropped sharply in 1993, and peaked again in 1995. Surimi prices fell dramatically between 1995 and 1998, and then rose again sharply in 1999. Fillet prices increased sharply between 1997 and 1999. In 1999, the last year for which NMFS estimates of the first wholesale value of Alaska pollock production are currently available, average prices for Alaska pollock products were generally high, and prices

[16] Alaska Seafood International, an Anchorage secondary processing firm, preparing a variety of retail-ready products, suspended operations in August, 2000. However, a controlling share of the firm was purchased in May, 2001 by a New York investment firm, and the company planned to resume operations in summer, 2001. (http://www.alaska-seafood.com/news.htm).

[17] Draft Programmatic SEIS, p. 3.10-115.

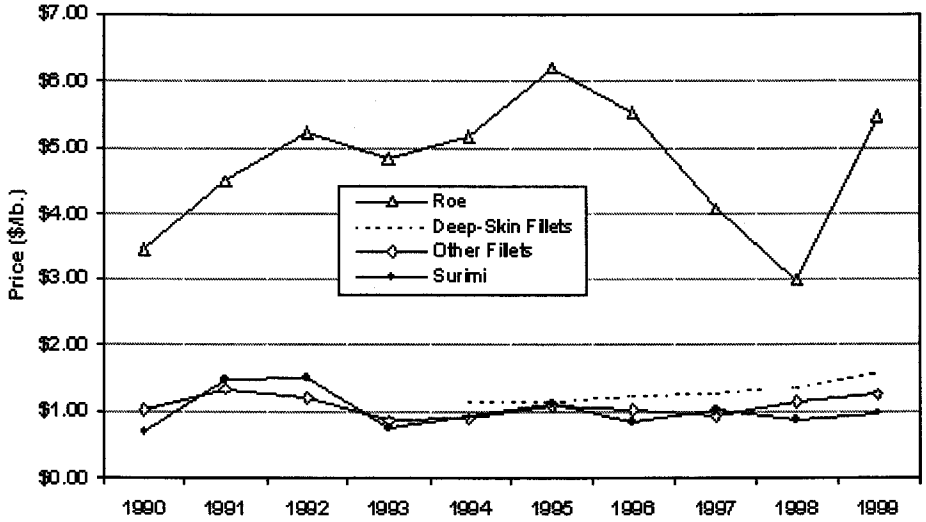
were particularly good for fillet products. However, as discussed in subsequent sections, other data sources and discussions with industry indicate that prices for fillets and surimi have fallen significantly since 1998.

Figure 2.4 Value of Production of Pollock Products from Alaska Waters



Source: NMFS, "Economic Status of the Groundfish Fisheries off Alaska," various reports.

Figure 2.5 Average Prices of Pollock Products from Alaska Waters



Source: NMFS, "Economic Status of the Groundfish Fisheries off Alaska," various reports.

2.2.4 Resource and Product Flows

This section provides an overview of the market flow of Alaska pollock, from harvest through processing to final consumer. The focus is on primary product forms and market channels, and is intended to provide context for product forms, countries of market demand, competitors, and final consumers. Figure 2.6 provides a visual representation of the resource and product flows for Alaska pollock.

Pollock are targeted with trawl gear by catcher vessels delivering to inshore processors, catcher vessels delivering to motherships in the Bering Sea, and catcher/processors in the open sea. Each sector (inshore and offshore), in aggregate, produces surimi, fillets, and roe, though in varying degrees of emphasis by plant or catcher/processor vessel.[18] Other product forms (minced, H&G, whole, etc.) are also produced by each sector.

Russian harvests of pollock are processed into fillets, blocks, and surimi for sale in many of the same markets targeted by the United States. A significant share of Russian catch is exported in frozen form to China, where it is thawed, reprocessed into fillets, refrozen, and sold as "twice-frozen" or "double-frozen" fillets.

Surimi products from inshore and offshore processors are sent to export markets, where nearly all of it goes to either Japan (primarily) or South Korea. Surimi is then reprocessed in these countries into a variety of traditional fish-paste products. A very small amount of surimi is re-exported to the United States to serve an ethnic Asian market seeking "authentic" *neriseihin.* Surimi retained in the domestic market is often used to make artificial crab and similar products.

There are two primary forms of fillet products. The first is deep-skin, in which the skin and layer of fat are removed during the filleting process. The fillets are then frozen into block form and sold almost exclusively to several major fast food chains, often under contract. The second form is regular-skinned fillet, sold as individually quick frozen (IQF), shatterpack, or layer pack. A substantial portion of this form is sold to domestic casual ("fish and chips") restaurants and institutions, or is further processed by breading and refreezing for the retail market as fish sticks, fish fillets, or other products.

The United States does not supply all the fillets demanded by domestic consumers. The balance is made up from imports of Alaska pollock blocks primarily from China and Russia. The "twice-frozen" blocks from China are generally lower in quality, but are often substituted for single-frozen blocks when the relative price of blocks is competitive.

Roe is harvested as an ancillary product during the winter spawning season. The highly prized roe is frozen or salted, and the product commands premium prices in the export market to Japan. After the roe is stripped from the pollock, the fish is further processed into surimi or fillets.

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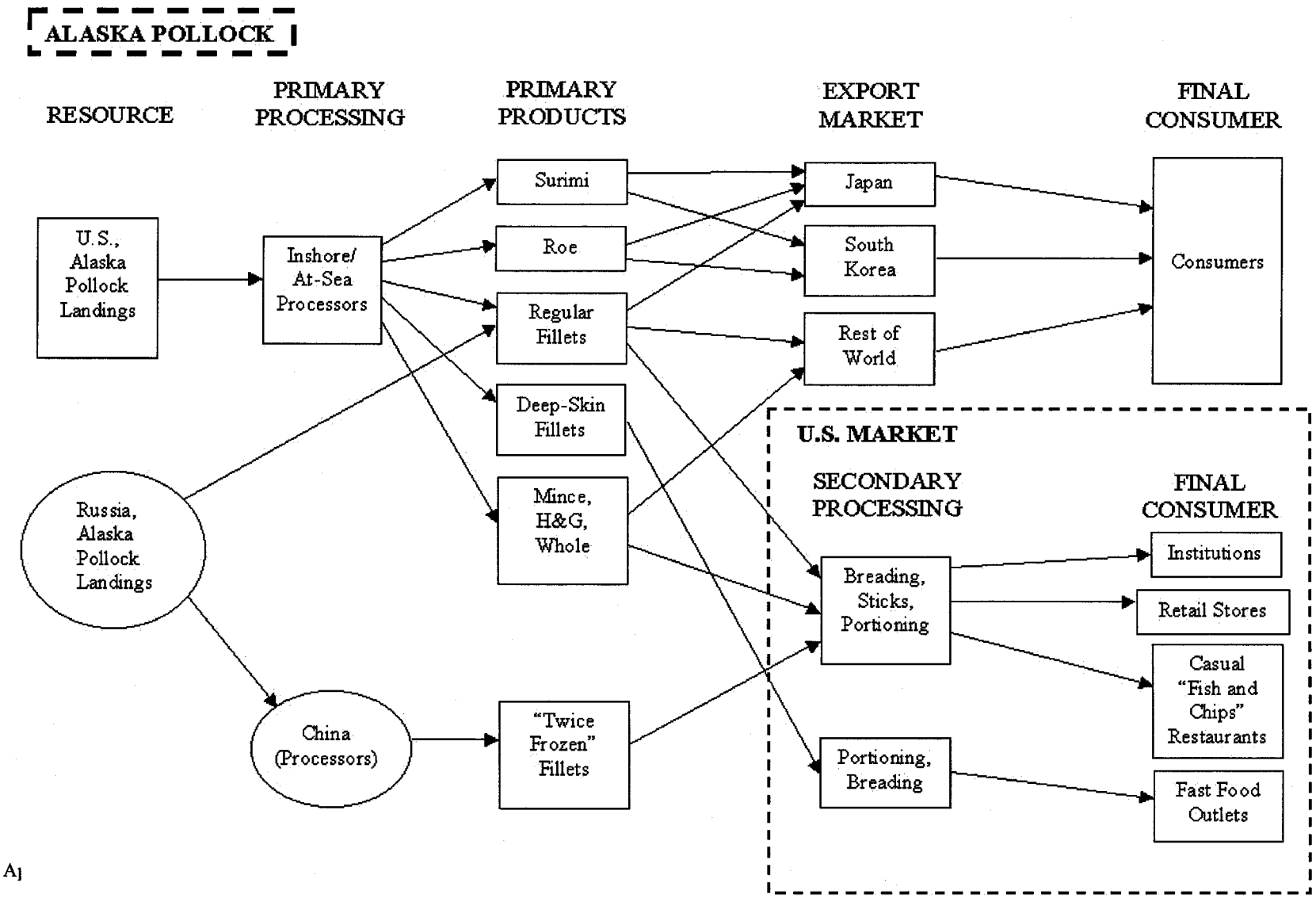
[18] Details on the processing forms by inshore processor, catcher/processor, and mothership may be found in the Draft Programmatic SEIS, Section 3.10.

Figure 2.6 Product Flow and Market Channels for Alaska Pollock



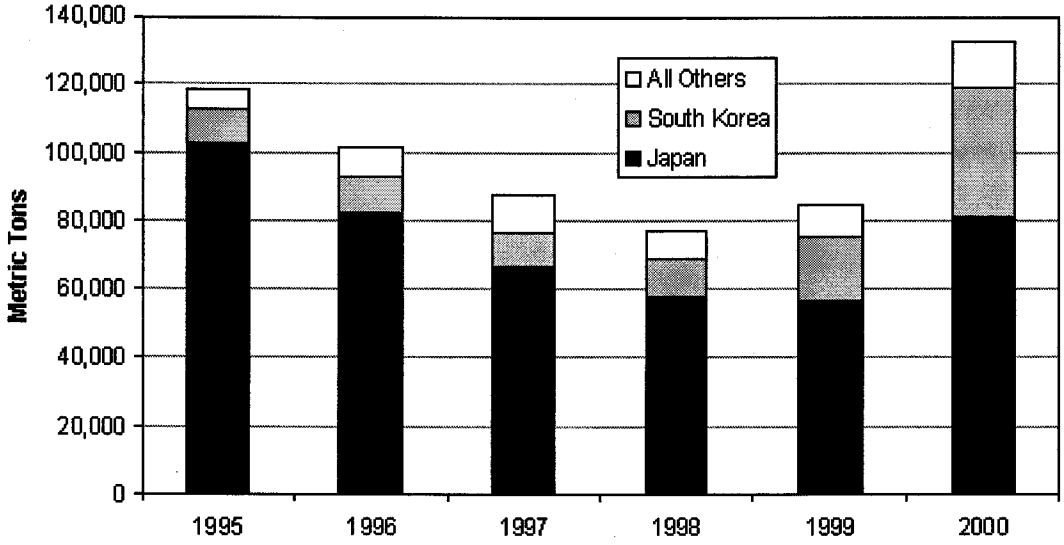
A1

2.2.5 Surimi

Fish surimi is a unique seafood product, involving a highly technical production process and graded on objectively measured quality characteristics. Surimi grades are based on attributes such as color, texture, water content, gel strength, and impurities. Although a common grading schedule has not been adopted, many processors follow grade standards and a ranking system developed by the National Surimi Association in Japan.[19] There are hundreds of surimi-based foods (*neriseihin*) commonly grouped into broad categories: *kamaboko* (steamed), *chikuwa* (broiled), *satsumaage* (fried), fish ham and sausages, and seafood analogs. Each product requires certain characteristics of the surimi base. Pollock surimi tend to have highly desired characteristics of interest to *neriseihin* producers in Japan.

Virtually all pollock surimi harvested in Alaska waters and processed inshore or at-sea are exported. As shown in Figure 2.7, most of these exports are to Japan, although there is a small but growing amount exported to South Korea.[20] The balance of exports reach select ethnic markets in primarily European countries. Pollock surimi exports declined from 1995 to 1998, but have since rebounded; exports in 2000 were higher than the previous five years.

Figure 2.7 U.S. Exports of Alaska Pollock Surimi



Source: Personal communication, NMFS, Fisheries Statistics and Economics Division, Silver Spring, MD.

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[19] Larkin, Sherry L. and Gilbert Sylvia, "Firm-Level Hedonic Analysis of U.S. Produced Surimi: Implications for Processors and Resource Managers," *Marine Resource Economics*, Vol. 14, p. 180; and Park, J. and M. Morrissey, "The Need for Developing Uniform Surimi Standards," in *Quality Control & Quality Assurance for Seafood*, G. Sylvia, A.L. Shriver, and M. Morrissey, eds., pp. 64-71, Oregon Sea Grant, Corvallis, OR.

[20] It is not certain the degree to which South Korea processes surimi imported from the United States for domestic consumption or for re-export to Japan.

Alaska pollock is not the only form of surimi exported to Japan (see Figure 2.8). Most of the remainder is made from Pacific whiting, harvested off the coast of Oregon and Washington. However, it is generally acknowledged that the surimi made from Pacific whiting is of lower quality and serves a different niche market.[21]

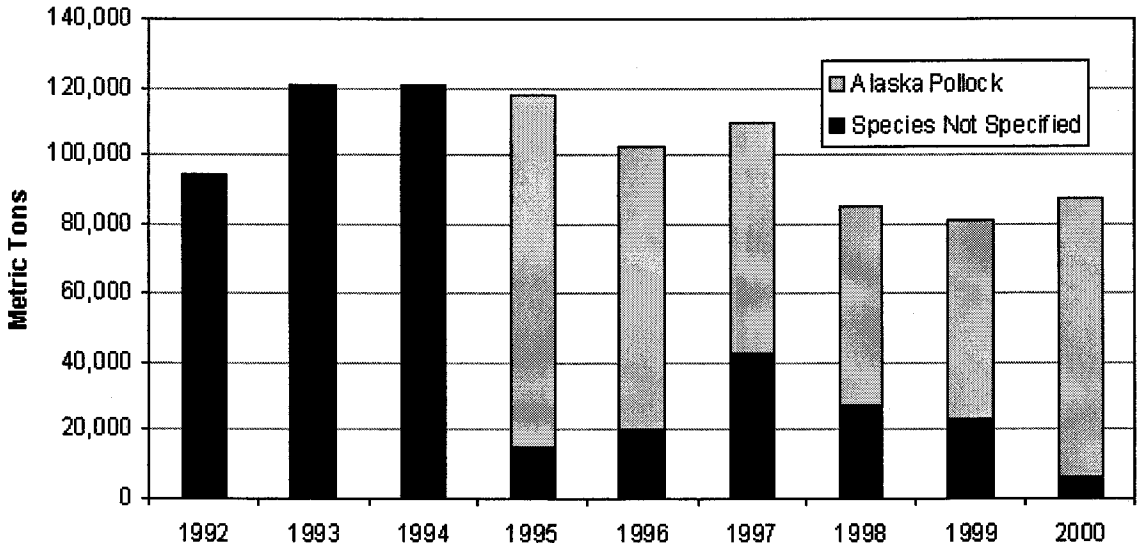


Figure 2.8 U.S. Exports of Surimi to Japan

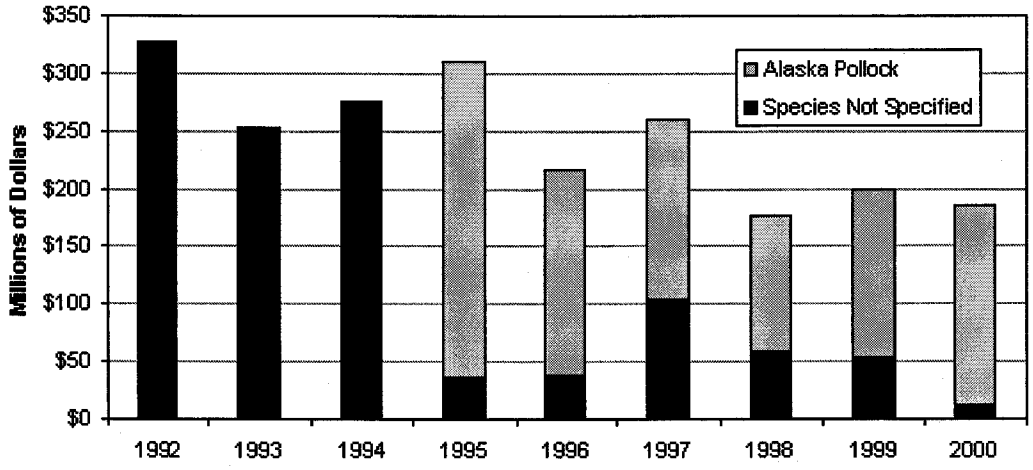
Source: Personal communication, NMFS, Fisheries Statistics and Economics Division, Silver Spring, MD.

The value of surimi exported to Japan for the years 1992 through 2000 is shown in Figure 2.9. The value declined annually, as did exports, during much of the 1990s, but export value (and quantity) of the Alaska pollock surimi portion was higher in 2000 than in the previous three years, at $174 million. U.S. exports of all surimi to Japan has generally been declining, which seems to mirror the Japanese imports of surimi from all sources (see Figure 2.10). A more complete treatment of recent and future trends for surimi is presented in Section 4 of this report.

Figure 2.11 presents a long term trend of surimi and "marine processed goods." Interest in fish paste products peaked in the 1970s, but has steadily declined since the mid-1980s. The steady decline in pollock surimi imports to Japan, beginning in 1996 corresponds with a change in Japanese inventory patterns, as shown in Figure 2.12. Holdings of pollock surimi ranged from 70,000 MT to over 100,000 MT prior to 1996, and ranged from 40,000 to 60,000 MT since then.

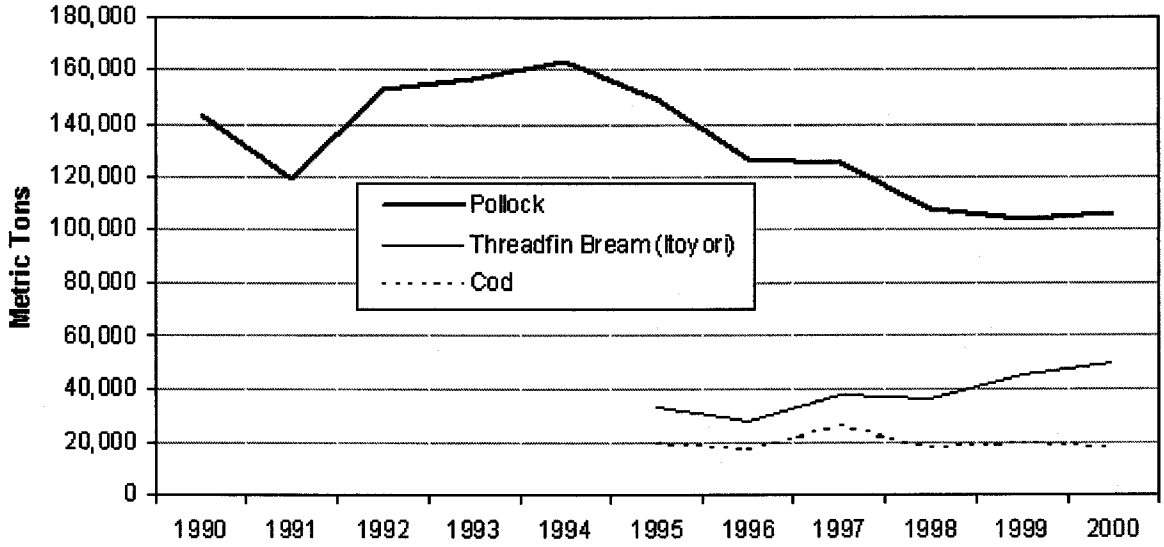
[21] See, for example, Sylvia, Gilbert, "Global Markets and Products of Hake," in *Hake: Biology, Fisheries, and Markets*, Alheit, J. and T.J. Pitcher, eds., Chapman and Hall, London, 1995, and Larkin and Sylvia, 2000.

Figure 2.9 Value of U.S. Surimi Exports to Japan



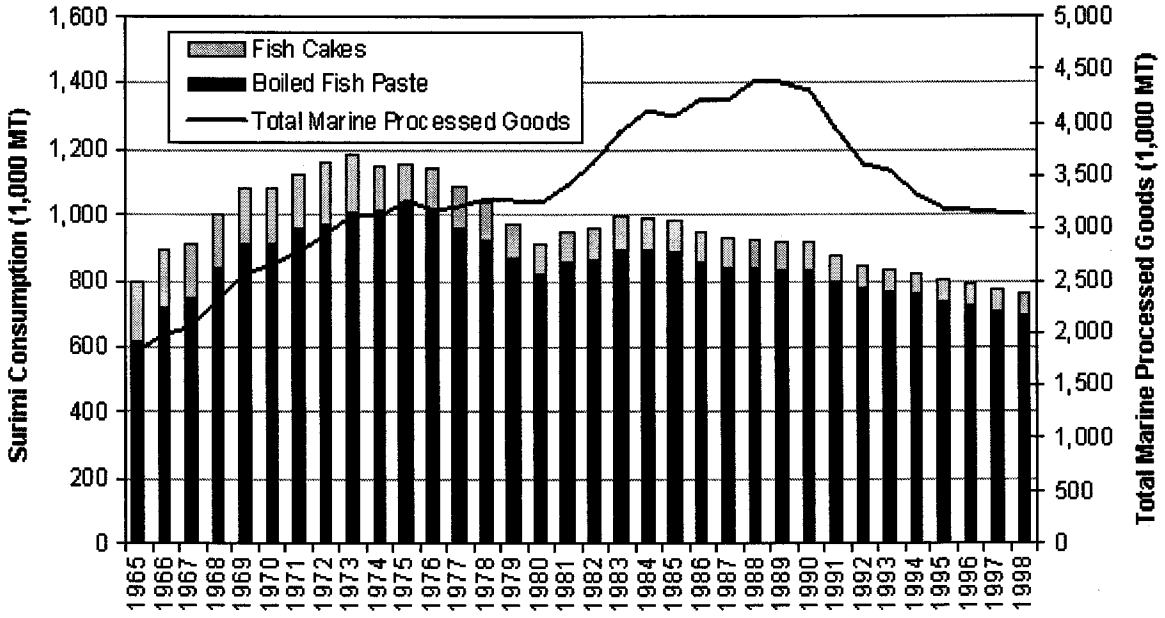
Source: Personal communication, NMFS, Fisheries Statistics and Economics Division, Silver Spring, MD.

Figure 2.10 Japanese Imports of Surimi – All Forms



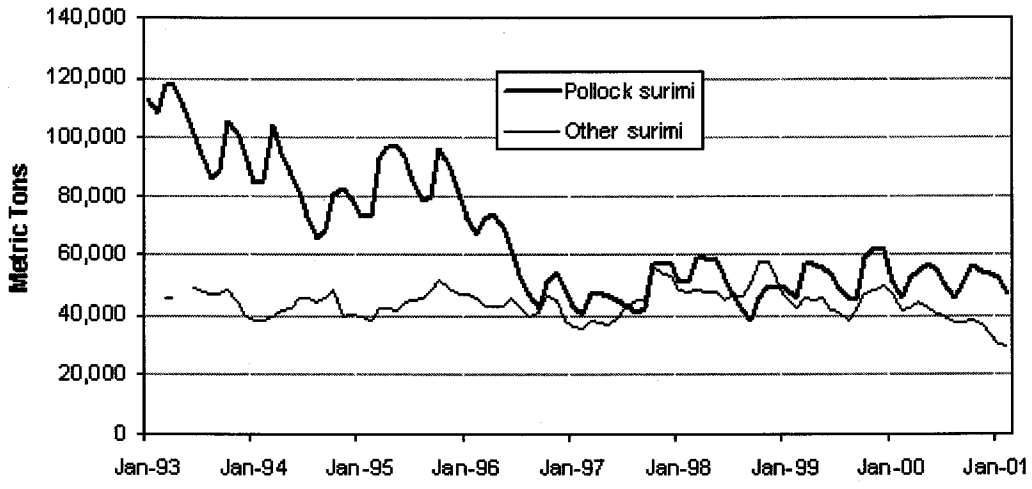
Source: *Bill Atkinson's News Report,* annual import summaries.

Figure 2.11 Japanese Historic Consumption of Marine Processed Goods, Including Surimi



Source: *(Japan) Seafood Daily News*, "Power Seafood Data Book," 2001.

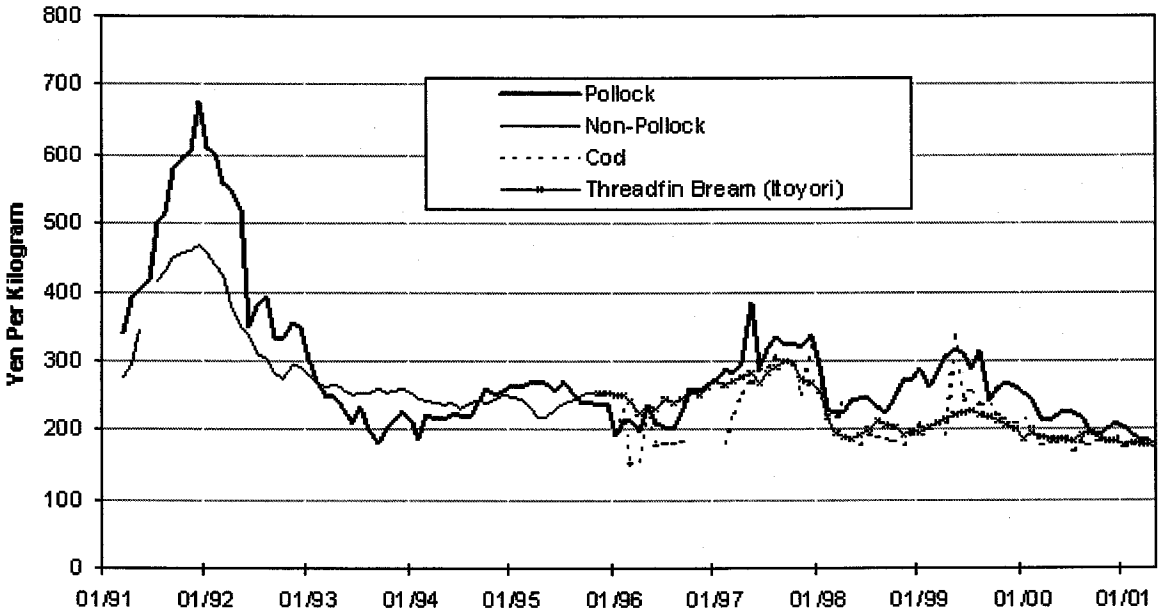
Figure 2.12 Japanese Surimi Inventories



Source: *Bill Atkinson's News Report,* monthly import tables.

Surimi can be made from a number of different species of fish that exhibit the proper characteristics. Japan imports surimi made from Alaska pollock, hake (Pacific whiting), hoki (from Argentina and Chile),[22] and *itoyori* or threadfin bream (from Indonesia). Among these products, only *itoyori* has shown a steady increase in imports. But while pollock surimi still dominates the imports species, it is unclear whether is it being replaced by other species. No one contacted during this study believed that the characteristics and quality found in pollock surimi were matched by surimi from any other species; that is, pollock surimi serves a unique – and superior – quality niche. However, an interesting picture emerges when comparing average prices in Japan for surimi from different sources. Figure 2.13 presents such a comparison (based on information presented in a major trade publication). The findings suggest a remarkably close relationship among prices. It remains to be determined whether buyers or secondary processors in Japan actually perceive attribute differences, or whether pollock merely dominates the market volume and the products may be substitutes at the margins.

Figure 2.13 Average Monthly Price of Japanese Surimi Imports (yen/kilo)



Source: *Bill Atkinson's News Report,* monthly import tables.

2.2.6 Roe

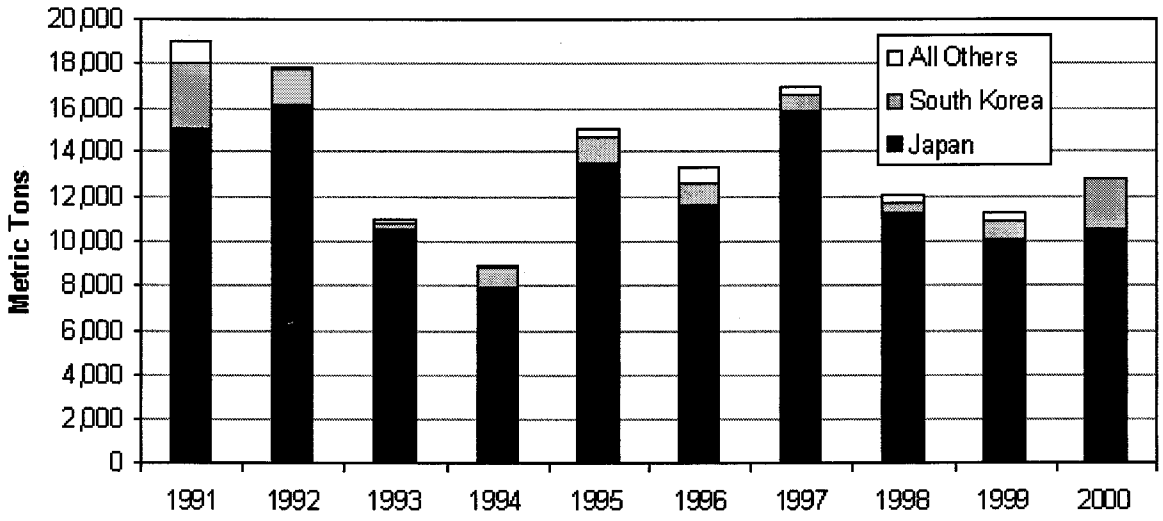
Roe, or fish eggs, from Alaska pollock are a prized seafood commodity in Japan. Traditionally, Japanese consumers buy roe during the Christmas season. Pollock roe are frozen and later prepared in brine (as *tarako*), and often used in rice ball sushi and mixed with side dishes, or seasoned and spiced (as *karashi*

[22] "Hoki" is the common name for *Macrunronus novaezelandie*, also known as blue grenadier or New Zealand whiptail. Hoki is found only in the waters off New Zealand and Australia. Yet, the literature, including the FAO "Globefish" periodical and Japan's Ministry of Agriculture, Forestry, and Fisheries (MAFF) publications, refer to Hoki from Argentina and/or Chile. It is not clear whether the referenced species is Patagonian grenadier or one of several species of hake.

mentaiko) with a salty hot pepper flavor.[23] A very small amount of pollock roe is salted for processing. Alaska pollock roe are harvested during spawning, which coincides with the "A" Season. Pollock are caught ideally at the time when the eggs are at their fullest size and just prior to dispersal by the females. Roe are graded and priced according to size.

Nearly all Alaska pollock roe is exported, and virtually the entire amount is destined for Japan or South Korea (see Figure 2.14). The total annual value of exports to Japan (Figure 2.15) varied considerably during the last decade, ranging from a low of $77 million in 1998 to a high of $164 million in 1992.[24] The Japanese export value per unit (shown in Figure 2.16) also showed that the average annual price fluctuated from $6.89 to $11.98 per kilogram during the last decade.

Figure 2.14 U.S. Exports of Alaska Pollock Roe

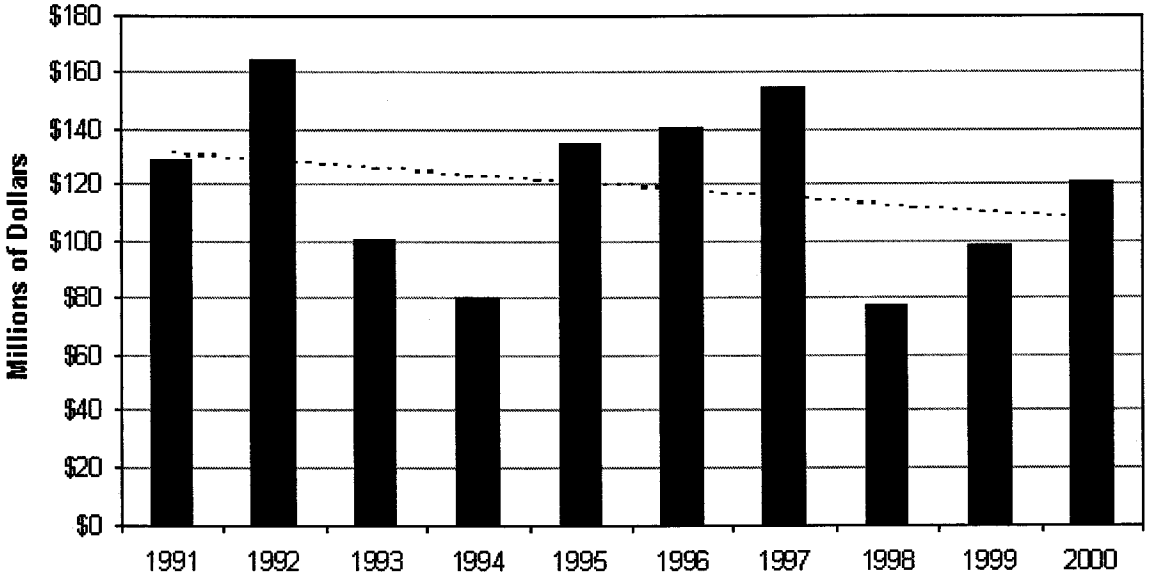


Source: Personal communication, NMFS, Fisheries Statistics and Economics Division, Silver Spring, MD.

[23] U.S. Department of Agriculture, Foreign Agricultural Service, *Japan Seafood Japanese Fish Roe Report (Salmon and Cod/Pollock) 1999*, December 17, 1999.

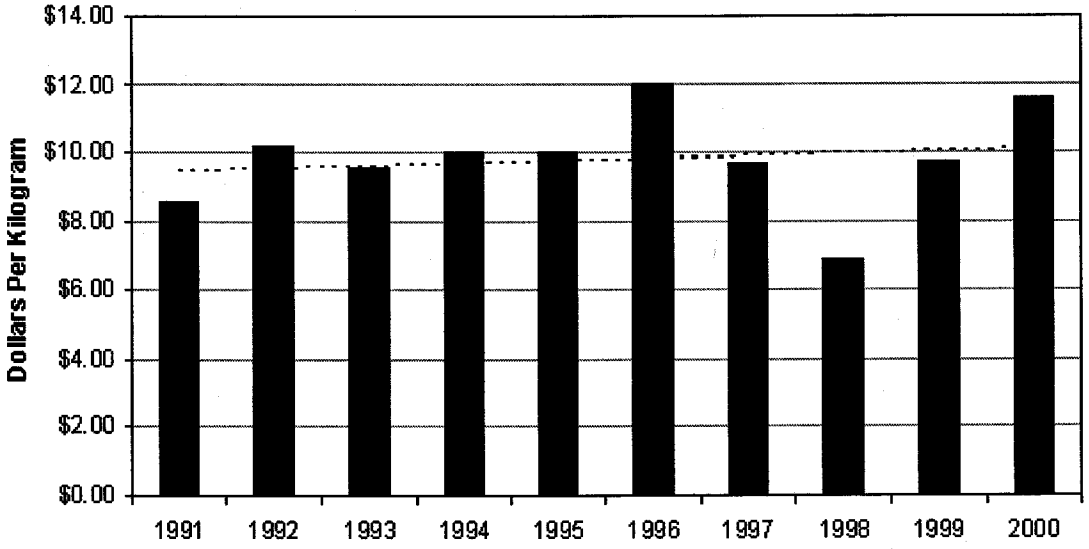
[24] The 2001 roe season appears to have surpassed all years in the last decade, with total annual value exceeding $195 million, according to NMFS.

Figure 2.15 Value of U.S. Exports of Alaska Pollock Roe to Japan



Source: Personal communication, NMFS, Fisheries Statistics and Economics Division, Silver Spring, MD.

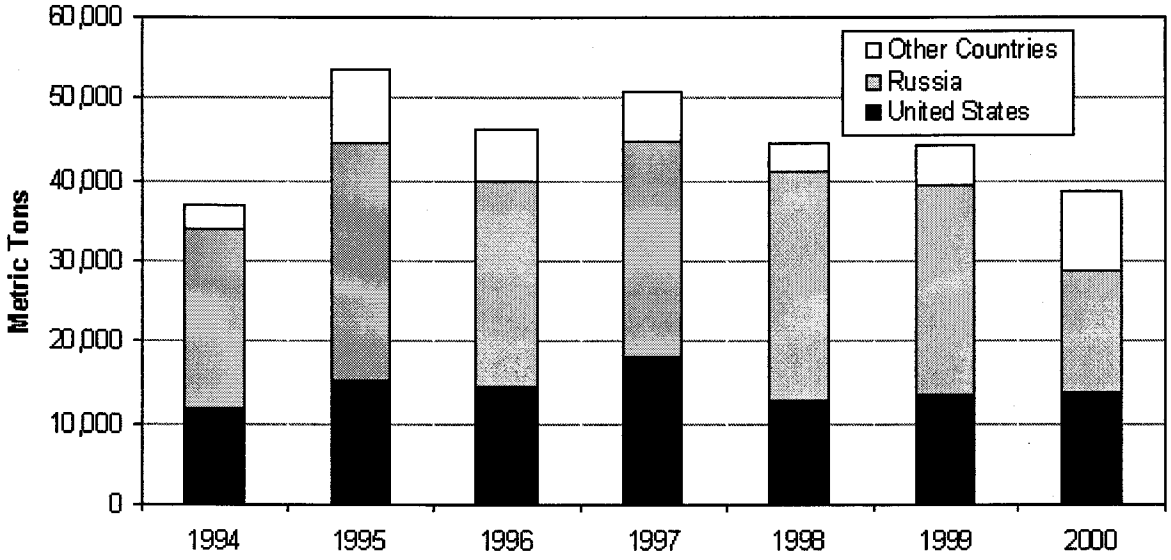
Figure 2.16 Price per Kilogram of U.S. Exports of Frozen Alaska Pollock Roe to Japan



Source: Personal communication, NMFS, Fisheries Statistics and Economics Division, Silver Spring, MD.

Japan imports pollock roe primarily from Russia and the United States (see Figure 2.17). In recent years, overall imports of pollock roe have been on a downward trend. This is due primarily to supply limitations on catch in both countries, rather than directly a result of declining demand in Japan. This is demonstrated by comparing the relative market shares of the United States to Russia for 1998 through 2000. Coinciding with the general decline in Russian harvest of Alaska pollock are gains by Alaskan suppliers of market share in amounts that do not quite make up the difference in supply. These correspond with higher prices received.

Figure 2.17 Estimated Japanese Roe Imports, by Country of Origin



Source: Japanese press estimates, as reported in *Bill Atkinson's News Report*, July 12, 2000.

Roe provides those involved in the pollock fishery their greatest opportunity for profit. Although information is not available as to the cost of producing each primary product form, it is clear by inspection of the wholesale revenues (price per unit of fish, as shown previously in Figure 2.5) that the margins provided by revenues from roe are superior to those of the other product forms. Many of those in the industry contacted for this study stated bluntly that, were it not for roe, they could not afford to be in the fishery.

2.2.7 Fillets

After surimi, the most common product form produced from pollock is the fillet. Fillets are prepared in a variety of forms that are targeted to, and for the convenience of, different end users. Fillets are used in a wide range of products. Pollock is the dominant species of whitefish used by quick service ("fast food") restaurant chains, including McDonald's, Long John Silver's, and Burger King, among others. Pollock fillets are also common in other casual "fish and chips" style restaurants, and the primary species for the breaded and frozen fillet retail product.

The two primary filleting types affecting primary processing are regular and "deep-skin." The latter form reflects a deeper cut of the skin to remove the layer of fat. It reflects a higher grade (and price) of fish because of the requirements for larger sized fish, lower retained portion (more waste), and lower fat content.

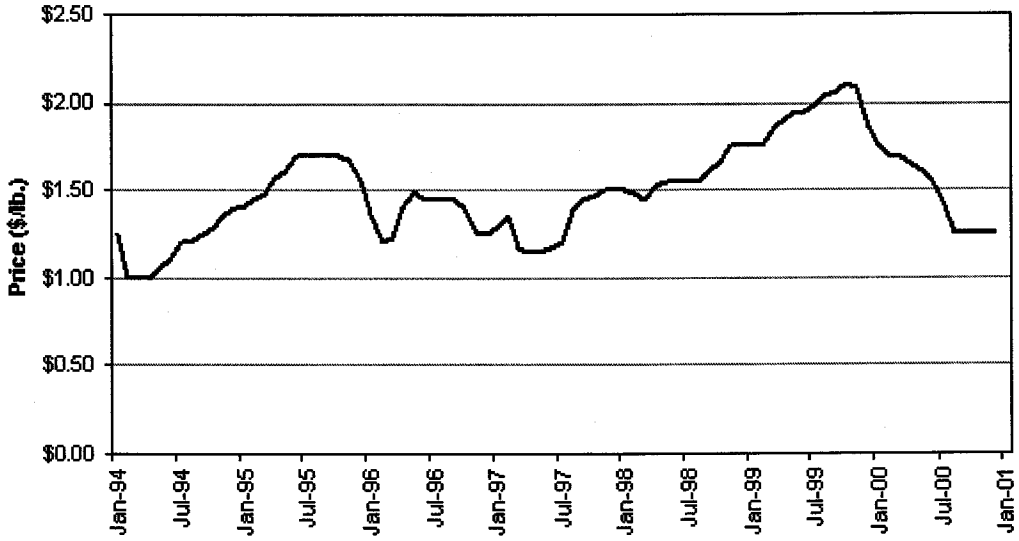
Regular fillets are graded under 2 ounce, 2-4 ounce, 4-6 ounce, and 6-8 ounce forms, and are frozen and packed as IQF (individually quick frozen), shatterpack (layered frozen fillets that separate individually when struck upon a hard surface), and blocks (fish placed in a form and frozen in a plate freezer). Blocks are sold and reprocessed into breaded products. Deep-skin block is the dominant form used in the fast food industry, and most are produced under contract.

The primary market for U.S. produced Alaska pollock fillets is the U.S. domestic market. Figures 2.18 and 2.19 show trends in U.S. wholesale prices for frozen pollock fillets and fillet blocks. Wholesale prices for U.S. produced single-frozen fillets and fillet blocks peaked in 1999 and have since fallen dramatically. In contrast, prices of imported double-frozen fillets and fillet blocks have been much lower and more stable. Since 1999, prices of U.S. products have fallen to close to the levels of imported products.

Contributing to the sharp decline in prices for U.S. product has been a dramatic increase in U.S. imports of pollock, which are primarily frozen fillets and frozen fillet blocks. As shown in Figure 2.20, total calendar-year imports of Alaska pollock increased by 25 percent from 80 thousand tons in 1997 to 100 thousand tons in 1999. Data for December 2000 imports are not yet available. However, as shown in Figure 2.20, imports for January-November 2000 were almost as high as the record levels of 1999.

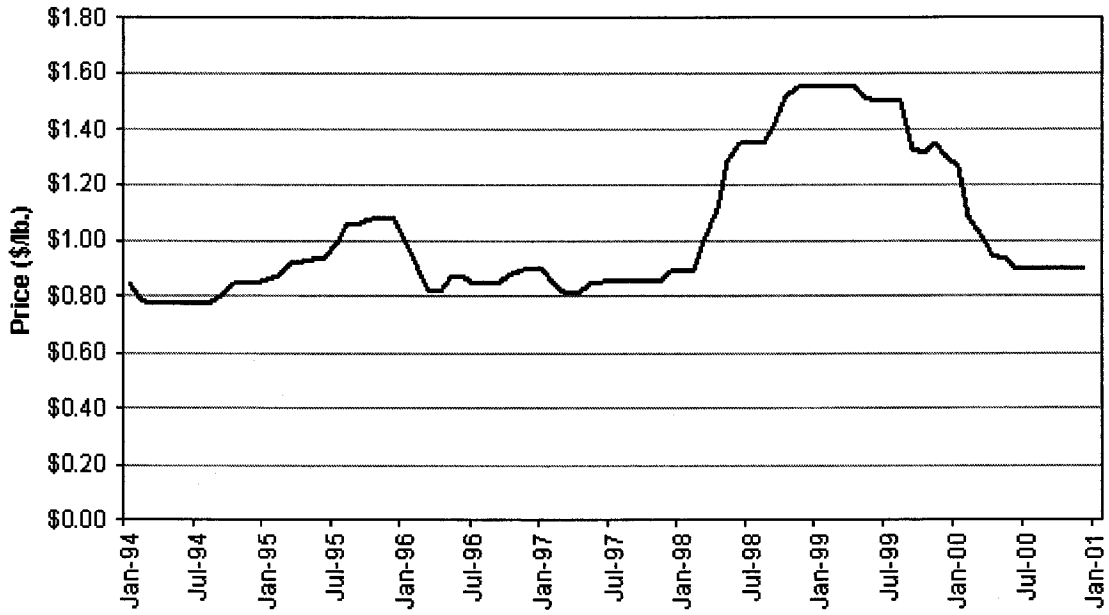
China is the biggest supplier of U.S. imports of pollock, followed by Russia (Figure 2.21). Most of the imports from China are of Alaska pollock harvested in Russian waters by both Russian and foreign fleets. This product is frozen at sea and shipped to China, where it is thawed, processed into fillets, and refrozen for export to primarily U.S. and European markets. Because of low labor costs, this double-frozen product is able to compete successfully in world markets with single-frozen U.S. product. Figure 2.22 demonstrates this fact through a comparison of average annual import prices of pollock fillets and blocks from Russia and China.

Figure 2.18 U.S. Wholesale Prices for Alaska Pollock Fillets



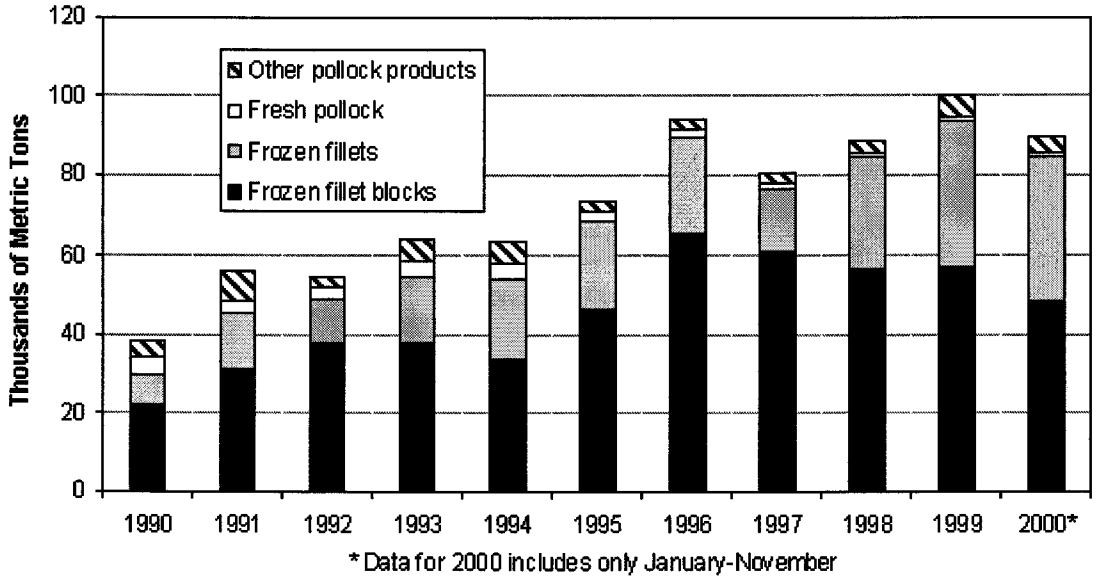
Source: Urner-Barry, *Seafood Price Current*, 2001.

Figure 2.19 U.S. Wholesale Prices for Alaska Pollock Blocks



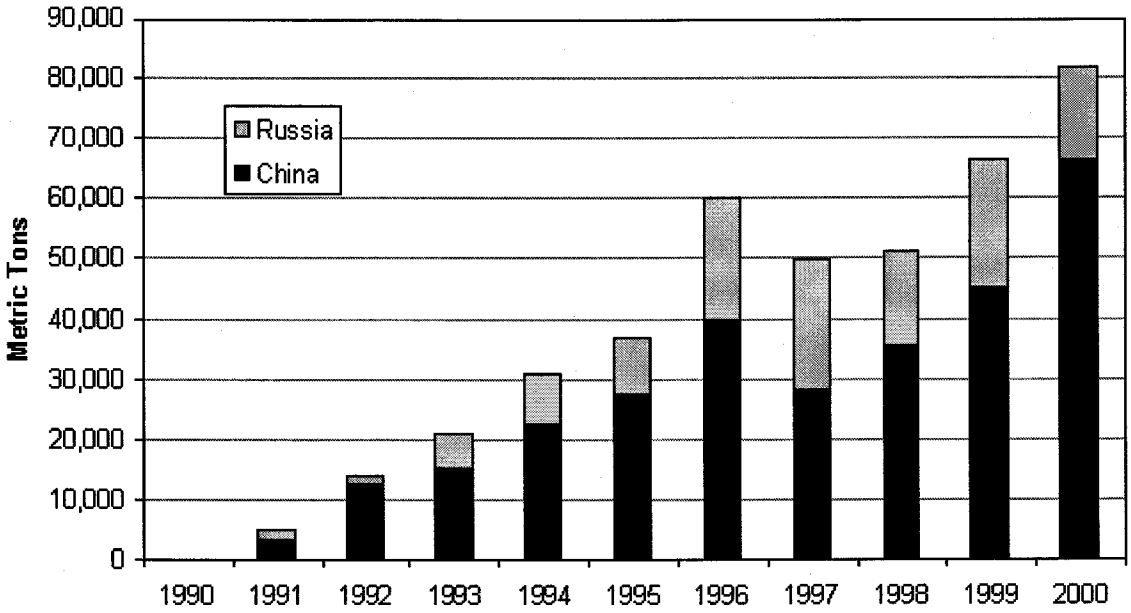
Source: Urner-Barry, *Seafood Price Current*, 2001.

Figure 2.20 U.S. Imports of Pollock Products



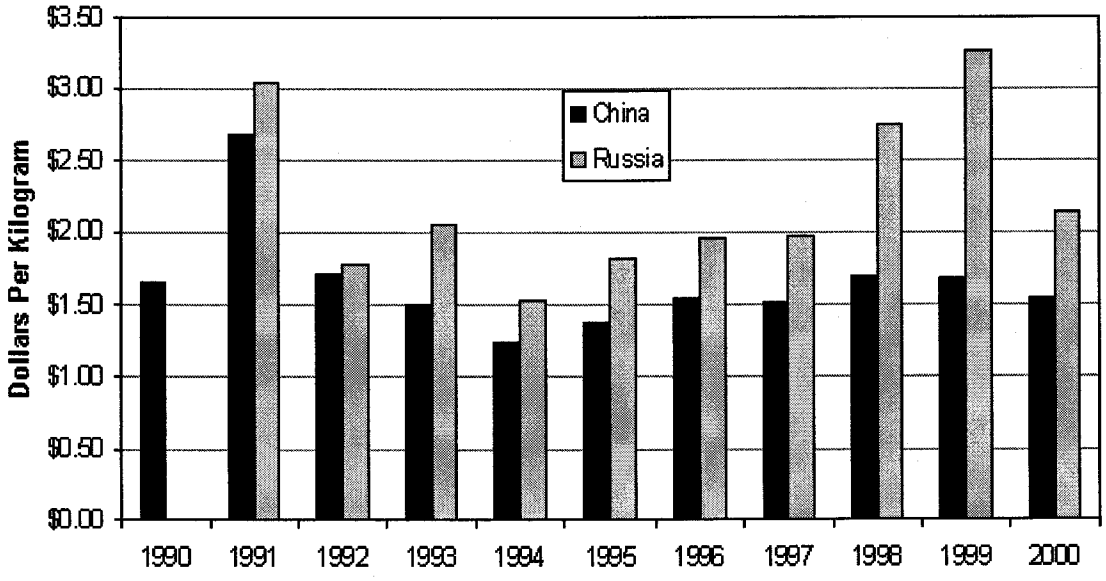
Source: Personal communication, NMFS, Fisheries Statistics and Economics Division, Silver Spring, MD.

Figure 2.21 U.S. Imports of Frozen Fillets and Blocks from Russia and China



Source: Personal communication, NMFS, Fisheries Statistics and Economics Division, Silver Spring, MD.

Figure 2.22 Price /Kilo of U.S. Imports of Alaska Pollock Fillets and Blocks from Russia and China



Source: Personal communication, NMFS, Fisheries Statistics and Economics Division, Silver Spring, MD.

Alaska pollock is a member of the cod family, and pollock fillets compete with those of other cod-like species of fish in the world market. As recent as the late 1980s, the quick service and national seafood restaurant chains used Atlantic cod in their primary products. McDonald's was at the time the world's largest buyer of cod products.[25] When Atlantic cod harvests in Canada and the United States declined significantly in the early 1990s, many chains and smaller restaurants changed to other species. McDonald's and Long John Silver's moved to the more consistently available Alaska pollock as its main source of fillets.

2.3 Pacific Cod

Pacific cod (*Gadus macrocephalus*) is one of the two cod species of commercial importance in the world, the other being the far more abundant Atlantic cod (*Gadus morhua*). The geographic range of Pacific cod is the rim of the North Pacific Ocean, from the Yellow Sea off Korea, through the Bering Strait, along the Aleutians and the Gulf of Alaska, Southeast Alaska, Canada, to Oregon, although some are found as far south as Southern California. The Bering Sea is the center of abundance,[26] and the location of the largest quantity of catch. World harvests of Pacific cod have reached some 500,000 MT in the early 1990s, although it has ranged mostly around 400,000 MT during the past decade. The US leads all countries in harvest of Pacific cod.

Pacific cod is the second largest groundfish fishery in Alaska waters, following Alaska pollock. In the last several years, Pacific cod represented 13 to 15 percent of Alaska groundfish catch by volume, with an ex-vessel value in 1999 of $306.9 million.[27] The primary product forms include headed and gutted (H&G), fillets, and salted cod, but H&G is the most common processed product. Cod enters an international market, but much of it remains in the United States as IQF, or breaded and portioned, for use in restaurants and food service. The characteristics of the market are presented in this section.

2.3.1 Brief History of the Pacific Cod Fishery in Alaska Waters

Pacific cod has been sought commercially for a relatively short period of time compared to other fisheries. In the early 1960s, Japanese longline and trawl operations began fishing for Pacific cod, and in the early 1970s, vessels from the USSR joined the fleet. Foreign fisheries were replaced by joint ventures in the 1980s, and the joint ventures were phased out by 1988. World harvests of Pacific cod were generally less than 200,000 MT as recent as the early 1980s, but rose sharply to more than 400,000 MT a few years later, remaining near those levels today. The increased harvest coincided with the precipitous decline in world Atlantic cod harvests in the late 1980s, followed by the collapse of the Canadian Atlantic cod fishery in the early 1990s. Although Atlantic and Pacific cod are distinct species with some perceived differences, the shortage of Atlantic cod stocks allowed Pacific cod to make inroads into the market, as discussed below.

The fishery for Pacific cod is conducted with pot, bottom trawl, longline, and jig gear. In an attempt to avoid and reduce conflict among the gear groups, the Council implemented an allocation of the Bering Sea and

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[25] Geirsson, Magni, and Torbjorn Trondsen, "Frozen Cod Products in the U.S. Market," in *Econometric Modelling of the World Trade in Groundfish*, W.E. Shrank and N. Ray, eds., North Atlantic Treaty Organization, Scientific Affairs Division and Kluwer Academic Publishers, Boston, 1989.

[26] Draft Programmatic SEIS, p. 3.3-10.

[27] Hiatt, Terry, and Joe Terry, November 10, 2000, Table 36, p. 74.

Aleutian Island harvests between jig, fixed-gear, and trawl fisheries in the early 1990s. The amendment was reauthorized in 1996 with changes in the allocation and a further split between trawl catcher vessels and trawl catcher/processors. The fixed-gear allocation was further subdivided in 1999 between longline catcher/processors, longline catcher vessels, and pot gear vessels.[28] Coincident with the allocation measures and a 1995 Council Groundfish License Limitation Program, which reduced the number of vessels eligible to participate in the groundfish fisheries, was a general reduction in the number of vessels involved in the fishery, from 963 in 1995 to 631 in 1999 (see Table 2.2).

Table 2.2 Number of Vessels Catching Pacific Cod in Alaska by Year

Year	Hook/Line	Pot	Trawl	Total
1995	475	261	227	963
1996	288	214	231	733
1997	451	199	225	875
1998	393	218	207	818
1999	167	267	197	631

Source: Hiatt, Terry, and Joe Terry, "Stock Assessment and Fishery Evaluation Report for the Groundfish

Fisheries of the Gulf of Alaska and Bering Sea/Aleutian Island Area: Economic Status of the Groundfish Fisheries off Alaska, 1999," Socioeconomic Assessments Program, Alaska Fisheries Science Center, NMFS, Seattle, WA, November 10, 2000.

The trawl fishery is typically conducted in the first few months of the year, but fixed gear may operate nearly year-round. Because Pacific cod is often caught as bycatch during the crab and halibut seasons, the Pacific cod fishery often closes before the targeted cod fishery TAC is reached. Pacific cod is also taken as bycatch in the trawl fisheries for pollock, yellowfin sole, and rock sole in the eastern Bering Sea, the trawl Atka mackerel fishery in the Aleutian Islands region, and the trawl fisheries for flatfish, flounder, and flathead sole in the Gulf of Alaska.[29]

2.3.2 Supply and Harvests

U.S. harvests of Pacific cod over the last ten years have varied greatly, ranging from a low of 194 thousand metric tons in 1993 to nearly 317 thousand metric tons in 1997 (see Figure 2.23). Almost all harvests occur in Alaska waters, with the largest share of the catch coming from the Bering Sea and Aleutian islands. Landings of Pacific cod are made throughout the year, but are highest in the months of February through May (see Figure 2.24). The ex-vessel price varied considerably over the period of 1990 through 1999.

Pacific cod are harvested not only from Alaska waters, but also in other parts of the North Pacific Ocean. The U.S. is the leading harvester of Pacific cod, followed by Russia and Japan, as shown in Figure 2.25. More than half the harvest is from U.S. waters.

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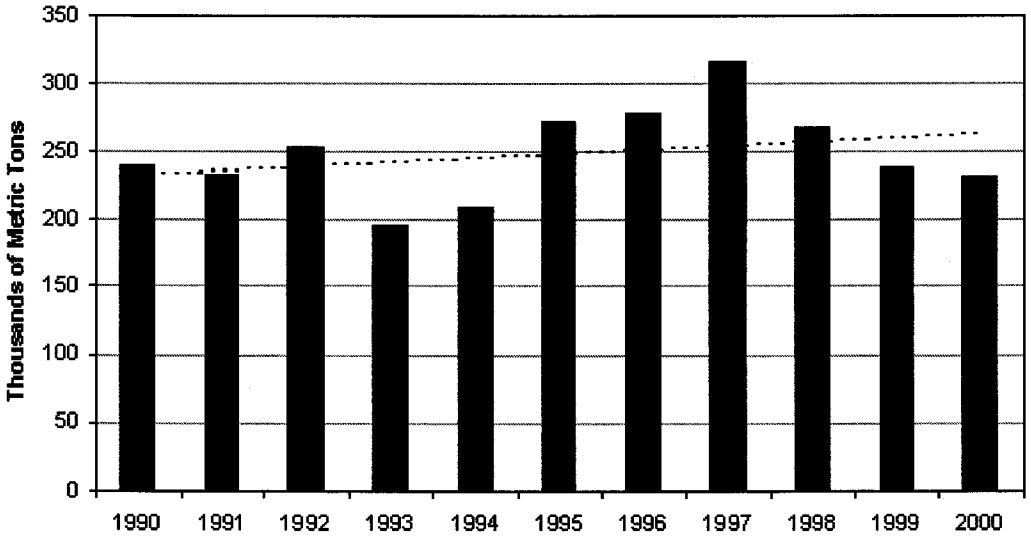
[28] Draft Programmatic SEIS, p. 3.10-12.

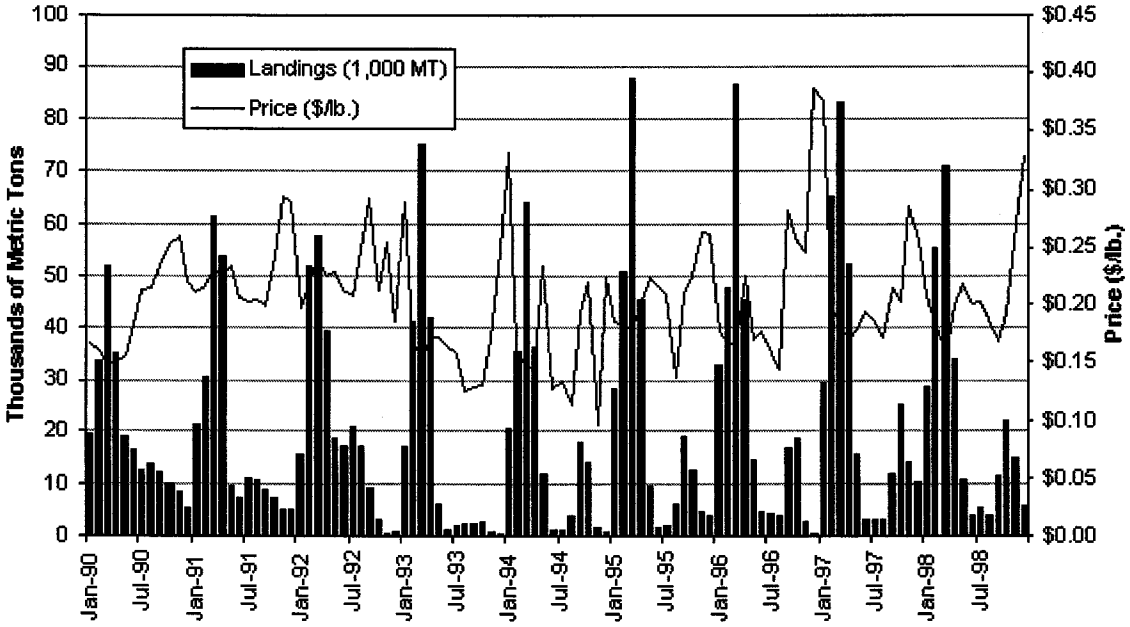
[29] Draft Programmatic SEIS, p. 3.3-15.

Figure 2.23 U.S. Pacific Cod Landings



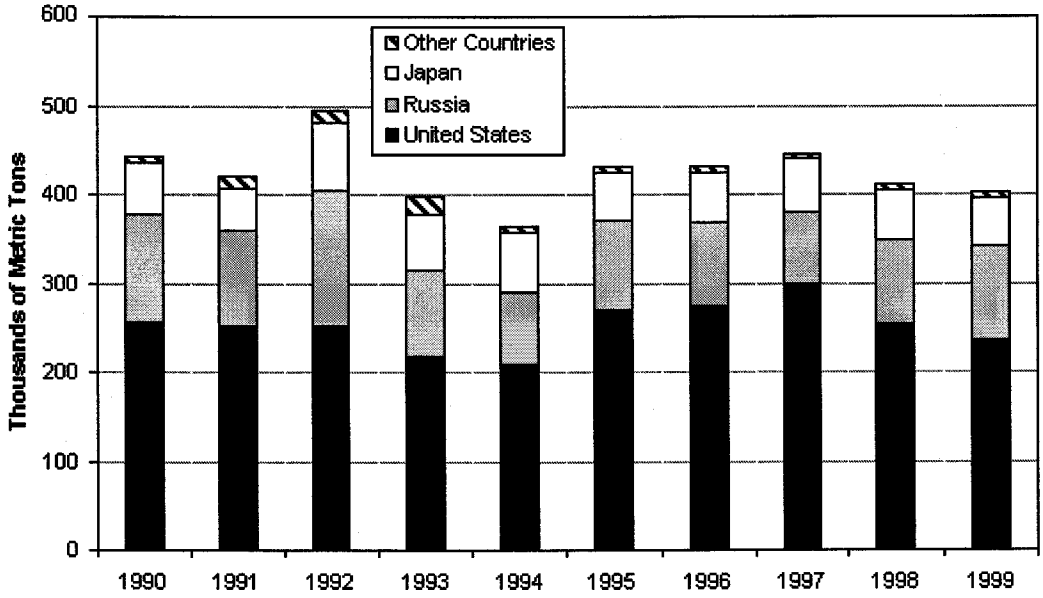
Source: Personal communication, NMFS, Fisheries Statistics and Economics Division, Silver Spring, MD.

Figure 2.24 Pacific Cod Landings and Price by Month for Alaska



Source: Personal communication, NMFS, Fisheries Statistics and Economics Division, Silver Spring, MD.

Figure 2.25 World Harvests of Pacific Cod



Source: FAO, "FishStat" database.

Because Pacific cod enters an international market with Atlantic cod where increasingly it is used interchangeably, it is useful to examine Atlantic cod supplies and harvests. U.S. Pacific cod annual landings are compared with Atlantic cod landings in Figure 2.26, demonstrating that Pacific cod landings are approximately ten times that of Atlantic cod. Landings of Atlantic cod declined from 43.7 thousand metric tons in 1990 to 9.7 thousand metric tons in 1999.

Atlantic cod is found in the North Atlantic Ocean, from Cape Hatteras in the U.S., along the North American coast, to Greenland, around Iceland, the coasts of Europe, to the Barents Sea. It is far more abundant than Pacific cod, and has been harvested for centuries. Pacific cod has varied between 20 and 30 percent of total cod harvests in the past decade.[30]

Overall catches of cod (Atlantic and Pacific combined) have decreased by more than 25 percent from the late 1980s to the present. As shown in Figure 2.27, world landings of 1.9 million MT in 1990 have declined to less than 1.5 million MT in 1999. Much of the decline can be attributed to the collapse of the Canadian cod stock in the early 1990s, previously the largest supplier of cod, and a less-precipitous decline in Icelandic stocks. Meanwhile, Norway and the Russia increased their share of cod harvest, but the stock managed jointly by both countries in the Barents Sea has also declined the last several years.

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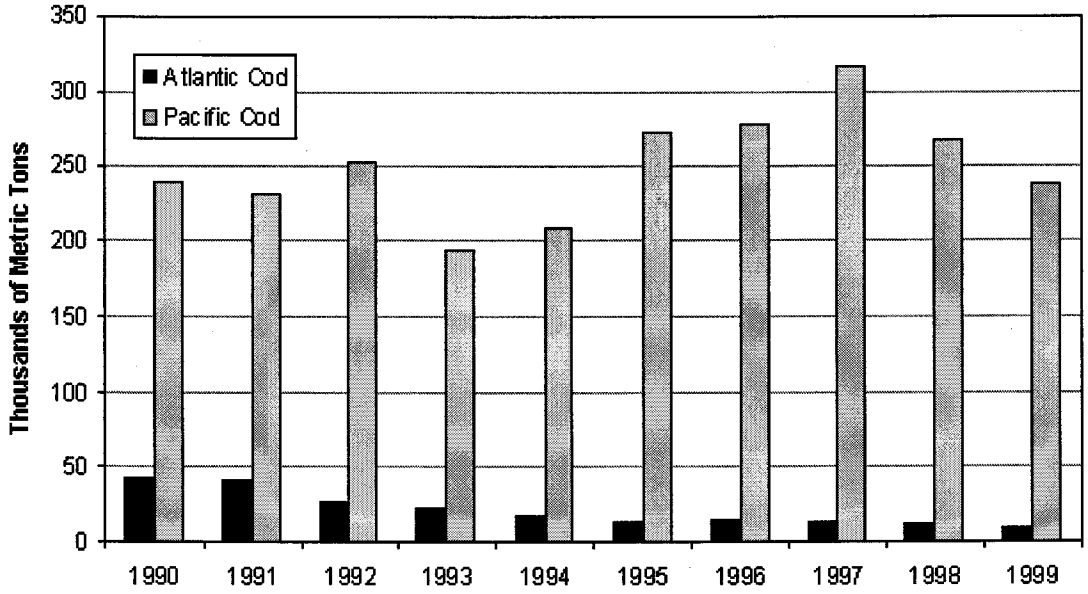
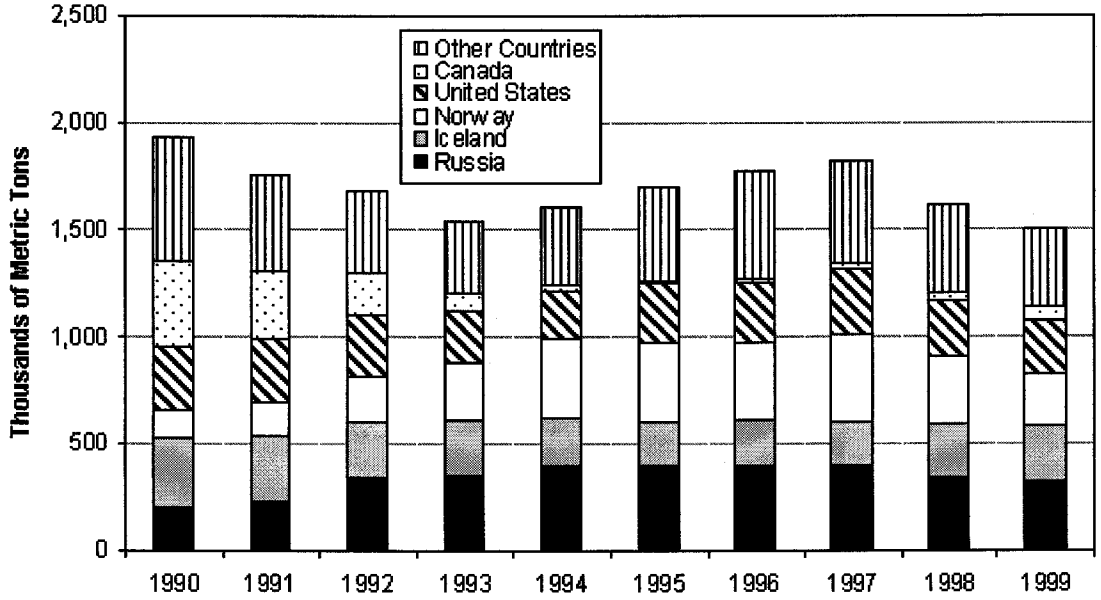
[30] Sjøholt, Trond, p. 56.

Figure 2.26 U.S. Pacific Cod and Atlantic Cod Landings



Source: Personal communication, NMFS, Fisheries Statistics and Economics Division, Silver Spring, MD.

Figure 2.27 World Harvest of Cod



Source: FAO, "FishStat" database.

2.3.3 Product Forms

Pacific cod are processed into a variety of products which are sold in different markets in the United States and rest of the world, competing with production of cod products by other nations. The most valuable of the intermediate products to enter these markets are H&G, fillets, and salted forms.

NMFS estimates of the Pacific cod primary product forms and value from Alaska waters is shown in Table 2.3. Primary product is the form that results after initial processing of live fish. Value is first wholesale as derived by NMFS. Between 50 and 63 percent of the products by volume in each year is processed as H&G and then frozen. Fillets account for 15 to 20 percent of product weight but about a third of the overall value. The filleted form includes those sold as blocks, IQF, and shatterpacks, and fresh. The remainder of cod is salted, minced, or dried.

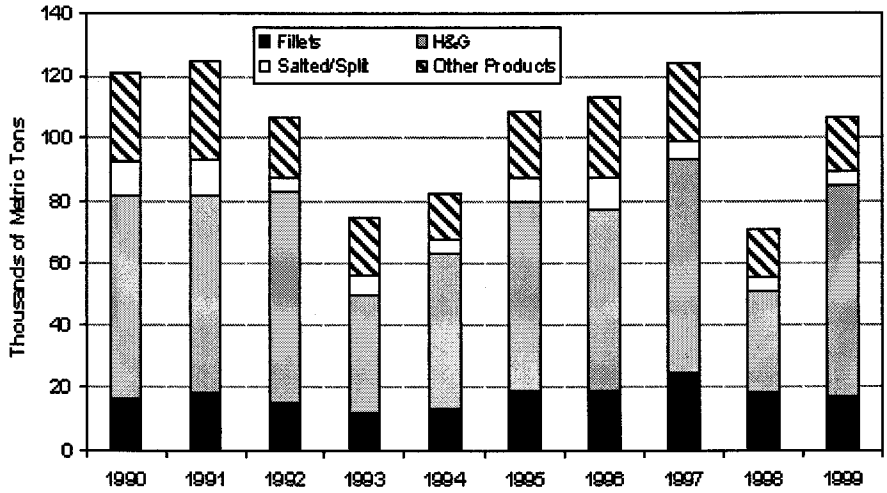
Table 2.3 Production of Pacific Cod Products in the Fisheries off Alaska

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Volume (1,000 MT)										
Fillets	16.8	18.3	14.9	12.5	13.3	19.2	19.3	24.5	18.3	17.4
H&G	65.4	63.7	68.3	37.3	50.5	60.9	57.7	69.0	32.9	67.5
Salted/Split	10.4	11.2	4.7	6.6	4.2	7.6	10.8	5.5	4.6	4.6
Other products	28.5	31.8	19.1	18.1	14.7	21.0	25.1	25.3	14.9	17.1
Total	**121.1**	**125.1**	**107.0**	**74.5**	**82.7**	**108.6**	**112.9**	**123.3**	**100.7**	**106.7**
Value ($ millions)										
Fillets	60.4	91.4	66.2	50.1	48.8	79.0	71.8	98.5	74.9	95.5
H&G	117.8	125.7	114.8	60.2	83.6	91.3	98.2	90.9	126.7	172.6
Salted/Split	35.7	43.1	15.9	16.3	6.4	18.5	23.6	12.0	11.2	17.3
Other products	31.8	35.9	21.4	18.7	15.7	29.0	30.9	24.8	15.9	21.4
Total	**245.7**	**296.1**	**218.3**	**145.3**	**154.5**	**217.8**	**224.6**	**226.1**	**228.6**	**306.9**

Source: NMFS, "Economic Status of the Groundfish Fisheries off Alaska," various reports.

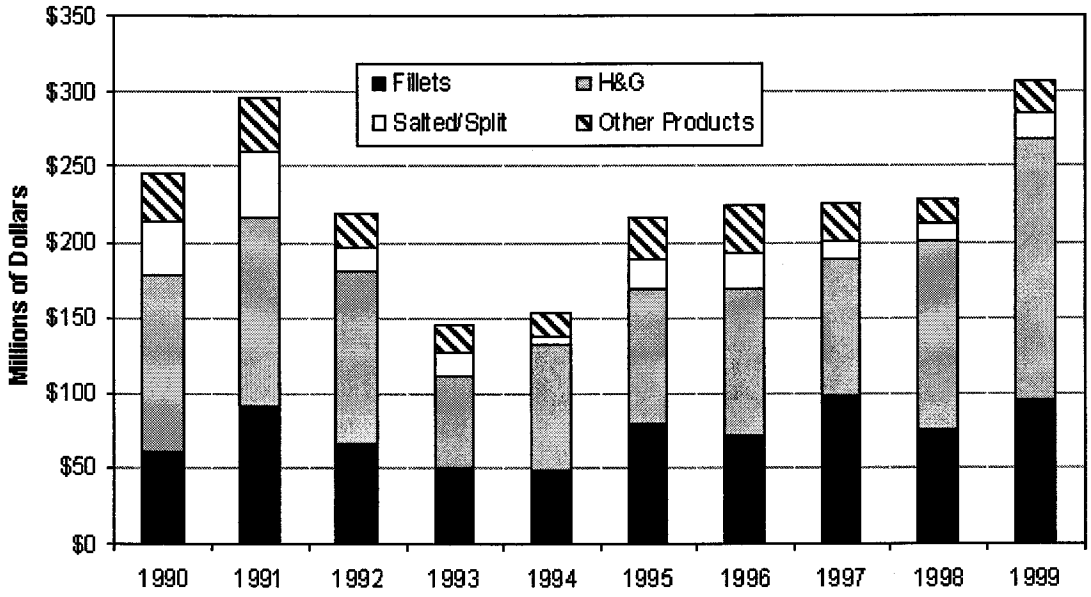
Figures 2.28 and 2.29 show changes over the past decade in total Pacific cod production and value from Alaska waters. The volume of production has fluctuated from year to year, reflecting differences in total harvest volume, but most of the fluctuation was absorbed by the H&G product form. Fillet volume remained relatively uniform over the period, and salted and other product forms remained at levels below 20 percent of total cod products. Value of product forms varied somewhat consistently with production volume, but reflect relative prices between the product forms. This is demonstrated by examining first wholesale prices for the past decade (Figure 2.30). Average annual prices for fillets were high in 1991, but remained below $2.00 per pound until 1999, when they rose to nearly $2.50 per pound. H&G prices were uniform on average through the 1990s, then shot to record high levels in 1998 before receding somewhat in 1999.

Figure 2.28 Volume of Production of Pacific Cod Products from Alaska Waters



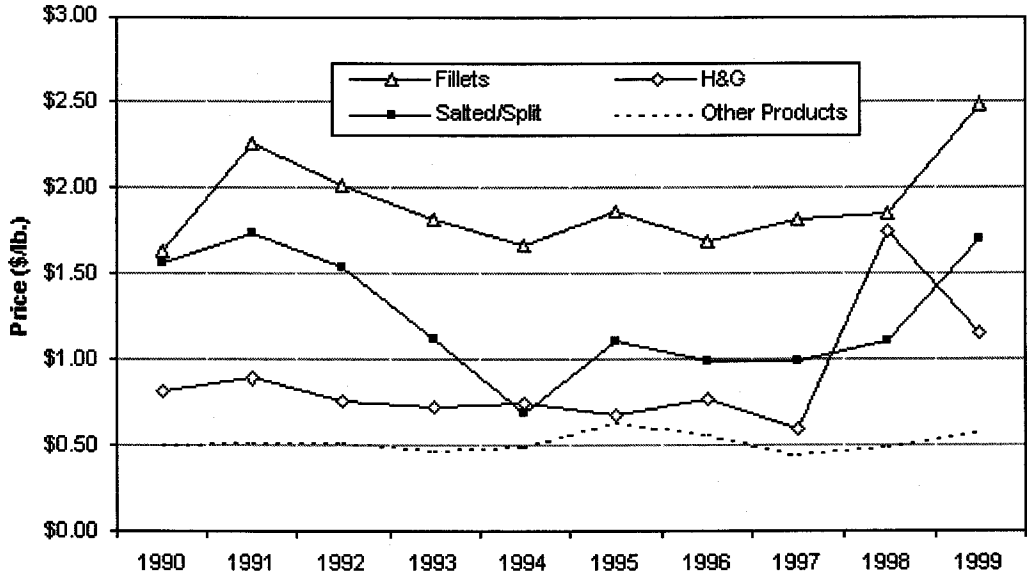
Source: NMFS, "Economic Status of the Groundfish Fisheries off Alaska," various reports.

Figure 2.29 Value of Production of Pacific Cod Products from Alaska Waters



Source: NMFS, "Economic Status of the Groundfish Fisheries off Alaska," various reports.

Figure 2.30 Average Prices of Pacific Cod Products from Alaska Waters



Source: NMFS, "Economic Status of the Groundfish Fisheries off Alaska," various reports.

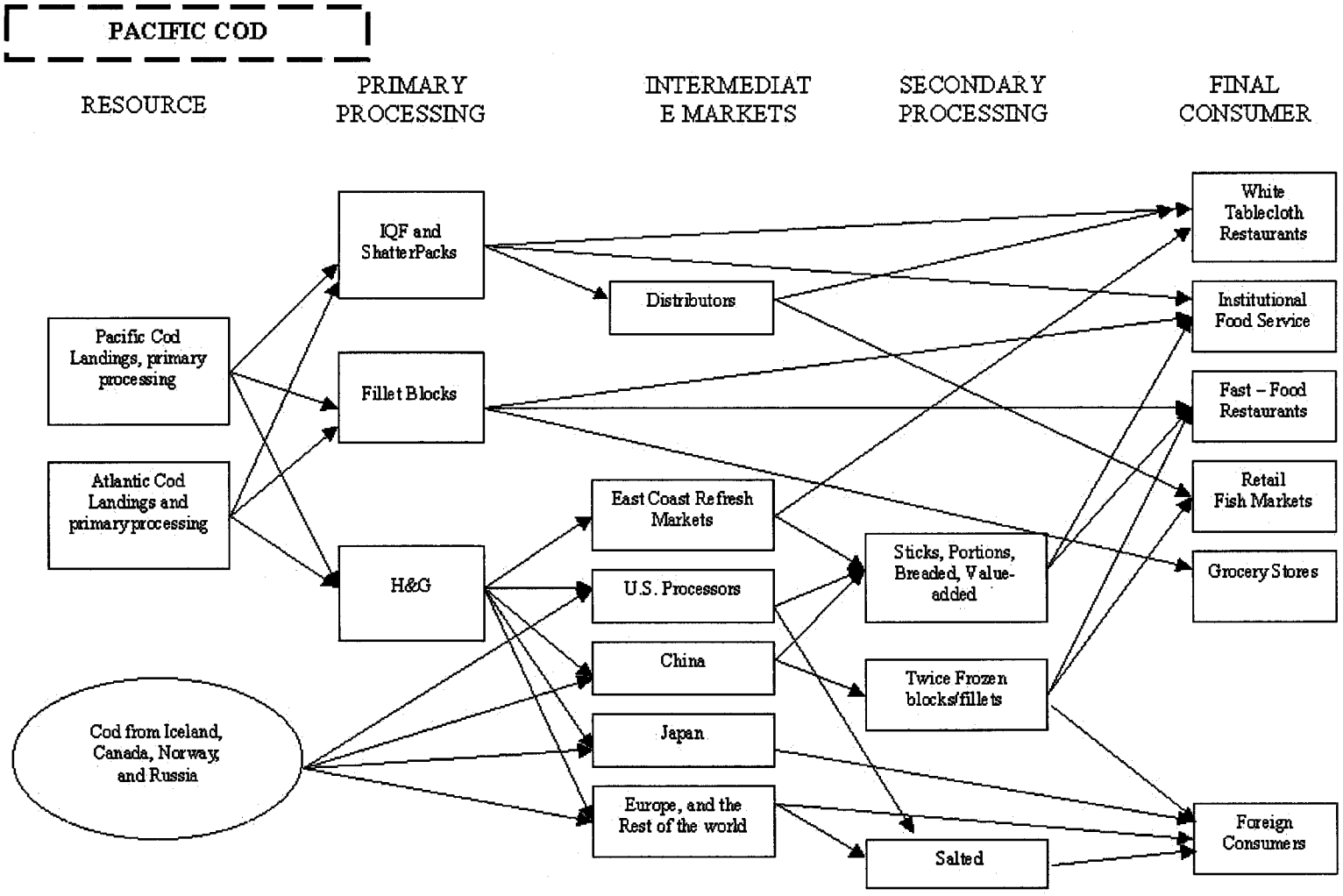
2.3.4 Resource and Product Flows

This section provides an overview of the market flow of Pacific cod from harvest and first processing to final consumer. An outline of the major marketing channels for Pacific cod is presented in schematic form in Figure 2.31. The figure shows the different types of processing of each product and the different markets that are served by the products. Pacific cod landings are represented as the primary resource, with U.S. Atlantic cod landings and foreign cod (which is mostly Atlantic cod) as related and competing resources. Pacific cod is processed as either H&G, fillet blocks, or individually frozen fillets, which are either individually quick-frozen or processed into shatterpacks. Other product forms (e.g., mince and oil) are not shown.

The three product types proceed through various market channels to several different final markets. The final markets, shown at the right of the diagram, include: fine or "white tablecloth" restaurants, institutional food service, quick-service restaurants, retail fish markets, grocery stores, and overseas markets. A brief description of the flows for each of the basic product types follows.

IQF fillets and shatter pack fillets of Pacific cod are used by both white tablecloth restaurants, by institutional food service, and by retail fish markets. In most cases, these products are used with the fillet still intact; hence the processing requires preservation of individual fillets. Larger institutional buyers or retail fish markets may buy the products directly from the processors, while smaller buyers typically purchase through a distributor.

Figure 2.31 Product Flow and Market Channels for Pacific Cod



Fillet blocks are used when the customer desires a product that requires a high degree of uniformity. Blocks are typically cut into smaller portions of uniform size and weight. Breaded fish portions as used in fish sandwiches or casual "fish and chips" style restaurants are typical of this type of use. Institutions, including hospitals, prisons, and schools, also purchase fillet blocks, as do some grocery retailers.

H&G Pacific cod is frozen after the first processing, and then proceeds to another processor within the U.S., or is exported for secondary processing. Some domestic H&G Pacific cod is sent to the East Coast refresh market, where it is thawed and filleted before being processed further, or sold as refreshed. Other U.S. processors may purchase H&G cod and further process it by cutting it into sticks and portions, or breading it for sale in grocery stores or food services. Foreign consumers, especially China, Japan, and Europe, also purchase H&G cod for further processing, including the production of salt cod. Salt cod is very popular in Europe, parts of Africa, and Latin America. Although most of the Pacific cod that becomes salt cod is processed outside the U.S., some U.S. processors are once again producing the product domestically for export, as they have at times in the past.

Some H&G cod obtained by China from the U.S. and other countries is further processed and re-exported to the U.S. This is shown in the diagram in the lower left corner, where cod from Iceland, Canada, Norway, and Russia is exported to China, where it is either breaded and portioned or thawed and refrozen into blocks, referred to as "twice-frozen fillet blocks." These twice-frozen blocks from China have gained considerable popularity in the U.S. during recent years, although the quality of the fish is reported to be lower than the quality of fish in single-frozen, U.S.-produced fillet blocks. Still, the twice-frozen blocks tend to be less expensive, and therefore provide some competition with the single-frozen blocks.

2.3.5 Headed and Gutted

Cod that is headed and gutted, or H&G, is processed with heads and guts (viscera) removed, unlike "dressed" fish, which are typically sold head-on and gutted. H&G is a less-expensive form of processing than filleting, and provides buyers with options for utilization of the net product without sources of contamination like the gills and guts.[31] H&G products generally require further processing.

Disappearance of H&G Pacific cod (67.5 million MT in 1999) is split among the domestic market and exports to Japan and other countries. Although industry experts indicate that the majority of H&G is exported, limitations in the available trade data from NMFS makes it difficult to determine with precision the portion that is exported.[32] Figure 2.32 indicates the quantity of all Pacific cod exports, excluding salted, dried, and minced, by country of destination.[33] The vast majority of these exports are probably in the H&G product form. In

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[31] *SeaFood Business*, "The Seafood Handbook," http://www.seafoodhandbook.com/harvest/ffforms.html, 1999.

[32] NMFS trade records do not specify an "H&G" product form for exports. Although exporters are required to report product form, the relevant categories for cod include only "fillet, frozen," "dried," "minced, frozen," "salted," "fresh," and "frozen." The largest category of export specified (75 percent of all cod exports) is "frozen."

[33] This was determined by isolating those exports of "cod" (species not specified) through the Anchorage and Seattle port districts. "Fresh cod" was included in this aggregation because, according to NMFS, a unknown portion of frozen has probably been improperly identified by exporters as "fresh" (Steve Koplin, NMFS, personal communication).

addition, most of these exports are destined for Japan. The balance are exported to South Korea, Canada, and Europe. Product sold to Korea is containerized and re-exported to Norway and elsewhere.[34]

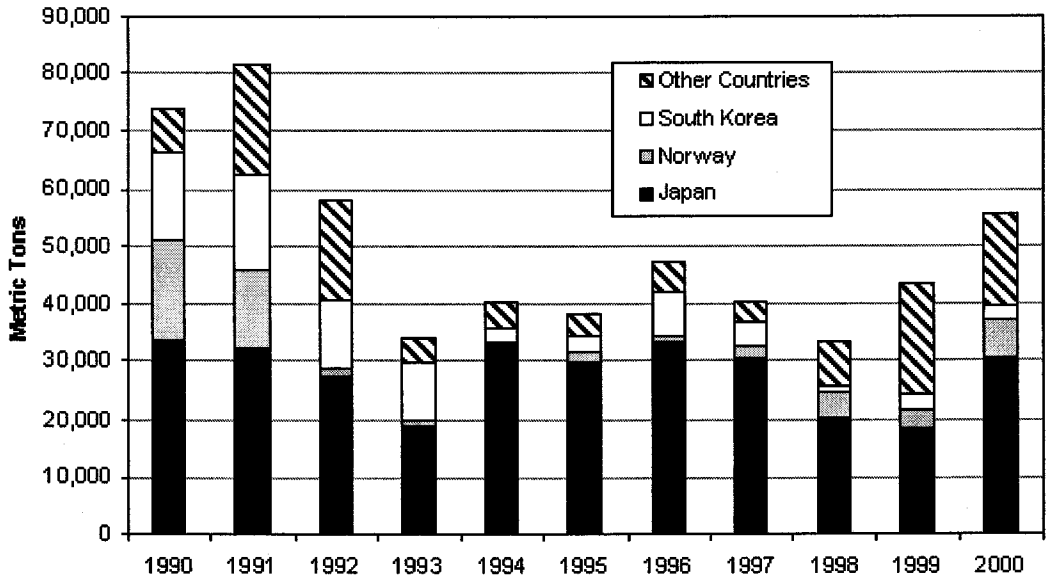


Figure 2.32 U.S. Exports of Pacific Cod, excluding Salted, Dried, and Minced

Source: Personal communication, NMFS, Fisheries Statistics and Economics Division, Silver Spring, MD.

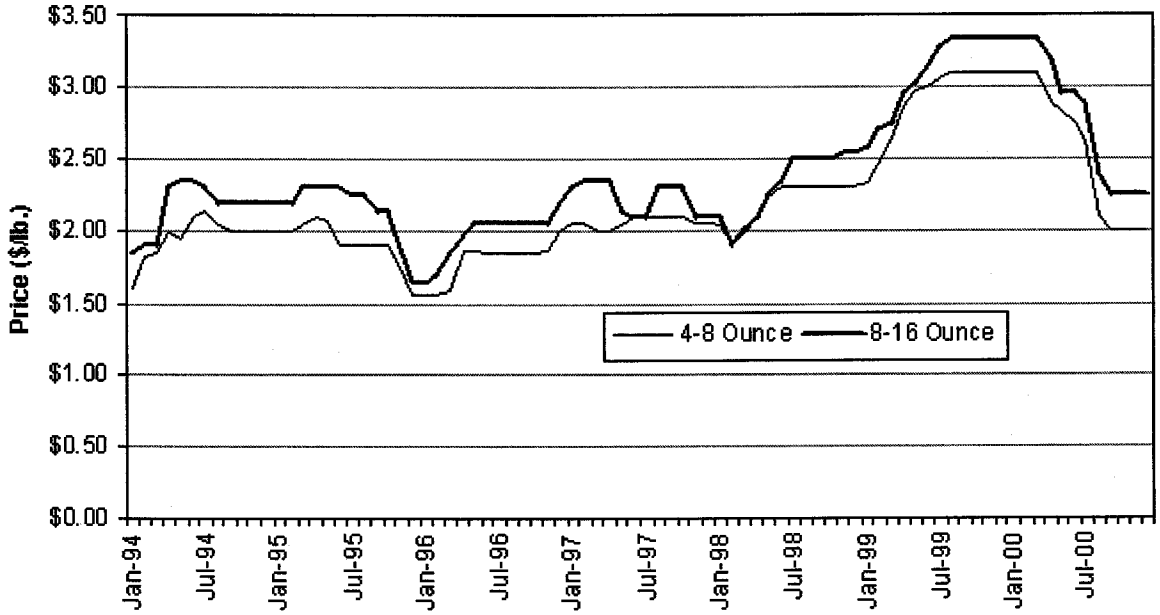
2.3.6 Fillets

After H&G, the most common product form produced from Pacific cod is the fillet. Fillets are processed and frozen into several different forms depending upon the final destination. Fillets are graded as 4-8 ounce, 8-16 ounce, 16-32 ounce, and 32+ ounce, and are packed either IQF, shatterpack, or layer pack. Cod blocks are also prepared for further processing, often portioned and breaded.

Pacific cod fillets are destined primarily for the domestic market. Most of the product is used in finer and casual restaurants, institutions, and retail fish markets. Wholesale prices for Pacific cod fillets sold in shatterpacks are shown in Figure 2.33. The average price per pound for 8-16 ounce fillet shatterpacks ranged from about $1.60 to $2.30 a pound from 1994 to 1998, then surged above $3.25 for much of 1999 before recovering in the latter half of 2000.

[34] Draft Programmatic SEIS, p. 3.10-119.

Figure 2.33 Wholesale Prices for "Alaskan" Cod Shatterpack Fillets

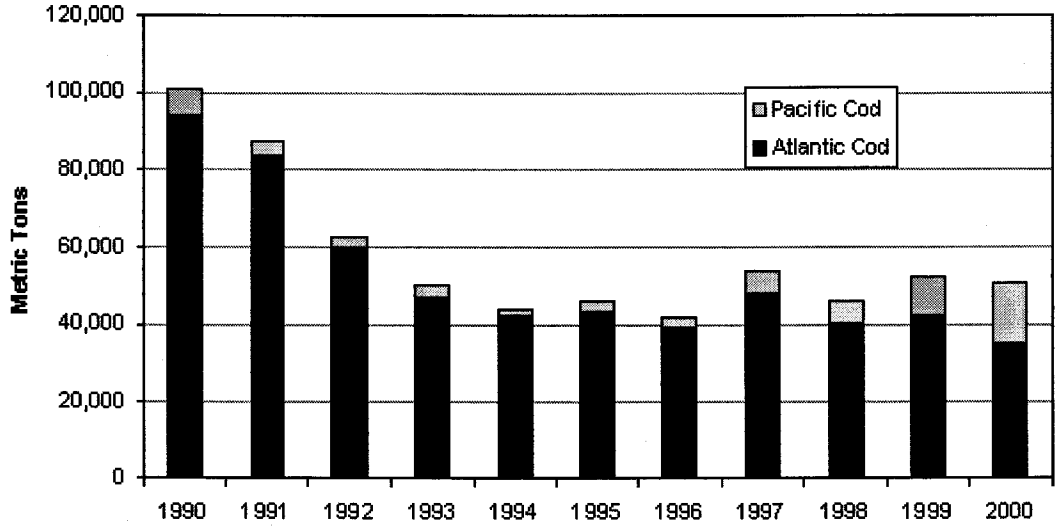


Source: Urner Barry, *Seafood Prices 2001*, Urner Barry Publications, Inc., 2001.

The U.S. is a net importer of fillets, although some U.S.-produced cod fillets are exported to Japan and elsewhere. The U.S. production of Pacific cod fillets has exceeded 20 thousand MT only once in the past decade, yet imports of cod fillets have exceeded 40 thousand MT every year in the same period (see Figure 2.34). Imports of cod have been primarily of the Atlantic species, although in 1999 and 2000, Pacific cod imports have increased in share. A closer examination of imports by country reveals an interesting picture of the changing situation in cod. Figure 2.35 displays the imports of Atlantic cod by country. In the early 1990s, Canada supplied the majority of Atlantic cod imports to the United States. When the Canadian stocks collapsed, no other country made up the lost share. Hence, imports of Atlantic cod fillets declined from more than 80,000 MT in 1991 to about 35,000 MT in 2000.

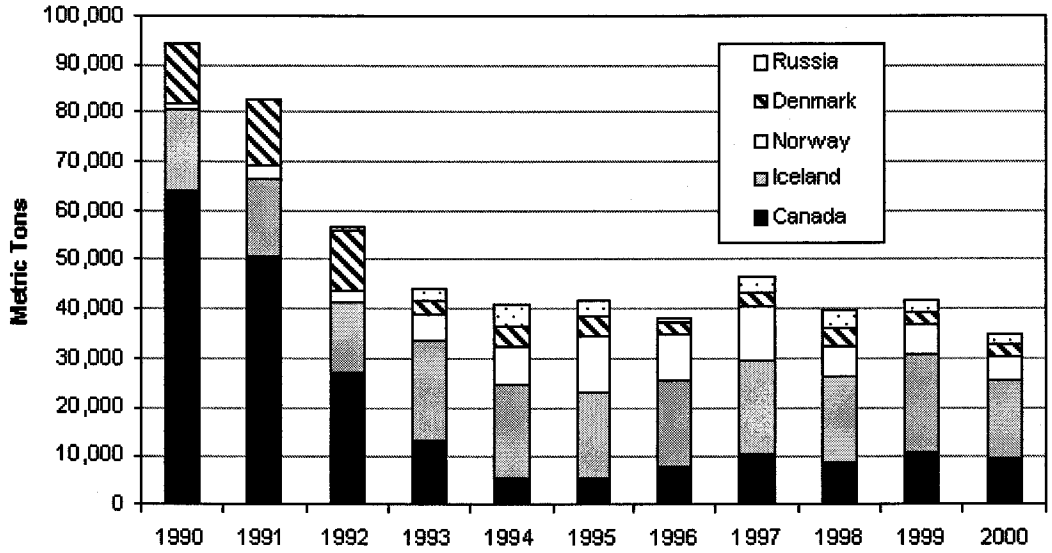
A contrasting situation is presented in Figure 2.36, which displays the imports of Pacific cod over the same period. Although the quantities of imports remain small compared to Atlantic cod, increases in the amount of Pacific cod imported from China the last several years has placed that country second in volume among those exporting cod to the U.S. The majority of cod imported from China is so-called "twice-frozen" fillets: imported by China as whole fish or H&G, thawed, reprocessed as fillets, and re-exported. The twice-frozen product is considered lower in quality and commands a lower price.

Figure 2.34 U.S. Imports of Atlantic and Pacific Cod Fillets



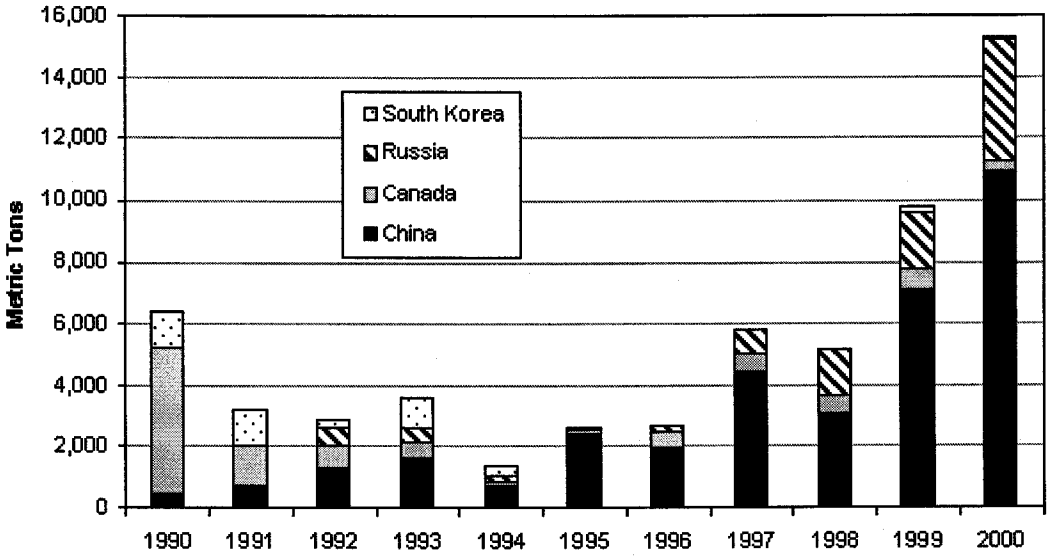
Source: Personal communication, NMFS, Fisheries Statistics and Economics Division, Silver Spring, MD.

Figure 2.35 U.S. Imports of Atlantic Cod Fillets from Major Importing Countries



Source: Personal communication, NMFS, Fisheries Statistics and Economics Division, Silver Spring, MD.

Figure 2.36 U.S. Imports of Pacific Cod Fillets from Major Importing Countries



Source: Personal communication, NMFS, Fisheries Statistics and Economics Division, Silver Spring, MD.

Both Atlantic and Pacific cod appear to enter the same market with some degree of substitution. However, it is important to note that Atlantic cod has a long and well-established history in the U.S. market. Several industry representatives mentioned the distinct market niche of Atlantic cod, particularly on the east coast, and despite their attribute similarities, some differences do exist between the species.[35] This can also be demonstrated by a difference in the import prices of Atlantic and Pacific cod, as shown in Figure 2.37. In summary, Pacific cod is considered in the market to be an inferior product to Atlantic cod, but that may in part be the result of the firm market niche held by Atlantic cod. Nevertheless, reductions is availability of Atlantic cod fillets has provided opportunity for Pacific cod to enter the market.

The U.S. market for all fillets, particularly cod, has also been influenced by the increased production of aquaculture-grown whitefish. The species of greatest significance is catfish, but in recent years there have been increases in both domestically produced and imported tilapia. During the 1990s the production of catfish increased from 208 thousand MT in 1993 to 256 thousand MT in 1998,[36] virtually all of it consumed domestically.

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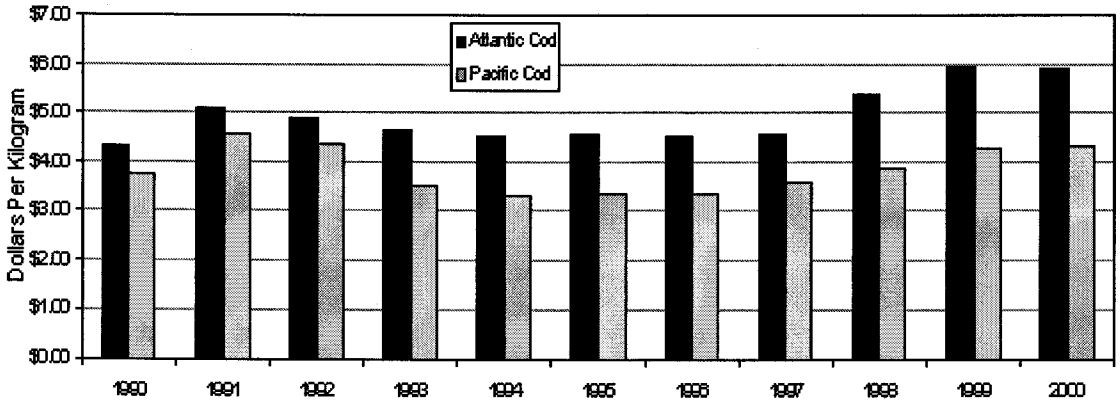
[35] According to *The Seafood Handbook*, "Atlantic cod fillets have a silvery, subcutaneous layer that distinguishes them from Pacific cod.... It's less firm than haddock and sweeter than Pacific cod.... The moisture content [of Pacific cod] is a little higher than that of Atlantic cod, making it less firm.... Use Atlantic and Pacific cod interchangeably, though Pacific cod produces larger, thicker fillets, and its moisture content makes breading difficult." (*SeaFood Business*, "The Seafood Handbook," http://www.seafoodhandbook.com/harvest/ffforms.html, 1999.)

[36] NMFS, *Fisheries of the United States, 1999*, Office of Science and Technology, Fisheries Statistics and Economics Division, October, 2000, p. 23.

Figure 2.37 Price per Kilo for U.S. Imports of Atlantic and Pacific Cod Fillets

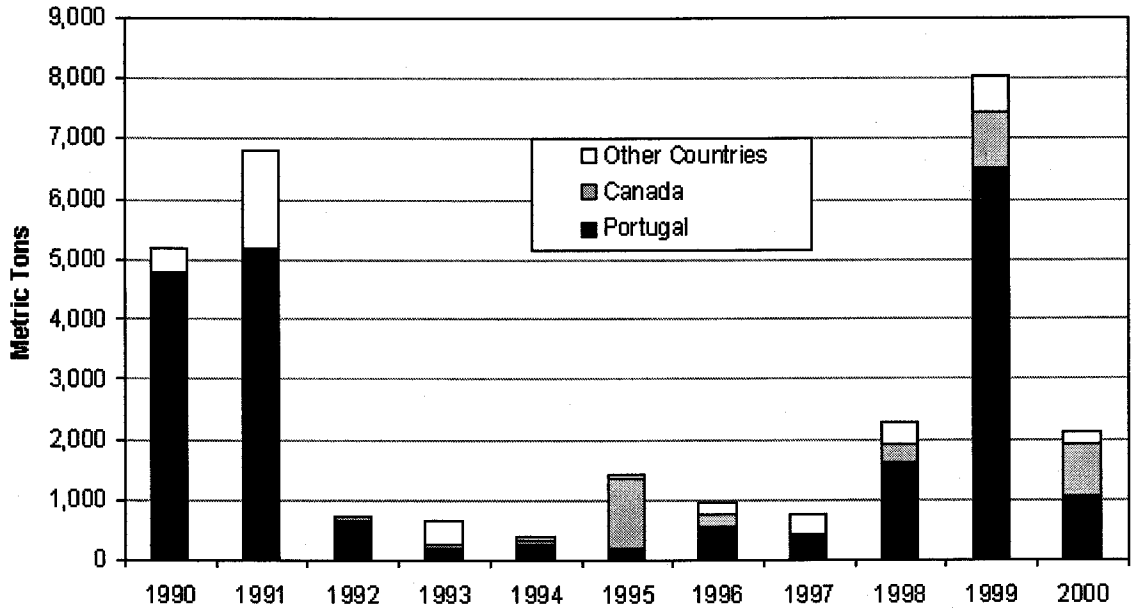


Source: Personal communication, NMFS, Fisheries Statistics and Economics Division, Silver Spring, MD.

2.3.7 Salted Cod

Salted, dried, minced, and other products account for about 20 percent of annual Pacific cod products by volume and 15 percent of the total value on average over the last five years. Salted cod, the largest of this group, is a traditional product enjoyed primarily by Europeans and Latin Americans. Consequently, most of the 6.6 thousand MT estimated to have been produced annually in the U.S. was exported. The quantity of salted Pacific cod exported through Anchorage, Seattle, and Portland districts is shown in Figure 2.38. Most was sent to Portugal and Canada.

Figure 2.38 U.S. Exports of Salted Pacific Cod, through Anchorage, Seattle, and Portland Districts



Source: Personal communication, NMFS, Fisheries Statistics and Economics Division, Silver Spring, MD.

2.4 Atka Mackerel

Atka mackerel (*Pleurogrammus monopterygius*) are one of the most abundant groundfish species in the Aleutian Islands. They are distributed from the Kamchatka Peninsula throughout the Aleutian Islands and eastern Bering Sea, and eastward to Southeast Alaska, although the center of abundance is the Aleutian Islands.[37] Atka mackerel are an important component to the diet of other groundfish, seabirds, and marine mammals, mainly northern fur seals and Steller sea lions.[38]

Atka mackerel are the target of a directed trawl fishery which caught some 42 thousand MT in the Aleutian Islands in 2000.[39] The primary product forms are headed and gutted (H&G) and whole fish. Nearly all products are exported. The characteristics of the market are presented in this section.

2.4.1 Brief History of the Atka Mackerel Fishery in Alaska Waters

Atka mackerel have been targeted in the Aleutian Islands since at least the 1970s. Vessels from Russia, Japan, and Korea fished the waters near the Aleutians during this period, and annual catches peaked at 24

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[37] Draft Programmatic SEIS, p. 3.3-36.

[38] Draft Programmatic SEIS, p. 3.3-37.

[39] Witherell, David, "Groundfish of the Bering Sea and Aleutian Islands Area: Species Profiles 2001," Report of the North Pacific Fishery Management Council, December 21, 2000.

thousand MT.[40] Foreign fisheries were replaced by joint ventures in the 1980s, and the fishery became entirely domestic by 1990. Harvests fluctuated considerably during the 1990s, and rose to a high of 88 thousand MT in 1996 before declining as a result of reduced stocks. Atka mackerel are not commonly caught as bycatch in other directed fisheries. The largest amounts of discards, which are likely undersized fish, occur in the directed Atka mackerel fisheries.[41]

The fishery is targeted by catcher/processor trawlers. In 1999, the fishery involved 17 catcher/processor vessels. In 2001 it is thought that at least three companies and eight boats are involved in the fishery, with five boats from one firm, two from a second, and one from a third.[42] The Atka mackerel fishery is regulated under the BSAI Groundfish Fishery Management Plan, which controls the fishery through permits, seasons, catch quotas, and gear restrictions. Beginning in 1994, the Atka mackerel fishery was apportioned among subareas of the Aleutian Islands. Seven and one-half percent of the TAC is allocated to Community Development Quota (CDQ) groups, and 2 percent is for vessels using jig gear. In 1999, the TAC was further allocated among known Steller sea lion critical habitat.[43]

2.4.2 Supply and Harvests

U.S. harvests of Atka mackerel take place almost entirely in the Bering Sea and Aleutian Islands. Landings during the last decade ranged from a low of 22 thousand MT in 1990 to 88 thousand MT in 1996, as shown in Figure 2.39. The pattern of harvest followed the TAC in the mid-1990s, and the sharp decline in harvests beginning in 1997 reflected the large drop in the biological stock size (and consequently, the TAC); the TAC in 1997 was just 63 percent of that in 1996. In recent years harvests have continued to decline, which is attributed to Steller sea lion protection measures.[44] During the 1990s the ex-vessel price has fluctuated considerably, from $0.13 to $0.15 per pound through 1995, to just $0.05 per pound in 1999 (see Figure 2.40). An important factor in the precipitous price decline is the degree and level of international competition.

World harvests of Atka Mackerel are shown in Figure 2.41. Japan leads all countries in landings with between 98 thousand MT and 241 thousand MT. The U.S. and Russia account for most of the balance. Although world harvests increased yearly through the 1990s, the Japanese harvest was significantly smaller in 1999 than in the previous year, the result of restrictions placed on the Japanese trawl fleet. This led to the first decrease in world supply in a decade.

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[40] Witherell, David, December 21, 2000.

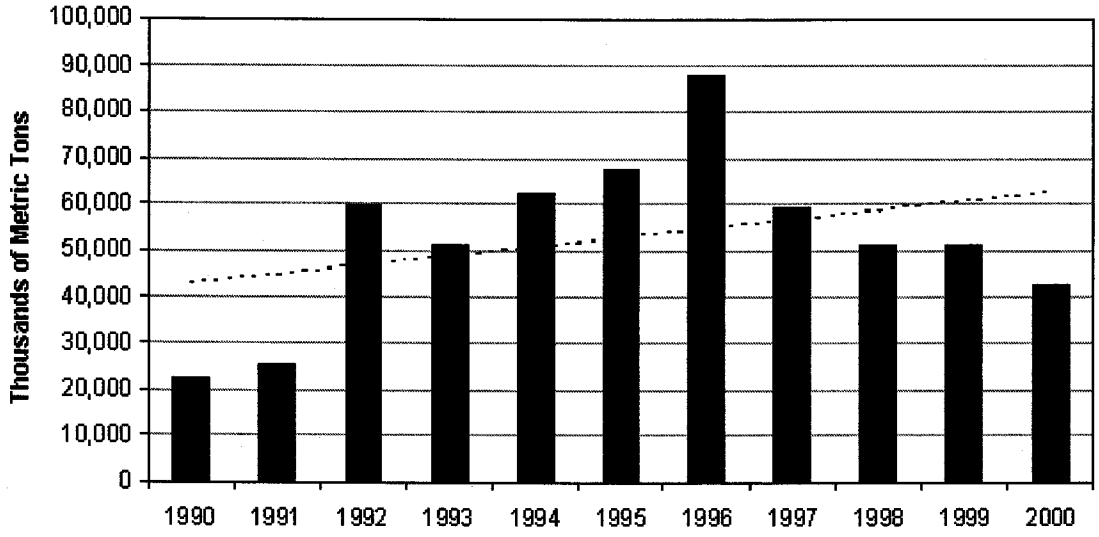
[41] Draft Programmatic SEIS, p. 3.3-39.

