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Summary of Observer Sampling of Domestic Groundfish Fisheries in the Northeast Pacific Ocean and Eastern Bering Sea, 1990

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Michael Guttormsen, Renold Narita, Jessica Gharrett,
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U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
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by

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ABSTRACT

This report summarizes the 1990 domestic groundfish observer program and domestic groundfish activities in the eastern Bering Sea and Aleutian Islands region, the Gulf of Alaska region, and off the Washington-Oregon-California coast. Data contained herein provide estimates of the domestic groundfish catches and bycatch of Pacific salmon (*Oncorhynchus* spp.), Pacific halibut (*Hippoglossus stenolepis*), snow (Tanner) crabs (*Chionoecetes* spp.), king crabs (*Paralithodes* spp. and *Lithodes* spp.), and Pacific herring (*Clupea pallasi*). Estimates of rockfish and flatfish catches are tabulated by species groups and also by species.

CONTENTS

Page

Introduction..... 1
History of U.S. Groundfish Fisheries..... 2
Observer Sampling Procedures..... 4
Observer Coverage of Fishing Fleets..... 5
Methods of Calculation..... 6
  Estimates of Domestic Groundfish Catches..... 6
  Estimates of Domestic Bycatch of Pacific Salmon, Pacific Halibut, Snow (Tanner) Crabs, King Crabs, and Pacific Herring..... 6
  Target Fisheries..... 7
  Estimates of Rockfish and Flatfish Catch by Species..... 7

Summary of Observer Sampling for Bering Sea and Aleutian Islands Domestic Groundfish Fisheries..... 13
  Area of Sampling..... 13
  Catch Allocations..... 13
  Estimates of Domestic Groundfish Catches..... 13
  Restrictions..... 14
  Summary of Data Collected..... 15
  Observations of Fishing Gear-Marine Mammal Interactions..... 16
  Observations of Fishing Gear-Sea Bird Interactions..... 16
  Bycatch of Prohibited Species..... 16
    Pacific Salmon..... 16
    Pacific Halibut..... 18
    Snow (Tanner) Crabs..... 20
    King Crabs..... 22
    Pacific Herring..... 24
  Rockfish Catch by Species..... 25
  Flatfish Catch by Species..... 25
  Tables and Figures for the Bering Sea and Aleutian Islands Region..... 26

Summary of Observer Sampling for Gulf of Alaska Domestic Groundfish Fisheries..... 149
  Estimates of Domestic Groundfish Catches..... 149
  Restrictions..... 149
  Summary of Data Collected..... 150
  Observations of Fishing Gear-Marine Mammal Interactions..... 150
  Observations of Fishing Gear-Sea Bird Interactions..... 150
  Bycatch of Prohibited Species..... 151
    Pacific Salmon..... 151
    Pacific Halibut..... 152
    Snow (Tanner) Crabs..... 153
    King Crabs..... 155

Rockfish Catch by Species..... 157
Flatfish Catch by Species..... 157
Tables and Figures for the Gulf of Alaska Region..... 158

Summary of Observer Sampling off the Coasts of Washington, Oregon, and California..... 271
Estimates of Domestic Groundfish Catches..... 271
Bycatch of Prohibited Species..... 271
Pacific Salmon..... 271
Pacific Halibut..... 271
Rockfish Catch by Species..... 271
Flatfish Catch by Species..... 272
Tables and Figures for the Washington-Oregon-California Region..... 273

Citations..... 279

INTRODUCTION

The year 1990 was the first full year of federally mandated observer coverage in the U.S. domestic groundfish fishery off Alaska. The domestic observer program for groundfish was the result of amendments to the fishery management plans for the Bering Sea and Aleutian Islands and Gulf of Alaska regions. Previously, amendments to the Marine Mammal Protection Act in 1988 that were implemented in August 1989 had mandated between 20 and 35% observer coverage of the Alaskan trawl fisheries. Observer coverage in 1990 of the U.S. domestic trawl fishery off the Washington, Oregon, and California coasts, on the other hand, was voluntary; however, the four vessels involved in this fishery had observers aboard during their entire fishing operations.

The observers' objectives were to 1) determine the incidental catches of marine mammals and other species whose retention is prohibited by U.S. regulations, 2) determine the total catch and catch composition of groundfish, 3) provide information needed to assess the biological status of the various stocks of fish, and 4) report possible violations of U.S. fishing regulations. This report summarizes observer data collected aboard domestic groundfish vessels operating within the U.S. 200-mile Exclusive Economic Zone (EEZ) of the northeast Pacific Ocean and eastern Bering Sea in 1990. The report also provides statistics on the catch of groundfish and prohibited species taken in the groundfish fisheries of the Bering Sea and Aleutian Islands and Gulf of Alaska regions. A description of gear types used in this paper is presented in Table 1. While aboard vessels, observers obtained information on the location, duration, average depth, and catch weight of each trawl haul, longline set, or pot set made while they were on board. They sampled several hauls or portions of longline or pot sets each day to determine species composition by weight, the incidence of species whose retention was prohibited, incidental take of marine mammals, and the age and length composition of designated species. In addition, observers described fishing strategies and sampling methods used and reported possible violations of U.S. regulations.

HISTORY OF U.S. GROUNDFISH FISHERIES

U.S. fishermen made only limited use of groundfish resources in the Bering Sea and the northeast Pacific Ocean prior to extensive fishing of large-scale foreign fisheries in these regions. Virtually ignored by the U.S. fishing industry were the expansive groundfish stocks of walleye pollock (Theragra chalcogramma) and flatfish (Pleuronectidae), which in recent years have made up a significant percentage of the world's groundfish catch (Marasco and Aron 1991). Domestic fishermen in small owner-operated vessels traditionally fished in coastal waters. With the exception of handline fishing for Pacific cod which began in Alaskan waters in the late 1880s (Cobb 1927), domestic fishermen concentrated fishing effort on species of high market value. In Alaska, primary catch species were Pacific salmon (Oncorhynchus spp.), Pacific halibut (Hippoglossus stenolepis), Pacific herring (Clupea pallasi) for roe, sablefish (Anoplopoma fimbria), pink shrimp (Pandalus spp.), king crabs (Paralithodes spp. and Lithodes spp.), and snow (Tanner) crabs (Chionoecetes spp.). As late as 1980, major groundfish species (walleye pollock, flatfish, and rockfish) made up less than 1% of the U.S. commercial catch in Alaska (Huppert 1991). In the Washington-Oregon-California region, demersal trawling for rockfish (Sebastes spp.) and flatfish (Pleuronectidae) and pot fishing for sablefish were the major domestic fisheries prior to 1980.

Large-scale commercial groundfish fisheries were pioneered by foreign nations, led by Japan, which expended the most effort of any nation in Alaska waters (Chitwood 1969; Bakkala et al. 1979). In 1930, Japan initiated limited mothership fisheries in the eastern Bering Sea, harvesting for the first time large quantities of walleye pollock and flatfish for reduction into fish meal. These fisheries were ended by World War II, but resumed from 1954 to 1957 when the flatfish catch, composed mainly of yellowfin sole (Pleuronectes asper), was frozen.

In 1958, the U.S.S.R. entered the Bering Sea fishery for flatfish, and along with Japan initiated fish meal operations, which soon became one of the largest users of the flatfish resource. The total flatfish catch peaked at 610,000 metric tons (t) in 1961 and then suddenly declined to 114,000 t in 1963. During the period from 1958 to 1963, Japan's flatfish freezing fleets and longline-gillnet mothership fleets expanded fishing effort along the entire continental slope of the Bering Sea. Both nations expanded fishing operations into the Gulf of Alaska and along the Washington-Oregon-California coast. Principal species harvested were Pacific halibut, Pacific ocean perch (Sebastes alutus), other rockfish, and sablefish.

In 1964, when Bering Sea yellowfin sole catches were in decline, a new automated process was developed to convert walleye pollock into surimi, a minced fish meat used to make a variety of fish-based products. Large Japanese mothership processors with their fleets of catcher boats began shifting their main fishing effort to walleye pollock, the largest single fish resource in the North Pacific Ocean. Walleye pollock catches reached a peak of 1.9 million t in 1972. In 1973 and 1974, catch quotas were negotiated by the United States with Japan and the U.S.S.R., and restrictions on fishing were enacted due to evidence of declining walleye pollock abundance (Alton and Bakkala 1966).

Meanwhile, foreign vessels using bottom trawls in the Gulf of Alaska and along the Washington-Oregon-California coast quickly depleted the limited and vulnerable rockfish stocks. In the Gulf of Alaska, Soviet fishing shifted to walleye pollock, Atka mackerel (Pleurogrammus monopterygius), and flatfish, while Japan began to concentrate on the sablefish resource with pot and longline gear. For 1966, the first year of foreign fishing off the U.S. West Coast, Japan's annual rockfish catch was 8,000 t, but by 1968 its annual catch for rockfish had dropped to only a few hundred metric tons. Also in 1966, the U.S.S.R. caught 24,000 t of Pacific ocean perch and 136,000 t of Pacific whiting (Merluccius productus), initiating the important mothership Pacific whiting fishery. Later, while rockfish catches drastically declined and fishing effort for those stocks ceased, the Pacific whiting catch of the U.S.S.R. increased to a record 231,000 t in 1976 (Nelson et al. 1981). Midwater trawling was prohibited beginning in 1973 to protect depleted rockfish stocks.

During the late 1970s and early 1980s, Japan and the U.S.S.R. were joined by four other countries which participated in the foreign fishery on a smaller scale: the Republic of Korea, Poland, Taiwan, and West Germany.

The first steps toward Americanization of the groundfish fisheries were taken in 1976 when the United States enacted the Magnuson Fishery Conservation Management Act (MFCMA) to conserve U.S. fishery resources and promote development of the U.S. domestic groundfish fishing industry. The Act established the fishery conservation zone, extending jurisdiction from U.S. coastlines seaward to 200 miles. In 1978, U.S. fishing vessels initiated joint venture fishing, delivering their Pacific whiting catch to Soviet processor vessels in the Washington-Oregon-California region. When red king crab catches dwindled in the early 1980s, many U.S. crab fishermen turned to joint venture groundfish fishing (Marasco and Aron 1991). During the 1980s, joint venture fishieries developed between the United States and 11 foreign nations and by 1987 virtually displaced foreign-directed fishing.

In the late 1980s, capital investment in Alaskan fisheries increased domestic harvesting and processing capabilities. As a result, domestic fisheries began to displace joint venture operations. U.S. groundfish catches rose dramatically, with over a 100-fold increase in the Bering Sea from 14,000 t in 1981 to 1.7 million t in 1990, and an almost 50-fold increase in the Gulf of Alaska from 4,500 t to 244,400 t (Table 2). Meanwhile, domestic catch totals from the Washington-Oregon-California region remained constant at about 100,000 t over the same 10-year period, with rockfish, flatfish, and sablefish being the most important species by weight. At the end of 1990, Pacific whiting, the primary species harvested by the joint venture fishery, had yet to develop widespread markets in the United States.

OBSERVER SAMPLING PROCEDURES

The sampling procedures used by observers in 1990 on domestic vessels were similar to those used in foreign and joint venture fisheries and have been described previously by Nelson et al. (1981) and French et al. (1981). While on vessels using trawl gear, observers determined the species composition of the catch by taking representative basket samples of selected hauls. Individuals of each species in the samples were then counted and weighed. If the catch was composed of a high percentage of one species, the observer often determined the composition of the entire haul by separating, counting, and weighing all nontarget species. The weight of the target species catch was calculated by subtracting the weight of the other species from the total haul weight. The numbers of the target species were obtained by dividing the total weight of the species catch by the average weight per fish, determined from a sample of the catch. Observers aboard vessels using longline or pot gear determined the species composition by sampling several pots or sections of the longline, then expanded the sampling results to the entire number of pots or hooks in the set.

For those species for which additional biological information was desired, observers measured length frequencies from random samples and collected otoliths or scales from subsamples stratified by length and sex. They also recorded the incidental catch by number and weight of four species groups that cannot be retained due to U.S. regulations. These designated "prohibited species" are Pacific salmon, Pacific halibut, snow (Tanner) crabs, and king crabs. The weight of the fifth prohibited species, Pacific herring, was determined through species composition sampling. Observers also collected data on the sightings and incidental catch of marine mammals, the design and dimensions of fishing gear, and methods of fish processing. Some observers conducted additional special studies.

OBSERVER COVERAGE OF FISHING FLEETS

Observer coverage requirements of domestic fishing vessels were dependent on length overall (LOA), which is the horizontal distance, rounded to the nearest foot, between the foremost part of the bow and the aftermost part of the stern. Domestic fishing vessels and motherships 125 feet LOA or greater required an observer at all times when fishing for groundfish. Vessels between 60 feet and 125 feet LOA required observer coverage 30% of the time while engaged in groundfish fishing each quarter of the fishing year. Coverage was suspended if the vessel fished less than 10 days in the quarter. Vessels less than 60 feet LOA required no observer coverage unless so requested by the National Marine Fisheries Service (NMFS) Regional Director. Vessels delivering unsorted catch to motherships were exempt from coverage requirements. For the purposes of the coverage requirements, the first fishing day of a trip was defined to be the first day gear was fished or set, and every succeeding day was counted until the vessel returned to port.

Required observer coverage of the processing plants and floating processors was based on annual production. Plants processing 10,000 t or more of groundfish required that an observer be present each day the plant received or processed groundfish, between 1,000 and 10,000 t required coverage of 30% of the processing days, and less than 1,000 t did not require any coverage. Additionally, the NMFS Regional Director had the authority to alter these requirements if warranted by special circumstances. For example, participants in the Port Moller Pacific cod trawl fishery were required to have 100% observer coverage, regardless of their vessel size or length of stay in the fishery. Waivers to these requirements were sought throughout the year on a case-by-case basis, but were rarely granted.

A comparison of coverage days reported by observers to fishing days reported by vessels shows a coverage level of 96.4% for fishing vessels greater than 125 feet LOA, 38.5% for fishing vessels between 60 and 125 feet LOA (Table 3), and 97.2% for motherships. Overall, coverage was 60.9%. Data on the number of fishing days within the domestic groundfish fleet in Alaska were obtained from vessel and processor logbooks which participants in the fishery are required to keep and submit to the NMFS. Because the 1990 logbooks recorded only fishing days instead of vessel trip days, the vessel trip days given in Table 3 are underestimated and the rate of observer coverage is overestimated.

Contractors for the Alaska Fisheries Science Center placed 441 observers aboard vessels and at processing plants which participated in domestic groundfish fisheries in 1990. Among the

vessels whose catches were sampled were 71 catcher/processor trawl vessels, 116 catcher-only trawl vessels, 31 catcher/processor longline vessels, 78 catcher-only longline vessels, 8 catcher/processor pot vessels, and 12 catcher-only pot vessels. Observers were also placed aboard 5 motherships which processed unsorted catches, and aboard 12 vessels and at 23 processing plants which accepted sorted catches.

METHODS OF CALCULATION

Estimates of Domestic Groundfish Catches

In the Bering Sea and Aleutian Islands and Gulf of Alaska regions, estimates of U.S. domestic groundfish catches were based on groundfish reports submitted by processing operations. On a weekly basis, catcher/processor vessels, motherships, shoreside processing plants, and floating processor vessels were required to submit reports containing product weights and discard estimates of all allocated fish species or species groups to the NMFS Regional Office in Juneau, Alaska. Standard recovery rates were then applied by product type to estimate round weights of retained groundfish catch by species and species group. These amounts were then combined with the reported discard amounts to provide total groundfish catch. For catcher/processor vessels in the Washington-Oregon-California region, groundfish catches were based on observer estimates of total catch.

Estimates of Domestic Bycatch of Pacific Salmon, Pacific Halibut, Snow (Tanner) Crabs, King Crabs, and Pacific Herring

For Pacific salmon, Pacific halibut, snow (Tanner) crabs, and king crabs, observer data provided an estimate of the mean incidence or the average number of individuals (or kilograms in the case of Pacific halibut) caught per metric ton of groundfish by area, gear type, and target. Estimates of the entire catch of the prohibited species were then made by applying these observed bycatch rates to processor groundfish catch reports by area, gear type, and target fishery. For crab species, regulations required monitoring of only C. bairdi and red king crab. For "other" snow crabs, which include C. opilio, C. angulatus, C. tanneri, and the C. bairdiXC. opilio hybrid; and "other" king crabs, which include blue (Paralithodes platypus), golden (Lithodes aequispina), and couesi (L. couesi) king crabs, post-season estimates were made using the same method described above. Processing operations provided estimates of Pacific herring catches in the weekly groundfish reports.

Target Fisheries

In 1990, target fisheries were defined using the criteria given in Table 4. Both the reported catches of groundfish and bycatch rates were stratified by these target fisheries, along with gear types and areas, to estimate prohibited species catches. These estimates were used to monitor fisheries on which prohibited species bycatch limits were in effect (discussed later in the Restrictions section of this report). It should be noted that vessel and observer groundfish reports designated as "other species" fisheries generally had either large catches of Pacific cod or else had large catches of walleye pollock but had a bycatch of Pacific cod exceeding 5% of the total retained catch.

Target criteria used for tables in this report providing bycatch rates, average weight information, and plots providing relative bycatch rates are somewhat different than criteria given in Table 4. Because data were not reported as to whether catches by species were retained or discarded, calculations were based on total catches rather than on retained catches. Targets were also assigned on a haul-by-haul rather than weekly basis. Rates in the walleye pollock fishery were calculated on gear type rather than on composition of catch. Additionally, a number of trawl fisheries were combined to simplify reporting. These fisheries were Greenland turbot (Reinhardtius hippoglossoides), sablefish, rockfish, Atka mackerel, and "other species" fisheries. For longliners, sets consisting of at least 20% sablefish were classified as "sablefish", or, failing that criteria, were targeted as "Pacific cod" for sets consisting of at least 20% Pacific cod. The remaining longline sets were designated as the "other species" fisheries. Fishing activities of pot vessels were not divided into specific target fisheries. These vessels harvested primarily Pacific cod, though a number of operations were observed that concentrated on sablefish.

Estimates of Rockfish and Flatfish Catch by Species

In 1990, specific catch allocations were set for yellowfin sole, rock sole (Lepidopsetta bilineata), and Greenland turbot in the Bering Sea and Aleutian Islands region and arrowtooth flounder (Atheresthes stomias) in the Gulf of Alaska region; thus, catch estimates for these species were prepared by summing the industry reports for these species. Estimated catches of rockfish species and other species of flatfish were estimated by applying average monthly percent species composition by area and gear type from data collected by observers to vessel-reported rockfish and flatfish catches. It should be noted that even though all observers were trained in species identification and instructed in the use of identification keys, errors in identification of some species could have been made, and any errors would affect individual species estimates, as would identification errors included in vessel-reported catches.

Table 1.--Definition of gear types used in U.S. domestic groundfish fisheries in the Bering Sea and Aleutian Islands, Gulf of Alaska, and Washington-Oregon-California regions in 1990.

Gear type	Definition
Bottom trawl	Trawls containing bobbins, rollers, or chafing gear on the footrope to protect against contact with the seabed.
Pelagic trawl	Trawls on which neither the net nor the trawl doors operates in contact with the seabed and has no protective devices that would make it suitable for fishing in contact with the seabed.
Longline	A stationary, buoyed, and anchored line containing baited hooks.
Pot	A string of individual baited pots.

Table 2.--Estimated groundfish landings (in 1,000s of metric tons) taken in domestic groundfish fisheries by region, 1981-90. Source: PacFIN*.

Species group	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Bering Sea and Aleutians Islands region										
Walleye pollock	0.2	0.2	1.1	7.3	30.8	57.9	215.5	522.6	993.7	1,390.9
Pacific cod	14.1	24.9	42.0	38.7	45.8	34.2	44.7	87.2	123.8	167.5
Sablefish	<0.1	0.2	0.1	1.1	3.4	6.0	7.8	6.6	4.5	4.5
Atka mackerel	0.0	0.0	0.0	0.0	0.0	<0.1	0.1	1.9	18.3	23.3
All rockfish	<0.1	<0.1	<0.1	1.3	0.9	1.1	2.7	2.6	7.3	23.7
Yellowfin sole	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.4	1.7	16.0
Turbots and other flatfish	0.0	<0.1	<0.1	<0.1	0.1	6.6	24.2	31.1	35.4	59.1
Other fish	0.0	0.0	3.3	0.0	0.5	0.2	0.9	0.3	0.3	20.8
Squid	0.0	0.0	0.0	0.0	0.0	<0.1	<0.1	0.2	0.2	0.6
Total	14.4	25.2	46.5	48.4	81.5	106.0	295.9	659.9	1,185.1	1,706.4
Gulf of Alaska region										
Walleye pollock	0.6	2.2	0.1	1.0	15.4	21.3	39.9	55.7	66.6	80.6
Pacific cod	1.1	2.2	4.2	3.2	3.0	8.0	29.5	30.9	41.7	70.8
Sablefish	1.9	2.9	3.8	8.9	11.4	21.7	26.3	31.0	29.8	25.8
All rockfish	0.4	0.3	0.4	1.1	2.7	7.9	12.7	18.4	23.4	24.7
All flounders	0.4	0.3	0.4	0.4	0.5	1.5	2.7	7.0	5.2	34.7
Other fish	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.3	0.6	0.5	7.8
Unspecified groundfish	<0.1	<0.1	<0.1	<0.1	0.0	<0.1	<0.1	0.3	<0.1	0.0
Total	4.5	8.0	9.1	14.8	33.2	61.0	111.4	143.8	167.4	244.4
Washington-Oregon-California region										
Pacific whiting	0.8	1.0	1.1	2.7	3.9	3.5	4.8	6.9	7.4	12.8
Walleye pollock	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Jack mackerel	<0.1	<0.1	<0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pacific cod	1.3	0.9	0.6	0.6	0.4	0.3	2.3	3.3	2.2	1.1
Sablefish	11.4	18.5	14.5	14.1	14.3	13.2	12.7	10.8	10.3	9.1
Lingcod	3.3	3.8	4.1	4.1	3.9	1.9	2.6	2.7	3.6	2.9
Pacific ocean perch	1.4	0.9	1.8	1.6	1.4	1.3	1.0	0.8	1.4	1.0
Other rockfish	57.9	60.6	45.7	38.4	36.2	35.5	39.3	40.1	43.8	42.3
All flounders	25.9	32.6	29.4	27.7	30.5	26.0	28.9	27.0	29.9	27.7
Other fish	0.6	0.4	0.3	0.6	0.6	0.4	0.5	0.5	0.5	0.8
Unspecified groundfish	0.5	0.2	0.2	0.1	0.2	0.1	0.2	0.2	0.1	0.2
Squid	0.0	0.0	<0.1	0.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total	103.2	119.0	97.6	89.9	91.3	82.3	92.3	92.4	99.3	97.8

*Pacific Coast Fisheries Information Network.

Note: 1990 Bering Sea and Aleutian Islands and Gulf of Alaska data provided by NMFS Regional Office, Juneau, AK. Discarded amounts are included in NMFS Regional Office data but not in PacFIN data. All catches include only U.S.-caught and -processed amounts.

Table 3.--Annual summary of vessel fishing trip days and observer coverage days in U.S. domestic groundfish fisheries in the Bering Sea and Aleutian Islands, Gulf of Alaska, and Washington-Oregon-California regions, 1990[a].

Vessel length/type	Vessel fishing trip days[b]	Observer coverage days	Percent coverage
Catcher/processor and catcher vessels 125 feet and longer LOA[c]	19,558	18,856	96.4%
Catcher/processor and catcher vessels between 60 and 125 feet LOA	11,300	4,351	38.5%
Catcher/processor and catcher vessels less than 60 feet LOA	7,695	0	0.0%
Motherships	811	788	97.2%
Total	39,364	23,995	60.9%

[a]Coverage days begin on the first day a vessel sets its fishing gear and end when it returns to port.

[b]Vessel logbooks in 1990 recorded fishing days instead of vessel trip days, thus the percentage of days with observer coverage is overestimated. Vessel fishing days do not include catcher boats that delivered catch to either foreign or domestic motherships.

[c]Length overall (LOA) is the horizontal distance, rounded to the nearest foot, between the foremost part of the bow and the aftermost part of the stern.

Table 4.--Definitions of target fisheries used for inseason management in the Bering Sea and Aleutian Islands and Gulf of Alaska regions in 1990.

Target[1]	Criteria[2] (in descending priority)
Flatfish fishery	
Yellowfin sole/ other flatfish	Sum of flatfish species ≥20%. (Excluding arrowtooth flounder, Greenland turbot, and Pacific halibut in the Bering Sea and Aleutian region and Pacific halibut in the Gulf of Alaska region.)
Non-flatfish fisheries	
Pollock midwater	Pollock ≥95%. (Pelagic trawl only.)
Pollock bottom	Pollock and Pacific cod ≥50% and Pacific cod <5%.
Turbot	Greenland turbot and arrowtooth flounder >20%. (Bering Sea and Aleutian Islands region only.)
Sablefish	Sablefish ≥20%.
Rockfish	All species of rockfish ≥20%.
Other	Pollock and Pacific cod ≥50% and Pacific cod ≥5%.
Akta mackerel	Atka mackerel ≥20%.
Other	Fails to meet any of the above criteria.

[1]Targets were calculated for weekly processor and observer reports for each area fished and gear type used.

[2]Based on retained weight of the species groups in relation to total retained catch.

SUMMARY OF OBSERVER SAMPLING FOR BERING SEA AND ALEUTIAN ISLANDS DOMESTIC GROUNDFISH FISHERIES

Area of Sampling

The area sampled by observers in the eastern Bering Sea lies within the U.S. EEZ off the Alaskan coastline and the Aleutian Islands. In 1990, zones and areas defined by the North Pacific Fishery Management Council (NPFMC) Bering Sea Groundfish Fishery Management Plan (FMP) Amendment 12A were used and are shown in Figure 1. Zones 1, 2, and 3 are regions designated in management plan Amendment 12A protecting crab and Pacific halibut stocks. These three zones are further divided into NPFMC regulatory and reporting areas: Zone 1 = Areas 511, 512, and 516; Zone 2 = Areas 513, 517 (also designated as Zone 2H), and 521; Zone 3 = Areas 514, 515, 522, 530, and 540. No fishing occurred in Area 530, and this area is not included in the tables in this report.

Catch Allocations

The 1990 domestic annual harvest (DAH), which consists of domestic annual processing (DAP--the total amount of groundfish expected to be both caught and processed by U.S. groundfish fisheries) and joint venture processing (JVP--the total amount of groundfish allotted to be caught by U.S vessels and delivered to foreign processing vessels), accounted for the entire 2 million t allowed to be taken within the U.S. EEZ in the Bering Sea and Aleutian Islands region. The domestic fisheries received an initial allocation of 1,495,320 t, the joint venture received an allocation of 252,382 t, and a reserve was set aside of 252,298 t. Releases from reserves and reapportionment from unused joint venture allocations raised the final domestic allocation to 1,866,691 t.

Estimates of Domestic Groundfish Catches

Domestic groundfish vessels caught an estimated 1.7 million t or 91.4% of the final DAP allocation in 1990 (Table 5). A detailed breakdown of the 1990 groundfish catches by month, NPFMC area, gear type, and target fishery is provided in Guttormsen et al. (1992a). Walleye pollock, the major target fishery of the domestic groundfish fleet, accounted for 81.5% or 1,390,891 t of this amount. For walleye pollock, 100.7% of the allocation was caught, and 8.5% of the total catch was discarded. Pacific cod accounted for 167,459 t or 9.8% of the total groundfish catch. For Pacific cod, 87.3% of the allocation was caught, and 7.0% of the total catch was discarded. The remaining 11 species or species groups accounted for 8.7% of the total catch. None of the 11 individually accounted for more than 1.4% of the total

groundfish catch. Percentage of the DAP caught varied widely for the remaining 11 species and species groups, ranging from 15.0% for yellowfin sole to 127.2% for Greenland turbot. Reported discarded amounts were similarly variable, ranging from 0.7% of the sablefish catch to 94.2% of the "other" fish category. Overall, 11.6% of the allocated groundfish caught in 1990 were reported to be discarded.

The distribution of domestic groundfish catch is presented by NPFMC area in Figure 2. The largest amount of groundfish was caught in Area 521 (692,100 t or 41% of the total catch). The groundfish catch in other areas was 333,400 t (or 20%) in Area 515, 230,200 t (or 13%) in Area 517, 134,200 (or 8%) in Area 540, 118,100 t (or 7%) in Area 513, 104,100 t (or 6%) in Area 511, 66,400 t (or 4%) in Area 522, 15,400 t (or 1%) in Area 514, 11,900 t (or 1%) in Area 516, and 700 t (or less than 1%) in Area 512.

Restrictions

Previous emergency regulations that created the Port Moller restricted area established a limit on the number of red king crab taken as bycatch by groundfish fisheries, and required a certain percentage of observer coverage to be carried over into Amendment 12A, thus trawling was still prohibited in the area between long. 160°W and 162°W and south of lat. 58°N and the southern portion of this area is reserved for a controlled domestic trawl fishery for Pacific cod. In 1989, the NPFMC Bering Sea Groundfish FMP Amendment 12A was enacted as a follow-up to Amendment 10 to control the bycatch of red king crab and Chionocetes bairdi during yellowfin sole and other flatfish fisheries and to protect the stocks of these two crab species from further decline. Amendment 12A also designated zones which could be closed to a fishery whenever specified bycatch limits were attained (Fig. 1), and established limits on the bycatch of Pacific halibut in trawl fisheries. Pacific halibut bycatch is accumulated over the entire Bering Sea region; attainment of the primary quota closes Zones 1 and 2H, while attainment of the secondary quota closes the entire Bering Sea and Aleutian Islands region.

In 1990, the U.S. domestic flatfish trawl fishery received bycatch limits of 138,600 red king crab in Zone 1, 529,600 C. bairdi in Zone 1, and 1,100,000 C. bairdi in Zone 2. For Pacific halibut, the flatfish fishery received a primary quota of 467 t and a secondary quota of 567 t. Domestic trawl vessels targeting on non-flatfish species received a limit of 11,400 red king crab in Zone 1, 260,400 C. bairdi in Zone 1, and 890,000 C. bairdi in Zone 2. For Pacific halibut, the non-flatfish fishery received a primary quota of 3,273 t and a secondary quota

of 3,966 t. No bycatch limits were set for longline or pot fishery vessels in 1990.

All prohibited species zone closures in the 1990 Bering Sea domestic groundfish fisheries occurred due to attainment of Pacific halibut quotas. Attainment of the primary and secondary Pacific halibut quotas closed flatfish fishing in Zones 1 and 2H on March 14 and on November 16 for the remainder of the Bering Sea. Attainment of the primary and secondary Pacific halibut quotas restricted non-flatfish fisheries to the use of pelagic trawl gear as of May 30 in Zones 1 and 2H and as of June 30 for the rest of the Bering Sea.

Summary of Data Collected

In the Bering Sea and Aleutians Islands region, observers sampled 23,169 trawl hauls, 4,797 longline sets, and 737 pot sets for groundfish composition and prohibited species incidence. Among biological data collected by observers in 1990 were 621,190 lengths and age structures from 23,771 individuals of 12 groundfish species (Table 6). These data and specimens were used by scientists of the Status of Stocks Task at the Alaska Fisheries Science Center for use in determining biomass estimates and year-class strengths, and results are reported in "Stock Assessment and Fishery Evaluation for the Groundfish Resources of the Bering Sea/Aleutian Islands Region as Projected for 1991[1]".

Also, observers collected stomachs from 780 walleye pollock, 565 Pacific cod, 339 arrowtooth flounder, 265 yellowfin sole, 61 flathead sole (Hippoglossoides elassodon), and 51 Pacific halibut and scanned the stomach contents of 1,253 Pacific cod, 150 Alaska plaice (Pleuronectes quadrituberculatus), and 13 rock sole. Results from analyses of these stomach contents were used to provide estimates of predation mortalities of groundfish and crab species and as input for multispecies models.

From prohibited species, observers recorded 38,594 crab carapace lengths and widths, 5,953 Pacific salmon lengths, and 38,561 Pacific halibut lengths. Observers also collected scales from 5,953 Pacific salmon for species verification and age analysis. Condition was recorded for 225,542 Pacific halibut, 218,217 snow crabs, and 12,211 king crabs. Observers also recovered 2 tagged chinook (Oncorhynchus tshawytscha) and 1 tagged chum salmon (O. keta).

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[1]Available from the North Pacific Fishery Management Council, P.O. Box 103136, Anchorage, AK 99510.

Observations of Fishing Gear-Marine Mammal Interactions

Observers monitored 1,224,367 t of groundfish taken in 27,416 trawl hauls and 45,505 t taken in 4,951 longline sets for fishing gear-marine mammal interactions in Bering Sea and Aleutian Islands groundfish fisheries in 1990 (Table 7). Over one-half of the observed interactions, affecting 43 of the 81 animals, were acts of deterrence which occurred mainly to protect the catch from these animals. Of the other animals involved in interactions, 18 animals died from being caught in fishing gear (freshly dead), 15 were decomposed, 3 were caught and released unharmed, 1 was caught but released without the condition being noted, and 1 was caught and released in an injured condition. Thirty-eight Steller sea lions (Eumetopias jubatus) were encountered, 10 of which were freshly dead. Another 13 of these animals were deterred in a single haul and 10 more deterred in a single longline set. Twenty killer whales (Orcinus orca) were deterred, also in a single longline set. Other species encountered were 6 Dall's porpoises (Phocoenoides dalli, 5 freshly dead), 4 walruses (Odobenus rosmarus, none freshly dead), 4 northern fur seals (Callorhinus ursinus, none freshly dead), 1 ribbon seal (Phoca fasciata, freshly dead), 1 harbor seal (Phoca vitulina, freshly dead), and 1 harbor porpoise (Phocoena phocoena, freshly dead). Also, of the 7 marine mammals not identified to species, 5 were decomposed, 1 was dead, and the condition of 1 was unknown.

Observations of Fishing Gear-Sea Bird Interactions

In trawl hauls and longline sets sampled for groundfish species and prohibited species incidence, sea birds were observed in 70 (0.3%) hauls and 247 (5.1%) sets, respectively. Numbers extrapolated from sample weight to haul and set weight yielded 649 birds (627 kg) in sampled trawl hauls and 3,287 sea birds (3,350 kg) in sampled longline sets. Because of the difficulty associated with sea bird indentification, observers recorded all seabird catch as the single category "birds".

Bycatch of Prohibited Species

Pacific Salmon

Bycatch rates of Pacific salmon for trawl vessels by gear type, target fishery, NPFMC area, and month are shown in Table 8. The highest annual rates occurred in Area 511 for hauls using pelagic trawl gear which were classified as target "other species" (0.510 fish/t of groundfish) and walleye pollock (0.122 fish/t). For the "other" fishery, the highest rates occurred in April (0.768 fish/t, all chinook salmon), and July (1.827 fish/t,

all chum salmon). For the walleye pollock fishery, the highest monthly rates occurred from July through October, ranging from 1.453 fish/t to 0.331 fish/t (primarily chum salmon).

Bycatch rates of Pacific salmon in U.S. domestic groundfish catches are plotted by 1/2° latitude and 1° longitude areas by gear type, target fishery, and quarter in Figure 3. Most of the highest rates (greater than 0.5 salmon/t) occurred in pelagic trawl fisheries south of lat. 57°N in Areas 511 and 517 during the third and fourth quarters. In Area 521, where the major portion of the midwater catch was taken, most blocks had rates of zero during the first half of the year and less than 0.1 salmon/t during the second half. In "other species" pelagic trawl fisheries, rates exceeded 0.5 salmon/t during the second quarter in single statistical blocks in Areas 511 and 517. Rates for bottom trawl fisheries generally ranged from 0 to 0.1 salmon/t, with a few exceptions. In flatfish fisheries, a rate of greater than 1.0 salmon/t occurred in a single block along the outer shelf southeast of the Pribilof Islands in Area 517 during the second quarter, and rates of greater than 0.1 and less than 0.5 salmon/t occurred in three blocks in the same area during the first quarter. In the "other" trawl fishery, rates between 0.5 and 1.0 salmon/t occurred in single blocks in Area 522 in the first quarter and in Area 513 in the fourth quarter.

The estimated U.S. domestic bycatch of Pacific salmon in 1990 was 30,501 fish (Table 9). Chinook salmon accounted for 46.2% of this amount (14,085 fish), and "other" salmon (primarily chum salmon) accounted for 53.8% (16,416 fish). By gear type, 43.07% of the chinook salmon were caught with bottom trawl gear, 56.90% were caught with pelagic trawl gear, and 0.03% with longline gear. "Other" salmon were taken primarily with pelagic trawl gear (96.58%)--only 3.22% were caught with bottom trawl gear and 0.21% with longline gear. No Pacific salmon were observed caught with pot gear. By NPFMC area, the largest chinook salmon bycatch was taken in Areas 515 (39.6%) and 517 (35.2%). For "other" salmon, nearly half the bycatch (48.5%) was taken in Area 521.

Bycatch of Pacific salmon by target fishery, zone, and species are presented in Table 10. The walleye pollock fishery (pelagic and bottom gear combined) accounted for 78.9% of the bycatch, taking 90.1% of the Zone 1 bycatch, 76.2% of the Zone 2 bycatch, and 79.4% of the Zone 3 bycatch. However, in terms of rate of occurrence, the highest rate by zone occurred in the walleye pollock midwater fishery in Zone 1 (0.102 fish/t); for all zones combined the highest rate occurred in "other" trawl fisheries (0.031 fish/t).

The species composition, sex composition, average weight, and average length of incidentally caught Pacific salmon are given in Table 11. Chum (53.1%) and chinook salmon (46.2%)

accounted for most of the bycatch, with the remainder made up of coho (O. kisutch; 0.5%), sockeye (O. nerka; 0.1%), pink salmon (O. gorbuscha; 0.1%). Also, 1 steelhead (O. mykiss) was caught in 1990.

Pacific Halibut

Bycatch rates and average weights for Pacific halibut are presented in Table 12. The highest annual rates for trawl gear were observed when bottom trawl gear was used in fisheries for flatfish (rates of 115 kg/t in Area 540 and 70 kg/t in Area 515), and "other species" (rates of 55 kg/t in Area 515 and 36 kg/t in Area 522). The lowest annual rates for these two fisheries were observed in Area 521--1.99 kg/t in the flatfish fishery and 4.12 kg/t in the "other species" fishery. The highest rates in the walleye pollock fishery were 3.51 kg/t in Area 515 with bottom trawl gear and 0.19 in Area 511 with pelagic trawl gear. For longline vessels, the highest annual rates occurred in Area 511 in the "other species" fishery (1,776 kg/t) and the Pacific cod fishery (1,405 kg/t). Rates of over 100 kg/t were also observed in the Pacific cod fishery in Areas 515 (327 kg/t) and 512 (118 kg/t), in the sablefish fishery in Areas 522 (147 kg/t), 515 (123 kg/t), 517 (117 kg/t), and 521 (113 kg/t), and in the "other" fishery in Area 521 (174 kg/t). However, in the Pacific cod fishery in Areas 521 and 522, where the majority of groundfish caught by longline vessels was taken, the lowest annual rates were observed--16 kg/t in Area 522 and 24 kg/t in Area 521, along with a rate of 17 kg/t observed in the "other species" longline fishery in Area 522. For pot fishery vessels, the highest annual rates were observed in Areas 515 (24 kg/t) and 521 (15 kg/t).

The average weight of Pacific halibut caught in the U.S. domestic groundfish fisheries in 1990 was 3.37 kg and the average length was 56.8 cm. Average Pacific halibut bycatch weights were smaller in trawls than in longline or pot sets. The average weight of 4.31 kg/t in Area 512 in the Pacific cod longline fishery, which was the lowest for longline and pot vessels, exceeded all annual average weights for trawl vessels in Areas 511, 512, 513, 514, 515, 516, and 517 with the exception of Area 515 in the "other species" bottom trawl fishery. The smallest average weights were observed in Zone 1 in the flatfish fishery--0.66 kg in Area 516, 0.75 kg in Area 511, and 0.82 in Area 512. The largest average weights were observed in the walleye pollock fishery (with pelagic gear) in Area 540 (29.36 kg), in the "other species" longline fishery in Area 522 (19.31 kg), and in the sablefish longline fishery in Area 540 (15.30 kg).

Pacific halibut incidence rates (kilograms of Pacific halibut per metric ton of groundfish catch) are plotted in 1/2° latitude by 1° longitude blocks by gear type, target fishery, and

quarter in Figure 4. For flatfish and "other" bottom trawl fisheries, most of the blocks over 10 kg/t during the first and second quarters were on the continental shelf in Areas 511, 513, 515, and 517. Most rates were lower than 10 kg/t when those fisheries moved north to Areas 513 and 514 during the third and fourth quarter after Area 517 and Zone 1 were closed to bottom trawling because of Pacific halibut bycatch restrictions. For the pelagic trawl fishery, Pacific halibut incidence rates generally were less than 1.0 kg/t. Most rates were greater than 10 kg/t for the Pacific cod and sablefish longline fisheries along the outer shelf area (Areas 521, 522, 517, and 515) and along the Aleutian chain (Area 540).

The estimated U.S. domestic bycatch of Pacific halibut was 7,345 t in 1990 (Table 13). By contrast, the largest amount by weight of combined foreign and U.S. joint venture totals since the inception of the Magnuson Act was only 4,597 t (Guttormsen et al. 1990), which was taken in 1980. Bottom trawl vessels caught 4,853 t or 66.1% of the total, followed by longliners, which caught 2,131 t or 29.0%. Vessels using pelagic trawl gear (4.62%) and pot vessels (0.29%) accounted for the remaining bycatch.

Due to a lack of information about mortality of Pacific halibut taken incidentally in Bering Sea and Aleutian Islands region in the domestic groundfish fisheries, bycatch in 1990 was managed as total bycatch and not by mortality. However, Williams and Wildebuer (1991) examined Pacific halibut viability data from 8,504 trawls, 3,542 longline sets, and 230 pot sets sampled by observers in 1990, and found that short-term mortality ranged from 74 to 78% for trawls, 13 to 18% for longlines, and 6 to 10% for pots. Based on the results of this analysis, they recommended a 75% mortality rate be used to manage Pacific halibut bycatch for trawl vessels, a 10% mortality rate for pot vessels, and a 16% rate for longline vessels be used. Pacific halibut bycatch for trawl vessels in 1992 was managed by these recommendations.

The bycatch of Pacific halibut by target fishery and NPFMC zone is presented in Table 14. Trawl and longline "other species" fisheries (primarily Pacific cod) took 4,995 t or 68.0% of the total amount of incidentally taken Pacific halibut, with trawl vessels taking 46.2, 40.4, and 47.0% of the bycatch in Zone 1, Zone 2, and Zone 3, respectively, with longline vessels taking 2.0, 42.0, and 12.6% of the bycatch in Zone 1, Zone 2, and Zone 3, respectively. In terms of weight of Pacific halibut per metric ton of groundfish, however, the highest rates occurred in the sablefish longline (80.7 kg/t) and Greenland turbot fisheries (50.9 kg/t).

Snow (Tanner) Crabs

Bycatch rates and average weights for C. bairdi are presented in Table 15. In trawl flatfish fisheries, annual rates of greater than 10 crab/t were observed in Areas 513 (18.801 crab/t) 516 (12.192 crab/t), and 511 (12.059 crab/t). Annual rates exceeding 10 crab/t were also observed for bottom trawl hauls classified as "other" targets in Areas 512 (13.104 crab/t) and 511 (10.254 crab/t). Rates for vessels fishing for walleye walleye pollock using bottom trawl gear targeting on non-flatfish species, however, were low, with the only annual rates greater than 1.0 crab/t occurring for bottom trawlers targeting on walleye pollock in Area 521. For longline fisheries, annual rates by NPFMC area were less than 1 crab/t with the exception of the Pacific cod fishery in Area 512, in which a rate of 3.584 crab/t was observed. Pot fishery vessels showed annual rates of greater than 10 crab/t in five of the seven NPFMC areas observed.

The highest annual bycatch rates for "other" snow crabs occurred in flatfish fisheries (Table 16). "Other" snow crabs were taken at a rates of 93.975 crab/t in Area 513, 24.812 crab/t in Area 515, 23.852 crab/t in Area 521, and 18.696 crab/t in Area 514. The lowest annual rates occurred in NPFMC areas in Zone 1 (0.512 crab/t in Area 511, 0.048 crab/t in Area 516, and 0 crab/t in Area 512. In the walleye pollock fishery, all annual rates were less than 1.0 crab/t except in Area 513 (1.076 crab/t taken with pelagic trawl gear) and Areas 522 and 521 (7.127 and 5.494 crab/t, respectively, taken with bottom trawl gear). In "other" fisheries, there were several rates of greater than 10 crab/t--12.630 crab/t in Area 515 and 10.690 crab/t in Area 513 using bottom trawl gear and 16.713 crab/t in Area 514 using pelagic trawl gear. For longline vessels, annual rates for all target fisheries and NPFMC areas were 1.0 crab/t or less with the exceptions of Area 521 in the sablefish fishery (3.060 crab/t) and Areas 513 and 511 in the Pacific cod fishery (1.029 and 1.008 crab/t, respectively). Annual rates for pot vessels varied widely by NPFMC area. "Other" snow crabs were taken at a rate of 753.898 crab/t in Area 517 and 384.395 crab/t in Area 522, compared with 0 crab/t in Areas 512 and 515.

Bycatch rates of C. bairdi in domestic groundfish catches are shown by 1/2° latitude and 1° longitude statistical areas, gear type, target fishery, and quarter in Figure 5. Generally, the highest rates were observed in bottom trawl fisheries for flatfish and "other species" and in the pot fishery. During the first and second quarters, when bottom trawl fishing for flatfish occurred on the shelf in the southeastern Bering Sea, rates were frequently greater than 10 crab/t and were occasionally greater than 25 crab/t in Area 517, Area 511, and Area 516 just north of the Alaska Peninsula. Also in the first quarter, single blocks having a rate greater than 25 crab/t were located in Area 521 and

Area 515. When Zone 1 and Zone 2H were closed to bottom trawling during the third and fourth quarters, the flatfish fishery relocated primarily to Area 513 and the southwestern portion of Area 514 and rates remained high in Area 514. The "other species" bottom trawl fishery showed similar trends to that of the flatfish bottom trawl fishery. Pelagic trawl bycatch rates were generally less than 1 crab/t along the outer shelf and slope where most of this fishery's catch occurred. The pot fishery during the third quarter caught C. bairdi at rates greater than 25 crab/t in three areas: south of St. Matthew Island, on the outer continental shelf near the Pribilof Islands, and along the Alaska Peninsula.

The bycatch rates of "other" snow crabs species are plotted by 1/2° latitude and 1° longitude statistical areas by gear type, target fishery, and quarter in Figure 6. As in the case of C. bairdi, the highest rates were taken by bottom trawl fisheries for flatfish and "other species" and by the pot fishery. During the first quarter when bottom trawling for flatfish occurred on the shelf southwest of the Pribilof Islands primarily in Area 517 and Zone 1, the highest rates (greater than 25 crab/t) were centered in the northern part of Area 517. In the second quarter, when bottom trawling extended onto the outer continental shelf, "other" snow crabs incidence rates were also greater than 25 crab/t northwest of the Pribilof Islands in Area 521. During the third and fourth quarters, bottom trawling for flatfish relocated to Areas 513 and 514, where most rates were greater than 25 crab/t. The pot fishery in the third quarter, which fished in these areas of concentration of other snow crabs, also had similarly high rates in Areas 517, 513, 514, and 521, and additional high rates south of St. Matthew Island. Unlike the rates of C. bairdi, higher "other" snow crab rates did not occur along the Alaska Peninsula but were distributed farther to the north on the continental shelf.

The estimated U.S. domestic bycatch of C. bairdi in 1990 is presented in Table 17. Bottom trawl vessels caught about 1,554,900 or 86.8% of the estimated 1,792,026 C. bairdi taken in 1990. By NPFMC area, the highest bycatch occurred in Areas 511 (32.7%), 517 (16.8%), and 515 (16.0%).

U.S. domestic groundfish fisheries caught an estimated 3,054,602 "other" snow crabs in 1990 (Table 18). These crabs were primarily C. opilio. Bottom trawl vessels caught about 2,170,900 or 71.1% of the total bycatch. By NPFMC area, the highest bycatch occurred in Areas 513 (34.8% of the total amount caught) and 521 (26.4%). Significant amounts were also caught in Areas 517 (12.9%), 514 (10.9%), and 515 (10.8%).

The bycatch of C. bairdi by target fishery and zone is presented in Table 19. "Other" trawl fisheries (the major component of which is Pacific cod) and yellowfin sole/

"other" flatfish fisheries accounted for 53.6% and 38.4% of the total bycatch. By zone, 42.0% of the bycatch was caught in Zone 1, 38.2% in Zone 2, and 19.7% in Zone 3.

The yellowfin sole/"other" flatfish fishery accounted for 43.3% of the incidentally caught "other" snow crabs (Table 20). A high amount of bycatch also occurred in the walleye pollock fishery (20.4% taken by both gear categories combined), the "other" trawl fishery (19.5%), the pot fishery (8.4%), and the Greenland turbot fishery (7.7%). The pot fishery caught "other" snow crabs at the highest rate (180.4 crab/t). By zone, 74.1% of the bycatch occurred in Zone 2, 22.5% occurred in Zone 3, and 3.4% occurred in Zone 1.

The condition of snow crabs is shown in Table 21. In the pot fishery, 98.4% of the C. bairdiXC. opilio hybrid , 97.3% of the C. bairdi, and 96.3% of the C. opilio crabs were observed to be in excellent condition. Mortality was highest in trawl fisheries, especially for C. angulatus (80.7% dead) and C. tanneri (76.4% dead). These species are most commonly found on the continental slope and are associated with catches of Greenland turbot and sablefish. For other snow crabs, 51.9% of the C. opilio, 37.5% of the C. bairdi, and 29.0% of the C. bairdiXC. opilio hybrids were dead in observed trawl catches. For longline vessels, mortality rates ranged from 6.5% for C. tanneri to 18.8% for C. bairdiXC. opilio hybrid crab.

The species composition, sex composition, average weight, and average carapace width of incidentally caught snow crabs are presented in Table 22. All five species of snow crabs were observed in groundfish catches sampled by observers. Of these crabs, C. opilio (60.0%) and C. bairdi (37.0%) made up the largest portion of the observed crabs caught, with C. angulatus (2.2%), the C. bairdiXC. opilio hybrid (0.6%), and C. tanneri (0.2%) making up the remainder.

King Crabs

The highest annual rates for red king crab occurred in Zone 1 (Areas 511, 512, and 516) and were associated with vessels using bottom trawl and pot gear (Table 23). Flatfish trawl vessels caught red king crab at a rate of 5.758 crab/t in Area 512, 5.179 crab/t in Area 516, and 0.963 crab/t in Area 511. Rates of 12.740 and 2.869 crab/t were observed in Areas 512 and 516, respectively, in "other" fisheries using bottom trawl gear. The highest rates by NPFMC area for the walleye pollock fishery were 0.315 crab/t in Area 516 for catches taken with bottom trawl gear. In the "other" fishery category, a rate of 0.051 crab/t was observed in Area 514 for catches taken with pelagic trawl gear. For longline vessels, the only occurrence of red king crab was observed in the Pacific cod fishery in Area 522 (less than

0.001 crab/t). Pot fishery vessels caught red king crab at a rate of 137.849 crab/t in Area 512. No other annual rate by NPFMC area exceeded 1 crab/t for pot fishery vessels.

Annual bycatch rates of "other" king crabs were much lower than those for red king crab (Table 24). The highest annual rate in the flatfish fishery was 0.726 (in Area 515) and all other rates were less than 0.5 crab/t. The highest rates in the walleye pollock fishery and "other" target fisheries using bottom trawls occurred in Area 540 and were 0.336 and 0.241 crab/t, respectively. The highest annual rate for longline vessels also occurred in Area 540 (0.429 crab/t in the "other" target fishery). The highest rate for vessels using pelagic gear was 0.008 crab/t in "other" fisheries in Area 514. No "other" king crabs were observed taken by pot fishery vessels.

Bycatch rates of red king crab by 1/2° latitude by 1° longitude areas are plotted in Figure 7. For trawl vessels using bottom gear, rates of greater than 1 crab/t occurred inside or near Zone 1 or in the vicinity of the Pribilof Islands. The pot fishery had rates greater than 10 crab/t in Areas 512 and 511 in the third and fourth quarters, respectively.

The bycatch rates of "other" king crabs are given by 1/2° latitude by 1° longitude areas in Figure 8. Only bottom trawl fishing in three isolated blocks caught these crabs at a rate greater than 10 crab/t: in Area 517 during the third quarter in the flatfish fishery; in the eastern portion of Area 540 during the fourth quarter in the walleye pollock bottom trawl fishery; and in the eastern portion of Area 540 in the second quarter of the "other species" bottom trawl fishery. "Other species" bottom trawl fishing in the third quarter caught crabs at an rate of between 1 and 5 crab/t on the outer shelf in the northwest corner of Area 521, southeast of the Pribilof Islands in Area 517, and along the eastern half of the Aleutian Island chain.

Bottom trawl vessels caught about 98,430 of the estimated 107,132 incidentally taken red king crab in 1990 (Table 25). The bycatch of red king crab occurred mostly in Areas 511 and 516, accounting for 91.0% of the total number taken by the U.S. domestic fishery in 1990.

An estimated 25,308 "other" king crabs were taken as bycatch in 1990 (Table 26). Vessels using bottom trawl gear caught about 24,900 or 98.4% of the total bycatch. Over half of the bycatch (52.7%) was taken in Area 540, the Aleutian Islands region.

The estimated bycatch of red king crab by target fishery and NPFMC zone is presented in Table 27. Fisheries for yellowfin sole and other flatfish took an estimated 84,054 crab or 78.5% of the total bycatch. Significant bycatch was observed in "other" fisheries, primarily in the Pacific cod fishery; trawl vessels

caught 9,384 crab or 8.8% of the total bycatch and pot vessels caught 8,262 crab or 7.7%). Pot fishery vessels caught red king crab at an overall rate of 5.83 crab/t. The yellowfin sole/other flatfish fishery was the only other fishery whose rate exceeded 0.05 crab/t, taking red king crab at a rate of 1.31 crab/t.

The bycatch of "other" king crabs occurred primarily in the rockfish fishery (39.7% of the total bycatch) and the Greenland turbot fishery (37.6%) (Table 28). These two fisheries also had the highest overall bycatch rates, with rates of 0.55 crab/t and 0.32 crab/t for the Greenland turbot and rockfish fisheries, respectively.

All red king crab observed for condition in pot sets were in excellent condition (Table 29). In trawl fisheries, condition varied among species. For red king crab and blue king crab, 52.4% and 48.4%, respectively, of the observed crab were in excellent condition. On the other hand, only 28.6% of the golden king crab were in excellent condition.

The species composition, sex composition, average weight, and average carapace length of incidentally caught king crabs are given in Table 30. Of the king crabs sampled by observers in groundfish catches, red king crab were the most common (80.9%), followed in order by golden king crab (17.3%), blue king crab (1.7%), and couesi king crab (0.1%).

Pacific Herring

The bycatch of Pacific herring was 2,943.3 t, occurring at a rate of 1.7 kg/t of groundfish. Bycatch was limited almost exclusively to pelagic trawls targeting on walleye pollock (2,934.7 t). The largest part of the bycatch occurred in Areas 521 (1,193.5 t), 517 (976.9 t), and 515 (545.0 t). Outside of these NPFMC areas, the bycatch was 227.9 t. By month, the largest amounts were taken in August (1,302.3 t) and September (942.4 t). Significant amounts were also taken during October (380.9 t), July (170.6 t), and June (145.2 t). The bycatch during all remaining months was 1.9 t.

Annual bycatch rates of Pacific herring per metric ton of groundfish are shown by 1/2° latitude by 1° longitude areas in Figure 9. Rates exceeding 1.0 kg/t occurred primarily in six concentrations of blocks: southern Area 512 (including southern Areas 511 and 516), northern Area 511 (including northeastern Area 513 and southern Area 514), northwestern Area 521 (and northward into Area 522), eastern Area 514 (including northeastern Area 511), western Area 514 and eastern Area 522 (including northern Area 513, and southeastern Area 517 (including eastern Area 515).

Rockfish Catch by Species

Fourteen species of rockfish were identified by observers in U.S. domestic catches in the Bering Sea and Aleutian Islands region in 1990 (Table 31). The "other rockfish" group refers to the seven species that each made up less than 0.1% of the rockfish catch. In 1990, approximately 23,731 t of rockfish were taken by U.S. domestic groundfish fisheries (Table 32). Over two-thirds of the total rockfish was taken in Area 540 (the Aleutian Islands region). Pacific ocean perch was the major component of the catch in this NPFMC area, accounting for 11,826 t or 73.5% of the 16,082 t of rockfish catch. Other species making up a substantial portion of the catch in Area 540 were rougheye rockfish (S. aleutianus, 1,619 t), northern rockfish (S. polyspinus, 1,235 t), shortspine thornyhead (Sebastolobus altivelis, 550 t), shortraker rockfish (Sebastes borealis, 546 t), and dusky rockfish (S. ciliatus, 260 t). The catch of rockfish in Areas 521 and 515 accounted for 6,838 t of the 7,649 t of rockfish reported outside of Area 540. Pacific ocean perch accounted for 4,520 t or 96.6% of the rockfish catch in Area 521. In Area 515, the predominant catch was Pacific ocean perch (1,469 t), followed in importance by rougheye rockfish (340 t), shortspine thornyhead (117 t), and northern rockfish (115 t).

Flatfish Catch by Species

Eighteen species of flatfish were identified by observers in 1990 (Table 33). The "other flatfish" group refers to seven species that each made up less than 0.1% of the flatfish catch. The catch of flatfish was fairly evenly distributed by NPFMC area, with catches of below 5,000 t only being reported in Areas 512 and 522 (Table 34). In Area 511, in which the highest percentage of the total flatfish catch occurred (21.9%), rock sole was the major species taken (11,483 t). Rock sole also made up over one-half of the flatfish catch in Area 516. Yellowfin sole was the major species taken in Areas 513 (4,046 t) and 514 (9,280 t). In Areas 515 and 540, Greenland turbot and arrowtooth flounder were the major species taken. The flatfish catch in Area 517 was primarily split between flathead sole, rock sole, Greenland turbot, and arrowtooth flounder. In Area 522, Greenland turbot, arrowtooth flounder, flathead sole, and Alaska plaice were the predominant flatfish species caught.

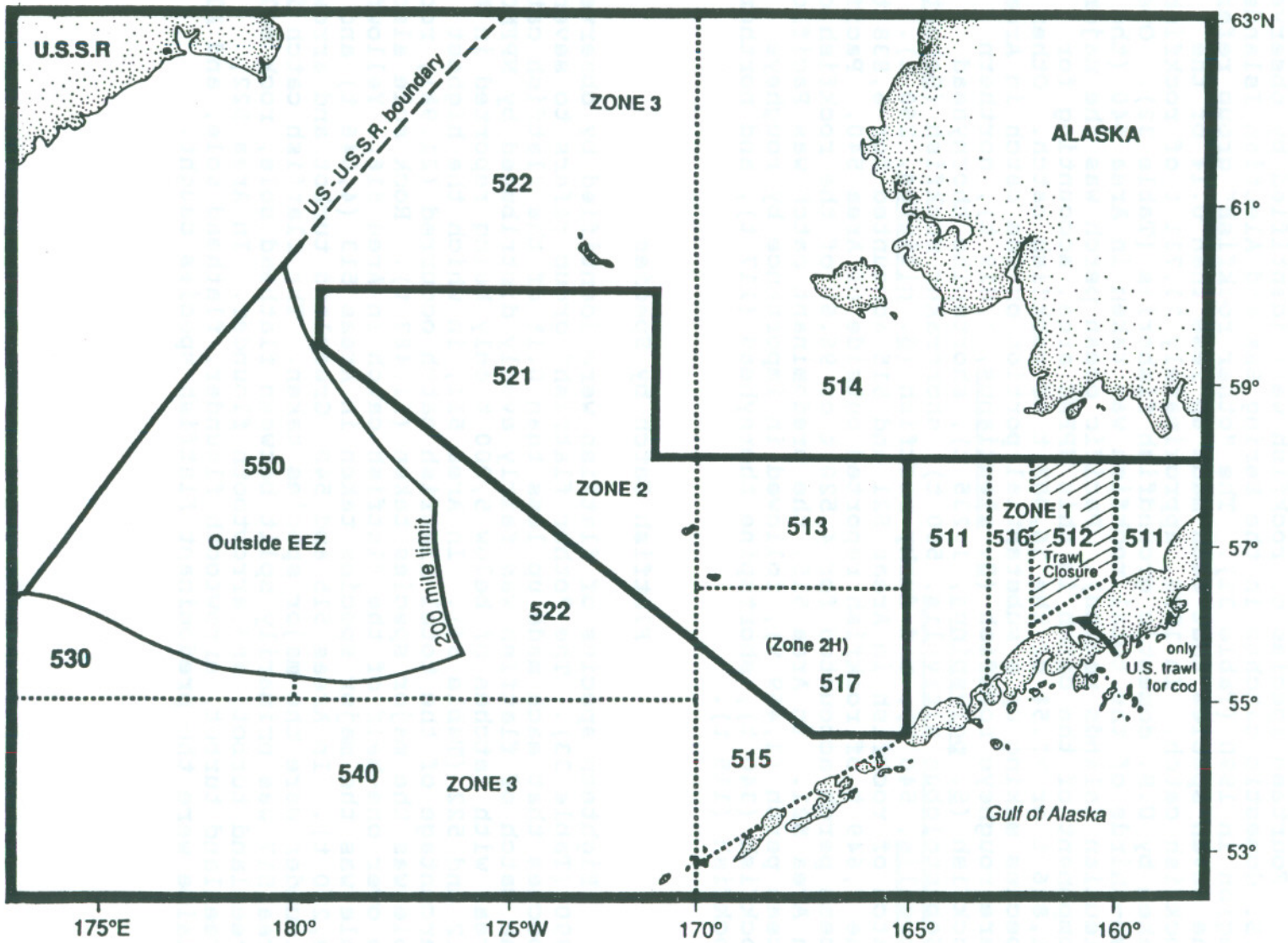


Figure 1.--Bering Sea and Aleutian Islands zones and areas defined by the North Pacific Fisheries Management Council (NPFMC) for use in placing restrictions on the incidental catch of crab and Pacific halibut

Table 5.--Estimated groundfish catches (in metric tons) reported by U.S. processing vessels and plants in the Bering Sea and Aleutian Islands region, 1990.

Species group	Retained catch	Discarded catch	Total catch	Percent by species	Percent discarded	DAP*	Percent caught of DAP
Walleye pollock	1,272,035.1	118,856.1	1,390,891.2	81.51%	8.5%	1,381,642	100.7%
Pacific cod	155,675.3	11,783.2	167,458.5	9.81%	7.0%	191,898	87.3%
Rock sole	12,176.4	11,147.3	23,323.7	1.37%	47.8%	56,867	41.0%
Atka mackerel	20,298.7	3,019.7	23,318.4	1.37%	12.9%	23,500	99.2%
Pacific ocean perch	19,010.1	3,444.9	22,455.0	1.32%	15.3%	22,900	98.1%
Other fish	1,197.4	19,610.6	20,808.0	1.22%	94.2%	25,327	82.2%
Other flounders	2,356.2	14,315.2	16,671.4	0.98%	85.9%	32,380	51.5%
Yellowfin sole	10,093.2	5,908.7	16,001.9	0.94%	36.9%	106,825	15.0%
Arrowtooth flounder	2,033.4	8,159.7	10,193.1	0.60%	80.1%	9,873	103.2%
Greenland turbot	8,169.5	735.5	8,905.0	0.52%	8.3%	6,999	127.2%
Sablefish	4,417.7	32.8	4,450.5	0.26%	0.7%	6,120	72.7%
Other rockfish	966.6	309.6	1,276.2	0.07%	24.3%	1,435	88.9%
Squid	72.3	553.4	625.7	0.04%	88.4%	925	67.6%
Total	1,508,501.9	197,876.7	1,706,378.6		11.6%	1,866,691	91.4%

* Domestic annual processing allowance (DAP) as of 31 December 1990.

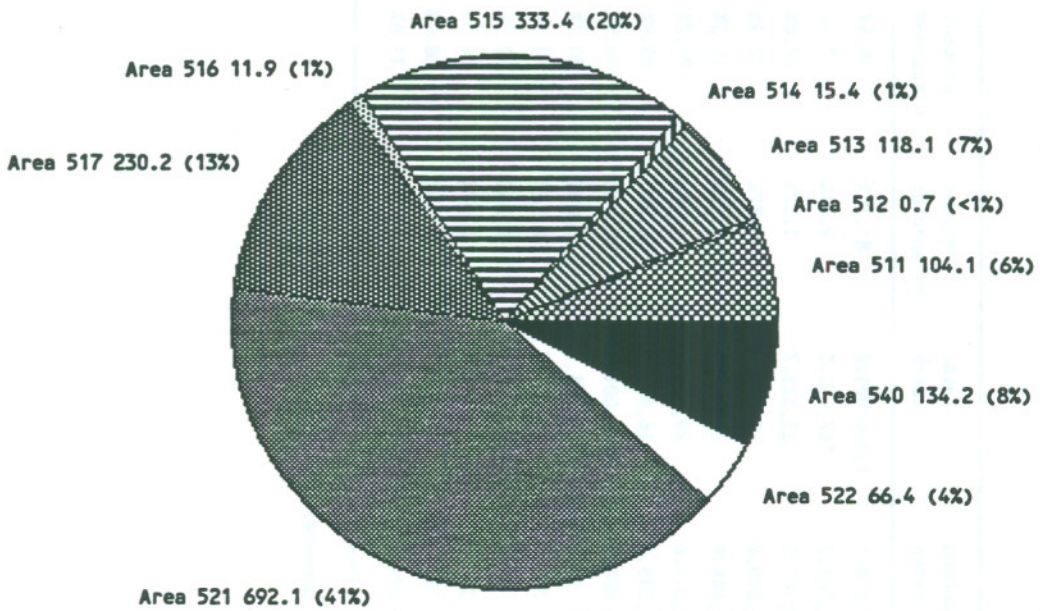


Figure 2.--Total U.S. domestic groundfish catch in thousands of metric tons (% of total catch) in the Bering Sea and Aleutian Islands region by NPFMC area, 1990.

Table 6.--Summary of data collected by U.S. groundfish observers in the Bering Sea and Aleutian Islands region, 1990.

Species	Lengths[1]	Age structures[2]	Condition
Groundfish species			
Walleye pollock	426,793	15,974	--
Pacific cod	170,002	4,641	--
Sablefish	257	167	--
Atka mackerel	208	208	--
Pacific ocean perch	16,064	344	--
Rougheye rockfish	26	--	--
Shortraker rockfish	123	54	--
Shortspine thornyhead	271	--	--
Greenland turbot	173	173	--
Flathead sole	4,771	843	--
Rock sole	1,124	1,075	--
Yellowfin sole	1,378	292	--
Totals	621,190	23,771	--
Prohibited species			
C. bairdi	13,192	--	107,927
C. opilio	24,846	--	101,651
C. angulatus	--	--	6,606
C. tanneri	56	--	1,197
*C. bairdi*X*C. opilio* hybrid	93	--	836
Red king crab	90	--	5,954
Golden king crab	307	--	5,279
Blue king crab	10	--	899
Couesi king crab	--	--	79
Chinook salmon	3,521	3,521	--
Chum salmon	2,247	2,247	--
Silver salmon	163	163	--
Sockeye salmon	15	15	--
Pink salmon	7	7	--
Pacific halibut	38,561	--	225,542
Totals	83,108	5,953	455,970

[1]Fork lengths were collected from fish, carapace widths from snow (Tanner) crabs, and carapace lengths from king crabs.

[2]Otoliths were collected from most groundfish species, and scales were collected from Pacific salmon and Pacific cod.

Table 7.--Observed marine mammal-fishing gear interactions in U.S. domestic groundfish fisheries in the Bering Sea and Aleutian Islands region by gear type, species, and condition of animal, 1990.

Gear type	Species	Condition[1]	Number
Trawl[2]	Steller sea lion	Freshly dead	10
Trawl	Steller sea lion	Decomposed	3
Trawl	Steller sea lion	Unharmed	1
Trawl	Steller sea lion	Deterred	13
Trawl	Steller sea lion	Injured	1
Trawl	Northern fur seal	Decomposed	1
Trawl	Northern sea lion	Unharmed	2
Trawl	Walrus	Decomposed	4
Trawl	Dall's porpoise	Freshly dead	5
Trawl	Dall's porpoise	Decomposed	1
Trawl	Ribbon seal	Freshly dead	1
Trawl	Harbor porpoise	Decomposed	1
Trawl	Harbor seal	Freshly dead	1
Trawl	Unidentified pinniped	Decomposed	2
Trawl	Unidentified whale	Decomposed	3
Trawl	Unidentified dolphin	Freshly dead	1
Trawl	Unidentified dolphin	Unknown	1
Longline[3]	Steller sea lion	Deterred	10
Longline	Killer whale	Deterred	20

[1]"Freshly dead" refers to dead animals not decomposed or shot that were brought onboard or released from fishing gear. "Decomposed" refers to animals obviously dead prior to contact with fishing gear. "Unharmed" refers to animals entrapped by fishing gear but released without apparent injury. "Injured" refers to animals entrapped by fishing gear that were released with an apparent injury. "Unknown" refers to animals entrapped by fishing gear but released before the observer could determine the animal's condition. "Deterred" refers to animals that were not entrapped but were subjected to harrassment such as seal bombs.

[2]Observers sampled 1,224,367 metric tons of groundfish taken in 27,416 trawls.

[3]Observers sampled 45,505 metric tons of groundfish taken in 4,951 longline sets.

Table 8.--Monthly bycatch rates (number of fish per metric ton of catch) and average weight (kg) of Pacific salmon (all species) taken in domestic groundfish fisheries in the Bering Sea and Aleutians Islands region by gear type, target fishery, and NPFMC area, 1990.

	Area 511		Area 512		Area 513		Area 514		Area 515		Area 516		Area 517		Area 521		Area 522		Area 540	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Bottom trawl (flatfish target)																				
Jan.	0.012	3.43	--	--	0.000	0.00	--	--	ns	ns	0.001	1.40	0.082	5.33	0.000	0.00	--	--	--	--
Feb.	0.014	5.18	--	--	0.000	0.00	--	--	ns	ns	0.000	0.00	0.022	3.76	ns	ns	--	--	--	--
Mar.	0.004	7.60	--	--	0.024	9.75	--	--	0.207	3.17	--	--	0.075	4.43	0.054	5.08	0.000	0.00	--	--
Apr.	0.003	6.85	0.000	0.00	0.006	6.10	--	--	--	--	--	--	0.049	4.06	ns	ns	--	--	--	--
May	0.000	0.00	0.000	0.00	--	--	--	--	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--
June	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00
July	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aug.	--	--	--	--	0.000	0.00	0.002	4.23	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	--	--
Sep.	--	--	--	--	0.005	3.20	0.000	0.00	--	--	--	--	0.000	0.00	--	--	ns	ns	--	--
Oct.	--	--	--	--	0.014	6.11	0.001	3.95	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--
Nov.	--	--	--	--	0.004	6.29	0.001	7.50	--	--	--	--	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--
Year	0.011	5.02	0.000	0.00	0.007	6.04	0.001	4.55	0.050	3.17	<0.001	1.40	0.049	4.38	0.025	5.08	0.000	0.00	0.000	0.00
Bottom trawl (pollock target)																				
Jan.	0.011	3.97	--	--	--	--	--	--	ns	ns	0.000	0.00	0.177	5.00	--	--	--	--	ns	ns
Feb.	0.000	0.00	--	--	0.019	2.97	--	--	0.224	3.30	--	--	0.007	4.00	0.000	0.00	--	--	--	--
Mar.	0.004	5.94	--	--	0.003	4.32	--	--	ns	ns	0.000	0.00	0.020	3.90	0.007	4.33	--	--	--	--
Apr.	0.007	4.60	--	--	0.006	10.84	--	--	--	--	--	--	0.003	4.13	0.005	6.01	--	--	0.000	0.00
May	0.000	0.00	--	--	0.000	0.00	--	--	--	--	0.000	0.00	0.009	5.17	0.002	3.54	0.000	0.00	0.000	0.00
June	--	--	--	--	--	--	--	--	0.000	0.00	--	--	--	--	<0.001	2.80	0.000	0.00	0.000	0.00
July	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.008	2.83	0.000	0.00	0.000	0.00
Aug.	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	0.047	1.50	0.000	0.00	0.000	0.00
Sep.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	0.035	5.00	0.000	0.00
Oct.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	0.000	0.00
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	0.000	0.00
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	0.000	0.00
Year	0.005	5.10	--	--	0.005	5.42	--	--	0.008	3.30	0.000	0.00	0.010	4.07	0.005	2.80	0.003	5.00	0.000	0.00

Table 8.--Continued.

	Area 511		Area 512		Area 513		Area 514		Area 515		Area 516		Area 517		Area 521		Area 522		Area 540	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Bottom trawl (other targets)																				
Jan.	0.018	5.37	--	--	--	--	--	--	0.019	3.80	0.000	0.00	0.023	4.10	--	--	--	--	0.000	0.00
Feb.	0.017	6.12	--	--	0.039	6.24	--	--	0.016	3.11	ns	ns	0.020	4.49	--	--	--	--	0.000	0.00
Mar.	0.006	6.43	--	--	0.038	3.91	--	--	0.018	3.19	--	--	0.092	3.70	0.000	0.00	0.064	3.70	0.059	4.04
Apr.	0.013	4.89	--	--	0.016	6.40	--	--	0.042	2.80	--	--	0.026	4.83	0.062	2.99	0.290	3.57	0.013	2.58
May	0.002	3.75	0.000	0.00	0.000	0.00	--	--	0.022	3.91	0.000	0.00	0.008	6.77	0.004	3.58	0.000	0.00	0.003	3.18
June	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--	0.001	3.88	0.000	0.00	0.018	2.34
July	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	<0.001	1.40
Aug.	--	--	--	--	0.000	0.00	--	--	0.007	3.55	--	--	0.002	4.90	0.009	3.20	0.000	0.00	0.001	6.40
Sep.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.136	6.00	0.016	3.73	0.013	3.54	0.003	1.56
Oct.	--	--	--	--	0.000	0.00	--	--	0.014	2.40	--	--	--	--	0.011	4.75	--	--	0.021	2.84
Nov.	--	--	--	--	0.245	6.90	--	--	--	--	--	--	--	--	--	--	--	--	0.012	4.51
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	0.007	3.23	--	--	--	--	0.024	4.59
Year	0.010	5.36	0.000	0.00	0.022	5.10	--	--	0.017	3.10	0.000	0.00	0.046	3.95	0.035	3.09	0.046	3.63	0.011	2.97
Pelagic trawl (pollock target)																				
Jan.	0.020	3.70	--	--	--	--	--	--	0.018	2.01	--	--	0.107	2.89	--	--	--	--	ns	ns
Feb.	0.015	4.58	--	--	0.004	8.10	--	--	0.013	2.37	--	--	0.055	2.86	--	--	--	--	--	--
Mar.	0.007	4.84	--	--	0.004	4.67	--	--	0.004	2.81	0.000	0.00	0.013	4.84	0.009	4.42	--	--	--	--
Apr.	0.003	5.27	--	--	0.003	4.40	--	--	ns	ns	--	--	0.010	3.81	0.002	4.81	0.000	0.00	ns	ns
May	0.000	0.00	ns	ns	0.001	4.25	--	--	0.000	0.00	--	--	0.002	4.00	0.001	5.17	0.000	0.00	--	--
June	0.000	0.00	--	--	0.003	1.85	--	--	0.001	4.60	--	--	0.003	3.40	0.000	3.38	0.000	0.00	--	--
July	1.453	3.15	--	--	0.000	0.00	0.000	0.00	0.005	2.11	--	--	0.094	2.16	0.007	2.00	0.000	0.00	--	--
Aug.	0.614	3.53	--	--	0.006	1.40	0.000	0.00	0.006	2.64	--	--	0.016	2.68	0.030	1.93	0.001	2.63	--	--
Sep.	0.749	2.32	--	--	0.000	0.00	--	--	0.013	2.48	--	--	0.032	3.51	0.009	3.20	0.007	3.72	--	--
Oct.	0.331	2.54	--	--	0.000	0.00	--	--	0.162	1.35	--	--	0.064	2.36	0.009	4.07	0.004	4.47	0.011	3.61
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	0.131	4.00	--	--	0.054	4.31	0.123	0.92
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	0.021	2.67
Year	0.122	3.21	ns	ns	0.003	4.54	0.000	0.00	0.016	2.03	0.000	0.00	0.011	2.80	0.026	2.41	0.002	3.87	0.031	1.72

Table 8.--Continued.

	Area 511		Area 512		Area 513		Area 514		Area 515		Area 516		Area 517		Area 521		Area 522		Area 540	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Pelagic vessels (other targets)																				
Jan.	0.133	2.22	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--	ns	ns
Feb.	0.000	0.00	--	--	--	--	--	--	--	--	--	--	0.029	4.23	--	--	--	--	--	--
Mar.	0.000	0.00	--	--	0.004	7.50	--	--	ns	ns	--	--	0.182	5.90	ns	ns	--	--	--	--
Apr.	0.768	6.80	--	--	0.000	0.00	--	--	ns	ns	--	--	0.088	3.71	0.067	4.14	--	--	ns	ns
May	ns	ns	--	--	0.000	0.00	--	--	ns	ns	--	--	0.003	5.20	0.000	0.00	--	--	ns	ns
June	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	--	--	--	--
July	1.827	3.23	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.002	1.76	--	--	--	--
Aug.	0.000	0.00	--	--	0.000	0.00	--	--	0.022	4.80	--	--	0.080	1.89	0.007	2.69	--	--	--	--
Sep.	0.000	0.00	--	--	0.117	2.06	--	--	0.037	4.76	--	--	0.024	4.07	0.020	4.02	0.003	1.80	--	--
Oct.	0.153	4.06	--	--	0.111	7.00	0.000	0.00	0.009	5.10	--	--	0.038	3.92	0.006	4.25	--	--	0.018	6.00
Nov.	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--	0.029	3.41	0.725	4.61	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.023	3.51	--	--	--	--	ns	ns
Year	0.510	5.40	--	--	0.012	2.99	0.000	0.00	0.011	4.85	--	--	0.037	3.62	0.010	3.62	0.003	1.80	0.018	6.00

Dashes indicate area not fished.

ns = Fishing occurred but no sampling by observer.

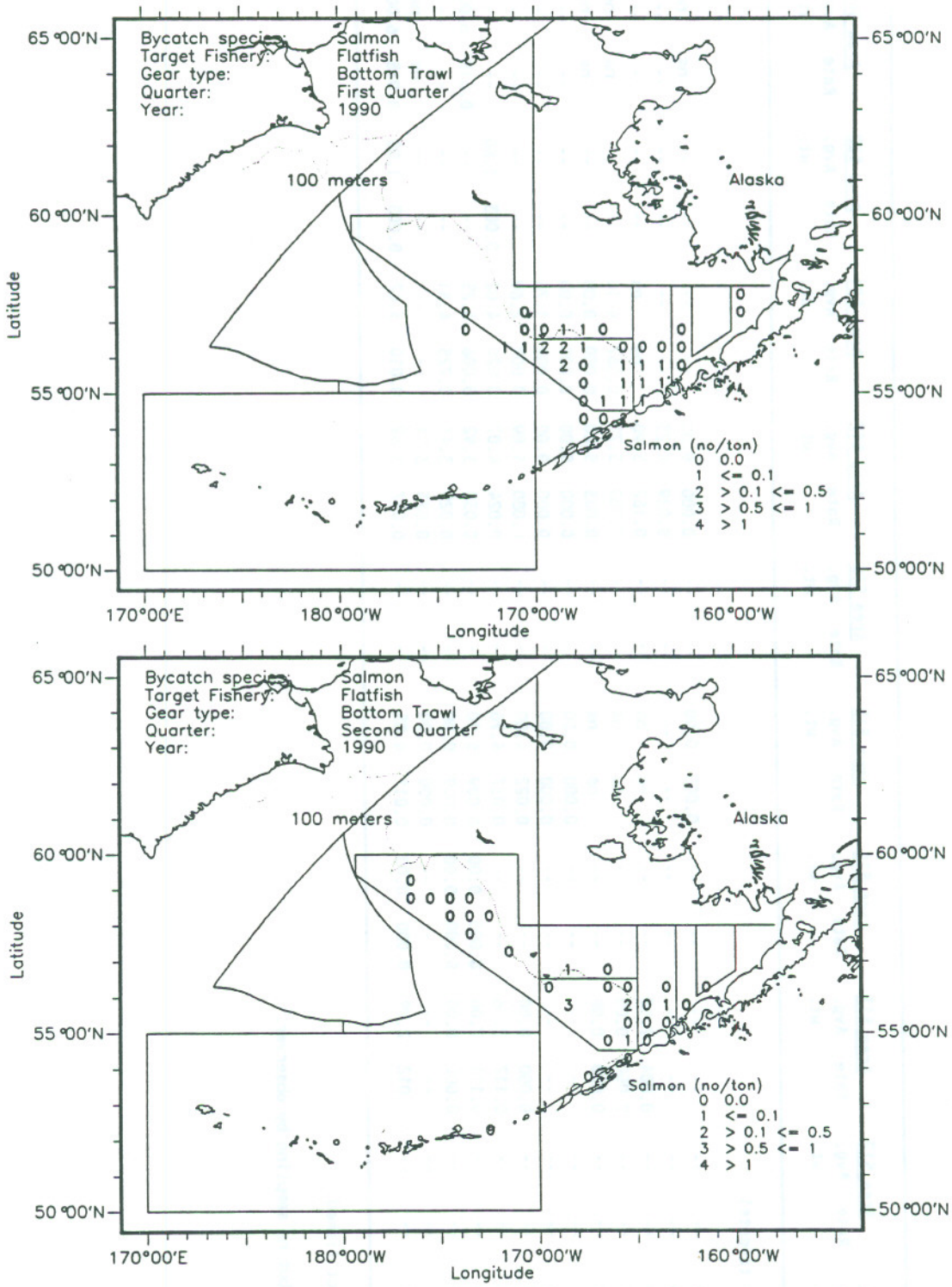


Figure 3.--Average incidence (no./t) of Pacific salmon in the U.S. domestic fisheries by quarter, target fishery, gear type, and 1/2° latitude by 1/2° longitude areas in the Bering Sea/Aleutians Islands region, 1990.

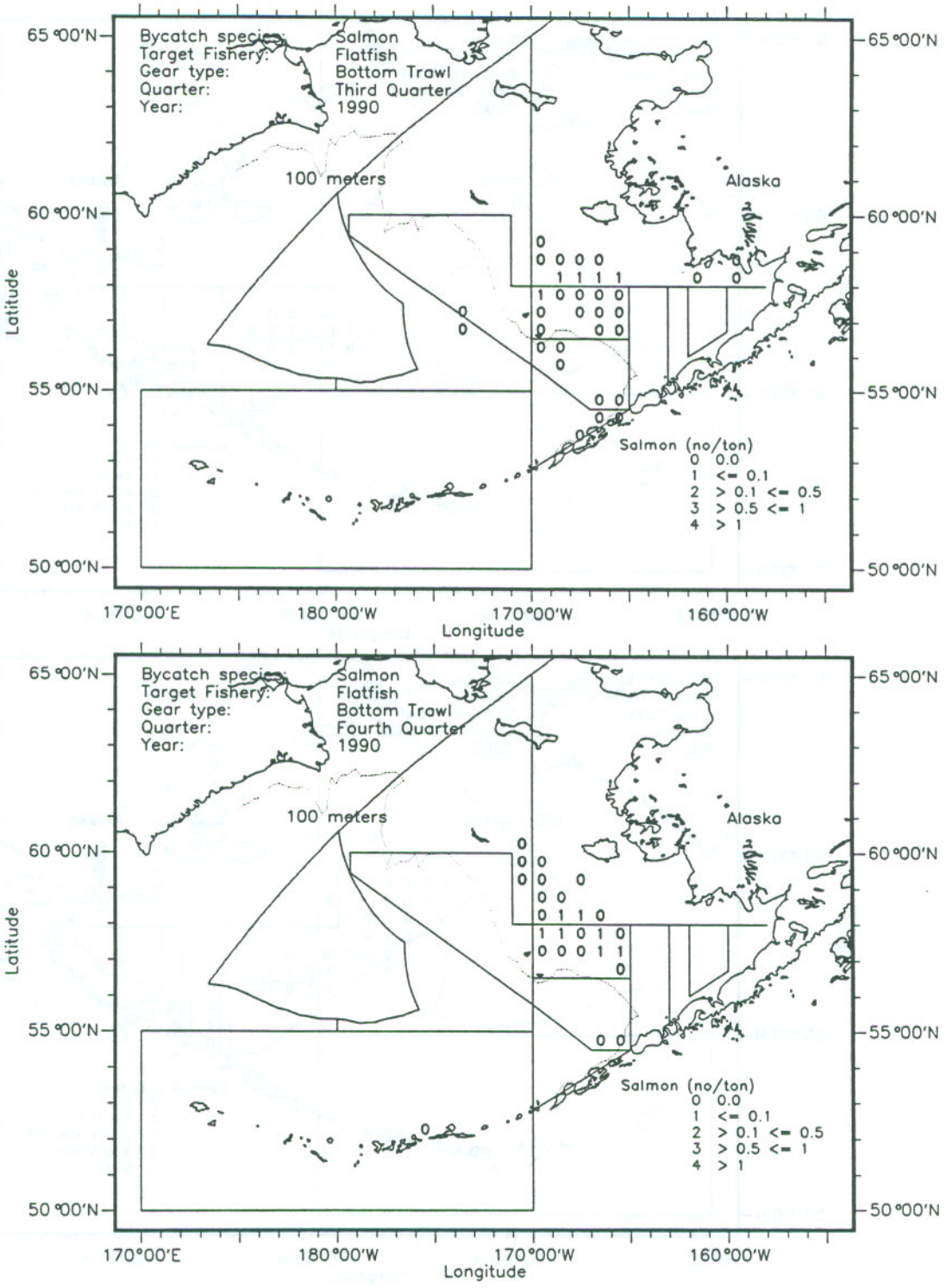


Figure 3.--Continued.

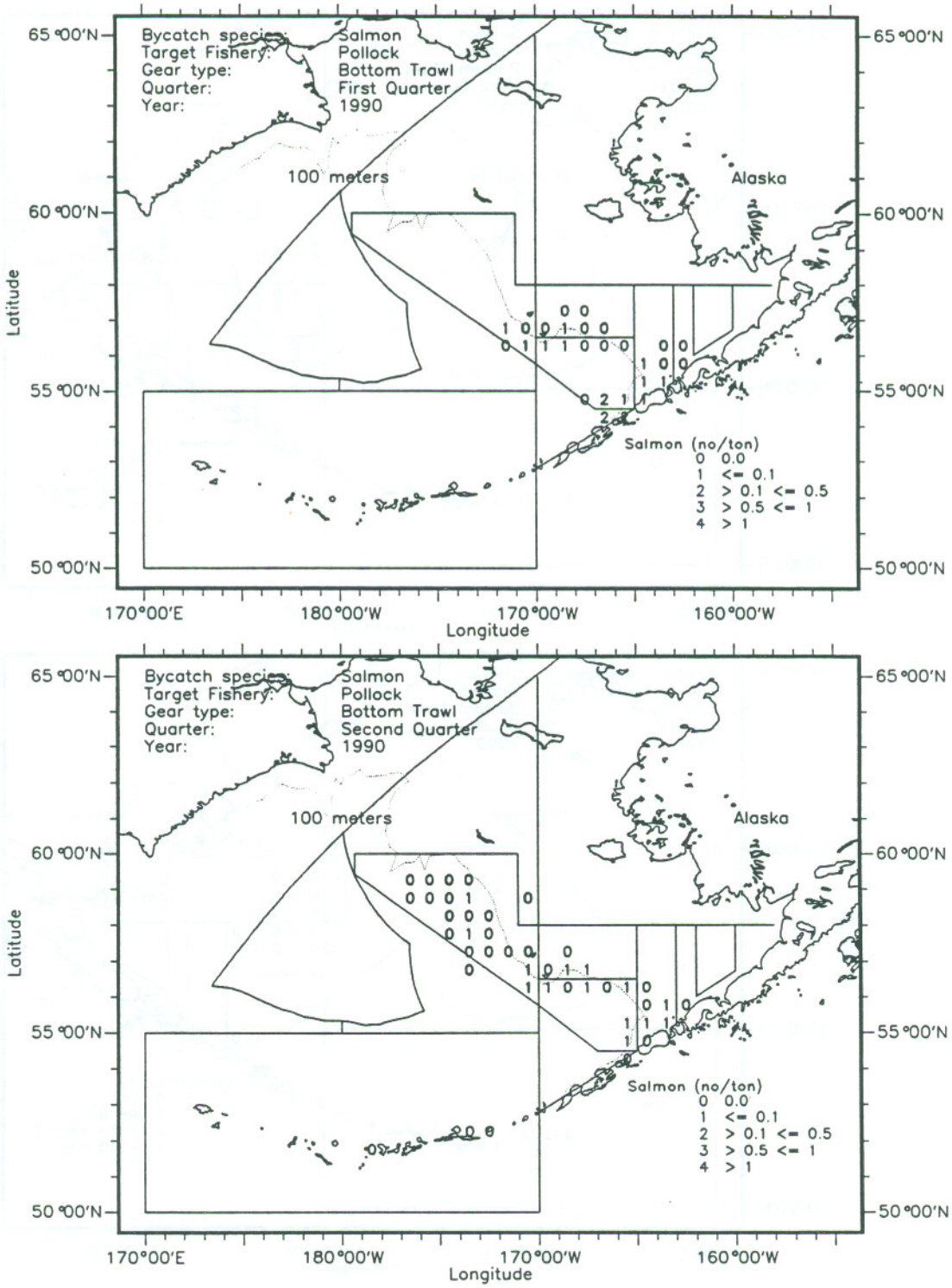


Figure 3.--Continued.

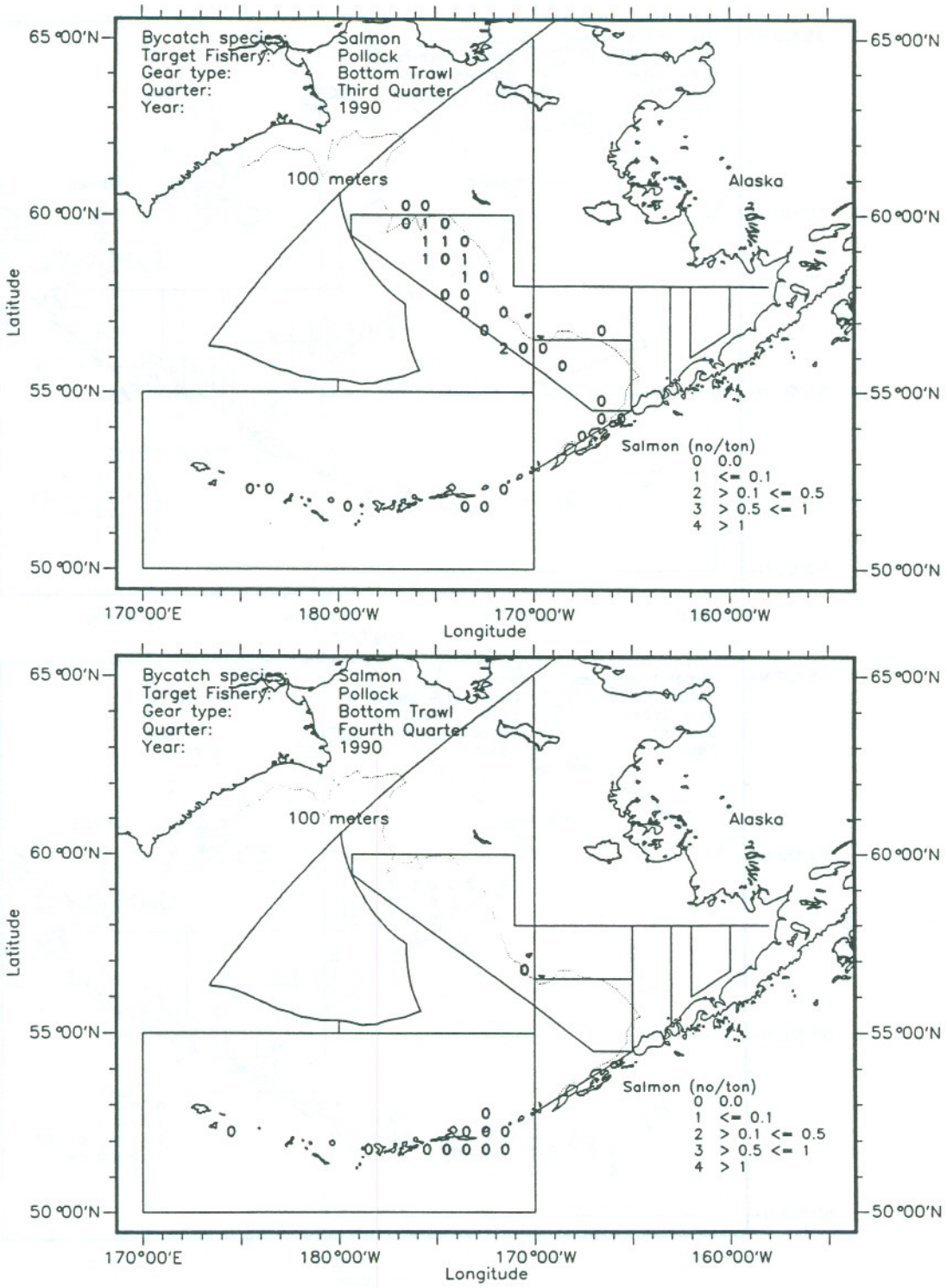


Figure 3.--Continued.

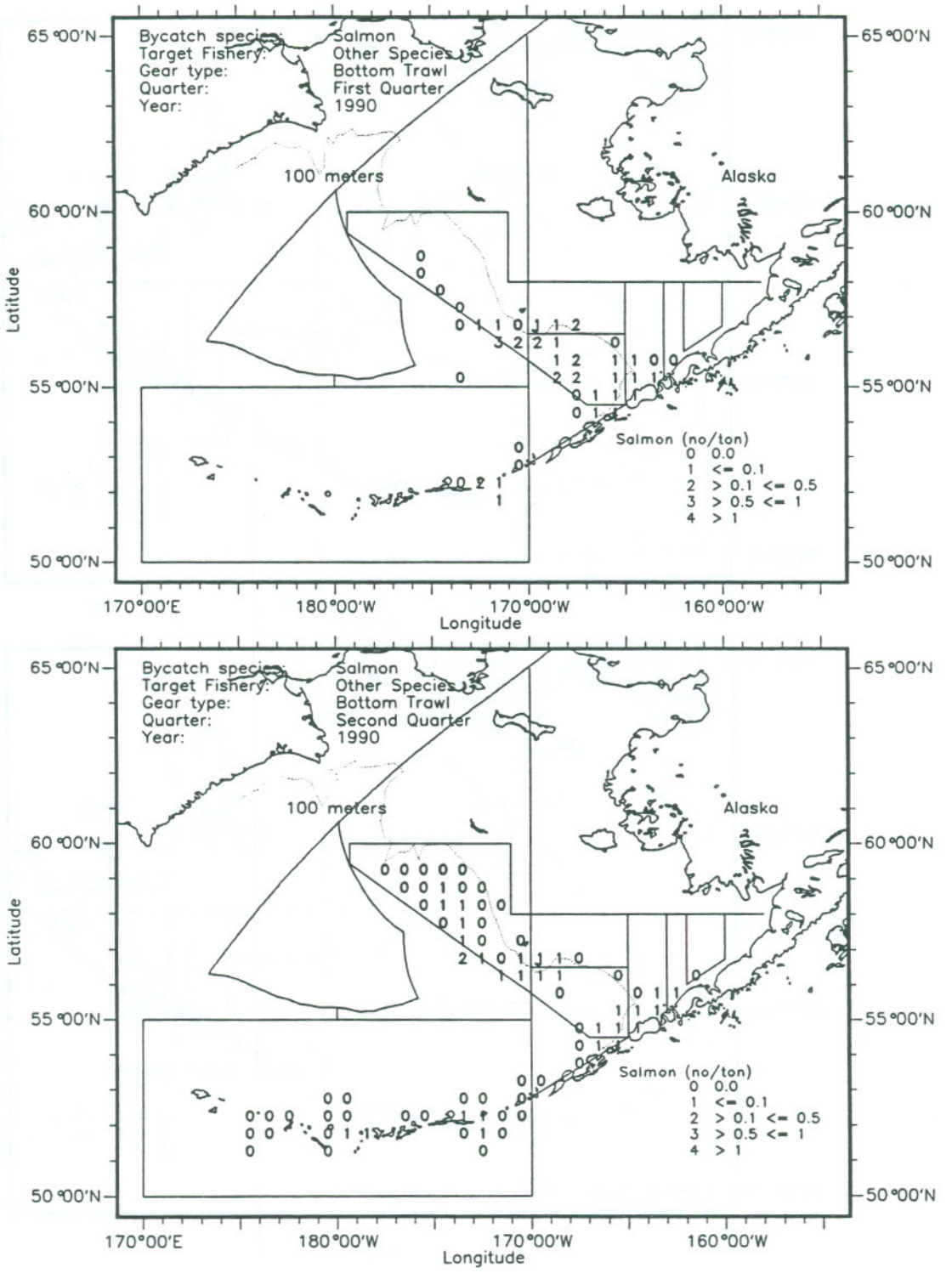


Figure 3.--Continued.

