Annual Report on the Maine-New Hampshire Inshore Trawl Survey

January 1, 2009-December 31, 2009

Contract # NA07NMF4720357

Submitted to the NOAA Fisheries Northeast Region
Cooperative Research Partners Program

By

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July 2010

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ACKNOWLEDGEMENTS

The Maine-New Hampshire Inshore Trawl Survey is a complex project that benefits from the assistance of many people. Without their help the surveys could not be successfully completed.

We would like to thank the Maine DMR and New Hampshire F&G staff that helped with the mailings, car shuttles, web site, and contributed to the data collection and entry. We appreciate the hard work put in by the crew of the F/V Robert Michael, Captain Robert Tetrault II, and crewmembers Andrew Langella, Steve Train, and Kris Weeks. Jeff Flagg and Danny Libby provided invaluable assistance by mending and transporting nets to keep the survey running on schedule, and storing gear during the off-season.

Thanks to science crewmembers, Trisha deGraaf, Melissa Smith, Kathleen Reardon, Lisa Pinkham, James Becker, Claire Enterline, Chris Uraneck, Robert Ekert, and Kim Trull. Thanks to Margaret Hunter for updating our website. We are especially grateful for the support provided by Colonel Joe Fessenden, Lieutenants Jon Cornish and Alan Talbot, and some 20 Marine Patrol Officers who helped both on and off the water, handling gear and assisting in communications with lobstermen, and whose presence added to our security.

We also express many thanks to all of the facilities along the coast that provided dockage for the survey vessel: University of New Hampshire Pier (Newcastle, NH), Rockland Fish Pier (Rockland, ME), Vinalhaven Town Pier (Vinalhaven, ME), Billings Marine (Stonington, ME), Dysart's Great Harbor Marina (Southwest Harbor, ME) and the US Coast Guard (Jonesport, ME).

Lastly, we appreciate the support and cooperation of those fixed gear fishermen throughout the survey area that moved gear and suggested alternate sites when necessary. The Lobster Zone Councils, Maine Lobster Advisory Council, Maine Lobstermen's Association, and Downeast Lobstermen's Association also provided many comments and suggestions to help minimize gear conflicts and improve cooperation.

EXECUTIVE SUMMARY

This report summarizes results from the 2009 sampling season of a comprehensive bottom trawl survey of groundfish and invertebrate species along the coast of Maine and New Hampshire. Prior to 2000, fishery-independent data were not available for nearly 80% of the inshore Gulf of Maine's inshore waters. The Maine-New Hampshire Inshore Trawl Survey was established to fill the information gap and collect valuable information on the fish and biological communities in this area and create a time series for long-term monitoring of inshore stocks. The survey uses a stratified random sampling design, with an additional single fixed station per stratum. Using the Jeff Flagg designed ME-NH survey trawl net and a commercial fishing vessel, the survey has proven to be a successful example of fishermen and scientists working together to benefit fisheries management. Two annual surveys are conducted, fall and spring, to create a rich database on fish and invertebrate species that is accessible to fishery managers, academic researchers, fishing industry members, graduate students, non-governmental organizations, and the general public. With eight complete years and a ninth underway, seasonal time series of abundance have been established for over 25 species of fish and invertebrates. Information from the survey is used in the assessment and management of several fisheries, and additional requests for and uses of these data have provided new insight into communities and populations in the Gulf of Maine.

INTRODUCTION

Initiated in the fall of 2000, 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. The survey has completed nine years of biannual survey work, and the tenth year is now underway. 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. It is a valuable method to strengthen the trust between fishermen and scientists and increase the confidence fishermen have in the data.

Fishery-independent trawl surveys help to provide an index of the distribution and abundance of a variety of fish and invertebrate species that is not influenced or biased by fishing effort or outside factors. As they continue on an annual basis, these surveys should reflect changes in abundances of populations more accurately 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 provide population abundance estimates.

Surveying the inshore waters of the Maine and New Hampshire coasts has been difficult due to a complex bottom consisting of ledges, canyons, seamounts and boulders, amplified by an abundance of lobster gear. The survey has seen an average success rate of 99% in the spring and 74% in the fall. Dealing with the large quantity of fixed gear, especially in the fall, still limits the number of tows that can be made, but continual and extensive public outreach has maintained a satisfactory level of tow completion. Despite the difficulties, the coverage this survey provides promises to be very valuable to better understanding marine ecosystems in the Gulf of Maine. We are confident that the northern Gulf of Maine can be successfully and consistently sampled via trawl survey indefinitely, with sustained funding.

Project Objectives:

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 can affect fish distribution.
- To gather information on biological parameters (growth rates and reproduction).

MATERIALS AND METHODS

Methods are described under separate cover in "Maine-New Hampshire Inshore Groundfish Trawl Survey Procedures and Protocols (2005)," available on-line at http://www.maine.gov/dmr/rm/trawl/reports.htm. The manual includes detailed descriptions of survey design, station selection, survey vessels, net design, public notification, sample collection and catch handling, and other information on survey methods and operations.

SURVEY STRATA

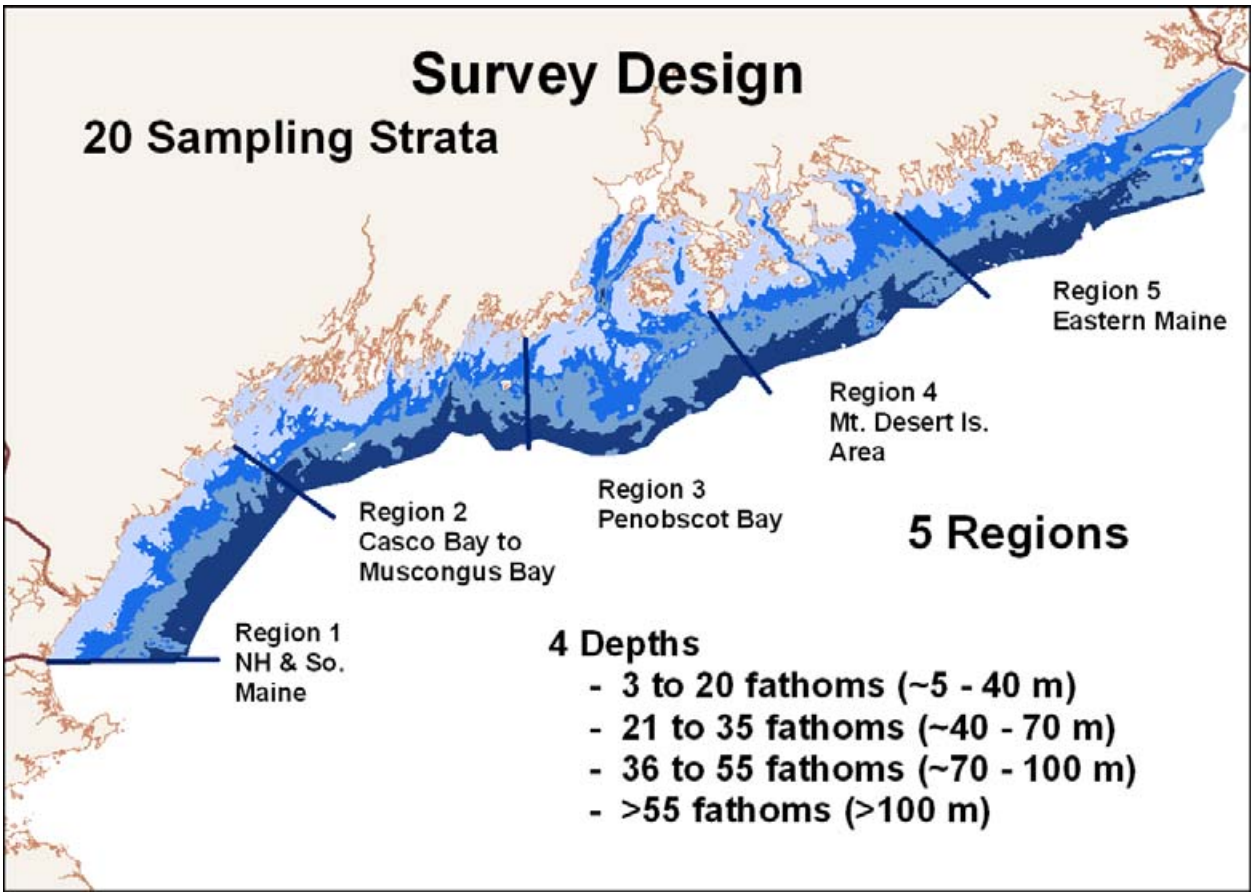


Figure 1. Sampling strata for the Maine-New Hampshire Inshore Trawl Survey

RESULTS

SPRING 2009 SUMMARY

The spring survey began May 4, 2009 in Portsmouth, New Hampshire and finished on June 5 off Cutler, ME. Of the 115 targeted tows, 112 total tows were completed for a success rate of 97%, equivalent to last spring's survey totals. Start coordinates for the spring survey are shown in Figure 2. The 12-mile limit approximates the survey's seaward extent, the black lines divide the regions and the depth strata are illustrated by the color gradient. On average, 4.5 tows were completed per day. The weather conditions were quite good for the spring survey and no days were lost to weather.

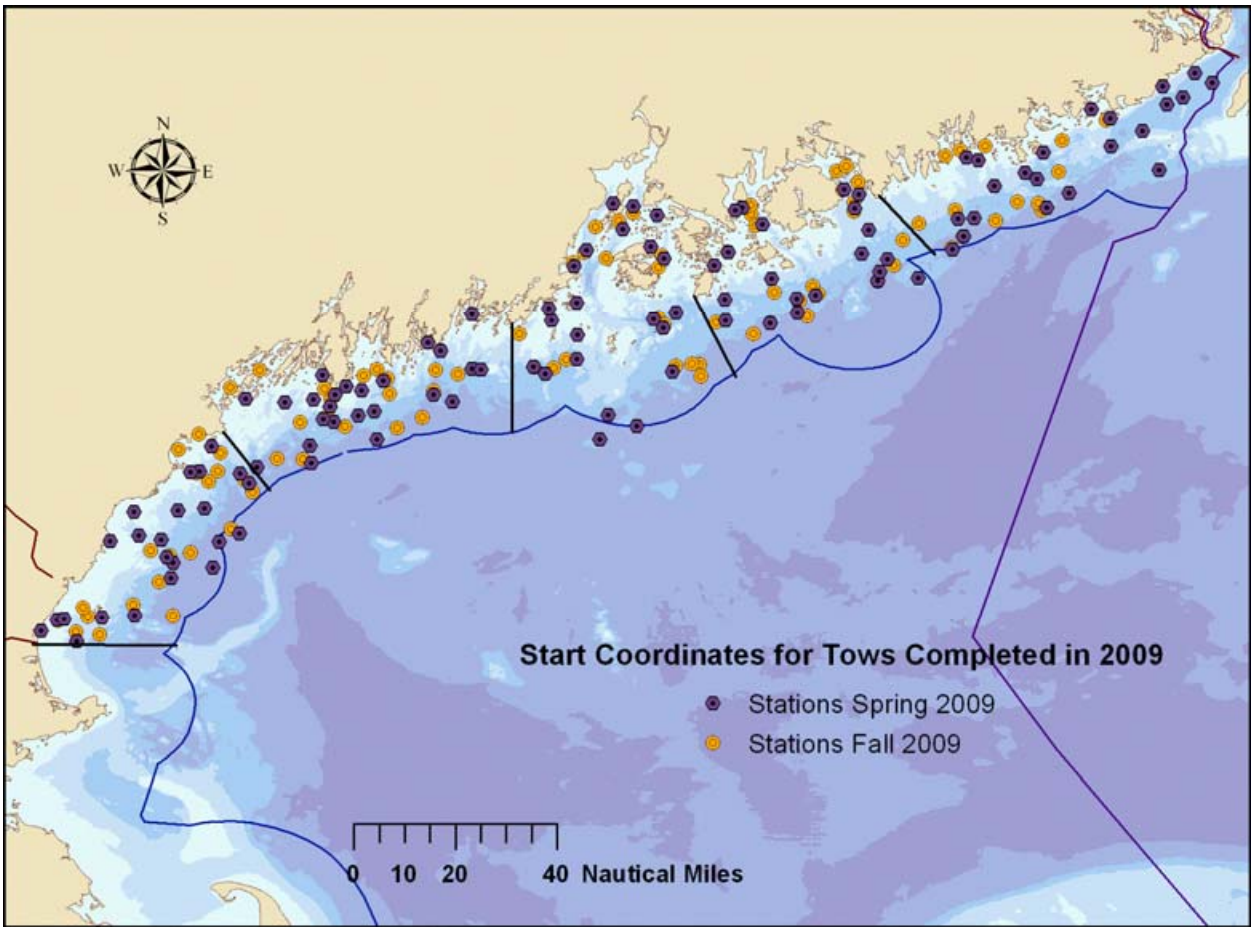


Figure 2. Survey start coordinates for the 2009 season.

Average bottom temperatures by stratum ranged from 3.8 to 7.5^{o}C (Table 1), with an overall average of 5.2^{o}C. The highest spring survey average temperature was 6.2^{o}C in 2006 and the lowest average was 4.0^{o}C in 2004.

Table 1. Average bottom temperature (^{o}C) for the spring 2009 survey

REGION					
STRATUM	**1**	**2**	**3**	**4**	**5**
1	5.1	6.1	5.7	7.5	6.3
2	4.0	5.3	5.2	6.0	6.1
3	3.8	4.3	4.6	5.2	6.0
4	3.9	4.2	4.6	5.2	6.1

The volume of total mixed catch varied from 12 kg to 2385 kg per tow, with an average of 131 kg and a median of 80 kg per tow. The average catch per tow for this survey was similar to that of the past few years, but overall one of the lower springs catches, the lowest (80 kg) occurring in 2005 (Sherman et al, 2007).

The total number of species caught was 93, with a low of 11 and high of 37 in any particular tow, and an average of 24 species. A complete listing of tow locations, coordinates, dates, times, and depths can be found in Appendix A. Biological samples are collected on selected finfish species, based on seasonal abundance and available time between tows. Table 2 shows the numbers of biological samples taken for the spring 2009 survey, one halibut was sampled due to bad condition. Halibut are usually tagged and released.

Table 2. Spring 2009 species sampled for individual weights, sex, maturity, food habits, and hard parts for aging.

Number of Biological Samples Spring 2009				
Species	**Lengths**	**Sex and Maturity Stage**	**Otoliths**	**Food Habits**
American plaice	5075	606	429	NA
Atlantic cod	237	178	136	37
Atlantic halibut	60	1	1	NA
Haddock	64	9	8	4
Goosefish	94	10	NA	10
Winter flounder	3470	676	411	NA
Yellowtail flounder	333	203	NA	NA

Of note for the spring 2009 survey were the catches of alligatorfish, *Aspidophoroides monopterygius*, which were higher than any previous year in the eastern most part of the survey. There is little information on alligatorfish; they are a benthic species and have been found on all types of bottom habitat from sand/pebble to mud (Bigelow and Schroeder 2002, Scott and Scott 1988). Catches in this area of the survey have increased dramatically since 2006 with this spring showing the highest catches (Figure 3). Perhaps there is a preference for harder bottom types, as the sediment in this area contains more sand and gravel (Kelly and Dixon 1999),

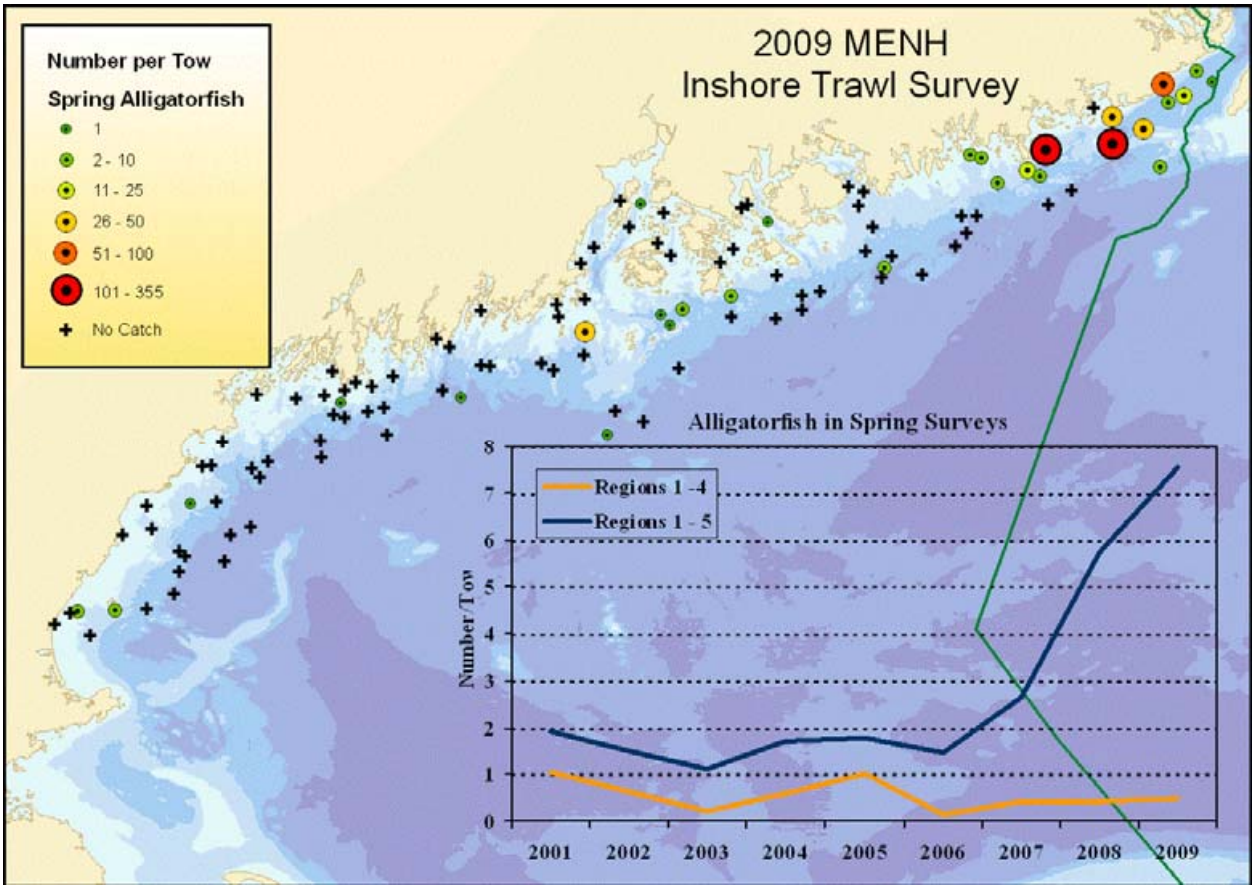


Figure 3. Numbers of alligatorfish caught for individual tows for the spring 2009 survey (bubble plot) and the plot shows the simple mean number of fish caught per survey for the entire area (Regions 1-5) and by excluding the eastern most region (Regions 1-4).

Mean lengths for alligatorfish sampled during this time period ranged from 10.4+/-0.5 cm in 2006 to 11.2+/-0.4 cm in 2008.

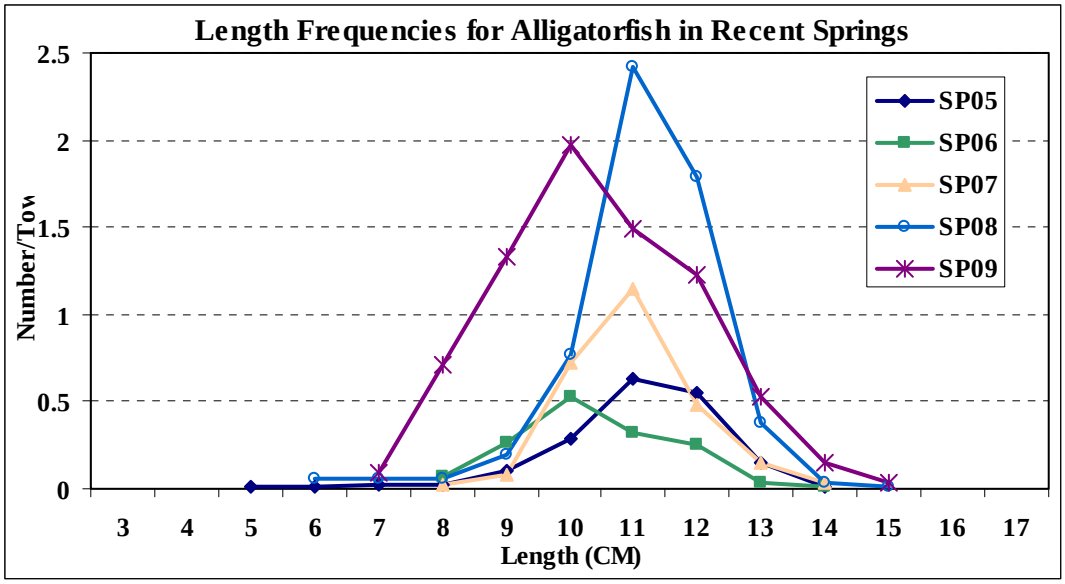


Figure 4. Shown are length frequencies as simple mean number per tow for alligatorfish in recent spring surveys. Total fish measured are 186, 160, 285, 644, and 844 respectively for 2005 through 2009.

Jonah crabs, *Cancer borealis*, are fairly abundant in our survey trawls. They appear to be more abundant in the eastern portion of the survey area, especially in the spring (Figure 5). The average number for a spring survey is approximately 650 individuals based on nine years of sampling.

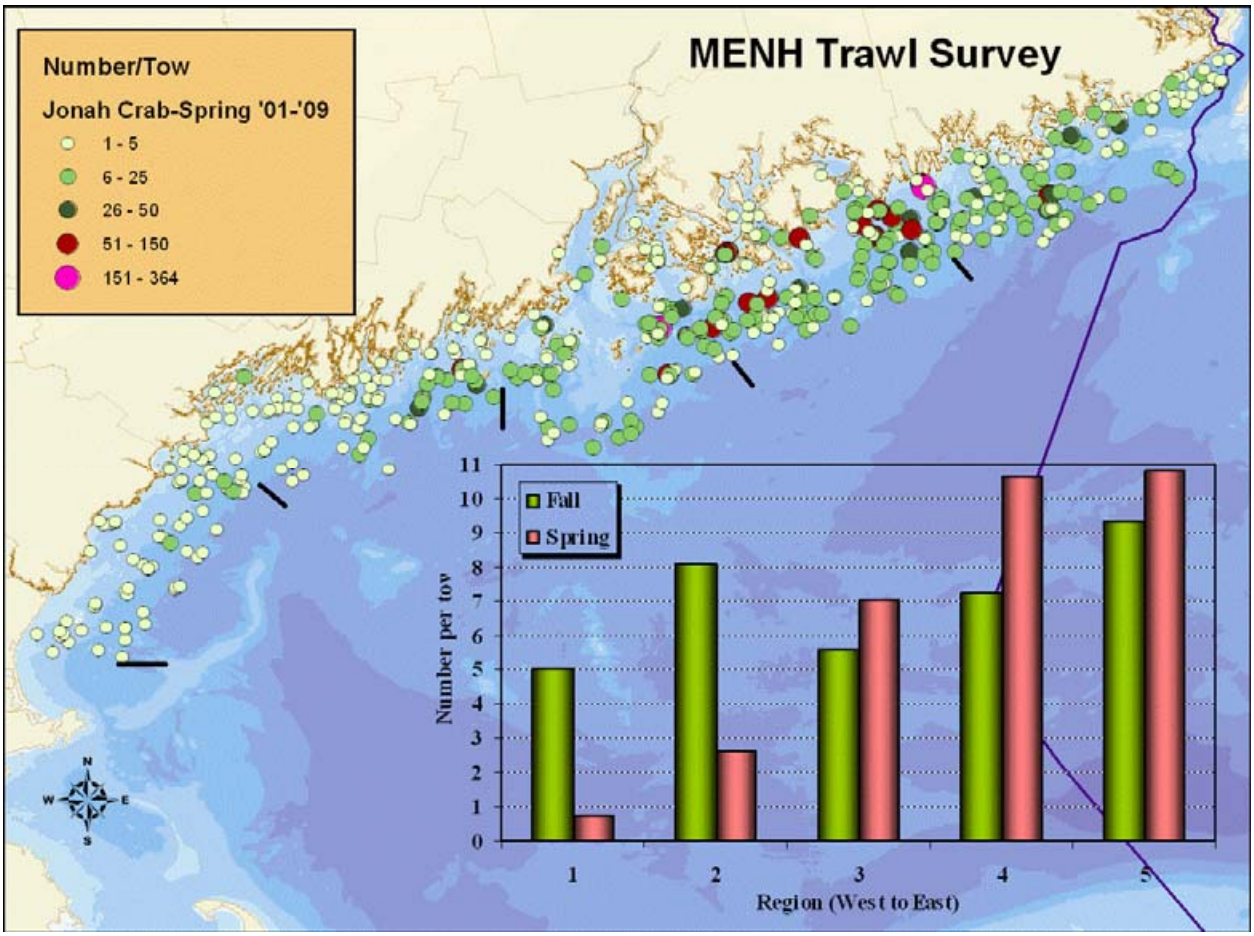


Figure 5. Jonah crab individual catches in number for nine years of spring surveys. The plot overlay shows the 9-year average catch by season for each of the 5 regions starting in the west with region 1.

Numbers were down in the spring of 2009 and have been declining since 2005. Since 2004, all crabs are separated by sex when measured. The number of females sampled in the spring 2009 survey was down by almost ½ of the previous spring (Figure 6).

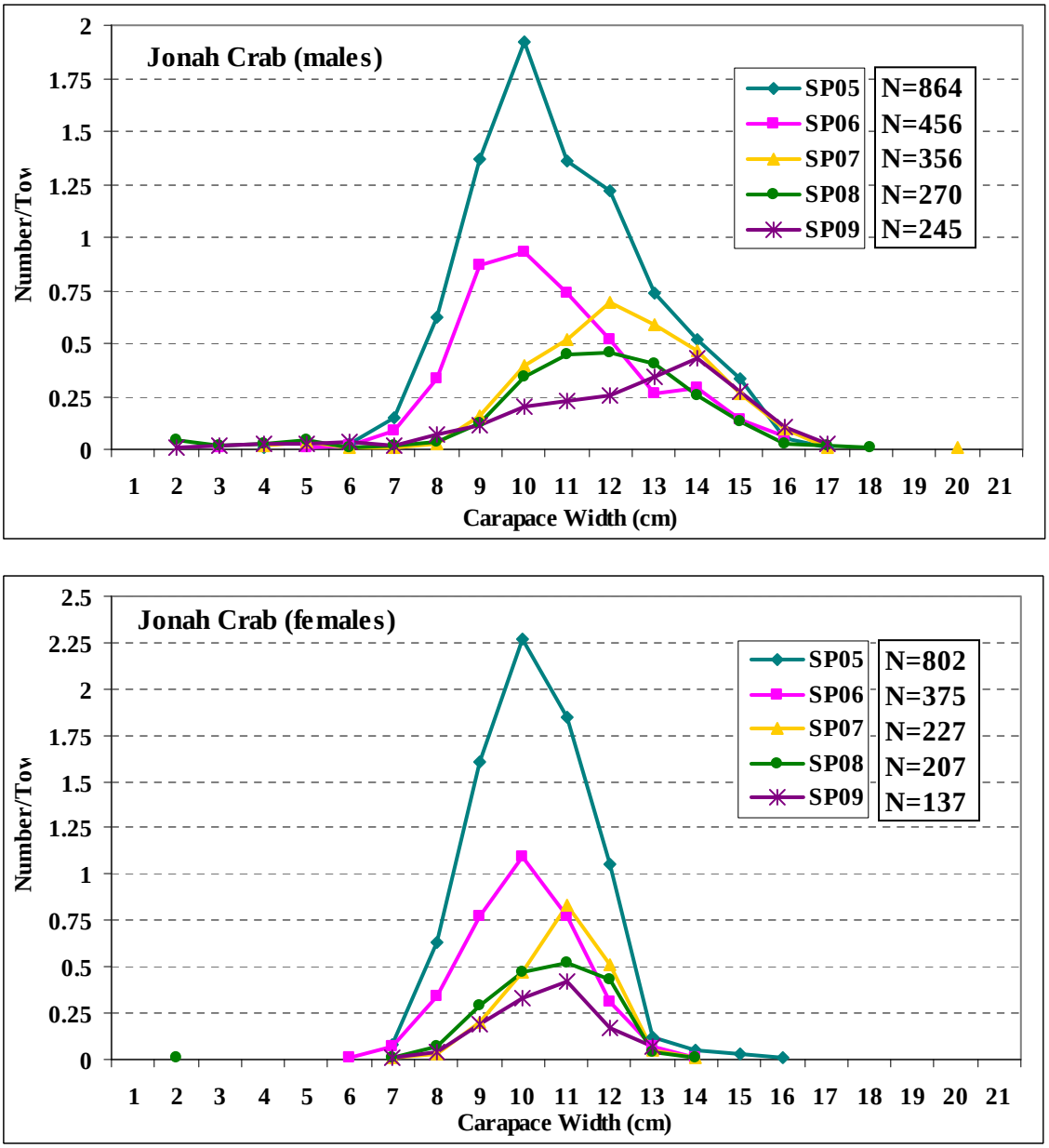


Figure 6. Catch at length as simple mean number per tow for Jonah crab separated by sex in recent springs.

Occurrence of ocean pout, *Zoarces americanus*, is fairly low in the MENH survey. Typically, in the spring we encounter around 50 individual for the entire survey area. The spring 2009 survey saw a record 144 fish.

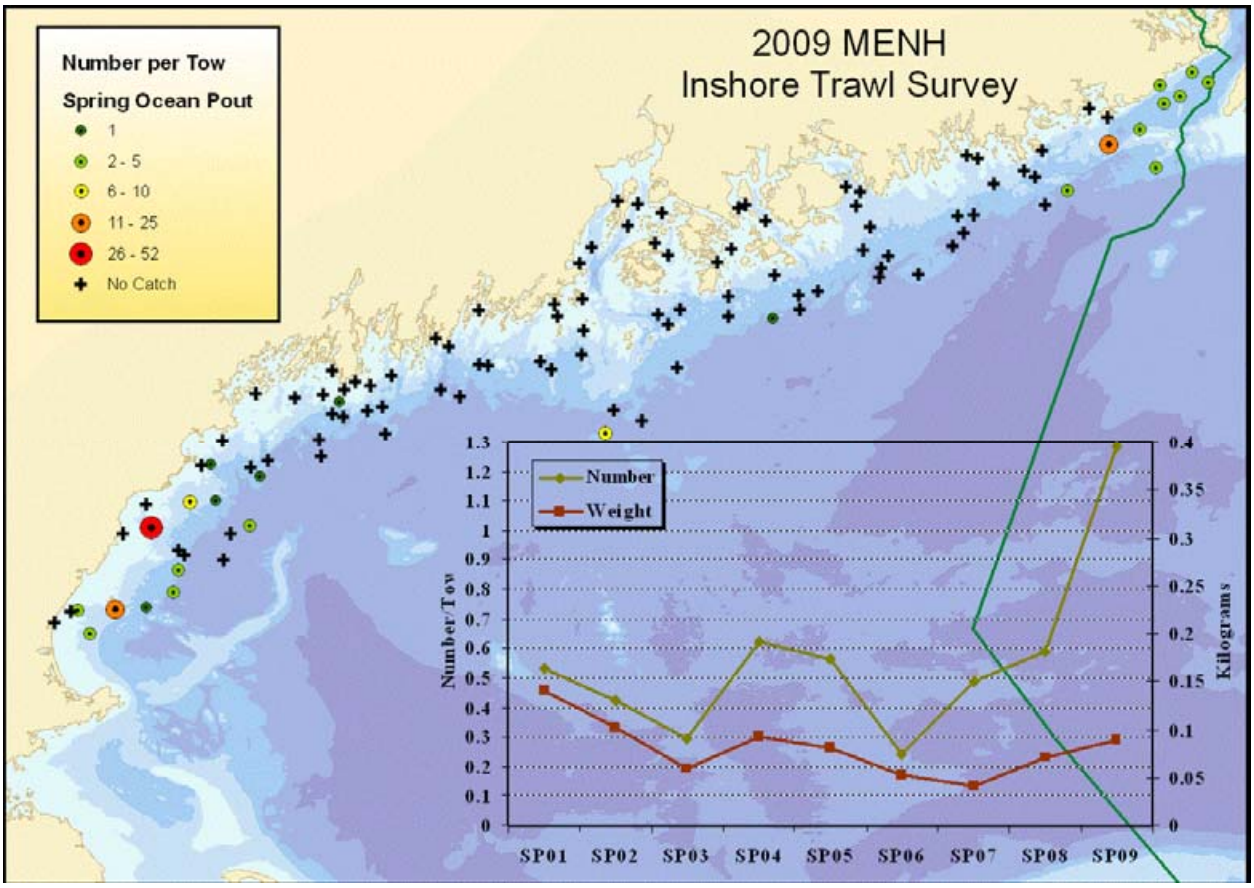


Figure 7. Catches in number for ocean pout in the spring 2009 survey. The overlain plot displays the simple mean catch in number and kilograms for all spring surveys.

FALL 2009 SUMMARY

The survey began October 5, 2009 in Portsmouth, New Hampshire and finished on November 6th off of Cutler, Maine. As usual, weather conditions were not as favorable for the fall survey. We lost four days due to weather but the fixed lobster gear was lighter in some areas this year, so our daily tow completion rate was higher. We completed 92 tows out of the scheduled 115. This translates to an 80% completion rate, with an average of 4.3 tows per day. Start coordinates for the fall survey are shown in Figure 2.

Another factor which helped increase our efficiency was the volunteer help from the Maine DMR and the New Hampshire Fish & Game. We had a full staff of four scientists on almost all sea days.

Average bottom sea water temperatures for each stratum ranged from 6.5^{o}C to10.9^{o}C (Table 3) and the overall average was 9.5^{o}C.

Table 3. Average bottom temperature (^{o}C) for the fall 2009 survey.

REGION					
STRATUM	**1**	**2**	**3**	**4**	**5**
1	10.4	8.7	7.8	6.5	10.4
2	10.9	9.1	8.4	7.3	10.9
3	10.8	10.9	10.5	10.2	10.8
4	10.2	10.0	10.2	10.0	10.2

The volume of total mixed catch varied from 4.5 kg to 1124.4 kg per tow, with an average of 199.6 kg and a median of 154 kg per tow. This catch average is among the top five of the last 10 years with 2007 being the highest (Sherman et al. 2009). The total number of species caught was 95, with a low of 12 and high of 34 in any particular tow, and an average of 23 species. Atlantic moonfish were seen again this fall and we did have one planehead filefish. We tagged several Atlantic halibut. One was tagged with a 30-day pop-off satellite tag remaining from the halibut tagging program which has begun transmitting. We expect the data from that in the future. An Atlantic sturgeon was also tagged with a pop-off satellite tag which has been retrieved and was transmitting.

Otoliths, sex, and maturity stages were collected on selected individuals of cod, haddock, white hake, and witch flounder. Stomach content analysis was done on goosefish and cod.
Table 4 shows the samples collected for fall 2009.

Table 4. Fall 2009 species sampled for individual weights, sex, maturity, food habits, and hard parts for aging.

Number of Biological Samples Fall 2009				
Species	**Lengths**	**Sex and Maturity Stage**	**Otoliths**	**Food Habits**
Atlantic cod	112	31	28	5
Haddock	321	3	3	
Goosefish	212	64	NA	50
White Hake	3157	446	257	
Witch Flounder	903	197	90	

Atlantic mackerel, *Scomber scombrus*, are found throughout the survey area with fall 2009 catches being the lowest seen in the 10 years of the survey (Figures 8 and 9). Mackerel are seen in varying densities in the survey area and are routinely more abundant in the fall surveys. Average spring catches are especially low, with only three of the nine springs sampled finding any mackerel. This correlates with the known migration patterns of mackerel, they are more commonly found to the south and offshore in the spring and move into the Gulf of Maine in the late summer and fall (Studholme et al. 1999, Bigelow and Schroeder 1953).

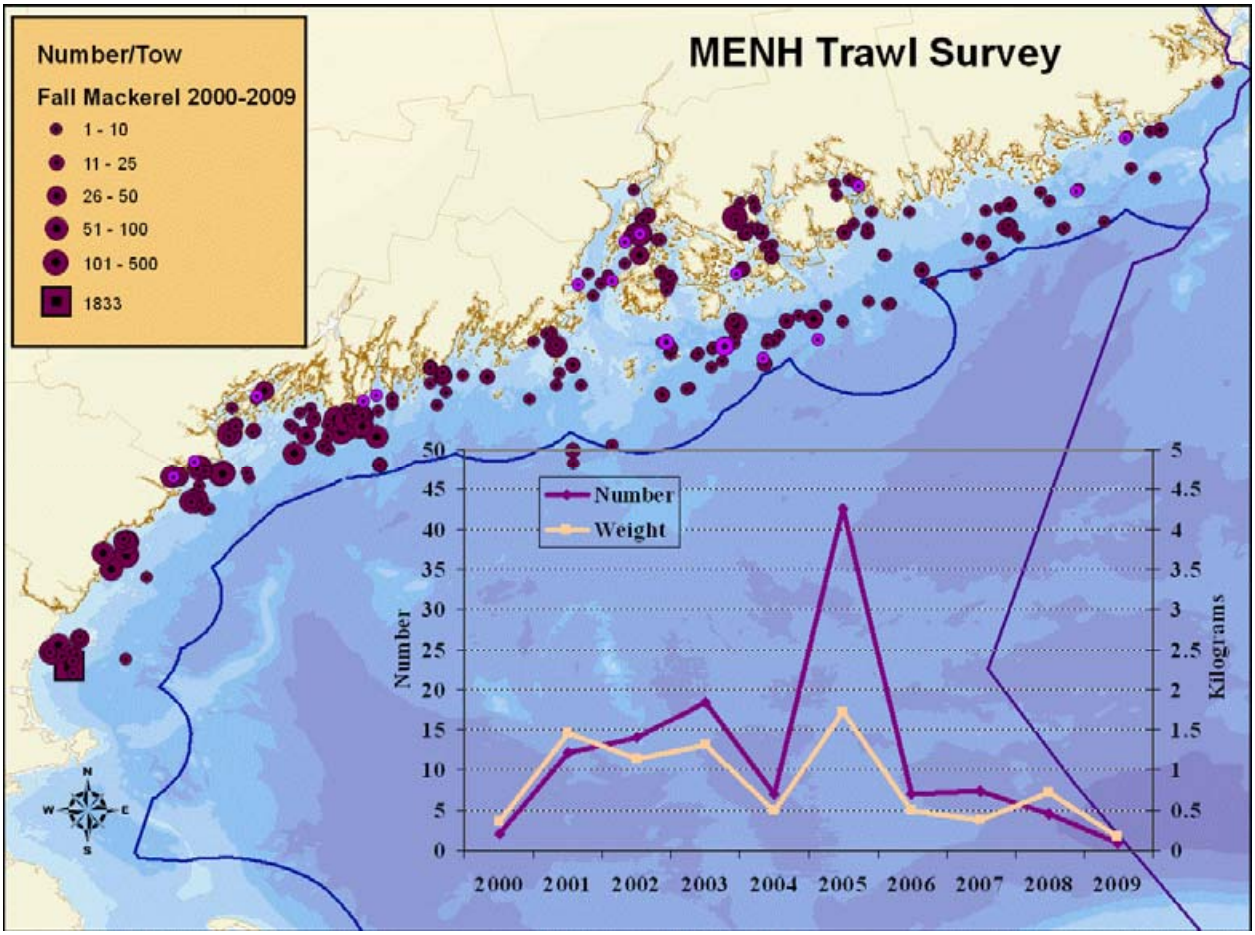


Figure 8. Catches in number for Atlantic mackerel in the fall surveys from 2000 through 2009. Fall 2009 catch numbers are presented in the lighter shade. The plot overlay displays the simple mean catch in number and kilograms for all fall surveys.

The length frequency pattern is typically bi-modal with the largest numbers seen in the 16 to 18 cm range (Figure 9). Mean lengths ranged from 17.2 cm in 2005 to 25.8 cm in 2009. The large number of 16 to 18 cm fish seen in the high catches of the fall 2005 survey were the result of a single tow in New Hampshire waters (Figures 8 and 9).

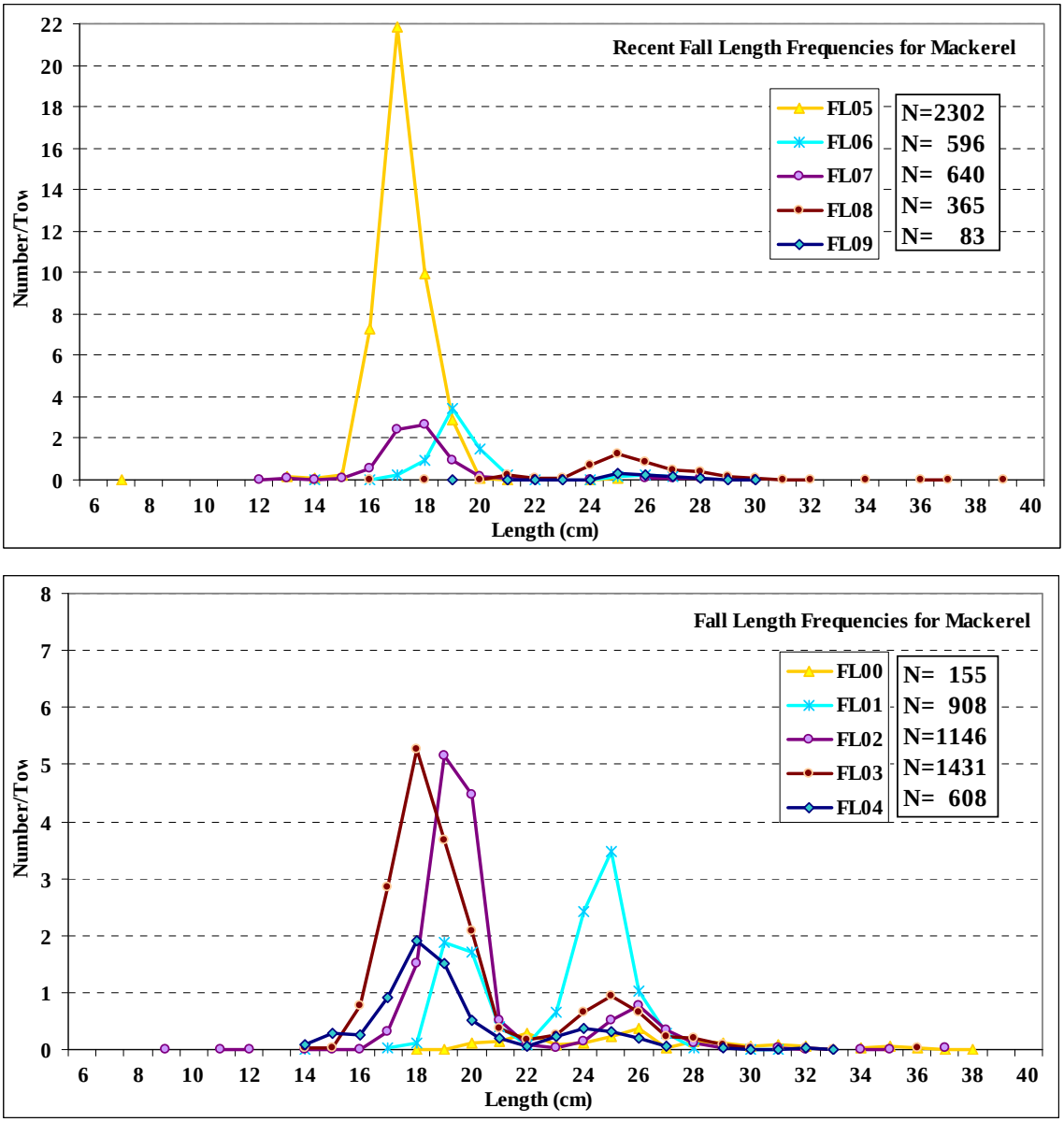


Figure 9. Catch at length as simple mean number per tow for Atlantic mackerel for fall surveys.

Catches of short-finned squid, *Illex illecebrosus*, another migratory species that moves into the area in the summer and fall, have been rising in recent years. Where the mackerel numbers have decreased since 2005, *Illex* numbers have greatly increased in the same time period (Figure 10). *Illex* are more abundant in the deeper strata with over 90 % of the catches occurring in strata 3 and 4 (Figure 10).

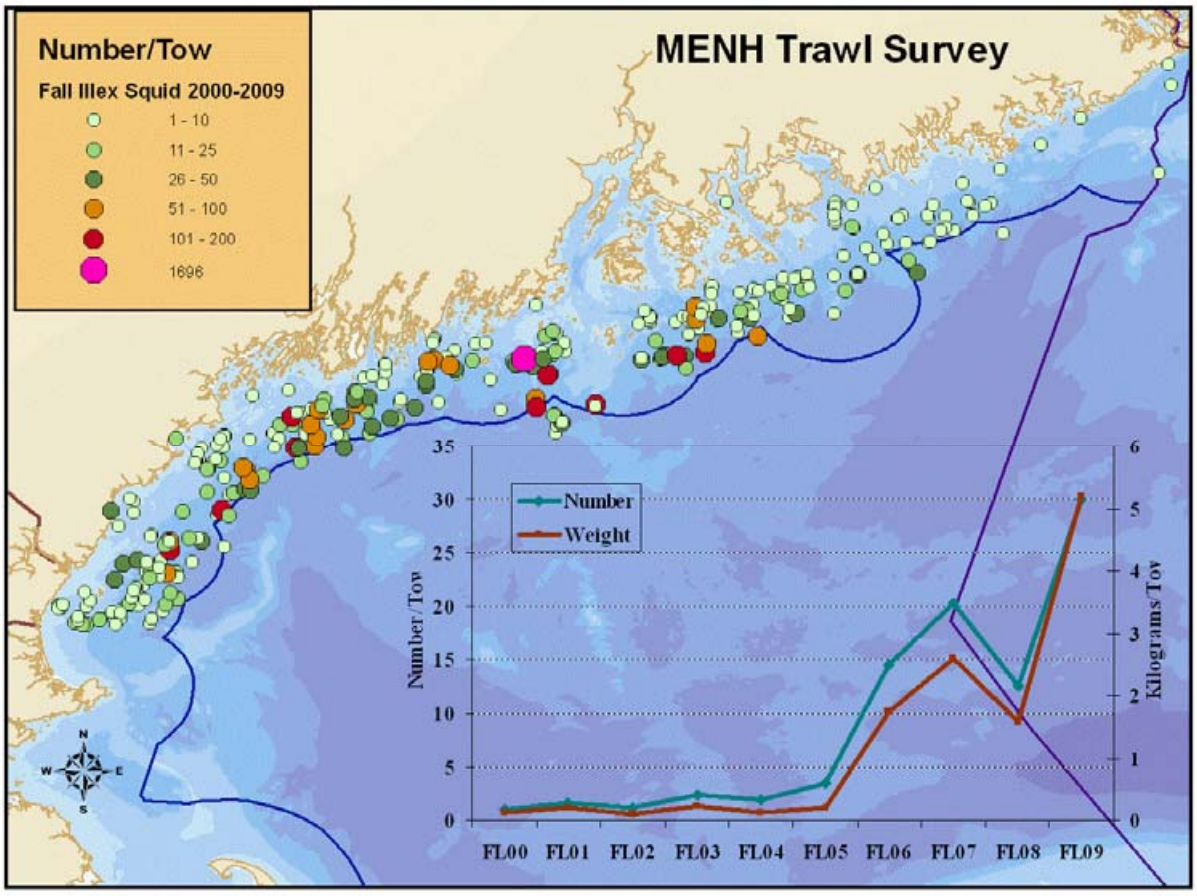


Figure 10. Numbers of *Illex* caught for fall tows conducted from 2000 through 2009 (tows without squid are not included). The plot overlay displays the simple mean catch in number and kilograms for all fall surveys.

Mean mantle lengths ranged from a low of 13.2 cm in 2004 to a high of 19.4 cm in 2009. The sizes of squid sampled have generally been larger since 2006 (Figure 11).