[42] Personal communication, Andy Smoker, NMFS, Alaska Region, May 14, 2001.

[43] Witherell, David, December 21, 2000.

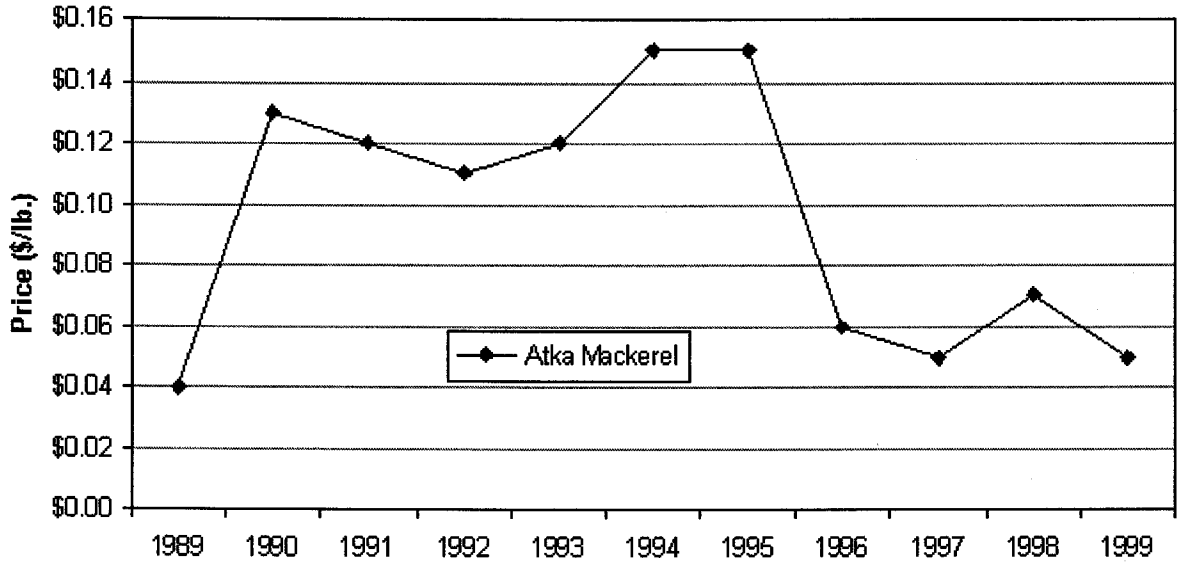
[44] Witherell, David, December 21, 2000.

Figure 2.39 U.S. Atka Mackerel Landings



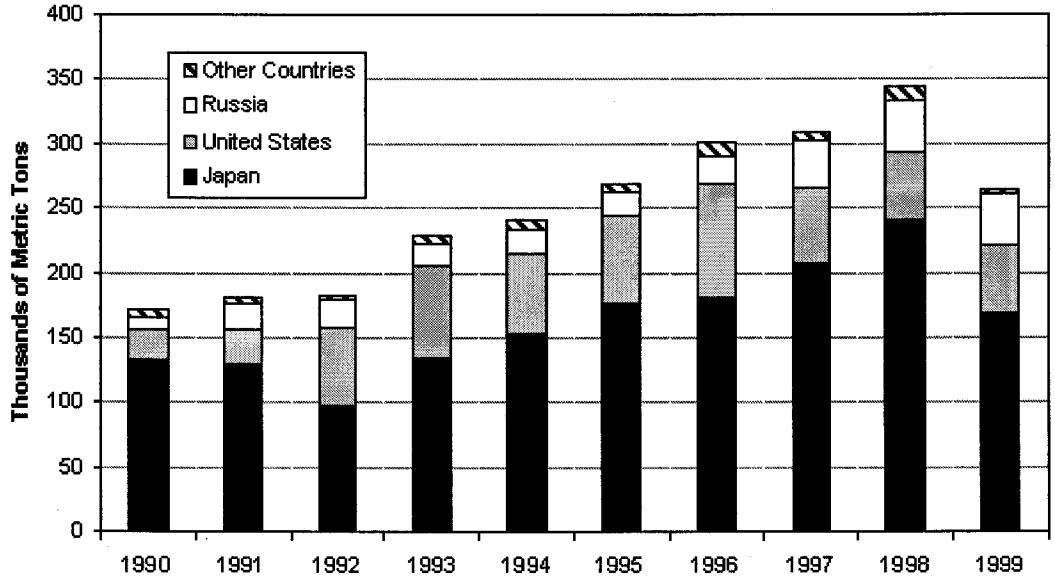
Source: Personal communication, NMFS, Fisheries Statistics and Economics Division, Silver Spring, MD.

Figure 2.40 Atka Mackerel Ex-Vessel Price in the U.S.



Source: Personal communication, NMFS, Fisheries Statistics and Economics Division, Silver Spring, MD.

Figure 2.41 World Harvests of Atka Mackerel



Source: FAO, "FishStat" database.

2.4.3 Product Forms

Atka mackerel are processed almost exclusively as H&G or sold as whole fish. A small portion has in the past been processed into surimi. Nearly all Atka mackerel products enter the export market destined for Japan, South Korea, or China. NMFS estimates of the Atka mackerel product forms and value from Alaska waters is shown in Table 2.4. Primary product is the form that results after initial processing of live fish. Value is first wholesale as derived by NMFS. Between two-thirds and three-quarters of the products by volume in each year is processed as H&G and then frozen. The balance remains as whole fish.

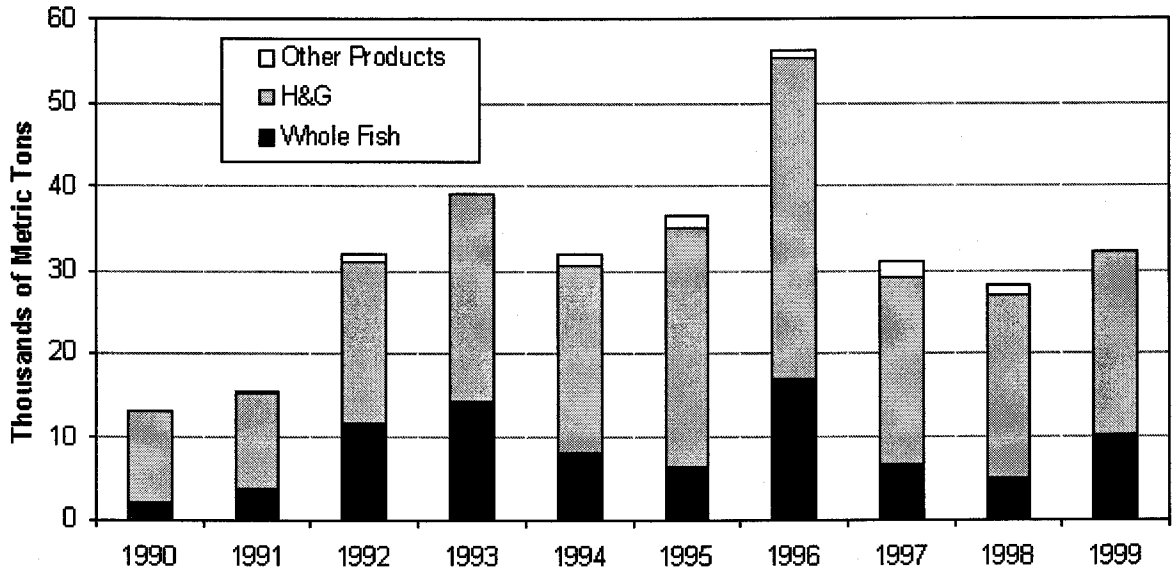
Figures 2.42 and 2.43 show changes over the past decade in total Atka mackerel production and value from Alaska waters. The volume of production has fluctuated from year to year, reflecting differences in total harvest volume, but most of the fluctuation was absorbed by the "whole fish" product form. Value of product forms varied fairly consistently with production volume, but reflect relative prices between the product forms. This is demonstrated by examining prices for the past decade (Figure 2.44). Average annual prices for Atka mackerel products declined from year to year since the peak in 1990. This is due primarily to the fact that final demand is almost entirely limited to Japan and the quantity available to Japanese consumers has increased steadily over the same time period.

Table 2.4 Production of Atka Mackerel Products in the Fisheries off Alaska

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Volume (1,000 MT)										
Whole Fish	2.0	3.8	11.5	14.2	8.1	6.4	16.7	6.8	4.9	10.1
H&G	11.0	11.3	19.5	24.8	22.4	28.6	38.8	22.3	22.0	22.2
Other products	0.0	0.2	1.0	0.0	1.5	1.4	0.8	1.8	1.1	0.0
Total	**18.1**	**15.3**	**32.0**	**39.0**	**32.0**	**36.4**	**56.4**	**31.0**	**27.9**	**32.4**
Value ($ millions)										
Whole Fish	4.2	5.2	12.8	11.7	6.2	5.3	15.1	4.2	2.5	4.7
H&G	21.7	23.3	32.1	42.2	21.9	36.3	52.9	30.0	15.1	18.2
Other products	0.0	0.1	2.1	0.0	2.2	2.6	0.8	2.5	0.8	0.0
Total	**25.9**	**28.6**	**47.0**	**53.9**	**30.3**	**44.3**	**68.7**	**36.7**	**18.4**	**22.9**

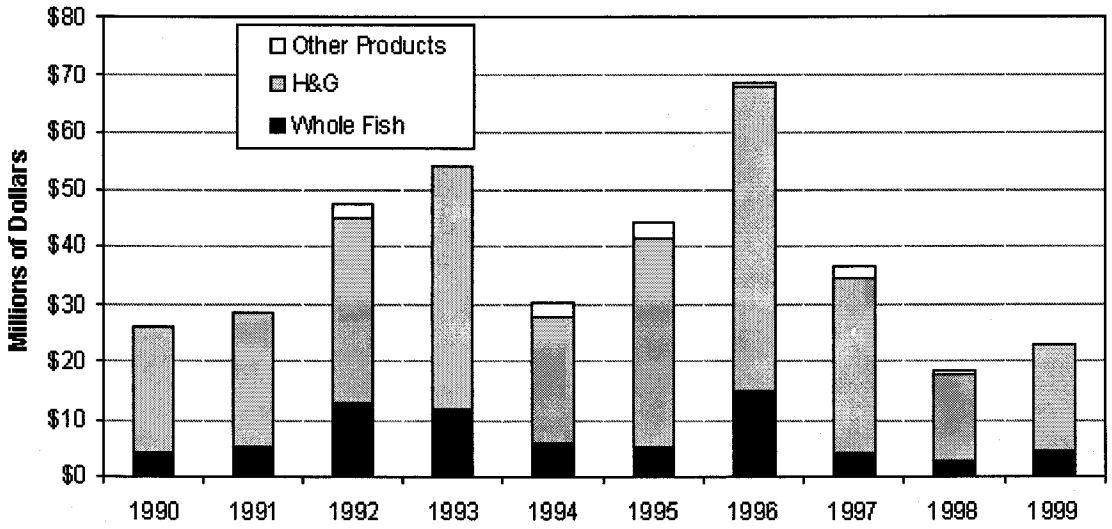
Source: NMFS, "Economic Status of the Groundfish Fisheries off Alaska," various reports.

Figure 2.42 Volume of Production of Atka Mackerel Products from Alaska Waters



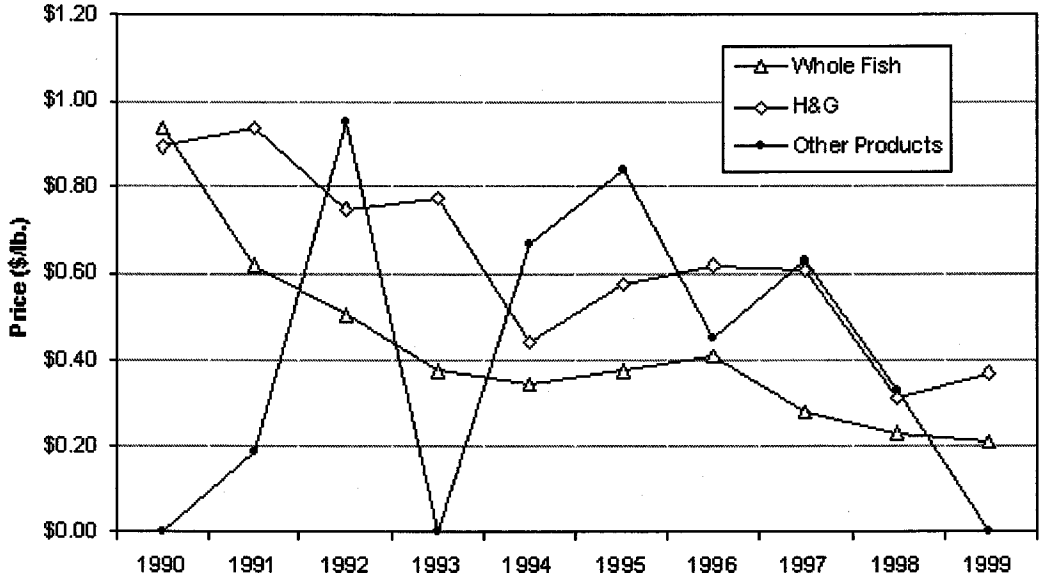
Source: NMFS, "Economic Status of the Groundfish Fisheries off Alaska," various reports.

Figure 2.43 Value of Production of Atka Mackerel Products from Alaska Waters



Source: NMFS, "Economic Status of the Groundfish Fisheries off Alaska," various reports.

Figure 2.44 Average Prices of Atka Mackerel Products from Alaska Waters

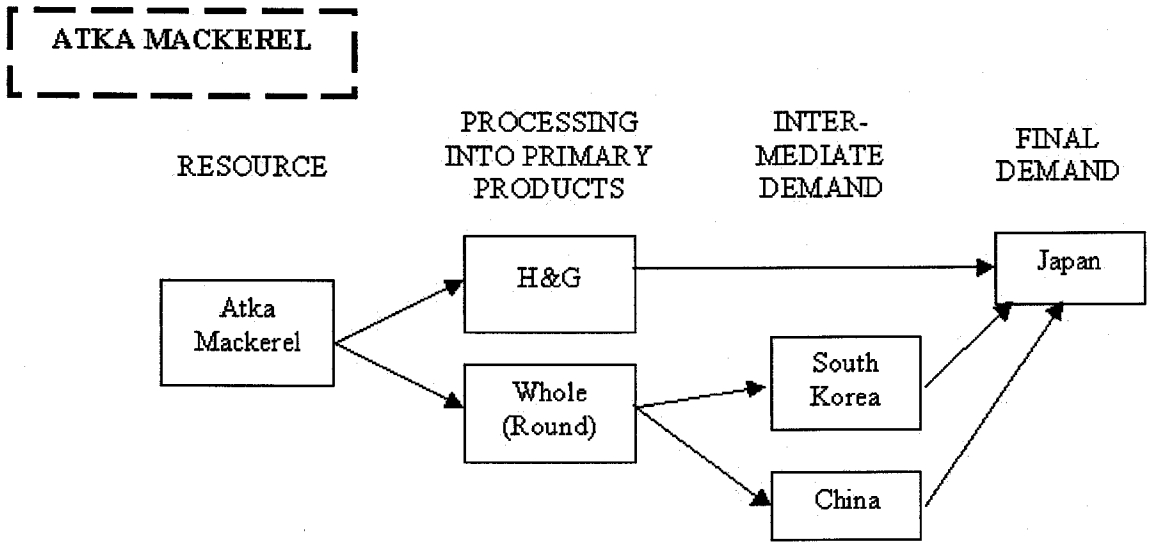


Source: NMFS, "Economic Status of the Groundfish Fisheries off Alaska," various reports.

2.4.4 Resource and Product Flows

An outline of the marketing channels for Atka mackerel is presented in schematic form in Figure 2.45. Atka mackerel are harvested by catcher/processors and processed as either H&G or whole fish. Japanese imports are primarily of H&G product form, while South Korea (and to some extent, China) import whole fish. Most of the product going to South Korea and China is thought to be reprocessed and re-exported to Japan.

Figure 2.45 Product Flow and Market Channels for Atka Mackerel

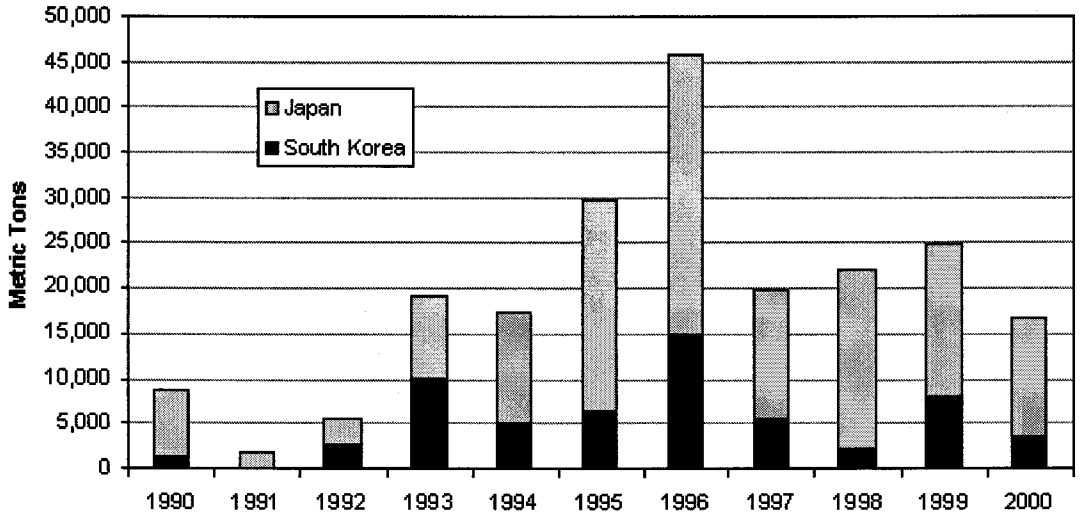


2.4.5 Headed and Gutted

Atka mackerel that is headed and gutted, or H&G, is processed with heads and guts (viscera) removed. In Japan, the mackerel is then split, salted, and grilled. This is reportedly a popular food consumed at social gathering establishments.

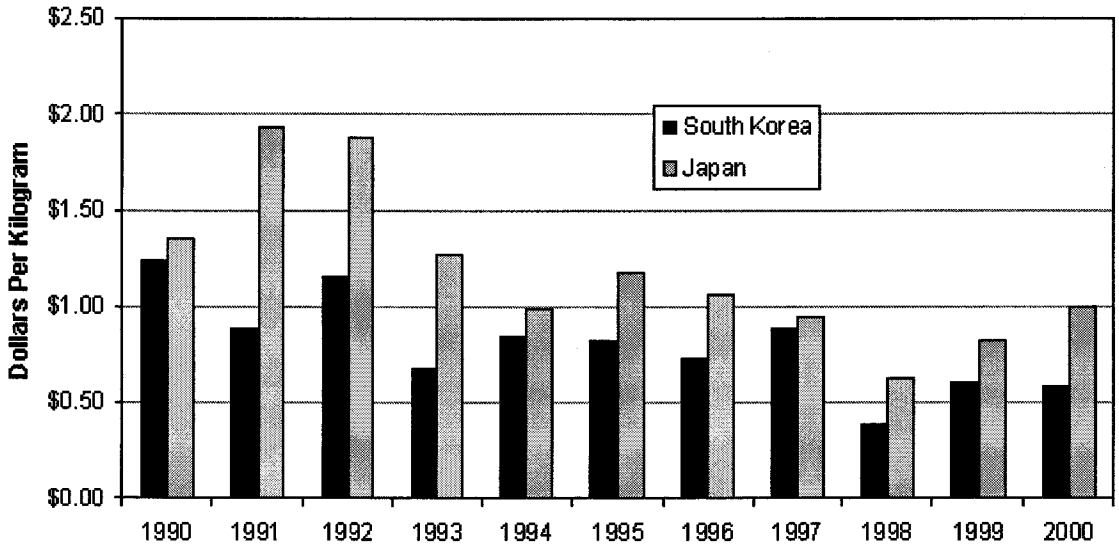
Exports to Japan and South Korea are shown in Figure 2.46, and export prices are shown in Figure 2.47. The export volume closely mirrors the production (and landings) patterns shown in Table 2.4 and Figure 2.39. Considerable year to year variability can be seen in exports to each country, which reflects both a combination of harvests and relative prices (for H&G in Japan and whole fish in South Korea) between the two countries. H&G requires more processing labor than whole fish, so must command a higher purchase price. As prices for whole fish near those for H&G (for example, in 1997), more raw fish will be sold whole. As prices diverge (as in 1998), relatively more will be sold in the H&G processed form.

Figure 2.46 U.S. Exports of Atka Mackerel to Japan and South Korea



Source: Personal communication, NMFS, Fisheries Statistics and Economics Division, Silver Spring, MD.

Figure 2.47 Price per Kilo for U.S. Exports of Atka Mackerel to Japan and South Korea



Source: Personal communication, NMFS, Fisheries Statistics and Economics Division, Silver Spring, MD.

3.0 DATA AVAILABILITY AND COLLECTION

3.1 Federal/Public Statistics

Data related to landings, exports, and imports of the various relevant groundfish species were obtained from the Fisheries Statistics and Economics Division of NMFS, using databases accessed via the website, http://www.st.nmfs.gov/st1/. All data from this source is cited as "personal communication, NMFS, Fisheries Statistics and Economics Division, Silver Spring, MD." In a few instances, where recent data were not yet available via the website, data were also obtained through special requests directly to NMFS Alaska Fisheries Science Center. Landings data were only available through 1999 on the NMFS national website; data for 2000, where available, were obtained from the NMFS Alaska Region Office (website: http://www.fakr.noaa.gov/).

Data on landings presented within this report are based upon the U.S. domestic commercial landings data collected by NMFS. These include those fish and shellfish that are landed and sold in the 50 states by U.S. fishermen and do not include landings made in U.S. territories or by foreign fishermen. Aquaculture products are not included in landings of groundfish species. Because of confidentiality concerns, federal statutes prohibit public disclosure of information that would allow identification of the data contributors and possibly put them at a competitive disadvantage. Thus, data for individual species may, in some cases, be incomplete. Nevertheless, these data represent the best and most comprehensive information available on landings.

The principal landing statistics collected are "pounds" and "ex-vessel" dollar value identified by species, year, month, state, county, port, water, and fishing gear. The data used in this report are only the pounds (round, or live, weight) and ex-vessel value by species. Landing data are collected at the state level from seafood dealers who submit monthly reports of the weight and value of landings by vessel. States are also gathering more landings data through mandatory trip-tickets. In that case, at the conclusion of every fishing trip, seafood dealers and fishermen record landings by species on trip-tickets, and may include other data such as fishing effort and area fished.

U.S. trade data (exports and imports) are maintained by NMFS in databases form for fishery products from years 1975 to present. NMFS receives the data from the Foreign Trade Division of the Bureau of the Census, after Census has compiled information submitted by importers and exporters to the U.S. Customs Service. Detailed data are available categorized by year and month, fish species and product (categorized using ten character commodity codes), country (origin for import data, or destination for export data), U.S. Customs district, and whether it is an import, export, or re-export. The volume (in kilograms) and value (dollars) of the product are provided for each data record.

The database contains information on three types of trade: imports of fishery products, exports of fishery products, and re-exports of fishery products. Data for imports include imports for "consumption," which is a combination of entries into the U.S. for immediate consumption, and withdrawals from Customs bonded warehouses. These data represent the actual entry into U.S. consumption channels of commodities originating outside the U.S. during a certain time period. Exports include commodities (in this case, fishery products) which are grown, produced, or manufactured in the United States and sold outside the U.S. market. For statistical purposes, domestic exports may also include commodities of foreign origin which have been changed from the form in which they were imported or enhanced in value through manufacturing in the U.S. These re-exports include commodities which have entered the U.S. as imports, were not sold, but are re-

exported in the same condition as when imported. If the items were imported for sale in the U.S. market and later were resold overseas, they are recorded as "exports" rather than re-exports.

For exports and re-exports, the value presented is the f.a.s. (free alongside ship) value, which is defined as the value at the port of export, based on the transaction price including inland freight, insurance, and other charges incurred in placing the merchandise alongside the carrier. It excludes the cost of loading, freight, insurance, and other charges or transportation costs beyond the export port. For imports, the value presented is the Customs value, which is generally defined as the price actually paid or payable for merchandise when sold for exportation to the U.S. It excludes U.S. import duties, freight, insurance, and other charges incurred in bringing the merchandise to the U.S. market. This value approximates a foreign f.a.s. value similar to the f.a.s. value for U.S. exports.

3.2 Japanese/International Statistics

The significance of Japan with respect to the demand for groundfish products requires that any analysis of markets include Japanese statistical records. In general, Japanese statistical information is considered thorough, detailed, and very reliable. The difficulty for researchers is in acquiring a full set of time series data related to specific, often relatively obscure, consumption patterns within Japan. Much of the Japanese consumer expenditure information for various products originates from the "Annual Report on the Family Income and Expenditure Survey," an annual publication of the Ministry of Agriculture, Forestry, and Fisheries (MAFF). The data were available in various forms, from secondary sources, electronic website (http://www.statgo.jp/english/), and full published reports. The time series is complete from 1996 through March 2001. The website also provided some population and income data.

A considerable amount of inventory, transaction, and price data was provided by the trade publication, *Bill Atkinson's News Report*. This periodical recounts market information and periodical data series from the perspective of Japan. Much of the price information was provided through this publication. Data on fish paste and surimi imports, consumption, and prices were obtained from the 2001 edition of the Japanese book, "Power Seafood Data Book," prepared by the (Japan) Seafood Daily News.

Some international fish harvest, production, and trade data were available from the Food and Agricultural Organization (FAO) of the United Nations, from their website (http://www.fao.org), the FishStat database, periodicals (e.g., *Globefish*), and various recent special publications. Our reliance on these international data sources was fairly limited, and was used only to supplement gaps of information.

3.3 Industry Data

Representatives from various fishing industry firms and organizations were interviewed to provide background information used in this study. The information requested included descriptions of products types, the nature of the markets for different products, and insights into current market trends. The representatives included salespeople, processor managers, seafood exporters, association representatives, and researchers. Several people served as ongoing resources, answering questions that developed during the study, or reviewing and providing comments on resource flow and market channel diagrams. Several industry representatives provided documents that contained additional data and information used in the report.

Wholesale price information was obtained from price series developed by Urner-Barry in their annual publication, *Seafood Price Current.* These included price series for Alaska pollock fillets, blocks, and twice-frozen blocks (imports).

3.4 Data Limitations

In general, data for landings, production, product form, and ex-vessel prices in the United States are available and fairly complete for recent years. This is true in spite of the variability found in product forms and the changes that have taken place over the past decade in the fisheries off Alaska among suppliers.

U.S. trade data (imports and exports) are readily available from the NMFS website in database form. However, there are limitations to the quality of the data that range from minor to substantial, depending on the species, product form, or time series required. This occurs because of the reporting requirements of – and degree of compliance by – importers and exporters of fish products. For example, an importer may specify that fillets are "Pacific cod," "Atlantic cod," or "cod." In some cases, the reported species is probably an error (such as "Pacific cod" imported from Denmark, where only Atlantic cod is harvested). In other cases, commonly used groupings for similar species lead to difficulties in isolating specific trends: "whiting" or "hake" may be used interchangeably for the wide number of hake and grenadier species that serve as substitutes for Alaska pollock and Pacific cod. As a result of these limitations, there is some inconsistency inherent in the data, not all of which could be resolved.

International trade and landings data, primarily that from FAO, for Russia, China, and many developing countries is useful for trends, but of limited value for absolute quantities. In many cases, the reporting standards and data available from these countries are inadequate for more than just general guidance.

4.0 TREND ANALYSIS

4.1 Conditions Affecting the World Market for Groundfish

Groundfish catches have decreased worldwide in the last decade.[45] In aggregate, the decrease in supply will push consumer prices higher and reduce consumption. The extent to which this will take place will depend in part upon the relative prices of groundfish products and those of meat, poultry, and salmon. Also playing a role is the financial situation in major demand markets of Japan, the United States, and Europe. Numerous past studies have indicated that the demand for groundfish is elastic, so that poor economic conditions in demand centers will cause (proportionally) large decreases in the amount of product demanded.

4.2 Conditions Affecting the Alaska Fishing Industry

The American Fisheries Act of 1998 (AFA) provided the most recent and fundamental change to the fishing industry in Alaska. Although the act targeted the pollock fishery, the implications have been felt to some extent in other commercial fisheries by virtue of the size of the pollock fishery and the interrelationship among some catcher vessels and processors. The AFA changed the Bering Sea fishery in several ways: (1) it eliminated nine catcher/processor vessels from fishery participation; (2) it revised the allocation of the fishery

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[45] Sjøholt, Trond, *The World Market for Groundfish*, FAO.

among the inshore and offshore sectors, and among the offshore sector catcher/processors, motherships, and catcher vessels; and (3) it provided for the formation of fishing cooperatives, on a staggered schedule.

By nearly all accounts, the effect of the Act, on cooperative members in particular but on other aspects of the fishery as well, has been very positive, even "profound." Among the changes that have taken place is a 24 percent reduction in the size of the active pollock fleet by the transferring of quota within the cooperative.[46]

Conditions in the Japanese economy since 1998 have had an important effect on market conditions for Alaska seafood products. The major collapse of the economy in southeast Asia led to an economic slowdown in Japan, which caused Japanese consumer demand to slow. The yen weakened significantly, and the exchange rate dropped to a low of 144 yen per dollar in August 1998. The weak yen and slackened demand placed great pressure on Alaska producers. The economy has since recovered somewhat, and the Japanese yen has strengthened against the dollar.

4.3 Alaska Pollock - Recent and Future Trends

The single most important exogenous factor affecting the market for Alaska pollock is the future of Alaska pollock harvests in the Russian zone. As noted earlier, Russia supplies the largest share of Alaska pollock to the world market, and competes directly with supplies from U.S. waters off Alaska in all three major product areas. In the past several years, the TAC in Russia has been reduced each year. However, there is general consensus that the Russian stock of Alaska pollock has been overfished and that recovery will take at least several years. Adding to this is financial difficulty in the Russian fishing industry, and an uncertain future. In 2000, an estimated 150 million pounds of finished product were produced, and early estimates for this year suggest that landings will decline 30 percent.[47] The declining trend of harvests from Russian waters suggests a favorable market outlook for pollock from the EEZ off Alaska over the next few years due to tightening world supply.

Americans ate more fish (at 15.3 lbs. per capita) in 1999 than at any time since the 1980s. Alaska pollock ranked fourth overall at 1.57 lbs., after tuna, shrimp, and salmon, in per capita consumption. Consumption of fillets and steaks remained at about 3.2 lbs., while consumption of sticks and portions increased from 0.9 lb. in 1998 to 1.0 lb. per capita.[48]

4.3.1 Impacts of the AFA

To date, the AFA has been credited with a positive impact on the production of pollock fillets at the expense of surimi production.[49] By giving cooperative members more certainty among at-sea processors regarding their share of the fishing quota, the "race for fish" essentially stopped. That gives processors more time to

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[46] Loy, Wesley, "Dividing the Fish," *Pacific Fishing*, November, 2000.

[47] Redmayne, Peter, "Species Focus: Alaska pollock," *Seafood Business*, March, 2001.

[48] NMFS, *Fisheries of the United States*, 1999.

[49] U.S. General Accounting Office, *Fishery Management: American Fisheries Act Produces Benefits*, GAO/RCED-00-176, June 29, 2000, p. 2.

process their catch into fillets, which takes longer to produce than surimi. Also attributable to a slower process is an increased product recovery rate, leading to more product per unit of fish caught; the Pollock Conservation Cooperative (PCC) catcher/processors estimated that their recovery rate increased 35 percent in 2000 over a 1998 (pre-AFA) baseline.[50] Furthermore, within the first year of the cooperative (1999), the resulting product mix by PCC members between surimi and fillet production changed only slightly from the year before. However, the fraction of high value, deep-skin fillets increased substantially, with offsetting decreases in the production of lower grade mince and block fillets.[51]

4.3.2 Surimi Market

A long-term trend of reduced surimi demand in Japan has been noted elsewhere in this report. However, surimi has a small but growing interest in South Korea and elsewhere, including the United States. If harvests in Russia decline over the next several years as expected, producers in Alaska will be in a position to supply much of the balance of demand. This is particularly true if pollock surimi is viewed by Japanese consumers as superior to surimi made from other species.

Processors of pollock from the waters off Alaska will face a greater opportunity, under the AFA and particularly in the "A" season, to respond to market conditions with respect to production of surimi or fillets (or other product forms). Some processors indicated they are responsive to expected revenues from surimi and fillets as reflected in the market. This may not be true to the same extent for those in-shore processors that are predominantly Japanese-owned, who tend to tailor production to supply the surimi market. The likely outcome might be only small changes in the aggregate amount of surimi produced in Alaska as compared to the recent past.

4.3.3 Roe Market

Roe products are traditional foods, and Japanese demand may gradually decline to the extent that younger generations of Japanese consumers tend to prefer more Western food in their diet. There has also been an association made between reduced interest in roe and declining rice consumption at home among Japanese.[52] Over the longer term, Japanese and Korean demand for pollock roe will also have an important effect on market conditions.

Total Japanese pollock roe imports have been decreasing over the past few years, primarily as a result of declining imports from Russia. Declining total imports, together with declining pollock roe inventories, led to a steep decline in total pollock roe supply available to the Japanese market between 1997 and 2000. A comparison of Japanese pollock roe supply from all sources with average import prices shows a clear inverse relationship between total pollock roe supply and average import prices.

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[50] "Joint Report of the Pollock Conservation Cooperative and High Seas Catchers' Cooperative," presented to the North Pacific Fishery Management Council, January 31, 2001, p.19.

[51] Criddle, Keith R. and Seth Macinko, "Political Economy and Profit Maximization in the Eastern Bering Sea Fishery for Walleye Pollock," IIFET 2000 Proceedings, July 12, 2000, p. 3.

[52] Foreign Agricultural Service, "Japan Seafood, Japanese Fish Roe Report (Salmon and Cod/Pollock), 1999," U.S. Department of Agriculture, GAIN Report #JA9160, December 17, 1999.

The AFA is also believed to have benefited the market for roe. With a more relaxed fishing environment, catcher vessels may be better able to harvest and process roe at times that are optimal for quality. This, combined with better economic conditions in Japan, may explain recent strong prices for roe.

As with surimi, future Russian supply seems likely to be the most important factor affecting future pollock roe markets. The likelihood of further reductions in Russian pollock harvests over the next few years suggests a favorable market outlook for Alaska pollock roe. Over time, U.S. processors should have the opportunity to continue to capture further market share from Russian processors.

4.3.4 Fillet Market

The primary market for pollock fillets from U.S. EEZ waters off Alaska is the domestic market. However, there is now considerable competition from imported fillets of Alaska pollock. Russia has supplied as many as 20,000 MT annually of single-frozen fillets for the past five years, but China's twice-frozen blocks and fillets have grown to create a new segment of the market. In addition, pollock fillets have begun to enter the European market, especially Germany, in the last five years, and general shortages in global whitefish supplies have led to high single-frozen pollock prices.

The quality of single-freeze fillets coming from processors is said to be higher than that of a few years ago. This is attributed to the formation of cooperatives under the AFA, which allows catchers and processors to handle catch more carefully.[53]

In 1999, Chinese processors purchased a large quantity of H&G pollock from Russia and aggressively marketed twice-frozen product to buyers in the United States. Low prices for twice-frozen and high prices for single-frozen fillets created an opportunity for a shift among buyers, despite the lower quality. Although some recovery of prices has since taken place, substitution between products is expected to remain a part of the market.

The market for deep-skin pollock blocks is subject to some of the same competition as the single-frozen fillets. However, most deep-skin fillets are processed under contract in part to ensure a consistent and available supply of product. There is also evidence that, because of the AFA, processors are producing deep-skin rather than regular fillets.

Competition among buyers for the deep-skin product has led to greater reliance on substitute species, including hake and hoki fillet blocks. There is also a recent shift towards consideration of twice-frozen blocks as a substitute for the deep-skin product, as it is reportedly of higher quality than in the past.

4.4 Pacific Cod - Recent and Future Trends

The Pacific cod fishery has provided to the domestic market steady supplies of cod and cod products throughout the 1990s during a time when Atlantic cod landings have fallen. During this period, U.S. landings of Atlantic cod fell considerably from over 35 thousand MT annually to under ten thousand MT. In recent

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[53] "Alaska Pollock," *Seafood Business Buyers Guide*, October, 2000, http://www.seafoodbusiness.com/.

years, some buyers have switched from cod to pollock because of higher cod prices and the uncertainty of cod supplies.

International trade is an important factor in the market for Pacific cod, as it is for cod in general. Shortfalls in world cod stocks as recently as 1998 caused European and Japanese buyers to bid up demand and prices for Pacific cod. The U.S. is a net importer of cod fillets, but a net exporter of other cod product forms, which are primarily made up of H&G cod. A strengthening dollar may dampen future exports, especially to Japan. However, because of continued declines in the Barents Sea stocks off Russia and Norway, and increasing demand associated with population increases, industry analysts tend to be positive about prices in the near future.

Although Atlantic cod remains the dominant species in the U.S. cod fillet market, Pacific cod has made some inroads into that well-established niche. But price differences between Atlantic and Pacific cod indicate that the two are not viewed as perfect substitutes. Furthermore, there is additional competition and segmenting of the market taking place. The growing quantity of cheaper "twice-frozen" fillet imports from China provides a lower-cost alternative to traditional cod buyers. Second, aquaculture-grown whitefish is increasing in the share of the market, and this trend is expected to continue in the future.

4.5 Atka Mackerel - Recent and Future Trends

The U.S. and Russia are currently the only primary source of Atka mackerel for Japan because of reduced quotas and restrictions on the Japanese trawl fleet.[54] At the same time, supplies have been further reduced by a court injunction temporarily restricting U.S. landings. In late 2000, Japanese inventories were still plentiful, which helped meet the demand from Japanese processors. In early 2001, catches of Atka mackerel were still low after Japanese inventories and catches had both been drawn down, and the price of Atka mackerel rose. While higher prices may have begun to affect consumption,[55] industry experts believe that demand for Atka mackerel may be fairly inelastic, hence prices will strengthen in the face of declining supplies. The opinion that demand may be inelastic is based on speculation that these recent supply shortfalls will continue to improve prices. Although traditional Japanese foods are in general thought to be losing favor among Japanese youth who show an increasing preference for western foods, the popularity of Atka mackerel appears to be able to withstand such trends. It is still not clear whether Atka mackerel will become a premium product in Japan, or whether it will be supplanted by other substitute products such as grilled sardines.

5.0 APPLICATION OF PROTECTIVE MEASURES FOR THE STELLER SEA LION

5.1 Introduction

Five alternatives have been identified in the EIS, to which this markets analysis is appended and upon which it is based, which target harvest areas, season length, or TAC for Alaska pollock, Pacific cod, and Atka mackerel. Detailed descriptions of the alternatives are provided in the EIS, but the names corresponding with each alternative are identified as follows:

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[54] *Bill Atkinson's News Report*, September 27, 2000.

[55] *Bill Atkinson's News Report*, February 24, 2001.

Alternative 1:	No action
Alternative 2:	Low and slow
Alternative 3:	Restricted and closed areas
Alternative 4:	Area and fishery specific
Alternative 5:	CH catch limits

In this section, we analyze the impacts of the alternatives on the markets associated with products from Alaska pollock, Pacific cod, and Atka mackerel which may be attributable to the various Steller sea lion (SSL) protection alternatives. Specifically, we provide a discussion of the anticipated impacts of the alternatives in terms of the market, including prices, quantities produced, product forms and mix, market share and market penetration, product quality, balance of trade, and final consumers.

NMFS provided the anticipated changes in quantity of retained landings for each species associated with three of the alternatives. These quantities are determined by sector, region (Gulf of Alaska and Bering Sea/Aleutian Islands), and first and second half of the year. The quantitative estimates for the three alternatives provide sufficient information to infer the impacts for the remaining two.

5.2 Changes in Harvested Volume

The scenarios provided by NMFS include Alternative 1 (No Action), Alternative 2 (Low and Slow), and Alternative 4 (Area and Fishery Specific). The retained annual landings for these three alternatives are shown in Tables 5.1, 5.2, and 5.3. The alternatives reflect the application of rules to the Allowable Biological Catch (ABC) for 2001, using vessel patterns based on 1999 records. Details on the approach for estimating harvest level changes are provided in the RIR.

Table 5.1 Alternative 1 "No Action" - Retained Annual Landings

		Total Metric Tonnages		Metric Tons "at risk"		Metric Tons not "at risk"	
		GOA	BSAI	GOA	BSAI	GOA	BSAI
Atka mackerel	CDQ	0	5,198	0	1,725	0	3,473
	Jig	0	144	0	0	0	144
	Trawl	0	63,958	0	7,579	0	56,379
Pacific cod	CDQ	0	17,928	0	45	0	17,883
	Fixed<60	17,236	125	98	0	17,138	125
	Jig	813	319	22	0	792	319
	Longline-CV	702	1,723	0	62	701	1,662
	Longline-CP	1,961	92,696	0	248	1,961	92,448
	Pot-CV	6,169	14,631	20	161	6,148	14,469
	Pot-CP	2,835	4,259	11	56	2,824	4,203
	Trawl-CV-S	7,800	5	210	0	7,590	5
	Trawl-CV-M	12,269	31,675	178	787	12,091	30,887
	Trawl-CV-L	355	7,873	13	307	341	7,566
	Trawl-CP-Fillets	11	6,000	2	672	9	5,328
	Trawl-CP-H&G	698	10,767	40	1,240	658	9,527
Pollock	CDQ	0	140,000	0	2,520	0	137,480
	CV-Shoreside	99,350	604,800	764	3,871	98,586	600,929
	CP	0	483,840	0	6,580	0	477,260
	MS	0	120,960	0	1,972	0	118,988

Table 5.2 Alternative 2 "Low and Slow" - Retained Annual Landings

		Total Metric Tonnages		Metric Tons "at risk"		Metric Tons not "at risk"	
		GOA	BSAI	GOA	BSAI	GOA	BSAI
Atka mackerel	CDQ	0	1,716	0	1,085	0	631
	Jig	0	48	0	0	0	48
	Trawl	0	21,104	0	8,236	0	12,868
Pacific cod	CDQ	0	10,125	0	1,590	0	8,535
	Fixed<60	9,068	221	763	7	8,305	214
	Jig	2,509	474	511	16	1,999	458
	Longline-CV	447	301	41	26	406	274
	Longline-CP	615	85,189	315	11,726	300	73,463
	Pot-CV	5,988	8,703	680	234	5,308	8,469
	Pot-CP	3,505	3,161	3	27	3,502	3,135
	Trawl-CV-S	2,550	2	1,713	0	837	2
	Trawl-CV-M	6,199	15,133	2,100	12,294	4,100	2,839
	Trawl-CV-L	99	3,008	59	2,165	41	842
	Trawl-CP-Fillets	3	1,964	2	643	1	1,321
	Trawl-CP-H&G	656	6,698	137	3,747	519	2,951
Pollock	CDQ	0	113,659	0	32,273	0	81,386
	CV-Shoreside	44,508	431,341	35,817	163,531	8,691	267,810
	CP	0	392,808	0	49,741	0	343,067
	MS	0	98,211	0	15,008	0	83,203

Table 5.3 Alternative 4 "Area and Fishery Specific" - Retained Annual Landings

		Total Metric Tonnages		Metric Tons "at risk"		Metric Tons not "at risk"	
		GOA	BSAI	GOA	BSAI	GOA	BSAI
Atka mackerel	CDQ	0	5,198	0	2,563	0	2,635
	Jig	0	144	0	0	0	144
	Trawl	0	63,958	0	18,900	0	45,058
Pacific cod	CDQ	0	19,628	0	337	0	19,291
	Fixed<60	15,171	134	1,463	6	13,708	127
	Jig	3,470	352	0	0	3,470	352
	Longline-CV	745	1,648	77	278	668	1,370
	Longline-CP	1,186	93,896	172	3,660	1,014	90,236
	Pot-CV	8,605	14,491	3,321	2,035	5,284	12,456
	Pot-CP	3,775	4,399	96	793	3,679	3,606
	Trawl-CV-S	4,977	4	692	0	4,285	4
	Trawl-CV-M	11,693	30,037	1,310	391	10,383	29,646
	Trawl-CV-L	252	7,446	55	268	197	7,178
	Trawl-CP-Fillets	7	5,675	4	880	3	4,796
	Trawl-CP-H&G	968	10,289	46	1,081	921	9,208
Pollock	CDQ	0	140,000	0	14,336	0	125,664
	CV-Shoreside	99,348	604,800	10,795	18,991	88,553	585,809
	CP	0	483,840	0	11,032	0	472,808
	MS	0	120,960	0	2,903	0	118,057

Assumptions were made with respect to interpretation of the estimates. In particular, "total metric tons not at risk" was the quantity used to reflect harvest under the alternative. Strictly speaking, the portion that is "not at risk" is the quantity that is not directly restricted by the proposed action. While it can be argued that some of the tons "at risk" could, in fact, be caught through compensating changes such as vessel location, harvest behavior, or increased cost, the minimum harvest levels (those "not at risk") can be interpreted as providing the worst-case scenario impact.

5.3 Impacts of the Alternatives

5.3.1 Product Mix and Quantity of Products Supplied to the Market

For Alternative 1, the retained landings of pollock were anticipated to be 1,433,243 metric tons. This baseline level of harvest is anticipated to allow processors to supply product quantities to the market at levels comparable to, or somewhat higher than, those of recent years. Pollock landings were just over 1.2 million MT in 2000, which yielded 191 thousand MT of surimi, 62 thousand MT of fillets, 16 thousand MT of roe, and 95 thousand MT of other products, as shown earlier in Table 2.1.

Under Alternative 2, retained harvests are reduced by 43 percent from the baseline estimate. The impact of this reduction will severely affect production of all pollock products. However, the reduction is expected to affect fillet production to a greater extent than surimi. This is due in part to supply contracts and vertical integration among surimi processors, particularly those that are located inshore, with wholesalers and retailers

in Japan. Thus, surimi production would be reduced by a substantial amount – perhaps 25 percent or more – but is not likely to decline in as high a proportion as landings, all else remaining equal.

It was suggested by several industry contacts that, should area closures cause catcher vessels to harvest from sites farther from processors, the additional time required for catchers to haul raw fish to shore will affect the ability of inshore processors to produce high quality fillets. As a result, they may produce proportionally fewer fillets and more surimi than at present. To the extent that the Alternative 2 reduces the availability of larger-sized pollock generally sought for fillets, production of fillets will decline. Thus, reductions in pollock landings as may be experienced in Alternative 2 are likely to have a large effect on fillet production.

The impact on roe supply would be substantial under Alternative 2. The harvesting of roe is limited to a very short period of the year and, given the financial importance of roe to processors, the focus of catcher vessels and catcher/processors will be on targeting the overall TAC toward maximizing roe harvest to the greatest extent possible . Even under these conditions, potential roe harvest could be as little as half that of the no-action alternative.

This is predicated on the assumption that catcher vessels and catcher/processors will continue to operate in the fishery. Though little is known publicly about the cost structure within the pollock fishery, it is generally thought that revenues from roe help to offset costs of production in the other product forms and through the remainder of the year. If the total revenues generated from sale of roe are reduced in large measure on a permanent basis, the fishery as a whole could effectively cease, with repercussions felt throughout all product forms and by pollock markets and consumers.

The balance of trade in the U.S. will be affected as a result of these supply changes. Losses on the export side will be felt from reduced surimi and roe supplies, as the vast majority of these products are sold overseas.

Under Alternative 4, the retained harvests are reduced by a very small amount. This change in landings will result in only small impacts in the supply of surimi, fillets, and roe. The change in supply is not likely to be noticed at the consumer level, and processors are equally unlikely to change product mix explicitly in response to reduced landings. There will be accompanying impacts to the balance of trade.

The baseline alternative for Pacific cod involves retained landings of 234,675 MT. This represents 98 percent of the initial projected retained harvests, and is not expected to alter product composition in any noticeable way. An additional 4,172 MT would be considered at risk. The "at risk" portions in the baseline scenario would most affect trawl catcher/processors producing fillets, which would lose about 16 percent of their initial projected harvests, and trawl catcher/processors producing H&G cod, which would lose about 10 percent of the projected harvests. It is not likely that there would be any effect on either domestic or international markets discernable from a change of this magnitude in world cod supplies.

Alternative 2 represents a total annual TAC of just 127,819 MT. This would be a departure from recent historical landings in the United States, and would represent a distinct drop in world cod landings of nearly 10 percent. The effects of this could likely result in a weakened supply of domestic cod fillets, both domestically produced and those that are re-imported from China to the U.S. market. As domestic prices are bid up, producers would be somewhat compensated for losses in quantities produced, but it is likely that consumers would switch to other, cheaper products, including the wide variety of aquaculture-based whitefish

products available. Others would turn to domestic and imported pollock fillets and other whitefish, such as hake or hoki. International markets would also be affected, and prices would probably increase. In such a scenario, it is not likely that these producers and consumers would return, and Pacific cod producers would lose market share.

Alternative 4 is likely to have a similarly negligible effect on domestic and international markets. Landings not at risk would decline by about 13 thousand MT beyond the baseline scenario, and this would represent about 1 percent of world cod landings.

While the decrease in landings implied by the alternative represents a decrease (by about 5 percent) from the "no action" alternative, it is very near the quantity of landings (and TAC) of recent years, and does not represent a significant change in production. The impact on processors, distributors, and brokers in the market would likely be higher individually and in the aggregate, but would not be widely felt in the general economy.

For Atka mackerel, Alternative 1 represents 60,000 MT – more than recent harvests of Atka mackerel which average around 50,000 MT. Alternative 2 would significantly decrease Atka mackerel landings, to just over 13,500. This would represent roughly 25 percent of current landings, and very likely would result in a significant adverse impact on the fishery. It is very likely that revenues would not be sufficient to cover costs of operating, and vessels might abandon the fishery. The implications of this change would be a loss of a $5 million dollar fishery and the accompanying effect on the balance of trade, as nearly all of the product is exported.

Alternative 4 would result in 48,000 MT in landings, and is not expected to change the market from existing conditions.

5.3.2 Prices

Alaska pollock are processed into a wide variety of product forms sold in different markets around the world. The most valuable of these are surimi, fillets, and roe. Whether the per unit price of pollock will rise depends upon the combined effect on these markets.

Surimi from Alaska is largely sold primarily to markets in Japan, and the United States is by far the leading country providing pollock surimi to this market. Furthermore, surimi made from pollock is considered to be superior to most, if not all, other surimi; there are no close substitutes. Therefore, a change in quantity of pollock surimi supplied would result in a noticeable change in per unit cost. Results from the econometric model suggest that surimi exports to Japan are price ineleastic in this market; that is, demand for surimi will not soften much in response to a modest price increase. This may be attributed in part to supply contracts and vertical integration among surimi processors, wholesalers, and retailers in Japan. As a result, the "internalization" of the market channels may cushion the effects of price for intermediate products such as surimi. In contrast, the relatively recent but growing demand for surimi in South Korea and, to a lesser extent, Europe is likely to be more elastic – and price responsive. In general, buyers in those locations are more likely to reduce their purchases than those in Japan in response to higher prices.

As noted earlier, a supply shock to pollock landings of the magnitude suggested for Alternative 2 could reduce surimi production, but by a smaller percentage than the change in landings. The quantity of reduction would

still be enough to raise export prices for surimi. These higher prices would be more likely to affect the demand for surimi in the more elastic market segments, especially Europe and the United States.

A reduction in pollock supply implied by Alternative 4 would alter surimi production very little, and export prices would change negligibly, if at all.

A very similar story to surimi can be said of pollock roe. Alaska-based pollock roe dominates other supplies in Japan, and there are no close substitutes for pollock roe. In recent years the decline in supplies of roe from Russia have left United States suppliers with opportunity for a larger influence in the market. Thus, a change in the quantity supplied of pollock roe would result in a change in per unit cost. The econometric model indicates that Japanese imports of pollock roe tend to be fairly price inelastic. In the face of higher prices for roe faced by Japanese consumers, imports will decrease, but to a lesser extent, such that total revenue may stay the same or even rise. This circumstance is predicated for non-permanent and relatively small changes in the quantity of roe supplied. Substantial changes in quantity of a permanent nature are likely to lead to profound changes in market demand that are not easy to predict.

Alternative 2 would have a substantial bearing on the production of roe. Prices would rise to levels rarely, if ever, seen before. Such changes in price are likely to change the nature of the demand, to an area of the demand curve that is more responsive to price. Once again, this is predicated on the assumption that the fishery will continue to operate in the face of large reductions in a primary revenue source.

A lesser impact would result from reductions in landings on a scale of that in Alternative 4. Prices for roe would be expected to rise and demand for roe decline, but total revenue may change little, if at all, and could actually increase.

The fillet market is quite different from surimi and roe. Nearly all of the fillets (deep-skin and other forms) produced from pollock end up in the domestic market, and the demand in the United States far exceeds the current supply of fillets. The domestic fillet market, however, is fairly competitive in terms of product form (IQF, block, and twice-frozen), supplying country (Russia and China play major roles), and fillets from other species, including hake and hoki. As a result, the per unit price for pollock fillets will rise only if there is a large change in the amount of fillets supplied to the marketplace. Because pollock is only one (albeit, a significant one) of the sources of whitefish fillets in the world market, several factors, in addition to the size of pollock landings from the U.S. EEZ off Alaska, will ultimately determine these market responses.

Reductions in pollock landings as may be experienced in Alternative 2 are likely to have a large effect on fillet production. Greater reductions in production will take place for fillets than surimi; furthermore, prices are likely to rise, but not to an extent that will offset the reduced supply in terms of total revenue. The impacts will be felt through the market channels to the final consumer in terms of somewhat higher prices. However, the most likely occurrence will be a negative effect on the trade balance, as more fillets are imported to offset the reduced supply.

Alternative 4 will also result in fewer fillets produced, but the impacts would be much less. The reduction in landings is smaller than for Alternative 2, and the resulting decline in fillets produced would be less. The reduction may not be enough to change the price for fillets, and final consumers may not even notice a price change. It is much more likely that imported fillets will mostly or completely offset the pollock fillet shortfall.

Pacific cod enters an international market, but much of the product stays in the United States. More than half of the processed product is H&G and sold to Japan, Europe, South Korea, and China. Some of that sold to China is reprocessed and returns to the United States as "twice-frozen" blocks. Fillets, as IQF and blocks, represent the next largest product form, and about a third of the value, and are sold in domestic markets to fancy and family restaurants, institutions, and retail fish markets. As Atlantic cod stocks in the United States and Canada dwindled during the last decade, Pacific cod effectively filled the void. However, the United States continues to import Atlantic cod (from Iceland, Canada, and Norway), serving a primarily east coast market.

The product forms for Pacific cod are diverse, and Pacific cod often serves as an effective substitute for Atlantic cod, world stocks of which rise and fall. But markets for Atlantic cod, both domestically and abroad, are well-established. If the quantity of Pacific cod is reduced by a small amount, the per unit price may hold steady or rise only slightly.

Atka mackerel is usually processed into H&G, almost entirely exported, and nearly all of it goes to either Japan or South Korea. It is a unique and popular product in those countries, with few substitutes. If the supply is reduced, the per unit price will very likely rise.

5.3.3 Market Share

The product forms that derive from the three species are varied, and enter different market environments. As such, the long-term damage to market share will be more or less significant, depending upon the product. For pollock, surimi and roe are sold predominantly to Japanese markets, but there are no close substitute products and limited alternate supplies from other countries. In recent years, U.S. suppliers have managed to obtain a larger share of the market for both products, as the landings of pollock from Russia have declined. Market share is of great importance in these markets because of the relatively small number of suppliers and buyers. Personal relationships are formed and established, and buyers often track the product by processor and even individual vessels.

The same cannot be said to the same extent for pollock fillets. Several large quick-service restaurant chains in the United States depend upon steady supplies of deep-skin fillets, and use pollock rather than other whitefish primarily because of its reliability in supply and uniform quality. In most cases, the deep-skin fillet product is processed under supplier contracts. Relatively small changes in quantity of landings might not affect the market share. However, if a relatively large proportion of the supply were to be interrupted, a shift would likely take place permanently to other supplying countries, product forms, or substitute species. At present, a significant share of domestic pollock fillet demand is satisfied by imports, and the role of China in supplying "twice-frozen" fillets could increase.

A similar circumstance might befall markets for Pacific cod, which must compete in well-established markets characterized by long-standing relationships. The inroads that Pacific cod has made in filling the void left by the declining Atlantic cod stocks could very well be lost, at least for some time.

5.3.4 Product Quality

Alaska Pollock is a fragile fish whose quality deteriorates rapidly the longer the time from harvest to processing. As such, any factors that will increase the length of time to processing will, in general, lower the quality of the product produced. To the extent that the alternatives result in catcher vessels traveling farther distances from (inshore) processors, and thereby lengthening the time between harvest and processing, the quality of surimi, fillets, and roe will be adversely affected. This may not be true among the at-sea catcher/processors or catcher vessels for motherships; their mobility allows them to move where the harvests take place.

Impacts on quality are notable in the marketplace. Surimi and roe in particular are graded and priced based upon attributes, some of which are affected by freshness. If product quality is lower, prices received are lower and total revenue is affected. This has cumulative and long-term effects upon the market share for these processors and distributors who no longer can compete in the high-end quality market.

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Appendix E1

Harvest Data and Maps

Appendix E1 1999 catch of Atka mackerel, Pacific cod, and pollock in the BSAI and GOA

Table		Page Number
Table E1-1.	1999 catch (in metric tons) of Atka mackerel, Pacific cod, and pollock in the BSAI and GOA target groundfish fisheries by gear type, federal reporting area (Zone) , and processing mode.	E1-2
Table E1-2.	Description of Bering Sea and Aleutian Islands statistical and reporting areas.	E1-10
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Figure E1-1.	Bering Sea and Aleutian Islands statistical and reporting areas.	E1-9
Figure E1-2.	Gulf of Alaska statistical and reporting areas.	E1-11

Table E1-1. 1999 catch (in metric tons) of Atka mackerel, Pacific cod, and pollock in the BSAI and GOA target groundfish fisheries by gear type, federal reporting area (Zone), and processing mode

Management Area	Target code	Gear	Zone	Processing mode	AMCK	PCOD	PLCK
	A Atka Mackerel	TRW	517	P	82	23	32
	A	TRW	518	P	12	1	1
	A	TRW	519	P	1,741	110	213
	A	TRW	541	P	14,565	943	5
	A	TRW	542	P	21,520	717	72
	A	TRW	543	P	16,207	755	26
	B Bottom pollock	TRW	509	M		24	2,466
	B	TRW	509	P		49	2,304
	B	TRW	513	P		9	720
	B	TRW	513	S	8		112
	B	TRW	514	P		20	205
	B	TRW	516	P		0	42
	B	TRW	517	M		9	511
	B	TRW	517	P	7	28	1,616
	B	TRW	517	S	136	3	422
	B	TRW	519	P			21
	B	TRW	521	P		2	383
	B	TRW	523	P			0
	B	TRW	542	P	4	0	0
	C Pacific cod	HAL	509	P		15,183	769
	C	HAL	512	P		271	19
	C	HAL	513	M		104	2
	C	HAL	513	P		13,038	830
	C	HAL	514	P		19	2
	C	HAL	514	S	0	3	0
	C	HAL	516	P		1,824	56
	C	HAL	517	P		13,364	845
	C	HAL	518	P	0	1,397	11
	C	HAL	518	S	0	8	0
	C	HAL	519	P	0	459	18
	C	HAL	519	S	0	8	0
	C	HAL	521	P	0	32,400	1,239
	C	HAL	521	S		2	-
	C	HAL	523	P		2,513	69
	C	HAL	523	S		0	
	C	HAL	524	P		698	44
	C	HAL	524	S		0	
	C	HAL	541	P	6	4,096	7

Management Area	Target code	Gear	Zone	Processing mode	AMCK	PCOD	PLCK
BSAI	C	HAL	541	S	0	87	0
	C Pacific cod	HAL	542	P	62	3,217	5
	C	HAL	542	S	0	11	
	C	HAL	543	P	3	389	
	C	JIG	519	P		0	0
	C	JIG	519	S		100	0
	C	JIG	541	S		69	
	C	POT	509	P	0	776	5
	C	POT	509	S	1	1,470	4
	C	POT	513	P		254	0
	C	POT	513	S	-	39	0
	C	POT	516	P		4	
	C	POT	517	P		0	
	C	POT	517	S	0	1,091	5
	C	POT	518	M		66	
	C	POT	518	P		4	
	C	POT	518	S	6	539	2
	C	POT	519	P		26	
	C	POT	519	S	3	7,219	1
	C	POT	521	P		357	4
	C	POT	524	P		551	0
	C	POT	541	M	0	33	
	C	POT	541	P	0	301	0
	C	POT	541	S	1	1,691	2
	C	POT	542	M	0	289	
	C	POT	542	P	0	320	
	C	POT	543	M		574	
	C	POT	543	P	0	541	
	C	TRW	509	M		101	15
	C	TRW	509	P		6,670	6,058
	C	TRW	509	S	3	5,428	7,518
	C	TRW	513	P	0	279	376
	C	TRW	513	S		54	1
	C	TRW	516	P		145	66
	C	TRW	517	M		85	18
	C	TRW	517	P	35	1,522	1,282
	C	TRW	517	S	0	20,651	1,332
	C	TRW	518	P	3	52	12
	C	TRW	518	S		11	
	C	TRW	519	P	21	57	22
	C	TRW	519	S	-	177	3
	C	TRW	521	M		646	141
	C	TRW	521	P		1,236	290
	C	TRW	521	S		68	10
	C	TRW	523	M		73	57

Management Area	Target code	Gear	Zone	Processing mode	AMCK	PCOD	PLCK
BSAI	C	TRW	523	P		36	0
	C Pacific cod	TRW	541	M	28	5,617	61
	C	TRW	541	P	372	6,141	10
	C	TRW	541	S	0	1,452	384
	C	TRW	542	M		244	0
	C	TRW	542	P	98	397	28
	F Other flatfish	TRW	509	P		0	0
	F	TRW	517	P	44	130	213
	F	TRW	519	P	0	10	112
	K Rockfish	HAL	519	S		1	
	K	HAL	521	P		0	
	K	HAL	542	P		2	
	K	TRW	517	P		5	3
	K	TRW	518	P		1	3
	K	TRW	519	P	4	3	3
	K	TRW	541	P	172	41	16
	K	TRW	542	P	734	67	255
	K	TRW	543	P	158	63	79
	L Flathead sole	TRW	509	P		67	71
	L	TRW	512	P		0	0
	L	TRW	513	P		1,572	2,134
	L	TRW	516	P		1	0
	L	TRW	517	P	14	755	1,198
	L	TRW	519	P			3
	L	TRW	521	P		826	633
	L	TRW	524	P		1	0
	O Other Species	HAL	521	S		6	0
	O	HAL	524	P		7	2
	O	HAL	524	S		0	
	O	HAL	541	S	0	2	
	O	HAL	542	S		0	
	O	POT	541	S		0	
	P Pollock-midwater	TRW	509	M		110	29,410
	P	TRW	509	P	0	380	59,785
	P	TRW	509	S		363	94,186
	P	TRW	513	M	0	42	9,600
	P	TRW	513	P	0	239	59,024
	P	TRW	513	S	0	68	31,068
	P	TRW	516	M		0	74
	P	TRW	516	P		0	266
	P	TRW	517	M	0	202	29,266
	P	TRW	517	P	0	418	114,897
	P	TRW	517	S	7	711	306,736
	P	TRW	519	P			370

Management Area	Target code	Gear	Zone	Processing mode	AMCK	PCOD	PLCK
BSAI	P	TRW	519	S		2	1,399
	P	TRW	521	M	0	45	36,952
	Pollock midwater	TRW	521	P	0	494	165,872
	P	TRW	521	S		1	658
	P	TRW	523	P		0	95
	P	TRW	524	M			136
	P	TRW	524	P		0	102
	P	TRW	542	P	0	0	60
	R Rock sole	TRW	509	P		2,082	4,070
	R	TRW	513	P		19	88
	R	TRW	514	P		29	15
	R	TRW	516	P	0	1,179	1,027
	R	TRW	517	P		7	7
	S Sablefish	HAL	517	S		0	
	S	HAL	518	P		1	
	S	HAL	518	S		33	
	S	HAL	519	S		1	0
	S	HAL	541	P		12	0
	S	HAL	541	S		33	0
	S	HAL	542	P		1	
	S	HAL	542	S		8	0
	S	POT	518	P		0	
	S	POT	519	S		1	
	T Greenland Turbot	HAL	509	S		0	
	T	HAL	517	P		23	1
	T	HAL	517	S		0	
	T	HAL	518	P		0	
	T	HAL	518	S		0	
	T	HAL	519	S		0	
	T	HAL	521	P		79	3
	T	HAL	521	S		0	
	T	HAL	523	P		19	0
	T	HAL	523	S		0	
	T	HAL	524	P		0	0
	T	HAL	541	P		10	0
	T	HAL	541	S		2	
	T	HAL	542	P		4	
	T	POT	541	P		1	
	T	TRW	517	P	60	63	126
	T	TRW	519	P	73	23	21
	W Arrowtooth Fl.	TRW	517	P	7	41	129
	W	TRW	519	P	1	41	127
	Y Yellowfin sole	TRW	509	P		1,752	2,302
	Y	TRW	513	P	0	960	3,201

Management Area	Target code	Gear	Zone	Processing mode	AMCK	PCOD	PLCK
BSAI	Y	TRW	513	S		7	85
	Y	TRW	514	P		702	1,549
	Y	TRW	517	P	25	946	1,550
	Y Yellowfin sole	TRW	519	P	8	13	10
	Y	TRW	524	P		3	5
BSAI Total					**56,231**	**173,978**	**989,777**
GOA							
	Bottom pollock	JIG	630	S			0
	B	TRW	610	S		1	23
	B	TRW	620	S		158	2,096
	B	TRW	630	S		263	695
	C Pacific cod	HAL	610	P	0	5,139	8
	C	HAL	610	S		29	1
	C	HAL	620	P		190	
	C	HAL	620	S		123	10
	C	HAL	630	M		3	0
	C	HAL	630	P		110	
	C	HAL	630	S		6,014	127
	C	HAL	640	S		1	0
	C	HAL	649	S		205	8
	C	HAL	650	S		9	0
	C	HAL	659	P		17	
	C	HAL	659	S		97	2
	C	JIG	620	S		8	
	C	JIG	630	S		18	0
	C	JIG	640	S		26	
	C	JIG	649	S		6	
	C	JIG	650	S		0	
	C	OTH	630	S		7	
	C	POT	610	M		184	
	C	POT	610	P	0	1,424	0
	C	POT	610	S	-	1,161	0
	C	POT	620	P	0	2,932	
	C	POT	620	S	-	5,410	2
	C	POT	630	M		39	
	C	POT	630	P		6	
	C	POT	630	S	-	7,555	3
	C	POT	649	S	-	297	0
	C	POT	650	S		7	
	C	TRW	610	M		54	1
	C	TRW	610	P		428	90
	C	TRW	610	S	1	14,348	239
	C	TRW	620	P		91	
	C	TRW	620	S	0	2,411	149

Management Area	Target code	Gear	Zone	Processing mode	AMCK	PCOD	PLCK
GOA	C	TRW	630	M		172	
	C	TRW	630	P		618	49
	C	TRW	630	S	0	15,308	476
	C Pacific cod	TRW	650	P		36	1
	D Deepwater Flats	TRW	620	P		4	2
	D	TRW	620	S		22	15
	D	TRW	630	S		249	68
	D	TRW	640	P		3	
	D	TRW	640	S		8	7
	H Shallow wat. Flt	TRW	610	P		1	0
	H	TRW	620	S		3	2
	H	TRW	630	P		6	0
	H	TRW	630	S		259	77
	K Rockfish	HAL	610	S		0	
	K	HAL	620	S		0	
	K	HAL	630	P		3	
	K	HAL	630	S		1	
	K	HAL	640	S		1	
	K	HAL	649	S		1	
	K	HAL	650	S		28	
	K	HAL	659	P		0	
	K	HAL	659	S		24	
	K	JIG	630	S		4	1
	K	JIG	649	S		0	
	K	JIG	650	S		0	
	K	TRW	610	P	140	39	14
	K	TRW	620	P		124	4
	K	TRW	620	S	-	46	1
	K	TRW	630	P	0	215	15
	K	TRW	630	S	-	880	30
	K	TRW	640	P		2	12
	K	TRW	640	S	-	18	0
	O Other species	HAL	630	S		0	
	O	HAL	649	S		0	
	O	HAL	650	S		0	
	O	TRW	630	S		100	38
	P Pollock midwater	JIG	630	S			0
	P	POT	620	S			0
	P	TRW	610	M			98
	P	TRW	610	S	118	103	22,855
	P	TRW	620	S		204	35,826
	P	TRW	630	S		151	28,460
	P	TRW	640	S		0	1,740
	P	TRW	649	S		1	2,209

Management Area	Target code	Gear	Zone	Processing mode	AMCK	PCOD	PLCK
GOA	**S Sablefish**	HAL	610	P		24	0
	S	HAL	610	S		38	0
	S	HAL	620	P		2	
	S Sablefish	HAL	620	S		18	0
	S	HAL	630	P		10	0
	S	HAL	630	S		162	0
	S	HAL	640	P		1	
	S	HAL	640	S		15	0
	S	HAL	649	S		0	0
	S	HAL	650	P		0	0
	S	HAL	650	S		56	0
	S	HAL	659	P	1		
	S	HAL	659	S		38	0
	S	TRW	640	P			1
	W Arrow tooth FL	TRW	610	P	1	74	13
	W	TRW	620	P		2	0
	W	TRW	620	S		1	1
	W	TRW	630	P		141	69
	W	TRW	630	S		40	19
	W	TRW	640	P		3	
	X Rex sole	TRW	610	P		112	41
	X	TRW	620	P	0	228	32
	X	TRW	630	P		239	8
GOA Total					**262**	**68,613**	**95,637**

Notes: GEAR: TRW = trawl; HAL = hook-and-line; POT = pot; JIG = mechanical and hand jigs
ZONE: Zones are described in Tables E1-2 and 3 and are illustrated in Figures E1-1 and 2
Processing Modes: P = catcher/processor; M = mothership; and S = shoreside processor
BSAI - Bering Sea and Aleutian Islands, GOA - Gulf of Alaska
AMCK - Atka mackerel; PCOD - Pacific cod; PLCK - Pollock

Source: Data from 1999 NMFS Blend database.

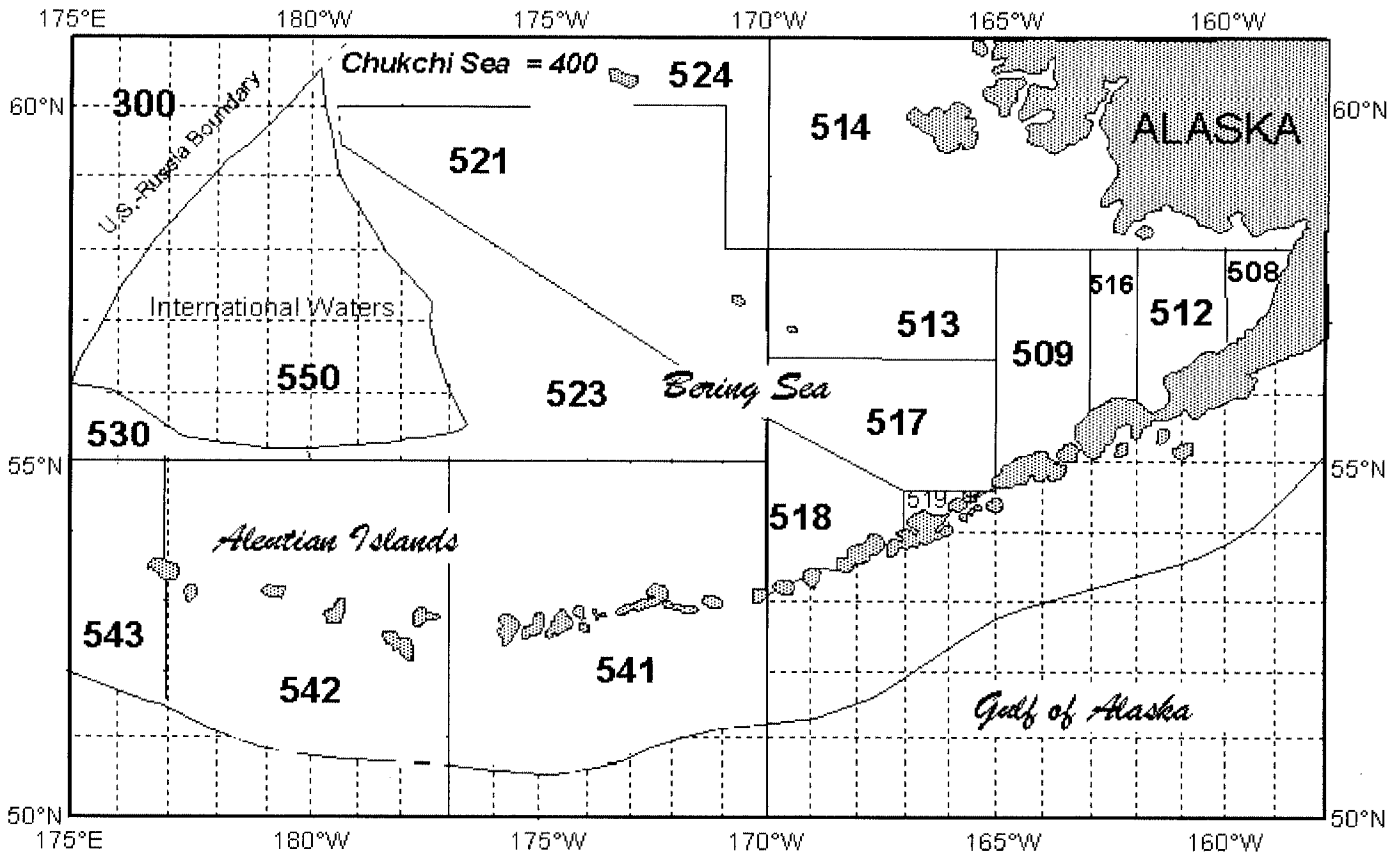


Figure E 1-1. Bering Sea and Aleutian Islands statistical and reporting Areas

Table E1-2 Description of Bering Sea and Aleutian Islands statistical and reporting areas

Code	Description
300	Russian waters. Those waters inside the Russian 200 mile limit as described in the current editions of NOAA chart INT 813 Bering Sea (Southern Part) and NOAA chart INT 814 Bering Sea (Northern Part).
400	Chukchi Sea. North of a diagonal line between 66°00' N, 169° 42.5' W (Cape Dezhneva, Russia); and 65°37.5' N, 168°7. 5' W (Cape Prince of Wales, Alaska) and to the limits of the U.S. EEZ as described in the current edition of NOAA chart INT 814 Bering Sea (Northern Part).
508	South of 58° 00' N between the intersection of 58° 00' N lat with the Alaska Peninsula and 160°00' W long
509	South of 58°00' N lat between 163°00' W long and 165°00' W long
512	South of 58°00' N lat, north of the Alaska Peninsula between 160°00' W long and 162°00' W long
513	Between 58°00' N lat and 56°30' N lat, and between 165°00' W long and 170°00' W long
514	North of 58°00' N to the southern boundary of the Chukchi Sea, area 400, and east of 170°00' W long.
516	South of 58°00' N lat, north of the Alaska Peninsula, and between 162°00' and 163°00' W long
517	South of 56°30' N lat, between 165°00' W long and 170°00' W long; and north of straight lines between 54°30' N lat, 165°00' W long, 54°30' N lat, 167°00' W long, and 55°46' N lat, 170°00' W long
518	Bogoslof District: South of a straight line between 55°46' N lat, 170°00' W long and 54°30' N lat, 167°00' W long, and between 167°00' W long and 170°00' W long, and north of the Aleutian Islands and straight lines between the islands connecting the following coordinates in the order listed: 52°49.2' N, 169°40.4' W 52°49.8' N, 169°06.3' W 53°23.8' N, 167°50.1' W 53°18.7' N, 167°51.4' W
519	South of a straight line between 54°30' N lat, 167°00' W long and 54°30' N lat, 164°54' W long; east of 167°00' W long; west of Unimak Island; and north of the Aleutian Islands and straight lines between the islands connecting the following coordinates in the order listed: 53°59.0' N, 166°17.2' W 54°02.9' N, 166°03.0' W 54°07.7' N, 165°40.6' W 54°08.9' N, 165°38.8' W 54°11.9' N, 165°23.3' W 54°23.9' N, 164°44.0' W
521	The area bounded by straight lines connecting the following coordinates in the order listed: 55°46' N, 170°00' W, 59°25' N, 179°20' W, 60°00' N, 179°20' W, 60°00' N, 171°00' W, 58°00' N, 171°00' W, 58°00' N, 170°00' W, 55°46' N, 170°00' W
523	The area bounded by straight lines connecting the following coordinates in the order listed: 59°25' N, 179°20' W; 55°46' N, 170°00' W; 55°00' N, 170°00' W; 55°00' N, 180°00' W; and north to the limits of the US EEZ as described in the current edition of NOAA chart INT 813 Bering Sea (Southern Part).
524	The area west of 170°00' W bounded south by straight lines connecting the following coordinates in the order listed: 58°00' N, 170°00' W 58°00' N, 171°00' W; 60°00' N, 171°00' W; 60°00' N, 179°20' W; 59°25' N, 179°20' W and to the limits of the US EEZ as described in the current edition of NOAA chart INT 813 Bering Sea (Southern Part).
530	The area north of 55°00 N lat and west of 180°00 W long to the limits of the US EEZ as described in the current edition of NOAA chart INT 813 Bering Sea (Southern Part).
541	Eastern Aleutian District. The area south of 55°00' N lat, west of 170°00' W long, and east of 177°00' W long and bounded on the south by the limits of the US EEZ as described in the current editions of NOAA chart INT 813 Bering Sea (Southern Part) and NOAA chart 530 (San Diego to Aleutian Islands and Hawaiian Islands).
542	Central Aleutian District. The area south of 55°00' N lat, west of 177°00' W long, and east of 177°00' E long and bounded on the south by the limits of the US EEZ as described in the current editions of NOAA chart INT 813 Bering Sea (Southern Part) and NOAA chart 530 (San Diego to Aleutian Islands and Hawaiian Islands)
543	Western Aleutian District. The area south of 55°00' N lat and west of 177°00' E long, and bounded on the south and west by the limits of the US EEZ as described in the current editions of NOAA chart INT 813 Bering Sea (Southern Part) and NOAA chart 530 (San Diego to Aleutian Islands and Hawaiian Islands)
550	Donut Hole. International waters of the Bering Sea outside the limits of the EEZ and Russian economic zone as depicted on the current edition of NOAA chart INT 813 Bering Sea (Southern Part).

NOTE: A statistical area is the part of a reporting area contained in the EEZ.

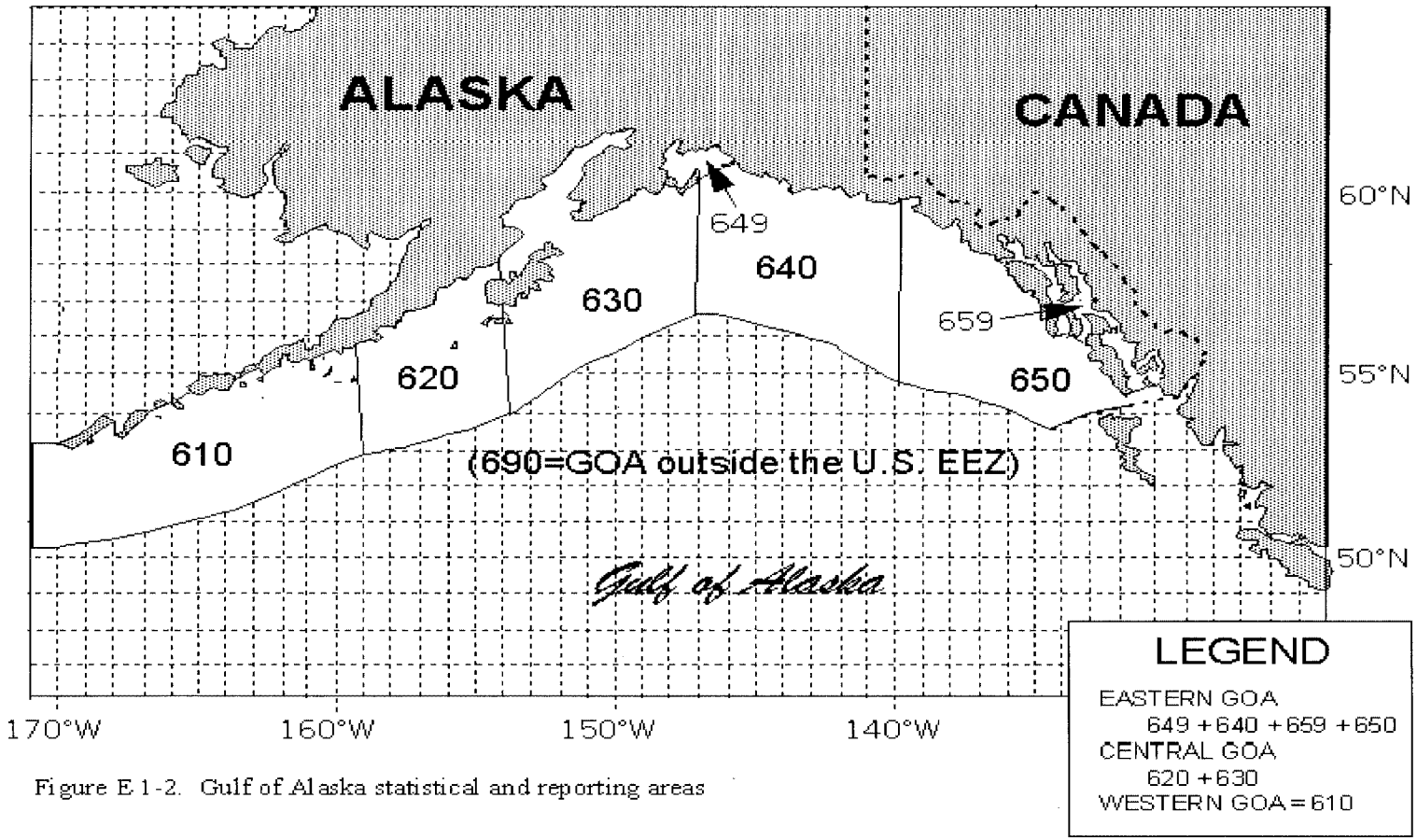


Figure E 1-2. Gulf of Alaska statistical and reporting areas

Table E1-3 Description of Gulf of Alaska statistical and reporting areas

Code	Description
610	Western GOA Regulatory Area, Shumagin District. Along the south side of the Aleutian Islands, including those waters south of Nichols Point (54°51' 30" N lat) near False Pass, and straight lines between the islands and the Alaska Peninsula connecting the following coordinates in the order listed: 52°49.18' N, 169°40.47' W; 52°49.24' N, 169°07.10' W; 53°23.13' N, 167°50.50' W; 53°18.95' N, 167°51.06' W; 53°58.97' N, 166°16.50' W; 54°02.69' N, 166°02.93' W; 54°07.69' N, 165°39.74' W; 54°08.40' N, 165°38.29' W; 54°11.71' N, 165°23.09' W; 54°23.74' N, 164°44.73' W; and southward to the limits of the US EEZ as described in the current editions of NOAA chart INT 813 (Bering Sea, Southern Part) and NOAA chart 500 (West Coast of North America, Dixon Entrance to Unimak Pass), between 170°00' W long and 159°00' W long.
620	Central GOA Regulatory Area, Chirikof District. Along the south side of the Alaska Peninsula, between 159°00' W long and 154°00' W long, and southward to the limits of the US EEZ as described in the current edition of NOAA chart 500 (West Coast of North America, Dixon Entrance to Unimak Pass).
630	Central GOA Regulatory Area, Kodiak District. Along the south side of continental Alaska, between 154°00' W long and 147°00' W long, and southward to the limits of the US EEZ as described in the current edition of NOAA chart 500 (West Coast of North America, Dixon Entrance to Unimak Pass). Excluding area 649.
640	Eastern GOA Regulatory Area, West Yakutat District. Along the south side of continental Alaska, between 147°00' W long and 140°00' W long, and southward to the limits of the US EEZ, as described in the current edition of NOAA chart 500 (West Coast of North America, Dixon Entrance to Unimak Pass). Excluding area 649.
649	Prince William Sound. Includes those waters of the State of Alaska inside the base line as specified in Alaska State regulations at 5 AAC 28.200.
650	Eastern GOA Regulatory Area, Southeast Outside District. East of 140°00' W long and southward to the limits of the US EEZ as described in the current edition of NOAA chart 500 (West Coast of North America, Dixon Entrance to Unimak Pass). Excluding area 659.
659	Eastern GOA Regulatory Area, Southeast Inside District. As specified in Alaska State regulations at 5 AAC 28.105 (a)(1) and (2).
690	GOA outside the U.S. EEZ as described in the current editions of NOAA chart INT 813 (Bering Sea, Southern Part) and NOAA chart 500 (West Coast of North America, Dixon Entrance to Unimak Pass).

NOTE: A statistical area is the part of a reporting area contained in the EEZ.

APPENDIX E2

1999 catch data by area and vessel type, gear and size

Appendix E2 Tables of 1999 estimated catch distribution by time and area of pollock, Pacific cod, and Atka mackerel inside and outside of Steller sea lion critical habitat by vessel gear type and vessel size

Table E2-1 1999 estimated catcher vessel trawl pollock catch in the BSAI by vessel size, management area, and week E1-18

Table E2-2 1999 estimated percentage of catcher vessel trawl pollock catch within 3 nm of listed rookeries and haulouts in the BSAI by vessel size, management area, and week E1-20

Table E2-3 1999 estimated percentage of catcher vessel trawl pollock catch within 20 nm of listed rookeries and haulouts in the BSAI by vessel size, management area, and week E1-22

Table E2-4 1999 estimated catcher processor trawl pollock catch in the BSAI by vessel size, management area, and week E1-24

Table E2-5 1999 estimated percentage of catcher processor trawl pollock catch within 3 nm of listed rookeries and haulouts in the BSAI by vessel size, management area, and week E1-26

Table E2-6 1999 estimated percentage of catcher processor trawl pollock catch within 20 nm of listed rookeries and haulouts in the BSAI by vessel size, management area, and week E1-28

Table E2-7 1999 estimated catcher vessel trawl Pacific cod catch in the BSAI by vessel size, management area, and week E1-30

Table E2-8 1999 estimated percentage of catcher vessel trawl Pacific cod catch within 3 nm of listed rookeries and haulouts in the BSAI by vessel size, management area, and week E1-32

Table E2-9 1999 estimated percentage of catcher vessel trawl Pacific cod catch within 20 nm of listed rookeries and haulouts in the BSAI by vessel size, management area, and week E1-34

Table E2-10 1999 estimated catcher processor trawl Pacific cod catch in the BSAI by vessel size, management area, and week E1-36

Table E2-11 1999 estimated percentage of catcher processor trawl Pacific cod catch within 3 nm of listed rookeries and haulouts in the BSAI by vessel size E1-38

Table E2-12. 1999 estimated percentage of catcher processor trawl Pacific cod catch within 20 nm of listed rookeries and haulouts in the BSAI by vessel size E1-40

Table E2-13. 1999 estimated catcher vessel pot Pacific cod catch in the BSAI by vessel size, management area, and week E1-42

Table E2-14 1999 estimated percentage of catcher vessel pot Pacific cod catch within 3 nm of listed rookeries and haulouts in the BSAI by vessel size, management area, and week E1-44

Table E2-15 1999 estimated percentage of catcher vessel pot Pacific cod catch within 20 nm of listed rookeries and haulouts in the BSAI by vessel size, management area, and week E1-46

Table E2-16 1999 estimated catcher processor hook-and-line Pacific cod catch in the BSAI by vessel size, management area, and week E1-48

Table E2-17 1999 estimated percentage of catcher processor hook-and-line Pacific cod catch within 3 nm

of listed rookeries and haulouts in the BSAI by vessel size, management area, and week ... E1-50

Table E2-18. 1999 estimated percentage of catcher processor hook-and-line Pacific cod catch within 20 nm of listed rookeries and haulouts in the BSAI by vessel size, management area, and week ... E1-52

Table E2-19 1999 estimated catcher vessel jig Pacific cod catch in the BSAI by vessel size, management area, and week ... E1-54

Table E2-20 1999 estimated percentage of catcher vessel jig Pacific cod catch within 3 nm of listed rookeries and haulouts in the BSAI by vessel size, management area, and week ... E1-56

Table E2-21 1999 estimated percentage of catcher vessel jig Pacific cod catch within 20 nm of listed rookeries and haulouts in the BSAI by vessel size, management area, and week ... E1-58

Table E2-22 1999 estimated catcher processor trawl Atka mackerel catch in the BSAI by vessel size, management area, and week ... E1-60

Table E2-23 1999 estimated percentage of catcher processor trawl Atka mackerel catch within 3 nm of listed rookeries and haulouts in the BSAI by vessel size, management area, and week ... E1-62

Table E2-24 1999 estimated percentage of catcher processor trawl Atka mackerel catch within 20 nm of listed rookeries and haulouts in the BSAI by vessel size, management area, and week ... E1-64

Table E2-25 1999 estimated catcher vessel trawl pollock catch in the GOA by vessel size, management area, and week ... E1-66

Table E2-26 1999 estimated percentage of catcher vessel trawl pollock catch within 3 nm of listed rookeries and haulouts in the GOA by vessel size, management area, and week ... E1-68

Table E2-27 1999 estimated percentage of catcher vessel trawl pollock catch within 20 nm of listed rookeries and haulouts in the GOA by vessel size, management area, and week ... E1-70

Table E2-28 1999 estimated catcher vessel trawl Pacific cod catch in the GOA by vessel size, management area, and week ... E1-72

Table E2-29 1999 estimated percentage of catcher vessel trawl Pacific cod catch within 3 nm of listed rookeries and haulouts in the GOA by vessel size, management area, and week ... E1-74

Table E2-30 1999 estimated percentage of catcher vessel trawl Pacific cod catch within 20 nm of listed rookeries and haulouts in the GOA by vessel size, management area, and week ... E1-76

Table E2-31 1999 estimated catcher vessel pot Pacific cod catch in the GOA by vessel size, management area, and week ... E1-78

Table E2-32 1999 estimated percentage of catcher vessel pot Pacific cod catch within 3 nm of listed rookeries and haulouts in the GOA by vessel size, management area, and week ... E1-80

Table E2-33 1999 estimated percentage of catcher vessel pot Pacific cod catch within 20 nm of listed rookeries and haulouts in the GOA by vessel size, management area, and week ... E1-82

Table E2-34 1999 estimated catcher vessel hook-and-line Pacific cod catch in the GOA by vessel size, management area, and week ... E1-84

Table E2-35 1999 estimated percentage of catcher vessel hook-and-line Pacific cod catch within 3 nm of listed rookeries and haulouts in the GOA by vessel size, management area, and week E1-86

Table E2-36 1999 estimated percentage of catcher vessel hook-and-line Pacific cod catch within 20 nm of listed rookeries and haulouts in the GOA by vessel size, management area, and week E1-88

Table E2-37 1999 estimated catcher processor hook-and-line Pacific cod catch in the GOA by vessel size, management area, and week E1-90

Table E2-38. 1999 estimated percentage of catcher processor hook-and-line Pacific cod catch within 3 nm of listed rookeries and haulouts in the GOA by vessel size, management area, and week E1-92

Table E2-39 1999 estimated percentage of catcher processor hook-and-line Pacific cod catch within 20 nm of listed rookeries and haulouts in the GOA by vessel size, management area, and week E1-94

Table E2-40 1999 estimated catcher vessel jig Pacific cod catch in the BSAI by vessel size, management area, and week E1-96

Table E2-41 1999 estimated percentage of catcher vessel jig Pacific cod catch within 3 nm of listed rookeries and haulouts in the BSAI by vessel size, management area, and week E1-98

Table E2-42 1999 estimated percentage of catcher vessel jig Pacific cod catch within 20 nm of listed rookeries and haulouts in the BSAI by vessel size, management area, and week E1-100

Appendix E2 Figures of catch by target, area, and gear within 3 and 20 nm of listed rookeries and haulouts by week in 1999

Figure E2-1 1999 catcher vessel trawl catch of pollock within 3 and 20 nm of listed rookeries and haulouts in the BSAI by week E1-102
Figure E2-2 1999 catcher processor trawl catch of pollock within 3 and 20 nm of listed rookeries and haulouts in the BSAI by week E1-103
Figure E2-3 1999 catcher vessel trawl catch of Pacific cod within 3 and 20 nm of listed rookeries and haulouts in the BSAI by week E1-104
Figure E2-4 1999 catcher processor trawl catch of Pacific cod within 3 and 20 nm of listed rookeries and haulouts in the BSAI by week E1-105
Figure E2-5 1999 catcher vessel pot catch of Pacific cod within 3 and 20 nm of listed rookeries and haulouts in the BSAI by week E1-106
Figure E2-6 1999 catcher processor hook-and-line catch of Pacific cod within 3 and 20 nm of listed rookeries and haulouts in the BSAI by week E1-107
Figure E2-7 1999 catcher processor trawl catch of Atka mackerel within 3 and 20 nm of listed rookeries and haulouts in the BSAI by week E1-108
Figure E2-8 1999 catcher vessel trawl catch of pollock within 3 and 20 nm of listed rookeries and haulouts in the GOA by week E1-109
Figure E2-9 1999 catcher vessel trawl catch of Pacific cod within 3 and 20 nm of listed rookeries and haulouts in the GOA by week E1-110
Figure E2-10 1999 catcher vessel pot catch of Pacific cod within 3 and 20 nm of listed rookeries and haulouts in the GOA by week E1-111
Figure E2-11 1999 catcher vessel hook-and-line catch of Pacific cod within 3 and 20 nm of listed rookeries and haulouts in the GOA by week E1-112
Figure E2-12 1999 catcher vessel jig catch of Pacific cod within 3 and 20 nm of listed rookeries and haulouts in the GOA by week E1-113

Table E2-1 1999 estimated catcher vessel trawl pollock catch in the BSAI by vessel size, management area, and week

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
2-Jan-1999	-	-	-	-	-	-	-	-	-	-
9-Jan-1999	-	-	-	-	-	-	-	-	-	-
16-Jan-1999	-	-	-	-	-	-	-	-	-	-
23-Jan-1999	-	3,208	3,208	-	1,291	1,291	-	-	-	4,500
30-Jan-1999	-	16,596	16,596	-	7,154	7,154	-	-	-	23,750
6-Feb-1999	-	24,044	24,044	-	24,315	24,315	-	-	-	48,359
13-Feb-1999	-	24,414	24,414	-	23,914	23,914	-	-	-	48,328
20-Feb-1999	-	13,301	13,301	-	15,618	15,618	-	-	-	28,918
27-Feb-1999	-	21,594	21,594	-	13,277	13,277	-	-	-	34,871
6-Mar-1999	-	12,227	12,227	x	7,776	7,776	-	-	-	20,003
13-Mar-1999	-	-	-	-	-	-	-	-	-	-
20-Mar-1999	-	-	-	-	-	-	-	-	-	-
27-Mar-1999	-	-	-	-	-	-	-	-	-	-
3-Apr-1999	-	-	-	-	-	-	-	-	-	-
10-Apr-1999	-	x	x	-	-	-	-	-	-	x
17-Apr-1999	-	-	-	-	-	-	-	-	-	-
24-Apr-1999	-	-	-	-	-	-	-	-	-	-
1-May-1999	-	-	-	-	-	-	-	-	-	-
8-May-1999	-	-	-	-	-	-	-	-	-	-
15-May-1999	-	-	-	-	-	-	-	-	-	-
22-May-1999	-	-	-	-	-	-	-	-	-	-
29-May-1999	-	-	-	-	-	-	-	-	-	-
5-Jun-1999	-	-	-	-	-	-	-	-	-	-
12-Jun-1999	-	-	-	-	-	-	-	-	-	-
19-Jun-1999	-	-	-	-	-	-	-	-	-	-
26-Jun-1999	-	-	-	-	-	-	-	-	-	-
3-Jul-1999	-	-	-	-	-	-	-	-	-	-
10-Jul-1999	-	-	-	-	-	-	-	-	-	-

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
17-Jul-1999	-	-	-	-	-	-	-	-	-	-
24-Jul-1999	-	-	-	-	-	-	-	-	-	-
31-Jul-1999	-	2,668	2,668	-	938	938	-	-	-	3,605
7-Aug-1999	-	12,839	12,839	-	9,178	9,178	-	-	-	22,017
14-Aug-1999	-	18,074	18,074	-	14,209	14,209	-	x	x	32,282
21-Aug-1999	-	18,847	18,847	-	14,393	14,393	-	x	x	33,240
28-Aug-1999	-	17,161	17,161	-	16,058	16,058	-	-	-	33,219
4-Sep-1999	-	x	x	-	7,171	7,171	-	x	x	7,171
11-Sep-1999	-	x	x	-	14,477	14,477	-	-	-	14,477
18-Sep-1999	-	10,258	10,258	-	14,917	14,917	-	-	-	25,175
25-Sep-1999	-	22,418	22,418	-	29,847	29,847	-	-	-	52,265
2-Oct-1999	-	17,986	17,986	-	19,126	19,126	-	-	-	37,113
9-Oct-1999	-	15,833	15,833	-	12,994	12,994	-	-	-	28,826
16-Oct-1999	-	-	-	-	x	x	-	-	-	x
23-Oct-1999	-	-	-	-	-	-	-	-	-	-
30-Oct-1999	-	5,375	5,375	-	4,083	4,083	-	-	-	9,458
6-Nov-1999	-	x	x	-	-	-	-	-	-	x
13-Nov-1999	-	-	-	-	-	-	-	-	-	-
20-Nov-1999	-	-	-	-	-	-	-	-	-	-
27-Nov-1999	-	-	-	-	-	-	-	-	-	-
4-Dec-1999	-	-	-	-	-	-	-	-	-	-
11-Dec-1999	-	-	-	-	-	-	-	-	-	-
18-Dec-1999	-	-	-	-	-	-	-	-	-	-
25-Dec-1999	-	-	-	-	-	-	-	-	-	-
1-Jan-2000	-	-	-	-	-	-	-	-	-	-
Grand Total	-	256,843	256,843	x	250,734	250,734	-	x	x	507,577

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.
x - confidential data, less than 4 participating vessels.

Table E2-2 1999 estimated percentage of catcher vessel trawl pollock catch within 3 nm of listed rookeries and haulouts in the BSAI by vessel size, management area, and week

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
2-Jan-1999	0	0	0	0	0	0	0	0	0	0
9-Jan-1999	0	0	0	0	0	0	0	0	0	0
16-Jan-1999	0	0	0	0	0	0	0	0	0	0
23-Jan-1999	0	0	0	0	0	0	0	0	0	0
30-Jan-1999	0	0	0	0	0	0	0	0	0	0
6-Feb-1999	0	0	0	0	0.01	0.01	0	0	0	0
13-Feb-1999	0	0	0	0	0	0	0	0	0	0
20-Feb-1999	0	0	0	0	0	0	0	0	0	0
27-Feb-1999	0	0	0	0	0	0	0	0	0	0
6-Mar-1999	0	0	0	0	0	0	0	0	0	0
13-Mar-1999	0	0	0	0	0	0	0	0	0	0
20-Mar-1999	0	0	0	0	0	0	0	0	0	0
27-Mar-1999	0	0	0	0	0	0	0	0	0	0
3-Apr-1999	0	0	0	0	0	0	0	0	0	0
10-Apr-1999	0	0	0	0	0	0	0	0	0	0
17-Apr-1999	0	0	0	0	0	0	0	0	0	0
24-Apr-1999	0	0	0	0	0	0	0	0	0	0
1-May-1999	0	0	0	0	0	0	0	0	0	0
8-May-1999	0	0	0	0	0	0	0	0	0	0
15-May-1999	0	0	0	0	0	0	0	0	0	0
22-May-1999	0	0	0	0	0	0	0	0	0	0
29-May-1999	0	0	0	0	0	0	0	0	0	0
5-Jun-1999	0	0	0	0	0	0	0	0	0	0
12-Jun-1999	0	0	0	0	0	0	0	0	0	0
19-Jun-1999	0	0	0	0	0	0	0	0	0	0
26-Jun-1999	0	0	0	0	0	0	0	0	0	0
3-Jul-1999	0	0	0	0	0	0	0	0	0	0

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
10-Jul-1999	0	0	0	0	0	0	0	0	0	0
17-Jul-1999	0	0	0	0	0	0	0	0	0	0
24-Jul-1999	0	0	0	0	0	0	0	0	0	0
31-Jul-1999	0	0	0	0	0	0	0	0	0	0
7-Aug-1999	0	0	0	0	0	0	0	0	0	0
14-Aug-1999	0	0	0	0	0	0	0	0	0	0
21-Aug-1999	0	0	0	0	0	0	0	0	0	0
28-Aug-1999	0	0	0	0	0	0	0	0	0	0
4-Sep-1999	0	0	0	0	0	0	0	0	0	0
11-Sep-1999	0	0	0	0	0	0	0	0	0	0
18-Sep-1999	0	0	0	0	0	0	0	0	0	0
25-Sep-1999	0	0	0	0	0	0	0	0	0	0
2-Oct-1999	0	0	0	0	0	0	0	0	0	0
9-Oct-1999	0	0	0	0	0	0	0	0	0	0
16-Oct-1999	0	0	0	0	0	0	0	0	0	0
23-Oct-1999	0	0	0	0	0	0	0	0	0	0
30-Oct-1999	0	0	0	0	0	0	0	0	0	0
6-Nov-1999	0	0	0	0	0	0	0	0	0	0
13-Nov-1999	0	0	0	0	0	0	0	0	0	0
20-Nov-1999	0	0	0	0	0	0	0	0	0	0
27-Nov-1999	0	0	0	0	0	0	0	0	0	0
4-Dec-1999	0	0	0	0	0	0	0	0	0	0
11-Dec-1999	0	0	0	0	0	0	0	0	0	0
18-Dec-1999	0	0	0	0	0	0	0	0	0	0
25-Dec-1999	0	0	0	0	0	0	0	0	0	0
1-Jan-2000	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.

Table E2-3 1999 estimated percentage of catcher vessel trawl pollock catch within 20 nm of listed rookeries and haulouts in the BSAI by vessel size, management area, and week

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
2-Jan-1999	0	0	0	0	0	0	0	0	0	0
9-Jan-1999	0	0	0	0	0	0	0	0	0	0
16-Jan-1999	0	0	0	0	0	0	0	0	0	0
23-Jan-1999	0	0	0	0	0	0	0	0	0	0
30-Jan-1999	0	5.48	5.48	0	3.57	3.57	0	0	0	4.91
6-Feb-1999	0	5.26	5.26	0	6.18	6.18	0	0	0	5.72
13-Feb-1999	0	4.45	4.45	0	4.02	4.02	0	0	0	4.24
20-Feb-1999	0	0	0	0	0	0	0	0	0	0
27-Feb-1999	0	6.28	6.28	0	6.60	6.60	0	0	0	6.40
6-Mar-1999	0	0	0	0	0	0	0	0	0	0
13-Mar-1999	0	0	0	0	0	0	0	0	0	0
20-Mar-1999	0	0	0	0	0	0	0	0	0	0
27-Mar-1999	0	0	0	0	0	0	0	0	0	0
3-Apr-1999	0	0	0	0	0	0	0	0	0	0
10-Apr-1999	0	0	0	0	0	0	0	0	0	0
17-Apr-1999	0	0	0	0	0	0	0	0	0	0
24-Apr-1999	0	0	0	0	0	0	0	0	0	0
1-May-1999	0	0	0	0	0	0	0	0	0	0
8-May-1999	0	0	0	0	0	0	0	0	0	0
15-May-1999	0	0	0	0	0	0	0	0	0	0
22-May-1999	0	0	0	0	0	0	0	0	0	0
29-May-1999	0	0	0	0	0	0	0	0	0	0
5-Jun-1999	0	0	0	0	0	0	0	0	0	0
12-Jun-1999	0	0	0	0	0	0	0	0	0	0
19-Jun-1999	0	0	0	0	0	0	0	0	0	0
26-Jun-1999	0	0	0	0	0	0	0	0	0	0
3-Jul-1999	0	0	0	0	0	0	0	0	0	0

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
10-Jul-1999	0	0	0	0	0	0	0	0	0	0
17-Jul-1999	0	0	0	0	0	0	0	0	0	0
24-Jul-1999	0	0	0	0	0	0	0	0	0	0
31-Jul-1999	0	29.45	29.45	0	30.72	30.72	0	0	0	29.78
7-Aug-1999	0	10.28	10.28	0	9.48	9.48	0	0	0	9.95
14-Aug-1999	0	14.26	14.26	0	10.85	10.85	0	0	0	12.76
21-Aug-1999	0	1.35	1.35	0	8.69	8.69	0	0	0	4.53
28-Aug-1999	0	0	0	0	0	0	0	0	0	0
4-Sep-1999	0	0	0	0	0	0	0	0	0	0
11-Sep-1999	0	0	0	0	0	0	0	0	0	0
18-Sep-1999	0	10.16	10.16	0	0	0	0	0	0	4
25-Sep-1999	0	13.43	13.43	0	5.70	5.70	0	0	0	9
2-Oct-1999	0	9.69	9.69	0	8.52	8.52	0	0	0	9
9-Oct-1999	0	0	0	0	4.70	4.70	0	0	0	2
16-Oct-1999	0	0	0	0	0	0	0	0	0	0
23-Oct-1999	0	0	0	0	0	0	0	0	0	0
30-Oct-1999	0	0	0	0	0	0	0	0	0	0
6-Nov-1999	0	0	0	0	0	0	0	0	0	0
13-Nov-1999	0	0	0	0	0	0	0	0	0	0
20-Nov-1999	0	0	0	0	0	0	0	0	0	0
27-Nov-1999	0	0	0	0	0	0	0	0	0	0
4-Dec-1999	0	0	0	0	0	0	0	0	0	0
11-Dec-1999	0	0	0	0	0	0	0	0	0	0
18-Dec-1999	0	0	0	0	0	0	0	0	0	0
25-Dec-1999	0	0	0	0	0	0	0	0	0	0
1-Jan-2000	0	0	0	0	0	0	0	0	0	0
Grand Total	0	5.98	5.98	0	4.58	4.58	0	0	0	5.29

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.

Table E2-4 1999 estimated catcher processor trawl pollock catch in the BSAI by vessel size, management area, and week

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
2-Jan-1999	-	-	-	-	-	-	-	-	-	-
9-Jan-1999	-	-	-	-	-	-	-	-	-	-
16-Jan-1999	-	-	-	-	-	-	-	-	-	-
23-Jan-1999	-	4,164	4,164	-	-	-	-	-	-	4,164
30-Jan-1999	-	15,433	15,433	-	-	-	-	-	-	15,433
6-Feb-1999	-	20,854	20,854	-	-	-	-	-	-	20,854
13-Feb-1999	-	18,166	18,166	-	-	-	-	-	-	18,166
20-Feb-1999	-	3,421	3,421	-	-	-	-	-	-	3,421
27-Feb-1999	-	24,001	24,001	-	-	-	-	-	-	24,001
6-Mar-1999	-	26,721	26,721	-	-	-	-	-	-	26,721
13-Mar-1999	x	13,615	13,615	-	-	-	-	-	-	13,615
20-Mar-1999	x	3,107	3,107	-	-	-	-	-	-	3,107
27-Mar-1999	-	x	x	-	-	-	-	-	-	x
3-Apr-1999	x	x	x	-	-	-	-	-	-	x
10-Apr-1999	-	230	230	-	-	-	-	-	-	230
17-Apr-1999	-	437	437	-	-	-	-	-	-	437
24-Apr-1999	-	157	157	-	-	-	-	-	-	157
1-May-1999	-	64	64	-	-	-	-	-	-	64
8-May-1999	-	x	x	-	-	-	-	-	-	x
15-May-1999	-	x	x	-	-	-	-	-	-	x
22-May-1999	-	x	x	-	-	-	-	-	-	x
29-May-1999	-	60	60	-	-	-	-	-	-	60
5-Jun-1999	-	x	x	-	-	-	-	-	-	x
12-Jun-1999	-	-	-	-	-	-	-	-	-	-
19-Jun-1999	-	x	x	-	-	-	-	-	-	x
26-Jun-1999	-	-	-	-	-	-	-	-	-	-
3-Jul-1999	-	-	-	-	-	-	-	-	-	-
10-Jul-1999	-	x	x	-	-	-	-	-	-	x

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
17-Jul-1999	-	x	x	-	-	-	-	-	-	x
24-Jul-1999	-	x	x	-	-	-	-	-	-	x
31-Jul-1999	-	33	33	-	-	-	-	-	-	33
7-Aug-1999	-	19,589	19,589	-	-	-	-	-	-	19,589
14-Aug-1999	-	23,556	23,556	-	-	-	-	-	-	23,556
21-Aug-1999	-	23,085	23,085	-	x	x	-	-	-	23,085
28-Aug-1999	-	17,579	17,579	-	-	-	-	-	-	17,579
4-Sep-1999	x	12,480	12,480	-	-	-	-	-	-	12,480
11-Sep-1999	-	2,179	2,179	-	-	-	-	-	-	2,179
18-Sep-1999	-	10,932	10,932	-	-	-	-	-	-	10,932
25-Sep-1999	-	28,041	28,041	-	-	-	-	-	-	28,041
2-Oct-1999	-	14,522	14,522	-	-	-	-	-	-	14,522
9-Oct-1999	-	20,173	20,173	-	-	-	-	-	-	20,173
16-Oct-1999	-	15,110	15,110	-	-	-	-	-	-	15,110
23-Oct-1999	-	6,783	6,783	-	-	-	-	-	-	6,783
30-Oct-1999	-	4,203	4,203	-	-	-	-	-	-	4,203
6-Nov-1999	-	x	x	-	-	-	-	-	-	x
13-Nov-1999	-	-	-	-	-	-	-	-	-	-
20-Nov-1999	x	-	x	-	-	-	-	-	-	x
27-Nov-1999	-	x	x	-	-	-	-	-	-	x
4-Dec-1999	-	x	x	-	-	-	-	-	-	x
11-Dec-1999	-	-	-	-	-	-	-	-	-	-
18-Dec-1999	-	-	-	-	-	-	-	-	-	-
25-Dec-1999	-	-	-	-	-	-	-	-	-	-
1-Jan-2000	-	-	-	-	-	-	-	-	-	-
Grand Total	x	328,693	328,693	-	x	x	-	-	-	328,693

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.
x - confidential data, less than 4 participating vessels.

