Northwest Atlantic Fisheries Organization

Serial No. N2964 **NAFO SCR Doc. 97/107**

SCIENTIFIC COUNCIL MEETING NOVEMBER 1997

A Trawl Survey for Small Shrimp (*Pandalus borealis*) in Shallow Water at West Greenland (NAFO Subarea 1) in 1991

by

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Introduction

During the offshore stratified-random trawl survey in 1991 a special study was undertaken in search for the youngest year-classes of shrimp (*Pandalus borealis*). 68 trawl hauls were performed in depths between 100 and 300 m on and at the banks off West Greenland from 64°N to 69°15'N to investigate if concentrations of age group 1 and 2 shrimp could be identified.

This paper presents results from the study.

Material and Methods

In total 68 trawl hauls were performed in three areas in West Greenland waters (Figure 1). Trawl positions were chosen with 5-10 nautical miles distance in between, so that possible local patches of small shrimp might be identified: 21 hauls between 64°N and 66°N (Area 1). 39 hauls on and at Store Hellefiske Bank between 67°N and 68°20'N (Area 2), and seven hauls on and at Disko Bank between 68°45'N and 69°15'N. All positions in Area 1 were chosen in the depth interval from 100 to 200 meter, while in Area 2 and 3 some positions were selected in deeper water between 200 and 300 meters, in a few cases even deeper.

Details on the research vessel and the trawl used are given in Carlsson and Kanneworff (1992). Trawling time was kept close to 30 minutes. Mesh size in the cod-end was 28 mm (stretched mesh) during the first 21 hauls (in Area 1), while a liner with a mesh size of 20 mm was used in the cod-end during the hauls in Area 2 and 3.

In order to minimize the influence of diel vertical migrations of shrimp, the trawl operations were carried out mainly in the daytime (0900-2100 UTC).

When the catch size allowed, a sample of up to 6 kg of shrimp was taken from the catch. Shrimp were sorted by sex, and oblique carapax length was measured by slide calliper to nearest 0.1 mm.

Results and Discussion

Table 1 show trawl positions, duration and depth of each haul, together with total catches of shrimp, separated in catch of *Pandalus borealis*, *P. montagui* and other species.

Catches of shrimp were small, the highest catch being 6.8 kg in 30 minutes. Small amounts of *Pandalus montagui* were caught especially in shallow water in Area 1, where this species was present in almost all samples. It was also present in five samples from Area 2 from depth below 200 meters, but absent in Area 3. The relatively largest catches of *Pandalus borealis* were found in depths greater than 200 meters in Area 2. Largest catches (by weight) of other species were found in the Disko Bank area (Area 3) and consisted mainly of *Argis lar.*

Length distributions of *Pandalus borealis* were examined for the occurrence of small shrimp. No shrimp of age group 1 (8-9 mm CL according to the age-at-length interpretation by Savard et al (1994)) were found, and only a very limited number of shrimp of age group 2 (at 12-13 mm CL) were present in the samples. Length distributions in samples from the relatively larger catches of *Pandalus borealis* (Figures 2-9) show the dominance of a male group at 17-18 mm CL (interpreted as age 4) in five samples from 190-270 meters depth in Area 2 (Figures 3, 4, 6, 8, and 9). Two samples from 210-325 meters depth in the same area also show a group at 20-21 mm CL (Age 5, Figures 5 and 7). One sample from Area 1 in 132-147 meters depth (Figure 2) show the occurrence of the same size groups. Larger males and females are scarce in all samples.

A mesh size of 20 mm should have a 50% retention length of about 13 mm CL (K. Lehmann, personal information). In the offshore and inshore trawl surveys, where a 20 mm mesh has been used since 1993, shrimp of age 1 and 2 occur in the catches occasionally, but in general in connection with catches of larger shrimp (e.g. Carlsson and Kanneworff, 1997). The small catches during the present survey may result in a change in selectivity with less retention of the small shrimp sizes.

The result of this survey is thus negative in the sense, that concentrations of younger age groups of *Pandalus borealis* were not found in the area surveyed.

References

Carlsson, D.M. and P. Kanneworff, 1992. Report on a stratified-random trawl survey for shrimp (*Pandalus borealis*) in NAFO Subareas 0+1 in July-September 1991, and a comparison with earlier surveys. NAFO SCR Doc. 92/67. Serial No. N2122

Carlsson, D.M. and P. Kanneworff, 1997. Stratified-random trawl survey for shrimp (*Pandalus borealis*) in Disko Bay and Vaigat, inshore west Greenland 1997. NAFO SCR Doc. 97/99, Serial No. NN2956.

Savard, L., D.G. Parsons, and D.M. Carlsson, 1994. Estimation of age and growth of northern shrimp (*Pandalus borealis*) in Davis Strait (NAFO Subareas 0+1) using cluster analysis and modal analysis. J Northw. Atl. Fish. Sci., Vol. 16:64-74.

