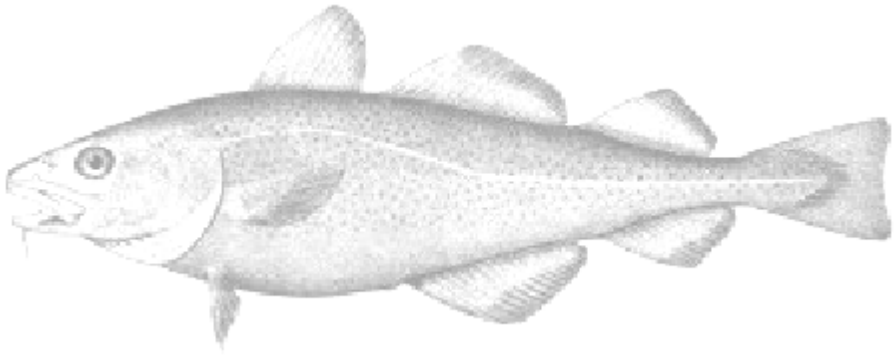
Final Report to the

Northeast Consortium

on the

Maine - New Hampshire Inshore Groundfish Trawl Survey



July 2003 – June 2004

Final Report

Fall 2003 and Spring 2004
Maine-New Hampshire
Inshore Trawl Survey

Submitted to the Northeast Consortium
Contract # 03-667

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February 2005

Maine DMR Research Reference Document 05/02

TABLE OF CONTENTS

Acknowledgements	iii
Executive Summary	iv
Introduction	1
Objective	2
Materials and Methods	2
Analysis and Presentation of Data	2
Results	2
Fall 2003 Summary	2
Spring 2004 Summary	3
Ichthyoplankton	4
NetMind™ Trawl Monitoring System	5
Selected Species	7
Winter flounder	8
Witch flounder	12
American plaice	16
Yellowtail flounder	20
Atlantic cod	24
Haddock	28
Pollock	32
White hake	36
Silver hake	40
Goosefish	44
Herring	48
American lobster	52
Conclusions	56
References	57
Appendix A: Individual Station Descriptions	A-1
Appendix B: Survey Catch Index	B-1
Appendix C: Taxa List	C-1

ACKNOWLEDGEMENTS

Logistically, this was a complex project that benefited from the assistance of many people. Without their help the surveys could not have been completed. Forgive us for inevitably overlooking others who provided support.

We would like to that Maine DMR and New Hampshire F&G staff that helped with mailings, car shuttles, and contributed to the data collection and entry. We appreciate the hard work put in by the commercial boat crews. F/V Tara Lynn crew members Captain Sam Galli, Robert Woodward, and Brian Perkins, and F/V Robert Michael crew members Captain Curt Rice, Jerry Balzano, and Dale Doucette, as well as shore engineer Randy Greenleaf, were all most helpful, professional and enjoyable to work with. Jeff Flagg and Danny Libby provided invaluable dockside assistance throughout the coast by transporting nets and parts to keep the survey running, and storing gear during the off-season. Science crewmembers included Vincent Manfredi, Jeanne Brown, Andrew Gowen, Katie Wisz, Dan Schick, Linda Mercer, Kerrie O'Donnell, Josh Carloni, Karina Jolles, Sean Moriarty, Matt Carpenter and Kevin Sullivan. Fishermen observers included Kelo Pinkham and Steve Train. We are especially grateful for support from Colonel Joe Fessenden, Lieutenants Dave Mercier and Alan Talbot, and some 20 Marine Patrol Officers who helped both on and off the water, handling gear, helping to communicate 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 vessels. Alison Ferreira successfully assisted us through our federal permitting processes. Terry Stockwell, Sarah Cotnoir, Wendy Parker, Linda Mercer, Carl Wilson and Dan Schick helped with all aspects of the project providing technical guidance, field assistance, administrative support, and general advice.

Once again, we are grateful to NOAA National Weather Service's James Mansfield and Mark Turner for broadcasting our schedule to mariners to avoid gear conflicts and address the communications concerns raised by fixed gear fishermen. 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 the fourth 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 fourth year and discusses comparisons with the previous three years. Up until recently, there was not a long enough time series to allow in-depth analysis of data. However, after four complete sampling years and a fifth 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 four years of biannual survey work. The fourth year of the project was funded through the Northeast Consortium. 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 four years of extensive public outreach, the survey has seen an average success rate of 95% in the spring and 75% 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)." 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

For the purposes of this report, which is to provide a very general overview, data from both the stratified and fixed components of the survey were analyzed together. All data presented in bar graphs are arithmetic mean numbers of individuals caught per standard 20-minute tow. Error bars, when shown, are standard errors of that mean. All length frequency graphs are percent at length. Bubble plot distributions portray catch per unit of effort (number of individuals caught in a standard tow) for individual stations. Stratified means and errors reported in Appendix B were calculated utilizing the same formulas reported for the NMFS' SURVAN formulas (Kramer and Forrester, 1994).

RESULTS

FALL 2003 SUMMARY

The fall survey began on October 13, 2003, and 78 out of 115 targeted tows were completed. The volume of total mixed catch varied from a minimum of 196 kg to a maximum of 469 kg, averaging 173 kg. The total number of species caught was 81 with a low of 13 and a high of 32 in any particular tow and an average of 22. Quahog, *Mercenaria mercenaria*, was seen for the first time in the trawl survey. Three individuals were caught in West Penobscot Bay.

Average bottom temperatures by stratum ranged from 6.5 to 11.5^{o} C (Table 1). The overall average temperature for fall 2003 was 9.2^{o} C, compared to 9.5^{o} C for 2000, 10.2^{o} C for 2001 and 10.5^{o} C for 2002.

Table 1. Average bottom temperatures (^{o} C) for the Fall 2003 survey.

Region						
Stratum		1	2	3	4	5
	1	10.8	10.0	11.2	10.9	7.7
	2	8.9	9.5	10.9	9.9	9.7
	3	6.5	7.8	9.9	10.0	9.4
	4	6.7	6.8	8.6	9.7	8.9

Completing the survey in the fall season with the profusion of lobster gear continues to be a challenge. The fall 2003 survey had a 68% success rate, the lowest to date of all the fall surveys. The worst areas were in the two shallow strata of Region 3, primarily in Penobscot Bay. The low success rate prompted discussions at each of Maine's Lobster Zone Council meetings, as well as a presentation at the Maine Fishermen's Forum in March of 2004, regarding the effects of little cooperation from the fixed gear industry. A complete listing of tow locations, coordinates, dates, times, and depths can be found in Appendix A.

Observations from the fall 2003 survey showed overall haddock abundance up from the previous fall (Appendix B) and size classes remained similar to all fall surveys (Figure 19). Haddock CPUE (Figure 20) showed significant increases in regions 1 and 5, due to larger catches at two stations in each area. Catches of white hake were up coastwide (Figure 26) with the overall mean catch at its highest this fall (Appendix B). Lobster numbers were down from the previous fall surveys (Appendix B, Figure 38). With the difficulty in completing proposed tows in regions 2 and 3, it isn't clear whether this decline is real or an artifact of this imposed sampling bias. Silver hake were again the most abundant species caught in the surveys (Figures 27, and 29). The large abundance of goosefish seen in the fall 2001 survey hasn't been repeated (Figure 32) but all size ranges continue to be represented (Figure 31) with the highest abundance seen along the southwestern survey area (Figure 30). An increased abundance of witch flounder was also seen in the fall of 2001 (Figure 8), and this year-class is perhaps represented in the fall 2003 length frequencies (Figure 7), as a significant percentage of the fish measured were larger.

SPRING 2004 SUMMARY

The spring survey began on May 3, 2004 along the coast of New Hampshire. Of 115 proposed tows, 103 were completed in this survey. The weight of the total mixed catch varied from a minimum of about 6 kg to a maximum of about 593 kg, averaging about 111 kg. The total

number of species caught was 79, with a low of 10 and a high of 35 in any particular tow, and an average of 21. Sea Lamprey, *Pteromyzon marinus*, was seen for the first time in the trawl survey. One individual was caught at the Damariscove Island fixed station.

Average bottom temperatures by stratum ranged from 2.9 to 7.0°C (Table 2). The overall average temperature for spring 2004 was 4.0° C, compared to 4.1° C for 2001, 6.1° C for 2002 and 4.6° C for 2003. Specific station information can be found in Appendix A.

Table 2. Average bottom temperatures (° C) for the Spring 2004 survey.

Region						
Stratum		1	2	3	4	5
	1	3.4	4.8	5.8	7.0	5.2
	2	3.0	3.2	4.8	4.7	4.6
	3	2.9	2.9	3.3	3.7	4.6
	4	3.1	3.0	2.9	3.6	5.2

Observations from the spring 2004 survey showed herring abundance increased from the previous 3 surveys (Figure 35, Appendix B), and the catches continued to consist of mostly juveniles (Figure 34). Herring consistently remained the most abundant finfish caught in the spring surveys (Appendix B, Figure 33). Winter flounder numbers were up from 2003 mainly due to an increase in abundance in region 5 (Figures 3 and 5), and a greater number of adult winter flounder occurred in those Downeast areas (Figure 4). Cod abundance was low compared to some of the other species (Appendix B) with a slight increase in numbers this spring (Figure 17), but no real trends can be seen in overall abundance. The majority of cod caught were juveniles (Figure 16) and were patchy in occurrence (Figure 15). Yellowtail flounder were more common in the spring (Figures 12 and 14), with no obvious yearly trends (Appendix B). Pollock catches have been low due to the net design and towing speed (Figures 21 and 23). When a noteworthy catch of pollock occurred, it consisted of mostly juveniles (Figure 22). American plaice were most abundant in the southwestern GOM in the spring (Figures 9 and 11). Spring catches showed a larger size range (Figure 10), while fall catches were made up of more juveniles.

