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Groundfish Food Habits and Predation on Commercially Important Prey Species in the Eastern Bering Sea from 1990 to 1992

April 1996

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Groundfish Food Habits and Predation on Commercially Important Prey Species in the Eastern Bering Sea from 1990 to 1992

by

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ABSTRACT

This document describes the feeding habits of major groundfish species in the eastern Bering Sea based on stomach content information collected during 1990, 1991, and 1992. The total consumption of commercially important prey species by groundfish populations is calculated for the main feeding period of May through September during 1990, 1991, and 1992. Estimated predation mortality in terms of numbers and biomass during this period is presented. These estimates are compared with existing knowledge of prey species abundance. Possible impact of predation on prey species abundance patterns is discussed.

CONTENTS

EXECUTIVE SUMMARY

This document summarizes groundfish predation on commercially important stocks of fish and crabs on the eastern Bering Sea shelf from 1990 to 1992. The amount of predation is calculated using estimates of predator biomass, daily ration, and the proportion of various prey categories in the stomach contents. Estimates are presented in terms of number and biomass of prey consumed during the main sampling period of May through September of each year.

Predator and Prey Species

The following groundfish predators are included in this report because they are dominant members of the eastern Bering Sea shelf fish fauna that consume commercially important fish or crab. The commercially important prey eaten by some of these predators are also listed below:

Groundfish predators	Commercially important prey
Walleye pollock	Walleye pollock
Pacific cod	Pacific cod
Yellowfin sole	Yellowfin sole
Greenland turbot	Greenland turbot
Arrowtooth flounder	Arrowtooth flounder
Flathead sole	Flathead sole
Pacific halibut	Rock sole
Alaska plaice	Pacific halibut
Rock sole	Pacific herring
Skates	King crabs
	Snow crab
	Tanner crab

Total Groundfish Consumption Estimates

The total amount of each prey consumed from May to September of 1984 to 1992 is presented in Tables 1 and 2. These estimates are the sum of the consumption by each predator species. Unlike previous reports, the estimated consumption of walleye pollock does not include cannibalism for the period October to December.

Biomass consumed is converted to number consumed using available prey size information. If prey size information was lacking for a predator, number consumed could not be estimated. Total number consumed is an underestimate in these cases and is shown in parentheses.

Estimated number at-age of snow crab (Chionoecetes opilio), Tanner crab (C. bairdi), and walleye pollock (Theragra chalcogramma) consumed by groundfish predators are presented in Tables 3-5 and Figure 1. Total numbers of age-0 and age-1 snow crab consumed were large from 1990 to 1992, probably indicating large recruitment in those years. However, consumption of age-0 Tanner crab in recent years was low, a potential indication of low recruitment. Age-0 pollock consumption was relatively low in 1991 and 1992, possibly indicating low recruitment.

Table 1. – Estimated total biomass (metric tons) by year of commercially important prey consumed by groundfish from May through September in the eastern Bering Sea. Consumption of walleye pollock includes cannibalism estimates for 1985-1992.

Prey	Year 1984	1985	1986	1987	1988	1989	1990	1991	1992
King crabs	2,684	1,136	2,867	845	568	1,935	348	8	1,035
Snow crab (Chionoecetes opilio)	98,818	132,467	149,078	151,242	62,173	129,343	149,049	139,349	102,086
Tanner crab (Chionoecetes bairdi)	63,189	89,991	48,822	107,134	55,825	88,520	63,432	40,179	36,516
Pacific cod	13,430	9,978	9,302	8,881	1,330	7,762	42,534	3,075	4,123
Walleye pollock	314,783*	1,443,121	1,158,022	697,131	706,000	745,825	1,813,469	852,814	926,936
Pacific herring	0	19,322	44,440	12,286	5,440	79	16,410	10,674	3,600
Atka mackerel	0	0	0	1,650	0	0	3,187	0	0
Arrowtooth flounder	4,327	15,436	781	13,761	0	464	832	1,164	10,551
Flathead sole	9,787	5,929	13,993	1,965	1,454	25,718	7,325	3,260	12,312
Rock sole	8,020	20,843	38,804	18,552	5,156	15,283	6,309	10,677	36,038
Yellowfin sole	56,291	28,359	42,330	17,394	9,671	7,190	5,203	5,394	6,391
Greenland turbot	3,919	0	0	0	16	17,635	12,922	635	2,559
Pacific halibut	89	0	0	0	185	0	0	68	1,481
Alaska plaice	0	0	0	0	0	13	0	0	557

* Walleye pollock cannibalism estimate was not available for 1984.

Table 2. -- Estimated number (millions) by year of commercially important prey consumed by groundfish from May through September in the eastern Bering Sea. Values in parentheses indicate cells with some missing prey size information and therefore are underestimates of the total number consumed. Consumption of walleye pollock includes cannibalism estimates for 1985-1992.

Prey	Year 1984	1985	1986	1987	1988	1989	1990	1991	1992
King crabs	(35,566) [a]	(2)	(5)	(1)	8	(3)	(0)	(1)	1
Snow crab (Chionoecetes opilio)	(30,921)	12,235	13,042	(10,666)	11,870	(20,805)	67,938	(34,941)	(38,042)
Tanner crab (Chionoecetes bairdi)	(152,850)	(13,926)	9,898	42,632	14,659	(27,244)	20,514	18,512	(6,614)
Pacific cod	(1,124)	3,263	(76)	8,194	2	(75)	(6,772)	(61)	(29)
Walleye pollock	(47,832)[b]	(664,467)	(160,511)	91,049	56,858	554,766	(228,351)	(31,119)	(48,062)
Pacific herring	0	(303)	(554)	(23)	140	(1)	(909)	71	(0)
Atka mackerel	0	0	0	8	0	0	(0)	0	0
Arrowtooth flounder	1,920	(3)	(40)	3,791	0	(101)	174	13	(25,874)
Flathead sole	363	2,128	381	210	761	(4,292)	(4,623)	146	(261)
Rock sole	23,611	5,514	1,688	1,531	(5,809)	1,694	975	(1,035)	(709)
Yellowfin sole	480	313	651	63,767	(87)	16,909	78	48	(118)
Greenland turbot	81,721	0	0	0	17	(30,328)	34,128	1,278	17,215
Pacific halibut	728	0	0	0	665	0	0	507	(2,093)
Alaska plaice	0	0	0	0	0	9	0	0	(0)

[a] Most king crab consumed in 1984 were blue king crab megalops larvae.

[b] Walleye pollock cannibalism estimate was not available for 1984.

Table 3.– Estimated number (millions) of snow crab, Chionoecetes opilio, consumed by age by groundfish from May through September in the eastern Bering Sea.

	Year								
Age	1984	1985	1986	1987	1988	1989	1990	1991	1992
0	0	0	0	0	312.07	0	12,386.71	12,414.24	3,474.40
1	28,596.70	7,001.20	5,880.00	5,293.27	10,016.68	17,238.94	7,486.98	5,843.12	2,980.90
2	1,700.50	4,385.50	6,464.40	2,808.65	920.02	2,530.76	499.14	151.02	63.38
3	559.10	792.00	655.90	1,513.75	530.21	925.31	90.36	96.84	33.56
4	64.60	56.20	41.50	16.23	68.96	102.14	47.76	6.46	42.83
5	0	0	0	9.02	0	4.14	3.54	0	19.23
6	0	0	0	13.20	0	4.14	0	0	0

Table 4.– Estimated number (millions) of Tanner crab, Chionoecetes bairdi, consumed by age by groundfish from May through September in the eastern Bering Sea.

	Year								
Age	1984	1985	1986	1987	1988	1989	1990	1991	1992
0	139,312.90	5,371.70	3,370.70	27,883.16	1,074.11	18,646.08	6.83	730.54	0
1	13,161.40	7,693.00	6,644.70	10,637.84	13,204.82	7,925.99	62,464.29	29,376.67	34,918.99
2	296.30	650.50	191.10	576.12	361.90	549.16	4,737.75	4,319.00	2,596.80
3	87.60	197.60	6.50	98.75	11.84	82.06	637.84	457.88	432.76
4	0	12.90	0	0	2.76	32.45	91.31	52.94	78.21
5	0	0	0	0	2.76	8.05	0	3.49	13.94
6	0	0	0	0	0	0	0	0	1.26

Table 5.- Estimated number (millions) of walleye pollock consumed by age by groundfish from May through September in the eastern Bering Sea.

	Year								
Age	1984	1985	1986	1987	1988	1989	1990	1991	1992
0	43,819.42	642,951.50	121,822.70	80,252.80	43,635.30	544,371.20	177,071.06	8,962.40	31,857.13
1	4,042.00	26,667.90	37,203.10	9,220.75	11,826.20	9,193.03	48,480.70	20,871.53	13,966.42
2	188.10	546.60	1,092.10	1,627.61	673.74	486.78	1,981.31	823.98	1,019.12
3	152.50	210.00	347.90	205.46	187.25	156.48	344.22	151.73	705.12
4	77.30	97.00	59.20	33.13	230.55	164.29	187.53	98.44	201.42
5	50.50	48.90	67.00	13.04	126.82	154.44	124.37	54.12	80.51
6+	39.70	32.00	87.10	9.50	135.65	216.17	161.53	157.27	232.43

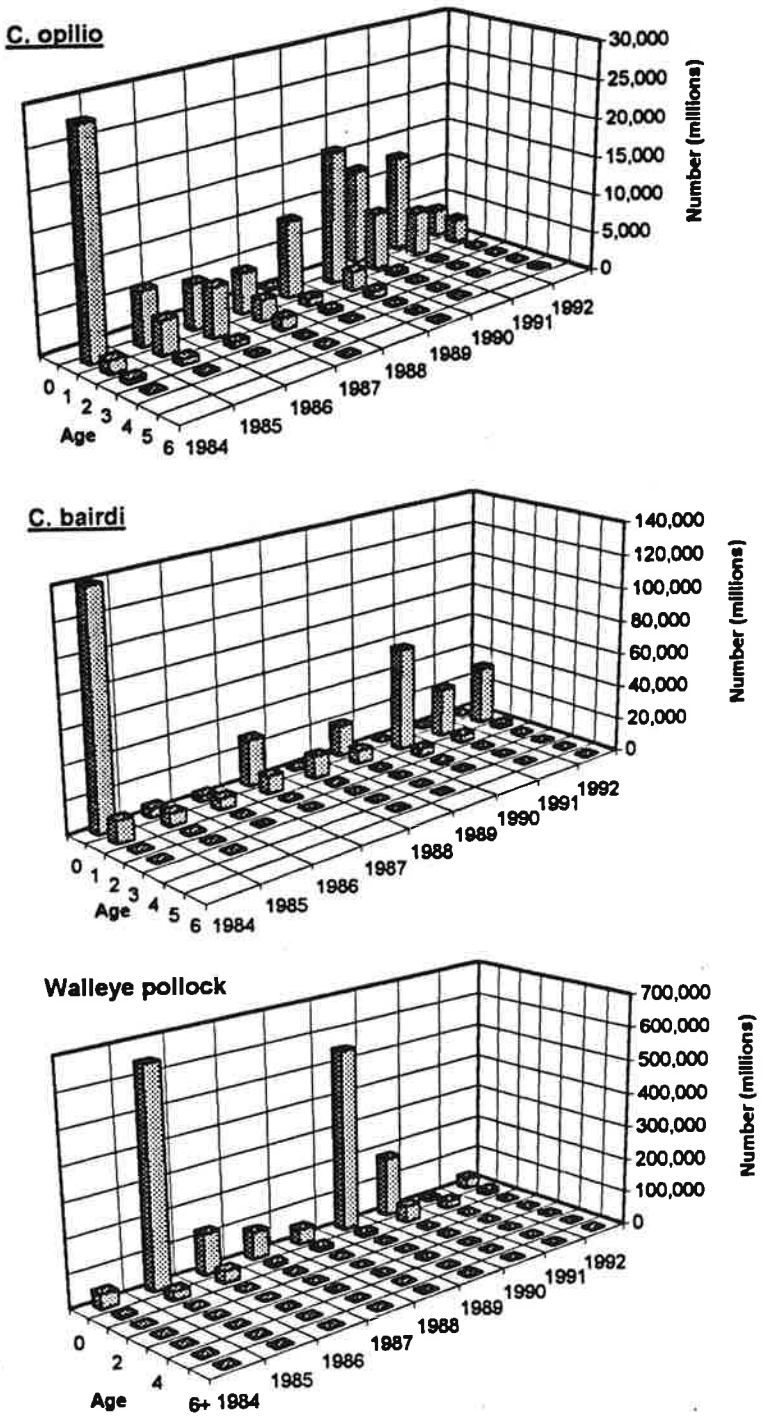

Figure 1.- Estimated number at-age of snow crabs (Chionoecetes opilio), Tanner crabs (C. bairdi), and walleye pollock, consumed by groundfish during months 5 to 9 from 1984 to 1992 in the eastern Bering Sea. (There was no cannibalism estimate for walleye pollock in 1984.)

INTRODUCTION

Many large marine fish are predators of either juvenile or small adult fish and crab. Because predation forms the largest part of natural mortality of young fish and crab, it is important to estimate the magnitude of predation loss on commercially important populations. Population models that assume constant natural mortality rates due to a lack of information on actual rates can be improved by providing more accurate estimates of predation losses. The move toward multispecies management of stocks can be helped through studying the food web connections between components of marine ecosystems, which include fish, crabs, marine mammals, and birds.

The primary purpose of the Trophic Interactions Program of the Resource Ecology and Fisheries Management Division (REFM) at the Alaska Fisheries Science Center (AFSC) is to study the consumption of commercially important fish or crab by key fish predators in the eastern Bering Sea. These fish and the fish they consume are commercially important species and form a major part of the groundfish biomass in the eastern Bering Sea. Program objectives include providing impact assessments relating to fish predation effects on prey species populations, improving population model estimates of predation mortality by marine fish, and detecting possible changes in abundance and distribution of juvenile fish and crab populations.

This paper reports the progress of the Trophic Interactions Program of the REFM Division of the AFSC in analyzing available data from 1990 to 1992 on the predation of commercially important fish and crab species. The first section details the methods used to estimate the total biomass and numbers of prey consumed by the major groundfish species in the area. The second section summarizes the consumption of commercially important prey by all the major predators. Appendices summarize the diet and total prey consumption by the following predators: walleye pollock, Pacific cod (Gadus macrocephalus), yellowfin sole (Pleuronectes asper), flathead sole (Hippoglossoides elassodon), rock sole (Pleuronectes bilineatus, Alaska plaice (Pleuronectes quadrituberculatus), Greenland turbot (Reinhardtius hippoglossoides), arrowtooth flounder (Atheresthes stomias), Pacific halibut (Hippoglossus stenolepis), and skates (Rajidae).

METHODS

Sample Collection and Laboratory Analysis

Stomachs were collected from major groundfish species during 1990, 1991, and 1992 in the eastern Bering Sea. Samples were taken primarily during May through September using bottom and pelagic trawl gear on research and commercial fishing vessels. Sampling occurred throughout the 24-hour day, although most sampling occurred between 0600 and 2000 Alaska daylight time. For all species, stomachs were removed at sea and placed in cloth bags labelled with information regarding the location of capture, fork length, sex, and sexual maturity of the fish. Fish showing evidence of regurgitation (i.e., food in the mouth or throat or a flaccid stomach) were not included in the sample. Stomachs were preserved in 10% formalin and later transferred to 70% ethyl alcohol. Contents were identified to the lowest taxonomic level possible and enumerated. Wet weights were recorded after the contents were blotted with paper towels. Standard length (SL) measurements of prey fish and carapace width (CW) or lengths (CL) of crab prey were taken when whole prey were available.

The prey category "offal" was used if the ingested item had obviously been discarded from a processor (i.e., a consumed fish that had its head sliced off with a clean diagonal cut).

Data Analysis

Prey Consumption by Predator Populations

Estimates of the total biomass of each prey species consumed by the continental shelf portion of each groundfish population were calculated according to

$$C_i = DR_i * D * B_i * P_i \ , \qquad (1)$$

where C_i is the consumption (by weight) of a prey species by size group i of a predator species, DR_i is the daily ration (as a proportion of body weight daily, BWD) of predator size group i, D is the number of days in the sampling period when the prey species was vulnerable to predation, B_i is the biomass of the

predator size group i, and P_i is the proportion by weight of the prey species in the diet of predator size group i.

Total consumption estimates using Equation (1) were computed within each major stratum of the eastern Bering Sea (Fig. 1). These strata were devised by the Resource Assessment and Conservation Engineering (RACE) Division of the AFSC to reflect, in general, natural boundaries based on bottom depth. Strata 1 and 2 are considered inner continental shelf areas, strata 3 and 4 comprise the middle shelf, and strata 5 and 6 are the outer shelf zones.

Predator size groupings used for total consumption estimates were based on size groupings used previously (Livingston et al. 1986, Livingston 1991, Livingston et al. 1993) and on knowledge of each predator's diet. If consumption of commercially important prey groups differed among predator sizes, then predator size groups were chosen to minimize such consumption differences within a size group.

Daily ration (DR) estimates were derived using some basic bioenergetic considerations as an alternative to using rations estimated from gastric evacuation rate models and field-estimated stomach content weights. As Livingston et al. (1986) found, estimates derived from gastric evacuation rate models tend to be lower than expected based on known annual growth patterns of eastern Bering Sea species. Part of the problem with rations estimated in this fashion may be due to undetected regurgitation of stomach contents from field collections. It is believed that more realistic rations can be derived using bioenergetic variables such as annual growth increments and food conversion efficiency estimates; thus, that is the approach used here. Daily growth in weight of each species size group was estimated from annual growth increments by length and length-weight relationships for each species. A gross conversion efficiency rate of food to somatic tissue for juvenile fish was assumed to be 25% and for adult fish was assumed to be 10% based on estimates presented by Brett and Groves (1979). Daily growth increments could thus be converted to the amount of food required to produce that growth. When the daily food requirements are divided by mean fish weight, then the result is daily ration expressed as a fraction of body weight:

Predator	Predator size (cm)	Daily ration
Pacific cod	<30	0.012
	30-59	0.009
	≥60	0.007
Walleye pollock	<30	0.011
	30-39	0.011
	40-49	0.008
	≥50	0.004
Greenland turbot	<30	0.011
	30-49	0.013
	≥50	0.005
Arrowtooth flounder	<20	0.009
	20-39	0.009
	≥40	0.007
Pacific halibut	<30	0.014
	30-59	0.010
	≥60	0.004
Flathead sole	all sizes	0.007
Yellowfin sole	all sizes	0.004
Alaska plaice	all sizes	0.005
Rock sole	all sizes	0.007
Skates	all sizes	0.007

The time period of analysis (D) for total consumption estimates by all predator species was months 5 to 9, or 153 days. The analysis was restricted to this time period because most stomach samples were collected during this period and survey estimates of groundfish biomass were obtained at this time.

Unquantified migrations of fish into different strata occur and insufficient numbers of stomach samples were taken in each stratum outside of this time period. Thus, total consumption estimates made outside of this time period would not be very reliable. Since months 5 to 9 are probably the main feeding and growth period for groundfish in the eastern Bering Sea, these total consumption estimates can be considered conservative estimates of total annual predation removals by these groundfish populations.

Total consumption estimates of king crabs by Pacific cod were restricted to a 31-day period during months 5 to 9 when it is most likely that soft-shell (newly molted) king crabs were available. Unlike previous reports, total consumption estimates for walleye pollock cannibalism were not made for months 10 to 12 because of low sample sizes during this period in 1990 to 1992.

Predator biomass estimates (B) (listed in the respective appendix for each species) for flathead sole, rock sole, Alaska plaice, Greenland turbot,arrowtooth flounder, and skates were obtained from RACE Division bottom trawl survey data. These trawl surveys are conducted in the eastern Bering Sea during June to August of each year. Biomass estimates of arrowtooth flounder and Greenland turbot include only the shelf portion of the populations. Biomass estimates of walleye pollock, a semipelagic fish, were obtained from Wespestad (1994). Biomass estimates of Pacific cod, yellowfin sole and rock sole were obtained from synthesis model estimates presented in Thompson (1994), Wilderbuer (1994), and Wilderbuer and Walters (1994), respectively. Pacific halibut biomass estimates were derived from a combination of sources: RACE Division bottom trawl survey data for halibut <80 cm [1] and International Pacific Halibut Commission estimates from CAGEAN model results for age 8+ ($\geq$ 80 cm) halibut.[2] Biomasses of species obtained from model outputs were apportioned into each stratum by using the proportion of the trawl survey biomass found in each stratum.

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[1]Gary Walters, Alaska Fisheries Science Center, 7600 Sand Point Way NE, Seattle, WA 98115, Pers. commun., 1995.

[2]Patrick Sullivan, International Pacific Halibut Commission, P.O. Box 95009, Seattle, WA 98145-2009, Pers. commun., 1995.

The proportion by weight of each prey item in the diet of each predator size group was calculated for each stratum in the following fashion. First, all stomach content data for a particular fish species size group that was collected in a stratum during months 5 to 9 in a given year were used. Estimates of the percentage by weight of a given prey item in the stomach contents were then calculated for each 20 nautical mile square in the stratum where stomachs were collected. The estimated percent by weight of the prey item in the whole stratum was then calculated as the average of the percentages from each 20 nautical mile square. Standard errors of the stratum percentages were derived from the variance between squares.

For strata where prey size information was available, total consumption estimates in terms of biomass were converted to number of prey. The size frequency of a particular prey in the stomach contents of a given predator size group from a stratum in a particular year during months 5 to 9 was used along with the length-weight relationship for the prey to convert biomass consumed within a particular prey size interval to number consumed. If prey size information for a given predator size group was not available for a given stratum, then the size frequency of that prey in all strata combined for the predator size group was used. Finally, when no prey size information was available, the number consumed could not be estimated.

Snow (Chionoecetes opilio) and Tanner (C. bairdi) crabs and walleye pollock were assigned to approximate age groups based on the following age-length conversions:

Age (years)	Carapace width (mm)		Standard length (cm)
	C. opilio	C. bairdi	Walleye pollock
0	<5	<9	<10
1	5-24	9-34	10-19
2	25-39	35-49	20-27
3	40-59	50-69	28-33
4	60-74	70-84	34-37
5	75-94	85-104	38-40
6+	≥95	≥105	≥41

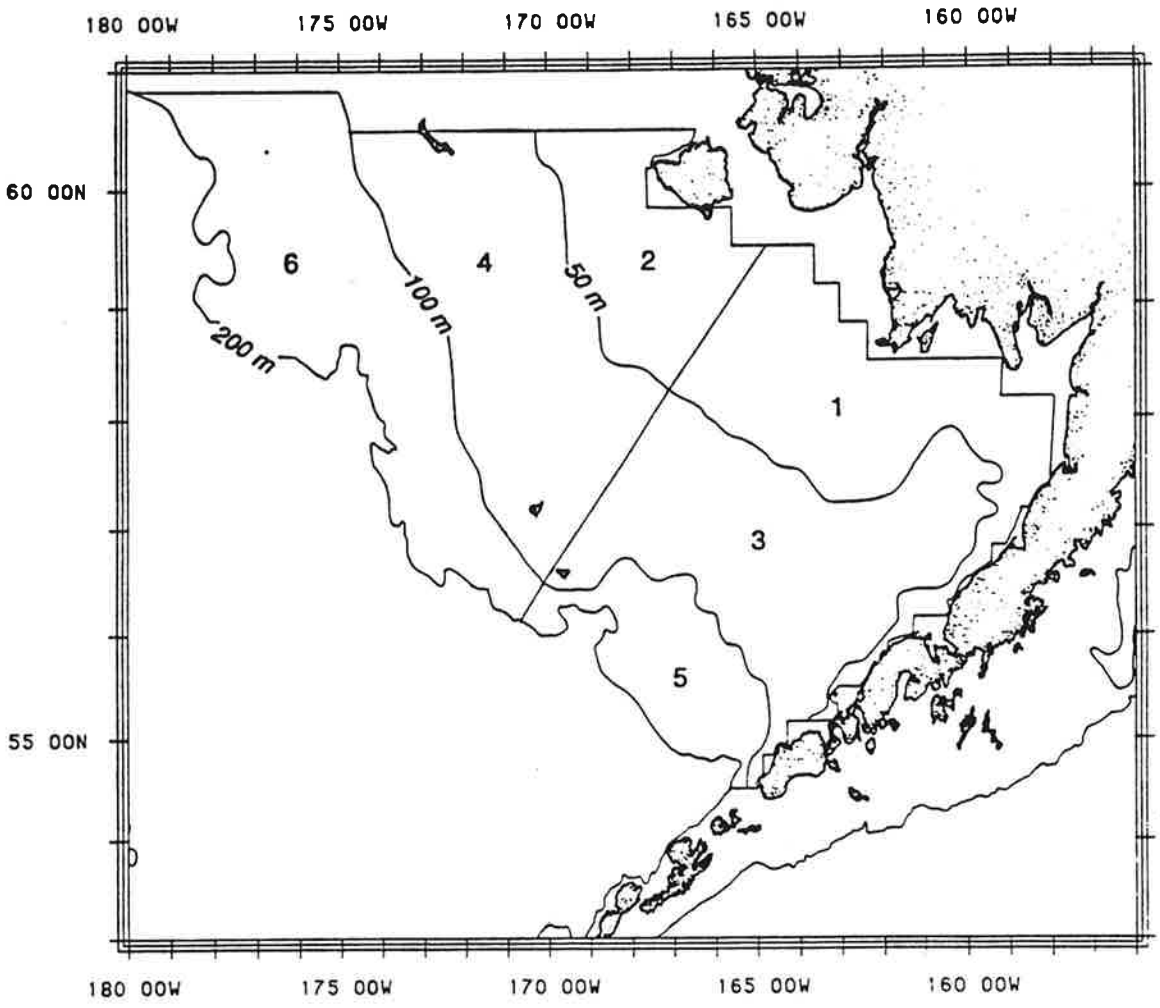

Figure 2.--Map of the eastern Bering Sea shelf showing bottom depth zones and strata used in this report.

RESULTS AND DISCUSSION

Groundfish Predation on Commercially Important Prey

The total impact of groundfish predation on a particular prey species was estimated by summing the individual predator species removals described in the appendices. Comparison of total fish predation with each predator species' removals provides an indication of which predator population tends to be the most important source of mortality for a prey population. Also, comparison of total predation removals with prey population size demonstrates the relative importance of predation as a source of mortality. Finally, interannual fluctuations in predation on a particular age group of prey may give early indications of changes in abundance of prey age groups before they are vulnerable to assessment by trawl survey. The total consumption of each important prey group is summarized in terms of estimated biomass and numbers removed by groundfish predation in the eastern Bering Sea for segments of the years 1990 to 1992.

King Crabs

Tables 6-7 and Figure 2 present the estimated total biomass and number of king crabs consumed by all groundfish predators for 31 days during months 5 to 9 in 1990 to 1992.

Red king crab--Pacific cod was the main predator of red king crabs (*Paralithodes camtschatica*) and king crabs that could not be identified to the species level. Most of the unidentified king crabs consumed by Pacific cod were assumed to be red king crabs based on the locations where unidentified king crabs were consumed. These crabs were assumed to be soft-shell females based on the timing and location of consumption by Pacific cod. Walleye pollock was a minor predator on king crabs and probably consumed pelagic larvae. Pacific halibut was also a minor consumer of king crab. No king crab from Pacific halibut stomachs were measurable. The largest amounts of king crab consumed were by Pacific cod consuming king crab legs in 1991 and 1992. Pacific cod consumption of red king crab and unidentified king crab (not including legs only consumption) was 1,200, 326, and 1035 metric tons (t) in 1990,1991, and 1992, respectively. Groundfish predation on king crab in terms of biomass during these three years was similar to the estimated predation for the 1987-1989 period, which ranged from 554 t to 1,928.2 t (Livingston et al. 1993). Abundance of female red king crab (Stevens et al. 1996) during the 1990 to 1992 time period was about the same as abundance in 1988 and 1989.

Snow and Tanner Crabs

Total biomass of snow and Tanner crabs consumed by groundfish predators is presented in Table 8. Table 9 presents data on the estimated number of snow crabs consumed in areas where prey size information was available, so they should be considered the minimum number consumed by groundfish predators. Figures 3-4 show the biomass and numbers removed by prey size.

Snow crabs--The main predator of snow crabs, in terms of estimated biomass removed, was Pacific cod. Pacific cod consumed at least 60% of the total biomass removals of snow crabs in all three years. The remaining predators were Alaska plaice, flathead sole, walleye pollock, Pacific halibut, rock sole,skates, and yellowfin sole. Biomass of snow crabs consumed by Pacific cod decreased from 1990 (118,019.7 t) to 1992 (78,483 t), and numbers consumed by Pacific cod showed a similar decline over the time period. Unlike the 1987 to 1989 period, consumption of snow crab by the other groundfish predators occurred every year. This could indicate the availability of more small snow crab in the 1990 to 1992 period compared to the 1987 to 1989 period because most of the other predators on snow crab were flounders with relatively small mouth gapes.

Most of the sampled snow crab consumed in 1988 and 1989 were less than 15 mm CW or approximately age 0 to age 1. Stevens et al. (1991) note strong recruitment of postlarval crab in the last few years. The large numbers of ages 0-1 crab consumed in 1990 may be a reflection of above-average numbers of small crab recruiting into the southeastern Bering Sea shelf population. Monitoring the amount of predation on small crabs by these predators may provide early indications of the presence of abundant year classes of crabs.

Tanner crabs--Estimated total biomass of Tanner crabs consumed by all predators decreased from 1990 (63,432 t) to 1992 (36,516 t). Like snow crabs, most of the biomass removed was due to Pacific cod predation. However, most of the number consumed was due to predation on small (1-20 mm CW) crab by flatfish such as flathead sole, rock sole, and yellowfin sole. Total number consumed was highest in 1990 (20,514 million) but was much lower than the estimate of total number consumed in 1984, which was 152,850 million (Livingston 1991). This may be an indication that there has not been any increased recruitment of Tanner crab since 1984.

Table 6.- Estimated total biomass (metric tons) of king crabs consumed by groundfish by year during months 5 to 9 in the eastern Bering Sea.

Prey	Predator		Biomass consumed 1990	1991	1992
Lithodidae					
	Pacific cod		852.13	318.30	0
	Walleye pollock		0	0	1.21
	Pacific halibut		0	3.12	0
		Total	852.13	321.42	1.21
King crab legs					
	Pacific cod		0	1,892.79	2,261.09
		Total	0	1,892.79	2,261.09
Paralithodes camtschatica (red king crab)	Pacific cod		348.16	7.53	1,035.37
		Total	348.16	7.53	1,035.37

Table 7. – Estimated total number (millions) of king crabs consumed by groundfish by year during months 5 to 9 in the eastern Bering Sea. Values in parentheses indicate cells with some missing prey size information and therefore are underestimates of the total number consumed.

Prey	Predator	Number consumed 1990	1991	1992
Paralithodes camtschatica (red king crab)	Pacific cod	(0)	0.55	0.98
	Total	0	0.55	0.98

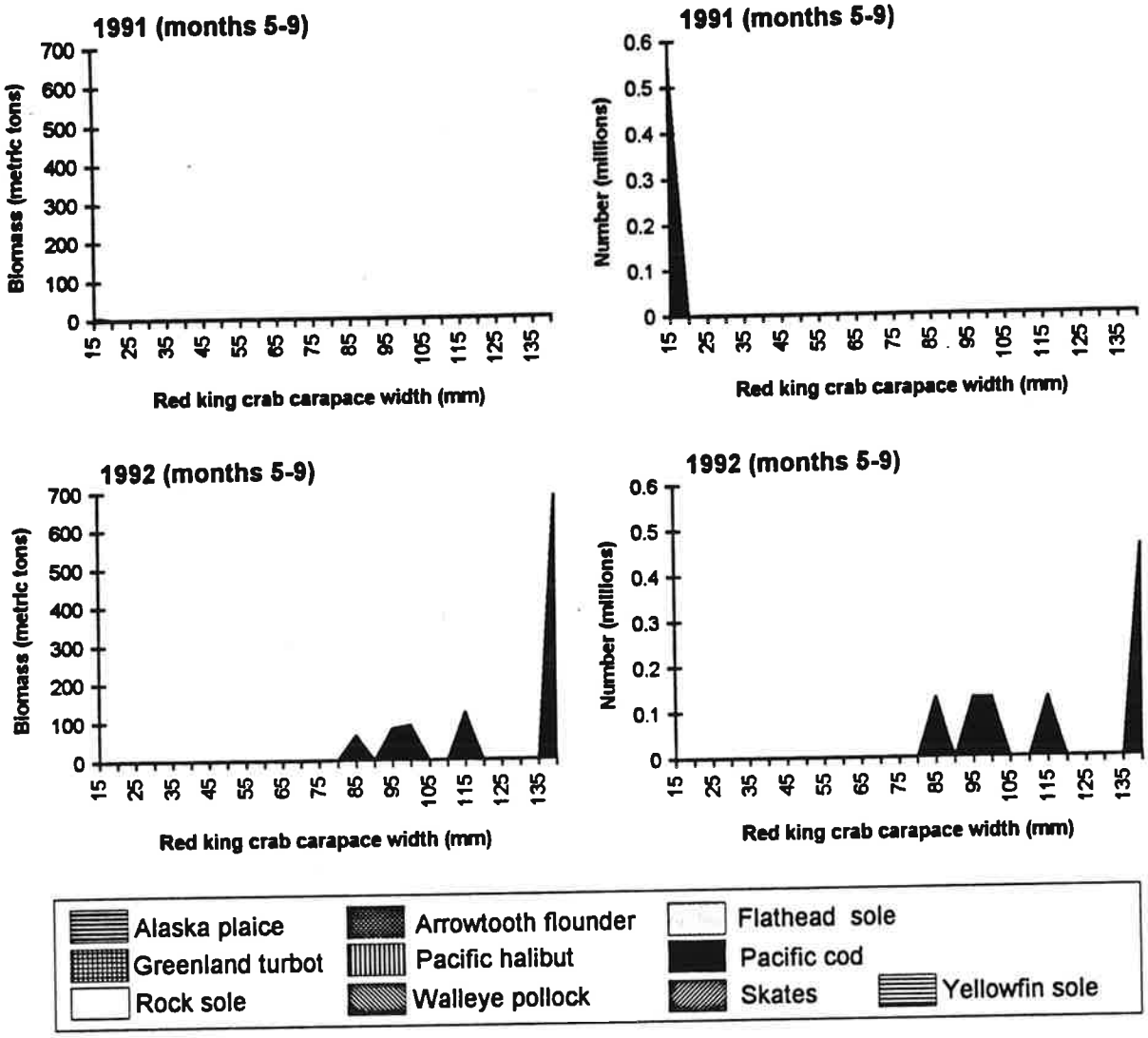

Figure 3. – Estimated biomass and numbers of red king crab consumed by groundfish predators during months 5 to 9 in 1991 and 1992 in the eastern Bering Sea by prey size.

Table 8. - Estimated total biomass (metric tons) of Tanner crabs (Chionoecetes bairdi), snow crabs (C. opilio), and Unidentified Chionoecetes consumed by groundfish by year during months 5 to 9 in the eastern Bering Sea. (ns = not sampled)

Prey	Predator	Biomass consumed 1990	1991	1992
C. opilio				
	Alaska plaice	5,534.80	3,252.77	63.75
	Flathead sole	4,713.85	15,778.62	13,496.37
	Pacific cod	118,019.70	87,997.81	73,483.04
	Pacific halibut	2,391.19	1,769.67	1,470.58
	Rock sole	1,769.58	5,076.41	3,346.72
	Skates	ns	ns	9,579.25
	Walleye pollock	444.10	2,412.00	441.06
	Yellowfin sole	16,175.66	23,061.22	204.98
	Total	149,048.88	139,348.50	102,085.75
C. bairdi				
	Flathead sole	11,136.61	2,796.51	2,900.48
	Pacific cod	47,379.57	32,090.62	30,780.00
	Pacific halibut	1,058.39	2,355.24	809.04
	Rock sole	111.87	0	0
	Skates	ns	ns	1,574.96
	Walleye pollock	0	460.56	0
	Yellowfin sole	3,745.64	2,475.89	451.33
	Total	63,432.08	40,178.82	36,515.81
Unid. Chionoecetes	Alaska plaice	2,094.62	0	141.80
	Flathead sole	10,978.23	1,186.28	1,468.92
	Pacific cod	36,095.24	47,037.73	15,101.53
	Pacific halibut	779.85	244.23	985.44
	Rock sole	15,459.39	2,555.16	757.94
	Skates	0	0	8,221.85
	Walleye pollock	19,469.29	11,794.41	585.39
	Yellowfin sole	46,758.85	16,463.50	15,178.25
	Total	131,635.47	79,281.31	42,441.12

Table 9. - Estimated total number (millions) of Tanner crabs (Chionoecetes bairdi), snow crabs (C. opilio), and Unidentified Chionoecetes consumed by groundfish by year during months 5 to 9 in the eastern Bering Sea. Values in parentheses indicate cells with some missing prey size information and therefore are underestimates of the total number consumed. (ns = not sampled.)

Prey	Predator	Number consumed 1990	1991	1992
C. opilio				
	Alaska plaice	25,763.01	(195.41)	72.22
	Flathead sole	2,868.14	12,484.10	19,589.77
	Pacific cod	20,485.75	(10,977.24)	(6,683.43)
	Pacific halibut	930.94	(243.90)	365.41
	Rock sole	3,298.98	5,750.33	8,720.13
	Skates	ns	ns	2,305.85
	Walleye pollock	503.06	1,401.71	72.96
	Yellowfin sole	14,088.14	3,887.83	232.19
	Total	67,938.02	34,940.52	38,041.96
C. bairdi				
	Flathead sole	11,345.54	2,066.83	4,425.63
	Pacific cod	2,202.10	9,188.17	(2,012.50)
	Pacific halibut	50.32	321.84	(50.06)
	Rock sole	302.63	0	0
	Skates	ns	ns	126.11
	Walleye pollock	0	237.05	0
	Yellowfin sole	6,613.90	6,697.79	(0)
	Total	20,514.49	18,511.68	6,614.30
Unid. Chionoecetes	Alaska plaice	7,485.35	0	164.30
	Flathead sole	(26,215.41)	(26,800.28)	(26,689.29)
	Pacific cod	(35,028.26)	(15,637.94)	(12,235.17)
	Pacific halibut	(0)	(0)	(574.80)
	Rock sole	(1,255.93)	(0)	(100.05)
	Skates	ns	ns	(2,387.54)
	Walleye pollock	45,445.58	(0)	(0)
	Yellowfin sole	173,609.62	(0)	(0)
	Total	289,040.15	42,438.22	42,151.15

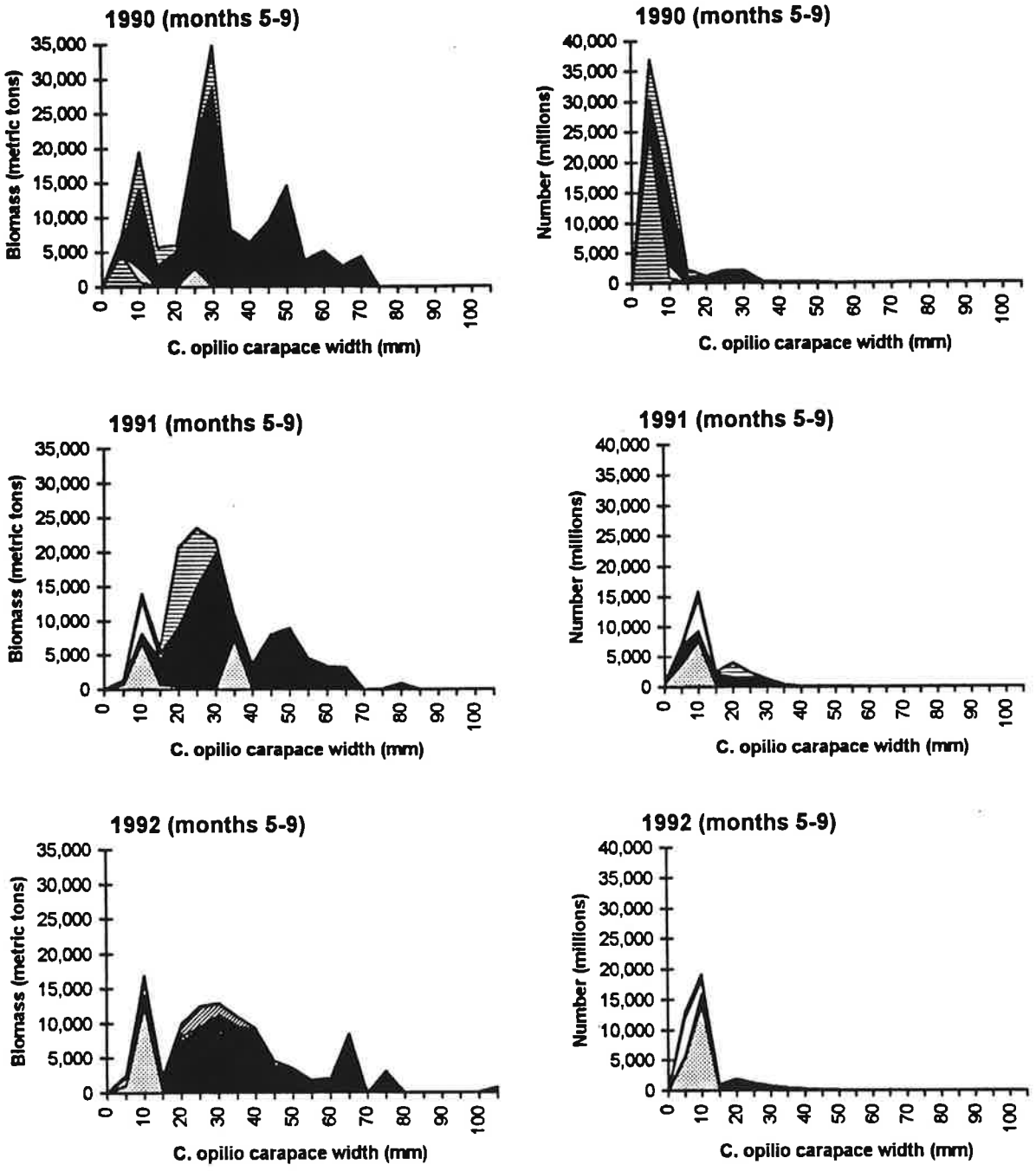

Figure 4. -- Estimated biomass and numbers of C. opilio consumed by groundfish predators during months 5 to 9 in 1990, 1991 and 1992 in the eastern Bering Sea by prey size.

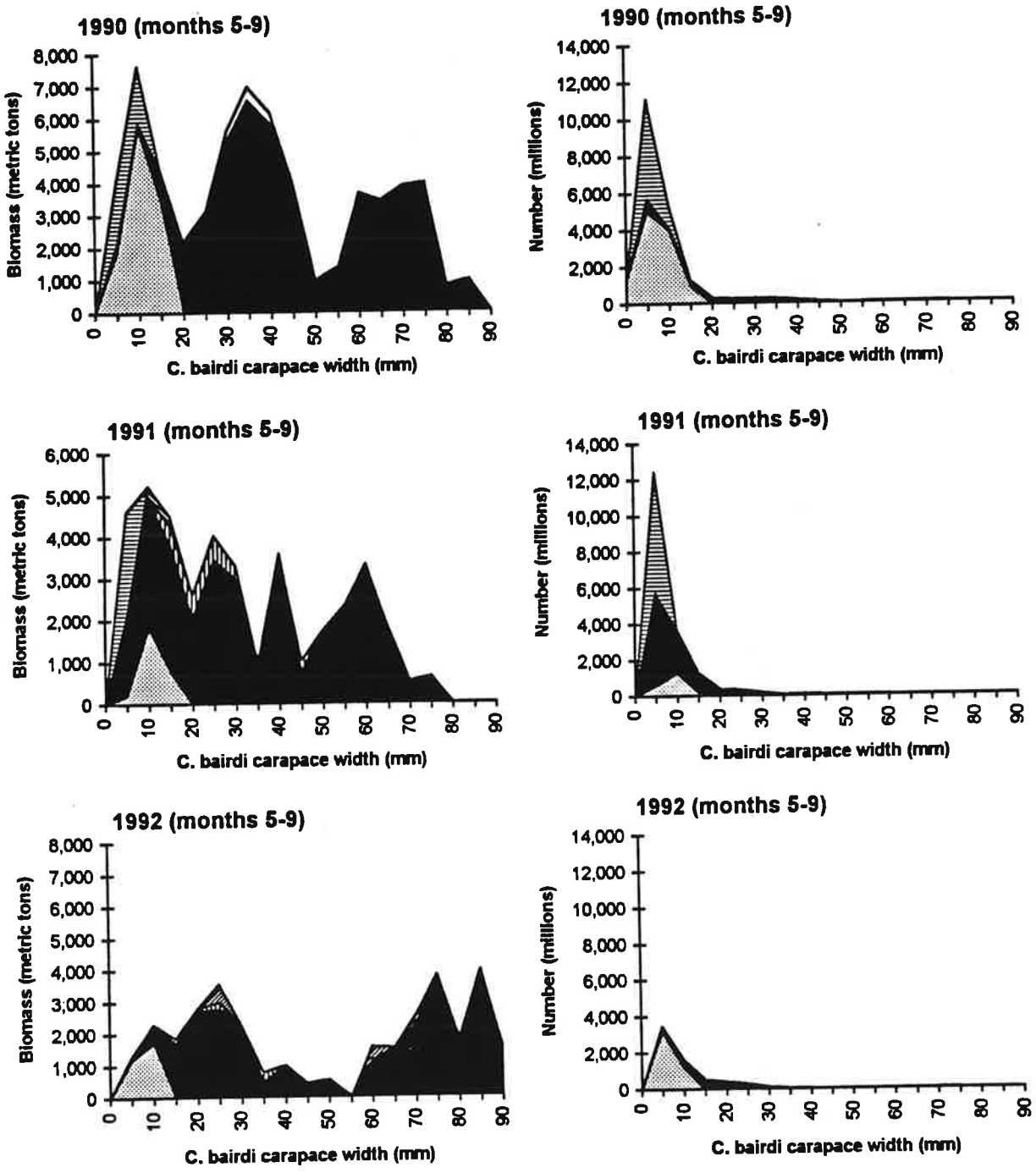

Figure 5. -- Estimated biomass and numbers of C. bairdi consumed by groundfish predators during months 5 to 9 in 1990, 1991 and 1992 in the eastern Bering Sea by prey size.

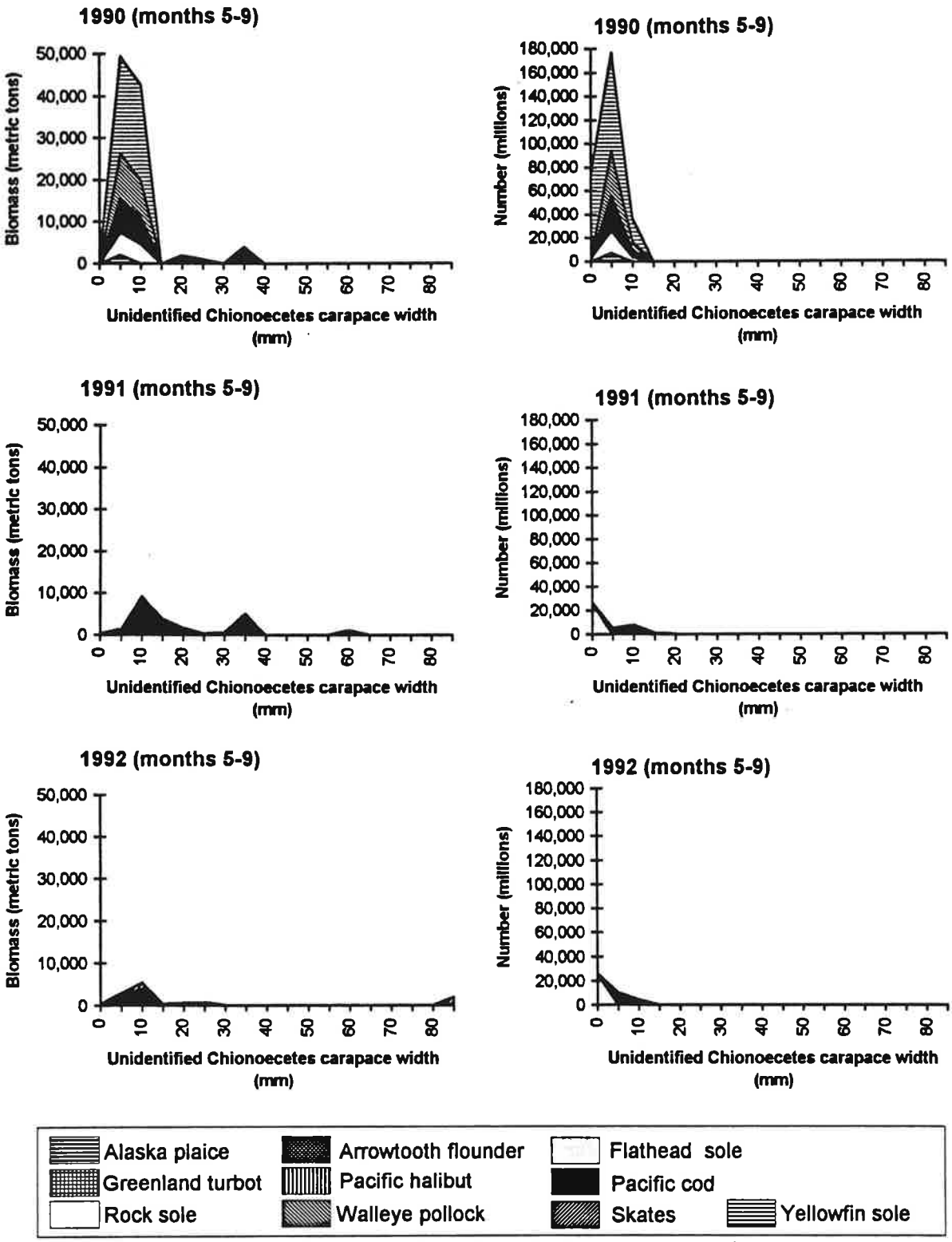

Figure 6. -- Estimated biomass and numbers of unidentified Chionoecetes consumed by groundfish predators during months 5 to 9 in 1990, 1991 and 1992 in the eastern Bering Sea by prey size.

Roundfish

Roundfish, for the purposes of this report, is defined as any groundfish species that is not a flatfish. Total estimated biomass and minimum numbers of Pacific cod, walleye pollock, Pacific herring (Clupea pallasi), Atka mackerel (Pleurogrammus monopterygius), and fish from the smelt family Osmeridae consumed by all groundfish predators are summarized in Tables 10-11 and Figures 7-10.

Pacific cod--Total estimated biomass of Pacific cod consumed by groundfish predators (Table 10) decreased from 1990 (42,534 t) to 1992 (4,123 t). Predators on Pacific cod include Pacific cod, walleye pollock, skates, Greenland turbot, and Pacific halibut. Although Pacific cod cannibalism did occur each year, it was not the major source of predation mortality. The number consumed was highest in 1990 (6.8 billion) and was primarily due to walleye pollock predation on age-0 fish. There does not seem to be any relationship between the number of age-0 Pacific cod consumed in a year and the strength of that Pacific cod year class. For example, Thompson (1995) reported that the 1990 and 1991 year classes were average while the 1992 year class was above average and our data show that 1990 was the year with the largest number of age-0 Pacific cod consumed. It appears that Pacific cod is not a major dietary component of any groundfish species. Therefore, consumption of Pacific cod tends to be a sporadic occurrence that may not necessarily be related to its abundance.

Walleye pollock--Walleye pollock was consumed by most of the major groundfish predators considered here. Walleye pollock cannibalism dominated walleye pollock removals in terms of biomass and numbers in all years. Pacific cod was the next most important predator in terms of biomass removals, while flathead sole was the next most important predator in terms of numbers removed.

Sizes of walleye pollock consumed by predators indicate most were age-0 walleye pollock (less than 14 cm SL) in all years (Fig. 8). Pacific cod tended to consume a wide range of walleye pollock sizes, mainly from 5 to 50 cm SL. Most age-1 pollock (approximately 14-22 cm SL) were consumed by Pacific cod, walleye pollock, and arrowtooth flounder. More age-0 pollock were consumed in 1990 than in 1991 and 1992. Wespestad (1995) shows that the cohort analysis estimate of abundance for the 1990 pollock year class at age 3 was larger than estimates for the 1991 and 1992 year classes. However, bottom trawl survey estimates of abundance for these year classes at age-1 indicated that the 1992 year class was more abundant than the 1990 year class. Our predation data indicate, however, that the 1992 year class was not heavily preyed upon at age-0.

Pacific herring--Arrowtooth flounder, Pacific cod, rock sole, skates, and walleye pollock consumed Pacific herring. A different predator was responsible for consuming the most herring in each year: walleye pollock in 1990, arrowtooth flounder in 1991, and Pacific cod in 1992. No groundfish predator consumed Pacific herring in all three years. Biomass of Pacific herring consumed by predators decreased from 1990 to 1992.

Little size information was available on Pacific herring consumed by groundfish predators. However, those consumed in 1990 were immature (< 20 cm) while those consumed in 1991 were larger than 21 cm. Pacific herring consumption by groundfish predators tended to be sporadic in time and space and may depend on encounter rates of Pacific herring schools rather than overall biomass. Furthermore, most of the Pacific herring available during the summer feeding period on the shelf are immature Pacific herring because adults have moved inshore to spawn. Pacific herring may constitute a larger fraction of the diet of groundfish predators in other time periods when adult Pacific herring have migrated to outer shelf waters for the winter feeding period. However, we have insufficient samples during autumn and winter to quantify Pacific herring consumption during those periods.

Atka mackerel--Our samples indicated that Atka mackerel was consumed only by Pacific cod and only in 1990. The last two AFSC groundfish predation reports (Livingston 1991 and Livingston et al. 1993) noted only one previous year, 1987, where Atka mackerel were consumed. The current center of distribution of Atka mackerel is in the Aleutian Islands. Although their distribution in the past has extended north to the Pribilof Islands, catches of Atka mackerel in the Bering Sea are low. The size of Atka mackerel consumed by Pacific cod was 16 cm SL.

Osmerids (Smelts)--Smelts were consumed by several groundfish species in 1990 to 1992: flathead sole, Pacific cod, Pacific halibut, and walleye pollock. Estimates of the biomass of smelt consumed over the three years were 9,285 t, 5,254 t, and 9,099 t, respectively. Walleye pollock tended to be the most important predator on smelts in each year. Sizes of smelts consumed ranged from 4 to 14 cm SL.

Table 10. -- Estimated total biomass (metric tons) of roundfish consumed by groundfish by year during months 5 to 9 in the eastern Bering Sea. (ns = not sampled.)

Prey	Predator	Biomass consumed 1990	1991	1992
Pacific cod				
	Greenland turbot	0	0	807.97
	Pacific cod	233.37	343.66	1,397.74
	Pacific halibut	0	1,552.19	201.82
	Skates	ns	ns	1,715.50
	Walleye pollock	42,300.83	1,179.10	0
	Total	42,534.20	3,074.95	4,123.03
Walleye pollock				
	Arrowtooth flounder	247,896.27	107,874.82	54,468.30
	Flathead sole	92,212.53	62,060.08	54,059.12
	Greenland turbot	7,516.43	8,337.89	9,401.86
	Pacific cod	365,397.99	237,762.53	252,062.66
	Pacific halibut	28,098.50	30,069.08	20,862.31
	Rock sole	1,225.30	6,076.67	0
	Skates	ns	ns	224,567.72
	Walleye pollock	1,062,207.00	375,519.53	311,159.00
	Yellowfin sole	8,915.07	25,113.68	355.39
	Total	1,813,469.09	852,814.28	926,936.36
Pacific herring				
	Arrowtooth flounder	0	10,674.13	0
	Pacific cod	259.68	0	2,150.39
	Rock sole	5,844.07	0	0
	Skates	ns	ns	488.49
	Walleye pollock	10,306.32	0	961.15
	Total	16,410.07	10,674.13	3,600.03
Atka mackerel				
	Pacific cod	3187.21	0	0
	Total	3187.21	0	0
Osmerids				
	Flathead sole	2,552.27	495.49	1,887.90
	Pacific cod	3,344.67	722.37	1,421.03
	Pacific halibut	309.88	166.75	1,543.55
	Walleye pollock	3,078.14	3,869.49	4,246.23
	Total	9,284.96	5,254.10	9,098.71

Table 11. -- Estimated total number (millions) of roundfish consumed by groundfish by year during months 5 to 9 in the eastern Bering Sea. Values in parentheses indicate cells with some missing prey size information and therefore are underestimates of the total number consumed. (ns = not sampled.)

Prey	Predator	Number consumed 1990	1991	1992
Pacific cod				
	Greenland turbot	0	0	0.88
	Pacific cod	(0)	(0)	(28.44)
	Pacific halibut	0	5.85	(0)
	Skates	ns	ns	(0)
	Walleye pollock	6,771.71	55.03	0
	Total	6,771.71	60.88	29.32
Walleye pollock				
	Arrowtooth flounder	9,758.30	2,868.23	692.12
	Flathead sole	(13,357.77)	4,837.65	6,148.18
	Greenland turbot	98.98	162.29	60.50
	Pacific cod	4,168.74	(2,622.40)	(2,051.78)
	Pacific halibut	(1,552.38)	1,578.23	399.95
	Rock sole	(212.30)	(0)	0
	Skates	ns	ns	(723.32)
	Walleye pollock	197,060.32	(16,984.13)	37,986.30
	Yellowfin sole	2,141.93	(2,066.54)	(0)
	Total	228,350.72	31,119.47	48,062.15
Pacific herring				
	Arrowtooth flounder	0	71.32	0
	Pacific cod	(0)	0	(0)
	Rock sole	368.17	0	0
	Skates	ns	ns	(0)
	Walleye pollock	540.53	0	(0)
	Total	908.7	71.32	0
Atka mackerel				
	Pacific cod	(0)	0	0
	Total	0	0	0
Osmerids				
	Flathead sole	495.63	56.99	402.03
	Pacific cod	599.66	(72.94)	(154.90)
	Pacific halibut	34.25	(0)	219.28
	Walleye pollock	550.24	316.77	797.93
	Total	1,679.78	446.70	1,574.14

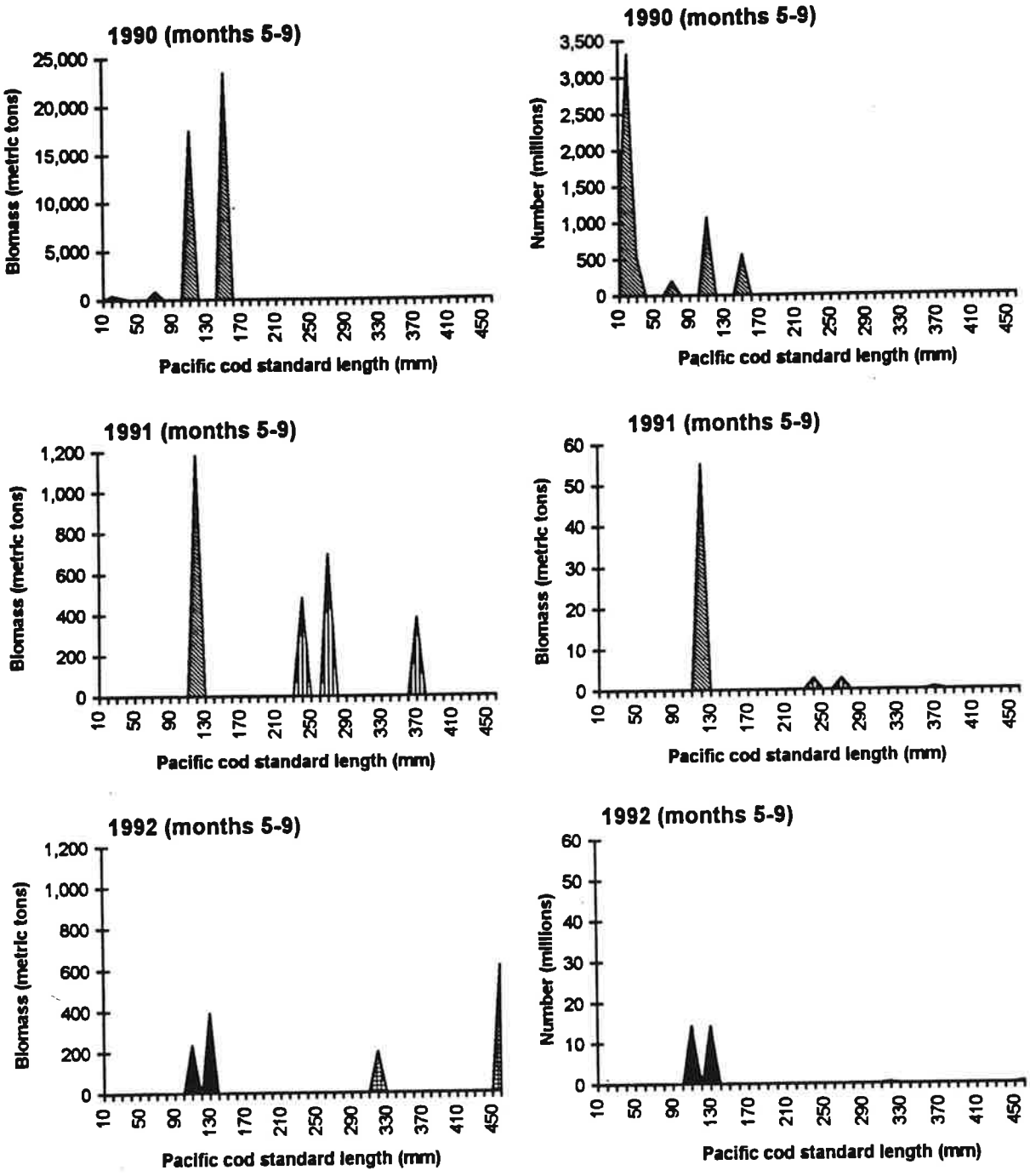

Figure 7. – Estimated biomass and numbers of Pacific cod consumed by groundfish predators during months 5 to 9 in 1990, 1991 and 1992 in the eastern Bering Sea by prey size.

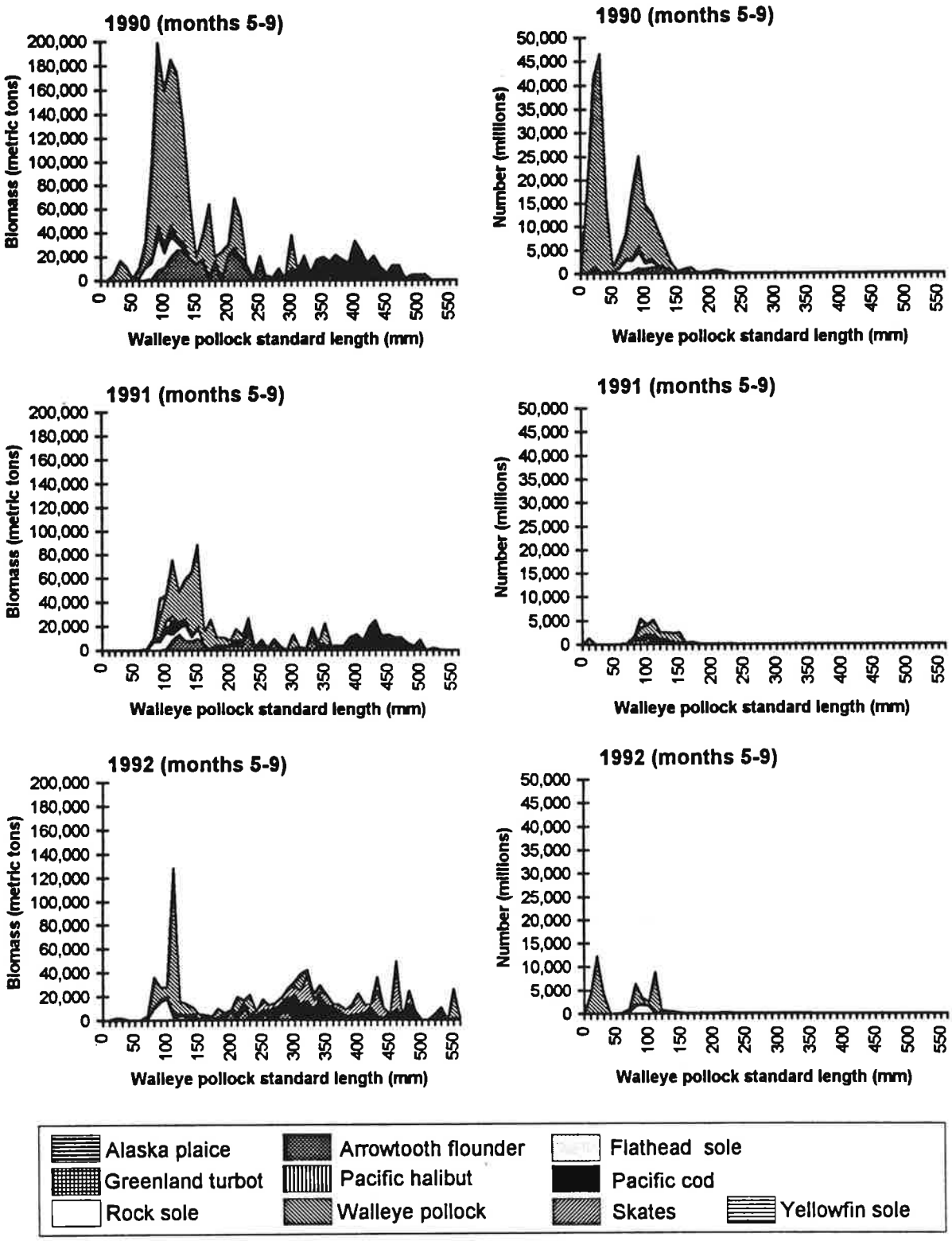

Figure 8. -- Estimated biomass and numbers of walleye pollock consumed by groundfish predators during months 5 to 9 in 1990, 1991 and 1992 in the eastern Bering Sea by prey size.

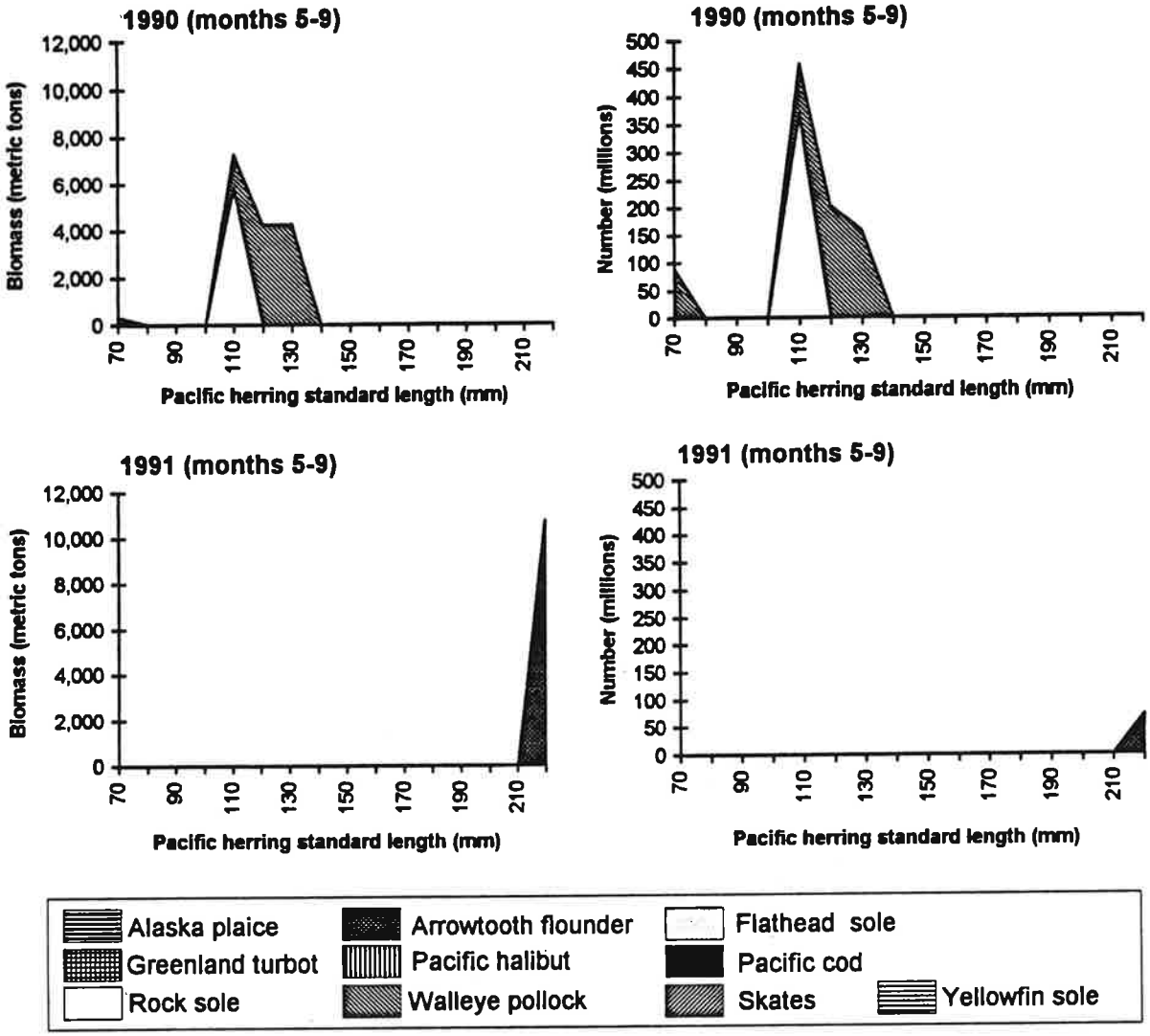

Figure 9. -- Estimated biomass and numbers of Pacific herring consumed by groundfish predators during months 5 to 9 in 1990 and 1991 in the eastern Bering Sea by prey size.

