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Data on the Occurrence of Horseshoe Crabs, *Limulus polyphemus* (L.), in NMFS-NEFC Survey Samples

by

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Research on the lysate properties of the amebocytes in the blood of horseshoe crabs has stimulated consideration of man's responsibility for its conservation and protection (Galler, 1979). Limulus polyphemus, Tachypleus tridentatus, T. gigas, and Carcinoscorpins rotundicaudo are the four extant species of the subclass Xiphosura. Fossil remains date to the Ordovician period. The American horseshoe crab, Limulus polyphemus, is distributed along the Northwestern Atlantic coast from the Yucatan Peninsula to Canada; the remaining species occur in diverse Indo-Pacific habitats (Sekiguchi and Nakamura, 1979).

The population viability of some of these ancient species may be threatened. The numbers of T. tridentatus in Japan, an endangered species, have declined due to pollution, overharvesting, and the destruction of spawning and nursery areas (Nishii, 1975 in Shuster and Botton, in prep.; Pearson and Woodland, 1979). Fishing practices in the United States have had probable negative impact on the American horseshoe crab in Delaware Bay. Beaches of the lower bay are spawning sites of major significance for adult crabs. Their annual migration to these beaches formed the basis for a unique commercial fishery that utilized them in livestock and poultry feeds and fertilizer. Large numbers (750,000 in 1855; 1,200,000 in 1856) were collected from the beaches or in gill nets, fyke nets, and pound nets. Catches reached a peak of 4 to 5 million crabs in the late 1920's, but declined thereafter to annual amounts of about 250,000 (Shuster, 1960). McHugh (1977) summarized landing records of horseshoe crabs in New Jersey for 1960-1975 and graphed the available records of a high level of harvesting before a peak of about 2,600 metric tons was reached in 1929. Fishery statistics for the Middle Atlantic Region, which included mostly landings from Delaware Bay, showed a more than two-fold decline in catch from 1930 to 1939 (Figure 1). This decline was probably due to overfishing. In the 1940's, the plants processing horseshoe crabs were forced to close and thereafter landings have averaged about 120 metric tons annually and ranged from 600 metric tons to none recorded.

Fishermen continue to use horseshoe crabs for lobster, eel, and conch bait and prefer egg-laden females. Some of the catches reported for the Middle Atlantic Region after the processing plants closed were for these purposes, but the levels have declined drastically (Figure 1). Fishery statistics record landings of less than 4 metric tons on only two occasions (1933 and 1939) from the New England Region and on one occasion (1954) from the Chesapeake Region during 1930 to 1968. Thereafter and to 1975, five annual landings of 3 to 11 metric tons were recorded for the New England Region and three landings of 17 to 41 metric tons were recorded for the Chesapeake Region. These catches equal 2,750 to 22,500 animals, based on the average weight of 4 pounds per animal used for statistical purposes. Pearson and Weary (1980) reported that fishermen annually use 60,000 horseshoe crabs. These are only very approximate values, since the catches are geographically dispersed and many low level amounts are unreported.

Horseshoe crabs are considered to be a predator of the commercially important soft-shelled clam, Mya arenaria. This bivalve mollusc and Gemma gemma, Spisula solidissima, Ensis directus, and Mytilus edulis have

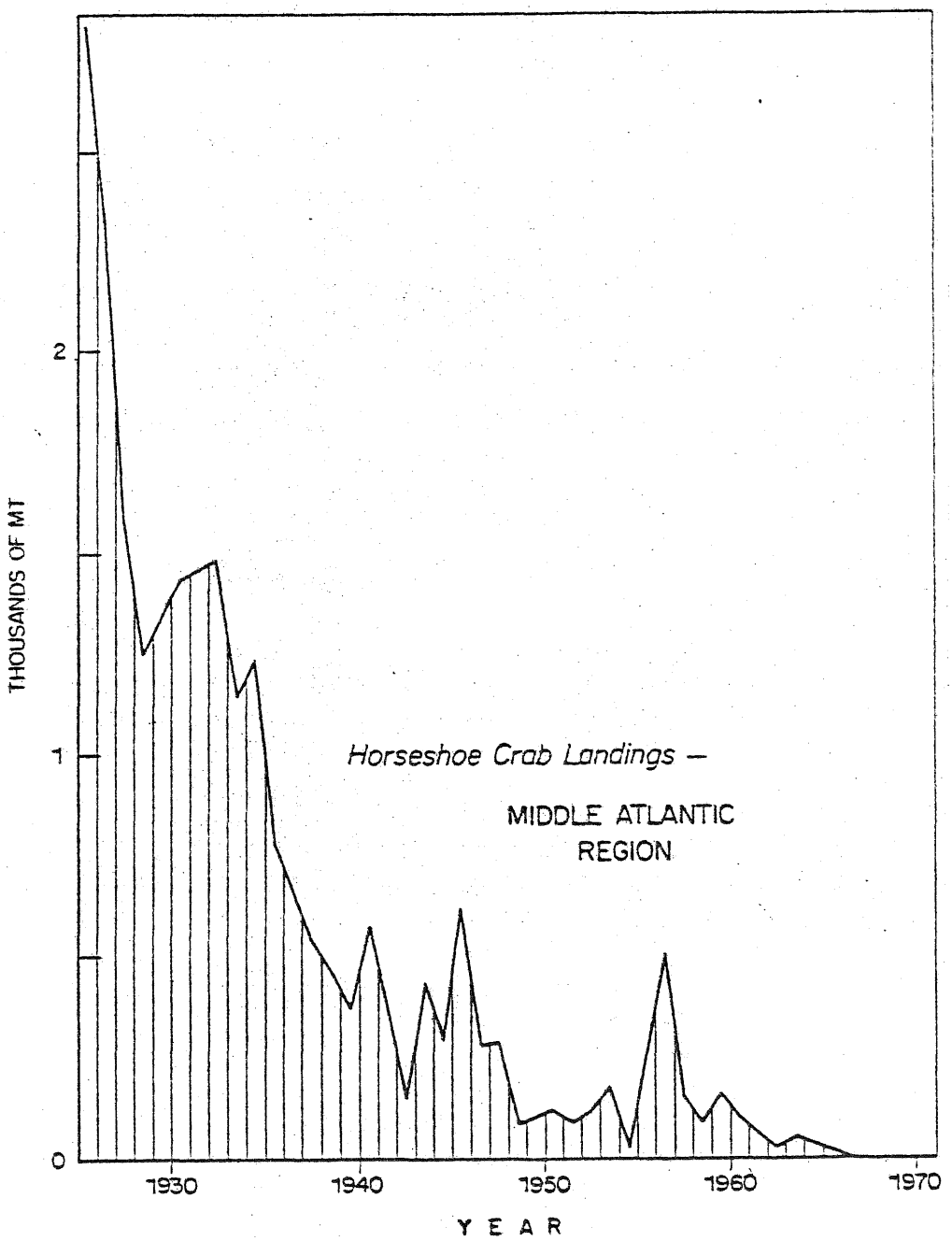

Figure 1. Landing statistics on horseshoe crabs, Limulus polyphemus, in the Middle Atlantic Region compiled from numerous Statistical Digests of Fishery Statistics of the United States, Departments of Commerce and Interior, Bureau of Commercial Fisheries.

been found in their diet (Turner, et al. 1948; Smith, 1949; Smith and Chin, 1953). Smith (1953) reported on the ability of horseshoe crabs to locate soft-shelled clams. Turner (1949) and Smith et al. (1955) developed methods of combatting the predations of horseshoe crabs. Shellfish officers and clam diggers in some of the coastal towns of Massachusetts have disposed of horseshoe crabs by throwing them well above the high tide zone or transporting them to dumps. The extent of these losses to the populations is unknown.

Adult horseshoe crabs are removed from the populations for use in Limulus amebocyte lysate (LAL) tests; Pearson and Weary (1980) estimated that 30,000 crabs are taken annually. The bleeding technique is considered relatively harmless if only about one-third of the whole blood plasma is removed (Sekiguchi and Nakamura, 1979). However, the fate of some crabs after bleeding is doomed, since Massachusetts law prohibits releasing them in state waters (contrary to federal statute) and LAL producers far removed from the parent population find the expense of returning them to the parent population is an added research burden.

These various depredations continue despite a lack of adequate statistics on annual harvesting rates or estimates assessing the extent of the populations, especially in the ocean. The data assembled herein provides a basis for elaborating on the occurrence of horseshoe crabs in the ocean. Heretofore, existing records of the "crab" on the continental shelf of North America are limited and are mostly for relatively nearshore shallow depths (Shuster 1979). Wolff (1977) reported 200 m for the species in Northern European waters. Records collected during assessment surveys by the National Marine Fisheries Service extend this record to deeper depths and may provide a basis for evaluating future sampling needs.

Appendices Tables 1-5 list individual station data at locations where horseshoe crabs were caught during the respective types of survey cruises.

Tables 1-5 summarize data on horseshoe crabs caught during NMFS surveys. Table 1 lists the information from 16 survey cruises for surf clams (Spisula solidissima) and ocean quahogs (Arctica islandica) during 1965 to 1980; Table 2 for six special clam surveys in 1972, 1976, and 1977; Table 3 for three sea scallop (Placopecten magellanicus) surveys in 1975, 1977, and 1978; and Table 4 for 23 finfish cruises in 1975 to 1980 during inshore bottom trawl surveys; and Table 5 for 18 finfish cruises in 1975 to 1980 during offshore finfish surveys.

Literature Cited

Galler, S. R. 1979. Limulus polyphemus, a target of opportunity. In: Cohen, E. (ed.) Biomedical Applications of the Horseshoe Crab (Limulidae). Alan R. Liss, Inc., New York, p. 107-108.

McHugh, J. L. 1977. Fisheries and fishery resources of New York Bight. U.S. Dept. Commer., NOAA, NMFS, Tech. Rept. NMFS Cir. 401. 50 p.

Pearson, F. C. III, and M. Weary. 1980. The Limulus amebocyte lysate test for endotoxin. Bio. Sci. 30:461-464.

Pearson, F. C., and E. Woodland. 1979. In vitro cultivation of Limulus amebocytes. In: Cohen, E. (ed.) Biomedical Applications of the Horseshoe Crab (Limulidae). Alan R. Liss, Inc., New York, pp. 93-99.

Sekiguchi, K., and K. Nakamura. 1979. Ecology of the extant horseshoe crabs. In: Cohen, E. (ed.) Biomedical Applications of the Horseshoe Crab (Limulidae). Alan R. Liss, Inc., New York, p. 37-45.

Shuster, C. N., Jr. 1960. Horseshoe "crabs"-- In former years during the month of May, these animals dominated Delaware Bay shores. Estuarine Bull., Univ. Del., 10(8):4-5.

Shuster, C. N., Jr. 1979. Distribution of the American horseshoe "crab", Limulus polyphemus (L.). In: Cohen, E. (ed.). Biomedical Applications of the Horseshoe Crab (Limulidae). Alan R. Liss, Inc., New York, p. 3-26.

Shuster, C. N., Jr., and M. L. Botton (in prep.). An estimate of the 1977 spawning population of the horseshoe crab, Limulus polyphemus (L.), in Delaware Bay.

Smith, O. R. 1949. Clam mortality in Massachusetts. Oyster Inst. North Amer. 15:2.

Smith, O. R., and E. Chin. 1953. The effects of predation on soft clams, Mya arenaria. 1951 Conv. Addresses, Natl. Shellfish. Assoc., p. 37-44.

Smith, O. R. 1953. Notes on the ability of the horseshoe crab, Limulus polyphemus, to locate soft-shell clams, Mya arenaria. Ecol. 34: 636-637.

Smith, O. R., J. P. Baptist, and E. Chin. 1955. Experimental farming of the soft-shell clam, Mya arenaria, in Massachusetts, 1949-1953. U.S. Dept. Interior, Fish and Wildlife Serv., Commer. Fish. Rev. 17(6):1-16.

Turner, H. J., Jr., J. C. Ayers, and C. L. Wheeler. 1948. Appendix II. The horseshoe crab and boring snail as factors limiting the abundance of the soft-shell clam. In: Turner, H. J., Jr. Report on investigations of the propagation of the soft-shell clam, *Mya arenaria*. Commonwealth of Mass., Dept. Conservation, Div. Mar. Fish., p. 43-45.

Turner, H. J., Jr. 1949. Report on investigations of methods of improving shellfish resources in Massachusetts. Commonwealth of Mass., Dept. Conservation, Div. Mar. Fish., p. 3-22.

Wolff, T. 1977. The horseshoe crab (*Limulus polyphemus*) in north European waters. Vidensk Meddr. dansk. naturh. Foren. 140:39-53.

APPENDIX TABLES 1-5

Appendix Table 1. Horseshoe crabs in clam survey cruises.

CRUISE	YR	MO	DA	LAT	LON	STRAT	TOW	DEPTH(M)	NUMB	WT.(KGS)	B.TEM	S.TEM
SM651	65	6	12	384	750		192	15.2	1		14.3	
	65	6	14	375	753		236	12.2	1		12.4	
	65	6	14	374	753		237	14.9	1		11.0	
	65	6	20	371	757		282	36.6	1		14.2	
	65	6	23	353	753		355	20.7	1		17.7	
	65	6	23	352	753		360	13.1	2		17.6	
SM652	65	10	27	365	756		1	6.7	1		17.6	
	65	10	28	370	754		14	13.1	1		17.3	
	65	10	28	370	755		15	16.9	1		16.9	
	65	10	28	371	754		16	8.2	3		16.4	
	65	10	28	373	753		26	13.4	2		16.7	
	65	10	28	373	753		27	16.8	1		16.7	
	65	10	29	374	755		34	14.0	1		15.6	
	65	10	30	375	745		45	27.7	1		14.6	
	65	10	30	382	750		57	13.7	5		14.5	
	65	11	3	383	745		62	15.2	2		13.2	
	65	11	3	385	744		66	23.5	1		12.4	
	65	11	3	390	743		68	9.1	2		13.1	
	65	11	4	392	741		80	12.5	1		12.7	
	65	11	4	394	741		87	13.4	1		11.4	
	65	11	5	403	733		93	16.2	1		6.8	
66-1	66	5	18	404	732		23	16.8	1		7.9	
	66	6	1	374	751		229	26.8	1		—	
	66	6	2	361	753		249	23.2	2		—	
	66	6	2	361	754		251	21.2	1		—	
	66	6	3	353	752		286	30.5	1		—	
	66	6	10	365	754		410	19.5	1		—	
66-6	66	8	15	384	750		21	17.7	6		16.6	
	66	8	15	381	750		35	22.3	1		11.2	
	66	8	16	375	752		51	14.6	1		14.5	
	66	8	16	375	753		52	11.6	1		16.4	
	66	8	16	374	752		54	15.8	6		17.8	
	66	8	20	371	753		77	19.5	1		15.2	
	66	8	20	371	754		79	15.5	2		13.5	
SM671	67	5	14	394	735		55	21.3	1		6.5	
	67	5	18	381	744		199	21.3	2		—	
	67	5	18	382	744		202	17.7	3		—	
	67	5	18	381	744		231	25.0	1		—	
	67	6	10	376	751		267	14.0	1		—	
	67	6	10	375	752		251	13.1	2		—	

Appendix Table 1. (cont.)

CRUISE	YR	MO	DA	LAT	LON	STRAT	TOW	DEPTH(M)	NUMB	WT.(KGS)	B.TEM	S.TEM
******	**	**	**	***	***	*****	***	**********	****	********	*****	*****
69-1	69	6	24	384	745		77	18.6	6		—	
	69	6	25	382	746		96	19.8	2		—	
	69	6	25	381	751		97	15.8	1		—	
	69	6	25	375	742		114	13.1	6		—	
	69	6	25	374	752		116	17.1	1		—	
	69	6	25	371	753		133	19.8	2		—	
	69	6	26	372	754		134	12.2	8		—	
	69	6	26	371	754		135	18.6	3		—	
	69	6	26	365	751		144	23.5	1		—	
	69	6	27	364	753		159	16.1	1		—	
70-6	70	8	17	392	743		91	16.5	1		—	
	70	8	17	385	745		103	12.8	1		—	
	70	8	18	384	750		113	14.6	1		—	
	70	8	19	380	751		132	12.8	2		—	
	70	8	19	375	751		139	18.3	1		—	
	70	8	19	375	752		140	20.1	2		—	
	70	8	19	375	752		146	18.3	1		—	
	70	8	19	374	753		147	12.8	1		—	
	70	8	19	373	753		148	14.6	2		—	
	70	8	19	373	752		149	27.4	3		—	
	70	8	19	372	750		151	38.4	1		—	
	70	8	19	371	750		152	42.1	1		—	
	70	8	20	372	754		155	11.0	1		—	
	70	8	20	372	754		156	14.6	2		—	
	70	8	20	371	754		164	10.0	4		—	
	70	8	20	370	755		165	14.6	5		—	
SM 743	74	6	13	403	754		2	21.6	2		11.6	
	74	6	16	395	734		23	28.0	1		13.4	
	74	6	17	390	743		54	14.6	1		16.6	
	74	6	17	390	743		55	21.0	1		18.5	
	74	6	17	385	745		62	12.8	3		16.5	
	74	6	17	385	745		63	9.1	1		18.1	
	74	6	17	384	750		64	14.9	3		18.9	
	74	6	18	384	745		65	25.0	4		19.0	
	74	6	18	383	750		74	13.4	2		16.8	
	74	6	18	382	750		75	15.5	5		17.4	
	74	6	18	382	745		77	21.9	1		16.9	
	74	6	18	381	751		85	14.3	1		16.8	
	74	6	18	380	751		86	14.6	4		16.7	
	74	6	18	380	751		87	10.4	4		18.1	
	74	6	19	375	751		93	17.7	1		17.0	
	74	6	19	375	752		95	14.6	6		16.8	

Appendix Table 1. (cont.)