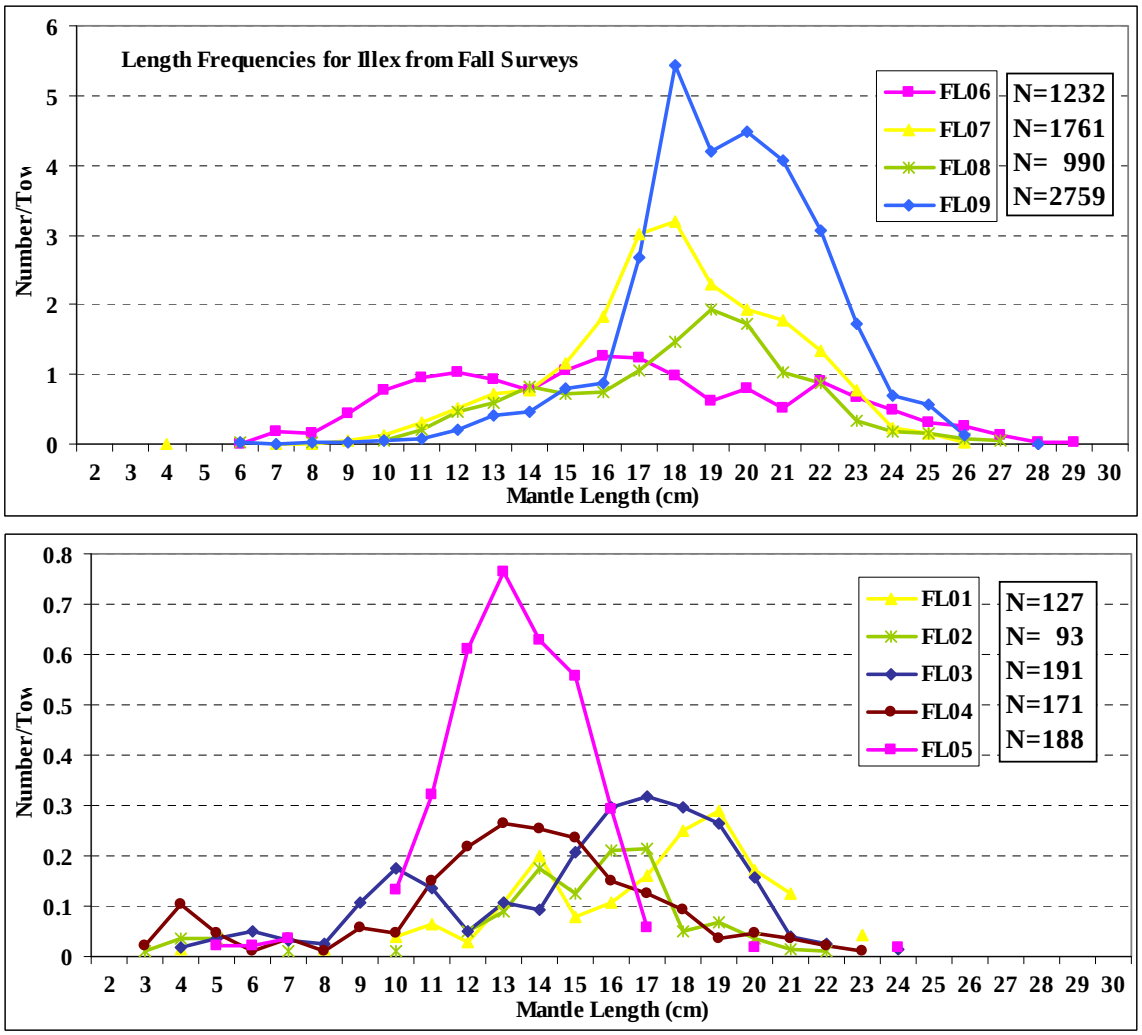


Figure 11. Top graph shows catch at length as simple mean number per tow for *Illex* squid for recent fall surveys. Catch at length for previous surveys is displayed below (note the difference in scale for the y-axes).

Illex recruits into the fishery at 11 cm mantle length (Hendrickson and Holmes 2004). Figure 12 illustrates the occurrence of these recruits in relation to some environmental factors. For the fall surveys, *Illex* are most abundant in depths ranging from 81–90 meters, temperatures of 11°C, and salinities of 33 PPT.

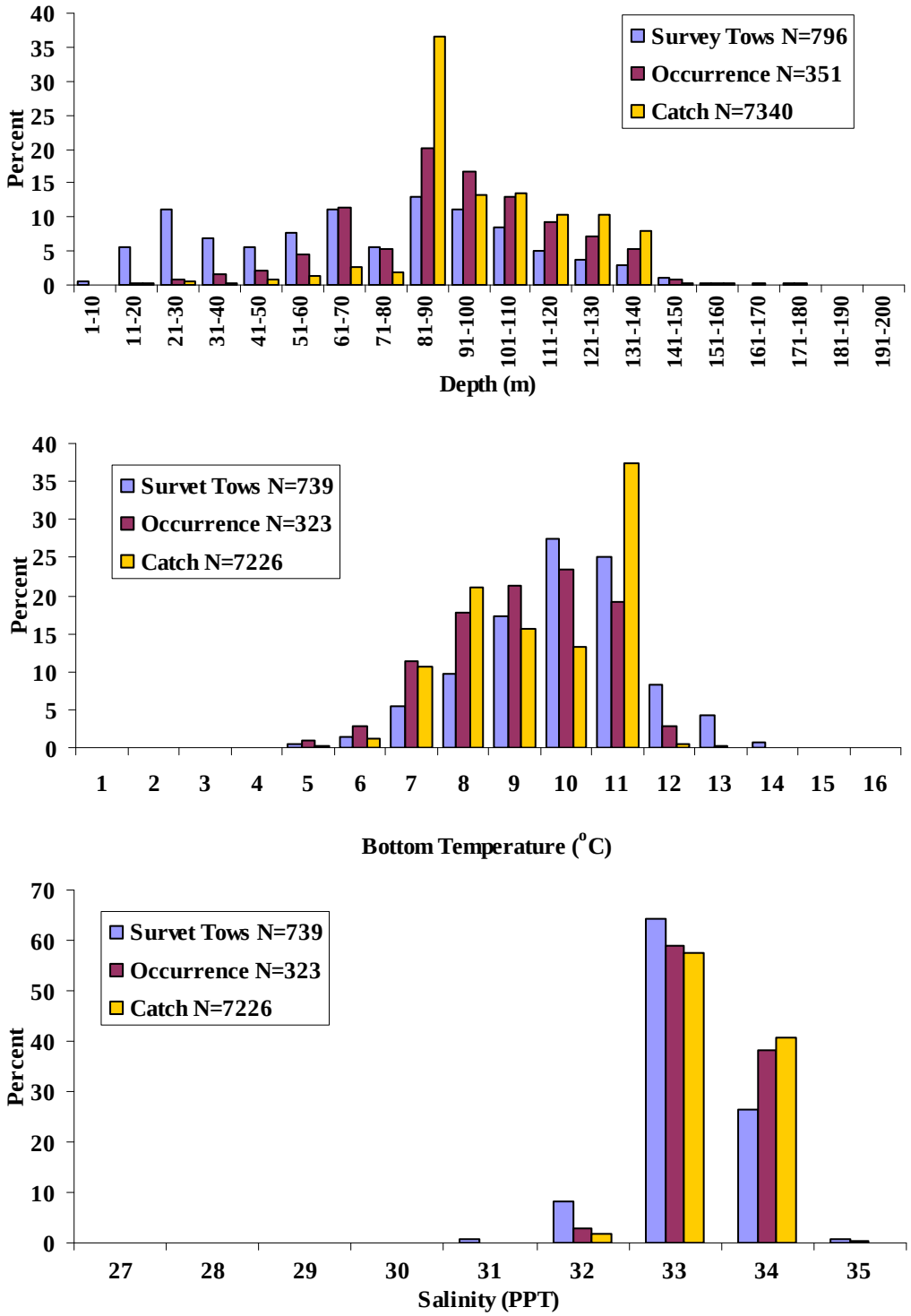


Figure 12. Distributions of *Illex* >=11 cm and trawls in relation to bottom depth, water temperature, and salinity for fall surveys 2000-2009 (all tows combined).

Atlantic menhaden, *Brevoortia tyrannus*, is a sporadic visitor to the Gulf of Maine in the summer and fall (Bigelow and Schroeder 1953). They haven't been seen in the fall catches since 2007 and when they do occur their numbers are exceedingly variable and greater than 80 % are caught in stratum 1 (Figure 13). Individuals caught are small; overall mean length for fall is 7.5 cm. with a yearly range of +/-1 cm.

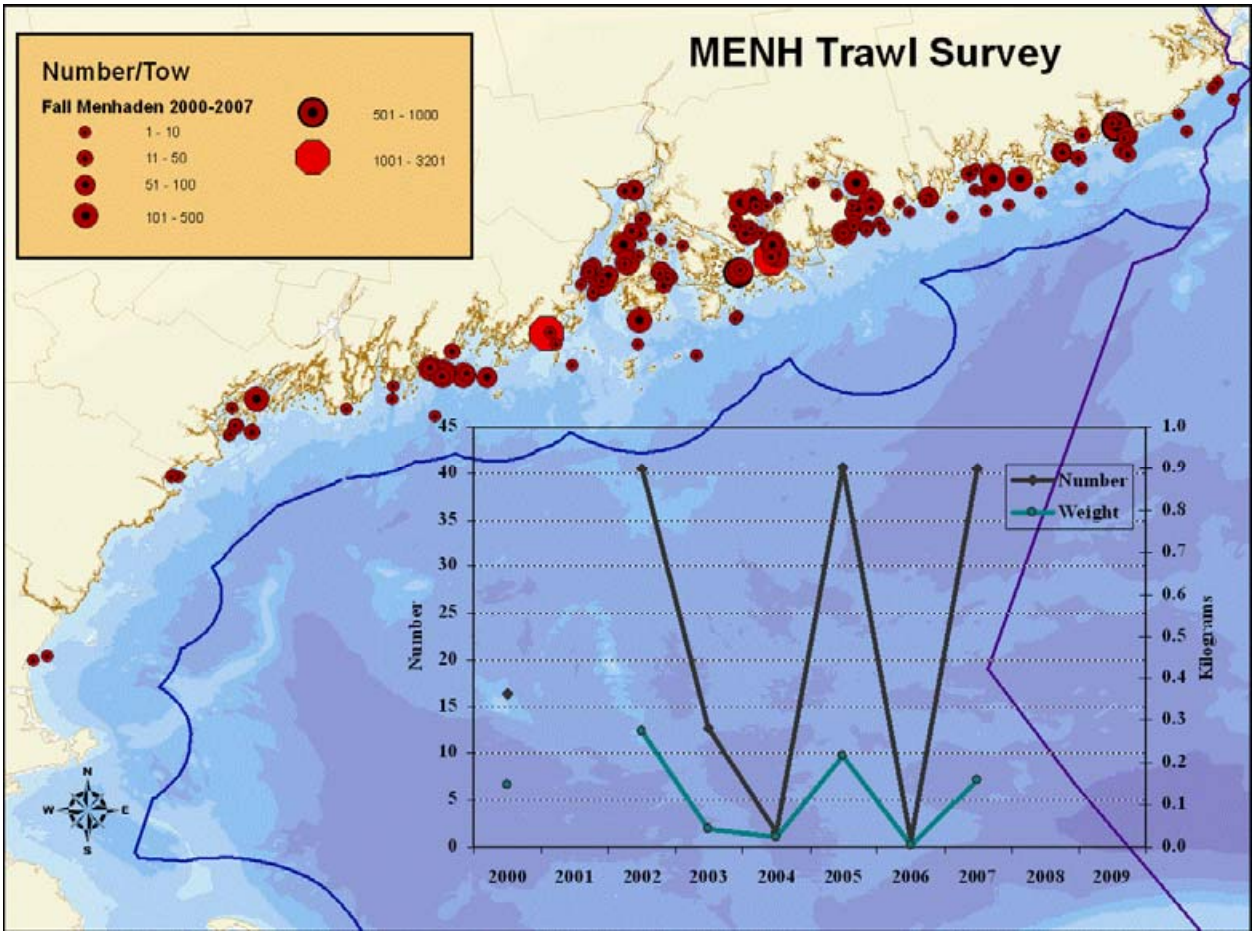


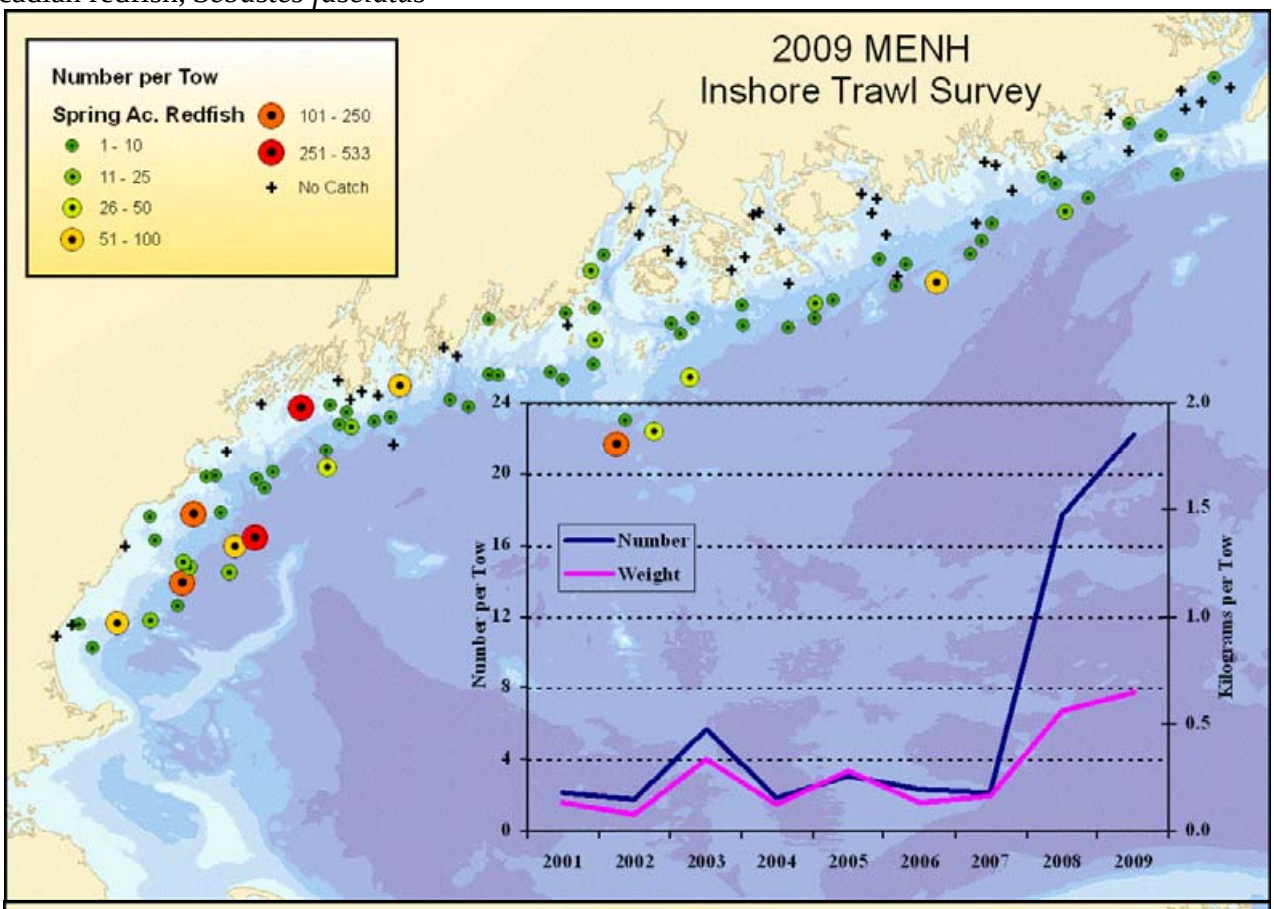
Figure 13. Menhaden individual catches in number for 10 years of fall surveys. The plot overlay shows survey indices in stratified mean number and weight (kg) for the fall.

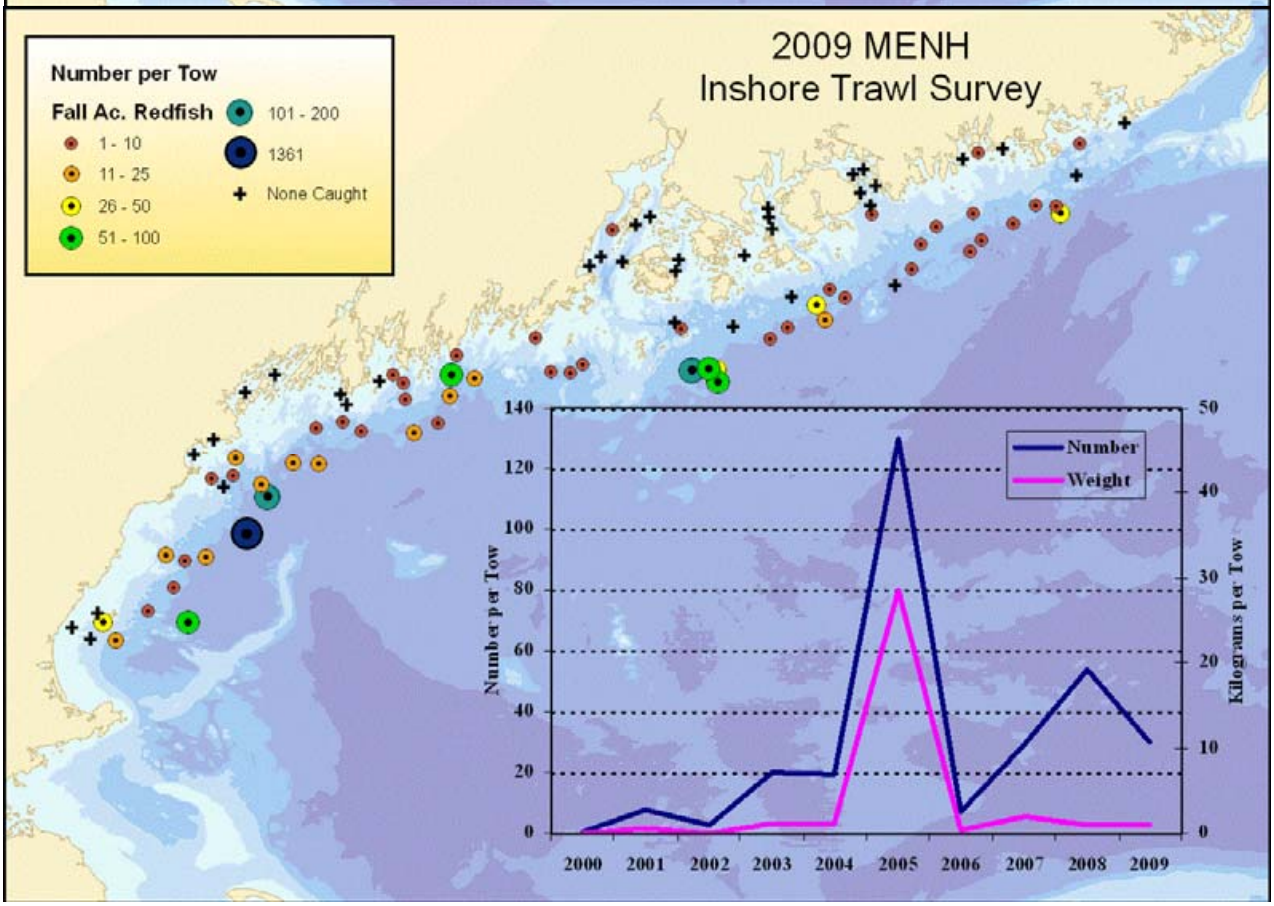
SELECTED SPECIES

The following pages contain bubble distribution maps, catch at length plots, abundance indices, and data tables for a selection of fish and invertebrates that are important to Maine and New Hampshire commercially or recreationally as well as others that are consistently abundant in our trawl catch. All indices and catch at length data were calculated for the entire survey area (20 strata) unless otherwise noted. All means are stratified mean number or weight and length frequencies are stratified catch at length.

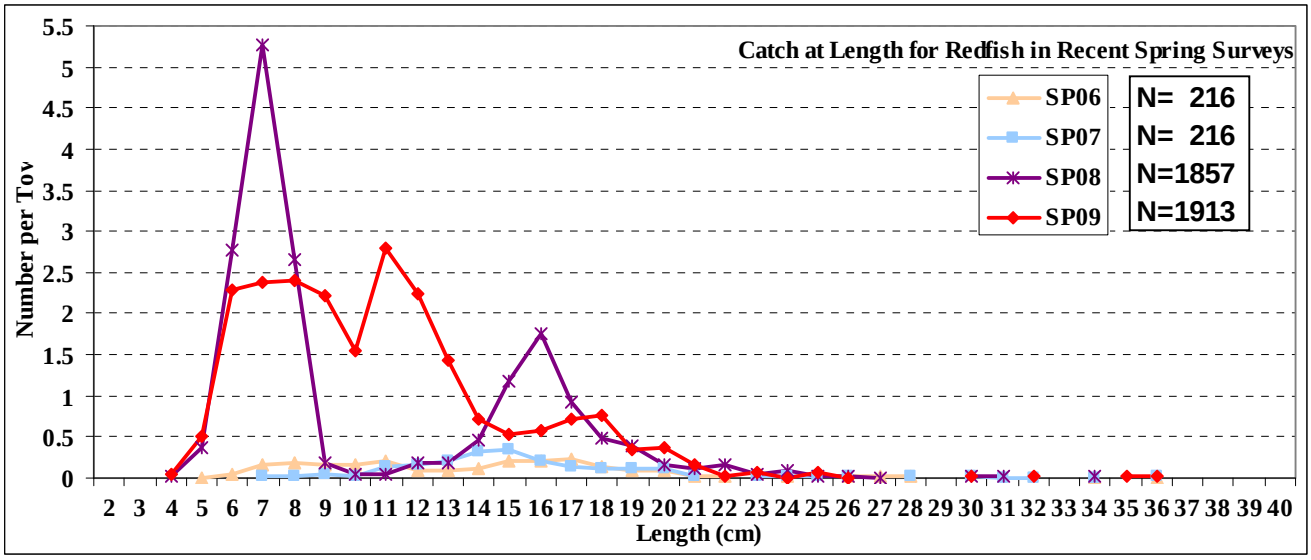
FINFISH

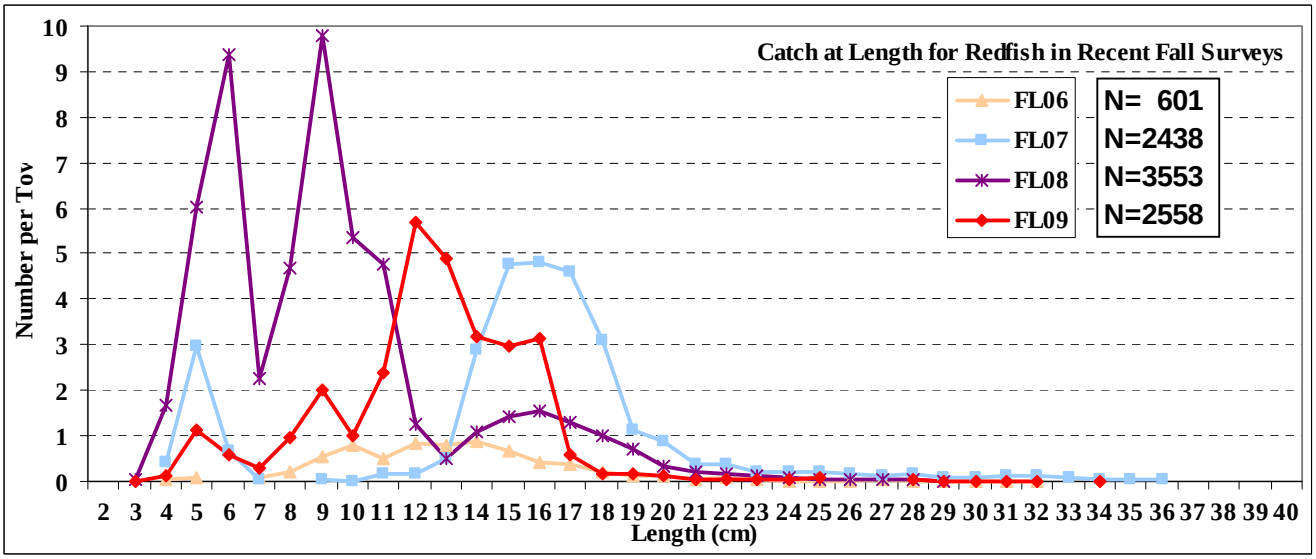
Acadian redfish, *Sebastes fasciatus*



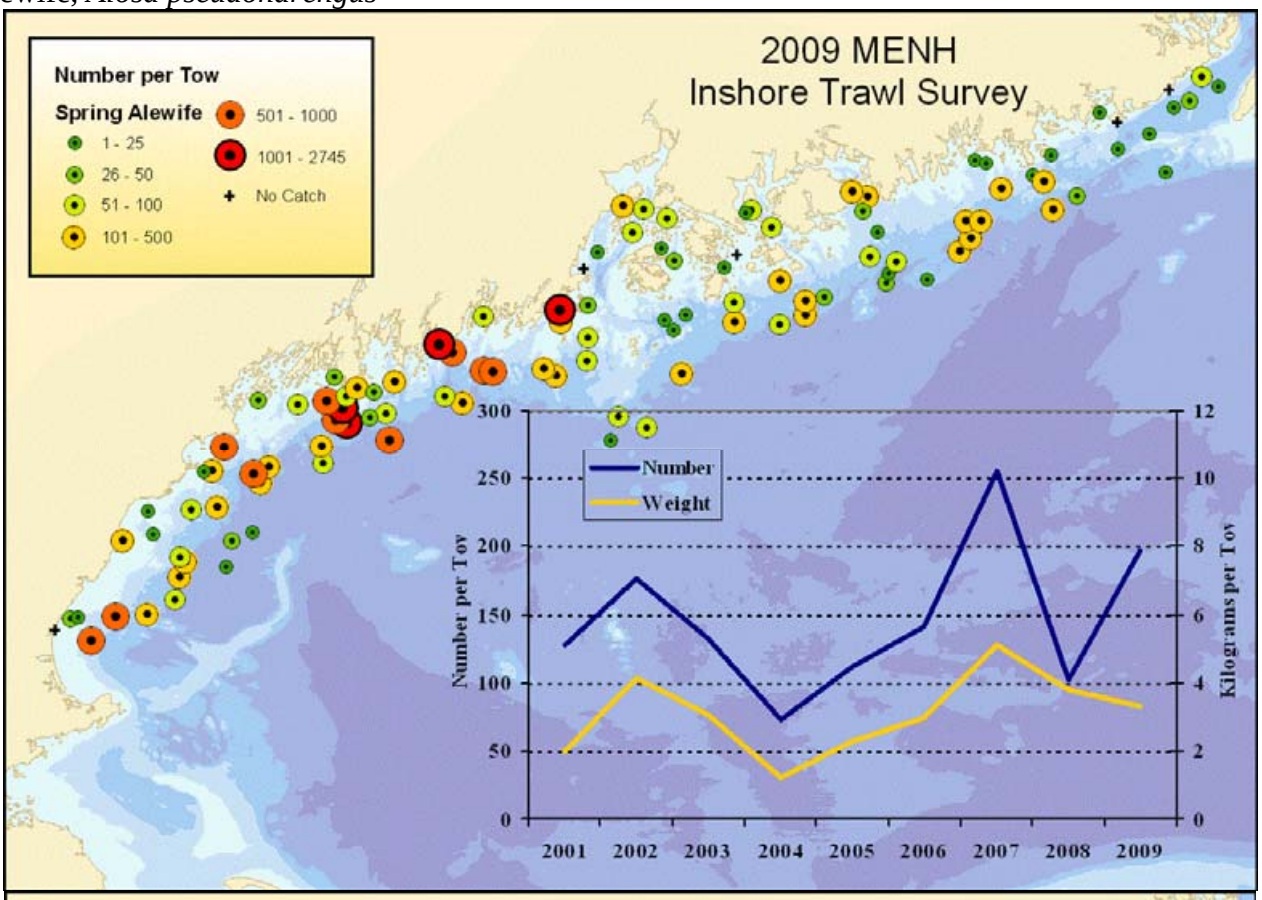


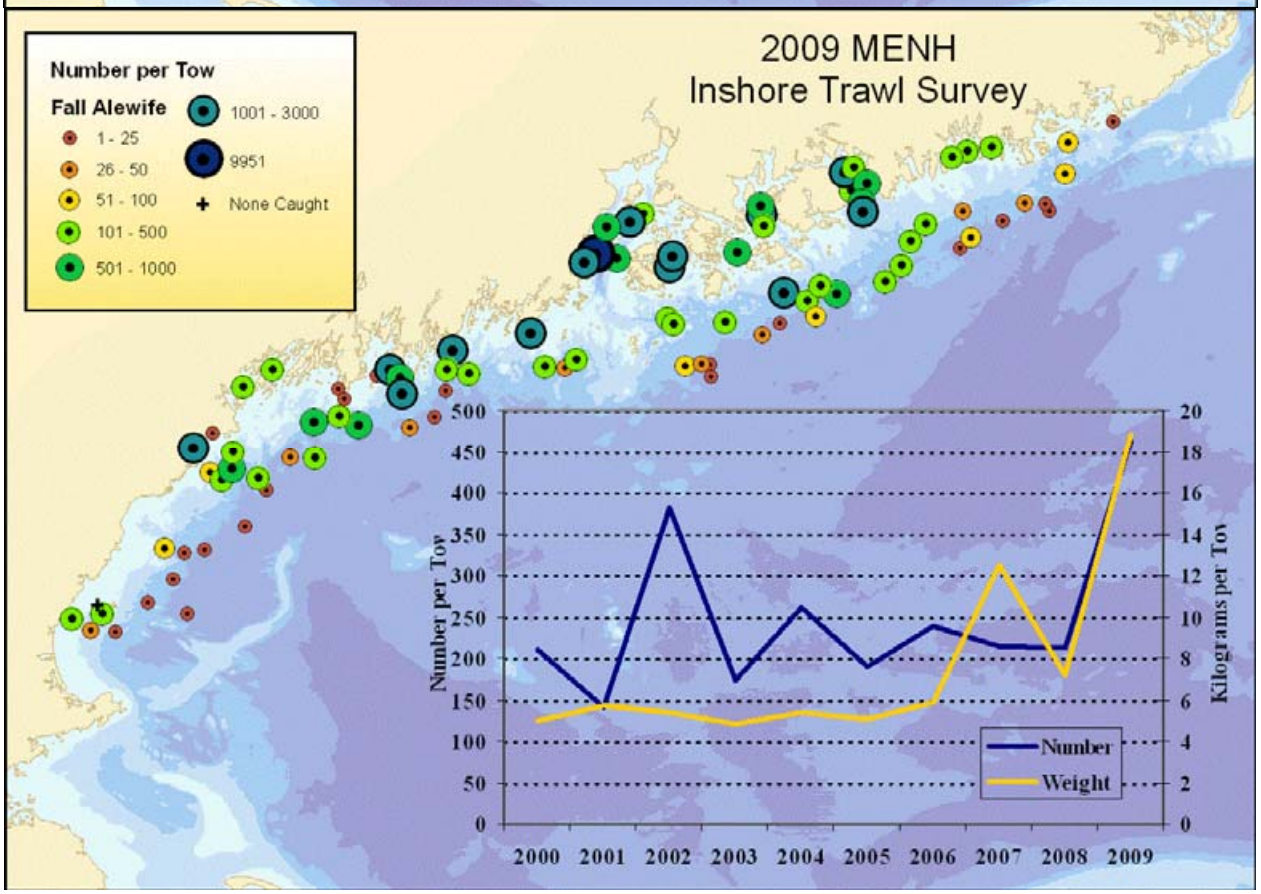
Means and standard error for the graphs overlain on the distribution maps									
fixed stations not included									
SPRING					FALL				
for redfish, indices calculated for regions 1 through 5, strata 1 through 4 (2003 on)									
	Stratified Mean					Stratified Mean			
	Number		Weight			Number		Weight	
	Mean	SE	Mean	SE		Mean	SE	Mean	SE
					2000	0.65	0.21	0.03	0.01
2001	2.18	0.62	0.13	0.06	2001	7.95	2.74	0.54	0.33
2002	1.79	0.41	0.08	0.02	2002	2.70	1.24	0.07	0.05
2003	5.66	2.14	0.34	0.14	2003	20.07	17.79	1.19	0.88
2004	1.82	0.53	0.13	0.03	2004	19.42	5.58	1.22	0.46
2005	3.09	0.76	0.28	0.12	2005	129.96	105.82	28.50	28.05
2006	2.33	0.91	0.13	0.05	2006	6.95	2.10	0.32	0.09
2007	2.15	0.51	0.16	0.04	2007	29.64	12.15	2.07	0.64
2008	17.69	5.14	0.56	0.22	2008	53.93	14.85	1.06	0.33
2009	22.26	7.18	0.65	0.24	2009	29.73	17.19	1.03	0.62



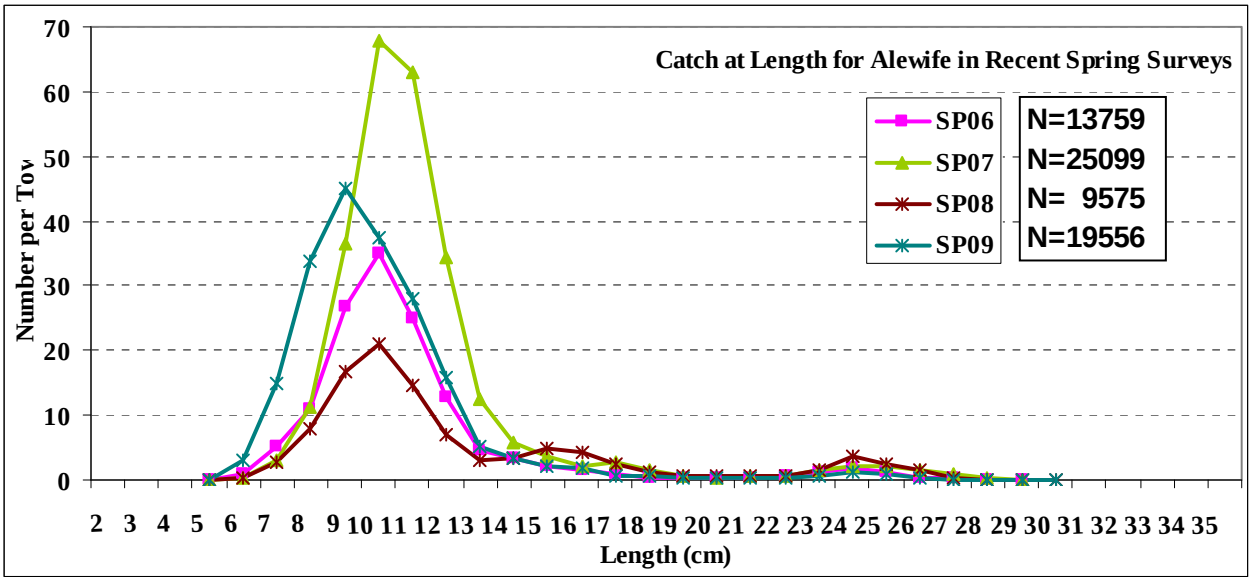


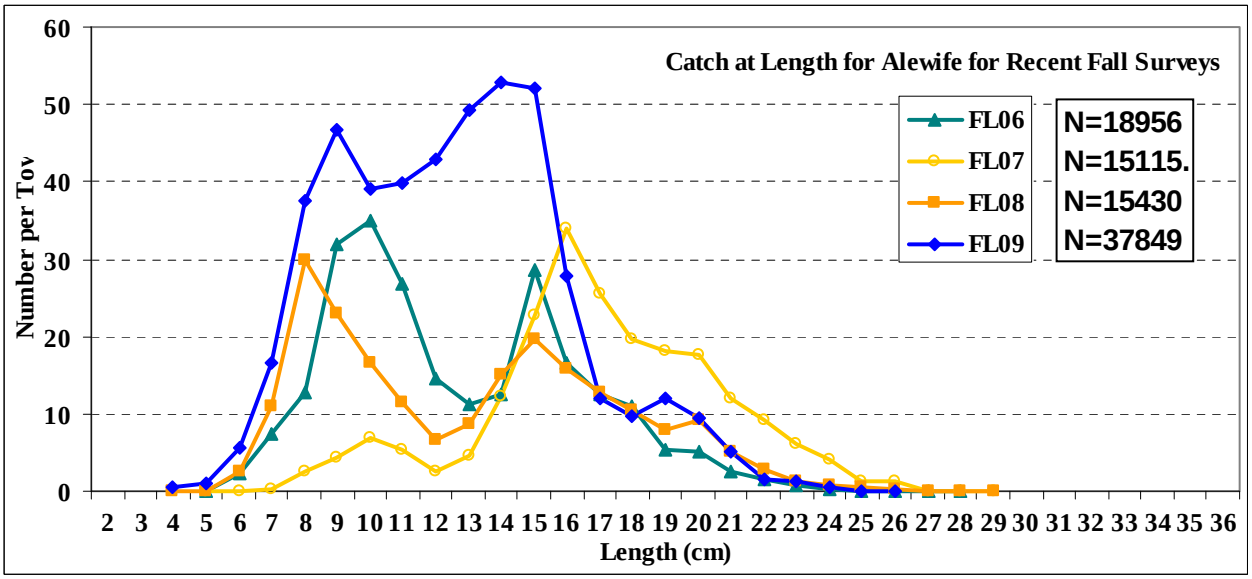
Alewife, *Alosa pseudoharengus*



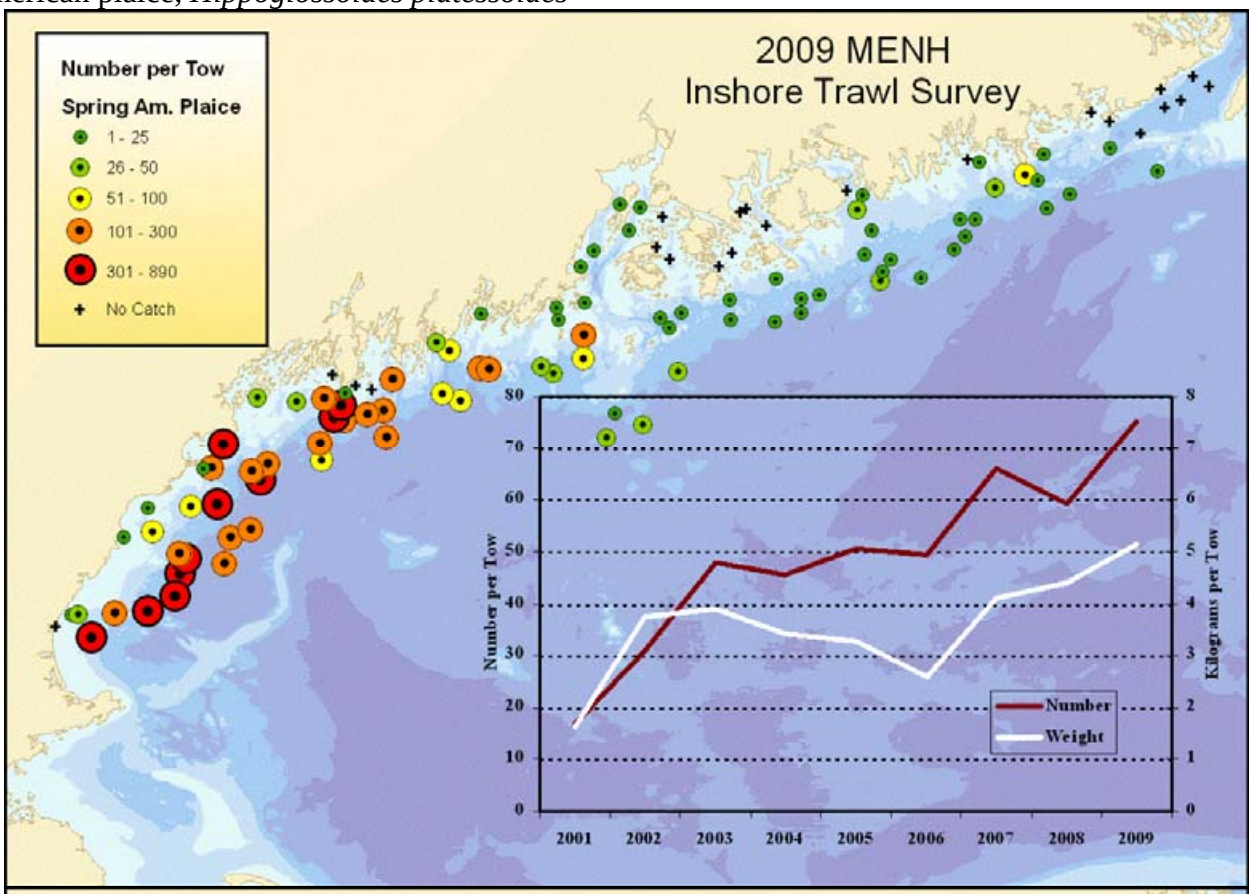


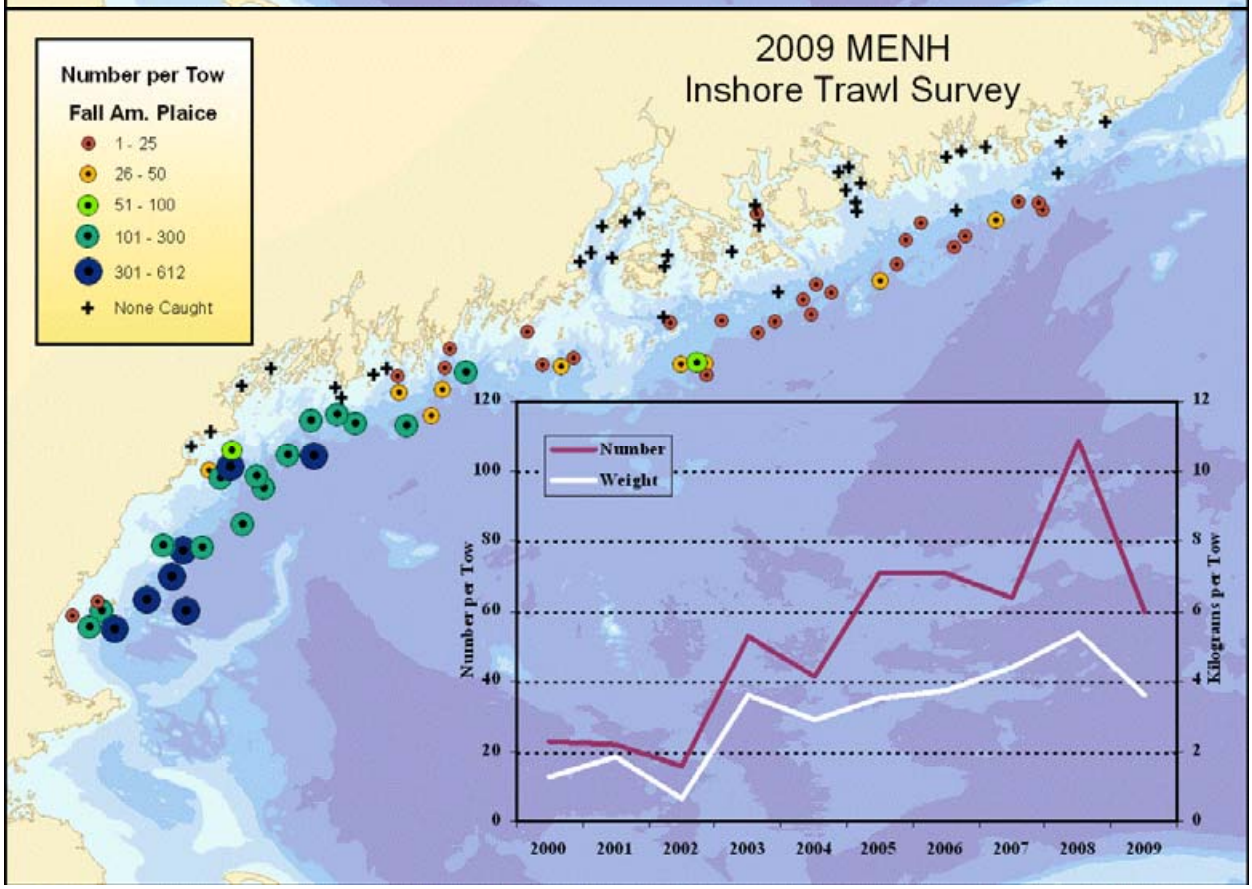
Mean and standard error for the graphs overlain on the distribution maps									
no fixed stations									
Regions 1 through 5, strata 1 through 4 (2003 on)									
SPRING					FALL				
Stratified Mean					Stratified Mean				
	Number		Weight			Number		Weight	
	mean	error	mean	error		mean	error	mean	error
					2000	210.41	72.14	4.94	1.48
2001	127.44	31.43	1.97	0.41	2001	140.64	57.86	5.72	2.16
2002	175.59	53.23	4.15	0.88	2002	381.27	163.92	5.36	1.71
2003	132.72	32.46	3.05	0.72	2003	174.43	51.42	4.85	2.07
2004	72.77	10.47	1.20	0.15	2004	261.32	61.81	5.36	0.66
2005	112.12	14.21	2.29	0.29	2005	190.51	28.49	5.10	0.70
2006	140.64	18.11	2.97	0.39	2006	239.42	59.48	5.85	1.45
2007	255.31	67.31	5.10	1.06	2007	215.23	49.97	12.52	3.33
2008	101.79	11.82	3.78	1.13	2008	211.32	43.56	7.18	0.79
2009	196.29	37.44	3.30	0.48	2009	463.66	117.52	18.83	6.99



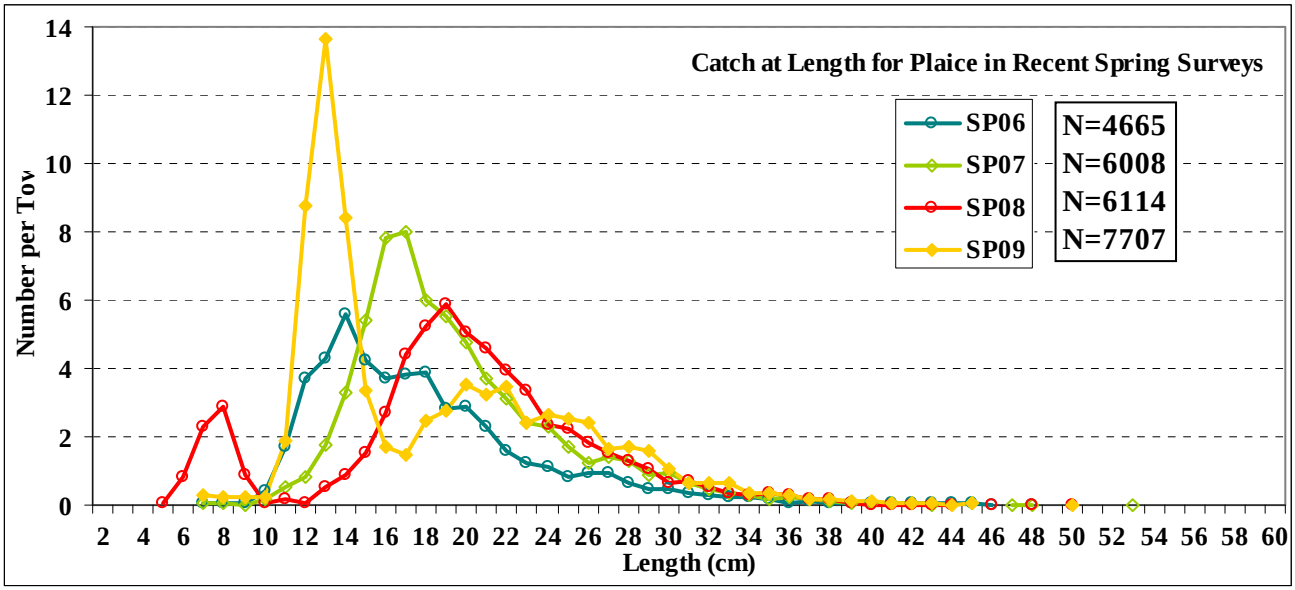


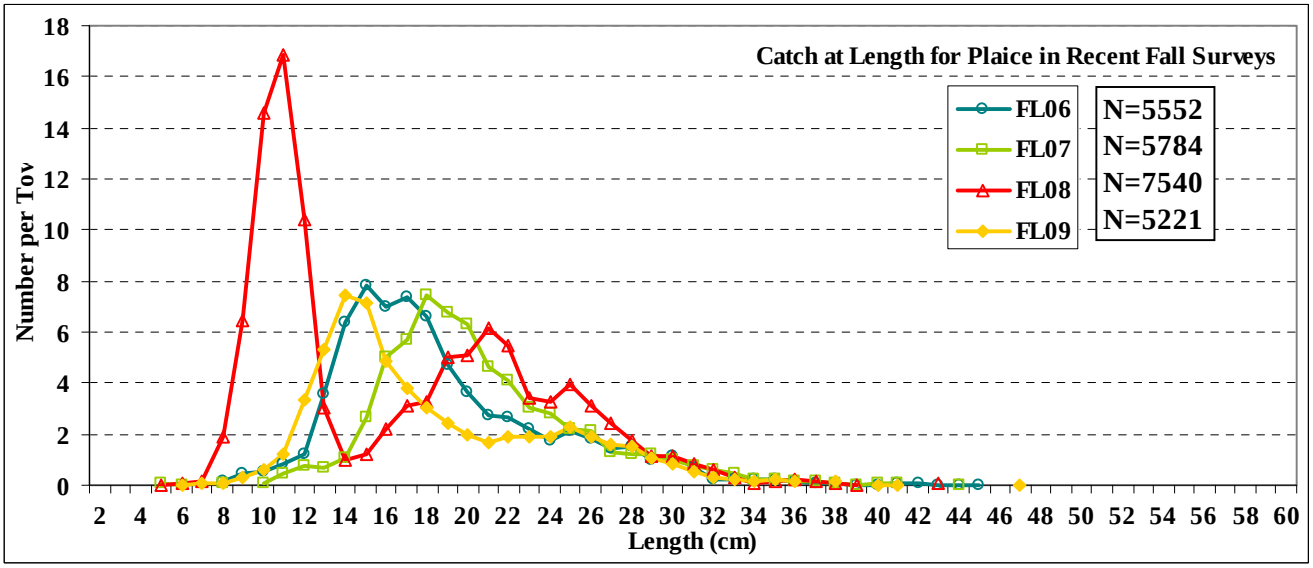
American plaice, *Hippoglossoides platessoides*



