Sublittoral Macro-Infauna of the Lower Bay of Fundy

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by

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ABSTRACT

Peer, D., D.J. Wildish, A.J. Wilson, J. Hines, and M. Dadswell. 1980. Sublittoral Macro-Infauna of the Lower Bay of Fundy. Canadian Technical Report of Fisheries and Aquatic Sciences. Technical Report 981: ~~000-000~~. 74 p.

The net weight biomass and numbers of individuals of 212 species of benthic macrofauna were measured at 98 locations in the outer Bay of Fundy. Sediment pigments and size particle distributions were measured at some locations. The extent of the occurrence within the Bay of conspicuous macrofauna species is shown and compared with that of the same species in other bodies of water.

RÉSUMÉ

Peer, D., D.J. Wildish, A.J. Wilson, J. Hines, and M. Dadswell. 1980. Sublittoral Macro-Infauna of the Lower Bay of Fundy. Canadian Technical Report of Fisheries and Aquatic Sciences. Technical Report 981: 000-000.

Les auteurs ont déterminé la biomasse en poids humide et le nombre d'indiyidus appartenant à 98 stations de l'entrée de la baie de Fundy. À quelques stations, ils ont mesuré les pigments du sédiment et la distribution des particules. Ils montrent la répartition, dans la baie, des espèces bien en évidence de la macrofaune. Ils la comparent avec celle des mêmes espèces habitant d'autres masses d'eau.

INTRODUCTION

This report records the first attempt at a systematic mapping of the benthic infaunal communities in the Bay of Fundy. Previous benthic work (see references in Moyse, 1978) in the Bay has involved limited areas, generally inshore.

The objectives of this program were discussed at the Acadia University Institute Workshop, Wolfville in 1976 (see Wildish, 1977) and were to determine the community types and their biomass, particularly in the deeper, less well known areas, throughout the Bay. The overall objective was the construction of a productivity map for the Bay based on the biomass data and classical secondary production calculations (Crisp, 1971). Discussion among the authors at Wolfville led to agreement to jointly tackle this problem. Major responsibility areas were:

D. Peer and A. Wilson - Sampling and fieldwork.

D. Peer - Preliminary sorting and identification.

M. Dadswell - Identification and confirmation of all taxa.

D. Wildish - Seasonal measurements of a few dominants to determine annual production.

Spatial coverage throughout the Bay was completed in three cruises as follows: May 2 to 26, 1978 - J.L. Hart, August 10 to 20, 1978 - CSS Dawson; August 11 to 19, 1979 - CSS Dawson. Each of these will be reported separately beginning with the May 1978 work as soon as available and with a minimum of interpretation so that the raw data will be available to other investigators as soon as possible. A more detailed analysis will be made when the program is completed. The present report covers the outer part of the Bay between Ile Haute and Grand Manan. This was the area sampled during the first cruise by the J.L. Hart. The subsequent cruises by the Dawson covered the two arms of the Inner Bay.

METHODS

Two grab samples were taken at each of 98 locations (Fig. I). So that community type and productivity could be related to tidal behaviour the station positions were chosen to correspond to the grid used in a numerical model of the tidal behaviour (Greenberg, 1979). The vessel was allowed to drift during sampling. Positioning was by Decca navigator and the final position recorded was that at the completion of sampling. Quantitative samples were not always possible because large stones often became wedged between the jaws of the grab. Repeated attempts would sometimes result in a quantitative sample but if a closed grab sample was not obtained in 7 to 10 attempts the best two were retained.

The grab used was a 0.1 m^2 Hunter (Hunter and Simpson, 1976). Its design permitted access to the surface of the sample before it was opened so an undisturbed subsample for pigment and particle size analysis could be taken. The remaining sediment was then washed through an 0.8 mm^2 sieve and the material retained on the sieve from both samples was combined and preserved in a 10% solution of buffered formalin and seawater. Epifauna was scraped from the cobbles when these were too large for the containers in which the samples were stored.

Ashore the samples were washed again through a 0.8 mm^2 sieve to remove formalin. The organisms were hand-picked from the sediment and tentatively identified. Individuals from each identified taxon were then counted and, after removal of surface moisture, weighed to the nearest milligram. Species containing calcium carbonate were preserved in alcohol, others in formalin and sent for identification and, or confirmation.

The particle size distribution of thirty-two of the sediment samples was determined by sieving in Phi-unit increments and pipet analysis. Sediment pigments were measured by fluorescence according to the method of Holm-Hansen et al. (1965).

RESULTS AND DISCUSSION

The locations of the sampling stations are shown in Fig. 1. The geographical position of the sampling station, time sampled, depth and an estimate of the degree of efficiency of operation of the grab is provided in Table 1. A designation of 1 indicates two full, closed grabs, 2 indicates a small opening in at least one of the samples perhaps resulting in some loss of smaller organisms and finally 3 indicates that the sample is non-quantitative.

The species list (Appendix 1) includes 212 fully identified taxa. Appendix II gives the numbers and wet formalin weights for each of 225 fully or partially identified taxa at each of the 98 sampling locations. These data are the total of both samples so, for a quantitatively sampled station, five times this value would be an estimate of numbers or biomass per m^2.

Sediment particle size analysis is presented in Table II. Eighteen of the samples were analyzed at the St. Andrews Biological Station and the remainder through the Atlantic

Geoscience Centre, Bedford Institute of Oceanography. Sediment pigment values are presented on Table III and shown in Fig. II.

Although it is not the intention to describe benthic communities in detail at this time, there were four species whose distributions were worthy of comment because each was particularly abundant in and uniquely confined to, a particular part of the Bay. They were, in all cases, abundant to the extent that their presence modified the physical nature of the bottom.

The species were as follows: The northern horse mussel Modiolus modiolus, the brachiopod Terebratulina septemtrionalis, the polychaete Sternaspis scutata and the amphipod Haploops fundiensis. The geographic area where each species occurred is shown in the accompanying figures (Fig. III to VI). Each was absent from the samples outside of the shaded area in the figures. Species distributions were not mutually exclusive, as part of the distribution of T. septemtrionalis overlaps that of each of the other species, whilst that of S. scutata and H. fundiensis also overlap in part.

These distributions represent the response of a species to different physical and biological factors. Whether each is part of a distinct association of benthic animals will be known after a closer examination of the data but it would seem reasonable that organisms of such a size and density that their shells or structures are a significant physical presence on the sediment surface would create niches for a number of other associated species. Individuals of M. modiolus often cover the surface of the sediment as, to a lesser degree, does T. septemtrionalis. The tubes of the amphipod H. fundiensis stand vertically above the sediment surface giving it a stubble field aspect.