St. No.	T-pos. No.	Date mmdd	Mean position		Start, UTC	Tow, min.	Depth interval		Catch of shrimp, kg			
									Total	P.bor.	P.mont.	Other
1	201	0831	65°58.3'N	54°57.3'W	0924	31	114	118	0.038	0.022	0.016	0.000
2	202	0831	65°50.7'N	54°45.1'W	1139	30	123	124	0.060	0.010	0.016	0.034
3	203	0831	65°44.6'N	54°41.5'W	1308	31	138	145	0.270	0.010	0.230	0.030
4	204	0831	65°37.3'N	54°29.2'W	1529	31	122	145	0.080	0.000	0.074	0.006
5	205	0831	65°28.1'N	54°24.1'W	1801	31	111	126	0.007	0.000	0.007	0.000
6	206	0831	65°22.2'N	54°25.3'W	1939	23	94	104	0.020	0.000	0.000	0.020
7	207	0831	65°14.8'N	54°26.7'W	2100	33	112	122	0.280	0.000	0.110	0.170
8	214	0901	65°06.5'N	54°30.7'W	0902	31	146	150	0.040	0.000	0.020	0.020
9	213	0901	64°58.9'N	54°16.5'W	1045	33	130	137	0.280	0.000	0.045	0.235
10	212	0901	64°51.3'N	54°14.4'W	1220	30	145	155	0.160	0.000	0.080	0.080
11	211	0901	64°43.8'N	54°16.5'W	1354	30	140	168	0.170	0.000	0.100	0.070
12	210	0901	64°36.2'N	54°09.3'W	1532	30	153	160	0.010	0.000	0.004	0.007
13	209	0901	64°28.3'N	53°56.5'W	1738	33	135	138	0.011	0.000	0.000	0.011
14	208	0901	64°21.4'N	54°00.2'W	1920	32	172	184	0.050	0.000	0.003	0.047
17	215	0902	65°16.3'N	54°47.2'W	0859	33	132	147	4.306	4.260	0.030	0.016
18	216	0902	65°23.3'N	54°49.8'W	1032	30	110	115	0.250	0.020	0.100	0.130
19	217	0902	65°31.1'N	54°59.7'W	1213	34	139	150	0.050	0.000	0.020	0.030
20	218	0902	65°38.6'N	55°09.3'W	1357	32	150	178	0.280	0.005	0.215	0.060
21	219	0902	65°46.1'N	55°22.3'W	1540	31	152	159	0.050	0.024	0.016	0.010
22	220	0902	65°54.2'N	55°17.2'W	1727	31	132	142	0.040	0.005	0.005	0.030
23	221	0902	65°54.2'N	55°41.2'W	1910	30	154	158	0.640	0.640	0.000	0.000
25	305	0903	67°10.3'N	55°51.6'W	0910	32	93	103	0.360	0.310	0.000	0.050
26	302	0903	67°19.8'N	55°51.2'W	1053	32	98	120	0.120	0.080	0.000	0.040
27	304	0903	67°28.7'N	55°40.4'W	1239	30	94	100	0.043	0.021	0.000	0.022
28	315	0903	67°23.1'N	56°04.9'W	1438	30	116	119	0.029	0.000	0.000	0.029
29	330	0903	67°23.2'N	56°20.3'W	1616	31	140	144	0.000	0.000	0.000	0.000
30	339	0903	67°24.1'N	56°46.0'W	1803	30	198	203	0.130	0.130	0.000	0.000
31	340	0903	67°19.4'N	56°59.6'W	1942	29	228	230	0.020	0.020	0.000	0.000
33	338	0904	67°13.9'N	56°44.5'W	0912	32	246	263	6.770	6.770	0.000	0.000
34	337	0904	67°16.2'N	56°32.2'W	1053	30	188	197	0.560	0.560	0.000	0.000
35	331	0904	67°19.2'N	56°16.7'W	1220	33	120	140	0.030	0.020	0.000	0.010
36	316	0904	67°17.2'N	56°05.4'W	1342	33	114	124	0.020	0.000	0.000	0.020
37	317	0904	67°09.3'N	56°09.2'W	1521	30	107	135	0.010	0.000	0.000	0.010
