APPENDIX A

Population and Population Density of Rockingham and Strafford County Towns

(NHOSP, 1997b)

Population by Towns: US Census and NH OSP Projections. **TABLE A-1**

Town	Area (mi²)	US Census 1990	OSP Est 1993	OSP Est 1995	OSP Est 2005	OSP Est 2015
ROCKINGHAM COUNTY						
Exeter	19.5	12481	12500	11995	11943	12017
Greenland	13.6	2768	2863	2799	3085	3402
Hampton	13.5	12278	12466	11970	12028	12641
Hampton Fall	12.5	1503	1584	1424	1443	1529
New Castle	2.0	840	835	825	849	874
Newfields	7.3	888	964	800	736	749
Newington	12.1	990	700	675	736	812
Newmarket	13.8	7157	7308	7197	7952	8740
North Hampto	13.8	3637	3733	3274	2858	2903
Portsmouth	15.6	25925	22561	22766	24112	25033
Rye	14.0	4612	4590	4048	3396	3371
Seabrook	9.5	6503	6616	6547	7245	7959
Stratham	15.2	4955	5224	5873	8066	9395
Brentwood	16.8	2590	2677	2599	2858	3153
Candia	30.2	3557	3589	3599	3962	4370
Chester	26.0	2691	2812	2749	3113	3465
Danville	11.7	2534	2766	2974	4047	4713
Deerfield	51.9	3124	3194	3424	4273	4901
East Kingsto	9.9	1352	1458	1349	1500	1654
Epping	26.2	5162	5342	5548	6735	7616
Fremont	17.2	2576	2703	2599	2858	3153
Hampstead	14.4	6732	7056	7722	10216	11799
Kensington	11.8	1631	1631	1599	1698	1842
Kingston	20.8	5591	5651	5748	6594	7366
Newton	9.9	3473	3527	3524	3849	4245
Northwood	29.7	3124	3159	3299	3905	4370
Nottingham	48.1	2939	3001	3199	3934	4432
Raymond	29.3	8713	8925	9446	11999	13734
Sandown	14.3	4060	4228	4773	6566	7647
STRAFFORD COUNTY						
Dover	28.2	25042	25500	24324	24310	25767
Durham	25.5	11818	11515	11416	11303	11937
Madbury	14.0	1404	1456	1535	1853	2081
Rollinsford	7.7	2645	2681	2594	2647	2828
Barrington	49.1	6164	6406	6661	7954	8884
Farmington	37.4	5739	5810	5888	6480	7077
Lee	20.4	3729	3816	4374	5813	6679
Middleton	18.6	1183	1181	1334	1715	1956
Milton	34.7	3691	3758	4119	5122	5794
NewDurham	45.0	1974	1973	2266	2947	3364
Rochester	46.9	26630	26960	27078	29374	31948
Somersworth	10.3	11249	11370	10812	10935	10990
Strafford	52.0	2965	3083	3484	4639	5320

TABLE A-2 *Population Density By Towns: US Census and NH OSP Projections.*

Town	Area (mi²)	US Census 1990	OSP Est 1993	OSP Est 1995	OSP Est 2005	OSP Est 2015
ROCKINGHAM						
Exeter	19.50	640.05	641.0	615.13	612.46	616.26
Greenland	13.60	203.53	210.5	205.81	226.84	250.15
Hampton	13.50	909.48	923.4	886.67	890.96	936.37
HamptonFalls	12.50	120.24	126.7	113.92	115.44	122.32
NewCastle	2.00	420.00	417.5	412.50	424.50	437.00
Newfields	7.30	121.64	132.1	109.59	100.82	102.60
Newington	12.10	81.82	57.9	55.79	60.83	67.11
Newmarket	13.B0	518.62	529.6	521.52	576.23	633.33
NorthHampton	13.80	263.55	270.5	237.25	207.10	210.36
Portsmouth	15.60	1661.86	1446.2	1459.36	1545.64	1604.68
Rye	14.00	329.43	327.9	289.14	242.57	240.79
Seabrook	9.50	684.53	696.4	689.16	762.63	837.79
Stratham	15.20	325.99	343.7	386.38	530.66	618.09
Brentwood	16.80	154.17	159.3	154.70	170.12	187.68
Candia	30.20	117.78	118.8	119.17	131.19	144.70
Chester	26.00	103.50	108.2	105.73	119.73	133.27
Danville	11.70	216.58	236.4	254.19	345.90	402.82
Deerfield	51.90	60.19	61.5	65.97	82.33	94.43
EastKingston	9.90	136.57	147.3	136.26	151.52	167.07
Epping	26.20	197.02	203.9	211.76	257.06	290.69
Fremont	17.20	149.77	157.2	151.10	166.16	183.31
Hampstead	14.40	467.50	490.0	536.25	709.44	819.38
Kensington	11.80	138.22	138.2	135.51	143.90	156.10
Kingston	20.80	268.80	271.7	276.35	317.02	354.13
Newton	9.90	350.81	356.3	355.96	388.79	428.79
Northwood	29.70	105.19	106.4	111.08	131.48	147.14
Nottingham	48.10	61.10	62.4	66.51	81.79	92.14
Raymond	29.30	297.37	304.6	322.39	409.52	468.74
Salem	25.60	1005.70	1017.0	995.70	1018.13	1069.30
Sandown	14.30	283.92	295.7	333.78	459.16	534.76
STRAFFORD						
Dover	28.20	888.01	904.3	862.55	862.06	913.72
Durham	25.50	463.45	451.6	447.69	443.25	468.12
Madbury	14.00	100.29	104.0	109.64	132.36	148.64
Rollinsford	7.70	343.51	348.2	336.88	343.77	367.27
Barrington	49.10	125.54	130.5	135.66	162.00	180.94
Farmington	37.40	153.45	155.3	157.43	173.26	189.22
Lee	20.40	182.79	187.1	214.41	284.95	327.40
Middleton	18.60	63.60	63.5	71.72	92.20	105.16
Milton	34.70	106.37	108.3	118.70	147.61	166.97
NewDurham	45.00	43.87	43.8	50.36	65.49	74.76
Rochester	46.90	567.80	574.8	577.36	626.31	681.19
Somersworth	10.30	1092.14	1103.9	1049.71	1061.65	1066.99
Strafford	52.00	57.02	59.3	67.00	89.21	102.31

APPENDIX B

Drainage Area and Discharge of Tributaries to the Great Bay Estuary

Drainage area and discharge for rivers entering the Great Bay Estuary. From Short (1992). **TABLE B-1**

Rivers	Drainage Area[a] (km^2)	Mean Discharge[b] cfs	Period of Record
Lamprey	543	278	1934-77
Squamscott	331	163[c]	none
Winnicut	19	-	none
Oyster	78	19	1934-77
Bellamy	85	25[c]	none
Cocheco	472	242[c]	none
Salmon Falls	392	204	1968-78
Piscataqua	414	210[c]	none
Total	**2334**	**1141**	

[a] drainage areas from Brown and Arellano (1979)
[b] flow data from Normandeau Assoc., Inc. (1979)
[c] Calculated from a regression of mean discharge = 0.5617 x area - 22.62 (R2=0.998) based on data[a] from the Lamprey, Oyster and Salmon Falls Rivers.

APPENDIX C

Land Cover and Land Use Classification and Areas for the Great Bay and Hampton Harbor Estuary Watersheds

(Complex Systems Research Center/UNH, 1995)

Definitions of Land Cover and Land Use

Land cover data were developed from LANDSAT Thematic Mapper imagery, 1988 and 1990. For the purposes of the NEP nomination, some categories were collapsed for simplicity.

Forested	Land with tree cover, characterized by greater than 30 sq. feet/acre.
Wetland	Based on National Wetlands Inventory Criteria, and indicating the presence of hydric soils, hydrophytic vegetation, and evidence of hydrology.
Urban	Developed or built-up areas.
Agriculture	Lands that are actively farmed, or pastureland.
Disturbed	Land that has been altered to the extent that soil is exposed (e.g., gravel pits).
Cleared	Other classes of cleared lands, including clear cuts, orchards, etc
Water	Self explanatory.

Land use data was collected from a variety of sources including aerial photography interpretation, municipal tax records, and windshield surveys. Data sources were colleected in late 1980s and early 1990s.

Forested/Open (default)	Areas with no other uses present (default)
Single Family Residential	Areas of detached single family residences
Multi Family Residential	Areas of attached and detached multi-family residences, apartment complexes, ete.
Mobile Home	Areas of delineated groupings of homes in subdivisions. Scattered mobile homes are included in Single Family Residential.
Commercial/Mixed	Areas of retail and service establishments, as well as urban and non-urban areas where uses are too mixed to be mapped appropriately at the given scale. Also represents educational, administrative, and religious facilities, as well as cemeteries.
Industrial	Areas of manufacturing or non-retail eommereial facilities.
Recreational	Public and private parks, recreational areas, playgrounds, ballfields, golf courses, sport facilities, and reserves.
Agriculture/Mining	Crop and pasture lands, dairy, and livestock facilities, as well as areas with active resource extraction (e.g., gravel pits).
Not Classified	Areas with no data available.

TABLE C-1 *Watershed Land Cover for the Great Bay and Hampton/Seabrook estuaries (NH Portion)*

	Great Bay Estuary		Hampton/Seabrook Estuary	
Category	Acres	% of Total	Acres	% of Total
Forested	296,070	66	10,094	40
Wetland	44,703	10	5,392	21
Urban	43,944	10	5,800	23
Agriculture	28,418	6	2,039	8
Disturbed	8,494	2	380	2
Cleared	9,240	2	400	2
Water	17,211	4	1,030	4

TABLE C-2 *Watershed Land Use for the Great Bay and Hampton/Seabrook Estuaries (NH Portion)*

	Great Bay Estuary		Hampton/Seabrook Estuary	
Category	Acres	% of Total	Acres	% of Total
Forested/Open (default)	271,080	57	19,341	77
Single Family Residential	47,474	10	2,798	11
Multi Family Residential	1,710	< 1	1,198	5
Mobile Home	1,693	< 1	167	< 1
Commercial/Mixed	11,345	2	1,130	4
Industrial	3,118	< 1	282	1
Recreational	12,216	3	128	< 1
Agriculture/Mining	17,243	4	89	< 1
Not Classified	96,958	20	—	—

Note: Total acreage values for land use categories may not correlate well with those of land cover categories due to differences in catetgory definitions and data collection methods. Land cover data is derived from LANDSAT Thematic Mapper imagery, while land use data is derived primarily from aerial photo interpretation, municipal tax records, and windshield surveys of areas actively used for some purpose (for example, "agriculture" is defined and was identified differently in the development of land use and land cover information; hence, total acreage values do not correlate well).

