

## Skates

### Whiteblotched skate (*Bathyraja maculata*)

Whiteblotched skate accounted for more than 49% of the total estimated combined skates biomass in the entire survey area, being most abundant in the Eastern Aleutian area (Table 47). Mean individual weights (4.86 kg) were generally smaller than either Aleutian skate (10.98 kg) or Alaska skate (8.85 kg). In general, mean CPUE was highest in the 101-200 m and 301-500 m depth intervals. The highest subarea-specific mean CPUEs occurred in the NE and SE Eastern Aleutian subareas in 101-200 m (Table 48), west and south of Seguam Island (Fig. 61), and on Stalemate Bank in 101-200 m.

Males and females were almost equally represented in length frequency collections, and their respective length frequency distributions more or less mirrored each other (Fig. 62). Figure 63 shows the length-weight relationships for male, female, and combined sexes of whiteblotched skate.

### Alaska skate (*Bathyraja parmifera*)

Alaska skate was the second most abundant species of skate captured during this survey, but was the most abundant skate in the Western and Central Aleutian areas (Table 2). The estimated biomass of 10,500 t, was highest in the 1-100 m and 101-200 m depth intervals, and was almost equally distributed across both intervals (Table 49). Alaska skate abundance in the Southern Bering Sea area was very low. Mean sizes were largest in the Western Aleutian area and decreased eastward. The smallest mean sizes were found in the deeper depths. The highest four subarea-specific mean CPUEs and estimated biomasses were found on Petrel and Stalemate Banks (Table 50 and Fig. 64).

Females far outnumbered males in the length frequency samples. Total lengths ranged from 22 to 130 cm (Fig. 65). Figure 66 summarizes the length-weight relationships for male, female, and combined sexes of Alaska skate.

Table 47.--Number of survey hauls, number of hauls with whiteblotched skate, mean CPUE, biomass estimates with confidence limits, mean weight, and mean length based on the 2002 Aleutian Islands bottom trawl survey, by NPFMC regulatory area and depth interval.

NPFMC area	Depth (m)	Number of trawl hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	95% Confidence limits		Mean weight (kg)	Mean length (cm)
						Minimum biomass (t)	Maximum biomass (t)		
Western Aleutian	1-100	26	1	2.11	1,028	0	3,207	7.724	97.9
	101-200	51	8	5.82	3,095	521	5,669	6.128	89.0
	201-300	19	2	0.50	86	0	230	8.899	114.5
	301-500	13	0	-	-	-	-	-	-
	All depths	109	11	2.77	4,209	924	7,493	6.497	91.0
Central Aleutian	1-100	30	1	0.18	103	0	389	8.418	109.0
	101-200	45	7	2.65	1,221	0	3,041	8.901	108.0
	201-300	23	6	2.19	462	0	1,237	4.335	84.6
	301-500	17	9	1.20	476	0	964	3.391	74.9
	All depths	115	23	1.37	2,262	292	4,232	5.707	88.6
Eastern Aleutian	1-100	16	2	1.08	739	0	1,979	8.715	106.8
	101-200	47	15	5.54	4,306	20	8,591	5.031	89.1
	201-300	42	16	2.95	1,447	582	2,311	5.702	93.3
	301-500	27	17	6.20	3,523	1,301	5,745	3.051	72.4
	All depths	132	50	3.97	10,014	5,164	14,864	4.263	83.0
All Aleutian Areas	1-100	72	4	1.06	1,870	0	4,241	8.126	100.4
	101-200	143	30	4.87	8,622	3,539	13,705	5.755	90.4
	201-300	84	24	2.28	1,994	925	3,064	5.391	90.3
	301-500	57	26	3.09	3,999	1,744	6,254	3.088	72.6
	All depths	356	84	2.90	16,485	10,453	22,516	4.858	85.3
Southern Bering Sea	1-100	30	0	-	-	-	-	-	-
	101-200	16	0	-	-	-	-	-	-
	201-300	7	3	1.18	67	0	166	4.517	82.0
	301-500	8	4	1.67	174	0	383	2.081	65.0
	All depths	61	7	0.32	241	16	467	2.446	72.0

Table 48.--Sampling effort, mean CPUE, and estimated biomass with 95% confidence limits (CL) of whiteblotched skate by NPFMC regulatory area and survey subarea, ranked by descending mean CPUE for the 2002 Aleutian Islands bottom trawl survey.

NPFMC Area	Depth range (m)	Subarea	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Biomass CL	
							Min. (t)	Max. (t)
Eastern Aleutian	101-200	NE Eastern Aleutian	17	6	13.30	2,677	0	6,873
Eastern Aleutian	101-200	SE Eastern Aleutian	15	9	8.57	1,628	503	2,754
Western Aleutian	101-200	W Western Aleutian	28	7	7.58	3,083	503	5,662
Eastern Aleutian	301-500	SE Eastern Aleutian	12	9	6.75	1,737	225	3,249
Eastern Aleutian	301-500	Combined Eastern Aleutian	13	8	6.69	1,786	0	3,598
Central Aleutian	101-200	Petrel Bank	6	2	6.14	1,065	0	2,965
Central Aleutian	201-300	SE Central Aleutian	4	1	5.90	282	0	1,178
Eastern Aleutian	1-100	SE Eastern Aleutian	5	2	4.24	739	0	2,078
Eastern Aleutian	201-300	SE Eastern Aleutian	12	7	4.15	854	125	1,583
Central Aleutian	201-300	N Central Aleutian	10	4	3.86	169	0	412
Eastern Aleutian	201-300	NE Eastern Aleutian	22	9	3.01	592	79	1,106
Western Aleutian	1-100	W Western Aleutian	16	1	2.78	1,028	0	3,219
Central Aleutian	301-500	SW Central Aleutian	2	1	1.80	142	0	1,946
Southern Bering	301-500	Combined Southern Bering	8	4	1.67	174	0	389
Central Aleutian	301-500	N Central Aleutian	8	6	1.61	200	42	358
Southern Bering	201-300	Combined Southern Bering	7	3	1.18	67	0	169
Central Aleutian	301-500	Petrel Bank	3	2	1.08	134	0	664
Central Aleutian	1-100	Petrel Bank	4	1	1.07	103	0	430
Central Aleutian	101-200	SE Central Aleutian	14	3	0.91	68	0	151
Western Aleutian	201-300	W Western Aleutian	9	1	0.65	61	0	201
Central Aleutian	101-200	N Central Aleutian	8	1	0.62	66	0	221
Western Aleutian	201-300	E Western Aleutian	10	1	0.32	25	0	82
Central Aleutian	101-200	SW Central Aleutian	17	1	0.22	23	0	71
Central Aleutian	201-300	Petrel Bank	3	1	0.15	11	0	59
Western Aleutian	101-200	E Western Aleutian	23	1	0.10	13	0	39

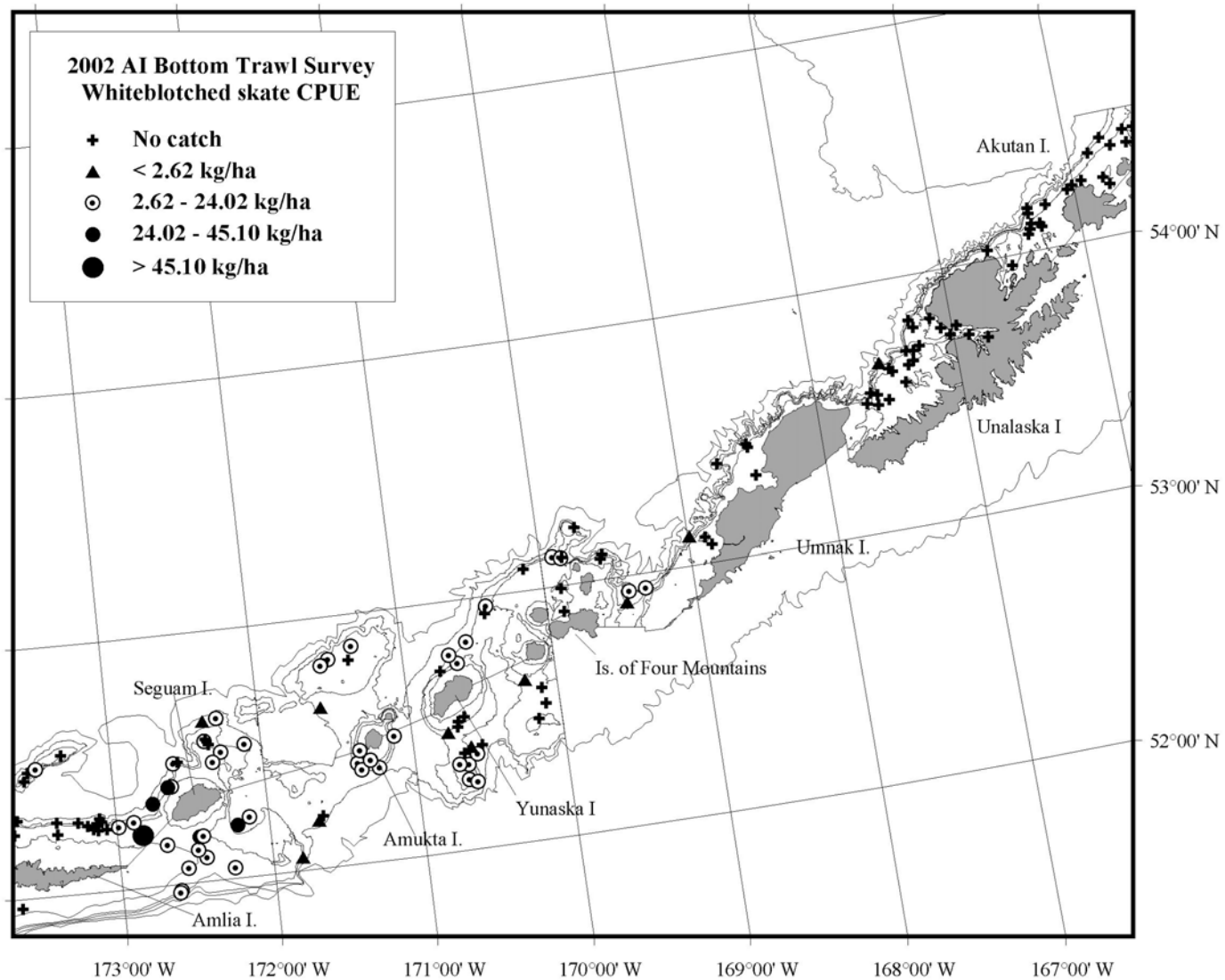


Figure 61.--Distribution and relative abundance of whiteblotched skate from the 2002 Aleutian Islands bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than mean CPUE, between mean CPUE and two standard deviations above mean CPUE, between two and four standard deviations above mean CPUE, and greater than four standard deviations above mean CPUE.

