

Shrimp Investigations

Ungava Bay - Eastern Hudson Strait and Division 2G

by

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Introduction

An exploratory fishing survey for shrimp (Pandalus borealis and P. montagui) in areas of the Northwest Atlantic north of 57°N was conducted in September-October 1978. Part of the results of that survey was presented by Veitch et al. (1978) and descriptive of areas OA and OB. This paper includes information obtained from areas in and around Ungava Bay and the eastern Hudson Strait and in Division 2G. Methods and materials are as outlined in the previous report.

A total of 7 successful sets were made in Ungava Bay and east Hudson Strait, and 25 in Division 2G. The length of tow varied from 15 to 130 minutes at depths of 218-402 meters in the former area and 30 to 160 minutes at depths of 179 to 521 meters in 2G. (Table 1 and 2, Fig. 1 and 2)

An estimate of minimum trawlable biomass for shrimp was obtained by areal expansion based on depth stratum areas calculated for ICNAF Division 2G. (Fig. 13).

Results

Ungava Bay and East Hudson Strait

Details of shrimp catches. Pandalus montagui were caught in greater quantities than other shrimp species, but occurred in only 3 of 7 sets. The largest catch was 132 kg§/hr at position 61°21'N and 65°28'W at a depth of 285 m. Other catches of this species were considerably smaller (Table 1).

Fig. 3 and 4 show length frequencies obtained in August 1978 from data presented by MacLaren Marex (1978). Fig. 5 presents similar data for this study (September 1978). Fig. 3 indicates a polymodal distribution with prominent peaks at 17, 20, and 25 mm. A further breakdown of these data shows an increase in size with an increase in depth (Fig. 4). In September (Fig. 5) the peak occurs at 23 mm in the shallower depth (<293 m). Percent ovigerous increased to 28 in September from 18 in August.

The largest catch of P. borealis (14 kgs) was approximately 5% of the largest P. montagui catch. Only one other set contained P. borealis. Estimation of minimum trawlable biomass was not attempted due to insufficient coverage of the area.

Other species. Greenland halibut (Reinhardtius hippoglossoides) and Arctic cod (Boreogadus saida) were the major fish species taken in 6 of the 7 sets.

Greenland halibut were caught in greater quantities than other species. The largest catch taken was 30 kgs in a 25 minute tow at 60°23'N and 65°25'W (260 m). Fig. 6 shows most were of non-commercial size with an approximate one to one ratio of males to females.

Arctic cod occurred in small quantities, the largest being 10 kgs in a 90 minute tow at position 60°36'N and 65°23'W in 402 m. Fig. 7 indicates a number of year classes may be represented with most animals occurring in the youngest age group.

Redfish (Sebastes mentella) were noticeably absent and occurred in very low numbers in only 1 of the 7 sets.

ICNAF Division 2G

Details of shrimp catch. P. borealis occurred in 23 of 25 sets with the largest catch being 750 kgs/hr at position 60°25'N and 62°40'W in 316 m. This area, approximately 120 km due east of Cape Chidley, produced the best shrimp catches with 4 sets yielding greater than 100 kgs/hr. Catches to the north and south of this area were considerably smaller. The southern-most set, with roughly 200 kgs/hr, was the only exception.

Fig. 8 indicates obvious modes in the length frequency distribution at 21 and 25-27 mm. Fig. 9 indicates the smaller peak occurs constantly irregardless

of depth fished. Approximately 31% of the shrimp from intermediate depths of 313 to 348 m were ovigerous with proportions decreasing in either direction.

Estimate of minimum trawlable biomass. The minimum biomass calculated for P. borealis (Table 3) was 6754 metric tons for depths 183-549 m. Neither diel variability nor trawl efficiency for catching shrimp were taken into account in these calculations.

Other species. Greenland halibut (Reinhardtius hippoglossoides) and redfish (Sebastes mentella) were the major fish species taken.

Greenland halibut occurred in 20 of 25 sets. The largest catch was 136 kgs/hr at position 59°38'N and 60°36'W at a depth of 309 m. Fig. 10 indicates the majority of fish to be below commercial size with the most prominent mode around 14 cm.

Redfish were obtained in 20 of 25 sets with the largest catch being 800 kgs/hr at position 60°25'N and 62°10'W at 366 m. Fig. 11 indicates a polymodal distribution with peaks at 9, 12, 18, and 22 cm. A further breakdown of this data indicates an increase in size with an increase in depth (Fig. 12).

Arctic cod (Boreogadus saida) occurred in only 1 set.

Discussion

Significant quantities of P. montagui are indicated from limited data obtained in the Ungava Bay - east Hudson Strait area. Length distributions indicate sizes of acceptable commercial standards. Recent information (Jones, pers. comm.) reveals that commercial catches and acceptable sizes of shrimp were maintained by one vessel in this area in 1979.

Results of the present survey also imply that potentially commercial shrimp concentrations and sizes exist in the 280-320 m depth range east of Cape Chidley.

Details of stratification and total coverage (<1 set for every 1250 km²) used in estimating biomass for the 2G area do not facilitate segregation by well-defined areas. More extensive coverage should more accurately delineate zones of optimum density.

The estimate of 6754 metric tons for 2G was based on a horizontal trawl opening of 27.4 m. Should this measurement be closer to 22 m as suggested by Parsons (1979), then the estimate would be approximately 8400 metric tons. Using this range of biomass and an estimate of natural mortality of 0.7, the same as that assumed for the more southern areas (Parsons et al. 1980), then MSY can be estimated between 2400 and 2900 metric tons. These calculations are derived from the formula $MSY = 0.5 M B_0$, where M is the estimate of instantaneous natural mortality and B_0 the virgin biomass.

From other studies in more southern Labrador areas (Parsons et al. 1980) there is an apparent decrease in availability of shrimp from levels experienced in the early summer. This decrease may be due to factors which are partially or wholly independent of fishing pressure. Considering this possibility, it is interesting to note that the survey in Division 2G was conducted at a time of year when densities in other Labrador areas were at their lowest levels.

Greenland halibut, many of them juveniles, occurred as by-catch in both areas. Redfish were lacking in Ungava Bay (probably due to temperature), but occurred in large numbers in certain catches in 2G. It is encouraging to note that these redfish (mostly of small and intermediate sizes) appeared in areas where shrimp catches were relatively low.

References

- MacLaren Marex Inc. 1978. Report on Canso Condor - Shrimp and Groundfish Cruise of July 28-September 24, 1978 in Northeastern Canadian Waters for Supply and Services Canada and Fisheries and Environment Canada.
- Parsons, D. G. 1979. Canadian Research Efforts for Shrimp (Pandalus borealis) in Division OA and Subarea 1 in 1979. NAFO/SCR Doc., No. 7, Serial No. N018.
- Parsons, D. G., G. E. Tucker and P. J. Veitch. 1980. Status of the Labrador Pink Shrimp Resources, Divisions 2H and 2J. CAFSAC Res. Doc. 80/14
- Veitch, P. J., D. G. Parsons and A. Duthie. 1978. An exploratory survey for shrimp (Pandalus borealis) in Statistical Areas OA and OB. ICNAF Res. Doc., No. 88, Serial No. 5304.

Table 1. Details of catch by the stern trawler KRISTINA LOGOS in Ungava Bay and East Hudson Strait - September 1978.