APPENDIX D

Abundance and Value of New Hampshire Shellfish Resources

Abundance and Value of Shellfish Resources (N.H. Fish and Game) **TABLE D-1**

	CLAMS			OYSTERS		
AREA	**Acres**	**Bushels of Adults**	**Value @ $100/bu**	**Acres**	**Bushels of Adults**	**Value @ $60/bu**
Hampton Harbor	242	19,400	$1,940,000	0	0	0
Little Harbor Area	400	1,600	$160,000	0	0	0
Great Bay Estuary & Tributaries	2575	8,700	$870,000	52	51,931	$3,115,860
TOTAL	3217	29,700	$2,970,000	52	51,931	$3,115,860

Estimated Great Bay Oyster Population Data **TABLE D-2**

Bed Location	**Open/Closed Status**	**1981 Est. Acres**	**1993 Est. Acres**	**1981 Est. Bushels per Bed**	**1993 Est.Bushels per bed**
Nannie Island	Open	18.5	18.5	18,193	20,615
Adams Point	Open	2.0	5.1	1,794	8,358
SW Great Bay	Closed	9.8	no data	59,122	no data
Oyster River	Closed	7.4	6.0	12,062	10,038
Bellamy River	Closed	3.1	1.0	3,891	1,074
Piscataqua River	Closed	12.3	12.3	23,735	5,412

APPENDIX E

Finfish and Intertidal and Subtidal Infaunal Invertebrate Species in the Great Bay Estuary

TABLE E-1

Species list of finfish collected from Great Bay Estuary, New Hampshire. Collections were made by fyke, haul seines, trawls and gill nets from July 1980 to October 1981 (Nelson 1981).

Species	Common Name
MARINE	
Acipenseridae:	
Acipenser oxyrhynhus	Atlantic sturgeon
Ammodytidae:	
Ammodytes americanus	American sand lance
Bothidae:	
Scopthalmus aquosus	Windowpane
Clupeidae:	
Alosa aestivalis	Blueback herring
Alosa pseudoharengus	River herring(Alewife)
Alosa sapidissima	American shad
Brevoortia tyrannus	Atlantic menhaden
Clupea harengus harengus	Atlantic herring
Cottidae:	
Hemitripterus americanus	Sea raven
Cyclopteridae:	
Cyclopterus lumpus	Lumpfish
Gadidae:	
Gadus morhua	Atlantic cod
Pollachius virens	Pollock
Urophycis chuss	Red hake
Urophycis tenuis	White hake
Labridae:	
Tautogolabrus adspersus	Cunner
Osmeridae:	
Osmerus mordax	Rainbow smelt
Pholidae:	
Pholis gunnellus	Rock gunnel
Pomatomidae:	
Pomatomus saltatrix	Bluefish
Rajidae:	
Raja erinacea	Little skate
Raja ocellata	Winter skate
Salmonidae:	
Oncorhynchus kisutch	Coho salmon
Oncorhynchus tshawytscha	Chinook salmon
Salmo salar	Atlantic salmon
Serranidae:	
Centropristis striata	Black sea bass
ESTUARINE	
Anguillidae:	
Anguilla rostrata	American eel
Atherinidae:	
Menidia menidia	Atlantic silverside
Cottidae:	
Myoxocephalus aenaeus	Grubby
Cyprinodontidae:	
Fundulus heteroclitus	Common mummichog
Fundulus majalis	Striped mummichog
Gadidae:	
Microgadus tomcod	Atlantic tomcod
Gasterostidae:	
Apeltes quadracus	4-spine stickleback
Gasterosteus aculeatus	3-spine stickleback
Pungitius pungitius	9-spine stickleback
Percichthyidae:	
Morone americanus	White perch
Petromyzontidae:	
Petromyzon marinus	Sea lamprey
Pleuronectidae:	
Liopsetta putnami	Smooth flounder
Pseudopleuronectes americanus	Winter flounder
Syngnathidae:	
Syngnathidae fuscus	Northern pipefish
FRESHWATER	
Catastomidae:	
Catastomus commersoni	White sucker
Centrarchidae:	
Lepomis gibbosus	Pumpkinseed
Lepomis macrochirus	Bluegill
Micropterus dolomieui	Smallmouth bass
Micropterus salmoides	Largemouth bass
Cyprinidae:	
Notemigonus crysoleucas	Golden shiner
Notropis hudsonius	Spottail shiner
Semotilus corporalis	Fallfish
Esocidae:	
Esox niger	Chain pickerel
Ictaluridae:	
Ictalurus nebulosus	Brown bullhead
Percidae:	
Perca flavescens	Yellow perch
Salmonidae:	
Oncorhynchus mykiss	Rainbow trout
Salvelinus fontinalis	Brook trout

TABLE E-2 *Intertidal and subtidal infaunal invertebrate species collected (retained on a 0.5 mm screen) in the Great Bay Estuary, New Hampshire between June 1981 to May 1982 (Nelson 1982).*

	Intertidal	Subtidal
Phylum: RHYNCHOCOELA		
Nemertea spp.	x	x
Phylum: ANNELIDA		
Class: Polychaeta		
Aglaophamus circinata	x	x
Aglaophamus neotenus		x
Ampharete spp.	x	x
Aricidea catherinae	x	x
Capitella capitata	x	x
Chaetozone spp.	x	x
Clymenella torquata	x	x
Eteone heteropoda	x	x
Eteone longa		x
Eteone spp.	x	x
Exogone hebes	x	x
Fabricia sabella	x	x
Harmothoe spp.		x
Heteromastus filiformis	x	x
Hypaniola grayii		x
Lumbrineris tenuis	x	x
Nephtys paradoxa		x
Nephtys picta	x	x
Nephtys spp.		x
Nereis diversicolor	x	x
Nereis zonata	x	x
Nereis spp.	x	x
Paraonis fulgens	x	
Pholoe minuta	x	x
Phyllodoce maculata		x
Phyllodoce mucosa	x	x
Phyllodoce spp.	x	x
Polydora ligni		x
Polydora spp.		x
Praxillela gracilis	x	
Prionospio steenstrupi	x	x
Prionospio spp.		x
Pygospio elegans	x	x
Scolelepis squamatus	x	x
Scolelepis spp.	x	x
Spio spp.	x	x
Streblospio benedicti	x	x
Tharyx acutus		x
Class: Oligochaeta		
unidentified *Oligochaeta* spp.	x	x
Phylum: MOLLUSCA		
Class: Gastropoda		
Haminoea solitaria	x	x
Hydrobia minuta	x	x
Hydrobia spp.		x
Ilyanassa obsoleta	x	x
Littorina littorea	x	x
Lunatia heros	x	x
Lunatia spp.		x
Nassarius trivittatus		x
Odostomia spp.	x	x
Class: Bivalvia		
Cerastoderma pinnulatum		x
Crassostrea virginica	x	x
Ensis directus		x
Gemma gemma	x	x
Lysonia hyalina	x	x
Macoma balthica	x	x
Modiolus modiolus	x	x
Mulinia lateralis	x	x
Mya arenaria	x	x
Mytilus edulis	x	
Nucula tenuis		x
Nucula spp.		x
Solemya velum		x
Tellina agilis	x	x
Phylum: ARTHROPODA		
Class: Crustacea		
Ampelisca abdita/vadorum	x	x
Caprella spp.	x	x
Corophium spp.		x
Crangon septemspinosa	x	x
Cumacea spp.	x	x
Cyathura polita	x	x
Diastylis polita		x
Edotea triloba	x	x
Gammarus mucronatus	x	x
Gammarus spp.		x
Harpinia spp.	x	x
Leptognatha caeca		x
Leucon americanus	x	x
Leucon nasicoides	x	x
Microdeutopus gryllotalpa	x	x
Microdeutopus spp.	x	x
Oxyurostylis smithi	x	x
Photis macrocoxa	x	x
unidentified Copepoda spp.	x	x
unidentified Ostracoda spp.	x	x
Phylum: HEMICHORDATA		
Class: Enteropneusta		
Saccoglossus kowalevskii		x

APPENDIX F

Status and Trends for Overall Quality and Use Support for Water Quality in New Hampshire's Coastal Surface Waters: 1988-1996.

(NHDES, 1996b, 1994, 1992, 1990, 1988)

Status and trends for water quality in coastal surface waters from 1988 to 1996: Overall quality and use support. **TABLE F-1**

F= fully supporting all uses; P= partially supporting all uses; N= non-supporting all uses

FRESHWATER RIVERS AND STREAMS: **MILES**

	Coastal Basin				**Piscataqua River Basin**			
	F	P	N	Total	F	P	N	Total
1988	21	2	5	28	111	41	31	183
1990	24	4	0	28	83	45	55	183
1992	59	0	15	74	950	21	30	1001
1994	72	2	0	74	957	22	22	1001
1996	74	0	0	74	990	6	5	1001

TIDAL WATERS: SQUARE **MILES**

	Open Ocean				**Coastal Shoreline**				**Estuaries**			
	F	P	N	Total	F	P	N	Total	F	P	N	Total
1988	NA	NA	17.9	0.1	0	18	6.8	-	9.8	16.6		
1990	NA	NA	17.9	0.1	0	18	6.8	-	9.8	16.6		
1992	53.8	0	0.2	54	18	0	0	18	9.5	—	18.7	28.2
1994	53.8	0	0.2	54	18	0	0	18	9.5	—	18.7	28.2
1996	54	0	0	54	18	0	0	18	10.5*	0.4	17.3	28.2

*Area reflects individual use support for shellfish consumption only.