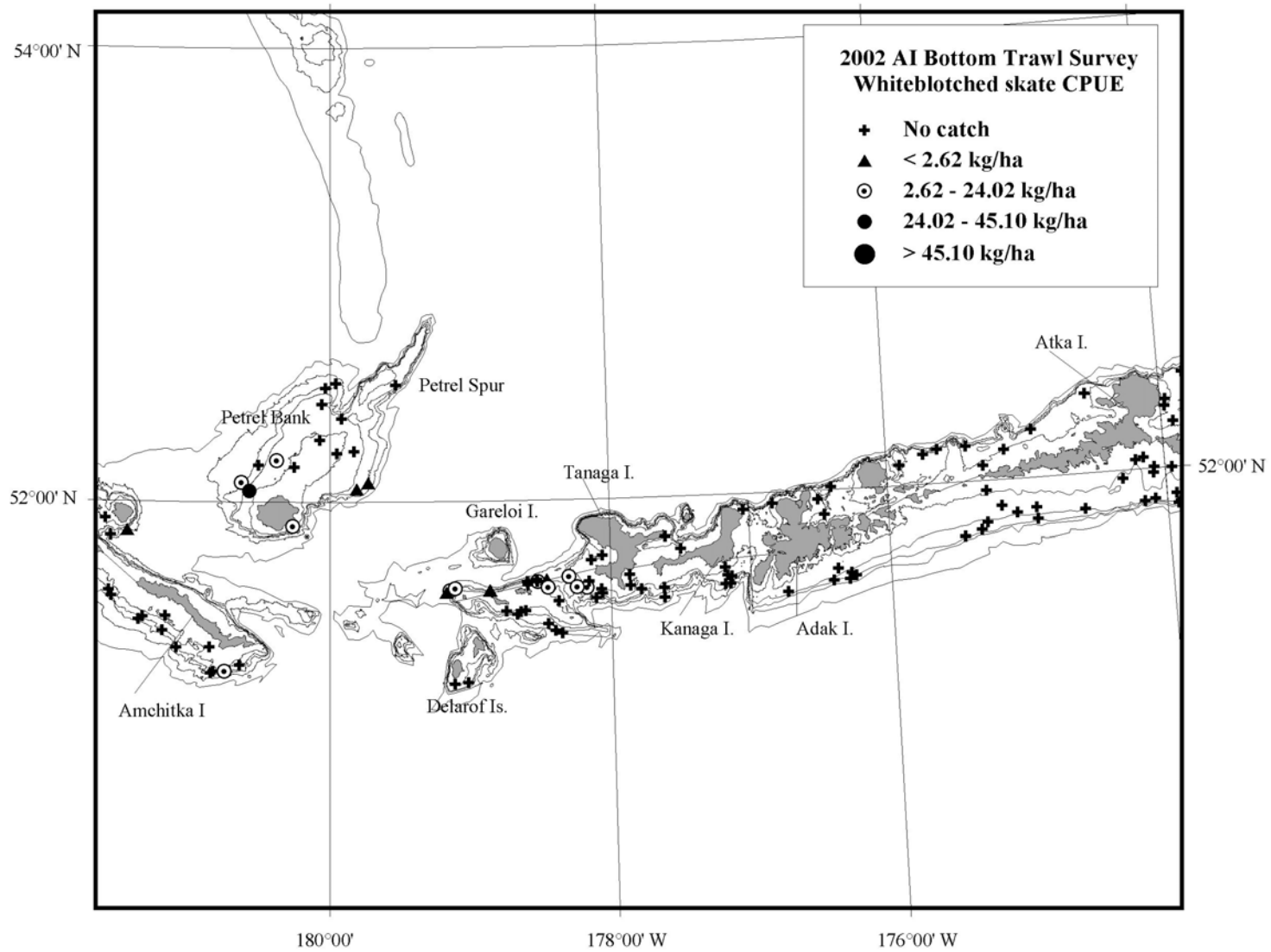


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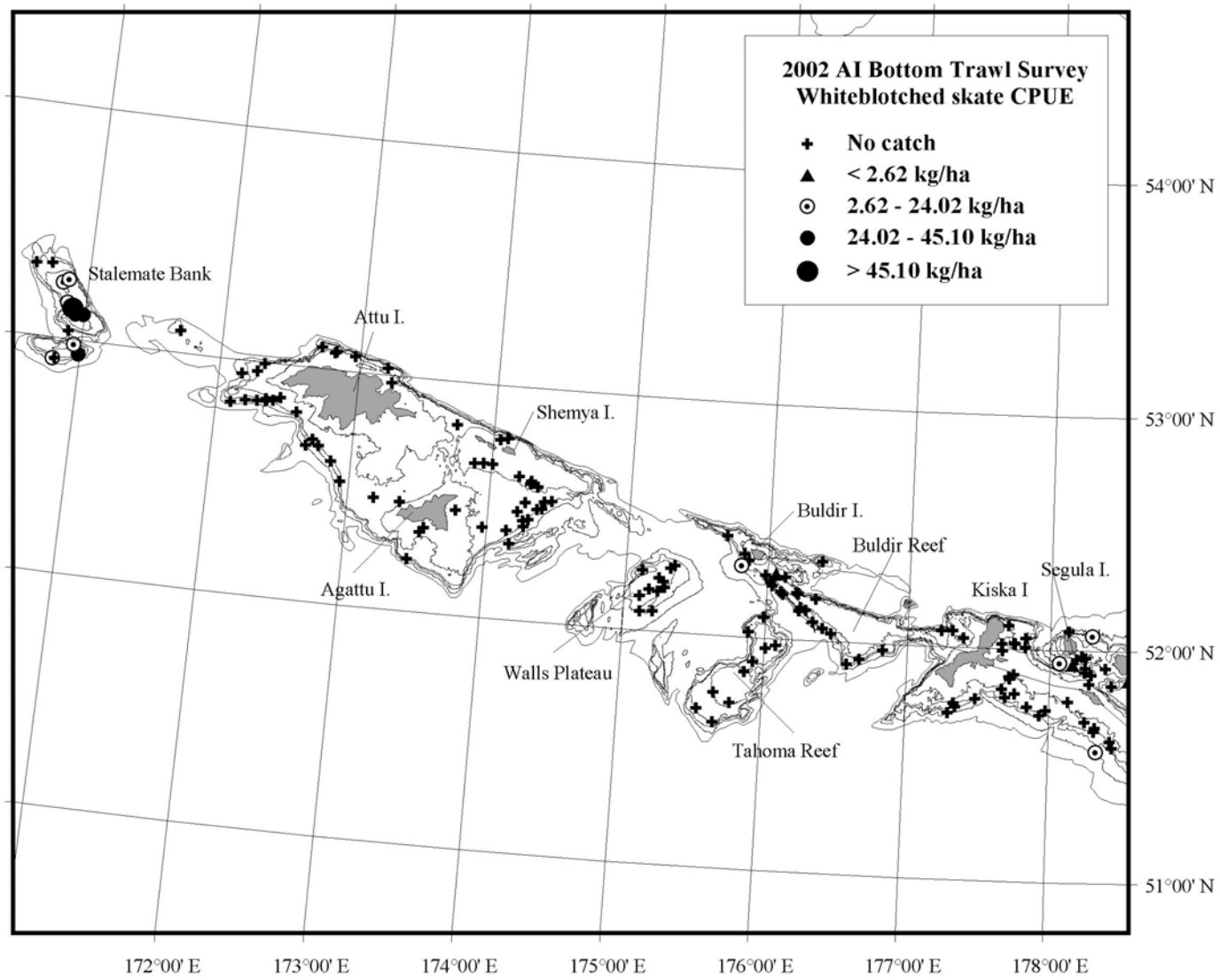


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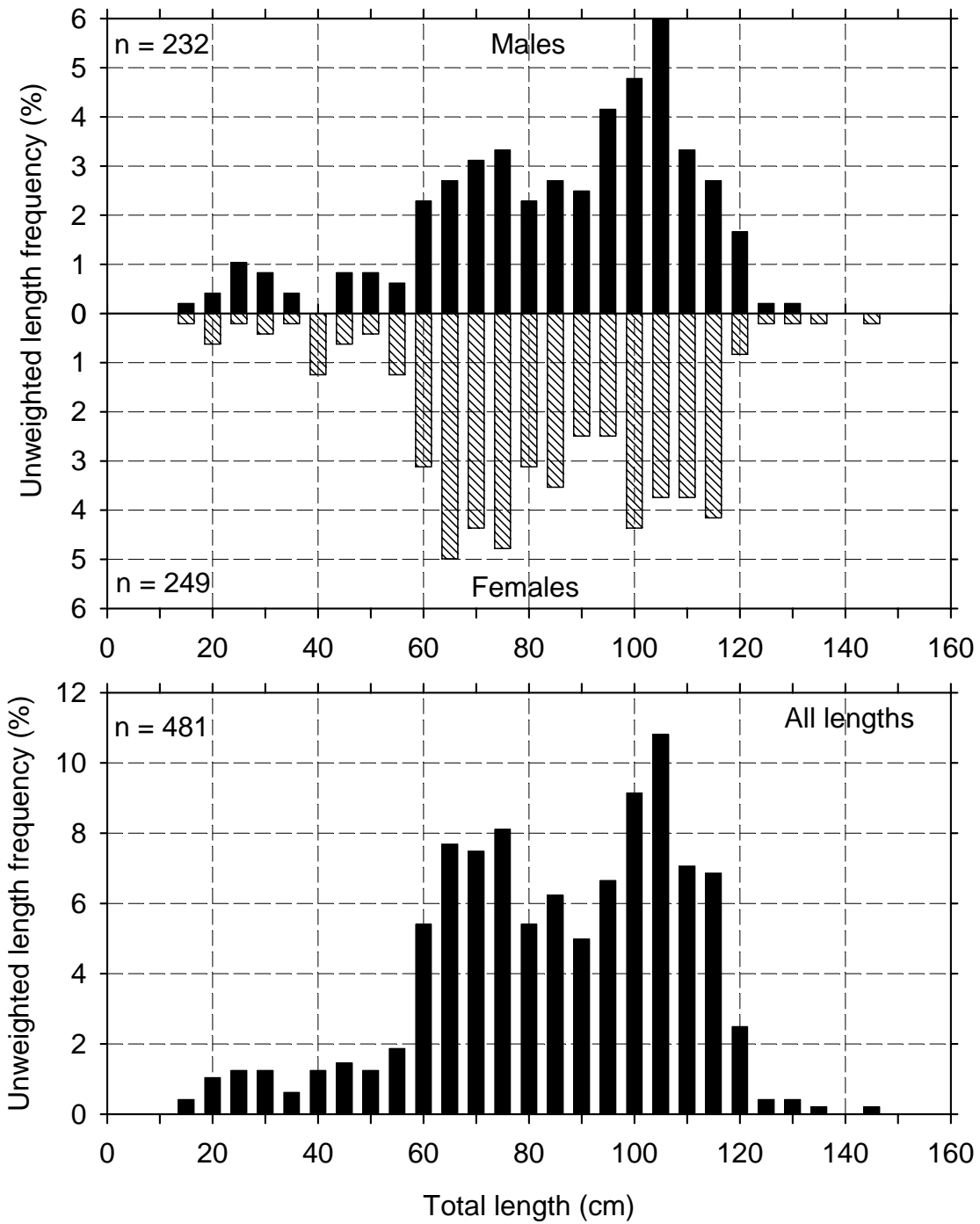


Figure 62.--Length frequencies of whiteblotched skate catches from the 2002 Aleutian Islands bottom trawl survey. Lengths grouped in 5 cm increments. Lengths are from all areas and depths.

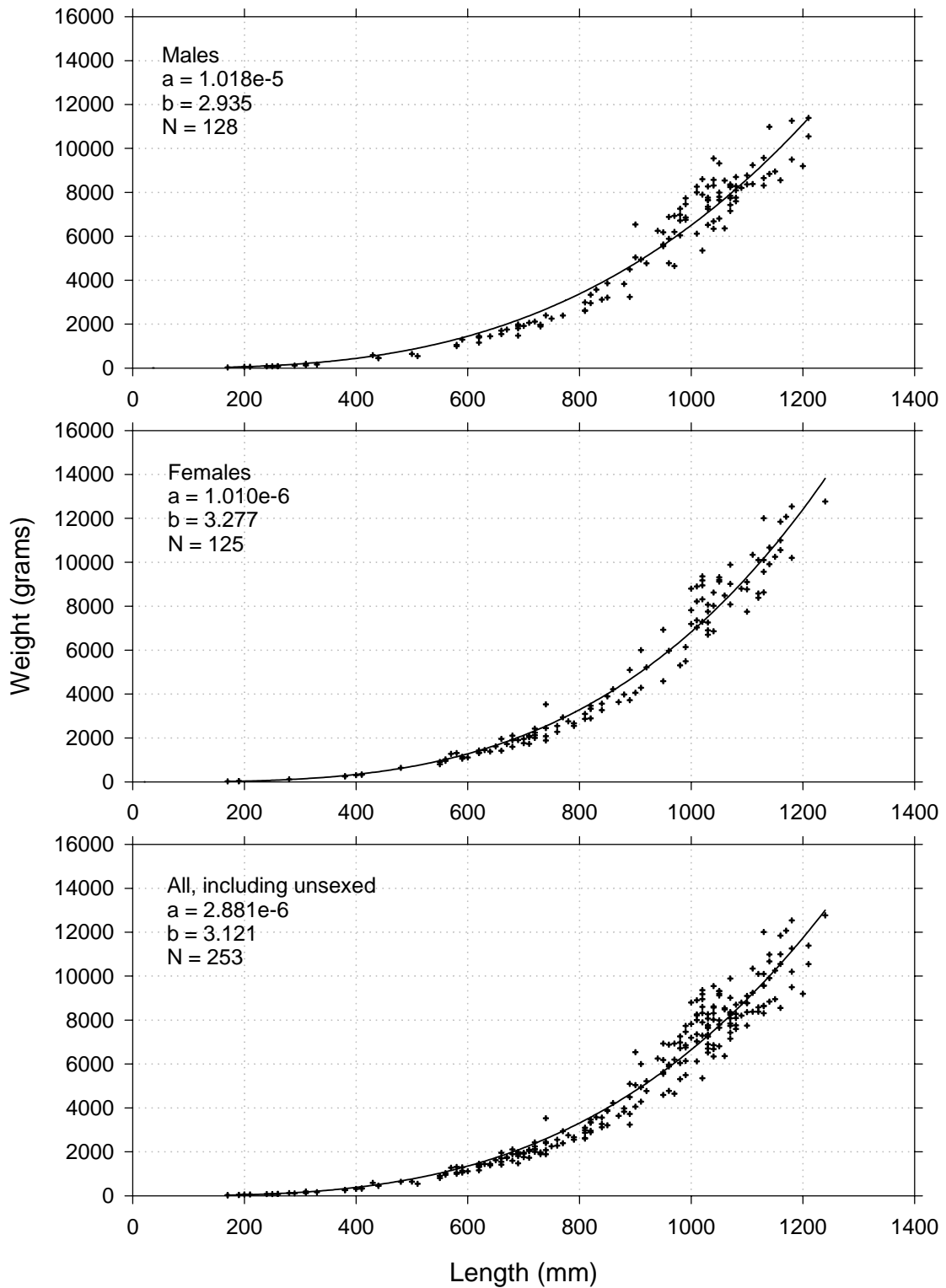


Figure 63.--Length-weight relationship for whiteblotched skate specimens collected during the 2002 Aleutian Islands bottom trawl survey. The non-linear least squares regression (solid line) was calculated using the formula  $Weight_{(grams)} = a * Length_{(mm)}^b$ .