CRUISE	YR	MB	DA	LAT	LBN	STRAT	TBW	DEPTH(M)	NUMB	WT.(KGS)	B.TEM	S.TEM
SM743	74	6	19	383	752		96	7.6	2		17.9	
(cont.)	74	6	19	384	753		97	12.8	1		16.8	
	74	6	19	384	752		98	14.6	6		16.9	
	74	6	19	384	752		99	20.7	2		20.9	
	74	6	19	383	751		105	27.4	2		16.6	
	74	6	19	383	752		106	21.9	1		16.8	
	74	6	19	373	753		108	13.7	12		20.6	
	74	6	19	373	754		109	6.7	24		17.6	
	74	6	19	372	754		110	13.7	6		17.3	
	74	6	19	372	752		113	27.4	1		17.0	
	74	6	19	372	751		114	26.2	2		13.8	
	74	6	19	372	751		115	31.1	2		15.7	
	74	6	20	371	752		119	27.4	2		13.7	
	74	6	20	371	752		120	24.7	1		15.2	
	74	6	20	371	754		123	11.0	1		17.6	
	74	6	20	370	754		124	19.5	2		16.2	
	74	6	20	370	754		125	15.5	3		17.1	
	74	6	20	370	755		126	10.4	5		18.3	
	74	6	21	370	751		130	34.7	3		19.0	
	74	6	21	365	751		133	24.4	1		13.7	
	74	6	21	365	753		136	21.9	1		17.2	
	74	6	21	365	754		137	16.1	4		17.2	
	74	6	21	365	754		138	17.4	4		23.9	
	74	6	21	365	755		139	15.2	6		19.0	
	74	6	21	364	755		140	8.2	4		19.2	
	74	6	22	364	754		143	18.3	3		17.8	
	74	6	22	364	753		144	20.1	1		19.8	
	74	6	22	363	754		156	21.9	6		17.9	
	74	6	22	362	755		158	10.4	4		15.1	
	74	6	22	362	752		163	27.4	1		18.4	
	74	6	22	361	753		168	23.8	3		19.6	
	74	6	22	361	754		170	15.2	6		15.9	
	74	6	22	360	754		171	19.2	2		17.4	
	74	6	22	360	753		172	20.1	2		16.7	
	74	6	23	360	752		174	24.7	1		20.3	
	74	6	23	360	751		175	30.2	1		24.3	
	74	6	23	355	751		178	32.9	5		24.7	
	74	6	23	355	753		181	16.5	6		17.7	
	74	6	23	354	752		182	18.3	7		22.8	
	74	6	23	354	752		183	21.9	8		24.4	
	74	6	23	353	752		187	23.8	1		25.0	
	74	6	23	353	752		188	15.8	6		25.0	
	74	6	23	352	752		189	16.8	5		25.3	
	74	6	23	352	752		190	21.3	1		25.5	

Appendix Table 1. (cont.)

CRUISE	YR	MO	DA	LAT	LON	STRAT	TOW	DEPTH(M)	NUMB	WT.(KGS)	B.TEM	S.TEM
SM743	74	6	23	384	751		191	26.2	3		24.2	
(cont.)	74	6	24	370	751		196	3.5.7	1		17.2	
SM742	74	8	6	370	754		242	22.0	3		19.0	
	74	8	6	365	754		243	18.3	3		19.1	
	74	8	6	365	754		244	16.5	3		23.8	
	74	8	6	365	754		246	20.1	1		18.7	
	74	8	6	364	754		247	16.5	1		18.5	
	74	8	6	364	754		248	16.5	1		18.9	
	74	8	6	364	754		249	16.5	3		20.8	
	74	8	6	364	754		250	16.5	6		17.9	
	74	8	6	363	754		257	20.1	9		20.6	
	74	8	6	363	755		253	18.3	1		18.6	
	74	8	6	363	754		255	18.3	1		18.1	
	74	8	6	363	753		258	23.8	1		17.4	
	74	8	6	363	753		261	31.1	4		22.3	
	74	8	6	363	754		264	18.3	1		17.5	
	74	8	6	363	753		267	20.1	3		18.6	
	74	8	6	363	753		268	25.6	1		20.7	
	74	8	6	363	753		271	23.8	1		23.4	
	74	8	7	363	754		273	23.8	3		17.9	
	74	8	7	363	754		274	22.0	5		23.8	
	74	8	7	364	754		275	20.1	4		17.9	
	74	8	7	364	753		281	20.1	1		24.6	
	74	8	7	364	754		286	16.5	2		23.9	
	74	8	7	364	753		287	18.3	1		24.8	
	74	8	7	364	752		290	25.6	4		18.4	
	74	8	7	364	752		291	20.1	2		18.4	
	74	8	7	364	753		292	27.4	3		24.2	
	74	8	7	364	753		294	18.3	1		22.8	
	74	8	7	364	754		295	22.0	1		23.3	
	74	8	7	365	754		296	20.1	1		22.3	
	74	8	7	365	753		305	22.0	1		22.0	
	74	8	7	365	754		306	16.5	2		18.3	
	74	8	7	365	753		308	16.5	4		18.8	
	74	8	8	366	753		318	14.6	2		19.4	
	74	8	8	370	753		319	22.0	7		24.3	
	74	8	8	370	752		321	27.4	3		24.9	
76-1	76	4	12	404	733		22	7.0	2		5.8	
	76	4	12	404	734		23	14.0	1		—	
	76	4	19	403	740		25	15.5	1		—	
	76	5	2	383	745		118	25.9	2		—	
	76	5	2	383	750		119	14.9	4		—	

Appendix Table 1. (cont.)

CRUISE	YR	MO	DA	LAT	LON	STRAT	TOW	DEPTH(M)	NUMB	WT.(KGS)	B.TEM	S.TEM
76-1	76	5	2	382	751		120	13.7	6		–	
(cont.)	76	5	2	382	745		121	23.2	4		–	
	76	5	2	381	745		127	31.1	1		–	
	76	5	2	381	751		129	12.5	8		–	
	76	5	3	375	750		136	29.3	2		–	
	76	5	3	375	752		137	18.6	3		–	
	76	5	4	374	753		139	14.6	21		–	
	76	5	4	376	752		140	26.8	17		–	
	76	5	4	373	750		144	29.9	1		–	
	76	5	4	373	752		146	23.8	2		–	
	76	5	4	373	754		147	14.6	1		–	
	76	5	4	372	754		148	12.2	1		–	
	76	5	4	372	753		149	24.4	1		–	
	76	5	4	372	752		150	32.0	11		–	
	76	5	4	372	755		152	48.0	1		–	
	76	5	4	371	752		155	23.8	3		–	
	76	5	4	371	754		156	20.1	10		–	
	76	5	4	371	755		157	14.6	23		–	
	76	5	5	370	753		158	16.8	3		–	
	76	5	5	370	755		161	15.2	29		–	
	76	5	5	370	760		162	10.4	5		10.4	
	76	5	6	370	752		163	29.3	1		10.6	
	76	5	7	364	753		171	21.3	3		10.7	
	76	5	7	363	751		176	34.7	5		11.0	
	76	5	7	363	752		177	25.6	1		12.3	
	76	5	7	362	755		180	16.5	2		12.1	
	76	5	7	362	752		182	32.6	1		11.9	
	76	5	7	362	751		183	26.2	3		12.7	
	76	5	7	361	751		185	25.6	1		13.8	
	76	5	8	360	752		189	29.0	2		19.1	
	76	5	8	355	753		190	19.5	1		21.7	
	76	5	8	363	755		191	77.1	1		12.8	
	76	5	10	385	745		218	17.1	1		–	
	76	5	10	384	745		219	30.5	1		–	
	76	5	10	384	745		220	13.7	1		–	
77-2	77	2	7	371	755		1	9.4	3		–	
	77	2	7	370	752		4	27.1	1		–	
	77	2	7	365	752		5	22.3	2		–	
	77	2	7	365	751		6	28.7	3		–	
	77	2	8	371	750		13	43.9	6		–	
	77	2	10	385	743		40	27.4	10		–	
	77	2	10	383	743		44	31.1	1		–	
	77	2	11	380	745		48	32.9	1		–	

Appendix Table 1. (cont.)

CRUISE	YR	MO	DA	LAT	LON	STRAT	TOW	DEPTH(M)	NUMB	WT.(KGS)	B.TEM	S.TEM
******	**	**	**	***	***	*****	***	**********	****	********	*****	*****
77-2	77	2	11	375	750		50	32.9	1		—	
(cont.)	77	2	11	374	751		52	29.3	2		—	
	77	2	11	373	751		53	27.4	2		—	
	77	2	11	373	750		54	32.9	1		—	
	77	2	11	371	752		58	25.6	2		—	
	77	2	11	372	752		59	25.6	6		—	
	77	2	11	372	754		60	21.9	2		—	
	77	2	11	373	754		61	12.8	4		—	
	77	2	11	373	752		62	25.6	23		—	
	77	2	11	374	752		63	20.1	20		—	
	77	2	11	375	752		64	13.7	9		—	
	77	2	11	375	751		65	23.8	7		—	
	77	2	11	381	751		67	11.0	1		—	
	77	2	12	382	750		69	20.1	2		—	
	77	2	12	382	745		70	23.8	8		—	
	77	2	12	383	745		71	23.8	2		—	
	77	2	12	383	750		72	14.6	1		—	
	77	2	12	384	745		73	29.3	12		—	
	77	2	12	384	750		74	12.8	2		—	
	77	2	12	385	750		75	20.1	4		—	
	77	2	12	385	745		76	12.8	6		—	
	77	2	13	390	745		77	11.9	3		—	
	77	2	13	391	742		84	27.4	1		—	
	77	2	14	402	740		110	21.0	1		—	
	77	2	14	403	740		111	9.1	2		—	
	77	2	17	403	733		115	27.4	1		—	
78-01	78	1	6	404	725		6	22	1		—	
	78	1	6	404	731		9	26	1		—	
	78	1	6	403	731		10	27	1		—	
	78	1	7	393	740		33	25	1		—	
	78	1	7	391	742		39	18	4		—	
	78	1	7	390	740		42	37	1		—	
	78	1	7	390	740		43	38	1		—	
	78	1	7	385	743		48	27	10		—	
	78	1	8	390	743		51	22	7		—	
	78	1	8	390	744		52	16	1		—	
	78	1	8	390	744		53	14	5		—	
	78	1	8	390	744		57	17	1		—	
	78	1	8	390	744		58	13	2		—	
	78	1	8	390	744		59	11	1		—	
	78	1	8	385	744		60	15	7		—	
	78	1	8	385	744		62	25	3		—	
	78	1	8	384	743		64	32	3		—	

Appendix Table 1. (cont.)

CRUISE	YR	MO	DA	LAT	LON	STRAT	TOW	DEPTH(M)	NUMB	WT.(KGS)	B.TEM	S.TEM
78-01	78	1	8	384	750		67	15	1		—	
(cont.)	78	1	11	374	752		71	16	2		—	
	78	1	11	375	752		72	17	5		—	
	78	1	11	375	750		73	30	1		—	
	78	1	11	381	750		74	25	4		1	
	78	1	11	383	750		77	14	1		—	
	78	1	11	383	745		78	20	1		—	
	78	1	11	383	744		79	29	1		—	
	78	1	12	382	744		82	35	1		—	
	78	1	12	373	752		90	20	1		—	
	78	1	12	373	753		91	21	2		—	
	78	1	12	372	754		92	12	6		—	
	78	1	12	372	753		94	24	4		—	
	78	1	12	372	752		95	30	2		—	
	78	1	12	371	750		98	36	1		—	
	78	1	12	370	750		99	34	2		—	
	78	1	12	370	751		100	35	5		—	
	78	1	12	371	751		101	30	2		—	
	78	1	12	371	752		102	27	2		—	
	78	1	12	371	754		103	17	3		—	
	78	1	13	370	754		104	14	6		—	
	78	1	13	370	753		105	24	12		—	
	78	1	15	364	752		112	31	1		—	
	78	1	15	364	752		113	22	1		—	
	78	1	16	364	757		115	29	1		—	
	78	1	16	364	751		118	27	1		8.0	
	78	1	16	363	753		121	24	1		6.2	
	78	1	16	363	754		122	22	5		—	
	78	1	16	363	754		123	21	1		7.0	
	78	1	16	362	754		124	22	1		—	
	78	1	16	362	754		125	22	2		—	
	78	1	16	361	753		126	27	1		7.0	
	78	1	16	361	752		128	31	2		—	
	78	1	17	360	753		136	20	3		8.4	
	78	1	17	355	752		137	24	1		—	
	78	1	17	354	751		138	36	1		—	
	78	1	17	354	752		140	26	1		10.0	
	78	1	17	354	750		142	49	1		12.5	
	78	1	18	365	750		148	37	1		8.8	
	78	1	18	365	745		150	66	1		10.2	
	78	2	5	384	745		316	18	30		—	
	78	2	5	383	744		318	31	1		—	
	78	2	5	384	744		319	31	4		2.8	
	78	2	5	384	744		322	15	2		—	

Appendix Table 1. (cont.)

CRUISE	YR	MO	DA	LAT	LON	STRAT	TOW	DEPTH(M)	NUMB	WT.(KGS)	B.TEM	S.TEM
******	**	**	**	***	***	*****	***	**********	****	********	*****	*****
78-07	78	12	14	371	752	9 3	128	30	2		—	
	78	12	16	365	753	9 4	140	26	3		—	
	78	12	14	373	751	9 5	123	22	5		—	
	78	12	13	375	750	9 6	109	24	1		—	
	78	12	14	371	752	9 7	129	20	2		—	
	78	12	16	365	755	9 11	139	22	1		—	
	78	12	16	365	752	9 13	141	27	1		—	
	78	12	15	371	752	9 15	134	26	1		—	
	78	12	13	374	750	9 16	108	29	1		—	
	78	12	14	372	750	9 18	127	31	3		—	
	78	12	16	370	751	9 19	142	32	4		—	
	78	12	9	381	744	13 1	76	28	1		14.5	
	78	12	9	382	743	13 2	72	27	3		—	
	78	12	13	375	744	13 6	111	33	1		—	
	78	12	9	382	743	13 8	73	38	1		—	
	78	12	9	383	744	13 9	70	18	1		—	
	78	12	14	382	744	13 10	116	26	4		—	
	78	12	13	375	742	15 3	101	57	1		—	
	78	12	9	385	743	17 1	62	26	11		—	
	78	12	9	384	744	17 3	63	15	1		—	
	78	12	8	384	741	17 4	61	34	3		13.6	
	78	12	8	385	742	17 5	59	20	3		—	
	78	12	6	401	733	29 3	17	25	2		—	
	78	12	16	370	754	82 1	135	9	1		—	
	78	12	16	370	753	82 3	137	15	1		—	
	78	12	16	370	754	82 4	138	15	1		—	
	78	12	14	372	752	83 1	130	20	3		—	
	78	12	15	371	753	83 2	133	15	1		—	
	78	12	14	372	753	83 4	131	15	2		—	
	78	12	14	374	752	84 1	124	15	7		—	
	78	12	14	374	751	84 2	122	18	1		—	
	78	12	14	373	752	84 3	126	19	1		—	
	78	12	14	373	752	84 4	125	13	3		—	
	78	12	14	375	751	84 5	120	16	2		—	
	78	12	14	375	750	84 6	121	20	3		—	
	78	12	14	381	750	85 2	119	18	1		—	
	78	12	14	382	750	85 3	117	17	11		—	
	78	12	14	381	745	85 4	113	18	2		—	
	78	12	14	381	750	85 5	118	32	14		—	
	78	12	14	381	745	85 6	114	18	3		—	
	78	12	9	383	745	86 1	69	18	1		14.7	
	78	12	9	383	745	86 2	67	19	5		—	
	78	12	9	384	750	86 3	66	17	2		—	
	78	12	9	383	750	86 4	68	11	4		—	

Appendix Table 1. (cont.)