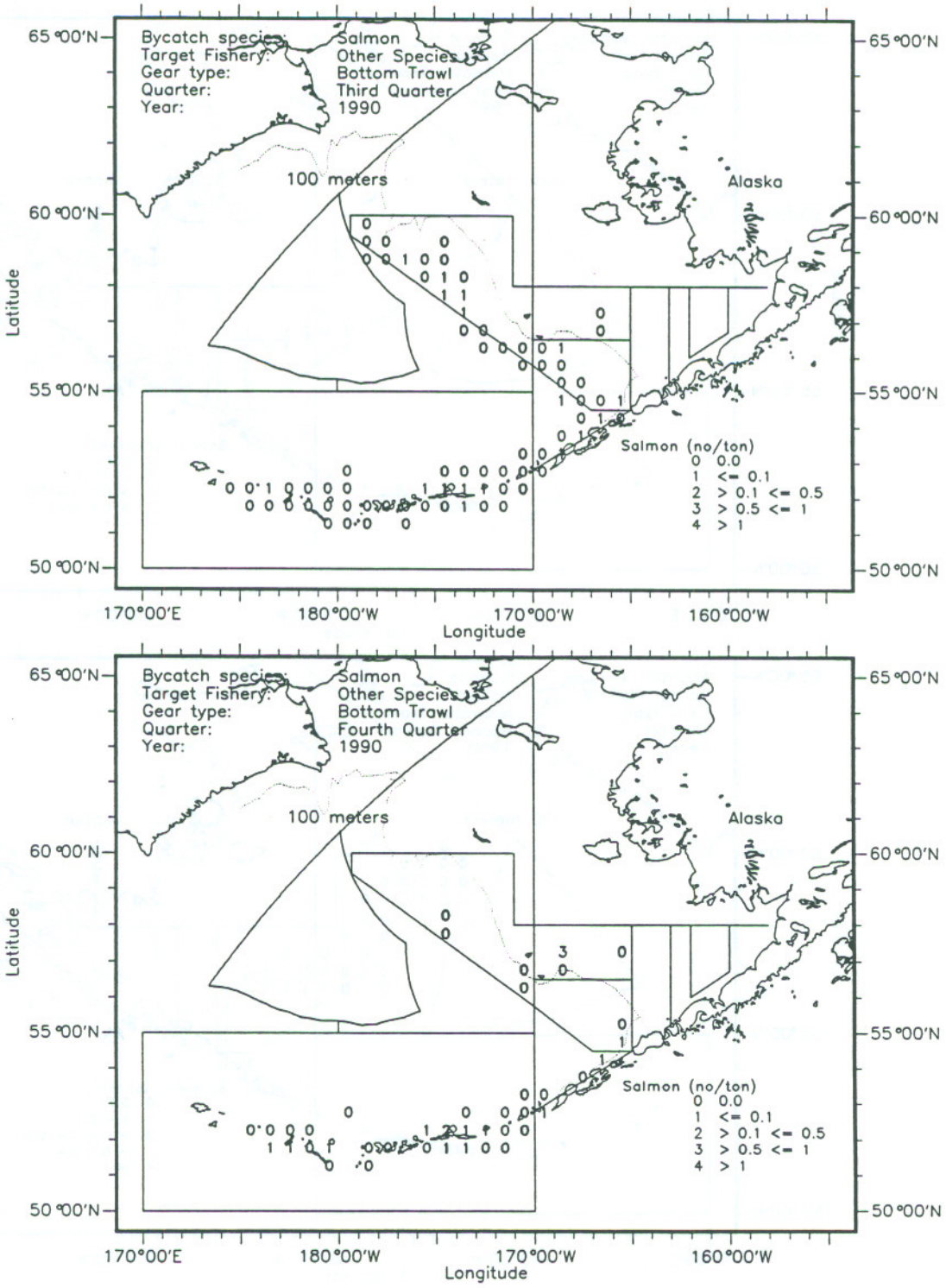


Figure 3.--Continued.

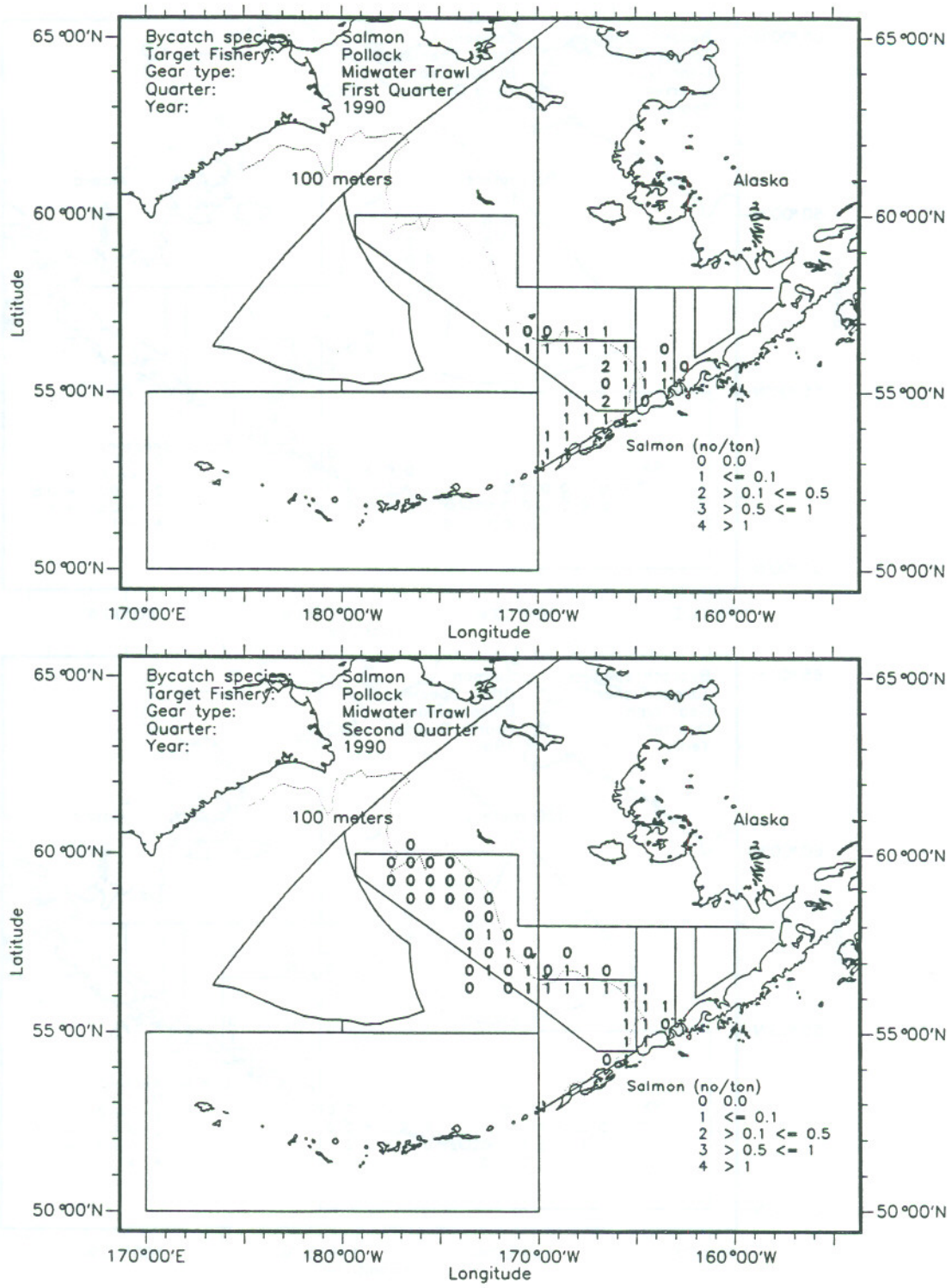


Figure 3.--Continued.

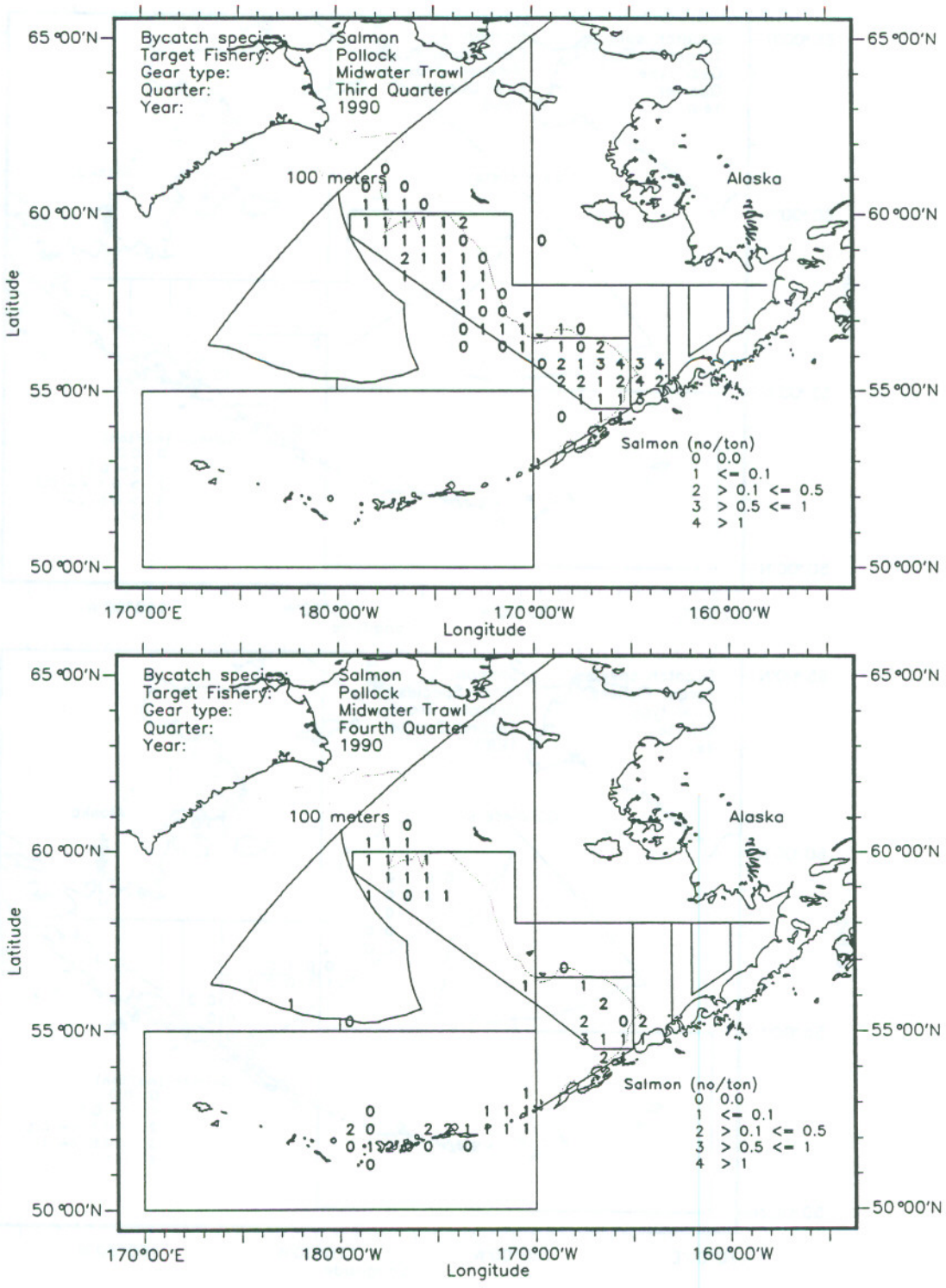


Figure 3.--Continued.

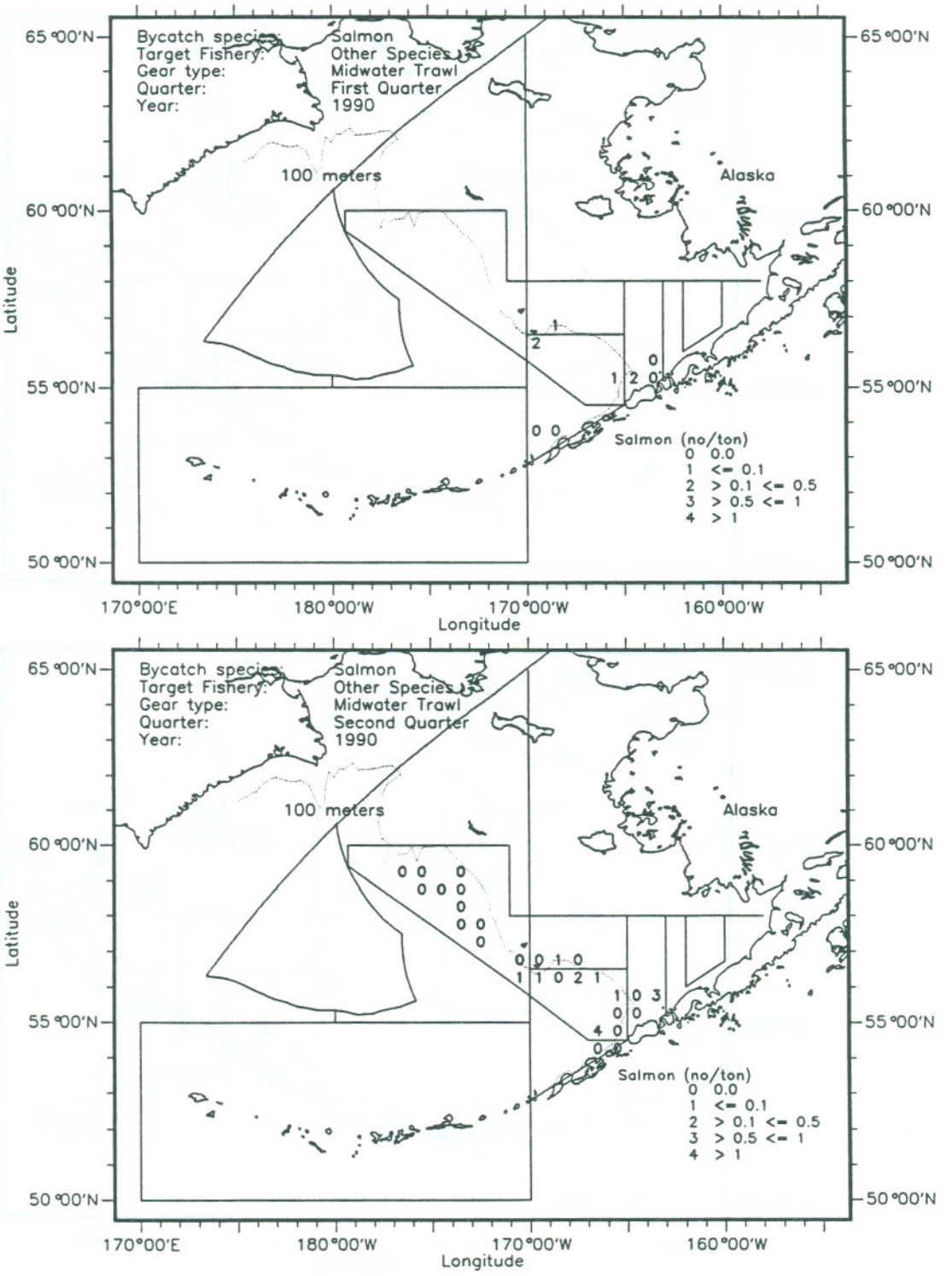


Figure 3.--Continued.

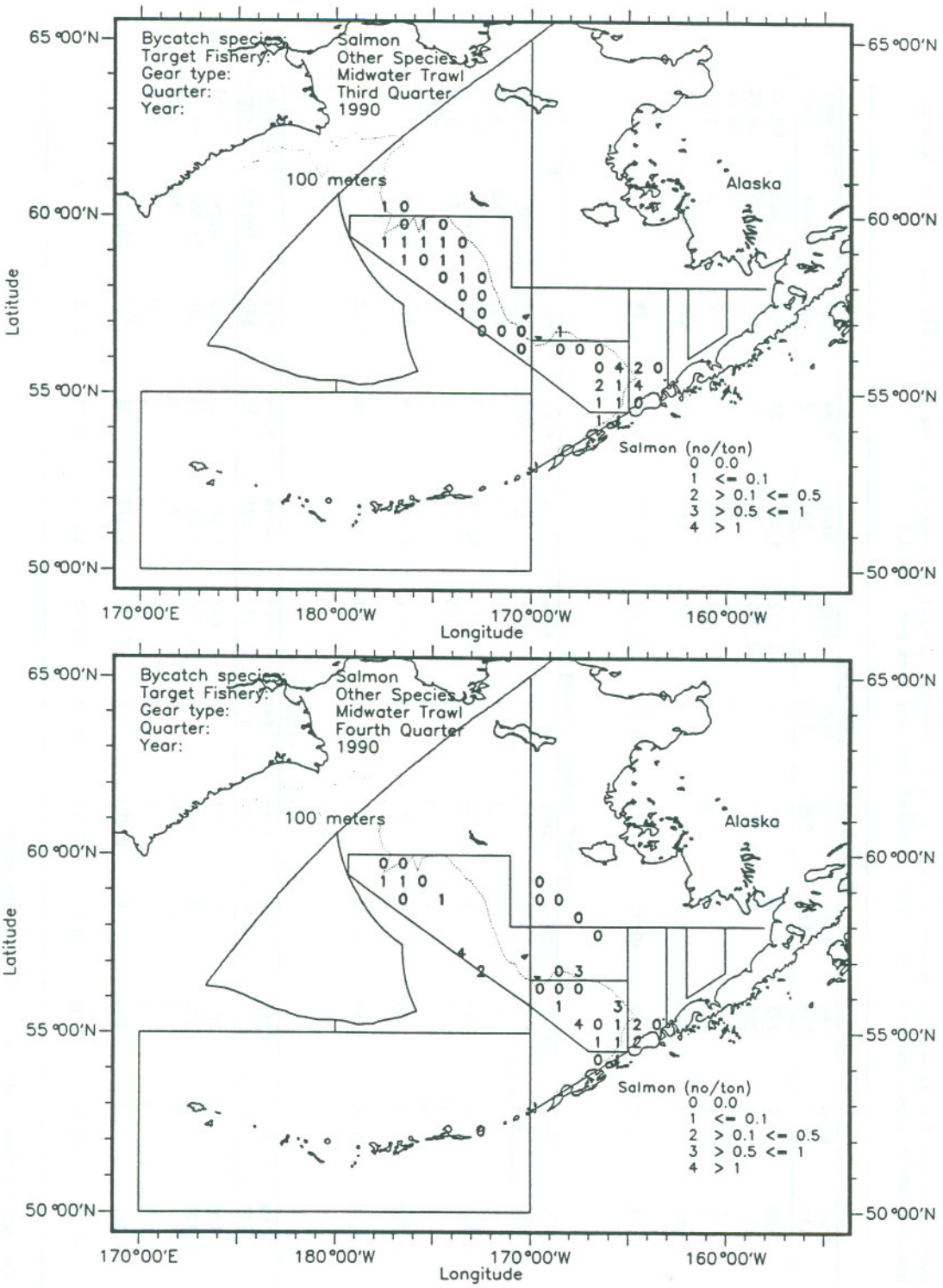


Figure 3.--Continued.

Table 9.--Estimated bycatch of Pacific salmon (by number of fish) by U.S. domestic groundfish vessels in the Bering Sea and Aleutian Islands region by species, NPFMC area, and gear type, 1990. (Dashes indicate area not fished.)

Chinook salmon (numbers)												
Gear type	Area 511	Area 512	Area 513	Area 514	Area 515	Area 516	Area 517	Area 521	Area 522	Area 540	Total	% by gear type
Bottom trawl	400	0	273	9	1,405	6	2,412	1,384	21	156	6,066	43.1%
Pelagic trawl	630	3	269	0	4,172	--	2,535	34	5	367	8,015	56.9%
Longline	0	0	0	--	0	0	4	0	0	0	4	<0.1%
Pot	0	0	0	--	0	0	0	0	0	0	0	0.0%
Total	1,030	3	542	9	5,577	6	4,951	1,418	26	523	14,085	
Percent by area	7.3%	<0.1%	3.8%	<0.1%	39.6%	<0.1%	35.2%	10.1%	0.2%	3.7%		

"Other" salmon* (numbers)												
Gear type	Area 511	Area 512	Area 513	Area 514	Area 515	Area 516	Area 517	Area 521	Area 522	Area 540	Total	% by gear type
Bottom trawl	0	0	12	0	3	0	25	77	4	407	528	3.2%
Pelagic trawl	2,558	3	41	0	2,708	--	2,211	7,861	5	467	15,854	96.6%
Longline	0	0	0	--	0	0	13	21	0	0	34	0.2%
Pot	0	0	0	--	0	0	0	0	0	0	0	0.0%
Total	2,558	3	53	0	2,711	0	2,249	7,959	9	874	16,416	
Percent by area	15.6%	<0.1%	0.3%	<0.1%	16.5%	<0.1%	13.7%	48.5%	0.1%	5.3%		

Total salmon (numbers)												
Gear type	Area 511	Area 512	Area 513	Area 514	Area 515	Area 516	Area 517	Area 521	Area 522	Area 540	Total	% by gear type
Bottom trawl	400	0	285	9	1,408	6	2,437	1,461	25	563	6,594	21.6%
Pelagic trawl	3,188	6	310	0	6,880	--	4,746	7,895	10	834	23,869	78.3%
Longline	0	0	0	--	0	0	17	21	0	0	38	0.1%
Pot	0	0	0	--	0	0	0	0	0	0	0	0.0%
Total	3,588	6	595	9	8,288	6	7,200	9,377	35	1,397	30,501	
Percent by area	11.8%	<0.1%	2.0%	<0.1%	27.2%	<0.1%	23.6%	30.7%	0.1%	4.6%		

*Species in this group include chum, coho, sockeye, and pink salmon.

Table 10.--U.S. domestic groundfish catch (in metric tons (t)) and Pacific salmon bycatch (in numbers) by target fishery, NPFMC zone, and species in the Bering Sea and Aleutians Islands region, 1990.

Fishery	Zone	Groundfish catch	Pacific salmon					
			Chinook salmon	Other salmon	Total salmon	Per t of groundfish	% within zone	% of total salmon catch
Yellowfin sole/ other flatfish (All gears)	1	35,215.6	131	0	131	0.004	3.6%	0.4%
	2	12,124.7	204	12	216	0.018	1.3%	0.7%
	3	17,014.6	9	18	27	0.002	0.3%	0.1%
	Total	64,354.9	344	30	374	0.006	--	1.2%
Pollock midwater (All gears)	1	31,215.3	624	2,552	3,176	0.102	88.2%	10.4%
	2	788,589.8	2,688	9,902	12,590	0.016	73.3%	41.3%
	3	388,334.3	4,524	2,703	7,227	0.019	74.3%	23.7%
	Total	1,208,139.4	7,836	15,157	22,993	0.019	--	75.4%
Pollock bottom (All gears)	1	17,479.8	67	0	67	0.004	1.9%	0.2%
	2	81,997.3	440	58	498	0.006	2.9%	1.6%
	3	19,350.2	110	380	490	0.025	5.0%	1.6%
	Total	118,827.3	617	438	1,055	0.009	--	3.5%
Other (Trawl)	1	31,635.3	217	9	226	0.007	6.3%	0.7%
	2	100,800.4	3,553	220	3,773	0.037	22.0%	12.4%
	3	46,717.9	1,362	168	1,530	0.033	15.7%	5.0%
	Total	179,153.6	5,132	397	5,529	0.031	--	18.1%
Other (Longline)	1	136.8	0	0	0	0.000	0.0%	0.0%
	2	44,879.7	4	34	38	0.001	0.2%	0.1%
	3	5,940.9	0	0	0	0.000	0.0%	0.0%
	Total	50,957.4	4	34	38	0.001	--	0.1%
Other (Pot)	1	542.1	0	0	0	0.000	0.0%	0.0%
	2	511.2	0	0	0	0.000	0.0%	0.0%
	3	364.8	0	0	0	0.000	0.0%	0.0%
	Total	1,418.1	0	0	0	0.000	--	0.0%
Turbot (All gears)	1	71.6	0	0	0	0.000	0.0%	0.0%
	2	3,776.2	0	0	0	0.000	0.0%	0.0%
	3	13,361.9	2	5	7	0.001	0.1%	<0.1%
	Total	17,209.7	2	5	7	<0.001	--	<0.1%
Sablefish (Trawl)	1	nf	nf	nf	nf	nf	nf	nf
	2	352.5	0	0	0	0.000	0.0%	0.0%
	3	110.6	0	0	0	0.000	0.0%	0.0%
	Total	463.1	0	0	0	0.000	--	0.0%
Sablefish (Longline)	1	323.6	0	0	0	0.000	0.0%	0.0%
	2	487.6	0	0	0	0.000	0.0%	0.0%
	3	2,733.1	0	0	0	0.000	0.0%	0.0%
	Total	3,544.3	0	0	0	0.000	--	0.0%
Rockfish (All gears)	1	nf	nf	nf	nf	nf	nf	nf
	2	6,847.4	22	35	57	0.008	0.3%	0.2%
	3	24,655.7	48	120	168	0.007	1.7%	0.6%
	Total	31,503.1	70	155	225	0.007	--	0.7%
Atka mackerel (All gears)	1	nf	nf	nf	nf	nf	nf	nf
	2	nf	nf	nf	nf	nf	nf	nf
	3	30,807.7	80	200	280	0.009	2.9%	0.9%
	Total	30,807.7	80	200	280	0.009	--	0.9%
Total (All gears)	1	116,620.1	1,039	2,561	3,600	0.031	--	11.8%
	2	1,040,366.8	6,911	10,261	17,172	0.017	--	56.3%
	3	549,391.7	6,135	3,594	9,729	0.018	--	31.9%
	Total	1,706,378.6	14,085	16,416	30,501	0.018	--	--

nf = No fishing.

Table 11.--Biological data on the bycatch of Pacific salmon in U.S. domestic groundfish fisheries in the Bering Sea and Aleutian Islands region, 1990.

Species	Percent by species	Sex	Sex composition	Average weight (kg)	Average length (cm)
Chum	53.1%	Male	49.0	2.28	54.5
		Female	51.0	2.18	54.1
Chinook	46.2%	Male	44.8	3.74	64.4
		Female	55.2	3.87	64.1
Coho	0.5%	Male	38.6	3.19	57.1
		Female	61.4	3.20	63.3
Sockeye	0.1%	Male	75.0	2.74	62.1
		Female	25.0	2.03	52.7
Pink	0.1%	Male	33.3	1.80	57.0
		Female	66.7	0.86	31.0
Steelhead	<0.1%	Male	100.0	5.40	71.0

Table 12.--Monthly bycatch rates (weight in kilogram per metric ton of catch) and average weight (kg) of Pacific halibut taken in domestic groundfish fisheries in the Bering Sea and Aleutian Islands region by gear type, target fishery, and NPFMC area, 1990.

	Area 511		Area 512		Area 513		Area 514		Area 515		Area 516		Area 517		Area 521		Area 522		Area 540	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Bottom trawl (flatfish target)																				
Jan.	17.67	0.51	--	--	2.24	0.73	--	--	ns	ns	8.24	0.56	55.79	1.61	2.01	0.83	--	--	--	--
Feb.	17.24	0.74	--	--	28.72	3.02	--	--	ns	ns	6.23	0.81	21.54	2.08	ns	ns	--	--	--	--
Mar.	11.18	0.81	--	--	10.71	2.50	--	--	276.09	3.76	--	--	23.79	1.92	1.76	1.91	101.44	6.27	--	--
Apr.	16.98	0.73	5.43	1.15	9.12	1.64	--	--	--	--	--	--	32.32	1.33	ns	ns	--	--	--	--
May	18.04	2.65	13.01	0.79	--	--	--	--	51.08	5.40	14.02	1.23	26.41	2.33	4.69	1.60	--	--	--	--
June	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.12	4.27	0.00	0.00	115.33	3.44
July	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aug.	--	--	--	--	1.15	7.14	3.26	2.59	1.60	7.82	--	--	2.80	8.49	--	--	23.11	7.30	--	--
Sep.	--	--	--	--	0.52	9.11	0.30	12.30	--	--	--	--	0.00	0.00	--	--	ns	ns	--	--
Oct.	--	--	--	--	2.43	9.93	1.72	2.03	--	--	--	--	10.95	13.71	--	--	0.97	2.58	--	--
Nov.	--	--	--	--	7.03	3.06	18.97	1.26	--	--	--	--	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	31.94	1.07	--	--	--	--	--	--
Year	16.87	0.75	11.14	0.82	4.10	3.40	3.99	1.55	70.03	3.84	9.09	0.66	23.56	1.81	1.99	2.55	7.72	5.55	115.33	3.44
Bottom trawl (pollock target)																				
Jan.	0.39	1.46	--	--	--	--	--	--	ns	ns	1.62	4.93	59.62	3.15	--	--	--	--	ns	ns
Feb.	2.41	0.65	--	--	0.30	2.03	--	--	126.79	4.08	--	--	11.18	3.35	0.63	1.60	0.00	0.00	--	--
Mar.	1.13	0.60	--	--	0.45	1.27	--	--	142.77	12.25	0.00	0.00	1.48	5.08	0.34	4.63	0.00	0.00	--	--
Apr.	1.64	0.95	--	--	0.89	2.76	--	--	--	--	--	--	1.32	2.72	0.54	3.42	0.00	0.00	0.82	5.88
May	5.61	2.50	--	--	0.20	1.67	--	--	--	--	0.45	2.30	3.54	3.59	0.77	3.89	0.75	2.33	1.94	4.36
June	--	--	--	--	--	--	--	--	2.25	3.21	--	--	--	--	0.47	5.27	2.08	5.85	0.36	1.80
July	--	--	--	--	--	--	--	--	1.48	6.64	--	--	0.00	0.00	0.03	8.09	--	--	2.88	19.60
Aug.	--	--	--	--	36.59	6.62	--	--	0.75	7.00	--	--	0.00	0.00	0.08	17.06	0.00	0.00	5.72	29.75
Sep.	--	--	--	--	--	--	--	--	1.12	9.01	--	--	--	--	16.57	12.29	0.00	0.00	1.17	21.87
Oct.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.42	7.60	0.00	0.00	1.65	6.21
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.93	6.27
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.56	6.20
Year	1.64	0.90	--	--	0.53	1.63	--	--	3.51	3.73	0.26	3.62	1.68	3.74	0.37	4.91	0.60	4.39	3.03	6.83

Table 12.--Continued.

	Area 511		Area 512		Area 513		Area 514		Area 515		Area 516		Area 517		Area 521		Area 522		Area 540	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Bottom trawl (other targets)																				
Jan.	12.00	1.29	--	--	--	--	--	--	107.97	1.48	9.31	0.26	19.22	1.08	--	--	--	--	12.49	6.31
Feb.	11.91	1.21	--	--	7.92	2.83	--	--	59.77	5.27	ns	ns	17.89	1.95	--	--	--	--	7.27	7.52
Mar.	4.57	0.77	--	--	4.20	3.01	--	--	115.93	6.05	--	--	18.98	1.94	4.80	1.90	93.89	9.27	6.94	9.47
Apr.	8.10	0.82	--	--	9.89	2.40	--	--	39.21	3.33	--	--	15.75	1.20	4.93	3.01	6.12	1.67	4.75	6.76
May	18.92	2.39	10.18	1.12	10.06	1.44	--	--	31.02	3.79	20.92	1.48	45.68	3.09	3.42	3.30	18.06	3.14	3.34	6.76
June	--	--	--	--	11.84	5.85	--	--	13.20	7.20	--	--	ns	ns	2.86	4.02	0.00	0.00	4.81	5.96
July	--	--	--	--	0.00	0.00	--	--	1.49	16.65	--	--	0.00	0.00	4.69	7.74	3.32	6.37	5.08	10.29
Aug.	--	--	--	--	2.75	10.70	--	--	4.24	10.96	--	--	3.05	12.03	8.41	10.85	3.66	10.83	2.68	11.54
Sep.	--	--	--	--	0.00	0.00	--	--	5.61	17.07	--	--	2.41	8.85	11.29	10.52	1.59	15.14	4.77	15.20
Oct.	--	--	--	--	10.17	5.17	--	--	8.04	10.53	--	--	ns	ns	2.71	5.92	0.00	0.00	6.76	9.21
Nov.	--	--	--	--	12.41	2.91	--	--	--	--	--	--	--	--	--	--	--	--	1.91	6.72
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	52.23	0.95	--	--	--	--	0.83	9.01
Year	12.53	1.43	10.18	1.12	8.09	2.17	--	--	54.85	4.98	20.68	1.42	19.05	1.66	4.12	3.42	36.32	8.85	5.08	7.68
Pelagic trawl (pollock target)																				
Jan.	0.18	2.28	--	--	--	--	--	--	<0.01	3.39	--	--	<0.01	1.26	--	--	--	--	ns	ns
Feb.	<0.01	1.40	--	--	0.24	2.86	--	--	<0.01	2.90	--	--	0.00	0.00	--	--	--	--	--	--
Mar.	0.21	1.00	--	--	0.07	2.40	--	--	0.01	15.51	0.00	0.00	0.09	4.28	0.20	3.51	0.00	0.00	--	--
Apr.	0.24	1.40	--	--	0.02	2.20	--	--	ns	ns	--	--	0.04	3.00	0.03	2.48	0.00	0.00	ns	ns
May	0.06	12.66	ns	ns	0.02	1.21	--	--	3.93	2.05	--	--	0.01	3.26	0.01	4.39	0.00	0.00	--	--
June	0.37	4.84	--	--	0.00	0.00	--	--	1.46	2.08	--	--	0.13	2.11	0.05	11.36	0.00	0.00	--	--
July	0.01	4.81	--	--	0.00	0.00	0.00	0.00	0.43	2.50	--	--	0.03	3.60	0.13	6.63	0.01	8.98	--	--
Aug.	0.00	0.00	--	--	0.09	6.87	0.00	0.00	0.07	3.26	--	--	0.05	4.23	0.18	7.71	<0.01	2.41	--	--
Sep.	0.38	8.00	--	--	0.26	5.79	--	--	0.10	4.43	--	--	0.09	5.81	0.04	11.96	0.00	0.00	--	--
Oct.	1.21	7.69	--	--	0.00	0.00	--	--	0.13	4.36	--	--	0.15	4.03	0.03	9.54	0.06	15.95	0.10	29.18
Nov.	--	--	--	--	0.00	0.00	--	--	--	--	--	--	0.00	0.00	--	--	0.00	0.00	0.02	33.91
Dec.	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	--	--	0.00	0.00	0.00	0.00
Year	0.19	1.28	ns	ns	0.06	2.48	0.00	0.00	0.05	2.58	0.00	0.00	0.06	3.59	0.08	7.60	0.01	12.41	0.08	29.36

Table 12.--Continued.

	Area 511		Area 512		Area 513		Area 514		Area 515		Area 516		Area 517		Area 521		Area 522		Area 540	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Pelagic trawl (other targets)																				
Jan.	0.00	0.00	--	--	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--	ns	ns
Feb.	0.00	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mar.	1.65	1.24	--	--	1.46	4.16	--	--	ns	ns	--	--	ns	ns	--	--	--	--	--	--
Apr.	3.57	0.81	--	--	0.00	0.00	--	--	ns	ns	--	--	0.04	3.44	0.00	0.00	0.00	0.00	--	--
May	ns	ns	--	--	0.02	1.10	--	--	ns	ns	--	--	ns	ns	0.00	0.00	0.00	0.00	ns	ns
June	--	--	--	--	--	--	--	--	7.50	1.97	--	--	8.49	2.04	1.61	8.17	0.00	0.00	ns	ns
July	0.19	4.11	--	--	--	--	--	--	10.25	2.62	--	--	1.36	2.14	2.09	6.90	0.00	0.00	--	--
Aug.	14.24	1.29	--	--	0.51	6.75	--	--	4.02	1.84	--	--	3.97	1.66	1.19	6.36	0.00	0.00	--	--
Sep.	0.00	0.00	--	--	0.75	3.81	--	--	4.46	4.31	--	--	1.81	3.85	0.56	7.56	0.08	6.37	--	--
Oct.	3.08	2.60	--	--	1.28	2.90	2.25	4.35	10.52	2.30	--	--	7.38	1.99	1.02	9.78	0.00	0.00	0.00	0.00
Nov.	6.32	2.52	--	--	9.68	2.60	30.91	1.55	6.95	1.67	--	--	17.11	1.51	64.41	3.83	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	7.75	1.30	--	--	29.83	0.99	--	--	--	--	ns	ns
Year	2.53	1.09	--	--	0.88	3.08	4.54	2.19	7.69	2.30	--	--	10.18	1.31	1.14	6.93	0.08	6.37	0.00	0.00
Longline vessels (sablefish target)																				
Jan.	--	--	--	--	--	--	--	--	ns	ns	--	--	ns	ns	ns	ns	--	--	ns	ns
Feb.	--	--	--	--	--	--	--	--	ns	ns	--	--	ns	ns	ns	ns	--	--	ns	ns
Mar.	--	--	--	--	--	--	--	--	397.07	7.68	--	--	36.55	4.12	--	--	--	--	68.22	14.82
Apr.	--	--	--	--	--	--	--	--	190.04	6.38	--	--	--	--	--	--	--	--	--	--
May	--	--	--	--	--	--	--	--	88.30	8.37	--	--	327.28	11.44	22.72	12.52	0.00	0.00	63.18	13.53
June	ns	ns	--	--	--	--	--	--	148.16	16.83	--	--	143.16	10.48	277.86	12.14	167.41	8.19	11.97	29.44
July	ns	ns	ns	ns	--	--	--	--	38.54	15.48	--	--	70.95	15.80	0.00	0.00	ns	ns	6.03	17.06
Aug.	--	--	--	--	--	--	--	--	0.75	9.13	ns	ns	4.15	12.96	46.68	10.06	0.00	0.00	22.40	20.14
Sep.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.78	7.25
Oct.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	18.52	10.47
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00	0.00	0.00
Dec.	--	--	--	--	--	--	--	--	--	--	--	--					--	--	ns	ns
Year	ns	ns	ns	ns	--	--	--	--	123.14	9.13	ns	ns	117.04	11.23	112.54	12.05	147.39	8.19	48.34	15.30

Table 12.--Continued.

	Area 511		Area 512		Area 513		Area 514		Area 515		Area 516		Area 517		Area 521		Area 522		Area 540	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Longline vessels (Pacific cod target)																				
Jan.	--	--	--	--	--	--	--	--	--	--	--	--	18.98	3.58	10.77	3.87	--	--	--	--
Feb.	--	--	--	--	ns	ns	--	--	ns	ns	--	--	11.63	4.10	10.40	3.99	3.19	4.40	--	--
Mar.	--	--	--	--	--	--	--	--	--	--	--	--	11.64	3.65	2.76	3.09	3.52	3.32	170.87	7.68
Apr.	--	--	--	--	--	--	--	--	58.70	7.64	--	--	37.27	3.13	2.67	4.27	13.33	3.25	--	--
May	--	--	--	--	--	--	--	--	519.61	6.27	--	--	39.78	3.87	12.10	4.83	14.56	3.66	86.14	9.87
June	1,512.23	10.93	117.79	4.31	--	--	--	--	608.08	9.97	--	--	199.09	4.43	53.64	6.03	48.23	6.61	2.25	4.76
July	--	--	--	--	--	--	--	--	215.39	5.32	--	--	34.37	7.38	34.83	6.32	22.04	5.20	111.02	8.22
Aug.	--	--	--	--	49.55	6.19	--	--	123.27	2.48	--	--	41.14	8.34	26.30	8.11	24.26	5.35	397.67	36.44
Sep.	--	--	--	--	110.44	11.97	--	--	409.44	4.46	--	--	91.77	8.26	17.19	6.67	18.28	5.66	29.16	9.40
Oct.	--	--	--	--	ns	ns	--	--	278.19	4.78	--	--	54.26	6.94	19.91	6.58	12.53	3.67	15.09	4.43
Nov.	119.92	4.13	--	--	114.40	6.59	--	--	224.25	6.99	--	--	54.09	4.39	22.67	5.28	24.89	3.28	58.07	7.02
Dec.	60.92	5.57	--	--	50.69	4.29	--	--	67.79	3.66	--	--	52.29	3.60	20.33	3.41	25.52	4.00	--	--
Year	1,404.76	11.03	117.79	4.31	79.90	7.71	--	--	326.67	6.10	--	--	50.98	5.50	23.82	5.89	16.41	4.72	29.21	6.73
Longline vessels (other targets)																				
Jan.	--	--	--	--	--	--	--	--	ns	ns	--	--	ns	ns	--	--	--	--	ns	ns
Feb.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns
Mar.	1,875.25	9.97	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	78.62	6.59
Apr.	--	--	--	--	--	--	--	--	41.36	5.00	--	--	--	--	--	--	--	--	--	--
May	1,663.27	9.21	--	--	--	--	--	--	61.33	4.58	--	--	--	--	--	--	--	--	304.07	14.73
June	--	--	--	--	--	--	--	--	1.36	6.80	--	--	557.81	9.27	221.26	9.53	16.60	19.31	4.81	15.59
July	--	--	--	--	--	--	--	--	53.31	8.81	--	--	16.51	10.22	1.70	5.06	--	--	22.76	18.18
Aug.	--	--	--	--	--	--	--	--	2.28	10.00	--	--	2.08	14.90	194.47	12.37	--	--	346.16	26.49
Sep.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	46.27	12.96	--	--	ns	ns
Oct.	1,785.72	5.61	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.34	20.15
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.04	2.64
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--	--	--	--	--
Year	1,775.75	8.26	--	--	--	--	--	--	75.38	8.50	--	--	64.29	9.16	174.40	10.80	16.60	19.31	69.35	10.87

Table 12.--Continued.

	Area 511		Area 512		Area 513		Area 514		Area 515		Area 516		Area 517		Area 521		Area 522		Area 540	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Pot vessels (all targets)																				
Jan.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mar.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Apr.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
May	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns
June	--	--	--	--	--	--	--	--	--	--	--	--	0.00	0.00	--	--	--	--	--	--
July	5.94	6.64	0.00	0.00	--	--	--	--	51.96	8.09	--	--	141.39	11.87	20.62	8.70	0.00	0.00	--	--
Aug.	4.18	9.33	--	--	0.83	5.97	--	--	85.01	17.65	--	--	3.16	4.87	12.00	11.43	0.00	0.00	--	--
Sep.	0.00	0.00	--	--	0.49	7.30	--	--	0.39	8.35	--	--	0.61	5.00	3.52	6.56	7.56	6.64	--	--
Oct.	20.01	3.00	--	--	--	--	--	--	26.32	4.13	ns	ns	--	--	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	--	--	ns	ns	--	--	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	5.11	7.21	0.00	0.00	0.46	6.26	--	--	23.41	4.70	ns	ns	3.62	5.80	15.35	9.58	7.53	6.64	ns	ns

Dashes indicate no fishing in this area.

ns = Fishing occurred but no sampling by observers.

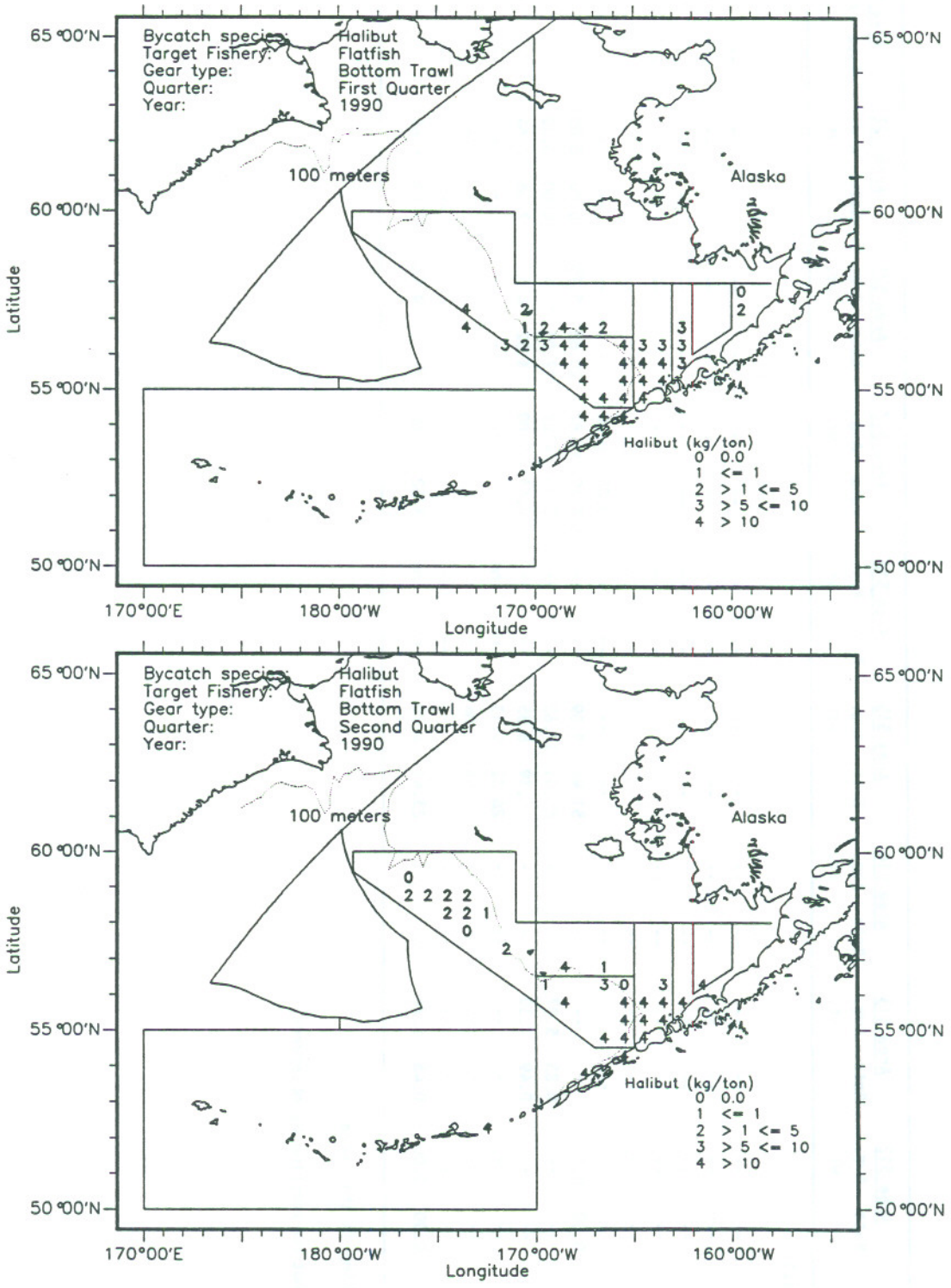


Figure 4.--Average incidence (kg./t) of Pacific halibut in the U.S. domestic fisheries by quarter, target fishery, gear type, and 1/2° latitude by 1/2° longitude areas in the Bering Sea-Aleutian Islands region, 1990.

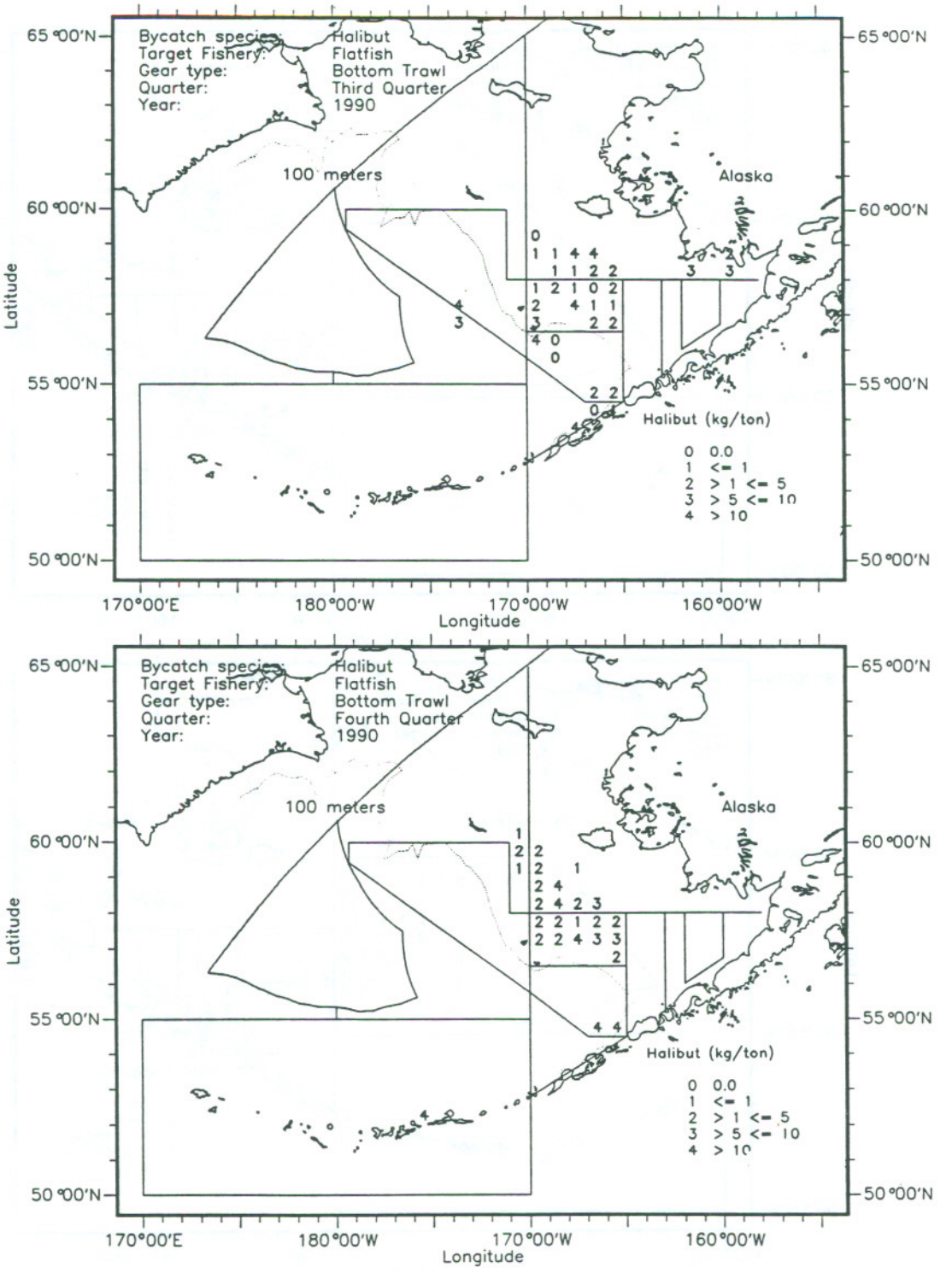


Figure 4.--Continued.

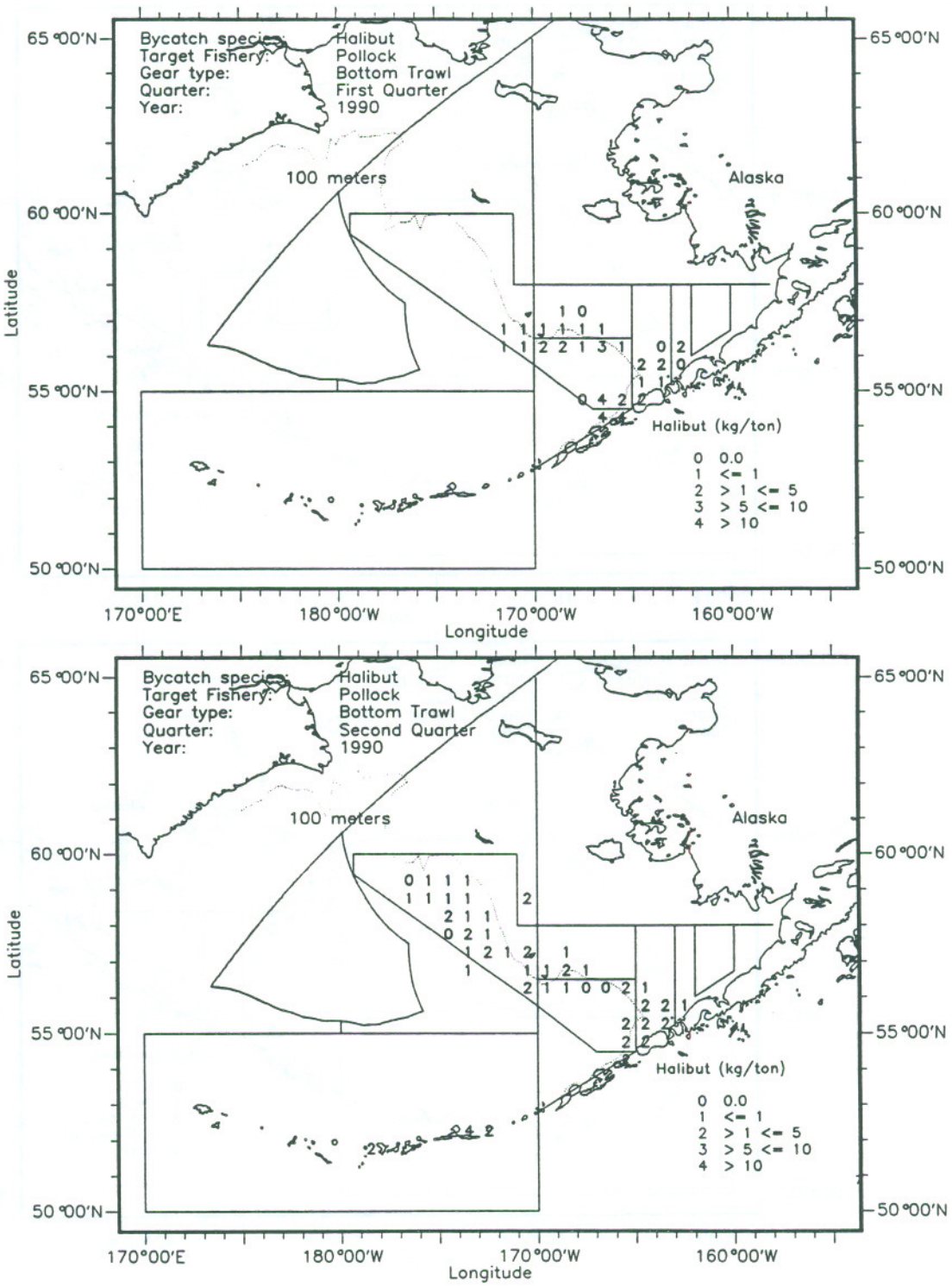


Figure 4.--Continued.

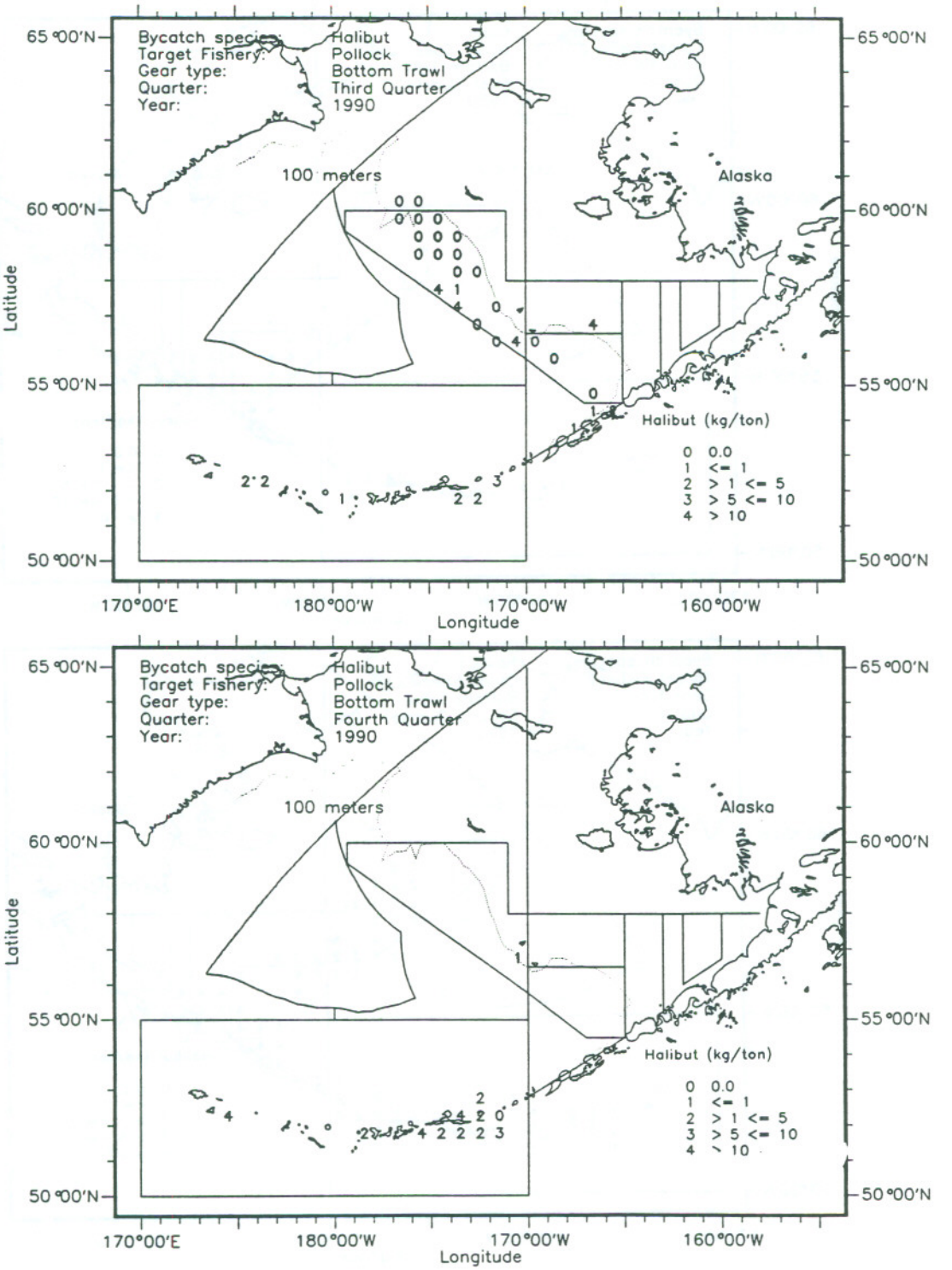


Figure 4.--Continued.

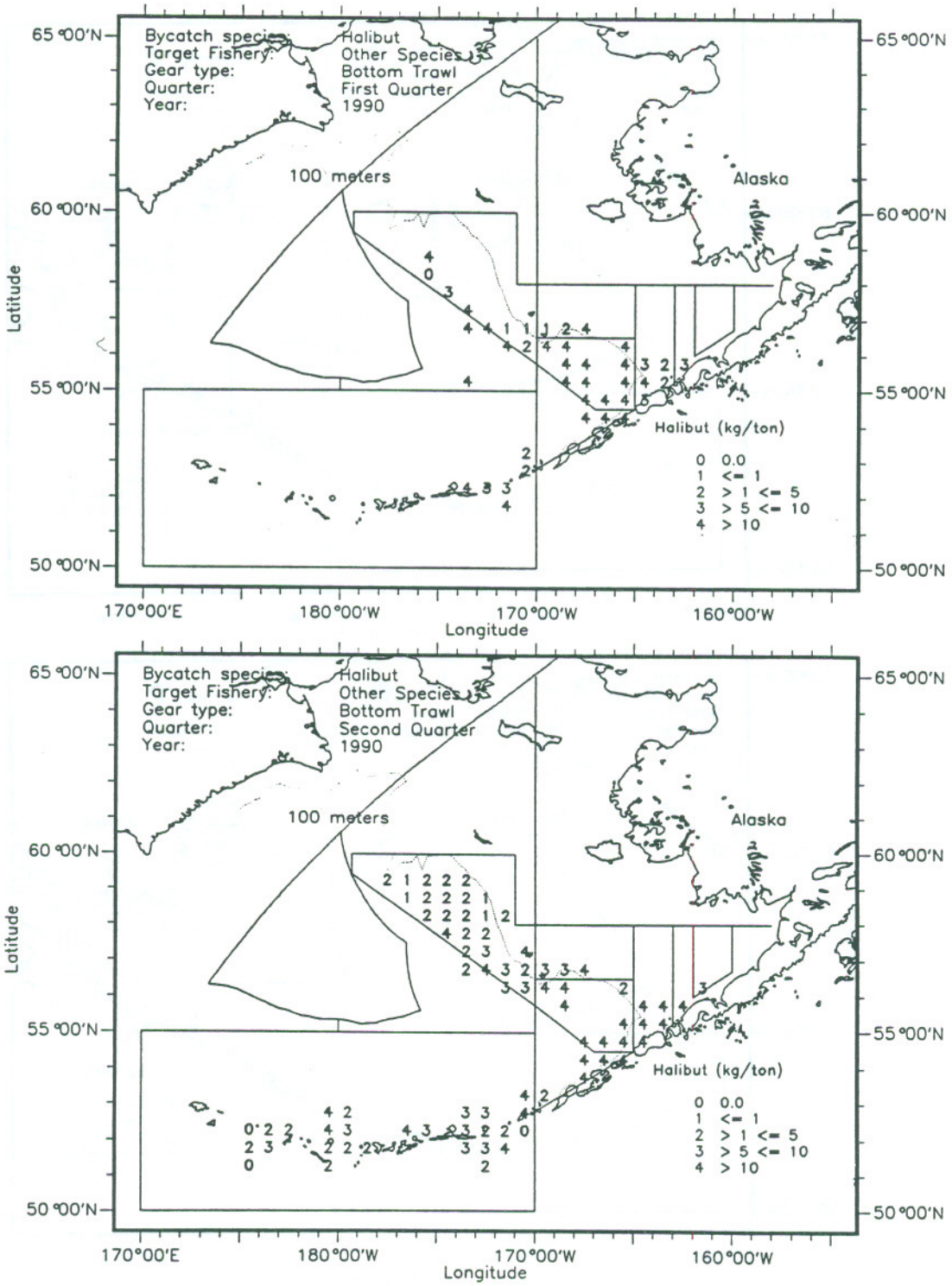


Figure 4.--Continued.

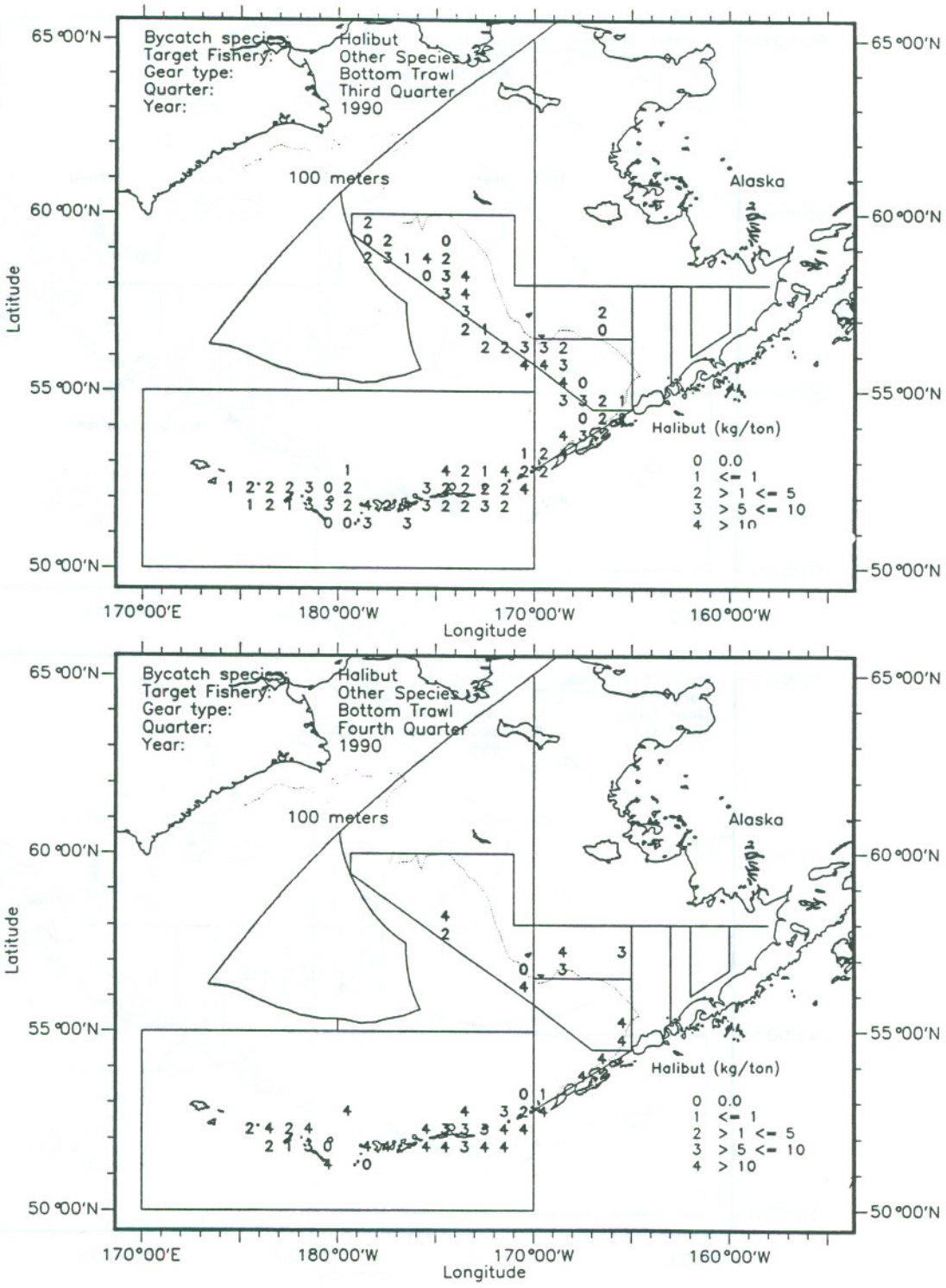


Figure 4.--Continued.

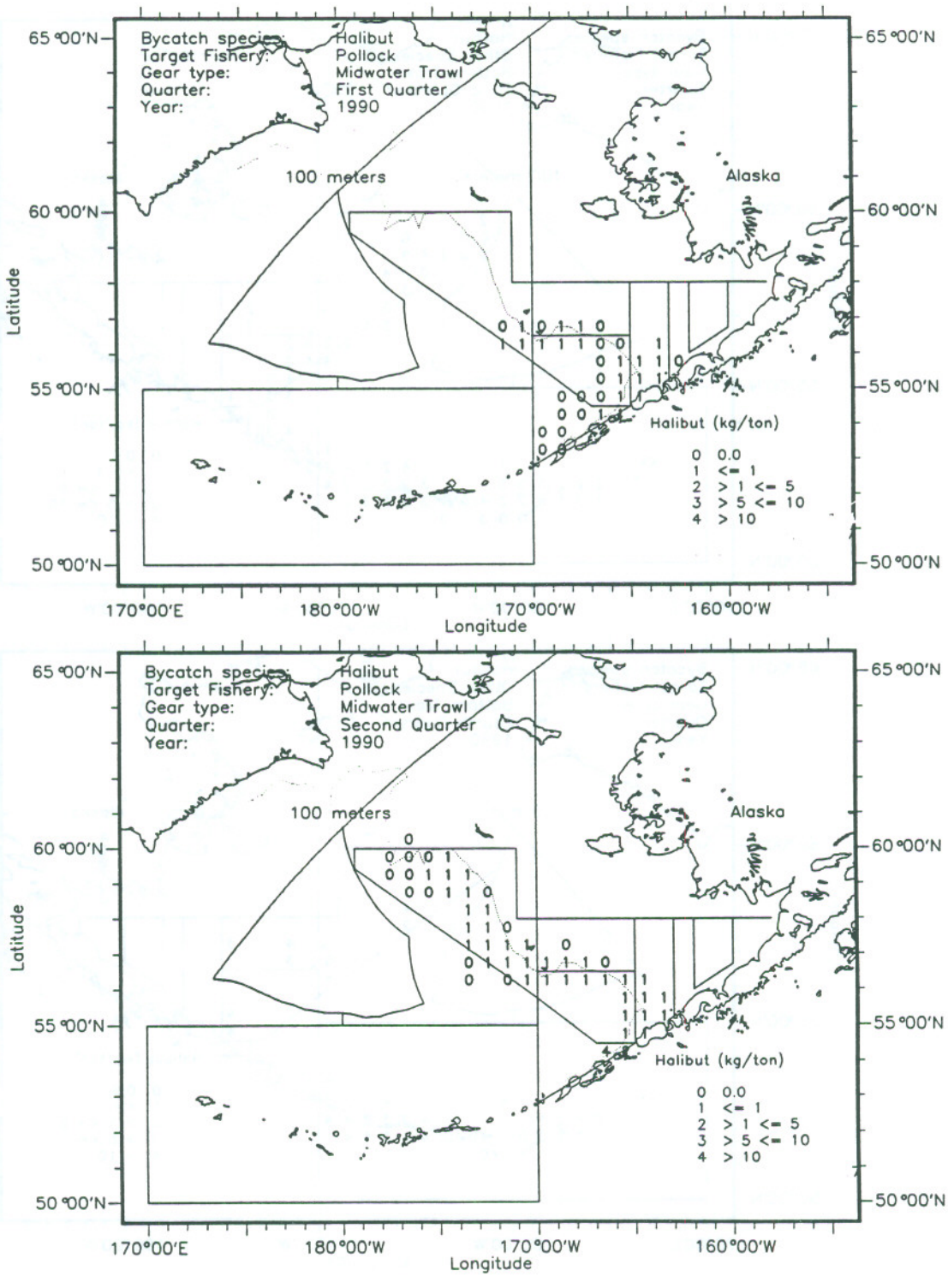


Figure 4.--Continued.

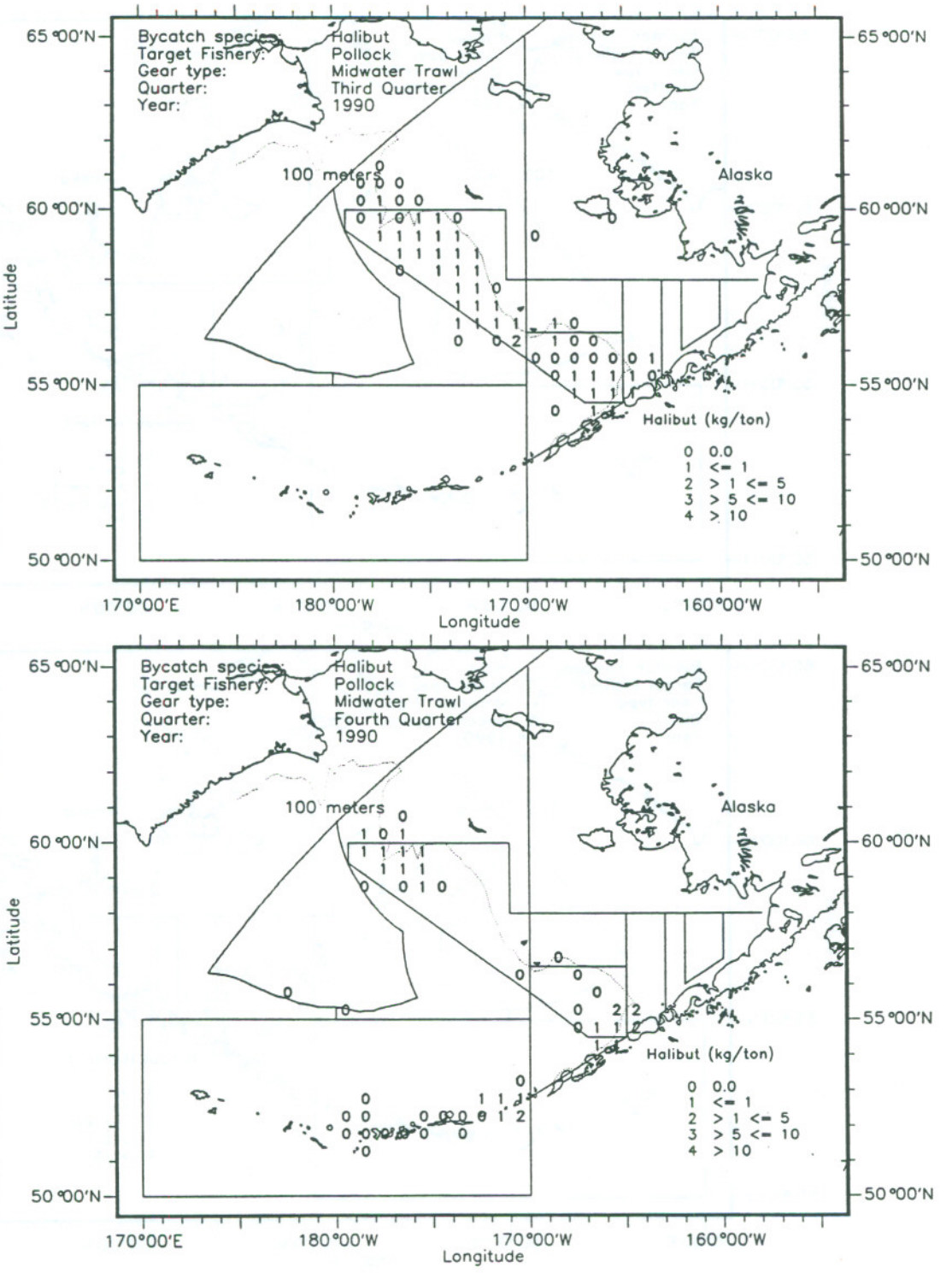


Figure 4.--Continued.

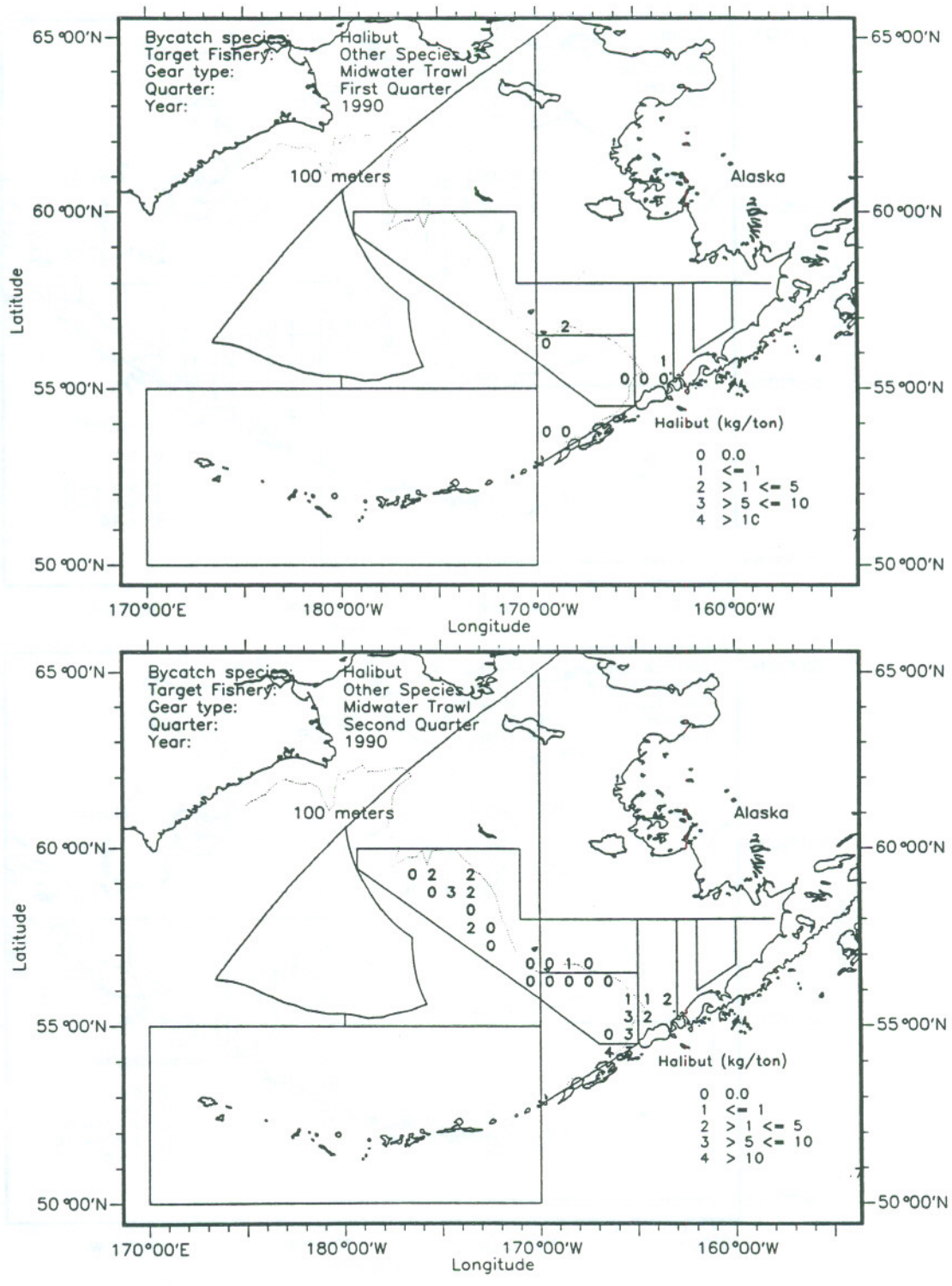


Figure 4.--Continued.

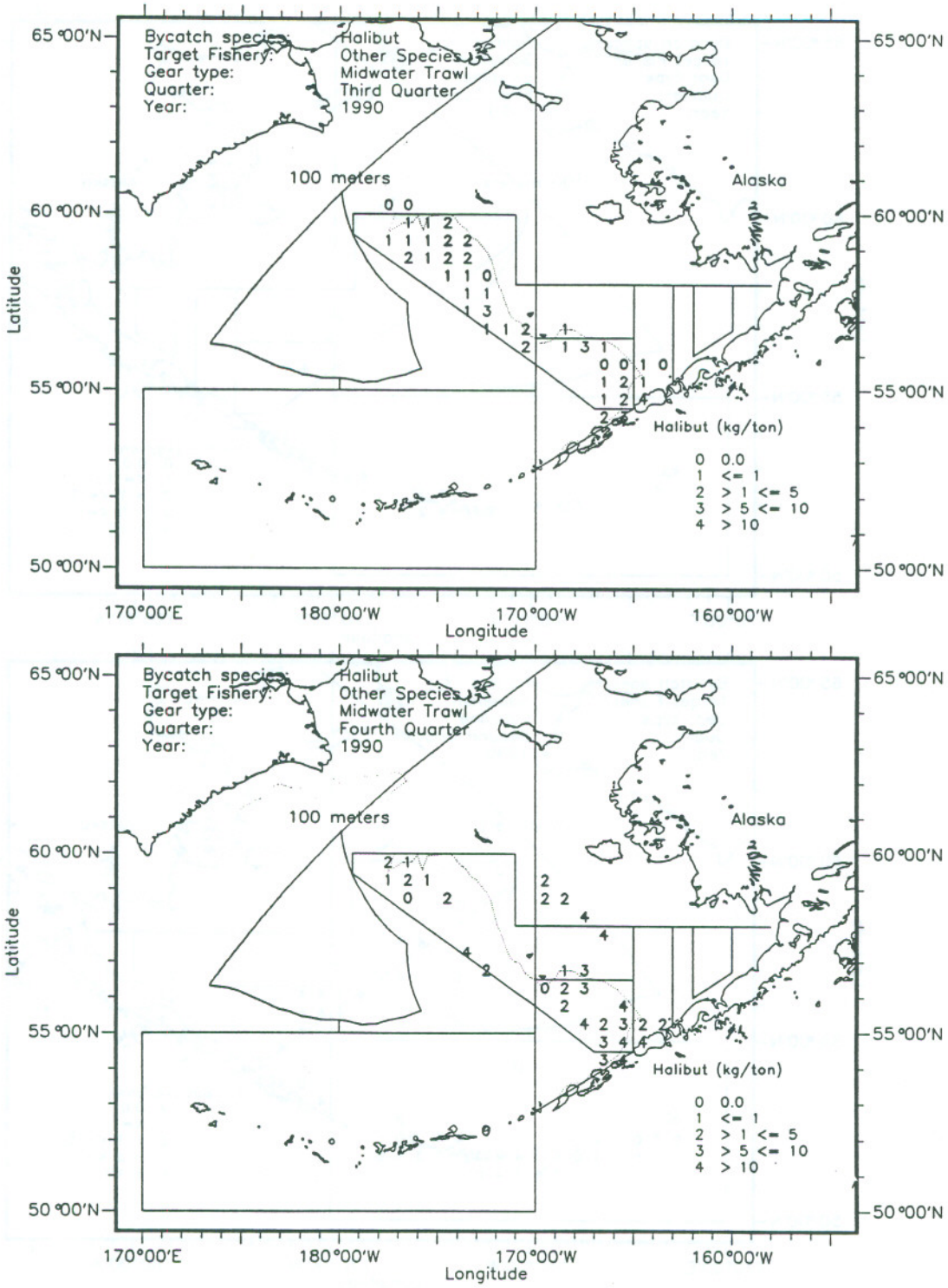


Figure 4.--Continued.

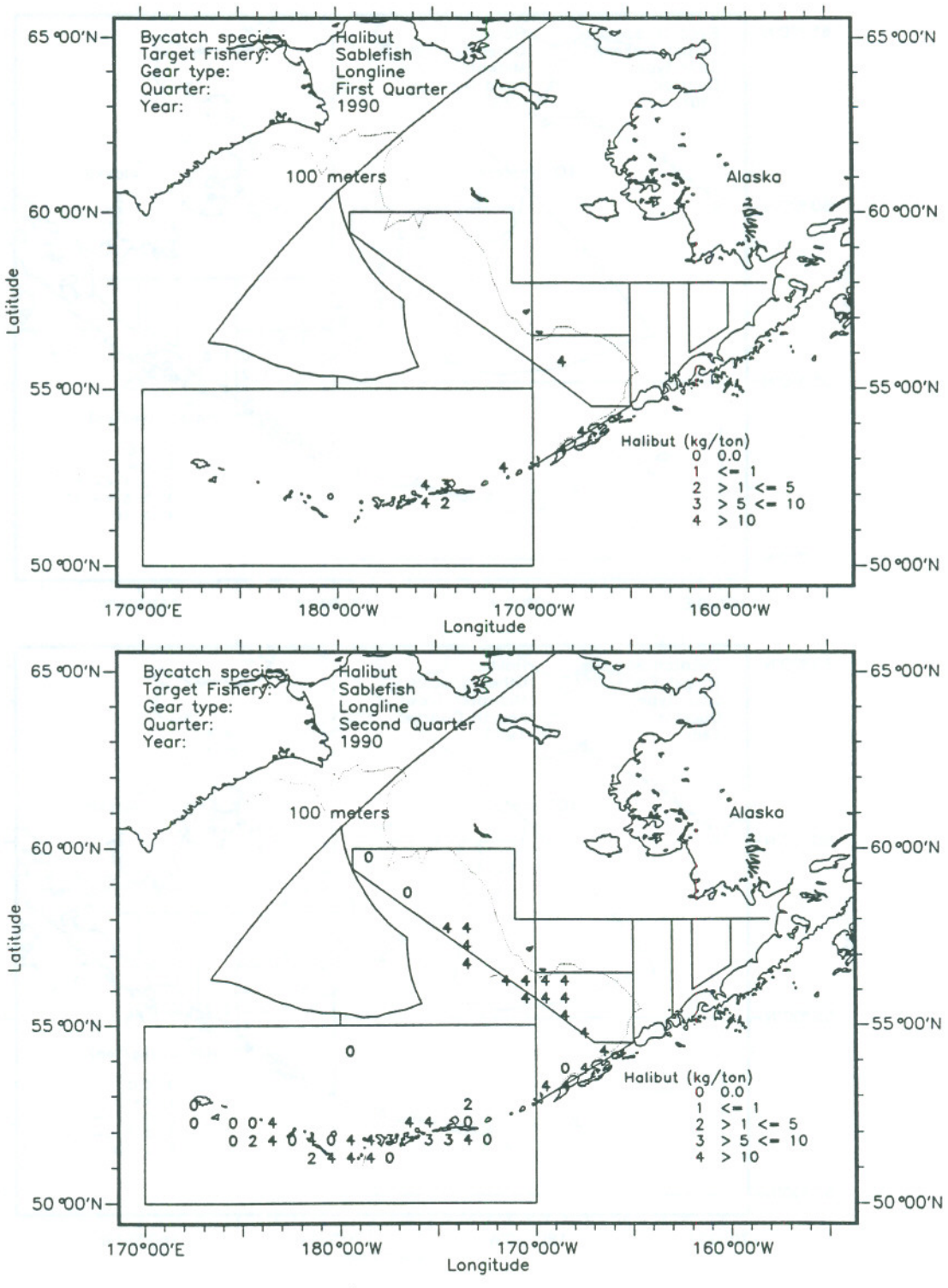


Figure 4.--Continued.

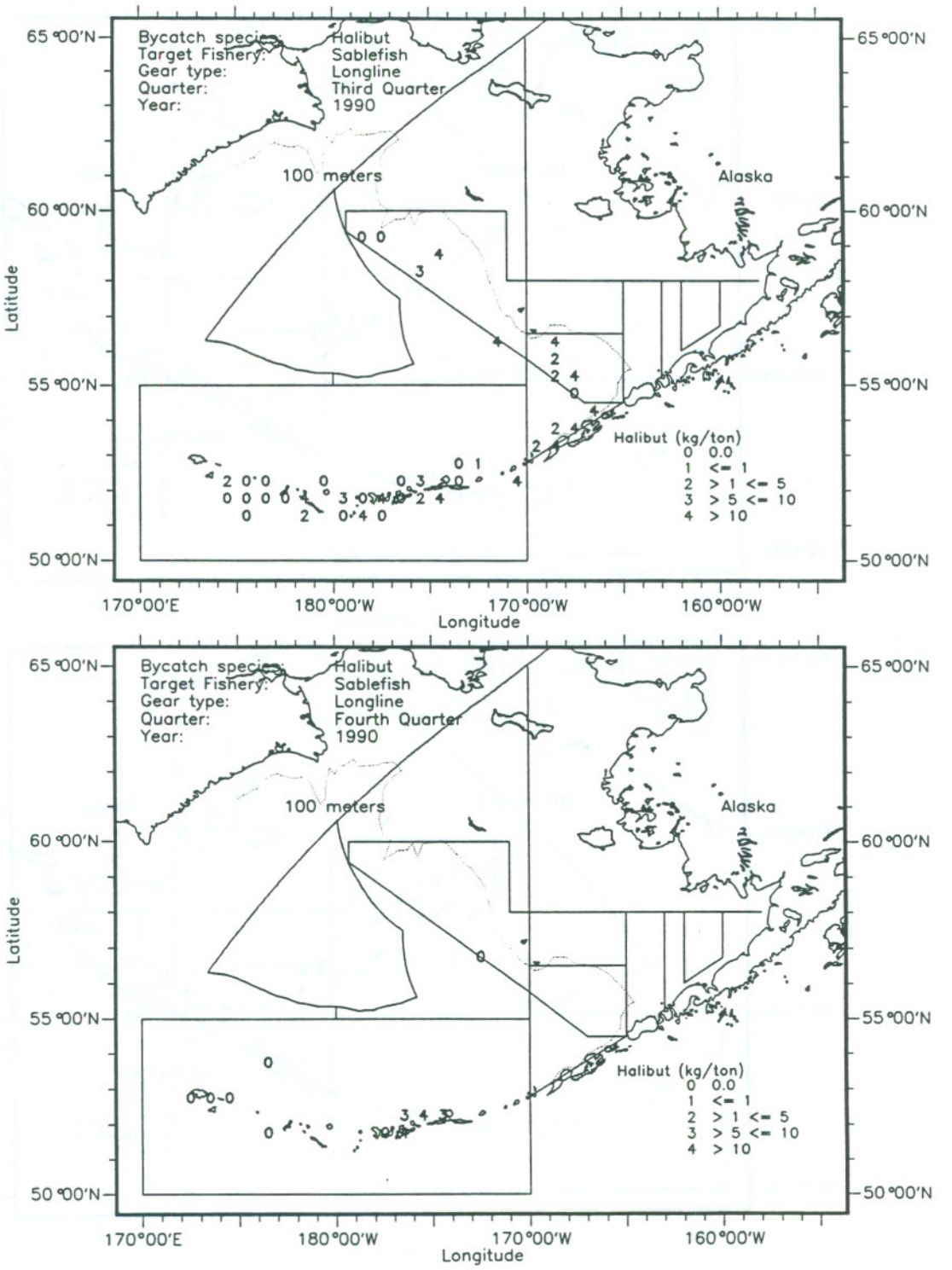


Figure 4.--Continued.

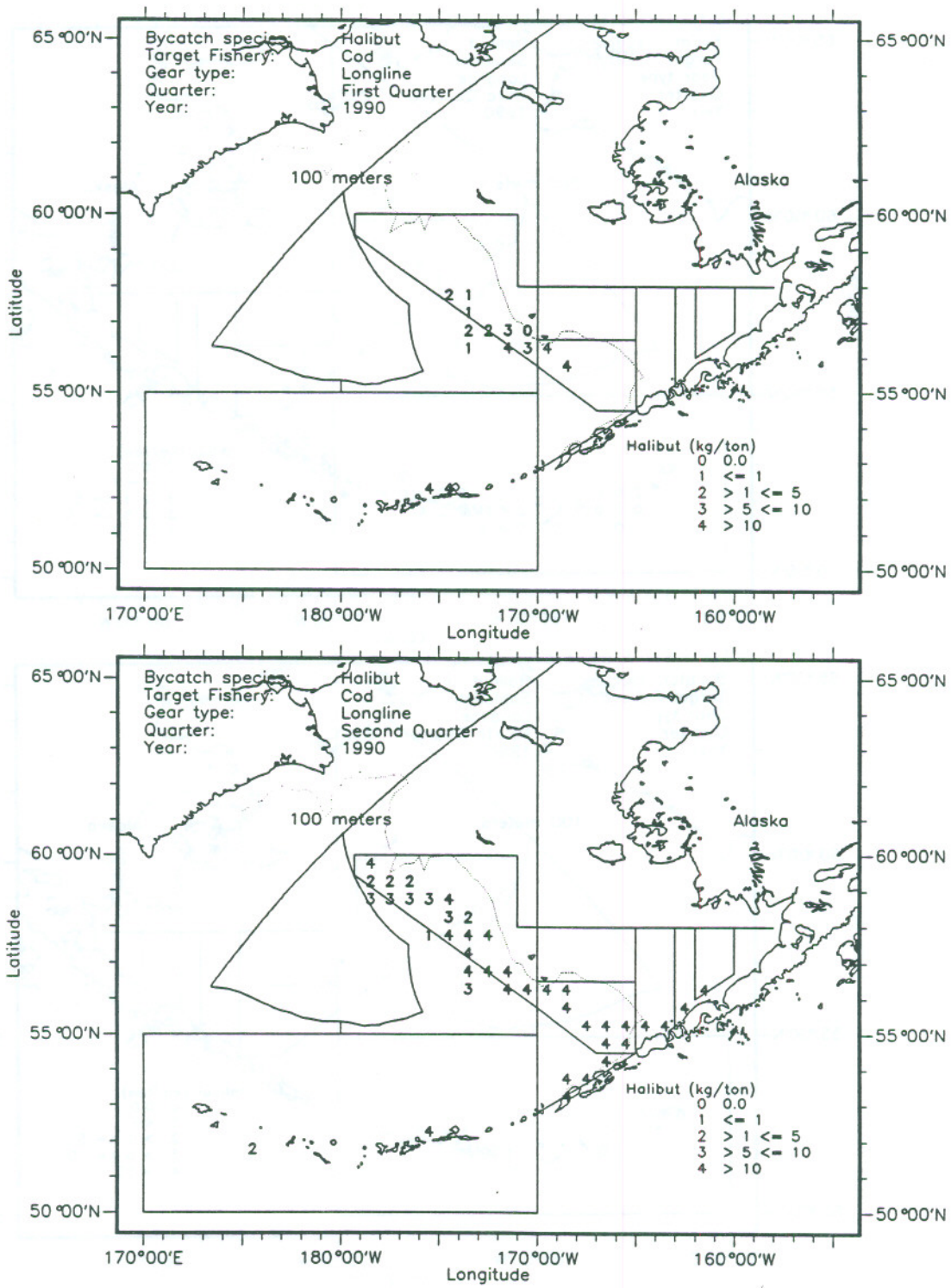


Figure 4.--Continued.

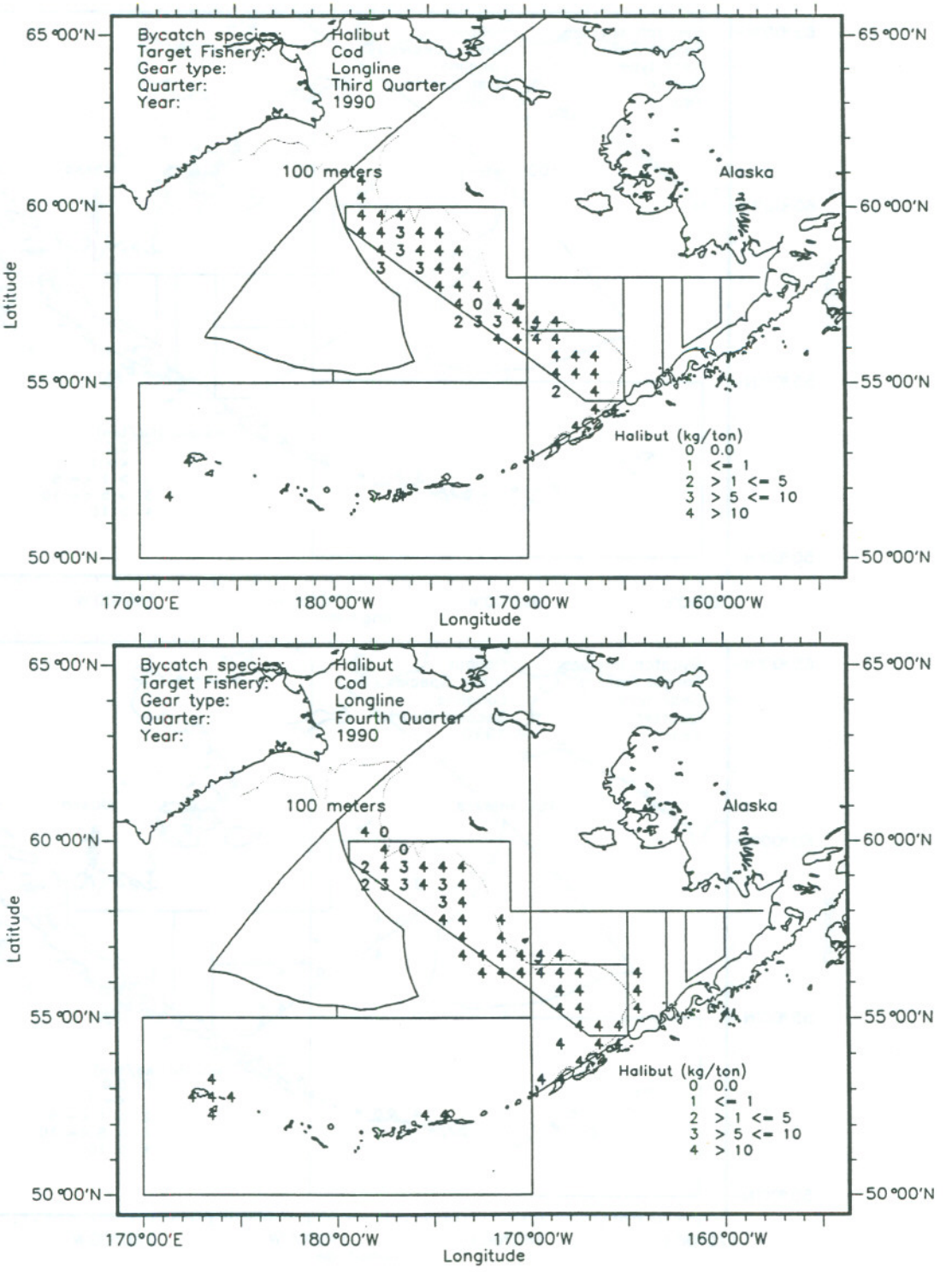


Figure 4.--Continued.

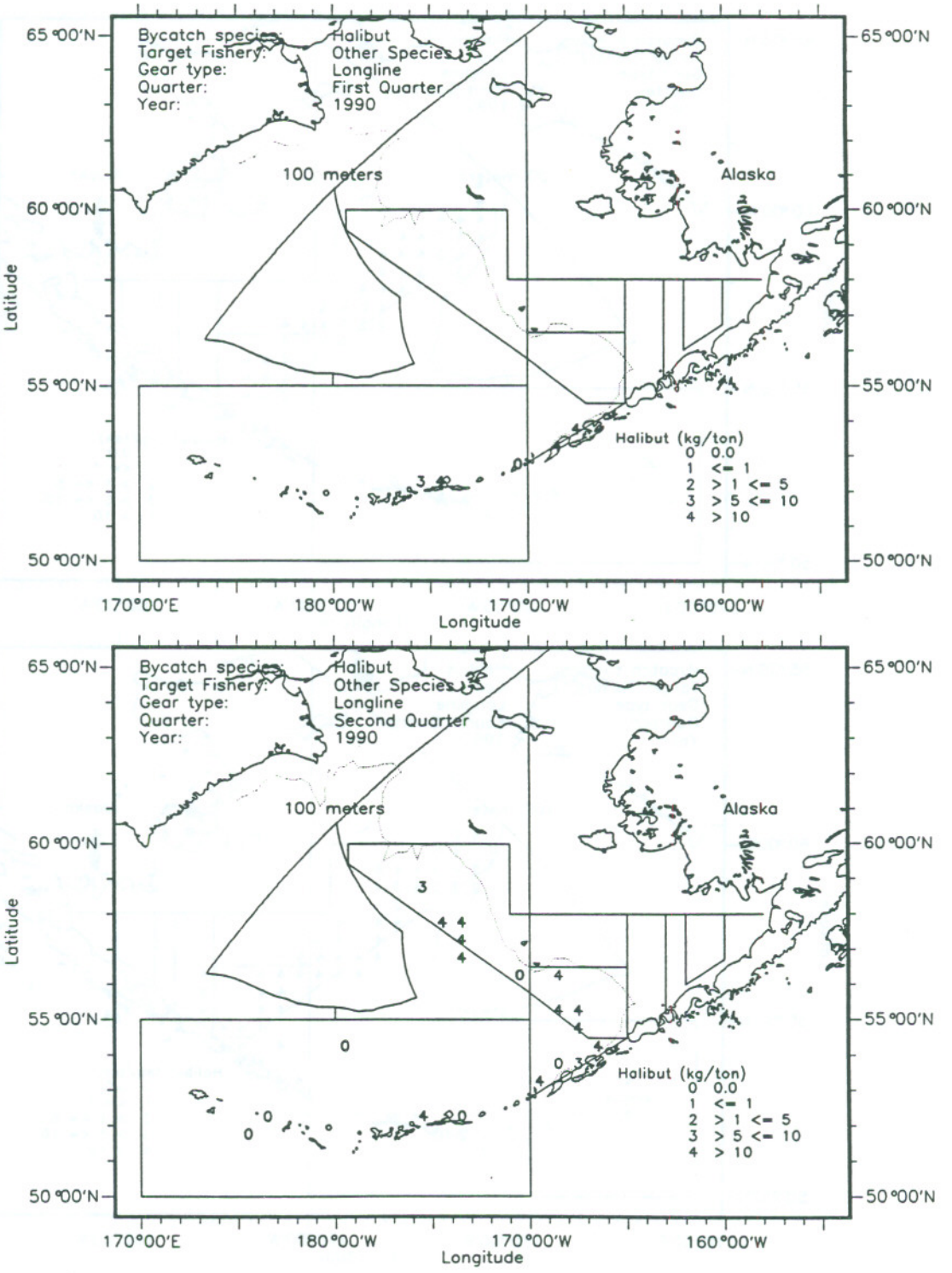


Figure 4.--Continued.

