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SUBLITTORAL MACRO-INFAUNA OF THE UPPER BAY OF FUNDY

by

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ABSTRACT

Wildish, D. J., D. L. Peer, A. J. Wilson, J. Hines, L. Linkletter, and M. J. Dadswell. 1983. Sublittoral macro-infauna of the upper Bay of Fundy. Can. Tech. Rep. Fish. Aquat. Sci. 1194: iii + 64 p.

Lists of species and species/density/biomass matrices are given for two benthic sampling surveys in the upper Bay of Fundy. The Chignecto Bay sampling in August 1978 included 95 stations and 137 taxa identified to species, while the Minas Basin sampling completed in August 1979 involved 73 stations and 126 identified species.

Key words: Macro-benthos, species, density, biomass, Bay of Fundy

RÉSUMÉ

Wildish, D. J., D. L. Peer, A. J. Wilson, J. Hines, L. Linkletter, and M. J. Dadswell. 1983. Sublittoral macro-infauna of the upper Bay of Fundy. Can. Tech. Rep. Fish. Aquat. Sci. 1194: iii + 64 p.

Le présent rapport contient une liste des espèces et matrices espèces/densité/biomasse de deux relevés de la faune benthique dans le haut de la baie de Fundy. L'échantillonnage de la baie Chignectou en août 1978 comprenait 95 stations et 137 taxa identifiés à l'espèce. Celui du bassin des Mines, terminé en août 1979, a couvert 73 stations et noté 126 taxa identifiés à l'espèce.

INTRODUCTION

We present here the taxonomic, density and biomass data for two benthic cruises in the upper Bay of Fundy (Chignecto Bay and Minas Basin). This represents the final field work in our attempt to systematically map the heterotrophic benthic production of the Bay of Fundy.

The objectives and organization of this work are outlined in a previous report (Peer et al. 1980) which presents similar raw data from the lower Bay of Fundy. One analysis of the lower Bay data has already been presented (Wildish and Peer 1983). Our primary purpose in tabulating raw data is to allow hindsight corrections that may become necessary as our meagre knowledge of benthic biology increases. For example, corrections to trophic group classifications or to estimated average life-spans will undoubtedly be made. At the moment, these are little better than educated guesses since lifespan and life-history data of many species have not been systematically investigated.

After multiplying by an annual turnover ratio (P:B), biomass data given in this report can be used to estimate production for a given species at a given station. Two methods to do this are available, based on literature reviews of empirical data: that of Robertson (1979) which depends on the inverse log relationship between lifespan (x) and P:B (y):

$$\log_{10} y = 0.66 - 0.726 \log_{10} x$$

and that of of Banse and Mosher (1980) for temperate-zone invertebrates, excluding insects, with annual mean temperature of about 5-20°C:

$$\log y = -0.21 + -0.37 \log B$$

where B is the mature biomass in Kcal. Difficulties encountered in applying these methods include determining individual population lifespans for all demes in the geographical area considered and knowing the age/mass threshold which separates immature from mature individuals in a given population. Nevertheless, we believe the effort to be worth while since it should allow the first crude estimate of production for the upper Bay of Fundy to be made.

METHODS

CHIGNECTO BAY

Benthic samples were collected with a 0.1-m^2 Van Veen grab deployed from CSS DAWSON between Aug. 4-22, 1978. A single sample was taken at each of 95 stations which were approximately 3 km apart (Fig. 1). A record was kept of the quantity as volume of sediment taken in each grab sample (Appendix 1).

A subsample was removed for grain size distribution and determination of carbon/nitrogen values (reported elsewhere) and the remainder sieved on deck with running seawater through a 0.8-mm mesh to retain the macro-infauna. Animals were preserved in 10% formalin in sea water and, on return to the laboratory, sorted into species, genera or family groups, weighed and counted before taxonomic verification in the Identificaton Centre, St. Andrews.

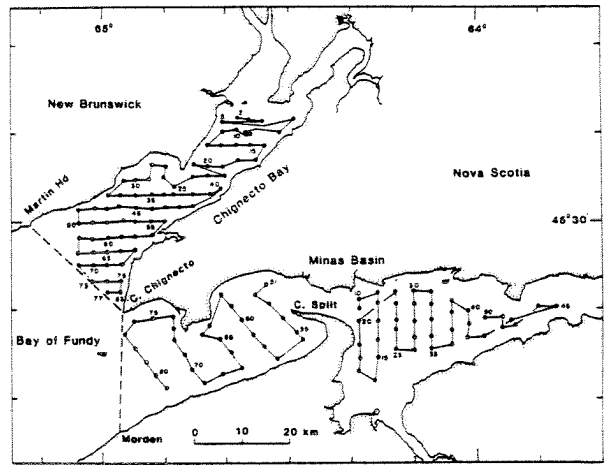

Fig. 1. Map of the upper Bay of Fundy showing the cruise tracks in Chignecto Bay and Minas Basin.

The area northwest of the line joining Martin Head and Cape Chignecto was arbitrarily set as within the upper Bay of Fundy and was found by planimetry to be 922 km^2 at low water and 1099 km^2 at high water. This arbitrary division of upper and lower Bay excludes 17 stations from consideration as part of the upper Bay, although the data are included for comparative purposes with previously obtained lower Bay of Fundy data (Peer et al. 1980).

MINAS BASIN

Benthic samples were collected with either a 0.1-m^2 or 0.5-m^2 Van Veen grab from Aug. 11-18, 1979, on the CSS DAWSON. Duplicate grab samples of 0.1 m^2 or single ones of 0.5-m^2 area were taken at 73 stations throughout the Basin (Fig. 1). All of the 0.5 m^2 samples taken were presumed to be valid ones, containing greater than 60% by volume of sediment.

Further treatment of the grab samples involved the same procedures as for Chignecto Bay after pooling of the 0.1-m^2 samples.

The portion of the Basin within the upper Bay of Fundy was arbitrarily set as eastwards of a line joining Cape Chignecto and Morden (Fig. 1), an area 1627 km^2 at low water and 2010 km^2 at high-water mark.

RESULTS AND DISCUSSION

The locations of the sampling stations in Chignecto Bay are shown in Fig. 1 and Appendix 1. The Minas Basin sampling locations in Fig. 1 and Appendix 2. Appendices 1 and 2 include data on depth of sampling and individual grab quality where this information is available.

The species list for Chignecto Bay (Appendix 3) includes 137 taxa fully identified to species with an additional 39 taxa partially identified. The list for Minas Basin includes 126 fully identified taxa (Appendix 4) with 60 partially identified taxa.

The species list in Appendix 3 refers to data from 95 stations (0.1-m^2 sample), of which 78 are in the upper Bay. The list in Appendix 4 refers to 73 stations most of which are 0.5-m^2 samples and all within the upper Bay.

Chignecto Bay and Minas Basin have comparable species diversity, but both have lower benthic species diversity than the lower Bay where 212 fully identified species were found for an effort of 98 duplicate 0.1-m^2 samples (Peer et al. 1980). Of course, the area of the lower Bay (8620 km^2) is greater than that of the upper Bay (3109 km^2) and may thus contain a wider range of niches.

Sediment data collected during both cruises are presented elsewhere (Amos and Long 1980; Amos and Asprey 1979) and may aid in interpreting benthic distributions.

Four dominant species were present in the lower Bay (Peer et al. 1980) as "key" species. Of these, Modiolus modiolus is present in the upper Bay at densities and biomasses comparable to those found in the lower Bay; Haploops fundiensis is absent from Minas Basin but present in Chignecto Bay at 16 different stations, with a maximum density of 80 individuals/m^2; Sternaspis scutata is absent from Minas Basin and rare in Chignecto Bay (2 stations); and Terebratulina septentrionalis is absent from Minas and rare in Chignecto Bay (3 stations). Two amphipods are common and "key" species throughout the upper Bay, Unciola irrorata and Leptocheirus pinguis, and reach extremely high densities at some stations.

The obvious faunal differences between the upper and lower Bay may be generally related to the estuarine nature of the upper Bay which is more extreme in, for example, turbidity, current speed, and salinity changes.

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APPENDIX 1

Station number and position of 0.1-m^2 Van Veen samples in Chignecto Bay; the grab volume is given as a proportion of the total possible. Dashes indicate no sediment sieved, question marks not recorded in field log book.

Station number	Latitude	Longitude	Grab volume
1			0.1
2	45° 41.5'	64° 38.1'	-
3	45 41.5	64 36.1	?
4	45 41.4	64 34.0	0.1
5	45 41.3	64 40.8	0
6	45 41.6	64 29.0	0.8
7	45 40.1	64 31.4	0.5
8	45 40.0	64 37.0	0.3
9	45 39.8	64 36.1	0.1
10	45 40.5	64 38.3	0.3
11	45 40.0	64 40.6	0.3
12	45 38.6	64 43.0	0.3
13	45 38.6	64 40.6	0.3
14	45 38.6	64 38.3	0.1
15	45 38.6	64 36.0	0.1
16	45 38.6	64 33.8	0.3
17	45 36.7	64 35.2	0.3
18	45 36.8	64 38.2	0.8
19	45 36.6	64 40.8	0.8
20	45 36.6	64 43.1	0.5
21	45 36.4	64 45.3	0.8
22	45 35.0	64 40.6	0
23	45 35.0	64 43.0	0.3
24	45 34.8	64 45.4	0.3
25	45 33.8	64 48.5	1.0
26	45 34.9	64 50.2	0.1
27	45 36.0	64 49.6	1.0
28	45 36.3	64 52.0	1.0
29	45 34.8	64 52.1	1.0
30	45 34.7	64 54.6	1.0
31	45 34.6	64 56.7	0.8
32	45 32.9	64 59.0	1.0
33	45 33.0	64 57.0	1.0
34	45 33.0	64 54.6	0.3
35	45 33.0	64 52.0	0.8
36	45 33.0	64 50.0	0.5
37	45 33.0	64 48.6	0.5
38	45 33.0	64 45.4	0.3
39	45 33.0	64 42.8	0.5
40	45 33.6	64 41.0	0.5
41	45 31.7	64 45.4	0.8
42	45 31.6	64 47.6	1.0
43	45 31.6	64 50.0	0.3
44	45 31.4	64 52.0	1.0
45	45 31.5	64 54.6	1.0
46	45 31.8	64 57.3	0.1
47	45 31.5	64 59.2	0.5
48	45 31.4	65 01.2	-
49	45 31.2	65 03.8	0.8
50	45 29.8	65 03.8	-
51	45 29.8	65 01.4	0.8
52	45 29.8	64 59.2	-
53	45 30.0	64 56.8	0.1
54	45 29.9	64 54.5	1.0
55	45 30.0	64 52.0	1.0
56	45 30.0	64 50.1	0.1
57	45 28.4	64 52.0	0
58	45 28.2	64 54.5	1.0
59	45 28.2	64 57.0	1.0
60	45 28.1	64 59.1	1.0
61	45 27.9	65 01.4	1.0
62	45 28.0	65 03.8	1.0
63	45 26.4	65 03,8	?
64	45 26.6	65 01.4	0.8
65	45 26.6	64 59.2	0.8
66	45 26.6	64 57.0	0.8
67	45 26.8	64 54.5	1.0
68	45 25.0	64 56.9	0.3
69	45 25.0	64 59.2	0.3
70	45° 25.0'	65° 01.5'	0.3
71	45 25.0	65 03.8	0.5
72	45 23.4	65 03.8	0.3
73	45 23.4	65 01.4	0.2
74	45 23.6	64 59.2	0.3
75	45 23.6	64 57.0	0.3
76	45 21.9	64 56.9	0.1
77	45 21.9	64 59.1	0.8
78	45 21.8	65 01.5	0.8
79	45 21.8	65 03.6	0.8
80	45 20.1	65 03.8	0.8
81	45 20.2	65 01.4	0.5
82	45 20.2	64 59.0	0.8
83	45 22.0	64 57.1	0.3
84	45 18.6	64 56.7	0
85	45 18.4	64 59.0	0.3
86	45 18.4	65 01.2	0.1
87	45 18.5	65 03.4	0.1
88	45 16.8	65 03.7	0.3
89	45 17.0	65 01.2	1.0
90	45 16.9	64 59.2	0.3
91	45 17.0	64 56.9	0.3
92	45 15.0	64 57.0	0.1
93	45 15.0	64 58.8	0.1
94	45 15.0	65 01.5	0
95	45 15.1	65 04.0	0.3

APPENDIX 2

Station number and position of benthic sample with depth and area sampled in Minas Basin; most of the large grab samples contained greater than 75% of a full grab. Dashes indicate no sediment sieved, question marks indicate no record in field log book.