Set #	Position		Date	Mean Time NST	Dur. (Mins)	Depth (M)	Weight Caught (Kg)				
	Lat.	Long.					Shrimp		Greenland Halibut	Redfish <u>S. mentella</u>	Arctic Cod
							<u>P. borealis</u>	<u>P. montagui</u>			
50	61°21'	65°28'	22/09	0840	130	285	14.29	285.71	2.27	1.27	-----
52	60°36'	65°23'	23/09	1445	90	402	0.45	-----	6.81	-----	10.00
53	60°20'	65°16'	23/09	1733	15	254	-----	12.50	17.00	-----	0.91
54	60°23'	65°25'	23/09	1903	25	260	-----	21.50	30.00	-----	0.45
55	59°39'	67°02'	24/09	0644	28	230	-----	-----	11.35	-----	2.00
57	59°42'	67°02'	24/09	0850	120	218	-----	-----	35.36	-----	4.54
58	59°59'	68°28'	24/09	1813	30	238	-----	-----	-----	-----	1.81
Total							14.74	319.71	102.79	1.27	19.71

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Table 2. Details of catch by the stern trawler KRISTINA LOGOS in ICNAF division 2G - September 1978.

Set #	Position		Date	Mean Time NST	Dur. (Mins)	Depth (M)	Weight Caught (Kg)				
	Lat.	Long.					Shrimp		Greenland Halibut	Redfish <i>S. mentella</i>	Arctic Cod
							<i>P. borealis</i>	<i>P. montaquui</i>			
1	60°24'	61°42'	08/09	1355	120	393	100.00	-----	13.61	54.43	-----
2	60°32'	61°49'	08/09	1620	90	433	22.68	-----	45.36	900.00	-----
3	60°22'	61°55'	08/09	2010	90	289	300.00	-----	1.00	4.00	-----
4	60°19'	61°57'	08/09	2255	120	302	140.00	-----	4.00	2.00	-----
5	60°39'	62°25'	09/09	0400	120	521	4.54	-----	-----	-----	-----
6	60°39'	62°38'	09/09	0640	120	508	-----	-----	-----	-----	-----
7	60°41'	63°43'	09/09	1215	80	410	22.00	-----	19.50	4.54	-----
8	60°56'	64°01'	09/09	1525	90	397	85.00	-----	45.36	0.45	-----
59	60°41'	63°52'	25/09	1200	60	399	12.00	-----	27.20	4.54	-----
60	60°37'	63°48'	25/09	1400	90	395	4.40	-----	27.20	0.91	-----
61	60°25'	62°40'	25/09	1935	120	316	1500.00	-----	27.20	45.45	-----
62	60°21'	62°24'	25/09	2208	75	293	250.00	-----	10.63	300.00	-----
63	60°11'	61°43'	26/09	0245	160	267	25.00	-----	9.08	5.00	-----
64	60°19'	62°08'	26/09	0743	115	293	600.00	-----	18.18	4.54	-----
65	60°25'	62°10'	26/09	1022	75	366	2.27	-----	22.70	1000.00	-----
66	60°24'	61°55'	26/09	1322	115	320	150.00	-----	-----	13.64	-----
67	60°09'	61°33'	26/09	1655	130	252	18.00	-----	-----	4.54	-----
68	60°02'	61°01'	26/09	2045	120	313	8.00	-----	181.08	9.08	-----
69	59°24'	60°27'	27/09	0310	70	289	0.91	-----	55.19	9.50	-----
70	59°38'	60°36'	27/09	0645	120	309	4.54	-----	272.70	11.35	-----
71	59°22'	60°47'	27/09	0950	30	214	2.00	-----	2.73	0.91	-----
72	58°41'	60°46'	28/09	0625	40	179	10.00	-----	-----	-----	1.00
73	58°40'	61°04'	28/09	0843	85	197	-----	-----	25.00	0.23	-----
74	58°10'	61°03'	28/09	1440	60	245	32.20	28.00	21.20	-----	-----
75	57°50'	60°24'	28/09	1913	155	280	400.00	-----	9.08	-----	-----
Total							3693.54	28.00	838.00	2375.11	1.00

Table 3. Estimates of trawlable biomass of shrimp (P. borealis) in ICNAF Division 2G.

Depth Range (M)	Area (KM ²)	No. of Sets	Biomass (Metric Tons)
183-366	8,292	16	6,315
367-548	3,386	8	439
Total	11,678	24	6,754

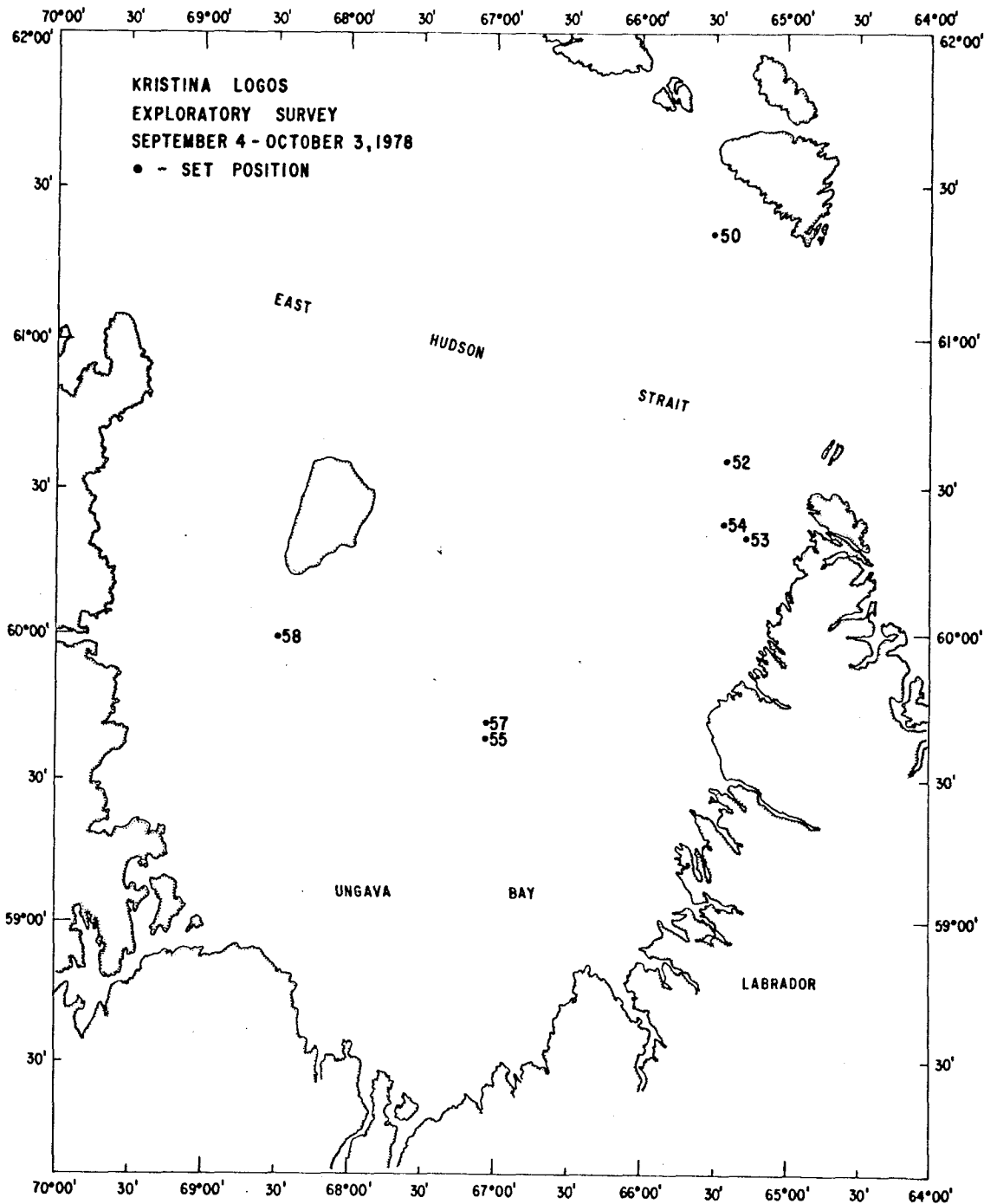


Fig. 1. Distribution of survey sets in Ungava Bay and East Hudson Strait, September 1978.