TABLE F-2 *Status and trends for water quality in coastal surface waters from 1988 to 1996: Overall quality and use support. (NHDES 1996b, 1994, 1992, 1990, 1988)*

F= fully supporting all uses; P= partially supporting all uses; N= non-supporting all uses

INDIVIDUAL USE IMPAIRMENT (SQ MILES)
SWIMMING*

	Open Ocean				Coastal Shoreline				Estuaries			
	F	P	N	Total	F	P	N	Total	F	P	N	Total
1988	ALL	—	—	ALL	17.9	0	0.1	18	ALL	—	—	ALL
1990	54	0	0	54	17.9	0	0.1	18	16.6	0	0	16.6
1992	53.8	0	0.2	54	18	0	0	18	16.6	0	0	16.6
1994	53.8	0	0.2	54	18	0	0	18	28.2	0	0	28.2
1996	54	0	0	54	18	0	0	18	28.2	0	0	28.2

AQUATIC LIFE SUPPORT

	Open Ocean				Coastal Shoreline				Estuaries			
	F	P	N	Total	F	P	N	Total	F	P	N	Total
1988	no data				no data				no data			
1990	no toxicity data				no toxicity data				no toxicity data			
1992	54	0	0	54	18	0	0	18	28.2	0	0	28.2
1994	54	0	0	54	18	0	0	18	27.8	0.4	0	28.2
1996	54	0	0	54	18	0	0	18	4.4	23.8	0	28.2

**Some temporary closures of swimming areas in coastal waters have occurred as a result of heavy bather use.*

APPENDIX G

Fecal Coliform Data for Great Bay, Little Harbor, Rye Harbor and Hampton Harbor: 1985-1996.

Annual geometric means for fecal indicator bacteria at the three sites at low and high tides: 1988-97. (Langan and Jones, 1997) **TABLE G-1**

BOLD values for fecal coliforms designate values >14/100 ml, the standard for approved shellfish waters.

ADAMS POINT

	Fecal Coliforms		*E. coli*		Enterococci		*C. perfringens*	
Year	High	Low	High	Low	High	Low	High	Low
1988-89	**29**	**15**	5	4	2	1		
1989-90	**33**	**16**	**16**	10	7	4		
1990-91	**23**	**17**	**15**	13	5	6		
1991-92	**26**	13	10	10	11	10	**21**	**23**
1992-93	12	11	11	9	2	2	9	12
1993-94	10	6	8	5	3	3	4	4
1994-95	7	6	4	3	3	2	4	6
1995-96	**21**	**17**	**16**	14	6	6	7	6
1996-97	**14**	13	11	10	4	4	5	7
Overall mean	**17**	12	10	8	4	4	6	8

SQUAMSCOTT RIVER

	Fecal Coliforms		*E. coli*		Enterococci		*C. perfringens*	
Year	High	Low	High	Low	High	Low	High	Low
1988-89	**53**	**362**	13	**42**	6	**29**		
1989-90	**44**	**234**	**24**	**137**	12	**60**		
1990-91	**20**	**190**	**15**	**142**	6	**18**		
1991-92	**24**	**148**	**19**	**81**	**14**	**48**	**44**	**73**
1992-93	**23**	**90**	**19**	**71**	3	**18**	**25**	**35**
1993-94	12	**61**	10	**54**	5	**27**	10	**22**
1994-95	12	**42**	6	**20**	5	**18**	4	**18**
1995-96	**51**	**128**	**28**	**104**	13	**56**	**16**	**15**
1996-97	**25**	**91**	**20**	**60**	5	**25**	13	**16**
Overall mean	25	**118**	**16**	**71**	7	**30**	14	**23**

LAMPREY RIVER

	Fecal Coliforms		*E.coli*		Enterococci		*C. perfringens*	
Year	High	Low	High	Low	High	Low	High	Low
1991-92	**114**	**214**	**101**	**191**	5	12	11	**17**
1992-93	**237**	**379**	**222**	**394**	**25**	**29**	8	**18**
1993-94	**100**	**225**	**90**	**178**	**22**	**33**	4	12
1994-95	**61**	**133**	**55**	**133**	**26**	**13**	4	7
1995-96	**268**	**588**	**195**	**497**	**86**	**169**	12	**17**
1996-97	**85**	**78**	**64**	**62**	14	**30**	7	8
Overall mean	**123**	**204**	**104**	**182**	**25**	**31**	7	11

TABLE G-2. *Fecal coliform concentrations (per 100 ml) at sites in Little Harbor: 1988-1996 (NHDHHS).*

FC/100 ML

Year	T1	T5	T6	T7	T8	T9	T10	T13	T14	LH2	WC1
1988	7.1	109	8.5		28.2	156	77.3	24.5			
1989	10.9	129	16.7		67.1	234	460	33			
1990	16.4	84	31		57.8	128	196	14.5			
1991	40.1	541	76.2		67.6	167	199	190			
1992	21.8	14.1	20.5		35.1	53.9	30.9	10.7			
1993	6.9	4.2	18.6		14	7.3	18.9	11.7			
1994	6	3.9	12.1		16.1	11.3	53	7.4			
1995	2.6	3.3	7.5	49.8	5.4	7.7	8.4	2.6	10.1	2.8	56.4
1996	2.3	16.2	4.7	11.1	50.3	6.9	17.4	4.2	7.3	7	12.5
Overall average	8.3	28.7	14.1	23.5	29.3	38.2	64.4	13.7	8.6	5	26.6
Last 30 average	4.3	5.5	9.4	23.5	17.3	13.3	23.1	13.7	8.6	5	26.6

NUMBER OF SAMPLES

Year	T1	T5	T6	T7	T8	T9	T10	T13	T14	LH2	WC1
1988	11	10	11		9	10	9	11			
1989	9	9	9		9	9	9	9			
1990	4	4	4		4	4	4	2			
1991	7	7	6		6	7	6	4			
1992	6	5	6		6	6	7	3			
1993	8	8	7		8	8	8	7			
1994	8	7	7		8	7	8	6			
1995	5	5	5	4	5	5	5	5	4	4	3
1996	8	8	9	7	2	4	3	10	10	7	3
Total samples	66	63	64	11	57	60	59	57	14	11	6

PERCENTAGE OF SAMPLES >43/100 ML

Year	T1	T5	T6	T7	T8	T9	T10	T13	T14	LH2	WC1
1988	9	70	27		44	80	78	45			
1989	22	89	22		67	89	89	44			
1990	25	75	50		50	100	100	0			
1991	71	86	83		67	86	100	100			
1992	17	20	17		50	50	29	33			
1993	13	0	29		13	0	25	14			
1994	13	14	14		38	29	50	0			
1995	0	0	0	50	0	20	20	0	25	0	67
1996	0	38	0	0	50	0	0	10	20	14	33
Overall average	18	46	25	18	42	53	58	28	21	9	50
Last 30 average	7	13	10	18	30	23	10	10	21	9	50

Fecal coliform concentrations (per 100 ml) at sites in Rye Harbor: 1985-1996 (NHDHHS). **TABLE G-3**

FECAL COLIFORMS/100 ML

Year	RH1	RH2	RH3	RH4
1985	276	25	48	
1986	51	6	4	6
1987	118	15	46	23
1988	53	13	3	7
1989	20	5	5	9
1990	18	12	6	9
1991	32	10	5	4
1992	7	5	6	10
1993	28	15	5	21
1994	17	13	5	20
1995	10	6	2	4
1996	3	6	2	4
Geometric mean	**29**	**10**	**10**	**11**
Last 30 geo.mean	**13.6**	**9.3**	**3.6**	**10.9**

NUMBER OF SAMPLES

Year	RH1	RH2	RH3	RH4
1985	2	2	2	
1986	11	11	4	7
1987	17	16	6	15
1988	7	8	6	7
1989	8	8	6	8
1990	3	3	3	3
1991	6	6	6	6
1992	6	6	6	6
1993	9	9	6	9
1994	7	7	7	6
1995	4	4	4	4
1996	7	8	7	8
Total	**87**	**88**	**63**	**79**

FRACTION OF SAMPLES > 43/100 ML

Year	RH1	RH2	RH3	RH4
1985	1	0.5	1	
1986	0.55	0.18	0	0.14
1987	0.59	0.13	0.5	0.27
1988	0.57	0.25	0	0.14
1989	0.5	0.13	0	0.13
1990	0.33	0.33	0.33	0.33
1991	0.5	0.17	0.17	0
1992	0.17	0.17	0.17	0.17
1993	0.44	0.33	0	0.33
1994	0.14	0.14	0.14	0.33
1995	0.25	0	0	0
1996	0.14	0	0	0.13
Average	**0.44**	**0.17**	**0.14**	**0.19**
Average	**0.23**	**0.13**	**0.07**	**0.23**

TABLE G-4 *Fecal coliform concentrations at sites in Hampton Harbor: 1985-1996 (NHDHHS).*

FECAL COLIFORMS/100 ML

Year	HH 1A	HH 2B	HH 5B	HH 5C	HH 10	HH 11	HH 12	HH 17	HH 18	HH 19
1988	24	26	27				9			
1989	10	14	17				5			
1990	16	51	15				7			
1991	38	18	28				21			
1992	14	27	13				8			
1993	16	11	15	10	12	8	11	13	11	9
1994	13	16	8	16	13	16	15	17	7	20
1995	9	9	8	7	6	5	6	8	3	7
1996	4	9	13	19	16	11	7	7	6	14
Overall average	15	13	13	10	11	10	10	12	6	12
Last 30 average	12	11	11	10	9	8	8	8	4	11