Table 49.--Number of survey hauls, number of hauls with Alaska skate, mean CPUE, biomass estimates with confidence limits, mean weight, and mean length based on the 2002 Aleutian Islands bottom trawl survey, by NPFMC regulatory area and depth interval.

NPFMC area	Depth (m)	Number of trawl hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	95% Confidence limits		Mean weight (kg)	Mean length (cm)
						Minimum biomass (t)	Maximum biomass (t)		
Western Aleutian	1-100	26	14	5.17	2,521	862	4,179	9.634	99.3
	101-200	51	17	4.47	2,376	0	4,872	10.460	99.8
	201-300	19	5	1.60	276	0	554	8.990	94.8
	301-500	13	0	-	-	-	-	-	-
	All depths	109	36	3.41	5,173	2,233	8,112	9.957	99.1
Central Aleutian	1-100	30	11	3.47	2,030	0	4,555	8.992	97.7
	101-200	45	13	4.01	1,845	0	4,170	7.921	97.3
	201-300	23	3	0.52	110	0	308	7.441	47.0
	301-500	17	0	-	-	-	-	-	-
	All depths	115	27	2.41	3,985	925	7,045	8.416	93.3
Eastern Aleutian	1-100	16	2	0.70	478	0	1,687	6.154	90.5
	101-200	47	8	1.08	835	115	1,556	7.736	87.7
	201-300	42	1	<0.01	0	0	1	0.077	71.5
	301-500	27	0	-	-	-	-	-	-
	All depths	132	11	0.52	1,313	0	2,685	6.930	89.7
All Aleutian Areas	1-100	72	27	2.86	5,028	2,213	7,843	8.899	98.1
	101-200	143	38	2.86	5,056	1,819	8,293	8.901	98.0
	201-300	84	9	0.44	386	79	694	7.821	72.6
	301-500	57	0	-	-	-	-	-	-
	All depths	356	74	1.84	10,471	6,231	14,711	8.855	95.8
Southern Bering Sea	1-100	30	2	0.09	37	0	108	3.851	75.0
	101-200	16	0	-	-	-	-	-	-
	201-300	7	0	-	-	-	-	-	-
	301-500	8	0	-	-	-	-	-	-
	All depths	61	2	0.05	37	0	108	3.851	75.0

Table 50.--Sampling effort, mean CPUE, and estimated biomass with 95% confidence limits (CL) of Alaska skate by NPFMC regulatory area and survey subarea, ranked by descending mean CPUE for the 2002 Aleutian Islands bottom trawl survey.

NPFMC Area	Depth range (m)	Subarea	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Biomass CL	
							Min. (t)	Max. (t)
Central Aleutian	1-100	Petrel Bank	4	2	10.08	968	0	4,039
Central Aleutian	101-200	Petrel Bank	6	3	6.89	1,195	0	3,558
Western Aleutian	1-100	W Western Aleutian	16	10	6.09	2,250	612	3,888
Western Aleutian	101-200	W Western Aleutian	28	7	4.97	2,021	0	4,512
Western Aleutian	101-200	E Western Aleutian	23	10	2.84	356	132	580
Central Aleutian	1-100	N Central Aleutian	14	5	2.61	550	0	1,132
Central Aleutian	101-200	N Central Aleutian	8	2	2.57	274	0	724
Western Aleutian	201-300	E Western Aleutian	10	4	2.57	201	0	450
Central Aleutian	101-200	SW Central Aleutian	17	5	2.47	260	0	546
Western Aleutian	1-100	E Western Aleutian	10	4	2.29	271	0	603
Eastern Aleutian	1-100	NW Eastern Aleutian	4	1	2.24	433	0	1,812
Central Aleutian	1-100	SW Central Aleutian	5	2	1.95	315	0	888
Central Aleutian	1-100	SE Central Aleutian	7	2	1.69	197	0	530
Central Aleutian	101-200	SE Central Aleutian	14	3	1.54	116	0	249
Central Aleutian	201-300	Petrel Bank	3	2	1.42	109	0	376
Eastern Aleutian	101-200	SE Eastern Aleutian	15	3	1.28	242	0	544
Eastern Aleutian	101-200	NE Eastern Aleutian	17	2	1.26	254	0	791
Eastern Aleutian	101-200	NW Eastern Aleutian	6	2	1.19	190	0	536
Western Aleutian	201-300	W Western Aleutian	9	1	0.79	75	0	247
Eastern Aleutian	101-200	SW Eastern Aleutian	9	1	0.66	150	0	494
Eastern Aleutian	1-100	SW Eastern Aleutian	5	1	0.23	44	0	167
Southern Bering	1-100	E Southern Bering Sea	27	2	0.15	37	0	108
Central Aleutian	201-300	N Central Aleutian	10	1	0.04	2	0	6
Eastern Aleutian	201-300	NE Eastern Aleutian	22	1	< 0.01	< 1	0	1

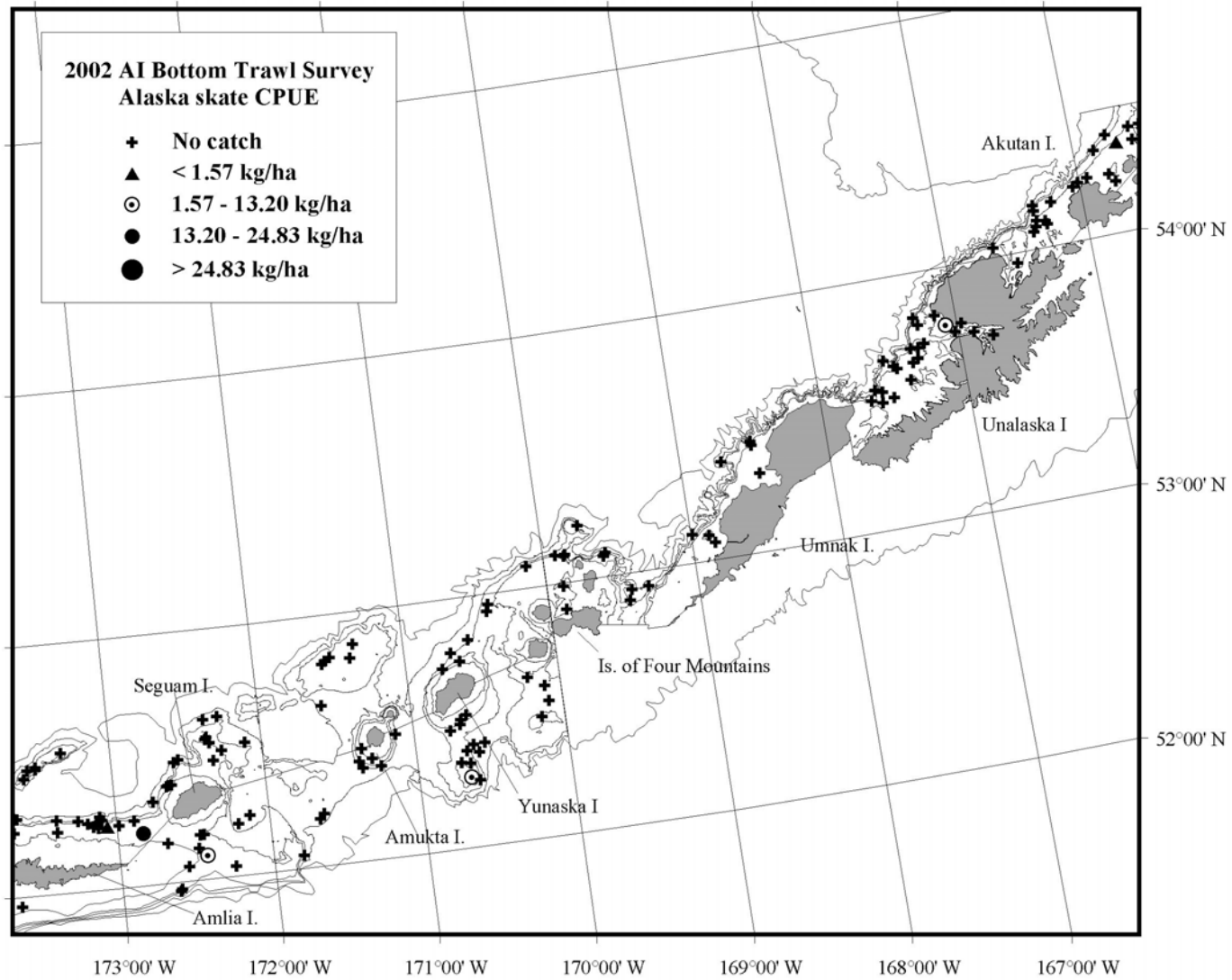


Figure 64.--Distribution and relative abundance of Alaska skate from the 2002 Aleutian Islands bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than mean CPUE, between mean CPUE and two standard deviations above mean CPUE, between two and four standard deviations, and greater than four standard deviations above mean CPUE.