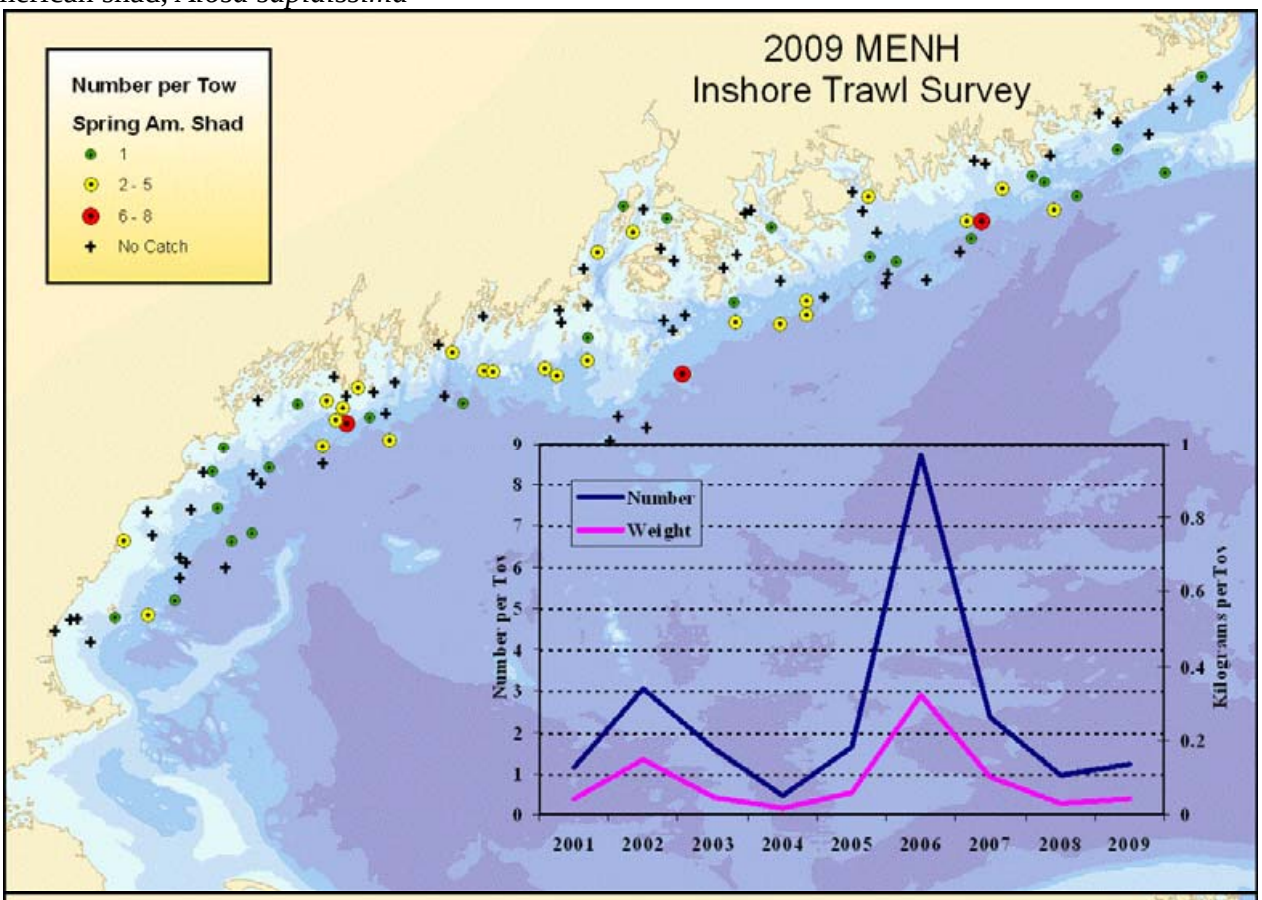


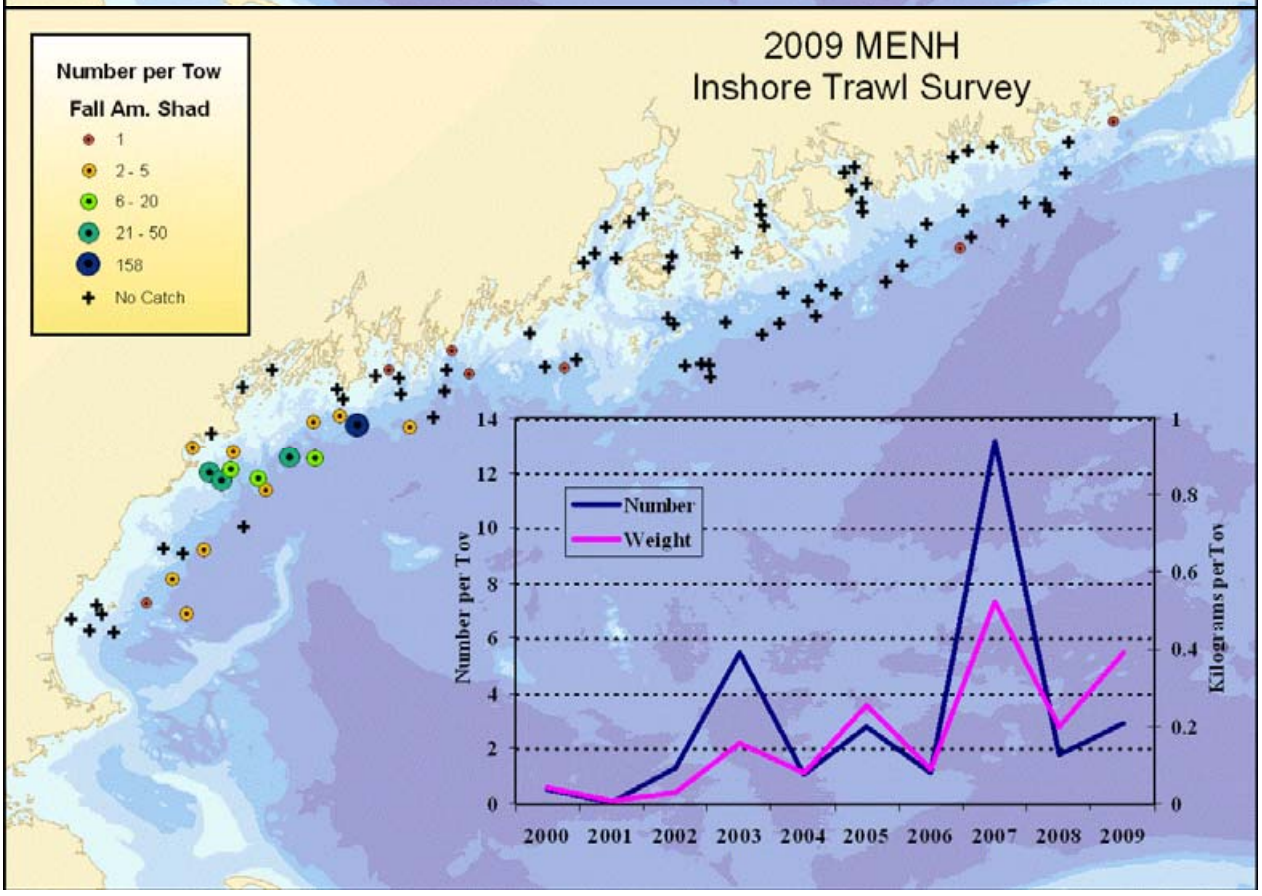
Mean and error for graphs overlain on distribution maps									
fixed stations not included for plaice, indices calculated for regions 1 through 5, strata 1 through 4 (2003 on)									
SPRING					FALL				
Stratified Means									
	Number		Weight			Number		Weight	
	Mean	Error	Mean	Error		Mean	Error	Mean	Error
					2000	22.66	6.30	1.28	0.28
2001	16.93	3.73	1.64	0.44	2001	21.93	2.26	1.85	0.20
2002	31.06	3.80	3.76	0.46	2002	15.68	3.68	0.67	0.13
2003	47.97	6.10	3.89	0.46	2003	52.82	7.31	3.60	0.38
2004	45.62	7.91	3.42	0.52	2004	41.11	4.29	2.89	0.27
2005	50.68	5.85	3.27	0.34	2005	70.72	8.89	3.53	0.32
2006	49.50	5.03	2.58	0.20	2006	70.70	7.66	3.74	0.30
2007	65.92	6.40	4.09	0.35	2007	63.60	7.38	4.38	0.43
2008	59.29	7.51	4.41	0.45	2008	108.72	12.69	5.35	0.63
2009	75.30	7.71	5.14	0.51	2009	59.93	6.69	3.61	0.43



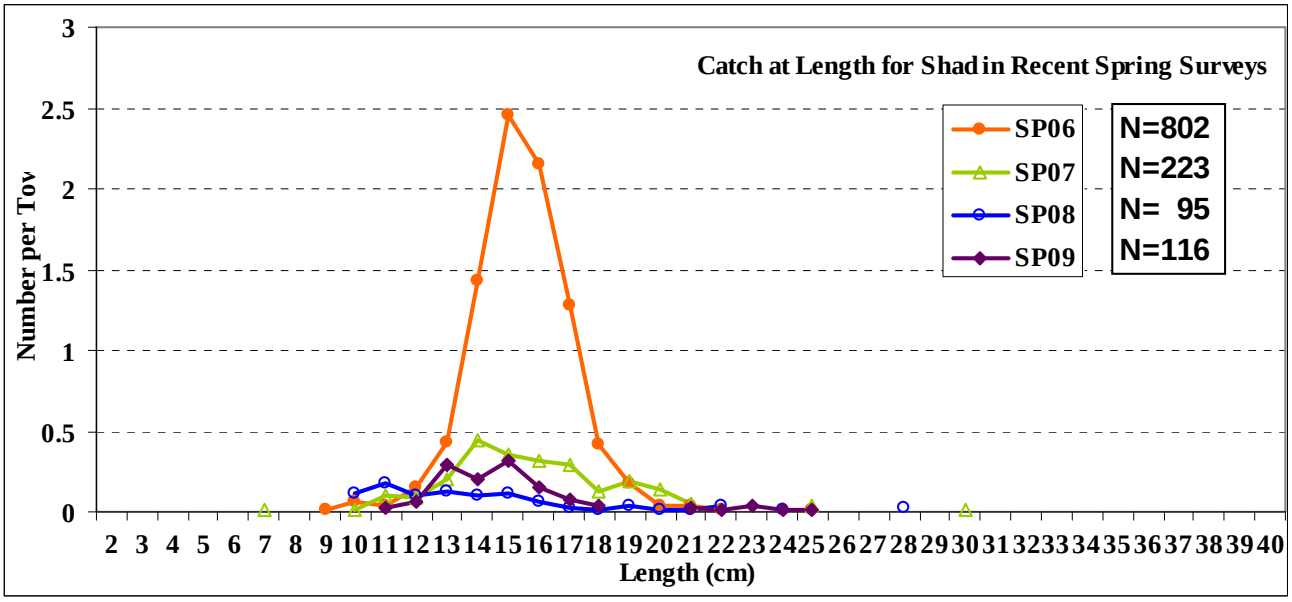


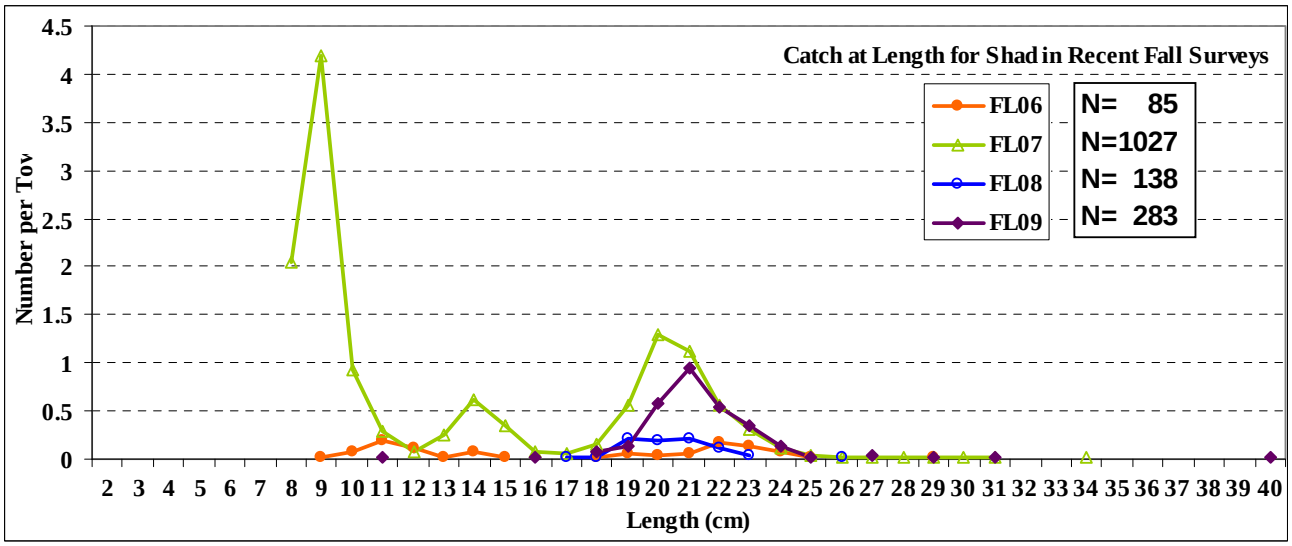
American shad, *Alosa sapidissima*



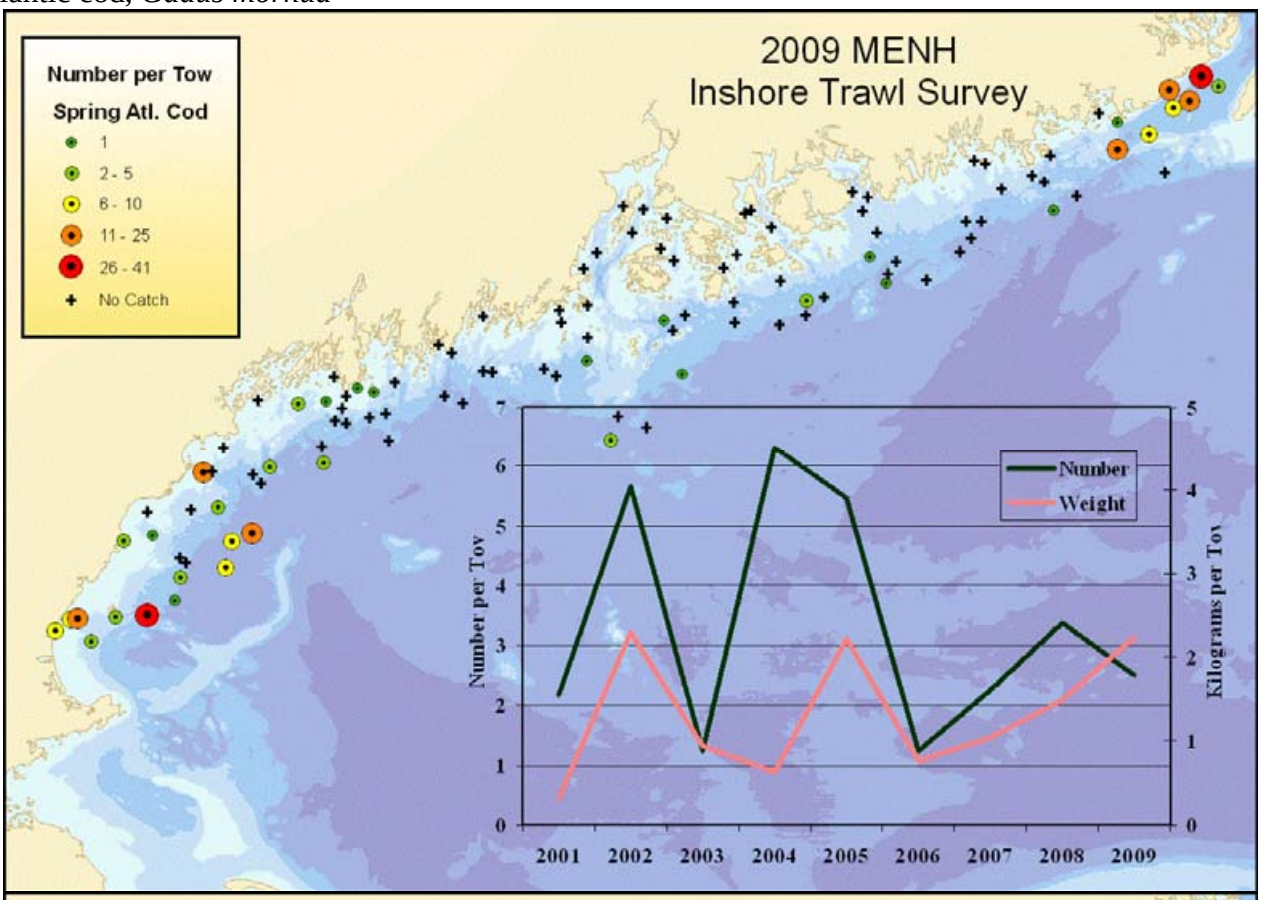


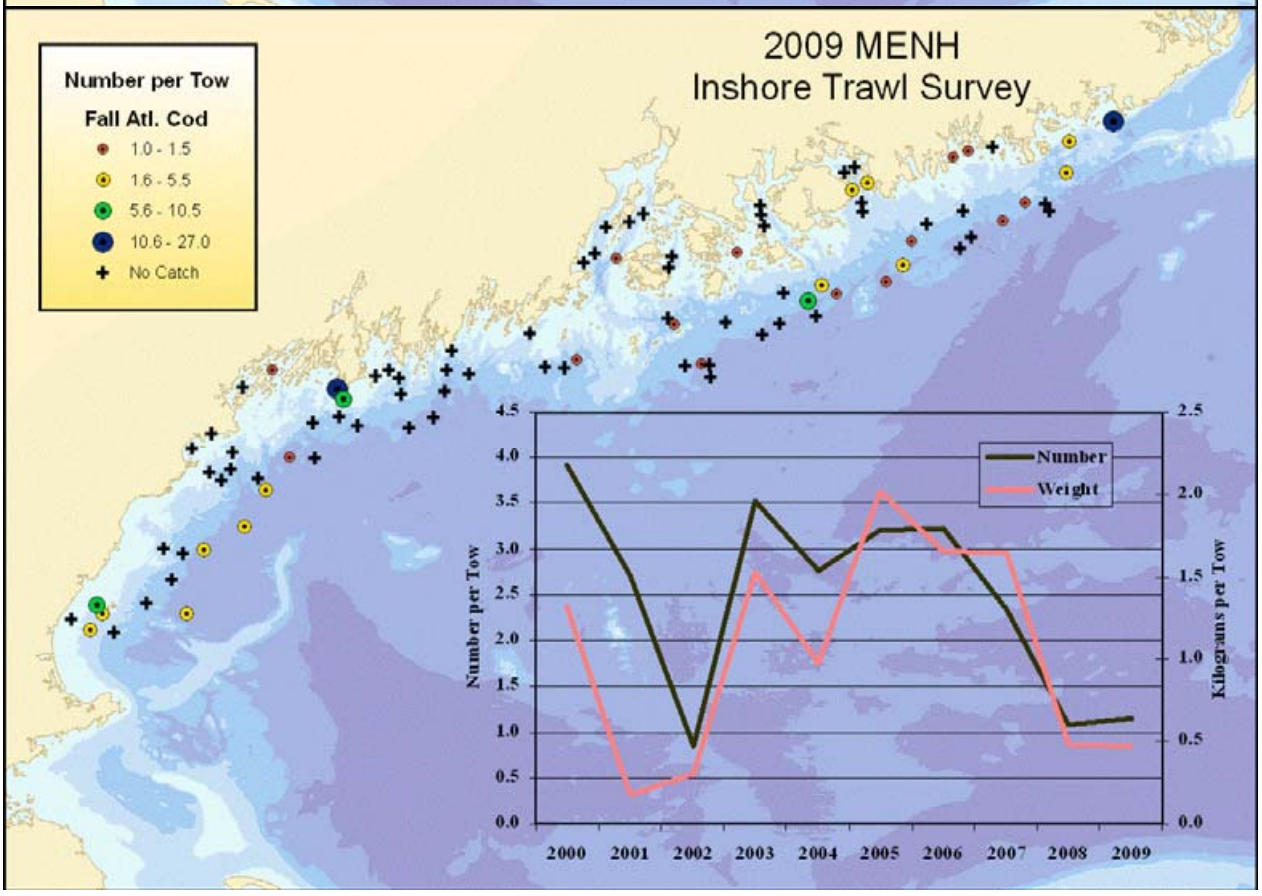
Mean and error for graphs overlain on distribution maps no fixed stations included for shad, indices calculated for regions 1 through 5; Strata 1 through 4 (2003 on)									
SPRING					**FALL**				
Stratified Mean					**Stratified Mean**				
	Number		**Weight**			**Number**		**Weight**	
	Mean	**Error**	**Mean**	**Error**		**Mean**	**Error**	**Mean**	**Error**
					2000	0.56	0.18	0.04	0.01
2001	1.16	0.37	0.04	0.01	**2001**	0.06	0.04	0.01	0.00
2002	3.03	0.50	0.15	0.03	**2002**	1.33	0.54	0.03	0.01
2003	1.62	0.34	0.05	0.01	**2003**	5.45	4.52	0.16	0.09
2004	0.45	0.11	0.02	0.00	**2004**	1.06	0.46	0.08	0.03
2005	1.65	0.28	0.06	0.01	**2005**	2.81	0.37	0.25	0.03
2006	8.72	1.59	0.32	0.06	**2006**	1.13	0.54	0.09	0.02
2007	2.35	0.29	0.10	0.01	**2007**	13.15	7.26	0.53	0.16
2008	0.97	0.35	0.03	0.01	**2008**	1.78	0.43	0.20	0.05
2009	1.24	0.17	0.04	0.01	**2009**	2.91	1.60	0.39	0.21



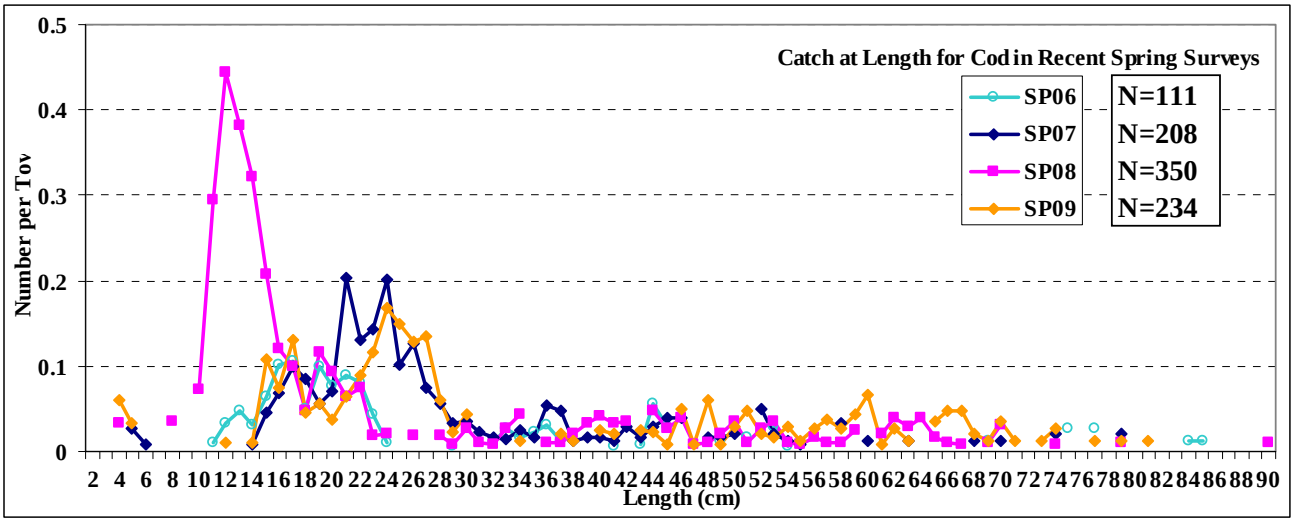


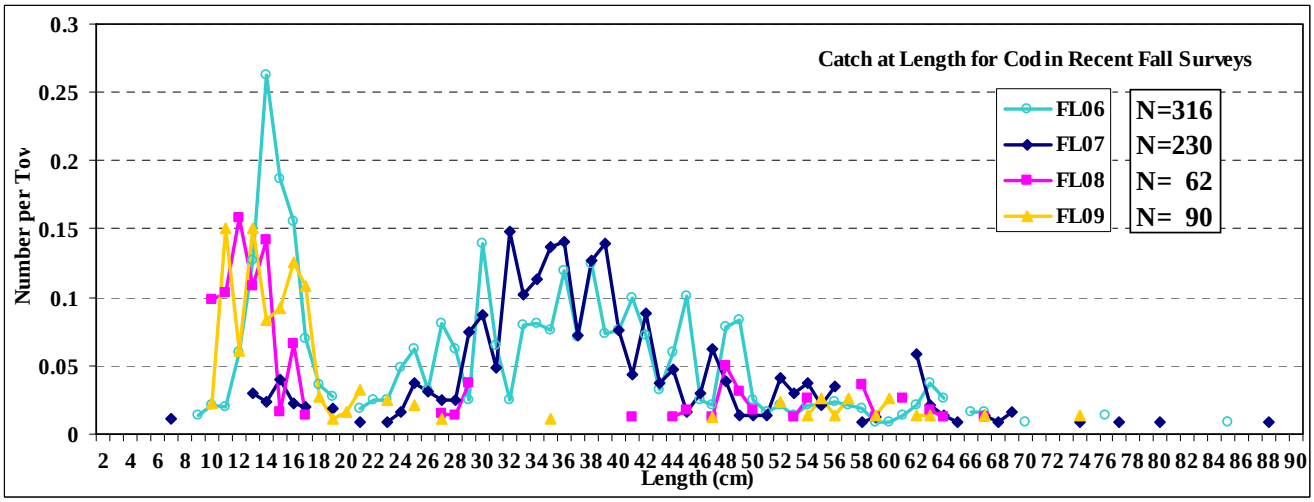
Atlantic cod, *Gadus morhua*



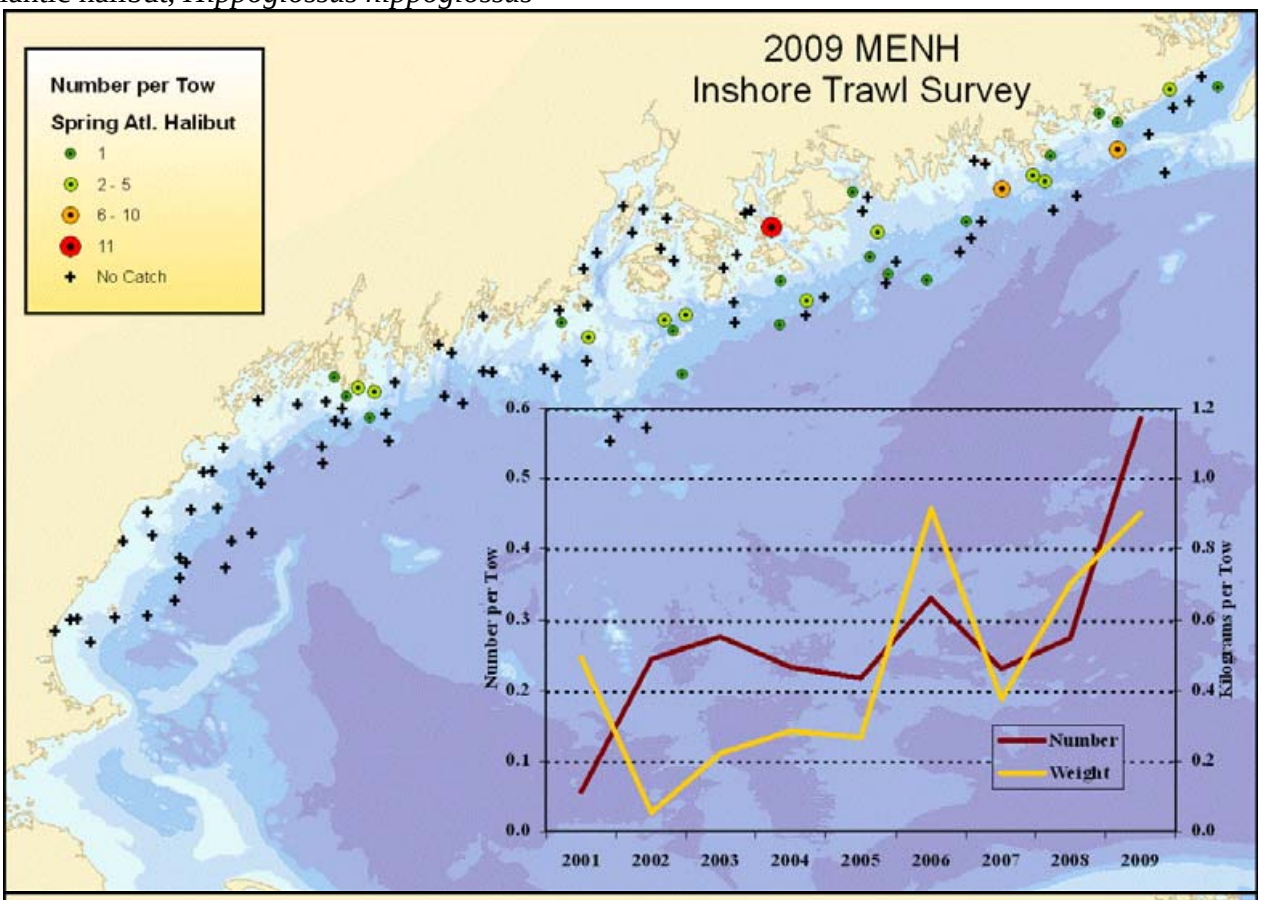


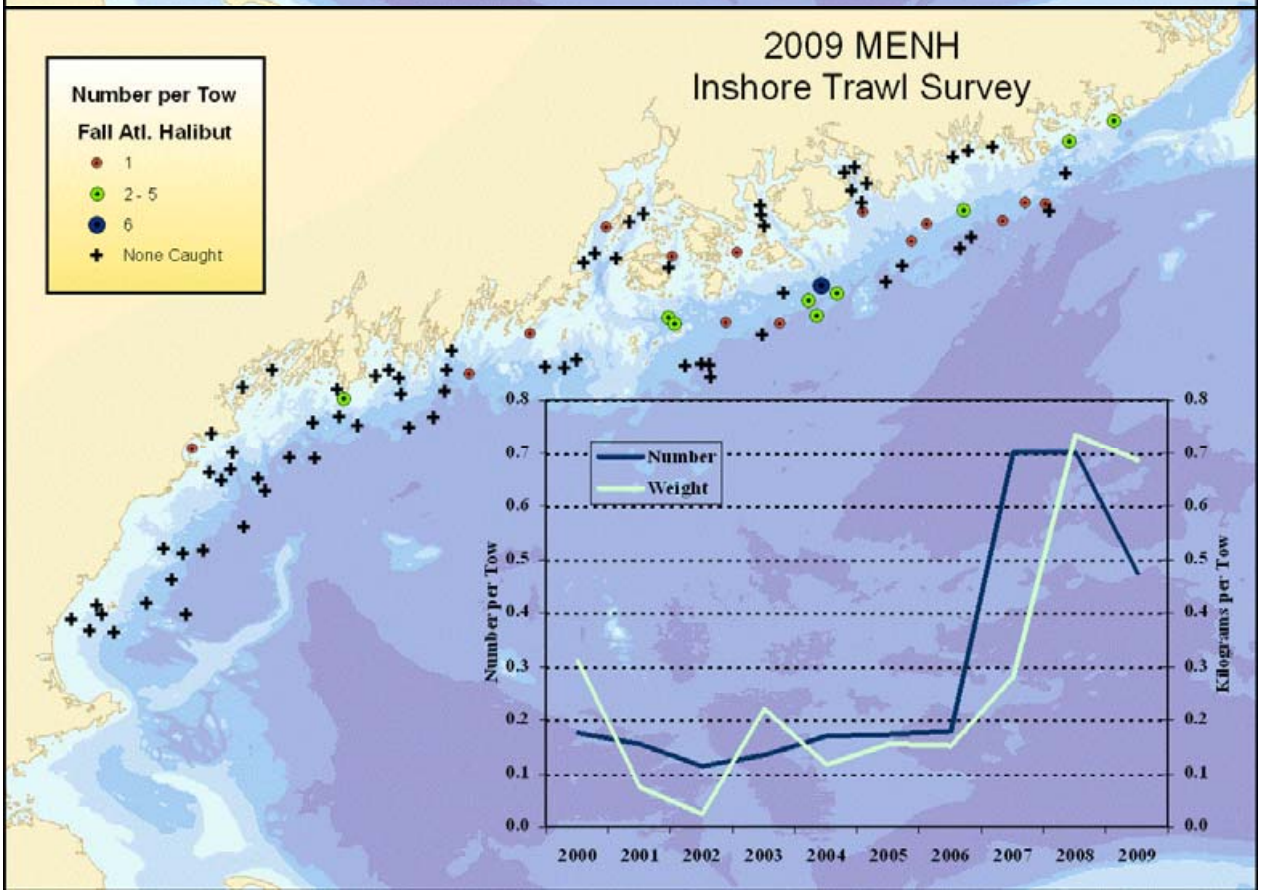
Mean with error for the graphs overlain on the distribution maps									
fixed stations not included									
for Atlantic cod, indices calculated for regions 1 through 5; strata 1 through 4 (2003 on)									
	FALL					SPRING			
	Stratified Mean					Stratified Mean			
	Number		Weight			Number		Weight	
	Mean	Error	Mean	Error		Mean	Error	Mean	Error
2000	3.91	1.85	1.32	0.74					
2001	2.72	0.72	0.18	0.04	**2001**	2.17	0.52	0.32	0.09
2002	0.85	0.20	0.30	0.09	**2002**	5.66	2.95	2.29	0.92
2003	3.53	0.80	1.52	0.30	**2003**	1.23	0.27	0.94	0.28
2004	2.76	1.11	0.98	0.27	**2004**	6.30	1.60	0.63	0.18
2005	3.20	1.87	2.01	1.37	**2005**	5.46	2.68	2.22	1.45
2006	3.22	1.56	1.66	0.86	**2006**	1.24	0.35	0.76	0.45
2007	2.34	1.21	1.64	0.83	**2007**	2.26	0.61	1.04	0.19
2008	1.08	0.45	0.48	0.19	**2008**	3.38	1.46	1.49	0.57
2009	1.18	0.40	0.05	0.02	**2009**	2.51	0.59	2.24	0.79



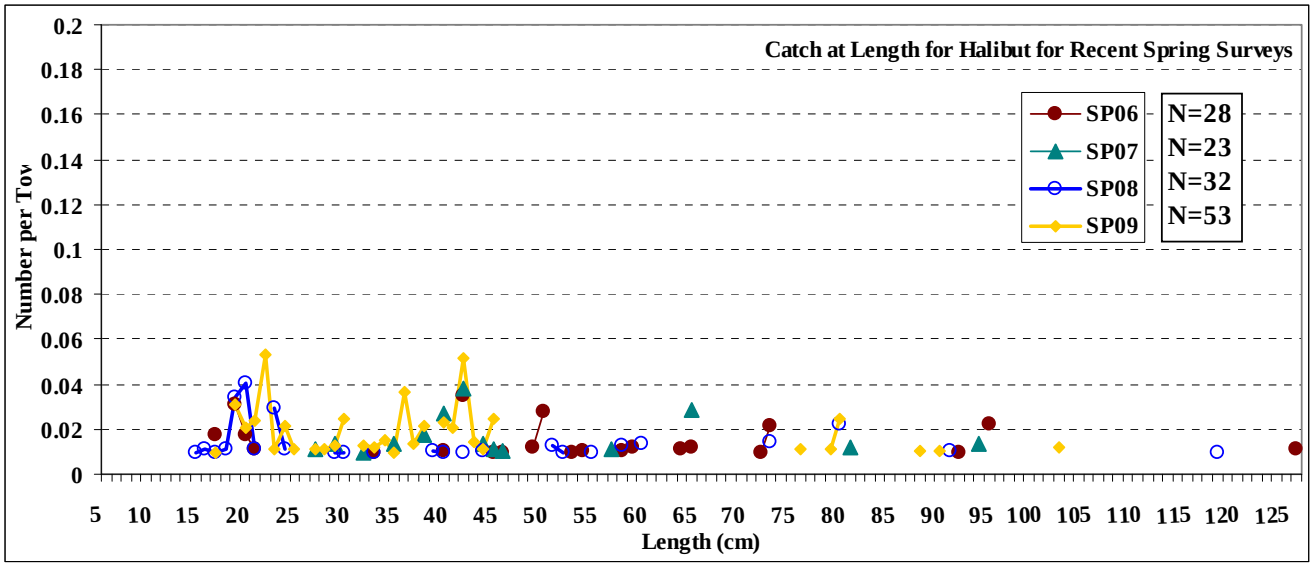


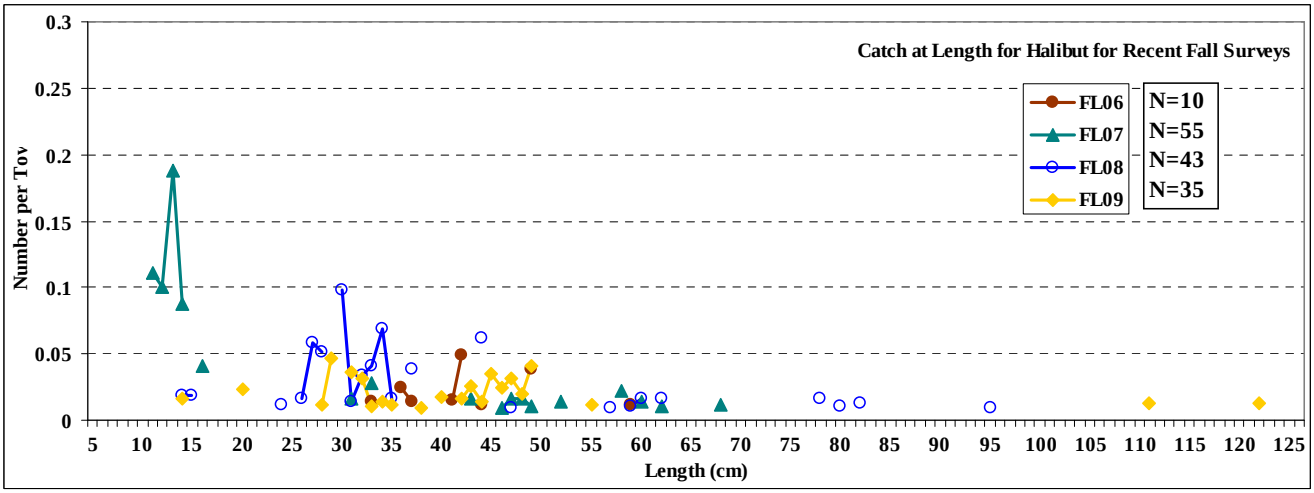
Atlantic halibut, *Hippoglossus hippoglossus*



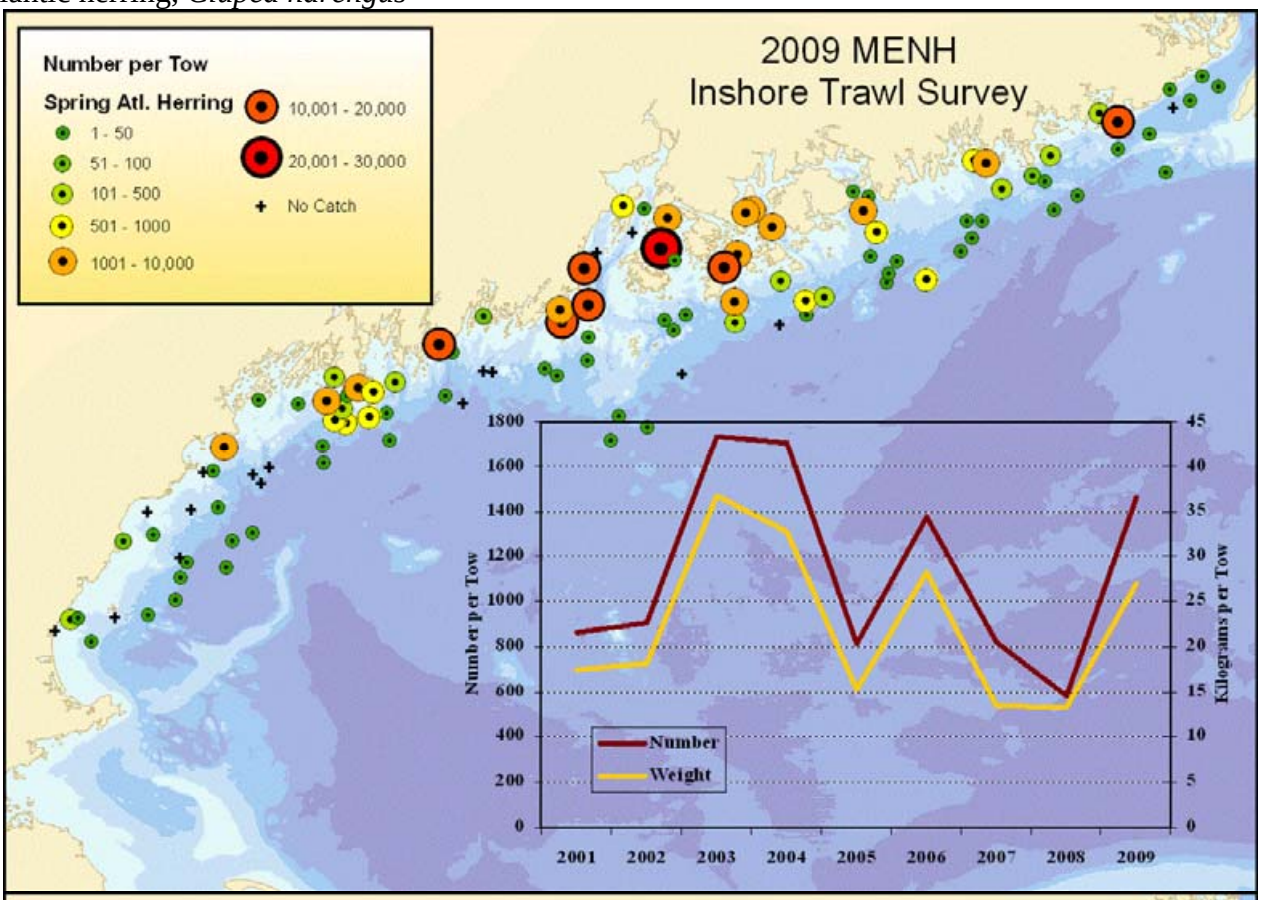


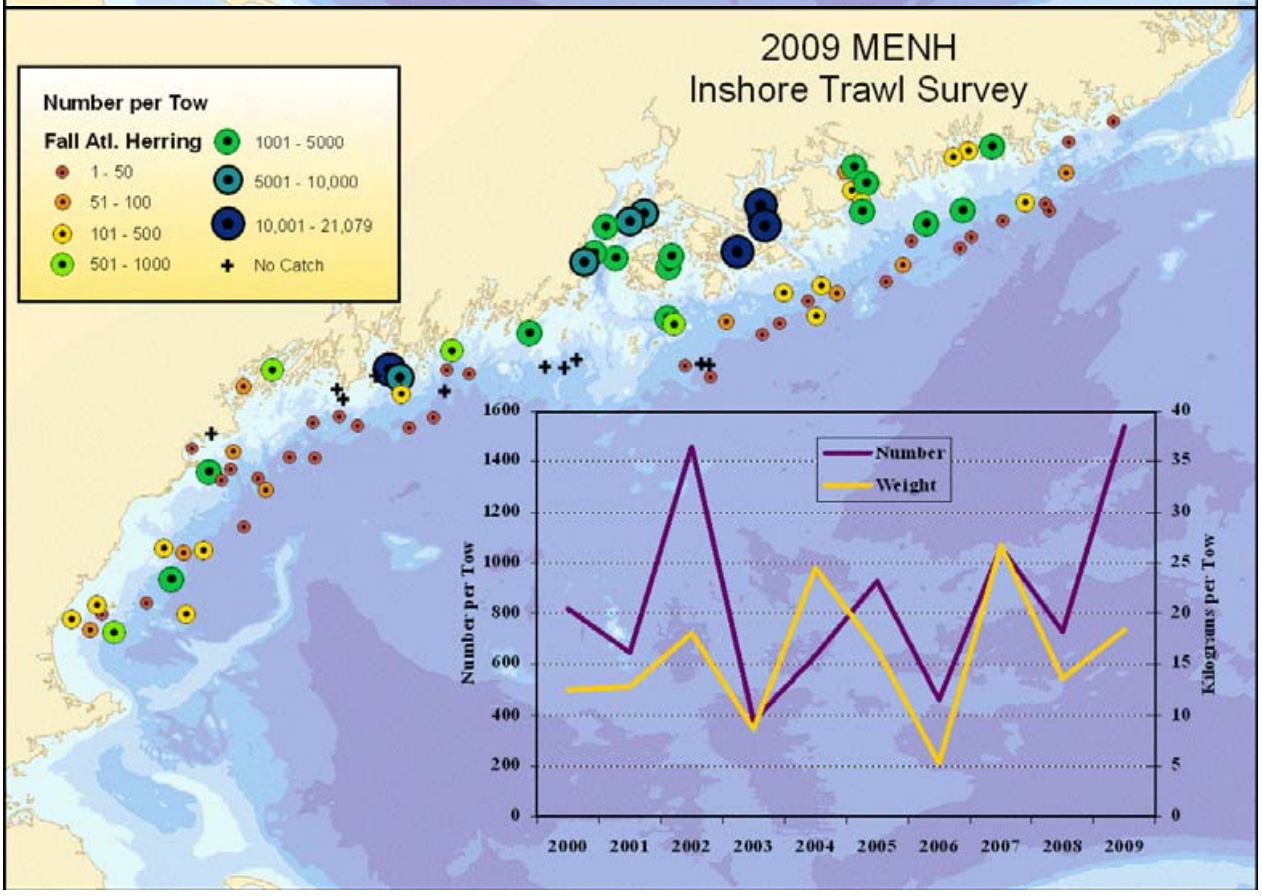
Mean and error for graphs overlain on distribution maps									
fixed stations not included									
for halibut, indices calculated for regions 1 through 5; strata 1 through 4 (2003 and up)									
SPRING					FALL				
	Stratified Mean					Stratified Mean			
	Number		Weight			Number		Weight	
	Mean	Error	Mean	Error		Mean	Error	Mean	Error
					2000	0.18	0.08	0.31	0.16
2001	0.06	0.02	0.49	0.41	2001	0.16	0.09	0.08	0.07
2002	0.24	0.08	0.05	0.03	2002	0.11	0.05	0.02	0.01
2003	0.28	0.07	0.22	0.13	2003	0.14	0.05	0.22	0.12
2004	0.23	0.06	0.29	0.18	2004	0.17	0.09	0.12	0.04
2005	0.22	0.08	0.27	0.12	2005	0.17	0.06	0.16	0.05
2006	0.33	0.08	0.92	0.34	2006	0.18	0.10	0.15	0.09
2007	0.23	0.07	0.38	0.16	2007	0.70	0.39	0.28	0.08
2008	0.27	0.08	0.70	0.28	2008	0.70	0.18	0.73	0.23
2009	0.59	0.15	0.90	0.32	2009	0.48	0.10	0.69	0.24