Station number	Latitude	Longitude	Depth m	Area sampled m^2
G9	45° 20.0'	64° 19.0'	58	0.5
G10	45° 21.5	64 19.0	27	0.5
G11	45° 22.0	64 15.8	28	0.5
G12	45° 20.6	64 15.8	49	0.5
G13	45° 18.6	65 15.8	43	0.5
G14	45° 16.6	65 15.8	32	0.5
G15	45° 14.6	64 15.6	-	0.5
G16	45° 12.8	64 16.4	17	0.5
G17	45° 13.1	64 18.9	17	0.5
G18	45° 14.2	64 18.9	13	0.5
G19	45° 16.1	64 18.9	15	0.5
G20	45° 18.6	64 19.0	42	0.5
G21	45° 22.1	64 13.0	-	0.5
G22	45° 20.6	64 13.0	-	0.5
G23	45° 18.8	64 13.0	19	0.5
G24	45° 16.7	64 13.0	22	0.5
G25	45° 15.4	64 13.0	15	0.2* Hunter
G26	45° 15.4	64 10.0	16	0.2*
G27	45° 16.7	64 10.0	-	0.2** small Van Veen
G28	45° 18.8	64 10.0	22	0.2**
G29	45° 20.8	64 10.0	22	0.2**
G30	45° 22.0	64 10.0	22	0.5
G31	45° 21.8	64 07.4	22	0.5
G32	45° 20.6	64 07.4	28	0.5
G33	45° 18.8	64 07.4	30	0.5
G34	45° 16.8	64 07.2	28	0.5
G35	45° 15.4	64 07.4	22	0.5
G36	45° 15.9	64 04.3	23	0.5
G37	45° 17.5	64 04.3	26	0.5
G38	45° 19.7	64 04.3	28	0.5
G39	45° 20.9	64 04.3	22	0.5
G40	45° 19.6	64 01.6	25	0.5
G41	45° 18.4	64 01.6	29	0.5
G42	45° 16.6	64 01.8	24	0.5
G43	45° 17.0	63 59.0	-	0.5
G44	45° 18.6	63 54.6	22	0.5
G45	45° 20.4	63 47.6	28	0.5
G46	45° 20.2	63 50.2	30	0.5
G47	45° 18.2	63 53.9	31	0.5
G48	45° 17.8	63 56.0	38	0.5
G49	45° 19.0	63 56.0	39	0.5
G50	45° 19.0	63 58.8	41	0.5
G51	45° 22.8	64 36.6	22	0.5
G52	45° 21.7	64 35.2	42	0.5
G53	45° 20.4	64 33.0	76	0.5
G54	45 19.0	64 30.9	46	0.5
G55	45 17.5	64 28.8	40	0.5
G56	45 16.6	64 27.7	24	0.5
G57	45 14.4	64 32.0	40	0.5
G58	45 15.8	64 34.0	42	0.5
G59	45 17.0	64 35.7	40	0.5
G60	45 18.8	64 37.4	80	0.5
G61	45 20.4	64 39.1	38	0.5
G62	45 21.6	64 40.7	25	0.5
G63	45 19.2	64 42.6	61	0.5
G64	45 17.1	64 43.8	70	0.5
G65	45 16.7	64 40.9	-	0.5
G66	45 15.2	64 39.1	41	0.5
G67	45 13.6	64 37.3	42	0.5
G68	45 12.6	64 40.5	42	0.5
G69	45 11.6	64 43.5	38	0.5
G70	45 13.3	64 45.2	53	0.5
G71	45 14.8	64 46.8	52	0.5
G72	45 16.4	64 48.6	92	0.5
G73	45 17.8	64 50.0	45	0.5
G74	45 19.5	64 51.8	40	0.5
G75	45 19.2	64 55.2	44	0.5
G76	45° 18.9'	64° 58.3'	-	0.5
G77	45 17.2	64 56.4	-	0.5
G78	45 15.6	64 54.6	50	0.5
G79	45 14.1	64 52.8	60	0.5
G80	45 12.6	64 51.2	54	0.5
G81	45 11.2	64 49.6	48	0.5
G82	45 10.2	64 49.1	43	0.5

APPENDIX 3

Species list and species/station matrix for Chignecto Bay; density is given as number per 0.2 m^2 and the wet formalin weight in grams is shown in brackets. No correction for skeletal or shell parts is made in the biomass values shown.

	Trophic type	Lifespan yr^{-1}
Porifera		
1. Porifera indetermin.	1	100.0
Cnidaria, Hydrozoa		
2. Campanularidae indetermin.	1	5.0
3. Tubularia (indivisa)	1	5.0
Cnidaria, Anthozoa		
4. Actinaria indetermin.	1	5.0
5. Stompia indetermin.	1	5.0
Nemertea (Rhynchocoela)		
6. Nemertea indetermin.	4	3.0
7. Micrura indetermin.	4	3.0
8. Amphiporus indetermin.	4	3.0
Brachiopoda		
9. Terebratulina septentrionalis (Couthony, 1839)	1	7.0
Mollusca, Aplacophora		
10. Chaetoderma nitidulum (Loven, 1844)	4	1.5
11. Chaetoderma indetermin.	4	1.5
Mollusca, Polyplacophora		
12. Hanleya mendicaria (Mighels & Adams, 1842)	3	2.5
13. Ischnochiton albus (Linnaeus, 1764)	3	3.0
Mollusca, Gastropoda		
14. Crepidula plana Say, 1822	1	5.0
15. Aeolidia papillosa (Linnaeus, 1761)	4	3.0
Mollusca, Bivalvia		
16. Nucula proxima Say, 1822	2/1	2.5
17. Nucula indetermin.	2/1	2.5
18. Yoldia myalis (Couthony, 1838)	2/1	4.0
19. Modiolus modiolus (Linnaeus, 1758)	1	20.0
20. Astarte undata Gould, 1841	1	5.0
21. A. montagui (Dillwyn, 1817)	1	5.0
22. A. borealis (Schumacher, 1817)	1	5.0
23. A. crenata subaequilatera Sowerby, 1854	1	5.0
24. Astarte indetermin.	1	5.0
25. Cerastoderma pinnulatum (Conrad, 1831)	1	7.0
26. Hiatella arctica (Linnaeus, 1767)	1	5.0
27. Hiatella indetermin.	1	5.0
Annelida, Polychaeta		
28. Phyllodoce maculata (Linnaeus, 1767)	2	3.0
29. P. groenlandica Oersted, 1842	2	3.0
30. Phyllodoce indetermin.	2	3.0
31. Lepidonotus squamatus (Linnaeus, 1758)	4	2.0
32. Harmothoe imbricata (Linnaeus, 1767)	4	2.0
33. H. extenuata (Grube, 1840)	4	3.0
34. Harmothoe indetermin.	4	3.0
35. Pholoe minuta (Fabricius, 1780)	4	2.0
36. Sthenelais limicola (Ehlers, 1868)	4	3.0
37. Glycera capitata Oersted, 1843	2	7.0
38. G. dibranchiata Ehlers, 1868	2	7.0
39. G. alba (Muller, 1788)	4	7.0
40. Glycera indetermin.	2	7.0
41. Goniadidae indetermin.	2	2.5
42. Goniada maculata Oersted, 1843	2/4	2.5
43. G. norvegica Oersted, 1845	4	3.0
44. Ophioglycera gigantea Verrill, 1885	2/4	3.0
45. Nepthys bucera Ehlers, 1868	4	2.0
46. N. incisa Malmgren, 1865	2/4	3.0
47. N. ciliata (Muller, 1789)	4	3.0
48. N. caeca (Fabricius, 1780)	4	3.0
49. Aglaophamus circinnata (Verrill, 1874)	4	2.0
50. A. neotenus Noyes, 1980	4	2.0
51. Aglaophamus indetermin.	4	2.0
52. Exogone verugera (Claparede, 1868)	2/3/4	2.0
53. Autolytus indetermin.	4	2.0
54. Syllidae indetermin.	4	2.0
55. Syllis cornuta Rathke, 1843	4	1.0
56. Nereis pelagica Linnaeus, 1750	4	4.0
57. N. zonata Malmgren, 1867	4	2.0
58. N. grayi Pettibone, 1956	4	2.0
59. Nereis indetermin.	4/2	2.0

	Trophic type	Lifespan yr^{-1}
60. Capitella capitata (Fabricius, 1780)	2	1.0
61. Scalibregma inflatum Rathke, 1843	2	2.0
62. Maldanidae indetermin.	2	2.0
63. Rhodine loveni Malmgren, 1865	2	2.0
64. Clymenella torquata (Leidy, 1855)	2	3.0
65. Clymenella indetermin.	2	3.0
66. Euclymene zonalis (Verrill, 1874)	2	2.0
67. Euclymene indetermin.	2	2.0
68. Nicomache personata Johnson, 1901	2	1.0
69. Nicomache indetermin.	2	1.0
70. Travisia carnea Verrill, 1873	2	3.0
71. Ophelina acuminata Oersted, 1843	2	1.5
72. Sternaspis scutata (Renier, 1807)	2	3.0
73. Spionidae indetermin.	2/4	1.0
74. Spio filicornis (Muller, 1776)	2/4	1.0
75. Scolecolepides viridis Verrill, 1873	2	1.0
76. Scolelepis squamatus (Muller, 1806)	2	1.0
77. Prionospio steenstrupi Malmgren, 1867	2	1.0
78. Polydora socialis (Schmarda, 1861)	1	1.0
79. Laonice cirrata Sars, 1851	2	2.0
80. Spiophanes bombyx (Claparede, 1870)	2	2.0
81. Aricidea catherinae Laubier, 1967	2	2.0
82. Sabellaria vulgaris Verrill, 1873	2	2.0
83. Lumbrineris fragilis (Muller, 1776)	4	3.0
84. L. acuta (Verrill, 1875)	4	2.0
85. Lumbrinereidae indetermin.	4	2.0
86. Ninoe nigripes Verrill, 1873	2	2.0
87. Drilonereis magna Webster & Benedict, 1887	4	2.0
88. Orbiniidae indetermin.	2	2.0
89. Scoloplos armiger (Muller, 1776)	2	2.0
90. S. acutus (Verrill, 1873)	2	1.0
91. Scoloplos indetermin.	2	2.0
92. Orbinia swani Pettibone, 1957	2	2.0
93. Cirratulidae indetermin.	2	2.0
94. Ampharete acutifrons (Grube, 1860)	2	2.0
95. A. arctica Malmgren, 1866	2	2.0
96. Ampharete indetermin.	2	2.0
97. Melinna cristata (Sars, 1851)	2	2.0
98. Terebellidae indetermin.	2	3.0
99. Amphitrite figulus (Dalyell, 1853)	2	3.5
100. A. cirrata Muller, 1771	2	3.0
101. Trichobranchus glacialis Malmgren, 1866	2	2.0
102. Terrebellides stroemi Sars, 1835	2	1.0
103. Polycirrus eximius (Leidy, 1855)	2	3.0
104. P. medusa Grube, 1850	2	3.0
105. Polycirrus indetermin.	2	3.0
106. Nicolea venustula (Montagu, 1818)	2	5.0
107. Streblosoma spiralis (Verrill, 1894)	2	3.0
108. Pherusa plumosa (Muller, 1776)	2	5.0
109. P. affinis (Leidy, 1855)	2	2.0
110. Brada villosa (Rathke, 1843)	2	3.0
111. Sabellidae indetermin.	1	1.0
112. Chone duneri Malmgren, 1867	1	1.0
113. Chone indetermin.	1	1.0
114. Potamilla neglecta (Sars, 1851)	1	1.0
115. P. reniformis (Leukart, 1849)	1	1.0
116. Myxicola infundibulum (Renier, 1804)	1	1.0
Annelida, Oligochaeta		
117. Tubificidae indetermin.	2	1.0

Cirratulidae probably includes Chaetozone, Tharyx, and Caulleriella.