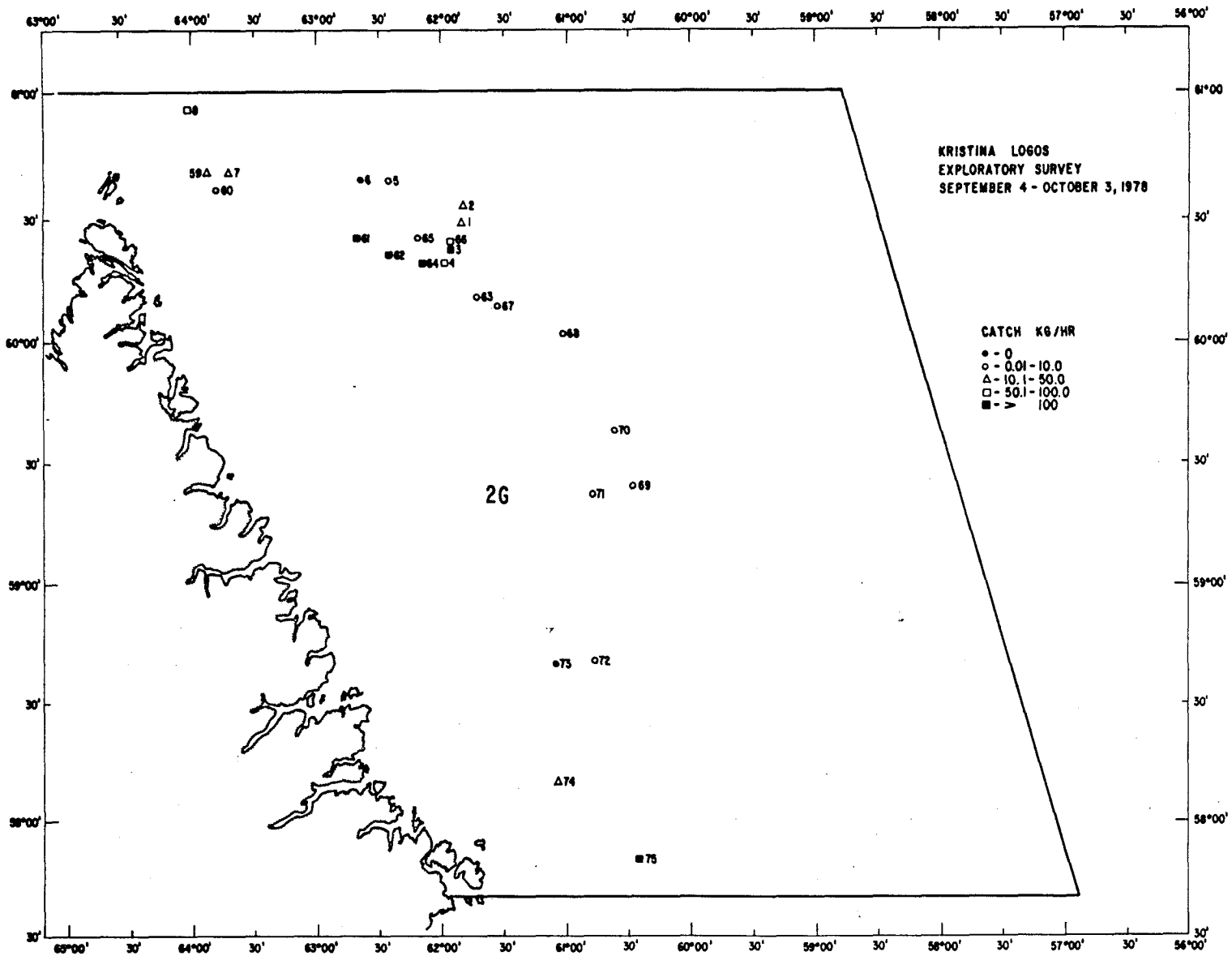


Fig. 2. Distribution of sets in Division 2G, September 1978.

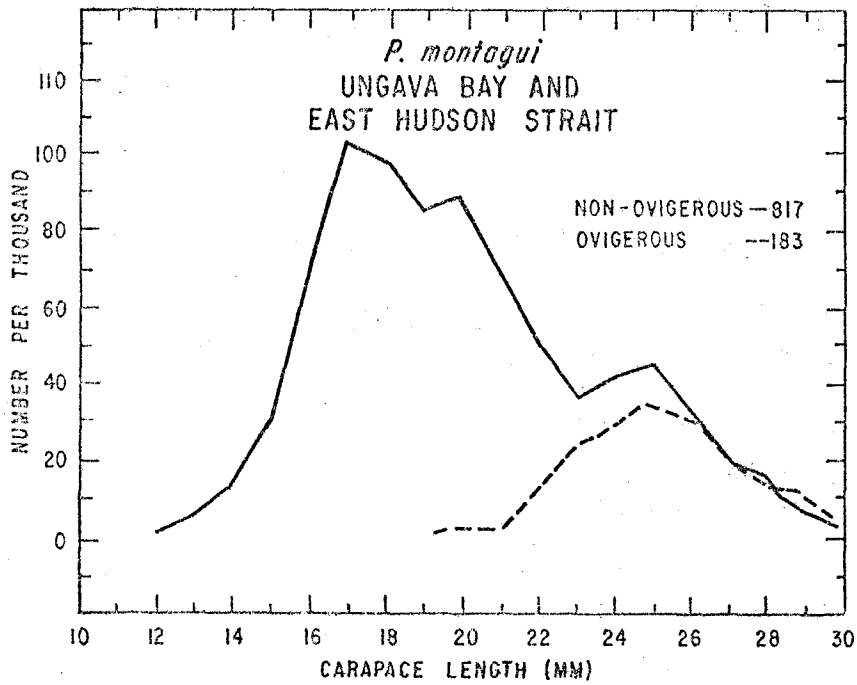


Fig. 3. General distribution of *P. montagui*.
From MacLaren Marex, 1978.