NUMBER OF SAMPLES

Year	HH 1A	HH 2B	HH 5B	HH 5C	HH 10	HH 11	HH 12	HH 17	HH 18	HH 19
1988	11	8	9				10			
1989	7	1	1				8			
1990	4	2	2				4			
1991	6	5	5				6			
1992	5	4	3				4			
1993	37	44	35	15	45	15	36	45	16	19
1994	26	36	10	11	34	29	34	29	29	28
1995	9	25	25	24	17	17	17	17	25	17
1996	3	10	10	10	10	10	10	10	10	10
Total samples	108	135	100	60	106	71	129	101	80	74

PERCENTAGE OF SAMPLES > 43FC/100 ML

Year	HH 1A	HH 2B	HH 5B	HH 5C	HH 10	HH 11	HH 12	HH 17	HH 18	HH 19
1988	45	38	33				10			
1989	14	0	0				13			
1990	25	50	50				25			
1991	67	40	60				50			
1992	40	25	33				0			
1993	35	20	29	13	16	0	22	20	25	16
1994	19	25	0	27	18	34	26	28	7	43
1995	11	4	8	4	0	12	0	12	4	12
1996	0	10	30	20	10	20	30	20	10	20
Overall average	30	20	23	13	13	20	20	21	10	26
Last 30 average	20	7	17	10	7	17	17	17	7	27

APPENDIX H

Tissue Concentrations of Toxic Contaminants in Bivalve Shellfish, Lobsters, Winter Flounder, and Marine Plants

TABLE H-1

*Trace metal contaminant concentrations (dry weight) in marine plant tissues at sites in New Hampshire and southern Maine.**

Species **Site**	**Ag**	**As**	**Cd**	**Cr**	**Cu**	**Hg**	**Ni**	**Pb**	**Zn**
Zostera marina: leaves									
Clark Cove	0.70	1.21	1.51	2.05	12.70	0.02	3.07	2.72	78.6
Sullivan Pt.	0.83	1.52	1.62	1.74	11.20	0.02	1.73	1.88	85.7
Dry docks	0.47	1.20	1.09	1.23	23.10	0.02	1.31	2.72	64.9
Back Channel	0.63	1.17	1.03	1.50	13.80	0.02	1.41	2.25	66.4
Jamaica Cove	0.73	1.54	1.05	2.89	17.00	0.02	1.79	3.78	71.1
Piscataqua R.	0.70	1.01	1.22	0.92	15.00	0.01	1.58	1.27	67.0
York Harbor	0.19	1.03	1.78	0.85	8.13	0.01	1.24	0.99	47.9
Average	**0.68**	**1.28**	**1.25**	**1.72**	**15.80**	**0.02**	**1.82**	**2.44**	**72.3**
Zostera marina: roots									
Clark Cove	0.58	2.76	0.53	7.57	8.45	0.05	2.38	5.96	43.6
Sullivan Pt.	0.76	6.62	0.61	7.55	12.00	0.04	3.43	10.90	72.9
Dry docks	0.80	5.84	0.43	9.37	20.80	0.04	3.16	9.05	48.4
Back Channel	0.61	4.90	0.49	12.40	29.40	0.05	3.60	19.70	67.4
Jamaica Cove	0.64	3.00	0.58	11.60	18.60	0.06	3.13	11.10	61.9
Piscataqua R.	0.54	3.76	0.56	6.56	12.00	0.03	2.84	8.48	46.3
York Harbor	0.19	1.72	0.63	2.46	8.70	0.01	1.31	2.48	27.7
Average	**0.66**	**4.48**	**0.53**	**9.18**	**16.90**	**0.05**	**3.09**	**10.87**	**56.8**
Spartina alterniflora									
Clark Cove	0.26	1.20	0.04	1.97	1.91	0.02	0.80	1.12	36.1
Sullivan Pt.	0.24	1.20	0.03	1.47	2.06	0.01	0.54	0.71	34.0
Back Channel	0.24	1.20	0.08	2.76	2.54	0.02	0.86	1.73	40.9
Jamaica Cove	0.14	1.20	0.08	1.44	3.23	0.01	0.68	0.63	18.9
Piscataqua R.	0.17	1.20	0.04	1.89	1.84	0.01	0.41	0.73	32.9
Spruce Creek	0.26	1.20	0.15	2.36	1.22	0.01	0.85	0.87	23.8
York Harbor	0.12	1.20	0.10	2.82	1.27	0.01	1.50	1.27	23.6
Average	**0.22**	**1.20**	**0.07**	**1.98**	**2.13**	**0.01**	**0.69**	**0.97**	**31.1**
Spartina patens									
Clark Cove	0.10	1.20	0.03	0.87	1.84	0.02	0.52	0.59	20.6
Sullivan Pt.	0.09	1.20	0.05	1.54	2.97	0.01	0.59	0.97	25.3
Back Channel	0.15	1.20	0.11	2.50	3.56	0.01	1.11	2.11	47.7
Piscataqua R.	0.22	1.20	0.16	3.52	3.70	0.02	1.75	4.08	22.1
Spruce Creek	0.14	1.20	0.13	2.88	2.03	0.02	0.95	1.18	20.1
York Harbor	0.11	1.20	0.14	1.06	1.89	0.02	0.59	0.54	11.1
Average	**0.14**	**1.20**	**0.10**	**2.26**	**2.82**	**0.02**	**0.98**	**1.79**	**27.7**
Ascophyllum nodosum									
Clark Cove	0.15	14.7	0.33	0.84	10.6	0.04	1.7	1.50	
Sullivan Pt.	0.65	2.1	0.78	0.63	31.4	0.03	3./	0.60	
Storage yard	1.02	17.2	0.55	0.47	26.1	0.06	2.7	6.90	116.0
Dry docks	0.33	15.2	0.37	0.76	10.1	0.03	1.1	1.03	63.9
Jamaica Cove	0.32	26.8	0.70	0.97	6.30	0.04		1.70	53.1
York Harbor	0.07	5.7	0.27	0.40	1.89	0.01	0.59	0.05	37.6
Average	**0.49**	**15.2**	**0.55**	**0.73**	**16.90**	**0.04**	**1.83**	**2.35**	**77.7**

*From NCCOSC, 1997

TABLE H-2 *Tissue Contaminants in blue mussels at sites on or near the New Hampshire coast: 1982-1997.*

Numbers in **BOLD** exceed the USFDA (1993) alert level for lead (11.5 µg/g dry weight). No other contaminant concentrations exceeded published USFDA alert levels or action limits.

Site Location Study*, year**, site #		METALS (µg/g; dry weight) (wet weights converted assuming 15% DW)											ORGANICS: (ng/g)		
NEW HAMPSHIRE		**Ag**	**Al**	**As**	**Cd**	**Cr**	**Cu**	**Fe**	**Hg†**	**Ni**	**Pb**	**Zn**	**PCBs**	**PAHs**	**Chlr. pest.**
USFDA Action Levels for Shellfish				*25*	*87*			*6.7*	*533*	*11.5*			*13000*		*33000*
Hampton Harbor, NH															
1993	GOMC (1997a)	0.05	94		2.1	1.6	6.4	274	0.46	1.4	2.4	123	10	71	4.2
1995	GOMC (1997c)	0.05			1.7	2.0	8.6	363	0.38	1.3	2.7	143			
1996	GOMC (1997d)	0.11	185		1.5	1.4	7.9	293	0.50	1.1	2.3	115	24	107	5.5
Rye Harbor, NH															
1994	GOMC (1997b)	0.10	125		1.4	1.5	6.5	280	0.61	1.4	2.1	90	5	71	3.5
1997	GOMC (1998)	0.06	180		1.5	2.1	7.0	313	0.64	1.7	2.3	117	12	69	12.0
Witch Creek, NH															
Rye	Isaza et al. (1989)				1.9	3.1	14.0		<0.2	2.5	6.7	100	260	14000	
	Isaza et al. (1989)				2.2	4.1	10.7		<0.2	<2.0	5.1	153	113	667	
Little Harbor, NH															
New Castle 1991	GOMC (1992)	0.90			2.7	9.0	45.5	330	0.50	4.2	5.2	270	16	<DL	ND
1992	GOMC (1994)	0.06	343		1.6	4.2		543	0.50	3.1	4.2	217	48	174	15.1
1995	GOMC (1997a)	0.05			2.2	2.7	8.8	510	0.69	1.7	6.5	155			
Fort Point, NH															
New Castle	Isaza et al. (1989)				2.1	5.4	10.0		<0.2	<2.0	10.0	200.0	127	<667	
1991; #2	Johnston et al. (1994)	0.51	154	7.5	1.1	2.7	6.9	419	0.22	1.7	4.5	103			
Goat I., NH															
Portsmouth	Isaza et al. (1989)				2.3	7.3	9.3		<0.2	<2.0	8.7	153	267	4530	
Shapleigh I., NH															
Back Channel 1991	GOMC (1992)	0.08			1.8	8.0	30.5	513	0.40	3.4	5.0	130	28	<DL	ND
Portsmouth 1992	GOMC (1994)	0.08	370		2.2	4.5		750	0.67	2.7	5.6	167	74	378	17.9
1991; #11	Johnston et al. (1994)	0.15	273	7.3	1.7	4.1	7.8	680	0.27	1.6	9.2	119			
Pierce's I., NH															
Portsmouth	Isaza et al. (1989)				2.7	7.3	8.0		<0.2	<2.0	<3.3	227	127	2600	
1991; #14	Johnston et al. (1994)	0.13	302	10.7	1.5	3.8	5.8	579	0.72	1.7	5.7	89			