Dense beds of M. modiolus with a wet weight biomass of over 1,000 gm/m have been found on the sandy gravel bottoms of Georges Bank by R.L. Wigley (1961b). A benthic community dominated by the amphipod Haploops tubicola was described by C.G. Joh Petersen (1913). It occurred on a "tough clay bottom" in the S.E. Kattegat. In St. Margarets Bay (Nova Scotia south shore) S. scutata was characteristic of well sorted sand with a low silt clay content (Hughes et al., 1972). This is in apparent contradiction to the present study where this species was confined to an area of high silt clay content (Table II). The highest values of pigments were also found in this area (Fig. VI) again probably indicative of a net depositional area. Thus the distribution of M. modiolus fits our existing concept of the optimum environmental conditions, i.e., water column mixing and current patterns similar to parts of Georges Bank. That the environmental requirements of S. scutata do not fit previous observations is perhaps a result of making empiriral correlations based on the more obvious environmental variables. The distribution of a benthic species is a function of the interaction of a number of variables, many of which are unknown.

ACKNOWLEDGEMENTS

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Table I. Position, time, depth, and quantitative reading for the 98 benthic sampling locations. A quantitative rating of: 1 = 2 complete quantitative samples; 2 = at least one grab was slighly open but the surface remained intact; 3 = nonquantitative sample.

Stn No.	Latitude	Longitude	Date	Time	Depth (m)	Q	Stn No.	Latitude	Longitude	Date	Time	Depth (m)	Q
1	44:54.0	66:43.5	May 2	12:20	82	1	50	45:23.7	65:21.4	May 7	13:04	42	1
2	44:54.0	66:43.5	May 2	14:02	104	3	51	45:17.2	65:17.2	May 7	13:58	60	1
3	44:51.0	66:40.2	May 2	15:20	113	1	52	45:10.0	65:10.2	May 7	15:05	62	3
4	44:48.0	66:35.5	May 2	15:57	119	1	53	45:07.6	65:07.1	May 7	15:37	68	2
5	44:44.7	66:34.2	May 2	16:55	114	1	54	45:04.2	65:04.9	May 7	16:22	40	3
6	44:41.0	66:30.6	May 3	09:33	188	1	55	45:05.5	65:11.0	May 8	08:20	73	2
7	44:37.6	66:27.1	May 3	10:26	208	1	56	45:06.8	65:18.4	May 8	09:08	79	1
8	44:34.0	66:25.3	May 3	11:13	208	1	57	45:09.6	65:32.0	May 8	10:49	58	3
9	44:31.1	66:22.0	May 3	11:50	155	1	58	45:10.2	65:40.9	May 8	12:54	57	3
10	44:28.0	66:19.3	May 3	13:10	154	1	59	45:11.4	65:47.6	May 8	13:30	68	2
11	44:33.3	66:19.5	May 3	14:10	150	1	60	45:06.0	65:45.6	May 8	14:12	75	1
12	44:39.1	66:16.9	May 3	15:12	132	3	61	45:04.4	65:42.5	May 8	14:47	90	1
13	44:45.0	66:16.3	May 3	16:20	133	1	62	44:48.2	65:37.0	May 8	15:47	93	1
14	44:49.8	66:12.5	May 3	17:27	117	2	63	44:55	65:34.4	May 8	16:41	75	2
15	44:55.8	66:10.8	May 3	18:17	113	1	64	44:51.5	65:30.8	May 8	17:56	66	3
16	45:00.9	66:09.8	May 3	19:16	97	1	65	44:52.9	65:38.5	May 8	18:57	73	1
17	45:06.2	66:08.7	May 3	20:00	77	1	66	44:54.2	65:45.8	May 8	19:50	84	1
18	45:08.2	66:04.5	May 4	09:06	64	1	67	44:56.6	66:00.5	May 10	14.22	104	2
19	45:04.5	66:00.6	May 4	09:46	93	1	68	44:58.0	66:07.4	May 10	15.35	113	2
20	45:01.2	65:58.4	May 4	10:35	102	2	69	44:58.3	66:15.0	May 10	16:26	101	1
21	44:58.0	65:55.8	May 4	11:24	104	3	70	44:59.3	66:22.8	May 10	17.39	97	1
22	44:54.9	65:53.5	May 4	13:03	97	3	71	45:02.8	66:26.0	May 10	18:21	49	1
23	44:51.2	65:50.3	May 4	14:08	99	3	72	45:05.3	66:22.0	May 11	08:45	33	1
24	44:48.4	65:46.5	May 4	14:48	82	3	73	45:01.8	66:18.0	May 11	09.27	86	1
25	44:45.2	65:44.6	May 4	15:36	69	2	74	44:52.2	66:08.0	May 11	11:19	112	1
26	44:51.2	65:41.0	May 5	09:58	80	2	75	44:49.4	66:05.0	May 11	12:09	117	3
27	44:56.3	65:49.4	May 5	10:54	95	3	76	44:45.9	66:01.5	May 11	13:45	108	3
28	45:01.5	65:39.4	May 5	11:40	93	1	77	44:42.5	66:01.0	May 11	14:44	99	3
29	45:06.8	65:43.0	May 5	13:13	80	1	78	44:39.6	66:56.1	May 11	15:37	86	3
30	45:11.7	65:38.5	May 5	14:25	51	3	79	45:02.0	66:36.5	May 23	12:13	44	1
31	45:11.6	65:33.8	May 5	15:38	55	3	80	45:03.8	66:32.7	May 23	13:23	29	1
32	45:10.5	65:31.0	May 5	16:46	66	2	81	44:58.2	66:33.9	May 23	14:05	60	1
33	45:07.7	65:26.8	May 5	18:24	77	2	82	44:55.4	66:31.4	May 23	14:51	84	1
34	45:04.6	65:22.9	May 5	19:15	79	1	83	45:00.7	66:29.9	May 23	15:44	62	1
35	45:02.0	65:20.0	May 5	20:00	68	3	84	45:07.5	66:17.0	May 24	09:09	18	2
36	44:58.5	65:16.5	May 5	20:47	42	3	85	45:04.0	66:13.4	May 24	09:56	79	1
37	45:03.6	65:16.4	May 6	08:30	73	1	86	45:03.0	66:06.0	May 24	10:40	95	1
38	45:09.4	65:13.4	May 6	09:30	58	3	87	44:59.8	66:01.8	May 24	11:41	102	3
39	45:14.4	65:12.5	May 6	10:20	62	2	88	45:04.0	65:54.0	May 24	13:18	95	2
40	45:19.4	65:11.2	May 6	11:01	57	2	89	45:05.7	65:49.4	May 24	13:55	90	1
41	45:24.8	65:09.8	May 6	11:42	51	1	90	45:09.0	65:53.0	May 24	14:35	64	1
42	45:26.8	65:05.2	May 6	12:51	48	1	91	45:07.2	65:53.8	May 24	15:07	79	1
43	45:27.8	64:58.4	May 6	13:35	46	1	92	45:10.2	66:00.6	May 24	15:51	46	1
44	45:31.9	64:51.2	May 6	14:51	66	1	93	45:13.3	65:44.2	May 25	09:57	51	1
45	45:09.2	64:54.5	May 6	08:10	38	3	94	45:15.8	65:38.5	May 25	10:30	42	3
46	45:12.4	64:57.4	May 7	09:00	58	2	95	44:42.4	66:19.4	May 25	16:10	124	1
47	45:18.5	65:02.9	May 7	10:03	55	1	96	44:45.5	66:22.4	May 25	16:49	148	1
48	45:21.8	65:06.4	May 7	10:45	46	1	97	44:48.8	66:25.4	May 26			1
49	45:20.3	65:18.5	May 7	11:57	55	1	98	44:52.2	66:28.2	May 26			1