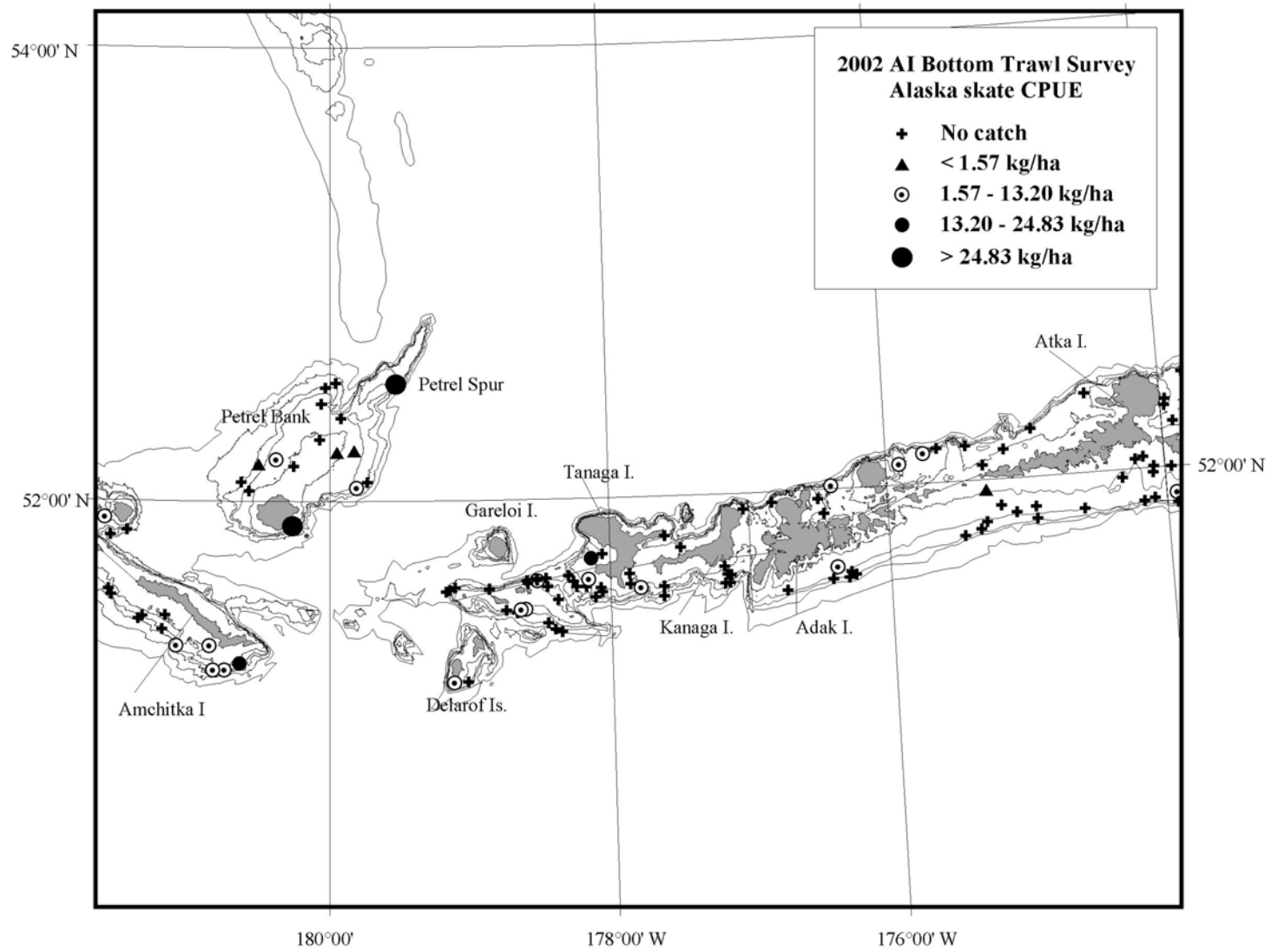


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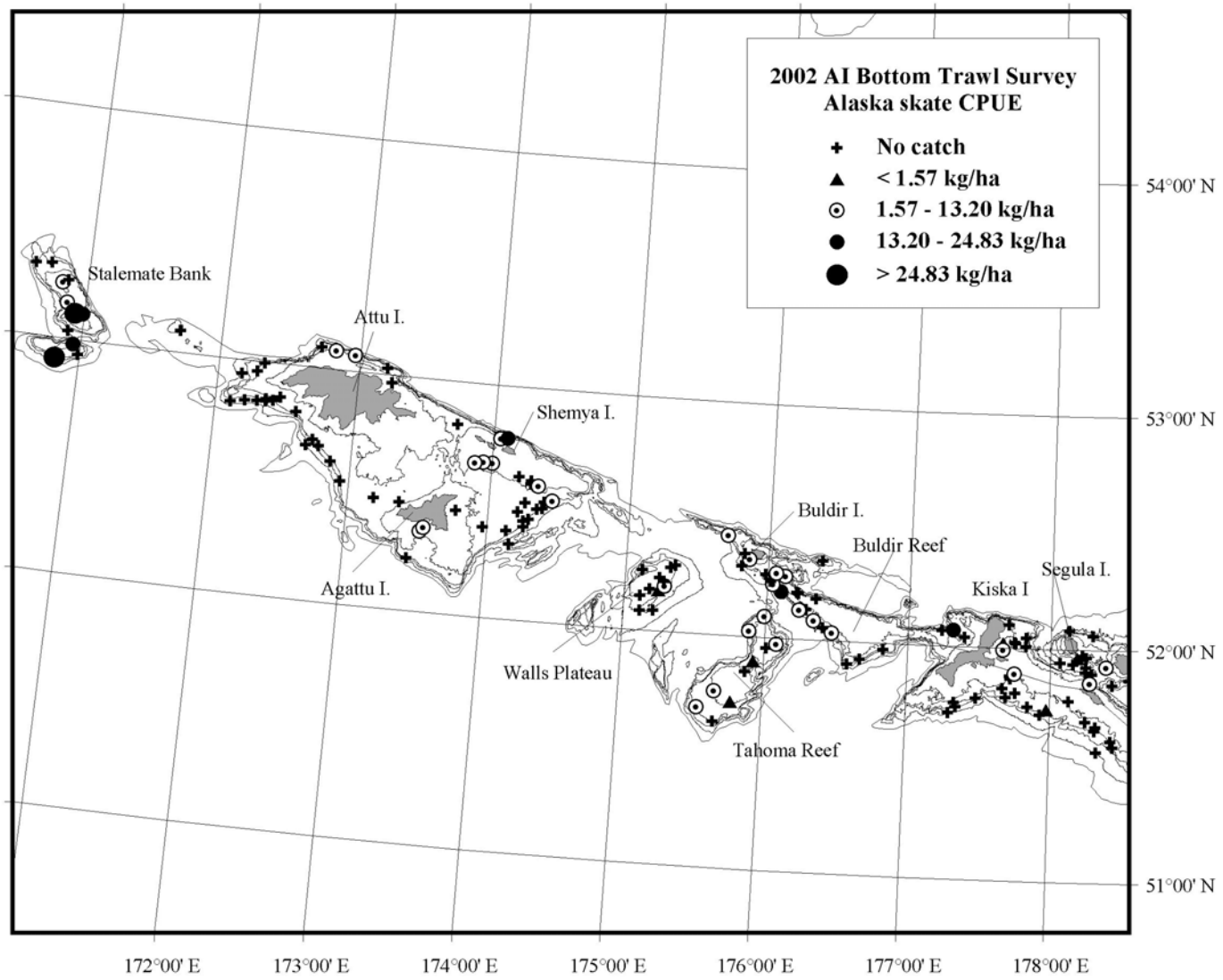


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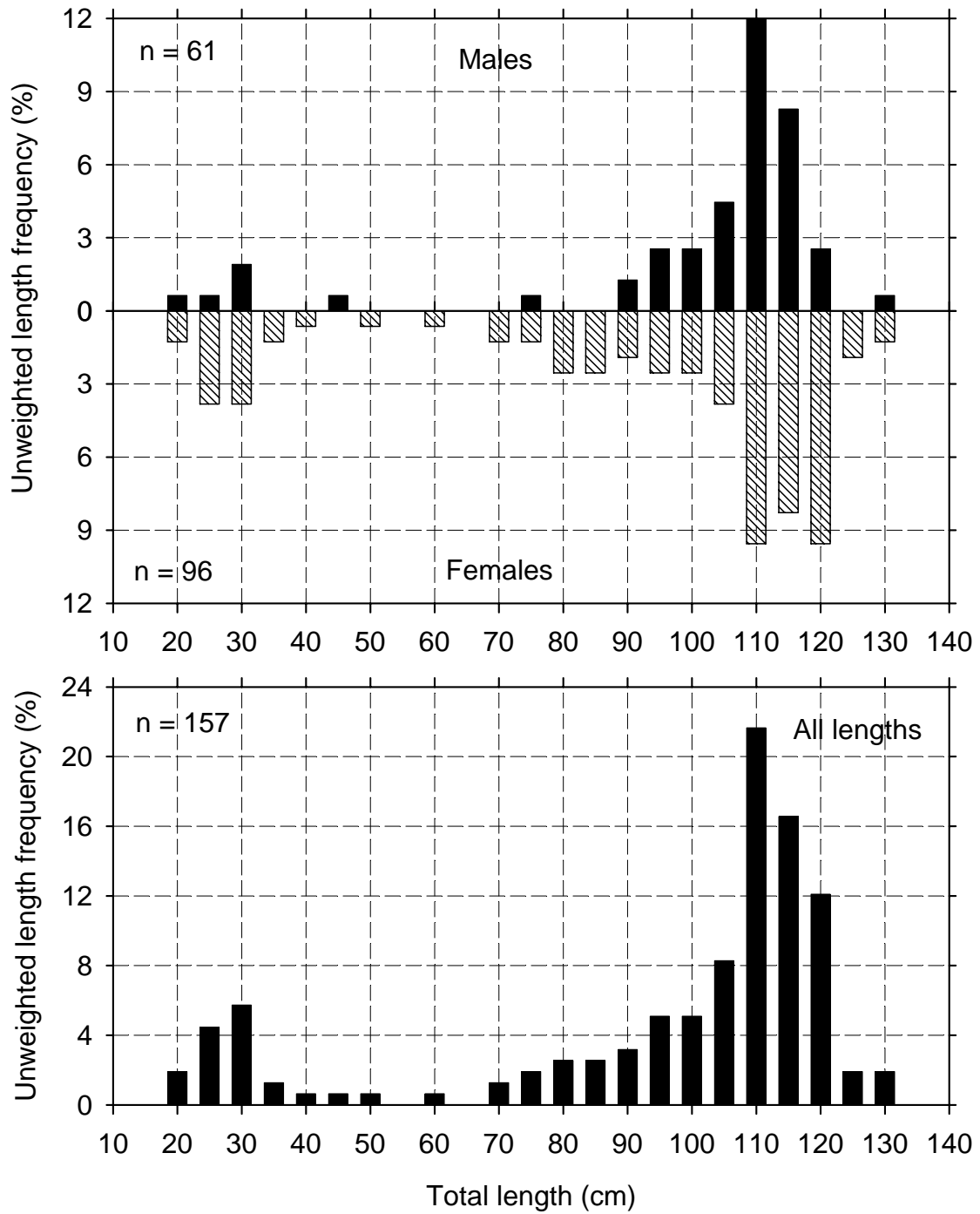


Figure 65.--Length frequencies of Alaska skate catches from the 2002 Aleutian Islands bottom trawl survey. Lengths grouped in 5 cm increments. Lengths are from all areas and depths.

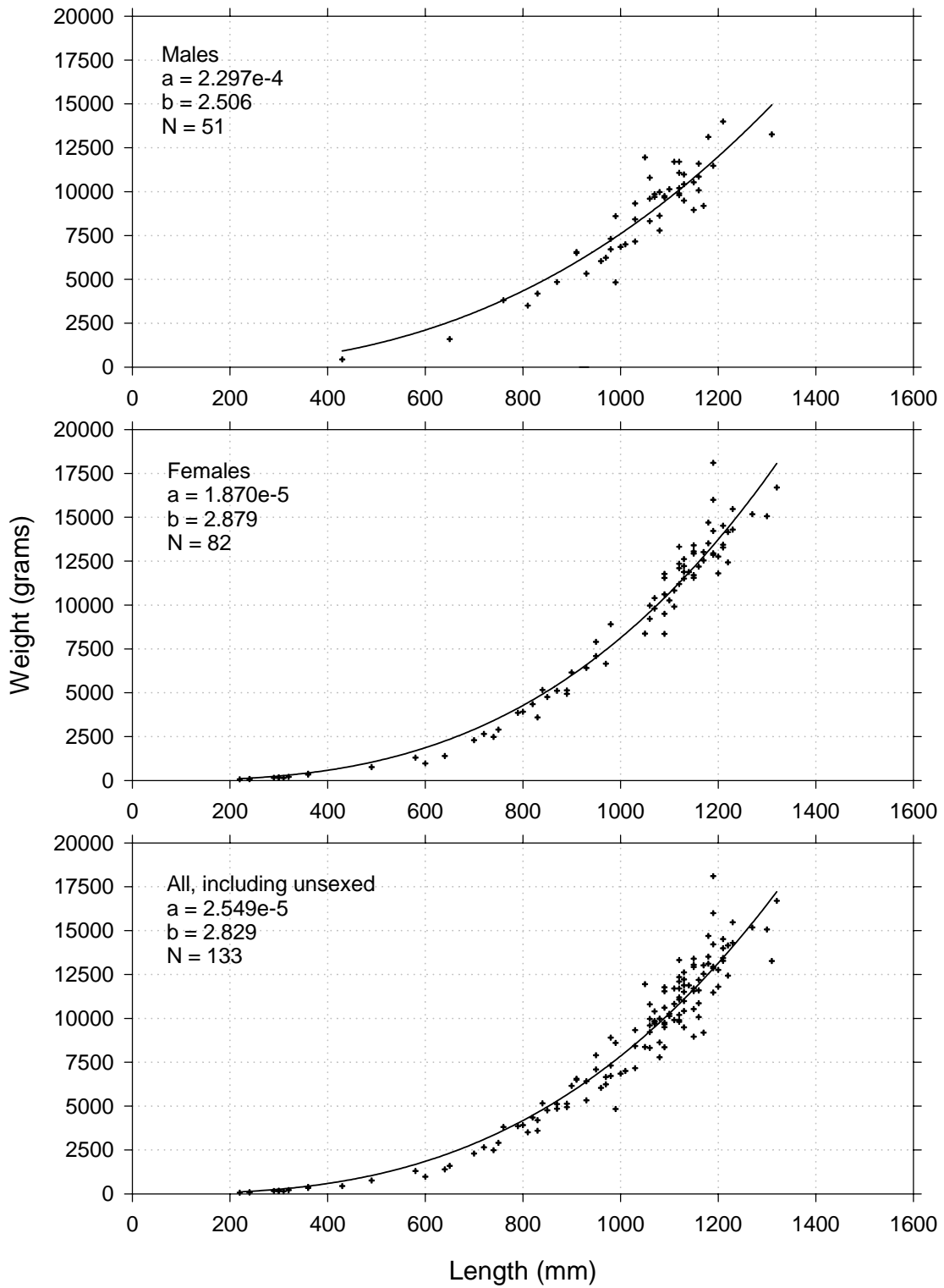


Figure 66.--Length-weight relationship for Alaska skate specimens collected during the 2002 Aleutian Islands bottom trawl survey. The non-linear least squares regression (solid line) was calculated using the formula  $Weight(\text{grams}) = a * Length(\text{mm})^b$ .

### **Aleutian skate (*Bathyraja aleutica*)**

Aleutian skate distribution was arrayed across all depth intervals sampled in the Aleutian areas, being highest in the 101-200 m and 201-300 m depth intervals (Table 51). This species was much less abundant in the Southern Bering Sea area, where they were caught in only 3 of 61 tows. Estimated total Aleutian skate biomass was less than half that of Alaska skate (Tables 49 and 51). Mean lengths and weights of Aleutian skate were larger than those for Alaska skate. The highest mean CPUE occurred in the SE Central Aleutian subarea in 201-300 m (Table 52), between Tanaga Island and the Delarof Islands and on Stalemate Bank (Fig. 67).