Site Location Study*, year**, site #	METALS (µg/g; dry weight) (wet weights converted assuming 15% DW)											ORGANICS: (ng/g)		
NEW HAMPSHIRE	**Ag**	**Al**	**As**	**Cd**	**Cr**	**Cu**	**Fe**	**Hg†**	**Ni**	**Pb**	**Zn**	**PCBs**	**PAHs**	**Chlr. pest.**
USFDA Action Levels for Shellfish			*25*	*87*			*6.7*	*533*	*11.5*			*13000*		*33000*
Four Tree I., NH														
Portsmouth Isaza et al. (1989)				2.1	8.7	11.3		<0.2	<2.0	8.0	147	180	15300	
Rt. 1 bridge, NH														
1991; #15 Johnston et al. (1994)	0.67	131	12.5	1.3	2.2	6.9	362	0.14	1.5	3.5	81			
Atlantic Heights, NH														
Portsmouth Isaza et al. (1989)				2.1	4.7	10.0		<0.2	<2.0	8.7	180	160	3800	
East Seafood Co., NH														
Newington Isaza et al. (1989)				2.7	4.8	15.3		<0.2	8.0	6.0	120	387	1670	
1991; #24 Johnston et al. (1994)	2.20	581	9.3	1.9	6.2	9.1	1070	0.50	2.7	5.8	134			
Piscataqua River, NH														
Dover, 1991; #26Johnston et al. (1994)	2.80	508	11.1	4.3	8.6	11.4	1190	0.20	3.1	5.9	125			
Piscataqua River (PSNH)/Little Bay, NH														
1991-93; #24-28NCCOSC (1997)	1.43		10.14	3.17	6.29	10.29		0.42	3.05	5.39	125	1646	145	46.9
Dover Point, NH														
Hilton State ParkIsaza et al. (1989)				2.9	4.2	11.3		<0.2	4.7	5.8	100	393	1470	
Dover 1994 GOMC (1997b)	0.10	238		3.1	3.1	7.9	455	0.83	1.7	3.4	145	26	187	10.4
July, 1996 GOMC (1997d)												66	658	2.2
October, 1996 GOMC (1997d)												46	298	4.6
1997 GOMC (1998)	0.06	233		1.8	2.5	6.7	325	0.70	1.4	1.9	110	49	266	20.2
General Sullivan Br., NH														
1991; #27 Johnston et al. (1994)	1.20	193	8.0	2.5	5.1	8.2	489	0.46	2.6	5.8	140			
Bellamy R., NH														
mouth; 1991; #28Johnston et al. (1994)	1.90	388	13.5	2.0	4.4	8.5	638	0.29	1.9	2.8	142			
Fox Point, NH														
Newington Isaza et al. (1989)				3.7	4.7	10.7		<0.2	6.7	5.6	87	293	73300	
1996 GOMC (1997d)												78	1355	7.6
Nannie I., NH														
Great Bay Isaza et al. (1989)				2.2	8.0	10.7		<0.2	3.9	8.7	87	613	12700	

Site Location Study*, year**, site #	METALS (µg/g; dry weight) (wet weights converted assuming 15% DW)											ORGANICS: (ng/g)		
NEW HAMPSHIRE	**Ag**	**Al**	**As**	**Cd**	**Cr**	**Cu**	**Fe**	**Hg†**	**Ni**	**Pb**	**Zn**	**PCBs**	**PAHs**	**Chlr. pest.**
USFDA Action Levels for Shellfish			*25*	*87*			*6.7*	*533*	*11.5*			*13000*		*33000*
Lamprey R., NH														
Newmarket Isaza et al. (1989)				3.3	57.0	16.0		<0.2	16.7	30.0	153	400	5200	
NEW HAMPSHIRE &MAINE														
Portsmouth Hrbr, mouth-Rt.1 br. (1993)		0.19		10.31	1.64	4.25	8.25	0.44	2.09	6.09	98	745	72	26.9
1,2,11,14,16,170-73NCCOSC (1997)														
MAINE														
Mast Cove, ME														
1991; #25 Johnston et al. (1994)	1.20	305	6.5	2.0	3.8	7.0	655	0.35	2.0	3.9	120			
Piscataqua R., ME														
I-95 to power line MEDEP (1993)				3.0	4.8	13.0		0.74	2.2	5.9	100			
Rt. 1 bridge, ME														
1991; #16 Johnston et al. (1994)	0.10	294	5.7	1.7	3.8	7.1	679	0.30	2.3	6.6	117			
Badger I., ME														
Kittery Isaza et al. (1989)				2.4	3.6	9.3		<0.2	<2.0	5.4	180	127	2270	
1991; #17 Johnston et al. (1994)	0.85	316	5.1	1.1	3.3	6.4	626	0.28	2.0	5.2	93			
Back Channel, ME														
E. bridge #32Gilfillan et al. (1985)	0.64			2.5	4.6	8.3		-		26.6	105			
1991; #18 Johnston et al. (1994)	0.06	223	8.0	1.9	3.5	6.1	648	0.39	1.4	10.9	98			
1993; #18,167-169NCCOSC (1997)	0.23		10.14	2.08	4.09	12.04		0.44	1.93	13.14	113	849	80	34.2
W. bridge; east endMEDEP (1993)	-			2.4	3.8	8.9		0.58		12.0	150			
Back Channel, MEW. bridge; east end														
#5 Gilfillan et al. (1985)	0.51			2.5	5.5	7.8				7.2	90			
#31 Gilfillan et al. (1985)	0.70			2.4	4.2	8.4				5.9	80			
Jamaica I., ME														
Kittery Isaza et al. (1989)				1.9	4.5	8.0		<0.2	<2.0	9.3	127	147	4470	
1991; #19 Johnston et al. (1994)	0.09	245	7.6	2.1	3.8	5.8	635	0.68	2.0	6.2	91			
1993;#19,164-66NCCOSC (1997)	0.25		9.63	2.22	4.64	14.68		1.1	2.67	32.37	123	732	79	33.3
Clark Cove, ME														
1991; #3 Johnston et al. (1994)	0.08	203	13.2	1.9	3.0	5.5	434	0.44	1.6	5.2	92			
1991; #4 Johnston et al. (1994)	0.61	348	10.5	0.1	4.0	7.6	617	0.22	1.4	10.3	130			
1991; #5 Johnston et al. (1994)	0.06	231	7.4	2.2	4.2	5.8	476	0.44	1.9	10.8	109			
1991; #6 Johnston et al. (1994)	1.2	237	8.8	1.9	3.7	8.4	573	0.16	1.8	9	132			

Site Location Study*, year**, site #	METALS (µg/g; dry weight) (wet weights converted assuming 15% DW)											ORGANICS: (ng/g)		
MAINE	**Ag**	**Al**	**As**	**Cd**	**Cr**	**Cu**	**Fe**	**Hg†**	**Ni**	**Pb**	**Zn**	**PCBs**	**PAHs**	**Chlr. pest.**
USFDA Action Levels for Shellfish			*25*	*87*			*6.7*	*533*	*11.5*			*13000*		*33000*
Clark Cove, ME (*continued*)														
1991; #7 Johnston et al. (1994)	0.85	294	6.3	1.6	3.4	7.5	627	0.24	2.4	10.7	107			
1991; #8 Johnston et al. (1994)	2.70	203	6.9	1.9	4.0	8.4	526	0.18	3.1	12.3	119			
1991; #161Johnston et al. (1994)	0.37			2.5	18.4	10.4	1110	0.45	9.0	7.5	97	61	680	
1991; #185Johnston et al. (1994)	0.06	189		1.7	6.0	7.8	596	0.32	3.0	5.0	100			
1993;3-#8,161-63NCCOSC (1997)	0.45		11.34	2.03	4.23	9.59		0.5	2.28	7.8	107	771	93	36.5
1993 GOMC (1997a)	0.28	187		2.4	3.3	7.5	535	0.74	2.6	5.4	126	70	154	11.1
1994 GOMC (1997b)	0.10	163		1.5	2.0	7.5	373	0.61	1.3	4.5	96	67	154	12.5
1995 GOMC (1997c)	0.12			1.8	3.3	9.9	535	0.56	1.7	6.1	135			
1996 GOMC (1997d)	0.10	335		1.7	2.9	8.2	518	0.86	1.4	5.1	113	38	203	7.3
1997 GOMC (1998)	0.06	428		1.6	3.0	7.0	610	0.66	1.9	5.1	125	37	147	15.3
Clark I., ME														
Kittery Isaza et al. (1989)				2.3	4.0	7.3		<0.2	<2.0	5.8	167	120	1600	
Sullivan Pt., ME														
Seavey I. #15Gilfillan et al. (1985)	0.50			3.6	5.7	7.4		-		8.1	90			
1991; #9 Johnston et al. (1994)	0.08	154	6.0	1.8	3.2	5.7	377	0.34	1.5	7.2	105			
1993;#9,159,160NCCOSC (1997)	0.19		8.76	1.97	3.23	7.55		0.32	1.63	7.27	98	949	70	51.8
Henderson Pt., ME														
Seavey I. #16Gilfillan et al. (1985)	0.60			2.9	6.0	8.2		-		5.4	81			
1991; #10AJohnston et al. (1994)	0.04	76.9	5.1	1.9	2.3	6.2	209	0.13	1.5	26	122			
1993;10.5,156-158NCCOSC (1997)	0.21		6.75	1.86	3.81	15.66		0.3	2.44	75.96	111	725	125	35.9
Dry Dock/Seavey I., ME														
1991; #10 Johnston et al. (1994)	0.03	522	8.4	2.0	3.4	8.1	497	0.97	1.4	13.5	222			
1991; #12AJohnston et al. (1994)	0.15	330	6.9	2.5	3.8	9.0	825	0.41	2.2	9.6	121			
1991; #12 Johnston et al. (1994)	0.07	280	6.5	3.1	3.5	32.3	536	0.45	2.3	11.0	105			
1993; #10,12,17,151-155 NCCOSC (1997)	0.34		8.3	2.22	3.94	12.14		0.48	2.2	8.08	107	2540	84	27.1
Spruce Creek, ME														
upstream #26AGilfillan et al. (1985)	0.68			2.5	5.3	7.1		-		6.9	85			
1991; #21 Johnston et al. (1994)	0.12	650	7.9	9.3	5.8	7.4	1300		2.1	6.4	125			
MEDEP (1993)	-			1.5	2.6	7.9		0.39		5.9	110			
Spruce Creek, ME														
downstream #20Johnston et al. (1994)	2.60	452	7.6	1.5	4.4	7.9	820	0.26	2.1	6.7	134			
1993; #20, 21 NCCOSC (1997)	1.36		7.75	5.4	5.1	7.65		0.26	2.1	6.55	130	821	103	34.6