Table E2-5 1999 estimated percentage of catcher processor trawl pollock catch within 3 nm of listed rookeries and haulouts in the BSAI by vessel size, management area, and week

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
2-Jan-1999	0	0	0	0	0	0	0	0	0	0
9-Jan-1999	0	0	0	0	0	0	0	0	0	0
16-Jan-1999	0	0	0	0	0	0	0	0	0	0
23-Jan-1999	0	0.04	0.04	0	0	0	0	0	0	0.04
30-Jan-1999	0	0	0	0	0	0	0	0	0	0
6-Feb-1999	0	0	0	0	0	0	0	0	0	0
13-Feb-1999	0	0	0	0	0	0	0	0	0	0
20-Feb-1999	0	0	0	0	0	0	0	0	0	0
27-Feb-1999	0	0	0	0	0	0	0	0	0	0
6-Mar-1999	0	0	0	0	0	0	0	0	0	0
13-Mar-1999	0	0	0	0	0	0	0	0	0	0
20-Mar-1999	0	0	0	0	0	0	0	0	0	0
27-Mar-1999	0	0	0	0	0	0	0	0	0	0
3-Apr-1999	0	0	0	0	0	0	0	0	0	0
10-Apr-1999	0	0	0	0	0	0	0	0	0	0
17-Apr-1999	0	0	0	0	0	0	0	0	0	0
24-Apr-1999	0	0	0	0	0	0	0	0	0	0
1-May-1999	0	0	0	0	0	0	0	0	0	0
8-May-1999	0	0	0	0	0	0	0	0	0	0
15-May-1999	0	0	0	0	0	0	0	0	0	0
22-May-1999	0	0	0	0	0	0	0	0	0	0
29-May-1999	0	0	0	0	0	0	0	0	0	0
5-Jun-1999	0	0	0	0	0	0	0	0	0	0
12-Jun-1999	0	0	0	0	0	0	0	0	0	0
19-Jun-1999	0	0	0	0	0	0	0	0	0	0
26-Jun-1999	0	0	0	0	0	0	0	0	0	0
3-Jul-1999	0	0	0	0	0	0	0	0	0	0

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
10-Jul-1999	0	0	0	0	0	0	0	0	0	0
17-Jul-1999	0	0	0	0	0	0	0	0	0	0
24-Jul-1999	0	0	0	0	0	0	0	0	0	0
31-Jul-1999	0	0	0	0	0	0	0	0	0	0
7-Aug-1999	0	0	0	0	0	0	0	0	0	0
14-Aug-1999	0	0	0	0	0	0	0	0	0	0
21-Aug-1999	0	0	0	0	0	0	0	0	0	0
28-Aug-1999	0	0	0	0	0	0	0	0	0	0
4-Sep-1999	0	0	0	0	0	0	0	0	0	0
11-Sep-1999	0	0	0	0	0	0	0	0	0	0
18-Sep-1999	0	0	0	0	0	0	0	0	0	0
25-Sep-1999	0	0	0	0	0	0	0	0	0	0
2-Oct-1999	0	0	0	0	0	0	0	0	0	0
9-Oct-1999	0	0	0	0	0	0	0	0	0	0
16-Oct-1999	0	0	0	0	0	0	0	0	0	0
23-Oct-1999	0	0	0	0	0	0	0	0	0	0
30-Oct-1999	0	0	0	0	0	0	0	0	0	0
6-Nov-1999	0	0	0	0	0	0	0	0	0	0
13-Nov-1999	0	0	0	0	0	0	0	0	0	0
20-Nov-1999	0	0	0	0	0	0	0	0	0	0
27-Nov-1999	0	0	0	0	0	0	0	0	0	0
4-Dec-1999	0	0	0	0	0	0	0	0	0	0
11-Dec-1999	0	0	0	0	0	0	0	0	0	0
18-Dec-1999	0	0	0	0	0	0	0	0	0	0
25-Dec-1999	0	0	0	0	0	0	0	0	0	0
1-Jan-2000	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.

Table E2-6 1999 estimated percentage of catcher processor trawl pollock catch within 20 nm of listed rookeries and haulouts in the BSAI by vessel size, management area, and week

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
2-Jan-1999	0	0	0	0	0	0	0	0	0	0
9-Jan-1999	0	0	0	0	0	0	0	0	0	0
16-Jan-1999	0	0	0	0	0	0	0	0	0	0
23-Jan-1999	0	8.29	8.29	0	0	0	0	0	0	8.29
30-Jan-1999	0	8.22	8.22	0	0	0	0	0	0	8.22
6-Feb-1999	0	4.96	4.96	0	0	0	0	0	0	4.96
13-Feb-1999	0	7.89	7.89	0	0	0	0	0	0	7.89
20-Feb-1999	0	17.82	17.82	0	0	0	0	0	0	17.82
27-Feb-1999	0	13.30	13.30	0	0	0	0	0	0	13.30
6-Mar-1999	0	5.95	5.95	0	0	0	0	0	0	5.95
13-Mar-1999	0	2.65	2.65	0	0	0	0	0	0	2.65
20-Mar-1999	0	0	0	0	0	0	0	0	0	0
27-Mar-1999	0	0	0	0	0	0	0	0	0	0
3-Apr-1999	0	0	0	0	0	0	0	0	0	0
10-Apr-1999	0	0	0	0	0	0	0	0	0	0
17-Apr-1999	0	0	0	0	0	0	0	0	0	0
24-Apr-1999	0	0	0	0	0	0	0	0	0	0
1-May-1999	0	0	0	0	0	0	0	0	0	0
8-May-1999	0	0	0	0	0	0	0	0	0	0
15-May-1999	0	0	0	0	0	0	0	0	0	0
22-May-1999	0	0	0	0	0	0	0	0	0	0
29-May-1999	0	0	0	0	0	0	0	0	0	0
5-Jun-1999	0	0	0	0	0	0	0	0	0	0
12-Jun-1999	0	0	0	0	0	0	0	0	0	0
19-Jun-1999	0	0	0	0	0	0	0	0	0	0
26-Jun-1999	0	0	0	0	0	0	0	0	0	0
3-Jul-1999	0	0	0	0	0	0	0	0	0	0

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
10-Jul-1999	0	0	0	0	0	0	0	0	0	0
17-Jul-1999	0	0	0	0	0	0	0	0	0	0
24-Jul-1999	0	0	0	0	0	0	0	0	0	0
31-Jul-1999	0	92.75	92.75	0	0	0	0	0	0	92.75
7-Aug-1999	0	0	0	0	0	0	0	0	0	0
14-Aug-1999	0	0	0	0	0	0	0	0	0	0
21-Aug-1999	0	0	0	0	0	0	0	0	0	0
28-Aug-1999	0	0	0	0	0	0	0	0	0	0
4-Sep-1999	0	0	0	0	0	0	0	0	0	0
11-Sep-1999	0	0	0	0	0	0	0	0	0	0
18-Sep-1999	0	5.69	5.69	0	0	0	0	0	0	5.69
25-Sep-1999	0	0	0	0	0	0	0	0	0	0
2-Oct-1999	0	0	0	0	0	0	0	0	0	0
9-Oct-1999	0	0	0	0	0	0	0	0	0	0
16-Oct-1999	0	0	0	0	0	0	0	0	0	0
23-Oct-1999	0	0	0	0	0	0	0	0	0	0
30-Oct-1999	0	0	0	0	0	0	0	0	0	0
6-Nov-1999	0	0	0	0	0	0	0	0	0	0
13-Nov-1999	0	0	0	0	0	0	0	0	0	0
20-Nov-1999	0	0	0	0	0	0	0	0	0	0
27-Nov-1999	0	0	0	0	0	0	0	0	0	0
4-Dec-1999	0	0	0	0	0	0	0	0	0	0
11-Dec-1999	0	0	0	0	0	0	0	0	0	0
18-Dec-1999	0	0	0	0	0	0	0	0	0	0
25-Dec-1999	0	0	0	0	0	0	0	0	0	0
1-Jan-2000	0	0	0	0	0	0	0	0	0	0
Grand Total	0	3.19	3.19	0	0	0	0	0	0	3.19

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.

Table E2-7 1999 estimated catcher vessel trawl Pacific cod catch in the BSAI by vessel size, management area, and week

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
2-Jan-1999	-	-	-	-	-	-	-	-	-	-
9-Jan-1999	-	-	-	-	-	-	-	-	-	-
16-Jan-1999	-	-	-	-	-	-	-	-	-	-
23-Jan-1999	-	-	-	-	311	311	-	-	-	311
30-Jan-1999	-	-	-	-	1,150	1,150	-	-	-	1,150
6-Feb-1999	-	-	-	-	1,311	1,311	-	-	-	1,311
13-Feb-1999	-	-	-	-	1,645	1,645	-	-	-	1,645
20-Feb-1999	-	x	x	-	2,540	2,540	-	x	x	2,540
27-Feb-1999	-	-	-	-	1,883	1,883	-	-	-	1,883
6-Mar-1999	-	392	392	x	3,495	3,495	-	-	-	3,888
13-Mar-1999	x	1,066	1,066	1,027	2,411	3,438	-	-	-	4,503
20-Mar-1999	934	694	1,629	1,670	1,634	3,303	-	-	-	4,932
27-Mar-1999	242	91	333	728	307	1,035	-	-	-	1,368
3-Apr-1999	x	718	718	798	2,078	2,876	-	-	-	3,594
10-Apr-1999	x	444	444	x	1,706	1,706	-	-	-	2,151
17-Apr-1999	-	x	x	-	1,346	1,346	-	-	-	1,346
24-Apr-1999	-	-	-	-	-	-	-	-	-	-
1-May-1999	-	-	-	-	-	-	-	-	-	-
8-May-1999	-	-	-	-	-	-	-	-	-	-
15-May-1999	-	-	-	-	-	-	-	-	-	-
22-May-1999	-	-	-	-	-	-	-	-	-	-
29-May-1999	-	-	-	-	-	-	-	-	-	-
5-Jun-1999	-	-	-	-	-	-	-	-	-	-
12-Jun-1999	-	-	-	-	-	-	-	-	-	-
19-Jun-1999	-	-	-	-	-	-	-	-	-	-
26-Jun-1999	-	-	-	-	-	-	-	-	-	-
3-Jul-1999	-	-	-	-	-	-	-	-	-	-
10-Jul-1999	-	-	-	-	-	-	-	-	-	-

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
17-Jul-1999	-	-	-	-	-	-	-	-	-	-
24-Jul-1999	-	-	-	-	-	-	-	-	-	-
31-Jul-1999	-	-	-	-	-	-	-	-	-	-
7-Aug-1999	-	-	-	-	-	-	-	-	-	-
14-Aug-1999	-	-	-	-	-	-	-	-	-	-
21-Aug-1999	-	-	-	-	-	-	-	-	-	-
28-Aug-1999	-	-	-	-	x	x	-	-	-	x
4-Sep-1999	-	-	-	-	-	-	-	-	-	-
11-Sep-1999	-	-	-	-	-	-	-	-	-	-
18-Sep-1999	-	-	-	-	-	-	-	-	-	-
25-Sep-1999	-	-	-	-	-	-	-	-	-	-
2-Oct-1999	-	-	-	-	-	-	-	-	-	-
9-Oct-1999	-	-	-	-	x	x	-	-	-	x
16-Oct-1999	-	-	-	-	x	x	-	-	-	x
23-Oct-1999	-	-	-	-	x	x	-	-	-	x
30-Oct-1999	-	-	-	-	-	-	-	-	-	-
6-Nov-1999	-	-	-	-	-	-	-	-	-	-
13-Nov-1999	-	-	-	-	-	-	-	-	-	-
20-Nov-1999	-	-	-	-	-	-	-	-	-	-
27-Nov-1999	-	-	-	-	x	x	-	-	-	x
4-Dec-1999	-	-	-	-	x	x	-	-	-	x
11-Dec-1999	-	-	-	-	x	x	-	-	-	x
18-Dec-1999	-	-	-	-	x	x	-	-	-	x
25-Dec-1999	-	-	-	-	-	-	-	-	-	-
1-Jan-2000	-	-	-	-	-	-	-	-	-	-
Grand Total	1,176	3,406	4,582	4,223	21,817	26,040	-	x	x	30,622

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.
x - confidential data, less than 4 participating vessels.

Table E2-8 1999 estimated percentage of catcher vessel trawl Pacific cod catch within 3 nm of listed rookeries and haulouts in the BSAI by vessel size, management area, and week

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
2-Jan-1999	0	0	0	0	0	0	0	0	0	0
9-Jan-1999	0	0	0	0	0	0	0	0	0	0
16-Jan-1999	0	0	0	0	0	0	0	0	0	0
23-Jan-1999	0	0	0	0	0	0	0	0	0	0
30-Jan-1999	0	0	0	0	0	0	0	0	0	0
6-Feb-1999	0	0	0	0	0	0	0	0	0	0
13-Feb-1999	0	0	0	0	0	0	0	0	0	0
20-Feb-1999	0	0	0	0	0	0	0	0	0	0
27-Feb-1999	0	0	0	0	0	0	0	0	0	0
6-Mar-1999	0	0	0	0	0	0	0	0	0	0
13-Mar-1999	0	0	0	1.65	0	0.49	0	0	0	0.38
20-Mar-1999	0	0	0	2.61	0	1.32	0	0	0	0.88
27-Mar-1999	0	0	0	0	0	0	0	0	0	0
3-Apr-1999	0	0	0	0	0.01	0.01	0	0	0	0.01
10-Apr-1999	0	0	0	0	0	0	0	0	0	0
17-Apr-1999	0	0	0	0	0	0	0	0	0	0
24-Apr-1999	0	0	0	0	0	0	0	0	0	0
1-May-1999	0	0	0	0	0	0	0	0	0	0
8-May-1999	0	0	0	0	0	0	0	0	0	0
15-May-1999	0	0	0	0	0	0	0	0	0	0
22-May-1999	0	0	0	0	0	0	0	0	0	0
29-May-1999	0	0	0	0	0	0	0	0	0	0
5-Jun-1999	0	0	0	0	0	0	0	0	0	0
12-Jun-1999	0	0	0	0	0	0	0	0	0	0
19-Jun-1999	0	0	0	0	0	0	0	0	0	0
26-Jun-1999	0	0	0	0	0	0	0	0	0	0
3-Jul-1999	0	0	0	0	0	0	0	0	0	0

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
10-Jul-1999	0	0	0	0	0	0	0	0	0	0
17-Jul-1999	0	0	0	0	0	0	0	0	0	0
24-Jul-1999	0	0	0	0	0	0	0	0	0	0
31-Jul-1999	0	0	0	0	0	0	0	0	0	0
7-Aug-1999	0	0	0	0	0	0	0	0	0	0
14-Aug-1999	0	0	0	0	0	0	0	0	0	0
21-Aug-1999	0	0	0	0	0	0	0	0	0	0
28-Aug-1999	0	0	0	0	0	0	0	0	0	0
4-Sep-1999	0	0	0	0	0	0	0	0	0	0
11-Sep-1999	0	0	0	0	0	0	0	0	0	0
18-Sep-1999	0	0	0	0	0	0	0	0	0	0
25-Sep-1999	0	0	0	0	0	0	0	0	0	0
2-Oct-1999	0	0	0	0	0	0	0	0	0	0
9-Oct-1999	0	0	0	0	0	0	0	0	0	0
16-Oct-1999	0	0	0	0	0	0	0	0	0	0
23-Oct-1999	0	0	0	0	0	0	0	0	0	0
30-Oct-1999	0	0	0	0	0	0	0	0	0	0
6-Nov-1999	0	0	0	0	0	0	0	0	0	0
13-Nov-1999	0	0	0	0	0	0	0	0	0	0
20-Nov-1999	0	0	0	0	0	0	0	0	0	0
27-Nov-1999	0	0	0	0	0	0	0	0	0	0
4-Dec-1999	0	0	0	0	0	0	0	0	0	0
11-Dec-1999	0	0	0	0	0	0	0	0	0	0
18-Dec-1999	0	0	0	0	0	0	0	0	0	0
25-Dec-1999	0	0	0	0	0	0	0	0	0	0
1-Jan-2000	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	1.43	0	0.23	0	0	0	0.20

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.

Table E2-9 1999 estimated percentage of catcher vessel trawl Pacific cod catch within 20 nm of listed rookeries and haulouts in the BSAI by vessel size, management area, and week

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
2-Jan-1999	0	0	0	0	0	0	0	0	0	0
9-Jan-1999	0	0	0	0	0	0	0	0	0	0
16-Jan-1999	0	0	0	0	0	0	0	0	0	0
23-Jan-1999	0	0	0	0	30.72	30.72	0	0	0	30.72
30-Jan-1999	0	0	0	0	29.32	29.32	0	0	0	29.32
6-Feb-1999	0	0	0	0	30.71	30.71	0	0	0	30.71
13-Feb-1999	0	0	0	0	30.50	30.50	0	0	0	30.50
20-Feb-1999	0	0	0	0	30.72	30.72	0	0	0	30.72
27-Feb-1999	0	0	0	0	31.80	31.80	0	0	0	31.80
6-Mar-1999	0	30.72	30.72	0	30.72	30.72	0	0	0	30.72
13-Mar-1999	0	16.10	16.10	85.57	28.36	45.45	0	0	0	38.51
20-Mar-1999	89.38	7.32	54.39	88.60	33.29	61.25	0	0	0	58.98
27-Mar-1999	95.01	47.74	82.05	98.79	19.76	75.34	0	0	0	76.98
3-Apr-1999	0	19.93	19.93	87.67	21.53	39.88	0	0	0	35.90
10-Apr-1999	0	0	0	0	28.50	28.50	0	0	0	22.61
17-Apr-1999	0	0	0	0	26.94	26.94	0	0	0	26.94
24-Apr-1999	0	0	0	0	0	0	0	0	0	0
1-May-1999	0	0	0	0	0	0	0	0	0	0
8-May-1999	0	0	0	0	0	0	0	0	0	0
15-May-1999	0	0	0	0	0	0	0	0	0	0
22-May-1999	0	0	0	0	0	0	0	0	0	0
29-May-1999	0	0	0	0	0	0	0	0	0	0
5-Jun-1999	0	0	0	0	0	0	0	0	0	0
12-Jun-1999	0	0	0	0	0	0	0	0	0	0
19-Jun-1999	0	0	0	0	0	0	0	0	0	0
26-Jun-1999	0	0	0	0	0	0	0	0	0	0
3-Jul-1999	0	0	0	0	0	0	0	0	0	0

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
10-Jul-1999	0	0	0	0	0	0	0	0	0	0
17-Jul-1999	0	0	0	0	0	0	0	0	0	0
24-Jul-1999	0	0	0	0	0	0	0	0	0	0
31-Jul-1999	0	0	0	0	0	0	0	0	0	0
7-Aug-1999	0	0	0	0	0	0	0	0	0	0
14-Aug-1999	0	0	0	0	0	0	0	0	0	0
21-Aug-1999	0	0	0	0	0	0	0	0	0	0
28-Aug-1999	0	0	0	0	0	0	0	0	0	0
4-Sep-1999	0	0	0	0	0	0	0	0	0	0
11-Sep-1999	0	0	0	0	0	0	0	0	0	0
18-Sep-1999	0	0	0	0	0	0	0	0	0	0
25-Sep-1999	0	0	0	0	0	0	0	0	0	0
2-Oct-1999	0	0	0	0	0	0	0	0	0	0
9-Oct-1999	0	0	0	0	0	0	0	0	0	0
16-Oct-1999	0	0	0	0	0	0	0	0	0	0
23-Oct-1999	0	0	0	0	0	0	0	0	0	0
30-Oct-1999	0	0	0	0	0	0	0	0	0	0
6-Nov-1999	0	0	0	0	0	0	0	0	0	0
13-Nov-1999	0	0	0	0	0	0	0	0	0	0
20-Nov-1999	0	0	0	0	0	0	0	0	0	0
27-Nov-1999	0	0	0	0	0	0	0	0	0	0
4-Dec-1999	0	0	0	0	0	0	0	0	0	0
11-Dec-1999	0	0	0	0	0	0	0	0	0	0
18-Dec-1999	0	0	0	0	0	0	0	0	0	0
25-Dec-1999	0	0	0	0	0	0	0	0	0	0
1-Jan-2000	0	0	0	0	0	0	0	0	0	0
Grand Total	90.54	15.55	34.80	89.44	29.22	38.98	0	0	0	38.36

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.

Table E2-10. 1999 estimated catcher processor trawl Pacific cod catch in the BSAI by vessel size, management area, and week.

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
2-Jan-1999	-	-	-	-	-	-	-	-	-	-
9-Jan-1999	-	-	-	-	-	-	-	-	-	-
16-Jan-1999	-	-	-	-	-	-	-	-	-	-
23-Jan-1999	-	107	107	-	45	45	-	-	-	153
30-Jan-1999	x	588	588	-	189	189	-	-	-	777
6-Feb-1999	-	248	248	-	x	x	-	-	-	248
13-Feb-1999	-	x	x	-	x	x	-	-	-	x
20-Feb-1999	-	396	396	-	x	x	-	-	-	396
27-Feb-1999	x	416	416	-	x	x	-	-	-	416
6-Mar-1999	x	884	884	x	353	353	-	-	-	1,237
13-Mar-1999	x	47	47	x	x	x	-	-	-	47
20-Mar-1999	1,752	x	1,752	-	x	x	-	-	-	1,752
27-Mar-1999	1,220	x	1,220	-	x	x	-	-	-	1,220
3-Apr-1999	720	x	720	-	x	x	-	-	-	720
10-Apr-1999	x	x	x	-	-	-	-	-	-	x
17-Apr-1999	-	x	x	-	-	-	-	-	-	x
24-Apr-1999	-	96	96	-	x	x	-	-	-	96
1-May-1999	-	40	40	-	189	189	-	-	-	230
8-May-1999	x	x	x	-	x	x	-	-	-	x
15-May-1999	-	x	x	-	-	-	-	-	-	x
22-May-1999	-	x	x	-	x	x	-	-	-	x
29-May-1999	-	x	x	-	-	-	-	-	-	x
5-Jun-1999	-	-	-	-	-	-	-	-	-	-
12-Jun-1999	-	x	x	-	-	-	-	-	-	x
19-Jun-1999	-	-	-	-	-	-	-	-	-	-
26-Jun-1999	-	-	-	-	-	-	-	-	-	-
3-Jul-1999	-	-	-	-	-	-	-	-	-	-
10-Jul-1999	-	x	x	-	-	-	-	-	-	x
17-Jul-1999	-	x	x	-	-	-	-	-	-	x

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
24-Jul-1999	-	x	x	-	-	-	-	-	-	x
31-Jul-1999	-	x	x	-	-	-	-	-	-	x
7-Aug-1999	-	x	x	-	-	-	-	-	-	x
14-Aug-1999	-	x	x	-	-	-	-	-	-	x
21-Aug-1999	-	x	x	-	-	-	-	-	-	x
28-Aug-1999	-	60	60	-	-	-	-	-	-	60
4-Sep-1999	x	-	x	-	-	-	-	-	-	x
11-Sep-1999	-	-	-	-	-	-	-	-	-	-
18-Sep-1999	-	-	-	-	-	-	-	-	-	-
25-Sep-1999	-	-	-	-	-	-	-	-	-	-
2-Oct-1999	x	x	x	-	-	-	-	-	-	x
9-Oct-1999	-	-	-	-	-	-	-	-	-	-
16-Oct-1999	-	-	-	-	x	x	-	-	-	x
23-Oct-1999	x	-	x	-	x	x	-	-	-	x
30-Oct-1999	-	-	-	-	-	-	-	-	-	-
6-Nov-1999	-	-	-	-	-	-	-	-	-	-
13-Nov-1999	-	-	-	-	-	-	-	-	-	-
20-Nov-1999	x	-	x	-	-	-	-	-	-	x
27-Nov-1999	x	x	x	x	-	x	-	-	-	x
4-Dec-1999	-	-	-	-	-	-	-	-	-	-
11-Dec-1999	-	-	-	-	-	-	-	-	-	-
18-Dec-1999	-	-	-	-	-	-	-	-	-	-
25-Dec-1999	-	-	-	-	-	-	-	-	-	-
1-Jan-2000	-	-	-	-	-	-	-	-	-	-
Grand Total	3,693	2,883	6,576	x	777	777	-	-	-	7,353

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.
x - confidential data, less than 4 participating vessels.

Table E2-11 1999 estimated percentage of catcher processor trawl Pacific cod catch within 3 nm of listed rookeries and haulouts in the BSAI by vessel size

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
2-Jan-1999	0	0	0	0	0	0	0	0	0	0
9-Jan-1999	0	0	0	0	0	0	0	0	0	0
16-Jan-1999	0	0	0	0	0	0	0	0	0	0
23-Jan-1999	0	0	0	0	0	0	0	0	0	0
30-Jan-1999	0	0.05	0.05	0	0.05	0.05	0	0	0	0.05
6-Feb-1999	0	0	0	0	0	0	0	0	0	0
13-Feb-1999	0	0	0	0	0	0	0	0	0	0
20-Feb-1999	0	0	0	0	0	0	0	0	0	0
27-Feb-1999	0	0	0	0	0	0	0	0	0	0
6-Mar-1999	0	0	0	0	0	0	0	0	0	0
13-Mar-1999	0	0	0	0	0	0	0	0	0	0
20-Mar-1999	0.16	0	0.16	0	0	0	0	0	0	0.16
27-Mar-1999	0.89	0	0.89	0	0	0	0	0	0	0.89
3-Apr-1999	0	0	0	0	0	0	0	0	0	0
10-Apr-1999	0	0	0	0	0	0	0	0	0	0
17-Apr-1999	0	0	0	0	0	0	0	0	0	0
24-Apr-1999	0	0	0	0	0	0	0	0	0	0
1-May-1999	0	0	0	0	0	0	0	0	0	0
8-May-1999	0	0	0	0	0	0	0	0	0	0
15-May-1999	0	0	0	0	0	0	0	0	0	0
22-May-1999	0	0	0	0	0	0	0	0	0	0
29-May-1999	0	0	0	0	0	0	0	0	0	0
5-Jun-1999	0	0	0	0	0	0	0	0	0	0
12-Jun-1999	0	0	0	0	0	0	0	0	0	0
19-Jun-1999	0	0	0	0	0	0	0	0	0	0
26-Jun-1999	0	0	0	0	0	0	0	0	0	0
3-Jul-1999	0	0	0	0	0	0	0	0	0	0
10-Jul-1999	0	0	0	0	0	0	0	0	0	0

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
17-Jul-1999	0	0	0	0	0	0	0	0	0	0
24-Jul-1999	0	0	0	0	0	0	0	0	0	0
31-Jul-1999	0	0	0	0	0	0	0	0	0	0
7-Aug-1999	0	0	0	0	0	0	0	0	0	0
14-Aug-1999	0	0	0	0	0	0	0	0	0	0
21-Aug-1999	0	0	0	0	0	0	0	0	0	0
28-Aug-1999	0	0	0	0	0	0	0	0	0	0
4-Sep-1999	0	0	0	0	0	0	0	0	0	0
11-Sep-1999	0	0	0	0	0	0	0	0	0	0
18-Sep-1999	0	0	0	0	0	0	0	0	0	0
25-Sep-1999	0	0	0	0	0	0	0	0	0	0
2-Oct-1999	0	0	0	0	0	0	0	0	0	0
9-Oct-1999	0	0	0	0	0	0	0	0	0	0
16-Oct-1999	0	0	0	0	0	0	0	0	0	0
23-Oct-1999	0	0	0	0	0	0	0	0	0	0
30-Oct-1999	0	0	0	0	0	0	0	0	0	0
6-Nov-1999	0	0	0	0	0	0	0	0	0	0
13-Nov-1999	0	0	0	0	0	0	0	0	0	0
20-Nov-1999	0	0	0	0	0	0	0	0	0	0
27-Nov-1999	0	0	0	0	0	0	0	0	0	0
4-Dec-1999	0	0	0	0	0	0	0	0	0	0
11-Dec-1999	0	0	0	0	0	0	0	0	0	0
18-Dec-1999	0	0	0	0	0	0	0	0	0	0
25-Dec-1999	0	0	0	0	0	0	0	0	0	0
1-Jan-2000	0	0	0	0	0	0	0	0	0	0
Grand Total	0.37	0.01	0.21	0	0.01	0.01	0	0	0	0.19

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.

Table E2-12. 1999 estimated percentage of catcher processor trawl Pacific cod catch within 20 nm of listed rookeries and haulouts in the BSAI by vessel size

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
2-Jan-1999	0	0	0	0	0	0	0	0	0	0
9-Jan-1999	0	0	0	0	0	0	0	0	0	0
16-Jan-1999	0	0	0	0	0	0	0	0	0	0
23-Jan-1999	0	25.69	25.69	0	0	0	0	0	0	18.07
30-Jan-1999	0	10.67	10.67	0	11.32	11.32	0	0	0	10.83
6-Feb-1999	0	0	0	0	0	0	0	0	0	0
13-Feb-1999	0	0	0	0	0	0	0	0	0	0
20-Feb-1999	0	16.00	16.00	0	0	0	0	0	0	16.00
27-Feb-1999	0	0	0	0	0	0	0	0	0	0
6-Mar-1999	0	1.16	1.16	0	0	0	0	0	0	0.83
13-Mar-1999	0	73.32	73.32	0	0	0	0	0	0	73.32
20-Mar-1999	85.43	0	85.43	0	0	0	0	0	0	85.43
27-Mar-1999	76.43	0	76.43	0	0	0	0	0	0	76.43
3-Apr-1999	92.40	0	92.40	0	0	0	0	0	0	92.40
10-Apr-1999	0	0	0	0	0	0	0	0	0	0
17-Apr-1999	0	0	0	0	0	0	0	0	0	0
24-Apr-1999	0	0	0	0	0	0	0	0	0	0
1-May-1999	0	0	0	0	0	0	0	0	0	0
8-May-1999	0	0	0	0	0	0	0	0	0	0
15-May-1999	0	0	0	0	0	0	0	0	0	0
22-May-1999	0	0	0	0	0	0	0	0	0	0
29-May-1999	0	0	0	0	0	0	0	0	0	0
5-Jun-1999	0	0	0	0	0	0	0	0	0	0
12-Jun-1999	0	0	0	0	0	0	0	0	0	0
19-Jun-1999	0	0	0	0	0	0	0	0	0	0
26-Jun-1999	0	0	0	0	0	0	0	0	0	0
3-Jul-1999	0	0	0	0	0	0	0	0	0	0
10-Jul-1999	0	0	0	0	0	0	0	0	0	0

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
17-Jul-1999	0	0	0	0	0	0	0	0	0	0
24-Jul-1999	0	0	0	0	0	0	0	0	0	0
31-Jul-1999	0	0	0	0	0	0	0	0	0	0
7-Aug-1999	0	0	0	0	0	0	0	0	0	0
14-Aug-1999	0	0	0	0	0	0	0	0	0	0
21-Aug-1999	0	0	0	0	0	0	0	0	0	0
28-Aug-1999	0	0	0	0	0	0	0	0	0	0
4-Sep-1999	0	0	0	0	0	0	0	0	0	0
11-Sep-1999	0	0	0	0	0	0	0	0	0	0
18-Sep-1999	0	0	0	0	0	0	0	0	0	0
25-Sep-1999	0	0	0	0	0	0	0	0	0	0
2-Oct-1999	0	0	0	0	0	0	0	0	0	0
9-Oct-1999	0	0	0	0	0	0	0	0	0	0
16-Oct-1999	0	0	0	0	0	0	0	0	0	0
23-Oct-1999	0	0	0	0	0	0	0	0	0	0
30-Oct-1999	0	0	0	0	0	0	0	0	0	0
6-Nov-1999	0	0	0	0	0	0	0	0	0	0
13-Nov-1999	0	0	0	0	0	0	0	0	0	0
20-Nov-1999	0	0	0	0	0	0	0	0	0	0
27-Nov-1999	0	0	0	0	0	0	0	0	0	0
4-Dec-1999	0	0	0	0	0	0	0	0	0	0
11-Dec-1999	0	0	0	0	0	0	0	0	0	0
18-Dec-1999	0	0	0	0	0	0	0	0	0	0
25-Dec-1999	0	0	0	0	0	0	0	0	0	0
1-Jan-2000	0	0	0	0	0	0	0	0	0	0
Grand Total	83.82	6.87	50.08	0	2.75	2.75	0	0	0	45.08

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.

Table E2-13. 1999 estimated catcher vessel pot Pacific cod catch in the BSAI by vessel size, management area, and week

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
2-Jan-1999	-	-	-	-	-	-	-	-	-	-
9-Jan-1999	-	-	-	-	-	-	-	-	-	-
16-Jan-1999	-	7	7	-	17	17	-	-	-	24
23-Jan-1999	-	-	-	-	-	-	-	-	-	-
30-Jan-1999	-	-	-	-	-	-	-	-	-	-
6-Feb-1999	-	-	-	-	-	-	-	-	-	-
13-Feb-1999	-	-	-	-	-	-	-	-	-	-
20-Feb-1999	-	-	-	-	-	-	-	-	-	-
27-Feb-1999	-	-	-	x	-	x	-	x	x	x
6-Mar-1999	-	-	-	x	-	x	-	-	-	x
13-Mar-1999	-	-	-	x	-	x	-	-	-	x
20-Mar-1999	-	-	-	-	x	x	-	-	-	x
27-Mar-1999	-	x	x	-	-	-	-	-	-	x
3-Apr-1999	-	x	x	-	155	155	-	-	-	155
10-Apr-1999	-	293	293	x	537	537	x	-	x	830
17-Apr-1999	-	619	619	x	1,403	1,403	-	-	-	2,023
24-Apr-1999	-	x	x	-	221	221	-	-	-	221
1-May-1999	-	-	-	-	-	-	-	-	-	-
8-May-1999	x	243	243	85	300	384	-	-	-	628
15-May-1999	x	333	333	136	634	769	-	-	-	1,102
22-May-1999	99	123	223	77	512	589	-	-	-	811
29-May-1999	x	x	x	135	395	530	-	-	-	530
5-Jun-1999	x	x	x	164	385	548	-	x	x	548
12-Jun-1999	x	x	x	74	173	247	-	-	-	247
19-Jun-1999	-	-	-	-	-	-	-	-	-	-
26-Jun-1999	-	-	-	-	-	-	-	-	-	-
3-Jul-1999	-	-	-	-	-	-	-	-	-	-
10-Jul-1999	-	-	-	-	-	-	-	-	-	-

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
17-Jul-1999	-	-	-	-	-	-	-	-	-	-
24-Jul-1999	-	-	-	-	-	-	-	-	-	-
31-Jul-1999	-	-	-	-	-	-	-	-	-	-
7-Aug-1999	-	-	-	-	-	-	-	-	-	-
14-Aug-1999	-	-	-	-	-	-	-	-	-	-
21-Aug-1999	-	-	-	-	-	-	-	-	-	-
28-Aug-1999	-	-	-	-	-	-	-	-	-	-
4-Sep-1999	-	x	x	x	-	x	-	-	-	x
11-Sep-1999	-	x	x	63	x	63	-	-	-	63
18-Sep-1999	x	x	x	60	x	60	-	-	-	60
25-Sep-1999	x	78	78	81	94	175	-	-	-	253
2-Oct-1999	x	177	177	38	174	212	-	-	-	389
9-Oct-1999	x	113	113	-	205	205	-	-	-	318
16-Oct-1999	-	38	38	-	17	17	-	-	-	55
23-Oct-1999	-	-	-	-	-	-	-	-	-	-
30-Oct-1999	-	-	-	-	-	-	-	-	-	-
6-Nov-1999	-	-	-	-	x	x	-	-	-	x
13-Nov-1999	-	-	-	-	-	-	-	-	-	-
20-Nov-1999	-	-	-	-	-	-	-	-	-	-
27-Nov-1999	-	-	-	-	-	-	-	-	-	-
4-Dec-1999	-	-	-	-	-	-	-	-	-	-
11-Dec-1999	-	-	-	-	-	-	-	-	-	-
18-Dec-1999	-	-	-	x	-	x	-	-	-	x
25-Dec-1999	-	-	-	x	-	x	-	-	-	x
1-Jan-2000	-	-	-	x	-	x	-	-	-	x
Grand Total	99	2,024	2,123	913	5,219	6,132	x	x	x	8,255

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.
x - confidential data, less than 4 participating vessels.

Table E2-14 1999 estimated percentage of catcher vessel pot Pacific cod catch within 3 nm of listed rookeries and haulouts in the BSAI by vessel size, management area, and week

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
2-Jan-1999	0	0	0	0	0	0	0	0	0	0
9-Jan-1999	0	0	0	0	0	0	0	0	0	0
16-Jan-1999	0	13.46	13.46	0	2.44	2.44	0	0	0	5.71
23-Jan-1999	0	0	0	0	0	0	0	0	0	0
30-Jan-1999	0	0	0	0	0	0	0	0	0	0
6-Feb-1999	0	0	0	0	0	0	0	0	0	0
13-Feb-1999	0	0	0	0	0	0	0	0	0	0
20-Feb-1999	0	0	0	0	0	0	0	0	0	0
27-Feb-1999	0	0	0	0	0	0	0	0	0	0
6-Mar-1999	0	0	0	0	0	0	0	0	0	0
13-Mar-1999	0	0	0	0	0	0	0	0	0	0
20-Mar-1999	0	0	0	0	0	0	0	0	0	0
27-Mar-1999	0	0	0	0	0	0	0	0	0	0
3-Apr-1999	0	0	0	0	0.02	0.02	0	0	0	0.02
10-Apr-1999	0	0.02	0.02	0	0.06	0.06	0	0	0	0.05
17-Apr-1999	0	0	0	0	1.13	1.13	0	0	0	0.79
24-Apr-1999	0	0	0	0	0.01	0.01	0	0	0	0.01
1-May-1999	0	0	0	0	0	0	0	0	0	0
8-May-1999	0	0.01	0.01	0	2.25	1.75	0	0	0	1.08
15-May-1999	0	0	0	0	0.05	0.04	0	0	0	0.03
22-May-1999	0	0	0	0	0.27	0.23	0	0	0	0.17
29-May-1999	0	0	0	0	0	0	0	0	0	0
5-Jun-1999	0	0	0	0	0	0	0	0	0	0
12-Jun-1999	0	0	0	40.42	0	12.11	0	0	0	12.11
19-Jun-1999	0	0	0	0	0	0	0	0	0	0
26-Jun-1999	0	0	0	0	0	0	0	0	0	0
3-Jul-1999	0	0	0	0	0	0	0	0	0	0

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
10-Jul-1999	0	0	0	0	0	0	0	0	0	0
17-Jul-1999	0	0	0	0	0	0	0	0	0	0
24-Jul-1999	0	0	0	0	0	0	0	0	0	0
31-Jul-1999	0	0	0	0	0	0	0	0	0	0
7-Aug-1999	0	0	0	0	0	0	0	0	0	0
14-Aug-1999	0	0	0	0	0	0	0	0	0	0
21-Aug-1999	0	0	0	0	0	0	0	0	0	0
28-Aug-1999	0	0	0	0	0	0	0	0	0	0
4-Sep-1999	0	0	0	0	0	0	0	0	0	0
11-Sep-1999	0	0	0	0	0	0	0	0	0	0
18-Sep-1999	0	0	0	21.20	0	21.20	0	0	0	21.20
25-Sep-1999	0	0	0	14.26	0	6.62	0	0	0	4.59
2-Oct-1999	0	0	0	0	0.01	0	0	0	0	0
9-Oct-1999	0	0	0	0	0.46	0.46	0	0	0	0.30
16-Oct-1999	0	11.42	11.42	0	3.16	3.16	0	0	0	8.88
23-Oct-1999	0	0	0	0	0	0	0	0	0	0
30-Oct-1999	0	0	0	0	0	0	0	0	0	0
6-Nov-1999	0	0	0	0	0	0	0	0	0	0
13-Nov-1999	0	0	0	0	0	0	0	0	0	0
20-Nov-1999	0	0	0	0	0	0	0	0	0	0
27-Nov-1999	0	0	0	0	0	0	0	0	0	0
4-Dec-1999	0	0	0	0	0	0	0	0	0	0
11-Dec-1999	0	0	0	0	0	0	0	0	0	0
18-Dec-1999	0	0	0	0	0	0	0	0	0	0
25-Dec-1999	0	0	0	0	0	0	0	0	0	0
1-Jan-2000	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0.27	0.26	5.93	0.51	1.32	0	0	0	1.04

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.

Table E2-15 1999 estimated percentage of catcher vessel pot Pacific cod catch within 20 nm of listed rookeries and haulouts in the BSAI by vessel size, management area, and week

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
2-Jan-1999	0	0	0	0	0	0	0	0	0	0
9-Jan-1999	0	0	0	0	0	0	0	0	0	0
16-Jan-1999	0	100.00	100.00	0	76.91	76.91	0	0	0	83.75
23-Jan-1999	0	0	0	0	0	0	0	0	0	0
30-Jan-1999	0	0	0	0	0	0	0	0	0	0
6-Feb-1999	0	0	0	0	0	0	0	0	0	0
13-Feb-1999	0	0	0	0	0	0	0	0	0	0
20-Feb-1999	0	0	0	0	0	0	0	0	0	0
27-Feb-1999	0	0	0	0	0	0	0	0	0	0
6-Mar-1999	0	0	0	0	0	0	0	0	0	0
13-Mar-1999	0	0	0	0	0	0	0	0	0	0
20-Mar-1999	0	0	0	0	0	0	0	0	0	0
27-Mar-1999	0	0	0	0	0	0	0	0	0	0
3-Apr-1999	0	0	0	0	96.22	96.22	0	0	0	96.22
10-Apr-1999	0	98.50	98.50	0	97.58	97.58	0	0	0	97.91
17-Apr-1999	0	99.36	99.36	0	98.89	98.89	0	0	0	99.03
24-Apr-1999	0	0	0	0	95.91	95.91	0	0	0	95.91
1-May-1999	0	0	0	0	0	0	0	0	0	0
8-May-1999	0	100.00	100.00	100.00	77.31	82.31	0	0	0	89.17
15-May-1999	0	99.32	99.32	100.00	65.79	71.82	0	0	0	80.13
22-May-1999	100.00	98.38	99.11	100.00	72.05	75.71	0	0	0	82.13
29-May-1999	0	0	0	81.90	58.51	64.46	0	0	0	64.46
5-Jun-1999	0	0	0	88.89	12.48	35.27	0	0	0	35.27
12-Jun-1999	0	0	0	100.00	0	29.96	0	0	0	29.96
19-Jun-1999	0	0	0	0	0	0	0	0	0	0
26-Jun-1999	0	0	0	0	0	0	0	0	0	0
3-Jul-1999	0	0	0	0	0	0	0	0	0	0

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
10-Jul-1999	0	0	0	0	0	0	0	0	0	0
17-Jul-1999	0	0	0	0	0	0	0	0	0	0
24-Jul-1999	0	0	0	0	0	0	0	0	0	0
31-Jul-1999	0	0	0	0	0	0	0	0	0	0
7-Aug-1999	0	0	0	0	0	0	0	0	0	0
14-Aug-1999	0	0	0	0	0	0	0	0	0	0
21-Aug-1999	0	0	0	0	0	0	0	0	0	0
28-Aug-1999	0	0	0	0	0	0	0	0	0	0
4-Sep-1999	0	0	0	0	0	0	0	0	0	0
11-Sep-1999	0	0	0	100.00	0	100.00	0	0	0	100.00
18-Sep-1999	0	0	0	92.72	0	92.72	0	0	0	92.72
25-Sep-1999	0	94.23	94.23	100.00	95.55	97.61	0	0	0	96.57
2-Oct-1999	0	93.87	93.87	100.00	97.30	97.78	0	0	0	96.01
9-Oct-1999	0	96.72	96.72	0	98.05	98.05	0	0	0	97.58
16-Oct-1999	0	89.31	89.31	0	88.86	88.86	0	0	0	89.17
23-Oct-1999	0	0	0	0	0	0	0	0	0	0
30-Oct-1999	0	0	0	0	0	0	0	0	0	0
6-Nov-1999	0	0	0	0	0	0	0	0	0	0
13-Nov-1999	0	0	0	0	0	0	0	0	0	0
20-Nov-1999	0	0	0	0	0	0	0	0	0	0
27-Nov-1999	0	0	0	0	0	0	0	0	0	0
4-Dec-1999	0	0	0	0	0	0	0	0	0	0
11-Dec-1999	0	0	0	0	0	0	0	0	0	0
18-Dec-1999	0	0	0	0	0	0	0	0	0	0
25-Dec-1999	0	0	0	0	0	0	0	0	0	0
1-Jan-2000	0	0	0	0	0	0	0	0	0	0
Grand Total	100.00	98.24	98.32	94.86	77.71	80.26	0	0	0	85

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.

Table E2-16 1999 estimated catcher processor hook-and-line Pacific cod catch in the BSAI by vessel size, management area, and week

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
2-Jan-1999	-	687	687	-	x	x	-	-	-	687
9-Jan-1999	-	3,187	3,187	-	x	x	-	-	-	3,187
16-Jan-1999	-	3,227	3,227	-	x	x	-	-	-	3,227
23-Jan-1999	-	2,589	2,589	-	x	x	-	-	-	2,589
30-Jan-1999	-	2,893	2,893	-	x	x	-	-	-	2,893
6-Feb-1999	-	1,799	1,799	-	x	x	-	-	-	1,799
13-Feb-1999	-	2,754	2,754	-	x	x	-	-	-	2,754
20-Feb-1999	-	2,933	2,933	-	x	x	-	-	-	2,933
27-Feb-1999	-	2,460	2,460	-	x	x	-	-	-	2,460
6-Mar-1999	x	2,752	2,752	-	x	x	-	-	-	2,752
13-Mar-1999	x	1,224	1,224	x	x	x	-	-	-	1,224
20-Mar-1999	151	1,471	1,622	x	201	201	-	-	-	1,822
27-Mar-1999	132	1,444	1,576	x	365	365	-	-	-	1,941
3-Apr-1999	x	1,464	1,464	x	520	520	-	-	-	1,984
10-Apr-1999	830	1,210	2,041	x	309	309	-	-	-	2,350
17-Apr-1999	999	1,380	2,380	318	x	318	-	-	-	2,697
24-Apr-1999	-	-	-	-	-	-	-	-	-	-
1-May-1999	-	-	-	-	-	-	-	-	-	-
8-May-1999	-	x	x	-	-	-	-	-	-	x
15-May-1999	-	x	x	-	-	-	-	-	-	x
22-May-1999	-	-	-	-	-	-	-	-	-	-
29-May-1999	-	-	-	-	-	-	-	-	-	-
5-Jun-1999	-	-	-	-	-	-	-	-	-	-
12-Jun-1999	-	-	-	-	-	-	-	-	-	-
19-Jun-1999	-	-	-	-	-	-	-	-	-	-
26-Jun-1999	-	-	-	-	-	-	-	-	-	-
3-Jul-1999	-	-	-	-	-	-	-	-	-	-
10-Jul-1999	-	-	-	-	-	-	-	-	-	-

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
17-Jul-1999	-	-	-	-	-	-	-	-	-	-
24-Jul-1999	-	-	-	-	-	-	-	-	-	-
31-Jul-1999	-	-	-	-	-	-	-	-	-	-
7-Aug-1999	-	-	-	-	-	-	-	-	-	-
14-Aug-1999	-	-	-	-	-	-	-	-	-	-
21-Aug-1999	-	-	-	-	-	-	-	-	-	-
28-Aug-1999	-	-	-	-	-	-	-	-	-	-
4-Sep-1999	-	-	-	-	-	-	-	-	-	-
11-Sep-1999	-	x	x	-	-	-	-	-	-	x
18-Sep-1999	x	933	933	x	364	364	-	-	-	1,297
25-Sep-1999	x	1,969	1,969	x	748	748	-	-	-	2,717
2-Oct-1999	x	1,889	1,889	x	572	572	-	-	-	2,460
9-Oct-1999	x	1,828	1,828	-	330	330	-	-	-	2,158
16-Oct-1999	x	1,739	1,739	x	405	405	-	-	-	2,145
23-Oct-1999	x	513	513	x	109	109	-	-	-	622
30-Oct-1999	-	-	-	-	x	x	-	-	-	x
6-Nov-1999	-	-	-	-	-	-	-	-	-	-
13-Nov-1999	-	-	-	-	-	-	-	-	-	-
20-Nov-1999	-	-	-	-	-	-	-	-	-	-
27-Nov-1999	-	-	-	-	-	-	-	-	-	-
4-Dec-1999	-	-	-	-	-	-	-	-	-	-
11-Dec-1999	-	x	x	-	x	x	-	-	-	x
18-Dec-1999	-	x	x	-	x	x	-	-	-	x
25-Dec-1999	-	x	x	-	-	-	-	-	-	x
1-Jan-2000	-	x	x	-	-	-	-	-	-	x
Grand Total	2,113	42,344	44,456	318	3,922	4,240	-	-	-	48,696

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.
x - confidential data, less than 4 participating vessels.

Table E2-17 1999 estimated percentage of catcher processor hook-and-line Pacific cod catch within 3 nm of listed rookeries and haulouts in the BSAI by vessel size, management area, and week

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
2-Jan-1999	0	0	0	0	0	0	0	0	0	0
9-Jan-1999	0	0	0	0	0	0	0	0	0	0
16-Jan-1999	0	0	0	0	0	0	0	0	0	0
23-Jan-1999	0	0	0	0	0	0	0	0	0	0
30-Jan-1999	0	0	0	0	0	0	0	0	0	0
6-Feb-1999	0	0	0	0	0	0	0	0	0	0
13-Feb-1999	0	0	0	0	0	0	0	0	0	0
20-Feb-1999	0	0	0	0	0	0	0	0	0	0
27-Feb-1999	0	0	0	0	0	0	0	0	0	0
6-Mar-1999	0	0	0	0	0	0	0	0	0	0
13-Mar-1999	0	0	0	0	0	0	0	0	0	0
20-Mar-1999	0	0	0	0	0	0	0	0	0	0
27-Mar-1999	0	0	0	0	0	0	0	0	0	0
3-Apr-1999	0	0	0	0	0	0	0	0	0	0
10-Apr-1999	2.95	0	1.20	0	0	0	0	0	0	1.04
17-Apr-1999	1.56	0	0.65	0.03	0	0.03	0	0	0	0.58
24-Apr-1999	0	0	0	0	0	0	0	0	0	0
1-May-1999	0	0	0	0	0	0	0	0	0	0
8-May-1999	0	0	0	0	0	0	0	0	0	0
15-May-1999	0	0	0	0	0	0	0	0	0	0
22-May-1999	0	0	0	0	0	0	0	0	0	0
29-May-1999	0	0	0	0	0	0	0	0	0	0
5-Jun-1999	0	0	0	0	0	0	0	0	0	0
12-Jun-1999	0	0	0	0	0	0	0	0	0	0
19-Jun-1999	0	0	0	0	0	0	0	0	0	0
26-Jun-1999	0	0	0	0	0	0	0	0	0	0
3-Jul-1999	0	0	0	0	0	0	0	0	0	0

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
10-Jul-1999	0	0	0	0	0	0	0	0	0	0
17-Jul-1999	0	0	0	0	0	0	0	0	0	0
24-Jul-1999	0	0	0	0	0	0	0	0	0	0
31-Jul-1999	0	0	0	0	0	0	0	0	0	0
7-Aug-1999	0	0	0	0	0	0	0	0	0	0
14-Aug-1999	0	0	0	0	0	0	0	0	0	0
21-Aug-1999	0	0	0	0	0	0	0	0	0	0
28-Aug-1999	0	0	0	0	0	0	0	0	0	0
4-Sep-1999	0	0	0	0	0	0	0	0	0	0
11-Sep-1999	0	0	0	0	0	0	0	0	0	0
18-Sep-1999	0	0	0	0	0	0	0	0	0	0
25-Sep-1999	0	0	0	0	0	0	0	0	0	0
2-Oct-1999	0	0	0	0	0	0	0	0	0	0
9-Oct-1999	0	0	0	0	0	0	0	0	0	0
16-Oct-1999	0	0	0	0	0	0	0	0	0	0
23-Oct-1999	0	0	0	0	0	0	0	0	0	0
30-Oct-1999	0	0	0	0	0	0	0	0	0	0
6-Nov-1999	0	0	0	0	0	0	0	0	0	0
13-Nov-1999	0	0	0	0	0	0	0	0	0	0
20-Nov-1999	0	0	0	0	0	0	0	0	0	0
27-Nov-1999	0	0	0	0	0	0	0	0	0	0
4-Dec-1999	0	0	0	0	0	0	0	0	0	0
11-Dec-1999	0	0	0	0	0	0	0	0	0	0
18-Dec-1999	0	0	0	0	0	0	0	0	0	0
25-Dec-1999	0	0	0	0	0	0	0	0	0	0
1-Jan-2000	0	0	0	0	0	0	0	0	0	0
Grand Total	1.90	0	0.09	0.03	0	0	0	0	0	0.08

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.

Table E2-18. 1999 estimated percentage of catcher processor hook-and-line Pacific cod catch within 20 nm of listed rookeries and haulouts in the BSAI by vessel size, management area, and week

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
2-Jan-1999	0	8.92	8.92	0	0	0	0	0	0	8.92
9-Jan-1999	0	16.84	16.84	0	0	0	0	0	0	16.84
16-Jan-1999	0	15.76	15.76	0	0	0	0	0	0	15.76
23-Jan-1999	0	17.80	17.80	0	0	0	0	0	0	17.80
30-Jan-1999	0	7.22	7.22	0	0	0	0	0	0	7.22
6-Feb-1999	0	7.12	7.12	0	0	0	0	0	0	7.12
13-Feb-1999	0	10.13	10.13	0	0	0	0	0	0	10.13
20-Feb-1999	0	10.38	10.38	0	0	0	0	0	0	10.38
27-Feb-1999	0	0.65	0.65	0	0	0	0	0	0	0.65
6-Mar-1999	0	4.13	4.13	0	0	0	0	0	0	4.13
13-Mar-1999	0	0	0	0	0	0	0	0	0	0
20-Mar-1999	0	0	0	0	0	0	0	0	0	0
27-Mar-1999	0	0	0	0	0.76	0.76	0	0	0	0.14
3-Apr-1999	0	0	0	0	0	0	0	0	0	0
10-Apr-1999	78.10	0	31.78	0	0	0	0	0	0	27.60
17-Apr-1999	87.62	6.06	40.31	62.11	0	62.11	0	0	0	42.88
24-Apr-1999	0	0	0	0	0	0	0	0	0	0
1-May-1999	0	0	0	0	0	0	0	0	0	0
8-May-1999	0	0	0	0	0	0	0	0	0	0
15-May-1999	0	0	0	0	0	0	0	0	0	0
22-May-1999	0	0	0	0	0	0	0	0	0	0
29-May-1999	0	0	0	0	0	0	0	0	0	0
5-Jun-1999	0	0	0	0	0	0	0	0	0	0
12-Jun-1999	0	0	0	0	0	0	0	0	0	0
19-Jun-1999	0	0	0	0	0	0	0	0	0	0
26-Jun-1999	0	0	0	0	0	0	0	0	0	0
3-Jul-1999	0	0	0	0	0	0	0	0	0	0

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
10-Jul-1999	0	0	0	0	0	0	0	0	0	0
17-Jul-1999	0	0	0	0	0	0	0	0	0	0
24-Jul-1999	0	0	0	0	0	0	0	0	0	0
31-Jul-1999	0	0	0	0	0	0	0	0	0	0
7-Aug-1999	0	0	0	0	0	0	0	0	0	0
14-Aug-1999	0	0	0	0	0	0	0	0	0	0
21-Aug-1999	0	0	0	0	0	0	0	0	0	0
28-Aug-1999	0	0	0	0	0	0	0	0	0	0
4-Sep-1999	0	0	0	0	0	0	0	0	0	0
11-Sep-1999	0	0	0	0	0	0	0	0	0	0
18-Sep-1999	0	0	0	0	0	0	0	0	0	0
25-Sep-1999	0	0	0	0	0	0	0	0	0	0
2-Oct-1999	0	0	0	0	0	0	0	0	0	0
9-Oct-1999	0	4.62	4.62	0	2.48	2.48	0	0	0	4.30
16-Oct-1999	0	0	0	0	0	0	0	0	0	0
23-Oct-1999	0	0	0	0	0	0	0	0	0	0
30-Oct-1999	0	0	0	0	0	0	0	0	0	0
6-Nov-1999	0	0	0	0	0	0	0	0	0	0
13-Nov-1999	0	0	0	0	0	0	0	0	0	0
20-Nov-1999	0	0	0	0	0	0	0	0	0	0
27-Nov-1999	0	0	0	0	0	0	0	0	0	0
4-Dec-1999	0	0	0	0	0	0	0	0	0	0
11-Dec-1999	0	0	0	0	0	0	0	0	0	0
18-Dec-1999	0	0	0	0	0	0	0	0	0	0
25-Dec-1999	0	0	0	0	0	0	0	0	0	0
1-Jan-2000	0	0	0	0	0	0	0	0	0	0
Grand Total	72.14	6.58	9.69	62.11	0.28	4.91	0	0	0	9.28

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.

Table E2-19 1999 estimated catcher vessel jig Pacific cod catch in the BSAI by vessel size, management area, and week

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
2-Jan-1999	-	-	-	-	-	-	-	-	-	-
9-Jan-1999	-	-	-	-	-	-	-	-	-	-
16-Jan-1999	-	-	-	-	-	-	-	x	x	x
23-Jan-1999	-	-	-	-	-	-	-	x	x	x
30-Jan-1999	-	-	-	-	-	-	-	x	x	x
6-Feb-1999	-	-	-	-	-	-	-	x	x	x
13-Feb-1999	-	-	-	-	-	-	-	11	11	11
20-Feb-1999	-	-	-	-	-	-	-	-	-	-
27-Feb-1999	-	-	-	-	-	-	-	x	x	x
6-Mar-1999	-	-	-	-	-	-	-	x	x	x
13-Mar-1999	-	-	-	-	-	-	-	x	x	x
20-Mar-1999	-	-	-	-	-	-	-	-	-	-
27-Mar-1999	-	-	-	-	-	-	-	x	x	x
3-Apr-1999	-	-	-	-	-	-	-	x	x	x
10-Apr-1999	-	-	-	-	-	-	-	-	-	-
17-Apr-1999	-	-	-	-	-	-	-	x	x	x
24-Apr-1999	-	-	-	-	-	-	-	x	x	x
1-May-1999	-	-	-	-	-	-	-	x	x	x
8-May-1999	-	-	-	-	-	-	-	-	-	-
15-May-1999	-	-	-	-	-	-	-	x	x	x
22-May-1999	-	-	-	-	-	-	-	-	-	-
29-May-1999	-	-	-	-	-	-	-	x	x	x
5-Jun-1999	-	-	-	-	-	-	x	x	x	x
12-Jun-1999	-	-	-	-	-	-	x	x	x	x
19-Jun-1999	-	-	-	-	-	-	x	7	7	7
26-Jun-1999	-	-	-	-	-	-	-	x	x	x
3-Jul-1999	-	-	-	x	-	x	x	7	7	7
10-Jul-1999	-	-	-	x	-	x	x	x	x	x

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
17-Jul-1999	-	-	-	x	-	x	x	7	7	7
24-Jul-1999	-	-	-	x	-	x	x	2	2	2
31-Jul-1999	-	-	-	-	-	-	x	x	x	x
7-Aug-1999	-	-	-	x	-	x	x	x	x	x
14-Aug-1999	-	-	-	x	-	x	x	x	x	x
21-Aug-1999	-	-	-	x	-	x	-	2	2	2
28-Aug-1999	-	-	-	x	-	x	-	-	-	x
4-Sep-1999	-	-	-	x	-	x	-	-	-	x
11-Sep-1999	-	-	-	-	-	-	x	-	x	x
18-Sep-1999	-	-	-	x	-	x	x	x	x	x
25-Sep-1999	-	-	-	-	-	-	-	-	-	-
2-Oct-1999	-	-	-	-	-	-	-	-	-	-
9-Oct-1999	-	-	-	-	-	-	-	-	-	-
16-Oct-1999	-	-	-	x	-	x	-	-	-	x
23-Oct-1999	-	-	-	-	-	-	-	-	-	-
30-Oct-1999	-	-	-	x	-	x	-	-	-	x
6-Nov-1999	-	-	-	x	-	x	-	-	-	x
13-Nov-1999	-	-	-	x	-	x	x	-	x	x
20-Nov-1999	-	-	-	-	-	-	-	-	-	-
27-Nov-1999	-	-	-	x	-	x	-	-	-	x
4-Dec-1999	-	-	-	-	-	-	-	-	-	-
11-Dec-1999	-	-	-	-	-	-	-	x	x	x
18-Dec-1999	-	-	-	-	-	-	-	x	x	x
25-Dec-1999	-	-	-	-	-	-	-	x	x	x
1-Jan-2000	-	-	-	-	-	-	x	x	x	x
Grand Total	-	-	-	x	-	x	x	37	37	37

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.
x - confidential data, less than 4 participating vessels.

Table E2-20 1999 estimated percentage of catcher vessel jig Pacific cod catch within 3 nm of listed rookeries and haulouts in the BSAI by vessel size, management area, and week

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
2-Jan-1999	0	0	0	0	0	0	0	0	0	0
9-Jan-1999	0	0	0	0	0	0	0	0	0	0
16-Jan-1999	0	0	0	0	0	0	0	0	0	0
23-Jan-1999	0	0	0	0	0	0	0	0	0	0
30-Jan-1999	0	0	0	0	0	0	0	0	0	0
6-Feb-1999	0	0	0	0	0	0	0	0	0	0
13-Feb-1999	0	0	0	0	0	0	0	0.01	0.01	0.01
20-Feb-1999	0	0	0	0	0	0	0	0	0	0
27-Feb-1999	0	0	0	0	0	0	0	0	0	0
6-Mar-1999	0	0	0	0	0	0	0	0	0	0
13-Mar-1999	0	0	0	0	0	0	0	0	0	0
20-Mar-1999	0	0	0	0	0	0	0	0	0	0
27-Mar-1999	0	0	0	0	0	0	0	0	0	0
3-Apr-1999	0	0	0	0	0	0	0	0	0	0
10-Apr-1999	0	0	0	0	0	0	0	0	0	0
17-Apr-1999	0	0	0	0	0	0	0	0	0	0
24-Apr-1999	0	0	0	0	0	0	0	0	0	0
1-May-1999	0	0	0	0	0	0	0	0	0	0
8-May-1999	0	0	0	0	0	0	0	0	0	0
15-May-1999	0	0	0	0	0	0	0	0	0	0
22-May-1999	0	0	0	0	0	0	0	0	0	0
29-May-1999	0	0	0	0	0	0	0	0	0	0
5-Jun-1999	0	0	0	0	0	0	0	0	0	0
12-Jun-1999	0	0	0	0	0	0	0	0	0	0
19-Jun-1999	0	0	0	0	0	0	0	8.22	8.22	8.22
26-Jun-1999	0	0	0	0	0	0	0	0	0	0
3-Jul-1999	0	0	0	0	0	0	0	0	0	0

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
10-Jul-1999	0	0	0	0	0	0	0	0	0	0
17-Jul-1999	0	0	0	0	0	0	0	0	0	0
24-Jul-1999	0	0	0	0	0	0	0	0	0	0
31-Jul-1999	0	0	0	0	0	0	0	0	0	0
7-Aug-1999	0	0	0	0	0	0	0	0	0	0
14-Aug-1999	0	0	0	0	0	0	0	0	0	0
21-Aug-1999	0	0	0	0	0	0	0	0	0	0
28-Aug-1999	0	0	0	0	0	0	0	0	0	0
4-Sep-1999	0	0	0	0	0	0	0	0	0	0
11-Sep-1999	0	0	0	0	0	0	0	0	0	0
18-Sep-1999	0	0	0	0	0	0	0	0	0	0
25-Sep-1999	0	0	0	0	0	0	0	0	0	0
2-Oct-1999	0	0	0	0	0	0	0	0	0	0
9-Oct-1999	0	0	0	0	0	0	0	0	0	0
16-Oct-1999	0	0	0	0	0	0	0	0	0	0
23-Oct-1999	0	0	0	0	0	0	0	0	0	0
30-Oct-1999	0	0	0	0	0	0	0	0	0	0
6-Nov-1999	0	0	0	0	0	0	0	0	0	0
13-Nov-1999	0	0	0	0	0	0	0	0	0	0
20-Nov-1999	0	0	0	0	0	0	0	0	0	0
27-Nov-1999	0	0	0	0	0	0	0	0	0	0
4-Dec-1999	0	0	0	0	0	0	0	0	0	0
11-Dec-1999	0	0	0	0	0	0	0	0	0	0
18-Dec-1999	0	0	0	0	0	0	0	0	0	0
25-Dec-1999	0	0	0	0	0	0	0	0	0	0
1-Jan-2000	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	1.55	1.55	1.55

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.

Table E2-21 1999 estimated percentage of catcher vessel jig Pacific cod catch within 20 nm of listed rookeries and haulouts in the BSAI by vessel size, management area, and week

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
2-Jan-1999	0	0	0	0	0	0	0	0	0	0
9-Jan-1999	0	0	0	0	0	0	0	0	0	0
16-Jan-1999	0	0	0	0	0	0	0	0	0	0
23-Jan-1999	0	0	0	0	0	0	0	0	0	0
30-Jan-1999	0	0	0	0	0	0	0	0	0	0
6-Feb-1999	0	0	0	0	0	0	0	0	0	0
13-Feb-1999	0	0	0	0	0	0	0	57.64	57.64	57.64
20-Feb-1999	0	0	0	0	0	0	0	0	0	0
27-Feb-1999	0	0	0	0	0	0	0	0	0	0
6-Mar-1999	0	0	0	0	0	0	0	0	0	0
13-Mar-1999	0	0	0	0	0	0	0	0	0	0
20-Mar-1999	0	0	0	0	0	0	0	0	0	0
27-Mar-1999	0	0	0	0	0	0	0	0	0	0
3-Apr-1999	0	0	0	0	0	0	0	0	0	0
10-Apr-1999	0	0	0	0	0	0	0	0	0	0
17-Apr-1999	0	0	0	0	0	0	0	0	0	0
24-Apr-1999	0	0	0	0	0	0	0	0	0	0
1-May-1999	0	0	0	0	0	0	0	0	0	0
8-May-1999	0	0	0	0	0	0	0	0	0	0
15-May-1999	0	0	0	0	0	0	0	0	0	0
22-May-1999	0	0	0	0	0	0	0	0	0	0
29-May-1999	0	0	0	0	0	0	0	0	0	0
5-Jun-1999	0	0	0	0	0	0	0	0	0	0
12-Jun-1999	0	0	0	0	0	0	0	0	0	0
19-Jun-1999	0	0	0	0	0	0	0	100.00	100.00	100.00
26-Jun-1999	0	0	0	0	0	0	0	0	0	0
3-Jul-1999	0	0	0	0	0	0	0	90.04	90.04	90.04

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
10-Jul-1999	0	0	0	0	0	0	0	0	0	0
17-Jul-1999	0	0	0	0	0	0	0	100.00	100.00	100.00
24-Jul-1999	0	0	0	0	0	0	0	100.00	100.00	100.00
31-Jul-1999	0	0	0	0	0	0	0	0	0	0
7-Aug-1999	0	0	0	0	0	0	0	0	0	0
14-Aug-1999	0	0	0	0	0	0	0	0	0	0
21-Aug-1999	0	0	0	0	0	0	0	100.00	100.00	100.00
28-Aug-1999	0	0	0	0	0	0	0	0	0	0
4-Sep-1999	0	0	0	0	0	0	0	0	0	0
11-Sep-1999	0	0	0	0	0	0	0	0	0	0
18-Sep-1999	0	0	0	0	0	0	0	0	0	0
25-Sep-1999	0	0	0	0	0	0	0	0	0	0
2-Oct-1999	0	0	0	0	0	0	0	0	0	0
9-Oct-1999	0	0	0	0	0	0	0	0	0	0
16-Oct-1999	0	0	0	0	0	0	0	0	0	0
23-Oct-1999	0	0	0	0	0	0	0	0	0	0
30-Oct-1999	0	0	0	0	0	0	0	0	0	0
6-Nov-1999	0	0	0	0	0	0	0	0	0	0
13-Nov-1999	0	0	0	0	0	0	0	0	0	0
20-Nov-1999	0	0	0	0	0	0	0	0	0	0
27-Nov-1999	0	0	0	0	0	0	0	0	0	0
4-Dec-1999	0	0	0	0	0	0	0	0	0	0
11-Dec-1999	0	0	0	0	0	0	0	0	0	0
18-Dec-1999	0	0	0	0	0	0	0	0	0	0
25-Dec-1999	0	0	0	0	0	0	0	0	0	0
1-Jan-2000	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	85.08	85.08	85.08

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.

Table E2-22 1999 estimated catcher processor trawl Atka mackerel catch in the BSAI by vessel size, management area, and week

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
2-Jan-1999	-	-	-	-	-	-	-	-	-	-
9-Jan-1999	-	-	-	-	-	-	-	-	-	-
16-Jan-1999	-	-	-	-	-	-	-	-	-	-
23-Jan-1999	2,522	-	2,522	-	-	-	-	-	-	2,522
30-Jan-1999	4,404	-	4,404	-	-	-	-	-	-	4,404
6-Feb-1999	3,131	x	3,131	-	-	-	-	-	-	3,131
13-Feb-1999	3,052	-	3,052	-	-	-	-	-	-	3,052
20-Feb-1999	x	-	x	-	-	-	-	-	-	x
27-Feb-1999	x	-	x	-	-	-	-	-	-	x
6-Mar-1999	x	-	x	-	-	-	-	-	-	x
13-Mar-1999	x	-	x	-	-	-	-	-	-	x
20-Mar-1999	x	-	x	-	-	-	-	-	-	x
27-Mar-1999	x	-	x	-	-	-	-	-	-	x
3-Apr-1999	x	x	x	-	-	-	-	-	-	x
10-Apr-1999	x	x	x	-	-	-	-	-	-	x
17-Apr-1999	-	x	x	-	-	-	-	-	-	x
24-Apr-1999	-	x	x	-	-	-	-	-	-	x
1-May-1999	-	-	-	-	-	-	-	-	-	-
8-May-1999	x	-	x	-	-	-	-	-	-	x
15-May-1999	-	x	x	-	x	x	-	-	-	x
22-May-1999	-	x	x	-	-	-	-	-	-	x
29-May-1999	-	x	x	-	-	-	-	-	-	x
5-Jun-1999	-	-	-	-	-	-	-	-	-	-
12-Jun-1999	-	-	-	-	-	-	-	-	-	-
19-Jun-1999	-	-	-	-	-	-	-	-	-	-
26-Jun-1999	-	-	-	-	-	-	-	-	-	-
3-Jul-1999	-	-	-	-	-	-	-	-	-	-
10-Jul-1999	x	-	x	-	-	-	-	-	-	x

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
17-Jul-1999	-	-	-	-	-	-	-	-	-	-
24-Jul-1999	-	x	x	-	-	-	-	-	-	x
31-Jul-1999	-	-	-	-	-	-	-	-	-	-
7-Aug-1999	-	-	-	-	-	-	-	-	-	-
14-Aug-1999	-	-	-	-	-	-	-	-	-	-
21-Aug-1999	-	-	-	-	x	x	-	-	-	x
28-Aug-1999	-	-	-	-	-	-	-	-	-	-
4-Sep-1999	3,127	x	3,127	-	x	x	-	-	-	3,127
11-Sep-1999	3,601	x	3,601	-	x	x	-	-	-	3,601
18-Sep-1999	4,347	-	4,347	-	-	-	-	-	-	4,347
25-Sep-1999	4,371	-	4,371	-	-	-	-	-	-	4,371
2-Oct-1999	1,952	x	1,952	-	-	-	-	-	-	1,952
9-Oct-1999	1,335	-	1,335	-	-	-	-	-	-	1,335
16-Oct-1999	2,135	x	2,135	-	-	-	-	-	-	2,135
23-Oct-1999	1,601	-	1,601	-	-	-	-	-	-	1,601
30-Oct-1999	896	-	896	-	-	-	-	-	-	896
6-Nov-1999	x	-	x	-	-	-	-	-	-	x
13-Nov-1999	-	-	-	-	-	-	-	-	-	-
20-Nov-1999	x	-	x	-	-	-	-	-	-	x
27-Nov-1999	x	-	x	-	x	x	-	-	-	x
4-Dec-1999	-	-	-	-	-	-	-	-	-	-
11-Dec-1999	-	-	-	-	-	-	-	-	-	-
18-Dec-1999	-	-	-	-	-	-	-	-	-	-
25-Dec-1999	-	-	-	-	-	-	-	-	-	-
1-Jan-2000	-	-	-	-	-	-	-	-	-	-
Grand Total	36,473	x	36,473	-	x	x	-	-	-	36,473

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.
x - confidential data, less than 4 participating vessels.

Table E2-23 1999 estimated percentage of catcher processor trawl Atka mackerel catch within 3 nm of listed rookeries and haulouts in the BSAI by vessel size, management area, and week

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
2-Jan-1999	0	0	0	0	0	0	0	0	0	0
9-Jan-1999	0	0	0	0	0	0	0	0	0	0
16-Jan-1999	0	0	0	0	0	0	0	0	0	0
23-Jan-1999	0.07	0	0.07	0	0	0	0	0	0	0.07
30-Jan-1999	0.03	0	0.03	0	0	0	0	0	0	0.03
6-Feb-1999	1.23	0	1.23	0	0	0	0	0	0	1.23
13-Feb-1999	0.07	0	0.07	0	0	0	0	0	0	0.07
20-Feb-1999	0	0	0	0	0	0	0	0	0	0
27-Feb-1999	0	0	0	0	0	0	0	0	0	0
6-Mar-1999	0	0	0	0	0	0	0	0	0	0
13-Mar-1999	0	0	0	0	0	0	0	0	0	0
20-Mar-1999	0	0	0	0	0	0	0	0	0	0
27-Mar-1999	0	0	0	0	0	0	0	0	0	0
3-Apr-1999	0	0	0	0	0	0	0	0	0	0
10-Apr-1999	0	0	0	0	0	0	0	0	0	0
17-Apr-1999	0	0	0	0	0	0	0	0	0	0
24-Apr-1999	0	0	0	0	0	0	0	0	0	0
1-May-1999	0	0	0	0	0	0	0	0	0	0
8-May-1999	0	0	0	0	0	0	0	0	0	0
15-May-1999	0	0	0	0	0	0	0	0	0	0
22-May-1999	0	0	0	0	0	0	0	0	0	0
29-May-1999	0	0	0	0	0	0	0	0	0	0
5-Jun-1999	0	0	0	0	0	0	0	0	0	0
12-Jun-1999	0	0	0	0	0	0	0	0	0	0
19-Jun-1999	0	0	0	0	0	0	0	0	0	0
26-Jun-1999	0	0	0	0	0	0	0	0	0	0
3-Jul-1999	0	0	0	0	0	0	0	0	0	0

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
10-Jul-1999	0	0	0	0	0	0	0	0	0	0
17-Jul-1999	0	0	0	0	0	0	0	0	0	0
24-Jul-1999	0	0	0	0	0	0	0	0	0	0
31-Jul-1999	0	0	0	0	0	0	0	0	0	0
7-Aug-1999	0	0	0	0	0	0	0	0	0	0
14-Aug-1999	0	0	0	0	0	0	0	0	0	0
21-Aug-1999	0	0	0	0	0	0	0	0	0	0
28-Aug-1999	0	0	0	0	0	0	0	0	0	0
4-Sep-1999	0.04	0	0.04	0	0	0	0	0	0	0.04
11-Sep-1999	0.18	0	0.18	0	0	0	0	0	0	0.18
18-Sep-1999	1.18	0	1.18	0	0	0	0	0	0	1.18
25-Sep-1999	0	0	0	0	0	0	0	0	0	0
2-Oct-1999	0	0	0	0	0	0	0	0	0	0
9-Oct-1999	0	0	0	0	0	0	0	0	0	0
16-Oct-1999	0	0	0	0	0	0	0	0	0	0
23-Oct-1999	0	0	0	0	0	0	0	0	0	0
30-Oct-1999	0	0	0	0	0	0	0	0	0	0
6-Nov-1999	0	0	0	0	0	0	0	0	0	0
13-Nov-1999	0	0	0	0	0	0	0	0	0	0
20-Nov-1999	0	0	0	0	0	0	0	0	0	0
27-Nov-1999	0	0	0	0	0	0	0	0	0	0
4-Dec-1999	0	0	0	0	0	0	0	0	0	0
11-Dec-1999	0	0	0	0	0	0	0	0	0	0
18-Dec-1999	0	0	0	0	0	0	0	0	0	0
25-Dec-1999	0	0	0	0	0	0	0	0	0	0
1-Jan-2000	0	0	0	0	0	0	0	0	0	0
Grand Total	0.28	0	0.28	0	0	0	0	0	0	0.28

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.

Table E2-24 1999 estimated percentage of catcher processor trawl Atka mackerel catch within 20 nm of listed rookeries and haulouts in the BSAI by vessel size, management area, and week

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
2-Jan-1999	0	0	0	0	0	0	0	0	0	0
9-Jan-1999	0	0	0	0	0	0	0	0	0	0
16-Jan-1999	0	0	0	0	0	0	0	0	0	0
23-Jan-1999	62.85	0	62.85	0	0	0	0	0	0	62.85
30-Jan-1999	54.52	0	54.52	0	0	0	0	0	0	54.52
6-Feb-1999	70.73	0	70.73	0	0	0	0	0	0	70.73
13-Feb-1999	67.96	0	67.96	0	0	0	0	0	0	67.96
20-Feb-1999	0	0	0	0	0	0	0	0	0	0
27-Feb-1999	0	0	0	0	0	0	0	0	0	0
6-Mar-1999	0	0	0	0	0	0	0	0	0	0
13-Mar-1999	0	0	0	0	0	0	0	0	0	0
20-Mar-1999	0	0	0	0	0	0	0	0	0	0
27-Mar-1999	0	0	0	0	0	0	0	0	0	0
3-Apr-1999	0	0	0	0	0	0	0	0	0	0
10-Apr-1999	0	0	0	0	0	0	0	0	0	0
17-Apr-1999	0	0	0	0	0	0	0	0	0	0
24-Apr-1999	0	0	0	0	0	0	0	0	0	0
1-May-1999	0	0	0	0	0	0	0	0	0	0
8-May-1999	0	0	0	0	0	0	0	0	0	0
15-May-1999	0	0	0	0	0	0	0	0	0	0
22-May-1999	0	0	0	0	0	0	0	0	0	0
29-May-1999	0	0	0	0	0	0	0	0	0	0
5-Jun-1999	0	0	0	0	0	0	0	0	0	0
12-Jun-1999	0	0	0	0	0	0	0	0	0	0
19-Jun-1999	0	0	0	0	0	0	0	0	0	0
26-Jun-1999	0	0	0	0	0	0	0	0	0	0
3-Jul-1999	0	0	0	0	0	0	0	0	0	0

	L		L Total	M		M Total	S		S Total	Grand Total
	AI	BS		AI	BS		AI	BS		
10-Jul-1999	0	0	0	0	0	0	0	0	0	0
17-Jul-1999	0	0	0	0	0	0	0	0	0	0
24-Jul-1999	0	0	0	0	0	0	0	0	0	0
31-Jul-1999	0	0	0	0	0	0	0	0	0	0
7-Aug-1999	0	0	0	0	0	0	0	0	0	0
14-Aug-1999	0	0	0	0	0	0	0	0	0	0
21-Aug-1999	0	0	0	0	0	0	0	0	0	0
28-Aug-1999	0	0	0	0	0	0	0	0	0	0
4-Sep-1999	63.47	0	63.47	0	0	0	0	0	0	63.47
11-Sep-1999	46.81	0	46.81	0	0	0	0	0	0	46.81
18-Sep-1999	16.02	0	16.02	0	0	0	0	0	0	16.02
25-Sep-1999	3.94	0	3.94	0	0	0	0	0	0	3.94
2-Oct-1999	33.51	0	33.51	0	0	0	0	0	0	33.51
9-Oct-1999	42.02	0	42.02	0	0	0	0	0	0	42.02
16-Oct-1999	26.85	0	26.85	0	0	0	0	0	0	26.85
23-Oct-1999	21.14	0	21.14	0	0	0	0	0	0	21.14
30-Oct-1999	0	0	0	0	0	0	0	0	0	0
6-Nov-1999	0	0	0	0	0	0	0	0	0	0
13-Nov-1999	0	0	0	0	0	0	0	0	0	0
20-Nov-1999	0	0	0	0	0	0	0	0	0	0
27-Nov-1999	0	0	0	0	0	0	0	0	0	0
4-Dec-1999	0	0	0	0	0	0	0	0	0	0
11-Dec-1999	0	0	0	0	0	0	0	0	0	0
18-Dec-1999	0	0	0	0	0	0	0	0	0	0
25-Dec-1999	0	0	0	0	0	0	0	0	0	0
1-Jan-2000	0	0	0	0	0	0	0	0	0	0
Grand Total	40.96	0	40.96	0	0	0	0	0	0	40.96

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.

Table E2-25 1999 estimated catcher vessel trawl pollock catch in the GOA by vessel size, management area, and week

	L				L Total	M				M Total	S				S Total	Grand Total
	EGOA	610	620	630		EGOA	610	620	630		EGOA	610	620	630		
2-Jan-1999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Jan-1999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Jan-1999	-	-	-	-	-	-	-	-	-	-	-	-	-	x	x	x
23-Jan-1999	-	x	-	x	x	x	531	x	3,522	4,053	x	460	-	34	494	4,547
30-Jan-1999	-	x	-	x	x	x	1,588	498	5,710	7,797	-	2,662	-	x	2,662	10,459
6-Feb-1999	-	x	x	-	x	x	846	2,658	-	3,504	x	1,010	210	-	1,220	4,724
13-Feb-1999	-	x	x	-	x	559	-	2,274	-	2,833	-	x	259	-	259	3,092
20-Feb-1999	-	-	x	-	x	537	-	3,283	x	3,820	-	-	x	-	x	3,820
27-Feb-1999	-	-	-	-	-	529	-	-	-	529	-	-	-	-	-	529
6-Mar-1999	x	-	-	-	x	x	-	-	x	x	-	-	-	-	-	x
13-Mar-1999	x	-	-	x	x	x	-	-	-	x	-	-	-	-	-	x
20-Mar-1999	-	-	-	-	-	x	-	-	x	x	-	-	-	-	-	x
27-Mar-1999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Apr-1999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Apr-1999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17-Apr-1999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Apr-1999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-May-1999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8-May-1999	-	-	-	-	-	-	-	x	-	x	-	-	-	-	-	x
15-May-1999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22-May-1999	-	-	-	-	-	-	-	-	x	x	-	-	-	-	-	x
29-May-1999	-	-	-	-	-	-	-	-	x	x	-	-	-	-	-	x
5-Jun-1999	-	x	x	x	x	-	1,172	1,657	2,653	5,482	-	889	-	x	889	6,371
12-Jun-1999	-	x	x	x	x	-	991	6,617	1,628	9,235	-	503	x	x	503	9,738
19-Jun-1999	-	-	-	-	-	-	-	x	-	x	-	-	-	-	-	x
26-Jun-1999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jul-1999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Jul-1999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

	L				L Total	M				M Total	S				S Total	Grand Total
	EGOA	610	620	630		EGOA	610	620	630		EGOA	610	620	630		
17-Jul-1999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Jul-1999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31-Jul-1999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Aug-1999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14-Aug-1999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Aug-1999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28-Aug-1999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Sep-1999	-	1,348	692	-	2,040	-	1,482	620	2,923	5,024	-	439	-	x	439	7,503
11-Sep-1999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Sep-1999	-	-	-	-	-	-	1,252	312	4,755	6,319	-	1,257	-	x	1,257	7,576
25-Sep-1999	-	-	-	-	-	-	1,827	1,847	5,799	9,472	-	1,615	x	x	1,615	11,087
2-Oct-1999	-	-	x	-	x	-	-	5,351	392	5,742	-	-	529	x	529	6,271
9-Oct-1999	-	-	-	-	-	-	-	2,545	x	2,545	-	-	218	-	218	2,763
16-Oct-1999	-	-	936	-	936	-	-	3,714	-	3,714	-	-	63	-	63	4,713
23-Oct-1999	-	-	-	-	-	-	-	70	-	70	-	-	-	-	-	70
30-Oct-1999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6-Nov-1999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Nov-1999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20-Nov-1999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Nov-1999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Dec-1999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-Dec-1999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Dec-1999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25-Dec-1999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jan-2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grand Total	x	1,348	1,628	x	2,976	1,625	9,688	31,443	27,381	70,137	x	8,835	1,279	34	10,149	83,262

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.
x - confidential data, less than 4 participating vessels.

Table E2-26 999 estimated percentage of catcher vessel trawl pollock catch within 3 nm of listed rookeries and haulouts in the GOA by vessel size, management area, and week

	L				L Total	M				M Total	S				S Total	Grand Total
	EGOA	610	620	630		EGOA	610	620	630		EGOA	610	620	630		
02-Jan-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09-Jan-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-Jan-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23-Jan-1999	0	0	0	0	0	0	0	0	0	0	0	1.29	0	0	1.20	0.13
30-Jan-1999	0	0	0	0	0	0	0	0	0.88	0.65	0	0	0	0	0	0.48
6-Feb-1999	0	0	0	0	0	0	0	0.03	0	0.02	0	0	20.26	0	3.48	0.92
13-Feb-1999	0	0	0	0	0	0	0	2.54	0	2.04	0	0	0	0	0	1.87
20-Feb-1999	0	0	0	0	0	0	0	0.68	0	0.59	0	0	0	0	0	0.59
27-Feb-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6-Mar-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13-Mar-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20-Mar-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27-Mar-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3-Apr-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10-Apr-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24-Apr-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1-May-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8-May-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22-May-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29-May-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5-Jun-1999	0	0	0	0	0	0	31.18	0	6.51	9.81	0	13.22	0	0	13.22	10.29
12-Jun-1999	0	0	0	0	0	0	12.36	0	4.98	2.20	0	6.30	0	0	6.30	2.42
19-Jun-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26-Jun-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3-Jul-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	L				L Total	M				M Total	S				S Total	Grand Total
	EGOA	610	620	630		EGOA	610	620	630		EGOA	610	620	630		
10-Jul-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Jul-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24-Jul-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31-Jul-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7-Aug-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14-Aug-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21-Aug-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28-Aug-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Sep-1999	0	3.27	0	0	2.16	0	0.03	0	0	0.01	0	0.02	0	0	0.02	0.59
11-Sep-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18-Sep-1999	0	0	0	0	0	0	0.04	0	0	0.01	0	4.57	0	0	4.57	0.76
25-Sep-1999	0	0	0	0	0	0	0.05	0.02	0.50	0.32	0	1.42	0	0	1.42	0.48
2-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	2.32	0	2.32	0.20
9-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	20.92	0	20.92	1.65
16-Oct-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23-Oct-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30-Oct-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06Nov99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13-Nov-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20-Nov-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27-Nov-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Dec-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11-Dec-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18-Dec-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Dec-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1-Jan-00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	3.27	0	0	1.48	0	5.05	0.26	1.22	1.29	0	2.67	7.84	0	3.31	1.54

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.

Table E2-27 1999 estimated percentage of catcher vessel trawl pollock catch within 20 nm of listed rookeries and haulouts in the GOA by vessel size, management area, and week

	L				L Total	M				M Total	S				S Total	Grand Total
	EGOA	610	620	630		EGOA	610	620	630		EGOA	610	620	630		
2-Jan-99	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0
9-Jan-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-Jan-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23-Jan-1999	0	0	0	0	0	0	57.04	0	91.21	86.73	0	69.28	0	38.23	67.14	84.60
30-Jan-1999	0	0	0	0	0	0	66.09	84.08	86.99	82.54	0	66.91	0	0	66.91	78.56
6-Feb-1999	0	0	0	0	0	0	67.45	80.37	0	77.25	0	78.01	100.00	0	81.80	78.43
13-Feb-1999	0	0	0	0	0	100.00	0	66.74	0	73.31	0	0	79.63	0	79.63	73.84
20-Feb-1999	0	0	0	0	0	100.00	0	75.20	0	78.69	0	0	0	0	0	78.69
27-Feb-1999	0	0	0	0	0	100.00	0	0	0	100.00	0	0	0	0	0	100.00
6-Mar-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13-Mar-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20-Mar-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27-Mar-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3-Apr-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10-Apr-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24-Apr-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1-May-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8-May-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22-May-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29-May-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5-Jun-1999	0	0	0	0	0	0	100.00	23.08	81.73	67.91	0	93.34	0	0	93.34	71.45
12-Jun-1999	0	0	0	0	0	0	81.77	27.14	79.07	42.15	0	85.24	0	0	85.24	44.38
19-Jun-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26-Jun-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3-Jul-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	L				L Total	M				M Total	S				S Total	Grand Total
	EGOA	610	620	630		EGOA	610	620	630		EGOA	610	620	630		
10-Jul-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Jul-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24-Jul-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31-Jul-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7-Aug-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14-Aug-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21-Aug-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28-Aug-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Sep-1999	0	23.04	9.11	0	18.31	0	66.04	9.13	80.56	67.46	0	80.97	0	0	80.97	54.89
11-Sep-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18-Sep-1999	0	0	0	0	0	0	90.17	13.14	60.61	64.13	0	80.86	0	0	80.86	66.90
25-Sep-1999	0	0	0	0	0	0	100.00	23.89	75.94	70.43	0	74.09	0	0	74.09	70.96
2-Oct-1999	0	0	0	0	0	0	0	15.93	82.44	20.47	0	0	73.11	0	73.11	24.91
9-Oct-1999	0	0	0	0	0	0	0	10.58	0	10.58	0	0	100.00	0	100.00	17.63
16-Oct-1999	0	0	9.89	0	9.89	0	0	8.47	0	8.47	0	0	0	0	0	8.63
23-Oct-1999	0	0	0	0	0	0	0	1.64	0	1.64	0	0	0	0	0	1.64
30-Oct-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6-Nov-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13-Nov-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20-Nov-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27-Nov-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Dec-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11-Dec-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18-Dec-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Dec-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1-Jan-00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	23.04	9.56	0	15.67	100.00	80.92	34.01	78.88	59.54	0	76.00	79.79	38.23	76.35	60.02

Notes: Data are in percentages. Values are in mt

Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall

CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.

Table E2-28 1999 estimated catcher vessel trawl Pacific cod catch in the GOA by vessel size, management area, and week

	L			L Total	M			M Total	S			S Total	Grand Total
	CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		
2-Jan-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Jan-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Jan-1999	-	-	-	-	-	-	-	-	-	-	x	x	x
23-Jan-1999	-	-	-	-	172	-	-	172	x	-	23	23	194
30-Jan-1999	-	-	-	-	82	-	-	82	114	-	x	114	196
6-Feb-1999	-	-	-	-	238	-	x	238	58	-	170	228	465
13-Feb-1999	-	-	-	-	218	-	44	262	x	-	836	836	1,098
20-Feb-1999	-	-	-	-	1,557	-	298	1,855	184	-	1,853	2,036	3,892
27-Feb-1999	x	-	-	x	2,452	-	1,057	3,509	249	-	3,302	3,551	7,059
6-Mar-1999	x	-	x	x	2,807	-	1,248	4,055	308	-	2,955	3,263	7,318
13-Mar-1999	x	-	x	x	3,309	-	818	4,128	392	-	1,301	1,693	5,821
20-Mar-1999	x	-	-	x	1,038	-	-	1,038	x	-	-	x	1,038
27-Mar-1999	-	-	-	-	x	-	-	x	-	-	-	-	x
3-Apr-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Apr-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
17-Apr-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Apr-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
1-May-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
8-May-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
15-May-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
22-May-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
29-May-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Jun-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
12-Jun-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
19-Jun-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Jun-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jul-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Jul-1999	-	-	-	-	-	-	-	-	-	-	-	-	-

	L			L Total	M			M Total	S			S Total	Grand Total
	CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		
17-Jul-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Jul-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
31-Jul-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Aug-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
14-Aug-1999	-	-	-	-	x	-	-	x	-	-	-	-	x
21-Aug-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
28-Aug-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Sep-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
11-Sep-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Sep-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
25-Sep-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Oct-1999	-	-	-	-	714	-	-	714	x	-	-	x	714
9-Oct-1999	-	-	-	-	3,325	-	-	3,325	x	-	-	x	3,325
16-Oct-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Oct-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Oct-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
6-Nov-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Nov-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
20-Nov-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Nov-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Dec-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
11-Dec-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Dec-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
25-Dec-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jan-2000	-	-	-	-	-	-	-	-	-	-	-	-	-
Grand Total	x	-	x	x	15,912	-	3,465	19,377	1,304	-	10,439	11,743	31,120

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.
x - confidential data, less than 4 participating vessels.

Table E2-29 1999 estimated percentage of catcher vessel trawl Pacific cod catch within 3 nm of listed rookeries and haulouts in the GOA by vessel size, management area, and week

	L			L Total	M			M Total	S			S Total	Grand Total
	CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		
2-Jan-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
9-Jan-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
16-Jan-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
23-Jan-1999	0	0	0	0	0	0	0	0	0	0	2.28	2.28	0.27
30-Jan-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
6-Feb-1999	0	0	0	0	0	0	0	0	0	0	3.09	2.31	1.13
13-Feb-1999	0	0	0	0	0	0	0	0	0	0	9.96	9.96	7.58
20-Feb-1999	0	0	0	0	0	0	0.18	0.03	0	0	4.63	4.21	2.22
27-Feb-1999	0	0	0	0	0	0	0.02	0.01	0	0	2.26	2.10	1.06
6-Mar-1999	0	0	0	0	0	0	0.30	0.09	0	0	0.97	0.88	0.44
13-Mar-1999	0	0	0	0	0	0	0	0	0	0	0.56	0.43	0.13
20-Mar-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
27-Mar-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
3-Apr-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
10-Apr-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
24-Apr-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
1-May-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
8-May-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
22-May-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
29-May-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
5-Jun-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
12-Jun-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
19-Jun-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
26-Jun-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
3-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0

	L			L Total	M			M Total	S			S Total	Grand Total
	CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		
10-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
24-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
31-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
7-Aug-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
14-Aug-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
21-Aug-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
28-Aug-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Sep-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
11-Sep-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
18-Sep-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Sep-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
9-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
16-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
23-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
30-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
6-Nov-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
13-Nov-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
20-Nov-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
27-Nov-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Dec-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
11-Dec-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
18-Dec-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Dec-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
1-Jan-2000	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0.13	0.02	0	0	2.73	2.43	0.93

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.

Table E2-30 1999 estimated percentage of catcher vessel trawl Pacific cod catch within 20 nm of listed rookeries and haulouts in the GOA by vessel size, management area, and week

	L			L Total	M			M Total	S			S Total	Grand Total
	CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		
2-Jan-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
9-Jan-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
16-Jan-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
23-Jan-1999	0	0	0	0	0	0	0	0	0	0	70.67	70.67	8.31
30-Jan-1999	0	0	0	0	6.26	0	0	6.26	94.81	0	0	94.81	57.66
6-Feb-1999	0	0	0	0	44.35	0	0	44.35	82.38	0	75.97	77.60	60.61
13-Feb-1999	0	0	0	0	55.61	0	0	46.24	0	0	80.32	80.32	72.18
20-Feb-1999	0	0	0	0	12.64	0	60.10	20.27	41.73	0	68.73	66.29	44.35
27-Feb-1999	0	0	0	0	30.38	0	82.70	46.14	58.66	0	66.68	66.12	56.19
6-Mar-1999	0	0	0	0	42.36	0	88.32	56.50	66.67	0	64.41	64.63	60.12
13-Mar-1999	0	0	0	0	39.98	0	69.71	45.87	60.19	0	60.75	60.62	50.16
20-Mar-1999	0	0	0	0	19.20	0	0	19.20	0	0	0	0	19.20
27-Mar-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
3-Apr-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
10-Apr-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
24-Apr-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
1-May-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
8-May-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
22-May-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
29-May-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
5-Jun-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
12-Jun-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
19-Jun-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
26-Jun-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
3-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0

	L			L Total	M			M Total	S			S Total	Grand Total
	CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		
10-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
24-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
31-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
7-Aug-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
14-Aug-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
21-Aug-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
28-Aug-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Sep-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
11-Sep-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
18-Sep-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Sep-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2-Oct-1999	0	0	0	0	2.71	0	0	2.71	0	0	0	0	2.71
9-Oct-1999	0	0	0	0	24.65	0	0	24.65	0	0	0	0	24.65
16-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
23-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
30-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
6-Nov-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
13-Nov-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
20-Nov-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
27-Nov-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Dec-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
11-Dec-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
18-Dec-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Dec-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
1-Jan-2000	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	29.69	0	78.66	38.44	62.83	0	66.91	66.46	49.02

Notes: Data are in percentages. Values are in mt

Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall

CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.

Table E2-31 1999 estimated catcher vessel pot Pacific cod catch in the GOA by vessel size, management area, and week

	L			L Total	M			M Total	S			S Total	Grand Total
	CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		
2-Jan-1999	-	-	-	-	x	-	-	x	x	-	-	x	x
9-Jan-1999	-	-	-	-	448	x	x	448	563	-	113	676	1,124
16-Jan-1999	-	-	-	-	285	x	x	285	429	-	225	654	939
23-Jan-1999	-	-	-	-	804	x	x	804	911	-	108	1,019	1,823
30-Jan-1999	-	-	-	-	177	x	x	177	203	-	36	238	415
6-Feb-1999	-	-	-	-	84	x	-	84	88	-	37	125	210
13-Feb-1999	-	-	-	-	x	x	-	x	140	-	133	273	273
20-Feb-1999	-	-	-	-	449	x	x	449	932	-	134	1,067	1,516
27-Feb-1999	-	-	-	-	415	x	x	415	968	-	177	1,145	1,560
6-Mar-1999	-	-	-	-	515	x	x	515	775	-	258	1,033	1,548
13-Mar-1999	-	-	-	-	358	x	x	358	506	-	151	658	1,016
20-Mar-1999	-	-	-	-	56	x	-	56	174	-	580	754	810
27-Mar-1999	-	-	-	-	51	x	-	51	240	-	1,253	1,493	1,544
3-Apr-1999	-	-	-	-	144	x	x	144	361	-	1,434	1,795	1,939
10-Apr-1999	-	-	-	-	179	x	144	323	293	-	1,128	1,421	1,743
17-Apr-1999	-	-	x	x	290	x	540	830	504	-	572	1,076	1,906
24-Apr-1999	-	-	-	-	313	x	-	313	1,125	-	x	1,125	1,438
1-May-1999	-	-	-	-	220	-	-	220	776	-	x	776	996
8-May-1999	-	-	x	x	x	-	129	129	400	-	50	450	579
15-May-1999	-	-	x	x	-	-	140	140	285	-	37	322	462
22-May-1999	-	-	x	x	-	x	28	28	234	-	-	234	263
29-May-1999	-	-	-	-	-	-	x	x	86	-	-	86	86
5-Jun-1999	-	-	-	-	-	-	-	-	59	-	x	59	59
12-Jun-1999	-	-	x	x	-	-	-	-	x	-	-	x	x
19-Jun-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Jun-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jul-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Jul-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
17-Jul-1999	-	-	-	-	-	-	-	-	-	-	-	-	-

	L			L Total	M			M Total	S			S Total	Grand Total
	CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		
24-Jul-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
31-Jul-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Aug-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
14-Aug-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Aug-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
28-Aug-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Sep-1999	-	-	-	-	x	-	-	x	x	-	-	x	x
11-Sep-1999	-	-	-	-	165	-	x	165	x	-	-	x	165
18-Sep-1999	-	-	-	-	247	x	x	247	x	-	-	x	247
25-Sep-1999	-	-	-	-	150	-	x	150	x	-	-	x	150
2-Oct-1999	-	-	-	-	284	x	x	284	x	-	-	x	284
9-Oct-1999	-	-	-	-	52	x	x	52	x	-	-	x	52
16-Oct-1999	-	-	-	-	-	-	x	x	x	-	-	x	x
23-Oct-1999	-	-	-	-	-	-	-	-	x	-	-	x	x
30-Oct-1999	-	-	-	-	x	-	-	x	7	-	-	7	7
6-Nov-1999	-	-	-	-	x	-	-	x	x	-	x	x	x
13-Nov-1999	-	-	-	-	16	-	x	16	14	-	x	14	29
20-Nov-1999	-	-	-	-	53	x	x	53	9	-	x	9	62
27-Nov-1999	-	-	-	-	78	x	-	78	5	-	x	5	83
4-Dec-1999	-	-	-	-	70	x	-	70	30	-	x	30	101
11-Dec-1999	-	-	-	-	84	x	-	84	16	-	x	16	100
18-Dec-1999	-	-	-	-	67	-	-	67	27	-	x	27	93
25-Dec-1999	-	-	-	-	37	-	-	37	22	-	x	22	58
1-Jan-2000	-	-	-	-	x	-	-	x	22	-	7	29	29
Grand Total	-	-	x	x	6,093	x	981	7,074	10,203	-	6,434	16,637	23,711

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.
x - confidential data, less than 4 participating vessels

Table E2-32 1999 estimated percentage of catcher vessel pot Pacific cod catch within 3 nm of listed rookeries and haulouts in the GOA by vessel size, management area, and week

	L			L Total	M			M Total	S			S Total	Grand Total
	CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		
2-Jan-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
9-Jan-1999	0	0	0	0	0	0	0	0	1.48	0	0	1.23	0.74
16-Jan-1999	0	0	0	0	0	0	0	0/	9.84	0	6.99	8.86	6.17
23-Jan-1999	0	0	0	0	0	0	0	0	5.53	0	0	4.94	2.76
30-Jan-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
6-Feb-1999	0	0	0	0	0	0	0	0	1.89	0	7.01	3.40	2.03
13-Feb-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
20-Feb-1999	0	0	0	0	0	0	0	0	3.75	0	2.92	3.64	2.56
27-Feb-1999	0	0	0	0	0	0	0	0	4.54	0	11.82	5.67	4.16
6-Mar-1999	0	0	0	0	0	0	0	0	5.83	0	14.47	7.99	5.33
13-Mar-1999	0	0	0	0	0	0	0	0	5.92	0	11.78	7.27	4.71
20-Mar-1999	0	0	0	0	0	0	0	0	4.59	0	18.37	15.19	14.14
27-Mar-1999	0	0	0	0	11.34	0	0	11.34	7.79	0	19.23	17.39	17.19
3-Apr-1999	0	0	0	0	2.51	0	0	2.51	8.00	0	20.54	18.02	16.87
10-Apr-1999	0	0	0	0	0	0	0	0	10.22	0	23.02	20.38	16.61
17-Apr-1999	0	0	0	0	9.83	0	0	3.44	9.76	0	21.11	15.79	10.41
24-Apr-1999	0	0	0	0	5.64	0	0	5.64	4.53	0	0	4.53	4.77
1-May-1999	0	0	0	0	3.79	0	0	3.79	5.43	0	0	5.43	5.06
8-May-1999	0	0	0	0	0	0	0	0	3.93	0	0	3.49	2.71
15-May-1999	0	0	0	0	0	0	0	0	2.75	0	0	2.44	1.70
22-May-1999	0	0	0	0	0	0	0	0	4.53	0	0	4.53	4.04
29-May-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
5-Jun-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
12-Jun-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
19-Jun-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
26-Jun-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
3-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
10-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0

	L			L Total	M			M Total	S			S Total	Grand Total
	CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		
17-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
24-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
31-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
7-Aug-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
14-Aug-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
21-Aug-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
28-Aug-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Sep-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
11-Sep-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
18-Sep-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Sep-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2-Oct-1999	0	0	0	0	0.81	0	0	0.81	0	0	0	0	0.81
9-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
16-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
23-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
30-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
6-Nov-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
13-Nov-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
20-Nov-1999	0	0	0	0	15.37	0	0	15.37	0	0	0	0	13.17
27-Nov-1999	0	0	0	0	16.34	0	0	16.34	0	0	0	0	15.40
4-Dec-1999	0	0	0	0	23.16	0	0	23.16	0	0	0	0	16.18
11-Dec-1999	0	0	0	0	9.57	0	0	9.57	0	0	0	0	8.03
18-Dec-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Dec-1999	0	0	0	0	26.01	0	0	26.01	0	0	0	0	16.42
1-Jan-2000	0	0	0	0	0	0	0	0	4.92	0	0	3.71	3.71
Grand Total	0	0	0	0	1.99	0	0	1.71	5.09	0	17.42	9.86	7.43

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.

Table E2-33 1999 estimated percentage of catcher vessel pot Pacific cod catch within 20 nm of listed rookeries and haulouts in the GOA by vessel size, management area, and week

	L			L Total	M			M Total	S			S Total	Grand Total
	CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		
2-Jan-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
9-Jan-1999	0	0	0	0	28.60	0	0	28.60	57.89	0	90.39	63.33	49.49
16-Jan-1999	0	0	0	0	36.39	0	0	36.39	71.99	0	90.81	78.48	65.71
23-Jan-1999	0	0	0	0	51.60	0	0	51.60	69.55	0	91.98	71.93	62.96
30-Jan-1999	0	0	0	0	54.01	0	0	54.01	60.53	0	90.31	64.98	60.32
6-Feb-1999	0	0	0	0	32.35	0	0	32.35	83.08	0	91.10	85.44	64.09
13-Feb-1999	0	0	0	0	0	0	0	0	81.92	0	90.53	86.10	86.10
20-Feb-1999	0	0	0	0	35.88	0	0	35.88	69.51	0	93.06	72.48	61.64
27-Feb-1999	0	0	0	0	40.08	0	0	40.08	68.80	0	90.58	72.18	63.64
6-Mar-1999	0	0	0	0	45.92	0	0	45.92	68.63	0	90.73	74.15	64.76
13-Mar-1999	0	0	0	0	49.45	0	0	49.45	68.61	0	93.41	74.31	65.55
20-Mar-1999	0	0	0	0	47.51	0	0	47.51	68.08	0	91.47	86.07	83.39
27-Mar-1999	0	0	0	0	85.14	0	0	85.14	64.47	0	95.95	90.89	90.70
3-Apr-1999	0	0	0	0	50.33	0	0	50.33	90.11	0	96.25	95.01	91.70
10-Apr-1999	0	0	0	0	62.02	0	67.61	64.51	81.32	0	98.63	95.06	89.40
17-Apr-1999	0	0	0	0	70.04	0	100.00	89.52	80.77	0	97.83	89.83	89.69
24-Apr-1999	0	0	0	0	66.41	0	0	66.41	82.26	0	0	82.26	78.81
1-May-1999	0	0	0	0	81.45	0	0	81.45	88.05	0	0	88.05	86.59
8-May-1999	0	0	0	0	0	0	77.45	77.45	89.63	0	81.38	88.71	86.20
15-May-1999	0	0	0	0	0	0	100.00	100.00	95.10	0	81.38	93.52	95.49
22-May-1999	0	0	0	0	0	0	100.00	100.00	91.78	0	0	91.78	92.66
29-May-1999	0	0	0	0	0	0	0	0	93.28	0	0	93.28	93.28
5-Jun-1999	0	0	0	0	0	0	0	0	89.50	0	0	89.50	89.50
12-Jun-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
19-Jun-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
26-Jun-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
3-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0

	L			L Total	M			M Total	S			S Total	Grand Total
	CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		
10-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
24-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
31-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
7-Aug-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
14-Aug-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
21-Aug-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
28-Aug-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Sep-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
11-Sep-1999	0	0	0	0	32.36	0	0	32.36	0	0	0	0	32.36
18-Sep-1999	0	0	0	0	33.81	0	0	33.81	0	0	0	0	33.81
25-Sep-1999	0	0	0	0	50.25	0	0	50.25	0	0	0	0	50.25
2-Oct-1999	0	0	0	0	57.75	0	0	57.75	0	0	0	0	57.75
9-Oct-1999	0	0	0	0	20.73	0	0	20.73	0	0	0	0	20.73
16-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
23-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
30-Oct-1999	0	0	0	0	0	0	0	0	100.00	0	0	100.00	100.00
6-Nov-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
13-Nov-1999	0	0	0	0	40.98	0	0	40.98	50.52	0	0	50.52	45.40
20-Nov-1999	0	0	0	0	86.25	0	0	86.25	65.94	0	0	65.94	83.33
27-Nov-1999	0	0	0	0	98.04	0	0	98.04	0	0	0	0	92.39
4-Dec-1999	0	0	0	0	95.66	0	0	95.66	30.81	0	0	30.81	76.11
11-Dec-1999	0	0	0	0	99.33	0	0	99.33	39.42	0	0	39.42	89.71
18-Dec-1999	0	0	0	0	100.00	0	0	100.00	96.97	0	0	96.97	99.13
25-Dec-1999	0	0	0	0	90.96	0	0	90.96	34.70	0	0	34.70	70.22
1-Jan-2000	0	0	0	0	0	0	0	0	53.12	0	100.00	64.71	64.71
Grand Total	0	0	0	0	51.25	0	92.29	56.94	75.30	0	95.06	82.94	75.18

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.