38	332	0904	67°09.6'N	56°25.3'W	1644	31	150	191	0.010	0.000	0.000	0.010
39	336	0904	67°06.8'N	56°30.9'W	1748	31	210	250	4.400	4.400	0.000	0.000
41	341	0905	67°30.0'N	56°57.5'W	0920	31	202	217	1.730	1.720	0.000	0.010
42	342	0905	67°30.4'N	56°40.9'W	1137	36	182	198	0.090	0.070	0.000	0.020
43	329	0905	67°32.0'N	56°16.4'W	1337	30	134	136	0.040	0.014	0.006	0.020
44	314	0905	67°32.0'N	56°00.2'W	1504	31	122	180	0.640	0.020	0.280	0.340
45	310	0905	67°37.1'N	55°56.6'W	1627	32	105	109	0.053	0.014	0.004	0.035
46	313	0905	67°40.4'N	56°07.7'W	1752	30	124	137	0.020	0.013	0.000	0.007
47	328	0905	67°39.3'N	56°20.8'W	1902	30	131	145	0.000	0.000	0.000	0.000
48	343	0906	67°36.3'N	56°33.9'W	1651	32	180	193	0.000	0.000	0.000	0.000
49	344	0905	67°36.4'N	56°56.4'W	1905	30	207	216	0.020	0.012	0.000	0.008
50	345	0906	67°44.2'N	56°57.9'W	2044	32	220	228	0.031	0.031	0.000	0.000
51	346	0907	67°45.4'N	56°36.5'W	0906	31	189	196	0.073	0.030	0.027	0.016
52	327	0907	67°47.3'N	56°16.6'W	1040	33	146	158	0.019	0.000	0.007	0.012
53	312	0907	67°48.1'N	56°02.1'W	1204	30	116	121	0.000	0.000	0.000	0.000
54	347	0907	67°50.4'N	55°51.0'W	1320	31	108	110	0.180	0.006	0.000	0.174
55	351	0907	67°56.3'N	55°46.4'W	1427	31	102	112	0.540	0.000	0.000	0.540
56	354	0907	68°01.5'N	55°57.8'W	1607	32	118	124	0.270	0.000	0.000	0.270
57	355	0907	68°05.9'N	55°36.4'W	1752	39	100	111	0.659	0.005	0.000	0.654
58	359	0907	68°14.5'N	55°40.3'W	1928	32	240	326	3.490	3.390	0.000	0.100
60	358	0908	68°10.9'N	56°04.5'W	0913	32	178	198	0.250	0.250	0.000	0.000
61	357	0908	68°07.4'N	56°17.0'W	1046	36	158	178	0.030	0.030	0.000	0.000
62	353	0908	67°59.3'N	56°26.2'W	1234	35	155	162	0.039	0.013	0.000	0.026
63	350	0908	67°54.6'N	56°19.0'W	1405	32	156	161	0.020	0.000	0.000	0.020
64	349	0908	67°53.3'N	56°48.8'W	1608	30	174	194	0.000	0.000	0.000	0.000
65	348	0908	67°56.0'N	56°58.2'W	1739	30	263	271	1.900	1.900	0.000	0.000
66	352	0908	68°04.7'N	56°45.0'W	1937	31	217	220	0.200	0.190	0.000	0.010
67	356	0908	68°10.6'N	56°26.2'W	2117	34	234	240	1.080	1.080	0.000	0.000
77	401	0912	68°49.2'N	55°08.8'W	0939	32	247	258	0.110	0.110	0.000	0.000
78	404	0912	68°56.7'N	54°56.4'W	1141	32	214	238	0.260	0.110	0.000	0.150
79	403	0912	68°56.4'N	55°11.4'W	1305	35	207	220	0.040	0.025	0.000	0.015
80	402	0912	68°57.2'N	55°29.1'W	1443	31	158	165	1.000	0.000	0.000	1.000
81	405	0912	69°03.1'N	55°11.7'W	1628	42	173	178	3.800	0.006	0.000	3.794
82	406	0912	69°01.1'N	54°50.9'W	1837	31	196	230	0.400	0.000	0.000	0.400
83	407	0912	69°09.0'N	54°49.5'W	2030	30	92	103	4.530	0.005	0.000	4.525