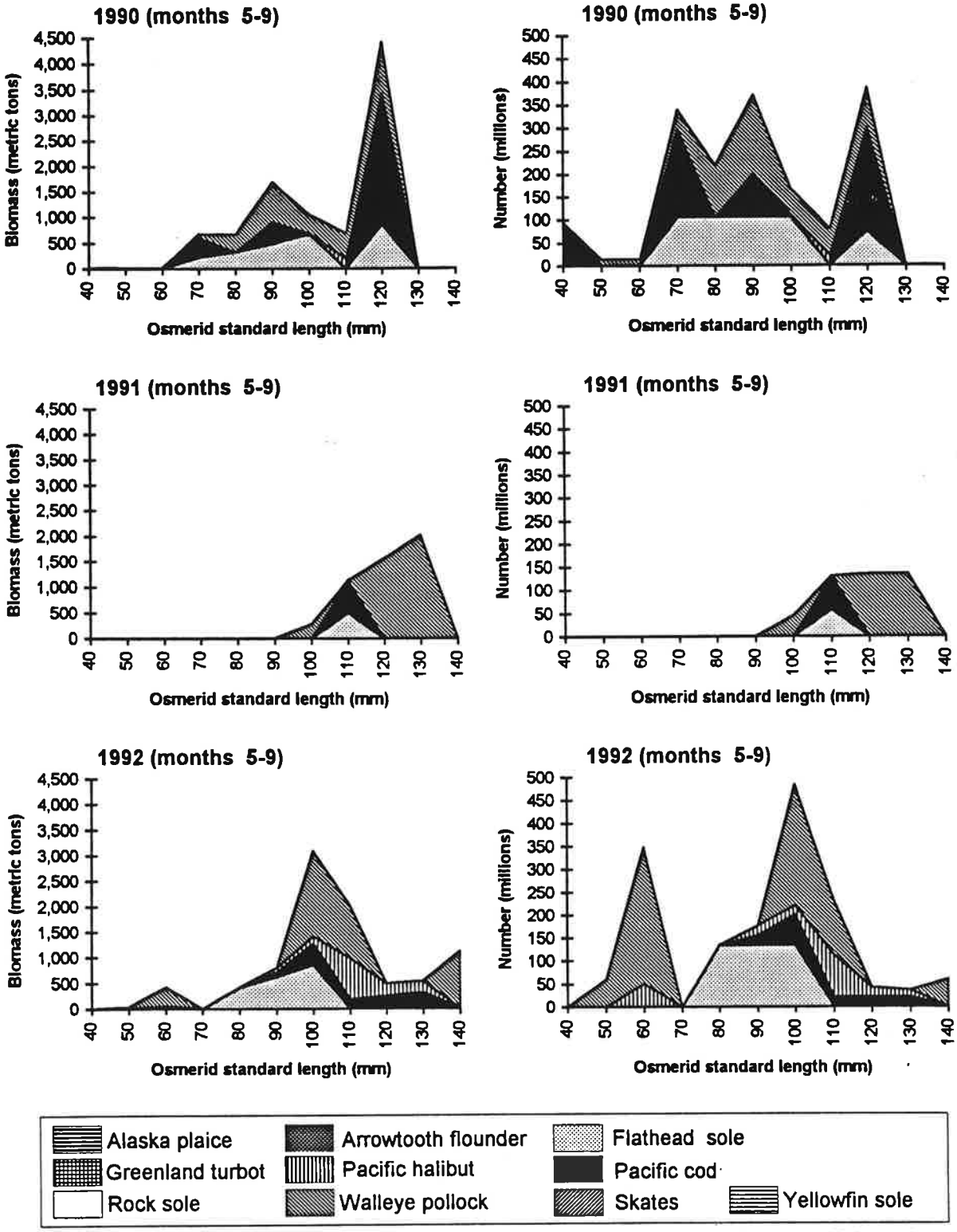

Figure 10. -- Estimated biomass and numbers of osmerids consumed by groundfish predators during months 5 to 9 in 1990, 1991 and 1992 in the eastern Bering Sea by prey size.

Flatfish

Arrowtooth flounder--Arrowtooth flounder was consumed by Pacific cod and walleye pollock (Tables 12-13). Estimated total biomass consumed in 1990 (832 t) was about ten times less than consumption in 1992 (10,551 t). In 1990 and 1991, Pacific cod was the only groundfish predator. However, in 1992, walleye pollock was the main predator in terms of biomass and numbers consumed. Most of the arrowtooth flounder consumed by walleye pollock were 2 to 5 cm SL.

Total biomass consumed in each year can be compared with the estimated standing stock of arrowtooth flounder to determine the relative importance of predation on the arrowtooth flounder population . Total consumption in each year, expressed as a percentage of trawl-estimated biomass of arrowtooth flounder, is less than 3%. This is a small percentage of the arrowtooth flounder population, indicating predation is probably not a major source of mortality. Examination of possible predation impact on arrowtooth flounder too small to be assessed by the trawl survey is not possible given the current state of knowledge about juvenile arrowtooth flounder abundance. However, most of the numbers of arrowtooth flounder consumed in 1992 were age-0 fish, and Wilderbuer et al. (1995) note that 1992 year class apparently stronger than the 1990 and 1991 year classes based on occurrence at age 1 in the bottom trawl survey. The increased consumption of arrowtooth flounder in 1992 may have been the result of increased availability of small fish.

Flathead sole--Estimated total biomass of flathead sole consumed by groundfish predators was highest in 1992 (12,312 t) while number consumed was highest in 1990 (4,623 million). Most of the biomass consumed in all three years was by Pacific cod, but flathead sole cannibalism accounted for most of the number consumed in (Table 13). Cannibalism by flathead sole was also noted in 1988 (Livingston et al. 1993). Other predators on flathead sole included arrowtooth flounder, flathead sole, and Pacific halibut.

Most of the flathead sole consumed were less than 20 cm SL or less than age 3. Walters and Wilderbuer (1990) report that flathead sole do not recruit to trawl fisheries until age 3, and although some age-2 fish are caught in research trawls, they are probably not fully recruited. This precludes a relevant comparison of predator removals of juveniles with the juvenile flathead sole population size.

In all three years, predators consumed some flathead sole that were possibly age 0, but total number of age-0 flathead sole consumed in 1990 was much higher than the other two years (Fig.

12). This might be an indication of an abundant year class produced in 1990.

Rock sole--Total estimated biomass of rock sole consumed by groundfish predators ranged from 6,309 t in 1990 to 36,038 t in 1992. The number of rock sole consumed was fairly constant across years, however. Pacific cod was the most important predator in terms of biomass removals. Other predators included Pacific halibut, skates, walleye pollock, and yellowfin sole. Size composition of rock sole consumed in all three years tended to consist of fish mainly between 5 and 15 cm SL (Fig. 13), sizes that are probably not fully vulnerable to trawl surveys.

Walleye pollock consumed large numbers of age-0 rock sole in 1990 and 1991, which might indicate abundant year classes of rock sole in those years. However, synthesis model estimates of year class strength indicates that only the 1990 year class was above-average (Wilderbuer and Sample 1995).

Yellowfin sole--Pacific cod, skates and Pacific halibut were predators of yellowfin sole during the 1990 to 1992 period. Pacific cod predation in terms of biomass and number dominated all three years. Consumption by all groundfish in terms of biomass was fairly constant across years, ranging from 5,203 t in 1990 to 6,391 t in 1992. Consumption was much lower in this period than in the 1984 to 1986 period where values ranged from 28,359 t to 56,291 t (Livingston 1991). These changes in consumption do not seem to be related to changes in biomass of yellowfin sole on the shelf because total biomass of yellowfin sole has been relatively stable from 1984 to 1992 according to stock synthesis model results (Wilderbuer 1995).

Most predation was on yellowfin sole ranging in size from 7 to 25 cm SL (ages 3-10) (Fig. 14). When estimates of total yellowfin sole consumption in terms of biomass are compared to the biomass estimated from trawl surveys, it appears that groundfish predation constitutes only a small proportion (< 1%) of the standing stock biomass.

Greenland turbot--Pacific cod, walleye pollock and yellowfin sole were the only groundfish that consumed Greenland turbot (Tables 12-13). Amount consumed was highest in 1990. Walleye pollock was the main predator on Greenland turbot in all three years (Fig. 15). Sizes consumed by walleye pollock ranged from 2 to 5 cm SL (probably age 0). It is unclear whether there is a relationship between the number consumed at age 0 and estimates of recruitment at age 1 from Ianelli et al. (1993). Our data show the largest numbers of Greenland turbot, presumably age 0, consumed in 1990 and Ianelli et al. (1993) show that the 1990 year class was larger than the 1991 and 1992 year classes at age 1.

Pacific halibut--Pacific halibut was consumed by Alaska plaice, Pacific cod, Pacific halibut, and walleye pollock in 1991 and 1992 (Tables 12-13). There was no evidence of predation on Pacific halibut in 1990. Sizes consumed ranged mostly from 1 to 3 cm SL (probably age 0) (Fig. 16). The size of Pacific halibut consumed suggests they were post-larvae that had not yet settled to the bottom. Deriso (1987) suggests that Pacific halibut may be transported into the Bering Sea from the Gulf of Alaska. It is possible that groundfish consumption of Pacific halibut is a transitory phenomenon, occurring during restricted time periods when postlarvae are swept into shallow waters and start settling to the bottom.

Offal

Several groundfish species consumed fish processing offal during the 1990 to 1992 period (Table 14). Pacific cod, walleye pollock, arrowtooth flounder, flathead sole, yellowfin sole, Pacific halibut and skates consumed offal. In general, Pacific cod tended to consume the most offal. Total amounts of offal consumed were relatively stable across years, ranging from 159,553 t in 1992 to 183,055 t in 1990. An estimated 1,339,795 t of offal was produced in the combined Bering Sea/Aleutian Islands regions and Gulf of Alaska in 1994 (Queirolo et al. 1995). Groundfish predators are thus estimated to consume about 12% of the total amount of offal produced. Because most of these groundfish predators are predators of pollock and most of the offal produced is from processing of pollock, there is probably not much disruption of normal energy pathways due to offal consumption.

Table 12. – Estimated total biomass (metric tons) of flatfish consumed by groundfish by year during months 5 to 9 in the eastern Bering Sea. (ns = not sampled.)

Prey	Predator	Biomass consumed 1990	1991	1992
Arrowtooth flounder				
	Pacific cod	832.11	1,164.14	1,687.99
	Walleye pollock	0	0	8,863.12
	Total	832.11	1,164.14	10,551.11
Flathead sole				
	Flathead sole	3,183.58	0	4,571.70
	Greenland turbot	0	0	144.81
	Pacific cod	4,141.34	2,668.76	7,364.05
	Pacific halibut	0	591.21	188.52
	Skates	ns	ns	42.80
	Total	7,324.92	3,259.97	12,311.88
Rock sole				
	Pacific cod	6,086.44	9,973.26	19,084.46
	Pacific halibut	0	681.82	1,046.28
	Skates	ns	ns	14,546.86
	Walleye pollock	222.65	21.83	39.56
	Yellowfin sole	0	0	1,321.07
	Total	6,309.09	10,676.91	36,038.23
Yellowfin sole				
	Pacific cod	5,202.90	4,686.42	4,118.21
	Pacific halibut	0	707.17	1,651.26
	Skates	ns	ns	621.93
	Total	5,202.90	5,393.59	6,391.40
Greenland turbot				
	Pacific cod	0	0	477.01
	Walleye pollock	12,922.41	634.87	1,990.39
	Yellowfin sole	0	0	91.55
	Total	12,922.41	634.87	2,558.95
Pacific halibut				
	Alaska plaice	0	37.97	0
	Pacific cod	0	0	865.77
	Pacific halibut	0	8.26	19.31
	Walleye pollock	0	21.56	29.48
	Yellowfin sole	0	0	566.12
	Total	0	67.79	1,480.68

Table 13.– Estimated total number (millions) of flatfish consumed by groundfish by year during months 5 to 9 in the eastern Bering Sea. Values in parentheses indicate cells with some missing prey size information and therefore are underestimates of the total number consumed. (ns = not sampled.)

Prey	Predator	Number consumed 1990	1991	1992
Arrowtooth flounder				
	Pacific cod	174.27	13.09	(12.58)
	Walleye pollock	0	0	25,861.78
	Total	174.27	13.09	25,874.36
Flathead sole				
	Flathead sole	3,772.39	0	(0)
	Greenland turbot	0	0	0.45
	Pacific cod	(850.63)	71.85	(206.61)
	Pacific halibut	0	74	27.41
	Skates	ns	ns	26.11
	Total	4,623.02	145.85	260.58
Rock sole				
	Pacific cod	223.53	381.86	(389.51)
	Pacific halibut	0	(35.99)	31.2
	Skates	ns	ns	284.82
	Walleye pollock	751.10	617.35	3.36
	Yellowfin sole	0	0	(0)
	Total	974.63	1,035.20	708.89
Yellowfin sole				
	Pacific cod	78.42	38.11	65.08
	Pacific halibut	0	9.90	(33.47)
	Skates	ns	ns	19.56
	Total	78.42	48.01	118.11
Greenland turbot				
	Pacific cod	0	0	80.69
	Walleye pollock	34,128.39	1,278.09	17,134.33
	Yellowfin sole	0	0	(0)
	Total	34,128.39	1,278.09	17,215.02
Pacific halibut				
	Alaska plaice	0	309.05	0
	Pacific cod	0	0	748.37
	Pacific halibut	0	21.97	4.2
	Walleye pollock	0	175.50	1340.52
	Yellowfin sole	0	0	(0)
	Total	0	506.52	2093.09

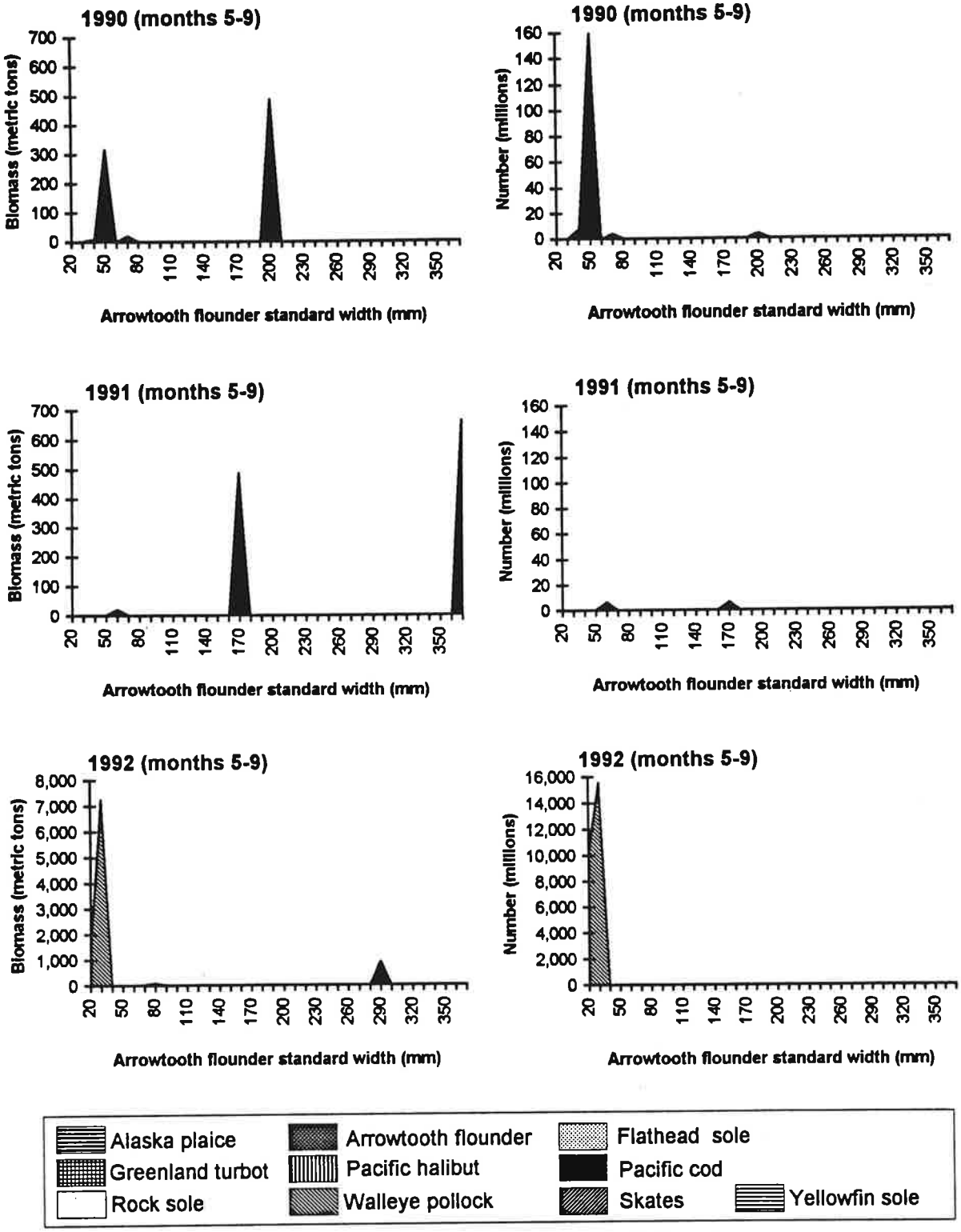

Figure 11. -- Estimated biomass and numbers of arrowtooth flounder consumed by groundfish predators during months 5 to 9 in 1990, 1991 and 1992 in the eastern Bering Sea by prey size.

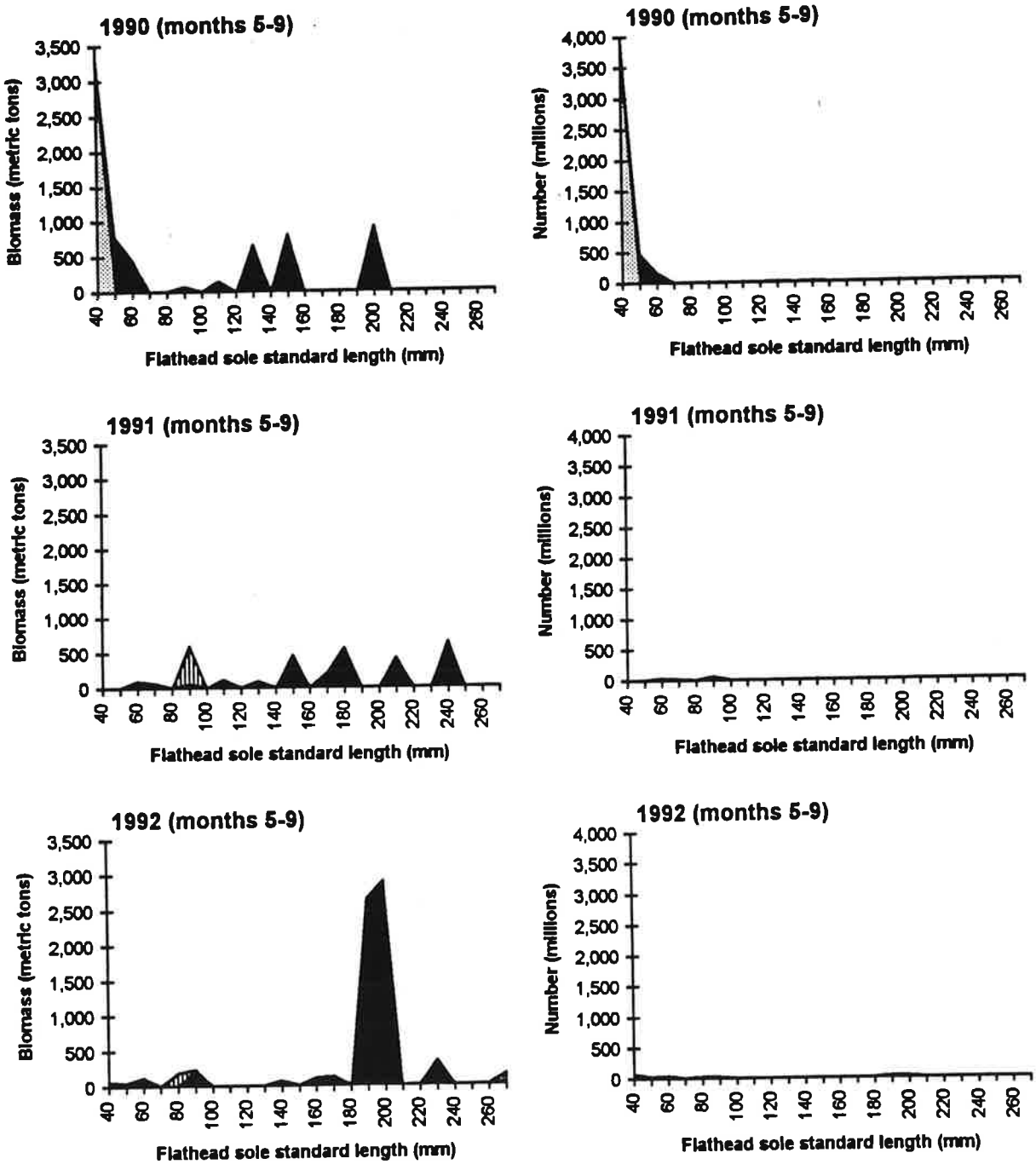

Figure 12. -- Estimated biomass and numbers of flathead sole consumed by groundfish predators during months 5 to 9 in 1990, 1991 and 1992 in the eastern Bering Sea by prey size.

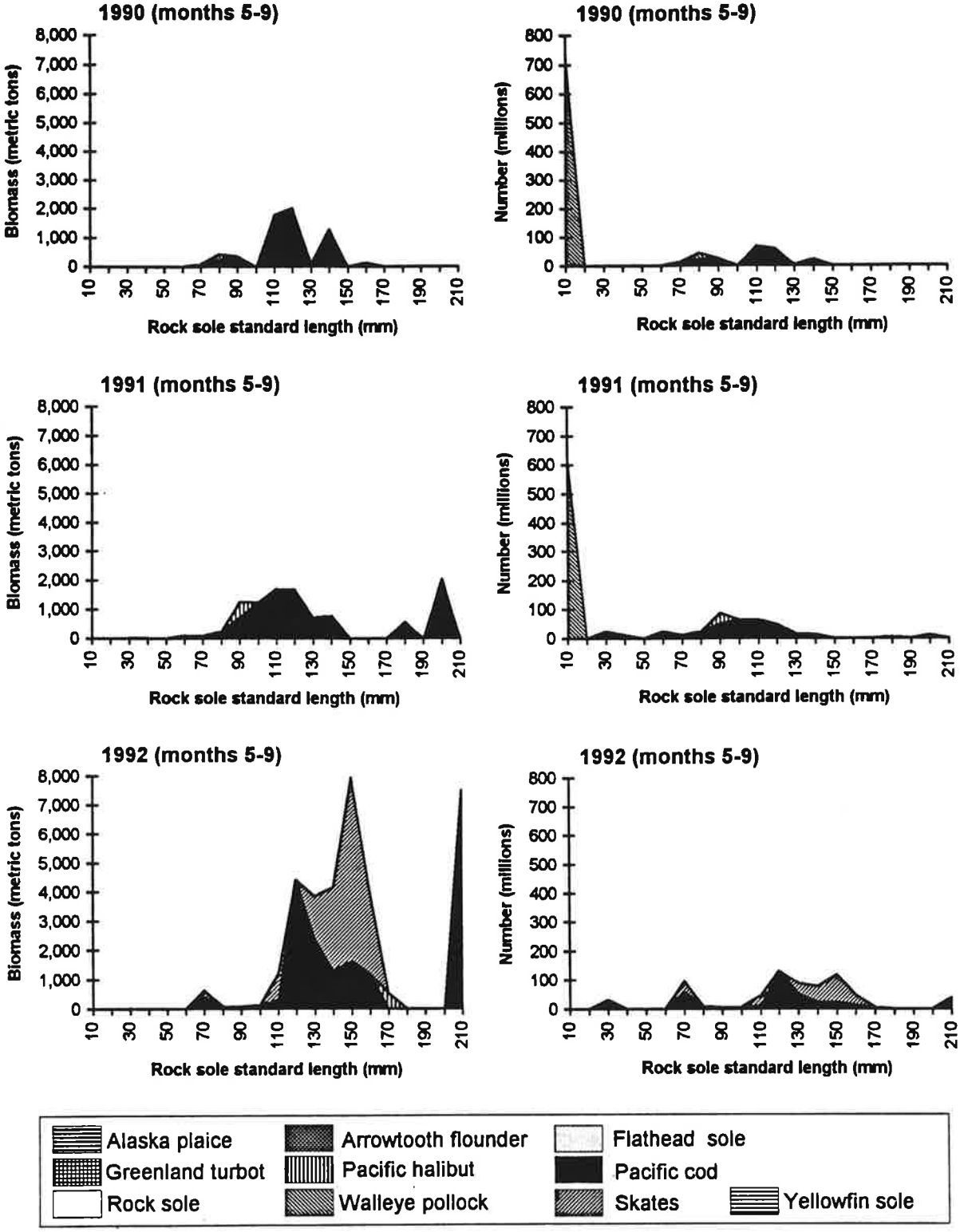

Figure 13. – Estimated biomass and numbers of rock sole consumed by groundfish predators during months 5 to 9 in 1990, 1991 and 1992 in the eastern Bering Sea by prey size.

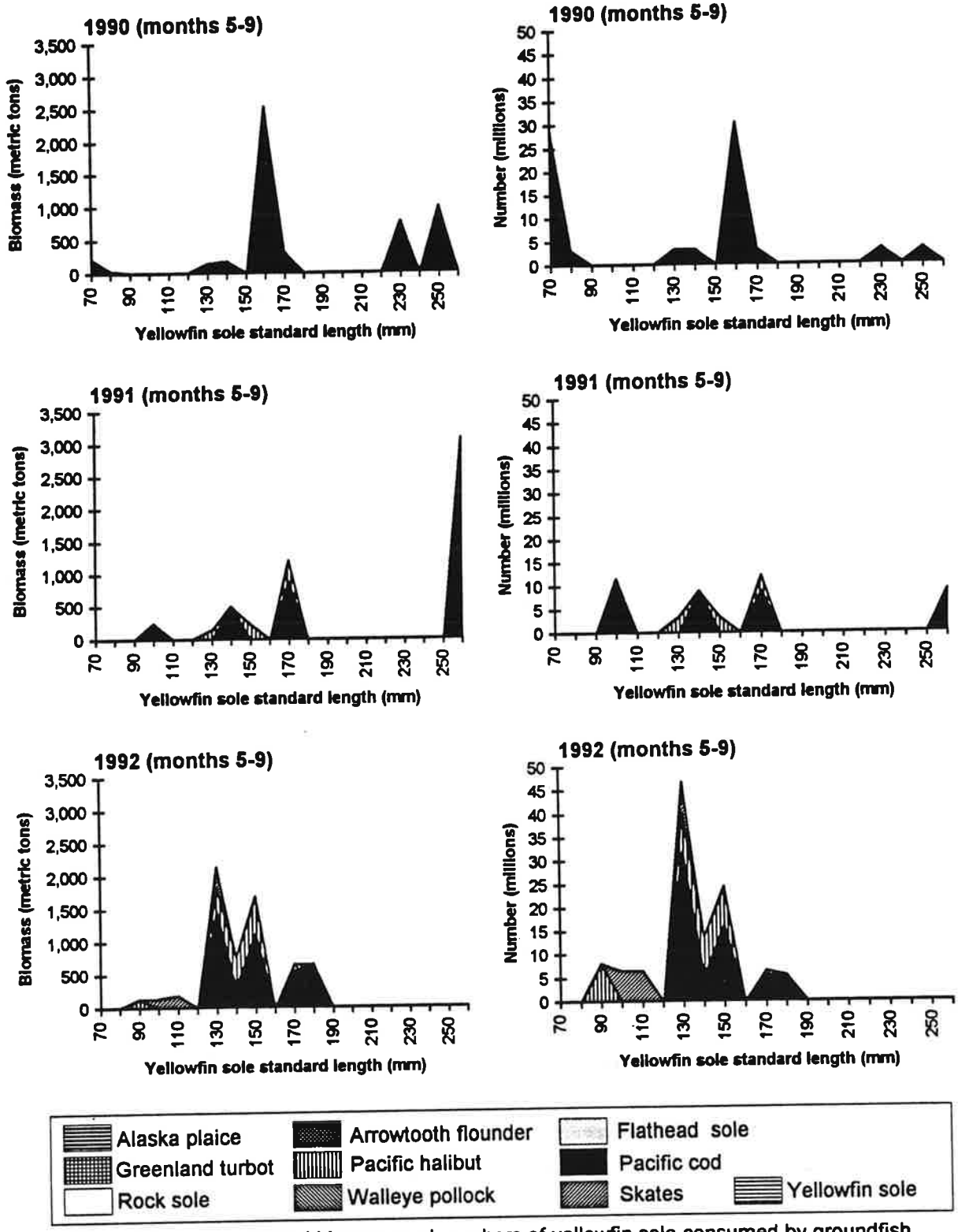

Figure 14. -- Estimated biomass and numbers of yellowfin sole consumed by groundfish predators during months 5 to 9 in 1990, 1991 and 1992 in the eastern Bering Sea by prey size.

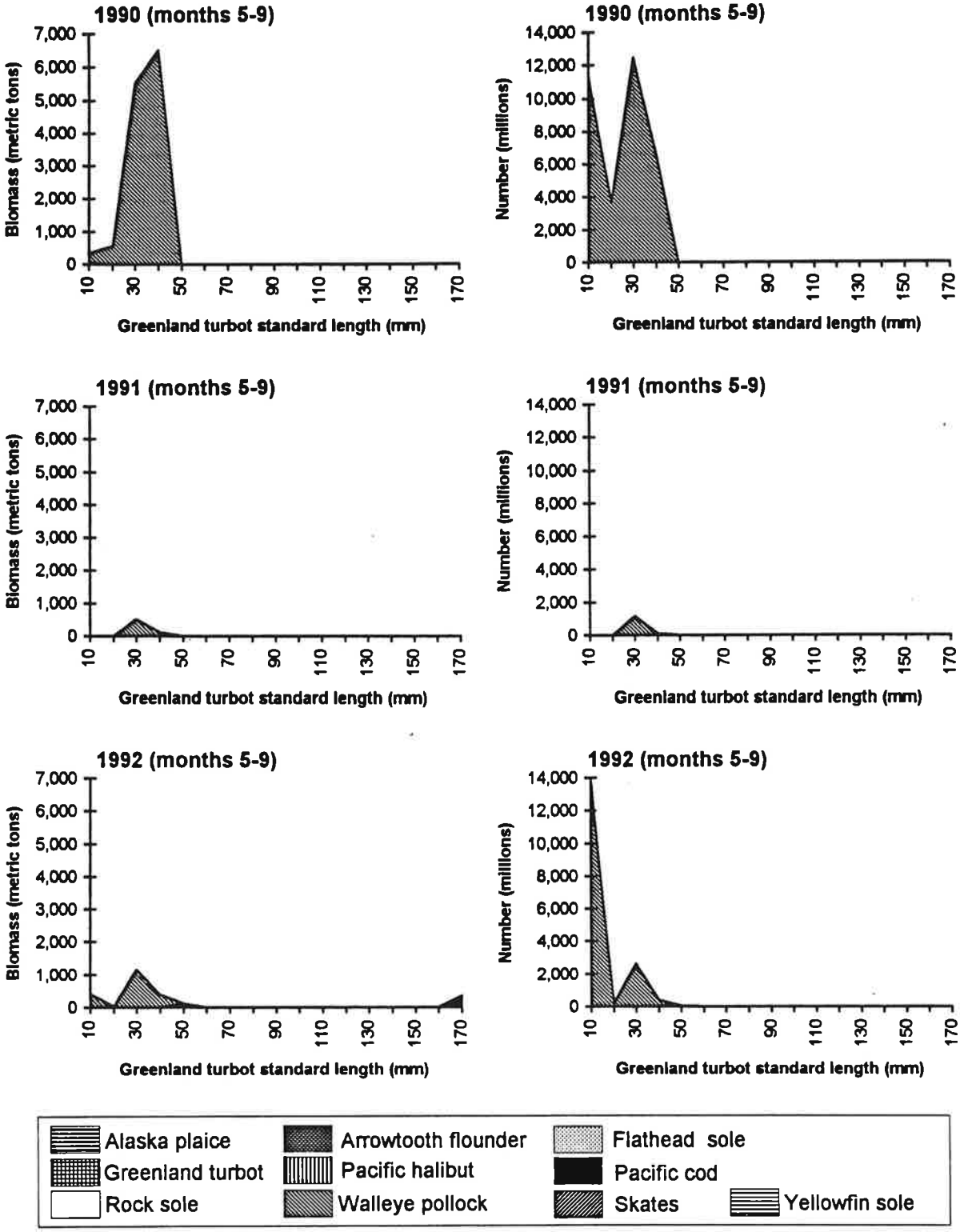

Figure 15. -- Estimated biomass and numbers of Greenland turbot consumed by groundfish predators during months 5 to 9 in 1990, 1991 and 1992 in the eastern Bering Sea by prey size.

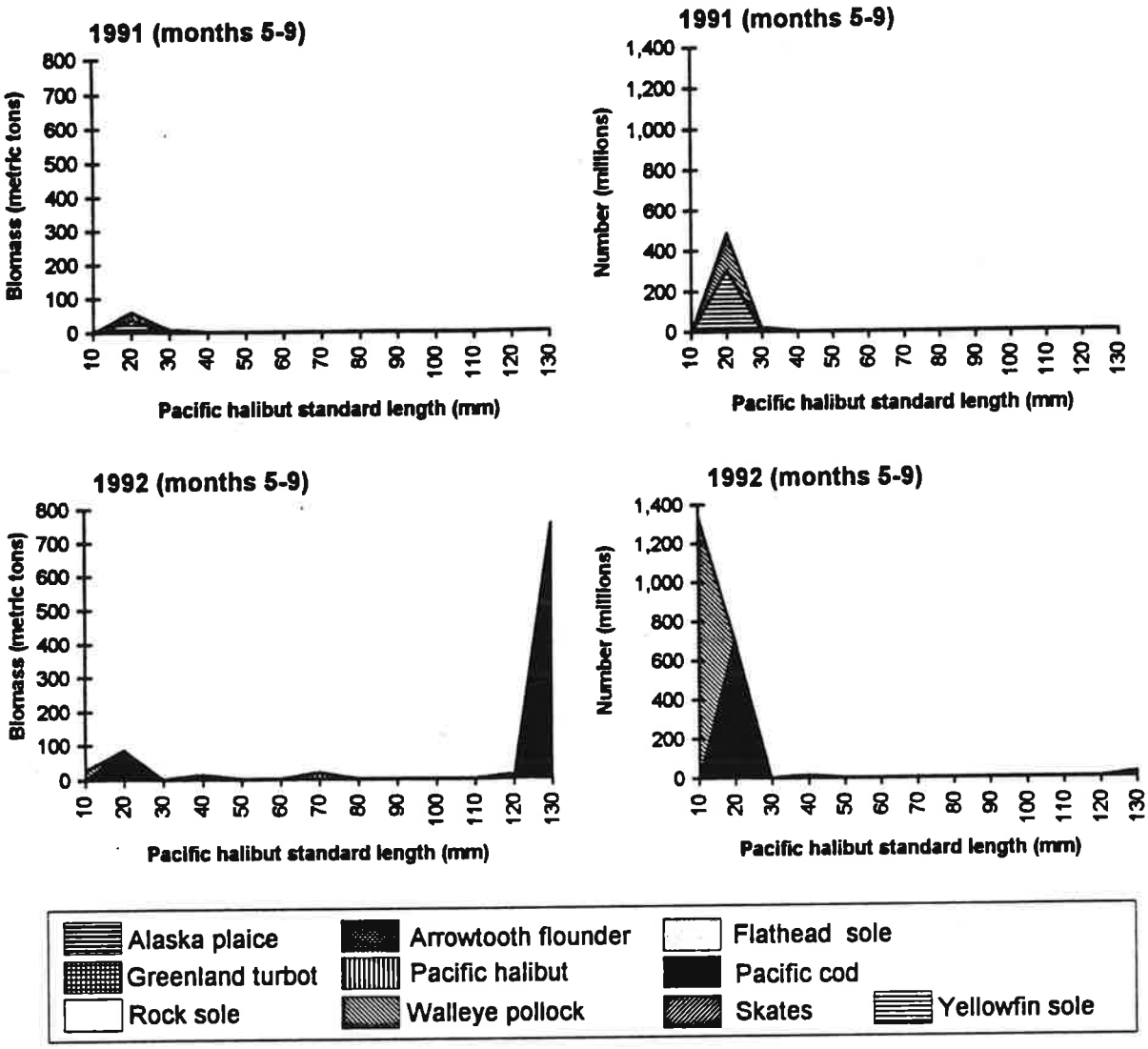

Figure 16. -- Estimated biomass and numbers of Pacific halibut consumed by groundfish predators during months 5 to 9 in 1991 and 1992 in the eastern Bering Sea by prey size.

Table 14.-- Estimated amounts of offal consumed (metric tons) by groundfish on the eastern Bering Sea shelf during the main feeding season, May through September. (ns - not sampled).

Groundfish predator	Year 90	91	92	Avg
Pacific cod	86,789	82,577	35,067	68,144
Walleye pollock	45,117	51,851	37,023	44,664
Arrowtooth flounder	21,350	3,933	2,977	9,420
Flathead sole	28,656	7,067	32,351	22,692
Yellowfin sole	114	35,853	13,477	16,481
Pacific halibut	1,029	0	2,466	1,165
Skates	ns	ns	36,192	12,064
Total	183,055	181,281	159,553	174,630

CONCLUSIONS

Predation by Pacific cod on Tanner and snow crabs in the eastern Bering Sea indicates a possible strong recruitment of snow crab in 1990 but no indication of increased recruitment for Tanner crab. Walleye pollock cannibalism was the most important source of groundfish predation on age-0 walleye pollock. Large numbers of age-0 pollock consumed in 1990 could be indicative of a 1990 year class that was more abundant than the 1991 and 1992 year classes. A better understanding of Tanner and snow crab size at-age and of the juvenile abundances of both these crabs as well as walleye pollock are needed to determine whether predation is a density-dependent factor controlling population size.

In many cases, groundfish appeared to be an early sampler of Tanner and snow crabs, and several flatfish species. Again, more information on juvenile abundance of these prey species may determine whether this predation is an early indicator of the presence of abundant year classes.

Consumption estimates for all prey should be viewed at the present time more as indices of consumption rather than actual consumption for several reasons. First, most of the calculations consider only the time period from May through September in each year. Although this is the main feeding period for most fishes in the Bering Sea, consumption of prey certainly occurs during other parts of the year. Inadequate numbers and spatial distribution of stomach samples during other parts of the year combined with gaps in knowledge about the seasonal migrations of groundfish predators make calculation of predation in other parts of the year difficult without seasonal resource assessment surveys in the area.

Predation estimates during the time period considered here may be underestimates for prey that are consumed year-round, such as Tanner and snow crabs that are consumed by Pacific cod. Predation estimates for groundfish predation on newly settling stages of crabs and flatfishes may be overestimates if the prey species are not available to the predator during the whole time period. Also, for prey that have a very limited spatial distribution within a stratum, such as red and blue king crabs, inadequate stomach sampling throughout the whole stratum can provide biased estimates of consumption. For these prey, consumption estimates would be biased upwards if sampling was concentrated more in areas where king crabs occur and estimates would be biased downwards if stomach sampling was not performed in king crab areas.

Estimates of total numbers consumed are underestimates for some prey since prey size data were not available for all predators consuming a particular prey due to advanced digestion of prey.

Total consumption estimates in terms of biomass are underestimates of total groundfish predation if important groundfish predators of a particular prey have not been sampled. Skates are growing parts of the groundfish biomass in the eastern Bering Sea and consideration of their predation is becoming important. The 1992 results presented here indicate that skates are an an important consumer of commercially important prey and stomach sampling of this predator will continue.

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APPENDIX A. - WALLEYE POLLOCK

List of Tables

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Table A-1. -- Mid-year estimates of biomass (by predator size, stratum, and year) of walleye pollock in the eastern Bering Sea for 1990 through 1992, from the VPA.

Predator size (cm)	Stratum		Biomass (metric tons) 90	91	92
<30	1		11,468	57,983	14,749
	2		2,714	38,222	55,577
	3		24,675	185,356	152,298
	4		36,162	174,568	120,417
	5		670	7,158	147,891
	6		312,185	2,797,007	811,491
		Subtotal	387,874	3,260,294	1,302,423
30-39	1		0	0	0
	2		0	0	0
	1		2,463	252	0
	3		11,029	24,891	2,335,447
	4		12,727	7,202	35,448
	5		24,610	4,206	196,717
	6		1,256,029	780,387	1,283,017
		Subtotal	1,306,858	816,938	3,850,629
40-49	1		2,828	780	738
	2		46	151	0
	3		341,396	309,707	219,362
	4		177,201	39,183	70,415
	5		211,497	76,901	61,391
	6		2,751,296	753,986	804,967
		Subtotal	3,484,264	1,180,709	1,156,873
≥50	1		117,878	80,939	157,155
	2		26,208	46,711	25,770
	3		631,492	881,093	621,202
	4		709,559	367,359	397,455
	5		304,534	237,435	194,988
	6		1,228,912	732,682	699,081
		Subtotal	3,018,582	2,346,220	2,095,651
		Total	8,197,578	7,604,160	8,405,577

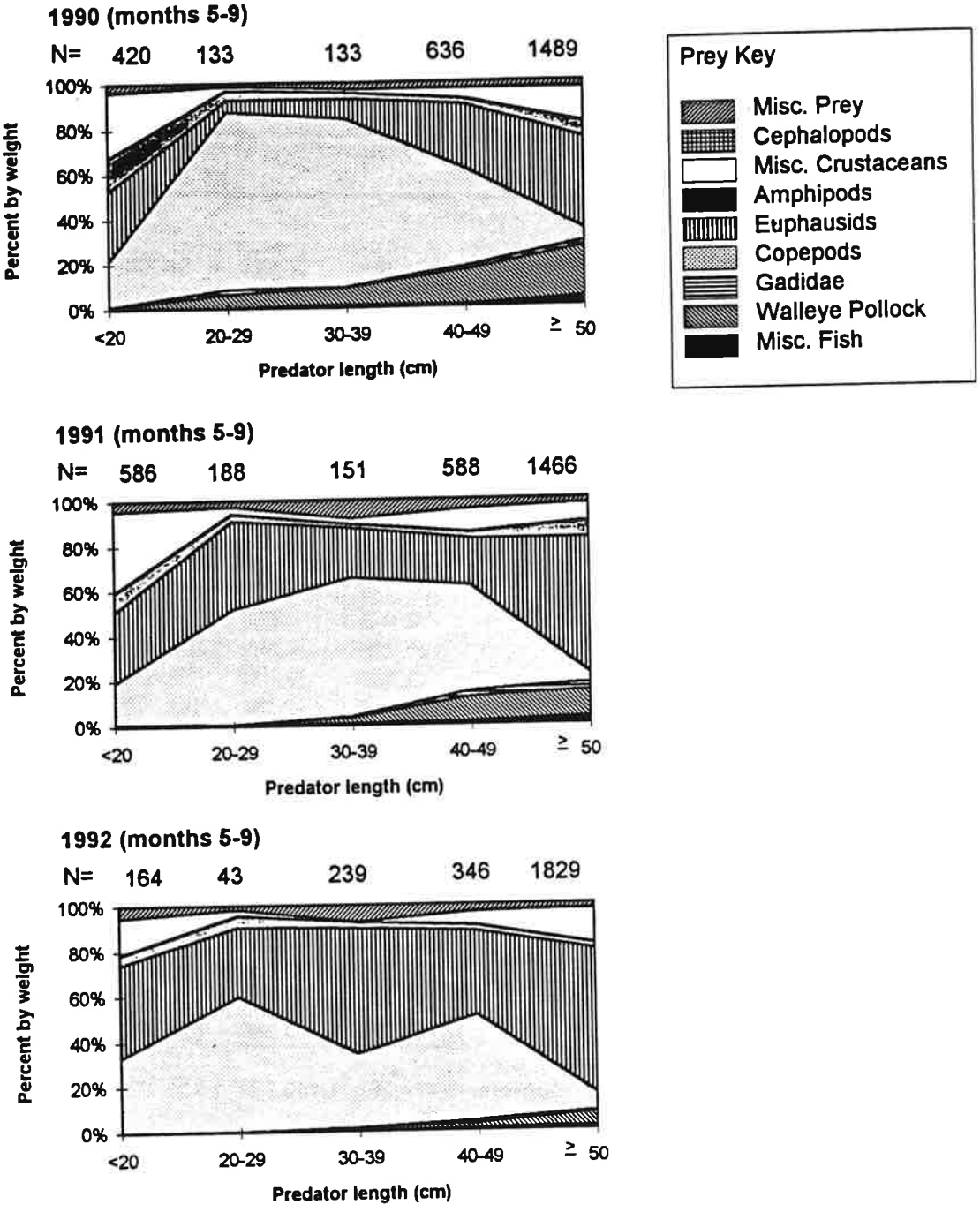


Figure A-1. -- Diet composition of walleye pollock, in terms of percent by weight, during months 5 to 9 by year and by predator size in the Bering Sea; N = number of stomachs.

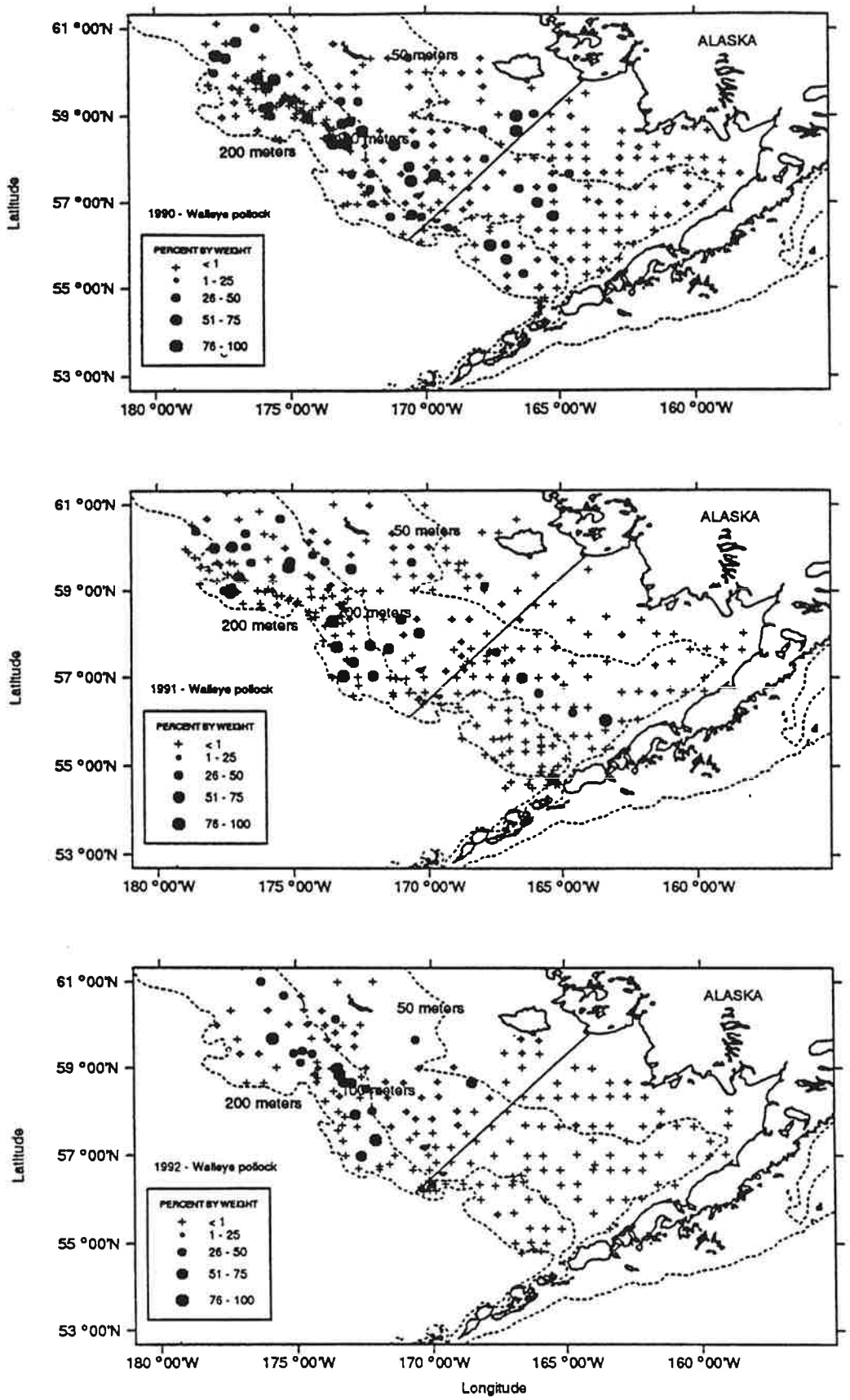


Figure A-2. -- Percent by weight of walleye pollock in the diet of walleye pollock by sampling station during months 5 to 9 in 1990, 1991 and 1992 in the eastern Bering Sea.

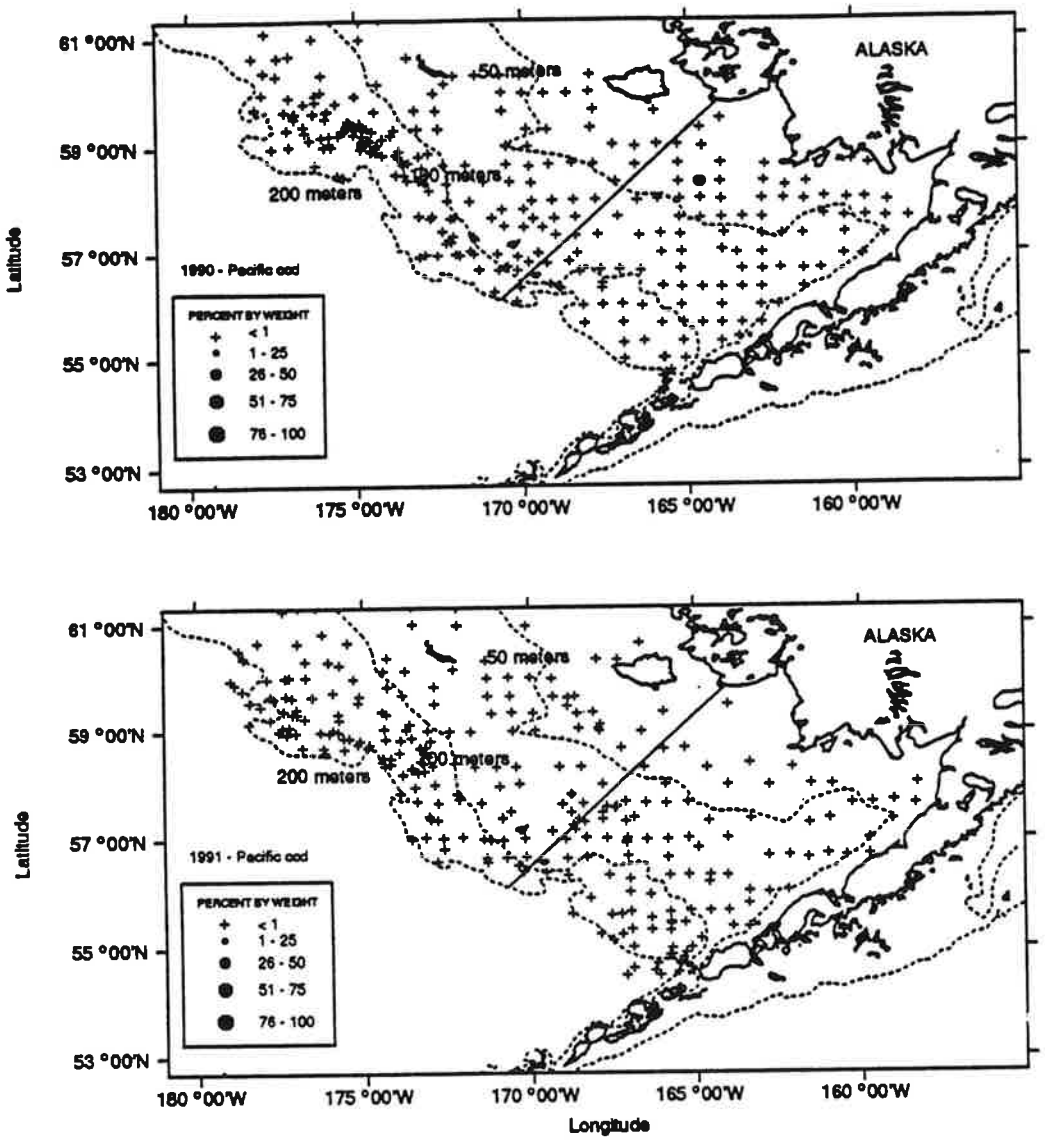
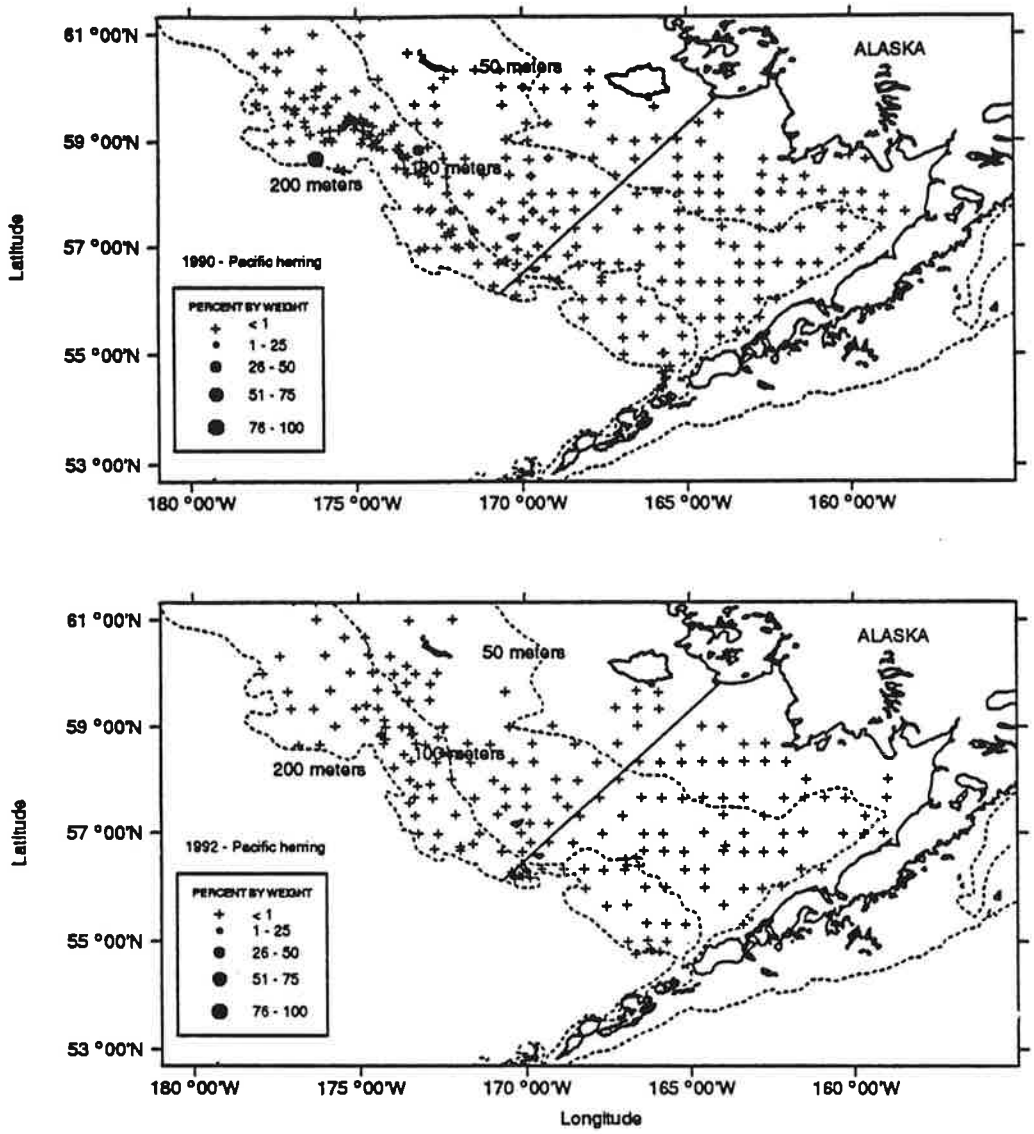


Figure A-3. -- Percent by weight of Pacific cod in the diet of walleye pollock by sampling station during months 5 to 9 in 1990 and 1991 in the eastern Bering Sea.



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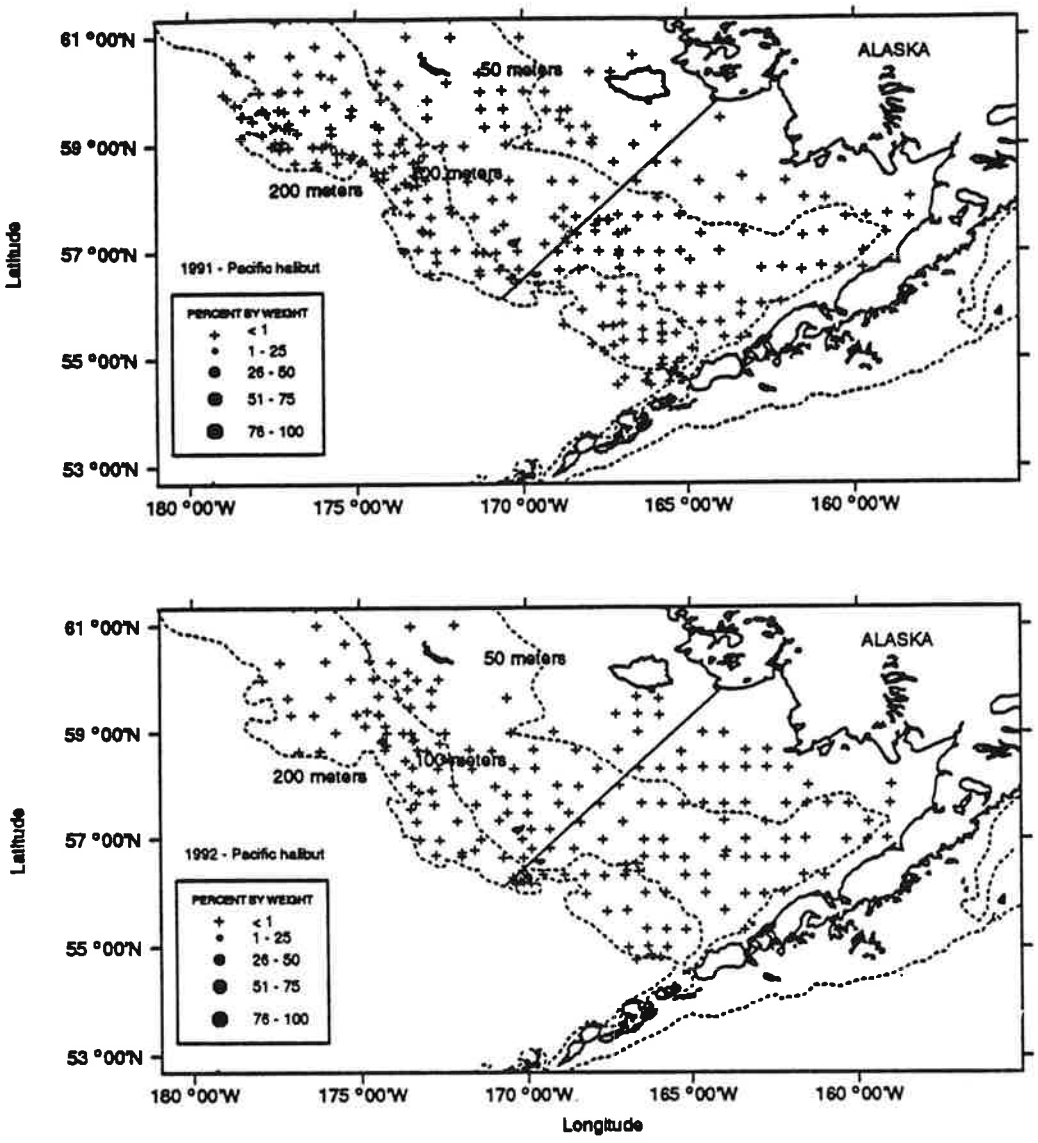

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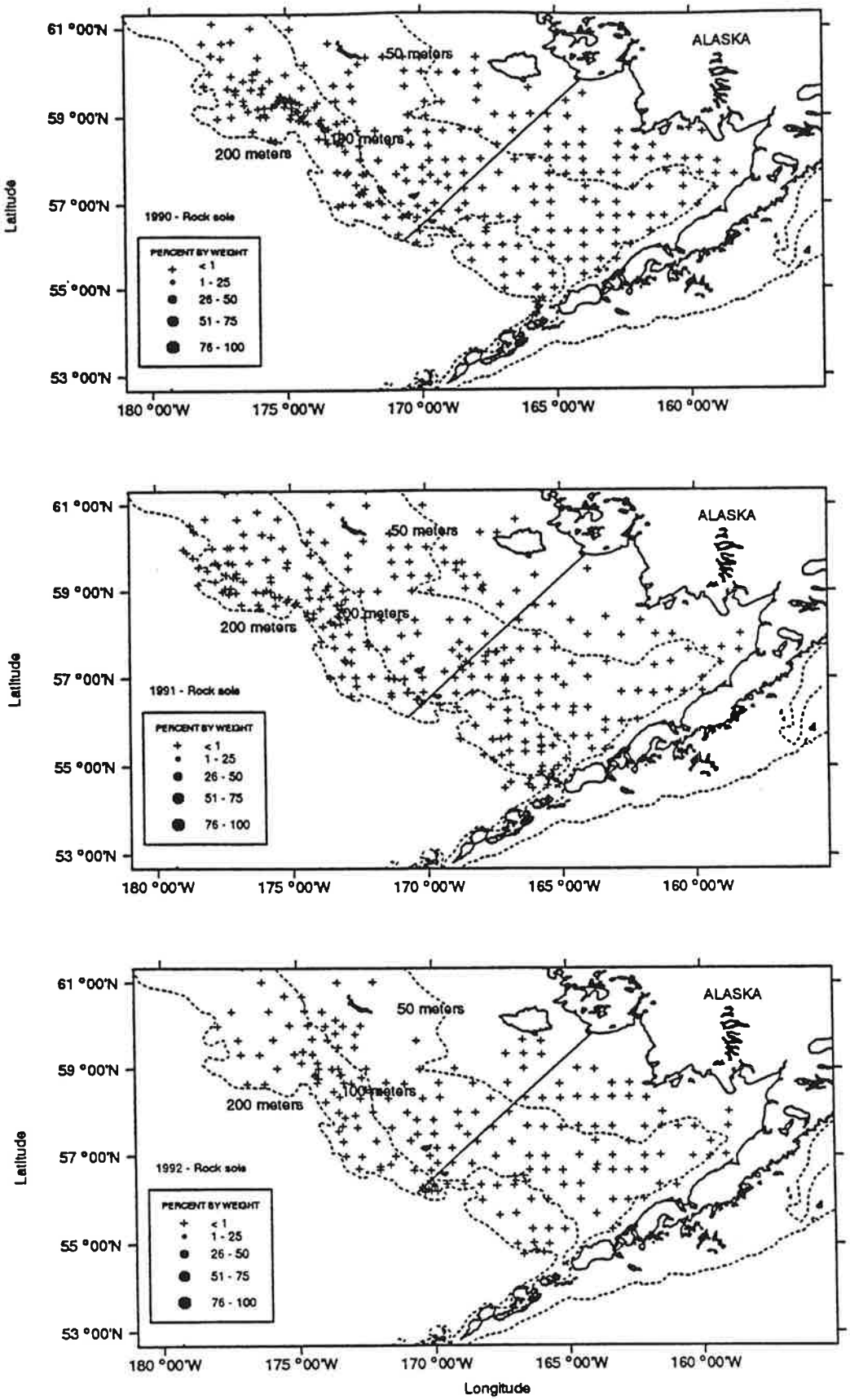

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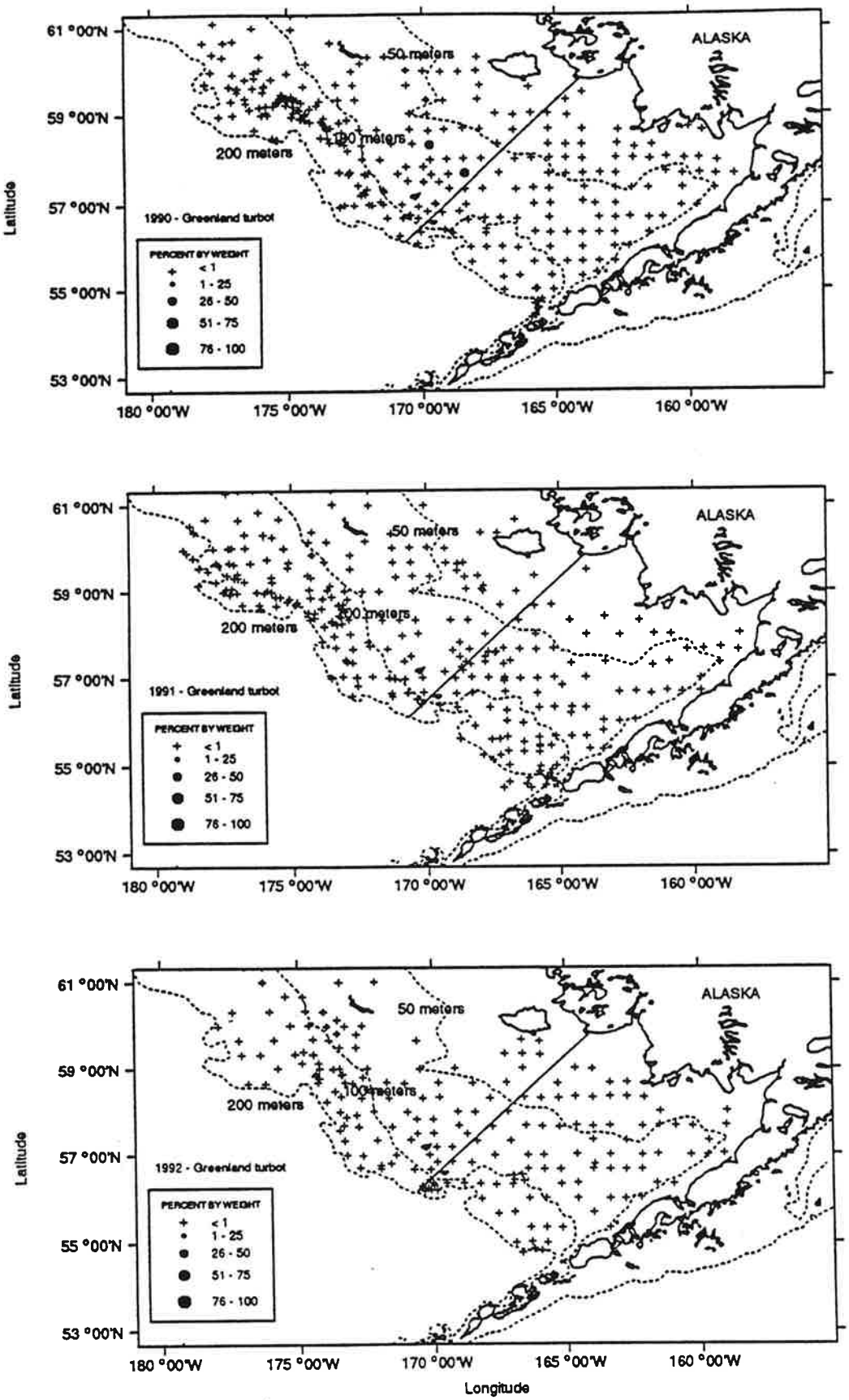


Figure A-7. -- Percent by weight of Greenland turbot in the diet of walleye pollock by sampling station during months 5 to 9 in 1990, 1991 and 1992 in the eastern Bering Sea.

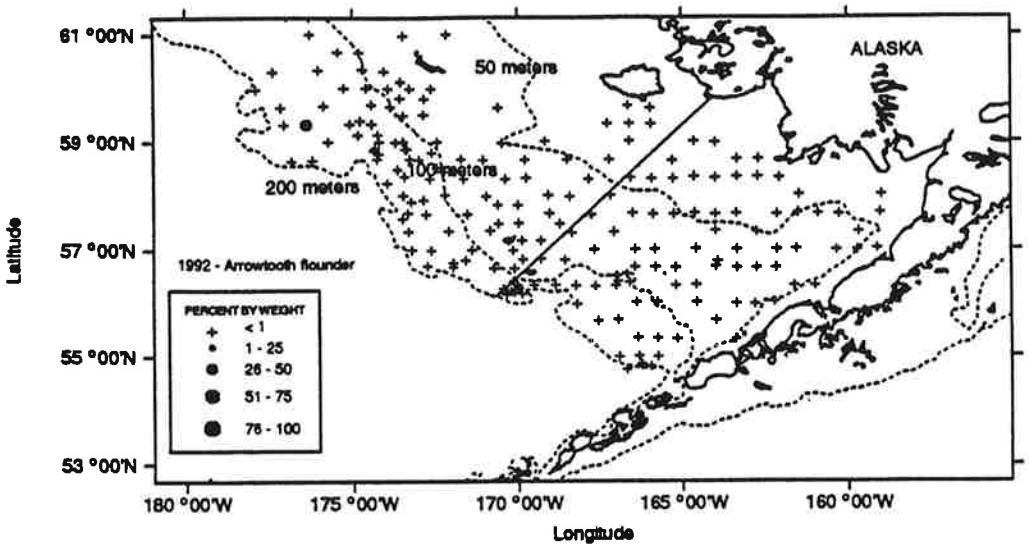


Figure A-8. -- Percent by weight of arrowtooth flounder in the diet of walleye pollock by sampling station during months 5 to 9 in 1992 in the eastern Bering Sea.

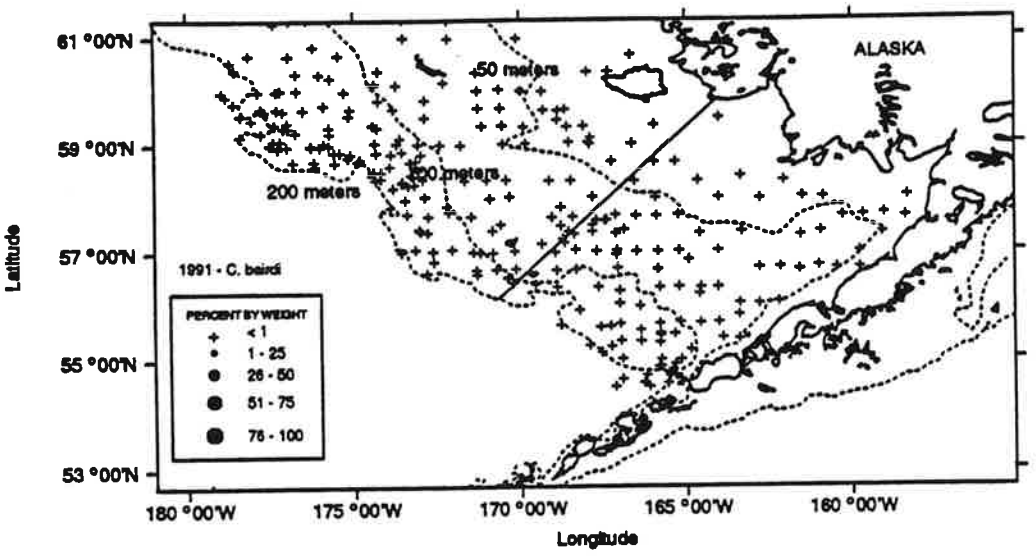


Figure A-9. -- Percent by weight of C. bairdi in the diet of walleye pollock by sampling station during months 5 to 9 in 1991 in the eastern Bering Sea.