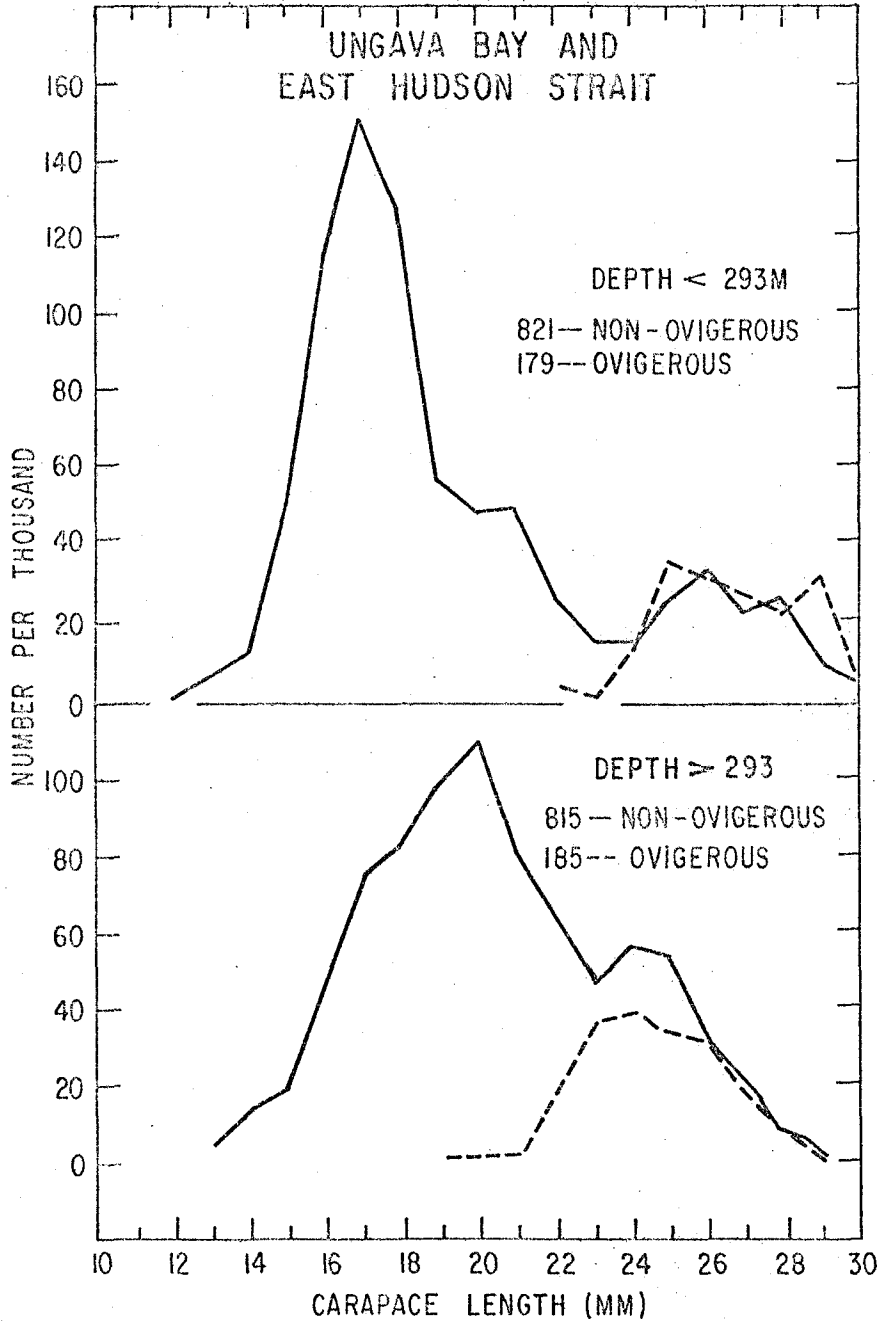


Fig. 4. Length distribution by Depth, MacLaren Marex, August 1978.

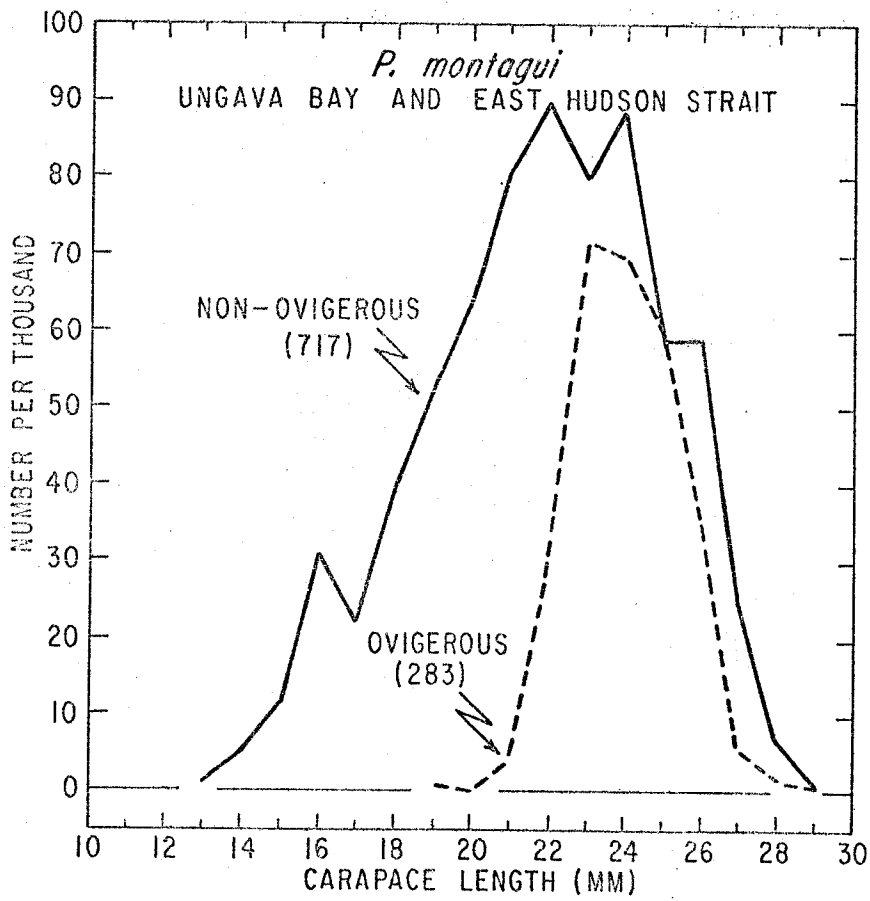


Fig. 5. Length distribution of *P. montagui*, September 1978.