Table 1. List of trawl positions with information on depth and catch of shrimp.

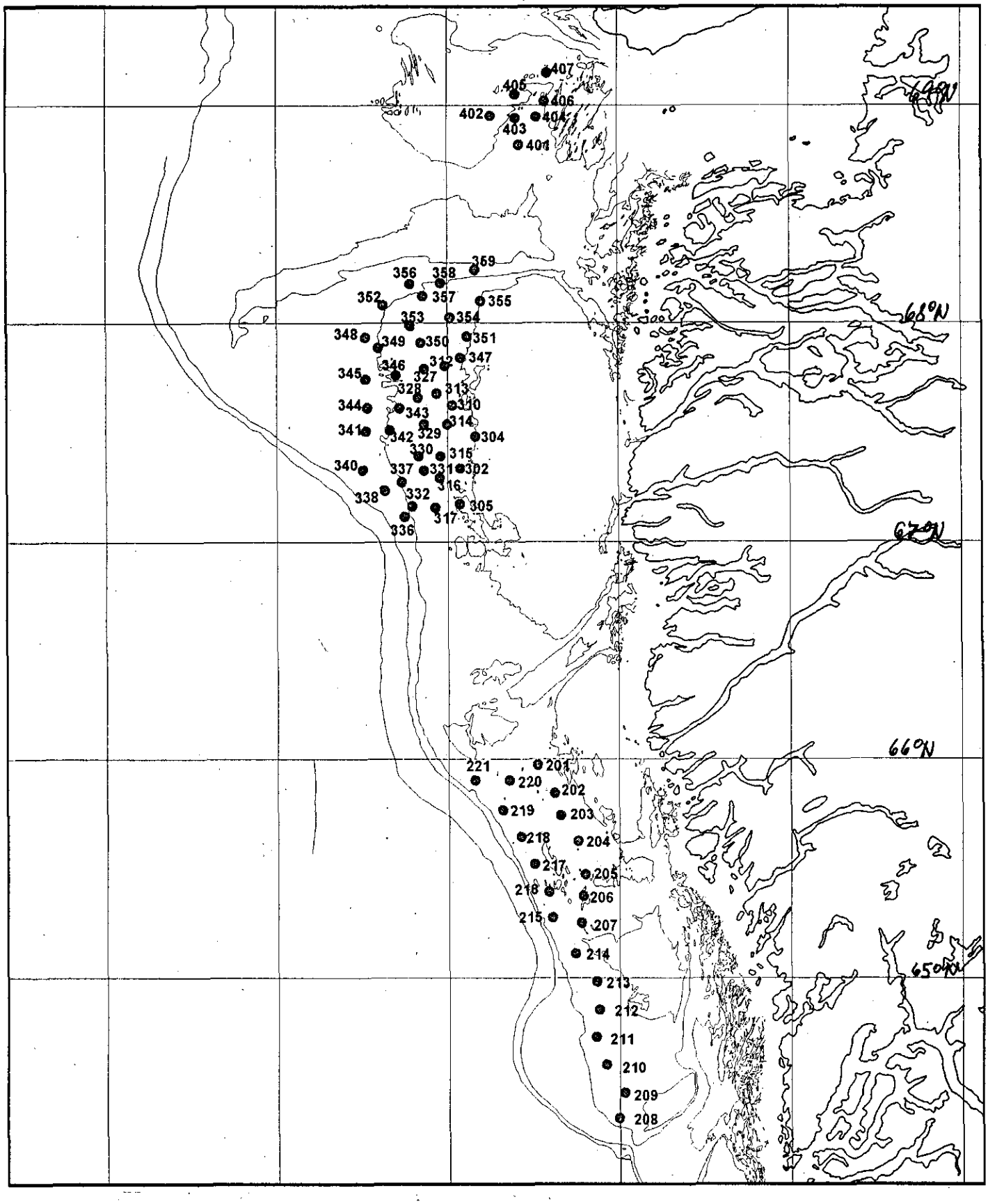

Figure 1. Map showing position of trawl stations.

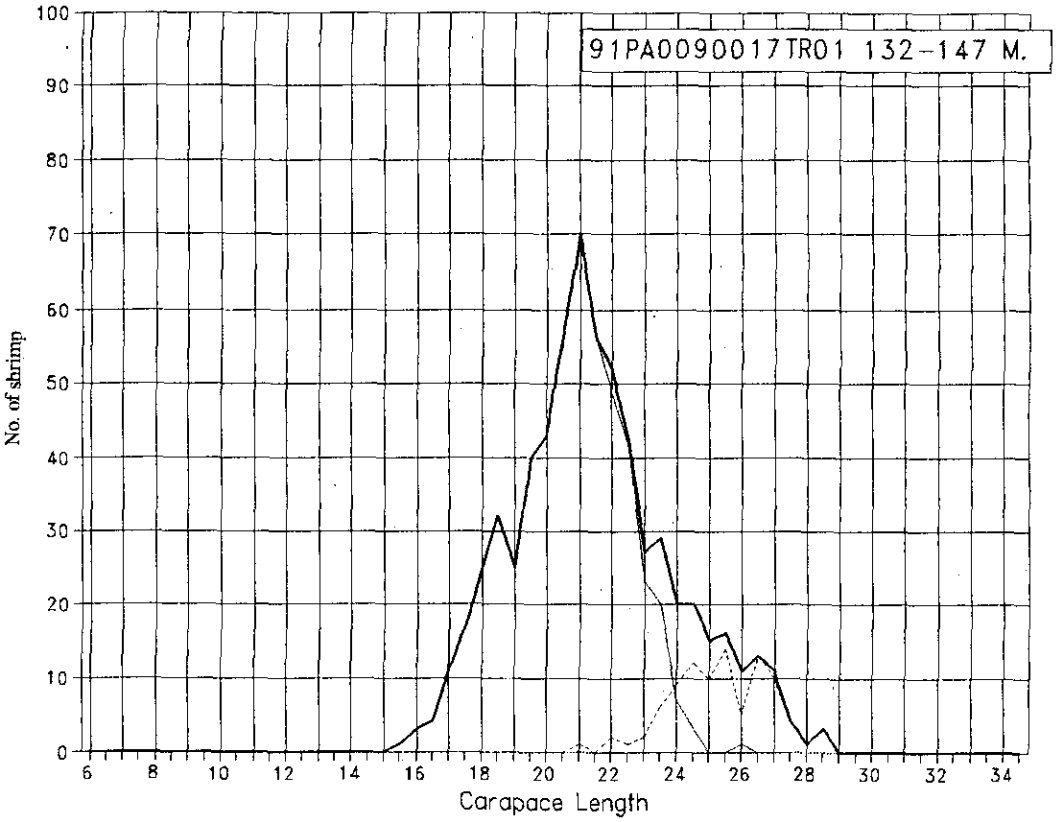

Figure 2. Length distribution of shrimp (*Pandalus borealis*) from trawl position no. 215 (station 17).