	Trophic type	Lifespan yr^{-1}
Sipuncula		
118. Sipuncula indetermin.	2	2.0
119. Phascolion strombi (Montagu, 1804)	2	2.0
120. Golfingia indetermin.	2	2.0
121 Phascolopsis gouldi (Pourtales, 1851)	2	2.0
Arthropoda, Pycnogonida		
122. Achelia spinosa (Stimpson, 1853)	4	2.0
123. Phoxichilidum femoratum (Rathke, 1799)	4	2.0
Arthropoda, Crustacea		
124. Balanus crenatus Bruguiere, 1789	1	5.0
125. Eudorella truncatula (Bate, 1856)	2	1.0
126. E. pusilla Sars, 1871	2	1.0
127. Diastylis quadricornis (Sars, 1871)	1	2.0
128. D. polita (Smith, 1879)	1	2.0
129. D. sculpta Sars, 1891	1	2.0
130. Pseudoleptocuma minor (Calman, 1912)	1	2.0
131. Cirolana polita (Stimpson, 1853)	2	2.0
132. Idotea phosphorea Harger, 1873	5	2.0
133. Ampelisca vadorum Mills, 1963	1/2	2.0
134. A. macrocephala Lilljeborg, 1852	1/2	2.0
135. Haploops fundiensis Wildish & Dickson, 1982	1/2	2.0
136. Corophium crassicorne Brugelius, 1859	2/1	1.0
137. C. acherusicum Costa, 1857	2/1	1.0
138. C. volutator (Pallas, 1766)	2/1	1.0
139. Erichthonius rubricornis Smith, 1873	1	1.0
140. E. difformis Milne-Edwards, 1830	1	1.0
141. Unciola irrorata Say, 1818	2	1.0
142. U. leucopis (Kroyer, 1845)	2	2.0
143. Casco bigelowi (Blake, 1929)	2	2.0
144. Melita n. indetermin.	2	1.0
145. Melita dentata (Kroyer, 1842)	2	1.0
146. Maera danae (Stimpson, 1853)	2	2.0
147. Ischyrocerus megacheir (Boeck, 1871)	1	1.0
148. I. anguipes Kroyer, 1838	1	1.0
149. Tmetonyx cicada (Fabricius, 1980)	2	1.0
150. Photis macrocoxa Shoemaker, 1945	1	1.0
151. Podoceropsis nitida (Stimpson, 1853)	2	1.0
152. Protomedia fasciata (Kroyer, 1842)	2	1.0
153. Leptocheirus pinguis (Stimpson, 1853)	1	2.0
154. Phoxocephalus holbolli (Kroyer, 1842)	2	1.0
155. Harpinia propinqua Sars, 1895	2	2.0
156. H. crenulata (Boeck, 1871)	2	2.0
157. Gammaropsis maculatus (Johnston, 1827)	2	1.0
158. Stenopleustes gracilis (Holmes, 1905)	2	1.0
159. Pleusymtes glaber (Boeck, 1861)	2/3	1.0
160. Metopa alderi (Bate, 1857)	2	1.0
161. Dyopedos monocanthus (Metzger, 1875)	1	1.0
162. Caprella linearis (Linnaeus, 1767)	2	2.0
163. Aeginina longicornis (Kroyer, 1842-43)	2	2.0
164. Eualus pusiolus (Kroyer, 1841)	5	5.0
165. Axius serratus Stimpson, 1852	5	5.0
166. Pagurus acadianus Benedict, 1901	5	10.0
167. P. pubescens Kroyer, 1838	5	10.0
168. Hyas coarctatus Leach, 1815	5	5.0
Echinodermata, Holothuroidea		
169. Holothuroidea indetermin.	2	3.0
Echinodermata, Echinoidea		
170. Echinarachnius parma (Lamarck, 1816)	2	18.0
Echinodermata, Stelleroidea		
171. Asterias vulgaris Verrill, 1866	4	10.0
172. Asterias indetermin.	4	10.0
173 Ophiurida indetermin.	1	5.0
174. Ophiura robusta (Ayres, 1851)	4	3.0
175. Amphipholis squamata (Delle Chiaje, 1828)	1	5.0
Chordata, Ascidiacea		
176. Boltenia ovifera (Linnaeus, 1767)	1	5.0

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6	1(0.013)						
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10	1(0.017)						
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15	1(0.492)						
16	4(0.040)						
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22							
23							2(8.033)
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29							
30						3(0.036)	2(0.030)
31	2(0.114)		1(0.015)			1(0.014)	1(0.016)
32	2(0.114)		4(0.060)	2(0.005)			
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40						1(0.101)	
41							
42	1(0.001)					2(0.202)	
43						2(0.202)	3(0.200)
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46				1(0.010)			
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56			1(0.013)				
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61	1(0.005)		1(0.018)				
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64						1(0.068)	
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71	2(0.050)		1(0.001)				1(0.045)
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82				1(0.001)		9(0.044)	9(0.038)
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93	1(0.010)						
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97	1(0.005)			1(0.006)			3(0.003)
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107						1(0.305)	
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111	1(0.010)						
112							
113				1(0.022)		1(0.043)	1(0.012)
114						1(0.042)	2(0.024)
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119				1(0.053)			
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132	1(0.058)						
133							1(0.007)
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139	119(0.112)						
140							
141	18(0.017)		9(0.010)	8(0.009)		155(0.321)	22(0.033)
142							
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146							1(0.020)
147							2 -
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152							1 -
153	28(0.366)						4(0.090)
154	6(0.003)		1(0.001)				1 -
155			1(0.001)				
156							
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160							
161			3(0.004)	1(0.001)			
162	3(0.008)		3(0.006)				2(0.005)
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1	1 -					1 -	
2					5(0.020)	7(0.247)	
3					1(2.905)		
4		1(0.008)		1(0.576)		1(0.164)	
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30				7(0.110)	2(0.034)	1(0.068)	
31		3(0.022)		2(0.065)	1(0.018)	2(0.138)	
32	3(0.053)						
33							
34		1(0.008)					
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42	2(0.010)			3(0.052)	1(0.037)		
43		2(0.028)				1(0.142)	
44		1(0.014)					
45				2(0.327)	1(0.030)		2(0.054)
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55						1(0.200)	
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60							
61	2(0.026)	1(0.010)		2(0.016)			
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63					1(0.008)		
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70							
71	4(0.040)	1(0.082)		6(0.110)		2(0.047)	
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79				1(0.028)	1(0.006)		
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81							
82		3(0.020)			3(0.028)	4(0.017)	
83					1(0.210)		
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85				1(0.002)			
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92					1(0.002)		
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97		2(0.030)		1(0.009)	2(0.014)		1(0.010)
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102				1(0.009)			
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106		1(0.015)					
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115				4(0.028)	2(0.021)		
116				1(0.008)			
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119					1 -		
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139					2 -		
140							
141	2(0.005)	13(0.025)		12(0.023)	15(0.050)	6(0.012)	
142						1(0.002)	1(0.002)
143							
144							
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146							
147	2(0.002)			1(0.015)			
148							
149							
150							
151							
152				1(0.015)	1 -		
153				17(0.255)	2(0.019)	2(0.012)	
154		3(0.002)		4(0.002)		4(0.004)	
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159						1(0.002)	
160						4(0.010)	
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162					1(0.002)		
163	1(0.002)						
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165							
166						1(4.010)	
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	15	16	17	18	19	20	21
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2							1(0.023)
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4						2(0.260)	2(0.335)
5							
6		2(0.022)					
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10		1(0.011)				2(0.048)	
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18							
19				1(5.474)		1(5.360)	
20							
21		1(0.490)					
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23							
24				1(0.020)			
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31					4(0.039)	1(0.008)	
32		2(0.070)	1(0.030)				
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39							
40							
41					1 -		
42						5(0.223)	1(0.083)
43	2(0.063)			4(0.382)	1(0.023)		
44				5(0.556)			3(0.347)
45							
46		1(0.008)			2(0.005)	3(0.010)	
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61							2(0.018)
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70							
71				2(0.008)	1(0.001)	3(0.100)	3(0.030)
72							
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76							1(0.022)
77							
78							
79				2(0.039)		2(0.084)	
80							
81							
82		4(0.020)		1(0.019)			
83				1(0.364)	1(0.091)	1(0.069)	
84							
85							
86						1(0.070)	
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	15	16	17	18	19	20	21
89	1(0.002)		1(0.011)				
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93		1(0.003)					
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95							
96							
97	1(0.005)	3(0.037)		2(0.038)		1(0.024)	
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106		1(0.013)					
107						1(1.915)	
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114							
115				1(0.006)		2(0.076)	
116					2(0.078)	3(0.116)	
117							
118							
119				1(0.018)			1(0.037)
120						1(0.024)	
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127				2(0.007)			
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132							
133		2(0.013)					
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135						2(0.004)	
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139		1(0.003)					
140							
141		29(0.077)		27(0.082)	11(0.037)	16(0.017)	4(0.006)
142		1(0.003)		2 -		1(0.001)	
143					2(0.023)		
144							
145							
146					4(0.044)	11(0.016)	
147				2 -			
148							
149							
150							
151							
152		1(0.003)					
153				2(0.034)		2(0.014)	
154		1(0.003)		3(0.004)		4(0.005)	2(0.002)
155						3(0.012)	
156						1(0.004)	
157							
158							
159							
160					1(0.003)		
161				1 -			
162							
163		1(0.006)		5(0.010)			
164							
165							
166				1(0.150)			
167							
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171		1(1.112)					
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174							
175						3(0.027)	
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5			1(0.082)	4(0.798)			
6						1(0.365)	1(0.184)
7							
8							
9							
10				1(0.098)			1(0.007)
11							
12							
13							
14							
15						98(1.905)	
16							16(0.150)
17						1(0.070)	1(0.077)
18							
19				1(0.814)			
20		1(2.876)					
21				2(0.098)			
22							
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29							
30							
31							
32				1(0.408)			
33		1(0.014)	1(0.002)				
34							
35							
36							18(0.053)
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42						1(0.014)	1(0.008)
43		2(0.005)		4(0.009)	1(0.060)		
44							
45							
46				3(0.127)		2(0.185)	7(0.732)
47							
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61		1(0.032)		3(0.043)			1(0.016)
62							
63				1(0.020)			
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69							
70							
71		9(0.443)	1(0.060)	16(0.436)			
72							1(0.023)
73							
74							
75		2(0.076)					
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77							
78							
79				1(0.037)			
80							
81							
82							
83			1(0.156)	1(0.040)			
84							
85							
86					1(0.006)	4(0.083)	18(0.126)
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	22	23	24	25	26	27	28
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92							22(0.128)
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97			2(0.030)				
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100			1(0.252)				
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108				1(0.077)			1(0.044)
109				1(0.010)			
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111			1(0.009)				
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114					1(0.003)		
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124							1(0.005)
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126							1(0.005)
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135				2(0.008)			
136			2(0.003)				
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138			1(0.001)				
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141				2(0.016)			
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143				1(0.023)			
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145				1(0.006)			
146		5(0.040)					
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152							
153				21(0.137)		2(0.014)	
154		2(0.001)		3(0.004)			
155		2(0.001)					
156							
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161			1(0.001)				
162							
163				3(0.010)			
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166		1(0.012)					
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4							1(1.070)
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6					1(0.106)		
7							1(0.004)
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19					2(41.870)		
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22						1(0.009)	
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37	1(0.008)						
38		1(0.240)					
39							
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42				1(0.010)		5(0.103)	1(0.019)
43							
44		1(0.240)					
45	1(0.094)						
46		1(0.002)				7(0.175)	5(0.216)
47							
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53					2(0.008)		
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60							
61	3(0.053)	8(0.188)			7(0.119)		3(0.027)
62							
63							2(0.119)
64		1(0.168)					
65							
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69							
70	1(0.140)						
71		2(0.003)			12(0.358)	3(0.003)	8(0.047)
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75		1(0.012)					
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79							1(0.010)
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82							
83					2(0.184)	1(0.036)	1(0.005)
84							
85							
86	1(0.005)				1(0.093)		
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89	6(0.044)	4(0.048)					
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92							2(0.005)
93							2(0.004)
94							1(0.001)
95							
96					2(0.049)	1(0.015)	
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101							2(0.004)
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108							1(0.497)
109							2(0.084)
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133							1 -
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135						2 -	7(0.050)
136							
137						2 -	
138							
139					2(0.001)		
140							
141						13(0.100)	5(0.013)
142							
143						1(0.050)	
144							
145							
146						1 -	
147					1(0.001)		1 -
148							
149							
150							1 -
151							
152						2 -	
153						22(0.300)	10(0.082)
154		3(0.010)					
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162					2(0.008)		
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5		2(0.123)					
6				1(0.010)			
7							
8						1(0.100)	
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10							
11	1(0.005)						
12							
13		1(0.037)					
14							
15					4(0.037)	2(0.022)	
16							
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19	1(10.786)	7(95.025)					
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23							1(2.505)
24	3(5.559)	7(9.040)					
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26		1(0.046)					
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29						1(1.042)	
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32		1(0.037)				1(0.020)	
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36	1(0.013)						
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40							
41				3(0.011)			
42	3(0.110)	1(0.012)	3(0.033)		2(0.059)	2(0.102)	1(0.019)
43							
44							
45							
46	2(0.016)	2(0.082)	1(0.010)	2(0.026)	2(0.320)		2(0.005)
47							
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60							
61	2(0.014)		1(0.014)			2(0.014)	6(0.125)
62							
63	1(0.029)						1(0.060)
64							
65							
66							
67							
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70							
71		5(0.260)	5(0.228)	2(0.047)		1(0.020)	1(0.041)
72							
73							
74							
75							
76							
77							
78							1(0.007)
79	3(0.047)	1(0.162)	2(0.080)	1(0.010)	1(0.035)		2(0.008)
80							
81							
82							
83	1(0.164)	2(0.372)	1(0.146)			1(0.071)	
84							
85							
86				1(0.040)	1(0.050)		4(0.080)
87							
88							