Table II. Sediment type expressed as the percentage silt-clay of selected sampling locations. Those in the left-hand column were done at St. Andrews, those in the right by the Atlantic Geoscience Centre, Bedford Institute. Three stations were repeated for calibration.

Station Number	% Silt-Clay	Station Number	% Silt-Clay
1	37	12	9
3	69	21	18
4	100	24	13
5	86	28	7
6	25	48	17
7	85	51	1
8	43	58	10
17	57	74	5
18	75	77	4
50	82	90	27
79	97	97	11
80	90		
81	63		
84	81		
86	32		

Repeat Samples

St. Andrews Station Number	St. Andrews % Silt-Clay	AGC % Silt-Clay
34	3	1
83	81	82
85	56	45

Table III. Chlorophyll and phaeophyton pigments expressed as micrograms per gram of dry sediment.

Stn	Phaeo.	Chlor.	Chlor. % of Total	Stn	Phaeo.	Chlor.	Chlor. % of Total	Stn	Phaeo.	Chlor.	Chlor. % of Total
3	9.00	1.92	17.6	35	0.11	0.07	38.3	68	4.58	0.60	11.7
4	22.21	2.87	11.4	36	0.39	0.69	68.1	69	6.13	1.00	14.0
5	13.14	2.56	17.9	37	2.53	0.55	17.7	70	5.24	1.48	22.0
6	4.70	0.67	12.5	38	2.12	1.08	33.8	71	3.08	0.38	22.2
7	7.74	1.22	13.6	39	1.16	0.31	24.1	72	0.84	0.31	26.9
8	4.38	0.66	13.0	40	0.25	0.08	24.8	73	6.23	1.53	19.7
9	7.10	0.75	9.6	41	1.41	0.82	36.8	74	2.09	0.31	12.9
10	6.99	1.33	16.0	42	1.62	0.66	28.9	78	1.63	0.38	19.0
11	10.23	1.53	13.0	43	0.82	0.51	38.5	79	14.56	5.62	27.5
13	3.80	0.29	7.0	44	0.73	0.33	31.0	80	14.69	4.96	25.2
14	4.38	0.74	14.5	46	0.27	0.11	25.7	81	13.70	3.19	18.9
15	6.32	1.04	14.2	47	0.43	0.20	31.0	82	10.95	2.18	22.6
16	6.52	0.59	12.0	48	4.92	1.46	22.9	83	9.09	2.31	20.3
17	3.32	0.84	20.1	49	0.72	0.21	22.7	84	12.83	8.94	41.1
18	15.10	5.53	26.8	50	8.69	12.86	59.7	85	3.90	1.42	26.7
19	6.92	1.46	17.5	51	0.11	0.05	31.0	87	1.55	0.29	15.6
20	2.67	0.23	8.0	53	0.04	0.02	32.3	88	0.24	0.05	18.5
21	1.86	0.26	12.1	55	0.13	0.16	54.3	89	0.74	0.27	26.3
22	2.63	0.45	14.5	56	0.04	0.01	24.1	90	4.38	1.77	28.8
23	1.23	0.20	14.0	58	0.43	0.05	10.1	91	1.55	0.65	29.4
24	5.16	0.87	14.5	59	1.70	0.63	27.1	92	2.25	0.88	28.0
25	1.27	0.32	20.2	60	3.38	1.52	31.0	93	1.22	0.33	21.2
26	6.86	1.14	14.2	61	5.82	1.38	19.2	94	0.10	0.04	28.6
28	5.23	0.61	10.4	63	9.14	1.37	13.0	95	8.14	1.12	12.1
29	4.90	1.08	18.1	65	9.10	1.77	16.3	96	2.84	0.60	17.5
32	8.79	0.42	34.9	66	1.76	0.29	13.3	97	2.30	0.36	13.6
34	0.06	0.07	52.5	67	0.85	0.08	8.4	98	9.12	1.93	17.4

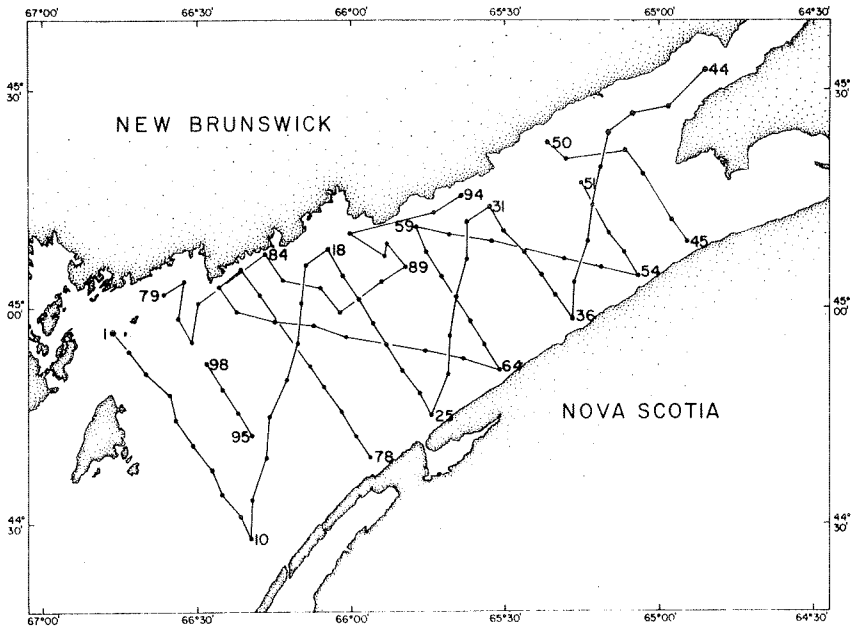

Figure I. Track chart and sampling locations of the May 1-16, 1978, cruise of MV J.L. Hart.