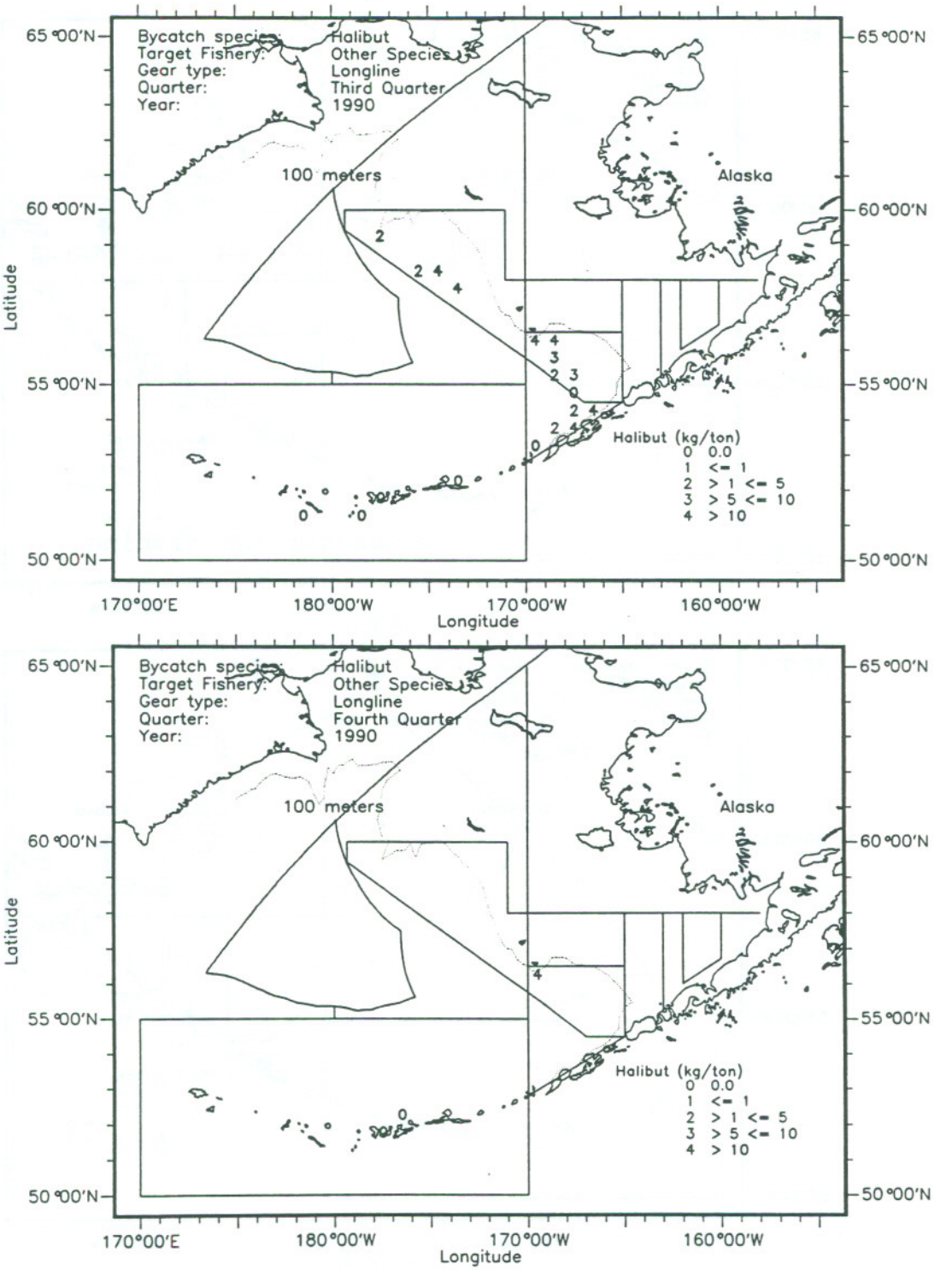


Figure 4.--Continued.

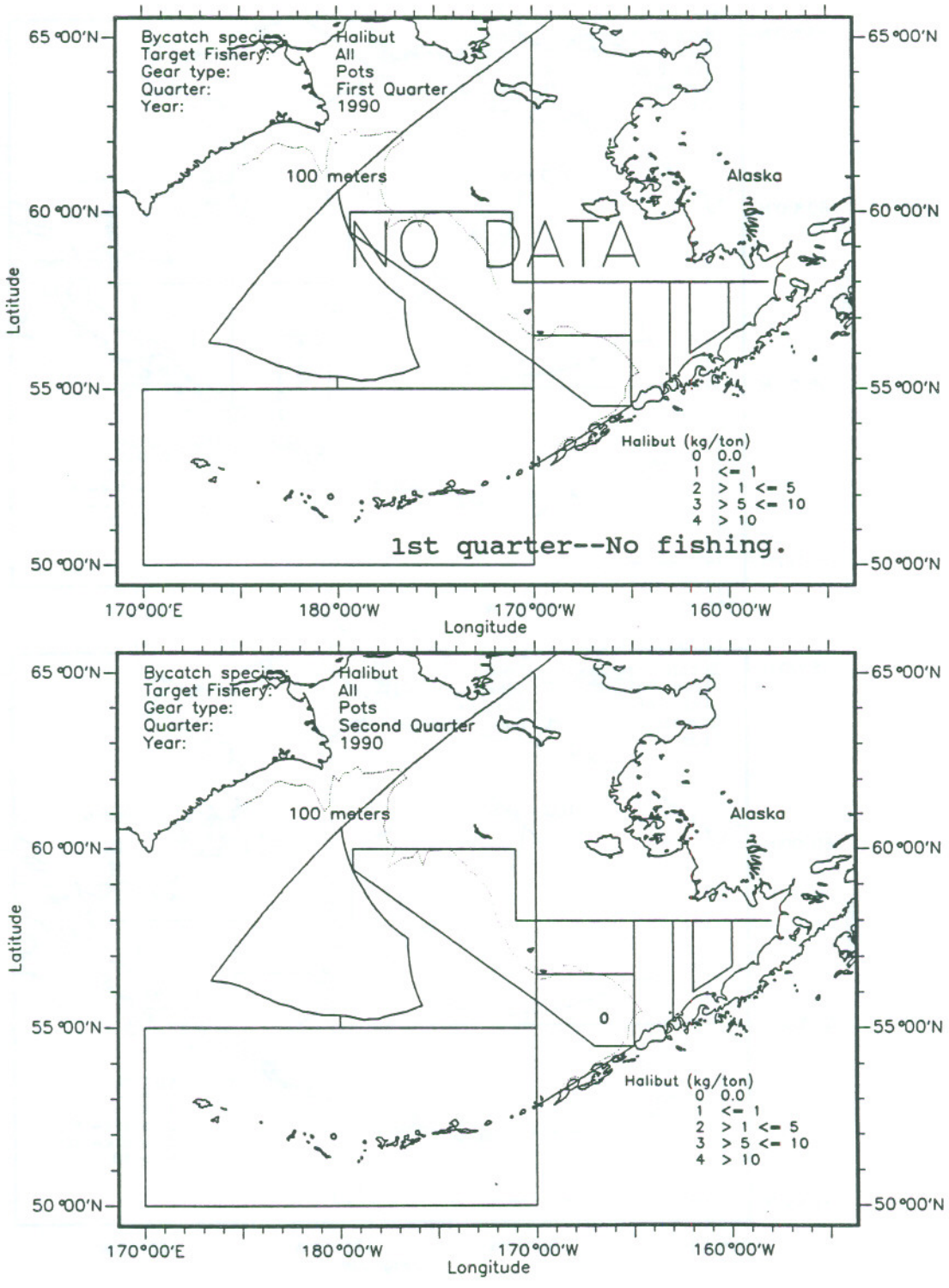


Figure 4.--Continued.

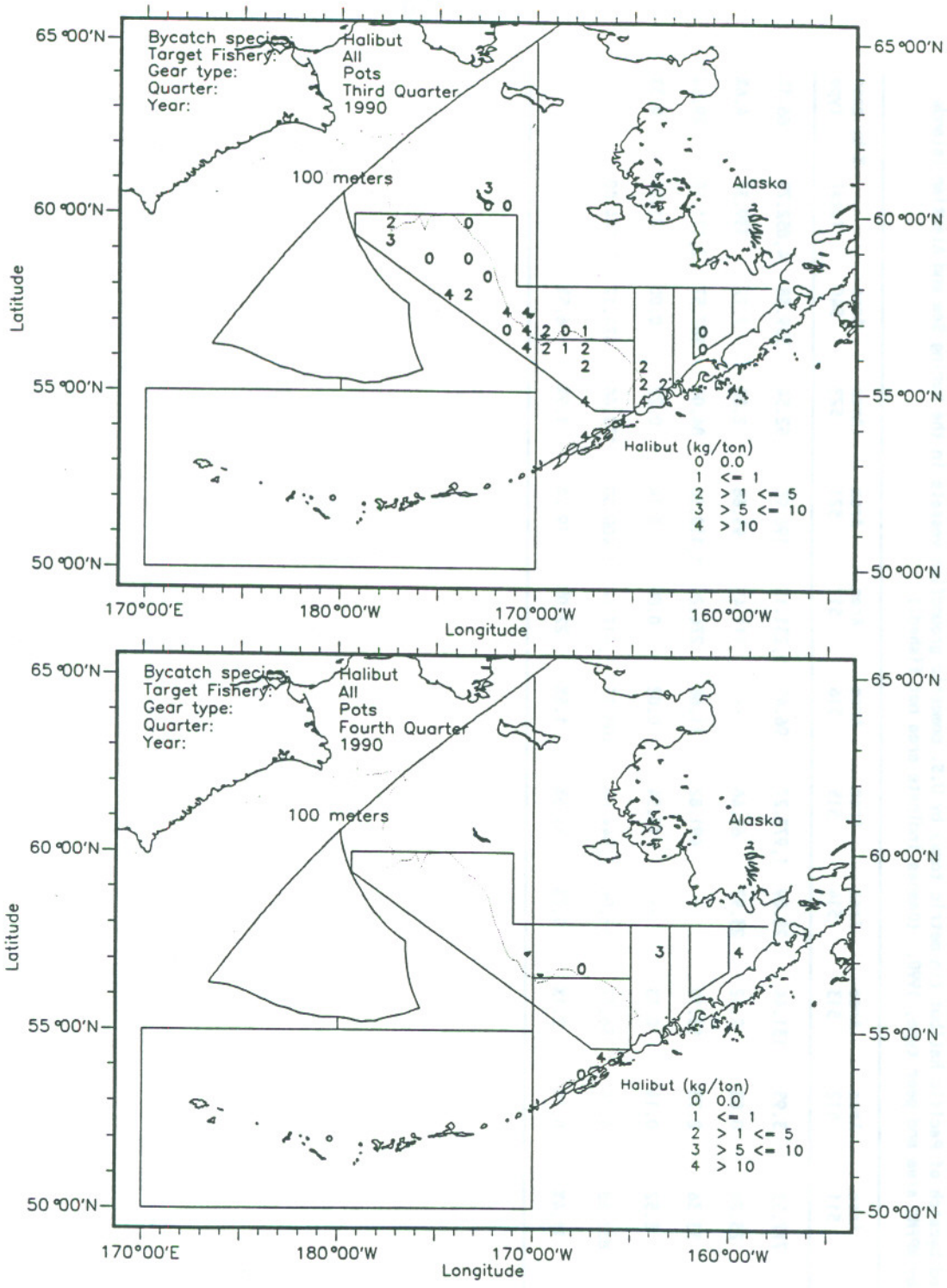


Figure 4.--Continued.

Table 13.--Estimated bycatch of Pacific halibut (in metric tons) by U.S. domestic groundfish vessels in the Bering Sea and Aleutian Islands region by NPFMC area and gear type, 1990. (Dashes indicate area not fished.)

Gear type	Area 511	Area 512	Area 513	Area 514	Area 515	Area 516	Area 517	Area 521	Area 522	Area 540	Total	% by gear type
Bottom trawl	777.53	3.95	131.44	28.09	1,973.27	96.45	1,231.13	198.98	52.54	359.38	4,852.75	66.1%
Pelagic trawl	23.28	0.03	9.42	23.97	65.46	--	111.45	95.68	2.88	7.22	339.38	4.6%
Longline	33.36	2.73	15.18	--	491.82	11.68	274.28	1,110.50	84.04	107.57	2,131.15	29.0%
Pot	3.52	0.14	0.13	--	13.54	0.02	0.80	3.14	0.22	0.00	21.51	0.3%
Total	837.68	6.84	156.17	52.06	2,544.08	108.15	1,617.66	1,408.30	139.68	474.17	7,344.80	
Percent by area	11.4%	0.1%	2.1%	0.7%	34.6%	1.5%	22.0%	19.2%	1.9%	6.5%		

Table 14.--U.S. domestic groundfish catch and Pacific halibut bycatch (in metric tons (t)) by target fishery and NPFMC zone in the Bering Sea and Aleutians Islands region, 1990.

Fishery	Zone	Groundfish catch (t)	Pacific halibut			
			Bycatch (t)	kg per t of groundfish	% within zone	% of total Pacific halibut bycatch
Yellowfin sole/ other flatfish (All gears)	1	35,215.6	426.44	12.1	44.8%	5.8%
	2	12,124.7	82.06	6.8	2.6%	1.1%
	3	17,014.6	66.90	3.9	2.1%	0.9%
	Total	64,354.9	575.40	8.9	-	7.8%
Pollock midwater (All gears)	1	31,215.3	6.63	0.2	0.7%	0.1%
	2	788,589.8	83.42	0.1	2.6%	1.1%
	3	388,334.3	23.17	0.1	0.7%	0.3%
	Total	1,208,139.4	113.22	0.1	-	1.5%
Pollock bottom (All gears)	1	17,479.8	26.86	1.5	2.8%	0.4%
	2	81,997.3	78.16	1.0	2.5%	1.1%
	3	19,350.2	20.36	1.1	0.6%	0.3%
	Total	118,827.3	125.38	1.1	-	1.7%
Other (Trawl)	1	31,635.3	440.10	13.9	46.2%	6.0%
	2	100,800.4	1,285.40	12.8	40.4%	17.5%
	3	46,717.9	1,509.04	32.3	47.0%	20.5%
	Total	179,153.6	3,234.54	18.1	-	44.0%
Other (Longline)	1	136.8	18.79	137.4	2.0%	0.3%
	2	44,879.7	1,337.50	29.8	42.0%	18.2%
	3	5,940.9	404.07	68.0	12.6%	5.5%
	Total	50,957.4	1,760.36	34.5	-	24.0%
Other (Pot)	1	542.1	3.67	6.8	0.4%	0.0%
	2	511.2	4.08	8.0	0.1%	0.1%
	3	364.8	13.77	37.7	0.4%	0.2%
	Total	1,418.1	21.52	15.2	-	0.3%
Turbot (All gears)	1	71.6	5.79	80.9	0.6%	0.1%
	2	3,776.2	199.08	52.7	6.3%	2.7%
	3	13,361.9	671.79	50.3	20.9%	9.1%
	Total	17,209.7	876.66	50.9	-	11.9%
Sablefish (Trawl)	1	nf	nf	nf	nf	nf
	2	352.5	3.20	9.1	0.1%	0.0%
	3	110.6	1.64	14.8	0.1%	0.0%
	Total	463.1	4.84	10.5	-	0.1%
Sablefish (Longline)	1	323.6	24.40	75.4	2.6%	0.3%
	2	487.6	48.72	99.9	1.5%	0.7%
	3	2,733.1	212.74	77.8	6.6%	2.9%
	Total	3,544.3	285.86	80.7	-	3.9%
Rockfish (All gears)	1	nf	nf	nf	nf	nf
	2	6,847.4	60.51	8.8	1.9%	0.8%
	3	24,655.7	180.18	7.3	5.6%	2.5%
	Total	31,503.1	240.69	7.6	-	3.3%
Atka mackerel (All gears)	1	nf	nf	nf	nf	nf
	2	nf	nf	nf	nf	nf
	3	30,807.7	106.33	3.5	3.3%	1.4%
	Total	30,807.7	106.33	3.5	-	1.4%
Total (All gears)	1	116,620.1	952.68	8.2	-	13.0%
	2	1,040,366.8	3,182.13	3.1	-	43.3%
	3	549,391.7	3,209.99	5.8	-	43.7%
	Total	1,706,378.6	7,344.80	4.3	-	-

nf = No fishing.

Table 15.--Monthly bycatch rates (number per metric ton of catch) and average weight (kg) of Chionoecetes bairdi snow (Tanner) crab taken in domestic groundfish fisheries by gear type, target fishery, and NPFMC area,1990.

	Area 511		Area 512		Area 513		Area 514		Area 515		Area 516		Area 517		Area 521		Area 522		Area 540	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Bottom trawl (flatfish target)																				
Jan.	23.697	0.30	--	--	7.530	0.48	--	--	ns	ns	14.402	0.45	3.476	0.24	108.660	0.43	--	--	--	--
Feb.	10.643	0.36	--	--	1.470	0.56	--	--	ns	ns	4.589	0.48	11.183	0.51	116.332	ns	--	--	--	--
Mar.	3.593	0.36	--	--	3.036	0.48	--	--	3.316	0.12	--	--	5.793	0.16	1.281	0.22	0.000	0.00	--	--
Apr.	12.670	0.24	2.303	0.20	0.681	0.38	--	--	--	--	--	--	4.738	0.08	ns	ns	--	--	--	--
May	10.388	0.34	1.641	0.37	--	--	--	--	0.000	0.00	4.606	0.21	28.741	0.32	0.419	0.02	--	--	--	--
June	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.511	0.19	--	--	0.000	0.00
July	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aug.	--	--	--	--	4.389	0.30	0.678	0.24	0.000	0.00	--	--	5.928	0.11	--	--	0.000	0.00	--	--
Sep.	--	--	--	--	24.634	0.24	0.926	0.32	--	--	--	--	1.477	0.10	--	--	ns	ns	--	--
Oct.	--	--	--	--	26.918	0.28	2.288	0.17	--	--	--	--	0.000	0.00	--	--	0.019	0.56	--	--
Nov.	--	--	--	--	17.366	0.21	6.386	0.12	--	--	--	--	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	0.975	0.46	--	--	--	--	--	--
Year	12.059	0.33	1.799	0.32	18.801	0.26	2.097	0.17	0.798	0.12	12.192	0.44	7.190	0.31	3.929	0.35	0.016	0.56	0.000	0.00
Bottom trawl (pollock target)																				
Jan.	0.022	0.31	--	--	--	--	--	--	ns	ns	1.559	0.75	0.000	0.00	--	--	--	--	ns	ns
Feb.	0.302	0.52	--	--	0.003	0.82	--	--	0.895	0.27	--	--	1.303	0.62	24.235	0.62	--	--	--	--
Mar.	0.355	0.21	--	--	0.053	0.44	--	--	ns	ns	0.000	0.00	0.017	0.25	0.147	0.25	--	--	--	--
Apr.	0.656	0.21	--	--	0.031	0.39	--	--	--	--	--	--	0.048	0.41	11.120	0.30	--	--	0.000	0.00
May	3.387	0.30	--	--	0.323	0.74	--	--	--	--	2.580	0.15	0.019	0.28	0.042	0.20	0.000	0.00	0.000	0.00
June	--	--	--	--	--	--	--	--	0.135	0.04	--	--	--	--	0.594	0.22	0.000	0.00	0.000	0.00
July	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
Aug.	--	--	--	--	0.000	0.00	--	--	0.008	0.20	--	--	0.000	0.00	0.000	0.00	--	--	0.000	0.00
Sep.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	--	--	3.716	0.03	0.000	0.00	0.000	0.00
Oct.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.556	0.19	--	--	0.000	0.00
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.649	0.25	--	--	0.047	0.46	--	--	0.097	0.12	0.667	0.31	0.049	0.46	1.252	0.29	0.000	0.00	0.000	0.00

Table 15.--Continued.

	Area 511		Area 512		Area 513		Area 514		Area 515		Area 516		Area 517		Area 521		Area 522		Area 540	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Bottom trawl (other targets)																				
Jan.	17.164	0.19	--	--	--	--	--	--	18.946	0.12	0.256	0.22	5.078	0.20	--	--	--	--	0.049	0.10
Feb.	19.959	0.20	--	--	0.519	0.39	--	--	0.487	0.05	ns	ns	3.785	0.13	--	--	--	--	0.997	0.14
Mar.	1.867	0.33	--	--	0.124	0.47	--	--	0.255	0.15	--	--	2.816	0.12	0.282	0.24	0.000	0.00	0.009	0.20
Apr.	3.079	0.24	--	--	1.292	0.49	--	--	0.086	0.07	--	--	5.401	0.21	1.805	0.25	0.067	0.01	0.000	0.00
May	9.973	0.30	13.104	0.15	1.802	0.34	--	--	0.049	0.31	6.464	0.19	1.960	0.15	0.941	0.15	0.823	0.15	0.008	0.37
June	--	--	--	--	0.000	0.00	--	--	0.062	0.31	--	--	ns	ns	0.759	0.16	0.000	0.00	0.001	0.10
July	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	1.074	0.05	0.343	0.17	0.015	0.36
Aug.	--	--	--	--	0.000	0.00	--	--	0.810	0.18	--	--	0.839	0.26	0.190	0.11	0.027	0.20	0.017	0.17
Sep.	--	--	--	--	--	--	--	--	0.001	0.10	--	--	0.000	0.00	0.593	0.05	0.042	0.04	0.004	0.34
Oct.	--	--	--	--	16.056	0.99	--	--	0.014	0.30	--	--	ns	ns	10.087	0.21	--	--	0.293	0.13
Nov.	--	--	--	--	65.772	0.15	--	--	--	--	--	--	--	--	--	--	--	--	0.286	0.27
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	20.367	0.22	--	--	--	--	0.001	0.05
Year	10.254	0.23	13.104	0.15	1.227	0.39	--	--	0.586	0.12	6.337	0.19	5.657	0.15	0.777	0.17	0.047	0.10	0.040	0.18
Pelagic trawl (pollock target)																				
Jan.	0.000	0.00	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--	ns	ns
Feb.	0.002	0.90	--	--	<0.001	0.50	--	--	<0.001	0.37	--	--	0.000	0.00	--	--	--	--	--	--
Mar.	0.004	0.54	--	--	<0.001	0.61	--	--	0.000	0.00	0.000	0.00	0.001	0.59	0.005	0.10	--	--	--	--
Apr.	0.003	0.20	--	--	<0.001	0.80	--	--	ns	ns	--	--	0.007	0.42	0.057	0.09	0.000	0.00	ns	ns
May	0.011	0.23	ns	ns	0.002	0.43	--	--	0.000	0.00	--	--	<0.001	0.50	0.000	0.00	0.000	0.00	--	--
June	0.000	0.00	--	--	0.000	0.00	--	--	0.013	0.08	--	--	0.014	0.27	0.005	0.16	0.000	0.00	--	--
July	0.009	0.66	--	--	0.000	0.00	0.000	0.00	0.117	0.05	--	--	0.002	0.37	0.076	0.22	0.003	0.05	--	--
Aug.	0.613	1.32	--	--	0.298	0.26	0.000	0.00	0.030	0.07	--	--	0.673	0.17	0.382	0.29	0.012	0.28	--	--
Sep.	0.000	0.00	--	--	0.188	0.35	--	--	0.005	0.17	--	--	0.042	0.18	0.038	0.27	0.000	0.00	--	--
Oct.	0.000	0.00	--	--	2.532	0.23	--	--	0.006	0.10	--	--	0.103	0.15	0.060	0.22	0.004	0.35	0.000	0.00
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	0.000	0.00
Year	0.004	0.48	ns	ns	0.011	0.28	0.000	0.00	0.006	0.06	0.000	0.00	0.185	0.17	0.114	0.27	0.004	0.35	0.000	0.00

Table 15.--Continued.

	Area 511		Area 512		Area 513		Area 514		Area 515		Area 516		Area 517		Area 521		Area 522		Area 540	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Pelagic trawl (other targets)																				
Jan.	0.000	0.00	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--	ns	ns
Feb.	0.000	0.00	--	--	--	--	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--
Mar.	0.000	0.00	--	--	0.007	0.70	--	--	0.000	0.00	--	--	0.000	0.00	ns	ns	--	--	--	--
Apr.	0.986	0.71	--	--	0.000	0.00	--	--	ns	ns	--	--	0.000	0.00	0.000	0.00	--	--	--	--
May	ns	ns	--	--	0.000	0.00	--	--	ns	ns	--	--	0.000	0.00	0.000	0.00	--	--	ns	ns
June	--	--	--	--	--	--	--	--	0.249	0.17	--	--	0.543	0.41	0.804	0.17	0.000	0.00	ns	ns
July	0.101	0.15	--	--	--	--	--	--	2.223	0.05	--	--	0.032	0.33	3.168	0.14	0.000	0.00	--	--
Aug.	0.000	0.00	--	--	2.544	0.39	--	--	2.861	0.11	--	--	0.290	0.07	0.541	0.26	0.000	0.00	--	--
Sep.	0.000	0.00	--	--	0.035	0.89	--	--	2.361	0.53	--	--	1.553	0.27	4.108	0.17	0.000	0.00	--	--
Oct.	3.049	0.41	--	--	2.506	0.29	11.846	0.08	0.946	0.14	--	--	3.161	0.27	0.245	0.30	0.000	0.00	0.000	0.00
Nov.	140.802	0.17	--	--	0.477	0.40	0.481	0.18	0.000	0.00	--	--	15.477	0.19	0.145	0.10	0.000	0.00	--	--
Dec.	--	--	--	--	--	--	--	--	0.377	0.30	--	--	11.633	0.24	--	--	--	--	ns	ns
Year	2.276	0.27	--	--	0.218	0.39	10.938	0.08	1.280	0.24	--	--	6.109	0.21	2.128	0.17	0.000	0.00	0.000	0.00
Longline (sablefish target)																				
Jan.	--	--	--	--	--	--	--	--	ns	ns	--	--	ns	ns	ns	ns	--	--	ns	ns
Feb.	--	--	--	--	--	--	--	--	ns	ns	--	--	ns	ns	ns	ns	--	--	ns	ns
Mar.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--	0.000	0.00
Apr.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--	--	--
May	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	--	--	0.000	0.00
June	ns	ns	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
July	ns	ns	ns	ns	--	--	--	--	0.008	1.20	ns	ns	0.000	0.00	0.000	0.00	ns	ns	0.000	0.00
Aug.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	--	--	0.000	0.00
Sep.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00
Oct.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.056	0.75
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	0.000	0.00
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns
Year	ns	ns	ns	ns	--	--	--	--	0.002	1.20	ns	ns	0.000	0.00	0.000	0.00	0.000	0.00	0.006	0.75

Table 15.--Continued.

	Area 511		Area 512		Area 513		Area 514		Area 515		Area 516		Area 517		Area 521		Area 522		Area 540	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Longline (Pacific cod target)																				
Jan.	--	--	--	--	--	--	--	--	--	--	--	--	0.051	0.66	0.000	0.00	--	--	--	--
Feb.	--	--	--	--	ns	ns	--	--	ns	ns	--	--	0.000	0.00	0.022	0.96	0.020	0.70	--	--
Mar.	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	0.007	0.50	0.000	0.00	0.000	0.00
Apr.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.001	0.40	0.000	0.00	--	--
May	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.007	0.49	0.000	0.00	0.000	0.00
June	0.000	0.00	3.584	0.85	--	--	--	--	0.000	0.00	0.000	0.00	0.025	0.87	0.015	0.60	0.000	0.00	0.000	0.00
July	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.062	0.62	0.010	0.72	0.035	0.31	0.000	0.00
Aug.	ns	ns	--	--	3.576	0.90	--	--	0.000	0.00	--	--	0.048	0.75	0.008	0.49	0.010	0.60	0.000	0.00
Sep.	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	0.085	0.58	0.016	0.64	0.043	0.22	0.000	0.00
Oct.	--	--	--	--	ns	ns	--	--	0.000	0.00	--	--	0.091	0.43	0.124	0.66	0.000	0.00	0.000	0.00
Nov.	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	0.018	0.10	0.016	0.80	0.000	0.00	0.000	0.00
Dec.	0.760	0.23	--	--	0.082	0.20	--	--	0.000	0.00	--	--	0.047	0.63	0.024	0.94	0.000	0.00	--	--
Year	0.658	0.23	3.584	0.85	0.821	0.88	--	--	0.000	0.00	0.000	0.00	0.054	0.58	0.027	0.68	0.011	0.34	0.000	0.00
Longline (other targets)																				
Jan.	--	--	--	--	--	--	--	--	ns	ns	--	--	ns	ns	--	--	--	--	ns	ns
Feb.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns
Mar.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--	0.000	0.00
Apr.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
May	ns	ns	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--	0.000	0.00
June	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
July	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	--	--	0.000	0.00
Aug.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	--	--	--	--
Sep.	--	--	--	--	--	--	--	--	ns	ns	--	--	ns	ns	0.000	0.00	--	--	ns	ns
Oct.	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	ns	ns	--	--	0.000	0.00
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--	--	--	--	--
Year	ns	ns	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00

Table 15.--Continued.

	Area 511		Area 512		Area 513		Area 514		Area 515		Area 516		Area 517		Area 521		Area 522		Area 540	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Pot vessels (all targets)																				
Jan.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mar.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Apr.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
May	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns
June	--	--	--	--	--	--	--	--	--	--	--	--	173.160	0.20	--	--	--	--	--	--
July	35.977	0.38	43.915	0.44	--	--	--	--	0.117	0.10	--	--	0.000	0.00	27.621	0.43	537.560	0.38	--	--
Aug.	6.773	0.18	--	--	10.175	0.52	--	--	1.207	0.95	--	--	47.948	0.25	30.125	0.41	--	--	--	--
Sep.	0.178	0.22	--	--	17.130	0.55	--	--	0.000	0.00	--	--	25.917	0.59	1.205	0.40	0.310	0.11	--	--
Oct.	38.348	0.50	--	--	6.545	0.62	--	--	ns	ns	ns	ns	ns	ns	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	--	--	ns	ns	--	--	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	23.417	0.36	43.915	0.44	10.602	0.55	--	--	0.020	0.52	ns	ns	43.515	0.29	27.579	0.42	2.293	0.34	ns	ns

Dashes indicates areas not fished.

ns = Fishing occurred but no sampling by observers.

Table 16.--Monthly bycatch rates (number per metric ton of catch) and average weight (kg) of "other" snow (Tanner) crabs* taken in domestic groundfish fisheries by gear type and target fishery, 1990.

	Area 511		Area 512		Area 513		Area 514		Area 515		Area 516		Area 517		Area 521		Area 522		Area 540	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Bottom trawl (flatfish target)																				
Jan.	0.752	0.25	--	--	1.451	0.33	--	--	ns	ns	0.053	0.20	4.219	0.15	3.253	0.15	--	--	--	--
Feb.	0.526	0.27	--	--	8.452	0.36	--	--	ns	ns	0.073	0.10	10.235	0.34	ns	ns	--	--	--	--
Mar.	0.181	0.23	--	--	14.685	0.27	--	--	0.231	0.17	--	--	11.100	0.21	0.347	0.32	2.198	0.20	--	--
Apr.	0.106	0.18	0.000	0.00	1.883	0.20	--	--	--	--	--	--	0.678	0.17	ns	ns	--	--	--	--
May	0.740	0.32	0.000	0.00	--	--	--	--	0.000	0.00	0.016	0.23	16.124	0.26	0.000	0.00	--	--	--	--
June	--	--	--	--	--	--	--	--	--	--	--	--	--	--	48.299	0.09	--	--	0.000	0.00
July	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			--	--
Aug.	--	--	--	--	27.668	0.37	12.670	0.21	34.814	0.19	--	--	9.006	0.21	--	--	23.673	0.05	--	--
Sep.	--	--	--	--	109.921	0.28	24.319	0.19	--	--	--	--	22.162	0.50	--	--	ns	ns	--	--
Oct.	--	--	--	--	155.185	0.24	17.681	0.16	--	--	--	--	0.000	0.00	--	--	2.449	0.09	--	--
Nov.	--	--	--	--	63.478	0.17	24.885	0.08	--	--	--	--	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--
Year	0.512	0.27	0.000	0.00	93.975	0.25	18.696	0.16	24.812	0.19	0.048	0.19	9.102	0.26	23.852	0.09	3.841	0.08	0.000	0.00
Bottom trawl (pollock target)																				
Jan.	0.000	0.00	--	--	--	--	--	--	ns	ns	0.000	0.00	2.123	0.38	--	--	--	--	ns	ns
Feb.	0.023	0.64	--	--	2.818	0.11	--	--	0.298	0.44	--	--	0.057	0.46	3.029	0.20	0.000	0.00	--	--
Mar.	0.043	0.22	--	--	0.922	0.20	--	--	1.081	0.15	0.000	0.00	0.178	0.56	0.976	0.22	0.000	0.00	--	--
Apr.	0.045	0.22	--	--	0.178	0.28	--	--	--	--	--	--	0.496	0.15	0.163	0.25	0.000	0.00	0.000	0.00
May	1.131	0.25	--	--	0.000	0.00	--	--	--	--	0.000	0.00	0.044	0.34	0.119	0.26	0.140	0.17	0.000	0.00
June	--	--	--	--	--	--	--	--	0.000	0.00	--	--	--	--	10.803	0.24	188.341	0.14	0.000	0.00
July	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.180	0.15	0.019	0.09	0.000	0.00
Aug.	--	--	--	--	0.000	0.00	--	--	0.161	0.18	--	--	0.593	0.33	0.000	0.00	--	--	0.000	0.00
Sep.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	--	--	0.364	0.02	0.000	0.00	0.000	0.00
Oct.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.058	0.09	--	--	0.000	0.00
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.115	0.25	--	--	0.926	0.18	--	--	0.079	0.21	0.000	0.00	0.324	0.24	5.494	0.24	7.127	0.14	0.000	0.00

Table 16.--Continued.

	Area 511		Area 512		Area 513		Area 514		Area 515		Area 516		Area 517		Area 521		Area 522		Area 540	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Bottom trawl (other targets)																				
Jan.	1.218	0.91	--	--	--	--	--	--	4.377	0.27	0.000	0.00	1.048	0.24	--	--	--	--	0.049	0.10
Feb.	0.489	0.20	--	--	14.671	0.15	--	--	48.347	0.14	ns	ns	1.935	0.24	--	--	--	--	1.475	0.18
Mar.	0.189	0.17	--	--	25.032	0.15	--	--	7.581	0.21	--	--	11.233	0.12	0.418	0.28	7.188	0.12	0.267	0.22
Apr.	0.158	0.18	--	--	3.745	0.21	--	--	5.701	0.27	--	--	4.761	0.11	80.604	0.11	0.000	0.11	0.009	0.11
May	0.619	0.26	0.000	0.00	2.141	0.23	--	--	0.016	0.52	0.252	0.40	0.575	0.31	0.249	0.09	0.000	0.23	0.000	0.00
June	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	0.00	4.848	0.18	0.000	0.00	<0.001	0.06
July	--	--	--	--	--	--	--	--	0.000	0.00	--	--	3.037	0.35	0.035	0.22	0.019	0.58	0.000	0.00
Aug.	--	--	--	--	13.356	0.41	--	--	10.008	0.22	--	--	3/351	0.26	1.772	0.26	3.257	0.12	0.066	0.16
Sep.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.077	0.17	0.000	0.00	0.001	0.45
Oct.	--	--	--	--	103.557	0.44	--	--	0.000	0.00	--	--	--	--	2.109	0.28	--	--	0.009	0.20
Nov.	--	--	--	--	29.530	0.27	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	--	--	--	--	0.111	0.20
Year	0.559	0.51	0.000	0.00	10.690	0.17	--	--	12.630	0.17	0.247	0.40	5.928	0.13	7.497	0.13	2.968	0.08	0.023	0.16
Pelagic trawl (pollock target)																				
Jan.	0.000	0.00	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--	ns	ns
Feb.	0.000	0.00	--	--	0.037	0.15	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--	--	--
Mar.	0.002	0.51	--	--	0.017	0.39	--	--	0.000	0.00	0.000	0.00	0.007	0.20	0.024	0.41	--	--	--	--
Apr.	0.001	0.10	--	--	0.001	0.18	--	--	ns	ns	--	--	0.025	0.33	0.006	0.18	0.000	0.00	ns	ns
May	0.011	0.28	ns	ns	0.015	0.21	--	--	0.000	0.00	--	--	0.002	0.46	0.000	0.00	0.000	0.00	--	--
June	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	--	--	0.012	0.45	0.031	0.23	0.000	0.00	--	--
July	<0.001	1.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--	0.002	0.29	0.563	0.17	0.009	0.25	--	--
Aug.	0.000	0.00	--	--	43.607	0.15	0.000	0.00	0.000	0.00	--	--	0.000	0.29	0.929	0.14	0.141	0.21	--	--
Sep.	0.000	0.00	--	--	1.841	0.13	--	--	<0.001	0.13	--	--	0.010	0.26	0.841	0.19	0.000	0.00	--	--
Oct.	0.000	0.00	--	--	2.837	0.28	--	--	0.000	0.00	--	--	0.010	0.07	0.042	0.37	0.197	0.21	<0.001	0.12
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	0.000	0.00
Year	0.001	0.40	ns	ns	1.076	0.15	0.000	0.00	<0.001	0.13	0.000	0.00	0.008	0.30	0.484	0.17	0.048	0.22	<0.001	0.12

Table 16.--Continued.

	Area 511		Area 512		Area 513		Area 514		Area 515		Area 516		Area 517		Area 521		Area 522		Area 540	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Pelagic trawl (other targets)																				
Jan.	0.000	0.00	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--	ns	ns
Feb.	0.000	0.00	--	--	--	--	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--
Mar.	0.000	0.00	--	--	0.770	0.15	--	--	0.000	0.00	--	--	0.000	0.00	ns	ns	--	--	--	--
Apr.	0.000	0.00	--	--	0.000	0.00	--	--	ns	ns	--	--	0.000	0.00	0.000	0.00	--	--	--	--
May	ns	ns	--	--	0.000	0.00	--	--	ns	ns	--	--	0.000	0.00	0.000	0.00	--	--	ns	ns
June	--	--	--	--	--	--	--	--	0.061	0.23	--	--	0.217	0.34	9.030	0.17	--	--	ns	ns
July	0.000	0.00	--	--	--	--	--	--	0.000	0.00	--	--	0.200	0.18	5.484	0.20	--	--	--	--
Aug.	0.000	0.00	--	--	73.161	0.15	--	--	0.306	0.25	--	--	0.015	0.20	2.678	0.24	--	--	--	--
Sep.	--	--	--	--	0.408	0.31	--	--	0.000	0.00	--	--	0.247	0.42	11.423	0.11	0.000	0.00	--	--
Oct.	1.439	0.30	--	--	21.010	0.52	14.241	0.17	0.008	0.21	--	--	0.065	0.33	0.387	0.16	--	--	0.000	0.00
Nov.	1.284	0.40	--	--	11.185	0.37	45.184	0.09	0.000	0.00	--	--	0.817	0.48	5.804	0.48	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.053	0.22	--	--	--	--	ns	ns
Year	0.328	0.30	--	--	5.663	0.19	16.713	0.15	0.042	0.24	--	--	0.266	0.45	5.890	0.15	0.000	0.00	0.000	0.00
Longline vessels (sablefish target)																				
Jan.	--	--	--	--	--	--	--	--	ns	ns	--	--	ns	ns	ns	ns	--	--	ns	ns
Feb.	--	--	--	--	--	--	--	--	ns	ns	--	--	ns	ns	ns	ns	--	--	ns	ns
Mar.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--	0.000	0.00
Apr.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--	--	--
May	--	--	--	--	--	--	--	--	0.073	0.84	--	--	0.000	0.00	0.000	0.00	--	--	0.000	0.00
June	ns	ns	--	--	--	--	--	--	0.000	0.00	--	--	0.188	0.86	0.000	0.00	0.000	0.00	0.000	0.00
July	ns	ns	ns	ns	--	--	--	--	0.000	0.00	ns	ns	0.732	0.92	0.000	0.00	ns	ns	0.010	0.01
Aug.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	3.060	0.90	--	--	0.000	0.00
Sep.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00
Oct.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	0.000	0.00
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns
Year	ns	ns	ns	ns	--	--	--	--	0.011	0.84	ns	ns	0.287	0.90	3.060	0.90	0.000	0.00	0.002	0.01

Table 16.--Continued.

	Area 511		Area 512		Area 513		Area 514		Area 515		Area 516		Area 517		Area 521		Area 522		Area 540	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Longline vessels (Pacific cod target)																				
Jan.	--	--	--	--	--	--	--	--	--	--	--	--	0.123	0.55	0.008	0.05	--	--	--	--
Feb.	--	--	--	--	ns	ns	--	--	--	--	--	--	0.000	0.00	0.313	1.12	0.000	0.00	--	--
Mar.	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	0.109	0.53	0.000	0.00	0.000	0.00
Apr.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--
May	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.006	0.39	0.000	0.00	0.000	0.00
June	0.000	0.00	0.000	0.00	--	--	--	--	0.000	0.00	0.000	0.00	0.038	0.30	0.033	0.55	0.032	0.30	0.000	0.00
July	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.225	0.49	0.180	0.55	0.004	0.30	0.000	0.00
Aug.	ns	ns	--	--	4.081	0.53	--	--	0.000	0.00	--	--	0.256	1.52	0.161	0.50	0.000	0.00	--	--
Sep.	--	--	--	--	0.092	0.61	--	--	0.000	0.00	--	--	0.292	0.52	0.136	0.51	0.000	0.00	0.000	0.00
Oct.	--	--	--	--	ns	ns	--	--	0.000	0.00	--	--	0.399	0.51	0.544	0.49	0.071	0.63	0.000	0.00
Nov.	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	--	--	0.597	0.20	0.094	0.78	0.012	0.50	0.000	0.00
Dec.	1.164	0.66	--	--	0.284	1.95	--	--	6.631	0.37	--	--	0.092	0.51	0.269	0.59	2.305	0.50	--	--
Year	1.008	0.66	0.000	0.00	1.029	0.65	--	--	0.132	0.37	0.000	0.00	0.221	0.69	0.176	0.56	0.063	0.50	0.000	0.00
Longline vessels (other target)																				
Jan.	--	--	--	--	--	--	--	--	ns	ns	--	--	ns	ns	--	--	--	--	ns	ns
Feb.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns
Mar.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--	0.000	0.00
Apr.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--	--	--
May	ns	ns	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--	0.000	0.00
June	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
July	--	--	--	--	--	--	--	--	0.073	0.42	--	--	0.062	1.39	0.000	0.00	--	--	0.000	0.00
Aug.	--	--	--	--	--	--	--	--	0.114	0.50	--	--	0.073	0.47	0.033	0.60	--	--	--	--
Sep.	--	--	--	--	--	--	--	--	ns	ns	--	--	ns	ns	0.000	0.00	--	--	ns	ns
Oct.	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	ns	ns	--	--	0.000	0.00
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--	--	--	--	--
Year	ns	ns	--	--	--	--	--	--	0.047	0.43	--	--	0.066	0.72	0.015	0.60	0.000	0.00	0.000	0.00

Table 16.--Continued.

	Area 511		Area 512		Area 513		Area 514		Area 515		Area 516		Area 517		Area 521		Area 522		Area 540	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Pot vessels (all targets)																				
Jan.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mar.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Apr.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
May	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns
June	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	--	--	8.658	0.40	--	--	--	--	--	--
July	2.557	0.38	0.000	0.00	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	72.682	0.18	7,735.791	0.20	--	--
Aug.	0.094	0.34	0.000	0.00	154.755	0.34	--	--	0.000	0.00	--	--	923.538	0.15	9.669	0.46	--	--	--	--
Sep.	0.000	0.00	0.000	0.00	65.594	0.45	--	--	0.000	0.00	--	--	87.964	0.40	77.422	0.31	320.106	0.12	--	--
Oct.	0.000	0.00	0.000	0.00	34.944	0.51	--	--	0.000	0.00	ns	ns	ns	ns	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	--	--	ns	ns	--	--	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	1.503	0.36	0.000	0.00	91.506	0.38	--	--	0.000	0.00	ns	ns	753.898	0.16	40.675	0.23	384.395	0.13	ns	ns

*Species include Chionoecetes opilio, C. angulatus, C. tanneri, and C. bairdiXC. opilio hybrid crabs.

Dashes indicate areas not sampled.

ns = Fishing occurred in this area but no sampling by observers.

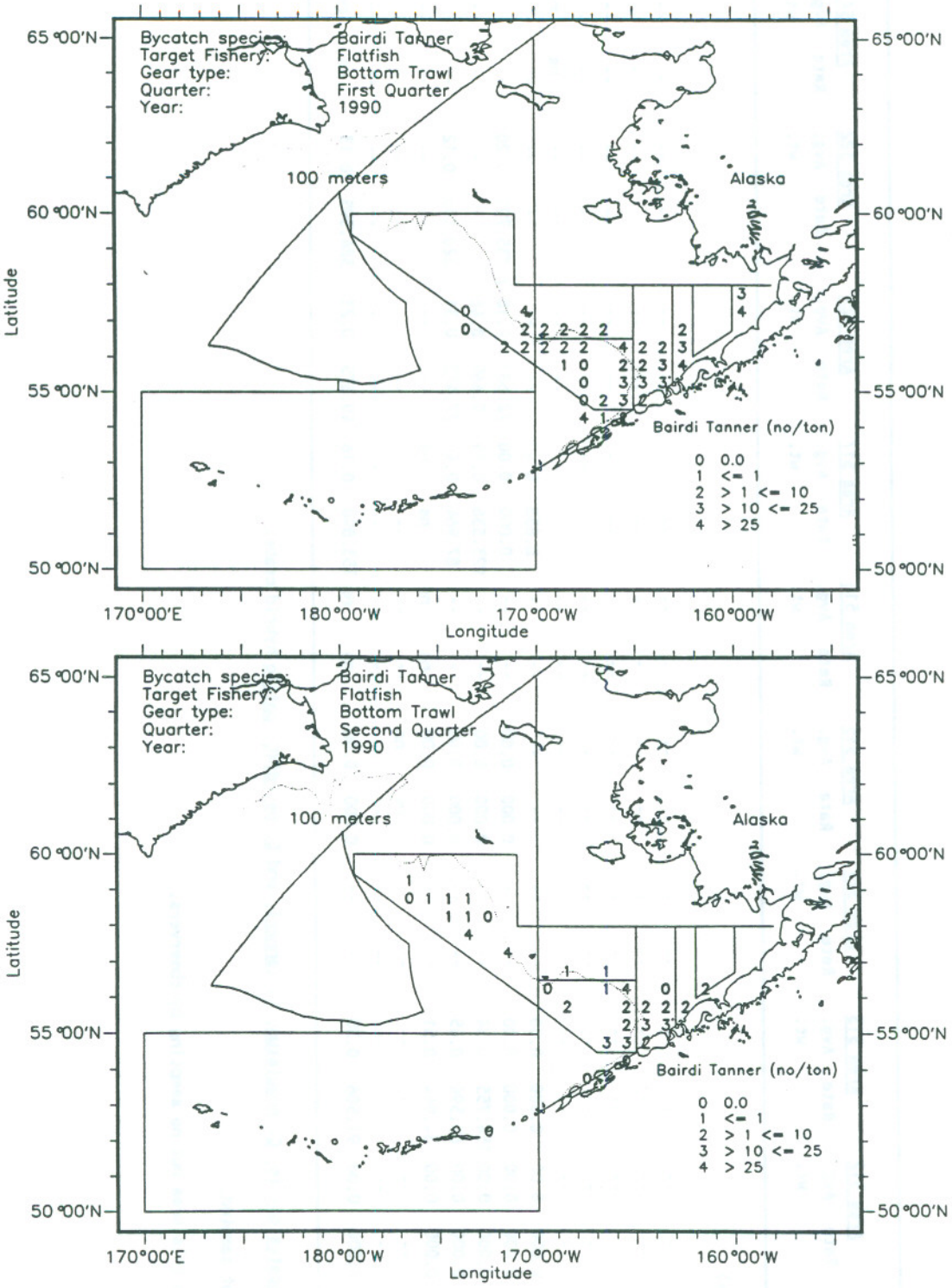


Figure 5.--Average incidence (no./t) of C.bairdi Tanner crab in the U.S. domestic fisheries by quarter, target fishery, gear type, and 1/2° latitude by 1/2° longitude areas in the Bering Sea-Aleutians Islands region, 1990.

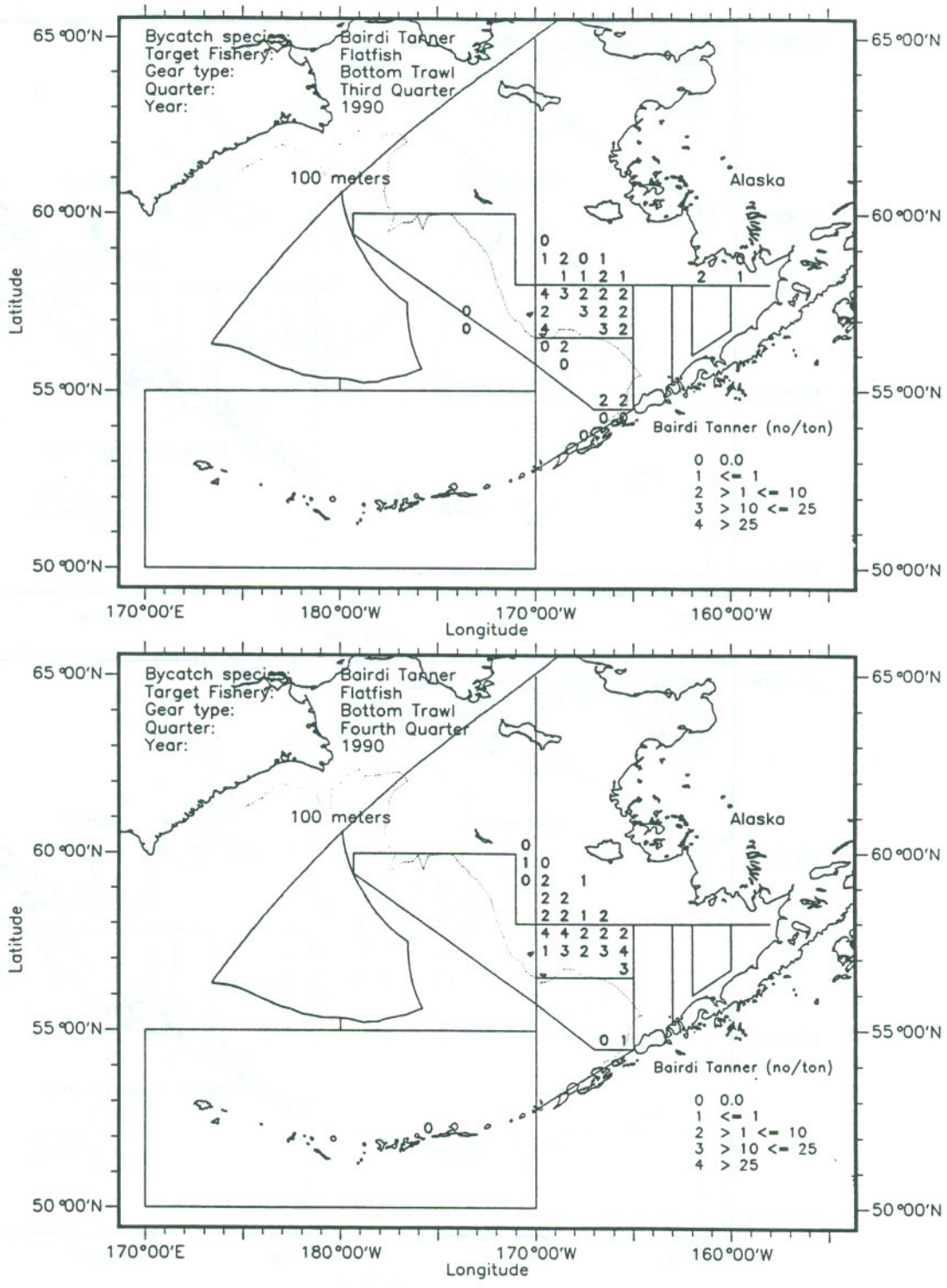


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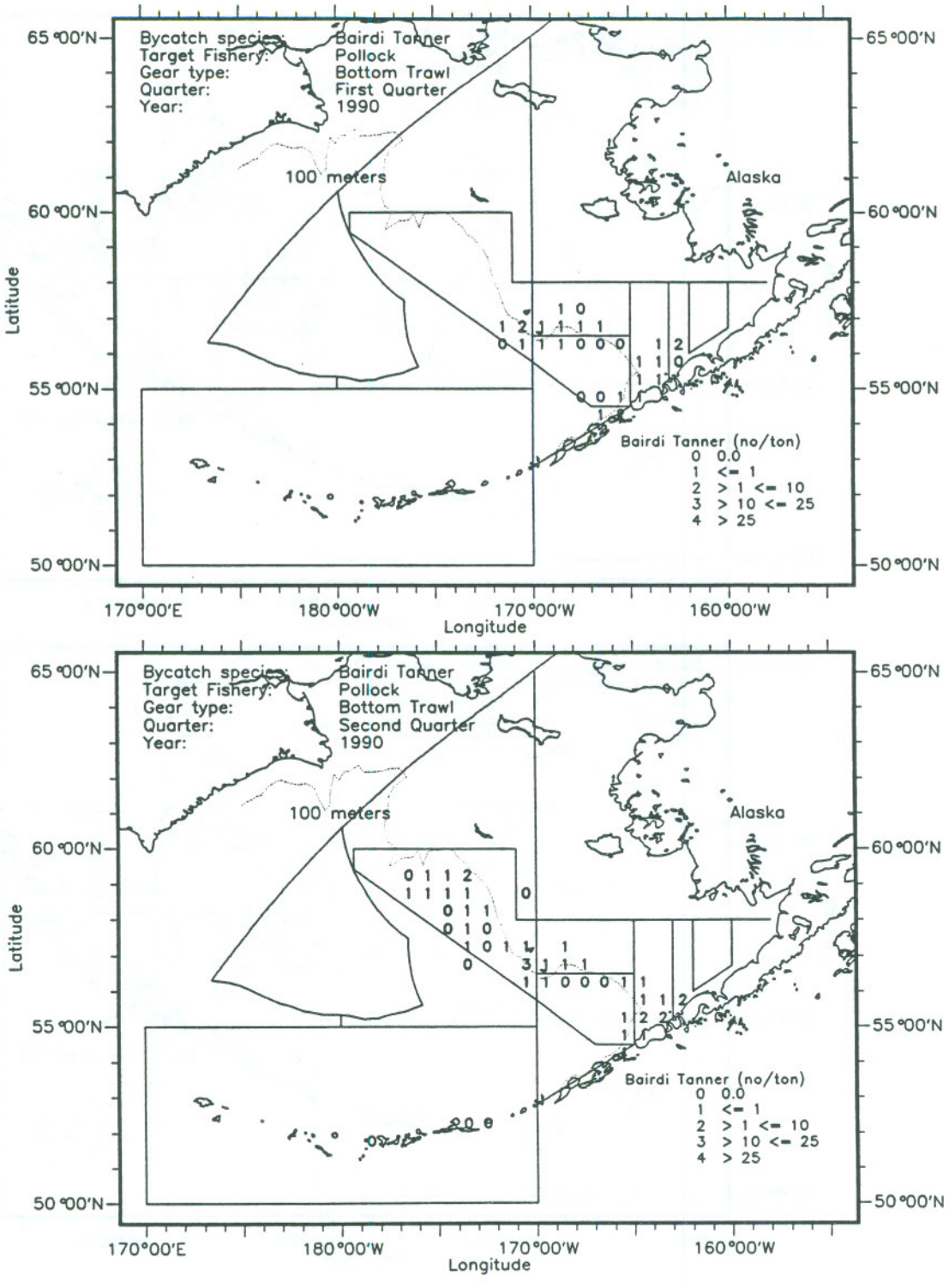


Figure 5.--Continued.

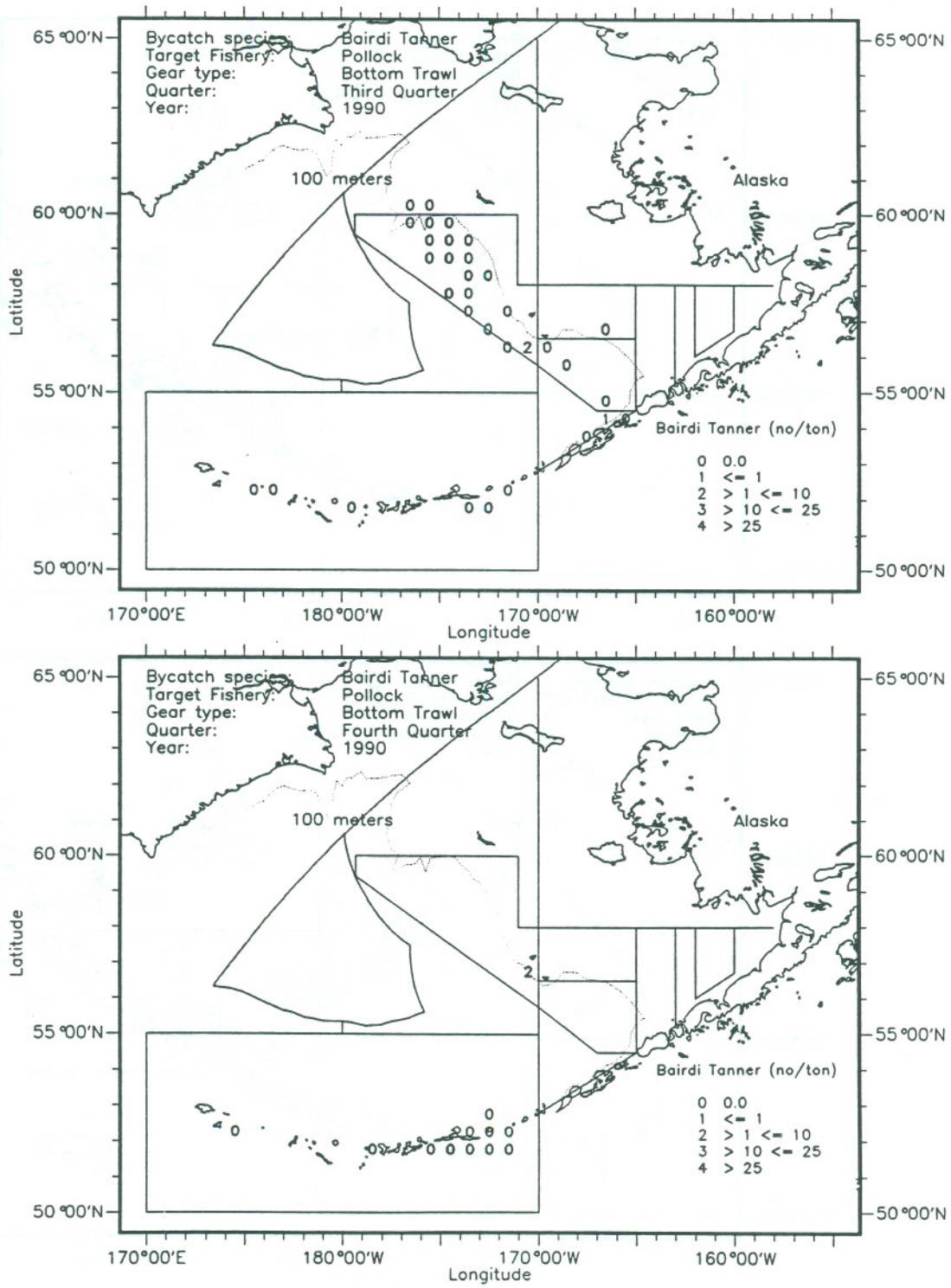


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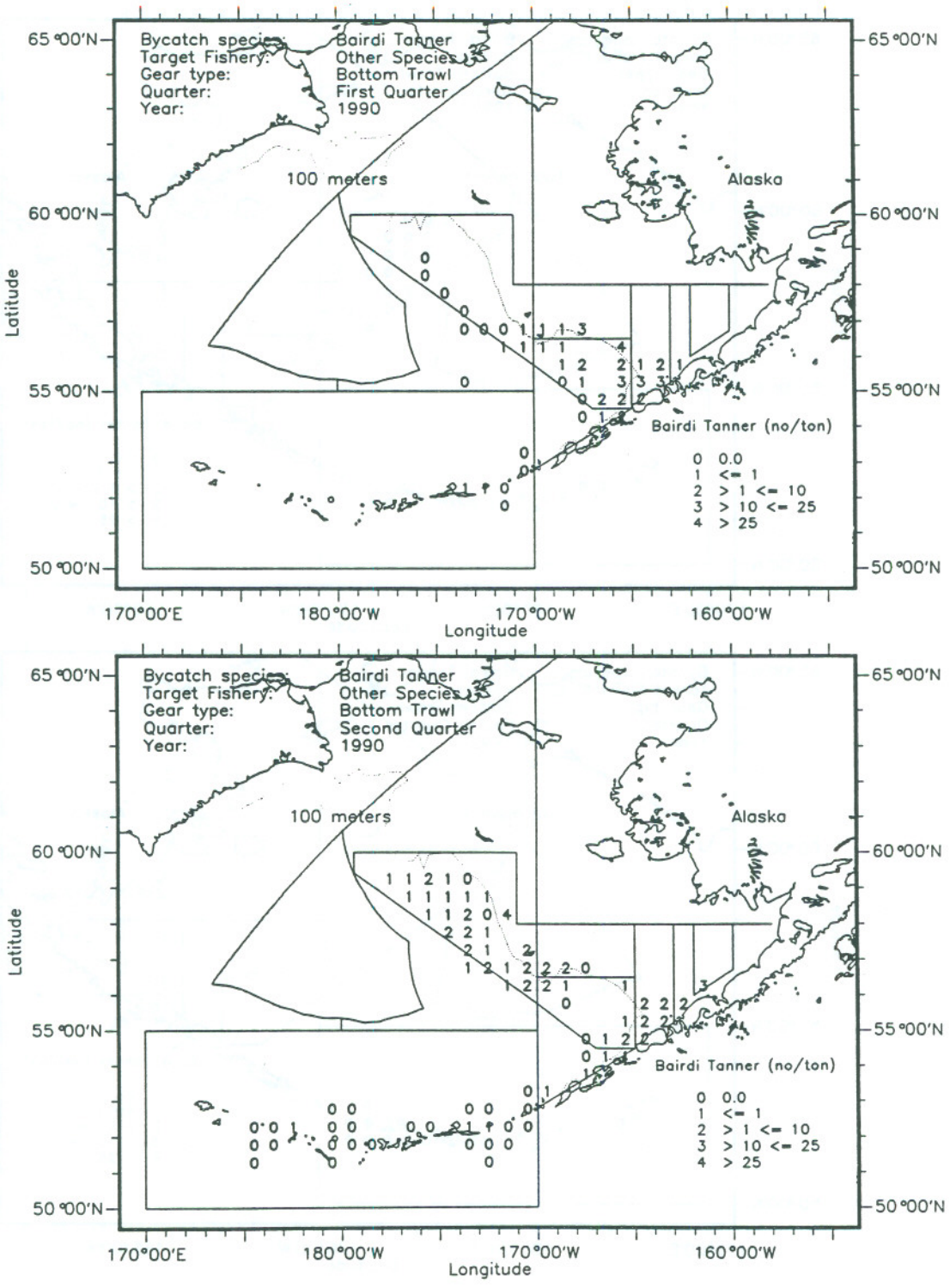


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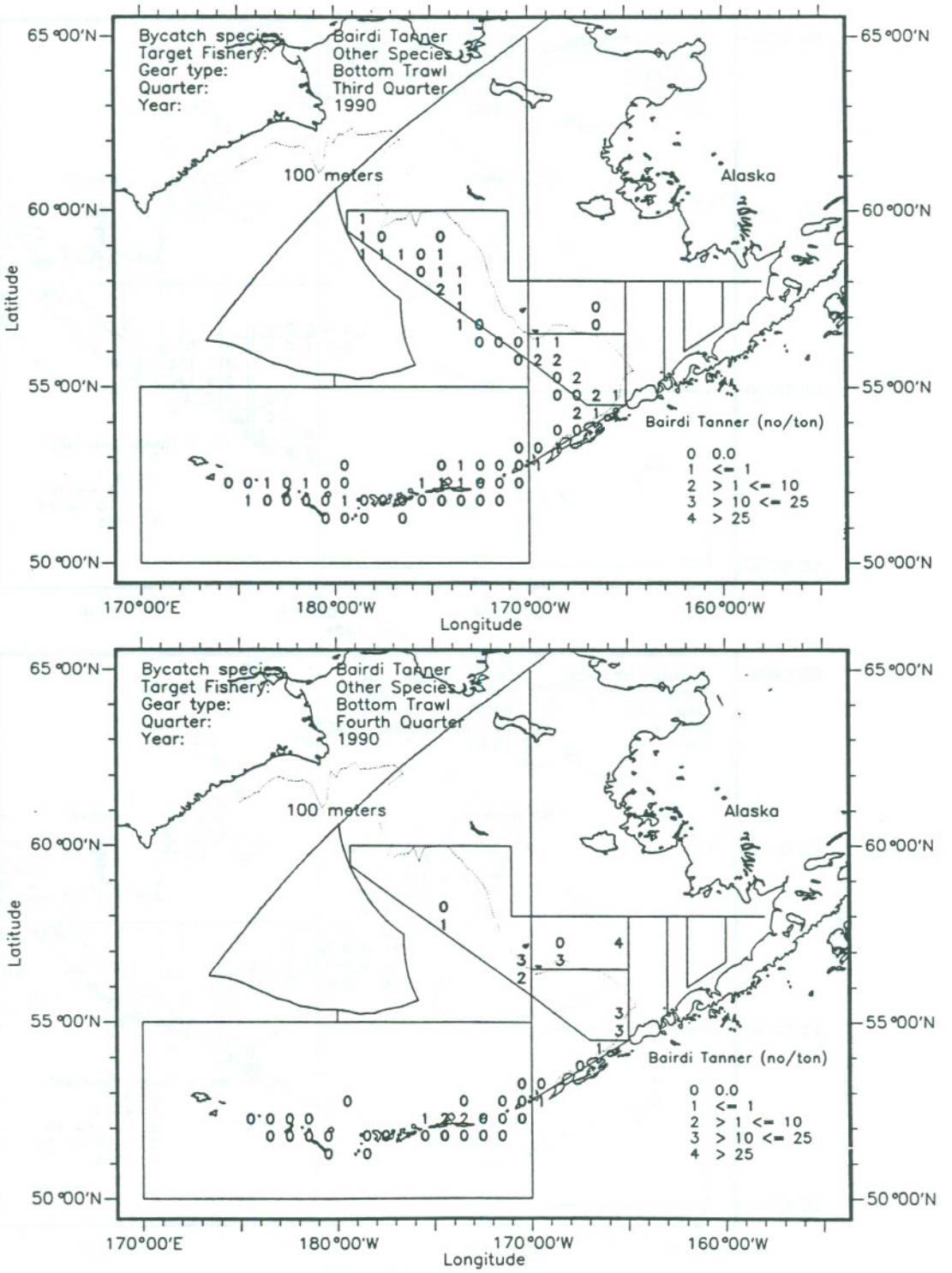


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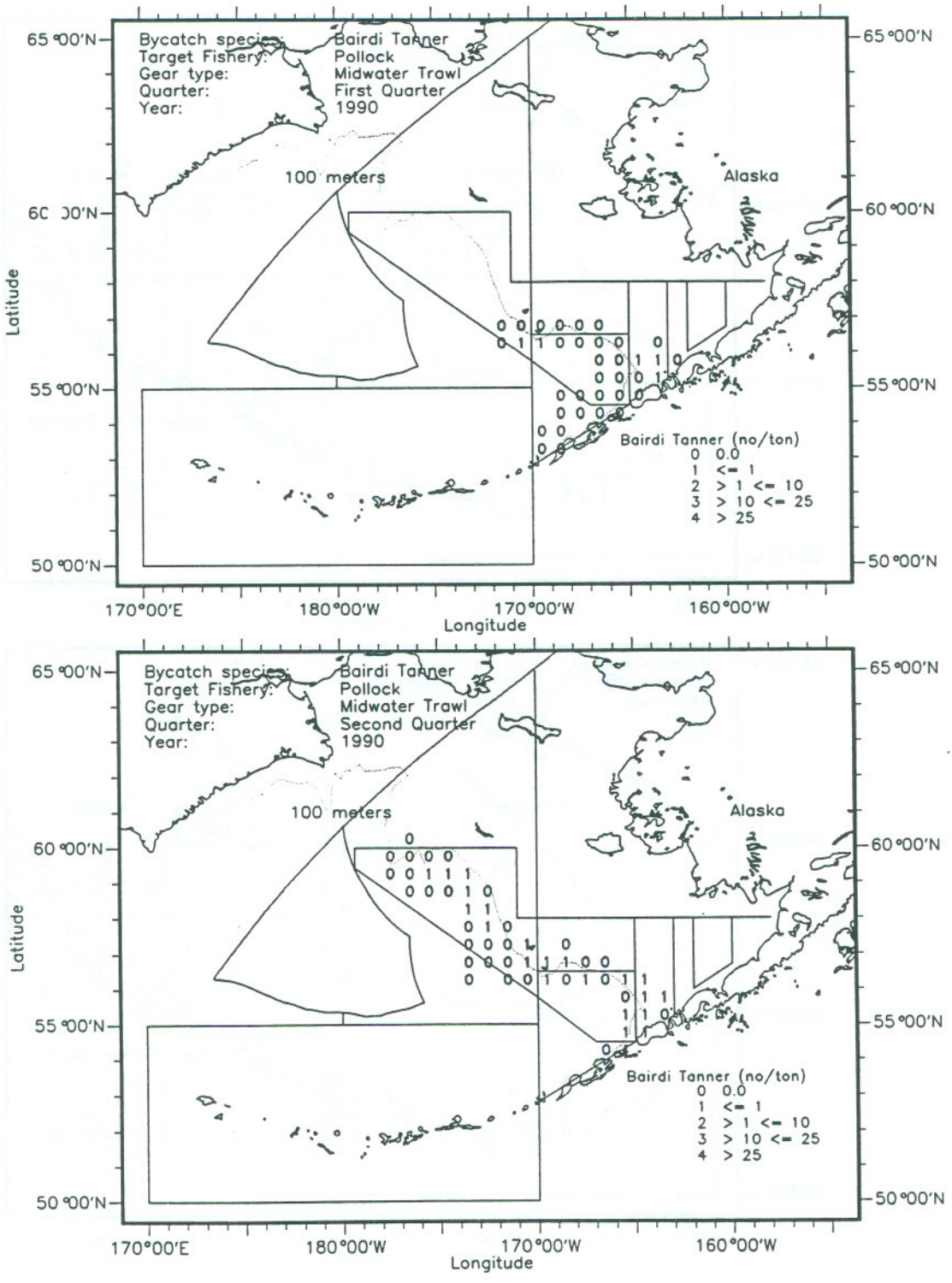


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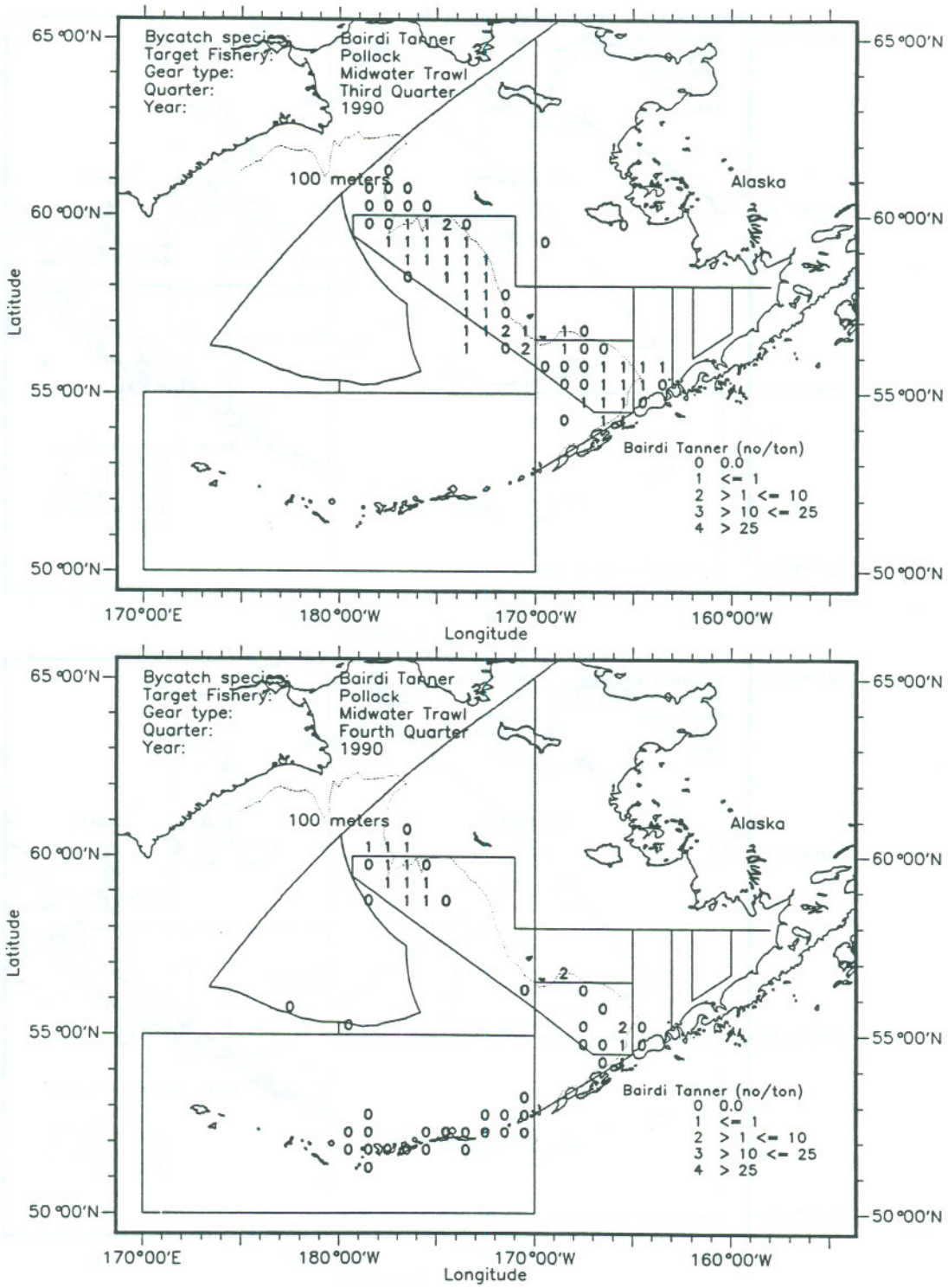


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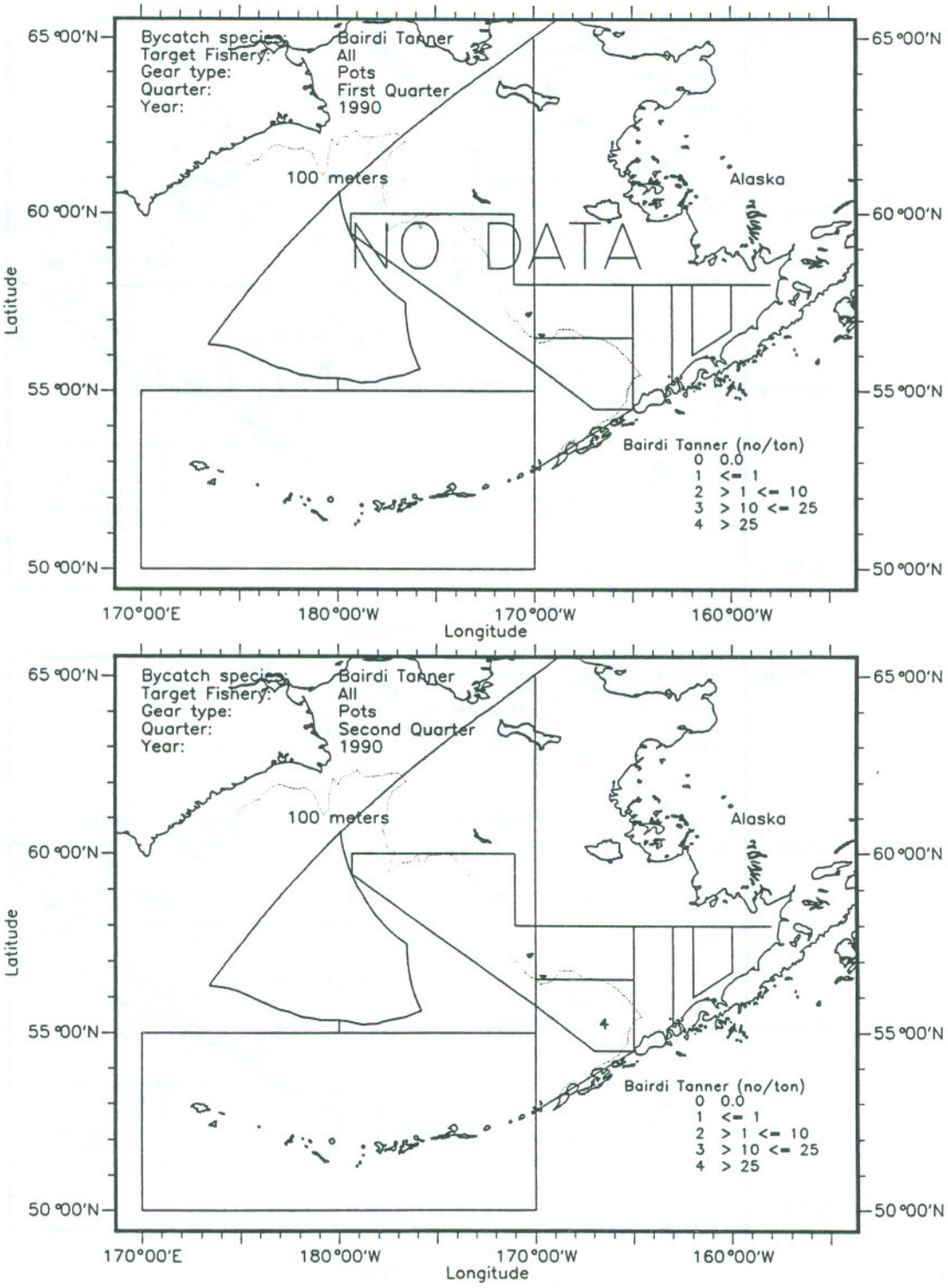


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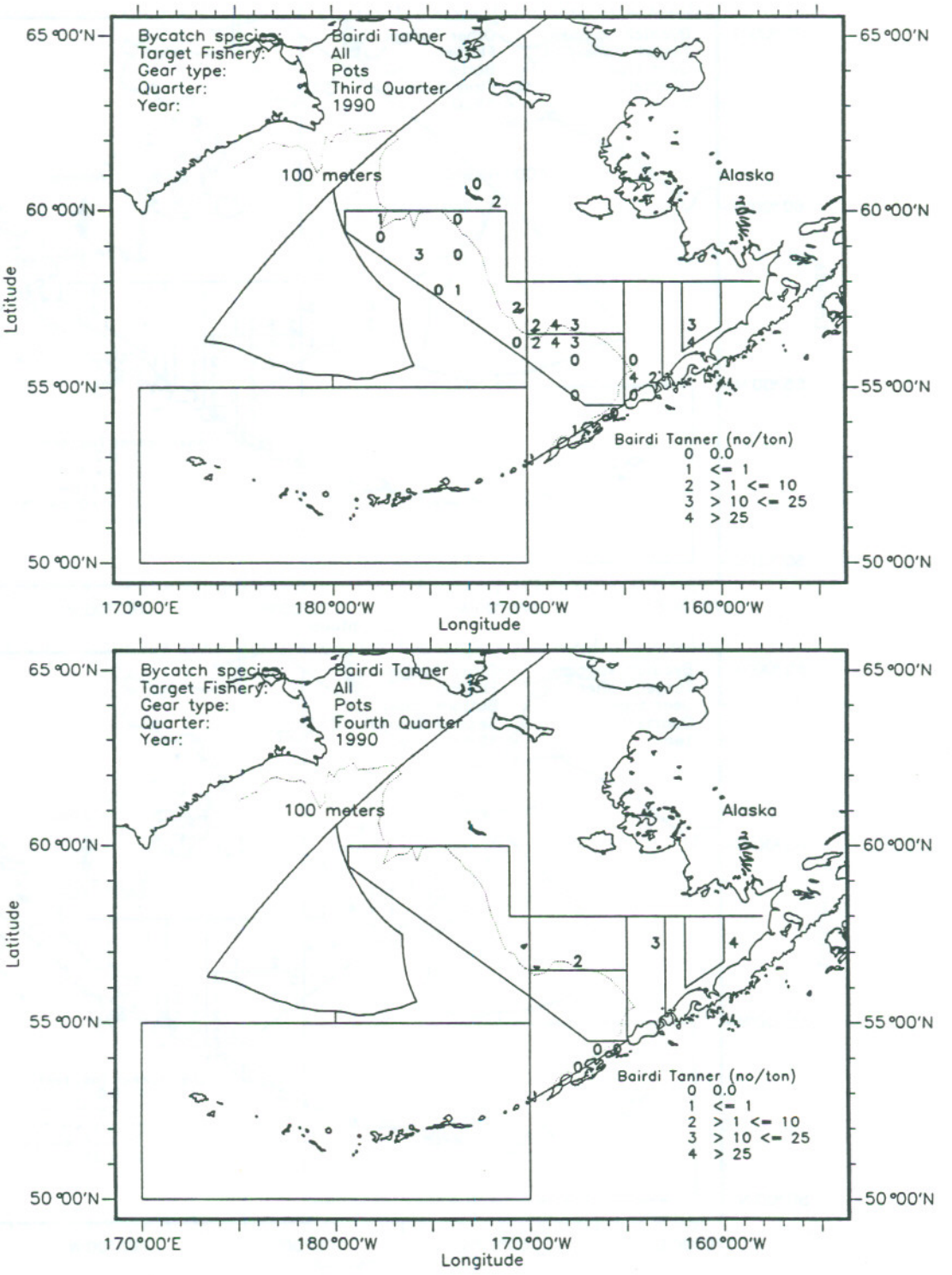


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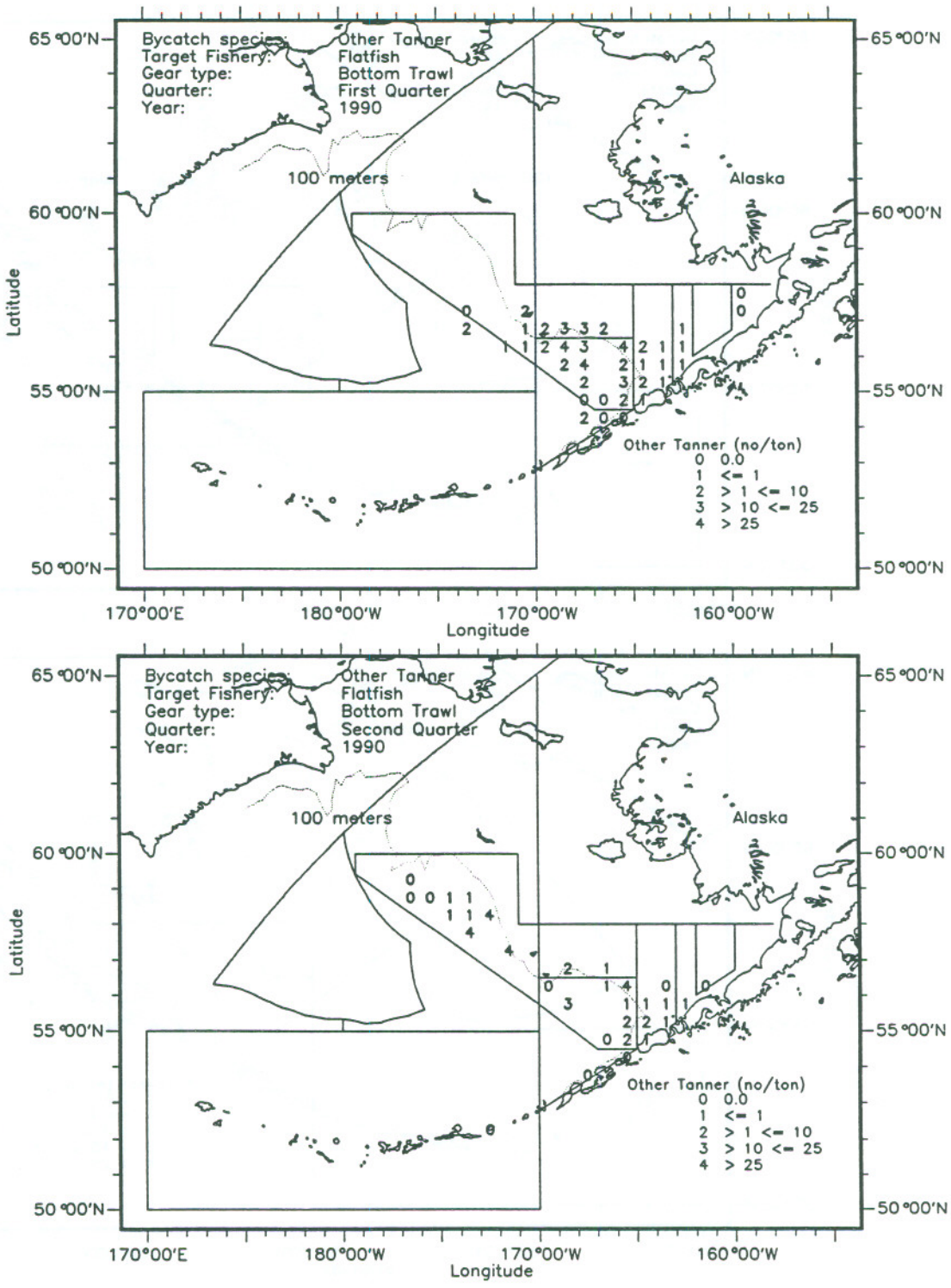


Figure 6.-Average incidence (no./t) of "other" Tanner crab in the U.S. domestic fisheries by quarter, target fishery, gear type, and 1/2° latitude by 1/2° longitude areas in the Bering Sea-Aleutians Islands region, 1990.

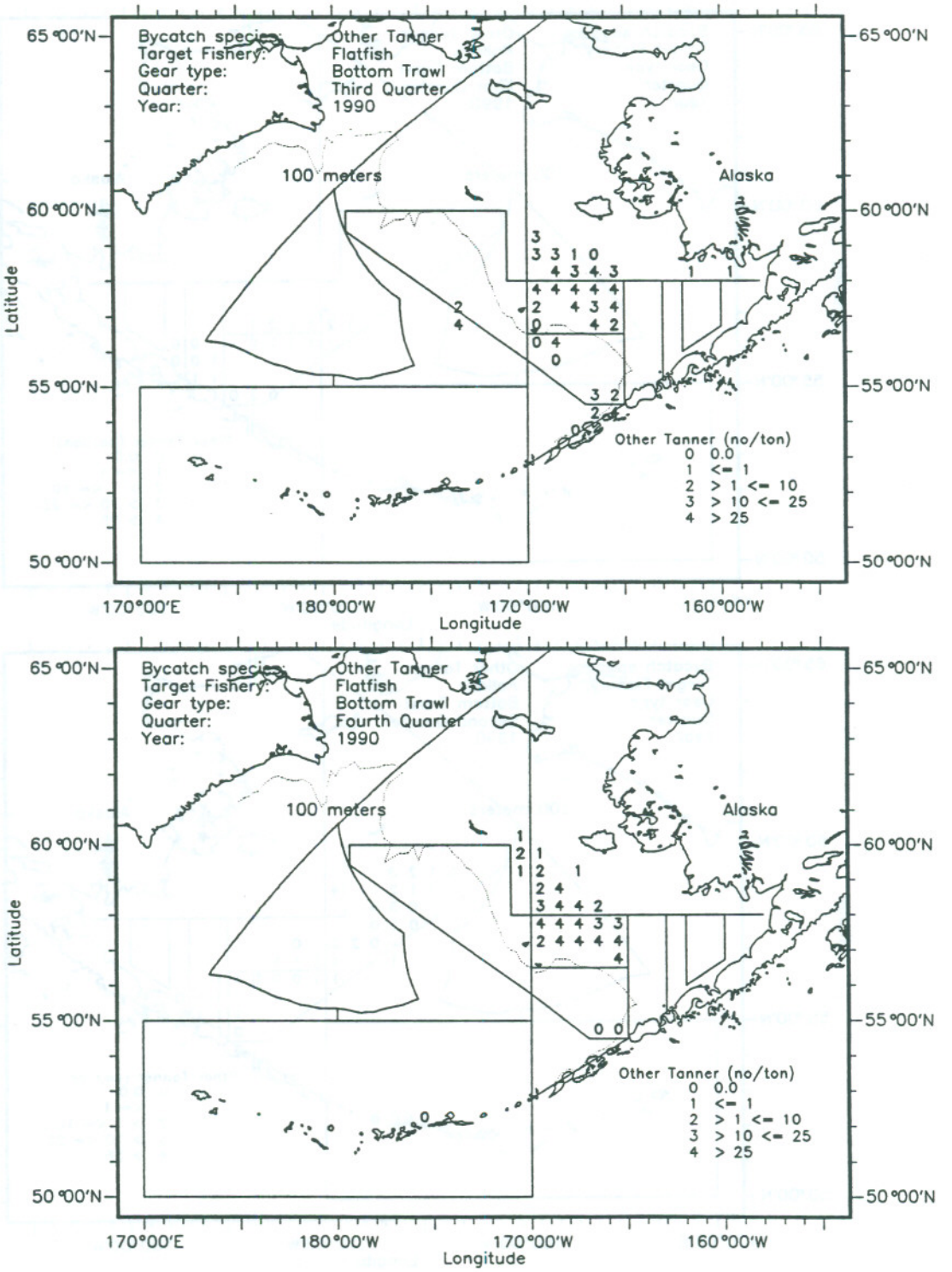


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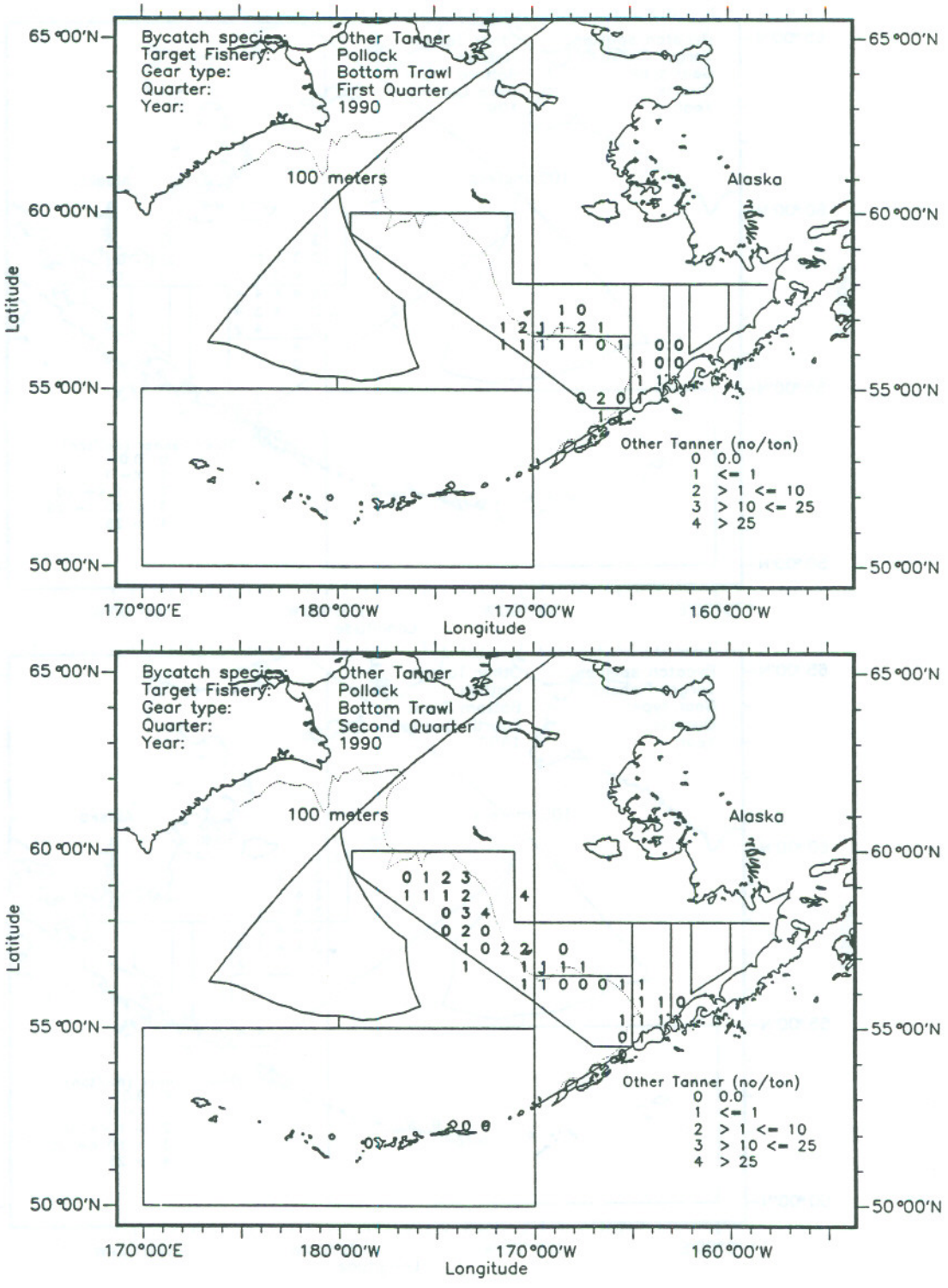


Figure 6.--Continued.

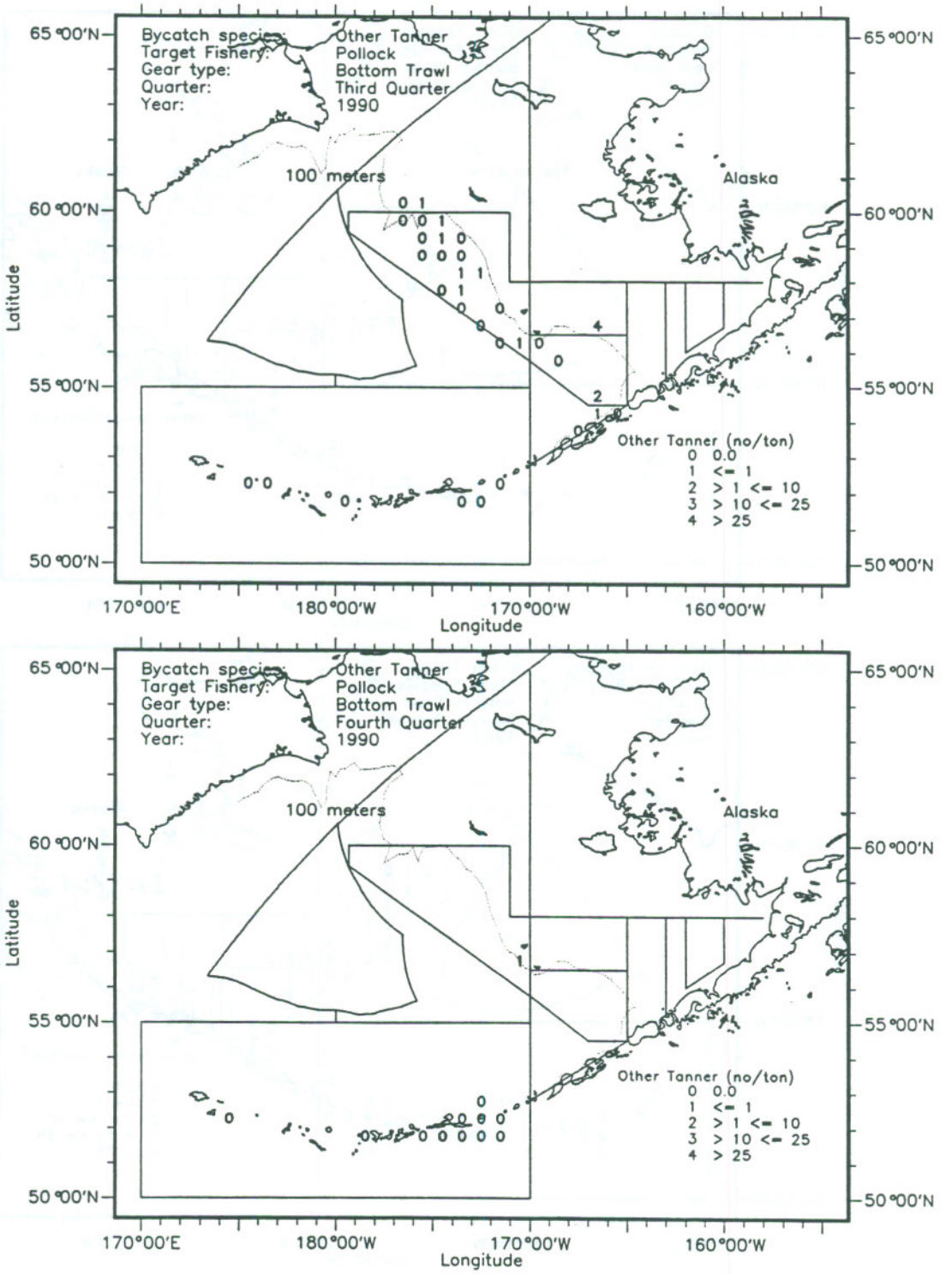


Figure 6.--Continued.

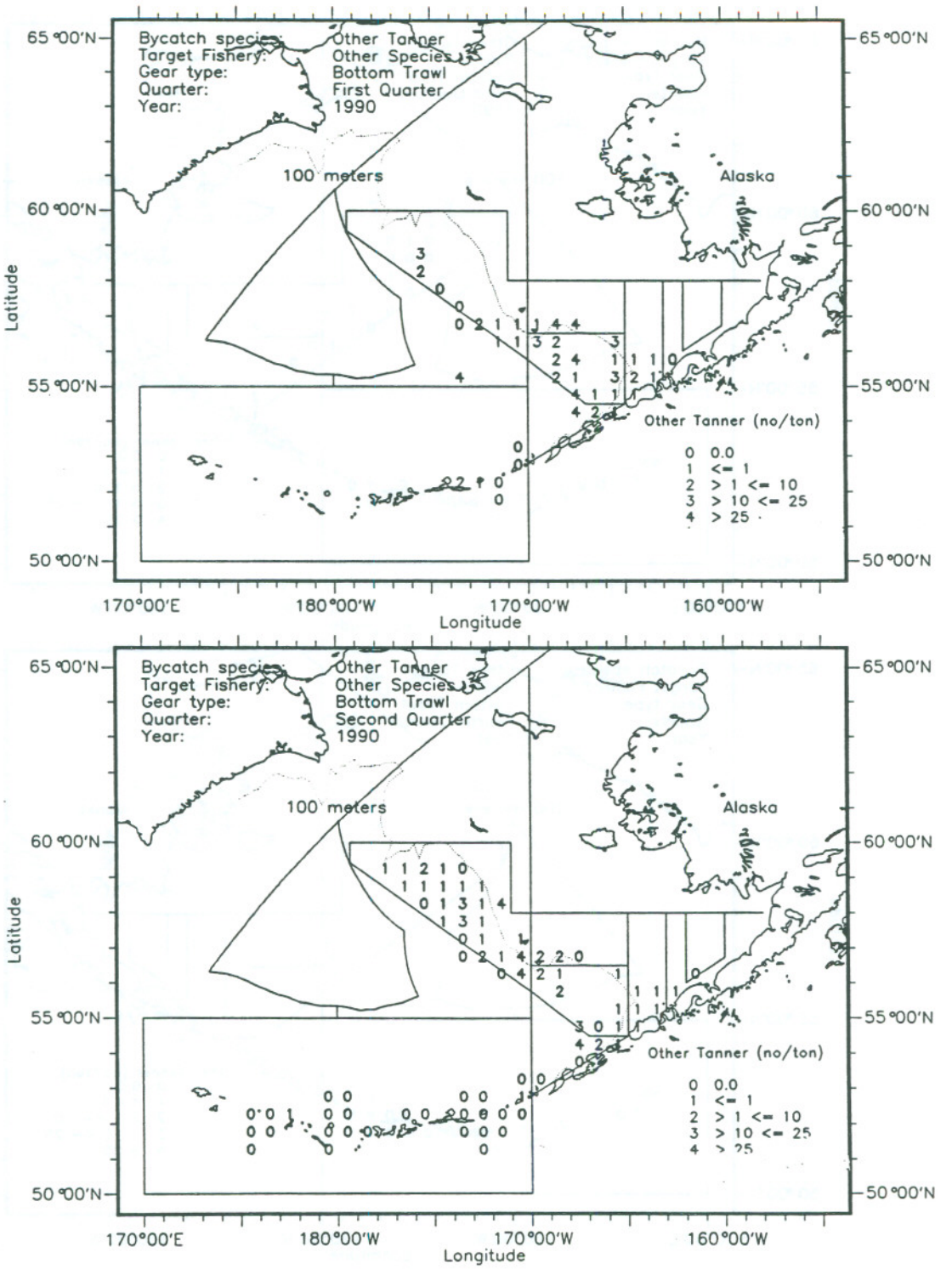


Figure 6.--Continued.