CRUISE	YR	MO	DA	LAT	LON	STRAT	TOW	DEPTH(M)	NUMB	WT.(KGS)	B.TEM	S.TEM
******	**	**	**	***	***	*****	***	**********	****	********	*****	*****
78-07	78	12	9	384	744	87 3	64	20	13		—	
	78	12	8	390	743	87 4	55	18	8		—	
	78	12	8	385	744	87 5	57	9	6		—	
	78	12	9	384	745	87 6	65	13	2		—	
	78	12	8	391	742	88 2	53	16	6		—	
	78	12	8	391	741	88 3	52	19	2		12.0	
	78	12	8	391	742	88 5	54	18	6		—	
	78	12	8	392	740	88 6	44	25	1		—	
	78	12	8	392	735	88 8	45	23	1		—	
	78	12	6	402	735	90 4	12	12	3		—	
	78	12	6	402	734	91 1	15	23	1		—	
79-01	79	1	27	370	753	9 5	116	22	1		—	
	79	1	28	373	744	9 11	128	48	1		—	
	79	1	26	373	750	9 14	102	24	1		—	
	79	1	27	373	752	9 19	107	24	1		—	
	79	1	27	365	751	9 20	119	33	1		—	
	79	1	27	371	751	9 21	109	24	1		—	
	79	1	30	381	744	13 3	143	18	1		—	
	79	1	30	380	745	13 5	141	22	1		—	
	79	1	31	384	742	17 1	155	26	3		—	
	79	1	24	385	742	17 2	95	26	1		6.3	
	79	1	24	398	742	17 3	94	20	3		—	
	79	1	31	384	743	17 5	154	26	1		—	
	79	1	6	404	722	33 3	7	37	1		—	
	79	1	27	370	753	82 1	115	17	1		6.8	
	79	1	27	371	754	83 1	105	9	1		—	
	79	1	27	372	752	83 3	106	18	3		7.0	
	79	1	26	373	752	84 1	100	13	13		5.5	
	79	1	26	374	752	84 3	99	13	4		—	
	79	1	26	373	752	84 5	104	18	3		—	
	79	1	30	381	745	85 1	142	11	1		—	
	79	1	30	382	745	85 2	145	17	2		4.2	
	79	1	30	380	750	85 3	140	17	2		—	
	79	1	31	385	744	87 4	149	7	2		—	
	79	1	17	392	741	88 5	77	27	4		—	
	79	1	23	403	735	91 1	89	22	6		6.2	

Appendix Table 1. (cont.)

SPP	CRUISE	YR	MO	DA	LAT	LON	STRAT	TOW	DEPTH(M)	NUMB	WT.(KGS)	B.TEM	S.TEM
***	******	**	**	**	***	***	*****	***	**********	****	********	*****	*****
318	080	80	2	2	3642	7539	5	1	18.	1	.00	.0	.0
318	080	80	1	29	3644	7525	5	4	19.	1	.00	.0	.0
318	080	80	1	29	3646	7525	5	5	24.	1	.00	.0	.0
318	080	80	2	2	3639	7532	5	6	15.	1	.00	.0	.0
318	080	80	1	28	3724	7451	9	1	38.	2	.00	.0	.0
318	080	80	1	29	3701	7531	9	2	22.	6	.00	.0	.0
318	080	80	1	29	3746	7459	9	6	32.	5	.00	.0	.0
318	080	80	1	29	3706	7513	9	7	31.	2	.00	.0	.0
318	080	80	1	28	3738	7457	9	8	31.	3	.00	.0	.0
318	080	80	1	29	3719	7519	9	9	30.	1	.00	.0	.0
318	080	80	1	29	3659	7537	9	11	20.	6	.00	.0	.0
318	080	80	1	29	3714	7530	9	14	21.	2	.00	.0	.0
318	080	80	1	28	3738	7517	9	20	24.	7	.00	.0	.0
318	080	80	1	28	3653	7513	9	22	26.	2	.00	.0	.0
318	080	80	1	28	3704	7501	9	24	42.	1	.00	.0	.0
318	080	80	1	28	3713	7456	9	26	40.	2	.00	.0	.0
318	080	80	1	29	3726	7521	9	28	24.	1	.00	.0	.0
318	080	80	1	29	3726	7521	9	28	24.	3	.00	.0	.0
318	080	80	1	29	3721	7513	9	29	31.	4	.00	.0	.0
318	080	80	1	29	3701	7523	9	30	29.	2	.00	.0	.0
318	080	80	1	29	3710	7517	9	31	25.	0	.20	.0	.0
318	080	80	1	29	3654	7526	9	32	29.	1	.00	.0	.0
318	080	80	1	26	3816	7431	13	1	35.	1	.00	.0	.0
318	080	80	1	26	3816	7449	13	4	20.	1	.00	.0	.0
318	080	80	1	26	3818	7433	13	9	40.	3	.00	.0	.0
318	080	80	1	26	3836	7443	13	11	18.	23	.00	.0	.0
318	080	80	1	27	3753	7453	13	14	29.	1	.00	.0	.0
318	080	80	1	26	3851	7431	17	4	24.	5	.00	3.1	.0
318	080	80	1	26	3838	7424	17	5	33.	1	.00	.8	.0
318	080	80	1	26	3849	7435	17	6	20.	3	.00	2.7	.0
318	080	80	1	27	3834	7421	17	8	43.	4	.00	.0	.0
318	080	80	2	4	3909	7402	21	10	37.	3	.30	.0	.0
318	080	80	2	4	3906	7404	21	12	33.	3	.30	.0	.0
318	080	80	2	4	3856	7411	21	19	37.	1	.10	.0	.0
318	080	80	1	23	4012	7348	25	5	29.	1	.10	5.7	5.8
318	080	80	2	2	3623	7545	80	2	17.	1	.00	.0	.0
318	080	80	2	3	3626	7545	80	3	17.	6	.00	.0	.0
318	080	80	2	2	3650	7550	81	3	14.	1	.00	.0	.0
318	080	80	1	29	3701	7545	82	2	14.	2	.00	.0	.0
318	080	80	1	29	3724	7531	83	1	10.	7	.00	.0	.0
318	080	80	1	29	3731	7523	83	3	18.	5	.00	.0	.0
318	080	80	1	29	3731	7523	83	3	18.	4	.00	.0	.0
318	080	80	1	28	3743	7516	84	1	22.	10	.00	.0	.0
318	080	80	1	27	3753	7509	84	2	21.	2	.00	.0	.0
318	080	80	1	28	3734	7523	84	4	17.	2	.20	.0	.0
318	080	80	1	26	3819	7501	85	2	10.	1	.00	.0	.0
318	080	80	1	26	3826	7457	85	3	18.	6	.00	.0	.0
318	080	80	1	26	3824	7457	85	4	20.	5	.00	.0	.0
318	080	80	1	26	3839	7501	86	1	12.	14	.00	.0	.0
318	080	80	1	26	3843	7448	86	2	17.	3	.00	.0	.0
318	080	80	1	25	3859	7433	87	4	11.	2	.00	6.3	.0
318	080	80	1	25	3909	7435	87	5	13.	1	.00	4.8	.0
318	080	80	1	26	3901	7442	87	6	11.	1	.00	6.6	.0
318	080	80	1	25	3929	7404	88	5	22.	1	.10	4.2	.0
318	080	80	1	24	4009	7359	89	9	17.	1	.10	5.4	.0
318	080	80	1	24	3949	7401	89	12	17.	1	.10	4.7	.0
318	080	80	1	4	4034	7326	91	3	15.	1	.10	6.3	6.2
318	080	80	1	4	4041	7252	92	1	22.	1	.00	6.9	6.4
318	807	80	8	23	3654	7522	9	1	27.	2	.00	21.0	23.5
318	807	80	8	23	3701	7513	9	2	33.	1	.00	.0	.0
318	807	80	8	23	3733	7507	9	14	25.	1	.00	.0	.0
318	807	80	8	24	3741	7510	9	17	27.	2	.20	.0	.0
318	807	80	8	24	3745	7454	9	19	27.	1	.00	.0	.0
318	807	80	8	24	3748	7525	84	2	9.	7	.00	.0	.0
318	807	80	8	24	3743	7513	84	3	17.	8	.00	21.6	21.8
318	807	80	8	24	3755	7508	84	4	18.	2	.00	.0	.0
318	807	80	8	24	3807	7503	85	2	17.	2	.00	21.8	21.0
318	807	80	8	25	3825	7449	85	3	18.	1	.00	.0	.0
318	807	80	8	26	3906	7438	87	2	13.	1	.00	.0	.0
318	807	80	8	26	3854	7435	87	5	22.	1	.00	21.8	21.7

Appendix Table 2. Horseshoe crabs in special clam survey cruises.

Tow Number	Date Mo.	Date Day	Lat. °	Lat. ′	Long. °	Long. ′	Depth (m)	Bottom Temp. °C	Number of Limuli			
2	5	16	38	56	74	53	4.0	11.6	5			
3	5	16	38	55	74	54	8.2	11.4	14			
4	5	16	38	56	74	55	4.9	11.6	13			
5	5	16	38	55	74	55	5.2	11.9	6			
8	5	16	38	54	74	55	11.0	11.0	1			
9	5	16	38	54	74	53	9.1	10.8	2			
10	5	16	38	54	74	51	6.7	10.9	10			
11	5	16	38	55	74	50	9.1	10.6	1			
12	5	16	38	56	74	50	11.3	10.8	11			
13	5	16	38	57	74	51	6.4	10.9	1			
15	5	16	38	58	74	50	3.7	11.8	7			
16	5	16	38	59	74	49	4.3	12.4	11			
17	5	16	38	59	74	47	2.7	11.3	5			
18	5	16	39	00	74	46	11.9	10.6	2			
23	5	16	38	58	74	47	9.1	10.9	3			
24	5	16	38	58	74	49	8.5	10.8	5			
26	5	16	38	55	74	48	10.7	10.6	2			
27	5	17	39	01	74	46	3.7	11.4	3			
28	5	17	39	02	74	46	4.0	10.7	2			
29	5	17	39	03	74	45	7.9	10.6	3			
30	5	17	39	04	74	44	4.0	10.6	8			
31	5	17	39	04	74	43	5.2	10.5	1			
32	5	17	39	05	74	43	4.0	10.4	4			
33	5	17	39	06	74	42	4.3	10.7	5			
34	5	17	39	08	74	42	4.0	10.9	7			
38	5	17	39	14	74	37	4.0	11.8	3			
39	5	17	39	15	74	36	4.6	10.8	5			
40	5	17	39	16	74	34	4.9	11.1	7			
41	5	17	39	17	74	32	7.6	10.7	4			
42	5	17	39	18	74	30	6.7	10.8	2			
43	5	17	39	17	74	31	5.2	11.9	3			
48	5	22	38	53	74	51	10.7	13.0	3			
49	5	22	38	53	74	53	11.3	13.0	2			
51	5	22	38	52	74	56	6.7	13.3	1			
52	5	22	38	52	74	58	8.5	13.3	6			
53	5	22	38	51	75	00	7.9	13.4	2			
55	5	22	38	50	75	01	7.6	14.0	1			
56	5	22	38	50	74	59	7.3	13.8	1			
57	5	22	38	50	74	57	7.0	13.7	3			
58	5	22	38	51	74	56	9.0	13.6	3			
59	5	22	38	51	74	54	10.7	13.3	4			
60	5	22	38	51	74	52	9.8	13.2	4			
61	5	22	38	52	74	51	7.3	13.0	1			
62	5	24	38	53	74	49	10.4	12.2	2			

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Appendix Table 2. (cont.)

Tow Number	Date Mo.	Date Day	Lat. °	Lat. ′	Long. °	Long. ′	Depth (m)	Bottom Temp. °C	Number Limuli			
63	5	24	38	52	74	49	11.0	12.0	2			
66	5	24	38	55	74	46	11.9	11.7	1			
67	5	24	38	56	74	44	11.6	12.1	2			
69	5	24	38	59	74	43	10.7	11.9	1			
70	5	24	39	00	74	44	12.8	12.1	3			
73	5	24	39	05	74	41	13.1	12.5	1			
75	5	24	39	08	74	40	8.8	12.0	2			
76	5	24	39	09	74	39	7.9	12.8	4			
77	5	24	39	08	74	39	12.8	12.0	1			
80	5	24	39	05	74	40	14.9	7.6	1			
81	6	1	39	22	74	24	4.9	14.5	1			
82	6	1	39	21	74	24	4.6	13.0	4			
85	6	1	39	20	74	27	5.5	13.5	1			
86	6	1	39	20	74	29	3.0	12.0	2			
88	6	1	39	19	74	28	7.9	13.0	2			
89	6	1	39	19	74	27	8.8	13.0	1			
93	6	1	39	21	74	22	12.2	12.5	4			
95	6	1	39	20	74	20	7.9	12.5	2			
96	6	1	39	22	74	22	6.1	15.0	1			
98	6	1	39	23	74	22	4.6	15.0	2			
99	6	1	39	24	74	21	5.2	15.0	1			
100	6	1	39	25	74	21	3.7	16.5	5			
103	6	1	39	27	74	19	3.7	15.0	2			
107	6	1	39	24	74	19	4.6	14.0	2			
111	6	20	38	56	74	43	14.0	12.6	1			
114	6	20	39	00	74	42	13.4	12.6	2			
115	6	20	39	02	74	42	10.4	12.0	1			
123	6	27	39	15	74	33	10.7	12.4	4			
126	6	28	39	17	74	30	12.8	12.4	2			
128	6	28	39	18	74	27	13.4	11.9	1			
143	6	30	39	31	74	15	7.6	16.5	3			
144	6	30	39	32	74	15	6.1	17.7	4			
145	6	30	39	32	74	14	8.2	15.3	2			
146	6	30	39	33	74	14	6.1	16.1	2			
158	7	5	39	30	74	13	15.5	16.0	1			
159	7	5	39	29	74	15	13.7	16.7	1			
160	7	7	39	37	74	12	4.3	19.2	2			
162	7	7	39	39	74	10	4.9	18.1	1			
163	7	7	39	40	74	10	4.9	19.9	2			
164	7	7	39	41	74	09	4.9	18.6	1			
165	7	7	39	41	74	07	12.8	18.4	1			
167	7	7	39	42	74	07	7.3	20.5	2			
168	7	7	39	42	74	06	10.4	18.5	1			
170	7	7	39	44	74	06	9.8	18.4	3			

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Appendix Table 2. (cont.)

Tow Number	Date Mo.	Date Day	Lat. °	Lat. '	Long. °	Long. '	Depth (m)	Bottom Temp. °C	Number of Limuli			
171	7	7	39	44	74	04	13.1	17.9	7			
172	7	7	39	45	74	06	6.7	20.7	1			
173	7	10	39	46	74	05	8.2	14.5	1			
174	7	10	39	47	74	05	5.2	14.3	5			
175	7	10	39	47	74	03	12.8	14.3	1			
176	7	10	39	46	74	03	11.6	13.0	1			
184	7	10	39	38	74	08	14.0	18.1	1			
185	7	10	39	37	74	10	12.2	14.6	1			
188	7	10	39	41	74	05	15.2	15.6	2			
195	7	11	39	52	74	00	17.4	10.8	2			
203	7	11	39	56	74	04	7.6	13.9	2			
206	7	11	39	53	74	05	6.7	12.7	2			
207	7	11	39	51	74	05	6.1	13.2	2			
210	7	11	39	48	74	05	6.1	13.4	3			
222	7	12	39	58	74	04	8.2	12.2	10			
223	7	12	39	59	74	04	6.4	12.1	4			
229	7	12	40	03	74	03	8.2	13.6	8			
230	7	12	40	05	74	02	7.6	13.6	8			
232	7	13	40	06	73	58	18.6	15.4	1			
245	7	17	40	14	73	55	18.9	9.2	1			
250	7	21	40	11	74	01	8.5	14.5	7			
256	7	21	40	07	74	01	14.9	15.9	1			
257	7	21	40	07	74	02	9.1	13.8	2			
264	7	24	40	18	73	56	15.8	12.1	2			
266	7	24	40	20	73	54	18.6	12.5	1			
267	7	24	40	19	73	56	13.7	12.8	3			
271	7	24	40	22	73	57	13.1	13.1	1			
274	7	24	40	25	73	56	12.2	13.8	1			
278	7	25	40	29	73	57	11.3	13.3	1			
282	7	25	40	30	73	51	12.8	19.0	2			
288	7	25	40	27	73	59	9.8	14.3	3			
291	7	27	40	25	73	58	8.5	13.8	9			
293	7	27	40	23	73	58	6.4	22.3	1			
297	7	27	40	18	73	59	9.1	13.7	1			
299	7	27	40	17	73	59	9.4	12.3	3			
300	7	27	40	16	73	57	14.3	11.9	1			
301	7	27	40	15	73	59	11.6	12.9	1			
302	7	27	40	15	73	59	11.0	12.3	1			
303	7	27	40	14	74	00	7.3	12.9	3			
305	7	27	40	08	74	02	10.4	12.4	1			
306	8	11	39	28	74	13	16.8	15.6	1			
364	8	29	38	59	74	40	11.3	17.6	1			
376	8	30	38	54	74	38	9.8	18.4	3			
386	8	30	38	49	74	41	20.7	13.3	1			

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Appendix Table 2. (cont.)