Table E2-34 1999 estimated catcher vessel hook-and-line Pacific cod catch in the GOA by vessel size, management area, and week

	L			L Total	M			M Total	S			S Total	Grand Total
	CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		
2-Jan-1999	-	-	-	-	-	-	-	-	87	x	-	87	87
9-Jan-1999	-	-	-	-	x	x	-	x	335	13	-	348	348
16-Jan-1999	-	-	-	-	x	x	x	x	477	23	-	500	500
23-Jan-1999	-	-	-	-	x	x	-	x	370	35	-	405	405
30-Jan-1999	-	-	-	-	x	-	x	x	408	45	-	453	453
6-Feb-1999	-	-	-	-	x	-	-	x	320	24	-	345	345
13-Feb-1999	-	-	-	-	-	-	-	-	120	35	-	155	155
20-Feb-1999	-	-	-	-	43	-	-	43	552	57	-	609	652
27-Feb-1999	-	-	-	-	x	-	-	x	975	61	-	1,036	1,036
6-Mar-1999	-	-	-	-	43	-	-	43	922	55	-	977	1,020
13-Mar-1999	-	-	-	-	35	-	-	35	802	51	x	854	889
20-Mar-1999	-	-	-	-	x	-	-	x	102	7	-	109	109
27-Mar-1999	-	-	-	-	x	x	-	x	8	15	-	23	23
3-Apr-1999	-	-	-	-	x	-	-	x	3	14	-	17	17
10-Apr-1999	-	-	-	-	x	-	-	x	2	8	-	10	10
17-Apr-1999	-	-	-	-	x	-	-	x	x	9	-	9	9
24-Apr-1999	-	-	x	x	x	-	-	x	3	8	-	10	10
1-May-1999	-	-	-	-	x	-	x	x	6	4	-	10	10
8-May-1999	-	-	-	-	x	-	x	x	5	4	-	9	9
15-May-1999	-	-	-	-	7	-	-	7	8	7	x	15	22
22-May-1999	-	-	-	-	3	x	-	3	6	6	x	12	15
29-May-1999	-	-	-	-	x	-	-	x	16	7	x	23	23
5-Jun-1999	-	-	x	x	x	-	-	x	7	5	x	12	12
12-Jun-1999	-	-	-	-	x	-	x	x	6	4	x	10	10
19-Jun-1999	-	-	-	-	x	-	x	x	1	2	-	4	4
26-Jun-1999	-	-	-	-	x	-	-	x	6	4	-	9	9
3-Jul-1999	-	-	-	-	x	-	-	x	0	2	-	2	2
10-Jul-1999	-	-	-	-	x	-	-	x	1	2	-	3	3

	L			L Total	M			M Total	S			S Total	Grand Total
	CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		
17-Jul-1999	-	-	-	-	x	-	-	x	x	x	-	x	x
24-Jul-1999	-	-	-	-	x	-	-	x	1	1	-	2	2
31-Jul-1999	-	-	-	-	x	-	x	x	1	2	-	3	3
7-Aug-1999	-	-	-	-	x	x	-	x	2	1	-	3	3
14-Aug-1999	-	-	-	-	x	-	-	x	2	x	-	2	2
21-Aug-1999	-	-	-	-	x	-	x	x	3	1	-	4	4
28-Aug-1999	-	-	-	-	x	-	x	x	1	1	x	2	2
4-Sep-1999	-	-	-	-	x	-	x	x	2	x	-	2	2
11-Sep-1999	-	-	-	-	x	-	x	x	4	2	-	6	6
18-Sep-1999	x	-	-	x	x	x	-	x	4	x	x	4	4
25-Sep-1999	x	-	-	x	x	-	-	x	4	x	x	4	4
2-Oct-1999	-	-	-	-	x	x	x	x	10	2	x	12	12
9-Oct-1999	-	-	-	-	x	-	x	x	6	1	x	7	7
16-Oct-1999	-	-	-	-	x	-	-	x	2	1	x	3	3
23-Oct-1999	-	-	-	-	x	-	-	x	5	x	-	5	5
30-Oct-1999	-	-	-	-	x	-	x	x	3	3	-	6	6
6-Nov-1999	-	-	-	-	x	x	-	x	0	2	-	2	2
13-Nov-1999	-	-	-	-	x	x	-	x	5	9	-	14	14
20-Nov-1999	-	-	-	-	x	x	-	x	0	3	-	3	3
27-Nov-1999	-	-	-	-	-	x	-	x	-	4	-	4	4
4-Dec-1999	-	-	-	-	-	-	-	-	-	x	-	x	x
11-Dec-1999	-	-	-	-	-	-	-	-	-	6	-	6	6
18-Dec-1999	-	-	-	-	-	x	-	x	-	9	-	9	9
25-Dec-1999	-	-	-	-	-	x	-	x	-	x	-	x	x
1-Jan-2000	-	-	-	-	-	-	-	-	-	x	-	x	x
Grand Total	x	-	x	x	131	x	x	131	5,607	551	x	6,159	6,290

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.
X - confidental data, less than 4 participating vessels.

Table E2-35 1999 estimated percentage of catcher vessel hook-and-line Pacific cod catch within 3 nm of listed rookeries and haulouts in the GOA by vessel size, management area, and week

	L			L Total	M			M Total	S			S Total	Grand Total
	CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		
2-Jan-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
9-Jan-1999	0	0	0	0	0	0	0	0	7.40	0	0	7.12	7.12
16-Jan-1999	0	0	0	0	0	0	0	0	3.58	0	0	3.42	3.42
23-Jan-1999	0	0	0	0	0	0	0	0	2.97	0	0	2.71	2.71
30-Jan-1999	0	0	0	0	0	0	0	0	5.07	2.62	0	4.82	4.82
6-Feb-1999	0	0	0	0	0	0	0	0	5.75	0	0	5.34	5.34
13-Feb-1999	0	0	0	0	0	0	0	0	0	7.25	0	1.64	1.64
20-Feb-1999	0	0	0	0	0	0	0	0	6.56	0	0	5.94	5.55
27-Feb-1999	0	0	0	0	0	0	0	0	4.12	0	0	3.88	3.88
6-Mar-1999	0	0	0	0	0	0	0	0	7.77	8.82	0	7.83	7.50
13-Mar-1999	0	0	0	0	0	0	0	0	8.23	0	0	7.73	7.43
20-Mar-1999	0	0	0	0	0	0	0	0	11.86	0	0	11.06	11.06
27-Mar-1999	0	0	0	0	0	0	0	0	2.53	0	0	0.87	0.87
3-Apr-1999	0	0	0	0	0	0	0	0	17.34	0	0	2.93	2.93
10-Apr-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
24-Apr-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
1-May-1999	0	0	0	0	0	0	0	0	1.34	0	0	0.84	0.84
8-May-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-1999	0	0	0	0	0	0	0	0	7.24	0	0	3.89	2.65
22-May-1999	0	0	0	0	0	0	0	0	1.95	0	0	1.03	0.81
29-May-1999	0	0	0	0	0	0	0	0	9.67	0	0	6.80	6.80
5-Jun-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
12-Jun-1999	0	0	0	0	0	0	0	0	6.27	0	0	3.83	3.83
19-Jun-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
26-Jun-1999	0	0	0	0	0	0	0	0	1.81	0	0	1.06	1.06
3-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0

	L			L Total	M			M Total	S			S Total	Grand Total
	CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		
10-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
24-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
31-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
7-Aug-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
14-Aug-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
21-Aug-1999	0	0	0	0	0	0	0	0	3.21	0	0	2.39	2.39
28-Aug-1999	0	0	0	0	0	0	0	0	3.58	0	0	2.21	2.21
4-Sep-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
11-Sep-1999	0	0	0	0	0	0	0	0	8.49	0	0	6.11	6.11
18-Sep-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Sep-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2-Oct-1999	0	0	0	0	0	0	0	0	4.04	0	0	3.21	3.21
9-Oct-1999	0	0	0	0	0	0	0	0	4.28	0	0	3.76	3.76
16-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
23-Oct-1999	0	0	0	0	0	0	0	0	0.94	0	0	0.94	0.94
30-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
6-Nov-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
13-Nov-1999	0	0	0	0	0	0	0	0	2.83	0	0	0.96	0.96
20-Nov-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
27-Nov-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Dec-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
11-Dec-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
18-Dec-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Dec-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
1-Jan-2000	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	5.76	1.55	0	5.38	5.27

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.

Table E2-36 1999 estimated percentage of catcher vessel hook-and-line Pacific cod catch within 20 nm of listed rookeries and haulouts in the GOA by vessel size, management area, and week

	L			L Total	M			M Total	S			S Total	Grand Total
	CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		
2-Jan-1999	0	0	0	0	0	0	0	0	72.41	0	0	72.41	72.41
9-Jan-1999	0	0	0	0	0	0	0	0	75.52	0	0	72.69	72.69
16-Jan-1999	0	0	0	0	0	0	0	0	76.76	0	0	73.26	73.26
23-Jan-1999	0	0	0	0	0	0	0	0	80.91	66.96	0	79.69	79.69
30-Jan-1999	0	0	0	0	0	0	0	0	85.82	74.79	0	84.73	84.73
6-Feb-1999	0	0	0	0	0	0	0	0	92.57	74.30	0	91.28	91.28
13-Feb-1999	0	0	0	0	0	0	0	0	82.85	73.07	0	80.64	80.64
20-Feb-1999	0	0	0	0	100.00	0	0	100.00	84.60	58.34	0	82.14	83.32
27-Feb-1999	0	0	0	0	0	0	0	0	82.35	69.79	0	81.61	81.61
6-Mar-1999	0	0	0	0	100.00	0	0	100.00	86.83	79.16	0	86.40	86.97
13-Mar-1999	0	0	0	0	72.56	0	0	72.56	83.12	71.65	0	82.43	82.04
20-Mar-1999	0	0	0	0	0	0	0	0	86.99	0	0	81.17	81.17
27-Mar-1999	0	0	0	0	0	0	0	0	71.92	0	0	24.64	24.64
3-Apr-1999	0	0	0	0	0	0	0	0	92.25	0	0	15.60	15.60
10-Apr-1999	0	0	0	0	0	0	0	0	56.79	0	0	12.35	12.35
17-Apr-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
24-Apr-1999	0	0	0	0	0	0	0	0	78.63	0	0	21.17	21.17
1-May-1999	0	0	0	0	0	0	0	0	63.82	0	0	39.88	39.88
8-May-1999	0	0	0	0	0	0	0	0	72.73	0	0	43.42	43.42
15-May-1999	0	0	0	0	39.21	0	0	39.21	70.22	0	0	37.72	38.19
22-May-1999	0	0	0	0	0	0	0	0	56.87	0	0	29.84	23.56
29-May-1999	0	0	0	0	0	0	0	0	78.60	0	0	55.32	55.32
5-Jun-1999	0	0	0	0	0	0	0	0	42.50	0	0	24.84	24.84
12-Jun-1999	0	0	0	0	0	0	0	0	58.20	0	0	35.56	35.56
19-Jun-1999	0	0	0	0	0	0	0	0	62.18	0	0	22.54	22.54
26-Jun-1999	0	0	0	0	0	0	0	0	60.46	0	0	35.53	35.53
3-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0

	L			L Total	M			M Total	S			S Total	Grand Total
	CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		
10-Jul-1999	0	0	0	0	0	0	0	0	80.24	0	0	34.27	34.27
17-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
24-Jul-1999	0	0	0	0	0	0	0	0	100.00	0	0	56.67	56.67
31-Jul-1999	0	0	0	0	0	0	0	0	63.82	0	0	29.26	29.26
7-Aug-1999	0	0	0	0	0	0	0	0	51.09	0	0	33.67	33.67
14-Aug-1999	0	0	0	0	0	0	0	0	50.66	0	0	50.66	50.66
21-Aug-1999	0	0	0	0	0	0	0	0	39.15	0	0	29.18	29.18
28-Aug-1999	0	0	0	0	0	0	0	0	42.77	0	0	26.37	26.37
4-Sep-1999	0	0	0	0	0	0	0	0	60.94	0	0	60.94	60.94
11-Sep-1999	0	0	0	0	0	0	0	0	100.00	0	0	71.90	71.90
18-Sep-1999	0	0	0	0	0	0	0	0	71.70	0	0	71.70	71.70
25-Sep-1999	0	0	0	0	0	0	0	0	75.68	0	0	75.68	75.68
2-Oct-1999	0	0	0	0	0	0	0	0	56.15	0	0	44.56	44.56
9-Oct-1999	0	0	0	0	0	0	0	0	82.38	0	0	72.40	72.40
16-Oct-1999	0	0	0	0	0	0	0	0	62.67	0	0	34.87	34.87
23-Oct-1999	0	0	0	0	0	0	0	0	89.89	0	0	89.89	89.89
30-Oct-1999	0	0	0	0	0	0	0	0	52.27	0	0	29.19	29.19
6-Nov-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
13-Nov-1999	0	0	0	0	0	0	0	0	52.56	0	0	17.81	17.81
20-Nov-1999	0	0	0	0	0	0	0	0	100.00	0	0	9.41	9.41
27-Nov-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Dec-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
11-Dec-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
18-Dec-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Dec-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
1-Jan-2000	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	86.94	0	0	86.94	82.84	46.53	0	79.59	79.75

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.

Table E2-37 1999 estimated catcher processor hook-and-line Pacific cod catch in the GOA by vessel size, management area, and week

	L			L Total	M			M Total	S			S Total	Grand Total
	CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		
2-Jan-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Jan-1999	-	-	-	-	-	-	x	x	-	-	-	-	x
16-Jan-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Jan-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Jan-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
6-Feb-1999	-	-	x	x	-	-	372	372	-	-	-	-	372
13-Feb-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
20-Feb-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Feb-1999	-	-	-	-	-	-	596	596	-	-	-	-	596
6-Mar-1999	-	-	-	-	-	-	626	626	-	-	-	-	626
13-Mar-1999	-	-	-	-	-	-	91	91	-	-	-	-	91
20-Mar-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Mar-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Apr-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Apr-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
17-Apr-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Apr-1999	-	-	663	663	-	-	-	-	-	-	-	-	663
1-May-1999	-	-	x	x	-	-	-	-	-	-	-	-	x
8-May-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
15-May-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
22-May-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
29-May-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Jun-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
12-Jun-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
19-Jun-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
26-Jun-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Jul-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Jul-1999	-	-	-	-	-	-	-	-	-	-	-	-	-

	L			L Total	M			M Total	S			S Total	Grand Total
	CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		
17-Jul-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Jul-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
31-Jul-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Aug-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
14-Aug-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
21-Aug-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
28-Aug-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Sep-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
11-Sep-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Sep-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
25-Sep-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Oct-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Oct-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Oct-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Oct-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
30-Oct-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
6-Nov-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Nov-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
20-Nov-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Nov-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Dec-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
11-Dec-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Dec-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
25-Dec-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Jan-2000	-	-	-	-	-	-	-	-	-	-	-	-	-
Grand Total	-	-	663	663	-	9999-	1,685	1,685	-	-	-	-	2,348

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.
X -confidential data, less than 4 participating vessels.

Table E2-38. 1999 estimated percentage of catcher processor hook-and-line Pacific cod catch within 3 nm of listed rookeries and haulouts in the GOA by vessel size, management area, and week

	L			L Total	M			M Total	S			S Total	Grand Total
	CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		
2-Jan-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
9-Jan-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
16-Jan-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
23-Jan-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
30-Jan-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
6-Feb-1999	0	0	0	0	0	0	0.04	0.04	0	0	0	0	0.04
13-Feb-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
20-Feb-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
27-Feb-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
6-Mar-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
13-Mar-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
20-Mar-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
Mar 27, 1999	0	0	0	0	0	0	0	0	0	0	0	0	0
3-Apr-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
10-Apr-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
24-Apr-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
1-May-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
8-May-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
22-May-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
29-May-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
5-Jun-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
12-Jun-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
19-Jun-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
26-Jun-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
3-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0

	L			L Total	M			M Total	S			S Total	Grand Total
	CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		
10-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
24-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
31-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
7-Aug-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
14-Aug-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
21-Aug-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
28-Aug-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Sep-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
11-Sep-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
18-Sep-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Sep-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
9-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
16-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
23-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
30-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
6-Nov-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
13-Nov-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
20-Nov-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
27-Nov-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Dec-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
11-Dec-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
18-Dec-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Dec-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
1-Jan-2000	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0.01	0.01	0	0	0	0	0.01

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.

Table E2-39 1999 estimated percentage of catcher processor hook-and-line Pacific cod catch within 20 nm of listed rookeries and haulouts in the GOA by vessel size, management area, and week

	L			L Total	M			M Total	S			S Total	Grand Total
	CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		
2-Jan-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
9-Jan-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
16-Jan-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
23-Jan-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
30-Jan-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
6-Feb-1999	0	0	0	0	0	0	94.75	94.75	0	0	0	0	94.75
13-Feb-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
20-Feb-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
27-Feb-1999	0	0	0	0	0	0	48.43	48.43	0	0	0	0	48.43
6-Mar-1999	0	0	0	0	0	0	36.36	36.36	0	0	0	0	36.36
13-Mar-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
20-Mar-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
27-Mar-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
3-Apr-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
10-Apr-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Apr-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
24-Apr-1999	0	0	33.57	33.57	0	0	0	0	0	0	0	0	33.57
1-May-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
8-May-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
15-May-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
22-May-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
29-May-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
5-Jun-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
12-Jun-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
19-Jun-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
26-Jun-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
3-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0

	L			L Total	M			M Total	S			S Total	Grand Total
	CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		
10-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
24-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
31-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
7-Aug-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
14-Aug-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
21-Aug-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
28-Aug-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Sep-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
11-Sep-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
18-Sep-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Sep-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
9-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
16-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
23-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
30-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
6-Nov-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
13-Nov-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
20-Nov-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
27-Nov-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Dec-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
11-Dec-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
18-Dec-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Dec-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
1-Jan-2000	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	33.57	33.57	0	0	51.57	51.57	0	0	0	0	46.49

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.

Table E2-40 1999 estimated catcher vessel jig Pacific cod catch in the BSAI by vessel size, management area, and week

	L			L Total	M			M Total	S			S Total	Grand Total
	CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		
2-Jan-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Jan-1999	-	-	-	-	-	-	-	-	x	-	-	x	x
16-Jan-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
23-Jan-1999	-	-	-	-	-	-	-	-	x	-	-	x	x
30-Jan-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
6-Feb-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
13-Feb-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
20-Feb-1999	-	-	-	-	-	-	-	-	x	-	-	x	x
27-Feb-1999	-	-	-	-	-	-	-	-	x	-	-	x	x
6-Mar-1999	-	-	-	-	-	-	-	-	x	-	-	x	x
13-Mar-1999	-	-	-	-	-	-	-	-	2	-	-	2	2
20-Mar-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
27-Mar-1999	-	-	-	-	-	-	-	-	1	-	x	1	1
3-Apr-1999	-	-	-	-	-	-	-	-	x	x	x	x	x
10-Apr-1999	-	-	-	-	-	-	-	-	5	x	-	5	5
17-Apr-1999	x	-	-	x	-	-	-	-	17	x	x	17	17
24-Apr-1999	-	-	-	-	-	-	-	-	25	x	x	25	25
1-May-1999	-	-	-	-	-	-	-	-	76	x	11	87	87
8-May-1999	-	-	-	-	-	-	-	-	93	-	24	117	117
15-May-1999	-	-	-	-	-	-	-	-	141	x	17	158	158
22-May-1999	-	-	-	-	-	-	-	-	192	x	24	216	216
29-May-1999	-	-	-	-	x	-	-	x	221	x	45	265	265
5-Jun-1999	-	-	-	-	-	-	-	-	86	-	25	110	110
12-Jun-1999	-	-	-	-	-	-	-	-	68	-	18	86	86
19-Jun-1999	-	-	-	-	x	-	-	x	21	x	x	21	21
26-Jun-1999	-	-	-	-	-	-	-	-	45	x	x	45	45
3-Jul-1999	-	-	-	-	-	-	-	-	28	x	x	28	28
10-Jul-1999	-	-	-	-	-	-	-	-	1	x	x	1	1

	L			L Total	M			M Total	S			S Total	Grand Total
	CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		
17-Jul-1999	-	-	-	-	-	-	-	-	2	-	x	2	2
24-Jul-1999	-	-	-	-	-	-	-	-	x	-	x	x	x
31-Jul-1999	-	-	-	-	-	-	-	-	x	-	x	x	x
7-Aug-1999	-	-	-	-	-	-	-	-	-	-	x	x	x
14-Aug-1999	-	-	-	-	-	-	-	-	x	-	-	x	x
21-Aug-1999	-	-	-	-	-	-	-	-	x	-	x	x	x
28-Aug-1999	-	-	-	-	-	-	-	-	-	-	18	18	18
4-Sep-1999	-	-	-	-	-	-	-	-	-	x	34	34	34
11-Sep-1999	-	-	-	-	-	-	-	-	x	-	20	20	20
18-Sep-1999	-	-	-	-	-	-	-	-	x	-	16	16	16
25-Sep-1999	-	-	-	-	-	-	-	-	-	-	x	x	x
2-Oct-1999	-	-	-	-	-	-	-	-	x	-	x	x	x
9-Oct-1999	-	-	-	-	-	-	-	-	x	x	x	x	x
16-Oct-1999	-	-	-	-	-	-	-	-	x	-	x	x	x
23-Oct-1999	-	-	-	-	-	-	-	-	x	x	x	x	x
30-Oct-1999	-	-	-	-	-	-	-	-	x	-	-	x	x
6-Nov-1999	-	-	-	-	-	-	-	-	x	-	-	x	x
13-Nov-1999	-	-	-	-	-	-	-	-	x	-	x	x	x
20-Nov-1999	-	-	-	-	-	-	-	-	x	-	-	x	x
27-Nov-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Dec-1999	-	-	-	-	x	-	-	x	x	-	-	x	x
11-Dec-1999	-	-	-	-	-	-	-	-	x	-	-	x	x
18-Dec-1999	-	-	-	-	-	-	-	-	-	-	-	-	-
25-Dec-1999	-	-	-	-	-	-	-	-	x	-	-	x	x
1-Jan-2000	-	-	-	-	-	-	-	-	x	-	-	x	x
Grand Total	x	-	-	x	x	-	-	x	1,024	x	251	1,275	1,275

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.
x - confidential data, less than 4 participating vessels.

Table E2-41 1999 estimated percentage of catcher vessel jig Pacific cod catch within 3 nm of listed rookeries and haulouts in the BSAI by vessel size, management area, and week

	L			L Total	M			M Total	S			S Total	Grand Total
	CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		
2-Jan-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
9-Jan-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
16-Jan-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
23-Jan-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
30-Jan-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
6-Feb-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
13-Feb-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
20-Feb-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
27-Feb-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
6-Mar-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
13-Mar-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
20-Mar-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
27-Mar-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
3-Apr-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
10-Apr-1999	0	0	0	0	0	0	0	0	26.80	0	0	26.80	26.80
17-Apr-1999	0	0	0	0	0	0	0	0	12.51	0	0	12.51	12.51
24-Apr-1999	0	0	0	0	0	0	0	0	10.19	0	0	10.19	10.19
1-May-1999	0	0	0	0	0	0	0	0	24.74	0	9.18	22.78	22.78
8-May-1999	0	0	0	0	0	0	0	0	27.59	0	0	21.93	21.93
15-May-1999	0	0	0	0	0	0	0	0	24.07	0	14.91	23.08	23.08
22-May-1999	0	0	0	0	0	0	0	0	20.25	0	11.90	19.32	19.32
29-May-1999	0	0	0	0	0	0	0	0	22.33	0	12.23	20.64	20.64
5-Jun-1999	0	0	0	0	0	0	0	0	28.55	0	0	22.20	22.20
12-Jun-1999	0	0	0	0	0	0	0	0	8.16	0	8.90	8.31	8.31
19-Jun-1999	0	0	0	0	0	0	0	0	6.08	0	0	6.08	6.08
26-Jun-1999	0	0	0	0	0	0	0	0	28.46	0	0	28.46	28.46
3-Jul-1999	0	0	0	0	0	0	0	0	39.33	0	0	39.33	39.33

	L			L Total	M			M Total	S			S Total	Grand Total
	CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		
Jul 10, 1999	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
24-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
31-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
7-Aug-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
14-Aug-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
21-Aug-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
28-Aug-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Sep-1999	0	0	0	0	0	0	0	0	0	0	33.81	33.81	33.80
11-Sep-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
18-Sep-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Sep-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
9-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
16-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
23-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
30-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
6-Nov-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
13-Nov-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
20-Nov-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
27-Nov-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Dec-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
11-Dec-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
18-Dec-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Dec-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
1-Jan-2000	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	22.26	0	9.91	19.83	19.83

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.

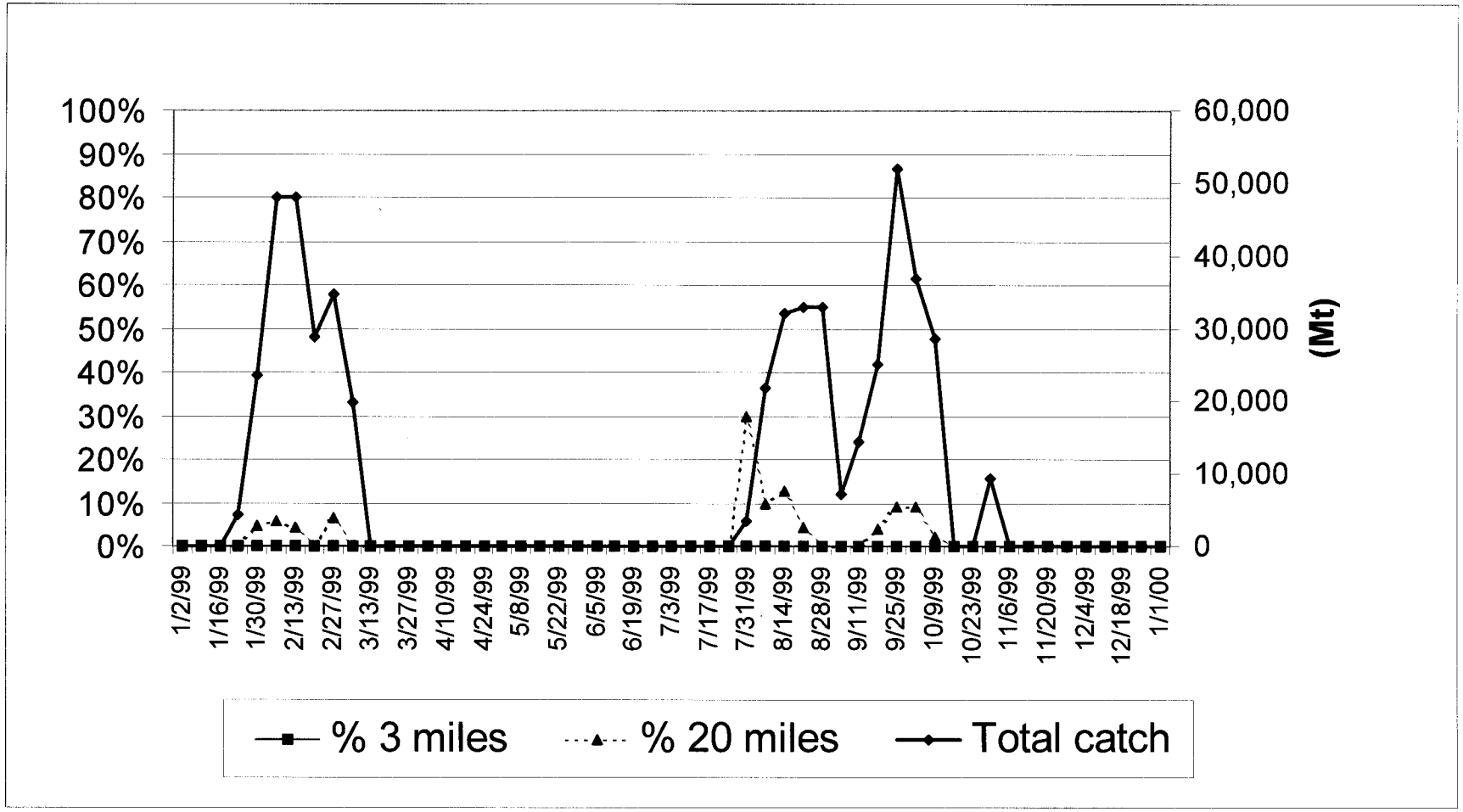
Table E2-42 1999 estimated percentage of catcher vessel jig Pacific cod catch within 20 nm of listed rookeries and haulouts in the BSAI by vessel size, management area, and week

	L			L Total	M			M Total	S			S Total	Grand Total
	CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		
2-Jan-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
9-Jan-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
16-Jan-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
23-Jan-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
30-Jan-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
6-Feb-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
13-Feb-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
20-Feb-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
27-Feb-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
6-Mar-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
13-Mar-1999	0	0	0	0	0	0	0	0	100.00	0	0	100.00	100.00
20-Mar-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
27-Mar-1999	0	0	0	0	0	0	0	0	99.37	0	0	99.37	99.37
3-Apr-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
10-Apr-1999	0	0	0	0	0	0	0	0	100.00	0	0	100.00	100.00
17-Apr-1999	0	0	0	0	0	0	0	0	74.32	0	0	74.32	74.32
24-Apr-1999	0	0	0	0	0	0	0	0	75.43	0	0	75.43	75.43
1-May-1999	0	0	0	0	0	0	0	0	94.66	0	100.00	95.33	95.33
8-May-1999	0	0	0	0	0	0	0	0	100.00	0	81.77	96.26	96.26
15-May-1999	0	0	0	0	0	0	0	0	98.94	0	100.00	99.06	99.06
22-May-1999	0	0	0	0	0	0	0	0	94.66	0	98.44	95.08	95.08
29-May-1999	0	0	0	0	0	0	0	0	96.73	0	100.00	97.28	97.28
5-Jun-1999	0	0	0	0	0	0	0	0	95.16	0	100.00	96.23	96.23
12-Jun-1999	0	0	0	0	0	0	0	0	81.79	0	88.58	83.18	83.18
19-Jun-1999	0	0	0	0	0	0	0	0	72.33	0	0	72.33	72.33
26-Jun-1999	0	0	0	0	0	0	0	0	85.04	0	0	85.04	85.04
3-Jul-1999	0	0	0	0	0	0	0	0	86.77	0	0	86.77	86.77

	L			L Total	M			M Total	S			S Total	Grand Total
	CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		CGOA	EGOA	WGOA		
10-Jul-1999	0	0	0	0	0	0	0	0	100.00	0	0	100.00	100.00
17-Jul-1999	0	0	0	0	0	0	0	0	78.23	0	0	78.23	78.23
24-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
31-Jul-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
7-Aug-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
14-Aug-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
21-Aug-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
28-Aug-1999	0	0	0	0	0	0	0	0	0	0	100.00	100.00	100.00
4-Sep-1999	0	0	0	0	0	0	0	0	0	0	100.00	100.00	100.00
11-Sep-1999	0	0	0	0	0	0	0	0	0	0	100.00	100.00	100.00
18-Sep-1999	0	0	0	0	0	0	0	0	0	0	100.00	100.00	100.00
25-Sep-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
9-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
16-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
23-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
30-Oct-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
6-Nov-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
13-Nov-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
20-Nov-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
27-Nov-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
4-Dec-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
11-Dec-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
18-Dec-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Dec-1999	0	0	0	0	0	0	0	0	0	0	0	0	0
1-Jan-2000	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	93.48	0	97.31	94.24	94.24

Notes: Data are in percentages. Values are in mt
Vessel size: L - greater than 125 ft LOA; M - 60 to 125 ft LOA; S - less than 60 ft LOA. LOA - Length Overall
CGOA - Central Gulf of Alaska, EGOA - Eastern Gulf of Alaska; WGOA - Western Gulf of Alaska.

Figure E2-1 1999 catcher vessel trawl catch of pollock within 3 and 20 nm of listed rookeries and haulouts in the BSAI by week



Source:

Figure E2-2 1999 catcher processor trawl catch of pollock within 3 and 20 nm of listed rookeries and haulouts in the BSAI by week

Source:

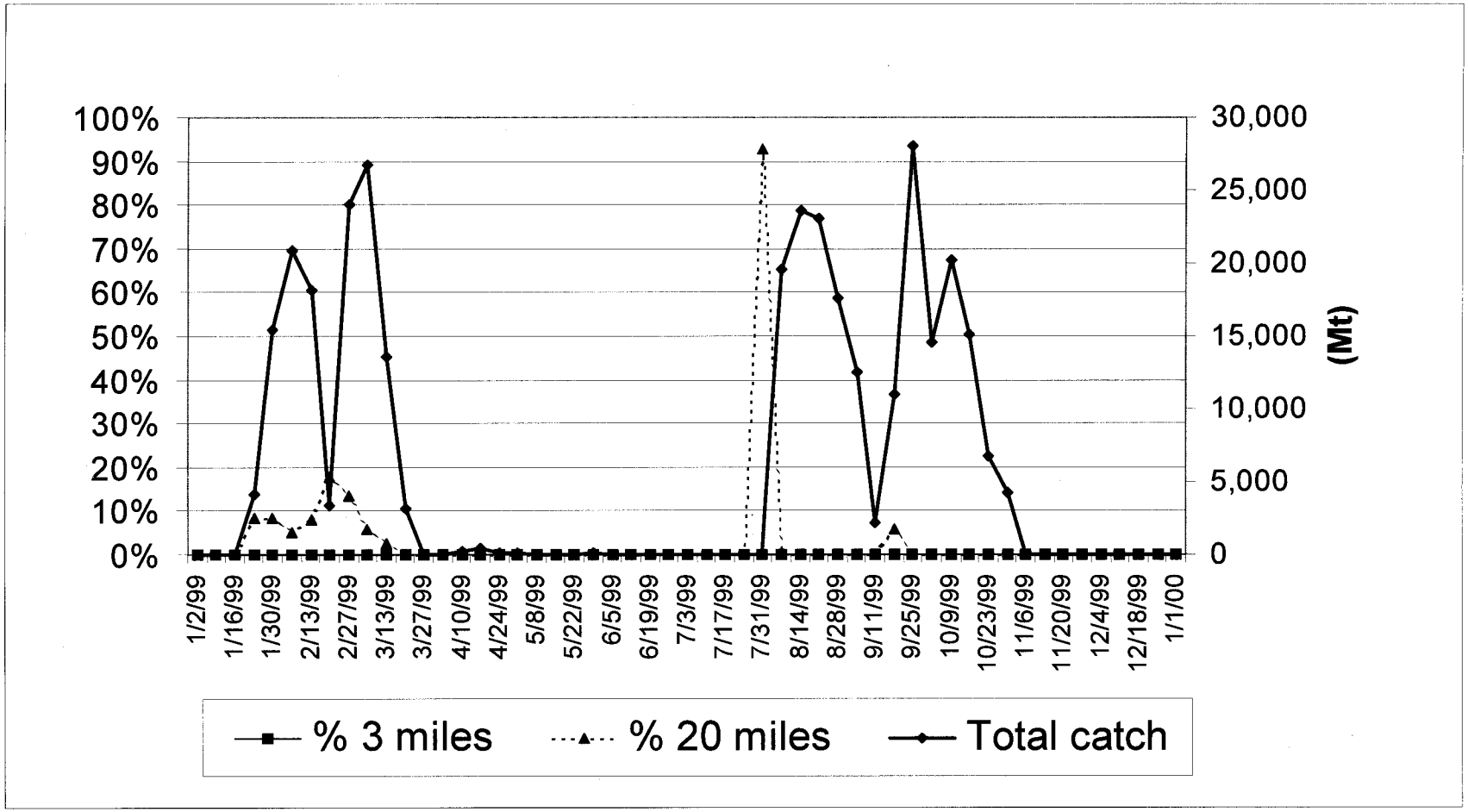
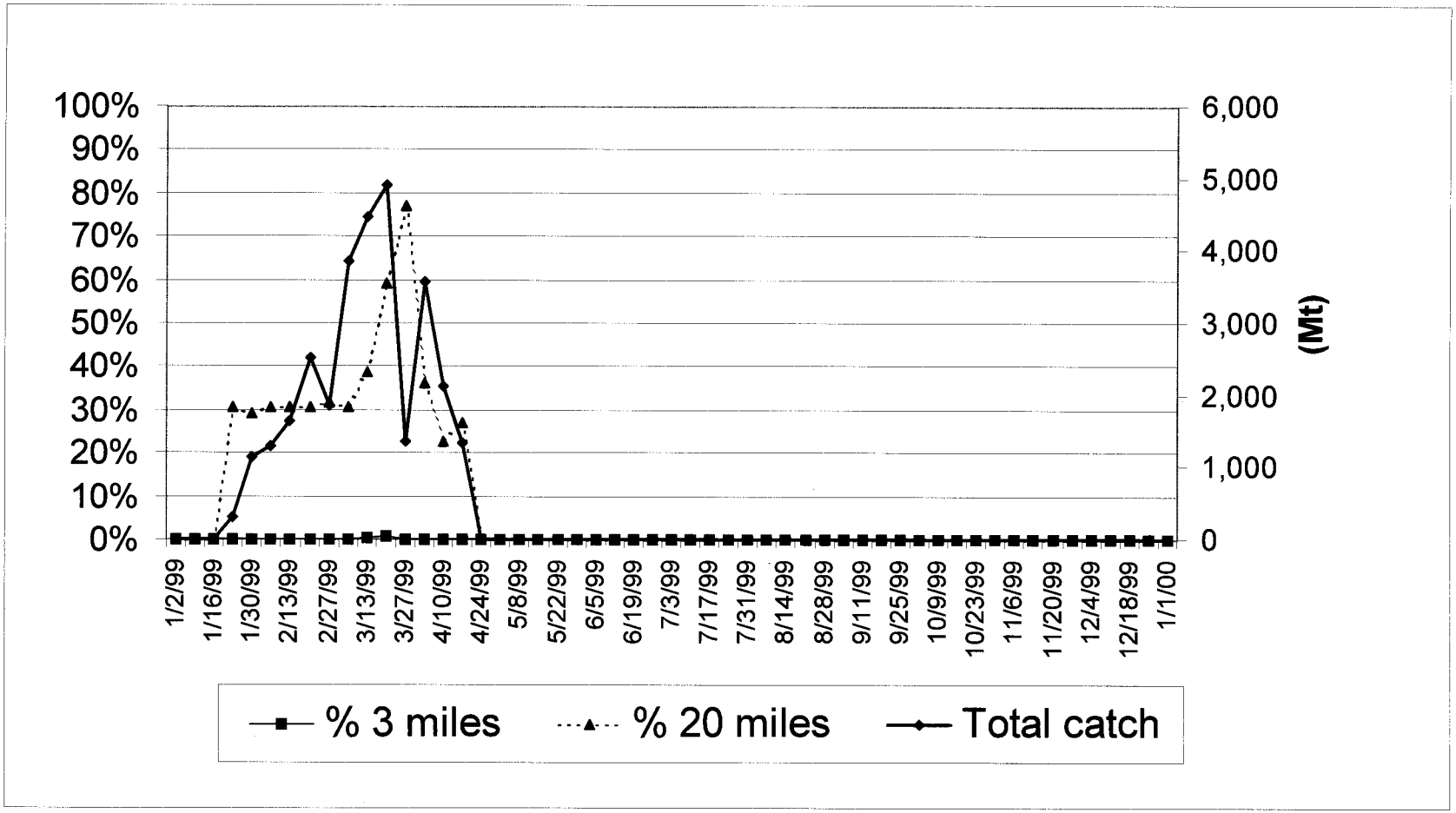


Figure E2-3 1999 catcher vessel trawl catch of Pacific cod within 3 and 20 nm of listed rookeries and haulouts in the BSAI by week



Source:

Figure E2-4 1999 catcher processor trawl catch of Pacific cod within 3 and 20 nm of listed rookeries and haulouts in the BSAI by week

Source:

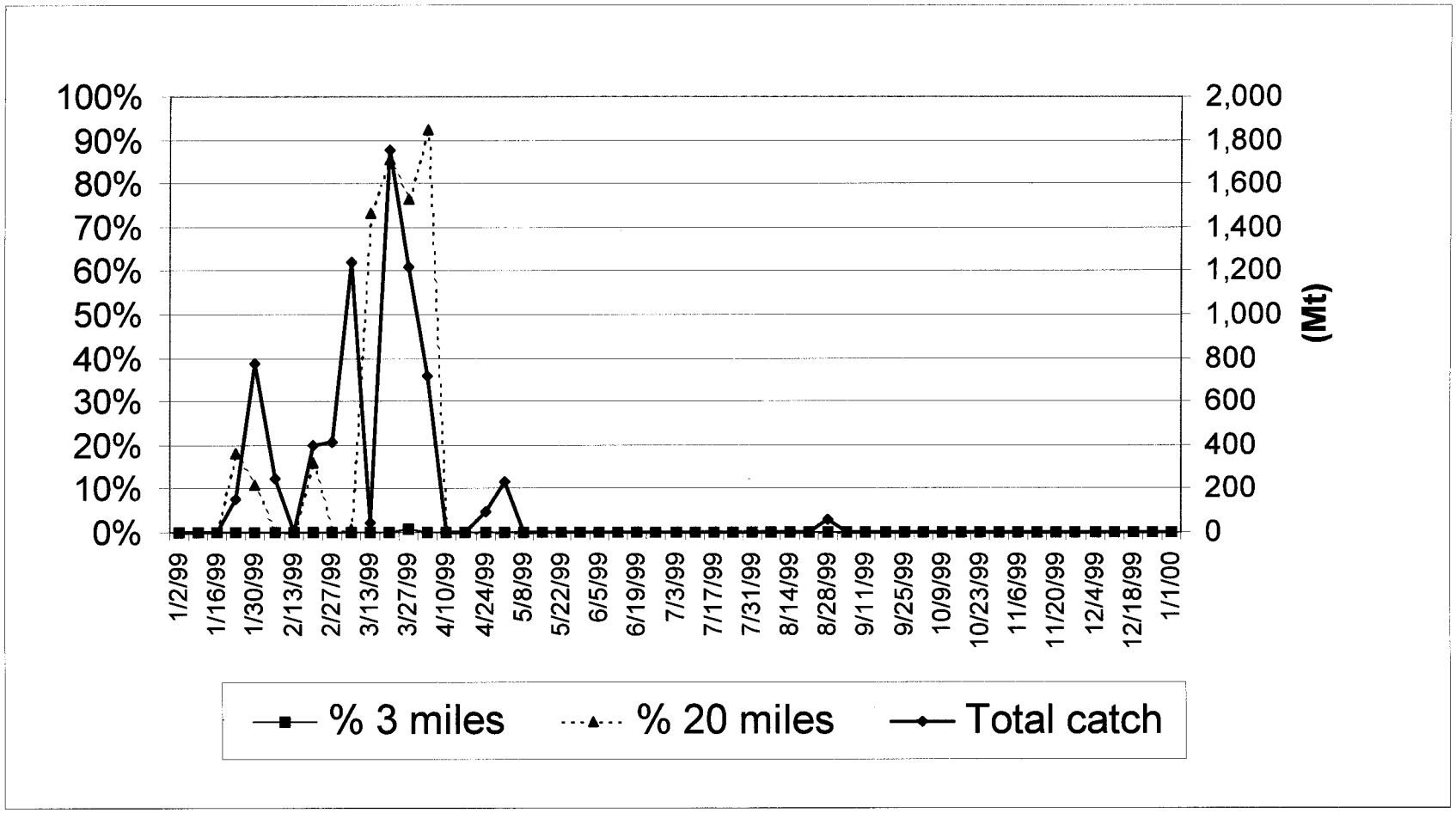
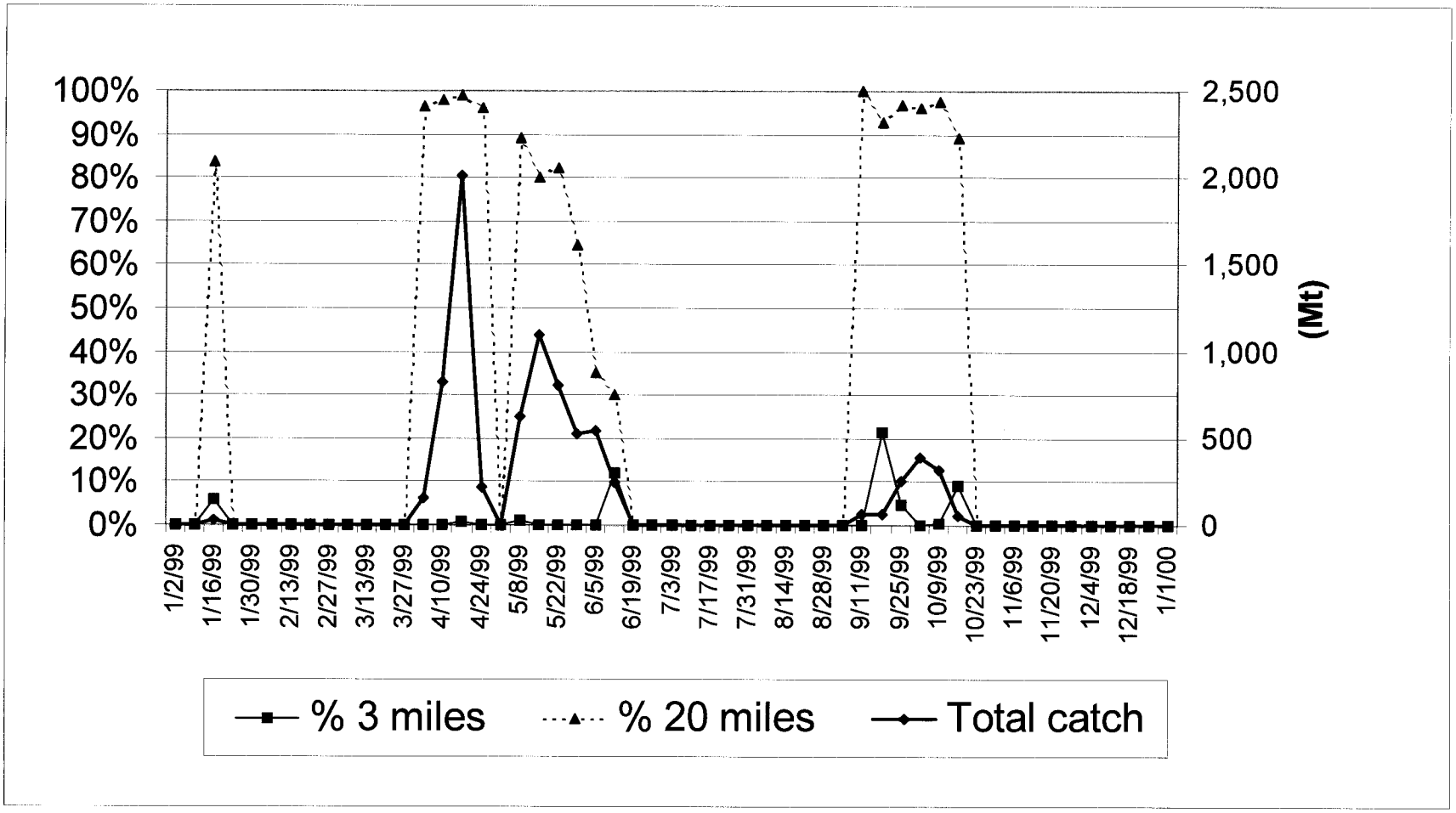


Figure E2-5 1999 catcher vessel pot catch of Pacific cod within 3 and 20 nm of listed rookeries and haulouts in the BSAI by week



Source:

Figure E2-6 1999 catcher processor hook-and-line catch of Pacific cod within 3 and 20 nm of listed rookeries and haulouts in the BSAI by week
Source:

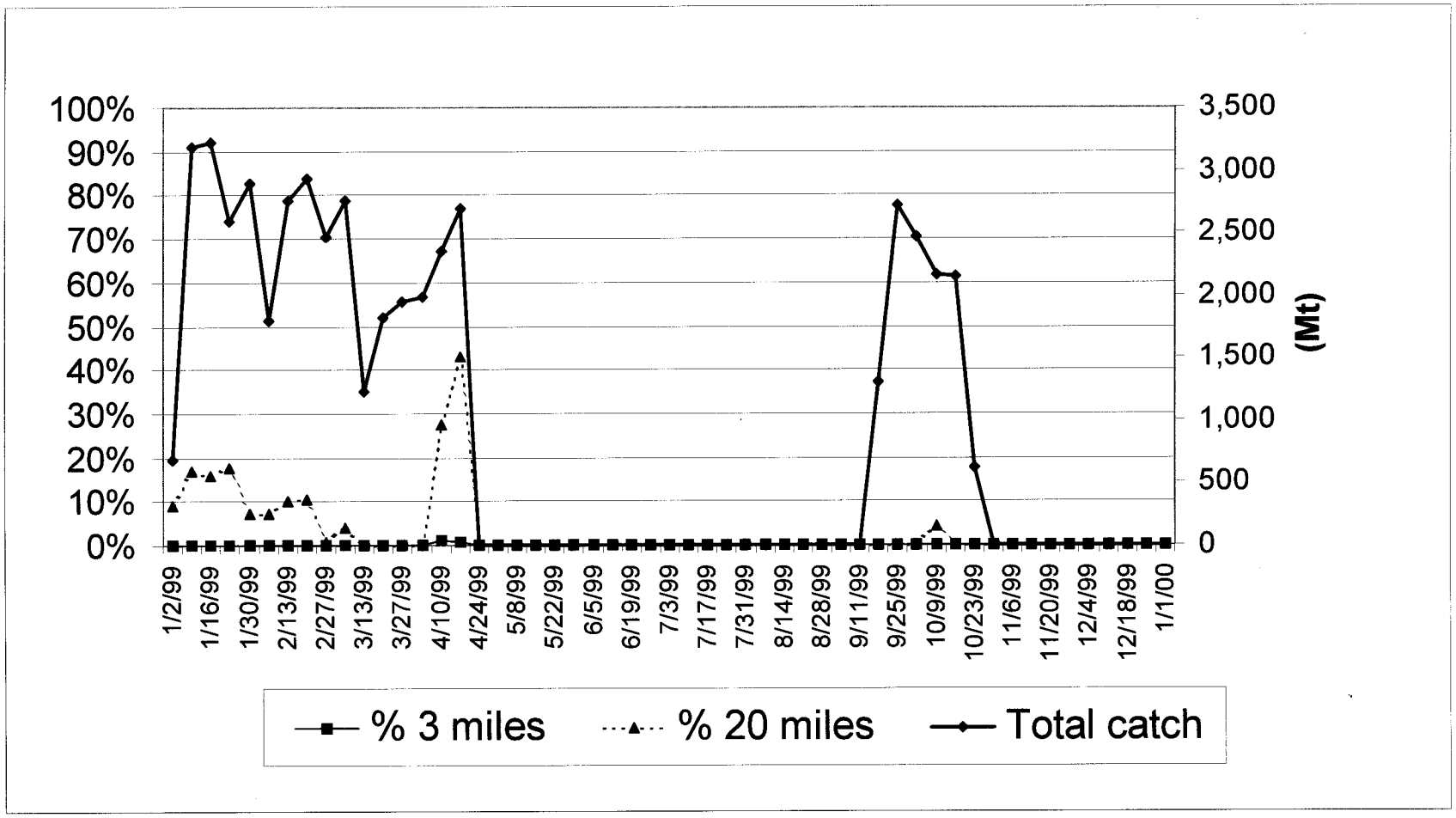
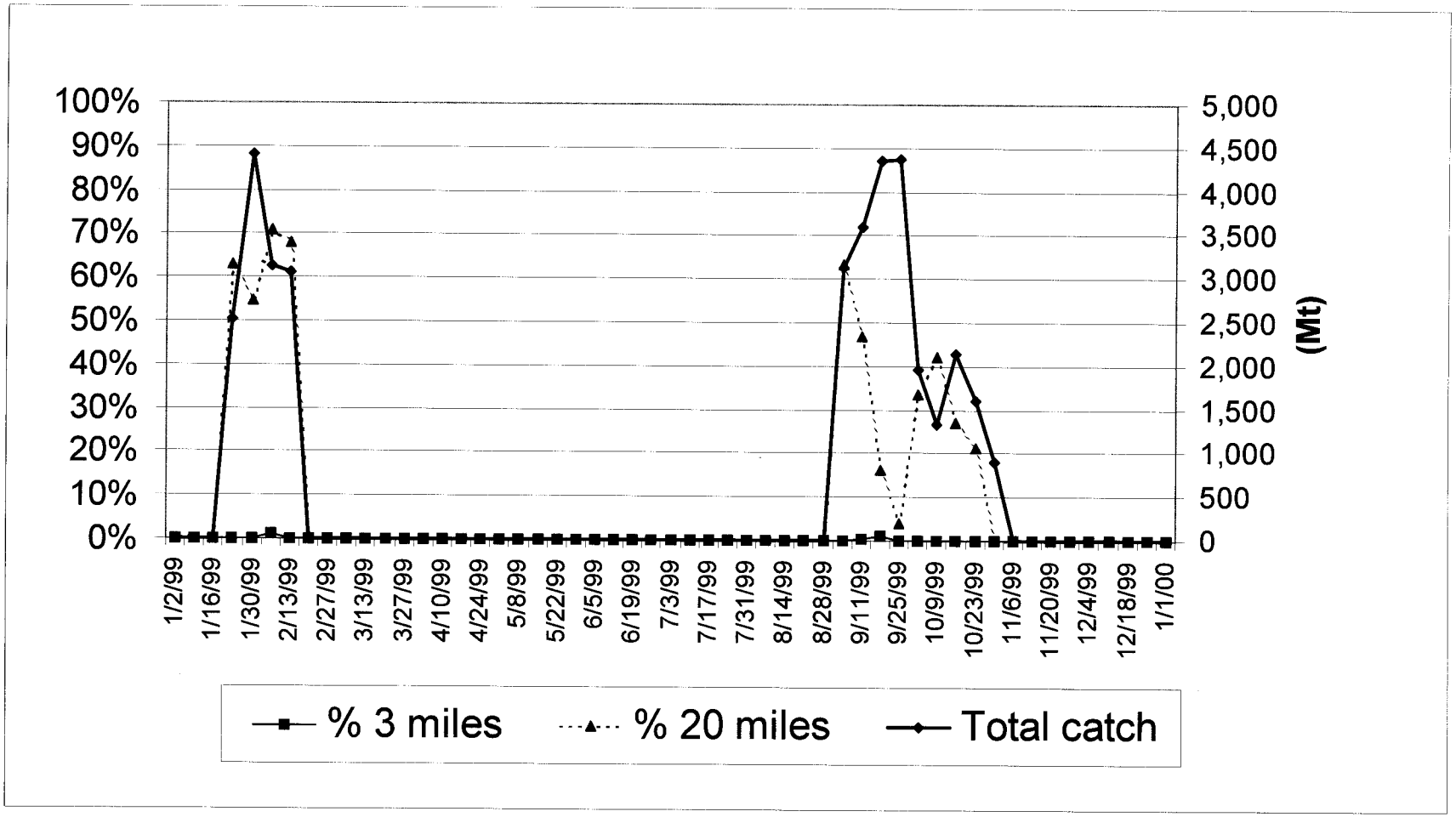


Figure E2-7 1999 catcher processor trawl catch of Atka mackerel within 3 and 20 nm of listed rookeries and haulouts in the BSAI by week



Source:

Figure E2-8 1999 catcher vessel trawl catch of pollock within 3 and 20 nm of listed rookeries and haulouts in the GOA by week
Source:

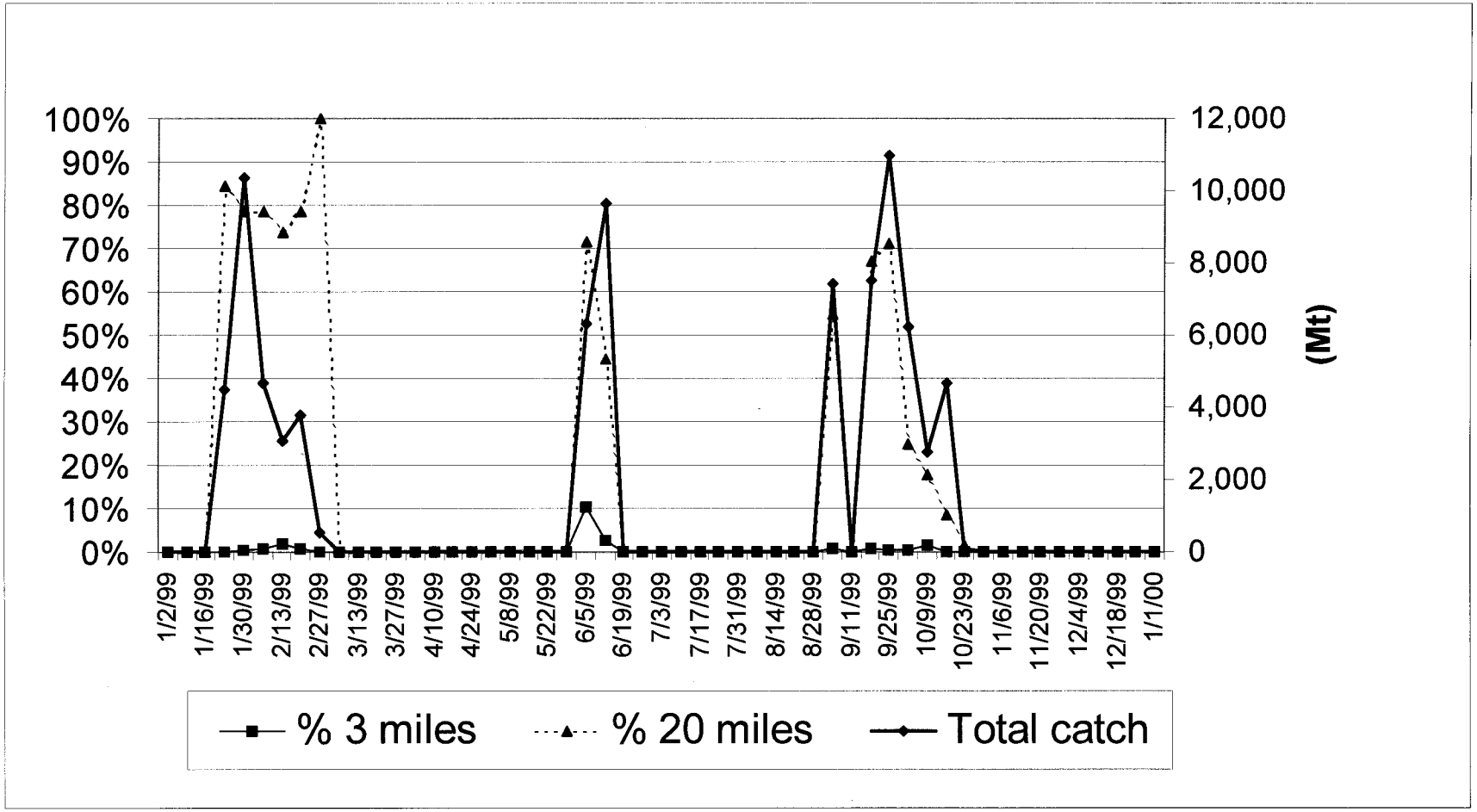
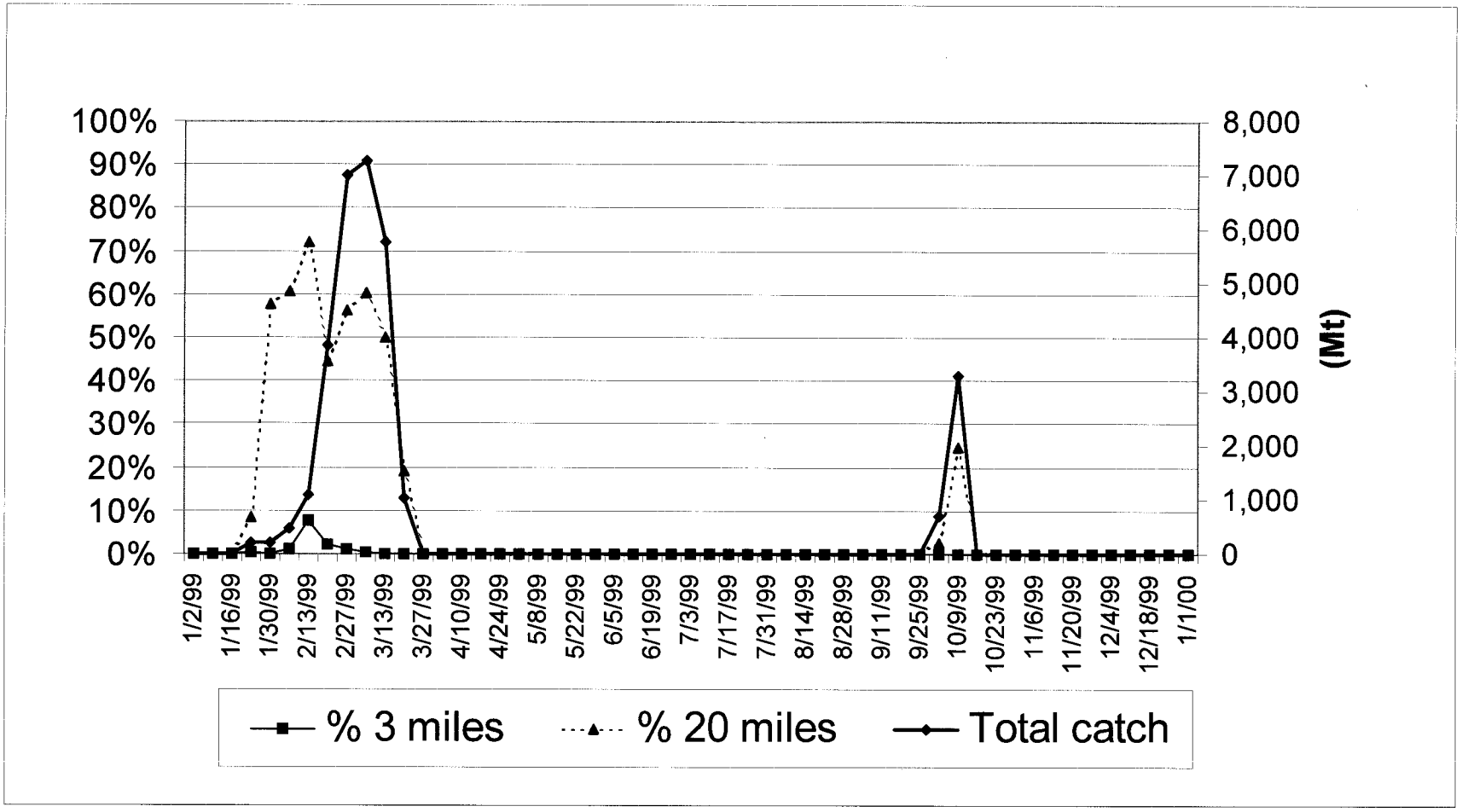


Figure E2-9 1999 catcher vessel trawl catch of Pacific cod within 3 and 20 nm of listed rookeries and haulouts in the GOA by week



Source:

Figure E2-10 1999 catcher vessel pot catch of Pacific cod within 3 and 20 nm of listed rookeries and haulouts in the GOA by week

Source:

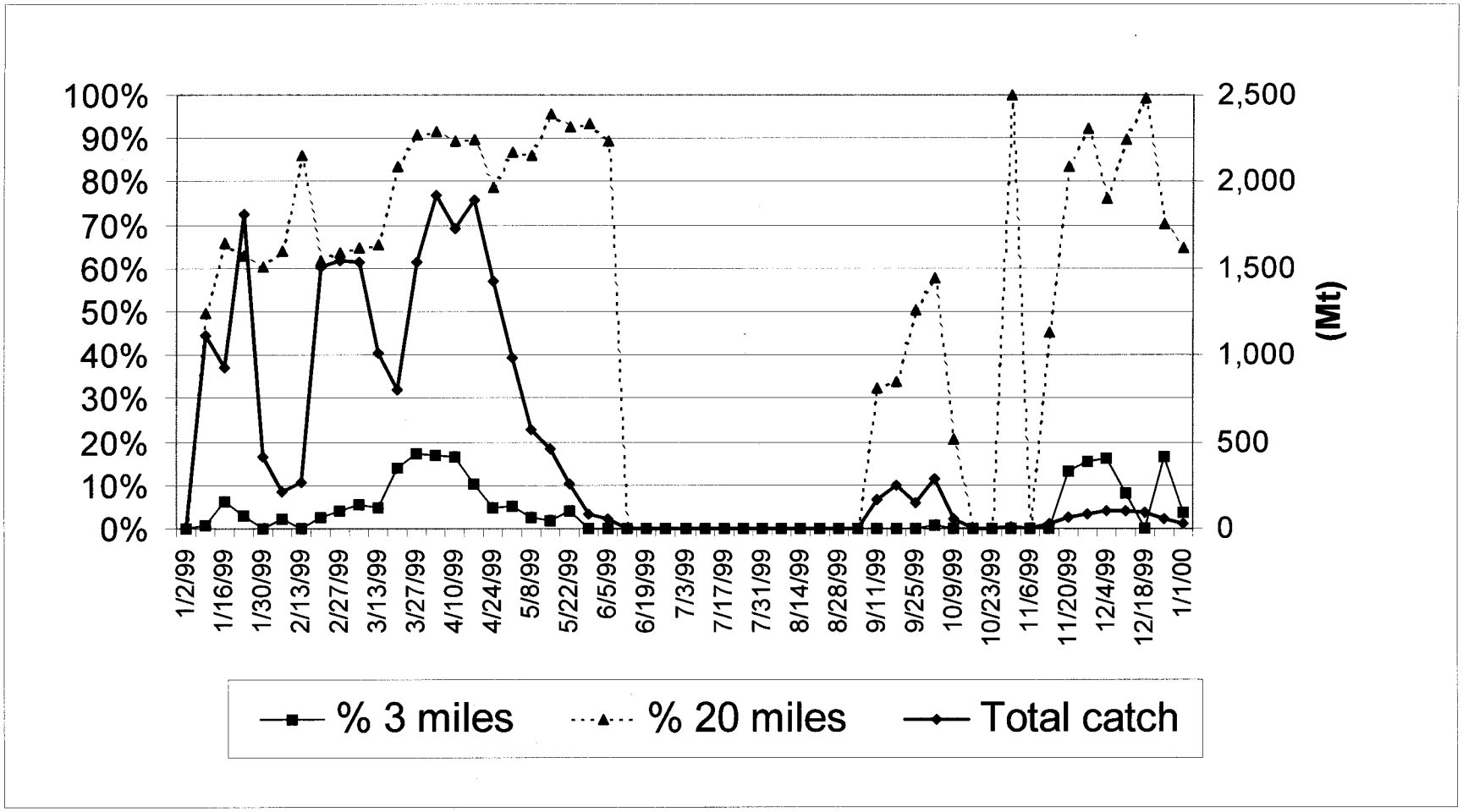
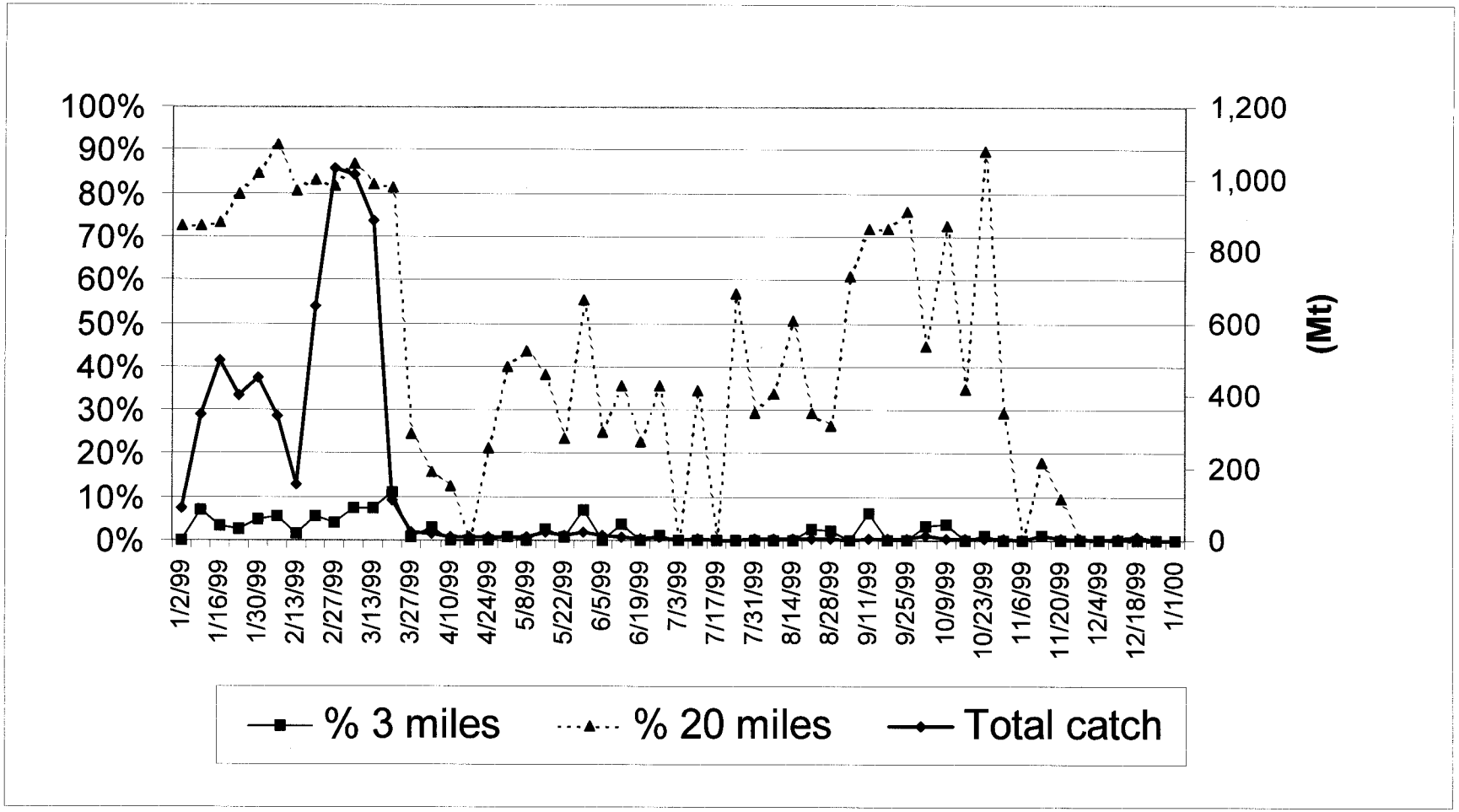
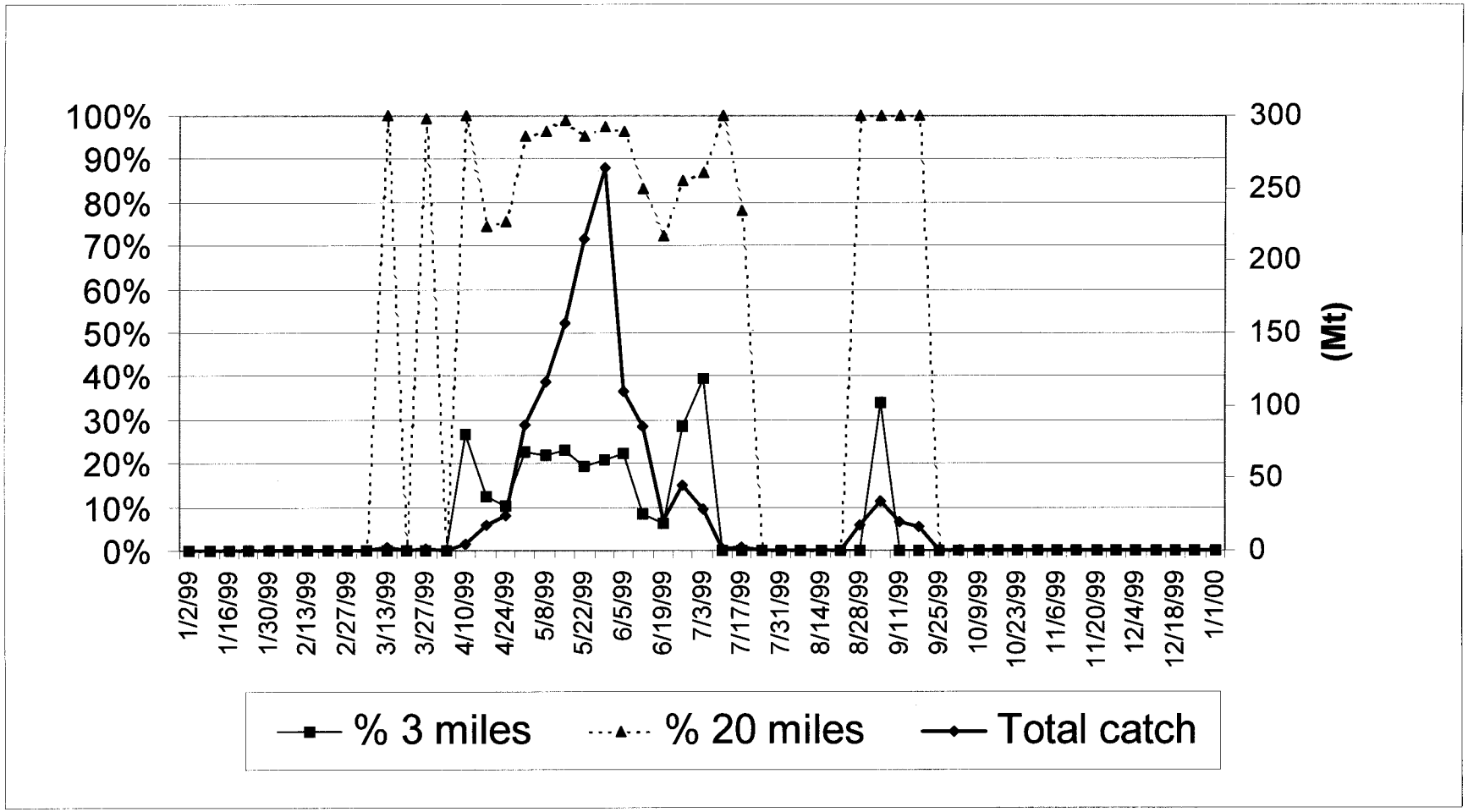


Figure E2-11 1999 catcher vessel hook-and-line catch of Pacific cod within 3 and 20 nm of listed rookeries and haulouts in the GOA by week



Source:

Figure E2-12 1999 catcher vessel jig catch of Pacific cod within 3 and 20 nm of listed rookeries and haulouts in the GOA by week



Source:

Appendix E3

Maps illustrative of 1999 spatial and temporal fishing harvest patterns by gear type and sector presented in Appendix E2.

Appendix E3 Maps illustrative of 1999 spatial and temporal fishing harvest patterns by gear type and sector.

Figure E3-1.	Total trawl retained pollock catch, 1999 A season, by ADF&G statistical area. (Values are in kg)	E-117
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Figure E3-34. CDQ all gear types retained Pacific cod catch, 1999 B Season, by ADF&G statistical area. (Values are in kg) E-150

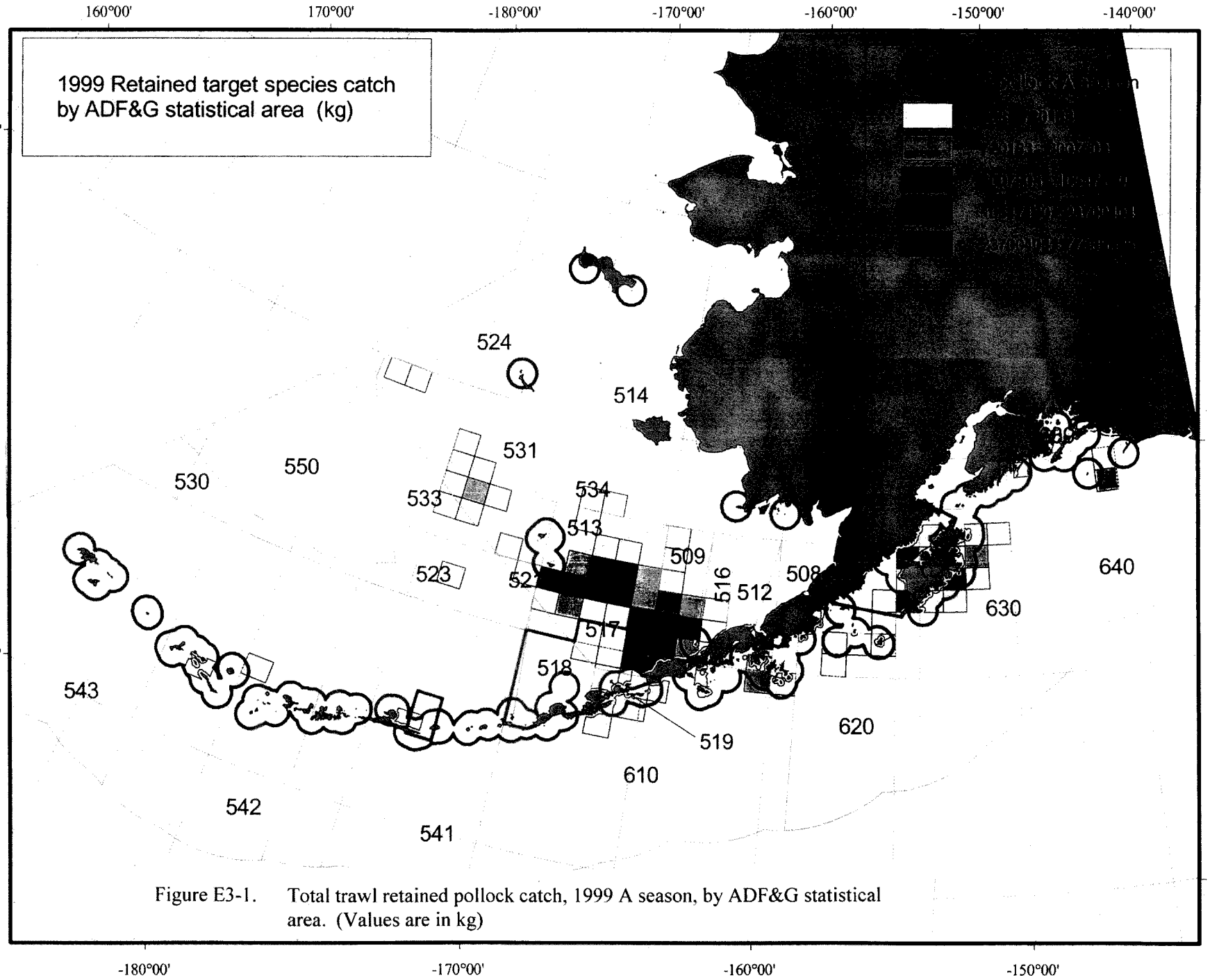


Figure E3-1. Total trawl retained pollock catch, 1999 A season, by ADF&G statistical area. (Values are in kg)

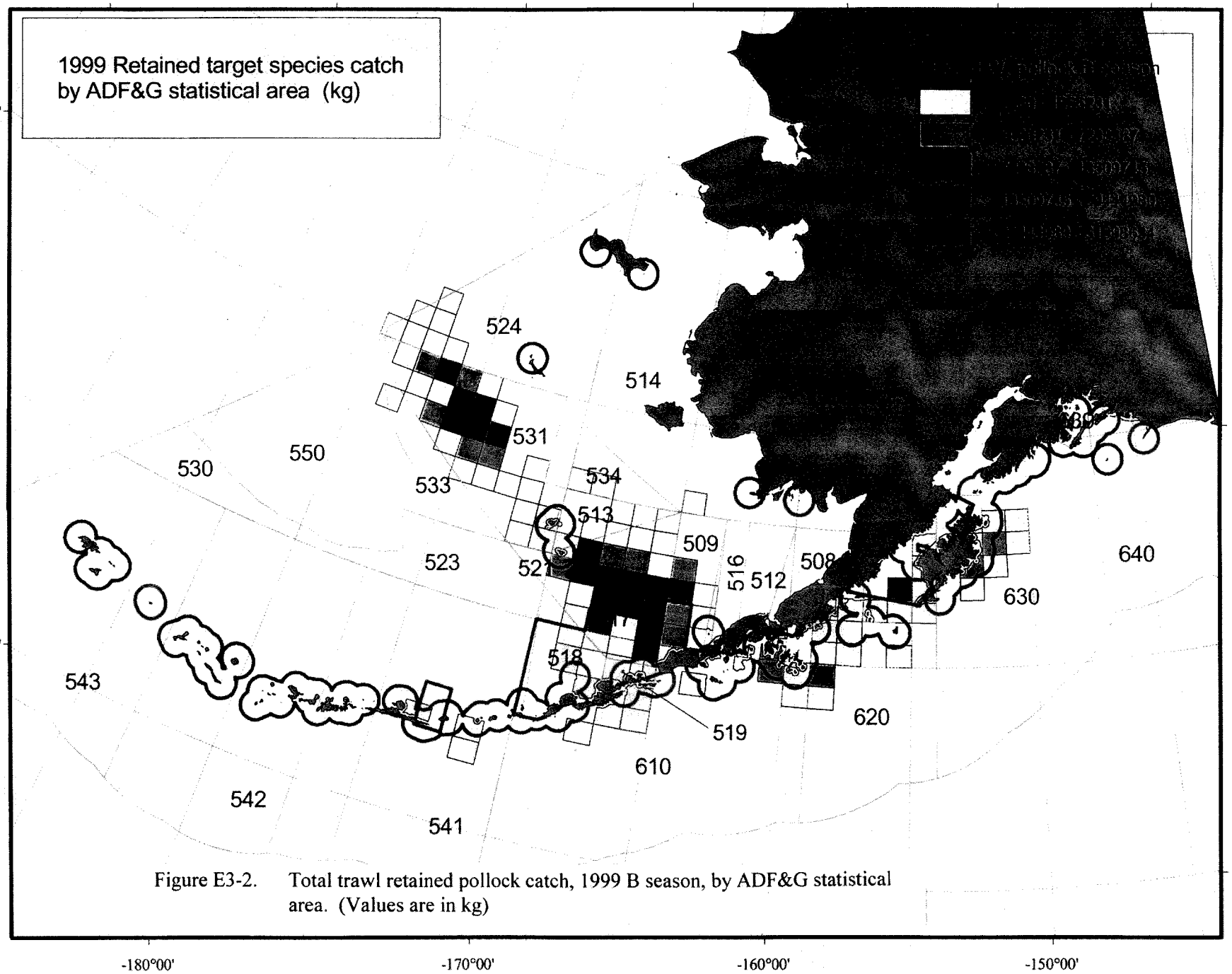


Figure E3-2. Total trawl retained pollock catch, 1999 B season, by ADF&G statistical area. (Values are in kg)

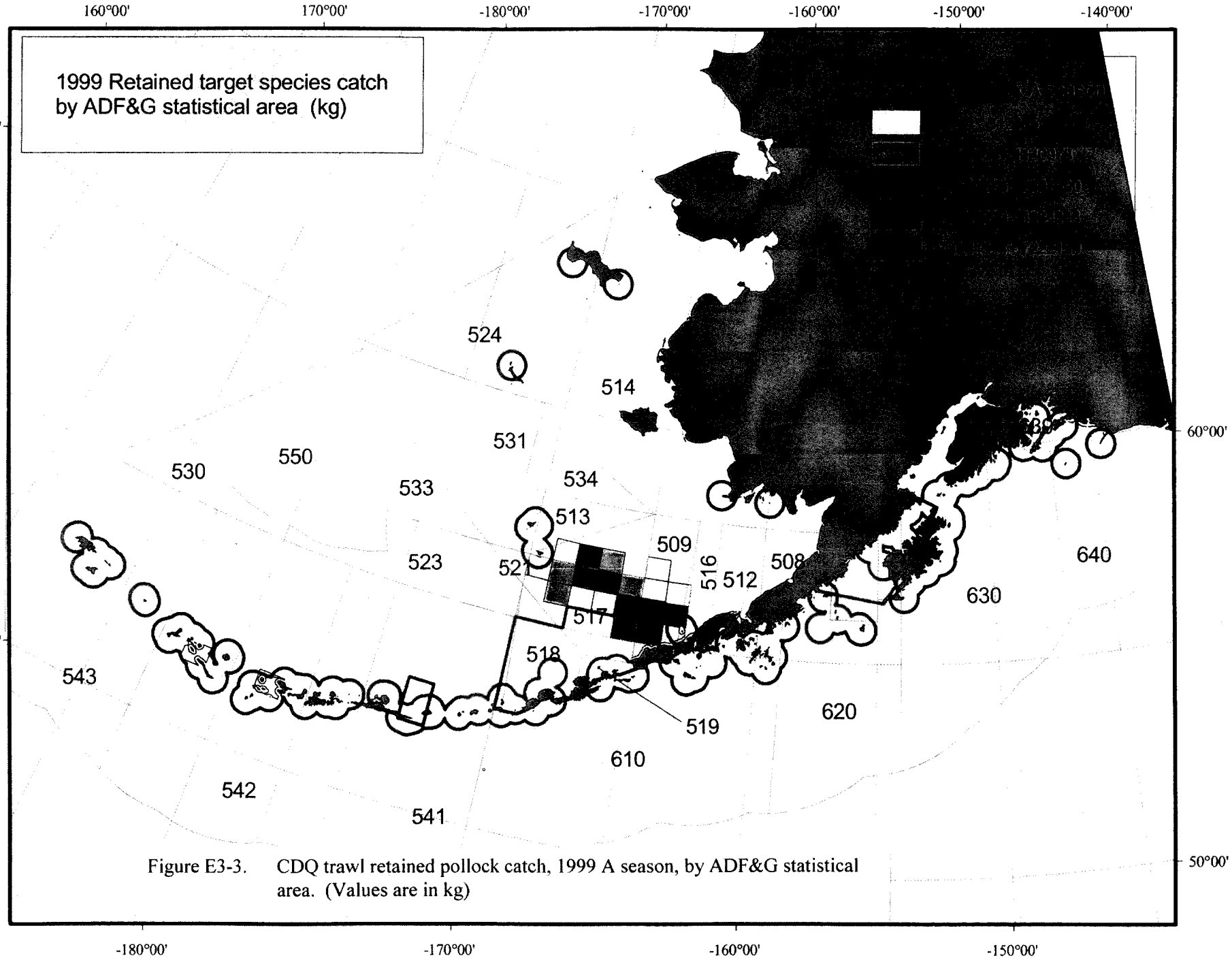


Figure E3-3. CDQ trawl retained pollock catch, 1999 A season, by ADF&G statistical area. (Values are in kg)

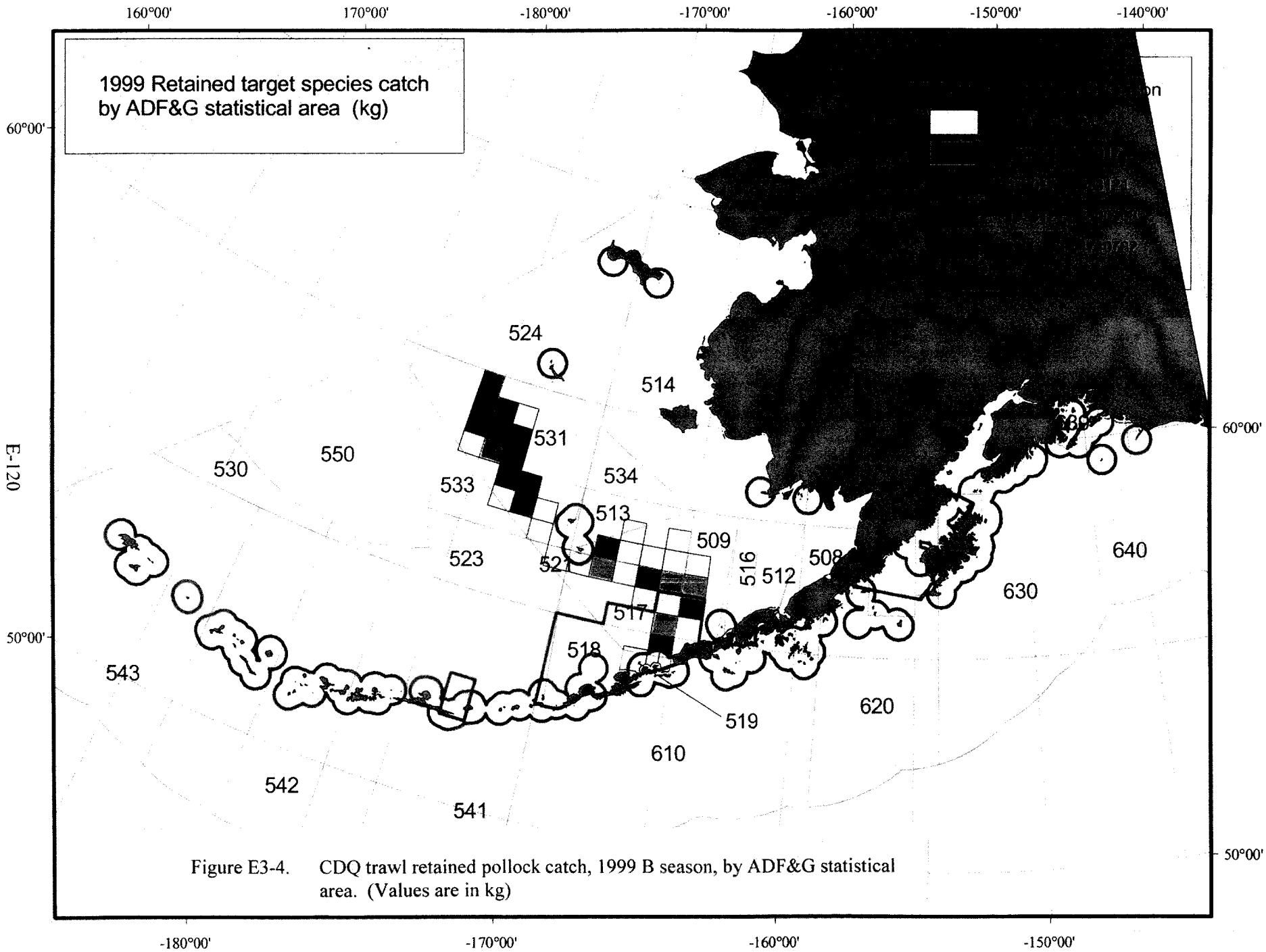


Figure E3-4. CDQ trawl retained pollock catch, 1999 B season, by ADF&G statistical area. (Values are in kg)

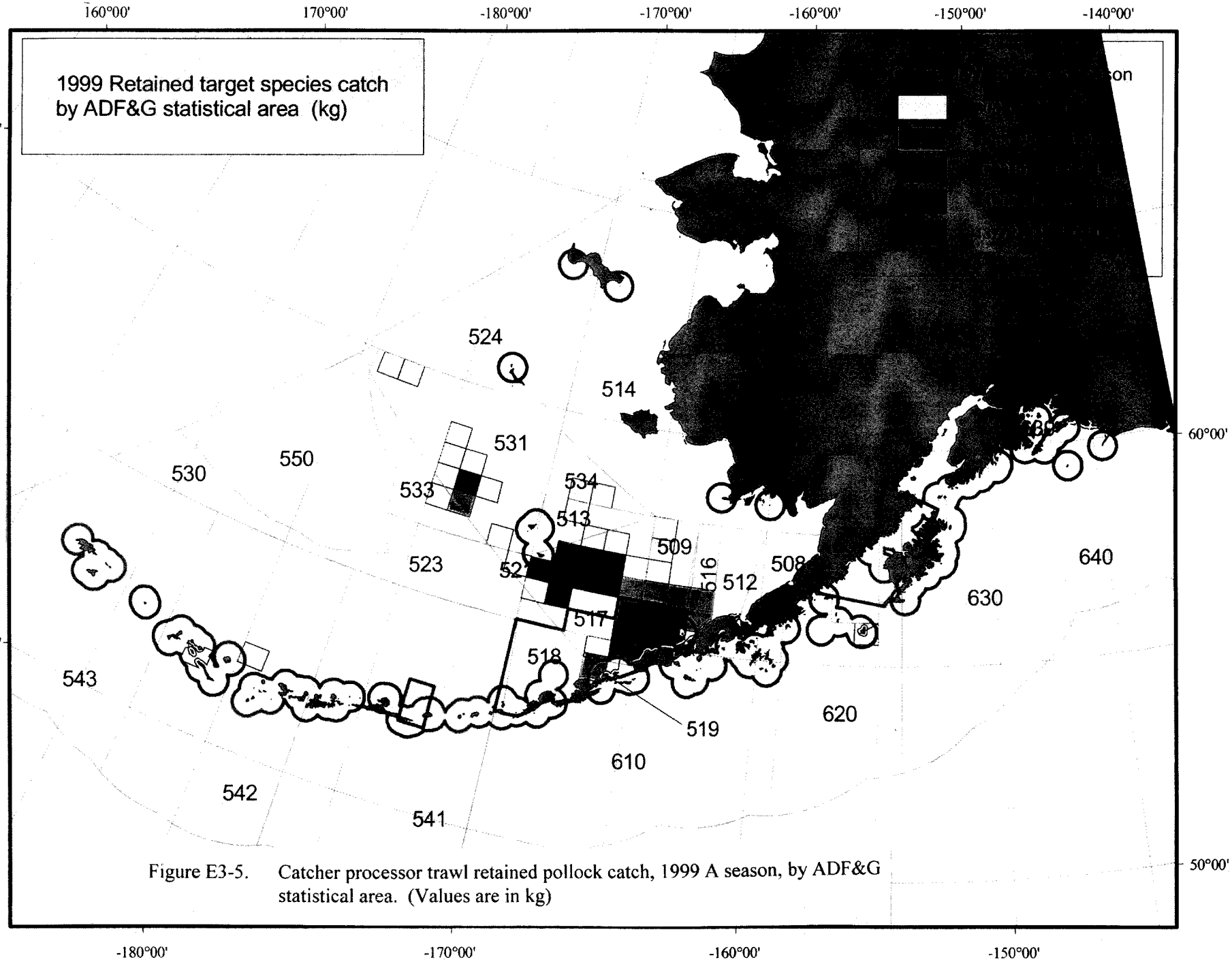


Figure E3-5. Catcher processor trawl retained pollock catch, 1999 A season, by ADF&G statistical area. (Values are in kg)

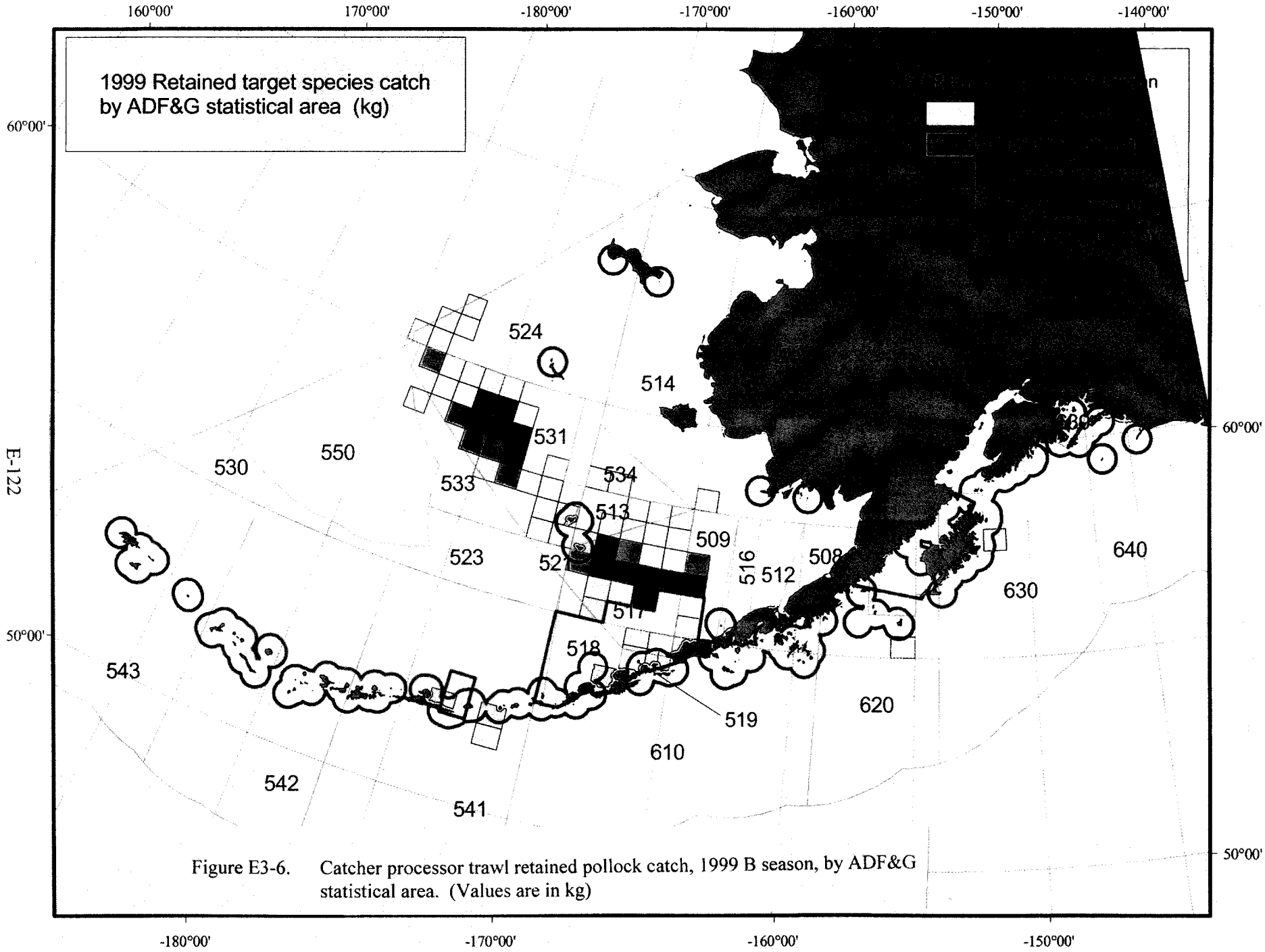


Figure E3-6. Catcher processor trawl retained pollock catch, 1999 B season, by ADF&G statistical area. (Values are in kg)

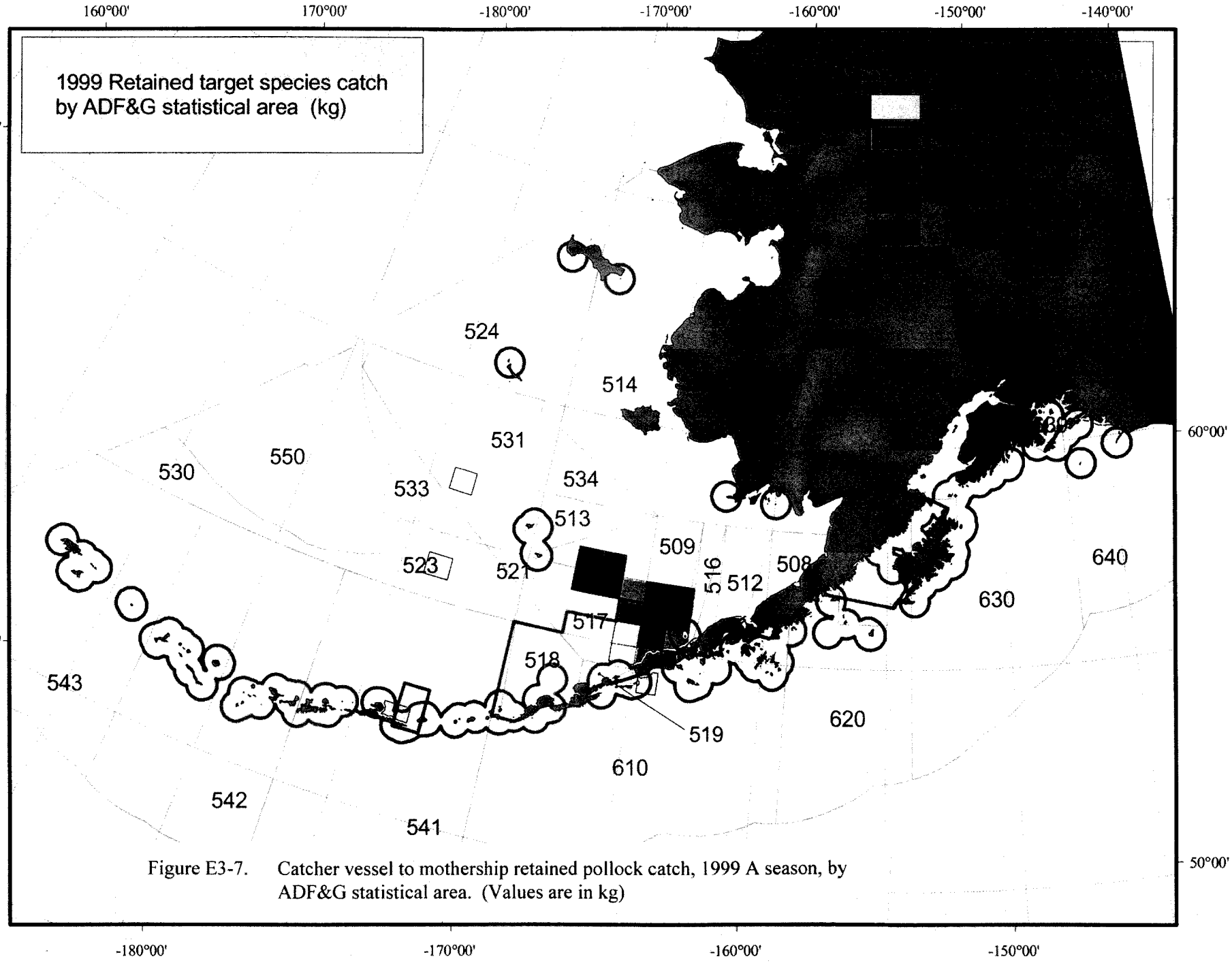
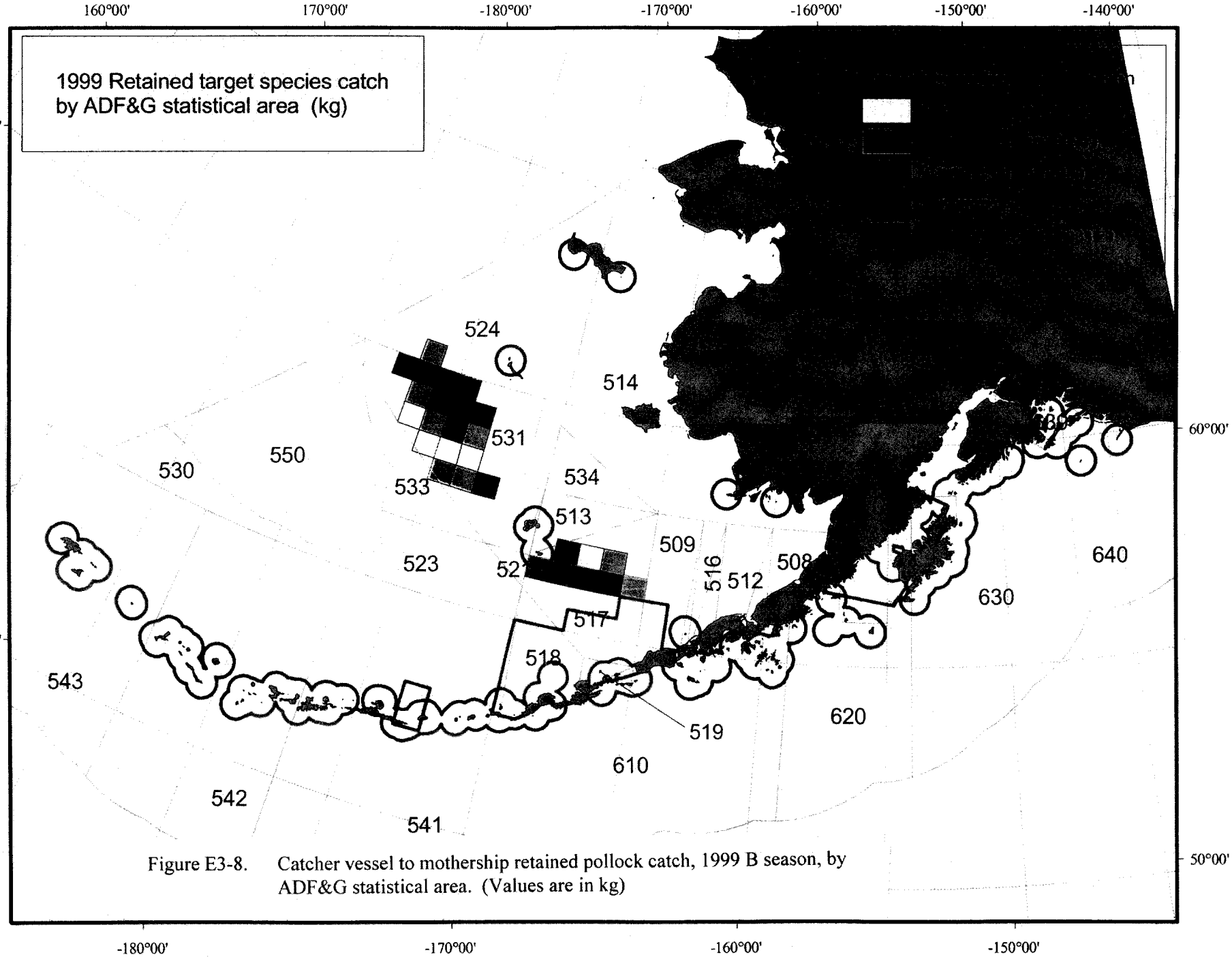


Figure E3-7. Catcher vessel to mothership retained pollock catch, 1999 A season, by ADF&G statistical area. (Values are in kg)



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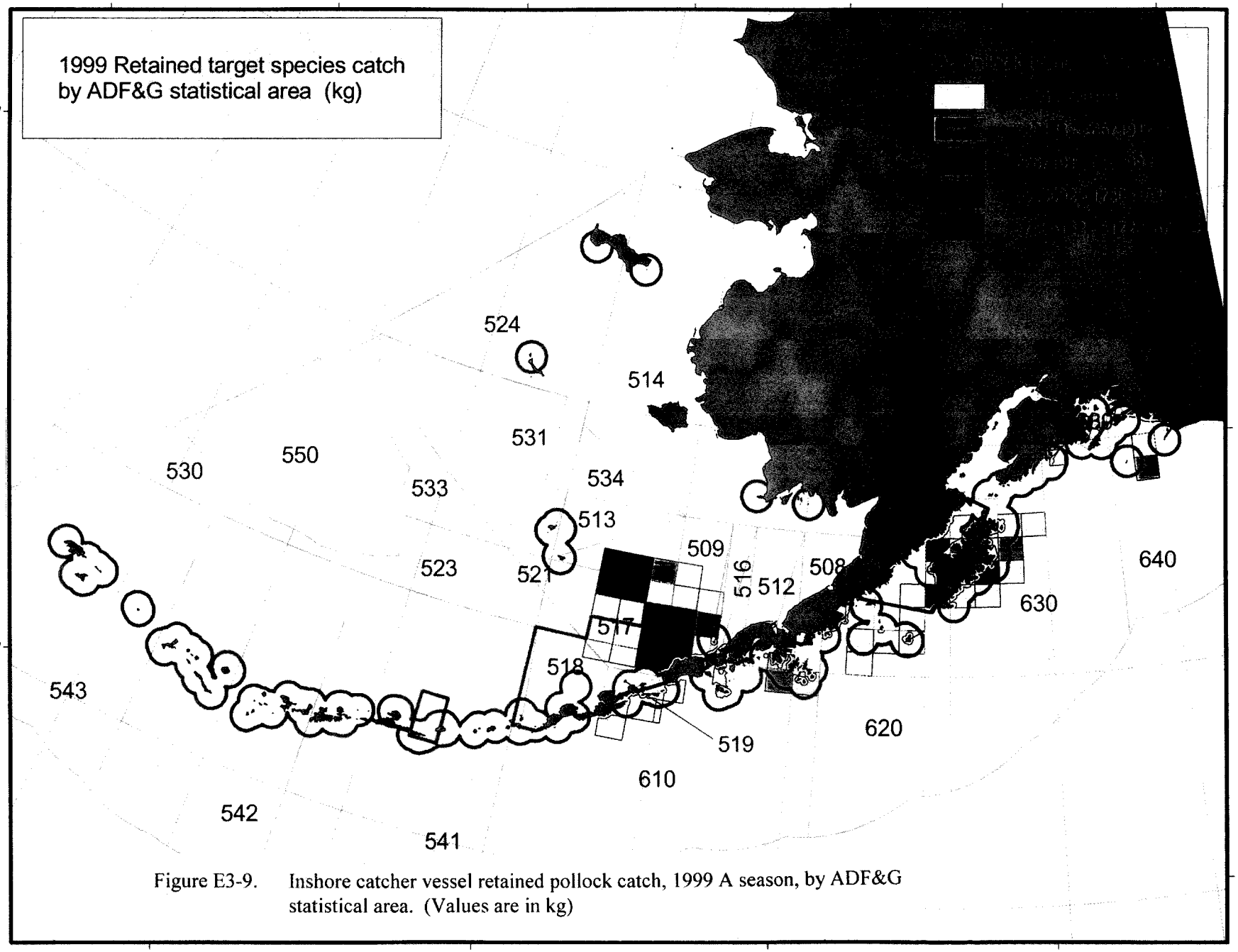

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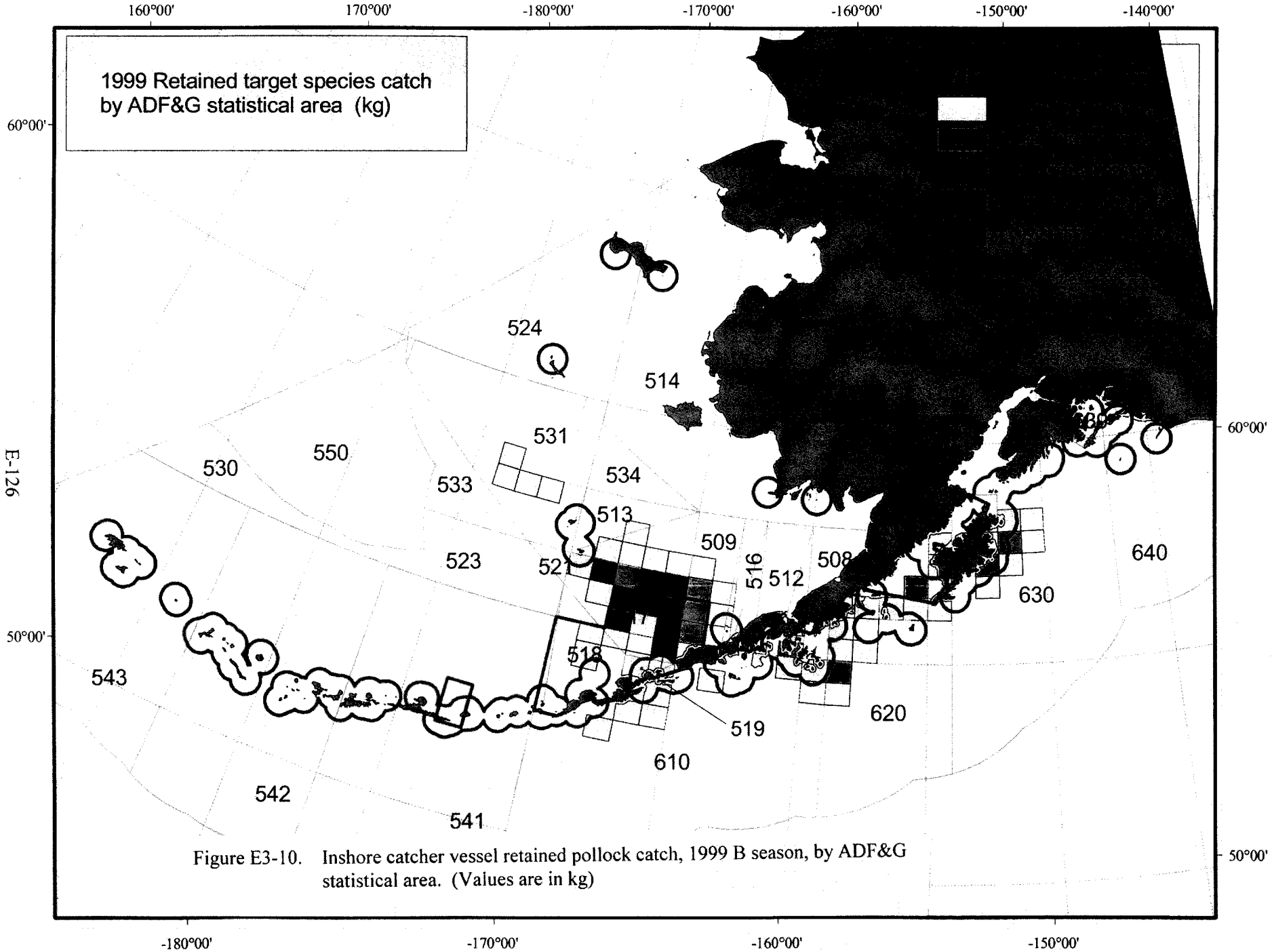