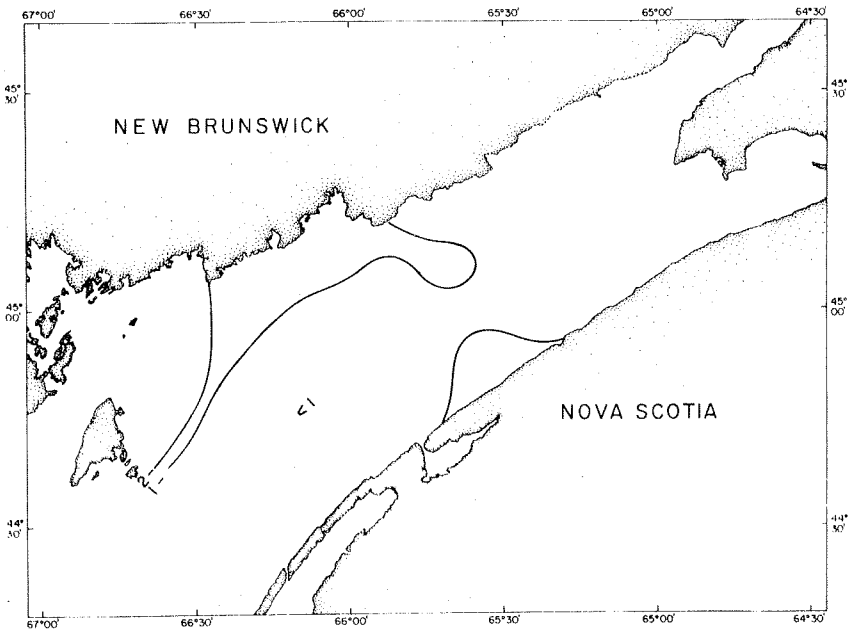

Figure II. Distribution of sediment chlorophyll as micrograms of 90% acetone extractable chlorophyll a per gram, dry weight, of sediment.

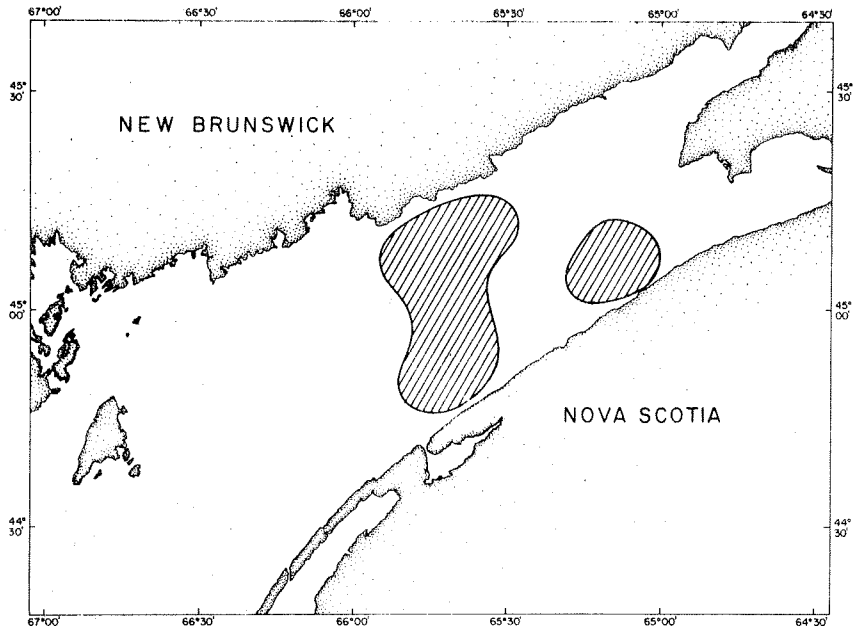

Figure III. Distribution of the horse mussel *Modiolus modiolus*.