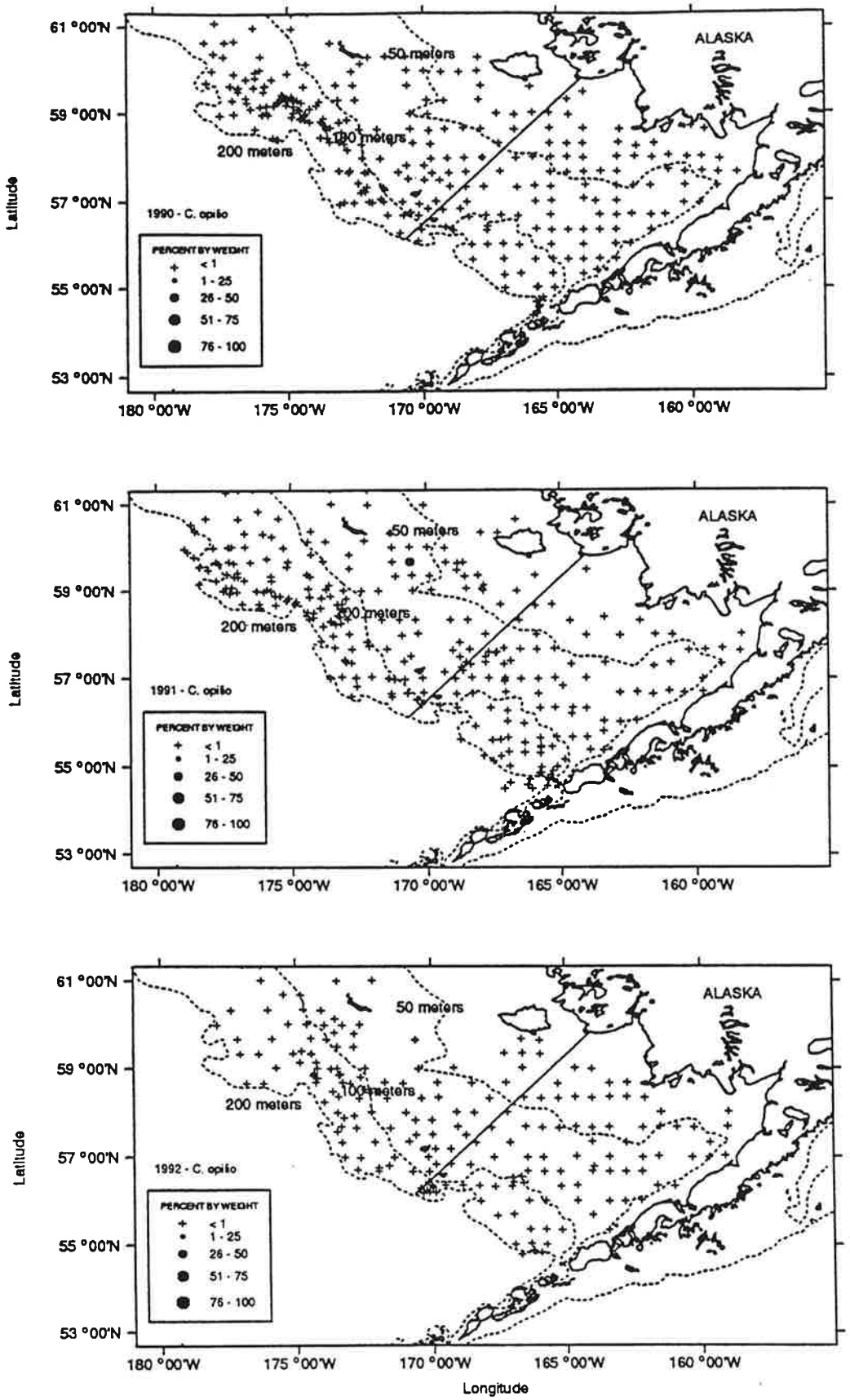


Figure A-10. -- Percent by weight of C. opilio in the diet of walleye pollock by sampling station during months 5 to 9 in 1990, 1991 and 1992 in the eastern Bering Sea.

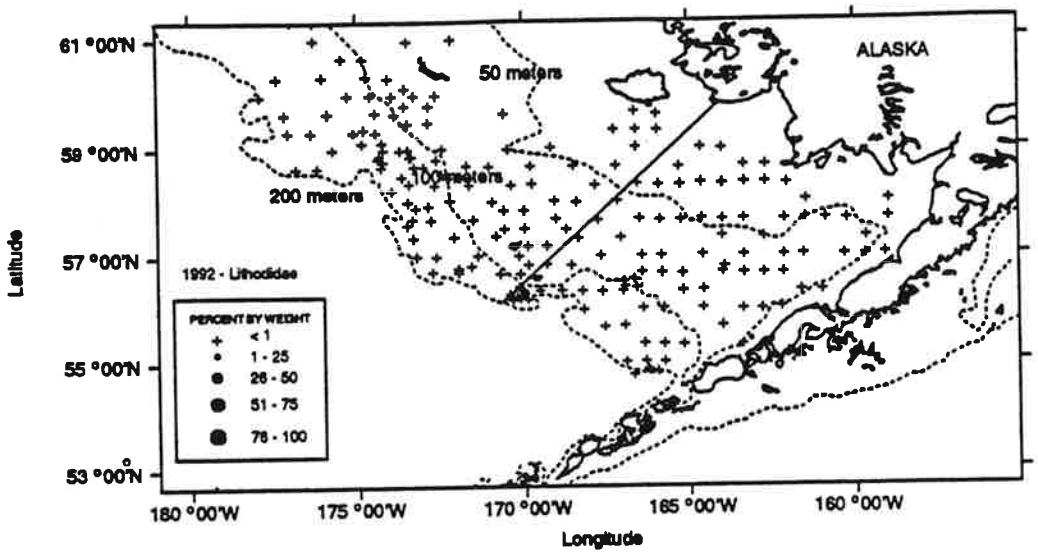


Figure A-11. -- Percent by weight of Lithodidae in the diet of walleye pollock by sampling station during months 5 to 9 in 1992 in the eastern Bering Sea.

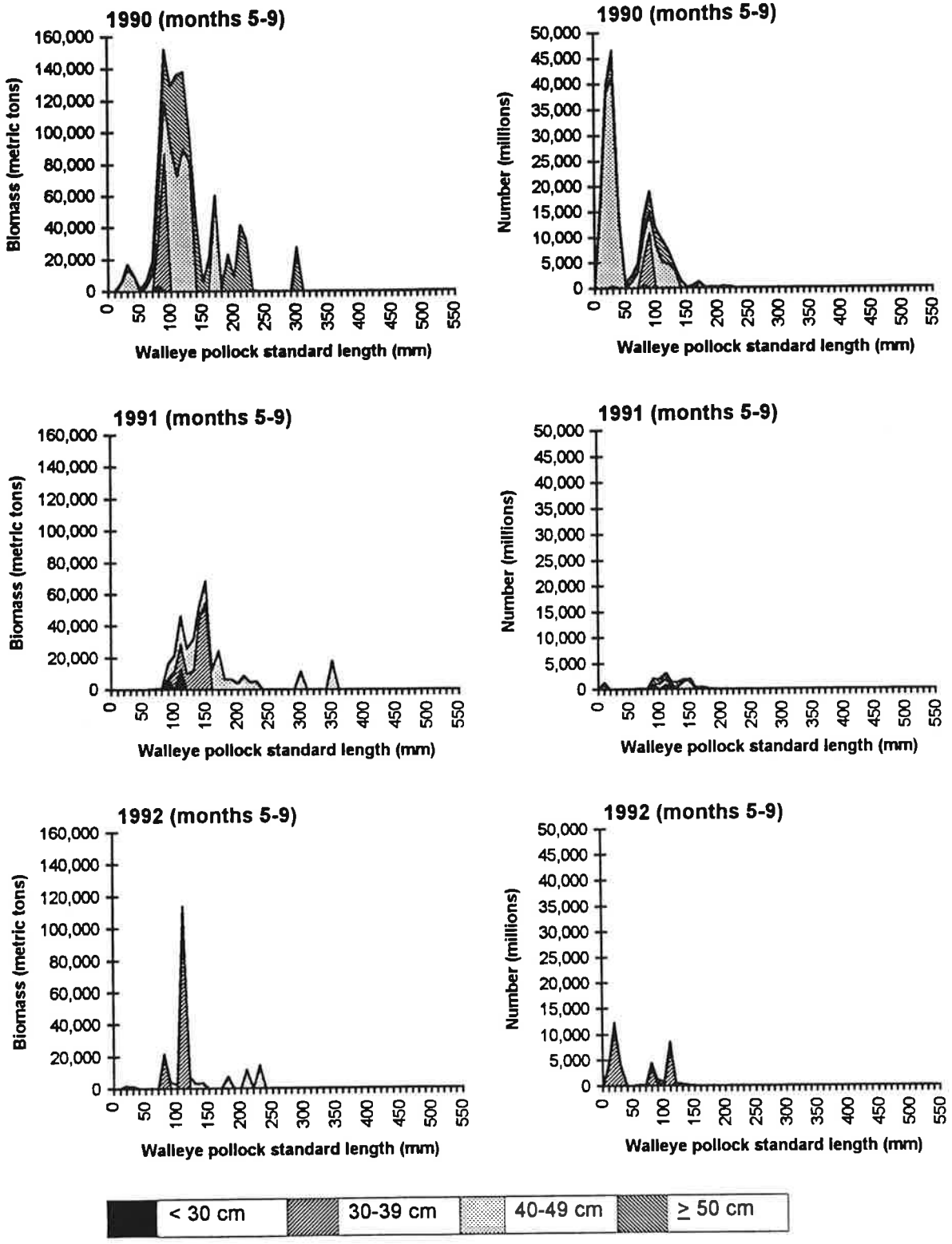


Figure A-12. -- Estimated biomass and numbers of walleye pollock consumed by four size groups of walleye pollock in the eastern Bering Sea by year, 1990-92 (months 5-9).

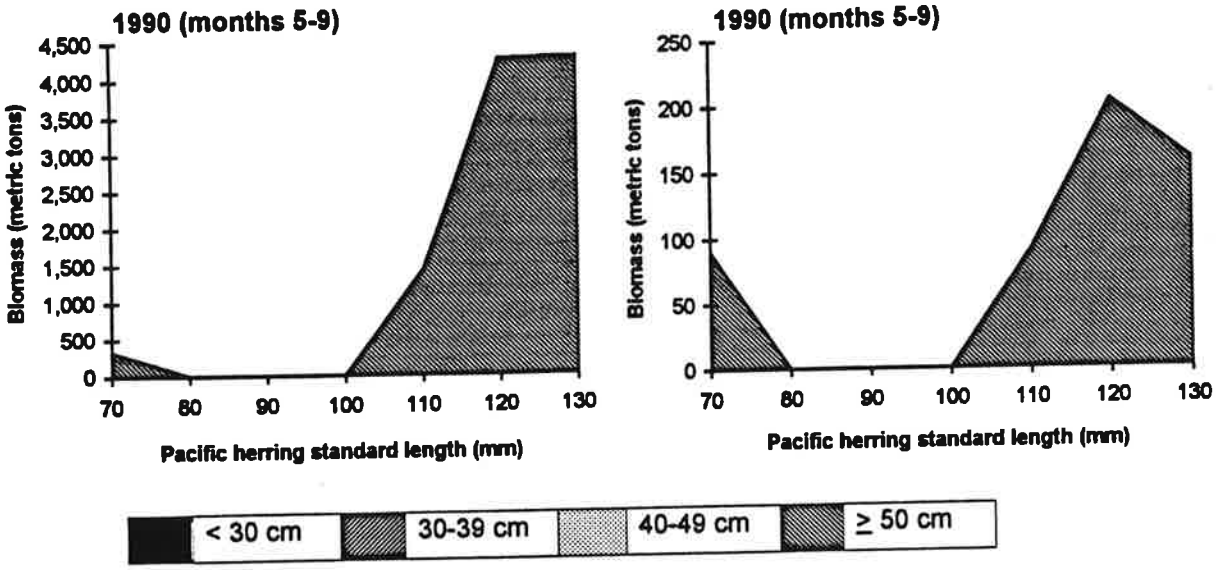


Figure A-13. – Estimated biomass and numbers of Pacific herring consumed by four size groups of walleye pollock in the eastern Bering Sea in 1990 (months 5-9).

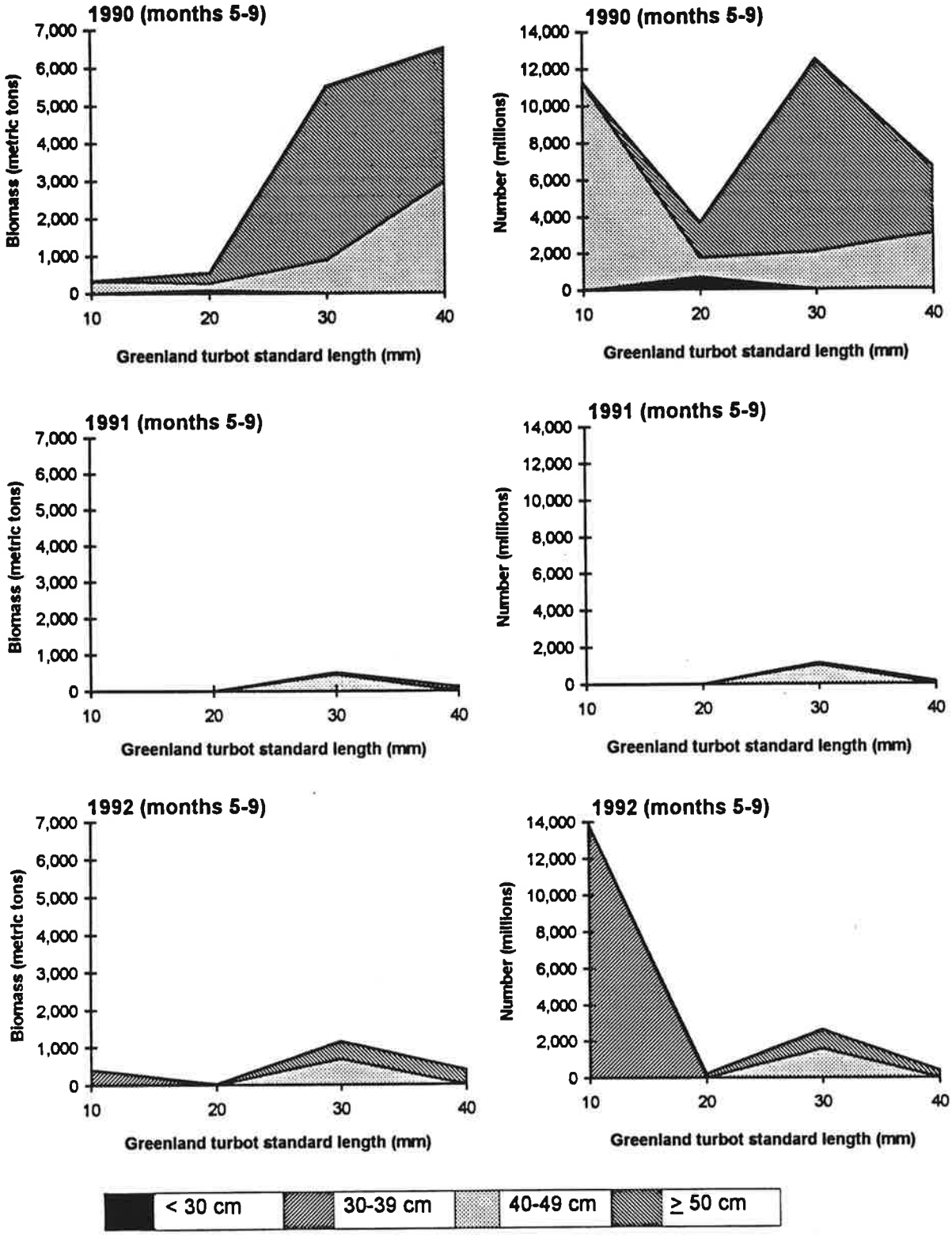
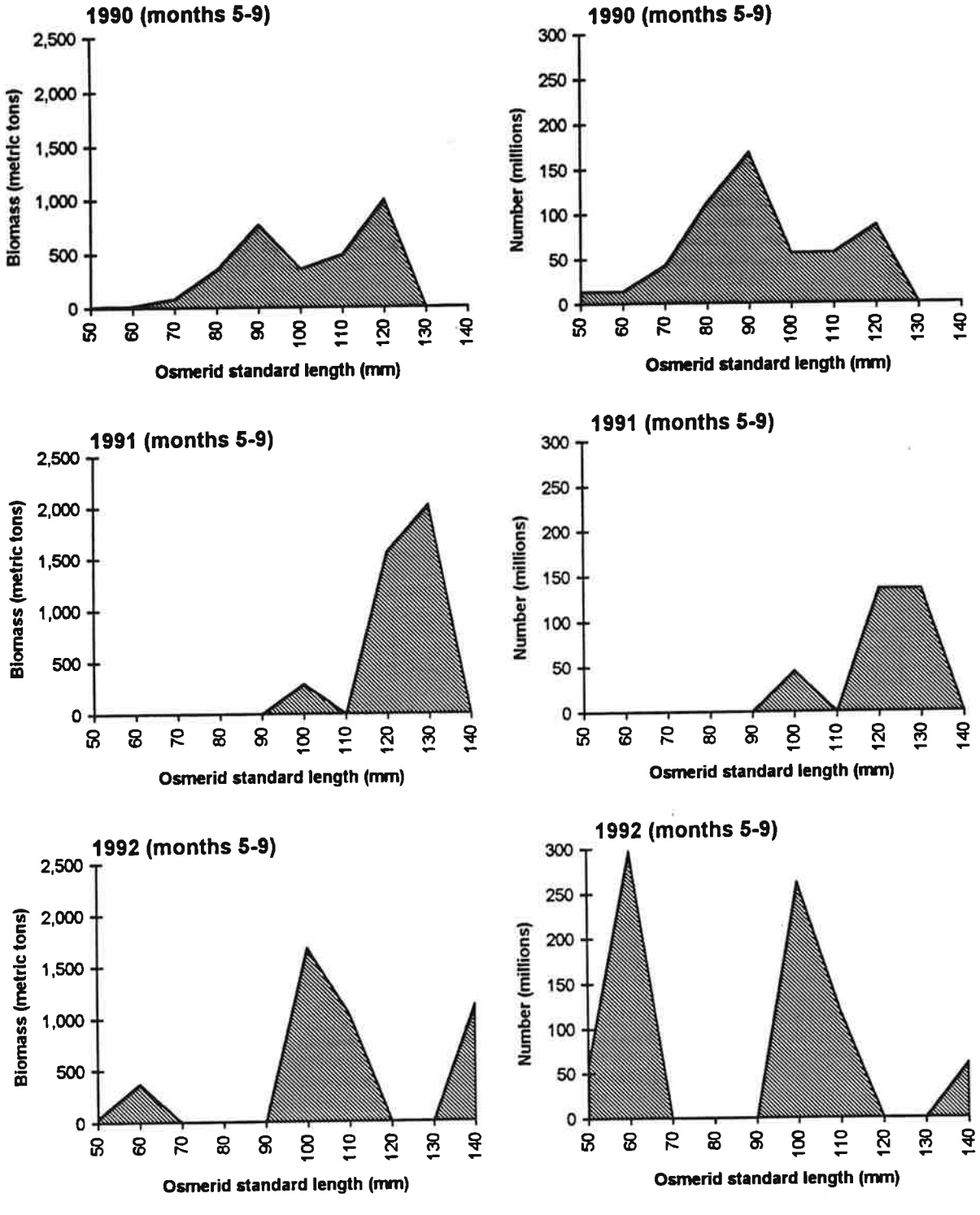


Figure A-14. -- Estimated biomass and numbers of Greenland turbot consumed by four size groups of walleye pollock in the eastern Bering Sea by year, 1990-92 (months 5-9).



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APPENDIX B. - PACIFIC COD

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Predator size (cm)	Stratum		Biomass (metric tons) 90	91	92
<30	1		23,908	69,588	51,231
	2		6,259	9,960	8,346
	3		6,576	18,465	54,970
	4		36,089	53,374	43,823
	5		195	0	0
	6		4,008	9,782	3,102
		Subtotal	77,035	161,168	161,472
30-59	1		24,295	59,841	78,522
	2		5,133	5,252	7,555
	3		99,674	74,701	115,855
	4		99,265	64,125	90,765
	5		16,447	14,046	21,628
	6		91,837	30,565	72,057
		Subtotal	336,651	248,531	386,381
<60	1		26,888	38,323	35,498
	2		15,418	28,272	2,096
	3		110,877	101,362	116,122
	4		74,904	73,104	32,928
	5		60,126	39,626	59,442
	6		291,155	195,642	103,140
		Subtotal	579,368	476,330	349,225
		Total	993,054	886,029	897,078

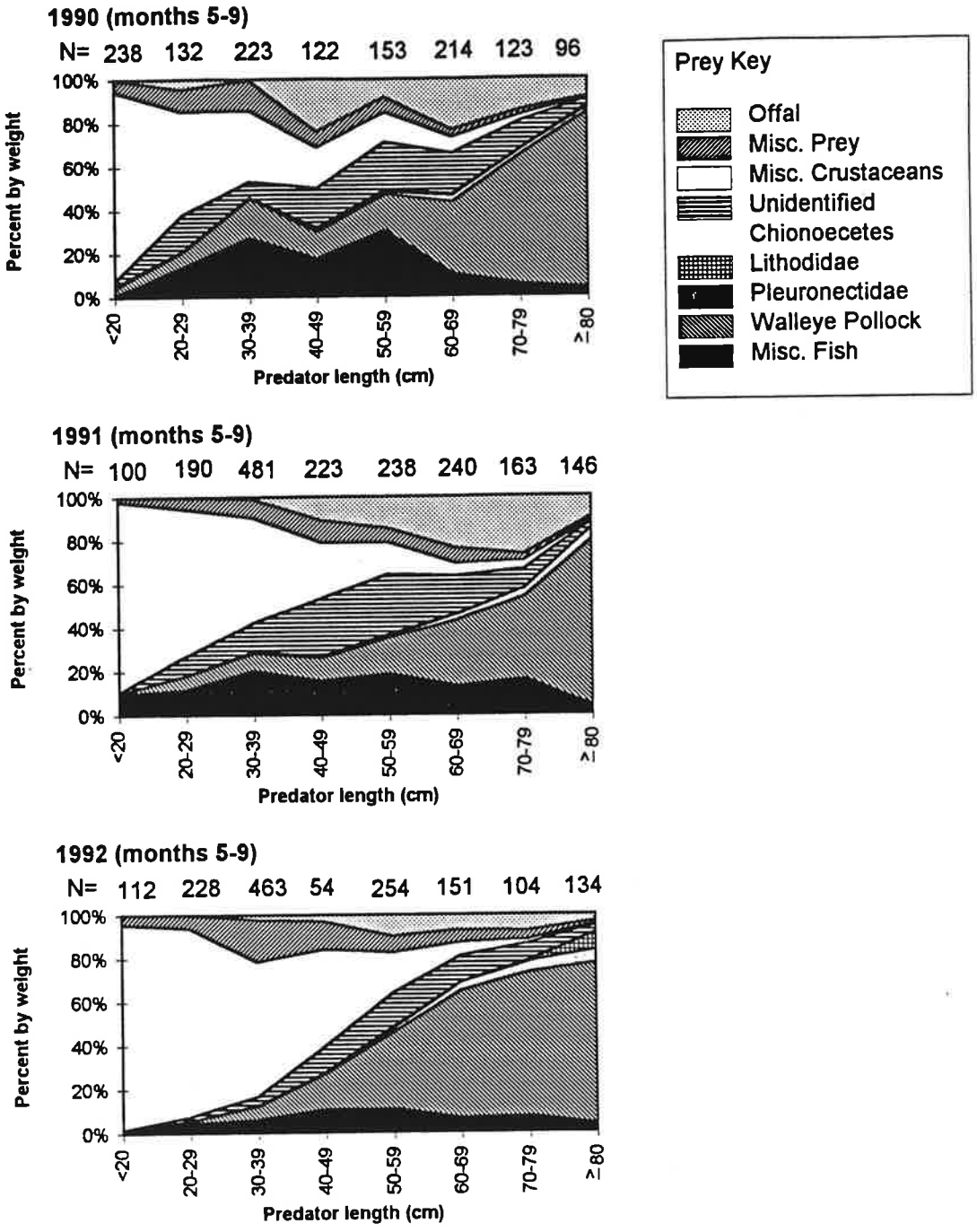


Figure B-1. -- Diet composition of Pacific cod, in terms of percent by weight, during months 5 to 9 by year and by predator size in the Bering Sea; N = number of stomachs.

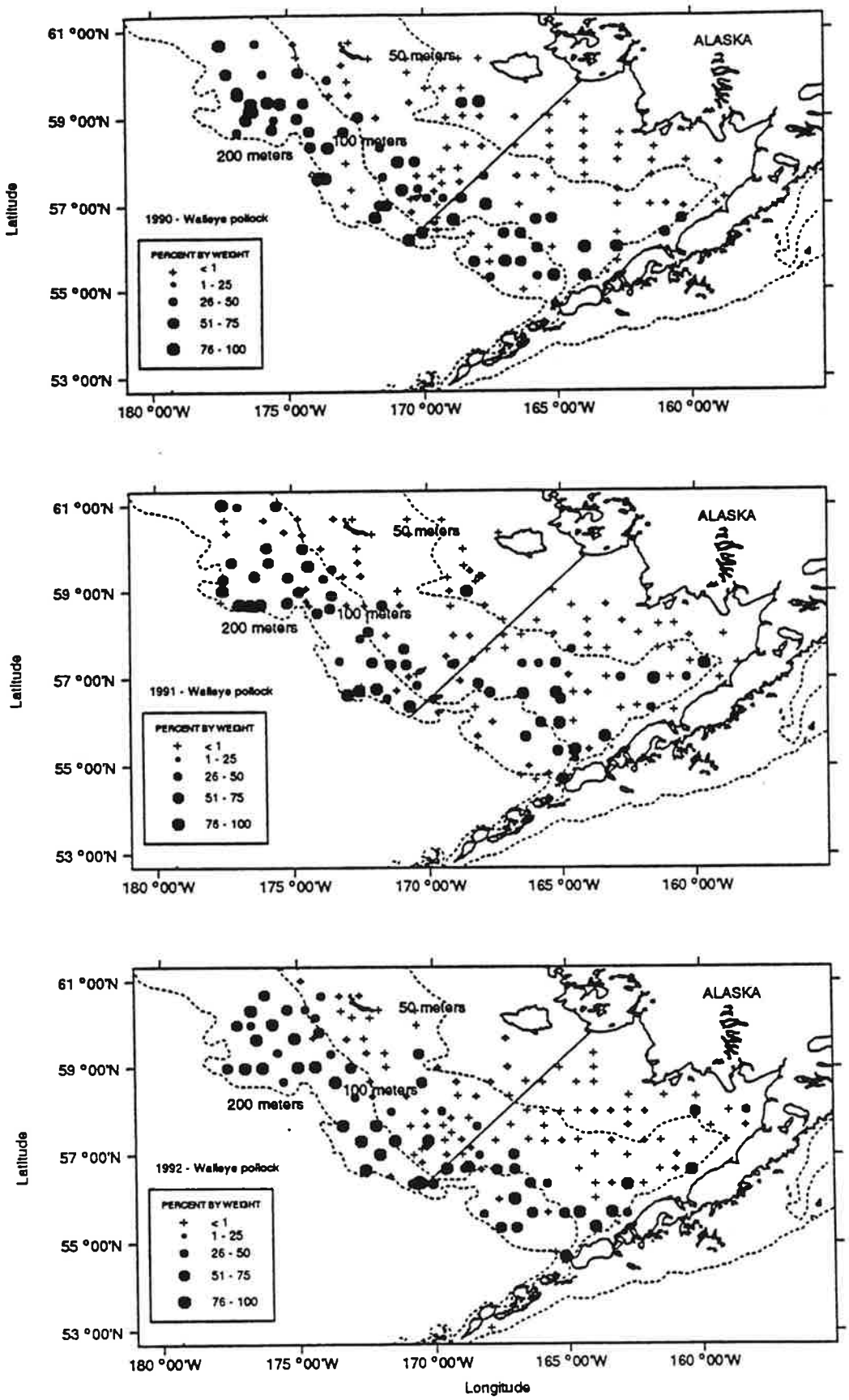


Figure B-2. -- Percent by weight of walleye pollock in the diet of Pacific cod by sampling station during months 5 to 9 in 1990, 1991 and 1992 in the eastern Bering Sea.

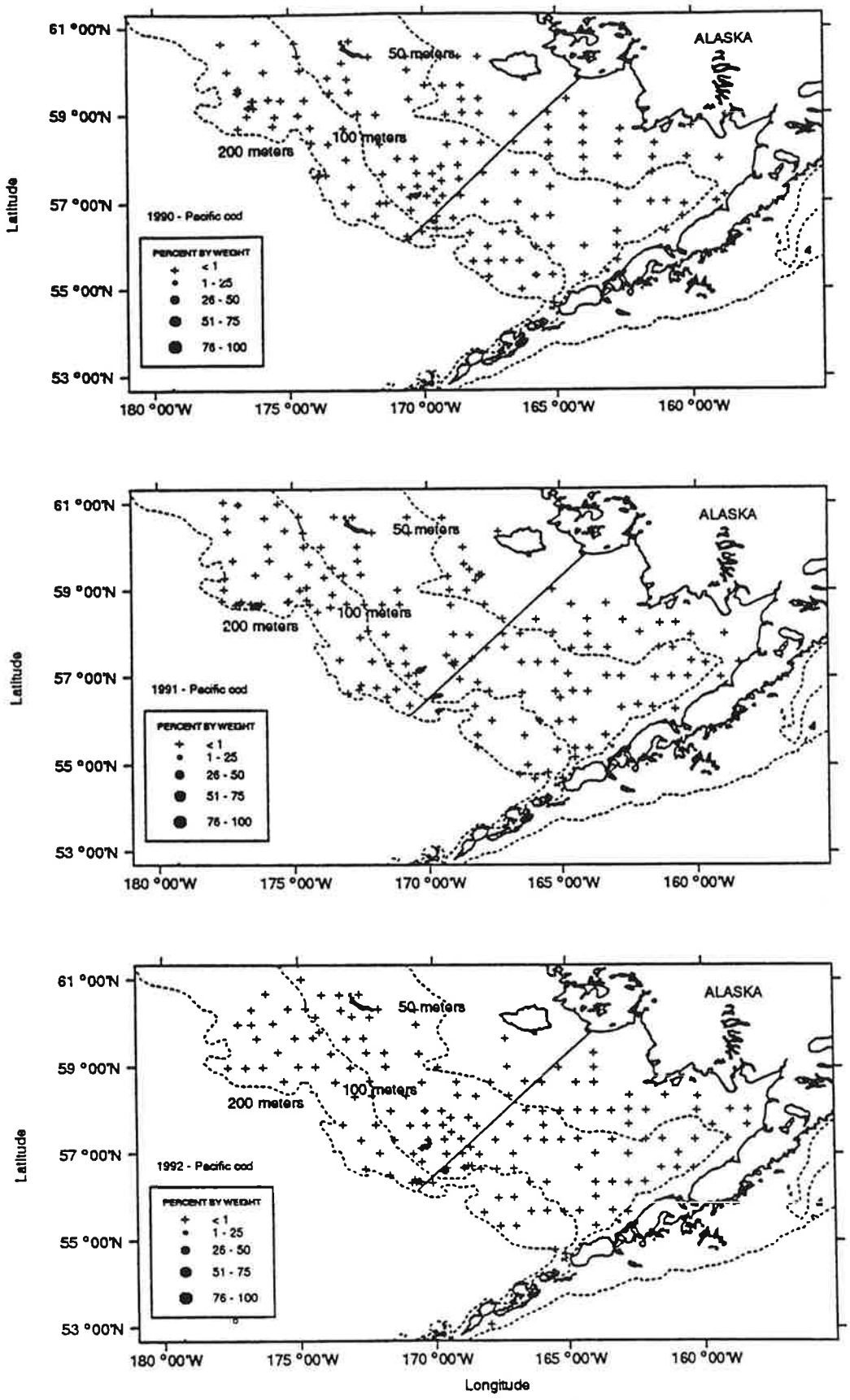


Figure B-3. -- Percent by weight of Pacific cod in the diet of Pacific cod by sampling station during months 5 to 9 in 1990, 1991 and 1992 in the eastern Bering Sea.

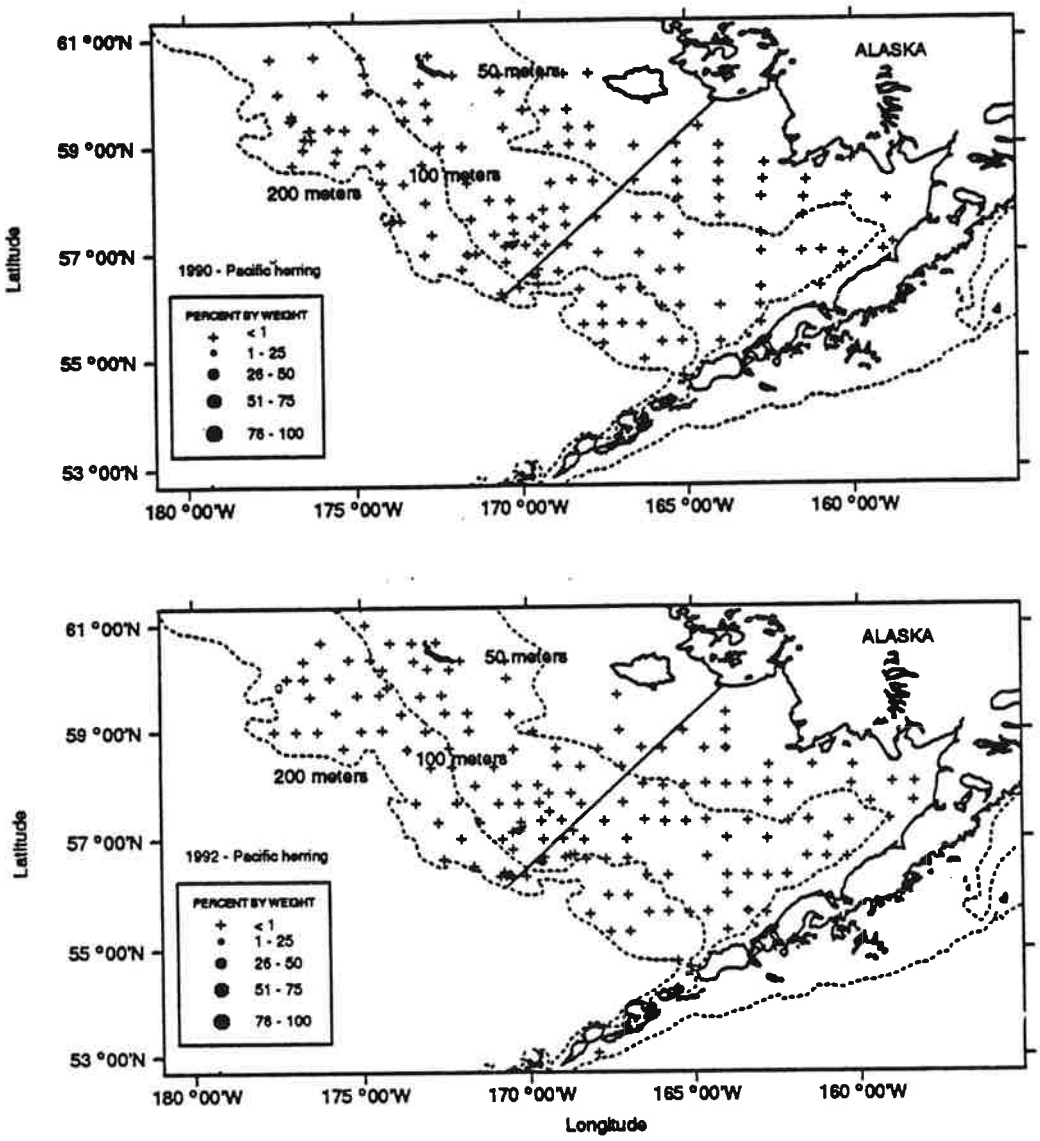


Figure B-4. -- Percent by weight of Pacific herring in the diet of Pacific cod by sampling station during months 5 to 9 in 1990 and 1992 in the eastern Bering Sea.

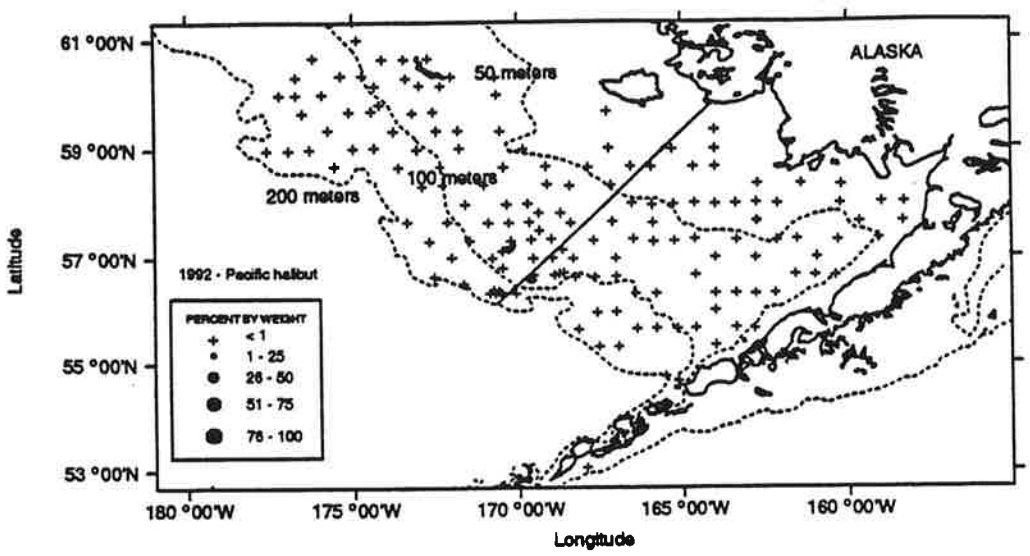


Figure B-5. -- Percent by weight of Pacific halibut in the diet of Pacific cod by sampling station during months 5 to 9 in 1992 in the eastern Bering Sea.

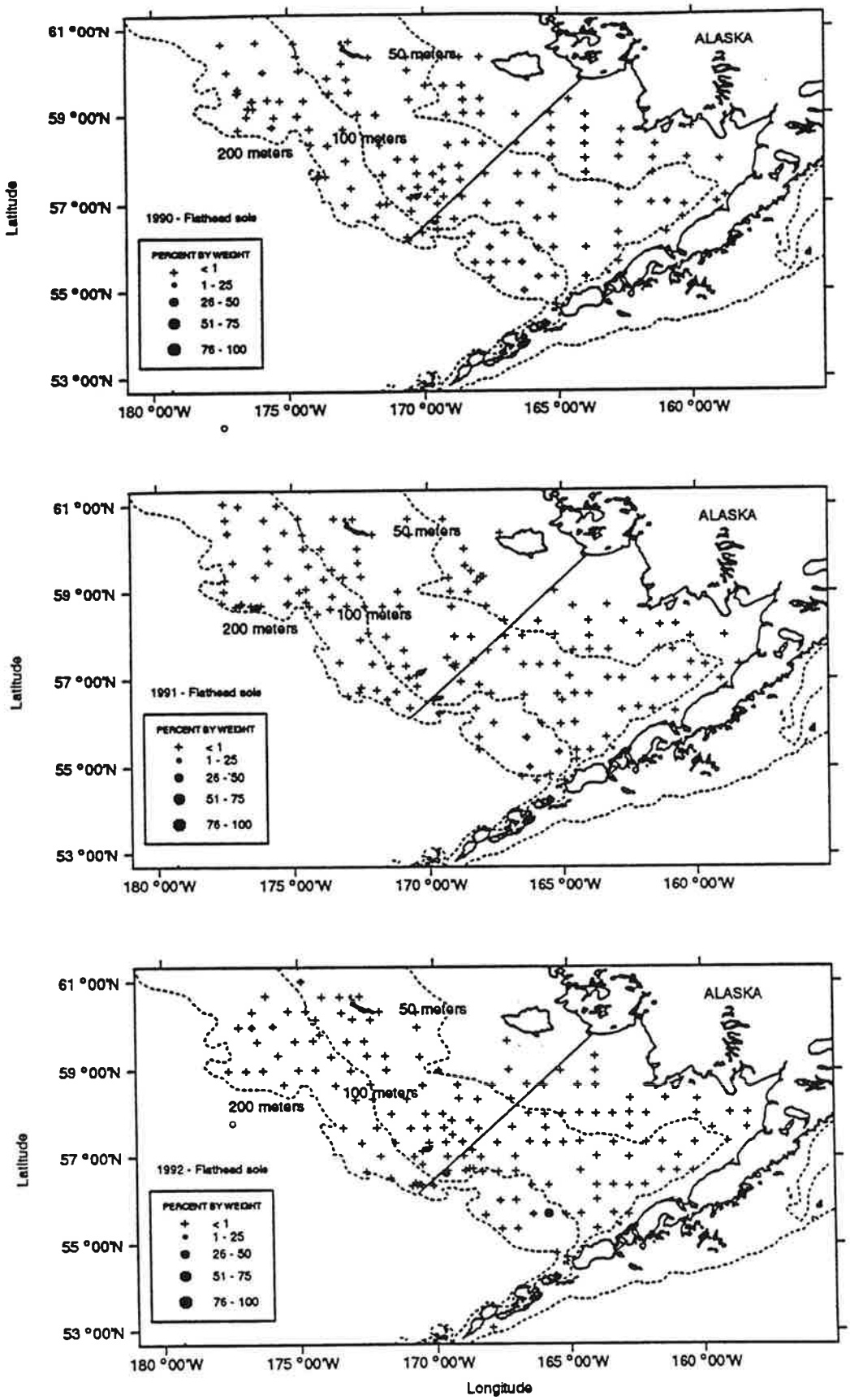


Figure B-6. -- Percent by weight of flathead sole in the diet of Pacific cod by sampling station during months 5 to 9 in 1990, 1991 and 1992 in the eastern Bering Sea.

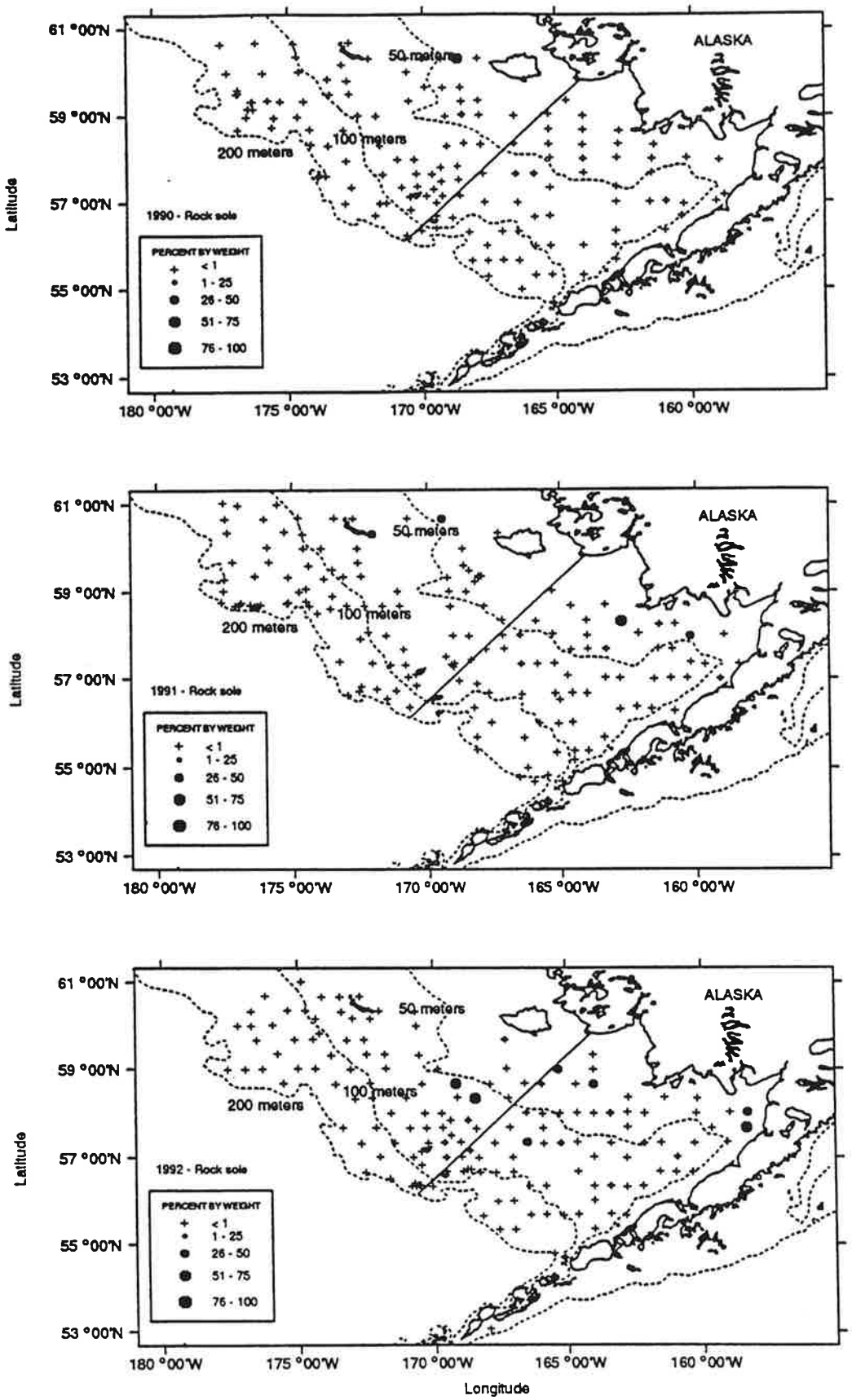
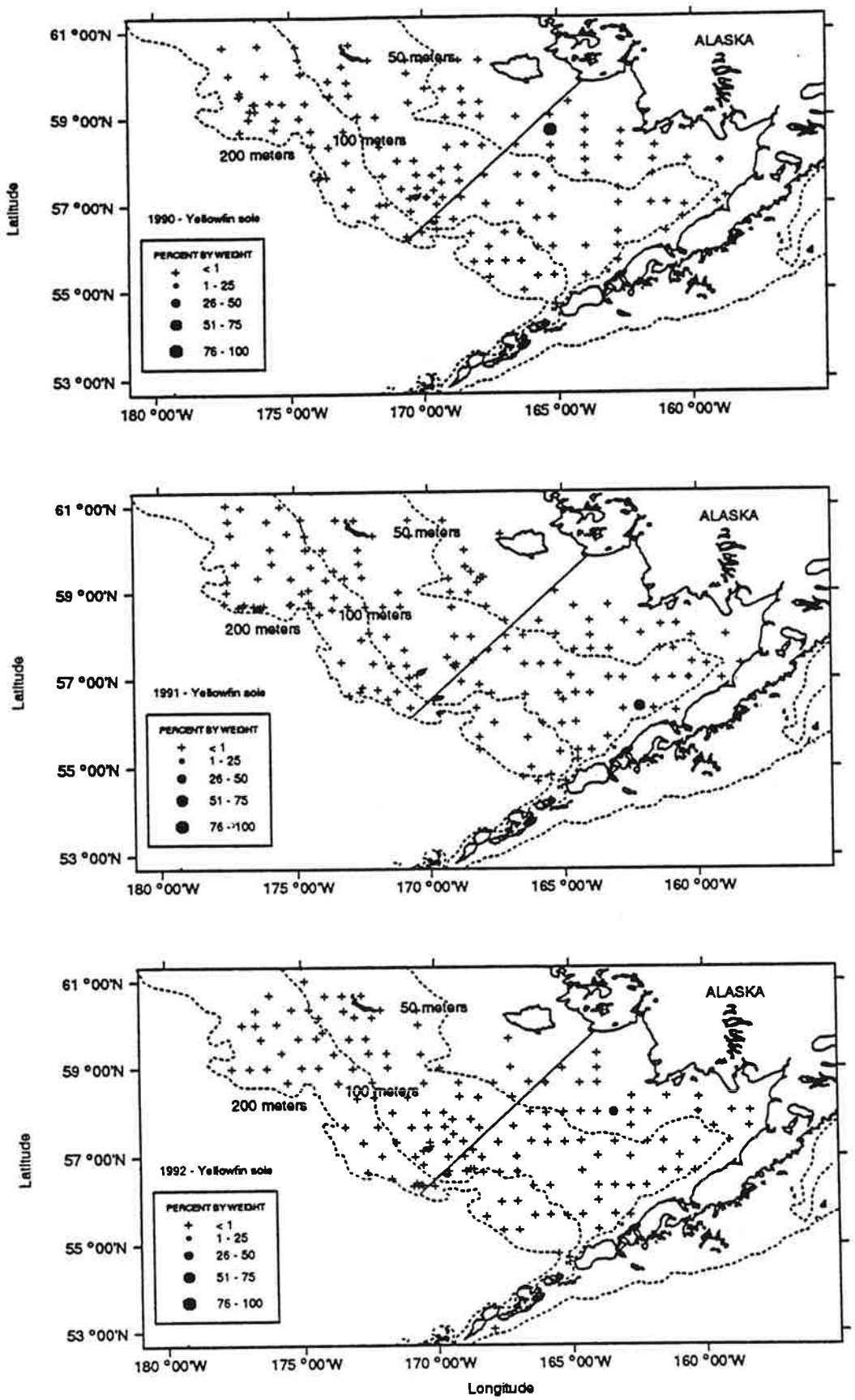


Figure B-7. -- Percent by weight of rock sole in the diet of Pacific cod by sampling station during months 5 to 9 in 1990, 1991 and 1992 in the eastern Bering Sea.



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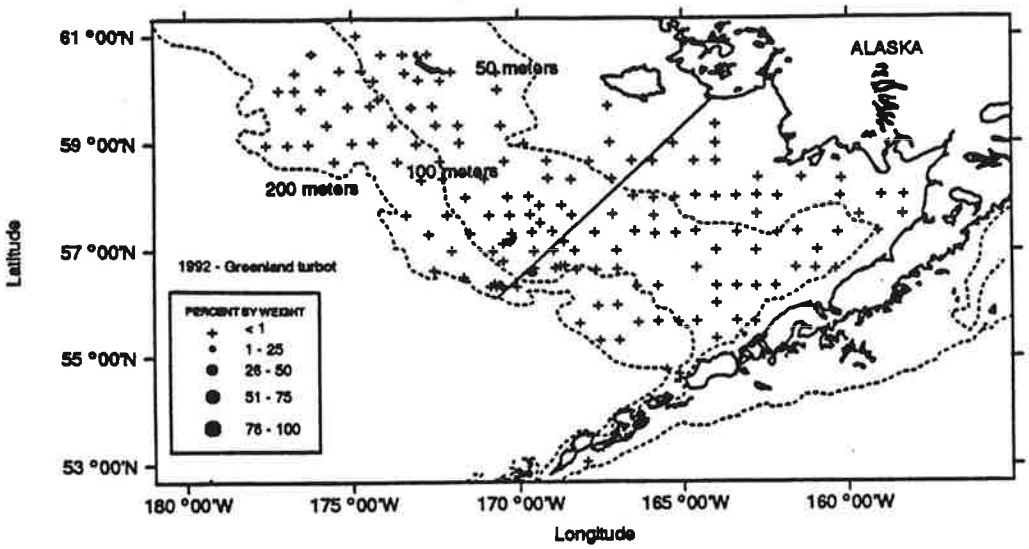

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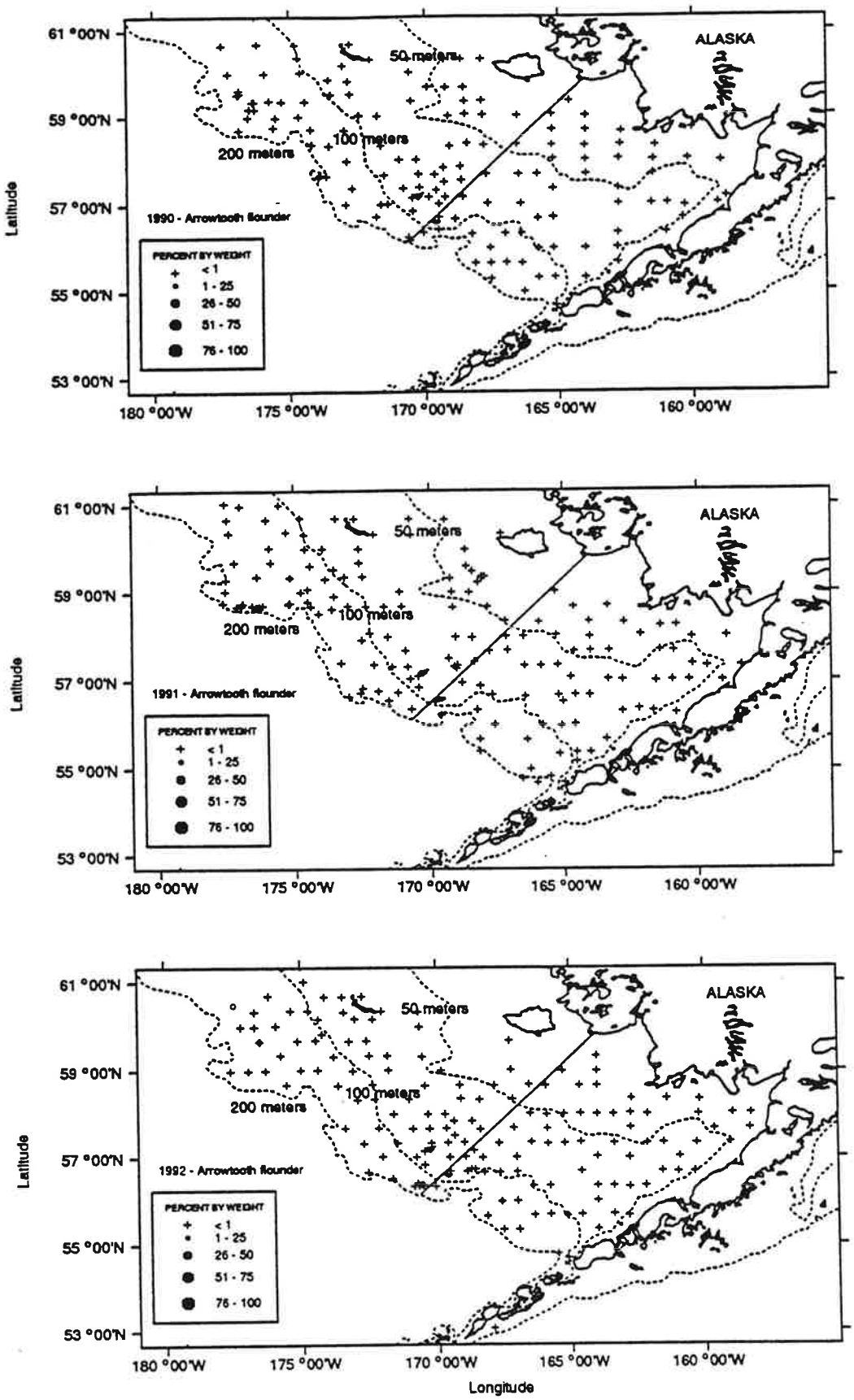

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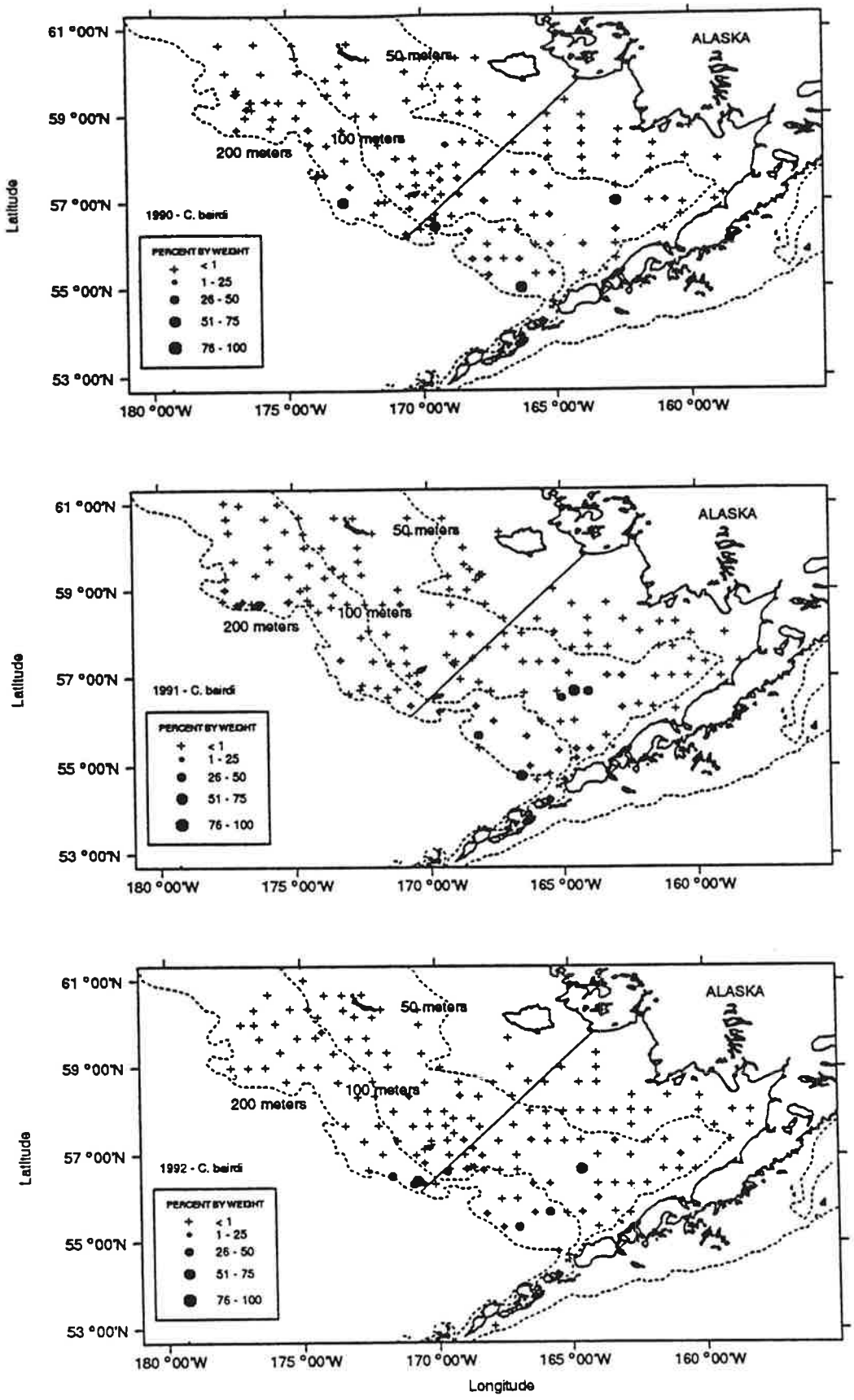
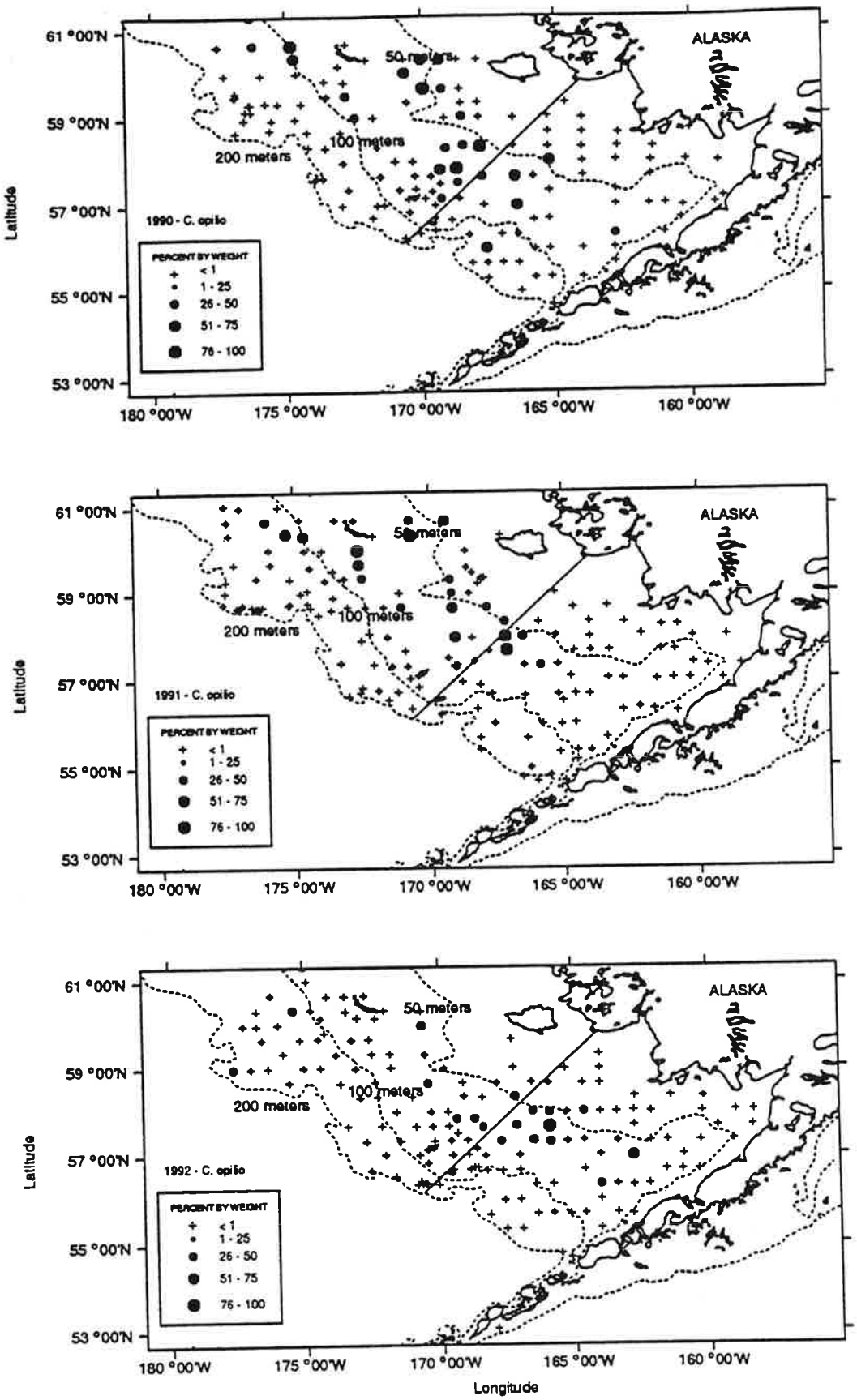


Figure B-11. -- Percent by weight of C. bairdi in the diet of Pacific cod by sampling station during months 5 to 9 in 1990, 1991 and 1992 in the eastern Bering Sea.



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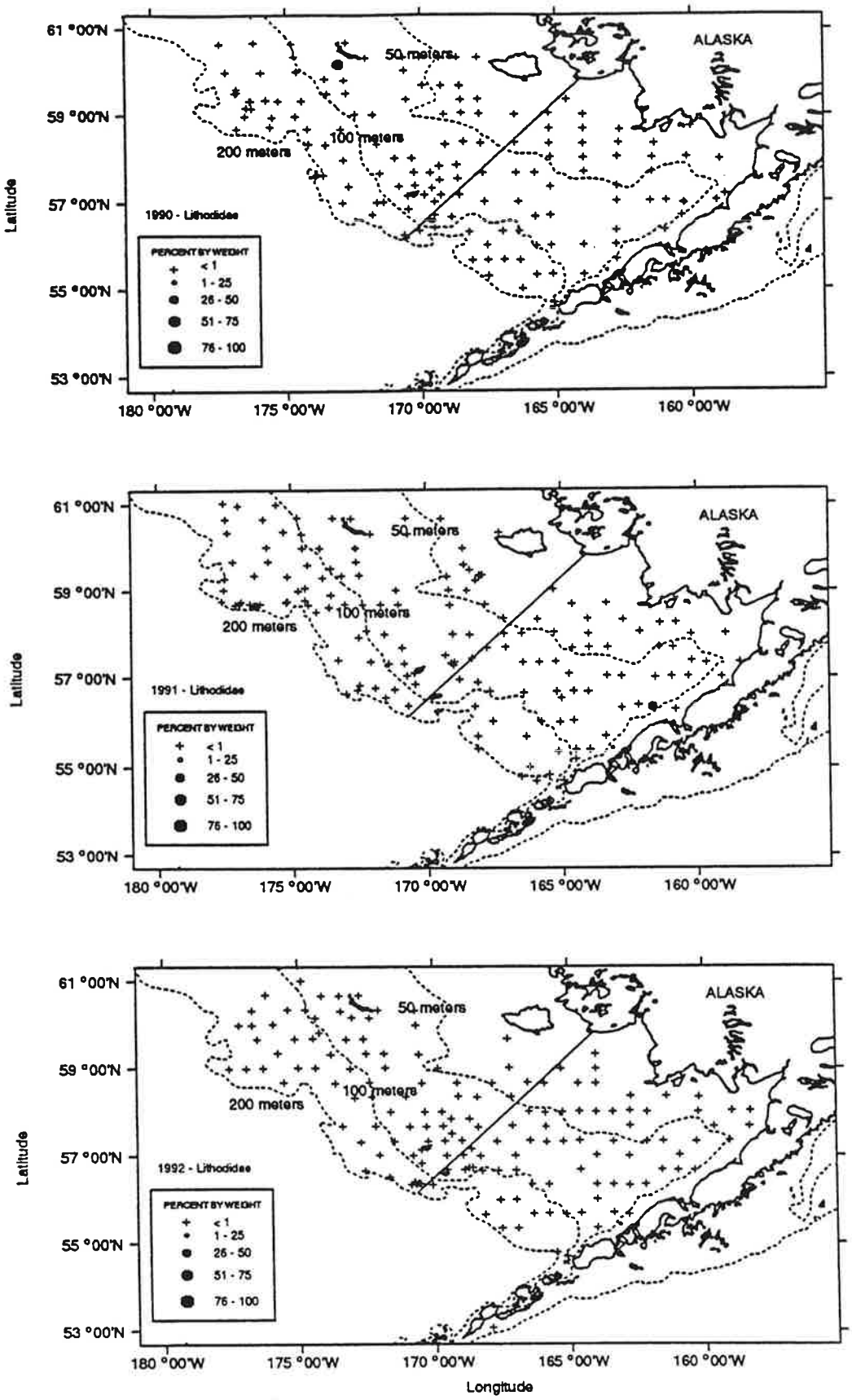

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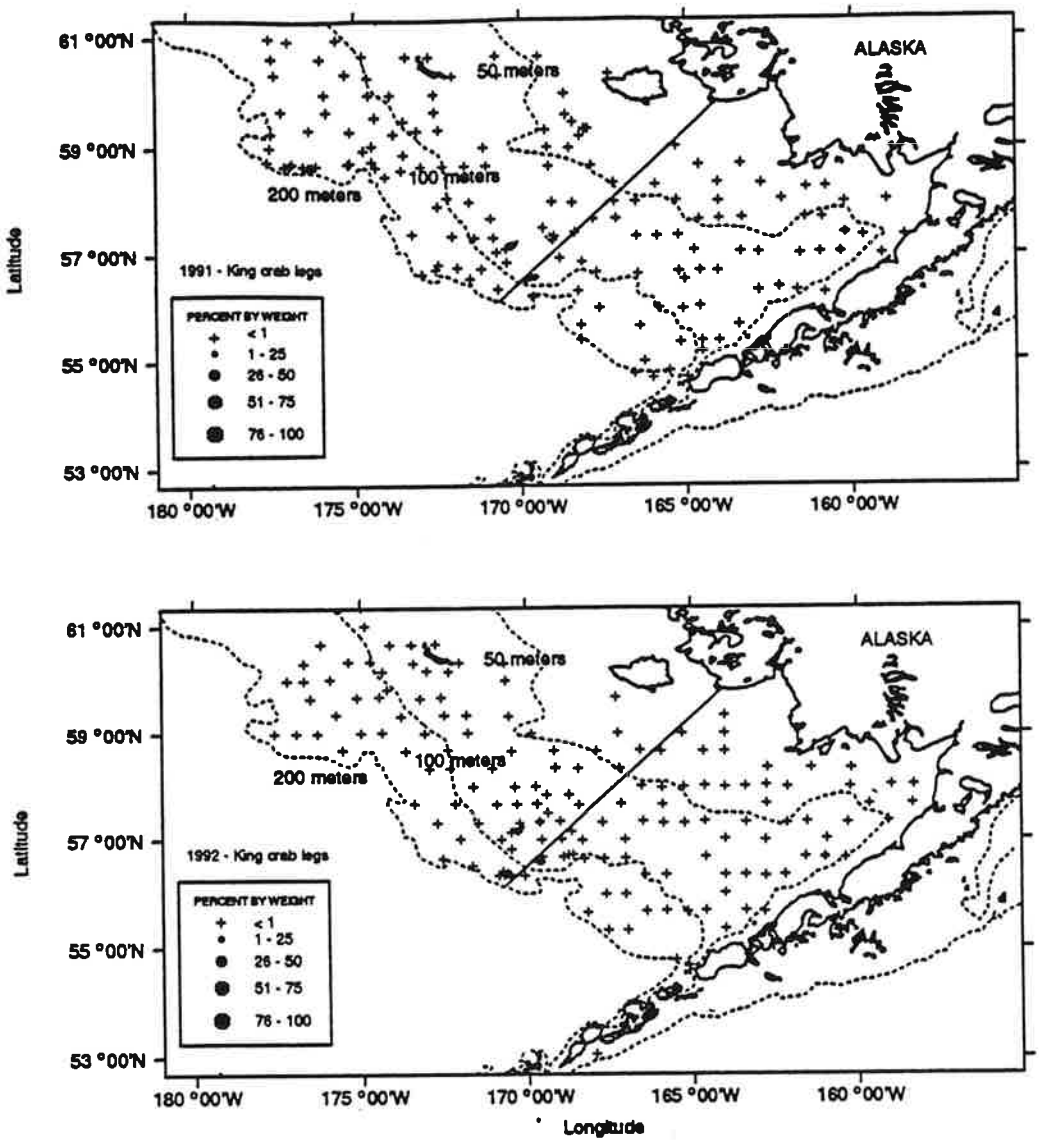

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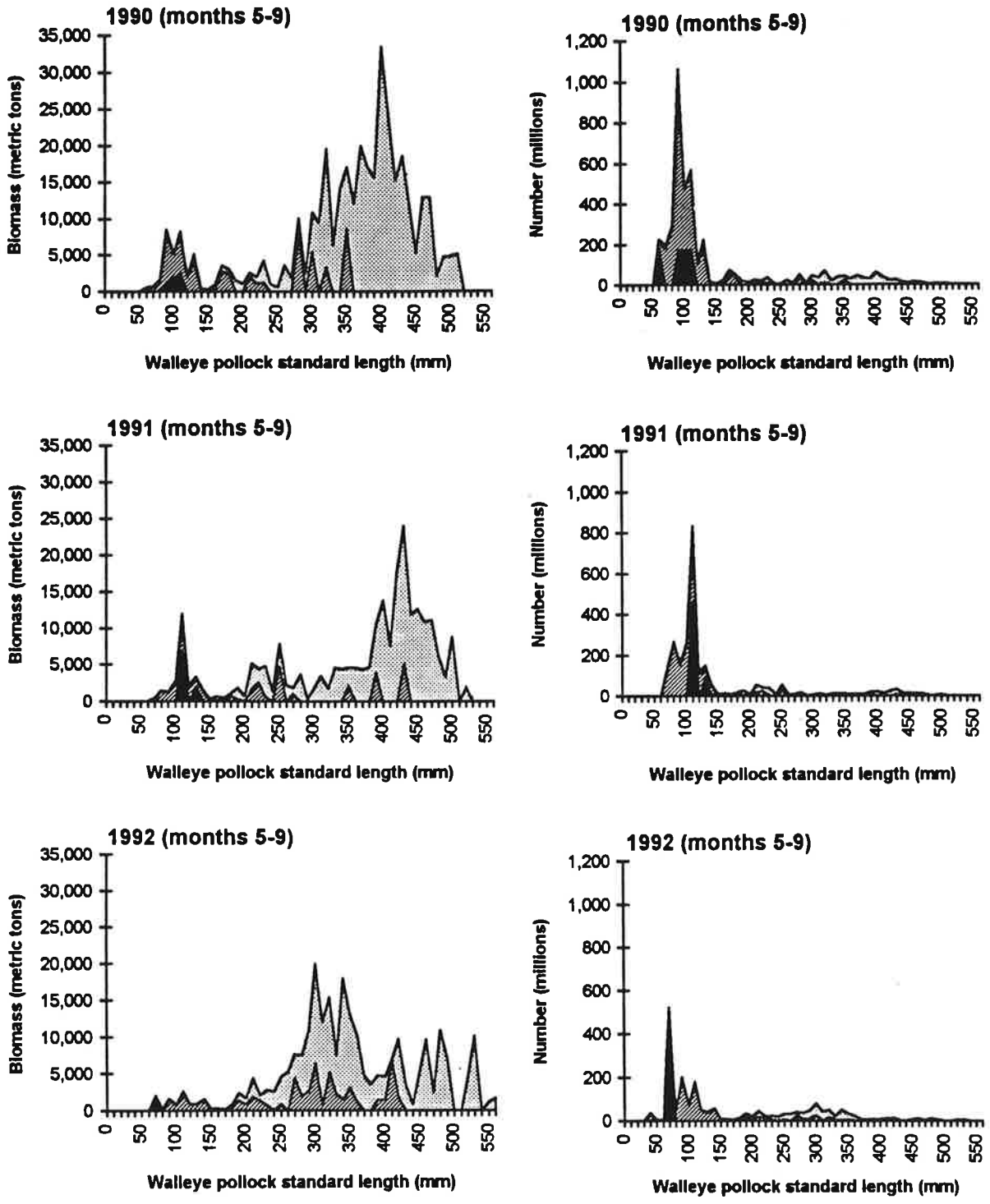

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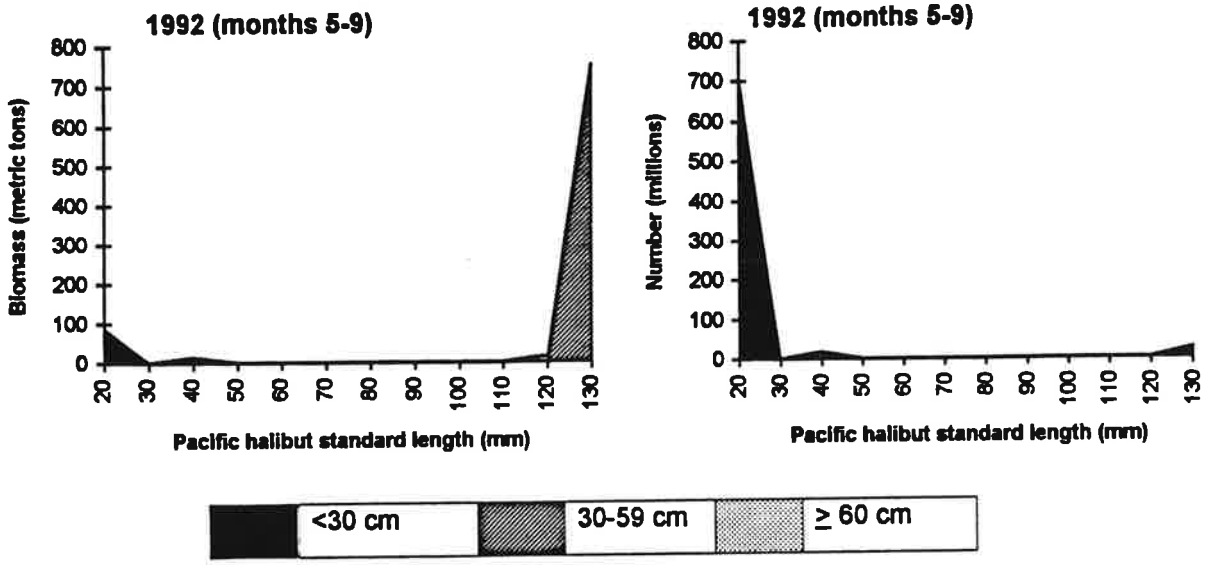


Figure B-16. -- Estimated biomass and numbers of Pacific halibut consumed by three size groups of Pacific cod in the eastern Bering Sea in 1992 (months 5-9).