	36	37	38	39	40	41	42
89						1(0.002)	
90				1(0.002)			
91							
92			1(0.004)	3(0.112)	1(0.002)	5(0.010)	2(0.056)
93							
94							
95							
96							1(0.030)
97							
98							
99							
100							
101		1(0.027)		2(0.073)			
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117							
118							
119	1(0.157)	1(0.069)	2(0.109)	2(0.042)			
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121							
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128							
129							
130							
131							
132							
133				1(0.005)	1(0.006)	1(0.004)	
134					1(0.006)		
135		1(0.006)	1(0.005)	5(0.026)	5(0.028)	1(0.005)	8(0.022)
136							
137							
138							
139		2 -	1 -			1(0.003)	
140							
141	6(0.016)	3(0.028)		12(0.046)	2(0.010)	8(0.027)	3(0.010)
142				2(0.008)		1(0.003)	
143	2(0.080)	1(0.055)	3(0.121)	1(0.038)			
144		1 -					
145							
146		2 -	1 -				
147			1 -				
148							
149							
150							
151							
152		2 -	1(0.010)				
153		7(0.090)	1(0.028)	3(0.058)			
154	2(0.002)		2(0.004)		2(0.004)		
155	3(0.003)		2 -	3(0.003)			
156							
157							
158			1 -				
159							
160							
161			2 -				
162		5(0.010)	1(0.002)				
163	1(0.007)		2(0.004)				
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165							
166			2(0.343)				
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174							
175	1(0.010)						
176							

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4							1(0.058)
5							
6							1(0.014)
7							
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9					2(0.064)		
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14			4(0.928)				
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31			1(0.201)				
32			1(0.201)				
33							
34							
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37							
38							
39							3(0.453)
40							
41							
42	1(0.003)	2(0.157)	4(0.190)		2(0.017)		1(0.023)
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44							
45							
46	1(0.080)		7(0.035)		8(0.112)		26(0.385)
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60							
61	2(0.020)	4(0.043)			1(0.007)		2(0.040)
62							
63			3(0.135)		2(0.167)		3(0.082)
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66		2(1.236)					
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71			3(0.055)		1(0.018)		
72							1(0.430)
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77							
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79	2(0.008)						
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81							
82	1(0.008)						
83	2(0.350)				1(0.035)		1(0.022)
84							
85							
86							
87							1(0.022)
88							

	43	44	45	46	47	48	49
89	1(0.010)						
90							
91		1(0.006)					
92							
93	1(0.001)	1(0.003)	3(0.016)		1(0.033)		2(0.012)
94			1(0.007)				
95							
96					2(0.050)		
97							2 -
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103							
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106			1(0.006)				
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108							
109			4(4.132)		2(0.777)		1(2.100)
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111							
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114							
115	2(0.009)			1(0.046)			
116							
117							
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119		1(0.070)			2(0.141)		1(0.058)
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131							
132							
133							1(0.001)
134							
135					2(0.016)		1(0.002)
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137							
138							
139					1(0.007)		
140							
141	2(0.005)		7(0.030)		11(0.043)		5(0.012)
142	1(0.003)						
143					4(0.121)		4(0.147)
144							
145			1(0.010)				
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150					1(0.007)		
151			2(0.020)				
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153			3(0.030)		45(0.694)		8(0.123)
154	4(0.003)		2(0.002)				
155							1(0.001)
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161					1(0.006)		
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5		1(0.313)			1(0.528)		
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19					7(83.277)		
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24		2(3.725)				1(3.564)	
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31					1(0.010)		
32					1(0.009)		
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40					3(0.140)		
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42		2(0.090)				1(0.036)	
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46		6(0.077)			1(0.016)		
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57					1(0.005)		
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61		1(0.036)					
62					1(0.055)		
63		3(0.751)				2(0.030)	
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71		1(0.023)			1(0.040)		
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73							
74					1(0.016)		
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83		2(0.153)			1(0.005)		
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107		9(7.004)					
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111		1(0.010)					
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113							
114					2(0.036)		
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126							
127		1(0.003)					
128		1(0.002)					
129							
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134						1(0.006)	
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137		1(0.004)					
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141		8(0.041)				6(0.024)	
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143		7(0.273)					
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147					3(0.004)		
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149							
150		1(0.004)					
151							
152							
153		50(0.600)			1(0.001)		
154							
155							
156							
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161		1(0.004)			2(0.002)		
162							
163					3(0.004)		
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171							
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173							
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	57	58	59	60	61	62	63
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4							
5				1(0.019)			
6							
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8							
9	21(8.242)		1(0.919)				
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17	5(0.068)						
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19	55(871.194)		3(28.376)	5(57.913)			
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24	3(5.312)		2(9.280)				1(3.774)
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27	2(0.230)						
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29							
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31	4(0.116)						
32	4(0.116)		1(0.075)	1(0.010)			
33							
34							
35							
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38							
39				1(0.092)	1(0.045)		
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41							
42	1(0.163)		3(0.064)	3(0.055)	2(0.088)		3(0.012)
43							
44							
45							
46	3(0.017)					3(0.125)	1(0.006)
47							
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55	1(0.023)						
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57	2(0.046)		1(0.001)				
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61	2(0.016)			10(0.130)		5(0.045)	1(0.013)
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63						1(0.085)	
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66			1(0.073)				
67							
68	1(0.006)						
69							
70							
71	5(0.230)			2(0.060)	4(0.090)	1(0.010)	1(0.031)
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74							2(0.006)
75							
76							
77							1(0.002)
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79			1(0.090)		1(0.007)	3(0.123)	3(0.563)
80							
81							
82	23(0.090)		1(0.002)	4(0.042)			5(0.048)
83	3(0.195)			2(0.205)		1(0.055)	3(0.129)
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85							
86							
87							1(0.042)
88							1(0.043)

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89			1(0.001)				
90	1(0.020)				1(0.035)		
91							
92				1(0.005)	1(0.001)		5(0.066)
93	1(0.028)						
94							
95							
96						1(0.067)	
97	4(0.073)						
98							
99	2(0.017)						
100							
101			1(0.040)				
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104							
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110							
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115	7(0.140)		3(0.023)	4(0.164)			
116	1(0.020)						
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118			1(0.004)				
119			1(0.064)	1(0.055)		1(0.071)	
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122							
123							
124							
125							2(0.004)
126							1(0.002)
127			1(0.008)			2(0.008)	
128							
129							
130							
131				1(0.012)			
132							
133							
134					1(0.001)	2(0.001)	
135					126(0.108)		
136							
137							
138							4(0.010)
139							
140							
141				3(0.008)	9(0.006)		1(0.016)
142							
143					1(0.062)	1(0.023)	
144							
145							
146	2(0.025)						
147							
148							
149							
150							
151							
152				1(0.002)	23(0.020)		
153				1(0.006)		2(0.010)	2(0.060)
154	1(0.001)						
155							
156							
157							
158							
159							
160	1(0.001)						
161							
162							
163							4(0.030)
164							
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168	3(1.113)		1(0.789)				1(0.015)
169			1(0.265)				
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	64	65	66	67	68	69	70
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6							
7		1(0.132)					
8							
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10	1(0.027)						
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19		1(12.552)		44(642.270)			
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25				1(0.158)			
26				2(1.660)			
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31				4(0.682)			
32							1(0.093)
33	1(0.022)						
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36					1(0.010)		
37				1(0.333)			
38							
39							
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41							
42	2(0.028)	1(0.004)	1(0.378)	1(0.005)			1(0.014)
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44							1(0.190)
45							
46	2(0.010)						
47							1(0.010)
48							
49		1(0.193)					
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51							
52			1(0.003)				
53							
54				2(0.004)			
55							
56							1(0.233)
57							
58							
59							
60							
61	10(0.153)	2(0.045)	3(0.055)	1(0.027)	1(0.017)	3(0.084)	1(0.007)
62							
63							
64						2(0.020)	
65			2(0.120)				
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67							
68							
69			3(0.180)				
70							
71		1(0.043)		3(0.053)			
72							
73							
74		5(0.015)					
75							
76							
77			2(0.005)				2(0.010)
78							
79	3(0.269)	1(0.277)		1(0.046)	2(0.258)		1(0.006)
80			2(0.004)				
81			1(0.003)				
82	1(0.006)	4(0.046)		12(0.061)			
83	4(0.270)	1(0.062)	1(0.260)	1(0.073)			
84							
85							
86	2(0.135)				1(0.037)		1(0.023)
87							
88							

	64	65	66	67	68	69	70
89	2(0.026)		5(0.093)	1(0.006)		2(0.012)	1(0.003)
90		1(0.007)					
91				1(0.006)			
92							
93	3(0.010)	3(0.011)	3(0.005)	2(0.002)	3(0.008)	1(0.002)	3(0.005)
94		1(0.006)					
95							
96							1(0.007)
97				2(0.036)			
98	3(0.047)						
99							
100							
101	1(0.015)						
102							
103							
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107							
108							
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110							
111		1(0.060)					1(0.055)
112							1(0.055)
113							
114							
115	7(0.120)	4(0.240)		2(0.050)			
116							1(0.001)
117							
118							
119		1(0.060)	4(0.178)		2(0.015)	3(0.146)	
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121							
122							
123							
124	3(0.373)			7(0.704)			
125							
126	1(0.005)	2(0.003)	2(0.001)		3(0.002)	2(0.002)	3(0.009)
127	3(0.015)	1(0.002)					2(0.006)
128							
129							
130						1(0.001)	
131			1(0.012)				
132							
133		1(0.004)					
134							
135							
136							
137							
138							
139							
140							
141	5(0.013)	6(0.026)	5(0.010)				3(0.048)
142	1(0.003)						
143		1(0.020)			1(0.023)		
144		1(0.020)		1(0.007)			2(0.005)
145							
146				2(0.015)			
147							
148							
149							
150							
151							
152		1(0.004)	1(0.003)				
153	1(0.028)	1(0.016)					
154			1(0.001)				3(0.006)
155							
156							
157							
158							
159							
160							
161							
162							
163		1(0.008)					1(0.002)
164							
165							
166							
167				1(0.585)			
168		1(0.404)					
169							
170							
171							
172							
173							1(0.005)
174							
175							
176							

	71	72*	73	74	75	76	77
1		*					
2							
3							
4							
5							
6							
7		1(0.096)					
8							
9							
10							
11							
12							
13							
14							
15				1(7.871)		14(0.107)	184(11.785)
16					184(5.061)		
17							
18							
19							
20							
21							
22							
23							
24	1(3.750)	7(38.404)		1(3.323)			
25							
26							
27							
28							
29							
30							
31							
32		1(0.010)		1(0.007)			
33							
34							
35							
36				1(0.675)			
37							1(1.073)
38							
39							
40	1(0.016)						
41							
42	2(0.057)	1(0.003)	1(0.011)			1(0.022)	
43							
44							
45							
46				1(0.014)		1(0.003)	
47	3(0.068)	1(0.051)					
48							1(0.010)
49							
50		1(0.051)					
51							
52							
53							
54							
55							
56				1(0.675)			
57							
58							
59							
60							
61	1(0.023)	2(0.026)		4(0.143)			
62							
63							
64							
65							
66							
67							
68							
69							
70							1(0.085)
71		1(0.072)		2(0.056)		1(0.003)	
72							
73							
74	2(0.015)	3(0.010)					
75							
76							
77		1(0.004)					
78							
79	3(0.153)	9(0.741)	1(0.087)				
80							
81							
82		7(0.077)					
83	2(0.363)					1(0.014)	
84							
85							
86				1(0.025)			
87			1(0.002)				
88							

*Indicates Lower Bay

	71	72*	73	74	75	76	77
89		2(0.003)				1(0.001)	
90	1(0.005)						8(0.086)
91							
92							
93	2(0.003)	3(0.007)	2(0.008)	2(0.012)		2(0.002)	
94	1(0.046)						
95		2(0.024)					
96							
97		1(0.013)					
98							
99							
100							
101							
102							
103			1(0.009)				
104							
105							
106							
107							
108							
109							
110							
111							
112							
113							
114							
115	1(0.026)	2(0.046)	1(0.033)				
116							
117							
118							
119	1(0.090)	1(0.032)					
120							
121							
122							
123		1(0.002)					
124							
125							
126		3(0.005)		4(0.008)			
127	1(0.005)	1(0.002)		2(0.004)			
128							
129	1(0.004)						
130							
131							
132				1(0.013)			
133							
134							
135		1(0.010)					
136							
137							
138							
139		1(0.001)					
140		1(0.002)					
141	2(0.012)	4(0.007)	1(0.003)	5(0.052)			
142							
143							
144							
145							
146	1(0.030)	1(0.010)					
147			1(0.003)				
148							
149	1(0.020)						
150							
151							
152							
153	1(0.004)						
154		4(0.004)	1(0.002)				
155							
156							
157							
158							
159							
160							
161							
162							
163		2(0.002)	3(0.003)				
164							
165							
166				1(0.151)			
167							
168				2(0.046)			
169							
170					1(3.060)		1(0.298)
171							
172							
173							
174							
175							
176							