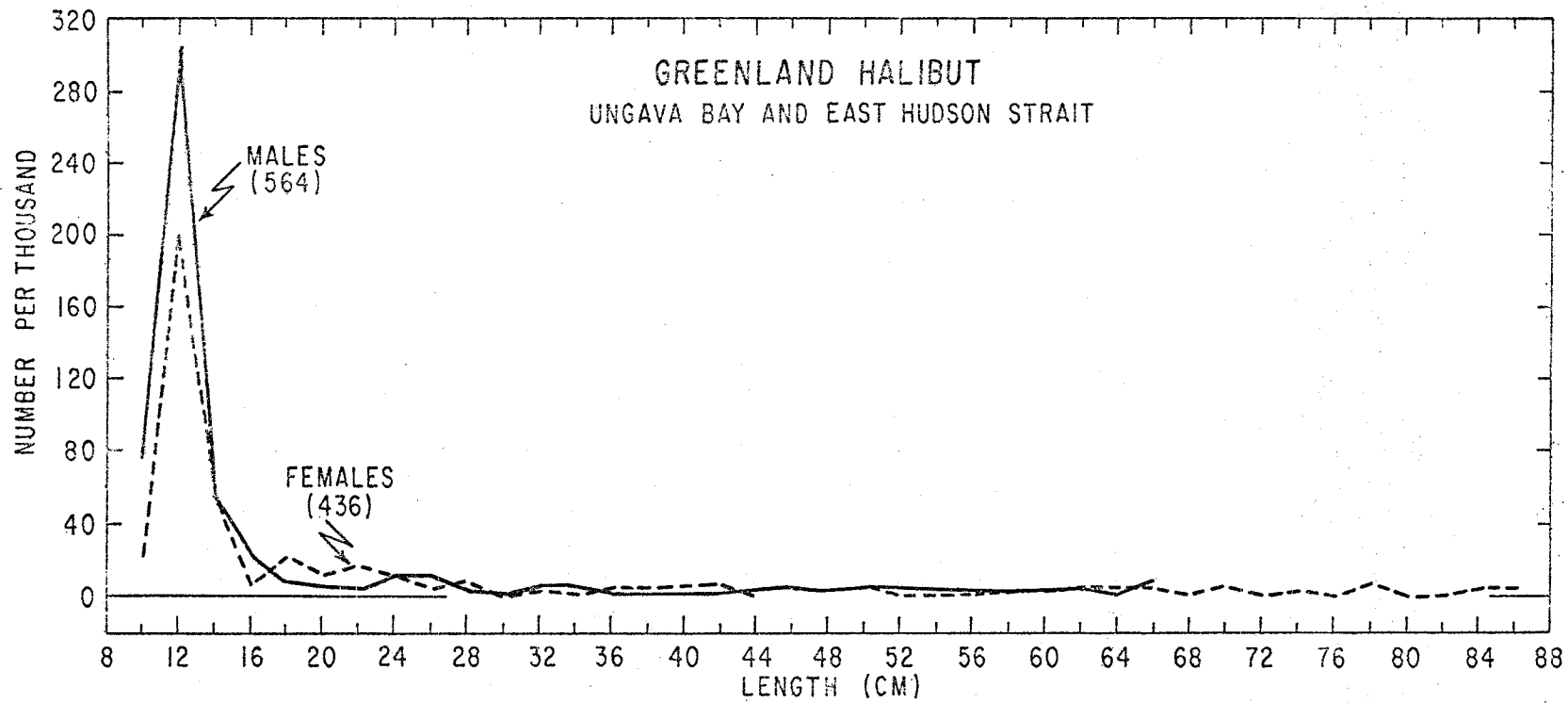


Fig. 6. Length distribution, September 1978.

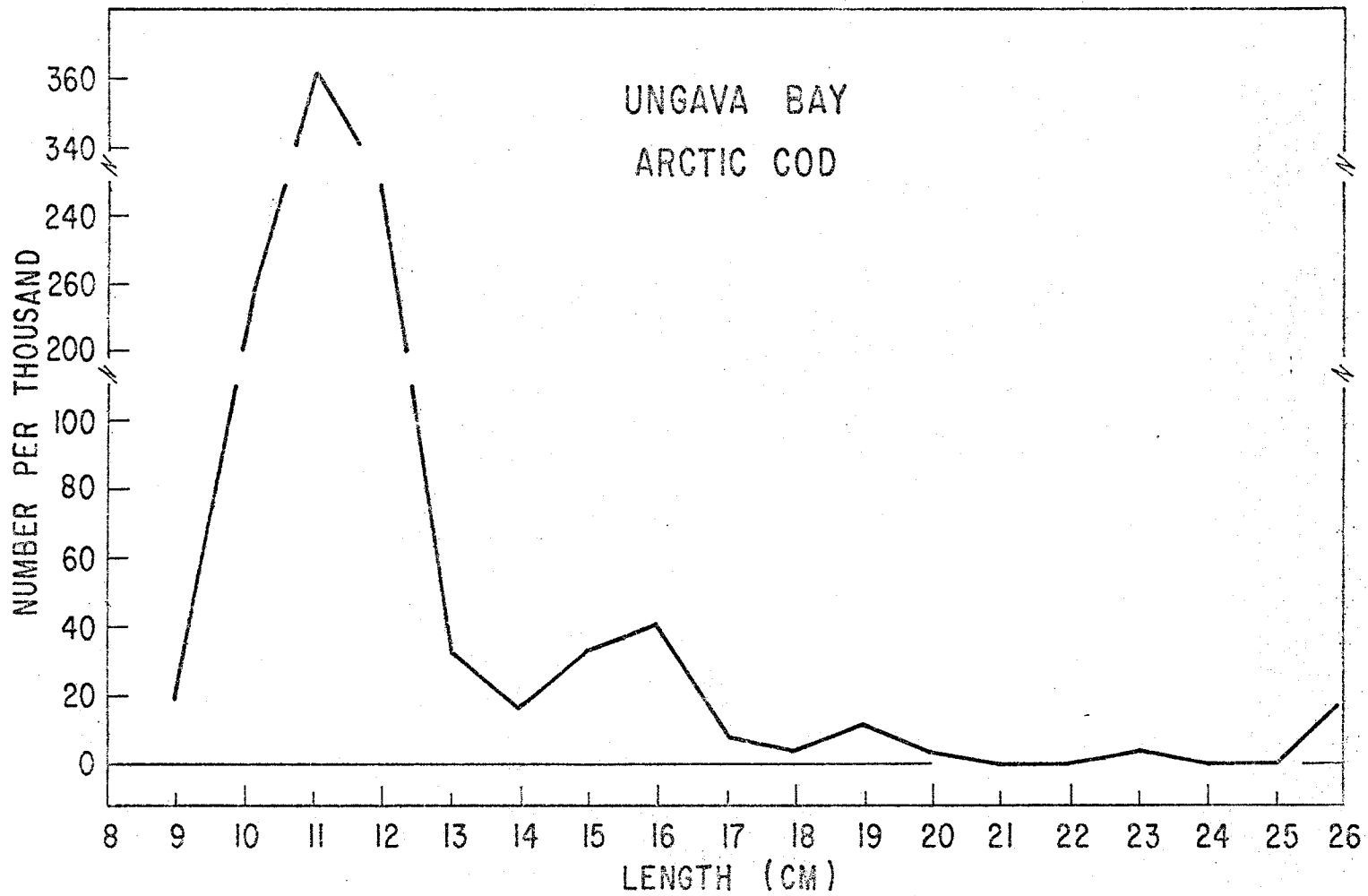


Fig. 7. Length distribution, September 1978.