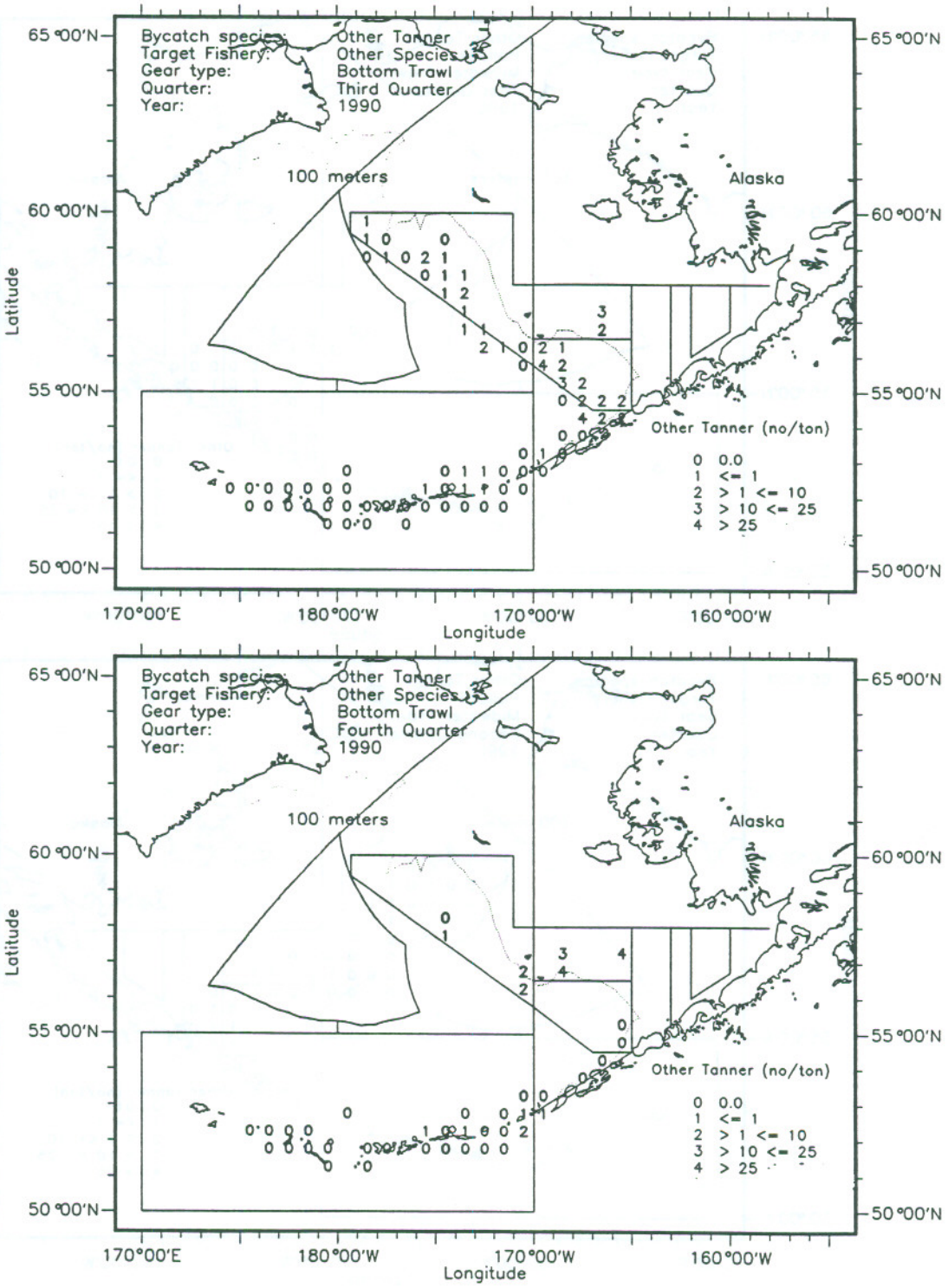


Figure 6.--Continued.

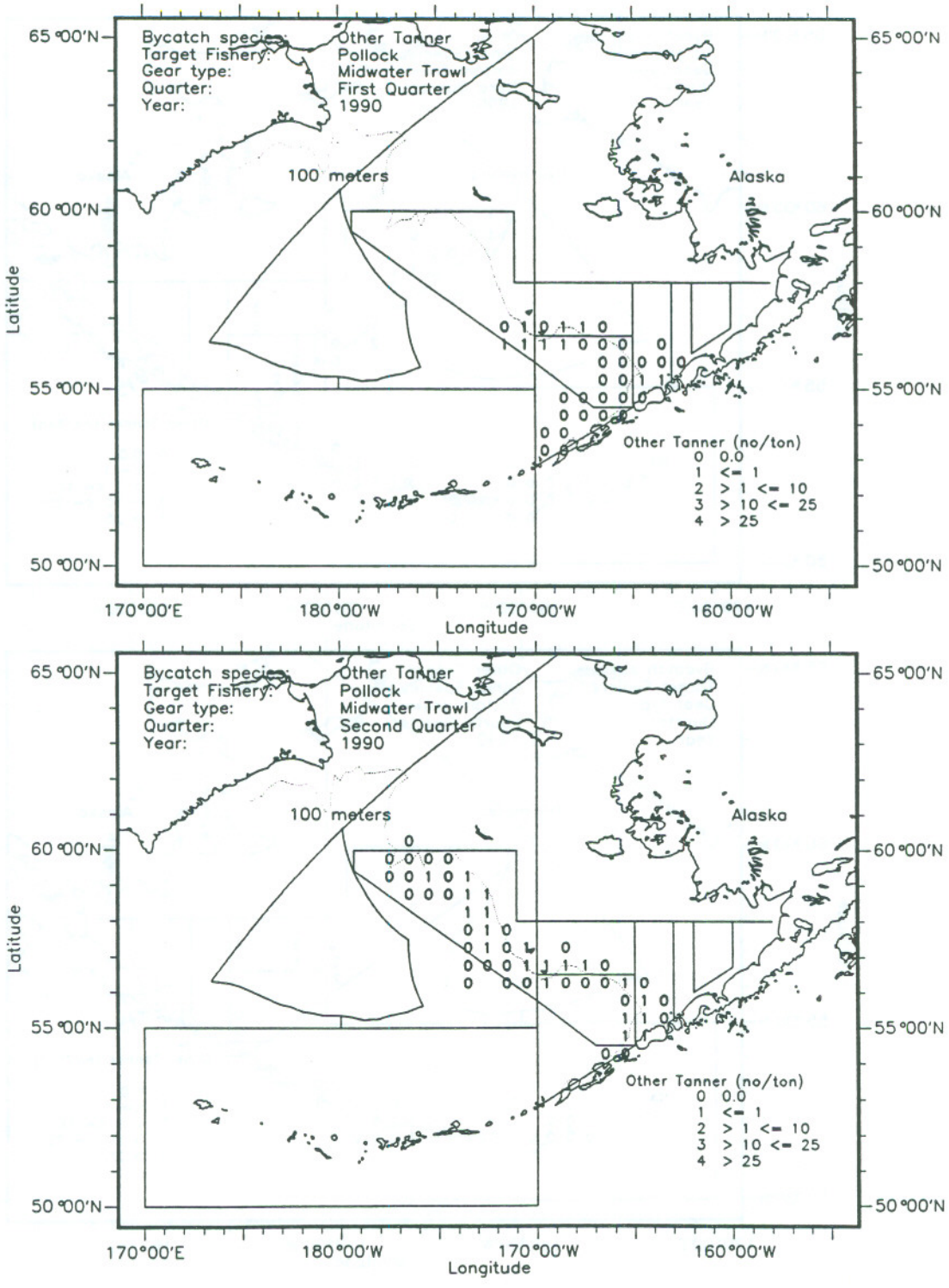


Figure 6.--Continued.

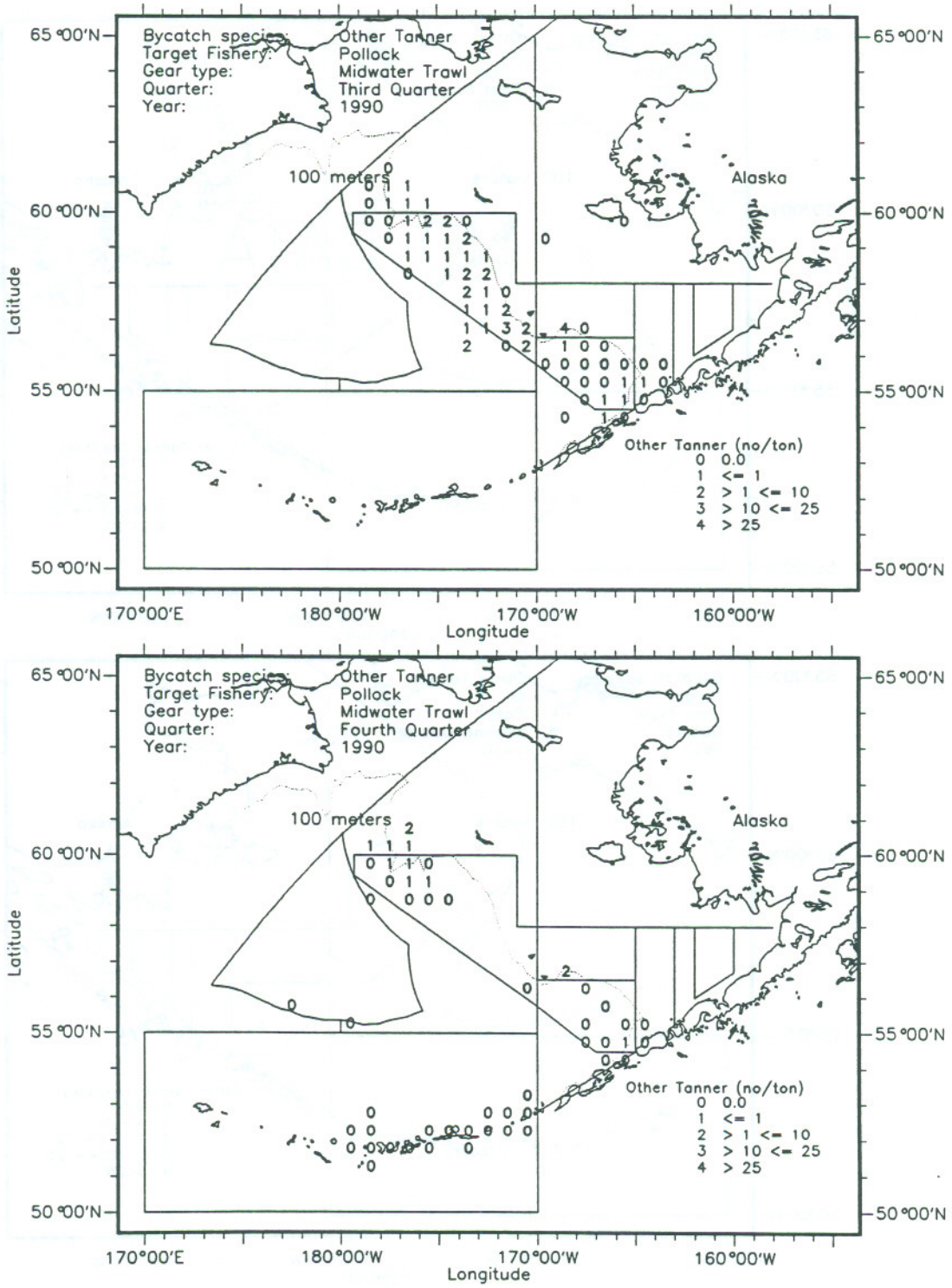


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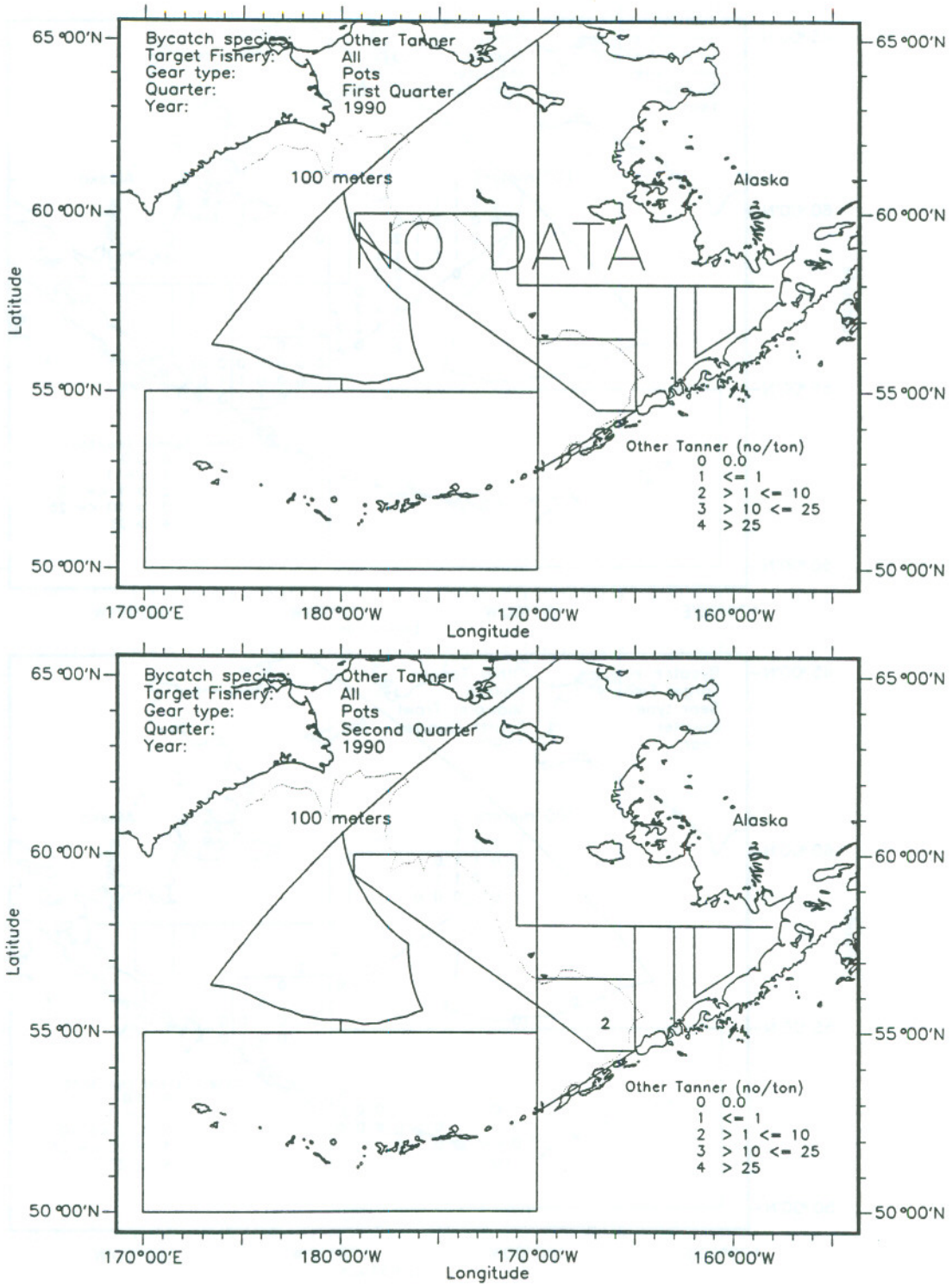


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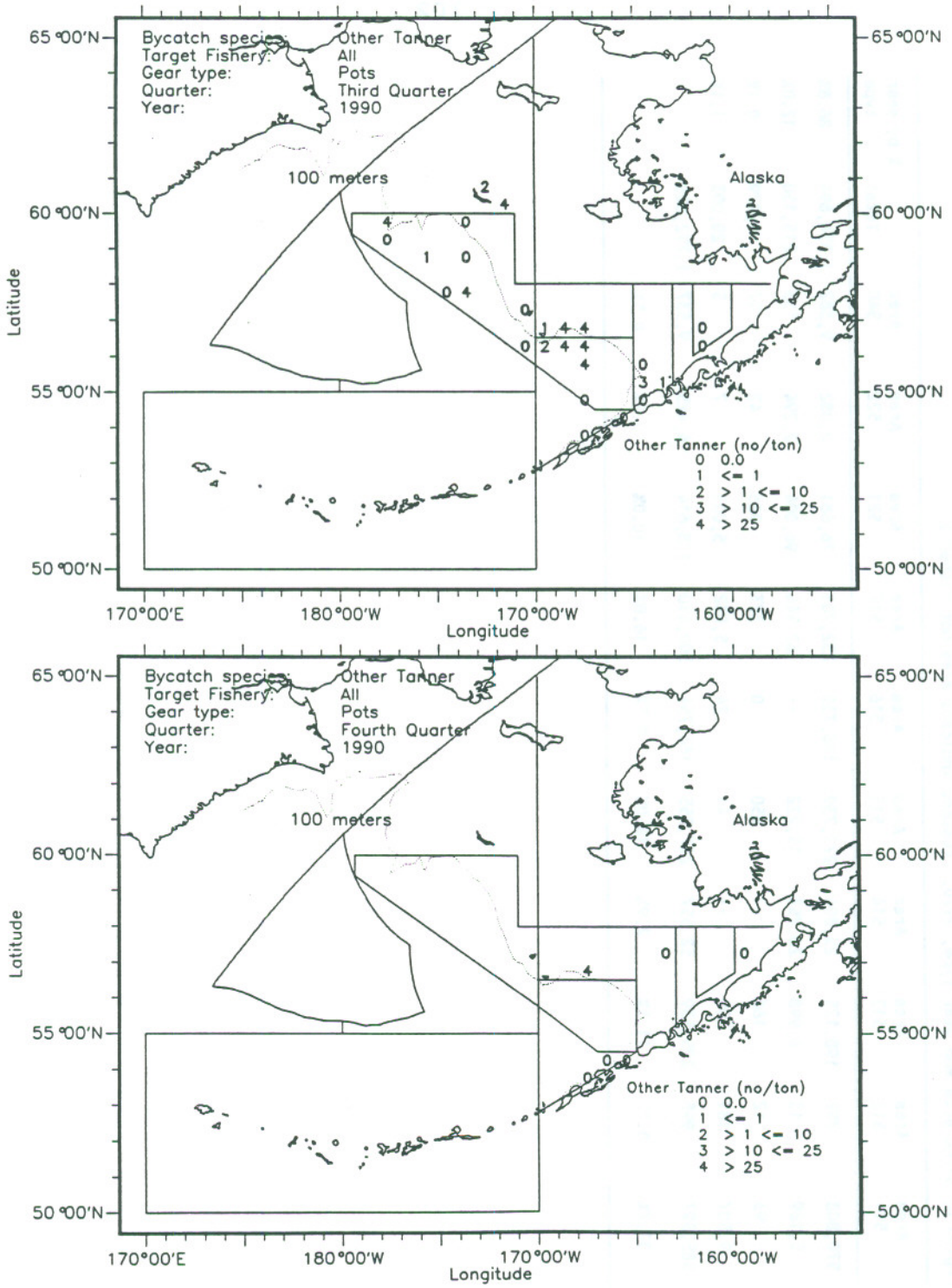


Figure 6.--Continued.

Table 17.--Estimated bycatch of Chionoecetes bairdi (by number of crab) by U.S. domestic groundfish vessels in the Bering Sea and Aleutian Islands region by NPFMC area and gear type, 1990. (Dashes indicate area not fished.)

Gear type	Area 511	Area 512	Area 513	Area 514	Area 515	Area 516	Area 517	Area 521	Area 522	Area 540	Total	% by gear type
Bottom trawl	570,808	792	198,175	25,804	271,739	166,730	232,701	76,681	2,082	9,382	1,554,894	86.8%
Pelagic trawl	5,189	13	6,998	26,753	15,222	--	62,544	96,004	2,294	133	215,150	12.0%
Longline	93	12	166	--	350	0	373	926	42	17	1,979	0.1%
Pot	9,507	181	200	--	44	24	5,032	5,003	7	5	20,003	1.1%
Total	585,597	998	205,539	52,557	287,355	166,754	300,650	178,614	4,425	9,537	1,792,026	
Percent by area	32.7%	0.1%	11.5%	2.9%	16.0%	9.3%	16.8%	10.0%	0.2%	0.5%		

Table 18.--Estimated bycatch of "other" snow (Tanner) crabs* (by number of crabs) by U.S. domestic groundfish vessels in the Bering Sea and Aleutian Islands region by NPFMC area and gear type, 1990. (Dashes indicate area not fished.)

Gear type	Area 511	Area 512	Area 513	Area 514	Area 515	Area 516	Area 517	Area 521	Area 522	Area 540	Total	% by gear type
Bottom trawl	70,770	0	985,952	271,335	328,628	10,070	174,384	316,796	3,053	9,872	2,170,860	71.1%
Pelagic trawl	363	138	75,328	60,342	888	--	2,989	471,868	2,517	1,394	615,827	20.2%
Longline	223	5	148	--	23	6	1,224	10,238	276	5	12,148	0.4%
Pot	20,645	1,359	616	--	0	180	216,147	7,053	9,728	39	255,767	8.4%
Total	92,001	1,502	1,062,044	331,677	329,539	10,256	394,744	805,955	15,574	11,310	3,054,602	
Percent by area	3.0%	0.0%	34.8%	10.9%	10.8%	0.3%	12.9%	26.4%	0.5%	0.4%		

*Species in this group include Chionoecetes opilio, C. angulatus, C. tanneri, and C. bairdiXC. opilio hybrid snow (Tanner) crabs.

Table 19.--U.S. domestic groundfish catch (in metric tons (t)) and Chionocetes bairdi bycatch (in numbers) by target fishery and NPFMC zone in the Bering Sea and Aleutians Islands region, 1990.

Fishery	Zone	Groundfish catch	C. bairdi Bycatch (numbers)	C. bairdi Per t of groundfish	C. bairdi % of catch within zone	C. bairdi % of total bycatch
Yellowfin sole/ other flatfish (All gears)	1	35,215.6	399,483	11.3	53.0%	22.3%
	2	12,124.7	220,025	18.1	32.1%	12.3%
	3	17,014.6	69,346	4.1	19.6%	3.9%
	Total	64,354.9	688,854	10.7	--	38.4%
Pollock midwater (All gears)	1	31,215.3	88	<0.1	<0.1%	<0.1%
	2	788,589.8	40,450	0.1	5.9%	2.3%
	3	388,334.3	5,637	<0.1	1.6%	0.3%
	Total	1,208,139.4	46,175	<0.1	--	2.6%
Pollock bottom (All gears)	1	17,479.8	9,733	0.6	1.3%	0.5%
	2	81,997.3	45,073	0.5	6.6%	2.5%
	3	19,350.2	5,745	0.3	1.6%	0.3%
	Total	118,827.3	60,551	0.5	--	3.4%
Other (Trawl)	1	31,635.3	334,220	10.6	44.4%	18.7%
	2	100,800.4	357,310	3.5	52.2%	19.9%
	3	46,717.9	268,602	5.7	75.9%	15.0%
	Total	179,153.6	960,132	5.4	--	53.6%
Other (Longline)	1	136.8	103	0.8	<0.1%	<0.1%
	2	44,879.7	1,455	<0.1	0.2%	0.1%
	3	5,940.9	390	0.1	0.1%	<0.1%
	Total	50,957.4	1,948	<0.1	--	0.1%
Other (Pot)	1	542.1	9,712	17.9	1.3%	0.5%
	2	511.2	10,235	20.0	1.5%	0.6%
	3	364.8	56	0.2	<0.1%	<0.1%
	Total	1,418.1	20,003	14.1	--	1.1%
Turbot (All gears)	1	71.6	8	0.1	<0.1%	<0.1%
	2	3,776.2	2,736	0.7	0.4%	0.2%
	3	13,361.9	1,886	0.1	0.5%	0.1%
	Total	17,209.7	4,630	0.3	--	0.3%
Sablefish (Trawl)	1	nf	nf	nf	nf	nf
	2	352.5	3,327	9.4	0.5%	0.2%
	3	110.6	334	3.0	0.1%	<0.1%
	Total	463.1	3,661	7.9	--	0.2%
Sablefish (Longline)	1	323.6	2	<0.1	<0.1%	<0.1%
	2	487.6	10	<0.1	<0.1%	<0.1%
	3	2,733.1	19	<0.1	<0.1%	<0.1%
	Total	3,544.3	31	<0.1	--	<0.1%
Rockfish (All gears)	1	nf	nf	nf	nf	nf
	2	6,847.4	4,182	0.6	0.6%	0.2%
	3	24,655.7	1,829	0.1	0.5%	0.1%
	Total	31,503.1	6,011	0.2	--	0.3%
Atka mackerel (All gears)	1	nf	nf	nf	nf	nf
	2	nf	nf	nf	nf	nf
	3	30,807.7	30	<0.1	<0.1%	<0.1%
	Total	30,807.7	30	<0.1	--	<0.1%
Total (All gears)	1	116,620.1	753,349	6.5	--	42.0%
	2	1,040,366.8	684,803	0.7	--	38.2%
	3	549,391.7	353,874	0.6	--	19.7%
	Total	1,706,378.6	1,792,026	1.1	--	--

nf = No fishing.

Table 20.--U.S. domestic groundfish catch (in metric tons (t)) and "other" snow (Tanner) crabs* bycatch (in numbers) by target fishery and NPFMC zone in the Bering Sea and Aleutians Islands region, 1990.

			"Other" snow (Tanner) crabs			
Fishery	Zone	Groundfish catch	Bycatch (numbers)	Per t of groundfish	% of catch within zone	% of total bycatch
Yellowfin sole/ other flatfish (All gears)	1	35,215.6	31,517	0.9	30.4%	1.0%
	2	12,124.7	953,095	78.6	42.1%	31.2%
	3	17,014.6	338,739	19.9	49.2%	11.1%
	Total	64,354.9	1,323,351	20.6	--	43.3%
Pollock midwater (All gears)	1	31,215.3	212	<0.1	<0.1%	<0.1%
	2	788,589.8	412,609	0.5	18.2%	13.5%
	3	388,334.3	3,805	<0.1	0.6%	0.1%
	Total	1,208,139.4	416,626	<0.1	--	13.6%
Pollock bottom (All gears)	1	17,479.8	3,887	0.2	3.7%	0.1%
	2	81,997.3	148,297	1.8	6.6%	4.9%
	3	19,350.2	56,411	2.9	8.2%	1.8%
	Total	118,827.3	208,595	1.8	--	6.8%
Other (Trawl)	1	31,635.3	45,585	1.4	43.9%	1.5%
	2	100,800.4	488,506	4.8	21.6%	16.0%
	3	46,717.9	60,298	1.3	8.8%	2.0%
	Total	179,153.6	594,389	3.3	--	19.5%
Other (Longline)	1	136.8	172	1.3	<0.1%	<0.1%
	2	44,879.7	11,544	0.3	0.5%	0.4%
	3	5,940.9	279	<0.1	<0.1%	<0.1%
	Total	50,957.4	11,995	0.2	--	0.4%
Other (Pot)	1	542.1	22,184	40.9	21.4%	0.7%
	2	511.2	223,816	437.8	9.9%	7.3%
	3	364.8	9,767	26.8	0.4%	0.3%
	Total	1,418.1	255,767	180.4	--	8.4%
Turbot (All gears)	1	71.6	148	2.1	<0.1%	<0.1%
	2	3,776.2	20,310	5.4	0.9%	0.7%
	3	13,361.9	215,377	16.1	31.3%	7.1%
	Total	17,209.7	235,835	13.7	--	7.7%
Sablefish (Trawl)	1	nf	nf	nf	nf	nf
	2	352.5	492	1.4	<0.1%	<0.1%
	3	110.6	584	5.3	0.1%	<0.1%
	Total	463.1	1,076	2.3	--	<0.1%
Sablefish (Longline)	1	323.6	54	0.2	<0.1%	<0.1%
	2	487.6	48	0.1	<0.1%	<0.1%
	3	2,733.1	21	<0.1	<0.1%	<0.1%
	Total	3,544.3	123	<0.1	--	<0.1%
Rockfish (All gears)	1	nf	nf	nf	nf	nf
	2	6,847.4	4,026	0.6	0.2%	0.1%
	3	24,655.7	2,808	0.1	0.4%	0.1%
	Total	31,503.1	6,834	0.2	--	0.2%
Atka mackerel (All gears)	1	nf	nf	nf	nf	nf
	2	nf	nf	nf	nf	nf
	3	30,807.7	11	<0.1	<0.1%	<0.1%
	Total	30,807.7	11	<0.1	--	<0.1%
Total (All gears)	1	116,620.1	103,759	0.9	--	3.4%
	2	1,040,366.8	2,262,743	2.2	--	74.1%
	3	549,391.7	688,100	1.3	--	22.5%
	Total	1,706,378.6	3,054,602	1.8	--	--

*Species include Chionoecetes opilio, C. angulatus, C. tanneri, and C. bairdjXC. opilio hybrid crabs.

nf = No fishing.

Table 21.--Snow (Tanner) crabs examined for condition by observers in U.S. domestic groundfish catches in the Bering Sea and Aleutian Islands region by species and gear type, 1990.

Species	Gear type	Excellent		Poor		Dead	
		numbers	%	numbers	%	numbers	%
Chionoecetes bairdi	Trawl	29,623	30.5%	31,033	32.0%	36,412	37.5%
	Pot	10,061	97.3%	146	1.4%	135	1.3%
	Longline	368	71.2%	112	21.7%	37	7.2%
C. opilio	Trawl	12,774	17.3%	22,713	30.8%	38,328	51.9%
	Pot	24,332	96.3%	268	1.1%	661	2.6%
	Longline	1,474	57.2%	644	25.0%	457	17.7%
C. tanneri	Trawl	93	8.0%	182	15.6%	891	76.4%
	Pot	0	0.0%	0	0.0%	0	0.0%
	Longline	18	58.1%	11	35.5%	2	6.5%
C. angulatus	Trawl	375	5.7%	897	13.6%	5,334	80.7%
	Pot	0	0.0%	0	0.0%	0	0.0%
	Longline	0	0.0%	0	0.0%	0	0.0%
C. hybridX C. opilio hybrid	Trawl	197	26.6%	329	44.4%	215	29.0%
	Pot	62	98.4%	1	1.6%	0	0.0%
	Longline	19	59.4%	7	21.9%	6	18.8%

Table 22.--Biological data on the bycatch of snow (Tanner) crabs in the U.S. domestic groundfish fisheries in the Bering Sea and Aleutian Islands region, 1990.

Species	Percent by species	Sex	Sex composition	Average weight (kg)	Average width (mm)
Chionoecetes opilio	60.0%	Male	59.4%	0.36	89.3
		Female	40.6%	0.18	63.1
C. bairdi	37.0%	Male	60.7%	0.36	86.5
		Female	39.3%	0.16	68.1
C. angulatus	2.2%	Male	62.3%	0.27	97.3
		Female	37.7%	0.12	74.2
C. bairdi X *C. opilio* hybrid	0.6%	Male	68.0%	0.34	89.8
		Female	32.0%	0.13	68.0
C. tanneri	0.2%	Male	64.5%	0.37	115.0
		Female	35.5%	0.23	92.7

Table 23.--Monthly bycatch rates (number per metric ton of catch) and average weight (kg) of red king crab taken in domestic groundfish fisheries in the Bering Sea and Aleutian Islands region by gear type, target fishery, and NPFMC area, 1990.

	Area 511		Area 512		Area 513		Area 514		Area 515		Area 516		Area 517		Area 521		Area 522		Area 540	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Bottom trawl (flatfish target)																				
Jan.	2.495	1.62	--	--	1.148	3.06	--	--	ns	ns	5.126	2.16	0.000	0.00	3.335	1.62	--	--	--	--
Feb.	0.974	1.90	--	--	0.000	0.00	--	--	ns	ns	1.136	2.23	0.000	0.00	ns	ns	--	--	--	--
Mar.	0.316	1.53	--	--	0.000	0.00	--	--	0.241	1.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--
Apr.	0.038	2.22	0.571	2.20	0.000	0.00	--	--	--	--	--	--	0.000	0.00	ns	ns	--	--	--	--
May	0.138	2.32	7.457	1.79	--	--	--	--	0.000	0.00	6.827	1.81	0.000	0.00	0.000	0.00	--	--	--	--
June	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00
July	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aug.	--	--	--	--	1.084	0.44	0.032	1.74	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	--	--
Sep.	--	--	--	--	0.026	2.26	0.004	2.53	--	--	--	--	0.000	0.00	--	--	--	--	--	--
Oct.	--	--	--	--	0.072	1.40	0.011	1.72	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--
Nov.	--	--	--	--	0.090	2.26	0.024	1.99	--	--	--	--	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--
Year	0.963	1.80	5.758	1.80	0.217	0.86	0.017	1.83	0.058	1.00	5.179	2.08	0.000	0.00	0.074	1.62	0.000	0.00	0.000	0.00
Bottom trawl (pollock target)																				
Jan.	0.000	0.00	--	--	--	--	--	--	ns	ns	1.395	2.04	0.000	0.00	--	--	--	--	ns	ns
Feb.	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	--	--	--	--
Mar.	0.201	1.62	--	--	<0.001	1.80	--	--	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--
Apr.	0.022	1.77	--	--	0.000	0.00	--	--	--	--	--	--	0.000	0.00	0.000	0.00	--	--	0.000	0.00
May	0.009	2.49	--	--	0.000	0.00	--	--	--	--	0.828	2.28	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
June	--	--	--	--	--	--	--	--	0.000	0.00	--	--	--	--	0.000	0.00	0.000	0.00	0.000	0.00
July	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
Aug.	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	--	--	0.000	0.00
Sep.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	--	--	0.000	0.00	0.000	0.00	0.000	0.00
Oct.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00
Year	0.115	1.64	--	--	<0.001	1.80	--	--	0.000	0.00	0.315	2.16	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00

Table 23.--Continued.

	Area 511		Area 512		Area 513		Area 514		Area 515		Area 516		Area 517		Area 521		Area 522		Area 540	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Bottom trawl (other targets)																				
Jan.	0.083	2.51	--	--	--	--	--	--	0.000	0.00	0.398	2.37	0.000	0.00	--	--	--	--	1.898	0.57
Feb.	0.010	2.45	--	--	0.000	0.00	--	--	0.002	0.20	ns	ns	0.001	0.10	--	--	--	--	1.694	0.56
Mar.	0.032	2.26	--	--	0.000	0.00	--	--	0.005	1.37	--	--	<0.001	0.55	0.000	0.00	0.000	0.00	0.031	0.81
Apr.	0.014	2.49	--	--	0.000	0.00	--	--	0.000	0.00	--	--	<0.001	2.50	0.000	0.00	0.000	0.00	0.006	0.86
May	0.038	1.58	12.740	1.73	0.000	0.00	--	--	0.000	0.00	2.910	1.76	0.000	0.00	0.001	1.50	0.000	0.00	0.000	0.00
June	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	ns	ns	0.000	0.00	--	--	0.013	0.25
July	--	--	--	--	--	--	--	--	0.010	0.74	--	--	0.000	0.00	0.001	3.39	0.000	0.00	0.014	1.17
Aug.	--	--	--	--	0.000	0.00	--	--	0.007	0.77	--	--	0.002	1.10	0.000	0.00	0.000	0.00	0.026	1.30
Sep.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.010	1.31	0.000	0.00	0.007	1.19
Oct.	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	ns	ns	0.000	0.00	--	--	<0.001	3.60
Nov.	--	--	--	--	0.245	2.52	--	--	--	--	--	--	--	--	--	--	--	--	0.005	2.23
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	--	--	--	--	0.001	4.30
Year	0.036	2.17	12.740	1.73	0.001	2.52	--	--	0.003	1.03	2.869	1.76	<0.001	0.69	<0.001	1.55	0.000	0.00	0.017	0.66
Pelagic trawl (pollock target)																				
Jan.	0.000	0.00	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--	ns	ns
Feb.	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--	--	--
Mar.	0.006	2.61	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--
Apr.	0.007	2.13	--	--	0.000	0.00	--	--	ns	ns	--	--	0.000	0.00	0.000	0.00	0.000	0.00	ns	ns
May	0.000	0.00	ns	ns	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--
June	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--
July	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--
Aug.	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--
Sep.	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	<0.001	0.80	0.000	0.00	--	--
Oct.	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	0.000	0.00
Year	0.005	2.37	ns	ns	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	<0.001	0.80	0.000	0.00	0.000	0.00

Table 23.--Continued.

	Area 511		Area 512		Area 513		Area 514		Area 515		Area 516		Area 517		Area 521		Area 522		Area 540	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Pelagic trawl (other targets)																				
Jan.	0.000	0.00	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--	ns	ns
Feb.	0.000	0.00	--	--	--	--	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--
Mar.	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	ns	ns	--	--	--	--
Apr.	0.000	0.00	--	--	0.000	0.00	--	--	ns	ns	--	--	0.000	0.00	0.000	0.00	--	--	--	--
May	ns	ns	--	--	0.000	0.00	--	--	ns	ns	--	--	0.000	0.00	0.000	0.00	--	--	ns	ns
June	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	--	--	ns	ns
July	0.025	0.85	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	--	--	--	--
Aug.	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	--	--	--	--
Sep.	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--
Oct.	0.000	0.00	--	--	0.000	0.00	0.052	1.76	0.000	0.00	--	--	0.000	0.00	0.000	0.00	--	--	0.000	0.00
Nov.	0.000	0.00	--	--	0.000	0.00	0.034	2.59	0.000	0.00	--	--	0.000	0.00	0.000	0.00	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--	ns	ns
Year	0.002	0.85	--	--	0.000	0.00	0.051	1.81	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
Longline vessels (sablefish target)																				
Jan.	--	--	--	--	--	--	--	--	ns	ns	--	--	ns	ns	ns	ns	--	--	ns	ns
Feb.	--	--	--	--	--	--	--	--	ns	ns	--	--	ns	ns	ns	ns	--	--	ns	ns
Mar.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--	0.000	0.00
Apr.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--	--	--
May	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	--	--	0.000	0.00
June	ns	ns	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
July	ns	ns	ns	ns	--	--	--	--	0.000	0.00	ns	ns	0.000	0.00	0.000	0.00	ns	ns	0.000	0.00
Aug.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	--	--	0.000	0.00
Sep.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00
Oct.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	0.000	0.00
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns
Year	ns	ns	ns	ns	--	--	--	--	0.000	0.00	ns	ns	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00

Table 23.--Continued.

	Area 511		Area 512		Area 513		Area 514		Area 515		Area 516		Area 517		Area 521		Area 522		Area 540	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Longline vessels (Pacific cod target)																				
Jan.	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	0.000	0.00	--	--	--	--
Feb.	--	--	--	--	ns	ns	--	--	--	--	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--
Mar.	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
Apr.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--
May	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
June	0.000	0.00	0.000	0.00	--	--	--	--	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
July	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
Aug.	ns	ns	--	--	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.005	0.50	--	--
Sep.	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
Oct.	--	--	--	--	ns	ns	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
Nov.	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
Dec.	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--
Year	0.000	0.00	0.000	0.00	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.001	0.50	0.000	0.00
Longline vessels (other targets)																				
Jan.	--	--	--	--	--	--	--	--	ns	ns	--	--	ns	ns	--	--	--	--	ns	ns
Feb.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns
Mar.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--	0.000	0.00
Apr.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--	--	--
May	ns	ns		--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--	0.000	0.00
June	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
July	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	--	--	0.000	0.00
Aug.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	--	--	--	--
Sep.	--	--	--	--	--	--	--	--	ns	ns	--	--	ns	ns	0.000	0.00	--	--	ns	ns
Oct.	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	ns	ns	--	--	0.000	0.00
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--	--	--	--	--
Year	ns	ns	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00

Table 23.--Continued.

	Area 511		Area 512		Area 513		Area 514		Area 515		Area 516		Area 517		Area 521		Area 522		Area 540	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Pot vessels (all targets)																				
Jan.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mar.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Apr.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
May	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns
June	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--
July	0.000	0.00	137.849	1.06	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--
Aug.	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	--	--	--	--
Sep.	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	16.404	1.48	0.000	0.00	--	--
Oct.	245.074	1.53	--	--	0.000	0.00	--	--	0.000	0.00	ns	ns	ns	ns	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	--	--	ns	ns	--	--	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.766	1.53	137.849	1.06	0.000	0.00	--	--	0.000	0.00	ns	ns	0.000	0.00	0.822	1.48	0.000	0.00	ns	ns

Dashes indicate areas not fished.

ns = Fishing occurred but no sampling by observers.

Table 24.--Monthly bycatch rates (number per metric ton of catch) and average weight (kg) of "other" king crabs* taken in domestic groundfish fisheries in the Bering Sea and Aleutian Islands region by gear type, target fishery, and NPFMC area, 1990.

	Area 511		Area 512		Area 513		Area 514		Area 515		Area 516		Area 517		Area 521		Area 522		Area 540	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Bottom trawl (flatfish target)																				
Jan.	0.003	0.40	--	--	0.147	0.60	--	--	ns	ns	0.000	0.00	0.000	0.00	0.201	0.80	--	--	--	--
Feb.	0.000	0.00	--	--	0.000	0.00	--	--	ns	ns	0.000	0.00	0.000	0.00	ns	ns	--	--	--	--
Mar.	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	--	--
Apr.	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	--	--	0.000	0.00	ns	ns	--	--	--	--
May	0.000	0.00	0.041	0.88	--	--	--	--	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--
June	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00
July	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aug.	--	--	--	--	0.254	2.61	0.000	0.00	1.021	0.65	--	--	0.154	0.64	--	--	0.031	2.20	--	--
Sep.	--	--	--	--	0.084	2.06	0.006	2.61	--	--	--	--	51.712	0.98	--	--	ns	ns	--	--
Oct.	--	--	--	--	0.510	1.92	0.004	1.73	--	--	--	--	0.000	0.00	--	--	0.005	2.50	--	--
Nov.	--	--	--	--	0.012	2.27	0.035	0.21	--	--	--	--	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--
Year	<0.001	0.40	0.031	0.88	0.233	2.04	0.007	0.96	0.726	0.65	0.000	0.00	0.033	0.82	0.004	0.80	0.006	2.40	0.000	0.00
Bottom trawl (pollock target)																				
Jan.	0.000	0.00	--	--	--	--	--	--	ns	ns	0.000	0.00	0.000	0.00	--	--	--	--	ns	ns
Feb.	0.000	0.00	--	--	0.000	0.00	--	--	0.298	0.34	--	--	0.013	0.65	0.000	0.00	--	--	--	--
Mar.	0.000	0.00	--	--	0.001	1.11	--	--	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--
Apr.	0.000	0.00	--	--	0.000	0.00	--	--	--	--	--	--	0.000	0.00	0.000	0.00	--	--	0.000	0.00
May	0.000	0.00	--	--	0.000	0.00	--	--	--	--	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.005	1.50
June	--	--	--	--	--	--	--	--	0.000	0.00	--	--	--	--	0.000	0.00	0.000	0.00	0.000	0.00
July	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	0.035	2.57
Aug.	--	--	--	--	0.000	0.00	--	--	0.130	0.33	--	--	0.000	0.00	0.000	0.00	--	--	0.070	2.53
Sep.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	--	--	0.000	0.00	0.000	0.00	0.005	1.00
Oct.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	--	--	2.365	0.57
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.345	0.49
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.000	0.00	--	--	0.001	1.11	--	--	0.055	0.33	0.000	0.00	<0.001	0.65	0.000	0.00	0.000	0.00	0.336	0.60

Table 24.--Continued.

	Area 511		Area 512		Area 513		Area 514		Area 515		Area 516		Area 517		Area 521		Area 522		Area 540	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Bottom trawl (other targets)																				
Jan.	0.000	0.00	--	--	--	--	--	--	0.000	0.00	0.000	0.00	0.067	0.21	--	--	--	--	0.000	0.00
Feb.	0.000	0.00	--	--	0.000	0.00	--	--	0.055	0.30	ns	ns	<0.001	1.29	--	--	--	--	0.000	0.00
Mar.	0.000	0.00	--	--	0.000	0.00	--	--	0.016	0.87	--	--	0.001	1.02	0.000	0.00	0.000	0.00	0.873	1.06
Apr.	0.000	0.00	--	--	<0.001	0.80	--	--	0.021	1.54	--	--	<0.001	0.11	0.006	1.06	0.000	0.00	0.115	0.53
May	0.000	0.00	0.000	0.00	0.001	2.00	--	--	0.009	1.08	0.042	1.73	0.010	0.59	0.000	0.00	0.000	0.00	0.042	1.56
June	--	--	--	--	0.000	0.00	--	--	0.060	0.46	--	--	--	--	0.001	1.48	--	--	0.022	0.92
July	--	--	--	--	--	--	--	--	0.218	0.77	--	--	0.000	0.00	0.127	1.49	0.000	0.00	0.363	1.00
Aug.	--	--	--	--	0.000	0.00	--	--	1.011	0.66	--	--	0.970	0.41	0.211	1.10	0.037	0.85	0.890	1.03
Sep.	--	--	--	--	--	--	--	--	0.088	0.99	--	--	0.954	1.37	0.061	1.70	0.019	1.68	0.456	0.83
Oct.	--	--	--	--	0.123	2.75	--	--	0.396	0.82	--	--	--	--	0.043	1.80	0.012	1.43	0.584	0.73
Nov.	--	--	--	--	0.392	1.35	--	--	--	--	--	--	--	--	--	--	--	--	0.066	1.27
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	--	--	--	--	0.094	0.78
Year	0.000	0.00	0.000	0.00	0.002	1.49	--	--	0.165	0.94	0.041	1.73	0.060	0.40	0.019	1.30	0.012	1.43	0.241	0.94
Pelagic trawl (pollock target)																				
Jan.	0.000	0.00	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--	ns	ns
Feb.	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--	--	--
Mar.	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--
Apr.	0.000	0.00	--	--	0.000	0.00	--	--	ns	ns	--	--	0.000	0.00	0.000	0.00	--	--	ns	ns
May	0.000	0.00	ns	ns	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--
June	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--
July	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--
Aug.	0.000	0.00	--	--	0.003	2.00	0.000	0.00	0.000	0.00	--	--	0.000	0.00	0.020	1.62	0.000	0.00	--	--
Sep.	0.000	0.00	--	--	0.000	0.00	--	--	<0.001	0.50	--	--	<0.001	0.75	0.000	0.00	0.000	0.00	--	--
Oct.	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	<0.001	1.60	0.000	0.00	0.000	0.00
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	0.000	0.00
Year	0.000	0.00	ns	ns	<0.001	2.00	0.000	0.00	<0.001	0.50	0.000	0.00	<0.001	0.75	0.005	1.62	0.000	0.00	0.000	0.00

Table 24.--Continued.

	Area 511		Area 512		Area 513		Area 514		Area 515		Area 516		Area 517		Area 521		Area 522		Area 540	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Pelagic trawl (other targets)																				
Jan.	0.000	0.00	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--	ns	ns
Feb.	0.000	0.00	--	--	--	--	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--
Mar.	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	ns	ns	--	--	--	--
Apr.	0.000	0.00	--	--	0.000	0.00	--	--	ns	ns	--	--	0.000	0.00	0.000	0.00	--	--	--	--
May	ns	ns	--	--	0.000	0.00	--	--	ns	ns	--	--	0.000	0.00	0.000	0.00	--	--	ns	ns
June	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	--	--	ns	ns
July	0.000	0.00	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.002	1.25	--	--	--	--
Aug.	0.000	0.00	--	--	0.000	0.00	--	--	0.011	1.20	--	--	0.000	0.00	0.000	0.00	--	--	--	--
Sep.	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--
Oct.	0.000	0.00	--	--	0.000	0.00	0.009	1.10	0.000	0.00	--	--	0.000	0.00	0.001	1.00	--	--	0.000	0.00
Nov.	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--	0.000	0.00	0.000	0.00	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--	ns	ns
Year	0.000	0.00	--	--	0.000	0.00	0.008	1.10	0.001	1.20	--	--	0.000	0.00	<0.001	1.20	0.000	0.00	0.000	0.00
Longline vessels (sablefish target)																				
Jan.	--	--	--	--	--	--	--	--	ns	ns	--	--	ns	ns	ns	ns	--	--	ns	ns
Feb.	--	--	--	--	--	--	--	--	ns	ns	--	--	ns	ns	ns	ns	--	--	ns	ns
Mar.	--	--	--	--	--	--	--	--	0.184	0.50	--	--	0.000	0.00	--	--	--	--	0.000	0.00
Apr.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--	--	--
May	--	--	--	--	--	--	--	--	0.057	2.15	--	--	0.000	0.00	0.000	0.00	--	--	0.045	0.34
June	ns	ns	--	--	--	--	--	--	0.048	1.79	--	--	0.014	0.49	0.000	0.00	0.000	0.00	0.024	0.60
July	ns	ns	ns	ns	--	--	--	--	0.000	0.00	ns	ns	0.328	2.42	0.000	0.00	ns	ns	0.011	0.75
Aug.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	--	--	0.216	1.37
Sep.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00
Oct.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.240	1.75
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	0.540	0.80
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns
Year	ns	ns	ns	ns	--	--	--	--	0.033	1.41	ns	ns	0.093	2.26	0.000	0.00	0.000	0.00	0.076	1.07

Table 24.--Continued.

	Area 511		Area 512		Area 513		Area 514		Area 515		Area 516		Area 517		Area 521		Area 522		Area 540	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Longline vessels (Pacific cod target)																				
Jan.	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--
Feb.	--	--	--	--	ns	ns	--	--	--	--	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--
Mar.	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
Apr.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--
May	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
June	0.000	0.00	0.000	0.00	--	--	--	--	0.079	1.20	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.626	0.50
July	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.003	2.53	0.010	1.70	0.000	0.00
Aug.	ns	ns	--	--	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	0.001	2.15	0.011	2.60	--	--
Sep.	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.016	1.16	0.000	0.00
Oct.	--	--	--	--	ns	ns	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	0.006	1.70
Nov.	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	0.002	1.08	0.004	1.08	0.000	0.00
Dec.	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--
Year	0.000	0.00	0.000	0.00	0.000	0.00	--	--	0.013	1.20	0.000	0.00	0.000	0.00	0.001	1.92	0.004	1.73	0.009	0.96
Longline vessels (other target)																				
Jan.	--	--	--	--	--	--	--	--	ns	ns	--	--	ns	ns	--	--	--	--	ns	ns
Feb.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns
Mar.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--	1.744	0.70
Apr.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--	--	--
May	ns	ns	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--	0.000	0.00
June	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	0.381	0.90
July	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	--	--	0.000	0.00
Aug.	--	--	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	--	--	--	--
Sep.	--	--	--	--	--	--	--	--	ns	ns	--	--	ns	ns	0.000	0.00	--	--	--	--
Oct.	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	ns	ns	--	--	0.000	0.00
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13.715	2.10
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--	--	--	--	--
Year	ns	ns	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.004	0.50	0.000	0.00	0.429	1.15

Table 24.--Continued.

	Area 511		Area 512		Area 513		Area 514		Area 515		Area 516		Area 517		Area 521		Area 522		Area 540	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Pot vessels (all targets)																				
Jan.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mar.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Apr.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
May	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns
June	--	--	--	--	--	--	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--
July	0.000	0.00	0.000	0.00	--	--	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--
Aug.	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	--	--	--	--
Sep.	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--
Oct.	0.000	0.00	--	--	0.000	0.00	--	--	0.000	0.00	ns	ns	ns	ns	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	--	--	ns	ns	--	--	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.000	0.00	0.000	0.00	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	ns	ns

*Species include golden, blue, and couesi king crabs.

Dashes indicate areas not fished.

ns = Area fished but no sampling by observers.

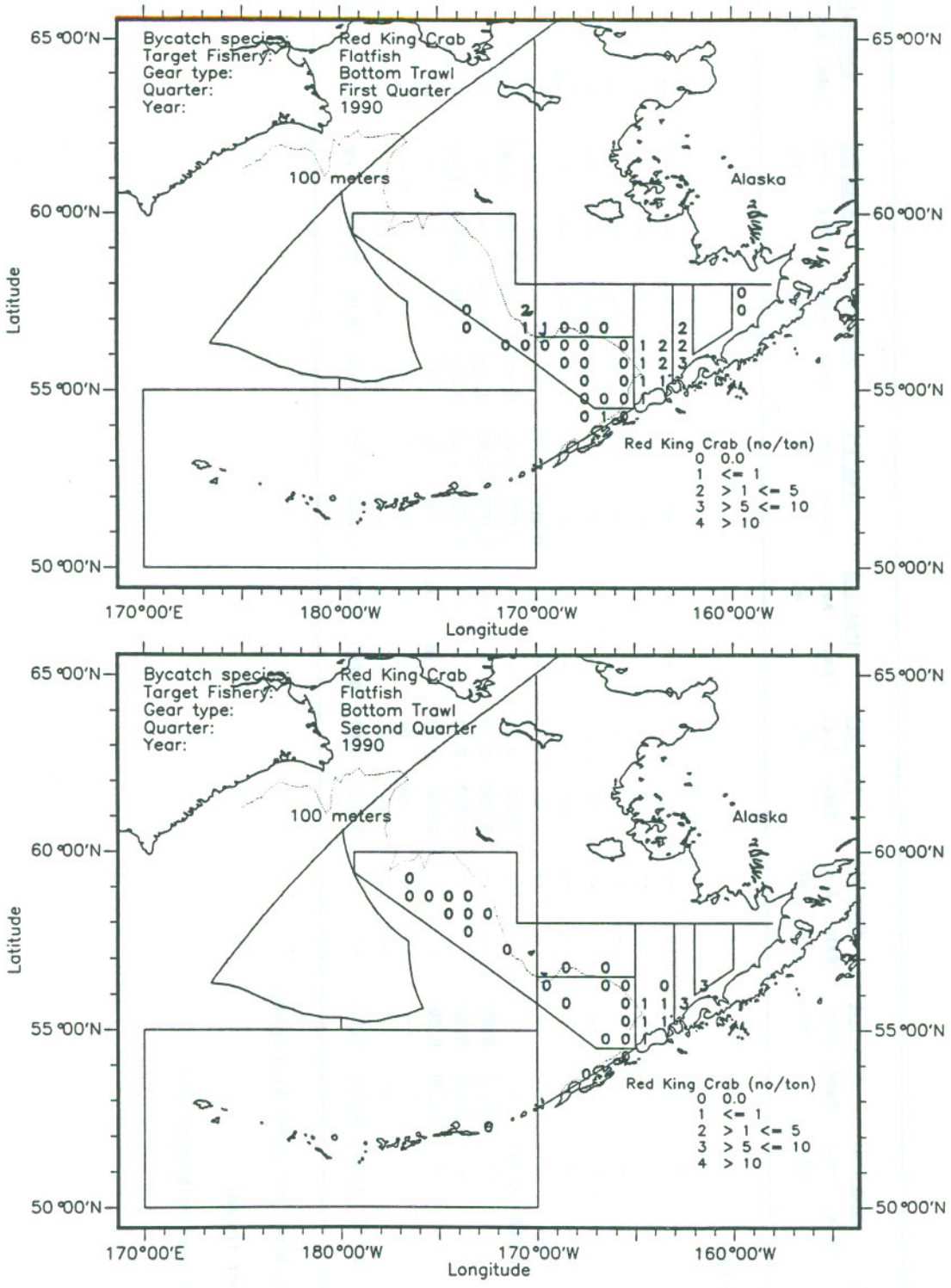


Figure 7.-Average incidence (no./t) of red king crab in the U.S. domestic fisheries by quarter, target fishery, gear type, and 1/2° latitude by 1/2° longitude areas in the Bering Sea-Aleutians Islands region, 1990.

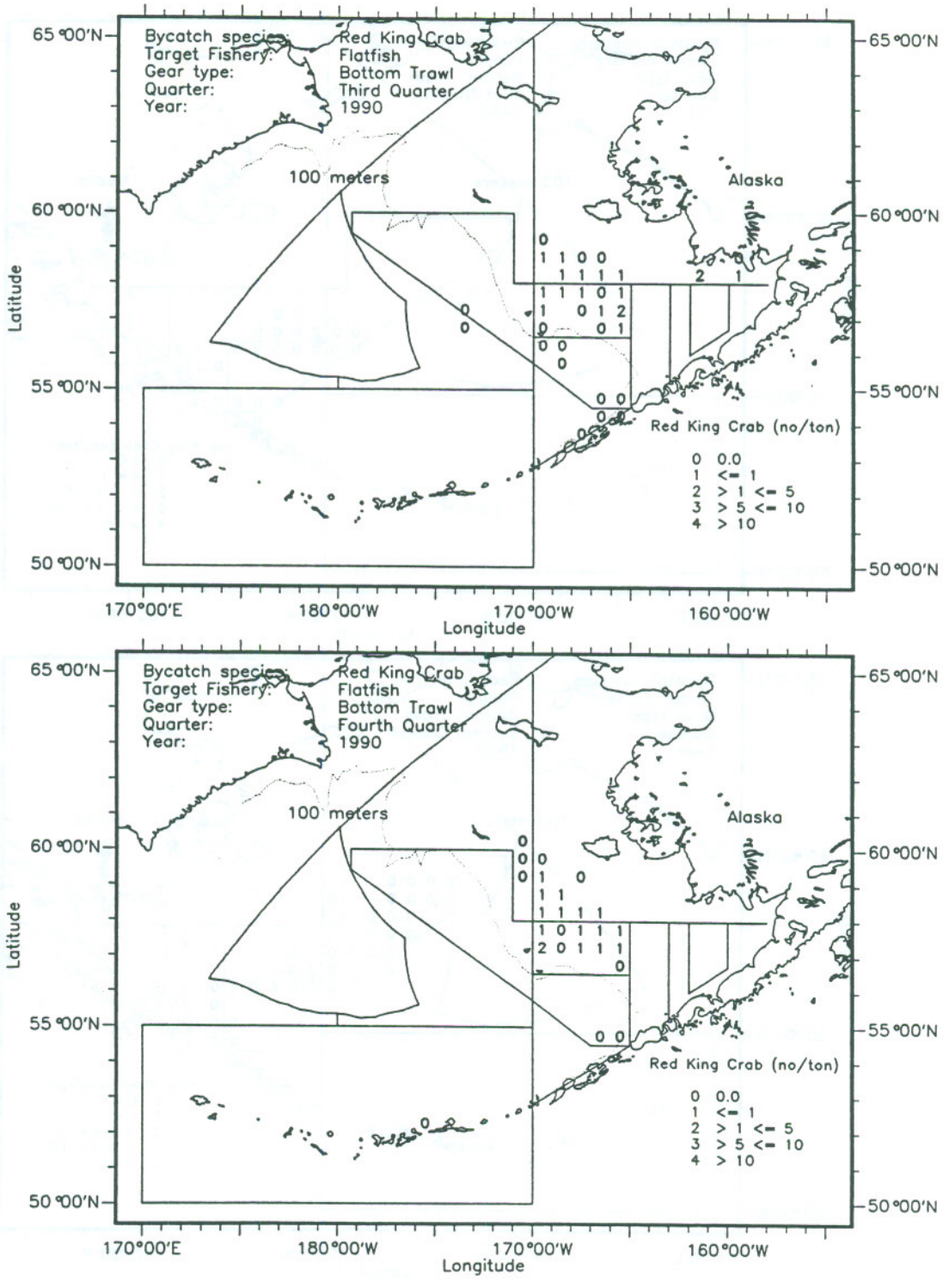


Figure 7.--Continued.

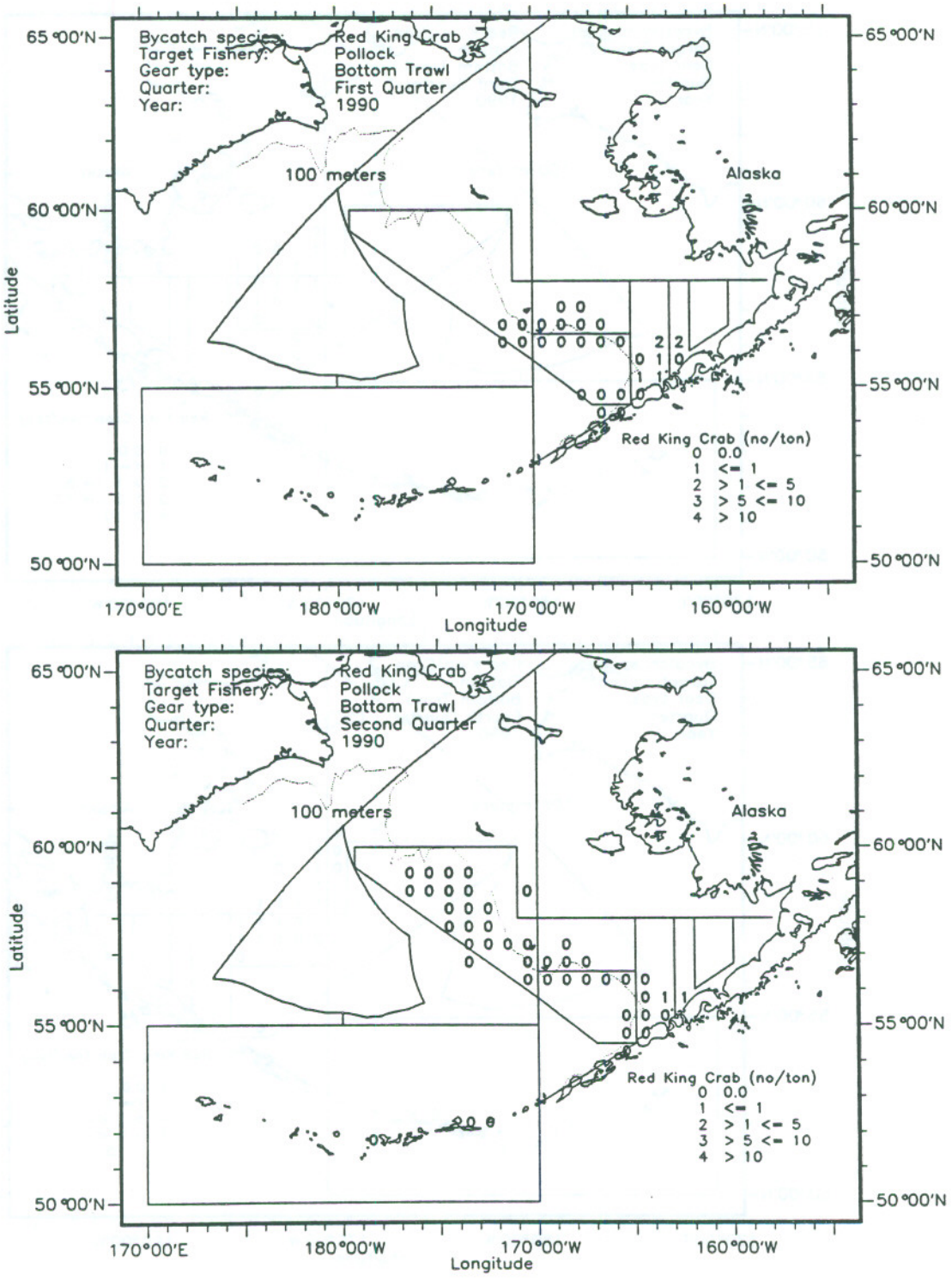


Figure 7.--Continued.

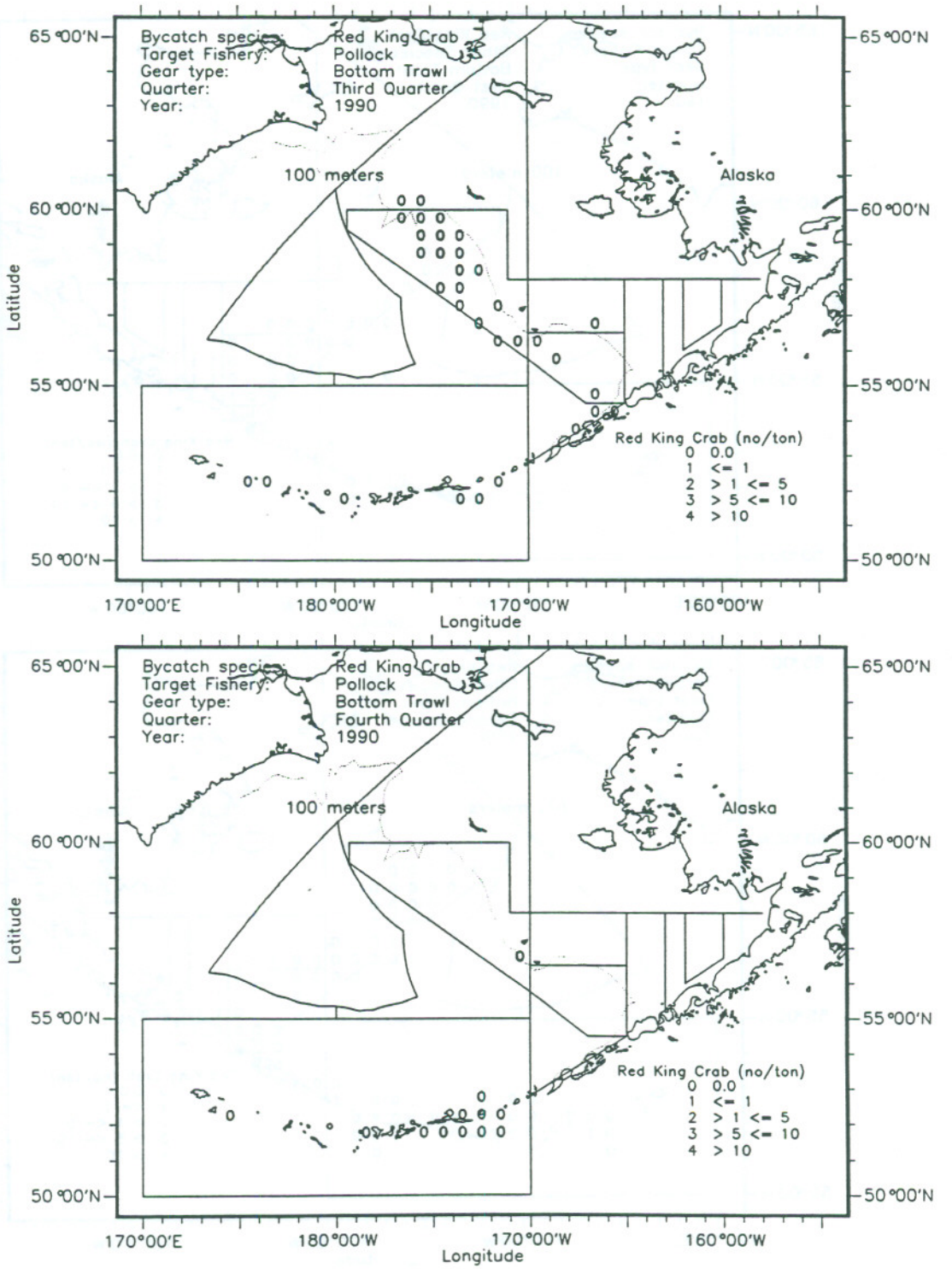


Figure 7.--Continued.

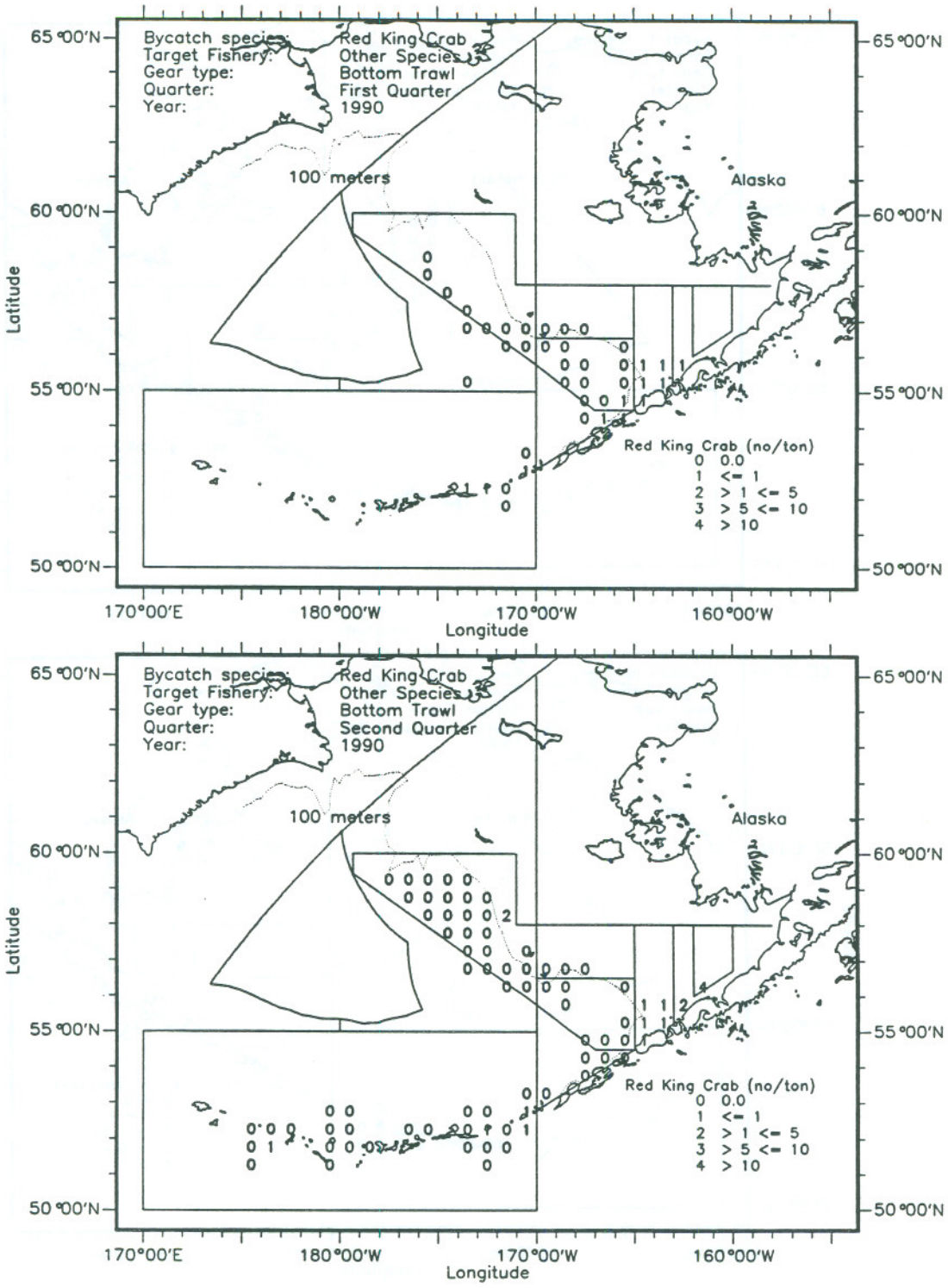


Figure 7.--Continued.

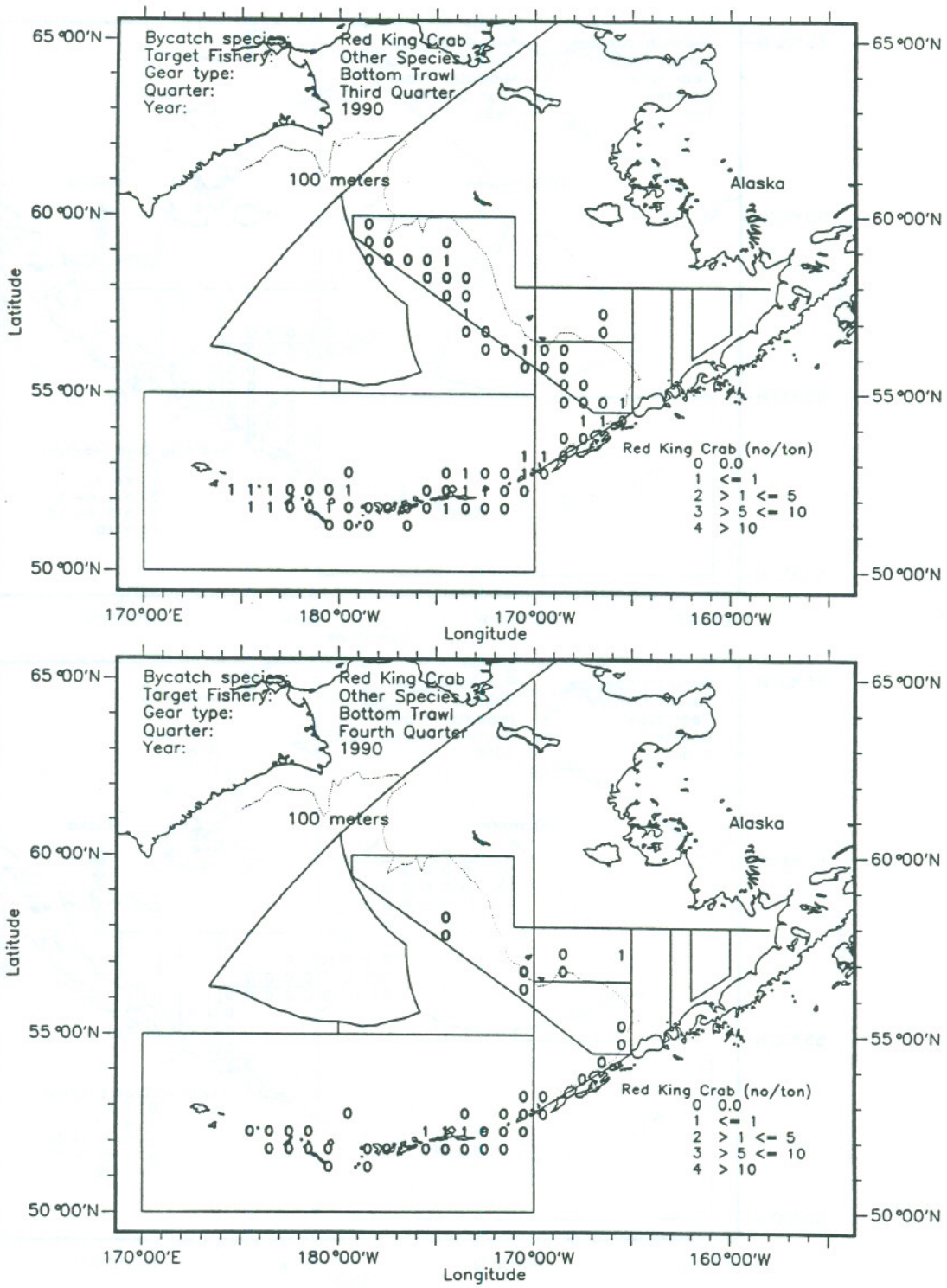


Figure 7.--Continued.

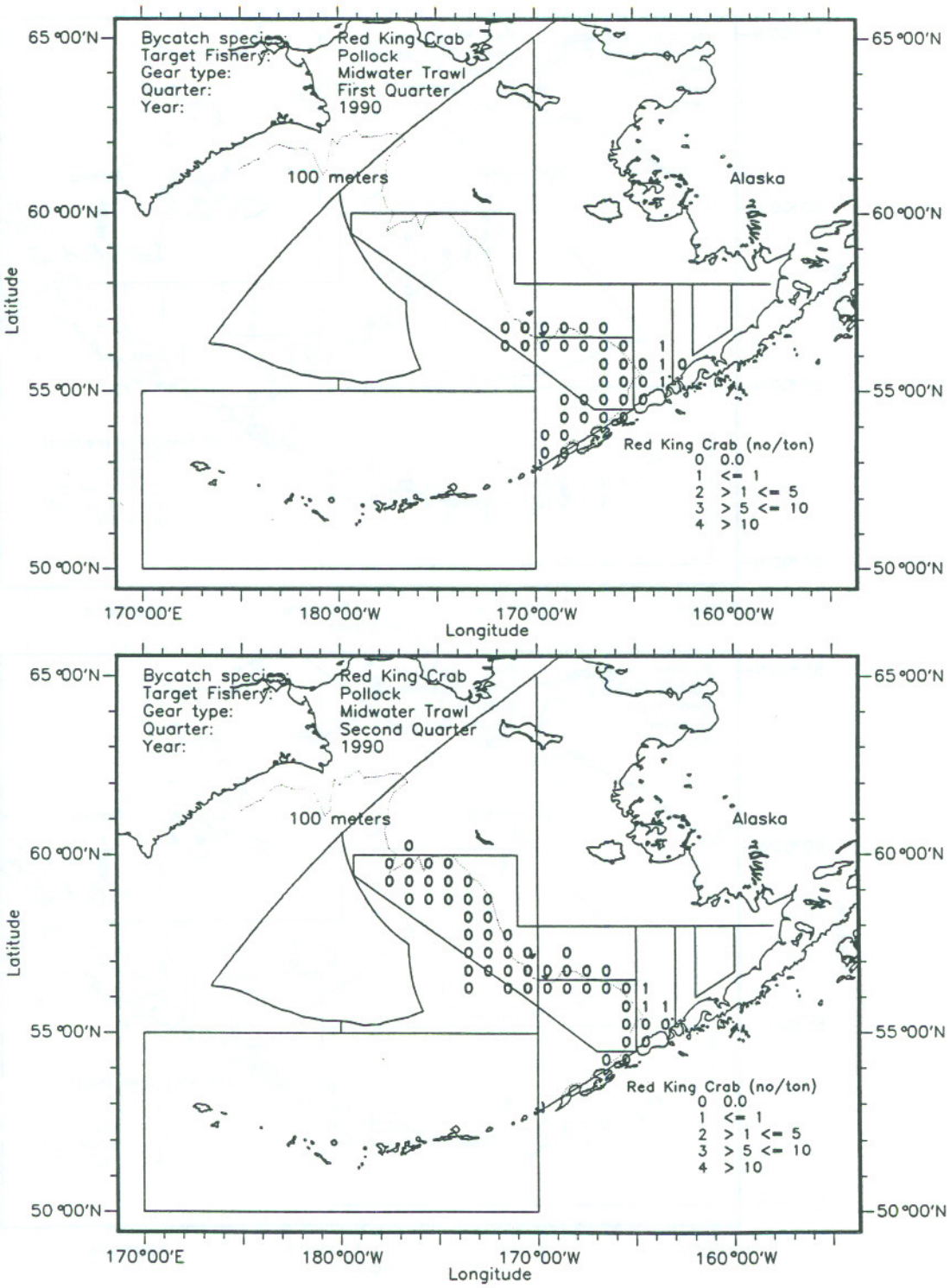


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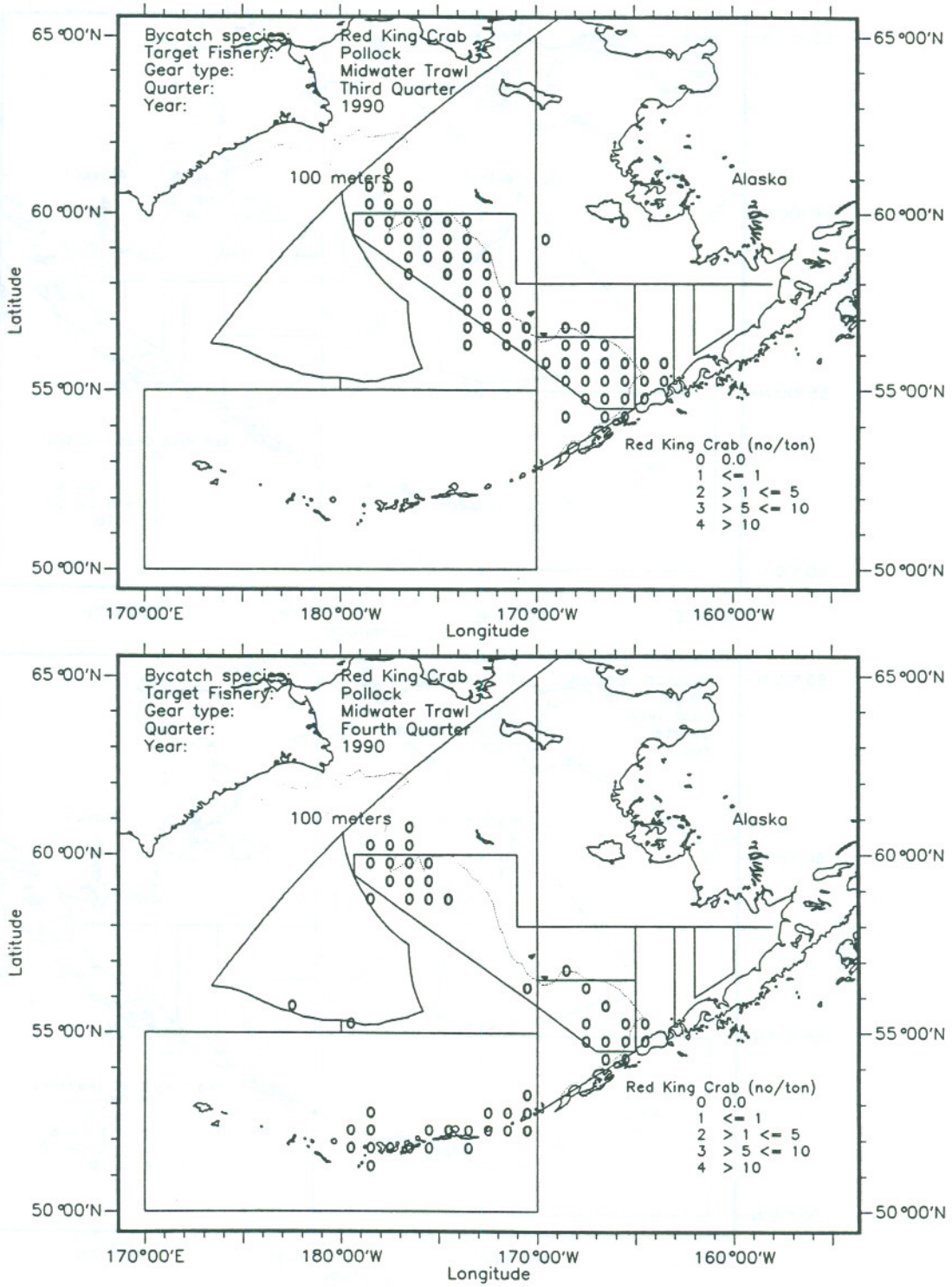


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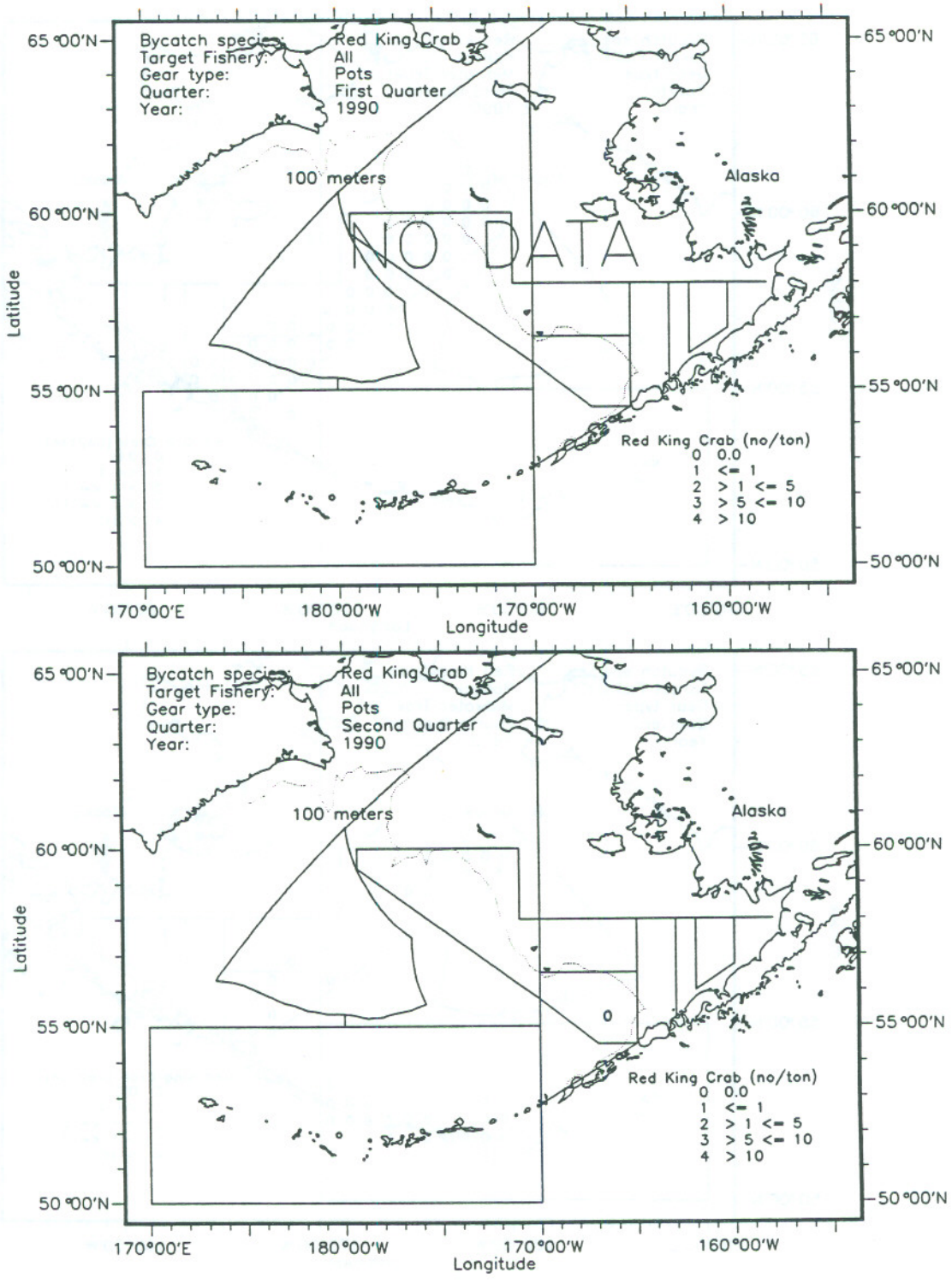


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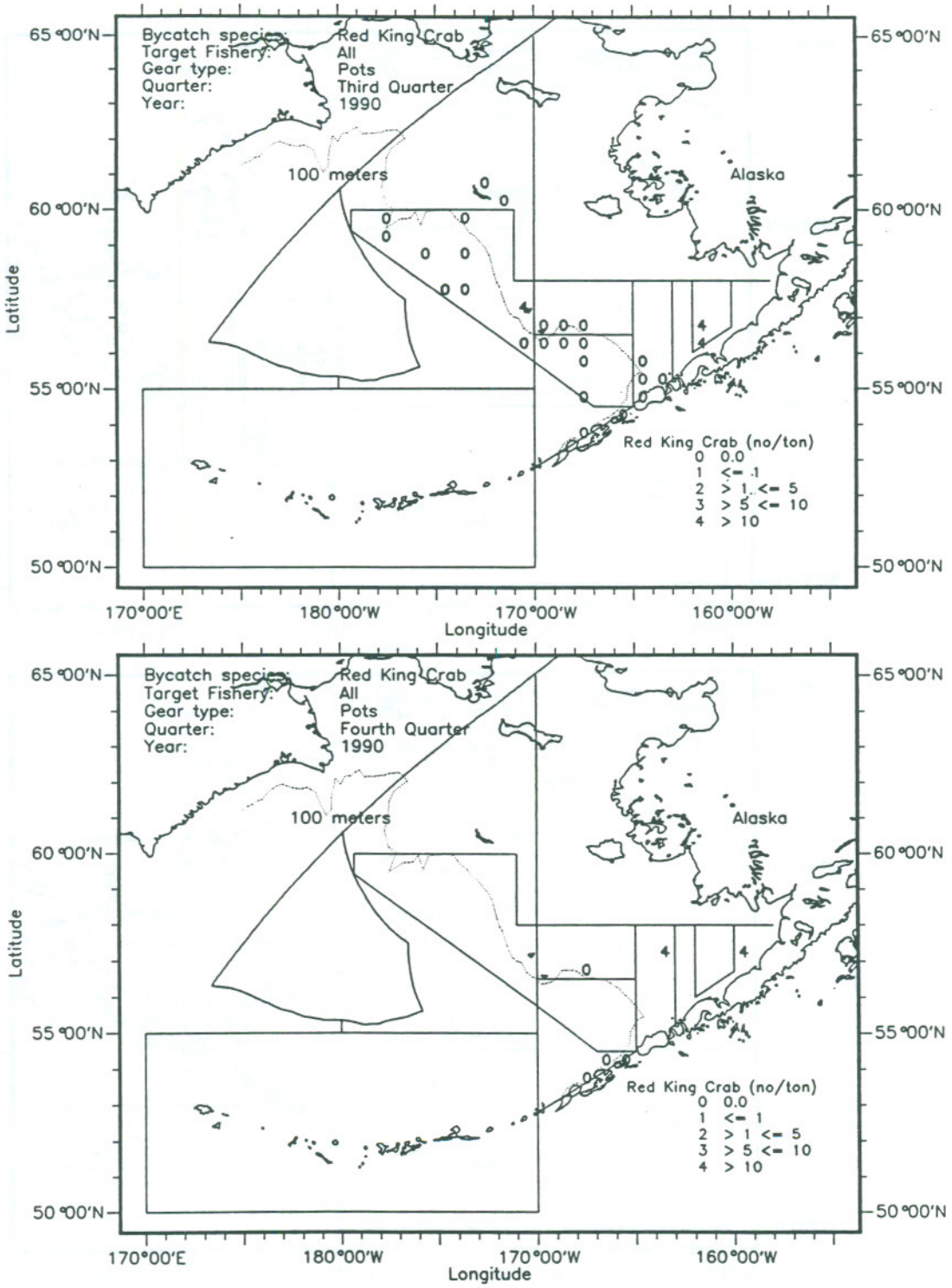


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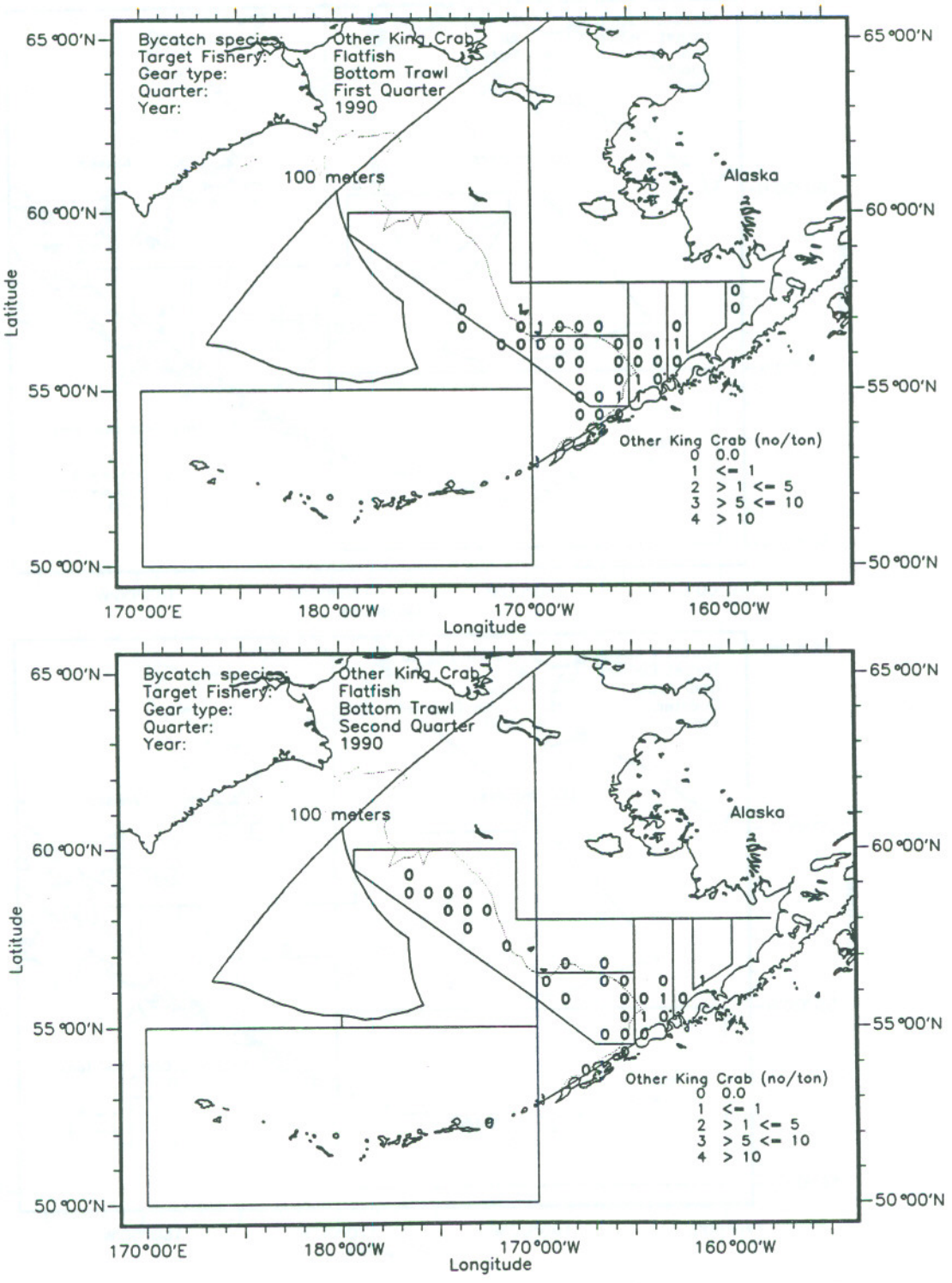


Figure 8.-Average incidence (no./t) of "other" king crab in the U.S. domestic fisheries by quarter, target fishery, gear type, and 1/2° latitude by 1/2° longitude areas in the Bering Sea-Aleutians Islands region, 1990.