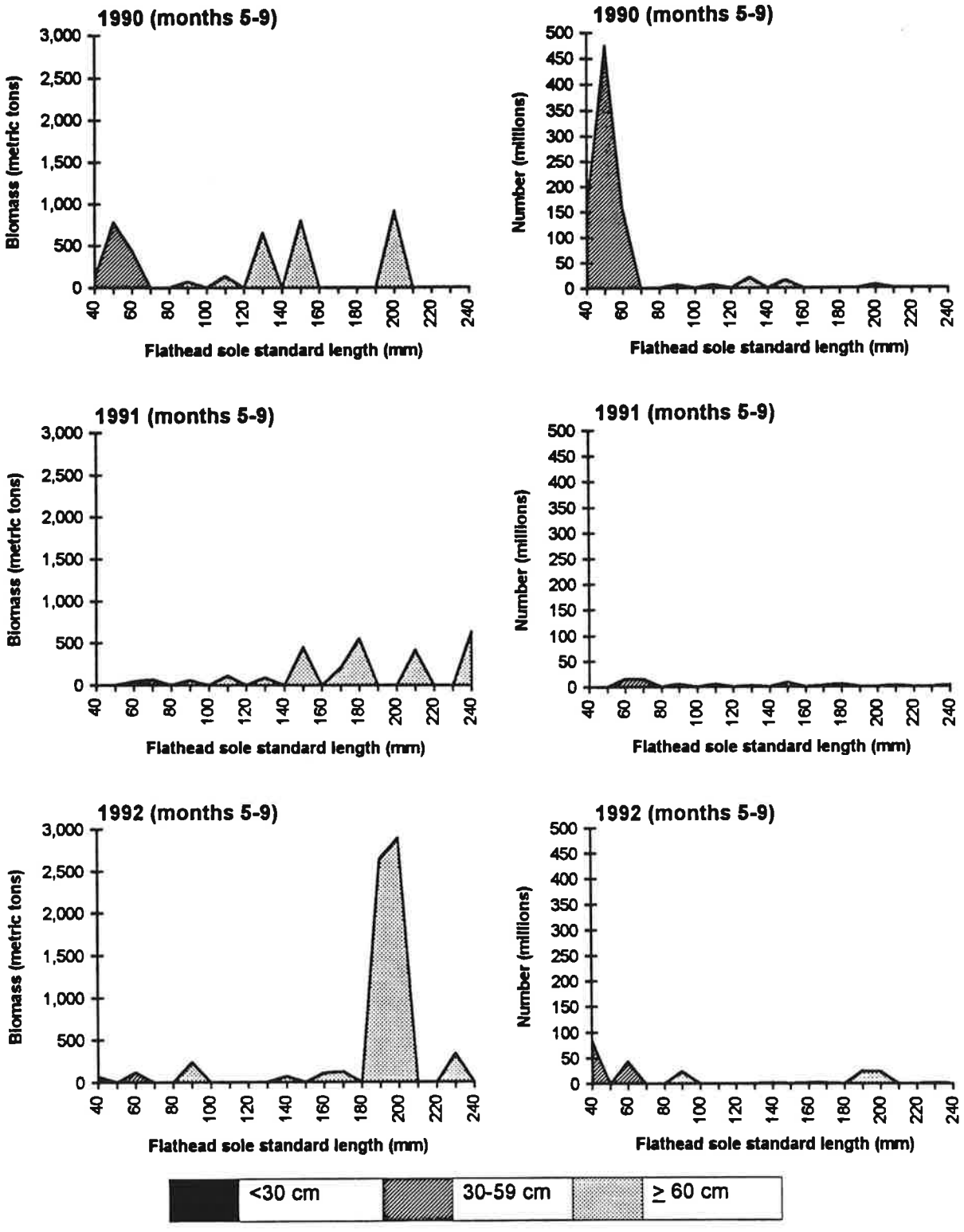


Figure B-17. -- Estimated biomass and numbers of flathead sole consumed by three size groups of Pacific cod in the eastern Bering Sea by year, 1990-1992 (months 5-9).

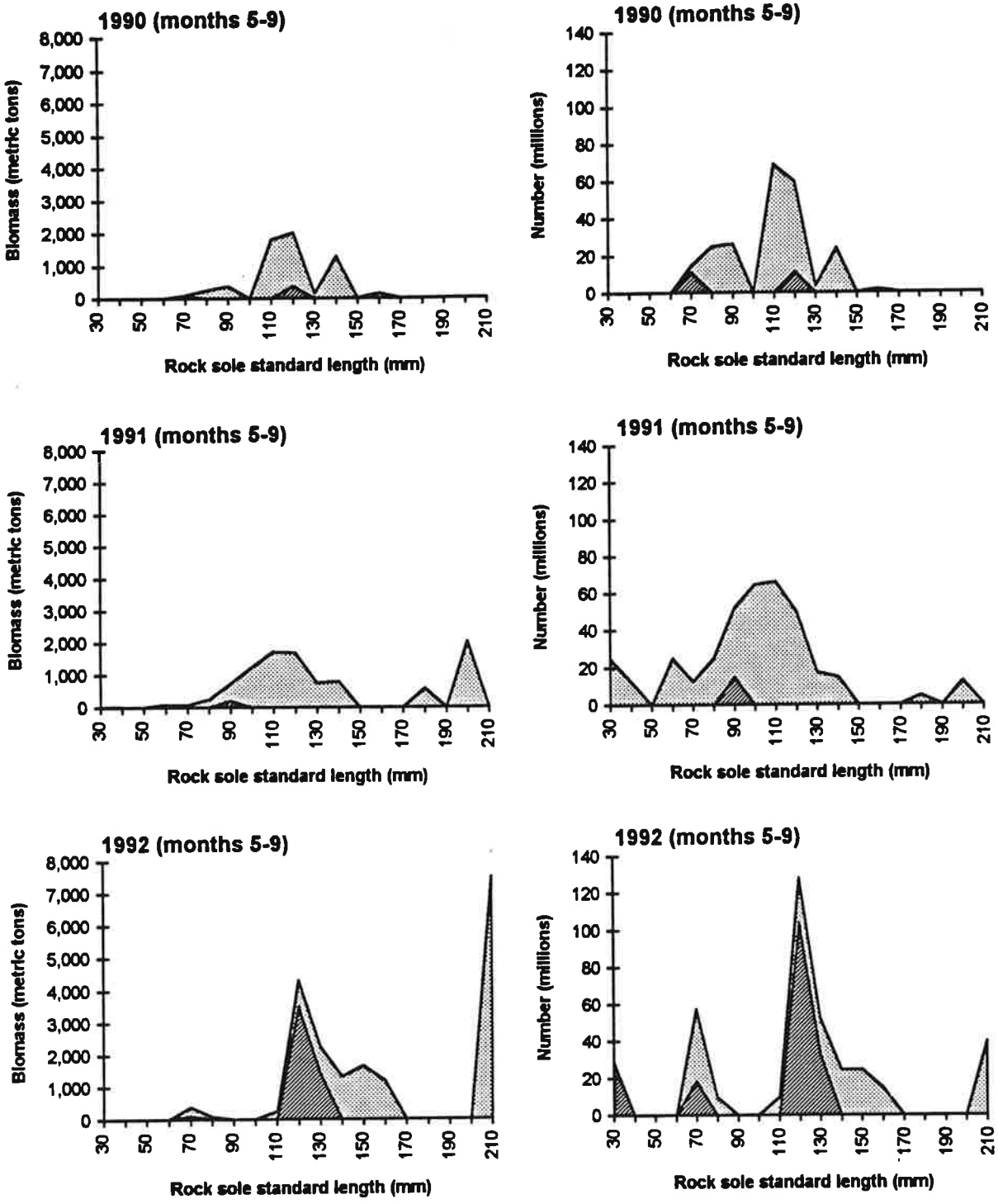
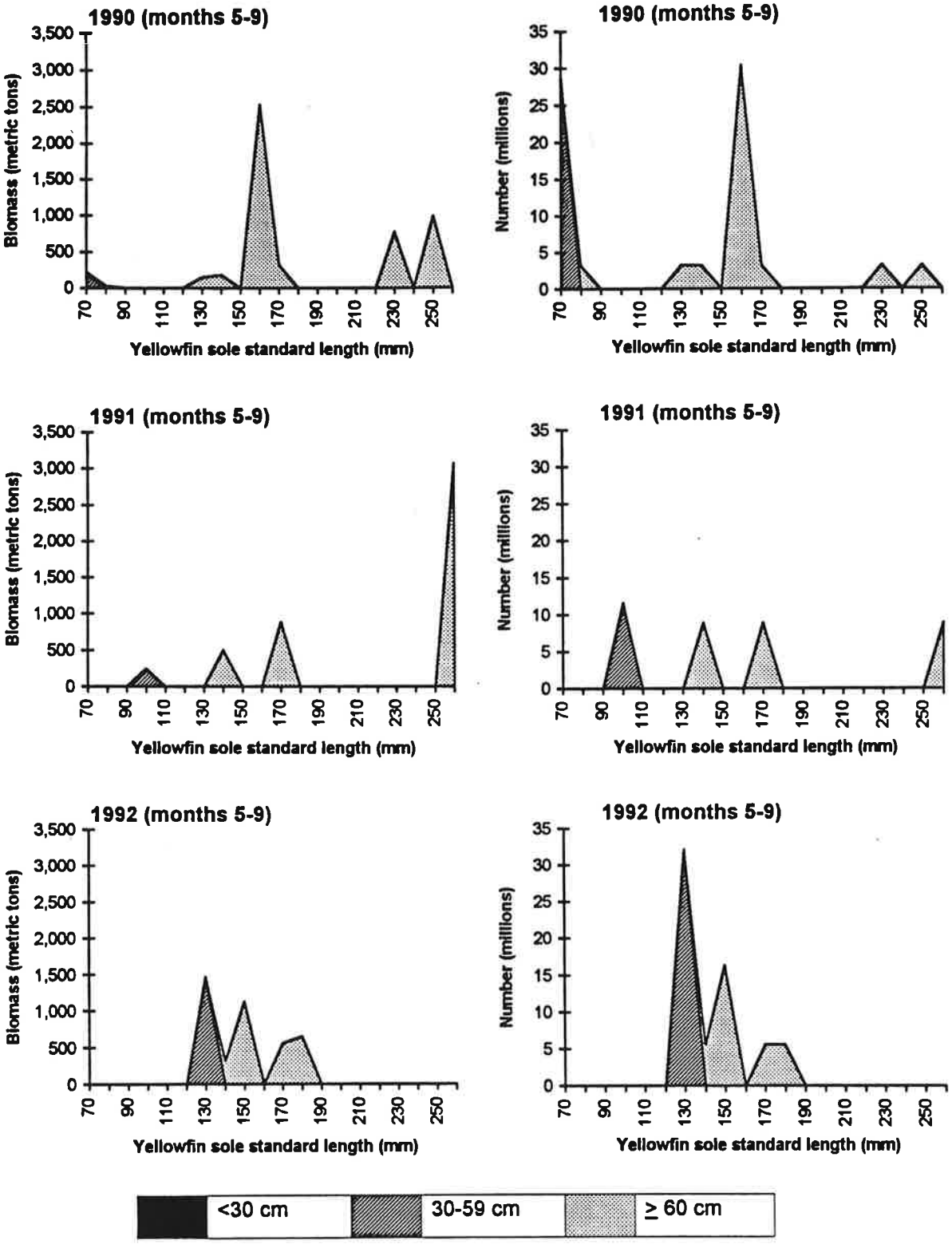


Figure B-18. -- Estimated biomass and numbers of rock sole consumed by three size groups of Pacific cod in the eastern Bering Sea by year, 1990-1992 (months 5-9).



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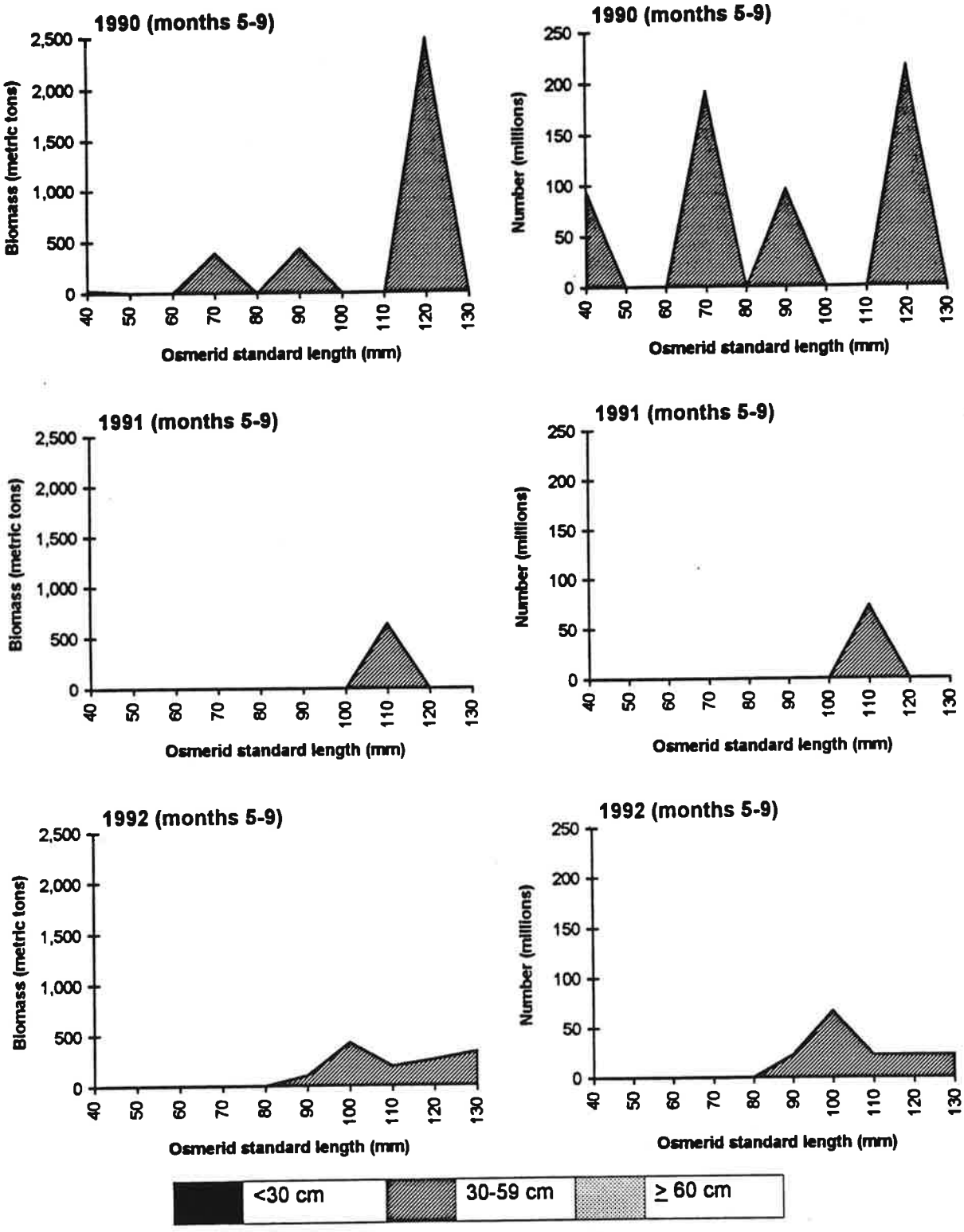

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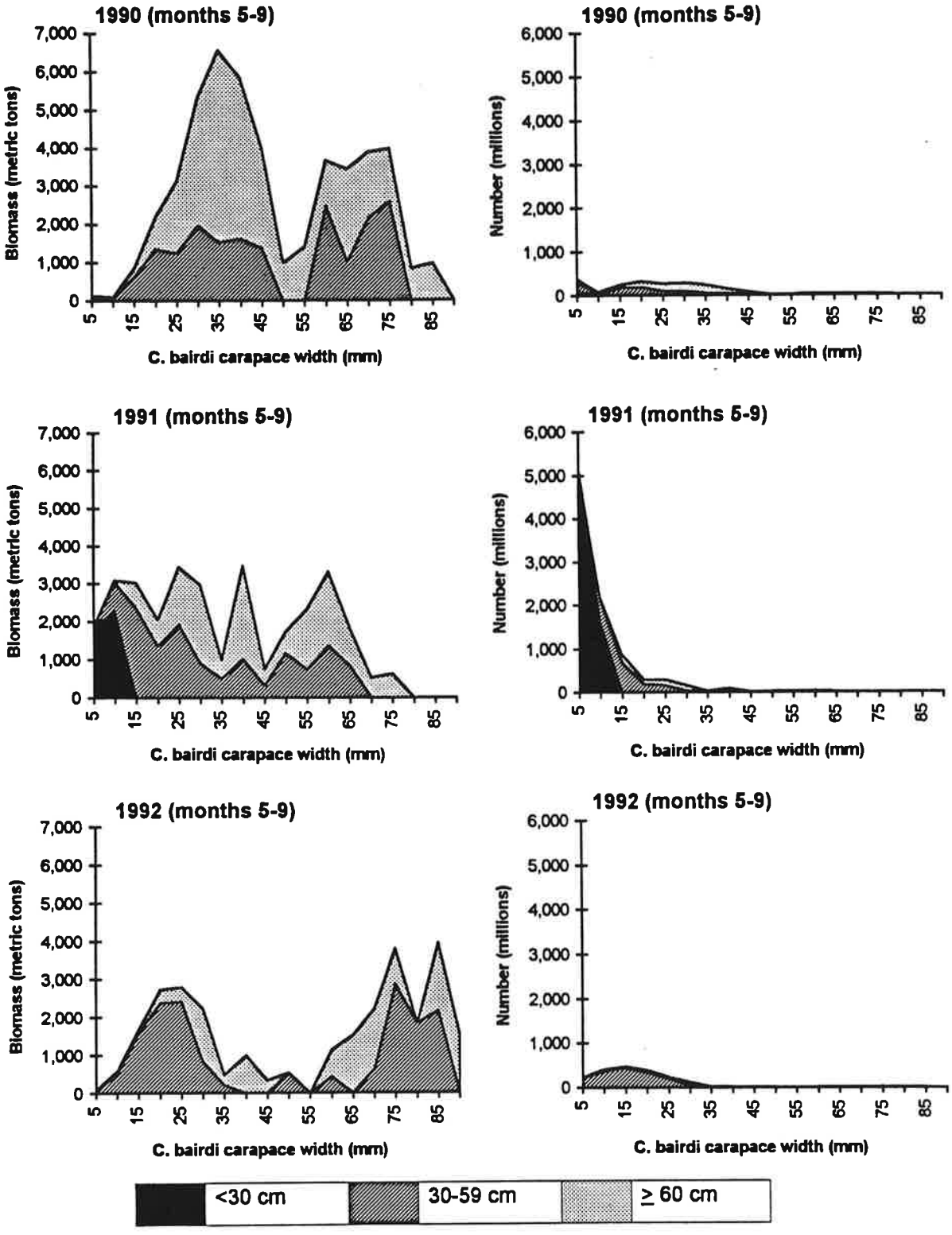

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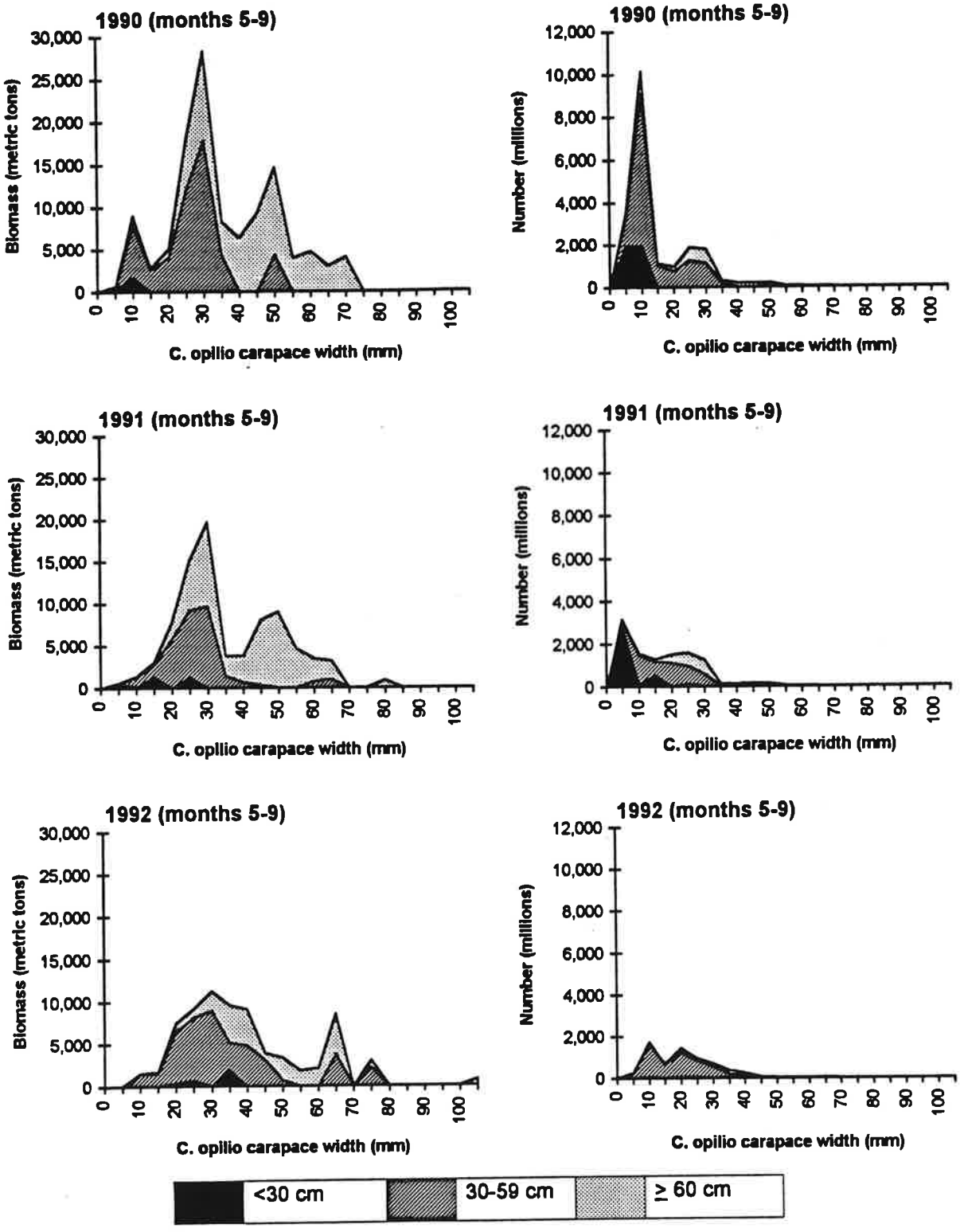

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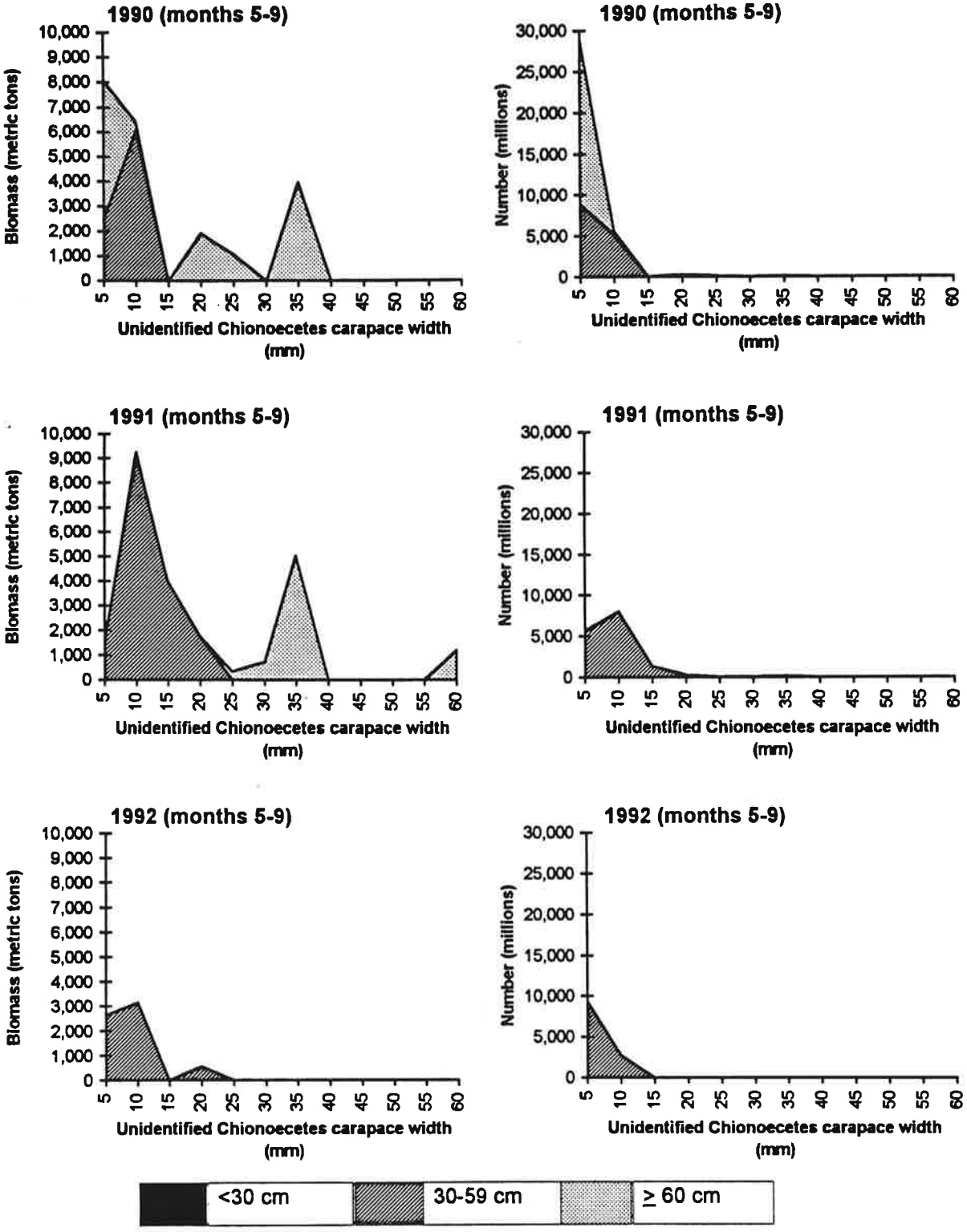
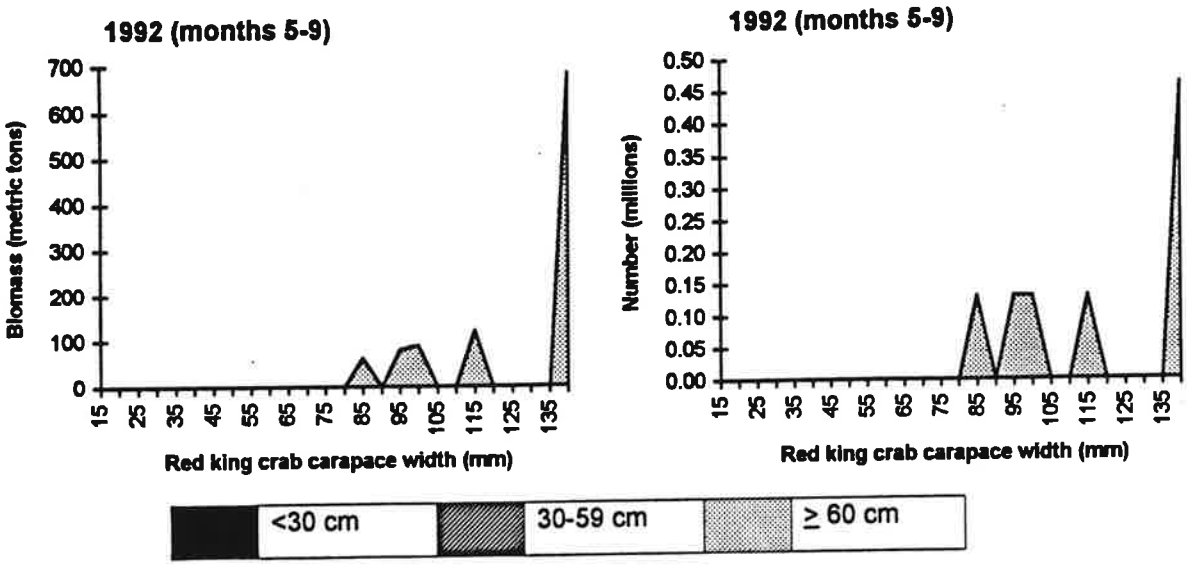


Figure B-23. -- Estimated biomass and numbers of unidentified Chionoecetes consumed by three size groups of Pacific cod in the eastern Bering Sea by year, 1990-1992 (months 5-9).



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APPENDIX C. - YELLOWFIN SOLE, FLATHEAD SOLE, ROCK SOLE, AND ALASKA PLAICE

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Predator size (cm)	Stratum	Biomass (metric tons) 90	91	92
all lengths	1	1,073,772	1,159,901	1,054,368
	2	456,282	510,056	397,926
	3	834,890	699,728	982,519
	4	341,133	360,405	284,943
	5	767	848	0
	6	36	894	0
	Subtotal	2,706,880	2,731,832	2,719,756
	Total	2,706,880	2,731,832	2,719,756

Table C-2. – Mid-year estimates of biomass (by predator size, stratum, and year) of flathead sole in the eastern Bering Sea for 1990 through 1992, from the bottom trawl shelf survey.

Predator size (cm)	Stratum	Biomass (metric tons) 90	91	92
all lengths	1	22,159	22,504	20,879
	2	959	1,040	63
	3	179,375	243,896	254,246
	4	64,062	66,767	53,562
	5	89,578	78,250	136,596
	6	272,101	132,436	186,038
	Subtotal	628,234	544,893	651,384
	Total	628,234	544,893	651,384

Table C-3. -- Mid-year estimates of biomass (by predator size, stratum, and year) of rock sole in the eastern Bering Sea for 1990 through 1992, from the synthesis model.

Predator size (cm)	Stratum	Biomass (metric tons) 90	91	92
all lengths	1	760,705	930,391	815,926
	2	495,753	288,718	286,539
	3	52,301	324,118	530,091
	4	353,508	331,998	396,104
	5	2,800	3,787	3,380
	6	65,588	48,980	45,294
	Subtotal	1,730,656	1,927,992	2,077,335
	Total	1,730,656	1,927,992	2,077,335

Table C-4. – Mid-year estimates of biomass (by predator size, stratum, and year) of Alaska plaice in the eastern Bering Sea for 1990 through 1992, from bottom trawl shelf survey.

Predator size (cm)	Stratum	Biomass (metric tons) 90	91	92
all lengths	1	71,233	88,293	36,017
	2	55,641	70,628	17,721
	3	138,115	121,828	57,128
	4	230,680	228,136	116,918
	5	0	224	0
	6	27,109	19,968	19,075
	Subtotal	522,778	529,077	246,859
	Total	522,778	529,077	246,859

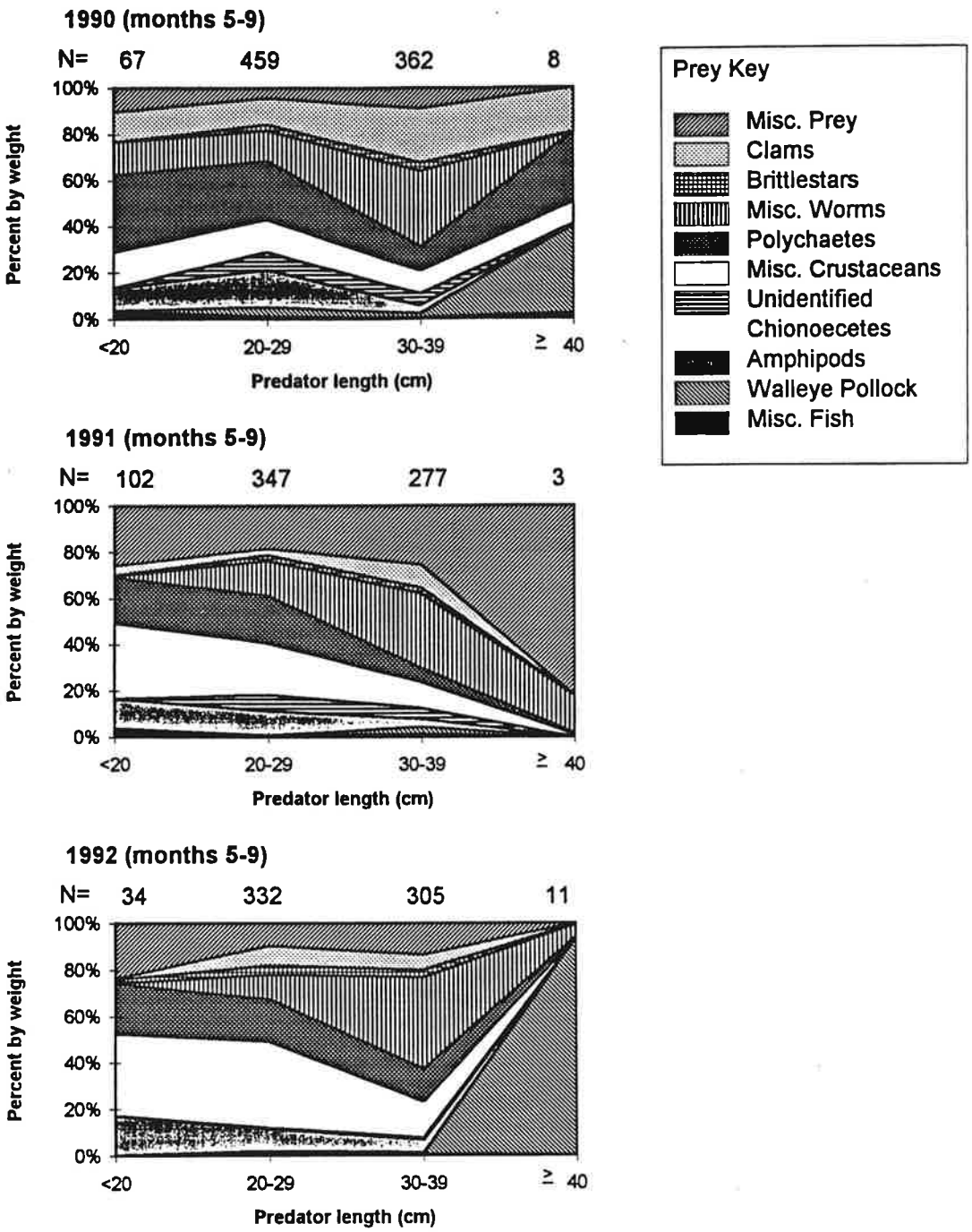


Figure C-1. -- Diet composition of yellowfin sole, in terms of percent by weight, during months 5 to 9 by year and by predator size in the Bering Sea; N = number of stomachs.

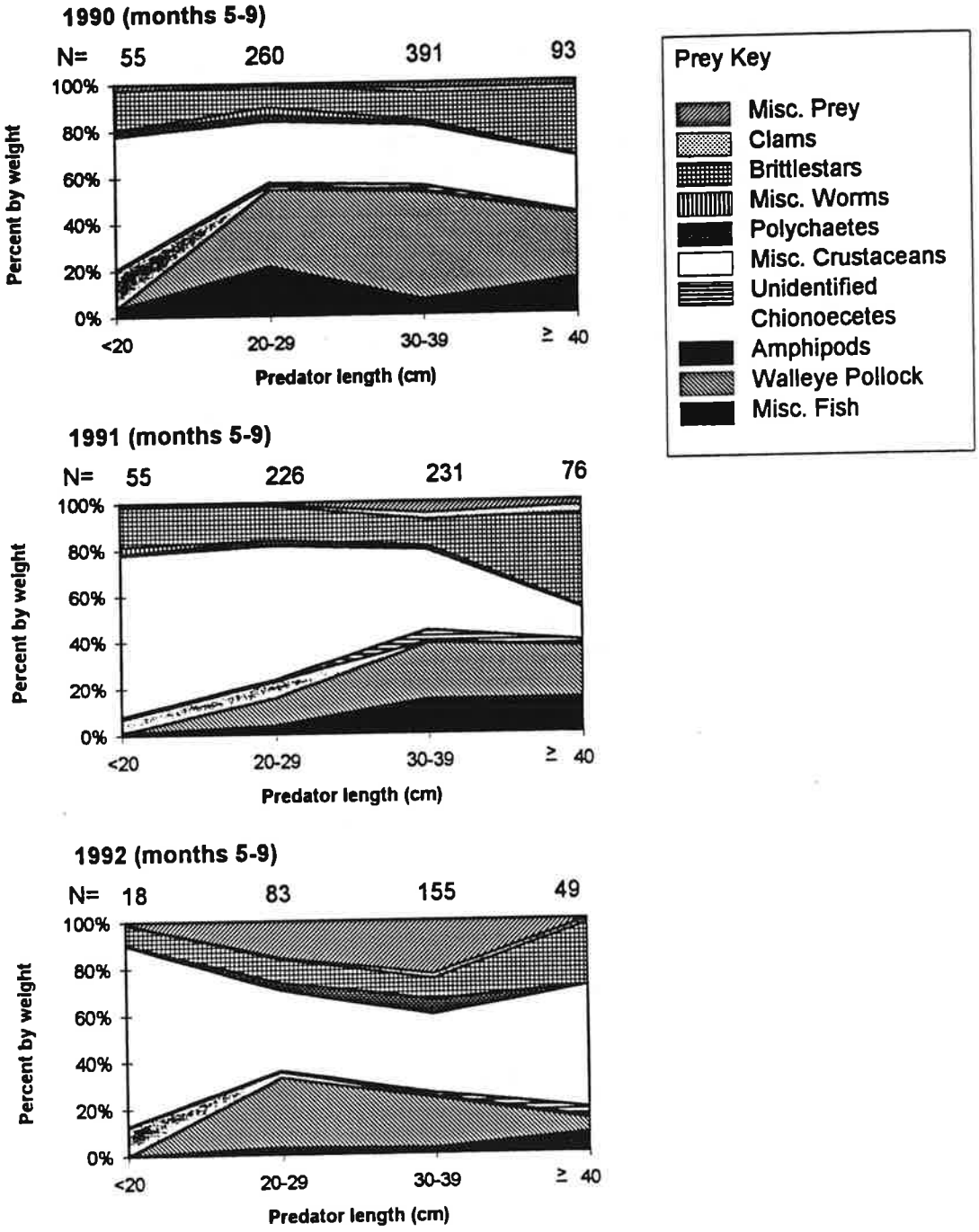
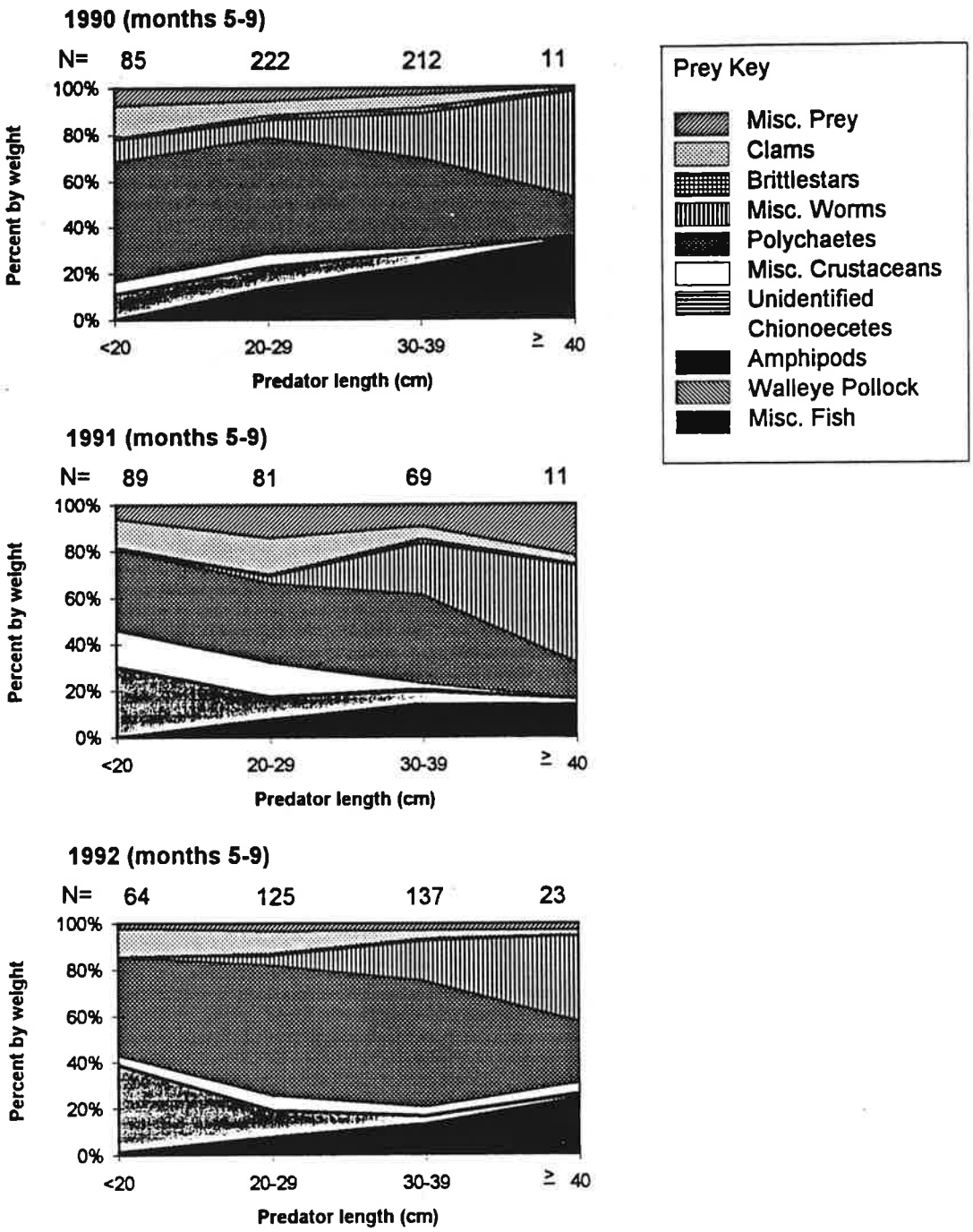


Figure C-2. – Diet composition of flathead sole, in terms of percent by weight, during months 5 to 9 by year and by predator size in the Bering Sea; N = number of stomachs.



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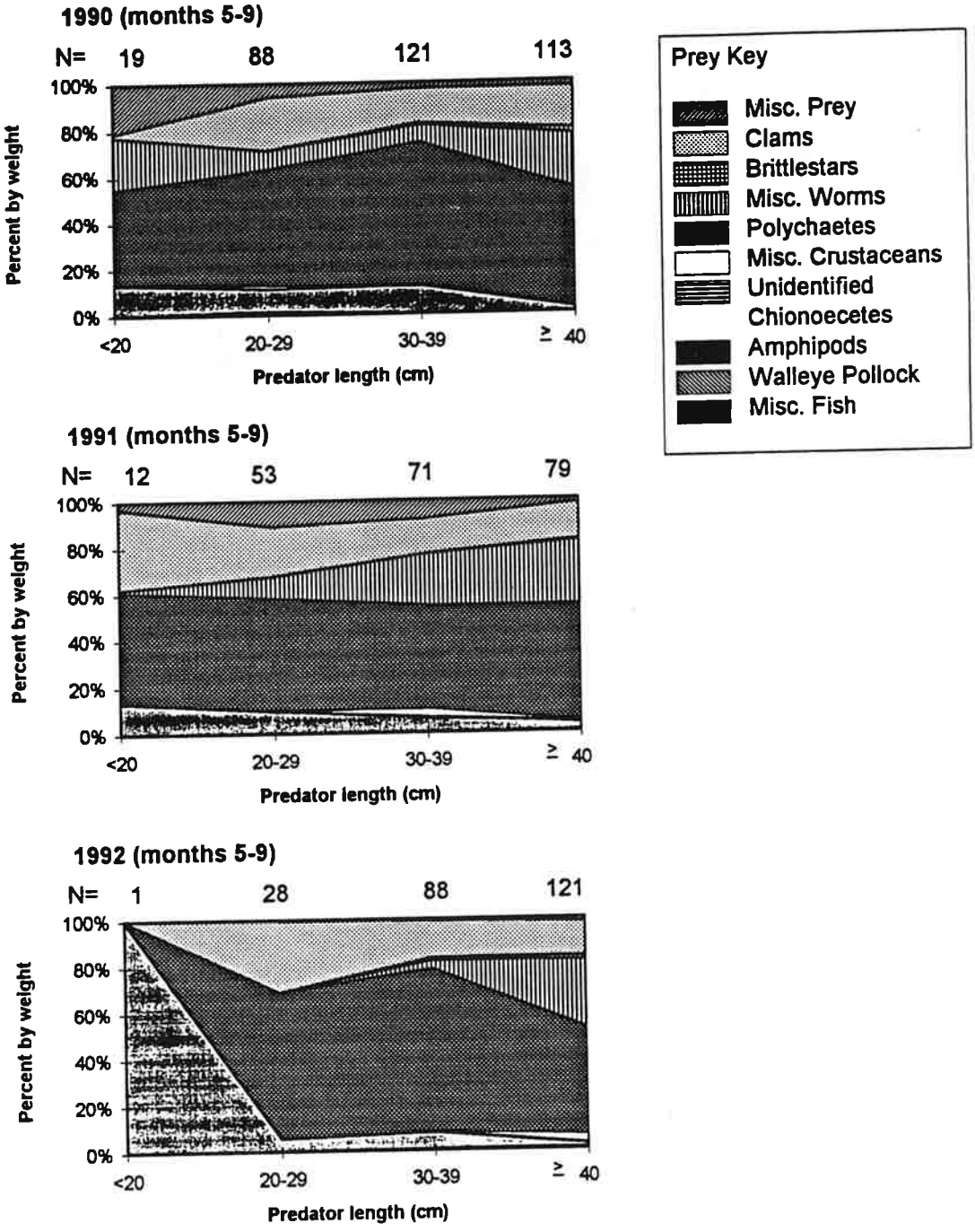

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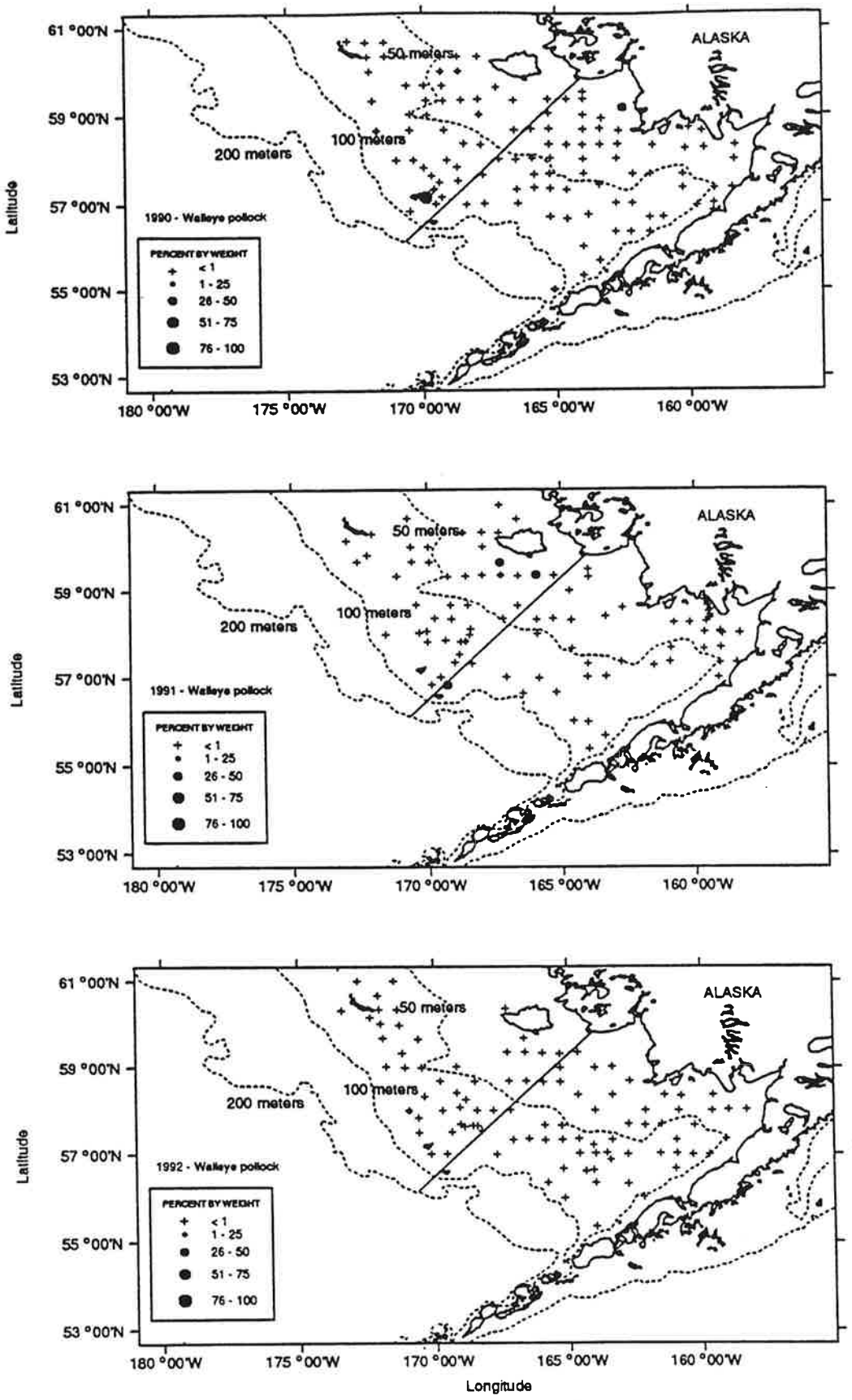

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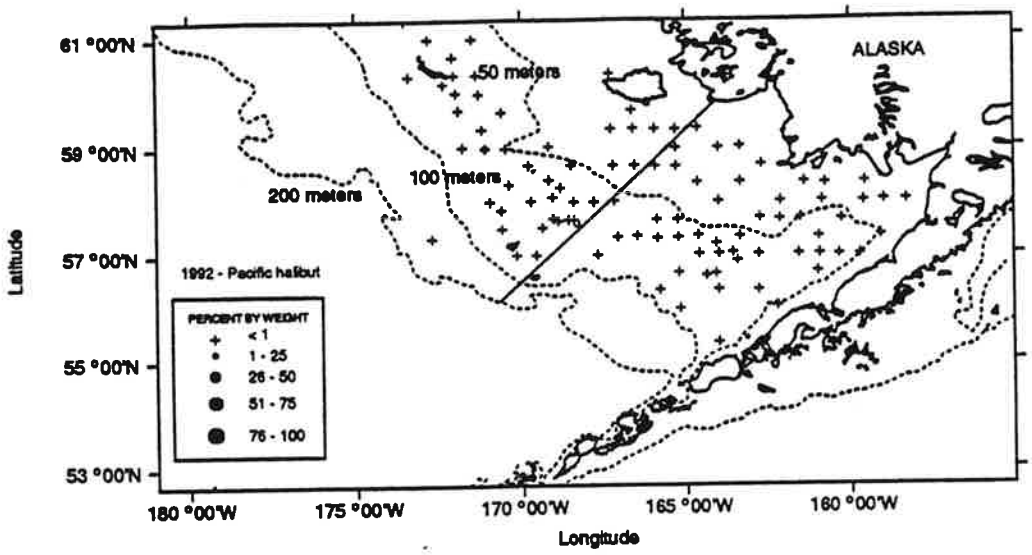

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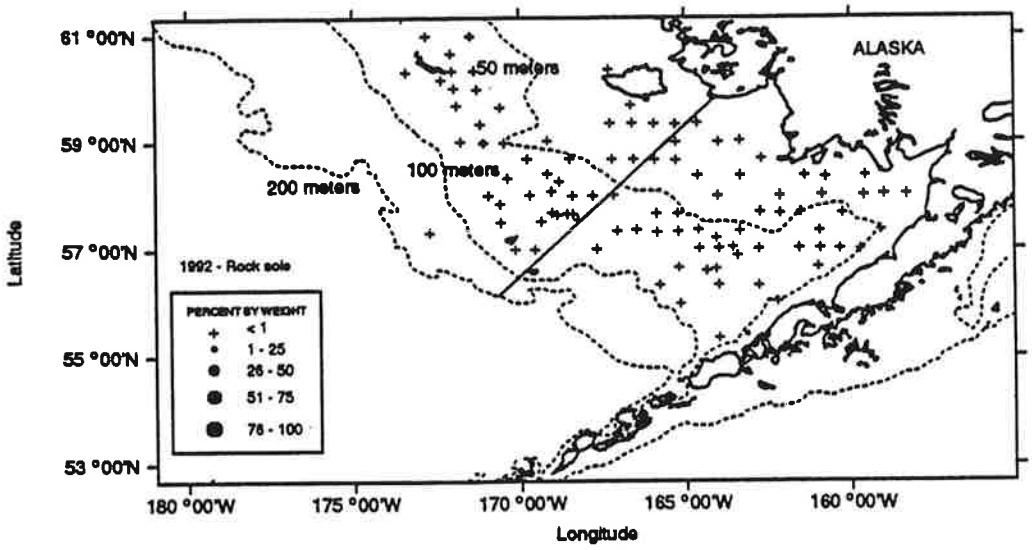

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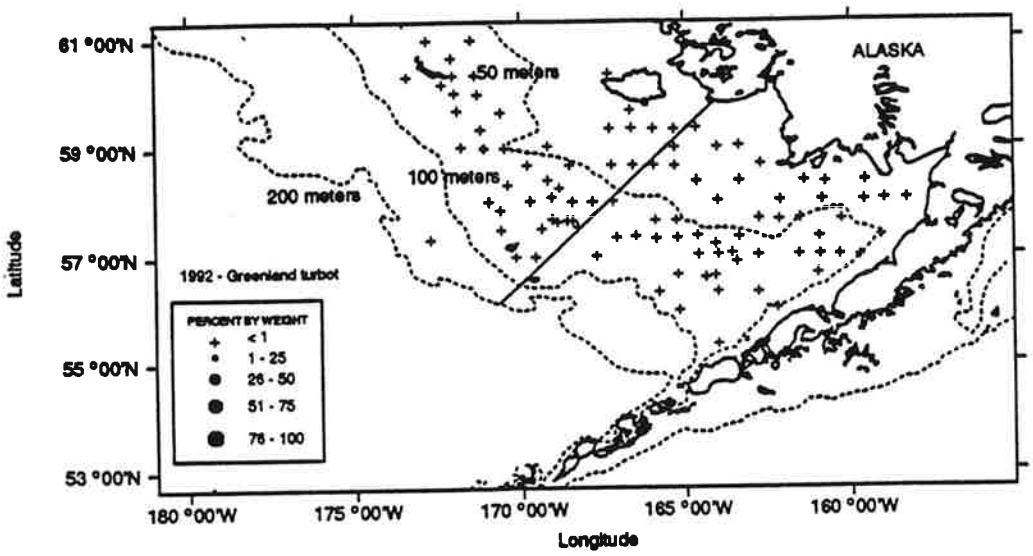

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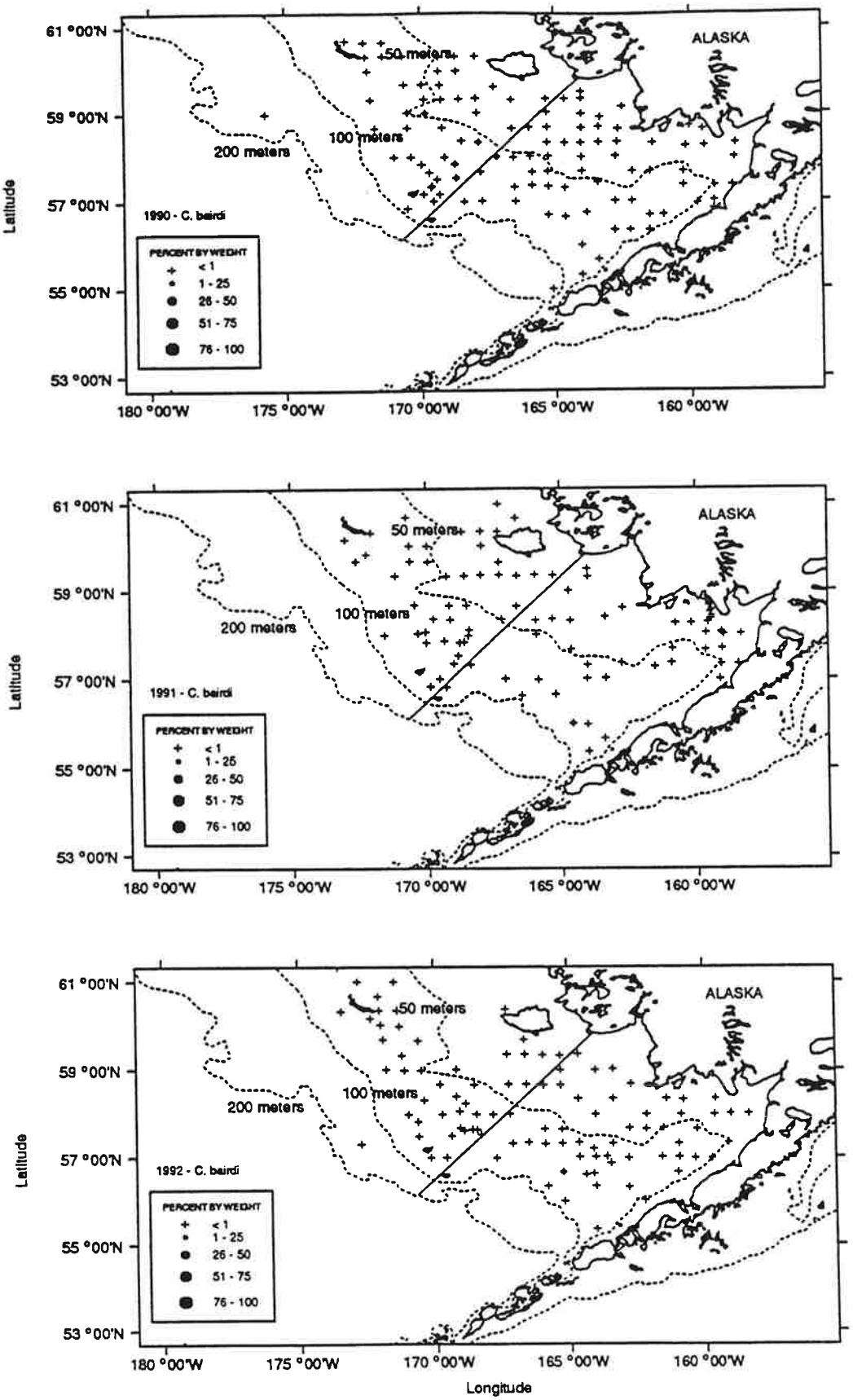

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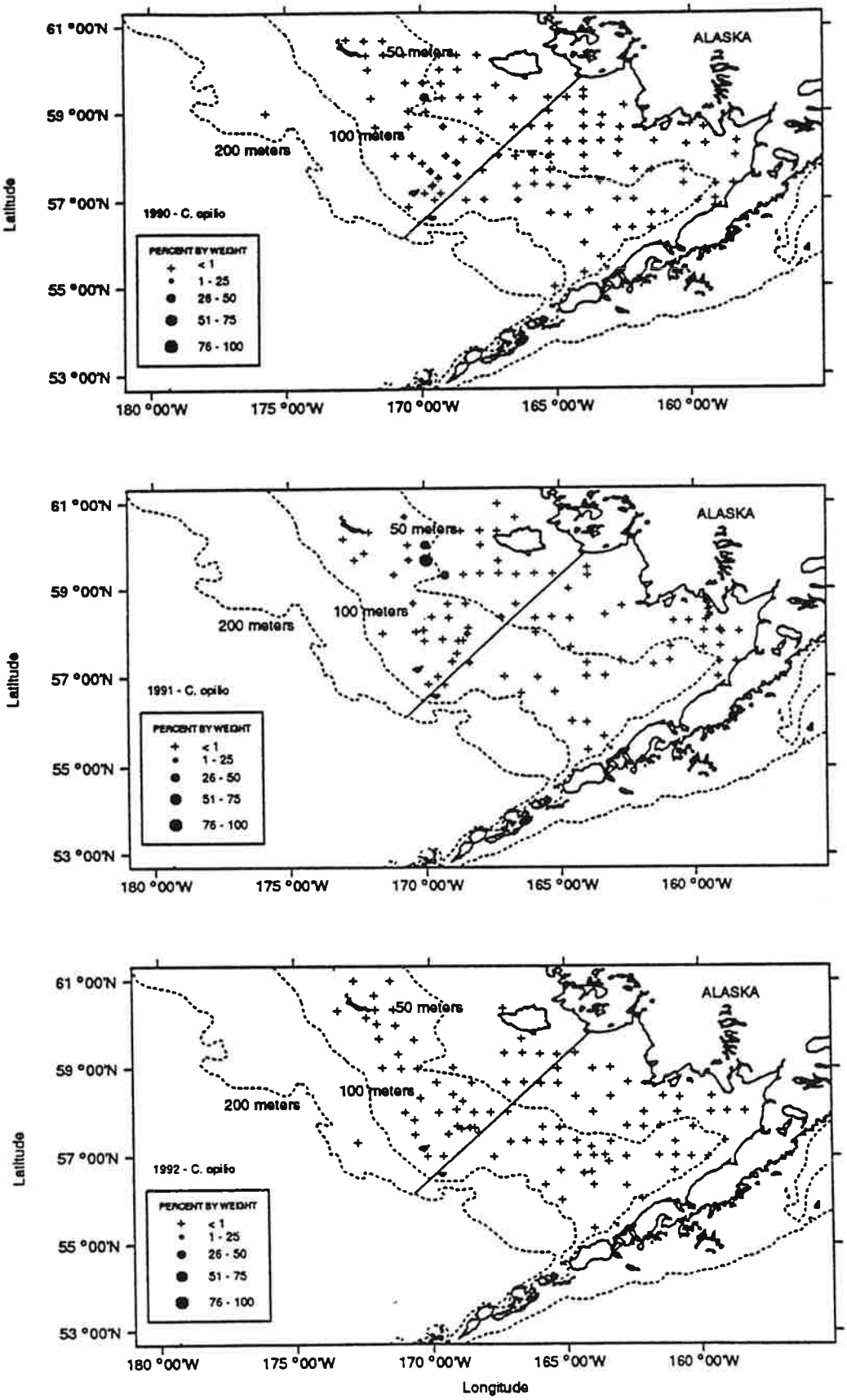

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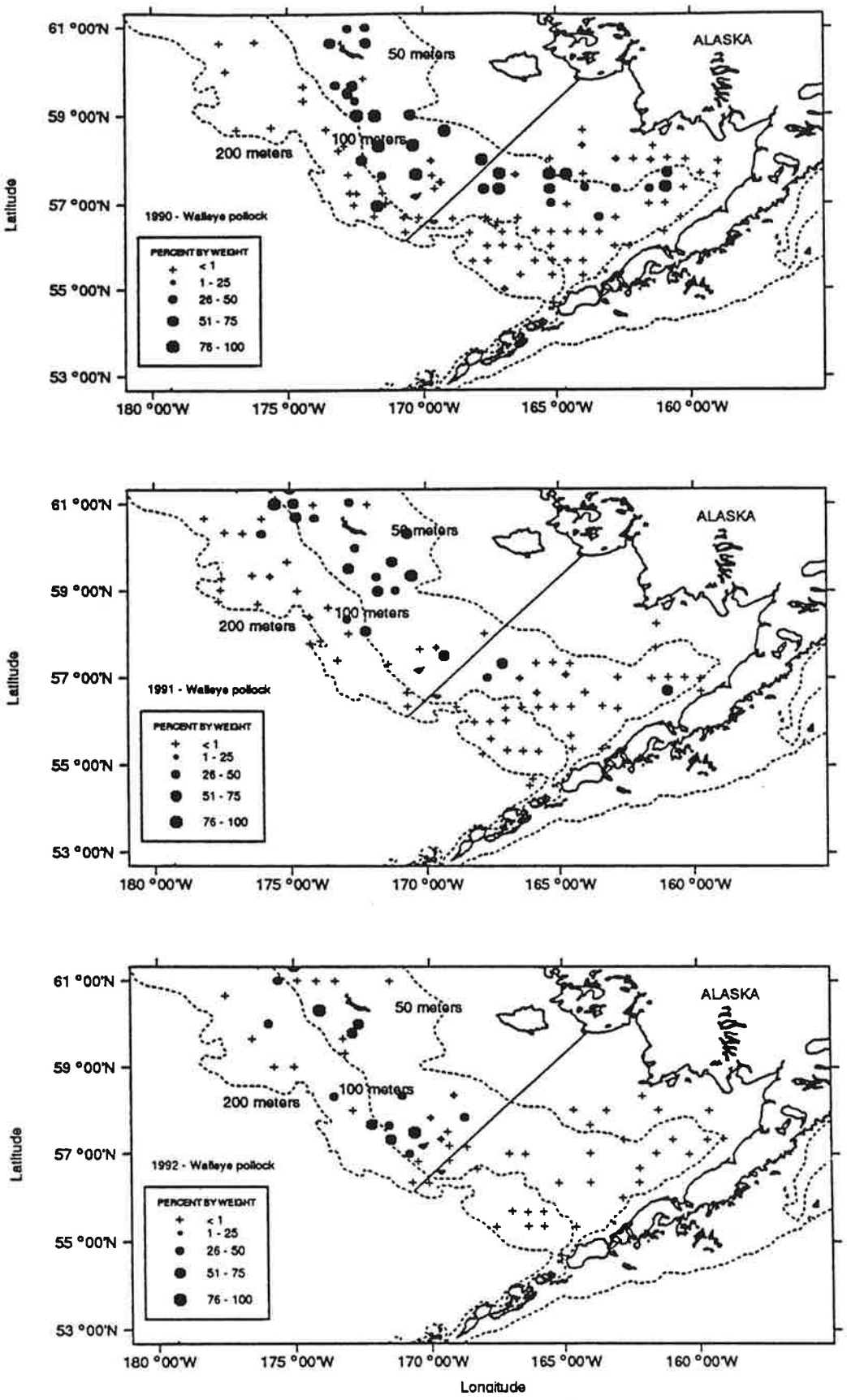