Tow Number	Date Mo. Day	Lat. ° ′	Long. ° ′	Depth (m)	Bottom Temp. °C	Number of Limuli			
387	8 30	38 50	74 43	19.5	14.2	3			
388	8 30	38 51	74 45	14.6	15.0	1			
390	9 19	38 48	74 49	15.8	21.2	2			

Cruise Vessel	Date Yr. Mo. Day	Tow Number	Lat. ° ′	Long. ° ′	Depth (m)	Number of Limuli	Bottom Temp. °C	Dissolved Oxygen mg/l	
Valerie E	76 8 6	1	39 28	74 16	13.0	1	15.0	1.69	
Gail + Cora	76 9 11	1	39 31	74 13	8.5	45	17.0	1.15	
May Snow	76 9 9	10	39 44	74 04	11.9	5	19.3	7.20	
	76 9 13	29	38 57	74 33	17.1	5	16.5	3.05	
	76 9 13	30	38 57	74 43	12.2	2	18.6	6.05	
	76 9 13	31	38 14	74 35	14.6	75	18.0	2.80	
	76 9 8	51	40 00	74 03	5.5	4	19.6	8.70	
	76 9 13	510	39 21	74 18	17.7	1	17.7	3.00	
Cora May	76 9 16	42	40 34	73 44	12.8	6	19.0	5.85	
Snow	76 9 20	49	40 48	72 24	27.4	1	14.6	3.65	
Margaret +	76 10 7	1	39 28	74 16	9.8	1	16.4	6.70	
Nancy									
Delaware II	77 8 17	1	40 33	73 48	16.9	6	21.8		
	77 8 17	4	40 32	73 53	15.5	1	20.5		
	77 8 18	6	40 33	73 52	12.2	5	20.5		
	77 8 18	7	40 33	73 51	14.6	2	20.5		
	77 8 18	9	40 33	73 51	13.7	1	20.9		
	77 8 18	12	40 30	73 50	13.7	1	20.5		
	77 8 19	16	40 37	73 15	14.0	2	19.8		
	77 8 20	20	40 33	73 51	13.7	1	20.1		
	77 8 20	23	40 37	73 14	18.4	1	18.6		
	778 21	27	40 35	73 17	23.2	8	20.7		

Appendix Table 3. Horseshoe crabs in sea scallop survey cruises.

CRUISE	YR	MO	DA	LAT	LON	STRAT	TOW	DEPTH(M)	NUMB	WT.(KGS)	B.TEM	S.TEM
75-08	75	8	11	366	752		6-1	31	3		12.5	
	75	8	12	361	745		7-6	146	15		12.7	
	75	8	12	361	745		7-5	110	2		12.5	
	75	8	13	354	751		8-7	33	25		19.3	
	75	8	12	353	751		8-1	29	2		22.5	
	75	8	12	361	751		7-2	33	22		16.8	
	75	8	12	361	752		7-1	33	25		18.1	
	75	8	12	362	751		6-7	37	3		16.3	
77-08	77	9	13	355	746		133	106	26		15.9	
	77	9	13	354	745		134	121	5		14.6	
	77	9	13	353	751		135	68	14		18.9	
	77	9	13	354	750		136	77	78		17.2	
78-10	78	8	27	363	752		283	33	1		13.5	
	78	8	28	364	754		287	19	33		15.6	
	78	8	29	384	744		301	24	15		13.6	
	78	8	29	385	742		302	29	8		11.3	

Appendix Table 4. Horseshoe crabs in inshore bottom trawl cruises.

SPP	CRUISE	YR	MO	DA	LAT	LON	STRAT	TOW	DEPTH(M)	NUMB	WT.(KGS)	B.TEM	S.TEM
***	******	**	**	**	***	***	*****	***	**********	****	********	*****	*****
318	401	75	10	15	4033	7334	9	1	22.	1	.91	16.7	17.5
318	401	75	10	15	4034	7324	10	2	27.	1	2.27	16.5	17.2
318	401	75	10	23	4013	7359	13	2	24.	6	5.44	16.3	17.2
318	401	75	10	23	4027	7347	14	2	49.	14	13.61	15.6	16.3
318	401	75	11	7	3948	7402	16	3	29.	2	4.99	15.1	16.0
318	401	75	11	7	3930	7415	18	2	16.	1	23.59	15.3	15.2
318	401	75	11	6	3905	7441	21	1	24.	1	9.98	15.5	15.6
318	401	75	11	6	3909	7439	21	2	20.	1	1.36	15.2	16.0
318	401	75	11	6	3854	7443	22	1	26.	1	2.27	16.0	16.4
318	401	75	11	6	3901	7437	22	2	29.	1	15.42	15.7	16.0
318	401	75	11	6	3855	7435	23	1	27.	1	14.06	16.0	16.0
318	401	75	11	7	3906	7435	23	2	31.	8	15.42	15.5	15.7
318	401	75	11	6	3836	7502	24	1	22.	1	23.13	16.2	16.3
318	401	75	11	6	3855	7452	24	2	20.	42	73.48	16.0	16.4
318	401	75	11	6	3844	7458	25	1	38.	27	39.01	15.9	16.1
318	401	75	11	6	3850	7449	25	2	22.	21	56.25	16.2	16.4
318	401	75	11	6	3842	7449	26	2	31.	4	5.90	16.0	16.4
318	401	75	11	6	3815	7506	27	1	22.	14	6.80	16.4	16.4
318	401	75	11	6	3819	7555	29	1	35.	14	18.14	16.4	16.8
318	401	75	11	5	3753	7517	30	1	20.	1	17.69	17.0	17.5
318	401	75	11	5	3759	7513	30	2	22.	1	9.53	16.9	17.5
318	401	75	10	31	3742	7521	31	1	24.	13	24.49	17.4	17.5
318	401	75	11	5	3755	7513	31	3	31.	1	34.47	17.0	17.5
318	401	75	11	5	0	0	34	2	18.	5	16.33	.0	.0
318	401	75	11	4	3654	7549	37	2	26.	8	3.63	17.9	17.4
318	401	75	11	4	3657	7545	37	3	26.	13	9.98	17.8	17.3
318	401	75	10	31	3707	7538	38	1	27.	4	4.08	17.8	17.7
318	450	76	3	6	4051	7221	4	1	20.	2	2.60	5.3	5.2
318	450	76	3	5	4039	7301	7	1	18.	2	2.10	5.2	5.2
318	450	76	3	6	4050	7228	7	2	15.	2	1.60	5.0	5.2
318	450	76	3	5	4034	7305	8	1	26.	2	2.20	4.7	4.7
318	450	76	3	4	4036	7325	9	1	11.	3	3.10	4.5	4.8
318	450	76	3	4	4031	7331	10	1	15.	4	3.50	4.7	5.0
318	450	76	3	4	4034	7319	10	2	18.	5	5.90	4.7	4.8
318	450	76	3	4	4027	7328	11	2	23.	3	2.60	4.6	4.7
318	450	76	3	24	4033	7343	12	1	11.	11	14.00	5.7	5.8
318	450	76	3	10	4011	7357	13	1	22.	3	2.60	4.5	4.2
318	450	76	3	24	4032	7341	13	2	13.	21	28.00	5.8	5.8
318	450	76	3	4	4025	7343	14	1	25.	1	.80	5.0	6.0
318	450	76	3	24	3958	7403	15	1	11.	4	6.90	5.0	5.3
318	450	76	3	24	4005	7359	16	2	20.	6	8.40	5.0	5.5
318	450	76	3	12	3932	7401	20	1	22.	4	5.60	5.0	4.9
318	450	76	3	12	3927	7403	20	2	23.	1	1.10	5.1	5.1
318	450	76	3	12	3914	7411	20	3	26.	2	.90	5.2	5.1
318	450	76	3	13	3907	7440	21	1	11.	10	13.40	5.0	5.0
318	450	76	3	13	3900	7444	22	1	11.	4	7.90	5.0	5.0
318	450	76	3	23	3853	7443	22	2	13.	50	119.40	6.2	6.7
318	450	76	3	13	3906	7429	23	1	22.	4	7.40	4.9	4.9
318	450	76	3	23	3853	7437	23	2	14.	23	30.00	6.0	6.8
318	450	76	3	14	3845	7502	25	1	21.	60	51.50	6.0	6.2
318	450	76	3	14	3838	7459	25	2	17.	15	13.80	5.7	5.7
318	450	76	3	14	3830	7454	26	1	15.	7	8.60	6.2	6.2
318	450	76	3	23	3843	7448	26	2	17.	55	82.50	6.5	7.5
318	450	76	3	22	3800	7514	27	1	13.	99	100.20	8.1	8.1
318	450	76	3	23	3802	7509	28	1	18.	63	53.00	8.0	8.0
318	450	76	3	23	3806	7503	28	2	17.	1	1.50	7.9	7.9
318	450	76	3	23	3813	7459	29	1	13.	9	17.30	7.4	7.4
318	450	76	3	23	3821	7449	29	2	18.	15	17.50	6.9	7.2
318	450	76	3	22	3732	7535	30	1	10.	16	16.00	9.5	9.5
318	450	76	3	22	3736	7531	31	1	13.	44	27.00	8.8	8.8
318	450	76	3	23	3748	7511	31	2	17.	11	7.90	8.1	8.1
318	450	76	3	22	3734	7524	32	1	16.	23	22.00	8.2	9.0
318	450	76	3	23	3756	7503	32	2	20.	31	49.00	8.1	8.0
318	450	76	3	22	3718	7541	33	1	11.	37	21.00	9.5	9.3
318	450	76	3	22	3714	7542	34	1	10.	24	8.90	8.4	9.0
318	450	76	3	22	3729	7527	34	2	16.	1	1.40	8.3	9.0
318	450	76	3	22	3714	7533	35	1	17.	6	4.40	9.7	9.6
318	450	76	3	22	3720	7528	35	2	19.	1	1.10	8.2	9.5
318	450	76	3	22	3650	7556	36	1	7.	13	5.40	9.7	9.4

Appendix Table 4. (cont.)

SPP	CRUISE	YR	MO	DA	LAT	LON	STRAT	TOW	DEPTH(M)	NUMB	WT.(KGS)	B.TEM	S.TEM
***	******	**	**	**	***	***	*****	***	**********	****	********	*****	*****
318	450	76	3	22	3650	7548	37	1	15.	50	22.50	9.5	9.3
318	450	76	3	22	3701	7544	37	2	13.	19	9.90	8.7	9.2
318	450	76	3	22	3636	7538	38	1	17.	1	.60	9.3	9.7
318	450	76	3	22	3655	7540	38	2	19.	60	31.40	8.7	9.2
318	450	76	3	21	3557	7536	39	1	17.	1	.80	10.5	10.6
318	450	76	3	21	3609	7541	40	1	18.	2	4.50	9.9	10.4
318	450	76	3	21	3625	7543	40	2	17.	15	7.40	9.5	10.0
318	450	76	3	21	3559	7531	41	1	20.	5	2.60	11.6	10.5
318	450	76	3	21	3607	7531	41	2	22.	9	14.00	10.7	10.6
318	450	76	3	21	3621	7540	41	3	18.	12	8.40	9.8	10.2
318	450	76	3	21	3545	7530	42	1	9.	22	14.90	12.9	11.6
318	450	76	3	20	3519	7523	43	1	18.	10	6.40	14.4	13.5
318	450	76	3	20	3531	7515	44	1	28.	24	13.40	15.5	12.9
318	450	76	3	20	3518	7518	44	2	22.	25	20.00	16.1	15.0
318	460	76	10	1	4045	7238	7	1	18.	1	2.00	16.6	16.6
318	460	76	10	2	4043	7249	7	3	18.	1	1.70	16.1	16.1
318	460	76	10	2	4035	7308	8	2	22.	5	5.30	16.5	17.1
318	460	76	10	2	4035	7322	10	1	13.	4	4.00	15.5	16.2
318	460	76	10	2	4032	7332	10	2	15.	2	3.20	15.8	16.5
318	460	76	10	2	4025	7332	11	1	22.	1	1.00	15.8	18.1
318	460	76	10	2	4031	7346	13	1	18.	5	9.50	15.6	17.3
318	460	76	10	6	3941	7403	16	2	13.	1	.80	17.2	17.0
318	460	76	10	3	4009	7359	16	3	15.	1	2.70	17.3	16.8
318	460	76	10	6	3933	7412	18	1	9.	5	9.00	16.6	17.5
318	460	76	10	6	3916	7426	19	1	13.	5	9.50	16.6	16.9
318	460	76	10	6	3913	7425	19	2	15.	2	5.40	17.3	17.8
318	460	76	10	8	3900	7445	21	1	11.	5	9.00	17.0	16.9
318	460	76	10	16	3855	7441	22	1	13.	4	4.00	17.6	17.6
318	460	76	10	16	3905	7440	22	2	15.	1	.90	16.1	16.2
318	460	76	10	16	3849	7440	23	1	16.	14	18.00	17.6	17.7
318	460	76	10	16	3904	7435	23	2	16.	6	5.50	16.5	16.4
318	460	76	10	16	3838	7502	24	1	11.	9	8.00	16.5	16.5
318	460	76	10	16	3834	7455	25	1	16.	2	3.00	17.3	17.3
318	460	76	10	16	3841	7500	25	2	13.	2	1.50	16.6	17.0
318	460	76	10	8	3841	7446	26	1	12.	15	30.00	18.1	18.8
318	460	76	10	16	3847	7447	26	2	15.	1	2.20	17.6	17.7
318	460	76	10	16	3808	7508	27	1	9.	39	47.00	17.5	17.6
318	460	76	10	16	3816	7458	28	1	13.	3	3.10	17.7	18.0
318	460	76	10	16	3821	7500	28	2	11.	9	18.00	17.6	17.6
318	460	76	10	16	3803	7457	29	1	24.	1	.80	19.0	19.2
318	460	76	10	16	3822	7454	29	2	15.	4	6.50	17.5	17.5
318	460	76	10	15	3758	7513	30	1	13.	24	30.00	17.8	17.8
318	460	76	10	15	3737	7532	31	2	13.	20	18.00	18.5	19.0
318	460	76	10	15	3726	7536	33	1	11.	3	2.00	18.9	18.8
318	460	76	10	14	3711	7537	34	1	16.	6	4.00	19.7	19.7
318	460	76	10	15	3718	7537	34	2	15.	7	7.50	19.5	19.6
318	460	76	10	15	3717	7530	35	1	20.	1	.40	21.4	19.7
318	460	76	10	15	3723	7527	35	2	24.	2	3.30	19.8	19.8
318	460	76	10	14	3648	7549	37	1	15.	20	17.00	20.2	19.3
318	460	76	10	14	3631	7536	38	1	22.	4	6.50	20.5	20.3
318	460	76	10	14	3705	7538	38	2	18.	2	2.00	20.1	20.1
318	460	76	10	14	3608	7542	39	1	12.	19	24.00	20.5	19.6
318	460	76	10	13	3559	7535	40	1	20.	1	.20	19.9	19.4
318	460	76	10	13	3541	7527	42	1	15.	7	4.50	.0	.0
318	460	76	10	13	3537	7522	43	2	18.	3	1.60	20.8	21.1
318	460	76	10	13	3515	7518	44	1	18.	2	1.60	22.9	23.0

Appendix Table 4. (cont.)