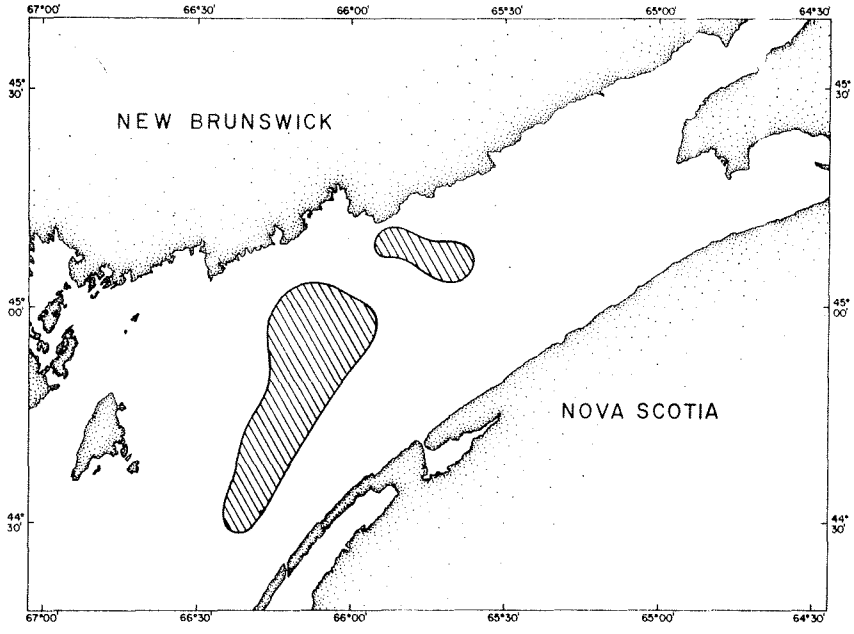

Figure IV. Distribution of the brachiopod <u>Terebratulina septemtrionalis.</u>

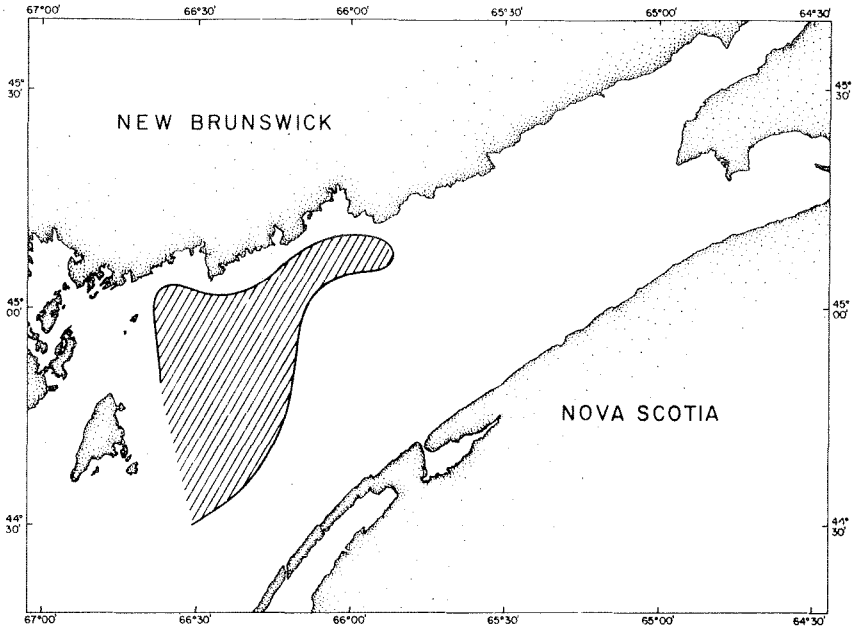

Figure V. Distribution of the polychaete worm *Stermaspis scutata.*

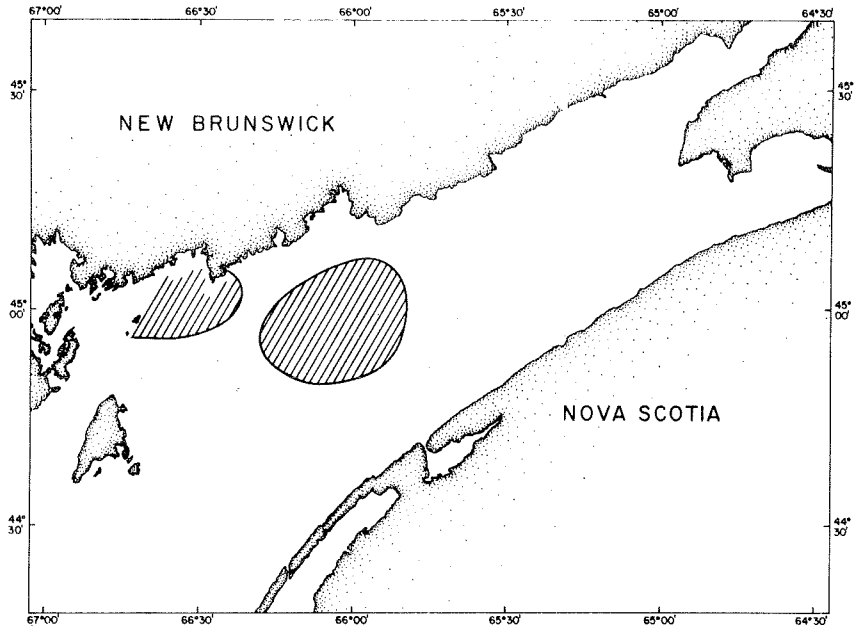

Figure VI. Distribution of the amphipod
Haploops fundiensis.

APPENDIX I

List of identified species

APPENDIX I

PORIFERA

Isodictya deichmannae (de Lauberfels, 1949)
Polymastia robusta (Bowerban, 1861)

CNIDARIA ANTHOZOA

Edwardsia elegans Verrill, 1869
Haloclava producta Stimpson, 1856
Stomphia coccinea (Muller, 1776)
Cerianthus borealis Verrill, 1873

RHYNCHOCOELA

Lineus sp.
Cerebratulus sp.
Tetrastemma vittatum Verrill, 1874

BRACHIOPODA

Terebratulina septentrionalis (Couthony, 1839)

MOLLUSCA, APLACOPHORA

Chaetoderma sp.

MOLLUSCA, POLYPLACOPHORA

Hanleya mendicaria (Mighels and Adams, 1842)
Ischnochiton albus (Linnaeus, 1767)

MOLLUSCA, GASTROPODA

Puncturella noachina (Linnaeus, 1771)
Solariella obscura (Couthony, 1838)
Acirsa costulata Mighels and Adams, 1842
Torellia vestita Jeffreys, 1867
Crucibulum striatus Say, 1824
Polinices immaculatus (Totten, 1835)
Natica clausa Broderip and Sowerby, 1829
Colus pygmaeus (Gould, 1841)
Neptunea decemcostata (Say, 1826)
Propebela cancellata (Mighels and Adams, 1842)
Oenopota elegans (Muller, 1842)
Cylichna alba (Brown, 1827)
Elysia catula (Gould, 1870)
Acanthodoris pilosa (Muller, 1776)
Turbonilla rathbuni Verrill and Smith, 1880

MOLLUSCA, SCAPHOPODA

Dentalium entale Henderson, 1920

MOLLUSCA, BIVALVIA (PELECYPODA)

Nucula proxima Say, 1822
N. delphinodonta Mighels and Adams, 1842
Nuculana tenuisulcata (Couthony, 1838)
Yoldia myalis (Couthony, 1838)
Bathyarca pectunculoides (Scacchi, 1833)
Placopecten magellanicus (Gmelin, 1791)
Chlamys islandica (Muller, 1776)
Musculus discors (Linnaeus, 1767)
M. niger (Gray, 1824)
Crenella glandula (Totten, 1834)
Modiolus modiolus (Linnaeus, 1758)
Anomia aculeata (Muller, 1791)
Astarte undata (Gould, 1841)
A. subaequilatera Sowerby, 1854
Cyclocardia borealis (Conrad, 1831)
Arctica islandica (Linnaeus, 1767)
Hiatella arctica (Linnaeus, 1767)
Thyasira flexuosa (Montagu, 1803)
Cerastoderma pinnulatum (Conrad, 1831)
Clinocardium ciliatum (Fabricius, 1780)

ANNILIDA POLYCHAETA

Phyllodoce maculata (Linnaeus, 1767)
P. groenlandica Oersted, 1842
P. mucosa Oersted, 1843
Paranaitis speciosa (Webster, 1880)
Eteone longa (Fabricius, 1780)
Aphrodita hastata Moore, 1905
Laetmonice filicornis Kinberg, 1855
Antinoella sarsi (Malngren, 1865)
Lepidonotus squamatus (Linnaeus, 1758)
Hartmania moorei Pettibone, 1955
Harmothoe imbricata (Linnaeus, 1767)
H. extenuata (Gicube, 1840)
H. oerstedi (Malmgren, 1865)
H. nodosa (Sars, 1860)
Pholoe minuta (Fabricius, 1780)
Sthenelais limicola (Ehlers, 1864)
Glycera capitata Oersted, 1843
Goniada maculata Oersted, 1843
G. norvegica Oersted, 1845
Ophioglycera sp.
O. gigantea Verrill, 1885
Nephtys bucera Ehlers, 1868
N. incisa Malmgren, 1865
N. ciliata (O.F. Muller, 1789)
N. caeca (Fabricius, 1780)
N. picta Ehlers, 1868
Aglaophamus circinata (Verrill, 1874)
Notomastus latericeus Sars, 1850
Heteromastus filiformis (Claporède, 1864)
Mediomastus ambiseta (Hartman, 1944)
Scalibregma inflatum Rathke, 1843
Polyphysia crassa (Oersted, 1843)
Nicomache lumbricalis (Fabricius, 1780)
Praxillella praetermissa (Malmgren, 1865)
Enclymene zonalis (Verrill, 1874)
Maldane sarsi Malmgren, 1865
Ophelia limacina Rathke, 1843
Travisia sp.
T. carnea Verrill, 1873
Ophelina acuminata Oersted, 1843
Sternaspis scutata (Renier, 1817)
Spio filicornis (O.F. Muller, 1776)
S. setosa Verrill, 1873
Prionospio steenstrupi Malmgren, 1867
Polydora websteri Hartman, 1943
P. socialis (Schmarda, 1861)
Laonice cirrata Sars, 1851
Scolelepis squamatus (Mueller, 1806)
Spiophanes bombyx (Claparède, 1870)
Trochochaeta sp.
Aricidea quadrilobata Webster & Benedict 1887
A. suecica Eliason, 1920
A. catherinae Laubier, 1967
Paraonis fulgens (Levinsen, 1883)
Tauberia gracilis (Tauber, 1879)
Apistobranchus typicus (Webster and Benedict, 1887)