Figure E3-10. Inshore catcher vessel retained pollock catch, 1999 B season, by ADF&G statistical area. (Values are in kg)

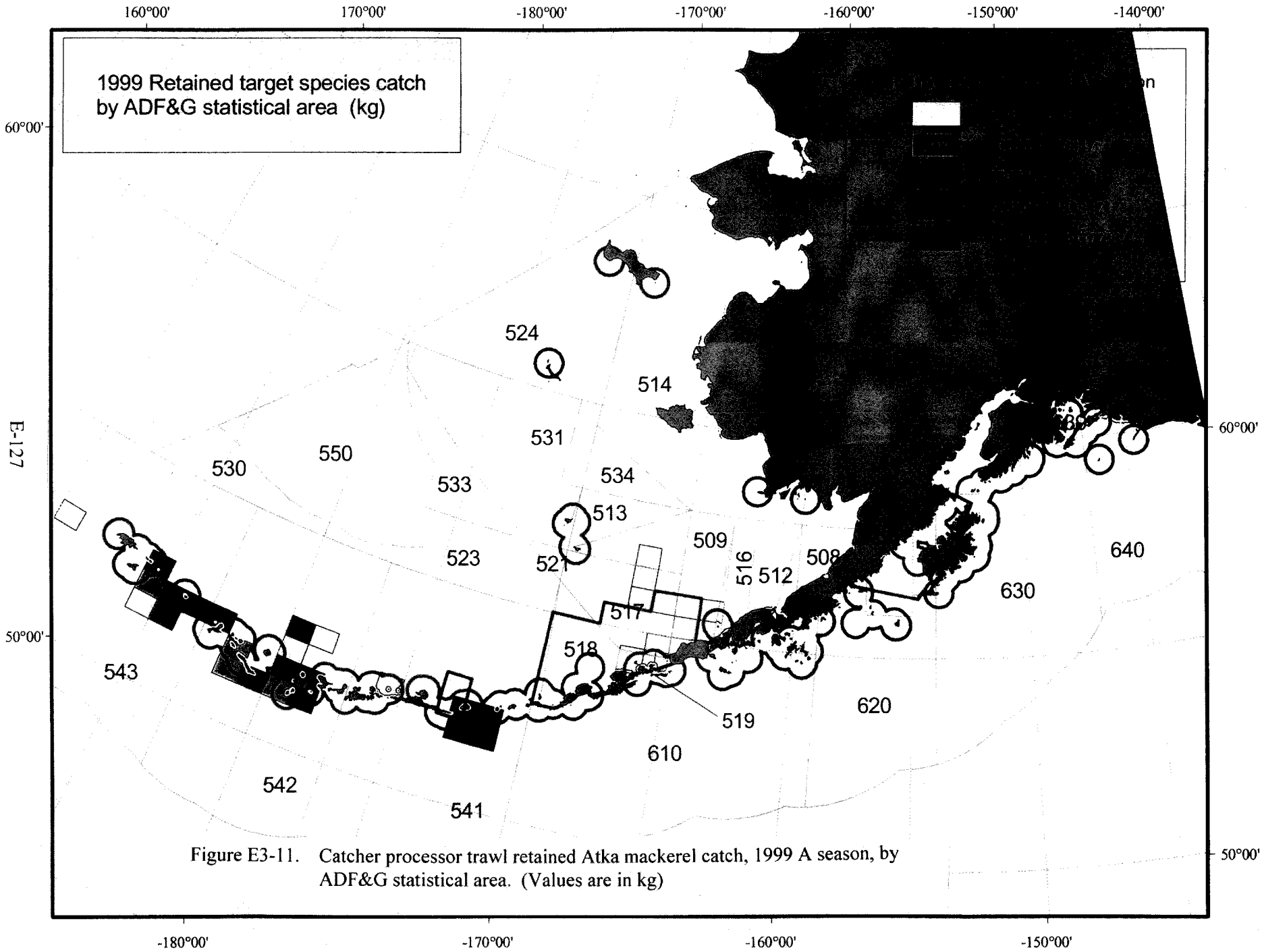


Figure E3-11. Catcher processor trawl retained Atka mackerel catch, 1999 A season, by ADF&G statistical area. (Values are in kg)

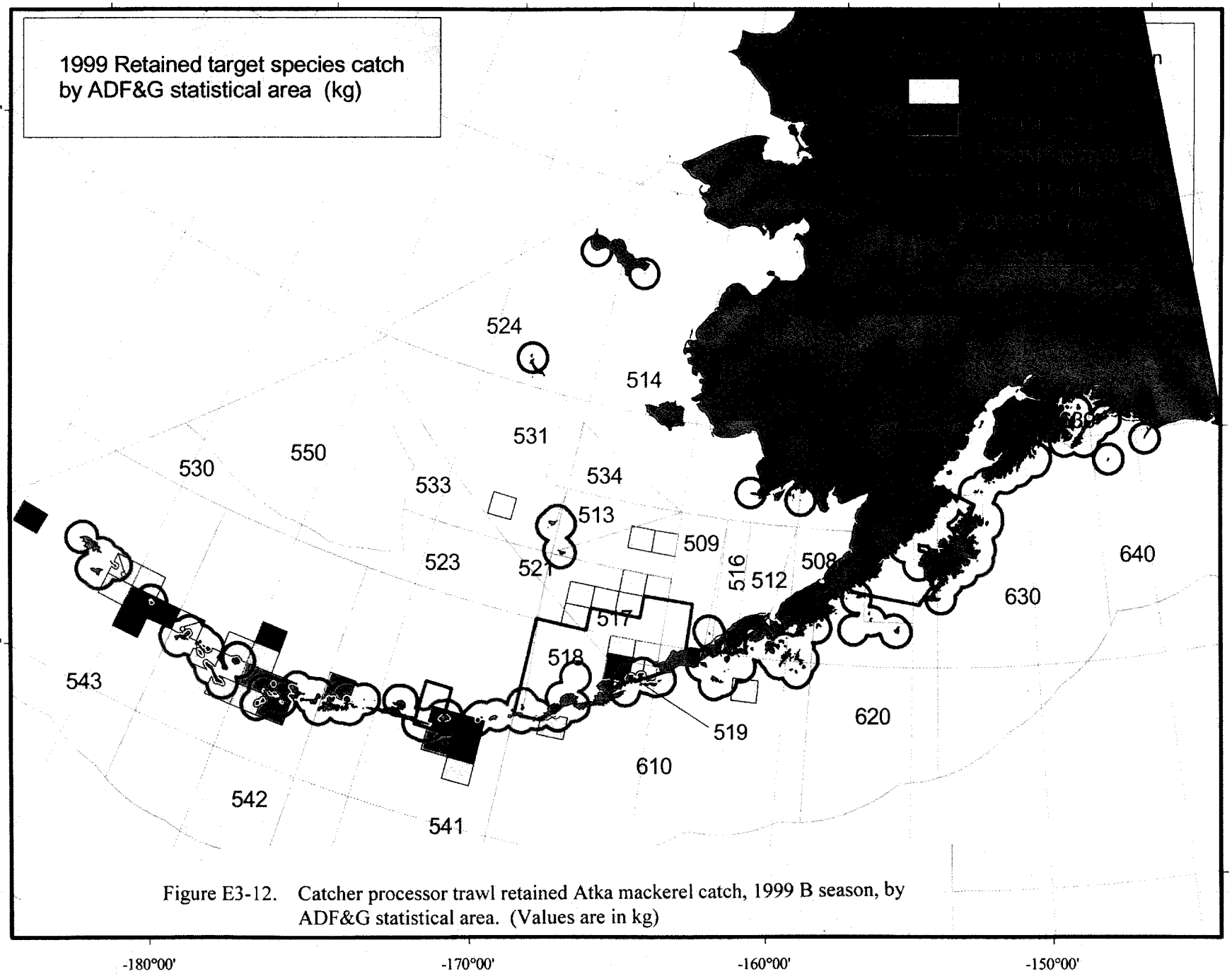


Figure E3-12. Catcher processor trawl retained Atka mackerel catch, 1999 B season, by ADF&G statistical area. (Values are in kg)

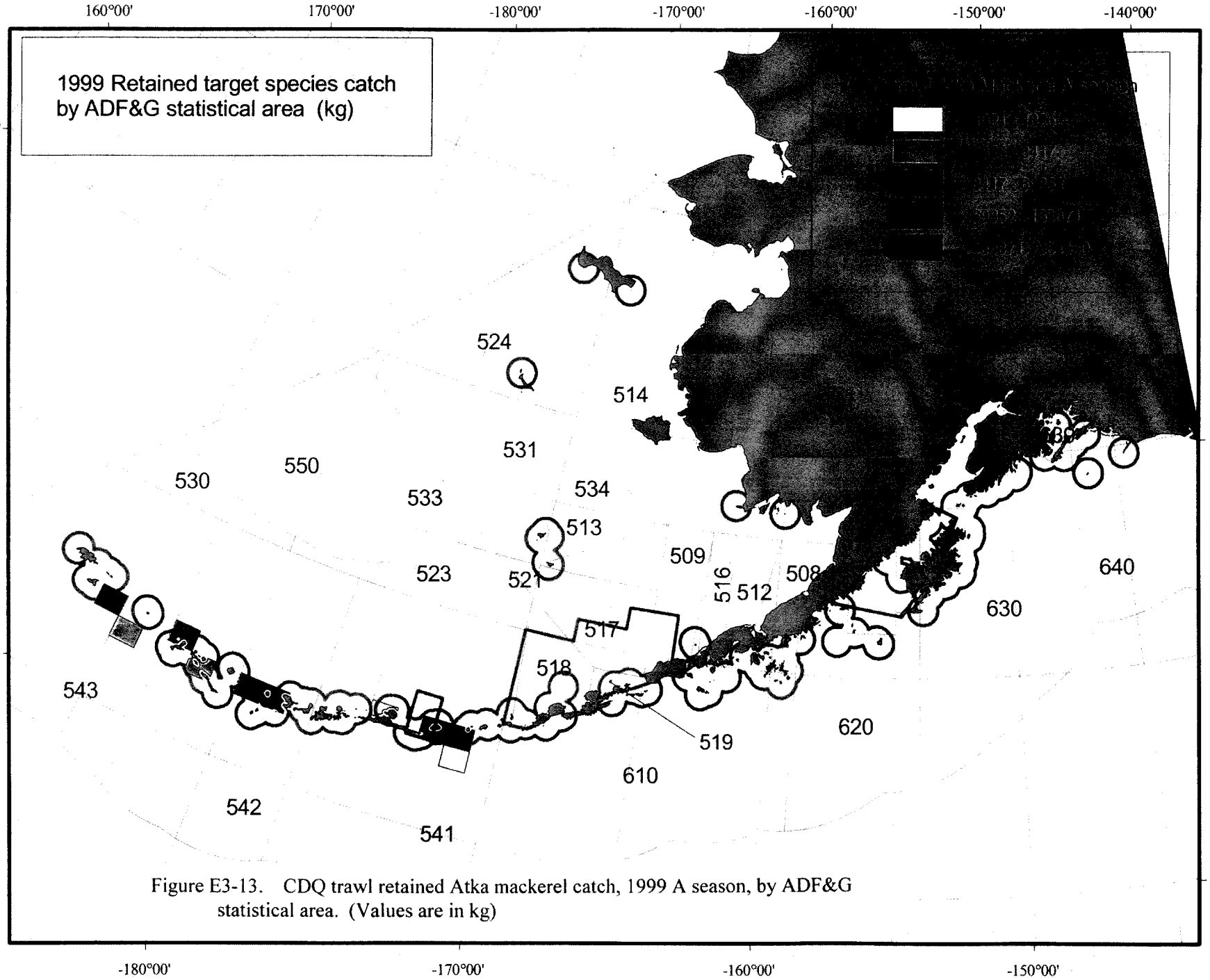
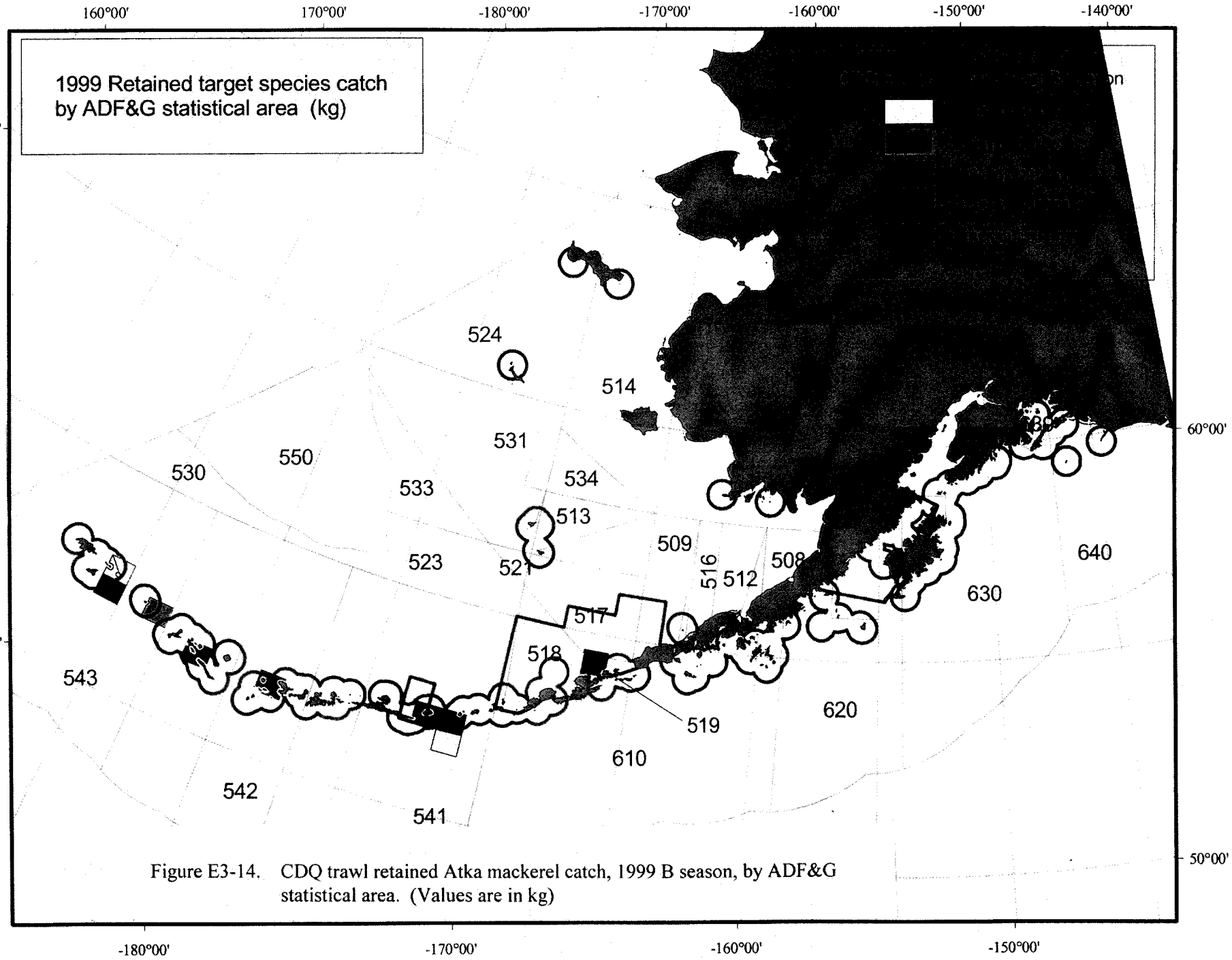


Figure E3-13. CDQ trawl retained Atka mackerel catch, 1999 A season, by ADF&G statistical area. (Values are in kg)



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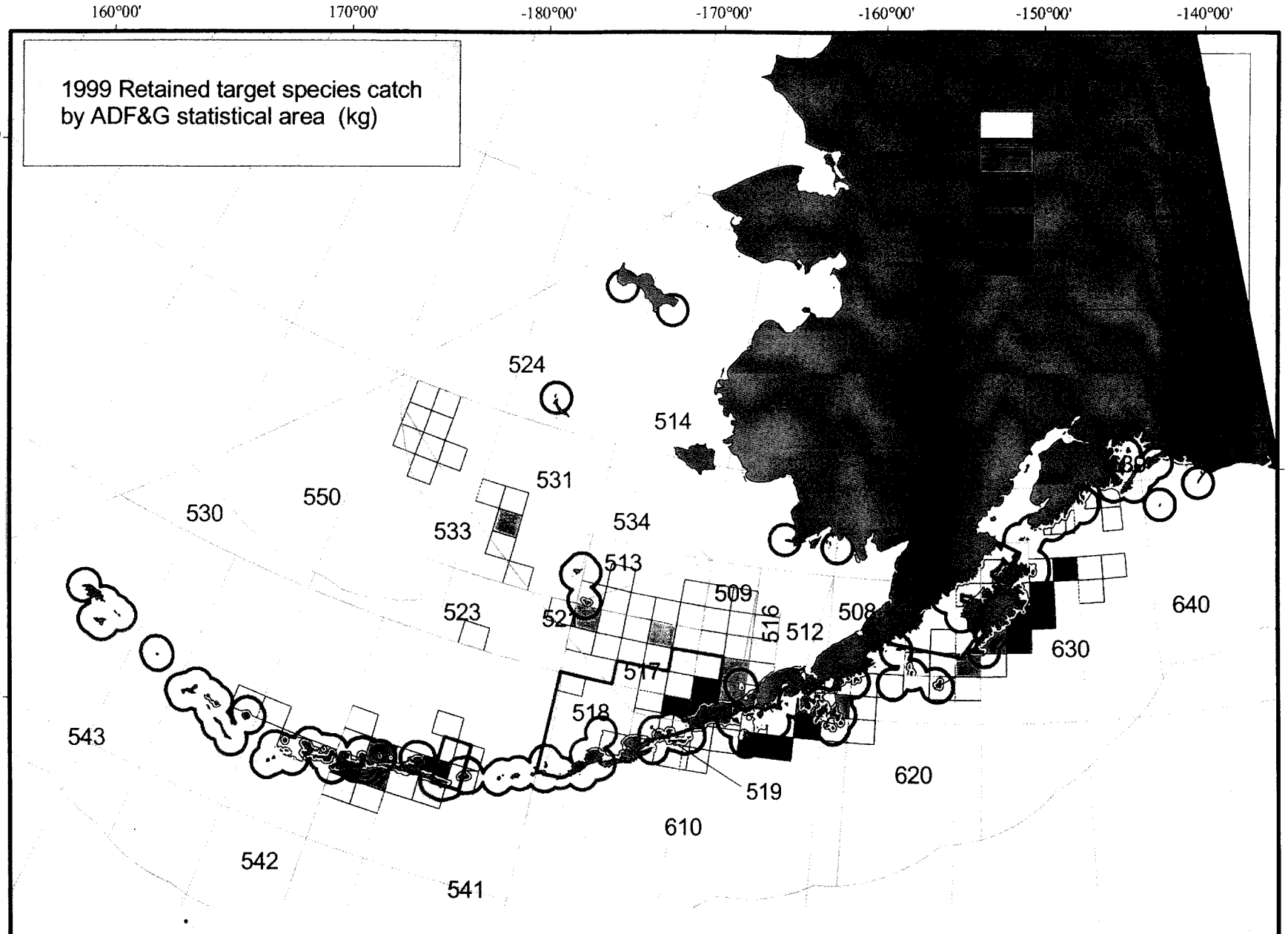

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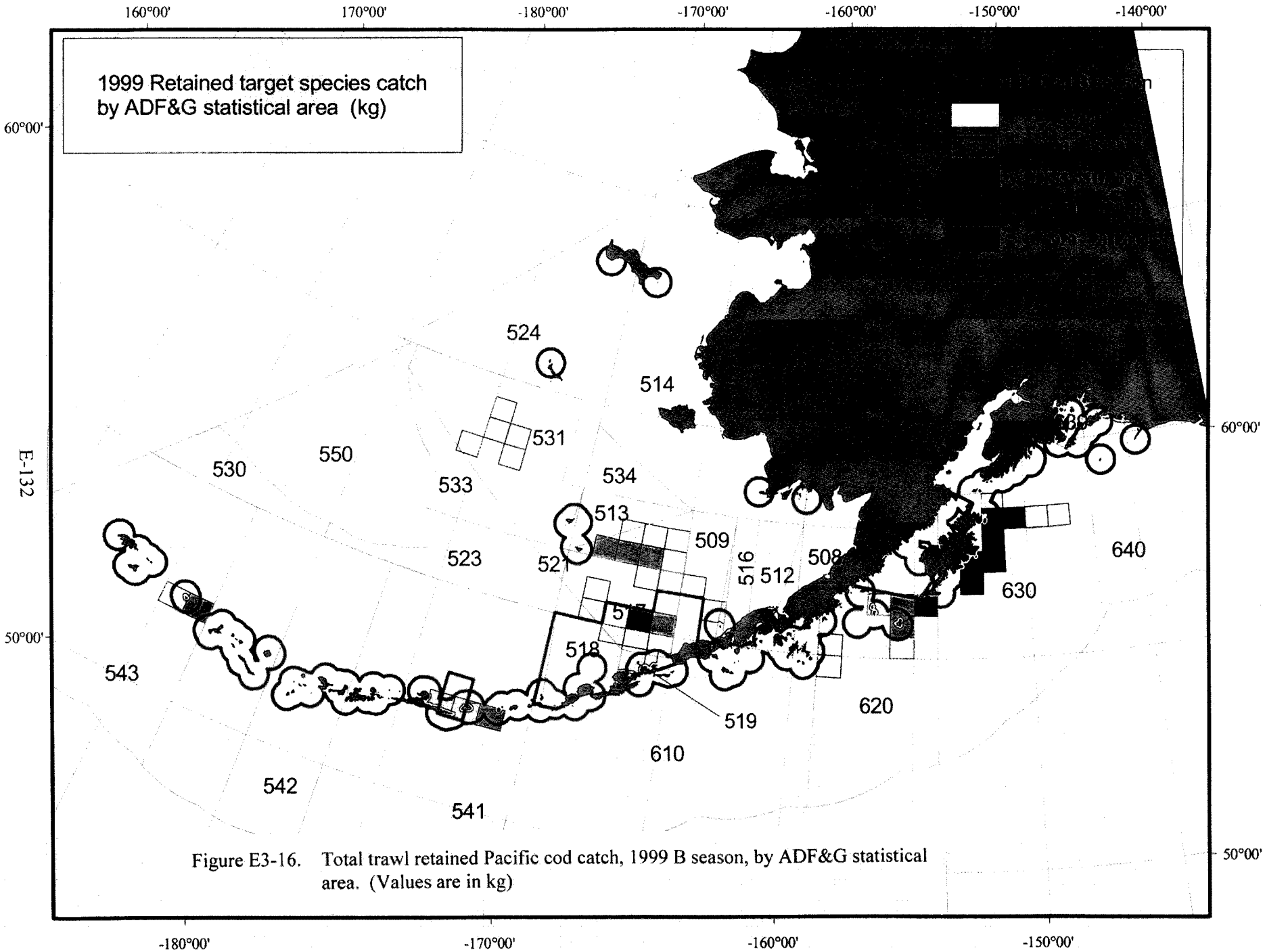


Figure E3-16. Total trawl retained Pacific cod catch, 1999 B season, by ADF&G statistical area. (Values are in kg)

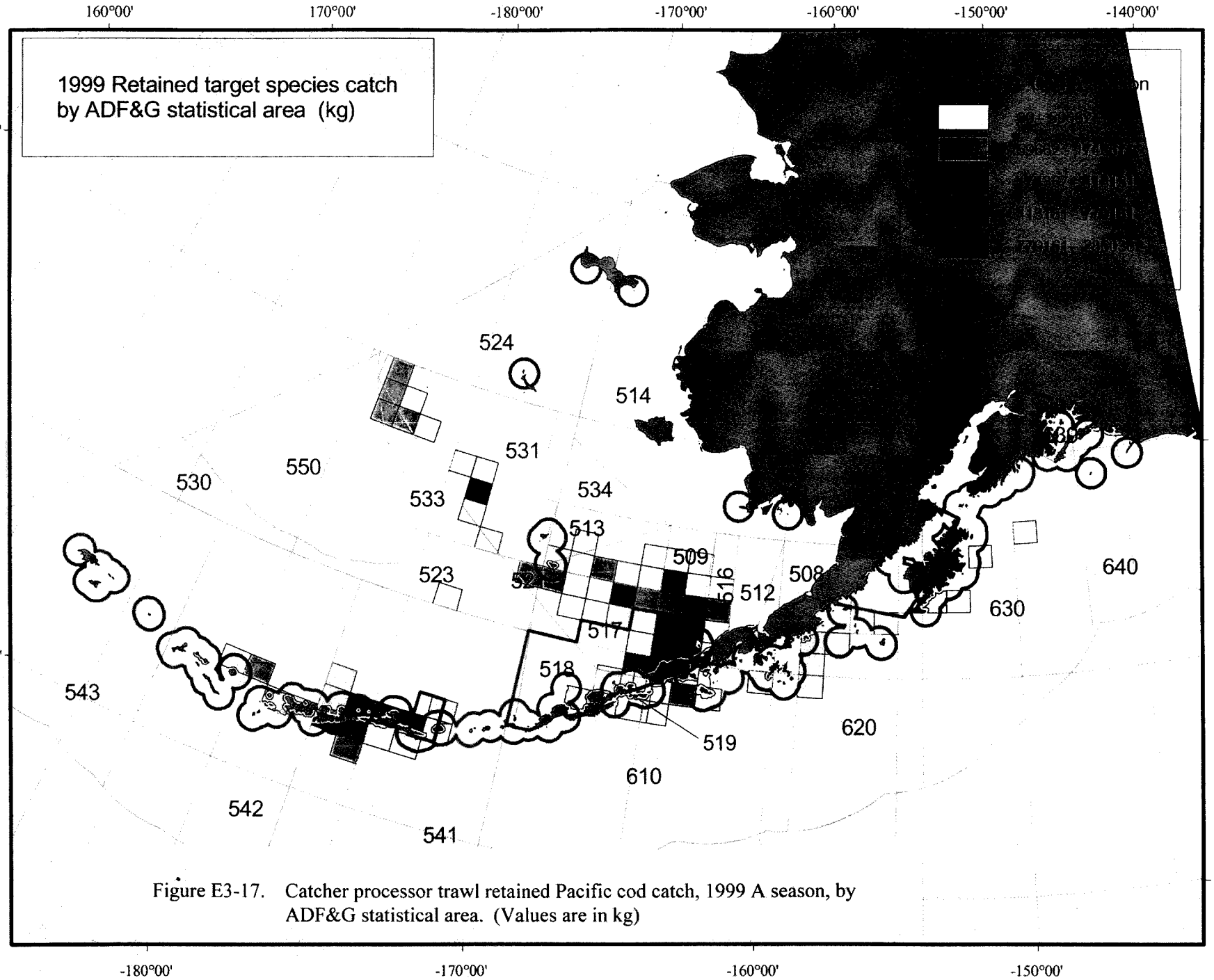


Figure E3-17. Catcher processor trawl retained Pacific cod catch, 1999 A season, by ADF&G statistical area. (Values are in kg)

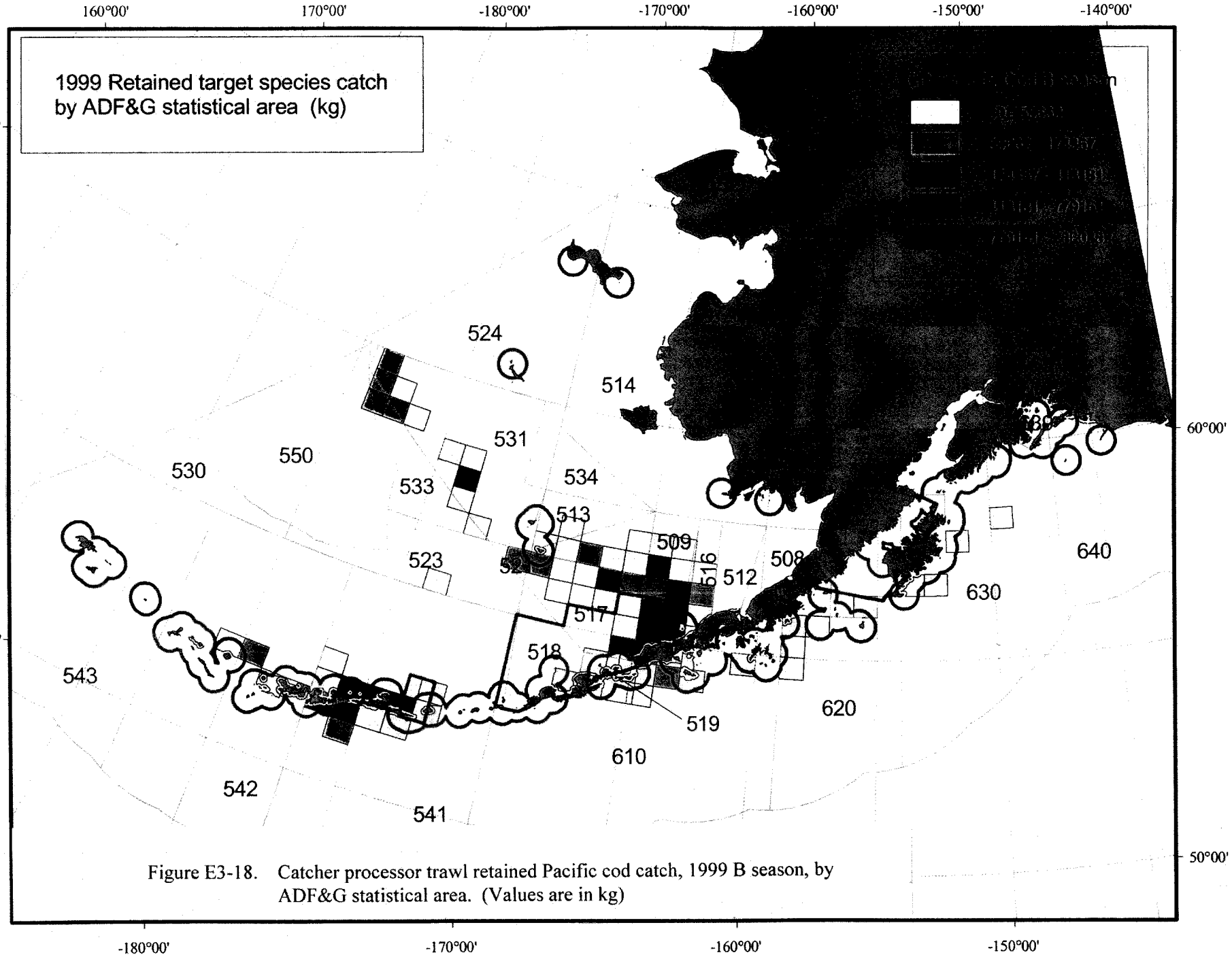
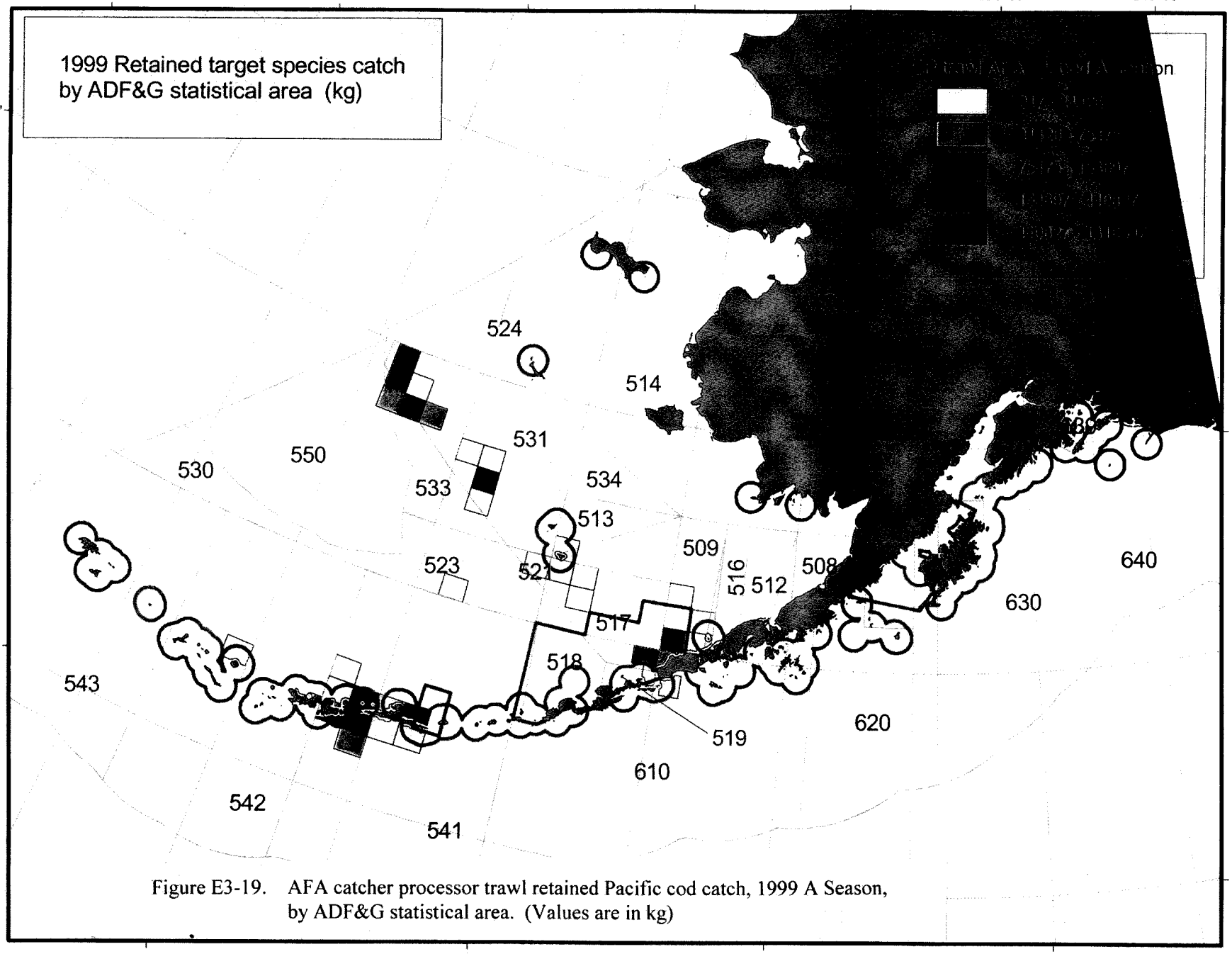


Figure E3-18. Catcher processor trawl retained Pacific cod catch, 1999 B season, by ADF&G statistical area. (Values are in kg)



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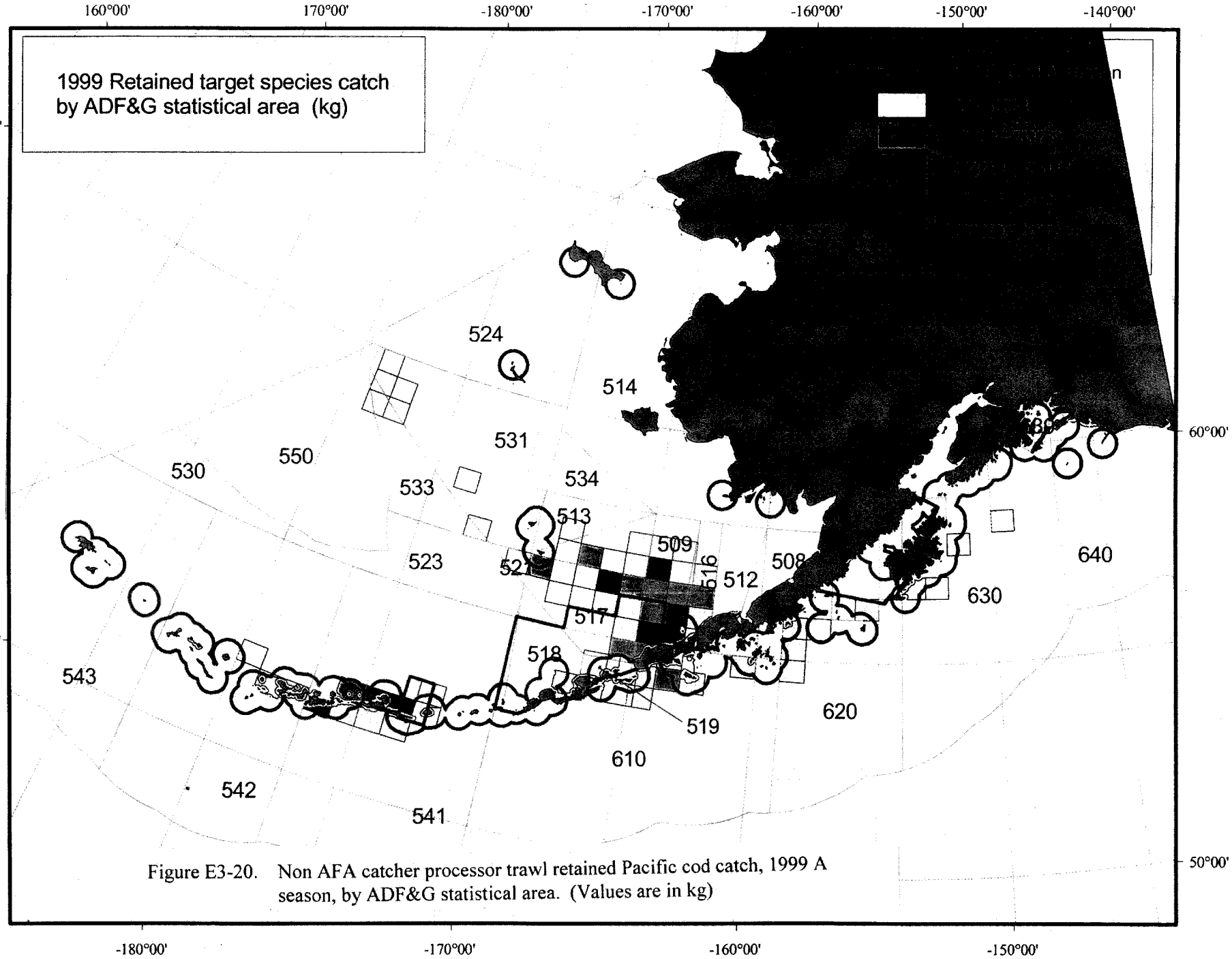

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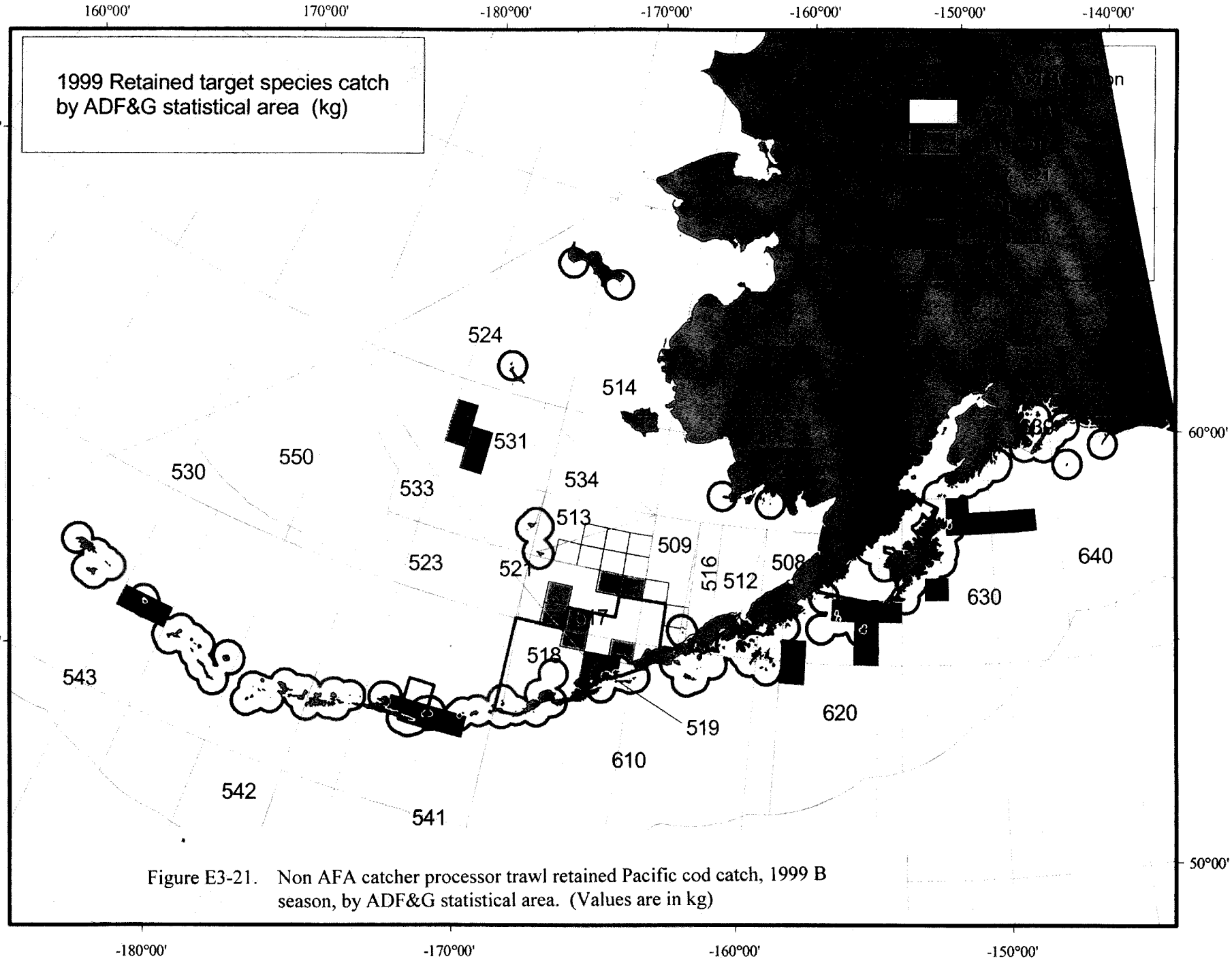

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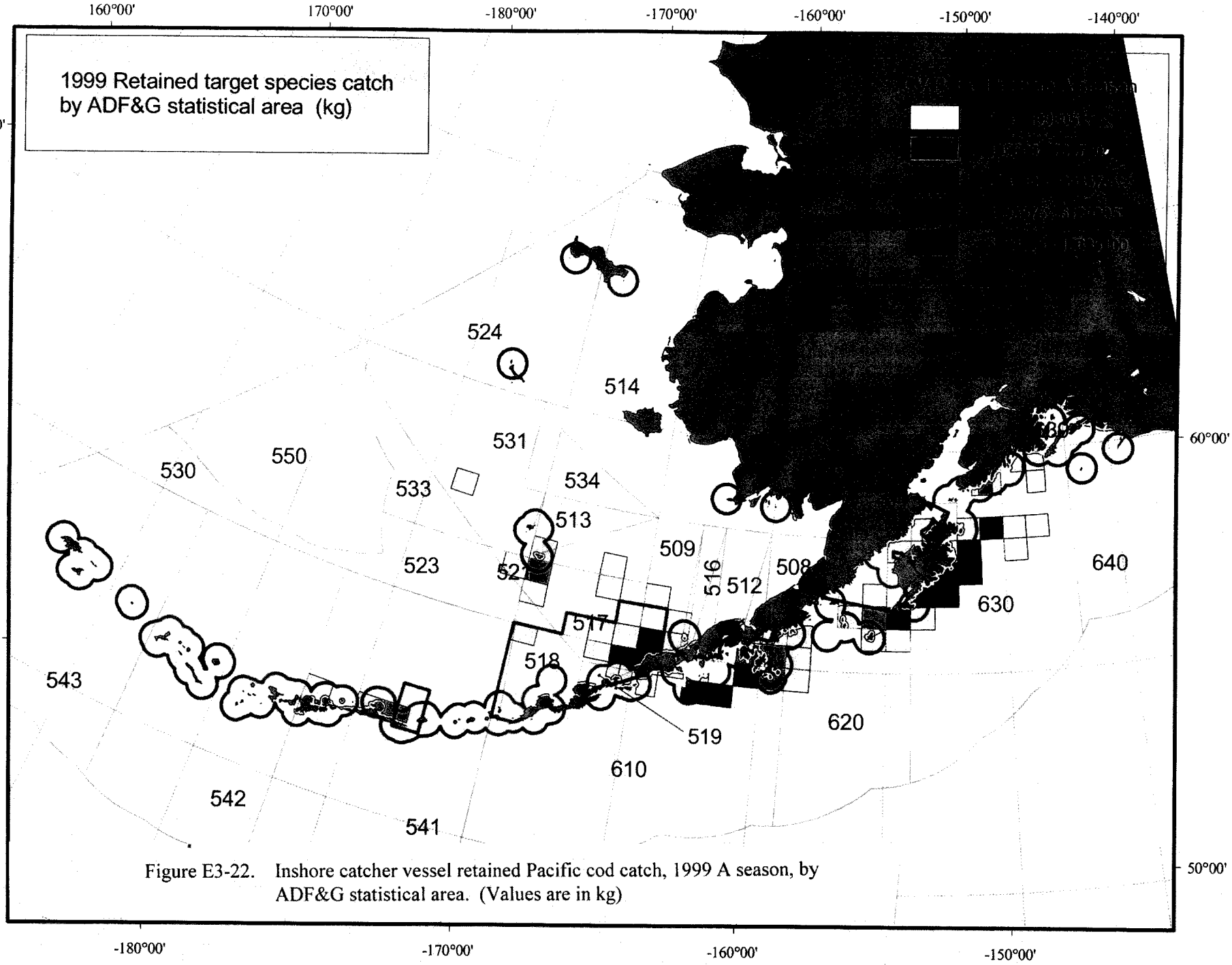

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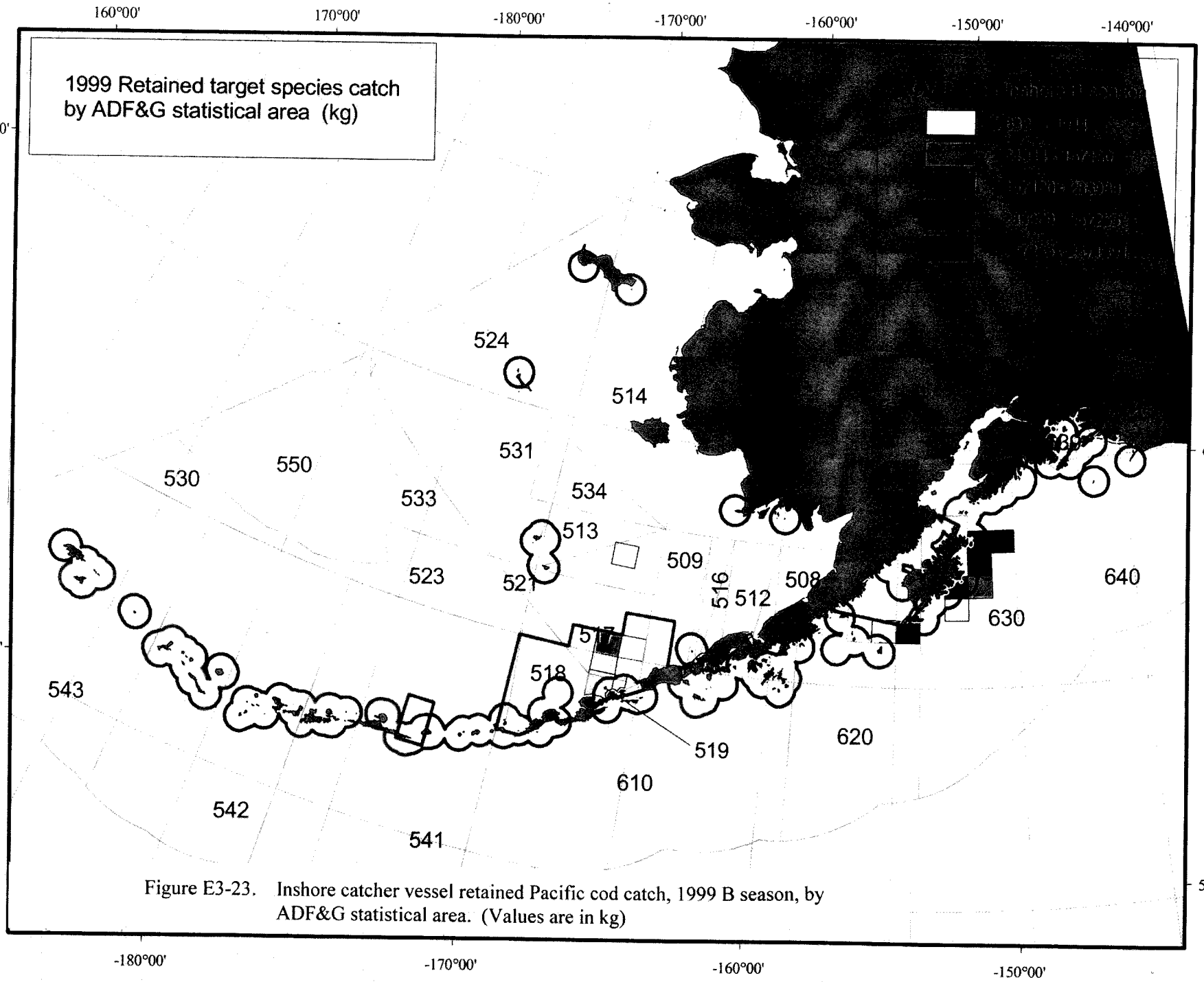

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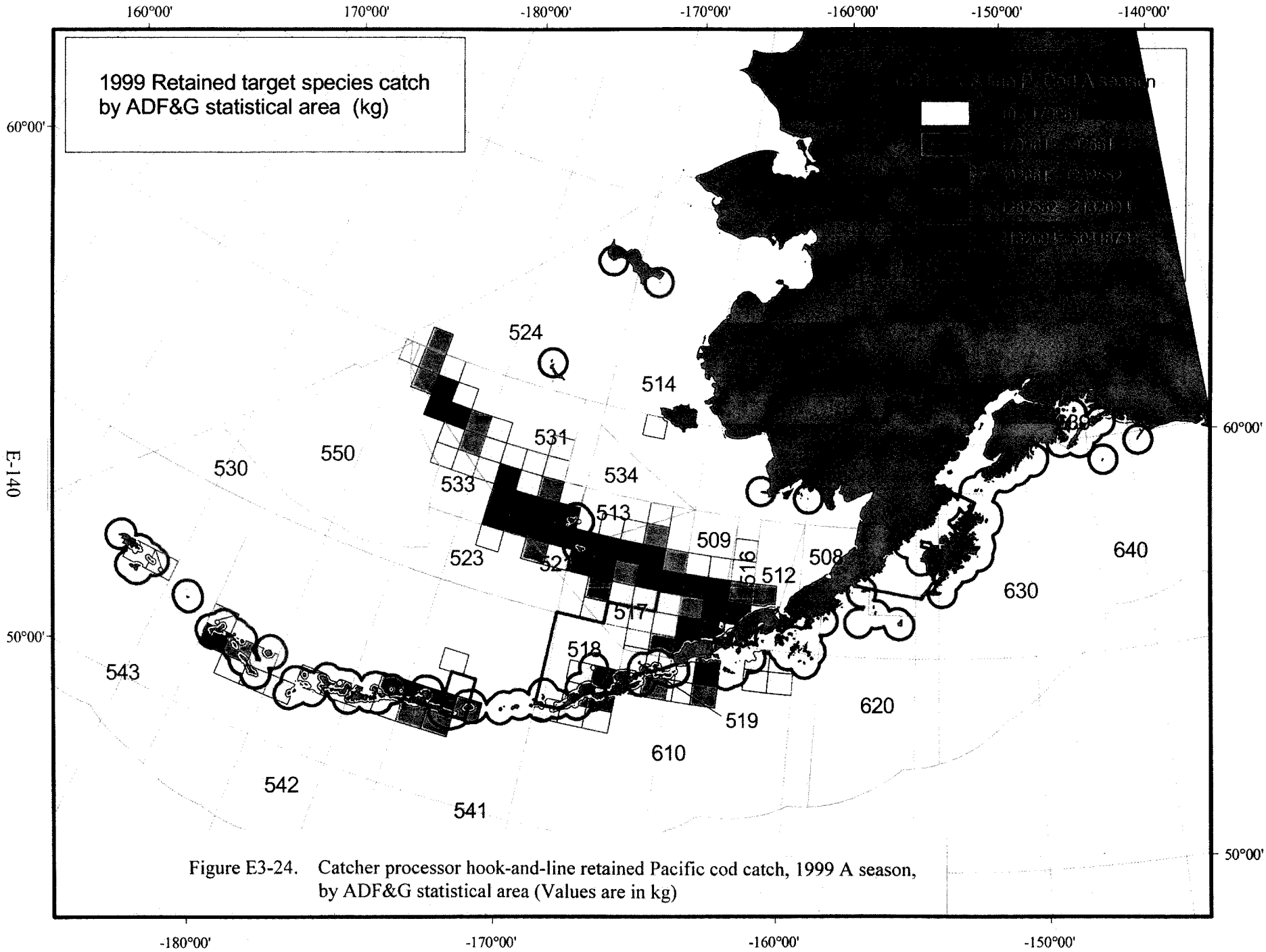

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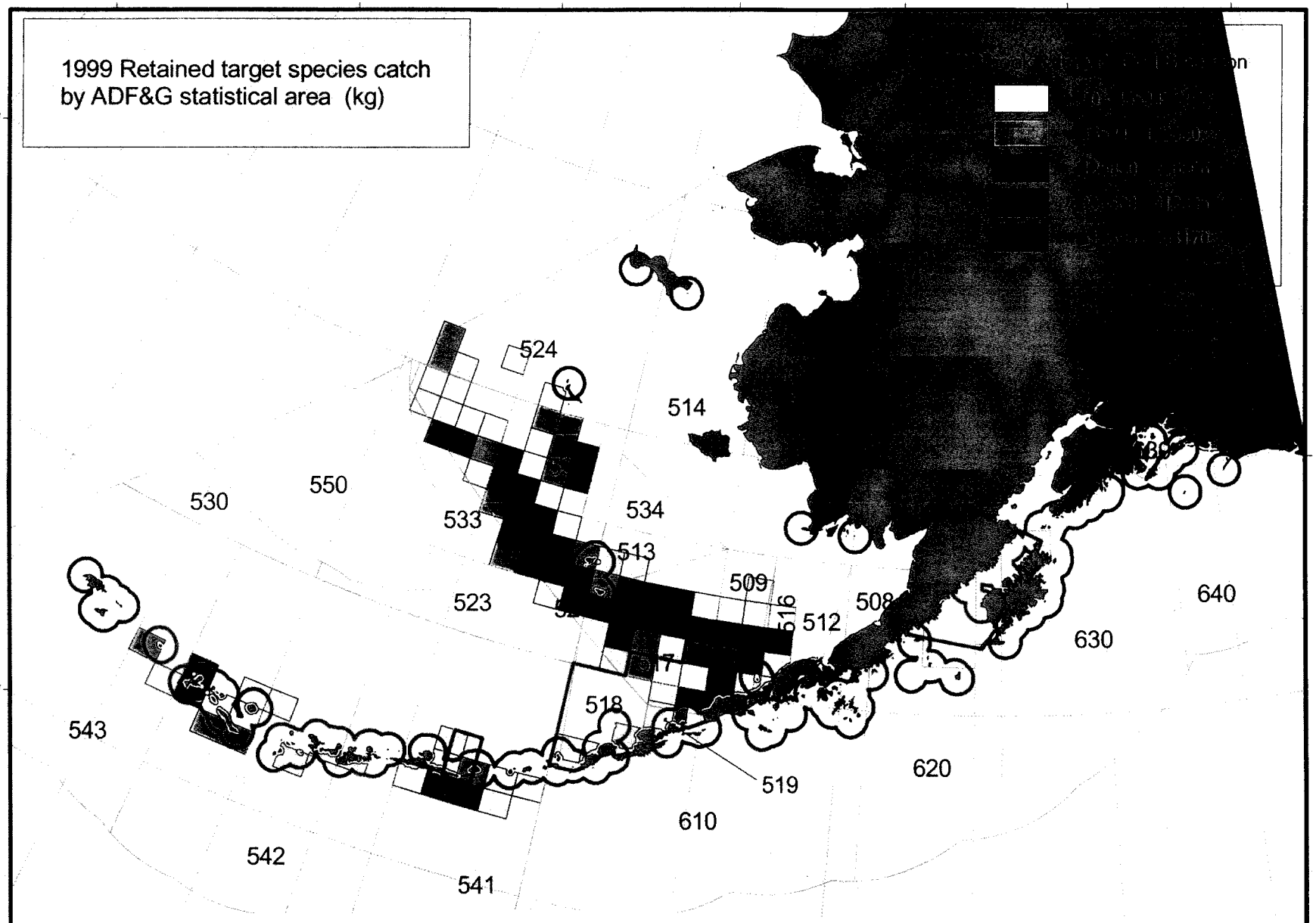

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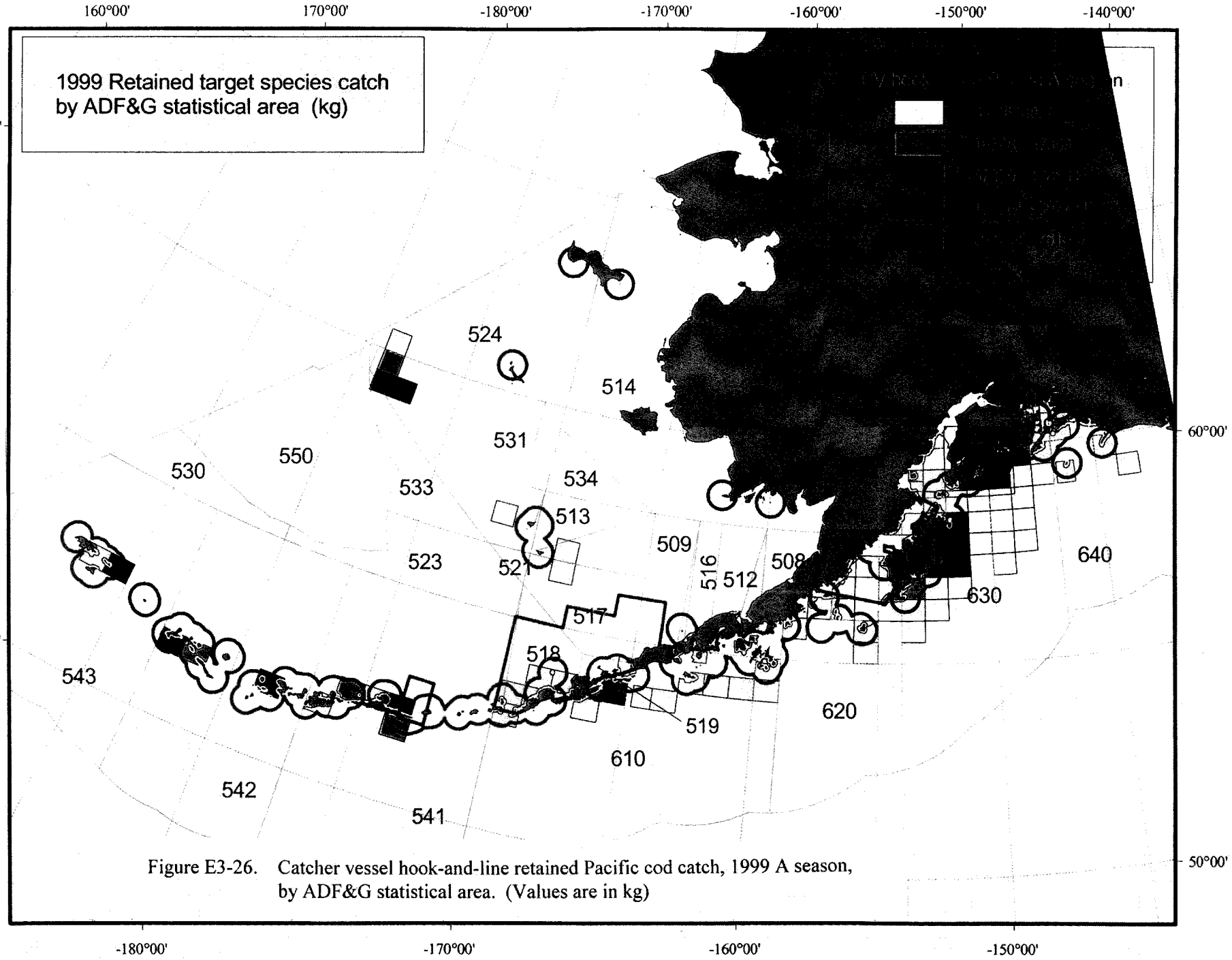

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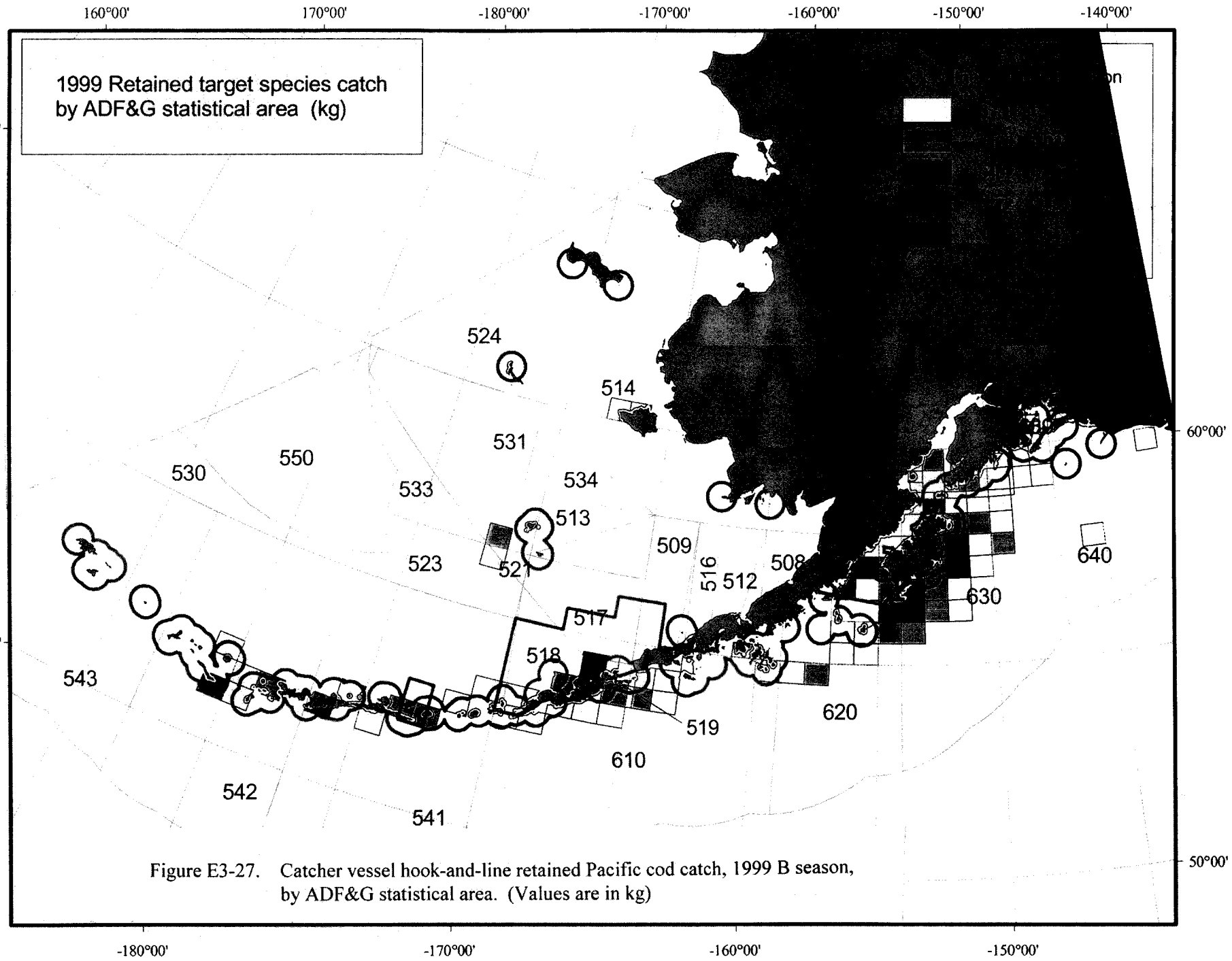

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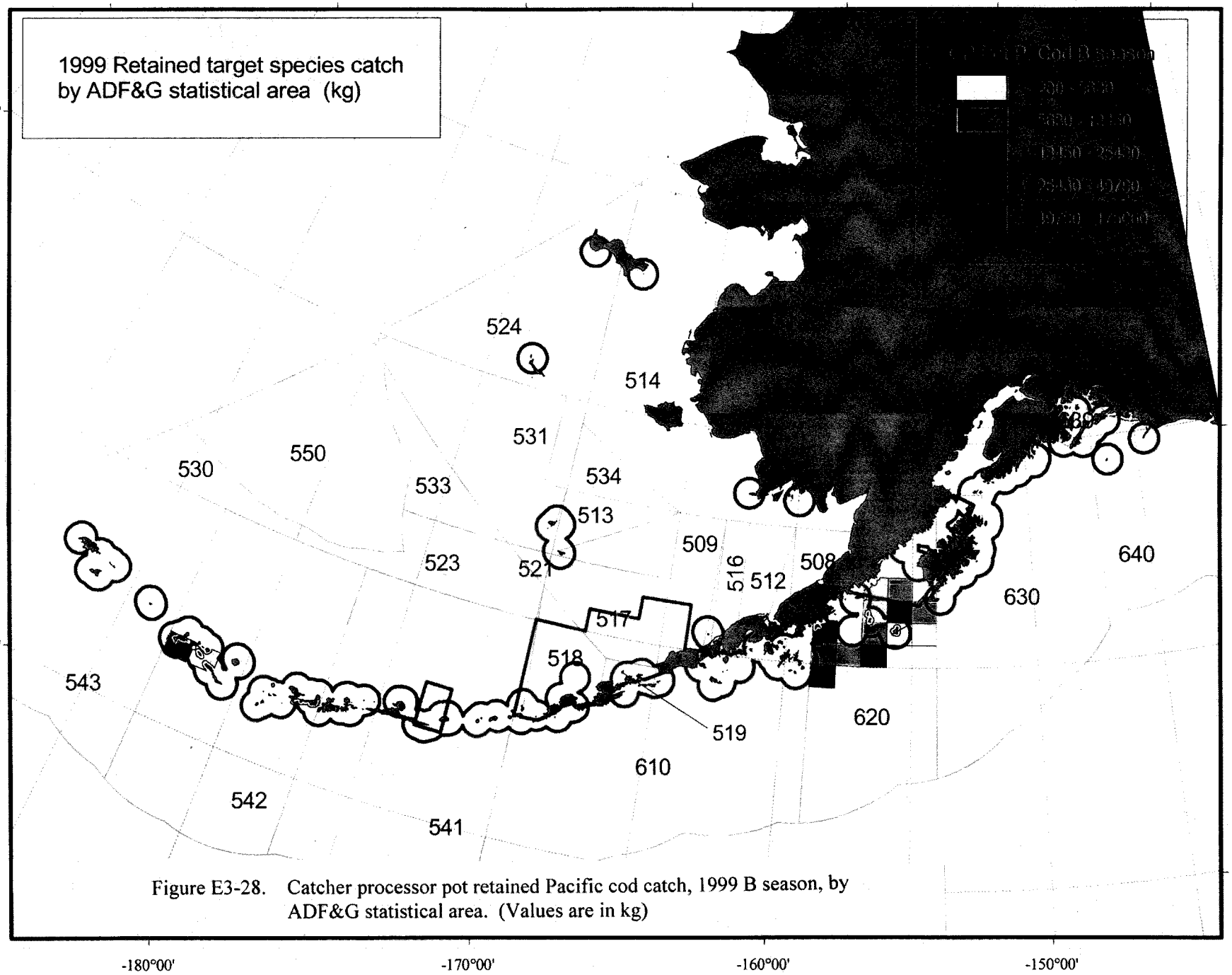

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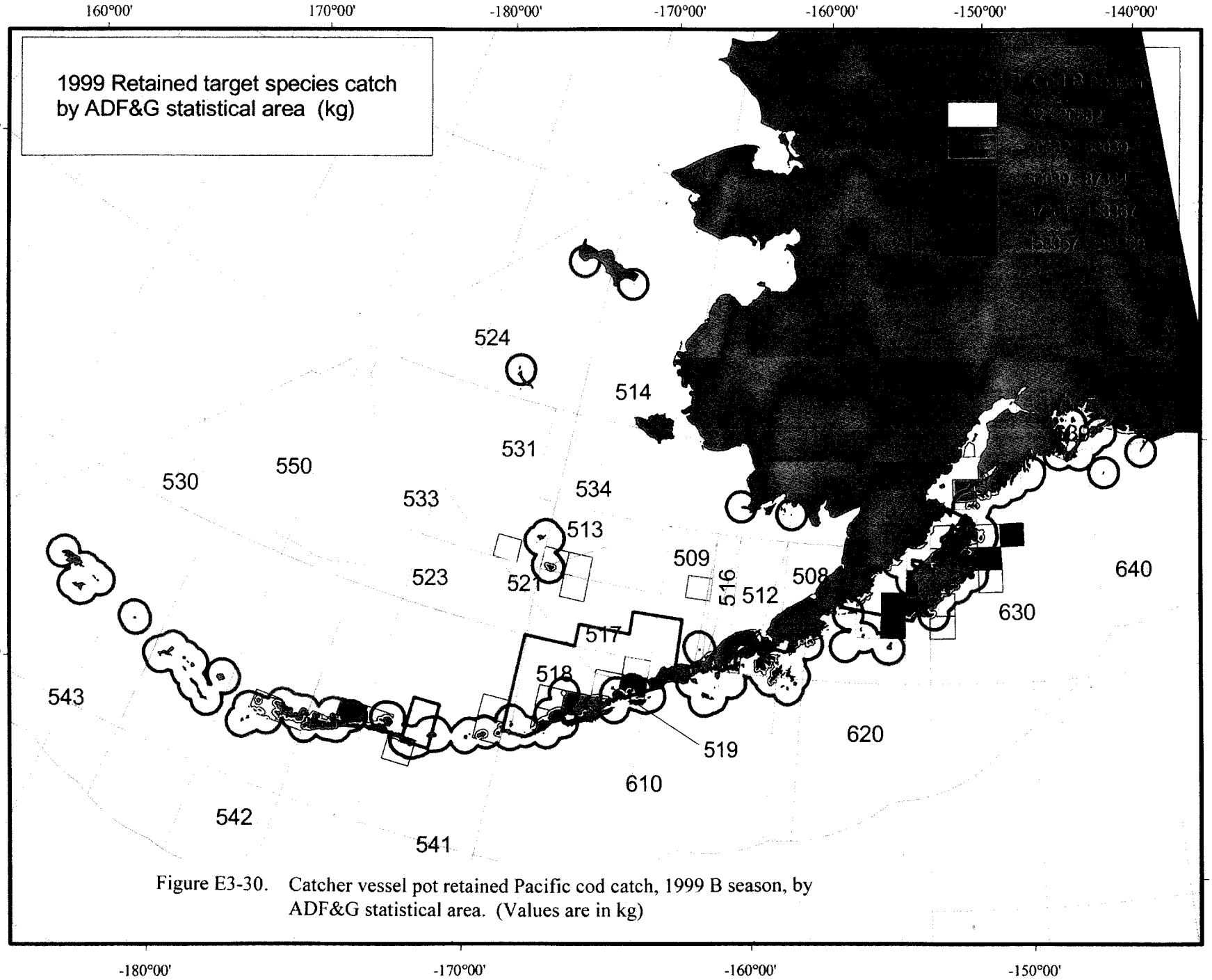

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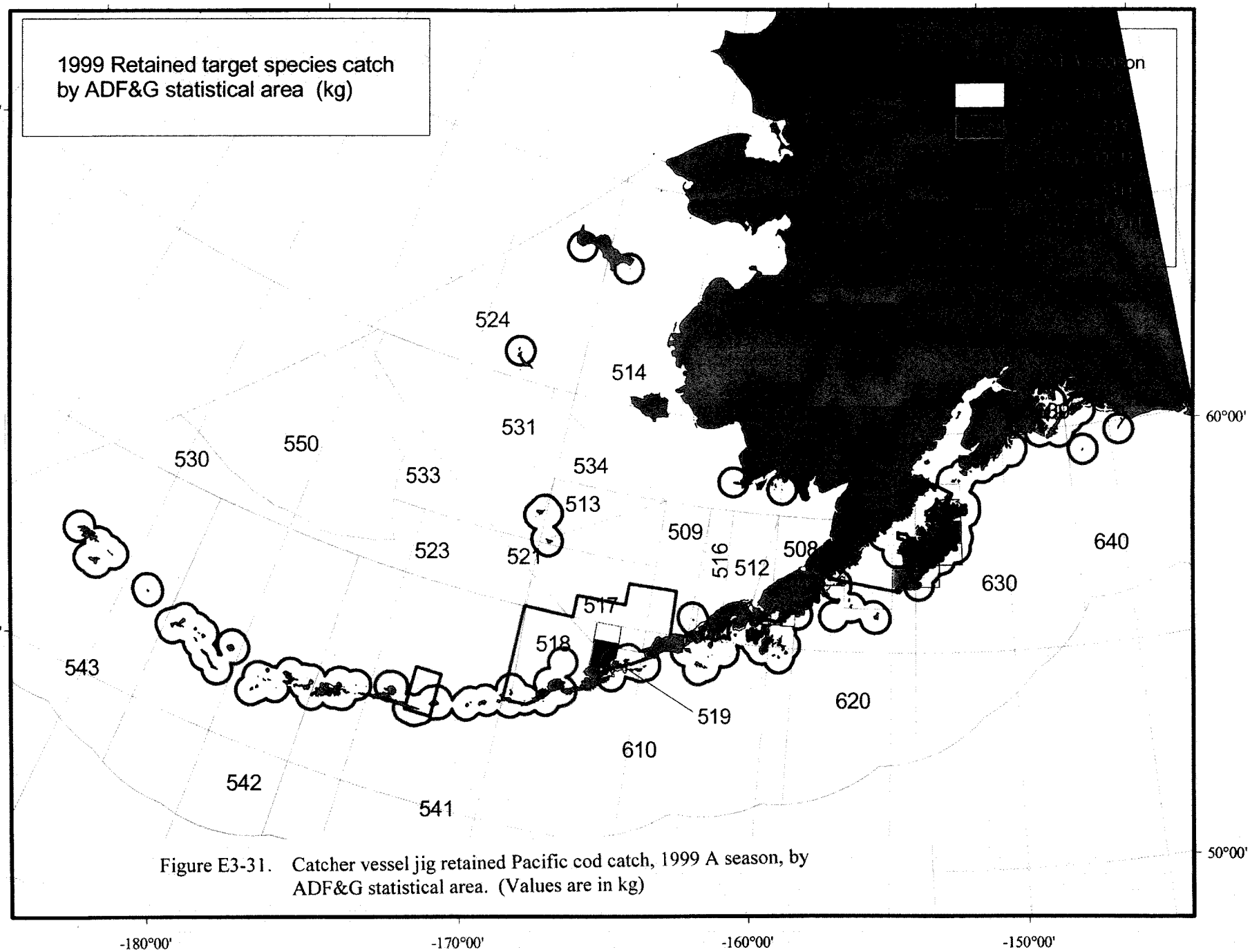

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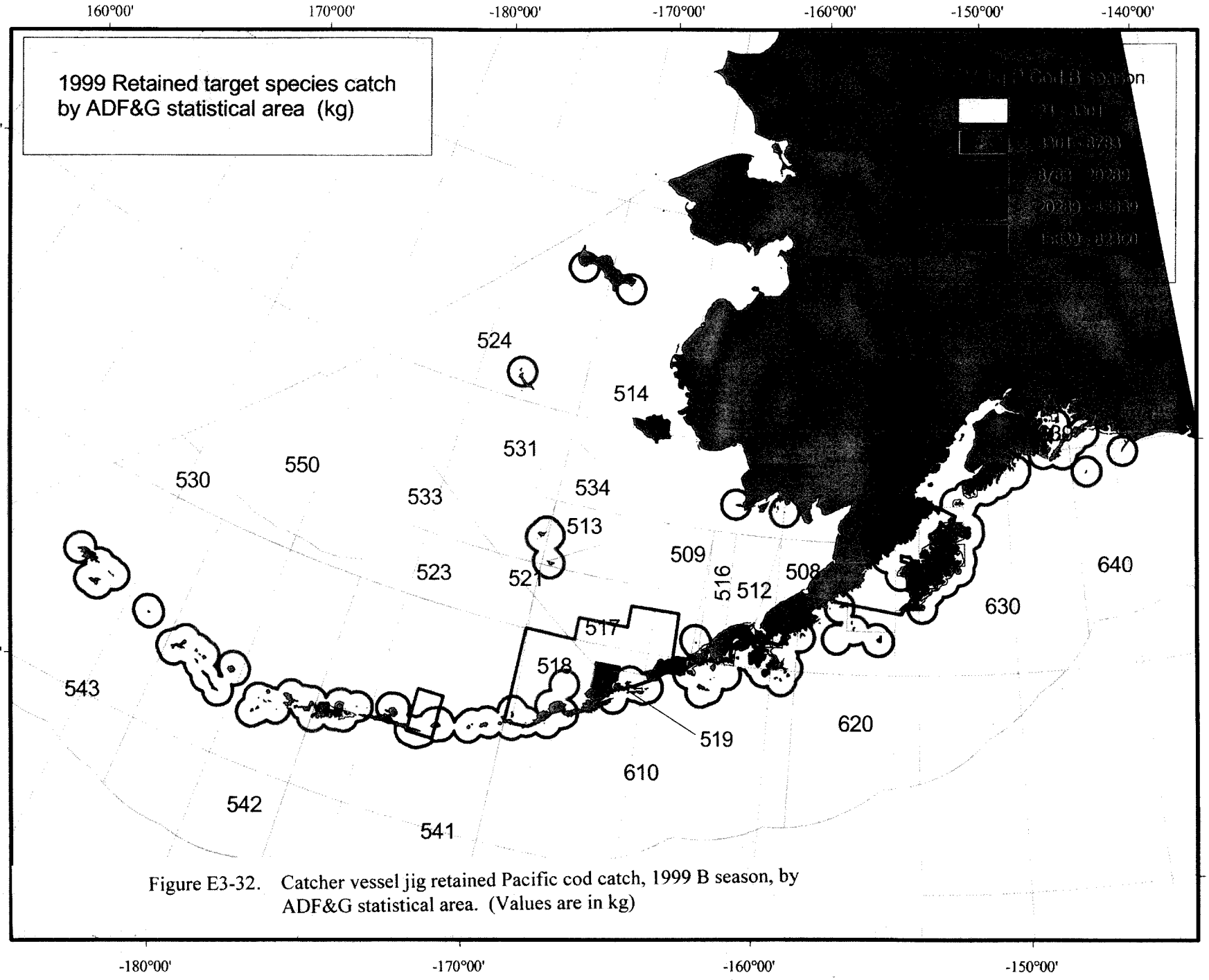

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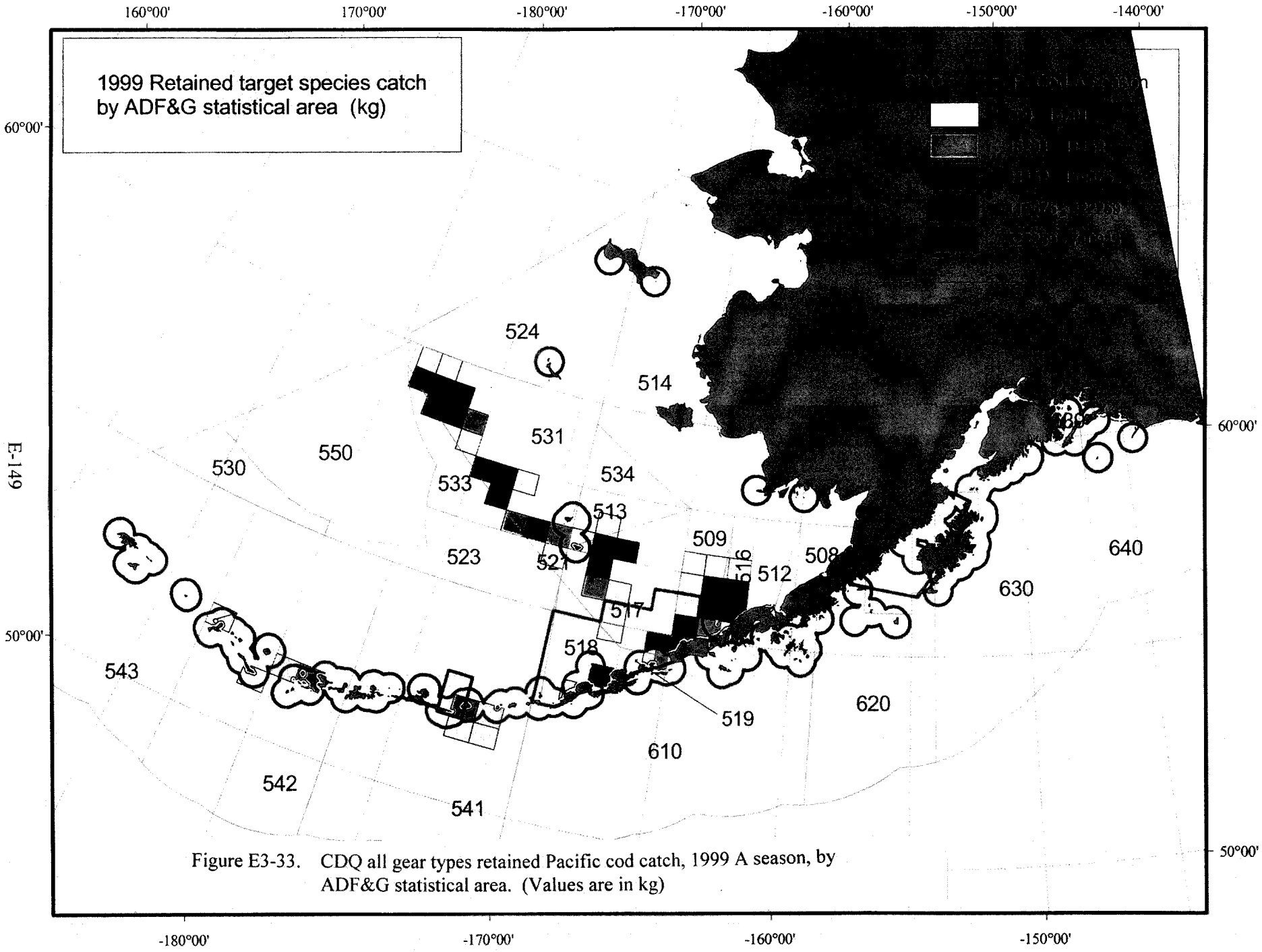

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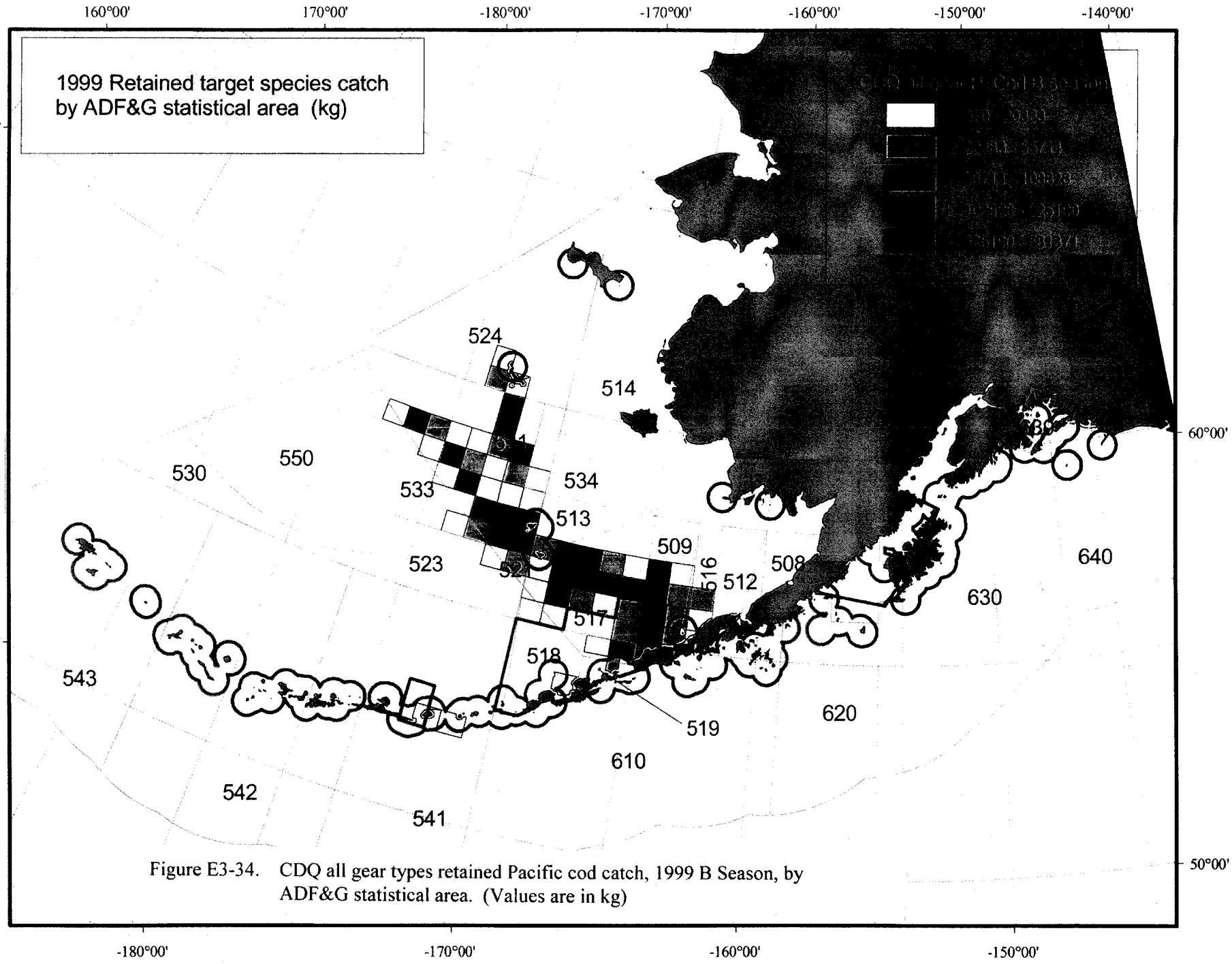

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APPENDIX F1: GROUNDFISH COMMUNITY SOCIOECONOMIC PROFILES

This appendix contains profiles of those communities most engaged in, and substantially dependent upon, the North Pacific groundfish fishery. These are communities in three regions, the Alaska Peninsula/ Aleutian Islands region, the Kodiak region, the Washington Inland Waters region, that have ties to multiple fisheries sectors. These sectors, in turn, are either significant components of the overall fishery or of the larger economic base of the community.

The information contained in this appendix is intended to supplement the regional existing conditions information contained in Section 3.12.2 of this SEIS by describing the groundfish social or sociocultural context at the community level in detail sufficient to illustrate the range of types of engagement in, and dependence upon, the groundfish fishery. Quantitative description of baseline engagement or dependence on a regional basis is found in the discussion of Alternative 1 in Section 4.12.2 of this SEIS. This same level of quantitative description (e.g., total catcher vessel payments to labor, total shorebased processed value, etc.) cannot be presented at community level due to confidentiality restrictions associated with reporting data from individual or a small group of entities. Taken as a whole, however, the information contained in Section 3.12.2, Section 4.12.2, and this appendix provides a comprehensive treatment of the likely differential distribution of social impacts resulting from the proposed alternatives.

1.0 ALASKA PENINSULA/ALEUTIAN ISLANDS REGION COMMUNITIES: UNALASKA, AKUTAN, SAND POINT, AND KING COVE

In this section, Alaska Peninsula/Aleutian Island region communities with the strongest direct links to the North Pacific groundfish fishery are profiled in detail. These are Unalaska, Akutan, Sand Point, and King Cove. While these four primary ports are dominant in the region, there have been recent additions of list of regional communities directly engaged in the groundfish fishery. No groundfish data are yet available for False Pass, but it is known that substantial processing investment has been made in the community, and groundfish is being locally processed during 2001. Groundfish has not been a major focus of processing in St. Paul in recent years, but groundfish do appear in the processing reports for 2000. (It is worth noting that Chignik - although not geographically in the region, it is lumped analytically in regional totals for processing data - does run some groundfish as well, but as is the case for St. Paul, this is clearly not the main focus of local processing.) Additionally Adak, a former military community, has become a significant regional processor of groundfish in the recent past. Although production figures are confidential, it is common knowledge that although no groundfish were landed in the community prior to 1998, it has since become a significant and growing purchaser of groundfish, particularly cod, within the region. This community is quite different in sociocultural terms from the other communities of the region, given its recent development as an industrial site on a converted military base rather than within or adjacent to a traditional community. Because of lack of data in the case of False Pass, confidentiality concerns and the relative lack of dependency in St. Paul and Chignik, and confidentiality concerns with respect to data from Adak, the discussion in this section focuses on the four major groundfish communities in the region. (Chignik area vessels have seen increased involvement in the grounfish fishery in recent years, and because of the proposed Option 1 to Alternative 4 in this SEIS, brief additional information on these communities and vessels is provided in a note [Section 1.4] at the end of this appendix section.)

Unalaska and Akutan are located on the Bering Sea side of the Alaska Peninsula/Aleutian Island chain, while Sand Point and King Cove are on the Gulf of Alaska side. Nonetheless, a substantial portion of the groundfish processed in Sand Point and King Cove is harvested in the Bering Sea (although the American Fisheries Act [AFA] substantially changed this balance for Sand Point, as detailed in the following sections). Historically, relatively small amounts of groundfish harvested in the GOA have been delivered for processing in Dutch Harbor/Unalaska and Akutan. In general, Aleutians East Borough communities have typically accessed fishery resources in both the Bering Sea and the Gulf of Alaska, whereas the Aleutians West Census Area communities have focused more on Bering Sea (and Aleutian Islands) area fishery resources. While this gives the Aleutians East Borough communities an increased range of flexibility, in practical terms it means that these communities are also vulnerable to downturns in either major area.

At present, pollock and Pacific cod are the primary groundfish species landed and/or processed in these four ports. Alaska Department of Fish and Game fish ticket data indicate that in Dutch Harbor/Unalaska and Akutan, pollock represented 83 percent and 76 percent, respectively, of the 1997 total groundfish landings in these ports, with Pacific cod making up virtually all of the balance. In the case of Sand Point, pollock and Pacific cod, respectively, accounted for 69 percent and 29 percent of the total, with fractional percentages of other groundfish species accounting for the rest. In King Cove, this relationship was reversed, with pollock catch-share at 31 percent and Pacific cod at 69 percent of the groundfish total.

In the case of pollock, surimi is the principal product, and fillets are a distant second, although product mix has been changing recently, with at least part of the change attributed to changing conditions brought about by the AFA. Several ancillary product forms (e.g., roe), as well as byproducts (e.g., white fish meal) are derived from pollock landings. Fillets are the primary product form produced from Pacific cod landings in these ports, although several lesser product forms (e.g., H&G) and byproducts (e.g., white fish meal) are also produced. The majority of the output from the processing operations in these landings ports is exported, principally to Asian markets, although some enters the domestic market for secondary processing and/or sale.

While changes in any groundfish TAC or changes in the pattern of distribution, in either the GOA or BSAI management areas, could have indirect economic consequences for any or all of the principal ports, the impacts would be most severe and direct if pollock, and to only a lesser extent Pacific cod, TACs were in effect substantially reduced for whatever reason. Furthermore, these impacts would not be uniform in distribution across the four key Aleutian region groundfish landings ports, owing to geographic location, proximity to fishing grounds, plant capacity and capability difference, availability and variety of support facilities offered, and intermediate and final markets served.

Historically, the processors in each of these ports competed directly with the mothership and catcher/processor fleets which participate in many of these same fisheries. However, due to the inshore/offshore allocations of pollock in the BSAI, and the subsequent AFA provisions and associated co-ops, the competition for pollock occurs in seafood markets, not on the fishing grounds. Each sector has different capabilities and limitations. And, while each supplies some amount of product into common markets, each also has developed the potential to focus a portion of its operation on specific markets.

One of the major differences between the community of Unalaska/Dutch Harbor and the other regional communities profiled (Akutan, King Cove, and Sand Point) is that the City of Unalaska is a municipality outside of any organized borough, while Akutan, King Cove, and Sand Point are all communities within the Aleutians East Borough (AEB). The fact that the latter three communities are within a borough has a direct

impact on the way that fishery associated tax revenues are distributed among and between communities. While the fishery associated municipal revenues are discussed in detail in the Unalaska community profile, a summary of groundfish related tax revenues for the multiple AEB communities is presented here in this regional overview section rather than in the individual community profiles that follow, as this discussion applies to multiple communities. Further, it gives a sense of the order of magnitude of the importance of the fisheries as a revenue source for the borough and its constituent communities.

It is estimated that the AEB and the communities of Akutan, Sand Point, King Cove, and False Pass collectively will receive approximately $5.4 million in state and local fish taxes from groundfish for 2000. In addition, approximately $4.0 million will be received by the AEB and its communities from crab, salmon, other non-groundfish, and shellfish processing. The methodology used to develop this estimate is as follows:

- According to the AEB Manager (Juettner, personal communication, 2001[1]), the AEB will receive a total of $1.4 million as its share of the Fishery Business Tax (FBT) for the 2000 fishery from all species including groundfish, crab, salmon, and other fisheries processed in the AEB. The State of Alaska shares the FBT (calculated generally as 3 percent of ex-vessel value) as follows:
    - 1.5 percent goes to the state
    - 1.5 percent goes to the local governments in whose jurisdiction the processing occurs, which in turn is split 50 percent to the city and 50 percent to the borough. If processing occurs outside of any local government jurisdiction (such as with the floating processor operating in Beaver Inlet on Unalaska Island), the state shares the taxes with all communities in the 'unorganized borough' (i.e., all communities in the state outside of organized boroughs, such as Unalaska and may other communities throughout the state).
- All of the processing in the AEB takes place within cities in the Borough, and therefore the Borough shares all of the FBT 50-50 with the city in which the processing occurs. Therefore, the AEB's $1.4 million FBT revenue represents 0.75 percent of the total ex-vessel value processed in the AEB (with the other 0.75 percent [i.e., the other half of the 1.5 percent the state shares with local governments] going directly to the cities). Dividing $1.4 million by 0.0075 yields an estimated $187.7 million total ex-vessel value of processing in the AEB. Unfortunately for the purposes of further analysis, information from the AEB indicating species specific ex-vessel values are confidential and cannot be released. Therefore, the species breakdown needs to be derived from other sources, and the updated sector profiles from Appendix I of the Groundfish SEIS provides information that allows an estimate to be made. According to this source, in 2000, groundfish accounted for approximately 58 percent of the total ex-vessel value of the processing sectors contributing to AEB taxes (Bering Sea pollock shore plants, Alaska Peninsula/Aleutian Island shore plants, and floating processors), and therefore it is assumed that 58 percent of the AEB FBT is from groundfish. Utilizing this assumption, a total figure of $108.7 million of ex-vessel value can be estimated to have been generated in the AEB from groundfish in 2000.

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[1] Juettner, Robert, Borough Manager, Aleutians East Borough, AK. Personal communication 7/01

- In addition to the State FBT, the AEB and each community within the AEB collect local fish taxes of 2 percent, except for Akutan, which taxes at a 1 percent rate. Thus, all processors in the AEB with the exception of Akutan pay 5.5 percent of ex-vessel value in taxes, and for Akutan the analogous figure is 4.5 percent. Assuming that roughly 50 percent of the total tax revenue was generated in Akutan and 50 percent in other communities within the AEB, the average fish tax collected in AEB communities is 5 percent of the total ex-vessel value. Multiplying the estimate of total groundfish ex-vessel value ($108.7 million) by 5 percent yields an estimated fish tax revenue of $5.4 million from groundfish for all local governments in the AEB for 2000.

It is also important to note that significant impacts through loss of fishery related revenue that could result from fishery management actions would be felt in all borough communities, not just those communities that are directly engaged in the fishery. This is the case because communities without major groundfish plants (Cold Bay, False Pass, and Nelson Lagoon) normally benefit from borough expenditures that are made possible by collection of fishery related revenue in communities with major groundfish plants (Akutan, King Cove, and Sand Point). Given that changes in tax revenue resulting from changes in groundfish landing patterns in one community within the borough is directly linked to expenditures in other communities in the borough (for example, a decline in fish tax revenue in King Cove paid to the Borough would impact Nelson Lagoon if it were large enough to necessitate reductions in school expenditures), the borough structure would serve to distribute impacts to communities in a different way than seen in the rest of the region that has no such structure. A recently released report commissioned by the AEB (McDowell Group, 2001) underscores the importance of commercial fisheries to the AEB as a whole by noting that seafood industry accounts for approximately 99 percent of the AEB's basic economic employment, 76 percent of all employment, and – through fish taxes – 40 percent of the operating budget for the AEB government.

The following subsections examine the communities of Unalaska/Dutch Harbor, Akutan, Sand Point, and King Cove. Each of these communities vary widely in their structure, history of engagement with the fishery, and contemporary engagement with the fishery, and the level of detail presented for any particular community varies roughly by the degree of complexity of the community's ties to the fishery.

1.1 UNALASKA/DUTCH HARBOR

Unalaska is located approximately 800 miles southwest of Anchorage and 1,700 miles northwest of Seattle. Unalaska is the 11th largest city in Alaska, with a reported year-round population of just over 4,000. Dutch Harbor is the official name of the city's port, and is also often applied to the portion of the City of Unalaska located on Amaknak Island, which is connected by bridge to the rest of the community on Unalaska Island. The geographic feature of Dutch Harbor itself, along with Amaknak Island, is fully contained within the municipal boundaries of the City of Unalaska, which encompasses 115.8 square miles of land and 98.6 square miles of water.

Unalaska is in a unique position with respect to the Bering Sea groundfish fishery. It is the site of both the most intense onshore and offshore sector activity. Unalaska is a community whose economy is strongly tied to Bering Sea commercial fisheries in general, and the groundfish fishery in particular. Among groundfish species, pollock plays a particularly important role in local operations.

Unalaska has been variously described as a growing, developing, and maturing community. Whatever descriptor is chosen, during the span of years since the development of the groundfish fishery, Unalaska has

seen an impressive amount of community development. The changes that have accompanied this development are both obvious and subtle.

Population

It has always been difficult to ascertain total population figures for Unalaska or, to state it more accurately, it is difficult to interpret and compare the figures given for the population of Unalaska over the years. Over the years, Unalaska has been a 'less than permanent' home to many individuals whose length of stay in the community has varied. Some individuals may stay in Unalaska only a fishing season or two; others may stay for many years before moving on. These individuals have been counted in different ways, or not counted at all, in a number of censuses. Caution must therefore be used in interpreting total population figures from various sources.

Even though the total population of Unalaska has grown, the contemporary community maintains a relatively high transient population. This transient population includes workers at shore processing plants, although this particular population segment is notably less transient as the nature of the business of the shore plants has changed. Once characterized by rapid turnover during the King crab processing boom in the late 1970s, though more-or-less year-round processing during the early years of full-scale pollock processing, the current pattern is marked with peaks and valleys coinciding primarily with the pollock and, to a lesser extent, crab seasons, by maintenance of a 'core crew' of year round individuals who process lower volume species that are harvested at other times of the year and maintain the plant. (This topic is more fully addressed in the shore plant sector description in this document.)

In addition to the shore-resident (some of whom are short-term residents) population, there are also a number of individuals who may be thought of as a "floating population" associated with the community. These individuals are from fishing fleets, floating processors, catcher/ processors, and freighters that stop at the port of Unalaska for resupply. There are no current estimates of the "floating population," though such a figure was assembled for the year 1990 and is presented in Table 1.1-1 below. Although not true residents of the community of Unalaska, this "floating population" does have an impact on the community of Unalaska. They are associated with business and revenue generated in and for the city, and with services required of the City. Unalaska is, at least briefly or occasionally, where they live and work.

Table 1.1-1 Estimates of Floating Population Community of Unalaska, 1990

Vessel Type	Estimated Vessels	Average Crew Size	Floating Population
Trawlers			
Catcher Vessels	110	5	550
Catcher/Processors	60	75	4,500
Floating Processors Only	2	160	320
Longline			
Catcher Vessels	100	6	600
Catcher/Processors	20	25	500
Floating Processors Only	16	25	400
Crab			
Catcher Vessels	225	5.5	1,238
Catcher/Processors	25	22	550
Floating Processors Only	13	70	910
Cargo Vessels	350	25	8,750
Total Floating Population			18,318

Source: American Trawlers Assoc.; Alaska Crab Coalition; State of Alaska Dept. of Fish and Game; Resource Inventory and Analysis, Volume II, Aleutians West Coastal Resource Service Area, March 1990; The In-shore/Offshore Dispute; Impact of Factory Trawlers on Fisheries in the North Pacific and Proposals to Regulate the Fleet, The North Pacific Seafood Coalition, March 1990; and subsequent consultation with on-site resource Sinclair Wilt, Supervisor, Alyeska Seafoods, Unalaska. (Cited from Professional Growth Systems, Inc. 1990:12).

It should not be assumed that the characterization of Unalaska's "non-transient" population is without its own difficulties, as the nature of the community has changed over the years. Discussion and analytical categorization of the less transient portions of the Unalaska population differ in various publications on the community. "Permanent" residents of the community have been described as those individuals for whom Unalaska is their community of orientation, independent of their employment status. "Semi-permanent" or "long-term transient" residents are those individuals for whom Unalaska is now their community of residence, but for whom residency decisions are based virtually exclusively on employment criteria. In other words, a "permanent resident," as that term is used in this document, is an individual who considers Unalaska "home" and is highly unlikely to move from the community due to termination of a particular job. These individuals tend to remain in the community and seek other employment if a specific job ends, and they also typically remain in the community after their retirement from the labor force. A "semi-permanent" or "long-term transient" resident, on the other hand, is an individual who typically has moved to Unalaska for a particular employment opportunity and is highly likely to leave the community if that specific employment opportunity is terminated for any reason. These individuals may indeed remain in the community for a number of years, but their residency decision-making process is predicated on Unalaska being first and foremost a work site. Obviously, the categories "permanent" and "semi-permanent" or "long-term transient" resident are not precise terms, nor do they necessarily correspond to administrative/regulatory decisions about 'official' residency (e.g., whether or not one is classified as an "Alaska resident" for employment statistical reporting or taxation

purposes) nor do they correspond to U.S. Census count methodology,[2] but they are analytically useful where they conform to specific orientations toward the community that serve to shape community politics, development objectives, community perception, etc.

Ethnicity

Unalaska may be described as a plural or complex community in terms of the ethnic composition of its population. Although Unalaska was traditionally an Aleut community, the ethnic composition has changed with people moving into the community on both a short-term and long-term basis. Not surprisingly, in the latter half of this century, population fluctuations have coincided with periods of resource exploitation and scarcity.[3] For example, the economic and demographic expansion associated with the King crab boom in the late 1970s and early 1980s brought many non-Aleuts to Unalaska, including Euro-North Americans, Filipinos, Vietnamese, Koreans, and Hispanics. The Euro-American population shows a distinct change over the years, comprising around 30 percent of the population in 1970, over 60 percent in 1980 and 1990, and then back to 44 percent in 2000. The growth of Asian/Pacific Islander population (over 30 percent by 2000) is closely associated with the increasingly residential nature of the seafood processing sector workforce. The ethnic composition of Unalaska's population for the census years 1970, 1980, 1990, and 2000 appears in Table 1.1-2.

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[2] The technical classification of residency has been a contentious issue in recent years specifically with respect to the fishing industry related workforce. In terms of U.S. Bureau of the Census methodology, the first U.S. decennial census in 1790 established the concept of "usual residence" as the main principle in determining where people were to be counted. This concept has been followed in all subsequent censuses. Usual residence has been defined as the place where the person lives and sleeps most of the time, and is not necessarily the same as the person's voting or legal residence. Also, noncitizens who are living in the United States are included, regardless of their immigration status. The State of Alaska uses a specific set of criteria for determining residents of the state (i.e., those who qualify for Permanent Fund dividends). According to the state publication *Nonresidents Working in Alaska* (Alaska Department of Labor, 2001), using these criteria, the highest concentration of non-Alaska resident workers are found in the southwest region of Alaska and were primarily engaged in seafood processing. According to this document, 70.9 percent of the workers in this sector in Alaska were not state residents. Of the top private sector employers of non-state resident workers within the 'manufacturing' sector, all five were seafood processing firms with ties to the Alaska Peninsula/Aleutian Islands region, if not Unalaska itself. These firms (in alphabetical order) were: Icicle Seafoods, Peter Pan Seafoods, Inc., Trident Seafoods Corporation, Unisea, Inc., and Wards Cove Packing Company, Inc. Of the combined total of 11,006 workers reported for these firms, 8,669 individuals or 78.77 percent of the total number of workers were not classified as Alaska residents. The workforce at the individual firms ranged between 71 and 86 percent non-Alaska resident. The relative importance of state resident classification has been the subject of heated debate during recent NPFMC management decision making processes (for example, during the series of Inshore/Offshore decisions), but in practical terms for the purposes of a social impact assessment, the nature of interaction and relationship between of these workers their worksite community appears to depend more on living quarters configuration (i.e., industrial enclave style or more integrated with the rest of the community), work schedules, and individual decisions regarding the allocation of personal time, among other factors, than it does on formal state residency status for originally non-local workers - whether they be from elsewhere in Alaska or from another state.

[3] The most dramatic population shift of this century, however, was brought about by World War II. The story of the War, and the implications for the Aleut population of Unalaska and the other Aleut communities of Unalaska Island, is too complex and profound for treatment in this limited community profile. It may be fairly stated, however, that the events associated with World War II, including the Aleut evacuation and the consolidation of the outlying villages, forever changed the community and Aleut sociocultural structure.

Table 1.1-2 Ethnic Composition of Population Unalaska; 1970, 1980, 1990 and 2000

Race/Ethnicity	1970		1980		1990		2000	
	N	%	N	%	N	%	N	%
White	56	31.0%	848	64.1%	1,917	62.1%	1,893	44.2%
African American	0	0.0%	19	1.5%	63	2.0%	157	3.7%
Native Amer/ Alaskan	113	63.4%	200	15.1%	259	8.4%	330	7.7%
Aleut	107	60.1%	-	-	223	7.2%	-	-
Eskimo	5	2.8%	-	-	5	0.2%	-	-
American Indian	1	0.5%	-	-	31	1.0%	-	-
Asian/Pacific Islands*	-	-	-	-	593	19.2%	1,336	31.2%
Other**	9	5.6%	255	19.3%	257	8.3%	567	13.2%
Total	178	100%	1,322	100%	3,089	100%	4,283	100%
Hispanic***	na	na	na	na	394	12.7%	551	12.9%

* In the 2000 census, this was split into Native Hawaii and Other Pacific Islander (pop 24) and Asian (pop 1,312)

** In the 2000 census, this category was Some Other Race (pop 399) and Two or more races (pop 168).

*** 'Hispanic' is an ethnic category and may include individuals of any race (and therefore is not included in the total as this would result in double counting).

Source: 1970 data, University of Alaska, 1973; 1980, 1990, and 2000 data, U.S. Bureau of Census.

Table 1.1-3 provides information on group housing and ethnicity for Unalaska. Group housing in the community is largely associated with the processing workforce. As shown, 52 percent of the population lived in group housing in 1990. (Comparable 2000 data are not yet available.) Also as shown, the total minority population proportion was substantially higher in group quarters (49 percent) than in non-group quarters (31 percent).

Table 1.1-3 Ethnicity and Group Quarters Housing Information, Unalaska, 1990

Unalaska City	Total Population		Group Quarters Population		Non-Group Quarters Population	
	Number	Percent	Number	Percent	Number	Percent
White	1917	62.06	870	53.90	1047	70.98
Black	63	2.04	55	3.41	8	0.54
American Indian, Eskimo, Aleut	259	8.38	20	1.24	239	16.20
Asian or Pacific Islander	593	19.20	434	26.89	159	10.78
Other race	257	8.32	235	14.56	22	1.49
Total Population	3089	100.00	1614	100.00	1475	100.00
Hispanic origin, any race	394	12.75	337	20.88	57	3.86
Total Minority Pop	1252	40.53	795	49.26	457	30.98
Total Non-Minority Pop (White Non-Hispanic)	1837	59.47	819	50.74	1018	69.02

Source: Census 1990 STF2

Apart from the War years, prior to the growth of the current commercial-fisheries-based economy that traces its present configuration back to 1970s, Unalaska was traditionally an Aleut community. With the growth of the non-Aleut population, Aleut representation in the political and other public social arenas declined significantly. For example, in the early 1970s, Aleut individuals were in the majority on the city council; by the early 1980s, only one city council person was Aleut (IAI 1987:65). If one looks at Aleuts (or Alaska Natives) as a percentage of the total population, the change over the period of 1970 - 1990 is striking. In 1970, Aleut individuals made up slightly over 60 percent of the total community population (and Alaska Natives accounted for a total of 63 percent of the population). In 1980, Alaska Natives, including Aleuts, accounted for 15 percent of the population; by 1990, Aleuts comprised only 7 percent of the total community population (with Alaska Natives as a whole accounting for 8 percent of the population). Overall representation was similar in 2000. This population shift is largely attributable to fisheries and fisheries-related economic development and associated immigration. The fact that there is a "core" Aleut population of the community with a historical continuity to the past also has implications for contemporary fishery management issues. These include the activities of the Unalaska Native Fisherman's Association and active local involvement in the regional CDQ program. While neither of these undertakings exclude non-Aleuts, Aleut individuals are disproportionately actively involved (relative to their overall representation in the community population).