SPP	CRUISE	YR	MO	DA	LAT	LON	STRAT	TOW	DEPTH(M)	NUMB	WT.(KGS)	B.TEM	S.TEM
***	******	**	**	**	***	***	*****	***	**********	****	********	*****	*****
318	467	77	4	6	4024	7357	12	1	10.	1	.80	4.5	4.5
318	467	77	4	2	3916	7423	19	1	13.	2	2.30	4.2	5.5
318	467	77	4	2	3935	7406	19	2	19.	1	1.10	3.8	5.1
318	467	77	4	2	3927	7407	20	1	19.	1	.80	3.7	5.4
318	467	77	4	2	3918	7404	20	2	26.	4	5.50	3.9	6.3
318	467	77	3	31	3908	7440	21	1	10.	15	17.00	5.6	5.6
318	467	77	3	31	3901	7443	22	1	11.	9	7.50	5.3	5.3
318	467	77	4	1	3854	7437	22	2	18.	27	44.00	5.0	6.5
318	467	77	4	2	3902	7430	23	1	18.	15	21.50	4.3	6.1
318	467	77	4	2	3908	7429	23	2	17.	32	47.00	4.0	5.5
318	467	77	4	1	3844	7504	24	1	8.	59	73.00	5.5	7.0
318	467	77	4	1	3834	7459	25	1	14.	8	9.50	5.4	6.0
318	467	77	4	1	3847	7453	25	2	14.	12	16.50	4.7	5.7
318	467	77	4	1	3850	7442	26	1	17.	56	74.10	4.0	5.8
318	467	77	4	1	3840	7448	26	2	15.	40	48.00	4.4	6.3
318	467	77	3	27	3802	7513	27	1	7.	20	24.00	5.6	6.3
318	467	77	4	1	3824	7458	28	1	17.	16	17.50	5.0	6.4
318	467	77	3	27	3810	7505	28	2	15.	82	131.20	5.6	6.2
318	467	77	3	27	3811	7455	29	1	20.	21	33.00	4.7	5.3
318	467	77	4	1	3829	7448	29	2	25.	50	72.50	4.3	6.9
318	467	77	3	26	3738	7534	30	1	9.	3	4.00	6.3	6.3
318	467	77	3	26	3743	7522	31	1	15.	9	12.50	6.4	6.5
318	467	77	3	27	3754	7508	31	2	19.	7	11.50	5.0	5.7
318	467	77	3	26	3745	7509	32	1	26.	10	12.50	5.2	6.6
318	467	77	3	26	3733	7523	32	2	18.	8	9.50	5.2	5.2
318	467	77	3	26	3725	7536	33	1	14.	9	7.50	6.5	6.5
318	467	77	3	26	3721	7530	34	1	15.	1	1.20	5.8	5.8
318	467	77	3	26	3714	7539	34	2	15.	4	3.50	6.4	6.4
318	467	77	3	26	3728	7524	35	1	25.	19	22.00	5.3	5.3
318	467	77	3	26	3716	7530	35	2	20.	15	20.00	5.8	5.8
318	467	77	3	25	3703	7549	36	1	10.	3	4.50	6.7	6.7
318	467	77	3	25	3654	7549	37	1	14.	7	9.50	6.1	6.4
318	467	77	3	25	3701	7542	38	1	16.	7	4.20	6.4	6.4
318	467	77	3	23	3525	7527	42	1	13.	19	15.50	9.2	9.2
318	467	77	3	24	3513	7522	43	1	22.	27	18.00	15.6	14.5
318	467	77	3	23	3546	7518	44	1	29.	15	11.50	7.8	7.8
318	467	77	3	23	3525	7518	44	2	24.	28	31.50	15.0	12.6
318	467	77	4	8	4032	7308	8	1	26.	3	4.70	4.3	4.5
318	467	77	4	7	4042	7245	8	2	26.	1	1.00	4.0	4.5
318	467	77	4	8	4034	7322	10	2	15.	2	2.00	4.5	4.5
318	467	77	4	6	4029	7338	11	1	20.	2	2.00	4.3	4.5
318	775	77	7	28	4052	7218	4	2	22.	1	3.00	14.3	20.5
318	775	77	7	28	4049	7227	7	1	21.	1	2.50	.0	.0
318	775	77	7	28	4044	7248	7	2	18.	1	2.80	10.8	19.0
318	775	77	7	28	4048	7232	7	3	15.	6	13.00	12.5	18.5
318	775	77	7	28	4037	7322	9	1	12.	9	9.50	15.4	20.4
318	775	77	7	27	4032	7333	10	1	17.	1	2.50	13.0	20.4
318	775	77	7	30	4013	7359	12	1	15.	1	2.00	13.9	20.0
318	775	77	7	27	4032	7346	13	2	20.	1	2.20	12.2	19.8
318	775	77	7	31	3919	7428	18	1	8.	3	5.50	17.6	21.6
318	775	77	7	31	3932	7414	18	2	10.	14	26.00	18.2	20.1
318	775	77	7	31	3909	7440	21	1	11.	1	1.80	20.8	21.5
318	775	77	7	31	3855	7442	22	1	17.	9	16.00	17.7	20.4
318	775	77	7	31	3909	7435	22	2	15.	3	13.50	15.0	21.6
318	775	77	7	31	3901	7430	23	1	16.	1	2.70	12.2	20.9
318	775	77	8	1	3854	7454	24	1	9.	18	28.00	20.2	20.4
318	775	77	8	1	3849	7459	24	2	12.	10	16.00	18.7	18.9
318	775	77	8	1	3834	7501	25	1	14.	10	16.00	18.4	20.0
318	775	77	8	1	3841	7502	25	2	12.	18	16.00	20.6	20.6
318	775	77	8	1	3830	7453	26	1	14.	5	11.00	15.3	20.2
318	775	77	7	31	3847	7446	26	2	18.	1	2.50	13.3	20.2
318	775	77	8	1	3809	7509	27	1	9.	15	30.00	21.0	21.5
318	775	77	8	1	3813	7503	28	1	20.	67	75.00	18.2	22.5
318	775	77	8	1	3801	7502	28	2	18.	1	.60	18.1	22.4
318	775	77	8	1	3811	7458	29	2	17.	15	22.00	16.7	22.3
318	775	77	8	2	3731	7534	30	1	9.	2	3.30	20.6	22.9
318	775	77	8	1	3750	7524	30	2	10.	6	10.50	21.2	23.8
318	775	77	8	1	3741	7525	31	1	17.	4	4.00	19.7	22.7
318	775	77	8	1	3736	7521	32	2	23.	3	6.00	16.2	22.5
318	775	77	8	2	3725	7531	34	1	18.	1	.80	16.0	22.8
318	775	77	8	2	3718	7532	34	2	18.	1	2.60	16.7	23.3
318	775	77	8	2	3728	7525	35	1	19.	9	8.50	14.0	23.0

Appendix Table 4. (cont.)

SPP	CRUISE	YR	MO	DA	LAT	LON	STRAT	TOW	DEPTH(M)	NUMB	WT.(KGS)	B.TEM	S.TEM
***	******	**	**	**	***	***	*****	***	**********	****	********	*****	*****
318	775	77	8	2	3633	7547	37	1	17.	4	3.00	16.3	23.8
318	775	77	8	2	3621	7547	40	1	17.	2	2.20	11.9	23.2
318	775	77	8	3	3606	7527	41	1	22.	3	3.40	14.2	24.9
318	775	77	8	2	3615	7538	41	2	24.	1	1.00	14.5	24.4
318	777	77	10	16	4041	7255	7	2	20.	1	2.30	16.3	16.3
318	777	77	10	12	4044	7240	8	1	25.	1	2.10	16.3	16.6
318	777	77	10	11	4034	7306	8	2	24.	1	2.30	16.4	16.5
318	777	77	10	7	4034	7337	9	1	8.	2	.80	15.3	16.7
318	777	77	10	11	4024	7324	11	1	28.	1	1.90	16.3	16.5
318	777	77	10	6	4013	7359	12	1	13.	5	9.50	17.5	16.8
318	777	77	10	7	4032	7346	13	1	18.	2	4.00	12.9	16.5
318	777	77	10	6	4023	7357	13	2	13.	12	11.00	16.9	15.8
318	777	77	10	6	4008	7400	16	1	17.	4	10.50	17.1	17.1
318	777	77	10	4	3919	7425	18	1	6.	17	52.00	18.6	17.5
318	777	77	10	4	3919	7422	19	2	14.	7	14.00	18.9	18.9
318	777	77	10	4	3854	7437	22	1	11.	13	1.90	19.2	18.8
318	777	77	10	4	3902	7436	22	2	16.	5	8.50	18.9	18.8
318	777	77	10	4	3902	7431	23	1	18.	67	134.00	18.4	18.2
318	777	77	10	4	3851	7439	23	2	13.	44	110.00	16.8	18.5
318	777	77	10	4	3838	7503	24	1	7.	2	3.60	19.5	19.3
318	777	77	10	3	3854	7458	25	2	15.	11	14.50	19.8	19.3
318	777	77	10	3	3834	7452	26	1	23.	16	34.50	19.2	19.0
318	777	77	10	3	3830	7448	26	2	23.	33	59.00	19.2	17.9
318	777	77	10	3	3803	7512	27	1	8.	11	8.50	21.2	21.0
318	777	77	10	3	3813	7502	28	2	19.	7	11.50	20.6	20.0
318	777	77	10	3	3810	7454	29	1	23.	1	3.20	19.5	.0
318	777	77	10	3	3821	7449	29	2	19.	3	9.50	19.6	19.5
318	777	77	10	2	3741	7533	30	1	9.	9	14.50	21.6	21.5
318	777	77	10	3	3747	7517	31	1	17.	8	14.00	19.3	20.0
318	777	77	10	2	3753	7505	32	1	12.	4	4.50	17.7	21.3
318	777	77	10	2	3744	7511	32	2	20.	4	7.50	16.5	21.0
318	777	77	10	2	3729	7537	33	1	8.	10	10.00	21.9	21.9
318	777	77	10	2	3715	7540	34	1	13.	3	6.50	22.0	22.2
318	777	77	10	2	3720	7531	34	2	14.	1	2.20	18.6	21.3
318	777	77	10	2	3716	7531	35	1	20.	6	8.50	17.8	21.7
318	777	77	10	1	3651	7556	36	1	7.	5	7.00	22.1	22.2
318	777	77	10	1	3633	7547	37	1	17.	1	1.50	22.1	22.3
318	777	77	10	1	3618	7547	39	1	10.	2	2.90	22.2	22.1
318	777	77	9	30	3610	7542	40	1	18.	1	1.70	22.0	22.2
318	777	77	9	30	3550	7528	40	2	19.	1	.50	20.1	22.7
318	777	77	9	30	3603	7526	41	1	23.	1	2.60	19.0	22.2
318	777	77	10	1	3615	7532	41	2	26.	4	6.50	15.8	22.3
318	777	77	9	30	3521	7529	42	1	10.	1	1.30	23.0	23.9
318	780	78	1	22	4034	7259	8	1	24.	1	3.00	3.3	3.5
318	780	78	1	22	4047	7232	8	2	24.	1	2.00	3.5	2.8
318	780	78	1	23	4029	7327	11	2	19.	2	1.60	1.6	2.3
318	780	78	1	23	4026	7328	11	4	21.	1	2.40	2.6	2.8
318	780	78	1	23	4024	7336	11	6	21.	3	4.50	2.4	2.2
318	780	78	1	23	4026	7356	12	2	13.	3	4.50	3.6	2.1
318	780	78	1	23	4020	7355	13	2	18.	2	1.20	3.4	2.8
318	780	78	1	24	3922	7413	19	5	17.	1	1.50	3.7	2.6
318	780	78	1	25	3913	7418	20	3	19.	4	8.00	3.7	2.5
318	780	78	1	24	3907	7441	21	1	11.	1	.80	2.1	2.9
318	780	78	1	24	3856	7448	22	3	11.	2	1.90	1.8	2.1
318	780	78	1	25	3859	7431	23	1	18.	1	2.50	2.5	2.3
318	780	78	1	25	2904	7430	23	2	16.	4	9.50	2.7	3.3
318	780	78	1	24	3852	7439	23	3	15.	2	2.00	1.9	2.2

Appendix Table 4. (cont.)

SPP	CRUISE	YR	MO	DA	LAT	LON	STRAT	TOW	DEPTH(M)	NUMB	WT.(KGS)	B.TEM	S.TEM
***	******	**	**	**	***	***	*****	***	**********	****	********	*****	*****
318	782	78	4	8	4054	7205	5	1	29.	1	2.40	3.3	3.8
318	782	78	4	8	4044	7245	7	2	17.	4	7.50	4.1	4.8
318	782	78	4	7	4032	7308	8	1	22.	3	4.50	3.8	5.3
318	782	78	4	7	4037	7312	9	1	13.	1	.70	3.7	5.4
318	782	78	4	7	4031	7328	10	1	17.	5	9.30	3.8	5.2
318	782	78	4	7	4033	7325	10	2	17.	4	5.30	4.0	4.9
318	782	78	4	7	4031	7338	10	3	17.	7	8.20	3.7	5.5
318	782	78	4	7	4029	7327	11	1	21.	6	6.50	3.2	5.1
318	782	78	4	7	4022	7327	11	2	25.	2	1.80	3.9	5.9
318	782	78	4	7	4023	7337	11	3	22.	1	3.40	3.6	6.0
318	782	78	4	7	4032	7348	12	1	20.	4	6.00	3.8	5.8
318	782	78	4	7	4023	7355	13	1	15.	5	6.70	4.1	6.0
318	782	78	4	6	3952	7401	16	1	17.	1	2.70	4.9	5.9
318	782	78	4	6	3945	7401	16	2	17.	1	1.10	4.9	6.4
318	782	78	4	6	3932	7408	19	1	17.	3	2.50	4.7	5.0
318	782	78	4	6	3926	7410	19	2	17.	9	13.50	4.9	5.1
318	782	78	3	28	3854	7447	22	1	11.	12	10.00	4.8	5.3
318	782	78	3	28	3859	7442	22	2	15.	6	6.50	4.6	5.0
318	782	78	3	28	3907	7435	23	1	20.	8	7.50	4.3	4.7
318	782	78	3	29	3907	7429	23	2	20.	7	14.00	3.7	4.3
318	782	78	3	28	3849	7454	24	1	12.	22	17.00	4.6	4.9
318	782	78	3	28	3842	7502	25	1	13.	22	13.00	4.3	4.7
318	782	78	3	28	3844	7501	25	2	12.	6	6.50	4.5	5.0
318	782	78	3	28	3850	7445	26	1	15.	50	46.00	4.3	4.5
318	782	78	3	28	3849	7441	26	2	17.	42	25.00	4.2	5.3
318	782	78	3	27	3803	7459	28	1	20.	2	2.80	4.6	4.5
318	782	78	3	27	3814	7504	28	2	18.	10	8.10	4.2	5.6
318	782	78	3	27	3817	7451	29	1	22.	4	3.70	4.3	4.5
318	782	78	3	26	3743	7527	31	2	17.	1	.70	4.9	4.9
318	782	78	3	27	3754	7505	32	1	24.	1	2.40	4.5	4.4
318	782	78	3	26	3730	7531	34	1	15.	1	.20	5.0	5.1
318	782	78	3	26	3723	7527	35	2	26.	1	.40	4.7	4.8
318	782	78	3	26	3651	7552	37	1	10.	1	1.00	5.7	6.0
318	782	78	3	26	3646	7550	37	2	14.	1	.40	5.7	5.8
318	782	78	3	24	3514	7526	43	2	17.	7	5.00	15.9	16.0
318	782	78	3	24	3547	7517	44	1	28.	6	4.50	13.5	8.9
318	782	78	3	24	3541	7520	44	2	24.	14	8.00	14.9	11.5
318	786	78	8	10	0	0	4	1	22.	2	4.00	.0	.0
318	786	78	8	10	0	0	7	2	13.	1	2.20	.0	.0
318	786	78	8	9	0	0	9	1	7.	1	1.50	.0	.0
318	786	78	8	8	0	0	13	2	11.	14	27.00	.0	.0
318	786	78	8	8	0	0	15	1	12.	2	6.30	.0	.0
318	786	78	8	8	0	0	18	1	11.	12	25.50	.0	.0
318	786	78	8	6	0	0	19	2	13.	40	79.00	.0	.0
318	786	78	8	7	0	0	21	1	6.	18	26.00	.0	.0
318	786	78	8	6	0	0	22	1	14.	8	10.50	.0	.0
318	786	78	8	6	0	0	22	2	13.	16	33.60	.0	.0
318	786	78	8	6	0	0	23	2	15.	10	19.00	.0	.0
318	786	78	8	6	0	0	24	1	10.	3	5.20	.0	.0
318	786	78	8	6	0	0	25	1	15.	3	5.90	.0	.0
318	786	78	8	6	0	0	25	2	15.	6	12.00	.0	.0
318	786	78	8	6	0	0	26	1	14.	3	6.50	.0	.0
318	786	78	8	6	0	0	26	2	14.	11	25.00	.0	.0
318	786	78	8	6	0	0	27	1	8.	31	34.00	.0	.0
318	786	78	8	5	0	0	28	1	11.	14	21.00	.0	.0
318	786	78	8	5	0	0	28	2	20.	38	82.00	.0	.0
318	786	78	8	6	0	0	29	1	16.	4	9.00	.0	.0
318	786	78	8	5	0	0	29	2	16.	3	5.00	.0	.0
318	786	78	8	5	0	0	31	1	13.	11	22.00	.0	.0
318	786	78	8	5	0	0	31	2	12.	2	.50	.0	.0
318	786	78	8	4	0	0	32	1	19.	3	3.60	.0	.0
318	786	78	8	4	0	0	35	2	18.	2	1.70	.0	.0
318	786	78	8	3	0	0	37	1	11.	2	1.60	.0	.0
318	786	78	8	3	0	0	37	2	10.	4	6.50	.0	.0
318	786	78	8	2	0	0	38	1	16.	1	.00	.0	.0
318	786	78	8	3	0	0	38	2	15.	1	.80	.0	.0
318	786	78	8	2	0	0	42	1	9.	3	3.80	.0	.0
318	786	78	8	2	0	0	43	1	16.	2	5.50	.0	.0
318	10	78	9	8	3441	7627	53	1	7.	1	.80	27.1	27.5
318	10	78	9	9	3441	7644	56	1	8.	1	3.50	27.3	27.1
318	10	78	9	9	3440	7651	56	2	11.	3	7.00	27.1	27.0

Appendix Table 4. (cont.)