Aleutian skate lengths (Fig. 68) were frequently larger than Alaska skate lengths (Fig. 65). Figure 69 shows the length-weight regression relationships for Aleutian skate males, females, and combined sexes. These relationships may have suffered from small sample sizes.

### **Mud skate (*Bathyraja taranetzi*)**

Mud skates were found throughout the survey area in all depth intervals except the 1-100 m interval in the Southern Bering Sea area (Table 53). Mean CPUE was very modest, increasing somewhat with depth. With an estimated biomass of just over 1,750 t, it represents a small part of the general skate population in the Aleutian region. Subarea-specific mean CPUEs were small, but catches were scattered across the entire survey area, mostly in strata deeper than 200 m (Table 54).

Figure 70 summarizes catch locations and CPUE. Note that the CPUE values cited in the figure legend are very small. Figure 71 presents unweighted length frequencies for male, female, and combined sexes of mud skate. Note that skates are measured from the tip of the head to the tip of the tail. Length-weight relationships for mud skate are shown in Figure 72. The strength of the relationships may suffer from small sample sizes.



Table 51.--Number of survey hauls, number of hauls with Aleutian skate, mean CPUE, biomass estimates with confidence limits, mean weight, and mean length based on the 2002 Aleutian Islands bottom trawl survey, by NPFMC regulatory area and depth interval.

NPFMC area	Depth (m)	Number of trawl hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	95% Confidence limits		Mean weight (kg)	Mean length (cm)
						Minimum biomass (t)	Maximum biomass (t)		
Western Aleutian	1-100	26	1	0.15	74	0	239	13.801	125.0
	101-200	51	8	1.51	805	132	1,477	13.891	131.7
	201-300	19	7	2.73	470	136	804	10.358	115.9
	301-500	13	1	< 0.01	< 1	0	1	0.063	26.0
	All depths	109	17	0.89	1,349	588	2,110	11.727	119.1
Central Aleutian	1-100	30	2	0.34	200	0	505	9.438	117.5
	101-200	45	4	0.87	401	0	806	17.765	141.0
	201-300	23	6	2.87	606	0	1,254	15.098	125.6
	301-500	17	2	0.81	321	0	1,489	7.924	91.5
	All depths	115	14	0.92	1,527	337	2,717	12.283	125.0
Eastern Aleutian	1-100	16	1	0.20	136	0	720	2.555	73.0
	101-200	47	4	0.87	676	0	1,413	11.101	112.2
	201-300	42	3	0.68	333	0	737	15.206	135.0
	301-500	27	4	0.89	506	0	1,292	13.645	108.0
	All depths	132	12	0.65	1,650	522	2,778	9.539	111.9
All Aleutian Areas	1-100	72	4	0.23	410	0	969	5.140	101.2
	101-200	143	16	1.06	1,881	838	2,925	13.308	130.4
	201-300	84	16	1.61	1,409	708	2,109	13.117	122.4
	301-500	57	7	0.64	827	0	1,796	9.854	91.6
	All depths	356	43	0.80	4,527	2,925	6,128	10.977	119.5
Southern Bering Sea	1-100	30	2	0.49	198	0	525	20.020	138.5
	101-200	16	0	-	-	-	-	-	-
	201-300	7	0	-	-	-	-	-	-
	301-500	8	1	1.64	171	0	566	14.627	132.0
	All depths	61	3	0.49	370	0	849	17.099	134.8

Table 52.--Sampling effort, mean CPUE, and estimated biomass with 95% confidence limits (CL) of Aleutian skate by NPFMC regulatory area and survey subarea, ranked by descending mean CPUE for the 2002 Aleutian Islands bottom trawl survey.

NPFMC Area	Depth range (m)	Subarea	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Biomass CL	
							Min. (t)	Max. (t)
Central Aleutian	201-300	SE Central Aleutian	4	4	12.46	595	0	1,337
Western Aleutian	201-300	E Western Aleutian	10	5	4.05	317	41	594
Central Aleutian	301-500	SW Central Aleutian	2	1	3.37	266	0	3,646
Eastern Aleutian	201-300	SW Eastern Aleutian	6	2	3.05	218	0	617
Eastern Aleutian	101-200	NW Eastern Aleutian	6	2	2.54	405	0	1,068
Central Aleutian	101-200	SE Central Aleutian	14	2	2.25	170	0	421
Central Aleutian	101-200	SW Central Aleutian	17	2	2.20	232	0	569
Eastern Aleutian	301-500	SE Eastern Aleutian	12	2	1.85	476	0	1,268
Western Aleutian	101-200	W Western Aleutian	28	5	1.75	713	50	1,377
Central Aleutian	1-100	SE Central Aleutian	7	2	1.72	200	0	516
Southern Bering	301-500	Combined Southern Bering	8	1	1.64	171	0	577
Western Aleutian	201-300	W Western Aleutian	9	2	1.63	153	0	390
Eastern Aleutian	1-100	NE Eastern Aleutian	2	1	1.07	136	0	1,861
Eastern Aleutian	101-200	SW Eastern Aleutian	9	1	1.00	226	0	748
Southern Bering	1-100	E Southern Bering Sea	27	2	0.81	198	0	525
Central Aleutian	301-500	SE Central Aleutian	4	1	0.77	55	0	229
Western Aleutian	101-200	E Western Aleutian	23	3	0.73	91	0	213
Western Aleutian	1-100	E Western Aleutian	10	1	0.63	74	0	241
Eastern Aleutian	201-300	SE Eastern Aleutian	12	1	0.55	114	0	365
Eastern Aleutian	301-500	SW Eastern Aleutian	2	1	0.40	17	0	238
Central Aleutian	201-300	N Central Aleutian	10	2	0.26	11	0	30
Eastern Aleutian	101-200	SE Eastern Aleutian	15	1	0.23	44	0	140
Eastern Aleutian	301-500	Combined Eastern Aleutian	13	1	0.05	13	0	40
Western Aleutian	301-500	W Western Aleutian	11	1	< 0.01	< 1	0	1

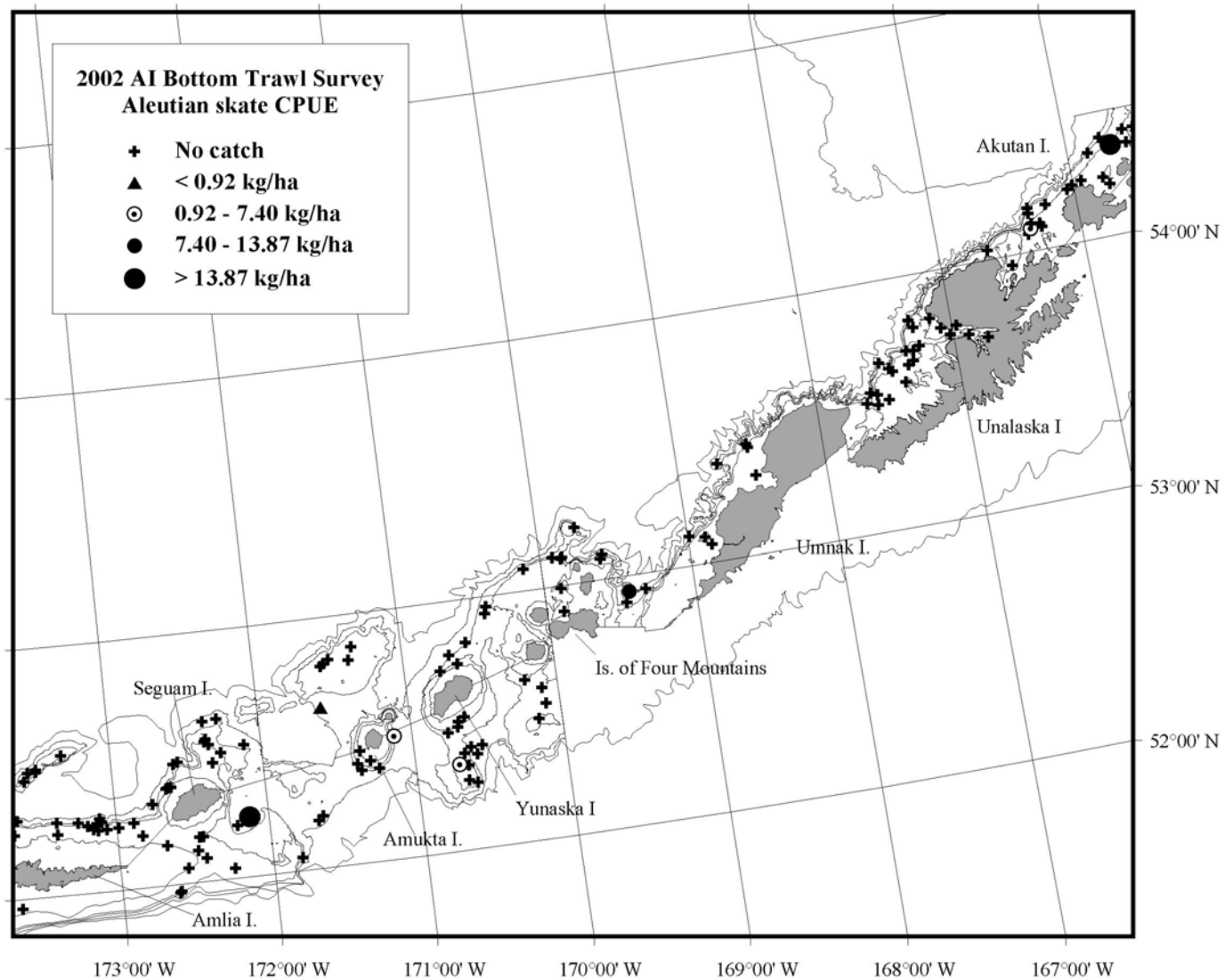


Figure 67.--Distribution and relative abundance of Aleutian skate from the 2002 Aleutian Islands bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than mean CPUE, between mean CPUE and two standard deviations above mean CPUE, between two and four standard deviations, and greater than four standard deviations above mean CPUE.