Ichthyoplankton

In the spring of 2004, 21 plankton 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 are in the process of being analyzed, and the information will be included in the year 5 report.

NetMind™ Trawl Monitoring System

Through a grant from the Maine Technology Institute, the Inshore Trawl survey was able to purchase the NetMind™ Trawl Monitoring System. Spring 2004 was the first survey to use this equipment, and it was utilized during every possible tow. The NetMind™ net mensuration system allows continuous monitoring of net dimensions during towing to assess consistency, maintain quality control, and provide swept area for biomass calculations. More information on the operation of this equipment can be found in "Maine-New Hampshire Inshore Groundfish Trawl Survey Procedures and Protocols (2005)."

The effects of gear interactions, mud and heavy catches, and tides on net performance are clearly seen with the use of the NetMind™ system. Figure 1 is an example of a standard 20-minute tow where there were no gear interactions or other problems.

The door and wingspreads remain nearly constant, at 30- and 10-meters respectively, and the tilt, which measures the angle of the net, is stable between 10 and 20 degrees. The distance between the headrope and bottom is also consistent. This net is fishing well and does not experience any gear interaction or hangs.

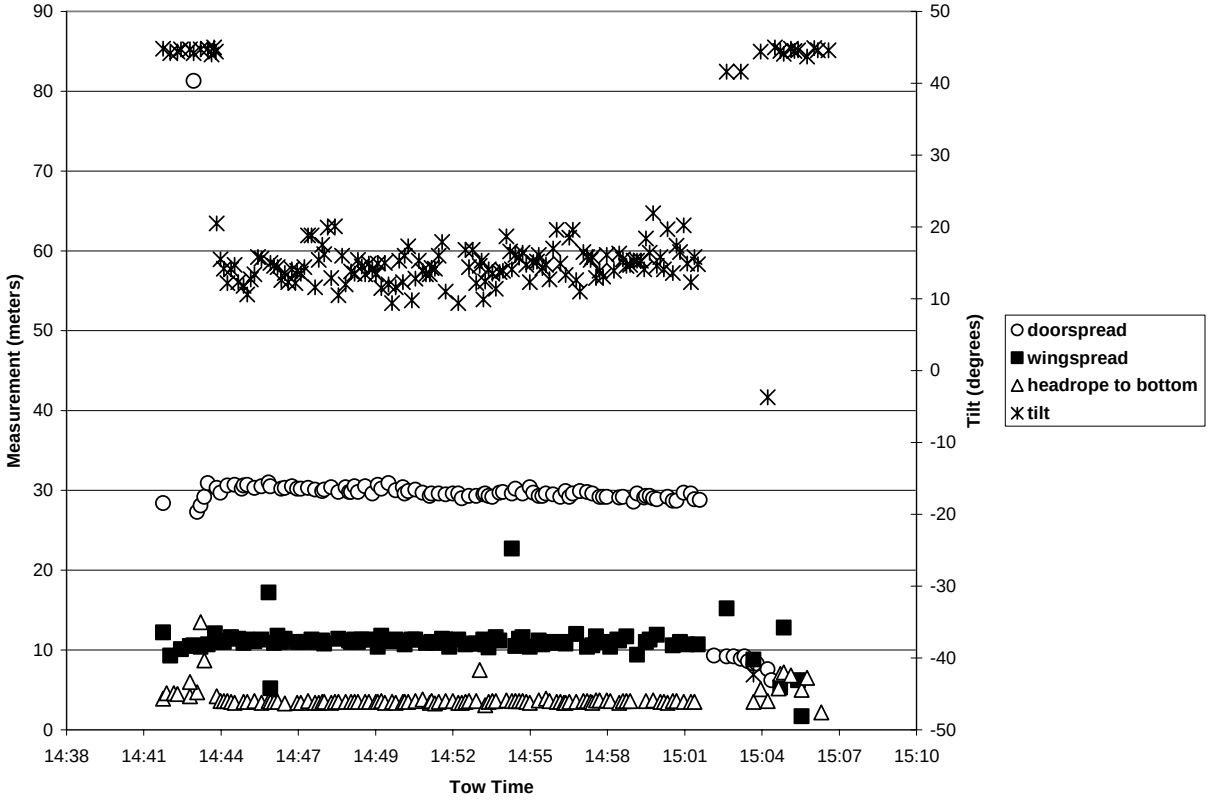


Figure 1. Net Dimensions for SP04-79.

Figure 2 is an example of a tow where there was a fast, strong tide, strong winds, and large wave swells. The tilt is extremely variable, indicating the net was bouncing. The door and wing sensors were not in constant communication, as seen by fewer data points, and there are also a few extreme values seen. This could be caused by the doors "lying down" during the tow, causing loss of communication between the sensors.

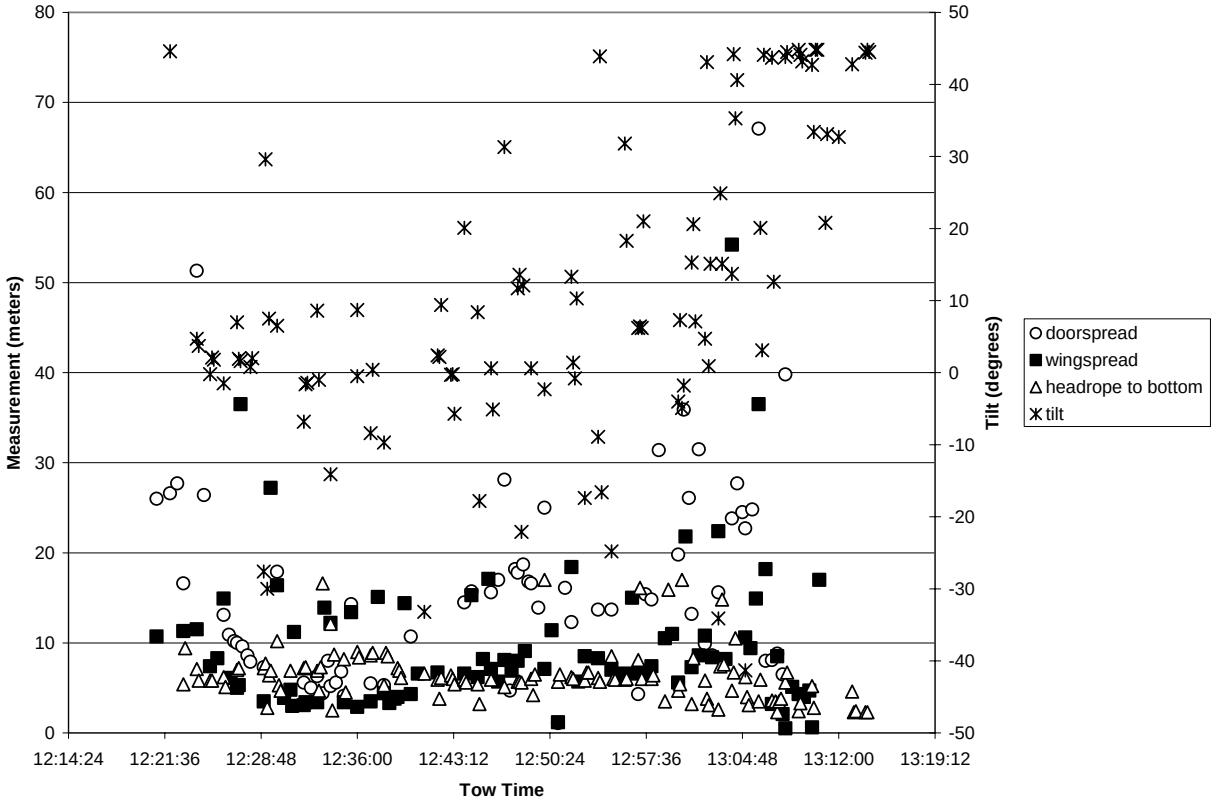
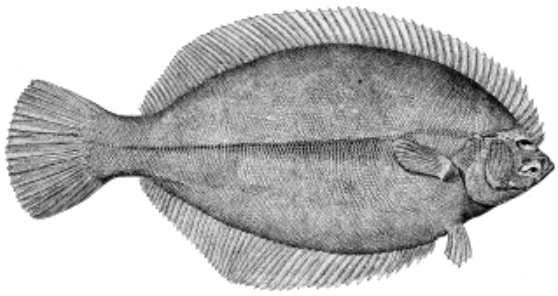


Figure 2. Net Dimensions for SP04-95.

Although the net is bouncing around and not maintaining a stable configuration, this tow was still accepted, as it reached the standard 20-minute duration with no evident net damage or gear interaction. This example shows the need for more research on the effects of tidal currents and sea state on the trawl survey nets.

SELECTED SPECIES

The following pages contain distribution maps for selected species, followed by length frequency plots and graphs of regional abundance for those same species. Fish diagrams are courtesy of the National Marine Fisheries Service, North East Fisheries Science Center (www.nefsc.noaa.gov).