During field interviews for this project, a number of individuals, including local governmental officials and individuals from various private sector enterprises, commented that it appeared to them that there were less people overall in the community in the 2000-2001 period than in the recent past, although there are no hard data available to verify this. Speculation included that with the apparent slow-down in the local support service economy with the AFA-related cessation of the race for fish within the pollock fishery, there has been some population loss among the permanent population, but again, there is no quantitative information available to check this speculation. Anecdotal evidence cited by interviewees include less participation in city-

sponsored recreational sports (e.g., the basketball league has seen a drop in the number of teams), and an easing of the shortage of housing (discussed below).

Age and Sex

In the recent past, and particularly with the population growth seen in association with the development of the commercial fishing industry, Unalaska's population has had more men than women. Historically, this has been attributed to the importance of the fishing industry in bringing in transient laborers, most of whom were young males. Table 1.1-4 portrays the changes in proportion of males and females in the population for the years 1970, 1980, 1990, and 2000.

Table 1.1-4 Population Composition: Age and Sex Unalaska; 1970, 1980, 1990, and 2000

	1970		1980		1990		2000	
	N	%	N	%	N	%	N	%
Male	98	55%	858	65%	2,194	71%	2,830	66%
Female	80	45%	464	35%	895	29%	1,453	34%
Total	178	100%	1,322	100%	3,089	100%	4,283	100%
Median Age	26.3 years		26.8 years		30.3 years		36.5 years	

Source: 1970 data, University of Alaska, 1973; 1980, 1990, and 2000 data, U.S. Bureau of Census.

Census data from the period 1970-1990 showed a climb in median age from 26.3 years to 30.3 years and then a further jump to 36.5 years in 2000. This is commonly attributed to the relative size of the workforce in comparison to resident families. That is, there is quite a large proportion of adult residents included in the census counts who are not raising children in the community, thereby raising the median age. On the other hand, what the median age information does not portray is that older age bracket residents (i.e., those individuals typically past their 'working years') tend to be under-represented in Unalaska compared to the general population, as few non-lifetime residents of the community chose to stay in Unalaska in their retirement years.

School district enrollment figures are presented in Table 1.1-5. This is another indicator of the changing nature of Unalaska's population over the time period portrayed. One can see in the enrollment figures, for example, the enrollment decline that followed the economic decline of the fishing industry in the early 1980s, following the crash of locally important King crab stocks. Enrollments have increased from the late 1980s onward, reflecting two trends, according to school staff. One is the overall growth of the community, and the other is the increase in the number of people who are making Unalaska home for their families. As shown, however, the growth has leveled off recently. The City is in the process of expanding the school, but the issue of whether or not to proceed with the expansion during a time of overall population decline and a leveling off of student population in particular was the subject of debate and a highly contested ballot measure in the community, with the decision to proceed with the expansion passing by a handful of votes.

Table 1.1-5 Unalaska City School District Enrollment, Fiscal Years 1978-2001

Fiscal Year	School Enrollment
FY 78	133
FY 79	140
FY 80	200
FY 81	186
FY 82	191
FY 83	151
FY 84	140
FY 85	140
FY 86	137
FY 87	159
FY 88	159
FY 89	159
FY 90	225
FY 91	256
FY 92	290
FY 93	330
FY 94	359
FY 95	356
FY 96	353
FY 97	373
FY 98	380
FY 99	353
FY 00	352
FY 01	352

Source: Unalaska City School, 2001

The link between the fisheries and school population can in part be seen through a categorization of the employment, by sector, of parents of Unalaska school children as ascertained by the Unalaska School District as of January, 2000 and shown in Table 1.1-6. As shown, the largest single sector was government/public, but fish processing and fishing support accounted for 36 percent of the total. According to school staff, the assignment of individual employers/entities to these categories (especially the "fishing support" category) is inexact, but they do give an indication of the relative strength of ties of the different sectors to the school population. One trend that senior staff did note during interviews was an increase in students for whom English is a second language. According to senior school staff, 47 percent of the 2000-2001 kindergarten class were ESL (English as a second language) students. Also, according to school staff the Unalaska City School District was recently named in a poll as one of the top 100 school districts in the country, and placed first in the state in exit exam scores, which has spurred an increase in enrollment of students from smaller

villages in the region. For the most part, these are individuals who have chosen to stay with relatives in Unalaska to take advantage of the local educational opportunities, but there is now more opportunity for families to relocate to Unalaska from other regional communities with easing of the local housing shortage.

Table 1.1-6 Parent Employment by Sector, Unalaska City School District Fiscal Year 2000

Parent Employment Sector	Percentage
Government/Public	28%
Fish Processing	18%
Fishing Support	18%
Retail/Restaurant/Services	17%
Transportation/Freight	16%
Self Employed/Unemployed	3%
Total	100%

Source: Unalaska City School District, 2001

Housing Types and Population Segments

Household types in Unalaska vary by population segment, although this has changed in recent years. In the early 1990s, it was a truism that virtually all permanent residents lived in single-family dwellings, whereas short-term workers lived in group housing at work sites. This pattern has changed somewhat over the years with the construction of a number of multi-unit complexes not associated with particular employers. It is still the case, however, that processing workers for the seafood plants tend to live in housing at the worksite and longer-term workers at the shoreplants tend to live in company housing adjacent to worksites. One seafood processor, however, owns multi-family dwellings in what is otherwise primarily a single-family residential area, so its workforce tends to be differently distributed geographically than other workforces. Some residents of the community have drawn the distinction, with respect to processing firms, that one is not 'fully' a resident of the community unless one has a private residence in the community (i.e., that the 'test' of 'real' residency is tied to whether or not one lives in company-provided housing). This distinction breaks down, however, when one examines the issue on a detailed level, as a number of companies (and not just seafood firms) provide or subsidize housing for employees in Unalaska both adjacent to and separate from their worksite locations; also, the persons living in such residences may, in fact, stay in the community for considerable lengths of time (outstaying many in 'private' residences) and become centrally involved in community life.

The housing market has also changed during the period 1998-2001. Through the mid-1980s and the 1990s, housing was at a premium in the community, with virtually zero vacancy rates and waiting lists for rental opportunities. According to city staff, as of 2000, housing and rental prices had not appreciably dropped, but demand has slackened considerably such that there are no longer waiting lists maintained by some of the larger housing owners. According to the city appraiser and planning staff, home sales are slower than in the past, and there is some concern about declines in value, but those concerns have not been realized yet. This was still the case during 2001 fieldwork. Also according to the City, although rental demand is off, rents have

not yet begun to drop in response to decrease in demand. This "softening" of the housing market is directly attributed by most to recent changes in the local fishery, including the slowing of the "race for fish" in the pollock fishery that was made possible by the AFA and the formation of co-ops, among other fishery related factors.

The most recent housing market survey conducted by the City of Unalaska was completed November, 2000 (City of Unalaska Planning Department Spreadsheet, February 2001) noted that there has been "some curiosity expressed" about how 31 new units in the community will effect the rental market. These units include 16 apartments and 15 single-family dwellings for low-income residents (with the single-family dwellings further restricted to Alaska Native/Native American residents). Until very recently, the impact of the addition of new units to the community housing stock on rental rates would not have arisen as an issue. This same survey found that "while only one participant [in the survey] acknowledged lowering rental rates, several of the others acknowledged changing some of their rental policies, e.g., no last month deposit or renting to the general public if units are not required for employees." According to interview data, some landlords are now including fuel or utilities costs in the rental price, with the owner of the largest stock in the community including utilities. The housing survey also found that the upper range for housing costs had decreased slightly between 1997 and 2000 for apartments, whereas the costs for single-family dwellings increased slightly over this same period.

Another recent change in housing mentioned in interviews is that companies (other than the major seafood processors) are less likely to supply housing for workers than was the case in the past. This is reportedly due to their being more housing available on the market now, such that companies do not feel forced to tie up housing units for the entire year to be able to meet employee housing needs during peak demand periods. While there are no systematic data available to document this common assertion, the City of Unalaska has discontinued the practice of holding long-term housing leases, which until very recently was a common practice due to the local housing shortage. According to City staff, as of early 2001, the City retained just one lease for housing, and this was on a month-to-month basis. As of fieldwork in early 2001, there were rental vacancies in the community. One long term resident noted that the local access television channel now commonly runs postings for rental opportunities whereas in the recent past virtually all rental opportunities were communicated by word of mouth and openings never had a chance to hit the open market.

Links to the Groundfish Fishery

In the late 1970s and early 1980s the community prospered significantly from the King crab fishery. The crab boom resulted in a dramatic increase in both fishing boats and processors in town. In the mid-seventies there were from 90 to 100 commercial vessels regularly fishing the Bering Sea. By 1979 the number had jumped to between 250 and 280, an increase so dramatic that it was difficult for skippers to find crew members. The King crab fishery subsequently declined precipitously and fishermen and processors alike have had to diversify their businesses in order to survive. One of the avenues of diversification was the pollock fishery, and this fishery has provided an economic mainstay for the community in subsequent years.

Table 1.1-7 shows the volume and value of fish landed at Unalaska over the period 1977-2000. This span encompasses the high year of the King crab fishery, and shows the decline of the fishery thereafter, and the growth of the pollock fishery. Average value per pound is an artificial figure in that it combines a number of different variables, but it is useful for an overall look at how volume and value have varied over the years (particularly as pollock, a relatively high volume, low value per unit species grew in importance as a

component of the community processing base). As shown, Unalaska has ranked as the number one U.S. port in volume of landings since 1992, and ranked first in value of landings from 1988 to 1999.[4] In 2000, Unalaska dropped to second in value of landings behind New Bedford, Massachusetts (where the value of landings totaled $146.3 million on a much lower volume [89.0 million pounds] than landed in Unalaska).

Table 1.1-7 Volume and Value of Fish Landed at Unalaska, 1977-2000

Year	Volume		Value		Average Value ($/lb)
	(millions of pounds)	US Ranking	(millions of dollars)	US Ranking	
1977	100.5	-	61.4	-	0.61
1978	125.8	-	99.7	-	0.79
1979	136.8	-	92.7	-	0.68
1980	136.5	3	91.3	10	0.67
1981	73.0	5	57.6	11	0.79
1982	47.0	6	47.8	14	1.02
1983	48.9	9	36.4	15	0.74
1984	46.9	20	20.3	13	0.43
1985	106.3	18	21.3	8	0.20
1986	88.3	9	37.2	10	0.42
1987	128.2	4	62.7	8	0.49
1988	337.3	3	100.9	1	0.30
1989	504.3	2	107.4	1	0.21
1990	509.9	2	126.2	1	0.25
1991	731.7	2	130.6	1	0.18
1992	736.0	1	194.0	1	0.26
1993	793.9	1	161.2	1	0.20
1994	699.6	1	224.1	1	0.32
1995	684.6	1	146.2	1	0.21
1996	579.0	1	118.7	1	0.20
1997	587.8	1	122.6	1	0.21
1998	597.1	1	110.0	1	0.18
1999	678.3	1	140.8	1	0.21
2000	699.8	1	124.9	2	0.18

Source: 1980-1996 data from National Marine Fisheries Service data cited in City of Unalaska FY 97 Annual Report (December, 1997). 1977-1979 data from NMFS data as cited in IAI 1991. 1997-2000 data from NMFS website - http://www.st.nmfs.gov/st1/commercial/landings/lport_hist.html Average value derived from volume and value data.

[4] If ports in U.S. territories are included, Unalaska/Dutch Harbor ranks second behind Pago Pago in American Samoa for at least some of these years. As the center of the U.S. flag tuna fishery, value of landings at that port in 1998 (approximately $232 million) more than doubled Unalaska/Dutch Harbor's total for that same year, the last full year for which data are available (NMFS, 2001).

Tables 1.1-8 through 1.1-11 provide detailed break-out of processed weight and value of processed fish by species group by year for Unalaska. Given that these data are from a different source as the data in Table 1.1-7, the totals do not match, but the intent of tables is to give a sense of overall effort and value of commercial fish landed in the community and changes through time.

Table 1.1-8 provides information on total processed weight by species group by year for 1993-2000, and Table 1.1-9 provides the same information by percentage for each year. Important information for recent years to note is the overall dominance of pollock and the second tier domination of other groundfish and crab in landing volumes. Second, the precipitous decline in crab landings from 1998 (easily the highest volume year over the 1993-2000 span) to 1999 (still the second highest year over this period) to 2000 (far and away the lowest volume year of this period) is readily apparent. Pollock landings, on the other hand, increased from 1998 to 1999, and then again in 2000, reaching its highest level for the 1993-2000 in 2000. Clearly, the recent increase in pollock landings in the community is related to AFA reallocation of quota to onshore processing entities (which increased the inshore component from 35 percent to 50 percent of the BSAI pollock TAC[5]) as well as increases in the overall TAC itself.

Table 1.1-8 Total Processed Weight Contributed by Various Species Groups, by Year Unalaska/Dutch Harbor

Species	1993	1994	1995	1996	1997	1998	1999	2000
Salmon	9,815,693	8,219,894	9,760,479	8,492,280	5,102,131	10,040,698	14,451,050	5,419,183
Halibut	3,530,379	2,738,901	3,048,416	1,792,292	4,244,464	2,549,776	5,152,770	See Note
Crab	57,026,545	34,058,757	28,391,316	28,436,954	39,828,000	80,217,780	56,606,628	15,507,892
Herring	2,475,156	6,504,076	5,620,267	6,333,310	1,725,481	1,489,656	1,964,630	1,386,097
Other Non-GF	448,085	605,852	126,844	812,487	700	1,950	0	0
Pollock	662,921,232	680,883,305	643,364,726	541,758,182	523,462,456	531,184,102	612,370,740	693,429,290
Other GF	29,128,471	80,987,733	105,701,161	102,457,948	109,325,165	47,665,233	42,787,186	61,501,748
Total	765,345,561	813,998,518	796,013,209	690,083,453	683,688,397	673,149,195	733,333,004	777,244,210

Note: Halibut is missing from the 2000 database
Source: Fish Ticket Data supplied by NPFMC staff

[5] Inshore/Offshore-3, passed by the NPFMC in 1998, was scheduled to take the inshore component from 35 percent to 39 percent of the BSAI pollock TAC by reallocating 4 percent away from the offshore sector (and leaving the CDQ preallocation set aside at 7.5 percent). This planned shift never took place, however, as it was superceded later that same year (before implementation) by AFA. After CDQ and incidental take allocations were 'taken off the top,' AFA allocated 50 percent of the remaining TAC to onshore sector, 40 percent to the offshore catcher processor sector, and 10 percent to newly created the mothership sector (which had previously been a part of the offshore sector along with catcher processors). AFA also increased CDQ set aside to 10 percent of the overall TAC.

Table 1.1-9 Percentage of Total Processed Weight Contributed by Various Species Groups, by Year, Unalaska/Dutch Harbor

Species	1993	1994	1995	1996	1997	1998	1999	2000
Salmon	1%	1%	1%	1%	1%	1%	2%	1%
Halibut	0%	0%	0%	0%	1%	0%	1%	See Note
Crab	7%	4%	4%	4%	6%	12%	8%	2%
Herring	0%	1%	1%	1%	0%	0%	0%	0%
Other Non-GF	0%	0%	0%	0%	0%	0%	0%	0%
Pollock	87%	84%	81%	79%	77%	79%	84%	89%
Other GF	4%	10%	13%	15%	16%	7%	6%	8%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Note: Halibut is missing from the 2000 database
Source: Fish Ticket Data supplied by NPFMC staff

Table 1.1-10 presents information on the value of processed fish by species group by year for the period 1993-2000 for Unalaska. Table 1.1-11 provides the same information on a percentage basis. As shown, from 1993-1999, pollock fluctuated between 31 percent and 41 percent of total commercial fish value, and then jumped to 57 percent of the total in 2000. This sharp increase is due in large part to what happened to local crab value in 2000, going from $86 million to $43 million in processed value between 1999 and 2000 (and halibut not appearing in the data also accounts for at least a small portion of the jump). Crab declined from 51 percent of value in 1999 to 31 percent of value in 2000 (and this decrease will be greater when the halibut data are added). Pollock is easily at its highest point of total value ($80 million) of the 1993-2000 span during 2000; crab at $43 million is at its lowest point of the span in that same year. During the period 1993-2000, crab value was higher than pollock value except for 1997 (when the value of pollock surpassed crab by approximately $4 million) and 2000 (when the value of pollock was approximately $37 million greater than crab). As can be seen, the increase in value of landings in the community resulting from AFA related pollock landings increases were more than offset by the decline in crab landings in 2000.

Table 1.1-10 Value of Processed Fish by Species Group and Year for Unalaska/Dutch Harbor, 1993-2000

Species	1993	1994	1995	1996	1997	1998	1999	2000
Salmon	6,615,324	7,877,088	7,598,230	6,657,590	3,108,353	4,083,910	6,344,180	3,428,065
Halibut	4,497,715	5,271,277	5,714,417	3,528,928	8,561,085	2,307,552	9,320,086	See Note
Crab	73,104,099	69,363,848	69,248,632	55,334,010	49,420,889	64,092,959	85,615,553	42,908,899
Herring	371,273	754,995	1,188,539	2,111,846	329,564	311,338	479,371	235,637
Other Non-GF	744,782	459,663	39,239	244,984	4,885	421	0	0
Pollock	45,788,471	52,089,951	62,896,575	43,283,714	53,181,109	36,032,380	55,806,016	79,742,642
Other GF	5,570,305	11,554,074	20,320,242	17,428,653	15,569,770	8,194,740	10,715,151	12,545,008
Total	136,691,969	147,370,896	167,005,874	128,589,725	130,175,655	115,023,300	168,280,357	138,860,251

Note: Halibut is missing from the 2000 database
Source: Fish Ticket Data supplied by NPFMC staff

Table 1.1-11 Percentage of Total Processed Value Contributed by Various Species Groups, by Year, Unalaska/Dutch Harbor

Species	1993	1994	1995	1996	1997	1998	1999	2000
Salmon	5%	5%	5%	5%	2%	4%	4%	2%
Halibut	3%	4%	3%	3%	7%	2%	6%	See Note
Crab	53%	47%	41%	43%	38%	56%	51%	31%
Herring	0%	1%	1%	2%	0%	0%	0%	0%
Other Non-GF	1%	0%	0%	0%	0%	0%	0%	0%
Pollock	33%	35%	38%	34%	41%	31%	33%	57%
Other GF	4%	8%	12%	14%	12%	7%	6%	9%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Note: Halibut is missing from the 2000 database
Source: Fish Ticket Data supplied by NPFMC staff

The commercial fishery provides very large component of the employment base in Unalaska. According to the City of Unalaska Comprehensive Annual Financial Report for the fiscal year ending June 30, 2000, "The Unalaska economy is driven by the seafood industry. About half of the Unalaska labor force is employed by the seafood industry, and 90 percent of the workers consider themselves dependent on the seafood industry." In a telephone survey conducted by the City an included in that same report, the top four employers in the community are seafood industry businesses (Table 1.1-12). The City is the fifth largest employer, and the next two are shipping firms that rely virtually exclusively on the seafood industry. These firms are followed by the school district, which is followed by a fuel and vessel supply firm that relies very heavily on the fishing industry. It is only at the number 10 position on the list that one comes to an employer that is not a seafood company, a direct/exclusive support firm for commercial fishing sector firms, or a government entity.

Table 1.1-12 City of Unalaska, Ten Principal Employers, June 30, 2000

Employer	Type of Business
Unisea, Inc.	Seafood, Hotel
Westward Seafoods, Inc.	Seafood
Alyeska Seafood, Inc.	Seafood
Royal Aleutian Seafoods, Inc.	Seafood
City of Unalaska	Local Government, Utilities, Port
Sealand Services, Inc.	Transportation
American President Lines, Ltd.	Transportation
Unalaska City School	Primary, Secondary Education
Western Pioneer, Inc.	Fuel, Vessel Support
Alaska Commercial Company	Grocery, Retail

Source: City of Unalaska

The following discussion of the fishing industry is divided into the harvesting and processing sectors, as each has significance for the Unalaska economy and community. A third section provides information on fishing industry support services.

Harvesting

The catcher vessel sector description of the Inshore/Offshore-3 document (NPFMC 1998) as well as the sector profile discussion in this document details patterns of geographic distribution of vessels and vessel operations. As noted in those discussions, one of the trends in recent years has been the dramatic increase in ownership and/or control (through third party entities with some type of business relationship to the processors) of harvest vessels by the shoreplants in Unalaska. Prior to this pattern of acquisition, it was accurate to say that no permanent residents of Unalaska were involved in the pollock fishery as vessel owners, nor were any vessels 'home ported' out of Unalaska in the sense of being the community of residence for the skipper and crew. With the changes in ownership patterns have come complexities for the description of the relationship of the harvest fleet to the community. While it is still true to say that no independent fishermen who are permanent residents of the community own pollock harvesting vessels, some pollock harvesting vessels are now owned (partially or wholly) by economic entities based in the community (or, given the complex nature of corporate relationships and/or restrictions on foreign ownership of the fleet, by entities with close relationships with entities based in the community). This change in ownership pattern, while it may have shifted where vessels are home ported or, perhaps more importantly from an economic perspective, spend more of the year, it is still the case that very few, if any, permanent residents of the community work on pollock harvesting vessels.

With the AFA, there have been some recent changes in ownership of catcher vessels, and the details of this shift are analyzed the Council's AFA Report to Congress (NPFMC 2001). There have been examples in Unalaska of a vessel being purchased by other vessels within a co-op and the redistribution of the purchased vessel's quota share being distributed among other vessels in the co-op, and of vessels changing ownership

and moving between co-ops that are based in different communities. Further, quota has been rented to other co-op members as well. None of these changes involved local residents, and none of the shifts of quota resulting from these actions are considered of a magnitude to have created community level impacts.

There are also indications that there are fundamental changes in relations between vessel crew and owners with the conversion of one or more vessel crew compensation structures from a share to a wage basis on vessels controlled by processing entities. This is perhaps consistent with an assigned quota system where vessel revenues are more-or-less predictable. Crew share systems are, of course, well suited for a fishing environment where the crew shares in the economic risk and benefits in the rewards of uncertain outcomes, but with what is essentially corporate ownership of a stable quota share, there are those who feel that results can be obtained from vessels without needed to utilize an share incentive system. This is consistent with the observation of one locally based skipper that with the AFA co-op quota assignment system, operating a vessel has become more like "running a combine" than hunting, as "everything is in fences now." Different AFA processors in Unalaska have very different vessel ownership/control patterns, with one processor having virtually no ownership interest (having decreased from a minor ownership share previously) while others have quite strong interests. While these specific changes may or may not be AFA influenced in their timing, clearly the trends of processor control of catch capacity leading to these logical consequences were operating in the pre-AFA environment. Further, there has been considerable speculation related to the differential economics of various price points when it comes to what plants pay for fish, given different catcher vessel ownership relations. Where plants control a large portion of the delivery fleet (and can thus decide where to take their profits in that transaction), the price paid to non-directly controlled vessels becomes a marginal cost, with different rules about what makes economic sense in comparison to a fleet not controlled by a processor. While there were numerous opinions about the logical outcome of these circumstances under an AFA driven management regime, clearly these potential changes have not yet fully played themselves out in the relatively brief time since the implementation of onshore co-ops in Unalaska.

According to interviews conducted for an AFA social impact assessment in 2001, while there has been leasing of quota between vessels that resulted in greater overall economic efficiency, there have been some cases where there has been a reluctance of vessel owners to trade the resource due to concerns or lack of trust in what NMFS or NPFMC may do in the long run. That is, despite incentives to lease quota, some owners are still protective of maintaining an ongoing history of direct participation in the pollock fishery as a hedge against possible future changes in fishery management.

Another change among catcher vessels participating in co-ops is the level of information sharing between vessels, such that vessels can coordinate catch timing and location so as to be able to optimize timing at the processing plant. In some ways, the co-ops have resulted in "absolute flexibility" from the perspective of coordination and running a processing plant. From the perspective of the catcher vessel owner, although most agree wholeheartedly that co-ops are a better management system that complete open access, the current system in some ways represents a loss of flexibility in terms of the strength of ties to a particular processor. Of course, the change with co-ops is to some degree more apparent than real, given the existing ownership/control patterns of a good proportion of the fleet and the limited number of delivery options available to vessels without a commitment to any particular plant.

Yet another change in the 1999-2001 era is the differential importance of small harvest vessels for some operations in the face Steller sea lion related harvest area restrictions. Catch and delivery by co-op member vessels that are small enough to fish inside areas closed to the larger vessel classes can be coordinated to

optimize the overall delivery schedule. This has been recognized as an important strategic approach by at least one processor to date, but clearly the utility of such an approach is enhanced or limited by the scale of the individual processing operation.

Another type of relationship change between catcher vessels and shore processors in Unalaska resulting from the implementation of co-ops is the degree of management coordination between the vessel co-op and the plant, as realized in the creation of co-op manager positions. These individuals represent the co-op in dealing with plant management and are privy to a level of detail about plant operations and economics that simply was not communicated to the catcher fleet prior to the formation of co-ops.

In terms of the role of the community of Unalaska in relation to the overall pollock harvest in the Bering Sea, Table 1.1-13 shows the relative distribution of Bering Sea pollock catch between sectors in the initial allocation for 2000. Table 1.1-14 displays information on the links between the inshore allocation and specific communities as measured by base of operations for the individual cooperatives. This, of course, is not an exact measure because there is the flexibility of delivering some catch outside the cooperative, the ability of open access quota to be delivered anywhere, and the fact that some entities have locations in more than one community, among other factors. These factors show, in at least rough terms, the relative importance of Unalaska as a base of operations for the Bering Sea inshore pollock catcher vessel activity as well as for the shore processing sector. As shown, over half of the inshore pollock co-op allocations are associated with Unalaska based entities. This likely understates the relative percentage of Unalaska as a support community for CV operations, as some logistical and other support activity for Akutan and Beaver Inlet operations takes place in Unalaska as well.

Table 1.1-13 Initial Bering Sea Pollock Allocations, 2000

Quota/Allocation	Percent of TAC	Metric Tons
TAC	100%	1,139,000
CDQ	10%	113,900
Incidental Catch Amount	5%	51,255
Offshore	40%*	389,538
Mothership	10%*	97,385
Inshore	50%*	486,923

* Amounts calculated from remaining TAC after deductions for CDQ and Incidental Catch Amounts.
Source: Ettefagh, 2001.

Table 1.1-14 Allocations to Inshore Cooperatives by Community Base of Operations, 2000

Cooperative	Percentage of Inshore Allocation
Unalaska Based	
Unisea Fleet Cooperative	24.087%
Westward Fleet Cooperative	16.824%
Unalaska Fleet Cooperative	11.655%
Subtotal, Unalaska Based Cooperatives	52.566%
Other Communities	
Akutan Catcher Vessel Association	28.257%
Arctic Enterprise Association (currently operating in Akutan)	5.466%
Northern Victor Fleet Cooperative (currently operating in Beaver Inlet [outside of municipal and organized borough boundaries])	6.837%
Peter Pan Cooperative (King Cove)	0.720%
Subtotal, Other Communities	41.280%
Non-Location Specific	
Open Access	6.154%

Source: Based on data from 2000 Final Report of Unalaska Fleet Cooperative to the NPFMC (Ettefagh, 2001)

While there is no direct participation in the pollock fishery by vessels owned or crewed by local residents, there is a local commercial catcher vessel fleet that interacts to some degree with the larger as well as the smaller processors. A portion of the fleet is represented by the Unalaska Native Fisherman Association, and according to interview data, in 1998 there are 24 boats in the association, ranging in size from 18 foot skiffs up to a 68 foot commercial vessel. This association is open to Natives and non-Natives alike, but there is a requirement that members must live in the community eight months per year. Local vessels do not participate in the pollock fishery, but do participate in the local cod, halibut, and crab fisheries on a small scale. A frequently noted problem in developing markets and long-term relationships with the larger processing entities, however, is that the locally based fleet are small vessels by Bering Sea standards. In practical terms this means that they are more weather dependent than larger vessels and have a smaller delivery capacity per trip, which makes it difficult for larger plants to accommodate what are by necessity small and sporadic deliveries. There are two smaller processing entities in the community that in addition to doing custom processing for the larger processors and serving the local charter sportfishing sector, also serve as an important market for the local small boat commercial fleet.

Between 1992 and 2000, as shown in Table 1.1-15, between 3 and 21Unalaska resident owned vessels less than 60' have had landings in targeted groundfish fisheries in any given year. Also as shown in this same table, the total value of groundfish ex-vessel revenues for the community based fleet ranged between $40,000 to $250,000 per year during this same time period, for the years that can be disclosed. A couple of trends are

apparent in this table. The number of vessels during this era peaked at 21 in 1996, and has declined every year since, with the 7 vessels fishing in 2000 representing a 67 percent reduction from the 1996 fleet size. Total Unalaska owned vessel groundfish ex-vessel revenues have declined over this same 1996-2000 period, but not quickly as the number of vessels themselves, resulting in a 50 reduction of annual revenues between 1996 and 2000. This has had the effect of raising the average revenue per vessel within the reduced fleet by 201 percent between 1996 and 2000. Among the groundfish species, Pacific cod plays a dominant role for these vessels. Between 1992 and 2000, Pacific cod accounted for between 71 and 100 percent of value of catch for this fleet in any given year, with an average of 92 percent per year over this span. Over the most recent four years, 1997 through 2000, Pacific cod accounted for 89 percent of total value of catch for the Unalaska owned under 60' fleet. There is no state water groundfish fishery in the Bering Sea near the community, so these data all refer exclusively to federal water fisheries. Two to four Unalaska resident owned vessels 60' or greater participated in the targeted groundfish fishery each year for the years 1992-1999, but none did so in 2000.

Table 1.1-15 Vessels <60' Owned by Unalaska Residents with Landings in Groundfish Target Fisheries and Groundfish Ex-vessel Revenue of Unalaska/Dutch Harbor Resident Owned Vessels, 1992-2000

Year	Number of Unalaska Owned Vessels	Unalaska Owned Vessels, Groundfish Ex-Vessel Revenue	
		Total (thousands of dollars)	Average per Vessel (dollars)
1992	6	40	$6,700
1993	3	suppressed	suppressed
1994	16	110	$6,900
1995	13	250	$19,200
1996	21	150	$7,100
1997	16	120	$7,500
1998	9	110	$12,200
1999	9	110	$12,200
2000	7	100	$14,300

Note: Includes "ghost vessels"
Source: CFEC/ADFG Fish Tickets, June 2001

Table 1.1-16 provides information on the gear types of the community under 60' groundfish target vessels in 2000. As shown, the 7 vessels participated in the 2000 fishery and all were fixed gear vessels. Two were in the 33-59' FGCV class, and three were in the less than or equal to 32' FGCV class, while the remaining two did not make enough landings to be classified into any specific gear class (i.e., they were categorized as "ghost vessels").

Table 1.1-16 Vessels <60' Owned by Unalaska/Dutch Harbor Residents with Landings in Groundfish Target Fisheries by Vessel Class, 2000

CV Sector	Number of Unalaska/Dutch Harbor Vessels
TCV Non-AFA	0
TCV <60	0
PCV	0
FGCV 33-59	2
FGCV≤32	3
Ghost	2
Total	7

Note: Includes "ghost vessels"
Source: CFEC/ADFG Fish Tickets, June 2001

Reportedly, the activities of this local fleet is effectively constrained to the west of Unalaska Bay on the north side of Unalaska Island, due to environmental as well as potential gear conflict factors. According to one local longline fisherman, if fishing is attempted to the east, currents in the major passes, especially when combined with rough weather, make for untenable conditions for small boats. Further, frequent transits of this area by the larger scale fishing fleet as well as the numerous shipping vessels that call on the Port of Dutch Harbor make gear loss to great of a risk to be conducive to fishing in the area. In contrast, the waters to the west feature less current and more sheltered or protected areas for small boats to ride out rough weather.

For the local small boat jig fleet, the most recent field interview data available suggest that none or very few of jig boat owners derive their income exclusively from commercial fishing, and that commercial fishing for small boat owners is generally one part of a (variable) multiple income source strategy of "piecing together a living." In terms of the number of participants, this fleet has seen growth and decline in recent years. According to CFEC/ADF&G fish ticket data, three Unalaska/Dutch Harbor jig vessels fished groundfish in 1992, two fished in 1993, and then there was an upsurge in participation with between 13 and 18 vessels reporting per year from 1994 to 1997, inclusive. A decline quickly followed, however, as in 1998, 1999, and 2000, there were 9, 8, and 7 vessels participating each year, respectively.

There has been a recent shift in the importance of different gear types among community vessels targeting Pacific cod. During the 1993 to 1998 period, 95 percent of Pacific cod landed by Unalaska owned vessels under 60' were caught using jig gear. In 1999 and 2000, catch by vessels using longline gear increased significantly but specific figures cannot be disclosed due to confidentiality restrictions. Table 1.1-17 presents information on number of Unalaska/Dutch Harbor vessels specifically targeting Pacific cod by gear type use. As some vessels utilize more than one type of gear, the total number of vessels that fished in any given year may be less than the sum of the counts by gear types for that year. As shown, the number of vessels using jig gear far outnumber the vessels using any other gear type for all of the years shown.

Table 1.1-17 Number of Unalaska/Dutch Harbor Vessels < 60' Targeting Pacific Cod in the Bering Sea by Gear Type Utilized, 1992-2000

Year	Number of Vessels					
	Longline	Jig	Other	Pot	Trawl	Total
1992	4	3	0	0	0	6
1993	1	2	0	0	0	3
1994	1	12	0	0	0	13
1995	3	12	0	0	0	13
1996	1	18	1	0	1	19
1997	2	13	1	1	0	15
1998	0	9	0	0	0	9
1999	2	8	1	0	0	9
2000	2	7	0	0	0	7

Source: CFEC/ADFG Fish Tickets, June 2001.

According to one local long-term local fisherman, while there has been more local groundfish activity utilizing jig gear since the development of the contemporary small boat groundfish fleet, there has been an increasing emphasis on longline gear in the past couple of years by some local residents (and this observation is consistent with the quantitative data available). In addition to these individuals, there are also individuals who, while not long term residents, fish the area on a more-or-less regular basis using small vessels and longline gear. According to this fisherman, at present (2001), there are about three small boat longline fishermen who 'live in houses' in the community, another three or so who live on their boats, and about three others who seasonally come to the area to fish, with some turnover being common in the latter group. Characterizing the level of effort of the 'local' component is problematic with currently available data. Most deliveries by these vessels has been characterized as being made at two local small processors rather than the large volume 'industrial' plants due to a typically better price structure, but a relatively small portion is reported to also be made at the largest plants in the community for a variety of reasons, including the ability to obtain different types of operational support at the larger facilities that are unavailable at the small processing operations.

It is also important to note that there are a number of vessels that are not owned by community residents in the under 60' class that deliver to Unalaska (and Beaver Inlet) processors. Table 1.1-18 provides information on ex-vessel revenues for all under 60' vessels that make local deliveries, and includes all groundfish species, including Pacific cod, sablefish, and so on. Examining the figure for the fixed gear vessel class 33-59' for 2000, it can be seen that the value for this sector alone ($1.23 million) is about 12 times higher than the total ex-vessel revenues for all Unalaska/Dutch Harbor resident owned under 60' vessel classes combined for the same year ($0.10 million, as shown in Table 1.1-15). This is an important consideration for this SEIS if Alternative 4/Option 2 (Dutch Harbor small boat exemption/limited fishing zone within the Area 9 [Bogoslof] closure) is considered. These data would seem to indicate that if historical and contemporary data are a guide, effort many times greater than that represented by the local fleet (as measured by community residence of the owner) could be directed toward that exclusion area. Further, these data suggest that

additional effort could be directed toward this area by new vessels coming to the area, given the apparent existing level of use by non-locally owned vessels. While it may be the case the Unalaska/Dutch Harbor owned small vessels do not fish far from the community, it is clear from the landings data that small vessels in these same gear classes from other communities fish far from their owner's communities (i.e., in the Unalaska/Dutch Harbor area). Additional notes on Bering Sea small boat (under 60') vessel landings volume and value data specific to the Pacific cod fishery (for both 'all' and 'fixed gear' classes) that would be useful in a more detailed analysis of Alternative 4/Option 2, Dutch Harbor/Area 9 limited fishing zone are presented in Section 1.4 below.

Table 1.1-18 Groundfish Ex-Vessel Revenue of Vessels <60' Delivering to Processors on Unalaska Island, 1992-2000

Year	Ex-Vessel Revenue by Gear Type (millions of dollars)				
	TCV < 60'	FGCV 33-59'	FGCV ≤ 32'	Ghost	Total
1992	0.14	1.75	0.11	0.01	2.01
1993	0.05	0.78	0.02	0.01	0.86
1994	0.01	0.64	0.17	0.01	0.83
1995	0.05	1.62	0.12	0.07	1.86
1996	0.02	0.93	0.10	0.03	1.08
1997	0.00	0.65	0.09	0.03	0.77
1998	0.02	0.31	0.10	0.02	0.45
1999	0.08	0.70	0.04	0.12	0.94
2000	0.03	1.23	0.02	0.03	1.31

Note: Includes landings to the Northern Victor, which operates in Beaver Inlet outside of any municipal (or borough) boundary, but not landings to the Arctic Enterprise, which operated in Beaver inlet for part of this period, but more recently has been operating in Akutan Bay. Other than the Northern Victor, all landings were made within the municipal boundaries of Unalaska.
Source: CFEC/ADFG Fish Tickets, June 2001

Unalaska did not qualify as a CDQ community, but it is an ex-officio member of the Aleutian Pribilof Island Community Development Association (APICDA). This CDQ group is partners with both an onshore and offshore entity, and offers training programs in Unalaska. Though Unalaska is not formally a CDQ community, according to interview data it is in fact where more of APICDA training and other programs are run because of the size of the population it services in the community. Although theoretically the recent increase in CDQ quota under AFA hurt the community as a non-CDQ participant, the simultaneously occurring increase in onshore quota, again in theory, more than made up the difference. The precise impacts of this shift on the community are not possible to ascertain with available data, but it is known that given CDQ partnerships with onshore and offshore sector participants that directly or indirectly benefit the community through either local economic activity or payment of taxes in one form or another, the consequences of the change are likely to be minor indeed. When queried about the impact of CDQ allocation change, a number of respondents offered the opinion that it was simply a "cost of doing business."

Processing

The shoreplant operations themselves, and the range of variation of operations in the community, have been summarized in earlier documents (most recently in the Inshore/Offshore-3 SIA) and are described in the Sector Profile section of this document, and are not recapitulated here. Rather, this section focuses on recent changes in the sector and its relationship to the community.

In terms of links to the community, it is important to note that shoreplants have long been a part of the community. That is not to say that relationships between the plants and the community itself have been without strain at times over the years, but Unalaska is perhaps unique with respect to the AKAPAI communities included in this analysis for the degree of articulation of the plants with the local community. A number of the longer-term residents working at the plants, especially management level personnel, are actively involved in the community and serve in various elected, appointed, and volunteer capacities with the City of Unalaska and numerous community organizations.

Paradoxically, it has been the case in Unalaska that length of local residency of the workforce employed in seafood processing is inversely related to the vitality of the local industry in general. When the workforce was largest, there were virtually no local hires, particularly of long-term residents. For example, in 1982, at the height of processing capacity for King crab, there were no individuals identified as local residents working in the processing plants. There were a number of reasons cited for that fact at the time, including working conditions, pay rate, and work hours at the seafood plants that were attractive only to temporary transient workers. At that time, workers were hired out of the Pacific Northwest, typically Seattle, and were flown to Unalaska to work on a six-month contract basis. With the downturn in the crab fisheries, companies are no longer able to afford the expenses of a six-month contract system. Some have done away with such contracts and hire workers for an indefinite period of time with incentives for longevity; others hire more out of the Alaska labor pool than in the past.

Several other factors influencing local hires in periods of fluctuation should be noted. First, under "boom" conditions there is a range of available employment options for local residents outside of the less appealing processing jobs. Second, when there is a downturn in hires at the local processing plants, virtually all of the workforce at the individual plants consists of returning workers, obviating the need for new hires. Even when six-month contracts were most common, there was always a core of returning workers. Third, setting the lack of long-term resident hires aside, Unalaska is seldom the "point of hire" for processing workers for individuals who are newly arrived to the community. That is to say, people do not come to Unalaska for processing work unless they have already secured a position. It is far too expensive to fly out to the community on the off chance they might gain employment, particularly at relatively low-paying jobs, especially given the fact that there is seldom housing available in the community and that which does come available is relatively expensive. Fourth, it should be noted that a lack of local hire does not apply to all positions with the seafood companies. Management positions at nearly all of the seafood companies (as well as with the major fisheries support sector companies) are occupied by individuals who, if not originally from the community, are at least long-time residents of the community or the region. In a number of ways, the processing industry is a "small circle" in terms of managers, and individuals who have worked for more than one company and have gained ten to twenty years experience in the community and the region are not uncommon. Individual owners and, in the case of "permanently" moored floating processors, even the plants themselves may come and go, but individuals in upper level management positions tend to remain in the business and in the area.

Very few, if any, lifetime residents of the community work at the shoreplants at any one time. There are a number of reasons commonly cited for this, but the most common dynamic involves the high cost of living in the community. Costs are such that it is nearly impossible for a local resident to take an entry- level job at one of the plants, and better paying jobs at the plant are typically filled by individuals who have 'worked their way up' within the company. Further, according to interview data, local residents who have tried working at the plants have found that entry-level position work schedules are not typically compatible with an active involvement in community and family life outside of the plant.

Interviews with processing plant personnel suggest that a major operational impact experienced by the community of Unalaska since the passage of AFA and the formation of the co-op system has been the slowing down of spreading out of pollock processing activity. While some plants reported minor changes in numbers of personnel associated with pollock processing operations, for the most part levels have stayed almost the same, given the need for a full complement of staff to run the plants. What has changed is that, according to senior plant personnel, workers are working less hours per day and working for longer periods than was the case at the end of the open access era. Workers are reportedly earning perhaps slightly more than in past seasons, but it is taking them longer to do so, given the shorter workdays. This has had some impact on recruiting personnel, as there are some processing workers who want to come to the community for a relatively brief period of time and maximize the number of hours worked during the time they are in the community so that they can return to their home communities with more money in a shorter period of time. Plant personnel also note that recruiting for processing workers has been more difficult during the time that there is a strong economy in the Lower 48.

Plant personnel also note that despite co-op formation, there is still a "race" interval during pollock processing in the roe season. Roe is at optimal quality for only a relatively short period, so there is a premium placed on maximizing return within that relatively short window. Further, non-roe pollock are also harvested to target maximum returns based on quality of fish, but those windows are much larger than the roe window.

One change within shoreplants as a result of co-op/AFA related conditions has been the addition of additional pollock products to the processing mix. During open access when highest throughput was the goal, the returns on a number of specialty products were not worth the time (and opportunity costs) that such production would take. Some plants that concentrated heavily on surimi are now producing pollock fillets. Fillets are more labor intensive to produce than surimi, so theoretically would result in more employment at the plants, but in practice plant operations typically split their labor forces between a "surimi side" and a "seafood side" of operations. Producing pollock fillets means a diversion of some pollock to the "seafood side" of the operation and this has happened at the same time that the seafood side of local operations has been in decline with the shrinking of crab quotas. At least two of the major AFA plants have reported that they are not using dedicated crews for crab processing because of the sharp decline in volume in this past year, such that pollock seafood side products have picked up some of the slack, with workers switching to processing other species as they become available. In general, it is the case at all plants that "less pollock is going to fish meal" as other products are being developed and recovery rates for existing products are increased given the ability to optimize for return per unit rather than return based on volume. With the slowing of the pace of processing, at least one shoreside operation has closed a relatively inefficient but significant portion of their plant in favor of maximizing use of other portions of the plant. One operation reports more workers on site than in the recent past, but another reports labor force is down somewhat from the peak years when the crab quota was larger. The combination of balancing seafood with surimi production, and adding

fillet and other product capacity makes comparing workforces between circumstances like 'comparing apples and oranges' in the words of one plant manager.

There have been disruptions to plant operations associated with recently imposed Steller sea lion protection measures. According to senior staff at the local pollock plants, there were times during the C/D season of 2000 when the individual plants ran out of fish during what would otherwise have been continuous operation periods. When plants shut down during production, there are disproportionate inefficiencies created not just by the downtime, but by required cleaning as well. Plant managers were of a common opinion that the 2000 A/B seasons were a marked success under initial co-op and AFA quota allocation conditions, but that in the C/D season, the Steller sea lion protection measures "took away" at least some of the gains realized under the new management system. On the other hand, the opinion was universally held among plant managers that the co-op structure mitigated, at least to a degree, the negative impacts to the Steller sea lion protection measures (i.e., without the co-ops, the negative impacts of the protection measures would have been much worse). In concrete terms, in addition to timing and effort inefficiencies, the sea lion protection measures hurt shoreplants in terms of fish quality and age, something that the co-op system had allowed the plants to make gains on compared to the derby system context pre-AFA.

There has been some shift in inshore pollock away from Unalaska Island with the move of the Arctic Enterprise floating processor from Beaver Inlet to Akutan (coincident with its purchase by a new owner), but this shift has not had direct consequences on the community of Unalaska. Local revenues were not effected, as Beaver Inlet is outside of the municipal boundaries of Unalaska, nor is Beaver Inlet part of an organized borough, so there were no local taxes that derived from that operation. The operation was supported logistically out of Unalaska as the closest transportation hub, but that is still the case to some degree even with the vessel operating out of Akutan.

Support Services

Unalaska is unique among Alaska coastal communities in the degree to which it provides support services for the Bering Sea groundfish fishery. As described in detail in the Inshore/Offshore-1 community profile (NPFMC 1991), Unalaska serves as an important port for several different aspects of pollock fishery. Support services include a wide range of companies, including such diverse services as accounting and bookkeeping, banking, construction and engineering, diesel sales and service, electrical and electronics services, freight forwarding, hydraulic services, logistical support, marine pilots/tugs, maritime agencies, net replacement and repair, vessel repair, stevedoring, vehicle rentals, warehousing, and welding, among others. There is no other community in the region with this type of development and capacity to support the various fishery sectors in the Bering Sea.

In general, in the way of support services, there is little direct supply of the main shoreplants in the community. This is especially true of the large pollock oriented shoreplants, by far the largest plants in the community. These are large enough entities that it is more efficient to supply most on-site needs directly from outside of the community. These plants all feature an "industrial enclave" style development to some degree, but this varies from operation to operation. Plants may purchase some regular items such as rain gear and boots for processors locally that they do not want to keep in inventory, but major purchases may be limited to fuel sales. Commonly large volume supplies, such as packaging materials and food are purchased "down south" and shipped direct. Individual processing plant workers do patronize local businesses to some extent, but this is limited by the fact that they are supplied furnished housing and meals by the processors. The

smaller operations in Unalaska have proportionally more local purchases of goods and services in the community. The major non-pollock crab processor in the community noted that because of the scale of their operation they did buy most services in town, but that with the overall decline in the support service sector of the economy they have seen "about a half dozen" of their vendors leave the community.

There are a number of businesses in Unalaska that are oriented toward supporting catcher vessels for a significant amount of their business. With a decrease in the race for fish during the locally important pollock fishery (and the coincident decline of quota in the area crab fishery), there has been a drop-off in peak demand for services. The amount of this drop-off depends on a number of different factors, including the relative reliance on crab and trawl fleet support. According to one service supply business manager who is quite heavily dependent upon trawl vessels, the co-op system in theory should help his business out in the long run, because even if overall there are less vessels with quota reassignments within co-ops, it will be the less efficient vessels that drop out, leaving more predictability and more secure players. In practice, a good portion of the support business in Unalaska has been built on inefficiencies, as according to this manager "this was Unalaska business." Like many of the support service businesses contacted, the common pattern for his business was to have a limited staff of year-round personnel and to ramp up capacity during peak periods by bringing in temporary or seasonal staff from Outside. This is true both for vessel oriented service firms that are parts of larger regional or national entities as well as for more locally based firms (and of the latter there are very few). With the conditions created by AFA (in conjunction with the fall in crab quotas), there have been employment cut backs at all of the businesses contacted in this subsector, either in the form of having fewer year-round personnel or in cutting back on the number of seasonal hires for peak demand, and in all cases a cutting back of overtime hours for staff. One electronics firm contacted is at half the level of employment that was typical in pre-co-op circumstances, and this was not an unusual case. One local business manager captured a common sentiment regarding the cutbacks and the quality of the jobs remaining in the community, however, with the observation that with the cutback "we have been trading money for sanity." In the words of another business owner, during the days of the race for fish "I didn't know I was crisis oriented" and in the time passing since crisis mode he has had to find other ways of making the business work. In this particular case of a locally owned vessel support business, survival has meant diversifying away from relying on the fishing industry nearly exclusively by performing similar services for land-based businesses (and adding new marine-oriented services) and away from relying on Unalaska as a nearly exclusive geographic base of revenue by taking his services to the region and beyond.

Another common problem with these businesses is inventory, and this has changed somewhat under co-op conditions (again, depending on how relatively dependent a business is on trawl-specific trade). Under race for fish conditions, carrying a larger than normal relative to overall volume of sales inventory was necessary due to the need to have virtually everything possible on hand instantly in case of need during the fishing season, as downtime for vessels off of the fishing grounds meant unacceptable opportunity losses, and vessels were willing to pay whatever it took to get them back on the grounds as quickly as possible - time was worth more than the cost of urgent repairs. As the race for fish went away, it was much more efficient to be able to order specialty parts expressed shipped in from the Lower 48 (typically Seattle) if needed than to try and stock everything in Unalaska.

Depending on the composition of the business base of these firms, they have been hit more or less hard by the decline in the crab quota. According to one business manager, with the loss of income to crab vessels, he has seen his crab vessel support business drop off 50 percent as owners are not spending money on preventative maintenance, and among those who are performing work, they are slower to pay their bills.

With the trawl fleet, the slowing down of the race for fish has also meant that the trawlers are spreading their business differently in the community, according to support business owners. Not only is less money being spent overall because of the relative lack of urgency, "now money managers are involved" in looking at relative value between providers and shopping work around. For a number of the support businesses that service the catcher fleet, the loss of a large portion of the catcher processor fleet was a large blow. While these large vessels did not employ the full range of services that some of the smaller catcher vessels might have employed in the community (simply due to their not being facilities able to handle all of the work), they did need specialty service work from a number of the suppliers.

Another common observation of the support sector within the community is that while the relatively longer pollock seasons are good for the community as a whole, a number of entrepreneurial businesses have folded, and the redundancy among (or the range of choices among) service providers has been reduced. The flip side of this means that, according to one fishing business manager, they can be more selective in their purchasing of services and "everything no longer needs to be at a premium price in Dutch Harbor."

Fuel sales are another type of locally provided support for the catcher vessel fleet. The Steller sea lion restrictions that went into place in the C/D seasons in 2000 have meant an increase in fuel sales due to longer vessel trips to the open fishing grounds. This, coupled with co-occurring high fuel prices has meant higher costs to the catcher vessel (and the catcher-processor) fleet. While the fuel sales businesses have benefitted (as has the municipality of Unalaska through tax on the fuel sales), the vessels and shoreplants (because of the higher cost of fuel they are purchasing) have been hurt.

There is a significant amount of support business in the community that is directly related to the offshore fleet. Catcher processors use warehousing services, and refuel and resupply when they are in the community to do a full or partial offload of product. (During the race for fish days, depending on the pace of the fishing, length of the season, capacity of the vessel, and a number of other variables, catcher processors may make a partial offload during the season [to free up capacity for finishing the season], and then do a full offload in Unalaska at the end of the season, or they may make a full offload during the season.) Additionally, catcher processors typically need a range of expediting, freight management, and logistical support services through Unalaska to keep operating in the Bering Sea. While this basic pattern has not changed in the post-AFA era, the volume of local work is down significantly due to both the reduction in the catcher processor fleet and the slackening of the pace of fishing during the 1999-2001 era.

This loss of catcher processor related business has not be evenly distributed throughout the support sector businesses in the community. For example, the OSI facilities in Captain's Bay were disproportionately dependent on the portion of the fleet that was excluded from the fishery compared to most other large businesses in the community. As a result, demand for dockage and warehousing at the facility is down, as are associated sales of other goods and services at the facility. Loss in local support demand can also be gauged by the fact that American Seafoods itself has a much reduced direct presence in the community, going from three year-round and four seasonal employees pre-AFA, to one year-round and two employees each hired for two months under the present circumstances.

For the catcher processor business activity that remains in the community, there has also been a shift by one of the main companies away from utilizing private facilities in favor of doing a higher portion of their business

across one of the municipal docks. Clearly a rational business decision in the new environment, this has served to move some support income from the private to public sector.

Shipping seafood products is also a major business sector in the community. In addition to the two main shipping lines that serve the community, another type of support service provided in the community for both the inshore and offshore fleet is stevedoring services. While some shoreplants typically do not use stevedores in loading operations across their docks, or the demand is lower for stevedoring because of containerized product, hatch gangs are used for loading product 'over the side' to trampers for shipment from Unalaska. Stevedoring jobs are relatively high paying, and much valued in the community, though the work is not steady for the bulk of persons engaged in it. What does make this labor opportunity particularly valued is the fact that long-term locals, including lifetime residents, may qualify for, and provide a viable labor pool for, these positions without having to go through minimum-wage type of entry positions first. There are also union and non-union laborers alike who come to the community during the busy seasons to take advantage of the opportunities available in the community.

With the recent changing of the pace and structure of the fishery with co-ops, shipping business patterns have changed in the community. The largest difference is attributed to the fact that processors can now much more closely time their operations and shipping needs, and can thus optimize their range of shipping choices. This opens up a range of options not readily available under race for fish conditions. For example, processing entities can more easily arrange for scheduled transfers direct to trampers rather than having to use always available locally established shipping firms to transfer product. Of course, shipping choices ultimately depend on product mix, destination, and cost efficiencies, but clearly local shipping-related entities have felt impacts directly as a result of fishery structure changes. There are also indications that shoreside plants have shifted to a greater emphasis on tramper shipments relative to containerized shipments, but no quantitative information is available to verify this assertion.

One change seen in the community in the post-race for pollock era is the addition of two more private dock/shipping facilities in the community, one at the old East Point plant location and another in Captain's Bay. There would also appear to be proportionately more offshore related volume going across municipal docks than was the case in the past, and city revenue from dockage and wharfage in general is up. These two factors reinforce the general observation that shipping related business is becoming less concentrated among the formerly dominant local entities and more spread out among various entities.

In the 1999-2001 era, there has been a reported shift in product destination from Unalaska, with less product going to Asia and more going to domestic and European markets, due primarily to change in product mix. One of the large shipping firms in the community reports that here has been almost a 100 percent fall-off in business to his company from the offshore sector since AFA, and increases from the shoreside have not made up this differential. This is attributed to the fact that without the Olympic system, seafood companies can schedule and plan offloads, meaning that they can make their own arrangements rather than having to go through a shipping company that is always available. Similarly, the onshore sector can more easily schedule tramper loads. The situation is not straightforward, however, for the two primary shipping companies with a local presence in Unalaska. There has been some movement of market share between the two firms that, according to some, were as closely associated with ownership and corporate changes at the two firms as much as any local market forces. According to one firm, union longshoring hours were down approximately 22 percent between 1998 and 2000. The community has seen a higher proportion of work going to non-union longshoremen recently, although the non-union entities tend to have smaller workforces

(because, in part, of being able to schedule work rather than needing a large on-call labor pool). Co-op conditions have pushed inventories up because of increased recovery rates and diversification of product mix, meaning that there has been some increase in demand for cold storage, berthing, dockside services, and so on. While one senior shipping manager has reported that movement of product will become more of an issue with this trend, he also reports that there has been a tradeoff with the slowing of the peak periods post-AFA; even during the busy season, now staff are able to work more normal schedules and can be home with their families by 7:00 p.m.

There are also support service providers in Unalaska who support inshore processing entities that are operating far outside of the community. For example, the firm (Icicle Seafoods) that owns the floating processor in Beaver Inlet (Northern Victor) has a local Unalaska representative who supports that operation. (When a second floater was operating in Beaver Inlet, this entity had an office in Unalaska that, among other functions, supported that operation.) Similarly, the company that owns and operates the large shoreplant in Akutan (Trident) has a support office in Unalaska because of the logistical support needs of that plant that cannot be managed directly from Akutan.

In general, the recent changes experienced by support service sector businesses in Unalaska have gone to the heart of the paradox of the Unalaska support service economy. This portion of the local economy was historically dependent to a large degree of the economic inefficiency of the commercial fishing industry. To the extent that the co-op quota allocation system has made pollock fishing more economically efficient, it has also served to allow vessel and facility owners to not have to purchase inefficient support services. This has meant a drop in local support service activity, employment, and revenue. There are no data available to quantify the amount of the drop, but it has clearly been significant for many of the businesses in this sector. Overall, peak demand is lower, the pace of business is slower, money has become at least as important of a consideration as time, and businesses do not need the level of inventory and staff as in the past. There are, of course, exceptions to this generalization, but the pattern is apparently quite consistent over the sector as a whole.

The Municipality and Revenues

Table 1.1-19 presents a break-down of revenues by source for the City of Unalaska. This provides a sense of scale for the different revenue sources for the City's General Fund. Table 1.1-20 provides a break-out of selected fisheries-related General Fund revenue sources. These include the local raw fish sales tax, the intergovernmental fisheries business tax and the fisheries resource landing tax. As shown, the local raw fish tax increased substantially from FY99 to FY00, with the latter encompassing the first half of the 2000 calendar year, the first year of AFA onshore co-ops. Of course, a number of factors influence the volume and value of fish landed in the community which, in turn, translates into taxes paid. (The City of Unalaska does not keep a break-out of revenue generated by species or species group so information is not readily available to calculate the relative revenue contribution of individual species or species groups, but a proxy for that information for the shore based operations may be found in Tables 1.1-10 and 1.1-11.) Preliminary information for FY 2001 shows a further increase in revenues. This fiscal year covers the second half of the first full (calendar) year of onshore co-ops and the first half of the second year of onshore co-ops. It also captures the period when the more stringent Steller sea lion protection measures were put in place during 2000.

Table 1.1-19 City of Unalaska General Fund, Fiscal Years 1998-2001

Revenues	FY98 (actual)	FY99 (actual)	FY00 (actual)	FY01 (preliminary)
Real Property Tax	2,521,746	2,698,454	2,690,560	2,746,295
Personal Property Tax	1,164,363	1,120,957	1,202,265	1,116,263
Raw Fish Tax	2,641,124	2,513,500	3,410,717	2,958,360
Sales Tax	3,533,123	3,254,403	3,242,284	3,657,042
Other Taxes	439,735	516,863	509,434	524,195
State of Alaska	6,030,119	6,306,064	5,640,942	6,914,040
Charges for Services	278,703	282,778	279,159	298,409
Permits & Licenses	19,546	13,687	22,018	20,265
Miscellaneous	2,407,515	2,099,082	1,954,352	3,462,567
Other Financing Sources	386,895	273,416	461,817	19,346
Total General Revenue Funds	19,422,869	19,079,204	19,413,548	21,716,782

Source: City of Unalaska Finance Department spreadsheet, 2001

Table 1.1-20 City of Unalaska Selected Fisheries Related General Fund Revenues, Fiscal Years 1991-2001

	FY91	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00	FY01P*
Raw Fish Sales Tax	2,851,008	3,681,908	3,131,661	2,641,802	3,340,512	2,212,833	2,641,645	2,641,124	2,513,500	3,410,717	2,958,360
Fisheries Business Tax	2,067,793	2,475,197	3,581,134	2,770,321	2,364,847	2,828,570	2,071,914	2,424,747	2,424,787	2,483,670	3,249,218
Fisheries Resource Landing Tax	na	na	na	na	na	2,637,708	3,015,804	2,604,706	2,739,821	2,224,903	2,813,250
Three Source Total	4,918,801	6,157,105	6,712,795	5,412,123	5,705,359	7,679,111	7,729,363	7,670,577	7,678,108	8,119,290	9,020,828

* FY2001 is preliminary; all other years are actual.
Source: City of Unalaska Finance Department spreadsheet, 2001

One of the impacts of the AFA on the City of Unalaska revenues relates to the additional requirement that at-sea processors count landings outside of state waters as taxable events (under the fisheries resource landing tax). The particulars of that requirement are discussed in another section of this document, but as shown in Table 1.1-20, the local revenue derived from the fisheries resource landing tax increased from FY 1998 to FY 1999 (with the latter year encompassing the first half [calendar] year of offshore co-ops). Revenue from this source, however, fell over half a million dollars between FY 1999 and FY 2000 (the period covering the second half the first year of offshore co-ops and the first half of the second year of offshore co-ops) but, according to preliminary figures, rebounded in FY 2001. Looking at the three revenue source total, although there was some variation in the individual sources, the combined amount was nearly flat at $7.7 million for each year FY 1996 (the first year the fisheries resource landing tax came to the city) through FY

1999. FY 2000 combined three-source revenues rose to $8.1 million, so for the first FY that spanned both offshore co-ops and the start of on-shore co-ops, revenue sources that were directly fishery associated increased over five percent. Preliminary data have this figure increasing to $9.0 million in FY 2001.

Other Local Business Activity

Tourism continues to develop in the community, with new draws in the last few years associated with an increased local National Park Service presence, the opening of the Museum of the Aleutians, and the continued popularity of charter sport fishing. Sport charter fishing took off in the mid-1990s when world record sport halibut were caught locally in 1995 and 1996, with the latter fish, at 459 pounds, still representing the world record. Birding, hiking, kayaking, camping, and visiting the Holy Ascension Cathedral historic site are also tourism draws, but high cost and inconvenient transportation access make the development of this sector challenging for local businesses. With the slow down in the race for fish that accompanied AFA, direct fishery related passenger transportation demand also declined to some degree, although clearly demand was falling off prior to AFA. Table 1.1-21 provides information on passenger counts at the community airport for the period 1995-2000, as well as for the first half of 2001. As shown, the total number of passengers for this span of years peaked in 1996, and counts for 1999 and 2000 are the two lowest annual counts during 1995-2000. While there is considerable variation between quarters within and between years, quarterly counts for the first two quarters of 2001 are lower than either 1999 or 2000.

Table 1.1-21 City of Unalaska, Port of Dutch Harbor Airport Airport Passenger Count by Quarter, 1995-2001

Quarter	Calendar Year						
	1995	1996	1997	1998	1999	2000	2001
January-March	16,122	20,380	15,992	20,919	15,672	16,461	14,696
April-June	17,209	16,615	15,772	13,683	14,556	16,480	13,988
July-September	18,015	17,105	16,041	12,909	16,312	15,906	na
October-December	13,171	13,323	15,380	15,863	13,740	12,596	na
Total	64,517	67,423	63,185	63,374	60,280	61,443	na

Note: (1) Data from second half of 2001 not yet available. (2) Data in the table represent a total of enplaned and deplaned passengers, not "round trips" by single individuals (e.g., if 9,000 passengers got off planes in Unalaska during a particular quarter and 7,000 passengers boarded planes in Unalaska during that same quarter, the quarterly passenger count would be 16,000).
Source: Adapted from spreadsheet supplied by City of Unalaska Finance Department, 2001. Data were originally configured in fiscal year format. Data for April-June 2001 period supplied by telephone follow up.

Coupled with these conditions was a decrease in level service caused by the discontinuation of long-time air service provider Reeve Aleutian Airways and a further drop in demand related to the crab quota decline. This resulted in a situation where as of early 2001 the community was served by only one jet per day.

According to long-time community residents, this has had an impact on a range of services in the community (such as the price and availability of a variety of food at stores), as well as mail and freight.

Unalaska continues to support a much wider range of non-fisheries related businesses as well as fisheries support related businesses than any other community in the region. According to interviews conducted early in 2001, however, business conditions are changing with a general slow-down in the non-fisheries sectors of the economy, a trend at least partially related to recent structural changes in the groundfish fishery as well as the decline in the crab fishery. A number of businesses that serve the general public have gone out of business in the recent past, and examples of these businesses, including an office supply store, an auto parts store, a vehicle rental firm, and a bowling alley, were frequently cited during interviews. Also strongly marked was the reduction in number of more direct fishery support businesses that were needed for peak demand times. In this case, it is not that types of services are no longer available, it is more that there is less of a choice of providers of those services. One landlord reports having lost a net company, an electrical firm, a hydraulic firm, and a restaurant all out of a single building. While this is an unusual case, it does illustrate the range of businesses (and types of fleet support businesses) that have folded.

Table 1.1-22 provides service demand information for the period 1994 through 2000 from the Unalaska Department of Public Safety. As shown, the number of incidents/calls for service during this period peaked in 1997 and has since decreased annually. The number of investigative files/cases, typically indicative of more substantive requests for service, show an overall decline over this span, but not in a straight-line fashion. Fire responses show no clear pattern, but relatively large fluctuations from year to year are not uncommon due to the low number of responses.

Table 1.1-22 Unalaska Department of Public Safety Level of Service Indicators, 1994-2000

Indicator	Year						
	1994	1995	1996	1997	1998	1999	2000
Total Incidents/Calls	3,795	4,085	4,627	4,981	4,039	3,666	3,450
Investigative Files/Cases	993	974	944	865	787	802	834
Fire Responses	25	34	37	23	24	29	32

Source: Notes provided by City of Unalaska Department of Public Safety.

Another change in the local community context noted by multiple interviewees is an increased federal presence in the community. While having nowhere near the presence as in, for example, Kodiak, the United States Coast Guard now has a detachment in the community (after the community had lobbied for many years for an increased local presence given the importance of commercial fishing in the community and region). There are also now U.S. Customs and Immigration and Naturalization Service personnel and offices in the community.

One change in the community consistently mentioned during interviews with local business leaders (in an unrelated study) in early 2001 were the impacts associated with Steller sea lion protection measures that were in put in place during 2000. In the words of one community business leader, the issue is "hanging over the town" and people "can't do any planning" because of it. There is a recognition, however, among at least

some of the local residents that other communities in the region are even more vulnerable to community-level disruptions resulting from these measures due to a much higher reliance on a small boat fleet that cannot effectively fish outside of the protection zones. While the seasonality of the local economy has changed with AFA related co-op management/quota allocation conditions, such that peak periods are not as high or sharp, and an increased level of activity lasts longer in the community, the interruptions of the seasons related to Steller sea lion protection measures does cause stoppages and inefficiencies at the major shoreplants in the community.

The housing market of Unalaska has changed significantly in the past few years. Although there was a lull in demand following the crash of local King crab activity in the early 1980s, housing demand has been strong in the community since the development of the contemporary fishery dating back to the 1970s. There are no longer lengthy waiting lists for rental properties, and home sales are sluggish. The community has not yet seen a dramatic dip in housing costs, but there is at least some concern in the community that either investments in housing will not be realized on the sale of the property or that homes will not be able to be sold in a timely fashion if individuals chose to leave the community, which is a very different set of circumstances than have been common for many years.

1.2 AKUTAN

Akutan is located on Akutan Island in the eastern Aleutian Islands, one of the Krenitzin Islands of the Fox Island group. The community is approximately 35 miles east of Unalaska and 766 air miles southwest of Anchorage. Akutan is surrounded by steep, rugged mountains reaching over 2,000 feet in height. The village sits on a narrow bench of flat, treeless terrain. The small harbor is ice-free year-round, but frequent storms occur in winter and fog occurs in summer. Akutan began in 1878 as a fur storage and trading port for the Western Fur & Trading Company. The company's agent established a commercial cod fishing and processing business that quickly attracted nearby Aleuts to the community. A church and school were built in 1878.

The community of Akutan was previously profiled in the 1991 SIA in the Unalaska Social Impact Assessment Addendum (IAI 1991), and the details of that profile will not be recapitulated here. Akutan is the site of one of the larger shoreplant facilities that process Bering Sea pollock, and that operation is grouped with (and described with) the Unalaska/Dutch Harbor shoreplants in the inshore profile in the Sector and Community Profiles appendix to the Steller Sea Lion EIS. The purpose of this brief section is to underscore the unique aspects of Akutan with respect to potential socioeconomic assessment issues that could arise out of the groundfish management process.

Akutan is a unique community in terms of its relationship to the Bering Sea groundfish fishery. It is the site of one of the largest of the shoreplants in the region, but it is also the site of a village that is geographically and socially distinct from the shoreplant. This 'duality' of structure has had marked consequences for the relationship of Akutan to the Bering Sea groundfish fishery.

One example of this may be found in Akutan's status as a CDQ community. Initially (in 1992), Akutan was (along with Unalaska) deemed not eligible for participation in the CDQ program based upon the fact that the community was home to "previously developed harvesting or processing capability sufficient to support substantial groundfish participation in the BSAI..." though they met all other qualifying criteria. The Akutan Traditional Council initiated action to show that the community of Akutan, per se, was separate and distinct from the seafood processing plant some distance away from the residential concentration of the community

site, that interactions between the community and the plant were of a limited nature, and that the plant was not incorporated in the fabric of the community such that little opportunity existed for Akutan residents to participate meaningfully in the Bering Sea pollock fishery (i.e., it was argued that the plant was essentially an industrial enclave or worksite separate and distinct from the traditional community of Akutan and that few, if any, Akutan residents worked at the plant). With the support of the Aleutian Pribilof Island Community Development Association (APICDA) and others, Akutan was successful in a subsequent attempt to become a CDQ community and obtained that status in 1996.

This action highlights the fundamentally different nature of Akutan and Unalaska. Akutan, while deriving economic benefits from the presence of a large shoreplant near the community proper, has not articulated large-scale commercial fishing activity with the daily life of the community. While US Census figures show Akutan had a population of 589 in 1990 and 713 in 2000, the Traditional Council considers the "local" resident population of the community to be around 80 persons, with the balance being considered "non-resident employees" of the seafood plant. This definition, obviously, differs from census, state, and electoral definitions of residency, but is reflective of the social reality of Akutan. The residents of the village of Akutan, proper, are almost all Aleut. As shown in Table 1.2-1, less than 16 percent of the population in 2000 was Native American/Native Alaskan. Table 1.2-3 shows the population composition by sex in 1990 and 2000, and is clearly indicative of a male-dominated industrial site rather than a typical residential community.

Table 1.2-1 Ethnic Composition of Population Akutan; 1990 and 2000

	1990		2000	
Race/Ethnicity	**N**	**%**	**N**	**%**
White	227	38.5%	168	23.6%
African American	6	1.0%	15	2.2%
Native Amer/Alaskan	80	13.6%	112	15.7%
Asian/Pacific Islands*	247	41.9%	277	38.9%
Other**	29	4.9%	141	19.7%
Total	589	100%	713	100%
Hispanic***	45	7.6%	148	20.8%

Source: U.S. Bureau of Census.

* In the 2000 census, this was split into Native Hawaii and Other Pacific Islander (pop 2) and Asian (pop 275)

** In the 2000 census, this category was Some Other Race (pop 130) and Two or more races (pop11).

***' Hispanic' is an ethnic category and may include individuals of any race (and therefore is not included in the total as this would result in double counting).

Table 1.2-2 provides information on group housing and ethnicity for Akutan. Group housing in the community is almost exclusively associated with the processing workforce. As shown, 85 percent of the population lived in group housing in 1990. (Comparable 2000 data are not yet available.) Also as shown, the ethnic composition of the group and non-group housing segments were markedly different, with the non-group housing population being predominately (83%) Alaska Native, and the group housing population having almost no (1%) Alaska Native representation.

Table 1.2-2 Ethnicity and Group Quarters Housing Information, Akutan, 1990

Akutan	Total Population		Group Quarters Population		Non-Group Quarters Population	
	Number	Percent	Number	Percent	Number	Percent
White	227	37.52	212	42.32	15	17.05
Black	6	0.99	6	1.20	0	0.00
American Indian, Eskimo, Aleut	80	13.22	7	1.40	73	82.95
Asian or Pacific Islander	247	40.83	247	49.30	0	0.00
Other race	29	4.79	29	5.79	0	0.00
Total Population	589	100.00	501	100.00	88	100.00
Hispanic origin, any race	45	7.44	45	8.98	0	0.00
Total Minority Pop	342	56.53	298	59.48	73	82.95
Total Non-Minority Pop (White Non-Hispanic)	247	40.83	203	40.52	15	17.05

Source: Census 1990 STF2

Table 1.2-3 Population Composition by Sex Akutan; 1990 and 2000

	1990		2000	
	N	%	N	%
Male	449	76%	549	77%
Female	140	24%	164	23%
Total	589	100%	713	100%
Median Age	NA		40.2 years	

Source: U.S. Bureau of the Census

Akutan also differs from Unalaska in terms of opportunity to provide a support base for the commercial fishery. There is no boat harbor in the community, nor is there an airport. While there is a 'local' commercial fishery, this is pursued out of open skiff-type vessels, and participation in this type of enterprise has reportedly declined in recent years. (Through the CDQ program, however, the community does participate in the commercial fishery in other ways, including partial ownership [by APICDA] of a BSAI catcher-processor.) The Akutan village corporation does derive economic benefits from the local shoreplant through land leasing arrangements and through sales of goods and services to local seafood plant employees, including check cashing services.

As a CDQ community, the community of Akutan enjoys access to the BSAI groundfish resource independently of direct participation in the fishery. Akutan, like the other CDQ communities, has benefitted from the increase under AFA from 7.5 percent to 10 percent of each BSAI groundfish TAC (except for the fixed gear sablefish TACs, of which CDQ communities receive 20 percent for the eastern Bering Sea and the Aleutian Islands areas). The direct benefit/value of this increase, of course, depends upon the TAC itself as well the value of the resource (or value of the rent). Similarly, economic benefits the community derives from the local 1 percent raw fish tax from landings at the nearby plant are dependent on BSAI groundfish TACs and the resulting ex-vessel value of groundfish landings.

Although this conclusion pertains to the community of Akutan, implications for the groundfish landings port of Akutan are quite different. The Trident plant is the principal facility in the Akutan port and, historically, a number of smaller, mobile processing vessels have operated seasonally out of the port of Akutan. Akutan does not have a boat harbor or an airport in the community. Beyond the limited services provided by the plant, no opportunity exists in Akutan to provide a support base for other major commercial fisheries. Indeed, alternative economic opportunities of any kind are extremely limited.

While crab processing was a major source of income for the Akutan plant during the boom years of the late 1970s and early 1980s, with the economic collapse of this resource base in the early 1980s, groundfish processing became the primary source of economic activity. In 1997, for example, State of Alaska and NMFS catch records indicate that, while landings of herring and crab were reported for the Akutan plant, more than 98 percent of the total pounds landed were groundfish, and these made up more than 80 percent of the estimated total value.

With respect to groundfish fishery and related potential socioeconomic impacts to Akutan, the village is in a unique position. As a CDQ community, Akutan enjoys access to Bering Sea pollock independent of direct participation in the fishery. As home community to a shoreplant, Akutan derives considerable fiscal benefits from inshore operations. As CDQ partners with both inshore and offshore entities, they derive economic benefits from both of those sectors. A change seen in the very recent past was the purchase of the Arctic Enterprise floating processor by Trident, and the move of the Arctic Enterprise from Beaver Inlet on Unalaska Island to Akutan Bay. The move of the Arctic Enterprise, combined with the increase in CDQ quota, mean that both the industrial and village portions of the community appear to have captured more of the overall pollock quota post-AFA than was the case pre-AFA. In summary, the potential social impacts to Akutan as a result of groundfish management changes depends upon how one defines the community of Akutan. If the traditional village of Akutan is the unit of analysis, the fishery would appear to have little direct impact on the day-to-day lives of individuals in the community, as long as the structure of the sectors stays roughly the same. On the other hand, if the census/legal definition of Akutan is used, the Akutan is a community more than five times larger than its 'traditional/Aleut' population, and that large margin of difference in population is associated exclusively with the onshore processing operation.

1.3 SAND POINT AND KING COVE

Sand Point is located on Humboldt Harbor on Popof Island, off the Alaska Peninsula, 570 air miles from Anchorage. Sand Point was founded in 1898 by a San Francisco fishing company as a trading post and cod fishing station. Aleuts from surrounding villages and Scandinavian fishermen were the first residents of the community. Sand Point served as a repair and supply center for gold mining during the early 1900s, but fish processing became the dominant activity in the 1930s. Aleutian Cold Storage built a halibut plant in 1946.

Trident operates the current processing plant, which primarily processes pollock, Pacific cod and other groundfish, salmon, and halibut. Peter Pan operates a buying station in Sand Point for their processing plant in King Cove. Sand Point is home port for the largest fishing fleet in the Aleutian Chain.

King Cove is located on the south side of the Alaska Peninsula, on a sand spit fronting Deer Passage and Deer Island. It is 18 miles southeast of Cold Bay and 625 miles southwest of Anchorage. King Cove was founded in 1911 when Pacific American Fisheries built a salmon cannery. Early settlers were Scandinavian, European, and Aleut fishermen. Of the first ten founding families, five consisted of a European father and an Aleut mother. The cannery operated continuously between 1911 and 1976, when it was partially destroyed by fire. The main processor in King Cove is now Peter Pan, and processes pollock, Pacific cod and other groundfish, salmon, crab, herring, and halibut. In addition, several small operators conducted operations in King Cove in 2000 – one for salmon only, and the other for salmon and groundfish (other than pollock).

Sand Point and King Cove, like Akutan, are a part of the Aleutians East Borough. Whereas Akutan is incorporated as a Second Class City, both Sand Point and King Cove are incorporated as First Class Cities. Like Akutan, both Sand Point and King Cove are home to one shoreplant each that processes Bering Sea pollock. Unlike Akutan, however, neither Sand Point nor King Cove are CDQ communities. Two further differences are key for understanding the link between the communities and the groundfish fishery: (a) both Sand Point and King Cove are historically commercial fishing communities that have had processing facilities as part of the community for decades; and (b) both Sand Point and King Cove have resident commercial fishing fleets that deliver to the local seafood processors. With respect to the latter point, Sand Point and King Cove are different from Unalaska. Whereas Unalaska does have vessels owned and operated by 'true' local residents, none of these vessels that would fall into this category deliver pollock to local plants, nor do they typically deliver cod on a regular basis in volumes comparable to other portions of the fleet. Sand Point and King Cove resident fleets are involved with pollock (Sand Point more than King Cove), though typically the Bering Sea pollock processed at those plants comes from deliveries from larger boats home ported outside of the community.

The two communities have similar histories with respect to fishing. Sand Point was founded as a trading point and cod fishing station by a San Francisco fishing company in 1898. King Cove was established in 1911 by cannery operators and commercial fishermen, many of whom were Scandinavian immigrants who married local Aleut women. King Cove is located on the south (i.e., Pacific Ocean) side of the Alaska Peninsula, while Sand Point is located on Popof Island in the Shumagin Islands group on the Pacific Ocean side of the Alaska Peninsula. Both communities then share a Gulf of Alaska orientation or GOA/BSAI orientation that the other Bering Sea pollock communities do not. Of the two, King Cove is more Bering Sea oriented, and Sand Point more Gulf of Alaska oriented.

Historically, both of these communities saw a large influx of non-resident fish tenders, seafood processing workers, fishers, and crew members each summer. For the last several decades, both communities were primarily involved in the commercial salmon fisheries of the area, but with the decline of the salmon fishery, plants in both communities have diversified into other species. The resulting ethnic diversity of population in both communities is evident in Tables 1.3-1 and 1.3-4. The predominance of males over females (Tables 1.3-3 and 1.3-6) is also an indicator of male-oriented processing employment, as well as possible differential female/male emigration from the communities.

Table 1.3-1 Ethnic Composition of Population King Cove; 1990 and 2000

Race/Ethnicity	1990		2000	
	N	%	N	%
White	127	28.2%	119	15%
African American	6	1.3%	13	1.6%
Native Amer/Alaskan	177	39.2%	370	46.7%
Asian/Pacific Islands*	125	27.7%	213	26.9%
Other**	16	3.5%	77	9.7%
Total	451	100%	792	100%
Hispanic***	53	11.8%	59	7.4%

Source: U.S. Bureau of Census.

* In the 2000 census, this was split into Native Hawaii and Other Pacific Islander (pop 1) and Asian (pop 212)

** In the 2000 census, this category was Some Other Race (pop 47) and Two or more races (pop30).

***' Hispanic' is an ethnic category and may include individuals of any race (and therefore is not included in the total as this would result in double counting).

Table 1.3-2 provides information on group housing and ethnicity for King Cove. Group housing in the community is largely associated with the processing workforce. As shown, 42 percent of the population lived in group housing in 1990. (Comparable 2000 data are not yet available.) Also as shown, ethnicity varied between the group and non-group housing, with the non-group housing population being 67 percent Alaska Native and the group housing population being 39 percent Alaska Native.

Table 1.3-2 Ethnicity and Group Quarters Housing Information, King Cove, 1990

King Cove	Total Population		Group Quarters Population		Non-Group Quarters Population	
	Number	Percent	Number	Percent	Number	Percent
White	127	28.16	57	30.16	70	26.72
Black	6	1.33	6	3.17	0	0.00
American Indian, Eskimo, Aleut	177	39.25	1	0.53	176	67.18
Asian or Pacific Islander	125	27.72	109	57.67	16	6.11
Other race	16	3.55	16	8.47	0	0.00
Total Population	451	100.00	189	100.00	262	100.00
Hispanic origin, any race	53	11.75	53	28.04	0	0.00
Total Minority Pop	331	73.39	139	73.54	192	73.28
Total Non-Minority Pop (White Non-Hispanic)	120	26.61	50	26.46	70	26.72

Source: Census 1990 STF2

Table 1.3-3 Population Composition: Age and Sex King Cove; 1990 and 2000

	1990		2000	
	N	%	N	%
Male	292	65%	472	60%
Female	159	35%	320	40%
Total	451	100%	792	100%
Median Age	NA		34.9 Years	

Source: U.S. Bureau of the Census

Table 1.3-4 Ethnic Composition of Population Sand Point; 1990 and 2000

Race/Ethnicity	1990		2000	
	N	%	N	%
White	284	32.3%	264	27.7%
African American	4	0.5%	14	1.5%
Native Amer/Alaskan	433	49.3%	403	42.3%
Asian/Pacific Islands*	87	9.9%	224	23.5%
Other**	70	8.0%	47	4.9%
Total	878	100%	952	100%
Hispanic***	78	8.9%	129	13.6%

Source: U.S. Bureau of Census.

* In the 2000 census, this was split into Native Hawaii and Other Pacific Islander (pop 3) and Asian (pop 221)

** In the 2000 census, this category was Some Other Race (pop 21) and Two or more races (pop 26).

***' Hispanic' is an ethnic category and may include individuals of any race (and therefore is not included in the total as this would result in double counting).

Table 1.3-5 provides information on group housing and ethnicity for Sand Point. Group housing in the community is largely associated with the processing workforce. As shown, 21 percent of the population lived in group housing in 1990. (Comparable 2000 data are not yet available.) The ethnic composition of the group and non-group housing segments were more similar than for the other communities profiled.

Table 1.3-5 Ethnicity and Group Quarters Housing Information, Sand Point, 1990

Sand Point	Total Population		Group Quarters Population		Non-Group Quarters Population	
	Number	Percent	Number	Percent	Number	Percent
White	284	32.35	48	25.40	236	34.25
Black	4	0.46	4	2.12	0	0.00
American Indian, Eskimo, Aleut	433	49.32	3	1.59	430	62.41
Asian or Pacific Islander	87	9.91	80	42.33	7	1.02
Other race	70	7.97	54	28.57	16	2.32
Total Population	878	100.00	189	100.00	689	100.00
Hispanic origin, any race	78	8.88	58	30.69	20	2.90
Total Minority Pop	601	68.45	146	77.24	455	66.04
Total Non-Minority Pop (White Non-Hispanic)	277	31.55	43	22.76	234	33.96

Source: Census 1990 STF2

Table 1.3-6 Population Composition: Age and Sex Sand Point; 1990 and 2000

	1990		2000	
	N	%	N	%
Male	557	63%	593	62%
Female	321	37%	359	38%
Total	878	100%	952	100%
Median Age	NA		36.5 Years	

Source: U.S. Bureau of the Census

The King Cove plant processes a good amount of crab and has developed groundfish processing capability, with Pacific cod as the predominant species, and with significant amounts of cod being supplied from both the GOA and the BSAI regions. This plant also processes a large amount of salmon, and some herring and halibut. The Sand Point plant does not process crab and has not processed herring since 1996, and in its groundfish operation has emphasized pollock over Pacific cod. It processes significantly more pollock than does the King Cove plant, but less "other groundfish" and much less Pacific cod of BSAI origin. Salmon is also processed in Sand Point, but much less than in King Cove. Through time, the King Cove plant has maintained a diversity of processing, while the Sand Point plant has become somewhat less diversified. Both plants are currently seeking new species and product opportunities. These dynamics have changed the distribution and peak of employment effort at the seafood plants, which have been further influenced by the affects of the AFA. Detailed production figures cannot be disclosed for the plants because of confidentiality restrictions. King Cove is somewhat unique among the four key regional groundfish ports insofar as it is relatively more dependent upon Pacific cod than pollock, among the groundfish species landed. Sand Point follows the more typical pattern, processing more pollock than Pacific cod. The two plants vary in their

pollock product mix, but both plants can now produce surimi as well as fillets. The relative dependence of the plants on different species has varied over time and with stock fluctuations. For instance, for both plants 1993 was clearly a very good year for salmon, while 1996 and 1997 were both poor salmon years. The pattern has been that the Sand Point plant depends more on pollock and groundfish in general, and the lesser (but significant) dependence of King Cove upon groundfish (most of which is not pollock) and its greater dependence on crab and salmon. While changes from 1999 to 2000 cannot be definitively stated to be other than statistical fluctuations, it is interesting to note that for King Cove the poundage processed and percentage of total plant dollars for crab decreased, while groundfish increased somewhat. For Sand Point, the pattern for 1999 and before had been for pollock to contribute more than non-pollock groundfish, both in terms of weight and value. This was reversed for 2000. These changes are made somewhat more tentative due to the lack of halibut data in the year 2000 data provided to us by NPFMC staff.

One of the plants obtains Bering Sea pollock in coordination with operations owned by the same company and located in one of the Bering Sea communities. This operation is unique among inshore operators for the degree of coordination across regions and for the way Bering Sea pollock processing is managed between regions. For the other plant, GOA pollock is obtained from the local small boat fleet as well as from a small number of outside boats, but BSAI pollock is obtained exclusively from larger capacity non-resident boats. Neither plant shows up in the 1991 BSAI pollock harvest data, but both appear in the 1994 data, and both increased in volume from 1994 to 1996. The trend since 1996 has been for a decline in the amount of BSAI pollock that these plants process, with a sharp decline between 1999 and 2000, which corresponds with the implementation of AFA for onshore plants.

In terms of employment, 87 percent of Sand Point's workforce is employed full time in the commercial fishery; for King Cove this figure is more than 80 percent (USACE 1998, 1997). In both cases, fishing employment is followed by local government (borough and local) and then by private businesses. Seafood processing ranks after each of these other employers, meaning that the vast majority of the workforce at the shoreplants are not counted as community residents.

In terms of articulation with the community at large, the plants in Sand Point and King Cove are quite different from those in Unalaska/Dutch Harbor or Akutan. As noted, compared to Sand Point and King Cove, the development of commercial seafood processing in Unalaska/Dutch Harbor and Akutan is a relatively recent development (at least in terms of continuity of operations at specific facilities). Both Sand Point and King Cove processors have longstanding relationships with the local catcher fleet which, in turn, is the source of most employment in the community (among permanent residents). This is a sharp contrast to Unalaska. Unalaska is the site of multiple shoreplants, and has a much more 'industrial' fishery than does either Sand Point or King Cove, but this is changing, particularly with respect to Bering Sea pollock, which is not fished by the local small boat fleet. As noted above, the boats delivering BSAI pollock to Sand Point and King Cove are 'Bering Sea' boats, of the same type delivering to the inshore sector elsewhere.

Another major difference between the fishing industry in Unalaska/Dutch Harbor and Sand Point and King Cove is the role of the support sector in the communities. Unalaska has a well developed support service sector, unlike either Sand Point or King Cove. In both Sand Point and King Cove, the lone processing plant has historically provided a variety of fleet support services that the plants in Unalaska no longer have to provide with the development of a support sector. In terms of relationships between inshore and offshore components of the groundfish fishery, Sand Point and King Cove are in quite different positions than Unalaska/Dutch Harbor or Akutan. Unlike Unalaska/Dutch Harbor, neither Sand Point nor King Cove have

enterprises related to the offshore sector or derive direct revenues from the offshore sector (although the plant in Sand Point is part of a company which also owns catcher processors). Unlike Akutan, Sand Point and King Cove are not CDQ-qualified communities, and are thus unable to directly participate in CDQ fisheries.

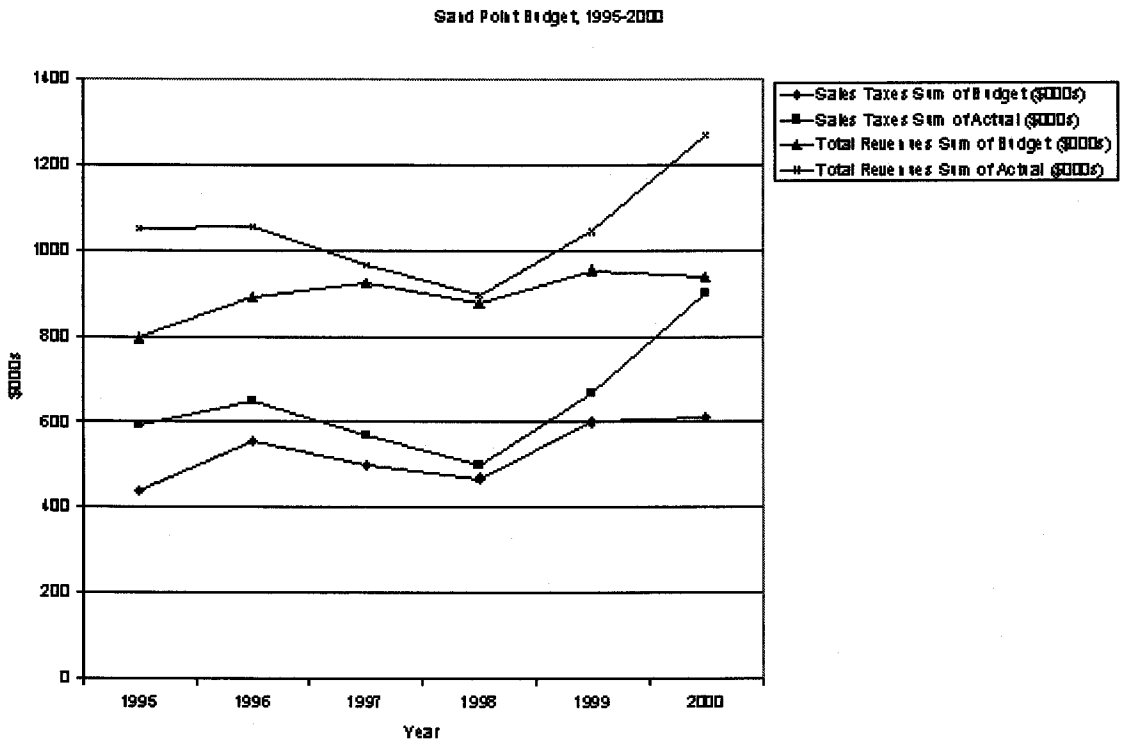
Changes associated with the recent restructuring of the groundfish fishery under AFA have been felt in both communities. The processors in both Sand Point and King Cove are qualified as AFA (BSAI pollock) processors. Of the two, however, only the King Cove plant also has a Co-op Processor Endorsement, as five CVs did deliver at least 80 percent of their inshore pollock to the King Cove plant during the AFA-qualifying period (while delivering most of their pollock offshore to a mothership owned by the same company as the shoreplant). The King Cove plant is relatively well located to process BSAI pollock, and is somewhat on the periphery of GOA pollock. The Sand Point processor does not have a Co-op Processor Endorsement, as every boat which delivered BSAI pollock to this plant delivered over 80 percent of its BSAI pollock to another plant owned by the same company in the Bering Sea. The operational pattern for the Sand Point plant was to serve as a "relief valve" for this Bering Sea plant during the open access race for fish. This maximized the amount of BSAI pollock that the parent company could process. With the implementation of the AFA and the end of the race for fish, the BSAI pollock season was lengthened and the rate of harvest (and processing) reduced. This much reduced the need to divert pollock to be processed at the Sand Point plant and seems to have confined this need to the "A" and "B" roe seasons. The reason given for this was that the need to harvest roe at its peak imposes a natural and inevitable "race for roe" that at times resulted in a harvest of more fish than could be processed by the Bering Sea plant alone. Sand Point and company managers saw little need to process "C" or "D" season BSAI pollock in the Sand Point plant. The imprecise processing figures we have for 2000, compared to 1999, seem to support this change, as the Sand Point plant processed significantly less BSAI pollock than in the year before, as well as significantly less pollock overall. Steller sea lion measures, and a shift of GOA pollock quota to the Kodiak Shelikof area, no doubt have a significant role in this change as well.

Although the King Cove plant processes significantly more BSAI cod than the Sand Point plant, its current production is less than in the past and has been declining. The Peter Pan Seafoods 2000 Co-op Report notes that the cod sideboard allocations of the five vessels delivering pollock to the King Cove plant were allocated to the mothership sector, and they report a reduction in their tendering needs for Pacific cod. More information is available from the AFA Report to Congress (NPFMC 2001) on recent operation dynamics in Sand Point than in King Cove. Volume available to the plant has decreased, for a number of reasons, low local quotas and Steller sea lion measures among them. Prices are low, with the only real "money makers" being "by-products" such as pollock roe, cod milt, and cod stomachs. They have been forced to modify their operations accordingly, primarily to scale back and economize wherever they can. Their peak labor force used to be in the summer for salmon, but is now in January and February for groundfish. There will be a secondary peak in the summer, but earnings then will not be nearly as high. They have a much reduced labor force even at their peak (about 250+), and have closed some of their bunk house facilities. Their core processing group is now perhaps 40+ processors, maintenance, and professional people. They have fewer processor foremen positions, as well as fewer office staff. They have also reduced the inventory in their store and, perhaps more significantly, have reduced the inventory of boat supplies and repair materials that they keep in stock. According to one senior manager, "For so long the idea was to work people as many hours as possible. Now that the fish are not in the pipeline, the idea is to match the workforce to the fish throughput."

There are few quantitative measures of economic activity in Sand Point which reflect the most recent dynamics. Available information on the overall budget for the City of Sand Point, and the receipt of sales taxes, indicates that these amounts have been steadily increasing (Figure 1.3-1). It should be noted that the reporting years end June 30, so that the most recent information is from June 30, 2000. The Sand Point Mayor reports that for this year (2001), sales tax receipts are significantly less than for last year, by somewhat over 20 percent(Gardener, personal communication, 2001[6]). Sales taxes are composed primarily of the raw fish tax and taxes on general retail sales, and the increase in 2000 is due primarily to the collection of significantly more fish taxes than expected. Information available on the value of processing in Sand Point is not totally consistent with this fish tax information, but is subject to estimation problems, especially for products with pricing mechanisms like that of roe. It is likely that roe prices in 1999 and 2000 account for the higher than expected tax receipts. Volume of production at both the Sand Point and King Cove plants declined significantly in 2000, after hitting peaks in 1999 that were the highest since 1993.

[6]Gardener, Glen, Mayor of Sand Point AK. In-person interview in Sand Point 03/20/01.

Figure 1.3-1. Sand Point Budget, 1995-2000



Retail and support activities in Sand Point are difficult to gauge, and company records are not available. Sales before June 30, 2000 are of course aggregated into the general sales tax information presented above. The Native Corporation started a retail grocery store, in order to provide some price competition for the long-time single grocer in the community (the processing plant also has a store, which is used mainly by its processing workers). This investment was made in 1997, when fishing conditions looked good, along with the purchase of a local NAPA store. The NAPA enterprise went out of business in 2000, but the store has been doing comparatively well. Corporation officers reported that even in these times of depressed economic activity that the store had gross sales of somewhat ahead of 2000 in the first quarter of 2001. They estimate that the more established store does approximately four times as much business as their store, and that store certainly stocks a much wider range of goods. The corporation has owned a local tavern since 1975, and it has consistently made a profit. The corporation's hotel is also successful, although it is busier in the winter than in the summer. A private bed and breakfast that was started recently has developed a strong business and tends to be full year-round. There are limited restaurants in the community, and one is currently up for sale.

Housing in Sand Point has always been in short supply, primarily because most housing is built through government agencies. There has not been any recent residential construction. Several families looking for permanent housing were staying at the corporation's hotel during the winter of 2000-2001. This is not only an indicator of a restricted housing supply, but also an indicator that the hotel has rooms available during the winter. Local residents did report that some houses are occupied only seasonally, in conjunction with the

summer fisheries, but that such houses were generally not available for rent, except perhaps to family, friends, and other "known" people.

The Sand Point and King Cove economies are still very cyclical, and tied to fishing and fish processing. In early 2001, because of expected low salmon prices, most people were expecting severe local effects from a number of fisheries related downturns as well as non-fisheries related events. For example, the failure of Reeve Aleutian Airlines has meant less travel by local residents. Several families have moved out of Sand Point and the school enrollment is significantly lower in 2001 and in 2000. Mail service is said to have been decreased in frequency. Overall retail economic activity is said to be reduced, and the corporation did not operate the lounge (bar and simple food) associated with the hotel in the winter of 2000-2001, although the tavern still did a good business. Given that many of the factors cited for these effects are regional and cumulative in nature (low fish prices, Steller sea lion measures, competition from farmed fish, Area M changes, negative impacts to Sand Point resulting from AFA-related conditions, and other management and resource concerns), it is possible that King Cove and Sand Point may grow in size because of population movement from smaller regional communities in even worse economic shape. This is not likely to strengthen the local economy, however.

The dynamics of the "available labor force" were also noted to have recently changed. Local resident wage and salary jobs have in the past been fairly well differentiated by sex – men either fished or worked at some "outside" occupation in a "land" department such as construction, maintenance, or fire and police. Women tended to fill office and service positions. Employers have started to see a change in this pattern, as more men are applying for steady (even if relatively low paying) jobs on land rather than fishing. The most commonly cited factor for this was the projected low salmon price, with the expectation that salmon members crew shares would not amount to very much. Other families have considered moving. The common pattern in the past has been for locals to graduate from high school and either go fishing or move to another community. There has been relatively little turnover in local jobs, as these jobs tend to be highly valued by those who occupy them since there are relatively few of them (and there are of course jobs that are held by more transient non-locals). Local opportunities are seen as quite constrained, and the local Native Corporations are looking more for non-local investment opportunities rather than local ones. It was pointed out by several people that development opportunities in Sand Point are quite limited. Limited air service makes the shipment of fish products very difficult, and precludes a great number of "value added" enterprises. Reeves Aleutian Airlines flew relatively large planes into Sand Point, but has been replaced by PenAir, which flies smaller planes and is more focused on passenger and mail service than on cargo.

The annual fishing and processing cycles for King Cove and Sand Point processors and communities have changed in the very recent past, and this is in good part attributable to AFA. For King Cove, crab deliveries and processing were much reduced in 2000 from those in 1999, and BSAI Pacific cod may have been similarly affected by AFA sideboard measures. The Peter Pan Seafoods 2000 Co-op Report indicates that the King Cove plant took delivery of Bering Sea pollock on four days in February, five days in March, two days in April, ten days in September, and five days in October. For Sand Point, plant managers reported less Bering Sea pollock being delivered during the "A" and "B" seasons, and very much less, if any, during the "C" and "D" seasons. This reflects the historical pattern for King Cove BSAI pollock, but a reduction for Sand Point. Crab and Pacific cod reductions were much more significant for King Cove. While the BSAI pollock reductions were significant for the Sand Point plant, it is likely that they are only part of a much larger pattern also involving Steller sea lion protective measures and the availability (or lack of it) of pollock quota

in the GOA. Similarly, community services are perceived to be in danger from decreased revenue flows resulting from reduced processing.

1.4 SUPPLEMENTAL REGIONAL PARTICIPATION NOTES: CHIGNIK AND DUTCH HARBOR

This section contains supplemental notes on the participation of the Chignik/Peninsula area communities in the North Pacific groundfish fishery, as well as some additional information on the Dutch Harbor small boat fleet participation in that fishery. These two sections provide some descriptive information that is useful as background information for the consideration of Alternative 4, Options 1 and 2, of this SSL SEIS. These options cover the Chignik/Area 4 exemption and the Dutch Harbor/Area 9 (Bogoslof) small boat exemption, respectively. Comprehensive social impact analysis was conducted for these options, but the following existing data are presented to provide a limited context description of these two issue areas.

1.4.1 Chignik/Peninsula Area Community and Groundfish Participation Notes

In addition to the communities mentioned in the above community profiles, engagement in the groundfish fishery has increased in some of the other small communities in the region in recent years. Because of the potential utility of this information for future consideration of Option 1 (Chignik/Area 4 small boat exemption) of Alternative 4 of this SEIS, some brief existing conditions information in presented here. This section draws on both standard secondary data sources and information from recent public testimony before the NPFMC. Information comparable to that developed for the other four Alaska regions in this document is not available for the Chignik region. This type of information was not specifically developed in this SEIS for these communities, due to the lack of local groundfish processing in recent years, combined with a very low participation in the federal groundfish fishery by the local catcher vessel fleet.

Population information from the 2000 U.S. Census for Chignik City (also known as Chignik Bay), Chignik Lagoon, Ivanof Bay, and Perryville is presented in Table 1.4-1. As shown, these are small communities, ranging in size from 22 to 145 residents, and all have strong majority Alaska Native populations. There is very little demographic diversity in these communities, with white and Alaska Native residents accounting for all but 8 persons in these five communities.

Table 1.4-1 Demographic Characteristics, Selected Lake and Peninsula Borough Communities, 2000

Race/Ethnicity	Chignik City		Chignik Lagoon		Chignik Lake		Ivanof Bay		Perryville	
	N	%	N	%	N	%	N	%	N	%
White	25	31.6	12	11.7	17	11.7	1	4.5	2	1.9
African American	-	-	1	1.0	-	-	-	-	-	-
Native American/Alaska Native	48	60.8	84	81.6	126	86.9	21	95.5	104	97.2
Nat. Hawaiian/Other Pac Islander	2	2.5	-	-	-	-	-	-	-	-
Asian	2	2.5	-	-	1	0.7	-	-	-	-
Some Other Race	1	1.3	-	-	-	-	-	-	-	-
Two Or More Races	1	1.3	6	5.8	1	0.7	-	-	1	0.9
Total	79	100	103	100	145	100	22	100	107	100
Hispanic*	1	1.3	-	-	2	1.4	-	-	-	-

Source: U.S. Bureau of Census.

* 'Hispanic' is an ethnic category and may include individuals of any race (and therefore is not included in the total as this would result in double counting).

\- Represents zero or rounds to zero.

Vessels from the Chigniks, Ivanof Bay and Perryville have recently (since 1997) increased their participation in groundfish fisheries. While there was reportedly substantial local groundfish harvesting and processing in the early 1990s, for several years prior to 1997 there were not enough vessels participating to allow release of value information, due to confidentiality restrictions. According to public testimony by both a local government representative and local Chignik fishermen at the October, 2001 NPFMC meetings in Seattle, the lack of groundfish landings during the mid-1990s was due to the lack of a local market (i.e., lack of an interested local processor) rather than a lack of interest on the part of the resident catcher vessel owners. Of the recent years for which data can be released, participation was highest in 1999 when 21 vessels made combined state and federal waters targeted groundfish landings generating $1.14 million in ex-vessel values with an average of $54,290 per vessel. Over 99 percent of the value was generated from Pacific cod, 95 percent of which were harvested with pots, with the remaining 5 percent harvested with jig gear. Of the local jig gear harvest, approximately 98 percent came from state water fisheries and 2 percent from federal waters. Given that Option 1 was modified between the Draft and Final SEIS to such that the Area 4 (Chignik) restriction does not apply to vessels using jig gear, there would be no impacts to this portion of the fleet resulting from the limited fishing zone. For pot gear, approximately 71 percent came from state waters and 29 percent from federal waters (see Table 2.5-11 of this SEIS). All of the vessels are in the FGCV 33-59 class or are "Ghost Vessels" (i.e., they did not have landings sufficient to meet the classification criteria for any specific groundfish gear class) and all of these vessels participate in other fisheries, particularly salmon. In terms of relative value of groundfish and non-groundfish activity for these vessels, for the years shown in the table, non-groundfish ex-vessel values were 2.7 times greater than the ex-vessel values in groundfish for these same vessels.

Table 1.4-2 Participation in State and Federal Grounfish Fisheries of Vessels from the Chigniks, 1997-2000

Year	Total Ex-vessel Value ($Millions)	Number of Vessels	Average Ex-Vessel Value (dollars per vessel)
1997	$0.35	9	$38,749
1998	$0.18	6	$29,669
1999	$1.14	21	$54,290
2000	$0.51	14	$36,209

Note: All vessels are either in the fixed gear catcher vessel 33-59' vessel class or are "ghost vessels' and are from Chignik Bay, Chignik Lagoon, Chignik Lake, Ivanof Bay, or Perryville.
Source: CFEC/ADFG Fish Tickets, June, 2001

According to public testimony given before the Advisory Panel at the October, 2001 NPFMC meetings in Seattle, by the individual fisherman involved, there is only one vessel from Chignik that is currently fishing in area federal waters rather than exclusively in state waters for groundfish. Also according to this testimony, this is a 58 foot vessel that utilizes pot gear in this fishery, and it accesses the processing market in Sand Point as there is currently no local market for groundfish in the Chigniks during the federal open season.

According to public testimony given by the Mayor of the City of Chignik before the Advisory Panel at the October, 2001 NPFMC meetings in Seattle, the groundfish fishery is an important part of economic foundation of the community, and has the potential for being much more important in the future. According to this testimony, several millions of dollars have been obtained for infrastructure improvements in Chignik Bay, including a small boat harbor, water/sewer improvements, and a new public (City) dock, and it is planned that these improvements be paid for in part through a 2 percent local groundfish landing tax instituted in 1997 and earmarked for the improvement of port facilities. The mayor also quoted language from the RIR (Appendix C to this SEIS) regarding the burdens on local social service agencies and noted that the follow statements that statements from the RIR are directly applicable to Chignik: "few, if any, viable alternative sources of economic activity exist in most of these rural coastal Alaska communities .. Fishing is the economic base in many of these communities. Moreover, these communities are generally very 'fragile,' in the sense that they do not have well-developed secondary economic sectors." The conclusion drawn in this testimony was that any adverse impacts to the local groundfish fishery, including preclusion of the potential for expansion of the portion of this fishery in federal waters over and above the level of effort seen in the recent (if not more distant) past, would have adverse impacts on the infrastructure investments and improvements that are underway. According to the mayor, these improvements to the only deep water port in the Chigniks (and the Lake and Peninsula Borough) were undertaken to induce or stimulate the local fishery economy (and particularly to attract local processing capacity and the associated market) through the availability of public sector facilities, rather than to service already existing demand. Specifically, according to the mayor's testimony, historically zero tax revenue has resulted from local groundfish activity in the federally managed fishery, as the City was not a taxing entity prior to the mid-1990s (i.e., not until after the end of the period in the late 1980s and early 1990s when there was locally significant groundfish processing activity that included groundfish from federal waters). In other words, the direct impacts of the Area 4 fishing restrictions would be minimal, with public testimony suggesting that only one vessel would be excluded from fishing as it has in

the last few years. On the other hand, the preclusion of the possibility of developing a federal waters based fishery beyond existing use levels - or, perhaps more accurately from the community perspective, the preclusion of resuming a fishery at reported historical levels - could have a substantial impact on the economy of these communities in the long term.

Concerns were also expressed by Chignik area residents at public testimony at the October 2001 NPFMC meetings in Seattle included the possibility that if nearby federal waters were closed to groundfishing, adjacent state waters where Chignik fishermen are reported to currently harvest nearly all of their groundfish take may be closed as well to create a larger and contiguous shore to deep water closure area. This would be a cumulative type of impact that could result from the proposed alternatives.

1.4.2 Supplemental Unalaska/Dutch Harbor Small Boat Fleet Notes

The Unalaska/Dutch Harbor small boat fleet participation in the groundfish fishery is described in Section 1.1, above. This section provides some additional information specific to the Bering Sea small vessel Pacific cod fishery for potential use in a consideration of Alternative 4/Option 2, the Dutch Harbor small boat exemption for the Area 9 (Bogoslof) exclusion area. (Summary impact information on this option is presented in Section 4.12.2.2.1 of the main body of this SEIS.)

The following two tables show data for the number of vessels less than 60' in length with landings in Pacific cod target fisheries in the Bering Sea FMP subarea by year for the period 1992-2000. While almost all of these landings were delivered to processors on Unalaska Island (Unalaska/Dutch Harbor and Beaver Inlet) and Akutan, there are very small amounts delivered to a limited number of other regional communities. These tables show the universe of small vessels making landings, including vessels from Unalaska/Dutch Harbor and elsewhere. Unlike the case of the Chignik area fishery, there is no state waters groundfish fishery anywhere near the community of Unalaska. Table 1.4-3 provides vessel number data for all vessels under 60' with relevant landings, while Table 1.4-4 shows vessel number data for the subset of these vessels with fixed gear Pacific cod landings.

Table 1.4-3 All Vessels < 60' with Landings in Pacific Cod Target Fisheries from the Bering Sea, 1992-2000

Year	Number of Vessels				
	TCV < 60'	FGCV 33-59'	FGCV ≤ 32'	Ghost	Total
1992	2	32	12	7	53
1993	3	9	1	3	16
1994	3	16	14	9	42
1995	5	28	18	10	61
1996	0	17	9	14	40
1997	1	11	10	3	25
1998	2	9	7	2	20
1999	1	7	5	3	16
2000	1	14	6	3	24

Source: CFEC/ADFG Fish Tickets, June 2001

Table 1.4-4 All Vessels < 60' with Fixed Gear Landings in Pacific Cod Target Fisheries from the Bering Sea, 1992-2000

Year	Number of Vessels				
	TCV < 60'	FGCV 33-59'	FGCV ≤ 32'	Ghost	Total
1992	0	31	12	7	50
1993	0	9	1	3	13
1994	3	16	14	9	42
1995	5	28	18	10	61
1996	0	17	8	14	39
1997	1	11	10	2	24
1998	0	9	6	1	16
1999	0	6	5	3	14
2000	0	14	6	3	23

Source: CFEC/ADFG Fish Tickets, June 2001

The following two tables show revenue data for vessels less than 60' in length with landings in Pacific cod target fisheries in the Bering Sea FMP subarea. As noted for the previous two tables, almost all of these landings were delivered to processors on Unalaska Island and Akutan, but there are also very small amounts delivered to a limited number of other regional communities. Table 1.4-5 provides vessel revenue data for all vessels under 60' with relevant landings, while Table 1.4-6 shows vessel revenue data for the subset of these vessels with fixed gear Pacific cod landings.