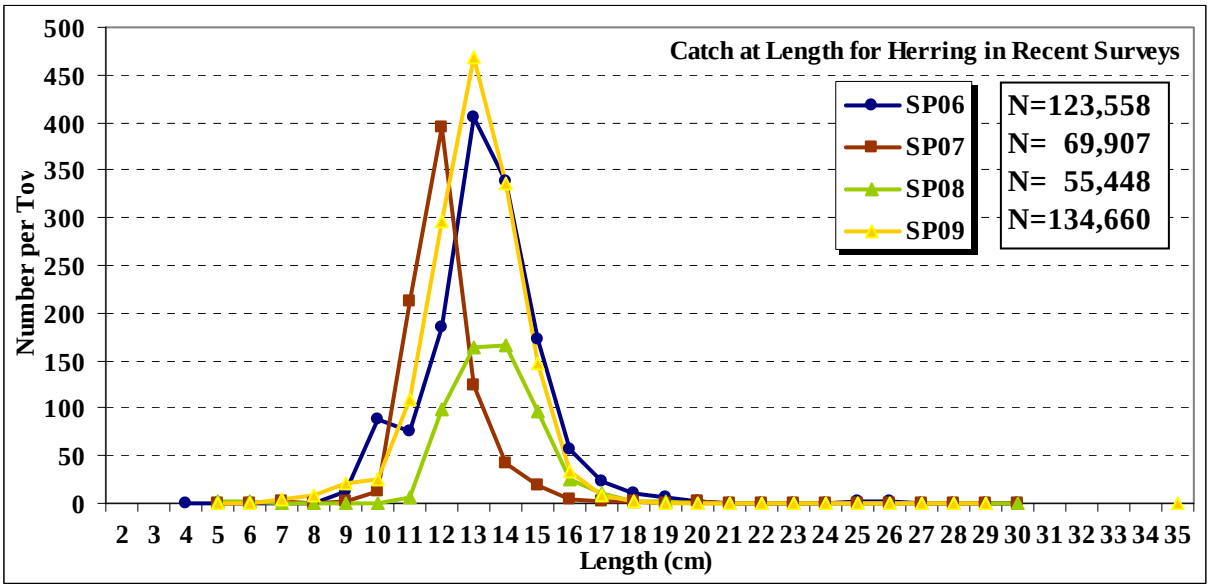


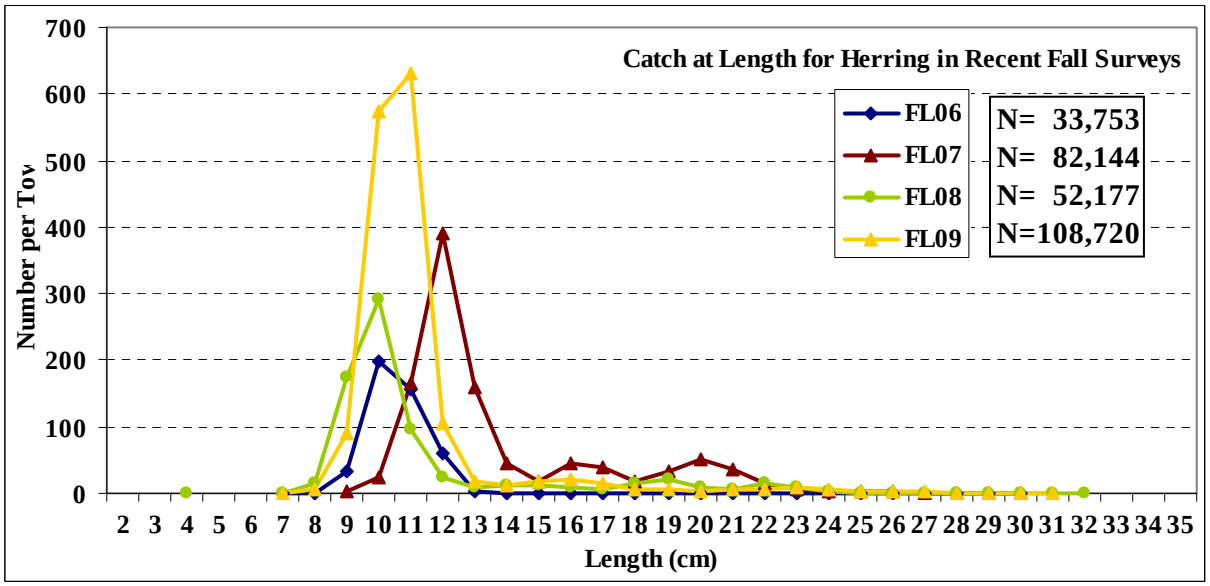
Atlantic herring, *Clupea harengus*





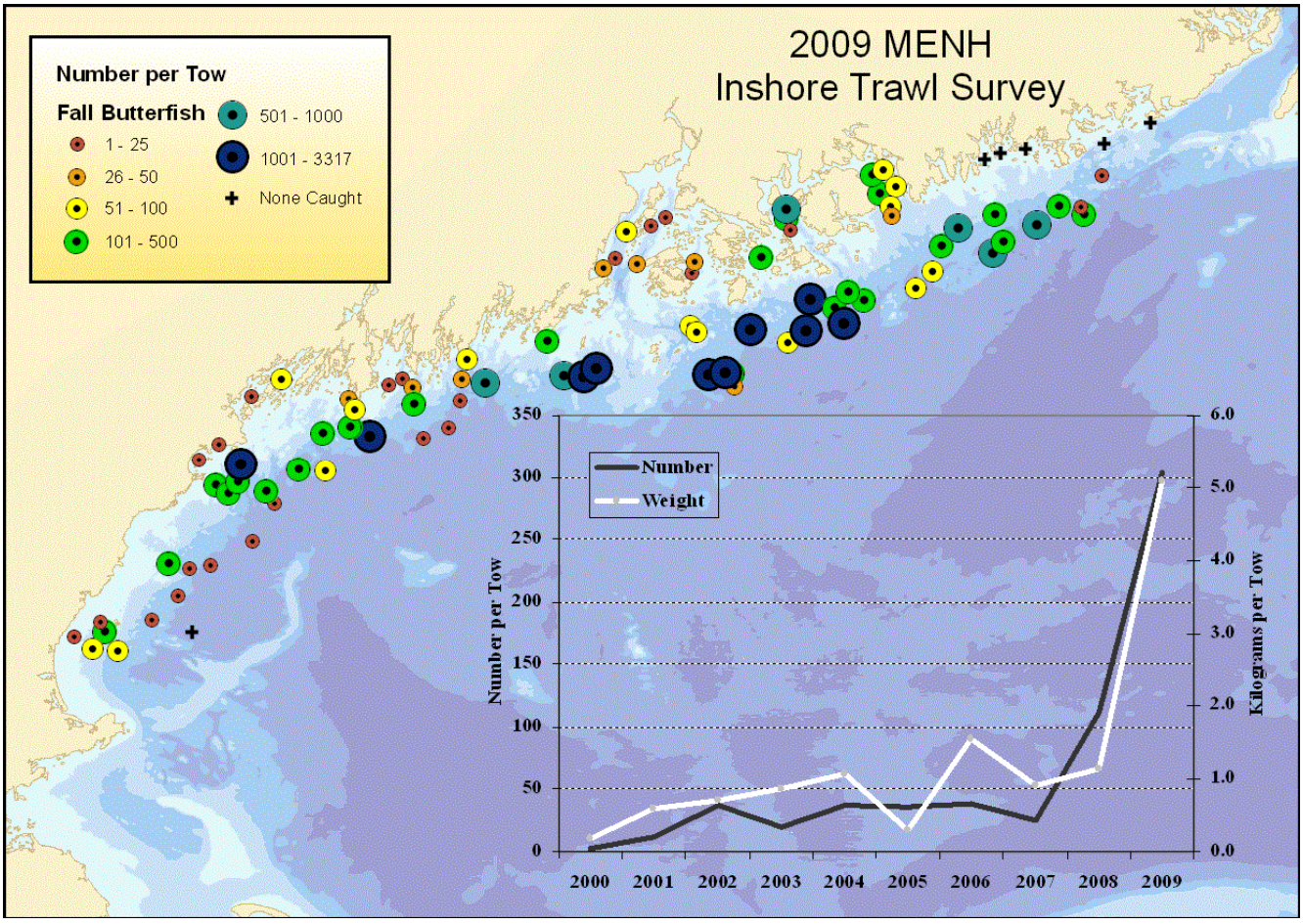
Mean and error for graphs overlain on distribution maps									
fixed stations not included									
For herring: Regions 1 through 5, strata 1 through 4 (2003 and up)									
SPRING					FALL				
	Stratified Mean					Stratified Mean			
	Number		Weight			Number		Weight	
	Mean	Error	Mean	Error		Mean	Error	Mean	Error
					2000	819.95	280.03	12.42	2.99
2001	863.57	320.16	17.43	6.35	2001	647.59	257.07	12.83	5.45
2002	907.83	277.64	18.16	5.12	2002	1457.16	583.46	18.15	6.45
2003	1734.67	451.80	36.64	9.17	2003	376.73	184.61	8.71	5.23
2004	1709.26	394.93	32.81	7.04	2004	633.36	206.06	24.47	11.50
2005	810.78	285.45	15.25	4.24	2005	928.00	248.14	16.44	6.37
2006	1375.43	320.15	28.22	6.03	2006	461.44	86.01	5.26	1.22
2007	821.49	293.07	13.48	4.70	2007	1059.36	284.90	26.78	13.05
2008	582.13	97.32	13.40	2.16	2008	730.87	195.77	13.58	5.61
2009	1461.51	401.06	26.99	7.71	2009	1542.49	361.47	18.32	4.58



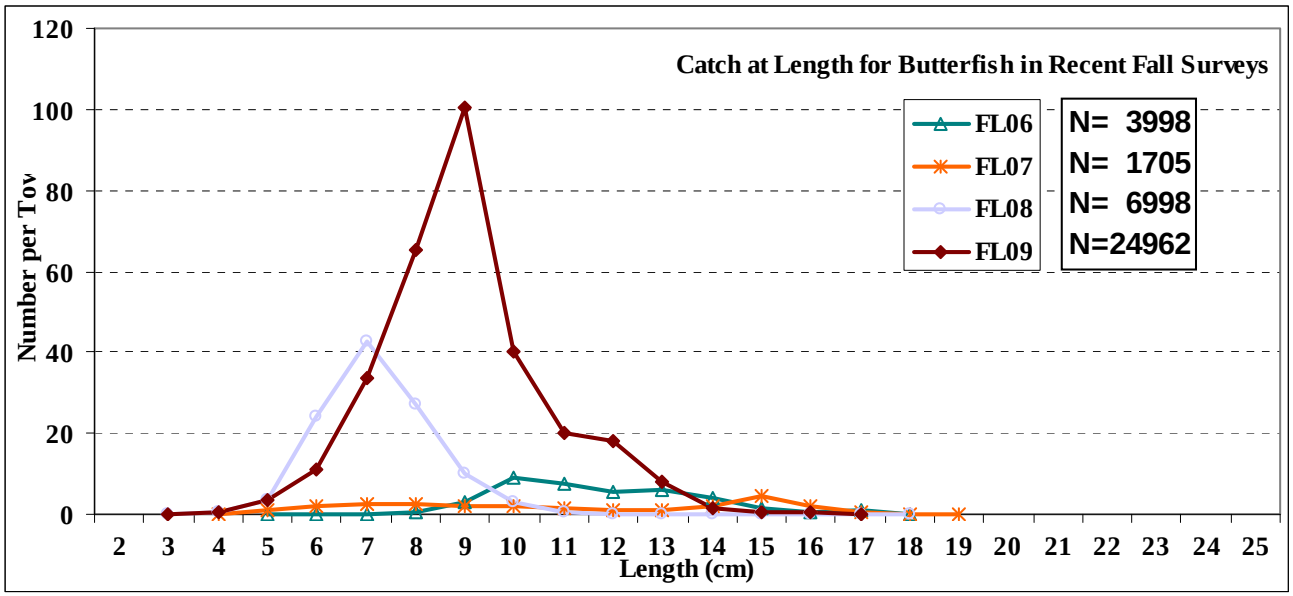


Butterfish, *Peprilus tricanthus*

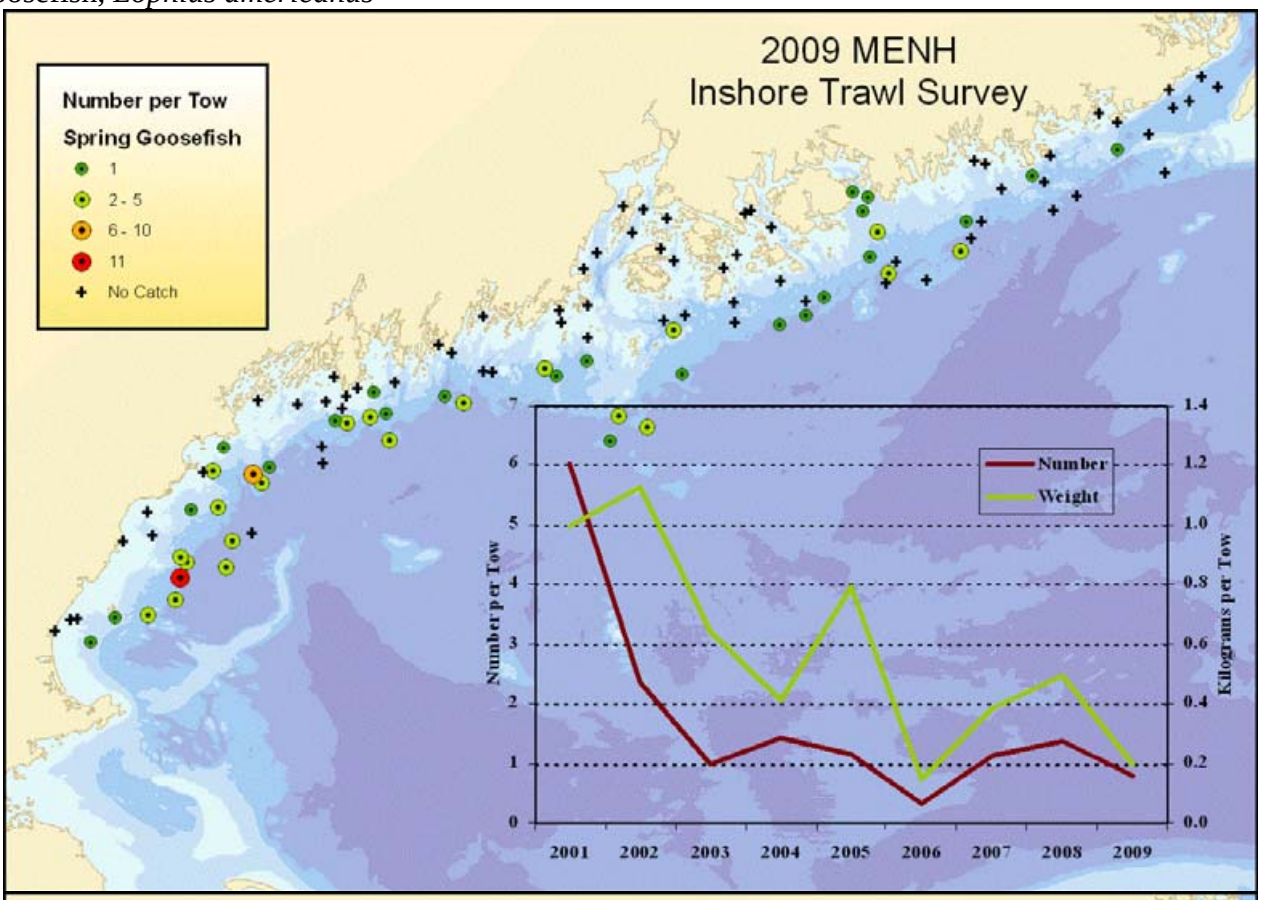
Fairly rare in the spring surveys, a total of 2 fish were caught in 2001, 3 in 2002, then nothing until 2006 where 13 fish were caught, 15 in 2007, 3 in spring 2008, and none in 2009.

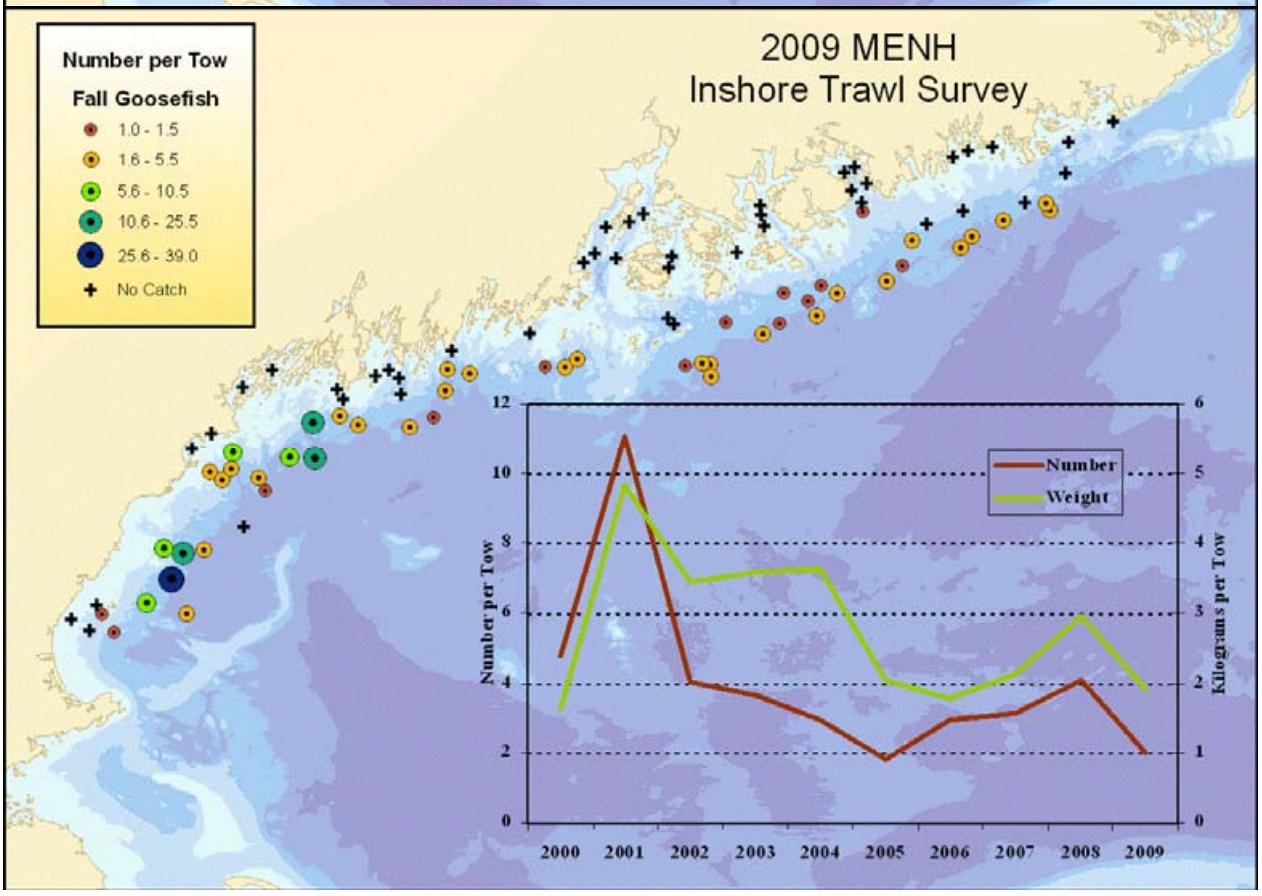


fixed stations not included FALL				
for butterfish, indices calculated for regions 1 through 5				
strata 1 through 4 (2003 and up)				
	Stratified Mean			
	Number		Weight	
	Mean	Error	Mean	Error
2000	2.26	0.78	0.18	0.07
2001	11.67	4.38	0.60	0.23
2002	37.92	13.73	0.71	0.21
2003	19.65	4.50	0.86	0.12
2004	37.60	5.91	1.06	0.34
2005	36.16	21.37	0.29	0.13
2006	38.91	10.93	1.55	0.56
2007	24.85	3.71	0.92	0.11
2008	112.10	42.00	1.14	0.37
2009	303.32	50.56	5.08	0.75

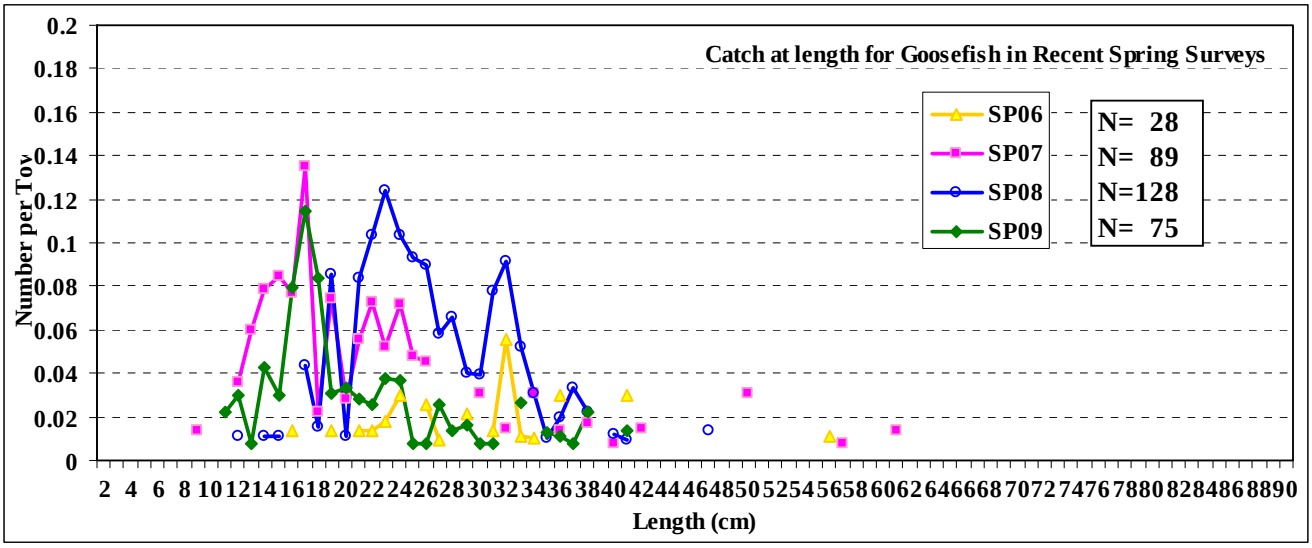


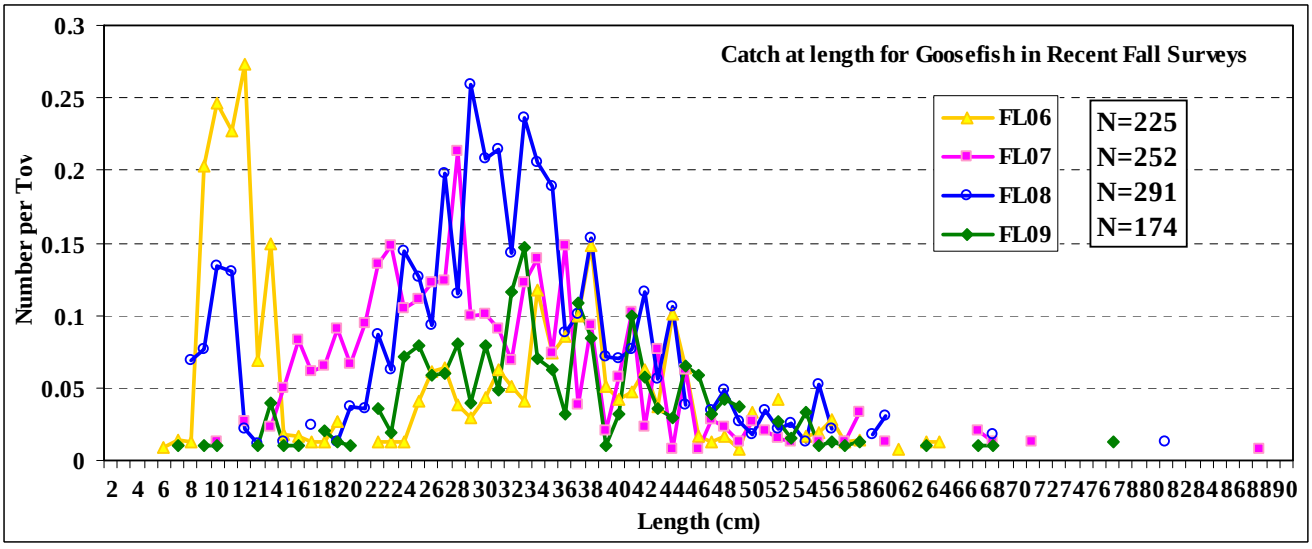
Goosefish, *Lophius americanus*



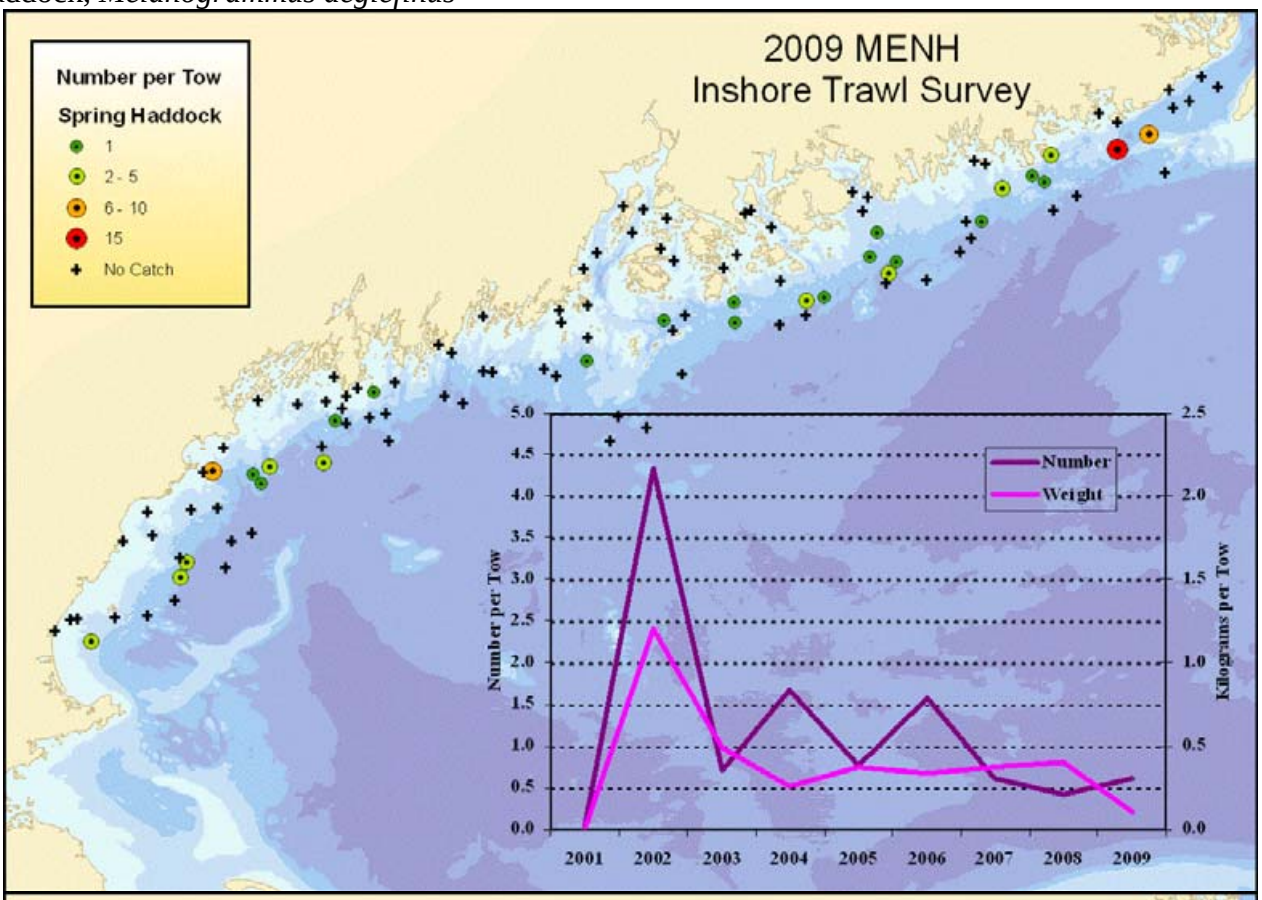


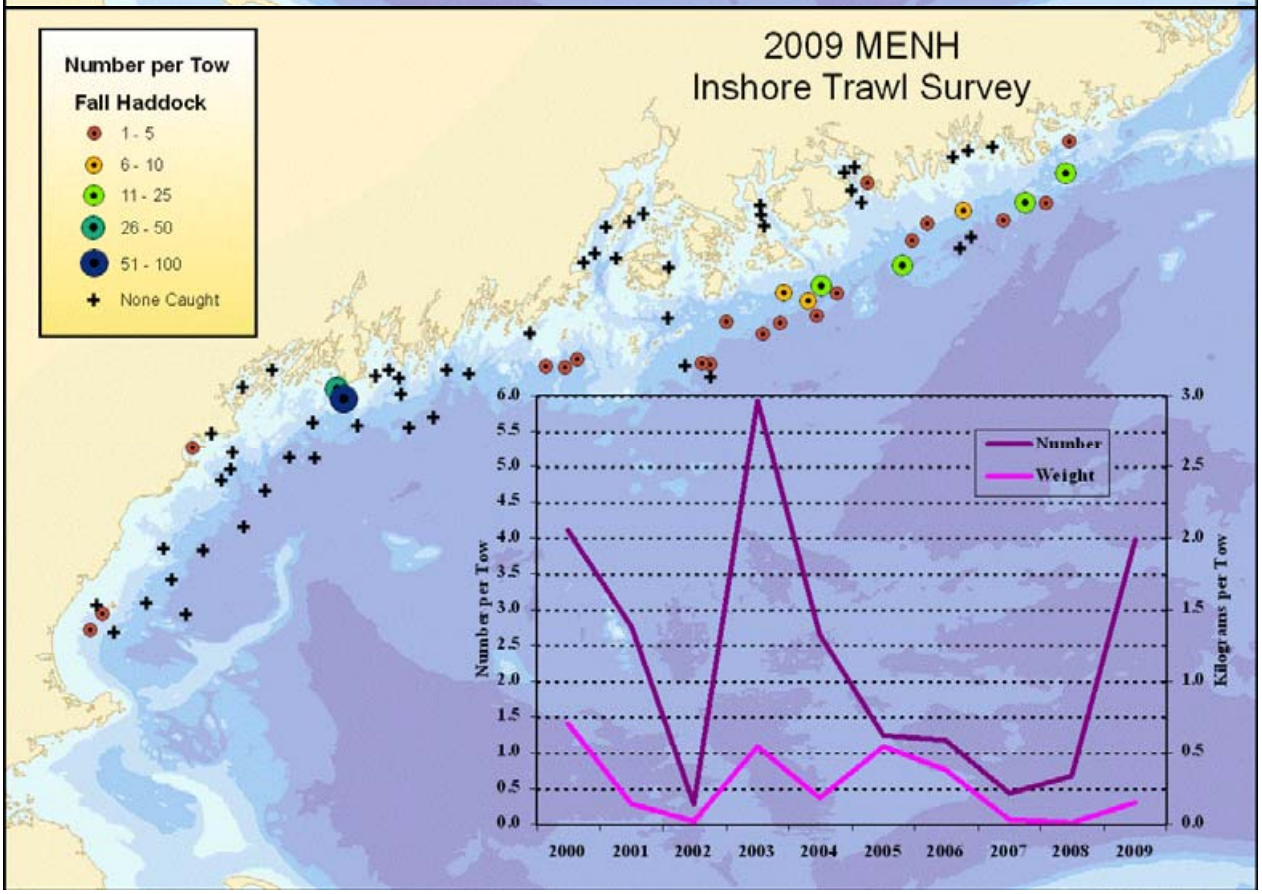
Mean and error for graphs overlain on distribution maps									
fixed stations not included									
for goosefish, indices calculated for regions 1 through 5									
strata 1 through 4 (from 2003 on)									
SPRING						FALL			
	Stratified Mean						Stratified Mean			
	Number		Weight				Number		Weight	
	Mean	Error	Mean	Error			Mean	Error	Mean	Error
						2000	4.8	0.61	1.65	0.28
2001	6.0	0.91	0.99	0.15		2001	11.1	1.56	4.83	0.50
2002	2.4	0.33	1.12	0.17		2002	4.1	1.13	3.45	1.14
2003	1.0	0.14	0.64	0.18		2003	3.7	0.64	3.60	0.80
2004	1.4	0.17	0.41	0.12		2004	3.0	0.52	3.63	0.84
2005	1.1	0.16	0.79	0.15		2005	1.8	0.25	2.04	0.47
2006	0.3	0.06	0.15	0.03		2006	2.9	0.31	1.79	0.20
2007	1.1	0.18	0.38	0.10		2007	3.1	0.43	2.13	0.35
2008	1.37	0.19	0.49	0.08		2008	4.10	0.70	2.96	0.41
2009	0.79	0.11	0.20	0.04		2009	2.00	0.41	1.93	0.52



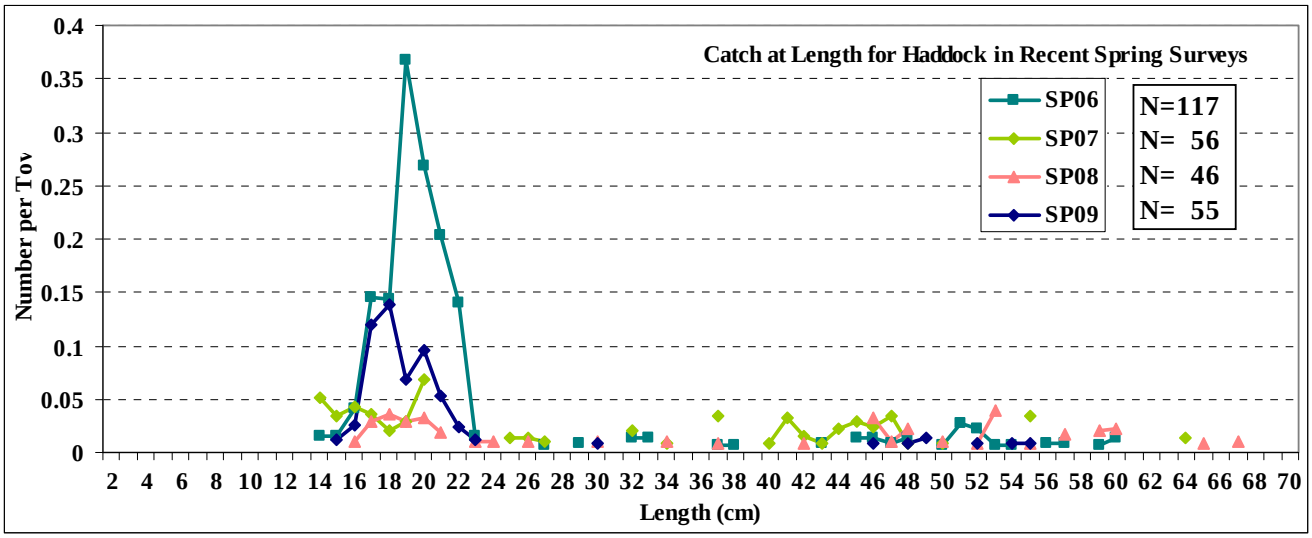


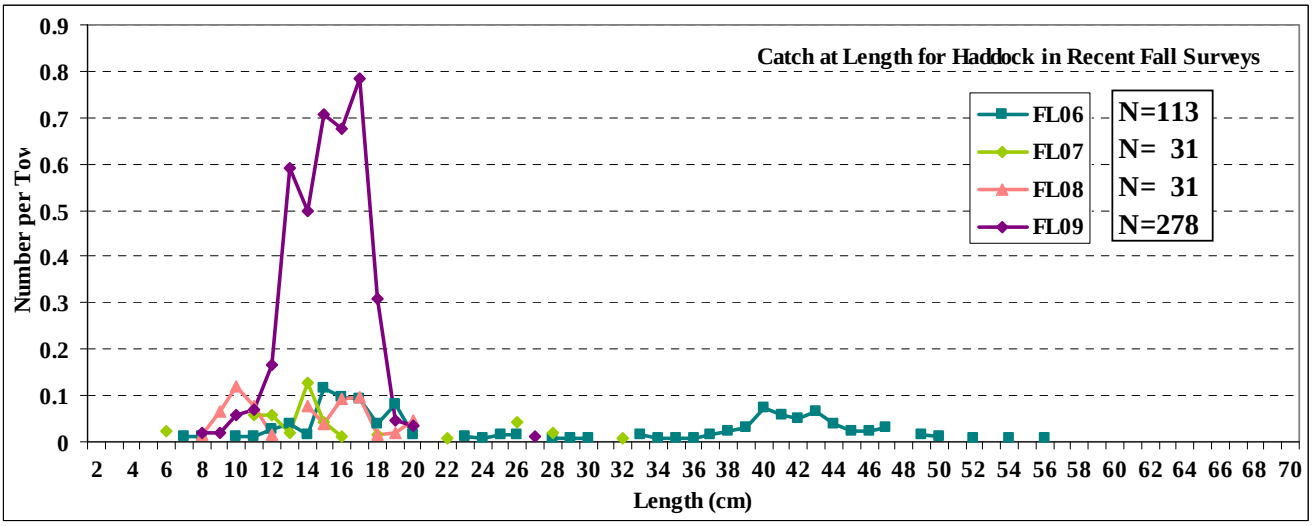
Haddock, *Melanogrammus aeglefinus*



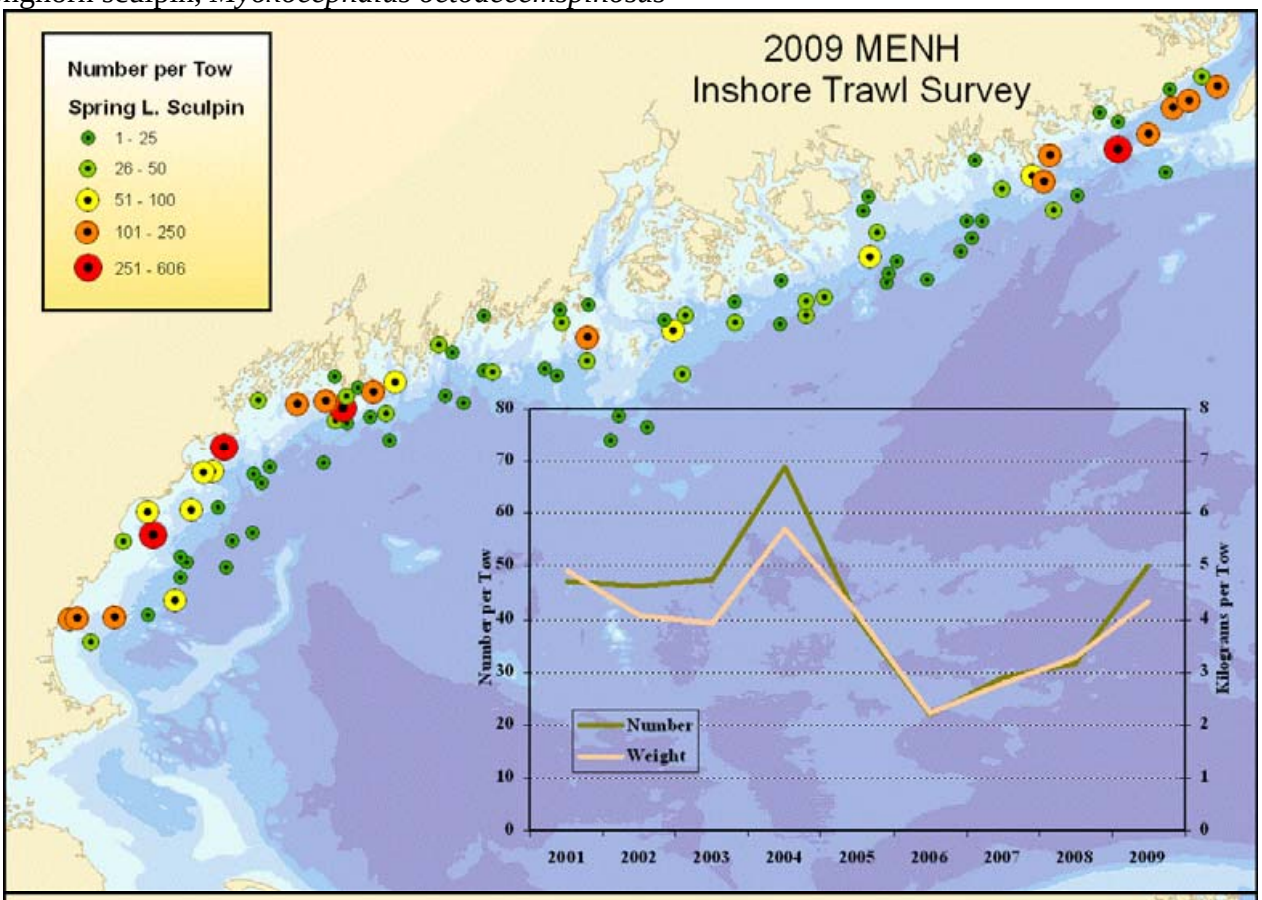


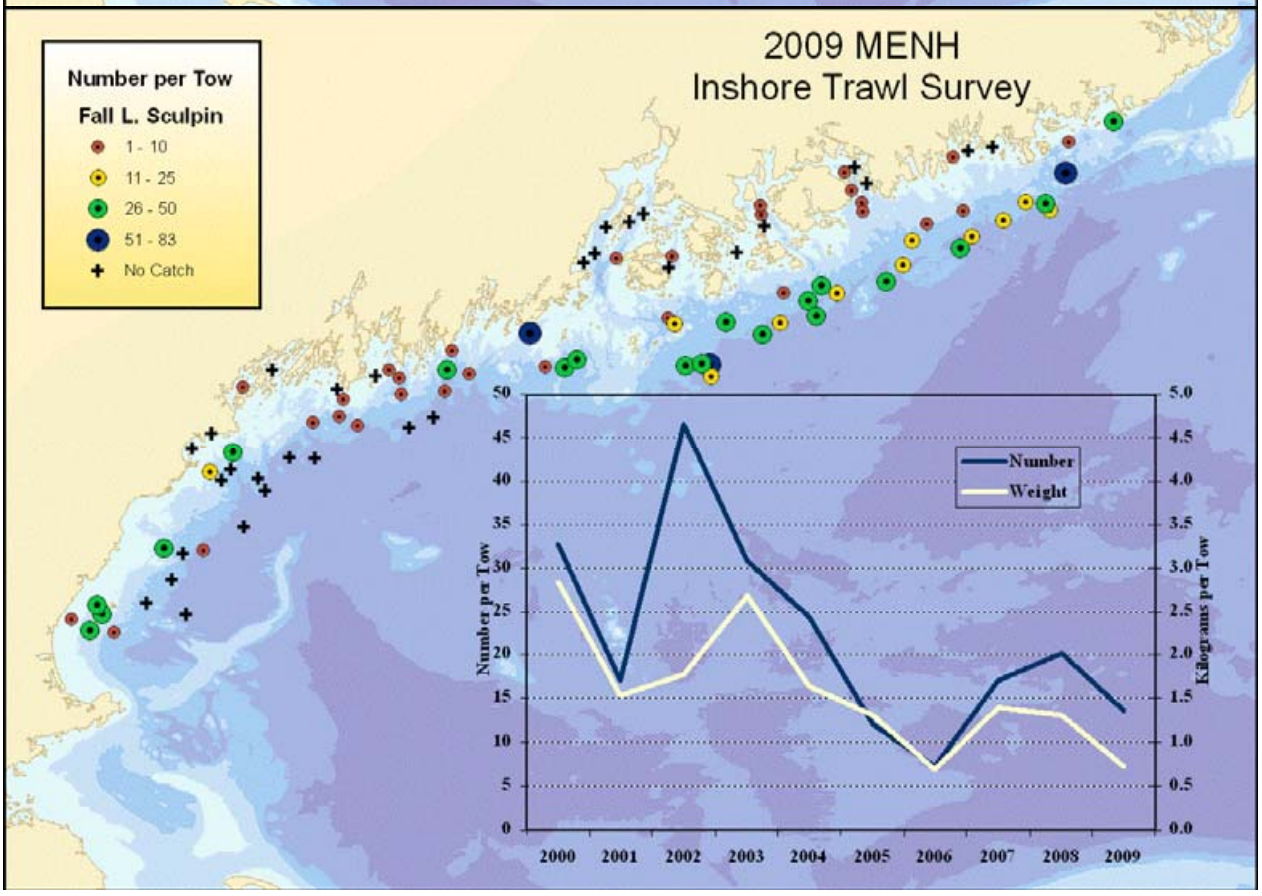
Mean and error for graphs overlain on distribution maps									
fixed stations not included									
for haddock, indices calculated for regions 1 through 5									
Strata 1 though 4 (2003 and up)									
SPRING					FALL				
	Number		Weight			Number		Weight	
	mean	error	mean	error		mean	error	mean	error
					2000	2.65	1.08	0.19	0.10
2001	0.02	0.02	0.00	0.00	2001	3.44	1.71	0.18	0.08
2002	4.33	1.25	1.20	0.32	2002	0.32	0.18	0.02	0.02
2003	0.71	0.40	0.46	0.31	2003	8.03	6.35	0.29	0.20
2004	1.63	0.62	0.10	0.04	2004	3.46	1.59	0.24	0.10
2005	0.63	0.30	0.12	0.06	2005	2.03	0.99	0.89	0.86
2006	1.77	1.35	0.28	0.14	2006	1.64	1.03	0.59	0.57
2007	0.40	0.11	0.23	0.08	2007	0.54	0.38	0.01	0.01
2008	0.43	0.16	0.37	0.15	2008	0.64	0.39	0.01	0.01
2009	0.61	0.23	0.10	0.04	2009	3.99	1.24	0.15	0.06



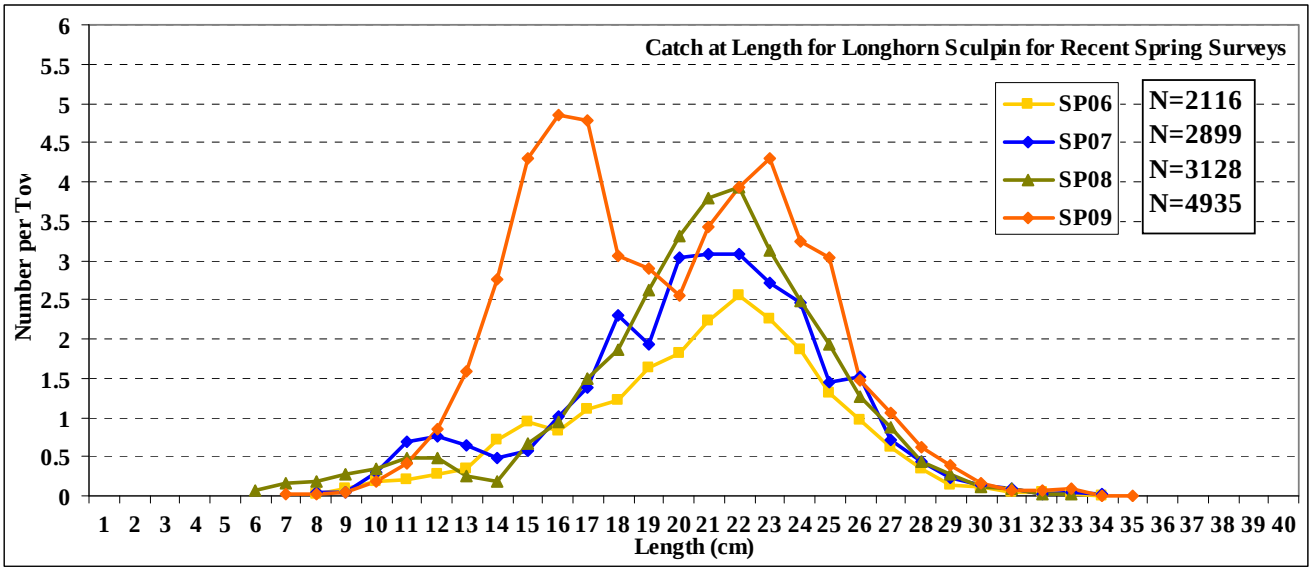


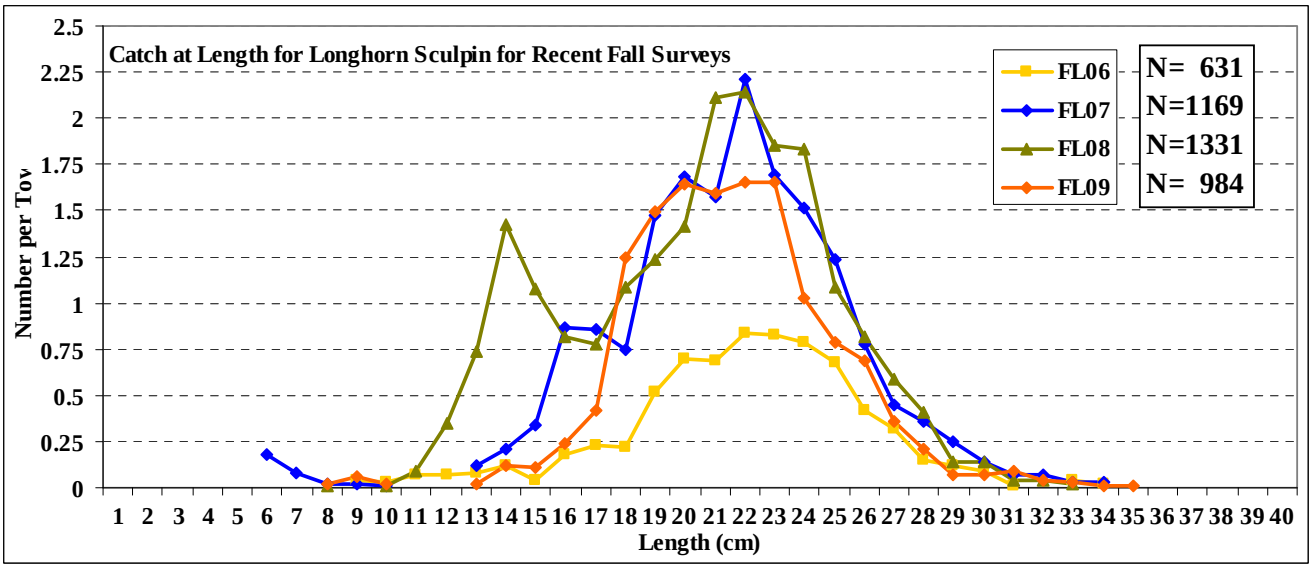
Longhorn sculpin, *Myoxocephalus octodecemspinosus*