Winter Flounder (*Pseudopleuronectes americanus)*

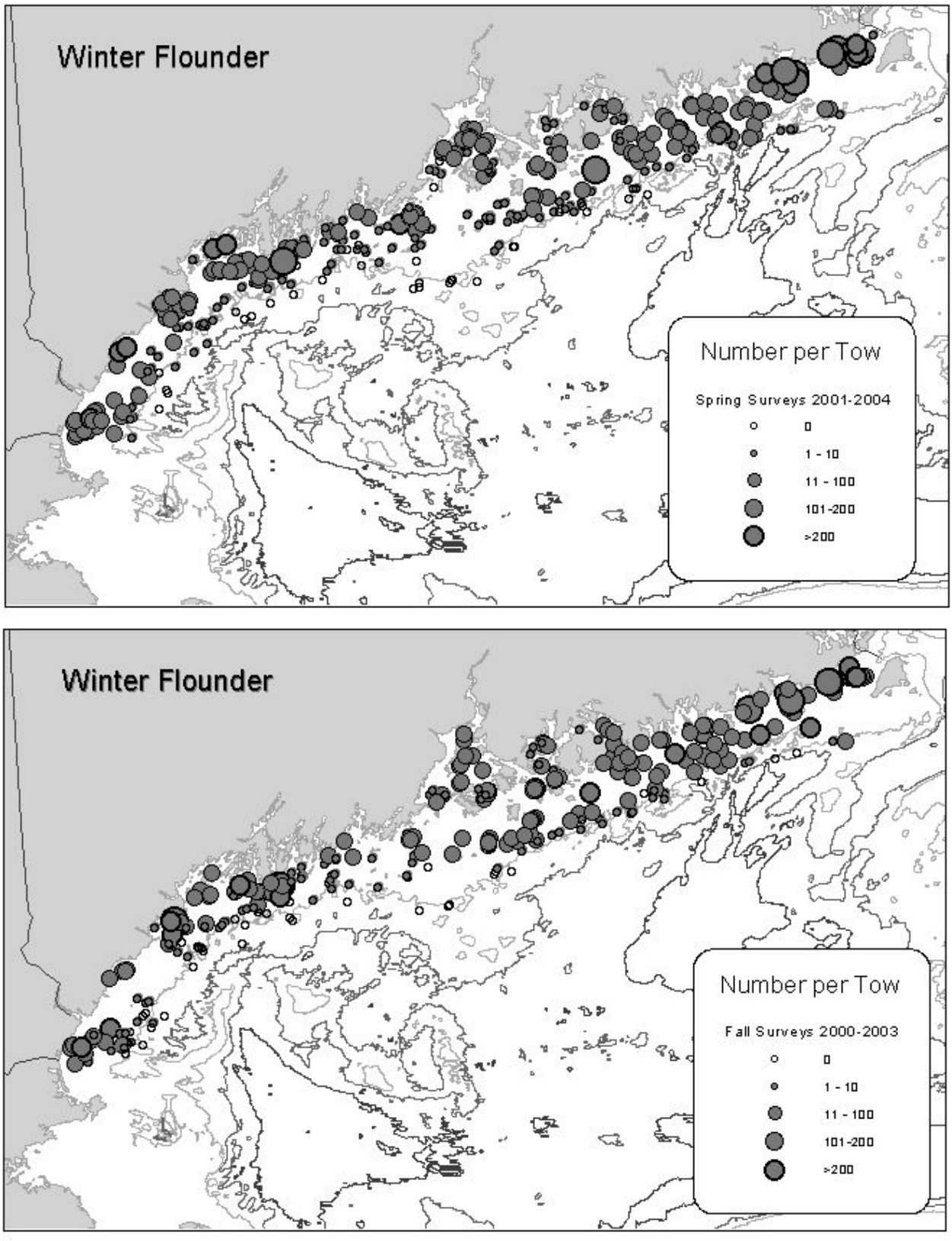
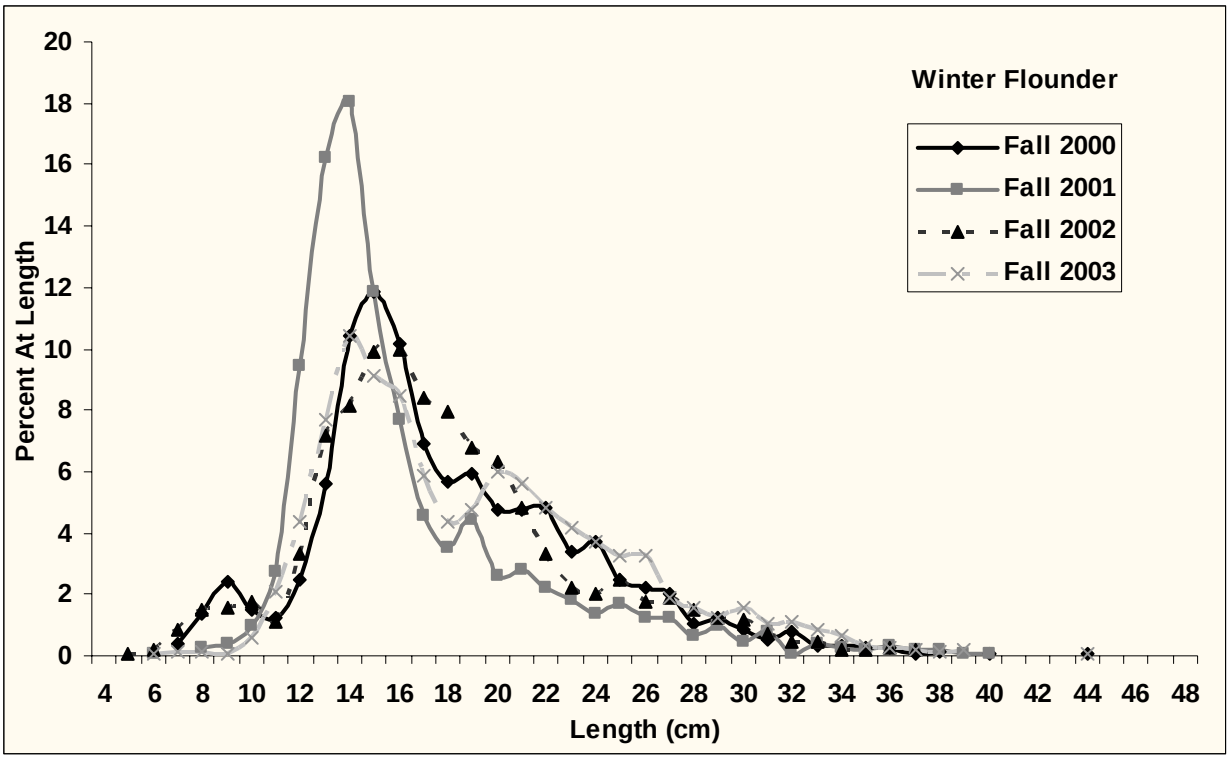


Figure 3. Fall and spring distributions of winter flounder (blackback).



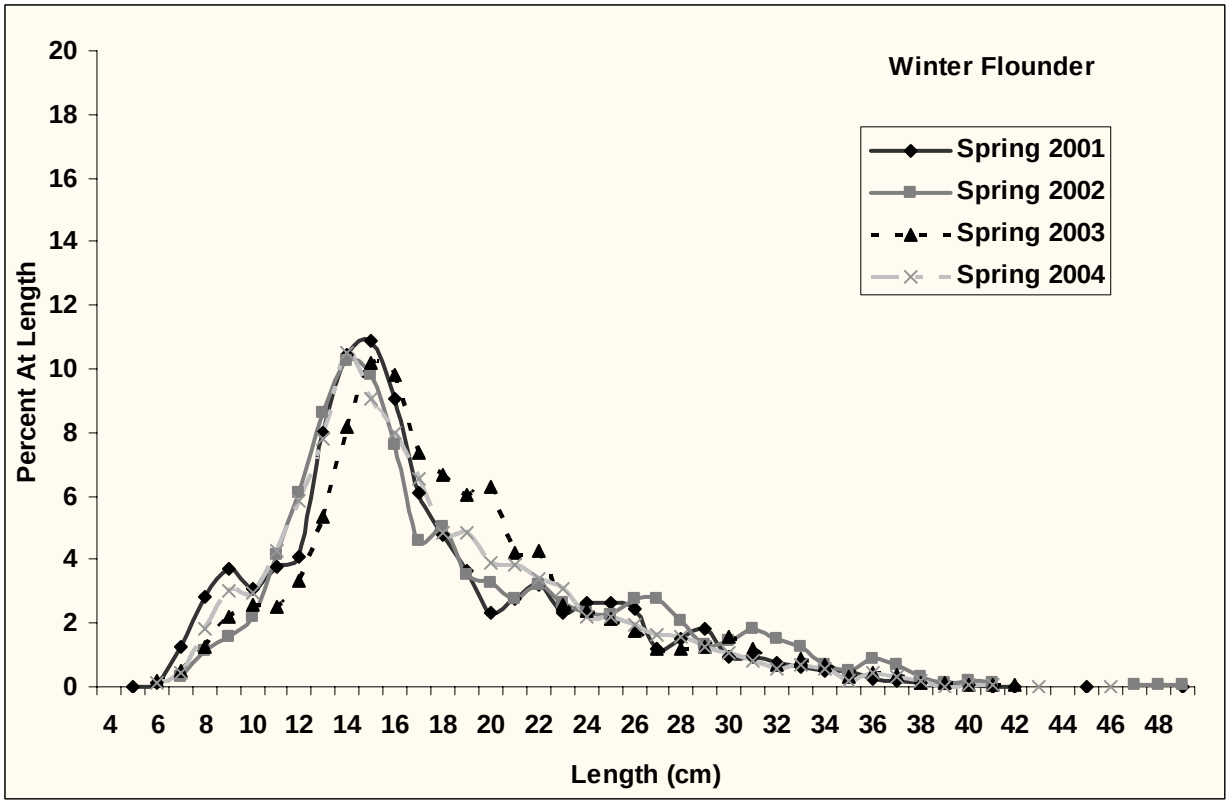


Figure 4. Length frequency plots for winter flounder by season and year, all strata combined.

