



Final Report

**NOAA Fisheries - Northeast Region
Cooperative Research Partners Program**



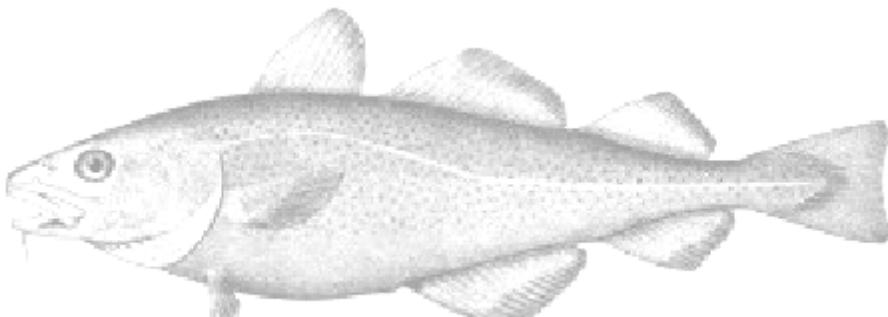
National
Oceanic and
Atmospheric
Administration



U.S.
DEPARTMENT
OF
COMMERCE

on the

Maine - New Hampshire Inshore Groundfish Trawl Survey



October 2004 – September 2005

Completion Report on the Maine-New Hampshire Inshore Trawl Survey
(October 1, 2004 – September 30, 2005)
Contract # EA133F-04-CN-0016

**Submitted to the NOAA Fisheries Northeast Region
Cooperative Research Partners Program**
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EXECUTIVE SUMMARY

This report summarizes the fifth year of a comprehensive bottom trawl survey of groundfish and other species for Maine and New Hampshire's inshore waters. This survey continues to establish the time series to be utilized for long-term monitoring of inshore stocks of the Gulf of Maine. Funds designated by Congress to assist ground fishermen were administered and distributed through the Northeast Consortium with the goal of fostering research partnerships between commercial fishermen and scientists.

This survey is intended to compliment similar surveys conducted by the National Marine Fisheries Service in the outer waters of the Gulf of Maine and surveys conducted by other Atlantic coast states in their inshore waters. Prior to this survey, no fishery-independent information has been available for approximately 80% of the U.S. Gulf of Maine's inshore waters. The survey utilizes newly designed research nets and two nearly identical commercial fishing vessels to complete over 100 trawls in spring and fall for a total of 50 days at sea.

This report highlights findings of the fifth year of the trawl survey. Up until recently, there was not a long enough time series to allow in-depth analysis of data. However, after five complete sampling years and a sixth underway, the data is now being included in some stock assessment models.

Trawl survey data has a wide array of uses beyond groundfish stock assessments. In truth, this is a multispecies survey that provides broad information on finfish and invertebrate populations and communities that can contribute to how we manage our marine environments.

INTRODUCTION

The Maine-New Hampshire Inshore Trawl Survey is a collaborative partnership between commercial fishermen and state researchers to assess inshore fish stocks along the Maine and New Hampshire coasts. Beginning in the fall of 2000, the survey has completed five years of biannual survey work. The fifth year of the project was funded through the Cooperative Research Partners Program of the National Marine Fisheries Service. From its inception, the project has been supported by federal funds appropriated to the National Marine Fisheries Service to foster cooperative research using commercial vessels. Collaborative research enables fishermen to contribute their knowledge and experience toward the progress of scientific data collection and ultimately to resource management decisions, and strengthens the trust between fishermen and scientists. Including fishermen in the design and execution of the inshore trawl survey has made the difficult process of maintaining the consistency and quality of this work possible.

Fishery-independent trawl surveys help to provide a baseline index of the distribution and abundance of a variety of fish and invertebrate species. As they continue on an annual basis, these surveys more truly reflect changes in abundances of populations than commercial fisheries catch statistics. Abundance indices derived from research trawl surveys that maintain consistent and standardized efforts can be utilized to enhance catch statistic based assessments and with additional research efforts could eventually give rise to population abundance estimates.

Information about population sizes, instantaneous recruitment and mortality rates, trends and distributions is essential for effective management of any resources. Such knowledge is critical to understanding both the dynamics and the condition of that resource. With four years of survey data from a region that previously lacked this information, we can begin to assess current stock conditions and develop more effective management strategies.

The long standing challenge of surveying the inshore waters of the Maine and New Hampshire coasts has been surmounted. After five years of extensive public outreach, the survey has seen an average success rate of 95% in the spring and 76% in the fall. Dealing with the large quantity of fixed gear in inshore waters still limits the number of tows that can be made, but continuing outreach has maintained a satisfactory level of completion. The coverage this survey provides promises to be very valuable to the understanding of marine ecosystems in the Gulf of Maine. We are confident that the northern Gulf of Maine can be successively and consistently sampled via trawl survey indefinitely, with sustained funding.

Objective

The overall goal of this project is to establish a solid foundation for a long-term fishery-independent monitoring program in Maine and New Hampshire's inshore waters (5-80⁺ fathoms).

Specific objectives are:

- To document the distribution and relative abundance of marine resources in the nearshore Gulf of Maine.
- To improve survey logistics to gain cooperation of the fixed gear fishermen.

- To develop recruitment indices for assessments of target species.
- To involve fishermen in scientific data collection.
- To collect environmental data, including temperature and salinity, that affect fish distribution.
- To collect ichthyoplankton samples along the coast to identify timing of finfish spawning.
- To gather information on biological parameters (growth rates and reproduction).

MATERIALS AND METHODS

Please refer to “Maine-New Hampshire Inshore Groundfish Trawl Survey Procedures and Protocols, 2005” (<http://www.maine.gov/dmr/rm/trawl/procandprot.pdf>). This protocol manual includes descriptions of survey design, station selection, survey vessels, net design, public notification, sample collection and catch handling, and other information on survey operations.

ANALYSIS AND PRESENTATION OF DATA

Appendix A provides a list of the stations completed in each survey, including temperature and salinity data. Stratified means and errors reported in Appendix B were calculated utilizing the same formulas reported for the NMFS’ SURVAN formulas (Kramer and Forrester, 1994). A list of all the species encountered by the trawl survey since its inception is provided in Appendix C. In addition, raw data for the fall 2004 and spring 2005 surveys are on the CD provided with this report.

RESULTS

FALL 2004 SUMMARY

The fall survey began on October 11, 2004, and 87 out of 115 targeted tows were completed. The volume of total mixed catch varied from a minimum of 3 kg to a maximum of 1402 kg, averaging 208 kg. The total number of species caught was 94 with a low of 10 and a high of 33 in any particular tow and an average of 23. Barndoor skate, *Dipturus laevis*, was seen for the first time in the trawl survey. One individual was caught at our one of our fixed stations in Region 1, northwest of Tanta. Atlantic wolffish, *Anarhichas lupus*, was also caught for the first time in the trawl survey. One individual was caught approximately 7 nautical miles west of Machias Seal Island. Two other species were also documented for the first time in the survey, bigeye scad, *Selar crumenophthalmus*; and lobster shrimp, *Axius serratus*.

Fall 2004 was colder than normal. Average bottom temperatures by stratum ranged from 5.6 to 10.8° C (Table 1). The overall average temperature for fall 2004 was 8.6° C, compared to 9.5° C for 2000, 10.2° C for 2001, 10.5° C for 2002 and 9.2° C for 2003.

Table 1. Average bottom temperatures ($^{\circ}$ C) for the Fall 2004 survey.

Region						
Stratum		1	2	3	4	5
	1	10.8	10.6	10.5	9.5	7.8
	2	8.5	9.2	9.6	9.3	8.6
	3	6.7	8.0	9.5	9.3	8.3
	4	5.6	6.7	8.2	8.4	7.5

SPRING 2005 SUMMARY

The spring survey began on May 2, 2005 along the coast of New Hampshire. Of 115 proposed tows, 104 were completed in this survey. The weight of the total mixed catch varied from a minimum of about 3 kg to a maximum of about 416 kg, averaging about 80 kg. The total number of species caught was 82, with a low of 9 and a high of 32 in any particular tow, and an average of 22. Capelin, *Mallotus villosus*, was documented for the first time in the trawl survey. Three individuals were caught in two trawls in the shallow waters of East Penobscot Bay, and three individuals were caught in two trawls in deeper waters approximately 10 nautical miles south of Great Wass Island. Other species documented caught for the first time in the trawl survey were rock gunnel, *Pholis gunnellus*; waved whelk, *Buccinum undatum*; and Arctic eulaid, *Eaulus fabricii*.

Average bottom temperatures by stratum ranged from 3.3 to 6.5 $^{\circ}$ C (Table 2). The overall average temperature for spring 2005 was 4.9 $^{\circ}$ C, compared to 4.1 $^{\circ}$ C for 2001, 6.1 $^{\circ}$ C for 2002, 4.6 $^{\circ}$ C for 2003, and 4.0 $^{\circ}$ C for 2004. Specific station information can be found in Appendix A.

Table 2. Average bottom temperatures ($^{\circ}$ C) for the Spring 2005 survey.

Region						
Stratum		1	2	3	4	5
	1	4.3	5.4	5.0	6.5	5.9
	2	4.0	4.7	5.2	5.3	5.6
	3	3.3	4.7	4.9	5.0	5.3
	4	3.6	4.1	4.4	5.3	5.5

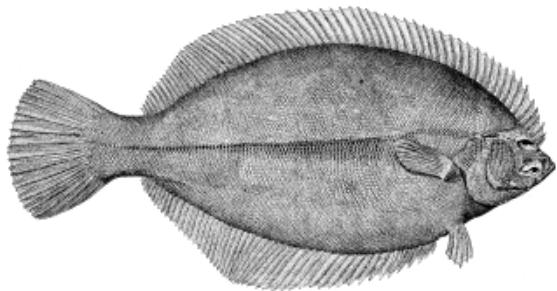
In the spring of 2005, thirty ichthyoplankton tows were made along the coast from New Hampshire to the Canadian border. The goal was to complete two tows on each sampling day, but due to time constraints, fixed gear, and a temporary loss of the plankton net, this was not always achieved. These samples have not yet been analyzed, and will be reported on in a future report.

SELECTED SPECIES

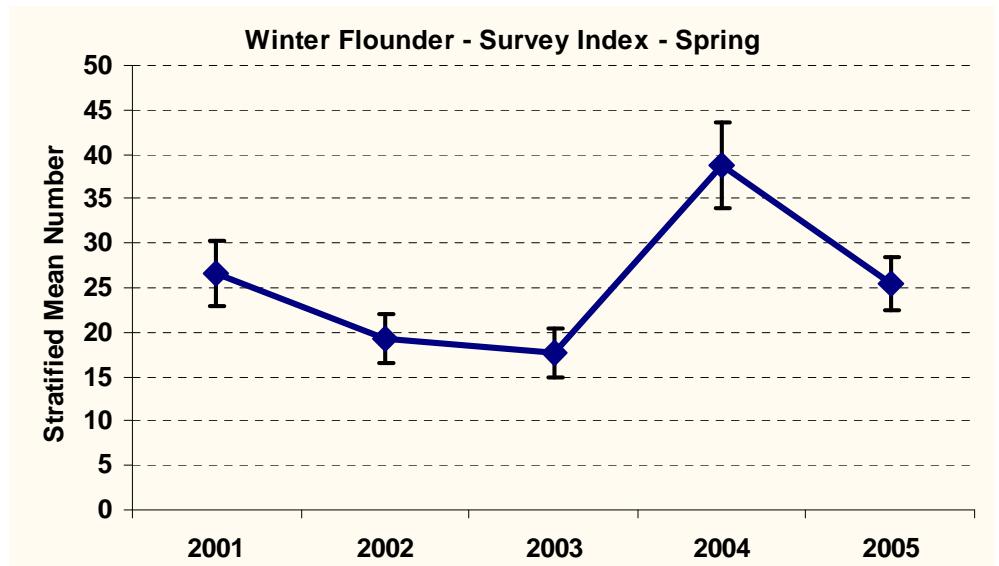
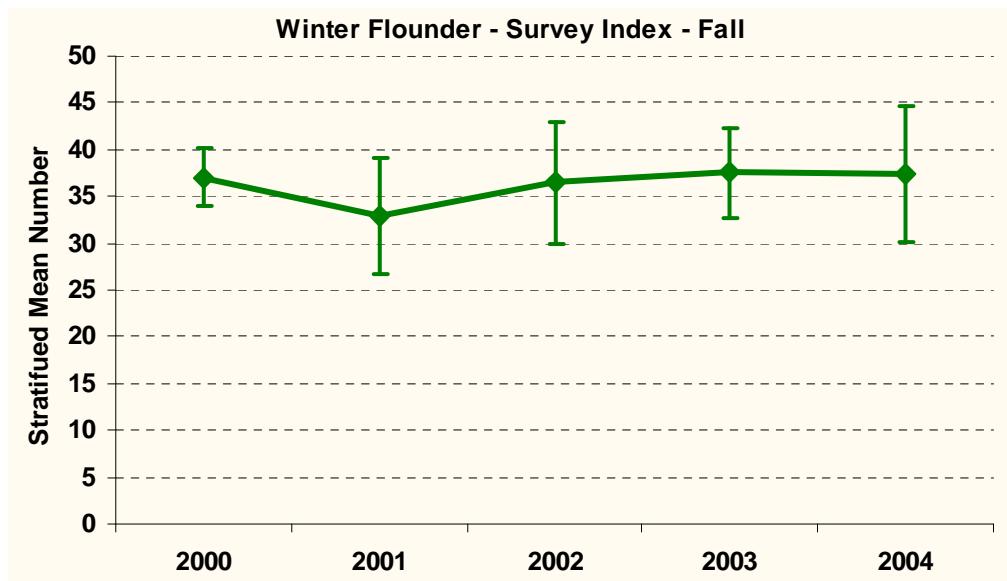
The following pages contain graphs and charts for a variety of commonly sampled species from the ME/NH Trawl Survey. For each species, there are survey indices of relative abundance, stratified mean number per standard tow, for each season. Survey area distribution charts of number caught per standard tow with an overlay of five-year average catches on a regional basis. Our five regions being: New Hampshire and Southern Maine (region 1), Cape Elizabeth through Port Clyde (region 2, midcoast), Penobscot Bay area (region 3), Mt. Desert Area (region 4), and Schoodic Point through Lubec (region 5, Downeast). Length frequency plots of total number caught per standard tow, expanded from sub-samples when applicable, for each season by year.

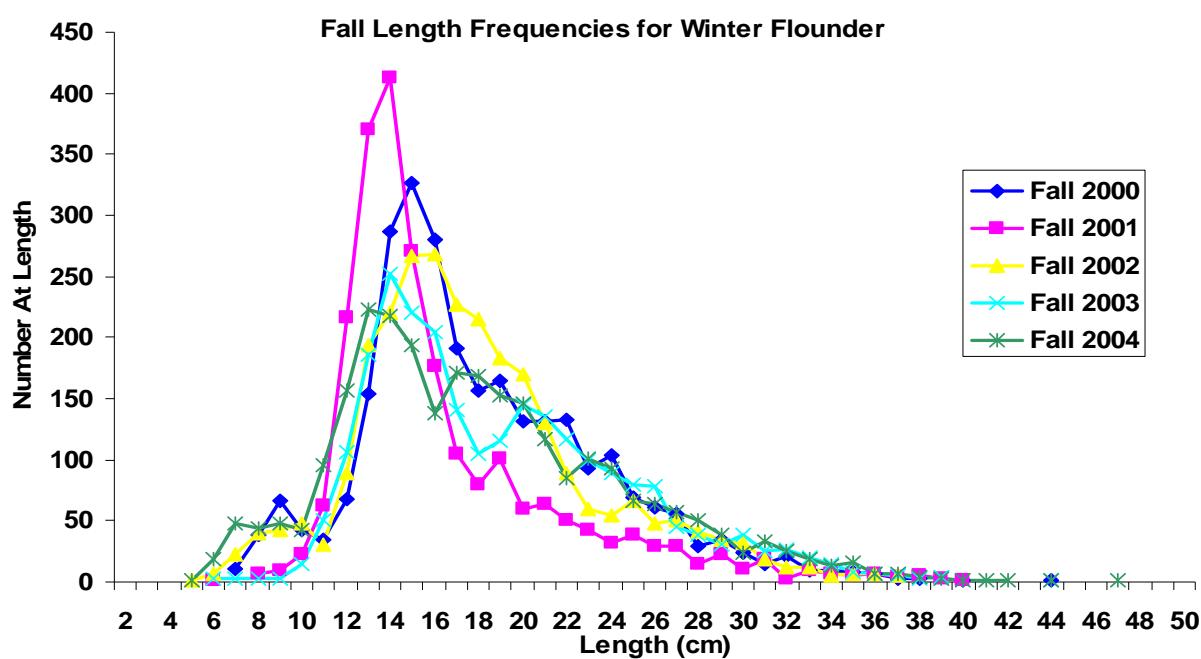
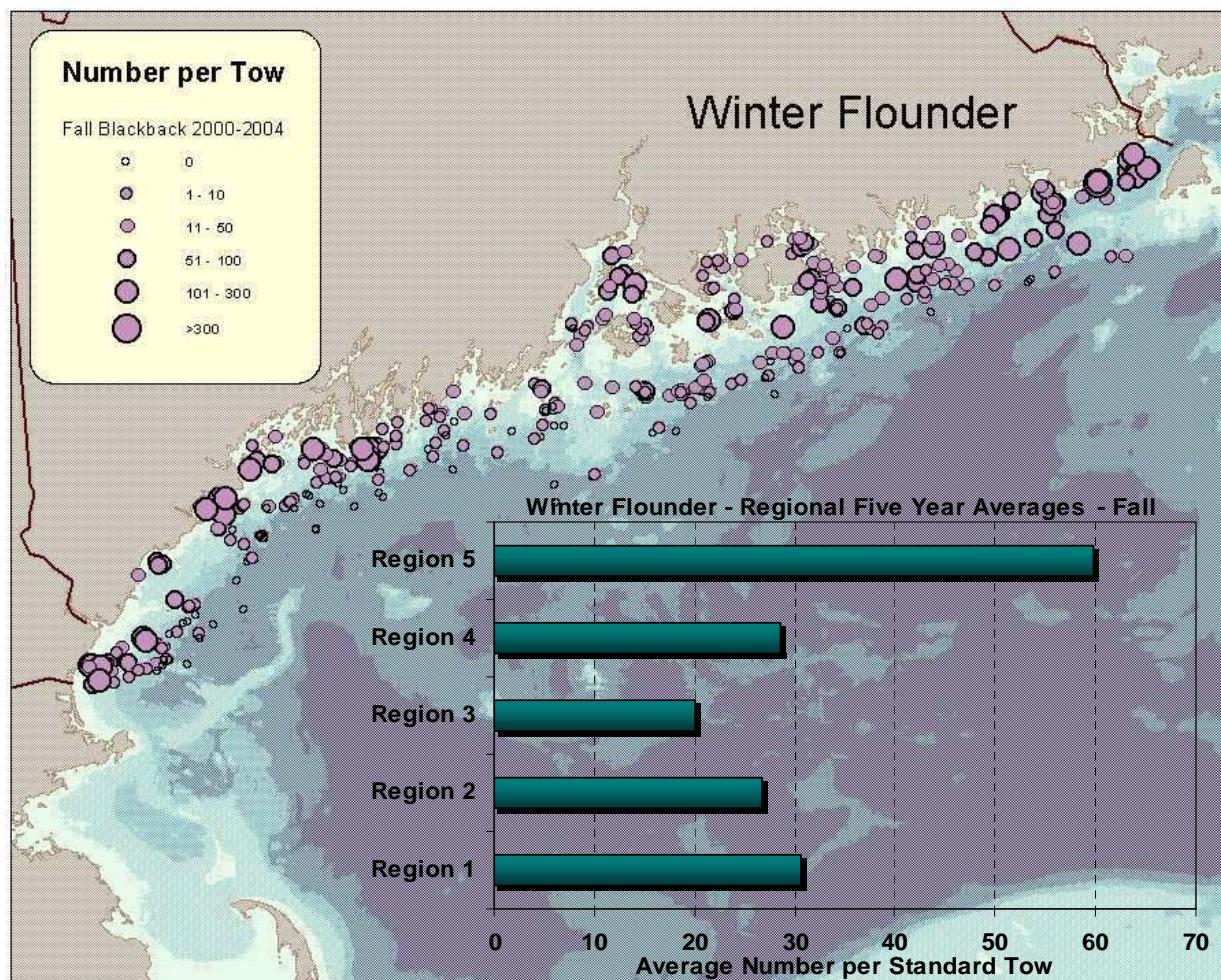
Fish diagrams are courtesy of the National Marine Fisheries Service, North East Fisheries Science Center (www.nefsc.noaa.gov).

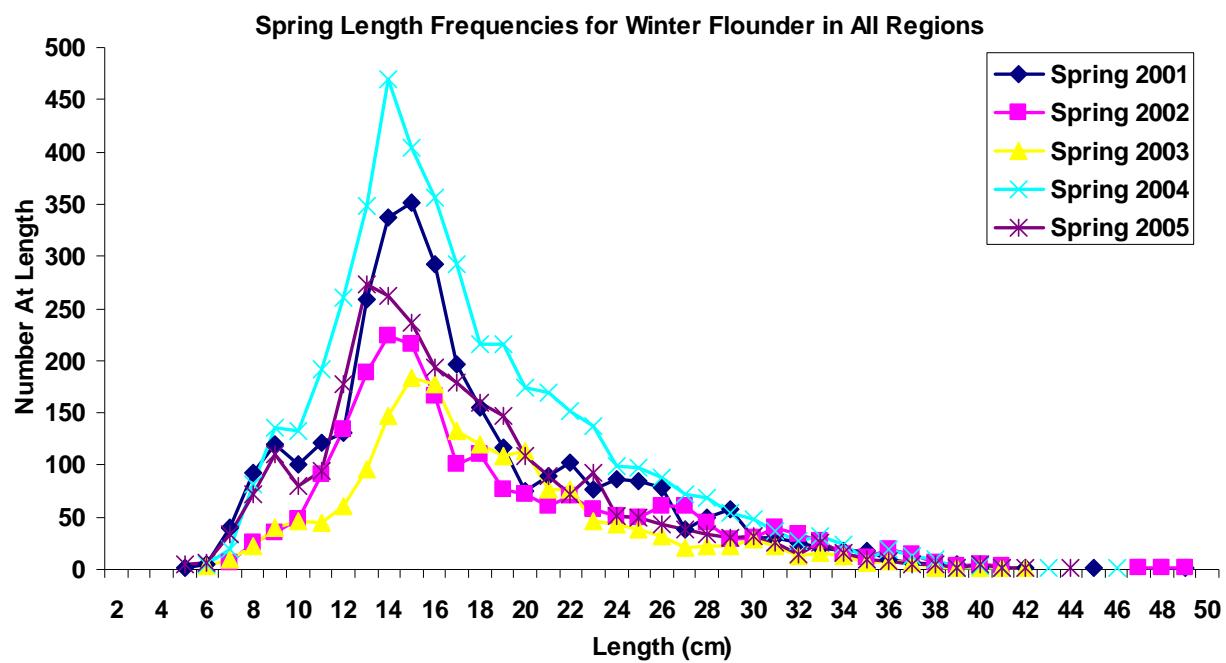
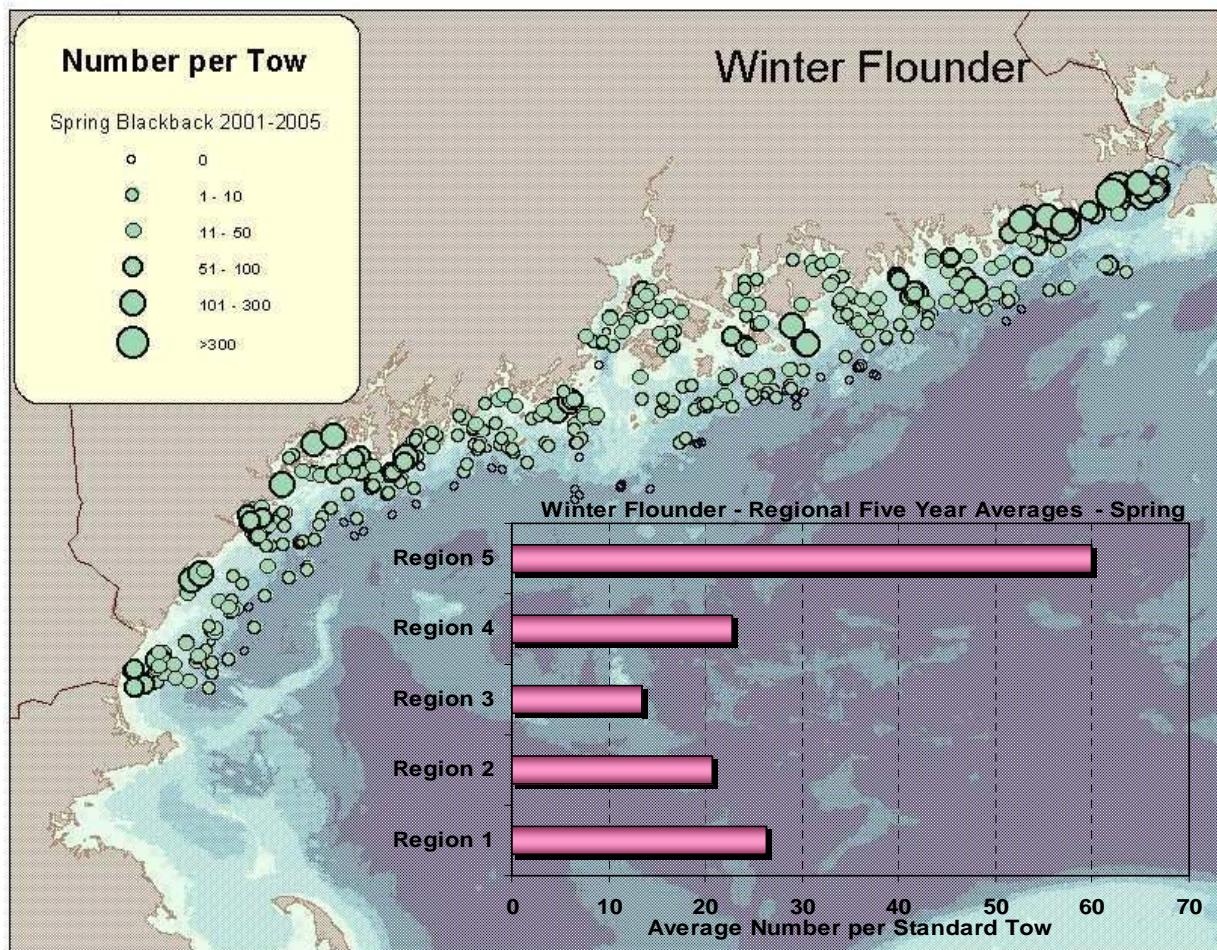


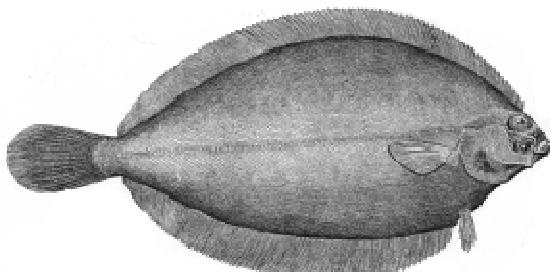


Winter Flounder
Pseudopleuronectes americanus

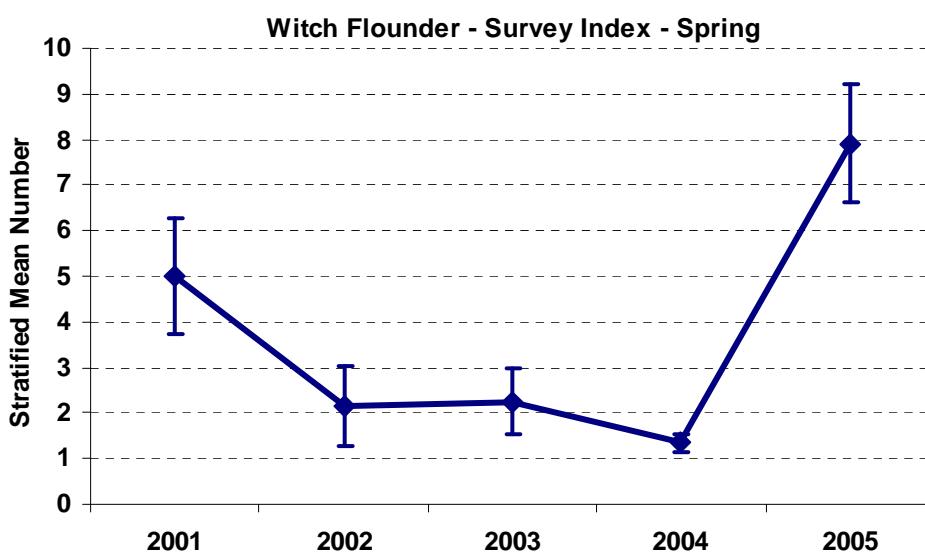
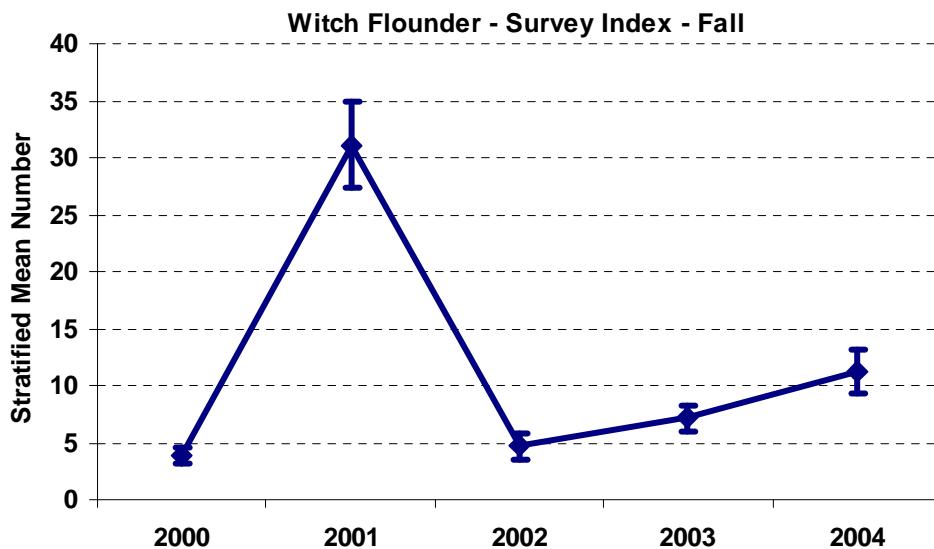


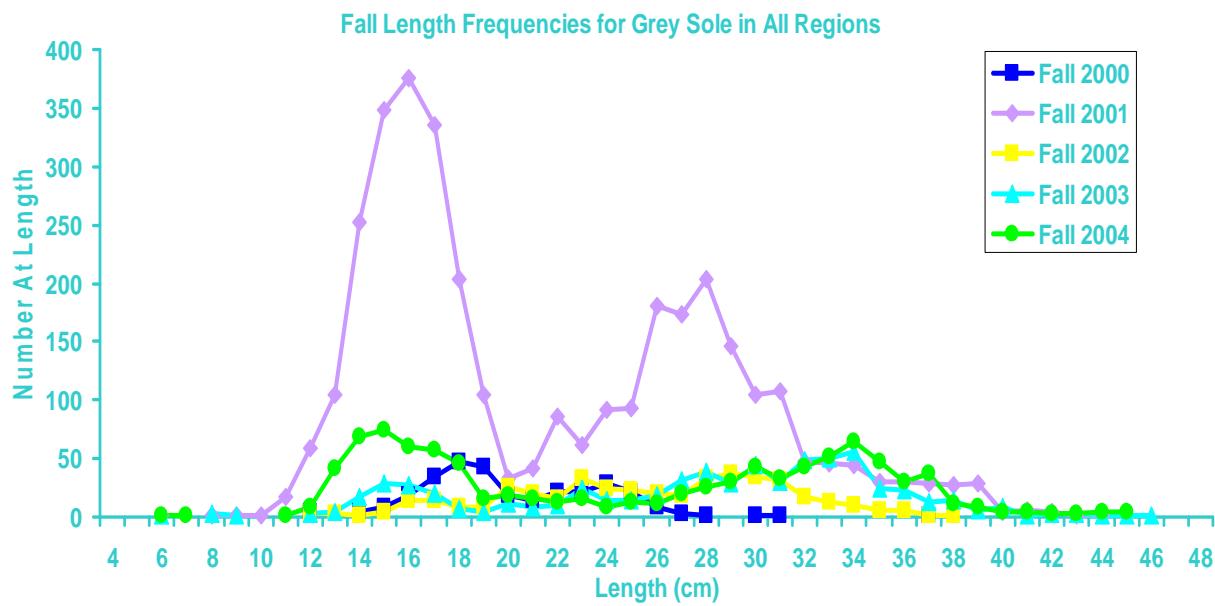
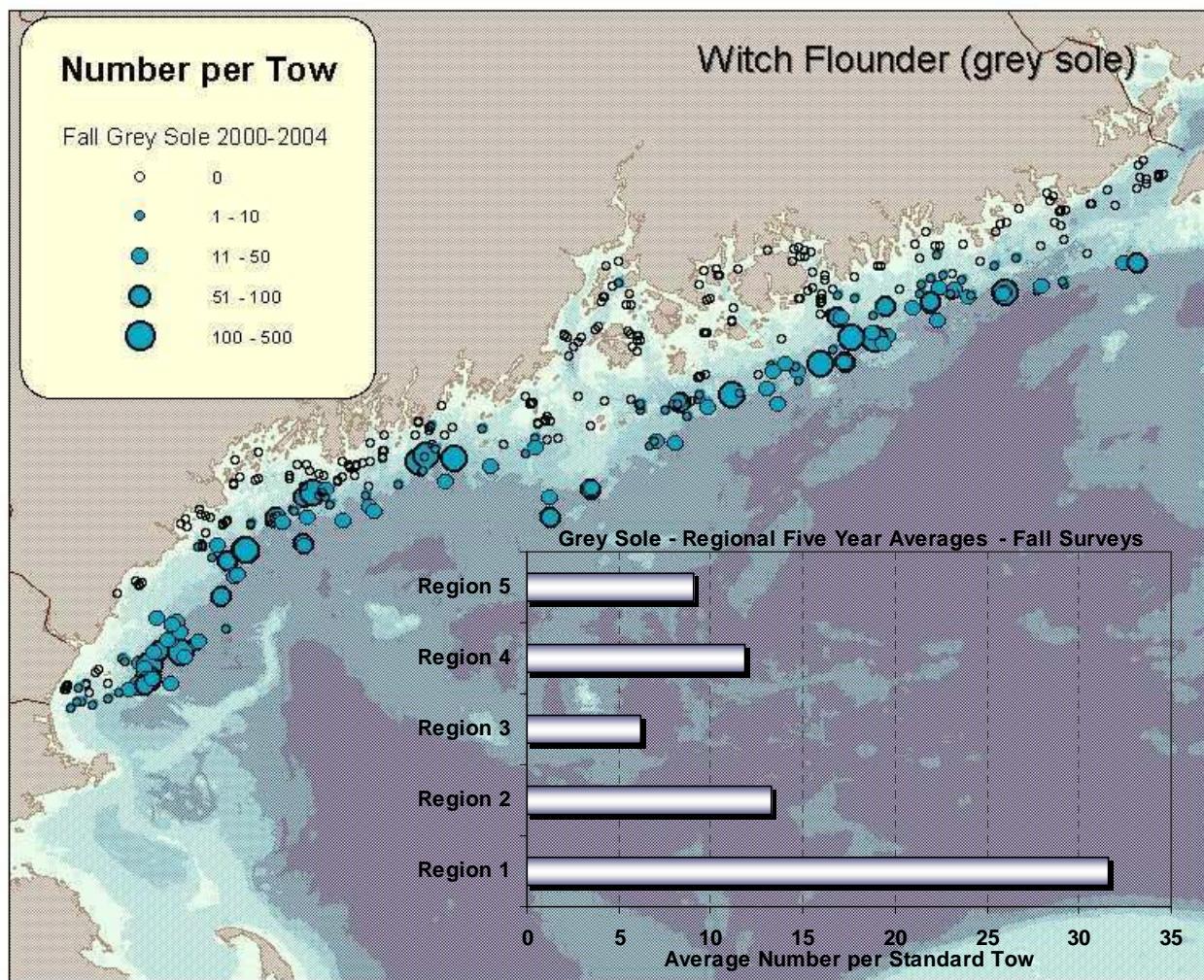


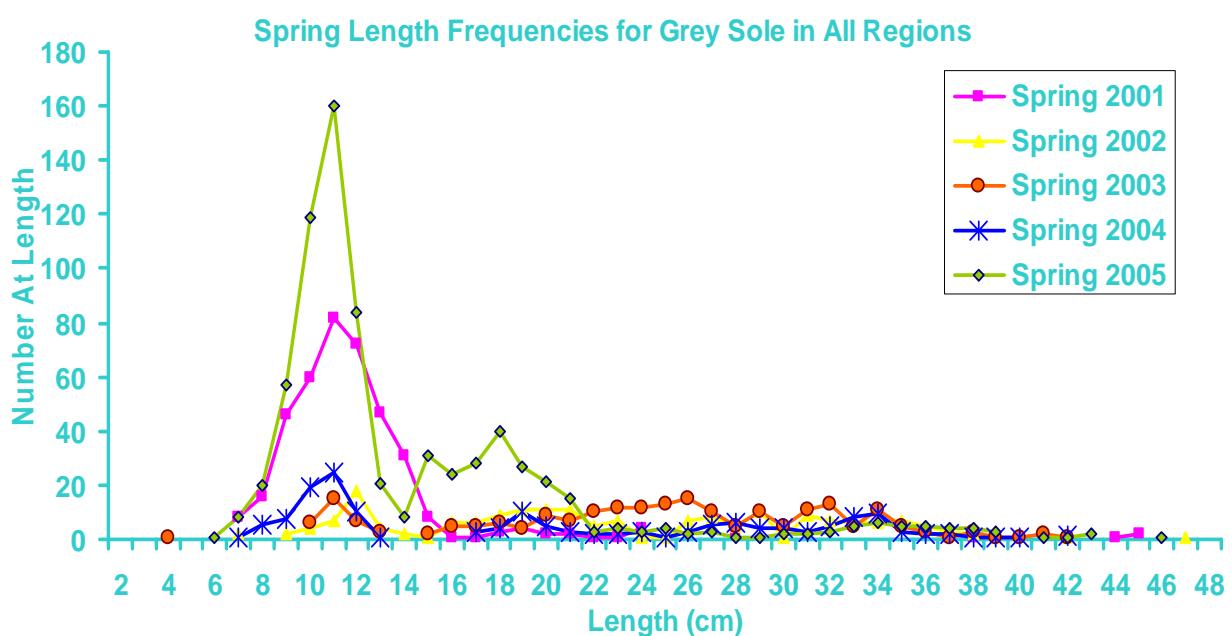
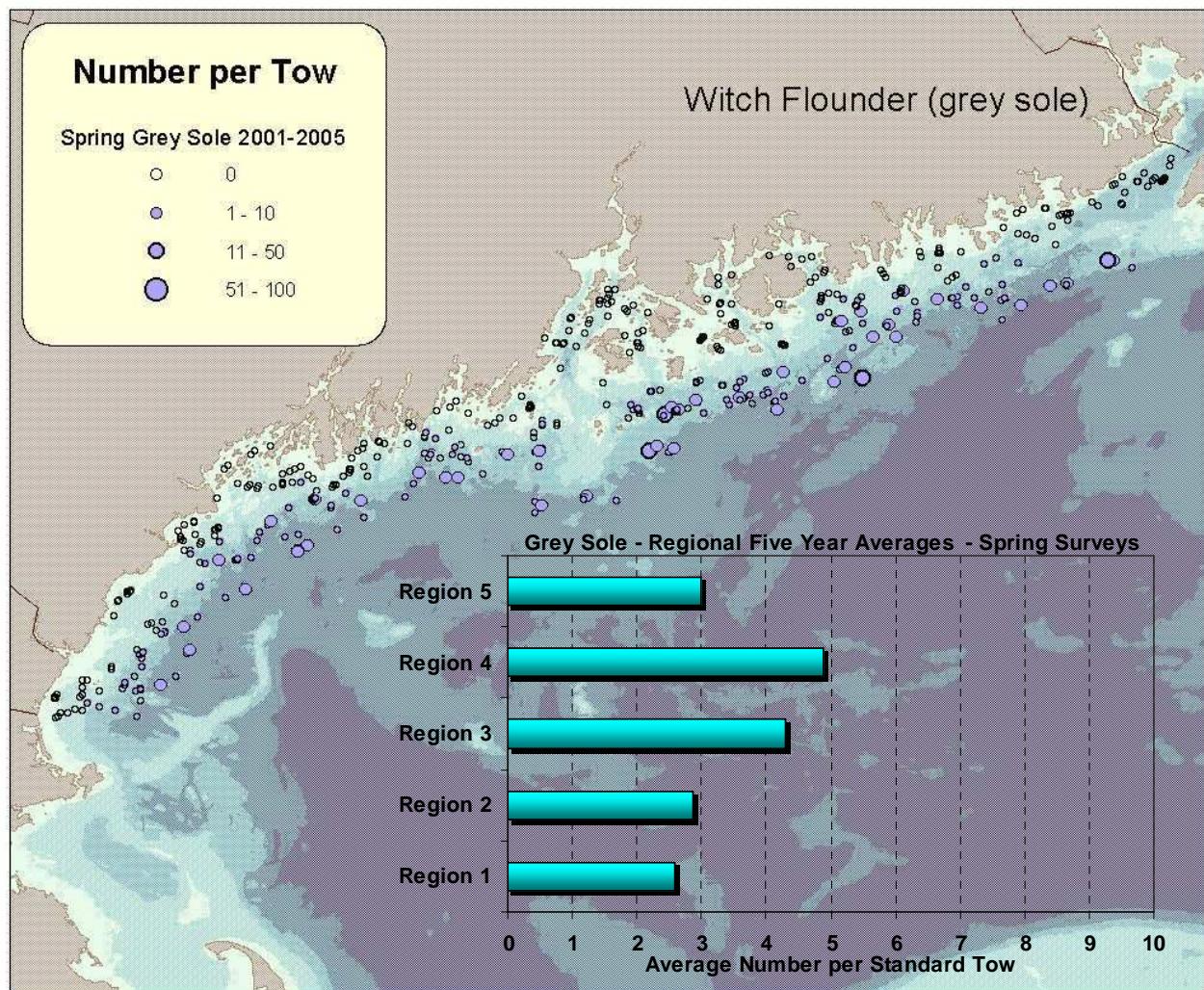