Site Location Study*, year**, site #	METALS (µg/g; dry weight) (wet weights converted assuming 15% DW)											ORGANICS: (ng/g)		
MAINE	**Ag**	**Al**	**As**	**Cd**	**Cr**	**Cu**	**Fe**	**Hg†**	**Ni**	**Pb**	**Zn**	**PCBs**	**PAHs**	**Chlr. pest.**
USFDA Action Levels for Shellfish				*25*	*87*			*6.7*	*533*	*11.5*			*13000*	*33000*
Pepperill Cove, ME														
Kittery MEDEP (1993)					2.5	3.9	9.1		0.57	2.3	11.0	110		
1991; #1 Johnston et al. (1994)		0.17	317	8.4	1.4	3.8	5.8	600	0.43	1.7	6.2	96		
Fort Foster, ME														
west end; #30CGilfillan et al. (1985)		0.55			2.2	7.3	7.4				4.2	80		
Fort Foster, ME														
east end; #RPGilfillan et al. (1985)		0.62			2.6	5.6	6.8				3.7	89		
Horn I., ME														
Kittery #HIGilfillan et al. (1985)		0.58			2.6	3.5	6.8				3.5	88		
White I., ME														
Kittery #WIGilfillan et al. (1985)		0.65			2.6	3.3	6.1				4.0	85		
Wood I., ME														
Kittery #WOODGilfillan et al. (1985)		0.66			3.5	5.4	8.3				5.8	93		
Brave Boat Harbor, ME														
York & Kittery MEDEP (1993)														
1993; #175Johnston et al. (1994)		0.87	ND		3.5		8.1	840	0.21		1.8	111	3	168	ND
1993; #186Johnston et al. (1994)		0.18	94		1.5	4.3	5.7	725	0.18	2.8	1.7	67	ND	ND	ND
1993 GOMC (1997a)		0.20	177		2.8	3.1	7.1	469	0.71	3.0	3.5	118	ND	ND	ND
1996 GOMC (1997d)		0.30	290		1.7	1.5	6.6	353	0.42	1.5	1.8	110	ND	ND	0.6
York Harbor, ME														
upstream #22Johnston et al. (1994)		0.07	197	3.9	1.4	2.0	6.0	341	0.11	1.0	1.9	89			
1991; #23 Johnston et al. (1994)		0.11	176	5.7	1.4	1.9	6.5	385	0.31	1.2	1.9	83			
1993; 22,23,123NCCOSC (1997)		0.17		7.31	1.49	1.87	7.5		0.23	1.08	2.06	83	481	39	19.8
Saco River, ME														
river mouth MEDEP (1993)														
1994 GOMC (1997b)		0.10	103		1.6	1.6	6.3	288	0.56	1.1	2.5	86	13	49	5.6
MASSACHUSETTS														
Merrimack River, MA														
mouth 1993 GOMC (1997a)		0.14	49		2.8	2.6	6.5	393	1.08	1.5	4.8	113	44	162	6.8

*Refer to bibliography for study citations. PNS samples include all results from 1991 (Johnston et al., 1994) and 1993 (NCCOSC, 1997).
**Dates for GOMC and PNS studies are sample dates. Sample dates for Gilfillan et al. are 1982 & 1983; MEDEP are 1988-1992; Isaza are 1987.
†Some GOMC Hg results are suspiciously high.

TABLE H-3 *Trace metal and toxic organic contaminant concentrations (dry weight) in oysters, soft-shelled clams and ribbed mussels at sites in New Hampshire and southern Maine.*

Species Site, Date	Information source	Ag µg/g	As µg/g	Cd µg/g	Cr µg/g	Cu µg/g	Hg µg/g	Ni µg/g	Pb µg/g	Zn µg/g		totPAH ng/g	totPCB ng/g	totDDx ng/g
Crassostrea virginica														
Nannie I, 1986	Nelson, 1986				3.5				4.9					
Piscataqua River	Nelson, 1986				4.5				4.6					
Bellamy River	Nelson, 1986				2.25				3.7					
Oyster River	Nelson, 1986				2.7				3.8					
Nannie I. 1992	Langan & Jones, 1995		7.4		2		1.1		1			564		
Nannie I. 1994	Langan & Jones, 1995		7.2		1		0.68		1			442		
Fabian Pt 1992	Langan & Jones, 1995		8		3.9		1.3		2			490		
Fabian Pt 1994	Langan & Jones, 1995		7.6		2		1		2			461		
Pierce Pt. 1992	Langan & Jones, 1995		6.4		2		0.95		1			648		
Pierce Pt. 1994	Langan & Jones, 1995		4.1		1.5		0.54		1			285		
MacIntyre Bk 1991	Weston, 1992*		5.58			114	0.7		2.3	3767				
Adams Point 1991	Weston, 1992		4.33			171	0.8		5.16	5283				
Fox Point, 1996	Chase et al., 1997											1145	116	39
Upper GBE, 1991-93	NCCOSC 1997	12.5	10.1	4.41	2.94	266	0.28	3.27	1.75	6004		985	227	110
Upper Pisc. R., 1991	Johnston et al. 1994	17.6	4.3	6.8	2.6	257	0.2	2.7	0.85	5080			203	88.4
Boston Harbor, 1991	Johnston et al. 1994	19.9	8.8	3.7	3.8	208	0.17	4.1	1.3	5830			214	159
Adams Point, 1991	Johnston et al. 1994	12.3	5.8	3.5	3.1	187	0.07	2.7	1.1	4620			189	126
Nannie I., 1991	Johnston et al. 1994	22.6	5	4.3	2.2	301	0.19	3	0.61	7100			246	109
Average		**16.98**	**6.51**	**4.5**	**2.7**	**214.9**	**0.6**	**3.154**	**2.2**	**5383.4**	**627.5**	**199.2**	**105.2**	
Mya arenaria														
Nannie I., 1987	Isaza et al., 1989			0.3	6.0		<0.2		5.6			22000	207	
Pierce Point	Isaza et al., 1989			1.4	26.7		<0.2		36			<0.67	227	
Fox Point	Isaza et al., 1989			1.3	9.3		<0.2		10			31333	127	
Bellamy River	Isaza et al., 1989			0.8	11.3		0.29		12			<0.67	247	
Hilton State Park	Isaza et al., 1989			1.0	8.7		<0.2		13.3			38000	113	
Three Rivers Point	Isaza et al., 1989			1.3	14.7		<0.2		12			3400	127	
Witch Creek	Isaza et al., 1989			0.3	8.0		<0.2		8.7			35333	<66.7	
Seabrook	Isaza et al., 1989			1.4	4.3	15.3	0.3	9.3	8	80			80	
MacIntyre Bk 1991	Weston, 1992		20.6			11.3	0.4		12.5	59.4				
Average			**20.6**	**1.0**	**11.1**	**13.3**	**04.**	**9.3**	**13.1**	**69.7**			**26013.3**	**161.0**
Geukensia demissus														
MacIntyre Bk 1991	Weston, 1992		5.87			6.7	0.7		2.4	34.7				
Adams Point 1991	Weston, 1992		4.87			7.3	0.6		2	43.3				
Average			**5.37**			**7**	**0.6**		**2.2**	**39**				
USFDA Action Levels for Shellfish				*25*	*87*		*6.7*	*533*	*11.5*				*13000*	*33000*

* Weston (1992), Nelson (1992) and Isaza et al. (1989) results based on wet weight. Data shown assume 12% (oysters),15% (mussels) and 16% (clams) dry weight.

TABLE H-4. *Trace metal and toxic organic contaminant concentrations (dry weight) in lobsters* (Homarus americanus) *and winter flounder* (Pleuronectes americanus) *at sites in New Hampshire, Maine and off-shore areas.*