SPP	CRUISE	YR	MO	DA	LAT	LON	STRAT	TOW	DEPTH(M)	NUMB	WT.(KGS)	B.TEM	S.TEM
***	******	**	**	**	***	***	*****	***	**********	****	********	*****	*****
318	788	78	9	18	3907	7428	23	2	19.	1	1.00	16.4	20.4
318	788	78	9	17	3845	7504	24	1	11.	3	6.50	21.4	21.5
318	788	78	9	17	3848	7453	25	2	13.	2	5.00	20.2	20.3
318	788	78	9	17	3835	7451	26	2	22.	3	5.50	17.1	21.6
318	788	78	9	17	3815	7506	27	1	11.	4	6.50	20.5	21.4
318	788	78	9	17	3808	7504	28	2	15.	18	32.50	20.2	21.5
318	788	78	9	17	3812	7500	29	1	19.	3	3.20	20.1	21.4
318	788	78	9	17	3822	7454	29	2	19.	2	2.00	20.7	21.2
318	788	78	9	15	3746	7530	30	1	7.	12	12.50	21.9	22.0
318	788	78	9	15	3750	7515	31	1	19.	6	10.50	20.8	21.7
318	788	78	9	15	3735	7526	31	2	15.	5	3.50	20.7	21.9
318	788	78	9	13	3732	7524	32	2	20.	4	5.50	22.0	22.0
318	788	78	9	15	3722	7538	33	1	9.	2	1.50	22.5	23.0
318	788	78	9	14	3711	7537	34	2	15.	6	5.60	22.3	22.3
318	788	78	9	13	3723	7526	35	1	23.	2	1.40	22.2	22.5
318	788	78	9	13	3651	7557	36	1	7.	3	6.50	24.3	25.1
318	788	78	9	13	3642	7551	37	1	14.	1	2.80	18.7	24.4
318	788	78	9	13	3702	7547	37	2	12.	1	.20	22.4	24.0
318	788	78	9	12	3648	7540	38	2	16.	1	2.50	18.4	25.5
318	788	78	9	12	3626	7545	40	2	19.	3	6.10	17.6	26.6
318	788	78	9	12	3541	7526	43	1	19.	3	4.70	20.1	25.7
318	788	78	9	11	3530	7525	43	2	17.	4	7.50	25.7	26.5
318	788	78	9	21	4031	7345	13	2	17.	1	1.00	18.2	20.1
318	788	78	9	21	4029	7350	14	1	25.	2	2.50	.0	.0
318	788	78	9	18	3922	7420	18	1	11.	4	7.50	19.8	20.7
318	788	78	9	18	3931	7414	19	1	12.	2	1.80	19.0	20.6
318	788	78	9	18	3909	7435	22	1	15.	4	8.50	19.7	20.6
318	788	78	9	17	3854	7439	22	2	12.	3	7.00	19.9	20.1
318	788	78	9	18	3903	7435	23	1	11.	3	4.00	19.9	21.1
318	479	79	3	27	3512	7536	50	1	13.	21	20.00	12.7	11.2
318	479	79	3	27	3507	7555	50	2	10.	4	2.70	14.2	14.3
318	479	79	3	27	3508	7550	51	1	11.	8	12.00	13.7	14.8
318	479	79	3	27	3506	7528	51	2	15.	5	3.00	12.9	9.3
318	479	79	3	27	3459	7605	53	1	8.	3	3.10	13.9	13.5
318	479	79	3	27	3454	7609	54	2	17.	1	2.50	14.4	13.7
318	479	79	3	27	3439	7622	55	1	16.	1	1.00	15.3	13.3
318	479	79	3	26	3441	7647	56	1	9.	2	1.50	12.1	12.0
318	479	79	3	26	3436	7657	57	2	13.	4	5.50	13.5	12.4
318	479	79	3	26	3437	7640	57	3	13.	8	8.50	12.6	12.3
318	792	79	4	12	4045	7246	7	1	16.	2	4.50	4.7	5.5
318	792	79	4	12	4046	7238	7	2	18.	1	1.00	4.5	5.1
318	792	79	4	11	4036	7323	9	1	9.	1	2.50	5.1	5.6
318	792	79	4	12	4035	7317	10	1	18.	3	5.50	5.2	6.1
318	792	79	4	11	4033	7330	10	2	17.	2	3.50	5.1	5.7
318	792	79	4	5	4026	7337	11	1	19.	4	5.20	4.7	5.2
318	792	79	4	5	4025	7331	11	2	20.	2	2.00	4.7	4.8
318	792	79	4	5	4023	7357	13	1	13.	4	3.60	5.1	6.6
318	792	79	4	5	4010	7355	14	2	17.	2	3.30	5.1	5.7
318	792	79	4	4	3920	7422	18	1	14.	14	20.00	6.3	6.2
318	792	79	4	4	3910	7437	19	1	13.	5	5.00	7.0	7.0
318	792	79	4	4	3911	7425	19	2	18.	4	5.20	6.5	6.6
318	792	79	4	4	3856	7450	21	1	11.	84	95.00	7.3	7.7
318	792	79	4	4	3902	7439	22	1	13.	21	26.00	6.9	6.9
318	792	79	4	4	3855	7440	22	2	13.	12	10.50	6.8	6.8
318	792	79	4	4	3859	7432	23	1	14.	7	7.50	6.3	6.3
318	792	79	4	4	3909	7431	23	2	15.	29	37.00	6.6	6.6
318	792	79	4	3	3344	7503	24	1	10.	3	1.80	6.6	7.5
318	792	79	4	4	3849	7449	25	1	16.	25	33.00	6.4	6.5
318	792	79	4	3	3841	7502	25	2	10.	9	8.50	6.6	7.3
318	792	79	4	3	3835	7454	26	1	17.	12	17.50	5.5	7.0
318	792	79	4	4	3849	7445	26	2	19.	49	47.00	6.8	6.8
318	792	79	4	1	3807	7509	27	1	12.	18	18.00	5.1	7.2
318	792	79	4	1	3813	7505	28	1	12.	24	25.00	5.1	7.2
318	792	79	4	1	3806	7505	28	2	14.	16	13.00	5.1	7.9
318	792	79	4	1	3811	7458	29	1	17.	4	7.50	5.2	7.8
318	792	79	4	3	3824	7454	29	2	17.	5	6.50	5.3	7.3
318	792	79	3	3	3735	7533	30	1	8.	1	1.00	6.3	9.1
318	792	79	3	31	3738	7531	31	1	11.	2	1.80	6.1	7.1

Appendix Table 4. (cont.)

SPP	CRUISE	YR	MO	DA	LAT	LON	STRAT	TOW	DEPTH(M)	NUMB	WT.(KGS)	B.TEM	S.TEM
***	******	**	**	**	***	***	*****	***	**********	****	********	*****	*****
318	792	79	4	1	3748	7526	31	2	12.	18	21.00	5.6	8.3
318	792	79	4	1	3751	7506	32	1	18.	2	4.00	5.2	6.8
318	792	79	4	1	3746	7509	32	2	20.	10	15.00	5.1	7.6
318	792	79	3	31	3727	7536	33	1	10.	2	1.30	5.1	7.5
318	792	79	3	31	3724	7537	34	1	9.	8	4.60	5.3	6.0
318	792	79	3	31	3711	7534	35	1	18.	2	4.00	4.3	8.4
318	792	79	3	31	3721	7528	35	2	22.	2	2.50	4.5	8.3
318	792	79	3	29	3701	7538	38	1	18.	2	2.00	4.5	7.2
318	792	79	3	27	3523	7518	44	2	23.	14	7.50	12.3	8.0
318	579	79	8	2	3513	7534	50	2	8.	9	17.50	27.3	27.3
318	579	79	8	1	3501	7543	52	2	23.	1	1.50	25.2	27.5
318	579	79	7	31	3439	7702	56	1	10.	1	3.50	25.2	26.9
318	795	79	8	6	4046	7241	6	1	10.	1	1.20	17.8	20.2
318	795	79	8	6	4037	7312	9	1	15.	1	.80	17.2	23.0
318	795	79	8	6	4034	7323	10	1	17.	1	1.00	16.1	23.0
318	795	79	8	5	4032	7341	13	2	15.	1	2.00	16.4	26.2
318	795	79	8	5	3918	7424	18	1	14.	7	16.50	16.9	26.0
318	795	79	8	5	3912	7430	19	2	17.	2	.40	14.4	26.5
318	795	79	8	4	3853	7447	22	1	15.	2	5.70	17.9	25.6
318	795	79	8	4	3909	7434	22	2	15.	2	1.70	14.9	26.3
318	795	79	8	4	3909	7425	23	2	21.	7	9.50	12.7	27.2
318	795	79	8	4	3846	7454	25	1	15.	2	4.80	17.4	23.8
318	795	79	8	4	3845	7501	25	2	19.	10	17.00	19.5	24.6
318	795	79	8	3	3835	7453	26	1	18.	4	7.00	12.6	24.7
318	795	79	8	4	3850	7444	26	2	14.	2	4.80	16.2	26.1
318	795	79	8	3	3816	7458	28	1	16.	1	1.80	15.3	27.4
318	795	79	8	3	3813	7501	28	2	19.	3	5.70	15.1	27.5
318	795	79	8	3	3819	7456	29	1	16.	3	7.90	15.0	26.9
318	795	79	8	3	3813	7452	29	2	24.	3	6.50	12.2	26.4
318	795	79	8	3	3724	7529	35	2	19.	1	1.00	14.9	26.8
318	795	79	8	3	3631	7537	38	1	23.	3	4.20	20.6	27.6
318	795	79	8	2	3553	7530	40	1	15.	1	.70	16.3	27.8
318	795	79	8	2	3606	7541	40	2	13.	1	1.70	19.1	25.2
318	795	79	8	2	3542	7514	44	1	36.	4	9.50	17.3	27.9
318	796	79	9	19	3431	7649	58	3	21.	1	.00	25.4	25.4
318	798	79	10	10	4049	7230	6	1	11.	1	.50	15.0	15.0
318	798	79	10	9	4043	7251	7	2	14.	1	.70	16.6	16.6
318	798	79	10	9	4041	7249	8	2	24.	1	2.00	15.1	16.8
318	798	79	10	8	4024	7326	11	1	26.	1	1.00	17.3	17.2
318	798	79	10	8	4033	7319	11	2	22.	1	1.20	17.5	17.4
318	798	79	10	8	4013	7356	13	2	17.	3	6.50	17.0	17.8
318	798	79	10	8	4028	7342	14	2	22.	1	1.40	13.9	16.7
318	798	79	10	7	3958	7403	15	1	15.	3	8.60	18.1	17.9
318	798	79	10	7	3948	7402	16	1	15.	1	2.00	18.3	17.9
318	798	79	10	7	3939	7407	16	2	14.	2	5.00	18.2	18.0
318	798	79	10	7	4005	7400	17	2	18.	2	4.40	18.1	17.8
318	798	79	10	6	3913	7435	18	1	11.	47	77.50	18.7	18.8
318	798	79	10	7	3926	7410	19	1	18.	4	7.50	18.3	18.6
318	798	79	10	7	3935	7408	19	2	17.	4	6.50	18.2	18.2
318	798	79	10	6	3915	7416	20	1	20.	5	8.50	18.7	18.8
318	798	79	10	6	3909	7439	21	1	7.	11	12.00	18.7	18.7
318	798	79	10	6	3853	7441	22	1	16.	4	5.60	18.8	18.8
318	798	79	10	6	3855	7444	22	2	14.	3	4.50	18.6	18.5
318	798	79	10	6	3852	7440	23	1	15.	3	6.30	18.8	18.7
318	798	79	10	6	3901	7432	23	2	14.	32	56.00	18.8	18.8
318	798	79	10	6	3849	7450	24	1	12.	19	26.00	18.8	18.8
318	798	79	10	6	3845	7501	25	1	19.	10	10.50	19.1	19.0
318	798	79	10	5	3830	7458	25	2	12.	5	7.50	19.1	19.0
318	798	79	10	5	3830	7448	26	1	22.	9	14.00	18.8	19.1
318	798	79	10	5	3843	7447	26	2	18.	7	11.50	19.0	19.0

Appendix Table 4. (cont.)

SPP	CRUISE	YR	MO	DA	LAT	LON	STRAT	TOW	DEPTH(M)	NUMB	WT.(KGS)	B.TEM	S.TEM
***	******	**	**	**	***	***	*****	***	**********	****	********	*****	*****
318	798	79	9	26	3800	7514	27	1	10.	28	27.00	19.3	19.2
318	798	79	9	26	3800	7505	28	1	15.	2	2.30	18.9	18.6
318	798	79	9	26	3807	7509	28	2	14.	37	29.00	19.0	19.2
318	798	79	10	5	3822	7452	29	1	18.	1	.80	18.8	19.2
318	798	79	9	26	3809	7501	29	2	14.	2	2.50	18.3	18.8
318	798	79	9	25	3742	7527	31	1	13.	16	15.50	19.7	19.6
318	798	79	9	25	3747	7526	31	2	11.	27	26.00	19.9	19.8
318	798	79	9	25	3737	7523	32	1	13.	10	8.50	19.7	19.4
318	798	79	9	23	3731	7535	33	1	11.	4	2.00	20.8	21.0
318	798	79	9	22	3717	7532	34	1	15.	2	2.80	17.8	21.4
318	798	79	9	23	3731	7528	34	2	12.	4	3.00	17.1	21.0
318	798	79	9	23	3731	7528	34	2	12.	5	.00	17.1	21.0
318	798	79	9	23	3726	7525	35	1	22.	1	.30	15.4	20.9
318	798	79	9	22	3636	7550	36	1	12.	1	1.50	22.0	22.0
318	798	79	9	21	3603	7538	40	2	13.	1	1.00	21.7	22.4
318	798	79	9	21	3608	7534	41	2	21.	1	.20	20.1	22.2
318	798	79	11	9	4152	7010	58	1	19.	2	2.50	11.1	11.2

Appendix 4. (cont.)