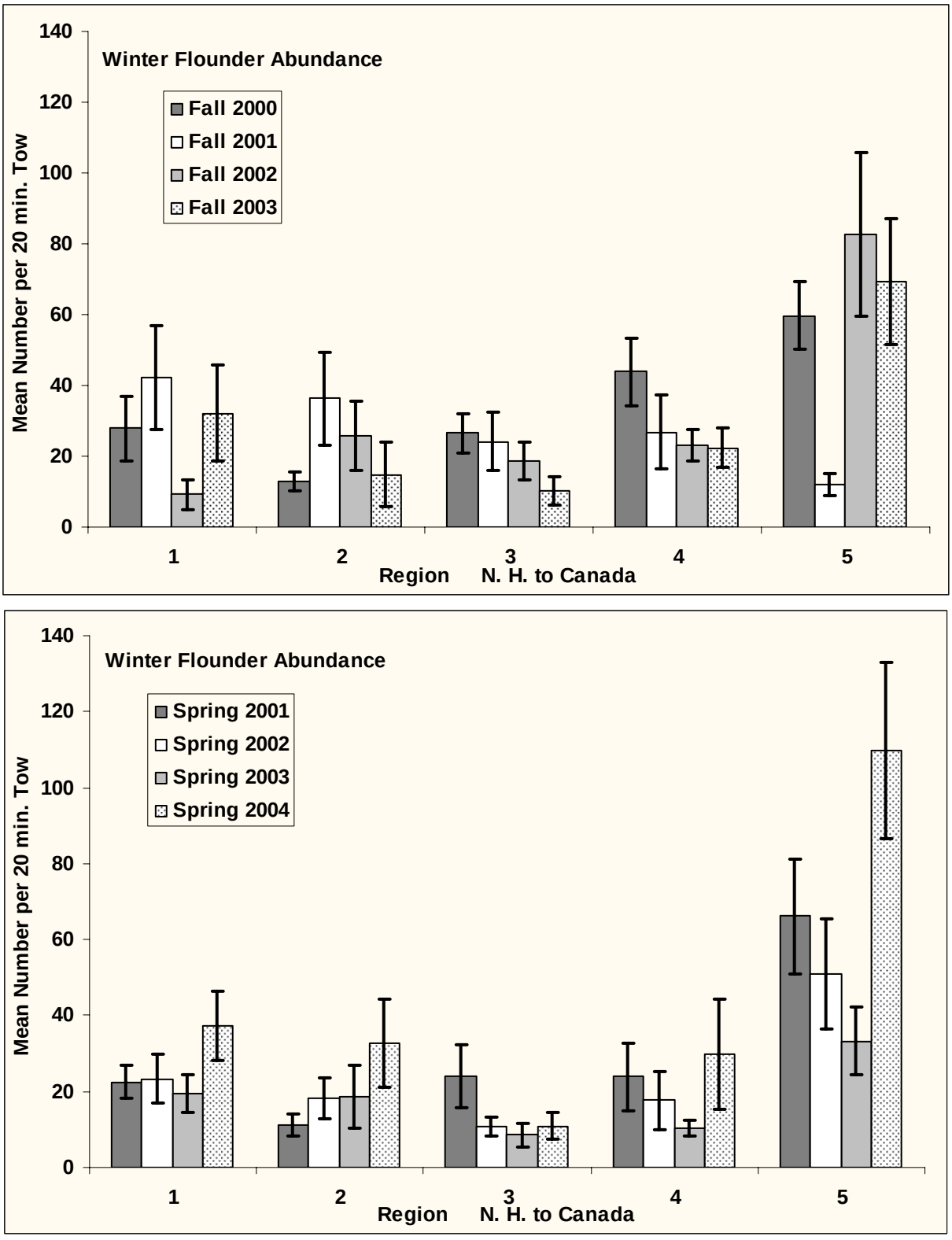
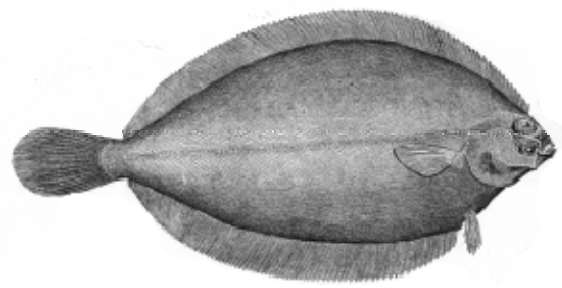


Figure 5. Regional CPUE for winter flounder by season and year.



Witch Flounder (*Glyptocephalus cynoglossus*)

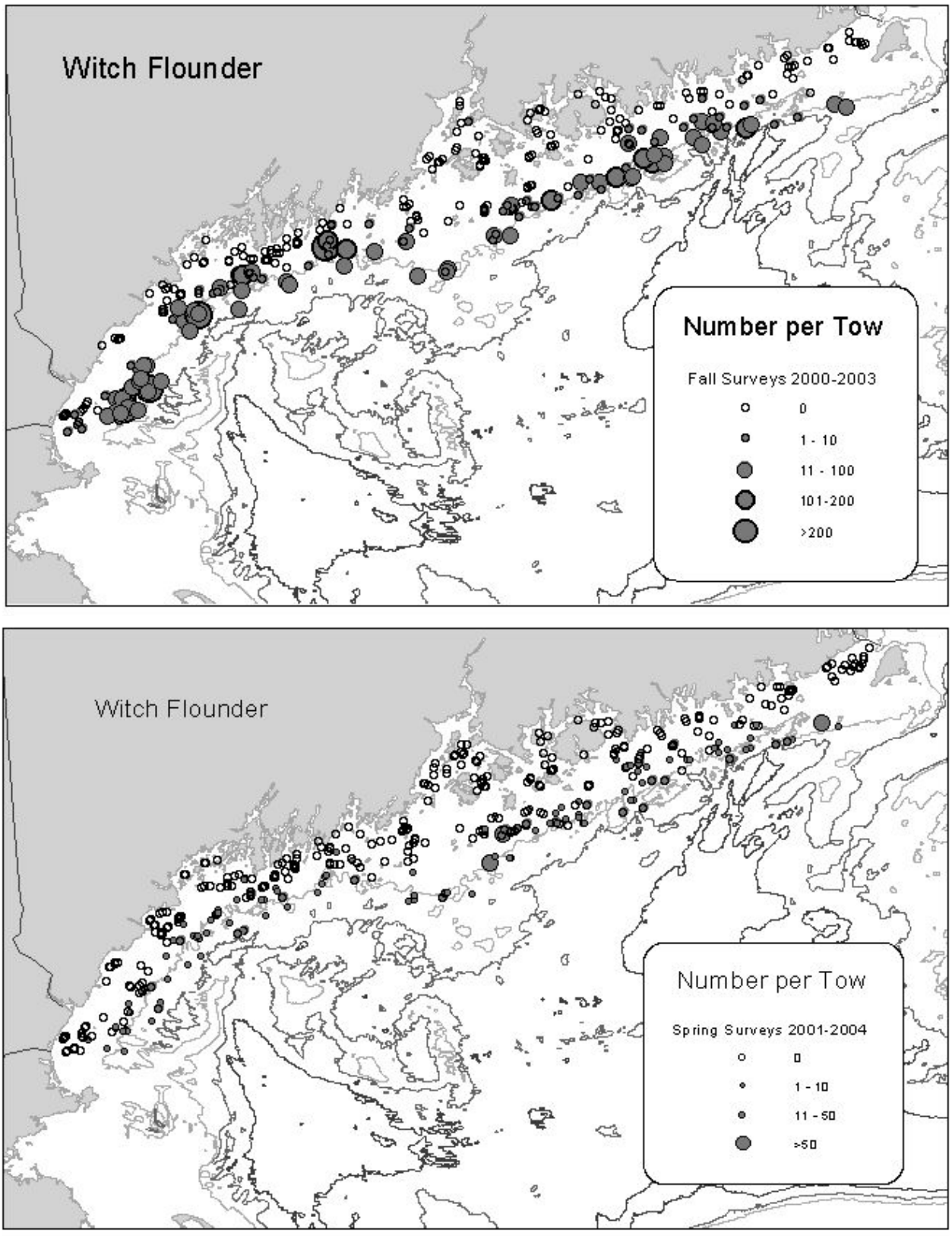
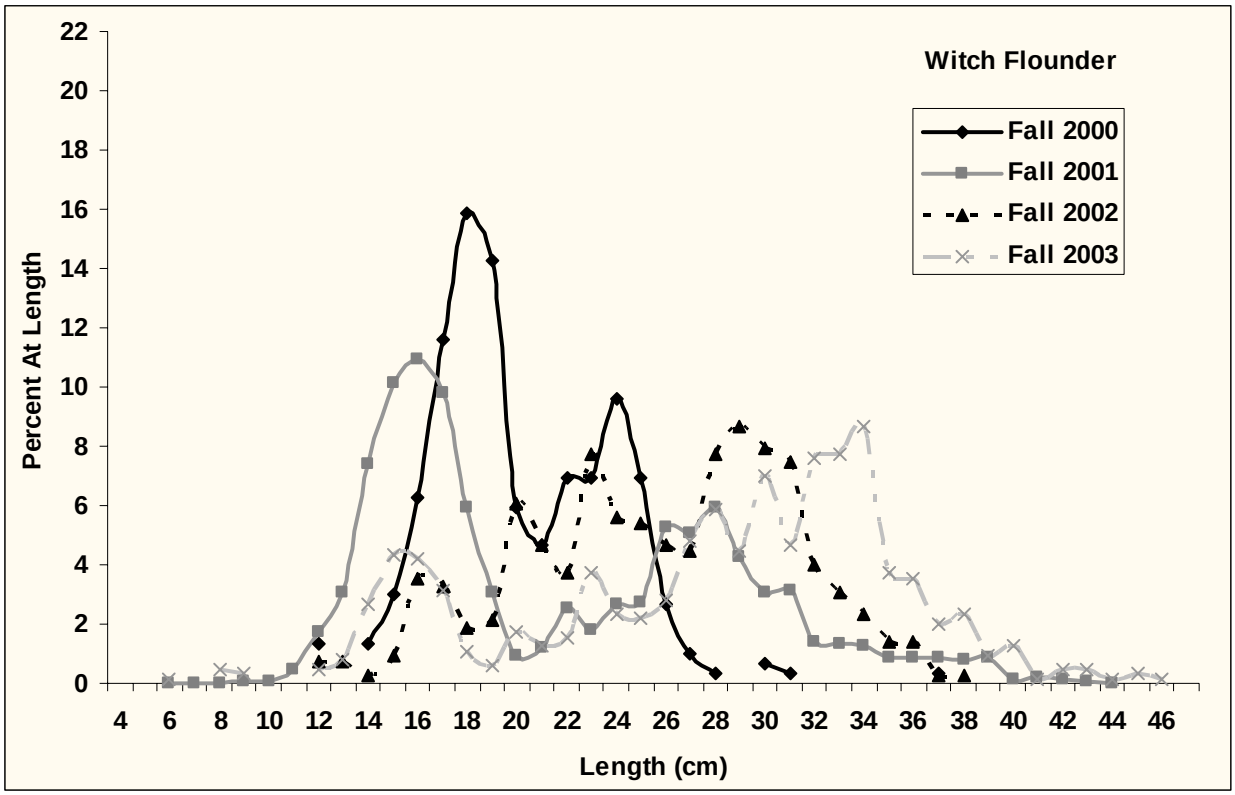


Figure 6. Fall and spring distributions of witch flounder (grey sole).