Tissue type Site	Information source	Ag	As	Cd	Cr	Cu	Hg/ methylHg	Ni	Pb	Zn	PAHs total	PCBs total	DDT and metabolites
LOBSTERS		µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	ng/g	ng/g	ng/g
Juveniles-tail + claw													
Clark Cove	NCCOSC (1997)	0.50	5.1	0.01	0.12	18.1	0.88	0.15	0.05	84	135	18.0	3.16
Sullivan Pt.	NCCOSC (1997)	0.74	4.83	0.01	0.21	30.5	0.96/0.15	0.19	0.06	119	168	11.3	2.67
Dry docks	NCCOSC (1997)	0.46	4.35	0.01	0.21		2.39/4.61	0.22	0.05	117	485	63.5	11.40
Jamaica Cove	NCCOSC (1997)	0.60	6.72	0.03	0.24	25.3	0.73	0.29	0.06	123	161	11.8	2.01
Isles of Shoals	NCCOSC (1997)	0.60	10.54	0.01	0.25	23.6	0.39	0.22	0.05	99	52	15.0	3.57
Juveniles-hepatopancreas													
Clark Cove	NCCOSC (1997)	1.07	12.17	7.06	0.29	150.0	0.21/0.13	0.58	0.08	79	2685	1017.0	498.00
Sullivan Pt.	NCCOSC (1997)	1.44	12.33	8.05	0.25	151.0	0.22/0.08	1.00	0.07	102	3596	848.0	398.00
Dry docks	NCCOSC (1997)	2.72	9.67	5.72	0.48		0.31	0.87	0.10	119	8371	1429.0	554.00
Jamaica Cove	NCCOSC (1997)	1.27	14.65	6.71	0.40	148.0	0.24	0.91	0.12	90	4007	877.0	326.00
Isles of Shoals	NCCOSC (1997)	0.54	12.77	11.68	0.34	83.6	0.17	1.81	0.19	71	225	814.0	426.00
Sublegal adults-tail + claw													
Portsmouth Hbr.	NCCOSC (1997)	0.54	10.07	0	0.24	26.2	1.01	0.18	0.04	115	72	19.0	3.36
Isles of Shoals	NCCOSC (1997)	0.70	13.73	0.01	0.36	23.3	0.51	0.31	0.06	115	48	33.0	7.08
Sublegal adults-hepatopancreas													
Portsmouth Hbr.	NCCOSC (1997)	3.01	12.09	5.16	0.36	112.0	0.22/0.07	0.52	0.17	59	3495	1130.0	553.00
Isles of Shoals	NCCOSC (1997)	2.26	19.64	15.37	0.38	257.0	0.18	1.32	0.09	74	675	1587.0	779.00
Adults-tail + claw													
Portsmouth Hbr.	NCCOSC (1997)	0.25	7.60	0.01	0.26	15.3	0.51/0.28	0.19	0.05	100	111	18.9	4.76
Isles of Shoals	NCCOSC (1997)	0.50	19.09	0.01	0.18	22.2	0.74/0.97	0.18	0.08	104	209	17.2	3.28
Brave Boat Hrbr	Sowles et al. (1996)	0.80	24.00	0.26	1.02	50.0	0.72		0.70	140	82		
ME reference sites	*Sowles et al. (1996)*	*1.10*	*21.00*	*0.18*	*0.59*	*42.0*	*0.43*		*1.30*	*178*	*135*		
Adults-hepatopancreas													
Portsmouth Hbr.	Johnston et al. (1994)	1.02	13.06	13.48	0.41	542.0	0.35/0.12	0.56	0.38	66	1504	1362.0	812.00
Isles of Shoals	Johnston et al. (1994)	0.46	17.52	12.89	0.22	173.0	0.2/0.11	2.00	0.32	70	332	1093.0	508.00
Brave Boat Hrbr	Sowles et al. (1996)	5.10	24.00	21.00	0.37	380.0	0.29		0.53	62			
ME reference sites	*Sowles et al. (1996)*	*3.85*	*19.00*	*15.00*	*0.33*	*195.0*	*0.20*		*0.70*	*48*			

Tissue type Site	Information source	Ag	As	Cd	Cr	Cu	Hg/ methylHg	Ni	Pb	Zn	PAHs total	PCBs total	DDT and metabolites
Mixed adult/juvenile-tail + claw													
Portsmouth Hbr.	Johnston et al. (1994)	0.68	12.93	0.04	0.74	25.7	1.3	0.53	0.41	81	2267	32.8	7.3
York Harbor	Johnston et al. (1994)											27.8	7.34
Mixed adult/juvenile-hepatopancreas													
Portsmouth Hbr.	NCCOSC (1997)	1.44	19.73	13.18	0.58	256	0.22	1.28	0.34	74.5	4111	1466	667
York Harbor	NCCOSC (1997)											1181	791
Adults-muscle													
Pierces I.	Isaza et al., 1989 (assume 21.7% dry weight)			<0.23	0.92- 1.38	37- 69	0.14- 0.51	<1.4	<2.3	92- 147	<.5- 12900	<0.05- 66400	
Adults-viscera													
Pierces I.	Isaza et al., 1989 (assume 21.7% dry weight)			6.5- 9.2	1.4- 1.6	129- 332	<0.14- 0.46	1.4- 2.8	<2.3	78- 111	21200- 87600	1705- 50700	
Adults (cooked)-meat													
Little Bay	Schwalbe and Juchatz (1991)											<300	<20
Adults (cooked)-tomalley													
Little Bay	Schwalbe and Juchatz (1991)											490	70
US FDA Action Levels for Shellfish				*25*	*87*		*6.7*	*533*	*12*		*13000*	*33000*	
WINTER FLOUNDER													
Flesh													
Portsmouth Hbr.	NCCOSC (1997)	0.008	5.75	0.010	0.23	0.27	0.21/0.25	0.18	0.06	16.4	17.2	51.5	6.61
Portsmouth Hbr.	Johnston et al. (1994)	0.034	6.41	0.040	0.73	3.58	0.10	0.65	0.37	38.4	518	87.4	24.8
Gulf of Maine	NCCOSC (1997)	0.004	31.1	0.010	0.28	0.28	0.4/0.23	0.30	0.08	12.3	18.9	67.6	11
Tork Harbor	Johnston et al. (1994)											26.3	5.38
Liver													
Portsmouth Hbr.	NCCOSC (1997)	0.464	3.37	0.16	0.27	15.3	0.13/0.05	0.58	0.28	89.4	59.6	938	163
Portsmouth Hbr.	Johnston et al. (1994)	0.66	2.10	0.09	0.40	22.0		0.53	0.24	114	531	838	192
Gulf of Maine	NCCOSC (1997)	7.63	25.6	3.64	0.40	84.2	0.3/0.12	3.63	2.82	131	54.8	787	180
York Harbor	Johnston et al. (1994)											658	175

APPENDIX I

Zooplankton Species in the Great Bay Estuary

Zooplankton species collected from the Great Bay Estuary, New Hampshire during 1979 (NAI 1980). **TABLE I-1**

Holoplankton
- *Acartia hudsonica*
- *Acartia* spp. copepodites
- *Calanus finmarchicus* copepodites
- Copepod nauplii, undifferentiated
- *Eurytemora* spp. copepodites
- *Evadne* spp.
- *Microsetella norvegica*
- *Oithona* spp. nauplii
- *Oithona* spp. copepodites
- *Podon* spp.
- *Pseudocalanus* spp. copepodites
- *Pseudocalanus*/*Calanus* nauplii
- Rotifera
- Tintinnida

Meroplankton
- *Anomia* spp. veligers
- Bivalve umbone veligers, undifferentiated
- Bivalve straight-hinge veligers
- Cirripedia cyprids
- Cirripedia nauplii
- Gastropoda veligers
- *Hiatella* spp. veligers
- *Modiolus modiolus* veligers
- *Mytilus edulis* veligers
- Polychaete larvae
- Polychaete eggs

Tychoplankton
- Foraminifera
- Harpacticoida

APPENDIX J

Species of Seaweeds and Plants Occurring in New Hampshire Salt Marshes

Summary of seaweed species composition from ten Great Bay estuarine areas (modified from Mathieson and Penniman 1991). **TABLE J-1**

	Piscataqua R.	Little Bay	Great Bay	Bellamy R.	Cocheco R.	Lamprey R.	Oyster R.	Salmon Falls	Squamscott R.	Winnicut R.	Longevity*
CHLOROPHYTA											
Acrochaete repens	x**										A
Blidingia minima	x	x	x	x	x	x	x	x	x	x	AA
Bryopsis plumosa	x	x	x	x	x						A
Capsosiphon fulvescens	x	x	x				x	x			A
Chaetomorpha aerea	x										P
Chaetomorpha brachygona	x	x	x								A
Chaetomorpha linum	x	x	x			x			x		P
Chaetomorpha melagonium	x	x									P
Chaetomorpha picquotiana	x	x	x								P
Cladophora albida		x	x								AA
Cladophora pygmaea	x	x	x								P
Cladophora sericea	x	x	x	x	x	x	x	x	x	x	AA/PP
Codiolum gregarium	x	x**									A
Codiolum pusillum		x**									A
Enteromorpha clathrata	x	x	x	x	x	x	x		x		A
Enteromorpha compressa	x	x	x				x	x			AA
Enteromorpha flexuosa ssp. *flexuosa*							x				A
Enteromorpha flexuosa ssp. *paradoxa*	x	x	x	x	x		x	x	x		A
Enteromorpha intestinalis	x	x	x	x	x	x	x	x	x		AA
Enteromorpha linza	x	x	x	x	x		x				AA
Enteromorpha prolifera	x	x	x	x	x	x	x	x	x	x	AA
Enteromorpha torta	x	x									A
Entocladia viridis		x	x								AA
Kornmannia leptoderma	x	x									A
Microspora pachyderma		x**	x				x		x		A
Monostroma grevillei	x	x	x								A
Monostroma pulchrum	x	x									A
Mougeotia sp.							x				A
Oedogonium sp.							x				A
Percursaria percursa	x	x									AA
Prasiola stipitata	x										AA
Pseudendoclonium submarium	x									AA	
Rhizoclonium riparium	x	x	x	x	x	x	x	x	x	x	AA
Rhizoclonium tortuosum	x	x	x	x			x				AA
Spirogyra sp.							x				A
Spongomorpha arcta	x	x									A
Spongomorpha spinescens	x	x									A
Stigeoclonium sp.						x			x		A
Ulothrix flacca	x	x	x	x	x	x	x	x	x		A
Ulothrix speciosa	x	x									A
Ulva lactuca	x	x	x	x	x	x	x	x	x		A/PP
Ulvaria obscura	x	x	x	x			x		x		A
Ulvaria oxysperma	x	x	x	x	x	x	x	x	x		A
Urospora penicilliformis	x	x	x								A
Urospora wormskioldii	x	x									A
Total Chlorophyta Taxa	35	37	25	14	12	11	20	11	14	4	

* = Longevity designations (A = annual, AA = aseasonal annual, P = perennial, PP = pseudoperennial) ** = Only found in culture