Table 1.4-5 Ex-Vessel Revenues of Vessels < 60' with Landings in Pacific Cod Target Fisheries from the Bering Sea, 1992-2000

Year	Ex-Vessel Revenues (Millions of Dollars)				
	TCV < 60'	FGCV 33-59'	FGCV ≤ 32'	Ghost	Total
1992	0.023	0.158	0.060	a	0.241
1993	0.056	0.098	b	a	0.154
1994	0.025	0.352	0.153	a	0.530
1995	0.026	0.686	0.122	0.005	0.839
1996	0.000	0.181	0.045	0.007	0.233
1997	0.011	0.097	0.043	a	0.151
1998	0.025	0.102	0.038	a	0.165
1999	0.002	0.088	0.033	a	0.123
2000	0.003	0.157	0.035	a	0.195

Notes:

[a] indicates that catch total was added to TCV < 60' total to comply with confidentiality restrictions.

[b] indicates that catch total was added to FGCV 33-59' total to comply with confidentiality restrictions.

Source: CFEC/ADFG Fish Tickets, June 2001

Table 1.4-6 Ex-Vessel Revenues of Vessels < 60' with Fixed Gear Landings in Pacific Cod Target Fisheries from the Bering Sea, 1992-2000

Year	Ex-Vessel Revenues (Millions of Dollars)				
	TCV < 60'	FGCV 33-59'	FGCV ≤ 32'	Ghost	Total
1992	0.000	0.158	0.060	0.004	0.222
1993	0.000	0.095	0.004	b	0.099
1994	a	0.373	0.153	0.004	0.530
1995	0.026	0.686	0.122	0.005	0.839
1996	0.000	0.181	0.040	0.005	0.226
1997	a	0.106	0.043	b	0.149
1998	0.000	0.102	0.039	b	0.141
1999	0.000	0.079	0.033	b	0.112
2000	0.000	0.157	0.036	b	0.193

Notes:

[a] indicates that catch total was added to FGCV 33-59' total to comply with confidentiality restrictions.

[b] indicates that catch total was added to FGCV ≤ 32' total to comply with confidentiality restrictions.

Source: CFEC/ADFG Fish Tickets, June 2001

2.0 KODIAK REGION COMMUNITIES

Within the Kodiak region, the City of Kodiak is the location of virtually all of the direct links with the groundfish fishery, so it will be the only regional community discussed in detail. (Processing data does show that groundfish are also run at Atilak, but this is a relatively specialized operation and very small relative to the aggregated operations associated with the City of Kodiak.) This section will draw upon previous profiles (IAI 1991, Northern Economics 1994, IAI 1994) as well as more current information from the Groundfish SEIS and field interviews conducted for AFA and SSL analysis.

2.1 KODIAK

Kodiak's identity is that of a fishing community. Through time, both its fishermen and processors have developed a dependency upon groundfish (summarized below), but a singular characteristic of both sectors is the participation in many different fisheries. That is, many participants display a wide diversification in their fishery operations. This section will focus on their participation in the groundfish fishery, and on linkages between the community and the groundfish fishery.

Commercial fish processing in the Kodiak region began on the Karluk spit in 1882. Not long after that, canneries were established in the community of Kodiak. While the quantity and form of shore processing plants in Kodiak has changed, this sector remains an influential component of the fishing industry that is, in turn, fundamental to the community and its economy.

Shore processing facilities or "canneries" in the Kodiak region concentrated primarily on salmon and herring prior to 1950, although there was a cold storage facility at Port Williams where halibut was frequently landed. As their common name suggests, the product produced was most often canned fish. Cannery operations expanded in the 1950s to accommodate King crab processing. Thirty-two processors processed 90 million pounds of crab in 1966. In the following years, there was some growth within the sector; for example, one new shore plant was built in Kodiak in 1968. Declining harvest levels, however, prompted several shore plants to move their operations during the late 1960s and early 1970s to Unalaska/Dutch Harbor in the Aleutian Islands, closer to the larger supply of Bering Sea-Aleutian Island King crab. This move also diverted some of the crab which had previously been taken to Kodiak for processing, and the number of shore plants in Kodiak declined by more than half. A temporary resurgence in the Kodiak red King crab stocks in the mid-to-late 1970s instigated expansion of existing plants once again, and fostered the building of two new plants in Kodiak. Larger freezing capacity was a notable addition to most of the shore plants. This allowed flexibility in storing larger volumes and processing more species into more diversified products. Larger docks also became important to the processors so that they could unload more boats in a given amount of time. With a larger overall capacity to process fish, competition by the plants for the fish resource increased, and the rate of return for individual shore plants declined. Diminishing crab stocks as the fishery entered the 1980s compounded this problem. After a record catch in 1980, the Kodiak King crab stocks crashed. Several factors, including over harvesting and natural conditions, have been cited by fishermen and scientific sources as contributors to this collapse. There has not been a red King crab opening in the Gulf of Alaska since 1982. Waters around Kodiak still produce tanner and Dungeness crab fisheries, and Kodiak shore plants process these species in addition to the few deliveries of crab they receive from boats returning from the Bering Sea fishery.

When King crab stocks started to crash in the late 1960s, some of the Kodiak plants sought to diversify. At least one plant added facilities to separate the previously dominant crab line; and the main plant was then converted into a shrimp plant. Other plants report they "evolved into shrimp" to augment their crab production. Kodiak shrimp landings peaked in 1971, and stocks crashed in the late 1970s. The reason, while not definitive, may have been related to predation by large stocks of cod and pollock. Between 1978 and 1981, several Kodiak processing plants stopped shrimp production.

Efforts to fish Dungeness crab along the Kodiak coastline were slower to intensify, and landings peaked in 1981. At about the time when the Kodiak shore plants started processing shrimp, the bairdi tanner crab fishery "started to become a reality," but the tanner crab seasons, like the seasons of other crab species, soon became shorter and less productive. Many of the plants maintained halibut production lines while they were processing crab, shrimp, and salmon. At that time, halibut processing was not the intense activity it was to become under the Olympic open access system. The season was open most of the year and there were relatively few boats fishing it. As the crab and shrimp faded as viable resources to maintain shore-plant production, salmon became much more important to the processing companies in Kodiak, as they continued looking for products to fill the gaps in their production.

The provisions of the Magnuson Act of 1976 gradually expelled the foreign fleets capitalizing on the groundfish fishery within the Gulf of Alaska EEZ, while American boats and processors entered the fishery. By the late 1970s a few Kodiak shore plants, according to one plant manager, started experimenting with groundfish resources "because there wasn't much crab to do." However, the majority of the groundfish caught prior to 1988 was processed aboard foreign vessels, first by wholly foreign operations, and then by joint ventures where American boats delivered to floating foreign processors. One informant described the late 1970s and 1980s as years of "forced" diversification:

> In that same time period [late 70s-early 80s] we started playing around with halibut and black cod, and very early playing around with other groundfish, and then in the mid-80s we got a lot more serious, and then in 1988 we built the new factory for surimi. It's pretty easy to see that we were kind of just forced into it. I mean, if you wanted to stay in the fish business you got into groundfish because that is all there was. And of course during that whole period, we continued to process salmon and herring and other products that were available to us.

Plant and dock expansions fostered their ability to further utilize groundfish resources. The first surimi production in Alaska took place in Kodiak in 1985 with the aid of an Alaska Fisheries Development Foundation Saltonstall-Kennedy grant. Also in the mid-80s, "the State of Alaska came out with their tax credit program for getting into the groundfish, and so we fully utilized that," according to one plant operator, and his was not the only plant to do so. In 1987, a single plant processed about one-third of all the pollock that was taken out of the Gulf, but tax credits and other incentives contributed to additional effort and capitalization in the processing sector. This had limiting effects on large volumes being received by any one plant. The growth of the shore-based groundfish fishery in the Gulf of Alaska provided most Kodiak processors with products needed to keep their plants running nearly year round. Large capital investments made the capacity to process groundfish resources greater than the total amount delivered, but a number of factors have converged to change operations significantly. Changing seasons have forestalled the opportunity to run plant operations year-round or at maximum capacity for extended periods of time, and competition for the "race for fish" stimulated overcapitalization in both the harvesting and processing sectors. Inshore/Offshore-1 management measures provided protection to GOA onshore processors and the harvesters who deliver to

them from preemption by the offshore sector, but even with license limitation the GOA fishery is still characterized by overcapitalization. The derby-style fishing tactics and, in particular, the large volumes of pollock that can be caught in a short amount of time with contemporary equipment and technology can effectively "plug" the shore plants. If plants increase their capacity to handle these peak demands, they are essentially "capitalizing for inefficiency" as much of this capacity will be idle for most of the year. After the implementation of the AFA in the Bering Sea, some Kodiak processors also cite the "race for history" in GOA fisheries (and especially pollock) as an additional pressure towards inefficiency in local groundfish fisheries, in anticipation of eventual groundfish rationalization of some sort in the GOA.

The development or evolution of the Kodiak harvesting fleet has essentially paralleled that of the processors to which they deliver (along with the development of a fleet component that in part or in whole participates in Bering Sea fisheries). The details and dynamics are somewhat complex, but have resulted in a fleet of multi-species, multi-gear boats (although trawlers may be somewhat more specialized, they can also switch gear or work as tenders). This versatility is especially important to harvesters as seasons have become more compressed and competition to harvest the resources has increased, although management restrictions such as license limitations or IFQs have increased the cost and perhaps reduced the possibility for such versatility. Kodiak fishermen greatly value having options and making their own decisions. Thus, both the potential benefits (generally increased stability of access and amount harvested for those who can fish) and the potential costs (increased cost for entry into fisheries and reduced flexibility) of any proposed management alternatives are generally quite clear to them.

Kodiak's economy has become increasingly diversified. The Coast Guard base, although relatively self-sufficient, contributes a great deal to the local economy. Housing has been relatively scarce since the 1980s and new house construction has been constant since that time, both to meet this demand as well as in a response to increased population and more Coast Guard personnel living off-base. The housing market is currently softer than it has been in the collective memory of most Kodiak residents, due to the problems of the fishing industry. The service sector, and especially the retail sector, has continued to grow and has become increasingly important. Fishing support services have been affected by the downturn in the fishing industry. The local timber industry is at a relative low point currently, but has been significant in the past. Education is an important economic and social component, represented by the facilities of Kodiak College and The Fishery Industrial Technology Center. The aerospace industry has the potential, through the rocket launch facility, to contribute to the economy both directly as well as more indirectly through support services and facilities provided to outside specialists who work at the launches.

Population

Table 2.1-1 provides sufficient detail to discuss Kodiak's gross population dynamics. The Russian history of Kodiak will not be discussed here. The City of Kodiak did not attain the status of the largest community on the island until about 1920 or so, and has grown steadily since then. The KIB was formed much later, and numbers for the borough are not available until 1960 when 7,174 people were enumerated. Named places within KIB only totaled 3,320 people however (mostly in the City of Kodiak). Based on present conditions, it can be assumed that most of the difference (whatever its "true" value) represented people living in the area of, but outside of the city limits of, the City of Kodiak (Linda Freed, personal communication 2001[7]). This

[7]Freed, Linda, Director of Community Development, Kodiak Island Borough, AK 6/00

would account for a good deal of the sudden increase between 1950 and 1960 of the population of the "Greater City of Kodiak" (Table 2.1-1).

Table 2.1-1 Kodiak Island Region Population 1880-2000

Year	KIB	Greater City of Kodiak[1]	City of Kodiak	Total Hinterland[2]
1880	NA	0	0	694
1890	NA	495	495	1,334
1900	NA	341	341	623
1910	NA	438	438	655
1920	NA	374	374	343
1930	NA	442	442	444
1940	NA	864	864	589
1950	NA	1,710	1,710	567
1960	7,174	6,482	2,628	692
1970	6,357	5,358	3,798	999
1980	9,939	8,842	4,756	1,097
1990	13,309	11,610	6,365	1,699
1999	13,989	12,185	6,893	1,804
2000	13,913	12,211	6,334	1,702

1 "Greater City of Kodiak" encompasses the City of Kodiak, Kodiak Station, and the derived unincorporated population – see text

2 "Total Hinterland" is the total population of all named places on Kodiak Island, other than the City of Kodiak and Kodiak Station

Source: DCED for named places; 'Greater City of Kodiak' and 'Total Hinterland' are derived values - see text.

The 2000 "unincorporated population" is 4,037 and is generally believed to approximate the population that could be considered part of the "greater City of Kodiak" area but not within its incorporated city limits. This "unincorporated" population is thus equal to about 64 percent of the city's 2000 incorporated population of 6,334. This is a dramatic relative increase, from only 50 percent in 1999, and reflects a slight increase in the "unincorporated" population and a decrease in the City of Kodiak population. An additional 1,840 people live on the Coast Guard base, which most people also consider as part of the "greater City of Kodiak" area. Together these three populations include 12,211 of the KIB's total 2000 population of 13,913, or about 86 percent. Note that this does not include Chiniak or Women's Bay (about 5 percent of the KIB's population) as part of the "Greater City of Kodiak," although it could be argued that they should be. This calculated percentage has varied from 84 to 90 percent since the formation of the KIB. Prior to that time (1880-1950) the City of Kodiak had been increasing in size relative to the other named places on the island (Table 2.1-1).

A common dynamic in fish processing towns is that the population increases seasonally, during peak harvest and processing periods. In Kodiak, this has historically occurred in summer (July and August). With the development of groundfish processing, Kodiak processors have increasingly tried to operate year-round with

an increasingly resident labor force. The strong national economy has also decreased the number of people willing to come to Kodiak to work seasonally, and the cost of transporting and training such temporary employees has also increased. While such transient workers are still part of Kodiak, they had not been as significant as in the past, due to the development of a more resident processing work force. Recent trends may be for the increased employment of more transient workers. These dynamics are discussed below in terms of the processing and harvesting labor force.

Ethnicity

Kodiak is a complex community in terms of the ethnic composition of its population. Sugpiaqs (Koniags) were the original inhabitants of Kodiak Island. In the late 1700s Russian contact and their sea otter operations had devastating effects on the Native population and culture. Alutiiq is the present-day Native language. Alaska (and Kodiak) became a U.S. Territory in 1867, and a cannery opened on Karluk spit in 1867. This marked the start of the development of commercial fishing on Kodiak, although Karluk remained the largest community on the island until about 1920. Fishing and military buildup associated with WWII brought many non-Natives to Kodiak, primarily Caucasians but also a substantial number of other minorities, at least initially associated primarily with fish processing employment.

Tables 2.1-2 through 2.1-4 below present some basic time series information on ethnicity. While the information is not all directly comparable due to changing definitions and different sources, certain conclusions are fairly clear. Most Filipino or Asian and Pacific Islanders live in the City of Kodiak. Nearly all can be assumed to live in the immediate area of that city. They are the segment of the KIB population that is most rapidly increasing, from an unknown population in 1970 (but no more than 3 percent) to 6+ percent in 1980 to 11+ percent in 1990 to 17 percent in 2000. This supports the common community perception, and plant manager reports, that fish processing workers are more of a resident work force than in the past. The Alaskan Native population has stayed at approximately the same percentage through time, but is clearly a smaller percentage of the City of Kodiak population than it is of the KIB as a whole. The Caucasian population has declined in terms of percentage over time. Overall, there has thus been a gradual, long-term shift in ethnic composition, with Asian and Pacific Islanders increasing in percentage and Caucasians declining in percentage. Native Americans and African Americans have shown relatively little change. The U.S. Census Bureau also has collected information on people of "Hispanic Origin" and it is potentially useful as an indicator of population dynamics. Plant managers have reported that they are hiring more Hispanics than in the past, and the limited census information available supports the anecdotal information that the Hispanic population is increasing, located primarily in the City of Kodiak (KIB website). This is the same pattern and dynamic described in IAI 1991.

Table 2.1-2 Ethnic Composition of Population Kodiak Island Borough; 1970, 1980, 1990, and 2000

Race/Ethnicity	1970		1980		1990		2000	
	N	%	N	%	N	%	N	%
White	NA	-	7,046	71%	9,289	70%	8,304	59.7%
African American	NA	-	72	0%	135	1%	134	1%
Native Amer/Alaskan	NA	-	1,710	17%	1,723	13%	2,028	14.6%
Asian/Pacific Islands*	NA	-	624	6%	1,492	11%	2,342	16.8%
Other**	NA	-	283	3%	670	5%	1,105	8%
Total	6,357	-	9,939	100%	13,309	100%	13,913	100%
Hispanic***	NA	-	204	2%	669	5%	848	6.1%

Source: U.S. Bureau of Census.

* In the 2000 census, this was split into Native Hawaii and Other Pacific Islander (pop 110) and Asian (pop 2,232).

** In the 2000 census, this category was Some Other Race (pop 387) and Two or more races (pop 718).

*** Hispanic' is an ethnic category and may include individuals of any race (and therefore is not included in the total as this would result in double counting).

Table 2.1-3 Ethnic Composition of Population Kodiak City; 1970, 1980, 1990, and 2000

Race/Ethnicity	1970		1980		1990		2000	
	N	%	N	%	N	%	N	%
White	3,094	81%	3,337	71%	4,028	63%	2,939	46.4%
African American	44	1%	26	1%	47	1%	44	0.7%
Native Amer/Alaskan	479	13%	573	12%	629	10%	663	10.5%
Asian/Pacific Islands*	NA	-	554	12%	1,282	20%	2,069	32.6%
Other**	116	3%	-	-	379	6%	619	9.8%
Total	3,798	100%	4,686	100%	6,365	100%	6,334	100%
Hispanic***	NA	-	196	4%	403	6%	541	8.5%

Source: U.S. Bureau of Census.

* In the 2000 census, this was split into Native Hawaii and Other Pacific Islander (pop 59) and Asian (pop 2,010)

** In the 2000 census, this category was Some Other Race (pop 276) and Two or more races (pop 343).

***' Hispanic' is an ethnic category and may include individuals of any race (and therefore is not included in the total as this would result in double counting).

Table 2.1-4 provides information on group housing and ethnicity for Kodiak. Group housing in the community is largely associated with the processing workforce. As shown, only six percent of the population lived in group housing in 1990. (Comparable 2000 data are not yet available.) This is a much lower percentage of population in group quarters than in the other communities profiled.

Table 2.1-4 Ethnicity and Group Quarters Housing Information, Kodiak, 1990

Kodiak City	Total Population		Group Quarters Population		Non-Group Quarters Population	
	Number	Percent	Number	Percent	Number	Percent
White	4028	63.28	192	53.93	3836	63.84
Black	29	0.46	3	0.84	26	0.43
American Indian, Eskimo, Aleut	811	12.74	21	5.90	790	13.15
Asian or Pacific Islander	1282	20.14	118	33.15	1164	19.37
Other race	197	3.10	22	6.18	175	2.91
Total Population	6365	100.00	356	100.00	6009	100.00
Hispanic origin, any race	407	6.39	42	11.80	365	6.07
Total Minority Pop	2429	38.16	181	50.84	2248	37.41
Total Non-Minority Pop (White Non-Hispanic)	3936	61.84	175	49.16	3761	62.59

Source: Census 1990 STF2

Age and Sex

The KIB is unbalanced in terms of ratios of males to females (Table 2.1-5). The City of Kodiak shows a similar imbalance, and has been relatively stable in this regard for the period 1970-2000 (Table 2.1-6). This is characteristic of communities where at least one major economic sector disproportionately employs single members of one sex. The fishing industry has historically employed many single males, both as harvesters and processors. Although this population has apparently become more resident (rather than transient) than in the past, evidently this has not greatly affected the overall population's sex composition. Single males are still disproportionately attracted to Kodiak, and females may tend to migrate out more than do males. IAI 1991 indicates that the male/female ratio for the Native population was approximately equal, as would be expected from a resident population. The sex ratio for Caucasians was somewhat skewed (54/46), and for Filipinos was even more skewed. This was interpreted as evidence for a relatively resident Native population, with a predominately resident Caucasian population somewhat more prone to movement in and out, and a much more mobile "other minority" population which contained a smaller percentage of family units with children. This interpretation seems to continue to apply.

Table 2.1-5 Population by Sex, Kodiak Island Borough; 1990 and 2000

	1990		2000	
	N	%	N	%
Male	7,395	56%	7,362	53%
Female	5,914	44%	6,551	47%
Total	13,309	100%	13,913	100%
Median Age	NA		31.6 Years	

Source: U.S. Bureau of the Census

Table 2.1-6 Population by Sex, Kodiak City; 1970, 1980, 1990, and 2000

	1970		1980		1990		2000	
	N	%	N	%	N	%	N	%
Male	2,055	54%	2,498	53%	3,496	55%	3379	53%
Female	1,743	46%	2,188	47%	2,869	45%	2955	47%
Total	3,798	100%	4,686	100%	6,363	100%	6334	100%
Median Age	NA		NA		NA		33.5 years	

Source: U.S. Bureau of the Census

Housing Types and Population Segments

Household type in Kodiak varies by population segment, although information is far from systematic in this regard. In the 1980s housing was in very short supply, and it was not unusual for complete strangers to be more than willing to share space in a marginal housing unit. Sales of houses and the rental of apartments was almost totally through word of mouth and almost instantaneous. This has changed to the point where houses are now on the market for a period of time more typical of other Alaskan urban communities before selling, although apartment vacancy rates are still lower than are private housing vacancies. Average rent for apartments is higher or equal to rent in other Alaskan urban communities, although the vacancy rate for units is higher than in places such as Anchorage, Juneau, and the Matanuska-Susitna Borough (AHFC 2001). Construction of new housing to meet the local demand has continued through the present, although it may have slowed somewhat in the recent past, and contractors are building few or no new houses on speculation. There are incentives which have encouraged the building of new housing outside of Kodiak city limits. The state will subsidize the mortgage rate one full percentage point for housing outside of the City of Kodiak. Further, undeveloped land within the current city limits is somewhat scarce.

It is recognized that fish processors tend to live in smaller structures and/or with more household members, than do people with other employment. There are sections of town or developments where certain ethnic

groups or socioeconomic classes of people are concentrated. However, there are also members of these same groups scattered throughout Kodiak.

One housing dynamic that had been operating until the recent past, already mentioned above, has been that of the development of a resident processing force. Kodiak processors had been able to close down bunk houses as those attracted to Kodiak by fairly steady processing work preferred more private housing in the community. With the more recent contraction of fishing seasons and processor operating days, the processing labor force has once again become somewhat transient. Processors report that they can maintain only a smaller "core" group of employees than has been the case in the past, and several have reopened or even constructed bunkhouses of sufficient size to handle their transient peak labor needs. There are still local people who work in the processing plants on a less than full-time basis, but the pay scale associated with most processing work requires a large number of hours to support a local resident. Other than for peak processing periods most labor is still local and has some sort of local housing arrangement. Systematic information is lacking, but anecdotally the same mechanism by which people are recruited to Kodiak to work in fish processing also allows them to find a place to live. Many such workers come because they have a relative or friend who is already working in Kodiak. This person then becomes a resource to locate housing. This is also one reason that household size and household structure tends to be different for different ethnic groups in Kodiak, and is especially fluid for fish processor workers.

The Coast Guard base also affects the local housing supply in that it is "home" to close to 2,000 people. The base is reported to have been built in the 1930s as a temporary facility, and so had a large supply of substandard housing. Much of this has since been dismantled, with a substantial but not equivalent amount of new and better housing being erected on-base. Most Coast Guard personnel have the option of living off-base if they prefer, so this has increased the local demand for housing.

Seasonality of the Kodiak Economy

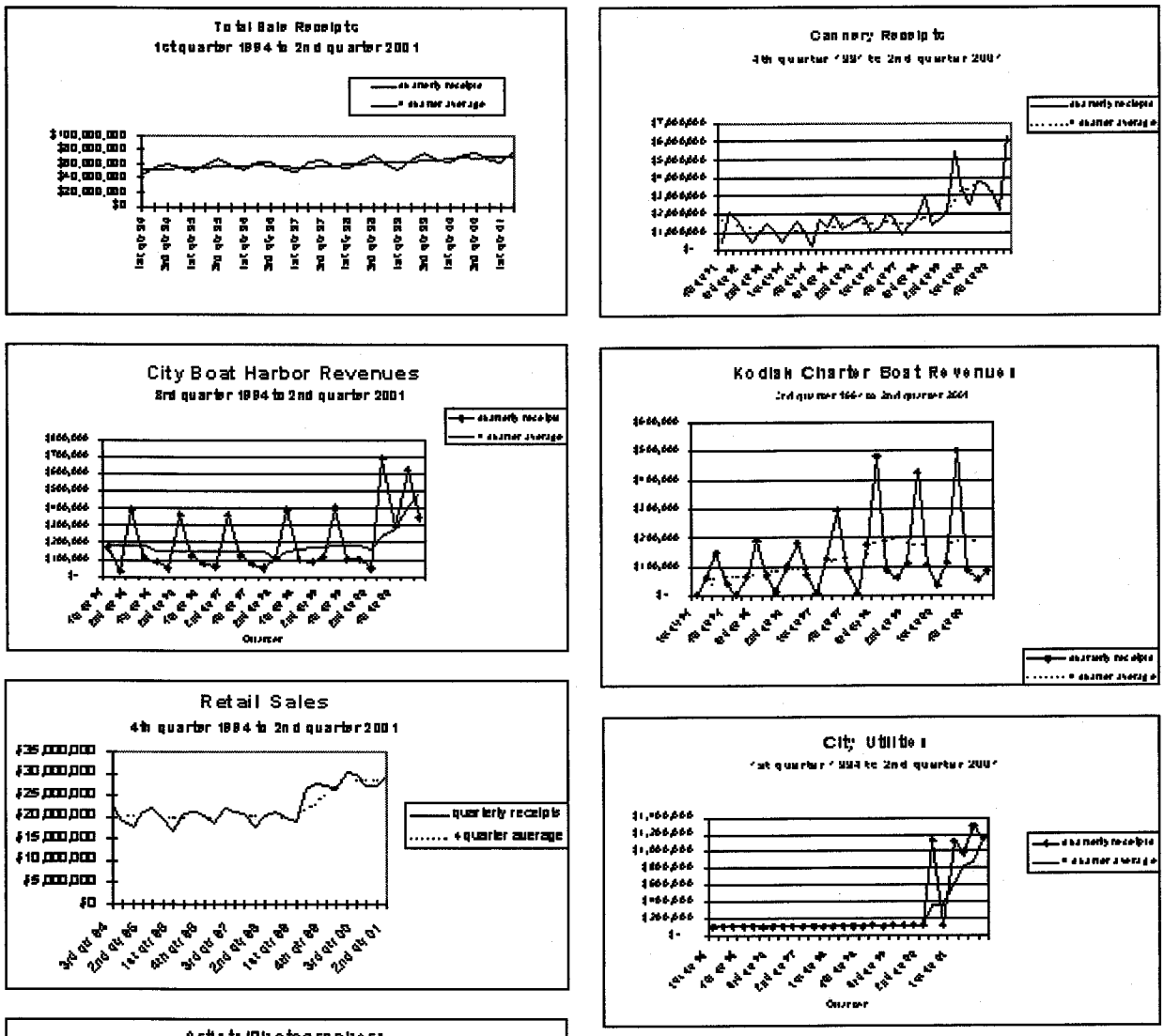
The regular and cyclical annual variation endemic to the Kodiak Island region's fishing economy was introduced in the general regional employment discussion above. This section merely wishes to reinforce this point, using the City of Kodiak as a focused example. The Kodiak Chamber of Commerce has provided city sales tax receipt information in spreadsheet format for the first quarter of 1994 through the second quarter of 2001 (Figure 2.1-1). Graphs of tax receipts over this period, by quarter, are presented for total sales receipts and selected economic sectors. The comparison of these graphs is the basis for the following brief discussion.

Total sales tax receipts are variable in a regular, cyclical way – but within a relatively well-defined range (the high point is generally no more than 1.5 times the low point, although that range seems to be increasing through time). Cannery receipts can be seen to vary in the same way as do total sales receipts, but the fluctuation between high and low points is much more extreme (the high point is over two times the low point). City boat harbor revenues are even more extreme, but this is an artificial variation, as most long-term moorage fees and such are billed and paid on an annual basis. On the other hand, charter boat revenues are perhaps the most extreme case of true extreme seasonal variation in economic activity, from zero in the winter to a peak in the summer. As this industry also depends on fish (primarily salmon and halibut), it has the same seasonal variation pattern as does the commercial processing sector. Retail sales, on the other hand, while showing some seasonal variation in response to the variation in many of primary economic sectors, exhibits a much narrower range of variation than does total sale receipts. This is what would be expected, as a

certain level of sales has to be maintained year-round to support the resident population. Sales would increase during peaks of economic activity, in proportion to the size of the peak in relation to the "base" level of sales. The city utilities graph is especially telling in this regard. The variation is less cyclical, but does exhibit some seasonality confounded by an overall trend towards increased revenues (increased use of utilities). This is an indicator that Kodiak has been experiencing consistent growth, both in population, housing supply, and general infrastructure. The last graph can be no more than suggestive, but the decline in revenues for artists and photographers may suggest that there is less discretionary income in the community, or that such expenditures for luxury or specialty items are increasingly being spent outside of the region.

As for Sand Point, this pattern may mask some of the indications of a local economic downturn by reporting only through June of 2000. Also, Kodiak has a more robust and diversified economy than does Sand Point, and sales tax receipts are an overall economic indicator, and do not necessarily reflect the contraction of one economic sector which is countered by the expansion of another. While both Kodiak and Sand Point are the regional centers for government for their respective regions, that of Kodiak is much larger. Kodiak also has a much larger school system as well as a branch of the University of Alaska system.

Figure 2.1-1. Kodiak Seasonal Economic Fluctuations



Despite the relative diversification of Kodiak's economy compared to the Alaska Peninsula/Aleutian Islands groundfish communities profiled, fishery related employment is still a very large part of the local employment pool. Excluding the U.S. Coast Guard, 4 of the 5 top employers in Kodiak in 2000 were fish processors, and three more were listed in the top 20 employers (Table 2.1-7).

Table 2.1-7 Top 20 Kodiak Employers, 2000

Rank	Employer	Employment
1	Kodiak Island Borough School District	402
2	Ocean Beauty Seafoods	338
3	Trident Seafood Group	240
4	Polar Equipment (Cook Inlet Processing)	227
5	North Pacific Processors (APS)	198
6	Providence Kodiak Island Medical Center	177
7	City of Kodiak	173
8	Wal-Mart Associates	147
9	International Seafoods of Alaska	146
10	Safeway, Inc.	142
11	Global Seafoods	136
12	Western Alaska Fisheries	108
13	Kodiak Area Native Association	108
14	Space Mark International	108
15	U.S. Department of Transportation	99
16	Alaska Department of Fish and Game	77
17	Ki Enterprises (McDonald's)	66
18	University of Alaska	54
19	Kodiak Island Housing Authority	51
20	Kodiak Electric Association	51

Source: Kodiak Chamber of Commerce, provided by Alaska Groundfish Data Bank via public comment letter (Comment 0762), October, 2001.

Links to the Groundfish Fishery

The development of commercial fishing in Kodiak was summarized above. Table 2.1-8 below displays the total volume of fish landed at Kodiak for 1984 through 2000. Kodiak has consistently ranked in the top three U.S. ports in terms of value of fish landings and in the top seven in terms of volume of landings.

Table 2.1-8 Volume and Value of Fish Landed at Kodiak, 1984-2000

Year	Pounds (millions)	U.S. Ranking	Value (millions)	U.S. Ranking
1984	69.9	7	113.6	2
1985	65.8	6	96.1	3
1986	141.2	7	89.8	3
1987	204.1	3	132.1	2
1988	304.6	3	166.3	1
1989	213.2	6	100.2	3
1990	272.5	3	101.7	3
1991	287.3	4	96.9	3
1992	274.0	3	90.0	3
1993	374.2	2	81.5	3
1994	307.7	2	107.6	2
1995	362.4	2	105.4	2
1996	202.7	5	82.3	3
1997	267.5	6	88.6	3
1998	357.6	5	78.7	3
1999	331.6	6	100.8	3
2000	289.6	6	94.7	3

Source: Personal communication from the National Marine Fisheries Service, Fisheries Statistics and Economics Division, Silver Spring, MD (accessed through NMFS Website).

Table 2.1-9 lists detailed information on total volume and value of fish landings for Kodiak for 2000 by species or species group. As shown, value of landings are dominated by Pacific cod, halibut, and salmon, which together account for 72.5 percent of the total value of all species landed. These three species account for between 23 and 25 percent of total value each, while no other species accounts for more than about 9 percent of the total. Pollock and sablefish, the next two most important species after Pacific cod, halibut, and salmon, account for 9 percent and 7 percent of the overall total, respectively. No other species accounts for more than about 2 percent of the total. Pollock, by far, accounts for the greatest volume of fish landed, with Pacific cod and salmon being quite close to each other as the second and third highest volume species (or species complex), respectively. As shown, several other groundfish species are relatively high volume species locally, but account for a relatively small proportion of the total value landed, due to relatively low values per pound.

Table 2.1-9 Volume and Value of Fish Landed at the Port of Kodiak, by Species, 2000

Species	Pounds (thousands)	% of Total Pounds	Ex-vessel Value (dollars)	% of Total Value
Pacific Cod	64,936,708	22.4	24,030,302	25.37
Halibut	9,258,799	3.2	23,146,998	24.44
Salmon	61,800,000	21.3	21,500,000	22.70
Pollock	102,229,713	35.3	8,720,096	9.21
Sablefish	3,377,355	1.2	6,957,351	7.35
Rock Sole	10,191,805	3.5	2,061,818	2.18
Bristol Bay Red King Crab	900,536	0.3	1,707,901	1.80
Weathervane Scallops	280,568	0.1	1,662,575	1.76
Bearing Sea Snow Crab	1,451,842	0.5	1,277,621	1.35
Pacific Ocean Perch	9,008,682	3.1	729,051	0.77
Herring	2,740,000	0.9	685,400	0.72
Rockfish	9,229,389	3.2	611,210	0.64
Dungeness Crab	236,921	0.1	390,920	0.41
Flatfish	1,847,248	0.7	252,530	0.27
Flathead Sole	1,676,648	0.6	234,642	0.25
Sea Cucumbers	116,152	0.0	174,228	0.18
Rex and Dover Sole	1,167,310	0.4	132,387	0.14
Black Rockfish	251,520	0.1	108,373	0.11
Octopus	181,993	0.1	90,997	0.10
Miscellaneous/other/ unspecified (inc. shrimp and sea urchins)*	8,716,811*	3.6*	225,600*	2.01*
Total	289,600,000	100	$94,700,000	100

*Note: Figures in this row provided to make totals for known and unspecified species sum to reported port totals and are adjusted to account for rounding errors and species that are not reported individually due to confidentiality restrictions. Values should be taken as approximations and should not be used for comparative purposes.

Source: Adapted from Kodiak Chamber of Commerce, provided by Alaska Groundfish Data Bank via public comment letter (Comment 0762), October, 2001.

The following discussion of the fishing industry is divided into the harvesting and processing sectors, as each is extremely important for the Kodiak economy and community. A third section provides some general contextual information on fishery industry support services.

Harvesting

The enumeration and geographic distribution of the groundfish catcher vessel sector is detailed in previous documents and abstracted for communities of interest for this document. The most important point in regard to the Kodiak component of this fleet is that most are multi-gear and multi-species boats. The majority of boats harvesting groundfish and crab for deliveries to Kodiak shore processors are Kodiak-based boats. Non-local boats from Newport or Seattle augment the trawl and longline fleets. One recent development, with the shift of GOA pollock quota from areas 610 and 620 to the Shelikof Area has been the temporary transfer of some boats from the Trident plant in Sand Point to the Trident plant in Kodiak.

Vessels in this fleet usually have a handshake agreement with a shore processor for the delivery of fish. The vessel is said to "work for" the shore plant and sometimes the plant operators refer to "their boats" meaning those with which working relationships exist. These vessels deliver to that plant on a regular basis. The size and composition of processor fleets vary, depending on the plant's capacity and product mix. Most of the boats that deliver to Kodiak processors are multi-purpose vessels that can change fisheries to meet the current market and fishing circumstances. For example, some vessels will switch between crab, halibut, and cod or crab, halibut, and pollock. One vessel reported that he fished for in excess of 20 species with three different types of gear. The size of a processor's fleet depends on what season it is and what they are targeting at the time. It is not uncommon, however, for a plant to have a fleet of 8 to 16 boats fishing groundfish and crab. Among plants that run pollock, there is a bimodal distribution of trawl fishing power. The larger plants typically have 8 to 10 trawlers working with them, whereas the smaller plants typically have 4 or fewer trawlers in their pollock fleet. Most plants also have 6 to 10 fixed-gear vessels in their fleet. Most of the fixed gear boats are pot boats fishing for Pacific cod and/or tanner crab. There is a small fleet that fishes for Dungeness crab as well.

Fleet sizes are smaller now than they were when shellfish was a larger part of production. Prior to the implementation of the AFA in the Bering Sea, we were told that the GOA pollock (and flatfish) fleet tended to cooperate in an effort to balance deliveries to maintain high levels of production. This was a somewhat unique relationship to develop in an open access fishery, but was a form of industry-developed "rationalization" to counter some of the inherent inefficiencies of a high volume/low value fishery with excess capacity. Ideally, the plants want just the right amount of boats to keep production lines busy all of the time, but with a trawl fleet's capacity to catch groundfish, its harvest can easily exceed its processor's capacity. After the implementation of AFA in the Bering Sea, Kodiak processors have reported that this arrangement is, in essence, no longer in effect. With the anticipation of eventual pollock (and other groundfish) rationalization in the GOA, a "race for history" in the GOA has resulted, with at least one new processing entrant and a host of wasteful and inefficient practices (see processing discussion below).

The exchange of product between fishermen and processors continues to be largely dependant upon what kind of relationship the boat operator has with the plant. According to one plant staffer, when a fisherman comes to talk to a processor, he has several main concerns. He wants to know how he's going to get in to make deliveries and if he is going to be able to deliver all the fish that he can catch. He does not want to have to wait to deliver fish because the processor has too many other boats delivering as well.

A reliance on flexibility and adaptability in the fishing industry has caused boats to become very good at converting from one gear type to another, if they have the gear available. In the mid-1980s this did not happen frequently, but it is easier and more common now (subject to license limitation and other management

measures). While boats may switch from one gear-type to another, operators usually deliver to the same processor. If a new operator comes aboard, the vessel may or may not change delivery sites, depending on the established relationships of the vessel owner/operator to processor.

Within the trawl fleet, there are conversions too. There is a switch in nets for midwater or pelagic trawling to bottom trawling when going from pollock to cod. Almost everybody who trawls has both types of nets. Medium-sized and the small trawlers (usually those less than 70 feet in length) will make a conversion as soon as tanner season is closed, but the bigger Kodiak trawlers, those in the 80-120-foot range, will usually leave their trawl gear on and not make any conversions, unless they are going tendering for salmon or herring. It wasn't that long ago that they could trawl the better part of the year, so a number of them sold their pots and abandoned the fixed-gear fishery. Also, The Kodiak area tanner quota has been so small in recent years that the bigger boats can't justify going out.

Generally speaking, fishermen stay with one company although there is no formal (written) contract to bind this relationship. Boats will usually try to set up some sort of a market before they leave the dock, although that depends, somewhat, on who's operating the boat and what kind of relationship he has with the plant. Often a plant will help find a market for a load it cannot use from one of its "regular" boats, especially for a high volume/low value species like pollock, or one that requires more time to process, such as flatfish.

Shore plants also provide certain services as inducement to do business. In general, the production capacity in Kodiak to process fish far exceeds the amount of product currently available, so all the processors in town are in competition with each other for available product. As a result, things like being able to provide a tendering contract serve as incentives for fishermen to do business with a certain plant. Providing gear storage for fishermen is an incentive. Providing a line of credit – if a fisherman's short on funds and needs to buy gear or equipment – is another inducement the local processors sometimes offer to a fisherman.

For some vessel operators, these tendering contracts are not only lucrative, but they become an important part of the total yearly income for vessels. Consequently, maintaining the handshake agreement to deliver groundfish when the processors need it most can be rewarded with a tendering contract that is important to the fishermen.

Most of the Kodiak CV fleet is overwhelmingly GOA-oriented. While Kodiak CVs have more of a presence in the BSAI pollock fishery than for the other species (in terms of pounds harvested and dollars earned), the GOA is still clearly where most Kodiak boats fish. It is this orientation, and their position as harvesters of the GOA, that Kodiak fishermen wish to protect, and which they fear may be adversely affected by the changes in the fishery associated with ongoing adaptations to AFA related management.

Processing

In 2000, seven plants processing groundfish in Kodiak. Of those plants, one was a new entrant that processed fish from the beginning of 2000 through mid-2001. According to the Alaska Groundfish Data Bank (Bonney, personal communication, 2001[8]), this processor stopped buying after the 2001 A/B pollock fishery and has

[8] Bonnie, Julie, Director, Alaska Groundfish Data Bank. Comment letter to NMFS on Steller Sea Lion Protection Measures Draft SEIS (Comment Letter 0762), October 15, 2001.

offered to sell some of their assets to other local processors. Other non-groundfish processors also exist. While capable of continuously processing large volumes, actual production, of course, varies during the year. Plants will add a shift, hire additional employees, and maximize processing and freezing capabilities during various seasons and season overlaps; various species require separate processing lines, machinery, and crews. At other times, especially during the later months of the year, the plants have little, if anything, to process, so they must layoff employees and attempt to minimize their overhead costs. Tables 2.1-10 and 2.1-11 show the aggregated volume and value, respectively, of the species processed in Kodiak by year for the period 1993-2000. With the exception of salmon, which is processed at several different locations within the KIB, nearly all of this activity takes place within the City of Kodiak.

Table 2.1-10 Volume of Groundfish Processed by Kodiak Shoreplants, by Species Group and Year, 1993-2000

Species	1993	1994	1995	1996	1997	1998	1999	2000
Salmon	105,954,109	42,512,087	150,212,021	38,480,944	47,096,755	85,182,682	63,097,929	60,096,447
Halibut	9,886,361	8,959,621	7,345,008	7,396,190	10,673,472	8,398,551	8,269,475	See Note
Crab	5,110,307	2,863,187	1,832,762	1,675,086	1,164,703	1,148,083	1,284,728	2,504,560
Herring	8,886,771	5,845,320	4,998,580	5,868,669	5,336,494	2,482,571	1,985,822	2,080,860
Other Non-GF	106,458	384,948	168,940	206,174	175,448	181,668	137,575	116,912
Pollock	155,412,622	163,440,241	65,393,556	45,996,042	83,781,584	164,936,160	129,788,161	106,386,467
Other GF	75,932,965	57,408,356	92,397,635	90,887,954	113,031,829	105,863,668	112,819,856	114,519,388
Total	361,289,593	281,413,760	322,348,502	190,511,059	261,260,285	368,193,383	317,383,546	285,704,634

Note: Halibut numbers not available for 2000
Source: State of Alaska Fish Ticket information supplied by NPFMC staff

Table 2.1-11 Value of Groundfish Processed by Kodiak Shoreplants, by Species Group and Year, 1993-2000

Species	1993	1994	1995	1996	1997	1998	1999	2000
Salmon	$30,919,937	$19,837,476	$41,353,791	$21,319,667	$16,552,661	$26,327,348	$28,587,045	$18,448,920
Halibut	$11,705,472	$16,874,425	$14,228,126	$16,144,982	$22,115,588	$10,254,625	$17,374,278	See Note
Crab	$8,840,233	$7,149,258	$4,124,565	$3,463,420	$2,775,965	$1,704,518	$4,414,024	$7,026,046
Herring	$2,583,290	$1,614,485	$2,815,598	$4,595,484	$941,584	$517,132	$608,933	$566,940
Other Non-GF	$83,036	$415,673	$143,154	$246,052	$193,067	$190,220	$146,081	$174,606
Pollock	$11,501,119	$12,625,509	$6,670,763	$4,369,377	$8,625,741	$11,190,308	$12,311,467	$12,255,024
Other GF	$18,421,120	$17,180,178	$25,630,081	$24,708,464	$28,861,917	$21,660,833	$32,556,598	$28,857,786
Total	$84,054,207	$75,697,004	$94,966,078	$74,847,446	$80,066,523	$71,844,984	$95,998,426	$67,329,322

Note: Halibut Numbers are not available for 2000.
Source: State of Alaska Fish Ticket information supplied by NPFMC staff.

In the words of one long-time Kodiak fisherman, "Our key is to be able to diversify, but it is still tough to make it." This ability to diversify has become paramount to both the fishermen and the processors of Kodiak. Shore-based plants have added crews, space, freezers, equipment, and searched for new markets as fishermen have been seeking, entering, and participating in pulse fisheries that feature wildly variable deliveries. Occasionally when open fisheries are exploited by new entrants, new products emerge. While this includes previously unexploited resources such as sea cucumbers or snails, it also includes variations of existing resources. Pacific cod harvested in pot gear is such an example.

Processors differ in the degree to which they actually do diversify their operations, but all those plants which process groundfish agree that it is essential for their plants. It is the highest volume component and provides essential employment for their work crews. Without groundfish these plants could not provide enough work to support their crews as Kodiak residents. Several plant managers made the same point about the other species they processed as well, although groundfish was perhaps considered a fundamental base of operations (up to 80 percent of most operations). Similarly, most processors consider their plant as only one component of an integrated system that requires a healthy harvesting sector, a stable and reliable processing labor force and an efficient plant, and capable management and adequate financial backing.

The general sector description contained in IAI 1994 is still generally valid, with a few caveats. Less halibut is delivered and processed in Kodiak than in previous years, as one result of the IFQ system has been to reduce the processors margin on halibut to very little. Harvesters can receive a higher price in Homer or Seward than in Kodiak, and both of those ports receive more halibut than does Kodiak. Most processors are also very uncertain as to how they will meet their future labor requirements. At present most retain a "core" crew of Kodiak residents, which they supplement as necessary with additional resident labor, and transient labor housed in a bunkhouse for peak demand periods. Processors seldom wish to bring labor in for any period shorter than the summer, due to the need to train and house such labor, but at least one plant was forced to do so the last couple of years. They constructed a forty-person bunkhouse to accommodate them. Other plants that are part of companies with several processing facilities will transfer labor from one to another as labor needs change in the various locations. Labor costs are reported to have increased, due to the strong national economy as well as the increase in locally available entry-level jobs in the retail and service sectors. Plant managers also report that many fewer college students approach them (either remotely or by simply appearing in Kodiak) than in years past.

Support Services

The full spectrum of services for the fishing industry is present in Kodiak, as described in detail in IAI 1991. Support services include a wide range of companies, including such diverse services as accounting and bookkeeping, banking, construction and engineering, diesel sales and service, electrical and electronics services, freight forwarding, hydraulic services, logistical support, marine pilots/tugs, maritime agencies, ship repair facilities (recently enlarged), stevedoring and shipping, and vehicle rentals, among others. There is no other community in the area with this type of development and capacity to support the GOA (and some Bering Sea) fisheries.

The Port of Kodiak is home to Alaska's largest and most diverse fishing fleet. It has more than 650 boat slips and 3 commercial piers that can handle vessels up to 1,000 feet long. Kodiak is also a vital link in the regional transportation network. As the hub of the Gulf of Alaska container logistics system, Kodiak serves Southwestern Alaska communities with consumer goods and provides outbound access to world fish markets.

LASH Marine Terminal, in Women's Bay, provides service to several freight carriers, freight forwarders and consolidators, construction contractors, and Kodiak's diverse fishing fleet. Regularly scheduled container ships operate between Kodiak and the Pacific Northwest, and between Kodiak and the Far East. Kodiak is a key link for Alaskan Coastal communities.

No systematic information exists on how support services have been affected by changes in the local economy in general. However, as for other communities, certain less systematic indicators are available. The loss of population in the City of Kodiak relative to outlying regions may reflect a weakening economy. Interviews with such primary fisheries support services such as the boat yard and the hydraulics shops indicated that fishermen were deferring more regular maintenance, and even canceling upgrades that had been scheduled in the past but which now, in the light of adverse fishing conditions, do not appear to be prudent investments. Several such jobs were said to have been canceled the day after the Steller sea lion RPAs were announced. These operations also note that the number of their uncollected bills has increased.

3.0 WASHINGTON INLAND WATERS REGION

There are a number of communities in the Washington Inland Waters region that have important links to the North Pacific groundfish fishery. However, none of these communities have the breadth and depth of ties found in the greater Seattle metropolitan area. Natural Resource Consultants (1999) note that the "Alaska groundfish and halibut fisheries conducted by Washington-based fleets are presently the most important engine of this region's fishing industry." They continue in their report to document how these fleets are, in fact, based mostly in the Port of Seattle.

3.1 SEATTLE

NRC enumerates the Washington State-based fleet and describes the fisheries in which they participate. They divide the 2,800 total vessels into the 1,450 vessels distant water fleet (most of which clearly do not fish for groundfish) and the 1,350 vessels in the local fleet. They report that the distant water fleet accounts for 95 percent of the catch and revenue, compared to 5 percent for the local fleet. They do not specifically focus on individual fisheries (although some information is provided in terms of graphs and diagrams), but it is evident that a number of Alaskan fisheries contribute to this pattern – salmon, halibut, sablefish, herring, crab, and of course groundfish (Natural Resource Consultants 1999:4, 50-76 with associated table). They also describe the currently dismal condition of local Washington State fisheries (Natural Resource Consultants 1999:77-88, with associated tables).

There is relatively little information which deals specifically with the Alaskan groundfish distant water fleet, or with those geographical areas of Seattle most identifiable with fishing and perhaps characterizable as "fishing communities." Past documents produced for the NPFMC have contained profiles of the Port of Seattle, Ballard, and the Ballard/Interbay/Northend Manufacturing Center (BINMIC) planning area, as potential types of (or proxies for) Seattle "fishing communities." Information for these areas is abstracted from those documents and presented in the appropriate sections below. For the most part, no additional information relevant to the Alaskan groundfish fisheries has been developed for those areas since the earlier documents were produced. The current status of whatever recent information is available is discussed in the relevant section.

Overview: Greater Seattle Area

"Seattle" as used in this section refers to the greater Seattle metropolitan area, and is not confined to the port or municipality of Seattle, except where specifically noted. As is clear from a consideration of the individual sector profiles, Seattle, in one way or another, is engaged in all aspects of the North Pacific groundfish fishery. While Seattle itself is quite distant in geographic terms from the harvest areas of the fishery, it is the organizational center of much of the industrial activity that comprises the human components of this fishery. More accurately, specific industry sectors based in and/or linked to Seattle (or, in some cases, specific geographic subareas within Seattle), are "substantially engaged in" or "substantially dependent upon" the North Pacific groundfish fishery.

What makes Seattle an analytic challenge, in terms of a socioeconomic assessment directly related to the Alaska groundfish fishery, is its scale and diversity. Seattle's relationship to the Alaska groundfish fishery is a paradox. When examined from a number of different perspectives, Seattle is arguably more involved in the Alaska groundfish fishery in general, and the Bering Sea pollock fishery in particular, than any other community. One example is the large absolute number of "Seattle" jobs within the Alaska groundfish fishery compared to all other communities, whether counted in terms of current residence, community of origin, or community of original hire - setting aside, for the moment, where the jobs are actually located. On the other hand, when examined from a comparative and relativistic perspective, it could be argued that the fishery is less important or vital for Seattle than for the other communities considered. Using the same example, the total number of Alaska groundfish fishery-related jobs in greater Seattle compared to the overall number of jobs in Seattle is quite small, in contrast with the same type of comparison for the much smaller Alaska coastal communities. The sheer size of Seattle dilutes the overall impact of the Alaska groundfish fishery jobs, whereas in Alaskan communities such jobs represent a much greater proportion of the total employment in the community setting aside, for the moment, the consideration of whether those jobs are filled by 'residents.'

As is also clear from earlier compiled sector descriptions, while all sectors are tied to Seattle in one way or another, the magnitude and nature of these ties varies considerably between sectors. It is through these ties, and how they are manifested in Seattle, that the role of the community in the Alaska groundfish fishery can be seen. While it was possible, and desirable for analytic purposes, to include some brief community level description for a few of the Alaska coastal communities in this document to show the relative 'engagement' or 'dependence' on the fishery, for Seattle this type of comparison tends to understate the importance of the Alaska groundfish fishery for particular sectors or subareas, losing the importance of the fishery in the 'noise' of the greater Seattle area.

The precise nature of the relationship between a given sector and the Seattle area varies from sector to sector, in terms of employment patterns, expenditure patterns, and concentration or localization in the Seattle area. While local experts and industry participants are well aware of these patterns, systematic quantitative information to describe these patterns was not available at the time of this study. We have used the limited information that is available and supplemented it with information garnered from field interviews to provide a community context characterization.

There are (at least) two ways to approach a discussion of the localization of fishing activity in general, and Alaska groundfish fishery activity in particular, within the Seattle area. The focus could be on port activity and economic organization, or on a more general historical/geographical (neighborhood or community) focus centered around fishermen, fishing activities, and marine support businesses. The first has the advantage of

being well-defined, but is totally industry focused, and fishing-related activities comprise only a small portion of total activity and are not an easily 'isolatable' component using existing information. The second, generally corresponding to the common identification of Ballard and its environs with Seattle's fishing community, would incorporate much more of the overall social organization of fishing activity, but is very difficult to define and characterize within an overall economic and social context as large as Seattle's. Either approach would be a huge task for which available information is limited. A compromise has been reached in this document by briefly discussing the Port of Seattle in regard to the Alaska groundfish fishery and a cursory history and characterization of Ballard within the context of greater Seattle. This section first overviews the fishery from the community context, and then focuses on fishery-related industrial areas. The conclusion includes a discussion of the issue from the perspective of the 'community side' of the links.

The Seattle 'Geography' of the Alaska Groundfish Fishery

In this section, locational issues are discussed with respect to the Seattle area and the Alaska groundfish fishery. Here, the discussion is divided into two components: the Port of Seattle and the community of Ballard. Each provides a different and useful perspective on the Seattle social/socioeconomic ties to the fishery. The Port of Seattle is one of the more obvious ways to discuss the localization of the fishing economy in Seattle and the concentration of potential socioeconomic impacts of fishery management upon Seattle. Ballard is another locally recognized and labeled area with a fishing identity. The characterization of neither is a straightforward task, but the first is much more possible than the second. There are practical limitations on the availability of data attributable specifically to the Alaska groundfish fishery. Further, the port is well defined as an institutional entity, whereas Ballard as a community is not.

The Port of Seattle

Martin Associates (2000) provides an overall assessment of the economic impact of fishing activity based at Port of Seattle facilities. They conclude that such activity generates $400 million in wages (direct, indirect, and induced), $315 million in business revenues, $42 million in local purchases, and $48 million in state and local taxes. There is no way to desegregate the Alaskan distant water fleet from this overall impact, so the utility of the information for our purposes is limited. They do provide estimates for the annual expenditures in Seattle of the various fishing vessels home ported there, and as might be expected, those for the larger vessels, such as participate in the Alaskan groundfish fisheries, are the highest in terms of expenditures per vessel – $250,000 for catcher trawlers, $900,000 for factory trawlers, and $1.7 million for motherships. Most of the vessels in these classes home ported in Seattle probably participate in the Alaskan groundfish fisheries, but also participate in other fisheries. There are also many vessels in the Seattle distant water fleet that do not participate in the Alaskan groundfish fisheries. The Port itself does not have information on moorage fees received and other such information readily available, but conversations with Port of Seattle officials has indicated that moorage fees from the Alaskan groundfish fleet have declined in the past two years for two principal reasons – there are fewer vessels (the retirement/scrapping of catcher processors) and vessels are spending more time at sea and less time in port. Both of these are directly attributable to AFA. While it would appear to be a negative effect, this was in fact explained as a positive indicator for the economy of the region as a whole, as a smaller number of profitable vessels is more of an economic driver than is a larger number of marginally viable vessels. The "loss" of Port of Seattle moorage fees is merely one of the more noticeable effects of this change, but not necessarily one of the more significant ones.

The Port of Seattle is separate from the Municipality of Seattle and is an economically self-supporting entity. Besides its direct revenues, it receives 1 percent of the property tax collected in King County, but with a cap on funding not to exceed $33 million a year. In turn, all port revenues are charged a 12.4 percent tax, which is split between the city of Seattle and the state of Washington (in lieu of property tax). The Port's charge is the development of infrastructure that will support local and regional economic activities, especially in cases where the rate of return on investment in that infrastructure may be too low (although still positive) for the private investor. Such development contributes to the overall economy of the region through synergistic and multiplier effects.

The Port of Seattle includes not only marine facilities but the airport as well. The port publishes various reports on their activities, but most are either too general or far too specific for the purposes of this study. The Marine Division of the port tracks economic activity by general service area - container terminal, cargo piers and industrial properties, central waterfront piers and property, warehouse and distribution operations, Shishole Bay Marina (recreational moorage), and Fishermen's Terminal Pier and property. None of this information is organized so that expenses and revenues attributable to fishing activity (let alone specific fisheries such as the Alaska groundfish fishery) can be aggregated and assessed - although projects now underway will, in the future, provide such information to a greater degree than at present. Given this lack of breakout documentation, most of the information on the nature and magnitude of the importance of the Alaska groundfish fishery for the Port of Seattle came from talks with the Director of Marine Operations for the port.

The Port's marine facilities occupy an extensive area, but can generally be characterized as the Ship Canal-Elliott Bay areas. The Director of Marine Operations estimated that Alaska-related fishing activity generates port revenues of $1 million to $2 million a year. Facilities, and the degree to which they are connected with fishery activities, were identified as follows:

- Fishermen's Terminal (Ship Canal) - an estimated 10 percent of its revenues (roughly $2 million for all fisheries per year) were judged to result from catcher processor operations and an additional 10 percent from catcher vessel activity associated with Alaska fisheries (not just groundfish);
- Pier and Terminal 91 (North Elliott Bay) - used extensively by catcher processor fleet and provides the bulk of the Port's revenue derived from the Alaska groundfish fishery, through moorage and other fees. This facility also caters to ferries, a tug and barge company, an auto importer, apple exports, and cold storage facilities;
- Central waterfront (mid-Elliott Bay) piers –not so fishery related, although they are sometimes used by larger vessels (Pier 48, Pier 66, Pier 69);
- Pier 25 (East Duwamish Waterway, south Elliott Bay) - permanent moorage for one of the mothership operations, but also used for catcher processor offloading, has cold storage facilities to hold product for transhipping, and a small surimi plant is located there;
- South end in general (Duwamish manufacturing and industrial center) - has some fisheries-related activities (such as cold storage facilities) but is more oriented to cargo operations and other industrial activities.

The summary conclusion for port-focused analysis is that fishing-related activities take place throughout the Port, but are concentrated in the Fishermen's Terminal and Pier 90/91 areas. Of primary importance for fishing activity, and especially for larger vessels, is the availability of suitable moorage. Much of this moorage is supplied by the port, in an aggressive response to the demand from the fishing fleet.

The initial development of Fishermen's Terminal in the 1980s was because of the perceived need for more moorage for larger vessels involved in the distant water fisheries. The current redevelopment of Fishermen's Terminal will likely increase this emphasis through the conversion of smaller moorage stalls to facilities more suitable for vessels 50 feet and longer (NRC 1999). This is in response to the drastic downturn in the economic viability of the local fishing fleet, especially the local salmon fleet which had been historically based at Fishermen's Terminal, and the increasing importance of Alaskan distant water fisheries for Seattle-based boats. These vessels tend to be 50 feet in length or more.

Ballard

When looked at on a neighborhood basis, one of more obvious foci of the distant water fishery in the greater Seattle area is the community of Ballard. Today the term 'Ballard' represents a loosely defined geographical neighborhood of northwest Seattle. There is no geographically standard area for which various types of comparable information exists. Nonetheless, the area does have a geographical identity in peoples' minds and, together with Magnolia and Queen Anne, has its own yellow pages telephone directory (published by the Ballard and Magnolia Chambers of Commerce). The following brief section is based predominately on information from the Ballard Chamber of Commerce (1998), Reinartz (1988a, 1988b, 1988c, 1988d), Hennig and Tripp (1988), and McRae (1988).

Fishermen's Terminal on Salmon Bay is recognized as the home of the Pacific fishing fleet and has been characterized as the West Coast's 'premier home port.' Fishermen's Terminal (Salmon Bay Terminal) in turn has often been identified with Ballard - formerly a separate city (incorporated 1890) annexed by Seattle in 1907. Until the construction of the Chittenden Locks and the Lake Washington Ship Canal, opened in 1917, Salmon Bay Terminal was confined to relatively small vessels, but was the focus of a developing fishing fleet. Once the area was platted and incorporated it quickly attracted settlers and industries desiring or dependent upon access to Puget Sound. The timber industry was the first to develop, due to the need to clear land as well as the value of the timber that was available. By the end of the 1890s Ballard was a well established community with the world's largest shingle manufacturing industry, as well as developing boat building and fishing industries. By 1900 Ballard was the largest area of concentrated employment north of San Francisco.

Ballard effectively blocked the expansion of Seattle to the north, and court decisions had given Seattle control over Ballard's fresh water supply, with the result that Ballard became part of Seattle in 1907. At that time the community had 17 shingle mills, 3 banks, 3 saw mills, 3 iron foundries, 3 shipyards, and approximately 300 wholesale and retail establishments. The Scandinavian identity of Ballard developed at or somewhat before this time. In 1910, first and second generation Scandinavian-Americans accounted for 34 percent of Ballard's population, and almost half of Ballard's population was foreign-born. Currently, less than 12 percent of the population is of Scandinavian descent, but the cultural association remains pervasive.

Ballard's economy continued to develop and diversify, but remained fundamentally dependent on natural resources, and especially timber and fishing. In 1930 the *Seattle Weekly News* reported that 200 of the 300 schooners of the North Pacific halibut fleet were home ported in Ballard, demonstrating not only the centrality of Ballard but the long-term importance of distant water fisheries to Seattle fishermen. In 1936 the Port of Seattle built a new wharf at the Salmon Bay terminal, and in 1937 a large net and gear warehouse was scheduled for construction there. Over the years, Seattle-based vessels were central to the evolution of a number of North Pacific fisheries.

Thus in some ways Ballard is considered a 'fishing community within' Seattle. While this has historically been the case, when examined with specific respect to the Alaska groundfish fishery, the area cannot cleanly be considered a 'village within a city.' While there is a concentration of multigenerational fishing families within the area, the 'industrialization' of the Alaska groundfish fishery has tended to disperse the ties and relationships of the fishery. While support service businesses remain localized to a degree (as discussed in another section below), there would not appear to be a continuity of residential location that is applicable to the Alaska groundfish fishery that is consistent with, for example, the historic halibut fishery. This is due to the many changes within the cluster of individual species fisheries that make up the overall Alaska groundfish fishery, and particularly the relatively recent development of one of the more dominant components of the fishery, the pollock fishery. In summary then, this 'community within the community' issue is not straightforward due to the complex nature of historical ties, continuity of fishing support sector location through time, changes in the technology and methods of fishing, and industrialization of the fishery. Clearly, Seattle represents a different pattern of co-location of residence and industry with respect to the Alaska groundfish fishery than that seen in the relevant Alaska communities.

General Community Links

The focus of the analysis in this section is the contribution of the Alaska groundfish fishery to Seattle. This section will examine the issue from the 'other side of the equation' - from the community 'side' of the sector-community links (and on a topical rather than a geographic focus). Unfortunately, most of the information available does not facilitate focusing on this issue with a fine resolution. Different sources address different partial aspects of this comprehensive question. Some discuss different scales of detail - local versus distant fisheries, groundfish versus other fisheries (crab, salmon, and so on), or fishing as a whole versus other maritime activity (shipping, for example). Some discuss different components of commercial fishing activity - harvest versus production, or one particular type of operation versus all others. Some concentrated on more confined, or more broadly regional, geographical areas. By collecting some of this material and piecing it together, however, some sort of understanding of the overall contribution of commercial fishing to Seattle should be possible.

Natural Resource Consultants (NRC 1986, 1999) have compiled quite comprehensive accounts of commercial fishing activity by the Seattle and Washington State fleet. They provide a brief historical narrative on the development of the various fisheries and then a more detailed summary of the status of fish stocks and historical harvest information. In 1986, the estimated ex-vessel value of the grand total of all seafood taken from local waters by Washington's local fleet was about $93 million (NRC 1986:18,19). Distant water fisheries, primarily in the Gulf of Alaska and the Bering Sea, yielded an estimated grand total of $290 million by 1,371 vessels with an aggregate crew of 6,088 (NRC 1986:28,33). The joint- venture fleet accounted for about $80 million (ex-vessel) of this, with about 81 vessels and 405 crew, with an additional 11 catcher processors accounting for another $25 million (ex-vessel) and about 330 jobs. In terms of weight or volume, 92 percent of the seafood harvested by Washington fishermen came from Alaskan waters, and only 7 percent from local waters. In terms of ex-vessel value, the Alaskan harvest was worth $283 million and local harvest $110 million (and other harvest $8 million). None of these general statements has changed to any appreciable degree in 1998/99. Alaskan distant waters fisheries still provide 95 percent of the harvest for the Washington state fishing fleet (NRC 1999).

Most of the Alaskan catch was processed to some extent in Alaska by a processor based in Seattle (mobile facilities, or on shore facilities owned by Seattle-based entities). NRC states that there were about 130

seafood processing/wholesaling and 33 wholesale/cold storage companies in Washington in 1985, operating 250 primary processing and wholesale plants in Washington and 120 shore based or at sea in Alaska. Washington processing employment was 4,000 seasonally and in Alaska was 8,000, with half coming from Washington (NRC 1986:35-39).

A similar NRC study in 1988 found that Washington fishermen harvested about 80 percent (ex-vessel value) of their catch in distant waters, with 98 percent of that coming from Alaskan waters. About 72 Washington state vessels participated in the joint venture trawl fishery, directly employing about 360 people. There were also 43 catcher processors employing about 2,200 people, and 26 shore-based trawlers, employing about 130 people.

NRC's summary of the contribution of commercial fishing to Washington State's economy in 1988 is shown in Table 3.1-1. Local water harvest and processing accounted for about 19 percent of this, distant water fisheries and processing about 57 percent, and other processing activities by Washington companies for about 24 percent. Of the estimated 36,608 FTEs associated with this economic activity, 39 percent were attributed to the distant water fishing fleet and 40 percent to out-of-Washington-state processing. The $1.794 billion of direct and indirect benefits associated with the activities of the distant water fleet was also estimated to generate an additional $795 million of induced benefits. Similar numbers are difficult to generate from their 1999 report, which was written with a different focus, but the general relative relationships between the value of various fisheries for the fleet should remain much the same (except perhaps for crab, which may have declined in terms of economic return).

Table 3.1-1 Estimated Volume and Value of Washington Distant Water Commercial Fish Harvest, 1985 and 1988

Fishery	Harvest Volume (000 mt)		Harvest Value (million $)		Wholesale Value (million $)	
	1985	1988	1985	1988	1985	1988
Salmon	80.3	66.8	106.1	240.0	238.0	525.6
King and Tanner Crab	26.4	51.7	42.2	129.4	54.9	191.5
Longline Halibut and Blackcod	12.1	19.8	20.9	40.7	34.8	63.1
JV Trawl	720.8	802.8	78.3	120.4	78.3	120.4
Catcher Processor	111.6	546.0	24.6	103.7	61.6	334.1
Roe Herring	12.6	5.9	8.5	5.9	18.7	10.8
TOTAL	963.8	1493.0	280.6	640.1	486.3	1245.5

Note: Shore-based trawl landings are not included. Dungeness crab landings have been excluded. Volume and value estimates for salmon landings may be as much as 5 percent too high, but are retained for consistency with earlier work.
Source: NRC 1988:10

Table 3.1-2 provides summary information on economic contributions of local and distant water landings.

Table 3.1-2 Total Economic Contribution to the Washington State Commercial Fishing Industry in 1988

	(Millions of $ to Washington Economy)		
Locally landed	Landed Value	137	269
	Value added by processing	171	320
Subtotal		308	589
Distant Water	Landed Value	639	1,257
	Value added by processing	288	537
Subtotal		927	1,794
Non-State Landings: Washington State share of value added		405	756
TOTAL		1,640	3,139

Source: NRC 1988:16

Turning to relatively more recent data, Chase and Pascall (1996) focus on the importance of Alaska as a market for Seattle region (Puget Sound) produced goods and services. They do so by identifying particular industrial sectors that generate the bulk of these economic impacts, but they do not locate these industrial sectors in terms of particular geographic locations within the region. In their discussion of the fisheries sector, Chase and Pascall indicate that only a fraction of the regional economy is based on fishing and seafood processing industries, but that these industry sectors are concentrated in several communities and rely heavily on North Pacific (Alaskan) resources. The communities that they single out are Bellingham, Anacortes, and the Ballard neighborhood of Seattle. They say that Seattle is the major base for vessels for various fisheries – groundfish (catcher vessels, catcher processors, motherships), halibut, crab, salmon, and others. There are numerous secondary processing plants in the region, and about 60 percent of the seafood harvested and shipped south for processing moves through the Port of Tacoma (Chase and Pascall 1996:23).

The relative value of Alaskan groundfish (cod, pollock, sablefish, flounder, and other bottom fish aggregated together) for the Seattle fleet varies from year to year, but in 1994 was about 17 percent of the ex-vessel value of the Alaska/North Pacific commercial fishing harvest (Chase and Pascall 1996:26), which represented about 75 percent by harvest value, and 92 percent by weight, of all fish harvested by the Puget Sound fishing fleet (Chase and Pascall 1996:23 - citing ADF&G, NPFMC, NMFS).

Other relatively recent work (Martin O'Connell Associates 1994) indicates the wide range of activities that the Port of Seattle supports and the web of support services which commercial fishing helps support, but provides no measure of the contribution of the Alaska groundfish fishery to this support. Fishing activities are included in this study only to the extent that they are reflected in activities at Fishermen's Terminal. This may reflect some Bering Sea and Gulf of Alaska catcher vessel activity, but would greatly underestimate catcher processor, mothership, and secondary processing activities. By their estimation, fishing activity at Fishermen's

Terminal in 1993 generated 4007 direct jobs (the majority of them crew positions), earning an average of $48,690 per direct job (total $195 million). Also, an additional 2,765 induced and indirect jobs were created. Fishing businesses also expended $145 million on local purchases of goods and services (Martin O'Connell Associates 1994:45-49). Again, this does not indicate the contribution of the Alaska groundfish fishery so much as it establishes that the local fishing/processing economy is densely developed. Also, if the estimates or models of vessel expenditures developed for operations using Fishermen's Terminal can be extrapolated to other vessels based in Seattle, an estimate of the contribution of the Alaska groundfish fishery may be possible. The estimate for annual expenditures in Seattle for a factory trawler using Fishermen's Terminal was about $2 million in 1993. Miller et al. (1994) indicate that for a model surimi vessel, 1993 operating expenditures other than for crew had been in the range of $10 million annually. These would have been distributed among all the places where the vessel fished, as well as its Seattle (or Tacoma) home port, but still indicates that there is a large contribution to the regional economy from the presence of these vessels. Each vessel also represents more than 100 direct jobs and a payroll of $3 to $5 million (Miller et al. 1994:1,23).

A summary profile of the Puget Sound maritime industry, which includes commercial fishing, is included in Economic Development Council of Seattle and King County 1995 (Appendix A:39-49). Pertinent information has been abstracted here. The list of included businesses is quite long and is a good indicator of how far indirect benefits can spread:

> . . . cargo shipping, tugs and barges, commercial fishing and supply; sip and boat building; cruise ships; vessel design and repair; fueling; moorage; the fabrication and sale of marine gear such as electronics; refrigeration, hydraulics, and propulsion equipment; the operation of marinas, dry docks and boat yards; services provided by customs and insurance brokers and shipping agents; and maritime professional services including admittedly law, marine surveying and naval architecture (Appendix A:39).

It was estimated that in 1992 there were 30,000 jobs in the maritime sector within the four-county region, including: 10,000 in commercial fishing, 7,000 in fish processing, 5,000 in marine recreation, and 3,900 in boat building and repair. Average wages were estimated at $24,000 for fish processors; $32,000 for ship and boat building and repair; and $50,000 to $80,000 for commercial fishing. The sector is one noted for providing entry-level positions for those with limited education and job skills, so that they can learn a high-wage job. Each job in this sector creates or supports one to two other jobs in the regional economy, and each dollar of sector output generates about one additional dollar in output from the rest of the economy.

Seattle offers the maritime sector, and the distant water fleet in particular, a "critical mass" of businesses that allows vessel owners and other buyers a competitive choice of goods and services. The same is true to a lesser extent of other regional ports, such as Tacoma. Efficient land transportation systems are also critical, and Seattle has good rail and truck linkages (and the Port of Seattle is working to improve them).

Although the maritime sector is an important one for the region, some of its components are currently experiencing some difficult times. Other regional communities (Anacortes, Bellingham, Port Townsend) as well as locations in Alaska (closer to the distant fishing waters) are working to develop port facilities to lure vessels so that they may gain the economic benefits of the associated support and supply business. Common sorts of projects are the improvement of shoreside access, building additional moorage, or work and storage capacity.

Natural Resource Consultants revised some of their earlier work and added additional analysis focused specifically on the contributions of inshore Washington State (but also Alaska) processing plants to the Washington State economy (NRC nd, 1997). The Washington inshore seafood processing industry purchased $859.5 million of raw material in 1991, $720.1 million from Alaska and $139.4 million from Washington waters. Salmon accounted for 46 percent of the total value of these purchases, while groundfish accounted for 19 percent. The total finished product from all this raw material was worth $2.1 billion ($1.8 billion from the Alaskan raw material). Salmon accounted for $780 million of the final product's value, while groundfish accounted for $482 million. "... inshore processors operating in Alaska and Washington account for more than 50 percent of the value of U.S. seafood exports" (NRC nd:4).

Expenditure patterns for Washington (and Washington-owned Alaskan) inshore plants were modeled in these NRC documents. Inshore plants expenditures average 46 percent for their raw materials (fish and shellfish), 16 percent for wages and benefits, 9 percent for processing materials, and 7 percent for tendering and other transportation costs. About 55 percent of these expenditures were made in Washington, 43 percent in Alaska, and 2 percent from other states. This is stated to include fish and shellfish purchased in Alaska from fishermen who home port in Washington (NRC nd:9), and economic benefits were produced from these expenditures in direct proportion to their magnitude.

The estimated total economic output from primary and secondary processing activities for all seafood to the Washington state economy in 1991 was calculated to be $1.865 billion. This was the result of three main factors:

- A substantial portion of expenditures for raw material (fish) in Alaska are made to fishermen whose home ports are in Washington.
- The majority of administrative and sales functions of processing companies are carried out in Washington.
- A major portion of support industries (equipment and packaging manufacturing) are located in Washington.

That is also the order of their significance in terms of contributions to economic benefits.

In addition, a substantial amount of secondary processing takes place in Washington. This produces additional benefits to that of primary processing of about 3,635 FTEs, earnings of $81 million, and indirect benefits of $287 million. The report also points out that the Washington inshore processing sector is the second highest value food product contributor to the Washington state economy, being topped only by the apple.

NRC updated this report in 1997 and reached essentially the same conclusions. In 1996 the Washington inshore seafood industry generated 32,837 FTEs (21,308 in Washington and 11,529 in Alaska) and $791 million of earnings impacts ($532 million in Washington and $259 million in Alaska). In terms of economic output, it contributed $1.9 billion to the Washington state economy and $1.2 billion to the state of Alaska economy (NRC 1997).

As noted earlier, these data underscore the interrelatedness of the economies of Alaska and Washington and, as has been seen through the sector profiles and the ties to particular communities, the ties between Seattle and specific Alaska communities. Companies based in Washington depend on Alaska fisheries for the great bulk of the raw materials processed in Washington, and residents of both states harvest Bering Sea resources.

Also, as noted earlier, the corporate offices and sales outlets of the processing companies are located in Washington, as are most of the suppliers and support services for the industry. The following section looks at the localization of the fishing industry within the waterfront area of Seattle.

The Ballard Interbay Northend Manufacturing Industrial Center

With previous discussion as a regional context, an attempt to more closely associate a specific area of Seattle with commercial fishing (and other associated) activities now can be examined. One of the fundamental purposes for the establishment of the Ballard/Interbay/Northend Manufacturing and Industrial Center (BINMIC) Planning Committee was the recognition that this area provided a configuration of goods and services that supported the historical, industrial, and maritime character. At the same time, developmental regional dynamics are promoting changes within the BINMIC area which may threaten the continued vitality of its maritime orientation. Among other objectives, the BINMIC final plan states:

> The fishing and maritime industry depends upon the BINMIC as its primary Seattle home port. To maintain and preserve this vital sector of our economy, scarce waterfront industrial land shale be preserved for water-dependent industrial uses and adequate uplands parcels shall be provided to sufficiently accommodate marine-related services and industries (BINMIC Planning Committee 1998:6).

Previous documents produced for the NPFMC have discussed the BINMIC area, and some of this information is abstracted below, for the sake of completeness. It is not vital to this discussion, however, as the BINMIC planning document has remained in the form in which it was "finalized" and the City of Seattle does not collect comparable time series measures for the BINMIC area.

As previously noted, Ballard, in northwest Seattle, is commonly identified as the center of Seattle's fishing community. This may be true in an historical residential sense, but commercial fishing-related suppliers and offices are spread along both sides of Salmon Bay-Lake Washington Ship Canal, around Lake Union, along 15th Avenue West through Queen Anne, and then spread along the shores of Elliot Bay on both sides of Pier 91. Not surprisingly, this is also the rough outline of the formal BINMIC boundaries, which is bordered by the Ballard, Fremont, Queen Anne, Magnolia, and Interbay neighborhoods. It is defined so as to exclude most residential areas, but to include manufacturing, wholesale trade, and transportation-related businesses. It includes rail transportation, ocean and fresh-water freight facilities, fishing and tug terminals, moorage for commercial and recreational boats, warehouses, manufacturing and retail uses, and various port facilities (Terminal 86, Piers 90 and 91).

The BINMIC "Economic Analysis" document (Economic Consulting Services 1997) uses much of the same information as was reviewed above, in combination with an economic characterization of the BINMIC area, to establish that certain economic activities are especially important for that area. One of these activities is commercial fishing - although again the connection to the Alaska groundfish fishery in particular is somewhat difficult to establish concretely.

The BINMIC area is a relatively small one, but contributes disproportionately to the city and regional economy (Table 3.1-3). Again, those characteristics are part of what determined its borders. The BINMIC resident population is only 1,120 (1990 census), but there are 1,048 businesses in the area and 16,093 employees. The great majority of business firms are small - 85 percent have fewer than 26 employees, but accounted for only

30 percent of total BINMIC employment. Self-employed individuals (i.e. fishermen) are probably not included in these numbers. Employment by industry sector is displayed in Table 3.1-4.

Table 3.1-3 Relationship of Estimated BINMIC Population and Employment to Local, Regional, and State Population and Employment

Area	1990 Population	BINMIC as % of Total	1994 Employment	BINMIC as % of Total
BINMIC	1,120	100	16,093	100
City of Seattle	516,259	0	490,632	3
King County	1,507,319	0	912,038	2
Puget Sound	2,748,895	0	1,363,226	1
Washington State	4,866,692	0	2,212,594	1

Note: Percent of total reflects BINMIC's share of each area's total population and employment
Source: Economic Consulting Services 1997:14

Table 3.1-4 BINMIC Employment by Industry Sector

Industry Sector	Units	Employees	Percent of Total
Agriculture, Forestry, & Fishing	129	750	5
Mining & Construction	83	1169	7
Manufacturing	216	5322	33
Transportation & Utilities	35	1608	10
Wholesale Trade	178	2239	14
Retail Trade	121	1606	10
Finance, Insurance, & Real Estate	43	306	2
Services	233	2604	16
Government	10	489	3
TOTAL	1048	16093	100

Source: Economic Consulting Services 1997:29

An important indicator of the importance of commercial fishing and other maritime activities is the availability of commercial moorage. As of 1994, more than 50 percent of all commercial moorage available in Puget Sound was located in Seattle, and of that, more than 50 percent was in the BINMIC area (representing 30 percent of all commercial moorage in the Puget Sound area). Thus, the BINMIC area is clearly important in terms of being an area where vessels (especially larger commercial vessels) are concentrated. The Port of Seattle has concluded that only the ports of Olympia and Tacoma at present provide a significant source of moorage in Puget Sound outside of Seattle. Port Angeles may build additional capacity at some point in the future. Olympia's facility was rebuilt in 1988. Some older moorage constructed of timber piling prior to

1950 is nearing the end of its useful life and will need to be replaced. On the other hand, it is expected that much of the private old timber moorage will not be replaced, so that overall moorage capacity will decline. In the Seattle area, there has also been a dynamic whereby commercial moorage had been converted to recreational moorage. Within the BINMIC area, recreational moorage within the UI Shoreline is prohibited altogether, because of the importance of commercial activity and the danger of interference from recreational moorage. The Port has concluded that it is unlikely that any new private commercial moorage will be developed (because of cost and regulatory regime) and is examining their options (Port of Seattle 1994). As previously mentioned, the Port is pursuing a program of repairing its facilities where economically feasible (when it can be fairly well assured of a steady tenant).

The BINMIC area is fairly well "built out." The BINMIC area contains 971 acres, divided into 806 parcels with an average size of 1.043 acres, but a median size of .207 acres. Thus there are many small parcels. Public entities of one sort or another own 574.8 acres (59 percent). The Port of Seattle is the largest landowner with 166 acres, while the city has 109 acres. Private land holders own 396 acres, of which only 19.45 acres were classified as vacant - 19.27 acres in 81 parcels as vacant industrial land and .18 acres in 2 parcels as vacant commercial land. An additional 200.76 acres were classified as "underutilized," meaning that it had few buildings or other improvements on it. This classification does not mean that the land may not be in use in a fruitful way (for instance, storage of gear or other use that is not capital intensive).

Economic Consulting Services (1997) lists 85 companies that have a processing presence in Washington state (Appendix C). Of these, over half (47) are located in Seattle, with many in the surrounding communities (Bellevue, Kirkland, Redmond). Of these 47, at least 18 are located within the BINMIC, and the rest are located very near the boundaries of the BINMIC. Some examples of fairly large fishing entities that are located within BINMIC (as well as elsewhere) are Trident Seafoods, Icicle Seafoods, Ocean Beauty Seafoods, Peter Pan, Alaska Fresh Seafood, and NorQuest Seafoods. All demonstrate some degree of integration of various fishing industry enterprises.

The BINMIC area of Seattle displays the following characteristics which indicate its important economic roles:

- it is a significant component of, and plays a vital role in, the greater Seattle economy;
- it is integrated into local, regional, national, and multinational markets;
- it is a key port for trade with Alaskan and the West Coast, Pacific, and Alaska fishing industries - and the Alaskan fishery is especially significant;
- Salmon Bay, Ship Canal, and Ballard function as a small port of its own, but also support fishing and a wide range of other maritime activities - including recreation and tourist vessels and activities; and
- it is, and has been, an area of concentration of businesses, corporations, organizations, institutions, and agencies that participate in, regulate, supply, service, administer, and finance the fishing industry.

Summary: Seattle and North Pacific/Groundfish Socioeconomic Issues

As noted in the introduction to this section, Seattle is an analytic challenge, in terms of a socioeconomic description and a social impact assessment directly related to the Alaska groundfish fishery, because of its scale and diversity. Seattle is arguably more involved in the Alaska groundfish fishery than any other community, but from a comparative perspective, Seattle is arguably among the least involved of the communities considered. The sheer size of Seattle dilutes the overall impact of the Alaska groundfish fishery

jobs and general economic contributions when viewed on a community scale, in contrast to Alaskan communities where such jobs and revenues are a much greater proportion of the total economic base of the community. This section has attempted to portray the complexities of the ties of the Alaska groundfish fishery to Seattle in terms of sectors, specific portions of the economy, and on a geographically localized basis.

All of the Alaska groundfish fishery sectors are tied to Seattle in one way or another, although the magnitude and nature of these ties varies considerably between sectors. It is clear that Seattle, as a community is, from a number of different perspectives encompassing specific sector structures and geographically attributable industrial areas, engaged in and dependent upon the Alaska groundfish fishery. To avoid losing the importance of the fishery in the 'noise' of the greater Seattle area, the association will be described in terms of Alaska groundfish fishery industry sectors and their linkages to Seattle, as described in this section, rather than attempting an overall contextualization of the fishery and impact analysis within the metropolitan area.

Links to Specific Groundfishing Sectors

In addition to looking at port-focused and neighborhood-focused activities, a relevant way to examine the nature of Seattle's involvement with the Alaska groundfish fishery is to look at the nature of the links between Seattle as a community and the relevant individual sectors of the Alaska groundfish fishery. This type of information is specifically intended to provide a general level overview of dynamic relationships of Seattle to all of the relevant sectors, and discuss the nature and degree of variation between sectors.

Inshore Processing

The Inshore/Offshore-3 analysis (NPFMC 1998) found that all of the larger floating processors with a continuity of participation in the Bering Sea pollock fishery during the 1990s were managed and operated out of Seattle. While moveable in theory, Alaska groundfish floating processors tend to operate in relatively fixed locations in Alaskan State waters, outside of incorporated city and organized Borough boundaries. Thus, they have minimal interaction with local Alaskan communities and can be characterized as true industrial enclaves. They employ relatively few Alaska residents, another potential measure of local community or at least state labor force interaction. This, along with the fact that these operations are supported out of the Seattle area (with some logistical support in Unalaska/Dutch Harbor, and marked reliance on air transportation links to that community), would appear to reinforce the overall ties of this subsector to Seattle as opposed to the Alaskan communities closer to their areas of operation.

As noted in earlier NPFMC documents, while the larger shoreplants which process Alaska groundfish are located in Alaska, all have multi-level ties to Seattle. All are administered from corporate headquarters in Seattle, which is the center for corporate and financial services. Thus, Seattle is the community where business decisions are made, or at least deliberated, for the Alaska shore plants (setting aside, as for other sectors, the complicating issue of degrees foreign ownership that vary by entity). This distinction should not be carried too far, however, as plant managers resident in the communities clearly have a role in corporate decision making, and executives based in Seattle also spend time in the Alaskan communities where their plants are located. Nonetheless, the role of 'Seattle' in the decision-making process, and the profound influence that process has in the Alaska shoreplant communities, is well recognized in the communities themselves.

In terms of the links between Seattle and the important inshore processing community of Unalaska/Dutch Harbor, specifically with the maturing of the fishing industry, the growth of local infrastructure and support services, and the overall changes in Unalaska/Dutch Harbor, the relationship between the communities has changed somewhat. It is no longer common to hear people express their recognition of the strong industry ties between Unalaska/Dutch Harbor and Seattle by saying that in some respects Unalaska is a 'suburb of Seattle,' as was not uncommon in the mid-1980s. The center-periphery relationship is perhaps more complex than ever for this sector. For the Bering Sea portion of the fishery, Seattle is the center of corporate operations; Unalaska/Dutch Harbor is the center of processing operations and the interdependencies are many and complex. A similar pattern applies to Kodiak for the Gulf of Alaska component of the fishery. Further, while there is some variation in this pattern with smaller inshore groundfish processors in other communities, plants in the other three of the top five Alaskan groundfish ports (Akutan, King Cove, and Sand Point) are all operated by firms managed out of Seattle.

In addition to being a decision-making and important administrative support community for the shoreplants, Seattle is also the location of some direct employment associated with the shore plant companies. While administrative shore plant sector employment in Seattle consists of relatively few jobs compared with positions at the plants themselves, the Seattle component has a greater proportion of jobs within the upper compensation range. Physical plants for secondary processing are located elsewhere in the Pacific Northwest, Alaska, other parts of the country, and overseas. Some have direct business operation connections with primary processors (both onshore and offshore).

The day-to-day management of the labor force of shore plants in Unalaska/Dutch Harbor tends to consist of year-round community residents (though these individuals were initially recruited from elsewhere). Managers of other shore plants tend to maintain homes outside of Alaska (many in the Seattle area), even though most spend most of their time in Alaska and may well qualify as Alaskan residents. The bulk of the labor force for shore plants consists of the maintenance/support and the processing crews (although the two may well overlap). The former tends to be employed on a more year-round basis, and thus tends to be more of an Alaska resident labor force. The latter tends to have a higher turnover and, with a significant percentage of the workforce still coming from the PNW and the greater Seattle area in particular, employment ties to Seattle are still important for Bering Sea and Gulf of Alaska community-based operations. As discussed in the 1998 Inshore/Offshore-3 document (NPFMC 1998), for the inshore pollock processing sector as a whole in 1996, non-Alaskan employees accounted for approximately 80 percent of the total workforce, but this figure varies widely by plant, with the range encompassing less than 10 percent to almost 40 percent of the workforce being Alaska residents of any one operation. A similar pattern is assumed to hold for all large groundfish plants. While it is important to recall that there are significant differences between 'residence' and the location of jobs, as discussed in earlier documents, there are impacts derived from the physical location of jobs more or less independent of the formal residency status of the workforce. While specific break-outs are not available, based on interviews with plant managers, it may be safely assumed that the bulk of the non-Alaska jobs come from the PNW region, and a disproportional number of those from Washington State and the greater Seattle area.

Interviews with processing personnel conducted for the 1994 SIA (IAI 1994) would indicate that a not insignificant portion of the wages paid to workers in Alaskan plants were used to help support extended families outside of the region. While quantitative data does not exist regarding this type of wage flow, it is one more indication (particularly given a general knowledge of the industry) of the ties between the shoreplants and Seattle (and the greater West Coast area).

In terms of support services for the shore plants, Seattle would appear to play a similar role for the shoreplant sector as it does for several of the other sectors, in nature if not in relative magnitude. Shoreplants do purchase goods and services in their 'host communities' but this is highly variable by plant and community. Among the major plant sites, Unalaska/Dutch Harbor and Kodiak have the highest degree of development of local support services, but it is still the case for these communities that materials and supplies needed for the operation of the plants are not manufactured locally, and a great deal of these are shipped out of the Seattle area, given that Seattle is both the headquarters of the individual companies and the nearest major port in the Lower-48.

In terms of expenditure patterns for the shore plant sector in relation to the Seattle area, there are several main areas to consider. First, the shore plants buy fish from the catcher vessel fleet and, as detailed in the sector profile for the catcher vessel fleet, the inshore delivering fleet is primarily based in Seattle and the Washington Inland Waters region. While there has been a considerable shift in recent years in ownership patterns with respect to shore plants as a sector, with processing entities coming to own and/or control a considerable percentage of their delivering fleets, interview data would suggest that there has not been a dramatic shift in employment patterns for crew members. That is, while the locus of ownership may have changed, the patterns of employment have not appeared to do so, with most of the crew members and skippers coming out of the Seattle and Washington Inland Waters region and Oregon coastal areas. This being the case, crew compensation as a function of shore plant expenditures for Alaska groundfish disproportionately accrue to Seattle and the Pacific Northwest as a region. Second, expenditures for support services would appear to be primarily directed toward the Seattle/Pacific Northwest area. Third, corporate finances would appear to flow through Seattle, so the community would derive economic benefits from these transactions. In short, shoreplant expenditures are important to Seattle when examined on a sector basis. The localization of such expenditures within Seattle, however, is less clear.

In terms of fiscal impacts to Seattle, clearly the differences of scale between Seattle and the Alaska shoreplant communities make a great difference in relative significance of the sector. Beyond this, there are different types of fiscal inputs/taxation relationships between the companies and communities based on where the actual 'work' or 'industry' of processing takes place. In the shore plant communities themselves, the plants, as described in the Alaska communities discussion, provide a basic fiscal underpinning for local government in the form various business, property, sales, and fish taxes. Seattle, not being the 'industrial' center of the processing, has a different relationship to the industry.

Motherships

Motherships, as a sector, have strong ties to the Seattle area. All three Bering Sea pollock mothership operations are headquartered in Seattle, and the motherships themselves are managed and supported principally out of Seattle. Hiring is done from Seattle and, while we have no statistical breakdown of the mothership labor force, many come from the Lower-48 and most are reportedly from the Pacific Northwest. All, and especially the mothership with a CDQ group partner and partial CDQ group ownership, have strong initiatives to hire Alaskans, and especially Alaskans from Western Alaska.

Given that the operations are headquartered in Seattle, the community acts as a corporate center for this industry sector, in terms of corporate and financial services support. There are a few administrative/office positions for each company in Seattle, but these account for less than 10 percent of the workforce in every case, even at the low end of operational range staffing aboard the vessels.

In terms of fiscal impacts to communities, like catcher processors, motherships are subject to the resource landing tax in Alaska, so they developed a different fiscal relationship to Alaska communities. Individual operations varied the location and number of offloads, so there was variability between operations in this regard, but motherships in general appeared to offload fewer times in Alaskan communities than did catcher processors. At least one was reported to sometimes take a product directly to Japan, and all reported taking their 'last load' to a non-Alaskan port.

The catcher vessel fleet for motherships tends to have Seattle owners and to be maintained in the Seattle/Pacific northwest region. Some vessels have California or Alaska owners, or may have some connections with Oregon. Regardless of ownership or "home port" designation, many of these catcher vessels normally remain in Alaskan waters between the last pollock season of the year and the first pollock season of the following year, unless there is a compelling reason for them to go to Seattle. Those mothership catcher vessels with Pacific whiting permits have an incentive to go south after the first pollock season, and those from that region are most likely to have such permits. They will normally schedule maintenance calls in Seattle during this period. Mothership catcher vessels do participate in more fisheries than do motherships themselves itself, but Alaska groundfish (specifically pollock) is their most important fishery.

Mothership labor forces are predominately Seattle-based. Offices are maintained in Seattle, one in conjunction with its pollock CDQ partner and its parent onshore processing company. Workforces range from 80 to 140 persons on the two smaller operations to 190 to 220 persons on the larger operation. An increasing number of these employees are reported to be from Western Alaska, especially on the CDQ partner vessel. The larger operation employs a crew of 40 to 60 people to maintain the vessel and thus work 6 to 7 months a year. Office staff work year-round, and the rest of the crew works only while the vessel is actively fishing or in transit (estimated at approximately 90 days).

All mothership operations report using Seattle as their primary logistical base. That is, they will leave Seattle with as many of the supplies that they will need for the fishing season as possible. All mothership operations contrasted this with the pattern of their catcher vessel fleet, which obtains most of its logistical support from Alaskan ports. The mothership reportedly does not carry supplies for its catcher vessel fleet (citing lack of storage capacity aboard their vessels). Motherships have a limited number of opportunities to take on additional supplies in Alaskan ports, since they normally do not have many offloads in Alaskan ports. Linkages to Alaskan communities are thus mostly through the resource landing tax paid on offloaded product and the activities of their catcher vessel fleet. Most mothership community linkages are with Seattle.

Catcher-Processor Sector

Corporate management and operations of the catcher-processor fleet is concentrated in the Seattle and Puget Sound area, as is ownership. These vessels are typically not present in Alaska when not working, although there have been a number of exceptions for ship work in Alaskan ports. Even these vessels for the most part use Seattle or Pacific Northwest facilities for regular maintenance and support. This pattern has been modified in recent years by the investment of five of the six CDQ groups in the offshore sector. These ownership shifts have affected some aspects of the operations of these vessels, but not the centralization of management and support services for them in Seattle. The sector industry association has established its headquarters in Alaska, and has made targeted hiring efforts in Anchorage as well as the CDQ regions, although employment continues to be predominately from Washington state.

Catcher-processors harvest and process Alaska groundfish in Alaskan waters and, although Seattle based, have fiscal ties to Alaska through the payment of a resource landing tax on the product they offload in taxable jurisdiction areas. For example, as noted in the discussion of Alaskan communities, the resource landing tax is a significant source of income to the community of Unalaska/Dutch Harbor. Some catcher processors will land their last load in Seattle, since many must make the trip anyway, but this varies by operation, and depends on a number of variables such as ultimate market, shipping costs, timing with respect to participation in other fisheries, and so on. Those catcher processors which participate in other fisheries (after pollock) producing fillets may tend to land more of their total pollock production in Alaska.

Catcher processor vessels are moored and maintained in the Seattle/Pacific Northwest area. The Port of Seattle has made a sizeable investment in renovating part of Pier 91, partly in response to the need of the largest catcher processor company for moorage and other workspace for its operations. The ability and desire of this company to sign a long-term lease enabled the Port of Seattle to finance these renovations, so there is a direct link seen between the Alaska groundfish fishery and port development. The Puget Sound area, and the Port of Seattle within the Puget Sound area, provides the majority of moorage available for the Alaska groundfish fishery fleet (and especially so for catcher processors).

Hiring for employment within the fleet occurs both in Alaska and the Lower-48. Turnover varies from year-to-year and is highly dependent on levels of compensation. Some people make careers of working on catcher processors, while others treat it as a seasonal activity or a "stage of life" activity. The one group of employees that was readily identifiable were those Alaskans hired from western Alaskan villages, primarily by fishing operations with CDQ partnerships. At least a limited number of individuals have relocated to Seattle, based on catcher processor employment, although interview data would indicate that they maintain contacts with relatives and return to the village at frequent intervals. Management and the vessel maintenance labor force, to the degree that such work does not require work in a shipyard, is clearly concentrated in Seattle. Interview information from the 1998 Inshore/Offshore-3 SIA (NPFMC 1998), derived from contact with five companies with 27 vessels, supported this general picture. Most employees are from Washington or other western states, with Seattle being the major (or only) point of hire. For those operations with CDQ partners, this was generally modified by an effort to incorporate CDQ group residents into the fishing (and other) operations through entry level positions and intern training programs.

Available information on expenditure patterns of the catcher processor fleet is fairly sketchy. Prior to the formation of co-ops, the catcher-processor sector fleet, on average, purchased 10 percent of its open-access pollock from the catcher vessel sector fleet, which is itself predominately Seattle based. Under the co-op system, however, there has been a fundamental change in this pattern, with additional catch capacity becoming much less important. Some drydock work has recently been done in Alaskan ports, specifically in Ketchikan, and in-season work also takes place in Alaska. Seattle is the only locale with a concentration of facilities that can provide these services for a large number of vessels, with the possibility for competitive bidding. Interviews with most firms for the 1998 Inshore/Offshore-3 SIA (NPFMC 1998) resulted largely in general level information; however the overall pattern was clear. Catcher processor operators consistently indicated that most expenditures were made in or through Seattle or the Puget Sound area - with in-season support from Alaskan sources as required. They were quick to point out that they needed to purchase large amounts of fuel in Unalaska/Dutch Harbor, paid a great amount of dock fees and resource landing taxes there, and in general provided a good deal of support for that community, both through fees and taxes and direct expenditures. At the same time, like all other businesses, their operations are managed to minimize expenses, in most cases entailing supplying the vessel as much as possible from Seattle.

The community economic/fiscal links of the catcher/processor sector can be summarized by the overall dichotomy or comparison of (Seattle) financial, most maintenance, and initial supply costs as opposed to (Alaskan and especially Unalaska) in-season operational costs. The majority of the labor force is in some way linked to Washington State or the Pacific Northwest. Thus, in terms of absolute value, the sector expends a great deal more, to a much wider economic network, in Seattle than it does in Alaska. The difference in the scales of the economies in Seattle and Alaska (especially for the community of Unalaska/Dutch Harbor), however, make the catcher processor sector economically important in Alaska in general, and the community of Unalaska/Dutch Harbor in particular. While also important in Seattle, the overall community effects of changes in the operations of this sector are less because of the sheer size of the Seattle economy. There may be identifiable effects on subsections of Seattle's economy, such as the Port, shipyards, or other services concentrated in Ballard.

The catcher-processor sector felt significant impacts as a result of AFA, but employment recruitment patterns have not changed a great deal from pre-AFA operations. Total employment has of course decreased, but those still working are working more hours and thus earning a higher yearly total than before. This, of course, does not minimize the impact on individuals and families of the loss of employment for an estimated 1,500 to 2,000 individuals as an early and direct result of AFA.

Catcher Vessels

Aside from the ownership-related ties already discussed, many of the larger class groundfish catcher vessels have other ties to the greater Seattle area. Patterns for smaller vessels are much more variable and Alaska focused, as shown in the ownership information previously discussed. Most of the vessels in the larger classes of catcher vessels will have overhauls and other major work done in Seattle (or an alternate port in Washington, or Portland, Readsport, or Newport in Oregon), but may make the trip only every two years if they do not usually participate in PNW coast fisheries on a regular basis. This is also a tendency which seems to accompany shore plant acquisition of more pollock-specialized catcher vessels. This, and the decreasing fishing opportunities in Pacific coast fisheries, are also factors in this trend. Depending on the degree of shelter provided by moorage at the different plant locations, the pollock-focused catcher vessels may tend to tie up at Alaskan shore plants between seasons. Limited moorage for catcher vessels participating in the Alaska groundfish fishery exists in other Alaskan ports (Kodiak, Sand Point), but only to a very limited extent. Catcher vessels delivering to motherships or offshore tend to go to Seattle every year if they participate in the Pacific coast hake fishery. Otherwise, they also tend to stay in Alaskan waters when they do not need major shipyard work and will look for Alaskan fisheries to 'fill in' their annual harvest cycle. This trend has the effect of increasing the use of air flights to connect crew with vessels, so that an indirect effect is to increase the availability of and support for transportation links for various Alaskan fishery communities (a trend also seen to a much larger degree with the 'transient' components of the shore plant workforces).

No systematic information on the geographic origin of overall sector employment is available, but interview information developed for the Inshore/Offshore-3 SIA (NPFMC 1998) indicates that for the larger classes of catcher vessels, most of the crew is from the Washington/Oregon area, with a concentration in Seattle. This was true even though many catcher vessels apparently spent most of their time in Alaskan waters and may tie up in Alaskan ports more than in Washington or Oregon. This may reflect an historical situation, before Alaskan moorage was available and boats did return to Seattle every year, combined with continued Washington/Oregon ownership.

Catcher vessel expenditure patterns are difficult to generalize. For the smaller vessel classes that tend to be Alaskan in ownership, Alaska-based expenditures are the norm. For the larger classes, in-season operational expenditures are made in Alaskan ports. Catcher vessels tend to tie up in Alaskan waters when possible, but maintenance requiring shipyard work and overhauls tend to take place in or near the owner's physical residence, which in most cases is the Pacific Northwest. Crew tends to reflect the boat's "community of origin" as well, so that the overall revenue flow for most larger catcher vessels is oriented to the Washington/Oregon area, and for the Alaska groundfish fishery, more specifically to Washington. These economic effects are distributed more widely, and to a wider range of communities, than for the processing sectors considered above.

Summary: Seattle and North Pacific/Groundfish Socioeconomic Issues

As noted in the introduction to this section, Seattle is an analytic challenge, in terms of a socioeconomic description and a social impact assessment directly related to the Alaska groundfish fishery, because of its scale and diversity. Seattle is arguably more involved in the Alaska groundfish fishery than any other community, but from a comparative perspective, Seattle is arguably among the least involved of the communities considered. The sheer size of Seattle dilutes the overall impact of the Alaska groundfish fishery jobs and general economic contributions when viewed on a community scale, in contrast to Alaskan communities where such jobs and revenues are a much greater proportion of the total economic base of the community. This section has attempted to portray the complexities of the ties of the Alaska groundfish fishery to Seattle in terms of sectors, specific portions of the economy, and on a geographically localized basis.

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APPENDIX F2: REGIONAL ECONOMIC INDICATORS 1975-1999

Table 1 Total Employment for Alaska Peninsula/Aleutian Islands Region, 1975-1999

Sector	No. of Persons Employed by Year					
	1975	1980	1985	1990	1995	1999
Agricultural Services, Forestry, Fishing, and Other	392	497	545	325a	63a	a
Construction	250	125	182	200	119a	a
Federal, Civilian	535	667	685	772	223	53
Finance, Insurance, and Real Estate	a	a	176	157	202	305
Manufacturing	754	1,816	928	1,499a	3,566	2,958
Military	3,330	2,410	2,505	2,897	1,073	68
Mining	35	0	a	a	a	a
Retail Trade	a	130	161	483	533	72a
Service	77	236	408	358	90a	635a
State and Local	263	376	590	690	691	640
Transportation and Public Utilities	a	134	250	576	463	334
Wholesale Trade	a	a	a	72a	47a	84a

Note: Where "a" appears in the table, the data is suppressed due to confidentiality reasons, or because there were fewer than ten jobs in that sector during the year indicated. Where an "a" follows a numerical value, one or more of the underlying statistical areas faced disclosure or other limitations. Although the data do not appear in the table, the totals shown in the summary table reflect all available information, which might include estimates of employment and income for unusually small sectors.

Table 2 Personal Income and Earnings for Alaska Peninsula/Aleutian Islands Region, 1975-1999

Sector	Earnings by Year ($Millions)					
	1975	1980	1985	1990	1995	1999
Agricultural Services, Forestry, Fishing, and Other	4.0	5.5	8.4	5.8a	0.4a	a
Construction	8.8	6.8	11.8	15.3	6.2a	a
Federal, Civilian	6.3	14.2	15.2	21.7	9.4	3.1
Finance, Insurance, and Real Estate	a	a	3.1	3.2	3.8	4.8
Manufacturing	9.4	35.8	22.9	48.9a	108.4	114.2
Military	43.7	44.0	70.6	91.2	40.3	1.9
Mining	1.2	a	a	0.1	0.0	0.0
Retail Trade	a	2.1	3.1	10.9	12.4	1.6a
Service	0.2	2.8	5.6	5.8	2.2a	22.0a
State and Local	4.1	9.3	19.2	22.9	27.8	26.7
Transportation and Public Utilities	a	2.5	9.0	15.8	13.0	12.1
Wholesale Trade	a	a	a	4.4a	2.6a	4.0

Note: Where "a" appears in the table, the data is suppressed due to confidentiality reasons, or because there were fewer than ten jobs in that sector during the year indicated. Where an "a" follows a numerical value, one or more of the underlying statistical areas faced disclosure or other limitations. Although the data do not appear in the table, the totals shown in the summary table reflect all available information, which might include estimates of employment and income for unusually small sectors.

Table 3 Per Capita Income and Total Employment for Alaska Peninsula/Aleutian Islands Region, 1975-1999

Indicator	Indicator Data by Year					
	1975	1980	1985	1990	1995	1999
Personal Income ($Millions)	77.5	110.7	155.4	246.3	215.4	187.6
Population (No. of Persons)	8,523	7,813	9,734	11,974	7,195	6,092
Per Capita Personal Income ($)	$9,089	$14,170	$15,968	$20,568	$29,943	$30,802
Total Full- and Part-Time Employment (No. of Persons)	6,035	6,572	6,494	9,202	8,313	6,378

Table 4 Total Employment for Kodiak Island Region, 1975-1999

Sector	No. of Persons Employed by Year					
	1975	1980	1985	1990	1995	1999
Agricultural Services, Forestry, Fishing, and Other	1,347	1,642	1,572	1,238	1,026	1,237
Construction	309	148	407	326	321	271
Federal, Civilian	318	282	239	164	161	179
Finance, Insurance, and Real Estate	101	114	180	294	323	311
Manufacturing	1,178	2,060	1,473	2,209	2,437	1,855
Military	1,894	1,387	1,122	1,181	1,143	1,019
Mining	0	0	13	a	a	a
Retail Trade	525	711	887	1,093	1,128	1,206
Service	567	858	1,036	1,615	1,593	1,934
State and Local	663	745	907	937	922	933
Transportation and Public Utilities	260	404	284	399	431	382
Wholesale Trade	47	49	54	50	111	65

Note: Where "a" appears in the table, the data is suppressed due to confidentiality reasons, or because there were fewer than ten jobs in that sector during the year indicated. Although the data do not appear in the table, the totals shown in the summary table reflect all available information, which might include estimates of employment and income for unusually small sectors.

Table 5 Personal Income and Earnings for Kodiak Island Region, 1975-1999

Sector	Earnings by Year ($Millions)					
	1975	1980	1985	1990	1995	1999
Agricultural Services, Forestry, Fishing, and Other	12.9	18.5	13.9	47.3	32.9	28.4
Construction	8.4	5.2	18.4	11.3	14.1	13.5
Federal, Civilian	7.2	10.4	11.5	8.2	10.2	11.8
Finance, Insurance, and Real Estate	1.5	2.7	3.2	3.2	5.3	7.0
Manufacturing	15.5	37.5	21.4	51.1	64.1	59.5
Military	24.7	26.3	37.4	38.5	48.0	51.6
Mining	a	0.6	0.6	a	0.1	0.1
Retail Trade	6.4	11.1	16.7	19.0	20.2	21.6
Service	5.3	12.5	19.3	31.1	31.2	43.7
State and Local	10.6	18.0	31.1	34.5	38.4	36.1
Transportation and Public Utilities	3.7	10.5	11.0	12.8	14.2	12.9
Wholesale Trade	0.7	0.9	1.3	1.2	4.6	2.8

Note: Where "a" appears in the table, the data is suppressed due to confidentiality reasons, or because there were fewer than ten jobs in that sector during the year indicated. Although the data do not appear in the table, the totals shown in the summary table reflect all available information, which might include estimates of employment and income for unusually small sectors.

Table 6 Per Capita Income and Total Employment for Kodiak Island Region, 1975-1999

Indicator	Indicator Data by Year					
	1975	1980	1985	1990	1995	1999
Personal Income ($Millions)	102.0	153.0	200.0	289.9	331.7	361.7
Population (No. of Persons)	9,153	10,004	12,243	13,400	14,883	14,350
Per Capita Personal Income ($)	$11,142	$15,298	$16,340	$21,637	$22,290	$25,204
Total Full- and Part-Time Employment (No. of Persons)	7,209	8,400	8,174	9,509	9,603	9,398

Table 7 Total Employment for Southcentral Region, 1975-1999

Sector	No. of Persons Employed by Year					
	1975	1980	1985	1990	1995	1999
Agricultural Services, Forestry, Fishing, and Other	1,445a	3,479	6,037	5,940	5,236	6,510
Construction	12,041	8,307	15,858	10,295	12,251	13,882
Federal, Civilian	11,113	9,909	10,097	11,003	10,993	10,350
Finance, Insurance, and Real Estate	12,497	16,593	18,078	14,567	14,789	16,604
Manufacturing	3,267	4,448	5,273	6,118	6,210	5,697
Military	14,439	13,286	13,467	14,382	12,749	11,547
Mining	2,240a	3,859a	6,004	7,241	5,894a	5,398
Retail Trade	14,520	17,690	28,516	30,205	36,681	39,518
Service	22,878	28,473	43,548	51,785	60,670	69,445
State and Local	13,723	15,976	21,699	22,564	24,805	25,342
Transportation and Public Utilities	9,347	10,582	12,786	15,817	17,398	19,798
Wholesale Trade	4,599a	4,702a	7,490	6,862	7,791a	8,203

Note: Where "a" appears in the table, the data is suppressed due to confidentiality reasons, or because there were fewer than ten jobs in that sector during the year indicated. Where an "a" follows a numerical value, one or more of the underlying statistical areas faced disclosure or other limitations. Although the data do not appear in the table, the totals shown in the summary table reflect all available information, which might include estimates of employment and income for unusually small sectors.