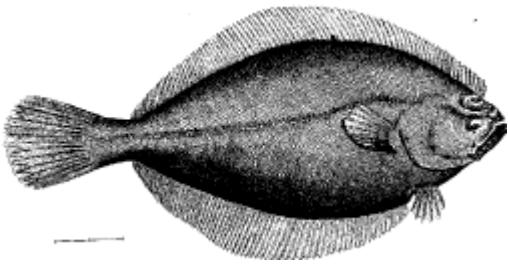


Witch Flounder
Glyptocephalus cynoglossus

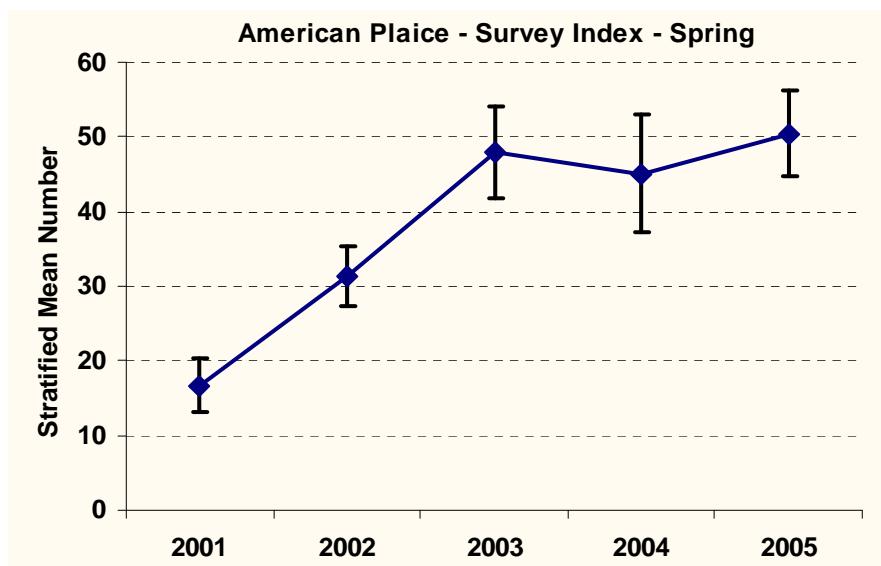
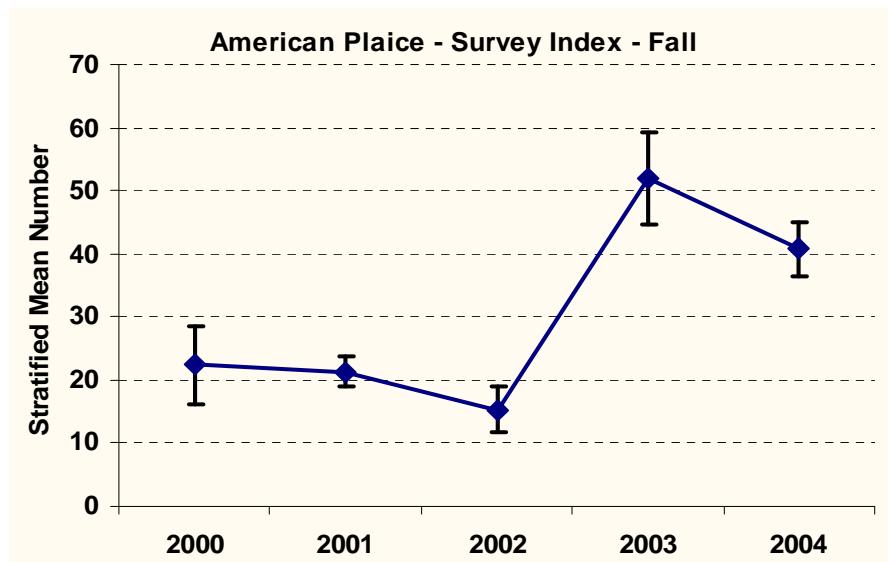


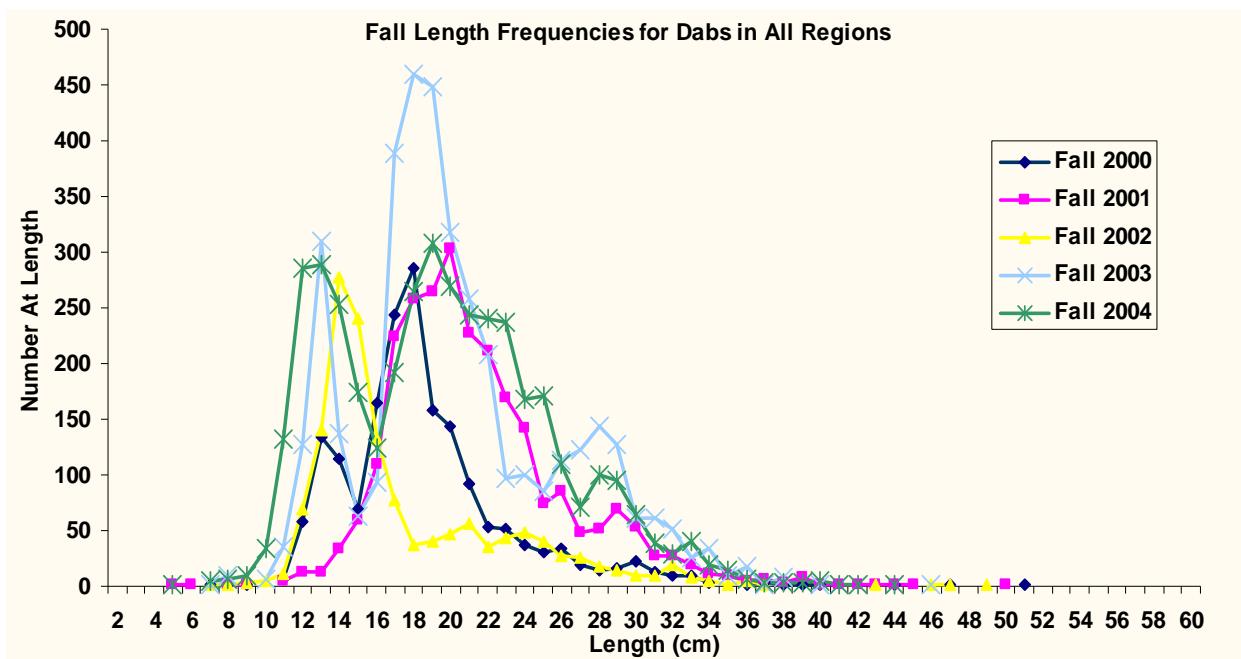
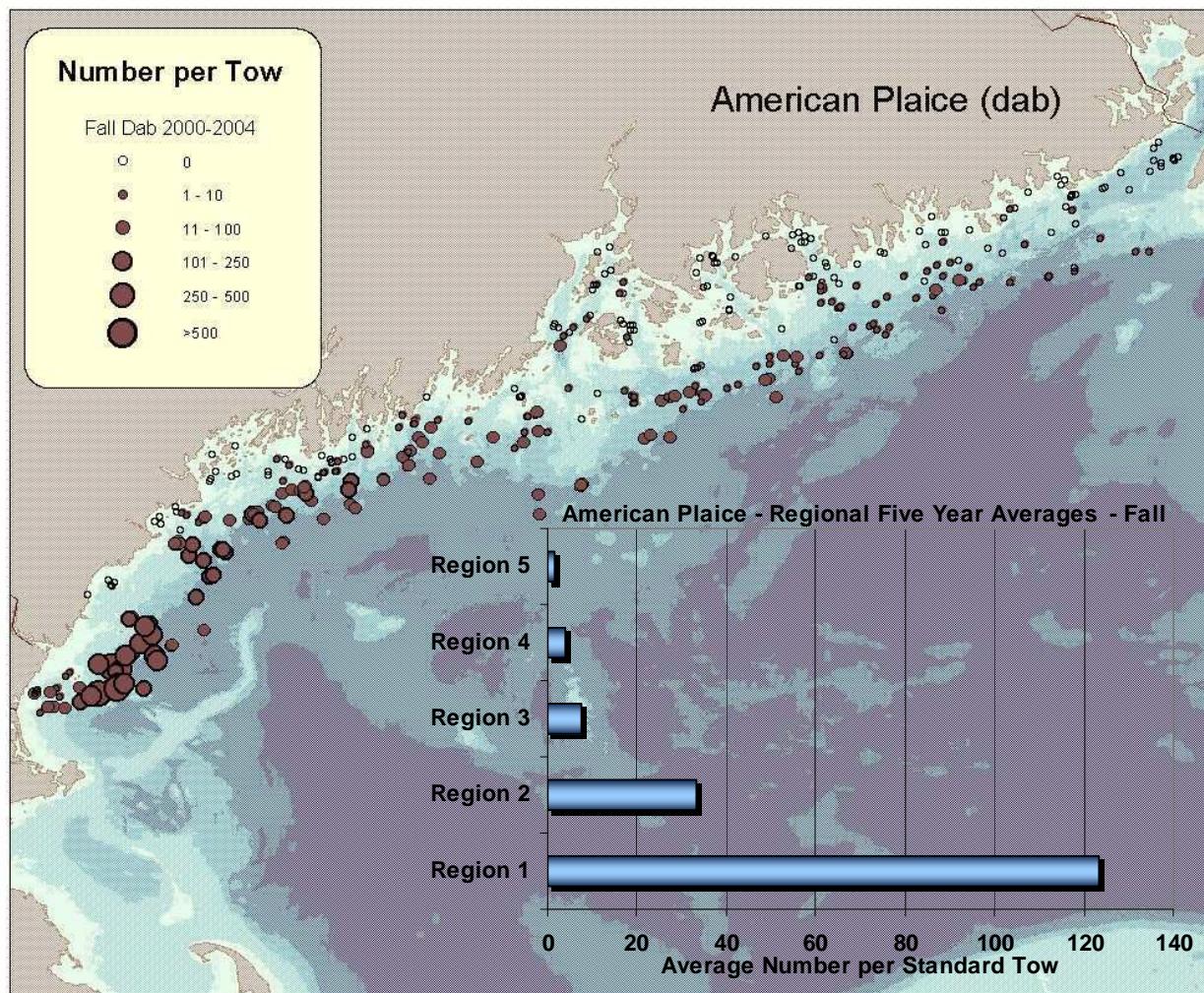


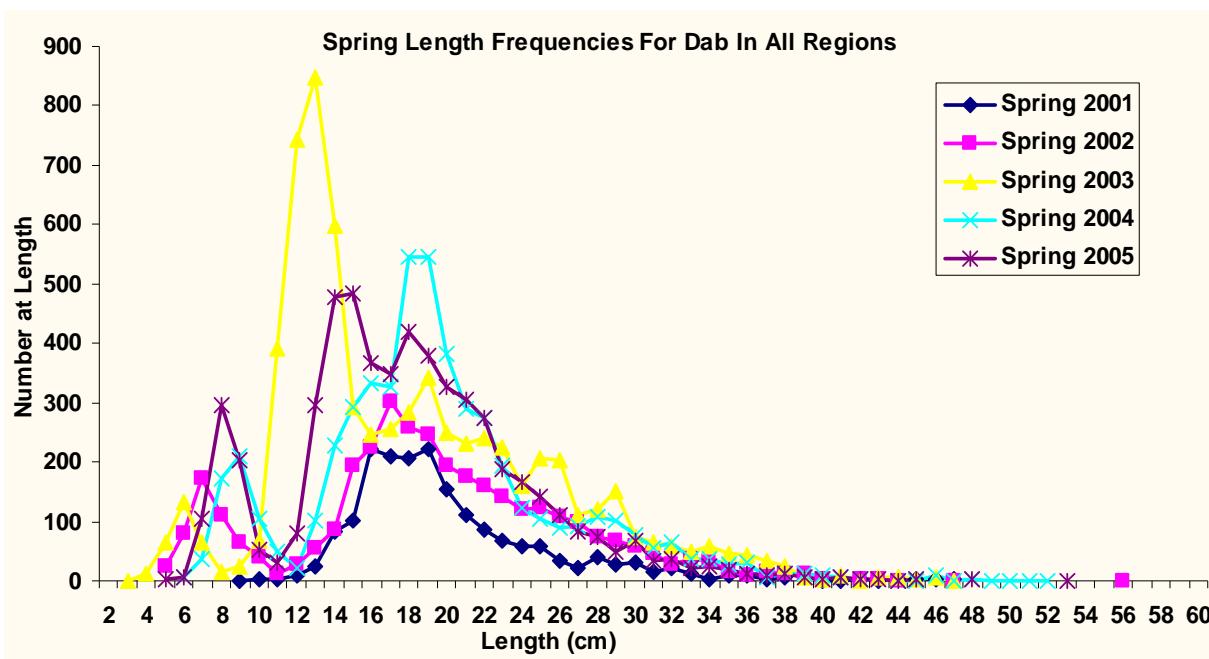
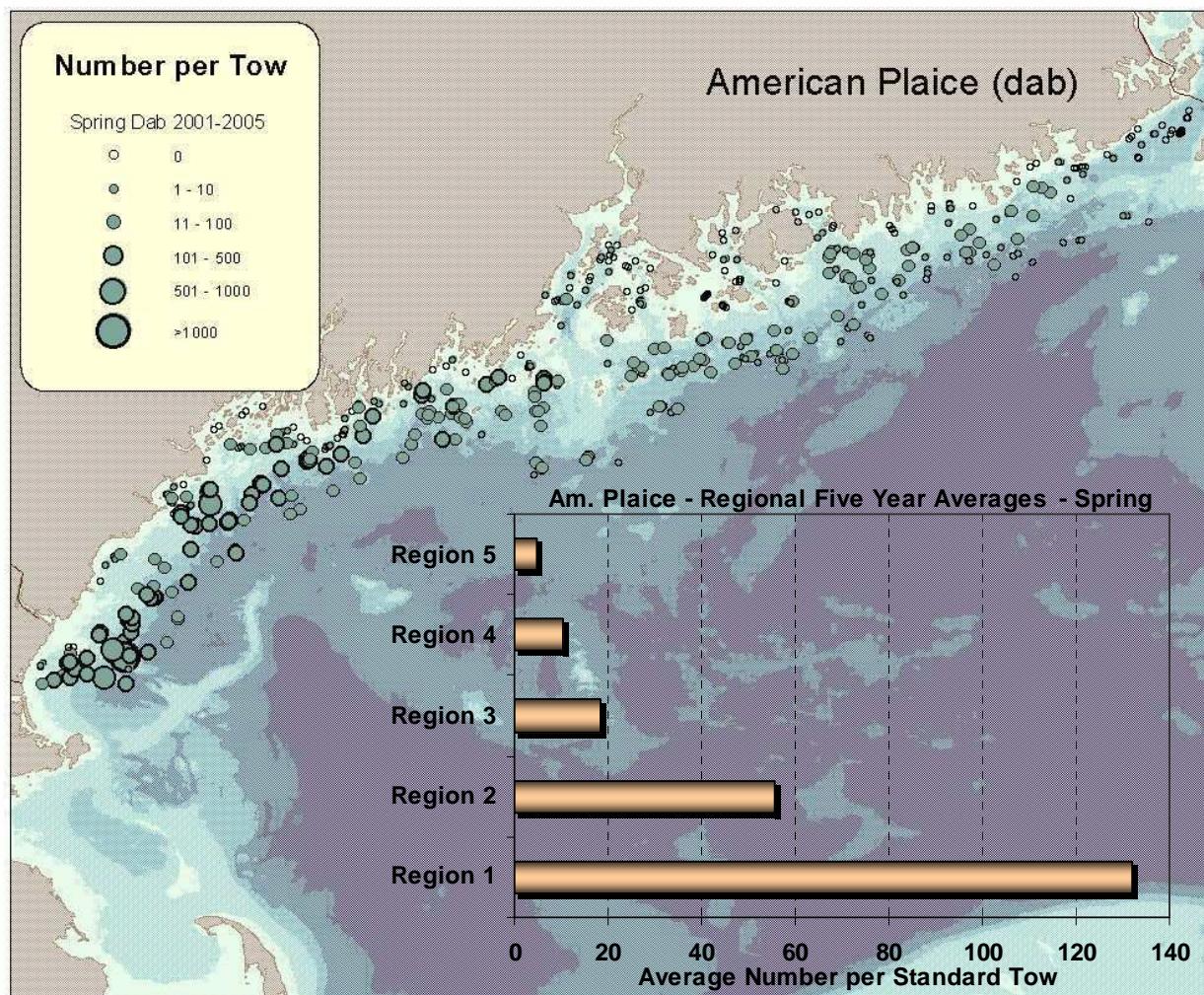


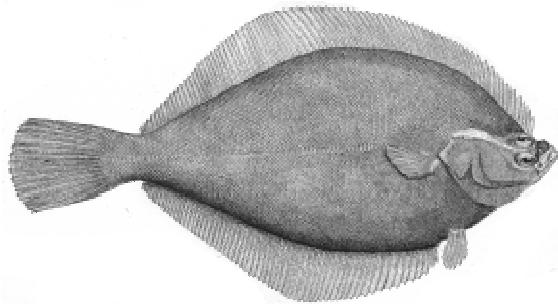


American Plaice
Hippoglossoides platessoides

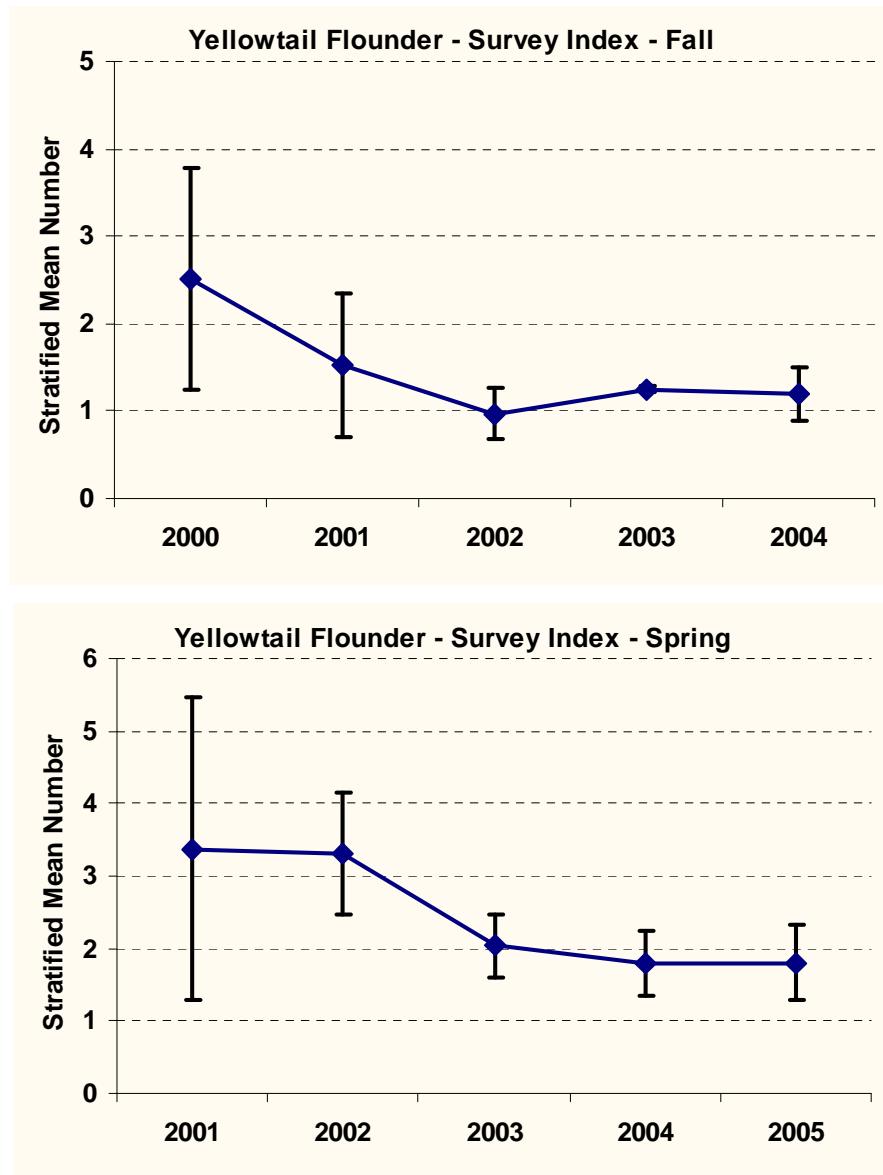


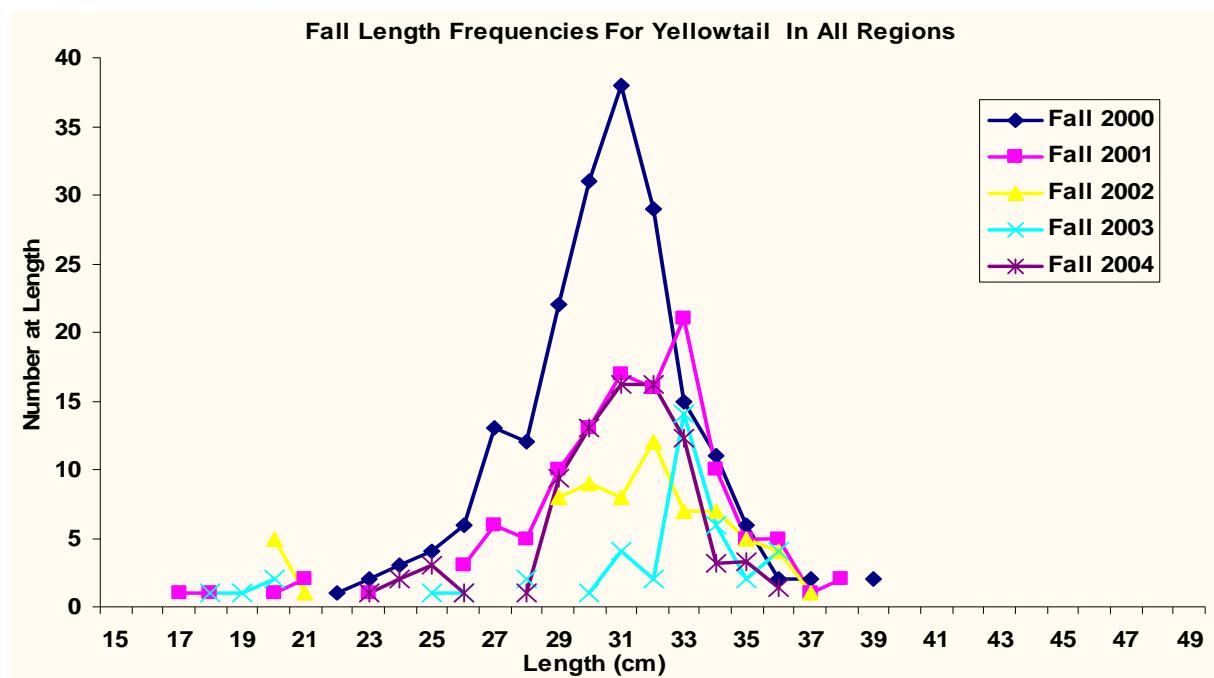
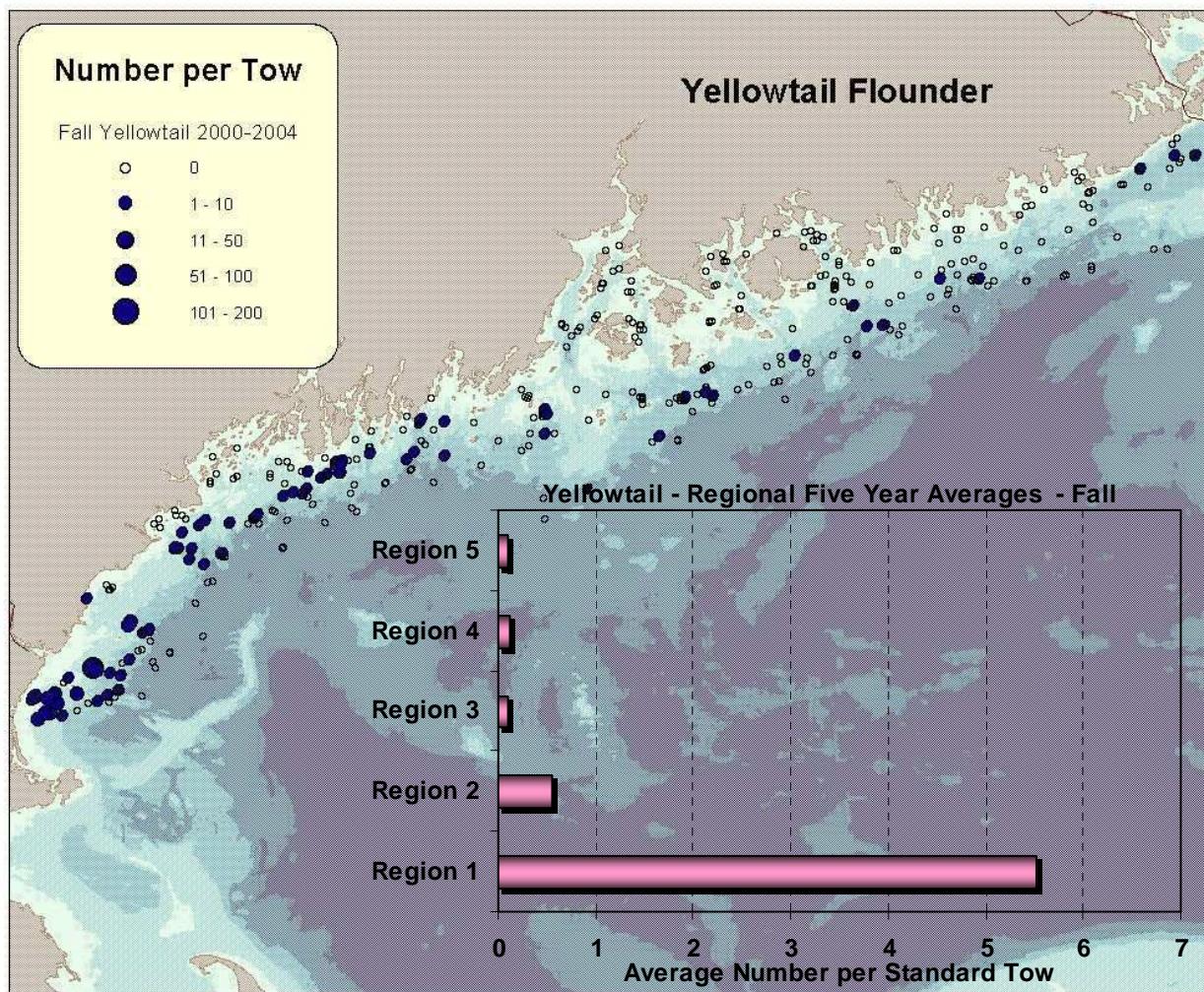


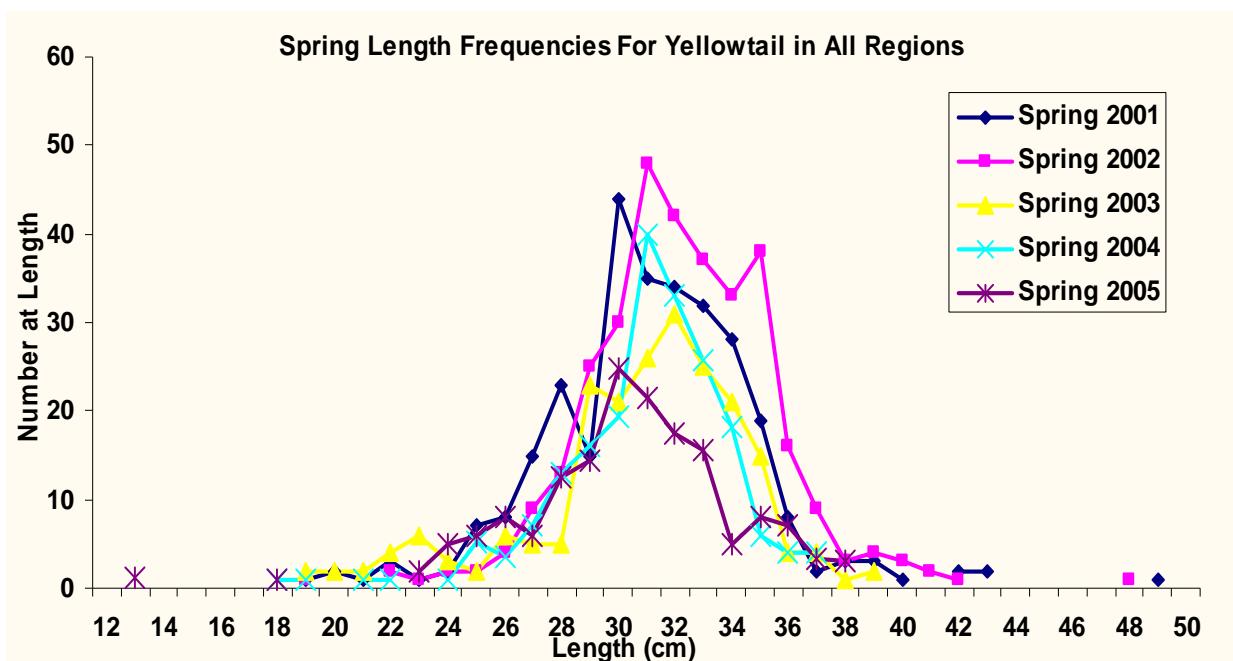
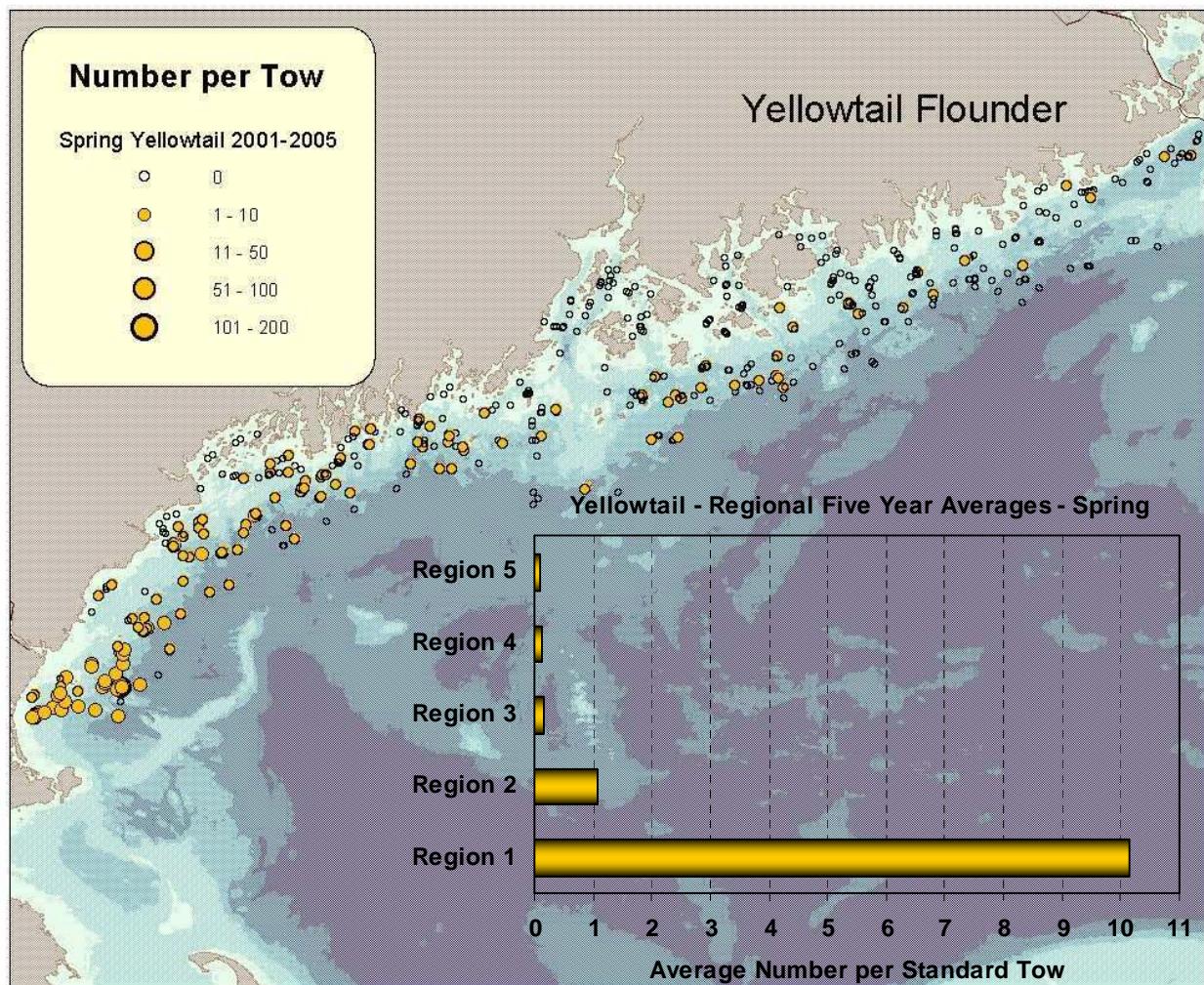


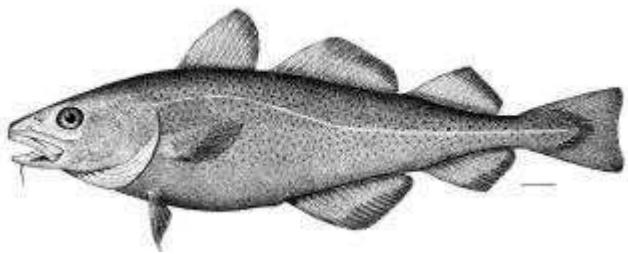


Yellowtail Flounder
Limanda ferruginea

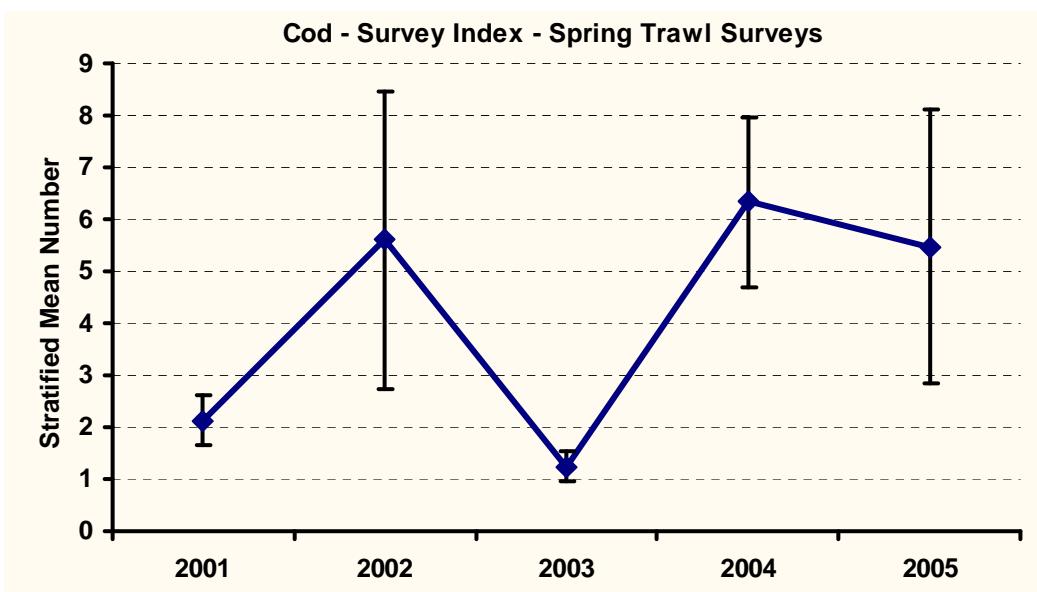
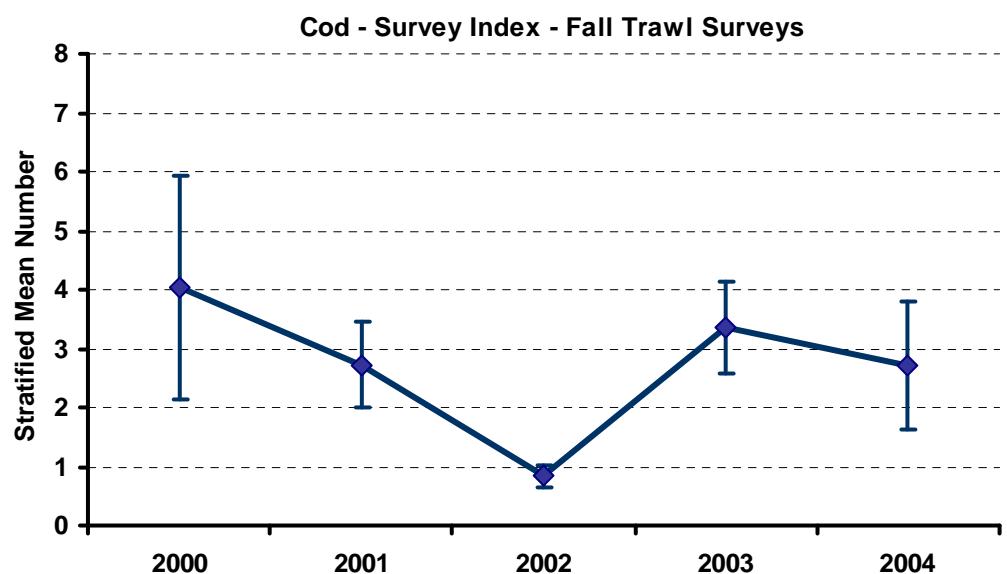


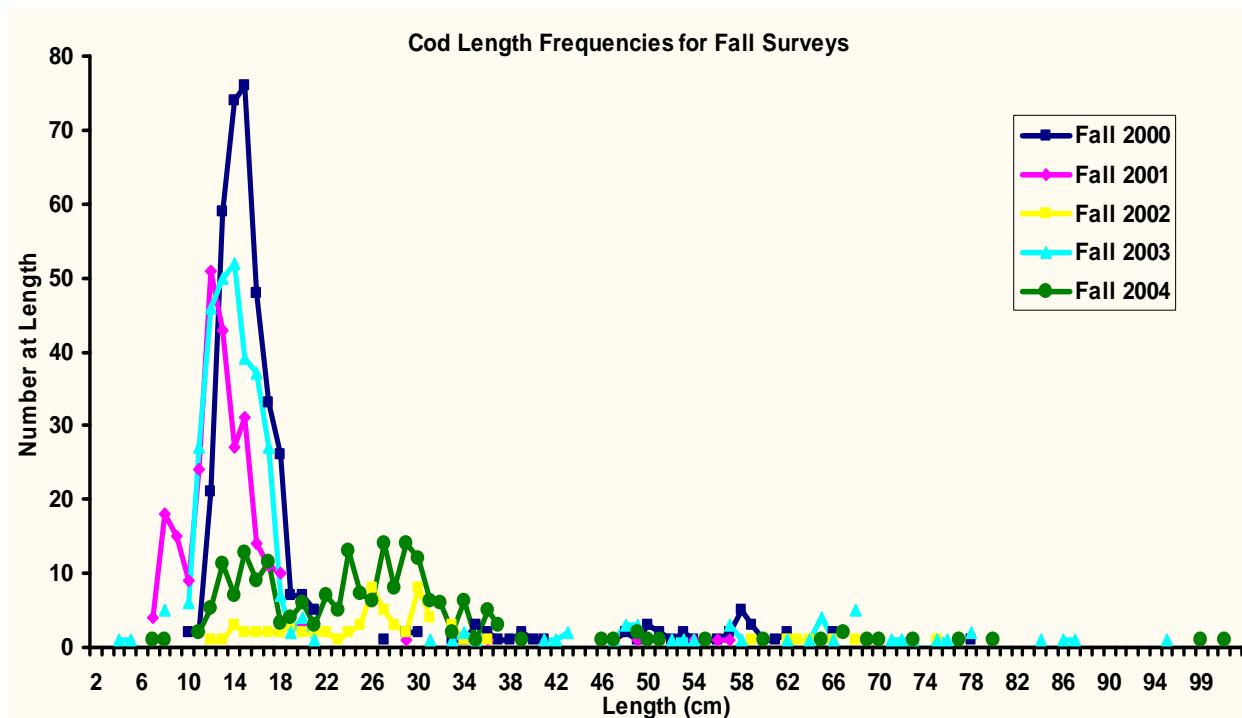
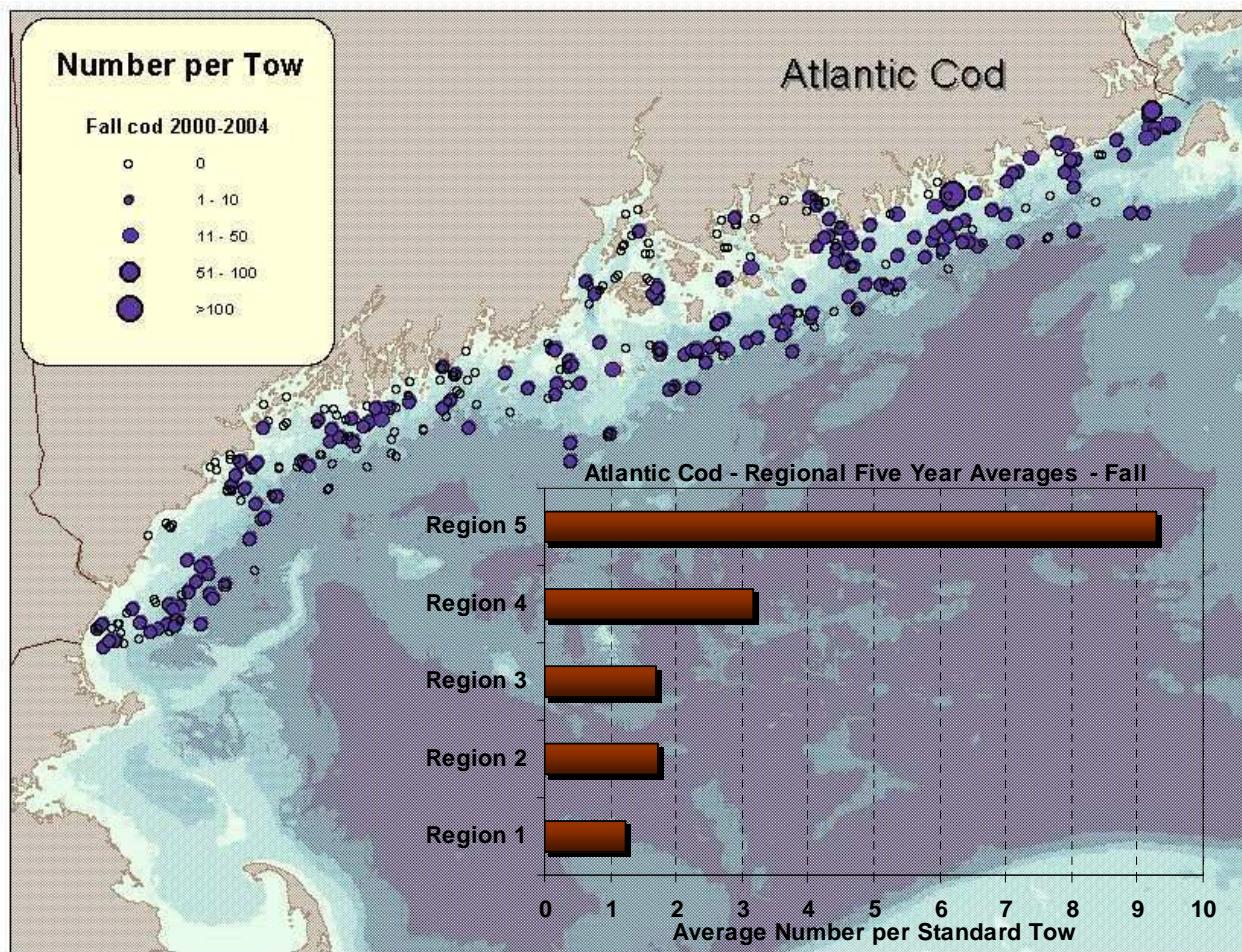