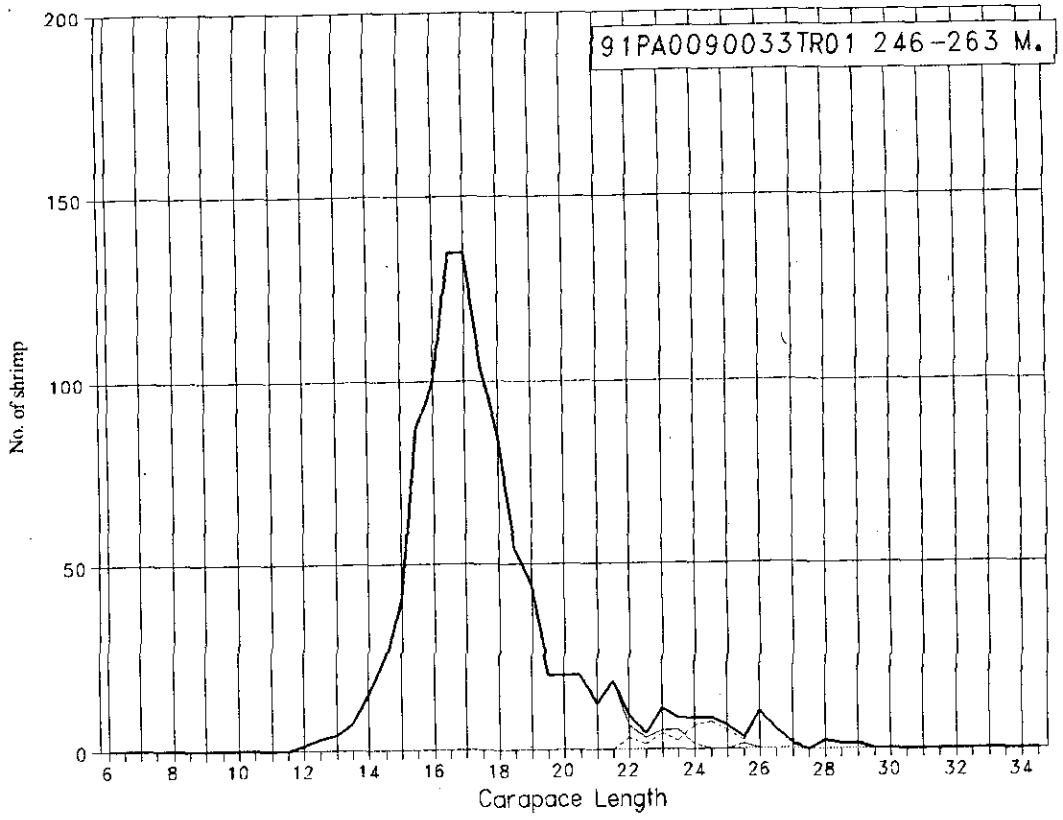

Figure 3. Length distribution of shrimp (*Pandalus borealis*) from trawl position no. 338 (station 33).

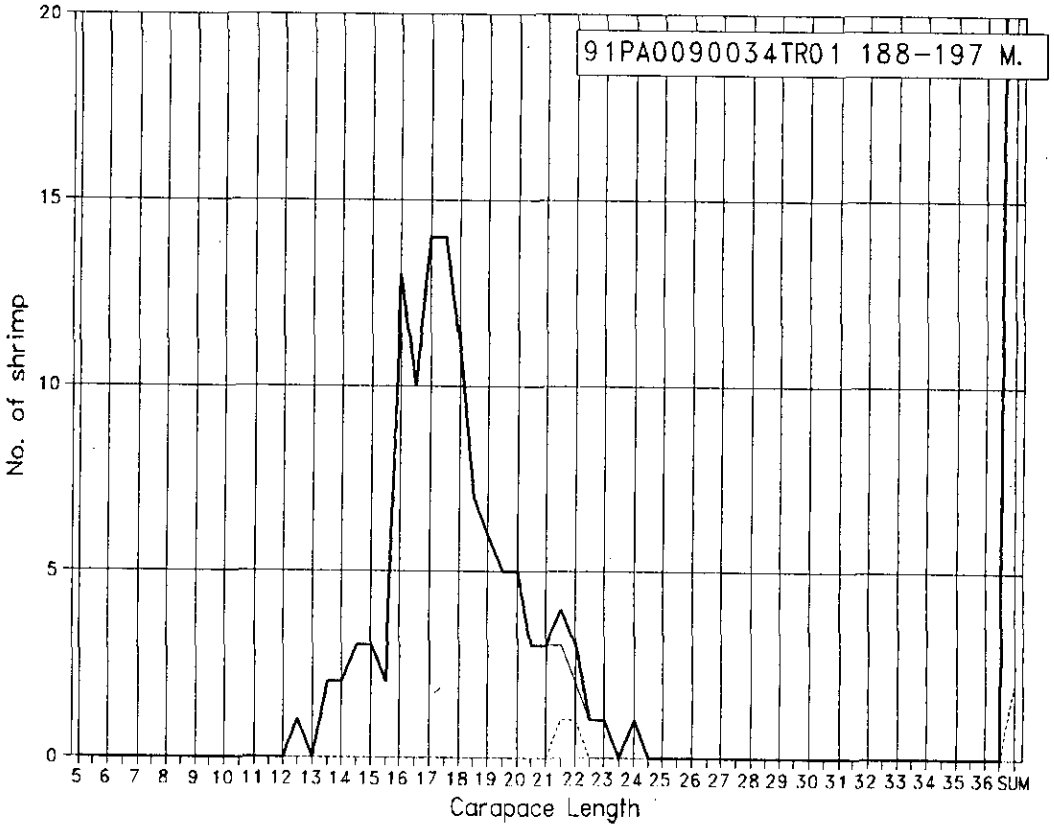

Figure 4. Length distribution of shrimp (*Pandalus borealis*) from trawl position no. 337 (station 34).