Sabellaria vulgaris Verrill, 1873
Nothria conchylega Sars, 1835
Eunice pennata (O.F. Muller, 1776)
E. norvegica (Linnaeus, 1767)
Lumbrineris fragilis (O.F. Muller, 1776)
L. tenuis (Verrill, 1873)
L. impatiens (Claparède, 1868)
Ninoe nigripes Verrill, 1873
Drilonereis magna Webster and Benedict, 1887
Scoloplos armiger (O.F. Muller, 1776)
S. acutus (Verrill, 1873)
Chaetozone setosa Malmgren, 1867
Tharyx acutus Wester and Benedict, 1887
Cossura longocirrata Webster & Benedict, 1887
Owenia fusiformis Delle Chiaje, 1841
Myriochele heeri Malmgren, 1867
Cistena gouldii (Verrill, 1873)
Ampharete acutifrons (Grube, 1860)
A. arctica Malmgren, 1866
Melinna cristata (Sars, 1851)
Anabothrus gracilis (Malmgren, 1866)
Amphitrite ornata (Leidy, 1855)
A. figulus (Dalyell, 1853)
A. cirrata Muller, 1776
Trichobranchus glacialis Malmgren, 1866
Terebellides stroemi Sars, 1835
Pista maculata (Dalyell, 1853)
Polycirrus eximius (Leidy, 1855)
P. medusa Grube, 1850
Streblosoma spiralis (Verrill, 1874)
Pherusa plumosa (Muller, 1776)
Brada granosa Stimpson, 1854
B. inhabilis (Rathke, 1843)
B. villosa (Rathke, 1843)
Diplocirrus hirsutus (Hansen, 1879)
Euchone rubrocincta (Sars, 1861)
Chone infundibuliformis Kroyer, 1856
C. duneri Malmgren, 1867
Sabella crassicornis Sars, 1851
S. penicillus (Linnaeus, 1767)
Potamilla sp.
P. neglecta (Sars, 1851)
P. reniformis (Leukart, 1849)
Sphaerosyllis erinaceus Chaparède, 1863
Exogone verugera (Claparede, 1868)
Syllis cornuta Rathke, 1843
Nereis virens (M. Sars, 1835)
N. pelagica Linnaeus, 1758
N. zonata Malmgren, 1867
N. grayi Pettibone, 1956

SIPUNCULIDA

Phascolion Strombi (Montagu, 1804)

ARTHROPOA CRUSTACEA

Calanus finmarchicus (Gunnerus, 1765)
Balanus balanus (Linnaeus, 1758)
B. crenatus Bruguiere, 1789
Eudorella trucatula (Bate, 1856)
Calathura branchiata (Stimpson, 1853)) from
Cirolana polita (Stimpson, 1853)) Rich-
Chiridotea tuftsi (Stimpson, 1853)) ard-
Janira alta (Stimpson, 1853) son
Ampelisca abdita Mills, 1964
A. vadorum Mills, 1953) from
A. marcrocephala Lilljeborg, 1852) Bousfield
A. aequicornis Bruzelius 1859?
Byblis gaimardi (Kroyer, 1846)
Haploops setosa Boeck, 1871
H. fundiensis Wildish & Dickenson 1981
Corophium bonelli (Milne - Edwards, 1830)
C. volutator (Pallas, 1766)
Erichthonius rubricornis (Stimpson 1853)
E. difformis Milne - Edwards, 1830
Unciola irrorata Say, 1818
U. leucopis (Kroyer, 1845)
Casco bigelowi (Blake, 1929)
Melita nitida Smith, 1873
Maera danae Stimpson, 1853
M. loveni (Bruzelius, 1859)
Argissa hamatipes (Norman, 1869)
Ischyrocerus anguipes Kroyer, 1838
Tmetonyx cicada (Fabricius, 1780)
Hippomedon propinquis G.O. Sars, 1890
Anonyx sarsi Steele and Brunel, 1968
Psammonyx nobilis (Stimpson, 1853)
Orchomene depressa Shoemaker, 1930
Menigrates obtusifrons (Boeck, 1860)
Westwoodilla brevicalcar (Goes 1866)
Photis reinhardi Kroyer, 1842
Gammaropsis melanops G.O. Sars, 1882
Podoceropsis nitida (Stimpson, 1853)
Protomedia faciata Krayer, 1842)
Neopleustes pulchellus (Kroyer, 1846)
Leptocheirus pinguis (Stimpson, 1853)
Phoxocephalus holbolli (Kroyer, 1842)
Harpinia propinqua G.O. Sars, 1895
H. truncata G.O. Sars, 1890
Stenopleustes gracilis (Holmes, 1905)
Pleusymtes glaber (Boeck, 1861)
Dyopedos porrectus Bate, 1857
Dyopedos monacantha (Metzger, 1875)
Aeginina longicornis (Kroyer, 1842-43)
Meganyctiphanes norvegica (M. Sars, 1857)
Pandalus montagui, Leach, 1813
Eualus pusiolus (Kroyer, 1841)
Crangon septemspinosa Say, 1818
Axius serratus Stimpson, 1852
Pagurus acadianus Benedict, 1901
P. pubescens Kroyer, 1838
Hyas coarctatus Leach, 1815
Cancer irroratus Say, 1817

ECHINODERMATA, HOLOTHUROIDEA

Psolus fabricii Duben and Koren, 1844
Molpadia oolitica (Pourtales, 1857)

ECHINODERMATA, ECHINOIDEA

Echinarachnius parma (Lamarck, 1816)
Brisaster fragilis (Duben and Moren, 1844)

ECHINODERMATA, STELLEROIDEA

Ctenodiscus crispatus (Retzius, 1805)
Ophiura robusta (Ayres, 1851)
Ophiura sarsi Lutken, 1858
Ophiacantha bidentata (Retzius, 1805)
Ophiopholis aculeata (Linnaeus, 1767)
Amphipholis squamata (Delle Chiaje, 1828)

CHORDATA ASCIDIACEA

Polycarpa fibrosa (Stimpson, 1852)

APPENDIX II

Numbers and wet formalin weights of 225 fully or partially identified taxa. The taxa are in numbered rows and are identified on the first two pages. Weights (in brackets) and numbers are totals for each of the 98 stations (columns) and are not always quantitative estimates. See Table I for a quantitative rating of the sampling.