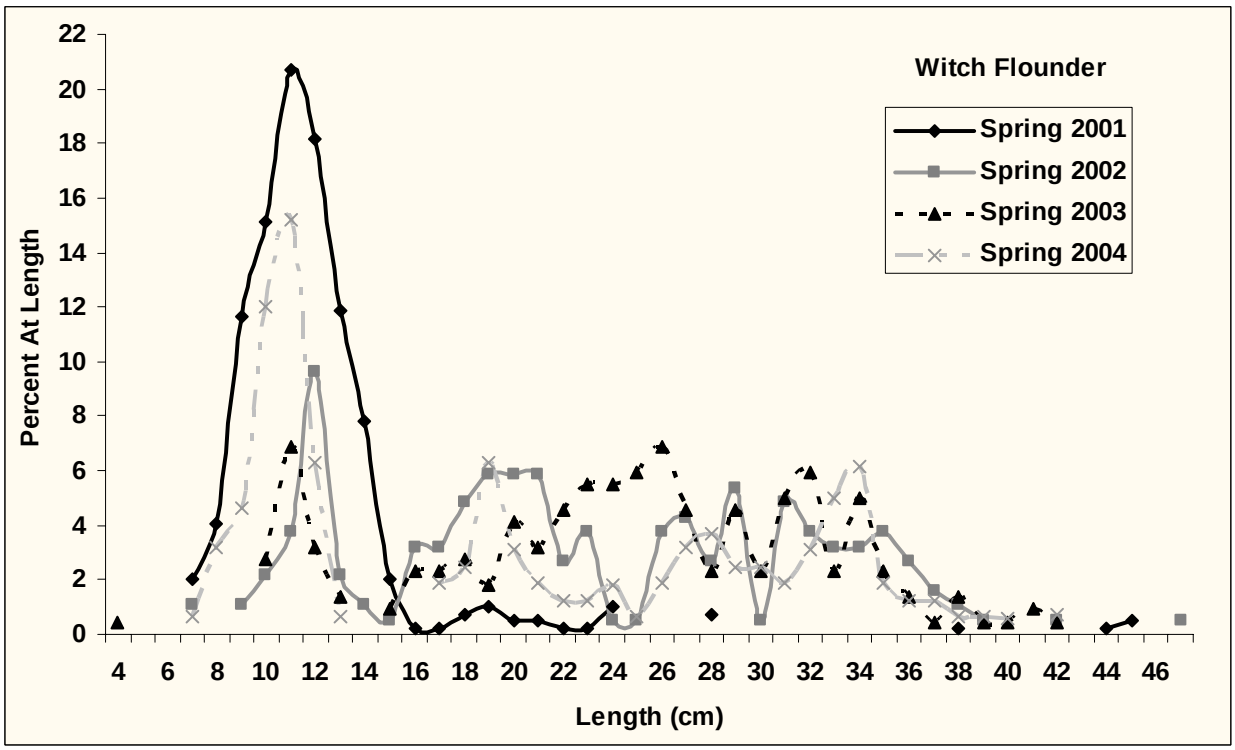
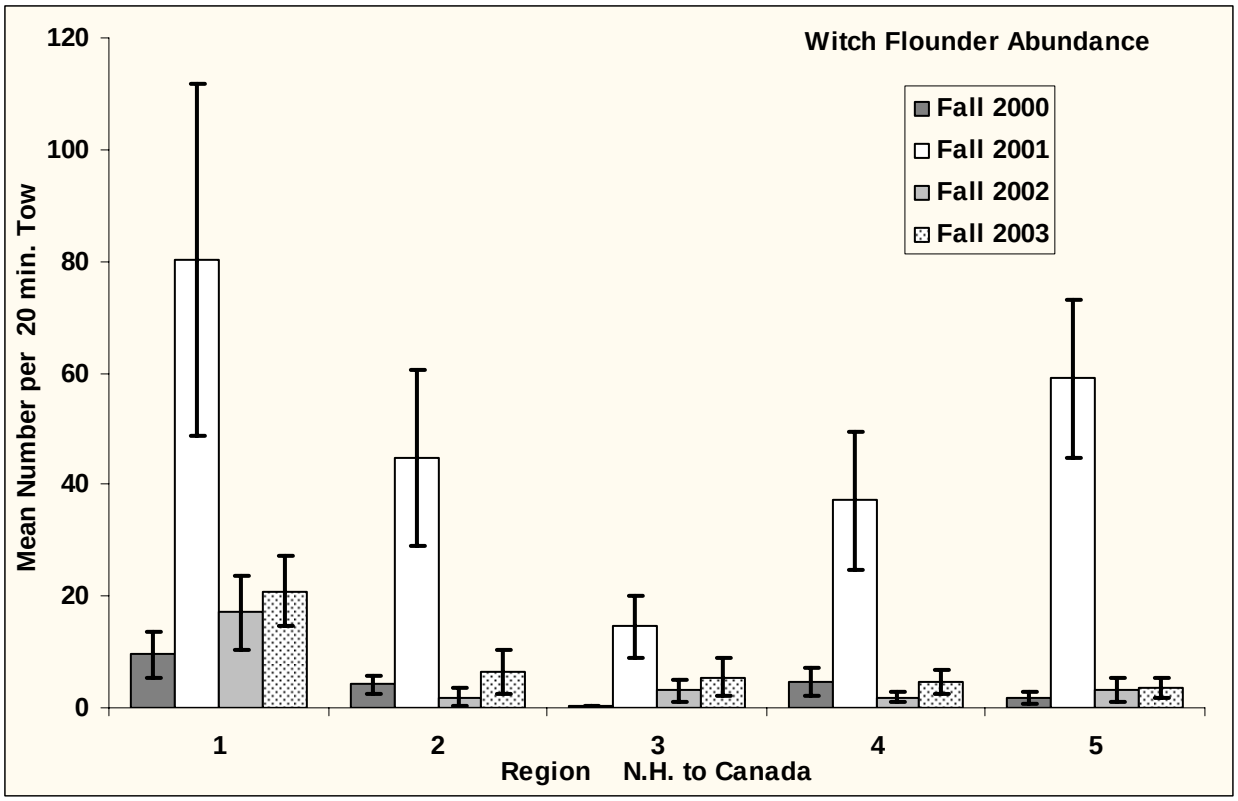


Figure 7. Length frequency plots for witch flounder by season and year, all strata combined.