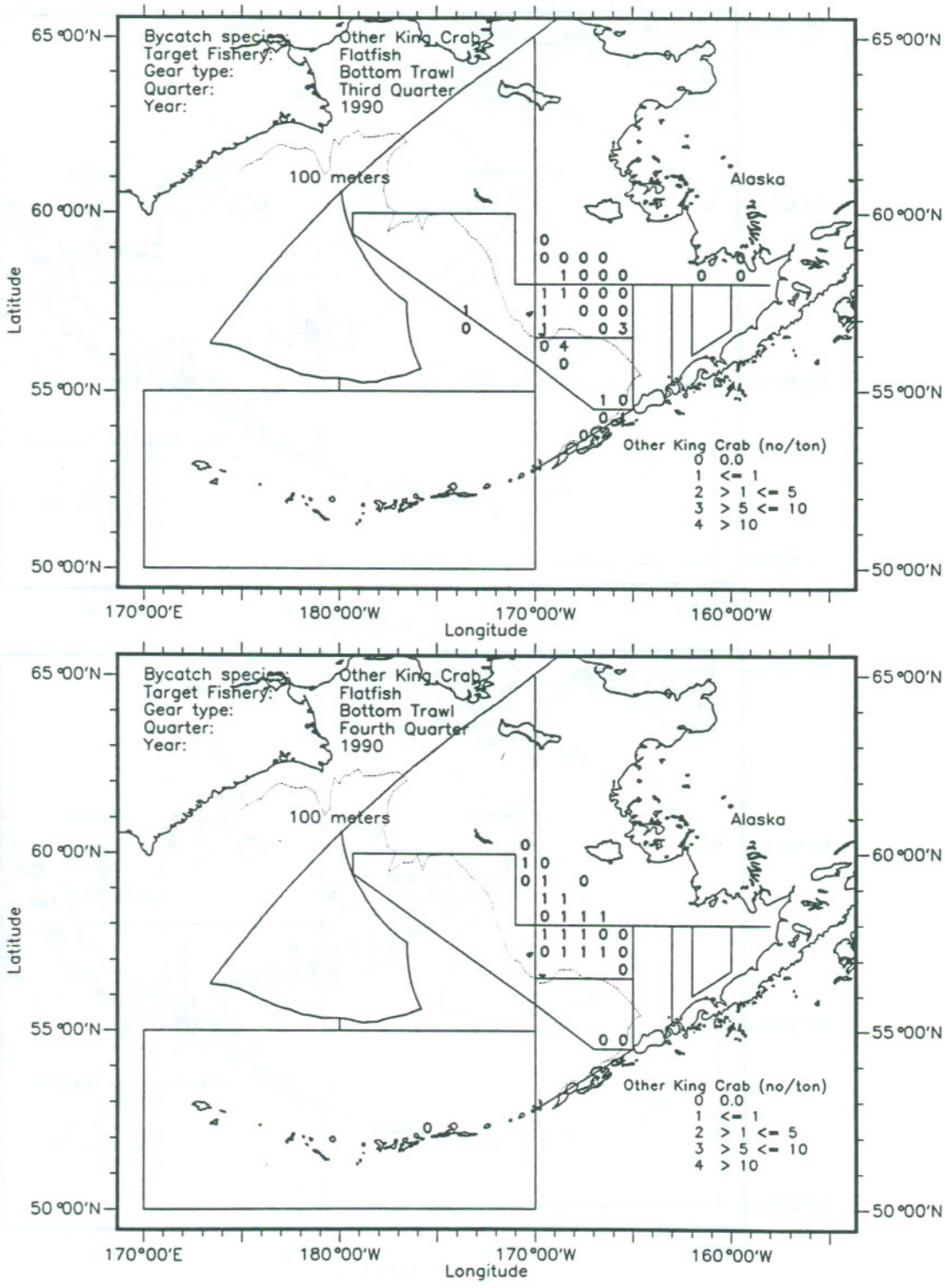


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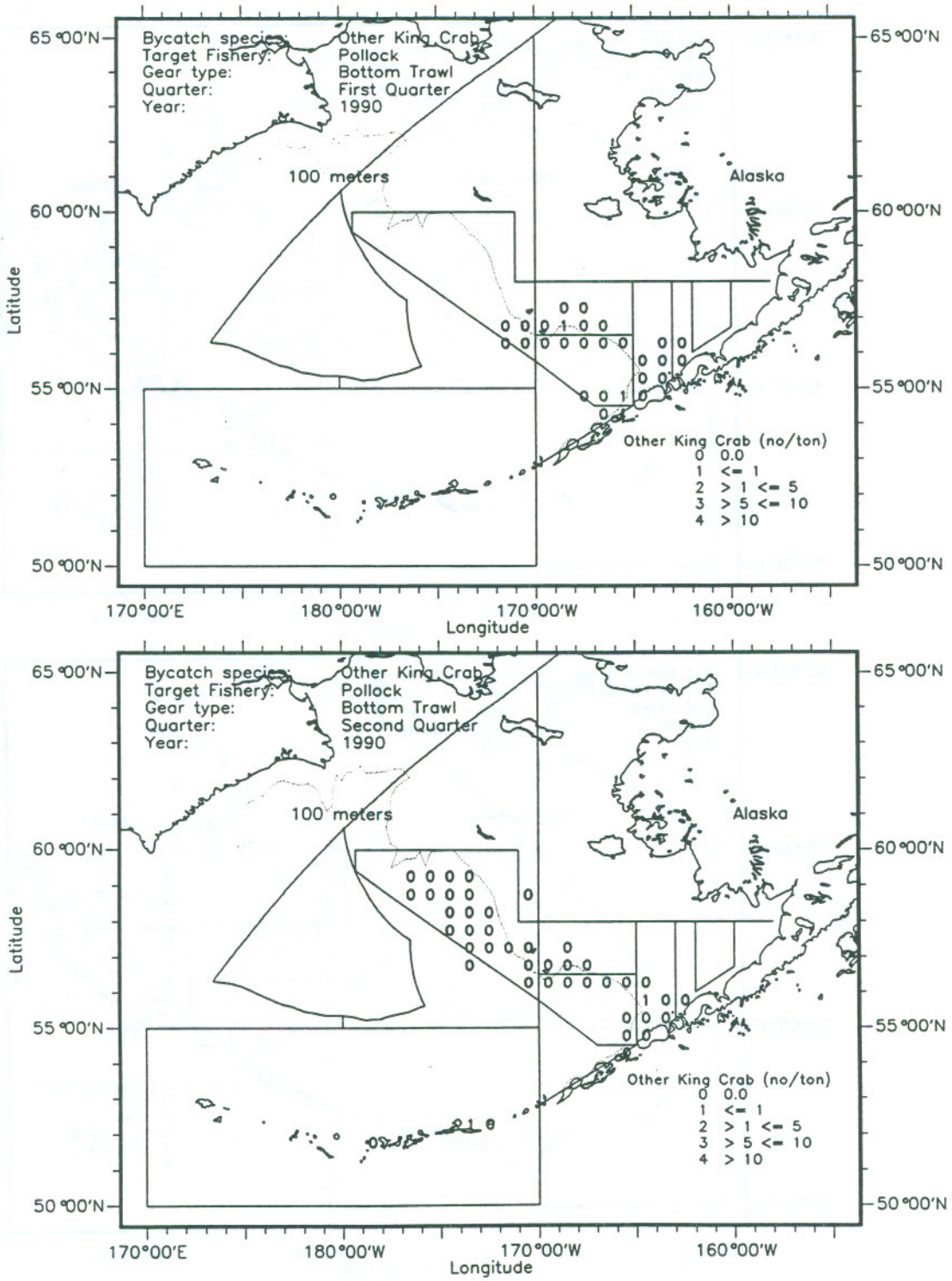


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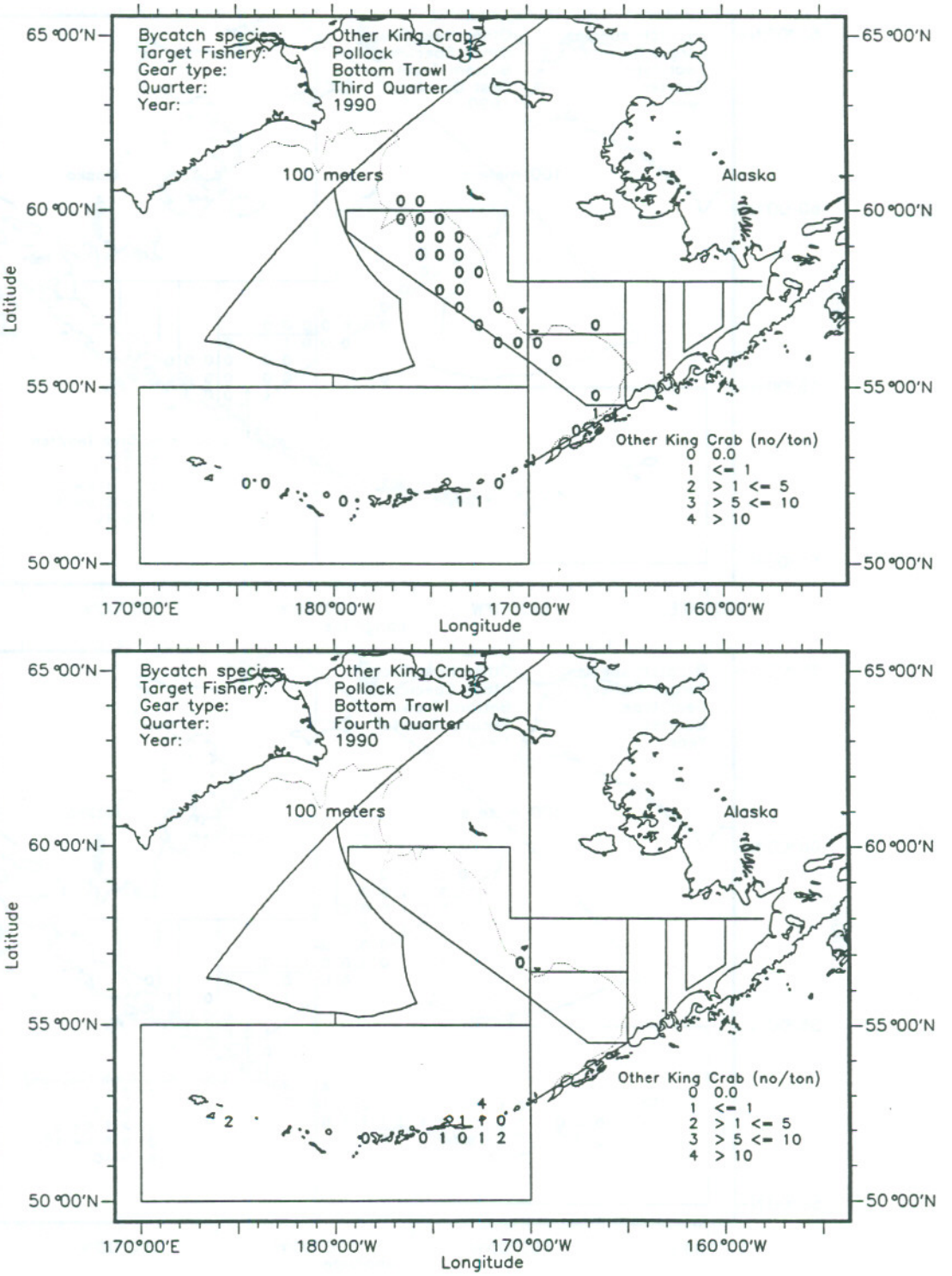


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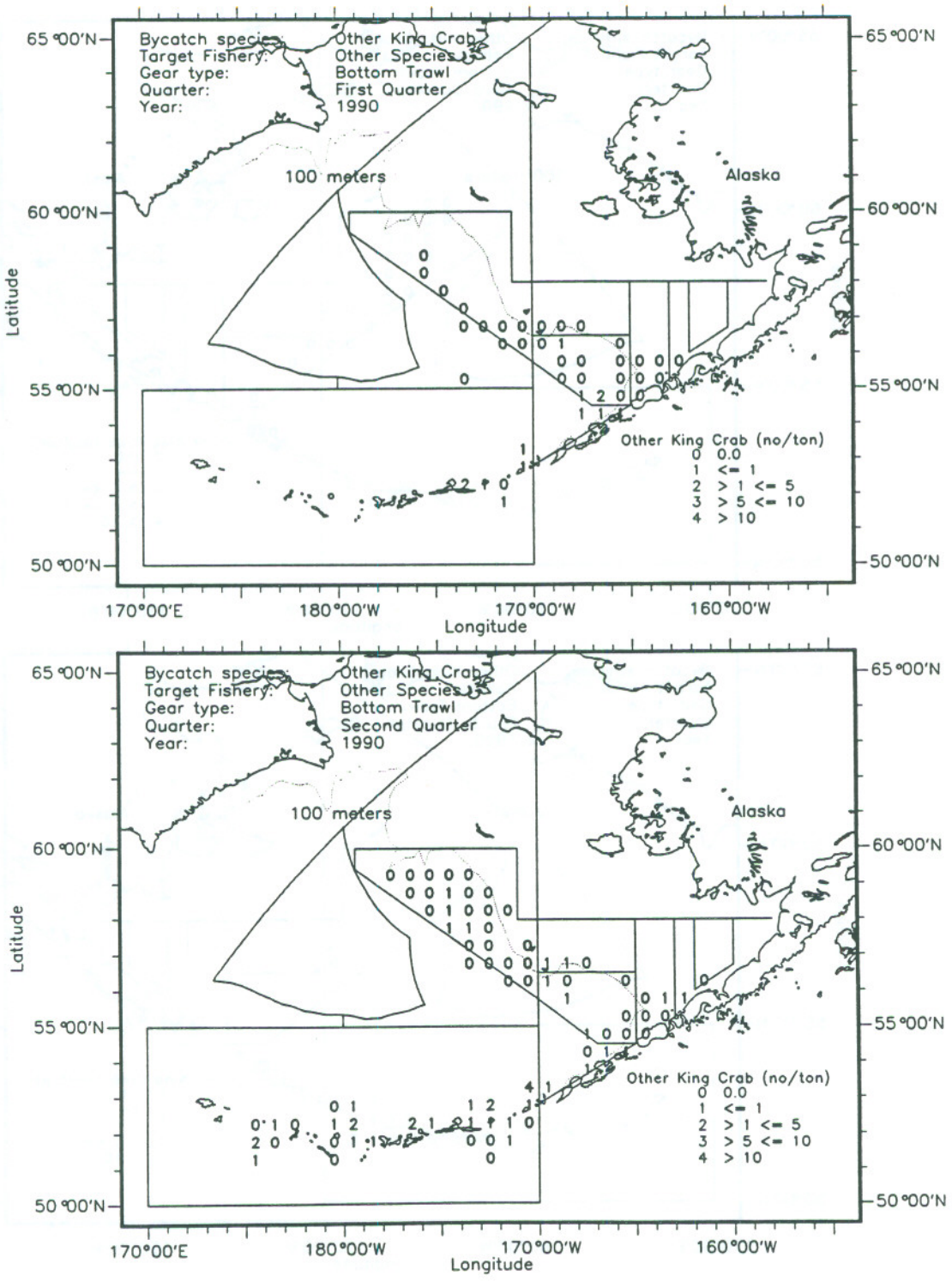


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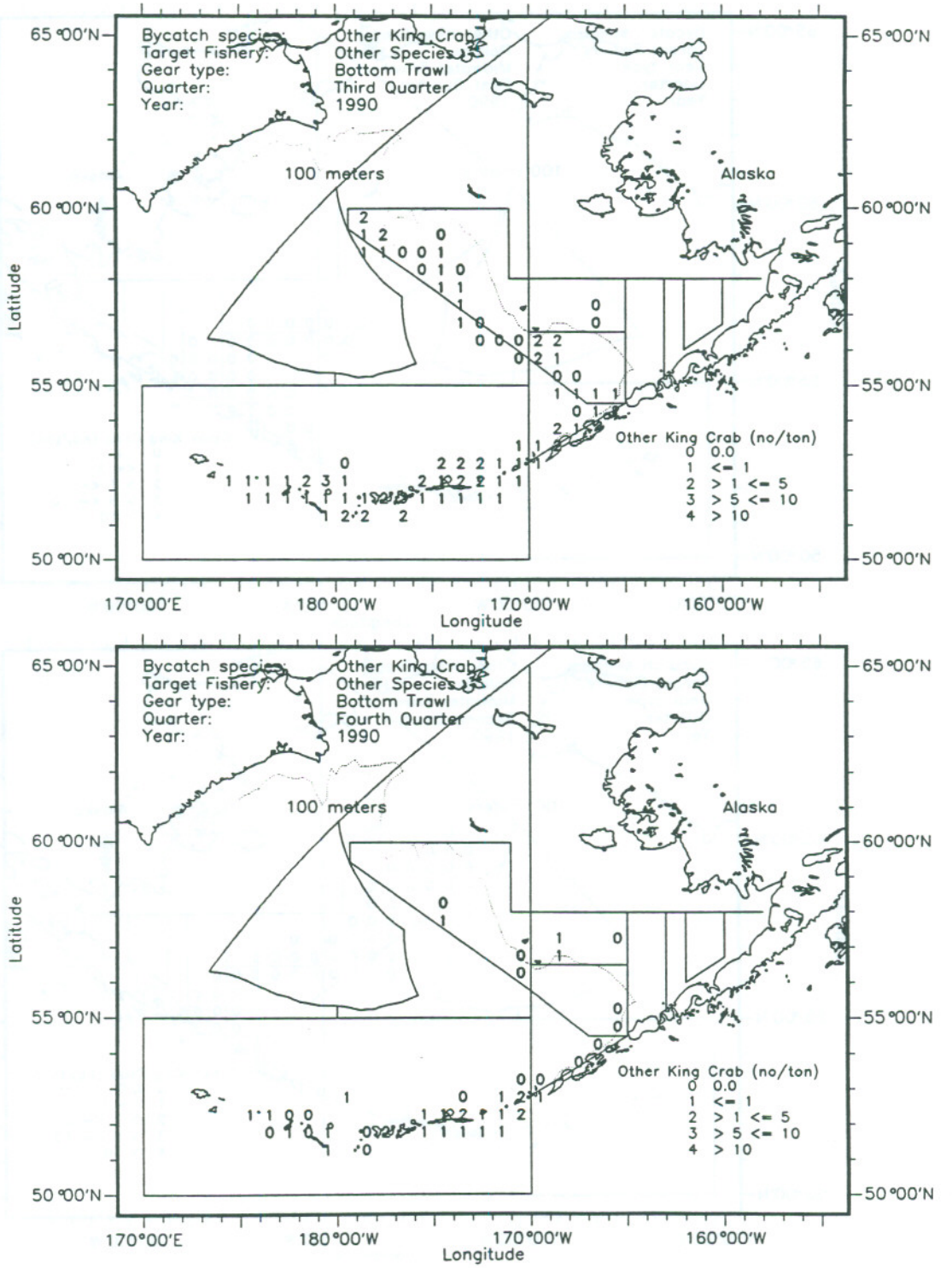


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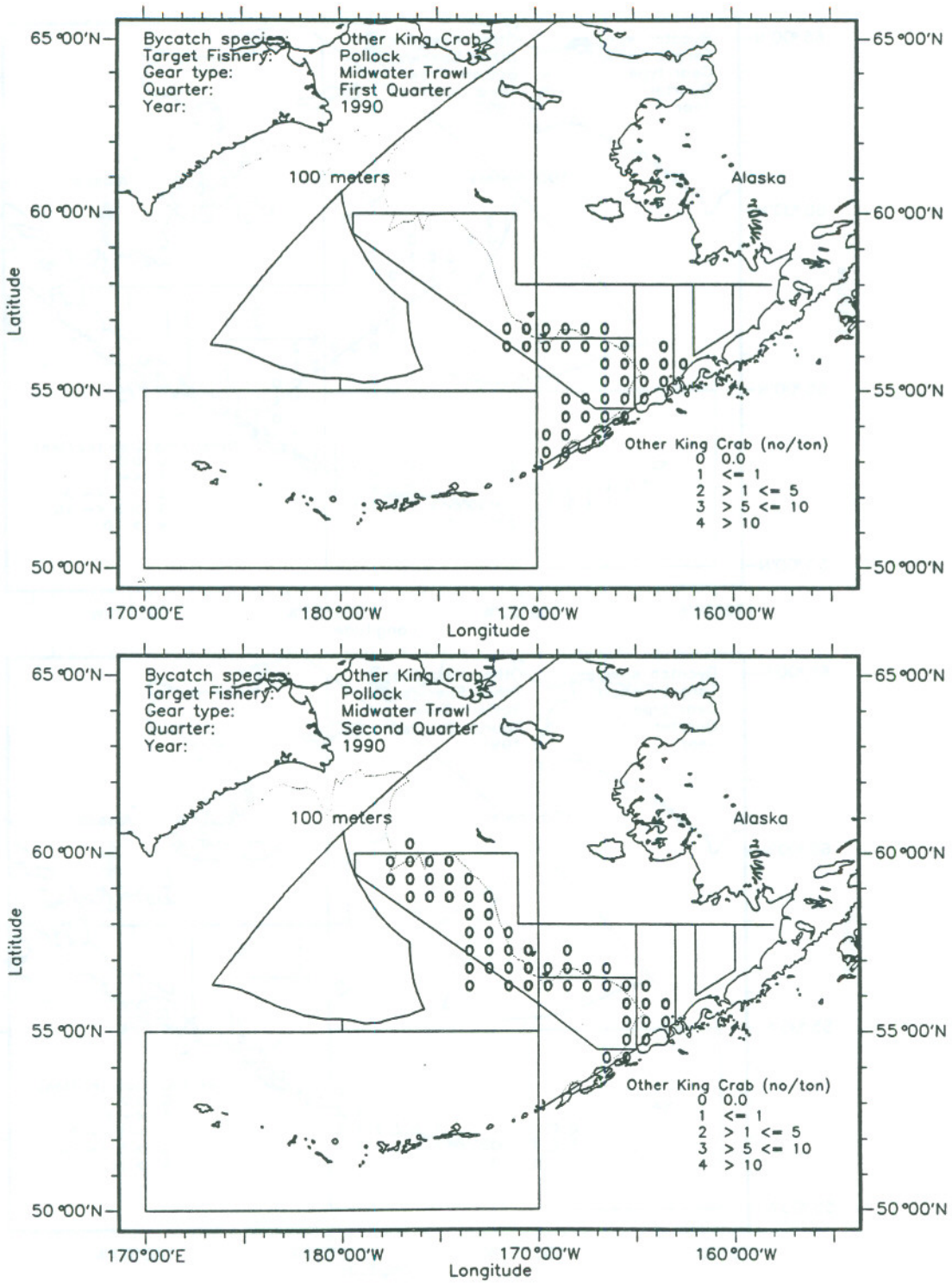


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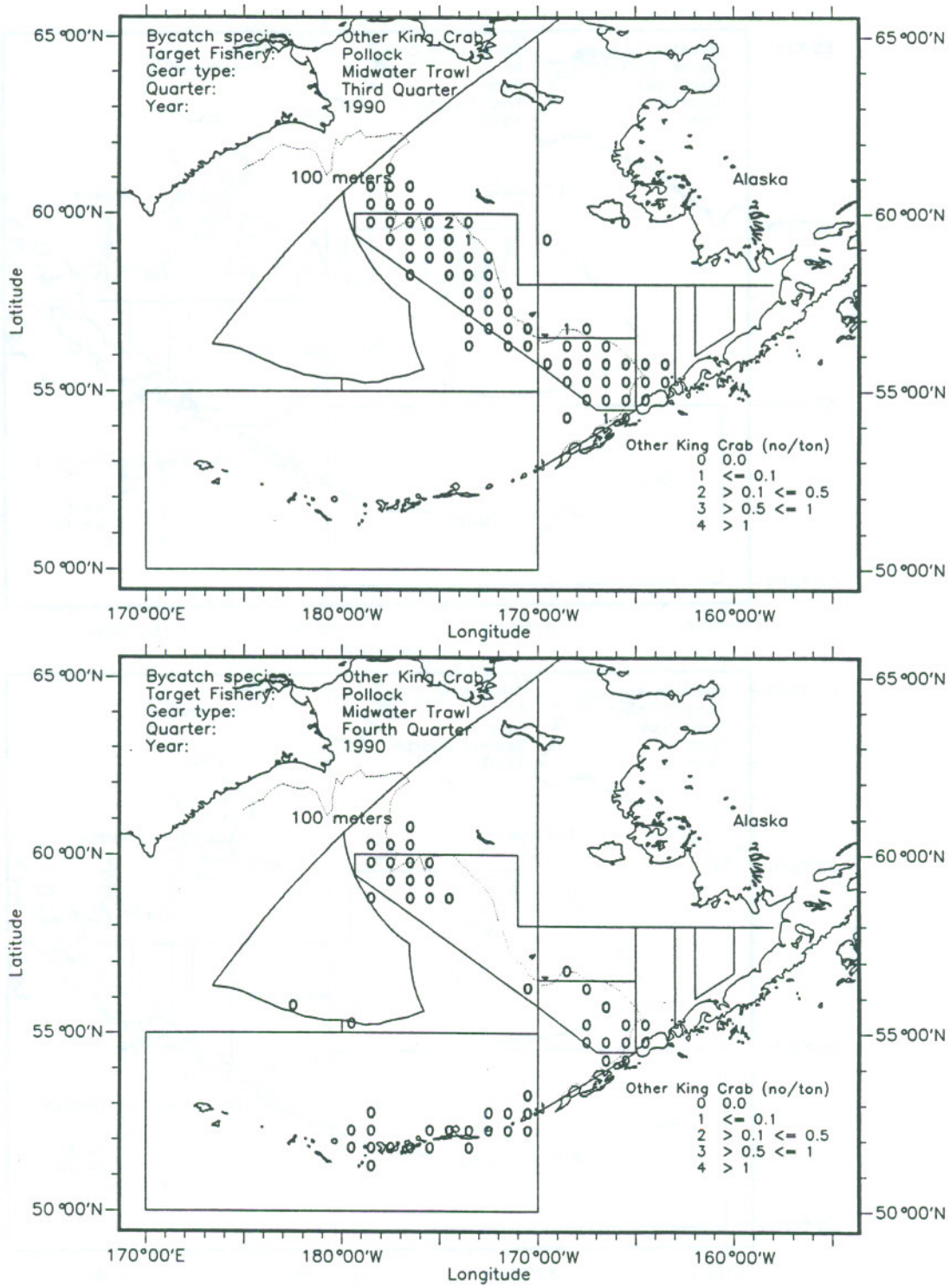


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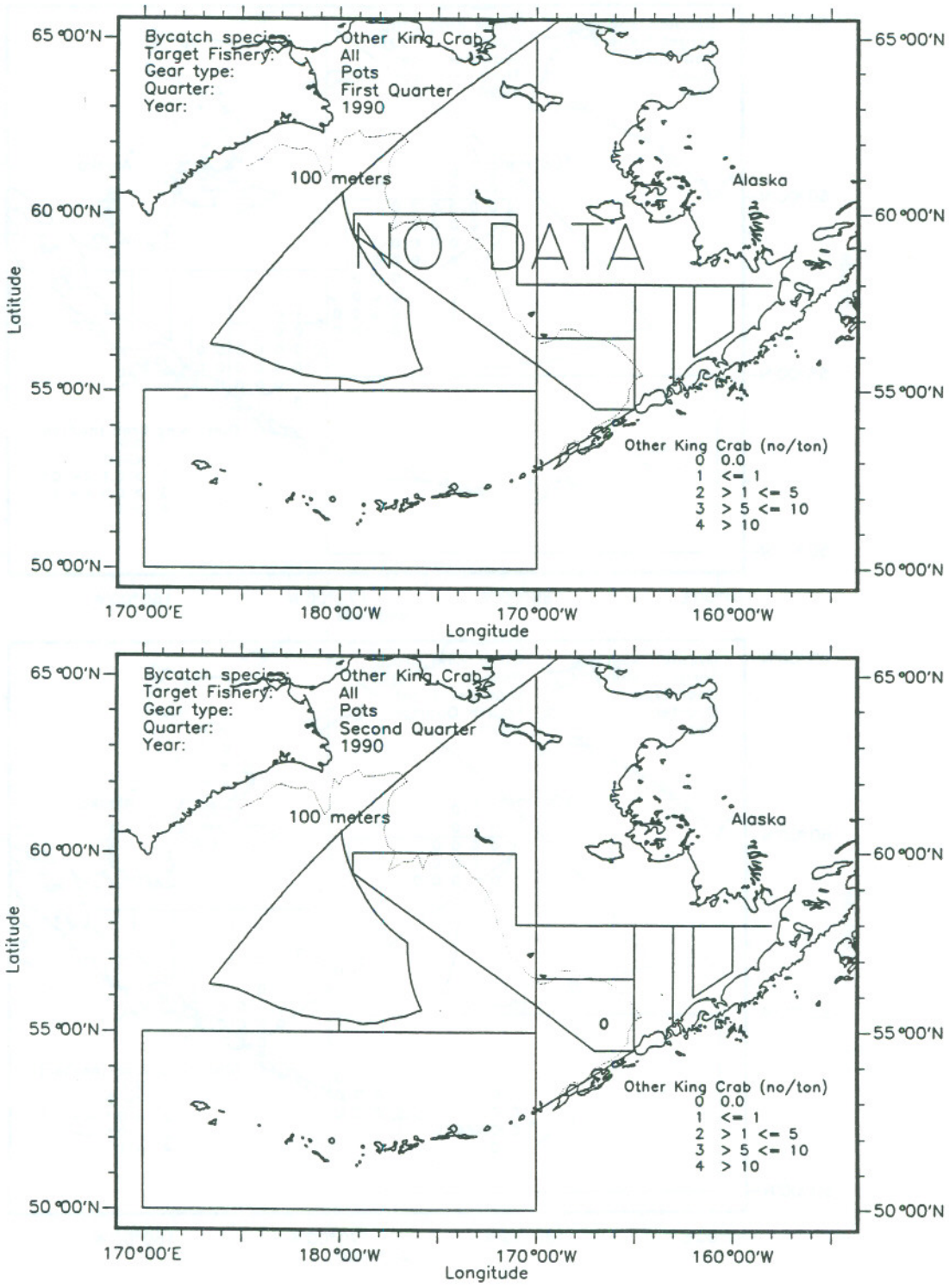


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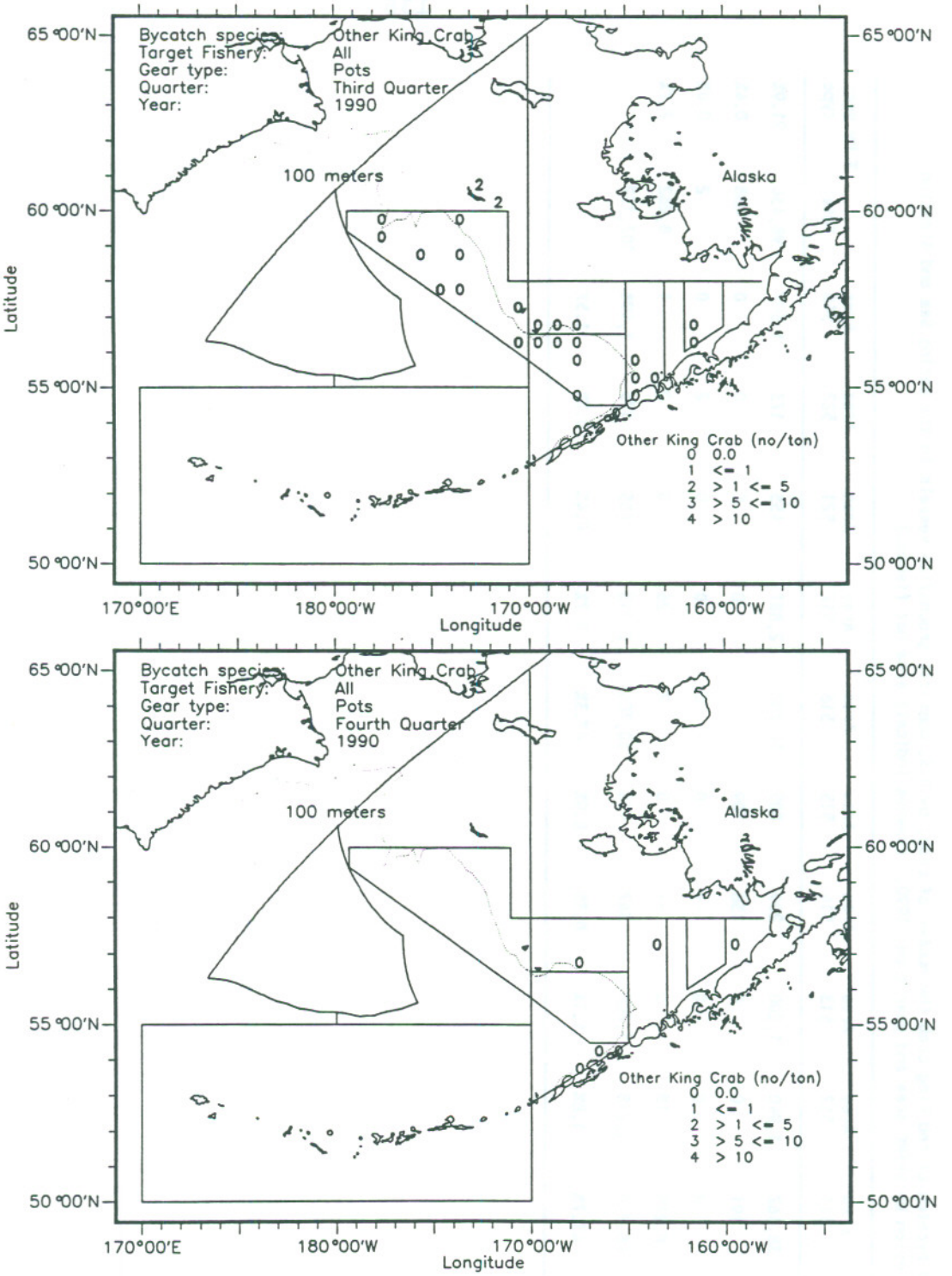


Figure 8.--Continued.

Table 25.--Estimated bycatch of red king crab (by number of crab) by U.S. domestic groundfish vessels in the Bering Sea and Aleutian Islands region by NPFMC area and gear type, 1990. (Dashes indicate area not fished.)

Gear type	Area 511	Area 512	Area 513	Area 514	Area 515	Area 516	Area 517	Area 521	Area 522	Area 540	Total	% by gear type
Bottom trawl	38,462	1,940	1,200	209	805	50,702	2,887	455	173	1,597	98,430	91.9%
Pelagic trawl	191	0	0	138	109	--	0	0	0	0	438	0.4%
Longline	0	0	0	--	0	0	0	0	2	0	2	0.0%
Pot	8,215	18	0	--	0	2	26	0	0	1	8,262	7.7%
Total	46,868	1,958	1,200	347	914	50,704	2,913	455	175	1,598	107,132	
Percent by area	43.7%	1.8%	1.1%	0.3%	0.9%	47.3%	2.7%	0.4%	0.2%	1.5%		

Table 26.--Estimated bycatch of "other" king crabs* (by number of crabs) by U.S. domestic groundfish vessels in the Bering Sea and Aleutian Islands region by NPFMC area and gear type, 1990. (Dashes indicate area not fished.)

Gear type	Area 511	Area 512	Area 513	Area 514	Area 515	Area 516	Area 517	Area 521	Area 522	Area 540	Total	% by gear type
Bottom trawl	290	2	2,603	76	4,671	45	3,061	952	32	13,167	24,899	98.4%
Pelagic trawl	0	0	23	20	21	--	1	73	0	1	139	0.5%
Longline	1	0	1	--	9	0	7	26	18	169	231	0.9%
Pot	0	0	0	--	0	0	0	0	39	0	39	0.2%
Total	291	2	2,627	96	4,701	45	3,069	1,051	89	13,337	25,308	
Percent by area	1.1%	0.0%	10.4%	0.4%	18.6%	0.2%	12.1%	4.2%	0.4%	52.7%		

Table 27.--U.S. domestic groundfish catch (in metric tons (t)) and red king crab bycatch (in numbers) by target fishery and NPFMC zone in the Bering Sea and Aleutians Islands region, 1990.

Fishery	Zone	Groundfish catch	Red king crab			
			Bycatch (numbers)	Per t of groundfish	% within zone	% of total red king crab bycatch
Yellowfin sole/ other flatfish (All gears)	1	35,215.6	81,170	2.30	81.6%	75.8%
	2	12,124.7	1,691	0.14	37.0%	1.6%
	3	17,014.6	1,193	0.07	39.3%	1.1%
	Total	64,354.9	84,054	1.31	--	78.5%
Pollock midwater (All gears)	1	31,215.3	98	<0.01	0.1%	0.1%
	2	788,589.8	0	0.00	0.0%	0.0%
	3	388,334.3	0	0.00	0.0%	0.0%
	Total	1,208,139.4	98	<0.01	--	0.1%
Pollock bottom (All gears)	1	17,479.8	4,238	0.24	4.3%	4.0%
	2	81,997.3	0	0.00	0.0%	0.0%
	3	19,350.2	313	0.02	10.3%	0.3%
	Total	118,827.3	4,551	0.04	--	4.2%
Other (Trawl)	1	31,635.3	5,788	0.18	5.8%	5.4%
	2	100,800.4	2,838	0.03	62.1%	2.6%
	3	46,717.9	758	0.02	25.0%	0.7%
	Total	179,153.6	9,384	0.05	--	8.8%
Other (Longline)	1	136.8	0	0.00	0.0%	0.0%
	2	44,879.7	0	0.00	0.0%	0.0%
	3	5,940.9	2	<0.01	0.1%	<0.1%
	Total	50,957.4	2	<0.01	--	<0.1%
Other (Pot)	1	542.1	8,235	15.19	8.3%	7.7%
	2	511.2	26	0.05	0.6%	<0.1%
	3	364.8	1	<0.01	<0.1%	<0.1%
	Total	1,418.1	8,262	5.83	--	7.7%
Turbot (All gears)	1	71.6	1	0.01	<0.1&	<0.1&
	2	3,776.2	3	<0.01	<0.1&	<0.1&
	3	13,361.9	568	0.04	18.7%	0.5%
	Total	17,209.7	572	0.03	--	0.5%
Sablefish (Trawl)	1	nf	nf	nf	nf	nf
	2	352.5	0	0.00	0.0%	0.0%
	3	110.6	0	0.00	0.0%	0.0%
	Total	463.1	0	0.00	--	0.0%
Sablefish (Longline)	1	323.6	0	0.00	0.0%	0.0%
	2	487.6	0	0.00	0.0%	0.0%
	3	2,733.1	0	0.00	0.0%	0.0%
	Total	3,544.3	0	0.00	--	0.0%
Rockfish (All gears)	1	nf	nf	nf	nf	nf
	2	6,847.4	10	<0.01	0.2%	<0.1&
	3	24,655.7	199	0.01	6.6%	0.2%
	Total	31,503.1	209	0.01	--	0.2%
Atka mackerel (All gears)	1	nf	nf	nf	nf	nf
	2	nf	nf	nf	nf	nf
	3	30,807.7	0	0.00	0.0%	0.0%
	Total	30,807.7	0	0.00	--	0.0%
Total (All gears)	1	116,620.1	99,530	0.85	--	92.9%
	2	1,040,366.8	4,568	<0.01	--	4.3%
	3	549,391.7	3,034	0.01	--	2.8%
	Total	1,706,378.6	107,132	0.06	--	--

nf = No fishing.

Table 28.--U.S. domestic groundfish catch (in metric tons (t)) and "other" king crabs* bycatch (in numbers) by target fishery and NPFMC zone in the Bering Sea and Aleutians Islands region, 1990.

Fishery/gear	Zone	Groundfish catch	"Other" king crabs			
			Bycatch (numbers)	Per t of groundfish	% within zone	% of total "other" king crabs bycatch
Yellowfin sole/ other flatfish (All gears)	1	35,215.6	3	<0.01	0.9%	<0.1%
	2	12,124.7	2,489	0.21	36.9%	9.8%
	3	17,014.6	172	0.01	0.9%	0.7%
	Total	64,354.9	2,664	0.04	--	10.5%
Pollock midwater (All gears)	1	31,215.3	0	0.00	0.0%	0.0%
	2	788,589.8	88	<0.01	1.3%	0.3%
	3	388,334.3	1	<0.01	<0.1%	<0.1%
	Total	1,208,139.4	89	<0.01	--	0.4%
Pollock bottom (All gears)	1	17,479.8	25	<0.01	7.4%	0.1%
	2	81,997.3	144	<0.01	2.1%	0.6%
	3	19,350.2	688	0.04	3.8%	2.7%
	Total	118,827.3	857	0.01	--	3.4%
Other (Trawl)	1	31,635.3	307	0.01	90.8%	1.2%
	2	100,800.4	568	0.01	8.4%	2.2%
	3	46,717.9	421	0.01	2.3%	1.7%
	Total	179,153.6	1,296	0.01	--	5.1%
Other (Longline)	1	136.8	0	0.00	0.0%	0.0%
	2	44,879.7	27	<0.01	0.4%	0.1%
	3	5,940.9	18	<0.01	0.1%	0.1%
	Total	50,957.4	45	<0.01	--	<0.1%
Other (Pot)	1	542.1	0	0.00	0.0%	0.0%
	2	511.2	0	0.00	0.0%	0.0%
	3	364.8	39	0.11	<0.1%	0.2%
	Total	1,418.1	39	0.03	--	0.2%
Turbot (All gears)	1	71.6	2	0.03	<0.1%	<0.1%
	2	3,776.2	2,669	0.71	39.6%	10.5%
	3	13,361.9	6,834	0.51	37.5%	27.0%
	Total	17,209.7	9,505	0.55	--	37.6%
Sablefish (Trawl)	1	nf	nf	nf	nf	nf
	2	352.5	12	0.03	0.2%	<0.1%
	3	110.6	8	0.07	0.1%	<0.1%
	Total	463.1	20	0.04	--	0.1%
Sablefish (Longline)	1	323.6	1	<0.01	0.3%	<0.1%
	2	487.6	6	0.01	0.1%	<0.1%
	3	2,733.1	171	0.06	0.9%	0.7%
	Total	3,544.3	178	0.05	--	0.7%
Rockfish (All gears)	1	nf	nf	nf	nf	nf
	2	6,847.4	744	0.11	11.0%	2.9%
	3	24,655.7	9,296	0.38	51.0%	36.7%
	Total	31,503.1	10,040	0.32	--	39.7%
Atka mackerel (All gears)	1	nf	nf	nf	nf	nf
	2	nf	nf	nf	nf	nf
	3	30,807.7	575	0.02	3.2%	2.3%
	Total	30,807.7	575	0.02	--	2.3%
Total (All gears)	1	116,620.1	338	<0.01	--	1.3%
	2	1,040,366.8	6,747	0.01	--	26.7%
	3	549,391.7	18,223	0.03	--	72.0%
	Total	1,706,378.6	25,308	0.01	--	--

*Species include golden, blue, and couesi king crabs.

nf = No fishing.

Table 29.--King crabs examined for condition by observers in U.S. domestic groundfish catches in the Bering Sea and Aleutian Islands region by species and gear type, 1990.

Species	Gear type	Excellent		Poor		Dead	
		numbers	%	numbers	%	numbers	%
Red king crab	Trawl	2,591	52.4%	1,363	27.5%	994	20.1%
	Pot	997	100.0%	0	0.0%	0	0.0%
	Longline	0	0.0%	0	0.0%	0	0.0%
Blue king crab	Trawl	387	48.4%	286	35.8%	126	15.8%
	Pot	0	0.0%	0	0.0%	0	0.0%
	Longline	0	0.0%	0	0.0%	0	0.0%
Golden king crab	Trawl	1,497	28.6%	1,748	32.3%	1,987	38.0%
	Pot	0	0.0%	0	0.0%	0	0.0%
	Longline	34	72.3%	13	27.7%	0	0.0%
Couesi king crab	Trawl	1	10.0%	2	20.0%	7	70.0%
	Pot	0	0.0%	0	0.0%	0	0.0%
	Longline	0	0.0%	0	0.0%	0	0.0%

Table 30.--Biological data on the bycatch of king crabs in U.S. domestic groundfish fisheries in the Bering Sea and Aleutian Islands region, 1990.

Species	Percent by species	Sex	Sex composition	Average weight (kg)	Average length (mm)
Red king crab	80.9%	Male	70.5	2.25	142.4
		Female	29.5	1.11	117.7
Golden king crab	17.3%	Male	31.8	0.96	110.2
		Female	68.2	0.75	107.3
Blue king crab	1.7%	Male	84.0	1.81	139.1
		Female	16.0	1.72	140.9
Couesi king crab	0.1%	Male	49.5	0.88	120.9
		Female	50.5	0.56	105.2

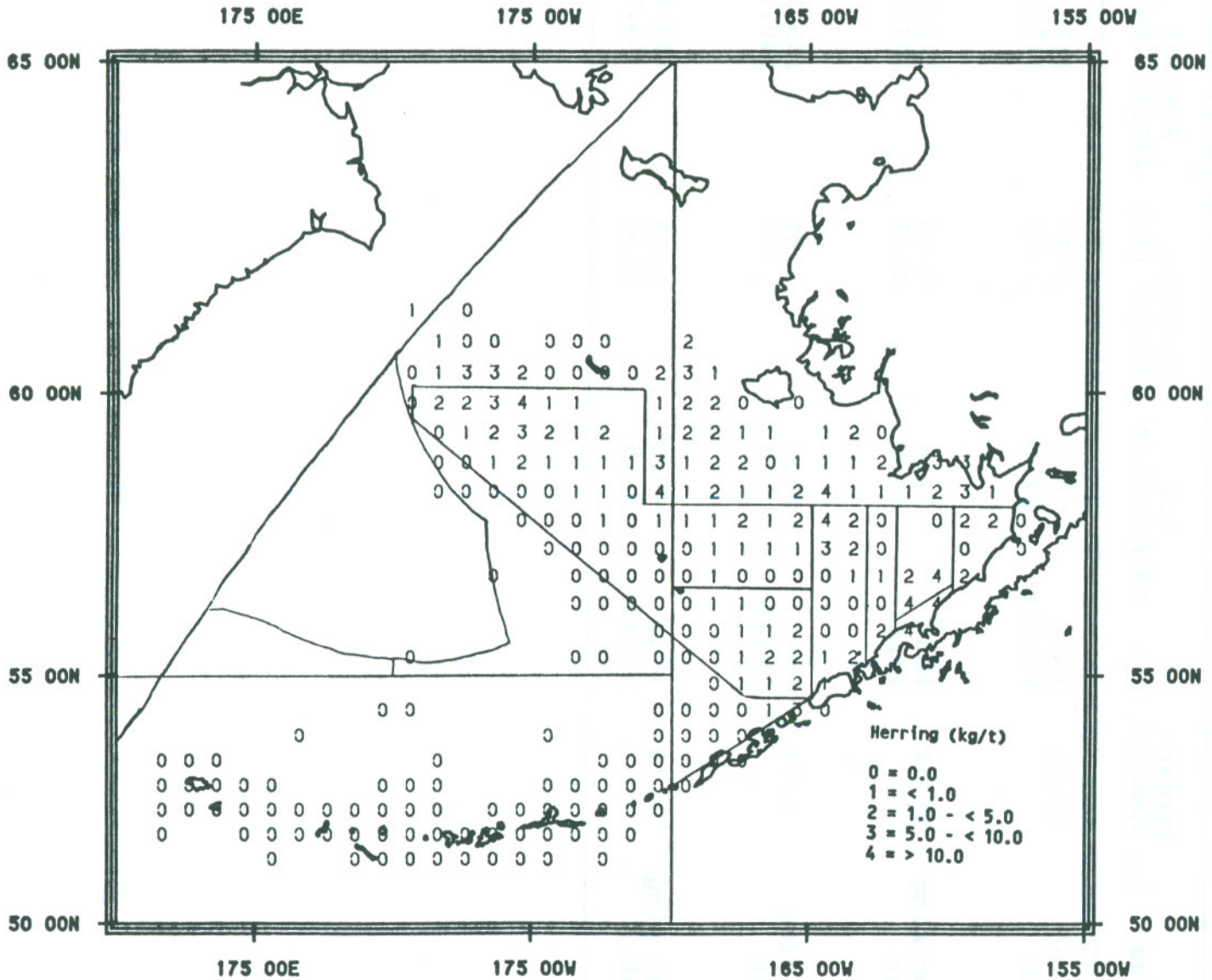


Figure 9.--Pacific herring bycatch (kg/metric ton of groundfish) in U.S. domestic groundfish fisheries in the Bering Sea and Aleutian Islands region by 1/2°longitude by 1°longitude blocks (all gears combined), 1990.

Table 31.--Common and scientific names of rockfish identified in U.S. domestic groundfish catches in the Bering Sea and Aleutian Islands region, 1990.

Common name	Scientific name
Dusky rockfish	Sebastes ciliatus
Harlequin rockfish	Sebastes variegatus
Northern rockfish	Sebastes polyspinis
Pacific ocean perch	Sebastes alutus
Rougheye rockfish	Sebastes aleutianus
Shortraker rockfish	Sebastes borealis
Shortspine thornyhead	Sebastolobus alascanus
Other rockfish*	
Black rockfish	Sebastes melanops
Blue rockfish	Sebastes mystinus
Darkblotched rockfish	Sebastes crameri
Longspine thornyhead	Sebastolobus altivelis
Redbanded rockfish	Sebastes babcocki
Redstripe rockfish	Sebastes proriger
Silvergray rockfish	Sebastes brevispinus

*The seven species listed under "other rockfish" each made up less than 0.1% of the rockfish catch in U.S. domestic groundfish catches.

Table 32.--Estimated U.S. domestic rockfish catch (in metric tons) by species and NPFMC area in the Bering Sea and Aleutian Islands region, 1990.

Common name	Area 511	Area 512	Area 513	Area 514	Area 515	Area 516	Area 517	Area 521	Area 522	Area 540	All areas	% of rockfish catch
Pacific ocean perch	10.5	0.0	4.8	1.3	1,469.1	0.0	224.0	4,519.5	269.7	11,825.5	18,324.4	77.22%
Rougheye rockfish	0.0	0.0	<0.1	0.0	340.1	0.0	3.6	22.4	3.2	1,618.8	1,988.1	8.38%
Northern rockfish	12.6	0.0	3.0	1.5	114.6	0.0	54.2	60.5	0.3	1,234.5	1,481.2	6.24%
Shortspine thornyhead	0.0	0.0	0.0	0.0	116.5	0.0	36.7	26.1	4.8	550.3	734.4	3.09%
Shortraker rockfish	0.0	0.0	2.6	0.0	79.1	0.0	17.0	10.1	7.2	545.5	661.5	2.79%
Dusky rockfish	79.2	0.5	1.7	37.8	26.4	0.4	15.3	29.8	0.0	259.9	451.0	1.90%
Harlequin rockfish	0.0	0.0	0.0	0.0	11.7	0.0	6.7	1.0	0.0	12.1	31.5	0.13%
Other rockfish species*	0.8	0.0	6.2	0.0	2.7	0.0	5.1	8.7	0.1	35.8	59.4	0.25%
Total	103.0	0.5	18.3	40.6	2,160.2	0.4	362.6	4,678.1	285.2	16,082.4	23,731.3	
Percent by area	0.4%	<0.1	0.1%	0.2%	9.1%	<0.1	1.5%	19.7%	1.2%	67.8%		

*Species included in this category each made up less than 0.10% of the total rockfish catch and are listed in Table 31.

Table 33.--Common and scientific names of flatfish identified in U.S. domestic groundfish catches in the Bering Sea and Aleutian Islands region, 1990.

Common name	Scientific name
Alaska plaice	Pleuronectes quadrituberculatus
Arrowtooth flounder	Atheresthes stomias
Butter sole	Pleuronectes isolepis
Dover sole	Microstomus pacificus
Flathead sole	Hippoglossoides elassodon
Greenland turbot	Reinhardtius hippoglossoides
Kamchatka flounder	Atheresthes evermanni
Rex sole	Errex zachirus
Rock sole	Pleuronectes bilineata
Starry flounder	Platichthys stellatus
Yellowfin sole	Pleuronectes asper
Other flatfish*	
Bering flounder	Hippoglossoides robustus
Curlfin sole	Pleuronichthys decurrens
Deepsea sole	Embassichthys bathybius
English sole	Pleuronectes vetulus
Longhead dab	Pleuronectes proboscidea
Petrale sole	Eopsetta jordani
Sand sole	Psettichthys melanostictus

* The seven species listed under "other flatfish" each made up less than 0.1% of the flatfish catch in U.S. domestic groundfish catches.

Table 34.--Estimated U.S. domestic flatfish catch (in metric tons) by species and NPFMC area in the Bering Sea and Aleutian Islands region, 1990.

Common name	Area 511	Area 512	Area 513	Area 514	Area 515	Area 516	Area 517	Area 521	Area 522	Area 540	All areas	% of flatfish catch
Rock sole	11,483.0	28.4	1,988.8	986.8	814.5	4,187.3	2,308.1	1,046.5	25.1	455.4	23,323.9	31.1%
Yellowfin sole	853.5	40.6	4,046.1	9,280.3	165.6	1,446.7	67.6	11.0	80.5	0.1	15,992.0	21.3%
Flathead sole	2,067.8	3.5	552.8	111.0	1,487.8	129.3	2,540.2	2,703.0	125.0	152.9	9,873.4	13.1%
Arrowtooth flounder	657.0	1.6	362.9	438.8	2,080.0	80.2	1,378.5	2,725.3	154.3	1,782.5	9,661.0	12.9%
Greenland turbot	69.9	3.8	1.8	0.0	3,852.7	4.7	1,704.9	451.6	204.1	2,611.8	8,905.3	11.9%
Alaska plaice	994.6	0.6	796.0	1,720.3	2.6	1,099.7	42.9	84.3	104.5	0.1	4,845.6	6.5%
Rex sole	131.8	0.4	1.8	0.2	417.4	2.2	225.4	32.0	8.6	250.3	1,070.1	1.4%
Kamchatka flounder	3.0	0.1	4.0	3.4	64.1	5.8	19.8	107.7	3.9	308.7	520.5	0.7%
Starry flounder	105.4	3.3	4.2	26.3	3.2	306.4	29.0	5.4	5.8	0.0	488.9	0.7%
Dover sole	0.6	0.0	0.6	<0.01	19.5	0.0	1.9	2.1	0.0	184.3	209.1	0.3%
Butter sole	62.6	0.8	0.2	0.0	0.1	52.9	2.3	0.1	<0.1	0.0	118.9	0.2%
Other flatfish*	32.7	0.1	3.3	13.5	0.1	3.1	4.5	4.4	0.3	15.1	77.2	0.1%
Total	16,461.9	83.0	7,762.5	12,580.7	8,907.6	7,318.4	8,325.1	7,173.4	712.0	5,761.2	75,085.7	
Percent	21.9%	0.1%	10.3%	16.8%	11.9%	9.7%	11.1%	9.6%	0.9%	7.7%		

*Species included in this category each made up less than 0.10% of the total flatfish catch and are listed in Table 33.

SUMMARY OF OBSERVER SAMPLING FOR GULF OF ALASKA DOMESTIC GROUNDFISH FISHERIES

Estimates of Domestic Groundfish Catches

U.S. domestic operations in the Gulf of Alaska region received an initial DAP allocation of 245,249 t of groundfish for 1990. There were no allocations for joint venture or foreign fisheries. Releases from reserves raised the final allocation to 297,749 t (Table 35). Domestic groundfish vessels caught 82.1% of this amount (244,397 t). Walleye pollock and Pacific cod were the primary target fisheries, accounting for 33.0% and 29.0%, respectively, of the total groundfish catch. Significant fisheries were also conducted for sablefish and slope rockfish. Overall, 17.0% of the allocated groundfish caught in 1990 was reported discarded, a large part of which was attributed to arrowtooth flounder. The large discard of arrowtooth flounder (90.5%) was due to limited markets for products made from this species.

The distribution of domestic groundfish catches is presented by NPFMC area in Figure 10. Over one-half of the groundfish catch was caught in Area 630 (128,200 t or 52% of the total catch). The numbers and percentages of the total groundfish catch in the other NPFMC areas was 54,700 t (22%) in Area 610, 30,000 t (12%) in Area 620, 12,400 t (5%) in Area 640, 9,100 t (4%) in Area 650, 6,700 t (3%) in Area 631, 2,300 t (1%) in Area 621, and 1,100 t (less than 1%) in Area 680.

Restrictions

In the Gulf of Alaska (Fig. 11), bycatch limits only applied to Pacific halibut taken in trawl and longline fisheries. Unlike in the Bering Sea and Aleutian Islands region, where Pacific halibut bycatch is managed by total bycatch, Pacific halibut bycatch in the Gulf of Alaska region is managed by mortality. A mortality rate of 50% was applied for trawl fisheries, which were restricted to a limit of 2,000 t of Pacific halibut mortality, and a mortality rate of 13% was used for longline fisheries, which had a mortality limit of 750 t. No limits were set for vessels using pots (traps) in 1990.

The Gulf of Alaska longline fishery closed on 1 July for the remainder of the year due to attainment of its Pacific halibut mortality limit. Attainment of the trawl Pacific halibut mortality quota closed the Gulf of Alaska to trawling on 21 November.

Summary of Data Collected

In the Gulf of Alaska region, observers sampled 5,593 trawl hauls, 2,029 longline sets, and 700 pot sets for groundfish composition and prohibited species bycatch. Among the biological data collected by observers in 1990 were 319,445 lengths and 9,801 otoliths from 22 groundfish species (Table 36). These data were used by scientists of the Status of Stocks Task at the Alaska Fisheries Science Center for use in determining biomass estimates and year-class strengths. The results are reported in "Stock Assessment and Fishery Evaluation Report for the 1991 Gulf of Alaska Groundfish Fishery[2]".

From prohibited species, observers collected 9,894 crab carapace lengths and widths, 5,142 Pacific salmon lengths, and 67,626 Pacific halibut lengths. Observers also collected scales from 3,648 Pacific salmon for species verification and age analysis. Condition was recorded for 139,900 Pacific halibut, 13,731 snow crabs, and 2,177 king crabs. Observers also recovered 41 tagged chinook salmon. No stomach samples were collected by observers in the Gulf of Alaska region in 1990.

Observations of Fishing Gear-Marine Mammal Interactions

Observers monitored 96,586 t of groundfish taken in 7,603 trawl hauls and 6,346 t of groundfish taken in 2,232 longline sets for fishing gear-marine mammal interactions in Gulf of Alaska groundfish fisheries in 1990 (Table 37). Nineteen of the 29 animals involved in interactions were deterred, 5 animals were caught freshly dead, 2 were decomposed, 1 was caught and released unharmed, and 2 were caught but released without the condition being determined. Of the 15 killer whales that were encountered, all were deterred in a single longline set. Of the eight Steller sea lions involved in interactions, two were freshly dead, three were deterred, one was released unharmed, and two were released without their condition being determined. Also encountered were four northern elephant seals (Mirounga angustirostrius, three freshly dead and one deterred), and two unidentifiable species of marine mammals (both decomposed).

Observations of Fishing Gear-Sea Bird Interactions

In longline sets sampled for groundfish species and prohibited species incidence, sea birds were observed in 19 (1.0%) sets. Numbers extrapolated from sample weight to set weight yielded 38 birds (58 kg) in sampled longline sets. No seabirds were recorded in trawl hauls or pot sets.

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[2]Available from the North Pacific Fishery Management Council, P.O. Box 103136, Anchorage, AK 99510.

Bycatch of Prohibited Species

Pacific Salmon

Bycatch rates and average weights of Pacific salmon for trawl vessels are presented in Table 38. No Pacific salmon were observed caught in longline or pot fisheries. Excluding NPFMC areas with low groundfish catches, the highest annual rates were generally observed in Areas 620 and 621 and were associated with target fisheries for flatfish and "other species" with the use of bottom trawl gear. In the flatfish fishery in Area 621, the highest rates were observed in October (4.387 fish/t), July (3.073 fish/t), August (1.394 fish/t), and September (0.854 fish/t), while in Area 620, the highest monthly rate was observed in April (0.952 fish/t). In "other species" fisheries (which caught primarily Pacific cod), the highest rates in Area 620 were observed in April (1.117 fish/t) and in Area 621 the highest rates were observed in March (2.567 fish/t) and April (1.292 fish/t).

Bycatch rates of Pacific salmon are plotted by 1/2° latitude and 1° longitude statistical areas in Figure 12 by gear type and quarter for the bottom trawl and midwater trawl fisheries. Rates were generally less than 1.0 salmon/t. However, the flatfish bottom trawl fishery had two rates exceeding 3.0 salmon/t in Area 621 during the fourth quarter, and one rate exceeding 2.0 salmon/t in Area 630 during the second quarter. In the "other species" bottom trawl fishery, a rate exceeded 3.0 salmon/t on the continental slope of Area 620 during the first quarter; single rates exceeded 2.0 salmon/t in Area 610 in the second and fourth quarters, and in Area 621 during the third quarter.

The estimated U.S. domestic bycatch of Pacific salmon in 1990 was 21,085 fish (Table 39). Bycatch in Areas 630 and 620 accounted for 48.9% and 38.7%, respectively, of the bycatch. By gear type, vessels using bottom trawl gear caught about 14,950 salmon and vessels using pelagic trawl gear caught about 6,135 salmon.

By target fishery, most of the bycatch of Pacific salmon was taken by the walleye pollock midwater (6,132 fish), flatfish (6,004 fish), and "other" trawl fisheries (6,003 fish) (Table 40). However, the overall bycatch rate was much higher in the flatfish fishery (0.239 fish/t) than in the walleye pollock midwater fishery (0.119 fish/t) and "other species" fishery (0.079 fish/t). Of the remaining bycatch, 2,551 fish were taken in the rockfish fishery, 206 fish in the sablefish trawl fishery, and 189 fish in the walleye pollock bottom trawl fishery.

The species composition, sex composition, average weight, and average length of incidentally caught Pacific salmon are

given in Table 41. Chinook salmon made up 80.3% of the total salmon bycatch, followed by chum (12.0%), coho (7.0%), sockeye (0.4%), and pink salmon (0.3%). No steelhead were observed taken in 1990.

Pacific Halibut

Bycatch rates and average weights for Pacific halibut are listed in Table 42. The highest rates occurred in longline fisheries. Annual rates by NPFMC area and target exceeded 100 kg/t in all NPFMC areas except Area 640 in the sablefish fishery (52 kg/t) and Area 631 in the Pacific cod fishery (33 kg/t). There were three occurrences where Pacific halibut was caught at a higher rate than was the catch of allocated groundfish--in Areas 621 (3,622 kg/t) and 610 (1,373 kg/t) in the "other" target fishery and in Area 621 (1,490 kg/t) in the sablefish fishery. Annual rates for vessels using bottom trawl gear that targeted on flatfish and "other species" exceeded 10 k g/t in all NPFMC areas sampled by observers except in Areas 610 and 680. Also, in all NPFMC areas except Area 650, flatfish fisheries showed at least one monthly occurrence of over 50 kg/t. For pot fishery vessels, the highest annual rate was observed in Area 620 (316 kg/t). For vessels using pelagic gear, only one annual rate exceeded 1 kg/t (5 kg/t in Area 610 in the "other species" target fishery).

The average weight of Pacific halibut in 1990 was 6.31 kg and the average length[3] was 70.31 cm. The smallest average weights for Pacific halibut by NPFMC area and gear type on an annual basis were observed in bottom trawl catches in Areas 621 and 631, with all annual average weights less than the average for the entire Gulf of Alaska. Small Pacific halibut also occurred in the pelagic trawl walleye pollock fishery in Area 631 (2.55 kg). The largest average Pacific halibut weights were less associated by NPFMC area or gear type. The largest average weight (22.66 kg) occurred in Area 640 in the walleye pollock fishery (using bottom gear), the second largest (19.65 kg) in the pot fishery in Area 620, the third largest (16.25 kg) in Area 621 in the walleye pollock fishery (using pelagic gear), and the fourth largest (13.36 kg) in Area 621 in the longline "other" fishery.

Pacific halibut bycatch rates are plotted in 1/2° latitude by 1° longitude statistical blocks by target fishery, gear type and quarter in Figure 13. In bottom trawl, longline, and pot

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[3]It should be noted that large Pacific halibut caught by longline vessels are usually not landed. Observers estimate the weight of these fish, but frequently are not able to measure their length. As a result, the size of these unlanded Pacific halibut are reflected in average weight but not average length data.

fisheries, high bycatch rates (greater than 10 kg/t) occurred throughout the Gulf of Alaska wherever fishing occurred on the continental shelf. Some rates were lower in scattered blocks along the continental slope where depths were greater. Rates were generally less than 1 kg/t for the walleye pollock midwater trawl fishery.

Groundfish fisheries in the Gulf of Alaska caught an estimated 12,152 t of Pacific halibut in 1990 (Table 43). By comparison, the highest bycatch ever taken by the combined foreign and joint venture fisheries was 3,592 t, which was taken in 1983 (Guttormsen et al. 1990). Longline vessels took 7,502 t (or 61.7%), and bottom trawl vessels took 4,336 t (or 35.7%), pot vessels took 2.4%, and pelagic trawl vessels took 0.2%. By weight, over one-half of the incidentally caught Pacific halibut in 1990 were taken in Area 630. The estimated weight of Pacific halibut mortality in 1990 was 3,190 t. The amount of mortality was highest for vessels using bottom trawl gear (2,168 t). For the other gear types, estimated mortality was 975 t for longline vessels, 35 t for pot vessels, and 12 t for vessels using pelagic trawl gear.

Williams and Wildebuer (1991) examined Pacific halibut viability data from 3,874 trawls, 985 longline sets, and 441 pot sets sampled by observers in the Gulf of Alaska region in 1990 and found that mortality ranged from 70 to 72% for trawls, 13 to 18% for longlines, and 6 to 10% for pots. Based on the results of this analysis, they recommended a 65% mortality rate for the management of Pacific halibut bycatch for trawl vessels. They also recommended a 10% mortality rate for pot vessels and found that the 16% rate for longline vessels was appropriate for use in future years.

The sablefish longline fishery caught 57.6% of the Pacific halibut bycatch taken in the Gulf of Alaska region in 1990 (Table 44). In terms of total mortality, however, the fishery accounted for 28.5% of the bycatch, which was comparable to the percentage of the total mortality taken by the "other species" trawl fishery (27.7%) and the rockfish fishery (21.1%). The amount of Pacific halibut bycatch per metric ton of groundfish was also highest in the sablefish longline fishery, both in terms of total Pacific halibut bycatch (289.1 kg/t) and mortality (37.6 kg/t).

Snow (Tanner) Crabs

The highest bycatch rates for C. bairdi on an annual basis were observed in the pot fishery (Table 45). Bycatch rates for that fishery were 17.184 crab/t in Area 621, 6.129 crab/t in Area 610, 4.948 crab/t in Area 630, and 1.790 crab/t in Area 631. In catches of groundfish taken with bottom trawl gear, annual rates were less than 1 crab/t with the exception of Area 630 in the

flatfish fishery (6.299 crab/t). For the pelagic walleye pollock fishery, rates of 0.007 crab/t and less than 0.001 crab/t were observed in Areas 621 and 630, respectively, and all other rates were zero. In "other" fisheries (using pelagic gear), a rate of 0.024 crab/t was observed in Area 630; all other rates were zero. In longline fisheries, no crab were observed in "other" target fisheries, and the highest annual rate in the sablefish fishery was 0.040 crab/t in Area 640. Only in the Pacific cod longline fishery were C. bairdi observed in all sampled NPFMC areas, with rates ranging from 0.414 crab/t in Area 621 to 0.026 crab/t in Area 610.

For "other" snow crabs, the only annual rates of greater than 0.1 crab/t were observed in Area 640 in the longline "other" fishery (0.382 crab/t), in Area 610 in the pot fishery (0.356 crab/t), and in Area 620 in the flatfish fishery (0.279 crab/t) (Table 46). No "other" snow crabs were observed taken with pelagic trawl gear in the Pacific cod or walleye pollock fisheries when bottom trawl gear was used, with the exception of 0.001 crab/t in Area 610.

C. bairdi bycatch rates are plotted in 1/2° latitude by 1° longitude statistical blocks by target fishery, gear type, and quarter in Figure 14. Rates were generally less than 1.0 crab/t in all fisheries and NPFMC areas, except near Kodiak Island where the highest rates of greater than 25 crab/t occurred in the flatfish bottom trawl fishery during the fourth quarter and the pot fishery during the second and third quarters.

"Other" snow crabs bycatch rates are given by 1/2° latitude by 1° longitude statistical blocks in Figure 15. Nearly all rates were zero or less than 1.0 crab/t throughout the Gulf of Alaska.

An estimated 198,289 C. bairdi were caught in U.S. groundfish fisheries in 1990 (Table 47). The bycatch was taken mostly by two gear types--pot, which accounted for 51.8% of the total bycatch and bottom trawl, which caught 47.4% of the C. bairdi. Bycatch was mostly confined to Areas 630 and 620, where 47.9% and 39.2%, respectively, of the take occurred.

An estimated 6,500 "other" snow crabs were incidentally caught in 1990 (Table 48). Vessels using bottom trawl gear caught the largest amount (48.4% of the bycatch). Longline vessels caught 25.9% and pot vessels caught 25.8%. No crabs were observed caught in pelagic trawl catches.

Estimated bycatch of C. bairdi by target fishery are given in Table 49. Over 98% of the bycatch occurred in three fisheries: pot and trawl "other" (primarily for Pacific cod) and flatfish trawl fisheries. Pot vessels took the largest amount

(102,717 crab), while trawl vessels caught 46,162 crab in the "other" target fishery and 46,233 crab in the flatfish fishery.

Bycatch of "other" snow crabs was highest in the flatfish fishery, which caught 2,109 crabs (Table 50). The remaining bycatch was mostly taken by the pot fishery (1,674 crabs), the sablefish longline (1,640 crabs), and the rockfish fishery (901 crabs).

Of the 13,731 snow crabs examined by observers for condition, 12,889 were C. bairdi (Table 51). For pot vessels, 96.0% of the C. bairdi were observed to be in excellent condition, 3.6% in poor condition, and 0.4% were dead. For trawl vessels, 41.0% were judged to be in excellent condition, 34.8% in poor condition, and 24.3% were dead. Of species taken in lesser amounts, C. tanneri taken in trawl catches showed the highest mortality (77.2% dead).

Of the snow crabs recorded by observers in groundfish catches in the Gulf of Alaska region, 96.8% were C. bairdi (Table 52). Other species caught were C. tanneri (3.1%) and C. angulatus (0.1%). For all species except C. angulatus, the ratio of males to females exceeded 2:1.

King Crabs

Incidental bycatch rates and average weights of red king crab taken in groundfish fisheries in the Gulf of Alaska are given in Table 53. The highest annual rate for red king crab was observed in the pot fishery in Area 630 (2.336 crab/t). Also, a rate of 0.175 crab/t was observed in Area 621 for this fishery. In trawl fisheries, the highest rates were observed in the flatfish fishery, where 0.840 crab/t in Area 610 and 0.150 crab/t in Area 621 were recorded. In longline fisheries, all annual rates were less than 0.1 crab/t. No red king crab were observed when pelagic trawl gear was used.

The highest bycatch rates for "other" king crabs was observed in "other" fisheries using bottom trawl gear, occurring in Areas 620 (0.094 crab/t) and 610 (0.093 crab/t) (Table 54). Rates in all other trawl fisheries were less than 0.05 crab/t. In longline fisheries, "other" king crabs were observed only in the sablefish fishery in Areas 610, 620 and 630, with the highest rate occurring in Area 610 (0.049 crab/t), and in the "other species" fishery in Area 630 (0.072 crab/t). Bycatch also occurred in the flatfish fishery but no rate exceeded 0.05 crab/t. No "other" king crabs were observed taken with pelagic trawl or pot gear.

Red king crab bycatch rates are plotted in 1/2° latitude by 1° longitude statistical blocks by target fishery, gear type, and

quarter in Figure 16. Rates were generally zero or less than 1.0 crab/t in all fisheries and NPFMC areas. The few rates greater than 5.0 crab/t occurred near Kodiak Island, in the pot fishery during the third quarter and the flatfish bottom trawl fishery during the fourth quarter.

"Other" king crabs bycatch rates are given by 1/2° latitude by 1° longitude statistical blocks in Figure 17. Nearly all rates were zero or less than 1.0 crab/t throughout the Gulf of Alaska. The highest rates were less than 5.0 crab/t in the western portion of Area 620 during the third quarter flatfish bottom trawl fishery and near the eastern border of Area 610 during the third and fourth quarter of the "other species" bottom trawl fishery.

The estimated bycatch of red king crab was 6,908 crab (Table 55). Pot vessels accounted for 91.1% of the red king crab caught in the Gulf of Alaska. The remainder of the bycatch was taken by bottom trawl vessels (507 crab) and longline vessels (106 crab).

An estimated 3,237 "other" king crabs were incidentally caught in the Gulf of Alaska in 1990 (Table 56). The bycatch was taken entirely by vessels using bottom trawl gear, which caught about 2,455 crabs, and longline vessels, which caught 782 crabs.

The bycatch of red king crab by target fishery is given in Table 57. Pot fishery vessels caught red king crab at a rate of 1.116 crab per metric ton of groundfish. No other fishery caught red king crab at a rate higher than 0.01 crab/t.

The bycatch of "other" king crabs was highest in the rockfish fishery, both in terms of total amount (1,898 crabs or 58.6% of the bycatch) and crabs per metric ton of groundfish (0.056 crab/t) (Table 58).

All red king crab observed for condition in catches of pot vessels were considered to be in excellent condition (Table 59). In trawl fisheries, most of the bycatch consisted of red and golden king crab, and condition was similar for these two species. For red king crab, 40.5% were in excellent condition, 37.1% were in poor condition, and 22.3% were dead. For golden king crab, 42.8% were in excellent condition, 32.3% were in poor condition, and 24.9% were dead.

Of the king crabs seen by observers in groundfish catches, 68.1% were red, 30.3% were golden, 1.3% were couesi, and 0.3% were blue (Table 60). With the exception of female red king crab, the average weight and carapace length for each species-sex group was greater than its counterpart in the Bering Sea and Aleutians Islands region.

Rockfish Catch by Species

Twenty-seven species of rockfish were identified by observers in U.S. domestic catches in the Gulf of Alaska region in 1990 (Table 61). The "other rockfish" group refers to the 12 species that each made up less than 0.1% of the rockfish catch. For allocation and catch-reporting purposes, rockfish were separated into various groups, which are defined in Table 62. In 1990, 24,693 t of rockfish were taken by U.S. groundfish fisheries (Table 63). Pacific ocean perch was the predominant rockfish species taken (42.0% of the rockfish catch), followed by rougheye rockfish (20.1%), shortraker rockfish (14.3%), northern rockfish (6.7%), shortspine thornyhead (6.4%), and dusky rockfish (6.3%). Pacific ocean perch was the most commonly caught rockfish in Areas 610 (3,064 t), 620 (2,228 t), and 630 (3,323 t). Shortraker rockfish fish (1,616 t) and Pacific ocean perch (1,438 t) were the predominant rockfish species caught in Area 640. Rougheye rockfish was the major rockfish species taken in Area 650 (1,194 t) and 680 (156 t). By NPFMC area, 29.7% of the rockfish was caught in Area 630, 23.3% in Area 610, 20.0% in Area 640, 17.6% in Area 620, and 8.3% in Area 650. The combined catch in Areas 621, 631, and 680 amounted to only 1.0%.

Flatfish Catch by Species

Sixteen species of flatfish were identified by observers in 1990 (Table 64). The "other flatfish" group refers to the five species that each made up less than 0.1% of the rockfish catch. Flatfish groups designated for allocation and catch-reporting purposes are shown in Table 65. Arrowtooth flounder accounted for 18,913 t of the 34,742 t of flatfish taken in the Gulf of Alaska region and was the most commonly taken flatfish in all NPFMC areas except Area 631 (Table 66). Of the remaining species of flatfish caught in the Gulf of Alaska groundfish fisheries, rock sole made up 17.7% of the flatfish catch, followed in order by rex sole (Errex zachirus, 10.5%), Dover sole (Microstomus pacificus, 6.8%), flathead sole (5.6%), and yellowfin sole (2.0%). The largest portion of catches of rock sole (3,720 t), flathead sole (1,683 t), and Dover sole (1,288 t) were taken in Area 630. The largest catch of rex sole (2,006 t) was taken in Area 620, and the largest catch of yellowfin sole (642 t) was taken in Area 610.

Table 35.--Estimated groundfish catches (in metric tons) reported by U.S. processing vessels and plants in the Gulf of Alaska region, 1990.

Species group	Retained catch	Discarded catch	Total catch	Percent by species	Percent discarded	DAP*	Percent caught of DAP
Walleye pollock	73,785.9	6,800.6	80,586.5	32.97%	8.4%	73,400	109.8%
Pacific cod	69,067.6	1,757.8	70,825.4	28.98%	2.5%	90,000	78.7%
Sablefish	25,084.3	682.2	25,766.5	10.54%	2.6%	26,000	99.1%
Slope rockfish	17,037.0	3,902.7	20,939.7	8.57%	18.6%	17,700	118.3%
Arrowtooth flounder	1,788.6	17,124.7	18,913.3	7.74%	90.5%	32,000	59.1%
Shallow-water flatfish	4,296.1	3,685.3	7,981.4	3.27%	46.2%	10,000	79.8%
Deep-water flatfish	5,708.8	2,138.5	7,847.3	3.21%	27.3%	22,000	35.7%
Other fish	2,605.5	5,178.0	7,783.5	3.18%	66.5%	14,179	54.9%
Pelagic rockfish	1,377.7	268.7	1,646.4	0.67%	16.3%	8,200	20.1%
Thornyheads	1,517.8	57.2	1,575.0	0.64%	3.6%	3,800	41.4%
Demersal rockfish	468.5	63.0	531.5	0.22%	11.9%	470	113.1%
Total	202,737.8	41,658.7	244,396.5		17.0%	297,749	82.1%

* Domestic annual processing allowance (DAP) as of 31 December 1990.

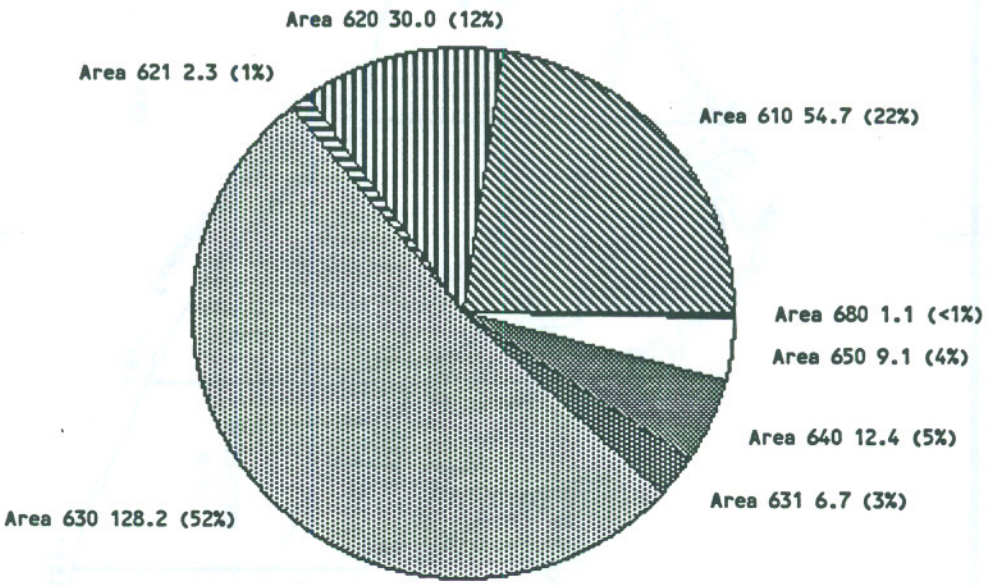


Figure 10.--Total U.S. domestic groundfish catch in thousands of metric tons (% of total catch) in the Gulf of Alaska region by NPFMC area, 1990.

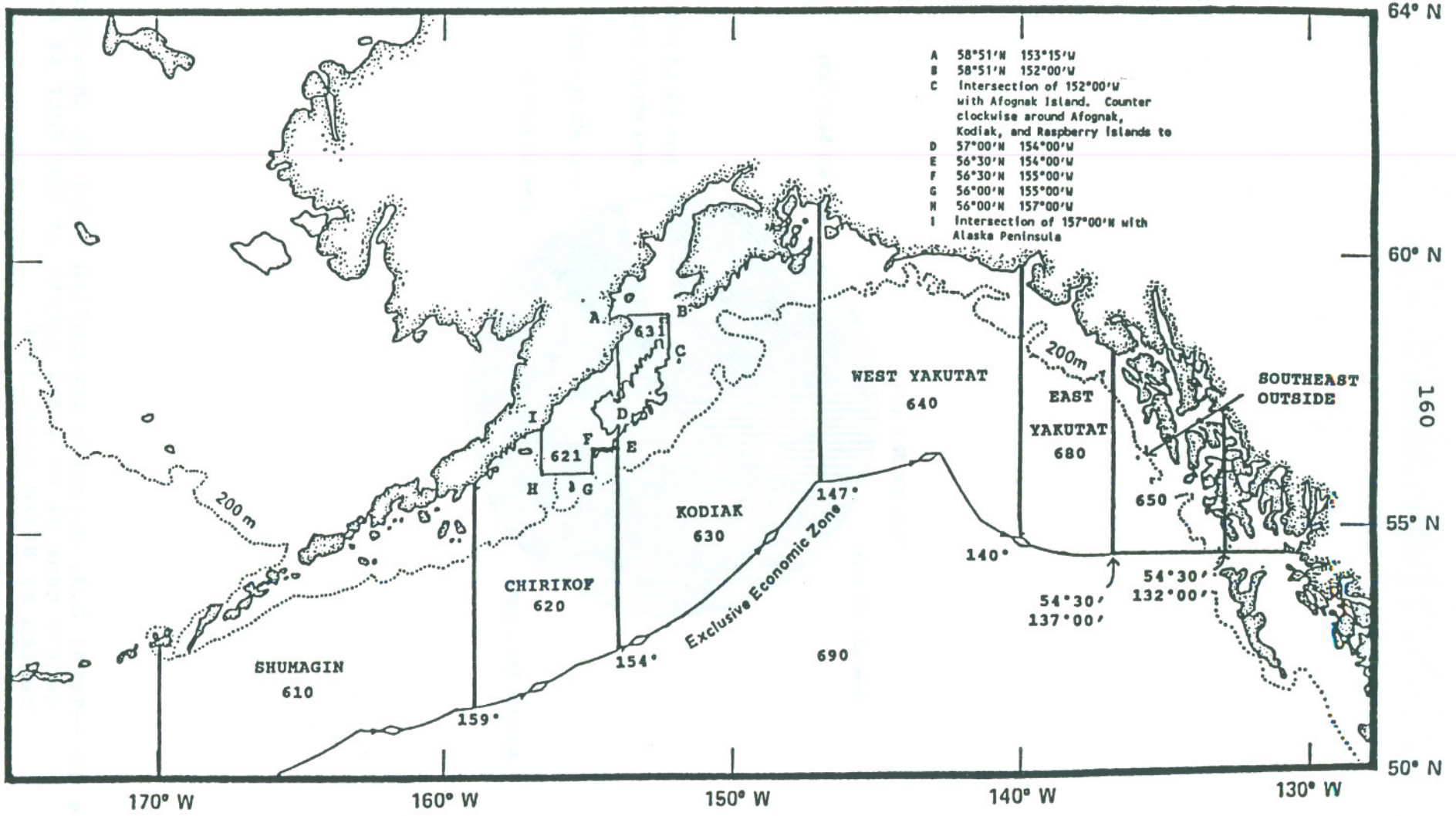


Figure 11.--Reporting NPFMC areas of the Gulf of Alaska region.

Table 36.--Summary of data collected by U.S. groundfish observers in the Gulf of Alaska region, 1990.

Species	Lengths[1]	Age structures[2]	Condition
Groundfish species			
Walleye pollock	60,010	3,890	--
Pacific cod	92,153	2,756	--
Sablefish	48,331	1,370	--
Atka mackerel	6,596	208	--
Pacific ocean perch	51,673	696	--
Bocaccio	49	--	--
Northern rockfish	4,670	74	--
Sharpchin rockfish	311	--	--
Rougheye rockfish	14,196	306	--
Black rockfish	200	--	--
Redbanded rockfish	22	--	--
Silvergray rockfish	126	--	--
Splitnose rockfish	23	--	--
Shortraker rockfish	6,012	82	--
Dusky rockfish	1,122	--	--
Shortspine thornyhead	8,934	90	--
Greenland turbot	3,835	109	--
Flathead sole	950	--	--
Rock sole	9,345	64	--
Alaska plaice	7,438	156	--
Butter sole	424	--	--
Arrowtooth flounder	3,025	--	--
Totals	319,445	9,801	--
Prohibited species			
Chionoecetes bairdi	7,694	--	12,889
C. angulatus	45	--	49
C. tanneri	757	--	793
Red king crab	395	--	875
Golden king crab	996	--	1,295
Blue king crab	7	--	7
Chinook salmon	4,022	2,734	--
Chum salmon	802	802	--
Silver salmon	269	99	--
Sockeye salmon	38	9	--
Pink salmon	11	4	--
Pacific halibut	67,626	--	139,900
Totals	82,662	3,648	155,808

[1]Fork lengths were collected from fish, carapace widths from snow (Tanner) crabs, and carapace lengths from king crabs.

[2]Otoliths were collected from most groundfish species, and scales were collected from Pacific salmon and Pacific cod.

Table 37.--Observed marine mammal-fishing gear interactions in U.S. domestic groundfish fisheries in the Gulf of Alaska region by gear type, species, and condition of animal, 1990.

Gear type	Species	Condition[1]	Number
Trawl[2]	Steller sea lion	Freshly dead	1
Trawl	Northern elephant seal	Freshly dead	2
Trawl	Unidentified pinniped	Decomposed	1
Trawl	Unidentified whale	Decomposed	1
Longline[3]	Steller sea lion	Freshly dead	1
Longline	Steller sea lion	Deterred	3
Longline	Steller sea lion	Unharmed	1
Longline	Steller sea lion	Unknown	2
Longline	Northern elephant seal	Freshly dead	1
Longline	Northern elephant seal	Deterred	1
Longline	Killer whale	Deterred	15

[1]"Freshly dead" refers to animals not decomposed or shot that were brought onboard or released from fishing gear. "Decomposed" refers to animals obviously dead prior to contact with fishing gear. "Unharmed" refers to animals entrapped by fishing gear but released without apparent injury. "Unknown" refers to animals entrapped by fishing gear but released before the observer could determine the animal's condition. "Deterred" refers to animals that were not entrapped but were subjected to harrassment such as seal bombs.

[2]Observers sampled 96,586 metric tons of groundfish taken in 7,603 trawls.

[3]Observers sampled 6,346 metric tons of groundfish taken in 2,232 longline sets.

Table 38.--Monthly bycatch rates (number per metric ton of catch and average weight (kg)) of Pacific salmon taken in U.S. domestic groundfish fisheries in the Gulf of Alaska region by gear type, target fishery, and NPFMC area, 1990.

	Area 610		Area 620		Area 621		Area 630		Area 631		Area 640		Area 650		Area 680	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Bottom trawl (flatfish target)																
Jan.	0.000	0.00	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Feb.	0.104	6.57	--	--	--	--	0.161	1.95	--	--	--	--	ns	ns	--	--
Mar.	0.000	0.00	0.000	0.00	--	--	0.187	2.96	2.175	1.87	0.087	2.60	0.000	0.00	--	--
Apr.	0.129	1.63	0.952	4.23	--	--	0.226	5.35	--	--	0.004	7.17	0.000	0.00	--	--
May	0.000	0.00	0.131	5.91	0.000	0.00	0.006	4.42	--	--	0.000	0.00	0.000	0.00	--	--
June	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
July	0.000	0.00	0.301	3.17	3.073	2.84	0.124	3.43	--	--	--	--	--	--	--	--
Aug.	0.000	3.84	0.000	0.00	1.394	3.34	0.241	4.09	0.000	0.00	--	--	0.000	0.00	--	--
Sep.	0.000	0.00	--	--	0.854	2.96	0.027	2.73	0.000	0.00	--	--	--	--	--	--
Oct.	0.051	6.10	0.066	3.62	4.387	2.84	0.181	2.69	0.049	4.25	--	--	--	--	--	--
Nov.	--	--	0.000	0.00	--	--	0.064	3.30	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.113	2.77	0.342	4.40	0.454	3.05	0.113	4.19	0.126	1.99	0.030	5.29	0.000	0.00	--	--
Bottom trawl (pollock target)																
Jan.	--	--	--	--	--	--	0.141	2.39	0.879	2.17	--	--	--	--	--	--
Feb.	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Mar.	0.000	0.00	--	--	--	--	0.094	2.50	--	--	--	--	--	--	--	--
Apr.	0.000	0.00	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
May	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
June	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
July	--	--	0.624	3.73	--	--	0.256	4.11	--	--	--	--	--	--	--	--
Aug.	0.000	0.00	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--
Sep.	2.178	0.17	--	--	--	--	0.007	3.99	--	--	--	--	--	--	--	--
Oct.	0.034	3.62	--	--	0.207	6.43	0.046	3.02	--	--	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.034	3.40	0.624	3.73	0.207	6.43	0.033	3.36	0.879	2.17	0.000	0.00	--	--	--	--

Table 38.--Continued.

	Area 610		Area 620		Area 621		Area 630		Area 631		Area 640		Area 650		Area 680	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Bottom trawl (other targets)																
Jan.	0.000	0.00	ns	ns	ns	ns	0.103	2.05	--	--	--	--	ns	ns	--	--
Feb.	0.007	4.70	ns	ns	0.256	2.92	0.126	2.76	0.364	1.85	--	--	ns	ns	--	--
Mar.	0.014	4.44	0.675	4.82	2.567	3.28	0.072	4.06	ns	ns	0.124	4.38	0.000	0.00	--	--
Apr.	0.011	2.75	1.117	5.58	1.292	2.87	0.345	5.57	ns	ns	0.031	6.18	0.010	3.88	ns	ns
May	0.000	0.00	0.306	4.74	0.155	3.42	0.049	7.62	ns	ns	0.006	6.95	0.008	2.40	ns	ns
June	0.000	0.00	--	--	--	--	ns	ns	--	--	--	--	--	--	--	--
July	0.013	0.98	0.038	3.51	0.101	3.88	0.055	4.68	--	--	0.063	8.12	0.000	0.00	--	--
Aug.	0.009	3.99	0.002	5.40	0.609	3.00	0.057	4.79	0.000	0.00	0.000	0.00	ns	ns	--	--
Sep.	0.000	0.00	0.000	0.00	0.471	2.43	0.055	3.00	0.000	0.00	--	--	--	--	--	--
Oct.	0.156	2.64	0.078	4.58	0.594	3.17	0.114	2.43	0.000	0.00	--	--	--	--	--	--
Nov.	0.019	3.24	0.038	5.20	--	--	0.249	3.17	--	--	--	--	--	--	--	--
Dec.	ns	ns	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.043	2.72	0.561	5.41	0.747	3.09	0.075	4.44	0.120	1.85	0.013	6.41	0.010	3.51	ns	ns
Pelagic trawl (pollock target)																
Jan.	0.000	0.00	--	--	0.241	3.27	0.064	2.66	0.047	2.72	--	--	--	--	--	--
Feb.	0.000	0.00	--	--	0.004	1.57	0.021	2.21	0.066	2.12	--	--	--	--	--	--
Mar.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Apr.	0.000	0.00	--	--	0.000	0.00	0.004	1.67	0.000	0.00	--	--	--	--	--	--
May	--	--	--	--	--	--	0.096	4.97	--	--	--	--	--	--	--	--
June	--	--	ns	ns	--	--	0.979	3.63	--	--	0.000	0.00	--	--	--	--
July	--	--	--	--	--	--	0.072	4.33	--	--	--	--	--	--	--	--
Aug.	--	--	--	--	--	--	0.001	6.92	--	--	--	--	--	--	--	--
Sep.	ns	ns	--	--	--	--	0.050	3.47	0.000	0.00	--	--	--	--	--	--
Oct.	0.034	3.26	--	--	--	--	0.155	3.36	ns	ns	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.032	3.26	ns	ns	0.021	3.06	0.118	3.47	0.052	2.25	0.000	0.00	--	--	--	--

Table 38.--Continued.

	Area 610		Area 620		Area 621		Area 630		Area 631		Area 640		Area 650		Area 680	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Pelagic trawl (other targets)																
Jan.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb.	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Mar.	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Apr.	ns	ns	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
May	--	--	--	--	--	--	ns	ns	--	--	0.000	0.00	--	--	--	--
June	--	--	--	--	--	--	1.277	6.23	--	--	0.016	8.55	--	--	--	--
July	--	--	ns	ns	--	--	ns	ns	--	--	--	--	--	--	--	--
Aug.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sep.	--	--	--	--	--	--	0.089	1.27	--	--	--	--	--	--	--	--
Oct.	1.244	3.12	ns	ns	--	--	0.156	5.10	ns	ns	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	ns	ns	--	--	--	--	--	--	--	--
Dec.	ns	ns	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	1.244	3.12	ns	ns	--	--	0.145	4.89	ns	ns	0.014	8.55	--	--	--	--

Dashes indicate area not fished.

ns = Fishing occurred but no sampling by observers.

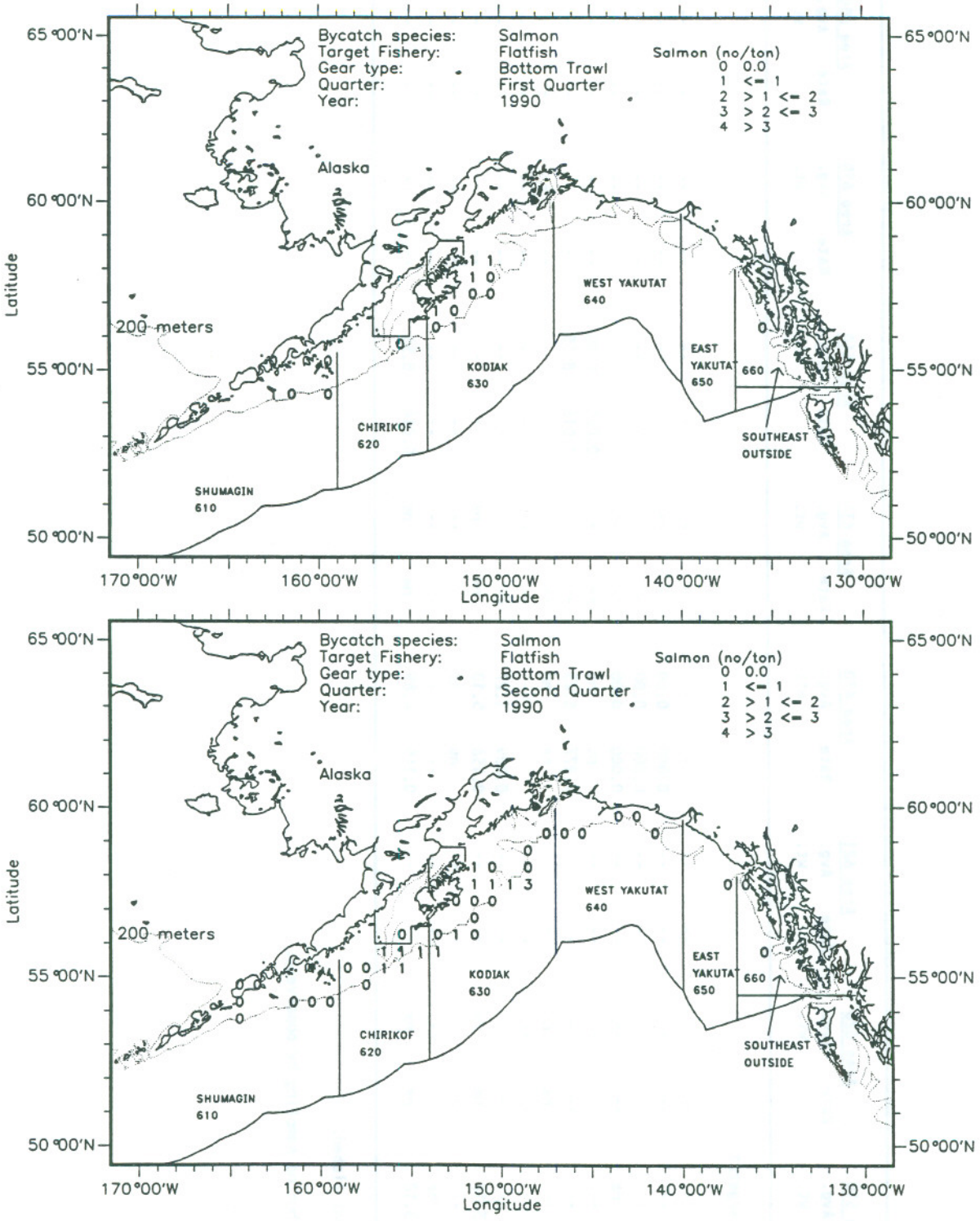


Figure 12.--Average incidence (no./t) of Pacific salmon in the U.S. domestic fisheries by quarter, target fishery, gear type, and 1/2° latitude by 1/2° longitude areas in the Gulf of Alaska region, 1990.

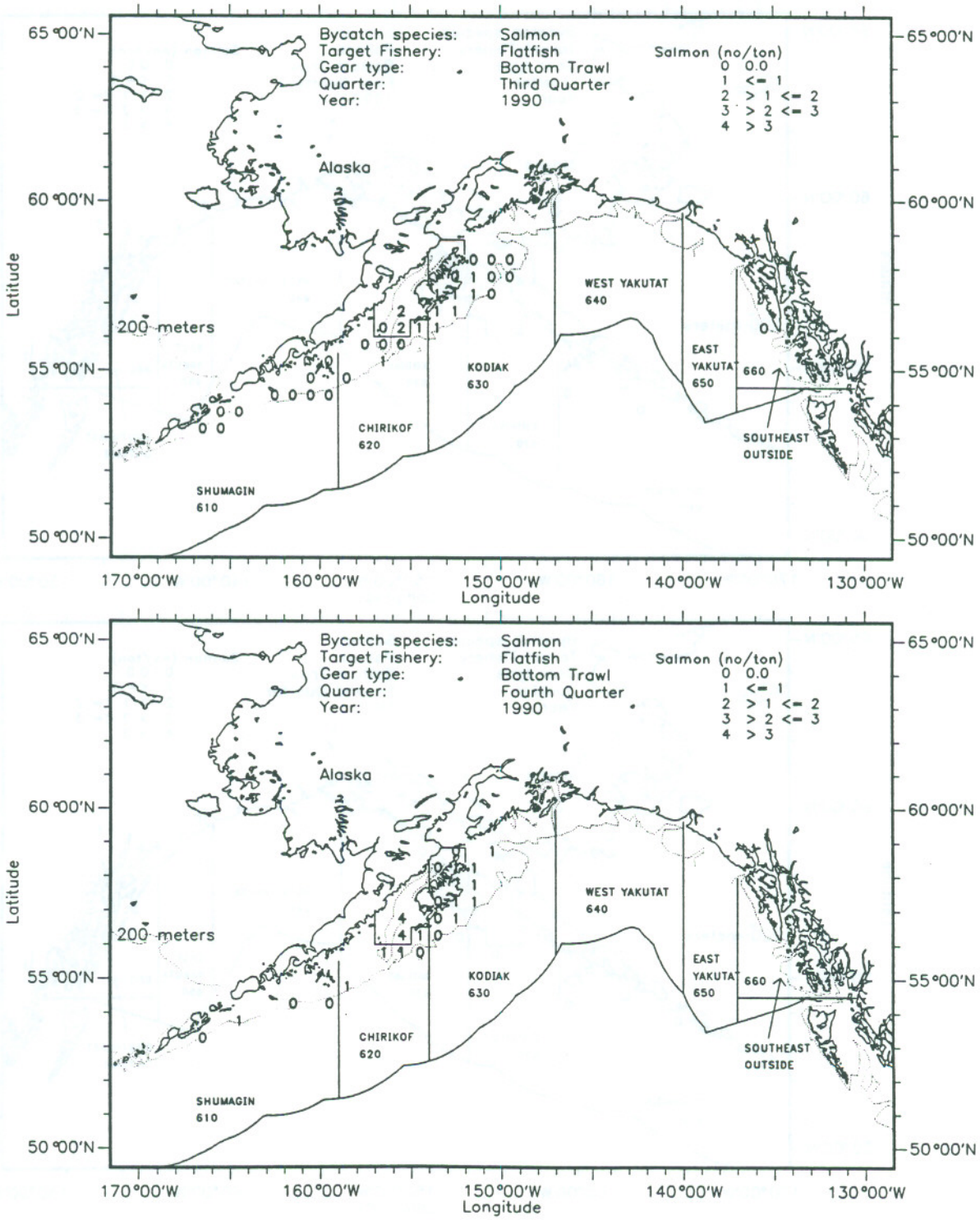


Figure 12.--Continued.

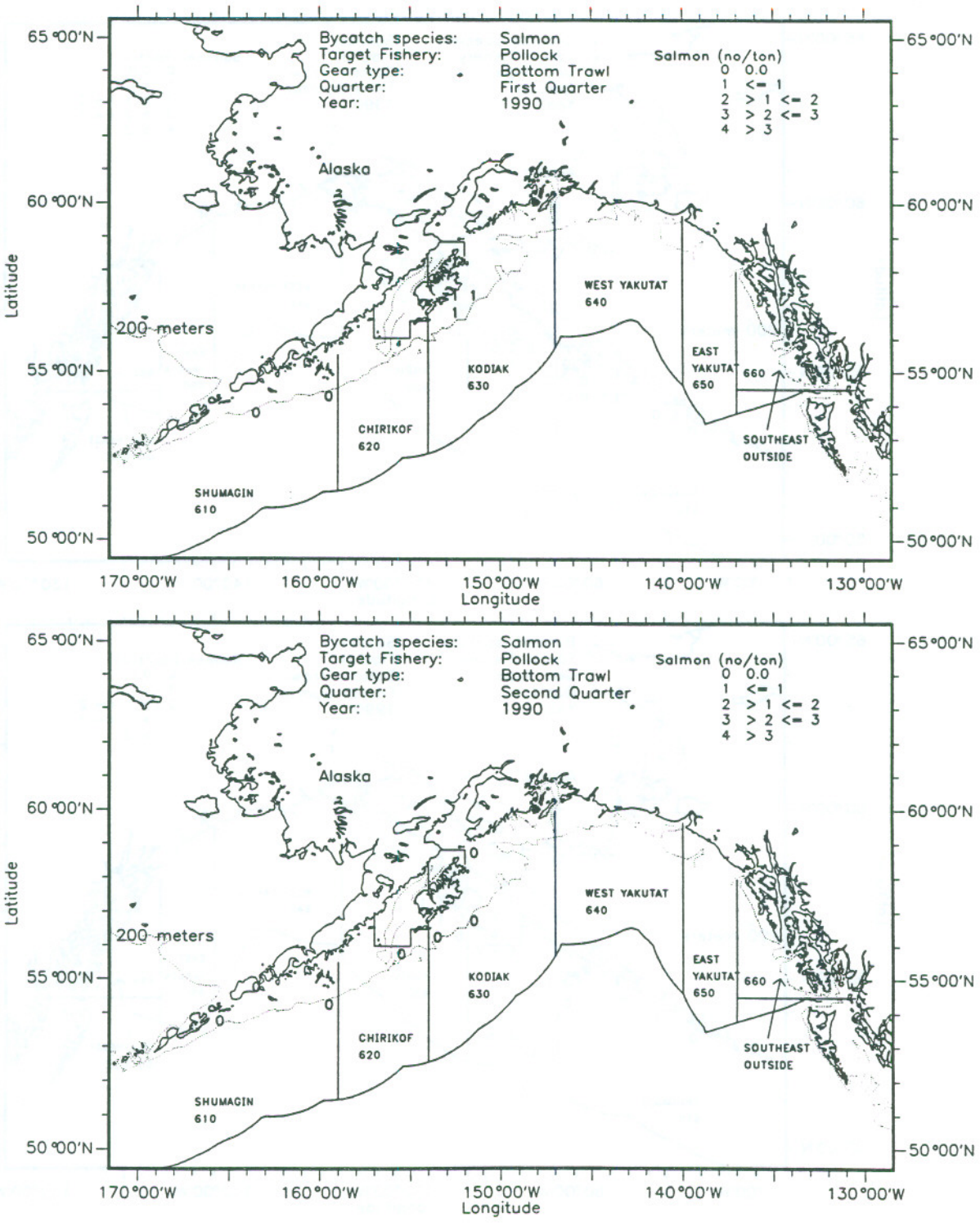


Figure 12.--Continued.