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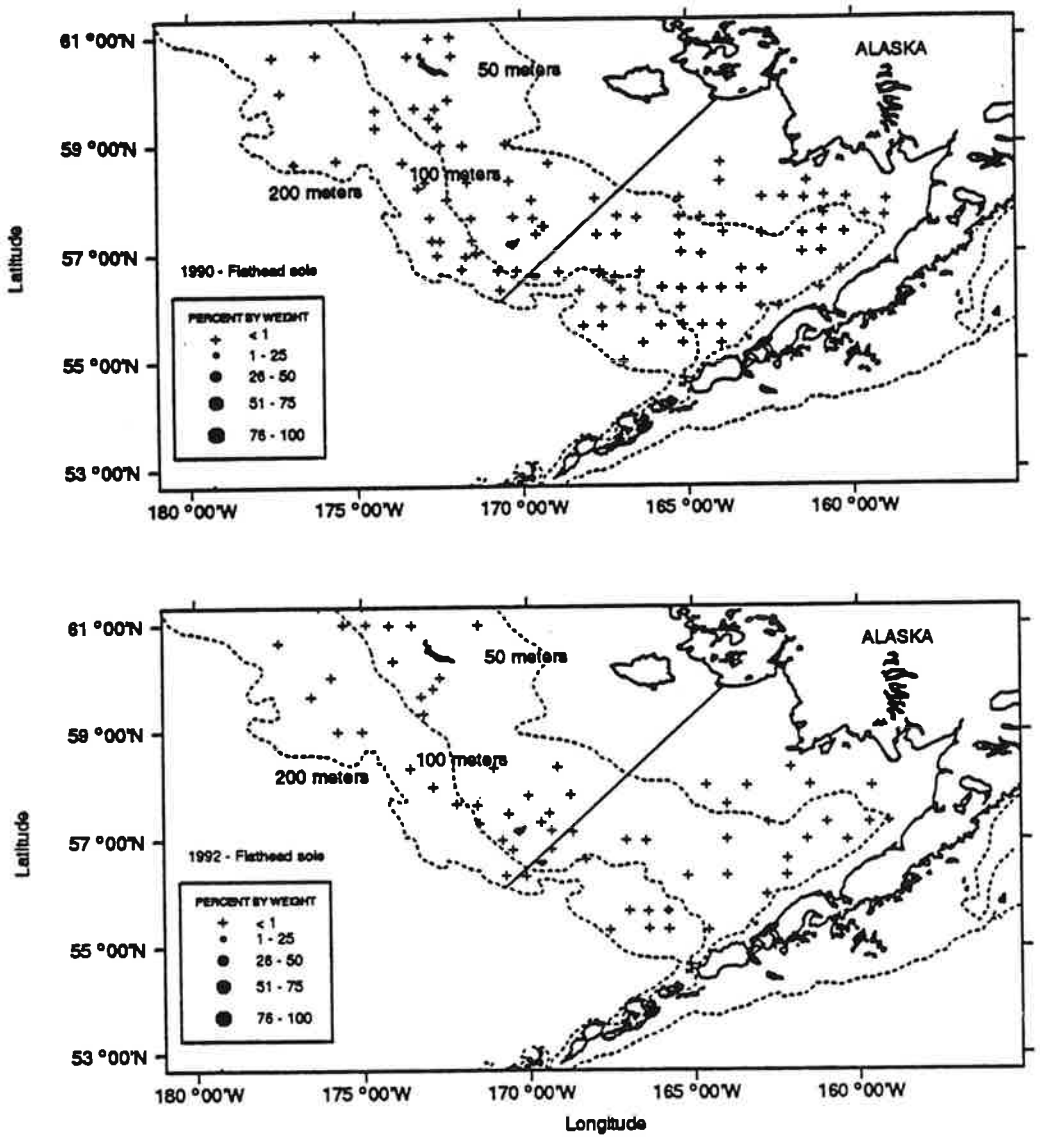

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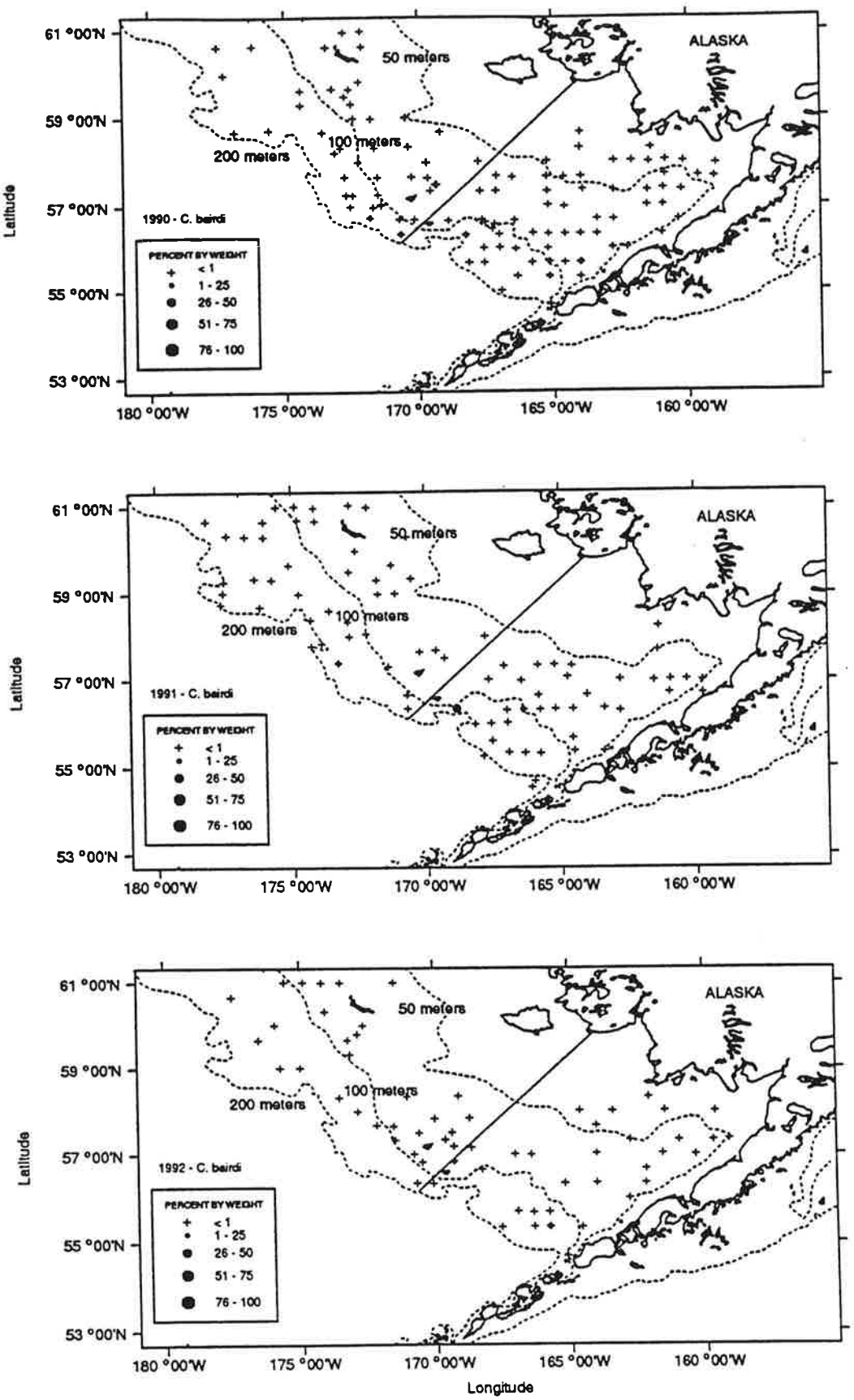

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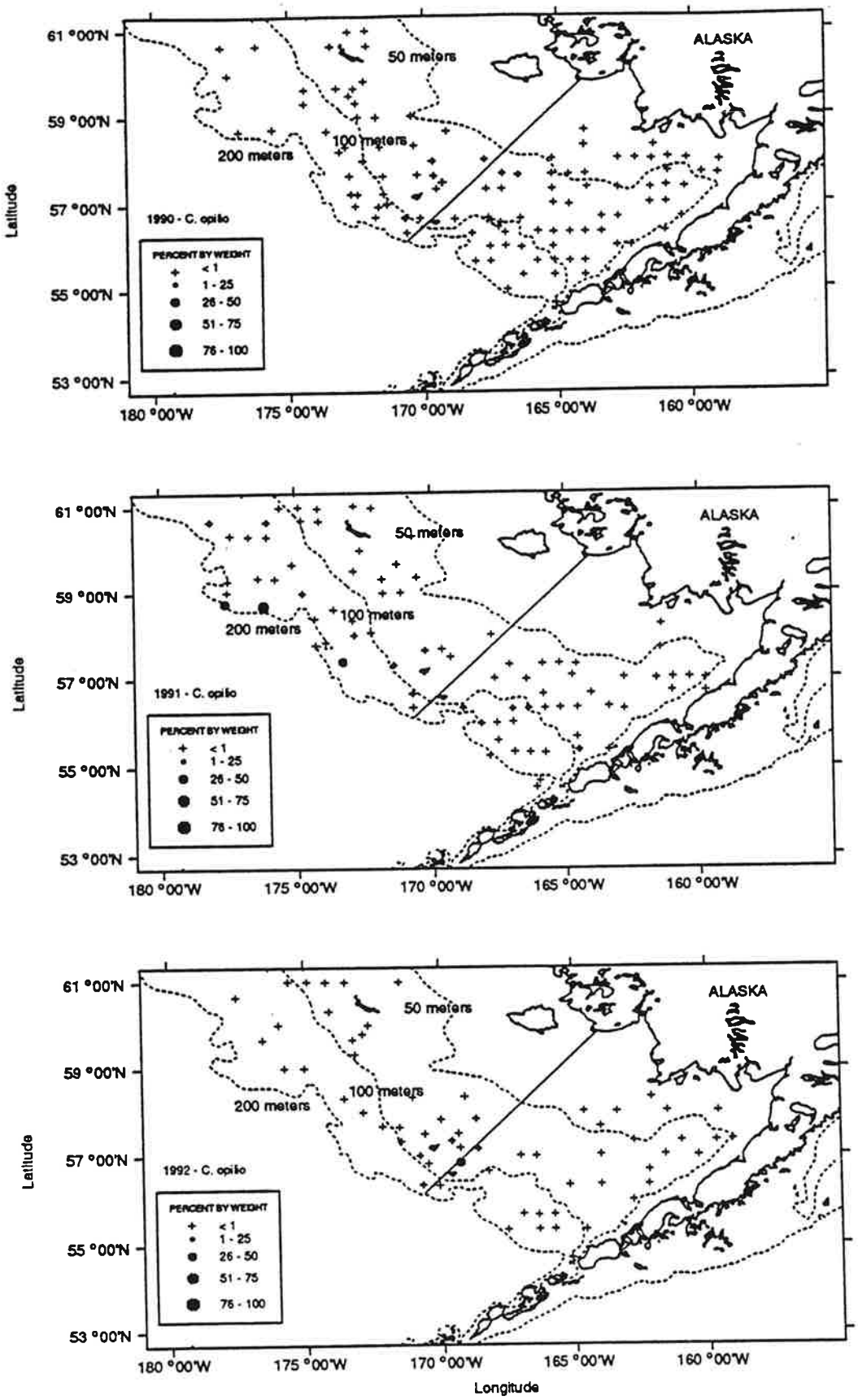

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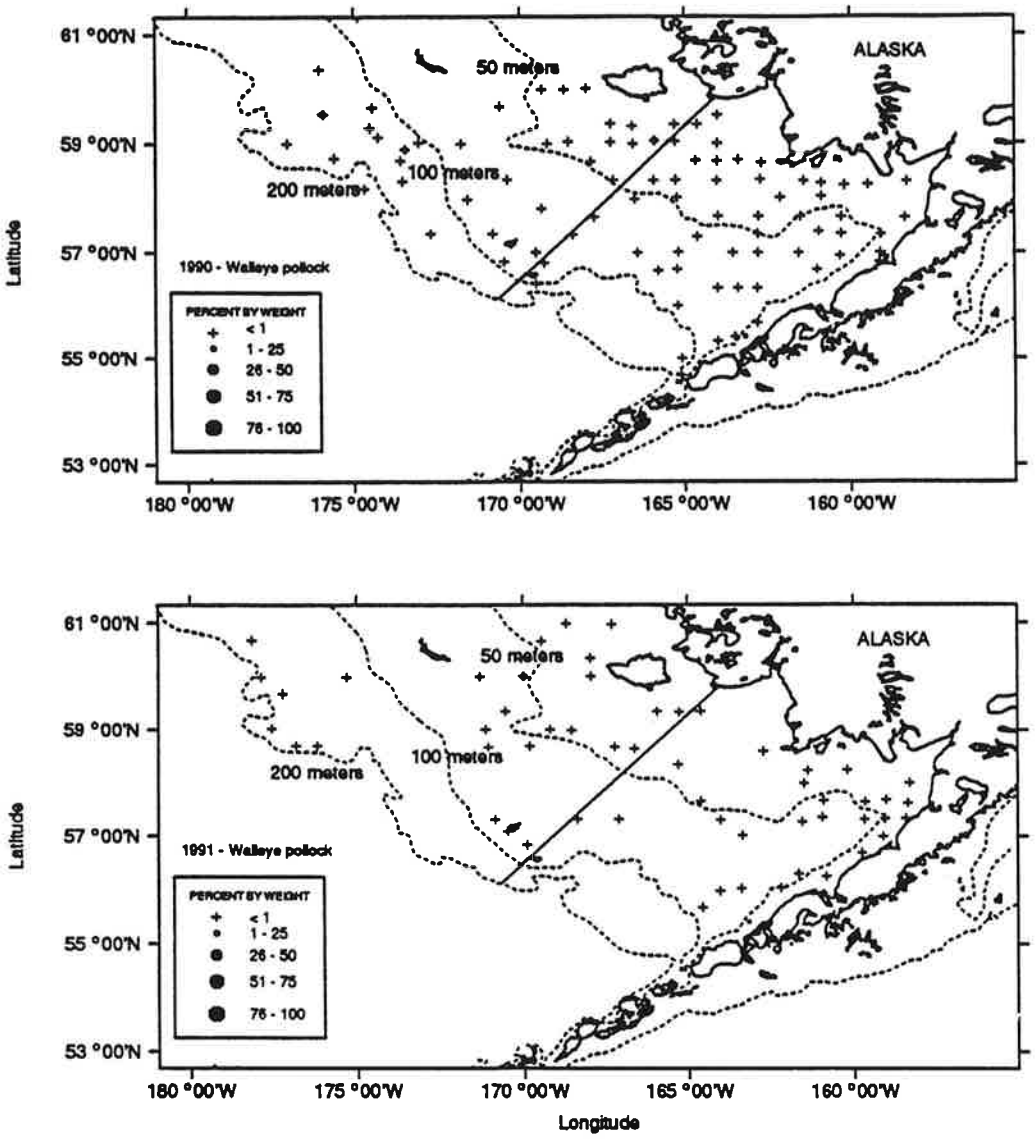

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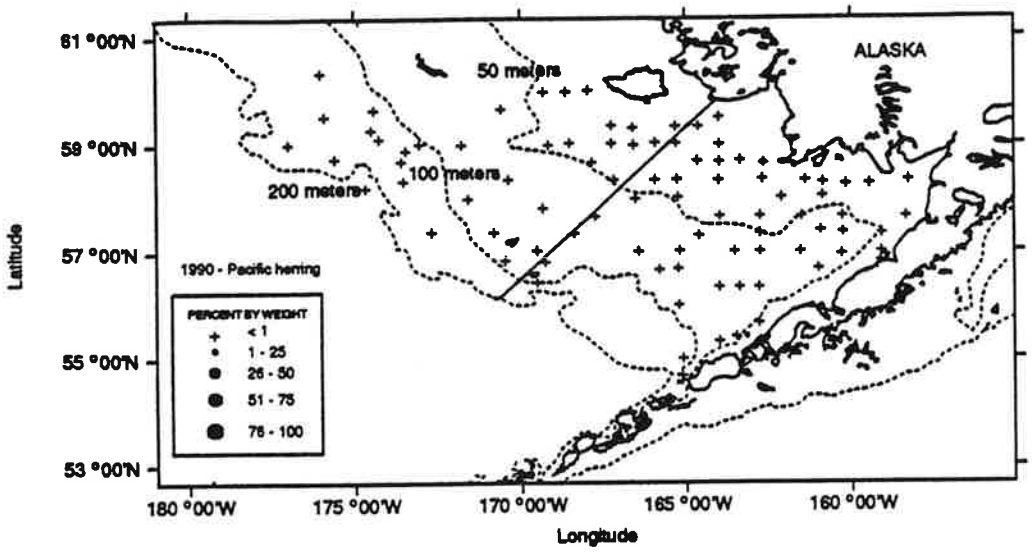

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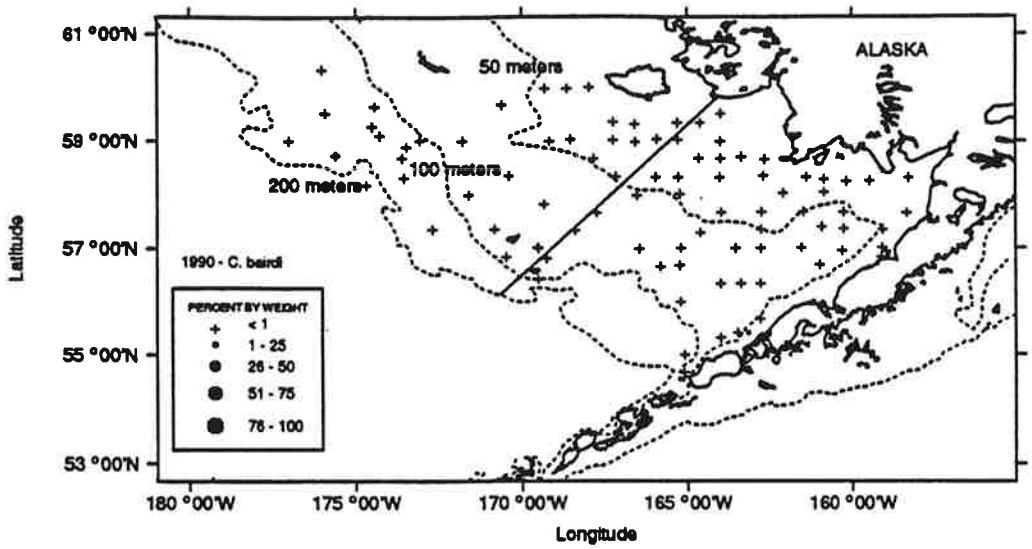

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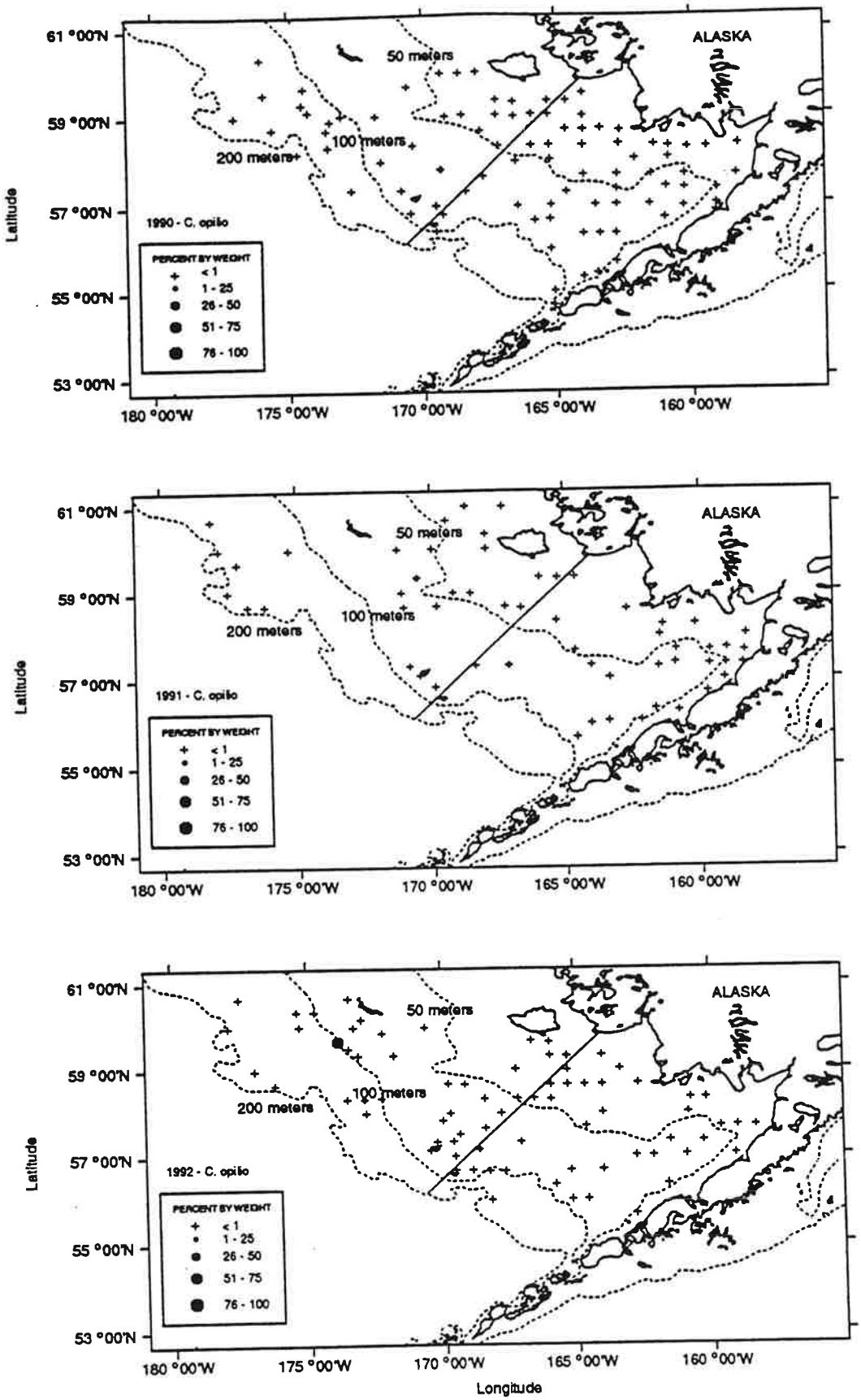

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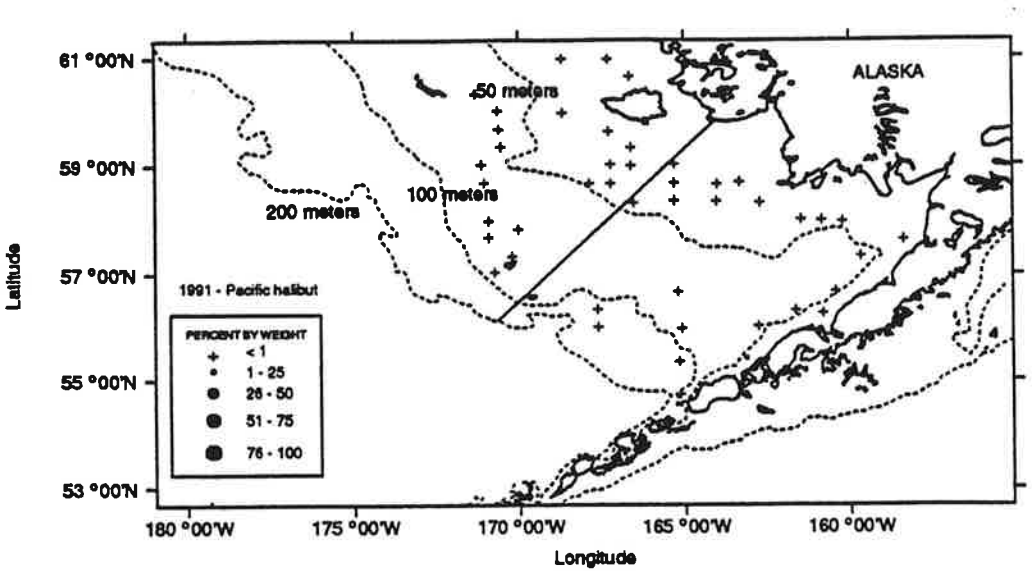

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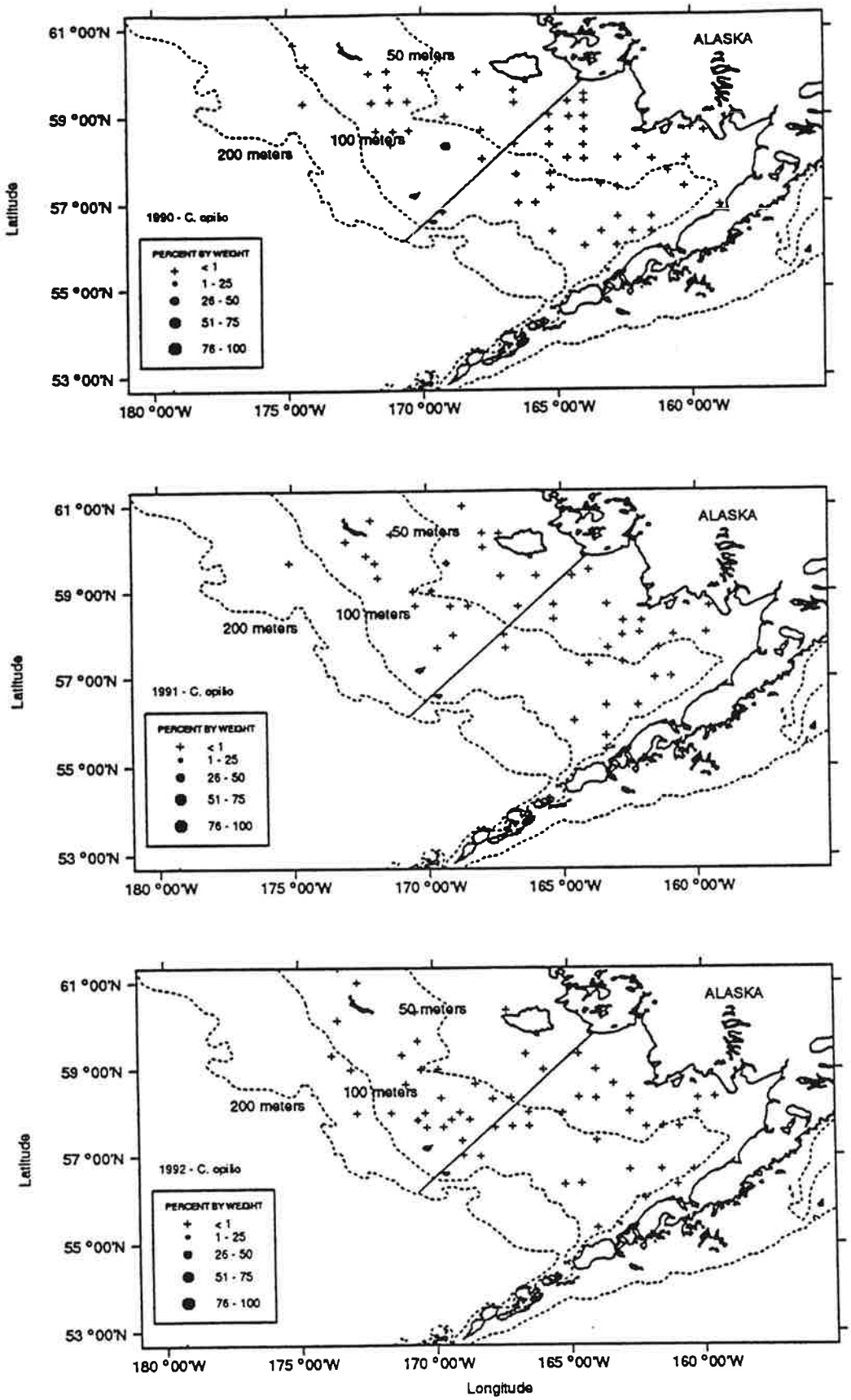


Figure C-20. -- Percent by weight of C. opilio in the diet of Alaska plaice by sampling station during months 5 to 9 in 1990, 1991 and 1992 in the eastern Bering Sea.

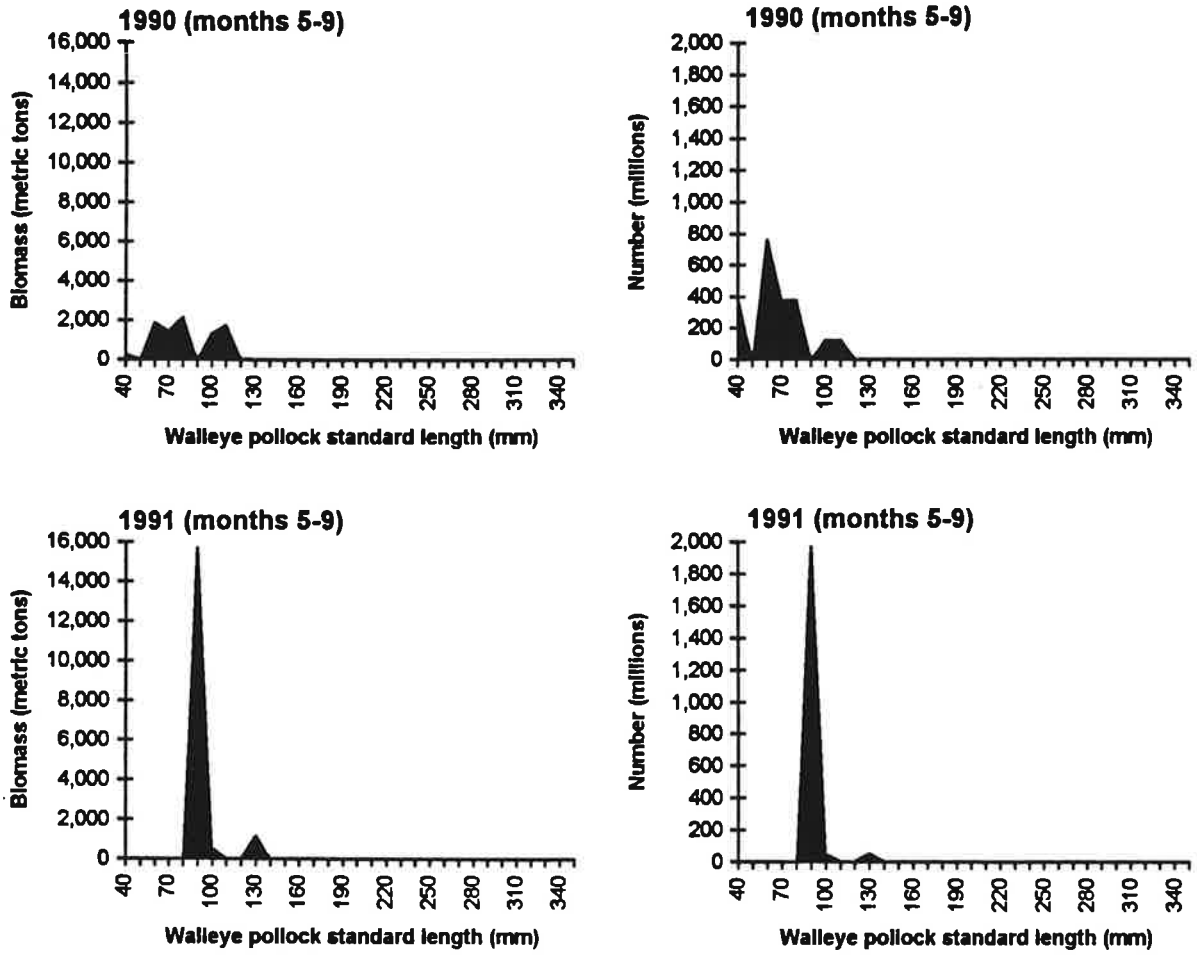
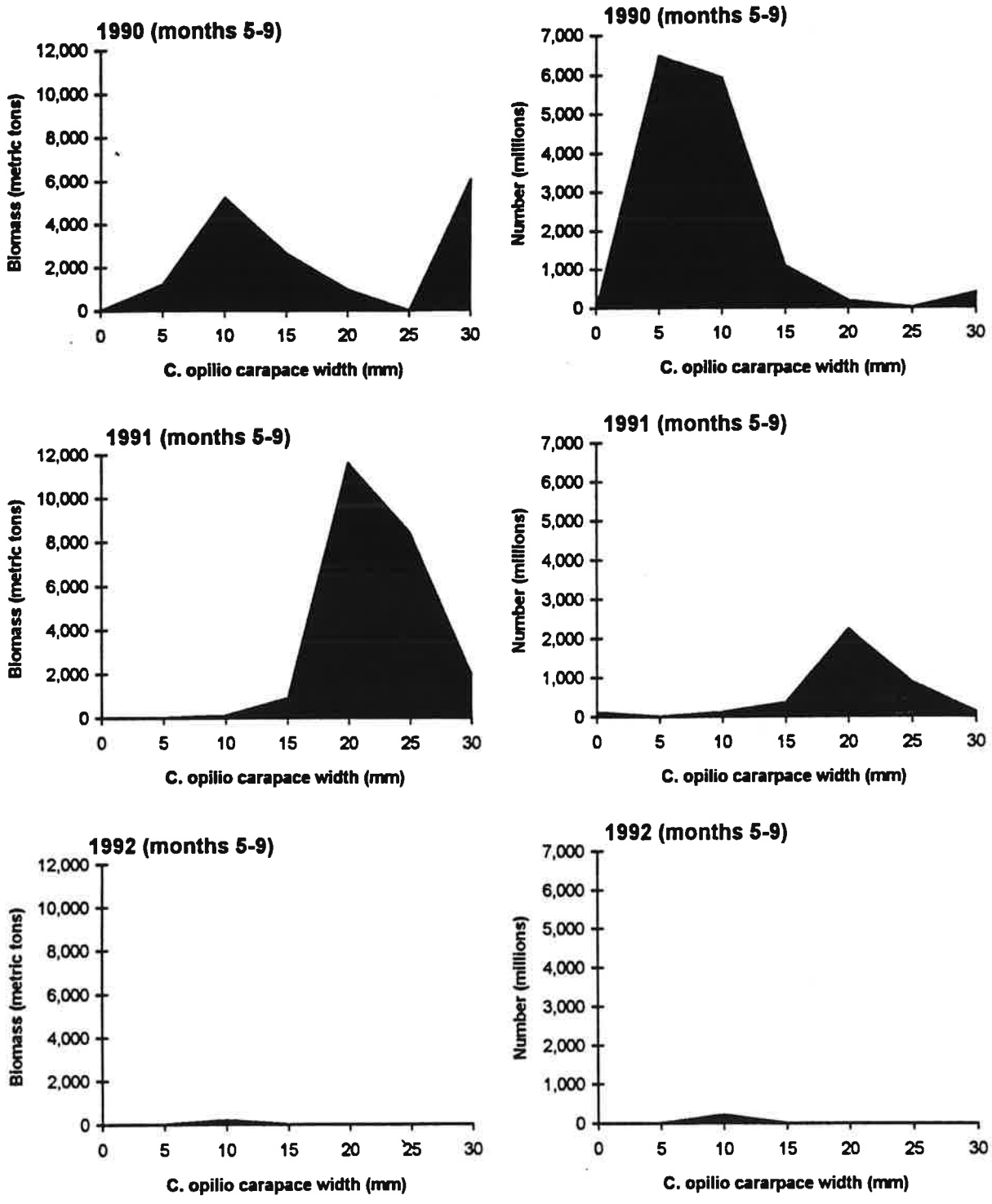


Figure C-21. -- Estimated biomass and numbers of walleye pollock consumed by yellowfin sole in the eastern Bering Sea by year, 1990-91 (months 5-9).



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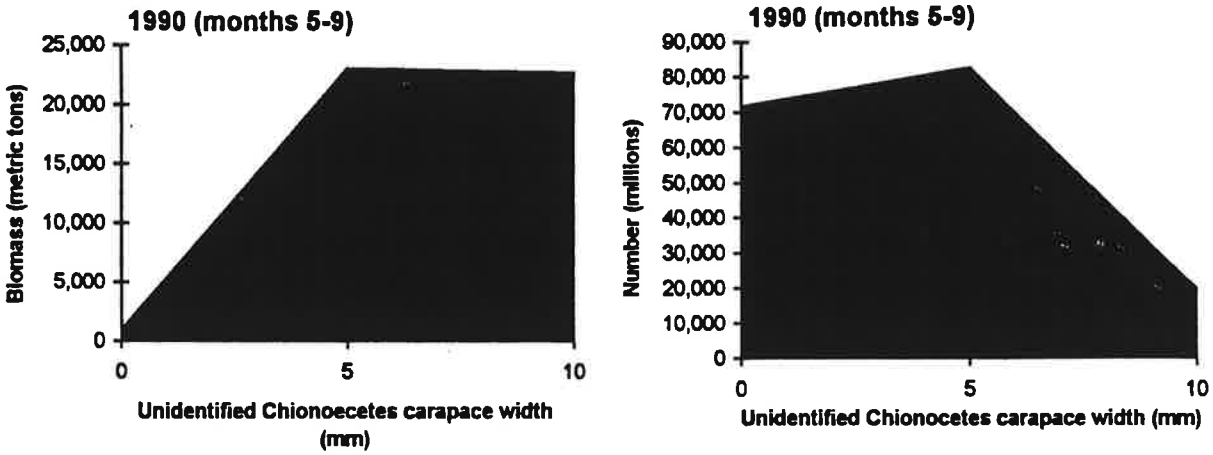
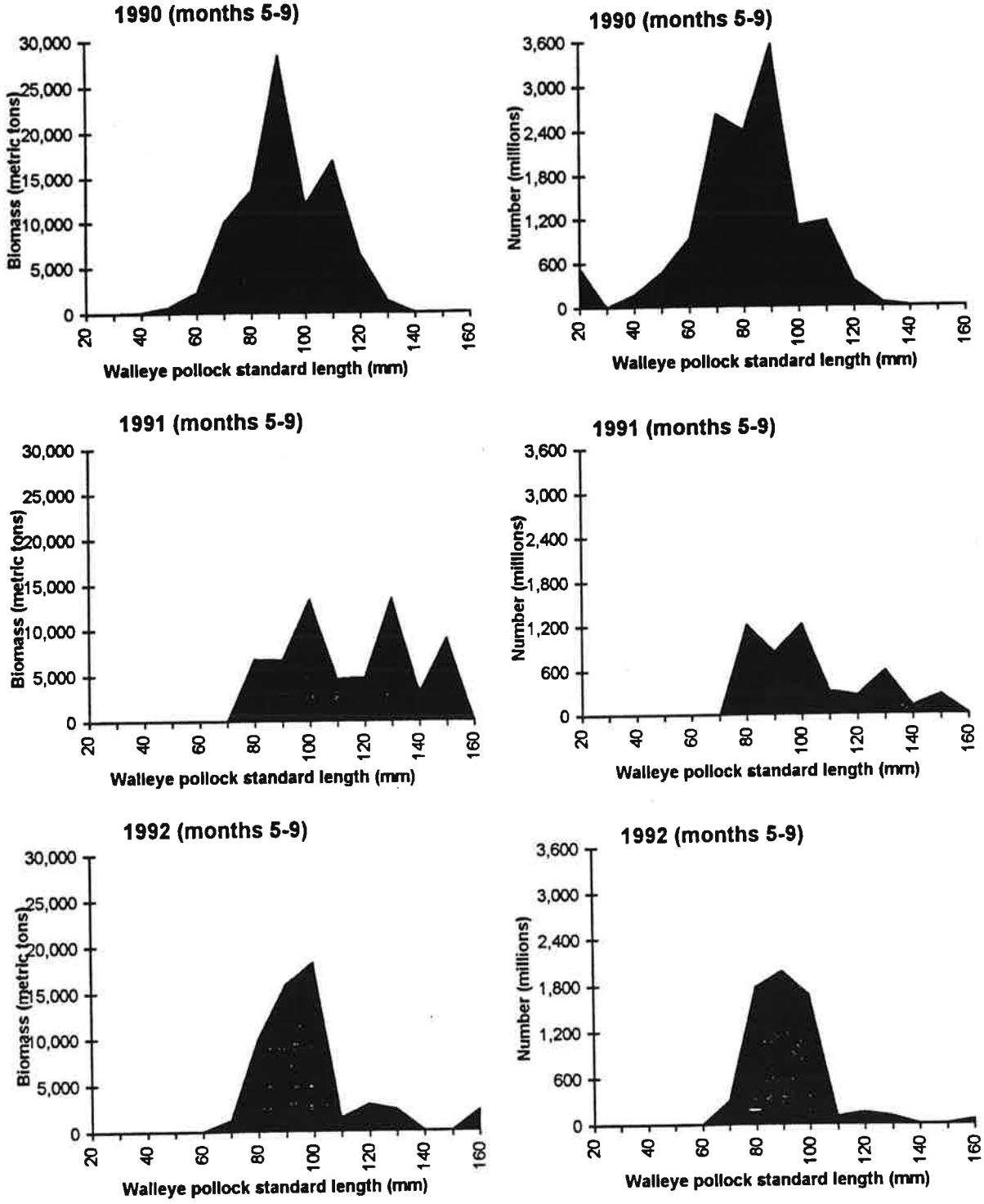


Figure C-23. – Estimated biomass and numbers of unidentified Chionoecetes consumed by yellowfin sole in the eastern Bering Sea in 1990 (months 5-9).



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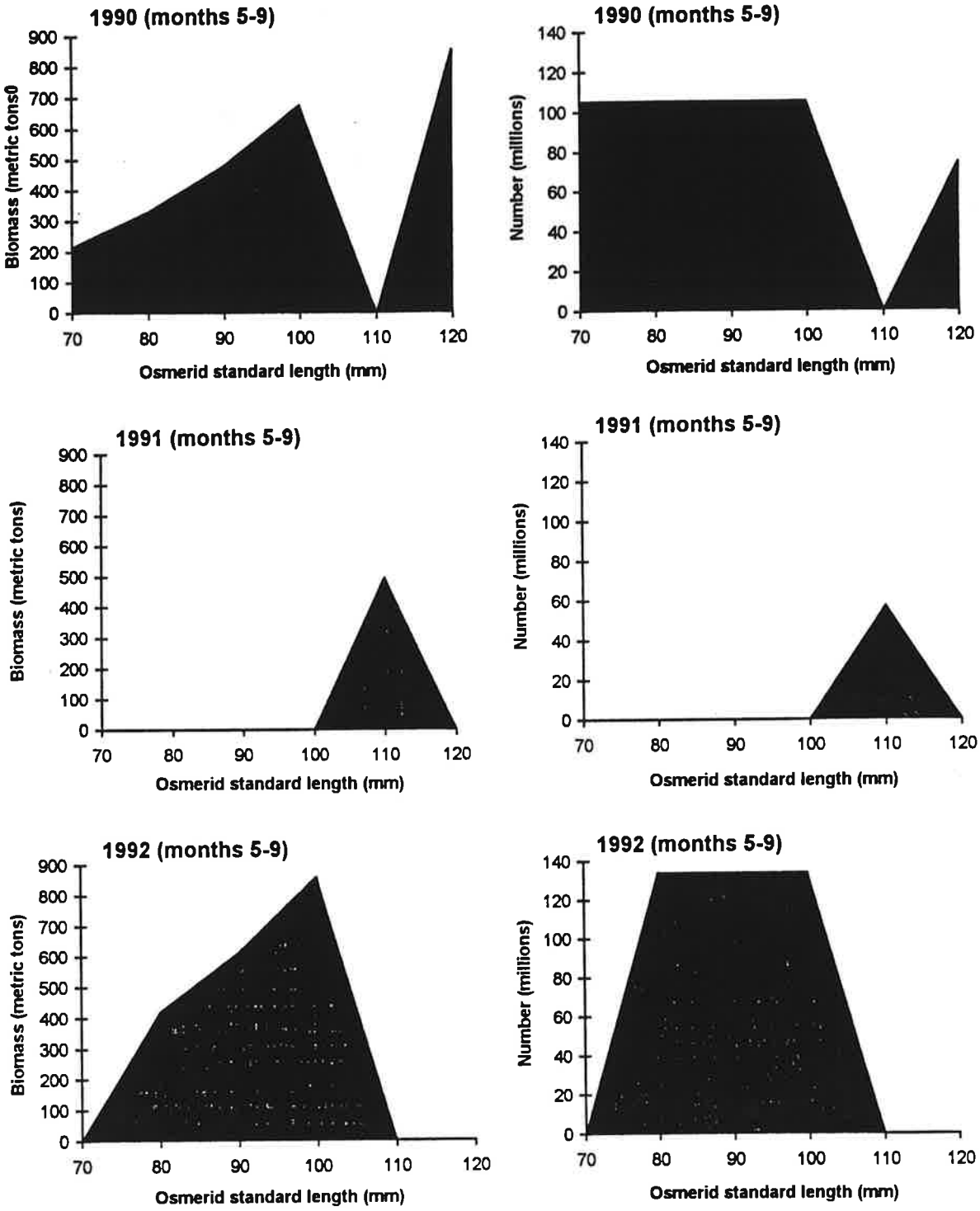

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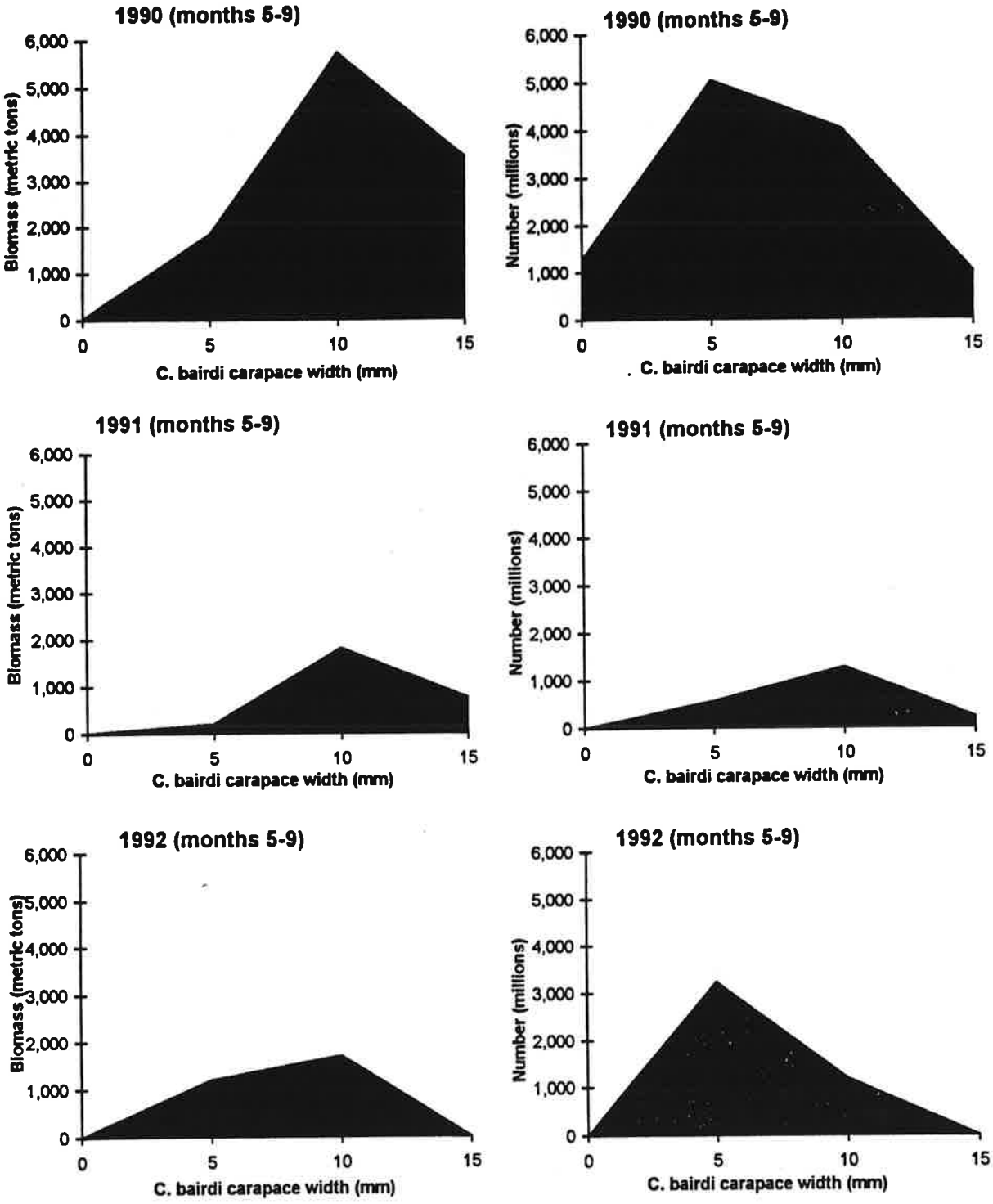
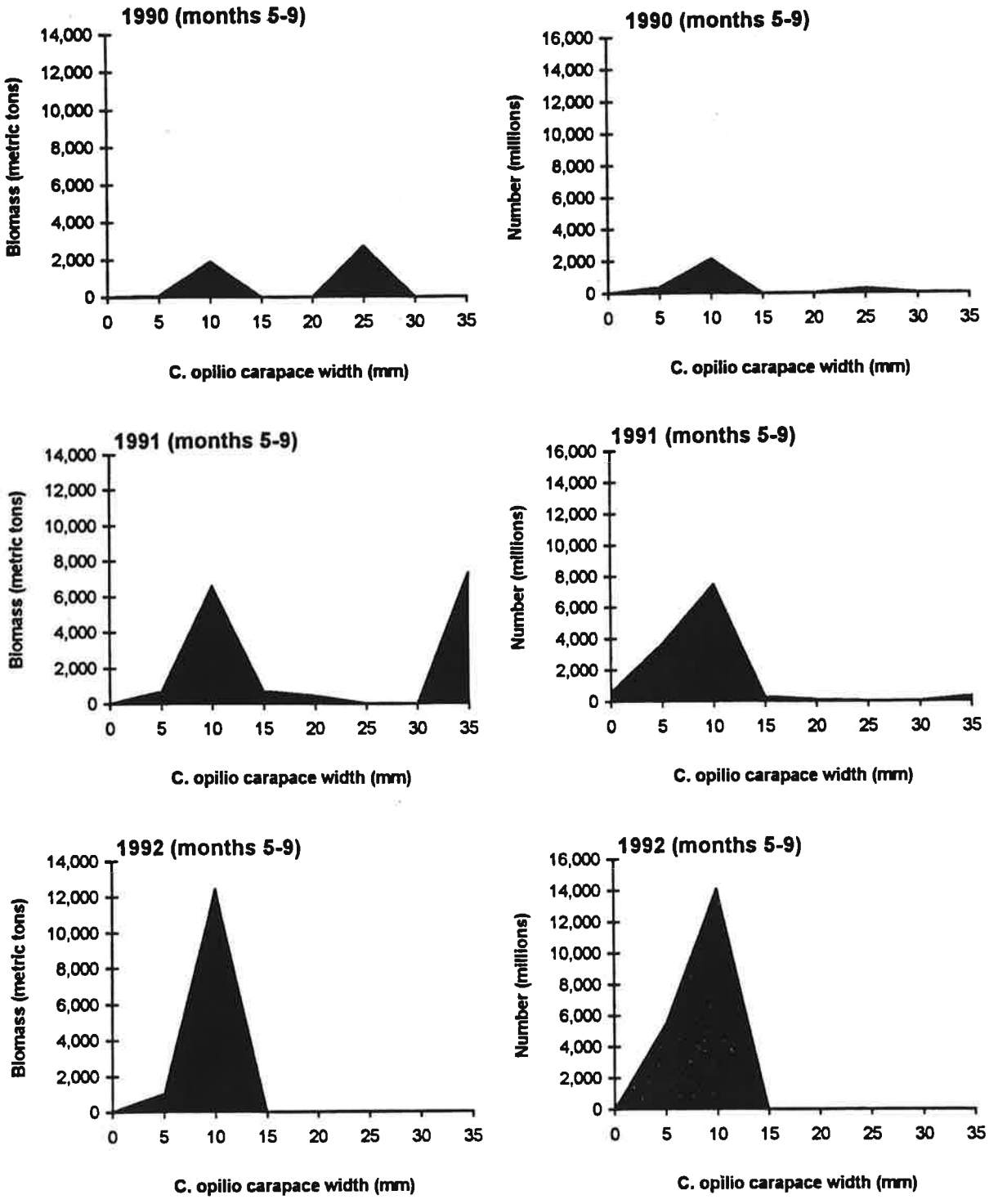


Figure C-26. -- Estimated biomass and numbers of C. bairdi consumed by flathead sole in the eastern Bering Sea by year, 1990-1992 (months 5-9).



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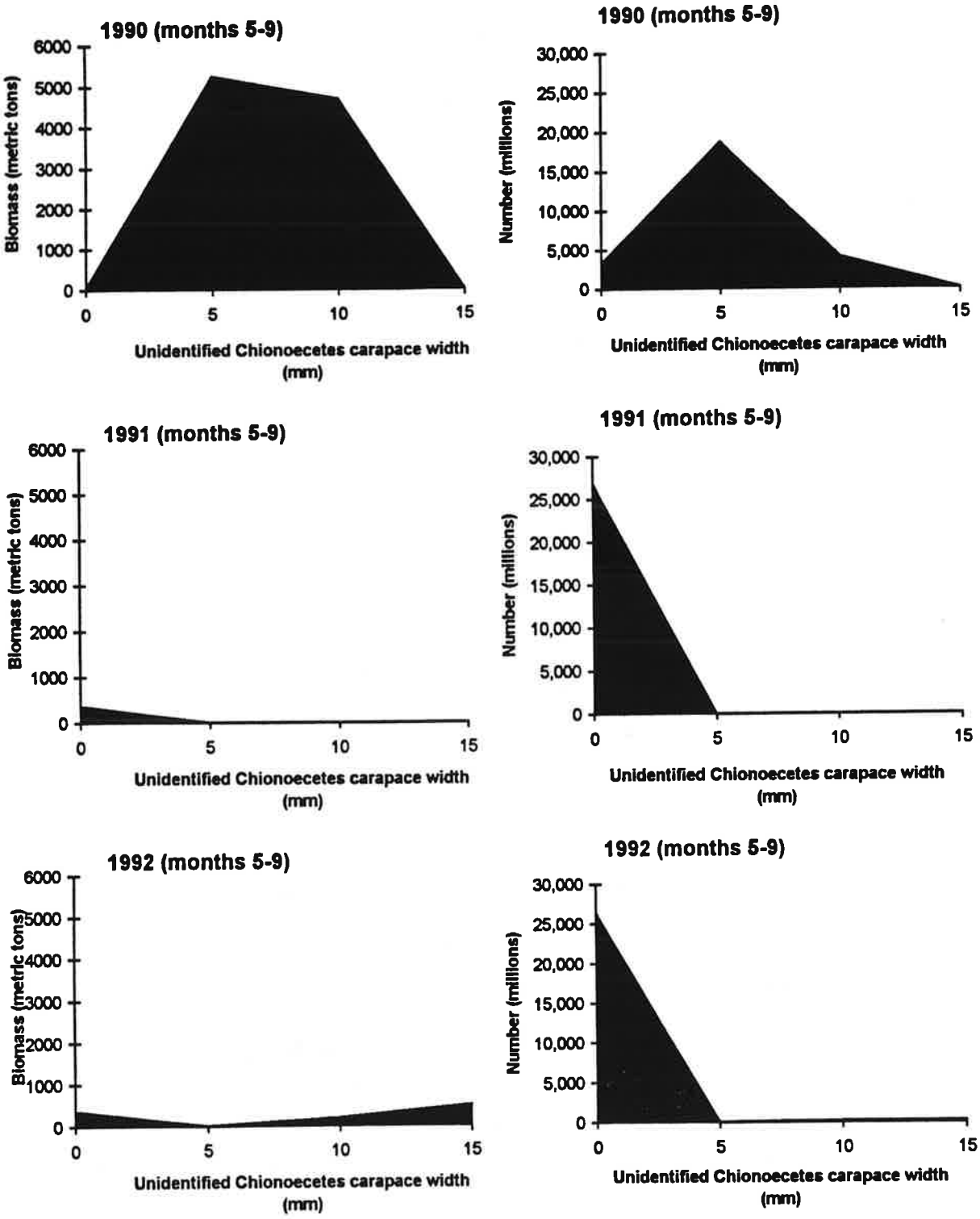

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Predator size (cm)	Stratum		Biomass (metric tons) 90	91	92
<30	4		45	67	1
	6		318	627	637
		Subtotal	363	694	638
30-49	4		121	119	0
	6		3,695	2,375	2,204
		Subtotal	3,816	2,494	2,204
≥50	3		0	0	617
	4		331	225	230
	5		0	0	214
	6		9,584	7,236	12,008
		Subtotal	9,915	7,461	13,069
	Total		14,094	10,649	15,911

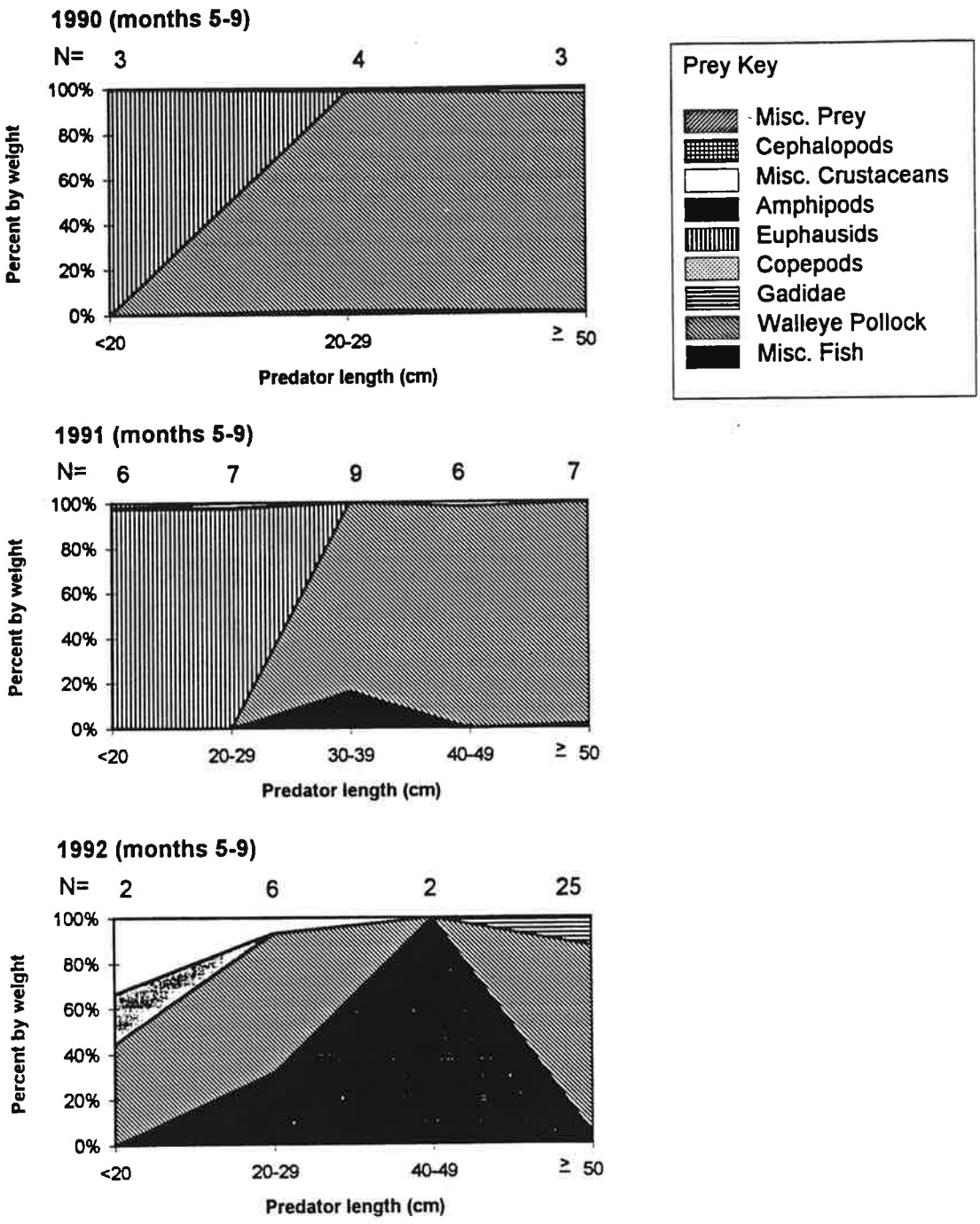
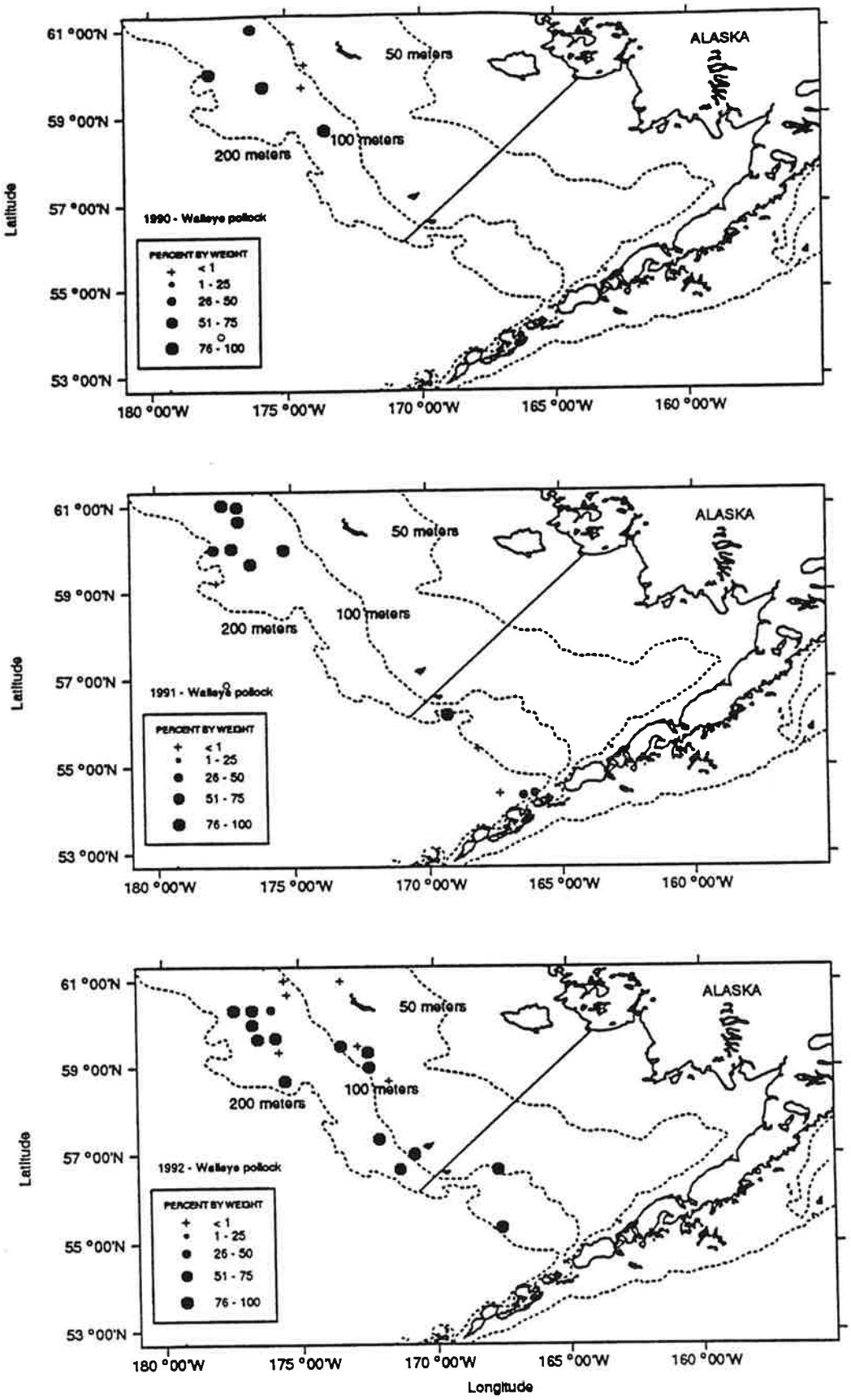


Figure D-1. -- Diet composition of Greenland turbot, in terms of percent by weight, during months 5 to 9 by year and by predator size in the Bering Sea; N = number of stomachs.



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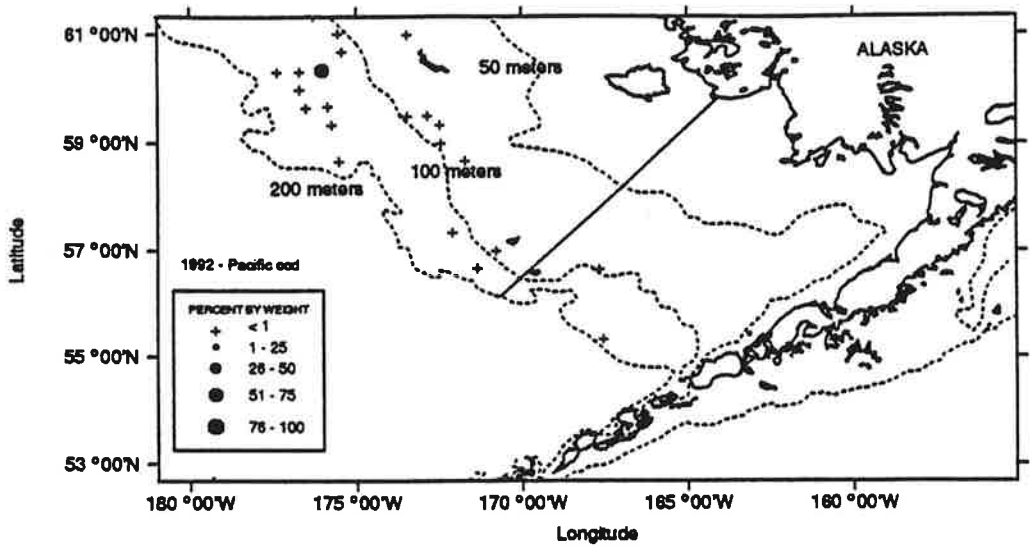

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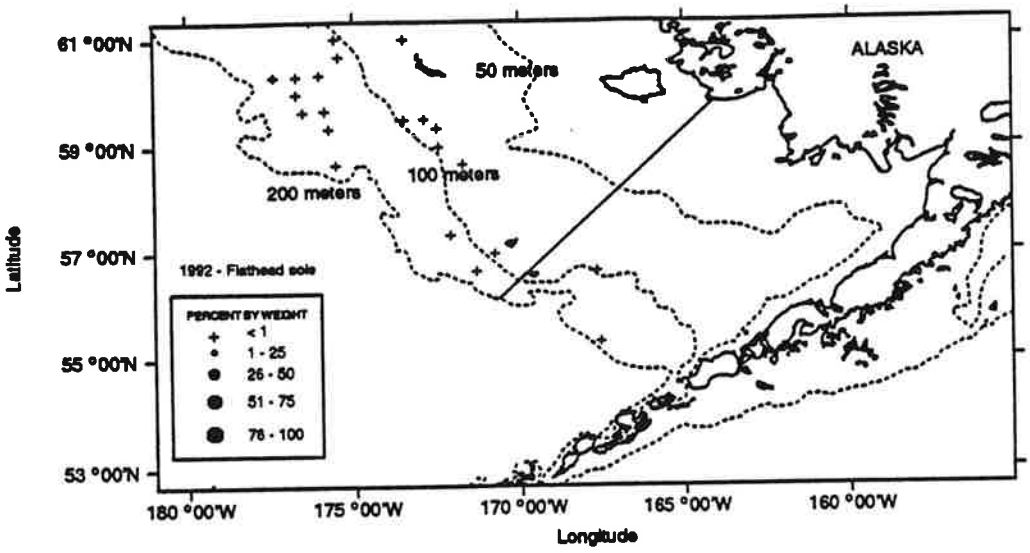

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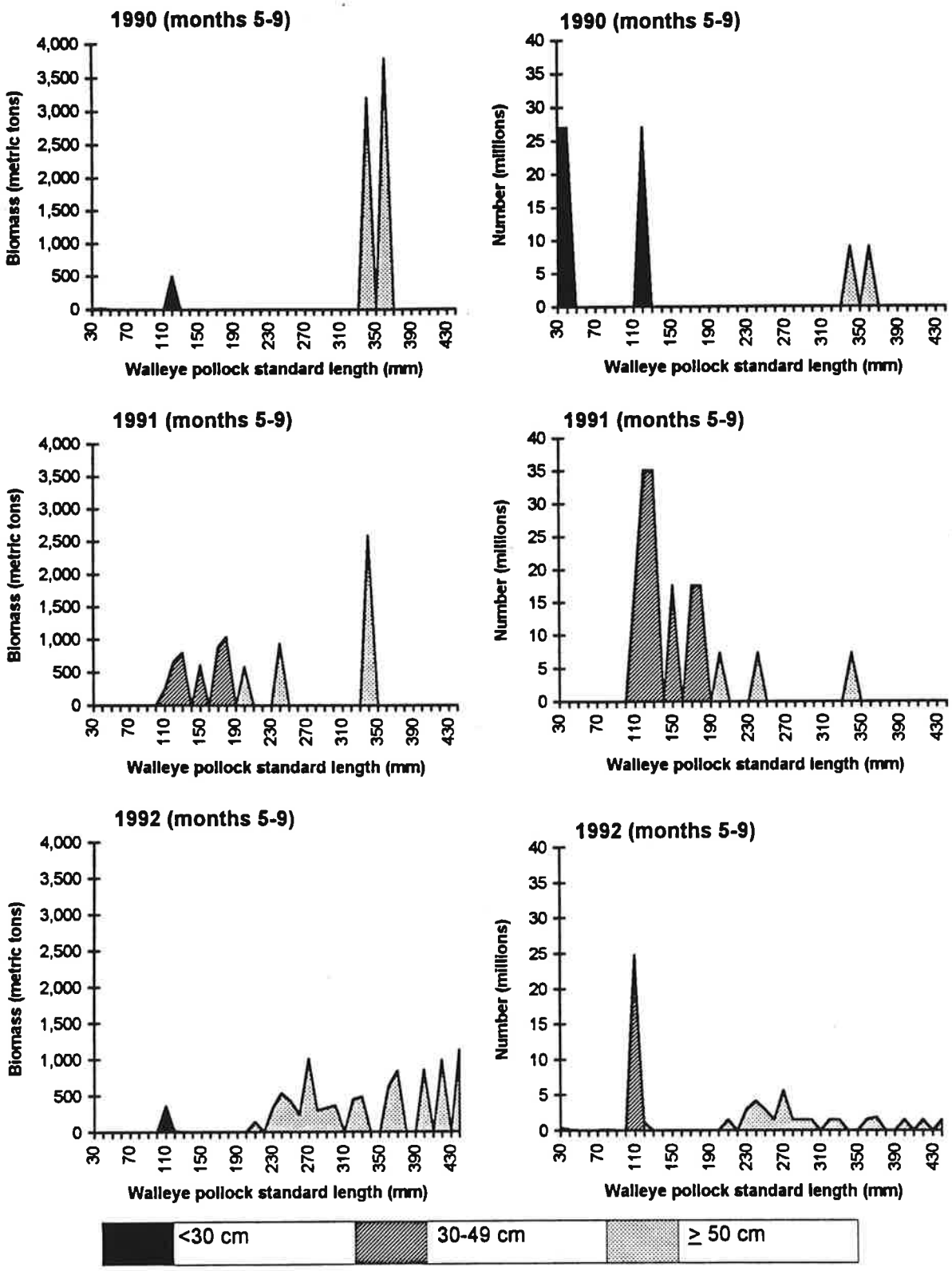

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Table E-1. -- Mid-year estimates of biomass (by predator size, stratum, and year) of arrowtooth flounder in the eastern Bering Sea for 1990 through 1992, from the bottom trawl shelf survey.