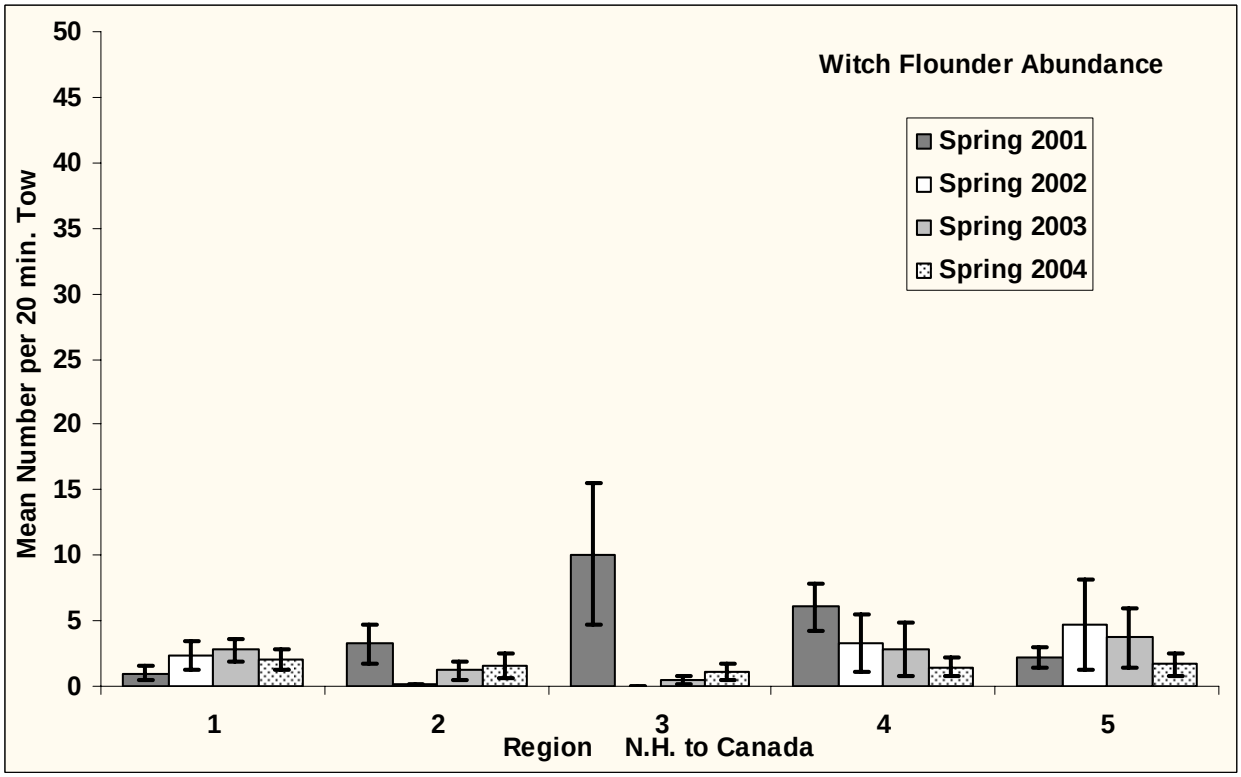
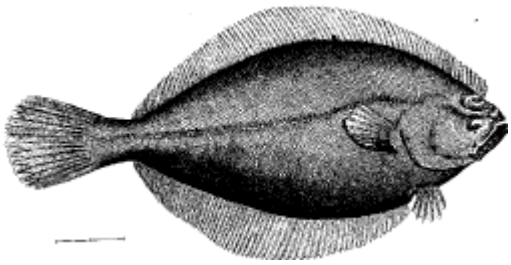
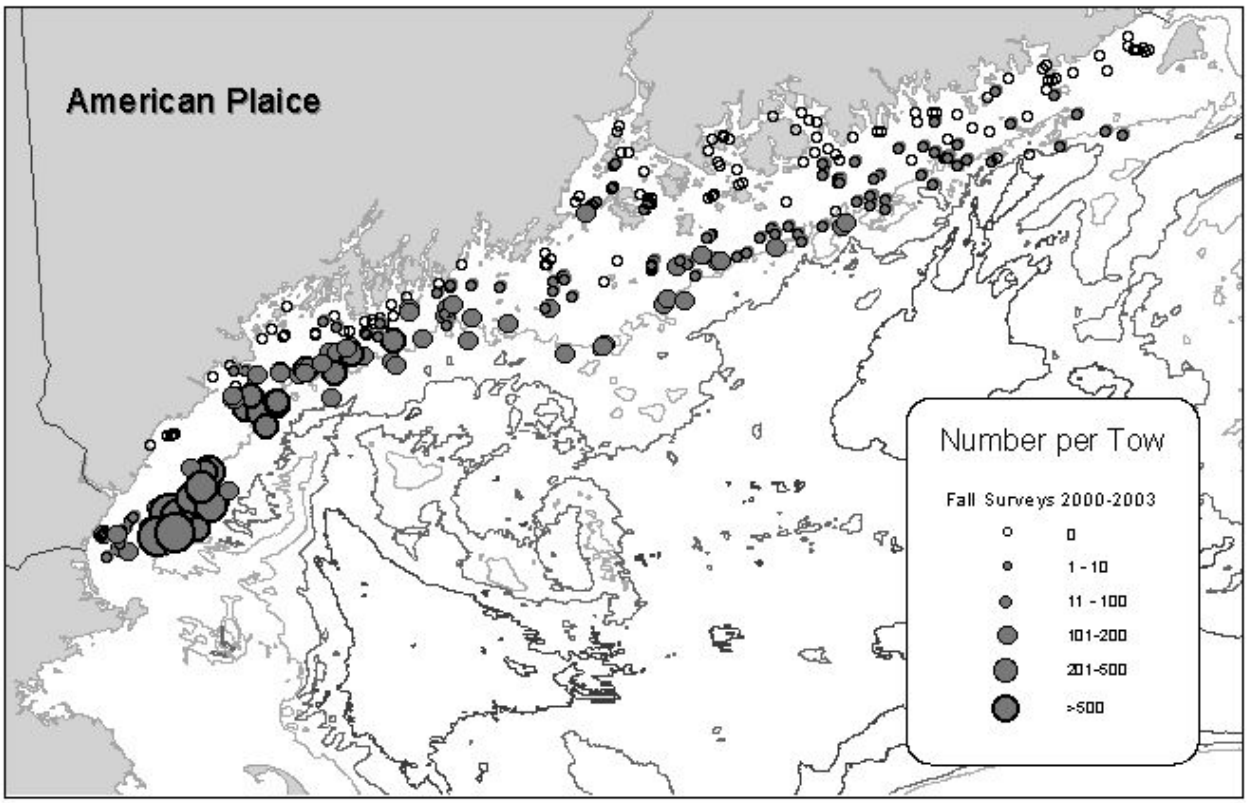


Figure 8. Regional CPUE for witch flounder by season and year.



American Plaice (*Hippoglossoides platessoides*)



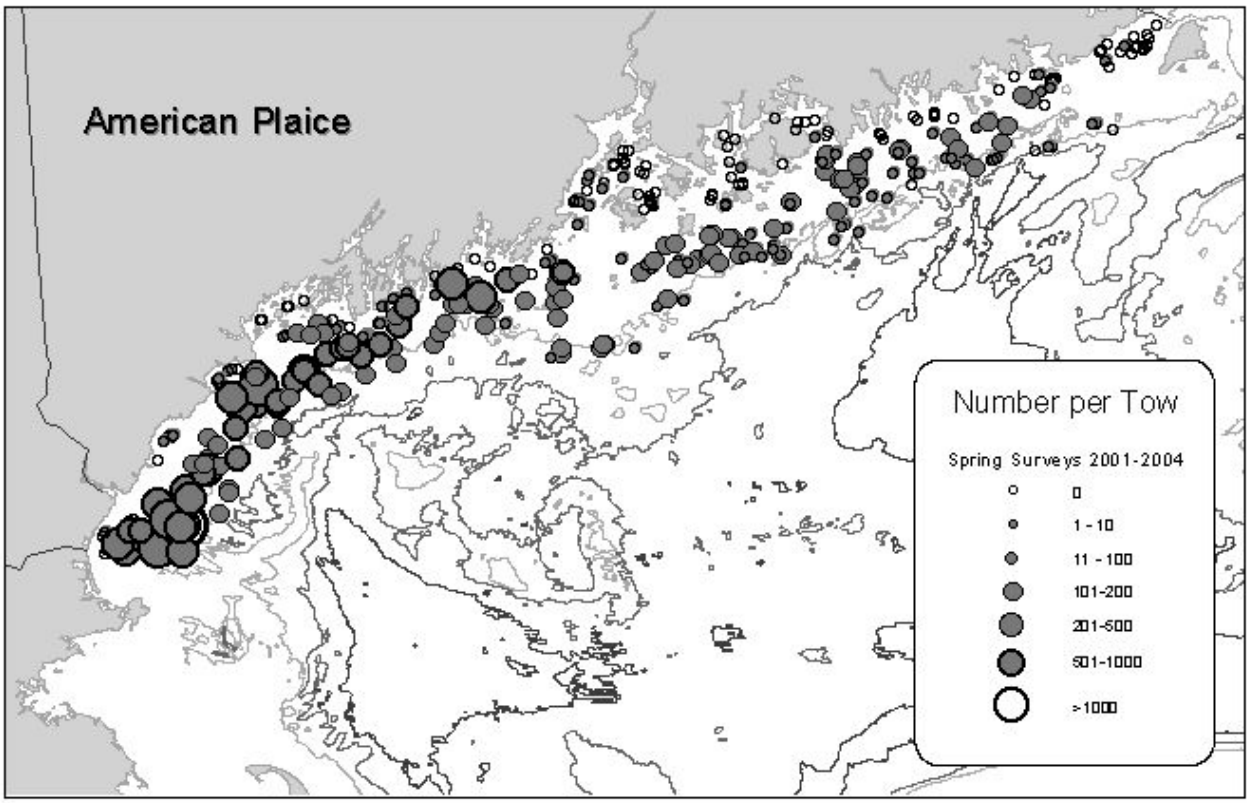


Figure 9. Fall and spring distributions of American plaice (dab).