	78*	79*	80*	81*	82*	83	84*
1							
2							
3							
4							
5							
6			1(0.150)				
7							
8							
9							
10	1(0.036						
11							
12							
13							
14							
15							
16							
17							
18				1(0.096)		1(0.105)	
19			7(54.176)				
20						1(6.715)	
21							
22							
23				1(2.743)			
24		1(4.264)	1(4.369)				
25							
26							
27							
28							
29							
30	1(0.002)						
31							
32	1(0.004)		2(0.024)	3(0.212)			
33							
34							
35							
36							
37							
38							
39							
40							
41							
42			1(0.021)				
43							
44				1(0.074)			
45					1(0.096)		
46	1(0.104)			4(0.050)		1(0.007)	
47							
48	1(0.026)						
49		1(0.025)					
50						1(0.007)	
51							
52							
53							
54							
55							
56			1(0.033)				
57							
58				1(0.011)			
59	1(0.002)						
60							
61	7(0.125)		2(0.031)			1(0.014)	
62	1(0.005)		1(0.035)				
63						1(0.010)	
64		7(0.038)					
65							
66							
67							
68							
69							
70							
71	7(0.505)		5(0.090)	2(0.096)		6(0.333)	
72							
73							
74		1(0.006)				1(0.002)	
75							
76							
77		2(0.003)				1(0.002)	
78							
79	2(0.543)	5(0.410)	5(0.295)			2(0.336)	
80							
81							
82		1(0.028)					
83		1(0.173)	2(0.183)	2(0.384)		3(0.131)	
84							
85							
86	1(0.078)					3(0.132)	
87							
88							

*Indicates Lower Bay

	78*	79*	80*	81*	82*	83	84*
89						1(0.002)	
90						3(0.007)	
91							
92							
93	1(0.026)	3(0.014)	1(0.006)	2(0.064)		2(0.014)	
94							
95			1(0.012)				
96						1(0.005)	
97			2(0.031)	2(0.018)		1(0.005)	
98							
99							
100							
101							
102							
103							
104							
105	1(0.019)			1(0.039)			
106							
107							
108							
109			1(0.011)			1(0.642)	
110							
111							
112							
113							
114							
115	1(0.015)		4(0.076)				
116							
117							
118							
119	3(0.104)	1(0.123)	1(0.072)	1(0.070)			
120							
121							
122							
123							
124						35(5.778)	
125							
126	3(0.003)		3(0.004)	1(0.002)			
127				1(0.002)		2(0.005)	
128							
129							
130							
131							
132			1(0.018)				
133		1(0.007)					
134	5(0.077)	1(0.008)	1(0.004)				
135						1(0.003)	
136						1(0.002)	
137							
138							
139							
140			23(0.066)				
141	3(0.010)	7(0.023)	3(0.009)	2(0.016)		1(0.003)	
142							
143	2(0.126)	4(0.138)					
144							
145	1 -						
146	3 -		1(0.020)			1(0.008)	
147	2 -						
148							
149							
150							
151							
152			1(0.003)				
153	8(0.067)	2(0.048)	1(0.004)				
154	1(0.006)		3(0.003)	4(0.002)		2(0.004)	
155	4 -			1(0.001)			
156							
157							
158							
159							
160							
161							
162							
163							
164				2(0.023)			
165							
166				1(0.015)			
167							
168							
169							
170							
171							
172				1(0.016)			
173							
174				1(0.016)			
175				2(0.032)			
176							

	85 *	86*	87*	88*	89*	90*	91*
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19	12(48.781)		5(24.973)	5(49.378)			
20							
21							
22							
23							
24	1(5.163)						
25							
26							
27							
28				1(0.005)			
29							
30							
31	3(0.309)		1(0.030)				
32	1(0.103)		5(0.154)			3(0.026)	
33							
34							
35	1(0.102)						
36							
37							
38							
39							
40							
41							
42			1(0.035)				
43							
44							
45							
46							
47	1(0.198)					1(0.022)	
48							
49							
50							
51			1(0.012)				
52							
53			1(0.002)				
54							
55							
56			2(0.023)				
57							
58							
59			1(0.011)	1(0.020)			
60			1(0.002)				
61	1(0.017)						
62	2(0.026)			2 -		1(0.006)	1(0.011)
63							
64			1(0.002)	1(0.016)			
65							
66				2(0.031)			2(0.022)
67							
68							
69							
70							
71							
72							
73	1(0.010)						
74	1(0.010)					4(0.010)	
75							
76			1(0.009)				
77				2(0.002)			
78							
79			2(0.259)	1(0.050)			
80				1(0.020)			
81							
82	13(0.068)		22(0.138)	8(0.062)		3(0.016)	
83							
84	1(0.010)						1(0.007)
85							
86							
87							
88				1(0.020)		1(0.007)	

*Indicates Lower Bay

	85*	86*	87*	88*	89*	90*	91*
89							
90	1(0.005)						
91			1(0.009)				1(0.073)
92							
93	3(0.018)			1(0.002)		1(0.002)	
94							
95							
96							
97	15(0.133)		1(0.009)				
98							
99							
100							
101							
102							
103						1(0.007)	1(0.002)
104							
105							
106							
107							
108							
109							
110						2(0.115)	
111							
112							
113							
114							1(0.007)
115	5(0.300)			43(1.664)			
116							
117							
118						2(0.004)	
119			1(0.073)				
120							
121						3(0.006)	
122							
123							
124							
125							
126	1(0.003)						
127							
128							
129	1(0.003)						
130							
131							
132							
133							
134							
135							
136							
137							
138							
139			5(0.023)	3(0.010)		1(0.005)	
140	1 -		4(0.018)				
141	3(0.015)					2(0.009)	
142						1(0.004)	
143							
144							
145							
146	2(0.027)						
147							
148	1 -						
149							
150							
151							
152	1 -						
153	2(0.028)			3(0.040)			
154							
155							
156							
157							
158						1(0.004)	
159			1(0.005)			1(0.004)	
160							
161							
162						1(0.003)	
163							
164						2(0.048)	
165							
166							
167							
168	1(0.132)					1(0.033)	
169							
170							
171							
172							
173							
174							
175							
176							

	92 *	93 *	94 *	95*
1				
2				
3				
4		1(4.333)		
5				
6				
7				
8				
9				
10				
11				
12	1(0.025)			
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27	1(0.013)			
28				
29				
30				
31				
32	3(0.022)			
33				
34				
35				
36				
37	1(0.108)			
38				
39				
40				
41				
42				
43				
44				
45				
46				
47				
48				
49				
50				
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61				
62	1(0.002)			
63				
64				
65				
66				
67	1(0.024)			
68				
69				
70				
71				
72				
73				
74				
75				
76				
77				
78				
79				
80				
81				
82	2(0.011)			
83				
84				
85				
86				
87				
88				

*Indicates Lower Bay

	92 *	93 *	94 *	95*
89				
90				
91				
92				
93				
94				
95				
96				
97	3(0.072)			
98				
99				
100				
101				
102				
103				
104				
105				
106				
107				
108				
109				
110				
111				
112				
113				
114				
115	1(0.030)			
116				
117				
118				
119				
120				
121				
122	1(0.001)			
123				
124				
125				
126				
127				
128				
129				
130				
131				
132				
133				
134				
135				
136				
137				
138				
139				
140				
141				
142				
143				
144				
145				
146				
147				
148				
149				
150				
151				
152				
153	3(0.028)			
154				
155				
156				
157	1(0.010)			
158				
159				
160				
161				
162				
163				
164				
165				
166				
167	2(0.193)			
168				
169				
170				
171				
172	1(19.400)			
173				
174				
175				
176		1 -		

APPENDIX 4

Species list and species/station matrix for Minas Basin, August 1979. Density is given as number per 0.5 m^2 (except for stations G25-G29 where it is 0.2 m^2) and wet formalin weight in grams in brackets. No correct ion for skeletal or shell parts is made in the biomass values shown.

	Trophic type	Lifespan yr^{-1}
Porifera		
1. Haliclona indetermin.	1	5.0
Cnidaria, Anthozoa		
2. Actinaria indetermin.	1	5.0
3. Edwardsia indetermin.	1	5.0
4. Peachia indetermin.	1	5.0
Platyhelminthes, Turbellaria		
5. Notoplana atomata Muller, 1776	4	2.0
Nemertea (Rhynchocoela)		
6. Nemertea indetermin.	4	3.0
7. Micrura indetermin.	4	3.0
8. Cerebratulus indetermin.	2	3.0
9. Amphiporus indetermin.	4	3.0
Aschelminthes, Nematoda		
10. Nematoda indetermin.	2	1.0
Mollusca, Polyplacophora		
11. Polyplacophora indetermin.	4	3.0
12. Lepidopleurus indetermin.	4	3.0
13. Ischnochiton albus (Linnaeus, 1764)	3	3.0
14. Ischnochiton indetermin.	3	3.0
Mollusca, Gastropoda		
15. Crucibulum striatum Say, 1824	3	6.0
16. Crepidula fornicata (Linnaeus, 1758)	1	5.0
17. C. plana Say, 1822	1	5.0
18. Lunatia triseriata (Say, 1826)	4	5.0
19. Polinices immaculatus (Totten, 1835)	4	5.0
20. Velutina velutina (Muller, 1776)	4	5.0
21. Nucella lapillus form imbricata Lamark, 1822	4	5.0
22. Buccinum undatum Linnaeus, 1758	4	5.0
23. Buccinum indetermin.	4	5.0
24. Neptunea decemcostata Say, 1826	4	5.0
25. Adalaria proxima (Alder & Hancock, 1854)	4	2.0
26. Oenopota indetermin.	4	3.0
27. Dendronotus indetermin.	4	3.0
Mollusca, Bivalvia		
28. Nucula proxima Say, 1822	2/1	2.5
29. Nucula indetermin.	2/1	2.5
30. Musculus niger (Gray, 1824)	1	4.0
31. M. discors form laevigatus Gray, 1824	1	4.0
32. M. discors (Linnaeus, 1767)	1	4.0
33. Modiolus modiolus (Linnaeus, 1758)	1	20.0
34. Crenella glandula (Totten, 1834)	1	4.0
35. Anomia squamula Linnaeus, 1758	1	2.0
36. A. simplex Orbigny, 1842	1	2.0
37. Astarte castanea (Say, 1822)	1	5.0
38. A. undata Gould, 1841	1	5.0
39. A. montagui (Dillwyn, 1817)	1	5.0
40. A. borealis (Schumacher, 1817)	1	5.0
41. A. crenata subaequilatera Sowerby, 1854	1	5.0
42. Astarte indetermin.	1	5.0
43. Cyclocardia borealis (Conrad, 1831)	1	5.0
44. Cerastoderma pinnulatum (Conrad, 1831)	1	7.0
45. Spisula polynyma (Stimpson, 1860)	1	5.0
46. Hiatella arctica (Linnaeus, 1767)	1	5.0
47. H. striata Fleuriau, 1802	1	5.0
48. Hiatella indetermin.	1	5.0
Annelida, Polychaeta		
49. Phyllodocidae indetermin.	2	3.0
50. Phyllodoce maculata (Linnaeus, 1767)	2	3.0
51. P. mucosa Oersted, 1843	2	3.0
52. P. groenlandica Oersted, 1842	2	3.0
53. Phyllodoce indetermin.	2	3.0
54. Eteone indetermin.	2	3.0
55. Eulalia viridis (Linnaeus, 1767)	2	3.0
56. E. bilineata Webster & Benedict, 1887	2	3.0
57. Eulalia indetermin.	2	3.0
58. Antinoella sarsi (Malmgren, 1865)	4	1.0
59. Lepidonotus squamatus (Linnaeus, 1758)	4	2.0
60. Harmothoe imbricata (Linnaeus, 1767)	4	2.0
61. Pholoe indetermin.	4	2.0
62. Sthenelais limicola (Ehlers, 1868)	4	3.0