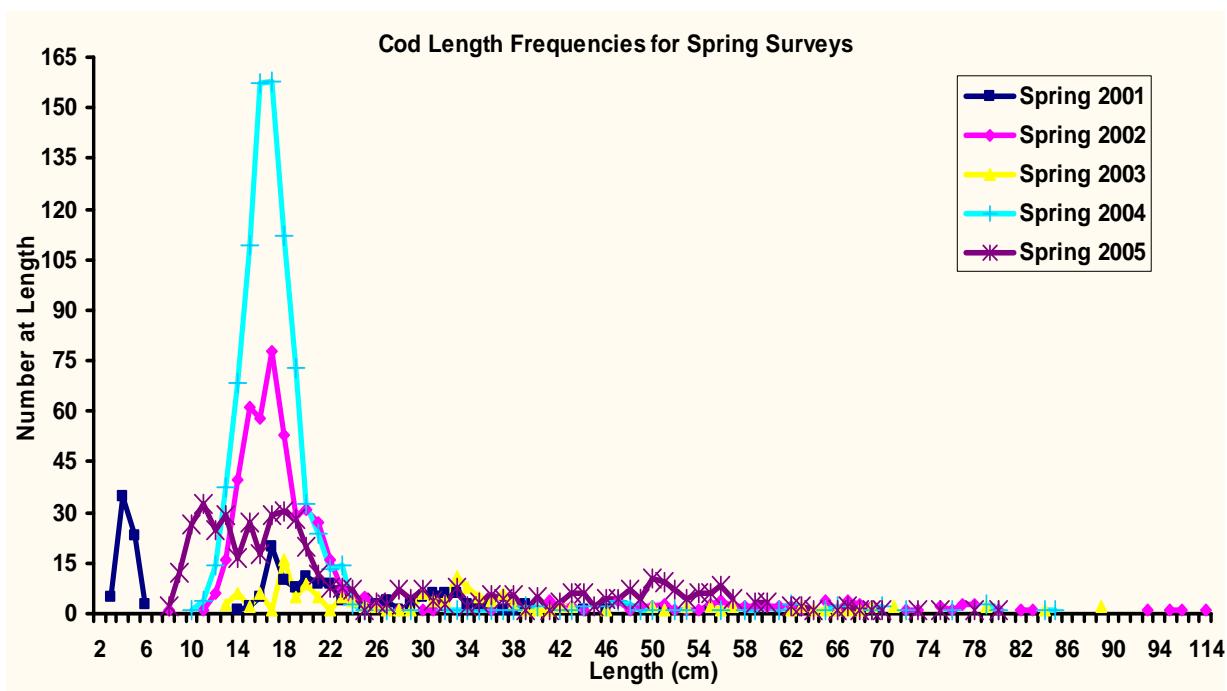
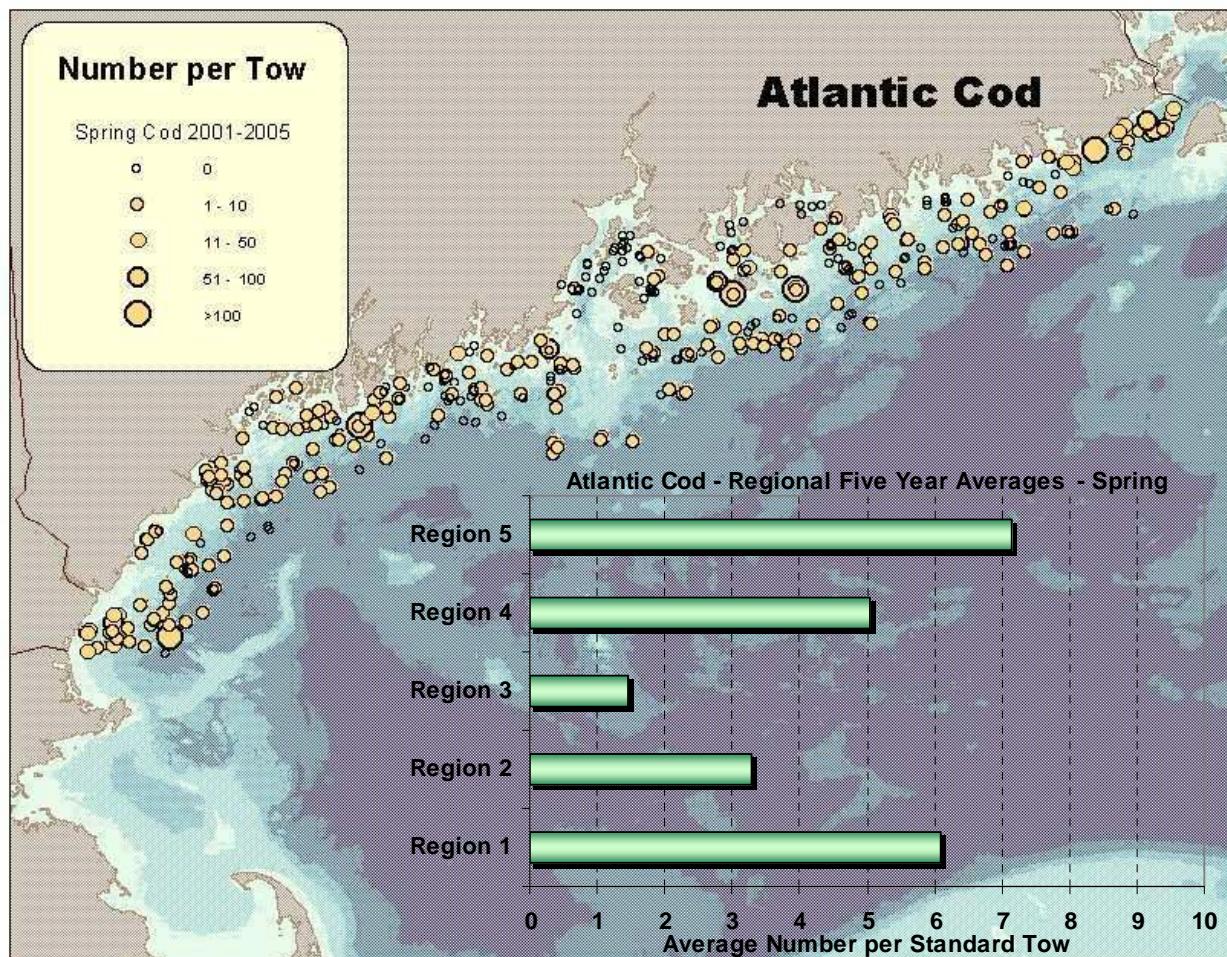


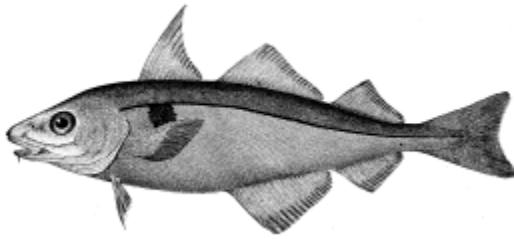


Atlantic Cod
Gadus morhua

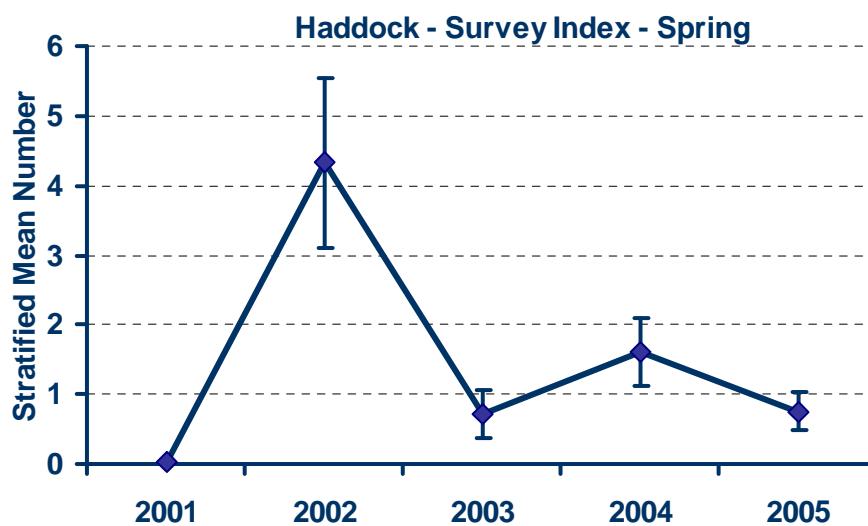
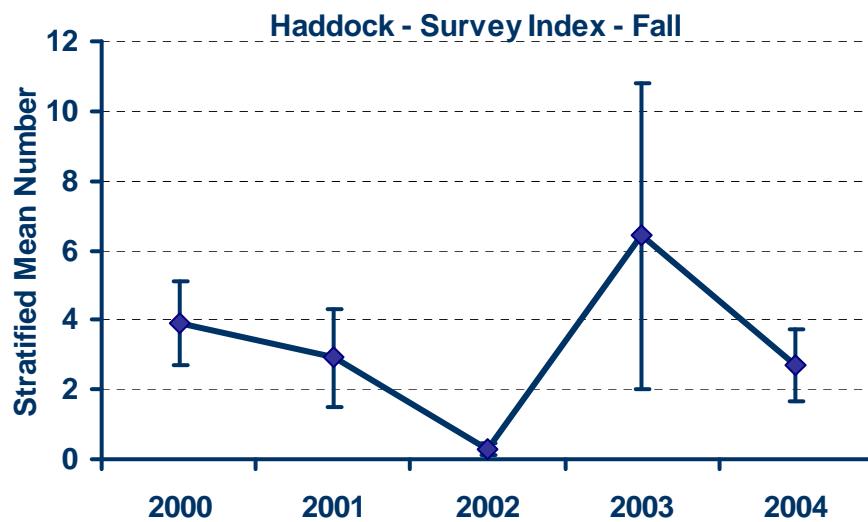


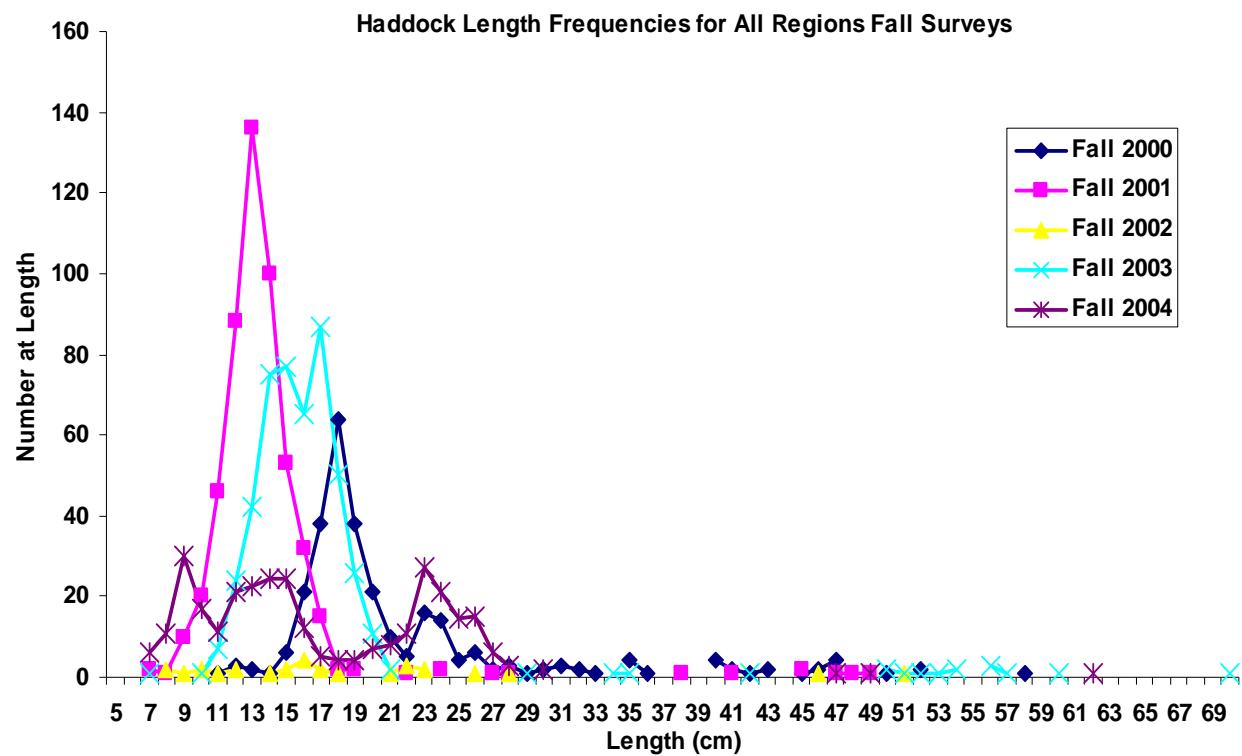
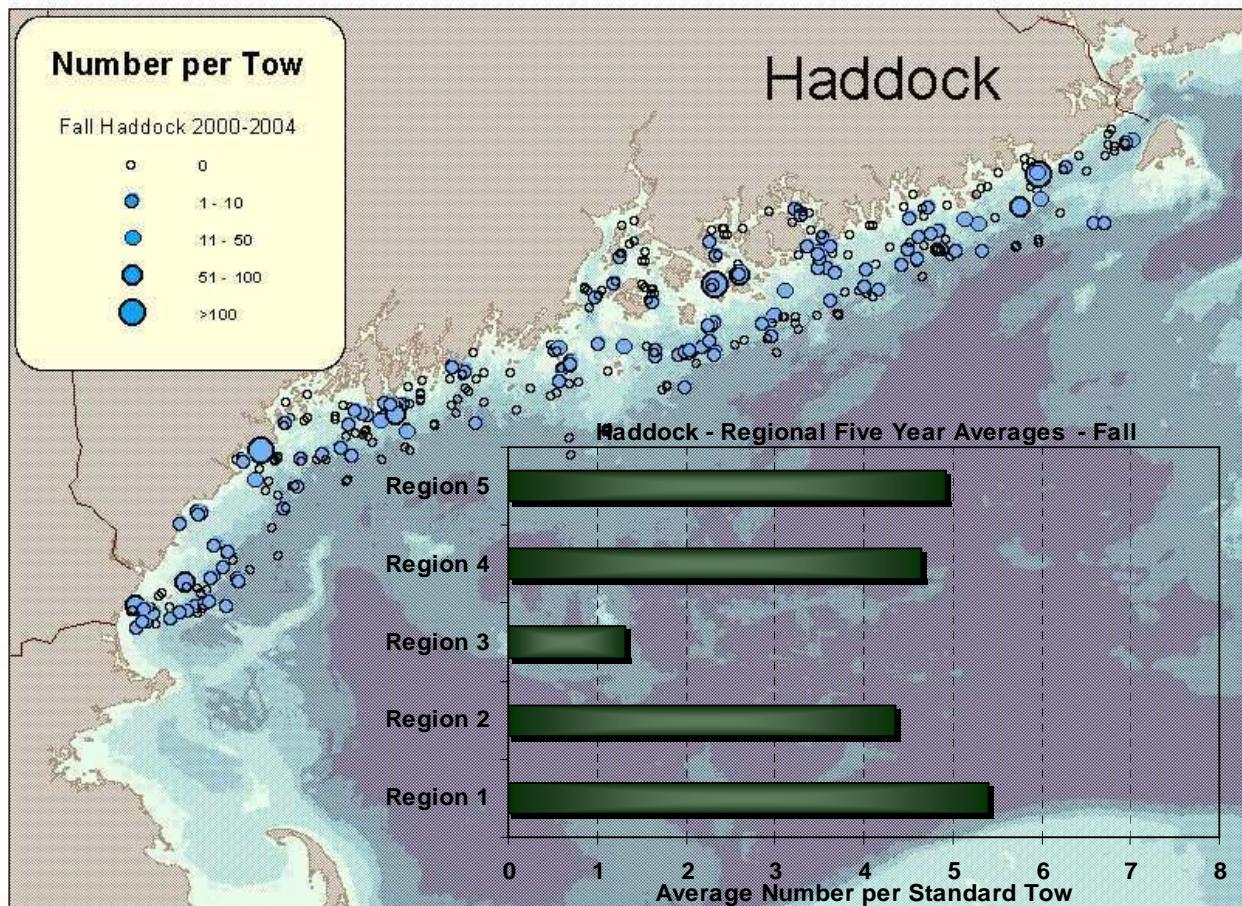


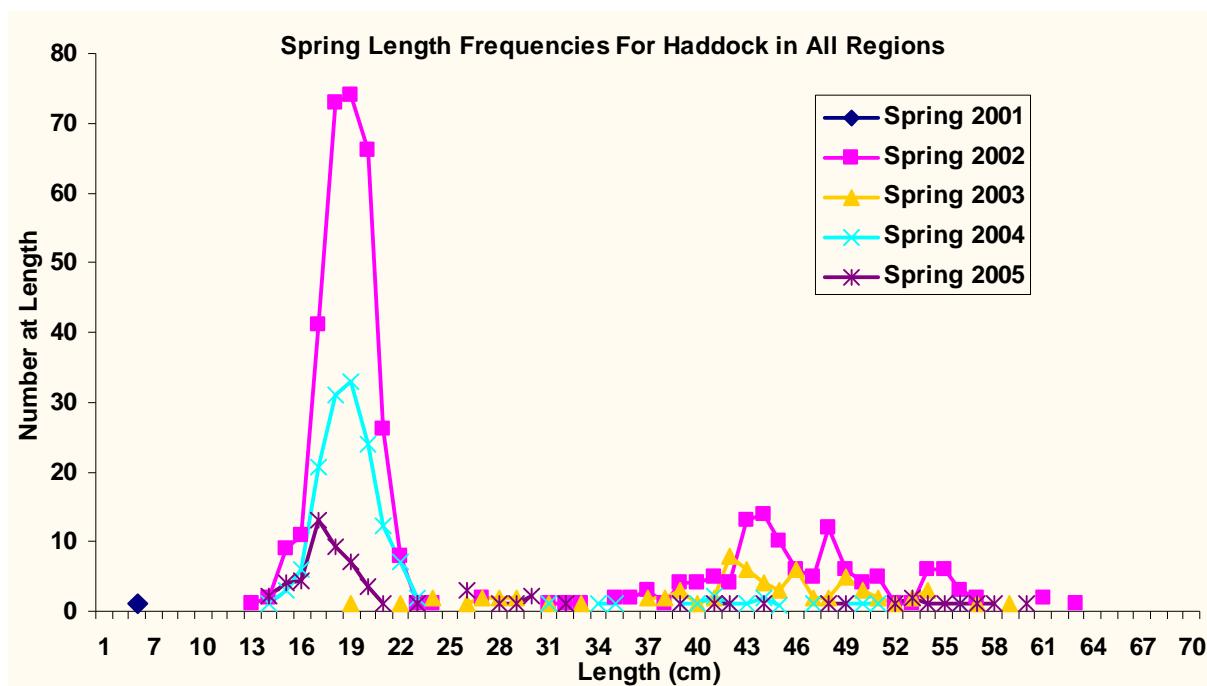
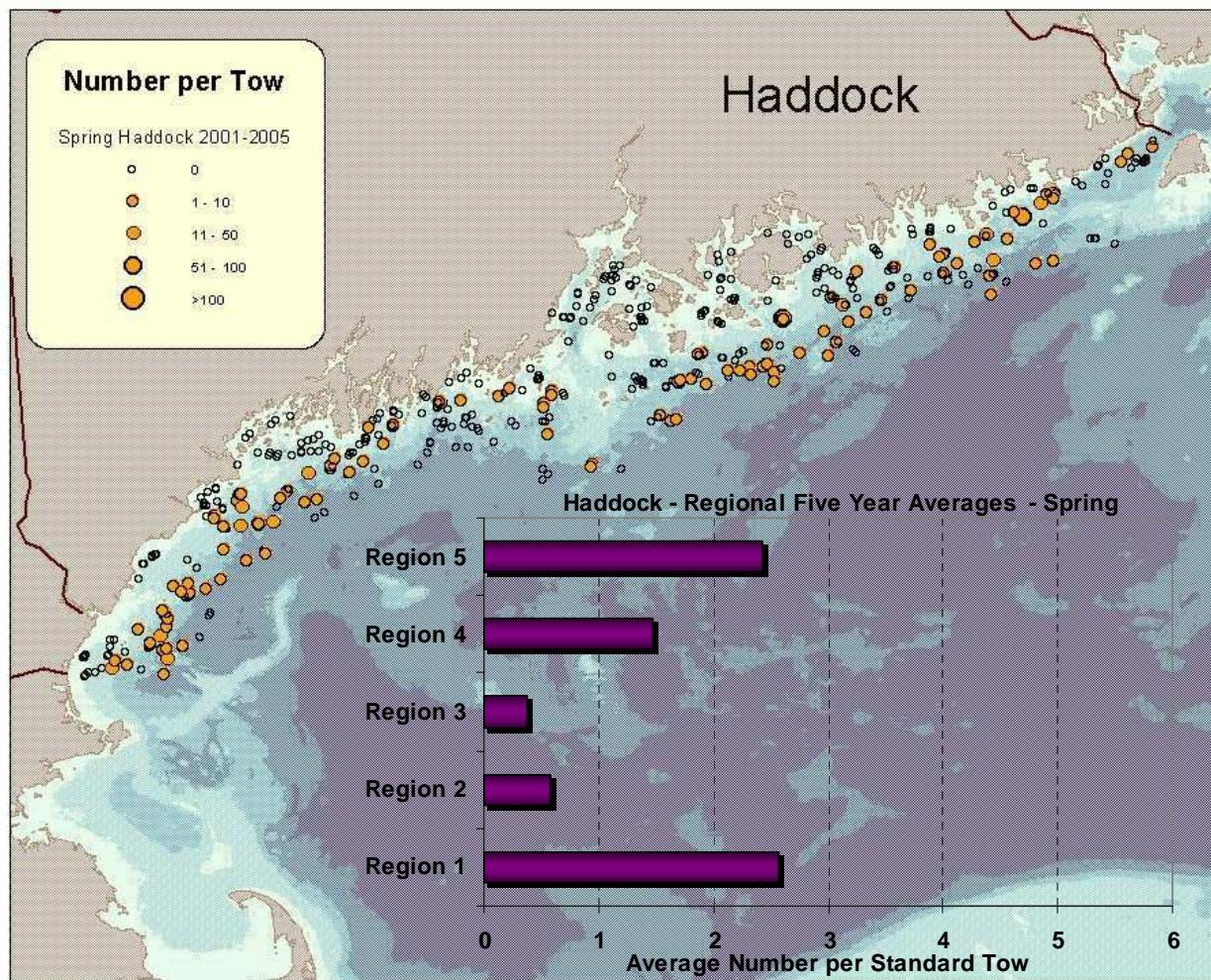


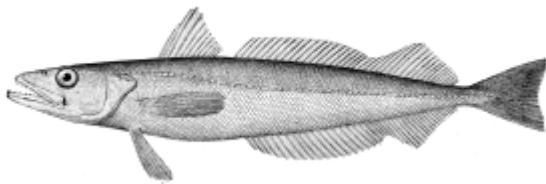


Haddock
Melanogrammus aeglefinus

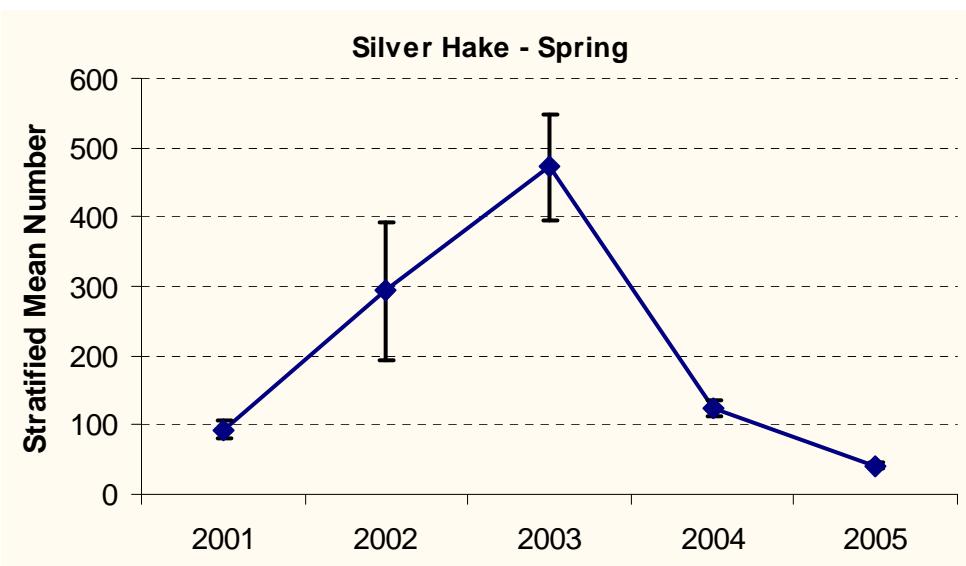
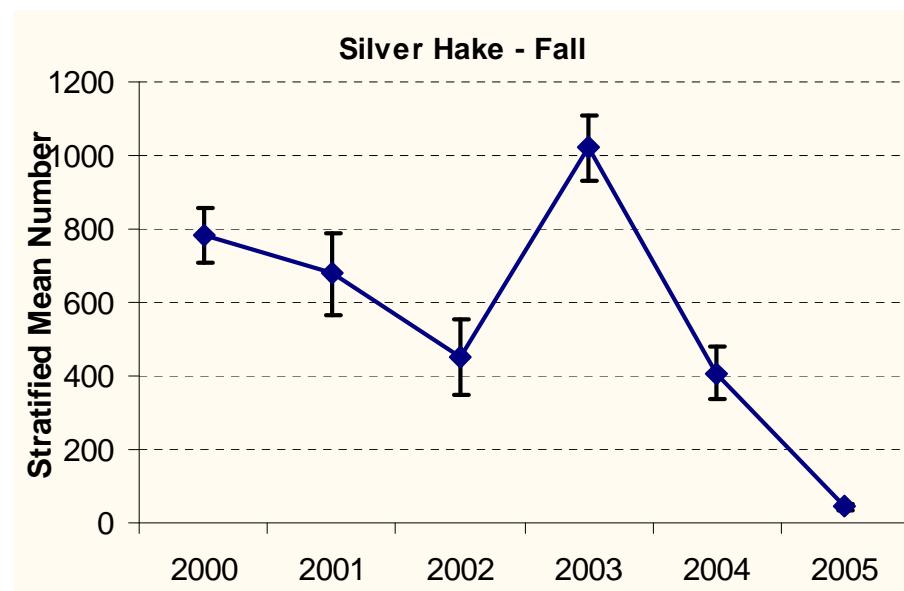


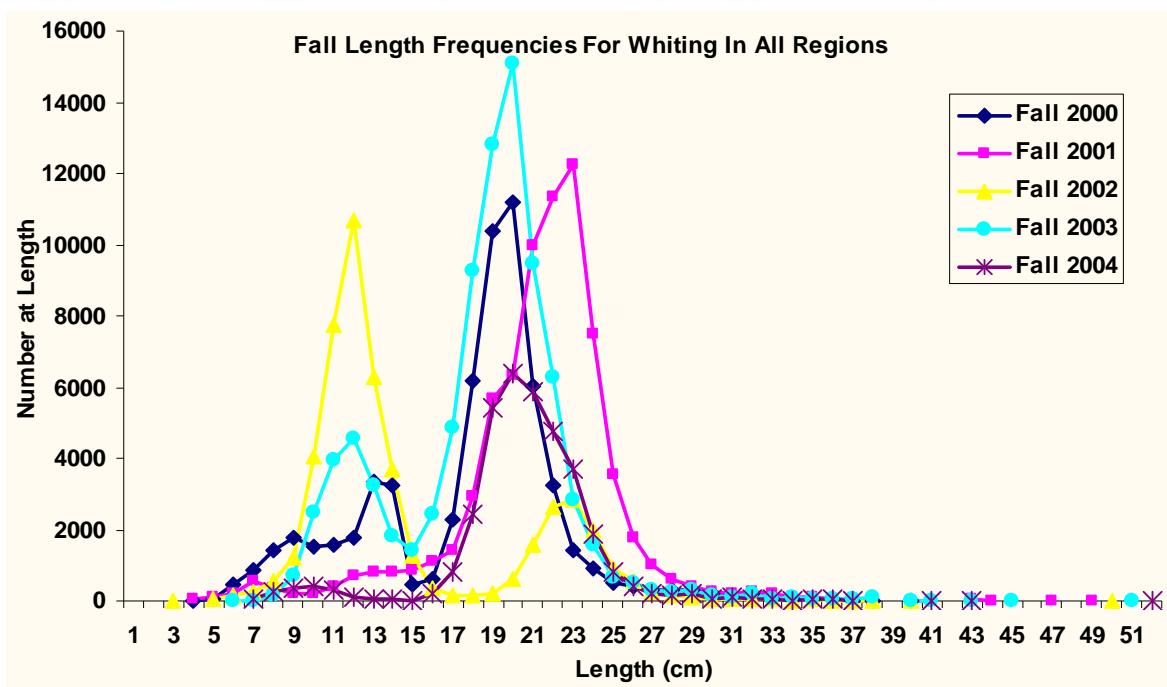
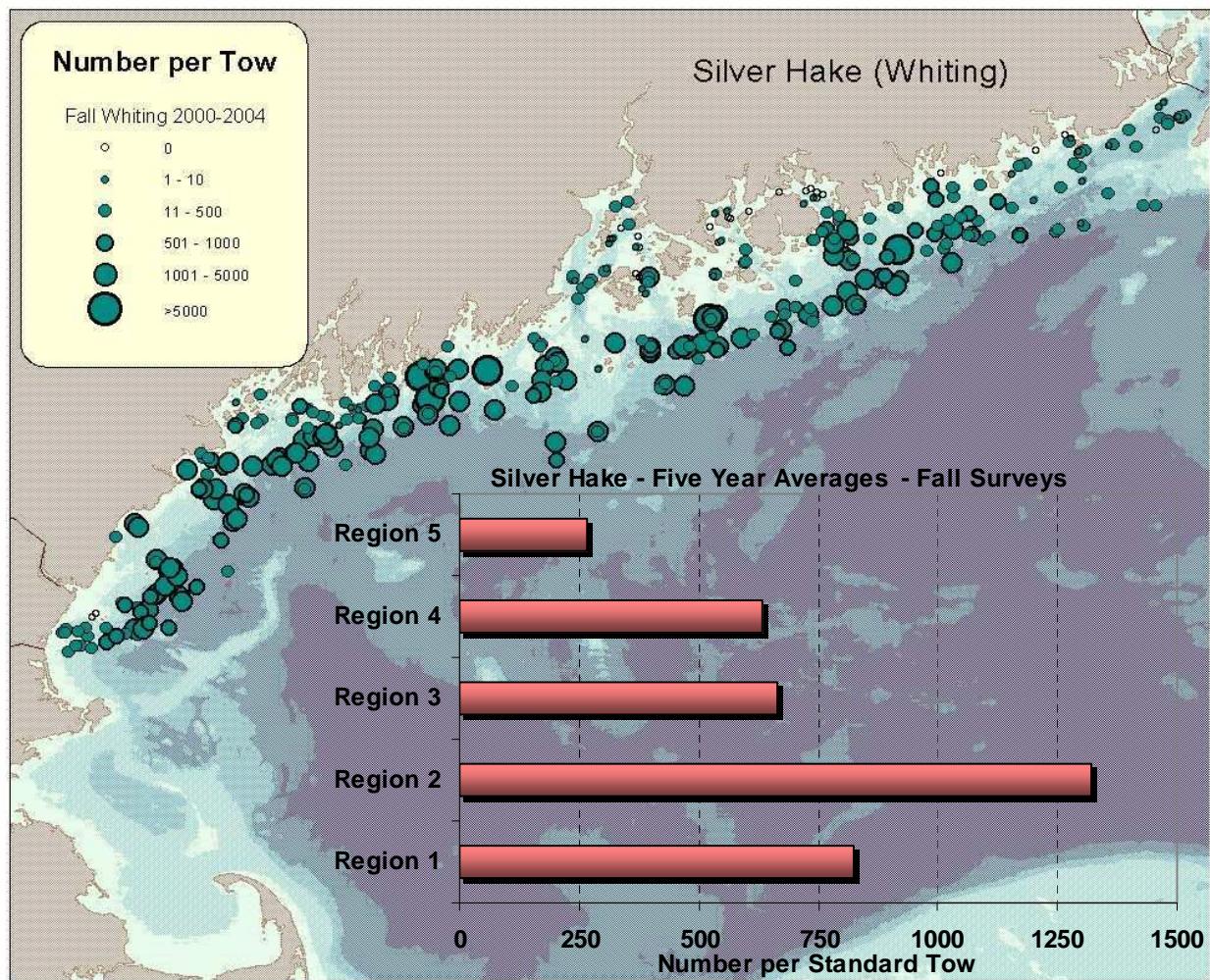


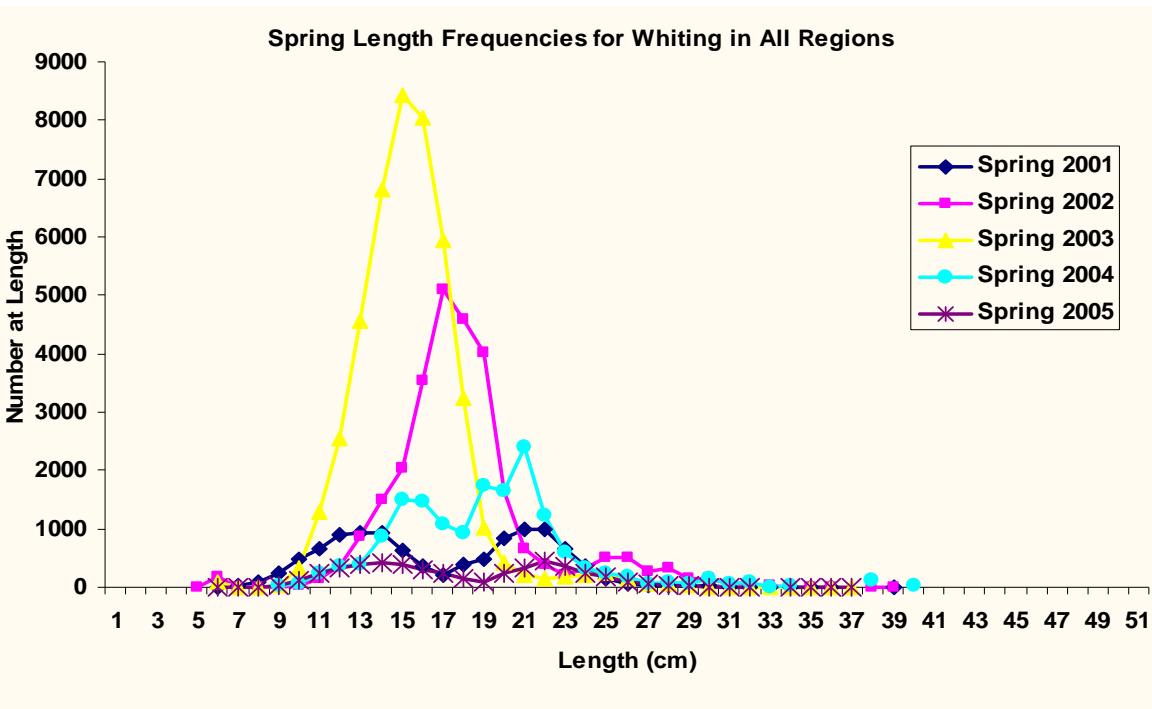
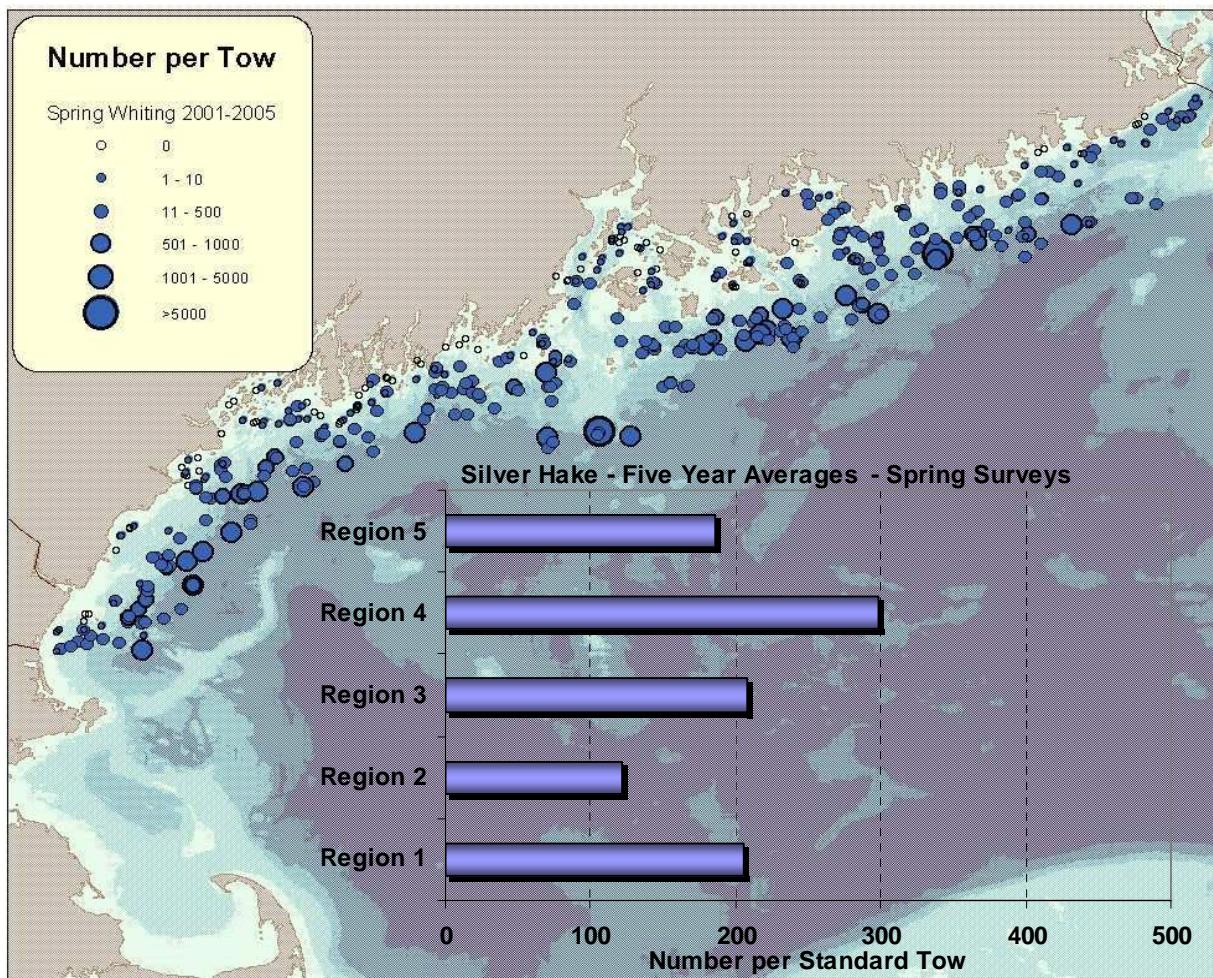


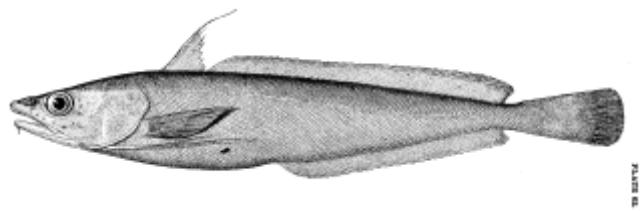


Silver Hake
Merluccius bilinearis

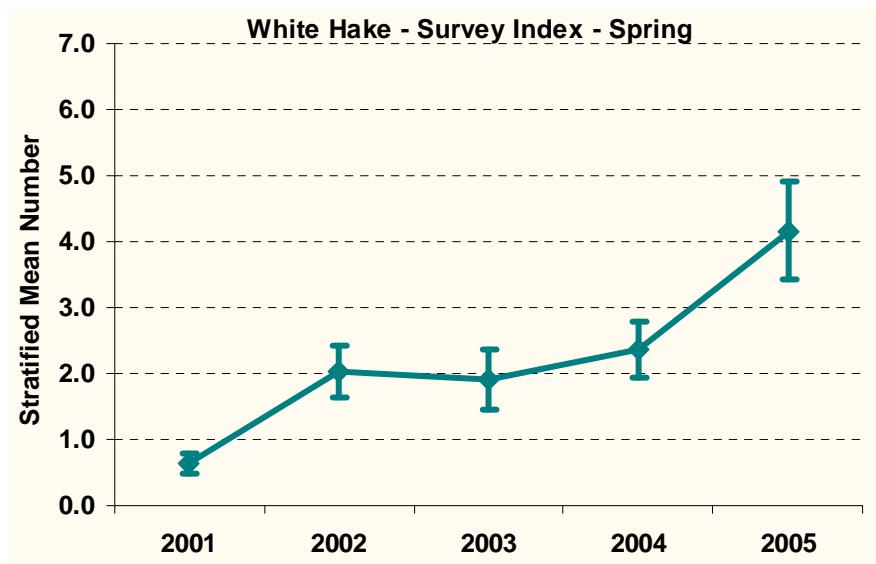
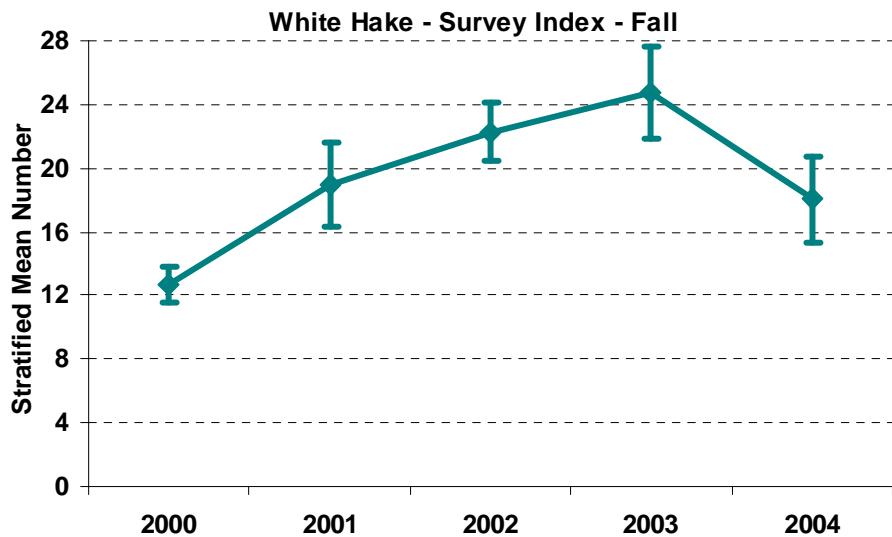