SPP	CRUISE	YR	MO	DA	LAT	LON	STRAT	TOW	DEPTH(M)	NUMB	WT.(KGS)	B.TEM	S.TEM
***	******	**	**	**	***	***	*****	***	**********	****	********	*****	*****
318	180	80	3	25	3512	7533	50	1	11.	5	7.50	13.6	13.6
318	180	80	3	25	3508	7552	50	2	12.	1	14.50	13.9	14.0
318	180	80	3	25	3508	7552	50	2	12.	12	.00	13.9	14.0
318	180	80	3	25	3507	7551	51	1	16.	2	2.10	14.7	15.6
318	180	80	3	25	3508	7543	51	2	18.	12	19.50	13.8	14.0
318	180	80	3	25	3503	7539	52	2	27.	3	2.00	15.4	14.2
318	180	80	3	24	3434	7626	54	1	15.	1	2.00	13.5	13.2
318	180	80	3	25	3446	7615	55	1	20.	1	.40	16.0	15.8
318	180	80	3	21	3433	7639	57	1	18.	2	2.40	12.5	12.4
318	180	80	3	21	3428	7639	58	1	21.	4	4.60	12.9	13.0
318	180	80	3	21	3423	7645	58	3	26.	1	.40	13.7	13.8
318	180	80	3	22	3356	7749	63	3	12.	1	3.30	10.5	10.4
318	480	80	7	14	3434	7627	54	1	16.	1	3.00	25.8	26.2
318	680	80	9	20	0	0	55	3	17.	1	1.10	.0	.0
318	680	80	9	21	0	0	58	2	22.	1	2.80	.0	.0
318	680	80	9	21	0	0	59	1	13.	2	6.00	.0	.0
318	801	80	4	8	4053	7218	3	2	8.	1	3.70	5.2	5.2
318	801	80	4	8	4053	7218	3	2	8.	1	.00	5.2	5.2
318	801	80	4	8	4050	7224	5	4	24.	4	2.50	5.2	5.4
318	801	80	4	5	4046	7241	7	2	15.	1	.40	4.2	4.8
318	801	80	4	5	4045	7244	7	3	20.	1	.70	4.2	4.8
318	801	80	4	5	4035	7336	9	1	13.	1	.10	5.8	5.9
318	801	80	4	5	4033	7352	12	1	9.	3	4.70	5.8	5.5
318	801	80	4	5	4024	7357	13	1	14.	8	10.50	4.7	6.2
318	801	80	4	5	4032	7349	13	2	16.	3	7.40	4.3	5.7
318	801	80	4	5	4024	7341	14	1	23.	1	1.50	4.3	5.4
318	801	80	4	4	3950	7405	15	1	10.	3	4.90	5.3	5.8
318	801	80	4	4	4008	7354	17	1	20.	2	10.00	4.5	6.3
318	801	80	4	4	4008	7354	17	1	20.	1	.00	4.5	6.3
318	801	80	4	1	3920	7416	19	2	17.	1	.90	5.4	5.4
318	801	80	4	1	3932	7403	20	1	24.	1	1.20	5.3	5.3
318	801	80	4	1	3915	7412	20	2	25.	3	16.00	5.6	5.5
318	801	80	4	1	3915	7412	20	2	25.	4	.00	5.6	5.5
318	801	80	4	1	3854	7447	22	2	15.	2	1.80	5.8	5.9
318	801	80	4	1	3908	7420	23	1	26.	1	3.10	5.8	5.8
318	801	80	4	1	3908	7420	23	1	26.	1	.00	5.8	5.8
318	801	80	3	31	3840	7501	25	1	15.	2	3.00	5.8	5.8
318	801	80	3	31	3850	7449	25	3	11.	7	15.50	5.5	5.6
318	801	80	3	31	3850	7449	25	3	11.	2	.00	5.5	5.6
318	801	80	3	31	3843	7453	26	1	17.	1	2.60	5.3	5.2
318	801	80	3	31	3843	7453	26	1	17.	1	.00	5.3	5.2
318	801	80	3	31	3848	7444	26	2	19.	2	1.00	4.8	4.8
318	801	80	3	31	3801	7514	27	1	10.	4	4.30	6.2	6.0
318	801	80	3	31	3818	7503	28	1	16.	8	10.50	6.2	6.1
318	801	80	3	31	3813	7505	28	2	16.	3	8.00	6.1	6.0
318	801	80	3	31	3813	7505	28	2	16.	3	.00	6.1	6.0
318	801	80	3	31	3823	7455	29	1	18.	4	4.60	5.6	5.5
318	801	80	3	27	3733	7526	31	1	19.	6	24.00	5.8	5.8
318	801	80	3	27	3733	7526	31	1	19.	8	.00	5.8	5.8
318	801	80	3	27	3741	7528	31	2	17.	6	9.50	5.4	5.8
318	801	80	3	27	3743	7513	32	1	21.	11	18.50	5.2	5.0
318	801	80	3	27	3736	7522	32	2	18.	1	1.10	5.4	5.6
318	801	80	3	27	3714	7543	33	1	9.	5	8.50	6.7	7.1
318	801	80	3	27	3716	7539	34	1	14.	7	11.50	6.3	6.8
318	801	80	3	27	3716	7535	35	1	20.	4	3.70	5.9	6.3
318	801	80	3	27	3722	7528	35	2	24.	1	4.20	5.7	6.2
318	801	80	3	27	3722	7528	35	2	24.	1	.00	5.7	6.2
318	801	80	3	27	3702	7550	36	1	11.	2	4.90	6.8	6.8
318	801	80	3	27	3700	7543	37	1	17.	1	.30	6.3	6.3
318	801	80	3	27	3653	7548	37	2	17.	3	3.00	6.6	6.8
318	801	80	3	26	3633	7539	38	1	21.	1	.70	6.8	6.8
318	801	80	3	26	3605	7539	40	2	19.	1	.20	7.1	7.0
318	801	80	3	25	3518	7525	43	2	19.	2	2.70	10.8	8.4
318	801	80	3	26	3536	7520	44	1	32.	2	4.50	6.9	7.2
318	801	80	3	26	3536	7520	44	1	32.	4	.00	6.9	7.2

Appendix 4. (cont.)

SPP	CRUISE	YR	MO	DA	LAT	LON	STRAT	TOW	DEPTH(M)	NUMB	WT.(KGS)	B.TEM	S.TEM
***	******	**	**	**	***	***	*****	***	**********	****	********	*****	*****
318	804	80	7	30	4048	7231	7	1	13.	1	2.00	16.5	21.7
318	804	80	7	21	3911	7429	19	2	17.	1	2.40	.0	.0
318	804	80	7	21	3908	7439	21	1	11.	12	23.00	11.1	15.0
318	804	80	7	21	3856	7448	22	1	9.	40	76.00	.0	18.7
318	804	80	7	21	3854	7445	22	2	13.	3	3.00	.0	.0
318	804	80	7	21	3831	7459	25	1	13.	16	24.00	.0	.0
318	804	80	7	21	3837	7458	25	2	16.	8	21.00	12.2	21.8
318	804	80	7	21	3844	7452	26	2	16.	2	5.20	.0	.0
318	804	80	7	20	3807	7509	27	1	12.	9	17.00	12.9	18.5
318	804	80	7	21	3816	7500	28	2	17.	13	22.00	.0	.0
318	804	80	7	20	3747	7530	30	1	10.	15	18.00	14.3	20.3
318	804	80	7	20	3758	7513	31	1	14.	2	8.00	13.6	20.3
318	804	80	7	20	3758	7513	31	1	14.	2	.00	13.6	20.3
318	804	80	7	20	3717	7543	33	1	7.	4	6.10	15.7	18.4
318	804	80	7	19	3710	7541	34	2	13.	2	1.20	12.2	20.4
318	804	80	7	20	3716	7531	35	2	18.	4	3.40	11.6	20.8
318	804	80	7	19	3656	7547	37	1	13.	2	1.00	13.5	22.8
318	804	80	7	19	3624	7545	40	1	18.	1	2.00	12.4	23.6
318	804	80	7	19	3556	7519	41	1	20.	1	4.10	18.1	25.4
318	804	80	7	19	3556	7519	41	1	20.	2	.00	18.1	25.4
318	804	80	7	18	3516	7529	42	1	9.	1	.70	23.8	26.0
318	804	80	7	18	3514	7526	43	2	17.	1	1.30	25.0	26.2
318	808	80	10	10	0	0	4	1	21.	1	3.00	.0	.0
318	808	80	10	10	0	0	6	1	7.	1	.70	.0	.0
318	808	80	10	9	0	0	7	1	18.	1	2.20	.0	.0
318	808	80	10	9	0	0	9	1	11.	1	.20	.0	.0
318	808	80	10	9	0	0	10	1	16.	1	.70	.0	.0
318	808	80	10	1	0	0	18	1	12.	7	9.50	.0	.0
318	808	80	10	1	0	0	19	2	17.	1	1.20	.0	.0
318	808	80	9	30	0	0	21	1	11.	4	6.80	.0	.0
318	808	80	10	1	0	0	22	1	11.	3	5.60	.0	.0
318	808	80	9	30	0	0	22	2	15.	5	7.80	.0	.0
318	808	80	9	30	0	0	22	2	15.	1	.00	.0	.0
318	808	80	10	1	0	0	23	1	20.	1	2.50	.0	.0
318	808	80	9	30	0	0	24	1	11.	12	9.50	.0	.0
318	808	80	9	30	0	0	25	2	9.	25	45.50	.0	.0
318	808	80	9	30	0	0	26	1	18.	2	7.50	.0	.0
318	808	80	9	30	0	0	26	1	18.	3	.00	.0	.0
318	808	80	9	30	0	0	26	2	15.	28	58.00	.0	.0
318	808	80	9	30	0	0	27	1	11.	4	6.20	.0	.0
318	808	80	9	30	0	0	28	2	12.	3	3.60	.0	.0
318	808	80	9	30	0	0	28	2	12.	1	.00	.0	.0
318	808	80	9	30	0	0	29	1	19.	2	4.40	.0	.0
318	808	80	9	28	0	0	29	2	15.	3	7.80	.0	.0
318	808	80	9	28	0	0	31	1	15.	1	1.10	.0	.0
318	808	80	9	27	0	0	33	1	7.	2	6.10	.0	.0
318	808	80	9	27	0	0	34	1	16.	1	3.00	.0	.0
318	808	80	9	27	0	0	34	2	13.	3	7.30	.0	.0
318	808	80	9	28	0	0	35	1	24.	7	10.60	.0	.0
318	808	80	9	27	0	0	35	2	18.	4	6.30	.0	.0
318	808	80	9	27	0	0	37	1	13.	5	5.60	.0	.0
318	808	80	9	26	0	0	40	1	17.	3	5.50	.0	.0
318	808	80	9	25	0	0	41	1	22.	1	.70	.0	.0

WOODS HOLE OCEANOGRAPHIC INSTITUTION

Appendix Table 5. Horseshore crabs in offshore bottom trawl cruises.

SPP	CRUISE	YR	MO	DA	LAT	LON	STRAT	TOW	DEPTH(M)	NUMB	WT.(KGS)	B.TEM	S.TEM
***	******	**	**	**	***	***	*****	***	**********	****	********	*****	*****
318	758	75	11	2	3614	7501	61	2	40.	2	3.63	14.0	16.3
318	758	75	11	2	3536	7452	62	2	68.	1	51.71	14.5	19.0
318	762	76	3	4	4013	7331	1	1	31.	1	1.00	4.4	5.0
318	762	76	3	20	3534	7457	61	1	44.	13	13.40	13.0	14.1
318	762	76	3	21	3551	7509	61	2	32.	10	8.40	13.7	11.4
318	762	76	3	21	3619	7510	61	4	31.	30	24.00	11.2	11.1
318	762	76	3	21	3626	7520	61	5	27.	30	26.00	10.0	10.2
318	762	76	3	20	3604	7452	62	1	88.	5	4.40	12.5	10.5
318	762	76	3	20	3544	7453	62	2	78.	24	18.00	12.8	14.7
318	762	76	3	20	3610	7447	63	1	170.	1	2.00	12.0	10.0
318	762	76	3	20	3533	7449	63	2	137.	21	23.10	11.8	17.4
318	762	76	3	20	3626	7446	64	1	246.	10	10.40	11.3	9.2
318	762	76	3	20	3553	7450	64	2	205.	18	19.00	11.2	10.7
318	762	76	3	17	3654	7537	65	1	21.	3	4.40	8.3	8.2
318	762	76	3	18	3701	7505	65	3	39.	6	6.90	7.6	7.5
318	762	76	3	18	3708	7507	65	4	31.	3	2.70	7.9	7.7
318	762	76	3	18	3731	7511	65	5	29.	6	12.40	7.4	7.4
318	762	76	3	18	3738	7507	65	6	23.	2	2.00	7.1	7.1
318	762	76	3	19	3638	7452	65	8	41.	1	.90	9.4	9.1
318	762	76	3	22	3638	7533	65	9	18.	1	.40	9.4	9.9
318	762	76	3	19	3651	7445	66	3	71.	4	4.40	11.9	8.7
318	762	76	3	13	3855	7432	69	1	22.	5	7.90	5.0	5.3
318	762	76	3	14	3828	7443	69	2	29.	3	2.60	5.6	5.6
318	762	76	3	23	3836	7447	69	8	27.	29	42.00	6.4	8.4
318	762	76	3	23	3846	7433	69	9	24.	18	28.00	6.3	7.3
318	762	76	3	15	3826	7349	70	2	65.	5	.10	8.8	7.8
318	767	76	10	13	3539	7506	61	2	37.	1	.50	22.8	21.0
318	767	76	10	14	3612	7521	61	3	29.	2	3.80	20.7	20.9
318	767	76	10	12	3623	7452	62	1	64.	1	3.00	13.5	21.2
318	767	76	10	13	3537	7449	64	2	205.	12	8.50	8.8	24.6
318	767	76	10	12	3655	7522	65	7	26.	1	2.00	20.3	20.3
318	767	76	10	8	3845	7429	69	3	27.	6	13.00	18.8	19.0
318	767	76	10	10	3826	7442	69	7	33.	10	10.50	19.5	19.5
318	771	77	3	24	3549	7504	61	3	34.	13	16.00	10.0	11.5
318	771	77	3	22	3629	7533	61	4	19.	1	1.60	6.0	7.6
318	771	77	3	22	3619	7457	61	5	44.	10	15.50	10.6	10.1
318	771	77	3	24	3559	7452	62	1	97.	9	12.50	10.7	12.3
318	771	77	3	24	3540	7453	62	2	69.	7	12.50	11.0	19.8
318	771	77	3	24	3612	7448	63	1	120.	7	7.50	10.9	16.0
318	771	77	3	24	3546	7451	63	2	118.	3	4.00	10.7	19.5
318	771	77	3	26	3733	7509	65	1	30.	1	.70	8.3	5.6
318	771	77	3	26	3720	7519	65	2	30.	1	1.00	5.1	5.1
318	771	77	3	26	3710	7509	65	5	33.	1	1.40	5.4	5.5
318	771	77	3	27	3731	7445	65	6	48.	1	3.00	8.0	8.0
318	771	77	3	25	3650	7513	65	8	24.	1	2.60	6.1	6.1
318	771	77	3	27	3723	7454	65	9	40.	1	1.20	6.2	6.2
318	771	77	3	22	3631	7446	66	1	90.	13	21.00	10.1	10.7
318	771	77	3	27	0	0	69	2	37.	9	19.00	.0	.0
318	771	77	3	27	0	0	69	3	21.	7	9.50	.0	.0
318	771	77	4	1	0	0	69	5	38.	14	31.00	.0	.0
318	771	77	4	1	0	0	69	9	28.	40	58.00	.0	.0
318	771	77	3	27	3751	7447	69	10	34.	2	3.70	5.0	5.0
318	771	77	4	2	3857	7414	73	4	35.	10	10.50	4.3	5.6
318	771	77	4	3	3917	7339	73	7	40.	1	1.50	3.7	5.3
318	774	77	8	4	3605	7515	61	3	26.	4	5.10	12.6	25.1
318	774	77	8	4	3626	7523	61	5	28.	1	.80	15.2	24.9
318	774	77	8	3	3558	7455	62	2	87.	2	3.30	12.9	25.4

Appendix Table 5. (cont.)

SHP	CRUISE	YR	MO	DA	LAT	LON	STRAT	TOW	DEPTH(M)	NUMB	WT.(KGS)	B.TEM	S.TEM
318	778	77	10	11	4028	7313	1	4	29.	1	2.00	16.4	16.0
318	778	77	9	29	3623	7500	61	1	37.	7	12.50	12.8	21.9
318	778	77	9	29	3608	7506	61	2	34.	6	8.50	17.9	22.2
318	778	77	9	29	3618	7516	61	4	30.	7	14.50	13.4	21.7
318	778	77	10	1	3625	7530	61	5	27.	3	6.00	15.9	.0
318	778	77	9	30	3612	7454	62	2	60.	1	2.00	14.2	21.6
318	778	77	9	29	3627	7447	63	2	118.	2	2.90	14.2	24.3
318	778	77	9	30	3541	7449	64	1	183.	8	13.50	13.6	25.8
318	778	77	10	2	3737	7518	65	2	20.	8	11.50	17.5	20.6
318	778	77	10	1	3702	7535	65	4	22.	1	3.00	18.4	.0
318	783	78	3	24	3623	7501	61	1	38.	2	3.50	8.5	7.6
318	783	78	3	24	3542	7454	62	1	58.	6	12.00	13.1	15.7
318	783	78	3	24	3620	7448	63	2	120.	1	1.50	11.7	9.8
318	783	78	3	23	3644	7514	65	2	26.	1	1.20	6.4	6.5
318	783	78	3	23	3712	7501	65	3	31.	1	1.20	7.2	7.1
318	783	78	3	28	3841	7430	69	7	33.	8	12.50	4.6	4.4
318	787	78	7	27	3600	7456	62	1	50.	1	.50	12.3	25.3
318	787	78	7	28	3552	7456	62	2	53.	1	1.60	14.1	27.0
318	787	78	8	5	3753	7503	65	5	23.	1	2.80	15.0	26.5
318	787	78	8	5	3805	7454	69	7	21.	6	11.50	11.7	26.5
318	679	79	3	23	3459	7533	50	1	35.	6	4.20	11.7	7.1
318	679	79	3	23	0	0	51	1	79.	40	43.00	.0	.0
318	679	79	3	23	3456	7521	52	1	133.	2	2.30	15.6	10.6
318	679	79	3	23	3521	7455	52	2	125.	4	3.50	17.4	22.4
318	679	79	3	23	3452	7524	53	1	188.	1	.30	13.4	21.8
318	679	79	3	27	3424	7609	54	2	37.	1	1.30	18.9	15.6
318	679	79	3	26	3425	7553	55	2	102.	1	1.20	15.2	16.7
318	793	79	3	22	3558	7458	61	3	52.	1	.80	8.2	8.7
318	793	79	3	23	3536	7452	62	2	64.	18	25.00	9.7	16.4
318	793	79	3	23	3540	7448	64	1	189.	7	10.50	11.8	18.6
318	793	79	3	28	3651	7512	65	4	25.	2	1.00	6.0	7.0
318	793	79	4	1	3740	7501	65	6	25.	1	1.20	6.2	6.7
318	793	79	4	4	3851	7428	69	1	19.	7	8.50	6.2	6.7
318	793	79	4	1	3814	7440	69	6	32.	1	.90	6.3	7.5
318	794	79	8	2	3551	7513	61	3	33.	1	1.80	12.9	27.6
318	797	79	9	15	3500	7516	52	2	135.	1	1.00	14.5	27.8
318	797	79	9	16	3427	7544	53	1	228.	1	2.80	10.9	25.6
318	799	79	9	15	3609	7512	61	3	32.	1	2.00	15.0	23.0
318	799	79	9	15	3550	7451	64	1	220.	2	3.00	11.8	24.2
318	799	79	9	22	3722	7516	65	1	26.	3	6.00	14.3	21.8
318	799	79	9	22	3727	7511	65	6	21.	1	.30	.0	21.2
318	799	79	10	5	3828	7448	69	1	23.	7	8.50	18.5	19.3
318	799	79	9	26	3754	7453	69	3	31.	2	.00	19.7	18.9
318	799	79	9	26	3759	7419	70	3	64.	1	.60	8.9	21.0
318	799	79	9	26	3742	7415	71	1	120.	1	3.50	13.2	22.8

Appendix Table 5. (cont.)