Predator size (cm)	Stratum		Biomass (metric tons) 90	91	92
<20	1		160	58	1
	3		937	525	182
	4		542	132	111
	5		215	138	50
	6		300	121	8
		Subtotal	2,154	974	352
20-39	1		746	408	202
	3		39,936	60,662	10,238
	4		10,655	6,957	2,167
	5		56,807	39,320	16,408
	6		36,877	13,127	2,760
		Subtotal	145,021	120,474	31,775
≥40	1		0	100	270
	3		30,172	29,168	5,676
	4		2,979	2,453	826
	5		82,866	59,356	45,691
	6		138,997	79,537	29,137
		Subtotal	255,014	170,614	81,600
		Total	402,189	292,062	113,727

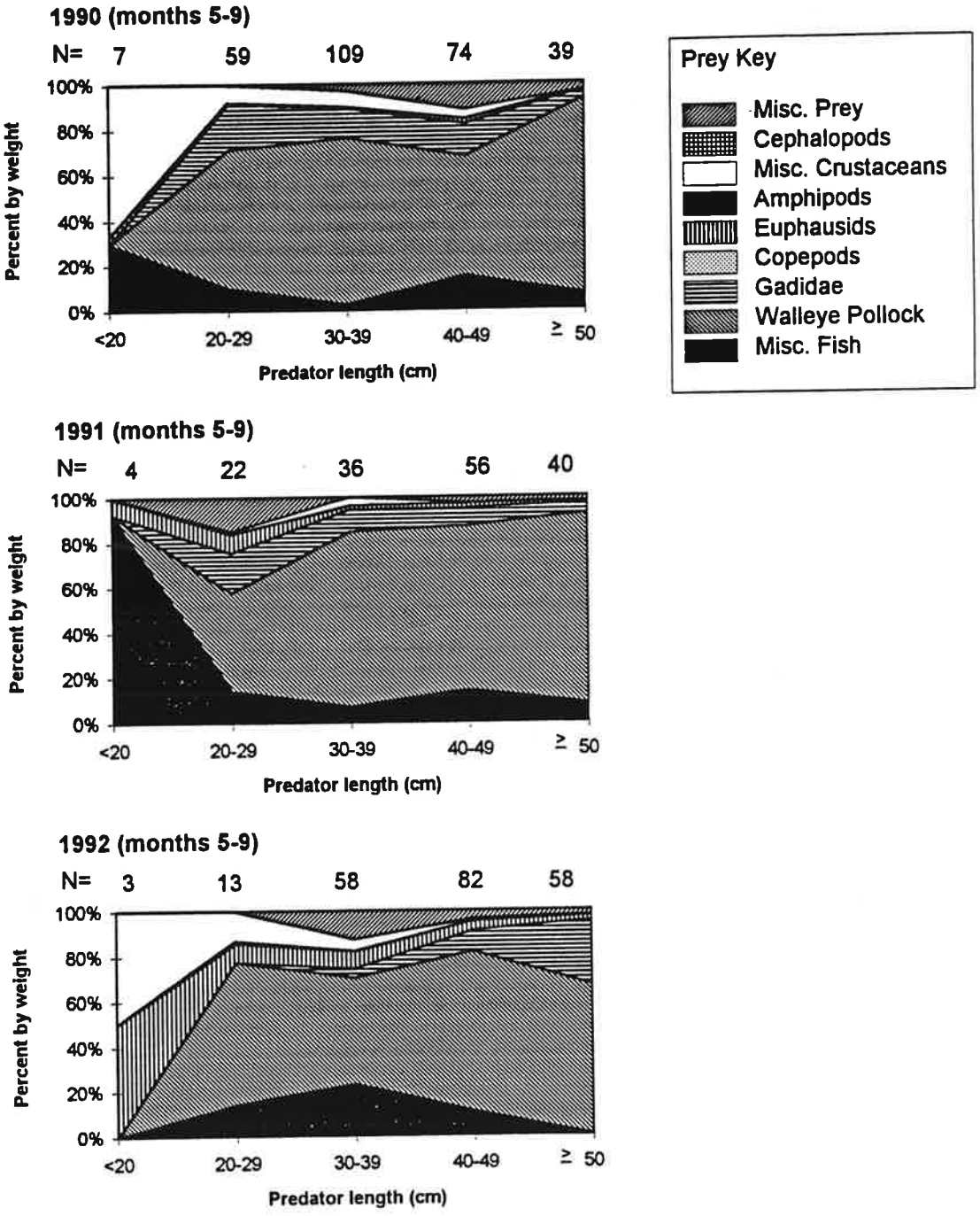


Figure E-1 -- Diet composition of arrowtooth flounder, in terms of percent by weight, during months 5 to 9 by year and by predator size in the Bering Sea; N = number of stomachs.

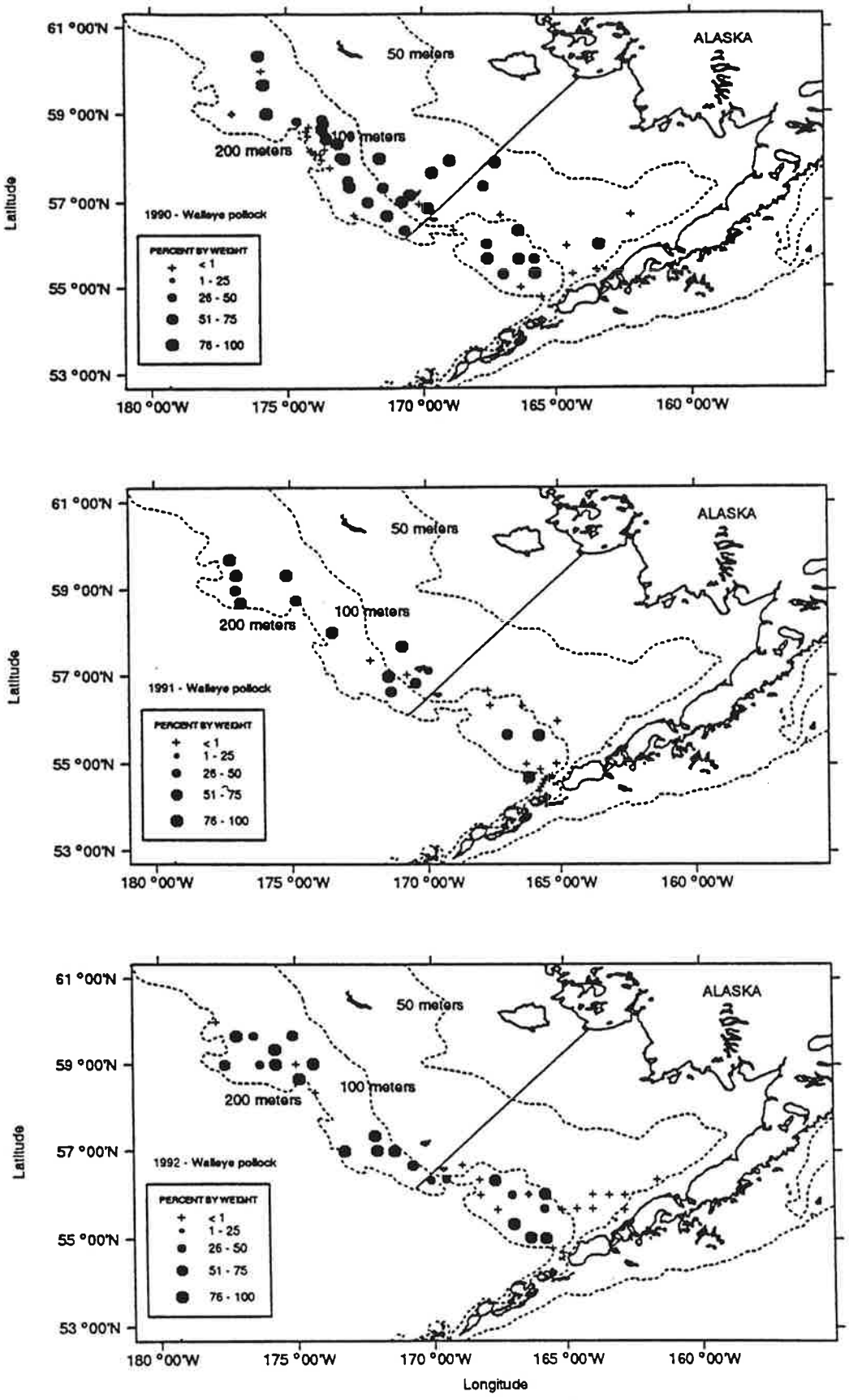
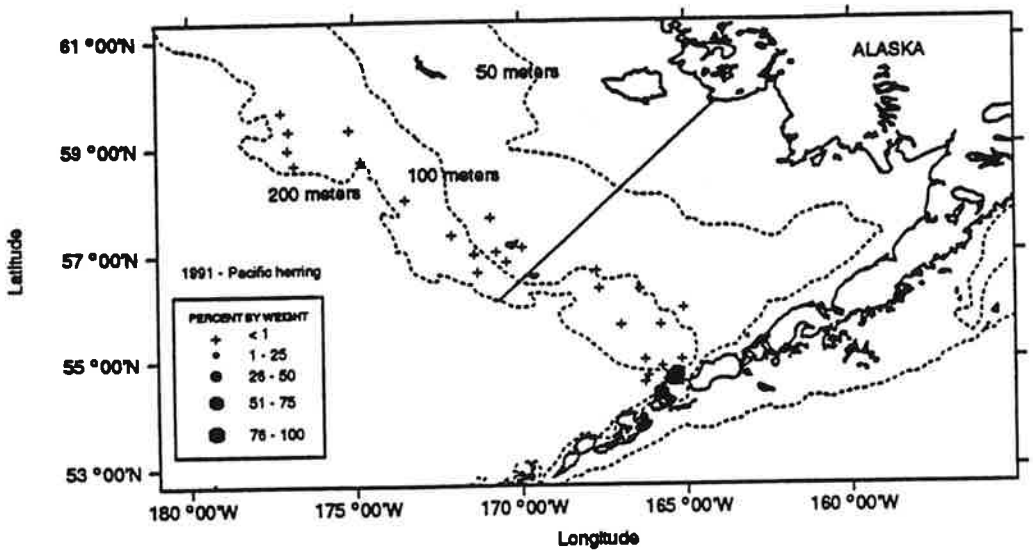


Figure E-2. -- Percent by weight of walleye pollock in the diet of arrowtooth flounder by sampling station during months 5 to 9 in 1990, 1991 and 1992 in the eastern Bering Sea.



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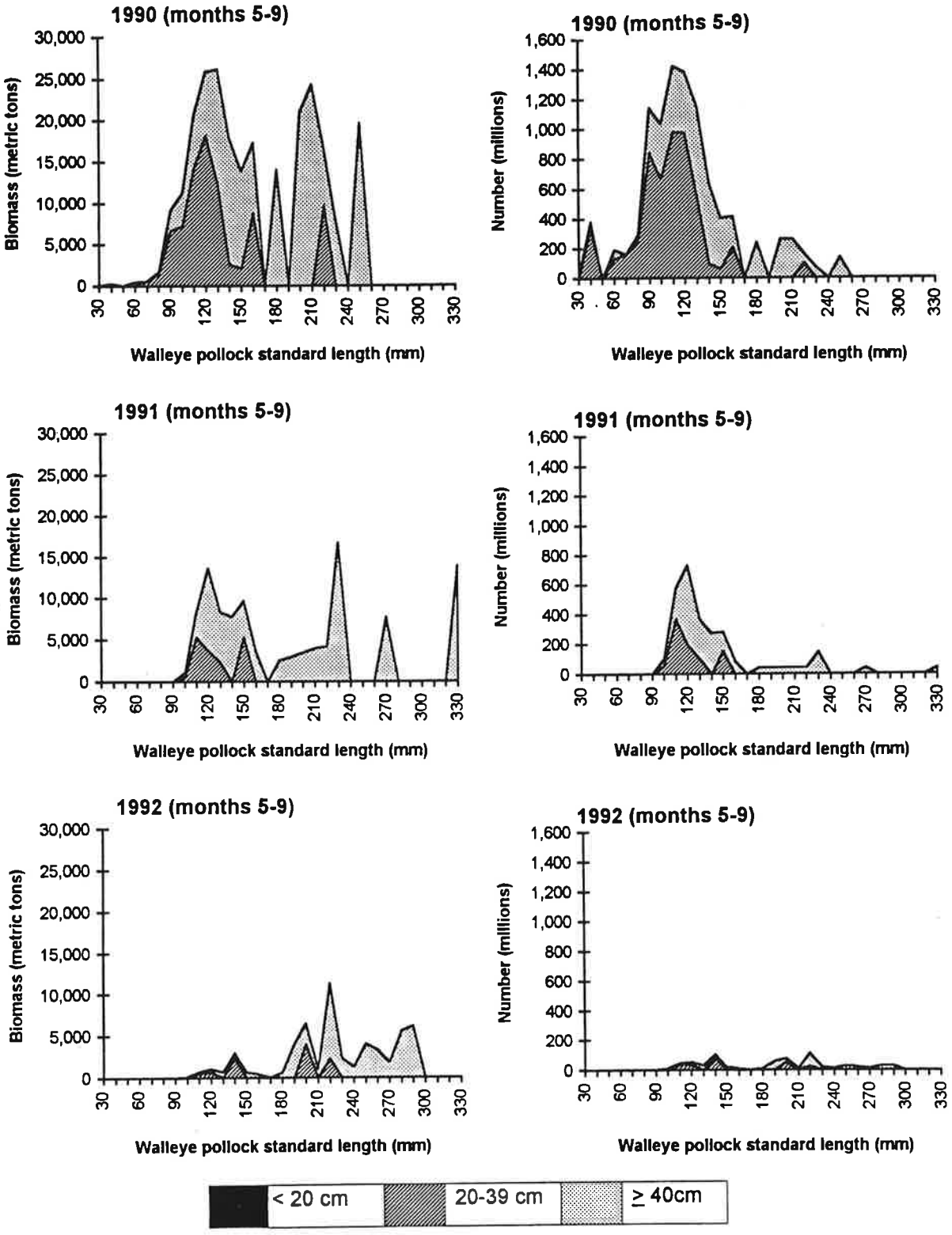

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APPENDIX F. - PACIFIC HALIBUT

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Predator size (cm)	Stratum		Biomass (metric tons) 90	91	92
<30	1		2,833	245	19
	2		455	90	71
	3		267	1	0
	4		3	65	46
		Subtotal	3,558	401	136
30-59	1		7,718	17,067	7,482
	2		2,065	10,312	5,002
	3		3,492	4,321	4,684
	4		2,088	4,767	3,345
	5		219	448	590
	6		504	602	1,210
		Subtotal	16,086	37,517	22,313
≥60	1		11,812	11,622	3,019
	2		2,637	6,343	4,572
	3		13,327	13,743	8,650
	4		5,704	7,835	3,158
	5		8,277	6,879	9,821
	6		14,995	5,432	9,146
		Subtotal	56,752	51,854	38,365
	Total		76,396	89,772	60,814

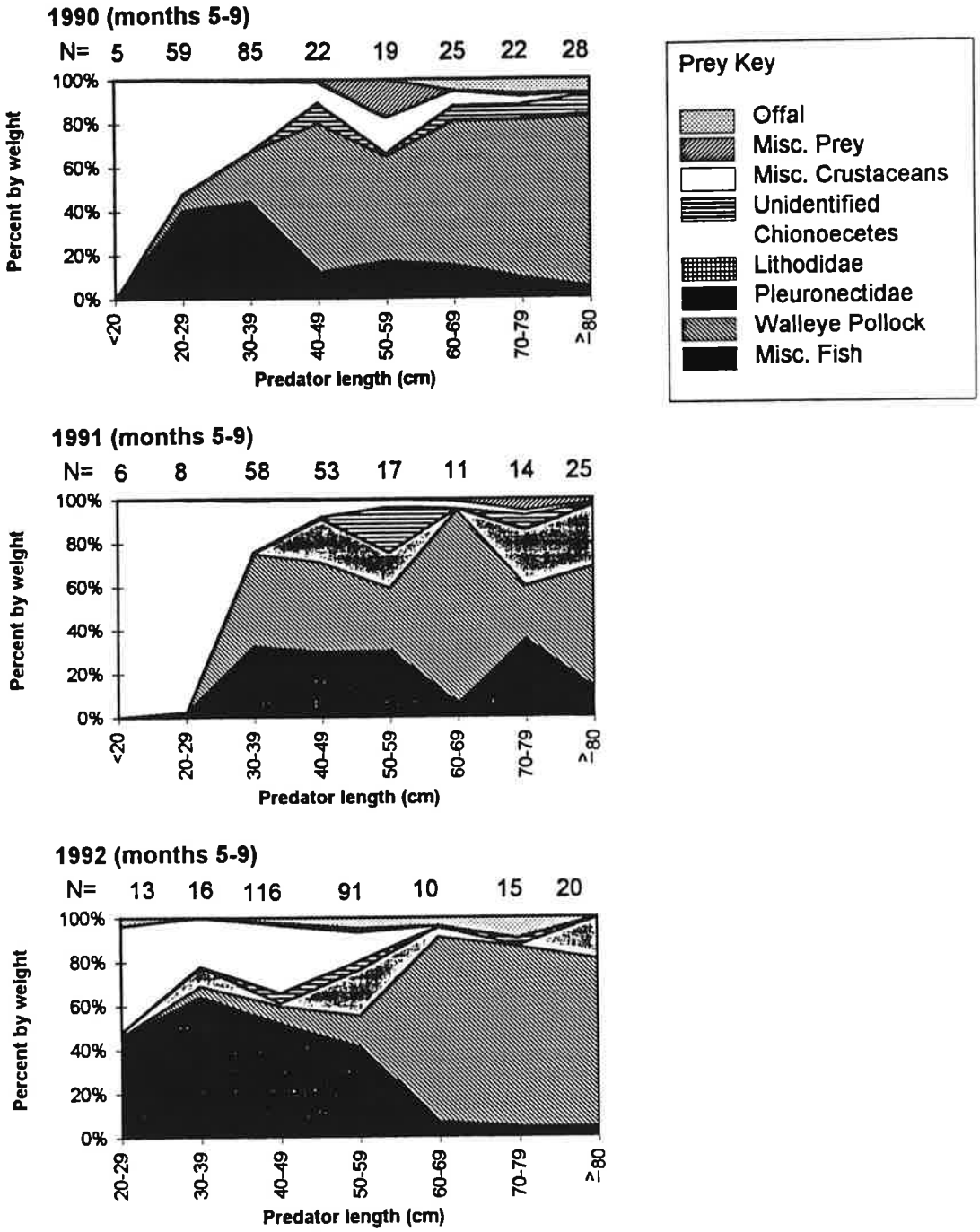


Figure F-1. -- Diet composition of Pacific halibut, in terms of percent by weight, during months 5 to 9 by year and by predator size in the Bering Sea; N = number of stomachs.

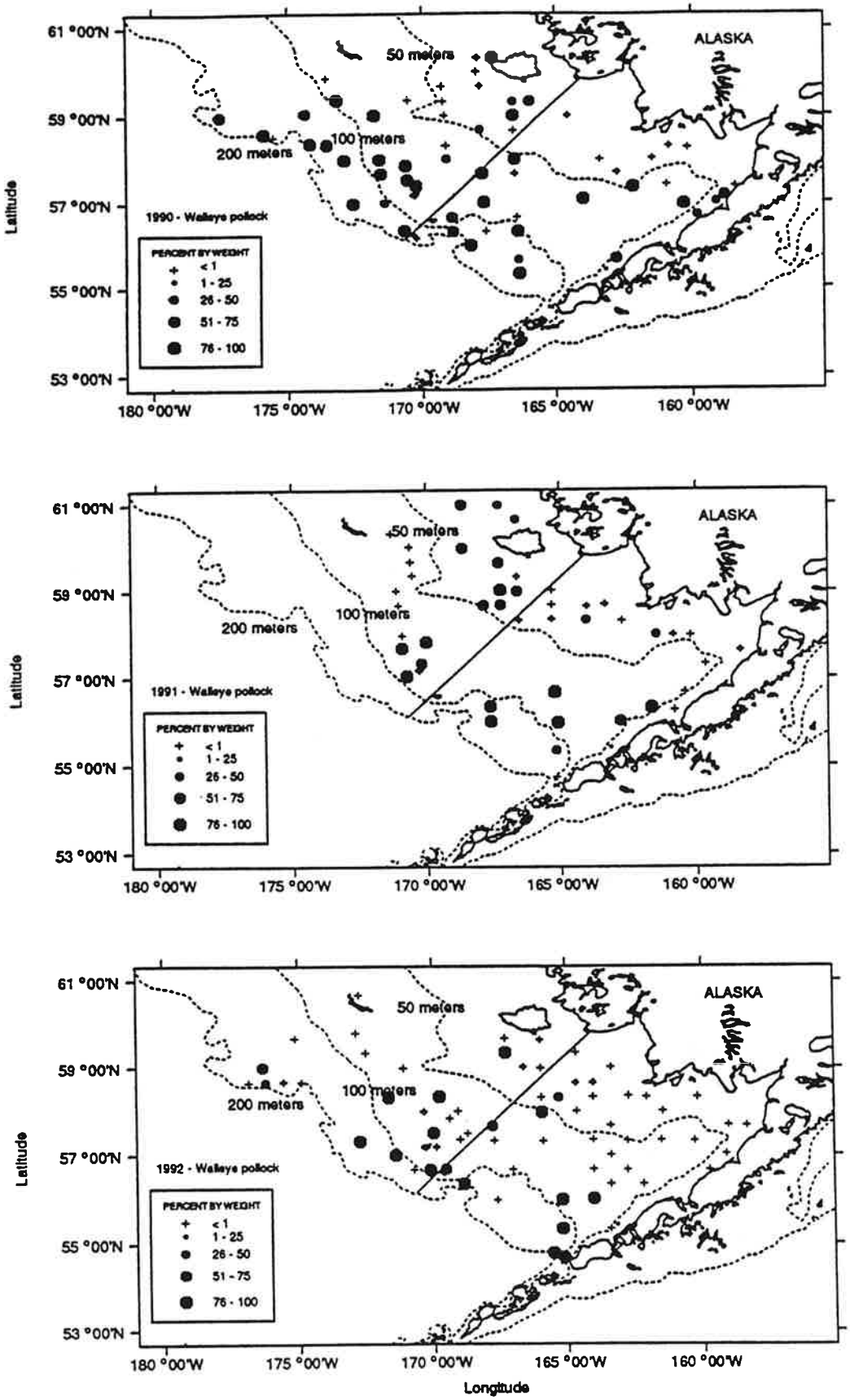
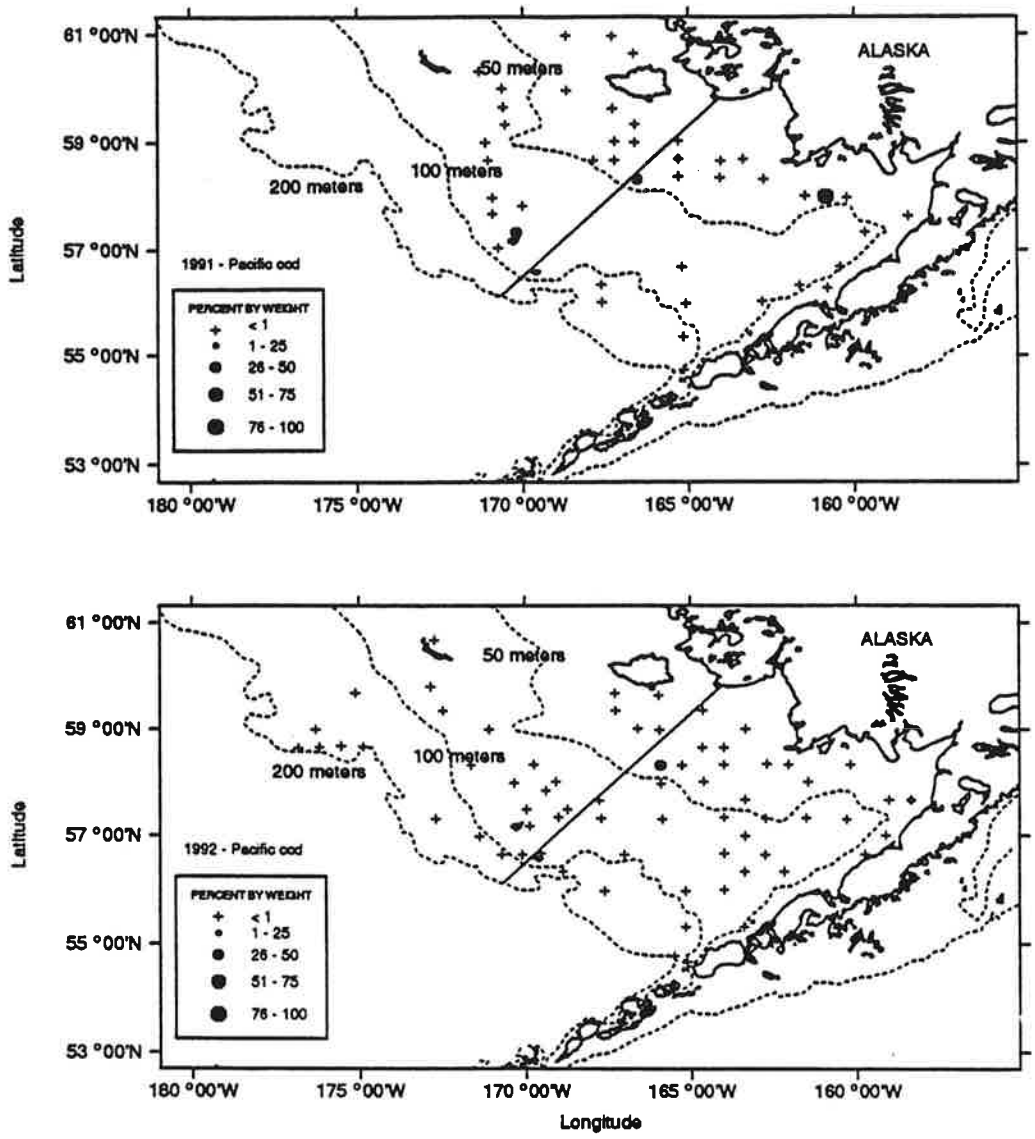


Figure F-2. -- Percent by weight of walleye pollock in the diet of Pacific halibut by sampling station during months 5 to 9 in 1990, 1991 and 1992 in the eastern Bering Sea.



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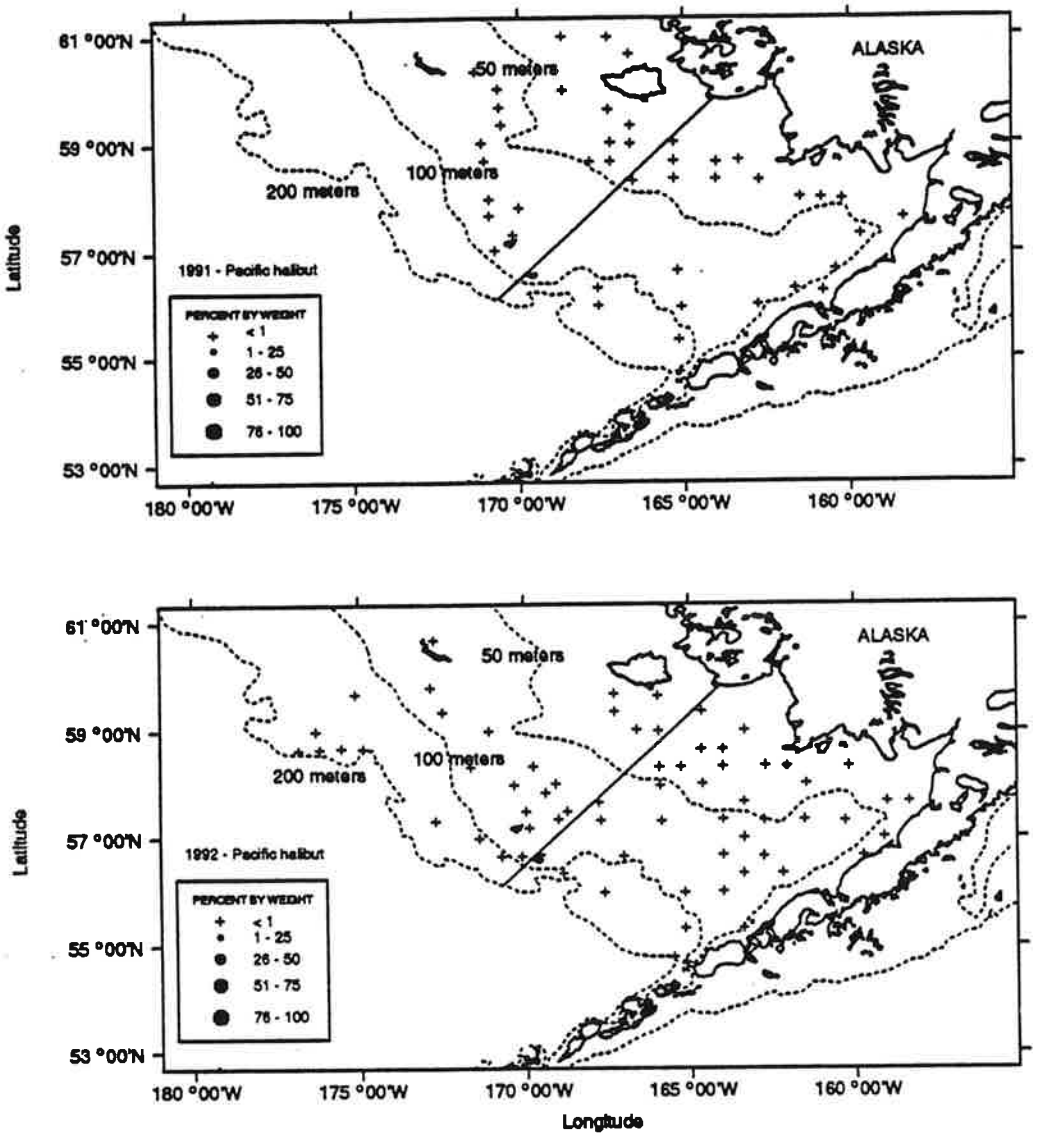


Figure F-4. -- Percent by weight of Pacific halibut in the diet of Pacific halibut by sampling station during months 5 to 9 in 1991 and 1992 in the eastern Bering Sea.

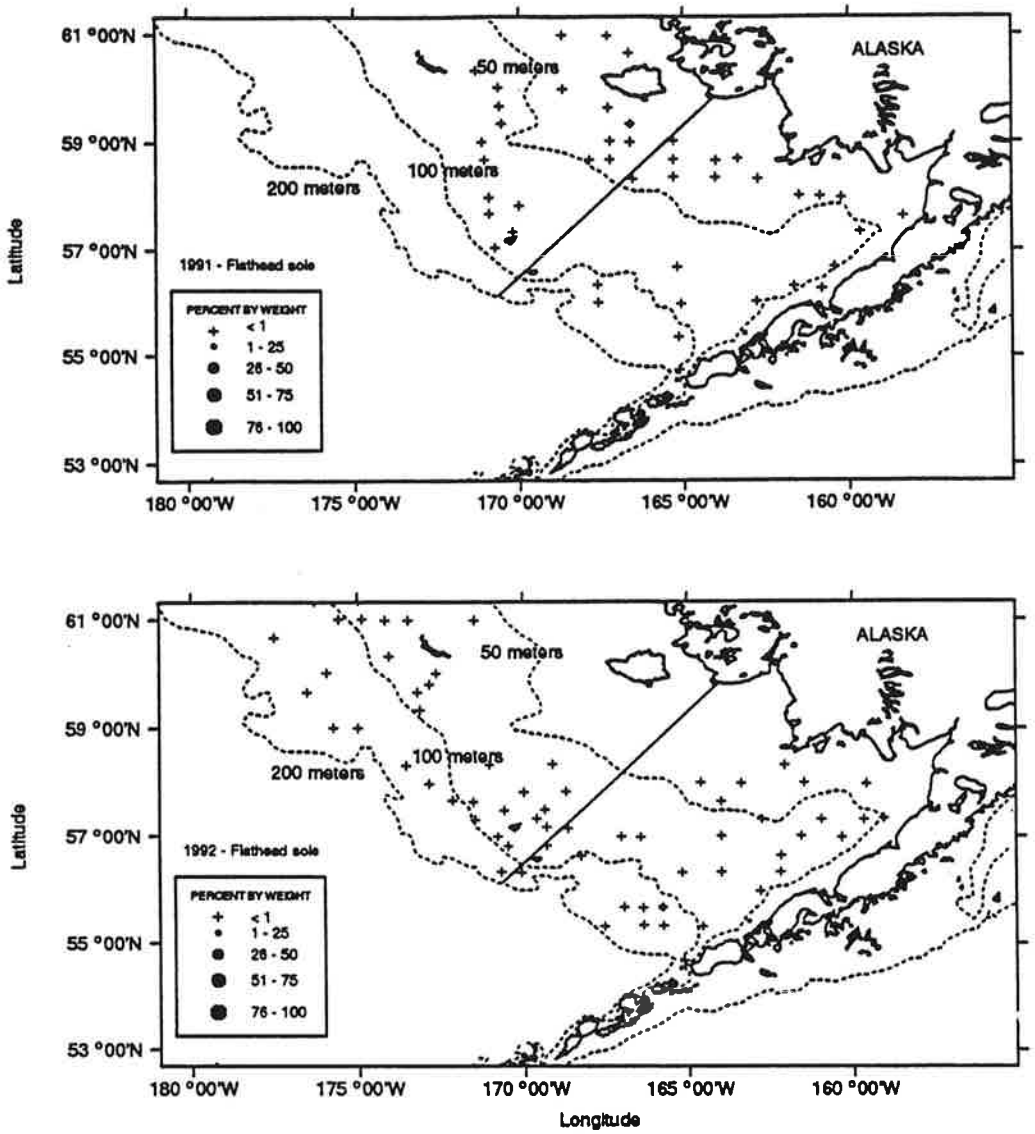
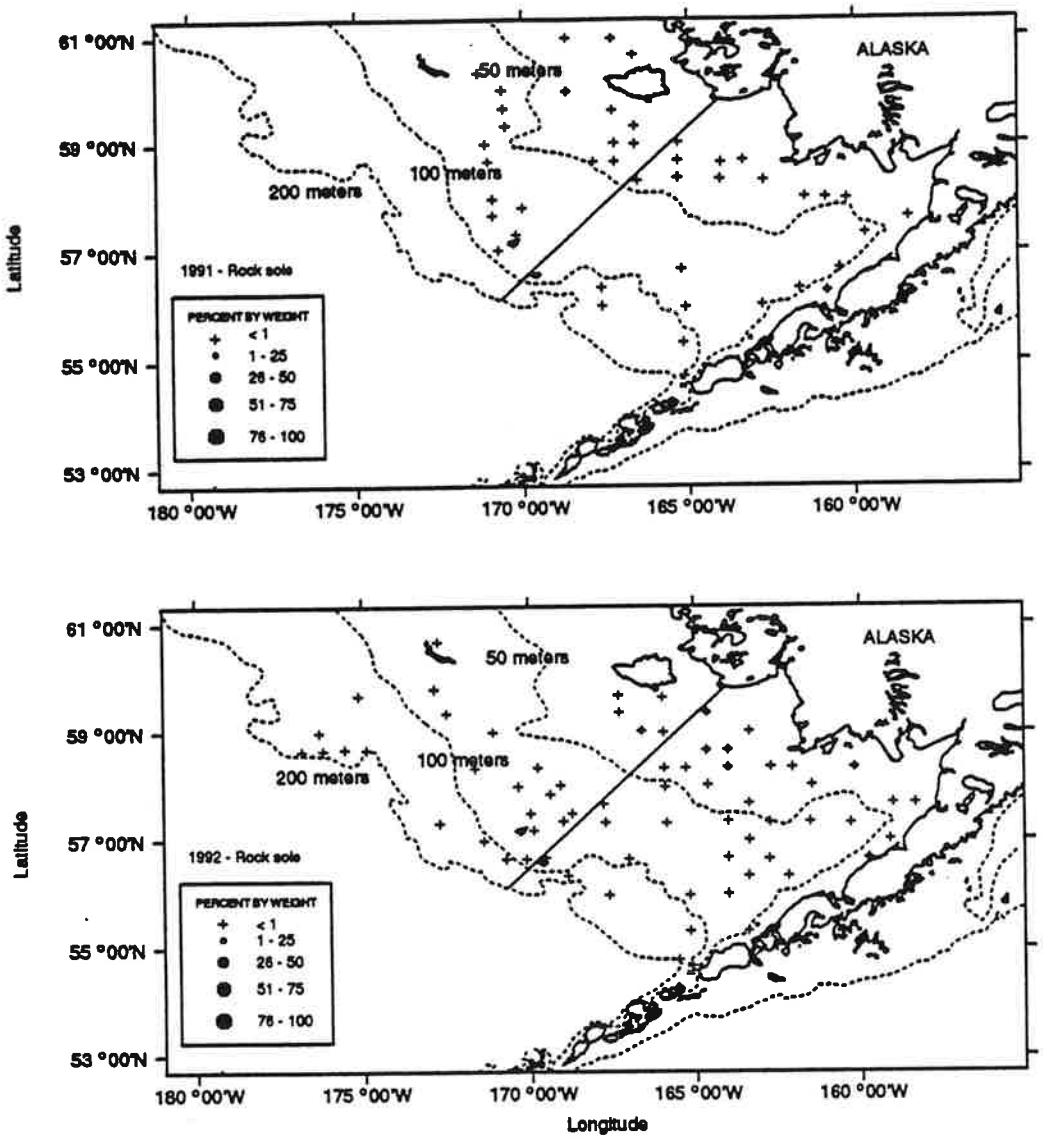


Figure F-5. -- Percent by weight of flathead sole in the diet of Pacific halibut by sampling station during months 5 to 9 in 1991 and 1992 in the eastern Bering Sea.



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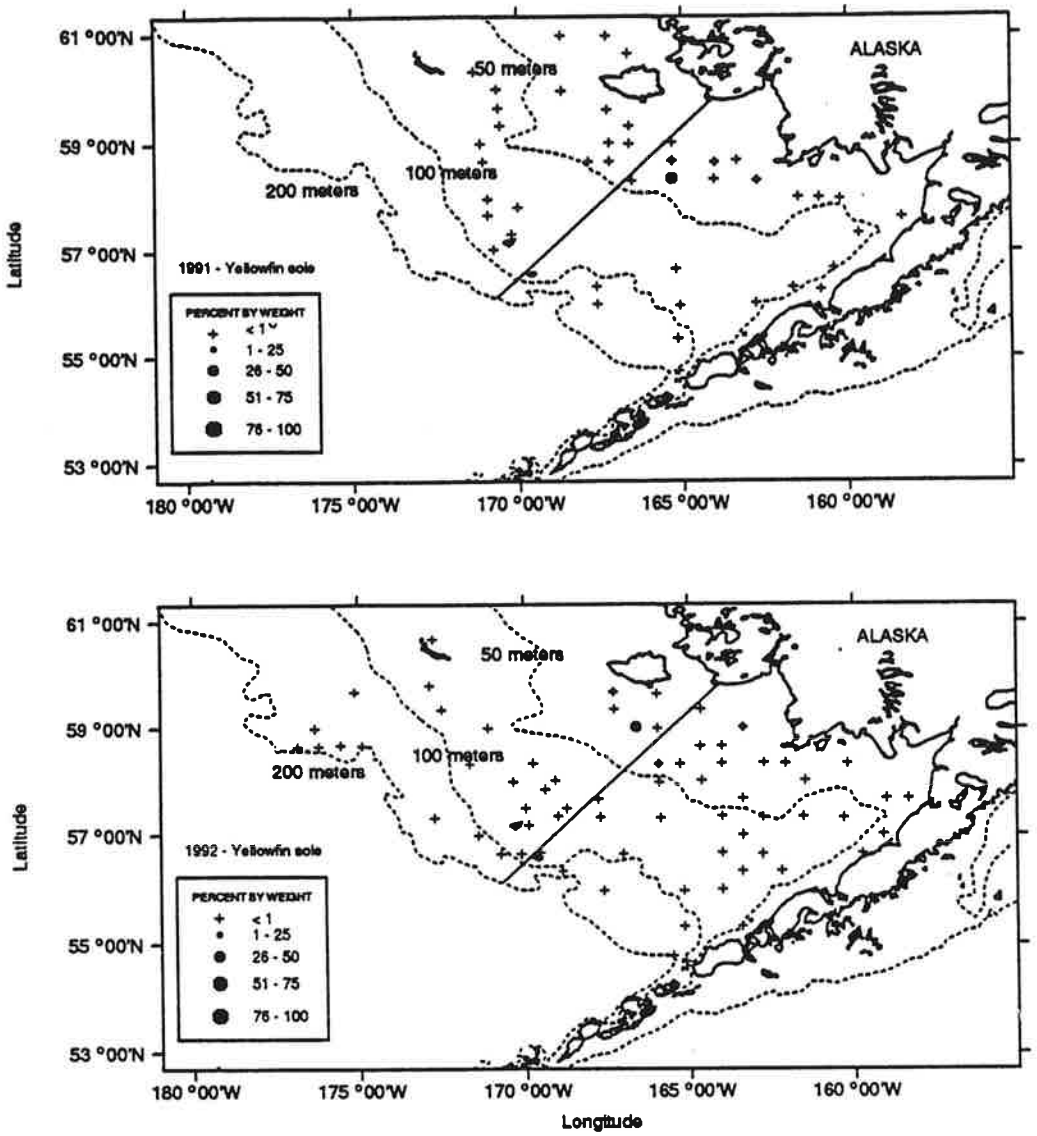

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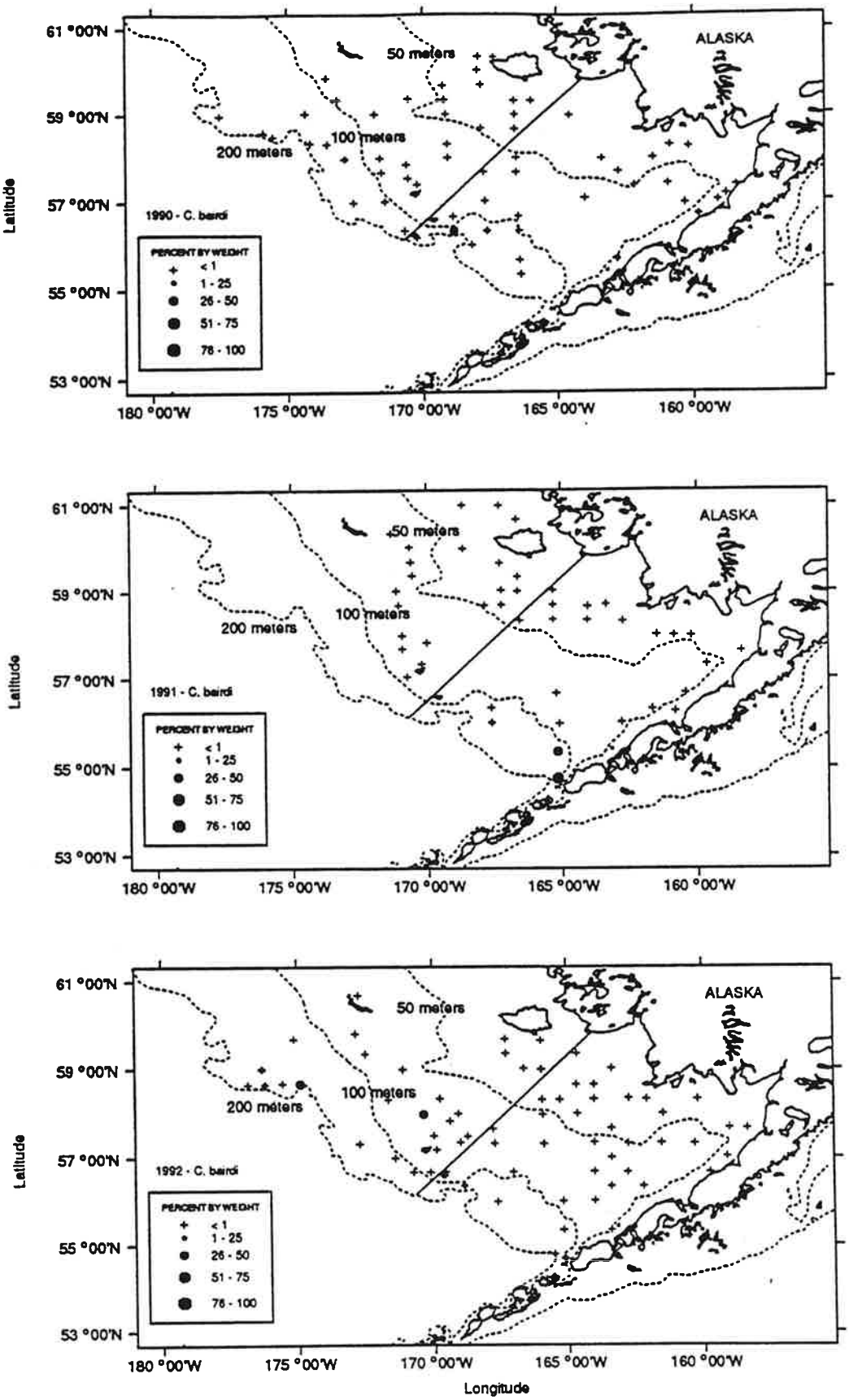


Figure F-8. -- Percent by weight of C. bairdi in the diet of Pacific halibut by sampling station during months 5 to 9 in 1990, 1991 and 1992 in the eastern Bering Sea.

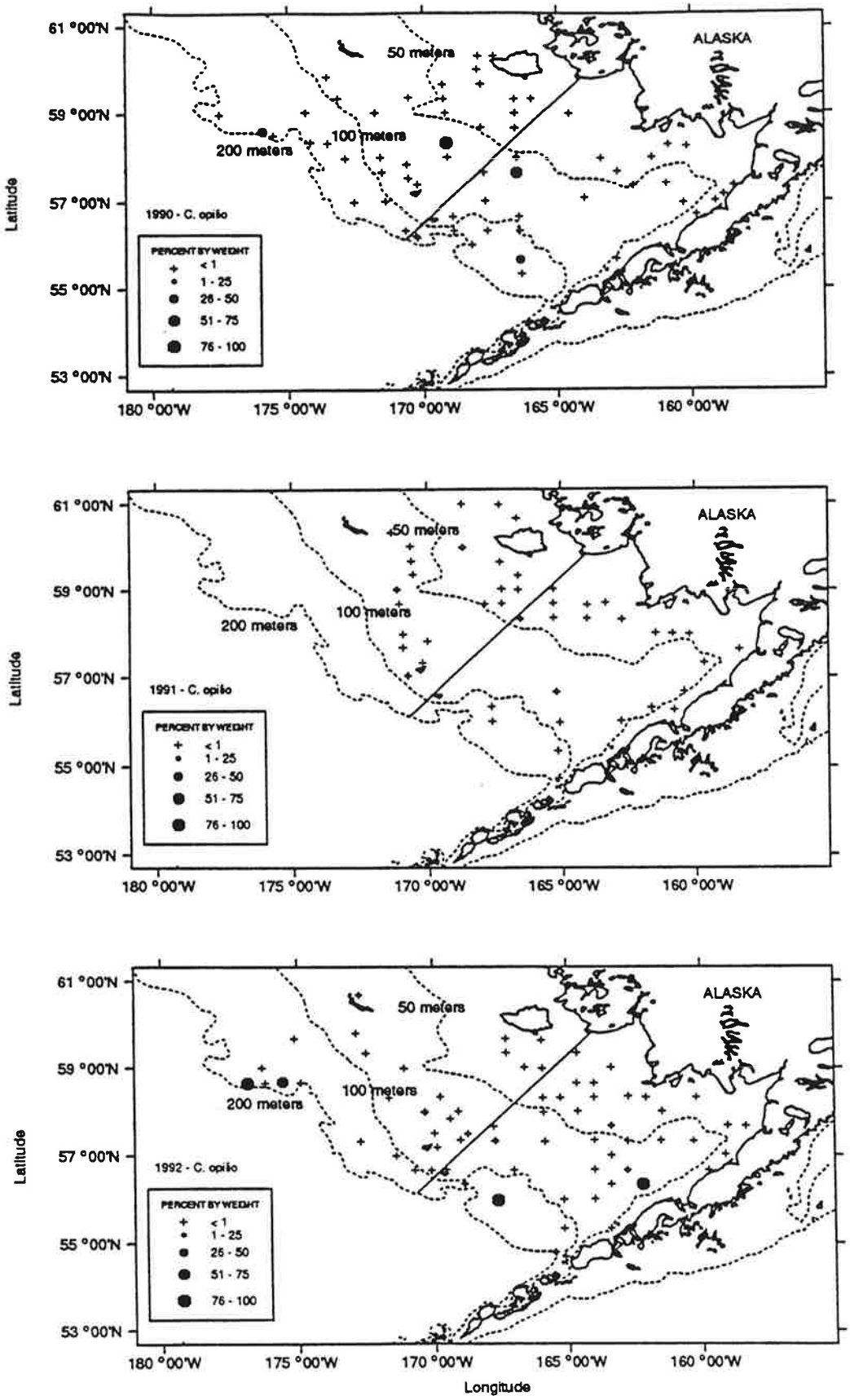
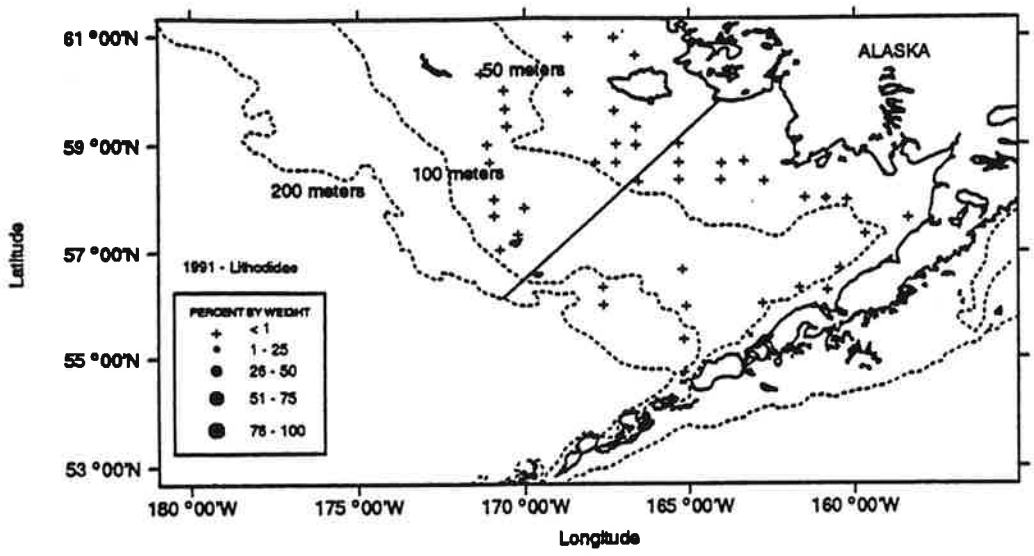


Figure F-9. -- Percent by weight of C. opilio in the diet of Pacific halibut by sampling station during months 5 to 9 in 1990, 1991 and 1992 in the eastern Bering Sea.



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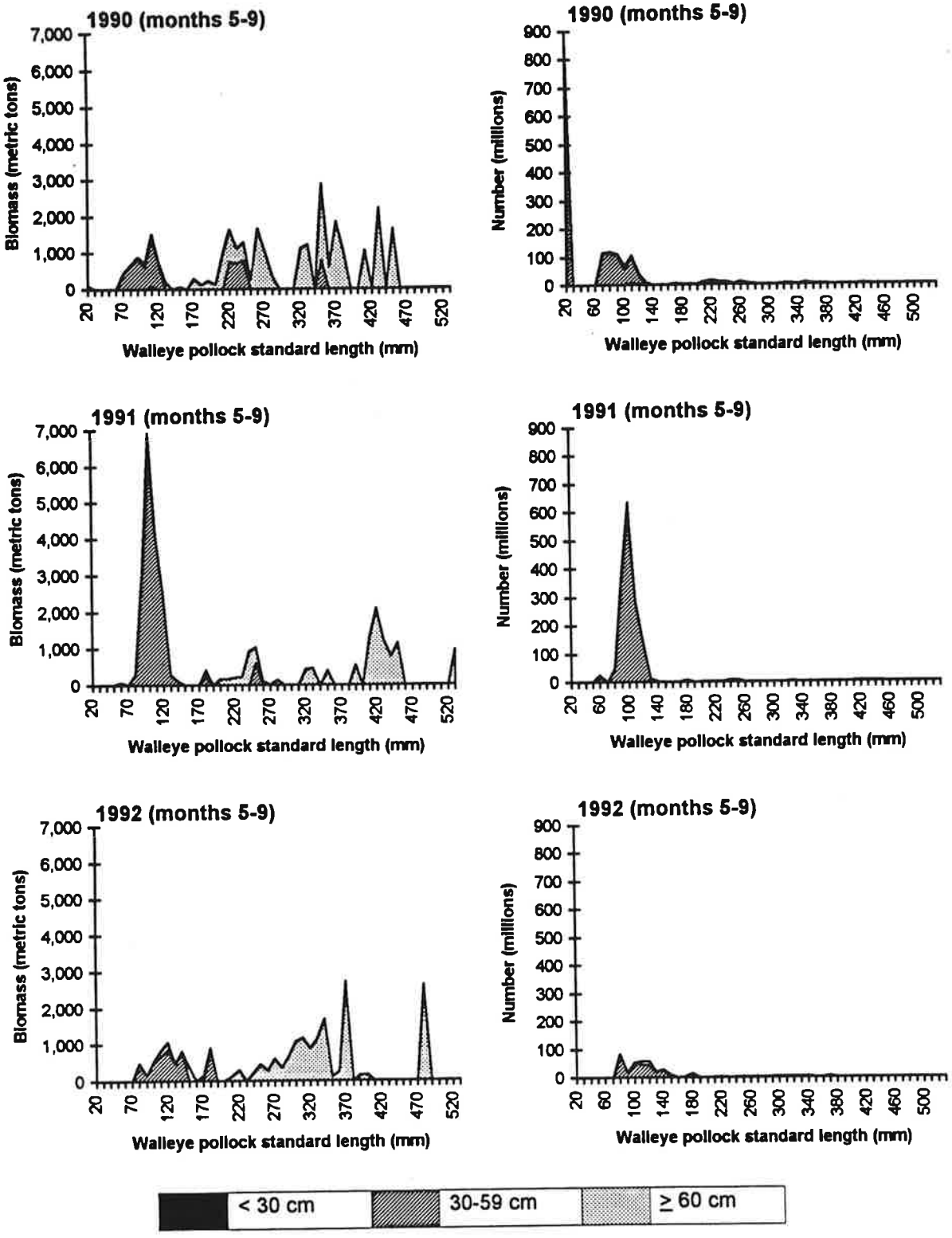


Figure F-11. – Estimated biomass and numbers of walleye pollock consumed by three size groups of Pacific halibut in the eastern Bering Sea by year, 1990-1992 (months 5-9).

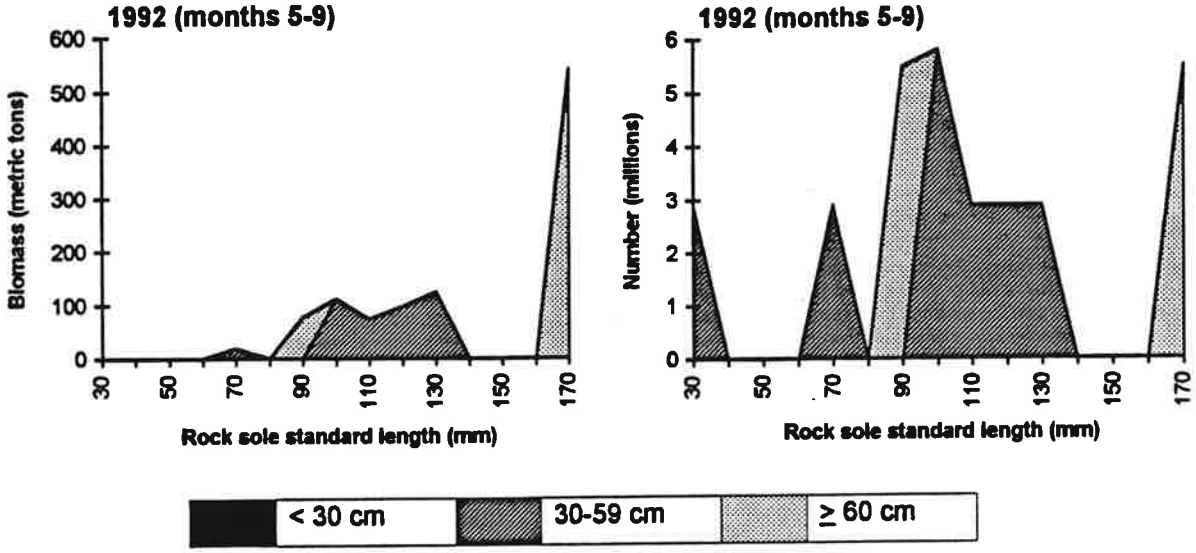


Figure F-12. – Estimated biomass and numbers of rock sole consumed by three size groups of Pacific halibut in the eastern Bering Sea in 1992 (months 5-9).

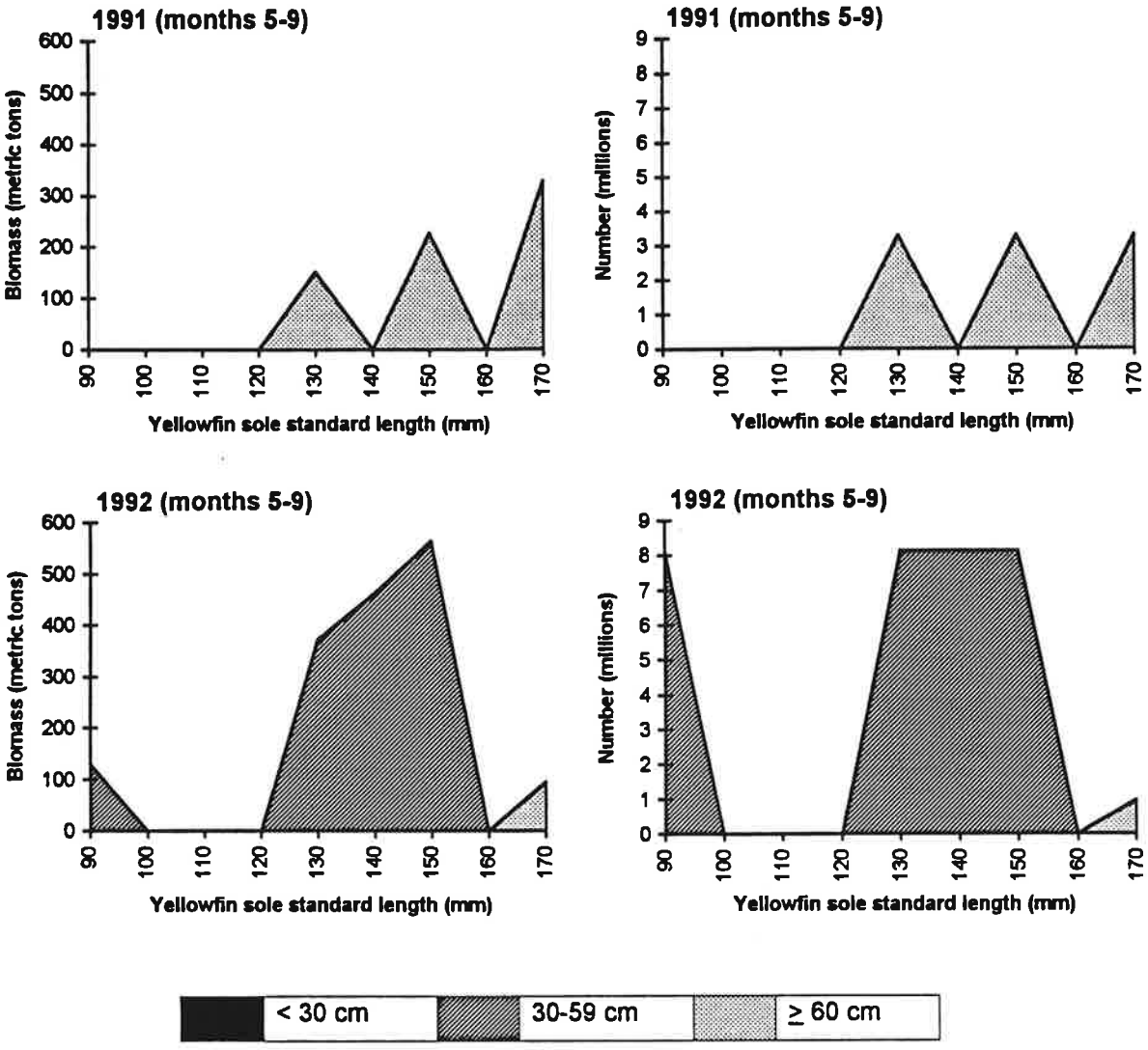
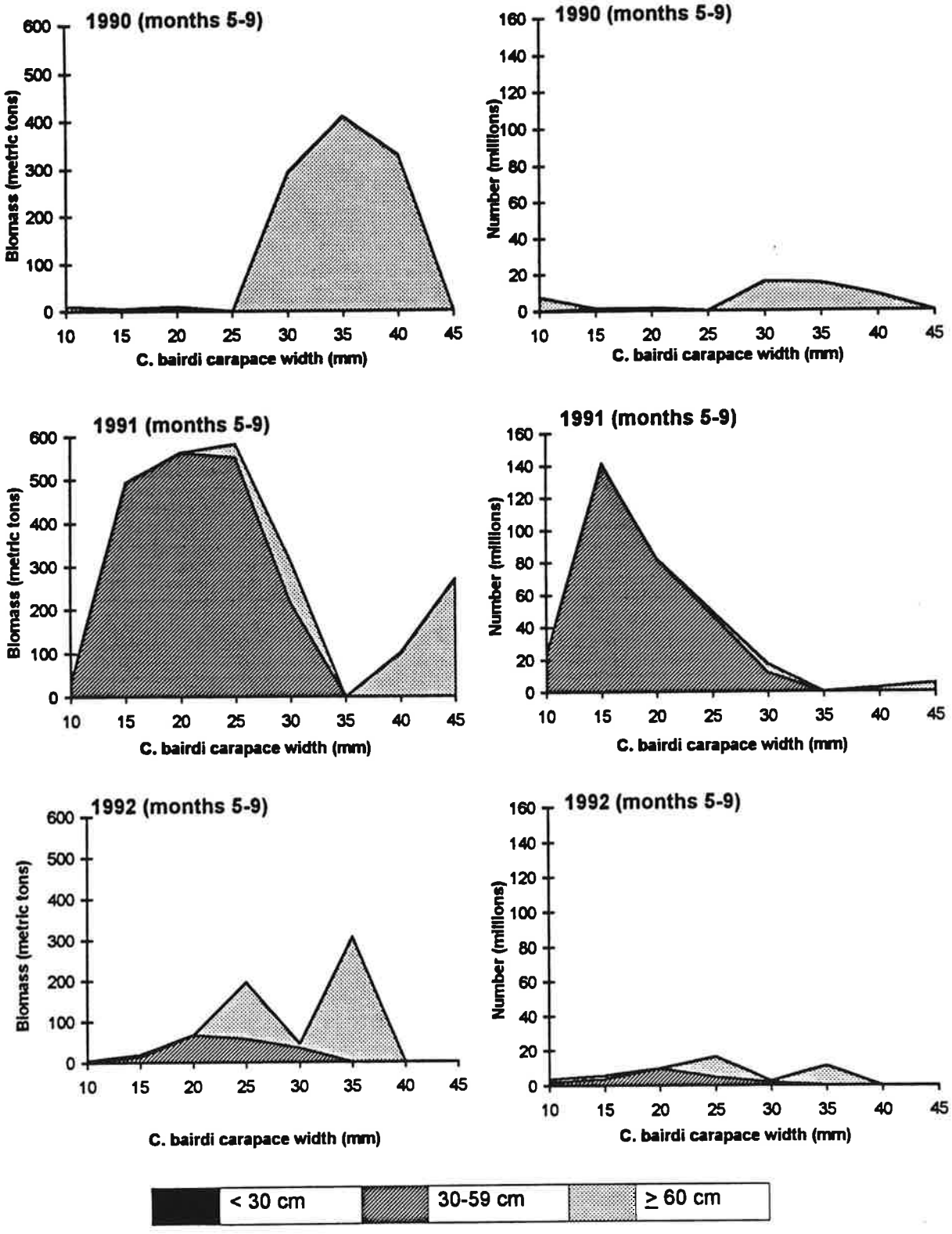


Figure F-13. -- Estimated biomass and numbers of yellowfin sole consumed by three size groups of Pacific halibut in the eastern Bering Sea by year, 1991 1992 (months 5-9).



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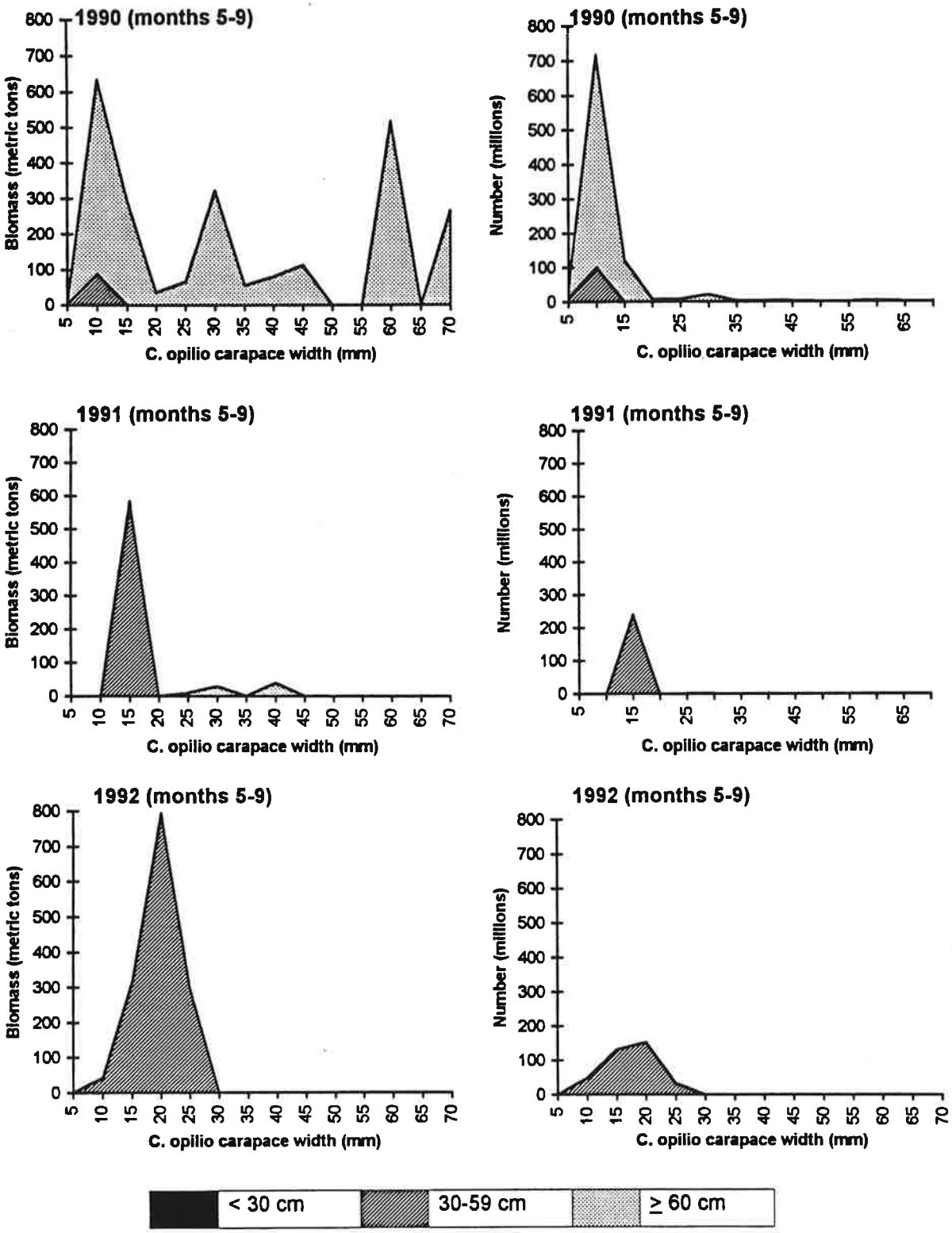

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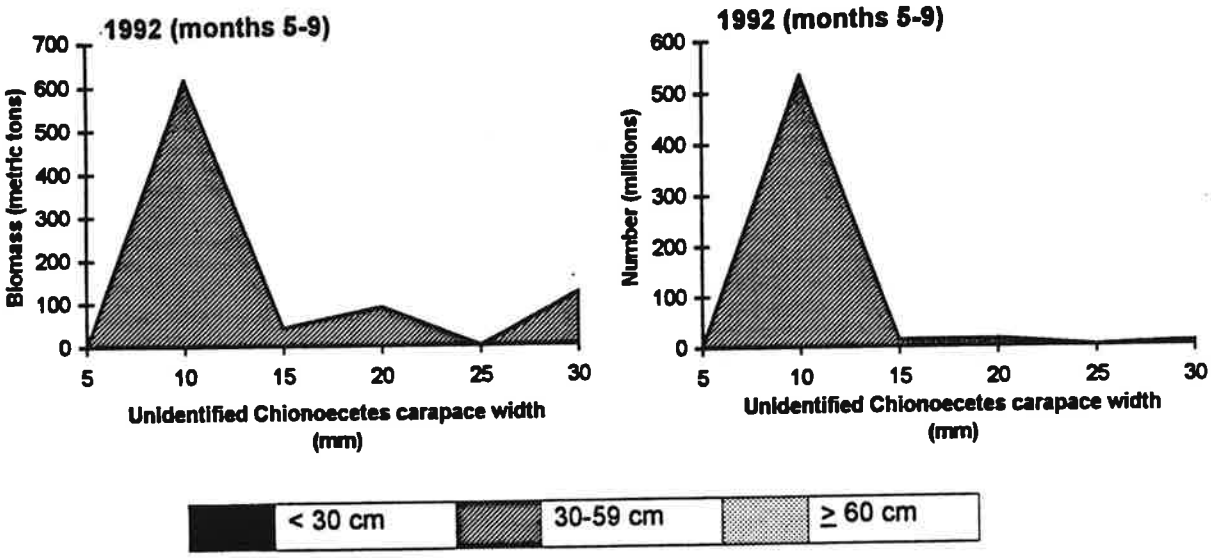

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APPENDIX G. - SKATES

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Predator size (cm)	Stratum		Biomass (metric tons)
all lengths	1		9,349
	2		9,861
	3		68,884
	4		56,209
	5		59,712
	6		173,515
		Subtotal	377,530
	Total		377,530

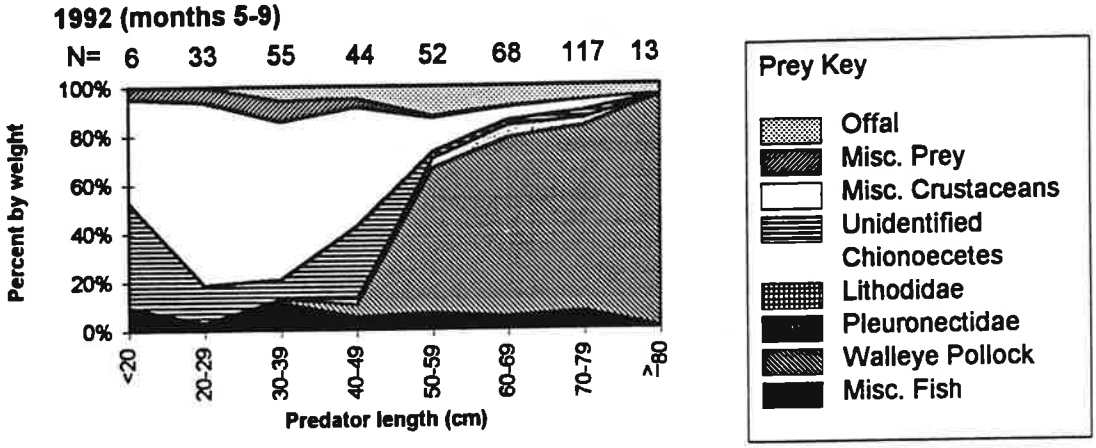


Figure G-1. -- Diet composition of skates, in terms of percent by weight, during months 5 to 9 by year and by predator size in the Bering Sea; N = number of stomachs.