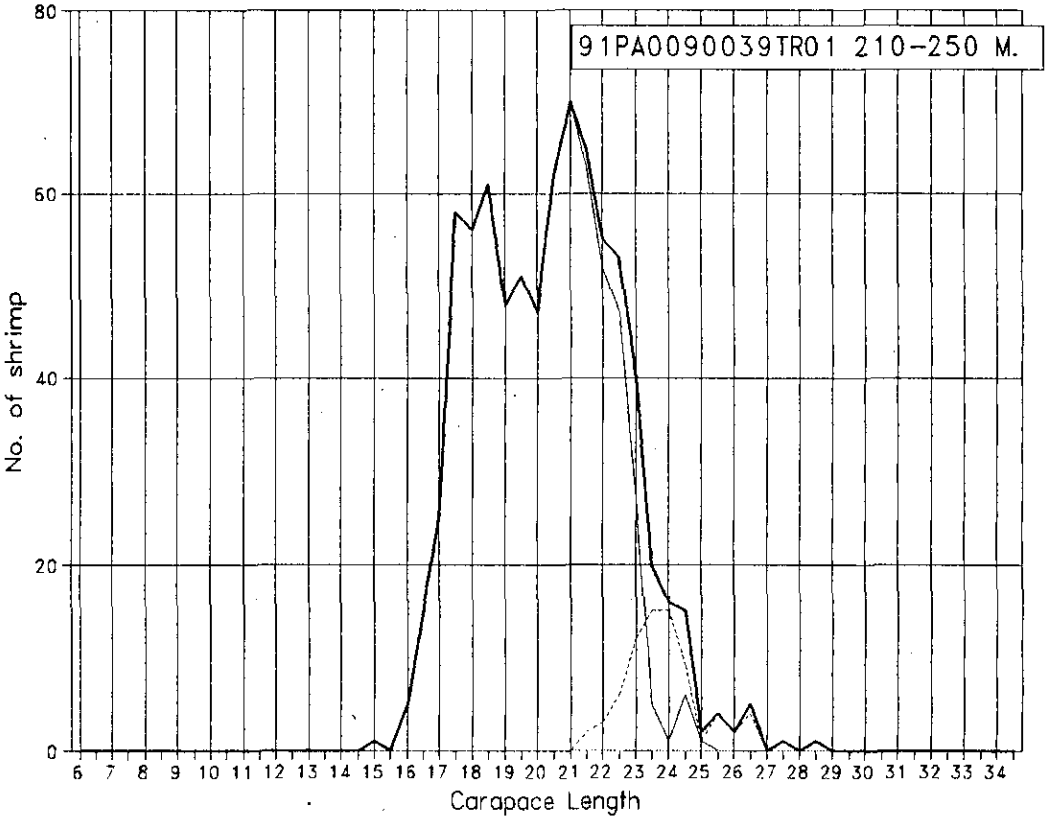

Figure 5. Length distribution of shrimp (*Pandalus borealis*) from trawl position no. 336 (station 39).