SPP	CRUISE	YR	MO	DA	LAT	LON	STRAT	TOW	DEPTH(M)	NUMB	WT.(KGS)	B.TEM	S.TEM
***	******	**	**	**	***	***	*****	***	**********	****	********	*****	*****
318	280	80	3	20	3520	7454	53	1	290.	3	4.00	10.0	19.8
318	580	80	7	14	3525	7503	50	3	31.	1	.60	21.1	25.4
318	802	80	4	8	4046	7229	5	16	30.	1	2.20	4.4	5.4
318	802	80	3	19	3539	7458	61	3	49.	8	11.50	13.0	14.2
318	802	80	3	19	3538	7451	62	1	72.	4	6.50	12.3	16.8
318	802	80	3	19	3544	7453	62	2	75.	8	11.50	12.1	16.7
318	802	80	3	19	3541	7451	63	1	96.	2	2.00	12.1	16.6
318	802	80	3	27	3649	7529	65	1	25.	3	13.50	6.5	6.6
318	802	80	3	27	3649	7529	65	1	25.	5	.00	6.5	6.6
318	802	80	3	27	3729	7511	65	2	29.	2	1.50	5.4	5.2
318	802	80	3	18	3714	7455	65	4	36.	1	.70	9.5	9.0
318	802	80	3	30	3738	7453	65	5	36.	2	2.30	5.7	6.0
318	802	80	3	18	3709	7447	66	3	75.	1	2.70	10.1	11.2
318	802	80	3	31	3811	7450	69	4	22.	3	6.00	5.7	5.7
318	802	80	4	1	3853	7428	69	5	25.	2	2.60	4.9	4.8
318	802	80	3	31	3817	7447	69	6	25.	5	6.00	5.5	5.4
318	805	80	7	19	3554	7514	61	1	25.	1	2.70	16.2	25.4
318	805	80	7	14	3547	7453	62	1	78.	3	5.40	11.8	26.1
318	805	80	7	20	3801	7453	69	6	25.	1	.60	9.5	22.0
318	809	80	10	10	4042	7240	1	5	25.	1	1.00	17.2	17.4
318	809	80	9	25	3623	7518	61	1	28.	3	5.70	17.4	24.8
318	809	80	9	25	3622	7523	61	2	30.	2	5.00	17.7	25.0
318	809	80	9	19	3554	7455	62	2	81.	1	1.70	10.1	25.2
318	809	80	9	19	3610	7448	63	1	120.	2	3.50	12.6	25.0
318	809	80	9	28	3715	7521	65	1	27.	2	2.90	18.5	21.9
318	809	80	9	28	3731	7505	65	2	28.	4	6.50	13.2	20.9
318	809	80	9	28	3722	7509	65	3	25.	2	4.10	16.2	22.2
318	809	80	9	26	3633	7535	65	5	22.	1	.80	24.4	24.8

SUMMARY TABLES 1-5

Table 1. Summary of the occurrence of the horseshoe crab, *Limulus polyphemus*, in survey samples for ocean clams by the NMFS-NEFC 1965-1980.

Vessel name	Survey Dates	Gear	Number of stations	Depth range (m)	General Area of Operation	Observations on *Limulus polyphemus*: Number of stations with Limuli	Total number caught	Depth Range (m)	Cruise number	Comp code	Appendix Table 1 page(s)
	1965										
Undaunted	11 May-25 June	1	374	9.1-71.6	Montauk Pt.-Cape Hatteras	6	7	12.2-36.6		SM651	7
Undaunted	22 Oct.-21 Nov.	1	217	6.7-75.0	Montauk Pt.-Oregon Inlet	15	24	6.7-27.7		SM652	7
	1966										
Delaware	18 May-10 June	2	415	12.2-39.6	New Jersey-Chincoteague	6	7	16.8-30.5	66-1		7
Albatross IV	14-27 Aug.	1	240	11.6-58.2	Maryland-Delaware	7	18	11.6-22.3	66-6		7
	1967										
Delaware	10 May-1 June	2	296	11.3-41.5	Montauk Pt.-Chincoteague Inlet	6	10	13.1-25.0		SM671	7
	1969										
Albatross IV	20 May-2 July	1	278	12.2-77.4	False Cape-Nantucket Sound	10	31	12.2-23.5	69-1		8
	1970										
Delaware II	13-24 Aug.	2	199	10.0-73.2	New Jersey-Delmarva Peninsula	16	29	10.0-42.0	70-6		8
	1974										
Delaware II	13-28 June	1	241	6.7-41.1	Montauk Pt.-Cape Hatteras	62	211	9.1-35.7		SM743	8-10
Delaware II	5-10 Aug.	1	141	14.6-43.9	New Jersey and Virginia fishing areas	35	90	14.6-31.1		SM742	10
	1976										
Delaware II	6 Apr.-13 May	2	217	7.0-86.6	Long Island-North Carolina	41	190	7.0-77.1	76-1	SM761	10-11
	1977										
Delaware II	26 Jan.-17 Mar.	2	212	9.1-82.3	Chesapeake Bay-Nantucket Shoals	34	162	9.1-43.9	77-2	SM772	11-12
	1978										
Delaware II	4 Jan.-11 Feb.	2	346	9-80	Cape Hatteras-Nantucket Shoals	61	178	10-62	78-01	278	12-13
Delaware II	5 Dec.-20 Dec.	2	163	9-87	Montauk Pt.-Cape Charles	55	173	9-57	78-07	879	14-15
	1979										
Delaware II	7 Jan.-1 Feb.	3	139	6-79	Cape Hatteras-Nantucket Shoals	25	59	9-48	79-01	791	15
Delaware II	3 Jan.-9 Feb.	3	207	7-60	Southern New England-Cape Hatteras	58	182	10-43	80-01	080	16
Delaware II	15 Aug.-12 Sept.	3	231	9-110	Nova Scotia-Cape Hatteras	12	29	9-33	80-06	807	16

Gear Legend: Hydraulic surf clam dredge #1=30"; #2 = 48"; and #3 = 60" wide knife.

Table 2. Summary of the occurrence of the horseshoe crab, Limulus polyphemus, in special survey samples for ocean clams by the NMFS-NEFC 1972-1977.

Vessel name	Survey dates	Gear	Number of stations	Depth range (m)	General Area of Operation	Observations on Limulus polyphemus: Number of stations with Limuli	Total number caught	Depth range (m)	Appendix Table 2 page (s)
	1972								
Linnea	16 May-19 Sep.	1	389	2.7-32.0	Coastal New Jersey	135	389	2.7-21.6	17-20
	1976								
Valerie E.	6-8 Aug.	2	25	13.0-41.0	Offshore Central New Jersey	1	1	13	20
Gail & Cora M. Snow	9-14 Sep.	2	31	8.5-42.1	as above	7	137	5.5-17.7	20
Cora May Snow	15-25 Sep.	2	35	7.3-57.6	Off Long Island, N.Y.	2	7	12.8-27.4	20
Margaret & Nancy	7-8 Oct.	2	11	9.8-45.4	Offshore Central New Jersey	1	1	9.8	20
	1977								
Delaware II	17-21 Aug.	1	60	11.9-28.7	Off Long Island, N.Y.	10	28	12.2-23.2	20

Table 3. Summary of occurrence of the horseshoe crab, *Limulus polyphemus*, in survey samples for sea scallops by the NMFS-NEFC 1975-1978.

Vessel name	Survey Dates	Gear	Number of stations	Depth range (m)	General Area of Operation	Observations on *Limulus polyphemus*			Cruise number	Comp code	Appendix Table 3 page (s)
						Number of stations with Limuli	Total number caught	Depth range (m)			
	1975										
Albatross IV	7-16 Aug.	1	100	26-148	Mid-Atlantic Bight	8	72	29.3-146.3	75-08	075	21
	1977										
Albatross IV	6-16 Sep.	1	170	26-152	So. New England-Cape Hatteras	4	123	69-121	77-08	277	21
	1978										
Albatross IV	15 Aug.-1 Sep.	1	348	19-110	Georges Bank-Cape Hatteras	4	60	19-33	78-10	978	21

Gear Legend: Scallop dredge 10' wide.

Table 4. Summary of the occurrence of horseshoe crabs, *Limulus polyphemus*, in samples for finfish during inshore bottom trawl surveys by NMFS-NEFC, 1975-1980.

Vessel and Cruise	Dates	Number of stations	Depth range (m)	Area	Gear	*Limulus polyphemus* Number of stations	*Limulus polyphemus* Number of crabs	*Limulus polyphemus* Depth range (m)	Computer code cruise number	Appendix Table 4 page (s)
	1975									
Delaware II 75-1	15 Oct-7 Nov	95	7-41	Cape Cod-Cape Hatteras	#36	27	207	16-49	401	22
	1976									
Delaware II 76-05	3 Mar-26 Mar	76	7-33	Block Island-Cape Hatteras	#41	56	953	7-28	450	22-23
Albatross IV 76-09	28 Sep-17 Oct	73	9-35	Block Island-Cape Hatteras	#36	42	269	9-24	460	23
	1977									
Delaware II 77-03	19 Mar-14 Apr	71	7-29	Block Island-Cape Hatteras	#41	41	670	8-29	467	24
Alb IV & Del II 77-07, 09	27 Jul-31 Aug	133	8-100	Gulf of Maine-Cape Hatteras	#36	35	248	8-24	775	24-25
Delaware II 77-12	26 Sep-15 Dec	75	6-37	Block Island-Cape Hatteras	#36	39	327	6-28	777	25
	1978									
Albatross IV 78-01	18 Jan-27 Jan	78	10-40	Mid-Atlantic-So. New England	#41	14	28	11-24	780	25
Albatross IV 78-04	20 Mar-23 May	72	9-42	Block Island-Cape Hatteras	#41	37	281	10-29	782	26
Alb IV & Del II 78-09,05	25 Jul-11 Aug	105	6-88	Gulf of Maine-Cape Hatteras	#36	31	271	6-22	786	26
Delaware II 78-06	5 Sep-22 Nov	77	7-29	Gulf of Maine-Cape Hatteras	#36	29	114	7-25	788	27
Delaware II 78-06	8 Sep-11 Sep	45	7-28	Cape Hatteras-Cape Fear	#36	3	5	7-11	010	26
	1979									
Delaware II 79-04	25 Mar-27 Mar	18	8-26	Cape Hatteras-Cape Fear	#41	10	57	8-17	479	27
Alb IV & Del II 79-03, 04	21 Mar-12 May	89	8-78	Gulf of Maine-Cape Hatteras	#41	38	425	8-23	792	27-28
Delaware II	29 Jul-2 Aug	35	8-28	Cape Hatteras-Cape Fear	#36	3	11	8-23	579	28
Alb IV & Del II 79-08,07,09	2 Aug-31 Aug	101	9-75	Gulf of Maine-Cape Hatteras	#36	22	62	10-36	795	28
Del II 79-10	18 Sep-21 Sep	37	9-33	Cape Hatteras-Cape Fear	#36	1	1	21	796	28
Del II 79-10	21 Sep-9 Nov	89	7-49	Cape Hatteras-Cape Cod	#36	42	324	7-26	798	28-29
	1980									
Delaware II 80-02	20-25 Mar.	37	9-27	Cape Hatteras-Cape Fear	#41	12	45	11-27	180	30
Delaware II 80-05	14-18 Jul.	39	9-29	Cape Hatteras-Cape Fear	#36	1	1	16	480	30
Delaware II 80-07	20-23 Sep.	38	7-28	Cape Hatteras-Cape Fear	#36	3	4	13-22	680	30
Delaware II 80-02	25 Mar.-22 Apr.	100	8-60	Gulf of Maine-Cape Hatteras	#41	49	166	8-32	801	30
Delaware II 80-08,05 & Albatross IV	14 Jul.-18 Aug.	103	9-89	Gulf of Maine-Cape Hatteras	#36	22	142	7-20	804	31
Delaware II 80-07	25 Sep.-15 Nov.	88	8-79	Gulf of Maine-Cape Hatteras	#36	30	137	7-24	808	31

Gear legend: #36 & #41 = Yankee Otter Trawls

Table 5. Summary of the occurrence of horseshoe crabs, *Limulus polyphemus*, in samples for finfish during offshore bottom trawl surveys by NMFS-NEFC, 1975-1980.

Vessel and Cruise	Dates	Number of stations	Depth range (m)	Area	Gear	*Limulus polyphemus* Number of stations	Number of crabs	Depth range (m)	Computer code cruise number	Appendix Table 5 page (s)
	1975									
Alb IV & Del II 75-12-17	15 Oct-18 Nov	304	20-369	Nova Scotia-Cape Hatteras	#36	2	3	40-68	758	33
	1976									
Alb IV & Del II 76-02,05	4 Mar-8 May	300	18-352	Nova Scotia-Cape Hatteras	#41	24	249	18-246	762	32
Albatross IV 76-09	20 Oct-23 Nov	267	24-384	Nova Scotia-Cape Hatteras	#36	7	33	26-205	767	32
	1977									
Alb IV & Del II 77-02,03	19 Mar-20 May	284	19-360	Nova Scotia-Cape Hatteras	#41	21	152	19-120	771	32
Alb IV & Del II 77-07,09	27 Jul-31 Aug	158	22-188	Gulf of Maine-Cape Hatteras	#36	3	7	26-87	774	32
Delaware II 77-12	26 Sep-15 Dec	339	19-417	Nova Scotia-Cape Hatteras	#36	10	44	20-183	778	33
	1978									
Albatross IV 78-04	20 Mar-23 May	319	23-351	Nova Scotia-Cape Hatteras	#41	6	19	26-120	783	33
Alb IV & Del II 78-09,05	25 Jul-20 Aug	168	17-271	Gulf of Maine-Cape Hatteras	#36	4	9	21-53	787	33
	1979									
Delaware II 79-04	23 Mar-27 Mar	22	31-216	Cape Hatteras-Cape Fear	#41	7	55	35-188	679	33
Alb IV & Del II 79-03,04	21 Mar-12 May	348	19-969	Nova Scotia-Cape Hatteras	#41	7	37	19-189	793	33
Alb IV & Del II 79-08,09	25 Jul-1 Sep	288	19-203	Gulf of Maine-Cape Hatteras	#36	1	1	33	794	33
Delaware II 79-10	15 Sep-23 Sep	33	26-292	Cape Hatteras-Cape Fear	#36	2	2	135-228	797	33
Alb IV & Del II 79-12,10	12 Sep-19 Nov	442	16-516	Nova Scotia-Cape Hatteras	#36	8	18	21-220	799	33
	1980									
Delaware II 80-02	20-25 Mar.	26	27-290	Cape Hatteras-Cape Fear	#41	1	3	290	280	34
Delaware II 80-05	14-18 Jul.	21	27-211	Cape Hatteras-Cape Fear	#36	1	1	31	580	34
Delaware II 80-03,02 & Albatross IV	16 Mar.-8 May	305	25-567	Nova Scotia-Cape Hatteras	#41	14	47	22-96	802	34
Delaware II 80-08,05 & Albatross IV	11 Jul-18 Aug.	162	21-251	Gulf of Maine-Cape Hatteras	#36	3	5	25-78	805	34
Delaware II 80-07	17 Sep.-14 Nov.	272	22-340	Nova Scotia-Cape Hatteras	#36	9	18	22-120	809	34

Gear Legend: #36 + #41 = Yankee Otter Trawls