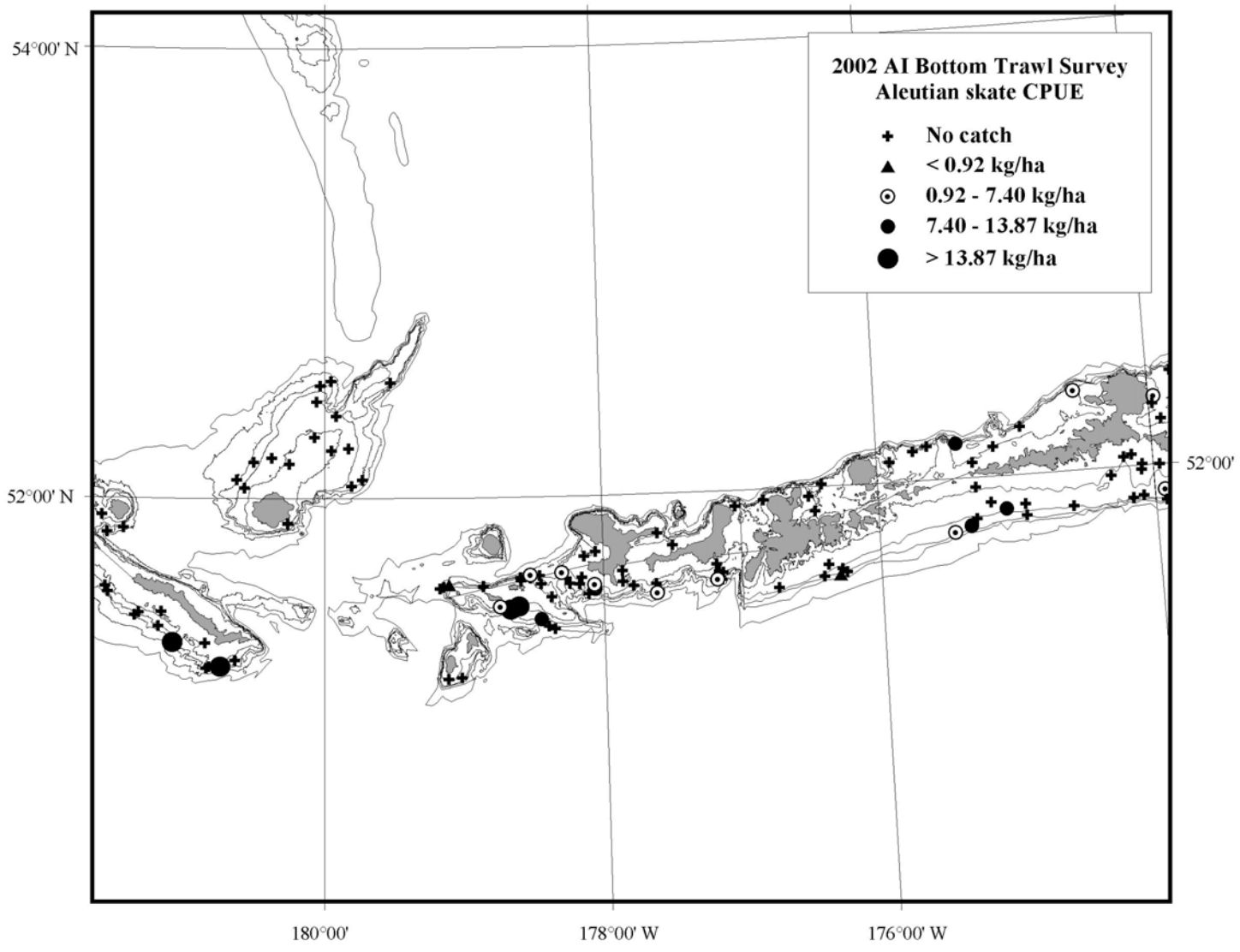


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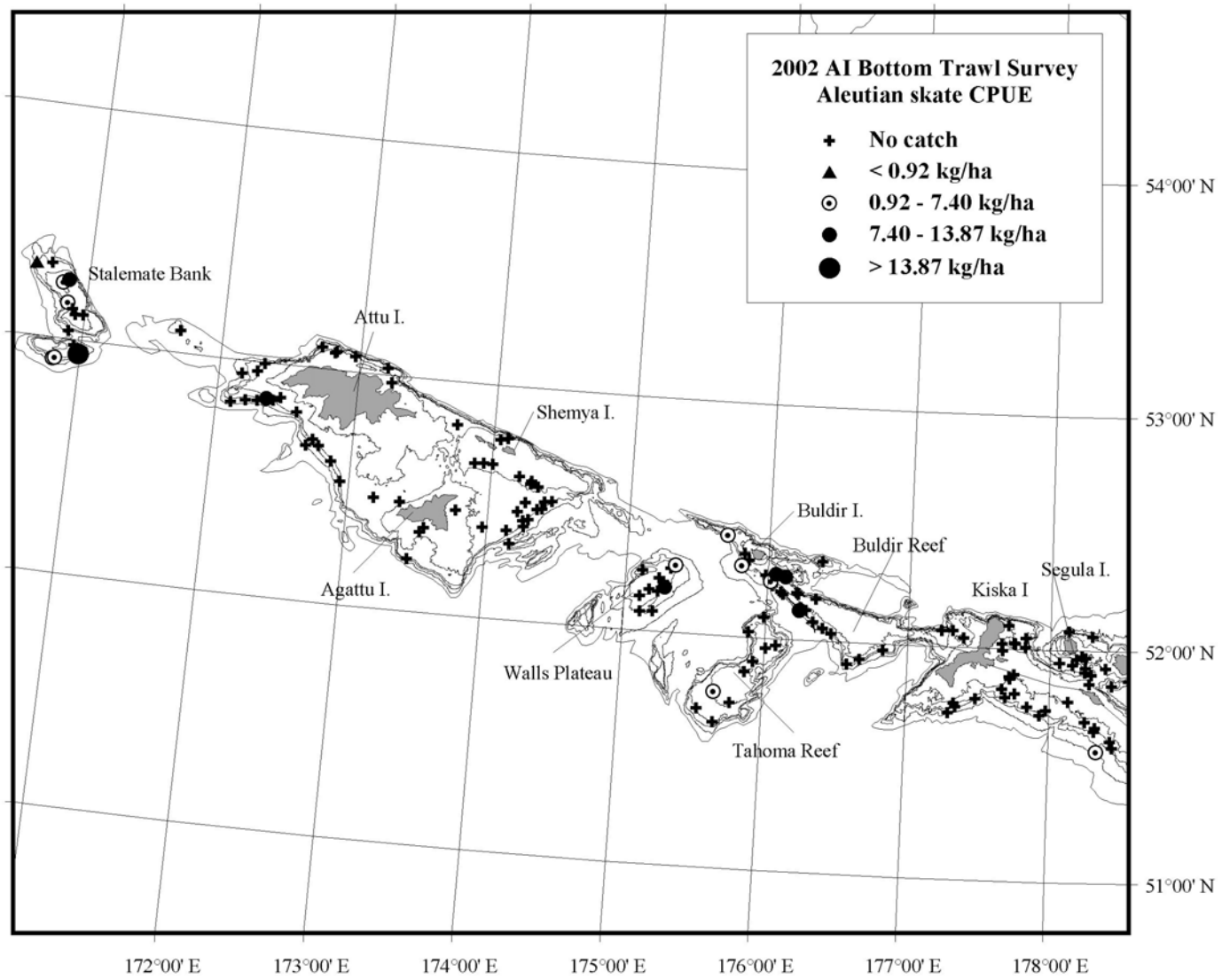


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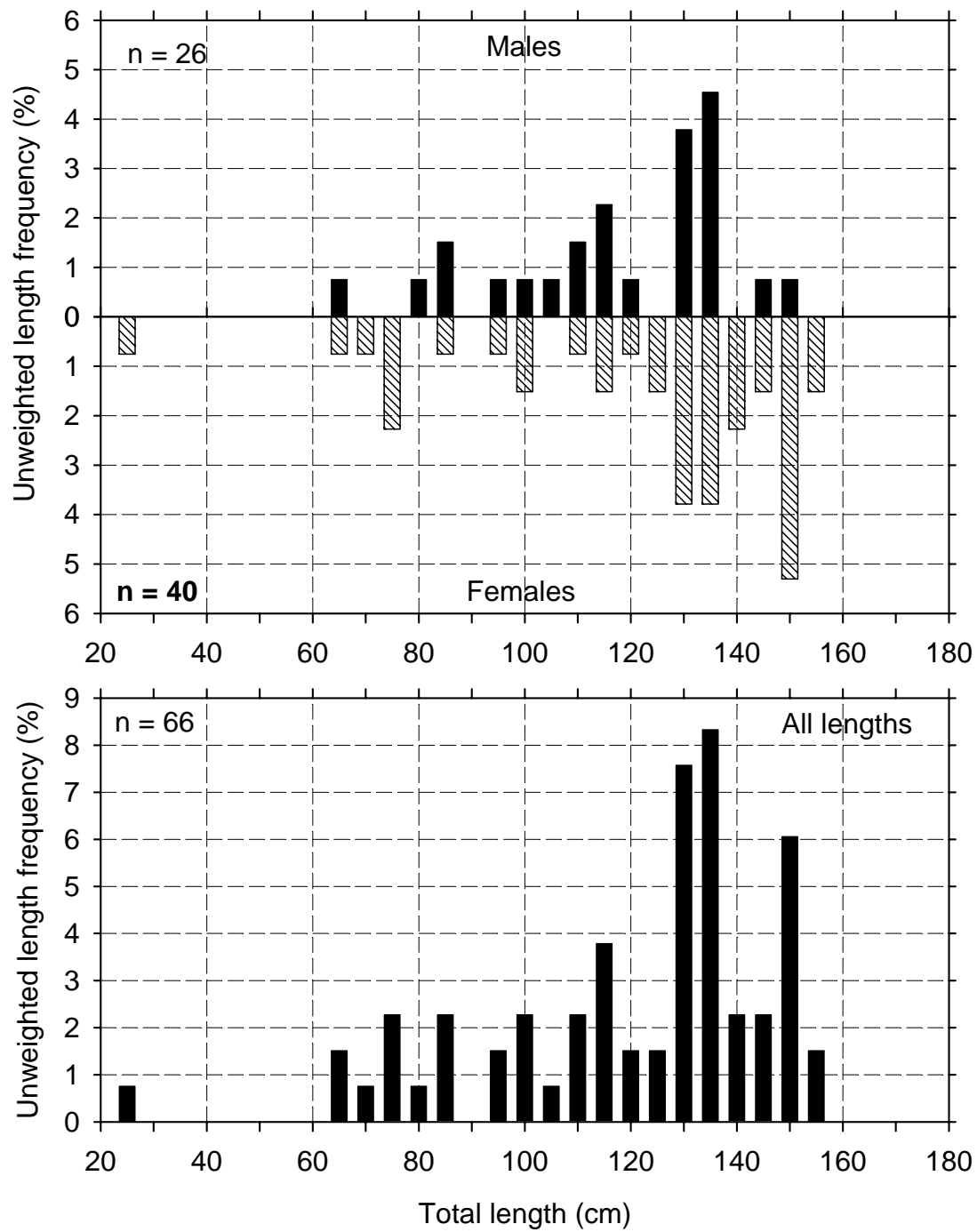


Figure 68.--Length frequencies of Aleutian skate catches from the 2002 Aleutian Islands bottom trawl survey. Lengths grouped in 5 cm increments. Lengths are from all areas and depths.

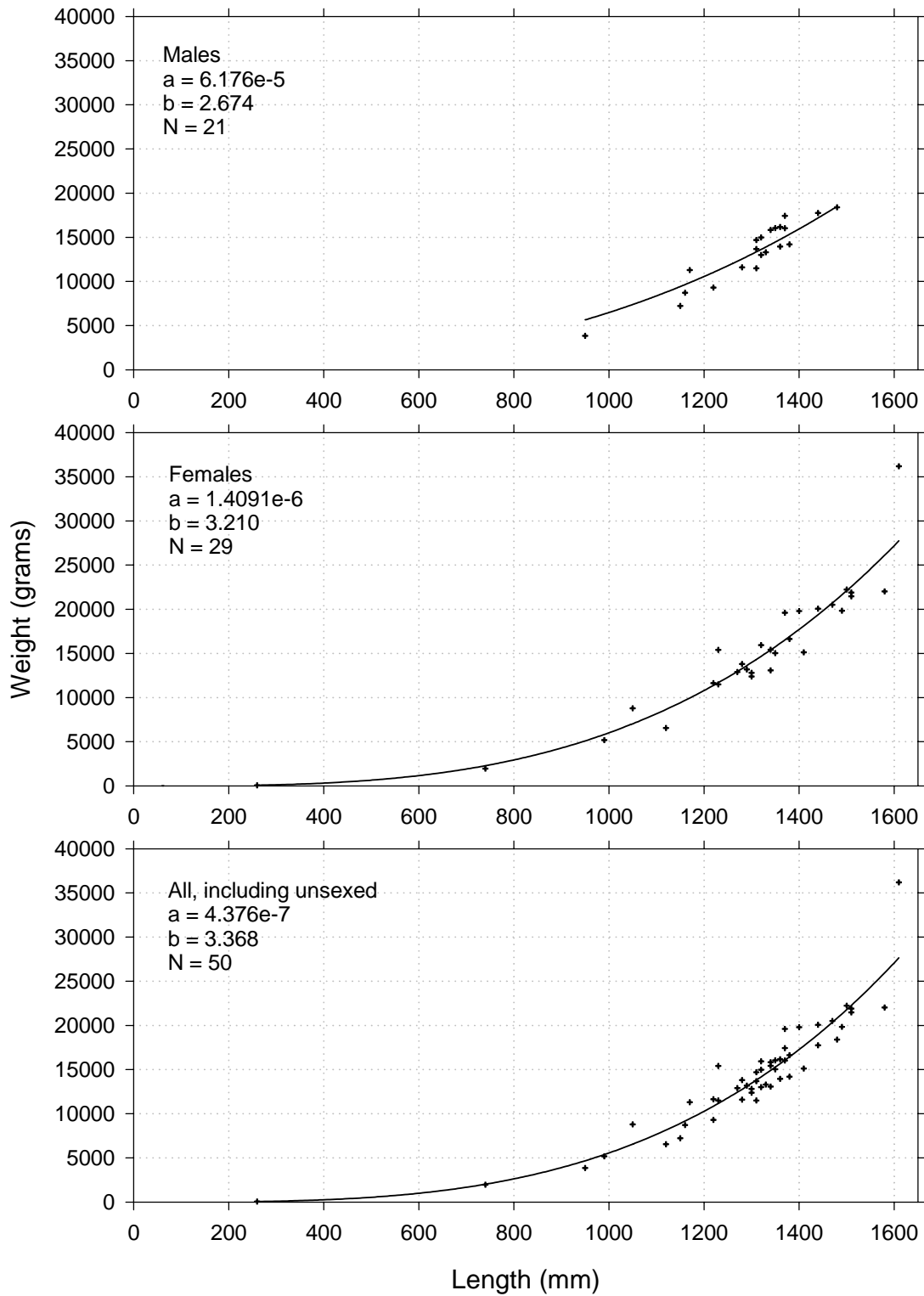


Figure 69.--Length-weight relationship for Aleutian skate specimens collected during the 2002 Aleutian Islands bottom trawl survey. The non-linear least squares regression (solid line) was calculated using the formula  $Weight_{(grams)} = a * Length_{(mm)}^b$ .

Table 53.--Number of survey hauls, number of hauls with mud skate, mean CPUE, biomass estimates with confidence limits, mean weight, and mean length based on the 2002 Aleutian Islands bottom trawl survey, by NPFMC regulatory area and depth interval.