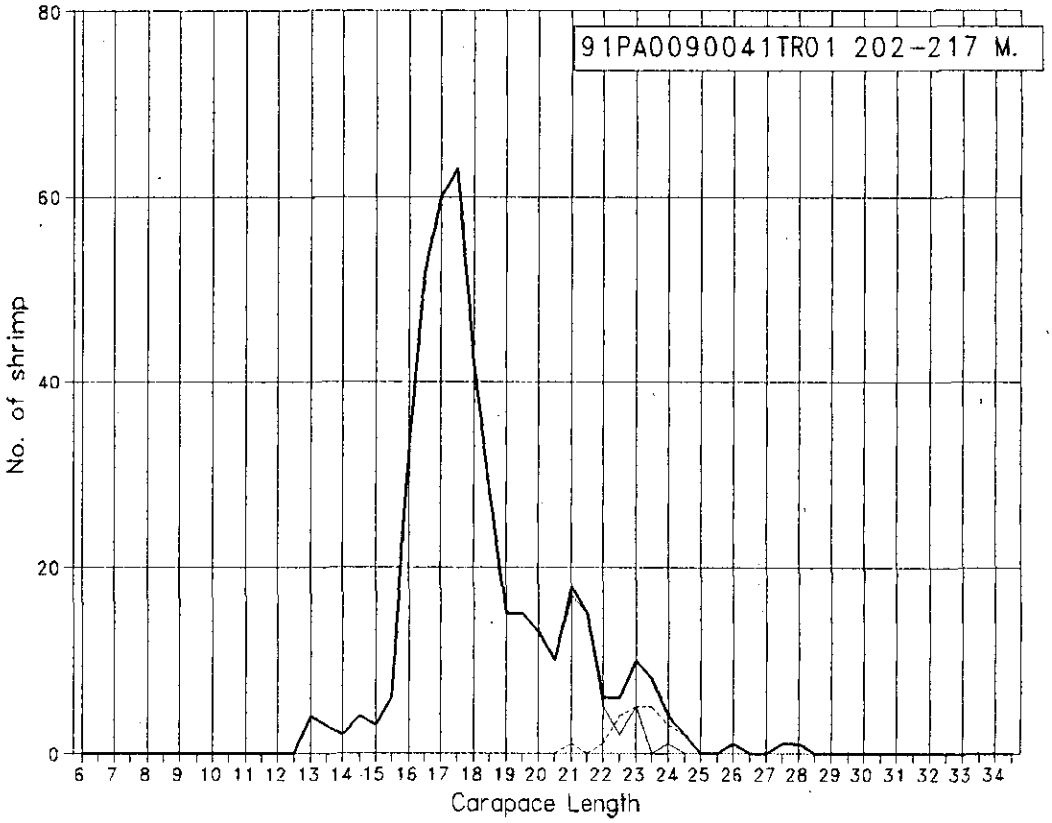

Figure 6. Length distribution of shrimp (*Pandalus borealis*) from trawl position no. 341 (station 41).

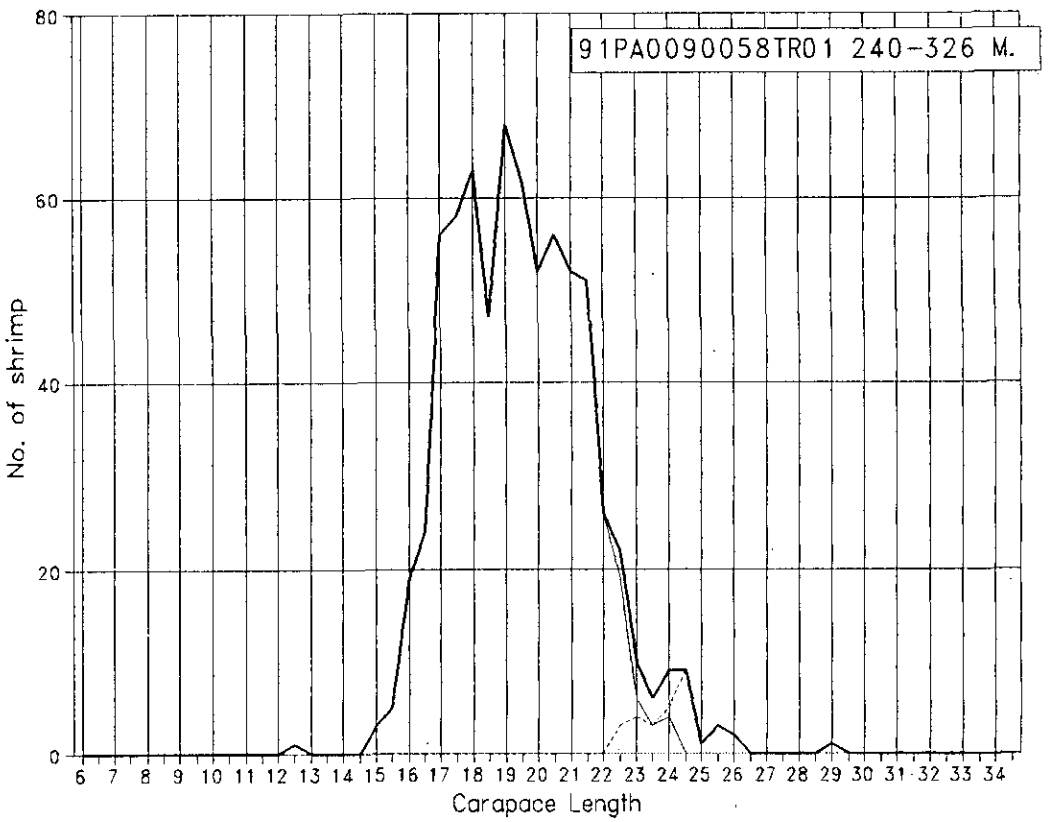

Figure 7. Length distribution of shrimp (*Pandalus borealis*) from trawl position no. 359 (station 58).