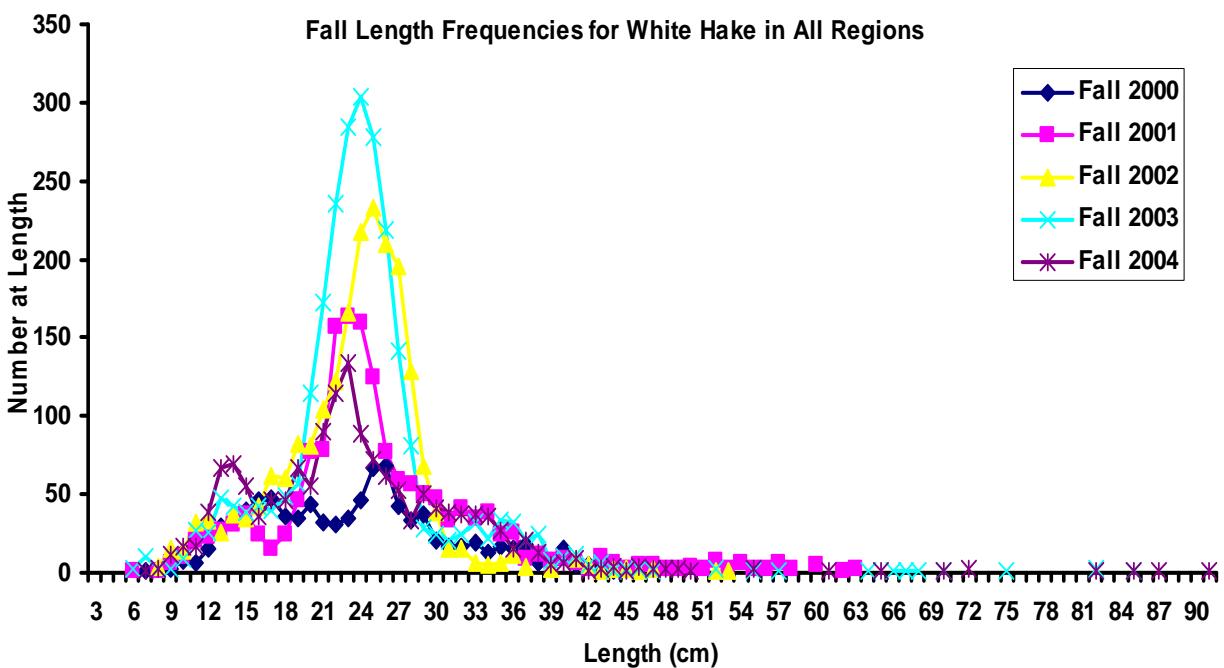
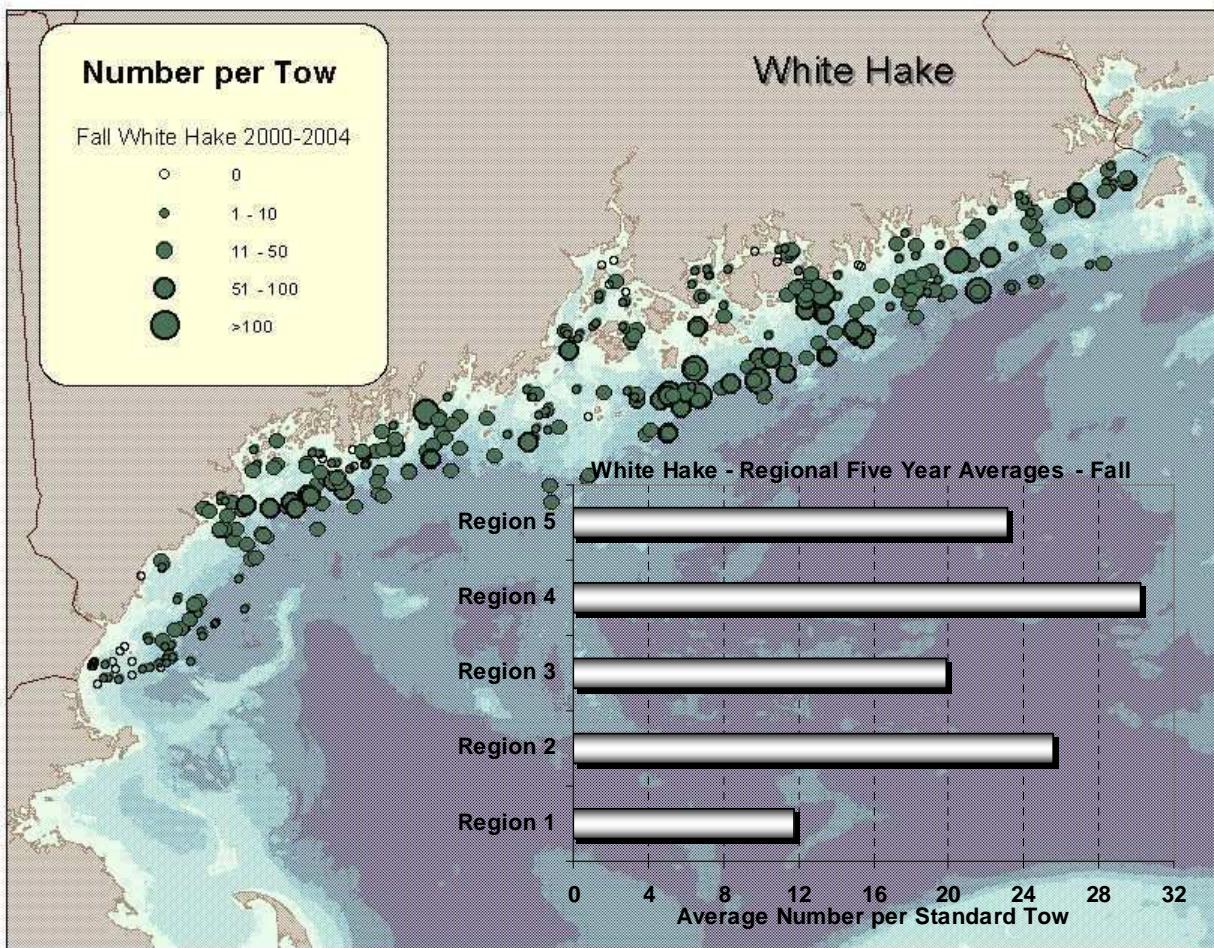


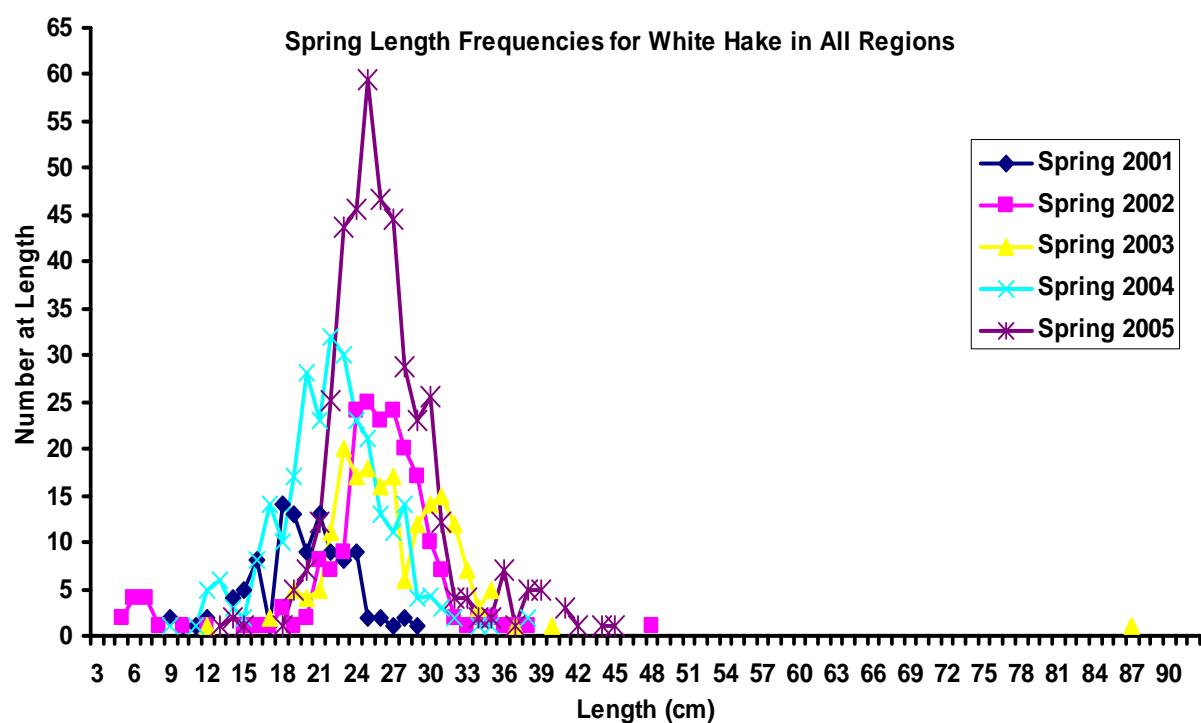
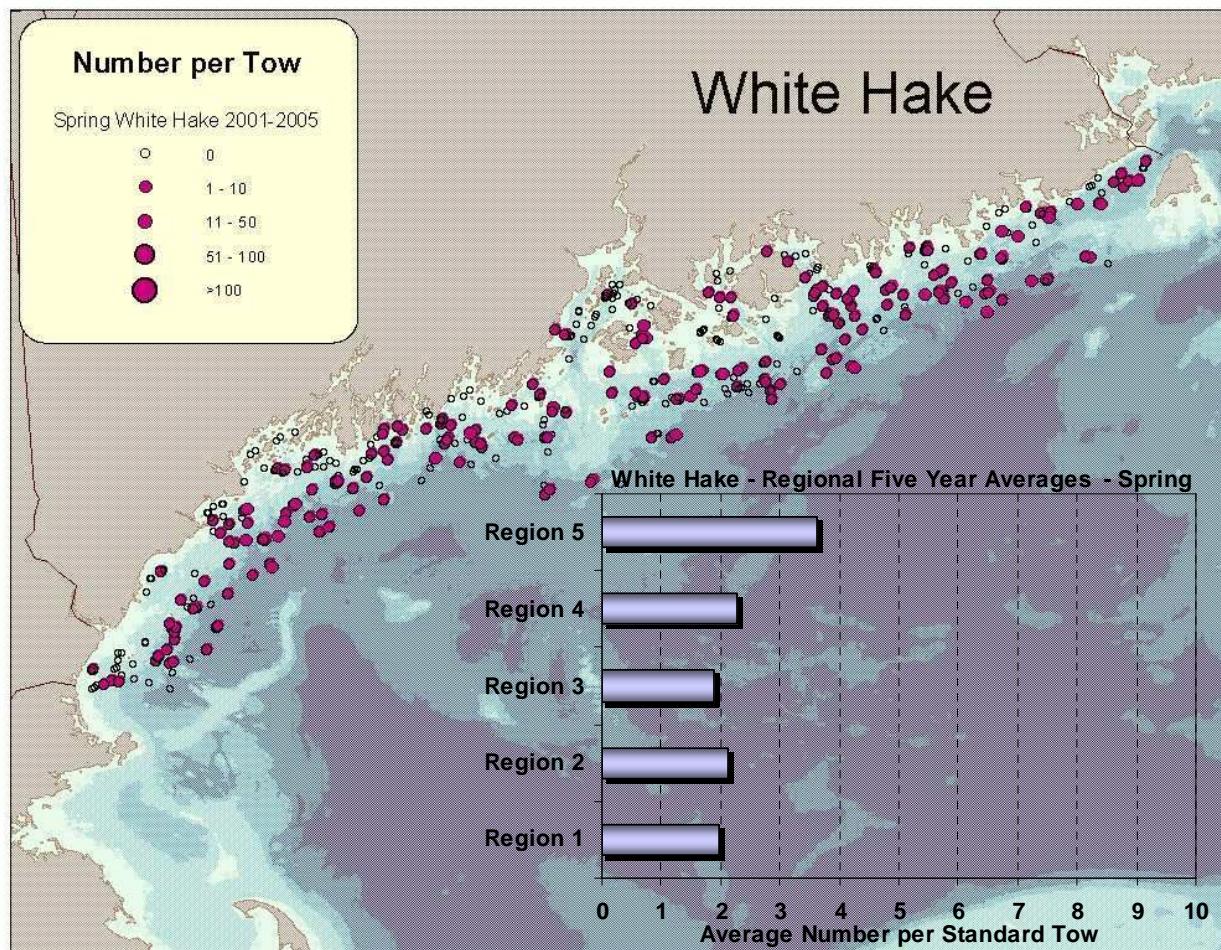


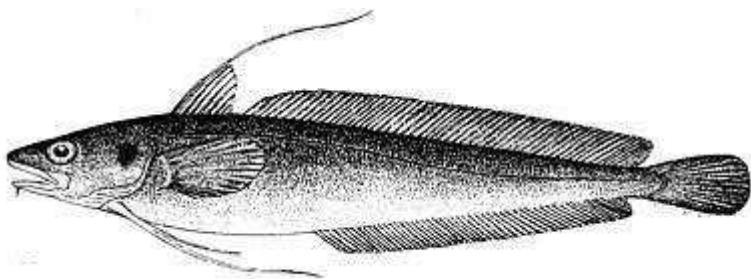


White Hake
Urophycis tenuis

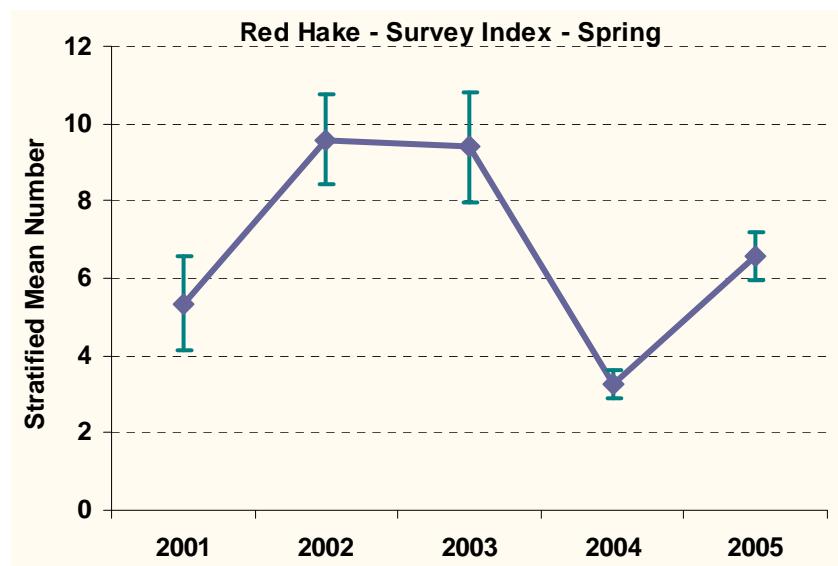
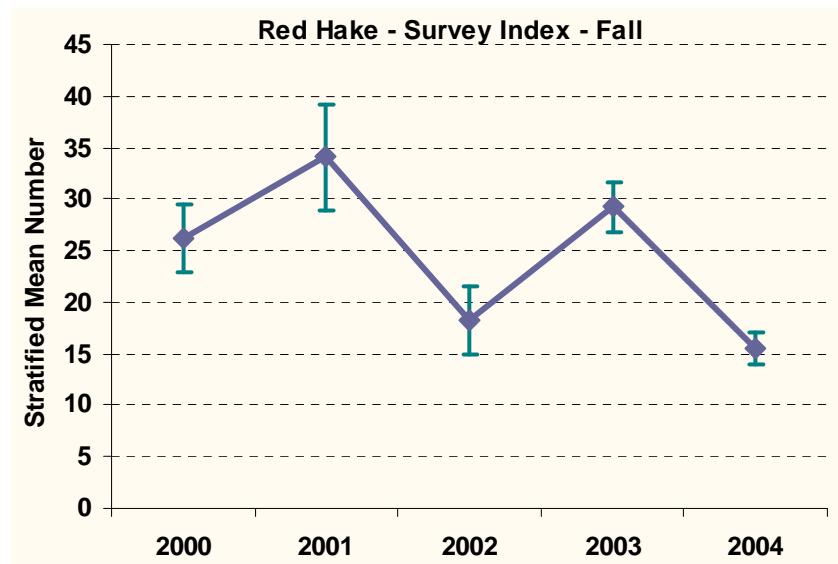


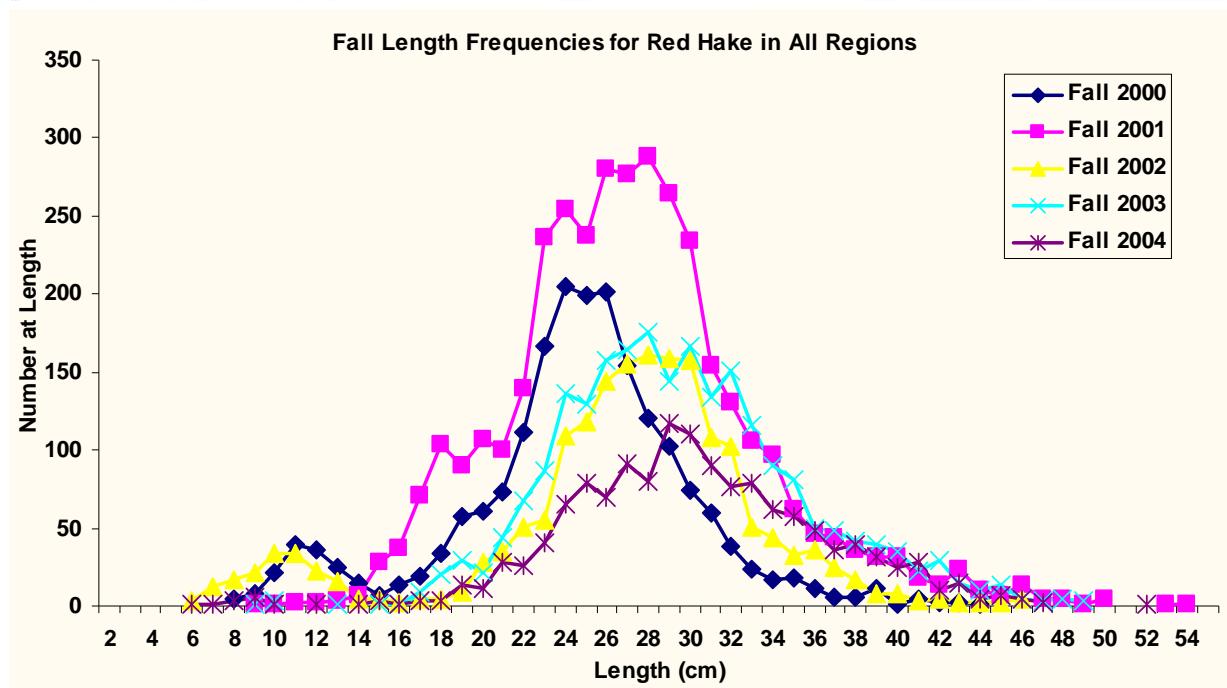
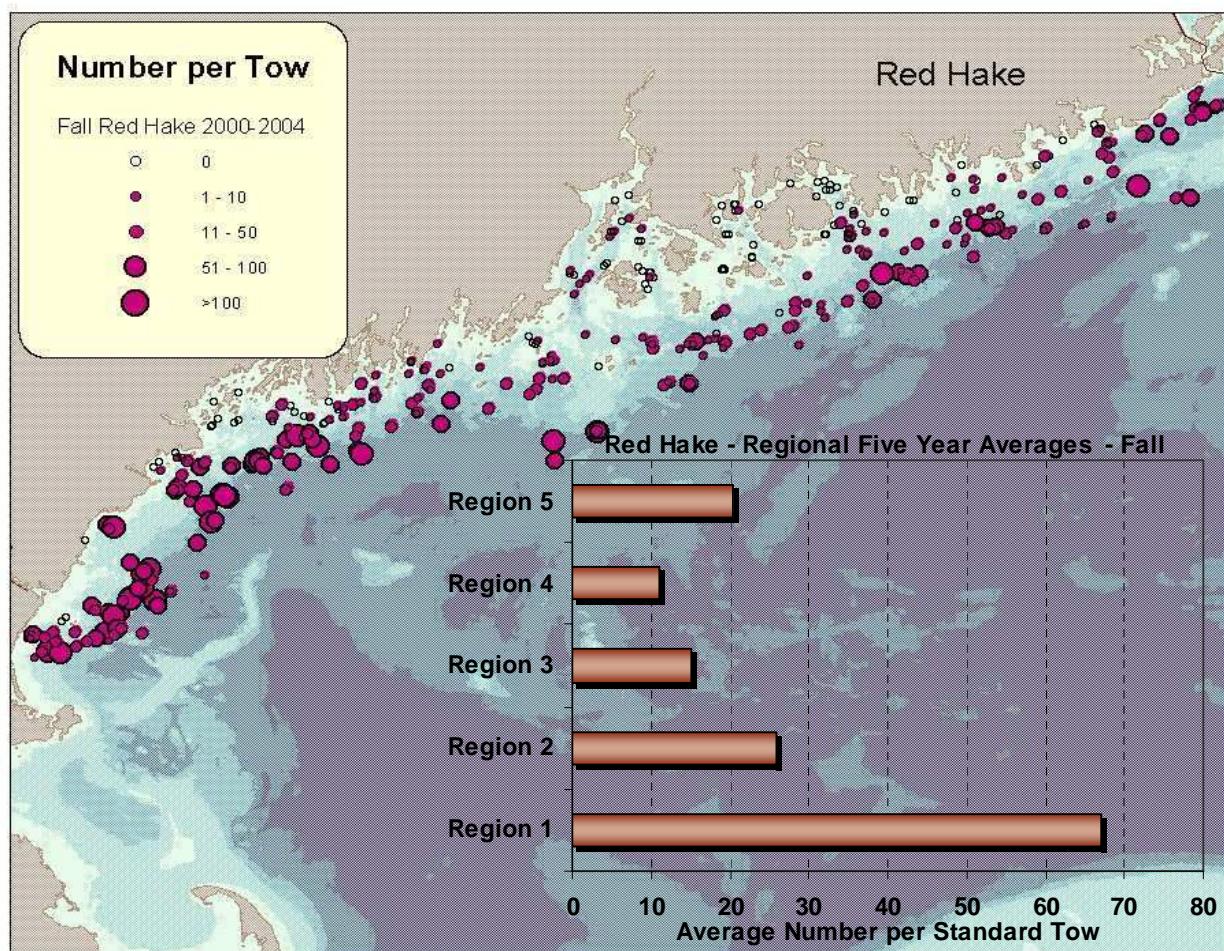


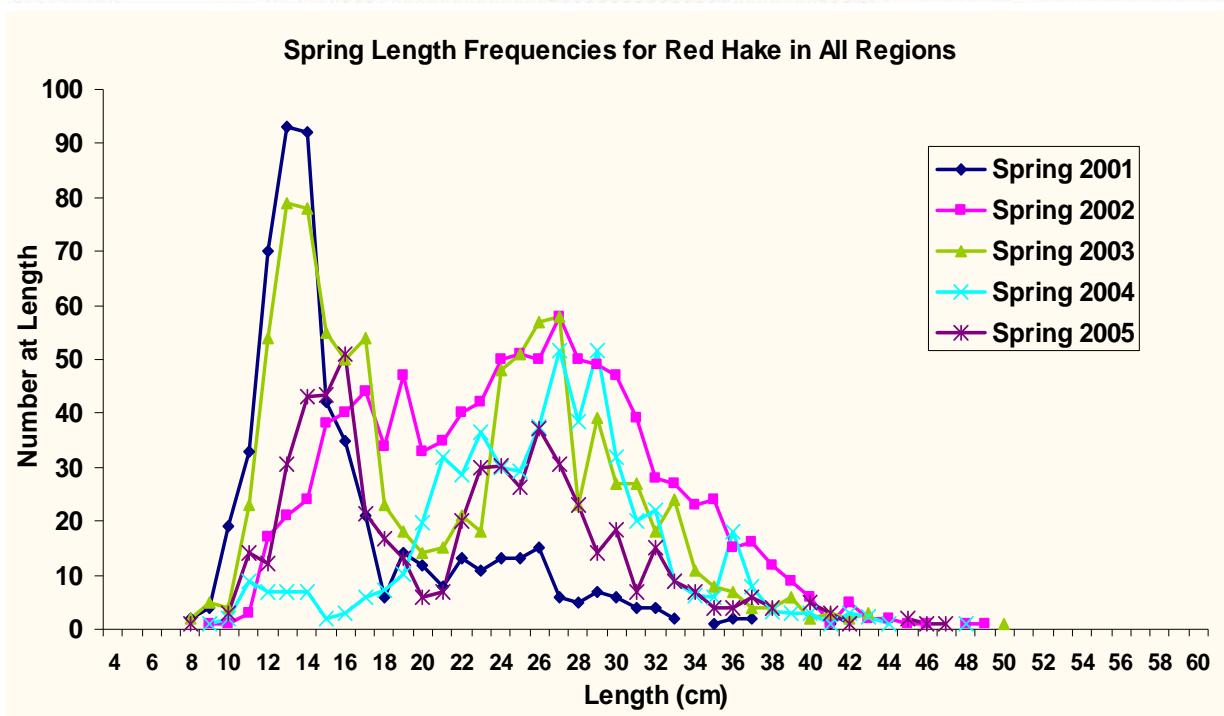
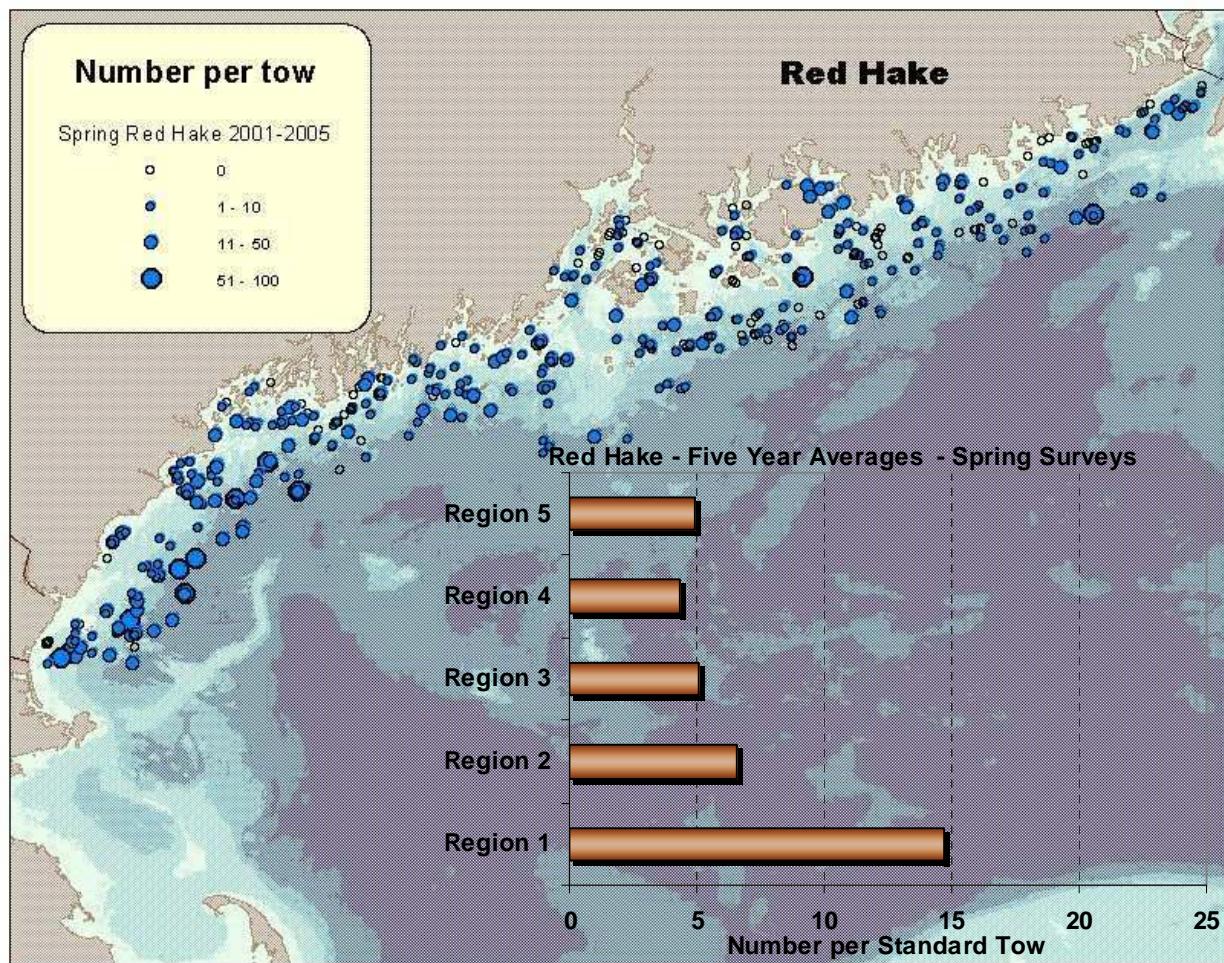


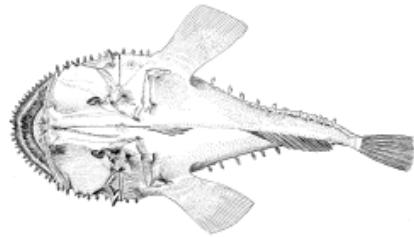


Red Hake
Urophycis chuss

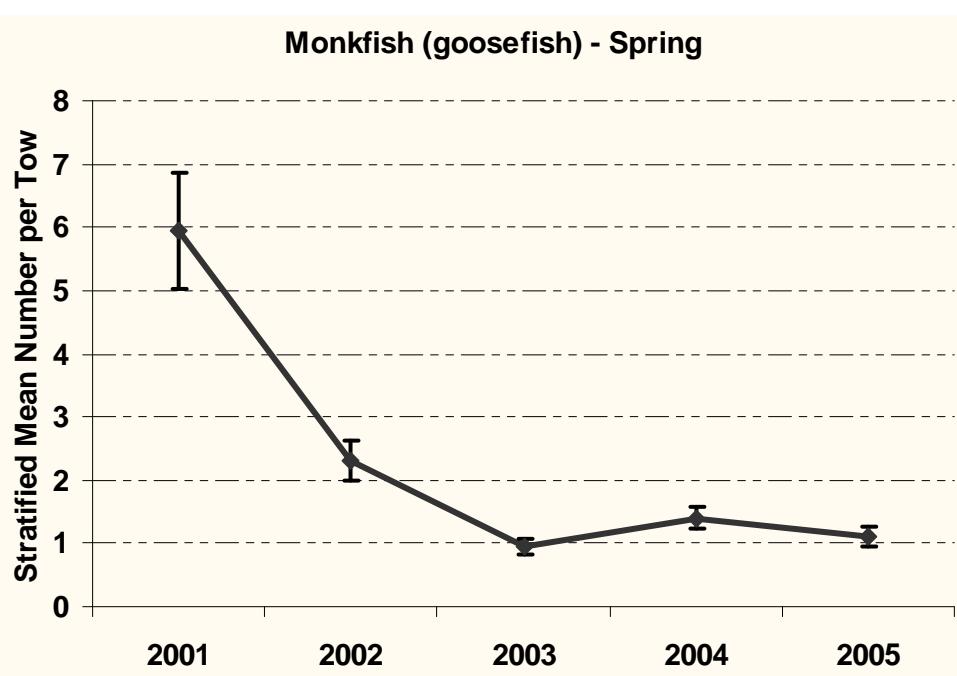
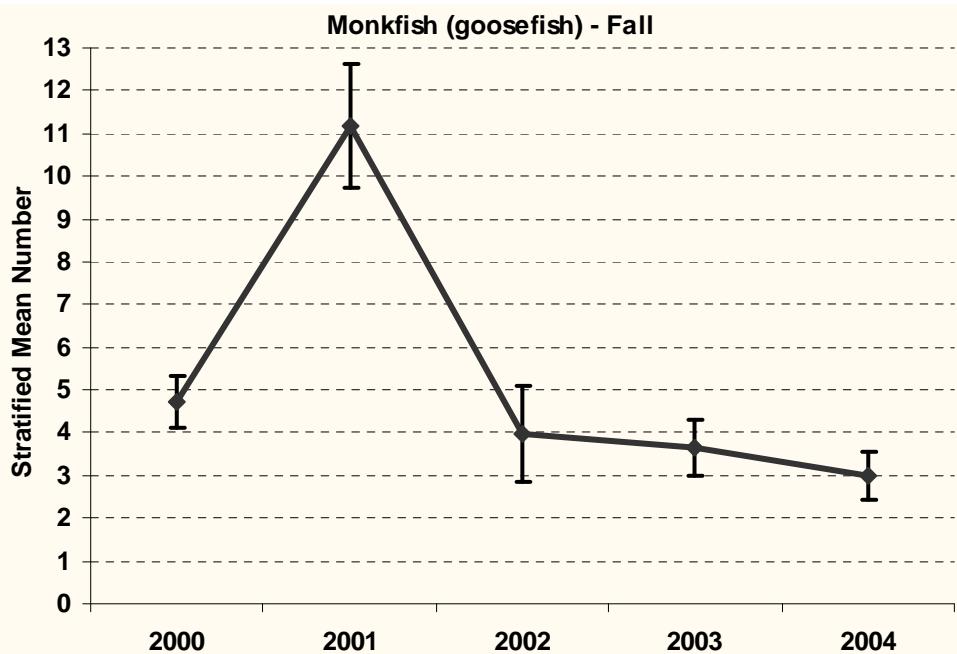


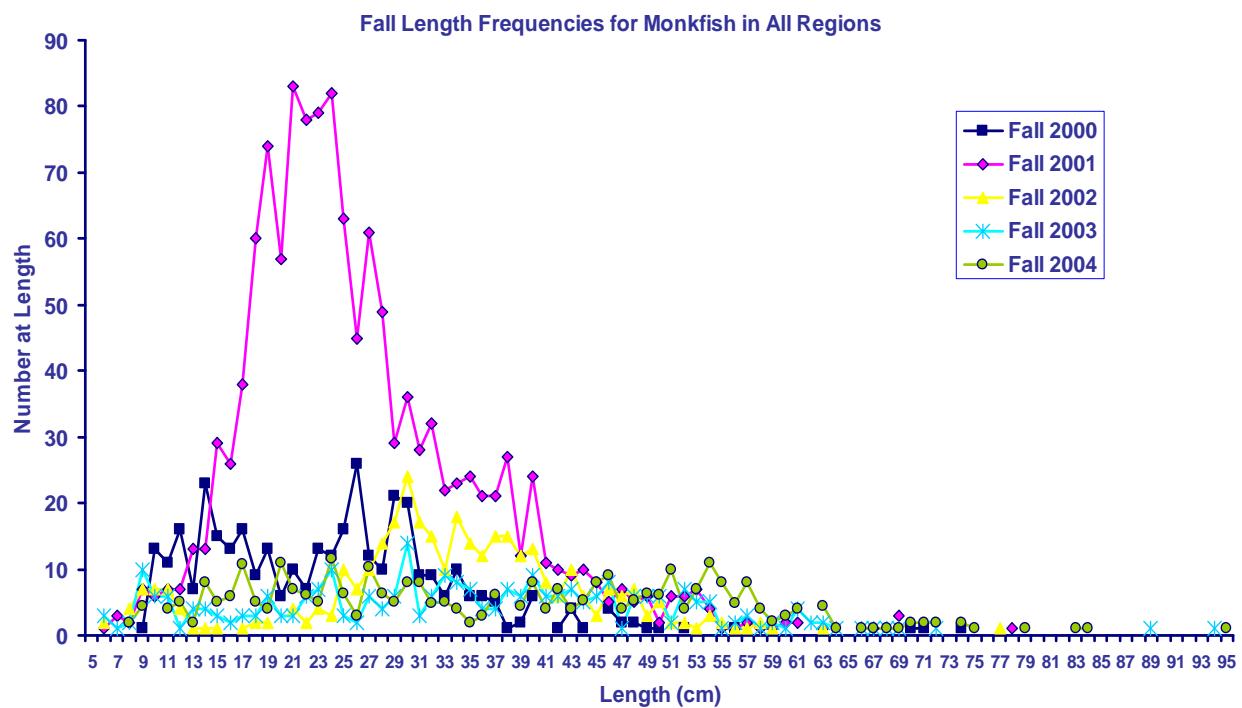
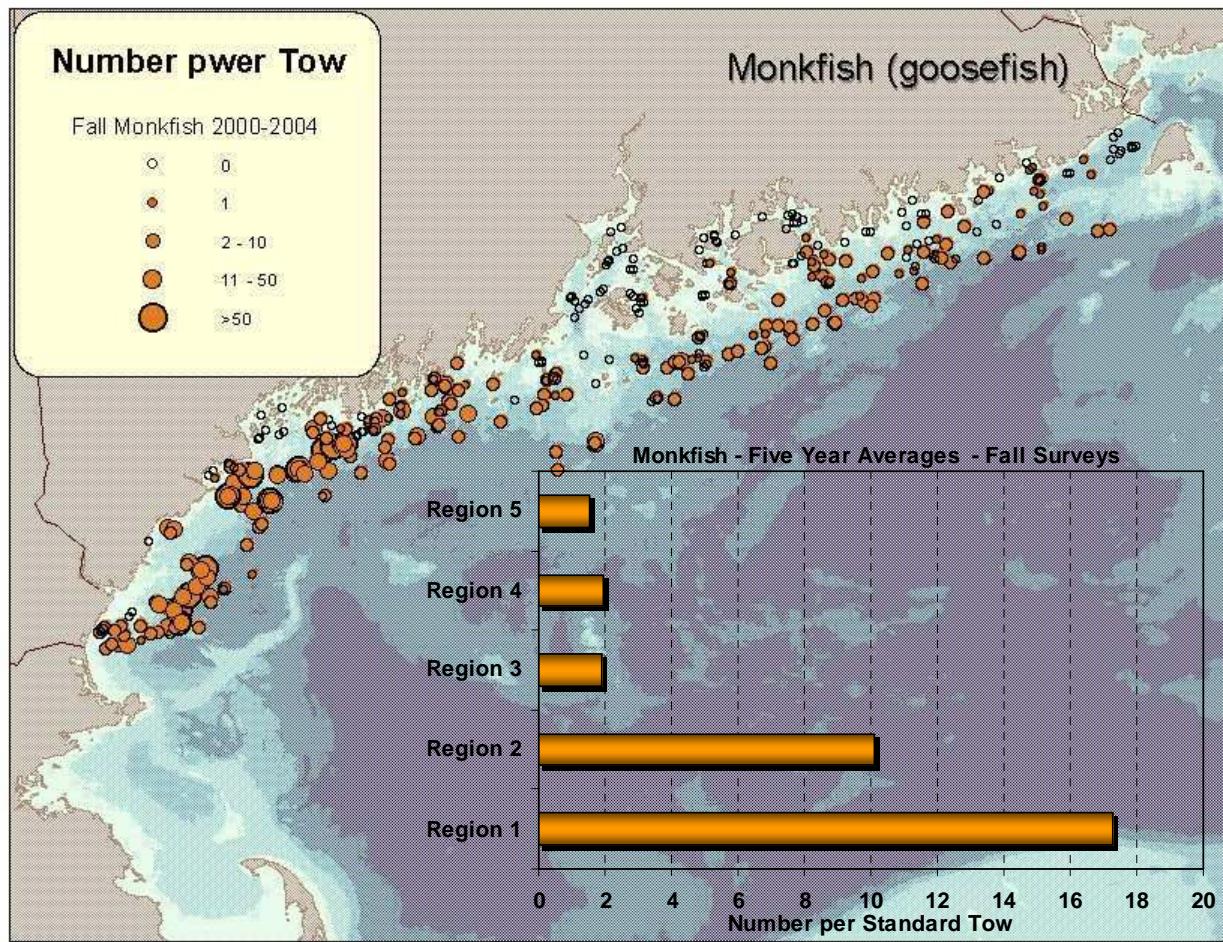


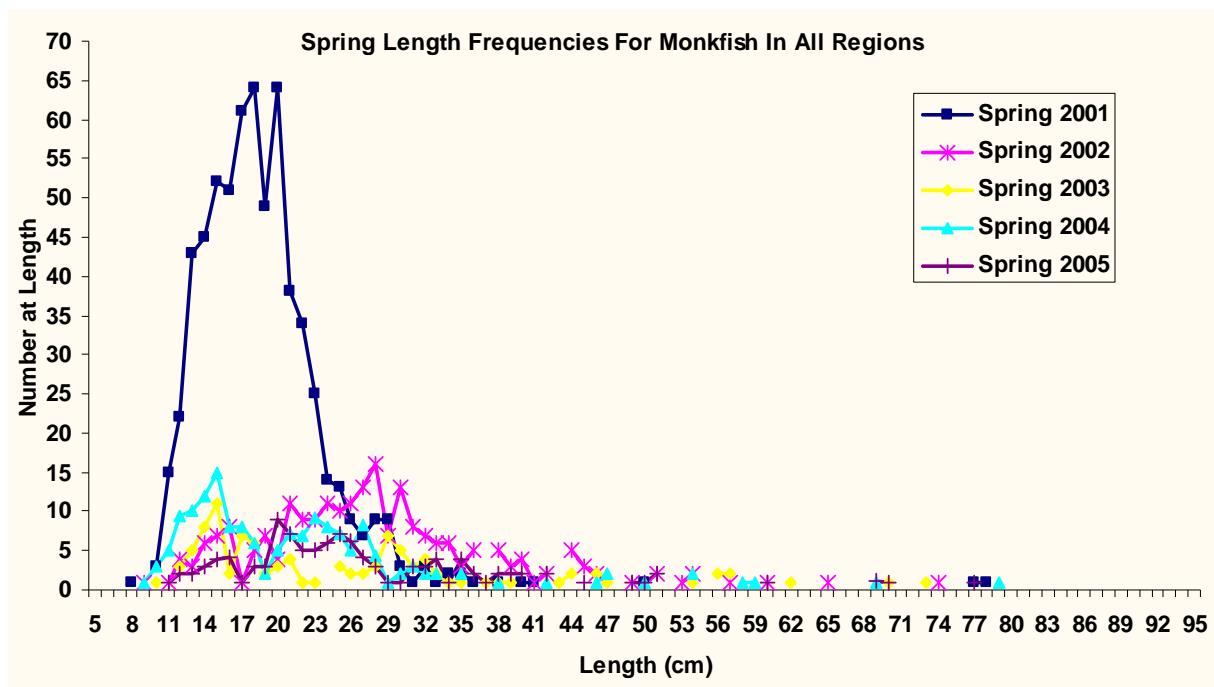
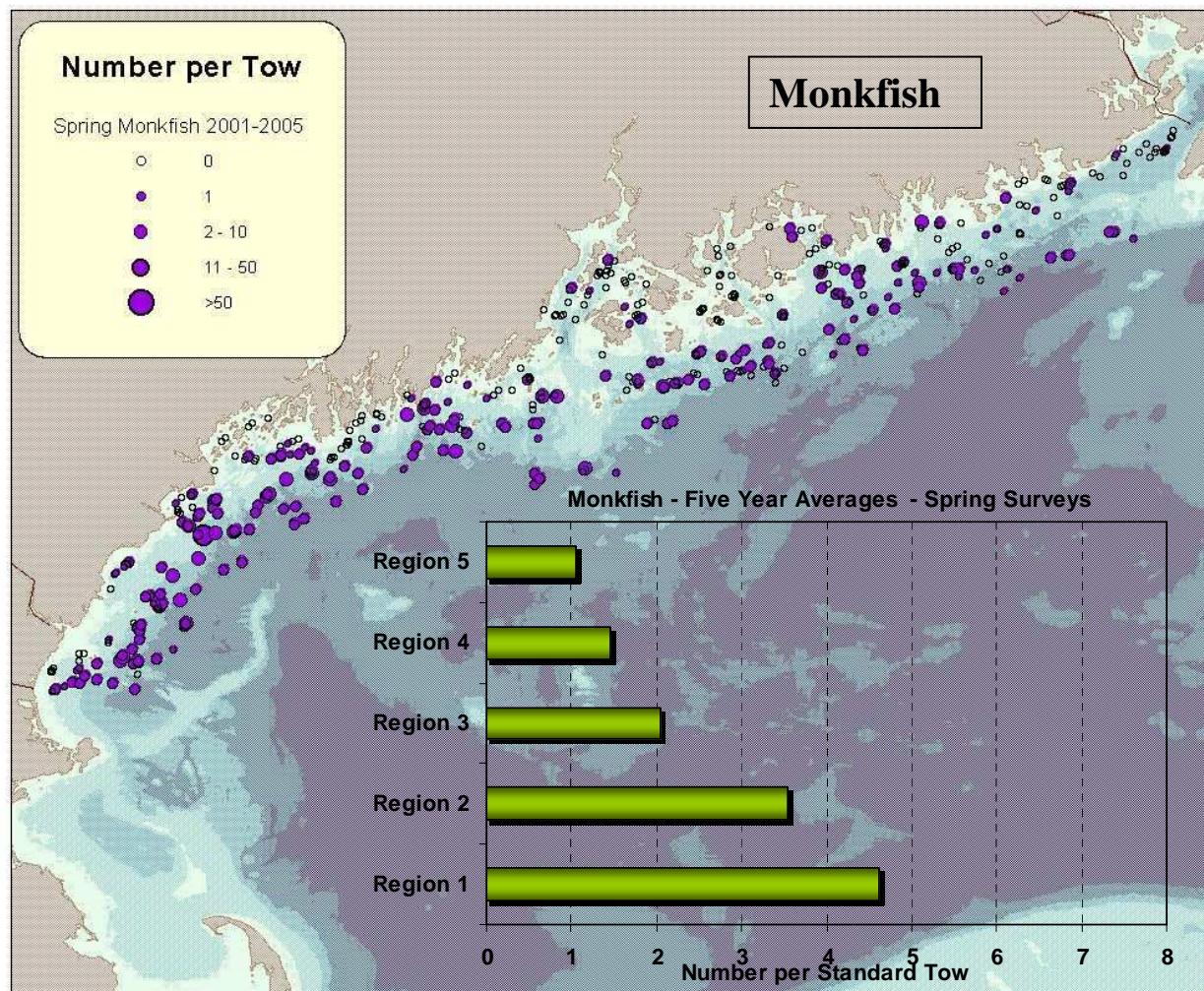