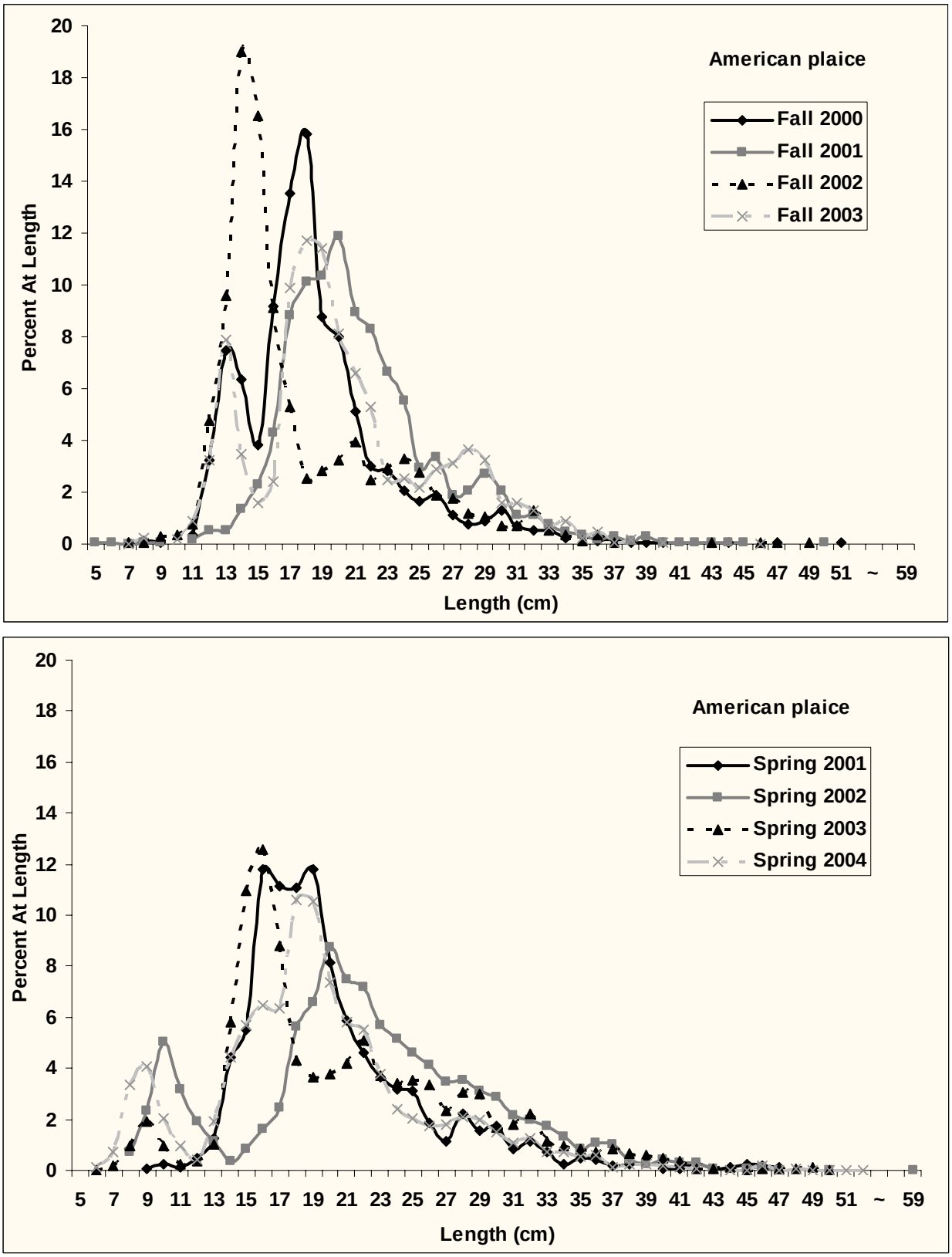


Figure 10. Length frequency plots for American plaice by season and year, all strata combined.

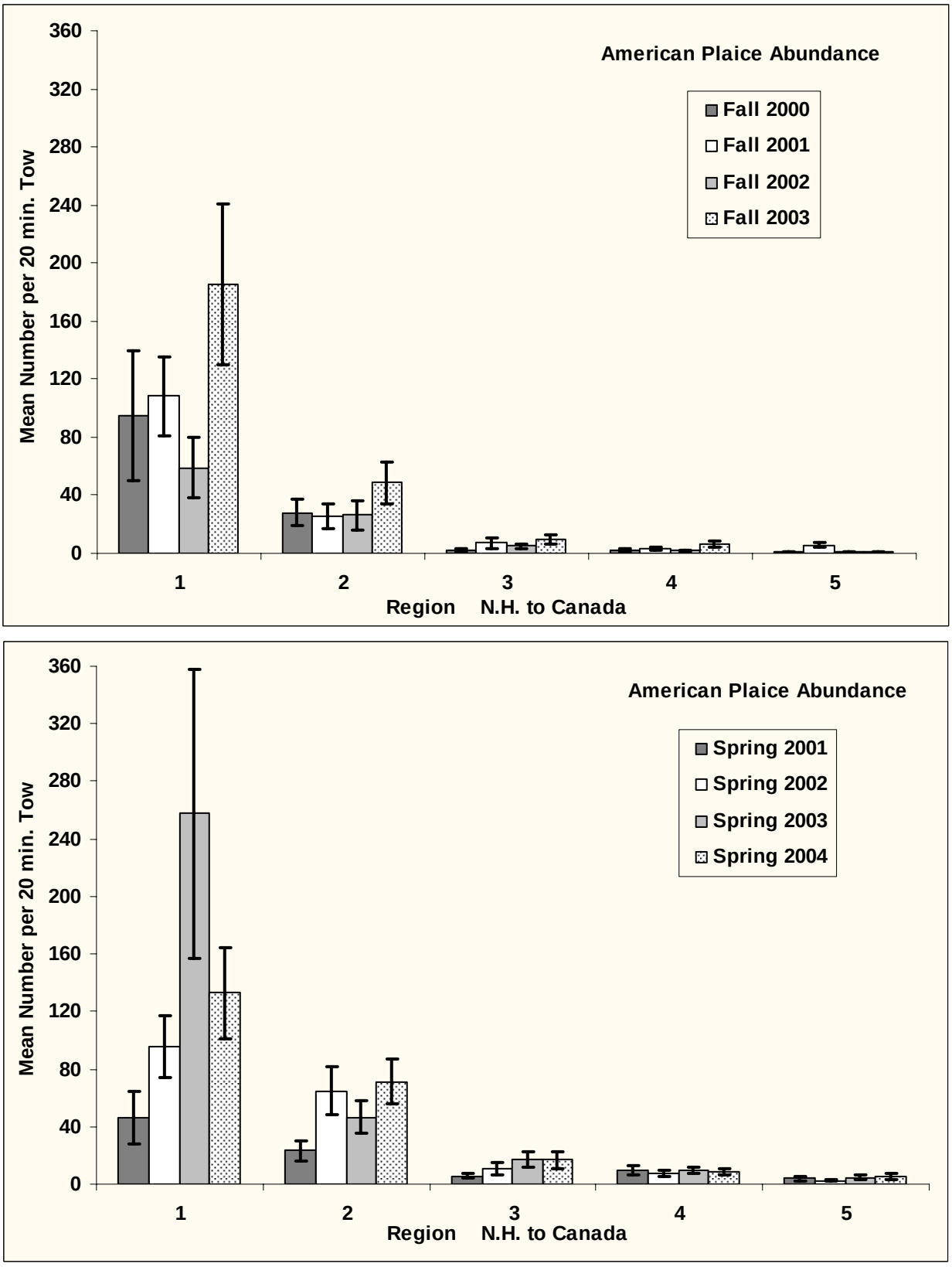
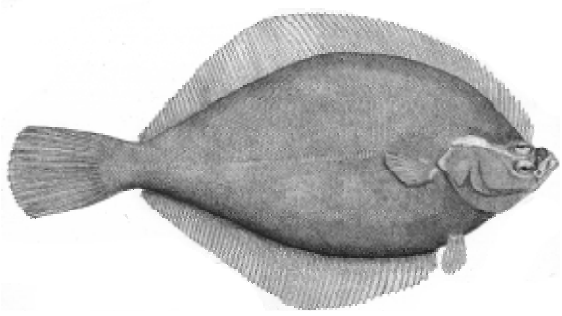


Figure 11. Regional CPUE for American plaice by season and year.



Yellowtail Flounder (*Limanda ferruginea*)

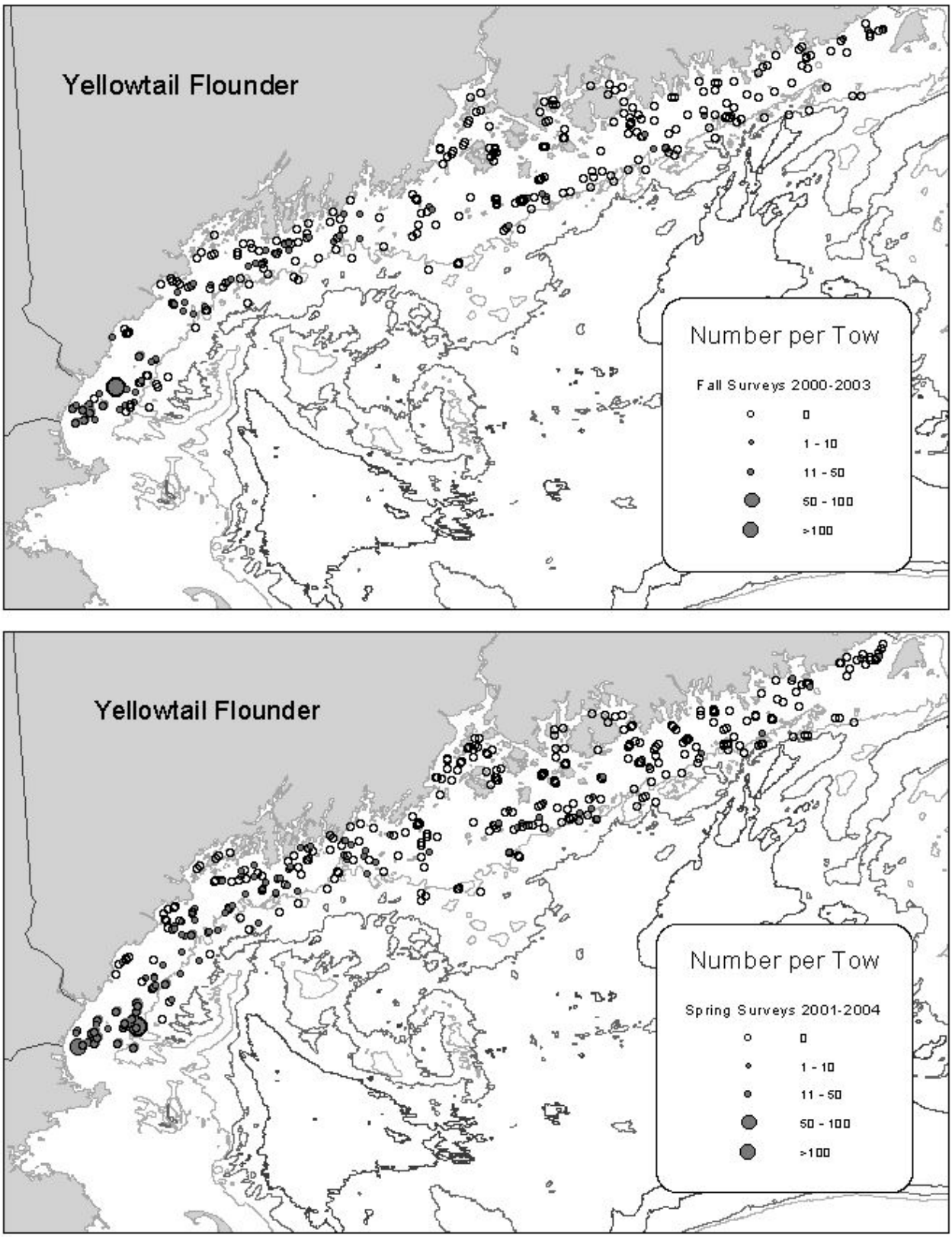
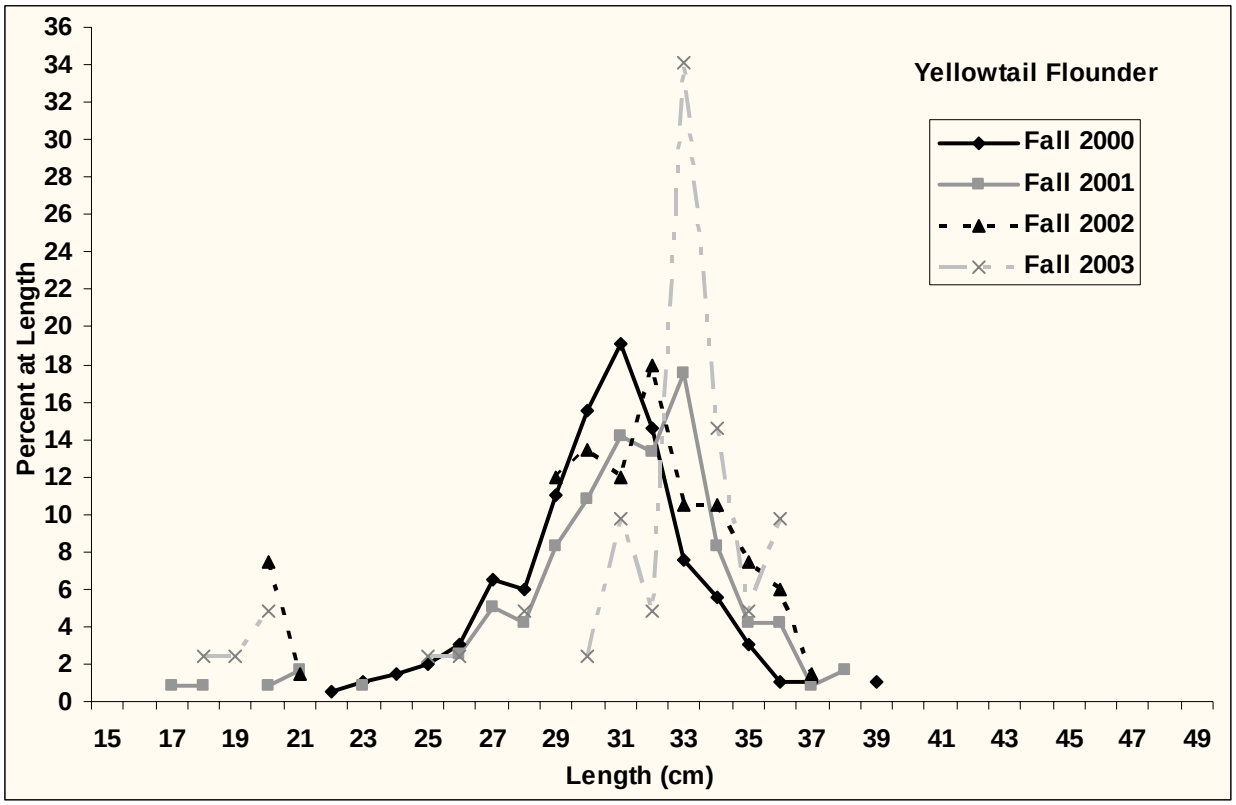