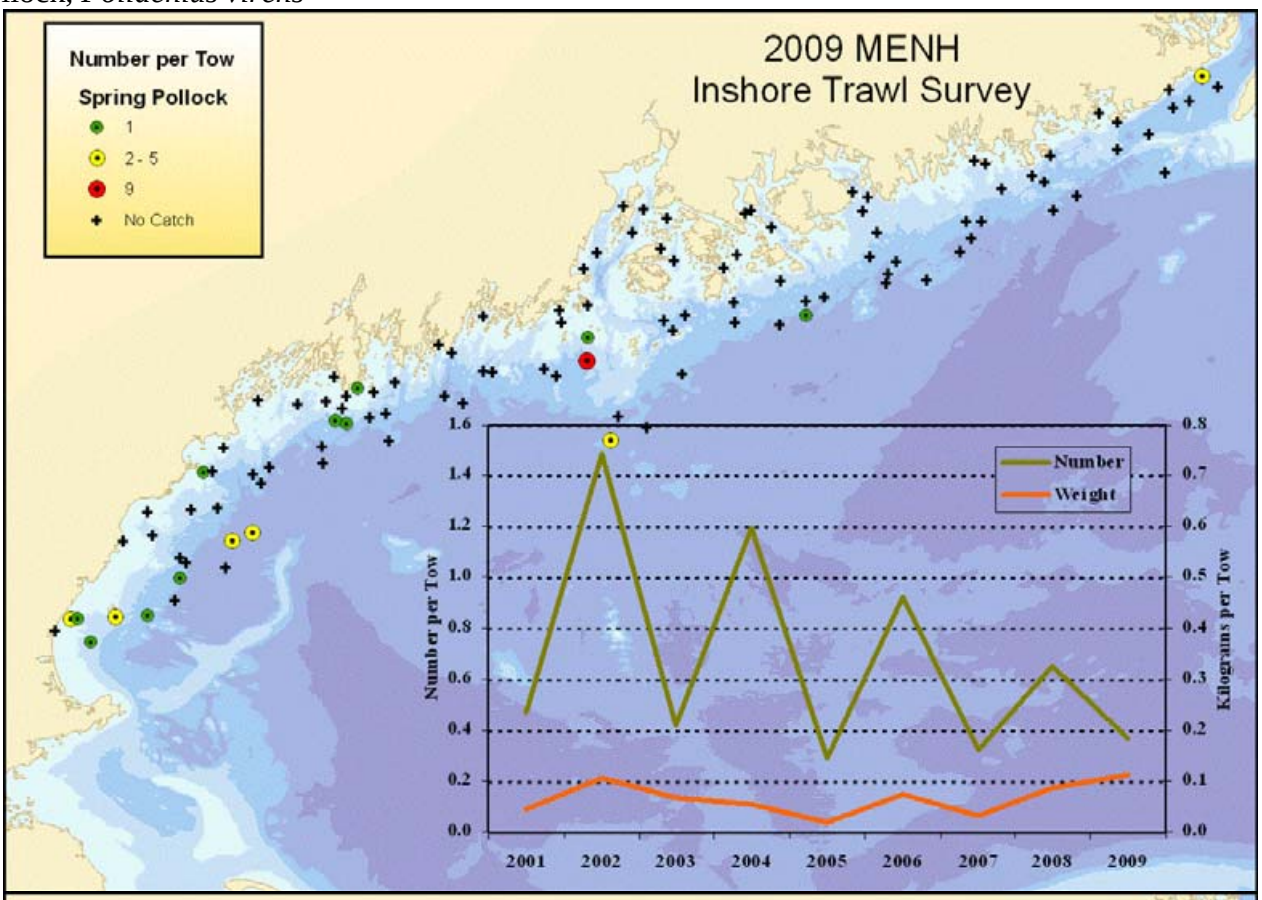


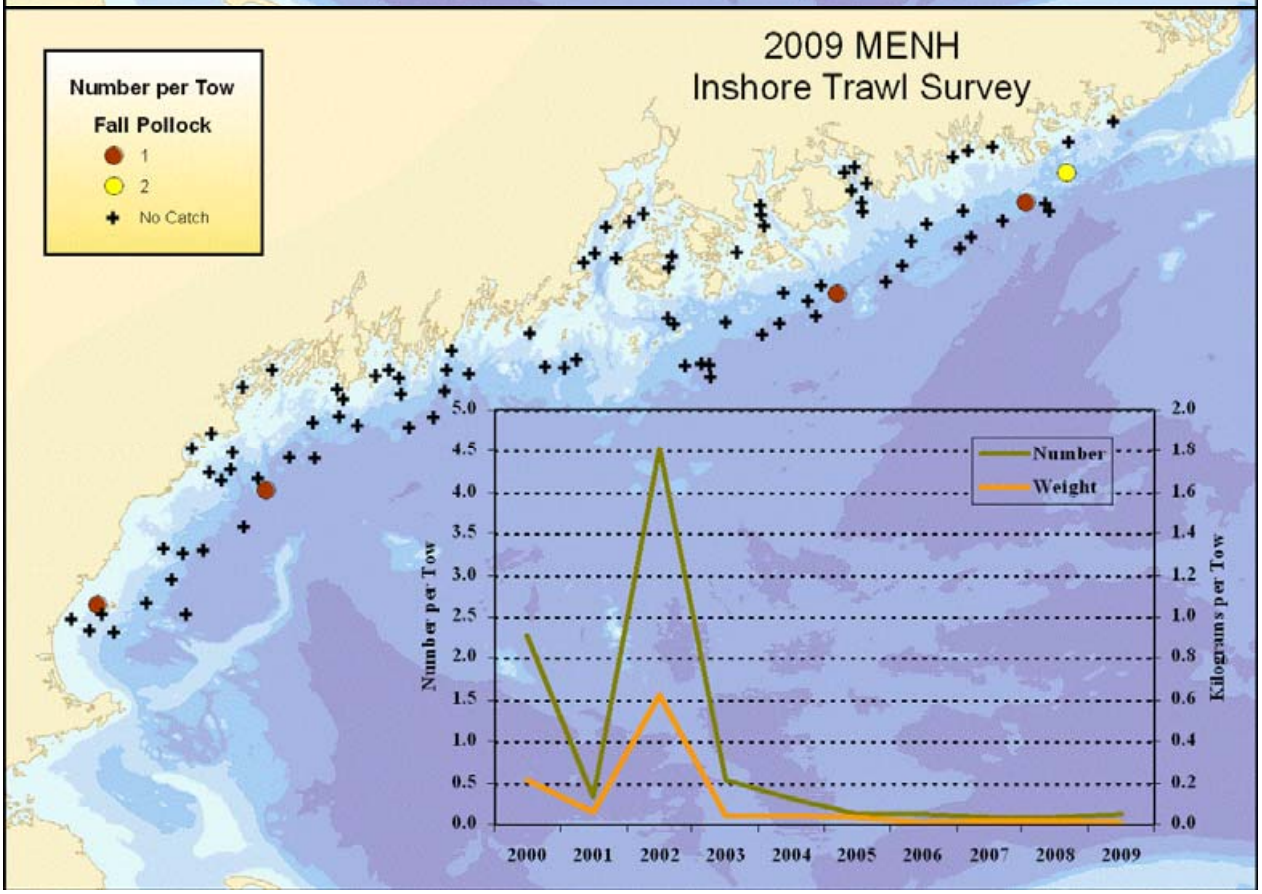
Mean and error for graphs overlain on distribution maps									
fixed stations not included									
for LH Sculpin, indices calculated for regions 1 through 5									
strata 1 through 4 (2003 and up)									
SPRING					FALL				
Stratified Mean					Stratified Mean				
	Number		Weight			Number		Weight	
	Mean	Error	Mean	Error		Mean	Error	Mean	Error
					2000	32.64	8.18	2.84	0.38
2001	47.28	5.67	4.91	0.53	2001	17.05	4.05	1.53	0.32
2002	46.28	7.28	4.07	0.53	2002	46.49	8.24	1.79	0.51
2003	47.37	5.25	3.93	0.50	2003	30.72	1.73	2.69	0.17
2004	68.73	5.83	5.70	0.50	2004	24.45	4.55	1.64	0.29
2005	40.09	3.89	4.10	0.37	2005	12.20	2.89	1.32	0.28
2006	21.86	3.79	2.22	0.34	2006	7.27	0.97	0.70	0.10
2007	29.06	5.02	2.77	0.46	2007	17.16	3.32	1.40	0.28
2008	31.61	3.51	3.28	0.39	2008	20.25	3.00	1.32	0.26
2009	50.17	7.62	4.33	0.51	2009	13.68	1.81	0.72	0.14



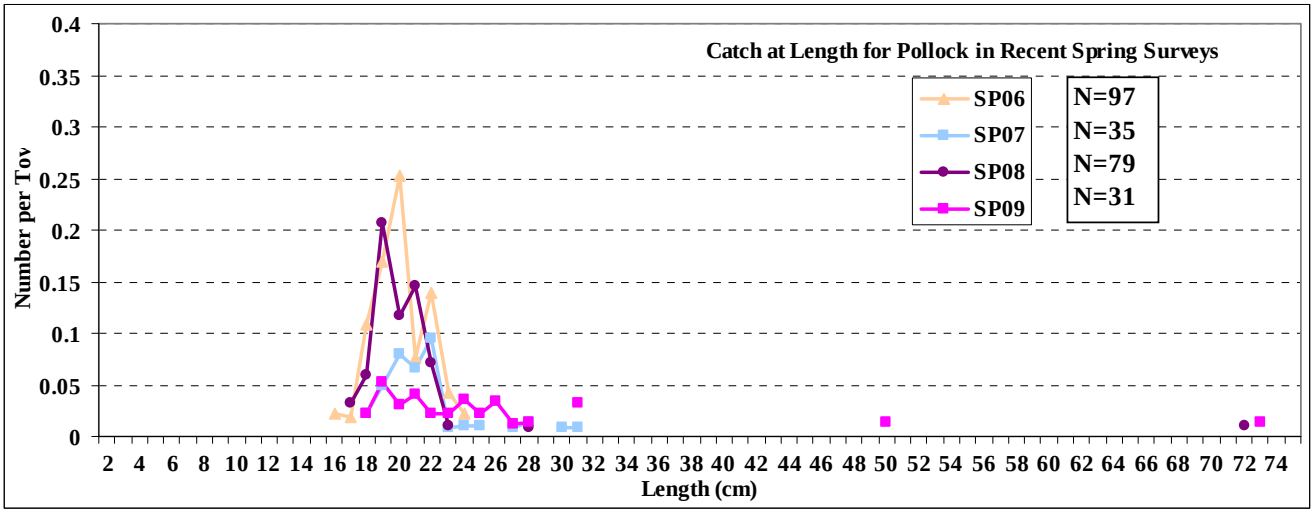


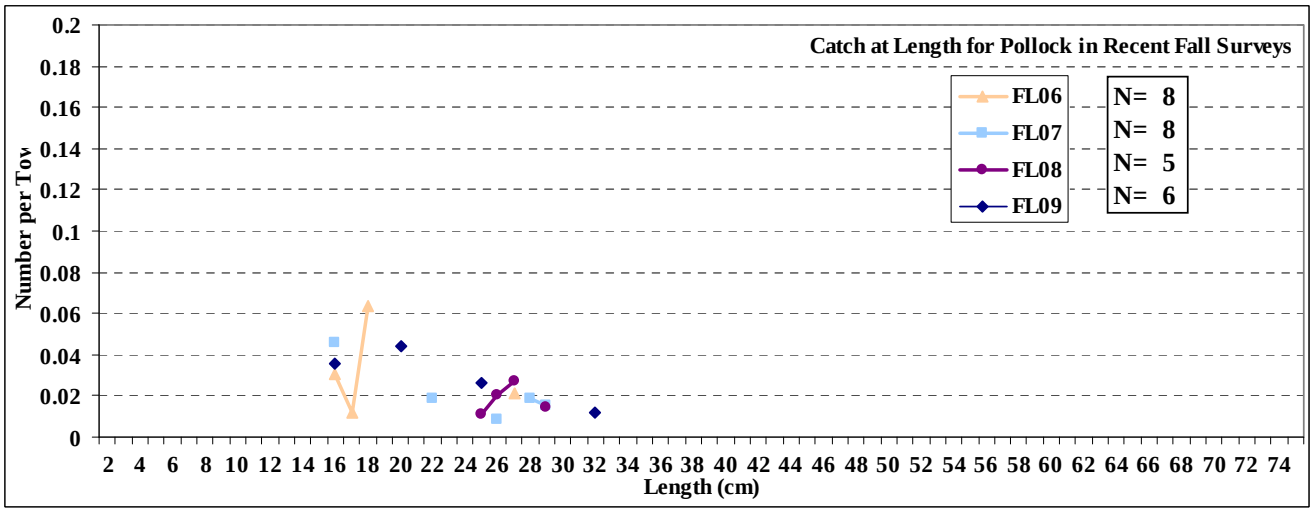
Pollock, *Pollachius virens*



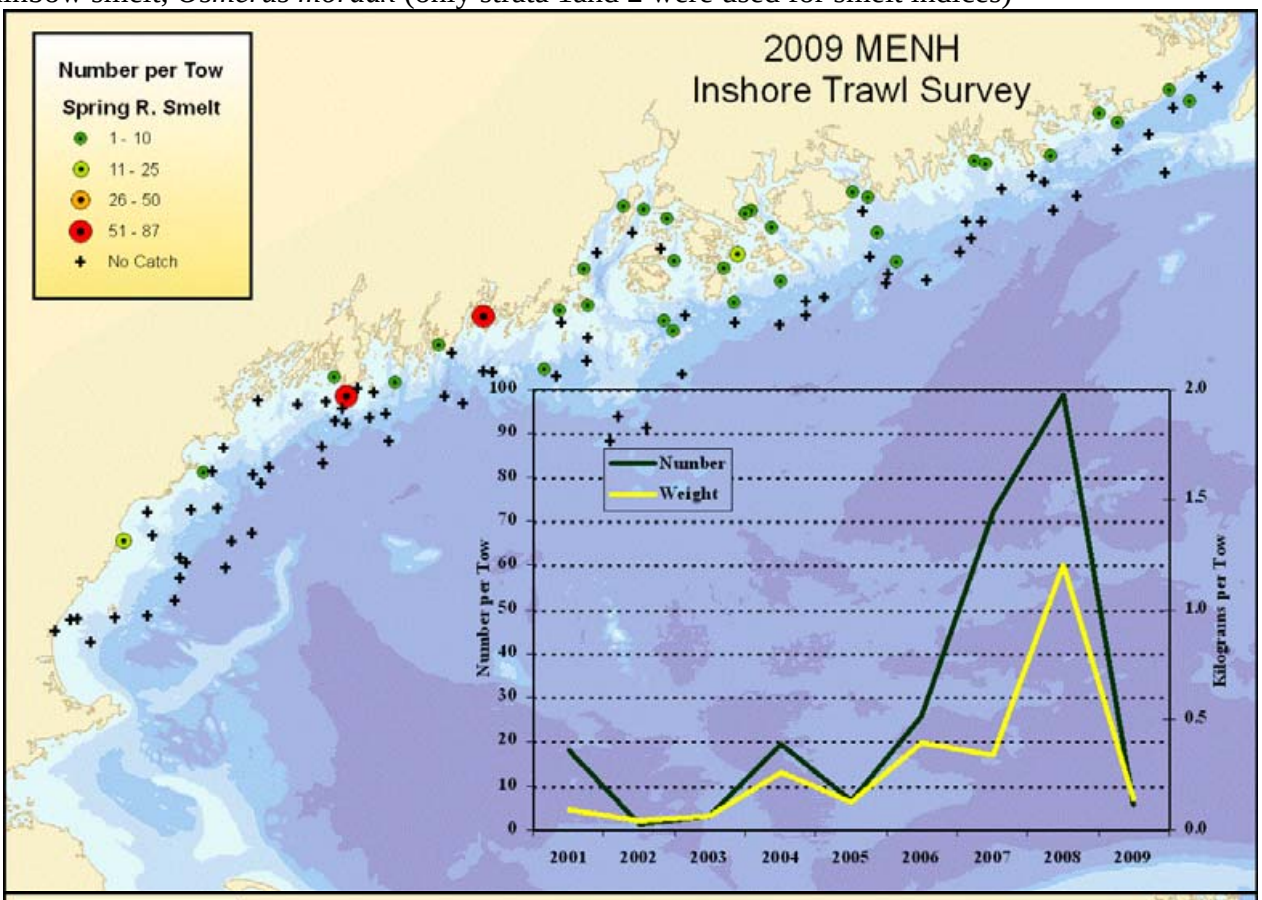


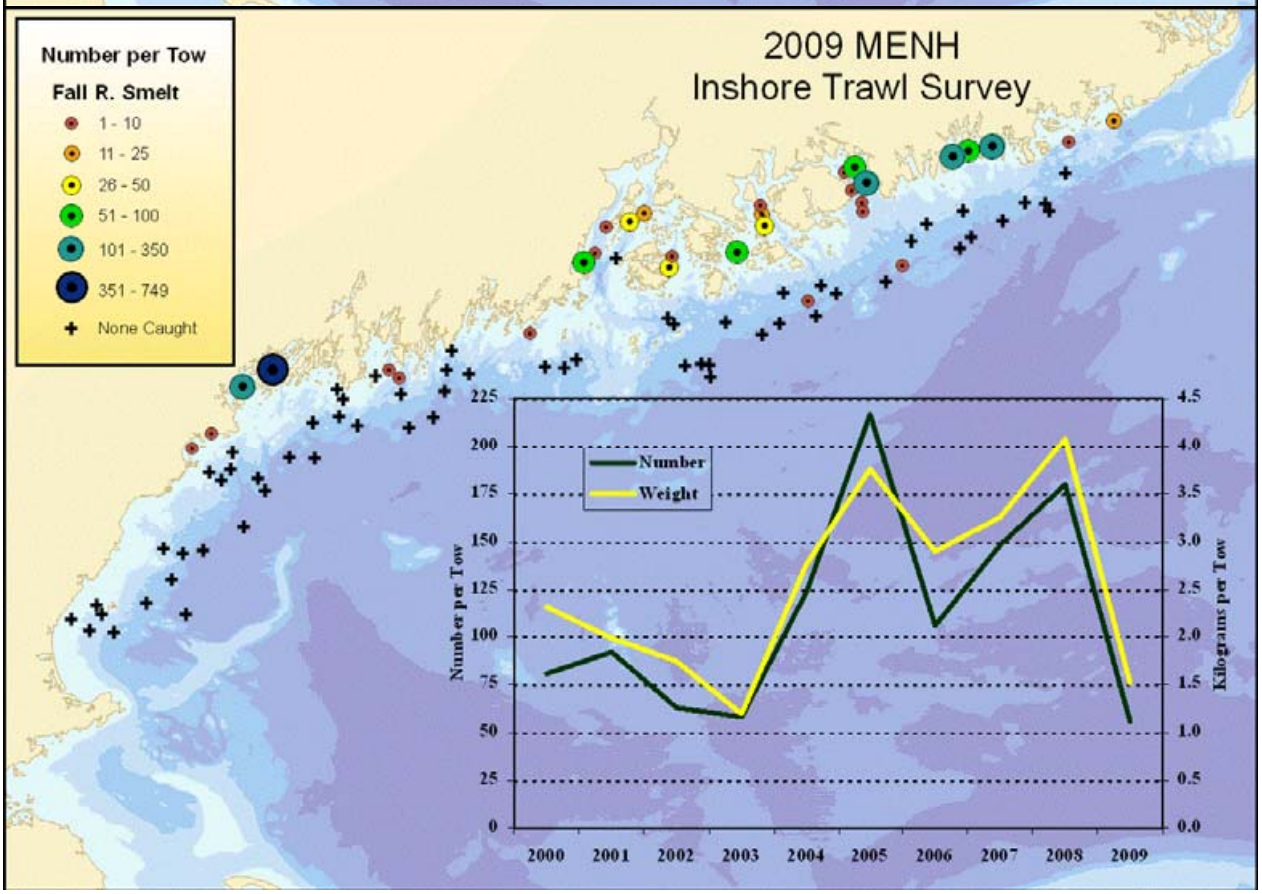
Mean and error for graphs overlain on distribution maps									
fixed stations not included									
for pollock, indices calculated for regions 1 through 5; strata 1 through 4 (2003 on)									
SPRING					FALL				
	Stratified Mean					Stratified Mean			
	Number		Weight			Number		Weight	
	Mean	Error	Mean	Error		Mean	Error	Mean	Error
					2000	2.27	1.24	0.22	0.07
2001	0.47	0.19	0.04	0.02	2001	0.33	0.11	0.06	0.02
2002	1.48	0.48	0.11	0.03	2002	4.54	3.15	0.63	0.46
2003	0.42	0.14	0.07	0.04	2003	0.53	0.20	0.04	0.02
2004	1.19	0.36	0.06	0.02	2004	0.30	0.12	0.04	0.01
2005	0.29	0.27	0.02	0.02	2005	0.13	0.05	0.03	0.02
2006	0.92	0.50	0.08	0.04	2006	0.11	0.06	0.01	0.01
2007	0.32	0.17	0.03	0.01	2007	0.08	0.04	0.01	0.01
2008	0.65	0.47	0.09	0.05	2008	0.07	0.04	0.01	0.01
2009	0.37	0.13	0.11	0.07	2009	0.12	0.05	0.01	0.01



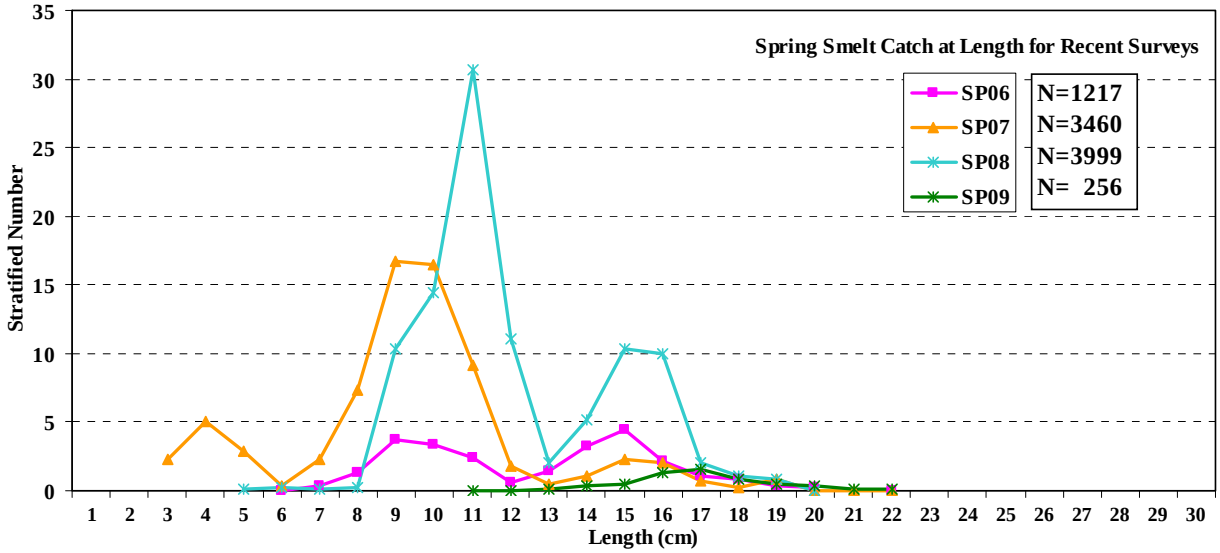


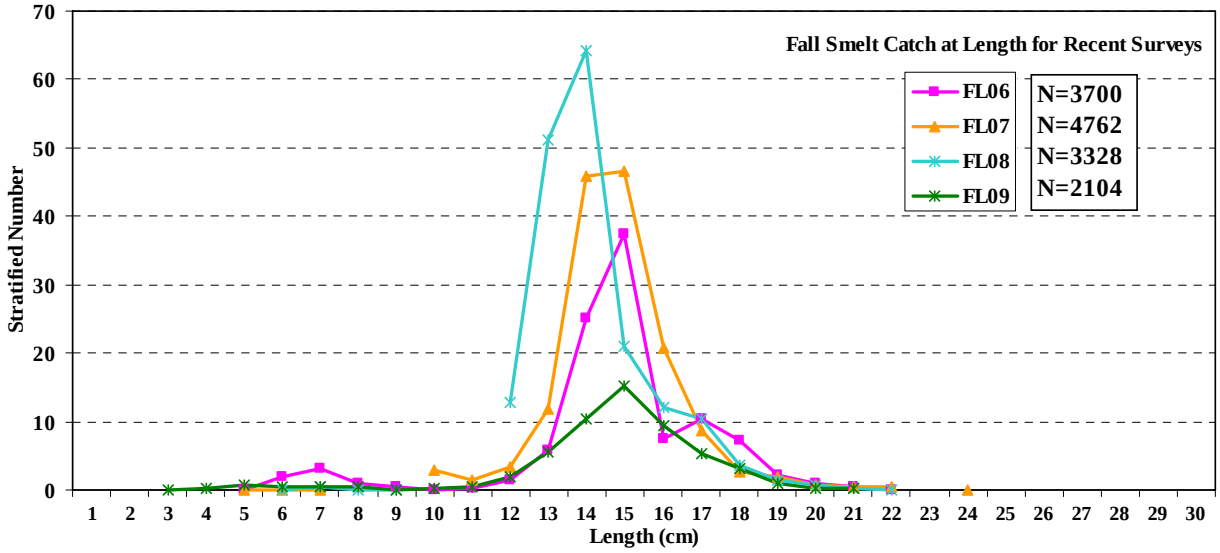
Rainbow smelt, *Osmerus mordax* (only strata 1and 2 were used for smelt indices)



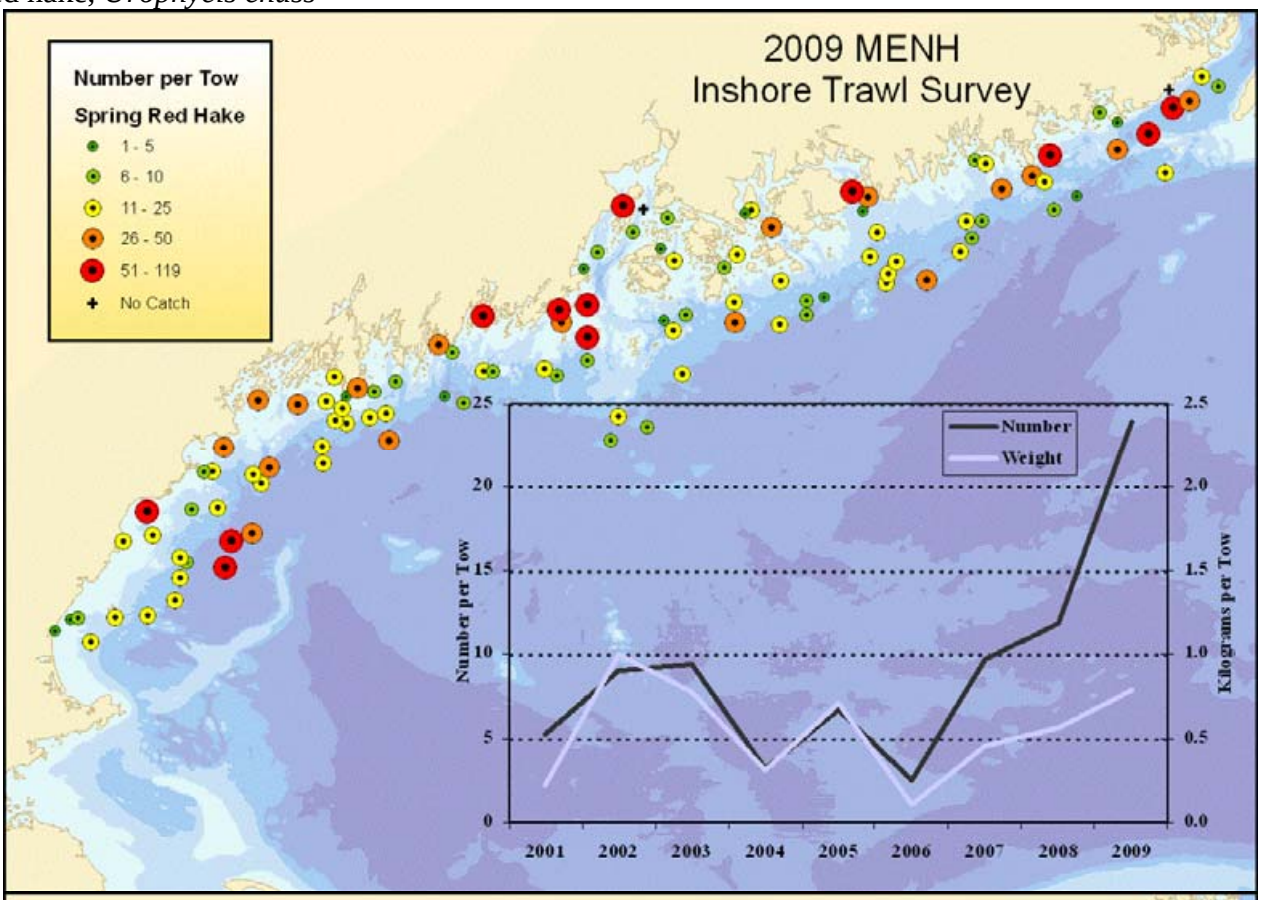


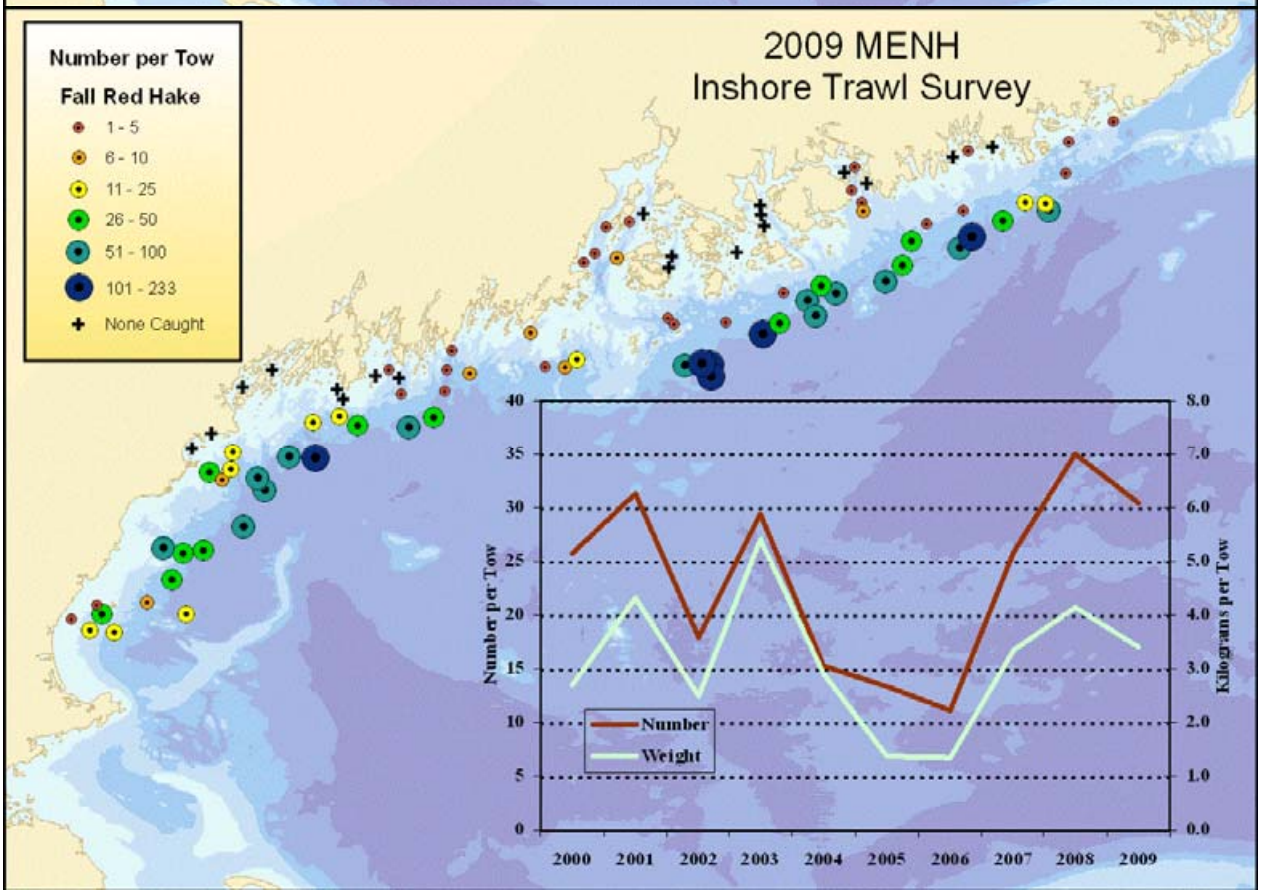
Mean and error for graphs overlain on distribution maps									
fixed stations not included									
for smelt, indices calculated for regions 1 through 5									
strata 1 and 2									
SPRING					FALL				
	Stratified Mean					Stratified Mean			
	Number		Weight			Number		Weight	
	Mean	Error	Mean	Error		Mean	Error	Mean	Error
					2000	81.00	38.77	2.32	1.28
2001	18.07	11.76	0.09	0.05	2001	91.94	17.99	1.99	0.41
2002	1.34	0.53	0.04	0.02	2002	63.24	49.51	1.74	1.32
2003	3.20	1.16	0.06	0.02	2003	58.18	16.65	1.20	0.35
2004	19.50	10.88	0.26	0.12	2004	123.81	42.44	2.77	0.92
2005	6.68	2.14	0.13	0.06	2005	217.23	48.69	3.76	0.97
2006	25.62	9.20	0.40	0.14	2006	105.85	58.25	2.89	1.39
2007	72.07	37.68	0.34	0.14	2007	148.49	85.05	3.25	1.70
2008	98.79	78.88	1.20	0.91	2008	179.87	156.18	4.07	3.34
2009	5.59	2.05	0.14	0.05	2009	56.05	20.44	1.52	0.61



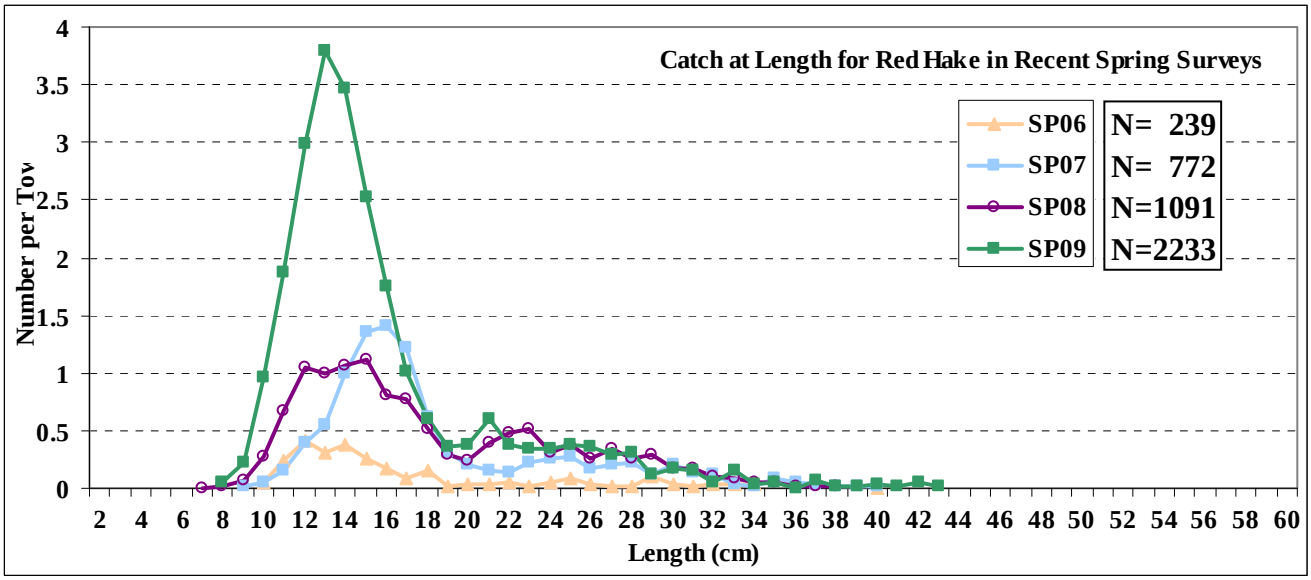


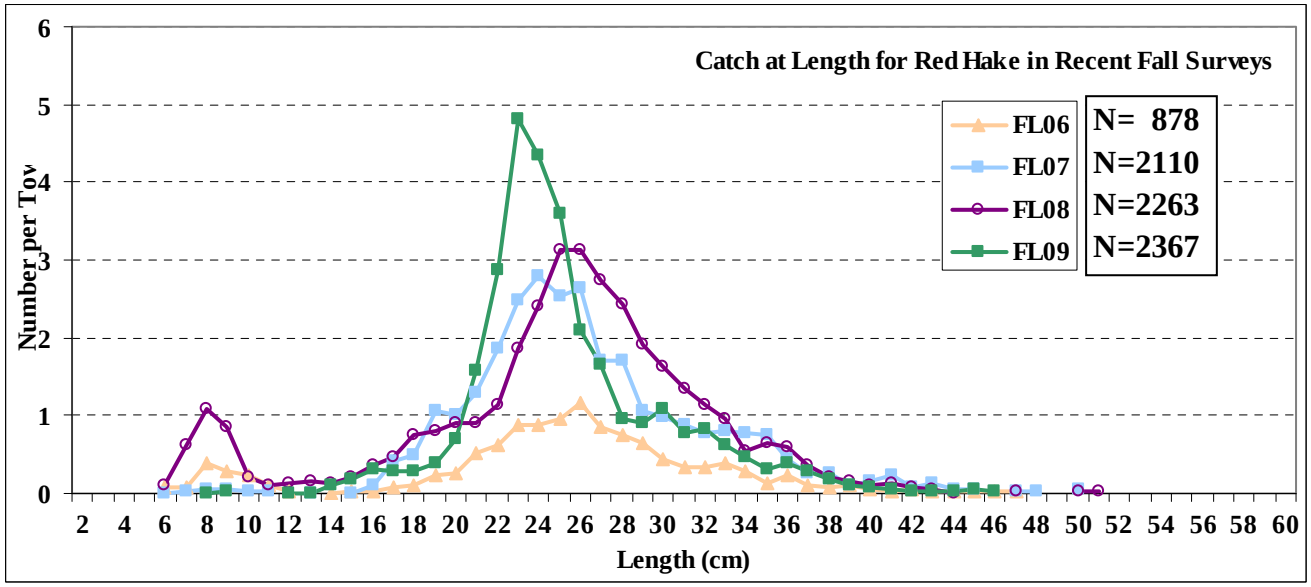
Red hake, *Urophycis chuss*



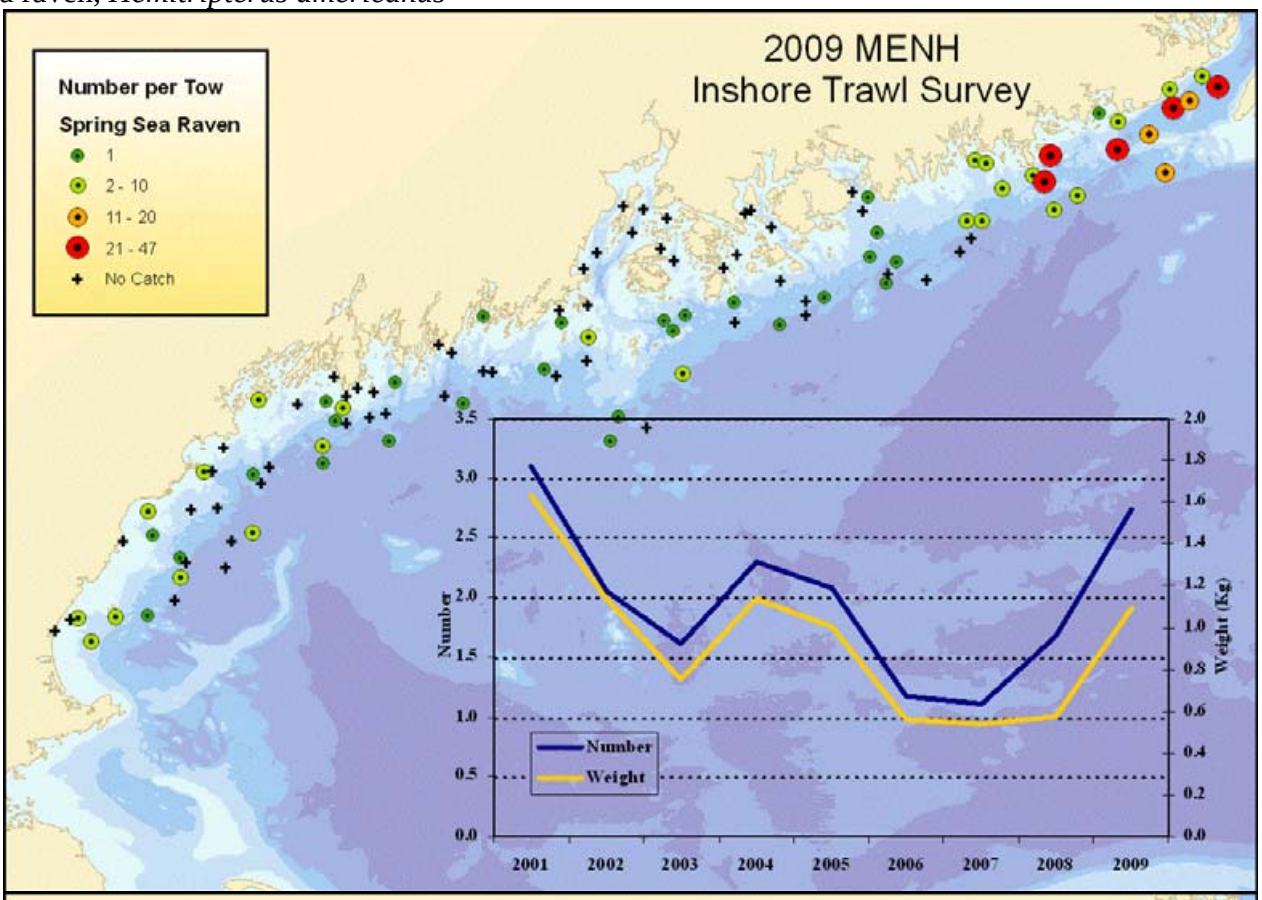


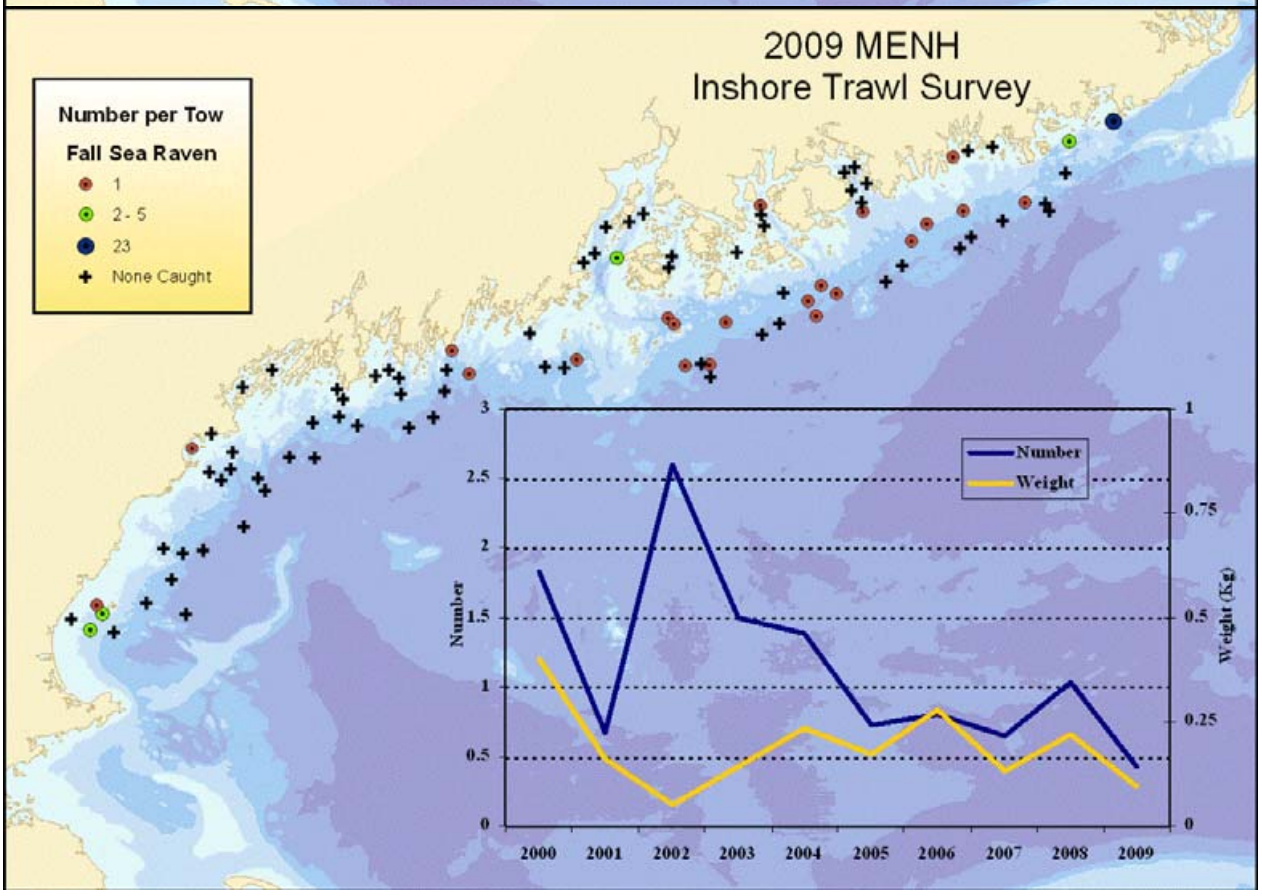
Mean and error for graphs overlain on distribution maps									
fixed stations **not** included									
for red hake, indices calculated for regions 1 through 5; strata 1 through 4 (2003 and up)									
SPRING					FALL				
	Stratified Mean					Stratified Mean			
	Number		Weight			Number		Weight	
	Mean	Error	Mean	Error		Mean	Error	Mean	Error
					2000	25.8	3.1	2.70	0.31
2001	5.3	1.1	0.22	0.08	2001	31.3	4.5	4.34	0.61
2002	9.1	1.1	1.00	0.11	2002	17.9	3.2	2.51	0.50
2003	9.5	1.5	0.78	0.17	2003	29.4	2.9	5.43	0.53
2004	3.2	0.4	0.31	0.05	2004	15.3	2.1	2.91	0.49
2005	6.7	0.6	0.71	0.05	2005	13.4	1.6	1.37	0.26
2006	2.6	0.4	0.10	0.02	2006	11.2	1.9	1.37	0.21
2007	9.7	1.5	0.46	0.10	2007	25.9	4.2	3.35	0.59
2008	11.8	1.8	0.57	0.07	2008	35.1	4.4	4.16	0.46
2009	23.9	2.1	0.78	0.05	2009	30.4	2.8	3.41	0.33