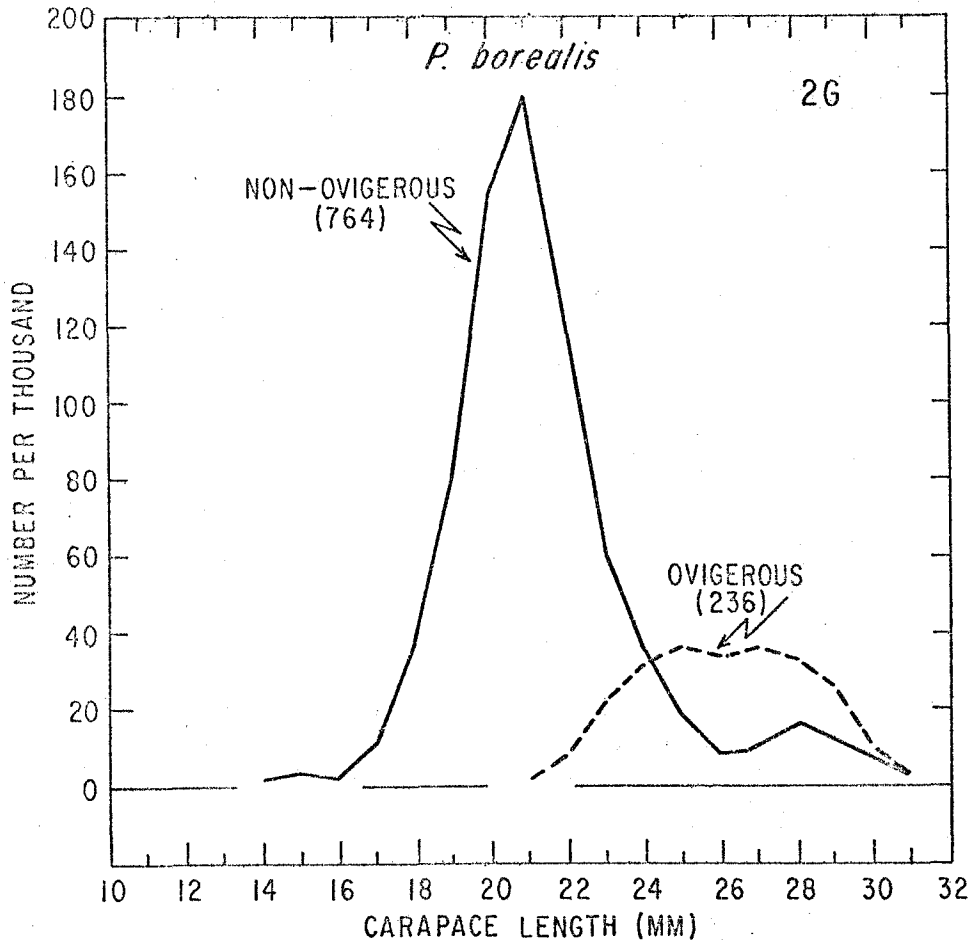


Fig. 8. General length distribution of P. borealis September 1978.

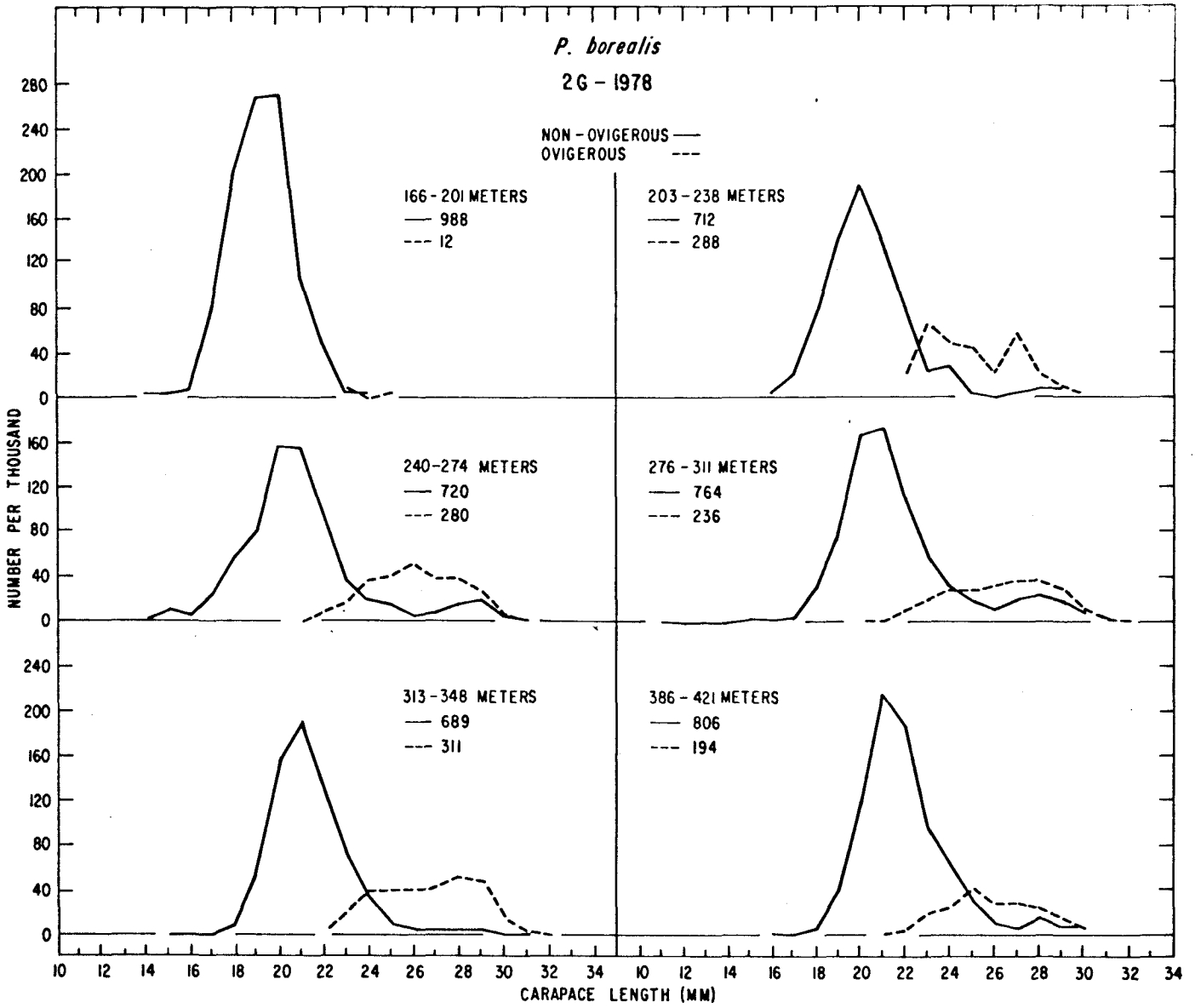


Fig. 9. Length distribution by depth, September 1978.