	Trophic type	Lifespan yr^{-1}
63. Glycera capitata Oersted, 1843	2	7.0
64. Goniadidae indetermin.	2	2.5
65. Goniada indetermin.	4	3.0
66. Ophioglycera gigantea Verrill, 1885	2/4	3.0
67. Nepthys ciliata (Muller, 1789)	4	3.0
68. N. caeca (Fabricius, 1780)	4	3.0
69. Nepthys indetermin.	4/2	3.0
70. Aglaophamus neotenus Noyes, 1980	4	2.0
71. Parapionosyllis longicirrata (Webster & Benedict, 1884)	4	2.0
72. Exogone verugera (Claparede, 1868)	2/3/4	2.0
73. Exogone indetermin.	2/3/4	2.0
74. Autolytus indetermin.	4	2.0
75. Syllis cornuta Rathke, 1843	4	1.0
76. S. hyalina Grube, 1863	4	2.0
77. Nereis diversicolor Muller, 1776	2/4	2.0
78. N. pelagica Linnaeus, 1750	4	4.0
79. N. grayi Pettibone, 1956	4	2.0
80. Nereis indetermin.	4/2	2.0
81. Mediomastus ambiseta (Hartman, 1947)	2	2.0
82. Notomastus indetermin.	2	3.0
83. Maldanidae indetermin.	2	2.0
84. Clymenella torquata (Leidy, 1855)	2	3.0
85. Clymenella indetermin.	2	3.0
86. Euclymene zonalis (Verrill, 1874)	2	2.0
87. Clymenura indetermin.	2	2.0
88. Opheliidae indetermin.	2	2.0
89. Ophelia bicornis Savigny, 1818	2	2.0
90. Travisia carnea Verrill, 1873	2	3.0
91. Ophelina acuminata Oersted, 1843	2	1.5
92. Spionidae indetermin.	2/4	1.0
93. Spio filicornis (Muller, 1776)	2/4	1.0
94. Spio indetermin.	2/4	1.0
95. Pygospio elegans Claparede, 1863	2	1.0
96. Scolelepis squamatus (Muller, 1806)	2	1.0
97. Prionospio steenstrupi Malmgren, 1867	2	1.0
98. Polydora socialis (Schmarda, 1861)	1	1.0
99. Polydora indetermin.	1	1.0
100. Laonice cirrata Sars, 1851	2	2.0
101. Spiophanes bombyx (Claparede, 1870)	2	2.0
102. Aricidea indetermin.	2	2.0
103. Sabellaria vulgaris Verrill, 1873	2	2.0
104. Lumbrineris fragilis (Muller, 1776)	4	3.0
105. L. acuta (Verrill, 1875)	4	2.0
106. Lumbrineris indetermin.	4	2.0
107. Drilonereis magna Webster & Benedict, 1887	4	2.0
108. Scoloplos acutus (Verrill, 1873)	2	1.0
109. S. armiger (Muller, 1776)	2	2.0
110. Scoloplos indetermin.	2	2.0
111. Cirratulidae indetermin.	2	2.0
112. Dodecaceria concharum Oersted, 1843	2	2.0
113. Caulleriella indetermin.	2	2.0
114. Ampharetidae indetermin.	2	2.0
115. Ampharete arctica Malmgren, 1866	2	2.0
116. Asabellides oculata (Webster, 1879)	2	2.0
117. Melinna cristata (Sars, 1851)	2	2.0
118. Terebellidae indetermin.	2	3.0
119. Amphitrite figulus (Dalyell, 1853)	2	3.5
120. A. affinis Malmgren, 1866	2	3.0
121. Amphitrite indetermin.	2	3.0
122. Polycirrus medusa Grube, 1850	2	3.0
123. P. phosphoreus Verrill, 1880	2	3.0
124. Polycirrus indetermin.	2	3.0
125. Nicolea venustula (Montagu, 1818)	2	5.0
126. Pista maculata (Dalyell, 1853)	2	3.0
127. Pherusa affinis (Leidy, 1855)	2	2.0
128. P. plumosa (Muller, 1776)	2	5.0

	Trophic type	Lifespan yr^{-1}
129. Sabellidae indetermin.	1	1.0
130. Potamilla reniformis (Leukart, 1849)	1	1.0
131. P. neglecta (Sars, 1851)	1	1.0
132. Potamilla indetermin.	1	1.0
133. Serpulidae indetermin.	1	1.0
Annelida, Oligochaeta		
134. Tubificidae indetermin.	2	1.0
Sipuncula		
135. Sipuncula indetermin.	2	2.0
136. Phascolion strombi (Montagu, 1804)	2	2.0
137. Golfingia indetermin.	2	2.0
Arthropoda, Pycnogonida		
138. Pycnogonum littorale (Strom, 1762)	4	2.0
Arthropoda, Crustacea		
139. Balanus balanus (Linnaeus, 1758)	1	5.0
140. B. crenatus Bruguiere, 1789	1	5.0
141 Balanus indetermin.	1	5.0
142 Lamprops quadriplicata Smith, 1879	2	1.0
143. Gnathia cerina (Stimpson, 1853)	1	2.0
144. Idotea phosphorea Harger, 1873	5	2.0
145. Ampelisca vadorum Mills, 1963	1/2	2.0
146. Corophium crassicorne Brugelius, 1859	2/1	1.0
147. C. tuberculatum Shoemaker, 1934	2/1	1.0
148. C. bonelli (Milne-Edwards, 1830)	1/2	1.0
149. Erichthonius rubricornis Smith, 1873	1	1.0
150. E. difformis Milne-Edwards, 1830	1	1.0
151. Unciola irrorata Say, 1818	2	1.0
152. U. leucopis (Kroyer, 1845)	2	2.0
153. Melita dentata (Kroyer, 1842)	2	1.0
154. Maera danae (Stimpson, 1853)	2	2.0
155. Ischyrocerus anguipes Kroyer, 1838	1	1.0
156. Jassa falcata (Montagu, 1808)	1/4	1.0
157. Hippomedon serratus Holmes, 1905	2	2.0
158. Orchomenella minuta (Kroyer, 1846)	5	1.0
159. Leptocheirus pinguis (Stimpson, 1853)	1	2.0
160. Phoxocephalus holbolli (Kroyer, 1842)	2	1.0
161. Stenopleustes gracilis (Holmes, 1905)	2	1.0
162. Pleusymtes glaber (Boeck, 1861)	2/3	1.0
163. Pontogeneia inermis (Kroyer, 1838)	2	1.0
164. Dyopedos monocanthus (Metzger, 1875)	1	1.0
165. Caprella septentrionalis Kroyer, 1838	2	2.0
166. Aeginina longicornis (Kroyer, 1842-43)	2	2.0
167. Eualus pusiolus (Kroyer, 1841)	5	5.0
168. Crangon septemspinosa Say, 1818	5	10.0
169. Axius serratus Stimpson, 1852	5	5.0
170. Pagurus acadianus Benedict, 1901	5	10.0
171. P. pubescens Kroyer, 1838	5	10.0
172. P. longicarpus Say, 1817	5	5.0
173. Pagurus indetermin.	5	10.0
174. Hyas coarctatus Leach, 1815	5	5.0
175. Cancer indetermin.	5	5.0
Echinodermata, Holothuroidea		
176. Psolus fabricii (Duben & Koren, 1846)	2	3.0
Echinodermata, Echinoidea		
177. Strongylocentrus droebachiensis (Muller, 1776)	3	10.0
Echinodermata, Stelleroidea		
178. Henricia indetermin.	2	10.0
179. Asteriidae indetermin.	4	10.0
180. Asterias indetermin.	4	10.0
181. Leptasterias indetermin.	4	10.0
182. Ophiurida indetermin.	1	5.0
183. Amphipholis squamata (Delle Chiaje, 1828)	1	5.0
Chordata, Ascidiacea		
184. Boltenia ovifera (Linnaeus, 1767)	1	5.0
185. Bostrichobranchus pilularis (Verrill, 1971)	1	5.0
Chordata, Pisces		
186. Liparis coheni Able, 1976	4	3.0

	9	10	11	12	13	14	15
1	1(4.223)						
2	3(2.220)	4(0.370)	2(2.172)		5(3.336)		2(0.113)
3							
4							
5							
6			1 -				
7							
8							
9							
10							
11		1(0.028)	4(0.046)		6(0.318)	1(0.004)	
12							
13							
14					1(0.098)		
15							
16							
17							
18							
19							
20							
21					1(6.716)		
22							
23							
24							
25							
26							
27							
28							
29							
30			2(0.010)				
31					1(0.967)		
32					66(315.450)	8(99.410)	25(596.930)
33		15(132.600)	74(882.940)			4(0.035)	2(0.008)
34	1(0.006)		26(0.124)				
35					1 -		
36							
37							
38			3(14.299)				
39			1(1.966)				
40			2(0.039)				
41			2(7.613)				
42							
43							
44							
45							
46							
47							
48							
49							
50							
51							
52							
53							
54							
55		1(0.006)					
56							
57							
58							
59		3(0.010)	8(0.096)		13(0.068)	9(0.132)	3(0.026)
60			3(0.047)		1(0.053)	5(0.073)	4(0.036)
61							
62							
63							
64							
65							
66							1(0.775)
67							
68							
69							
70							
71							
72							
73			1(0.002)			1(0.007)	
74							
75							
76			6(0.006)			4(0.004)	1(0.001)
77							
78			7(0.119)		1(0.002)	2(0.016)	2(0.040)
79							
80			3(0.051)			1(0.015)	
81						1(0.005)	
82							
83						2(0.007)	
84							
85							6(0.031)
86			48(0.150)			54(0.175)	22(0.114)
87							
88							
89							
90							
91							
92							
93						1(0.003)	

	9	10	11	12	13	14	15
94							
95						1(0.002)	1(0.006)
96							
97							
98					1(0.002)		1(0.005)
99							
100							
101							
102							
103	30(0.130)	8(0.013)	4(0.008)		34(0.135)		1(0.001)
104							
105							
106							
107							
108							
109							
110							
111							
112							
113			1 -				
114			1(0.010)				
115							
116					1(0.006)		
117					3(0.019)	7(0.024)	
118	1(0.002)		2(0.020)				
119							
120							
121						1(0.004)	
122							
123							
124							
125			1(0.010)				
126							
127							
128					2(0.012)		
129					2(0.006)		
130	1(0.002)						
131							
132							
133							
134						1(0.022)	
135							
136							
137			4(0.007)		4(0.006)		
138							
139							
140		38(0.220)			45(2.181)		
141							
142							
143							
144							
145							
146							
147							
148					5(0.005)		
149							
150							
151			1(0.002)				2(0.005)
152							
153			1(0.004)				
154							
155			1(0.005)				
156		7(0.003)					
157							
158							
159			1(0.005)				
160							1(0.002)
161							
162							
163							
164							
165							
166							
167						2(0.003)	
168							
169							
170							1(0.425)
171			1(0.356)				
172							
173							
174					1(1.962)		
175							
176							
177							
178	1(0.375)						
179							
180			1(0.730)				1(0.232)
181							
182							1 -
183							
184							
185	1(0.003)						
186							

	16	17	18	19	20	21	22
1				5(2.535)	3(0.120)	6(1.296)	2(0.840)
2							8(0.183)
3							
4							
5							1(0.013)
6			3(0.003)				
7							3(0.038)
8							
9			3(0.003)				
10				1(0.014)		10(0.316)	7(0.155)
11	2(0.010)						
12							
13							
14							
15							
16						1(0.037)	
17							
18	1(1.635)						
19							
20							
21							
22							
23							
24							
25							
26							
27	3(0.044)			2(0.033)			
28							
29							
30							
31					3(0.156)		
32					5(25.375)	41(672.120)	5(13.011)
33	1(25.558)		8(90.720)	64(730.530)		24(0.500)	3(0.242)
34			1(0.011)	4(0.067)			
35					1(0.031)		
36							1(0.090)
37							2(5.555)
38							
39						3(0.163)	
40			1(0.006)			12(0.652)	1(4.350)
41							
42							
43						1(1.373)	
44						1(1.373)	
45							
46							
47							
48							
49						1(0.012)	
50	1(0.001)						
51							
52							
53							
54							
55				6(0.011)	2(0.007)		
56							
57							
58							
59			4(0.021)	3(0.452)	2(0.023)	5(0.094)	4(0.209)
60	11(0.057)					4(0.075)	1(0.052)
61	1(0.005)					2(0.038)	
62							
63							
64			1(0.005)			1(0.012)	
65							
66							
67							
68	3(0.080)						
69							
70	1(0.027)						
71							
72	3(0.002)		1(0.012)				
73			2(0.008)			1(0.012)	
74	1(0.005)						6(0.117)
75							
76			1(0.004)			20(0.244)	4(0.065)
77							
78	2(0.353)		3(0.011)	2(0.004)		4(0.048)	2(0.042)
79							
80					2(0.007)	6(0.073)	
81							
82							
83	1(0.019)		1(0.012)				1(0.004)
84	1(0.019)						
85							
86	10(0.194)		8(0.093)			10(0.045)	64(0.330)
87	19(0.368)		5(0.058)				
88							
89							
90							
91	9(0.218)						
92							
93							