APPENDIX II

1. *Isodictya deichmannae*
2. *Polymastia robusta*
3. *Edwardsia elegans*
4. *Haloclava producta*
5. *Stompia coccinea*
6. *Cerianthus borealis*
7. *Cnidaria sp.*
8. *Lineus sp.*
9. *Cerebratulus sp.*
10. *Tetrestemma vittatum*
11. *Terebratulina septemtrionalis*
12. *Chaetoderma sp.*
13. *Hanleya mendicaria*
14. *Ischnochiton alba*
15. *Puncturella noachina*
16. *Solariella obscura*
17. *Acirsa costulata*
18. *Torellia vestita*
19. *Crucibulum striatum*
20. *Polinices immaculatus*
21. *Natica clausa*
22. *Colus pygmaeus*
23. *Neptunea decemcostata*
24. *Propebela cancellata*
25. *Oenopota elegans*
26. *Cylichna alba*
27. *Elysia catula*
28. *Acanthodoris pilosa*
29. *Turbonilla rathbuni*
30. *Dentalium entale*
31. *Nucula proxima*
32. *Nuculana delphinodonta*
33. *N. tenuisulcata*
34. *Yoldia myalis*
35. *Bathyarca pectunculoides*
36. *Placopecten magellanicus*
37. *Chlamys islandica*
38. *Musculus discors*
39. *M. niger*
40. *Crenella glandula*
41. *Modiolus modiolus*
42. *Anomia aculeata*
43. *Astarte undata*
44. *A. subequilatera*
45. *Cyclocardia borealis*
46. *Arctica islandica*
47. *Hiatella arctica*
48. *Thyasira flexuosa*
49. *Cerastoderma pinnulatum*
50. *Clinocardium ciliatum*
51. *Phyllodoce sp.*
52. *P. maculata*
53. *P. groenlandica*
54. *P. mucosa*
55. *Paranaitis speciosa*
56. *Eteone longa*
57. *Aphrodita hastata*
58. *Laetmonice filicornis*
59. *Antinoella sarsi*
60. *Lepidonotus squamatus*
61. *Hartmania moorei*
62. *Harmothoe imbricata*
63. *H. extenuata*
64. *H. oerstedi*
65. *H. nodosa*
66. *POLYNOIDAE*
67. *Pholoe minuta*
68. *Sthenelais limicola*
69. *Glycera capitata*
70. *Glycera sp.*
71. *Goniada maculata*
72. *Goniada norvegica*
73. *Ophioglycera gigantea*
74. *Ophioglycera sp.*
75. *Nephtys bucera*
76. *N. incisa*
77. *N. ciliata*
78. *Nephtys caeca*
79. *N. picta*
80. *N. sp.*
81. *Aglaophamus circinata*
82. *Notomastus latericeus*
83. *Heteromastus filiformis*
84. *Mediomastus ambiseta*
85. *Scalibregma inflatum*
86. *Polyphysia crassa*
87. *Nicomache lumbricalis*
88. *Praxillella praetermissa*
89. *Rhodine loveni*
90. *Euclymeme zonalis*
91. *Maldane sarsi*
92. *M. sp.*
93. *Ophelia limacina*
94. *Travisia sp.*
95. *T. carnea*
96. *Ophelina acuminata*
97. *Sternaspis scutata*
98. *Spio filicornis*
99. *S. setosa*
100. *Prionospio steenstrupi*
101. *Polydora websteri*
102. *P. socialis*
103. *Laonice cirrata*
104. *Scolelepis squamatus*
105. *Spiophanes bombyx*
106. *S. sp.*
107. *Trochochaeta sp.*
108. *Aricidea quadrilobata*
109. *A. suecica*
110. *A. jeffreysii*
111. *Paraonis fulgens*
112. *Tauberia gracilis*
113. *Apistobranchus typicus*
114. *Sabellaria vulgaris*
115. *Nothria conchylega*
116. *Eunice pennata*
117. *E. norvegica*
118. *Lumbrineris sp.*
119. *L. fragilis*
120. *L. tenuis*
121. *L. impatiens*
122. *Ninoe nigripes*
123. *Drilonereis magna*
124. *Paramphinome pulchella*

125. *Scoloplos sp.*
126. *S. armiger*
127. *S. acutus*
128. *Chaetozone setosa*
129. *Tharyx acutus*
130. *Cossura longocirrata*
131. *Owenia fusiformis*
132. *Myriochele heeri*
133. *Cistena gouldii*
134. *Ampharete sp.*
135. *A. acutifrons*
136. *A. arctica*
137. *Melinna cristata*
138. *Anabothrus gracilis*
139. *Amphitrite sp.*
140. *A. ornata*
141. *A. figulus*
142. *A. cirrata*
143. *Trichobranchus glacialis*
144. *Terebellides stroemi*
145. *Pista maculata*
146. *Polycirrus eximius*
147. *P. medusa*
148. *Streblosoma spiralis*
149. *TEREBELLIDAE*
150. *Pherusa plumosa*
151. *Brada granosa*
152. *B. inhabilis*
153. *B. villosa*
154. *Diplocirrus hirsutus*
155. *Euchone rubrocincta*
156. *Chone infundibuliformis*
157. *Chone duneri*
158. *Chone sp.*
159. *Sabella crassicornis*
160. *S. penicillus*
161. *S. sp.*
162. *Potamilla sp.*
163. *P. neglecta*
164. *P. reniformis*
165. *Autolytus sp.*
166. *Sphaerosyllis erinaceus*
167. *Exogone verugera*
168. *Syllis cornuta*
169. *Syllis sp.*
170. *Nereis sp.*
171. *N. virens*
172. *N. pelagica*
173. *N. zonata*
174. *N. grayi*
175. *Phascolion strombi*
176. *Calanus finmarchicus*
177. *Balanus balanus*
178. *B. crenatus*
179. *Eudorella trumcatula*
180. *Calathura branchiata*
181. *Cirolana polita*
182. *Chiridotea tuftsi*
183. *Janira alta*
184. *Ampelisca abdita*
185. *A. vadorum*
186. *A. marcrocephala*
187. *A. aequicornis*
188. *Byblis gaimardi*
189. *Haploops setosa*
190. *H. fundiensis*
191. *Corophium bonelli*
192. *C. volutator*
193. *Erichthonius rubricornis*
194. *E. difformis*
195. *Unciola irrorata*
196. *U. leucopis*
197. *Casco bigelowi*
198. *Melita nitida*
199. *Maera danae*
200. *M. loveni*
201. *Argissa hamatipes*
202. *Ischyrocerus anguipes*
203. *Tmetonyx cicada*
204. *Hippomedon propinquis*
205. *Anonyx sarsi*
206. *Psammonyx nobilis*
207. *Orchomene depressa*
208. *Menigrates obtusifrons*
209. *Westwoodilla brevicalcar*
210. *Photis reinhardi*
211. *Gammaropsis melanops*
212. *Podoceropsis nitida*
213. *Protomedia fasciata*
214. *Leptocheirus pinguis*
215. *Phoxocephalis holbolli*
216. *Harpinia propingua*
217. *H. trumcata*
218. *Stenopleustes gracilis*
219. *Pleusymtes glaber*
220. *Dyopedos porrectus*
221. *Dyopedos monocantha*
222. *Aeginia longicornis*
223. *Meganyctiphanes norvegica*
224. *Pandalus montagui*
225. *Eualus pusiolus*
226. *Crangon septemspinosa*
227. *Axius serratus*
228. *Pagurus acadianus*
229. *P. pubescens*
230. *P. sp.*
231. *Hyas coarctatus*
232. *Cancer irroratus*
233. *Psolus fabricii*
234. *Molpadia oolitica*
235. *Strongylocentrotus droebachiensis*
236. *Echinarachnius parma*
237. *Brisaster fragilis*
238. *Ctenodiscus crispatus*
239. *Asterias sp.*
240. *Ophiura robusta*
241. *Ophiura sarsi*
242. *Ophiacantha bidentata*
243. *Ophiopholis aculeata*
244. *Amphipholis squamata*
245. *Polycarpa fibrosa*