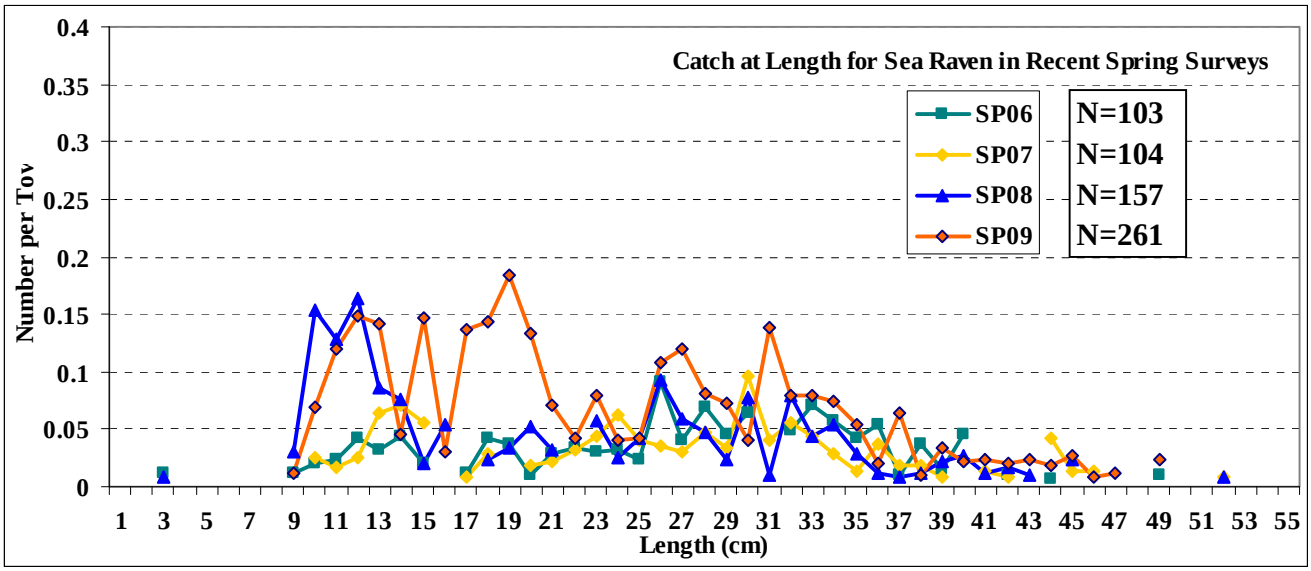


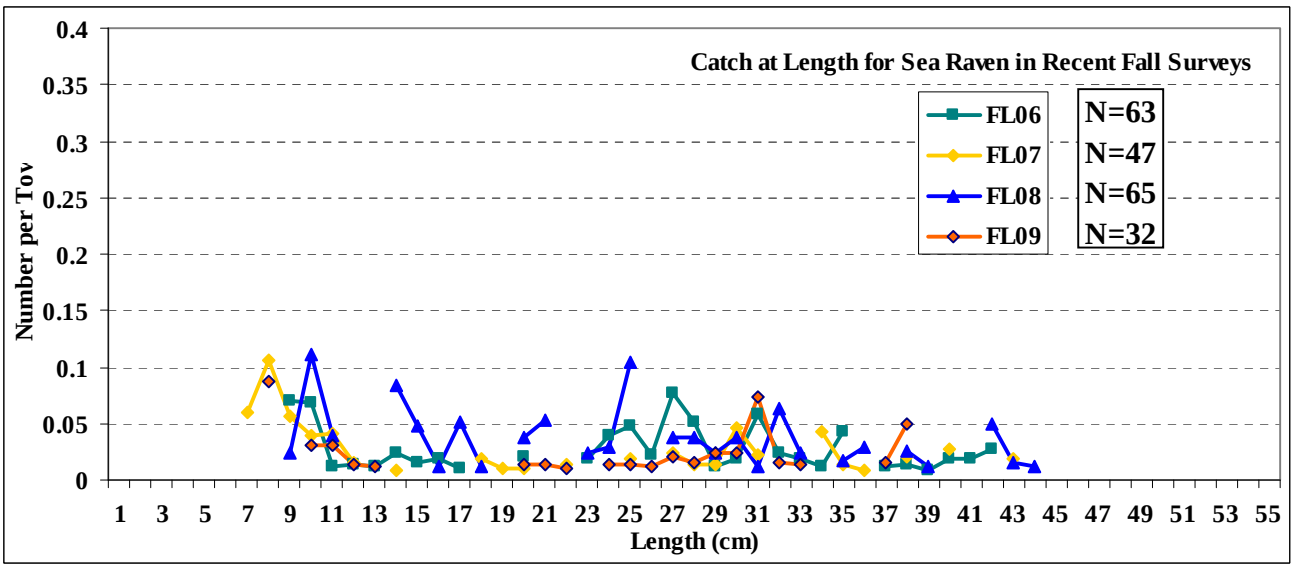
Sea raven, *Hemitripterus americanus*



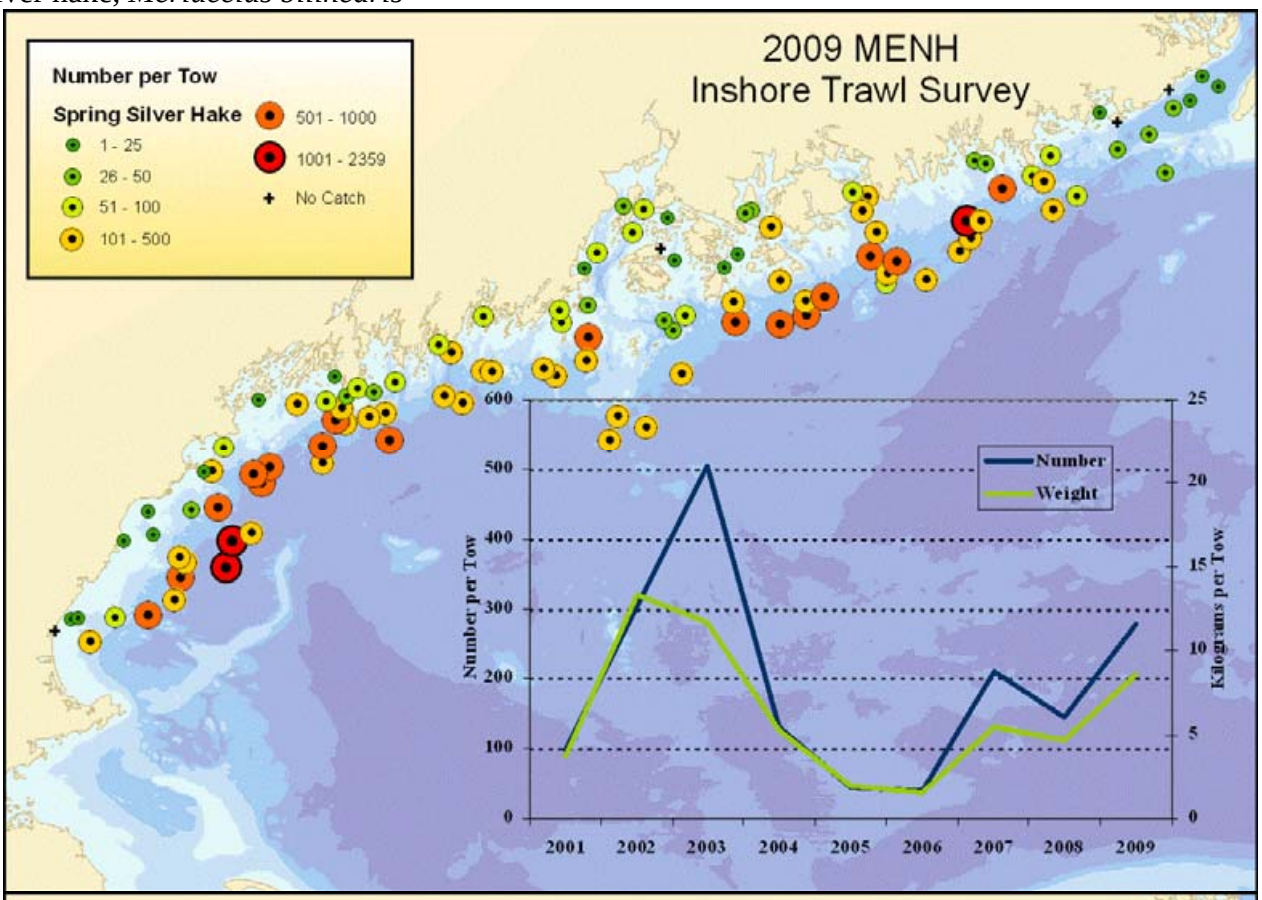


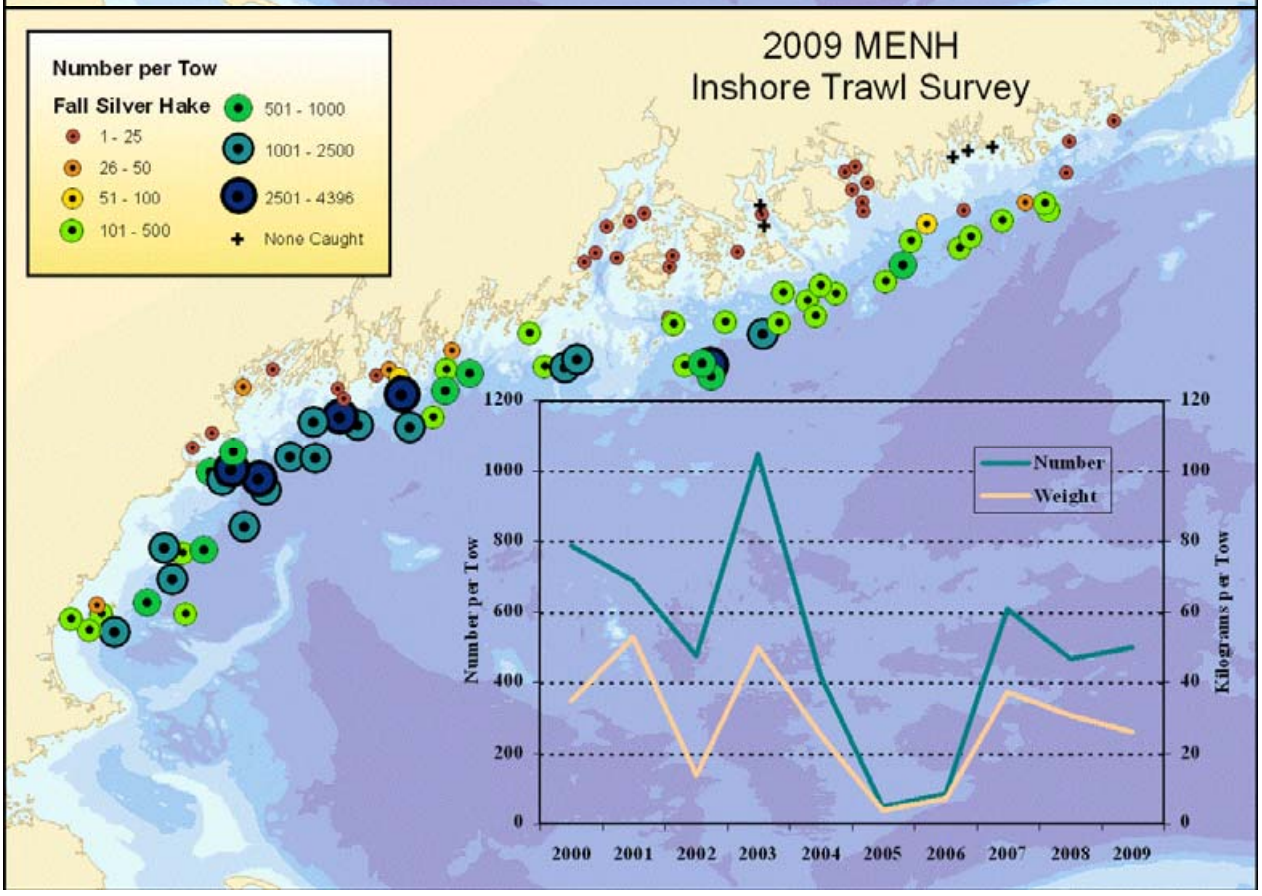
Mean and error for graphs overlain on distribution maps									
fixed stations not included									
for sea raven, indices calculated for regions 1 through 5 and strata 1 through 4									
SPRING					FALL				
Stratified Mean			Stratified Mean		Stratified Mean			Stratified Mean	
	number		weight			number		weight	
	Mean	Error	Mean	Error		Mean	Error	Mean	Error
					2000	1.83	0.30	0.40	0.09
2001	3.09	1.01	1.63	0.55	2001	0.67	0.13	0.16	0.06
2002	2.06	0.34	1.14	0.22	2002	2.59	0.84	0.05	0.02
2003	1.62	0.35	0.75	0.17	2003	1.50	0.36	0.14	0.06
2004	2.30	0.56	1.14	0.33	2004	1.39	0.42	0.24	0.06
2005	2.08	0.29	1.00	0.14	2005	0.73	0.17	0.17	0.04
2006	1.18	0.26	0.56	0.15	2006	0.80	0.17	0.28	0.07
2007	1.11	0.22	0.54	0.10	2007	0.65	0.25	0.13	0.04
2008	1.68	0.32	0.58	0.09	2008	1.03	0.34	0.22	0.11
2009	2.74	0.42	1.09	0.19	2009	0.43	0.09	0.09	0.03



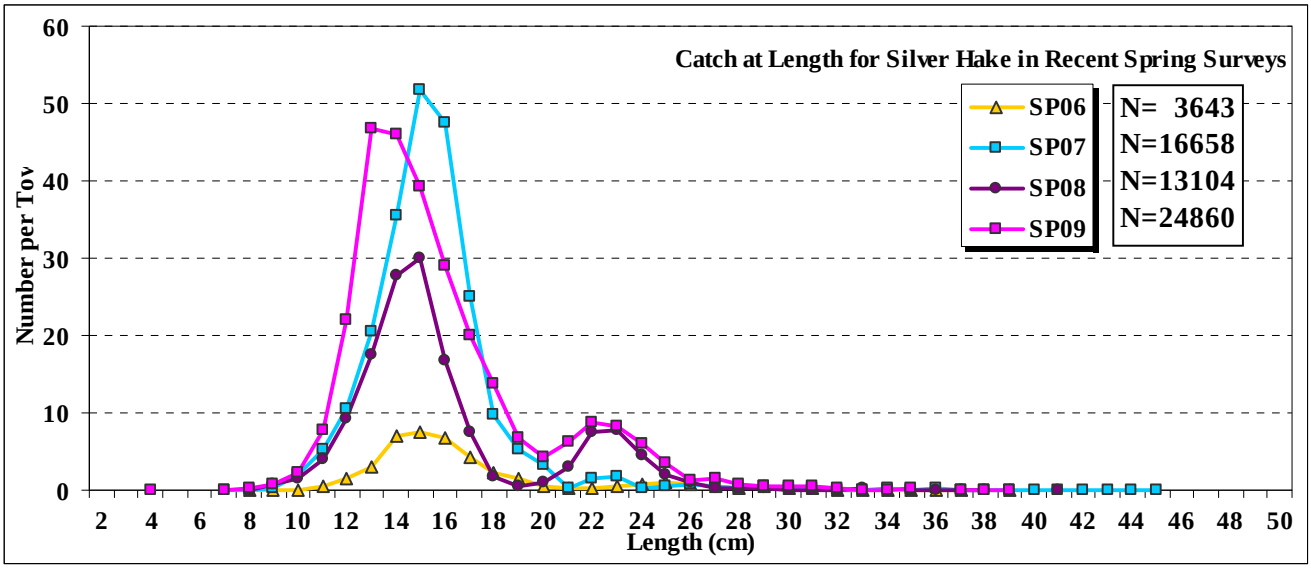


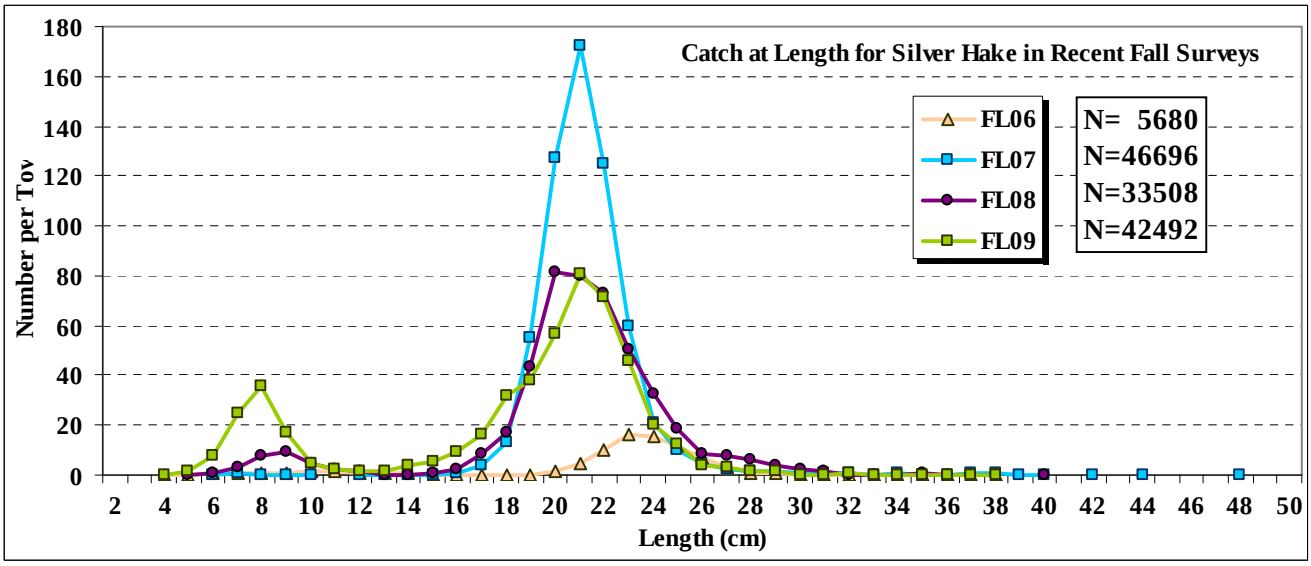
Silver hake, *Merluccius bilinearis*



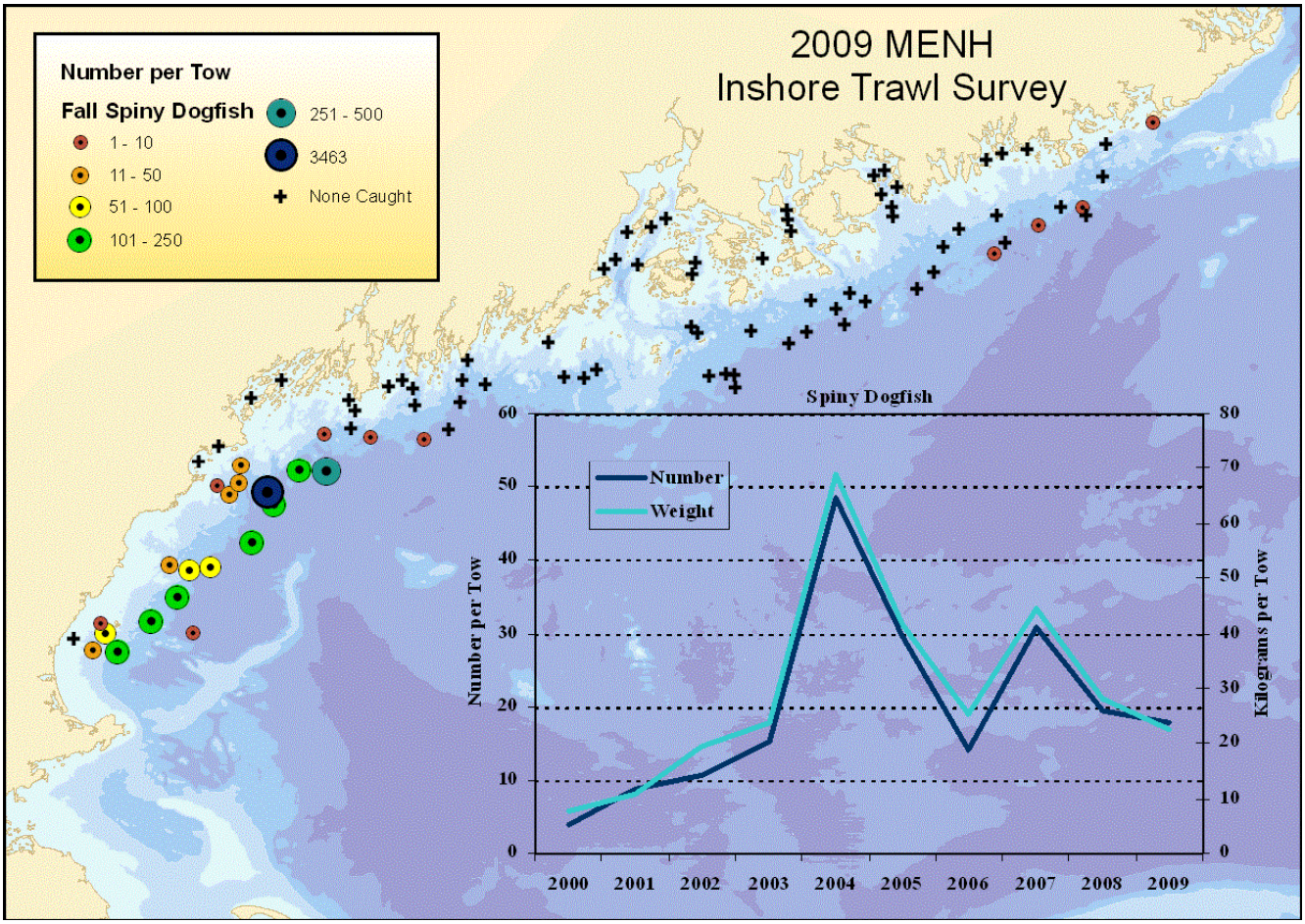


Mean and error for grpahs overlain on distribution maps									
fixed stations not included									
for silver hake, indices calculated for regions 1 through 5; strata 1 through 4 (2003 and up)									
SPRING					FALL				
	Stratified Mean					Stratified Mean			
	Number		Weight			Number		Weight	
	Mean	Error	Mean	Error		Mean	Error	Mean	Error
					2000	786.49	70.49	34.77	3.55
2001	97.74	13.58	3.68	0.50	2001	687.67	109.48	52.88	7.74
2002	302.44	103.63	13.34	4.69	2002	476.28	111.28	13.47	2.15
2003	503.71	79.69	11.63	1.86	2003	1046.25	116.65	49.97	5.72
2004	131.82	11.73	5.25	0.64	2004	413.66	95.64	24.85	6.03
2005	43.34	4.88	1.91	0.21	2005	44.93	9.31	3.77	0.92
2006	40.47	7.24	1.58	0.29	2006	82.59	20.11	7.13	2.03
2007	223.16	97.15	5.68	2.57	2007	605.57	111.88	37.14	6.75
2008	145.21	18.62	4.67	0.70	2008	467.93	120.68	30.66	9.67
2009	277.21	30.30	8.54	1.01	2009	498.48	82.68	25.73	4.48

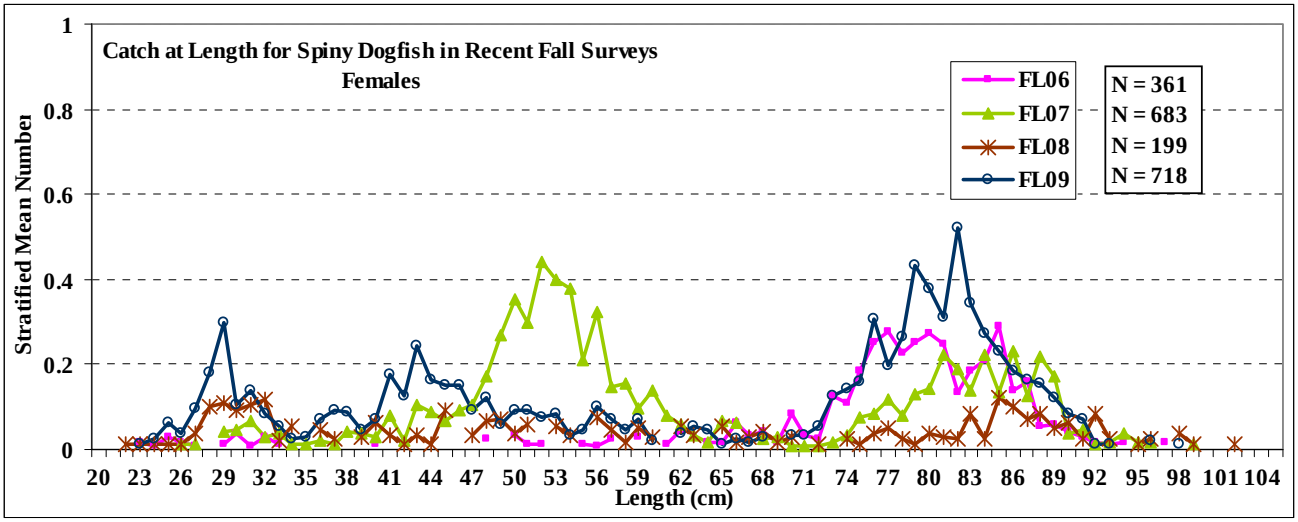


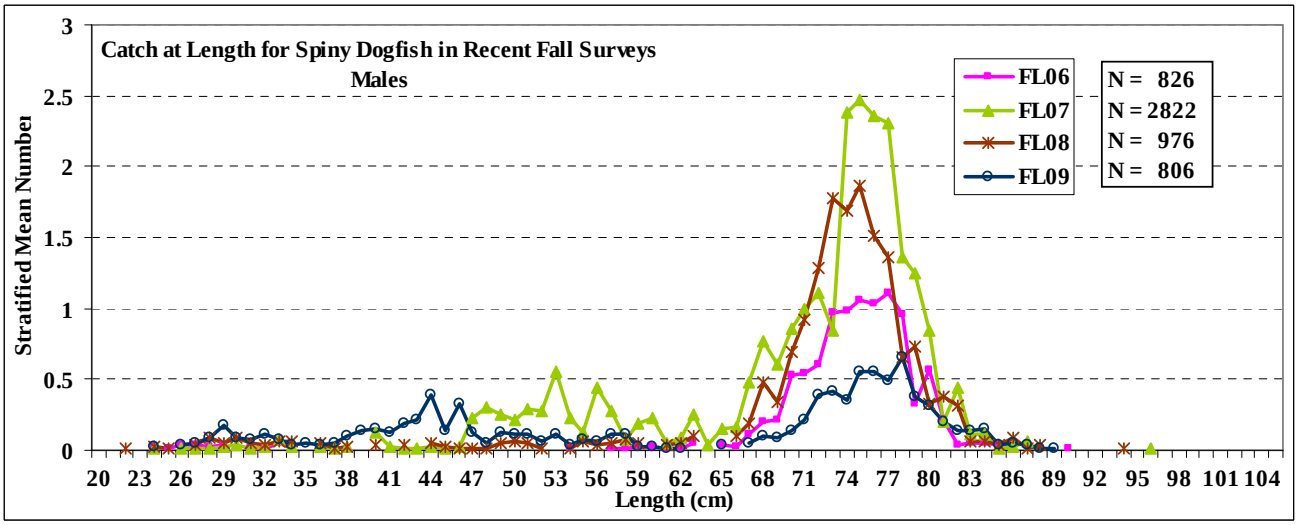


Spiny Dogfish, *Squalus acanthias*



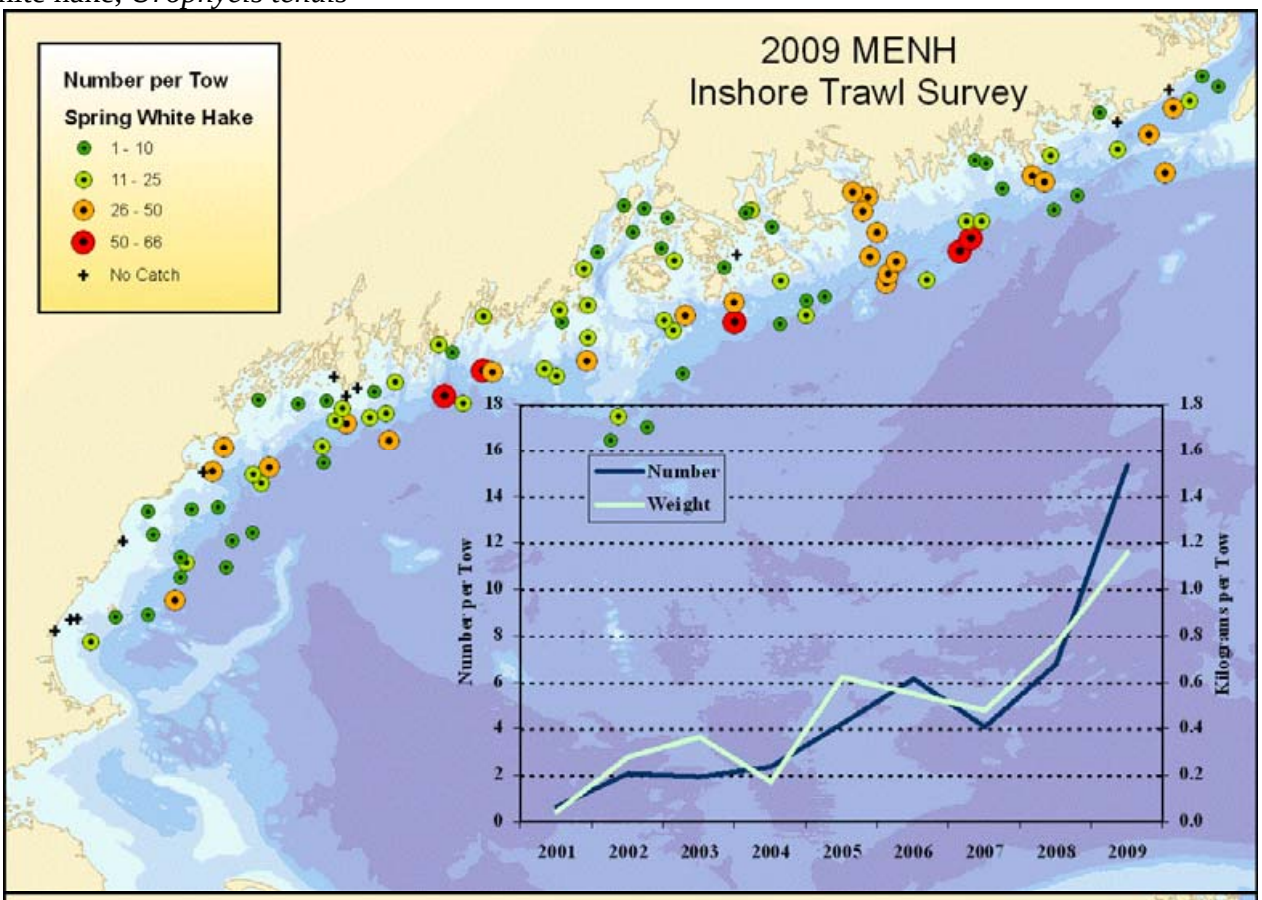
Mean and error for both seasons, only fall is displayed on the distribution map									
fixed stations not included									
for dogs, indices calculated for regions 1 through 5									
Strata 1 though 4 (2003 and up)									
SPRING					FALL				
	Stratified Mean					Stratified Mean			
	Number		Weight			Number		Weight	
	Mean	Error	Mean	Error		Mean	Error	Mean	Error
					2000	4.0	0.52	7.7	1.05
2001					2001	8.9	2.70	10.7	3.06
2002	0.08	0.04	0.17	0.08	2002	10.6	1.94	19.5	3.81
2003	0.21	0.15	0.23	0.22	2003	15.4	3.36	23.8	4.96
2004					2004	48.5	12.02	69.0	17.73
2005					2005	29.7	3.43	41.8	5.54
2006	0.33	0.13	0.10	0.05	2006	14.1	2.32	25.2	4.16
2007	0.04	0.03	0.04	0.04	2007	30.9	7.64	44.5	11.06
2008	0.25	0.16	0.30	0.20	2008	19.5	8.9	28.3	13.8
2009	0.01	0.01	0.01	0.01	2009	17.79	5.33	22.40	5.29

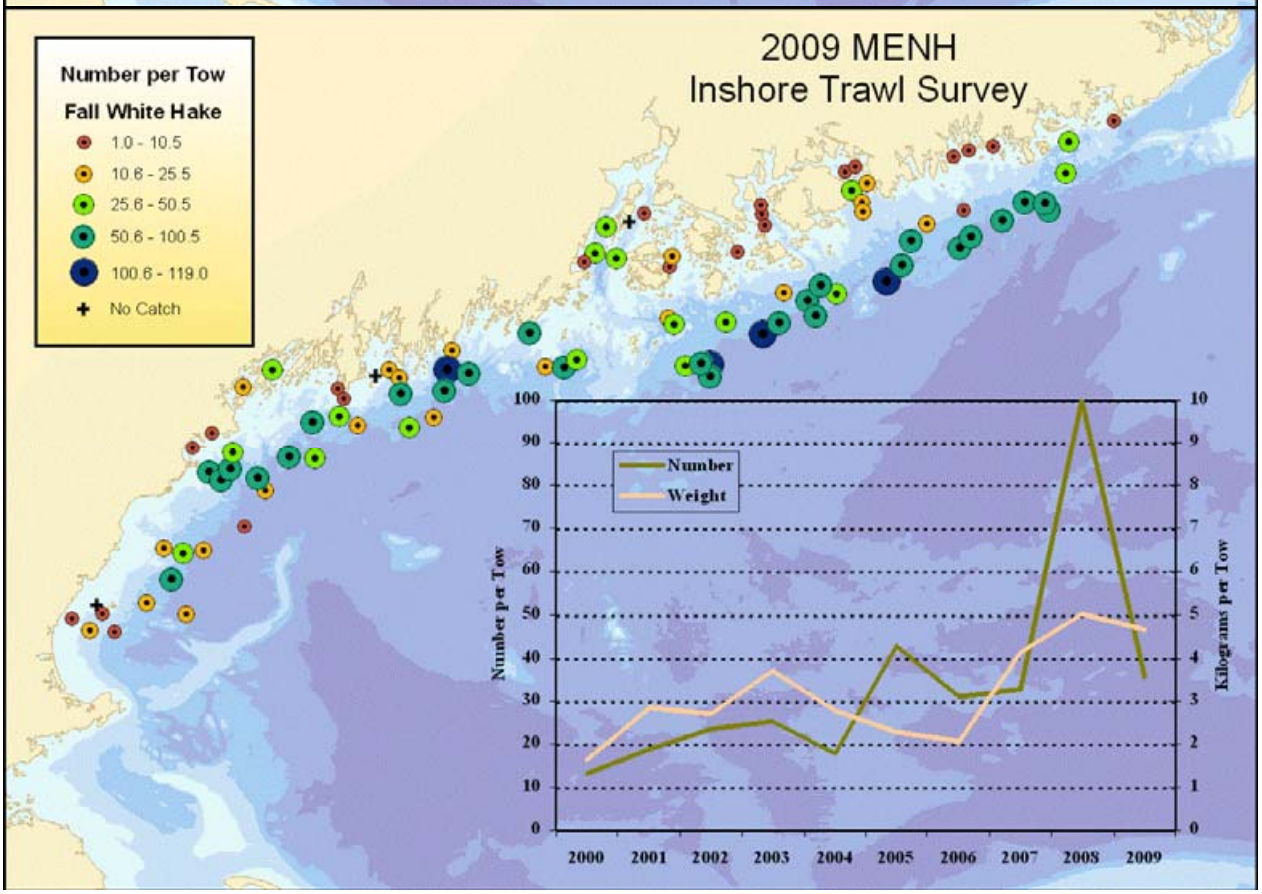




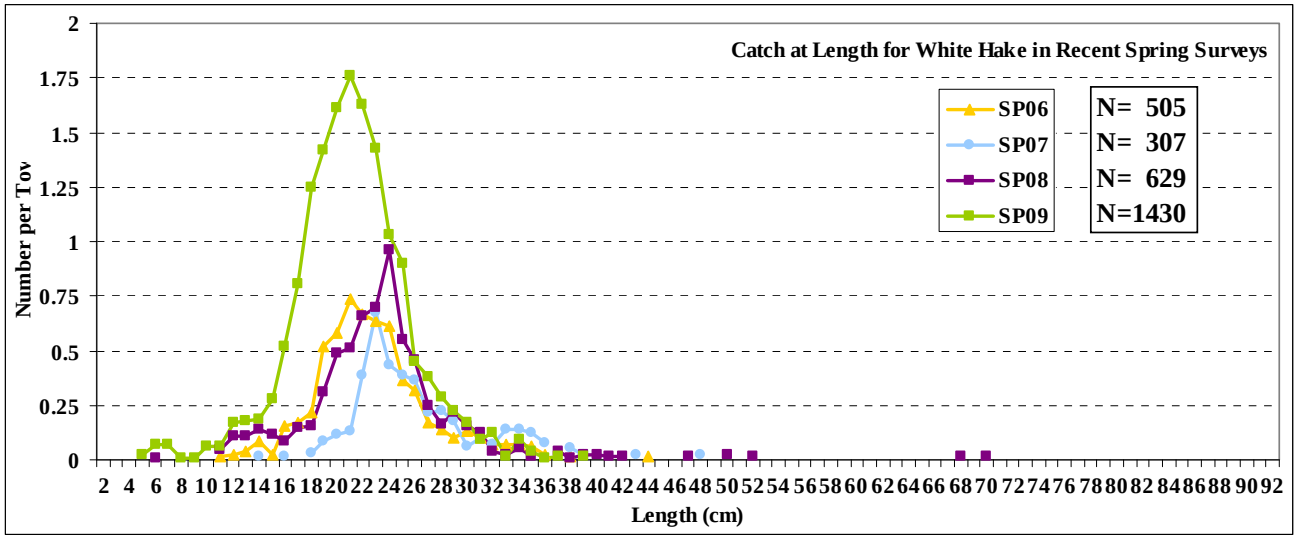
Dogfish are rarely caught in spring surveys, so only the data are presented.

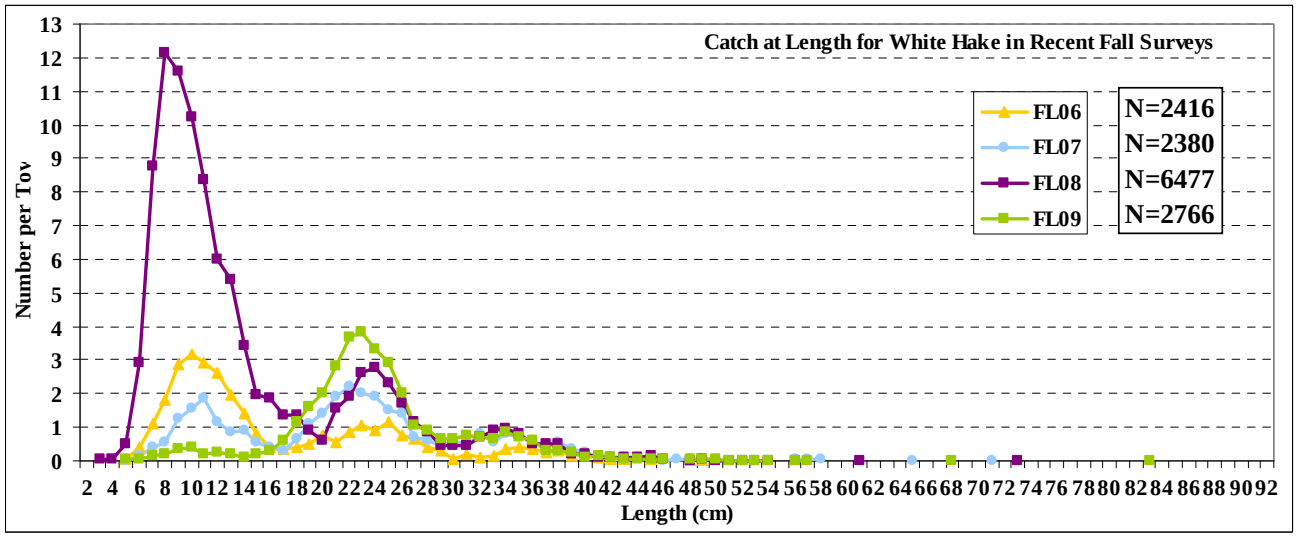
White hake, *Urophycis tenuis*



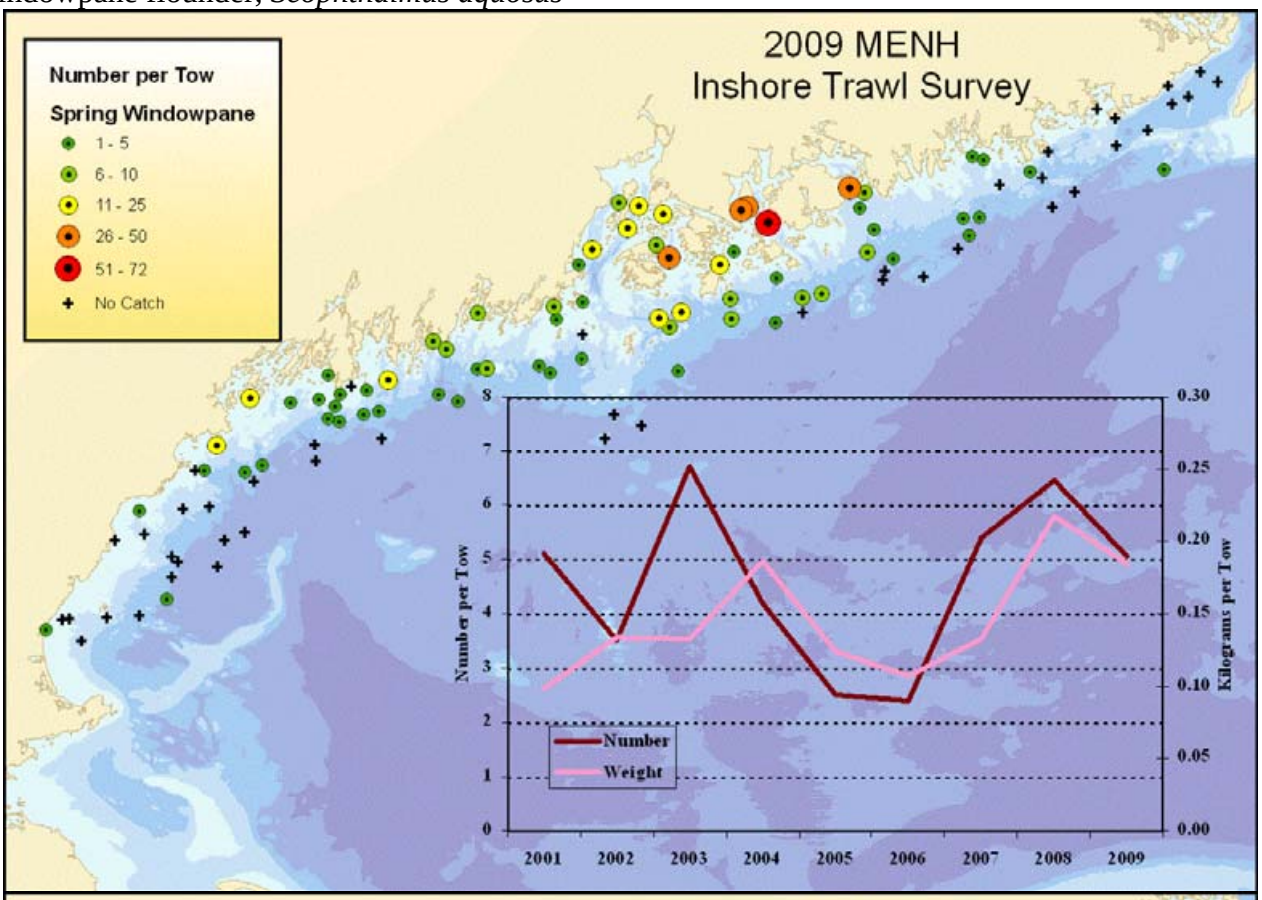


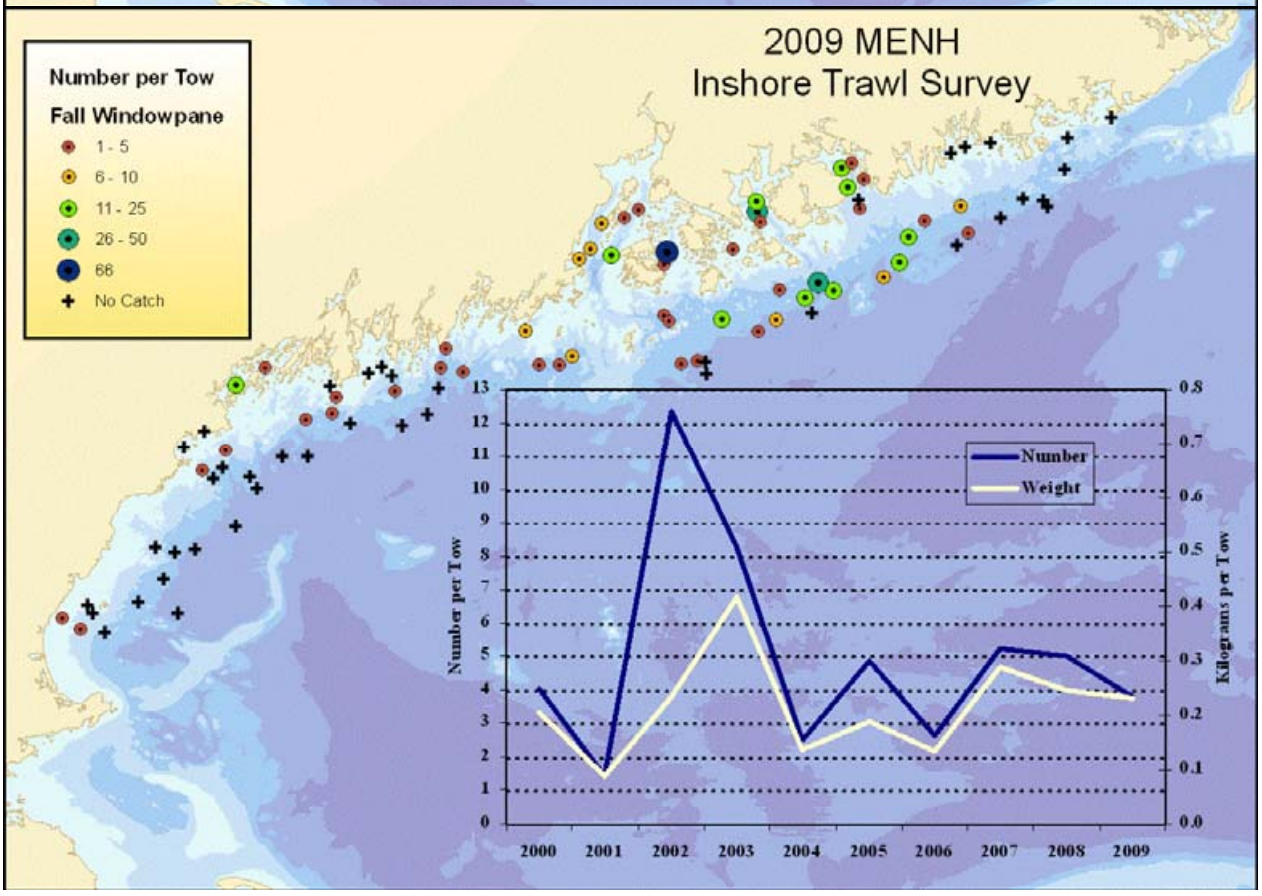
Mean and error for graphs overlain on distribution maps									
fixed stations not included									
for white hake, indices calculated for regions 1 through 5; strata 1 through 4 (2003 on)									
SPRING					FALL				
	Stratified Mean					Stratified Mean			
	Number		Weight			Number		Weight	
	Mean	Error	Mean	Error		Mean	Error	Mean	Error
					2000	13.1	1.2	1.63	0.16
2001	0.65	0.15	0.04	0.01	2001	18.9	2.7	2.84	0.33
2002	2.10	0.40	0.28	0.06	2002	23.6	1.9	2.71	0.27
2003	1.94	0.47	0.36	0.11	2003	25.4	3.0	3.70	0.45
2004	2.39	0.41	0.17	0.03	2004	17.8	2.6	2.77	0.35
2005	4.23	0.77	0.62	0.13	2005	42.8	3.1	2.26	0.22
2006	6.12	0.72	0.55	0.08	2006	31.1	3.7	2.05	0.21
2007	4.11	0.91	0.48	0.17	2007	32.9	2.8	4.12	0.51
2008	6.79	0.78	0.76	0.12	2008	99.9	8.4	5.00	0.33
2009	15.38	1.34	1.16	0.14	2009	35.5	2.3	4.65	0.37



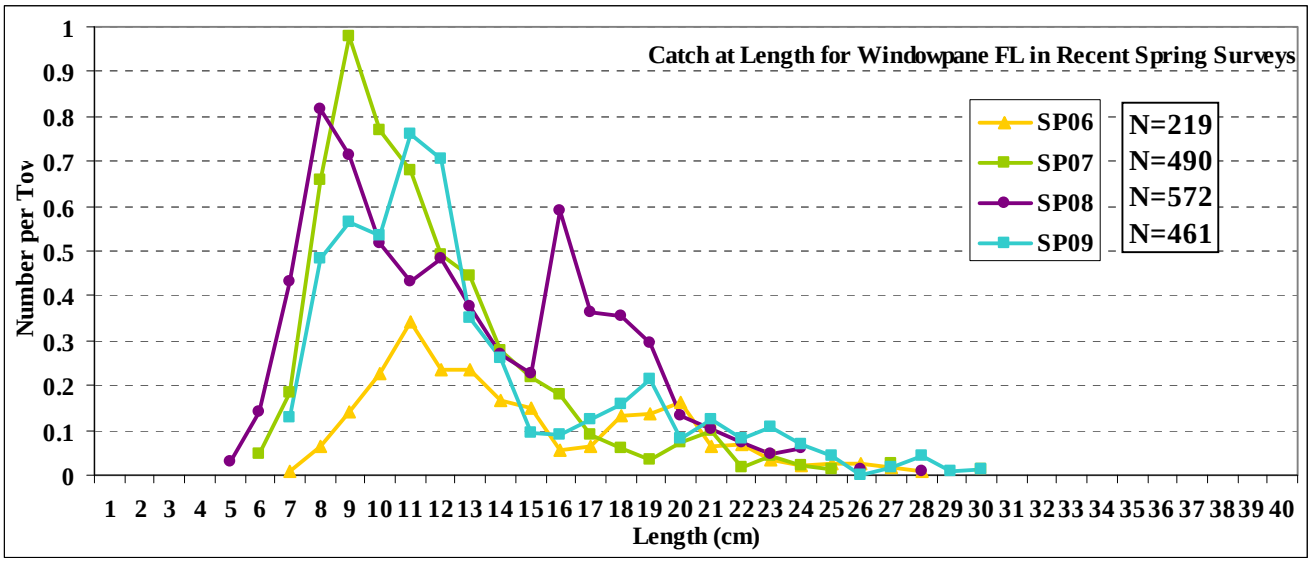


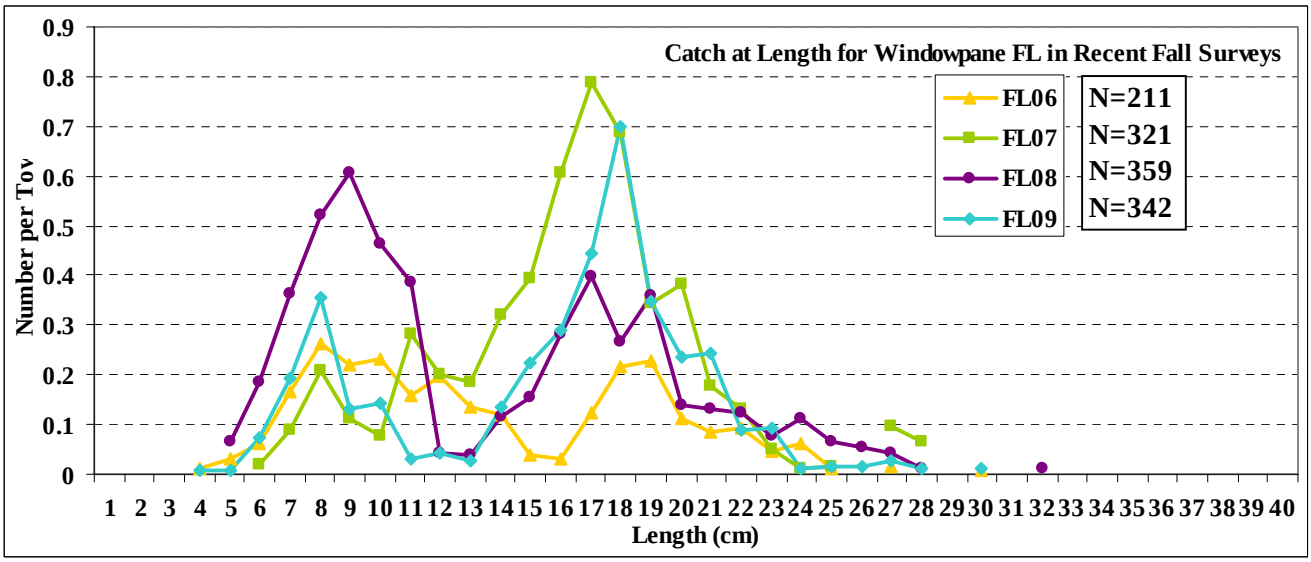
Windowpane flounder, *Scophthalmus aquosus*