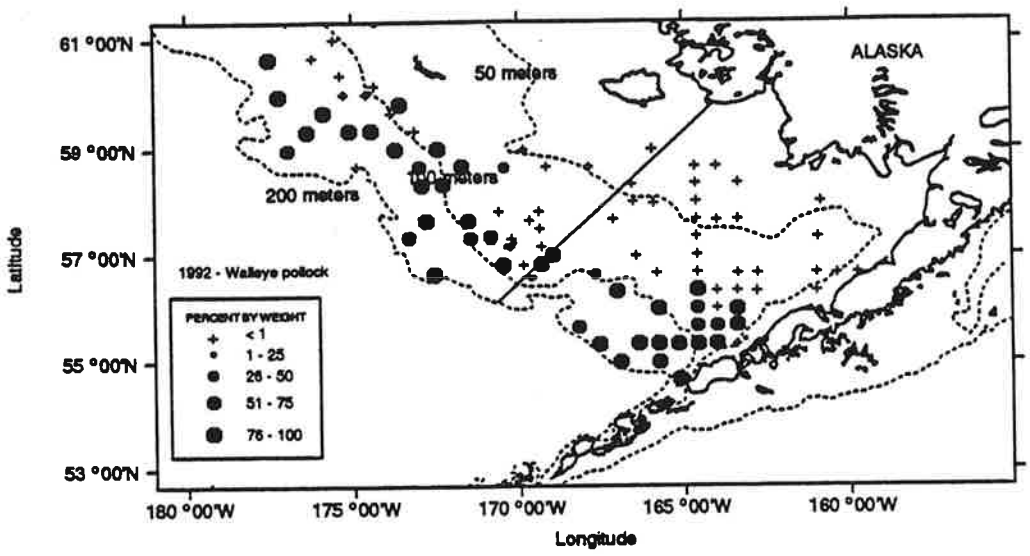
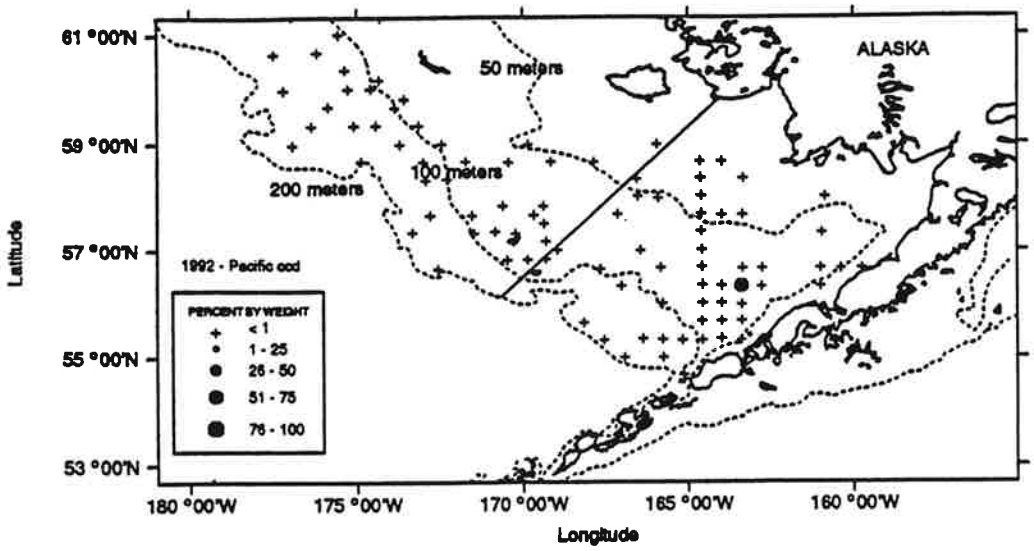


Figure G-2. -- Percent by weight of walleye pollock in the diet of skates by sampling station during months 5 to 9 in 1992 in the eastern Bering Sea.



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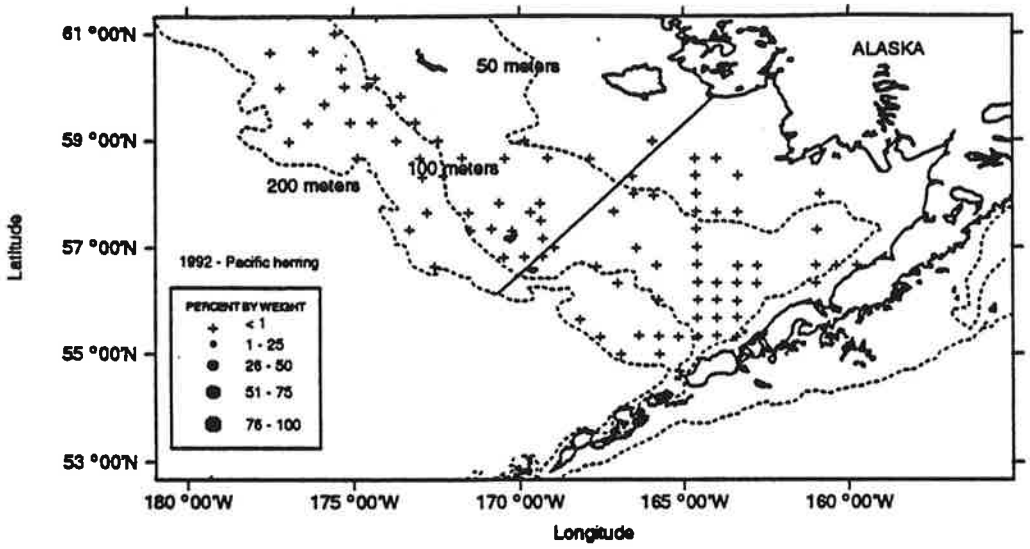

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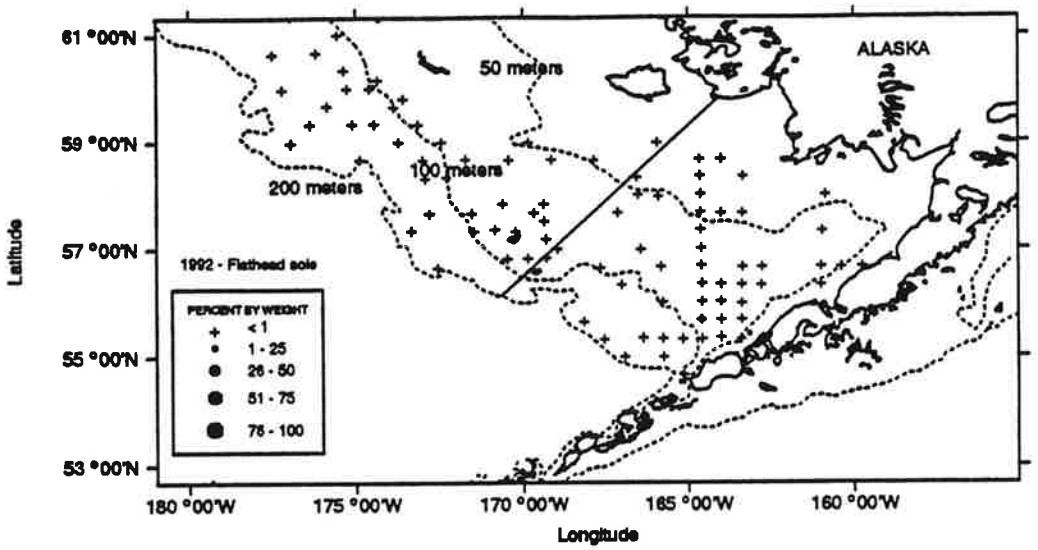
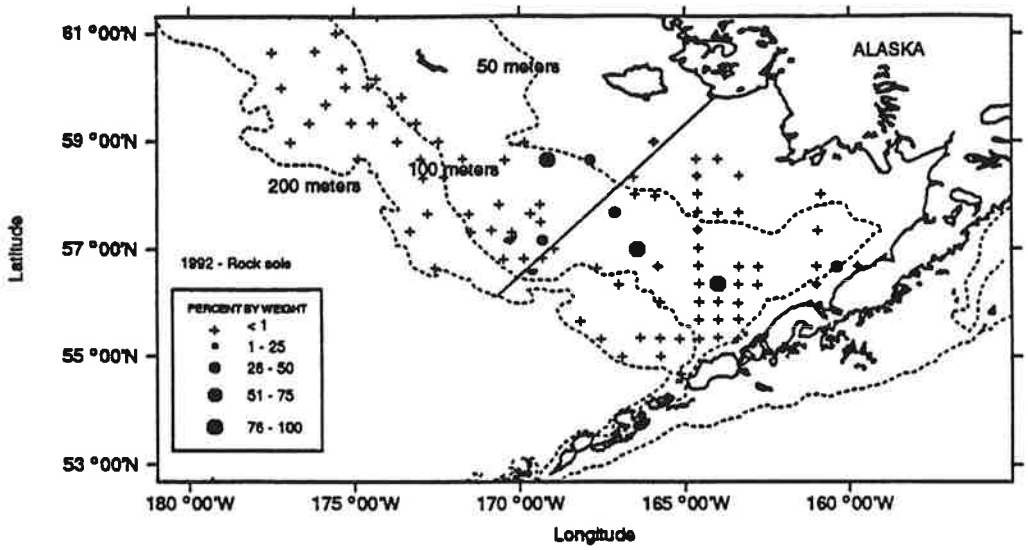


Figure G-5. -- Percent by weight of flathead sole in the diet of skates by sampling station during months 5 to 9 in 1992 in the eastern Bering Sea.



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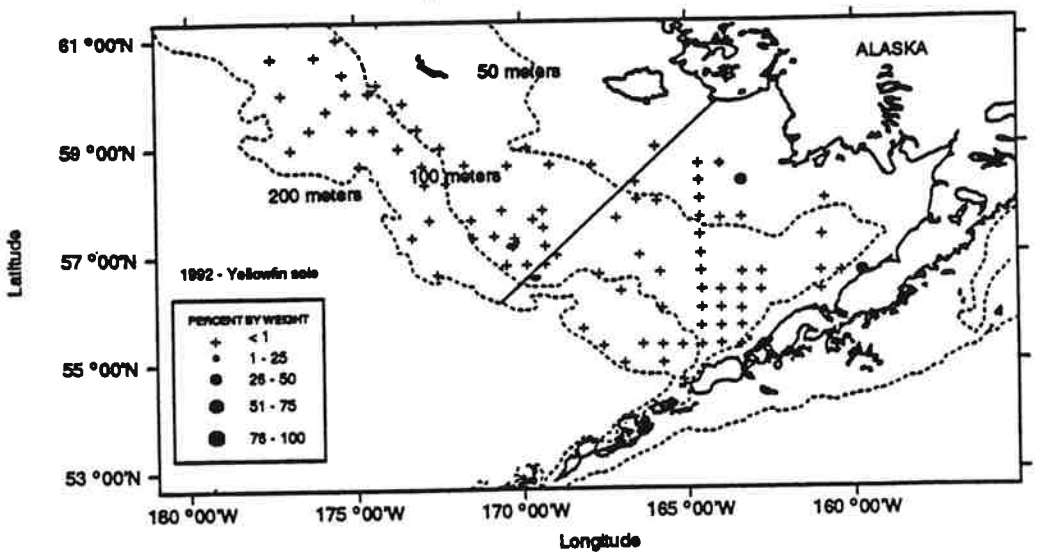

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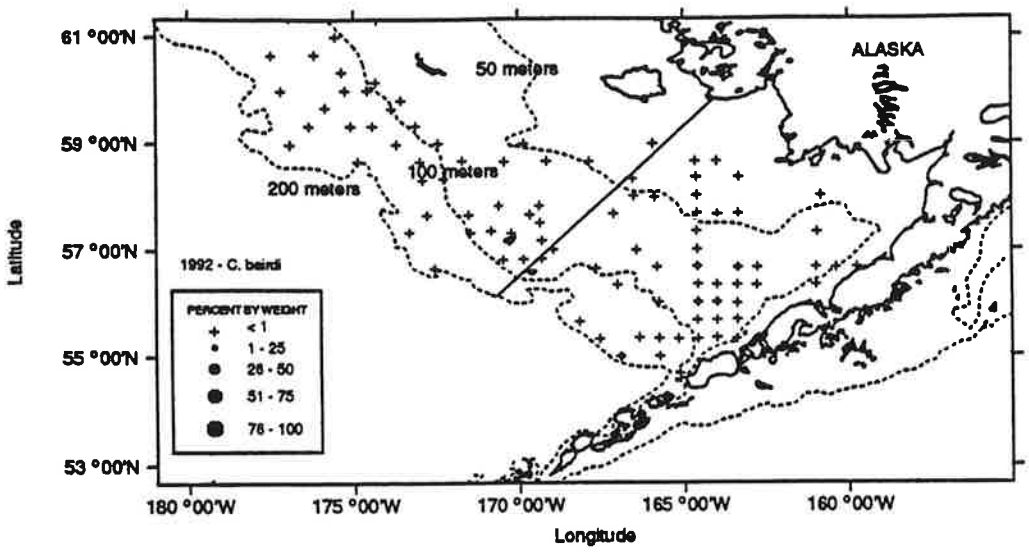
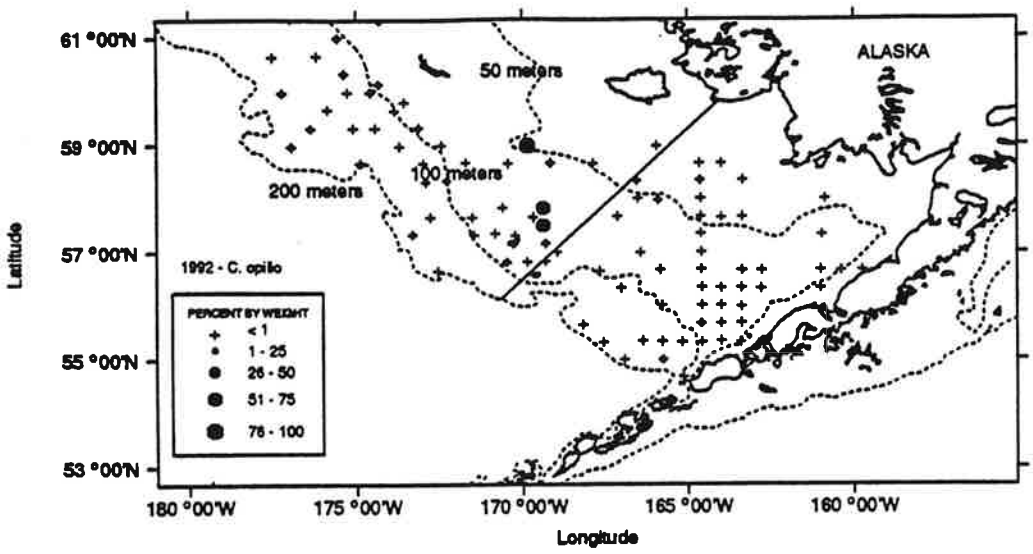


Figure G-8. -- Percent by weight of C. bairdi in the diet of skates by sampling station during months 5 to 9 in 1992 in the eastern Bering Sea.



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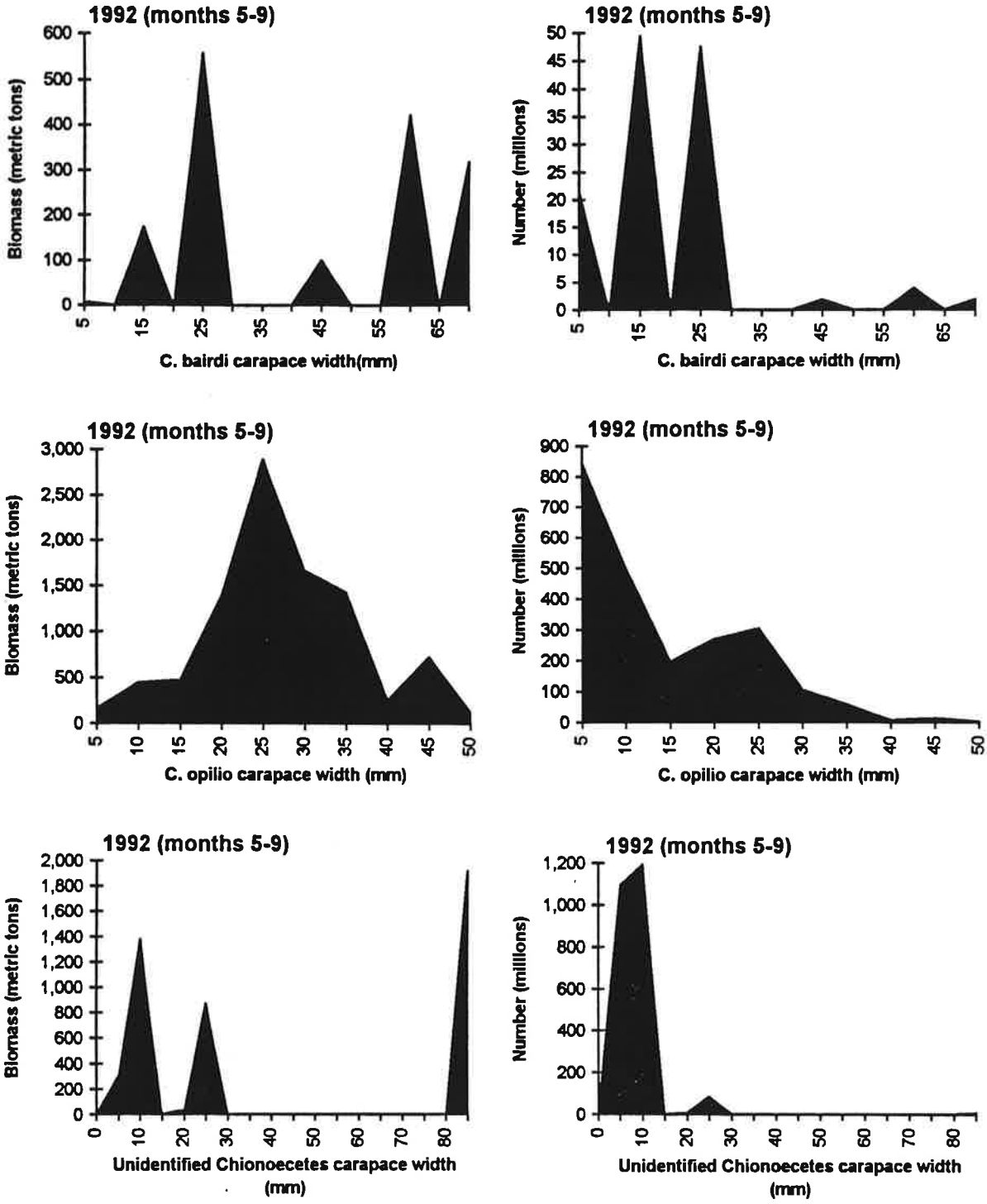

Figure G-10. -- Estimated biomass and numbers of C. opilio, C. bairdi, and unidentified Chionoecetes consumed by skates in the eastern Bering Sea in 1992 (months 5-9).

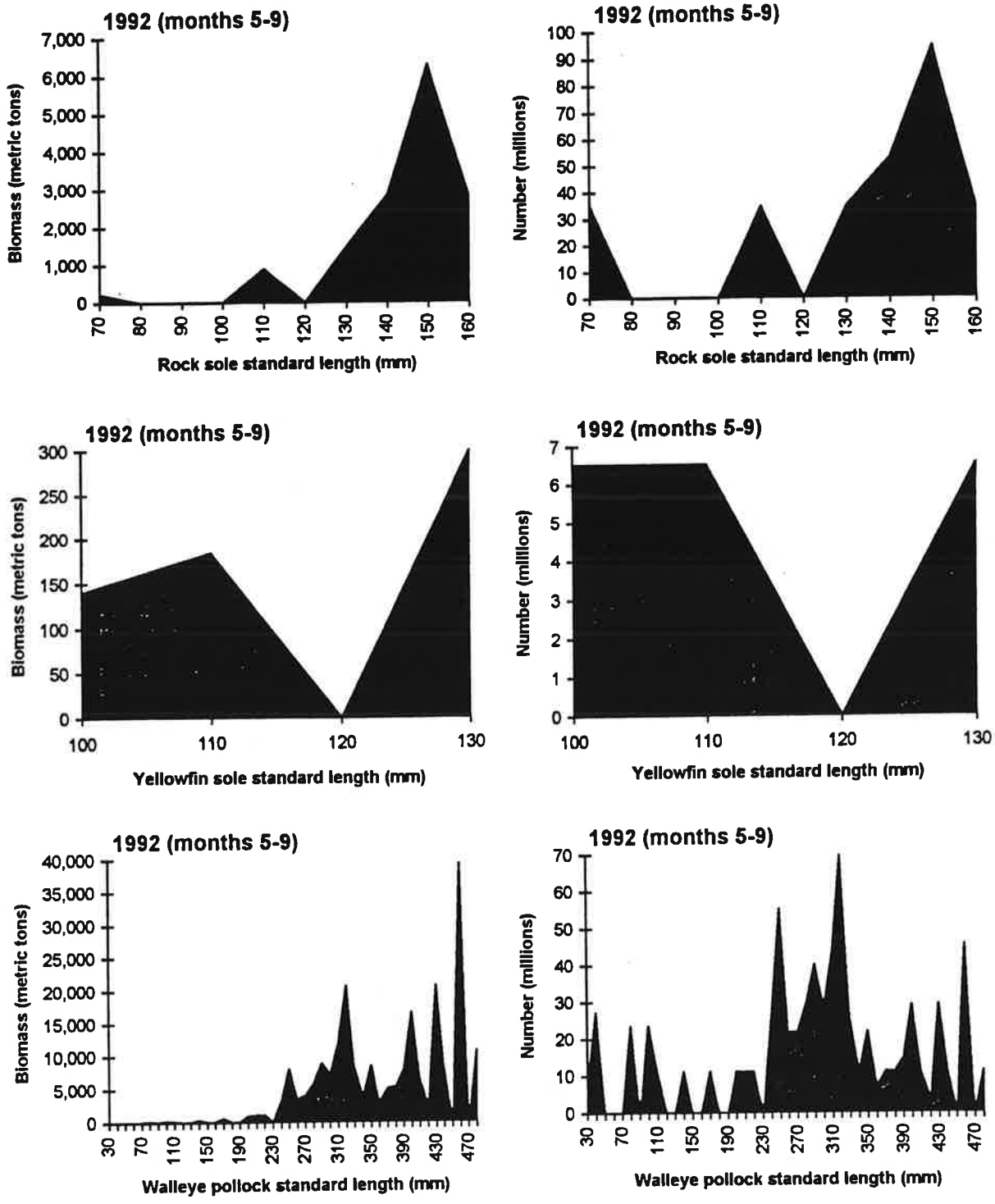

Figure G-11. -- Estimated biomass and numbers of rock sole, yellowfin sole and walleye pollock consumed by skates in the eastern Bering Sea in 1992 (months 5-9).

APPENDIX H. - DATA VALUES BY STRATUM

List of Tables

Table H-1. -- Estimates of total fish and crab prey consumption (in metric tons) by groundfish populations in the eastern Bering Sea from May through September by year, stratum, predator and predator size groups.

YEAR	STRATUM	PREDATOR	PREDATOR SIZE GROUP	PREY	% WEIGHT	SE % WEIGHT	NO. OF STATIONS	NO. OF STOMACHS	BIOMASS CONSUMED (TONS)	SE BIOMASS CONSUMED (TONS)
90	3	Pacific cod	2	Arrowtooth flounder	0.23	0.23	22	171	316.04	316.04
90	3	Pacific cod	3	Arrowtooth flounder	0.43	0.42	22	69	508.07	497.91
90	5	Pacific cod	3	Arrowtooth flounder	0.01	0.01	14	68	8.00	8.00
90	6	Pacific cod	3	Atka mackerel	1.02	1.02	27	187	3187.21	3187.21
90	3	Flathead sole	1	Bairdi Tanner crab	1.11	0.77	34	291	2128.57	1485.15
90	4	Flathead sole	1	Bairdi Tanner crab	0.09	0.06	20	184	61.82	44.38
90	5	Flathead sole	1	Bairdi Tanner crab	1.49	1.09	11	96	1430.76	1050.32
90	6	Flathead sole	1	Bairdi Tanner crab	2.58	1.72	17	131	7515.46	5007.21
90	4	Pacific cod	1	Bairdi Tanner crab	0.05	0.05	22	141	33.67	33.67
90	3	Pacific cod	2	Bairdi Tanner crab	4.61	1.75	22	171	6327.08	2404.67
90	4	Pacific cod	2	Bairdi Tanner crab	0.89	0.57	25	155	1216.93	785.22
90	5	Pacific cod	2	Bairdi Tanner crab	24.74	10.62	10	27	5602.47	2405.91
90	6	Pacific cod	2	Bairdi Tanner crab	3.99	2.47	24	72	5041.51	3128.48
90	3	Pacific cod	3	Bairdi Tanner crab	5.23	2.78	22	69	6207.00	3304.99
90	4	Pacific cod	3	Bairdi Tanner crab	3.48	2.85	20	65	2788.01	2287.54
90	5	Pacific cod	3	Bairdi Tanner crab	11.55	5.75	14	68	7440.82	3704.73
90	6	Pacific cod	3	Bairdi Tanner crab	4.08	3.08	27	187	12722.08	9606.93
90	5	Pacific halibut	2	Bairdi Tanner crab	2.94	2.94	3	4	9.85	9.85
90	1	Pacific halibut	3	Bairdi Tanner crab	4.56	3.32	6	9	329.32	239.75
90	5	Pacific halibut	3	Bairdi Tanner crab	13.8	8.41	7	20	698.83	425.80
90	6	Pacific halibut	3	Bairdi Tanner crab	0.22	0.22	8	17	20.39	20.39
90	6	Rock sole	1	Bairdi Tanner crab	0.16	0.16	8	36	111.87	111.87
90	3	Yellowfin sole	1	Bairdi Tanner crab	0.24	0.24	26	214	1243.73	1243.73
90	4	Yellowfin sole	1	Bairdi Tanner crab	1.2	0.62	27	219	2501.91	1298.23
90	6	Flathead sole	1	Flathead sole	1.09	1.09	17	131	3183.58	3183.58
90	6	Pacific cod	2	Flathead sole	1.08	0.62	24	72	1361.96	783.80
90	1	Pacific cod	3	Flathead sole	0.72	0.72	11	25	206.43	206.43
90	3	Pacific cod	3	Flathead sole	0.36	0.27	22	69	422.47	319.89
90	5	Pacific cod	3	Flathead sole	2.1	0.99	14	68	1352.54	639.63
90	6	Pacific cod	3	Flathead sole	0.26	0.26	27	187	797.94	797.94
90	3	Arrowtooth flounder	2	Gadidae	23.97	10.43	8	27	13180.47	5734.81
90	4	Arrowtooth flounder	2	Gadidae	13.56	5.88	7	49	1989.32	862.84
90	5	Arrowtooth flounder	2	Gadidae	17.29	12.15	8	40	13521.66	9501.22

Table H-1 (continued). -- Estimates of total fish and crab prey consumption (in metric tons) by groundfish populations in the eastern Bering Sea from May through September by year, stratum, predator and predator size groups.

YEAR	STRATUM	PREDATOR	PREDATOR SIZE GROUP	PREY	% WEIGHT	SE % WEIGHT	NO. OF STATIONS	NO. OF STOMACHS	BIOMASS CONSUMED (TONS)	SE BIOMASS CONSUMED (TONS)
90	6	Arrowtooth flounder	2	Gadidae	18.95	8.89	11	45	9623.14	4512.03
90	4	Arrowtooth flounder	3	Gadidae	5.3	5.3	4	17	169.01	169.01
90	5	Arrowtooth flounder	3	Gadidae	12.58	5.53	8	25	11166.72	4905.40
90	6	Arrowtooth flounder	3	Gadidae	10.87	6.18	16	63	16175.36	9194.70
90	3	Flathead sole	1	Gadidae	0.81	0.48	34	291	1552.50	924.28
90	4	Flathead sole	1	Gadidae	5.81	2.82	20	184	3988.70	1931.53
90	6	Flathead sole	1	Gadidae	1.08	1.08	17	131	3152.62	3152.62
90	6	Greenland turbot	3	Gadidae	3.86	3.86	2	3	282.86	282.86
90	2	Pacific cod	1	Gadidae	0.14	0.14	7	55	16.29	16.29
90	4	Pacific cod	1	Gadidae	0.83	0.69	22	141	552.29	460.06
90	1	Pacific cod	2	Gadidae	0.5	0.5	13	63	168.22	168.22
90	3	Pacific cod	2	Gadidae	2.63	1.52	22	171	3610.82	2084.29
90	4	Pacific cod	2	Gadidae	2.11	1	25	155	2884.00	1366.03
90	5	Pacific cod	2	Gadidae	7.69	7.37	10	27	1741.33	1669.91
90	6	Pacific cod	2	Gadidae	11.69	4.34	24	72	14784.36	5485.32
90	1	Pacific cod	3	Gadidae	1.51	1.08	11	25	434.47	309.76
90	2	Pacific cod	3	Gadidae	0.26	0.22	9	19	42.80	36.34
90	3	Pacific cod	3	Gadidae	2.63	1.3	22	69	3125.25	1540.00
90	4	Pacific cod	3	Gadidae	3.49	1.59	20	65	2803.41	1272.37
90	5	Pacific cod	3	Gadidae	1.28	0.65	14	68	821.10	420.06
90	6	Pacific cod	3	Gadidae	3.95	1.16	27	187	12330.52	3603.59
90	1	Pacific halibut	1	Gadidae	0.51	0.51	8	44	31.21	31.21
90	1	Pacific halibut	2	Gadidae	0.88	0.88	11	66	104.43	104.43
90	1	Pacific halibut	3	Gadidae	0.02	0.02	6	9	1.57	1.57
90	2	Pacific halibut	3	Gadidae	0.28	0.18	6	7	4.52	2.87
90	6	Pacific halibut	3	Gadidae	0.22	0.22	8	17	19.78	19.78
90	1	Walleye pollock	1	Gadidae	4.01	4.01	23	167	774.61	774.61
90	4	Walleye pollock	1	Gadidae	0.14	0.14	15	98	88.20	88.20
90	3	Walleye pollock	2	Gadidae	2.69	2.69	6	8	499.74	499.74
90	3	Walleye pollock	3	Gadidae	4.35	4.35	23	87	18168.20	18168.20
90	4	Walleye pollock	3	Gadidae	0.03	0.03	16	64	59.90	59.90
90	5	Walleye pollock	3	Gadidae	0.38	0.38	17	91	987.75	987.75
90	6	Walleye pollock	3	Gadidae	1	0.32	35	383	33715.96	10853.87

Table H-1 (continued). -- Estimates of total fish and crab prey consumption (in metric tons) by groundfish populations in the eastern Bering Sea from May through September by year, stratum, predator and predator size groups.

YEAR	STRATUM	PREDATOR	PREDATOR SIZE GROUP	PREY	% WEIGHT	SE % WEIGHT	NO. OF STATIONS	NO. OF STOMACHS	BIOMASS CONSUMED (TONS)	SE BIOMASS CONSUMED (TONS)
90	1	Walleye pollock	4	Gadidae	0.44	0.35	34	291	313.97	249.55
90	2	Walleye pollock	4	Gadidae	3.83	2.29	12	69	613.83	368.09
90	3	Walleye pollock	4	Gadidae	0.64	0.33	45	516	2492.60	1293.27
90	4	Walleye pollock	4	Gadidae	2.63	1.06	37	313	11400.97	4594.32
90	5	Walleye pollock	4	Gadidae	4.17	2.3	17	151	7772.97	4288.98
90	6	Walleye pollock	4	Gadidae	7.64	3.76	30	149	57495.83	28282.24
90	4	Yellowfin sole	1	Gadidae	0.59	0.59	27	219	1231.07	1231.07
90	6	Yellowfin sole	1	Gadidae	1.16		1	2	0.26	
90	2	Walleye pollock	1	Greenland turbot	0.05	0.05	7	72	2.24	2.24
90	4	Walleye pollock	1	Greenland turbot	0.18	0.18	15	98	108.68	108.68
90	3	Walleye pollock	3	Greenland turbot	0.06	0.06	23	87	258.18	258.18
90	4	Walleye pollock	3	Greenland turbot	1.85	1.53	16	64	4012.91	3319.54
90	6	Walleye pollock	3	Greenland turbot	0	0	35	383	76.63	76.63
90	2	Walleye pollock	4	Greenland turbot	0.06	0.04	12	69	9.80	6.62
90	3	Walleye pollock	4	Greenland turbot	0.01	0.01	45	516	33.14	33.14
90	4	Walleye pollock	4	Greenland turbot	1.94	1.1	37	313	8420.83	4797.97
90	1	Pacific cod	2	Lithodidae	0.03	0.03	13	63	1.90	1.90
90	4	Pacific cod	2	Lithodidae	3.07	3.07	25	155	849.69	849.69
90	3	Pacific cod	3	Lithodidae	0	0	22	69	0.54	0.54
90	6	Arrowtooth flounder	2	Offal	6.89	6.38	11	45	3497.7	3240.2
90	6	Arrowtooth flounder	3	Offal	11.99	6.77	16	63	17852.49	10079.54
90	3	Flathead sole	1	Offal	0.09	0.09	34	291	164.52	164.52
90	6	Flathead sole	1	Offal	9.78	6.71	17	131	28491.74	19566.27
90	6	Pacific cod	1	Offal	25	25	4	6	1839.67	1839.67
90	1	Pacific cod	2	Offal	3.44	3.37	13	63	1150.65	1128.91
90	2	Pacific cod	2	Offal	4.16	4.16	6	10	294.03	294.03
90	3	Pacific cod	2	Offal	0.01	0.01	22	171	20.45	20.45
90	4	Pacific cod	2	Offal	0.48	0.41	25	155	660.77	557.67
90	6	Pacific cod	2	Offal	15.62	5.61	24	72	19747.76	7095.83
90	1	Pacific cod	3	Offal	4.45	3.41	11	25	1282.57	980.57
90	3	Pacific cod	3	Offal	3.96	2.83	22	69	4704.79	3360.07
90	4	Pacific cod	3	Offal	9.67	5.44	20	65	7758.6	4362.1
90	5	Pacific cod	3	Offal	0.25	0.18	14	68	164.19	115.04

Table H-1 (continued). -- Estimates of total fish and crab prey consumption (in metric tons) by groundfish populations in the eastern Bering Sea from May through September by year, stratum, predator and predator size groups.

YEAR	STRATUM	PREDATOR	PREDATOR SIZE GROUP	PREY	% WEIGHT	SE % WEIGHT	NO. OF STATIONS	NO. OF STOMACHS	BIOMASS CONSUMED (TONS)	SE BIOMASS CONSUMED (TONS)
90	6	Pacific cod	3	Offal	15.77	3.65	27	187	49165.51	11382.7
90	1	Pacific halibut	2	Offal	0.29	0.29	11	66	34.23	34.23
90	3	Pacific halibut	3	Offal	3.03	2.02	7	15	247.5	165.16
90	5	Pacific halibut	3	Offal	9.02	9.02	7	20	456.67	456.67
90	6	Pacific halibut	3	Offal	3.16	3.16	8	17	290.3	290.3
90	6	Walleye pollock	2	Offal	1.06	0.79	27	117	22400.6	16740.8
90	4	Walleye pollock	3	Offal	1.03	0.71	16	64	2228.7	1529.85
90	6	Walleye pollock	3	Offal	0.33	0.26	35	383	10985.45	8671.66
90	5	Walleye pollock	4	Offal	0.01	0.01	17	151	18.89	18.89
90	6	Walleye pollock	4	Offal	1.26	0.87	30	149	9483.5	6533.56
90	5	Yellowfin sole	1	Offal	24.33		1	7	114.19	
90	3	Alaska plaice	1	Opilio snow crab	0.77	0.61	14	94	815.25	642.86
90	4	Alaska plaice	1	Opilio snow crab	2.67	2.67	16	61	4719.55	4719.55
90	3	Flathead sole	1	Opilio snow crab	0.69	0.59	34	291	1329.64	1129.88
90	4	Flathead sole	1	Opilio snow crab	0.89	0.59	20	184	611.18	405.36
90	6	Flathead sole	1	Opilio snow crab	0.95	0.95	17	131	2773.03	2773.03
90	4	Pacific cod	1	Opilio snow crab	3.23	1.62	22	141	2139.96	1072.69
90	2	Pacific cod	2	Opilio snow crab	16.17	16.17	6	10	1142.68	1142.68
90	3	Pacific cod	2	Opilio snow crab	10.26	4.27	22	171	14086.65	5862.51
90	4	Pacific cod	2	Opilio snow crab	23.62	6.02	25	155	32283.79	8228.11
90	5	Pacific cod	2	Opilio snow crab	0.43	0.31	10	27	97.19	69.70
90	6	Pacific cod	2	Opilio snow crab	3.29	1.72	24	72	4166.10	2178.87
90	1	Pacific cod	3	Opilio snow crab	7.32	5.18	11	25	2107.82	1492.75
90	2	Pacific cod	3	Opilio snow crab	25.29	8.84	9	19	4176.55	1460.15
90	3	Pacific cod	3	Opilio snow crab	7.83	4.27	22	69	9302.42	5069.56
90	4	Pacific cod	3	Opilio snow crab	40.15	7.97	20	65	32206.50	6389.96
90	5	Pacific cod	3	Opilio snow crab	5.52	3.7	14	68	3552.13	2380.73
90	6	Pacific cod	3	Opilio snow crab	4.09	2.39	27	187	12757.91	7437.35
90	3	Pacific halibut	2	Opilio snow crab	1.7	1.7	6	16	90.71	90.71
90	3	Pacific halibut	3	Opilio snow crab	14.67	11.52	7	15	1196.57	939.61
90	4	Pacific halibut	3	Opilio snow crab	15.74	15.74	6	7	549.54	549.54
90	5	Pacific halibut	3	Opilio snow crab	5.25	5.25	7	20	265.80	265.80
90	6	Pacific halibut	3	Opilio snow crab	3.14	3.14	8	17	288.57	288.57

Table H-1 (continued). -- Estimates of total fish and crab prey consumption (in metric tons) by groundfish populations in the eastern Bering Sea from May through September by year, stratum, predator and predator size groups.

YEAR	STRATUM	PREDATOR	PREDATOR SIZE GROUP	PREY	% WEIGHT	SE % WEIGHT	NO. OF STATIONS	NO. OF STOMACHS	BIOMASS CONSUMED (TONS)	SE BIOMASS CONSUMED (TONS)
90	4	Rock sole	1	Opilio snow crab	0.47	0.47	8	39	1769.58	1769.58
90	4	Walleye pollock	4	Opilio snow crab	0.1	0.1	37	313	444.10	444.10
90	2	Yellowfin sole	1	Opilio snow crab	0.11	0.07	14	128	303.48	189.98
90	3	Yellowfin sole	1	Opilio snow crab	1.36	0.97	26	214	6957.05	4960.46
90	4	Yellowfin sole	1	Opilio snow crab	4.27	1.95	27	219	8914.17	4066.76
90	5	Yellowfin sole	1	Opilio snow crab	0.2		1	7	0.96	
90	1	Flathead sole	1	Osmerids	3.6	3.6	16	97	854.00	854.00
90	4	Flathead sole	1	Osmerids	2.48	1.8	20	184	1698.27	1236.86
90	1	Pacific cod	2	Osmerids	9.16	6.24	13	63	3065.07	2087.47
90	2	Pacific cod	2	Osmerids	3.96	3.96	6	10	279.60	279.60
90	2	Pacific halibut	2	Osmerids	1.37	1.37	7	30	43.27	43.27
90	2	Pacific halibut	3	Osmerids	16.52	16.52	6	7	266.61	266.61
90	1	Walleye pollock	4	Osmerids	3.33	2.54	34	291	2404.00	1829.15
90	3	Walleye pollock	4	Osmerids	0.17	0.17	45	516	674.14	674.14
90	5	Pacific cod	3	Pacific cod	0.12	0.12	14	68	80.41	80.41
90	6	Pacific cod	3	Pacific cod	0.05	0.04	27	187	152.96	115.65
90	6	Walleye pollock	3	Pacific cod	0.52	0.41	35	383	17445.07	13916.34
90	1	Walleye pollock	4	Pacific cod	1.14	1.14	34	291	822.86	822.86
90	4	Walleye pollock	4	Pacific cod	0	0	37	313	12.66	12.66
90	6	Walleye pollock	4	Pacific cod	3.19	2.38	30	149	24020.24	17880.87
90	6	Pacific cod	3	Pacific herring	0.08	0.08	27	187	259.68	251.68
90	1	Rock sole	1	Pacific herring	0.72	0.72	27	202	5844.07	5844.07
90	1	Walleye pollock	4	Pacific herring	0.09	0.09	34	291	67.72	64.39
90	2	Walleye pollock	4	Pacific herring	0.94	0.94	12	69	150.15	150.15
90	4	Walleye pollock	4	Pacific herring	1.24	0.57	37	313	5364.39	2459.17
90	6	Walleye pollock	4	Pacific herring	0.63	0.63	30	149	4724.06	4724.06
90	3	Pacific cod	3	Paralithodes sp.	1.51	1.51	22	69	362.28	362.28
90	6	Walleye pollock	3	Paralithodes sp.	0	0	35	383	7.56	7.56
90	3	Arrowtooth flounder	3	Pleuronectidae	16.67	16.67	6	8	5385.70	5385.70
90	4	Arrowtooth flounder	3	Pleuronectidae	6.48	6.48	4	17	206.73	206.73
90	6	Arrowtooth flounder	3	Pleuronectidae	0.97	0.79	16	63	1450.05	1176.66
90	3	Flathead sole	1	Pleuronectidae	0.12	0.12	34	291	226.01	226.01
90	4	Flathead sole	1	Pleuronectidae	0.21	0.21	20	184	143.19	143.19

Table H-1 (continued). -- Estimates of total fish and crab prey consumption (in metric tons) by groundfish populations in the eastern Bering Sea from May through September by year, stratum, predator and predator size groups.

YEAR	STRATUM	PREDATOR	PREDATOR SIZE GROUP	PREY	% WEIGHT	SE % WEIGHT	NO. OF STATIONS	NO. OF STOMACHS	BIOMASS CONSUMED (TONS)	SE BIOMASS CONSUMED (TONS)
90	4	Pacific cod	1	Pleuronectidae	1.86	1.86	22	141	1233.68	1233.68
90	6	Pacific cod	1	Pleuronectidae	8.75	8.75	4	6	643.89	643.89
90	2	Pacific cod	2	Pleuronectidae	7.17	7.17	6	10	506.55	506.55
90	3	Pacific cod	2	Pleuronectidae	2.22	1.59	22	171	3040.48	2187.25
90	4	Pacific cod	2	Pleuronectidae	0.59	0.47	25	155	801.58	643.61
90	5	Pacific cod	2	Pleuronectidae	0.04	0.04	10	27	9.78	9.78
90	6	Pacific cod	2	Pleuronectidae	0.14	0.13	24	72	182.12	158.86
90	1	Pacific cod	3	Pleuronectidae	13.19	7.85	11	25	3799.28	2260.90
90	2	Pacific cod	3	Pleuronectidae	9.33	7.74	9	19	1541.04	1277.87
90	3	Pacific cod	3	Pleuronectidae	2.71	1.3	22	69	3222.36	1541.95
90	4	Pacific cod	3	Pleuronectidae	0.19	0.13	20	65	151.16	103.34
90	5	Pacific cod	3	Pleuronectidae	4.93	2.72	14	68	3174.84	1752.93
90	6	Pacific cod	3	Pleuronectidae	0.46	0.44	27	187	1420.47	1363.50
90	1	Pacific halibut	3	Pleuronectidae	17.45	9.62	6	9	1261.36	695.67
90	4	Pacific halibut	3	Pleuronectidae	0.69	0.69	6	7	23.99	23.99
90	1	Walleye pollock	1	Pleuronectidae	1.16	1.16	23	167	223.78	223.78
90	1	Walleye pollock	4	Pleuronectidae	0.02	0.02	34	291	16.20	14.40
90	3	Walleye pollock	4	Pleuronectidae	0.14	0.1	45	516	537.38	373.82
90	4	Walleye pollock	4	Pleuronectidae	1.48	1.32	37	313	6432.71	5715.76
90	5	Walleye pollock	4	Pleuronectidae	0.07	0.07	17	151	133.58	133.58
90	5	Yellowfin sole	1	Pleuronectidae	4.3		1	7	20.17	
90	3	Pacific cod	3	Red King crab	1.45	1.45	22	69	348.16	348.16
90	3	Pacific cod	2	Rock sole	0.33	0.33	22	171	450.56	450.56
90	1	Pacific cod	3	Rock sole	2.17	1.46	11	25	624.56	419.16
90	2	Pacific cod	3	Rock sole	11.66	8.73	9	19	1924.57	1441.79
90	3	Pacific cod	3	Rock sole	2.6	1.49	22	69	3086.75	1768.89
90	1	Walleye pollock	4	Rock sole	0.04	0.04	34	291	30.62	30.62
90	2	Walleye pollock	4	Rock sole	1.04	1.04	12	69	166.17	166.17
90	4	Walleye pollock	4	Rock sole	0	0	37	313	13.38	13.38
90	6	Walleye pollock	4	Rock sole	0	0	30	149	12.48	12.48
90	4	Walleye pollock	4	ROCKFISH	0	0	37	313	3.88	3.88
90	4	Alaska plaice	1	Unid. chionoecetes	1.19	0.71	16	61	2094.62	1247.33
90	3	Flathead sole	1	Unid. chionoecetes	0.58	0.25	34	291	1123.30	472.12

Table H-1 (continued). -- Estimates of total fish and crab prey consumption (in metric tons) by groundfish populations in the eastern Bering Sea from May through September by year, stratum, predator and predator size groups.

YEAR	STRATUM	PREDATOR	PREDATOR SIZE GROUP	PREY	% WEIGHT	SE % WEIGHT	NO. OF STATIONS	NO. OF STOMACHS	BIOMASS CONSUMED (TONS)	SE BIOMASS CONSUMED (TONS)
90	4	Flathead sole	1	Unid. chionoecetes	1.46	0.61	20	184	1003.64	416.05
90	5	Flathead sole	1	Unid. chionoecetes	1.03	1.03	11	96	987.51	987.51
90	6	Flathead sole	1	Unid. chionoecetes	2.7	1.72	17	131	7863.78	5025.57
90	2	Pacific cod	1	Unid. chionoecetes	15.75	13.56	7	55	1809.69	1558.12
90	3	Pacific cod	1	Unid. chionoecetes	0.19	0.19	8	16	23.48	23.48
90	4	Pacific cod	1	Unid. chionoecetes	6.79	3.06	22	141	4501.77	2030.64
90	2	Pacific cod	2	Unid. chionoecetes	0.07	0.07	6	10	4.70	4.70
90	3	Pacific cod	2	Unid. chionoecetes	1.81	1.04	22	171	2488.73	1430.06
90	4	Pacific cod	2	Unid. chionoecetes	4.42	1.81	25	155	6035.48	2479.49
90	5	Pacific cod	2	Unid. chionoecetes	14.21	5.33	10	27	3218.92	1207.04
90	6	Pacific cod	2	Unid. chionoecetes	2.64	1.27	24	72	3340.81	1604.70
90	1	Pacific cod	3	Unid. chionoecetes	5.47	4.71	11	25	1574.21	1356.66
90	2	Pacific cod	3	Unid. chionoecetes	1.38	0.98	9	19	227.38	162.33
90	3	Pacific cod	3	Unid. chionoecetes	3.34	1.93	22	69	3963.31	2289.28
90	4	Pacific cod	3	Unid. chionoecetes	2.84	1.5	20	65	2276.67	1199.99
90	5	Pacific cod	3	Unid. chionoecetes	8.62	2.57	14	68	5550.42	1653.71
90	6	Pacific cod	3	Unid. chionoecetes	0.35	0.12	27	187	1079.67	371.10
90	1	Pacific halibut	2	Unid. chionoecetes	6.48	6.48	11	66	765.61	765.61
90	3	Pacific halibut	3	Unid. chionoecetes	0.17	0.17	7	15	14.24	14.24
90	3	Rock sole	1	Unid. chionoecetes	0.63	0.34	24	149	351.45	187.68
90	4	Rock sole	1	Unid. chionoecetes	3.99	3.63	8	39	15106.43	13740.76
90	5	Rock sole	1	Unid. chionoecetes	0.05	0.05	2	10	1.51	1.51
90	4	Walleye pollock	3	Unid. chionoecetes	6.25	6.25	16	64	13555.88	13555.88
90	6	Walleye pollock	3	Unid. chionoecetes	0.01	0.01	35	383	330.72	330.72
90	2	Walleye pollock	4	Unid. chionoecetes	0.99	0.99	12	69	158.91	158.91
90	4	Walleye pollock	4	Unid. chionoecetes	1.25	0.72	37	313	5423.78	3112.48
90	1	Yellowfin sole	1	Unid. chionoecetes	0.14	0.14	33	299	905.16	905.16
90	2	Yellowfin sole	1	Unid. chionoecetes	0.68	0.67	14	128	1911.29	1868.75
90	3	Yellowfin sole	1	Unid. chionoecetes	4.02	1.91	26	214	20520.37	9761.96
90	4	Yellowfin sole	1	Unid. chionoecetes	11.22	3.7	27	219	23422.03	7717.68
90	3	Arrowtooth flounder	2	Walleye pollock	19.61	10.11	8	27	10785.04	5559.35
90	4	Arrowtooth flounder	2	Walleye pollock	81.6	5.58	7	49	11972.81	818.52
90	5	Arrowtooth flounder	2	Walleye pollock	45.13	17.2	8	40	35299.73	13455.52

Table H-1 (continued). -- Estimates of total fish and crab prey consumption (in metric tons) by groundfish populations in the eastern Bering Sea from May through September by year, stratum, predator and predator size groups.

YEAR	STRATUM	PREDATOR	PREDATOR SIZE GROUP	PREY	% WEIGHT	SE % WEIGHT	NO. OF STATIONS	NO. OF STOMACHS	BIOMASS CONSUMED (TONS)	SE BIOMASS CONSUMED (TONS)
90	6	Arrowtooth flounder	2	Walleye pollock	52.37	11.38	11	45	26592.82	5779.05
90	3	Arrowtooth flounder	3	Walleye pollock	66.46	21.02	6	8	21475.49	6791.45
90	4	Arrowtooth flounder	3	Walleye pollock	54.05	20.82	4	17	1724.40	664.12
90	5	Arrowtooth flounder	3	Walleye pollock	61.72	14.4	8	25	54776.87	12783.66
90	6	Arrowtooth flounder	3	Walleye pollock	57.28	10.4	16	63	85269.11	15482.25
90	1	Flathead sole	1	Walleye pollock	10.02	5.54	16	97	2378.63	1315.73
90	3	Flathead sole	1	Walleye pollock	20.41	5.62	34	291	39215.94	10801.25
90	4	Flathead sole	1	Walleye pollock	54.24	7.55	20	184	37213.61	5178.96
90	5	Flathead sole	1	Walleye pollock	0.5	0.5	11	96	478.95	478.95
90	6	Flathead sole	1	Walleye pollock	4.44	3.69	17	131	12925.40	10757.40
90	6	Greenland turbot	1	Walleye pollock	100	0	2	2	535.19	0.00
90	6	Greenland turbot	3	Walleye pollock	95.22	4.78	2	3	6981.24	350.52
90	4	Pacific cod	1	Walleye pollock	9.44	4.2	22	141	6257.05	2781.48
90	1	Pacific cod	2	Walleye pollock	4.26	2.8	13	63	1425.25	936.05
90	2	Pacific cod	2	Walleye pollock	20.17	13.22	6	10	1425.41	934.57
90	3	Pacific cod	2	Walleye pollock	4.67	2.36	22	171	6408.83	3238.61
90	4	Pacific cod	2	Walleye pollock	19.29	5.44	25	155	26362.94	7432.83
90	5	Pacific cod	2	Walleye pollock	5.73	4.18	10	27	1297.60	946.17
90	6	Pacific cod	2	Walleye pollock	18.75	5.96	24	72	23713.45	7537.89
90	1	Pacific cod	3	Walleye pollock	9.37	7.53	11	25	2698.72	2169.26
90	2	Pacific cod	3	Walleye pollock	12.67	11.03	9	19	2091.61	1820.56
90	3	Pacific cod	3	Walleye pollock	53.25	9.28	22	69	63236.18	11018.71
90	4	Pacific cod	3	Walleye pollock	15.42	6.32	20	65	12367.09	5066.39
90	5	Pacific cod	3	Walleye pollock	47.55	10.95	14	68	30619.26	7049.60
90	6	Pacific cod	3	Walleye pollock	60.13	6.21	27	187	187494.60	19352.43
90	1	Pacific halibut	1	Walleye pollock	1.57	1.57	8	44	95.39	95.39
90	2	Pacific halibut	1	Walleye pollock	14.44	10.11	5	17	140.72	98.58
90	1	Pacific halibut	2	Walleye pollock	14.94	5.32	11	66	1764.51	628.40
90	2	Pacific halibut	2	Walleye pollock	39.27	12.11	7	30	1240.71	382.50
90	3	Pacific halibut	2	Walleye pollock	29.41	18.25	6	16	1571.42	975.21
90	4	Pacific halibut	2	Walleye pollock	75.1	12.14	5	8	2399.30	387.79
90	5	Pacific halibut	2	Walleye pollock	33.33	33.33	3	4	111.69	111.69
90	6	Pacific halibut	2	Walleye pollock	100	0	2	2	771.12	0.00

Table H-1 (continued). -- Estimates of total fish and crab prey consumption (in metric tons) by groundfish populations in the eastern Bering Sea from May through September by year, stratum, predator and predator size groups.

YEAR	STRATUM	PREDATOR	PREDATOR SIZE GROUP	PREY	% WEIGHT	SE % WEIGHT	NO. OF STATIONS	NO. OF STOMACHS	BIOMASS CONSUMED (TONS)	SE BIOMASS CONSUMED (TONS)
90	1	Pacific halibut	3	Walleye pollock	45.99	16.28	6	9	3324.69	1177.01
90	2	Pacific halibut	3	Walleye pollock	44.84	17.93	6	7	723.63	289.37
90	3	Pacific halibut	3	Walleye pollock	78.42	10.94	7	15	6395.68	891.90
90	4	Pacific halibut	3	Walleye pollock	64.55	20.51	6	7	2253.42	715.95
90	5	Pacific halibut	3	Walleye pollock	35.99	15.73	7	20	1823.09	796.75
90	6	Pacific halibut	3	Walleye pollock	59.75	11.67	8	17	5483.13	1070.70
90	2	Rock sole	1	Walleye pollock	0.23	0.23	12	89	1199.50	1199.50
90	6	Rock sole	1	Walleye pollock	0.04	0.04	8	36	25.80	25.80
90	1	Walleye pollock	1	Walleye pollock	0.46	0.46	23	167	89.64	89.64
90	3	Walleye pollock	1	Walleye pollock	6.33	5.51	18	86	2629.14	2286.99
90	4	Walleye pollock	1	Walleye pollock	1.32	1.32	15	98	803.36	803.36
90	1	Walleye pollock	2	Walleye pollock	50	50	2	2	2072.61	2072.61
90	6	Walleye pollock	2	Walleye pollock	5.42	2.67	27	117	114510.70	56368.39
90	3	Walleye pollock	3	Walleye pollock	3.56	2.89	23	87	14874.97	12084.83
90	4	Walleye pollock	3	Walleye pollock	15.73	7.25	16	64	34114.47	15729.59
90	5	Walleye pollock	3	Walleye pollock	2.1	1.19	17	91	5446.63	3090.25
90	6	Walleye pollock	3	Walleye pollock	13.17	3.6	35	383	443599.20	121285.80
90	1	Walleye pollock	4	Walleye pollock	3.25	1.34	34	291	2344.79	969.13
90	2	Walleye pollock	4	Walleye pollock	24.16	9.5	12	69	3874.34	1524.26
90	3	Walleye pollock	4	Walleye pollock	8.94	2.33	45	516	34562.21	9005.36
90	4	Walleye pollock	4	Walleye pollock	19.13	3.41	37	313	83076.00	14800.15
90	5	Walleye pollock	4	Walleye pollock	17.13	6.98	17	151	31934.14	13006.33
90	6	Walleye pollock	4	Walleye pollock	38.33	7.01	30	149	288274.80	52753.40
90	2	Yellowfin sole	1	Walleye pollock	2.06	1.47	14	128	5757.11	4099.09
90	4	Yellowfin sole	1	Walleye pollock	1.47	1	27	219	3069.20	2080.28
90	5	Yellowfin sole	1	Walleye pollock	14.27		1	7	66.98	
90	6	Yellowfin sole	1	Walleye pollock	98.84		1	2	21.78	
90	4	Pacific cod	2	Yellowfin sole	0.16	0.16	25	155	224.82	224.82
90	1	Pacific cod	3	Yellowfin sole	9.41	7.59	11	25	2711.05	2185.66
90	3	Pacific cod	3	Yellowfin sole	1.91	1.91	22	69	2267.03	2267.03
91	4	Pacific cod	3	Arrowtooth flounder	0.65	0.61	21	86	505.85	473.71
91	6	Pacific cod	3	Arrowtooth flounder	0.31	0.31	31	261	658.29	658.29
91	3	Flathead sole	1	Bairdi Tanner crab	0.07	0.07	23	157	170.68	170.68

Table H-1 (continued). -- Estimates of total fish and crab prey consumption (in metric tons) by groundfish populations in the eastern Bering Sea from May through September by year, stratum, predator and predator size groups.

YEAR	STRATUM	PREDATOR	PREDATOR SIZE GROUP	PREY	% WEIGHT	SE % WEIGHT	NO. OF STATIONS	NO. OF STOMACHS	BIOMASS CONSUMED (TONS)	SE BIOMASS CONSUMED (TONS)
91	5	Flathead sole	1	Bairdi Tanner crab	2.82	2.82	9	77	2363.63	2363.63
91	6	Flathead sole	1	Bairdi Tanner crab	0.18	0.18	19	162	262.20	262.20
91	3	Pacific cod	1	Bairdi Tanner crab	9.15	6.2	13	27	3103.31	2101.74
91	4	Pacific cod	1	Bairdi Tanner crab	1.07	1.07	17	83	1048.07	1048.07
91	1	Pacific cod	2	Bairdi Tanner crab	0.15	0.12	18	173	124.80	99.36
91	3	Pacific cod	2	Bairdi Tanner crab	5.04	2.04	32	276	5185.23	2098.99
91	4	Pacific cod	2	Bairdi Tanner crab	1.35	1.17	27	235	1194.17	1029.24
91	5	Pacific cod	2	Bairdi Tanner crab	31.59	8.93	7	47	6110.21	1726.23
91	6	Pacific cod	2	Bairdi Tanner crab	1.72	0.62	29	173	725.35	260.09
91	3	Pacific cod	3	Bairdi Tanner crab	5.56	3.22	27	114	6038.20	3490.57
91	4	Pacific cod	3	Bairdi Tanner crab	0.28	0.18	21	86	215.73	144.63
91	5	Pacific cod	3	Bairdi Tanner crab	15.76	5.76	7	31	6687.75	2444.76
91	6	Pacific cod	3	Bairdi Tanner crab	0.79	0.4	31	261	1657.80	847.74
91	3	Pacific halibut	2	Bairdi Tanner crab	28.1	28.1	3	8	1857.97	1857.97
91	5	Pacific halibut	3	Bairdi Tanner crab	11.81	10.1	3	7	497.27	425.36
91	4	Walleye pollock	4	Bairdi Tanner crab	0.2	0.2	31	274	460.56	460.56
91	3	Yellowfin sole	1	Bairdi Tanner crab	0.57	0.57	16	132	2426.90	2426.90
91	4	Yellowfin sole	1	Bairdi Tanner crab	0.02	0.02	23	213	48.99	40.80
91	6	Pacific cod	2	Flathead sole	0.28	0.22	29	173	118.53	94.59
91	5	Pacific cod	3	Flathead sole	2.48	1.23	7	31	1050.96	522.60
91	6	Pacific cod	3	Flathead sole	0.72	0.4	31	261	1499.27	841.13
91	2	Pacific halibut	2	Flathead sole	3.38	3.38	7	47	534.03	534.03
91	4	Pacific halibut	2	Flathead sole	0.78	0.78	3	18	57.18	57.18
91	4	Arrowtooth flounder	2	Gadidae	12.63	10.92	3	12	1209.48	1046.28
91	5	Arrowtooth flounder	2	Gadidae	8.89	8.89	6	13	4814.16	4814.16
91	6	Arrowtooth flounder	2	Gadidae	4.13	4.13	6	20	746.32	746.32
91	5	Arrowtooth flounder	3	Gadidae	22.19	19.57	5	26	14103.40	12439.67
91	6	Arrowtooth flounder	3	Gadidae	14.89	10.06	10	46	12682.28	8573.53
91	1	Flathead sole	1	Gadidae	12.47	12.47	4	33	3005.27	3005.27
91	3	Flathead sole	1	Gadidae	0.46	0.46	23	157	1198.11	1198.11
91	4	Flathead sole	1	Gadidae	2.93	1.76	17	150	2095.39	1258.76
91	6	Flathead sole	1	Gadidae	2.33	2.33	19	162	3307.60	3307.60
91	6	Greenland turbot	2	Gadidae	0.63	0.63	5	15	29.56	29.56

Table H-1 (continued). -- Estimates of total fish and crab prey consumption (in metric tons) by groundfish populations in the eastern Bering Sea from May through September by year, stratum, predator and predator size groups.

YEAR	STRATUM	PREDATOR	PREDATOR SIZE GROUP	PREY	% WEIGHT	SE % WEIGHT	NO. OF STATIONS	NO. OF STOMACHS	BIOMASS CONSUMED (TONS)	SE BIOMASS CONSUMED (TONS)
91	6	Greenland turbot	3	Gadidae	0.28	0.28	4	7	15.27	15.27
91	1	Pacific cod	1	Gadidae	0.37	0.37	18	93	473.02	473.02
91	3	Pacific cod	1	Gadidae	2.58	1.43	13	27	875.07	485.07
91	4	Pacific cod	1	Gadidae	3.05	2.95	17	83	2989.14	2889.37
91	6	Pacific cod	1	Gadidae	0.35	0.35	7	17	63.61	63.61
91	1	Pacific cod	2	Gadidae	1.64	0.96	18	173	1353.55	789.20
91	2	Pacific cod	2	Gadidae	1.3	0.95	7	38	94.32	68.73
91	3	Pacific cod	2	Gadidae	3.92	1.96	32	276	4036.70	2016.27
91	4	Pacific cod	2	Gadidae	1.78	0.73	27	235	1570.87	646.24
91	5	Pacific cod	2	Gadidae	13.76	11.51	7	47	2661.74	2225.57
91	6	Pacific cod	2	Gadidae	5.53	2.32	29	173	2326.28	977.87
91	1	Pacific cod	3	Gadidae	7.26	5.75	12	20	2979.73	2361.82
91	2	Pacific cod	3	Gadidae	0.15	0.13	7	37	44.85	39.11
91	3	Pacific cod	3	Gadidae	6.61	3.68	27	114	7177.28	3996.47
91	4	Pacific cod	3	Gadidae	1.69	0.84	21	86	1322.58	661.04
91	5	Pacific cod	3	Gadidae	2.14	0.91	7	31	906.38	386.15
91	6	Pacific cod	3	Gadidae	9.6	3.74	31	261	20120.69	7832.73
91	1	Pacific halibut	2	Gadidae	5.84	5.49	13	55	1524.37	1434.52
91	2	Pacific halibut	2	Gadidae	2.72	1.78	7	47	428.67	280.92
91	3	Pacific halibut	2	Gadidae	22.43	22.43	3	8	1482.59	1482.59
91	4	Pacific halibut	2	Gadidae	7.36	7.36	3	18	537.08	537.08
91	1	Pacific halibut	3	Gadidae	2.93	2.83	10	22	208.39	200.94
91	2	Pacific halibut	3	Gadidae	12.25	12.25	4	4	475.53	475.53
91	3	Pacific halibut	3	Gadidae	24.45	18.81	5	8	2056.77	1582.30
91	5	Pacific halibut	3	Gadidae	3.12	3.12	3	7	131.14	131.14
91	2	Walleye pollock	1	Gadidae	3.45	3.45	10	119	2219.30	2219.30
91	6	Walleye pollock	2	Gadidae	0.31	0.31	30	132	4025.83	4025.83
91	3	Walleye pollock	3	Gadidae	2.85	2.74	26	116	10808.17	10371.90
91	4	Walleye pollock	3	Gadidae	1.08	1.08	13	22	516.49	516.49
91	6	Walleye pollock	3	Gadidae	3	1.03	41	365	27681.62	9511.87
91	1	Walleye pollock	4	Gadidae	0.04	0.04	17	185	20.41	20.41
91	2	Walleye pollock	4	Gadidae	0.04	0.04	8	78	10.84	10.84

Table H-1 (continued). -- Estimates of total fish and crab prey consumption (in metric tons) by groundfish populations in the eastern Bering Sea from May through September by year, stratum, predator and predator size groups.

YEAR	STRATUM	PREDATOR	PREDATOR SIZE GROUP	PREY	% WEIGHT	SE % WEIGHT	NO. OF STATIONS	NO. OF STOMACHS	BIOMASS CONSUMED (TONS)	SE BIOMASS CONSUMED (TONS)
91	3	Walleye pollock	4	Gadidae	4.33	2.74	35	467	23367.72	14771.95
91	4	Walleye pollock	4	Gadidae	2.52	1.18	31	274	5657.85	2646.26
91	5	Walleye pollock	4	Gadidae	6.8	5.17	16	182	9883.17	7507.09
91	6	Walleye pollock	4	Gadidae	11.08	3.17	41	276	49685.95	14212.48
91	6	Walleye pollock	3	Greenland turbot	0.05	0.03	41	365	459.09	272.18
91	4	Walleye pollock	4	Greenland turbot	0.01	0.01	31	274	16.56	16.56
91	6	Walleye pollock	4	Greenland turbot	0.04	0.04	41	276	159.22	159.22
91	3	Pacific cod	3	King crab legs	1.74	1.46	27	114	1892.79	1589.06
91	1	Pacific cod	2	Lithodidae	0.24	0.24	18	173	40.28	40.28
91	3	Pacific cod	2	Lithodidae	0.03	0.03	32	276	6.36	6.36
91	4	Pacific cod	2	Lithodidae	0.16	0.16	27	235	29.11	29.11
91	1	Pacific cod	3	Lithodidae	2.92	2.92	12	20	242.55	242.55
91	1	Pacific halibut	3	Lithodidae	0.22	0.22	10	22	3.12	3.12
91	6	Arrowtooth flounder	2	Offal	7.87	7.87	6	20	1422.36	1422.36
91	6	Arrowtooth flounder	3	Offal	2.95	2.95	10	46	2510.8	2510.8
91	6	Flathead sole	1	Offal	4.98	3.37	19	162	7067.12	4778.73
91	2	Pacific cod	2	Offal	13.12	11.52	7	38	949.08	833.31
91	3	Pacific cod	2	Offal	7.15	3.61	32	276	7358.19	3709.79
91	4	Pacific cod	2	Offal	4.9	2.38	27	235	4330.85	2105.81
91	6	Pacific cod	2	Offal	8.83	3.53	29	173	3715.99	1484.67
91	1	Pacific cod	3	Offal	6.79	5.26	12	20	2787.7	2160.76
91	2	Pacific cod	3	Offal	32.09	15.72	7	37	9717.91	4760.35
91	3	Pacific cod	3	Offal	11.14	4.07	27	114	12089.73	4420.1
91	4	Pacific cod	3	Offal	9.28	5.07	21	86	7261.82	3969.23
91	5	Pacific cod	3	Offal	9.41	8.6	7	31	3993.5	3648.72
91	6	Pacific cod	3	Offal	14.5	4.36	31	261	30372.51	9134.5
91	6	Walleye pollock	2	Offal	2.81	2.3	30	132	36905.12	30237.59
91	6	Walleye pollock	3	Offal	0.66	0.66	41	365	6079.09	6079.09
91	3	Walleye pollock	4	Offal	1.29	1.29	35	467	6957.23	6957.23
91	5	Walleye pollock	4	Offal	0.59	0.59	16	182	852.63	852.63
91	6	Walleye pollock	4	Offal	0.24	0.21	41	276	1057.03	929.47
91	1	Yellowfin sole	1	Offal	0.57	0.41	21	213	4056.44	2884.92
91	3	Yellowfin sole	1	Offal	6.92	4.93	16	132	29630.3	21112.47

Table H-1 (continued). -- Estimates of total fish and crab prey consumption (in metric tons) by groundfish populations in the eastern Bering Sea from May through September by year, stratum, predator and predator size groups.