NPFMC area	Depth (m)	Number of trawl hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	95% Confidence limits		Mean weight (kg)	Mean length (cm)
						Minimum biomass (t)	Maximum biomass (t)		
Western Aleutian	1-100	26	1	0.04	18	0	55	1.770	66.0
	101-200	51	3	0.07	40	0	91	1.041	53.3
	201-300	19	3	0.13	22	0	47	1.399	64.4
	301-500	13	6	0.58	188	0	398	1.243	48.4
	All depths	109	13	0.18	268	57	479	1.242	51.3
Central Aleutian	1-100	30	3	0.05	27	0	69	0.798	48.1
	101-200	45	3	0.05	25	0	63	1.618	69.5
	201-300	23	13	0.88	186	44	328	1.090	50.3
	301-500	17	15	0.82	328	186	470	0.687	49.8
	All depths	115	34	0.34	566	374	759	0.812	50.1
Eastern Aleutian	1-100	16	0	-	-	-	-	-	-
	101-200	47	6	0.08	59	8	111	1.215	59.4
	201-300	42	11	0.32	156	1	310	0.587	47.5
	301-500	27	15	1.10	623	127	1,119	0.563	45.7
	All depths	132	32	0.33	838	322	1,354	0.590	46.5
All Aleutian Areas	1-100	72	4	0.03	45	0	98	1.019	52.2
	101-200	143	12	0.07	124	46	203	1.211	57.8
	201-300	84	27	0.42	364	164	564	0.805	49.2
	301-500	57	36	0.88	1,139	602	1,677	0.656	47.1
	All depths	356	79	0.29	1,672	1,097	2,248	0.716	48.0
Southern Bering Sea	1-100	30	0	-	-	-	-	-	-
	101-200	16	1	0.05	10	0	30	2.120	71.0
	201-300	7	2	0.25	14	0	38	0.837	52.9
	301-500	8	4	0.61	64	0	140	0.849	53.9
	All depths	61	7	0.12	87	6	168	0.906	54.5



Table 54.--Sampling effort, mean CPUE, and estimated biomass with 95% confidence limits (CL) of mud skate by NPFMC regulatory area and survey subarea, ranked by descending mean CPUE for the 2002 Aleutian Islands bottom trawl survey.

NPFMC Area	Depth range (m)	Subarea	Number of hauls	Hauls with catch	Mean CPUE (kg/ha)	Estimated biomass (t)	Biomass CL	
							Min. (t)	Max. (t)
Eastern Aleutian	301-500	SW Eastern Aleutian	2	1	4.43	194	0	2,658
Central Aleutian	301-500	SE Central Aleutian	4	4	1.67	119	0	275
Central Aleutian	201-300	N Central Aleutian	10	5	1.30	57	0	120
Central Aleutian	201-300	SE Central Aleutian	4	2	1.07	51	0	204
Eastern Aleutian	301-500	SE Eastern Aleutian	12	6	1.06	272	22	523
Central Aleutian	201-300	Petrel Bank	3	3	0.74	57	0	162
Central Aleutian	301-500	Petrel Bank	3	3	0.72	89	0	203
Western Aleutian	301-500	W Western Aleutian	11	4	0.72	123	0	335
Central Aleutian	301-500	N Central Aleutian	8	6	0.64	79	16	142
Southern Bering	301-500	Combined Southern Bering	8	4	0.61	64	0	142
Eastern Aleutian	201-300	NE Eastern Aleutian	22	5	0.60	119	0	272
Eastern Aleutian	301-500	Combined Eastern Aleutian	13	8	0.59	157	26	288
Central Aleutian	301-500	SW Central Aleutian	2	2	0.51	40	0	276
Central Aleutian	201-300	SW Central Aleutian	6	3	0.50	21	0	49
Western Aleutian	301-500	E Western Aleutian	2	2	0.42	66	0	146
Southern Bering	201-300	Combined Southern Bering	7	2	0.25	14	0	39
Western Aleutian	201-300	W Western Aleutian	9	3	0.23	22	0	48
Eastern Aleutian	101-200	NE Eastern Aleutian	17	5	0.21	42	5	80
Eastern Aleutian	201-300	SE Eastern Aleutian	12	4	0.15	31	0	63
Central Aleutian	101-200	N Central Aleutian	8	1	0.14	15	0	50
Central Aleutian	1-100	N Central Aleutian	14	3	0.13	27	0	69
Eastern Aleutian	101-200	NW Eastern Aleutian	6	1	0.11	17	0	60
Central Aleutian	101-200	SE Central Aleutian	14	1	0.10	8	0	24
Eastern Aleutian	201-300	SW Eastern Aleutian	6	2	0.08	6	0	18
Western Aleutian	101-200	W Western Aleutian	28	2	0.08	33	0	83
Southern Bering	101-200	E Southern Bering Sea	11	1	0.08	10	0	31
Western Aleutian	101-200	E Western Aleutian	23	1	0.05	7	0	20
Western Aleutian	1-100	W Western Aleutian	16	1	0.05	18	0	55
Central Aleutian	101-200	SW Central Aleutian	17	1	0.03	3	0	9

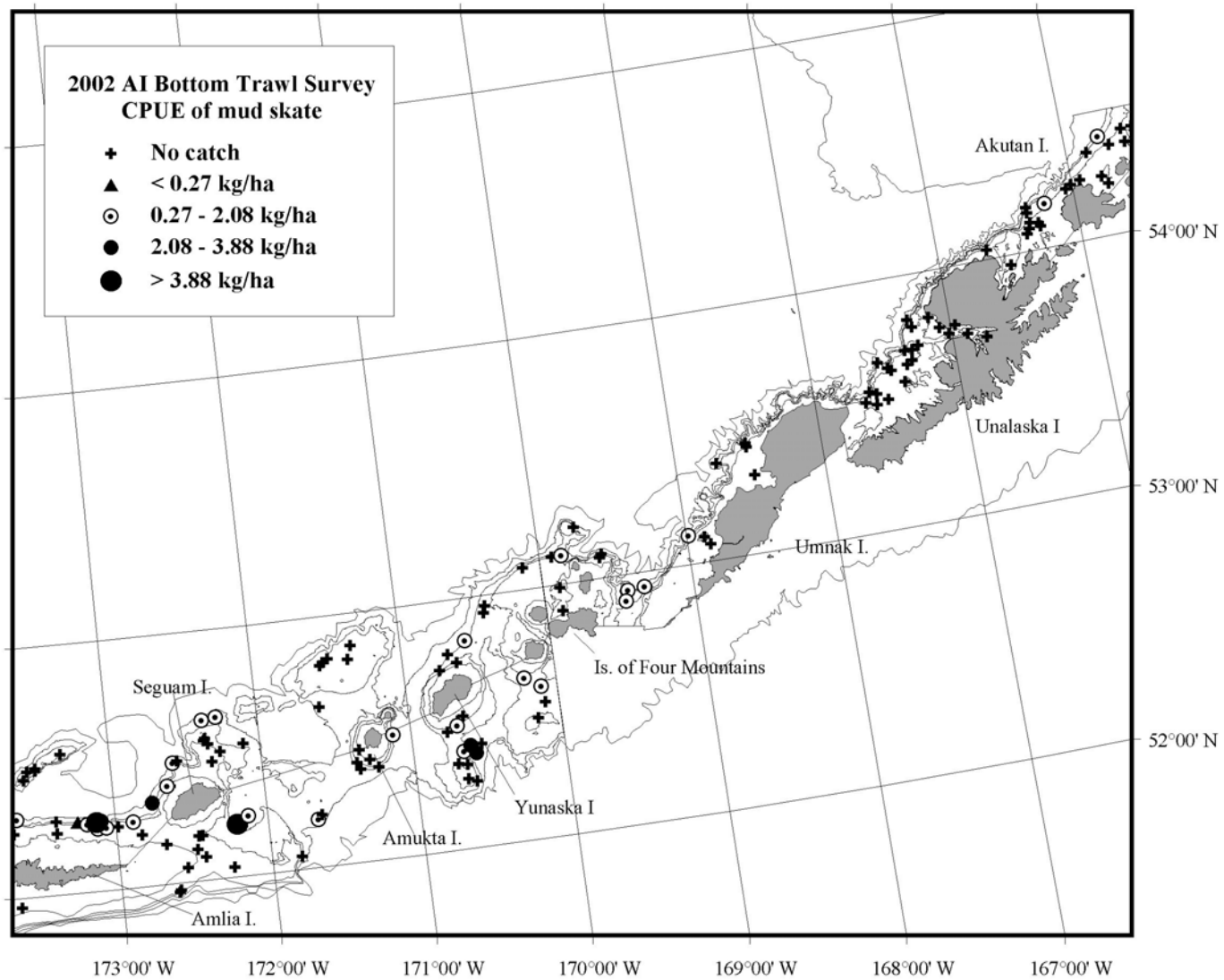


Figure 70.--Distribution and relative abundance of mud skates from the 2002 Aleutian Islands bottom trawl survey. Relative abundance is categorized as no catch, sample CPUE less than mean CPUE, between mean CPUE and two standard deviations above mean CPUE, between two and four standard deviations, and greater than four standard deviations above mean CPUE.

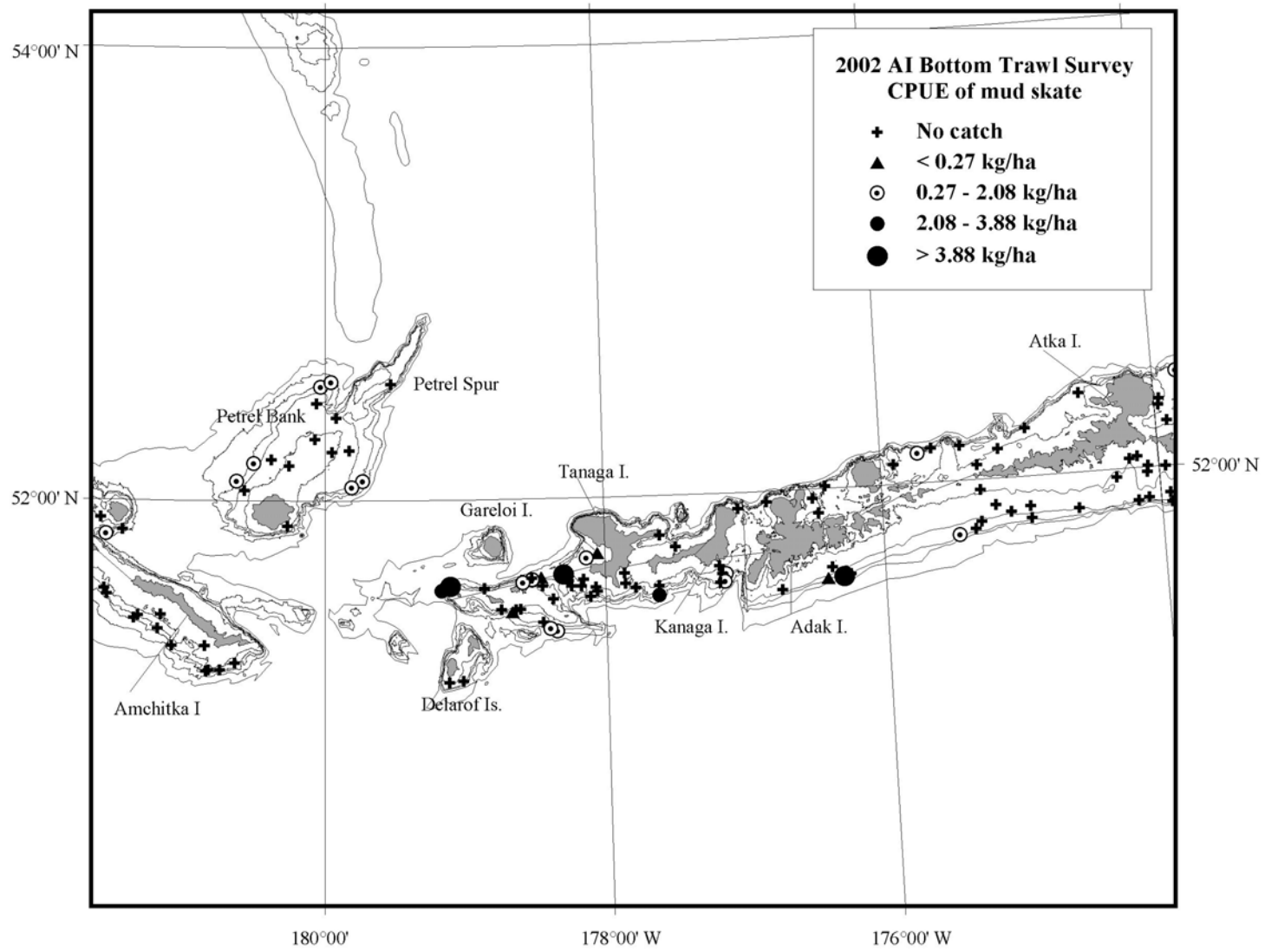


Figure 70.--(Continued).