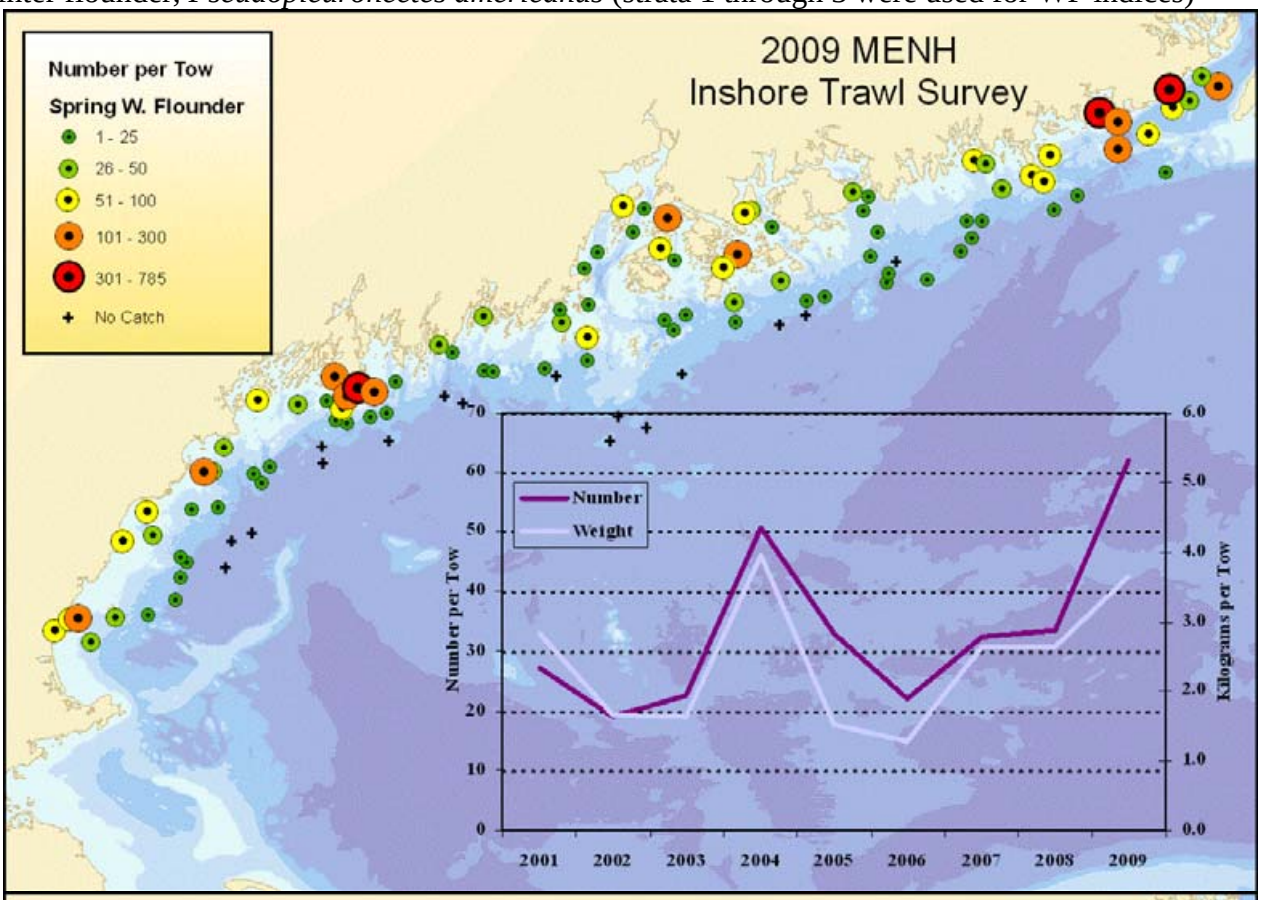


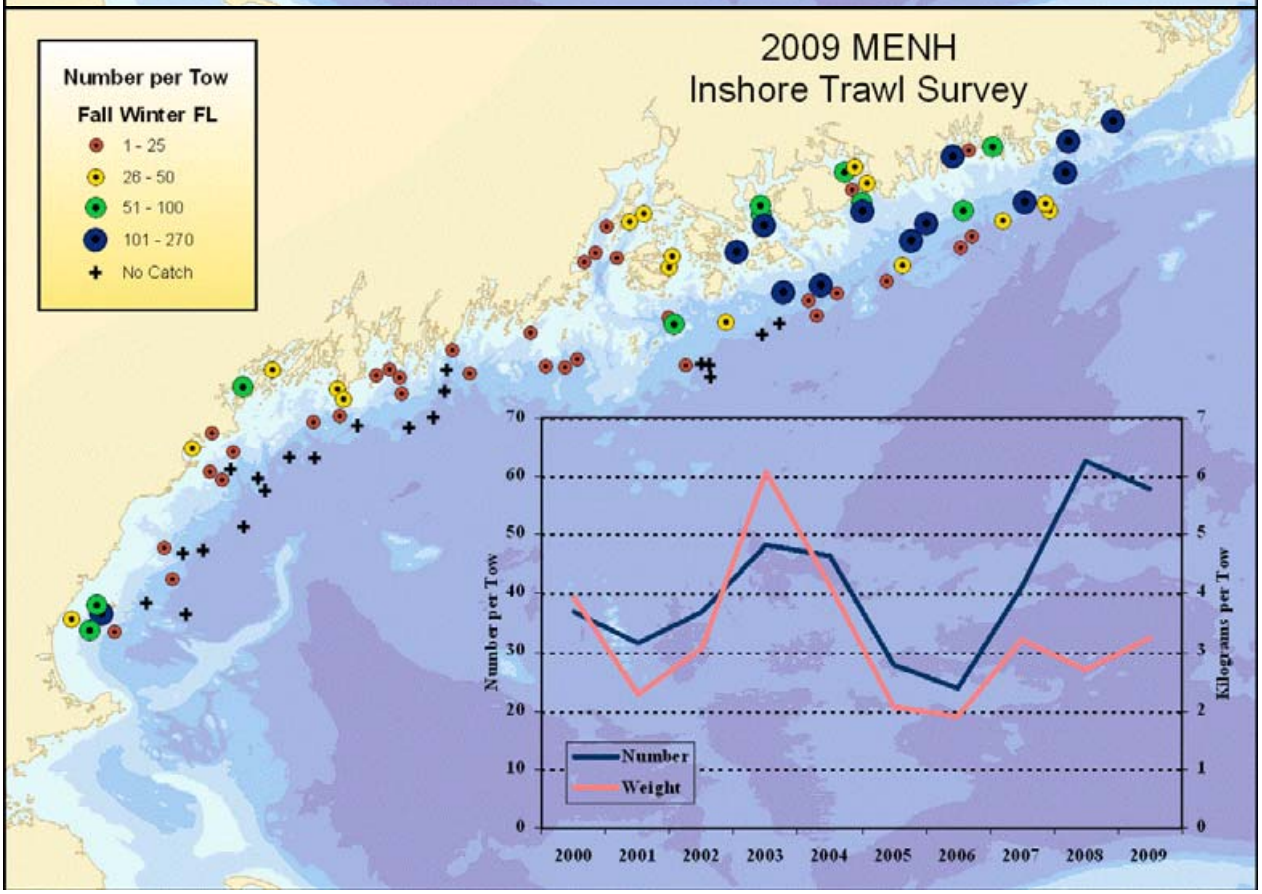
Mean and error for graphs overlain on distribution maps									
fixed stations **not** included									
for windowpane, indices calculated for regions 1 through 5; strata 1 through 4 (2003 and up)									
SPRING					FALL				
	Stratified Mean					Stratified Mean			
	Number		Weight			Number		Weight	
	Mean	Error	Mean	Error		Mean	Error	Mean	Error
					2000	4.05	0.62	0.20	0.03
2001	5.12	1.48	0.10	0.02	2001	1.46	0.48	0.09	0.02
2002	3.51	0.61	0.13	0.02	2002	12.35	3.64	0.24	0.06
2003	6.71	1.15	0.13	0.02	2003	8.29	1.20	0.42	0.05
2004	4.20	0.69	0.19	0.03	2004	2.52	0.78	0.14	0.03
2005	2.51	0.45	0.12	0.02	2005	4.90	1.60	0.19	0.05
2006	2.39	0.52	0.11	0.02	2006	2.66	0.39	0.14	0.03
2007	5.41	1.06	0.13	0.02	2007	5.24	1.16	0.29	0.07
2008	6.47	1.31	0.22	0.03	2008	5.03	0.82	0.24	0.03
2009	5.05	0.84	0.18	0.02	2009	3.83	0.46	0.23	0.03



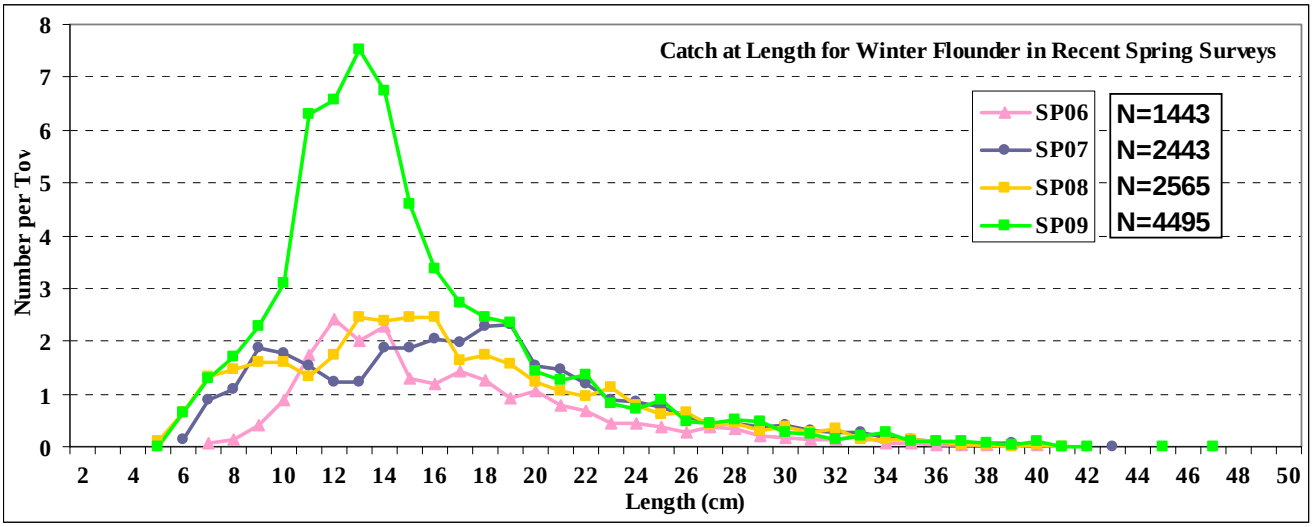


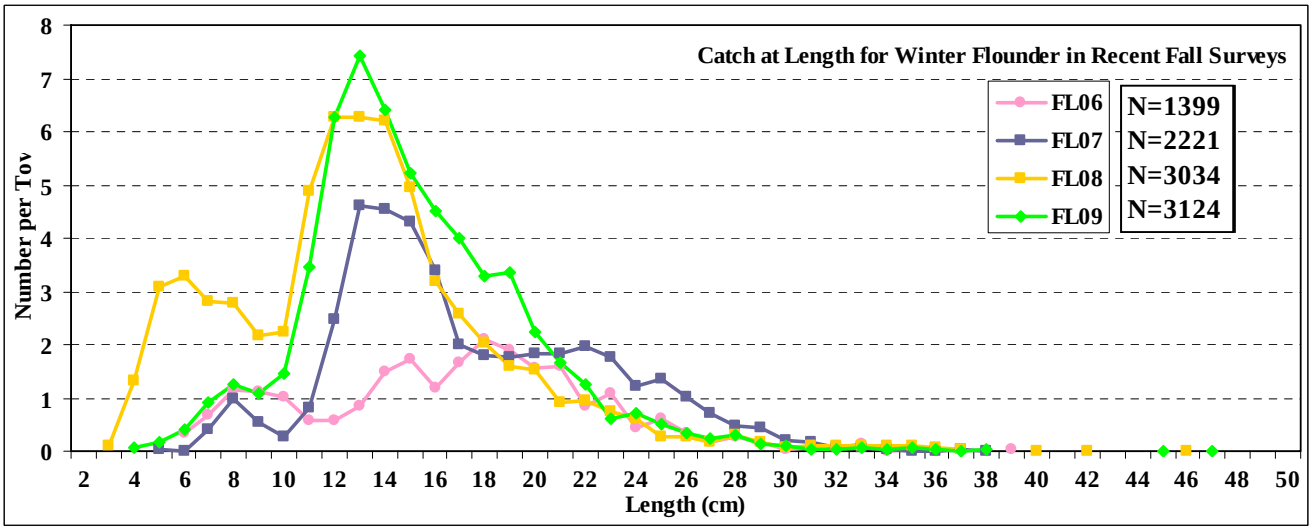
Winter flounder, *Pseudopleuronectes americanus* (strata 1 through 3 were used for WF indices)



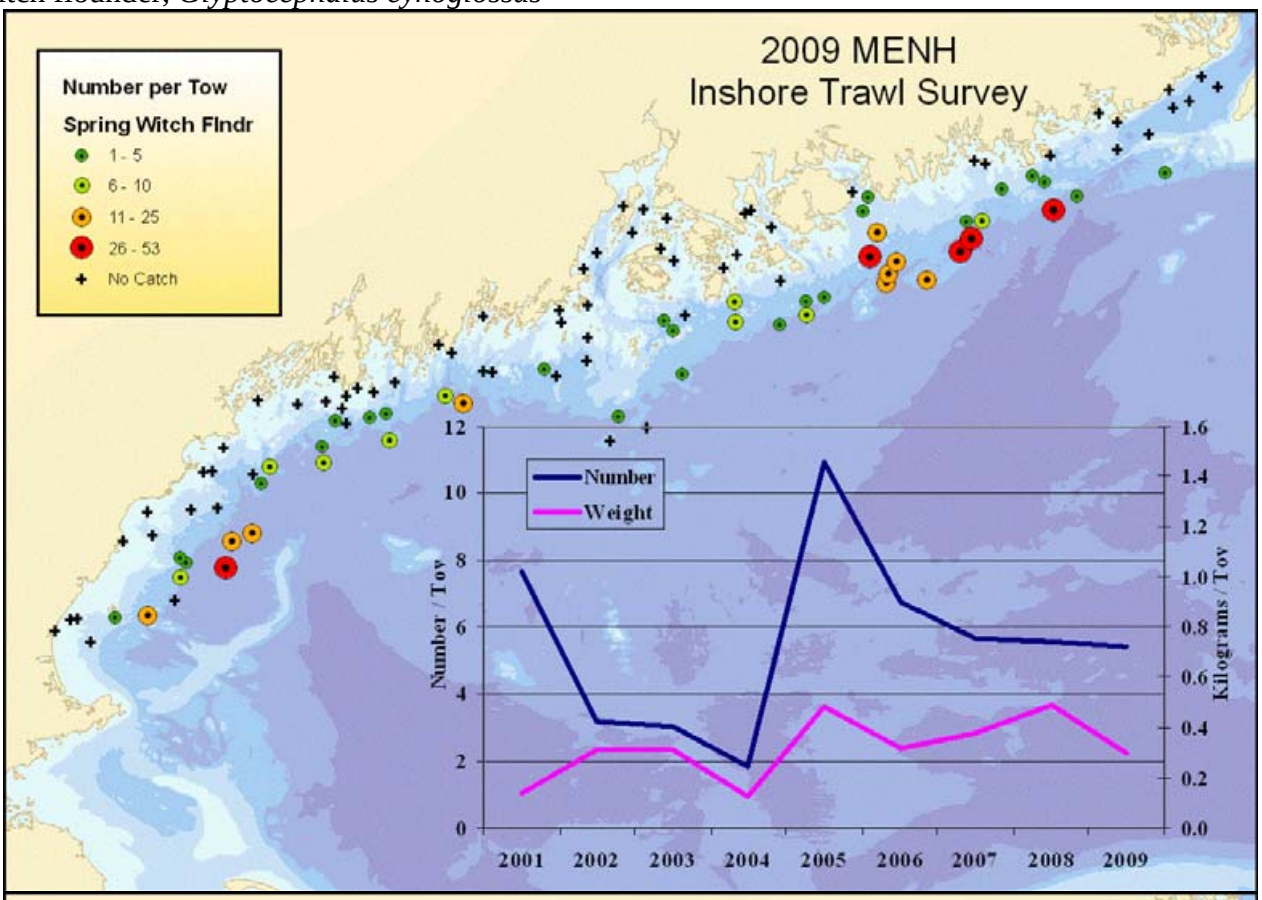


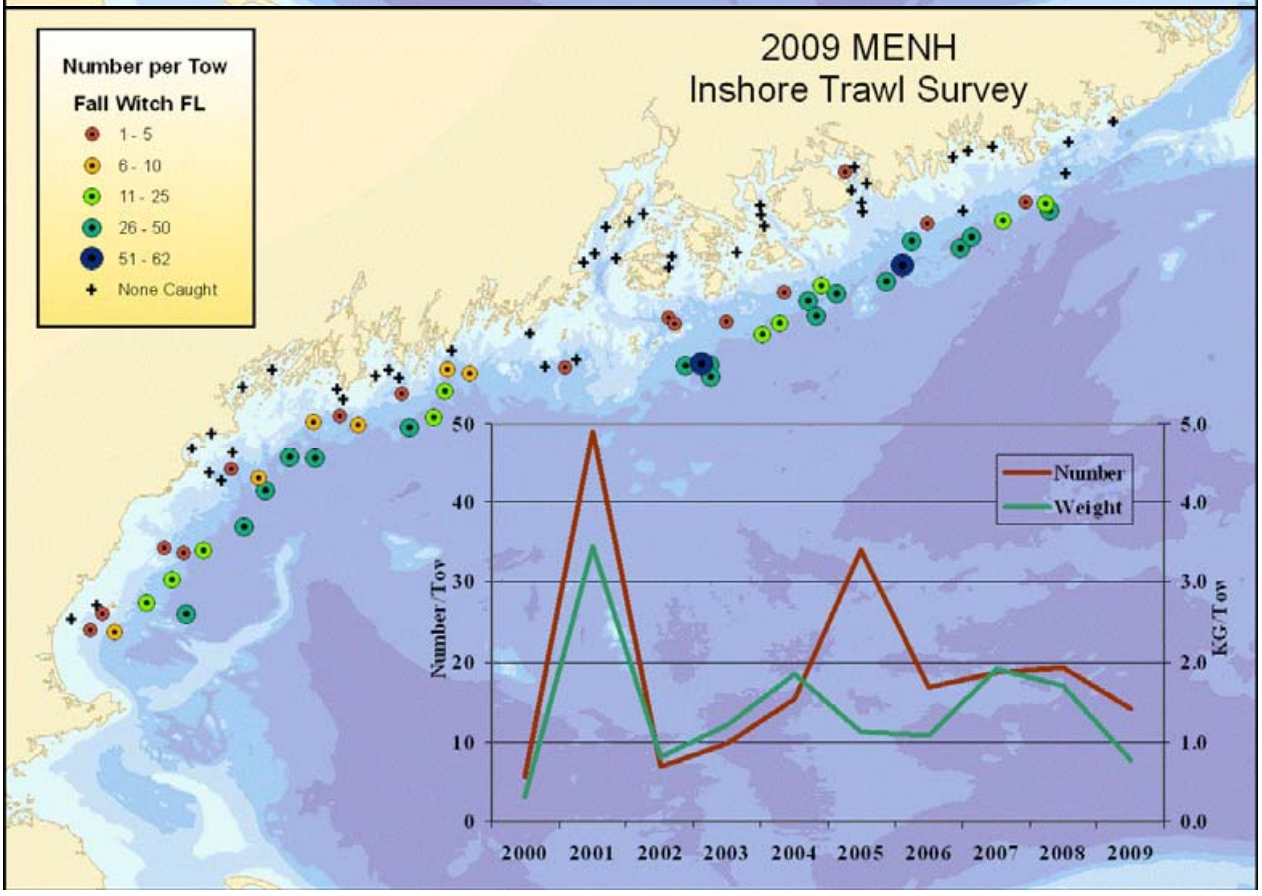
Mean and error for graphs overlain on distribution maps									
fixed stations not included									
for winter flounder, indices calculated for regions 1 through 5									
strata 1 through 3									
SPRING					FALL				
	Stratified Mean					Stratified Mean			
	Number		Weight			Number		Weight	
	Mean	Error	Mean	Error		Mean	Error	Mean	Error
					2000	36.77	3.17	3.92	0.41
2001	27.30	4.03	2.82	0.40	2001	31.43	6.21	2.28	0.25
2002	19.00	2.81	1.67	0.16	2002	36.95	6.77	3.08	0.71
2003	22.57	3.81	1.63	0.27	2003	48.15	5.82	6.06	0.22
2004	50.79	6.31	3.95	0.58	2004	46.42	9.01	4.14	0.82
2005	32.89	3.82	1.53	0.20	2005	27.90	2.57	2.08	0.28
2006	21.94	5.25	1.28	0.38	2006	23.78	3.44	1.92	0.25
2007	32.46	3.68	2.64	0.27	2007	41.18	7.78	3.22	0.91
2008	33.55	4.55	2.65	0.36	2008	62.46	5.96	2.70	0.24
2009	61.76	11.03	3.64	0.39	2009	57.69	8.50	3.22	0.51



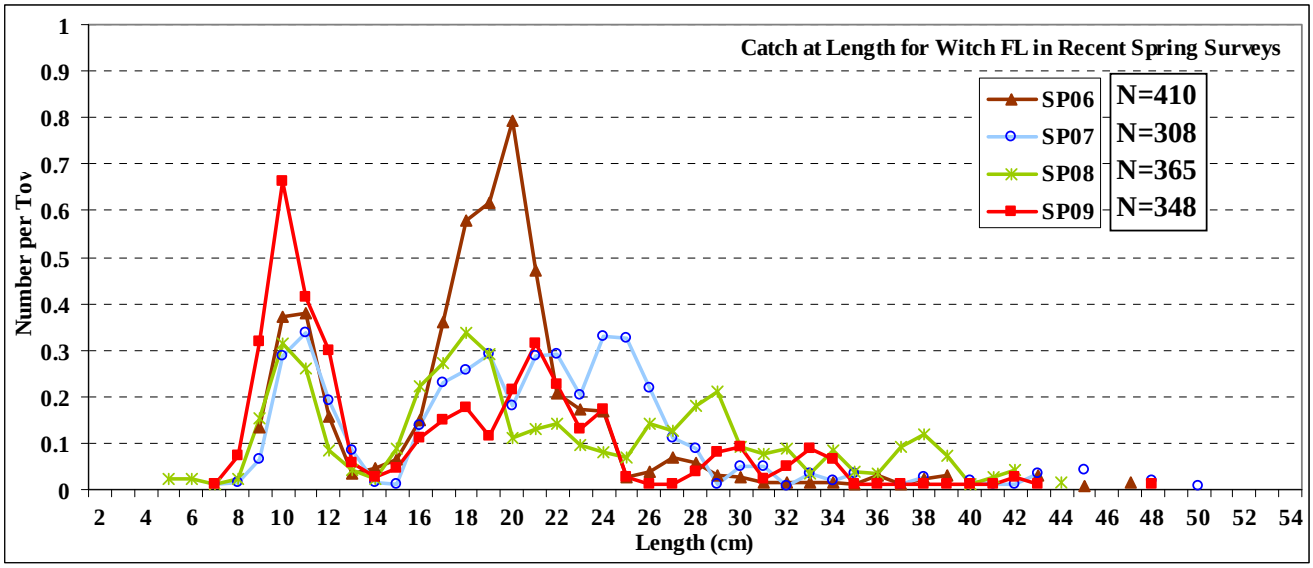


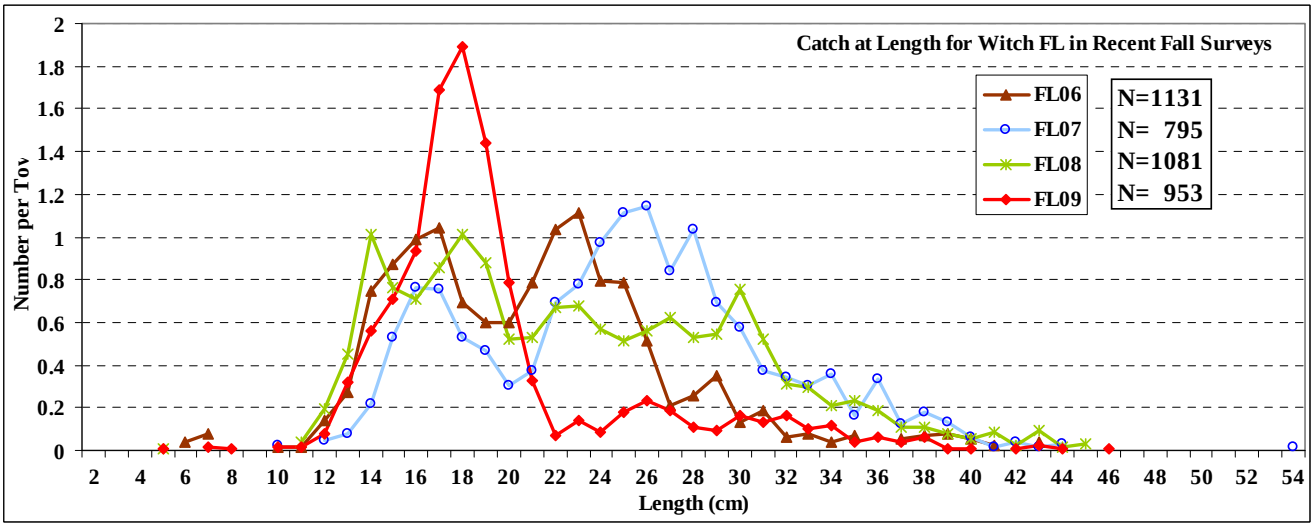
Witch flounder, *Glyptocephalus cynoglossus*



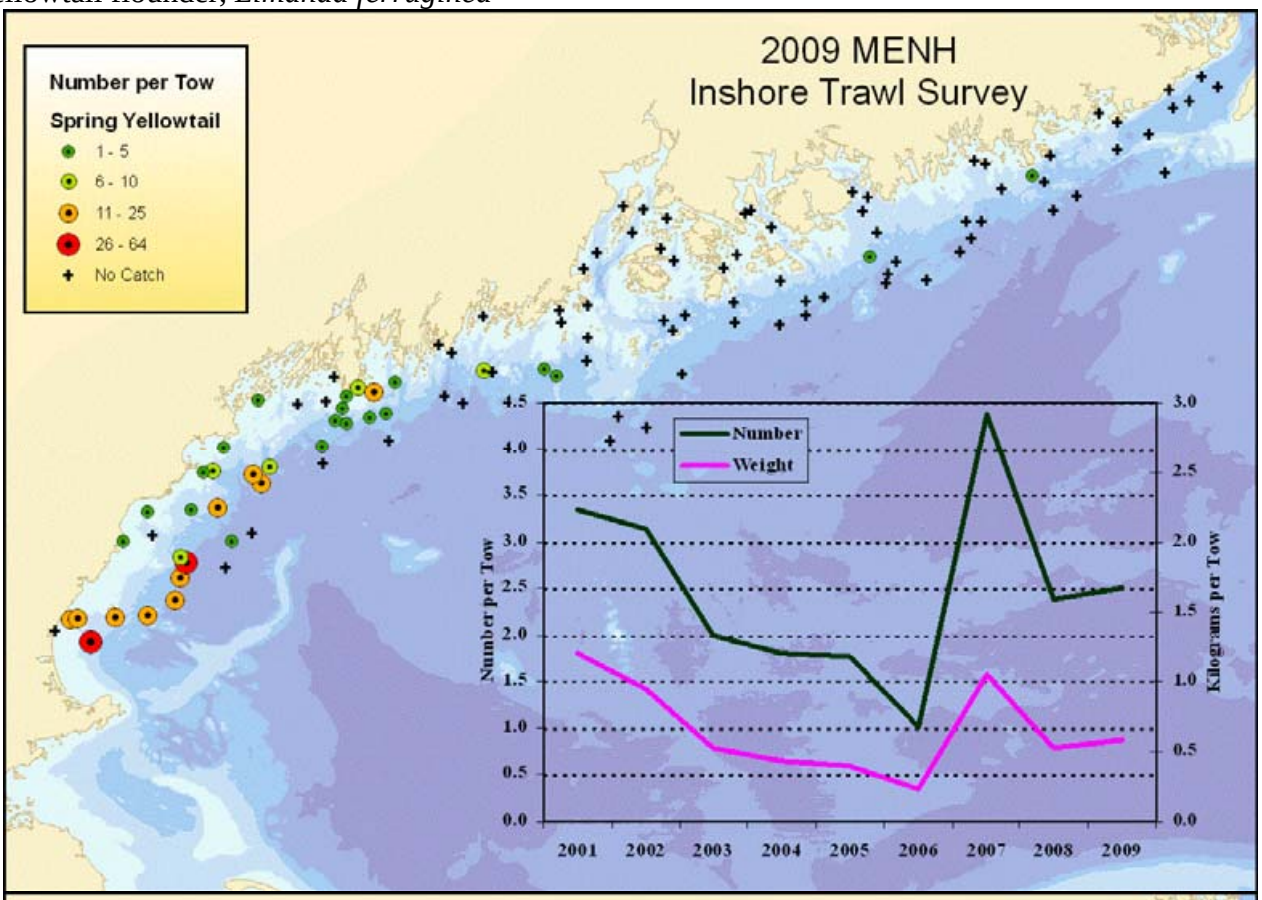


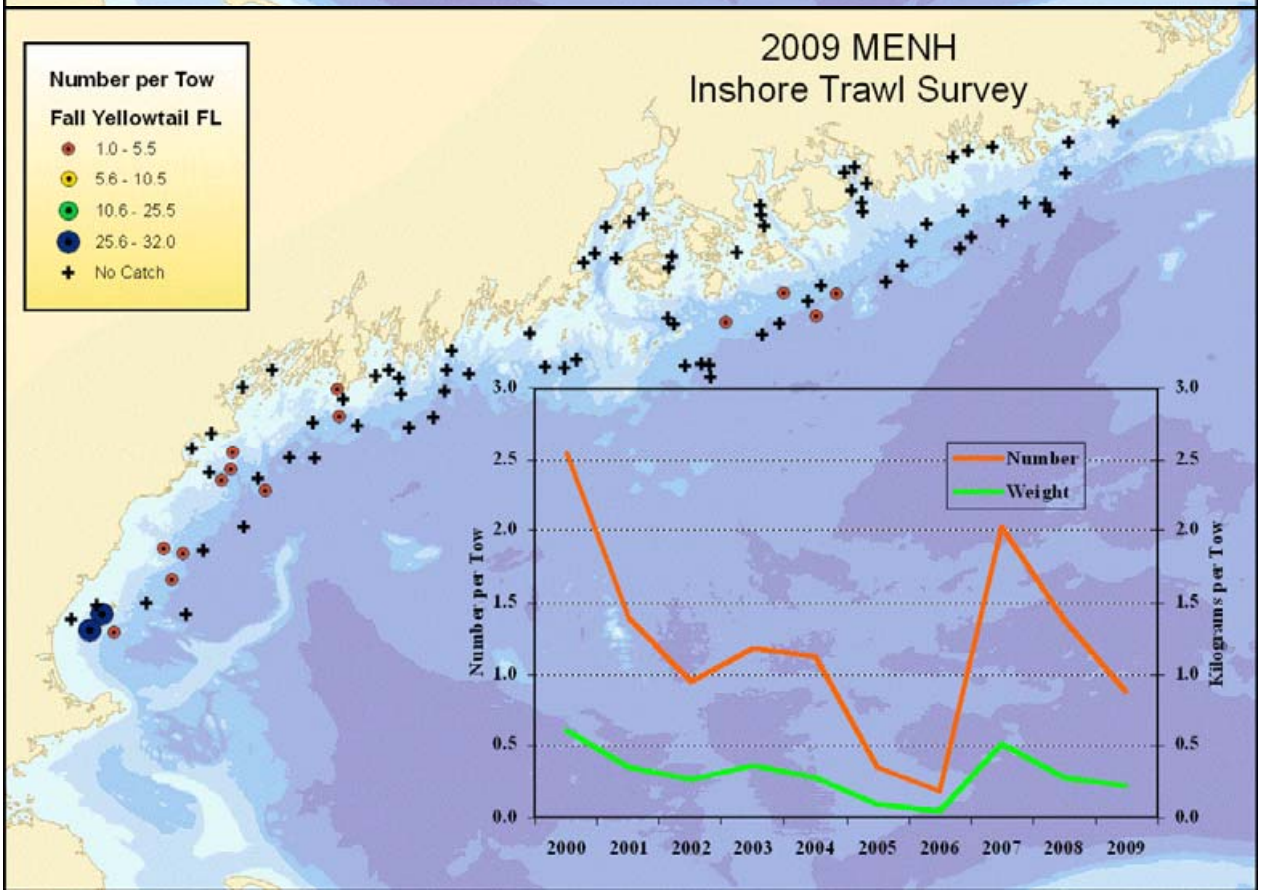
Mean and error for graphs overlain on distribution maps									
fixed stations not included									
for witch flounder, indices calculated for regions 1 through 5; strata 1 through 4 (2003 on)									
SPRING					FALL				
	Stratified Mean					Stratified Mean			
	Number		Weight			Number		Weight	
	Mean	Error	Mean	Error		Mean	Error	Mean	Error
					2000	3.9	0.71	0.21	0.04
2001	5.33	1.38	0.10	0.02	2001	34.2	4.31	2.42	0.46
2002	2.22	0.91	0.22	0.12	2002	4.8	1.23	0.56	0.17
2003	2.32	0.72	0.24	0.07	2003	7.4	1.16	0.92	0.19
2004	1.42	0.21	0.10	0.02	2004	11.7	1.94	1.41	0.20
2005	8.37	1.33	0.37	0.09	2005	26.2	3.55	0.86	0.10
2006	5.17	1.11	0.24	0.06	2006	12.8	1.37	0.83	0.07
2007	4.36	0.68	0.29	0.04	2007	14.4	2.04	1.47	0.30
2008	4.25	0.60	0.38	0.08	2008	14.8	1.8	1.31	0.23
2009	4.15	0.68	0.23	0.06	2009	10.8	1.1	0.59	0.07



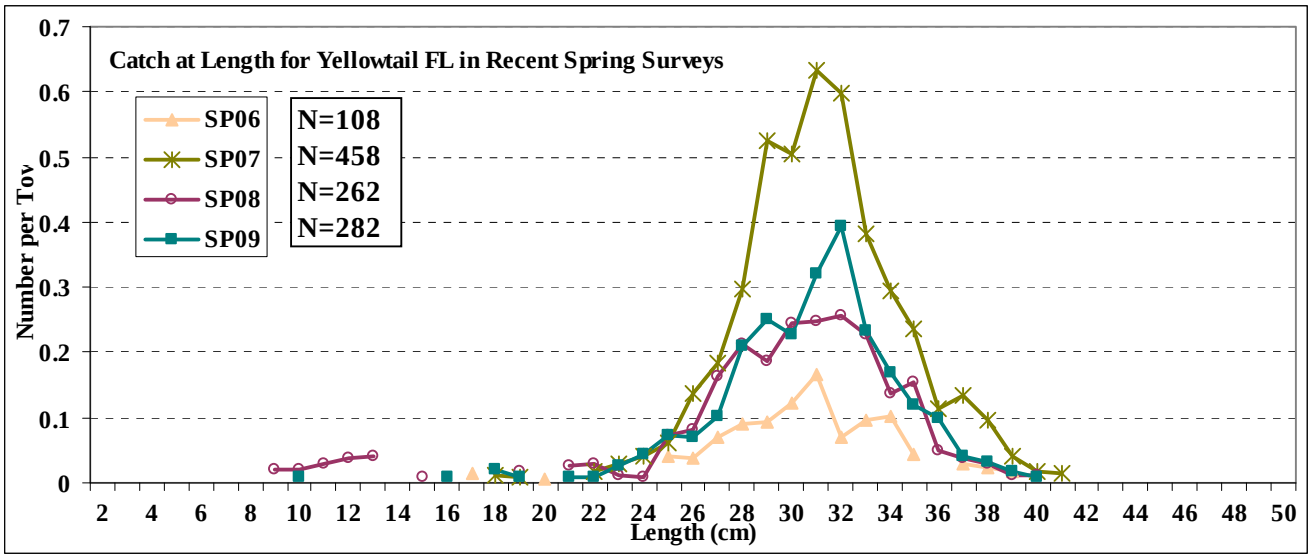


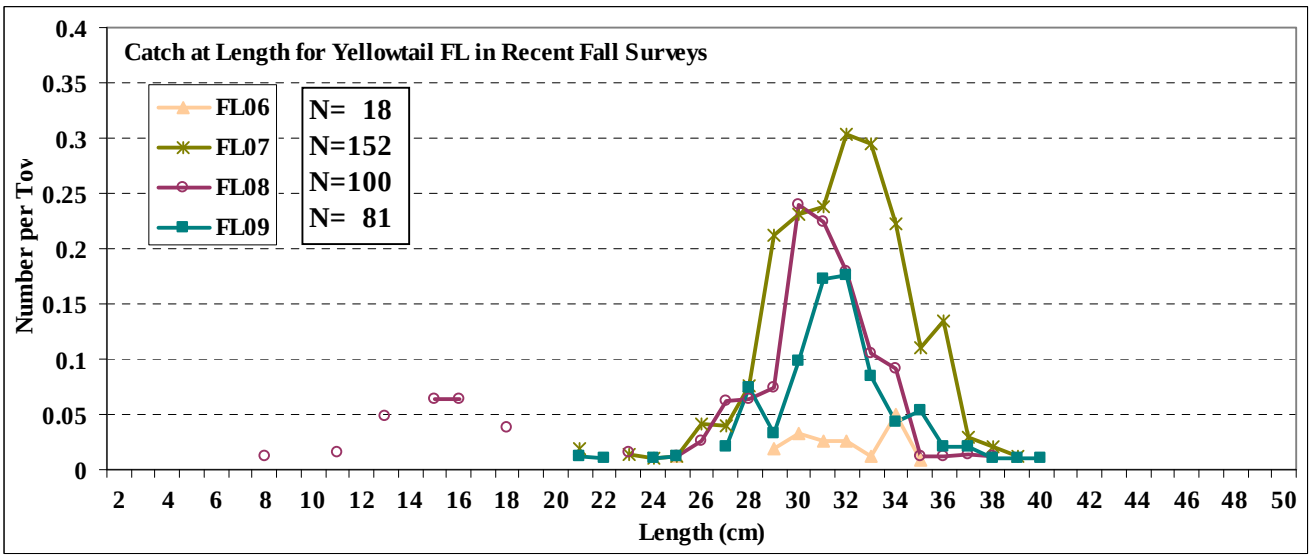
Yellowtail flounder, *Limanda ferruginea*



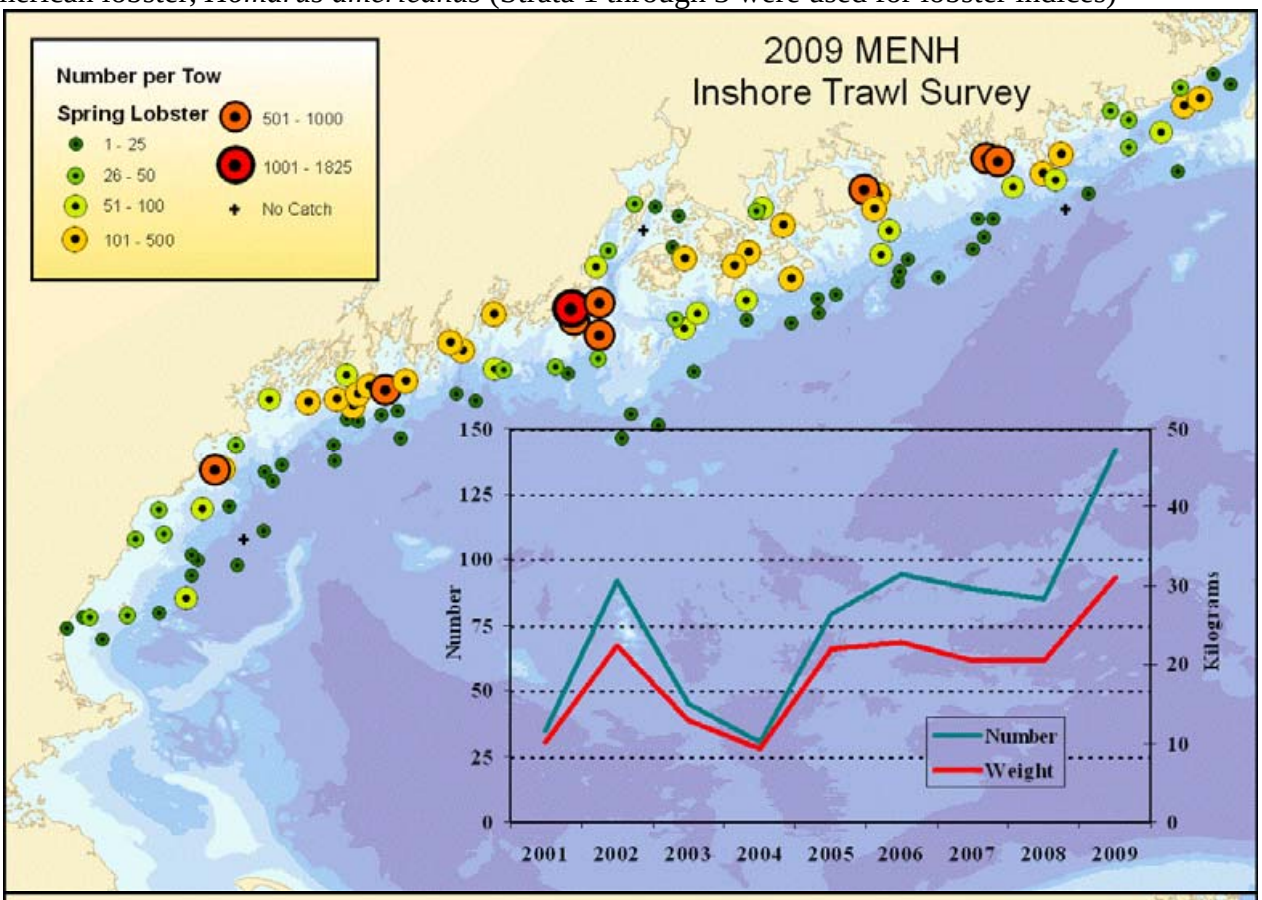


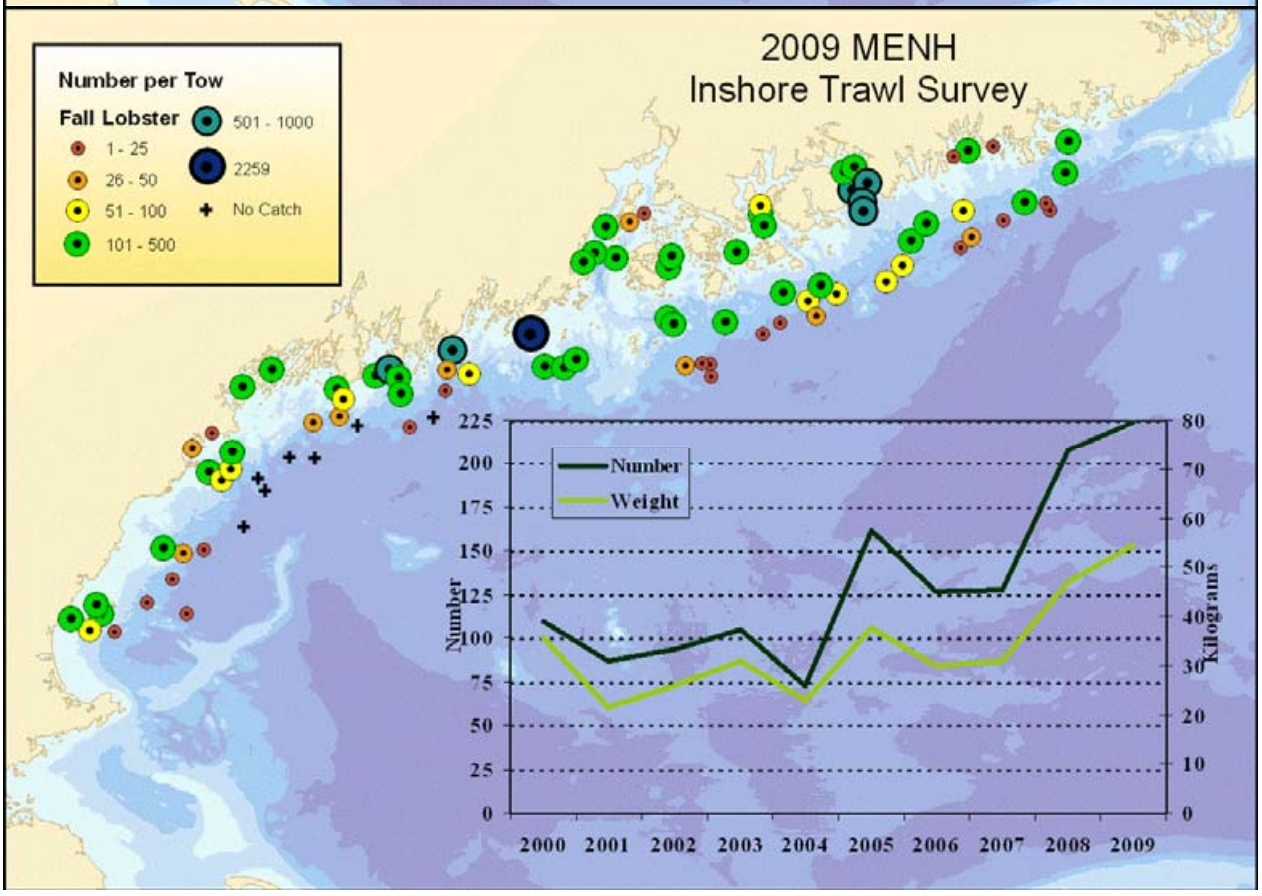
Mean and error for graphs overlain on distribution maps									
fixed stations not included									
for yellowtail flounder, indices calculated for regions 1 through 5; strata 1 through 4 (2003 on)									
SPRING					FALL				
	Stratified Mean					Stratified Mean			
	Number		Weight			Number		Weight	
	Mean	Error	Mean	Error		Mean	Error	Mean	Error
					2000	2.5	1.34	0.61	0.31
2001	3.35	2.09	1.20	0.82	2001	1.4	0.74	0.35	0.17
2002	3.14	0.76	0.95	0.22	2002	0.9	0.28	0.27	0.07
2003	1.99	0.43	0.52	0.11	2003	1.2	0.04	0.37	0.01
2004	1.80	0.45	0.43	0.11	2004	1.1	0.29	0.28	0.06
2005	1.77	0.51	0.40	0.11	2005	0.4	0.24	0.09	0.06
2006	1.02	0.20	0.23	0.05	2006	0.2	0.14	0.05	0.03
2007	4.38	1.17	1.05	0.27	2007	2.0	0.94	0.52	0.27
2008	2.37	0.68	0.53	0.15	2008	1.39	0.53	0.28	0.11
2009	2.50	0.61	0.58	0.15	2009	0.87	0.33	0.22	0.08



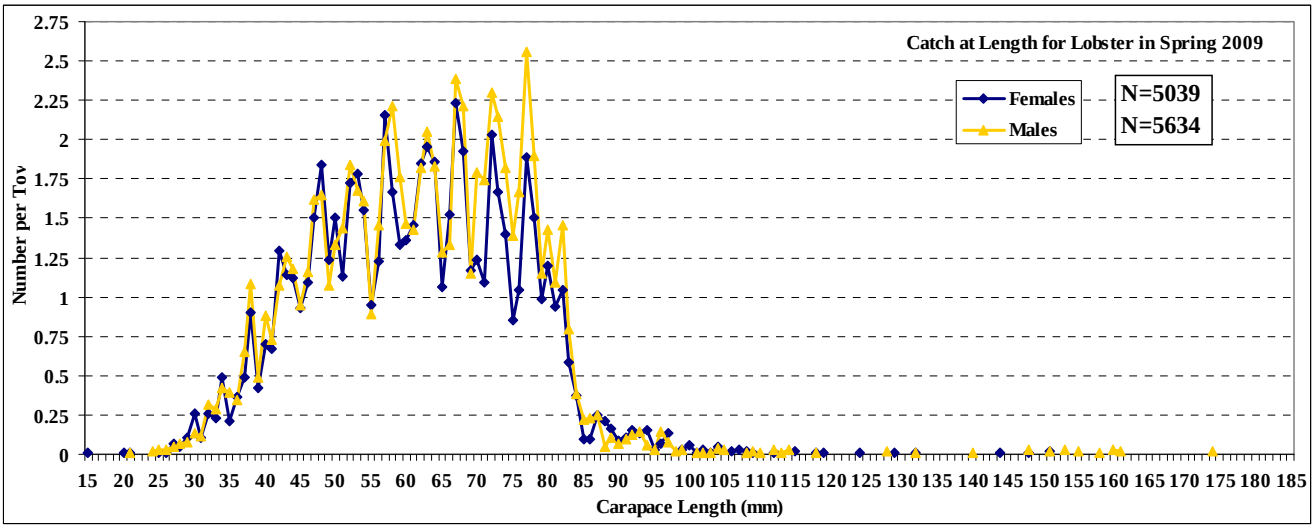


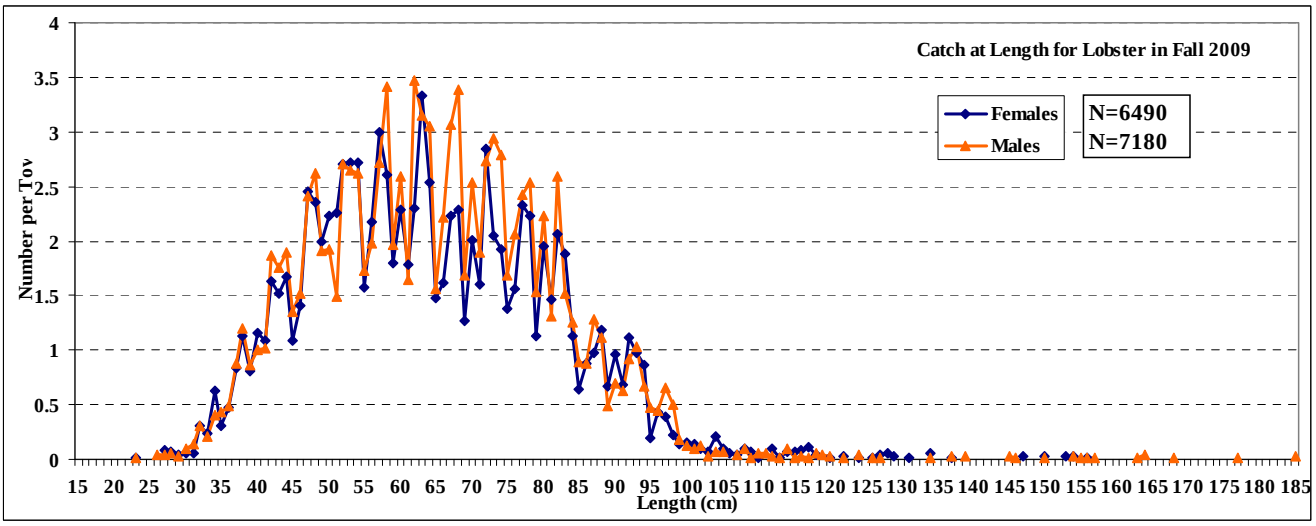
American lobster, *Homarus americanus* (Strata 1 through 3 were used for lobster indices)