	16	17	18	19	20	21	22
94							
95							
96			3(0.019)				
97	1(0.001)						3(0.003)
98							
99			1(0.003)				
100	1(0.012)					1(0.006)	
101							
102			1(0.001)				
103	1(0.003)		1(0.005)	37(0.100)	34(0.128)		2(0.017)
104	1(0.044)						
105	1(0.044)						
106							
107	1(0.044)		2(0.007)				
108							
109	7(0.033)						
110			2(0.016)				
111	2(0.010)		2(0.003)			1(0.003)	1(0.003)
112							
113			1(0.001)				
114							
115	1(0.005)						
116							
117				4(0.046)			
118						1(0.012)	1(0.010)
119							
120							
121							
122							
123							
124							1(0.010)
125							
126							
127							
128							
129							
130	5(0.030)			1(0.020)	2(0.012)	1(0.010)	
131							
132							
133						4 -	
134							
135	1(0.019)						
136							
137			10(0.010)			10(0.036)	1(0.023)
138							
139							
140				82(1.434)	3(0.026)		31(0.928)
141							
142	2 -						
143							
144	1(0.002)					1(0.100)	
145	18(0.025)						
146							
147							
148	4(0.008)			2(0.003)	5(0.004)	1(0.006)	
149							
150						1(0.006)	
151	2(0.004)						
152							
153	1(0.002)					6(0.036)	
154						2(0.011)	
155					1(0.001)	2(0.011)	
156							
157							
158							
159	10(0.062)						
160	20(0.018)		2 -				
161	1(0.002)		2 -				
162			4 -				
163							
164							
165							
166							
167							
168	2(0.006)						
169							
170							
171	1(0.340)						
172							
173	1 -						
174							
175							
176							
177							
178				1(0.136)		1(0.071)	
179							
180			1(0.658)	2(0.271)		3(0.214)	
181							
182							
183	4(0.011)						
184							
185							
186							

	23	24	25	26	27	28	29
1							1(0.030)
2							
3							
4							
5							
6							
7					1(0.002)		
8				4(0.020)			
9							
10					1(0.028)	1(0.014)	
11							
12							
13							
14					1(0.707)		
15				1(2.596)			
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							
32							
33			3(30.227)	9(29.063)		10(236.900)	17(40.000)
34							2(0.010)
35							
36							
37					1(3.526)	2(4.360)	1(4.784)
38							
39							2(0.608)
40							
41							
42							
43							
44							
45							
46							
47							
48							
49							
50							
51							
52							
53							
54							
55			1(0.027)	4(0.038)			
56							
57							
58							
59			2(0.011)	7(0.215)		1(0.031)	3(0.080)
60	1(0.020)		3(0.017)	4(0.122)		4(0.124)	1(0.027)
61			1(0.006)				
62							
63							
64							
65							
66							
67							
68							
69							
70							
71							
72							
73			3(0.082)				
74							1(0.001)
75							
76					1(0.001)		
77							
78			2(0.055)	1(0.009)		1(0.010)	1(0.004)
79							
80			1(0.027)	1(0.009)	1(0.001)		
81							
82							
83						1(0.026)	
84							
85							
86			25(0.421)		17(0.248)	4(0.009)	30(0.182)
87			6(0.101)		1(0.015)		
88							
89							
90							
91							
92							
93							

	23	24	25	26	27	28	29
94							
95							
96			2(0.005)				
97							
98				16(0.042)			
99				2(0.005)			
100							
101			1(0.003)				
102							
103			3(0.010)	223(1.000)	7(0.033)		1(0.001)
104							
105							
106							
107							
108							
109							
110							
111			3(0.003)				
112						1(0.004)	
113					1(0.005)		
114							
115							
116							
117							
118				1(0.003)			
119				1(0.031)			
120							
121							
122							
123							
124					3(0.018)		1(0.004)
125							
126							
127							
128							
129							
130			1(0.007)	1(0.043)			5(0.021)
131						1(0.001)	
132						1(0.004)	
133							
134							
135							
136							
137			7(0.014)	3(0.005)			
138							
139							
140							
141							
142							
143							
144						1(0.004)	
145				1 -			
146							
147							
148			2 -				
149						1(0.001)	
150							
151			5(0.006)	60(0.094)	1(0.004)	1(0.002)	
152							
153				1(0.103)			
154							
155				1 -			
156							
157							
158							
159							
160			7(0.015)				
161							
162							
163							
164							
165							
166							2(0.002)
167			1(0.010)			4(0.091)	
168							
169							
170							
171							
172							
173			1(0.005)				
174							
175							
176							
177							
178							
179							
180							
181							
182							
183							
184							
185							
186							

	30	31	32	33	34	35	36
1							
2	2(0.184)	4(0.116)	5(0.128)				
3							
4							
5							7(0.049)
6		1 -	13(0.027)				
7							
8							4(0.028)
9		1(0.020)					
10			1(0.002)				
11	8(0.282)	3(0.107)	2(0.012)				
12						1(0.030)	
13							
14							
15	6(1.390)					550(626.950)	30(6.707)
16	2(7.587)					30(7.967)	3(0.031)
17							
18				1(1.778)			
19							
20	2(0.036)						
21						2(8.180)	
22							
23							
24							
25						1(7.330)	
26							
27							
28							9(0.152)
29							3(0.233)
30	3(0.110)	3(0.085)					
31							
32	1(0.037)	2(0.153)	3(0.078)				
33	78(1091.640)	29(283.720)	84(563.170)	15(227.270)		46(1271.750)	87(1053.490)
34		5(0.020)					5(0.040)
35							
36							
37				11(0.045)			
38	14(57.092)	1(3.270)		1(4.165)		6(30.187)	
39	6(6.511)			1(0.006)			
40							
41	5(24.947)			2(7.656)		2(10.010)	
42			15(11.650)	4(0.016)			
43						1(4.090)	
44	1(0.204)						
45			1(0.027)				
46	4(0.147)	1(0.433)					1(0.028)
47							1(0.065)
48							
49							
50							
51							
52							
53							
54							
55	22(0.172)	7(0.048)	2(0.009)			1(0.027)	4(0.166)
56	1(0.008)	1(0.007)	1(0.005)				1(0.041)
57							8(0.331)
58	2(0.054)						
59	20(0.542)	16(0.400)	17(0.352)	1(0.005)		4(0.225)	39(0.895)
60	1(0.027)	4(0.100)	11(0.227)	5(0.027)		3(0.168)	10(0.231)
61			2(0.041)	1(0.005)			
62							
63							
64				2(0.240)			
65							
66			1(1.098)				1(0.205)
67						2(0.091)	
68							
69	2(0.072)						1(0.005)
70						1(0.045)	
71							
72							
73			2 -				
74			2(0.004)	3(0.005)			1(0.041)
75	3(0.023)			1(0.002)			3(0.002)
76						1(0.002)	
77							
78	2(0.016)	11(0.301)	8(1.334)	1(0.305)		4(0.108)	14(0.580)
79							
80	5(0.039)	2(0.055)					1(0.041)
81			1 -				
82							
83	1(0.055)		9 -	1(0.006)			
84							
85							
86	9(0.055)	16(0.082)	201(1.798)	52(0.294)		4(0.023)	20(0.152)
87			5(0.045)				
88							
89							
90							
91							
92							
93	1(0.010)		1(0.002)			1(0.011)	

	30	31	32	33	34	35	36
94							
95							
96							
97							
98	1 -	7(0.009)					9(0.094)
99		2(0.007)				1(0.011)	
100	1(0.010)						
101							
102							
103	139(0.498)	240(0.977)	43(0.085)	3(0.004)		7(0.055)	415(2.024)
104							
105							
106							1(0.013)
107							
108							
109						1(0.011)	
110							
111	3(0.065)						
112							
113	1(0.005)			1(0.001)			
114							
115							
116							
117							
118	4(0.221)		7(0.011)				
119		3(0.034)					
120							
121							
122							
123							
124	3(0.165)						
125							
126							
127						1(0.204)	
128							1(0.442)
129		4(0.048)	1(0.002)				
130	23(0.223)	11(0.170)	29(0.216)			1(0.010)	28(0.420)
131			1(0.007)				
132							
133							
134			1 -				
135	4 -		4 -				2(0.015)
136							
137	41(0.073)	12(0.025)	33(0.067)	5(0.005)			31(0.076)
138			1(0.045)				
139							2 -
140						60(3.823)	5(0.353)
141							
142							
143		1(0.002)					
144		1(0.003)	1(0.011)	2(0.003)			
145	2(0.020)	28(0.032)	3(0.008)				10(0.025)
146							
147							
148	20(0.007)	53(0.030)	5(0.006)				6(0.006)
149							
150							
151	50(0.078)	60(0.118)	44(0.058)			14(0.034)	133(0.760)
152							
153	2(0.015)			1(0.006)		1(0.005)	
154							
155	1 -	3 -					
156							
157							
158							
159	1(0.030)						7(0.123)
160	3(0.002)					10(0.010)	
161							
162		1 -				1(0.005)	
163							
164							
165		1 -					
166							
167	2(0.022)		4(0.012)			3(0.020)	
168							
169							1 -
170		1(0.050)				3(0.750)	1 -
171	3(0.068)						
172							
173							
174	1(0.046)	1(0.141)				1(1.220)	3(4.598)
175							
176							
177							
178							
179							
180	6(3.530)	2(1.407)	2(1.387)				
181							
182			3(0.011)				
183	14(0.130)		1(0.004)				
184							
185							
186							

	37	38	39	40	41	42	43
1							
2	1(0.003)					4(0.253)	1(0.122)
3							
4							
5					1(0.016)	2(0.013)	2(0.006)
6		1(0.003)	9(0.027)				4(0.010)
7					1(0.065)		
8							
9			1(0.003)				
10							
11							
12							
13							
14			1(0.088)				
15							
16							
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21							
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23							
24							
25							
26							
27							
28							
29							
30			2(0.109)			1(0.150)	
31			2(0.108)				
32							
33	1(5.240)		36(539.304)			25(159.952)	6(31.990)
34			11(0.076)				
35			2(0.170)				
36							
37			1(0.006)				
38							
39			2(0.730)				
40	1(1.666)		2(2.721)				
41							
42							
43							
44			1(0.586)				
45							
46							
47							
48							
49							
50						1(0.003)	1(0.003)
51							
52							
53							
54							
55	3(0.006)		7(0.252)			2(0.131)	4(0.020)
56							
57			2(0.072)				
58							
59	2(0.011)	1(0.012)	33 -			20(0.475)	42(1.319)
60	1(0.005)	2(0.024)	14 -			4(0.095)	3(0.094)
61							
62							
63							
64							
65							
66	1(0.182)						
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69							
70							
71			1(0.015)				
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73							
74							2(0.007)
75							
76			2(0.003)				1(0.003)
77					1(0.100)	1(0.065)	
78			11(0.396)			9(0.589)	14(0.661)
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80						1(0.065)	
81			2(0.019)				
82							
83			1(0.009)				
84							1(0.008)
85							
86	4(0.020)	3(0.010)	6(0.024)			50(0.314)	3(0.020)
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88							
89		1(0.003)					
90							
91							
92	1(0.002)						
93							

	37	38	39	40	41	42	43
94							
95							
96		1(0.003)					
97						8(0.016)	2(0.006)
98							2(0.015)
99							
100							
101							
102						199(0.678)	224(0.725)
103	21(0.078)		43(0.645)		1(0.205)		
104							
105							
106							
107							
108							
109							
110							
111	1(0.002)		3(0.007)				
112							
113	1(0.005)						
114							
115							1(0.014)
116					1(0.005)		
117	1(0.002)						1(0.031)
118							7(0.099)
119						1(0.042)	
120						1(0.042)	
121							
122							
123	1(0.002)						
124							3(0.042)
125	1(0.004)						
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127							
128							
129		2(0.006)					
130	3(0.008)		11(0.100)			53(0.341)	52(0.422)
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132							
133							
134							
135			1 -			3(0.010)	
136							
137			30(0.030)			50(0.110)	4(0.007)
138						1(0.009)	
139							
140							
141							
142							
143							
144							
145	2(0.002)	1 -	17(0.032)			18(0.016)	2(0.006)
146							
147							
148			19 -				3(0.003)
149							
150							
151	22(0.006)	3(0.005)	85(0.150)			164(0.217)	67(0.100)
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153			2(0.013)				
154							
155							
156							
157							
158							
159			1 -				
160		5(0.010)					
161							
162							
163							
164							
165		1 -					
166							
167							
168							
169							
170						2(0.883)	
171							
172							
173			3(0.260)				
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178							
179							
180							
181			2(1.482)				
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183							
184							
185						4(0.620)	
186							