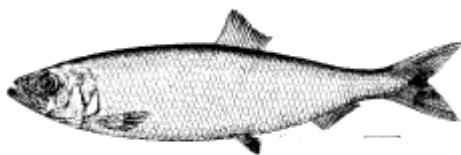


Goosefish (monkfish)
Lophius americanus

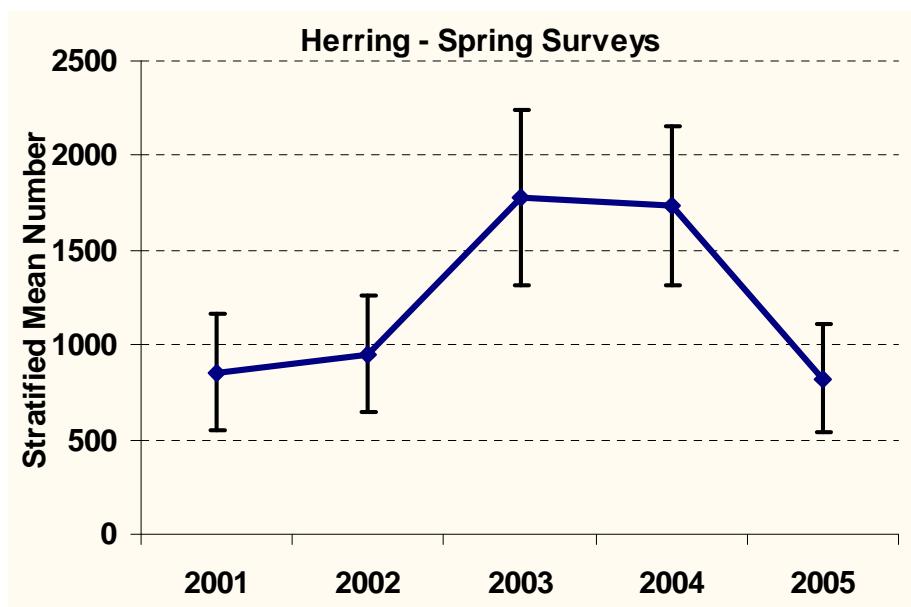
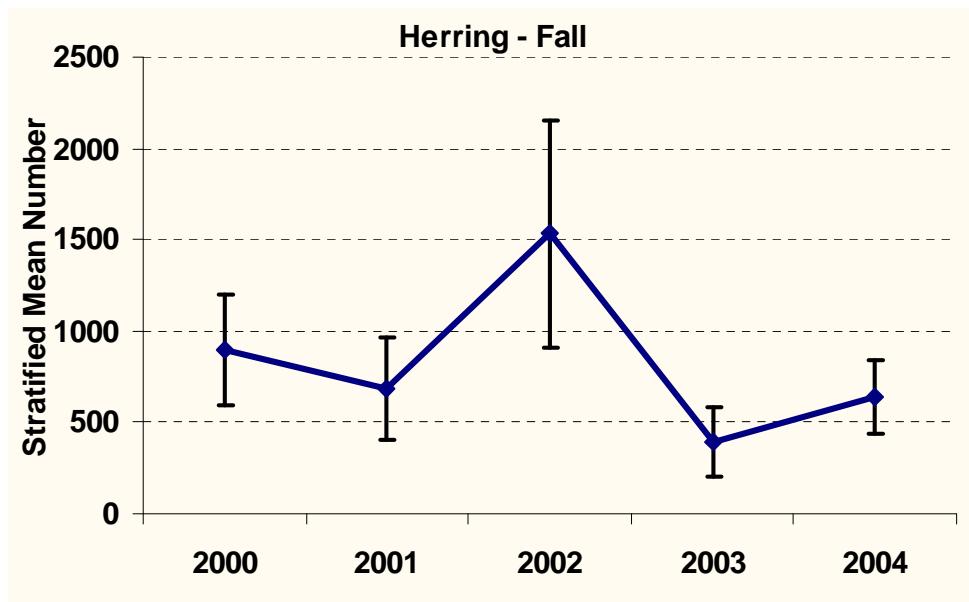


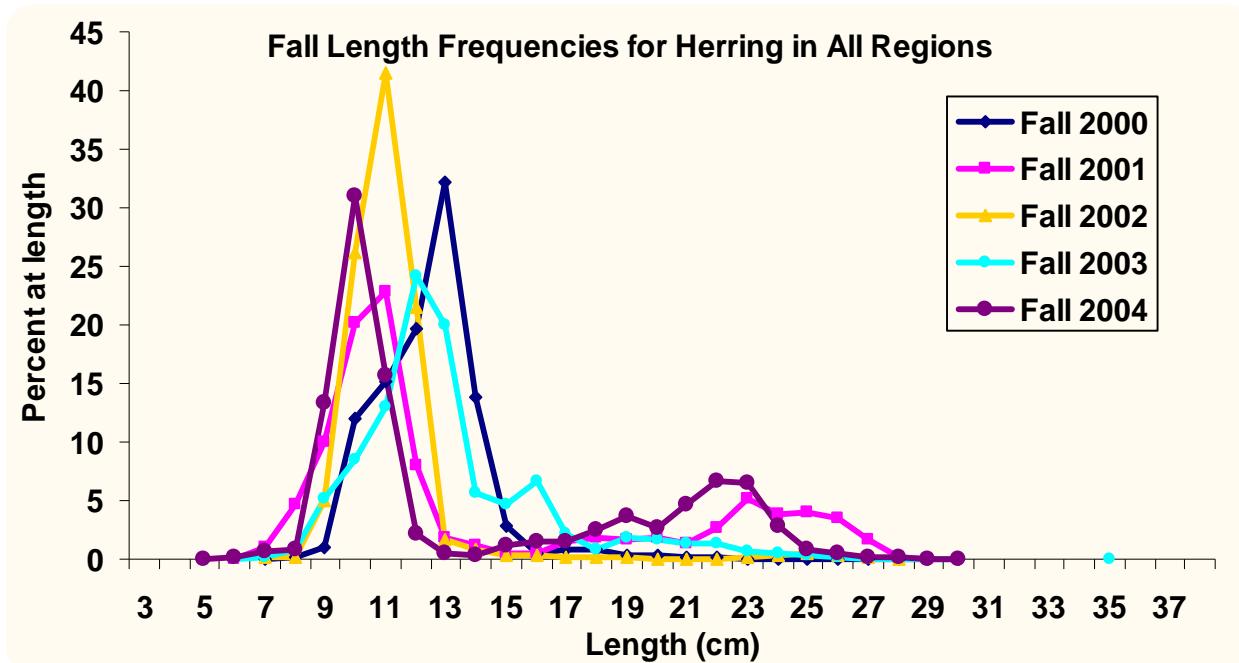
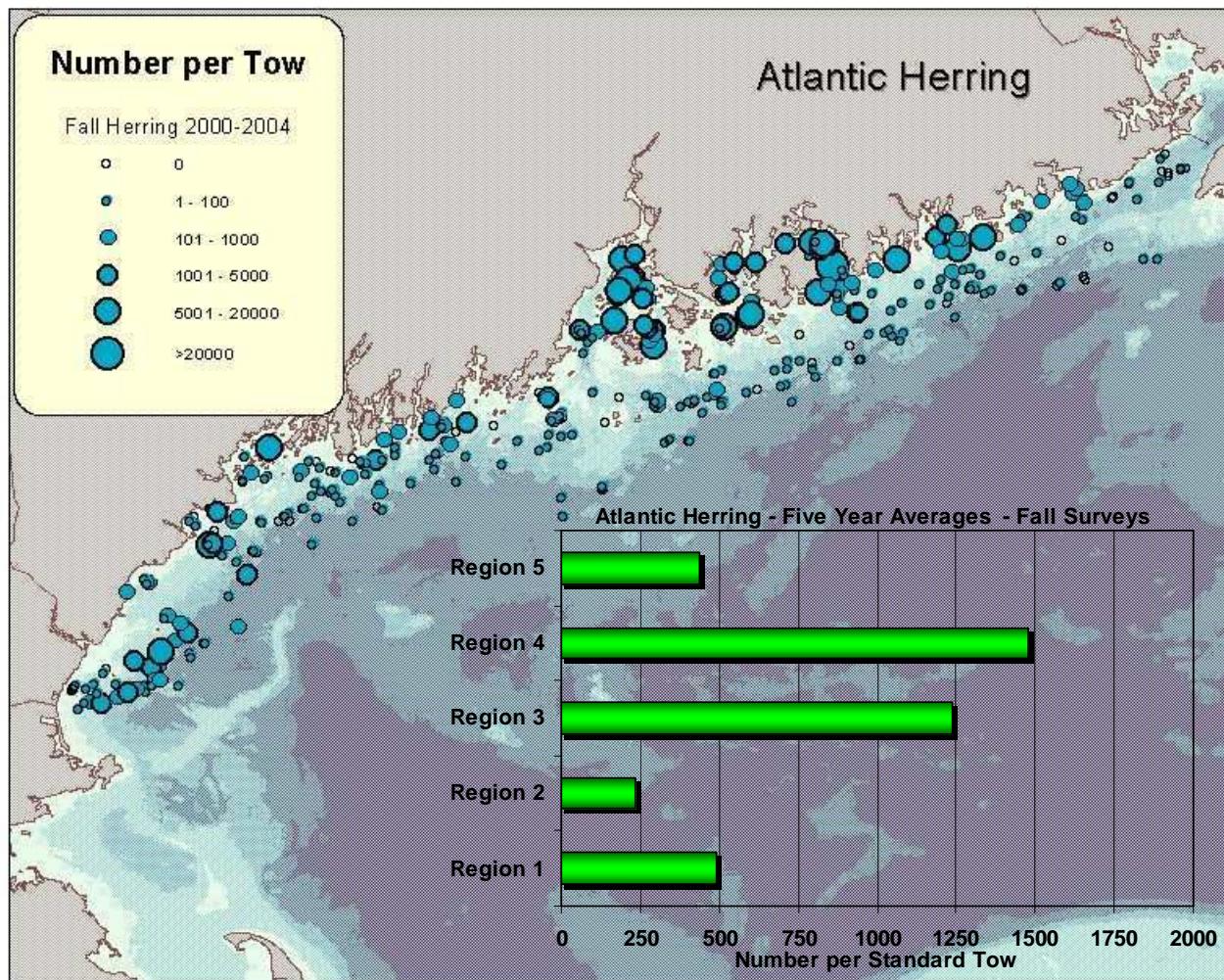


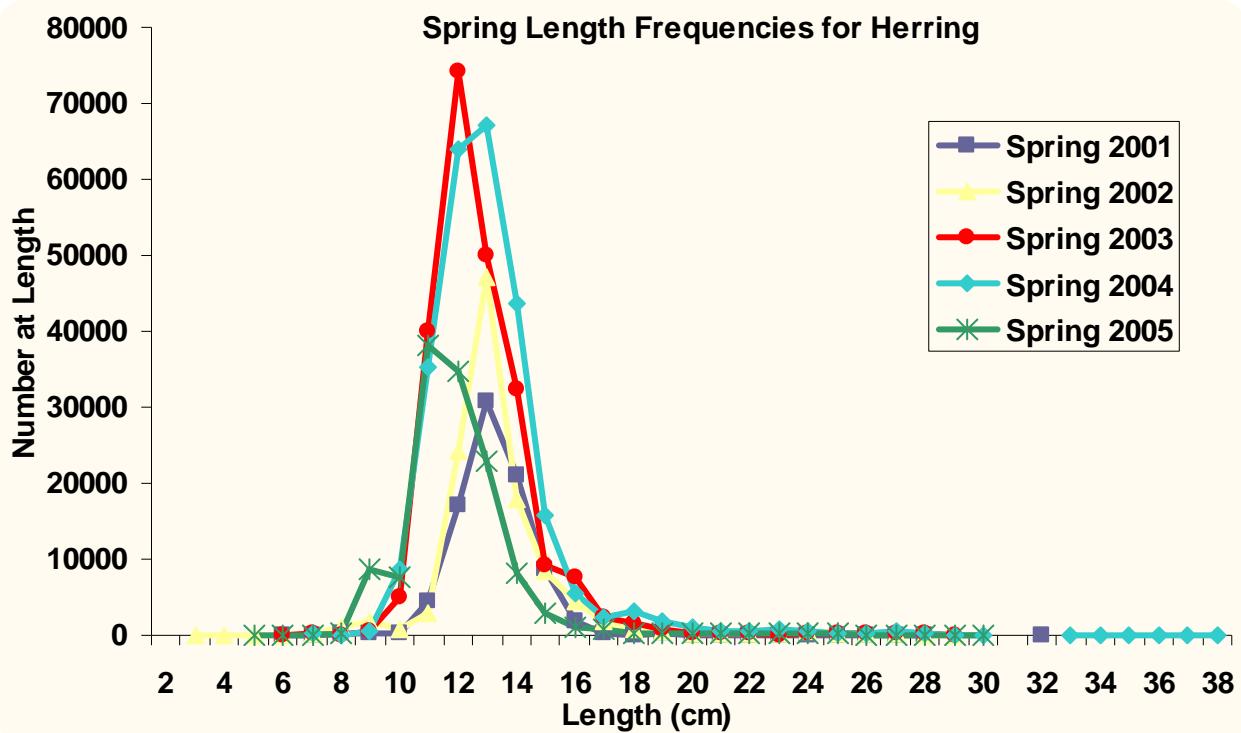
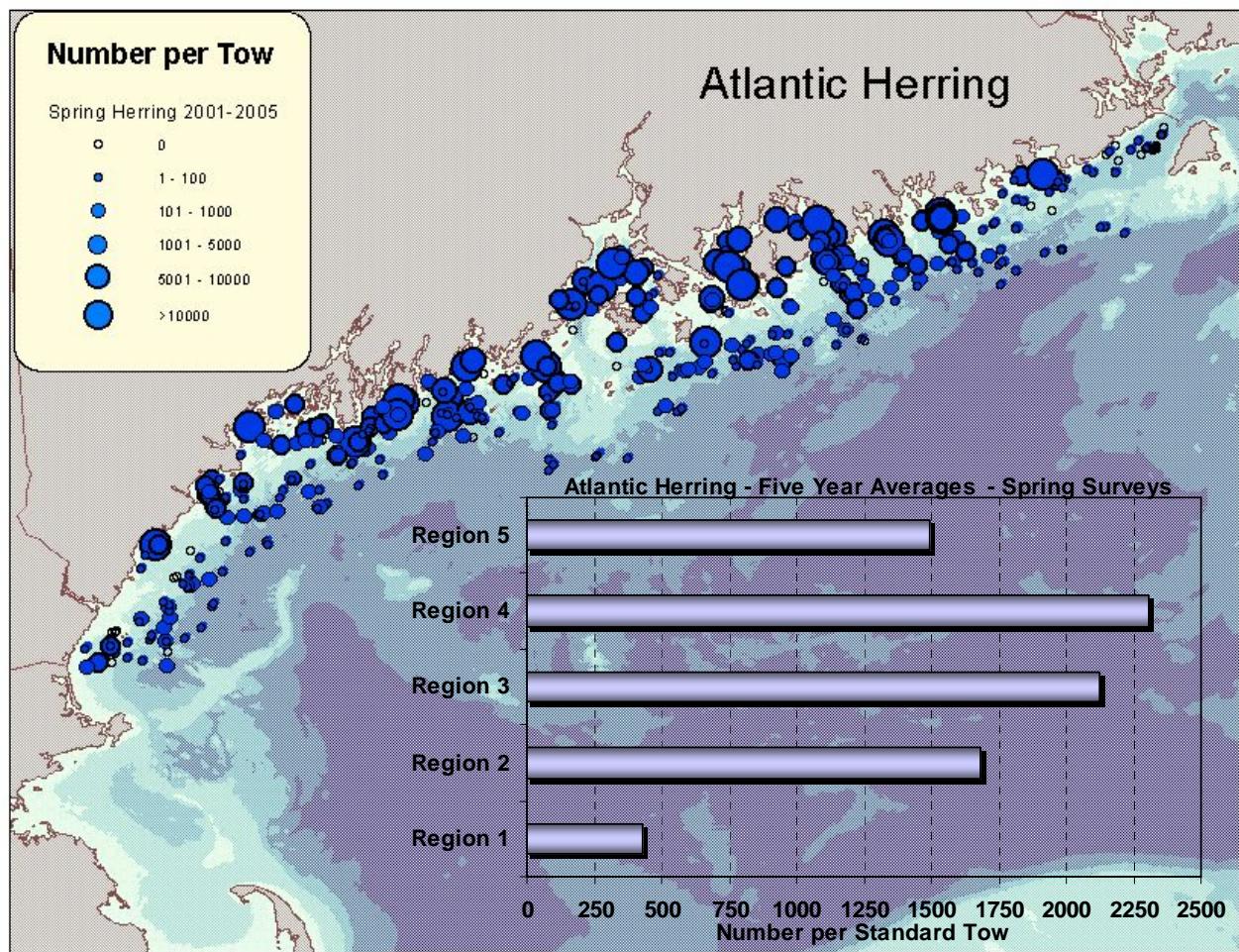


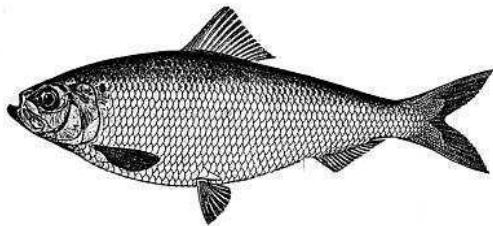


Atlantic Herring
Clupea harengus

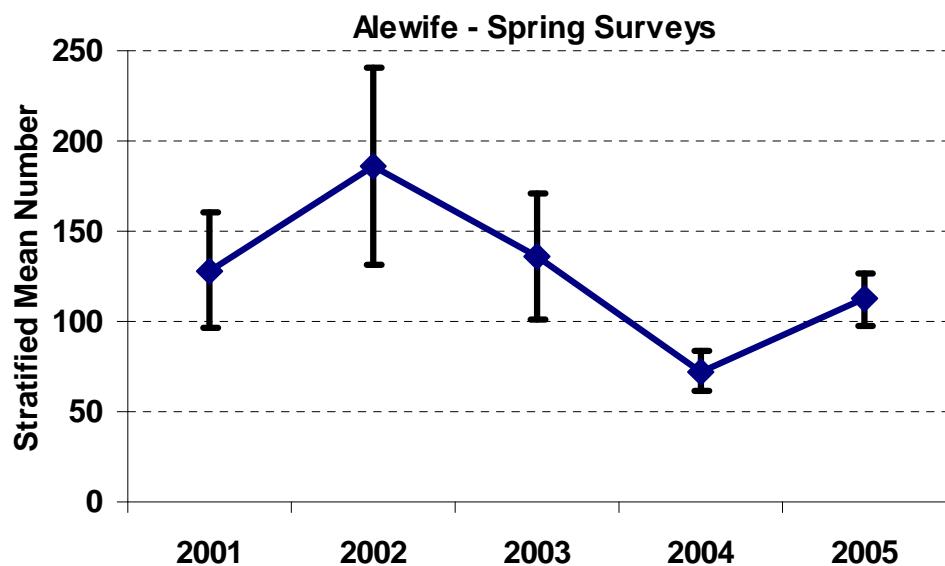
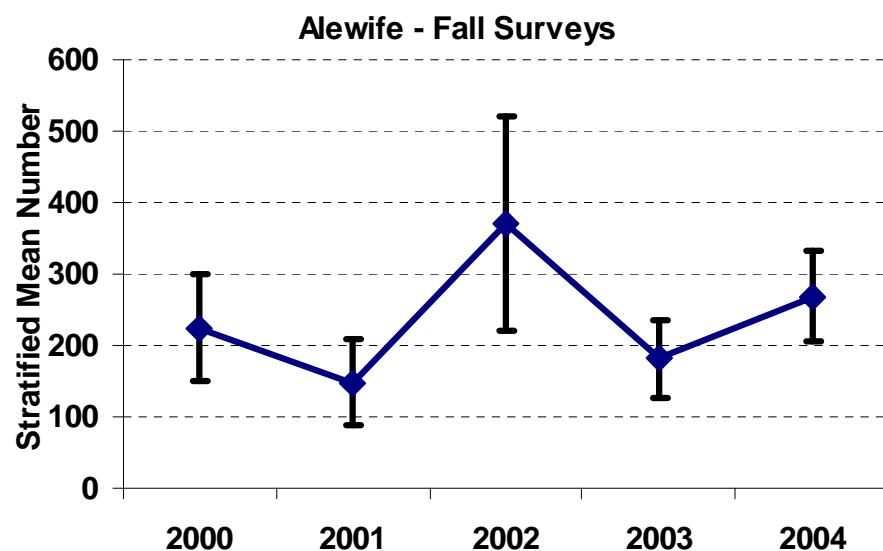


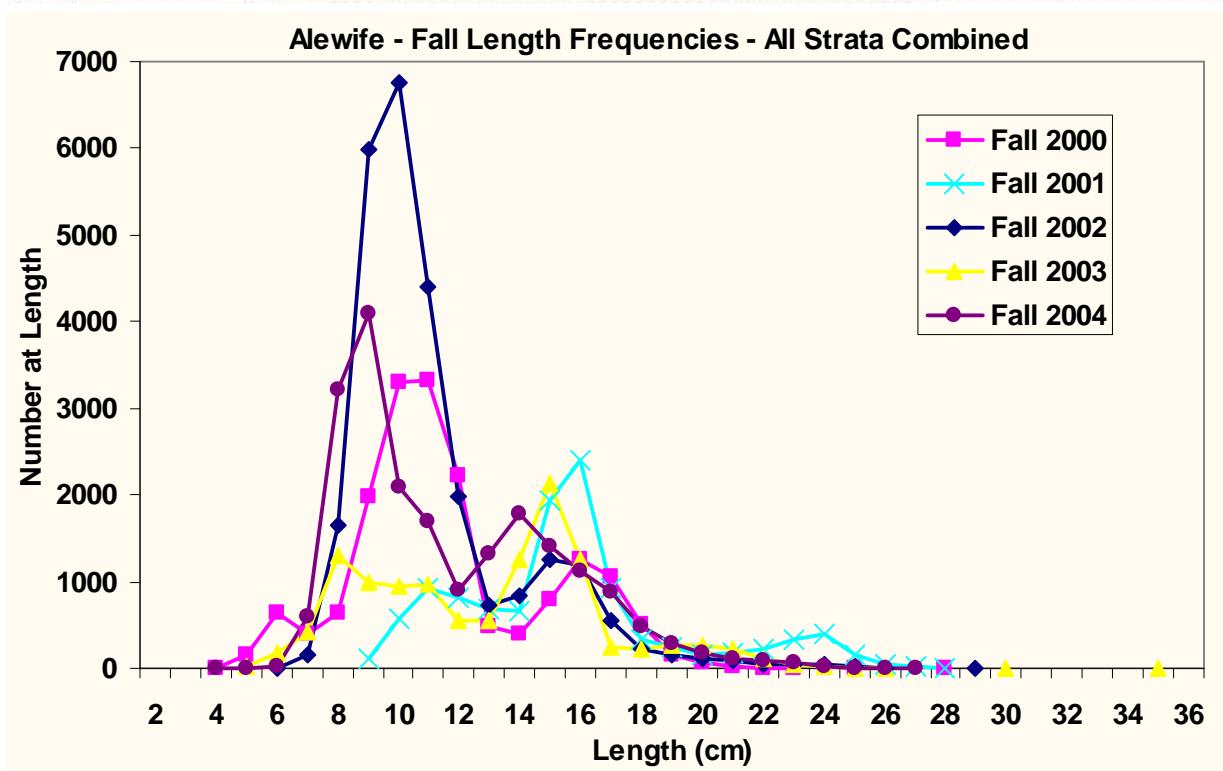
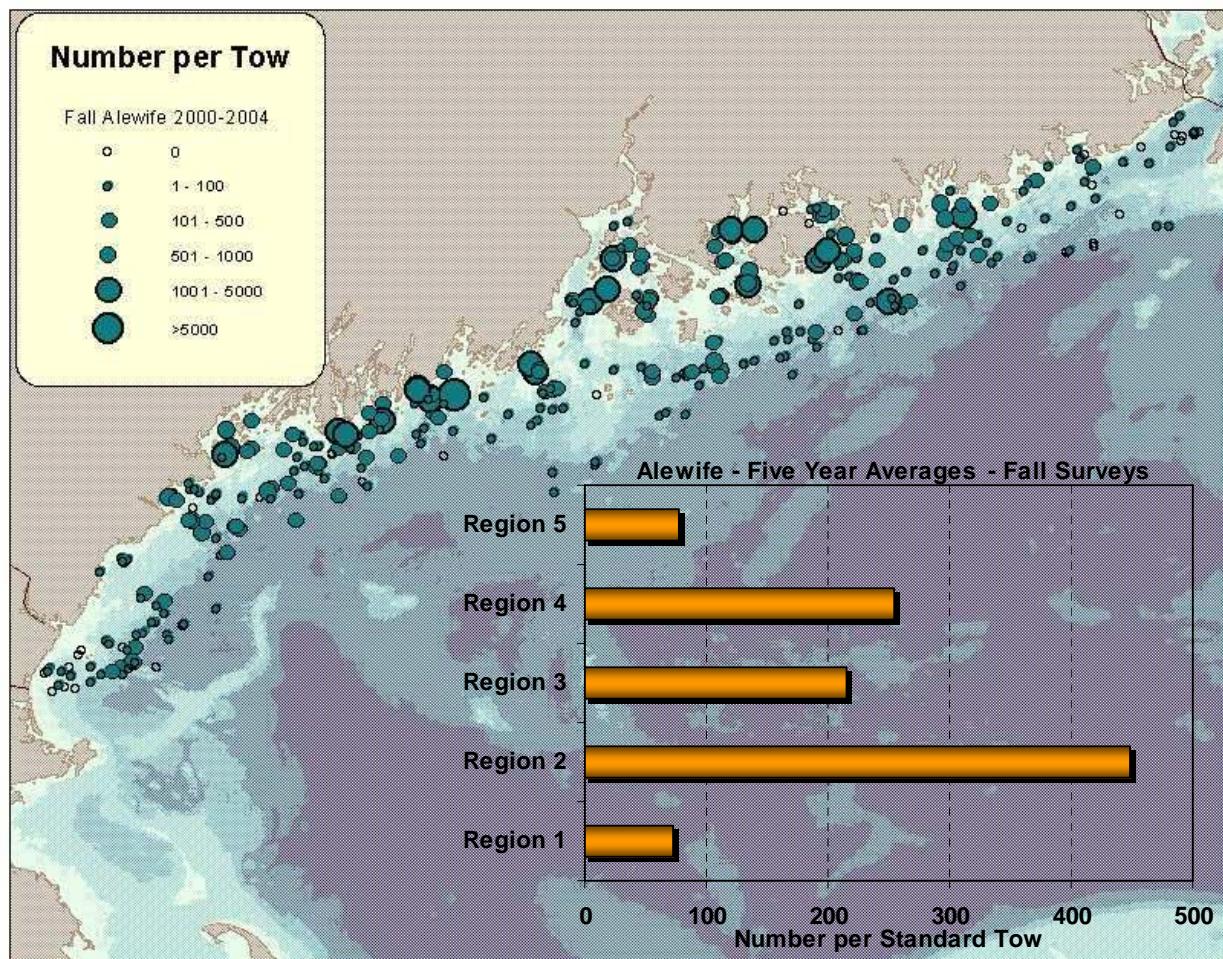


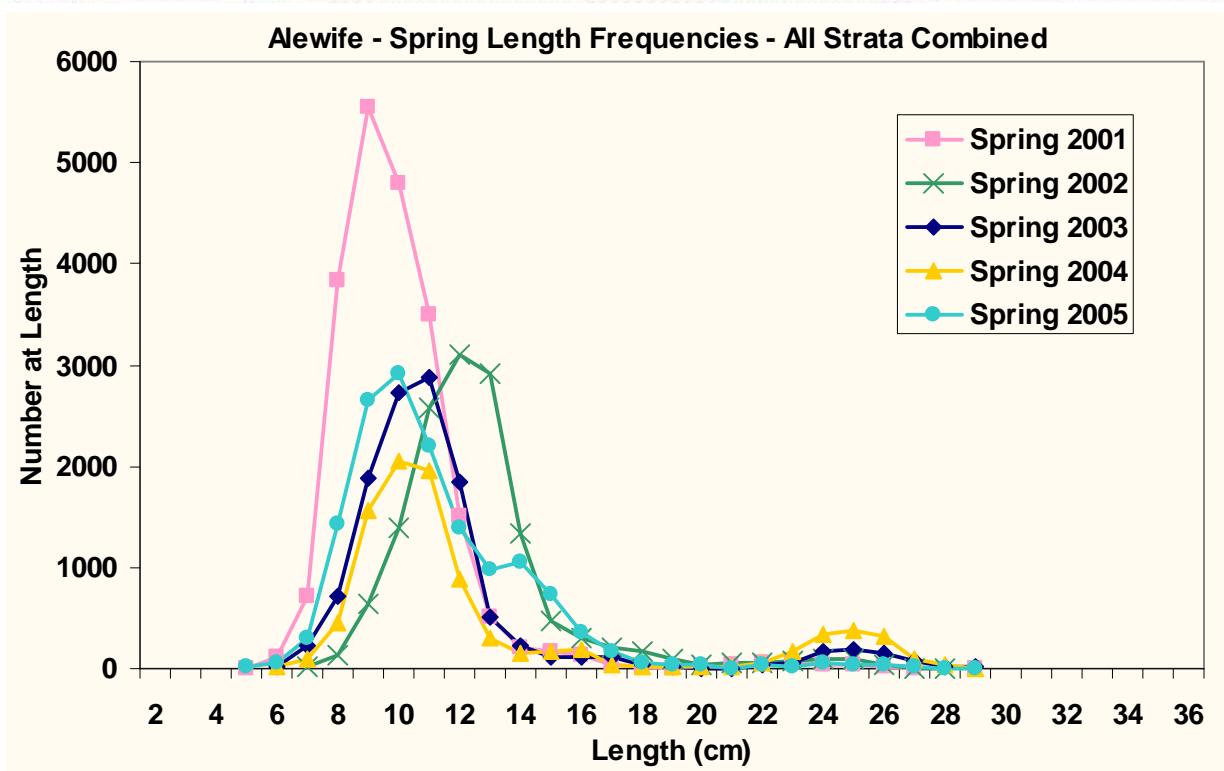
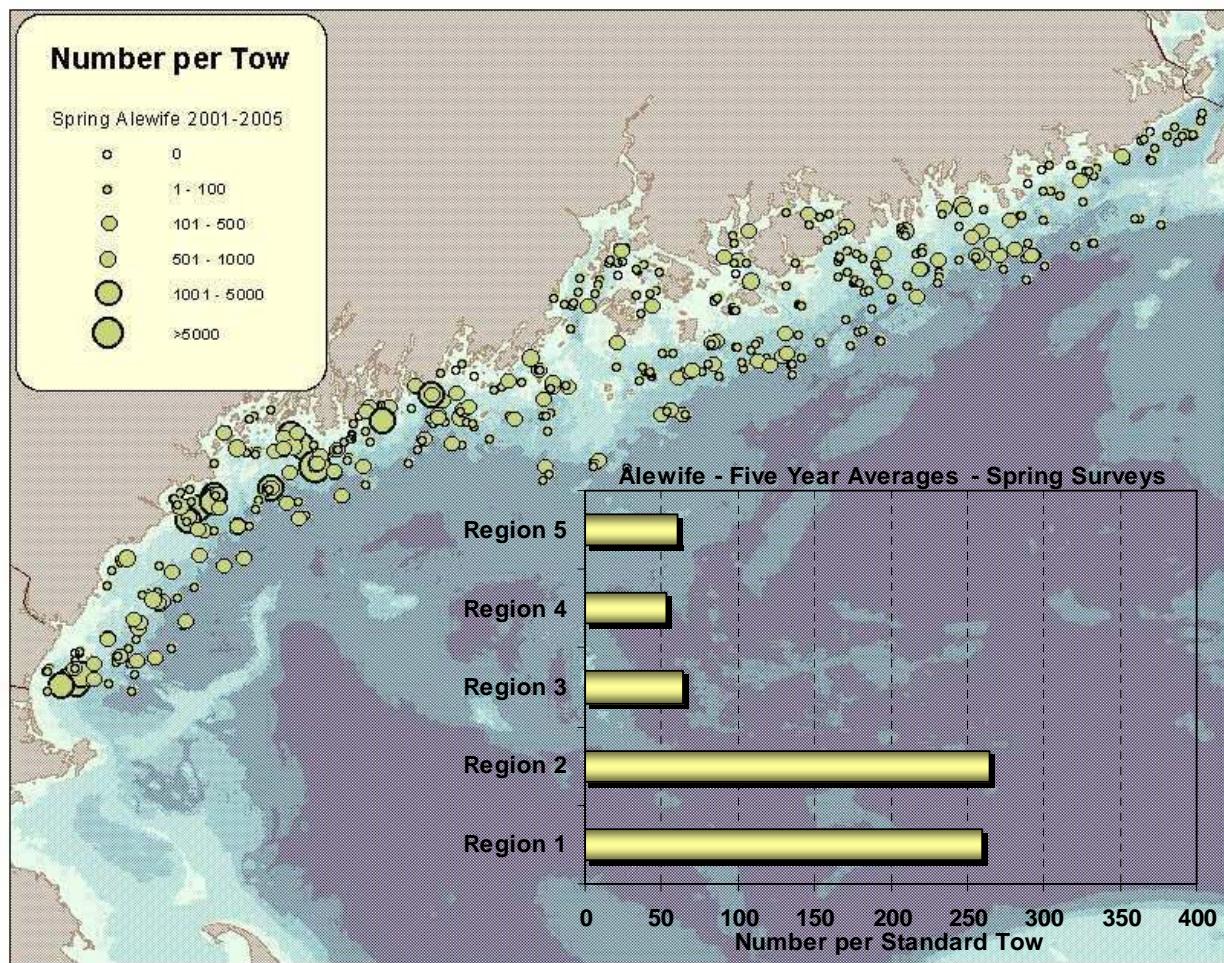


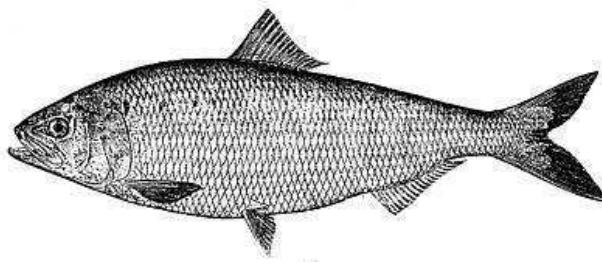


Alewife
Alosa pseudoharengus

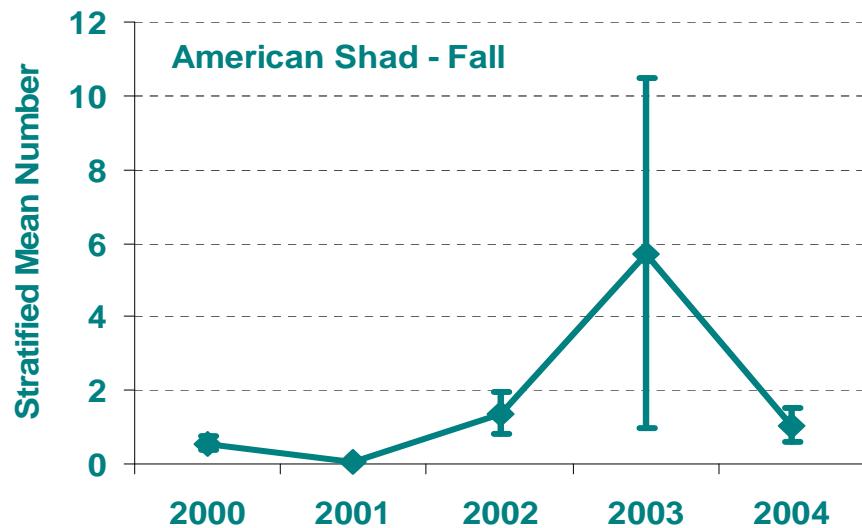




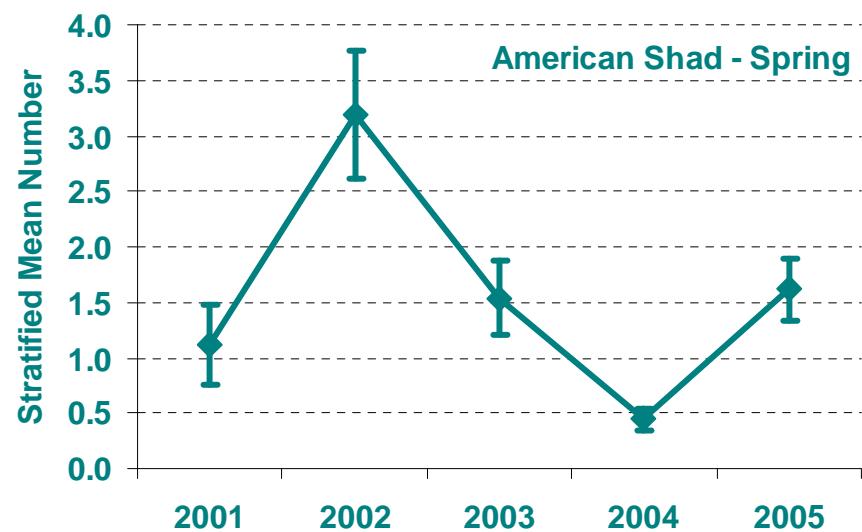




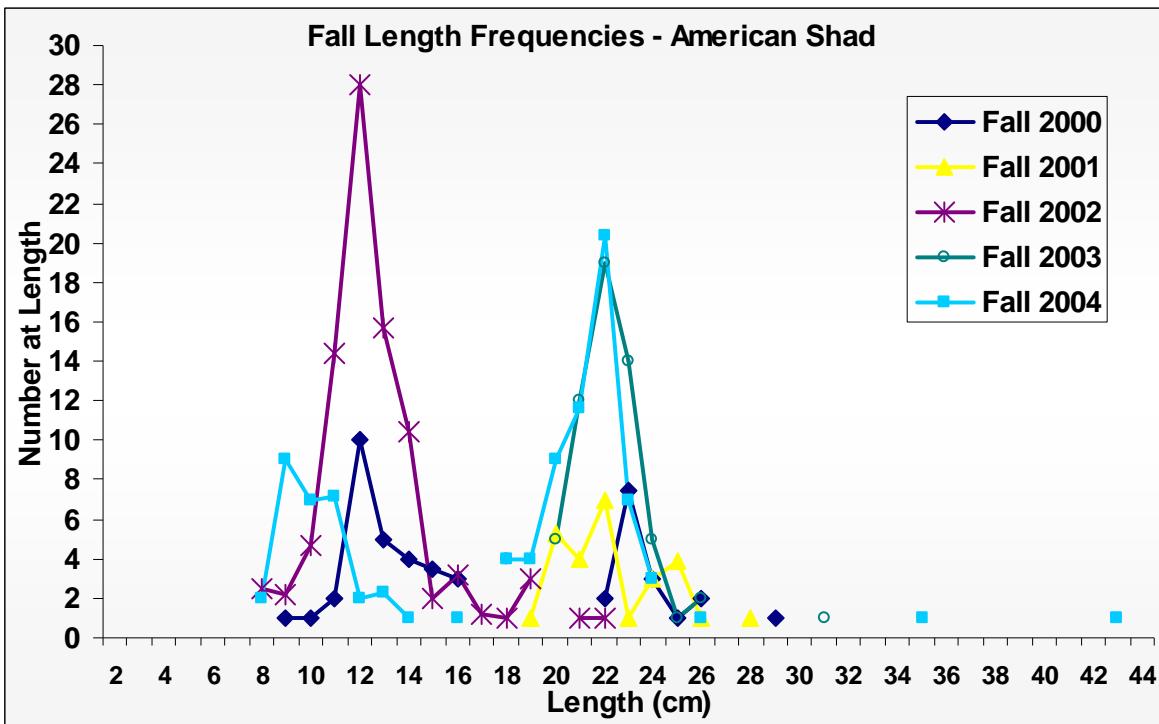
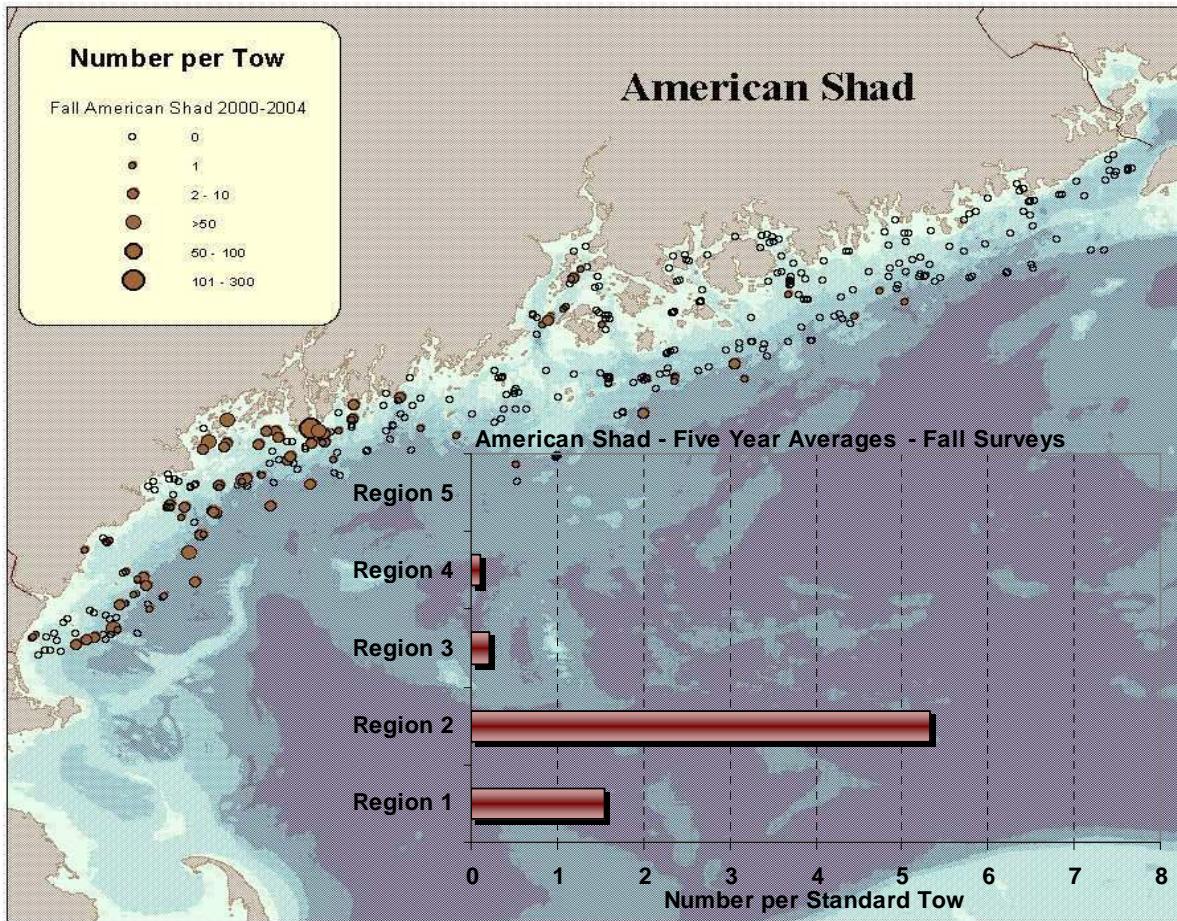
American Shad
Alosa sapidissima