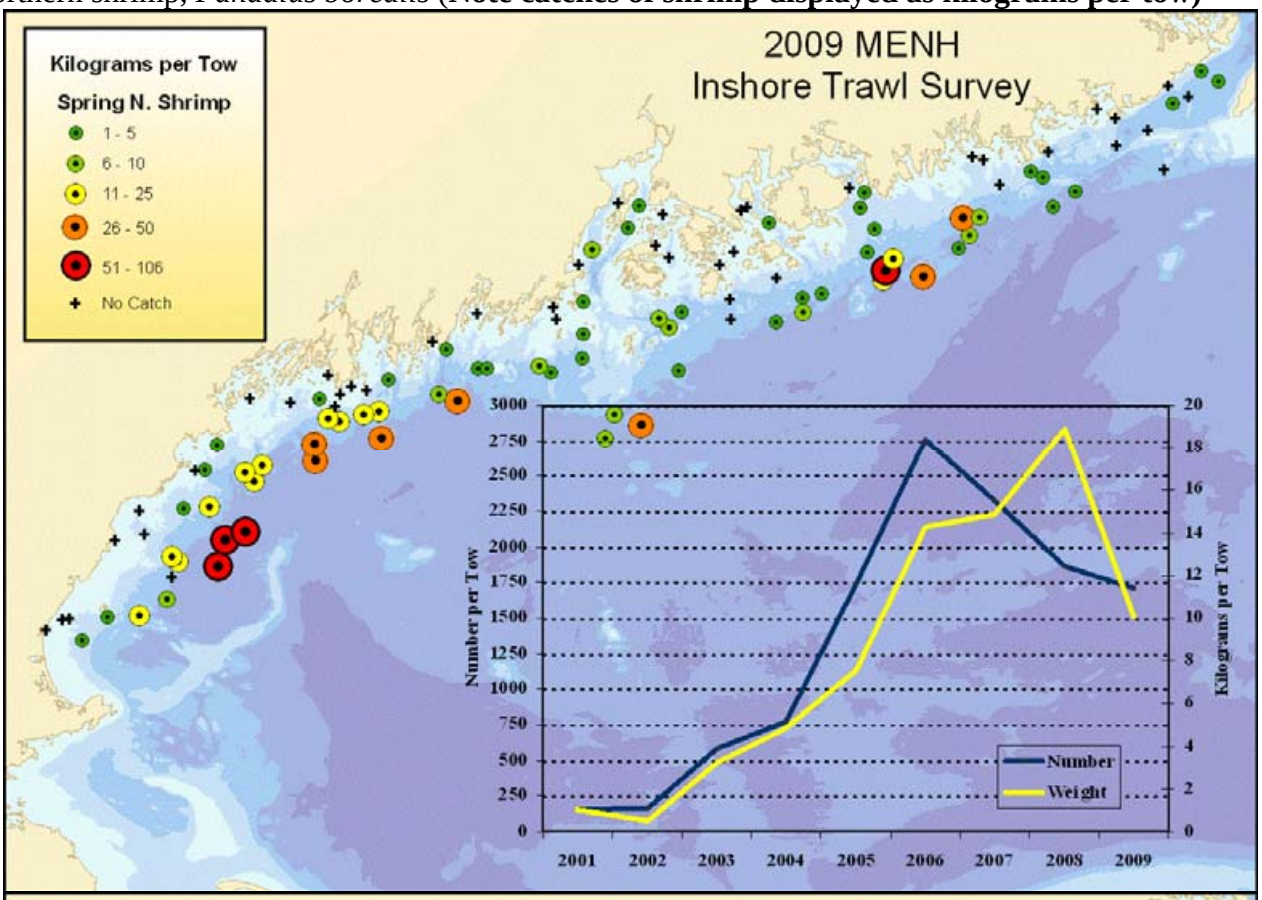


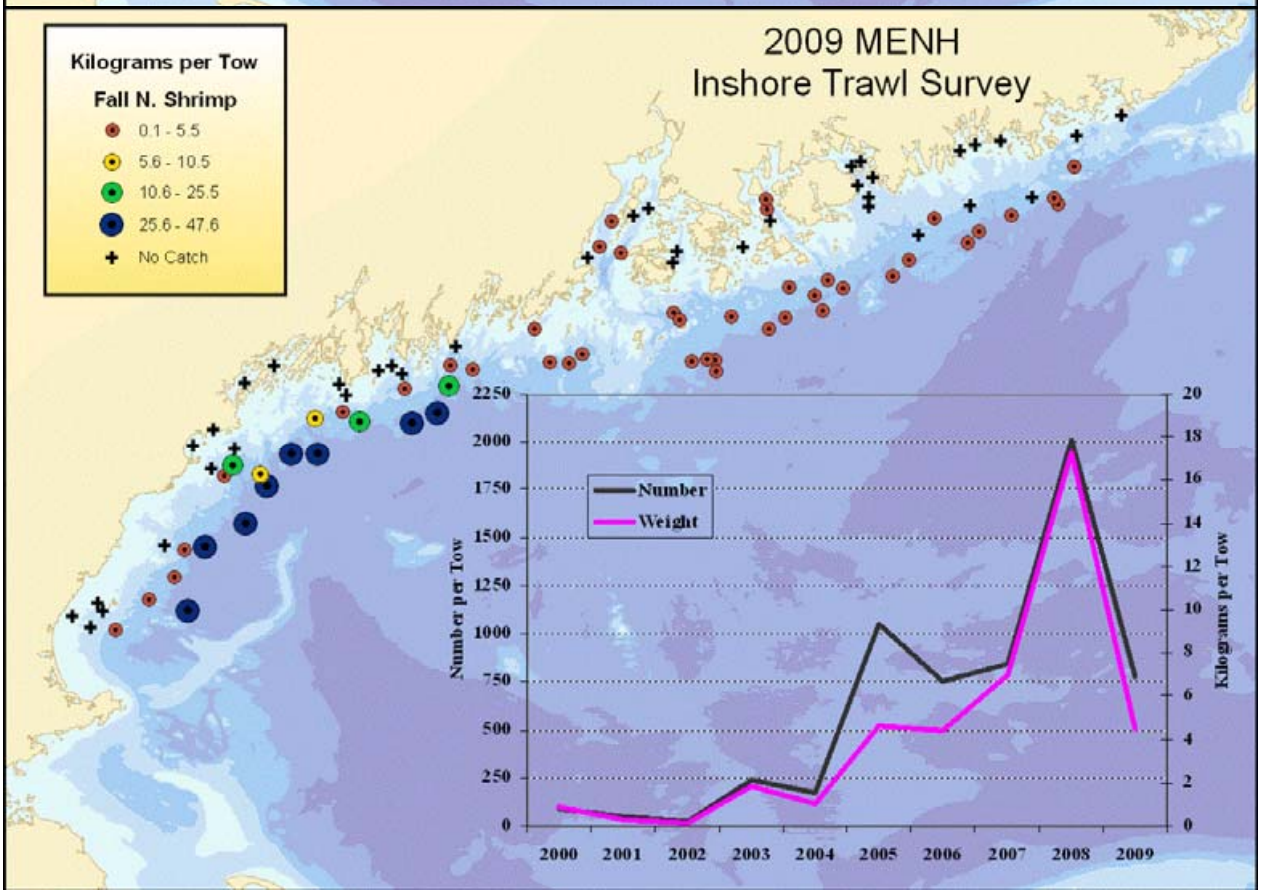
Mean and error for graphs overlain on distribution maps									
fixed stations not included									
for lobster, indices calculated for regions 1 through 5									
strata 1 through 3									
SPRING					FALL				
Stratified Mean			Stratified Mean		Stratified Mean			Stratified Mean	
	Number		Weight			Number		Weight	
	Mean	Error	Mean	Error		Mean	Error	Mean	Error
					2000	109.43	19.58	35.60	4.98
2001	34.67	5.53	10.04	1.37	2001	87.13	18.67	21.68	3.71
2002	91.47	13.85	22.42	3.09	2002	93.61	11.91	25.97	2.77
2003	44.64	7.43	12.82	1.84	2003	105.40	10.09	30.99	2.97
2004	30.17	3.81	9.31	1.07	2004	73.21	14.55	22.84	3.69
2005	79.24	14.21	22.02	3.75	2005	161.77	28.23	37.66	6.82
2006	94.52	22.57	22.75	4.65	2006	126.31	20.14	30.02	4.37
2007	88.37	11.68	20.48	2.48	2007	127.68	20.53	30.87	4.24
2008	84.84	21.66	20.56	5.30	2008	207.77	50.58	47.15	7.64
2009	141.89	30.74	31.02	5.33	2009	223.66	39.24	54.62	7.64





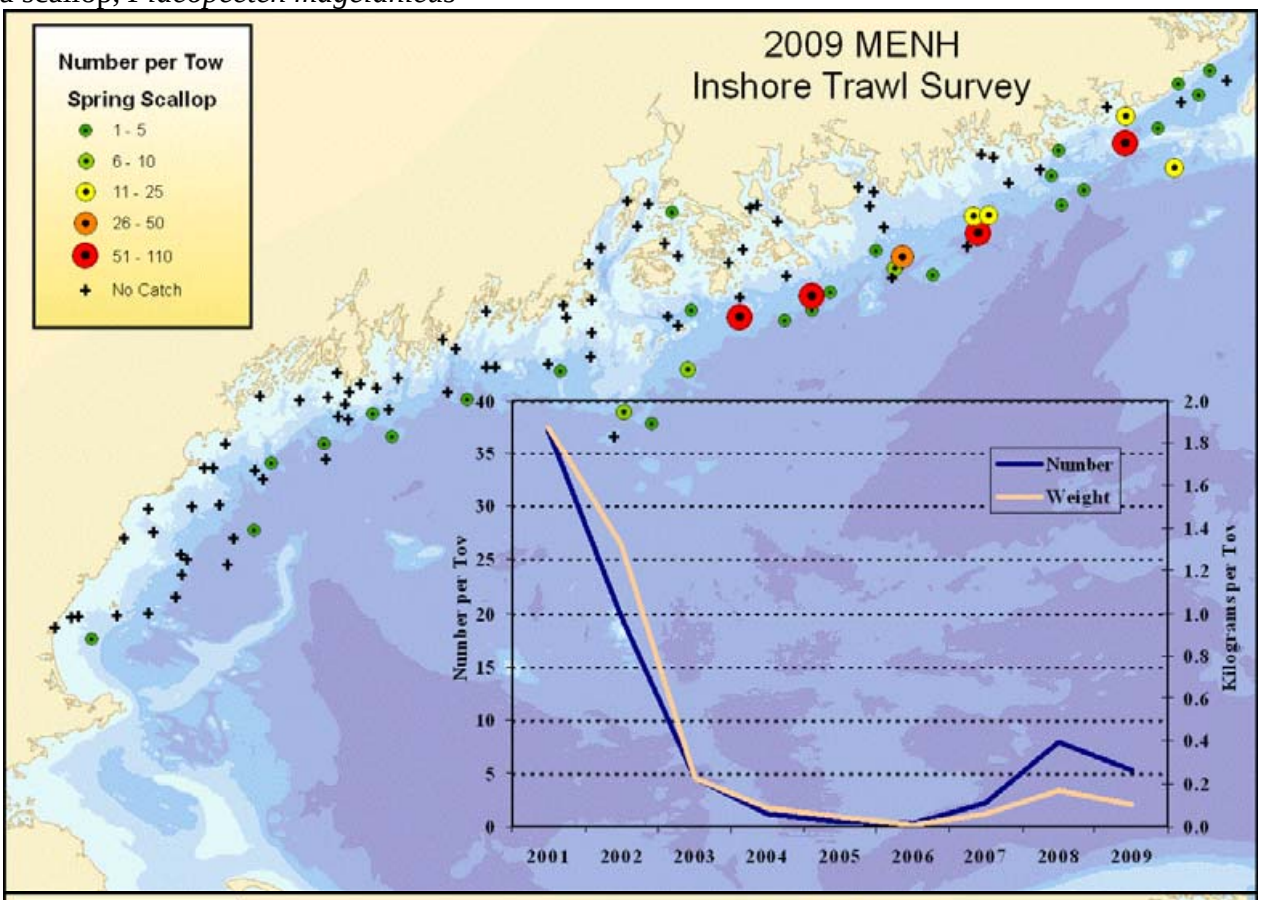
Northern shrimp, *Pandalus borealis* (**Note catches of shrimp displayed as kilograms per tow)**

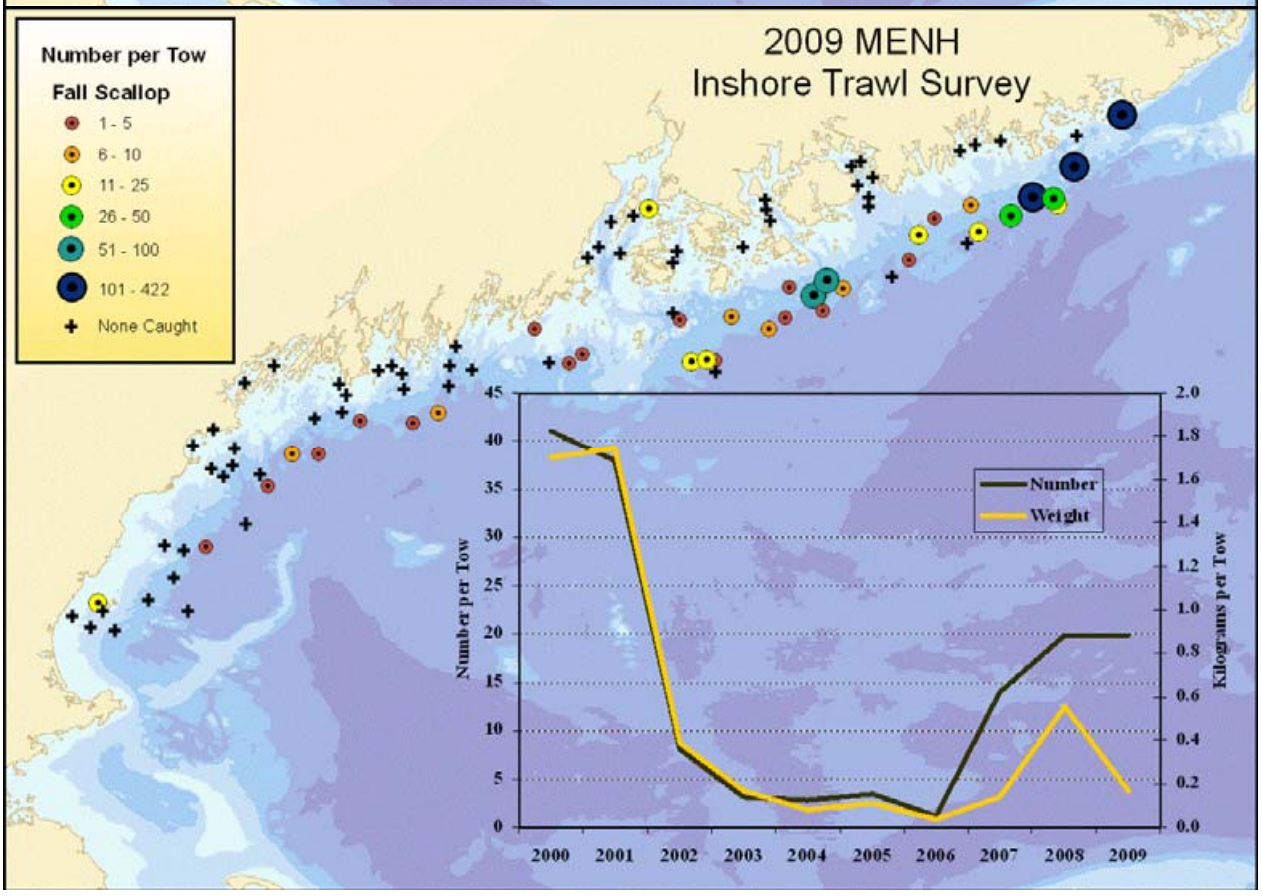




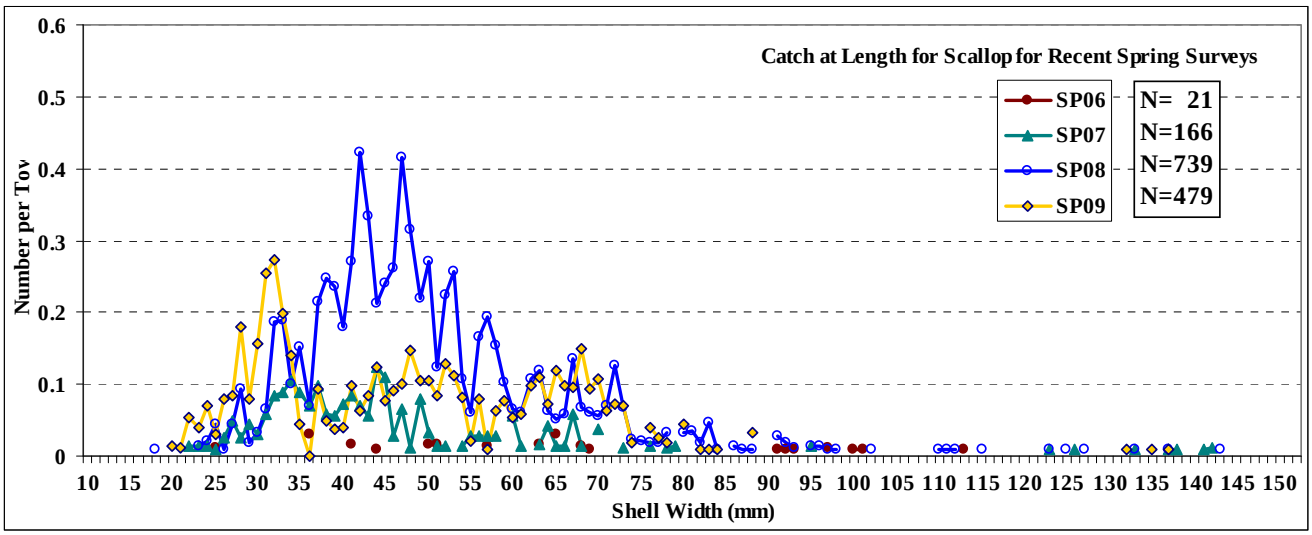
Mean and error for graphs overlain on distribution maps									
fixed stations not included									
for shrimp, indices calculated for regions 1 through 5; strata 1 through 4 (2003 and up)									
SPRING					FALL				
	Stratified Mean					Stratified Mean			
	Number		Weight (kg.)			Number		Weight (kg)	
	Mean	Error	Mean	Error		Mean	Error	Mean	Error
					2000	92.57	54.20	0.88	0.41
2001	159.77	52.13	1.05	0.35	2001	49.89	24.04	0.27	0.13
2002	167.40	68.82	0.50	0.22	2002	22.95	10.15	0.16	0.07
2003	582.09	77.06	3.25	0.39	2003	242.48	92.03	1.80	0.67
2004	774.30	139.20	4.86	1.18	2004	175.04	99.88	1.03	0.57
2005	1746.05	176.71	7.54	0.89	2005	1052.09	50.44	4.63	0.17
2006	2754.63	407.04	14.25	2.17	2006	749.43	204.83	4.44	1.34
2007	2327.07	611.97	14.86	4.38	2007	843.76	163.47	7.00	1.37
2008	1865.34	169.86	18.90	7.98	2008	2010.33	965.43	17.29	9.23
2009	1709.08	250.33	10.08	1.46	2009	775.52	55.45	4.47	0.37

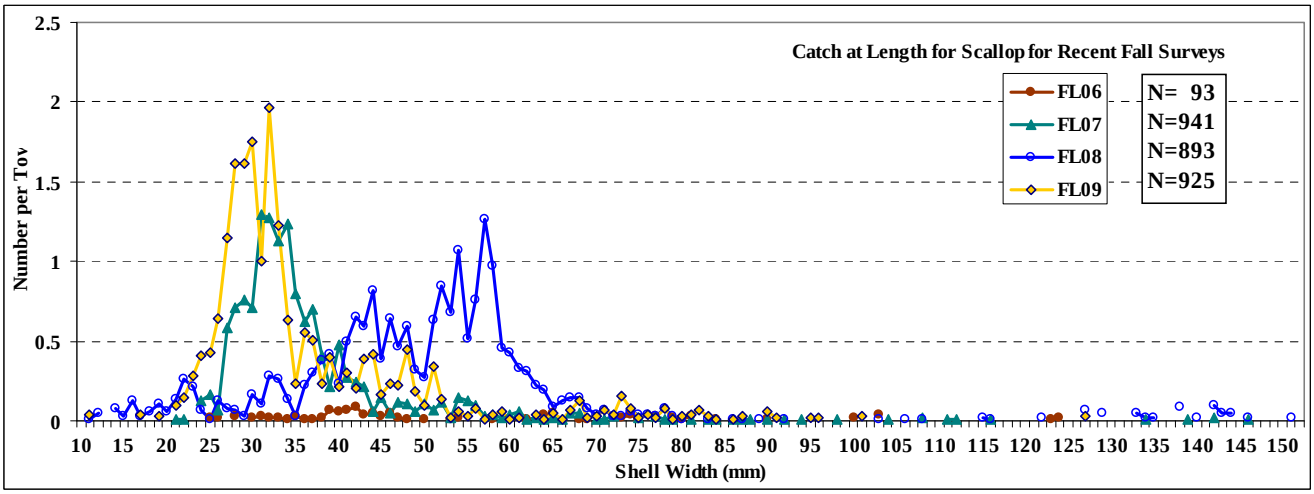
Sea scallop, *Placopecten magelanicus*





Mean and error for graphs overlain on distribution maps									
fixed stations not included									
for scallop, indices calculated for regions 1 through 5									
strata 1 through 4 (2003 on)									
SPRING					FALL				
Stratified Mean					Stratified Mean				
	Number		Weight			Number		Weight	
	Mean	Error	Mean	Error		Mean	Error	Mean	Error
					2000	41.08	11.66	1.70	0.67
2001	37.25	8.35	1.87	0.70	2001	38.01	10.51	1.75	0.37
2002	19.66	5.41	1.32	0.39	2002	8.13	1.95	0.39	0.10
2003	4.51	1.18	0.23	0.07	2003	3.17	1.96	0.16	0.09
2004	1.23	0.33	0.09	0.02	2004	2.72	1.20	0.08	0.03
2005	0.51	0.16	0.04	0.02	2005	3.38	1.24	0.11	0.04
2006	0.27	0.11	0.01	0.00	2006	1.16	0.39	0.04	0.01
2007	2.23	0.66	0.06	0.02	2007	13.98	4.71	0.14	0.03
2008	7.89	1.87	0.17	0.04	2008	19.80	6.12	0.55	0.27
2009	5.28	1.75	0.11	0.03	2009	19.88	9.17	0.17	0.05





PARTNERSHIPS

The fisherman-scientist partnership during this project has been consistently strong. Foremost is the partnership between the scientific staff and commercial boat crews. The commercial crew of the F/V Robert Michael has proven to be completely dedicated to this project. Not only did the crew operate the boat and handle the gear, they have become equal partners in solving problems related to gear conflicts, communications, scheduling and logistics. Their participation involves far more than boat operations and gear handling, including sorting the catch, weighing and measuring samples, and collecting biological specimens including otoliths. Their involvement has resulted in significant improvements to survey efficiency while still adhering to standard protocols.

REFERENCES

Bigelow, H.B. and W.C. Schroeder. 1953. Fishes of the Gulf of Maine. U.S. Fish Wildl. Ser. Fish. Bull. 53. 577 p.

Collette, B.B., and G. Klein MacPhee. 2002. Bigelow and Schroeder's Fishes of the Gulf of Maine 3rd Edition. Smithsonian Institution Press. Washington DC.

Hendrickson, L.C. and E.M. Holmes. 2004. Essential Fish Habitat Source Document: Northern Shortfin Squid, Illex illecebrosus, Life History and Habitat Characteristics Second Edition NOAA Technical Memorandum NMFS-NE-191. 46 pp.

Kelley, J.T. and S.M. Dickson. 1999. Surficial Sediments along the Inner Continental Shelf of Maine. Marine Georesources & Geotechnology, Volume 17, Issue 2 & 3 January 1999 , page 125.

Scott, W.B. and M.G. Scott. 1988. Atlantic fishes of Canada. Can. Bull. Fish. Aquat. Sci. 219: 731 p.

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

Sherman, S., K. Stepanek, J. Sowles, D. Grout, and R.M. Tetrault. 2005. Completion Report on the Maine-New Hampshire Inshore Trawl Survey (October 1, 2004 – September 30, 2005). Maine Department of Marine Resources, Research Reference Document 05/02.

Sherman, S., K. Stepanek, A. Gowen, J. Sowles, D. Grout, and R.M. Tetrault.2007 Annual Report on the Maine-New Hampshire Inshore Trawl Survey (January 1, 2007-December 31, 2007) Maine Department of Marine Resources, Research Reference Document 09/0?

Studholme, A.L., D.B. Packer, P.L. Berrien, D.L. Johnson, C.A. Zetlin, and W.W. Morse. 1999. Essential Fish Habitat Source Document: Atlantic Mackerel, Scomber scombrus, Life History and Habitat Characteristics. NOAA Technical Memorandum NMFS-NE-141. 44 pp.

Appendix A
Individual Station Descriptors for Start of Tow

DATE	REGION	TOWID	LAT deg/min	LON deg/min	Stratum	Time	Tow Duration	Depth (FA)	Temp C °	Salinity ppt
Spring 2009										
5/4/2009	1	SP09__1	42 56.885	70 36.042	2	0741	15	35.0	3.6	32.5
5/4/2009	1	SP09__2	42 52.195	70 41.028	2	0923	20	32.2	3.4	32.5
5/4/2009	1	SP09__3	42 54.346	70 48.054	1	1115	16	3.3	6.1	32.1
5/4/2009	1	SP09__4	42 56.482	70 44.921	1	1212	20	14.3	4.2	32.5
5/4/2009	1	SP09__5	42 56.668	70 43.505	1	1324	16	18.4	3.8	32.4
5/5/2009	1	SP09__6	42 57.305	70 29.667	3	0735	20	50.4	3.5	32.5
5/5/2009	1	SP09__7	43 04.762	70 22.504	3	0937	20	53.3	3.7	32.5
5/5/2009	1	SP09__8	43 07.865	70 22.070	3	1122	20	57.7	3.7	32.4
5/5/2009	1	SP09__9	43 08.857	70 23.351	3	1302	20	47.8	3.8	32.4
5/5/2009	1	SP09_10	43 12.422	70 24.327	3	1429	20	40.0	3.9	32.4
5/6/2009	1	SP09_11	43 13.178	70 28.755	2	0823	20	27.7	3.7	32.1
5/6/2009	1	SP09_12	43 18.193	70 21.067	2	1014	20	35.0	4.0	32.4
5/6/2009	1	SP09_13	43 17.814	70 29.692	1	1312	20	18.7	5.1	31.8
5/6/2009	1	SP09_14	43 12.014	70 34.457	1	1458	20	14.1	6.2	31.4
5/7/2009	1	SP09_15	43 06.899	70 14.195	4	0756	21	79.7	4.0	32.9
5/7/2009	1	SP09_16	43 12.003	70 12.922	4	0941	20	64.6	3.9	32.8
5/7/2009	1	SP09_17	43 13.609	70 08.996	4	1126	20	70.3	3.9	32.9
5/7/2009	1	SP09_18	43 18.604	70 15.834	3	1340	20	54.5	4.1	32.4
5/7/2009	1	SP09_19	43 23.570	70 07.111	4	1554	20	63.6	4.0	32.4
5/8/2009	1	SP09_20	43 26.713	70 05.473	4	0740	20	65.0	3.8	32.4
5/8/2009	1	SP09_21	43 25.377	70 08.850	3	0911	20	61.0	4.3	32.4
5/8/2009	1	SP09_22	43 25.861	70 16.881	2	1037	20	33.5	4.3	32.2
5/8/2009	1	SP09_23	43 25.762	70 18.669	1	1149	20	20.1	5.1	31.9
5/8/2009	1	SP09_24	43 30.806	70 14.550	2	1330	20	23.5	4.8	32.5
5/11/2009	2	SP09_25	43 27.526	69 54.832	4	0810	20	76.0	4.3	32.9
5/11/2009	2	SP09_26	43 30.882	69 55.114	4	0942	20	61.6	4.1	32.8
5/11/2009	2	SP09_27	43 35.563	69 50.332	3	1126	18	47.3	4.2	32.6
5/11/2009	2	SP09_28	43 36.108	69 52.440	3	1256	20	47.3	4.2	32.4
5/11/2009	2	SP09_29	43 38.607	69 51.057	2	1416	20	23.7	4.7	32.0
5/11/2009	2	SP09_30	43 40.138	70 07.797	1	1641	20	15.2	6.1	31.6
5/12/2009	2	SP09_31	43 39.420	69 59.969	2	0758	17	24.4	5.4	31.9
5/12/2009	2	SP09_32	43 40.016	69 54.373	2	0923	20	24.5	5.3	31.8
5/12/2009	2	SP09_33	43 44.809	69 52.568	1	1106	20	10.0	6.1	31.9
5/12/2009	2	SP09_34	43 40.992	69 50.153	1	1222	20	16.6	5.7	31.9
5/12/2009	2	SP09_35	43 42.653	69 47.978	1	1338	20	10.1	5.9	32.0
5/13/2009	2	SP09_36	43 32.109	69 41.843	4	0818	20	70.1	4.3	32.6
5/13/2009	2	SP09_37	43 37.621	69 42.435	3	0944	20	50.7	4.2	32.4
5/13/2009	2	SP09_38	43 36.880	69 45.587	3	1050	20	51.0	4.3	32.4
5/13/2009	2	SP09_39	43 41.836	69 44.846	1	1225	20	18.9	5.8	31.8
5/13/2009	2	SP09_40	43 43.764	69 40.649	2	1405	20	36.8	6.8	31.3
5/14/2009	2	SP09_41	43 46.052	69 23.134	3	0716	20	46.6	4.4	32.2

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DATE	REGION	TOWID	LAT deg/min	LON deg/min	Stratum	Time	Tow Duration	Depth (FA)	Temp C °	Salinity ppt
5/14/2009	2	SP09_42	43 45.950	69 21.308	3	0900	20	45.0	4.3	32.1
5/14/2009	2	SP09_43	43 39.652	69 27.014	4	1040	20	64.9	4.1	32.4
5/14/2009	2	SP09_44	43 40.959	69 30.775	4	1212	20	69.0	4.1	32.5
5/15/2009	2	SP09_45	43 56.890	69 23.108	1	0801	20	7.6	8.7	31.0
5/15/2009	2	SP09_46	43 49.675	69 29.288	2	1007	20	37.4	4.4	32.2
5/15/2009	2	SP09_47	43 51.364	69 31.872	1	1129	20	16.6	4.8	32.1
5/18/2009	3	SP09_48	43 45.143	69 08.664	3	0900	20	54.5	4.3	32.4
5/18/2009	3	SP09_49	43 46.555	69 10.983	3	1001	20	47.1	4.3	32.4
5/18/2009	3	SP09_50	43 52.800	69 02.333	2	1207	18	26.3	5.2	31.7
5/18/2009	3	SP09_51	43 55.711	69 07.482	1	1402	20	19.1	5.7	31.4
5/18/2009	3	SP09_52	43 58.091	69 08.044	1	1555	20	17.3	5.2	31.6
5/19/2009	3	SP09_53	44 18.828	68 55.404	1	0657	16	11.5	5.2	31.0
5/19/2009	3	SP09_54	44 18.238	68 51.320	2	0954	20	24.2	5.0	31.3
5/19/2009	3	SP09_55	44 13.726	68 53.469	2	1106	12	26.3	5.0	30.6
5/19/2009	3	SP09_56	44 09.581	69 00.551	2	1252	20	31.4	5.2	31.5
5/19/2009	3	SP09_57	44 06.464	69 03.103	1	1410	20	17.9	5.3	31.3
5/19/2009	3	SP09_58	43 59.178	69 02.443	2	1629	16	24.7	5.7	31.5
5/20/2009	3	SP09_59	43 34.808	68 50.656	4	0940	20	73.2	4.8	32.8
5/20/2009	3	SP09_60	43 32.145	68 57.949	4	1108	20	56.0	4.6	32.7
5/20/2009	3	SP09_61	43 36.990	68 56.245	4	1228	20	76.5	4.6	32.7
5/20/2009	3	SP09_62	43 48.013	69 02.552	3	1629	20	43.5	4.4	31.8
5/21/2009	3	SP09_63	43 45.481	68 43.614	3	0813	20	60.3	4.6	32.4
5/21/2009	3	SP09_64	43 54.132	68 45.445	3	1333	20	50.2	4.7	32.0
5/21/2009	3	SP09_65	43 56.028	68 47.335	3	1533	20	43.5	4.8	32.0
5/21/2009	3	SP09_66	43 57.210	68 42.931	3	1646	20	45.5	4.8	32.0
5/22/2009	3	SP09_67	44 16.487	68 46.624	1	0821	20	16.6	5.7	29.0
5/22/2009	3	SP09_68	44 10.338	68 47.933	1	1002	20	8.4	7.2	30.9
5/22/2009	3	SP09_69	44 08.024	68 45.341	2	1104	20	34.5	6.1	31.3
5/25/2009	4	SP09_70	43 55.767	68 33.192	3	0707	20	49.6	4.8	32.4
5/25/2009	4	SP09_71	43 59.788	68 33.288	3	0824	20	43.6	4.8	32.0
5/25/2009	4	SP09_72	44 09.144	68 32.666	1	1132	20	12.6	7.7	31.5
5/25/2009	4	SP09_73	44 06.616	68 35.428	1	1338	14	15.4	7.6	31.4
5/26/2009	4	SP09_74	43 55.229	68 24.379	4	0706	20	58.6	5.0	32.8
5/26/2009	4	SP09_75	43 57.184	68 18.990	4	0858	20	61.1	5.0	32.8
5/26/2009	4	SP09_76	43 59.982	68 19.106	3	1007	20	51.8	5.0	32.5
5/26/2009	4	SP09_77	44 00.723	68 15.462	3	1111	20	54.1	5.1	32.5
5/26/2009	4	SP09_78	44 03.967	68 24.086	2	1258	20	34.6	5.1	32.0
5/27/2009	4	SP09_79	44 08.892	68 06.372	3	0627	20	46.7	5.1	31.9
5/27/2009	4	SP09_80	44 14.719	68 25.843	2	1135	20	24.6	7.4	31.1
5/27/2009	4	SP09_81	44 18.033	68 29.903	1	1335	20	19.1	7.5	31.1
5/27/2009	4	SP09_82	44 17.412	68 31.185	1	1436	20	16.1	7.1	31.3
5/28/2009	4	SP09_83	44 04.149	67 55.197	3	0825	19	57.5	5.6	32.5
5/29/2009	4	SP09_84	44 03.494	68 03.175	4	0610	20	58.6	5.3	32.6

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DATE	REGION	TOWID	LAT deg/min	LON deg/min	Stratum	Time	Tow Duration	Depth (FA)	Temp C°	Salinity ppt
5/29/2009	4	SP09_85	44 05.393	68 02.783	4	0754	18	55.0	5.3	32.3
5/29/2009	4	SP09_86	44 07.811	68 01.195	3	0908	20	51.7	5.3	32.2
5/29/2009	4	SP09_87	44 13.573	68 04.915	3	1056	20	38.3	5.5	31.9
5/29/2009	4	SP09_88	44 20.656	68 06.896	2	1255	20	33.1	5.7	31.7
5/29/2009	4	SP09_89	44 21.657	68 09.802	2	1421	20	28.9	6.3	31.5
5/29/2009	4	SP09_90	44 17.810	68 07.748	2	1540	20	36.2	5.6	31.7
6/1/2009	5	SP09_91	44 09.767	67 48.417	4	0848	20	75.0	6.3	33.4
6/1/2009	5	SP09_92	44 12.341	67 46.210	4	1045	20	71.9	6.1	32.8
6/1/2009	5	SP09_93	44 15.786	67 47.370	3	1227	20	42.0	6.0	32.0
6/1/2009	5	SP09_94	44 15.940	67 44.232	3	1351	20	52.0	6.2	32.2
6/2/2009	5	SP09_95	44 24.900	67 34.162	2	0754	20	36.8	6.1	32.0
6/2/2009	5	SP09_96	44 23.682	67 31.837	3	0915	20	48.8	6.0	32.2
6/2/2009	5	SP09_97	44 22.327	67 40.197	2	1048	10	33.2	6.0	32.0
6/2/2009	5	SP09_98	44 27.975	67 45.642	1	1413	15	18.8	6.3	31.9
6/2/2009	5	SP09_99	44 27.374	67 43.355	1	1600	20	18.9	6.3	31.8
6/3/2009	5	SP09100	44 25.409	67 07.761	3	0635	20	57.0	6.4	33.3
6/3/2009	5	SP09101	44 33.093	67 10.981	2	0820	14	42.5	6.0	32.2
6/3/2009	5	SP09102	44 30.153	67 17.267	2	1006	19	40.0	6.0	32.1
6/3/2009	5	SP09103	44 20.901	67 25.428	4	1251	20	63.9	6.2	32.7
6/3/2009	5	SP09104	44 17.967	67 29.885	4	1429	20	61.2	6.3	31.9
6/4/2009	5	SP09105	44 38.383	67 06.212	3	0722	13	48.8	5.8	31.7
6/4/2009	5	SP09106	44 39.797	67 02.957	3	0843	20	45.1	5.9	31.7
6/4/2009	5	SP09107	44 42.637	66 57.283	4	1003	20	58.2	5.9	31.7
6/4/2009	5	SP09108	44 44.641	67 00.627	3	1125	20	46.2	5.7	31.8
6/4/2009	5	SP09109	44 41.968	67 06.974	1	1248	20	20.7	6.2	31.7
6/4/2009	5	SP09110	44 37.430	67 20.992	1	1618	16	10.5	6.6	31.8
6/5/2009	5	SP09111	44 35.591	67 17.365	2	0754	18	28.0	6.2	31.8
6/5/2009	5	SP09112	44 28.853	67 30.525	3	1028	19	42.0	6.3	31.8
Fall 2009										
10/5/2009	1	FL09__1	42 57.145	70 38.813	2	828	20	25.4	8.4	32.4
10/5/2009	1	FL09__2	42 53.472	70 36.436	3	1010	20	42.5	7.5	32.6
10/5/2009	1	FL09__3	42 53.987	70 41.212	2	1137	20	30.9	8.4	32.4
10/5/2009	1	FL09__4	42 56.188	70 44.810	1	1323	20	15.6	9.0	32.3
10/5/2009	1	FL09__5	42 58.881	70 39.844	1	1448	20	14.2	10.1	32.7
10/6/2009	1	FL09__6	42 59.351	70 29.854	3	0811	20	48.3	7.5	32.8
10/6/2009	1	FL09__7	42 57.167	70 22.010	4	0953	20	70.9	6.0	32.9
10/6/2009	1	FL09__8	43 03.918	70 24.833	3	1137	20	52.0	7.3	32.8
10/6/2009	1	FL09__9	43 09.223	70 22.683	3	1345	20	49.1	7.9	32.9
10/6/2009	1	FL09_10	43 10.166	70 26.478	2	1512	20	34.5	8.8	32.7
10/7/2009	1	FL09_11	43 09.787	70 18.648	4	0940	20	62.6	6.5	33.1
10/7/2009	1	FL09_12	43 14.463	70 10.644	4	1119	20	69.4	6.9	33.2

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DATE	REGION	TOWID	LAT deg/min	LON deg/min	Stratum	Time	Tow Duration	Depth (FA)	Temp C°	Salinity ppt
10/7/2009	1	FL09_13	43 21.740	70 06.404	4	1309	20	72.4	6.4	33.3
10/7/2009	1	FL09_14	43 24.114	70 07.807	4	1446	20	59.3	6.9	33.1
10/8/2009	1	FL09_15	43 33.112	70 16.965	1	0816	15	3.3	10.9	32.5
10/8/2009	1	FL09_16	43 30.065	70 20.885	1	0939	20	8.2	11.6	32.5
10/8/2009	1	FL09_17	43 25.382	70 17.369	2	1103	16	31.5	9.0	32.7
10/8/2009	1	FL09_18	43 23.728	70 15.040	3	1227	20	46.4	8.7	33.0
10/8/2009	1	FL09_19	43 25.910	70 13.232	3	1357	20	48.6	8.0	33.0
10/8/2009	1	FL09_20	43 29.414	70 12.707	2	1532	20	34.7	9.2	32.7
10/12/2009	2	FL09_21	43 28.270	70 01.525	4	0831	20	63.1	7.6	33.0
10/12/2009	2	FL09_22	43 28.192	69 56.445	4	1008	20	67.8	6.7	33.1
10/12/2009	2	FL09_23	43 34.724	69 48.128	3	1203	17	53.3	7.8	33.2
10/12/2009	2	FL09_24	43 36.699	69 51.640	3	1343	20	41.9	8.9	33.0
10/12/2009	2	FL09_25	43 35.482	69 56.944	3	1514	20	49.6	8.2	33.0
10/13/2009	2	FL09_26	43 42.377	70 10.738	1	0747	19	10.0	11.8	31.4
10/13/2009	2	FL09_27	43 45.800	70 04.935	1	0936	20	8.7	11.5	31.3
10/13/2009	2	FL09_28	43 42.105	69 52.130	1	1251	20	8.5	10.6	32.7
10/13/2009	2	FL09_29	43 40.045	69 50.877	1	1409	10	15.8	10.1	32.8
10/14/2009	2	FL09_30	43 44 .703	69 44.469	1	0928	20	10.5	10.6	32.0
10/14/2009	2	FL09_31	43 45.894	69 41.882	2	1109	15	29.5	9.5	32.8
10/14/2009	2	FL09_32	43 44.220	69 39.824	2	1348	20	33.4	9.0	32.8
10/14/2009	2	FL09_33	43 41.110	69 39.395	3	1505	20	45.1	8.6	33.0
10/15/2009	2	FL09_34	43 49.654	69 29.281	2	0749	20	38.0	8.8	33.0
10/15/2009	2	FL09_35	43 45.779	69 30.313	3	0932	20	56.0	7.9	32.1
10/15/2009	2	FL09_36	43 45.030	69 25.920	3	1110	20	45.8	9.1	33.0
10/15/2009	2	FL09_37	43 41.704	69 30.681	4	1228	13	61.9	7.7	33.1
10/15/2009	2	FL09_38	43 36.486	69 32.856	4	1408	20	58.9	7.5	33.1
10/15/2009	2	FL09_39	43 34.316	69 37.856	4	1526	20	69.9	7.2	33.2
10/20/2009	3	FL09_40	43 46.393	69 10.846	3	0946	20	47.5	10.6	32.9
10/20/2009	3	FL09_41	43 46.286	69 07.029	3	1116	20	49.2	10.5	32.8
10/20/2009	3	FL09_42	43 47.926	69 04.492	3	1245	20	44.8	10.6	32.8
10/20/2009	3	FL09_43	43 53.019	69 13.822	2	1454	19	32.3	10.6	32.6
10/21/2009	3	FL09_44	44 16.858	68 51.296	1	0813	20	14.6	11.0	30.8
10/21/2009	3	FL09_45	44 15.335	68 54.178	1	0923	15	18.0	11.1	32.1
10/21/2009	3	FL09_46	44 07.945	68 56.761	2	1110	16	34.7	10.8	32.3
10/21/2009	3	FL09_47	44 09.077	69 01.023	2	1233	16	29.5	10.8	32.5
10/21/2009	3	FL09_48	44 14.188	68 58.724	2	1400	20	31.0	11.9	32.0
10/21/2009	3	FL09_49	44 07.195	69 03.150	1	1548	20	19.8	10.9	31.4
10/22/2009	3	FL09_50	43 46.660	68 42.930	3	0956	20	58.3	10.5	33.0
10/22/2009	3	FL09_51	43 46.878	68 38.220	4	1218	20	68.3	10.4	33.1
10/22/2009	3	FL09_52	43 44.499	68 38.044	4	1359	20	75.2	9.9	33.4
10/22/2009	3	FL09_53	43 47.078	68 39.806	4	1519	20	60.0	10.4	33.1
10/23/2009	3	FL09_54	43 56.101	68 46.401	3	0751	20	47.6	10.4	33.0
10/23/2009	3	FL09_55	43 54.872	68 45.307	3	1015	15	51.7	10.4	33.0

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DATE	REGION	TOWID	LAT deg/min	LON deg/min	Stratum	Time	Tow Duration	Depth (FA)	Temp C °	Salinity ppt
10/23/2009	3	FL09_56	44 06.201	68 46.342	1	1245	19	14.5	10.2	31.6
10/23/2009	3	FL09_57	44 08.456	68 45.68 4	2	1416	20	29.8	10.5	31.8
10/26/2009	4	FL09_58	43 55.332	68 34.997	3	0904	20	51.4	10.2	33.0
10/26/2009	4	FL09_59	43 52.979	68 27.714	4	1059	20	68.1	9.8	33.3
10/26/2009	4	FL09_60	43 55.192	68 24.376	4	1236	20	60.1	10.3	33.1
10/26/2009	4	FL09_61	44 09.209	68 32.732	1	1610	20	13.1	10.4	32.4
10/27/2009	4	FL09_62	44 01.178	68 23.599	3	0910	19	45.4	10.2	33.1
10/27/2009	4	FL09_63	43 59.509	68 18.651	3	1038	20	53.1	10.1	32.9
10/27/2009	4	FL09_64	43 56.556	68 17.107	4	1149	20	53.8	9.9	33.3
10/27/2009	4	FL09_65	44 00.917	68 14.868	3	1306	20	52.8	10.2	32.9
10/27/2009	4	FL09_66	44 02.521	68 15.973	3	1413	16	52.0	10.2	32.9
10/28/2009	4	FL09_67	44 16.618	68 28.032	2	0820	16	23.6	9.6	31.3
10/28/2009	4	FL09_68	44 18.487	68 28.186	2	0934	20	33.9	9.7	32.3
10/28/2009	4	FL09_69	44 14.453	68 27.297	1	1106	20	12.3	10.3	32.2
10/29/2009	4	FL09_70	44 21.386	68 10.117	2	0810	20	26.5	9.7	32.2
10/29/2009	4	FL09_71	44 25.143	68 11.852	2	0944	19	25.0	10.3	31.4
10/29/2009	4	FL09_72	44 26.111	68 09.382	1	1106	20	18.3	10.0	32.5
10/29/2009	4	FL09_73	44 22.914	68 06.980	1	1246	20	19.0	10.0	32.4
10/29/2009	4	FL09_74	44 18.977	68 07.908	2	1421	20	32.5	10.2	32.6
10/29/2009	4	FL09_75	44 17.194	68 07.876	2	1531	20	35.6	10.3	32.7
10/30/2009	4	FL09_76	44 03.467	68 03.216	4	0856	15	61.5	9.7	33.5
10/30/2009	4	FL09_77	44 06.568	68 00.025	4	1019	20	53.8	10.1	33.2
10/30/2009	4	FL09_78	44 11.510	67 58.155	3	1156	18	44.5	10.1	33.0
11/2/2009	5	FL09_79	44 14.779	67 55.080	2	0848	20	40.2	10.1	32.9
11/2/2009	5	FL09_80	44 17.457	67 47.938	2	1030	18	38.6	10.1	32.7
11/2/2009	5	FL09_81	44 09.992	67 48.528	4	1411	20	73.7	10.0	33.3
11/2/2009	5	FL09_82	44 12.263	67 46.349	4	1524	20	69.7	10.2	33.1
11/3/2009	5	FL09_83	44 19.057	67 35.610	3	0754	15	47.5	10.2	32.7
11/3/2009	5	FL09_84	44 15.403	67 39.974	3	0914	20	56.4	10.2	32.9
11/3/2009	5	FL09_85	44 17.519	67 30.785	4	1314	20	58.9	9.8	33.4
11/3/2009	5	FL09_86	44 18.841	67 31.540	3	1421	20	53.9	10.1	33.0
11/4/2009	5	FL09_87	44 29.347	67 46.910	1	0838	15	9.9	9.8	32.3
11/4/2009	5	FL09_88	44 28.202	67 49.889	1	1000	20	10.3	9.5	32.0
11/4/2009	5	FL09_89	44 30.157	67 41.978	1	1220	15	9.2	9.4	31.8
11/5/2009	5	FL09_90	44 31.227	67 26.853	2	0758	16	27.4	10.2	32.4
11/5/2009	5	FL09_91	44 35.175	67 18.163	2	1015	20	29.6	10.1	32.5
11/5/2009	5	FL09_92	44 25.000	67 27.515	3	1439	12	44.4	10.4	32.7