	1	2	3	4	5	6	7
1							
2							
3							
4							
5							
6							
7							
8				1(0.285)			
9							1(0.028)
10							
11							
12				1(0.036)			2(0.025)
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30	2(0.369)			1(0.068)		2(0.252)	
31							
32							
33							
34							
35							
36							
37							
38							
39							
40							
41							
42							
43					1(1.914)		
44						1(3.460)	
45							
46							
47							
48							
49							
50							
51							
52			1(0.007)		1(0.003)		
53							1(0.001)
54							
55							
56							
57						1(0.550)	1(0.280)
58	1(0.002)						1(0.280)
59							1(0.049)
60							
61							
62							

	1	2	3	4	5	6	7
63							
64							
65							
66							
67							
68							
69							
70			1(0.012)				
71						2(0.166)	6(0.112)
72	1(0.267)		1(0.303)				
73							
74							
75							
76	8(0.228)		2(0.211)	3(0.085)	3(0.050)	1(0.117)	
77							
78							
79							
80							
81							1(0.025)
82	4(0.020)			3(0.009)			5(0.139)
83							
84							
85	1(0.030)						
86							1(1.607)
87							
88							
89	2(0.060)						
90							
91				2(0.006)			
92							
93							
94							
95							
96							
97	9(1.363)			1(0.64)		3(0.848)	1(0.163)
98							
99							
100							
101							
102							
103							1(0.025)
104							
105							
106							
107							1(0.049)
108	1(0.050)						
109						1(0.035)	
110							
111							
112							
113							
114							
115							
116							
117							
118				1(0.080)			
119	1(0.020)						4(0.073)
120							
121							
122	3(0.080)			2(1.082)			
123	3(0.058)						
124							
125							

	1	2	3	4	5	6	7
126							
127							
128							
129				1(0.005)			
130							
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69							
70							
71	1(0.021)	1(0.008)		3(0.053)	1(0.010)	2(0.027)	3(0.075)
72							
73	1(0.221)	1(0.084)					
74							
75							
76	19(0.076)	1(0.003)		4(0.140)	1(0.052)		4(4.80)
77				3(0.105)			
78							
79							
80							
81	1(0.004)			1(0.035)		1(0.008)	
82				1(0.011)	1(0.043)		
83							15(0.177)
84							1(0.004)
85							1(0.028)
86							
87	2(0.020)						
88							
89	2(0.220)						6(0.080)
90							
91							
92							
93							1(0.076)
94							
95							
96							
97	6(0.483)				1(0.528)	3(1.716)	5(1.830)
98							
99							
100							
101							
102							
103							
104							
105							
106							
107							
108							
109	2(0.007)						1(0.004)
110							
111							
112							
113							
114		1(0.013)					
115							
116					1(.006)	1(0.010)	1(0.006)
117				5(1.224)			
118							
119				1(0.080)	2(0.008)	1(0.011)	
120							
121	1(0.002)			1(0.020)			1(0.005)
122							
123							
124							

	92	93	94	95	96	97	98
125		1(0.001)	1(0.004)				
126							
127	1(0.001)					1(0.002)	
128			1(0.004)				
129	3(0.039)	3(0.010)	1(0.008)				7(0.030)
130							
131	1(0.010)	1(0.009)	2(0.008)			5(0.057)	9(0.149)
132							
133							
134					1(0.070)		
135							
136	1(0.009)			1(0.006)			1(0.136)
137	1(0.006)	2(0.022)			4(0.009)		
138	1(0.008)			94(0.295)			
140							
141							
142							
143				2(0.026)			1(0.102)
144					1(0.003)		
145							
146							
147							
148						1(0.253)	1(0.102)
149	1(0.221)						1(0.006)
150							
151				1(0.010)			1(0.245)
152							
153							1(0.245)
154							
155					1(0.002)		
156				5(0.039)			
157							
158							
159					1(0.677)		
160							
161							1(0.006)
162				1(0.006)			
163		3(0.142)					
164							
165							
166							
167							
168							
169				2(0.003)			
170						1(0.010)	
171							
172							
173							
174		1(0.003)		1(0.265)			1(0.006)
175					2(0.018)	3(0.064)	1(0.010)
176							
177							
178							
179				1(0.001)			
180	3(0.002)			1(0.003)			
181							
182							
183				1(0.003)			
184							
185							

	92	93	94	95	96	97	98
186	1(0.022)						
187							
188							1(0.008)
189				12(0.223)			
190				2(0.004)			6(0.008)
191							
192							
193							
194							
195	1(0.008)						
196							
197							
198							1(0.008)
199							
200				2(0.004)			
201							5(0.072)
202							
203							
204							
205							
206							
207							
208							
209							
210							
211							
212							
213							
214	1(0.010)						
215							
216				1(0.002)			
217				1(0.002)			
218							
219							
220				1(0.001)			
221				1(0.001)			5(0.040)
222				1(0.037)			
223							
224							
225							
226							
227							
228							
229							
230		1(0.185)					
231							
232							
233		1(0.170)					
234							1(0.704)
235							
236							
237					1(28.740)		
238							
239							
240				5(0.389)	4(0.038)		
241						1(0.870)	1(0.146)
242							
243				4(0.311)			
244							
245							