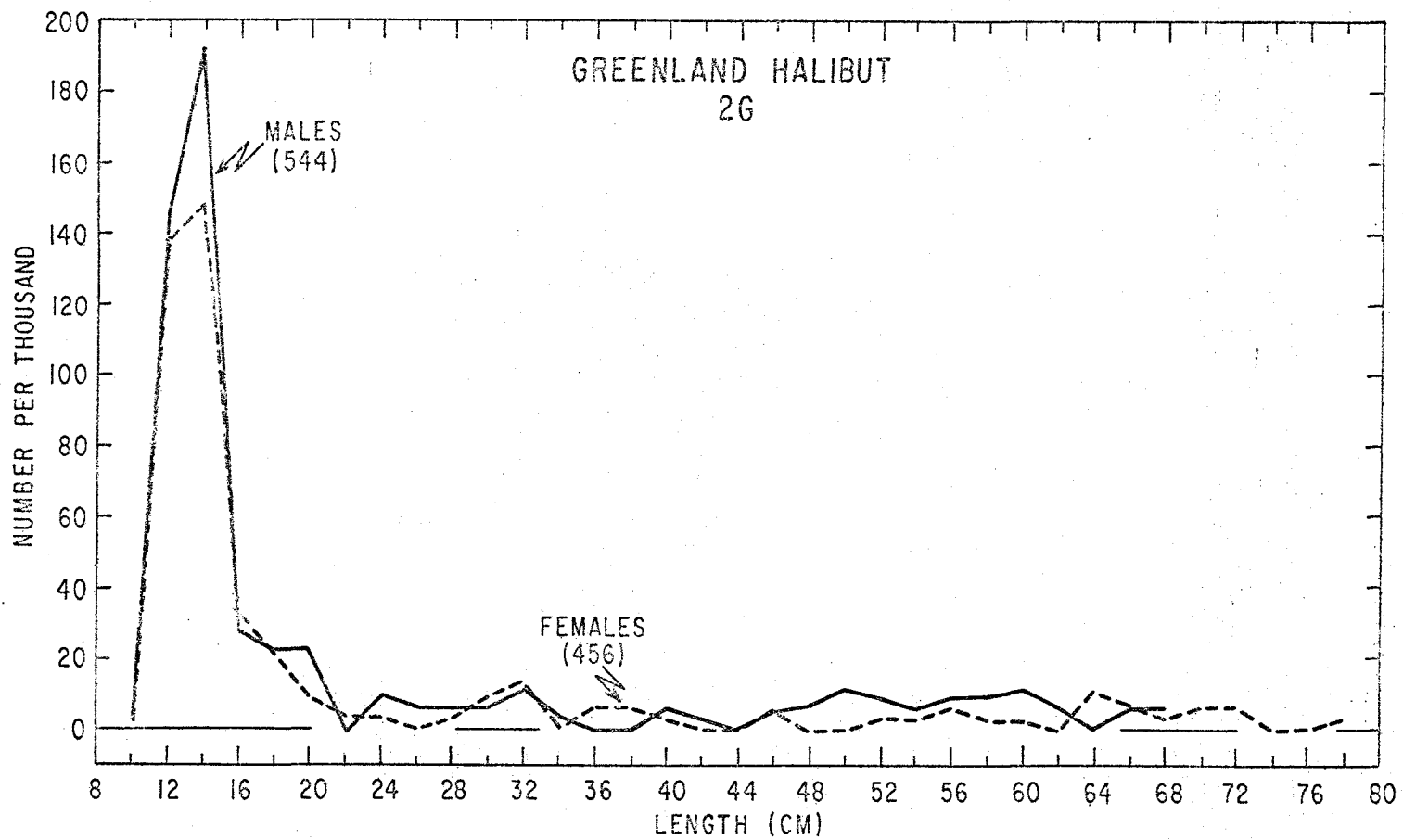


Fig. 10. Length distribution, September 1978.

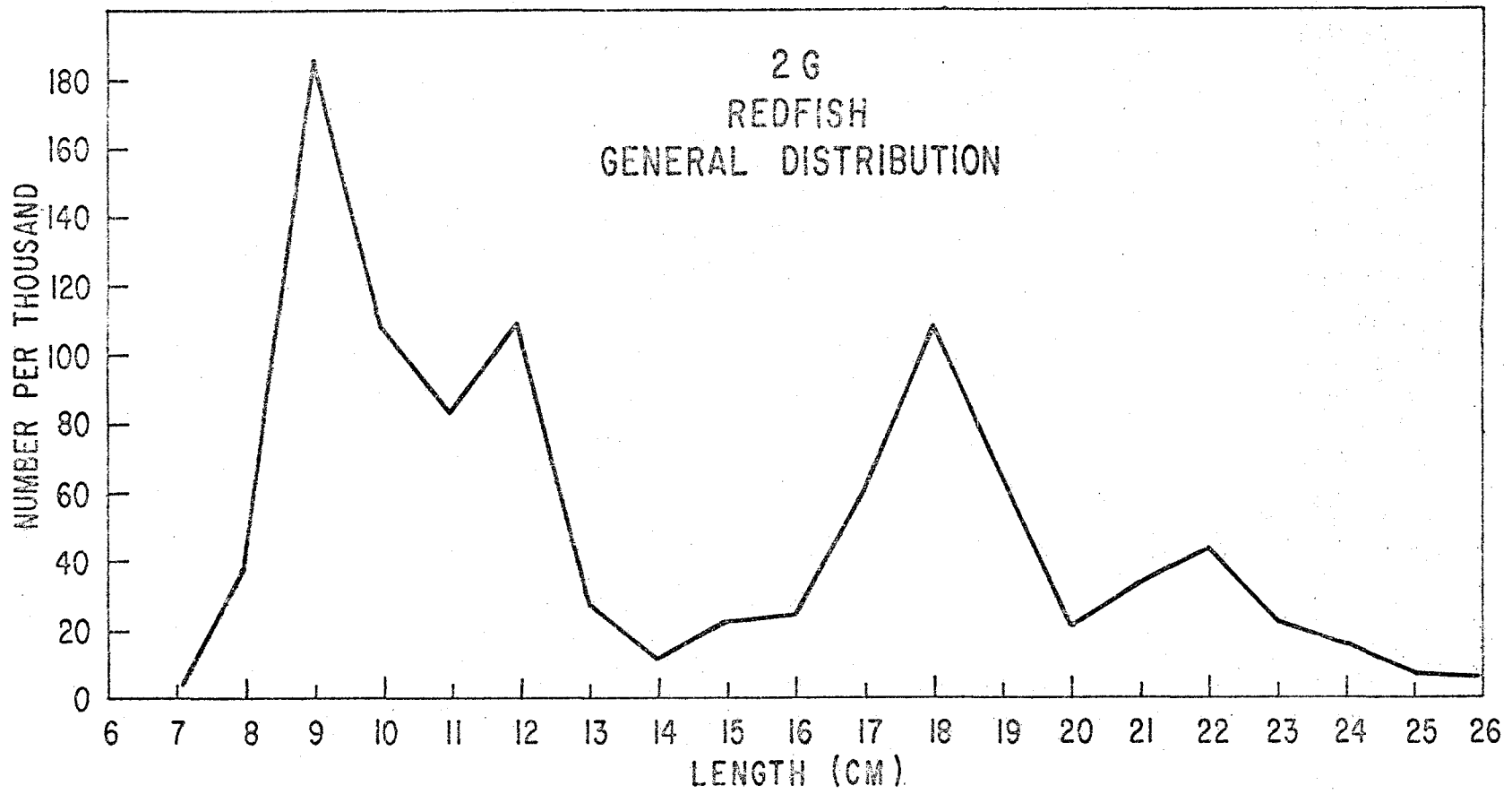


Fig. 11. General distribution, September 1978.