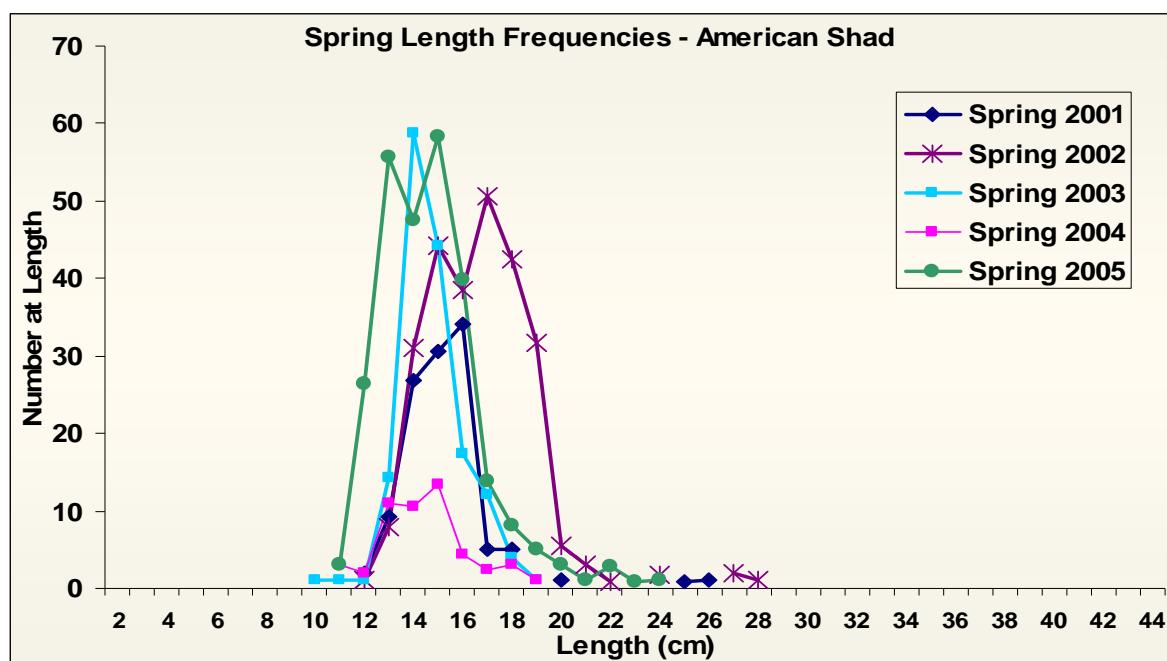
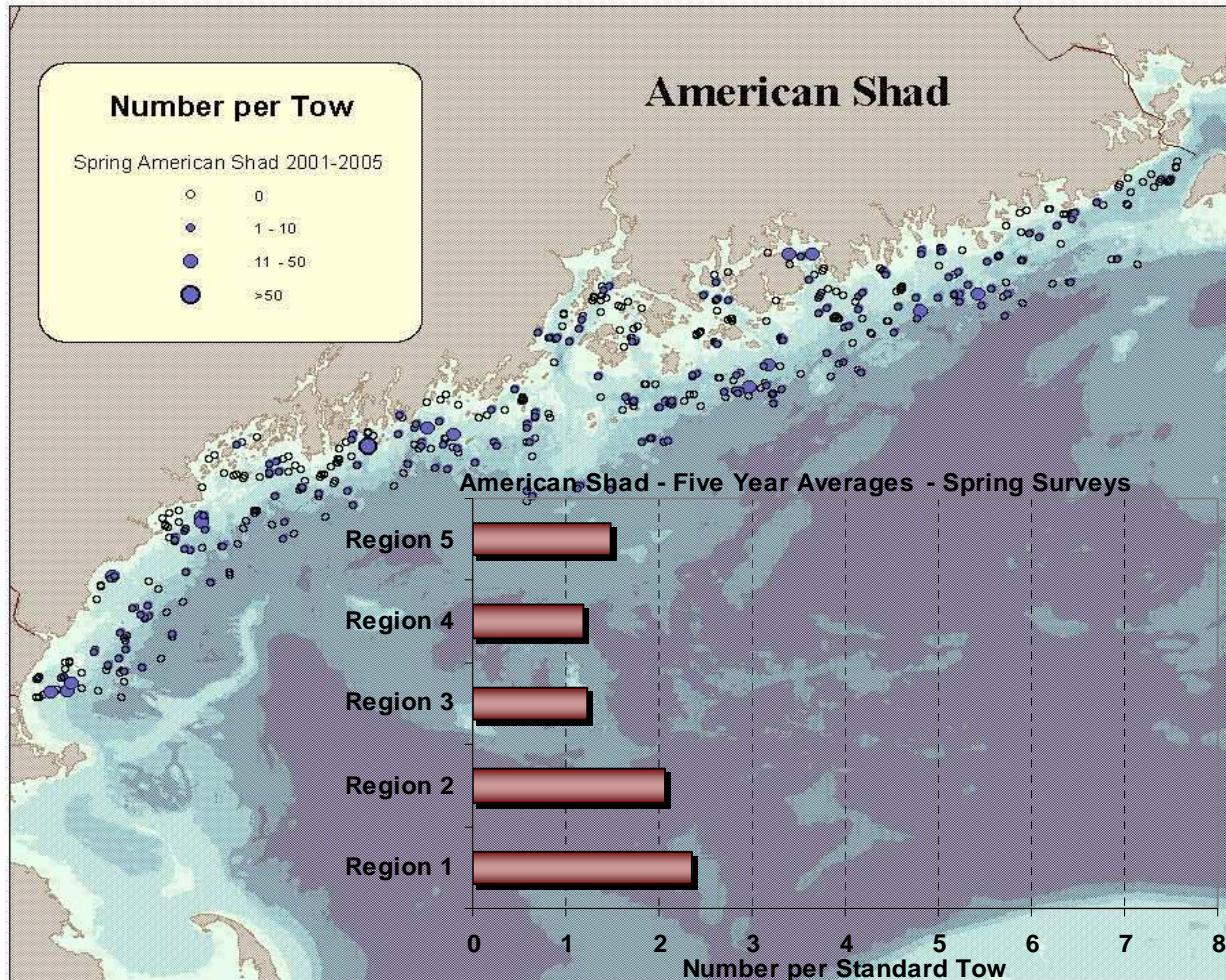


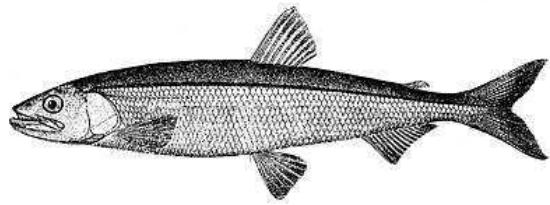
Relative Abundance for shad in fall survey trawls 2000 through 2004



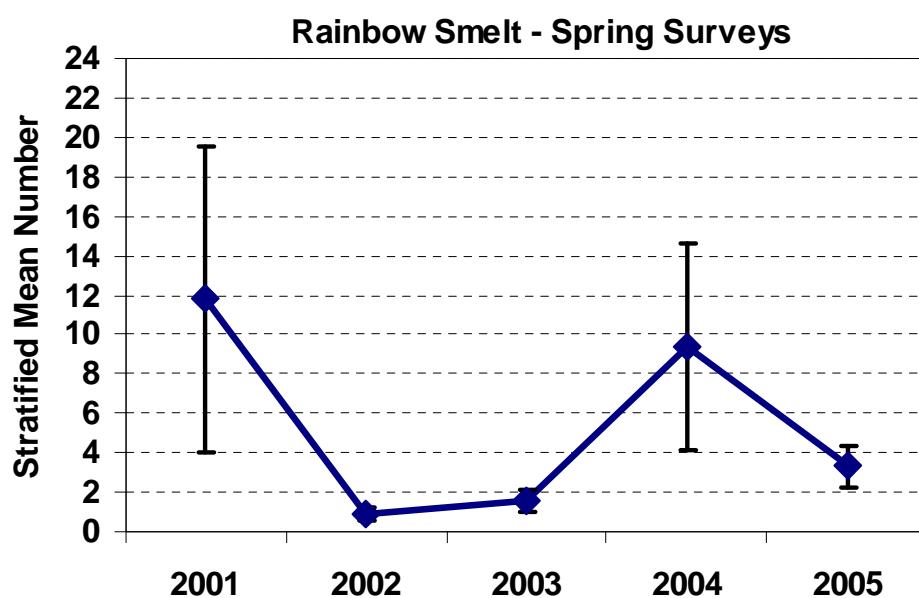
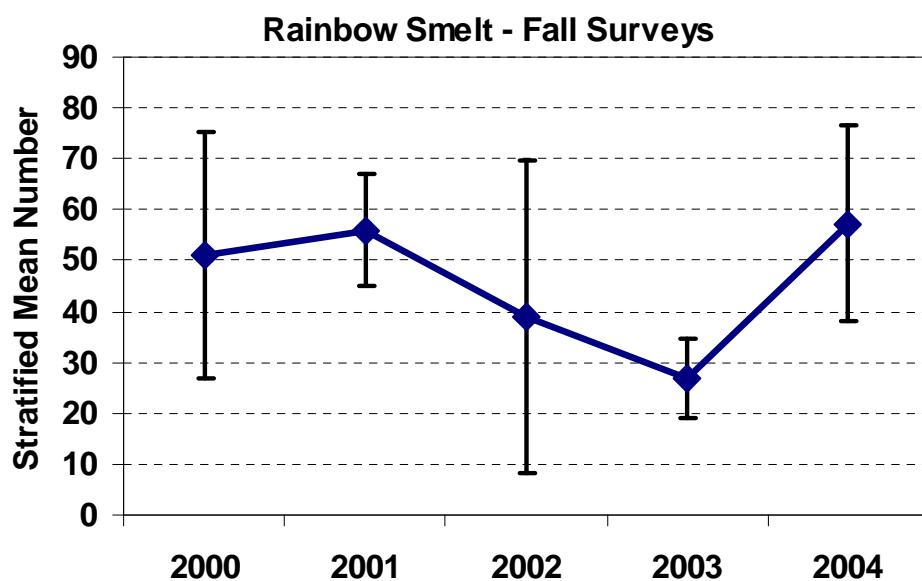
Relative Abundance for shad in spring survey trawls 2001 through 2005

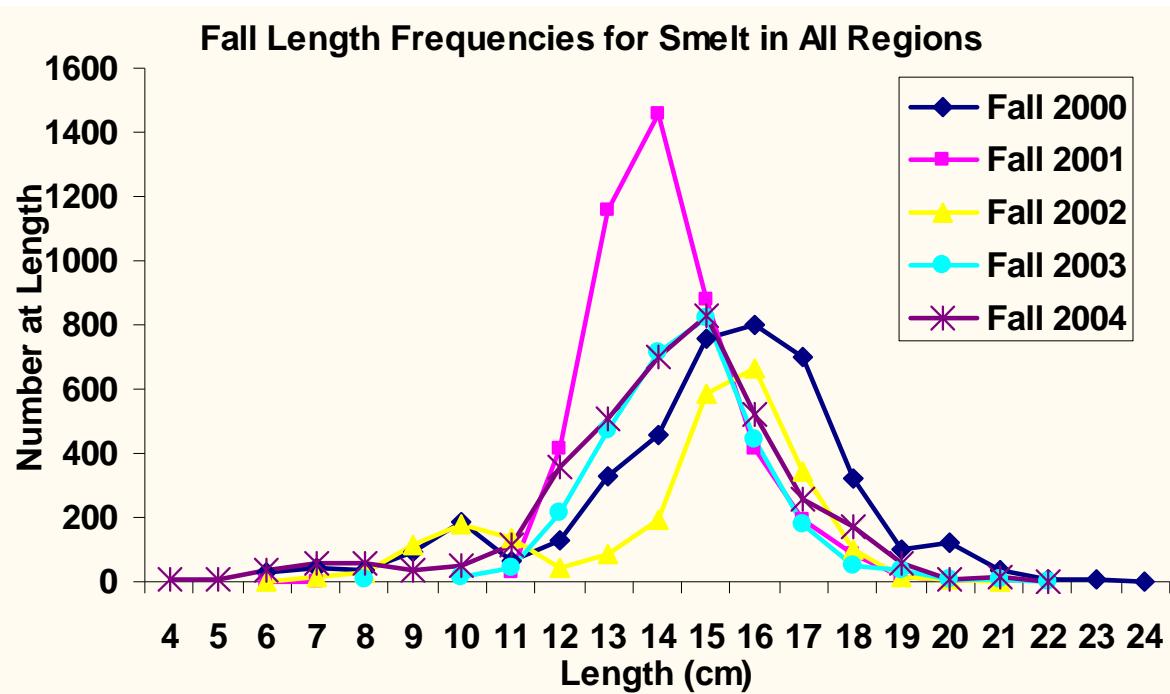
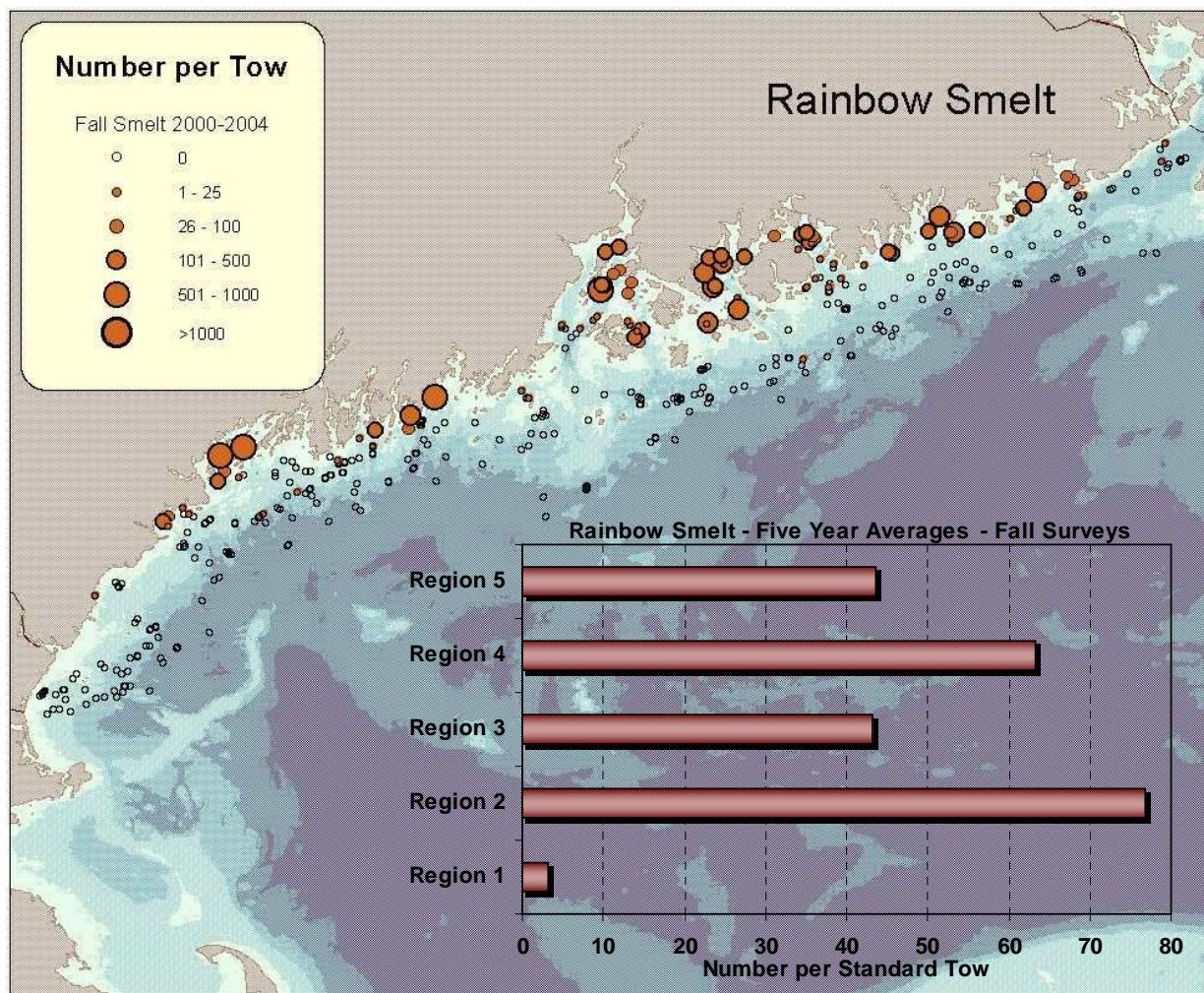


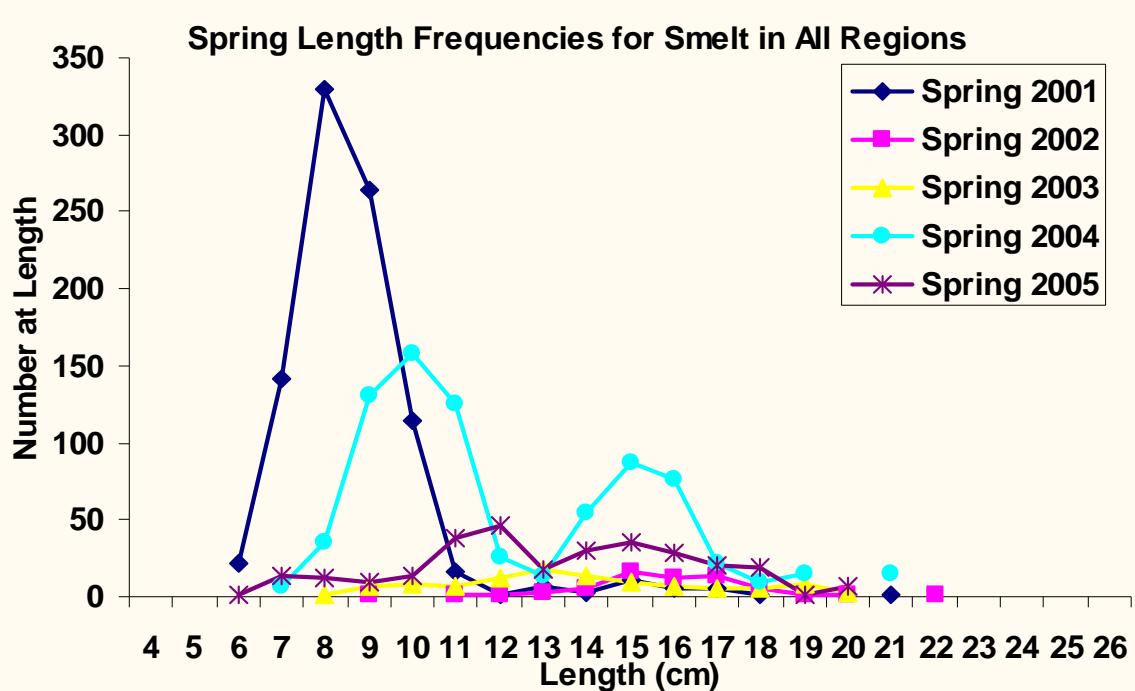
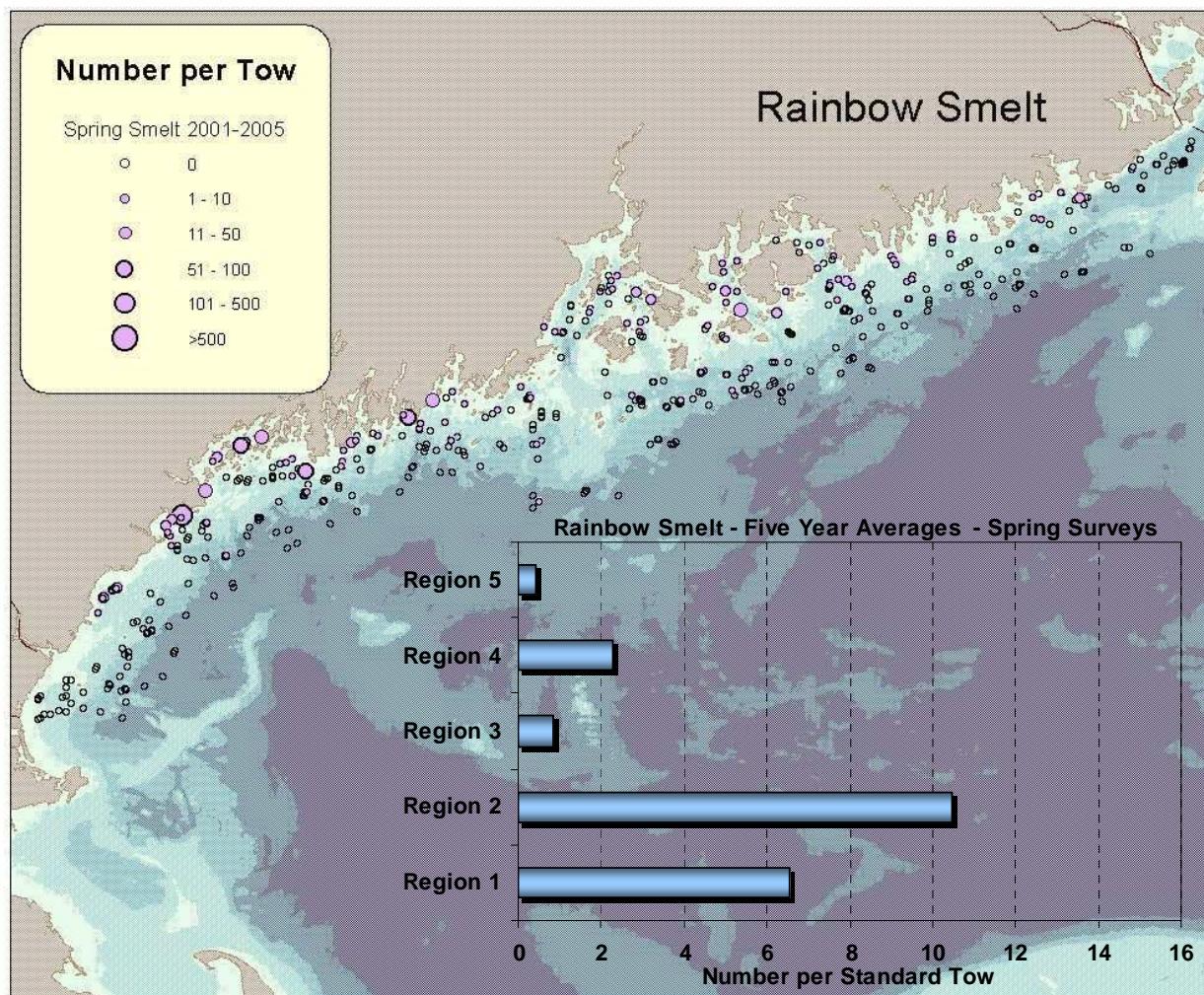


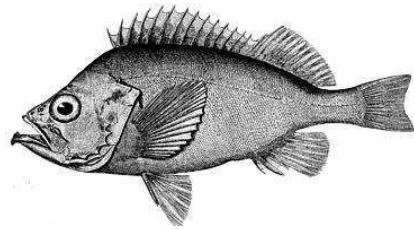


Rainbow Smelt
Osmerus mordax

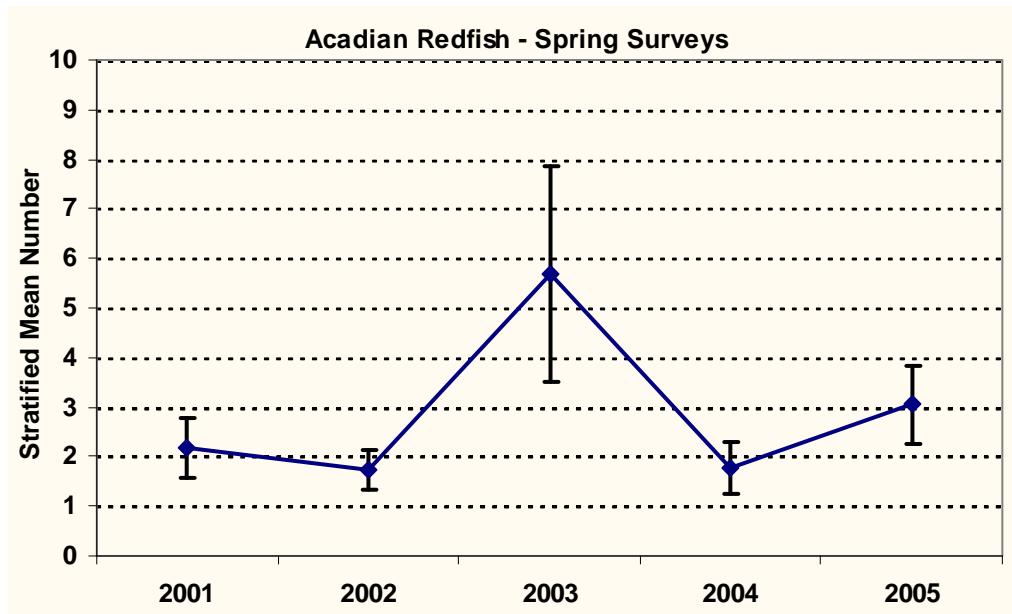
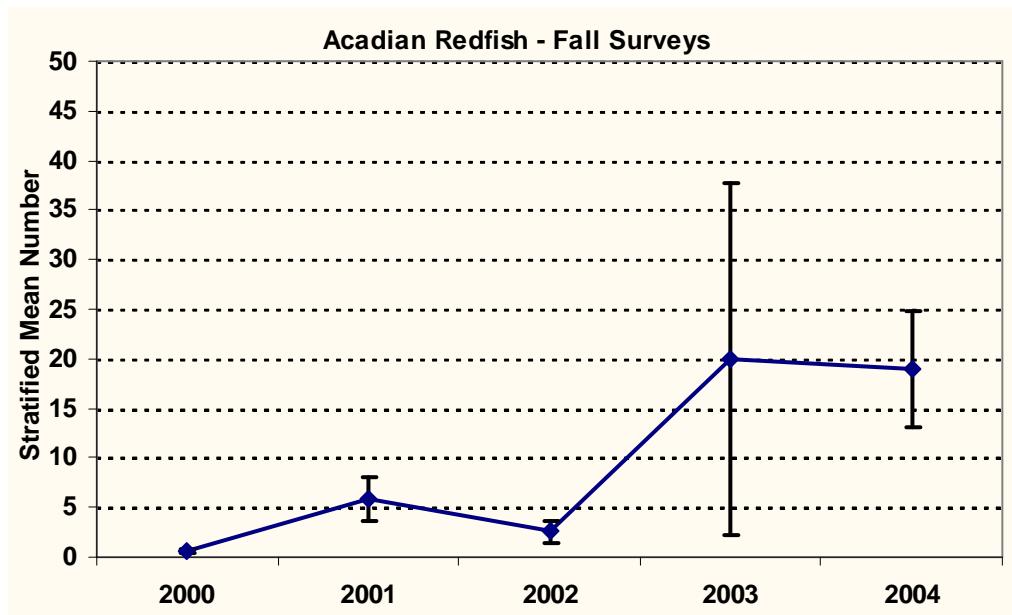


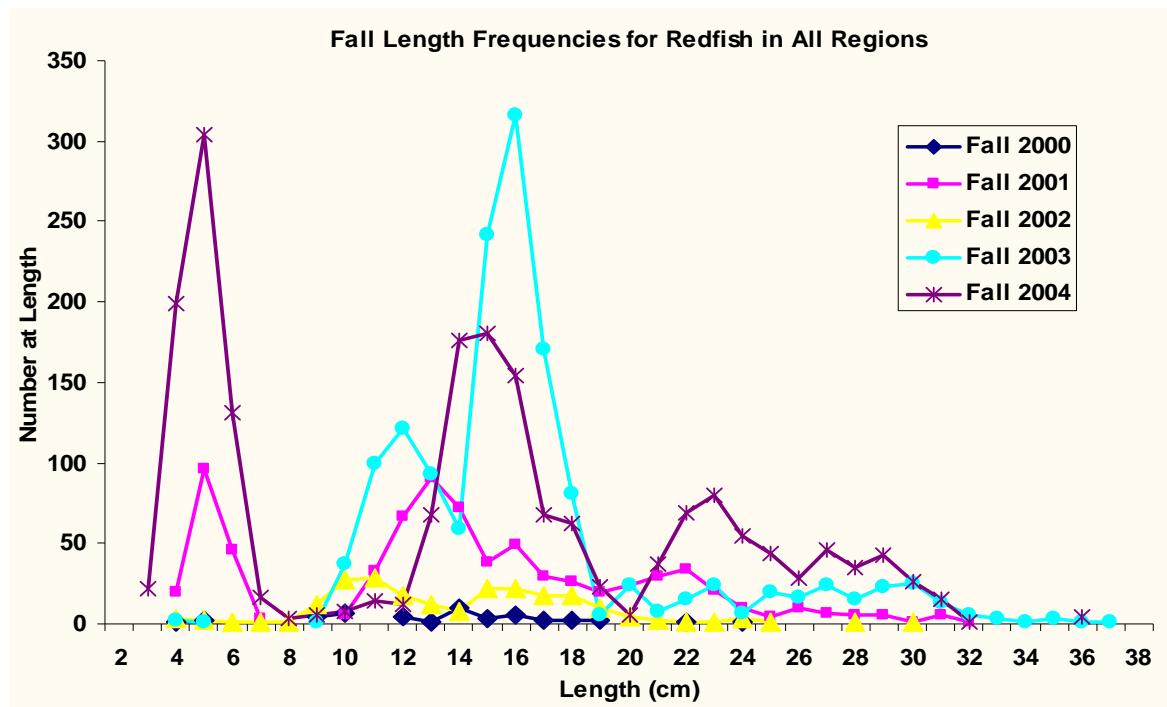
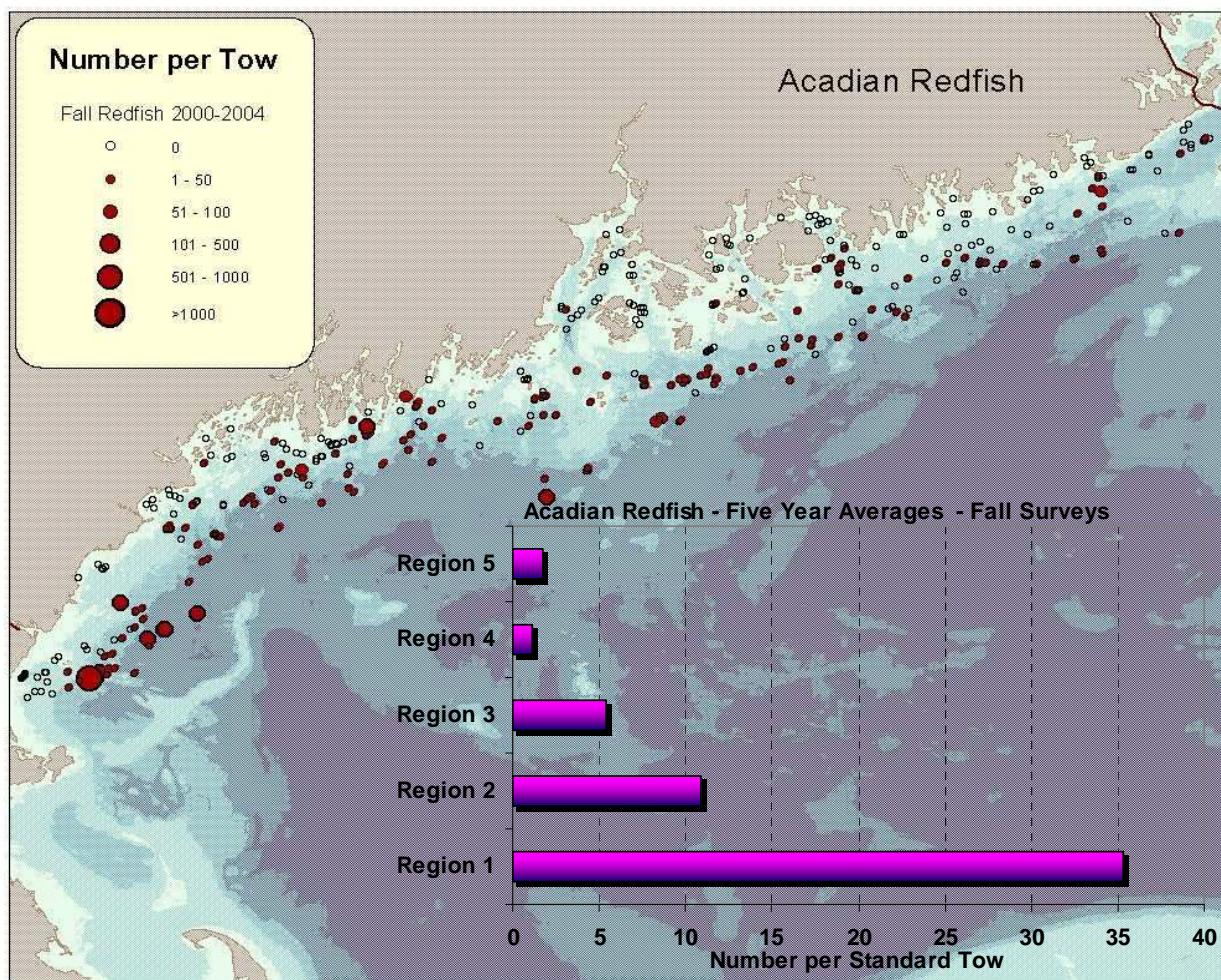


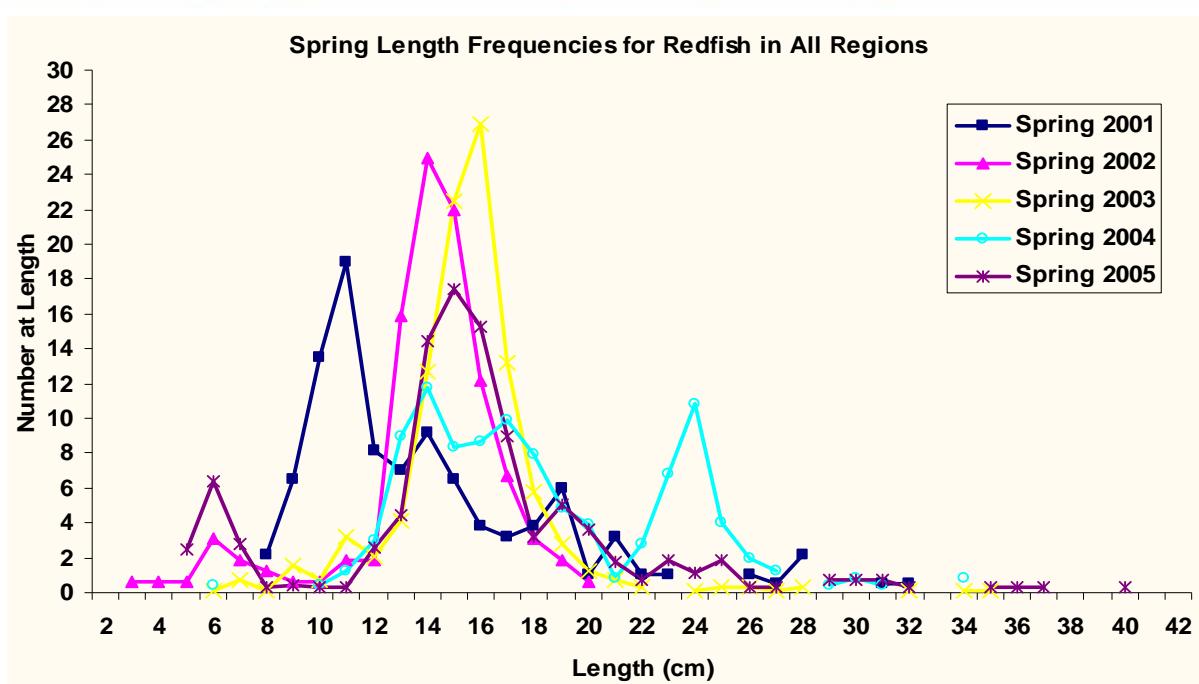
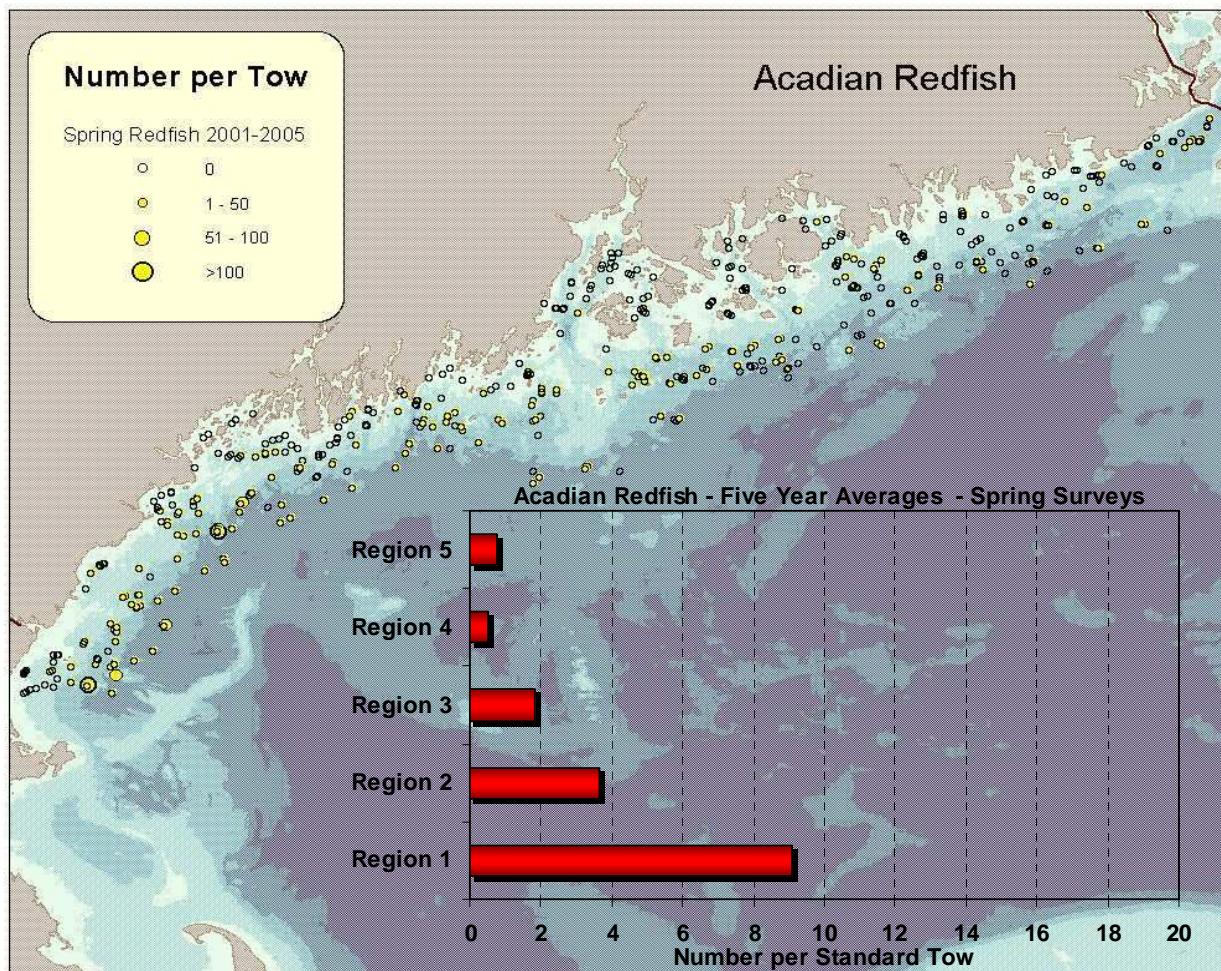


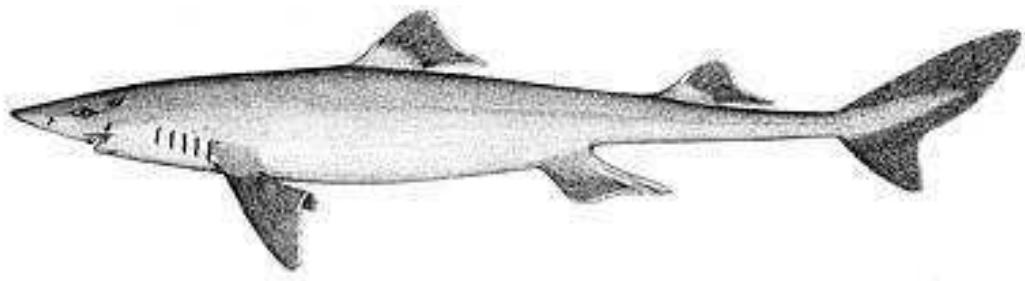


Acadian Redfish
Sebastes fasciatus

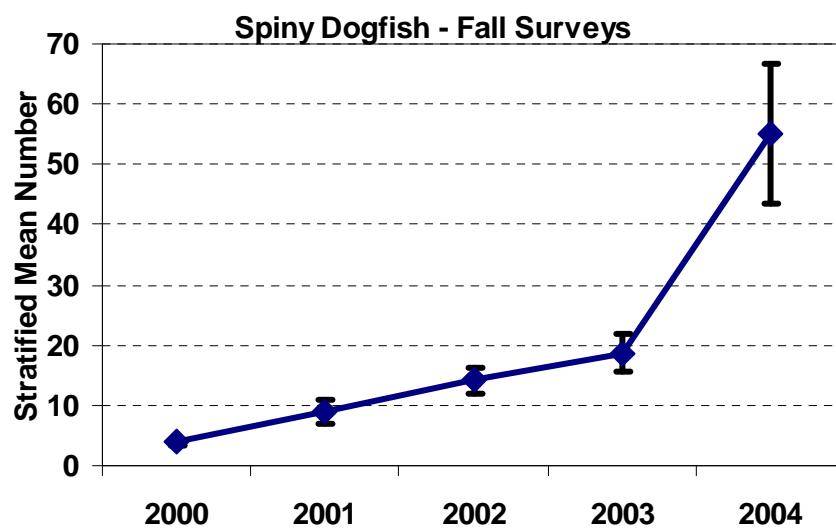


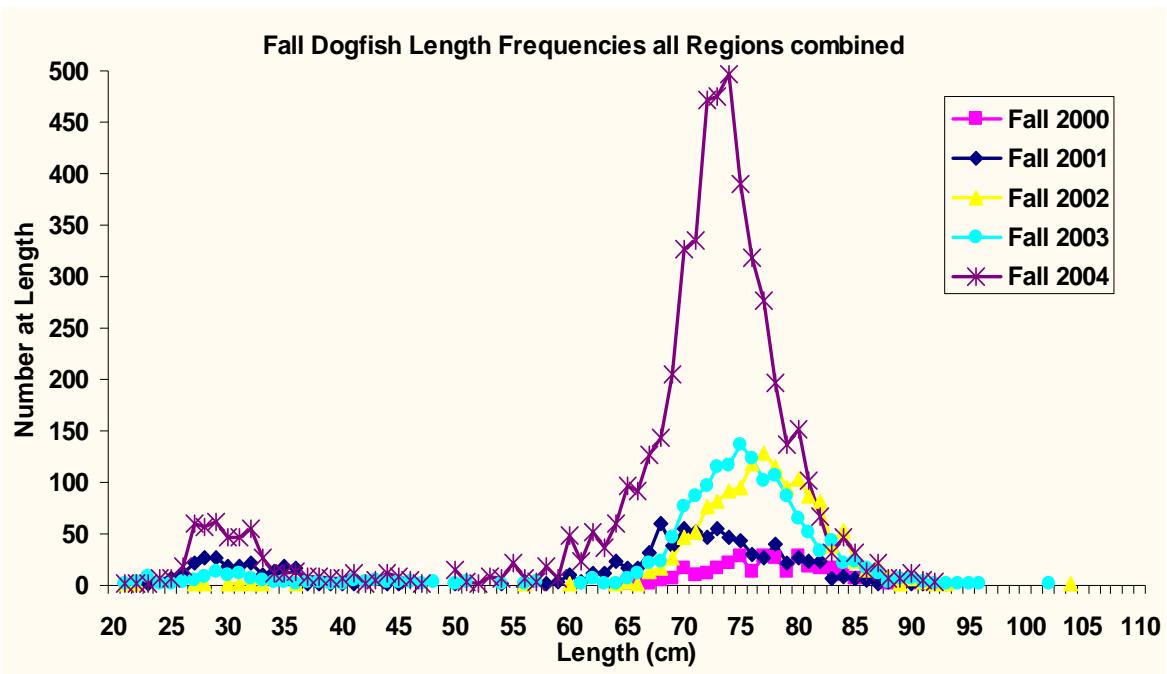
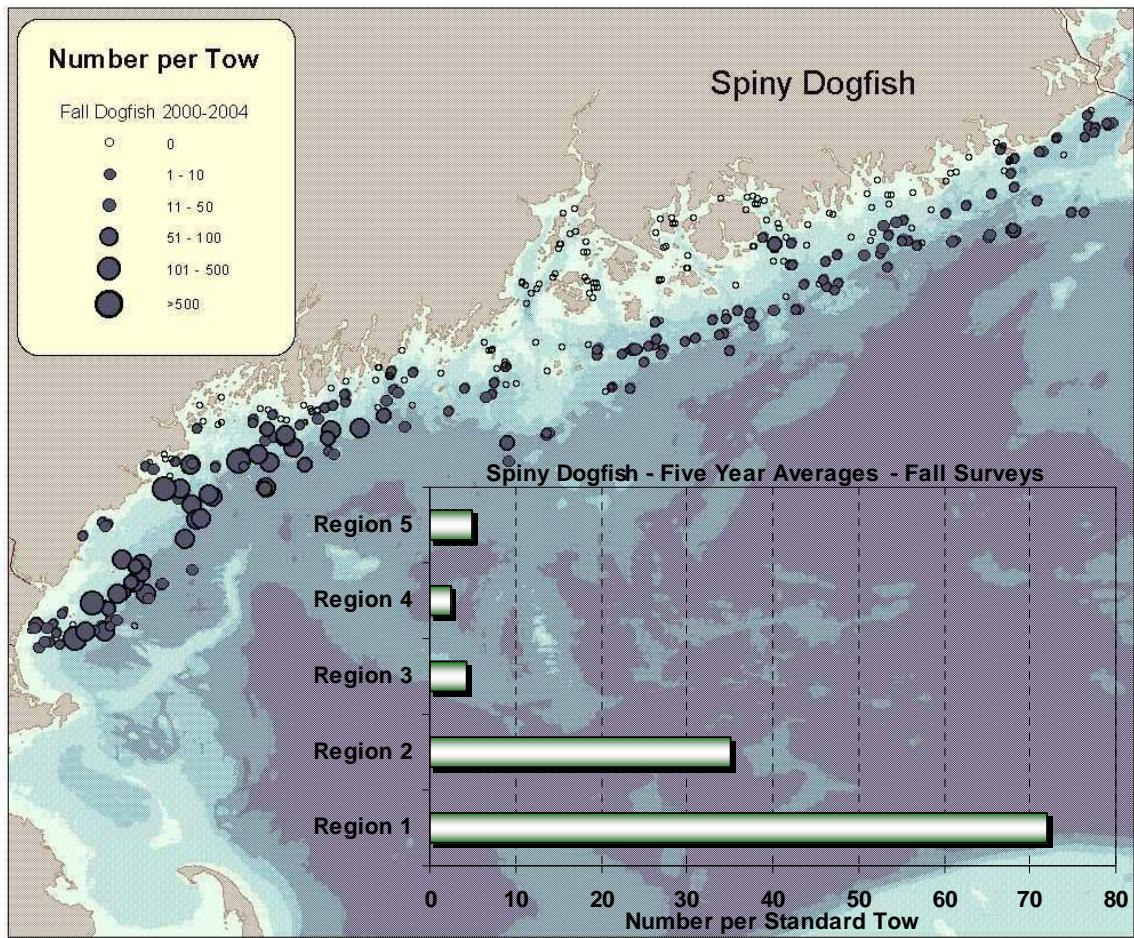