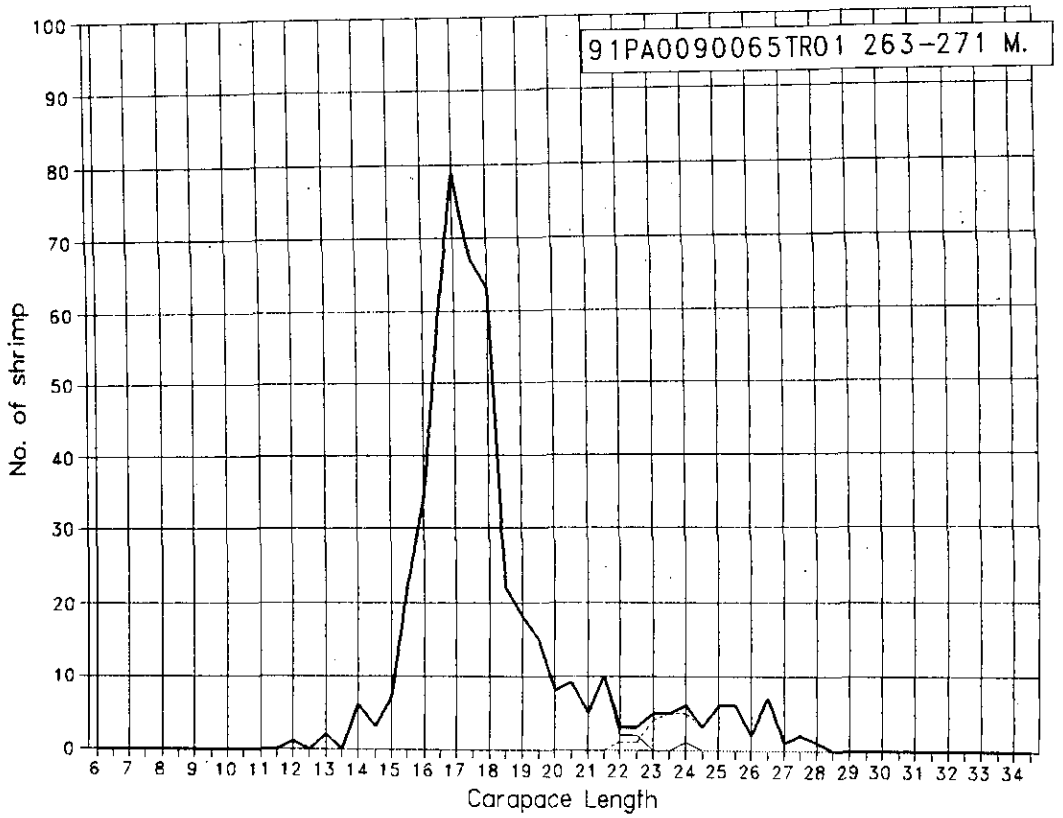

Figure 8. Length distribution of shrimp (*Pandalus borealis*) from trawl position no. 348 (station 65).

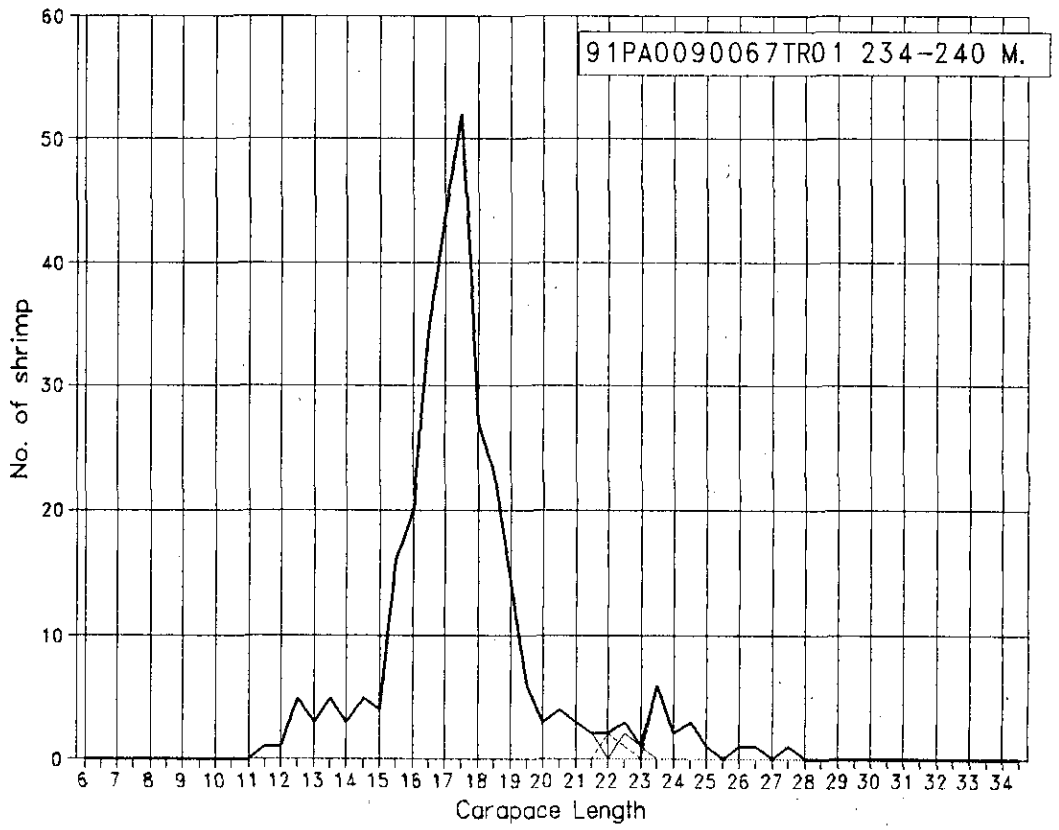

Figure 9. Length distribution of shrimp (*Pandalus borealis*) from trawl position no. 356 (station 67).