TABLE J-1 *Summary of seaweed species composition (continued)*

	Piscataqua R.	Little Bay	Great Bay	Bellamy R.	Cocheco R.	Lamprey R.	Oyster R.	Salmon Falls	Squamscott R.	Winnicut R.	Longevity*
PHAEOPHYTA											
Agarum cribrosum	x										P
Ascophyllum nodosum	x	x	x	x	x	x	x	x	x		P
Ascophyllum nodosum ecad *scorpioides*	x	x	x	x			x				P
Chorda filum	x	x									A
Chorda tomentosa	x	x									A
Chordaria flagelliformis	x	x									A
Delamarea attenuata	x										A
Desmarestia aculeata	x										P
Desmarestia viridis	x										A
Desmotrichum undulatum	x										A
Dictyosiphon foeniculaceus	x										A
Ectocarpus fasciculatus	x										A
Ectocarpus siliculosus	x	x	x	x	x		x				A
Elachista fucicola	x	x		x							P
Fucus distichus ssp. *distichus*	x										P
Fucus distichus ssp. *edentatus*		x									P
Fucus distichus ssp. *evanescens*	x	x	x				x				P
Fucus spiralis	x	x	x								P
Fucus vesiculosus	x										P
Fucus vesiculosus var. *spiralis*	x	x	x	x	x	x	x	x	x		P
Giffordia granulosa	x	x									A
Giffordia sandriana	x	x									A
Isthmoplea sphaerophora	x	x**									A
Laminaria digitata	x	x									P
Laminaria longicruris	x	x									P
Laminaria saccharina	x	x	x								P
Myrionema corunnae		x									A
Myrionema strangulans		x	x	x							A
Petalonia fascia	x	x	x	x			x				A
Petalonia zosterifolia		x									A
Petroderma maculiforme	x	x	x								P
Pilayella littoralis	x	x	x	x	x	x	x				A
Pseudolithoderma extensum	x	x	x								P
Punctaria latifolia	x	x									A
Ralfsia bornetii	x	x	x								P(?)
Ralfsia clavata	x	x	x								P(?)
Ralfsia fungiformis	x										P
Ralfsia verrucosa	x	x	x								P
Scytosiphon lomentaria var. *complanatus*		x									A
Scytosiphon lomentaria var. *lomentaria*	x	x	x				x				A
Sorocarpus micromorus		x									A
Sphacelaria cirrosa	x	x	x								P
Spongonema tomentosum		x									P(?)
Stictyosiphon griffithsianus	x	x									A
Ulonema rhizophorum	x	x									A
Total Phaeophyta Taxa	38	35	18	7	4	3	8	2	2	0	

	Piscataqua R.	Little Bay	Great Bay	Bellamy R.	Cocheco R.	Lamprey R.	Oyster R.	Salmon Falls	Squamscott R.	Winnicut R.	Longevity*
RHODOPHYTA											
Ahnfeltia plicata	x	x	x								P
Antithamnion cruciatum	x	x	x				x				A
Antithamnionella floccosa	x	x	x								AA
Audouinella membranacea	x	x	x								P(?)
Audouinella purpurea	x	x									P
Audouinella secundata	x	x	x				x				AA
Audouinella violacea			x			x	x				A
Bangia atropurpurea	x	x					x				A
Bonnemaisonia hamifera	x	x	x								P
Callithamnion byssoides		x	x								A
Callithamnion hookeri	x	x									A
Callithamnion tetragonum	x	x	x	x	x	x	x		x		P
Callocolax neglectus	x										P(?)
Callophyllis cristata	x										P
Ceramium deslongchampii var. *hooperi*	x		x								P(?)
Ceramium elegans			x								A
Ceramium rubrum	x	x	x	x	x	x	x		x		P
Ceramium strictum	x	x	x	x	x	x	x	x	x		A
Chondria baileyana	x	x	x	x		x	x				A
Chondrus crispus	x	x	x	x	x		x		x		P
Choreocolax polysiphoniae	x										P
Clathromorphum circumscriptum	x	x	x							P	
Corallina officinalis	x										P
Cruoriopsis ensis	x										P(?)
Cystoclonium purpureum var. *cirrhosum*	x	x	x								P
Cystoclonium purpureum forma *stellatum*	x										P
Dasya baillouviana	x	x	x	x	x	x	x	x	x		A
Dermatolithon pustulatum	x	x	x								P
Dumontia contorta	x	x	x								A
Erythrotrichia carnea	x	x	x					x			A
Fimbrifolium dichotomum	x										P
Fosliella lejolisii	x	x	x								P
Gloiosiphonia capillaris		x									A
Goniotrichum alsidii	x	x	x								A
Gracilaria tikvahiae	x	x	x	x		x	x		x		P
Gymnogongrus crenulatus	x	x	x						x		P
Hildenbrandia rubra	x	x	x			x	x				P
Leptophytum laeve	x										P
Lithophyllum corallinae	x										P
Lithothamniom glaciale	x										P
Lomentaria baileyana	x		x	x		x					A
Lomentaria clavellosa	x	x	x								P(?)
Lomentaria orcadensis	x	x									P
Mastocarpus stellatus	x	x									P
Membranoptera alata	x										P
Palmaria palmata	x	x	x	x							P
Petrocelis cruenta	x	x									P
Peyssonnelia rosenvingii	x	x	x								P
Phycodrys rubens	x	x									P

TABLE J-1 *Summary of seaweed species composition (continued)*

	Piscataqua R.	Little Bay	Great Bay	Bellamy R.	Cocheco R.	Lamprey R.	Oyster R.	Salmon Falls	Squamscott R.	Winnicut R.	Longevity*
Phyllophora pseudoceranoides	x	x	x								P
Phyllophora truncata	x	x	x								P
Phymatolithon laevigatum	x	x									P
Phymatolithon lenormandii	x	x									P
Polyides rotundus	x	x	x								P
Polysiphonia denudata	x	x	x	x	x	x	x		x		A
Polysiphonia elongata	x	x	x	x	x	x	x		x		P
Polysiphonia flexicaulis	x	x		x							P
Polysiphonia harveyi	x	x	x	x	x	x	x		x		A
Polysiphonia lanosa	x	x									P
Polysiphonia nigra	x	x	x	x	x		x				P(?)
Polysiphonia nigrescens	x	x	x	x		x					P
Polysiphonia novae-angliae		x									P(?)
Polysiphonia subtilissima	x	x	x		x	x	x	x	x		P
Polysiphonia urceolata	x	x									P
Porphyra leucosticta	x	x									A
Porphyra linearis		x									A
Porphyra miniata	x	x	x								A
Porphyra umbilicalis	x	x	x	x			x		x		A
Porphyra umbilicalis forma *epiphytica*	x	x	x								A
Porphyrodiscus simulans	x										P(?)
Pterothamnion plumula	x	x	x								AA
Ptilota serrata	x										P
Rhodomela confervoides	x	x									P
Rhodophysema elegans	x	x	x								P
Rhodophysema georgii	x	x									P(?)
Sacheria fucina			x	x		x	x		x		P
Scagelia corallina	x		x								AA
Trailliella intricata	x										P
Total Rhodophyta Taxa	71	60	47	17	10	15	21	3	14	0	
Grand Total Seaweed Taxa	144	132	90	38	26	29	49	16	30	4	

Major plant species occurring within New Hampshire salt marshes (modified from Breeding et al. 1974). **TABLE J-2**

Acnida cannabina	Water hemp
Aster subulatus	Salt marsh aster (annual)
Aster tenuifolius	Salt marsh aster (Perennial)
Atriplex glabriuscula	Orach
Atriplex patula	Orach
Bassia hirsuta	Hairy smotherweed
Carex scoparia	Sedge
Carex hormathodes	Marsh straw sedge
Cladium mariscoides	Twig rush
Distichlis spicata	Spike grass
Eleocharis halophila	Salt marsh spike-rush
Eleocharis parvula	Dwarf spike-rush
Eleocharis smallii	Small's spike-rush
Elymus virginicus	Virginia rye grass
Euphorbia polygonifolia	Seaside spurge
Gerardia maritima	Seaside gerardia
Glaux maritima	Sea milkwort
Hordeum jubatum	Squirrel-tail grass
Iva frutescens	Marsh elder
Juncus balticus	Baltic rush
Juncus canadensis	Canadian rush
Juncus gerardii	Black grass
Lathyrus japonicus	Beach pea
Limonium nashii	Sea lavender
Lythrum salicaria	Purple loosestrife
Myrica pensylvanica	Northern bayberry
Panicum virgatum	Switchgrass
Phragmites australis	Common reed
Plantago maritima	Seaside plantain
Polygonum aviculare	Knotweed
Polygonum ramosissimum	Bushy knotweed
Potamogeton pectinatus	Sago pondweed
Prunus maritima	Beach plum
Puccinellia maritima	Seashore alkali grass
Puccinellia paupercula	Alkali grass
Quercus alba	White oak
Quercus bicolor	Swamp white oak
Ranunculus cymbalaria	Seaside crowfoot
Rosa rugosa	Rugosa rose
Rosa virginiana	Low rose
Ruppia maritima	Widgeon grass
Sanguisorba canadensis	Canadian burnet
Salicornia bigelovii	Dwarf glasswort
Salicornia europaea	Common glasswort
Salicornia virginica	Perennial glasswort
Scirpus americanus	Three-square bulrush
Scirpus acutus	Hard-stemmed bulrush
Scirpus atrovirens	Bulrush
Scirpus cyperinus	Wool grass
Scirpus maritimus	Salt marsh bulrush
Scirpus paludosus	Bayonet-grass
Scirpus robustus	Salt marsh bulrush
Scirpus validus	Soft-stemmed bulrush
Smilax rotundifolia	Common greenbrier
Solidago sempervirens	Seaside goldenrod
Spartina alterniflora	Salt water cord grass
Spartina patens	Salt meadow grass
Spartina pectinata	Freshwater cord grass
Spergularia canadensis	Common sand spurrey
Spergularia marina	Salt marsh sand spurrey
Suaeda linearis	Sea blite
Suaeda maritima	Sea blite
Suaeda richii	Sea blite
Toxicodendron radicans	Poison ivy
Triglochin maritima	Seaside arrow grass
Typha angustifolia	Narrow-leaved cattail
Typha latifolia	Broad-leaved cattail
Zannichellia palustris	Horned pondweed
Zostera marina	Eelgrass