	44	45	46	47	48	49	50
1							
2	1(0.023)			20(3.200)	14(0.314)	35(1.478)	
3							
4							
5				1(0.004)		3(0.028)	
6			1(0.001)	2(0.012)			
7							
8				2(0.013)			
9							
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21							
22				1(0.235)			
23							
24							
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28							
29							
30							
31							
32					2(1.175)	16(95.042)	
33							
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44							
45							
46							
47							
48				1(0.264)			
49							
50							
51							
52							
53							
54							
55			1(0.001)	1(0.004)	13(0.035)	1(0.004)	
56				1(0.004)			
57				3(0.013)			
58							
59			2(0.100)	53(3.170)	3(0.043)	21(0.512)	1(0.154)
60				5(0.299)	4(0.057)	3(0.073)	
61							
62							
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64							
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66							
67							
68							
69							
70							
71							
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73							
74				1(0.053)			
75							
76		1(0.002)		1(0.002)			
77							
78				8(0.426)	1(0.041)	7(0.529)	
79							
80						2(0.005)	
81			8(0.017)				
82							
83				1(0.004)		2(0.008)	
84				5(0.020)	1(0.008)		
85							
86	2(0.003)	4(0.028)	5(0.011)	34(0.140)	3(0.023)	15(0.133)	
87							
88							
89							
90							
91							
92							
93							

	44	45	46	47	48	49	50
94							
95							
96							
97					3(0.003)		
98							
99							
100							
101							
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103	22(0.072)		7(0.027)	466(1.899)	78(0.246)	154(0.417)	
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107							
108							
109							
110							
111							
112					1(0.002)		
113							
114							
115							
116							
117							
118			1(0.002)				
119	1(0.010)			2(0.019)	1(0.013)	2(0.023)	
120							
121							
122							
123							
124							
125				8(0.075)	5(0.065)	6(0.071)	
126							
127							
128							
129							
130	2(0.020)			167(1.327)	25(0.145)	24(0.211)	
131							
132							
133							
134							
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136							
137						2(0.005)	
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142							
143							
144							
145				1 -			
146							
147				1 -			
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151				33(0.046)	3(0.003)	10(0.014)	
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153							
154							
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156			5(0.003)			8(0.010)	
157							
158							
159				1(0.008)			
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161							
162						3(0.004)	
163							
164				1 -		1(0.001)	
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167					1(0.002)	1(0.034)	
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171							
172				2(0.364)			
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174							
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179							
180							
181							
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184							
185							
186							

	51	52	53	54	55	56	57
1				8(1.080)			1(0.150)
2							
3					1(0.760)		
4							
5				3(0.163)			4(0.022)
6							
7							
8							
9							
10							
11		5(0.232)					
12							
13							
14							1(1.114)
15							
16							
17					3(0.072)		
18							
19							
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21							
22	1(4.825)						
23							
24							
25							
26							
27					9(0.190)		
28							
29				4(0.060)		3(0.050)	
30				1(0.165)			
31				4(0.063)			
32							
33				373(1760.990)			
34				5(0.105)			
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36							
37				1(0.003)			
38					9(40.608)	3(15.558)	2(9.180)
39				4(2.920)			
40				1(2.837)			
41				1(4.017)			1(4.943)
42					3 -		
43					9(32.588)	1(11.091)	
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46					1(0.035)		
47				7(0.984)			
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51					5(0.049)	1(0.023)	
52							
53					2(0.020)		
54							
55				7(0.032)			
56							
57				1(0.005)			1(0.008)
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59	1(0.010)			32(0.953)			3(0.095)
60				4(0.119)	16(0.561)	1(0.012)	4(0.128)
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62					1(0.040)	1(0.122)	
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65					1(0.068)	1(0.071)	
66				10(1.213)	10(0.678)	1(0.071)	
67				1(0.087)		1(0.012)	1(0.015)
68						6(0.071)	
69							
70					1(0.005)		
71							
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76				2(0.056)			
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79							
80						1(0.023)	
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83				1(0.003)			
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90						3(0.321)	
91					8(0.337)		
92							
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94							
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97							1(0.001)
98				2(0.009)			
99							
100							
101							
102				156(0.645)			41(0.200)
103	3(0.003)						
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107							
108						14(0.084)	
109							
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111							
112				2(0.003)			
113					1(0.620)		
114							
115				1(0.005)			
116				7(0.033)			
117				2(0.009)			
118							
119							
120							
121							1(0.060)
122							
123							
124							
125							
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127							
128				1(0.005)			1(0.012)
129				29(0.405)			23(0.260)
130							
131							
132							
133							
134					1(0.760)		
135					1(0.050)	1(0.090)	
136							27(0.076)
137	1 -			26(0.050)			
138				1(0.069)			
139							
140		150(10.119)					
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147							
148				2(0.014)			
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151				12(0.023)	40(0.233)	1(0.002)	27(0.064)
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153							
154							2(0.020)
155							
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157						1(0.050)	1(0.001)
158					19(0.056)		
159				5(0.028)	1023(21.971)	2(0.020)	2(0.016)
160					3(0.017)	2(0.003)	
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162				1(0.007)			
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166							
167				9(0.058)		3(0.009)	
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1							1(0.023)
2		5(2.300)		3(2.050)			
3							
4							
5				1(0.027)			
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11		1(0.013)					
12							
13				3(0.075)			
14							
15					1(0.598)		
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20							1(1.440)
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25				2(0.020)			
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30		2(0.008)					
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32							
33	1(4.036)	70(266.610)	2(9.502)	43(234.790)	2(38.841)		16(112.070)
34		1(0.006)		1(0.144)			
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48		2(0.240)					
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53					1(0.175)		
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55		7(0.011)		3(0.037)			
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59		10(0.518)	3(0.037)	3(0.193)	1(0.019)		1(0.066)
60		1(0.052)	1(0.012)	5(0.322)	4(0.075)		
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62							
63							
64						1(0.018)	
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66	2(0.337)	1(0.087)		1(0.552)			
67					1(0.044)	1(0.018)	
68							
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74							
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76	1(0.001)						
77							
78		6(0.306)		10(0.874)			1(0.021)
79		4(0.204)					
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83		1(0.005)	1(0.003)				
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85							
86				2(0.012)			
87							
88		1(0.005)					
89							
90							
91	1(0.032)						
92							
93							

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94							
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96	1(0.004)						
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98							
99		2(0.032)					
100							
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103		222(0.922)	5(0.014)		2(0.010)		4(0.030)
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106				2(0.036)			
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114							
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116							
117		1(0.027)					
118		1(0.027)	2(0.010)	1(0.018)			
119							
120		6(0.159)					
121	1(0.010)						
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123							
124			1(0.003)				
125							
126				1(0.018)			
127							
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129							
130		21(0.337)					
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133							
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136							
137		7(0.016)					
138							
139							
140				3250(613.817)	1(0.497)		5(1.075)
141							
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143							
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145					1(0.008)		
146					1 -		
147							
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151		2(0.002)	1(0.001)		112(0.392)	329(3.636)	9(0.130)
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159					4(0.019)	1608(27.718)	8(0.100)
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167					1(0.001)		1(0.087)
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186							

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1							
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9						1(0.007)	
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13					5(0.095)		1(0.025)
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24							
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28					2(0.118)	1(0.040)	
29							
30					3(0.756)	6(0.445)	
31							
32						6(1.537)	
33		10(60.740)					
34					4(1.008)		
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46						6(0.050)	
47						18(0.614)	8(0.212)
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53	1(0.002)	1(0.003)					
54							
55		5(0.040)				11(0.060)	8(0.036)
56							2(0.009)
57							
58							
59		4(0.178)				14(0.342)	29(0.580)
60		5(0.223)			3(0.005)	4(0.098)	3(0.060)
61							
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63					1(0.155)		
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76					1(0.001)		
77							
78		8(0.360)			1(0.210)	14(0.838)	8(0.099)
79							
80					4(0.840)	7(0.419)	3(0.037)
81							
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85							
86						3(0.066)	
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89	1(0.003)						
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91					1(0.090)		
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97						7(0.020)	
98							2(0.007)
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101							
102						260(1.410)	40(0.182)
103		25(0.160)					
104							
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111							1(0.003)
112							
113							
114							
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116					1(0.005)		
117					1(0.005)		2(0.083)
118						10(0.264)	1(0.042)
119							4(0.167)
120							
121							
122							
123						8(0.057)	
124	2(0.005)						
125							
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128							
129						14(0.265)	6(0.058)
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136						4(0.009)	
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140		1750(305.317)					1(0.004)
141							
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146							
147					8(0.010)	35(0.040)	24(0.039)
148							2(0.003)
149							3(0.005)
150							
151	1(0.017)	2(0.005)				1(0.017)	2(0.003)
152							
153							
154						1(0.001)	
155						1(0.001)	10(0.016)
156							
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159	2(0.033)						
160							
161							
162						4(0.004)	
163						1(0.001)	
164							1(0.002)
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167					1(0.001)	6(0.135)	
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173							
174		1(0.360)			1(0.082)		
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181						3(1.523)	1(0.598)
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184							2(9.864)
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	72	73	74	75	76	77	78
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2	8(25.108)			1(0.008)			
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6				1(0.078)	1 -		
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11	1(0.015)						3(0.060)
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14				3(0.100)			
15			1(0.381)				
16			2(0.595)				
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24					1(4.606)		
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32							
33				4(15.777)			
34				1(0.200)			1(0.005)
35			1(0.326)				
36							
37	1(0.003)		3(17.039)				
38			6(30.925)		7(31.782)		
39				1(2.741)	2(9.081)		
40			1(4.238)	1(4.863)			
41			9(46.881)		2(9.081)		
42	1(0.452)				1(4.540)	2(0.010)	7(33.053)
43			6(31.841)				
44							
45							
46					1(0.017)		
47			1(0.045)				
48				1(0.011)		1(0.011)	
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52						2(0.452)	
53							
54				1(0.002)			
55			1(0.014)				
56							
57							
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59	4(0.364)			2(0.022)	3(0.254)	5(0.116)	
60	1(0.091)		1(0.016)	10(0.110)	5(0.423)	6(0.139)	6(0.086)
61							1(0.014)
62							
63					1(0.044)		
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66					1(0.240)		2(0.686)
67			2(0.056)		1(0.064)		
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69			1(0.015)				
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72						4(0.006)	1(0.001)
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76	1(0.001)					5(0.007)	2(0.003)
77							
78				2(0.010)	12(0.363)	3(0.020)	2(0.010)
79							
80			1(0.014)				
81							
82						1(0.007)	
83						1(0.003)	
84			5(0.186)	1(0.007)			
85							
86				1(0.007)		42(0.309)	14(0.071)
87			1(0.037)			3(0.022)	
88							
89							
90							
91			1(0.120)		3(0.110)		
92							
93							

	72	73	74	75	76	77	78
94						1(0.003)	3(0.014)
95							1(0.005)
96						2(0.006)	
97							
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99							
100			2(0.031)			1(0.003)	1(0.005)
101							
102							
103			45(0.264)		10(0.050)	48(0.266)	
104							
105						4(0.010)	1(0.006)
106				1(0.002)		4(0.013)	
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108						2(0.020)	
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113							1(0.005)
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115			3(0.020)				
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117			1(0.007)		2(0.023)	3(0.012)	3(0.008)
118						2(0.008)	
119				1(0.024)			
120							
121					3(0.067)	1(0.003)	
122							1(0.010)
123				1(0.024)			
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128							
129			1(0.007)				
130			3(0.162)		3(0.102)	5(0.160)	
131							
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136							
137			1(0.003)			74(0.232)	1(0.004)
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141				1(0.946)			
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145			2(0.011)				
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148					10 -		
149							1(0.010)
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151			2(0.010)	2(0.010)	5(0.018)	7(0.022)	2(0.007)
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154					8(0.085)	3(0.034)	2(0.018)
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159	2(0.010)				4(0.073)		
160			1(0.002)				
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170				1(0.289)	2(2.977)		
171							
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173	1(0.004)						
174				1(0.253)	1(0.155)		1(0.087)
175							
176					1(0.319)		
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179					2(0.820)		
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181				3(1.621)			
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183				3(0.012)			
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55			1(0.022)
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59		1(0.241)	
60		1(0.241)	
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74		1(0.002)	1(0.002)
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78		1(0.002)	1(0.026)
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86		1(0.006)	
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