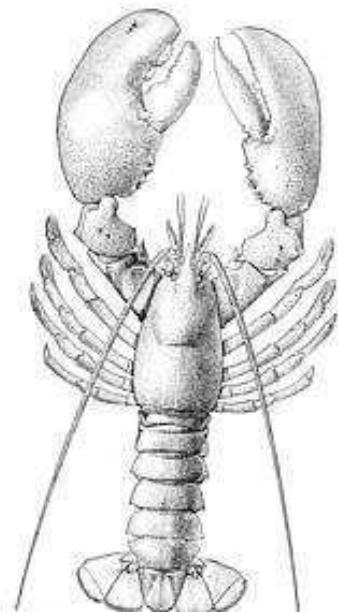




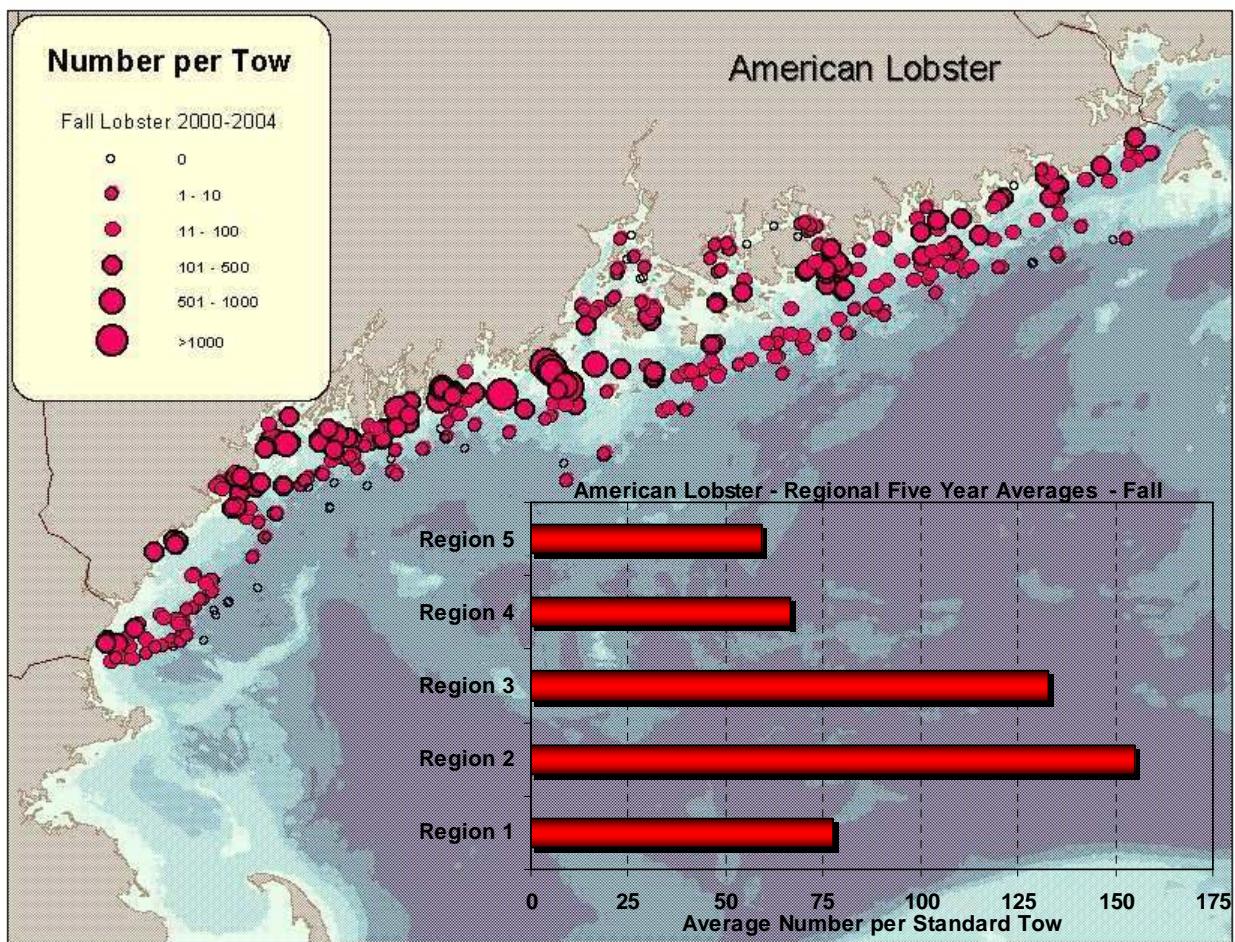
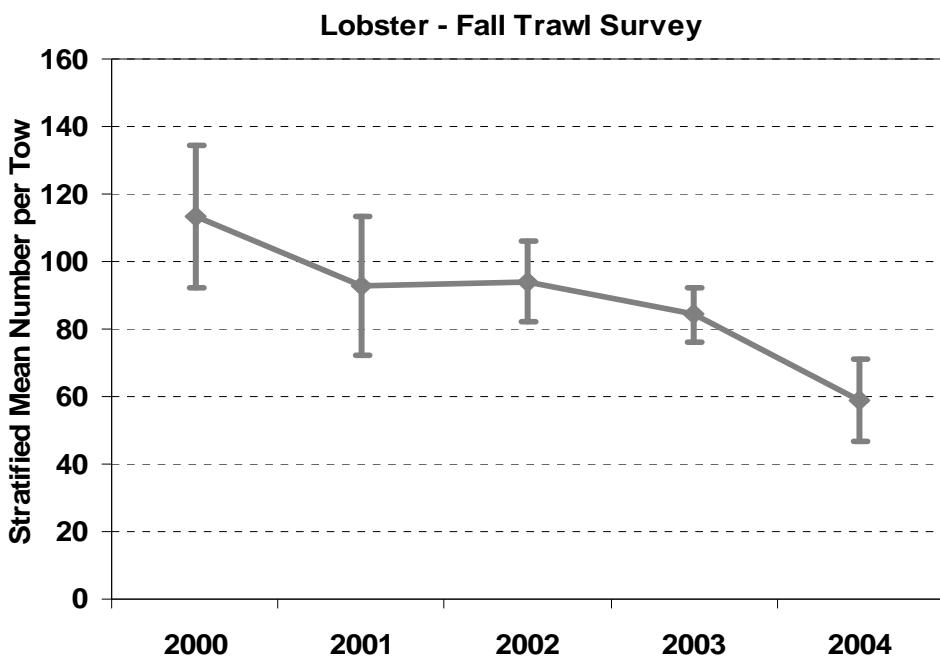
Spiny Dogfish
Squalus acanthias

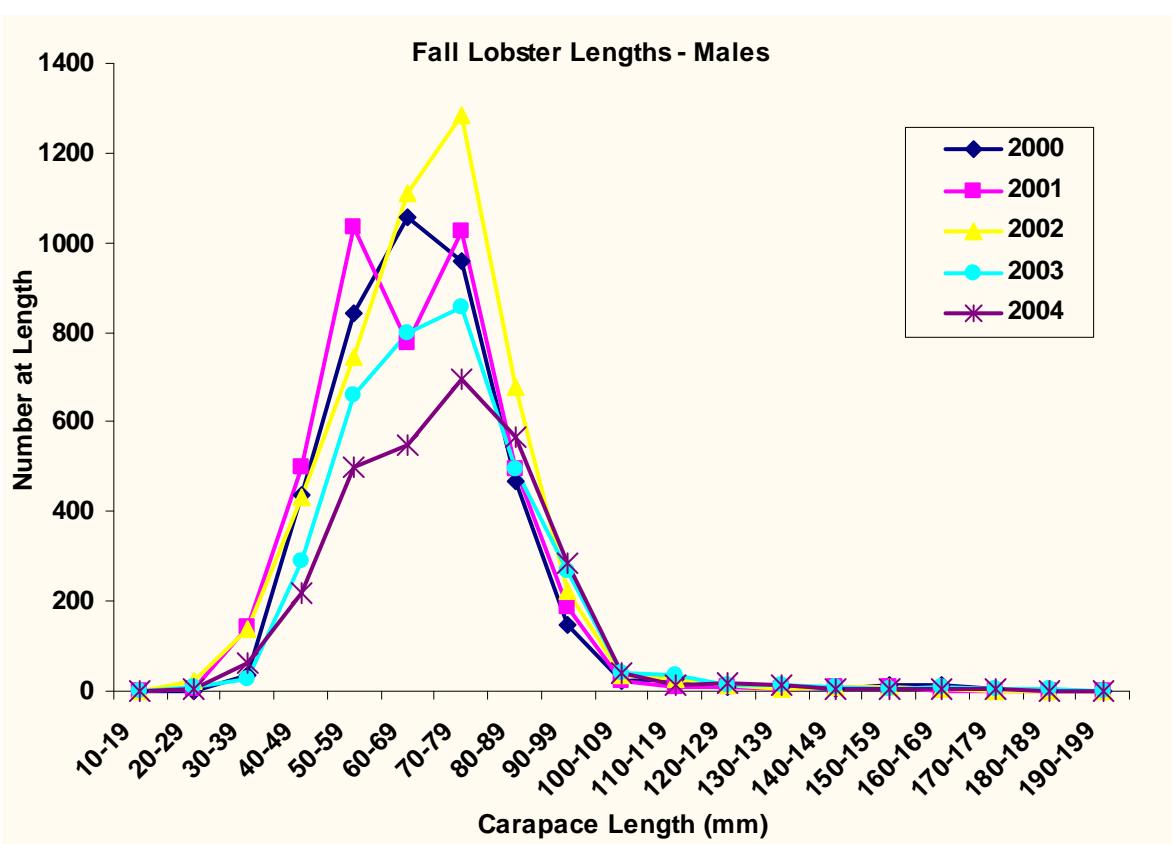
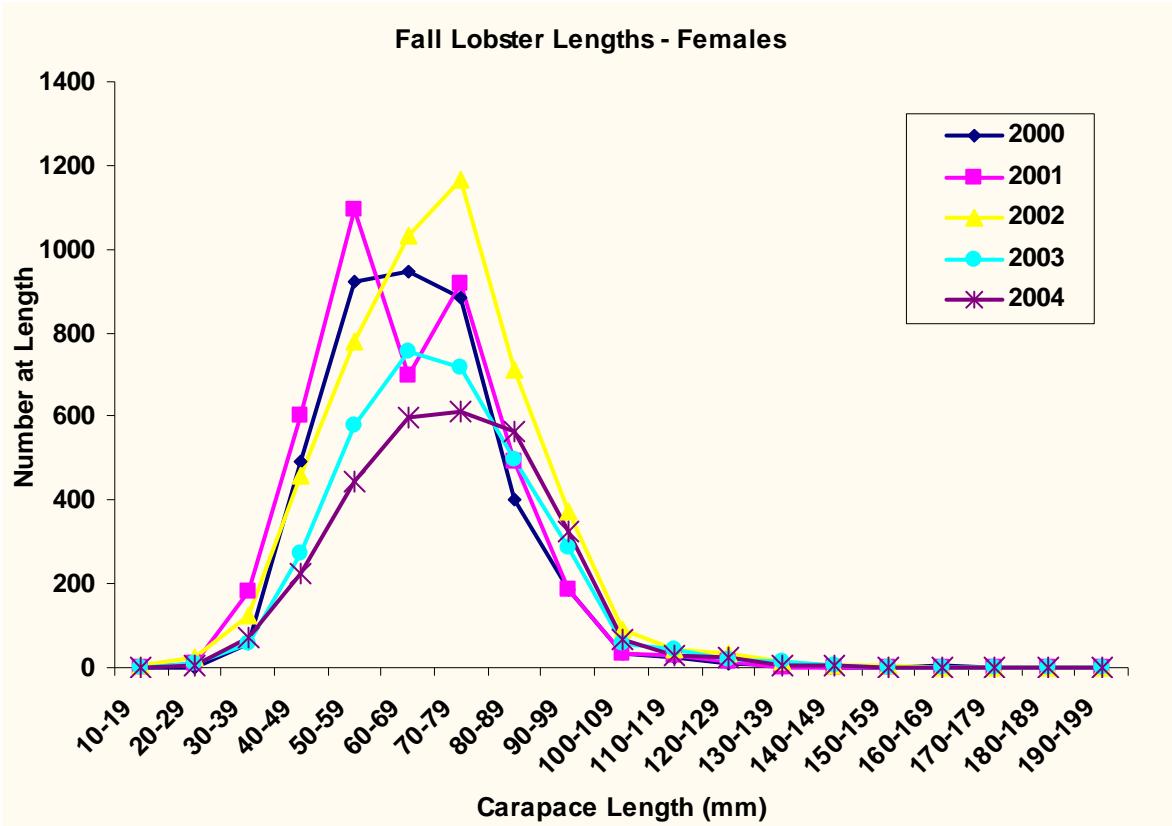


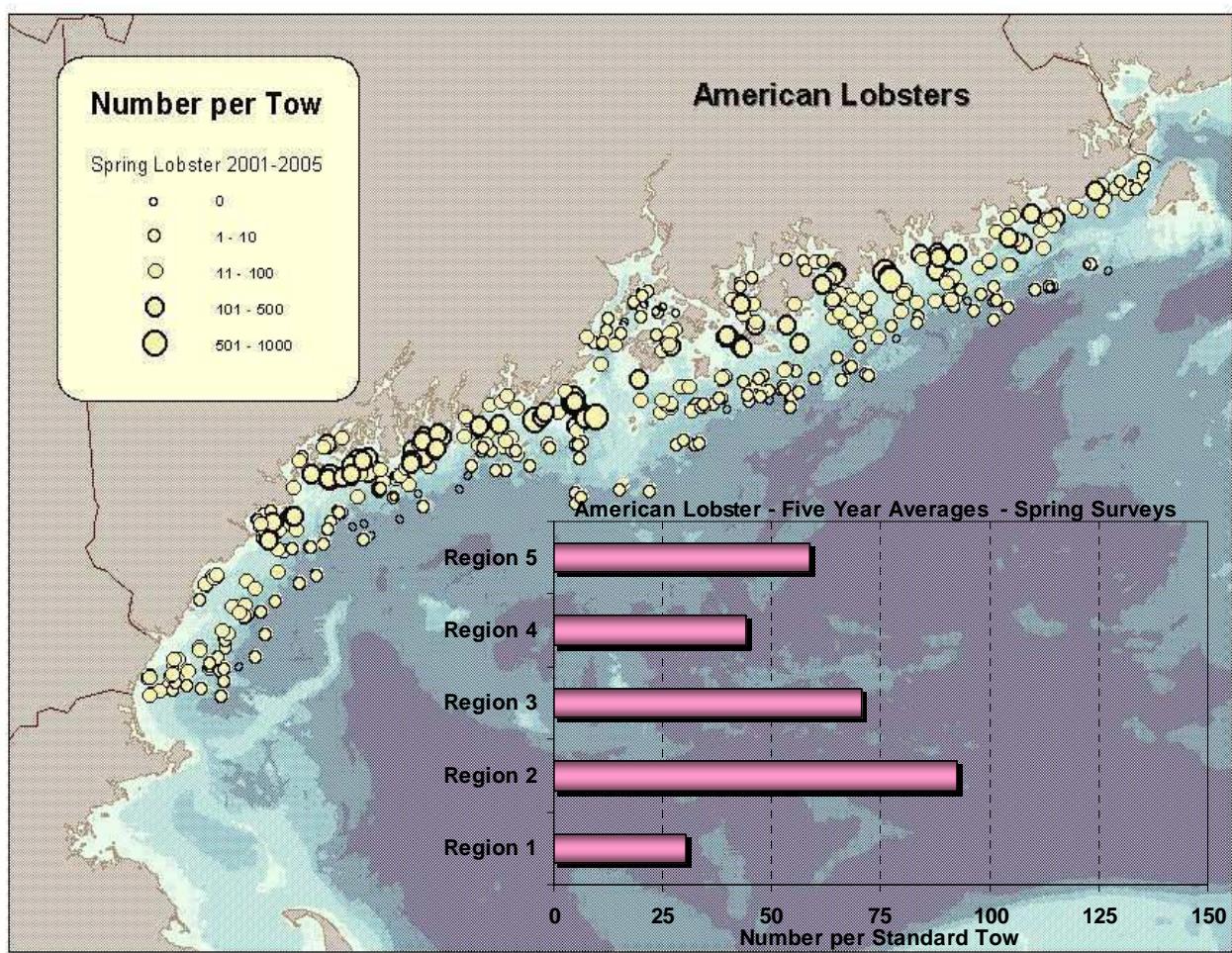
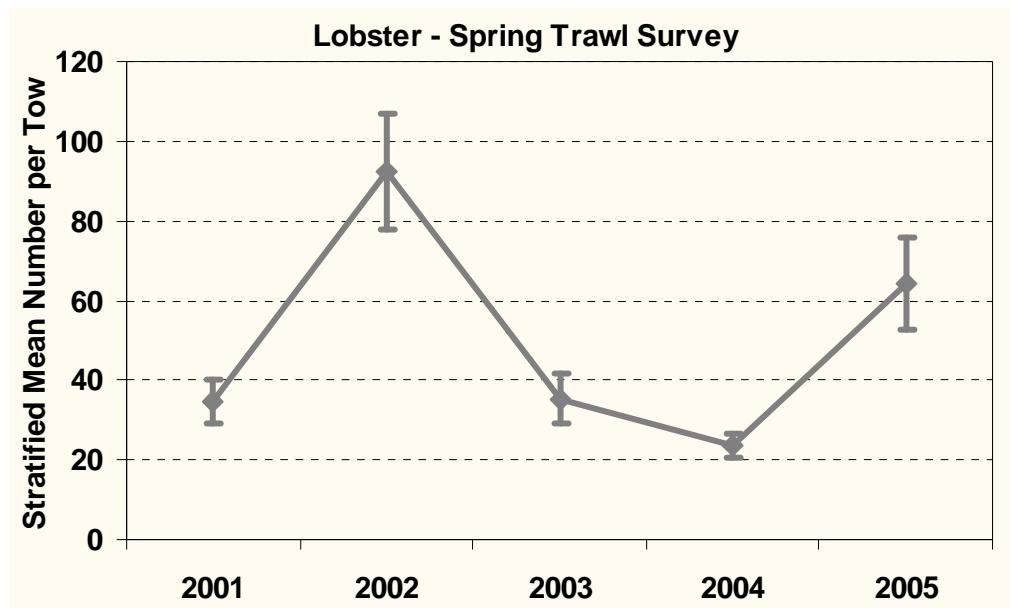


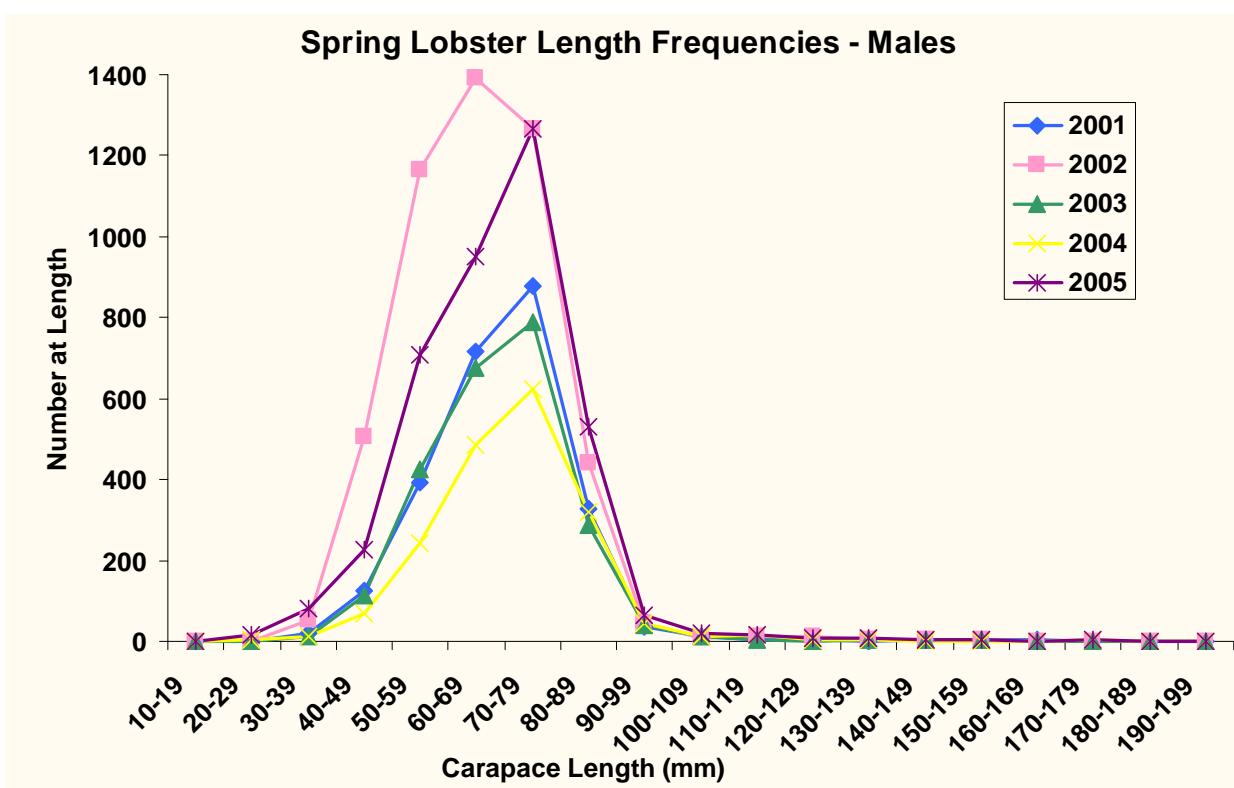
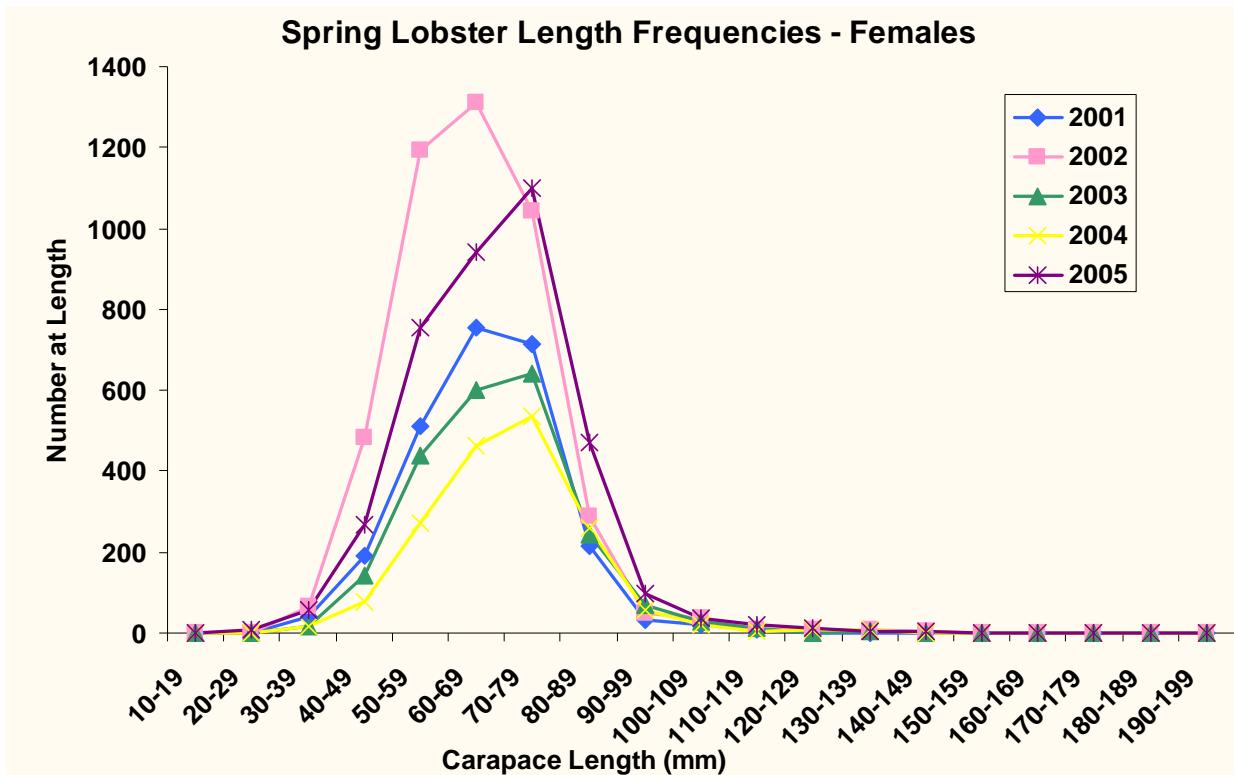


American Lobster
Homarus americanus









CONCLUSIONS

After five years of conducting the ME/NH Inshore Survey, the challenges foreseen in the planning stages have been met and successfully overcome. An enormous amount of public outreach is still essential to ensuring cooperation from fixed gear fishermen and without that cooperation the percent completion of tows would be significantly less. Equally, the assistance of the Maine DMR's Marine Patrol in moving fixed gear at key locations increases our tow completion rate and therefore the quality of the data collected by each survey.

At one time, the opinion was that an inshore survey along the coasts of Maine and New Hampshire would be impossible due to the rough bottom topography and the abundance of lobster fishing gear. In the initial planning phase, conversations were held with local fishermen to identify these difficult areas and it has been found that some are indeed "untowable" where others were not. Information about towable areas and non-towable areas has been documented from ten surveys and is now utilized to aid in survey planning. Long hours spent searching for towable bottom has demonstrated that large areas of the coast do not have to be eliminated as "untowable." The short tow duration of 20 minutes gives some leeway to find small towable areas in difficult terrain. The total survey coverage area is set and does not need any modifications due to logistics.

The project needs continuing outreach to local Maine and New Hampshire fishermen to reiterate the importance of the survey and the data it collects. Regular articles are published in several fishing related publications, staff attends lobster zone councils meetings on a yearly basis, presentations are given at the Maine Fishermen's Forum, and notices of the surveys are always sent to all fixed gear fishermen. This involves extra funds and added staff time but it well worth the time and effort by increasing the value of the data collected. The success of the survey is also enhanced by its ability to adhere to a fairly strict schedule of predetermined tow locations and dates. This enables the fixed gear fishermen to rely on the fact that the tows conducted in their areas will be done in a timely fashion.

This is the fifth annual report published and all data from the survey are provided to NMFS for use in stock assessments, as well as made publicly available. In addition to the NMFS, scientists and managers with the Maine and New Hampshire state agencies, the University of Maine, Bigelow Laboratories for Ocean Sciences and other non-government organizations are using the survey results. Tangible products and results delivered to date include the following:

- Five annual reports
- Survey Procedures and Protocols Manual
- Electronic data provided annually to NMFS-NEFSC, academia, and public
- Inshore trawl survey data are a key component of the new American lobster stock re-evaluation
- Peer reviewed publication on differentiation of two Gulf of Maine American lobster stocks
- Data provided on Winter flounder, *Pseudopleuronectes americanus*, for use in developing Amendment I to the fishery management plan.
- Data provided to support management measures on monkfish, herring and American shad

- Data used in determination of fishing season for Northern shrimp, *Pandalus borealis*
- Basis for design of species-specific survey for sea scallop, *Placopecten magelanicus*
- Basis for design of video resource assessment project for Jonah crab, *Cancer borealis*
- Platform and collections for various special studies and other (e.g. otoliths, stomach analyses, ichthyoplankton, genetic fin clips, and Infections Salmon Anemia).

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Kramer, W.P. and J.S. Forrester. 1994. Bottom Trawl Survey Analysis Program (SUN SURVAN Version 7.0) Program Report. Vol. 1. National Marine Fisheries Service, Northeast Fisheries Science Center. Massachusetts.

Sherman, S., Stepanek, K. and Sowles, J. 2005. Maine-New Hampshire Inshore Groundfish Trawl Survey Procedures and Protocols. Maine Department of Marine Resources, Research Reference Document 05/01.

Appendix A
Individual Station Descriptions

DATE	REGION	TOWID	LORAN	LORAN	LAT	LON	Start	Tow	Average	Temp	Salinity
			W	X	deg/min	deg/min	Time	Duration	Depth (FA)	C °	ppt
Fall 2004											
10/11	1	FL04_1	13757.4	25963.5	42 55.620	70 45.160	0842	20	15.8	9.5	32.1
			13750.1	25963.3	42 56.190	70 44.570					
10/11	1	FL04_2	13758.4	25933.0	42 52.750	70 42.870	1035	20	23.8	8.8	32.2
			13765.7	25833.1	42 52.130	70 43.470					
10/11	1	FL04_3	13711.8	25900.2	42 53.630	70 36.430	1315	20	41.1	7.1	32.3
			13719.6	25901.1	42 53.050	70 37.170					
10/11	1	FL04_4	13690.7	25895.0	42 54.870	70 34.260	1440	20	41.8	6.9	32.4
			13698.7	25895.8	42 54.280	70 34.990					
10/13	1	FL04_5	13644.9	25923.5	43 01.130	70 32.750	0758	19	31.5	8.6	32.3
			13641.2	25928.3	43 01.850	70 32.740					
10/13	1	FL04_6	13633.2	25872.9	42 57.420	70 27.600	1003	20	54.6	5.8	32.5
			13640.5	25878.4	42 57.350	70 28.650					
10/13	1	FL04_7	13599.9	25905.5	43 02.980	70 27.420	1152	20	49.9	6.7	32.5
			13608.0	25904.8	43 02.310	70 28.000					
10/13	1	FL04_8	13528.0	25868.2	43 05.090	70 18.030	1406	20	77.1	4.3	32.7
			13532.3	25862.9	43 04.270	70 17.930					
10/13	1	FL04_9	13540.7	25900.6	43 07.140	70 21.950	1542	20	55.1	6.6	32.6
			13545.3	25896.5	43 06.420	70 21.980					
10/14	1	FL04_10	13552.3	25942.1	43 10.180	70 26.520	0725	15	34.3	7.8	32.4
			13547.2	25943.5	43 10.690	70 26.220					
10/14	1	FL04_11	13540.2	25917.9	43 08.830	70 23.400	0853	20	48.2	6.9	32.5
			13531.9	25916.3	43 09.310	70 22.560					
10/14	1	FL04_12	13469.8	25854.3	43 08.150	70 11.650	1059	20	90.2	4.6	32.8
			13461.8	25852.3	43 08.540	70 10.780					
10/14	1	FL04_13	13440.1	25892.3	43 14.580	70 13.120	1235	20	64.5	5.9	32.7
			13440.7	25892.3	43 13.910	70 12.570					
10/14	1	FL04_14	13391.0	25906.6	43 19.050	70 09.710	1409	20	61.9	6.2	32.7
			13384.9	25908.4	43 19.660	70 09.380					
10/14	1	FL04_15	13347.4	25926.5	43 24.157	70 07.871	1609	20	58.9	6.8	32.7
			13346.3	25920.0	43 23.610	70 07.160					
10/17	1	FL04_16	13395.4	26024.5	43 30.100	70 21.260	0732	20	5.8	12.1	31.4
			13388.3	26025.7	43 30.790	70 20.800					
10/17	1	FL04_17	13391.4	26013.9	43 29.420	70 19.930	0838	20	12.2	10.9	31.9
			13386.4	26017.3	43 30.145	70 19.896					
10/17	1	FL04_18	13401.6	25979.5	43 25.309	70 17.503	1033	20	32.3	8.7	32.3
			13394.0	25979.7	43 25.882	70 16.909					
10/18	2	FL04_19	13264.0	25936.7	43 31.193	70 01.680	0901	20	53.5	7.5	32.6
			13255.8	25936.6	43 31.763	70 00.982					
10/18	2	FL04_20	13264.0	25925.5	43 30.089	70 00.539	1046	20	59.8	7.2	32.6
			13255.9	25924.8	43 30.585	69 59.785					
10/18	2	FL04_21	13266.0	25879.1	43 25.348	69 56.022	1229	20	90.8	5.0	30.7
			13258.2	25879.1	43 25.896	69 55.334					
10/18	2	FL04_22	13183.4	25871.9	43 30.345	69 47.707	1425	20	70.6	6.6	32.8
			13176.2	25868.2	43 30.466	69 46.689					

Appendix A
Individual Station Descriptions

DATE	REGION	TOWID	LORAN	LORAN	LAT	LON	Start	Tow	Average	Temp	Salinity
			W	X	deg/min	deg/min	Time	Duration	Depth (Ft)	C °	ppt
10/18	2	FL04_23	13228.4	25926.6	43 32.694	69 57.501	1608	20	58.7	7.6	32.6
			13227.1	25932.4	43 33.320	69 57.963					
10/19	2	FL04_24	13167.1	25923.5	43 36.686	69 51.776	0724	20	44.0	7.9	32.6
			13175.2	25923.2	43 36.086	69 52.472					
10/19	2	FL04_25	13181.1	25946.7	43 38.022	69 55.488	0940	20	32.7	9.1	32.4
			13186.9	25944.2	43 37.379	69 55.703					
10/19	2	FL04_26	13273.7	26013.7	43 38.153	70 10.295	1250	15	12.8	11.3	31.6
			13268.6	26015.8	43 38.720	70 10.085					
10/19	2	FL04_27	13236.4	26038.5	43 43.355	70 09.766	1537	18	8.8	11.3	31.6
			13243.0	26037.1	43 42.742	70 10.160					
10/20	2	FL04_28	13115.1	25882.0	43 36.094	69 42.625	0943	20	56.4	7.7	32.7
			13121.1	25878.9	43 35.351	69 42.838					
10/20	2	FL04_29	13133.4	25921.1	43 38.794	69 48.571	1208	20	20.4	9.9	32.3
			13125.6	25921.0	43 39.328	69 47.851					
10/20	2	FL04_30	13103.3	25912.8	43 40.032	69 44.994	1331	20	24.2	9.4	32.4
			13096.5	25914.6	43 40.689	69 44.574					
10/20	2	FL04_31	13094.0	25930.4	43 42.485	69 46.097	1457	20	9.5	10.7	32.0
			13091.3	25935.3	43 43.171	69 46.409					
10/21	2	FL04_32	13032.2	25915.9	43 45.409	69 38.974	0727	18	33.3	8.6	32.5
			13036.7	25912.5	43 44.605	69 39.001					
10/21	2	FL04_33	13061.0	25865.6	43 38.065	69 35.818	1031	20	54.6	8.2	32.6
			13065.9	25863.2	43 37.496	69 36.002					
10/21	2	FL04_34	13012.2	25861.2	43 40.952	69 30.769	1230	20	66.3	7.0	32.8
			13007.0	25865.3	43 41.699	69 30.775					
10/21	2	FL04_35	12963.4	25875.8	43 45.732	69 28.972	1427	20	42.7	8.5	32.5
			12957.5	25879.1	43 46.456	69 27.818					
10/22	2	FL04_36	12947.8	25918.6	43 51.265	69 31.714	0815	18	19.6	9.9	32.1
			12952.4	25915.3	43 50.631	69 31.732					
10/25	2	FL04_37	12944.7	25901.0	43 49.656	69 29.288	0807	20	36.2	9.4	30.9
			12937.6	25903.6	43 50.386	69 28.960					
10/25	2	FL04_38	12932.9	25884.8	43 48.704	69 26.253	1013	20	36.6	9.5	32.3
			12941.1	25883.7	43 48.051	69 26.855					
10/25	3	FL04_39	12874.5	25828.7	43 46.613	69 13.703	1228	20	47.8	9.5	32.4
			12875.2	25823.4	43 45.980	69 13.065					
10/25	3	FL04_40	12816.5	25804.4	43 47.729	69 04.744	1558	20	44.3	9.4	32.5
			12823.7	25802.4	43 47.032	69 05.181					
10/26	3	FL04_41	12789.5	25825.9	43 51.827	69 04.930	0808	20	34.2	9.6	32.3
			12784.0	25929.0	43 52.587	69 04.929					
10/26	3	FL04_42	12803.8	25827.5	43 51.045	69 06.581	0937	20	35.9	9.5	32.3
			12810.1	25823.9	43 50.269	69 06.734					
10/26	3	FL04_43	12719.1	25828.9	43 56.658	68 58.399	1253	20	33.5	9.3	32.4
			12725.5	25825.8	43 55.938	68 58.573					
10/27	3	FL04_44	12644.2	25893.2	44 08.805	69 00.415	1006	20	30.6	10.0	32.1
			12636.3	25896.3	44 09.649	69 00.109					
10/27	3	FL04_45	12542.1	25911.6	44 17.403	68 53.232	1157	19	17.1	10.4	32.0
			12549.3	25908.7	44 16.643	68 53.464					

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10/27	3	FL04_46	12507.6	25896.4	44 17.969	68 47.529	1319	13	23.0	10.6	31.9
			12507.1	25893.3	44 17.657	68 47.040					
10/27	3	FL04_47	12527.4	25887.7	44 15.700	68 48.155	1406	20	13.8	10.6	31.8
			12527.1	25882.3	44 15.097	68 47.285					
10/27	3	FL04_48	12565.2	25862.4	44 10.375	68 47.990	1551	20	7.9	10.5	31.9
			12566.4	25856.9	44 09.681	68 47.273					
10/28	3	FL04_49	12840.6	25723.3	43 37.208	68 56.172	0912	20	74.7	8.5	32.7
			12847.2	25720.7	43 36.526	68 56.499					
10/28	3	FL04_50	12925.8	25716.8	43 31.229	68 04.418	1138	20	73.7	7.9	32.9
			12933.9	25716.8	43 30.710	68 05.262					
10/29	3	FL04_51	12662.1	25790.1	43 56.094	68 47.177	0738	20	44.8	9.5	32.3
			12667.9	25793.1	43 56.055	68 48.143					
10/29	3	FL04_52	12661.2	25778.9	43 54.910	68 45.357	0851	20	50.6	9.5	32.3
			12666.7	25775.4	43 54.141	68 45.410					
10/29	3	FL04_53	12620.0	25757.0	43 54.947	68 37.442	1138	20	48.7	9.3	32.4
			12627.9	25756.5	43 54.395	68 38.228					
10/29	3	FL04_54	12682.1	25719.2	43 46.712	68 38.384	1327	20	66.6	8.3	32.7
			12689.7	25718.8	43 46.190	68 39.178					
11/1	4	FL04_55	12486.4	25812.1	44 09.808	68 32.110	0632	17	12.7	9.9	32.1
			12493.1	25811.7	44 09.325	68 32.750					
11/1	4	FL04_56	12557.2	25772.5	44 00.681	68 33.083	1032	19	41.1	9.4	32.3
			12550.5	25771.6	44 01.079	68 32.315					
11/1	4	FL04_57	12582.2	25754.9	43 57.077	68 32.956	1322	20	49.1	9.4	32.3
			12589.8	25754.9	43 56.609	68 33.806					
11/1	4	FL04_58	12597.5	25737.1	43 54.041	68 31.797	1437	20	53.8	8.9	32.5
			12590.3	25738.8	43 54.693	68 31.274					
11/2	4	FL04_59	12520.2	25701.6	43 54.680	68 17.195	0831	20	63.8	8.7	32.6
			12517.7	25705.5	43 55.324	68 17.604					
11/2	4	FL04_60	12507.2	25772.7	43 58.028	68 19.387	1006	20	55.9	8.7	32.6
			12500.2	25722.2	43 58.410	68 18.476					
11/2	4	FL04_61	12443.1	25728.5	44 02.753	68 12.924	1309	20	53.6	9.3	32.4
			12449.3	25725.5	44 01.986	68 13.108					
11/2	4	FL04_62	12453.8	25736.8	44 03.073	68 15.676	1451	15	51.9	9.3	32.4
			12458.9	25735.1	44 02.542	68 15.955					
11/3	4	FL04_63	12352.2	25852.3	44 23.109	68 24.878	0938	15	13.2	10.1	31.9
			12358.4	25852.3	44 22.708	68 25.558					
11/4	4	FL04_64	12328.3	25752.9	44 12.924	68 03.962	0933	15	40.5	9.5	32.3
			12327.5	25755.9	44 13.353	68 04.463					
11/4	4	FL04_65	12314.3	25777.9	44 17.132	68 07.824	1123	20	35.0	9.4	32.1
			12308.4	25780.9	44 17.876	68 07.717					
11/4	4	FL04_66	12392.3	25708.6	44 03.532	68 03.136	1541	15	62.0	7.8	33.1
			12397.6	25708.4	44 03.162	68 03.749					
11/7	4	FL04_67	12275.1	25796.1	44 21.845	68 06.811	0755	17	29.2	9.2	32.2
			12279.4	25792.7	44 21.163	68 06.652					
11/7	4	FL04_68	12264.7	25824.9	44 25.935	68 11.132	0938	18	24.1	9.2	32.2
			12270.8	25824.7	44 25.484	68 11.776					