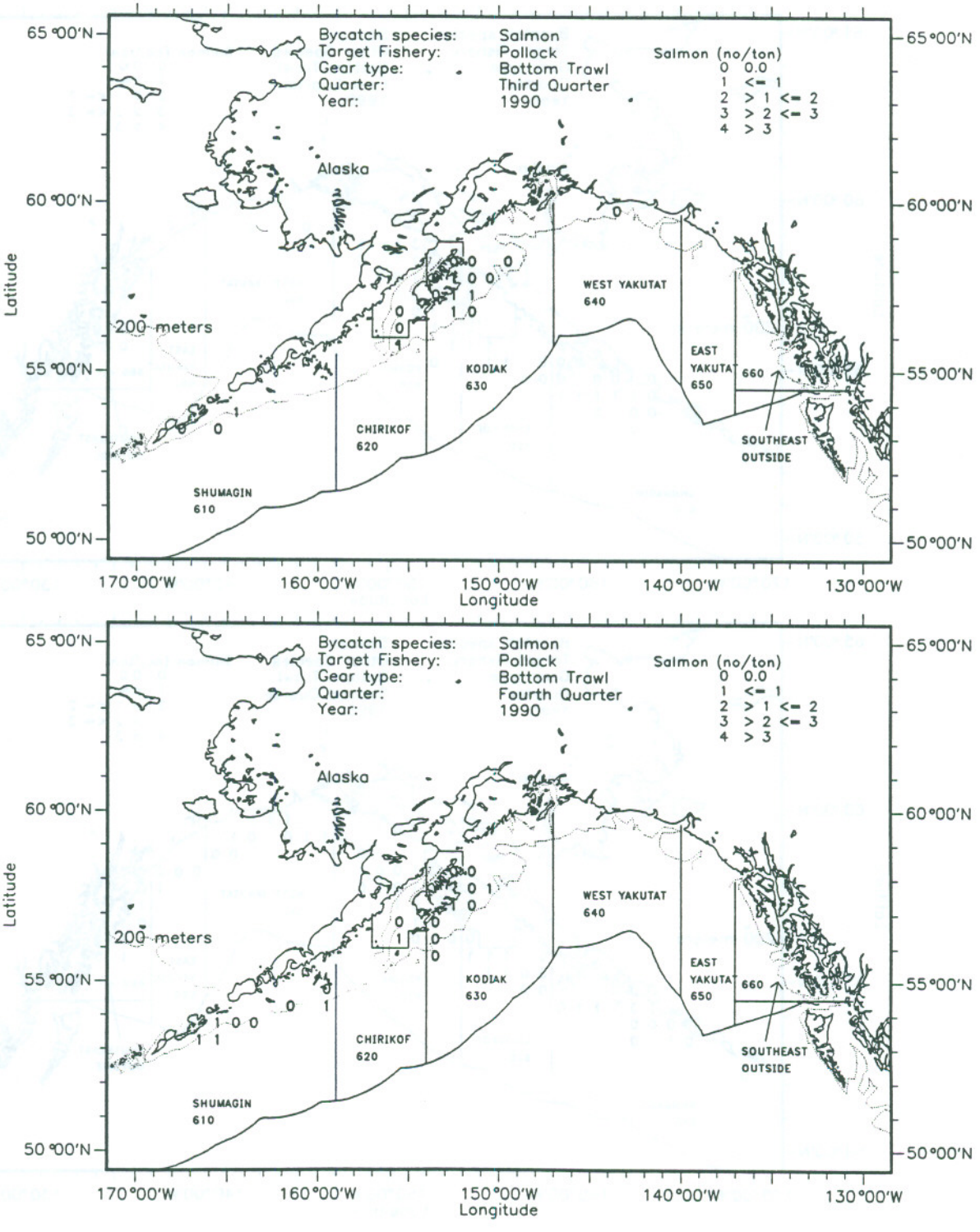


Figure 12.--Continued.

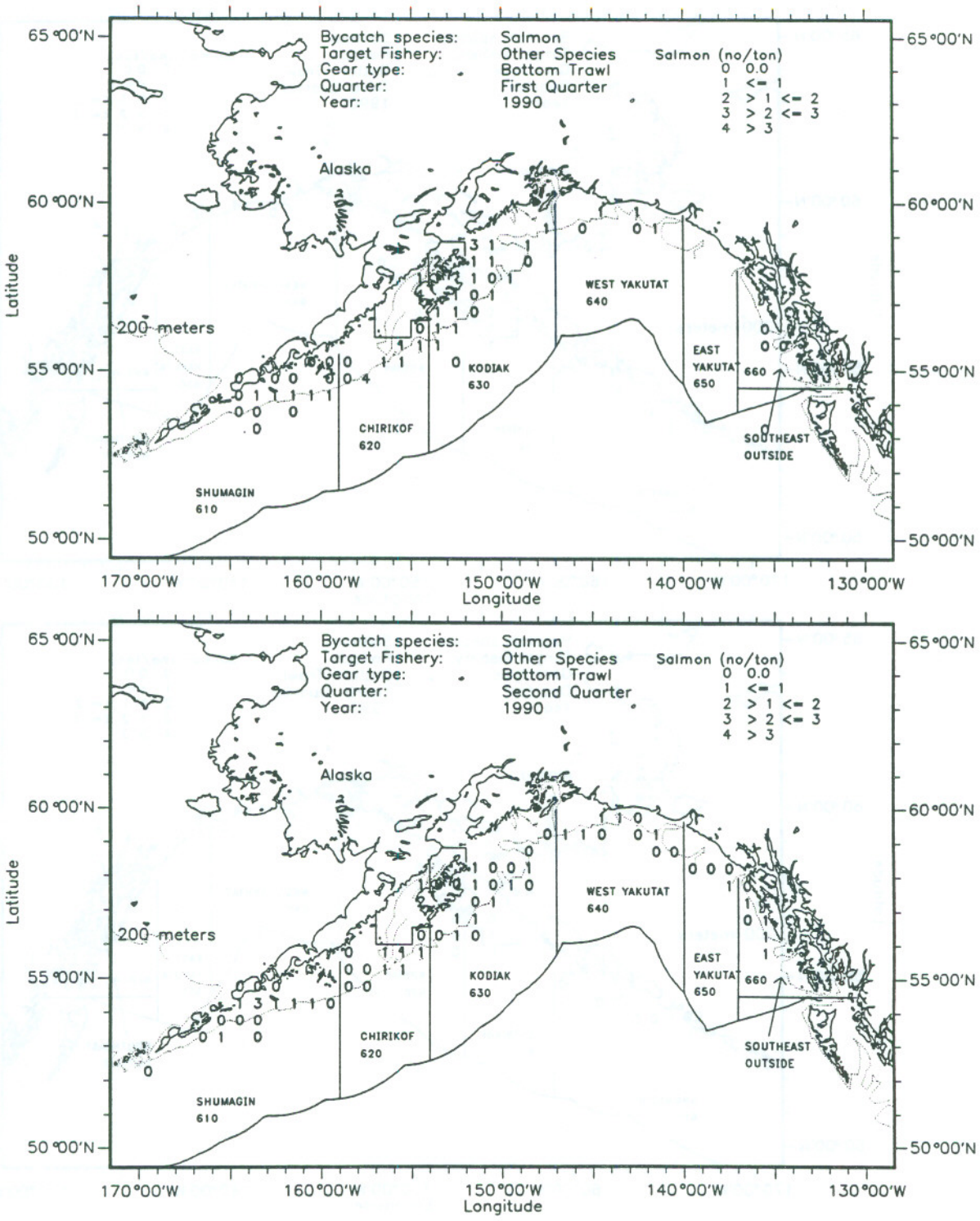


Figure 12.--Continued.

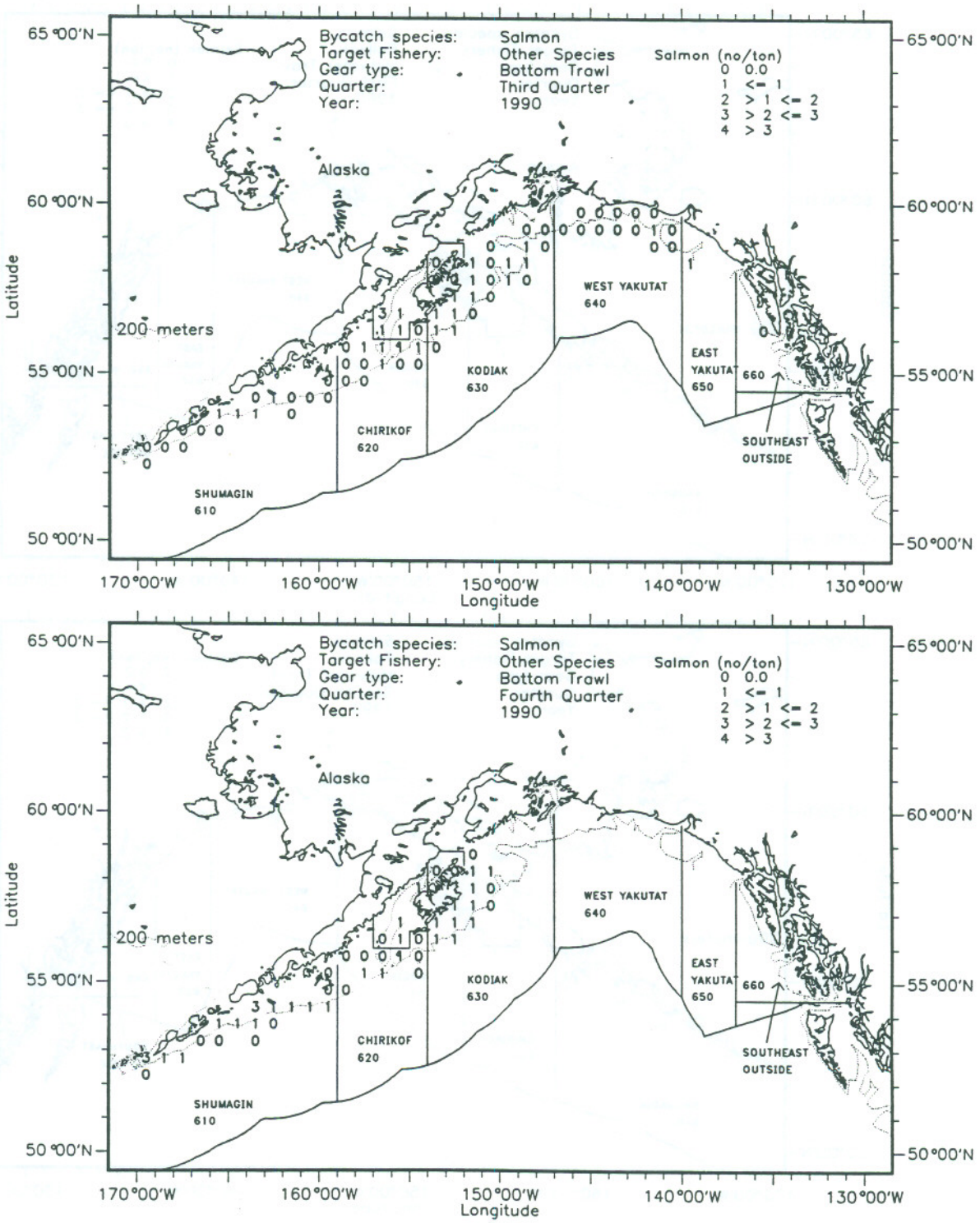


Figure 12.--Continued.

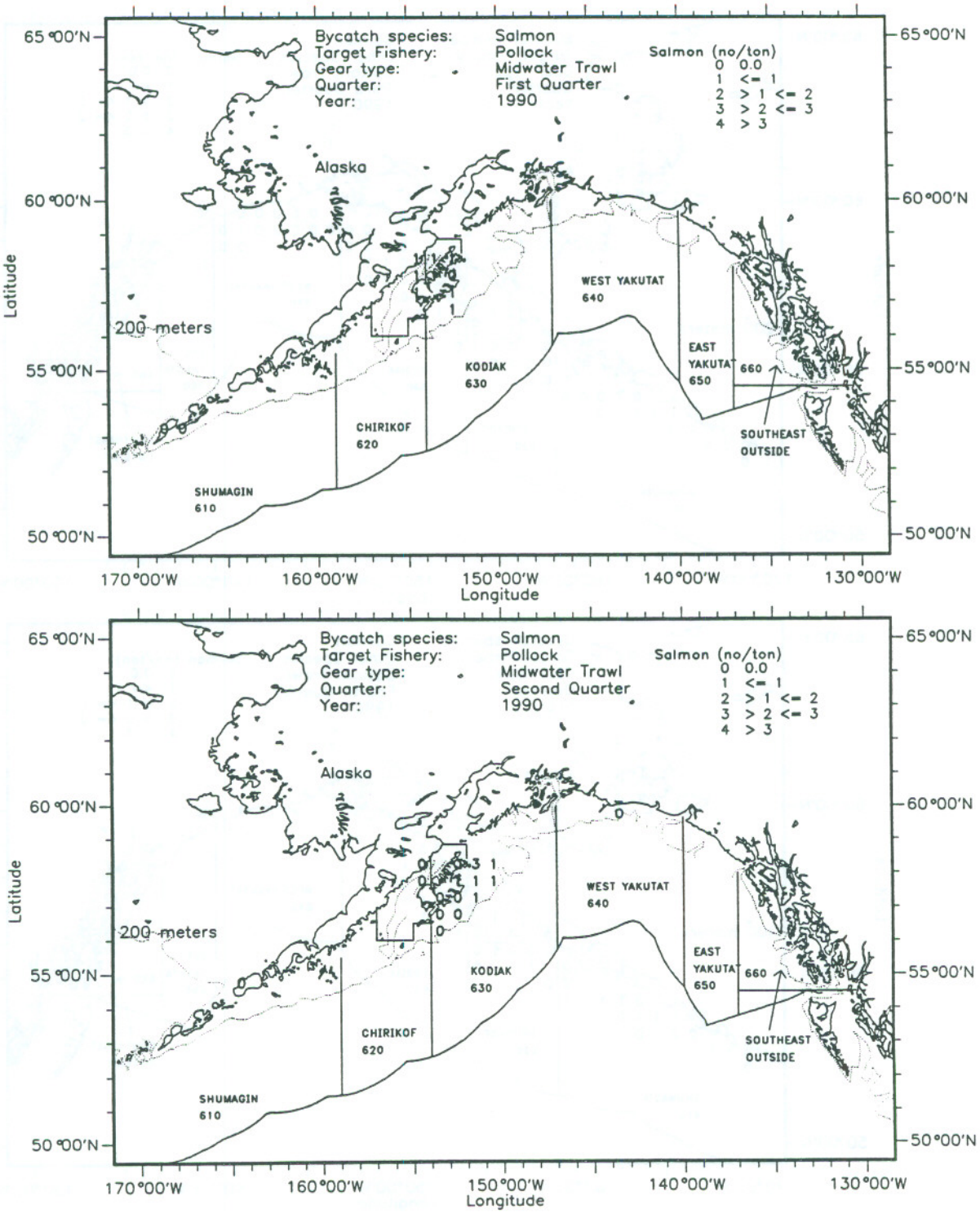


Figure 12.--Continued.

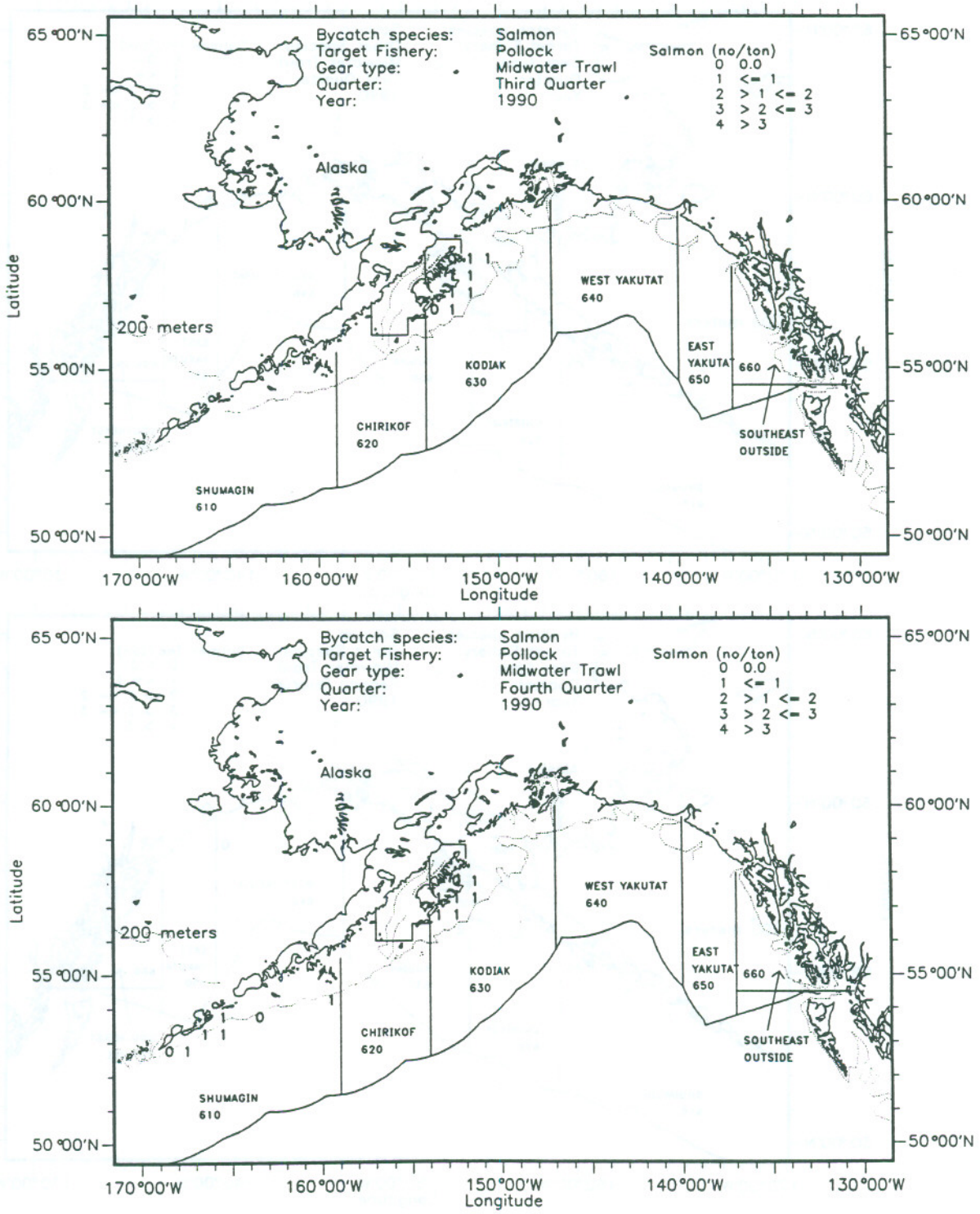


Figure 12.--Continued.

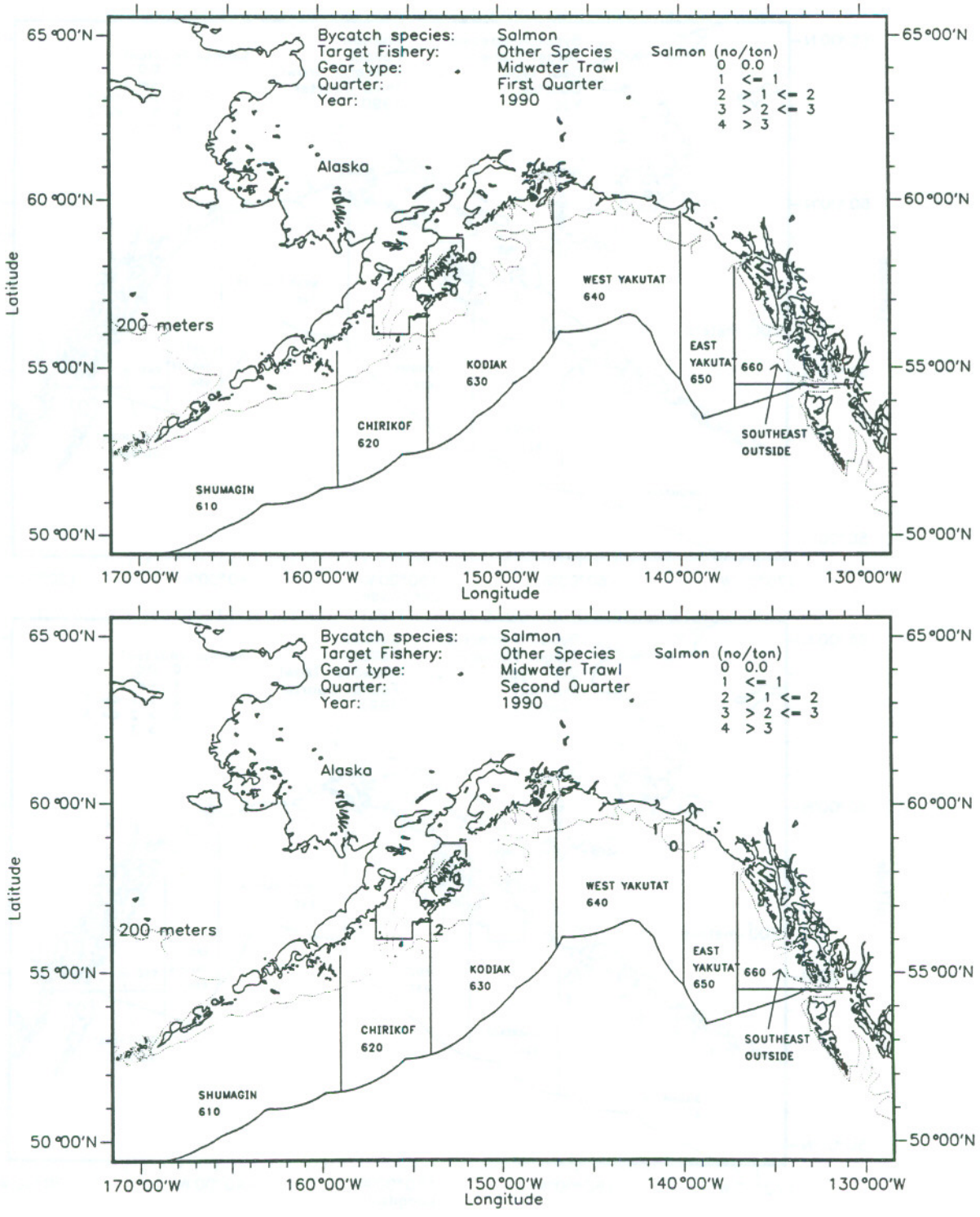


Figure 12.--Continued.

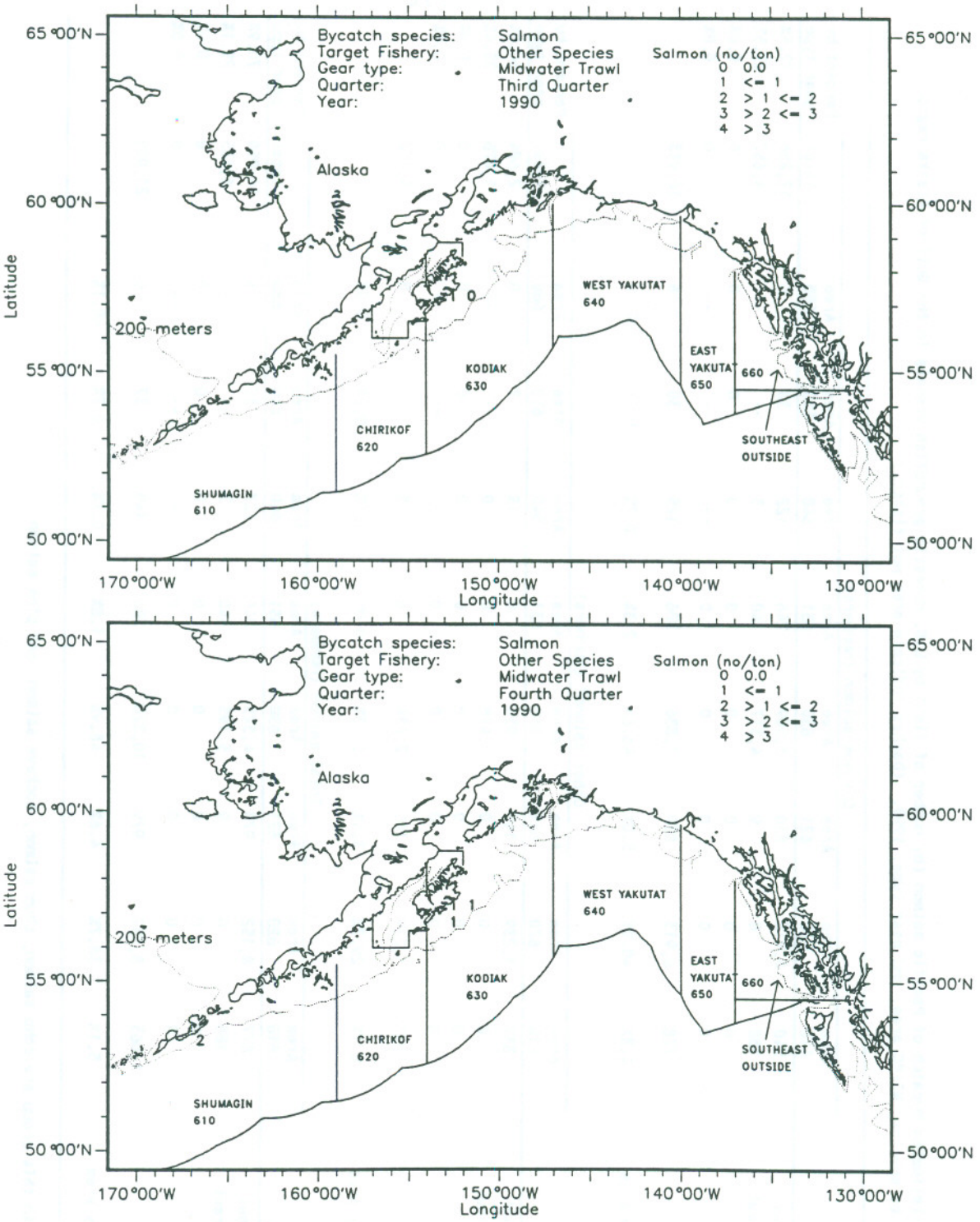


Figure 12.--Continued.

Table 39.--Estimated bycatch of Pacific salmon (by number of fish) by U.S. domestic groundfish vessels in the Gulf of Alaska region by species, NPFMC area, and gear type, 1990. (Dashes indicate area not fished.)

Gear type	Area 610	Area 620	Area 621	Area 630	Area 631	Area 640	Area 650	Area 680	Total	Percent by gear type
Chinook salmon (numbers)										
Bottom trawl	540	6,913	830	3,569	246	122	30	6	12,256	72.5%
Pelagic trawl	188	0	9	4,317	140	3	--	--	4,657	27.5%
Longline	0	0	0	0	0	0	0	0	0	0.0%
Pot	0	0	0	0	0	--	--	--	0	0.0%
Total	728	6,913	839	7,886	386	125	30	6	16,913	
Percent by area	4.3%	40.9%	5.0%	46.6%	2.3%	0.7%	0.2%	<0.1%		
Other salmon* (numbers)										
Bottom trawl	337	1,239	140	956	0	15	7	0	2,694	64.6%
Pelagic trawl	0	0	0	1,478	0	0	--	--	1,478	35.4%
Longline	0	0	0	0	0	0	0	0	0	0.0%
Pot	0	0	0	0	0	--	--	--	0	0.0%
Total	337	1,239	140	2,434	0	15	7	0	4,172	
Percent by area	8.1%	29.7%	3.4%	58.3%	0.0%	0.4%	0.2%	0.0%		
Total salmon (numbers)										
Bottom trawl	877	8,152	970	4,525	246	137	37	6	14,950	70.9%
Pelagic trawl	188	0	9	5,795	140	3	--	--	6,135	29.1%
Longline	0	0	0	0	0	0	0	0	0	0.0%
Pot	0	0	0	0	0	--	--	--	0	0.0%
Total	1,065	8,152	979	10,320	386	140	37	6	21,085	
Percent by area	5.1%	38.7%	4.6%	48.9%	1.8%	0.7%	0.2%	<0.1%		

*Species in this group are coho salmon, chum salmon, sockeye salmon, and pink salmon.

Table 40.--U.S. domestic groundfish catch (in metric tons) and Pacific salmon bycatch (in numbers) by target fishery and NPFMC area in the Gulf of Alaska region, 1990.

			Pacific salmon					
Fishery	Area*	Groundfish catch	Chinook salmon	Other salmon	Total salmon	Per t of groundfish	% within area	% of total salmon bycatch
Flatfish	Eastern	57.8	14	0	14	0.242	7.7%	0.1%
(All gears)	Central	22,979.2	5,784	182	5,966	0.260	30.1%	28.3%
	Western	2,047.6	17	7	24	0.012	2.3%	0.1%
	Total	25,084.6	5,815	189	6,004	0.239	--	28.5%
Pollock midwater	Eastern	nf	nf	nf	nf	nf	nf	nf
(All gears)	Central	45,267.1	4,466	1,478	5,944	0.131	30.0%	28.2%
	Western	6,321.2	188	0	188	0.030	17.7%	0.9%
	Total	51,588.3	4,654	1,478	6,132	0.119	--	29.1%
Pollock bottom	Eastern	nf	nf	nf	nf	nf	nf	nf
(All gears)	Central	18,406.7	1	3	4	0.000	<0.1%	<0.1%
	Western	884.8	44	141	185	0.209	17.4%	0.9%
	Total	19,291.5	45	144	189	0.010	--	0.9%
Other (Trawl)	Eastern	27.4	2	1	3	0.109	1.6%	<0.1%
	Central	44,106.0	3,768	1,835	5,603	0.127	28.2%	26.6%
	Western	32,277.9	395	2	397	0.012	37.3%	1.9%
	Total	76,411.3	4,165	1,838	6,003	0.079	--	28.5%
Other (Longline)	Eastern	249.5	0	0	0	0.000	0.0%	0.0%
	Central	3,040.2	0	0	0	0.000	0.0%	0.0%
	Western	2,451.4	0	0	0	0.000	0.0%	0.0%
	Total	5,741.1	0	0	0	0.000	--	0.0%
Other (Pot)	Eastern	nf	nf	nf	nf	nf	nf	nf
	Central	5,478.8	0	0	0	0.000	0.0%	0.0%
	Western	159.7	0	0	0	0.000	0.0%	0.0%
	Total	5,638.5	0	0	0	0.000	--	0.0%
Sablefish (Trawl)	Eastern	879.5	26	0	26	0.030	14.2%	0.1%
	Central	1,215.5	156	1	157	0.129	0.8%	0.7%
	Western	383.5	23	0	23	0.060	2.2%	0.1%
	Total	2,478.5	205	1	206	0.083	--	1.0%
Sablefish (Longline)	Eastern	11,468.0	0	0	0	0.000	0.0%	0.0%
	Central	10,855.3	0	0	0	0.000	0.0%	0.0%
	Western	1,868.8	0	0	0	0.000	0.0%	0.0%
	Total	24,192.1	0	0	0	0.000	--	0.0%
Rockfish (All gears)	Eastern	9,805.1	119	21	140	0.014	76.5%	0.7%
	Central	15,840.4	1,849	314	2,163	0.137	10.9%	10.3%
	Western	8,325.1	61	187	248	0.030	23.3%	1.2%
	Total	33,970.6	2,029	522	2,551	0.075	--	12.1%
Total (All gears)	Eastern	22,487.3	161	22	183	0.008	--	0.9%
	Central	167,189.2	16,024	3,813	19,837	0.119	--	94.1%
	Western	54,720.0	728	337	1,065	0.019	--	5.1%
	Total	244,396.5	16,913	4,172	21,085	0.086	--	--

*Eastern consists of Areas 640, 650, and 680; Central consists of Areas 620, 621, 630, and 631; and Western consists of Area 610.

nf = No fishing.

Table 41.--Biological data on the bycatch of Pacific salmon in U.S. domestic groundfish fisheries in the Gulf of Alaska region, 1990.

Species	Percent by species	Sex	Sex composition	Average weight (kg)	Average length (cm)
Chinook	80.3%	Male	40.1	3.57	61.9
		Female	59.9	3.88	61.1
Chum	12.0%	Male	46.7	3.36	60.1
		Female	53.3	3.11	59.6
Coho	7.0%	Male	44.8	3.59	64.7
		Female	55.2	3.71	64.5
Sockeye	0.4%	Male	53.7	2.20	57.0
		Female	46.3	2.49	61.5
Pink	0.3%	Male	33.3	1.96	51.0
		Female	66.7	1.36	48.4

Table 42.--Monthly bycatch rates (kg of fish per metric ton of catch and average weight (kg)) of Pacific halibut taken in U.S. domestic groundfish fisheries in the Gulf of Alaska region by gear type, target fishery, and NPFMC area, 1990.

	Area 610		Area 620		Area 621		Area 630		Area 631		Area 640		Area 650		Area 680	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Bottom trawl (flatfish target)																
Jan.	1.99	0.81	--	--	--	--	22.93	7.68	--	--	--	--	--	--	--	--
Feb.	11.32	1.38	--	--	--	--	13.22	2.50	--	--	--	--	ns	ns	--	--
Mar.	224.24	1.93	21.37	0.88	--	--	52.38	3.02	64.31	1.12	38.96	6.15	23.15	8.51	--	--
Apr.	31.29	1.51	33.85	3.97	--	--	49.85	5.56	--	--	111.16	10.28	4.24	8.20	--	--
May	159.81	8.02	47.86	5.10	25.38	2.22	45.23	12.28	--	--	94.24	8.98	16.22	6.44	--	--
June	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
July	3.48	6.74	83.00	8.88	38.40	3.84	36.47	15.67	--	--	--	--	0.00	0.00	--	--
Aug.	13.10	3.56	39.59	4.48	153.41	2.64	117.96	3.16	25.11	9.00	--	--	--	--	--	--
Sep.	59.24	9.34	--	--	119.52	2.84	39.96	5.14	86.01	10.12	--	--	--	--	--	--
Oct.	5.67	6.13	79.22	2.37	104.28	2.43	81.68	5.03	23.63	7.28	--	--	--	--	--	--
Nov.	--	--	97.66	2.64	0.00	0.00	105.07	3.89	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	31.21	4.40	46.06	4.78	44.96	3.28	68.10	5.88	28.44	4.48	52.73	8.59	12.91	7.24	--	--
Bottom trawl (pollock target)																
Jan.	--	--	--	--	--	--	0.03	2.95	0.00	0.00	--	--	--	--	--	--
Feb.	--	--	--	--	--	--	0.91	0.96	--	--	--	--	--	--	--	--
Mar.	15.60	3.29	--	--	--	--	60.57	1.91	--	--	--	--	--	--	--	--
Apr.	9.52	4.84	--	--	--	--	5.91	2.680	--	--	--	--	--	--	--	--
May	--	--	0.00	0.00	--	--	3.37	19.88	--	--	--	--	--	--	--	--
June	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
July	--	--	7.92	8.23	--	--	8.60	8.64	--	--	--	--	--	--	--	--
Aug.	1.96	0.05	--	--	--	--	3.12	18.56	--	--	24.92	22.66	--	--	--	--
Sep.	34.84	15.99	--	--	--	--	4.64	10.12	--	--	--	--	--	--	--	--
Oct.	2.65	8.72	--	--	31.55	5.07	31.16	9.64	--	--	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	2.97	7.19	3.91	8.23	31.55	5.07	5.60	9.27	0.00	0.00	24.92	22.66	--	--	--	--

Table 42.--Continued.

	Area 610		Area 620		Area 621		Area 630		Area 631		Area 640		Area 650		Area 680	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Bottom trawl (other targets)																
Jan.	16.55	0.53	ns	ns	ns	ns	24.78	3.83	--	--	--	--	ns	ns	--	--
Feb.	22.29	1.71	ns	ns	10.85	1.51	18.58	2.05	12.16	1.31	--	--	ns	ns	--	--
Mar.	11.16	2.27	39.22	7.82	49.84	2.29	38.98	5.37	69.29	1.12	52.28	6.47	27.50	7.29	2.51	6.25
Apr.	13.35	2.33	36.43	6.95	37.57	1.91	69.58	7.64	ns	ns	29.72	8.43	22.23	12.83	ns	ns
May	59.30	6.98	26.45	5.99	43.68	2.06	47.79	6.86	ns	ns	20.05	11.39	3.88	5.19	ns	ns
June	2.09	3.37	--	--	--	--	ns	ns	--	--	--	--	--	--	--	--
July	11.75	12.15	13.94	9.05	19.13	4.85	28.00	9.81	--	--	38.91	15.86	8.56	29.60	--	--
Aug.	6.90	7.80	46.40	6.29	33.28	4.98	53.85	9.01	29.34	23.80	17.57	21.30	ns	ns	--	--
Sep.	14.66	8.97	70.22	4.72	98.80	2.99	76.31	4.72	17.47	6.76	--	--	--	--	--	--
Oct.	11.20	5.56	87.27	4.39	34.90	2.63	98.55	5.57	23.68	4.07	--	--	--	--	--	--
Nov.	50.01	5.17	332.75	3.87	--	--	45.35	5.22	--	--	--	--	--	--	--	--
Dec.	ns	ns	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	9.96	3.24	23.14	6.58	45.14	2.87	28.42	5.81	19.08	4.30	19.94	11.76	20.26	10.95	2.51	6.25
Pelagic trawl (pollock target)																
Jan.	0.00	0.00	--	--	<0.01	0.40	<0.01	2.40	0.00	0.00	--	--	--	--	--	--
Feb.	0.00	0.00	--	--	0.05	46.00	0.06	22.80	<0.01	2.55	--	--	--	--	--	--
Mar.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Apr.	0.00	0.00	--	--	0.04	9.30	0.00	0.00	0.00	0.00	--	--	--	--	--	--
May	--	--	--	--	--	--	0.14	13.88	--	--	--	--	--	--	--	--
June	--	--	ns	ns	--	--	0.04	7.10	--	--	0.00	0.00	--	--	--	--
July	--	--	--	--	--	--	0.04	25.00	--	--	--	--	--	--	--	--
Aug.	--	--	--	--	--	--	0.08	32.16	--	--	--	--	--	--	--	--
Sep.	ns	ns	--	--	--	--	0.04	8.19	0.00	0.00	--	--	--	--	--	--
Oct.	0.06	6.92	--	--	--	--	0.03	10.04	ns	ns	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.06	6.92	ns	ns	0.04	16.25	0.04	12.03	<0.01	2.55	0.00	0.00	--	--	--	--

Table 42.--Continued.

	Area 610		Area 620		Area 621		Area 630		Area 631		Area 640		Area 650		Area 680	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Pelagic trawl (other targets)																
Jan.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb.	--	--	--	--	--	--	5.40	2.10	--	--	--	--	--	--	--	--
Mar.	--	--	--	--	--	--	6.62	1.28	--	--	--	--	--	--	--	--
Apr.	ns	ns	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--
May	--	--	--	--	--	--	ns	ns	--	--	0.00	0.00	--	--	--	--
June	--	--	--	--	--	--	0.00	0.00	--	--	0.66	12.64	--	--	--	--
July	--	--	ns	ns	--	--	ns	ns	--	--	--	--	--	--	--	--
Aug.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sep.	--	--	--	--	--	--	0.00	0.00	--	--	--	--	--	--	--	--
Oct.	5.08	4.17	ns	ns	--	--	0.50	6.55	ns	ns	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	ns	ns	--	--	--	--	--	--	--	--
Dec.	ns	ns	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	5.08	4.17	ns	ns	--	--	0.64	2.88	ns	ns	0.58	12.64	--	--	--	--
Longline vessels (Pacific cod target)																
Jan.	ns	ns	--	--	ns	ns	55.00	4.00	ns	ns	--	--	--	--	--	--
Feb.	155.13	6.70	--	--	32.47	10.39	58.26	7.94	32.88	9.44	--	--	--	--	--	--
Mar.	61.19	6.93	ns	ns	--	--	36.14	8.39	ns	ns	--	--	ns	ns	--	--
Apr.	227.89	6.17	ns	ns	360.83	6.47	1,162.36	7.24	--	--	ns	ns	ns	ns	--	--
May	ns	ns	ns	ns	651.17	7.39	190.51	5.46	--	--	ns	ns	ns	ns	--	--
June	1,994.01	9.00	--	--	--	--	--	--	--	--	ns	ns	ns	ns	--	--
July	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aug.	16.24	3.47	--	--	--	--	ns	ns	--	--	--	--	ns	ns	ns	ns
Sep.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Oct.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Nov.	381.64	6.95	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Dec.	81.68	4.85	--	--	--	--	ns	ns	--	--	--	--	--	--	--	--
Total	129.83	6.48	ns	ns	216.11	6.84	138.31	6.47	32.88	9.44	ns	ns	ns	ns	ns	ns

Table 42.--Continued.

	Area 610		Area 620		Area 621		Area 630		Area 631		Area 640		Area 650		Area 680	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Longline vessels (sablefish target)																
Jan.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mar.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Apr.	227.21	7.03	214.74	8.98	2,211.52	13.360	614.99	10.81	ns	ns	52.04	8.25	283.22	8.23	0.00	0.00
May	67.39	9.82	95.42	6.28	0.00	0.00	342.77	9.28	--	--	ns	ns	ns	ns	ns	ns
June	ns	ns	--	--	ns	ns	ns	ns	--	--	ns	ns	ns	ns	ns	ns
July	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Aug.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Sep.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Oct.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	150.15	7.49	150.82	7.84	1,490.44	13.36	456.92	10.09	ns	ns	52.04	8.25	283.22	8.23	0.00	0.00
Longline vessels (other target fisheries)																
Jan.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Feb.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Mar.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Apr.	1,373.08	8.15	598.82	12.64	3,622.12	13.36	165.23	9.12	--	--	--	--	ns	ns	ns	ns
May	--	--	--	--	--	--	2,618.70	13.77	--	--	ns	ns	ns	ns	ns	ns
June	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
July	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Aug.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Sep.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Oct.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Year	1,373.08	8.15	598.82	12.64	3,622.12	13.36	910.76	12.94	--	--	ns	ns	ns	ns	ns	ns

Table 42.--Continued.

	Area 610		Area 620		Area 621		Area 630		Area 631		Area 640		Area 650		Area 680	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Pot vessels (all target fisheries)																
Jan.	ns	ns	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb.	ns	ns	ns	ns	--	--	ns	ns	ns	ns	--	--	--	--	--	--
Mar.	ns	ns	ns	ns	--	--	0.00	0.00	1.53	3.33	--	--	--	--	--	--
Apr.	ns	ns	ns	ns	--	--	ns	ns	4.19	4.00	--	--	--	--	--	--
May	--	--	ns	ns	--	--	55.33	8.68	--	--	--	--	--	--	--	--
June	--	--	ns	ns	--	--	31.41	7.11	ns	ns	--	--	--	--	--	--
July	0.00	0.00	ns	ns	--	--	38.93	8.05	ns	ns	--	--	--	--	--	--
Aug.	0.00	0.00	316.25	19.65	80.44	10.47	109.88	8.30	ns	ns	--	--	--	--	--	--
Sep.	0.00	0.00	ns	ns	16.62	5.32	44.82	4.01	7.77	5.00	--	--	--	--	--	--
Oct.	0.00	0.00	ns	ns	7.86	3.66	36.01	4.47	70.02	3.27	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	41.90	3.58	31.04	3.00	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	ns	ns	ns	ns	--	--	--	--	--	--
Year	0.00	0.00	316.25	19.65	19.50	5.91	52.01	6.37	9.55	3.39	--	--	--	--	--	--

Dashes indicate area not fished.

ns = Fishing occurred but no sampling by observer.

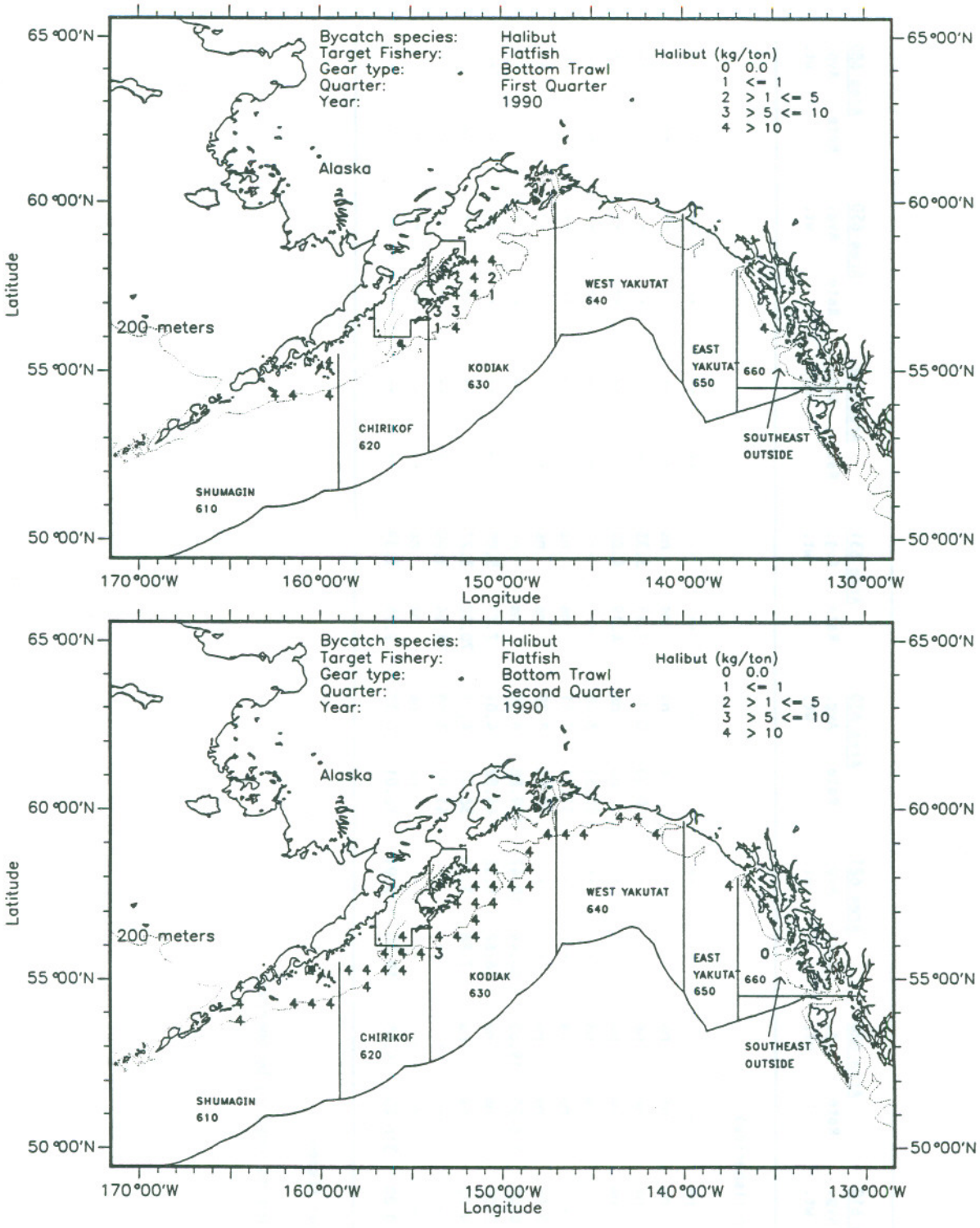


Figure 13.--Average incidence (kg./t) of Pacific halibut in the U.S. domestic fisheries by quarter, target fishery, gear type, and 1/2° latitude by 1/2° longitude areas in the Gulf of Alaska region, 1990.

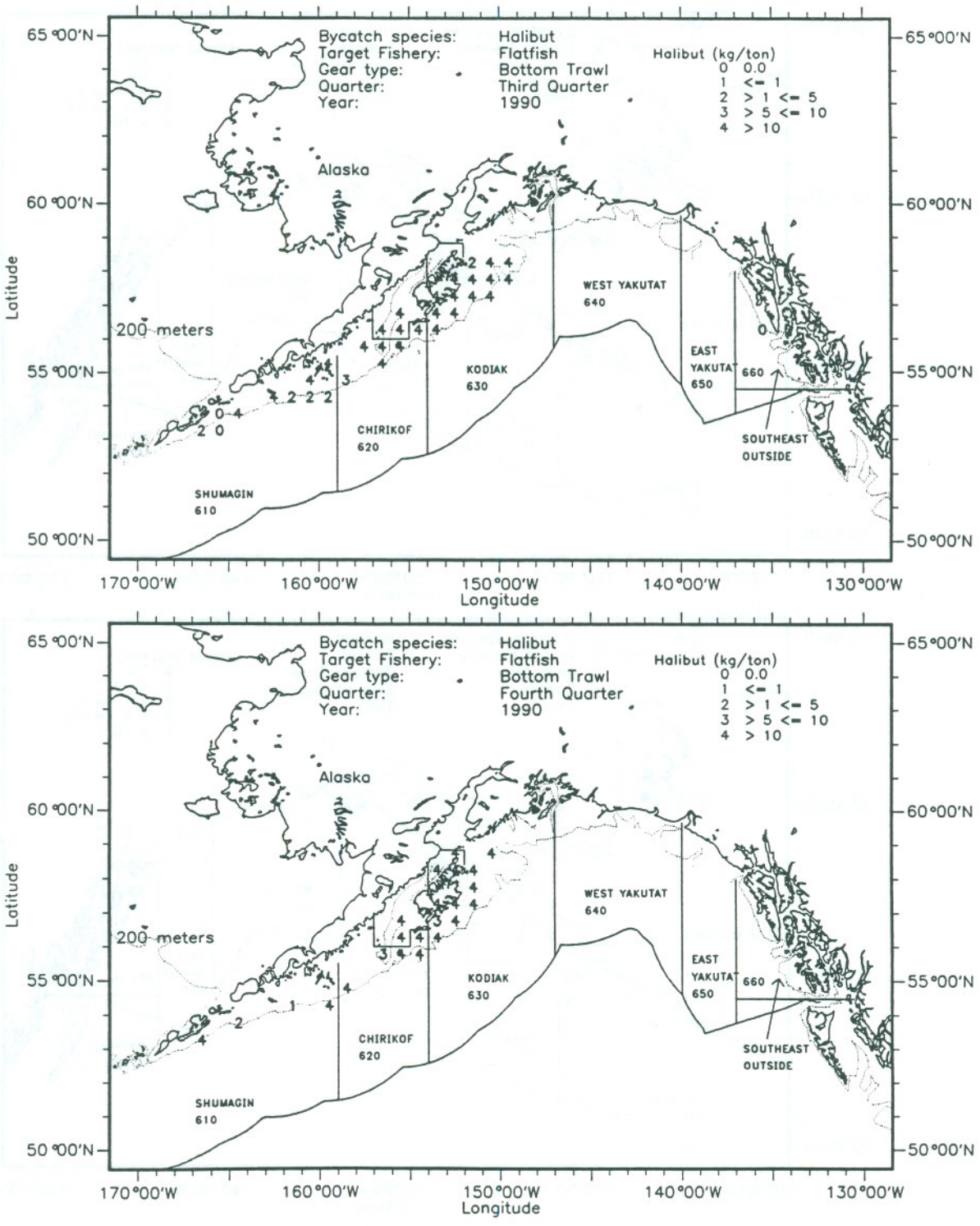


Figure 13.--Continued.

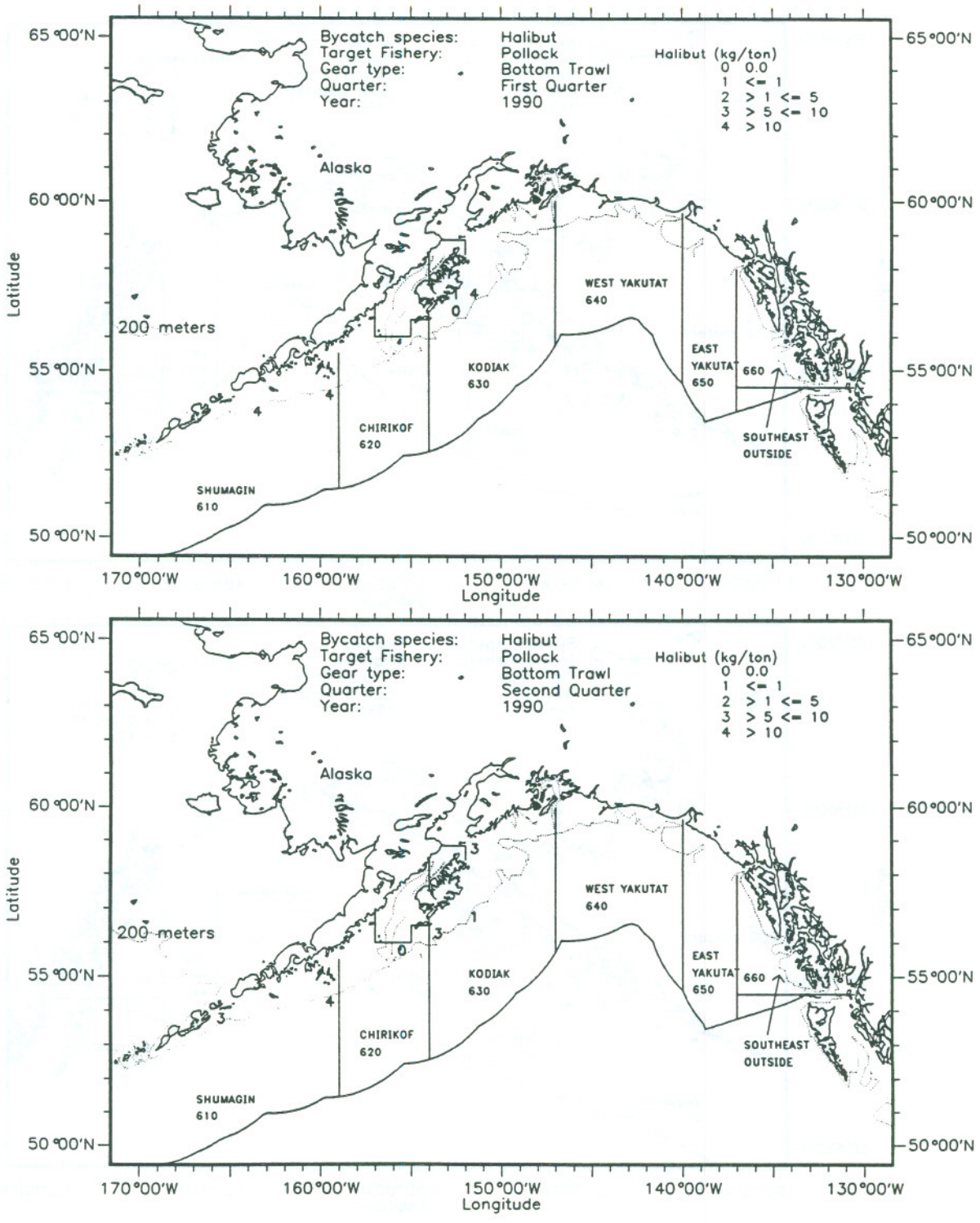


Figure 13.--Continued.

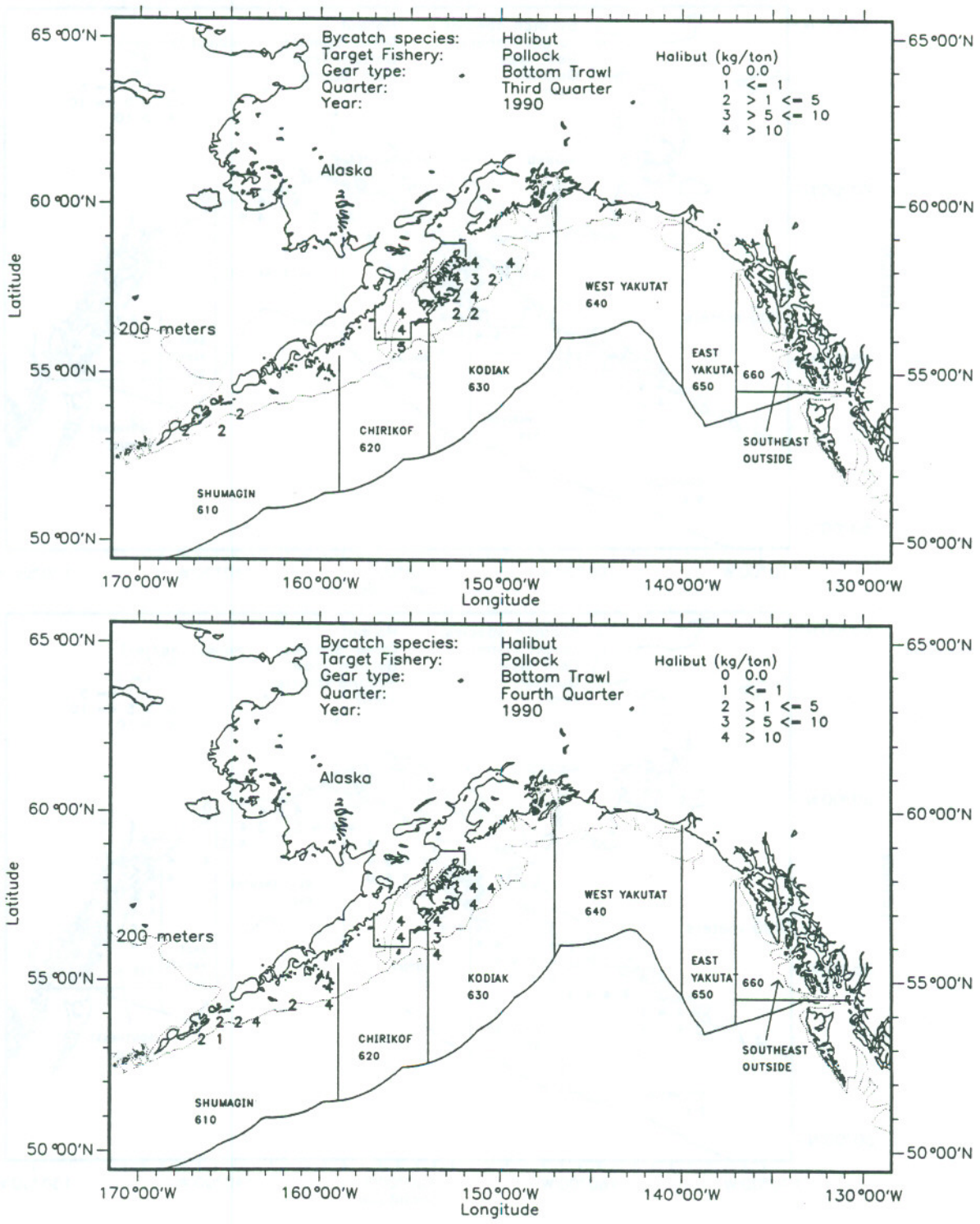


Figure 13.--Continued.

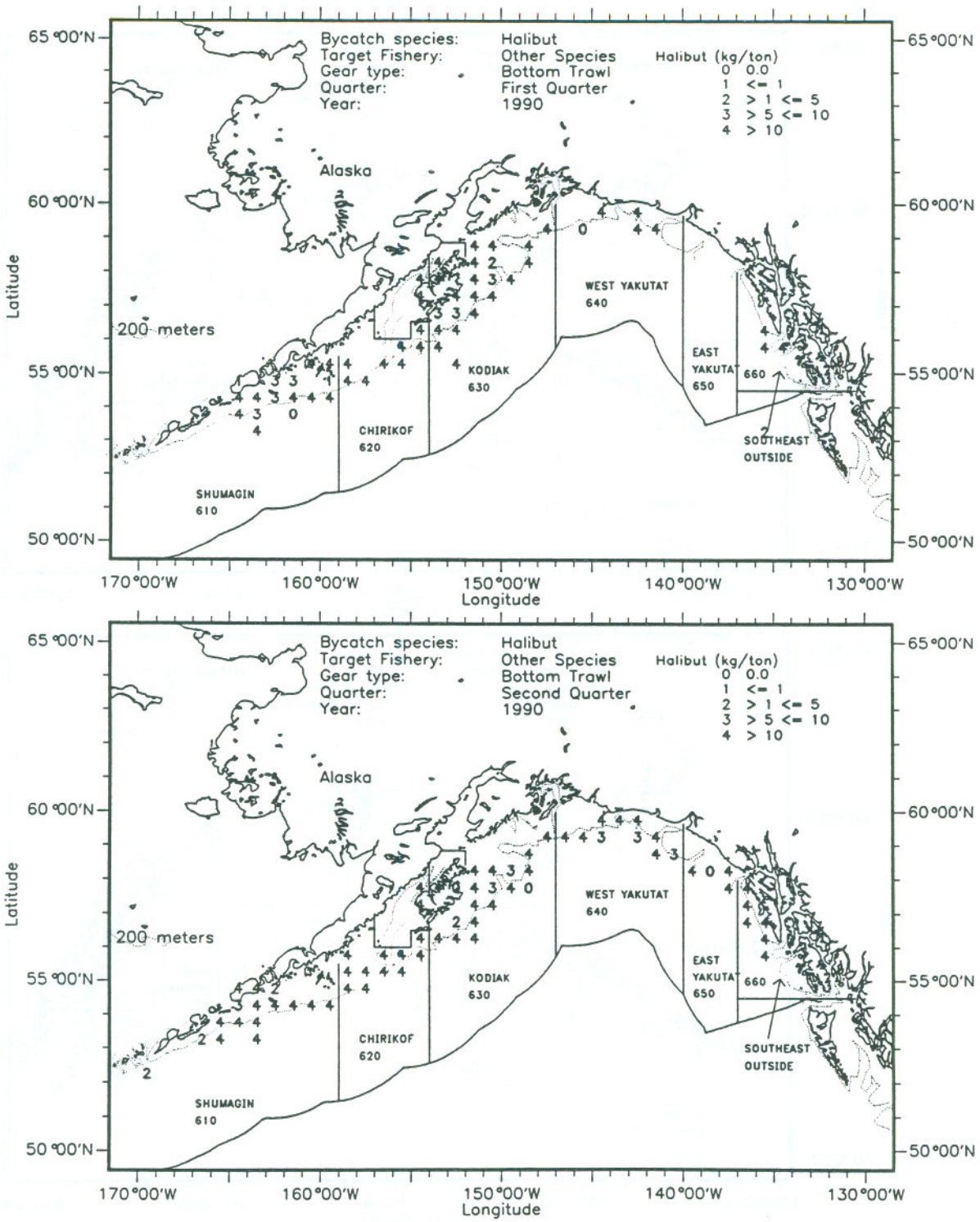


Figure 13.--Continued.

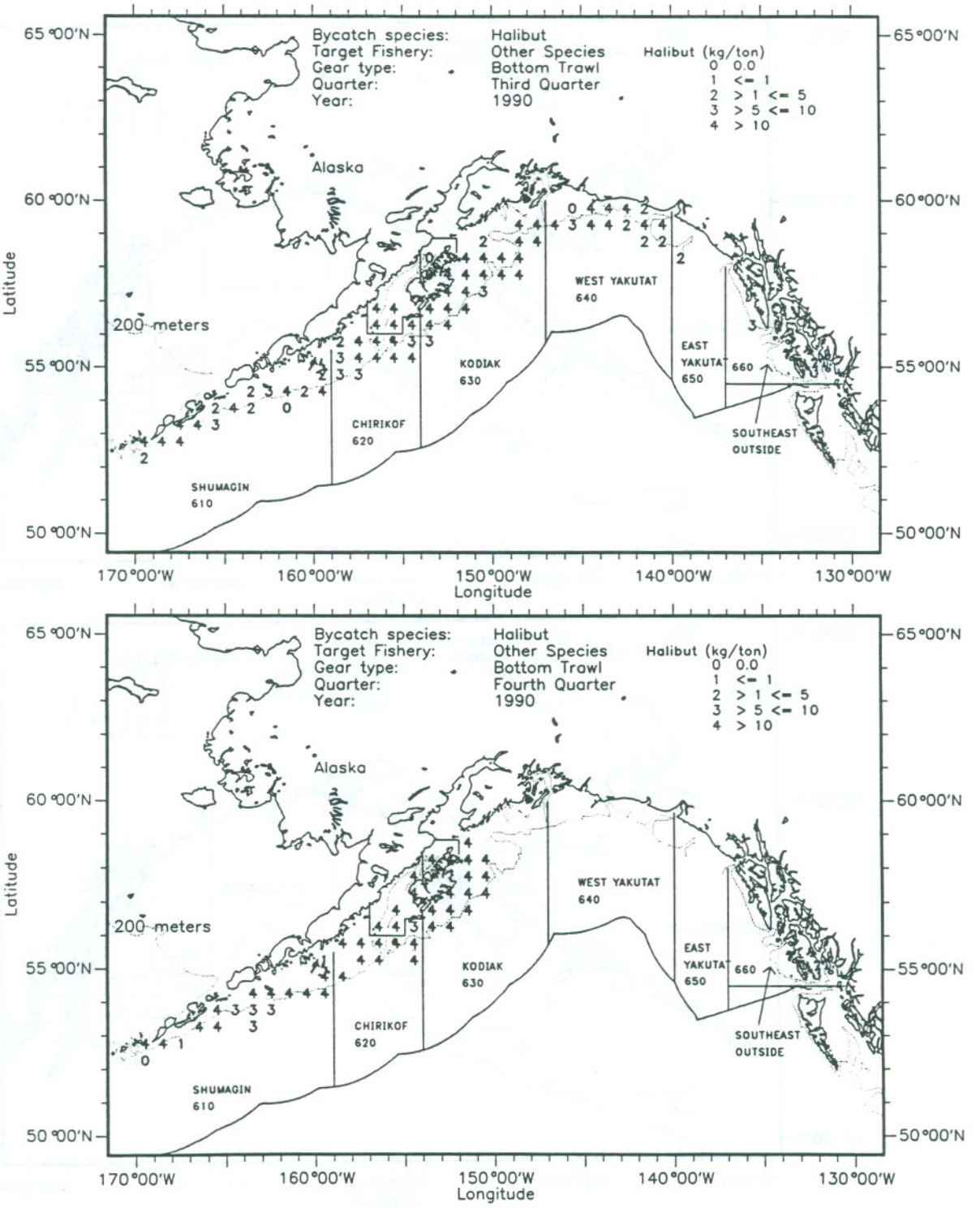


Figure 13.--Continued.

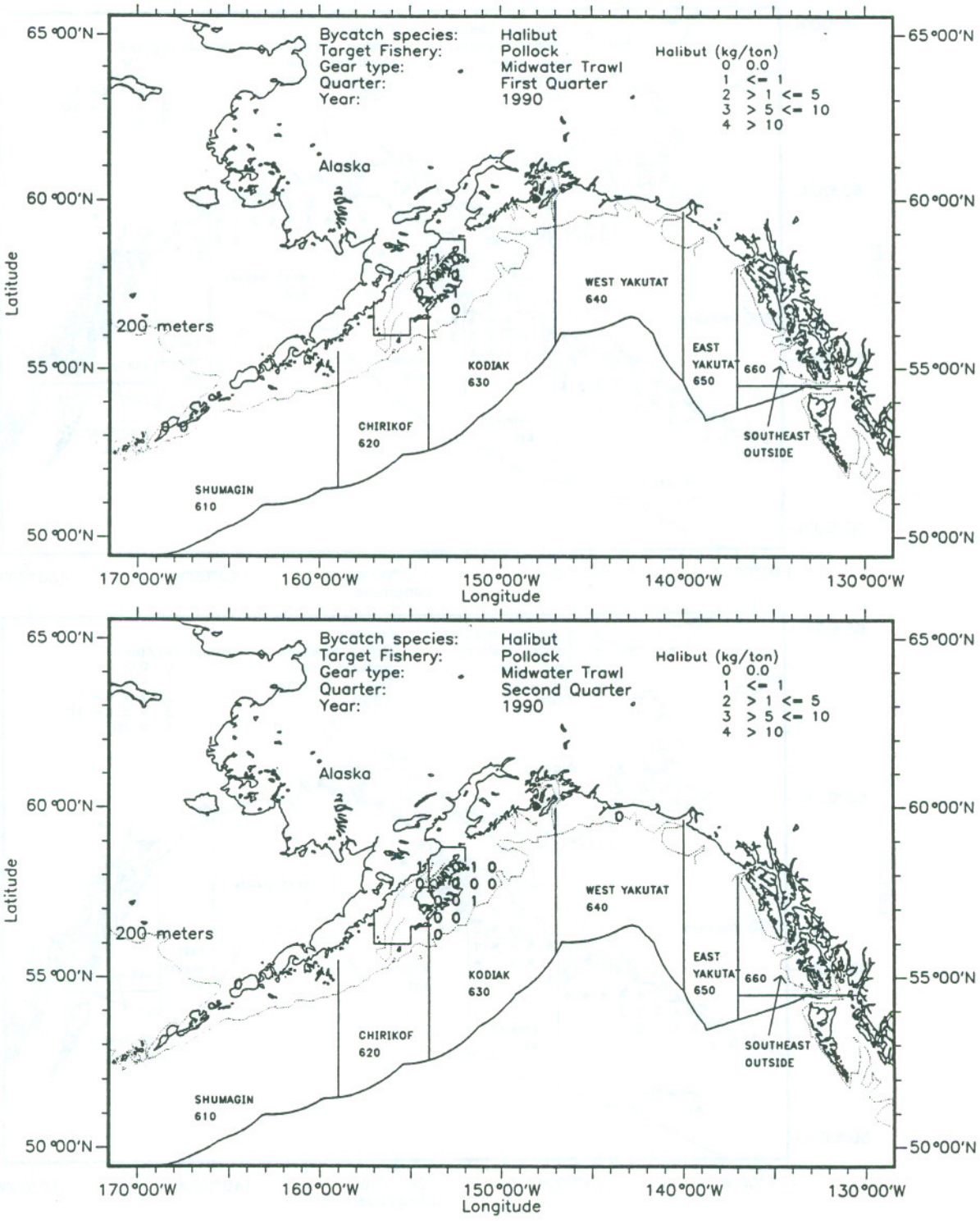


Figure 13.--Continued.

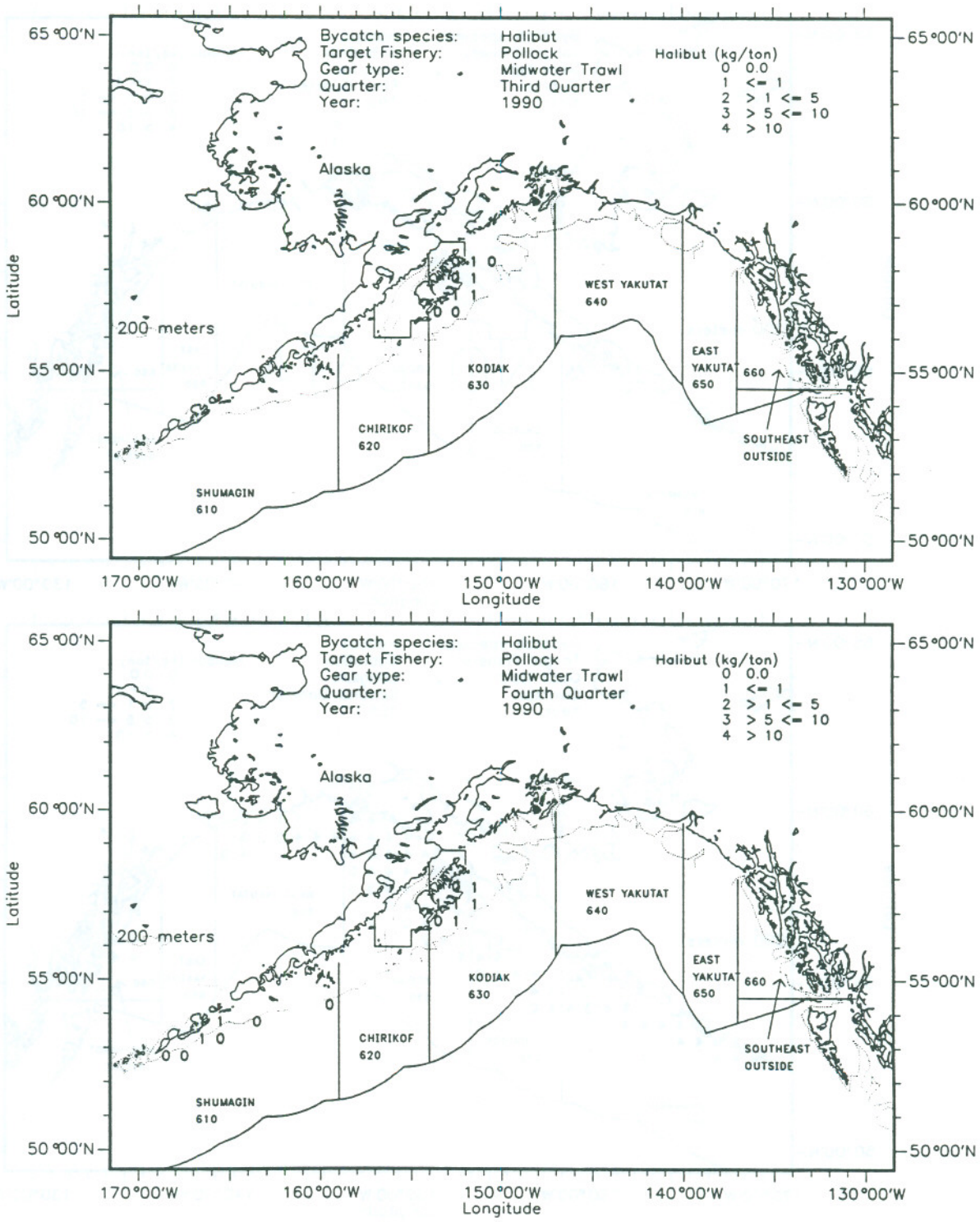


Figure 13.--Continued.

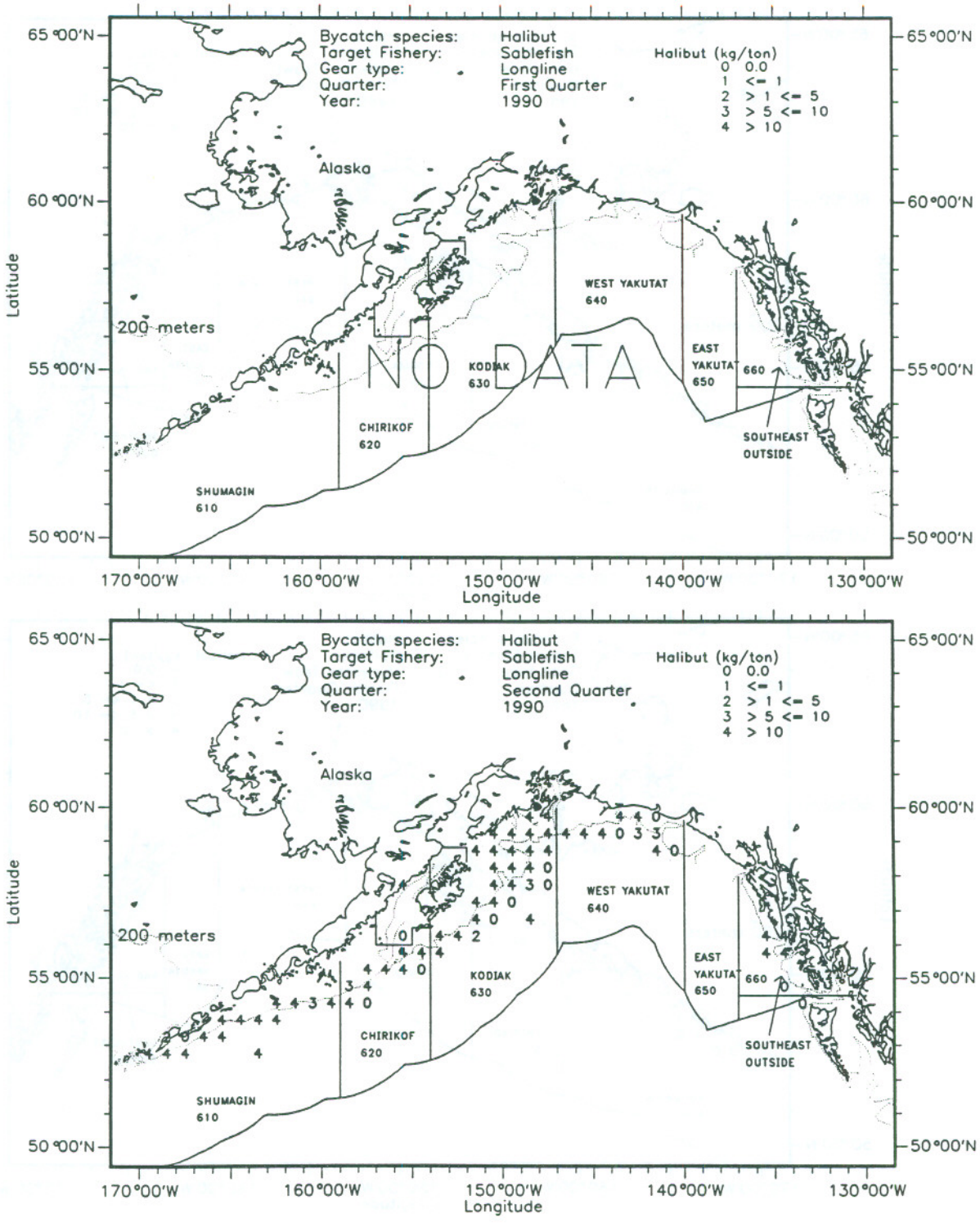


Figure 13.--Continued.

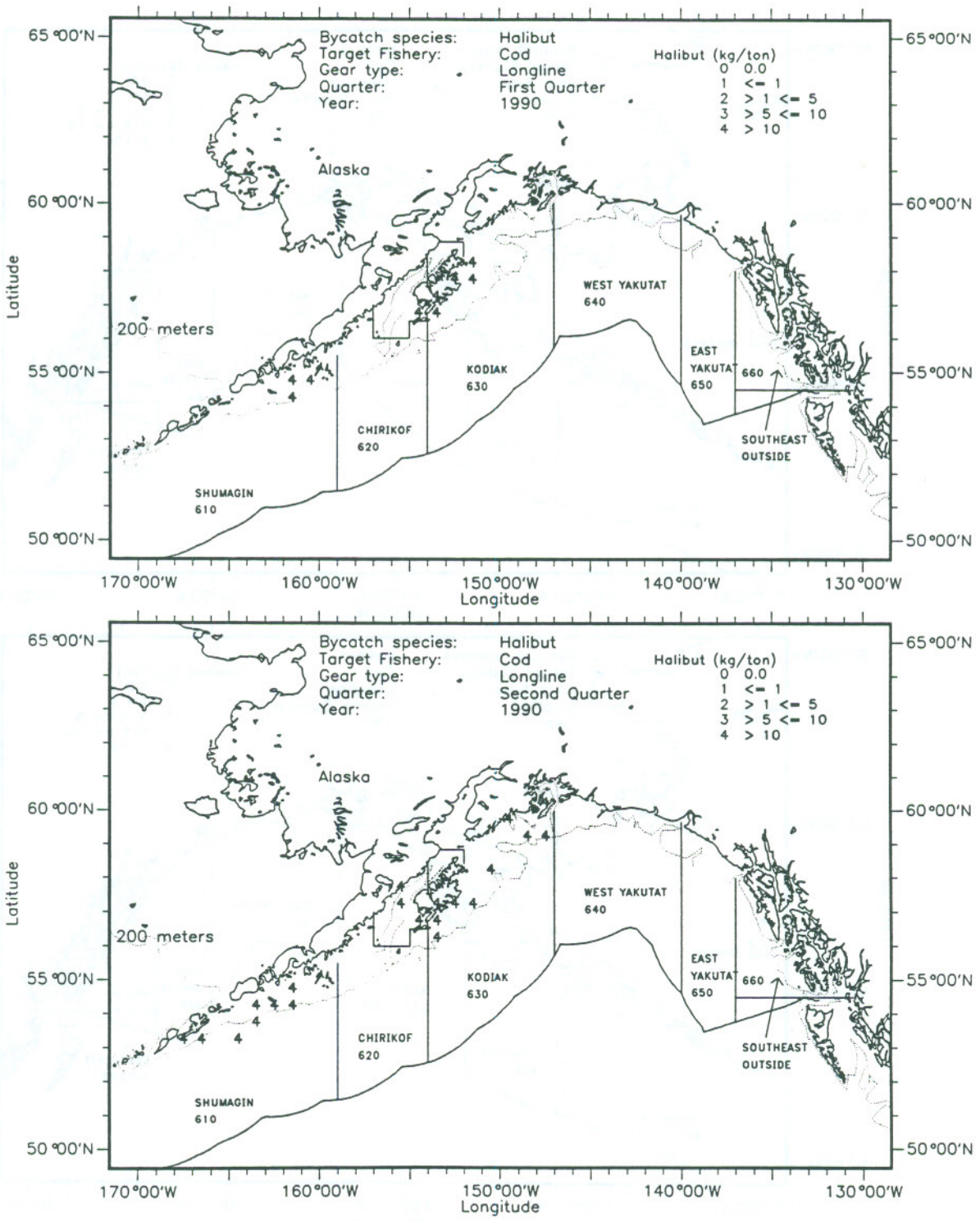


Figure 13.--Continued.

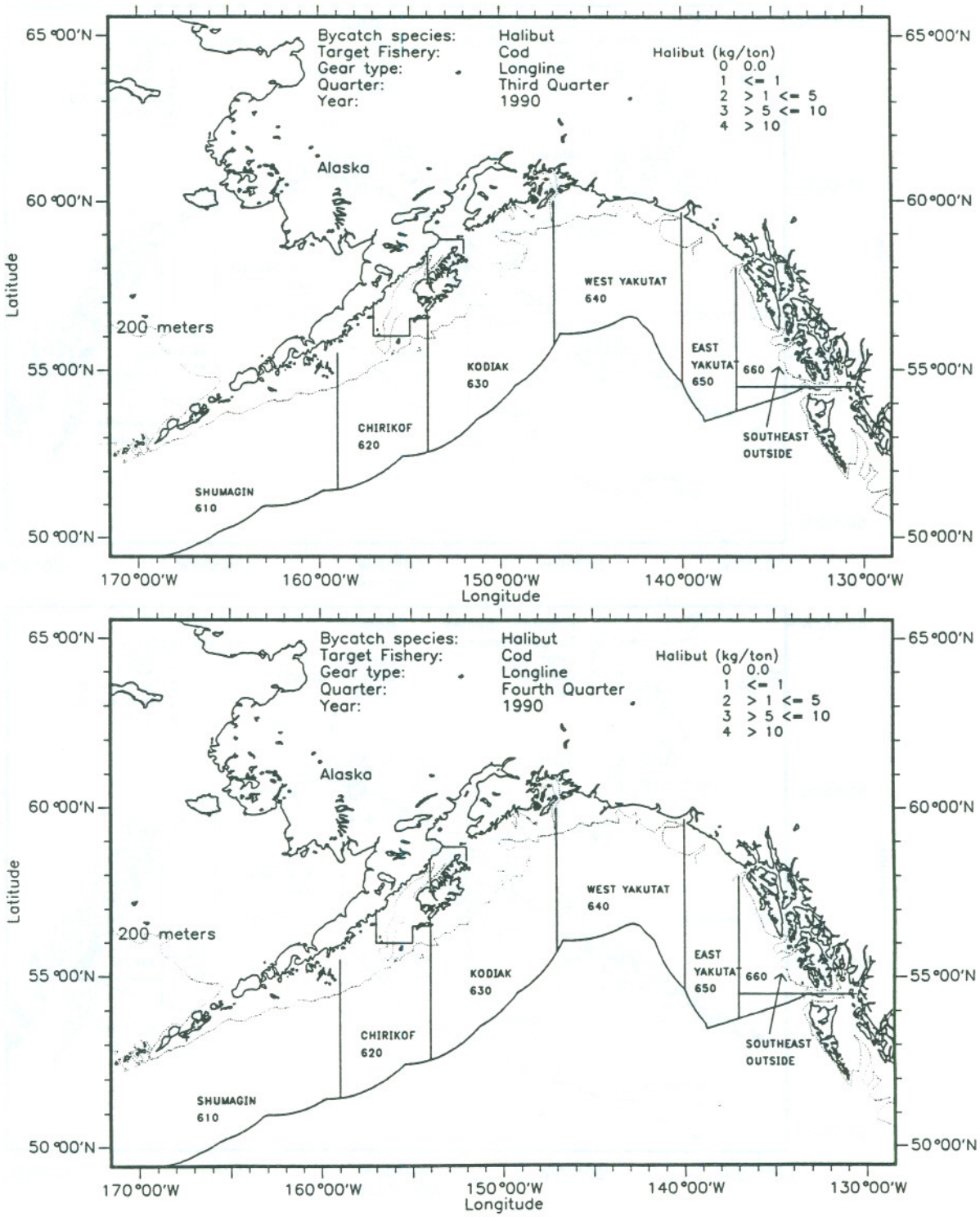


Figure 13.--Continued.

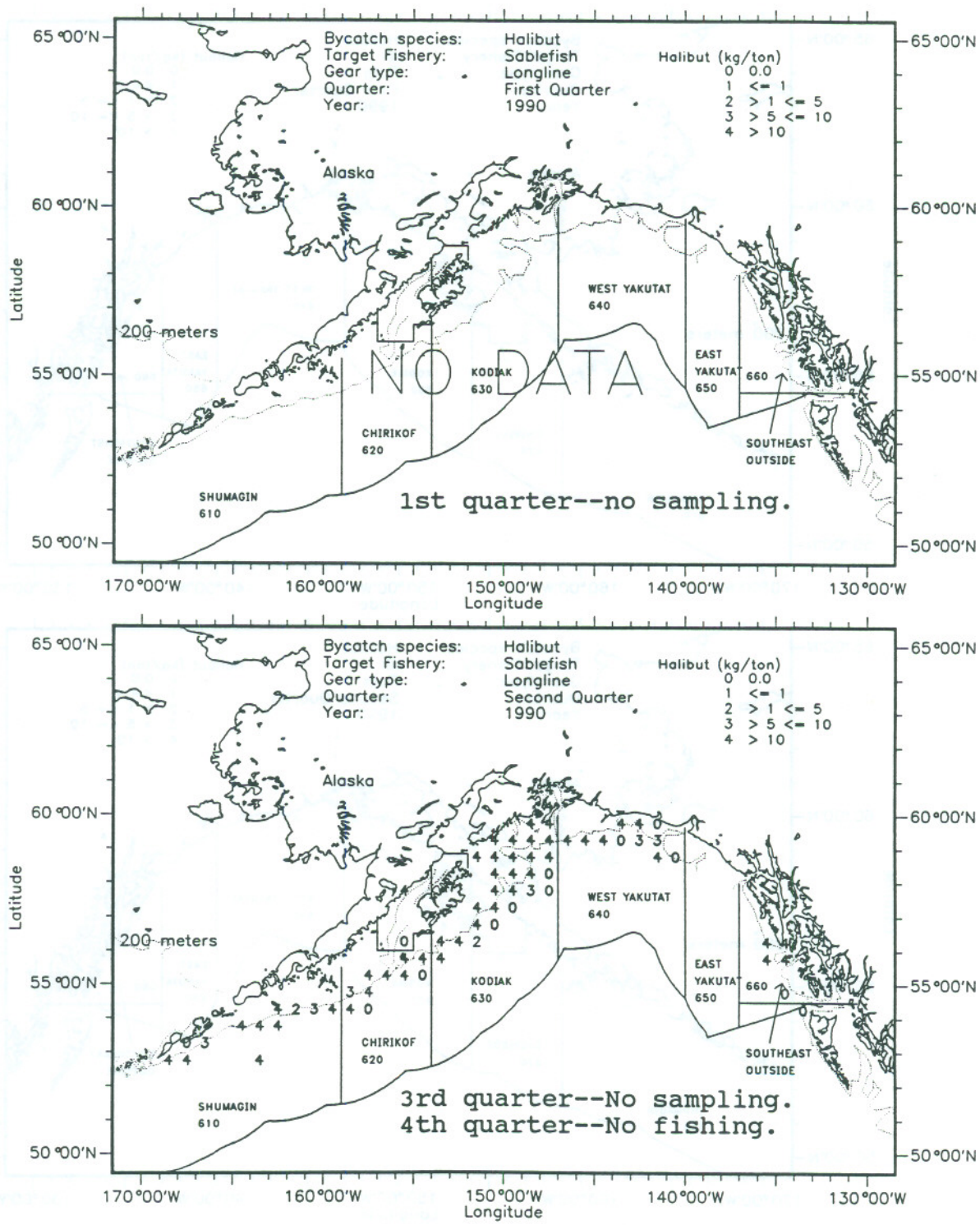


Figure 13.--Continued.

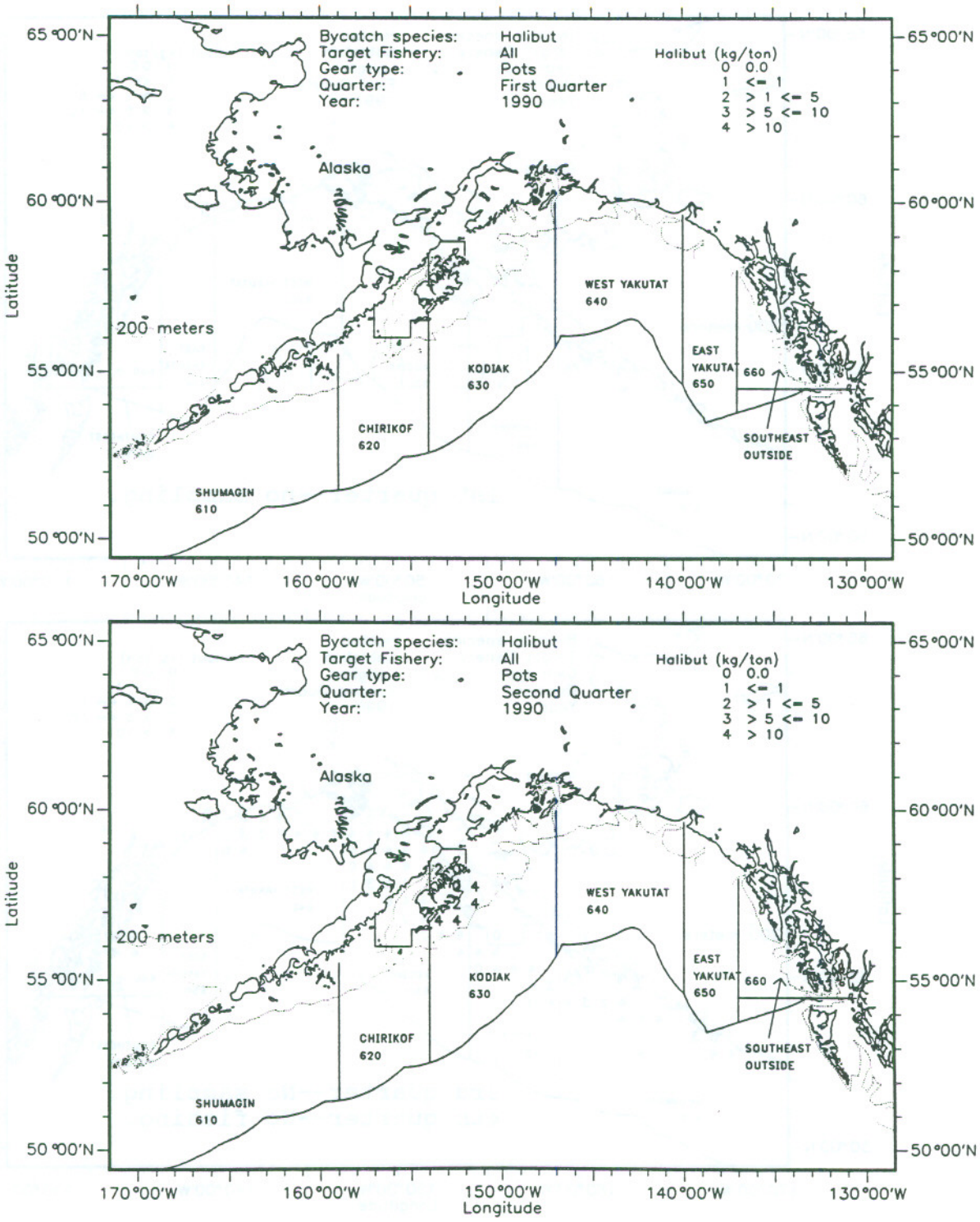


Figure 13.--Continued.

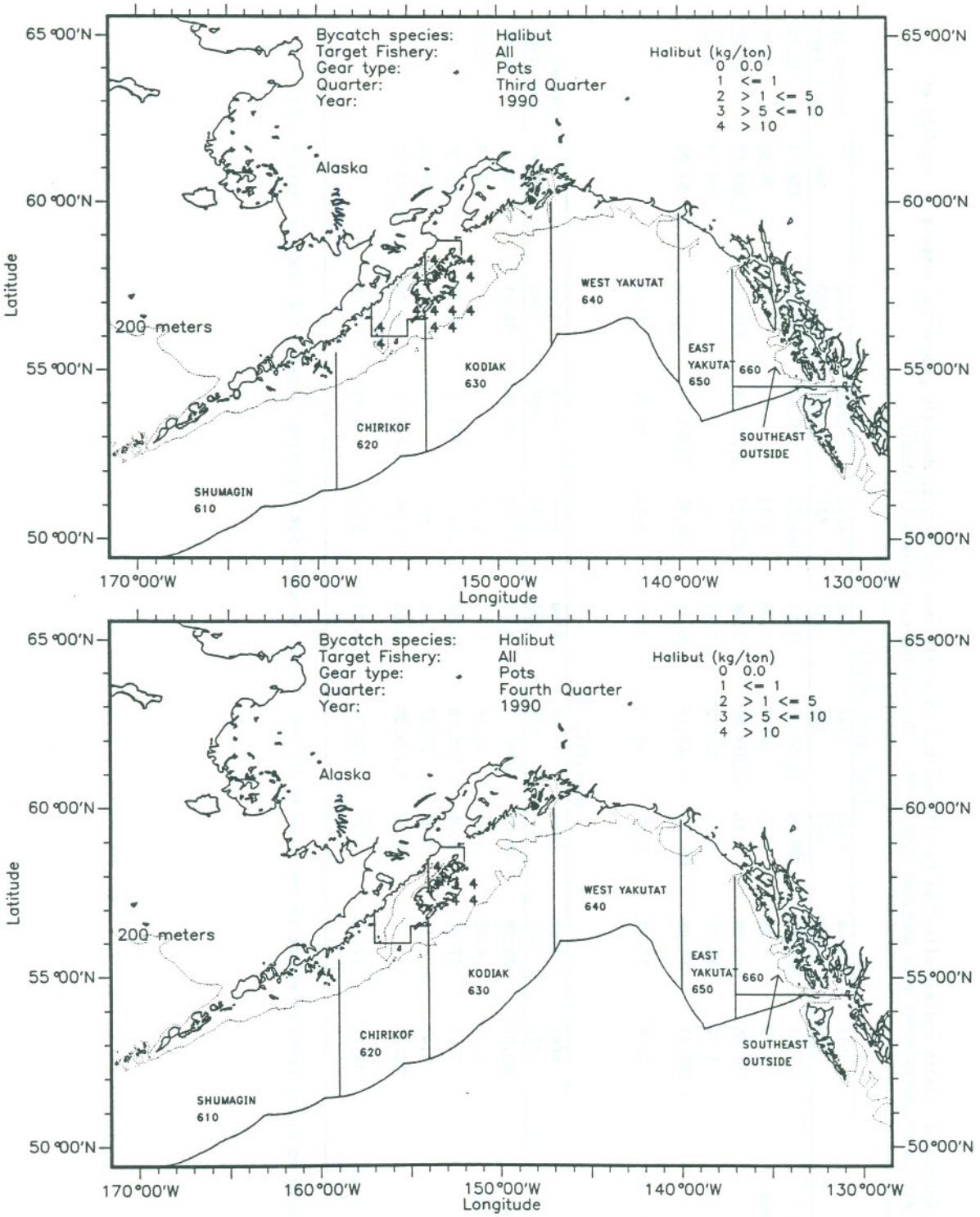


Figure 13.--Continued.

Table 43.--Estimated bycatch and mortality* of Pacific halibut in metric tons (t) by U.S. domestic groundfish vessels in the Gulf of Alaska region by NPFMC area and gear type, 1990. (Dashes indicate area not fished.)

	Total bycatch (t)									
Gear	Area 610	Area 620	Area 621	Area 630	Area 631	Area 640	Area 650	Area 680	Total	Percent by gear type
Bottom trawl	573.61	966.78	98.05	2,459.15	13.51	166.55	29.04	29.63	4,336.33	35.7%
Pelagic trawl	1.19	0.03	0.02	22.92	0.08	0.13	--	--	24.38	0.2%
Longline	531.06	445.28	1.56	4,039.88	2.86	232.27	2,026.16	222.83	7,501.89	61.7%
Pot	3.74	28.19	0.64	247.22	9.66	--	--	--	289.45	2.4%
Total	1,109.61	1,440.28	100.28	6,769.17	26.11	398.95	2,055.19	252.46	12,152.05	
Percent by area	9.1%	11.9%	0.8%	55.7%	0.2%	3.3%	16.9%	2.1%		

	Mortality (t)									
Gear	Area 610	Area 620	Area 621	Area 630	Area 631	Area 640	Area 650	Area 680	Total	Percent by gear type
Bottom trawl	286.81	483.39	49.03	1,229.58	6.76	83.28	14.52	14.81	2,168.17	68.0%
Pelagic trawl	0.59	0.02	0.01	11.46	0.04	0.07	--	--	12.19	0.4%
Longline	69.04	57.89	0.20	525.18	0.37	30.19	263.40	28.97	975.25	30.6%
Pot	0.45	3.38	0.08	29.67	1.16	--	--	--	34.73	1.1%
Total	356.89	544.67	49.32	1,795.89	8.33	113.54	277.92	43.78	3,190.33	
Percent by area	11.2%	17.1%	1.5%	56.3%	0.3%	3.6%	8.7%	1.4%		

* Pre-assigned mortality rates in effect in 1990 were as follows: trawl vessels--50%, longline vessels--13%, and pot vessels--12%.

Table 44.--U.S. domestic groundfish catch and Pacific halibut catch and mortality (in metric tons (t)) by target fishery and area in the Gulf of Alaska region, 1990.