YEAR	STRATUM	PREDATOR	PREDATOR SIZE GROUP	PREY	% WEIGHT	SE % WEIGHT	NO. OF STATIONS	NO. OF STOMACHS	BIOMASS CONSUMED (TONS)	SE BIOMASS CONSUMED (TONS)
91	4	Yellowfin sole	1	Offal	0.98	0.56	23	213	2165.84	1238.25
91	2	Alaska plaice	1	Opilio snow crab	0.32	0.32	9	41	172.51	172.51
91	4	Alaska plaice	1	Opilio snow crab	1.76	1.76	11	56	3080.26	3080.26
91	3	Flathead sole	1	Opilio snow crab	0.33	0.2	23	157	859.56	511.20
91	4	Flathead sole	1	Opilio snow crab	1.35	0.92	17	150	964.98	660.69
91	5	Flathead sole	1	Opilio snow crab	2.13	1.71	9	77	1781.85	1432.13
91	6	Flathead sole	1	Opilio snow crab	8.58	4.59	19	162	12172.23	6513.35
91	3	Pacific cod	1	Opilio snow crab	10.29	7.01	13	27	3488.69	2376.61
91	4	Pacific cod	1	Opilio snow crab	2.86	1.9	17	83	2801.54	1857.23
91	6	Pacific cod	1	Opilio snow crab	2.93	2.93	7	17	527.03	527.03
91	1	Pacific cod	2	Opilio snow crab	0.24	0.17	18	173	195.73	137.11
91	2	Pacific cod	2	Opilio snow crab	9.74	5.41	7	38	704.65	391.44
91	3	Pacific cod	2	Opilio snow crab	13.82	4.78	32	276	14220.04	4919.43
91	4	Pacific cod	2	Opilio snow crab	14.4	4.22	27	235	12715.70	3726.16
91	5	Pacific cod	2	Opilio snow crab	0.34	0.34	7	47	66.08	66.08
91	6	Pacific cod	2	Opilio snow crab	6.37	1.86	29	173	2681.08	783.13
91	2	Pacific cod	3	Opilio snow crab	19.73	5.61	7	37	5974.28	1697.73
91	3	Pacific cod	3	Opilio snow crab	5.97	3.47	27	114	6476.69	3769.19
91	4	Pacific cod	3	Opilio snow crab	29.79	7.31	21	86	23324.00	5721.48
91	5	Pacific cod	3	Opilio snow crab	2.45	2.23	7	31	1037.82	945.64
91	6	Pacific cod	3	Opilio snow crab	6.58	3.05	31	261	13784.48	6399.25
91	2	Pacific halibut	2	Opilio snow crab	0.52	0.52	7	47	81.69	81.69
91	4	Pacific halibut	2	Opilio snow crab	8	8	3	18	583.48	583.48
91	1	Pacific halibut	3	Opilio snow crab	0.53	0.53	10	22	37.38	37.38
91	2	Pacific halibut	3	Opilio snow crab	25	25	4	4	970.48	970.48
91	3	Pacific halibut	3	Opilio snow crab	0.48	0.48	5	8	40.06	40.06
91	4	Pacific halibut	3	Opilio snow crab	1	1	5	9	47.95	47.95
91	5	Pacific halibut	3	Opilio snow crab	0.2	0.2	3	7	8.63	8.63
91	3	Rock sole	1	Opilio snow crab	0.31	0.31	11	50	1079.69	1079.69
91	4	Rock sole	1	Opilio snow crab	1.12	1.12	9	49	3996.72	3996.72
91	4	Walleye pollock	4	Opilio snow crab	1.07	1.01	31	274	2412.00	2268.08
91	2	Yellowfin sole	1	Opilio snow crab	2.4	1.79	15	132	7505.67	5596.02
91	3	Yellowfin sole	1	Opilio snow crab	0.19	0.19	16	132	812.52	812.52

Table H-1 (continued). -- Estimates of total fish and crab prey consumption (in metric tons) by groundfish populations in the eastern Bering Sea from May through September by year, stratum, predator and predator size groups.

YEAR	STRATUM	PREDATOR	PREDATOR SIZE GROUP	PREY	% WEIGHT	SE % WEIGHT	NO. OF STATIONS	NO. OF STOMACHS	BIOMASS CONSUMED (TONS)	SE BIOMASS CONSUMED (TONS)
91	4	Yellowfin sole	1	Opilio snow crab	6.68	3.77	23	213	14743.03	8305.47
91	4	Flathead sole	1	Osmerids	0.69	0.69	17	150	495.49	495.49
91	4	Pacific cod	2	Osmerids	0.72	0.72	27	235	634.10	634.10
91	4	Pacific cod	3	Osmerids	0.11	0.11	21	86	88.27	88.27
91	1	Pacific halibut	2	Osmerids	0.64	0.64	13	55	166.75	166.75
91	2	Walleye pollock	4	Osmerids	0.73	0.73	8	78	209.00	209.00
91	4	Walleye pollock	4	Osmerids	1.63	1.03	31	274	3660.49	2306.97
91	3	Pacific cod	3	Pacific cod	0.32	0.32	27	114	343.66	343.66
91	1	Pacific halibut	3	Pacific cod	16.46	9.3	10	22	1170.57	661.78
91	4	Pacific halibut	3	Pacific cod	7.96	7.96	5	9	381.62	381.62
91	4	Walleye pollock	4	Pacific cod	0.52	0.52	31	274	1179.10	1179.10
91	1	Alaska plaice	1	Pacific halibut	0.06	0.06	14	65	37.97	37.97
91	2	Pacific halibut	2	Pacific halibut	0.05	0.05	7	47	8.26	8.26
91	4	Walleye pollock	4	Pacific halibut	0.01	0.01	31	274	21.56	21.56
91	5	Arrowtooth flounder	3	Pacific herring	16.79	16.79	5	26	10674.13	10674.13
91	1	Pacific cod	3	Paralithodes sp.	0.46	0.46	12	20	37.90	37.90
91	4	Arrowtooth flounder	2	Pleuronectidae	0.38	0.38	3	12	36.51	36.51
91	1	Pacific cod	2	Pleuronectidae	1.38	0.83	18	173	1139.20	686.01
91	2	Pacific cod	2	Pleuronectidae	0.07	0.07	7	38	4.90	4.90
91	3	Pacific cod	2	Pleuronectidae	0.71	0.35	32	276	733.86	364.83
91	4	Pacific cod	2	Pleuronectidae	0.98	0.63	27	235	864.75	560.64
91	6	Pacific cod	2	Pleuronectidae	0.37	0.24	29	173	154.30	100.68
91	1	Pacific cod	3	Pleuronectidae	11.9	4.77	12	20	4884.67	1955.94
91	2	Pacific cod	3	Pleuronectidae	5.49	4.94	7	37	1663.77	1495.42
91	3	Pacific cod	3	Pleuronectidae	5.38	3.37	27	114	5844.61	3654.17
91	4	Pacific cod	3	Pleuronectidae	2.96	1.37	21	86	2317.50	1070.62
91	5	Pacific cod	3	Pleuronectidae	1.13	0.73	7	31	478.94	311.76
91	6	Pacific cod	3	Pleuronectidae	0.36	0.15	31	261	755.71	311.52
91	1	Pacific halibut	2	Pleuronectidae	6.86	6.86	13	55	1791.67	1791.67
91	2	Pacific halibut	2	Pleuronectidae	1	0.65	7	47	157.48	102.17
91	1	Pacific halibut	3	Pleuronectidae	51.51	11.13	10	22	3663.87	791.50
91	2	Pacific halibut	3	Pleuronectidae	25	25	4	4	970.48	970.48
91	3	Pacific halibut	3	Pleuronectidae	20	20	5	8	1682.14	1682.14

Table H-1 (continued). -- Estimates of total fish and crab prey consumption (in metric tons) by groundfish populations in the eastern Bering Sea from May through September by year, stratum, predator and predator size groups.

YEAR	STRATUM	PREDATOR	PREDATOR SIZE GROUP	PREY	% WEIGHT	SE % WEIGHT	NO. OF STATIONS	NO. OF STOMACHS	BIOMASS CONSUMED (TONS)	SE BIOMASS CONSUMED (TONS)
91	6	Walleye pollock	2	Pleuronectidae	0.77	0.77	30	132	10069.33	10069.33
91	4	Walleye pollock	3	Pleuronectidae	1	1	13	22	479.60	479.60
91	5	Walleye pollock	3	Pleuronectidae	0.07	0.07	15	77	62.75	62.75
91	2	Walleye pollock	4	Pleuronectidae	0.05	0.05	8	78	15.09	15.09
91	3	Walleye pollock	4	Pleuronectidae	0	0	35	467	10.05	10.05
91	4	Walleye pollock	4	Pleuronectidae	0.01	0.01	31	274	29.28	17.68
91	1	Pacific cod	2	Red King crab	0.05	0.05	18	173	7.53	7.53
91	1	Pacific cod	2	Rock sole	0.25	0.25	18	173	208.09	208.09
91	1	Pacific cod	3	Rock sole	18.25	9.71	12	20	7491.84	3984.66
91	2	Pacific cod	3	Rock sole	0.14	0.14	7	37	41.81	41.81
91	3	Pacific cod	3	Rock sole	0.71	0.5	27	114	775.17	538.07
91	4	Pacific cod	3	Rock sole	1.86	1.86	21	86	1456.35	1456.35
91	1	Pacific halibut	2	Rock sole	1.94	1.94	13	55	505.46	505.46
91	2	Pacific halibut	2	Rock sole	1.12	1.12	7	47	176.36	176.36
91	6	Walleye pollock	3	Rock sole	0	0	41	365	21.83	21.83
91	3	Flathead sole	1	Unid. chionoecetes	0.14	0.12	23	157	354.83	317.51
91	4	Flathead sole	1	Unid. chionoecetes	0.07	0.07	17	150	48.10	48.10
91	5	Flathead sole	1	Unid. chionoecetes	0.02	0.02	9	77	18.17	18.17
91	6	Flathead sole	1	Unid. chionoecetes	0.54	0.26	19	162	765.18	361.80
91	2	Pacific cod	1	Unid. chionoecetes	15.98	11.52	8	70	2921.96	2106.88
91	3	Pacific cod	1	Unid. chionoecetes	3.89	2.65	13	27	1318.88	898.94
91	4	Pacific cod	1	Unid. chionoecetes	5.92	3.48	17	83	5800.24	3411.31
91	6	Pacific cod	1	Unid. chionoecetes	5.71	5.71	7	17	1026.27	1026.27
91	1	Pacific cod	2	Unid. chionoecetes	0	0	18	173	1.77	1.77
91	2	Pacific cod	2	Unid. chionoecetes	22.26	12.84	7	38	1609.65	928.26
91	3	Pacific cod	2	Unid. chionoecetes	5.96	2.19	32	276	6131.04	2255.98
91	4	Pacific cod	2	Unid. chionoecetes	9.36	2.9	27	235	8262.06	2557.98
91	5	Pacific cod	2	Unid. chionoecetes	11.43	4.43	7	47	2210.21	856.28
91	6	Pacific cod	2	Unid. chionoecetes	5.16	2.41	29	173	2172.47	1014.72
91	1	Pacific cod	3	Unid. chionoecetes	1.91	1.36	12	20	785.02	557.63
91	2	Pacific cod	3	Unid. chionoecetes	15.08	7.99	7	37	4565.83	2418.22
91	3	Pacific cod	3	Unid. chionoecetes	2.55	1.22	27	114	2771.25	1321.42
91	4	Pacific cod	3	Unid. chionoecetes	3.48	1.62	21	86	2721.70	1270.21

Table H-1 (continued). -- Estimates of total fish and crab prey consumption (in metric tons) by groundfish populations in the eastern Bering Sea from May through September by year, stratum, predator and predator size groups.

YEAR	STRATUM	PREDATOR	PREDATOR SIZE GROUP	PREY	% WEIGHT	SE % WEIGHT	NO. OF STATIONS	NO. OF STOMACHS	BIOMASS CONSUMED (TONS)	SE BIOMASS CONSUMED (TONS)
91	5	Pacific cod	3	Unid. chionoecetes	0.49	0.27	7	31	207.60	115.76
91	6	Pacific cod	3	Unid. chionoecetes	2.16	1.41	31	261	4531.78	2960.21
91	1	Pacific halibut	2	Unid. chionoecetes	0.51	0.51	13	55	132.39	132.39
91	2	Pacific halibut	2	Unid. chionoecetes	0.03	0.03	7	47	4.34	4.34
91	3	Pacific halibut	2	Unid. chionoecetes	1.56	1.56	3	8	103.33	103.33
91	4	Pacific halibut	2	Unid. chionoecetes	0.06	0.06	3	18	4.17	4.17
91	2	Rock sole	1	Unid. chionoecetes	0.24	0.24	8	38	751.57	751.57
91	3	Rock sole	1	Unid. chionoecetes	0.3	0.29	11	50	1028.53	1013.02
91	4	Rock sole	1	Unid. chionoecetes	0.22	0.22	9	49	775.06	775.06
91	6	Walleye pollock	1	Unid. chionoecetes	0	0	28	174	90.06	90.06
91	6	Walleye pollock	2	Unid. chionoecetes	0	0	30	132	46.33	46.33
91	3	Walleye pollock	3	Unid. chionoecetes	0	0	26	116	14.41	14.41
91	6	Walleye pollock	3	Unid. chionoecetes	0.03	0.03	41	365	282.67	282.67
91	4	Walleye pollock	4	Unid. chionoecetes	5.03	2.61	31	274	11317.19	5875.04
91	6	Walleye pollock	4	Unid. chionoecetes	0.01	0.01	41	276	43.75	43.75
91	1	Yellowfin sole	1	Unid. chionoecetes	0.01	0.01	21	213	85.36	85.36
91	2	Yellowfin sole	1	Unid. chionoecetes	0.71	0.54	15	132	2231.10	1678.00
91	3	Yellowfin sole	1	Unid. chionoecetes	0.31	0.3	16	132	1338.91	1276.47
91	4	Yellowfin sole	1	Unid. chionoecetes	5.81	3.69	23	213	12808.13	8140.21
91	4	Arrowtooth flounder	2	Walleye pollock	38.9	19.9	3	12	3726.72	1906.27
91	5	Arrowtooth flounder	2	Walleye pollock	7.08	7.08	6	13	3834.65	3834.65
91	6	Arrowtooth flounder	2	Walleye pollock	53.69	18.77	6	20	9704.10	3392.08
91	4	Arrowtooth flounder	3	Walleye pollock	66.67	33.33	3	3	1751.44	875.72
91	5	Arrowtooth flounder	3	Walleye pollock	37.03	22.8	5	26	23542.89	14493.85
91	6	Arrowtooth flounder	3	Walleye pollock	76.68	9.86	10	46	65315.02	8395.95
91	3	Flathead sole	1	Walleye pollock	9.21	4.1	23	157	24058.76	10711.60
91	4	Flathead sole	1	Walleye pollock	37.64	6.79	17	150	26912.94	4858.56
91	6	Flathead sole	1	Walleye pollock	7.82	3.89	19	162	11088.38	5518.26
91	6	Greenland turbot	2	Walleye pollock	89.57	7.03	5	15	4231.04	332.17
91	6	Greenland turbot	3	Walleye pollock	74.19	24.74	4	7	4106.85	1369.60
91	1	Pacific cod	1	Walleye pollock	1.57	1.57	18	93	1999.89	1999.89
91	2	Pacific cod	1	Walleye pollock	1.54	1.54	8	70	281.24	281.24
91	4	Pacific cod	1	Walleye pollock	6.79	4.09	17	83	6651.76	4010.98

Table H-1 (continued). -- Estimates of total fish and crab prey consumption (in metric tons) by groundfish populations in the eastern Bering Sea from May through September by year, stratum, predator and predator size groups.

YEAR	STRATUM	PREDATOR	PREDATOR SIZE GROUP	PREY	% WEIGHT	SE % WEIGHT	NO. OF STATIONS	NO. OF STOMACHS	BIOMASS CONSUMED (TONS)	SE BIOMASS CONSUMED (TONS)
91	1	Pacific cod	2	Walleye pollock	5.39	3.59	18	173	4439.07	2955.72
91	2	Pacific cod	2	Walleye pollock	12.42	11.06	7	38	898.11	800.13
91	3	Pacific cod	2	Walleye pollock	11.49	4.53	32	276	11818.59	4658.70
91	4	Pacific cod	2	Walleye pollock	14.97	3.87	27	235	13215.61	3421.19
91	5	Pacific cod	2	Walleye pollock	3.89	3.89	7	47	752.24	752.24
91	6	Pacific cod	2	Walleye pollock	20.67	4.74	29	173	8700.73	1996.75
91	1	Pacific cod	3	Walleye pollock	12.93	8.52	12	20	5305.70	3498.75
91	2	Pacific cod	3	Walleye pollock	13.09	11.78	7	37	3962.26	3568.30
91	3	Pacific cod	3	Walleye pollock	42.8	7.61	27	114	46467.52	8258.63
91	4	Pacific cod	3	Walleye pollock	22.55	7.78	21	86	17655.71	6088.45
91	5	Pacific cod	3	Walleye pollock	38.63	11.57	7	31	16395.05	4912.24
91	6	Pacific cod	3	Walleye pollock	47.35	5.77	31	261	99219.05	12099.75
91	1	Pacific halibut	2	Walleye pollock	23.02	8.16	13	55	6011.48	2131.34
91	2	Pacific halibut	2	Walleye pollock	64.02	8.84	7	47	10101.21	1393.96
91	4	Pacific halibut	2	Walleye pollock	20.46	20.46	3	18	1492.23	1492.23
91	1	Pacific halibut	3	Walleye pollock	12.8	9.53	10	22	910.62	678.09
91	2	Pacific halibut	3	Walleye pollock	12.75	12.75	4	4	494.94	494.94
91	3	Pacific halibut	3	Walleye pollock	52.35	21.6	5	8	4403.21	1816.45
91	4	Pacific halibut	3	Walleye pollock	70.36	19.36	5	9	3373.55	928.50
91	5	Pacific halibut	3	Walleye pollock	77.95	16.49	3	7	3281.84	694.12
91	4	Rock sole	1	Walleye pollock	1.71	1.71	9	49	6076.67	6076.67
91	3	Walleye pollock	1	Walleye pollock	3.51	3.51	11	86	10957.07	10957.07
91	6	Walleye pollock	2	Walleye pollock	1.53	1.38	30	132	20040.16	18152.02
91	1	Walleye pollock	3	Walleye pollock	32.33	32.33	3	3	308.69	308.69
91	3	Walleye pollock	3	Walleye pollock	0.15	0.15	26	116	582.95	582.95
91	4	Walleye pollock	3	Walleye pollock	7.69	7.69	13	22	3689.23	3689.23
91	6	Walleye pollock	3	Walleye pollock	15.62	4.4	41	365	144137.60	40609.30
91	1	Walleye pollock	4	Walleye pollock	0.07	0.06	17	185	34.28	29.81
91	2	Walleye pollock	4	Walleye pollock	3.14	1.96	8	78	898.02	559.97
91	3	Walleye pollock	4	Walleye pollock	6.58	3.24	35	467	35467.04	17475.42
91	4	Walleye pollock	4	Walleye pollock	14.52	3.94	31	274	32644.19	8854.67
91	6	Walleye pollock	4	Walleye pollock	28.27	5.05	41	276	126760.30	22632.05
91	2	Yellowfin sole	1	Walleye pollock	4.9	2.8	15	132	15279.96	8750.22

Table H-1 (continued). -- Estimates of total fish and crab prey consumption (in metric tons) by groundfish populations in the eastern Bering Sea from May through September by year, stratum, predator and predator size groups.

YEAR	STRATUM	PREDATOR	PREDATOR SIZE GROUP	PREY	% WEIGHT	SE % WEIGHT	NO. OF STATIONS	NO. OF STOMACHS	BIOMASS CONSUMED (TONS)	SE BIOMASS CONSUMED (TONS)
91	3	Yellowfin sole	1	Walleye pollock	1.81	1.81	16	132	7744.86	7744.86
91	4	Yellowfin sole	1	Walleye pollock	0.95	0.95	23	213	2088.86	2088.86
91	3	Pacific cod	2	Yellowfin sole	0.24	0.24	32	276	248.89	248.89
91	3	Pacific cod	3	Yellowfin sole	4.09	3.36	27	114	4437.53	3647.83
91	1	Pacific halibut	3	Yellowfin sole	9.94	4.67	10	22	707.17	332.10
92	1	Yellowfin sole	1	Alaska plaice	0.09	0.09	24	169	557.11	557.11
92	5	Pacific cod	2	Arrowtooth flounder	0.28	0.28	9	62	82.48	82.48
92	3	Pacific cod	3	Arrowtooth flounder	0.73	0.73	30	98	903.99	903.99
92	6	Pacific cod	3	Arrowtooth flounder	0.64	0.64	27	145	701.52	701.52
92	4	Walleye pollock	4	Arrowtooth flounder	0.03	0.03	32	515	67.15	67.15
92	6	Walleye pollock	4	Arrowtooth flounder	2.06	2.06	29	246	8795.97	8795.97
92	3	Flathead sole	1	Bairdi Tanner crab	0.44	0.44	15	70	1193.71	1193.71
92	5	Flathead sole	1	Bairdi Tanner crab	1.17	1.17	8	46	1706.77	1706.77
92	3	Pacific cod	2	Bairdi Tanner crab	4.69	1.46	37	343	7475.65	2331.26
92	4	Pacific cod	2	Bairdi Tanner crab	0.99	0.7	29	278	1237.80	873.80
92	5	Pacific cod	2	Bairdi Tanner crab	18.95	10.93	9	62	5643.18	3253.92
92	6	Pacific cod	2	Bairdi Tanner crab	2.16	1.41	31	296	2144.27	1401.80
92	1	Pacific cod	3	Bairdi Tanner crab	1.18	1.18	17	30	447.82	447.82
92	3	Pacific cod	3	Bairdi Tanner crab	4.41	2.96	30	98	5488.68	3676.07
92	4	Pacific cod	3	Bairdi Tanner crab	1.66	1.58	26	63	585.20	555.71
92	5	Pacific cod	3	Bairdi Tanner crab	8.46	3.38	9	42	5388.61	2152.98
92	6	Pacific cod	3	Bairdi Tanner crab	2.14	1.65	27	145	2368.79	1818.95
92	3	Pacific halibut	2	Bairdi Tanner crab	2.34	2.34	16	49	167.50	167.50
92	5	Pacific halibut	2	Bairdi Tanner crab	13.88	7.28	3	8	125.30	65.74
92	6	Pacific halibut	2	Bairdi Tanner crab	2.8	2.08	6	10	51.84	38.55
92	3	Pacific halibut	3	Bairdi Tanner crab	0.18	0.16	4	11	9.33	8.38
92	4	Pacific halibut	3	Bairdi Tanner crab	22.75	22.75	4	5	439.69	439.69
92	5	Pacific halibut	3	Bairdi Tanner crab	0.26	0.26	3	11	15.38	15.38
92	3	Skates	1	Bairdi Tanner crab	1.16	0.74	29	124	852.22	543.15
92	5	Skates	1	Bairdi Tanner crab	1.13	1.07	8	51	722.74	687.26
92	3	Yellowfin sole	1	Bairdi Tanner crab	0.08	0.05	30	213	451.33	321.91
92	5	Flathead sole	1	Flathead sole	3.13	3.13	8	46	4571.70	4571.70
92	6	Greenland turbot	3	Flathead sole	1.58	1.58	8	20	144.81	144.81

Table H-1 (continued). -- Estimates of total fish and crab prey consumption (in metric tons) by groundfish populations in the eastern Bering Sea from May through September by year, stratum, predator and predator size groups.

YEAR	STRATUM	PREDATOR	PREDATOR SIZE GROUP	PREY	% WEIGHT	SE % WEIGHT	NO. OF STATIONS	NO. OF STOMACHS	BIOMASS CONSUMED (TONS)	SE BIOMASS CONSUMED (TONS)
92	3	Pacific cod	2	Flathead sole	0.03	0.03	37	343	53.13	53.13
92	5	Pacific cod	2	Flathead sole	0.5	0.5	9	62	150.39	150.39
92	6	Pacific cod	2	Flathead sole	0.14	0.13	31	296	139.97	124.72
92	4	Pacific cod	3	Flathead sole	1.71	1.71	26	63	601.82	601.82
92	5	Pacific cod	3	Flathead sole	8.78	6.73	9	42	5591.22	4283.82
92	6	Pacific cod	3	Flathead sole	0.75	0.59	27	145	827.52	649.89
92	3	Pacific halibut	2	Flathead sole	2.63	2.63	16	49	188.52	188.52
92	3	Skates	1	Flathead sole	0.06	0.06	29	124	42.80	42.80
92	6	Arrowtooth flounder	2	Gadidae	8.21	8.21	8	21	311.85	311.85
92	5	Arrowtooth flounder	3	Gadidae	17.04	9.41	11	40	8336.25	4605.15
92	6	Arrowtooth flounder	3	Gadidae	18.42	7.85	16	88	5749.04	2450.37
92	3	Pacific cod	2	Gadidae	0.12	0.09	37	343	190.15	139.72
92	4	Pacific cod	2	Gadidae	0.8	0.4	29	278	1000.37	493.90
92	5	Pacific cod	2	Gadidae	4.15	2.45	9	62	1236.57	730.23
92	6	Pacific cod	2	Gadidae	0.52	0.26	31	296	516.54	262.78
92	3	Pacific cod	3	Gadidae	0.05	0.04	30	98	63.16	55.25
92	4	Pacific cod	3	Gadidae	0.48	0.44	26	63	170.43	154.38
92	5	Pacific cod	3	Gadidae	4.68	4.56	9	42	2982.19	2903.57
92	6	Pacific cod	3	Gadidae	0.62	0.5	27	145	690.12	554.58
92	2	Pacific halibut	1	Gadidae	0.35	0.35	2	9	0.54	0.54
92	1	Pacific halibut	2	Gadidae	0.26	0.26	19	111	29.32	29.32
92	3	Pacific halibut	2	Gadidae	1.33	1.05	16	49	95.42	74.94
92	4	Pacific halibut	2	Gadidae	5.52	4.02	9	25	282.42	205.50
92	5	Pacific halibut	2	Gadidae	4.31	4.31	3	8	38.87	38.87
92	6	Pacific halibut	2	Gadidae	0.55	0.55	6	10	10.26	10.26
92	3	Pacific halibut	3	Gadidae	1.79	1.79	4	11	94.63	94.63
92	6	Pacific halibut	3	Gadidae	20	20	5	8	1119.47	1119.47
92	1	Skates	1	Gadidae	0.35	0.35	13	21	34.96	34.96
92	3	Skates	1	Gadidae	0.67	0.39	29	124	496.54	291.15
92	4	Skates	1	Gadidae	0.91	0.59	18	58	545.13	354.07
92	5	Skates	1	Gadidae	0.16	0.1	8	51	102.43	67.08
92	6	Skates	1	Gadidae	0.68	0.31	19	127	1263.50	573.04
92	4	Walleye pollock	3	Gadidae	0.62	0.62	15	58	536.34	536.34

Table H-1 (continued). -- Estimates of total fish and crab prey consumption (in metric tons) by groundfish populations in the eastern Bering Sea from May through September by year, stratum, predator and predator size groups.

YEAR	STRATUM	PREDATOR	PREDATOR SIZE GROUP	PREY	% WEIGHT	SE % WEIGHT	NO. OF STATIONS	NO. OF STOMACHS	BIOMASS CONSUMED (TONS)	SE BIOMASS CONSUMED (TONS)
92	5	Walleye pollock	3	Gadidae	2.27	2.27	14	54	1705.73	1705.73
92	6	Walleye pollock	3	Gadidae	0.96	0.94	29	184	9451.83	9306.35
92	2	Walleye pollock	4	Gadidae	1.06	1.06	8	46	167.47	167.47
92	3	Walleye pollock	4	Gadidae	0.01	0.01	35	436	31.97	31.97
92	4	Walleye pollock	4	Gadidae	0.74	0.32	32	515	1808.63	771.87
92	5	Walleye pollock	4	Gadidae	2.85	2.85	16	236	3402.24	3402.24
92	6	Walleye pollock	4	Gadidae	2.49	1.15	29	246	10637.83	4923.14
92	4	Yellowfin sole	1	Gadidae	0.26	0.19	29	228	456.03	329.35
92	4	Pacific cod	1	Greenland turbot	0.16	0.16	29	128	130.75	130.75
92	6	Pacific cod	2	Greenland turbot	0	0	31	296	1.85	1.85
92	6	Pacific cod	3	Greenland turbot	0.31	0.31	27	145	344.41	344.41
92	3	Walleye pollock	2	Greenland turbot	0.01	0.01	7	85	411.55	411.55
92	4	Walleye pollock	3	Greenland turbot	0.8	0.8	15	58	689.50	689.50
92	4	Walleye pollock	4	Greenland turbot	0.31	0.12	32	515	742.58	287.12
92	6	Walleye pollock	4	Greenland turbot	0.03	0.03	29	246	146.76	137.83
92	4	Yellowfin sole	1	Greenland turbot	0.05	0.05	29	228	91.55	91.55
92	3	Pacific cod	2	King crab legs	1.02	1.02	37	343	1629.34	1629.34
92	3	Pacific cod	3	King crab legs	0.45	0.45	30	98	565.53	565.53
92	4	Pacific cod	3	King crab legs	0.19	0.19	26	63	66.22	66.22
92	4	Walleye pollock	4	Lithodidae	0	0	32	515	1.21	1.21
92	5	Arrowtooth flounder	2	Offal	5.4	4.38	9	30	1219.31	990.52
92	6	Arrowtooth flounder	3	Offal	5.63	5.41	16	88	1757.95	1687.4
92	5	Flathead sole	1	Offal	12.26	12.26	8	46	17931.99	17931.99
92	6	Flathead sole	1	Offal	7.24	7.24	8	36	14419.17	14419.17
92	1	Pacific cod	2	Offal	4.96	3.73	18	181	5360.74	4029.02
92	2	Pacific cod	2	Offal	3.38	3.38	4	61	351.21	351.21
92	3	Pacific cod	2	Offal	2.45	1.23	37	343	3916.16	1965.33
92	4	Pacific cod	2	Offal	1.37	0.73	29	278	1716.59	916.93
92	5	Pacific cod	2	Offal	2.33	2.33	9	62	694.91	694.91
92	6	Pacific cod	2	Offal	1.42	0.81	31	296	1413.34	804.79
92	1	Pacific cod	3	Offal	1	1	17	30	378.75	378.75
92	3	Pacific cod	3	Offal	7.36	3.06	30	98	9150.88	3807.95
92	4	Pacific cod	3	Offal	5.55	3.22	26	63	1957.1	1134.17

Table H-1 (continued). – Estimates of total fish and crab prey consumption (in metric tons) by groundfish populations in the eastern Bering Sea from May through September by year, stratum, predator and predator size groups.

YEAR	STRATUM	PREDATOR	PREDATOR SIZE GROUP	PREY	% WEIGHT	SE % WEIGHT	NO. OF STATIONS	NO. OF STOMACHS	BIOMASS CONSUMED (TONS)	SE BIOMASS CONSUMED (TONS)
92	5	Pacific cod	3	Offal	15.07	7.54	9	42	9593.41	4800.16
92	6	Pacific cod	3	Offal	0.48	0.48	27	145	533.69	533.69
92	2	Pacific halibut	1	Offal	5.56	5.56	2	9	8.45	8.45
92	1	Pacific halibut	2	Offal	0.22	0.16	19	111	24.96	18.85
92	3	Pacific halibut	2	Offal	7.77	5.42	16	49	556.81	388.49
92	4	Pacific halibut	2	Offal	10.51	7.26	9	25	538.07	371.61
92	6	Pacific halibut	2	Offal	6.02	6.02	6	10	111.52	111.52
92	1	Pacific halibut	3	Offal	11.75	11.75	4	6	217.1	217.1
92	5	Pacific halibut	3	Offal	0.02	0.02	3	11	1.15	1.15
92	6	Pacific halibut	3	Offal	18	18	5	8	1007.52	1007.52
92	1	Skates	1	Offal	4.06	3.2	13	21	406.12	320.62
92	3	Skates	1	Offal	6.48	2.82	29	124	4777.89	2079.38
92	4	Skates	1	Offal	20.28	8.02	18	58	12208.24	4826.99
92	5	Skates	1	Offal	3.94	3.35	8	51	2519.65	2141.29
92	6	Skates	1	Offal	8.76	4.36	19	127	16280.37	8093.69
92	6	Walleye pollock	2	Offal	0.14	0.14	16	106	2942.88	2942.88
92	6	Walleye pollock	3	Offal	1.08	1.08	29	184	10685.43	10685.43
92	3	Walleye pollock	4	Offal	0.68	0.68	35	436	2581.43	2581.43
92	4	Walleye pollock	4	Offal	0.59	0.54	32	515	1437.87	1301.63
92	6	Walleye pollock	4	Offal	4.53	3	29	246	19374.9	12841.59
92	3	Yellowfin sole	1	Offal	2.04	1.68	30	213	12238.71	10075.49
92	4	Yellowfin sole	1	Offal	0.71	0.71	29	228	1238.56	1238.56
92	4	Alaska plaice	1	Opilio snow crab	0.07	0.07	18	85	63.75	63.75
92	3	Flathead sole	1	Opilio snow crab	3.89	3.32	15	70	10602.08	9049.89
92	4	Flathead sole	1	Opilio snow crab	1.31	0.73	18	111	753.13	420.49
92	6	Flathead sole	1	Opilio snow crab	1.07	1.07	8	36	2141.16	2141.16
92	3	Pacific cod	1	Opilio snow crab	0.12	0.12	17	50	118.74	118.74
92	4	Pacific cod	1	Opilio snow crab	3.97	3.45	29	128	3191.73	2774.74
92	1	Pacific cod	2	Opilio snow crab	3.98	2.04	18	181	4304.43	2210.52
92	2	Pacific cod	2	Opilio snow crab	12.51	6.31	4	61	1301.38	656.30
92	3	Pacific cod	2	Opilio snow crab	10.47	2.81	37	343	16702.80	4489.84
92	4	Pacific cod	2	Opilio snow crab	8.37	2.43	29	278	10460.76	3040.11
92	5	Pacific cod	2	Opilio snow crab	3.03	3	9	62	902.71	893.92

Table H-1 (continued). -- Estimates of total fish and crab prey consumption (in metric tons) by groundfish populations in the eastern Bering Sea from May through September by year, stratum, predator and predator size groups.

YEAR	STRATUM	PREDATOR	PREDATOR SIZE GROUP	PREY	% WEIGHT	SE % WEIGHT	NO. OF STATIONS	NO. OF STOMACHS	BIOMASS CONSUMED (TONS)	SE BIOMASS CONSUMED (TONS)
92	6	Pacific cod	2	Opilio snow crab	9.63	2.75	31	296	9552.37	2724.89
92	1	Pacific cod	3	Opilio snow crab	9.69	5.3	17	30	3683.43	2016.10
92	2	Pacific cod	3	Opilio snow crab	34.14	28.62	3	7	766.31	642.51
92	3	Pacific cod	3	Opilio snow crab	9.78	4.22	30	98	12168.27	5248.56
92	4	Pacific cod	3	Opilio snow crab	10.73	3.56	26	63	3783.88	1256.30
92	6	Pacific cod	3	Opilio snow crab	5.93	2.53	27	145	6546.23	2798.35
92	1	Pacific halibut	2	Opilio snow crab	0.1	0.1	19	111	10.99	10.99
92	3	Pacific halibut	2	Opilio snow crab	8.26	6.24	16	49	591.82	447.07
92	4	Pacific halibut	2	Opilio snow crab	1.98	1.16	9	25	101.35	59.13
92	5	Pacific halibut	2	Opilio snow crab	38.01	31.26	3	8	343.12	282.17
92	6	Pacific halibut	2	Opilio snow crab	21.78	14.16	6	10	403.27	262.12
92	5	Pacific halibut	3	Opilio snow crab	0.33	0.33	3	11	20.03	20.03
92	3	Rock sole	1	Opilio snow crab	0.13	0.13	15	78	729.94	729.94
92	6	Rock sole	1	Opilio snow crab	5.39	5.3	12	56	2616.78	2568.85
92	1	Skates	1	Opilio snow crab	0.8	0.45	13	21	79.96	44.93
92	3	Skates	1	Opilio snow crab	0.21	0.18	29	124	156.57	136.32
92	4	Skates	1	Opilio snow crab	11.67	5.8	18	58	7027.83	3489.96
92	5	Skates	1	Opilio snow crab	0.25	0.16	8	51	161.16	105.47
92	6	Skates	1	Opilio snow crab	1.16	0.36	19	127	2153.73	671.09
92	4	Walleye pollock	4	Opilio snow crab	0.18	0.18	32	515	441.06	441.06
92	4	Yellowfin sole	1	Opilio snow crab	0.12	0.08	29	228	204.98	134.63
92	1	Flathead sole	1	Osmerids	8.44	8.44	9	42	1887.90	1887.90
92	1	Pacific cod	2	Osmerids	1.2	1.2	18	181	1301.65	1301.65
92	2	Pacific cod	2	Osmerids	0.23	0.23	4	61	23.63	23.63
92	3	Pacific cod	2	Osmerids	0.03	0.03	37	343	51.02	51.02
92	1	Pacific cod	3	Osmerids	0.12	0.12	17	30	44.73	44.73
92	2	Pacific halibut	1	Osmerids	38.89	38.89	2	9	59.14	59.14
92	1	Pacific halibut	2	Osmerids	8.58	2.88	19	111	982.75	329.12
92	2	Pacific halibut	2	Osmerids	6.56	5.93	5	20	501.66	453.61
92	1	Walleye pollock	4	Osmerids	3.86	3.62	26	350	3712.29	3481.94
92	3	Walleye pollock	4	Osmerids	0.14	0.1	35	436	533.94	390.08
92	6	Greenland turbot	3	Pacific cod	8.8	8.8	8	20	807.97	807.97
92	3	Pacific cod	2	Pacific cod	0.41	0.41	37	343	656.06	656.06

Table H-1 (continued). -- Estimates of total fish and crab prey consumption (in metric tons) by groundfish populations in the eastern Bering Sea from May through September by year, stratum, predator and predator size groups.

YEAR	STRATUM	PREDATOR	PREDATOR SIZE GROUP	PREY	% WEIGHT	SE % WEIGHT	NO. OF STATIONS	NO. OF STOMACHS	BIOMASS CONSUMED (TONS)	SE BIOMASS CONSUMED (TONS)
92	4	Pacific cod	2	Pacific cod	0.5	0.35	29	278	622.62	432.55
92	4	Pacific cod	3	Pacific cod	0.34	0.34	26	63	119.06	119.06
92	1	Pacific halibut	2	Pacific cod	0.64	0.64	19	111	73.44	73.44
92	1	Pacific halibut	3	Pacific cod	6.95	6.95	4	6	128.38	128.38
92	3	Skates	1	Pacific cod	2.33	2.29	29	124	1715.50	1690.50
92	1	Pacific cod	1	Pacific halibut	0.09	0.09	22	143	83.89	83.89
92	1	Pacific cod	2	Pacific halibut	0.7	0.69	18	181	753.25	742.52
92	4	Pacific cod	2	Pacific halibut	0.01	0.01	29	278	14.76	14.76
92	4	Pacific cod	3	Pacific halibut	0.04	0.04	26	63	13.87	13.87
92	1	Pacific halibut	2	Pacific halibut	0.17	0.17	19	111	19.31	19.31
92	6	Walleye pollock	3	Pacific halibut	0	0	29	184	29.48	29.48
92	4	Yellowfin sole	1	Pacific halibut	0.32	0.32	29	228	566.12	566.12
92	3	Pacific cod	2	Pacific herring	1.01	1.01	37	343	1608.63	1608.63
92	1	Pacific cod	3	Pacific herring	0.82	0.82	17	30	313.09	313.09
92	6	Pacific cod	3	Pacific herring	0.21	0.21	27	145	228.67	228.67
92	3	Skates	1	Pacific herring	0.66	0.66	29	124	488.49	488.49
92	3	Walleye pollock	4	Pacific herring	0.15	0.15	35	436	563.49	563.49
92	4	Walleye pollock	4	Pacific herring	0.16	0.16	32	515	397.66	397.66
92	2	Pacific cod	2	Pacific salmon	1.53	1.53	4	61	158.95	158.95
92	3	Skates	1	Pacific salmon	2.79	2.79	29	124	2060.61	2060.61
92	5	Arrowtooth flounder	2	Pleuronectidae	0.87	0.87	9	30	196.39	196.39
92	4	Pacific cod	1	Pleuronectidae	0.12	0.12	29	128	98.10	98.10
92	1	Pacific cod	2	Pleuronectidae	0.54	0.24	18	181	588.60	262.21
92	2	Pacific cod	2	Pleuronectidae	0.09	0.09	4	61	9.43	9.43
92	3	Pacific cod	2	Pleuronectidae	0.82	0.41	37	343	1313.55	650.51
92	4	Pacific cod	2	Pleuronectidae	0.16	0.16	29	278	205.17	202.44
92	5	Pacific cod	2	Pleuronectidae	0.05	0.05	9	62	14.98	14.98
92	6	Pacific cod	2	Pleuronectidae	0.91	0.84	31	296	901.12	831.79
92	1	Pacific cod	3	Pleuronectidae	18.7	6.73	17	30	7107.99	2559.46
92	2	Pacific cod	3	Pleuronectidae	0.6	0.6	3	7	13.44	13.44
92	3	Pacific cod	3	Pleuronectidae	6.1	2.98	30	98	7588.91	3707.16
92	4	Pacific cod	3	Pleuronectidae	0.39	0.32	26	63	135.95	111.82
92	4	Pacific halibut	1	Pleuronectidae	8.67		1	3	8.55	

Table H-1 (continued). – Estimates of total fish and crab prey consumption (in metric tons) by groundfish populations in the eastern Bering Sea from May through September by year, stratum, predator and predator size groups.

YEAR	STRATUM	PREDATOR	PREDATOR SIZE GROUP	PREY	% WEIGHT	SE % WEIGHT	NO. OF STATIONS	NO. OF STOMACHS	BIOMASS CONSUMED (TONS)	SE BIOMASS CONSUMED (TONS)
92	1	Pacific halibut	2	Pleuronectidae	1.49	0.74	19	111	170.27	84.28
92	2	Pacific halibut	2	Pleuronectidae	1.44	1.44	5	20	110.44	110.44
92	3	Pacific halibut	2	Pleuronectidae	2.99	2.99	16	49	214.48	214.48
92	4	Pacific halibut	2	Pleuronectidae	1.3	1.3	9	25	66.51	66.51
92	1	Pacific halibut	3	Pleuronectidae	41.79	15.3	4	6	772.15	282.73
92	2	Pacific halibut	3	Pleuronectidae	44.33	29.42	3	4	1240.48	823.15
92	1	Skates	1	Pleuronectidae	10.12	4.59	13	21	1013.62	459.22
92	2	Skates	1	Pleuronectidae	2.7	1.05	2	7	284.88	111.40
92	3	Skates	1	Pleuronectidae	0.91	0.4	29	124	671.11	298.57
92	4	Skates	1	Pleuronectidae	6.61	5.15	18	58	3981.29	3102.54
92	1	Walleye pollock	4	Pleuronectidae	0.03	0.03	26	350	33.14	28.50
92	4	Walleye pollock	4	Pleuronectidae	0.03	0.01	32	515	69.20	35.44
92	5	Walleye pollock	4	Pleuronectidae	0.01	0.01	16	236	9.90	9.90
92	6	Walleye pollock	4	Pleuronectidae	0.01	0.01	29	246	55.35	55.35
92	4	Yellowfin sole	1	Pleuronectidae	0.01	0.01	29	228	18.15	18.15
92	1	Pacific cod	3	Red King crab	4.59	4.59	17	30	353.53	353.53
92	3	Pacific cod	3	Red King crab	2.71	2.71	30	98	681.84	681.84
92	1	Pacific cod	2	Rock sole	0.59	0.58	18	181	636.01	623.25
92	3	Pacific cod	2	Rock sole	0.97	0.79	37	343	1544.39	1253.34
92	4	Pacific cod	2	Rock sole	2.3	2.3	29	278	2870.02	2870.02
92	1	Pacific cod	3	Rock sole	12.08	5.32	17	30	4592.57	2022.94
92	2	Pacific cod	3	Rock sole	3.59	3.59	3	7	80.63	80.63
92	3	Pacific cod	3	Rock sole	6.04	3.1	30	98	7508.64	3856.54
92	4	Pacific cod	3	Rock sole	5.25	3.91	26	63	1852.20	1378.18
92	1	Pacific halibut	2	Rock sole	3.75	1.76	19	111	429.54	201.67
92	2	Pacific halibut	3	Rock sole	22.04	22.04	3	4	616.74	616.74
92	1	Skates	1	Rock sole	2.31	1.42	13	21	230.99	141.72
92	2	Skates	1	Rock sole	32.08	10.71	2	7	3387.99	1130.90
92	3	Skates	1	Rock sole	9.56	4.52	29	124	7051.75	3335.10
92	4	Skates	1	Rock sole	6.44	4.65	18	58	3876.13	2797.32
92	1	Walleye pollock	4	Rock sole	0.04	0.03	26	350	39.56	28.54
92	4	Yellowfin sole	1	Rock sole	0.76	0.71	29	228	1321.07	1230.70
92	4	Alaska plaice	1	Unid. chionoecetes	0.16	0.16	18	85	141.80	141.80

Table H-1 (continued). -- Estimates of total fish and crab prey consumption (in metric tons) by groundfish populations in the eastern Bering Sea from May through September by year, stratum, predator and predator size groups.

YEAR	STRATUM	PREDATOR	PREDATOR SIZE GROUP	PREY	% WEIGHT	SE % WEIGHT	NO. OF STATIONS	NO. OF STOMACHS	BIOMASS CONSUMED (TONS)	SE BIOMASS CONSUMED (TONS)
92	3	Flathead sole	1	Unid. chionoecetes	0.13	0.13	15	70	366.77	366.77
92	4	Flathead sole	1	Unid. chionoecetes	0.71	0.71	18	111	409.41	409.41
92	6	Flathead sole	1	Unid. chionoecetes	0.35	0.35	8	36	692.74	692.74
92	1	Pacific cod	2	Unid. chionoecetes	2.26	1.46	18	181	2441.62	1578.87
92	2	Pacific cod	2	Unid. chionoecetes	2.1	0.98	4	61	217.97	101.80
92	3	Pacific cod	2	Unid. chionoecetes	2.1	0.71	37	343	3348.62	1133.61
92	4	Pacific cod	2	Unid. chionoecetes	3.22	2.22	29	278	4019.23	2773.18
92	5	Pacific cod	2	Unid. chionoecetes	1.85	1.44	9	62	551.98	429.67
92	6	Pacific cod	2	Unid. chionoecetes	0.68	0.56	31	296	670.12	554.85
92	1	Pacific cod	3	Unid. chionoecetes	1.72	1.72	17	30	653.31	653.31
92	3	Pacific cod	3	Unid. chionoecetes	2.04	1.31	30	98	2533.44	1632.06
92	4	Pacific cod	3	Unid. chionoecetes	1.69	1.69	26	63	596.81	596.81
92	6	Pacific cod	3	Unid. chionoecetes	0.06	0.05	27	145	68.43	53.59
92	1	Pacific halibut	2	Unid. chionoecetes	0.14	0.12	19	111	15.53	13.93
92	3	Pacific halibut	2	Unid. chionoecetes	3.32	2.06	16	49	238.12	147.87
92	4	Pacific halibut	2	Unid. chionoecetes	10.31	10.09	9	25	527.62	516.30
92	5	Pacific halibut	2	Unid. chionoecetes	10.22	10.22	3	8	92.22	92.22
92	6	Pacific halibut	3	Unid. chionoecetes	2	2	5	8	111.95	111.95
92	3	Rock sole	1	Unid. chionoecetes	0.13	0.13	15	78	729.94	729.94
92	6	Rock sole	1	Unid. chionoecetes	0.06	0.04	12	56	28.00	19.49
92	1	Skates	1	Unid. chionoecetes	8.69	4.79	13	21	870.19	479.37
92	2	Skates	1	Unid. chionoecetes	3.58	3.3	2	7	377.77	348.74
92	3	Skates	1	Unid. chionoecetes	2.68	1.2	29	124	1979.90	885.18
92	4	Skates	1	Unid. chionoecetes	1.54	0.82	18	58	925.08	493.72
92	5	Skates	1	Unid. chionoecetes	1.16	0.83	8	51	739.90	533.69
92	6	Skates	1	Unid. chionoecetes	1.79	1.08	19	127	3329.01	2006.63
92	3	Walleye pollock	2	Unid. chionoecetes	0	0	7	85	77.99	77.99
92	5	Walleye pollock	2	Unid. chionoecetes	0.13	0.13	8	42	413.84	413.84
92	6	Walleye pollock	3	Unid. chionoecetes	0	0	29	184	39.80	39.80
92	4	Walleye pollock	4	Unid. chionoecetes	0	0	32	515	3.23	3.23
92	6	Walleye pollock	4	Unid. chionoecetes	0.01	0.01	29	246	50.53	50.53
92	3	Yellowfin sole	1	Unid. chionoecetes	2.52	1.71	30	213	15135.30	10281.64
92	4	Yellowfin sole	1	Unid. chionoecetes	0.02	0.02	29	228	42.95	42.95

Table H-1 (continued). -- Estimates of total fish and crab prey consumption (in metric tons) by groundfish populations in the eastern Bering Sea from May through September by year, stratum, predator and predator size groups.

YEAR	STRATUM	PREDATOR	PREDATOR SIZE GROUP	PREY	% WEIGHT	SE % WEIGHT	NO. OF STATIONS	NO. OF STOMACHS	BIOMASS CONSUMED (TONS)	SE BIOMASS CONSUMED (TONS)
92	3	Arrowtooth flounder	2	Walleye pollock	16.1	16.1	6	13	2270.18	2270.18
92	5	Arrowtooth flounder	2	Walleye pollock	23.87	13.05	9	30	5392.32	2948.82
92	6	Arrowtooth flounder	2	Walleye pollock	56.22	15.29	8	21	2136.74	581.13
92	3	Arrowtooth flounder	3	Walleye pollock	24.94	24.94	4	5	1516.39	1516.39
92	5	Arrowtooth flounder	3	Walleye pollock	47.49	13.25	11	40	23238.07	6482.10
92	6	Arrowtooth flounder	3	Walleye pollock	63.82	9.73	16	88	19914.60	3037.11
92	4	Flathead sole	1	Walleye pollock	31.65	7.62	18	111	18153.19	4372.82
92	6	Flathead sole	1	Walleye pollock	18.02	9.25	8	36	35905.93	18422.73
92	4	Greenland turbot	1	Walleye pollock	66.67	33.33	3	4	1.12	0.56
92	6	Greenland turbot	1	Walleye pollock	33.33	33.33	3	4	357.36	357.36
92	3	Greenland turbot	3	Walleye pollock	100		1	1	472.01	
92	4	Greenland turbot	3	Walleye pollock	100	0	3	3	175.95	0.00
92	5	Greenland turbot	3	Walleye pollock	100		1	1	163.71	
92	6	Greenland turbot	3	Walleye pollock	89.61	8.71	8	20	8231.71	799.94
92	4	Pacific cod	1	Walleye pollock	2.07	2.07	29	128	1667.64	1667.64
92	1	Pacific cod	2	Walleye pollock	1.06	0.65	18	181	1141.90	699.43
92	2	Pacific cod	2	Walleye pollock	4.31	2.7	4	61	448.83	280.93
92	3	Pacific cod	2	Walleye pollock	7.12	2.4	37	343	11359.87	3824.48
92	4	Pacific cod	2	Walleye pollock	5.77	1.89	29	278	7216.13	2361.29
92	5	Pacific cod	2	Walleye pollock	21	10.07	9	62	6255.03	2998.97
92	6	Pacific cod	2	Walleye pollock	32.03	4.82	31	296	31781.82	4781.05
92	1	Pacific cod	3	Walleye pollock	24.54	8.28	17	30	9328.97	3147.24
92	2	Pacific cod	3	Walleye pollock	2.69	2.69	3	7	60.47	60.47
92	3	Pacific cod	3	Walleye pollock	42.7	7.88	30	98	53107.43	9801.56
92	4	Pacific cod	3	Walleye pollock	30.43	7.38	26	63	10731.48	2601.84
92	5	Pacific cod	3	Walleye pollock	53.42	10.48	9	42	34006.75	6672.25
92	6	Pacific cod	3	Walleye pollock	76.91	5.11	27	145	84956.34	5642.53
92	1	Pacific halibut	2	Walleye pollock	8.26	4.85	19	111	945.88	555.63
92	2	Pacific halibut	2	Walleye pollock	19.66	16.93	5	20	1504.81	1295.29
92	3	Pacific halibut	2	Walleye pollock	3.27	3.27	16	49	234.33	234.33
92	4	Pacific halibut	2	Walleye pollock	30.2	13.25	9	25	1545.51	678.12
92	6	Pacific halibut	2	Walleye pollock	35.58	17.02	6	10	658.71	315.18
92	2	Pacific halibut	3	Walleye pollock	27.55	20.24	3	4	770.90	566.20

Table H-1(continued). -- Estimates of total fish and crab prey consumption (in metric tons) by groundfish populations in the eastern Bering Sea from May through September by year, stratum, predator and predator size groups.

YEAR	STRATUM	PREDATOR	PREDATOR SIZE GROUP	PREY	% WEIGHT	SE % WEIGHT	NO. OF STATIONS	NO. OF STOMACHS	BIOMASS CONSUMED (TONS)	SE BIOMASS CONSUMED (TONS)
92	3	Pacific halibut	3	Walleye pollock	93.94	4.03	4	11	4973.01	213.50
92	4	Pacific halibut	3	Walleye pollock	50	28.87	4	5	966.35	557.92
92	5	Pacific halibut	3	Walleye pollock	98.97	0.07	3	11	5948.36	4.40
92	6	Pacific halibut	3	Walleye pollock	59.21	24.18	5	8	3314.45	1353.59
92	2	Skates	1	Walleye pollock	6.74	6.74	2	7	711.29	711.29
92	3	Skates	1	Walleye pollock	35.96	7.82	29	124	26528.77	5765.98
92	4	Skates	1	Walleye pollock	34.55	10.11	18	58	20797.42	6085.75
92	5	Skates	1	Walleye pollock	91.95	3.29	8	51	58805.54	2103.27
92	6	Skates	1	Walleye pollock	63.35	8.7	19	127	117724.70	16160.85
92	6	Walleye pollock	2	Walleye pollock	6.25	6.25	16	106	134957.40	134957.40
92	6	Walleye pollock	3	Walleye pollock	5.77	3.77	29	184	56823.32	37133.25
92	1	Walleye pollock	4	Walleye pollock	0.38	0.22	26	350	367.22	214.81
92	2	Walleye pollock	4	Walleye pollock	11.21	7.01	8	46	1767.53	1105.19
92	4	Walleye pollock	4	Walleye pollock	10.39	1.72	32	515	25266.93	4179.36
92	5	Walleye pollock	4	Walleye pollock	0.53	0.53	16	236	637.38	637.38
92	6	Walleye pollock	4	Walleye pollock	21.35	6.12	29	246	91339.22	26177.79
92	4	Yellowfin sole	1	Walleye pollock	0.2	0.19	29	228	355.39	338.41
92	1	Pacific cod	2	Yellowfin sole	1.36	1.36	18	181	1467.88	1467.88
92	1	Pacific cod	3	Yellowfin sole	4	2.9	17	30	1520.39	1100.90
92	3	Pacific cod	3	Yellowfin sole	0.91	0.74	30	98	1129.94	915.52
92	1	Pacific halibut	2	Yellowfin sole	0.27	0.27	19	111	31.37	31.37
92	2	Pacific halibut	2	Yellowfin sole	19.92	15.75	5	20	1524.74	1205.44
92	1	Pacific halibut	3	Yellowfin sole	5.15	5.15	4	6	95.15	95.15
92	1	Skates	1	Yellowfin sole	6.21	3.33	13	21	621.93	333.86

Table H-2. -- Estimated number (in millions) of prey consumed by groundfish predators in the eastern Bering Sea from May to September of 1990 through 1992, by predator size group and stratum. Numbers in parentheses indicate cells with missing prey size information.

Prey	Predator	Predator size (cm)	Stratum	Number (millions) 1990	1991	1992
Arrowtooth flounder	Pacific cod	30-59	3	159.1	0	0
			5	0	0	10.37
		<60	3	7.52	0	2.21
			4	0	12.34	0
			5	7.65	0	0
			6	0	0.75	(0)
	Walleye pollock	≥50	4	0	0	195.93
			6	0	0	25,665.85
Arrowtooth flounder Total				174.27	13.09	25,874.36
Bairdi Tanner crab	Flathead sole	all lengths	3	868.45	461.72	3229.23
			4	85.62	0	0
			5	2257.12	1421.31	1196.4
			6	8134.35	183.8	0
	Pacific cod	<30	3	0	5685.67	0
			4	91.09	975.6	0
		30-59	1	0	87.48	0
			3	333.7	702.41	998.52
			4	65	324	67.03
			5	424.6	635.56	213.3
			6	267.01	62.1	423.96
		≥60	1	0	0	24.38
			3	247.12	219.41	86.83
			4	52.7	26.94	55.26
			5	137.94	437.05	143.22
			6	582.94	31.95	(0)
	Pacific halibut	30-59	3	0	306.06	(0)
			5	2.14	0	14.81
			6	0	0	7.75
		≥60	1	8.68	0	0
			3	0	0	3.8
			4	0	0	22.68
			5	37.88	15.78	1.02
			6	1.62	0	0

Table H-2 (continued). -- Estimated number (in millions) of prey consumed by groundfish predators in the eastern Bering Sea from May to September of 1990 through 1992, by predator size group and stratum. Numbers in parentheses indicate cells with missing prey size information.

Prey	Predator	Predator size (cm)	Stratum	Number (millions) 1990	1991	1992
Bairdi Tanner crab, continued	Rock sole	all lengths	6	302.63	0	0
	Skates	all lengths	3	ns	ns	31.05
			5	ns	ns	95.06
	Walleye pollock	≥50	4	0	237.05	0
	Yellowfin sole	all lengths	3	871.82	6565.26	(0)
			4	5742.08	132.53	0
Bairdi Tanner crab Total				20514.49	18511.68	6614.3
Flathead sole	Flathead sole	all lengths	6	3772.39	0	0
	Greenland turbot	≥50	6	0	0	0.45
	Pacific cod	30-59	3	0	0	62.96
			6	791.44	32.04	64.29
		≥60	3	13.46	0	0
			5	29.56	25.36	70.56
			6	16.17	14.45	8.8
	Pacific halibut	30-59	2	0	53.89	0
			3	0	0	27.41
			4	0	20.11	0
	Skates	all lengths	3	0	0	26.11
Flathead sole Total				4623.02	145.85	260.58
Greenland turbot	Pacific cod	<30	4	0	0	71.39
		30-59	6	0	0	4.18
		≥60	6	0	0	5.12

Table H-2 (continued). -- Estimated number (in millions) of prey consumed by groundfish predators in the eastern Bering Sea from May to September of 1990 through 1992, by predator size group and stratum. Numbers in parentheses indicate cells with missing prey size information.

Prey	Predator	Predator size (cm)	Stratum	Number (millions) 1990	1991	1992
Greenland turbot, continued	Walleye pollock	<30	2	14.66	0	0
			4	712.34	0	0
		30-39	3	0	0	13906.34
		40-49	3	8724	0	0
			4	6068.76	0	1557.1
			6	2589.3	1036.75	0
		≥50	2	22.13	0	0
			3	74.83	0	0
			4	15922.37	16.96	1339.46
			6	0	224.38	331.43
Greenland turbot Total				34128.39	1278.09	17215.02
Opilio snow crab	Alaska plaice	all lengths	2	0	195.41	0
			3	923.49	0	0
			4	24839.52	(0)	72.22
	Flathead sole	all lengths	3	1602.92	1602.46	16264.15
			4	692.32	1013.12	900.2
			5	0	2322.12	0
			6	572.9	7546.4	2425.42
	Pacific cod	<30	4	3989.48	836.4	321.2
			6	0	2773.83	0
		30-59	1	0	221.71	498.48
			2	83.8	135.02	88
			3	3280.42	1252.35	1601.24
			4	8802.64	2845.02	1951.16
			5	43.98	(0)	524.81
			6	714.2	510.59	753.57
		≥60	1	126.49	0	283.34
			2	389.57	488.69	2.52
			3	694.69	493.29	460.66
			4	1811.16	999.1	105.15
			5	59.52	6.98	0
			6	489.8	414.26	93.3

Table H-2 (continued). – Estimated number (in millions) of prey consumed by groundfish predators in the eastern Bering Sea from May to September of 1990 through 1992, by predator size group and stratum. Numbers in parentheses indicate cells with missing prey size information.

Prey	Predator	Predator size (cm)	Stratum	Number (millions) 1990	1991	1992
Opilio snow crab, continued	Pacific halibut	30-59	1	0	0	4.52
			3	112.57	0	114.18
			4	0	240.03	72.45
			5	0	0	46.76
			6	0	0	125.39
		≥60	1	0	2.74	0
			3	50.23	1.13	0
			4	647.93	(0)	0
			5	1.5	(0)	2.11
			6	118.71	0	0
	Rock sole	all lengths	3	0	1223.02	3841.73
			4	3298.98	4527.31	0
			6	0	0	4878.4
	Skates	all lengths	1	0	0	6.34
			3	0	0	58.21
			4	0	0	1809.69
			5	0	0	28.79
			6	0	0	402.82
	Walleye pollock	≥50	4	503.06	1401.71	72.96
	Yellowfin sole	all lengths	2	1597.26	1448.12	0
			3	7678.77	156.76	0
			4	4811.02	2282.95	232.19
			5	1.09	0	0
Opilio snow crab Total				67938.02	34940.52	38041.96
Osmerids	Flathead sole	all lengths	1	74.27	0	402.03
			4	421.36	56.99	0
	Pacific cod	30-59	1	575.34	0	154.9
			2	24.32	0	(0)
			4	0	72.94	0

Table H-2 (continued). -- Estimated number (in millions) of prey consumed by groundfish predators in the eastern Bering Sea from May to September of 1990 through 1992, by predator size group and stratum. Numbers in parentheses indicate cells with missing prey size information.

Prey	Predator	Predator size (cm)	Stratum	Number (millions) 1990	1991	1992
Osmerids, continued	Pacific halibut	<30	2	0	0	3.98
		30-59	1	0	0	114.3
			2	4.98	0	101
		≥60	2	29.27	0	0
	Walleye pollock	≥50	1	491.61	0	714.51
			2	0	17.1	0
			3	58.63	0	83.42
			4	0	299.67	0
Osmerids Total				1679.78	446.7	1574.14
Pacific cod	Greenland turbot	≥50	6	0	0	0.88
	Pacific cod	30-59	4	0	0	28.44
	Pacific halibut	≥60	1	0	5.3	(0)
			4	0	0.55	0
	Walleye pollock	40-49	6	1060.67	0	0
		≥50	1	194.23	0	0
			4	2.9	55.03	0
			6	5513.91	0	0
Pacific cod Total				6771.71	60.88	29.32
Pacific halibut	Alaska plaice	all lengths	1	0	309.05	0
	Pacific cod	>30	1	0	0	682.79
		30-59	1	0	0	47.86
			4	0	0	17.15
		≥60	4	0	0	0.57
	Pacific halibut	30-59	1	0	0	4.2
			2	0	21.97	0

Table H-2 (continued). -- Estimated number (in millions) of prey consumed by groundfish predators in the eastern Bering Sea from May to September of 1990 through 1992, by predator size group and stratum. Numbers in parentheses indicate cells with missing prey size information.

Prey	Predator	Predator size (cm)	Stratum	Number (millions) 1990	1991	1992
Pacific halibut, continued	Walleye pollock	40-49	6	0	0	1340.52
		≥50	4	0	175.5	0
Pacific halibut Total				0	506.52	2093.09
Pacific herring	Arrowtooth flounder	≥40	5	0	71.32	0
	Rock sole	all lengths	1	368.17	0	0
	Walleye pollock	≥50	1	3.91	0	0
			2	8.64	0	0
			4	223.02	0	(0)
			6	304.96	0	0
Pacific herring Total				908.7	71.32	0
Red king crab	Pacific cod	30-59	1	(0)	(0.55)	0
		≥60	1	0	(0)	0.52
			3	(0)	(0)	0.46
Red king crab Total				0	0.55	0.98
Rock sole	Pacific cod	30-59	1	0	14.82	43.14
			3	22.36	0	55.56
			4	0	0	85.12
		≥60	1	20.44	311.75	136.08
			2	92.24	1.62	(0)
			3	88.49	9.66	39.6
			4	0	44.01	30.01
	Pacific halibut	30-59	1	0	35.99	20.24
		≥60	2	0	0	10.96
	Skates	all lengths	1	ns	ns	35.02
			2	ns	ns	54.08
			3	ns	ns	137.8
			4	ns	ns	57.92

Table H-2 (continued). -- Estimated number (in millions) of prey consumed by groundfish predators in the eastern Bering Sea from May to September of 1990 through 1992, by predator size group and stratum. Numbers in parentheses indicate cells with missing prey size information.

Prey	Predator	Predator size (cm)	Stratum	Number (millions) 1990	1991	1992
Rock sole, continued	Walleye pollock	40-49	6	0	617.35	0
		≥50	1	3.11	0	3.36
			2	16.88	0	0
			4	378.25	0	0
			6	352.86	0	0
Rock sole total				974.63	1035.2	708.89
Unid. Chionoecetes	Alaska plaice	all lengths	4	7485.35	0	164.3
	Flathead sole	all lengths	3	2654.85	25494.8	26352.69
			4	1468.13	(0)	0
			5	(0)	1305.48	(0)
			6	22092.43	(0)	336.6
	Pacific cod	<30	3	83.9	(0)	0
		30-59	1	0	(0)	8725.39
			3	8893.74	5309.66	3417.93
			4	5226.91	8113.12	(0)
			5	(0)	(0)	91.85
			6	(0)	1759.4	(0)
		≥60	3	154.72	105.76	(0)
			4	635.56	(0)	(0)
			5	19835.01	(0)	0
			6	198.42	350	(0)
	Pacific halibut	30-59	1	(0)	(0)	13.45
			3	0	(0)	91.68
			4	0	(0)	456.94
			5	0	0	12.73
	Rock sole	all lengths	3	1255.93	(0)	(0)
			6	0	0	100.05
	Skates	all lengths	1	0	0	82.07
			3	0	0	45.87
			4	0	0	1618.82
			5	0	0	640.78

Table H-2 (continued). -- Estimated number (in millions) of prey consumed by groundfish predators in the eastern Bering Sea from May to September of 1990 through 1992, by predator size group and stratum. Numbers in parentheses indicate cells with missing prey size information.

Prey	Predator	Predator size (cm)	Stratum	Number (millions) 1990	1991	1992
Unid. Chionoecetes, continued	Walleye pollock	40-49	4	32977.91	0	0
			6	804.56	(0)	(0)
		≥50	2	331.99	0	0
			4	11331.12	(0)	(0)
	Yellowfin sole	all lengths	1	65036.98	(0)	0
			2	13013.16	(0)	0
			3	32583.62	(0)	(0)
			4	62975.86	(0)	(0)
Unidentified Chionoecetes Total				289040.2	42438.22	42151.15
Walleye pollock	Arrowtooth flounder	20-39	3	1266.52	0	22.81
			4	781	199.55	0
			5	1672.57	265.9	98.78
			6	1649.46	411.2	104.55
		≥40	3	246.02	0	15.24
			4	245.6	104.34	0
			5	2201.38	440.94	166.45
			6	1695.75	1446.3	284.29
	Flathead sole	all lengths	1	425.46	0	0
			3	5179.68	1301.1	0
			4	5603.39	2975.94	1752.25
			6	2149.24	560.61	4395.93
	Greenland turbot	<30	4	0	0	0.75
			6	81	0	24.78
		30-49	6	0	140.48	0
		≥50	3	0	0	2.61
			4	0	0	2.4
			5	0	0	0.36
			6	17.98	21.81	29.6

Table H-2 (continued). -- Estimated number (in millions) of prey consumed by groundfish predators in the eastern Bering Sea from May to September of 1990 through 1992, by predator size group and stratum. Numbers in parentheses indicate cells with missing prey size information.

Prey	Predator	Predator size (cm)	Stratum	Number (millions) 1990	1991	1992
Walleye pollock, cont'd	Pacific cod	<30	1	0	88.13	0
			4	700.36	461.23	435.07
		30-59	1	112.68	391.36	13.22
			2	178.71	132.33	106.89
			3	701.69	108.72	77.77
			4	1337.84	727.2	390.58
			5	97.38	(0)	24.9
			6	179.16	136.93	387.66
		≥60	1	6.24	5.75	12.3
			2	8.36	11.04	(0)
			3	125.22	109.86	119.72
			4	26.42	124.05	31.37
			5	107.59	45.45	146.39
			6	587.09	280.35	305.91
	Pacific halibut	<30	1	6.61	0	0
		30-59	1	263.7	576.6	80.16
			2	150	872.1	136.11
			3	18.66	0	13.14
			4	122.18	38.63	45.51
			5	878.11	0	0
			6	1.99	0	37
		≥60	1	14.27	14.77	0
			2	13.86	45.5	34.17
			3	30.57	12.69	21
			4	21.97	10.8	2.39
			5	4.23	7.14	14.71
			6	26.23	0	15.76
	Rock sole	all lengths	2	212.3	0	0
	Skates	all lengths	3	ns	ns	67.78
			4	ns	ns	94.16
			5	ns	ns	191.2
			6	ns	ns	370.18

Table H-2 (continued). -- Estimated number (in millions) of prey consumed by groundfish predators in the eastern Bering Sea from May to September of 1990 through 1992, by predator size group and stratum. Numbers in parentheses indicate cells with missing prey size information.

Prey	Predator	Predator size (cm)	Stratum	Number (millions) 1990	1991	1992
Walleye pollock, cont'd	Walleye pollock	<30	1	248.33	0	0
			3	465.33	(0)	0
			4	267.3	0	0
		30-39	1	259.85	0	0
			6	15902.49	1789.48	30618.18
		40-49	1	0	15.47	0
			3	1591.02	29.22	0
			4	6848.48	184.8	0
			5	1524.72	0	0
			6	133342.7	7198.38	3095.08
		≥50	1	203.7	7.22	11.1
			2	399.55	320.19	139.72
			3	4707.96	1908.9	0
			4	9890.65	2288.74	2482.44
			5	2143.75	0	19.23
			6	19264.49	3241.73	1620.55
	Yellowfin sole	all lengths	2	1895.14	1915.7	0
			4	242.64	150.84	(0)
			5	3.59	0	0
			6	0.56	0	0
Walleye pollock Total				228350.7	31119.47	48062.15
Yellowfin sole	Pacific cod	30-59	1	0	0	32.11
			3	0	11.59	0
			4	28.88	0	0
		≥60	1	22.4	0	16.65
			3	27.14	26.52	16.32
	Pacific halibut	30-59	2	0	0	32.52
		≥60	1	0	9.9	0.95
	Skates	all lengths	1	0	0	19.56
Yellowfin sole Total				78.42	48.01	118.11