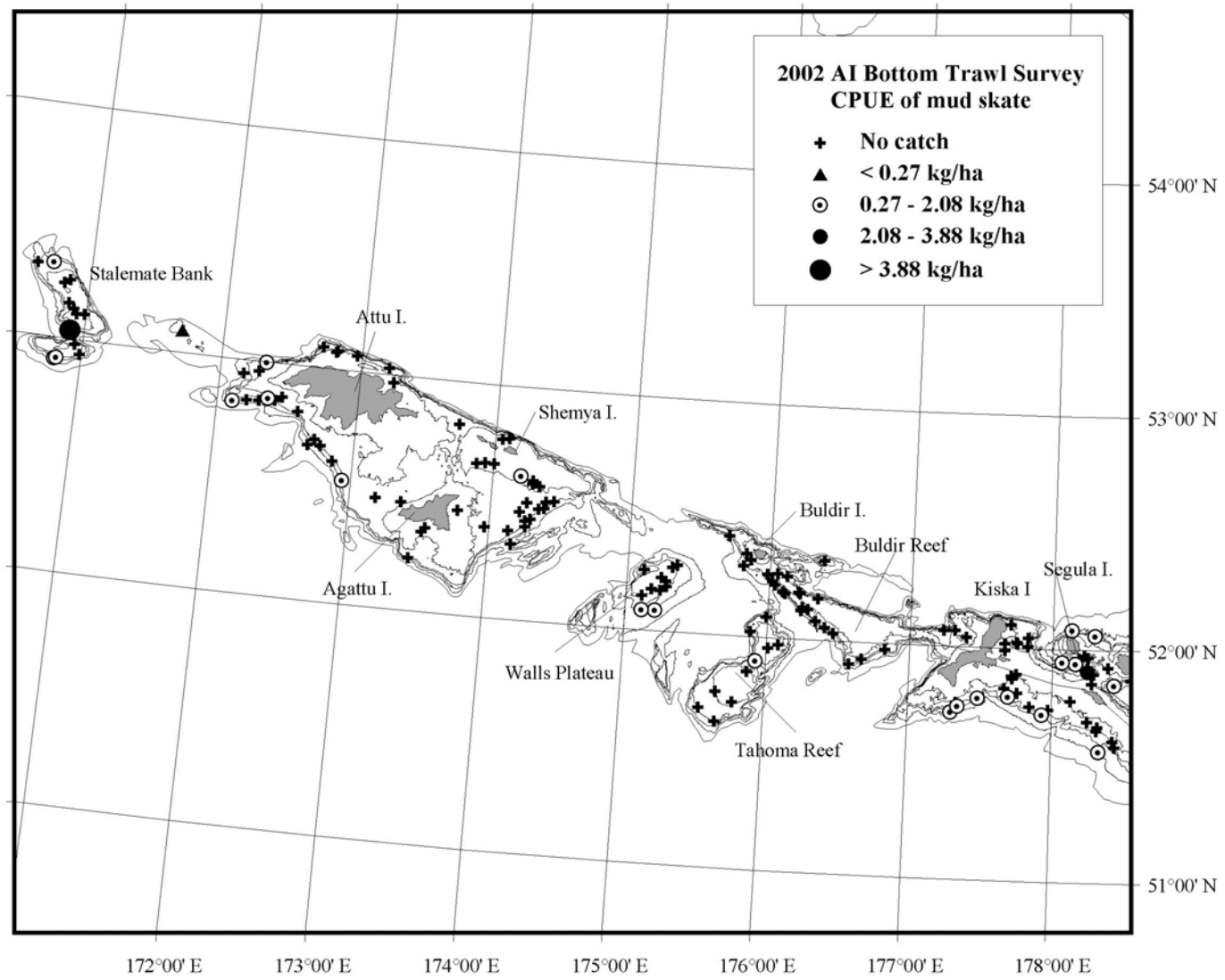


Figure 70.--(Continued).

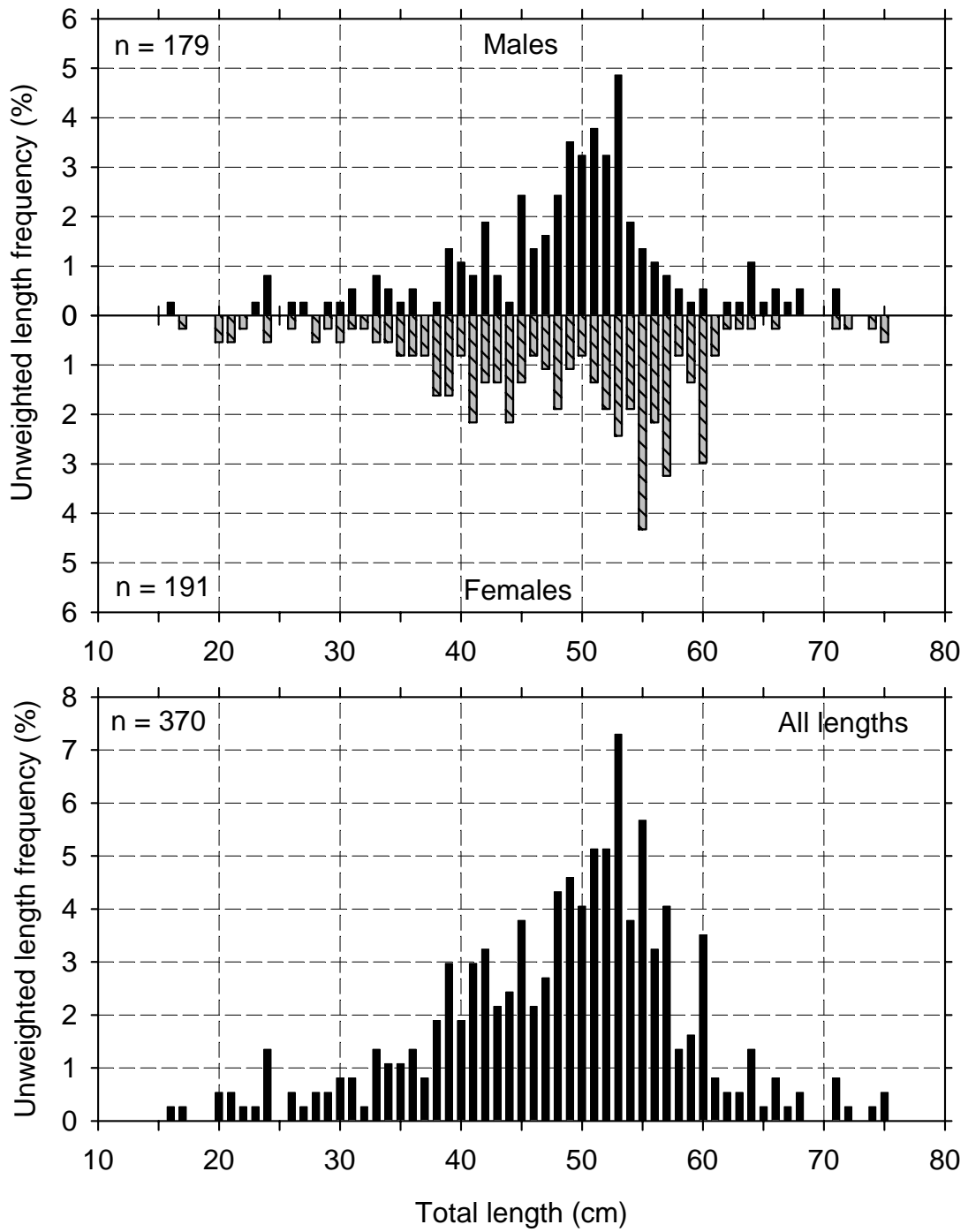


Figure 71.--Length frequencies of mud skate catches from the 2002 Aleutian Islands bottom trawl survey. Lengths are from all areas and depths.

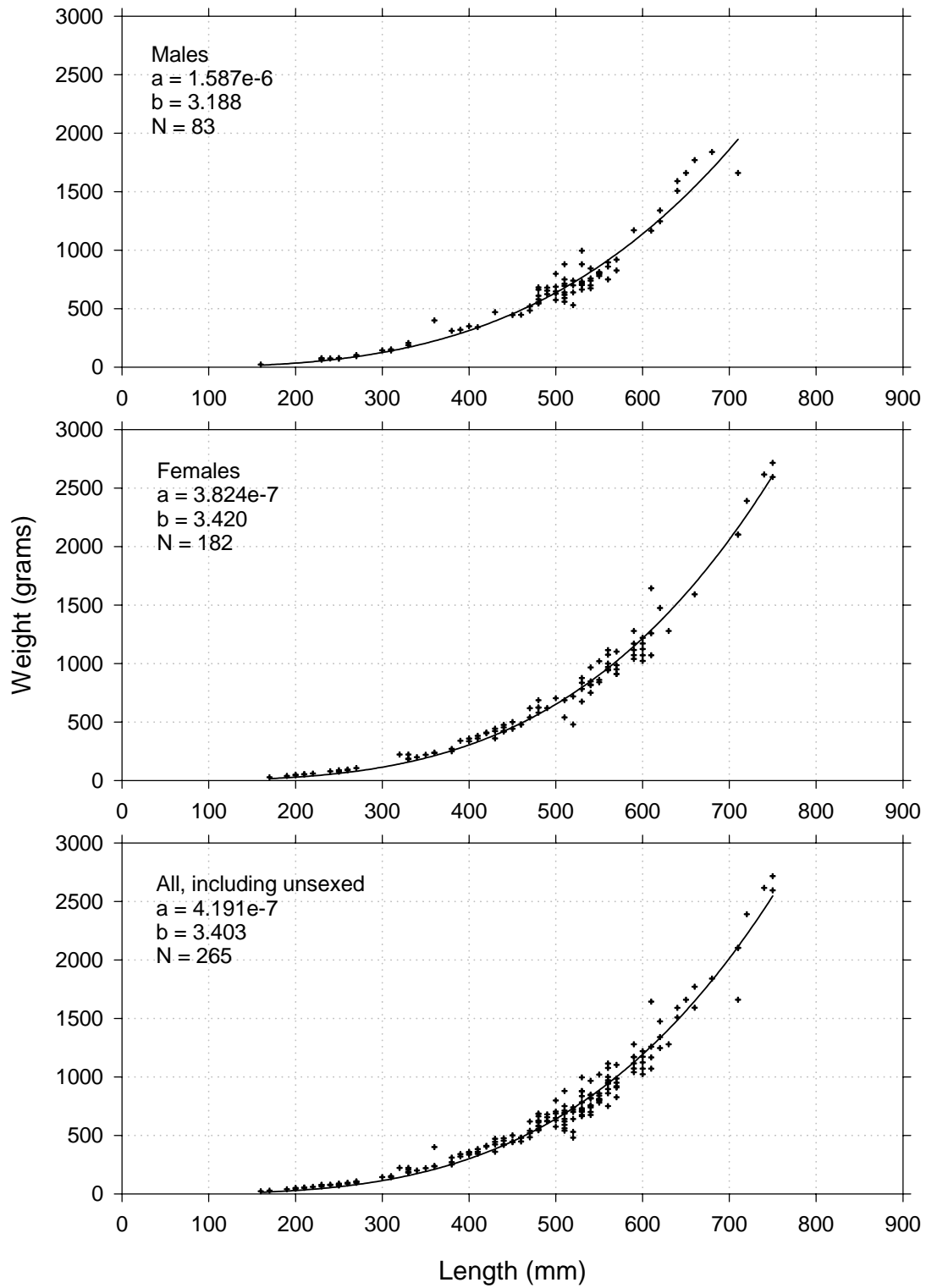


Figure 72.--Length-weight relationship for mud skate specimens collected during the 2002 Aleutian Islands bottom trawl survey. The non-linear least squares regression (solid line) was calculated using the formula  $Weight(\text{grams}) = a * Length(\text{mm})^b$ .

### Miscellaneous skates

Four species of skate and a group of unidentified skates comprise this category: big skate (*Raja binoculata*), Bering skate (*Bathyraja interrupta*), Commander skate (*B. lindbergi*), and whitebrow skate (*B. minispinosa*), and unidentified skates (*Bathyraja* sp.). These skates were relatively rare in survey trawl catches, as the mean CPUE and biomass estimates in Table 55 suggest. Catches of big skate were restricted to the west side of Unalaska Island in a typically muddy bottom habitat. Five catches of Bering skate were made between Unalaska and Umnak Islands (2), west of Seguam Island, west of Tanaga Island, and near the west side of Kiska Island. One catch of Commander skate was made in 458 m on the promontory west of Attu Island. Two catches of whitebrow skate were made near the NE tip of Umnak Island in 365 m and west of Seguam Island in 223 m. There were 6 catches of unidentified *Bathyraja* species that were preserved for subsequent identification.