			Pacific halibut bycatch				Pacific halibut mortality			
Fishery/gear	Area*	Groundfish catch	Weight (t)	kg per t of ground-fish	% within area	% of total bycatch	Weight (t)	kg per t of ground-fish	% within area	% of total bycatch
Flatfish (All gears)	Eastern	57.8	2.43	42.0	0.1%	<0.1%	1.21	20.9	0.3%	<0.1%
	Central	22,979.2	1,031.43	44.9	12.4%	8.5%	515.38	22.4	21.5%	16.2%
	Western	2,047.6	78.83	38.5	7.1%	0.6%	39.33	19.2	11.0%	1.2%
	Total	25,084.6	1,112.69	44.4	--	9.2%	555.92	22.2	--	17.4%
Pollock midwater (All gears)	Eastern	nf	nf	nf	nf	nf	nf	nf	nf	nf
	Central	45,267.1	4.38	0.1	0.1%	<0.1%	2.19	<0.1	0.1%	0.1%
	Western	6,321.2	0.42	0.1	0.0%	<0.1%	0.21	<0.1	0.1%	<0.1%
	Total	51,588.3	4.80	0.1	--	<0.1%	2.40	<0.1	--	0.1%
Pollock bottom (All gears)	Eastern	nf	nf	nf	nf	nf	nf	nf	nf	nf
	Central	18,406.7	53.22	2.9	0.6%	0.4%	26.34	1.4	1.1%	0.8%
	Western	884.8	0.78	0.9	0.1%	<0.1%	0.39	0.4	0.1%	<0.1%
	Total	19,291.5	54.00	2.8	--	0.4%	26.73	1.4	--	0.8%
Other (Trawl)	Eastern	27.4	0.55	20.1	0.0%	<0.1%	0.28	10.2	0.1%	<0.1%
	Central	44,106.0	1,501.49	34.0	18.0%	12.4%	750.74	17.0	31.3%	23.5%
	Western	32,277.9	266.17	8.2	24.0%	2.2%	133.08	4.1	37.3%	4.2%
	Total	76,411.3	1,768.21	23.1	--	14.6%	884.10	11.6	--	27.7%
Other (Longline)	Eastern	249.5	23.09	92.5	0.9%	0.2%	3.00	12.0	0.7%	0.1%
	Central	3,040.2	191.93	63.1	2.3%	1.6%	24.95	8.2	1.0%	0.8%
	Western	2,451.4	215.48	87.9	19.4%	1.8%	28.02	11.4	7.9%	0.9%
	Total	5,741.1	430.50	75.0	--	3.5%	55.97	9.7	--	1.8%
Other (Pot)	Eastern	nf	nf	nf	nf	nf	nf	nf	nf	nf
	Central	5,478.8	285.71	52.1	3.4%	2.4%	34.28	6.3	1.4%	1.1%
	Western	159.7	3.74	23.4	0.3%	<0.1%	0.45	2.8	0.1%	<0.1%
	Total	5,638.5	289.45	51.3	--	2.4%	34.73	6.2	--	1.1%
Sablefish (Trawl)	Eastern	879.5	25.21	28.7	0.9%	0.2%	12.61	14.3	2.9%	0.4%
	Central	1,215.5	43.78	36.0	0.5%	0.4%	21.88	18.0	0.9%	0.7%
	Western	383.5	25.40	66.2	2.3%	0.2%	12.70	33.1	3.6%	0.4%
	Total	2,478.5	94.39	38.1	--	0.8%	47.19	19.0	--	1.5%
Sablefish (Longline)	Eastern	11,468.0	2,409.55	210.1	89.0%	19.8%	313.24	27.3	72.0%	9.8%
	Central	10,855.3	4,268.94	393.3	51.2%	35.1%	554.96	51.1	23.1%	17.4%
	Western	1,868.8	315.36	168.8	28.4%	2.6%	41.00	21.9	11.5%	1.3%
	Total	24,192.1	6,993.85	289.1	--	57.6%	909.20	37.6	--	28.5%
Rockfish (All gears)	Eastern	9,805.1	245.73	25.1	9.1%	2.0%	104.88	10.7	24.1%	3.3%
	Central	15,840.4	955.00	60.3	11.5%	7.9%	467.49	29.5	19.5%	14.7%
	Western	8,325.1	203.43	24.4	18.3%	1.7%	101.72	12.2	28.5%	3.2%
	Total	33,970.6	1,404.16	41.3	--	11.6%	674.09	19.8	--	21.1%
Total (All gears)	Eastern	22,487.3	2,706.56	120.4	--	22.3%	435.22	19.4	--	13.6%
	Central	167,189.2	8,335.88	49.9	--	68.6%	2,398.21	14.3	--	75.2%
	Western	54,720.0	1,109.61	20.3	--	9.1%	356.90	6.5	--	11.2%
	Total	244,396.5	12,152.05	49.7	--	--	3,190.33	13.1	--	--

*Eastern consists of Areas 640, 650, and 680; Central consists of Areas 620, 621, 630, and 631; and Western consists of Area 610.

nf = No fishing.

Table 45.--Monthly bycatch rates (number of crab per metric ton of catch and average weight (kg)) of Chionoecetes bairdi taken in U.S. domestic groundfish fisheries in the Gulf of Alaska region by gear type and target fishery, 1990.

	Area 610		Area 620		Area 621		Area 630		Area 631		Area 640		Area 650		Area 680	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Bottom trawl (flatfish target)																
Jan.	0.593	0.61	--	--	--	--	0.597	0.87	--	--	--	--	--	--	--	--
Feb.	0.277	0.29	--	--	--	--	1.053	0.51	--	--	--	--	ns	ns	--	--
Mar.	0.083	0.81	0.000	0.00	--	--	2.042	0.55	--	--	--	--	0.000	0.00	--	--
Apr.	0.074	0.26	0.002	1.60	--	--	0.016	0.33	--	--	0.000	0.00	0.000	0.00	--	--
May	0.000	0.00	0.013	0.72	0.000	0.00	0.014	0.69	--	--	0.038	0.77	0.000	0.00	--	--
June	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
July	0.000	0.00	0.000	0.00	0.256	0.30	0.000	0.00	--	--	--	--	0.000	0.00	--	--
Aug.	0.900	0.08	0.304	1.17	0.026	1.51	0.285	0.20	1.196	0.32	--	--	--	--	--	--
Sep.	38.467	0.43	0.000	0.00	0.000	0.00	10.718	0.75	3.400	0.30	--	--	--	--	--	--
Oct.	0.000	0.00	0.434	0.13	0.063	0.10	13.792	0.35	0.344	0.82	--	--	--	--	--	--
Nov.	--	0.00	0.902	0.04	0.000	0.00	3.271	0.26	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.460	0.38	0.097	0.23	0.030	0.80	6.299	0.46	0.578	0.55	0.038	0.77	0.000	0.00	--	--
Bottom trawl (pollock target)																
Jan.	--	--	--	--	--	--	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Feb.	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Mar.	0.000	0.00	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Apr.	0.000	0.00	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
May	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--	--	--	--	--
June	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
July	--	--	0.000	0.00	--	--	0.762	0.60	--	--	--	--	--	--	--	--
Aug.	0.000	0.00	--	--	--	--	0.018	1.93	4.345	0.03	0.000	0.00	--	--	--	--
Sep.	0.000	0.00	--	--	0.000	0.00	0.565	0.51	--	--	--	--	--	--	--	--
Oct.	0.001	0.10	--	--	0.000	0.00	0.007	0.08	--	--	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.001	0.10	0.000	0.00	0.000	0.00	0.220	0.57	0.337	0.03	0.000	0.00	--	--	--	--

Table 45.--Continued.

	Area 610		Area 620		Area 621		Area 630		Area 631		Area 640		Area 650		Area 680	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Bottom trawl (other targets)																
Jan.	0.000	0.00	ns	ns	ns	ns	9.582	0.47	--	--	--	--	ns	ns	--	--
Feb.	0.405	0.36	ns	ns	0.000	0.00	1.776	0.65	0.000	0.00	--	--	ns	ns	--	--
Mar.	0.077	0.30	0.021	0.17	0.063	0.25	1.315	0.44	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00
Apr.	0.287	0.24	0.028	0.14	0.032	0.50	0.001	1.50	ns	ns	0.001	1.10	0.000	0.00	ns	ns
May	0.000	0.00	0.148	0.37	0.502	0.54	0.008	0.58	ns	ns	0.039	0.36	0.000	0.00	ns	ns
June	0.000	0.00	--	--	--	--	ns	ns	--	--	--	--	--	--	--	--
July	0.003	0.13	0.003	0.22	0.229	0.86	0.016	0.32	--	--	0.000	0.00	0.000	0.00	--	--
Aug.	0.048	0.12	0.041	0.85	0.011	1.00	0.065	0.56	1.721	0.26	0.000	0.00	ns	ns	--	--
Sep.	0.000	0.00	0.083	0.12	0.000	0.00	0.724	0.52	1.006	0.26	--	--	--	--	--	--
Oct.	0.027	0.12	0.178	0.15	0.008	0.08	0.266	0.37	0.000	0.00	--	--	--	--	--	--
Nov.	0.349	0.05	0.000	0.00	--	--	1.578	0.69	--	--	--	--	--	--	--	--
Dec.	ns	ns	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.129	0.21	0.062	0.34	0.107	0.83	0.492	0.49	0.519	0.26	0.015	0.38	0.000	0.00	0.000	0.00
Pelagic trawl (pollock target)																
Jan.	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Feb.	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Mar.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Apr.	0.000	0.00	--	--	0.025	0.15	0.000	0.00	0.000	0.00	--	--	--	--	--	--
May	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
June	--	--	ns	ns	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--
July	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Aug.	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Sep.	ns	ns	--	--	--	--	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Oct.	0.000	0.00	--	--	--	--	<0.001	0.80	ns	ns	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.000	0.00	ns	ns	0.007	0.15	<0.001	0.80	0.000	0.00	0.000	0.00	--	--	--	--

Table 45.--Continued.

	Area 610		Area 620		Area 621		Area 630		Area 631		Area 640		Area 650		Area 680	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Pelagic trawl (other targets)																
Jan.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb.	--	--	--	--	--	--	1.665	0.50	--	--	--	--	--	--	--	--
Mar.	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Apr.	ns	ns	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
May	--	--	--	--	--	--	ns	ns	--	--	0.000	0.00	--	--	--	--
June	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--
July	--	--	ns	ns	--	--	ns	ns	--	--	--	--	--	--	--	--
Aug.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sep.	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Oct.	0.000	0.00	ns	ns	--	--	0.000	0.00	ns	ns	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	ns	ns	--	--	--	--	--	--	--	--
Dec.	ns	ns	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.000	0.00	ns	ns	--	--	0.024	0.50	ns	ns	0.000	0.00	--	--	--	--
Longline vessels (Pacific cod target)																
Jan.	ns	ns	--	--	ns	ns	0.917	0.89	ns	ns	--	--	--	--	--	--
Feb.	0.000	0.00	--	--	0.256	1.23	0.259	1.40	0.206	1.70	--	--	--	--	--	--
Mar.	0.015	1.15	ns	ns	--	--	0.011	1.85	ns	ns	--	--	ns	ns	--	--
Apr.	0.000	0.00	ns	ns	0.667	0.69	0.000	0.00	--	--	ns	ns	ns	ns	--	--
May	ns	ns	ns	ns	0.000	0.00	0.201	0.63	--	--	ns	ns	ns	ns	--	--
June	0.000	0.00	--	--	--	--	--	--	--	--	ns	ns	ns	ns	--	--
July	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aug.	0.000	0.00	--	--	--	--	ns	ns	--	--	--	--	ns	ns	ns	ns
Sep.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Oct.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Nov.	0.629	0.70	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Dec.	4.277	0.39	--	--	--	--	ns	ns	--	--	--	--	--	--	--	--
Year	0.026	0.67	ns	ns	0.414	0.86	0.192	0.90	0.206	1.70	ns	ns	ns	ns	ns	ns

Table 45.--Continued.

	Area 610		Area 620		Area 621		Area 630		Area 631		Area 640		Area 650		Area 680	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Longline vessels (sablefish target)																
Jan.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mar.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Apr.	0.000	0.00	0.000	0.00	0.000	0.00	0.006	0.96	ns	ns	0.040	0.84	0.000	0.00	0.000	0.00
May	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	--	--	ns	ns	ns	ns	ns	ns
June	ns	ns	--	--	ns	ns	ns	ns	--	--	ns	ns	ns	ns	ns	ns
July	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Aug.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Sep.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Oct.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.000	0.00	0.000	0.00	0.000	0.00	0.002	0.96	ns	ns	0.040	0.84	0.000	0.00	0.000	0.00
Longline vessels (other targets)																
Jan.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Feb.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Mar.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Apr.	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	ns	ns	ns	ns
May	--	--	--	--	--	--	0.000	0.00	--	--	ns	ns	ns	ns	ns	ns
June	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
July	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Aug.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Sep.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Oct.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Year	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	--	--	ns	ns	ns	ns	ns	ns

Table 45.--Continued.

	Area 610		Area 620		Area 621		Area 630		Area 631		Area 640		Area 650		Area 680	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Pot vessels (all target fisheries)																
Jan.	ns	ns	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb.	ns	ns	ns	ns	--	--	ns	ns	ns	ns	--	--	--	--	--	--
Mar.	ns	ns	ns	ns	--	--	0.000	0.00	0.284	0.43	--	--	--	--	--	--
Apr.	ns	ns	ns	ns	--	--	ns	ns	0.042	0.30	--	--	--	--	--	--
May	--	--	ns	ns	--	--	0.000	0.00	--	--	--	--	--	--	--	--
June	--	--	ns	ns	--	--	3.376	0.64	ns	ns	--	--	--	--	--	--
July	12.085	0.37	ns	ns	--	--	9.147	1.13	ns	ns	--	--	--	--	--	--
Aug.	5.702	0.23	0.000	0.00	171.480	0.45	12.427	0.47	ns	ns	--	--	--	--	--	--
Sep.	0.000	0.00	ns	ns	8.728	0.51	8.201	0.55	0.000	0.00	--	--	--	--	--	--
Oct.	0.000	0.00	ns	ns	0.102	0.80	6.383	0.30	1.327	0.36	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	0.000	0.00	27.896	0.42	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	ns	ns	ns	ns	--	--	--	--	--	--
Year	6.129	0.29	0.000	0.00	17.184	0.48	4.948	0.52	1.790	0.42	--	--	--	--	--	--

Dashes indicate area not fished.

ns = Fishing occurred but no sampling by observer.

Table 46.--Monthly bycatch rates (number of crab per metric ton of catch and average weight (kg)) of "other" snow (Tanner) crabs* taken in U.S. domestic groundfish fisheries in the Gulf of Alaska region by gear type and target fishery, 1990.

	Area 610		Area 620		Area 621		Area 630		Area 631		Area 640		Area 650		Area 680	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Bottom trawl (flatfish target)																
Jan.	0.000	0.00	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Feb.	0.000	0.00	--	--	0.000	0.00	0.020	1.19	--	--	--	--	ns	ns	--	--
Mar.	0.000	0.00	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	--	--
Apr.	0.000	0.00	0.508	0.25	0.000	0.00	0.011	0.80	--	--	0.020	1.20	0.000	0.00	--	--
May	0.000	0.00	0.000	0.00	0.000	0.00	0.005	0.88	--	--	0.090	0.84	0.000	0.00	--	--
June	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
July	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	--	--	0.000	0.00	0.000	0.00	--	--
Aug.	0.113	0.66	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Sep.	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Oct.	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Nov.	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.006	0.66	0.279	0.25	0.000	0.00	0.005	0.99	0.000	0.00	0.042	0.96	0.000	0.00	--	--
Bottom trawl (pollock target)																
Jan.	--	--	--	--	--	--	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Feb.	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Mar.	0.000	0.00	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Apr.	0.000	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--
May	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--	--	--	--	--
June	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
July	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Aug.	0.000	0.00	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--
Sep.	0.000	0.00	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Oct.	0.001	0.50	--	--	0.000	0.00	0.000	0.00	--	--	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.001	0.50	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--

Table 46.--Continued.

	Area 610		Area 620		Area 621		Area 630		Area 631		Area 640		Area 650		Area 680	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Bottom trawl (other targets)																
Jan.	0.000	0.00	ns	ns	ns	ns	0.000	0.00	--	--	--	--	ns	ns	--	--
Feb.	0.000	0.00	ns	ns	0.000	0.00	0.000	0.00	0.000	0.00	--	--	ns	ns	--	--
Mar.	0.000	0.00	ns	ns	0.000	0.00	0.001	0.54	ns	ns	0.079	0.80	0.000	0.00	0.000	0.00
Apr.	0.003	0.34	0.138	0.33	0.031	0.30	0.000	0.00	ns	ns	0.030	0.60	0.002	0.02	ns	ns
May	0.000	0.00	0.000	0.00	0.000	0.00	0.004	0.68	ns	ns	0.146	0.52	0.000	0.00	ns	ns
June	0.000	0.00	--	--	--	--	ns	ns	--	--	--	--	--	--	--	--
July	0.213	0.18	0.033	0.35	0.000	0.00	0.004	0.56	--	--	0.000	0.00	0.000	0.00	--	--
Aug.	0.003	0.31	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.011	0.09	ns	ns	--	--
Sep.	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	ns	ns	--	--	--	--	--	--
Oct.	0.019	0.31	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Nov.	0.047	0.13	0.000	0.00	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Dec.	ns	ns	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.030	0.20	0.035	0.33	<0.001	0.30	0.002	0.58	0.000	0.00	0.068	0.52	0.001	0.02	0.000	0.00
Pelagic trawl (pollock target)																
Jan.	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Feb.	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Mar.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Apr.	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	--	--
May	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
June	--	--	ns	ns	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--
July	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Aug.	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Sep.	ns	ns	--	--	--	--	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Oct.	0.000	0.00	--	--	--	--	0.000	0.00	ns	ns	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.000	0.00	ns	ns	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--

Table 46.--Continued.

	Area 610		Area 620		Area 621		Area 630		Area 631		Area 640		Area 650		Area 680	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Pelagic trawl (other targets)																
Jan.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb.	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Mar.	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Apr.	ns	ns	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
May	--	--	--	--	--	--	ns	ns	--	--	0.000	0.00	--	--	--	--
June	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--
July	--	--	ns	ns	--	--	ns	ns	--	--	--	--	--	--	--	--
Aug.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sep.	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Oct.	0.000	0.000	ns	ns	--	--	0.000	0.00	ns	ns	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	ns	ns	--	--	--	--	--	--	--	--
Dec.	ns	ns	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.000	0.00	ns	ns	--	--	0.000	0.00	ns	ns	0.000	0.00	--	--	--	--
Longline vessels (Pacific cod target)																
Jan.	ns	ns	--	--	ns	ns	0.000	0.00	ns	ns	--	--	--	--	--	--
Feb.	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Mar.	0.000	0.00	ns	ns	--	--	0.000	0.00	ns	ns	--	--	ns	ns	--	--
Apr.	0.000	0.00	ns	ns	0.000	0.00	0.000	0.00	--	--	ns	ns	ns	ns	--	--
May	ns	ns	ns	ns	0.000	0.00	0.000	0.00	--	--	ns	ns	ns	ns	--	--
June	0.000	0.00	--	--	--	--	--	--	--	--	ns	ns	ns	ns	--	--
July	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aug.	0.000	0.00	--	--	--	--	ns	ns	--	--	--	--	ns	ns	ns	ns
Sep.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Oct.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Nov.	0.000	0.00	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Dec.	0.000	0.00	--	--	--	--	ns	ns	--	--	--	--	--	--	--	--
Year	0.000	0.00	ns	ns	0.000	0.00	0.000	0.00	0.000	0.00	ns	ns	ns	ns	ns	ns

Table 46.--Continued.

	Area 610		Area 620		Area 621		Area 630		Area 631		Area 640		Area 650		Area 680	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Longline vessels (sablefish target)																
Jan.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mar.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Apr.	0.020	0.94	0.042	0.75	--	--	0.045	0.58	ns	ns	0.055	0.89	0.029	1.20	0.000	0.00
May	0.036	0.36	0.000	0.00	0.000	0.00	0.044	0.75	--	--	ns	ns	ns	ns	ns	ns
June	ns	ns	--	--	ns	ns	ns	ns	--	--	ns	ns	ns	ns	ns	ns
July	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Aug.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Sep.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Oct.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.027	0.59	0.022	0.75	0.000	0.00	0.044	0.68	ns	ns	0.055	0.89	0.029	1.20	0.000	0.00
Longline vessels (other target fisheries)																
Jan.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Feb.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Mar.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Apr.	0.000	0.00	0.104	0.95	0.000	0.00	0.032	0.69	--	--	0.382	1.15	0.000	0.00	ns	ns
May	0.175	0.40	0.046	0.80	--	--	0.063	0.45	--	--	ns	ns	ns	ns	ns	ns
June	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
July	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Aug.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Sep.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Oct.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Nov.	0.000	0.00	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Year	0.008	0.40	0.067	0.88	0.000	0.00	0.040	0.59	--	--	0.382	1.15	0.000	0.00	ns	ns

Table 46.--Continued.

	Area 610		Area 620		Area 621		Area 630		Area 631		Area 640		Area 650		Area 680	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Pot vessels (all target fisheries)																
Jan.	ns	ns	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb.	ns	ns	ns	ns	--	--	ns	ns	ns	ns	--	--	--	--	--	--
Mar.	ns	ns	ns	ns	--	--	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Apr.	ns	ns	ns	ns	--	--	ns	ns	0.000	0.00	--	--	--	--	--	--
May	--	--	ns	ns	--	--	0.000	0.00	--	--	--	--	--	--	--	--
June	--	--	ns	ns	--	--	0.000	0.00	ns	ns	--	--	--	--	--	--
July	1.718	0.11	ns	ns	--	--	0.000	0.00	ns	ns	--	--	--	--	--	--
Aug.	0.000	0.00	0.000	0.00	0.000	0.00	0.065	1.10	ns	ns	--	--	--	--	--	--
Sep.	0.000	0.00	ns	ns	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Oct.	0.000	0.00	ns	ns	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	ns	ns	ns	ns	--	--	--	--	--	--
Year	0.356	0.11	0.000	0.00	0.000	0.00	0.008	1.10	0.000	0.00	--	--	--	--	--	--

*Species include Chionoecetes opilio, C. angulatus, and C. tanneri.

Dashes indicate areas not fished.

ns = Fishing occurred but no sampling by observer.

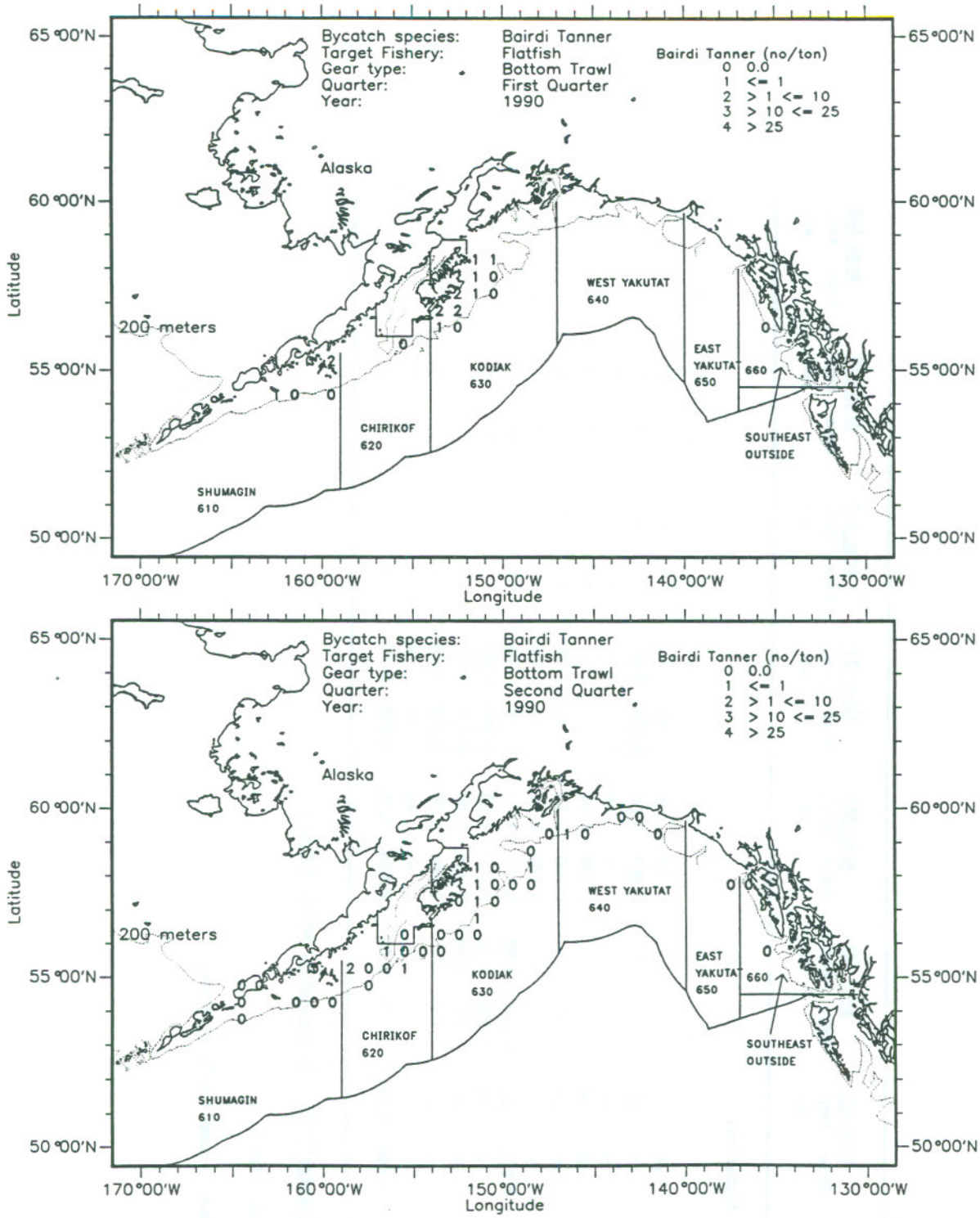


Figure 14.--Average incidence (no./t) of C. bairdi Tanner crab in the U.S. domestic fisheries by quarter, target fishery, gear type, and 1/2° latitude by 1/2° longitude areas in the Gulf of Alaska region, 1990.

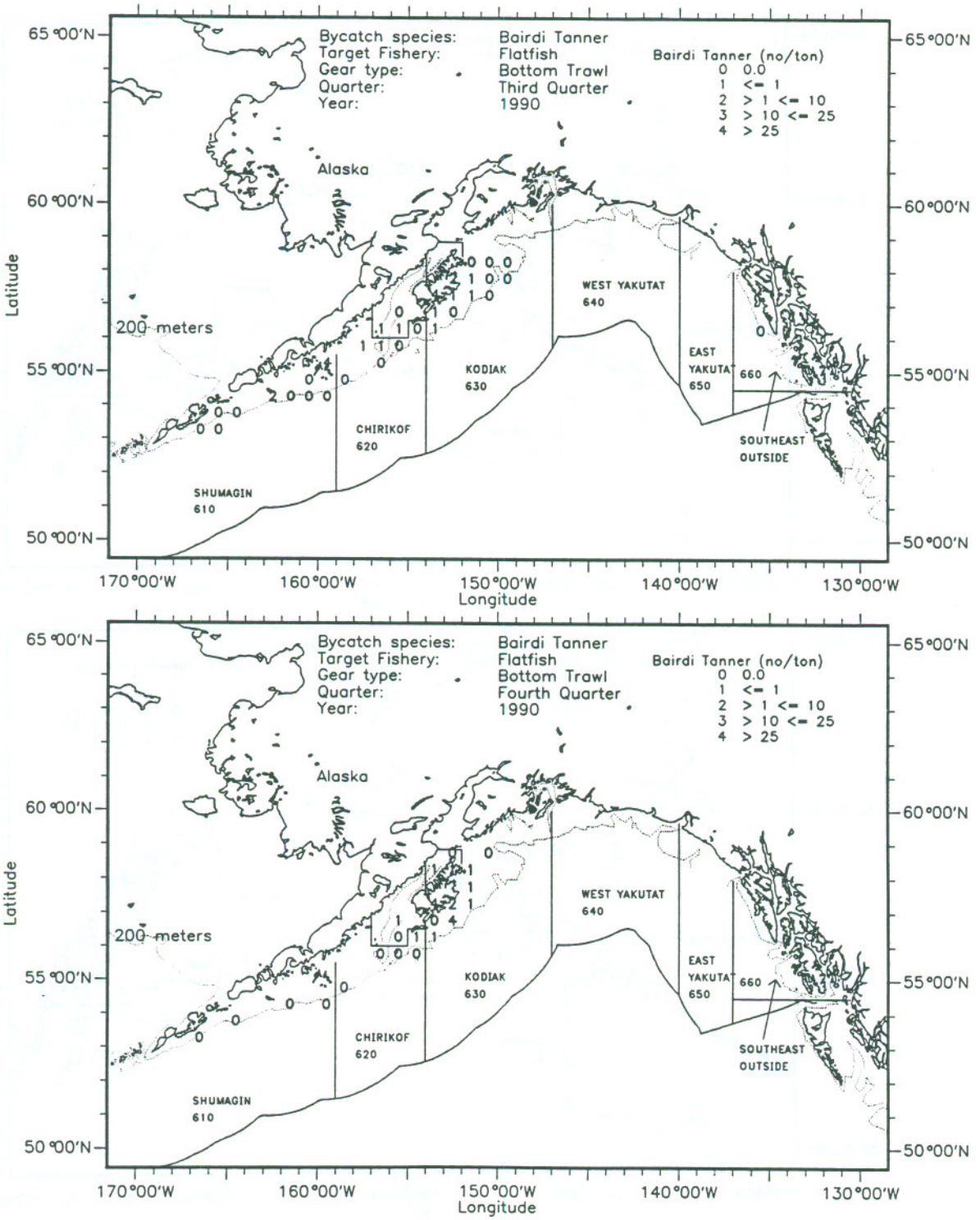


Figure 14.--Continued.

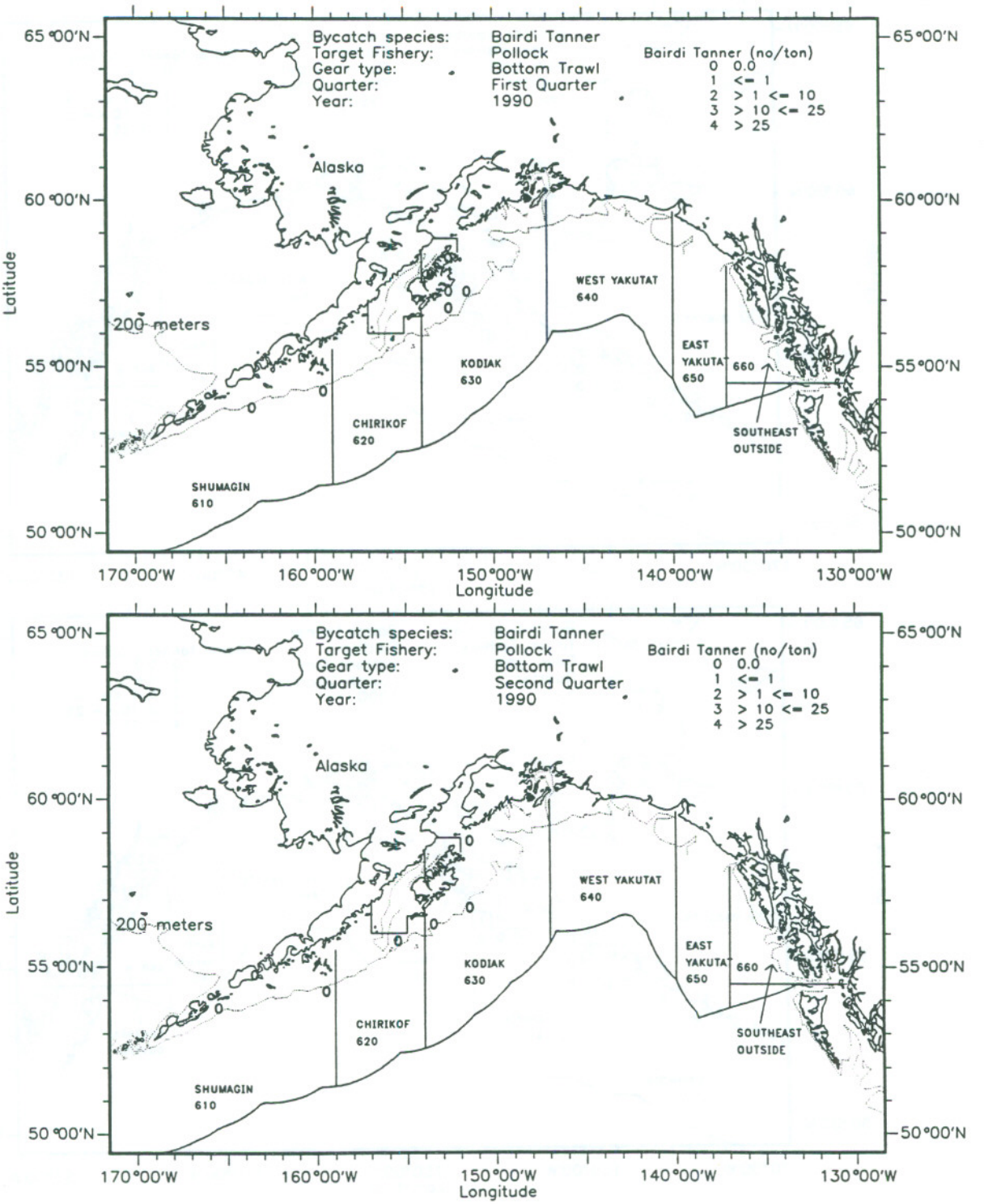


Figure 14.--Continued.

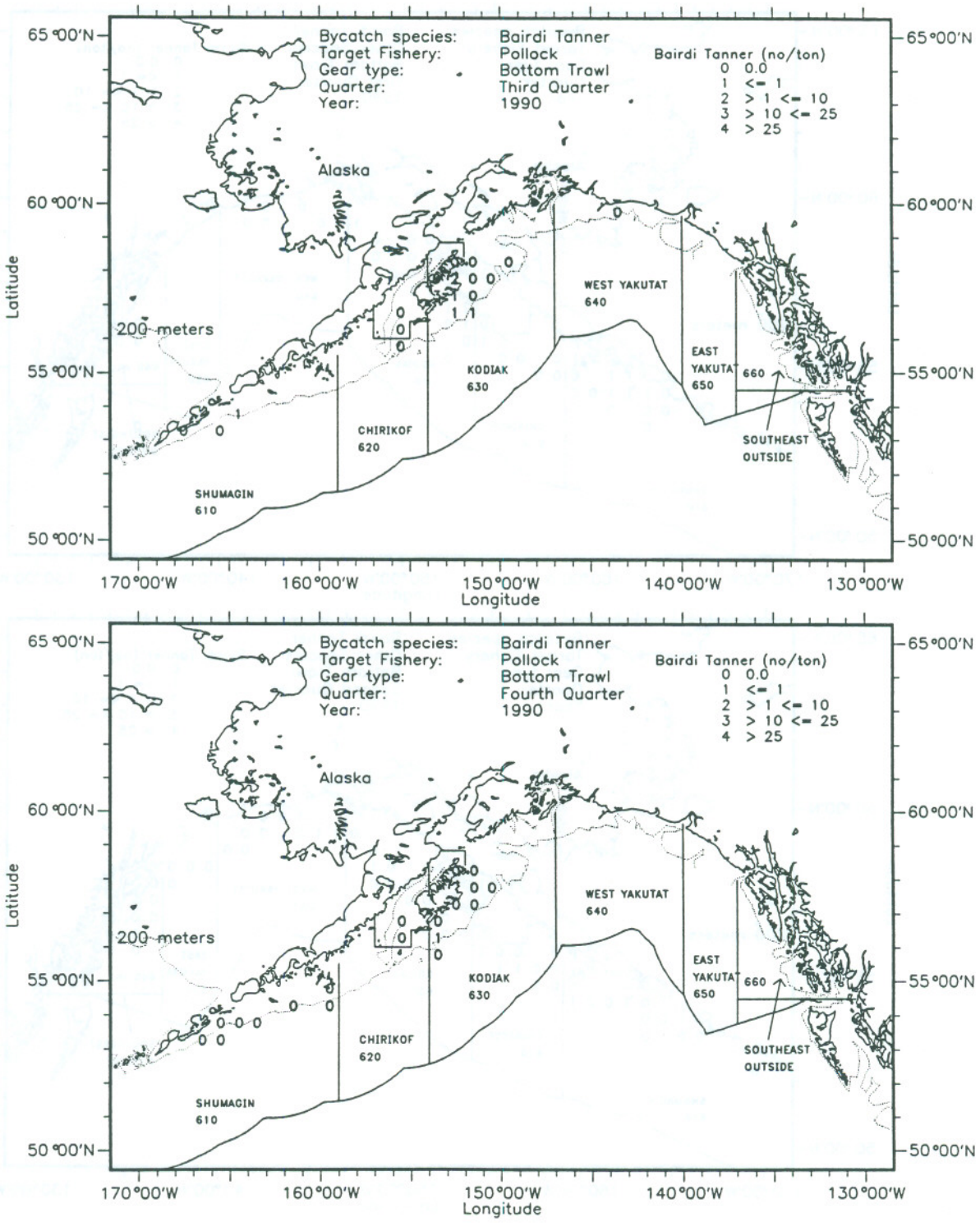


Figure 14.--Continued.

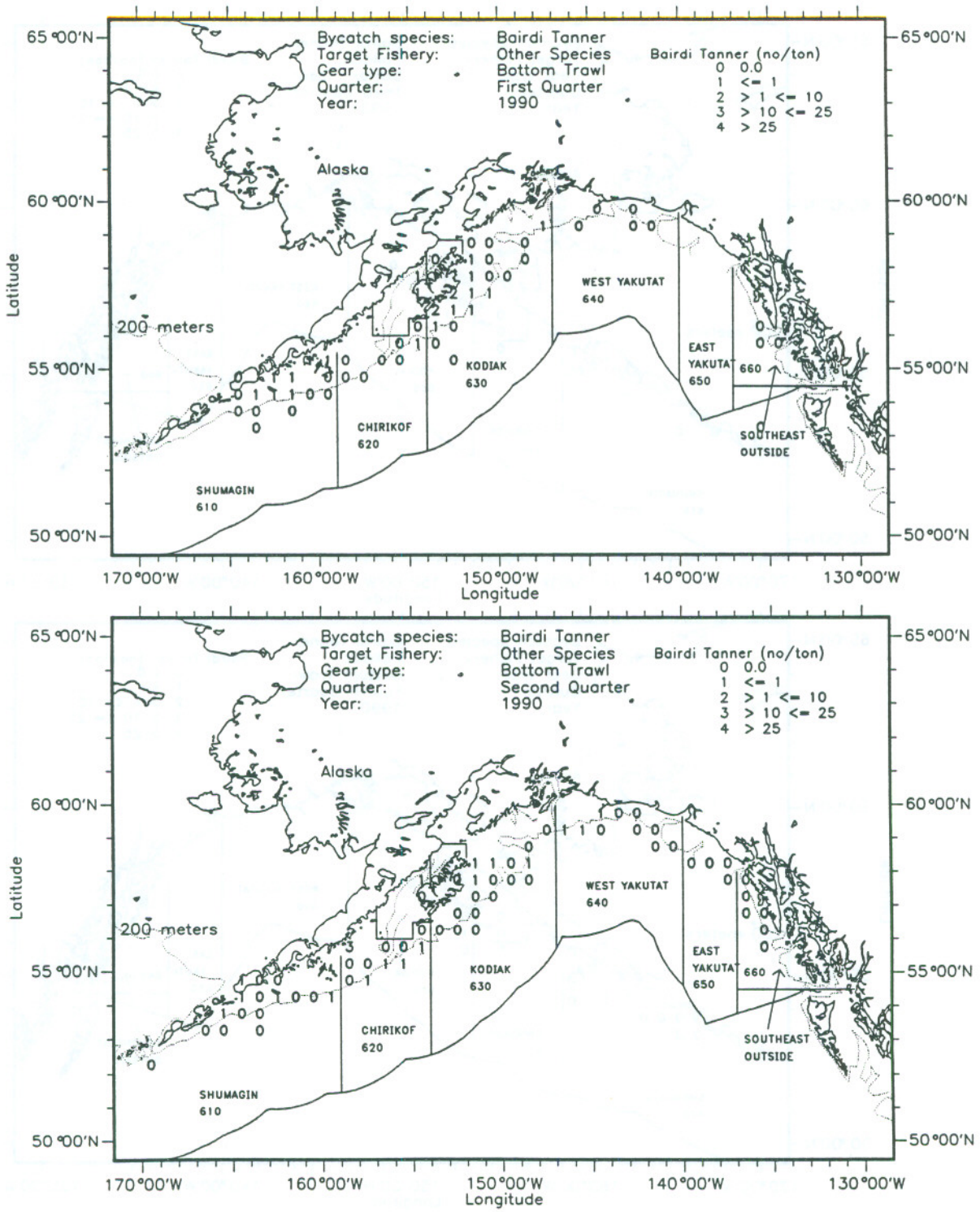


Figure 14.--Continued.

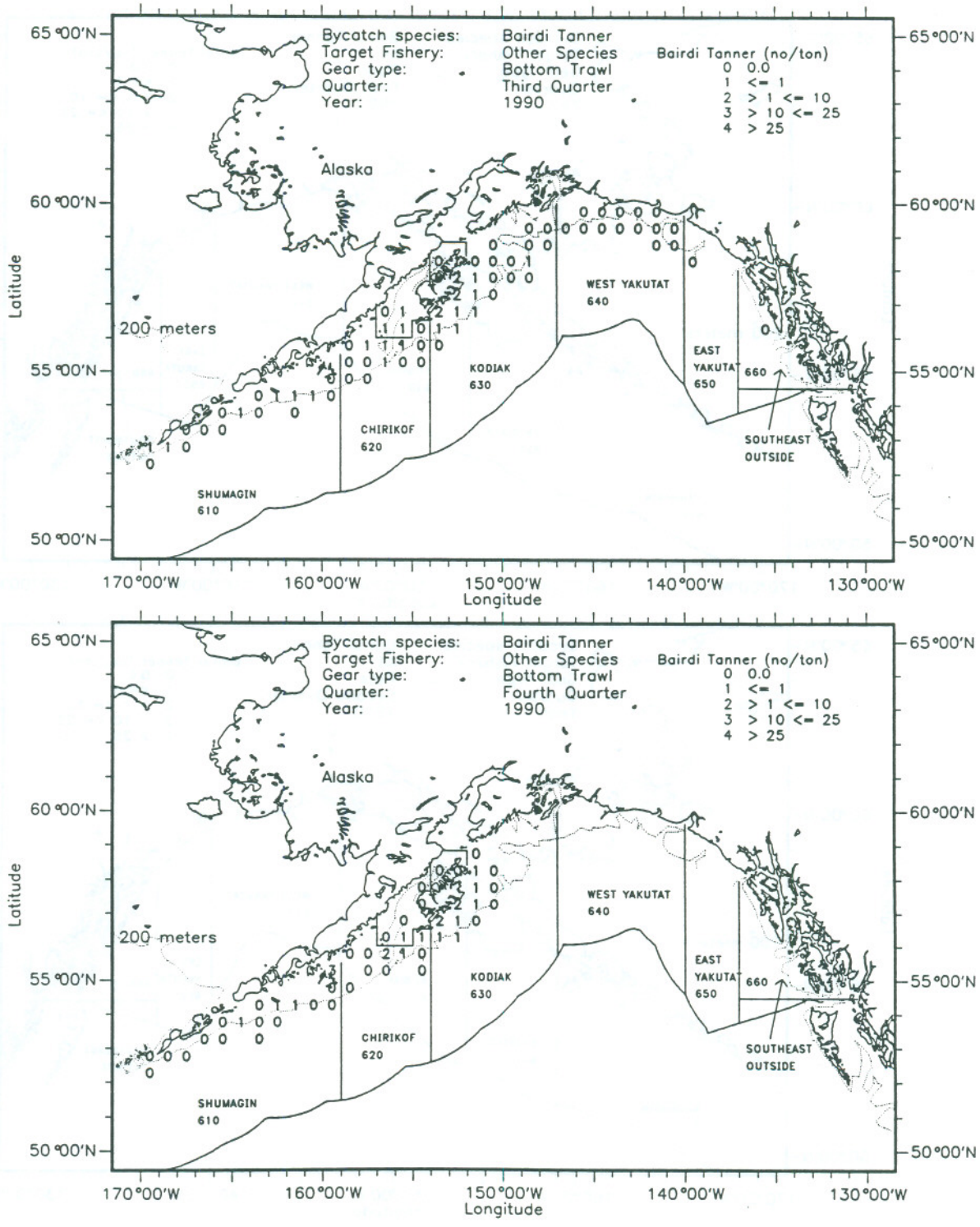


Figure 14.--Continued.

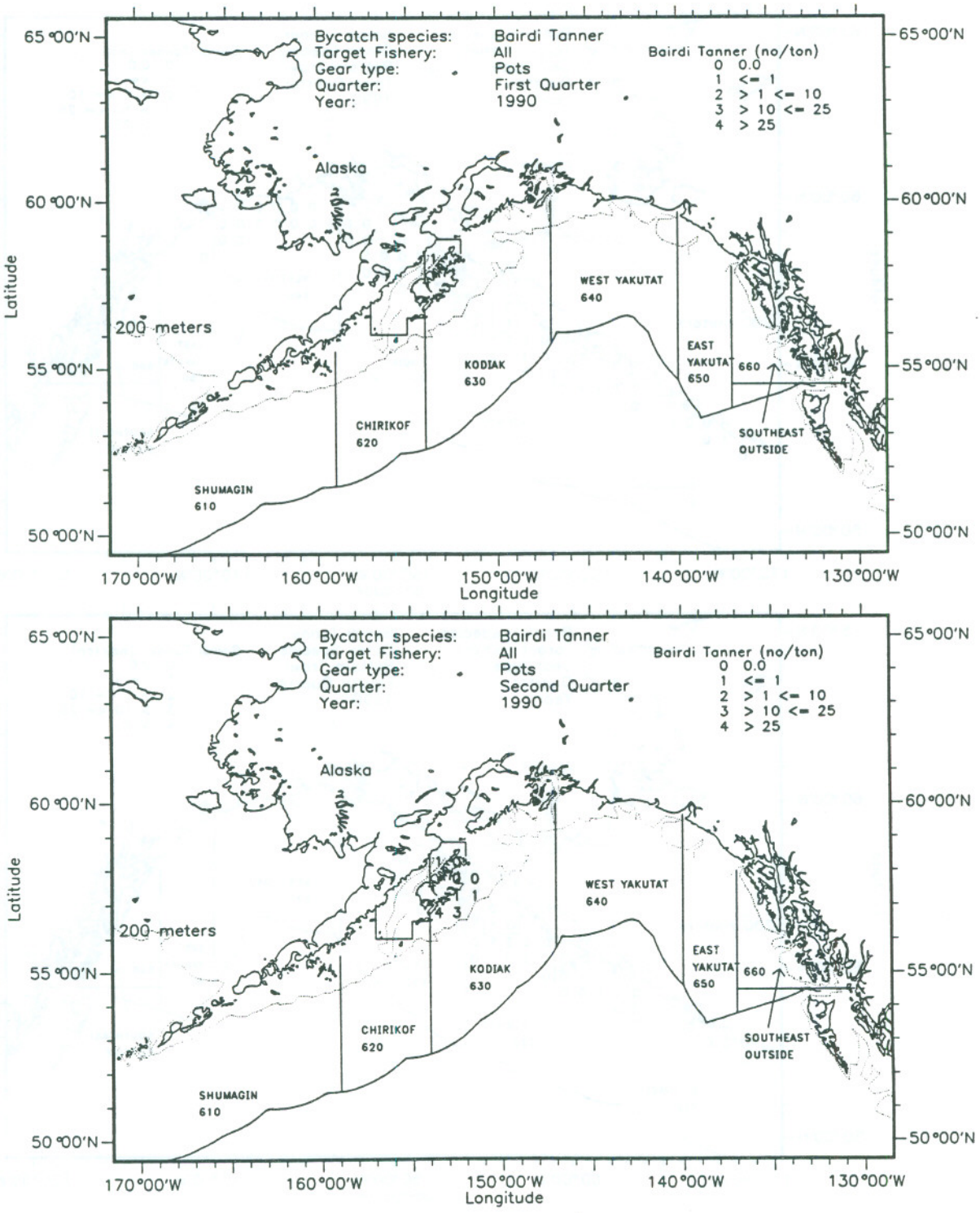


Figure 14.--Continued.

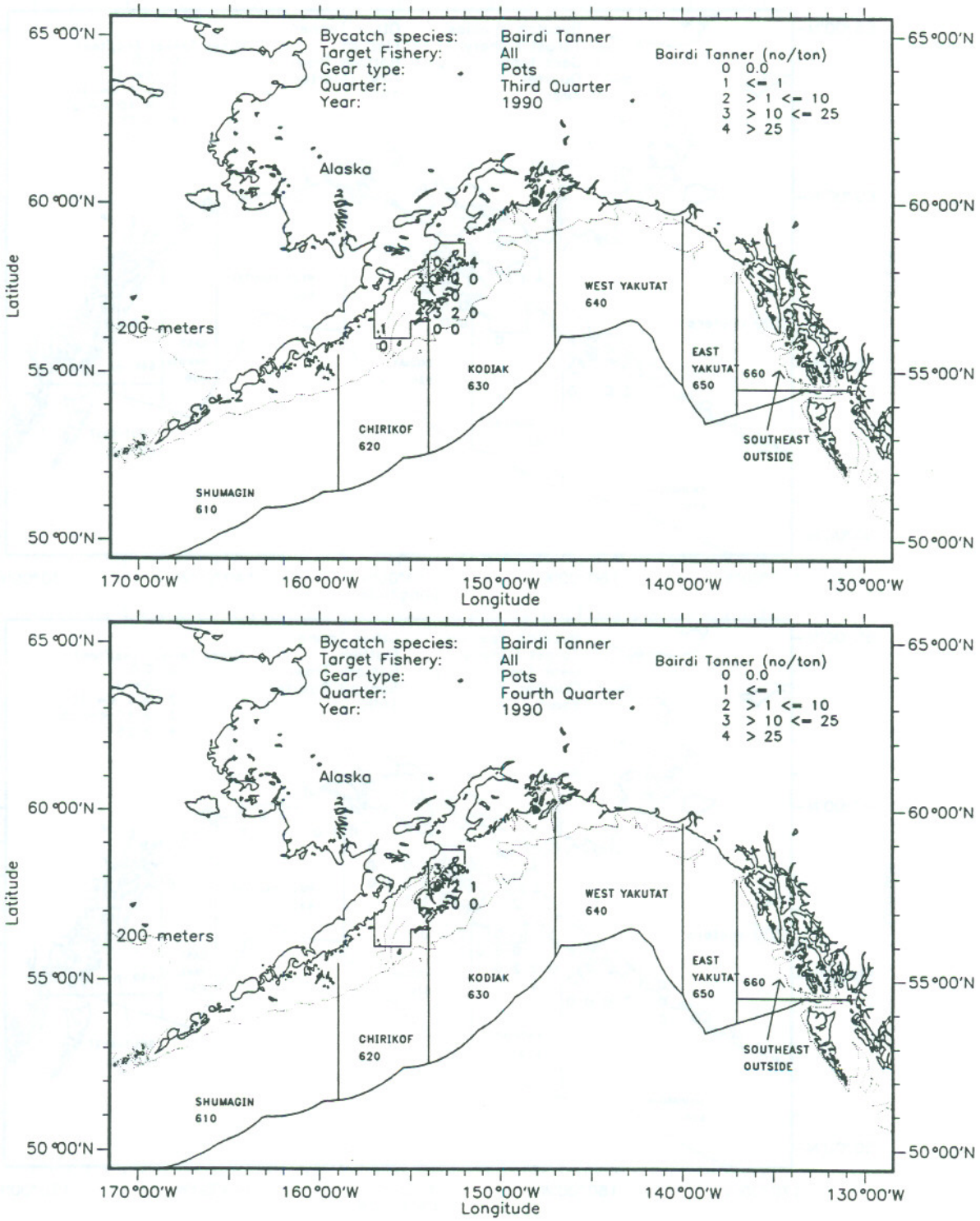


Figure 14.--Continued.

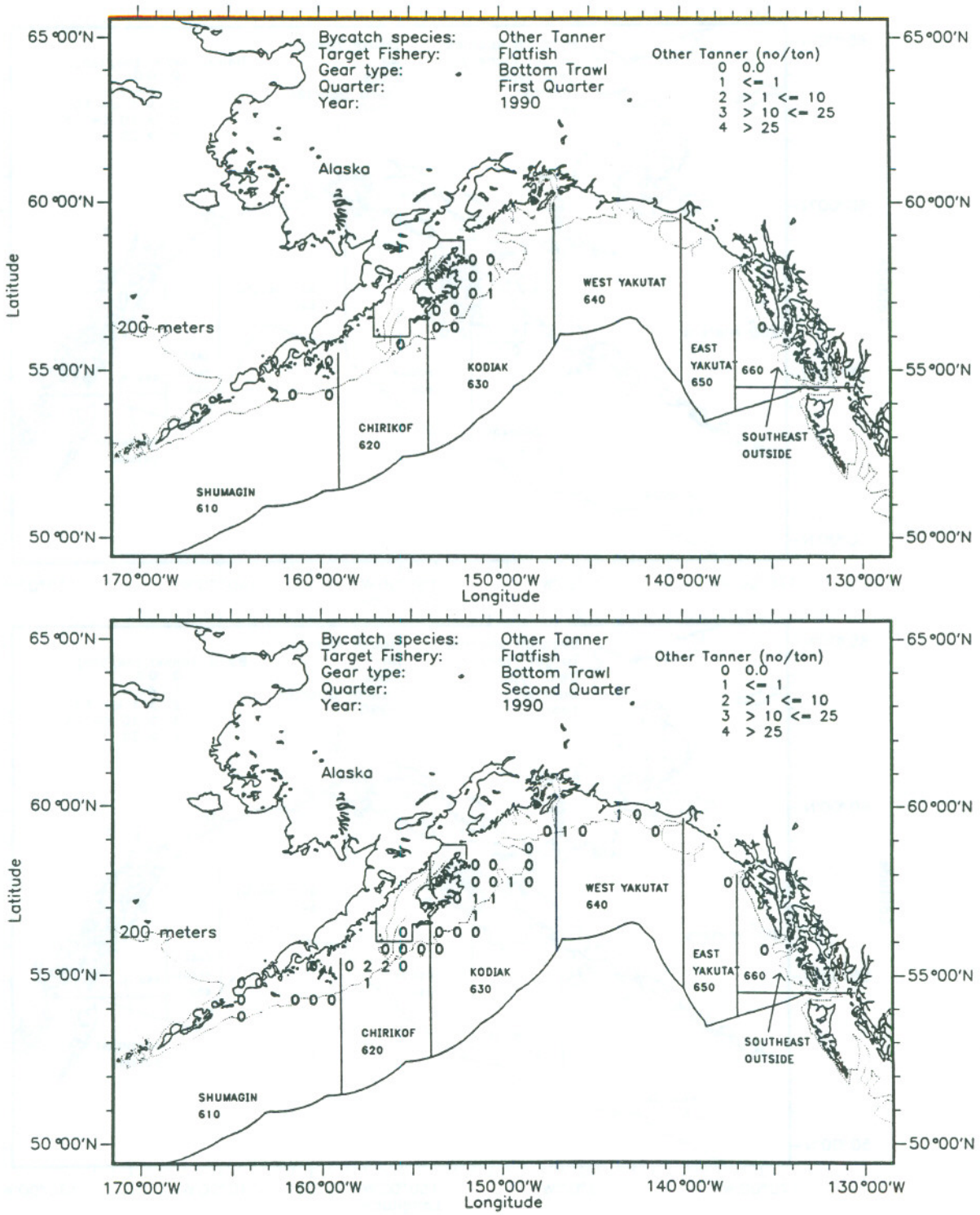


Figure 15.--Average incidence (no./t) of "other" Tanner crab in the U.S. domestic fisheries by quarter, target fishery, gear type, and 1/2° latitude by 1/2° longitude areas in the Gulf of Alaska region, 1990.

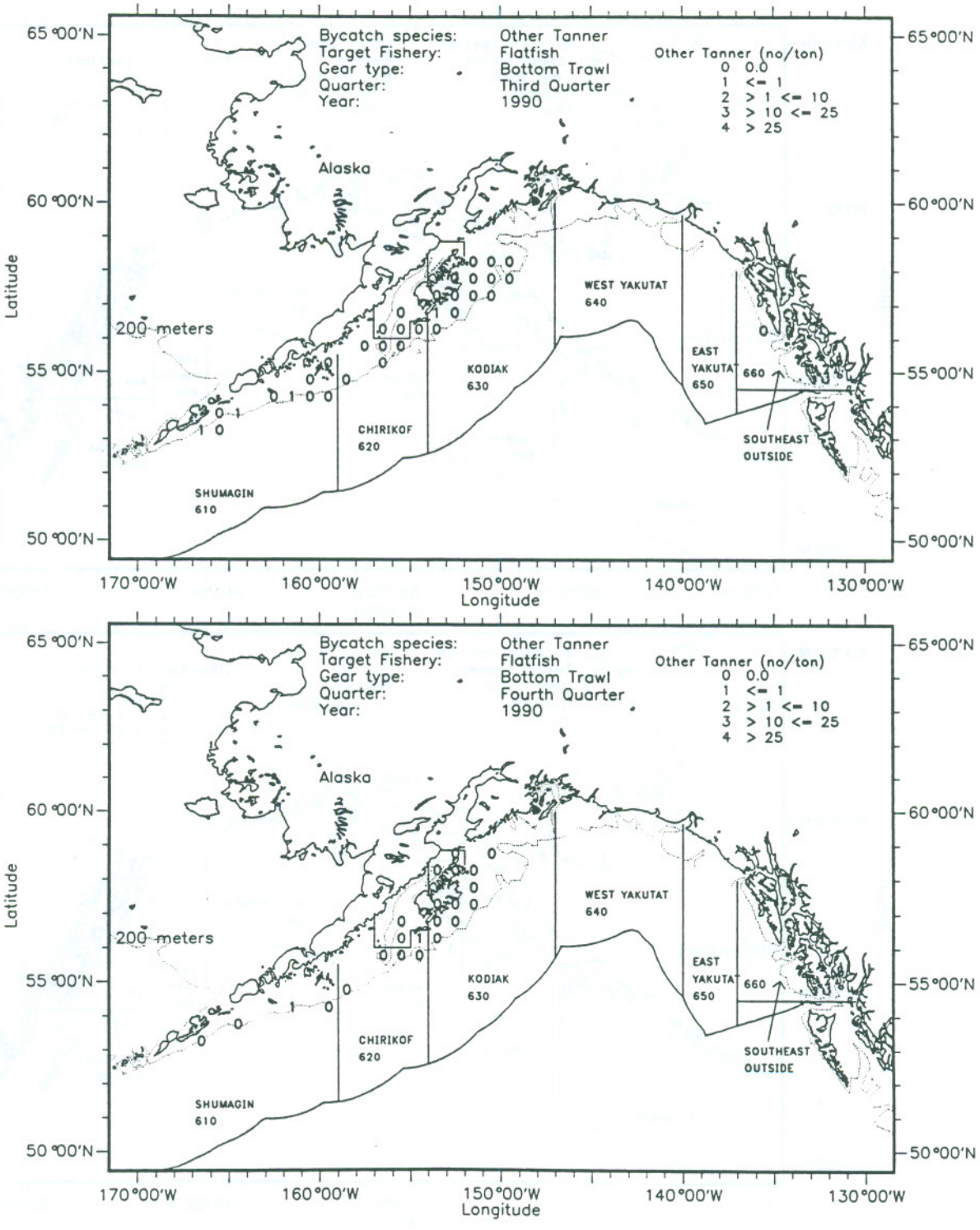


Figure 15.--Continued.

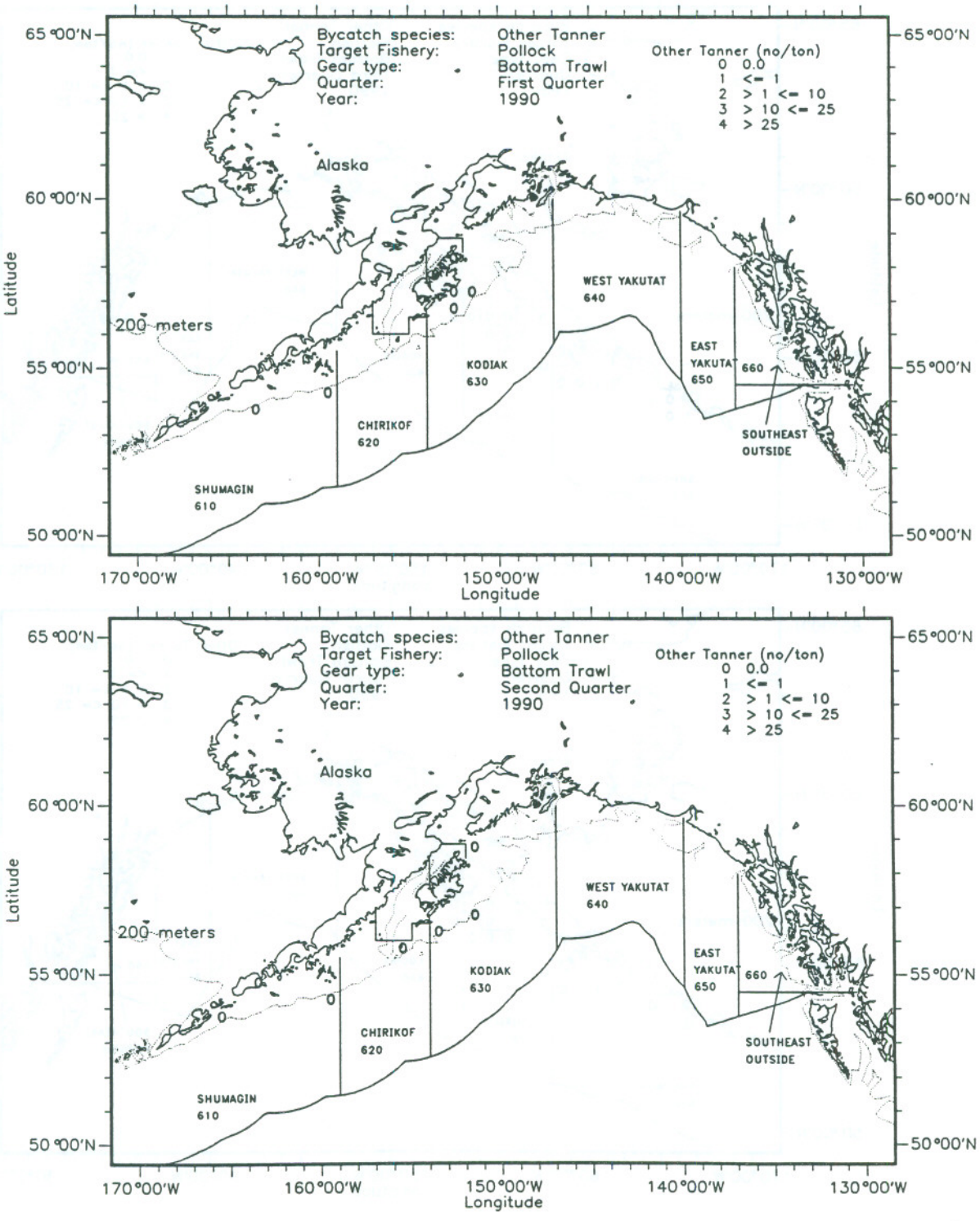


Figure 15.--Continued.

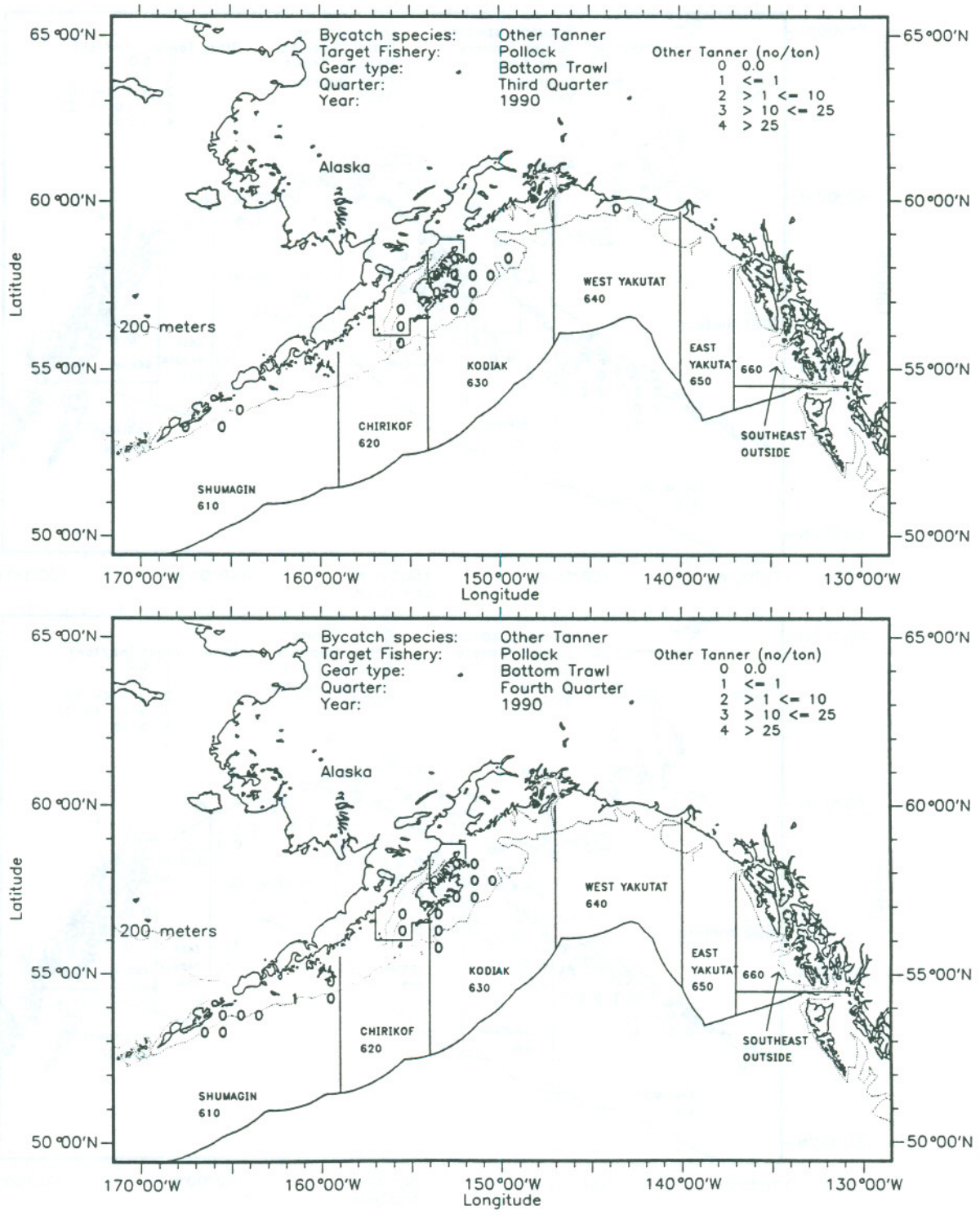


Figure 15.--Continued.

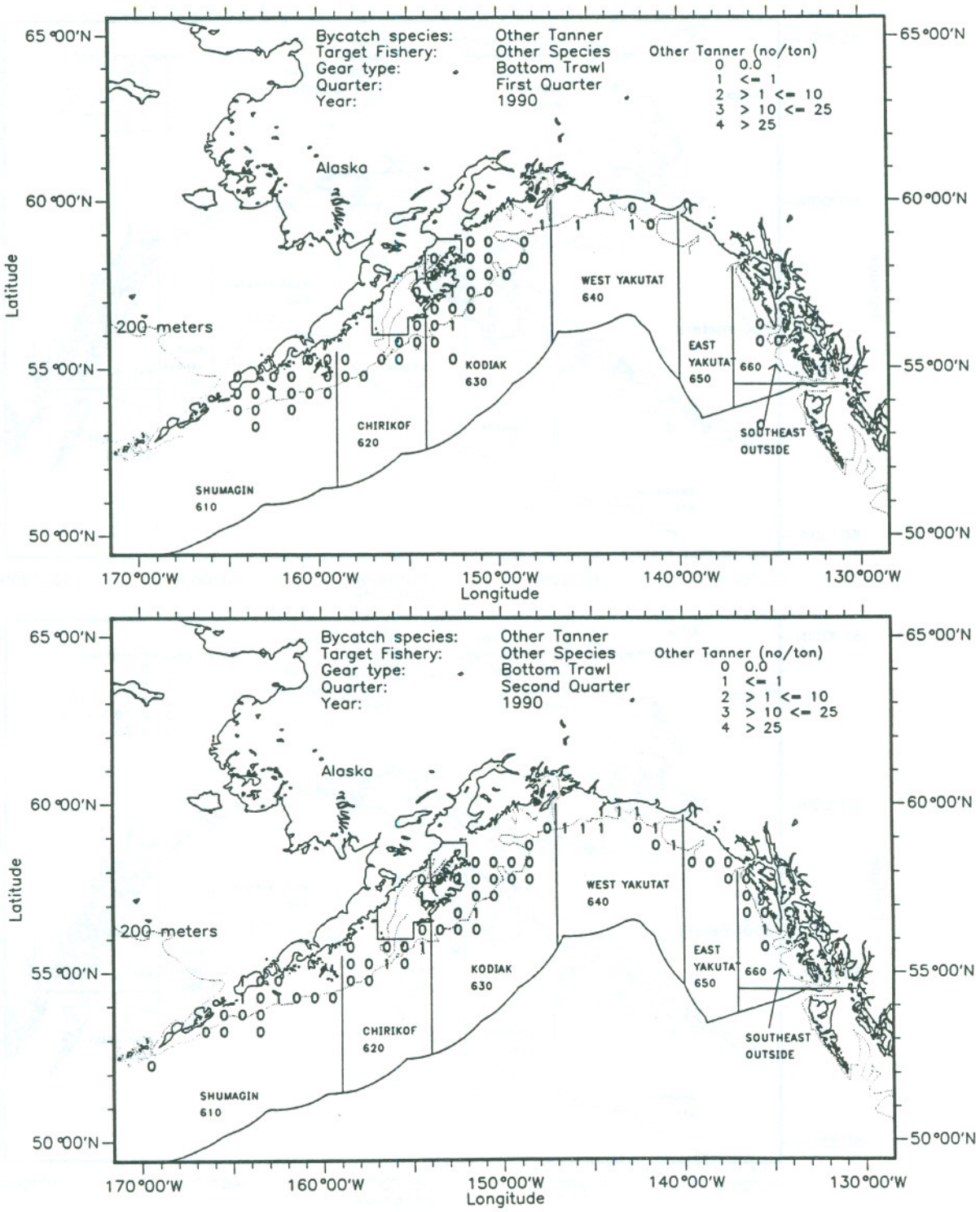


Figure 15.--Continued.

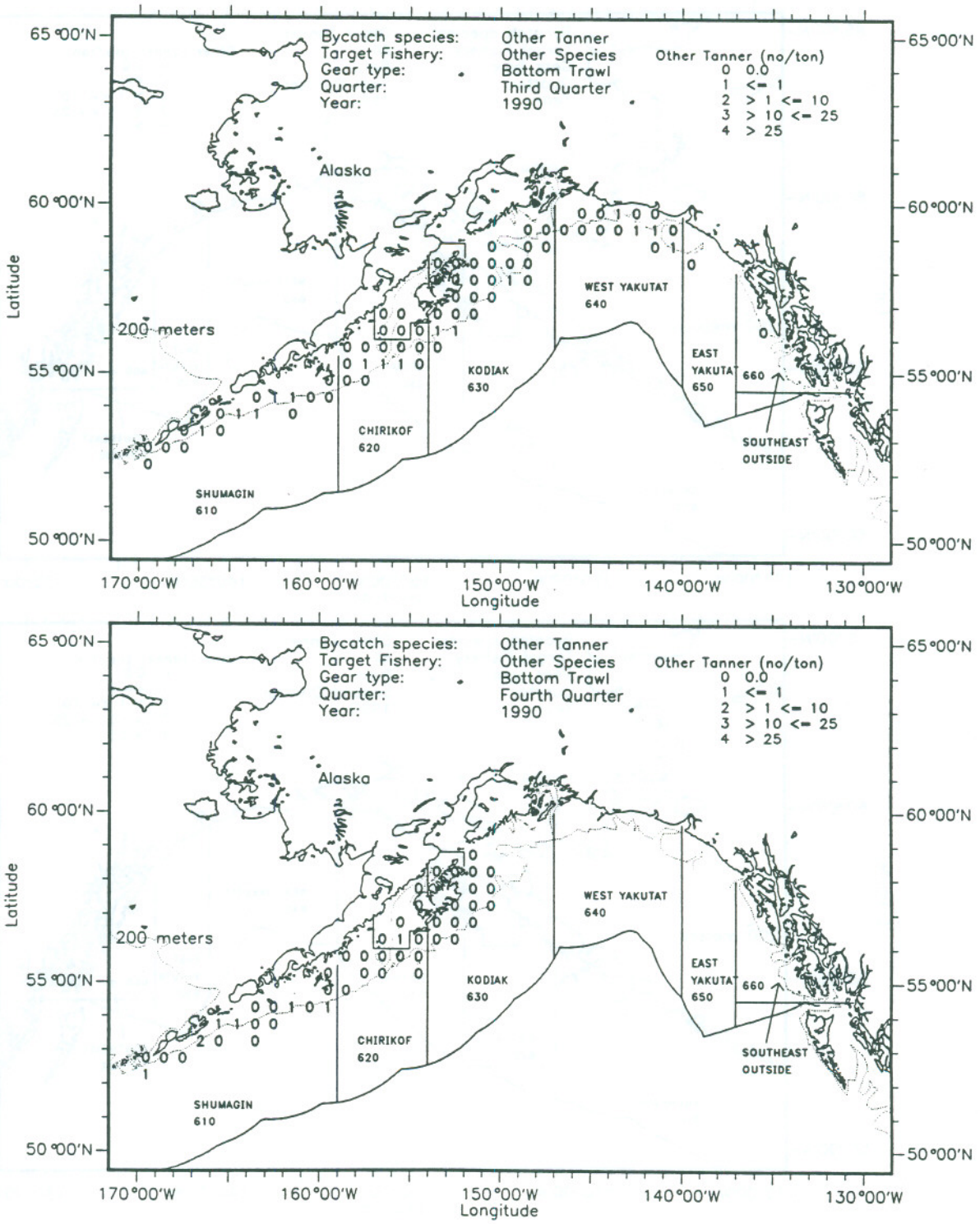


Figure 15.--Continued.

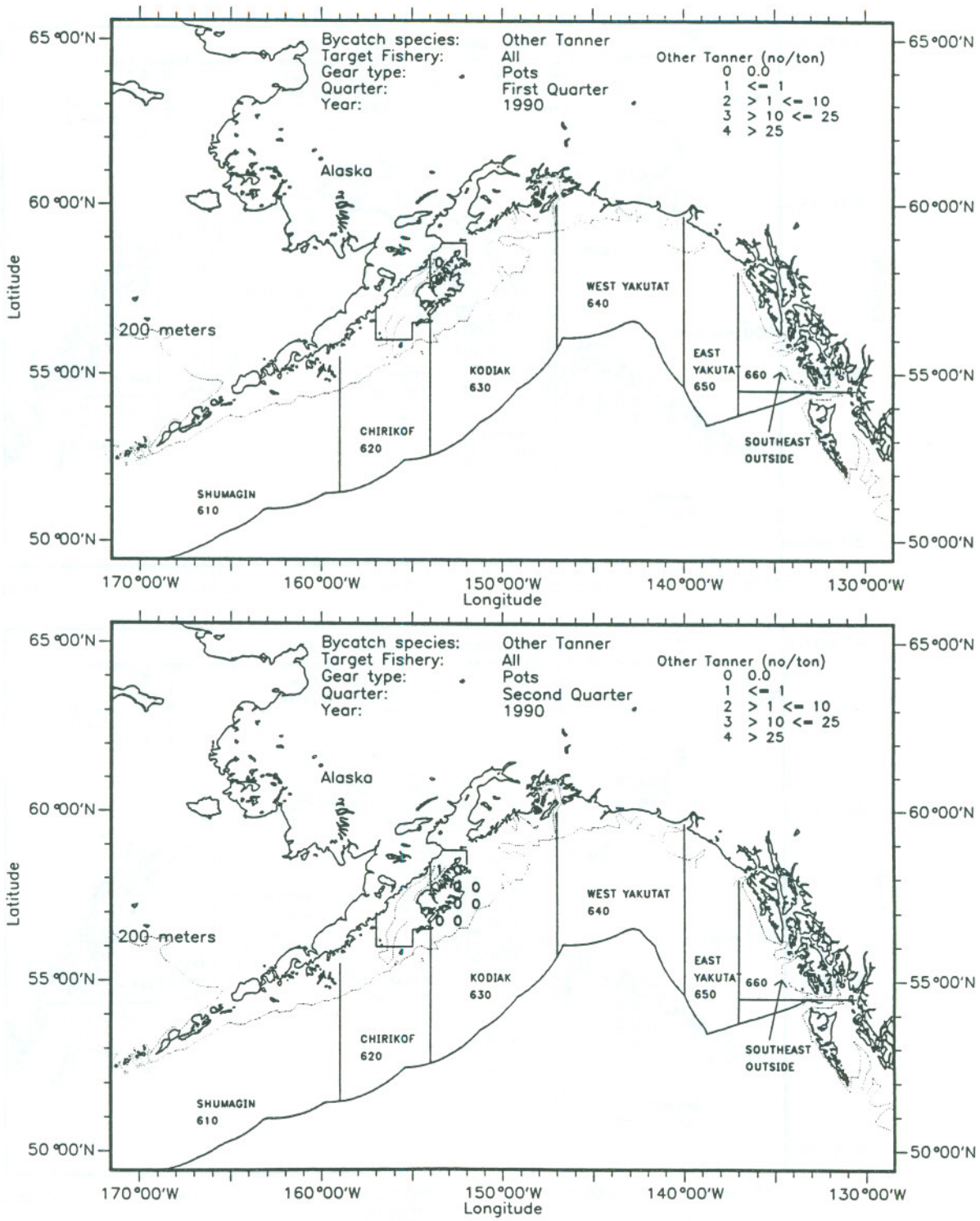


Figure 15.--Continued.

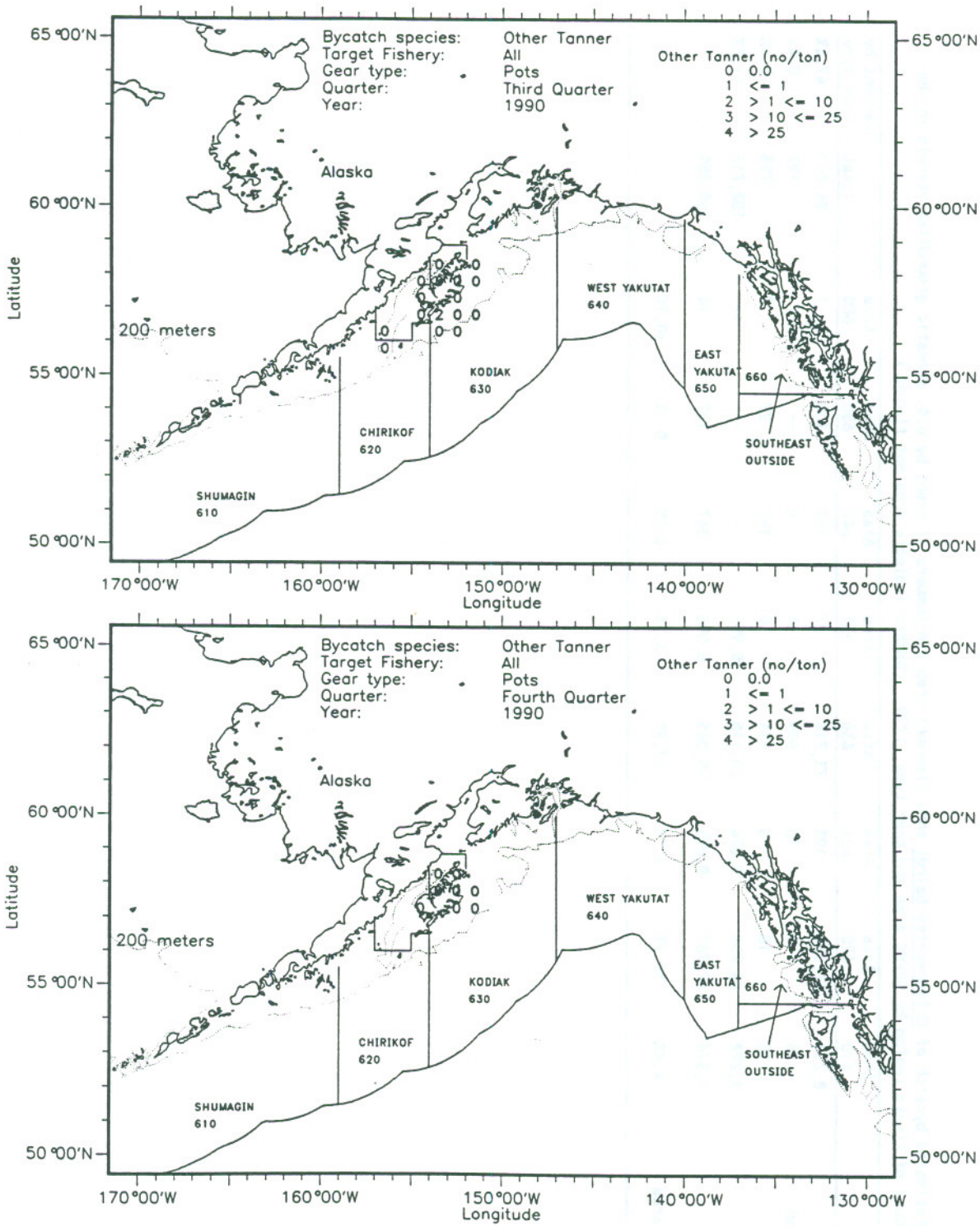


Figure 15.--Continued.

Table 47.--Estimated bycatch of Chionoecetes bairdi snow (Tanner) crab (in numbers of crab) by U.S. domestic groundfish vessels in the Gulf of Alaska region by NPFMC area and gear type, 1990. (Dashes indicate area not fished.)

Gear	Area 610	Area 620	Area 621	Area 630	Area 631	Area 640	Area 650	Area 680	Total	Percent by gear type
Bottom trawl	8,252	11,530	193	73,714	97	154	100	7	94,047	47.4%
Pelagic trawl	16	1	10	699	1	0	--	--	727	0.4%
Longline	16	18	8	534	0	193	22	7	798	0.4%
Pot	1,292	66,238	9,074	20,118	5,995	--	--	--	102,717	51.8%
Total	9,576	77,787	9,285	95,065	6,093	347	122	14	198,289	
Percent by area	4.8%	39.2%	4.7%	47.9%	3.1%	0.2%	0.1%	<0.1%		

Table 48.--Estimated bycatch of "other" snow (Tanner) crabs* (in numbers of crabs) by U.S. domestic groundfish vessels in the Gulf of Alaska region by NPFMC area and gear type, 1990. (Dashes indicate area not fished.)

Gear	Area 610	Area 620	Area 621	Area 630	Area 631	Area 640	Area 650	Area 680	Total	Percent by gear type
Bottom trawl	501	2,052	1	160	0	419	9	3	3,145	48.4%
Pelagic trawl	0	0	0	0	0	0	--	--	0	0.0%
Longline	97	287	0	649	0	328	282	38	1,681	25.9%
Pot	42	83	0	1,549	0	--	--	--	1,674	25.8%
Total	640	2,422	1	2,358	0	747	291	41	6,500	
Percent by area	9.8%	37.3%	0.0%	36.3%	0.0%	11.5%	4.5%	<0.1%		

*Species in this group include Chionoecetes opilio, C. angulatus, and C. tanneri snow (Tanner) crabs.

Table 49.--U.S. domestic groundfish catch (in metric tons (t)) and Chionoecetes bairdi catch (in numbers) by target fishery and area in the Gulf of Alaska region, 1990.

Fishery/gear	Area*	Groundfish catch	C. bairdi Catch (numbers)	C. bairdi Per t of groundfish	C. bairdi % within area	C. bairdi % of total bycatch
Flatfish (All gears)	Eastern	57.8	88	1.5	18.2%	<0.1%
	Central	22,979.2	45,988	2.0	24.4%	23.2%
	Western	2,047.6	157	0.1	1.6%	0.1%
	Total	25,084.6	46,233	1.8	--	23.3%
Pollock midwater (All gears)	Eastern	nf	nf	nf	nf	nf
	Central	45,267.1	10	<0.1	<0.1%	<0.1%
	Western	6,321.2	0	0.0	0.0%	0.0%
	Total	51,588.3	10	<0.1	--	<0.1%
Pollock bottom (All gears)	Eastern	nf	nf	nf	nf	nf
	Central	18,406.7	1,775	0.1	0.9%	0.9%
	Western	884.8	1	<0.1	<0.1%	<0.1%
	Total	19,291.5	1,776	0.1	--	0.9%
Other (Trawl)	Eastern	27.4	13	0.5	2.7%	<0.1%
	Central	44,106.0	38,426	0.9	20.4%	19.4%
	Western	32,277.9	7,724	0.2	80.7%	3.9%
	Total	76,411.3	46,163	0.6	--	23.3%
Other (Longline)	Eastern	249.5	15	0.1	3.1%	<0.1%
	Central	3,040.2	528	0.2	0.3%	0.3%
	Western	2,451.4	16	<0.1	0.2%	<0.1%
	Total	5,741.1	559	0.1	--	0.3%
Other (Pot)	Eastern	nf	nf	nf	nf	nf
	Central	5,478.8	101,425	18.5	53.9%	51.2%
	Western	159.7	1,292	8.1	13.5%	0.7%
	Total	5,638.5	102,717	18.2	--	51.8%
Sablefish (Trawl)	Eastern	879.5	18	<0.1	3.7%	<0.1%
	Central	1,215.5	3	<0.1	<0.1%	<0.1%
	Western	383.5	226	0.6	2.4%	0.1%
	Total	2,478.5	247	0.1	--	0.1%
Sablefish (Longline)	Eastern	11,468.0	207	<0.1	42.9%	0.1%
	Central	10,855.3	32	<0.1	<0.1%	<0.1%
	Western	1,868.8	0	0.0	0.0%	0.0%
	Total	24,192.1	239	<0.1	--	0.1%
Rockfish (All gears)	Eastern	9,805.1	142	<0.1	29.4%	0.1%
	Central	15,840.4	43	<0.1	<0.1%	<0.1%
	Western	8,325.1	160	<0.1	1.7%	0.1%
	Total	33,970.6	345	<0.1	--	0.2%
Total (All gears)	Eastern	22,487.3	483	<0.1		0.2%
	Central	167,189.2	188,230	1.1	--	94.9%
	Western	54,720.0	9,576	0.2	--	4.8%
	Total	244,396.5	198,289	0.8	--	--

*Eastern consists of Areas 640, 650, and 680; Central consists of Areas 620, 621, 630, and 631; and Western consists of Area 610.

nf = No fishing.

Table 50.--U.S. domestic groundfish catch (in metric tons (t)) and "other" snow (Tanner) crabs catch (in numbers) by target fishery and area in the Gulf of Alaska region, 1990.

Fishery/gear	Area*	Groundfish catch	"Other" snow (Tanner) crabs			
			Catch (numbers)	Per t of groundfish	% within area	% of total bycatch
Flatfish (All gears)	Eastern	57.8	2	<0.1	0.2%	<0.1%
	Central	22,979.2	2,096	0.1	43.8%	32.2%
	Western	2,047.6	11	<0.1	1.7%	0.2%
	Total	25,084.6	2,109	0.1	--	32.4%
Pollock midwater (All gears)	Eastern	nf	nf	nf	nf	nf
	Central	45,267.1	0	0.0	0.0%	0.0%
	Western	6,321.2	0	0.0	0.0%	0.0%
	Total	51,588.3	0	0.0	--	0.0%
Pollock bottom (All gears)	Eastern	nf	nf	nf	nf	nf
	Central	18,406.7	4	<0.1	0.1%	0.1%
	Western	884.8	0	0.0	0.0%	0.0%
	Total	19,291.5	4	<0.1	--	0.1%
Other (Trawl)	Eastern	27.4	1	<0.1	0.1%	<0.1%
	Central	44,106.0	71	<0.1	1.5%	1.1%
	Western	32,277.9	12	<0.1	1.9%	0.2%
	Total	76,411.3	84	<0.1	--	1.3%
Other (Longline)	Eastern	249.5	13	0.1	1.2%	0.2%
	Central	3,040.2	27	<0.1	0.6%	0.4%
	Western	2,451.4	0	0.0	0.0%	0.0%
	Total	5,741.1	40	<0.1	--	0.6%
Other (Pot)	Eastern	nf	nf	nf	nf	nf
	Central	5,478.8	1,632	0.3	34.1%	25.1%
	Western	159.7	42	0.3	6.6%	0.6%
	Total	5,638.5	1,674	0.3	--	25.8%
Sablefish (Trawl)	Eastern	879.5	24	<0.1	2.2%	0.4%
	Central	1,215.5	1	<0.1	<0.1%	<0.1%
	Western	383.5	23	0.1	3.6%	0.4%
	Total	2,478.5	48	<0.1	--	0.7%
Sablefish (Longline)	Eastern	11,468.0	635	0.1	58.9%	9.8%
	Central	10,855.3	908	0.1	<0.1%	14.0%
	Western	1,868.8	97	0.1	15.2%	1.5%
	Total	24,192.1	1,640	0.1	--	25.2%
Rockfish (All gears)	Eastern	9,805.1	404	<0.1	37.4%	6.2%
	Central	15,840.4	42	<0.1	<0.1%	0.6%
	Western	8,325.1	455	0.1	71.1%	7.0%
	Total	33,970.6	901	<0.1	--	13.9%
Total (All gears)	Eastern	22,487.3	1,079	<0.1	--	16.6%
	Central	167,189.2	4,781	<0.1	--	73.6%
	Western	54,720.0	640	<0.1	--	9.8%
	Total	244,396.5	6,500	<0.1	--	--

*Eastern consists of Areas 640, 650, and 680; Central consists of Areas 620, 621, 630, and 631; and Western consists of Area 610.

nf = No fishing.

Table 51.--Snow (Tanner) crabs examined for condition by observers in U.S. domestic groundfish catches in the Gulf of Alaska region by species and gear type, 1990.

Species	Gear type	Excellent		Poor		Dead	
		numbers	%	numbers	%	numbers	%
Chionoecetes bairdi	Trawl	3,162	41.0%	2,685	34.8%	1,874	24.3%
	Pot	4,917	96.0%	185	3.6%	20	0.4%
	Longline	18	39.1%	19	41.3%	9	19.6%
C. tanneri	Trawl	35	4.9%	127	17.9%	549	77.2%
	Pot	0	0.0%	0	0.0%	0	0.0%
	Longline	23	28.0%	45	54.9%	14	17.1%
C. angulatus	Trawl	17	36.2%	8	17.0%	22	46.8%
	Pot	0	0.0%	0	0.0%	0	0.0%
	Longline	1	50.0%	1	50.0%	0	0.0%

Table 52.--Biological data on the bycatch of snow (Tanner) crabs in U.S. domestic groundfish fisheries in the Gulf of Alaska region, 1990.

Species	Percent by species	Sex	Sex composition	Average weight (kg)	Average width (mm)
Chionoecetes bairdi	96.8%	Male	75.4	0.56	107.0
		Female	24.6	0.28	75.9
C. tanneri	3.1%	Male	66.8	0.48	117.4
		Female	33.2	0.28	97.2
C. angulatus	0.1%	Male	49.1	0.33	76.2
		Female	50.9	0.12	65.2

Table 53.--Monthly bycatch rates (number of crab per metric ton of catch and average weight (kg)) of red king crab taken in U.S. domestic groundfish fisheries in the Gulf of Alaska region by gear type, target fishery, and NPFMC area, 1990.

	Area 610		Area 620		Area 621		Area 630		Area 631		Area 640		Area 650		Area 680	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Bottom trawl (flatfish target)																
Jan.	19.962	2.57	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Feb.	0.000	0.00	--	--	--	--	0.000	0.00	--	--	--	--	ns	ns	--	--
Mar.	1.041	0.90	0.000	0.00	--	--	0.000	0.00	--	--	--	--	0.000	0.00	--	--
Apr.	0.000	0.00	0.027	1.95	--	--	0.000	0.00	--	--	0.000	0.00	0.000	0.00	--	--
May	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	--	--	0.000	0.00	0.000	0.00	--	--
June	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
July	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	0.000	0.00	--	--
Aug.	0.000	0.00	0.000	0.00	0.099	3.52	0.022	6.00	0.000	0.00	--	--	--	--	--	--
Sep.	0.906	0.70	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Oct.	0.000	0.00	0.015	6.00	0.752	3.24	0.010	2.36	0.000	0.00	--	--	--	--	--	--
Nov.	--	--	0.009	9.50	0.000	0.00	0.004	0.20	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.840	2.43	0.016	2.45	0.150	3.34	0.004	2.49	0.000	0.00	0.000	0.00	0.000	0.00	--	--
Bottom trawl (pollock target)																
Jan.	--	--	--	--	--	--	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Feb.	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Mar.	0.000	0.00	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Apr.	0.000	0.00	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
May	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--	--	--	--	--
June	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
July	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	--	--	--	--
Aug.	0.000	0.00	--	--	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--
Sep.	0.000	0.00	--	--	0.000	0.00	0.000	0.00	--	--	--	--	--	--	--	--
Oct.	0.000	0.00	--	--	0.000	0.00	0.000	0.00	--	--	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--

Table 53.--Continued.

	Area 610		Area 620		Area 621		Area 630		Area 631		Area 640		Area 650		Area 680	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Bottom trawl (other targets)																
Jan.	0.000	0.00	ns	ns	ns	ns	0.000	0.00	--	--	--	--	ns	ns	--	--
Feb.	0.000	0.00	ns	ns	0.000	0.00	0.000	0.00	0.000	0.00	--	--	ns	ns	--	--
Mar.	0.000	0.00	ns	ns	0.000	0.00	0.001	0.37	0.000	0.00	0.000	0.00	0.000	0.00	--	--
Apr.	0.003	2.21	0.026	1.36	0.000	0.00	0.000	0.00	ns	ns	0.000	0.00	0.000	0.00	ns	ns
May	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	ns	ns	0.000	0.00	0.000	0.00	ns	ns
June	0.000	0.00	--	--	--	--	ns	ns	--	--	--	--	--	--	--	--
July	0.006	0.34	0.001	1.40	0.111	5.45	0.000	0.00	--	--	0.000	0.00	0.000	0.00	--	--
Aug.	0.000	0.00	0.000	0.00	0.087	3.84	0.000	0.00	0.000	0.00	0.000	0.00	ns	ns	--	--
Sep.	0.014	0.95	0.000	0.00	0.008	4.30	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Oct.	0.000	0.00	0.005	1.30	0.110	3.50	0.001	0.40	0.000	0.00	--	--	--	--	--	--
Nov.	0.000	0.00	0.000	0.00	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Dec.	ns	ns	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.002	1.37	0.005	0.98	0.084	4.69	<0.001	0.38	0.000	0.00	0.000	0.00	0.000	0.00	ns	ns
Pelagic trawl (pollock target)																
Jan.	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Feb.	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Mar.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Apr.	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	--	--
May	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
June	--	--	ns	ns	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--
July	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Aug.	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Sep.	ns	ns	--	--	--	--	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Oct.	0.000	0.00	--	--	--	--	0.000	0.00	ns	ns	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.000	0.00	ns	ns	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--

Table 53.--Continued.

	Area 610		Area 620		Area 621		Area 630		Area 631		Area 640		Area 650		Area 680	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Pelagic trawl (other targets)																
Jan.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb.	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Mar.	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Apr.	ns	ns	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
May	--	--	--	--	--	--	ns	ns	--	--	0.000	0.00	--	--	--	--
June	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--
July	--	--	ns	ns	--	--	ns	ns	--	--	--	--	--	--	--	--
Aug.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sep.	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Oct.	0.000	0.00	ns	ns	--	--	0.000	0.00	ns	ns	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	ns	ns	--	--	--	--	--	--	--	--
Dec.	ns	ns	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.000	0.00	ns	ns	--	--	0.000	0.00	ns	ns	0.000	0.00	--	--	--	--
Longline vessels (Pacific cod target)																
Jan.	ns	ns	--	--	ns	ns	0.000	0.00	ns	ns	--	--	--	--	--	--
Feb.	0.000	0.00	--	--	0.000	0.00	0.129	2.52	0.000	0.00	--	--	--	--	--	--
Mar.	0.000	0.00	ns	ns	--	--	0.000	0.00	ns	ns	--	--	ns	ns	--	--
Apr.	0.000	0.00	ns	ns	0.000	0.00	0.000	0.00	--	--	ns	ns	ns	ns	--	--
May	ns	ns	ns	ns	0.000	0.00	0.000	0.00	--	--	ns	ns	ns	ns	--	--
June	0.000	0.00	--	--	--	--	--	--	--	--	ns	ns	ns	ns	--	--
July	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aug.	0.000	0.00	--	--	--	--	ns	ns	--	--	--	--	ns	ns	ns	ns
Sep.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Oct.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Nov.	0.000	0.00	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Dec.	0.000	0.00	--	--	--	--	ns	ns	--	--	--	--	--	--	--	--
Year	0.000	0.00	ns	ns	0.000	0.00	0.006	2.52	0.000	0.00	ns	ns	ns	ns	ns	ns

Table 53.--Continued.

	Area 610		Area 620		Area 621		Area 630		Area 631		Area 640		Area 650		Area 680	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Longline vessels (sablefish target)																
Jan.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mar.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Apr.	0.000	0.00	0.000	0.00	0.000	0.00	0.012	1.16	ns	ns	0.000	0.00	0.000	0.00	--	--
May	0.007	0.30	0.000	0.00	0.000	0.00	0.000	0.00	--	--	ns	ns	ns	ns	ns	ns
June	ns	ns	--	--	ns	ns	ns	ns	--	--	ns	ns	ns	ns	ns	ns
July	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Aug.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Sep.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Oct.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.003	0.30	0.000	0.00	0.000	0.00	0.005	1.16	ns	ns	0.000	0.00	0.000	0.00	--	--
Longline vessels (other targets)																
Jan.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Feb.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Mar.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Apr.	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	ns	ns	ns	ns
May	--	--	--	--	--	--	0.000	0.00	--	--	ns	ns	ns	ns	ns	ns
June	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
July	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Aug.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Sep.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Oct.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Year	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	--	--	ns	ns	ns	ns	ns	ns

Table 53.--Continued.