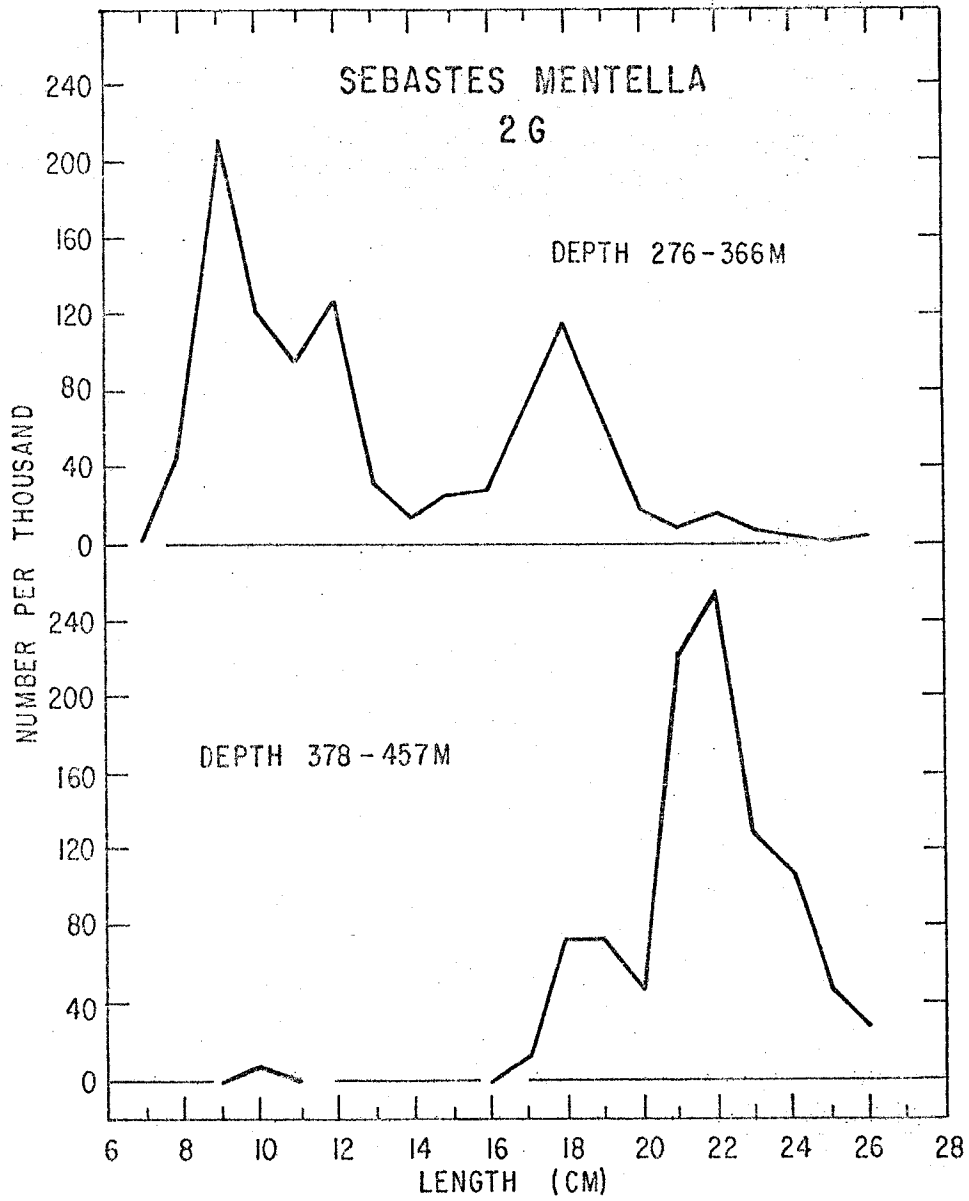


Fig. 12. Length distribution by depth, September 1978.

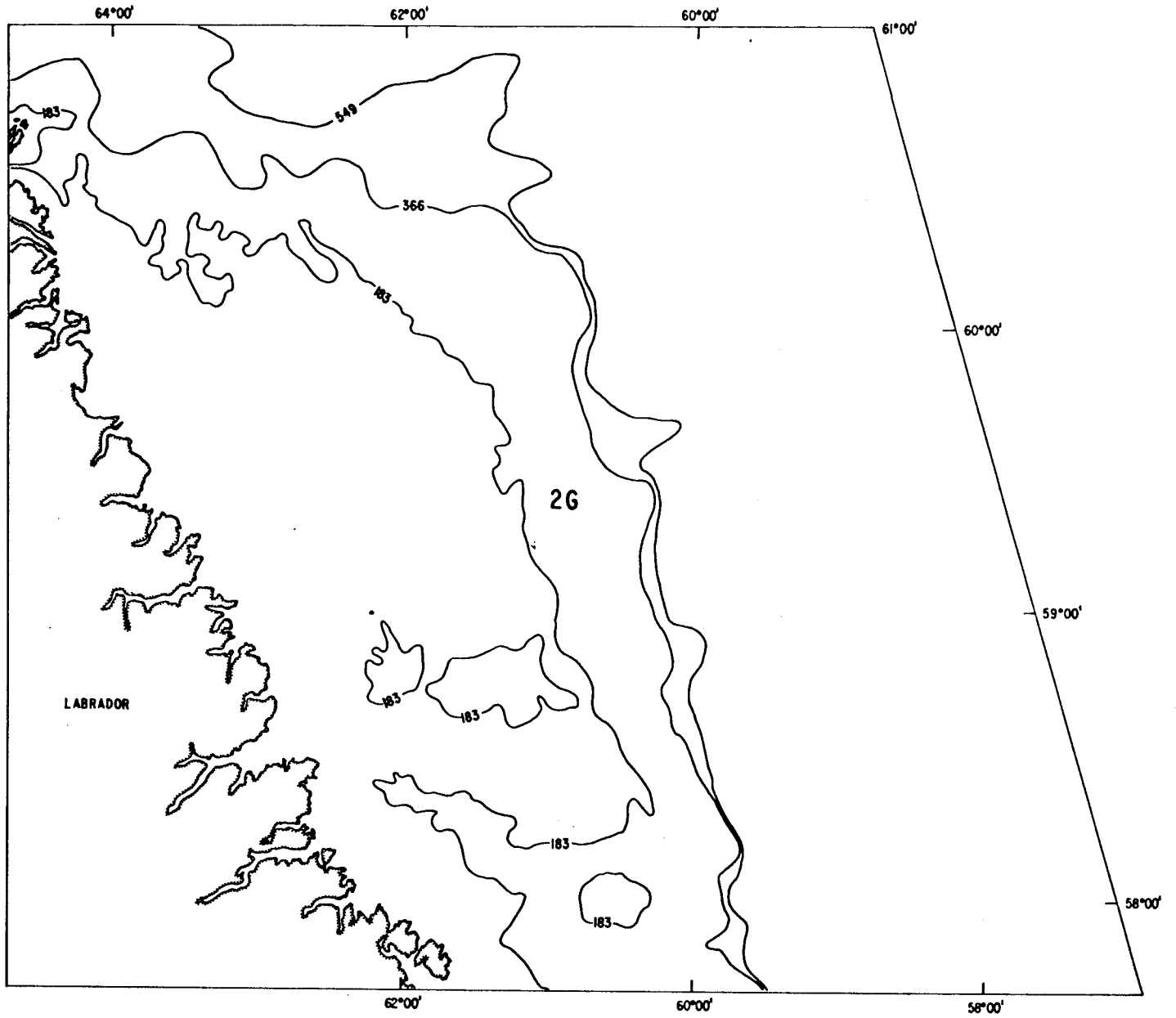


Fig. 13. Stratification chart of Division 2G, September 1978.