Table 8 Personal Income and Earnings for Southcentral Alaska Region, 1975-1999

Sector	Earnings by Year ($Millions)					
	1975	1980	1985	1990	1995	1999
Agricultural Services, Forestry, Fishing, and Other	10.0a	38.5	86.7	146.7	84.8	88.4
Construction	438.7	383.1	763.8	470.4	607.0	676.5
Federal, Civilian	211.4	292.4	387.0	513.6	646.9	715.3
Finance, Insurance, and Real Estate	75.3	139.7	282.4	222.9	329.3	405.6
Manufacturing	52.1	106.3	142.5	177.8	217.1	197.5
Military	167.7	229.7	357.3	439.4	454.4	484.6
Mining	65.1a	159.9a	340.6a	531.0	463.1a	441.9
Retail Trade	176.5	273.6	580.6	588.6	710.5	831.1
Service	336.0	525.4	1,013.8	1,258.8	1,565.7	1,965.0
State and Local	240.8	467.7	881.1	931.6	1,168.5	1,151.7
Transportation and Public Utilities	219.7	345.1	514.1	620.8	794.8	918.1
Wholesale Trade	92.7a	134.7a	256.6	237.4	271.8a	304.5

Note: Where "a" appears in the table, the data is suppressed due to confidentiality reasons, or because there were fewer than ten jobs in that sector during the year indicated. Where an "a" follows a numerical value, one or more of the underlying statistical areas faced disclosure or other limitations. Although the data do not appear in the table, the totals shown in the summary table reflect all available information, which might include estimates of employment and income for unusually small sectors.

Table 9 Per Capita Income and Total Employment for Southcentral Alaska Region, 1975-1999

Indicator	Indicator Data by Year					
	1975	1980	1985	1990	1995	1999
Personal Income ($Millions)	2,157.7	3,555.0	6,814.9	7,748.5	9,701.8	11,332.7
Population (No. of Persons)	200,595	227,962	311,610	318,861	357,565	374,975
Per Capita Personal Income ($)	$10,756	$15,595	$21,870	$24,301	$27,133	$30,222
Total Full- and Part-Time Employment (No. of Persons)	123,047	137,944	189,391	197,286	216,092	232,770

Table 10 Total Employment for Southeast Alaska Region, 1975-1999

Sector	No. of Persons Employed by Year					
	1975	1980	1985	1990	1995	1999
Agricultural Services, Forestry, Fishing, and Other	974a	2,262	3,120	3,357	3,047	2,187a
Construction	1217a	1,677	2,729	1,914	2,663a	2,788a
Federal, Civilian	2,064a	2,466a	2,040a	2,102a	1,924	1,760
Finance, Insurance, and Real Estate	1,170a	1,808a	1,702a	2,303	2,442a	2,120a
Manufacturing	3,828a	4,797	3,500	5,711	4,566	3,494a
Military	1,365a	1,183	1,010	1,315	1,261a	1,147a
Mining	39a	23a	54a	131a	269a	36a
Retail Trade	3,330a	4,023	5,101	6,357	7,935	7,576
Service	3,615a	5,002a	6,900a	9,267a	11,401	13,245
State and Local	6,751	7,746	9,687	9,890	10,008	10,233
Transportation and Public Utilities	2,122a	2,604	2,174a	2,911a	3,361	3,141
Wholesale Trade	373a	327a	398a	683a	629a	733a

Note: Where "a" appears in the table, the data is suppressed due to confidentiality reasons, or because there were fewer than ten jobs in that sector during the year indicated. Where an "a" follows a numerical value, one or more of the underlying statistical areas faced disclosure or other limitations. Although the data do not appear in the table, the totals shown in the summary table reflect all available information, which might include estimates of employment and income for unusually small sectors.

Table 11 Personal Income and Earnings for Southeast Alaska Region, 1975-1999

Sector	Earnings by Year ($Millions)					
	1975	1980	1985	1990	1995	1999
Agricultural Services, Forestry, Fishing, and Other	8.3a	26.6	59.2	77.4	61.2	33.6a
Construction	30.9a	59.8	102.6	69.7	110.9a	115.2a
Federal, Civilian	38.0	67.7	82.5	105.8	122.0	124.1
Finance, Insurance, and Real Estate	10.6a	25.2a	31.9a	38.3	51.3a	51.1a
Manufacturing	69.6a	137.7	119.3	219.5	179.9	121.4a
Military	11.1a	16.3	28.3	33.9	42.4	44.9
Mining	0.8a	1.6a	5.3a	4.0a	15.8a	0.7a
Retail Trade	36.6	56.0	94.8	108.2	151.8	149.5
Service	36.4a	79.7a	131.0a	156.0a	228.4	282.7
State and Local	117.9	218.9	359.4	389.2	445.6	443.8
Transportation and Public Utilities	33.0a	63.4	70.2a	92.2a	116.3	110.7
Wholesale Trade	7.3a	8.6a	12.9a	22.3a	20.7a	22.1a

Note: Where "a" appears in the table, the data is suppressed due to confidentiality reasons, or because there were fewer than ten jobs in that sector during the year indicated. Where an "a" follows a numerical value, one or more of the underlying statistical areas faced disclosure or other limitations. Although the data do not appear in the table, the totals shown in the summary table reflect all available information, which might include estimates of employment and income for unusually small sectors.

Table 12 Per Capita Income and Total Employment for Southeast Alaska Region, 1975-1999

Indicator	Indicator Data by Year					
	1975	1980	1985	1990	1995	1999
Personal Income ($Millions)	467.9	878.3	1,362.6	1,746.5	2,073.5	2,225.5
Population (No. of Persons)	51,907	54,385	67,562	69,490	73,401	72,525
Per Capita Personal Income ($)	$9,014	$16,149	$20,168	$25,133	$28,248	$30,686
Total Full- and Part-Time Employment (No. of Persons)	27,336	34,087	38,927	46,731	49,748	50,891

Table 13 Total Employment for Washington Inland Waters Region, 1975-1999

Sector	No. of Persons Employed by Year					
	1975	1980	1985	1990	1995	1999
Agricultural Services, Forestry, Fishing, and Other	11,491	19,632	22,928	29,237	31,156	34,894
Construction	48,344	75,435	83,680	119,877	122,075	152,873
Federal, Civilian	46,549	51,601	53,838	57,862	53,753	51,375
Finance, Insurance, and Real Estate	93,062	123,356	135,175	171,918	172,389	201,593
Manufacturing	170,353	225,326	214,140	281,795	249,824	279,737
Military	58,660	58,860	66,846	68,930	65,028	61,984
Mining	807a	1,689	2,101a	2,401	2,610	2,358a
Retail Trade	166,371	229,285	262,242	334,652	377,391	412,301
Service	219,444	309,057	401,585	550,024	644,900	771,417
State and Local	151,864	167,992	177,954	217,910	250,270	271,223
Transportation and Public Utilities	54,781	72,418	76,759	96,327	102,339	116,516
Wholesale Trade	55,782	73,016	79,190	103,100	114,285	123,083a

Note: Where "a" appears in the table, the data is suppressed due to confidentiality reasons, or because there were fewer than ten jobs in that sector during the year indicated. Where an "a" follows a numerical value, one or more of the underlying statistical areas faced disclosure or other limitations. Although the data do not appear in the table, the totals shown in the summary table reflect all available information, which might include estimates of employment and income for unusually small sectors.

Table 14 Personal Income and Earnings for Washington Inland Waters Region, 1975-1999

Sector	Earnings by Year ($Millions)					
	1975	1980	1985	1990	1995	1999
Agricultural Services, Forestry, Fishing, and Other	105.5	247.2	356.8	921.9	771.9	995.2
Construction	751.0	1,705.2	2,112.7	3,765.5	4,223.6	6,352.6
Federal, Civilian	808.1	1,341.2	1,843.8	2,395.6	2,883.9	3,222.8
Finance, Insurance, and Real Estate	609.2	1,353.2	1,862.0	3,152.4	4,647.8	6,811.5
Manufacturing	2,645.4	5,544.1	6,693.7	10,530.3	11,380.9	14,784.8
Military	607.8	877.5	1,654.8	1,932.6	2,249.8	2,523.1
Mining	28.9	95.4	91.5	47.4	68.0	90.9a
Retail Trade	1,316.5	2,431.3	3,544.4	5,086.6	6,397.9	8,867.1
Service	1,834.2	4,015.4	6,642.8	12,234.7	18,129.9	34,205.4
State and Local	1,635.6	2,906.2	4,183.5	6,165.4	8,676.6	10,647.0
Transportation and Public Utilities	878.9	1,728.2	2,355.0	3,522.1	5,164.1	6,040.6
Wholesale Trade	832.8	1,620.9	2,136.4	3,369.7	4,509.5	5,760.1a

Note: Where "a" appears in the table, the data is suppressed due to confidentiality reasons, or because there were fewer than ten jobs in that sector during the year indicated. Where an "a" follows a numerical value, one or more of the underlying statistical areas faced disclosure or other limitations. Although the data do not appear in the table, the totals shown in the summary table reflect all available information, which might include estimates of employment and income for unusually small sectors.

Table 15 Per Capita Income and Total Employment for Washington Inland Waters Region, 1975-1999

Indicator	Indicator Data by Year					
	1975	1980	1985	1990	1995	1999
Personal Income ($Millions)	15,806.6	31,216.0	46,122.0	72,336.7	94,592.5	131,449.0
Population (No. of Persons)	2,342,398	2,703,026	2,903,105	3,328,588	3,651,912	3,881,943
Per Capita Personal Income ($)	$6,748	$11,549	$15,887	$21,732	$25,902	$33,862
Total Full- and Part-Time Employment (No. of Persons)	1,094,198	1,426,707	1,594,370	2,050,879	2,201,894	2,497,196

Table 16 Total Employment for Oregon Coast Region, 1975-1999

Sector	No. of Persons Employed by Year					
	1975	1980	1985	1990	1995	1999
Agricultural Services, Forestry, Fishing, and Other	1,234	3,418	3,256	2,608	2076a	2,612
Construction	1,192	2,039	1,874	2,310	2,899	3,618
Federal, Civilian	534	564	507	611	517	564
Finance, Insurance, and Real Estate	2,026	2,819	2,268	2,449	3,098	3,841
Manufacturing	6,164	7,255	6,426	6,375	6,280	6,005
Military	1,022	986	877	892	892	794
Mining	76a	95a	151a	91a	31a	29a
Retail Trade	6,498	8,472	8,588	11,209	13,015	13,252
Service	6,216	8,484	10,161	12,205	14,590	16,971
State and Local	5,290	5,616	5,762	6,301	6,794	7,127
Transportation and Public Utilities	1,428	1,557	1,651	1,560	1,657	1,707
Wholesale Trade	390a	417a	652	881	701a	683a

Note: Where "a" appears in the table, the data is suppressed due to confidentiality reasons, or because there were fewer than ten jobs in that sector during the year indicated. Where an "a" follows a numerical value, one or more of the underlying statistical areas faced disclosure or other limitations. Although the data do not appear in the table, the totals shown in the summary table reflect all available information, which might include estimates of employment and income for unusually small sectors.

Table 17 Total Non-Farm Earnings for Oregon Coast Region, 1975-1999

Sector	Earnings by Year ($Millions)					
	1975	1980	1985	1990	1995	1999
Agricultural Services, Forestry, Fishing, and Other	8.6	26.1	28.8	45.1	29.9a	40.0
Construction	16.3	37.3	33.0	59.4	69.4	102.8
Federal, Civilian	7.9	13.1	16.4	21.7	25.0	30.6
Finance, Insurance, and Real Estate	6.3	14.2	11.1	21.5	39.3	55.2
Manufacturing	80.9	149.2	165.5	199.1	201.7	218.4
Military	8.5	12.7	16.4	17.3	22.5	23.0
Mining	1.0a	2.7a	3.9	1.6a	a	a
Retail Trade	42.8	75.7	95.2	139.8	178.0	206.4
Service	38.2	79.4	113.3	177.7	248.5	329.9
State and Local	47.6	80.8	110.8	153.9	209.5	244.2
Transportation and Public Utilities	23.5	32.6	38.0	42.5	53.0	58.0
Wholesale Trade	4.8a	6.5a	11.5	18.3	15.9a	18.6a

Note: Where "a" appears in the table, the data is suppressed due to confidentiality reasons, or because there were fewer than ten jobs in that sector during the year indicated. Where an "a" follows a numerical value, one or more of the underlying statistical areas faced disclosure or other limitations. Although the data do not appear in the table, the totals shown in the summary table reflect all available information, which might include estimates of employment and income for unusually small sectors.

Table 18 Per Capita Income and Total Employment for Oregon Coast Region, 1975-1999

Indicator	Indicator Data by Year					
	1975	1980	1985	1990	1995	1999
Personal Income ($Millions)	437.7	853.2	1,126.0	1,535.5	1,986.6	2,388.0
Population (No. of Persons)	76,666	89,215	89,453	94,151	103,150	104,728
Per Capita Personal Income ($)	$5,709	$9,564	$12,588	$16,309	$19,260	$22,802
Total Full- and Part-Time Employment (No. of Persons)	33,770	43,745	43,831	49,194	54,953	59,008

APPENDIX F3: EFFECTS OF THE PROPOSED ALTERNATIVES ON SUBSISTENCE USE OF RESOURCES

This appendix addresses the potential effects of the proposed alternatives on subsistence use of natural resources. For the purposes of this analysis, the discussion is split into three sections: subsistence use of groundfish, subsistence use of Steller sea lions, and indirect impacts on other subsistence activities.

Conclusions about effects on these areas are summarized briefly below. As the summary indicates, detailed analysis of effects on groundfish subsistence was deemed unnecessary. With regard to Steller sea lions, subsequent sections describe documented historical subsistence use of the resource and summarize the potential effects of the proposed alternatives on such use. Finally, a summary discussion is presented on the potential indirect impacts of the alternatives on other subsistence resource use.

- **Potential effects on groundfish subsistence use**. There is a relatively low level of subsistence activity associated with groundfish species targeted for commercial harvest. There are no indications that commercial harvest activity is adversely affecting groundfish-specific subsistence activities that do occur. Further, none of the alternatives restrict subsistence fishing directly. Given this current pattern, and the relationship of harvest levels proposed under the various alternatives to those allowed under baseline conditions, the potential direct and indirect (bycatch) effects of any of the proposed alternatives on subsistence use of groundfish resources will not be significant.

- **Potential effects of commercial groundfish fisheries on subsistence use of Steller sea lions.** Impacts to Steller sea lion subsistence use are less straightforward than is the case for groundfish subsistence use. The subsistence harvest of Steller sea lions has declined steadily and substantially since 1992, at the same time that the overall population of Steller sea lions was also declining. However, the relationship between the two is not clear. Furthermore, the complex connections between commercial groundfish fisheries and the decline in Steller sea lion population, discussed elsewhere in this document, render the analysis of impacts of commercial fishing on Steller sea lion based subsistence problematic. It is evident though, that both of these relationships are important for assessing the potential effects of the proposed alternatives on the subsistence use of Steller sea lions. If current levels of groundfish fishing are causing a decline in Steller sea lion population, the fisheries could be contributing indirectly to, if not causing, the declining trend in subsistence harvest and use of the Steller sea lion that has occurred in recent years. The magnitude of this contribution would then depend on the relationship between the population of Steller sea lions and the subsistence harvest of that population. Thus, to the extent that the alternatives achieve their intended protection of Steller sea lion populations, they will have neutral to positive effects on the subsistence use of that resource. The magnitude of the effects would depend on the increase in the Steller sea lion population and the strength of the relationship between the overall Steller sea lion population and the subsistence harvest from that population. More precise judgments are not possible, given the quality and quantity of information available, although qualitatively it is probable that subsistence harvest levels will not be significantly changed by the projected potential changes in the Steller sea lion population resulting from the proposed alternatives. This rather complex argument is presented in somewhat more detail below.

- **Indirect Impacts on Other Subsistence Activities.** Indirect impacts to other subsistence activities could occur through loss of income that would otherwise be directed toward subsistence pursuits, or an effective loss of access to commercial fishing activities and gear that would otherwise be used in a form of joint production of commercial and subsistence harvests. The variables that influence these indirect impacts are numerous and complex. Although some impacts are likely to accrue to a limited number of communities that participate directly in the fishery, quantification of these impacts is problematic. Impacts to subsistence in communities that participate in the fishery primarily through investment and control of quota (the CDQ communities) could occur through loss of income that would be directed toward subsistence pursuits, but quantification of these impacts is also problematic.

It should also be noted that subsistence is not the only "use" of Steller sea lions. As noted in Section 1.3.2.2 of the RIR (Appendix C of this SEIS), eco-tourism values are a set of non-consumptive use values that derive or benefit from the existence of Steller sea lions. The levels of both subsistence and eco-tourism use of Steller sea lions vary more-or-less independently from community to community, and each tends to vary with the intensity of local commercial fishery development. In terms of a social impact analysis, it is important to note that the set of communities that would be most heavily impacted (in terms of direct impacts on locally based fishery efforts and economic activity) by more restrictive alternatives are not the same set of communities that are most heavily involved in Steller sea lion subsistence, although there is some overlap. For some communities, it would appear that subsistence is relatively important to household economies at least in part due to limited commercial economic development, including commercial fisheries development. Further, it is important to note that the set of communities most likely to benefit from eco-tourism related to Steller sea lions is not the same set of communities most engaged in and dependent upon the groundfish fishery (i.e., those communities most likely to experience the greatest impacts under the more restrictive alternatives). While systematic analysis was not performed, it would appear that there is closer to an inverse relationship than a direct relationship between the two factors. For example, eco-tourism is highly developed in Southeast Alaska, and little developed in Aleutians, while reliance on fisheries most directly effected by the alternatives is high in the Aleutians and relatively low in Southeast. Eco-tourism potential appears to be effectively limited by access to major passenger transportation systems (with notable exceptions for some specialty or niche markets); commercial fisheries development, on the other hand, has occurred in areas that are relatively underserved by major passenger transportation links as well as those on more central routes. In sum, the relationship between cost of commercial fishery alternative impacts and the benefits of 'existence' or 'use' values is not straightforward, and those communities that experience adverse impacts that derive from management actions are frequently not the same communities that would experience beneficial impacts from those same actions. On the community level, a loss in commercial fishing is very unlikely to be offset by gains in either subsistence or eco-tourism, cost and benefit measurement issues aside, simply because the population experiencing the loss is not the same population as that experiencing the benefit.

1.0 POTENTIAL EFFECTS ON SUBSISTENCE GROUNDFISH USE: SUBSISTENCE SUMMARY BY REGION

The following sections provide a region-by-region summary of subsistence activity levels in each of the four Alaska regions analyzed. These summaries focus on the regionally important groundfish communities identified in the main body of this document and place the role of groundfish in the context of overall subsistence activities. (Levels of marine mammal harvest are discussed, but the detailed discussion of Steller

sea lion use is presented in its own section.) Analysis of how much of the groundfish utilized for subsistence is effectively retained from what are otherwise commercial catches in contrast to how much of the groundfish utilized for subsistence results from 'purely subsistence' activities or efforts is not possible with the available data, but in practical terms the lack of ability to make such a differentiation does not present difficulties for this analysis. Given the relatively low level of direct subsistence groundfish dependency, and the fact none of the alternatives would restrict subsistence groundfish take nor cause an increase of commercial utilization of groundfish stocks, the potential impacts of any of the alternatives on subsistence uses of groundfish are not considered to be significant.

1.1 Subsistence in the Alaska Peninsula and Aleutian Islands Region

Subsistence resource utilization for residents of the regionally important groundfish communities of Unalaska, Akutan, Sand Point, and King Cove are presented in this section. All of these communities feature subsistence activity, with consumption ranging from about 200 pounds per capita to over 450 pounds per capita. Within this overall consumption, groundfish specifically ranges from four to nine percent of the total.

Residents of Unalaska are reported to harvest and consume about 195 pounds of subsistence resource per capita, based on a 1994 survey of an estimated 700 year round households for a total ADF&G effective population of 1,825 individuals (ADF&G 2000). Of the subsistence total, 28 percent was salmon, 42 percent was non-salmon fish, 5 percent was land mammals, 5 percent was marine mammals, 1 percent was birds and eggs, 14 percent was marine invertebrates, and 6 percent was vegetation. Various groundfish are a component of the non-salmon fish, and average about 7 percent of the total (14 pounds per capita). The major contributors to this component are cod (8 pounds) and rockfish (5 pounds).

Residents of Akutan are reported to harvest and consume about 466 pounds of subsistence resource per capita, based on a 1990 survey of an estimated 31 year round households for a total ADF&G effective population of 102 individuals (ADF&G 2000). Of the subsistence total, 26 percent was salmon, 31 percent was non-salmon fish, 6 percent was land mammals, 23 percent was marine mammals, 6 percent was birds and eggs, 6 percent was marine invertebrates, and 2 percent was vegetation. Various groundfish are a component of the non-salmon fish, and average about 9 percent of the total (43 pounds per capita). The major contributors to this component are cod (29 pounds) and rockfish (11 pounds).

Residents of Sand Point are reported to harvest and consume about 256 pounds of subsistence resource per capita, based on a 1992 survey of an estimated 204 year round households for a total ADF&G effective population of 606 individuals (ADF&G 2000). Of the subsistence total, 54 percent was salmon, 21 percent was non-salmon fish, 11 percent was land mammals, 2 percent was marine mammals, 2 percent was birds and eggs, 7 percent was marine invertebrates, and 3 percent was vegetation. Various groundfish are a component of the non-salmon fish, and average about 9 percent of the total (22 pounds per capita). The major contributors to this component are cod (12 pounds) and rockfish (8 pounds).

Residents of King Cove are reported to harvest and consume about 256 pounds of subsistence resource per capita, based on a 1992 survey of an estimated 158 year round households for a total ADF&G effective population of 560 individuals (ADF&G 2000). Of the subsistence total, 53 percent was salmon, 17 percent was non-salmon fish, 15 percent was land mammals, 1 percent was marine mammals, 4 percent was birds and eggs, 7 percent was marine invertebrates, and 3 percent was vegetation. Various groundfish are a

component of the non-salmon fish, and average about 4 percent of the total (10 pounds per capita). The major contributors to this component are cod (6 pounds) and rockfish (2.5 pounds).

1.2 Subsistence in the Kodiak Island Region

As noted, Kodiak is the single regionally important groundfish community. Residents of the City of Kodiak are reported to harvest and consume about 151 pounds of subsistence resource per capita, based on a 1993 survey of an estimated 1994 year round households for a total ADF&G effective population of 6,058 individuals (ADF&G 2000). Of the consumption total, 32 percent was salmon, 40 percent was non-salmon fish, 15 percent was land mammals, 6 percent was marine invertebrates, and 7 percent was vegetation. Various groundfish are a component of the non-salmon fish and average about 8 percent of the total (12 pounds per capita). The major contributors to this component are cod (4.8 pounds), rockfish (3.6 pounds), and greenling (2.4 pounds).

1.3 Subsistence in the South Central Alaska Region

As noted, Cordova, Homer, Nikiski, Seward, and Anchorage are the regionally important groundfish communities in the South Central region. Subsistence in each of these communities is described in this section. Subsistence data for groundfish for these communities, where known, shows a much lower level of use than is the case for the Aleutian and Kodiak Island regions.

Residents of Cordova are reported to harvest and consume about 179 pounds of subsistence resource per capita, based on a 1997 survey of an estimated 830 year round households for a total ADF&G effective population of 2,507 individuals (ADF&G 2000). Of the total of subsistence resources, 35 percent was salmon, 24 percent was non-salmon fish, 30 percent was land mammals, 2 percent was marine mammals, 1 percent was birds and eggs, 3 percent was marine invertebrates, and 5 percent was vegetation. Various groundfish are a component of the non-salmon fish and average about 4 percent of the total (7 pounds per capita). The major contributors to this component are rockfish (5 pounds) and cod (1 pound).

Homer was designated a "rural" community in May 2000. Prior to that time Homer residents had not been federally qualified subsistence users, so no data has been collected in recent years. Hence, the only available information on Homer's community pattern of subsistence use is fairly old. Residents of Homer are reported to harvest and consume about 94 pounds of subsistence resource per capita, based on a 1982 survey of an estimated 1,798 year round households for a total ADF&G effective population of 5,633 individuals (ADF&G 2000). Of the total of subsistence resources, 21 percent was salmon, 32 percent was non-salmon fish, 25 percent was land mammals, 2 percent was birds and eggs, 18 percent was marine invertebrates, and 2 percent was vegetation. No groundfish were reported as part of the Homer subsistence harvest. This probably indicates a relatively low level of harvest, perhaps as incidental take while targeting some other species, rather than a complete absence of take.

Kenai's community pattern of use of subsistence resources is described as an indicator for Nikiski, as no information exists for Nikiski in the ADF&G subsistence database. Both Nikiski and Kenai had been classified as "non-rural" (non-subsistence) communities until the Federal Subsistence Board changed their classification in May 2000, when the board designated all communities on the Kenai Peninsula as "rural." The ADF&G subsistence database nonetheless includes some historical harvest information for Kenai. Residents of Kenai are reported to harvest and consume about 84 pounds of subsistence resource per capita,

based on a 1993 survey of an estimated 2,274 year round households for a total ADF&G effective population of 6,372 individuals (ADF&G 2000). Of the total of subsistence resources, 46 percent was salmon, 19 percent was non-salmon fish, 20 percent was land mammals, 1 percent was marine mammals, 1 percent was birds and eggs, 6 percent was marine invertebrates, and 6 percent was vegetation. The amount of the non-salmon fish harvest was composed of groundfish (0.32 pounds per capita) is not significant.

Anchorage is not described in terms of its residents' subsistence use patterns because Anchorage is defined as a "non-rural" community and thus its residents are not federally qualified subsistence users. It can be assumed that the average Anchorage resident takes a small amount of groundfish while sport fishing. Seward is not described in terms of its residents' subsistence use patterns because there is no available information. Until May 2000, Seward was also classified as a "non-rural" community. Seward's community pattern of subsistence resource use is probably very similar to Homer's.

1.4 Subsistence in the Southeast Alaska Region

Subsistence utilization in the regionally important groundfish communities of Petersburg, Sitka, and Yakutat are presented in this section. Total utilization ranges between about 200 and 400 pounds per capita in these communities, with groundfish making up between one and five percent of the total subsistence resources consumed.

Residents of Petersburg are reported to harvest and consume about 198 pounds of subsistence resource per capita, based on a 1987 survey of an estimated 1,123 year round households for a total ADF&G effective population of 3,739 individuals (ADF&G 2000). Of the subsistence resource total, 23 percent was salmon, 22 percent was non-salmon fish, 29 percent was land mammals, 2 percent was birds and eggs, 19 percent was marine invertebrates, and 4 percent was vegetation. Various groundfish are a component of the non-salmon fish and average about 2 percent of the total (3.5 pounds per capita). The major contributors to this component are cod and rockfish.

Residents of Sitka are reported to harvest and consume about 205 pounds of subsistence resource per capita, based on a 1996 survey of an estimated 3,053 year round households for a total ADF&G effective population of 8,535 individuals (ADF&G 2000). Of the subsistence resource total, 28 percent was salmon, 26 percent was non-salmon fish, 25 percent was land mammals, 4 percent was marine mammals, 13 percent was marine invertebrates, and 3 percent was vegetation. Various groundfish are a component of the non-salmon fish, and average about 5 percent of the total (9.9 pounds per capita). The major contributors to this component are rockfish (5 pounds) and greenling (3 pounds).

Residents of Yakutat are reported to harvest and consume about 398 pounds of subsistence resource per capita, based on a 1987 survey of an estimated 169 year round households for a total ADF&G effective population of 589 individuals (ADF&G 2000). Of the subsistence resource total, 54 percent was salmon, 19 percent was non-salmon fish, 4 percent was land mammals, 8 percent was marine mammals, 1 percent was birds and eggs, 10 percent was marine invertebrates, and 4 percent was vegetation. Various groundfish are a component of the non-salmon fish, and average about 1 percent of the total (5 pounds per capita). The major contributors to this component are flounder (2.5 pounds), cod (1.5 pounds), and rockfish (1 pound).

2.0 POTENTIAL EFFECTS ON SUBSISTENCE USE OF STELLER SEA LIONS

This section presents the recent historical subsistence harvest of Steller sea lions in Alaska by region, discusses the overall population decline of Steller sea lions and its possible relationship to commercial groundfish fisheries, and assesses the potential effects of the proposed alternatives upon subsistence Steller sea lion harvest and use. The overall conclusion is that, even if a causal linkage exists between the groundfish fishery and declining Steller sea lion populations, the short-term effects of the proposed alternatives on subsistence activities are likely to be negligible or only slightly positive. Alternatives that reduce the commercial groundfish harvest will logically have neutral or positive effects upon Steller sea lion populations. Whether this will increase the subsistence use of the Steller sea lion resource is not clear from the available information. The proposed alternatives, to the extent that they achieve the stated objectives of assisting in the recovery of Steller sea lion populations and given that they do not restrict existing opportunities or abilities to take Steller sea lions for subsistence purposes, will have no negative effects upon subsistence uses of Steller sea lions.

Even if one assumes that the proposed alternatives will have potential effects on the population of Steller sea lions, it is probable that in the short-term any effects on subsistence would be small in magnitude. Even relatively large changes (20 percent) in Steller sea lion populations may not be accompanied by changes in the rate of subsistence use, for the reasons discussed below. Although subsistence harvest is to some degree related to the total population (and density) of animals to be taken, other factors also affect the rate of harvest, especially at low population levels. Unfortunately, little is known about these relationships, so the threshold at which at population is no longer perceived as "low" is not clear, and no information exists on changes in cultural preferences for, and uses of, traditional foods. Thus, the possibility remains that subsistence use of sea lions will increase in direct proportion to any increase in Steller sea lion population, although that does not appear to be the most likely case from the information available.

Steller sea lions are taken by a number of methods throughout the year. Hunting for sea lions is a relatively specialized subsistence activity, and a relatively small core of highly productive hunters from a limited number of households account for most of the harvest. Once harvested, sea lion is widely distributed among a much wider range of households (ADF&G, 1999). For Kodiak Island communities, the sea lion harvest used to take place at their haulouts, and 20 or 30 were transported at a time aboard purse seiners. Thus, one or two hunters could supply an entire village. Currently, hunting sea lions involves two or three individuals using skiffs to hunt swimming sea lions in open water. The hauling capacity of such skiffs is one or two animals, and hunters Kodiak hunters prefer to take young adults of medium size rather than large bulls or young pups. Some sea lions are taken from shore locations where sea lions are known to swim close to the shoreline. The animal is then retrieved using a skiff. Peak months for harvest are October through December (ADF&G, 1991).

Methods in the Aleutians and Pribilof Islands are documented in ADF&G 1995. Pribilof Island residents hunt sea lions almost exclusively from the shore and target swimming juvenile (mid-size) males. On St. Paul Island sea lion hunting is most commonly done from shore at Northeast Point, accessible by truck. St. Paul hunters take advantage of known sea lion "swimways." Once shot, the hunter waits for the wind and sea to bring the carcass to shore, as heavy seas generally preclude the use of a skiff. A "sea dog" (a retrieval device consisting of a piece of wood with hooks attached to a 30 to 40 foot rope) assists in this process. Not all animals are recovered, but hunters try to shoot only those animals for which there is a high probability of eventual recovery. Hunters will at times hunt from skiffs in calm weather. Sea lion hunting on St Paul occurs

mainly from September through May. Sea lion hunting on St. George is similar to that of St. Paul, being predominately shore-based. Harvest occurs mainly from January through May. Sea lion harvest in the Aleutian Chain (Atka, Unalaska, Akutan, and Nikolski) occurs mostly from skiffs in open water, and hunters target both sexes. When skiff travel is risky or for a change of pace, sea lion hunting is also done from concealed shore stations. Aleutian Chain hunters will concentrate effort near haulout locations, and take more adult and female animals than do Pribilof Island hunters. Seasonality of sea lion harvest is quite variable, and appears to be dependent on sea lion abundance and distribution.

Historical documented subsistence harvests of Steller sea lions are presented in Tables 1 through 4. Most of this information is for years when Steller sea lions were classified as "threatened," before the western stock of Steller sea lions was reclassified as "endangered" in 1997. It should also be clearly noted that the information in the first table is not totally consistent with the other three, which underscores the general lack of precision in the data. What is evident, however, is that the area of heaviest subsistence use of Steller sea lions is in southwestern Alaska, and is concentrated in a relatively few communities. It is also important to note that while subsistence use of other resources is open to a broader spectrum of residents of coastal Alaskan communities, the take of marine mammals is restricted to the Alaska Native portion of the population under the terms of the Marine Mammal Protection Act of 1972 (as reauthorized in 1994 and amended through 1997; the specific subsistence exemption for Alaska Natives is found in Section 101 [16 U.S.C. 1371]). Therefore, any subsistence impacts to Stellar sea lions would be concentrated among Alaska Native residents of these communities.

Tables 1 through 4 document a sharp decline in subsistence harvest of Steller sea lions in recent years, the same years that have seen an overall decline in the population of Steller sea lions. More recent information on the subsistence take of Steller sea lions is not available, due in part to the fact that NMFS did not renew its contract with ADF&G for data collection after 1998. Co-management agreements between federal marine mammal regulators and subsistence user groups are still in development or awaiting final approval (Tom Loughlin, personal communication, 2000[9]). It is reasonable, however, to assume that the trend of decline in harvest has continued in more recent years in parallel with the overall sea lion population decline.

[9]Loughlin, Tom, National Marine Mammal Laboratory, Seattle WA. Telephone conversation 09/29/00.

Table 1 Documented Subsistence Steller Sea Lion Harvest, Alaskan Coastal Communities

Community	Region	Year	Total Community Subsistence Harvest (Edible lbs)	Steller Sea Lion		
				Number Harvested	Edible lbs	% Community Harvest
Alakanuk	W	1980	431,904	9	1,200	0.3%
Quinhagek	W	1982	536,584	16	2,286	0.4%
Sitka	SE	1996	1,749,772	2	400	0.0%
Chenega Bay	SC	1993	27,809	12	997	3.6%
Nanwalek	SC	1997	42,593	5	1,048	2.5%
Tatitluk	SC	1997	322,915	19	3,712	1.1%
Akhiok	SW	1992	25,735	3	600	2.3%
Akutan	SW	1990	47,397	38	7,688	16.2%
Aleknagik	SW	1989	54,079	2	221	0.4%
Atka	SW	1994	37,307	44	8,700	23.3%
False Pass	SW	1988	28,586	1	220	0.8%
Iliamna	SW	1991	82,915	1	130	0.2%
Ivanof Bay	SW	1989	15,677	1	150	1.0%
Manokotak	SW	1985	118,337	16	1,639	1.4%
Nikolski	SW	1990	36,945	26	5,143	13.9%
Old Harbor	SW	1997	88,851	37	7,442	8.4%
Ouzinkie	SW	1997	55,015	1	264	0.5%
Perryville	SW	1989	45,729	11	2,067	4.5%
Port Lions	SW	1993	78,371	2	356	0.5%
Saint George	SW	1994	11,330	3	556	4.9%
Saint Paul	SW	1994	131,814	141	28,214	21.4%
Unalaska	SW	1994	355,081	72	14,423	4.1%

Source: ADF&G CPDB, 2000.
NOTE: Numbers are for the "most typical" year for which information is available. ADF&G does only limited surveys and subsistence use can vary greatly from year-to-year. Communities with documented use but no harvest are not included. Numbers differ from, and are not included in, ADF&G 1997a; both are estimates based on samples.

Table 2 Estimated Subsistence Take of Steller Sea Lions, by Alaska Region

Community	Year						
	1992	1993	1994	1995	1996	1997	1998
Southeast Alaska	6	1	5	0	0	0	8
North Pacific Rim	32	35	26	31	14	6	29
Upper Kenai-Cook Inlet	10	11	1	0	3	0	0
Kodiak Island	58	58	61	137	60	38	18
South Alaska Peninsula	2	6	6	8	5	8	9
Aleutian Islands	135	124	122	96	58	52	37
Pribilof Islands	297	245	193	68	46	56	78
South Bristol Bay	0	0	0	0	0	0	0
North Bristol Bay	8	7	1	0	0	4	0
TOTAL	548	487	415	340	186	164	179

Source: ADF&G 1999

Table 3 Estimated Subsistence Take of Steller Sea Lions, Aleutian and Pribilof Communities

Community	Year						
	1992	1993	1994	1995	1996	1997	1998
Atka	39	25	54	40	17	12	17
Akutan	30	23	16	6	16	6	6
Ivanof Bay	0	4	0	0	2	2	2
King Cove	1	1	4	5	0	4	4
Nikolski	8	6	0	0	3	3	1
Perryville	1	0	1	3	3	2	1
Saint George	70	19	20	8	8	28	20
Saint Paul	227	227	173	60	38	28	58
Unalaska	59	43	42	47	22	30	13
TOTAL	434	344	309	166	109	115	122

Source: ADF&G 1995, 1996, 1997a, 1997b, 1998, 1999

NOTE: Numbers differ from, and are not included in, ADF&G CPDB, 2000. Both are estimates based on samples. Numbers in this table have been rounded to the nearest integer.

Table 4 Estimated Take of Steller Sea Lions, Selected Other Alaskan Communities

Community	Year						
	1992	1993	1994	1995	1996	1997	1998
Tatitlek	13	5	16	3	5	4	22
Akhiok	4	0	3	2	7	8	3
Old Harbor	46	33	48	113	50	26	13

Source: ADF&G 1995, 1996, 1997a, 1997b, 1998, 1999
NOTE: Numbers differ from, and are not included in, ADF&G CPDB, 2000. Both are estimates based on samples. Numbers in this table have been rounded to the nearest integer.

The documented Steller sea lion subsistence take is a measure of the past use and reliance upon this resource, and almost certainly does not represent the current harvest, which can be assumed to be much lower. For Atka, Akutan, Saint George, and Saint Paul (and perhaps Unalaska and several other communities) it can be seen that Steller sea lions represented a very significant subsistence resource in terms of relative contribution to overall community subsistence resource consumption

ADF&G has tried to address the possible linkage between the sharp decline in the overall Steller sea lion harvest and the steep decrease in the sea lion subsistence harvest between 1992 and 1998 ADF&G 1997a, 1998, 1999). They note that while the total number of sea lions harvested has decreased, this can be accounted for by an equivalent decrease in the number of people hunting sea lions. The apparent rate of hunter success has not declined in any measurable way (although ADF&G has not investigated this in a rigorous manner). ADF&G states:

> "... there are probably a variety of local factors related to the year-to-year changes in the number of households hunting sea lions in particular communities, including seasonal hunting conditions, local food needs, and personal circumstances of hunters. It is likely that the declines in the numbers of sea lion hunters in many communities are because sea lions are increasingly harder to find and consequently more difficult and expensive to hunt. As sea lions become scarcer in a community's hunting area, an increasing number of hunters in the community probably choose to stop hunting them. While the hunters that continue to hunt appear to maintain annual harvest rates similar to past years, hunters probably are investing more time and money in pursuit of the sea lions harvest. In addition to these factors, it is quite likely that some sea lion hunters have chosen to reduce their hunting activity because of perceived problems with sea lion populations" (ADF&G 1999:69).

In earlier documents, ADF&G had also suggested that another factor may be the increased availability of seasonal wage employment in local communities (presumably including work the groundfish fisheries). Some hunters may be choosing to work rather than to hunt, as a conscious economic choice of time allocation (ADF&G 1997a, 1998). This explanation is not stressed as much in their 1999 report, being included in the phrase "... personal circumstances of hunters" (ADF&G 1999:69). It should be noted that hunting Steller sea lions does require a considerable amount of effort, and in most cases the cooperation of several people,

so that time management and allocation could be a significant factor. An additional possible contribution to a decrease in sea lion subsistence harvest would be a cultural change in taste, so that the consumptive demand for sea lion may have decreased. No information exists on this possible factor.

This information provides some support for a direct relationship between the overall Steller sea lion population and the level of subsistence harvest. Such support is not definitive, however, and other factors cannot be excluded. The weighting of factors is also not possible from the evidence available. It does appear that present Steller sea lion harvest methods are likely to be more successful, and certainly more efficient, when resource populations (and density) are higher. In general, the more abundant a subsistence resource is, the more heavily it is used. Thus, our analysis does assume some relationship between the Steller sea lion population level and subsistence harvest from that population. The strength of that relationship cannot be determined given other factors in play.

This lack of precise information, both in terms of precise measurement as well as in terms of causal linkages, is not uncommon when examining human behavior. Human behavior is often "over–determined" in the sense that the same behavior can have several "causes," and sometime the same "causes" can have different results.

The relationship between the existing groundfish fishery and Steller sea lion population dynamics is far from clear, although the alternatives posit a direct linkage between the two (e.g., commercial fisheries are causally linked to sea lion population decline). Since the proposed alternatives decrease fishing relative to the status quo, such a causal linkage would logically result in positive Steller sea lion population effects, and neutral or positive in terms of subsistence use of Steller sea lions. Given the current depressed population of Steller sea lions, it is not clear that a slight improvement in their population would be reflected in increased subsistence take. A number of other variables, such as negotiated agreements, and/or other cultural or social variables that may influence long-term subsistence trends may be at work as well. Thus, the potential subsistence effects of most of the proposed alternatives are either neutral or slightly positive.

Given the lack of availability of precise information, it is not possible to distinguish degrees of positive subsistence impact among the alternatives, either to order them or to determine whether or not such theoretically positive impacts would rise to a level of significance. Logically, those which reduce commercial groundfish harvest the most could have the most potential benefit for the subsistence use of Steller sea lions, but operationally such differences will likely be slight. In general, somewhat positive effects could result if reductions in groundfish harvest would lead to increased sea lion populations, and if higher sea lion populations would result in benefits to subsistence users of sea lions. Such benefits could include higher harvest levels and lower harvest costs for sea lions.

Thus, the degree to which subsistence reliance on Steller sea lions could be affected by the proposed alternatives cannot be quantified given the lack of precise data, but it is not likely to be great. There is the additional complication that subsistence harvest levels normally vary considerably from year-to-year, due to the natural variability of weather, animal abundance and distribution, and other factors. Thus the long-term direction of change (trend) is more important than short-term measures of magnitudes of change. If there is a causal relationship between the commercial groundfish fishery and declining Steller sea lion populations, a reduction in or redirection of commercial groundfish harvest is probably a prerequisite for the increased subsistence harvest of Steller sea lions. It is simply not possible to determine how a specific change in one would result in a specific change in the other. ADF&G has concluded that there is a potential but essentially

unknown relationship between sea lion population and the level of sea lion subsistence harvest (ADF&G, 1997a, 1998, 1999). While it is clear that if sea lions approach extinction, then subsistence harvest would likely decline, it is much less clear that if sea lion population increases, then subsistence harvest will also increase. It is likely subsistence harvest changes would "lag behind," and be smaller in magnitude than, potential changes in overall Steller sea lion population. A number of other variables, such as negotiated agreements or other cultural or social variables that may influence long-term subsistence trends may be at work.

In terms of examining impacts on a community level, it is important to note that of all the communities listed in Table 1 as having a documented Steller sea lion harvest, only two of these, Akutan and Unalaska, are identified as "regionally important groundfish communities" (i.e., in Section 3.12.2 and Appendix F(1) of this SEIS) with substantial direct participation in the fishery. In other words, in general, where use of Steller sea lions is important to the community subsistence base, the commercial groundfish fishery is not, and vice versa. The two exceptions to this generalization have their own particular circumstances. In Akutan, as discussed in the community profile in Appendix F(1), the traditional community is essentially distinct from the local seafood processing operation with virtually no overlap in population, although there has been an increase in indirect participation in the fishery by local residents through the CDQ program. In Unalaska, as noted in that community profile in Appendix F(1), there is virtually no direct engagement of the local Aleut population in the commercial groundfish fishery (and Unalaska is not a CDQ community, although the community does benefit from being an ex-officio member of a CDQ group). In sum, the communities and populations that utilize Steller sea lions as a subsistence resource are not the same as those that directly utilize groundfish as a commercial resource, and that would therefore be directly impacted by the changes the proposed alternatives would bring about in commercial groundfish fishery. The communities of Alakanuk, Akutan, Aleknagik, Atka, False Pass, Nikolski, St. George, and St. Paul, listed as having documented Steller sea lion take, do participate in the fishery in various ways and to varying degrees through the CDQ program, and other communities listed also benefit from the fishery in the form of shared fish tax revenues.

3.0 INDIRECT IMPACTS ON OTHER SUBSISTENCE ACTIVITIES

Beyond direct use of groundfish and Steller sea lions as subsistence resources, the commercial groundfish management measures designed to protect Steller sea lions could have impacts on other subsistence pursuits. These type of impacts fall into two main categories:

- Impacts to other subsistence pursuits as a result of loss of income from the commercial groundfish fishery. This income could be used to purchase fuel, vehicles, other subsistence related gear, or otherwise offset expenses required to engage in a range of subsistence pursuits.

- Impacts to other subsistence pursuits as a result of the loss of opportunity to use commercial fishing gear and vessels for subsistence pursuits. This would result from vessels not being ready to go as a result of being prepared for commercial fishing or from the simultaneous harvest of fish and game resources during commercial fishing forays where these assets are used in such a manner that "commercial and subsistence catches are jointly produced, based on shared use of fixed and variable inputs."

With regards to the first type of potential impact, loss of income resulting in funds not being available for subsistence pursuits, this is a very complex issue. Among the factors involved:

- Loss of income can impact everyone associated with the fishery, and people associated with the fishery live in communities ranging across Alaska and the Pacific Northwest. Of the income that is lost to individuals who live in communities where subsistence is pursued, income may or may not be used for subsistence expenses.

- Income specifically contributed by groundfish pursuits may be a larger or smaller proportion funds used for subsistence by individuals or families.

- The relationship between loss of income to specific subsistence outcomes is not entirely straightforward. Clearly, income is required for contemporary subsistence pursuits and a loss of income could and would decrease subsistence efforts if the loss of income were of a sufficient magnitude across the groups that pool resources (e.g., extended families or entire communities in some cases) or engage in subsistence harvests or sharing. However, factors that influence participation in subsistence activities are many and complex. An increase of income may decrease subsistence activity (e.g. if the source of the income requires a time commitment away from subsistence pursuits) or an increase in subsistence activity (e.g., if the income is used to increase the efficiency of subsistence pursuits that are undertaken). A decrease in income may decrease subsistence involvement (e.g., it is more difficult to afford fuel for vessels used for subsistence) or increase subsistence involvement (e.g., subsistence represents a more attractive alternate activity of income producing activities are curtailed). This type of analytic difficulty in assessing the indirect subsistence outcomes of alternatives that may impact income - i.e., there is not a linear relationship between income and subsistence - is further discussed below.

- Field experience would indicate that subsistence strategies are, at least in part, flexible in nature and are readily adapted to the level of cash flow available. For example, when cash is relatively plentiful, subsistence activities may take place over a wider geographic area as new areas are explored for what may be marginal returns, but when cash becomes less available, subsistence is pursued with a more economic strategy, with the activity becoming more focused and cash efficient.

- Income associated with the groundfish fishery can derive from direct participation (e.g., employment), investment (e.g., vessel or processor ownership), control of quota (e.g. CDQ related revenues).

- CDQ communities represent a special case in that these are virtually the only communities where subsistence is heavily practiced and that benefit from the fishery primarily through investment (and control of quota).

- Different CDQ groups have chosen different organizational structures and strategies for use of funds derived from the program (and have had varying degrees of success with investments). As a result, there are effectively different levels of income to individuals and families in different CDQ communities.

- CDQ programs focused on employment and training may, in turn, indirectly influence individual subsistence spending and participation decisions.

The second type of potential impact, loss of opportunity for joint production, applies to groundfish communities with direct participation in the fishery (i.e., only vessels that currently participate in the commercial fishery can be used for joint production). Below are some general points about the vessels involved, followed by points about the communities involved.

- Not all vessels in the commercial groundfish fishery are used for subsistence in addition to commercial fishing.

- Depending on the community involved, a greater or lesser proportion of fleet engaged in the local commercial groundfish fishery is a non-resident fleet.

- Joint production can occur in at least two fundamentally different ways. Subsistence fish can be retained during what are otherwise commercial trips, or separate trips may be taken that focus on subsistence.

- As a general rule, trips specifically dedicated to subsistence are uneconomic for the larger vessels engaged in the groundfish fishery. Larger vessels also tend to fish more away from the community of residence of owner, skipper, and crew, therefore subsistence use is not practical even during what could otherwise be combined commercial/subsistence trips. For the largest vessels participating in the fishery, there is no indication of any subsistence utilization in any form. (For the large vessels that are based in communities were subsistence does take place, dedicated subsistence trips for fishing may be unusual, but it is known from field interviews that sometimes larger vessels are used to mke hunting trips with several persons going at once.)

- Smaller vessels are most likely to be involved in joint production.

- The proportion of the total subsistence production for individual communities that result from joint production from these particular vessels during the groundfish fishery is unknown, but as a general rule of thumb, the smaller vessel classes are less likely to be narrowly specialized than the larger vessels. Nearly all of the smaller class vessels that engage in the groundfish fishery are also involved in some combination of (or all of) the salmon, halibut, sablefish, and herring fisheries. Joint production opportunities would presumably still exist during pursuit of fisheries other than those potentially altered or reduced by the proposed alternatives. This is true both for the vessels engaged in the groundfish fishery, as well as for other vessels in the community that are not engaged in the groundfish fishery. As most if not all vessels are going to be gearing up anyway, the vessel will have had its annual maintenance (fixed costs) taken care of regardless, as long as the vessel is operating in some (any) fishery. Variable costs of subsistence may increase if vessels have to make more dedicated subsistence trips to achieve desired catch levels.

- For those small vessels engaging in other fisheries in addition to the groundfish fishery, the time of the year that the vessel would be available for joint production may decrease if the reduction of the commercial groundfish fishery were of a sufficient magnitude. For example, if a vessel owner decided not to prepare the vessel for pursuit of Pacific cod in March, but rather waited to get the boat ready for the year until a salmon opener in May, there may be crab subsistence opportunities forgone in the period the vessel was not available. Similarly, some vessel owners

may put their vessels to bed for the winter sooner than they otherwise would have, such that other joint production subsistence opportunities are foregone at the end of the year.

- In practical terms, joint production opportunities vary by gear type as well as vessel size. Although quantitative data are slim, knowledge of the industry would suggest that little subsistence takes place using trawl vessels compared to other gear types. Among the fixed gear classes, much more time is directed toward sablefish, salmon, and herring than is devoted to groundfish, therefore the joint production opportunities in this class would remain relatively high independent of the groundfish management alternative chosen.

- Field observations and discussions would indicate that almost all commercial vessel owners resident in communities where subsistence takes place also own at least one skiff from which they can engage in subsistence pursuits, so even if the larger commercial vessel is not available for any number of reasons, it will not mean the discontinuation of subsistence efforts. Even if a commercial vessel owner does not individually own a skiff, it is a truism of village life that there will always be other vessels owned by sons, fathers, brothers, other kin, or neighbors. It is also important to note that if commercial fishing time goes down, it is likely that subsistence activities will increase, because the relative importance of subsistence in the household economy (e.g., suppling food for the table) will increase.

- Field observations would indicate that different individuals look at the balance between commercial and subsistence catches during times of scarcity or forced decision making in very different ways. From one point of view, if the fishing is poor, the vessel owner should direct effort to the greatest extent possible toward the commercial catch in order to get at least some economic return out of a scarce resource for the family or household economy. From the other point of view, if conditions are bad, subsistence fishing should be accomplished first, because subsistence takes care of the basic need to put food on the table in the most direct way possible. Clearly both points of view are held, and both strategies are pursued by different individuals, and this is illustrative of another dimension of the complex relationship between commercial and subsistence pursuits.

- CDQ owned vessels that participate in the groundfish fishery largely do not participate in subsistence activities. Although CDQ communities in general have relatively high levels of subsistence engagement, CDQ owned vessels participating the groundfish fishery may not be based in those communities (i.e., they are an investment that is not directly run out of one of the communities, as is the case for ownership interest in catch processors). Other CDQ owned vessels do not participate in the groundfish fishery (or those portions of the groundfish fishery that will could change as a result of the alternatives) at all, or at only very low levels. For example, some CDQ owned vessels concentrate nearly exclusively on the salmon fishery, while others focus on halibut and sablefish. A more detailed discussion of CDQ owned fleet characteristics is provided in the separate CDQ discussion in this document.

- As noted earlier, factors involved in whether or not individuals engage in subsistence pursuits are multiple and complex, and this applies to vessels as well. Some data from ADF&G (and mentioned in the Steller sea lion subsistence section, above) suggest that in at least some instances, level of engagement in subsistence activities declines when individuals are engaged in

commercial pursuits. Therefore it may be the case for at least some individuals that if their commercial groundfishing activity declines, their direct participation in subsistence activities may increase. Field interviews and other studies (Kruse, et al., 1981, Kruse, 1982, Schroeder, et al., 1987) suggest that in other cases, individuals who are the most economically successful in a given community are often also among the highest subsistence producers.[10] This likely results from these individuals having access to more income to purchase better or more efficient equipment (and to be able to afford to engage in activities that require cash outlay for longer periods of time), and the flexibility of schedule that often comes with higher paying employment, among other individual or personal factors. In sum, the factors leading to subsistence participation are many, and even appear to be contradictory in some cases.

In terms of communities, significant social or community level impacts resulting from the alternatives analyzed are only anticipated in Unalaska, Akutan, King Cove, Sand Point, and Kodiak, based on the information presented in Section 3.12.2 and Appendix F(1), and the analysis presented in Section 4.14.2. (Some brief supplemental information on the characteristics of the Chignik area fleet is presented in Section 1.4 of Appendix F(1). As outlined below, joint production impacts are only considered likely for a subset of these communities.

- In the case of Unalaska, none of the large commercial vessels that deliver groundfish to the local processing plants are owned or crewed by residents of the community. There is a small boat fleet from the community that does jig for cod, although the most recent data available suggest that none or very few of jig boat owners derive their income exclusively from commercial fishing. The fact that commercial fishing for small boat owners is generally one part of a (variable) multiple income source strategy of piecing together a living suggests that even if there were a partial reduction opportunity to fish, there would still be incentives to continue to fish. If at least some fishing took place, the opportunity would continue to exist for joint commercial/subsistence production. In terms of the number of participants, this fleet has seen growth and decline in recent years. According to CFEC/ADF&G fish ticket data, three Unalaska/Dutch Harbor jig vessels fished groundfish in 1992, two fished in 1993, and then there was an upsurge in participation with between 13 and 18 vessels reporting per year from 1994 to 1997, inclusive. A decline quickly followed, however, as in 1998, 1999, and 2000, there were 9, 8, and 7 vessels participating each year, respectively. There are also some small boat longline groundfish activity by small boats, but the level of effort in federal waters by local residents within this small boat fleet is difficult to assess with currently available data, as noted in the Unalaska community profile in Appendix F(1) of this SEIS.

- In Akutan, like Unalaska, the fleet the delivers at the local processing facility is a non-residential fleet. Unlike Unalaska, however, the small boat fleet from the community comprised nearly exclusively of open-skiff type of vessels that generally do not deliver groundfish to the plant, so the residential fleet from the village/traditional community is essentially not engaged in the commercial groundfish fishery. Therefore, there would be no joint production impacts from any of the alternatives.

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[10] This general point is also developed on the ADF&G website Subsistence FAQ at: http://www.state.ak.us/local/akpages/FISH.GAME/subsist/geninfo/about/subfaq.htm

- In the case of Sand Point and King Cove, there is a residential fleet that does deliver groundfish in significant volume to the plants in addition to deliveries from non-residential catcher vessels. In 2000, 57 of the 80 total vessels in the AKAPAI region were owned by residents of King Cove and Sand Point (including 6 of the 10 'ghost' vessels). Looking at the vessel classes involved, it is unlikely, for reasons outlined above, that the four local pot boats (all over 85 feet in length) are in part subsistence vessels. It is also unlikely that the two "04-TCV Non-AFA" vessels over 90 feet in length (2 in King Cove and 1 in Sand Point) commonly engage in subsistence, although the third vessel in this class, at 68 feet, is more likely to do so. The rest of the local vessels are of a size that they are likely to engage in subsistence. (One factor to keep in mind is that 'ghost' vessels are so classified because while they made groundfish landings, they did not make enough to put them into a particular class, and therefore they are not likely to be affected by any of the alternatives.)

  In terms of relative engagement in other fisheries, the local fixed gear boats are heavily engaged in non-groundfish fisheries (approximately 65% of ex-vessel value for the FGCV 33-59' class and approximately 75% of FGCV less than 32' class is non-groundfish). Similarly all of the TCV 60 vessels are currently participating in salmon fisheries. Although data are not available to quantify potential impacts of this nature, it would appear likely that if income of larger vessels (i.e., those in the TCV NON-AFA/TCV 60/PCVs classes and some in the FGCV 33-59' vessel class) goes down significantly because of SSL alternatives, it will be more difficult for vessel owners and operators to justify using their large vessel for certain types of subsistence activities. One logical outcome could be that subistence effort may be shifted toward resources that are more accessible

- For Kodiak, similar to Sand Point and King Cove, there is a residential fleet that delivers significant amounts of groundfish to the local processing plants. The City of Kodiak based vessels account for 95 percent of the groundfish total ex-vessel value of the region, and about 87 percent of all grounfish vessels in the region. Old Harbor and Ouzinkie vessels account for between 1 and 2 percent of the total regional catcher vessel ex-vessel value each. Old Harbor is home to about 6 percent of the grounfish vessels in the region, and Ouzinkie about 3 percent of these vessels. Port Lions and Larsen Bay represent less than 1 percent of value and 2 percent of regional vessels each. As a general rule, the larger vessels in the region tend to be disproportionately associated with the community of Kodiak compared to the smaller villages. All onshore groundfish processing in the region occurs the community of Kodiak, with the exception of a single processor at Atilak. Available data suggest that this facility, however, does not appear to focus strongly on groundfish, and does not appear to take much if any delivery of groundfish from vessels based in the nearby community of Akhiok. Given the concentration of the fleet in Kodiak, and the inherent tendency of smaller vessels (such as those in the smaller villages as well as that portion of the Kodiak fleet) to be less specialized (and therefore have more joint production opportunities), whatever indirect subsistence impacts that do occur in this region as a result of the alternatives are likely to be concentrated in the City of Kodiak itself.

In summary, the indirect impact of the alternatives on subsistence is difficult to assess for the reasons discussed in this section. Impacts are likely to be concentrated among small vessel owners in a relatively small number of communities, although indirect impacts through loss of income may have impacts on subsistence pursuits in a wider range of communities, including the CDQ communities.

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APPENDIX F4: CDQ REGION AND PROGRAM EXISTING CONDITIONS

1.0 INTRODUCTION

The western Alaska Community Development Quota (CDQ) program was established to enable residents of rural communities in western Alaska to participate in the fisheries off their shores in a way that will bring significant economic development to the Bering Sea region. Originally involving only the pollock fishery, the program has in recent years has expanded to become multi-species in nature, encompassing both groundfish and non-groundfish fisheries.

The CDQ program is a federal program that allocates a portion of the total allowable catch (TAC) for federally managed Aleutian Island and Bering Sea species to eligible communities in western Alaska. The CDQ program includes such species as pollock, Pacific cod, Atka mackerel, flatfish, sablefish, and other groundfish, along with halibut, and crab. Currently, the CDQ program is allocated portions of the groundfish fishery that range from 10 percent for pollock to 7.5 percent for most other species. The CDQ program was granted in perpetuity through the Magnuson-Stevens Act authorized by the U.S. Congress in 1996. The State of Alaska is responsible for the administration and monitoring of the program. The State administers the program jointly thorough the Alaska Department of Community and Economic Development (the lead agency) and the Alaska Department of Fish and Game.

Sixty-five Alaska Native Claims Settlement Act (ANCSA) villages near the Bering Sea have established eligibility under federal and state regulations. These villages formed six non-profit CDQ groups: Aleutian Pribilof Island Community Development Association (APICDA); Bristol Bay Economic Development Corporation (BBEDC); Central Bering Sea Fishermen's Association (CBSFA); Coastal Villages Region Fund (CVRF); Norton Sound Economic Development Corporation (NSEDC); and Yukon Delta Fisheries Development Association (YDFDA). The groups have established partnerships with fishing corporations. Local hire and reinvestment of proceeds in fishery development projects are a required part of the program.

In recent years the program has provided more than 1,000 jobs annually for region residents. Yearly wages have exceeded $8 million. This program has also contributed to infrastructure development projects within the region as well as loan programs and investment opportunities for local fishermen.

Reports summarizing and/or reviewing the activities of the CDQ program have been prepared for several purposes (NPFMC 1998, NRC 1999, DCED 2001). In addition, each of the CDQ groups file a management plan with the State when they apply for their requested share of the overall CDQ allocation. Each group also files quarterly reports that detail their activities and tracks their progress in relation to the goals they have set in their management plans. The State can adjust the percentages awarded to each group from one allocation period to the next, based on the State's evaluation of various factors – documented need, adequacy of the proposed plans to use the requested allocation to meet those needs, past performance, and perhaps others.

1.1 CDQ Allocations and Harvest

In 1991, the NPFMC recommended to the Secretary of Commerce that a fishery CDQ program be created. The purpose of the CDQ program was to extend the economic opportunities of the productive fisheries in the Bering Sea and Aleutian Islands (especially pollock) to small, rural communities in proximity to these valuable living marine resources. As initially envisioned, the proposed program set aside 7.5 percent of the Bering Sea

and Aleutian Island's annual TAC for Alaska pollock for allocation to qualifying rural Alaskan communities. The program was initially proposed to run for a period of four years, lasting from 1992 through 1995, but was subsequently extended for an additional three years, carrying it through 1998. In subsequent actions, a CDQ program for BSAI halibut and sablefish was implemented in 1995. A CDQ program for BSAI crab was implemented in 1998, and the multi-species groundfish CDQ program was implemented in late 1998. The NPFMC also extended the pollock CDQ allocations permanently by including pollock in the multi-species groundfish CDQ program. The American Fisheries Act of 1998 increased the pollock allocation for the CDQ program to 10 percent of the annual TAC.

Under the current regulations all groundfish and prohibited species caught by vessels fishing for CDQ groups accrue against the CDQ allocations and none of the groundfish or prohibited species caught in the groundfish CDQ fisheries accrue against the non-CDQ apportionment of the TAC or prohibited species catch limits. The CDQ groups are required to manage their catch to stay within all of their CDQ allocations. The CDQ allocations recommended by the State for 2001-2002 are displayed in Table 1. In 2001, these percentages represented approximately 185,000 metric tons of groundfish (Table 2).

Table 1 CDQ Allocation Percentages by Species and Group, 2001-2002

	Allocation (Percent)						
	APICDA	BBEDC	CBSFA	CVRF	NSEDC	YDFDA	Total
Halibut							
4B	100	0	0	0	0	0	100
4C	10	0	90	0	0	0	100
4D	0	26	0	24	30	20	100
4E	0	30	0	70	0	0	100
Crab							
Bristol Bay Red King	18	18	0	18	18	18	100
Norton Sound Red King	0	0	0	0	50	50	100
Pribilof Red & Blue King	0	0	100	0	0	0	100
St. Matthew Blue King	50	12	0	12	14	12	100
Bering Sea C. Opilio Tanner	10	19	19	17	18	17	100
Bering Sea C. Bairdi Tanner	10	19	19	17	18	17	100
Sablefish & Turbot							
Sablefish, Hook & Line – A1	15	20	0	30	20	15	100
Turbot-AI	16	20	5	21	20	18	100
Sablefish, Hook & Line – BS	15	22	18	0	20	25	100
Turbot-BS	20	22	7	15	15	21	100
Pacific Cod	16	20	10	17	18	19	100

	Allocation (Percent)						
	APICDA	BBEDC	CBSFA	CVRF	NSEDC	YDFDA	Total
Pollock							
Bering Sea/ Al/Bogoslof	14	21	4	24	23	14	100
Atka mackerel:							
Eastern	30	15	8	15	14	18	100
Central	30	15	8	15	14	18	100
Western	30	15	8	15	14	18	100
Yellowfin sole	28	24	8	6	7	27	100
Flatfish:							
Other Flats	25	23	9	10	10	23	100
Rocksole	24	23	8	11	11	23	100
Flathead	20	20	10	15	15	20	100
Other Species	18	20	10	16	16	20	100
Other Rockfish							
O. Rockfish-BS	25	21	7	12	13	22	100
O. Rockfish – Al	23	17	7	18	17	18	100
Arrowtooth	24	22	9	11	10	24	100
Pacific Ocean Perch Complex							
True POP-BS	18	21	7	18	18	18	100
Other POP-BS	23	18	8	16	16	19	100
True POP – Al							
Eastern	30	15	8	15	14	18	100
Central	30	15	8	15	14	18	100
Western	30	15	8	15	14	18	100
Sharp/Northern-Al	30	15	8	15	14	18	100
Short/Rougheye – Al	22	18	7	18	17	18	100
Sablefish, Trawl – A1	24	23	9	10	10	24	100
Sablefish, Trawl – BS	17	20	10	17	18	18	100
Prohibited Species							
Halibut (mt)	22	22	9	12	12	23	100
Chinook salmon (#)	15	21	4	23	23	14	100
Other salmon (#)	15	21	5	23	22	14	100
Opilio (#)	24	22	9	11	10	24	°100
C. Bairdi – Zone 1 (#)	26	24	8	8	8	26	100
C. Bairdi – Zone 2 (#)	23	22	9	12	11	23	100
Red King Crab (#)	29	23	8	7	7	26	100

Source: DCED (2001)

Table 2 CDQ Allocation Amounts by Species and Group, 2001

CDQ Species	2001 TAC	2001 CDQ Allocation	CDQ Group Amounts (Metric Tons)					
			APICDA	BBEDC	CBSFA	CVRF	NSEDC	YDFDA
BS FG Sablefish	780	156	23	34	28	0	31	39
AI FG Sablefish	1,875	375	56	75	0	113	75	56
BS Sablefish	780	59	10	12	6	10	11	11
AI Sablefish	625	47	11	11	4	5	5	11
BS Pollock - total	1,400,000	140,000	19,600	29,400	5,600	33,600	32,200	19,600
AI Pollock	2,000	200	28	42	8	48	46	28
Bogoslof Pollock	1,000	100	14	21	4	24	23	14
Pacific Cod	188,000	14,100	2,256	2,820	1,410	2,397	2,538	2,679
WAI Atka Mackerel	27,900	2,093	628	314	167	314	293	377
CAI Atka Mackerel	33,600	2,520	756	378	202	378	353	454
EAI/BS Atka Mackerel	7,800	585	176	88	47	88	82	105
Yellowfin Sole	113,000	8,475	2,373	2,034	678	509	593	2,288
Rock Sole	75,000	5,625	1,350	1,294	450	619	619	1,294
BS Greenland Turbot	5,628	422	84	93	30	63	63	89
AI Greenland Turbot	2,772	208	33	42	10	44	42	37
Arrowtooth Flounder	22,011	1,651	396	363	149	182	165	396
Flathead Sole	40,000	3,000	600	600	300	450	450	600
Other Flatfish	28,000	2,100	525	483	189	210	210	483
BS Pacific Ocean Perch	1,730	130	23	27	9	23	23	23
WAI Pacific Ocean Perch	4,740	356	107	53	28	53	50	64
CAI Pacific Ocean Perch	2,560	192	58	29	15	29	27	35
EAI Pacific Ocean Perch	2,900	218	65	33	17	33	31	39
BS Other Red Rockfish	135	10	2	2	1	2	2	2
AI Sharpchin/Northern	6,745	506	152	76	40	76	71	91
AI Shortraker/Rougheye	912	68	15	12	5	12	12	12
BS Other Rockfish	361	27	7	6	2	3	4	6
AI Other Rockfish	676	51	12	9	4	9	9	9
Other Species	26,500	1,988	358	398	199	318	318	398
Protected Species								
Zone 1 Red King Crab (no.)	97,000	7,275	2,110	1,673	582	509	509	1,892
Zone 1 Bairdi Tanner Crab (no.)	730,000	54,750	14,235	13,140	4,380	4,380	4,380	14,235
Zone 3 Bairdi Tanner Crab (no.)	2,070,000	155,250	35,708	34,155	13,973	18,630	17,078	35,708
Opilio Tanner Crab (no.)	4,350,000	326,250	78,300	71,775	29,363	35,888	32,625	78,300
Pacific Halibut (mt)	4,575	343	75,460	75,460	30,870	41,160	41,160	78,890

CDQ Species	2001 TAC	2001 CDQ Allocation	CDQ Group Amounts (Metric Tons)					
			APICDA	BBEDC	CBSFA	CVRF	NSEDC	YDFDA
Chinook Salmon (no.)	41,000	3,075	461	646	123	707	707	431
Non-Chinook Salmon (no.)	42,000	3,150	473	662	158	725	693	441

Additional details on the harvest amount and wholesale value of the groundfish CDQ allocations are presented in Table 3 and Table 4. As noted above, prior to implementation of the multi-species groundfish CDQ program in 1998, the only groundfish species for which CDQ allocations existed were pollock and sablefish. However, other groundfish species were harvested incidentally. After 1998, CDQ allocations became available for all groundfish species, and the harvest of some species such as Pacific cod (PCOD) and Atka mackerel (AMCK) increased.

Table 3 Harvest Quantity of CDQ Allocations by Species, 1993-2000

Year	Reported Metric Tons (Thousands)							
	AMCK	FLAT	OTHR	PCOD	PLCK	ROCK	SABL	Total
1993	0.75	0.76	0.20	0.45	126.23	0.04	0.02	128.44
1994	0.00	1.02	0.13	1.77	137.51	0.02	0.00	140.45
1995	0.01	0.40	0.19	0.87	97.39	0.03	0.00	98.90
1996	0.00	0.56	0.10	0.75	92.77	0.01	0.00	94.20
1997	0.02	0.64	0.36	0.44	87.58	0.07	0.09	89.21
1998	1.22	1.31	0.71	2.49	83.97	0.45	0.10	90.24
1999	2.59	4.52	1.93	11.63	100.16	0.96	0.15	121.95
2000	4.79	1.79	3.05	13.48	113.71	1.19	0.16	138.18

Source: NMFS Blend and WPR Data, June 2001.

Table 4 Wholesale Value of CDQ Allocations by Species, 1993-2000

Year	$Millions							
	AMCK	FLAT	OTHR	PCOD	PLCK	ROCK	SABL	Total
1993	0.69	0.16	0.00	0.16	47.06	0.03	0.05	48.14
1994	0.00	0.10	0.00	0.59	60.36	0.00	0.00	61.05
1995	0.00	0.00	0.00	0.12	56.82	0.00	0.00	56.94
1996	0.00	0.01	0.00	0.08	51.71	0.00	0.00	51.80
1997	0.00	0.43	0.00	0.10	50.66	0.02	0.48	51.68
1998	0.43	0.65	0.00	2.00	43.10	0.16	0.35	46.70
1999	1.08	1.60	0.06	13.39	76.70	0.47	0.78	94.07
2000	2.06	0.72	0.03	16.01	91.66	0.55	0.77	111.80

Source: NMFS Blend and WPR Data, June 2001.

Table 5 shows the seasonal variability in the value of groundfish catches. The bimodal distribution in the groundfish fishery is a function of the two seasons – the A season, which by regulation opens in late January and continues into March, and the B season, which opens in September. Fishing is usually more lucrative in the A season because of the high value of pollock roe.

Table 5 Wholesale Value of CDQ Allocations by Target Fishery and Month, 1999-2000

		$Millions							
Year	Month	AMCK	FLAT	OTHR	PCOD	PLCK	ROCK	SABL	Total
1999	Jan	0.00	0.00	0.00	0.01	2.01	0.00	0.00	2.02
	Feb	0.00	0.00	0.00	0.00	28.87	0.00	0.00	28.87
	Mar	0.00	0.11	0.00	0.00	14.08	0.00	0.00	14.20
	Apr	0.00	0.00	0.00	0.52	0.00	0.00	0.00	0.52
	May	0.47	0.07	0.00	2.96	0.00	0.07	0.01	3.58
	Jun	0.70	0.05	0.00	0.89	0.00	0.05	0.18	1.86
	Jul	0.14	0.14	0.01	0.01	8.15	0.04	0.15	8.65
	Aug	0.04	0.02	0.02	1.46	4.21	0.07	0.13	5.95
	Sep	0.16	0.37	0.00	2.24	12.52	0.00	0.15	15.43
	Oct	0.01	0.28	0.00	0.85	4.10	0.00	0.12	5.36
	Nov	0.16	0.99	0.00	3.01	2.70	0.02	0.00	6.88
	Dec	0.00	0.09	0.00	0.67	0.00	0.00	0.00	0.76
2000	Jan	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Feb	0.00	0.00	0.00	0.00	23.18	0.00	0.00	23.18
	Mar	0.00	0.00	0.00	3.67	23.88	0.00	0.00	27.55
	Apr	0.00	0.05	0.00	5.71	2.59	0.00	0.06	8.41
	May	0.81	0.09	0.00	1.50	0.00	0.00	0.11	2.52
	Jun	0.25	0.50	0.00	0.24	0.00	0.00	0.00	0.99
	Jul	0.89	0.19	0.00	0.62	7.37	0.00	0.13	9.21
	Aug	0.39	0.02	0.00	1.41	10.79	0.00	0.00	12.61
	Sep	0.00	0.00	0.01	0.39	12.16	0.00	0.18	12.73
	Oct	0.00	0.00	0.00	0.00	10.79	0.00	0.07	10.86
	Nov	0.55	0.00	0.00	0.22	0.93	0.05	0.01	1.75
	Dec	0.02	0.00	0.00	1.81	0.00	0.16	0.00	1.99

Note: The value shown is the total value of all species caught by the target fishery.
Source: NMFS Blend and WPR Data, June 2001.

1.2 CDQ Communities

The purpose of the CDQ program is to facilitate the participation of Bering Sea and Aleutian Islands community residents in the Bering Sea/Aleutian Island fishery, as a means to develop local community

infrastructure and increase general community and individual economic and social well-being. CDQ communities are predominantly Alaska Native villages, as shown in Table 6. Alaska Native residents comprise 86.8 percent of the combined total population of all CDQ communities. They are remote, isolated settlements with few natural assets with which to develop and sustain a viable diversified economic base. As a result, economic opportunities have been few, unemployment rates have been chronically high, and communities (and the region) have been economically depressed.

While these communities border some of the richest fishing grounds in the world, they have largely been unable to exploit this proximity. The full Americanization of the Bering Sea/Aleutian Island fisheries occurred relatively quickly. However, the very high capital investment required to compete in these fisheries precluded small communities from participating in their development. The CDQ program serves to ameliorate some of these circumstances by extending an opportunity to qualifying communities to directly benefit from the productive harvest and use of these publicly owned resources.

According to Sec. 305(i)(1)(B) of the Magnuson-Stevens Act, to be eligible to participate in the CDQ program a community must–

(i) be located within 50 nautical miles from the baseline from which the breadth of the territorial sea is measured along the Bering Sea coast from the Bering Strait to the western most of the Aleutian Islands, or on an island within the Bering Sea;

(ii) not be located on the Gulf of Alaska coast of the north Pacific Ocean;

(iii) meet criteria developed by the Governor of Alaska, approved by the Secretary, and published in the Federal Register;

(iv) be certified by the Secretary of the Interior pursuant to the Alaska Native Claims Settlement Act (43 U.S.C. 1601 et seq.) to be a Native village;

(v) consist of residents who conduct more than one-half of their current commercial or subsistence fishing effort in the waters of the Bering Sea or waters surrounding the Aleutian Islands; and

(vi) not have previously developed harvesting or processing capability sufficient to support substantial participation in the groundfish fisheries in the Bering Sea, unless the community can show that the benefits from an approved Community Development Plan would be the only way for the community to realize a return from previous investments.

The sixty-five coastal communities currently eligible to participate in the CDQ program are organized into six CDQ groups, with between one and 21 communities in each group. The CDQ communities are geographically dispersed, extending westward to Atka, on the Aleutian chain, and northward along the Bering coast to the village of Wales, near the Arctic Circle. Table 7 summarizes the six CDQ groups in terms of their membership, approximate populations, and office locations. The total population of the 65 CDQ communities in 2000 was estimated to be 27,073. However, this population figure may include a substantial number of individuals who are not year-round residents. The administrative offices of CDQ groups tend to be located in regional hub communities, near government or industry partner offices, and/or near community or other ongoing projects.

Table 6 Alaska Native Percentage of Total Community Population, Alaska CDQ Communities, 2000

Aleutian Pribilof Island Community Development Association	
Akutan	16.4%
Atka	91.3%
False Pass	65.6%
Nelson Lagoon	81.9%
Nikolski	69.2%
Saint George	92.1%
Bristol Bay Economic Development Corporation	
Aleknagik	84.6%
Clark's Point	92.0%
Dillingham	60.9%
Egegik	76.7%
Ekuk	0.0%
Ekwok	93.8%
King Salmon	30.1%
Levelock	95.1%
Manokotak	94.7%
Naknek	47.1%
Pilot Point	86.0%
Port Heiden	78.2%
Portage Creek	86.1%
South Naknek	83.9%
Togiak	92.7%
Twin Hills	94.2%
Ugashik	81.8%
Central Bering Sea Fishermen's Association	
Saint Paul	86.5%
Coastal Villages Fishing Cooperative	
Chefornak	98.0%
Chevak	95.9%
Eek	96.8%
Goodnews Bay	93.9%
Hooper Bay	95.8%
Kipnuk	98.0%
Kongiganak	97.2%
Kwigillingok	97.9%

Coastal Villages Fishing Cooperative (Continued)	
Mekoryuk	96.7%
Napakiak	96.6%
Napaskiak	98.2%
Newtok	96.9%
Nightmute	94.7%
Oscarville	100.0%
Platinum	92.7%
Quinhagak	97.3%
Scammon Bay	97.4%
Toksook Bay	97.6%
Tuntutuliak	98.9%
Tununak	96.9%
Norton Sound Economic Development Corporation	
Brevig Mission	92.0%
Diomede	93.8%
Elim	94.9%
Gambell	95.8%
Golovin	92.4%
Koyuk	94.3%
Nome	58.7%
Saint Michael	93.2%
Savoonga	95.5%
Shaktoolik	94.8%
Stebbins	94.7%
Teller	92.5%
Unalakleet	87.7%
Wales	90.1%
White Mountain	86.2%
Yukon Delta Fisheries Development Association	
Alakanuk	97.9%
Emmonak	93.9%
Grayling	91.8%
Kotlik	96.1%
Mountain Village	93.5%
Nunam Iqua	93.9%
Total All Villages	**86.8%**

Source: U.S. Census Bureau Census 2000

Table 7 CDQ Group Communities, Populations and Administrative Locations

CDQ Group	Member Communities		2000 Population[1]	Office Locations
APICDA	Akutan Atka False Pass Nelson Lagoon	Nikolski St. George Unalaska[2]	1,143	Juneau Unalaska Staff also in Homer and Anchorage
BBEDC	Aleknagik Ckark's Point Dillingham Egegik Ekuk Ekwok King Salmon/Savinoski Levelock Manokotak	Naknek Pilot Point Portage Creek Port Heiden South Naknek Togiak Twin Hills Ugashik	5,932	Dillingham Juneau Seattle
CBSFA	St. Paul		532	St. Paul Anchorage
CVRF	Chefornak Chevak Eek Goodnews Bay Hooper Bay Kipnuk Kongiganak Kwigillinook Mekoryuk Mountain Village Napakiak	Napaskiak Newtok Nightmute Oscarville Platinum Quinhagak Scammon Bay Toksook Bay Tuntutuliak Tununak	7,855	Anchorage Bethel
NSEDC	Brevig Mission Diomede/Ignaluk Elim Gambell Golovin Koyuk Nome Savoonga	Shaktoolik St. Michael Stebbins Teller Unalakleet Wales White Mountain	8,488	Anchorage Various
YDFDA	Alakanuk Emmonak Grayling	Kotlik Sheldon Point	3,123	Seattle Seward

[1] The population estimate may include individuals who are not year-round residents.
[2] Unalaska is an *ex-officio* member of APICDA.
Source: DCED 2001, U.S. Census, 2000

2.0 CDQ GROUP PROFILES

Individual groups have followed a variety of strategies for using their CDQ allocations, and for the investment or other use of the proceeds. Most have formed stable partnerships with established fishing industry participants and have, or are seeking to, invest in the fishery. The following CDQ group profiles are adapted from those contained within the inshore/offshore pollock allocation amendment to the Bering Sea groundfish fishery management plan. Each CDQ group is allocated a share of the full suite of the species subject to CDQ allocations, but only pollock and Pacific cod are highlighted in the brief discussions below.

2.1 Aleutian Pribilof Island Community Development Association (APICDA)

The communities represented by APICDA are relatively small and located adjacent to the fishing grounds. Unalaska, the largest community in the region and the hub of the Bering Sea fishery, is a non-voting member of the APICDA Board of Directors. Unalaska residents are eligible for APICDA training and education opportunities, many of which are located in Unalaska to take advantage of proximity to the industry, rather than in the other member villages.

Currently, APICDA is allocated 14 percent of the pollock and 16 percent of the Pacific cod CDQ allocations, which are shared among its inshore and offshore partners in such a way as to maximize the benefit to APICDA. Because of proximity to the fishing grounds and year-round access to ice-free waters, APICDA's focus is primarily on community development and employment opportunities that occur in or near each community. These villages do not have the same need for factory trawler employment, as do residents of many other CDQ communities, who do not have the same opportunity for local fishery development. This is reflected in APICDA's employment statistics, which show one of the highest total employment levels, but a relatively low number of pollock processing jobs. APICDA also has a wide variety of investments in different sectors of the fishery, as well as in tourism, and other areas.

APICDA has employment provisions with both its inshore and offshore partners and has invested, both with them and individually, in a number of fisheries-based development projects in several of its villages, creating a variety of employment opportunities. Though the group has placed residents with all three pollock sectors, APICDA residents in general have shown a preference for non-pollock employment, with the single largest source being renovation and operation of a halibut processing plant in Atka.

2.2 Bristol Bay Economic Development Corporation (BBEDC)

BBEDC represents 17 villages distributed around the circumference of Bristol Bay, including Dillingham, the second-largest CDQ community with approximately 2,200 residents and the location of BBEDC's home office. BBEDC is currently allocated 21 percent of the pollock and 20 percent of the Pacific cod CDQ harvest.

To date, BBEDC has focused its community development efforts primarily on creating offshore employment opportunities, and it has employed more village residents in pollock processing jobs than any other group. The group changed from one offshore partner to another before the 1996 harvest. BBEDC's current partner is said to hire approximately 20 percent of its crew from CDQ villages.

BBEDC has also invested in a variety of fishing vessels, including part-interest in two pollock catcher processors and a freezer longliner. However, BBEDC also has a program to evaluate investments in regional infrastructure. The group also has active vocational training and internship programs with its offshore partner, and provides internship opportunities with out-of-region and local businesses to develop administrative and other specialized skills. BBEDC is also helping to promote workforce readiness skills through the four Bristol Bay school districts.

2.3 Central Bering Sea Fisherman's Association (CBSFA)

CBSFA is unusual among CDQ groups in that it represents a single community, St. Paul in the Pribilof Islands. St. Paul is strategically located to serve the Bering Sea fishing industry. As a result, CBSFA has focused attention on working with other island entities to improve St. Paul's harbor facility and on expanding the island's small boat fleet. The group also operates a revolving loan program to provide boat and gear loans to resident fishermen. CBSFA has primarily invested in crab vessels and has a small ownership interest in American Seafoods. CBSFA has been working with American Seafoods to explore the possibility of developing a multi-processing facility in Saint Paul.

Reflecting the focus of St. Paul residents on developing local fishing ventures and infrastructure, CBSFA has not seen much demand among residents for off-island processing jobs, either offshore or inshore. The group is partnered with a large offshore company and would like to build on the benefits of product offloads at St. Paul harbor and the attendant support services its residents can provide. Currently, CBSFA receives four percent of the pollock and ten percent of the Pacific cod CDQ harvest.

2.4 Coastal Villages Region Fund (CVRF)

CVRF currently manages 24 percent of the pollock and 17 percent of the cod CDQ harvest for its 21 member villages. The villages are located along the coast between the southern end of Kuskokwim Bay and Scammon Bay, including Nunivak Island. This remote area is poorly located to engage in the current Bering Sea fisheries. Furthermore, its residents, for the most part, have had little experience with commercial enterprise. CVRF has focused on helping residents adjust to working conditions outside of the immediate area and employs a training coordinator who actively recruits residents for employment and internship opportunities. CVRF sees a distinct employment advantage in the offshore sector for its residents, primarily because of shorter time commitments and higher wages. However, the group currently has both inshore and offshore partners. CVRF has purchased 22.5 percent of American Seafoods, the largest offshore fishing company in the Bering Sea. This investment includes seven factory trawlers.

CVRF provides employment to fishermen through its nearshore CDQ halibut fishery and on a longline vessel that harvests CDQ sablefish. The group continues to be interested in establishing salmon processing facilities both on the Kuskokwim and elsewhere in the region, as well as halibut processing facilities.

2.5 Norton Sound Economic Development Corporation (NSEDC)

Fifteen villages make up the region represented by NSEDC, which ranges from St. Michael to Diomede. The geographic expanse and diversity of interests among NSEDC's communities are challenging, as are the hurdles to developing local fisheries in this remote area that is ice-bound in winter.

Nevertheless, NSEDC has actively pursued both local fisheries and Bering Sea pollock investment strategies. The group has purchased approximately 50 percent of its offshore processor partner, Glacier Fish Company (GFC), including two catcher/processors and a seafood marketing subsidiary Together with the GFC, NSEDC owns the Norton Sound Fish Company, which operates a longline vessel and employs significant numbers of region residents. The group also owns independently two tender vessels specially built for the Norton Sound region.

NSEDC has developed or planned fisheries development projects in several villages, including Norton Sound Crab Company in Nome and commercial halibut operations on St. Lawrence Island. GFC hires residents of the Bering Sea region on a preferential basis for CDQ fishery operations. NSEDC operates an employment and training office in Unalakleet. This CDQ group currently receives 23 percent of the pollock and 18 percent of the Pacific cod CDQ allocations.

2.6 Yukon Delta Fisheries Development Association (YDFDA)

YDFDA represents five communities. The group's emphasis has been on creating employment opportunities in the Bering Sea fishery both through its mothership partner and through other pollock processors, both inshore and offshore. Another area of focus has been on a comprehensive training program that includes a combination trawl/pot/longline vessel and a 47-foot longline crab vessel. YDFDA has received steadily increasing CDQ pollock allocations and currently receives 14 percent of the pollock and 19 percent of the cod CDQ allocations. YDFDA faces the challenges of representing a region with few natural resources to develop, long distances to most viable fisheries, and relatively undeveloped human resources with respect to active participation in a commercial economy setting. While the group places residents in jobs with all three sectors, it indicates that offshore and mothership employment are most useful for its residents. The group's CDQ royalties fund a variety of training activities encompassing technical and office skills.

3.0 ECONOMIC IMPACTS OF THE CDQ PROGRAM

3.1 Revenue Generation

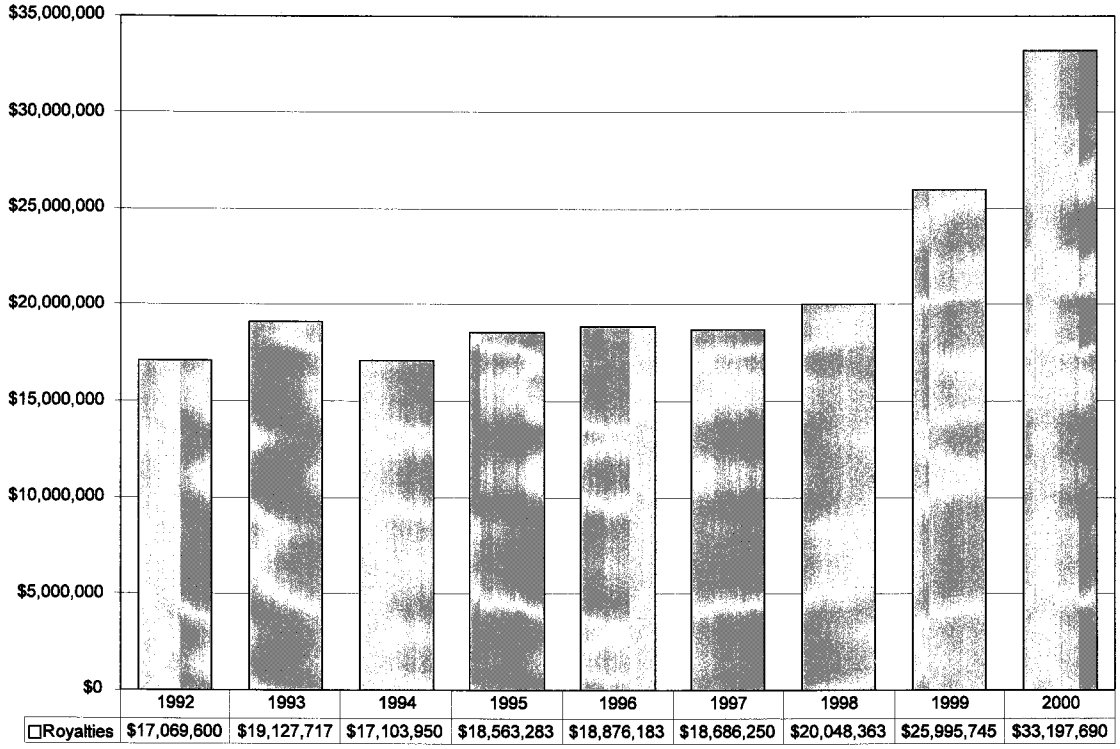
To be eligible to participate in the CDQ program, CDQ communities could have no current or historical linkage to the fisheries in question at the time of the program's implementation. Therefore, it has been necessary (with the exception of some of the halibut CDQs) for each CDQ group to enter into a relationship with one or more of the large commercial fishing companies that participate in the fishery. The CDQ community brings the asset of preferential access to the fish while the partnering firm brings the harvesting/processing capacity and experience in the fishery. The nature of these relationships differs from group to group. In every case, the CDQ community receives royalty payments on apportioned catch shares. Some of the agreements also provide for training and employment of CDQ community members within the partners' fishing operations, as well as other community development benefits. Each of the six groups negotiates a specific price per metric ton for the use of the apportioned CDQ shares, or a base price plus some form of profit sharing.

Based upon reports of consistently high bid-prices for CDQ shares (see, for example, testimony before the NPFMC on the impacts of Inshore/Offshore III on the pollock CDQ program), the partnering companies also apparently receive substantial benefits from these CDQ relationships. These benefits may include preferred access to the resource, resulting in better yields and more valuable product forms (e.g., roe), and the more

efficient use of capacity. The positive aspects of the CDQ pollock fishery probably contributed to the successful implementation of the offshore cooperative management system.

Over the duration of the CDQ program, pollock CDQ royalties have consistently exceeded $17 million (Figure 1). Royalty income rose substantially after 1998 because both the TAC and lease price of pollock CDQ shares increased. Stronger overseas markets for groundfish products and a shift by processors to higher value products were among the reasons for the increase in CDQ lease values. In 2000, the CDQ groups received over $33 million in pollock CDQ royalties.

Figure 1. Pollock CDQ Royalties, 1992-2000



Source: DCED (2001)

Royalties from the multi-species program provided an additional $7.5 million to the CDQ groups in 2000 (DCED 2001). The percentage of the total 2000 royalties generated by each non-pollock species are as follows: Pacific cod – 8%; opilio crab – 5%; Bristol Bay red king crab – 3%; and other species, including sablefish, Atka mackerel, halibut and turbot – 2%.

3.2 Asset Accumulation

The revenue stream from the lease of CDQ allocations has permitted the development of considerable savings within the CDQ groups. These savings provide important capital for making investments, and asset

accumulation by CDQ communities is one empirical measure of the performance of the program. Amassment of equity interest in real assets represents a clear community development strategy. Data suggest that CDQ groups, when taken as a whole, have retained almost half of their gross revenues in some form of equity, whether vessel ownership, processing facilities, marketable securities, loan portfolios, and IFQ holdings. The value of CDQ assets in aggregate increased from $1.5 million in 1992 to over $157 million in 2000 (DCED 2001).

Another benefit of capital asset acquisitions and venturing with industry participants is the enhanced control communities may exercise over the joint economic activity. As members in fishing companies with ownership interest, the CDQ groups are better able to take part in decisions that directly impact business operations and, thus, profitability. Also, the opportunity for technology transfer and hands-on experience (whether operational or managerial) occurs from the industry partner to the CDQ group. CDQ groups and their residents are able to learn first hand how the industry functions. This increases the likelihood of local control as CDQ residents, who have spent time learning from established industry partners, may one day be in control of their own operations and be able to operate independent of the CDQ program. In the interim, expanded employment opportunities, made available through vessel acquisition and partnering with established industry members, increase the sharing of benefits that accrue from the CDQ activities.

Investments in the Harvesting and Processing Sectors

Increasingly, CDQ groups are using their CDQs to leverage capital investment in harvesting/processing capacity. Acquisition of ownership interest in commercial fishing operations and other fisheries-related enterprises is one important means of directly adding to a CDQ group's economic sustainability, consistent with the program's mandate. Current equity acquisitions in vessels are presented in Table 8. The table also specifies, if applicable, the catcher vessel class or catcher processor class in which each vessel has been included for the sector profiles.

Table 8 Vessel Acquisitions by CDQ Groups

CDQ Group	Vessel Acquisitions (percent ownership in parentheses and vessel class in brackets)
APICDA	• Starbound (20%) 240' pollock factory trawler [FT-CP] • Bering Prowler (*25%)* 124' longline vessel harvesting Pacific cod and sablefish [L-CP] • Prowler (*25%)* 114' longline vessel harvesting Pacific cod and sablefish [L-CP] • Golden Dawn (*25%)* 148' catcher vessel harvesting Pacific cod, pollock and crab [TCV BSP = 125] • Ocean Prowler (20%) 155' longline-processing vessel harvesting Pacific cod and sablefish [L-CP] • Farwest Leader (*25%)* 105' pot vessel harvesting crab and Pacific cod [PCV] • Stardust (100%) 56' longline vessel harvesting Pacific cod and halibut [FGCV 33-59] • Bonanza (100%) 38' longline vessel harvesting halibut [FGCV 33-59] • AP#1, AP#2, AP#3 (100%) 36' longline vessels harvesting halibut and Pacific cod [GHOST or unclassified] • AP#4, AP#5 (100%) 35.5' longline vessels harvesting halibut and Pacific cod [GHOST or unclassified] • Konrad 1 (*75%)* 58' trawler/pot/tender vessel harvesting Pacific cod and pollock, salmon tender [TCV < 60] • Nikka D (100%) 28' vessel harvesting halibut [unclassified] • Agusta D (100%) 28' sportfishing charter vessel [unclassified] • Grand Aleutian (100%) 32' sportfishing charter vessel [unclassified]
BBEDC	• Arctic Fjord (20%) 270' pollock factory trawler [ST-CP] • Bristol Leader (50%) 167' longline vessel harvesting Pacific cod, halibut and sablefish [L-CP] • Neahkahnie (20%) 110' pollock catcher-processor [TCV BSP 60-124] • Northern Mariner (45%) crab vessel [PCV} • Bristol Mariner (45%) 125' crab vessel [PCV] • Nordic Mariner (45%) 121' crab vessel [PCV] • Cascade Mariner (40%) 100' crab vessel [unclassified]
CBSFA	• American Seafoods, LP (22.5%) which owns the following 270-340' catcher processors harvesting pollock, Pacific cod, yellowfin sole and rock sole: American Dynasty [ST-CP], Katie Ann [FT-CP], Northern Eagle [ST-CP], Ocean Rover [ST-CP], Northern Jaeger [ST-CP], American Triumph [ST-CP] and Northern Hawk [ST-CP] • Zolotoi (20%) 98' crab vessel [PCV] • Ocean Cape (35%) 98' crab vessel [FGCV 33-59]
CVRF	• American Seafoods, LP (22.5%) which owns the following 270-340' catcher processors harvesting pollock, Pacific cod, yellowfin sole and rock sole: American Dynasty [ST-CP], Katie Ann [FT-CP], Northern Eagle [ST-CP], Ocean Rover [ST-CP], Northern Jaeger [ST-CP], American Triumph [ST-CP] and Northern Hawk [ST-CP] • Ocean Prowler (20%) 155' longline-processing vessel harvesting Pacific cod and sablefish [L-CP] • Ocean Harvester (45%) 58' longline vessel harvesting halibut and Pacific cod [LCV] • Silver Spray (50%) 116' crab vessel and Pacific cod freezer boat [P-CP]
NSEDC	• Glacier Fish Company (50%) which owns the following 201-276' catcher processors harvesting pollock and Pacific cod: Northern Glacier [FT-CP] and Pacific Glacier [ST-CP] • Norton Sound (49%) 139' longline vessel [L-CP] • Golovin Bay (100%) tender [unclassified] • Norton Bay (100%) tender [unclassified]

CDQ Group	Vessel Acquisitions (percent ownership in parentheses and vessel class in brackets)
YDFDA	• Emmonak Leader (75%) 103' catcher vessel harvesting pollock [TCV BSP 60-124] • Alakanuk Beauty (75%) 105' catcher vessel harvesting pollock [TCV BSP 60-124] • Golden Alaska (19.6%) 308' pollock mothership [MS] • Blue Dolphin (100%) 47' longline/crab vessel [FGCV 33-59] • Lisa Marie (100%) 78' trawl/pot/longline vessel [PCV]

Source: DCED (2001)

All six CDQ groups have acquired ownership interests in the offshore pollock processing sector. In addition, APICDA and NSEDC have invested in inshore processing plants, some of which process groundfish (Table 9). These inshore plants include both shorebased and floating processing facilities.

Table 9 Inshore Processing Plant Acquisitions by CDQ Groups

CDQ Group	Inshore Plant Acquisitions (percent ownership in parentheses)
APICDA	• Atka Pride Seafoods, Inc. (100%) processes halibut • Bering Pacific Seafoods (50%) processes Pacific cod, salmon and other species
NSEDC	• Norton Sound Seafood Products (100%) processes mainly salmon • Norton Sound Crab Company (100%) processes mainly crab

Source: DCED (2001)

In most of the processing ventures in which CDQ groups have invested, the groups are minority owners. However, the revenues derived from these investments may be substantial. An overview of the relative economic importance of investments in the offshore and inshore groundfish processing sector may be acquired by examining the historical quantity and value of groundfish processed by catcher processors and inshore plants in which CDQ groups currently have an equity interest (Table 10 and Table 11). The groundfish processed by these enterprises accounted for about 14 percent of the total tonnage and 15 percent of the total wholesale value of groundfish processed in the Alaska fishery in 1999 and 2000. Overall, it is estimated that the ownership shares of CDQ groups represents approximately 27 percent of the total groundfish revenues of these enterprises based on a weighted average of wholesale product revenue.

Table 10 Quantity of Groundfish Processed by Catcher Processor Vessels and Inshore Plants in which CDQ Groups Currently Have an Equity Interest, 1999-2000

Year	Source of Harvests	AMCK	FLAT	ROCK	OTHR	PCOD	PLCK	SABL	Total
1999	Non-CDQ (1,000 MT)	0.00	10.46	0.09	2.63	18.79	211.14	0.33	243.45
	CDQ (1,000 MT)	0.00	0.52	0.03	0.86	5.42	66.55	0.05	73.43
	CDQ Tons as % of Total	15.4	4.7	23.0	24.6	22.4	24.0	13.8	23.2
2000	Non-CDQ (1,000 MT)	0.00	11.80	0.09	4.14	15.44	240.57	0.26	272.31
	CDQ (1,000 MT)	0.01	0.85	0.03	2.09	8.22	91.78	0.05	103.02
	CDQ Tons as % of Total	98.8	6.7	22.8	33.5	34.7	27.6	16.1	27.4

Source: NMFS Blend Data, June 2001; DCED (2001)

Table 11 Wholesale Product Value of Groundfish Processed by Catcher Processor Vessels and Inshore Plants in which CDQ Groups Currently Have an Equity Interest, 1999-2000

Year	Source of Harvests	AMCK	FLAT	ROCK	OTHR	PCOD	PLCK	SABL	Total
1999	Non-CDQ ($Millions)	0.00	2.16	0.09	0.03	19.99	161.10	1.45	184.82
	CDQ ($Millions)	0.00	0.17	0.01	0.04	6.15	50.46	0.23	57.06
	CDQ Value as % of Total	0.0	7.3	11.5	58.9	23.5	23.9	13.5	23.6
2000	Non-CDQ ($Millions)	0.00	2.20	0.10	0.07	17.77	192.91	1.19	214.25
	CDQ ($Millions)	0.00	0.21	0.01	0.01	9.66	73.64	0.23	83.77
	CDQ Value as % of Total	77.1	8.8	9.0	17.4	35.2	27.6	16.4	28.1

Source: NMFS Blend Data, June 2001; DCED (2001)

The most important component that CDQ groups bring into investments in the offshore groundfish processing sector is quota (DCED 2001). As shown in Table 10 and Table 11, CDQ catch accounts for a substantial portion of the total amount and value of groundfish processed by the companies in which the groups have invested.

The vessel list in Table 8 shows that CDQ groups have also invested in catcher vessels harvesting groundfish and other species. An overview of the relative economic importance of investments in these enterprises may be obtained by examining the historical quantity and value of groundfish caught by catcher vessels in which CDQ groups currently have an equity interest (Table 12). The groundfish harvested by these fishing operations accounted for about two percent of the total tonnage and three percent of the total ex-vessel value of groundfish harvested in the Alaska fishery in 1999 and 2000. Overall, it is estimated that the ownership

shares of CDQ groups represents approximately 50 percent of the total groundfish revenues of these enterprises based on a weighted average of ex-vessel revenue.

Table 12 Quantity and Ex-Vessel Value of Groundfish Harvested by Catcher Vessels in which CDQ Groups Currently Have an Equity Interest, 1999-2000

Year	AMCK	FLAT	ROCK	OTHR	PCOD	PLCK	SABL	Total
Retained Tons (Thousands)								
1999	0.04	0.04	0.01	0.00	2.17	30.13	0.14	32.54
2000	0.00	0.03	0.01	0.01	2.04	30.97	0.11	33.16
Ex-vessel Value ($Millions)								
1999	0.00	0.02	0.02	0.00	1.14	5.84	0.57	7.59
2000	0.00	0.01	0.01	0.00	1.34	7.18	0.55	9.09

Source: NMFS Blend Data and Weekly Reports, June 2001; DCED (2001)

3.3 Employment and Income

At the time of the 1990 U.S. Census, all the communities in rural, western Alaska were experiencing relatively high levels of unemployment, ranging from 9 percent in the Bristol Bay area to 31 percent in the Yukon Delta area (DCED 2001). While these high unemployment rates partly reflect the seasonality of employment opportunities and the timing of the census in April, they also may show the effects of limited employment opportunities. All of the communities in the CDQ areas had median incomes that were lower than the state median income (DCED 2001). The median income of the Central Bering Sea area and the Bristol Bay area was less than ten percent below the state level, but in the Yukon Delta area and the Aleutian Pribilof area the median income was only slightly greater than half the state level (DCED 2001). The poverty rates in all the CDQ areas except the Central Bering Sea were at least twice the state rate of seven percent.

Employment opportunities have been one of the most tangible direct effects of the CDQ program for many western Alaska village residents. Indeed, the CDQ program has had some success in securing career track employment for many residents of qualifying communities, and has opened opportunities for non-CDQ Alaskan residents, as well. Jobs generated by the CDQ program included work aboard harvesting vessels, internships with the partner company or government agencies, work at processing plants, and administrative positions.

Table 13 summarizes the total annual CDQ employment and wages presented in quarterly reports. The CDQ program has created an excess of $8 million in wages annually since 1998.

Table 13 CDQ Employment and Wages for all CDQ groups, 1993-2000[1]

	1993	1994	1995	1996	1997	1998	1999	2000
Number Working								
Management/ Administration	26	48	58	63	63	79	96	155
CDQ Pollock-Related	186	213	228	261	227	443	244	297
Other Fisheries	64	276	393	691	629	634	786	1146
Other Employment	95	531	157	138	130	194	213	236
Total	371	1068	836	1153	1049	1350	1339	1834
Total Wages ($)								
Management/ Administration	586,537	1,012,125	1,218,892	1,636,860	1,803,766	2,284,792	2,661,976	3,084,757
CDQ Pollock-Related	1,000,360	1,280,695	1,866,619	1,686,104	2,660,938	2,649,001	2,149,062	1,741,871
Other Fisheries	609,058	1,000,103	1,132,824	2,280,554	2,756,688	2,075,495	4,201,775	5,959,516
Other Employment	0	1,791,479	1,350,766	723,724	887,338	1,167,173	1,573,358	1,723,054
Total	2,195,955	5,084,402	5,569,101	6,327,242	8,108,730	8,176,461	10,586,171	12,509,198

[1] Employment figures may not represent full-time positions. In addition, some double-counting of employment and wages may have occurred in the compilation of data for quarterly reports.
Source: DCED (2001)

From 1993 through 2000, CDQ management and administration accounted for about six percent of the jobs and 24 percent of the wages. Pollock harvesting and processing accounted for 24 percent of the jobs and 26 percent of the wages. Other fisheries, which include halibut, salmon, sablefish, herring and crab related employment, accounted for 51 percent of the jobs and 34 percent of the wages. Finally, other employment, including internships, accounted for 18 percent of the jobs and 15 percent of the wages.

An overview of the relative impacts of the CDQ program may be gained by comparing income generated by the CDQ program with the total income in CDQ communities. Adjusted gross income data by zip code are available from the Internal Revenue Service for two years during the period that the CDQ program has existed - 1997 and 1998. The total adjusted gross income for all CDQ communities in these two years was $242,200,000 and $252,600,000, respectively. In addition, an estimate of adjusted gross income can be derived for 1999, the most recent year for which personal income data are available from the Regional Economic Information System (REIS) of the U.S. Bureau of Economic Analysis for Alaska boroughs and census areas. In 1997 and 1998, adjusted gross income in CDQ communities was approximately 27.5 percent of the total personal income in the boroughs and census areas in which CDQ communities are located. Applying this percent to the 1999 REIS personal income data yields an estimated adjusted gross income of $259,800,000 in CDQ communities for that year.

Table 14 shows CDQ wages in 1997 and 1998 as reported to DCED and total adjusted gross income for all CDQ communities as estimated above. CDQ-related income accounted for about 4.1 percent of the total income in CDQ communities by 1999.

Table 14 CDQ Wages Compared with Total Adjusted Gross Income in CDQ Communities, 1997-1999

	Total Adjusted Gross Income ($)	CDQ Wages ($)	CDQ Wages as % of Total Adjusted Gross Income
1997	242,200,000	8,108,730	3.3
1998	252,600,000	8,176,461	3.2
1999	259,800,000	10,586,171	4.1

[1] Includes management/administration wages
Sources: DCED (2001); Internal Revenue Service

While this analysis is based on the best information available, it yields only a rough approximation of the contribution of CDQ wages to regional income. As noted above, CDQ management and administration account for nearly one-fourth of CDQ wages. Many of the individuals in administrative positions work and reside in non-CDQ communities (Table 7). By including the wages of those individuals, this analysis overestimates the contribution of CDQ wages to the total income of CDQ communities. Some level of error may also have been introduced in the analysis because IRS income data are reported by zip code. The incomes of a number of small non-CDQ communities that share a zip cope with CDQ communities were included in the figure for total adjusted gross income. However, given the small size of the non-CDQ

communities included, it is unlikely that the introduced error appreciably changed the analysis results. Similarly, the incomes of certain CDQ communities (Kongiganak, Napaskiak, Newtok and Oscarville) were omitted from the total adjusted gross income figure because their zip code overlapped with the relatively large non-CDQ community of Bethel. Again, the introduced error is likely insignificant due to the small size of the CDQ communities omitted.

Adjusted gross income data obtained from the IRS for 1997 and 1998 can also be used to examine the contribution of CDQ wages of each CDQ group (Table 15). Among the factors that account for the differences across groups is the presence or absence of communities with comparatively large populations and diverse economies. For example, the CDQ communities of King Salmon and Dillingham in the BBEDC region and Nome in the NSEDC region contributed about half of the total adjusted gross income for all CDQ communities in 1997 and 1998. The higher level of economic activity in these towns results in higher per capita incomes and reduces the relative importance of CDQ wages.

Table 15 CDQ Wages Compared with Total Adjusted Gross Income in CDQ Communities, by CDQ Group, 1997-1999

	APICDA	BBEDC	CBSFA	CVRF	NSEDC	YDFDA
1997						
CDQ Wages ($)[1]	1,343,950	1,480,979	223,201	1,193,590	1,252,493	1,831,355
Total Adjusted Gross Income ($)	11,115,000	74,730,000	8,517,000	33,381,000	97,171,000	17,256,000
CDQ Wages as % of Total Adjusted Gross Income	12.09	1.98	2.62	3.58	1.29	10.61
1998						
CDQ Wages ($)[1]	1,061,750	1,317,694	714,288	1,645,402	1,663,439	1,773,888
Total Adjusted Gross Income ($)	10,209,000	80,655,000	8,010,000	35,719,000	100,375,000	17,659,000
CDQ Wages as % of Total Adjusted Gross Income	10.40	1.63	8.92	4.61	1.66	10.05

[1] Includes management/administration wages
Sources: DCED (2001); Internal Revenue Service; Regional Economic Information System

3.4 Training and Education

Training of CDQ community residents has been a primary objective for all the CDQ groups from the outset of the program and has been promoted as an essential means to a sustainable locally based fishery economy. Each CDQ group provides training for their residents, based not only upon the individual needs of the trainee, but upon the overall needs of the community.

Training programs span the range of educational opportunities, from vocational and technical training, to support for higher education at college and university levels. CDQ groups have spent nearly $8 million directly on training expenditures involving over 7,000 residents since 1993 (DCED 2001).

These investments are wholly dependent upon the revenues generated by the CDQ apportionments and, therefore, are another empirical measure of benefits deriving from the groundfish fisheries of the BSAI management area.

3.5 Indirect Employment and Income Effects

Some of the income earned in CDQ jobs, as well as spending for supplies and services in support of CDQ projects, passes through local merchants, service providers, and others before leaking out of the region in exchange for imports. The additional employment and income generated in this way is referred to as indirect economic impacts. In an area such as western Alaska, where very few goods and services are provided locally, money leaks out of the region relatively quickly. Nevertheless, every extra contribution to jobs and income helps, and these additional economic impacts of the CDQ program should not be overlooked.

4.0 REFERENCES CITED

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