	Area 610		Area 620		Area 621		Area 630		Area 631		Area 640		Area 650		Area 680	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Pot vessels (all target fisheries)																
Jan.	ns	ns	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb.	ns	ns	ns	ns	--	--	ns	ns	ns	ns	--	--	--	--	--	--
Mar.	ns	ns	ns	ns	--	--	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Apr.	ns	ns	ns	ns	--	--	ns	ns	0.000	0.00	--	--	--	--	--	--
May	--	--	ns	ns	--	--	0.000	0.00	--	--	--	--	--	--	--	--
June	--	--	ns	ns	--	--	0.000	0.00	ns	ns	--	--	--	--	--	--
July	0.000	0.00	ns	ns	--	--	0.000	0.00	ns	ns	--	--	--	--	--	--
Aug.	0.000	0.00	0.000	0.00	2.414	3.02	2.489	2.67	ns	ns	--	--	--	--	--	--
Sep.	0.000	0.00	ns	ns	0.024	2.42	7.858	1.32	0.000	0.00	--	--	--	--	--	--
Oct.	0.000	0.00	ns	ns	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	ns	ns	ns	ns	--	--	--	--	--	--
Year	0.000	0.00	0.000	0.00	0.175	2.95	2.336	1.51	0.000	0.00	--	--	--	--	--	--

Dashes indicate area not fished.

ns = Fishing occurred but no sampling by observer.

Table 54.--Monthly bycatch rates (number of crab per metric ton of catch and average weight (kg)) of "other" king crabs* taken in U.S. domestic groundfish fisheries in the Gulf of Alaska region by gear type, target fishery, and NPFMC area, 1990.

	Area 610		Area 620		Area 621		Area 630		Area 631		Area 640		Area 650		Area 680	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Bottom trawl (flatfish target)																
Jan.	0.000	0.00	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Feb.	0.000	0.00	--	--	--	--	0.003	1.00	--	--	--	--	ns	ns	--	--
Mar.	0.000	0.00	0.000	0.00	--	--	0.000	0.00	--	--	--	--	0.000	0.00	--	--
Apr.	0.026	0.99	0.027	2.48	--	--	0.008	0.97	--	--	0.011	1.45	0.000	0.00	--	--
May	0.180	0.74	0.011	1.27	0.000	0.00	0.034	0.29	--	--	0.050	1.27	0.000	0.00	--	--
June	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
July	0.774	0.75	1.445	10.52	0.000	0.00	0.000	0.00	--	--	--	--	0.000	0.00	--	--
Aug.	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Sep.	0.604	2.10	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Oct.	0.103	0.95	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Nov.	0.000	0.00	0.018	0.75	0.000	0.00	0.000	0.00	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.049	1.01	0.040	6.67	0.000	0.00	0.006	0.97	0.000	0.00	0.027	1.31	0.000	0.00	--	--
Bottom trawl (pollock target)																
Jan.	--	--	--	--	--	--	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Feb.	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Mar.	0.164	1.08	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Apr.	0.022	1.70	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
May	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--	--	--	--	--
June	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
July	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	--	--	--	--
Aug.	0.000	0.00	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--
Sep.	0.000	0.00	--	--	0.000	0.00	0.000	0.00	--	--	--	--	--	--	--	--
Oct.	0.000	0.00	--	--	0.000	0.00	0.000	0.00	--	--	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.007	1.17	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--

Table 54.--Continued.

	Area 610		Area 620		Area 621		Area 630		Area 631		Area 640		Area 650		Area 680	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Bottom trawl (other targets)																
Jan.	0.000	0.00	ns	ns	ns	ns	0.000	0.00	--	--	--	--	ns	ns	--	--
Feb.	0.000	0.00	ns	ns	0.000	0.00	0.000	0.00	0.000	0.00	--	--	ns	ns	--	--
Mar.	0.005	1.37	0.138	1.25	0.000	0.00	0.009	1.78	0.000	0.00	0.077	1.47	0.015	0.27	0.000	0.00
Apr.	0.012	0.98	0.040	1.31	0.000	0.00	0.001	2.20	ns	ns	0.018	1.36	0.000	0.00	ns	ns
May	0.107	1.04	0.024	0.86	0.000	0.00	0.017	1.53	ns	ns	0.024	11.32	0.000	0.00	ns	ns
June	0.048	1.40	--	--	--	--	ns	ns	--	--	--	--	--	--	--	--
July	0.030	1.54	0.273	0.83	0.001	5.50	0.008	1.38	--	--	0.000	0.00	0.000	0.00	--	--
Aug.	0.260	0.88	0.030	1.38	0.007	5.29	0.000	0.00	0.000	0.00	0.001	0.30	ns	ns	--	--
Sep.	1.769	0.88	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Oct.	0.106	0.26	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Nov.	0.195	0.61	0.000	0.00	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Dec.	ns	ns	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.093	0.72	0.094	0.90	0.002	5.31	0.006	1.38	0.000	0.00	0.017	6.51	0.003	0.27	0.000	0.00
Pelagic trawl (pollock target)																
Jan.	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Feb.	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Mar.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Apr.	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	--	--
May	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
June	--	--	ns	ns	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--
July	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Aug.	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Sep.	ns	ns	--	--	--	--	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Oct.	0.000	0.00	--	--	--	--	0.000	0.00	ns	ns	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.000	0.00	ns	ns	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--

Table 54.--Continued.

	Area 610		Area 620		Area 621		Area 630		Area 631		Area 640		Area 650		Area 680	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Pelagic trawl (other targets)																
Jan.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb.	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Mar.	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Apr.	ns	ns	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
May	--	--	--	--	--	--	ns	ns	--	--	0.000	0.00	--	--	--	--
June	--	--	--	--	--	--	0.000	0.00	--	--	0.000	0.00	--	--	--	--
July	--	--	ns	ns	--	--	ns	ns	--	--	--	--	--	--	--	--
Aug.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sep.	--	--	--	--	--	--	0.000	0.00	--	--	--	--	--	--	--	--
Oct.	0.000	0.00	ns	ns	--	--	0.000	0.00	ns	ns	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	ns	ns	--	--	--	--	--	--	--	--
Dec.	ns	ns	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.000	0.00	ns	ns	--	--	0.000	0.00	ns	ns	0.000	0.00	--	--	--	--
Longline vessels (Pacific cod target)																
Jan.	ns	ns	--	--	ns	ns	0.000	0.00	ns	ns	--	--	--	--	--	--
Feb.	0.000	0.00	--	--	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Mar.	0.000	0.00	ns	ns	--	--	0.000	0.00	ns	ns	--	--	ns	ns	--	--
Apr.	0.000	0.00	ns	ns	0.000	0.00	0.000	0.00	--	--	ns	ns	ns	ns	--	--
May	ns	ns	ns	ns	0.000	0.00	0.000	0.00	--	--	ns	ns	ns	ns	--	--
June	0.000	0.00	--	--	--	--	--	--	--	--	ns	ns	ns	ns	--	--
July	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aug.	0.000	0.00	--	--	--	--	ns	ns	--	--	--	--	ns	ns	ns	ns
Sep.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Oct.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Nov.	0.000	0.00	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Dec.	0.000	0.00	--	--	--	--	ns	ns	--	--	--	--	--	--	--	--
Year	0.000	0.00	ns	ns	0.000	0.00	0.000	0.00	0.000	0.00	ns	ns	ns	ns	ns	ns

Table 54.--Continued.

	Area 610		Area 620		Area 621		Area 630		Area 631		Area 640		Area 650		Area 680	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Longline vessels (sablefish target)																
Jan.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mar.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Apr.	0.031	3.32	0.068	0.73	--	--	0.073	0.49	ns	ns	0.000	0.00	0.000	0.00	--	--
May	0.007	0.06	0.000	0.00	0.000	0.00	0.019	0.63	--	--	ns	ns	ns	ns	ns	ns
June	ns	ns	--	--	--	--	ns	ns	--	--	ns	ns	ns	ns	ns	ns
July	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Aug.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Sep.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Oct.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Year	0.020	4.58	0.032	0.73	0.000	0.00	0.042	0.53	ns	ns	0.000	0.00	0.000	0.00	ns	ns
Longline vessels (other target fisheries)																
Jan.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Feb.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Mar.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Apr.	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	--	--	0.000	0.00	0.000	0.00	ns	ns
May	0.000	0.00	0.000	0.00	--	--	0.237	2.15	--	--	ns	ns	ns	ns	ns	ns
June	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
July	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Aug.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Sep.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Oct.	--	--	--	--	--	--	ns	ns	--	--	--	--	ns	ns	--	--
Nov.	0.000	0.00	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Dec.	--	--	--	--	--	--	--	--	--	--	--	--	ns	ns	--	--
Year	0.000	0.00	0.000	0.00	0.000	0.00	0.072	2.15	--	--	0.000	0.00	0.000	0.00	ns	ns

Table 54.--Continued.

	Area 610		Area 620		Area 621		Area 630		Area 631		Area 640		Area 650		Area 680	
	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.	Rate	Avg. wt.
Pot vessels (all target fisheries)																
Jan.	ns	ns	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb.	ns	ns	ns	ns	--	--	ns	ns	ns	ns	--	--	--	--	--	--
Mar.	ns	ns	ns	ns	--	--	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Apr.	ns	ns	ns	ns	--	--	ns	ns	0.000	0.00	--	--	--	--	--	--
May	--	--	ns	ns	--	--	0.000	0.00	--	--	--	--	--	--	--	--
June	--	--	ns	ns	--	--	0.000	0.00	ns	ns	--	--	--	--	--	--
July	0.000	0.00	ns	ns	--	--	0.000	0.00	ns	ns	--	--	--	--	--	--
Aug.	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	ns	ns	--	--	--	--	--	--
Sep.	0.000	0.00	ns	ns	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Oct.	0.000	0.00	ns	ns	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Nov.	--	--	--	--	--	--	0.000	0.00	0.000	0.00	--	--	--	--	--	--
Dec.	--	--	--	--	--	--	ns	ns	ns	ns	--	--	--	--	--	--
Year	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	--	--	--	--	--	--

*Species include golden, blue, and couesi king crabs.

Dashes indicates areas not fished.

ns = Areas fished but not sampled by observers.

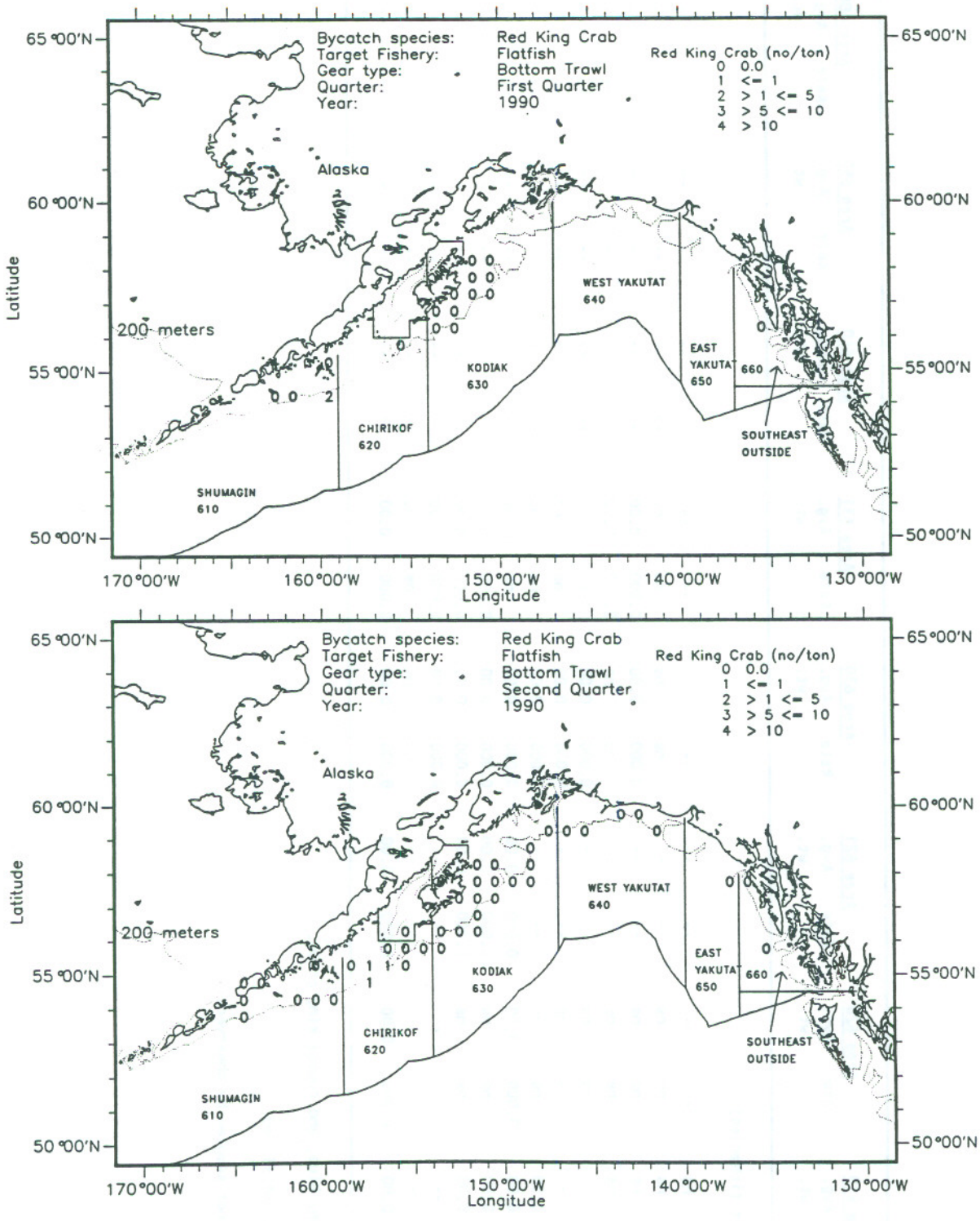


Figure 16.--Average incidence (no./t) of red king crab in the U.S. domestic fisheries by quarter, target fishery, gear type, and 1/2° latitude by 1/2° longitude areas in the Gulf of Alaska region, 1990.

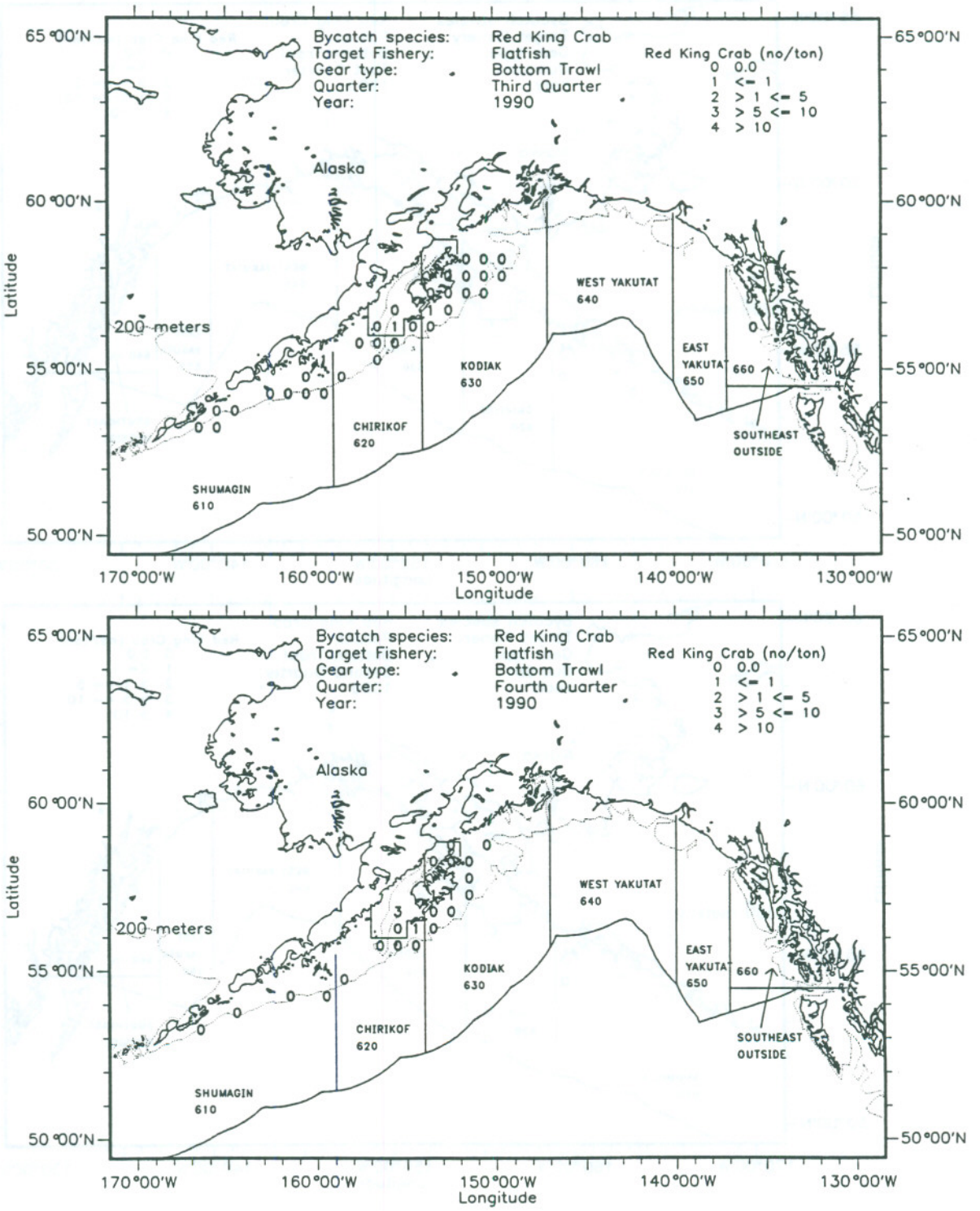


Figure 16.--Continued.

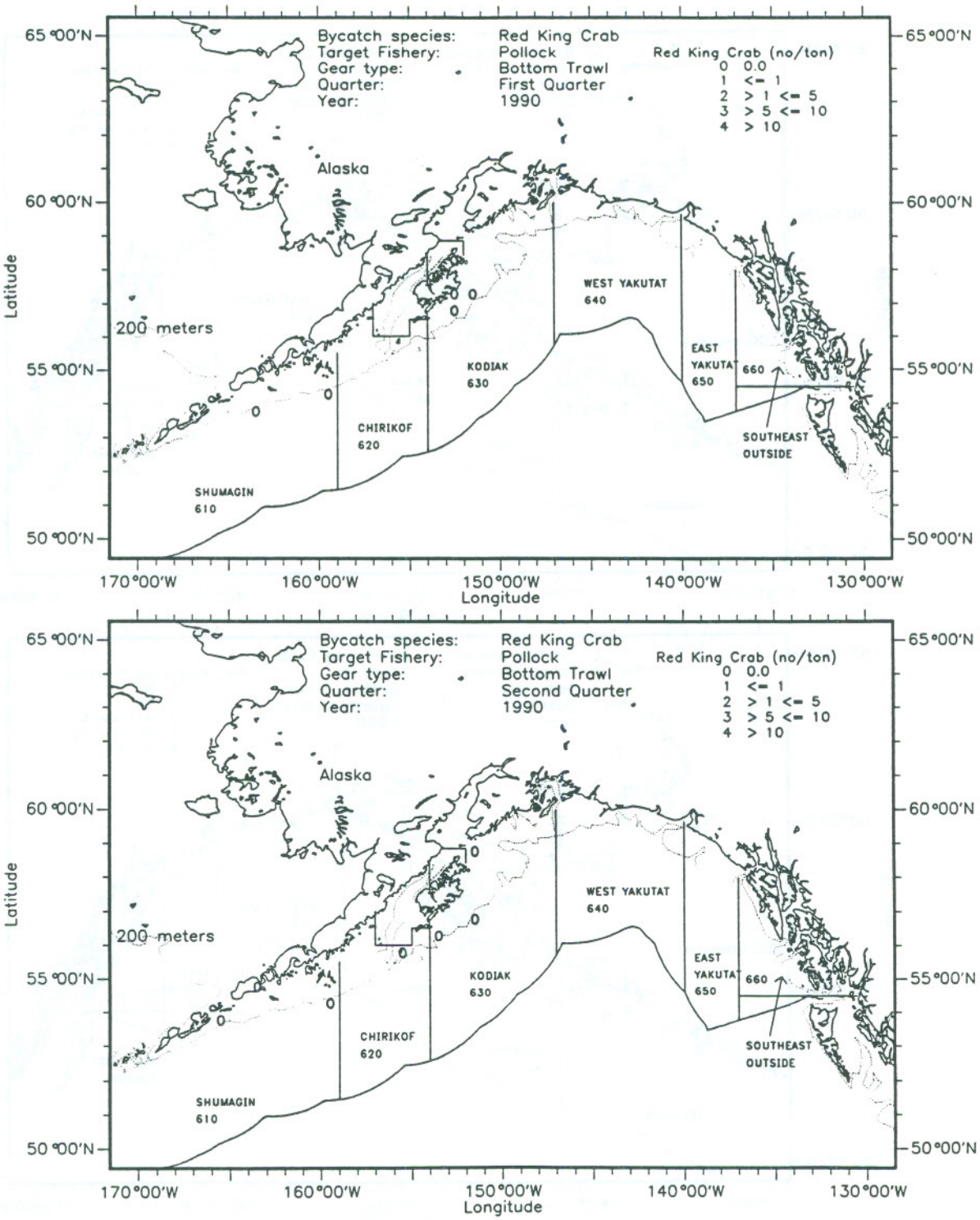


Figure 16.--Continued.

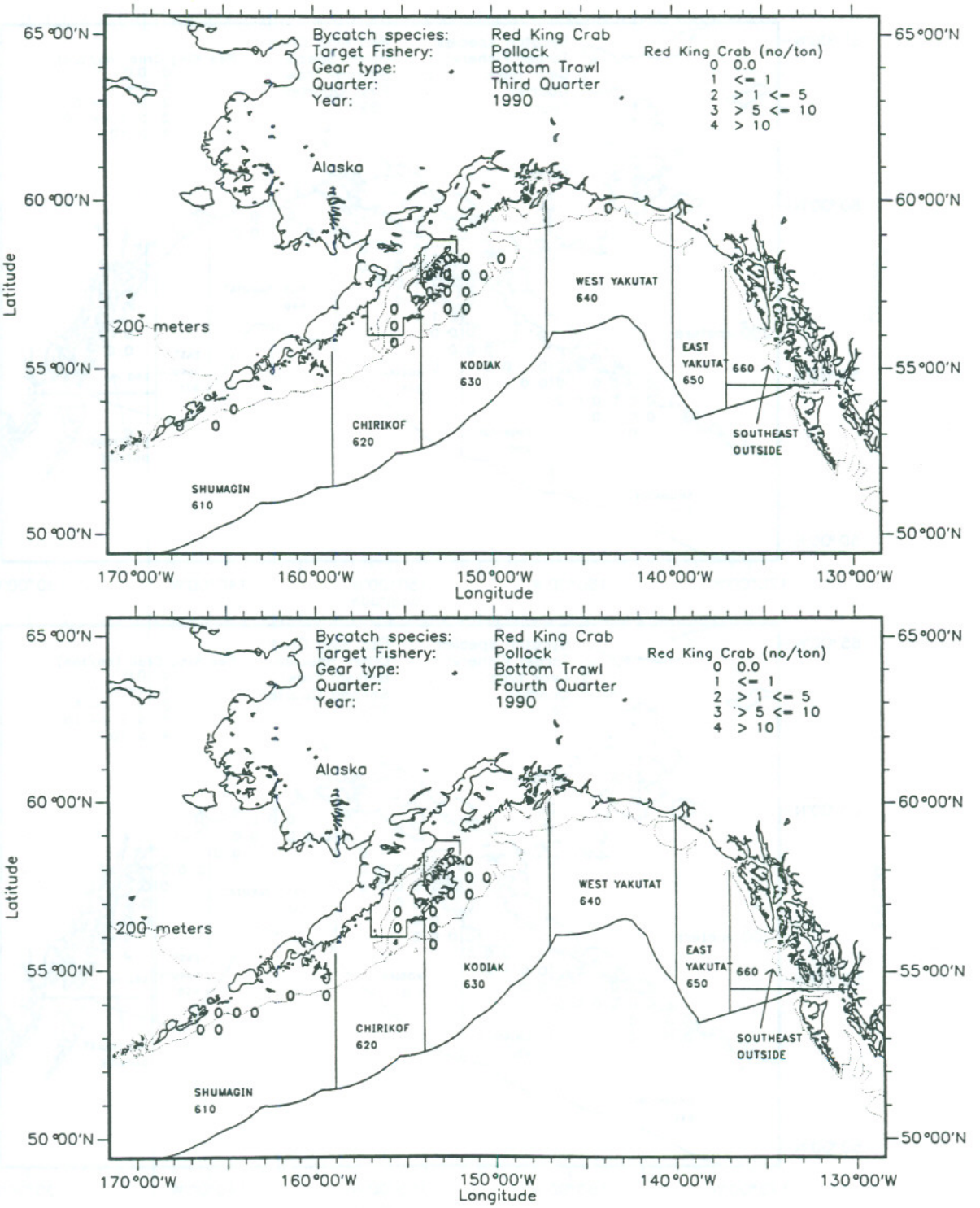


Figure 16.--Continued.

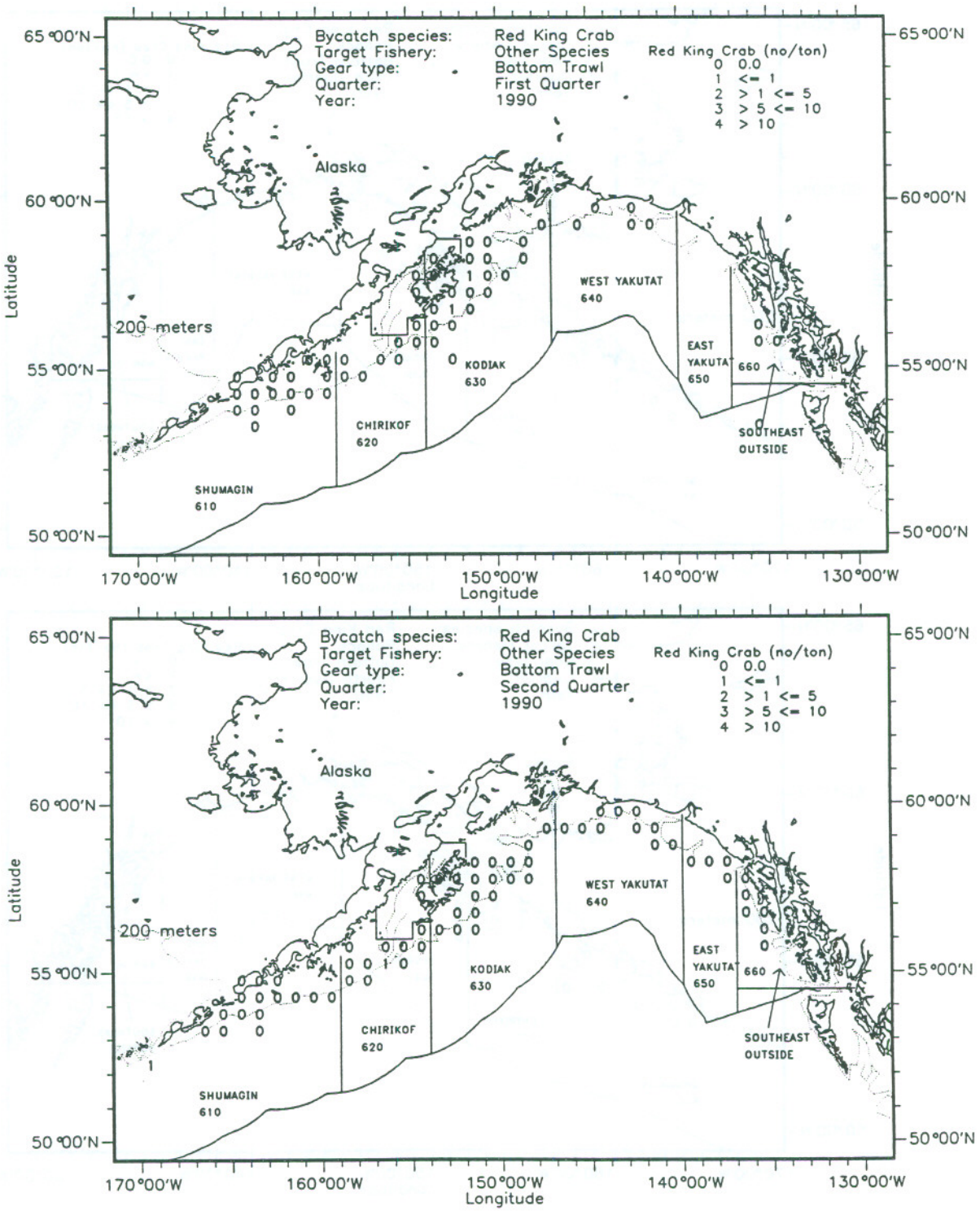


Figure 16.--Continued.

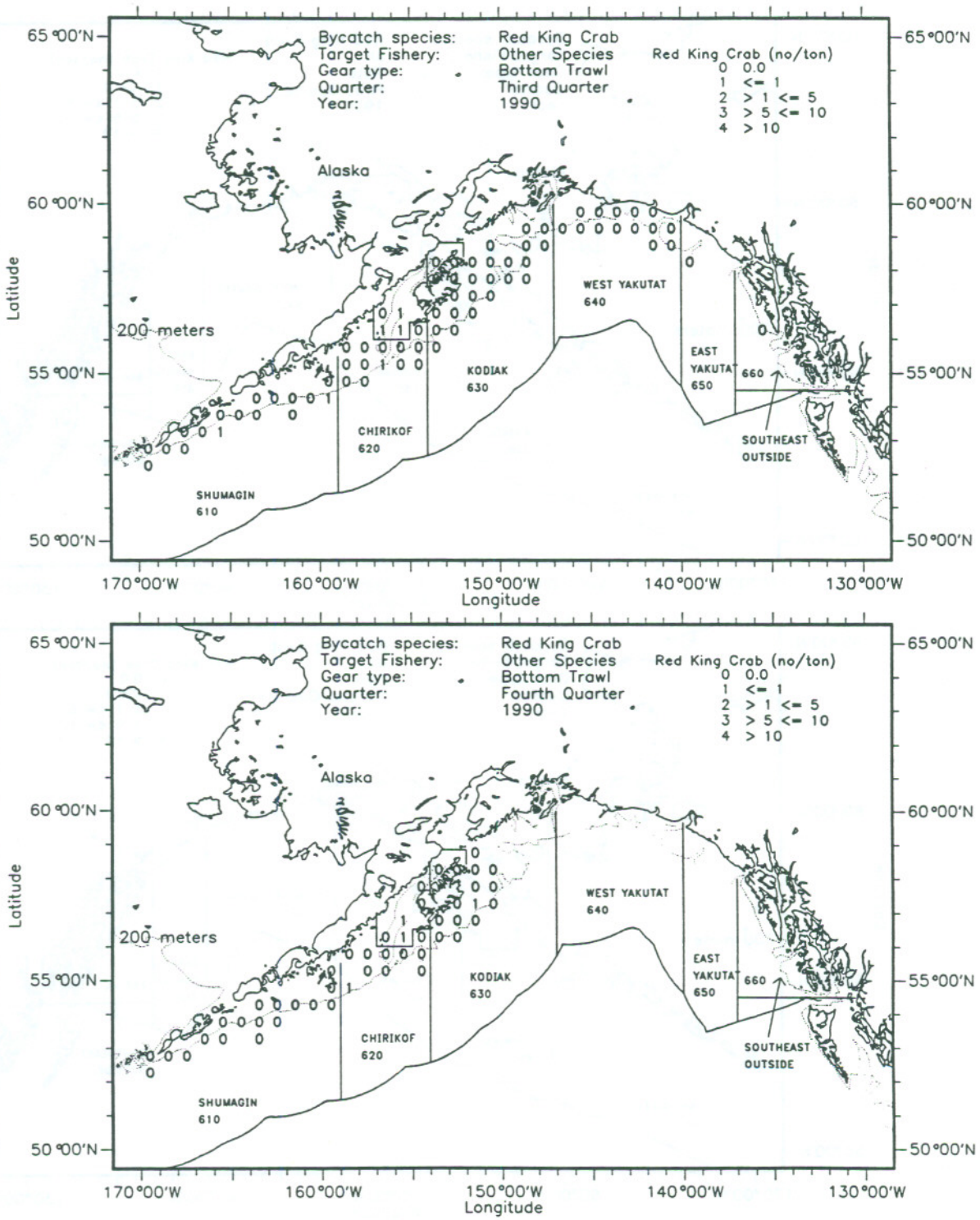


Figure 16.--Continued.

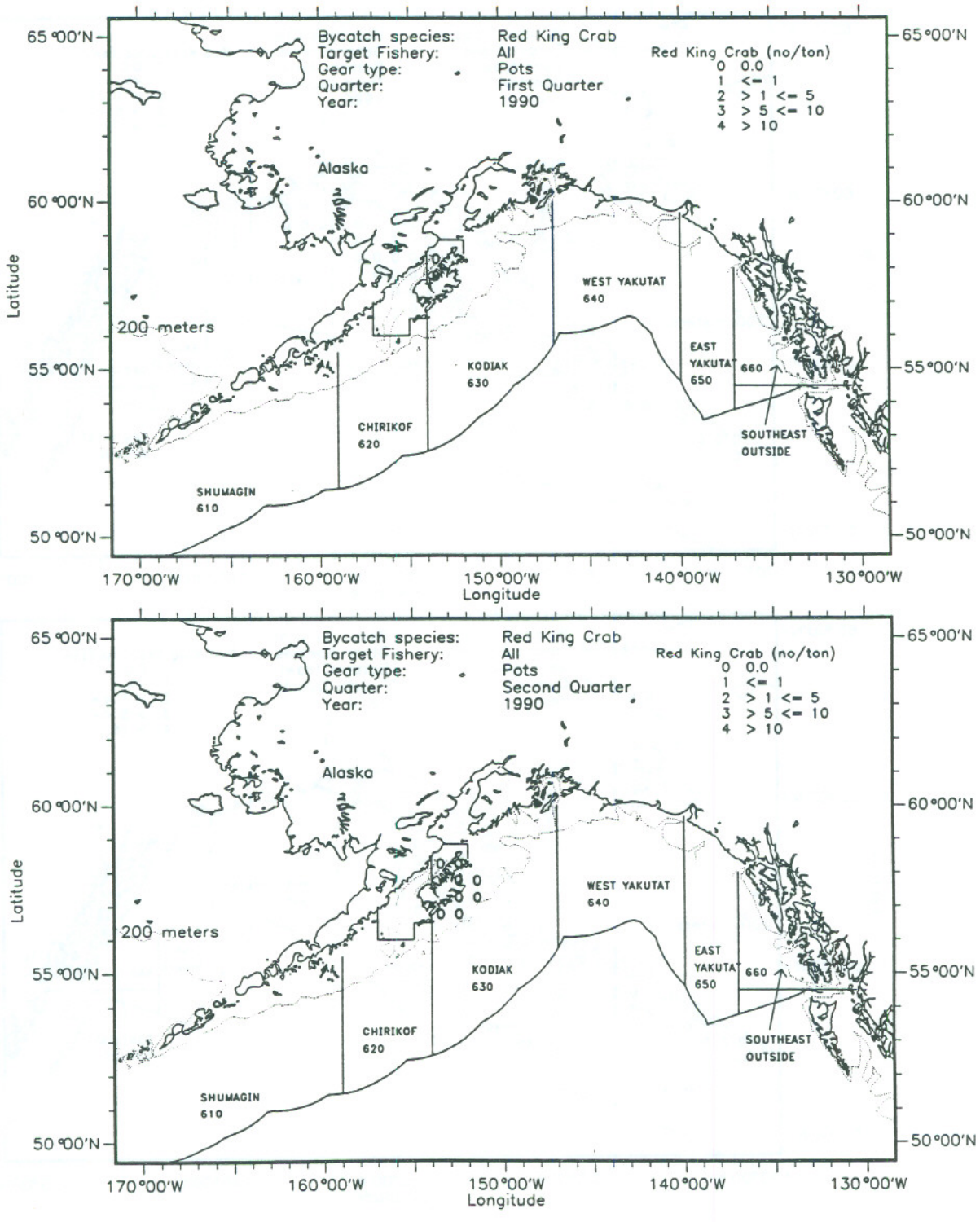


Figure 16.--Continued.

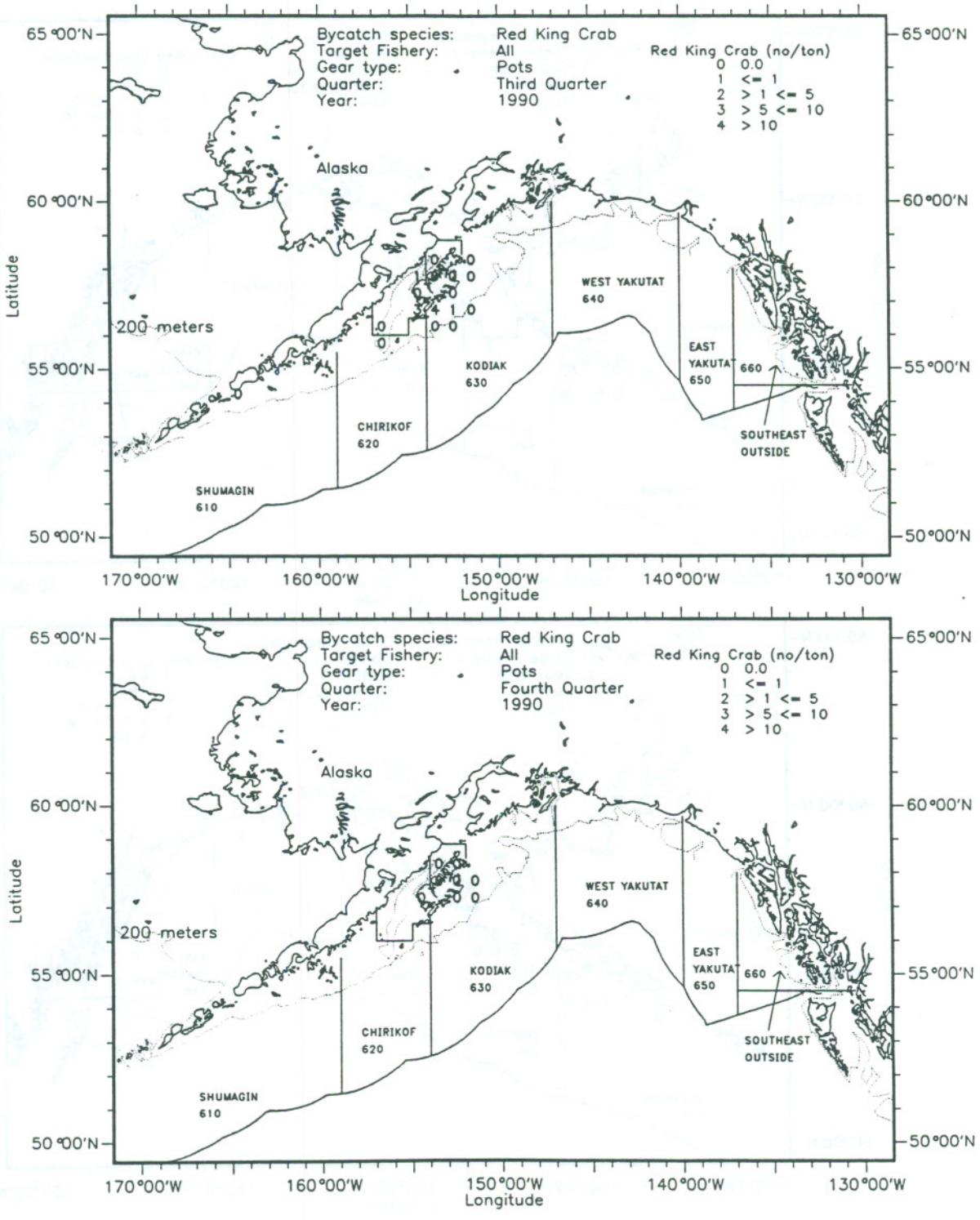


Figure 16.--Continued.

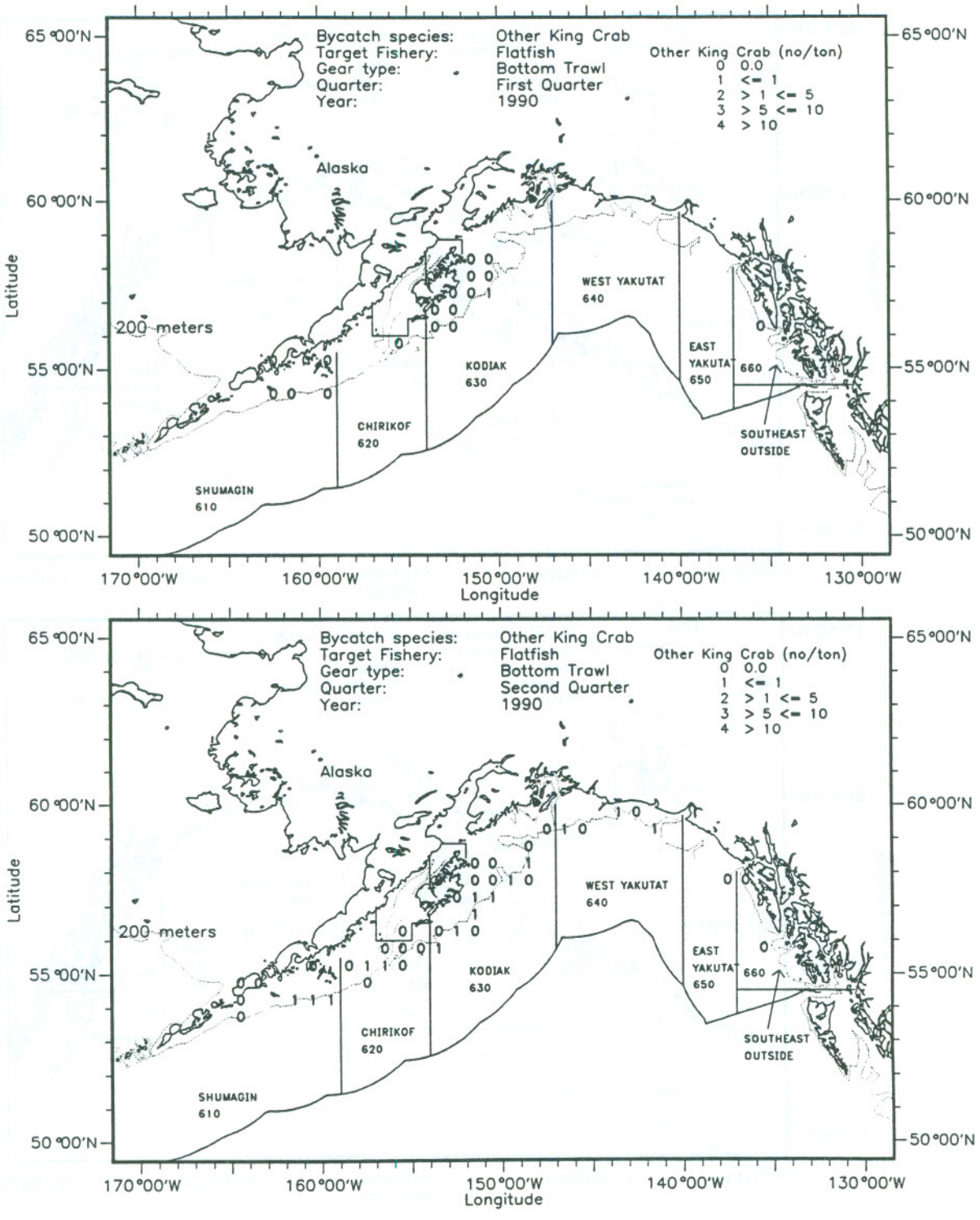


Figure 17.--Average incidence (no./t) of "other" king crab in the U.S. domestic fisheries by quarter, target fishery, gear type, and 1/2° latitude by 1/2° longitude areas in the Gulf of Alaska region, 1990.

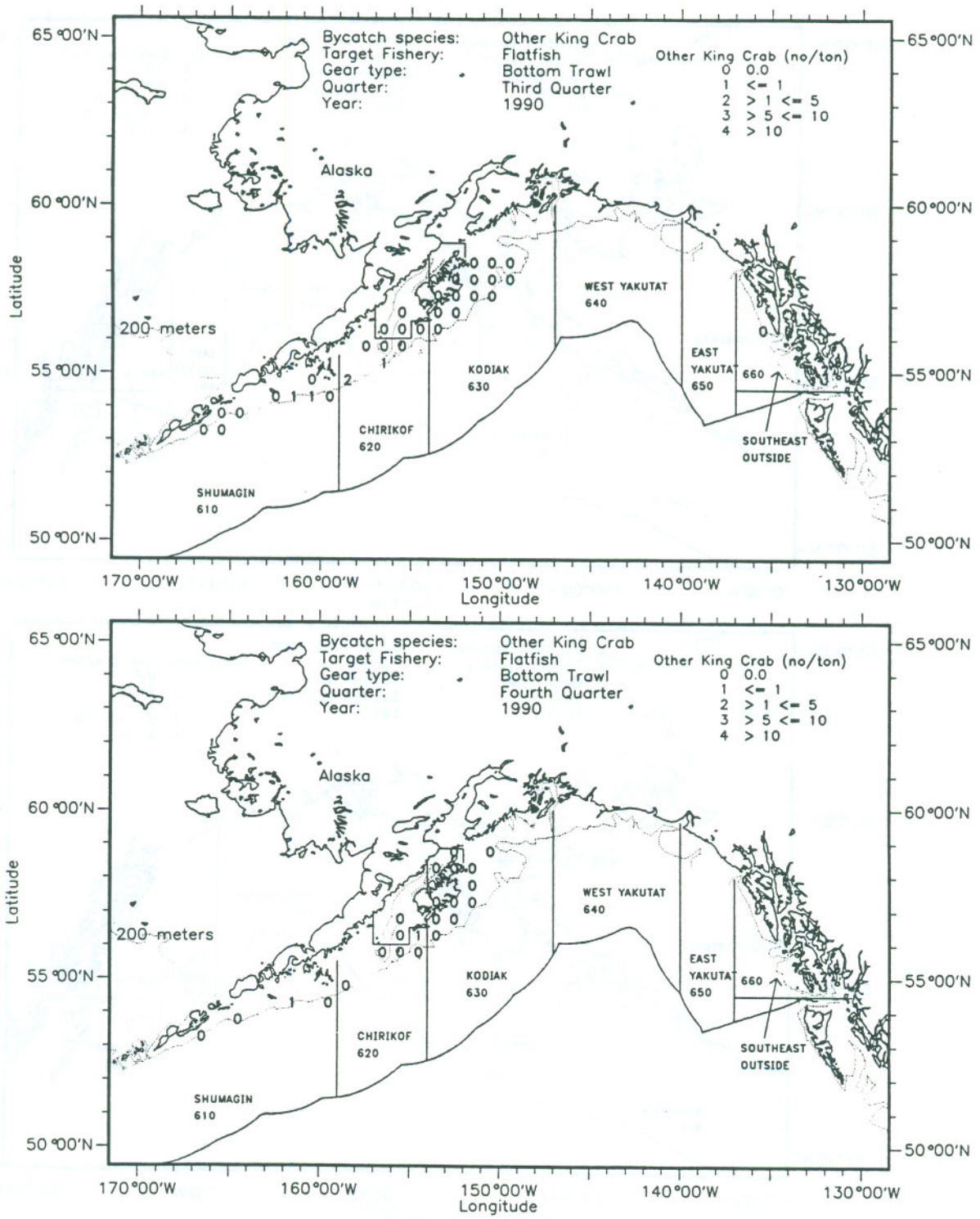


Figure 17.--Continued.

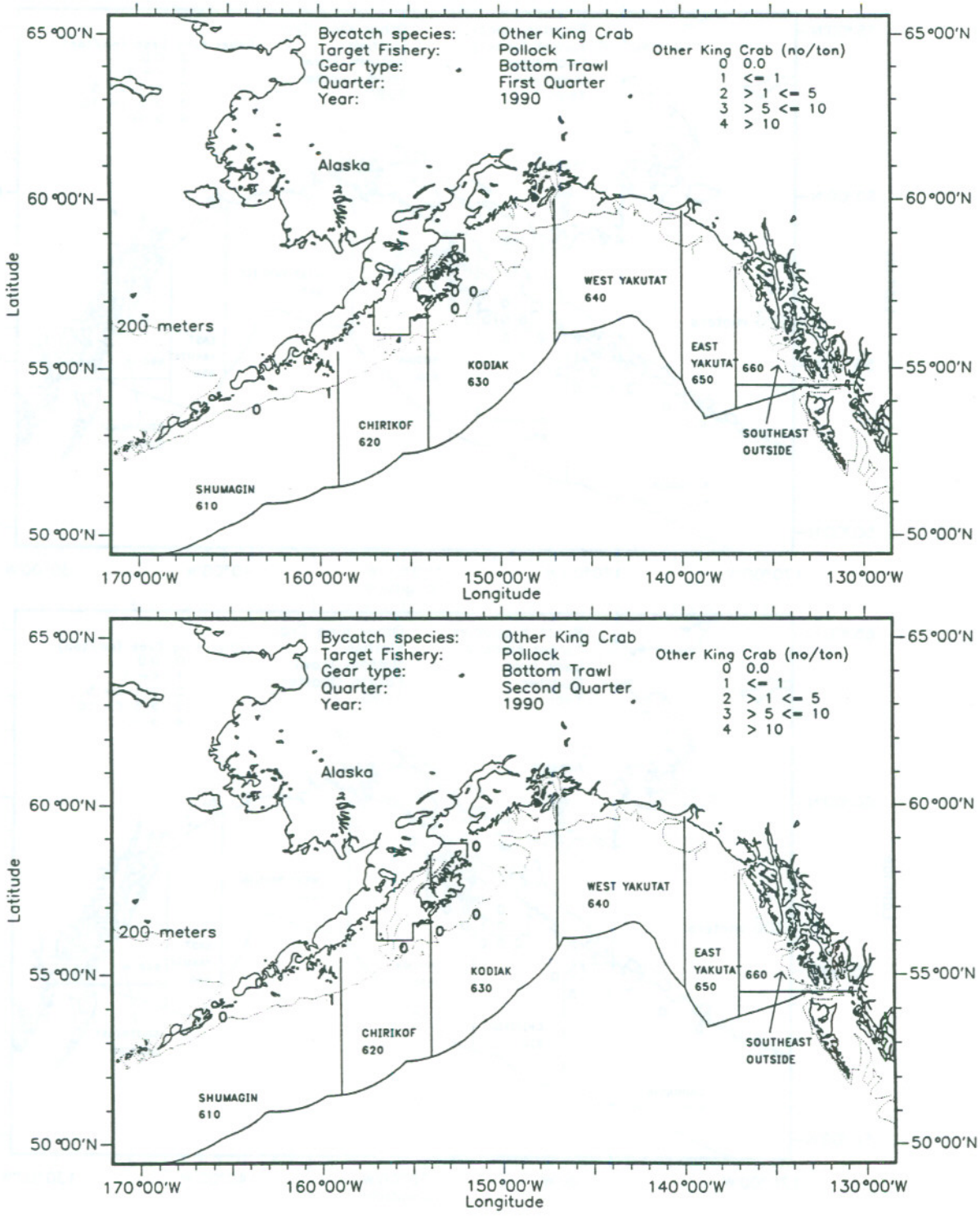


Figure 17.--Continued.

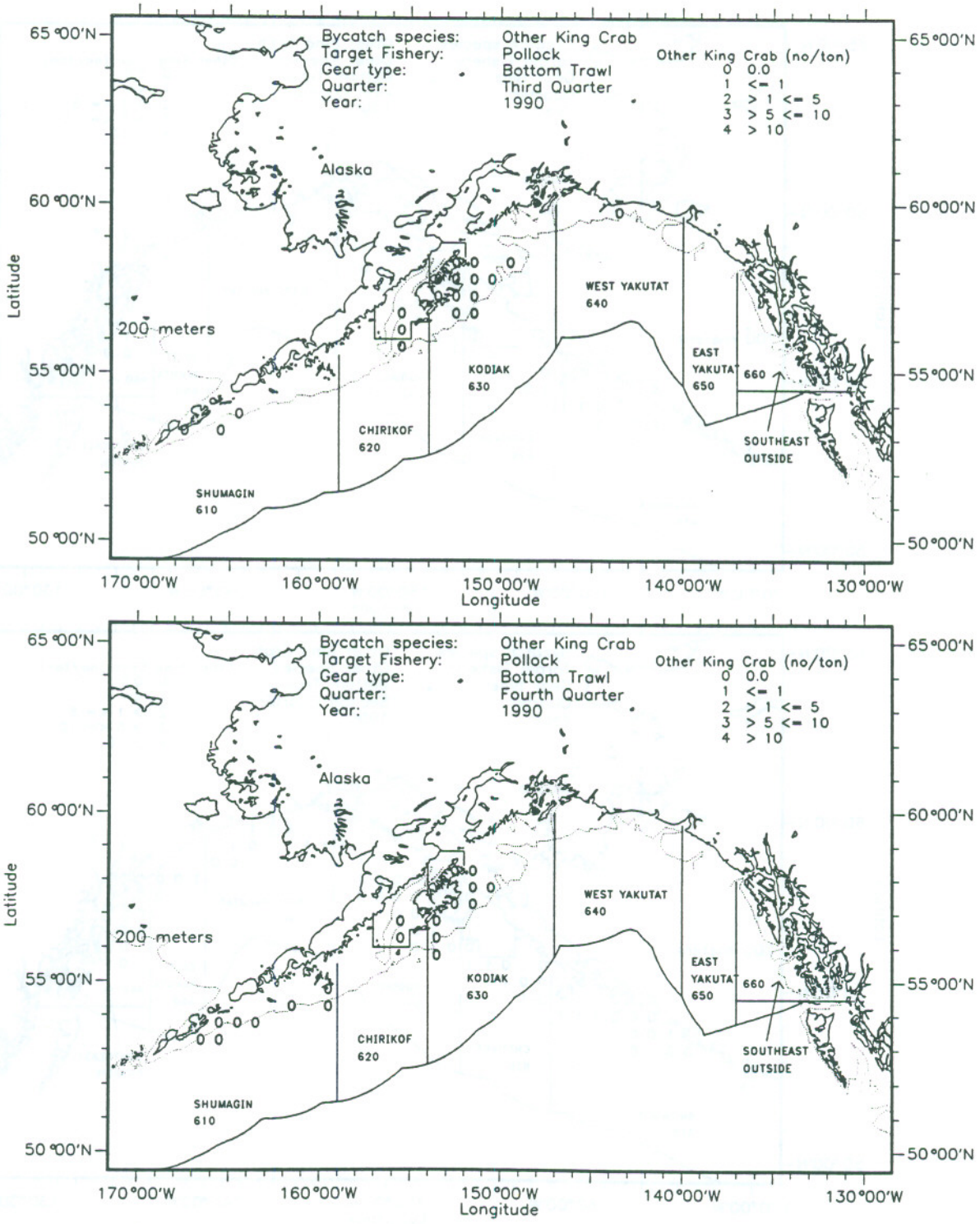


Figure 17.--Continued.

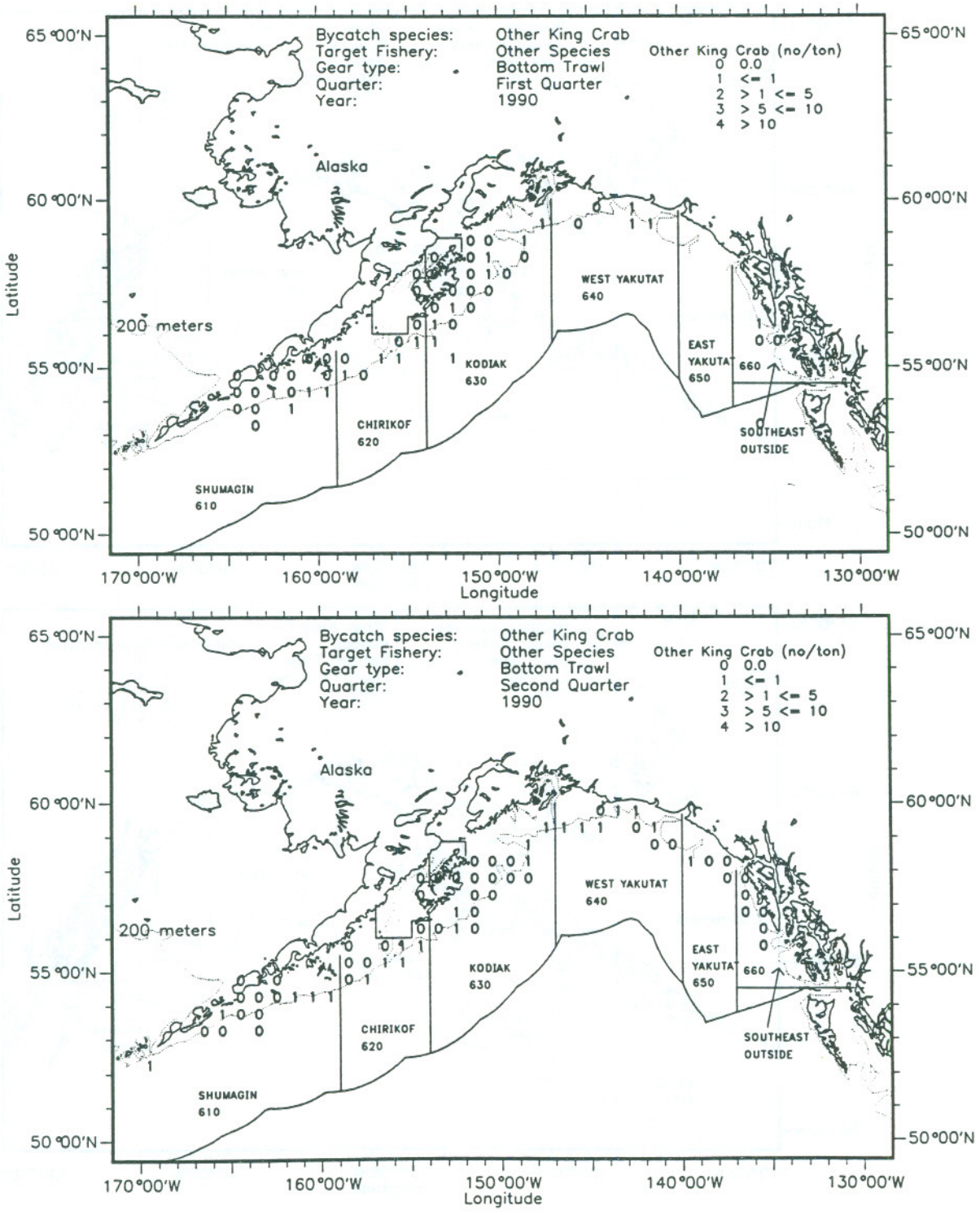


Figure 17.--Continued.

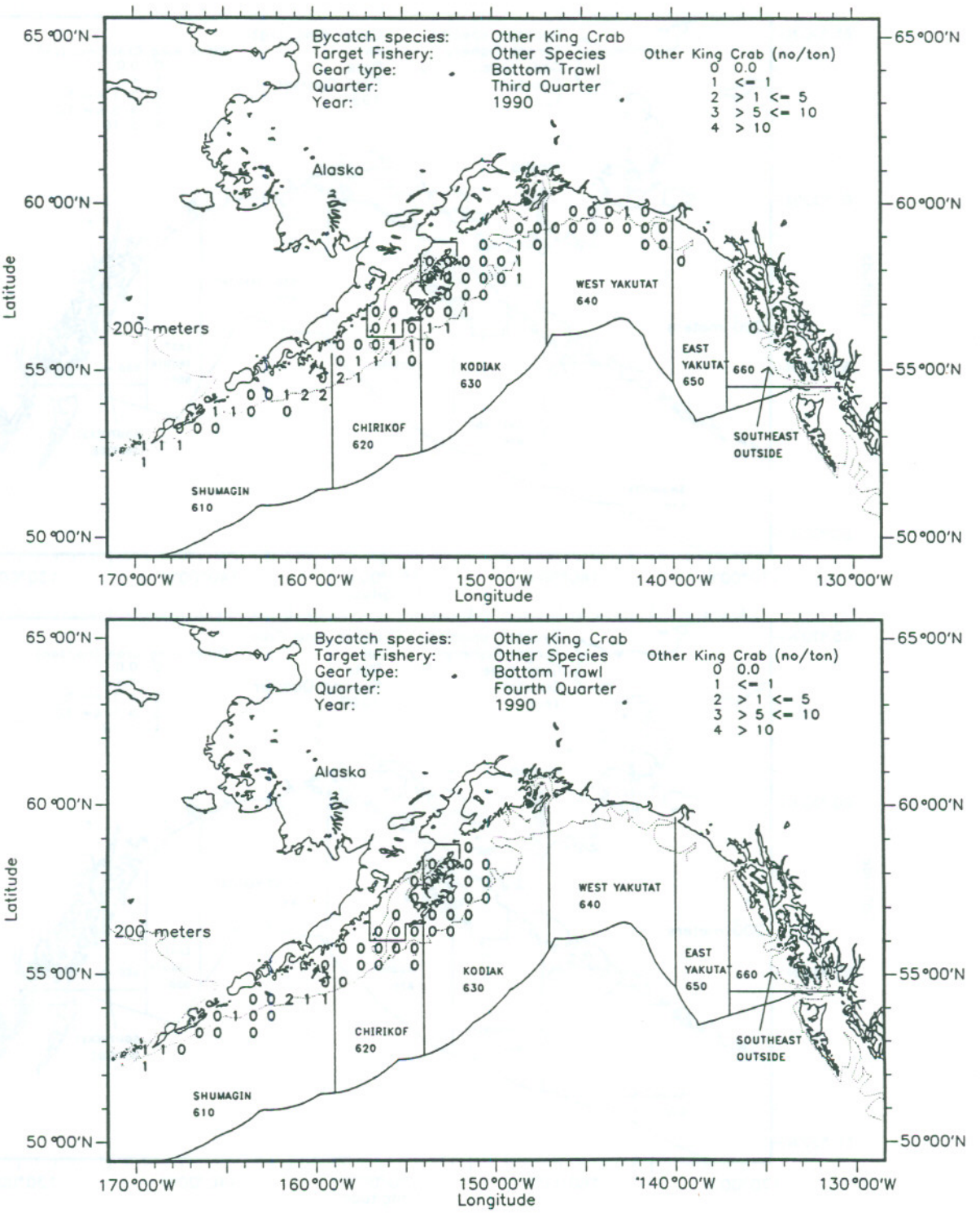


Figure 17.--Continued.

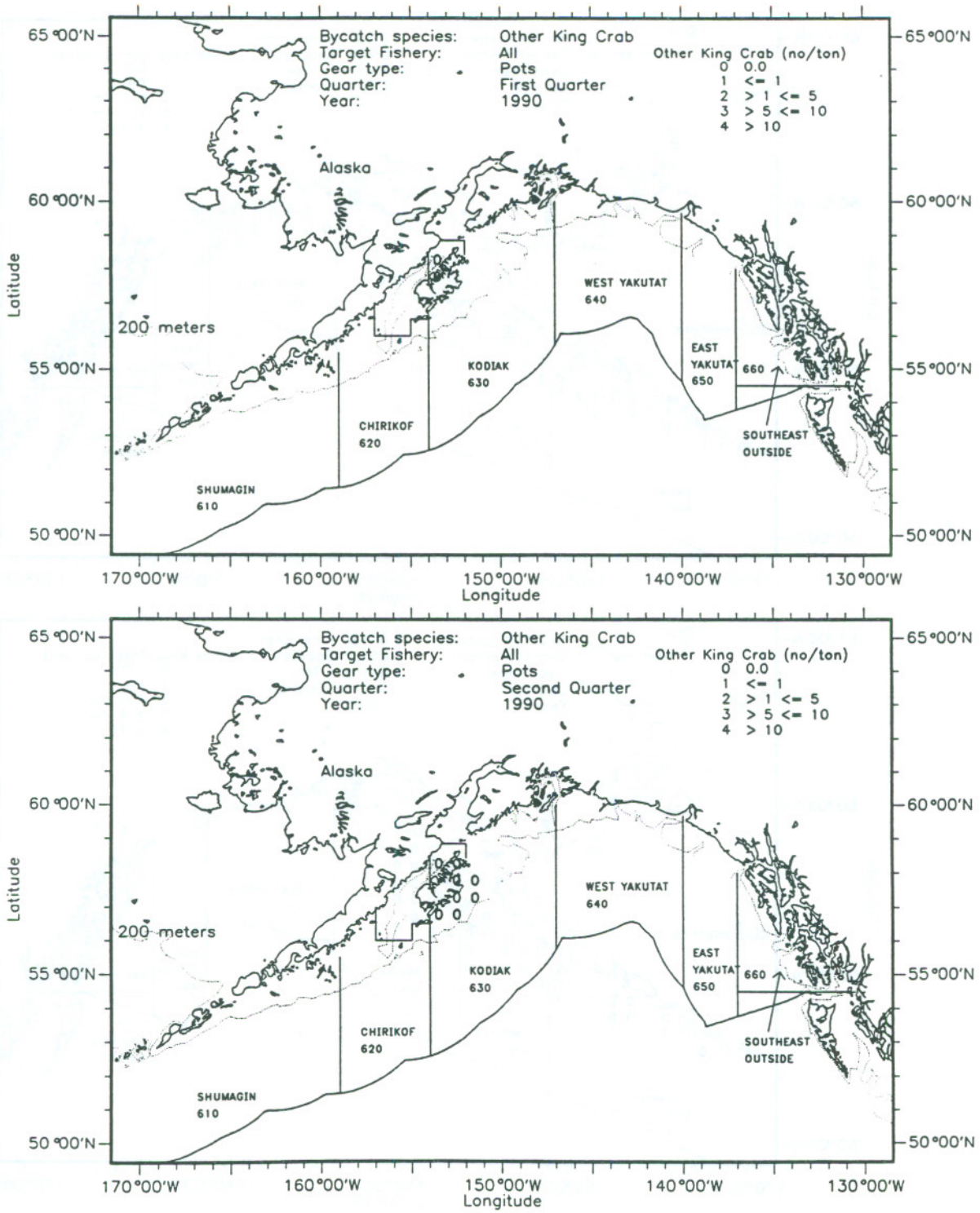


Figure 17.--Continued.

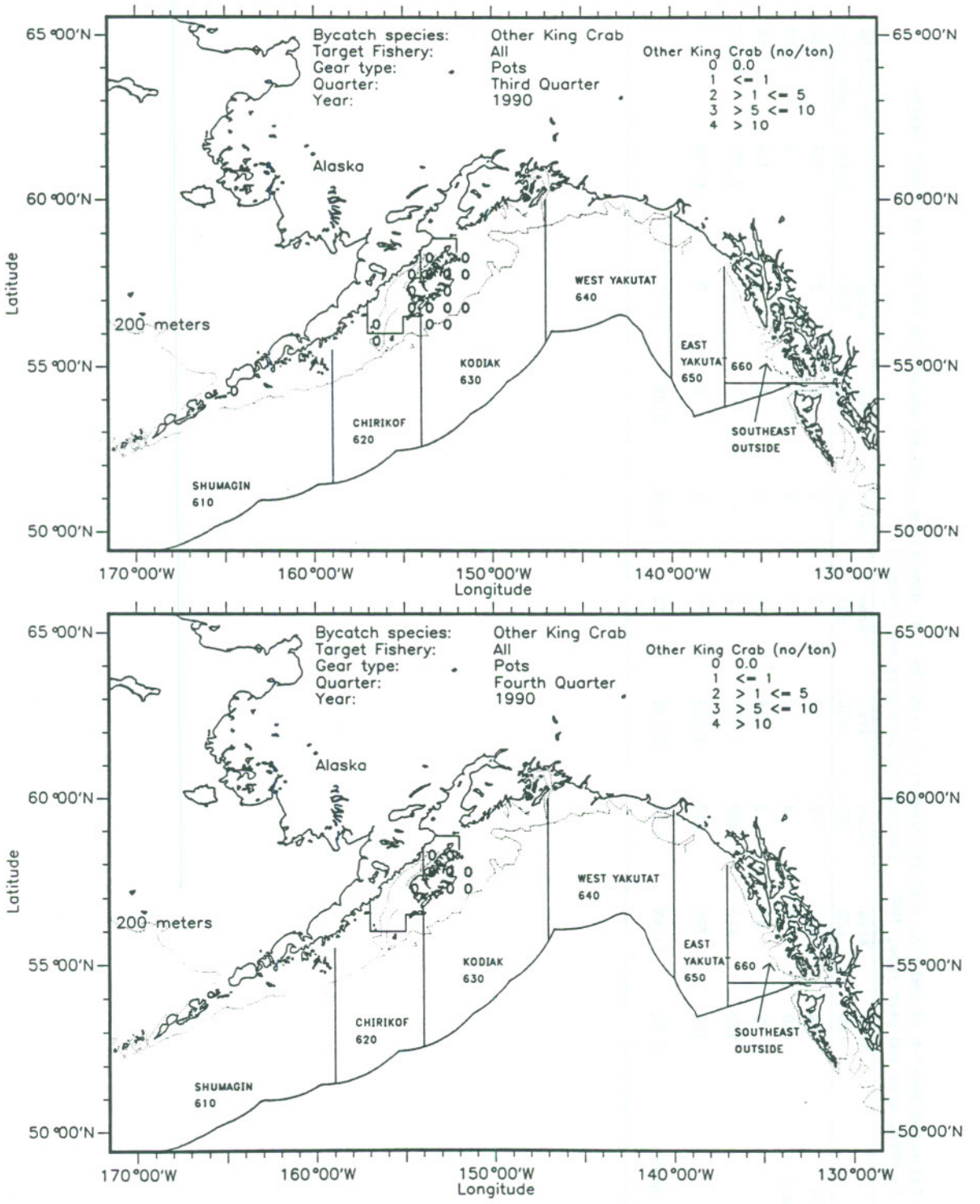


Figure 17.--Continued.

Table 55.--Estimated bycatch of red king crab (in numbers of crab) by U.S. domestic groundfish vessels in the Gulf of Alaska region by NPFMC area and gear type, 1990. (Dashes indicate area not fished.)

Gear	Area 610	Area 620	Area 621	Area 630	Area 631	Area 640	Area 650	Area 680	Total	Percent by gear type
Bottom trawl	38	307	112	50	0	0	0	0	507	7.3%
Pelagic trawl	0	0	0	0	0	0	--	--	0	0.0%
Longline	5	45	0	56	0	0	0	0	106	1.5%
Pot	132	446	200	5,517	0	--	--	--	6,295	91.1%
Total	175	798	312	5,623	0	0	0	0	6,908	
Percent by area	2.5%	11.6%	4.5%	81.4%	0.0%	0.0%	0.0%	0.0%		

Table 56.--Estimated bycatch of "other" king crabs* (in numbers of crabs) by U.S. domestic groundfish vessels in the Gulf of Alaska region by NPFMC area and gear type, 1990. (Dashes indicate area not fished.)

Gear	Area 610	Area 620	Area 621	Area 630	Area 631	Area 640	Area 650	Area 680	Total	Percent by gear type
Bottom trawl	968	1,192	1	177	0	110	3	4	2,455	75.8%
Pelagic trawl	0	0	0	0	0	0	--	--	0	0.0%
Longline	65	299	0	341	0	22	33	22	782	24.2%
Pot	0	0	0	0	0	--	--	--	0	0.0%
Total	1,033	1,491	1	518	0	132	36	26	3,237	
Percent by area	31.9%	46.1%	<0.1%	16.0%	0.0%	4.1%	1.1%	0.8%		

*Species in this group include blue, golden, and couesi king crabs.

Table 57.--U.S. domestic groundfish catch (in metric tons (t)) and red king crab catch (in numbers) by target fishery and area in the Gulf of Alaska region, 1990.

Fishery/gear	Area*	Groundfish catch	Red king crab			
			Catch (numbers)	Per t of groundfish	% within area	% of total bycatch
Flatfish (All gears)	Eastern	57.8	0	0.000	0.0%	0.0%
	Central	22,979.2	202	0.009	3.0%	2.9%
	Western	2,047.6	0	0.000	0.0%	0.0%
	Total	25,084.6	202	0.008	--	2.9%
Pollock midwater (All gears)	Eastern	nf	nf	nf	nf	nf
	Central	45,267.1	0	0.000	0.0%	0.0%
	Western	6,321.2	0	0.000	0.0%	0.0%
	Total	51,588.3	0	0.000	--	0.0%
Pollock bottom (All gears)	Eastern	nf	nf	nf	nf	nf
	Central	18,406.7	0	0.000	0.0%	0.0%
	Western	884.8	0	0.000	0.0%	0.0%
	Total	19,291.5	0	0.000	--	0.0%
Other (Trawl)	Eastern	27.4	0	0.000	0.0%	0.0%
	Central	44,106.0	267	0.006	4.0%	3.9%
	Western	32,277.9	0	0.000	0.0%	0.0%
	Total	76,411.3	267	0.003	--	3.9%
Other (Longline)	Eastern	249.5	0	0.000	0.0%	0.0%
	Central	3,040.2	19	0.006	0.3%	0.3%
	Western	2,451.4	0	0.000	0.0%	0.0%
	Total	5,741.1	19	0.003	--	0.3%
Other (Pot)	Eastern	nf	nf	nf	nf	nf
	Central	5,478.8	6,163	1.125	91.5%	89.2%
	Western	159.7	132	0.827	75.4%	1.9%
	Total	5,638.5	6,295	1.116	--	91.1%
Sablefish (Trawl)	Eastern	879.5	0	0.000	0.0%	0.0%
	Central	1,215.5	0	0.000	0.0%	0.0%
	Western	383.5	5	0.013	2.9%	0.1%
	Total	2,478.5	5	0.002	--	0.1%
Sablefish (Longline)	Eastern	11,468.0	0	0.000	0.0%	0.0%
	Central	10,855.3	82	0.008	1.2%	1.2%
	Western	1,868.8	5	0.003	2.9%	0.1%
	Total	24,192.1	87	0.004	--	1.3%
Rockfish (All gears)	Eastern	9,805.1	0	0.000	0.0%	0.0%
	Central	15,840.4	0	0.000	0.0%	0.0%
	Western	8,325.1	33	0.004	18.9%	0.5%
	Total	33,970.6	33	0.001	--	0.5%
Total (All gears)	Eastern	22,487.3	0	0.000		0.0%
	Central	167,189.2	6,733	0.040	--	97.5%
	Western	54,720.0	175	0.003	--	2.5%
	Total	244,396.5	6,908	0.028	--	--

*Eastern consists of Areas 640, 650, and 680; Central consists of Areas 620, 621, 630, and 631; and Western consists of Area 610.

nf = No fishing.

Table 58.--U.S. domestic groundfish catch (in metric tons (t)) and "other" king crabs catch (in numbers) by target fishery and area in the Gulf of Alaska region, 1990.

Fishery/gear	Area*	Groundfish catch	"Other" king crabs			
			Catch (numbers)	Per t of groundfish	% within area	% of total bycatch
Flatfish (All gears)	Eastern	57.8	2	0.035	1.0%	<0.1%
	Central	22,979.2	199	0.009	9.9%	6.1%
	Western	2,047.6	197	0.096	19.1%	6.1%
	Total	25,084.6	398	0.016	--	12.3%
Pollock midwater (All gears)	Eastern	nf	nf	nf	nf	nf
	Central	45,267.1	0	0.000	0.0%	0.0%
	Western	6,321.2	0	0.000	0.0%	0.0%
	Total	51,588.3	0	0.000	--	0.0%
Pollock bottom (All gears)	Eastern	nf	nf	nf	nf	nf
	Central	18,406.7	3	<0.001	0.1%	0.1%
	Western	884.8	0	0.000	0.0%	0.0%
	Total	19,291.5	3	<0.001	--	0.1%
Other (Trawl)	Eastern	27.4	1	0.036	0.5%	<0.1%
	Central	44,106.0	97	0.002	4.8%	3.0%
	Western	32,277.9	16	<0.001	1.5%	0.5%
	Total	76,411.3	114	0.001	--	3.5%
Other (Longline)	Eastern	249.5	8	0.032	4.1%	0.2%
	Central	3,040.2	15	0.005	0.7%	0.5%
	Western	2,451.4	0	0.000	0.0%	0.0%
	Total	5,741.1	23	0.004	--	0.7%
Other (Pot)	Eastern	nf	nf	nf	nf	nf
	Central	5,478.8	0	0.000	0.0%	0.0%
	Western	159.7	0	0.000	0.0%	0.0%
	Total	5,638.5	0	0.000	--	0.0%
Sablefish (Trawl)	Eastern	879.5	9	0.010	4.6%	0.3%
	Central	1,215.5	2	0.002	0.1%	<0.1%
	Western	383.5	31	0.081	3.0%	1.0%
	Total	2,478.5	42	0.017	--	1.3%
Sablefish (Longline)	Eastern	11,468.0	69	0.006	35.6%	2.1%
	Central	10,855.3	625	0.058	31.1%	19.3%
	Western	1,868.8	65	0.035	6.3%	2.0%
	Total	24,192.1	759	0.031	--	23.4%
Rockfish (All gears)	Eastern	9,805.1	105	0.011	54.1%	3.2%
	Central	15,840.4	1,069	0.067	53.2%	33.0%
	Western	8,325.1	724	0.087	70.1%	22.4%
	Total	33,970.6	1,898	0.056	--	58.6%
Total (All gears)	Eastern	22,487.3	194	0.009	--	6.0%
	Central	167,189.2	2,010	0.012	--	62.1%
	Western	54,720.0	1,033	0.019	--	31.9%
	Total	244,396.5	3,237	0.013	--	--

*Eastern consists of Areas 640, 650, and 680; Central consists of Areas 620, 621, 630, and 631; and Western consists of Area 610.

nf = No fishing.

Table 59.--King crabs examined for condition by observers in U.S. domestic groundfish catches in the Gulf of Alaska region by species and gear type, 1990.

Species	Gear type	Excellent		Poor		Dead	
		numbers	%	numbers	%	numbers	%
Red king crab	Trawl	107	40.5%	98	37.1%	59	22.3%
	Pot	605	100.0%	0	0.0%	0	0.0%
	Longline	3	50.0%	3	50.0%	0	0.0%
Blue king crab	Trawl	0	0.0%	7	100.0%	0	0.0%
	Pot	0	0.0%	0	0.0%	0	0.0%
	Longline	0	0.0%	0	0.0%	0	0.0%
Golden king crab	Trawl	551	42.8%	416	32.3%	320	24.9%
	Pot	0	0.0%	0	0.0%	0	0.0%
	Longline	5	62.5%	1	12.5%	2	25.0%
Couesi king crab	Trawl	7	25.9%	7	25.9%	13	48.1%
	Pot	0	0.0%	0	0.0%	0	0.0%
	Longline	12	66.7%	5	27.8%	1	5.6%

Table 60.--Biological data on the bycatch of king crabs in U.S. domestic groundfish fisheries in the Gulf of Alaska region, 1990.

Species	Percent by species	Sex	Sex composition	Average weight (kg)	Average length (mm)
Red king crab	68.1%	Male	53.7	3.36	148.4
		Female	46.3	1.44	115.5
Golden king crab	30.3%	Male	41.1	1.11	124.4
		Female	58.9	0.84	114.7
Couesi king crab	1.3%	Male	20.0	1.03	145.5
		Female	80.0	0.89	132.4
Blue king crab	0.3%	Male	50.0	5.13	188.0
		Female	50.0	5.50	208.0

Table 61.--Common and scientific names of rockfish identified in U.S. domestic groundfish catches in the Gulf of Alaska region, 1990.

Common name	Scientific name
Darkblotched rockfish	Sebastes crameri
Dusky rockfish	Sebastes ciliatus
Harlequin rockfish	Sebastes variegatus
Northern rockfish	Sebastes polyspinis
Pacific ocean perch	Sebastes alutus
Redbanded rockfish	Sebastes babcocki
Redstripe rockfish	Sebastes proriger
Rougheye rockfish	Sebastes aleutianus
Sharpchin rockfish	Sebastes zacentrus
Shortraker rockfish	Sebastes borealis
Shortspine thornyhead	Sebastolobus alascanus
Silvergray rockfish	Sebastes brevispinus
Yelloweye rockfish	Sebastes ruberrimus
Yellowtail rockfish	Sebastes flavidus
Widow rockfish	Sebastes entomelas
Other rockfish*	
Black rockfish	Sebastes melanops
Blue rockfish	Sebastes mystinus
Bocaccio	Sebastes paucispinus
Canary rockfish	Sebastes pinniger
Copper rockfish	Sebastes caurinus
Greenstriped rockfish	Sebastes elongatus
Longspine thornyhead	Sebastolobus altivelis
Rosethorn rockfish	Sebastes helvomaculatus
Splitnose rockfish	Sebastes diploproa
Stripetail rockfish	Sebastes saxicola
Tiger rockfish	Sebastes nigrocinctus
Yellowmouth rockfish	Sebastes reedi

* The 12 species listed under "other rockfish" each made up less than 0.1% of the rockfish catch in U.S. domestic groundfish catches.

Table 62.--Rockfish species groupings in the Gulf of Alaska, and the species associated with each group.

Species group	Associated species	
	Common name	Scientific name
Demersal shelf rockfish	Canary rockfish	Sebastes pinniger
	China rockfish	S. nebulosus
	Copper rockfish	S. caurinus
	Quillback rockfish	S. maliger
	Red banded rockfish	S. babcocki
	Rosethorn rockfish	S. helvomaculatus
	Tiger rockfish	S. nigrocinctus
	Yelloweye rockfish	S. ruberrimus
Pelagic shelf rockfish	Black rockfish	S. melanops
	Blue rockfish	S. mystinus
	Dusky rockfish	S. ciliatus
	Widow rockfish	S. entomelas
	Yellowtail rockfish	S. flavidus
Slope rockfish	Aurora rockfish	S. aurora
	Blackgill rockfish	S. melanostomus
	Bocaccio	S. paucispinis
	Chilipepper rockfish	S. goodei
	Darkblotched rockfish	S. crameri
	Greenstriped rockfish	S. elongatus
	Harlequin rockfish	S. variegatus
	Northern rockfish	S. polyspinis
	Pacific ocean perch	S. aleutus
	Pygmy rockfish	S. wilsoni
	Redstripe rockfish	S. proriger
	Rougheye rockfish	S. aleutianus
	Sharpchin rockfish	S. zacentrus
	Shortbelly rockfish	S. jordani
	Shortraker rockfish	S. borealis
	Silvergray rockfish	S. brevispinus
	Splitnose rockfish	S. diploproa
	Stripetail rockfish	S. saxicola
	Vermillion rockfish	S. miniatus
	Yellowmouth rockfish	S. reedi
Thornyheads	Longspine thornyhead	Sebastolobus altivelis
	Shortspine thornyhead	S. alascanus

Table 63.--Estimated U.S. domestic rockfish catch (in metric tons) by species and NPFMC area in the Gulf of Alaska region, 1990.

Common name	Area 610	Area 620	Area 621	Area 630	Area 631	Area 640	Area 650	Area 680	All areas	Percent of rockfish catch
Pacific ocean perch	3,063.5	2,227.6	0.0	3,322.5	<0.1	1,437.5	283.7	37.1	10,371.9	42.0%
Rougheye rockfish	653.4	1,037.1	0.0	990.5	0.0	942.9	1,193.8	155.9	4,973.7	20.1%
Shortraker rockfish	473.6	397.2	0.0	974.9	0.0	1,615.5	62.8	8.2	3,532.3	14.3%
Northern rockfish	936.8	124.4	0.0	566.6	0.2	26.3	0.0	0.0	1,654.3	6.7%
Shortspine thornyhead	397.1	340.9	0.0	411.9	0.0	260.7	135.5	24.2	1,570.2	6.4%
Dusky rockfish	162.8	136.5	9.8	761.2	1.0	471.1	10.1	0.6	1,553.1	6.3%
Redbanded rockfish	3.4	13.3	<0.1	22.1	0.0	29.1	246.5	19.7	334.0	1.4%
Yelloweye rockfish	17.5	3.2	0.2	38.5	0.0	13.1	110.8	8.8	192.2	0.8%
Sharpchin rockfish	19.6	5.6	0.0	76.7	0.0	37.1	0.0	0.0	139.1	0.6%
Harlequin rockfish	31.3	21.3	0.0	66.2	<0.1	14.6	0.0	0.0	133.4	0.5%
Redstripe rockfish	1.8	0.8	0.0	30.2	0.0	13.0	0.0	0.0	45.9	0.2%
Widow rockfish	0.9	0.0	0.0	0.0	0.0	42.2	1.0	0.1	44.2	0.2%
Yellowtail rockfish	0.8	3.5	0.0	39.8	0.0	0.0	0.0	0.0	44.0	0.2%
Darkblotched rockfish	<0.1	2.1	0.0	26.4	0.0	6.0	0.0	0.0	34.6	0.1%
Silvergray rockfish	<0.1	14.2	0.0	5.9	0.0	10.2	0.0	0.0	30.4	0.1%
Other rockfish*	1.8	5.8	0.9	6.0	0.0	24.8	0.0	0.0	39.3	0.2%
Total	5,764.4	4,333.4	10.9	7,339.6	1.3	4,944.2	2,044.2	254.6	24,692.6	
Percent by area	23.3%	17.6%	<0.1%	29.7%	<0.1%	20.0%	8.3%	1.0%		

*Species included in this category each made up less than 0.10% of the total rockfish catch and are listed in Table 61.

Table 64.--Common and scientific names of flatfish identified in U.S. domestic groundfish catches in the Gulf of Alaska region, 1990.

Common name	Scientific name
Arrowtooth flounder	Atheresthes stomias
Butter sole	Pleuronectes isolepis
Dover sole	Microstomus pacificus
English sole	Pleuronectes vetulus
Flathead sole	Hippoglossoides elassodon
Petrale sole	Eopsetta jordani
Rex sole	Errex zachirus
Rock sole	Pleuronectes bilineata
Sand sole	Psettichthys melanostictus
Starry flounder	Platichthys stellatus
Yellowfin sole	Pleuronectes asper
Other flatfish*	
Alaska plaice	Pleuronectes quadrituberculatus
Curlfin sole	Pleuronichthys decurrens
Deepsea sole	Embassichthys bathybius
Longhead dab	Pleuronectes proboscidea
Slender sole	Eopsetta exilis

* The five species listed under "other flatfish" each made up less than 0.1% of the flatfish catch in U.S. domestic groundfish catches.

Table 65.--Flatfish species groupings in the Gulf of Alaska, and the species associated with each group.

Species group	Associated species	
	Common name	Scientific name
Arrowtooth flounder	Arrowtooth flounder	Atheresthes stomias
Deep-water flatfish	Dover sole	Microstomus pacificus
	Greenland turbot	Reinhardtius hippoglossoides
	Rex sole	Errex zachirus
Shallow-water flatfish	Butter sole	Pleuronectes isolepis
	Rock sole	Pleuronectes bilineata
	Starry flounder	Platichthys stellatus
	Yellowfin sole	Pleuronectes asper
	All other flatfish (except Pacific halibut)	

Table 66.--Estimated U.S. domestic flatfish catch (in metric tons) by species and NPFMC area in the Gulf of Alaska region, 1990.

Common name	Area 610	Area 620	Area 621	Area 630	Area 631	Area 640	Area 650	Area 680	Total	% of flatfish catch
Arrowtooth flounder	1,803.6	8,084.2	221.8	7,235.0	11.5	1,049.0	471.0	37.2	18,913.3	54.4%
Rock sole	922.1	1,352.5	147.3	3,720.0	4.1	0.0	0.0	0.0	6,145.9	17.7%
Rex sole	111.1	2,005.6	0.5	1,449.8	0.0	50.0	28.9	4.1	3,650.0	10.5%
Dover sole	178.1	465.8	0.1	1,288.3	0.0	351.0	57.0	8.0	2,348.2	6.8%
Flathead sole	61.1	114.0	0.6	1,683.3	16.2	8.6	77.3	1.2	1,962.2	5.6%
Yellowfin sole	642.2	2.5	0.6	66.3	0.3	0.0	0.0	0.0	711.9	2.0%
Starry flounder	17.2	6.3	2.1	337.5	0.0	0.0	0.0	0.0	363.1	1.0%
Butter sole	4.5	50.0	7.5	287.9	0.0	0.0	0.0	0.0	349.9	1.0%
Petrale sole	8.0	0.0	0.0	1.8	0.0	117.7	0.0	0.0	127.5	0.4%
English sole	<0.1	4.9	3.7	64.5	0.4	0.0	0.0	0.0	73.5	0.2%
Sand sole	0.0	39.9	1.8	7.4	0.0	0.0	0.0	0.0	49.1	0.1%
Deepsea sole	0.7	0.1	0.0	0.9	0.0	28.0	0.0	0.0	29.6	0.1%
Other flatfish*	0.8	5.5	3.2	7.8	0.5	0.0	0.0	0.0	17.7	0.1%
Total	3,749.2	12,131.3	389.1	16,150.6	33.1	1,604.2	634.1	50.5	34,742.0	
Percent by area	10.8%	34.9%	1.1%	46.5%	0.1%	4.6%	1.8%	0.1%		

*Species included in this category each made up less than 0.10% of the total flatfish catch and are listed in Table 64.

SUMMARY OF OBSERVER SAMPLING OFF THE COASTS OF WASHINGTON, OREGON, AND CALIFORNIA

Estimates of Domestic Groundfish Catches

Four U.S. catcher/processor vessels participated in domestic fishing for Pacific whiting in 1990. These vessels voluntarily carried observers and allowed them to sample their catches. Fishing operations were conducted in November and December in the Vancouver, Columbia, and Eureka International North Pacific Fisheries Commission areas (Fig. 18). Observers sampled all 41 fishing days (100% coverage). Groundfish catches were based solely on observer reports. The catch of Pacific whiting accounted for 4,476 t (or 94.8%) of the 4,722 t of groundfish caught (Table 67). Forty-six percent (113 t) of the bycatch of other fish were from the "other species" group.

Bycatch of Prohibited Species

Pacific Salmon

Domestic catcher/processor vessels caught 617 chinook salmon in 1990. No other species of Pacific salmon were observed in 1990. Pacific salmon were caught at a rate of 0.131 fish/t of Pacific whiting. By comparison, joint venture vessels caught Pacific salmon at a rate of 0.058 fish/t of Pacific whiting in 1990 (Guttormsen et al. 1992b).

Pacific Halibut

Domestic catcher/processor vessels caught 58 Pacific halibut (0.5 t), or at a rate of 0.013 fish/t of Pacific whiting. In contrast, the joint venture Pacific whiting fishery incidentally caught 75 Pacific halibut with a Pacific whiting catch of 172,069 t, or at a rate of less than 0.001 fish/t.

Rockfish Catch by Species

Seventeen species of rockfish were identified in catches taken by catcher/processor vessels in 1990 (Table 68). The "other" rockfish group refers to the five species that each made up less than 0.1% of the rockfish catch. Pacific ocean perch, which was the major rockfish species caught, comprised 49.7 t (or 48.38%) of the 102.7 t of the rockfish catch (Table 69), followed in importance by darkblotched rockfish (Sebastes crameri, 26.3 t) and shortspine thornyhead (17.1). The remaining fourteen species accounted for 9.3 t.

Flatfish Catch by Species

Observers identified 12 species of flatfish in 1990 (Table 70). The "other" flatfish group refers to the two species that each made up less than 0.1% of the flatfish catch. Of the 27.8 t of flatfish caught in 1990, 10.5 t were rex sole, 5.6 t were English sole (Pleuronectes vetulus), 5.2 t were arrowtooth flounder, 3.9 t were Pacific sanddab (Citharichthys sordidus, and 1.5 t were flathead sole (Table 71). The remaining seven species accounted for 0.9 t of the flatfish catch.

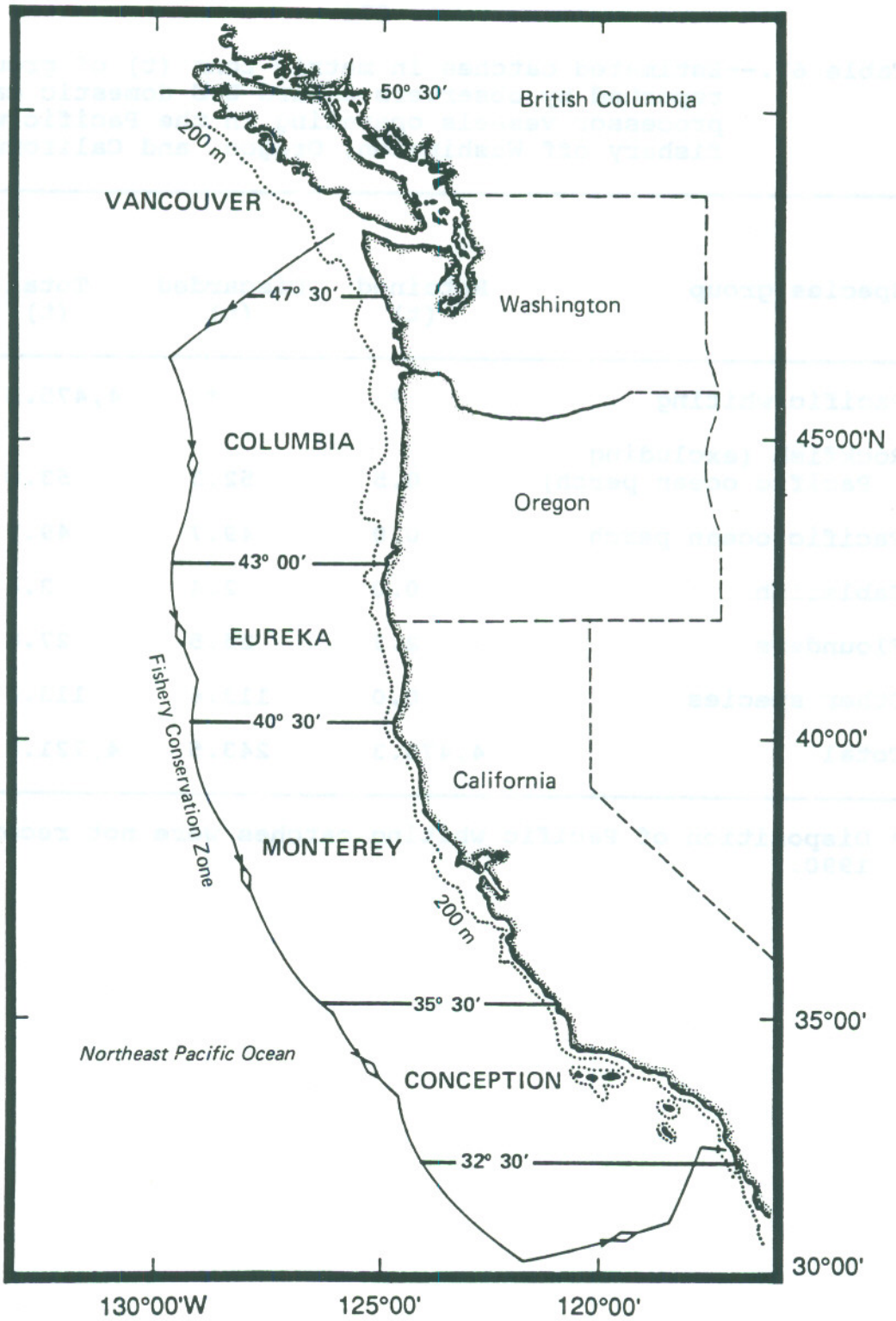


Figure 18.--International North Pacific Fisheries Commission statistical areas off the coasts of Washington, Oregon, and California.

Table 67.--Estimated catches in metric tons (t) of groundfish reported by observers aboard U.S domestic catcher/processor vessels operating in the Pacific whiting fishery off Washington, Oregon, and California, 1990.

Species group	Retained (t)	Discarded (t)	Total (t)	% of Pacific whiting catch
Pacific whiting	*	*	4,475.5	
Rockfish (excluding Pacific ocean perch)	0.5	52.5	53.0	1.2
Pacific ocean perch	0.0	49.7	49.7	1.1
Sablefish	0.0	2.4	2.4	<0.1
Flounders	2.3	25.5	27.8	0.6
Other species	0.0	113.4	113.4	2.5
Total	4,478.3	243.5	4,721.8	

* Disposition of Pacific whiting catches were not recorded in 1990.

Table 68.--Common and scientific names of rockfish identified by observers aboard U.S. catcher/processor vessels operating in the Washington-Oregon-California region, 1990.

Common name	Scientific name
Bocaccio	Sebastes paucispinus
Canary rockfish	Sebastes pinniger
Darkblotched rockfish	Sebastes crameri
Dusky rockfish	Sebastes ciliatus
Greenstriped rockfish	Sebastes elongatus
Pacific ocean perch	Sebastes alutus
Redbanded rockfish	Sebastes babcocki
Rougheye rockfish	Sebastes aleutianus
Shortraker rockfish	Sebastes borealis
Shortspine thornyhead	Sebastolobus alascanus
Splitnose rockfish	Sebastes diploproa
Yellowtail rockfish	Sebastes flavidus
Other rockfish*	
Aurora rockfish	Sebastes aurora
Redstripe rockfish	Sebastes proriger
Stripetail rockfish	Sebastes saxicola
Yellowmouth rockfish	Sebastes reedi
Widow rockfish	Sebastes entomelas

* The five species listed under "other rockfish" each made up less than 0.1% of the rockfish catch in U.S. domestic groundfish catches.

Table 69.--Estimated rockfish catch in metric tons (t) taken by U.S catcher/processor vessels operating in the Washington, Oregon, and California region, 1990.

Common name	Catch (t)	Percent of rockfish catch
Pacific ocean perch	49.7	48.38%
Darkblotched rockfish	26.3	25.67%
Shortspine thornyhead	17.1	16.61%
Splitnose rockfish	2.7	2.67%
Yellowtail rockfish	2.3	2.25%
Shortraker rockfish	1.0	0.99%
Rougheye rockfish	1.0	0.99%
Canary rockfish	1.0	0.95%
Dusky rockfish	0.5	0.47%
Redbanded rockfish	0.3	0.32%
Bocaccio	0.2	0.23%
Greenstriped rockfish	0.2	0.22%
*Other rockfish	0.1	0.08%
Total	102.7	

*Rockfish species that made up less than 0.10% of the total rockfish catch are included in this category.

Table 70.--Common and scientific names of flatfish identified by observers aboard U.S. catcher/processor vessels operating in the Washington-Oregon-California region, 1990.

Common name	Scientific name
Arrowtooth flounder	Atheresthes stomias
Curlfin sole	Pleuronichthys decurrens
Dover sole	Microstomus pacificus
English sole	Pleuronectes vetulus
Flathead sole	Hippoglossoides elassodon
Pacific sanddab	Citharichthys sordidus
Petrale sole	Eopsetta jordani
Rex sole	Errex zachirus
Sand sole	Psettichthys melanostictus
Slender sole	Eopsetta exilis
Other flatfish*	
Rock sole	Pleuronectes bilineata
Roughscale sole	Clidoderma asperrimum

* The two species listed under "other flatfish" each made up less than 0.1% of the flatfish catch in U.S. domestic groundfish catches.

Table 71.--Estimated flatfish catch in metric tons (t) taken by U.S catcher/processor vessels operating in the Washington, Oregon, and California region, 1990.

Common name	Catch (t)	Percent of flatfish catch
Rex sole	10.5	37.99%
English sole	5.6	20.29%
Arrowtooth flounder	5.2	18.71%
Pacific sanddab	3.9	14.22%
Flathead sole	1.5	5.51%
Dover sole	0.2	0.75%
Sand sole	0.2	0.73%
Slender sole	0.2	0.73%
Petrale sole	0.2	0.73%
Curlfin sole	0.1	0.27%
*Other flatfish	<0.1	0.09%
Total	27.8	

*Flatfish species that made up less than 0.10% of the total rockfish catch are included in this category.

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