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11/7	4	FL04_69	12256.8	25833.2	44 27.084	68 11.176	1056	20	21.2	9.2	32.2
			12256.0	25825.6	44 26.544	68 10.310					
11/7	4	FL04_70	12257.0	25839.4	44 27.801	68 12.321	1255	20	11.5	8.9	32.1
			12263.9	25840.5	44 27.476	68 13.314					
11/7	4	FL04_71	12313.7	25791.4	44 18.770	68 10.323	1512	17	25.9	9.2	32.3
			12307.8	25793.9	44 19.458	68 10.120					
11/8	5	FL04_72	12248.3	25725.7	44 14.784	67 48.866	0957	20	46.6	8.1	33.0
			12247.9	25721.7	44 14.306	67 47.957					
11/8	5	FL04_73	12222.1	25723.7	44 16.237	67 45.099	1134	20	52.1	8.2	32.9
			12229.6	25721.5	44 15.465	67 45.513					
11/8	5	FL04_74	12190.7	25721.6	44 18.016	67 40.615	1321	20	46.9	8.6	32.7
			12184.9	25720.1	44 18.210	67 39.516					
11/9	5	FL04_75	12116.0	25788.6	44 31.670	67 45.865	0914	15	7.0	8.7	32.1
			12120.3	25785.8	44 30.439	67 45.639					
11/9	5	FL04_76	12184.6	25744.3	44 21.212	67 44.790	1124	20	34.6	8.7	32.2
			12192.7	25742.6	44 20.458	67 45.422					
11/9	5	FL04_77	12168.9	25741.0	44 21.834	67 42.072	1236	16	32.9	8.9	32.4
			12174.9	25740.8	44 21.400	67 42.787					
11/10	5	FL04_78	12150.8	25698.8	44 17.798	67 30.127	0937	20	58.1	8.1	33.0
			12157.4	25699.1	44 17.394	67 31.071					
11/10	5	FL04_79	12110.4	25688.5	44 19.198	67 22.150	1225	20	97.0	7.1	33.9
			12117.1	25687.4	44 18.596	67 22.817					
11/10	5	FL04_80	12081.6	25685.1	44 20.693	67 17.177	1355	20	77.4	7.1	33.7
			12087.7	25685.3	44 20.303	67 18.099					
11/18	5	FL04_81	11856.7	25736.3	44 43.000	66 57.211	0727	20	54.3	8.5	32.2
			11864.9	25733.7	44 41.980	66 57.712					
11/18	5	FL04_82	11844.1	25753.8	44 45.912	67 00.319	0906	20	38.0	8.5	32.3
			11837.2	25754.9	44 46.577	66 59.559					
11/18	5	FL04_83	11884.2	25736.8	44 41.008	67 01.889	1044	20	44.3	8.4	32.3
			11876.3	25738.9	44 41.836	67 01.280					
11/18	5	FL04_84	11945.8	25738.7	44 36.789	67 11.430	1519	20	50.6	NA	NA
			11938.9	25738.7	44 37.264	67 10.551					
11/19	5	FL04_85	11959.1	25766.1	44 39.166	67 20.442	0702	20	9.2	7.0	26.7
			11966.6	25762.6	44 38.202	67 20.585					
11/19	5	FL04_86	11975.3	25746.1	44 35.524	67 17.700	0848	16	24.3	8.3	32.4
			11981.3	25746.4	44 35.212	67 18.502					
11/19	5	FL04_87	12017.8	25720.4	44 29.492	67 16.976	1246	20	42.6	8.2	32.4
			12010.5	25720.5	44 29.998	67 15.966					

Spring 2005

5/2	1	SP05_1	13757.9	25963.5	42 55.64	70 45.13	0909	20	16.1	4.6	31.2
			13749.1	25962.6	42 56.22	70 44.43	0929				
5/2	1	SP05_2	13708.3	25899.8	42 53.88	70 36.10	1200	20	41.3	3.2	32.0
			13700.6	25899.6	42 54.46	70 35.47	1220				

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5/2	1	SP05_3	13779.2	25940.8	42 51.70	70 45.16	1351	20	18.1	3.5	31.6
			13771.4	25940.5	42 52.33	70 44.51	1411				
5/2	1	SP05_4	13698.4	25951.7	42 59.39	70 39.50	1551	20	16.0	3.5	31.5
			13706.3	25957.2	42 59.28	70 40.52	1611				
5/3	1	SP05_5	13647.2	25859.4	42 55.06	70 27.67	0756	19	45.0	3.4	32.0
			13645.7	25865.2	42 55.74	70 28.03	0815				
5/3	1	SP05_6	13633.8	25873.8	42 57.46	70 27.70	0916	20	55.2	3.4	32.0
			13641.0	25879.3	42 57.40	70 28.77	0936				
5/3	1	SP05_7	13606.1	25857.7	42 58.13	70 23.96	1131	20	66.1	3.3	32.1
			13605.6	25850.6	42 57.53	70 23.35	1151				
5/3	1	SP05_8	13648.5	25930.8	43 01.58	70 33.64	1410	17	30.0	3.6	31.9
			13644.1	25934.7	43 02.21	70 33.52	1427				
5/4	1	SP05_9	13856.8	25915.7	43 04.98	70 27.15	0739	20	44.4	3.3	31.4
			13595.1	25915.9	43 04.43	70 27.97	0759				
5/4	1	SP05_10	13590.2	25925.1	43 05.67	70 28.38	0951	20	37.8	3.4	31.9
			13598.5	25927.8	43 05.27	70 29.27	1011				
5/4	1	SP05_11	13526.7	25868.2	43 05.23	70 18.01	1149	20	74.2	3.8	32.4
			13531.3	25863.3	43 04.44	70 17.98	1209				
5/4	1	SP05_12	13540.2	25917.5	43 08.87	70 23.42	1353	20	47.7	3.2	32.1
			13531.8	25915.4	43 09.29	70 22.57	1413				
5/4	1	SP05_13	13541.4	25926.0	43 09.54	70 24.32	1536	20	44.0	3.4	31.9
			13534.7	25928.7	43 10.32	70 23.98	1556				
5/5	1	SP05_14	13526.5	26000.2	43 17.71	70 29.62	0758	20	18.8	4.2	31.5
			13534.7	26000.2	43 17.08	70 30.26	0818				
5/5	1	SP05_15	13376.8	25885.0	43 17.90	70 06.35	1246	20	81.3	3.9	30.4
			13381.4	25880.1	43 17.10	70 06.28	1306				
5/5	1	SP05_16	13346.7	25926.5	43 24.20	70 07.80	1446	20	56.1	3.6	32.1
			13346.8	25919.6	43 23.53	70 07.16	1506				
5/5	1	SP05_17	13370.0	25996.4	43 29.26	70 16.52	1703	15	22.6	4.2	31.6
			13373.1	25993.0	43 28.72	70 16.44	1718				
5/6	1	SP05_18	13401.2	25979.6	43 25.34	70 17.45	0755	19	33.7	4.0	31.7
			13393.2	25979.7	43 25.92	70 16.87	0814				
5/10	1	SP05_19	13390.4	26008.2	43 28.87	70 19.31	1029	20	17.1	5.7	30.7
			13391.7	26002.2	43 28.24	70 18.86	1049				
5/10	1	SP05_20	13329.4	25980.0	43 30.68	70 11.60	1059	20	34.8	5.0	31.5
			13338.1	25980.4	43 30.09	70 12.32	1119				
5/10	2	SP05_21	13296.4	25927.7	43 27.94	70 03.60	1321	20	64.0	4.0	31.9
			13288.3	25925.8	43 28.36	70 02.71	1341				
5/10	2	SP05_22	13261.8	25879.1	43 25.66	69 55.65	1500	20	84.3	3.9	32.3
			13269.5	25879.6	43 25.13	69 56.40	1520				
5/10	2	SP05_23	13235.5	25898.3	43 29.38	69 55.31	1619	20	68.1	3.8	32.2
			13243.7	25898.2	43 28.81	69 55.99	1639				
5/10	2	SP05_24	13256.8	25936.9	43 31.73	70 01.11	1737	20	55.5	4.1	31.9
			13264.8	25936.4	43 31.09	70 01.74	1757				
5/11	2	SP05_25	13292.8	26015.2	43 36.85	70 12.02	0655	20	8.7	6.2	29.8
			13298.6	26012.9	43 36.23	70 12.26	0715				

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			W	X	deg/min	deg/min	Time	Duration	Depth (FA)	C °	ppt
5/11	2	SP05_26	13246.7	26009.9	43 39.74	70 07.66	0937	10	15.0	5.9	30.3
			13242.7	26010.1	43 40.04	70 07.38	0947				
5/11	2	SP05_27	13188.6	25968.7	43 39.74	69 58.44	1141	20	29.4	4.9	31.1
			13183.1	25992.8	43 40.53	69 58.41	1201				
5/11	2	SP05_28	13153.0	25972.7	43 42 .66	69 55.83	1331	20	17.6	5.5	30.4
			13144.5	25972.0	43 43.19	69 55.03	1351		13.5		
5/11	2	SP05_29	13166.4	25923.5	43 36.71	69 51.75	1539	20	42.5	4.6	31.9
			13174.4	25923.3	43 36.15	69 52.40	1559		46.8		
5/12	2	SP05_30	13121.1	25920.6	43 39.57	69 47.44	0741	20	17.7	5.1	31.3
			13129.5	25919.2	43 38.86	69 47.99	0801		21.5		
5/12	2	SP05_31	13101.2	25923.4	43 41.25	69 45.97	0939	20	15.7	5.2	31.2
			13108.1	25920.7	43 40.51	69 46.27	0959		18.7		
5/12	2	SP05_32	13089.6	25922.3	43 41.96	69 44.82	1044	20	18.4	5.3	31.1
			13083.1	25925.5	43 42.73	69 44.58	1104		15.7		
5/12	2	SP05_33	13039.0	25937.4	43 47.02	69 42.04	1338	20	26.5	4.5	31.6
			13033.8	25941.2	43 47.77	69 42.02	1358		26.2		
5/12	2	SP05_34	13031.3	25916.1	43 45.31	69 38.93	1510	20	32.0	4.8	31.8
			13036.9	25912.7	43 44.60	69 39.03	1530		35.6		
5/13	2	SP05_35	12937.8	25903.6	43 50.36	69 28.98	0725	18	33.8	4.3	31.7
			12943.8	25901.4	43 49.74	69 29.25	0743		37.7		
5/13	2	SP05_36	12860.0	25910.0	43 56.70	69 22.81	1003	20	9.3	5.0	30.8
			12855.2	25914.2	43 57.13	69 22.91	1023		7.0		
5/13	2	SP05_37	12913.5	25862.5	43 47.76	69 21.81	1205	20	38.9	4.9	31.6
			12906.0	25864.6	43 48.44	69 21.38	1225		40.1		
5/13	2	SP05_38	12963.6	25874.5	43 45.65	69 27.99	1435	20	45.3	5.0	31.8
			12957.2	25877.6	43 46.42	69 27.77	1455		42.7		
5/14	2	SP05_39	13006.4	25863.9	43 41.65	69 30.72	0839	19	62.6	4.6	31.5
			13012.7	25860.6	43 40.82	69 30.75	0858		66.5		
5/14	2	SP05_40	12980.1	25838.1	43 40.74	69 25.16	1054	20	60.5	4.3	32.0
			12973.5	25841.1	43 41.47	69 24.90	1114		57.5		
5/14	2	SP05_41	12925.6	25843.7	43 44.91	69 20.63	1330	20	60.8	4.9	31.8
			12929.5	25838.8	43 44.15	69 20.40	1350		52.3		
5/16	2	SP05_42	12924.8	25864.0	43 47.14	69 23.08	0707	20	43.6	4.9	31.7
			12931.1	25861.1	43 46.42	69 23.32	0727		47.4		
5/16	3	SP05_43	12829.7	25862.8	43 53.20	69 13.81	0950	20	31.5	4.9	31.4
			12838.3	25862.4	43 52.60	69 14.55	1010		34.3		
5/16	3	SP05_44	12776.1	25852.1	43 55.55	69 07.20	1220	20	19.2	5.5	31.0
			12784.3	25853.2	43 55.14	69 08.14	1240		19.6		
5/16	3	SP05_45	12789.1	25826.1	43 51.87	69 04.93	1453	20	35.0	5.2	31.5
			12782.7	25829.8	43 52.68	69 04.80	1513		30.5		
5/16	3	SP05_46	12770.6	25819.3	43 52.32	69 02.15	1624	20	27.2	5.3	31.4
			12765.9	25823.0	43 53.10	69 02.38	1644		26.8		
5/17	3	SP05_47	12660.3	25910.9	44 09.67	69 04.47	0651	20	12.0	4.8	30.8
			12665.1	25906.3	44 08.87	69 04.29	0711		12.0		
5/17	3	SP05_48	12645.7	25893.4	44 08.72	69 00.56	0805	20	34.5	4.5	31.0
			12654.1	25892.3	44 08.03	69 01.24	0825		29.2		

Appendix A
Individual Station Descriptions

DATE	REGION	TOWID	LORAN	LORAN	LAT	LON	Start	Tow	Average	Temp	Salinity
			W	X	deg/min	deg/min	Time	Duration	Depth (FA)	C °	ppt
5/17	3	SP05_49	12542.2	25911.5	44 17.39	68 53.19	1012	16	15.9	4.6	30.8
			12548.6	25909.3	44 16.75	68 53.48	1028		15.5		
5/17	3	SP05_50	12521.3	25911.7	44 18.77	68 51.25	1225	20	21.6	5.0	30.9
			12529.5	25909.7	44 18.04	68 51.72	1245		26.1		
5/17	3	SP05_51	12507.1	25869.5	44 15.03	68 43.43	1420	20	6.5	5.1	30.3
			12498.5	25870.4	44 15.69	68 42.73	1440		7.9		
5/18	3	SP05_52	12875.3	25819.7	43 45.58	69 12.59	0816	20	49.3	4.9	31.7
			12874.6	25825.1	43 46.20	69 13.22	0836		47.4		
5/18	3	SP05_53	12833.4	25800.6	43 46.29	69 06.10	0953	20	47.8	4.8	31.6
			12841.4	25803.9	43 46.06	69 07.16	1013		52.2		
5/18	3	SP05_54	12848.1	25720.6	43 36.48	68 56.56	1246	20	70.1	4.2	32.2
			12840.3	25722.9	43 37.19	68 56.07	1306		72.2		
5/18	3	SP05_55	12907.2	25740.3	43 34.92	69 05.44	1449	20	77.3	4.1	28.6
			12899.8	25738.1	43 35.12	69 04.43	1509		76.5		
5/19	3	SP05_56	12681.2	25718.8	43 46.71	68 38.25	0830	20	67.5	4.9	32.5
			12689.7	25718.9	43 46.19	68 39.19	0850		66.5		
5/19	3	SP05_57	12696.6	25731.7	43 47.22	68 41.92	1021	18	57.5	4.7	31.9
			12704.2	25731.3	43 46.72	68 42.65	1039		53.7		
5/20	3	SP05_58	12618.1	25756.8	43 55.06	68 37.33	0757	20	49.1	4.8	32.3
			12626.3	25756.2	43 54.48	68 38.13	0817		51.3		
5/20	3	SP05_59	12659.2	25780.3	43 55.12	68 45.24	0939	20	53.5	5.0	31.4
			12665.0	25777.0	43 54.40	68 45.34	0959		48.8		
5/20	3	SP05_60	12662.3	25789.3	43 55.96	68 46.92	1234	20	44.9	5.1	31.5
			12668.8	25786.4	43 55.22	68 47.15	1254		52.1		
5/20	3	SP05_61	12659.3	25828.2	44 00.55	68 52.44	1411	20	29.5	5.6	31.2
			12656.8	25823.1	44 00.14	68 51.45	1431		28.6		
5/20	3	SP05_62	12568.6	25841.6	44 07.95	68 45.33	1658	20	34.3	5.9	30.9
			12565.9	25846.4	44 08.68	68 45.69	1718		27.2		
5/30	4	SP05_63	12485.8	25811.9	44 09.80	68 32.02	0706	18	15.9	6.6	30.6
			12493.5	25811.4	44 09.27	68 32.75	0724		12.7		
5/30	4	SP05_64	12558.0	25772.2	44 00.65	68 33.23	1237	20	41.3	5.0	31.5
			12549.7	25772.8	44 01.24	68 32.46	1257		39.1		
5/30	4	SP05_65	12513.4	25758.8	44 00.72	68 24.46	1452	20	46.4	NA	NA
			12510.1	25753.2	44 01.45	68 24.85	1512		46.5		
5/30	4	SP05_66	12552.5	25739.2	43 57.10	68 27.11	1630	20	54.1	4.9	31.9
			12558.2	25739.9	43 56.83	68 27.83	1645		53.7		
5/31	4	SP05_67	12500.3	25722.2	43 58.39	68 18.50	0916	20	56.5	4.9	31.9
			12507.3	25722.9	43 58.04	68 19.42	0936		56.3		
5/31	4	SP05_68	12489.4	25711.3	43 57.78	68 15.31	1101	20	53.4	5.1	32.1
			12494.3	25714.3	43 57.83	68 16.39	1121		53.2		
5/31	4	SP05_69	12520.0	25701.3	43 54.70	68 17.15	1255	20	63.3	5.2	29.8
			12517.7	25706.0	43 55.39	68 17.68	1315		61.3		
5/31	4	SP05_70	12449.7	25716.9	44 00.93	68 11.61	1502	20	53.5	4.9	32.0
			12452.0	25721.1	44 01.29	68 12.63	1522		57.6		
6/1	4	SP05_71	12422.3	25845.3	44 17.77	68 31.03	0717	20	20.5	6.3	30.5
			12427.3	25840.9	44 16.94	68 30.75	0737		17.2		

Appendix A
Individual Station Descriptions

DATE	REGION	TOWID	LORAN	LORAN	LAT	LON	Start	Tow	Average	Temp	Salinity
			W	X	deg/min	deg/min	Time	Duration	Depth (FA)	C °	ppt
6/1	4	SP05_72	12417.9	25834.4	44 16.77	68 28.62	0853	16	19.2	6.4	30.5
			12417.9	25830.4	44 16.33	68 27.98	0909		17.7		
6/1	4	SP05_73	12432.3	25807.6	44 12.77	68 25.59	1055	19	17.5	6.5	30.5
			12439.5	25807.5	44 12.28	68 26.37	1114		12.3		
6/1	4	SP05_74	12414.8	25759.1	44 08.18	68 15.20	1339	17	27.7	5.2	31.1
			12412.7	25762.6	44 08.72	68 15.59	1356		22.9		
6/1	4	SP05_75	12399.2	25782.2	44 12.23	68 18.32	1547	18	18.1	NA	NA
			12399.9	25786.3	44 12.64	68 19.07	1605		13.7		
6/2	4	SP05_76	12391.0	25689.7	44 01.28	67 59.32	0829	20	90.0	5.6	33.0
			12391.5	25693.9	44 01.76	68 00.21	0849		79.9		
6/2	4	SP05_77	12392.3	25708.4	44 03.52	68 03.09	0949	20	60.0	5.4	32.9
			12400.0	25708.0	44 02.96	68 03.95	1009		65.5		
6/2	4	SP05_78	12322.1	25723.2	44 09.72	67 57.43	1220	20	47.8	4.9	32.0
			12329.8	25722.1	44 09.10	67 58.12	1240		44.9		
6/2	5	SP05_79	12288.8	25727.0	44 12.32	67 54.04	1400	20	42.5	5.0	32.2
			12290.1	25722.7	44 11.71	67 53.34	1420		43.8		
6/2	4	SP05_80	12327.8	25752.3	44 12.88	68 03.77	1546	20	43.1	5.0	31.4
			12327.6	25756.9	44 13.43	68 04.61	1606		40.0		
6/3	4	SP05_81	12294.5	25801.1	44 21.19	68 09.98	0744	20	28.3	5.6	30.8
			12289.8	25805.4	44 21.94	68 10.19	0804		26.9		
6/3	4	SP05_82	12308.4	25780.6	44 17.84	68 07.66	0913	20	35.6	5.1	31.1
			12314.4	25777.4	44 17.07	68 07.74	0933		36.8		
6/3	4	SP05_83	12323.9	25767.3	44 14.95	68 06.20	1045	20	36.5	5.3	31.3
			12316.5	25767.1	44 15.70	68 06.00	1105		35.7		
6/3	4	SP05_84	12288.7	25769.0	44 17.70	68 03.16	1157	20	33.6	5.2	31.2
			12296.8	25769.5	44 16.94	68 03.47	1217		36.3		
6/6	5	SP05_85	12218.9	25770.5	44 22.11	67 54.50	0739	20	20.5	5.5	31.1
			12214.9	25774.3	44 22.84	67 54.81	0759		20.8		
6/6	5	SP05_86	12228.3	25749.9	44 19.02	67 51.36	1244	20	32.9	5.4	31.3
			12222.1	25752.7	44 19.76	67 51.19	1304		31.8		
6/6	5	SP05_87	12258.9	25734.9	44 15.21	67 52.11	1424	20	40.3	5.1	31.7
			12267.0	25734.8	44 14.69	67 53.00	1544		37.7		
6/6	5	SP05_88	12289.3	25727.1	44 12.30	67 54.16	1552	20	43.0	5.2	32.6
			12289.9	25723.2	44 11.80	67 53.48	1612		44.1		
6/7	5	SP05_89	12209.7	25726.3	44 17.35	67 44.07	0828	20	46.7	5.1	31.9
			12215.3	25723.3	44 16.61	67 44.13	0848		48.4		
6/7	5	SP05_90	12192.0	25721.3	44 17.94	67 40.72	0941	20	46.4	5.1	31.8
			12185.7	25720.6	44 18.21	67 39.72	1001		50.0		
6/7	5	SP05_91	12169.8	25739.0	44 21.53	67 41.71	1148	20	36.2	5.5	31.6
			12162.8	25738.3	44 21.90	67 40.69	1208		35.1		
6/7	5	SP05_92	12135.0	25766.0	44 27.12	67 43.26	1403	20	20.1	5.7	31.0
			12130.2	25769.4	44 27.83	67 43.40	1423		20.0		
6/8	5	SP05_93	12152.8	25711.3	44 19.19	67 33.29	0744	20	47.5	5.1	32.1
			12159.9	25711.1	44 18.73	67 34.18	0804		47.3		
6/8	5	SP05_94	12149.2	25699.1	44 17.93	67 29.94	0906	20	63.1	5.2	32.1
			12155.8	25699.0	44 17.48	67 30.83	0926		57.1		

Appendix A
Individual Station Descriptions

DATE	REGION	TOWID	LORAN	LORAN	LAT	LON	Start	Tow	Average	Temp	Salinity
			W	X	deg/min	deg/min	Time	Duration	Depth (Ft)	C °	ppt
6/8	5	SP05_95	12150.5	25686.1	44 16.20	67 27.06	1120	20	108.0	5.7	33.2
			12157.6	25684.3	44 15.52	67 27.61	1140		105.0		
6/8	5	SP05_96	12184.9	25680.8	44 13.40	67 30.44	1253	20	102.0	5.6	33.2
			12177.4	25680.5	44 13.77	67 29.49	1313		104.0		
6/8	5	SP05_97	12081.8	25685.1	44 20.67	67 17.23	1545	20	77.7	5.4	32.9
			12088.4	25685.3	44 20.26	67 18.20	1605		80.0		
6/9	5	SP05_98	11862.9	25733.1	44 42.16	66 57.54	0928	16	54.3	5.6	31.3
			11857.2	25734.7	44 42.77	66 57.12	0944		56.4		
6/9	5	SP05_99	11924.2	25729.9	44 37.12	67 05.74	1230	19	49.7	5.6	31.4
			11917.8	25730.6	44 37.78	67 05.22	1249		49.2		
6/9	5	SP05_100	11941.1	25738.2	44 37.03	67 10.75	1529	20	50.2	5.6	31.5
			11948.3	25738.5	44 36.58	67 11.72	1549		50.9		
6/9	5	SP05_101	11940.1	25743.7	44 37.74	67 12.09	1736	19	37.7	5.6	31.3
			11947.5	25743.0	44 37.20	67 12.81	1755		36.0		
6/10	5	SP05_102	11980.7	25745.4	44 35.13	67 18.10	0843	20	27.8	5.8	31.4
			11973.4	25744.7	44 35.56	67 16.95	0903		32.7		
6/10	5	SP05_103	12011.5	25765.9	44 35.45	67 27.39	1209	20	9.2	6.5	31.0
			12004.9	25765.3	44 35.85	67 26.41	1229		9.9		
6/10	5	SP05_104	12042.1	25748.0	44 31.19	67 27.11	1421	20	27.5	5.7	31.4
			12035.0	25749.0	44 31.78	67 26.42	1441		28.3		

Appendix B
Survey Catch Index

Stratified Means for Selected Species	2000-2001		2001-2002		2002-2003		2003-2004		2004-2005	
	Mean Number	SE								

Stratified means were calculated using all stations sampled, fixed and random. We are currently updating our database to easily calculate stratified statistics on the random stations only.

Fall Surveys*

Acadian Redfish	0.61	0.20	6.87	2.15	2.57	0.96	17.12	13.53	19.76	6.62
Aesop Shrimp	12.13	5.58	122.47	29.02	296.43	85.14	215.53	73.35	882.04	321.50
Alewife	224.83	75.05	144.61	51.85	367.11	110.27	184.13	53.51	237.59	52.54
Alligatorfish	0.31	0.19	0.33	0.13	1.73	0.88	0.07	0.03	0.68	0.48
American Lobster	113.35	21.02	115.58	22.05	127.28	23.98	89.71	9.21	71.25	10.98
American Plaice	22.35	6.25	21.91	1.86	14.51	2.48	45.86	5.86	38.33	3.72
American Shad	0.57	0.18	0.22	0.10	1.16	0.41	6.38	4.78	0.99	0.36
Atlantic Cod	4.03	1.90	3.31	0.63	0.93	0.22	3.93	0.69	2.36	0.81
Atlantic Halibut	0.16	0.06	0.22	0.08	0.16	0.04	0.16	0.04	0.19	0.08
Atlantic Herring	898.13	301.94	717.91	178.36	1132.48	374.71	439.70	160.88	693.46	229.44
Atlantic Mackerel	2.14	0.94	11.61	6.23	14.47	6.33	25.91	8.95	7.01	3.88
Atlantic Menhaden	17.14	6.23			43.47	16.76	11.40	2.87	1.99	0.93
Atlantic Silverside	4.73	1.29	0.19	0.12	1.38	0.36	3.29	2.06	1.31	0.44
Atlantic Sturgeon	0.05	0.05	0.19	0.22	0.13	0.10			0.01	0.01
Atlantic Wolffish									0.01	0.01
Blueback Herring		0.00		0.00	4.20	1.53	7.65	2.62	5.02	1.48
Bristled Longbeak	89.04	22.81	151.04	31.36	554.11	132.51	311.60	41.04	447.65	55.56
Butterfish	2.23	0.77	11.88	3.22	51.32	14.89	14.27	4.36	43.88	6.94
Cunner	0.20	0.11	0.10	0.06	1.22	1.02	1.32	0.74	1.99	1.37
Daubed Shanny		0.00	0.01	0.01		0.00			0.00	
Fourbeard Rockling	0.34	0.09	1.50	0.33	1.09	0.22	1.96	0.34	2.19	0.37
Fourspot Flounder	0.23	0.07	0.52	0.12	0.09	0.03	0.21	0.09	0.06	0.02
Goosefish	4.73	0.60	12.61	1.21	3.73	0.76	3.66	0.53	3.31	0.52
Greenland Halibut			0.03	0.02	0.04	0.02	0.03	0.02	0.02	0.02
Haddock	3.90	1.22	6.06	1.91	0.35	0.13	6.34	2.36	3.32	1.05
Jonah Crab	1.77	0.36	14.97	1.62	5.99	1.55	5.53	0.89	10.31	1.75
Little Skate	2.44	1.14	1.90	0.35	2.90	1.69	0.87	0.20	0.94	0.21
Longfin Squid	4.59	1.17	15.33	2.76	24.12	4.09	2.16	0.79	14.63	5.23
Longhorn Sculpin	32.13	7.27	24.81	4.65	46.25	6.56	29.39	3.45	23.85	3.82
Lumpfish	0.04	0.02	0.14	0.05	0.16	0.05	0.51	0.22	0.32	0.07
Northern Shrimp	87.55	50.72	48.02	20.34	30.74	13.78	244.50	59.36	294.20	83.47
Ocean Pout	0.07	0.03	0.36	0.12	0.02	0.02	0.11	0.04	0.33	0.19
Octopus unclass.	0.09	0.05	0.28	0.06	0.35	0.17	0.08	0.05	0.15	0.11
Pollock	2.19	1.21	0.32	0.07	4.90	2.93	0.69	0.25	0.22	0.08
Rainbow Smelt	51.10	24.06	63.70	26.17	31.99	20.90	31.33	8.34	49.11	17.49
Red Hake	26.19	3.21	36.69	4.16	19.20	2.63	28.15	2.28	14.23	1.67
Rock Crab	2.82	1.09	6.61	1.79	1.79	0.50	1.25	0.44	4.27	0.87
Scup	6.69	1.93			1.53	0.85	1.38	1.02	66.88	49.07
Sea Cucumber	0.81	0.36	3.55	3.45	2.81	0.07	0.16	0.16	1.10	0.65
Sea Raven	1.78	0.28	1.16	0.42	2.06	0.63	1.18	0.34	1.25	0.34

Appendix B
Survey Catch Index

Stratified Means for Selected Species	2000-2001		2001-2002		2002-2003		2003-2004		2004-2005	
	Mean Number	SE								

Sea Scallop	39.34	11.08	33.82	8.25	7.64	1.80	3.34	1.32	2.60	0.96
Sevenspine Bay Shrimp	25.22	9.75	51.32	27.97	558.70	334.20	303.30	185.80	204.61	107.59
Shortfin Squid	1.25	0.75	1.26	0.19	0.95	0.20	2.50	0.48	1.85	0.42
Shorthorn Sculpin	0.30	0.12	0.09	0.08	0.41	0.24	0.05	0.02	0.23	0.07
Silver Hake	782.02	74.43	744.53	104.06	507.60	79.77	1066.49	90.00	363.36	49.13
Smooth Skate	0.20	0.08	0.43	0.16	0.15	0.08	0.23	0.08	0.28	0.06
Snakeblenny			0.00	0.03	0.02	0.09	0.05	0.02	0.07	0.04
Spiny Dogfish	3.92	0.52	8.85	2.05	14.15	2.08	18.72	3.02	54.96	11.66
Spotted Hake	0.01	0.01	0.02	0.02	0.01	0.01	0.02	0.02		
Thorny Skate	0.26	0.07	0.23	0.10	0.36	0.16	0.47	0.12	0.57	0.17
White Hake	12.66	1.12	18.93	2.22	23.26	1.87	32.05	2.79	17.52	2.30
Windowpane	4.15	0.65	2.22	0.66	13.12	2.77	8.01	1.49	2.65	0.68
Winter Flounder	37.05	3.13	31.73	4.34	33.02	5.13	32.35	5.05	32.08	5.44
Winter Skate	0.26	0.09	0.11	0.06	0.39	0.13	0.11	0.05	0.28	0.14
Witch Flounder	3.79	0.70	32.55	4.54	4.47	0.90	7.30	1.15	10.29	1.88
Wrymouth	0.15	0.09	0.45	0.12	0.06	0.03	1.11	0.72	1.34	0.77
Yellowtail Flounder	2.51	1.27	1.44	0.49	0.83	0.27	0.61	0.41	0.96	0.33

Spring Surveys*

Acadian Redfish	1.83	0.47	1.65	0.31	6.93	2.63	2.57	0.94	2.78	0.52
Aesop Shrimp	237.89	59.41	794.56	245.97	616.69	101.14	1666.71	509.95	1360.53	223.52
Alewife	187.53	50.02	160.12	40.14	118.96	20.55	85.87	11.75	133.43	19.97
Alligatorfish	1.99	0.87	1.58	0.77	1.30	0.68	1.46	0.66	1.69	0.74
American Lobster	45.80	6.66	100.06	13.63	43.95	6.40	34.32	6.31	69.90	10.48
American Plaice	16.43	2.86	33.84	3.37	58.71	13.91	45.46	5.63	54.03	4.55
American Sand Lance	13.82	9.62	0.43	0.42	0.03	0.02	0.08	0.05	0.03	0.03
American Shad	1.00	0.27	2.82	0.50	1.51	0.28	0.48	0.10	2.46	0.64
Atlantic Cod	1.83	0.38	7.05	2.67	1.60	0.29	8.26	1.69	4.65	1.66
Atlantic Halibut	0.04	0.02	0.34	0.12	0.21	0.06	0.19	0.05	0.28	0.06
Atlantic Herring	776.18	242.17	1446.98	399.16	2179.91	425.63	2462.28	492.67	1317.39	489.67
Atlantic Mackerel			0.02	0.02	0.37	0.37				
Atlantic Silverside	0.01	0.01					0.01	0.01		
Atlantic Sturgeon			0.02	0.02	0.02	0.01			0.01	0.01
Atlantic Wolffish			0.41	0.14					0.02	0.01
Blueback Herring	49.69	17.55	9.89	4.66	42.74	14.71	7.99	1.62	7.51	1.32
Bristled Longbeak	237.34	37.97	251.32	52.23	305.24	32.71	226.22	26.61	230.33	24.67
Butterfish	0.04	0.03	0.03	0.02						
Cunner	0.05	0.02	0.04	0.02	0.04	0.02	0.14	0.05	0.15	0.04
Cusk					0.01	0.01				
Daubed Shanny	0.60	0.14	0.08	0.03	0.04	0.02	0.43	0.14	1.63	0.30
Fourbeard Rockling	0.41	0.15	0.69	0.16	1.03	0.27	0.84	0.18	1.67	0.40
Fourspot Flounder	0.07	0.03	0.08	0.03	0.09	0.04	0.11	0.04	0.05	0.02
Goosefish	6.11	0.76	2.23	0.29	0.99	0.13	1.59	0.18	1.18	0.13
Greenland Halibut			0.02	0.01	0.09	0.03	0.04	0.03	0.03	0.02

Appendix B
Survey Catch Index

Stratified Means for Selected Species	2000-2001		2001-2002		2002-2003		2003-2004		2004-2005	
	Mean Number	SE								
Haddock	0.01	0.01	4.90	1.45	0.64	0.25	1.50	0.39	0.67	0.19
Jonah Crab	4.27	1.19	3.87	0.94	4.70	0.59	6.06	1.27	15.87	4.63
Little Skate	0.72	0.17	0.49	0.11	0.56	0.13	0.58	0.16	0.37	0.09
Longfin Squid	0.06	0.02	0.20	0.07	0.12	0.04	0.03	0.02	0.02	0.01
Longhorn Sculpin	51.15	5.30	53.78	8.88	47.11	4.76	74.43	7.18	39.84	3.24
Lumpfish	0.10	0.03	0.09	0.03	0.33	0.11	0.14	0.04	0.16	0.05
Northern Shrimp	248.05	38.32	152.70	51.77	549.88	63.68	676.61	89.57	1483.24	132.66
Ocean Pout	0.48	0.13			0.30	0.08	0.63	0.15	0.58	0.14
Octopus unclass.	0.50	0.23	0.07	0.04	0.02	0.01	0.02	0.02		
Pollock	0.38	0.11	1.18	0.33	0.76	0.39	1.54	0.38	0.31	0.28
Radiated Shanny	0.06	0.04			0.01	0.01	0.02	0.01	0.08	0.03
Rainbow Smelt	8.78	5.63	0.76	0.26	1.08	0.38	6.75	3.92	2.78	0.82
Red Hake	5.30	0.88	10.34	1.25	9.09	1.10	6.54	2.31	5.69	0.64
Rock Crab	10.32	1.89	1.33	0.26	5.32	1.70	3.50	0.86	3.52	0.90
Sea Cucumber	8.41	7.20	3.76	2.89	1.87	0.98	17.11	13.66	2.98	2.03
Sea Raven	2.98	0.68	2.58	0.58	2.06	0.47	2.12	0.38	2.44	0.37
Sea Scallop	30.41	6.43	16.54	4.18	4.38	1.01	1.31	0.32	0.59	0.17
Sea Urchin	0.30	0.18	0.02	0.02	0.14	0.09	0.35	0.31	0.34	0.16
Sevenspine Bay Shrimp	27.01	6.91	32.94	13.35	68.24	17.06	48.30	16.16	106.67	27.66
Shortfin Squid	0.02	0.01	0.02	0.01						
Shorthorn Sculpin	0.19	0.06	0.05	0.03	0.14	0.07	0.05	0.03	0.71	0.30
Silver Hake	95.39	10.01	267.77	88.36	439.51	75.28	167.33	42.02	50.05	8.21
Smooth Skate	0.22	0.07	0.22	0.18	0.07	0.03	0.52	0.32	0.23	0.07
Snakeblenny	0.55	0.19	0.28	0.10	0.69	0.19	1.16	0.28	1.53	0.28
Spiny Dogfish			0.10	0.04	0.15	0.10				
Thorny Skate	0.41	0.17	0.09	0.04	0.44	0.13	0.51	0.12	0.33	0.08
White Hake	1.01	0.22	2.14	0.36	1.82	0.36	3.00	0.56	4.17	0.58
Windowpane	5.82	1.45	2.82	0.49	7.46	1.15	4.10	0.54	3.22	0.75
Winter Flounder	30.41	3.46	24.47	3.54	18.60	2.52	40.28	4.81	25.66	3.27
Winter Skate	0.02	0.01	0.01	0.01	0.07	0.04	0.09	0.04	0.06	0.06
Witch Flounder	4.28	1.01	1.87	0.76	2.00	0.50	1.84	0.38	7.61	1.05
Wolf Eelpout	0.05	0.04			0.02	0.02	0.01	0.01	0.01	0.01
Wrymouth	0.17	0.07	0.11	0.04	0.99	0.37	0.46	0.15	0.30	0.10
Yellowtail Flounder	2.64	1.50	3.21	0.63	1.85	0.35	1.72	0.32	1.57	0.33

*Due to an error in the calculations of strata sizes, the means and errors reported in this table may differ from those published in a previous report. The error was only one of measurement; neither the total area covered nor the individual stratum sizes have changed.

Appendix C Taxa List

The following is a list of taxa we have encountered in all surveys conducted since 2000.

Finfish species

Flatfish

Atlantic halibut	<i>Hippoglossus hippoglossus</i>
Greenland halibut	<i>Reinhardtius hippoglossoides</i>
American plaice	<i>Hippoglossoides platessoides</i>
Summer flounder	<i>Paralichthys dentatus</i>
Four-spot flounder	<i>Paralichthys oblongus</i>
Yellowtail flounder	<i>Limanda ferruginea</i>
Winter flounder	<i>Pseudopleuronectes americanus</i>
Witch flounder	<i>Glyptocephalus cynoglossus</i>
Windowpane	<i>Scophthalmus aquosus</i>
Gulf Stream flounder	<i>Citharichthys arctifrons</i>

Gadids

Atlantic cod	<i>Gadus morhua</i>
Haddock	<i>Melanogrammus aeglefinus</i>
Pollock	<i>Pollachius virens</i>
Silver hake	<i>Merluccius bilinearis</i>
Cusk	<i>Brosme brosme</i>
White hake	<i>Urophycis tenuis</i>
Red hake	<i>Urophycis chuss</i>
Spotted hake	<i>Urophycis regia</i>
Four-beard rockling	<i>Enchelyopus cimbricus</i>

Other Benthics

Acadian redfish	<i>Sebastes fasciatus</i>
Ocean pout	<i>Macrozoarces americanus</i>
Goosefish	<i>Lophius americanus</i>
Spiny dogfish	<i>Squalus acanthias</i>
Atlantic hagfish	<i>Mxyine glutinosa</i>
Sea raven	<i>Hemitripterus americanus</i>
Alligatorfish	<i>Aspidophoroides monopterygius</i>
Lumpfish	<i>Cyclopterus lumpus</i>
Atlantic torpedo	<i>Torpedo nobiliana</i>
Winter skate	<i>Raja ocellata</i>
Little skate	<i>Raja senta</i>
Smooth skate	<i>Raja radiata</i>
Thorny skate	<i>Raja laevis</i>
Barndoor skate	<i>Myoxocephalus octodecemspinosus</i>
Longhorn sculpin	<i>Myoxocephalus scorpius</i>
Shorthorn sculpin	<i>Triglops murrayi</i>
Moustache sculpin	<i>Prionotus carolinus</i>
Northern searobin	<i>Lumpenus lumpretaeformis</i>
Snakeblenny	

Appendix C Taxa List

Daubed shanny	<i>Lumpenus maculatus</i>
American sand lance	<i>Ammodytes americanus</i>
Atlantic silverside	<i>Menidia menidia</i>
Three-spine stickleback	<i>Gasterosteus aculeatus</i>
Black sea bass	<i>Centropristes striata</i>
Atlantic tomcod	<i>Microgadus tomcod</i>
Cunner	<i>Tautogolabrus adspersus</i>
Grubby	<i>Myoxocephalus aenaeus</i>
Slender snipe eel	<i>Nemichthys scolopaceus</i>
Striped seasnail	<i>Liparis liparis</i>
Seasnail	<i>Liparis atlanticus</i>
Gulf seasnail	<i>Liparis coheni</i>
Gelationous seasnail	<i>Liparis fabricii</i>
Radiated shanny	<i>Ulvaria subbifurcata</i>
Rock gunnel	<i>Pholis gunnellus</i>
Wolf eelpout	<i>Lycenchelys verrillii</i>
Pearlsides	<i>Maurolicus muelleri</i>
Wrymouth	<i>Cryptacanthodes maculatus</i>
Sturgeon	<i>Acipenser spp.</i>
Sea Lamprey	<i>Petromyzon marinus</i>
American eel	<i>Anguilla rostrata</i>
Atlantic wolffish	<i>Anarhicas lupus</i>

Pelagics

Atlantic herring	<i>Clupea harengus</i>
Alewife	<i>Alosa pseudoharengus</i>
Blueback herring	<i>Alosa aestivalis</i>
American shad	<i>Alosa sapidissima</i>
Atlantic menhaden	<i>Brevoortia tyrannus</i>
Rainbow smelt	<i>Osmerus mordax</i>
Buckler dory	<i>Zenopsis conchifera</i>
Atlantic mackerel	<i>Scomber scombrus</i>
Butterfish	<i>Peprilus triacanthus</i>
Capelin	<i>Mallotus villosus</i>
Scup	<i>Stenotomas chrysops</i>
Rough scad	<i>Trachurus lathami</i>
Round scad	<i>Decapterus punctatus</i>
Bigeye scad	<i>Selar crumenophthalmus</i>
Atlantic moonfish	<i>Vomer setapinnis</i>
Short Bigeye	<i>Pristigenys alta</i>
Silver anchovy	<i>Engraulis eurystole</i>
Barracudina sp.	<i>Paralepididae spp.</i>

Invertebrates

Crustaceans

American lobster

Homarus americanus

Appendix C Taxa List

Green crab	<i>Carcinus maenus</i>
Hermit crab (unclass.)	<i>Diogenidae/Paguridae spp</i>
Jonah crab	<i>Cancer borealis</i>
Northern stone crab	<i>Lithodes sp.</i>
Red Crab	<i>Geryon quinquedens</i>
Rock crab	<i>Cancer irroratus</i>
Snow crab	<i>Chionectes opilio</i>
Spider crab (unclass.)	<i>Majidae spp.</i>
Aesop shrimp	<i>Pandalus montagui</i>
Arctic Eualid	<i>Eaulus fabricii</i>
Lobster shrimp	<i>Axius serratus</i>
Bristled longbeak	<i>Dichelopandalus leptocerus</i>
Krill	<i>Euphausid spp.</i>
Northern shrimp	<i>Pandalus borealis</i>
Mantis shrimp	<i>Stomatopod sp.</i>
Pink glass shrimp	<i>Pasiphaea multidentata</i>
Polar Lebbeid	<i>Lebbeus polaris</i>
Propinquus	<i>Pandalus propinquus</i>
Sevenspine bay shrimp	<i>Crangon septemspinosa</i>
Spiny Lebbeid	<i>Lebbeus groenlandicus</i>

Molluscs

Blue mussel	<i>Mytilus edulis</i>
Sea scallop	<i>Placopecten magelanicus</i>
Iceland scallop	<i>Chlamys islandica</i>
Horse mussel	<i>Modiolus modiolus</i>
Ocean quahog	<i>Arctica islandica</i>
False quahog	<i>Pitar morrhua</i>
Northern Cardita	<i>Venerocardia borealis</i>
Ax head clam	<i>Yoldia thraciaeformis</i>
Waved Astarte	<i>Astarte undata</i>
Squid (unclass.)	<i>Rossia spp.</i>
Shortfin squid	<i>Illex illecebrosus</i>
Longfin squid	<i>Loligo pealei</i>
Octopus (unclass.)	<i>Cephalopoda spp.</i>
Ten-Ridged whelk	<i>Neptunea decemcostata</i>
Stimpson's whelk	<i>Colus stimpsoni</i>
Quahog	<i>Mercenaria mercenaria</i>
Waved whelk	<i>Buccinum undatum</i>

Others

Sand dollar	<i>Echinoidae sp.</i>
Sea urchin	<i>Strongylocentrotus droebachiensis</i>
Starfish (unclass.)	various species

Appendix C

Taxa List

Boreal Asterias	<i>Asterias vulgaris</i>
Sea sponges	various species
Rat-tail cucumber	<i>Caudina arenata</i>
Sea cucumber	<i>Cucumaria frondosa</i>
Anemone	various species
Barnacle	various species