Figure 12. Fall and spring distributions of yellowtail flounder.



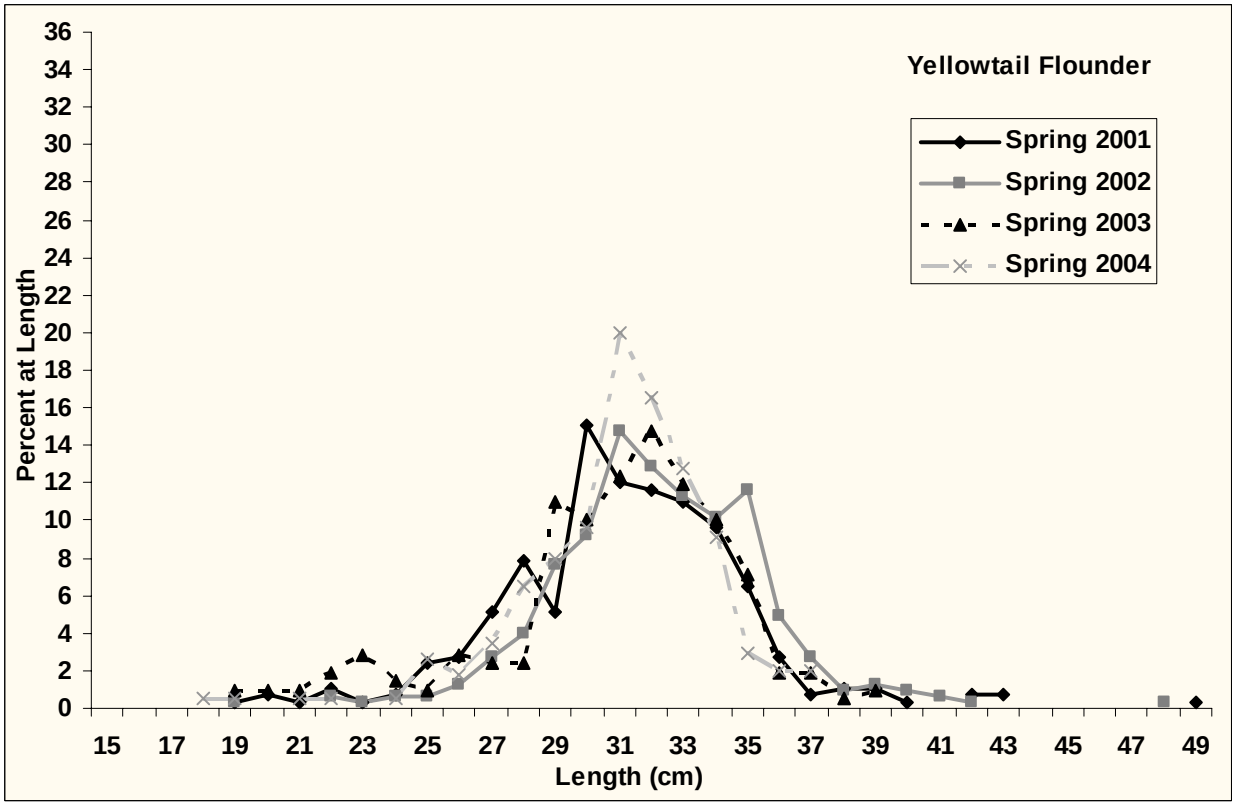
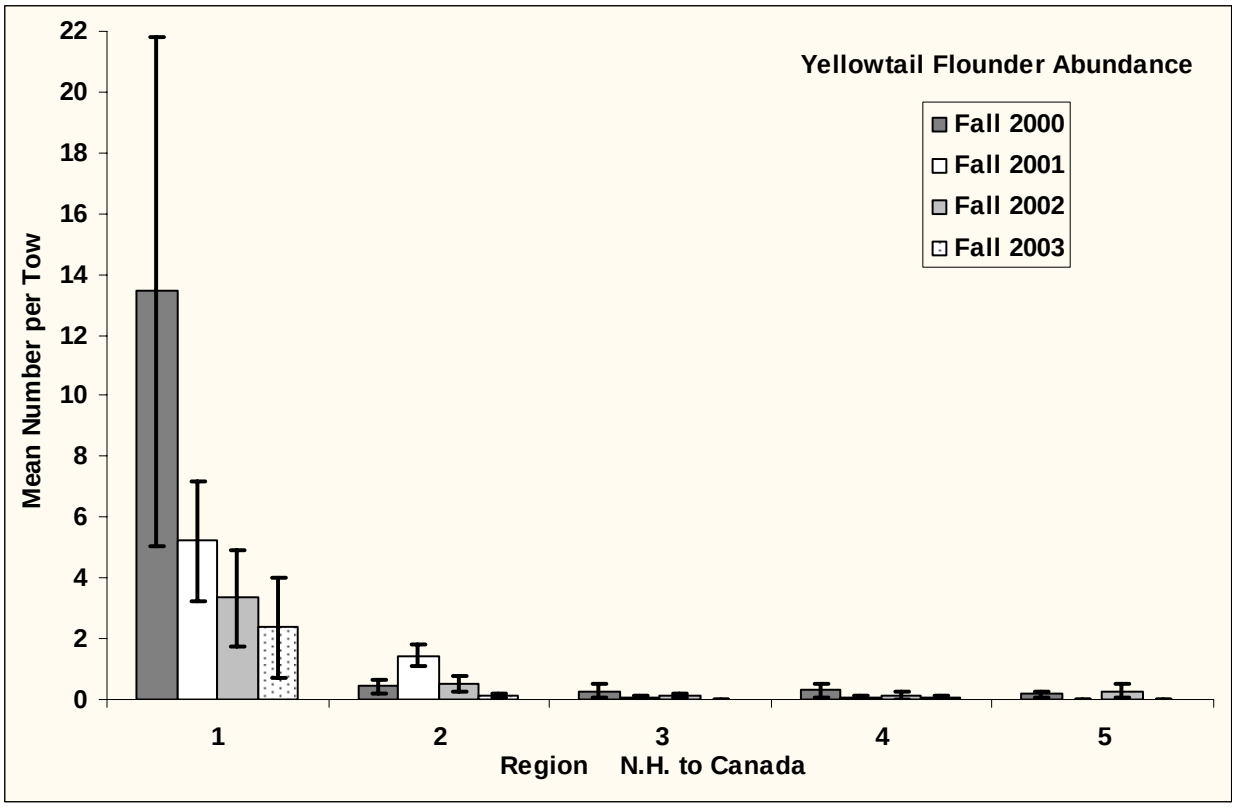


Figure 13. Length frequency plots for yellowtail by season and year, all strata combined.



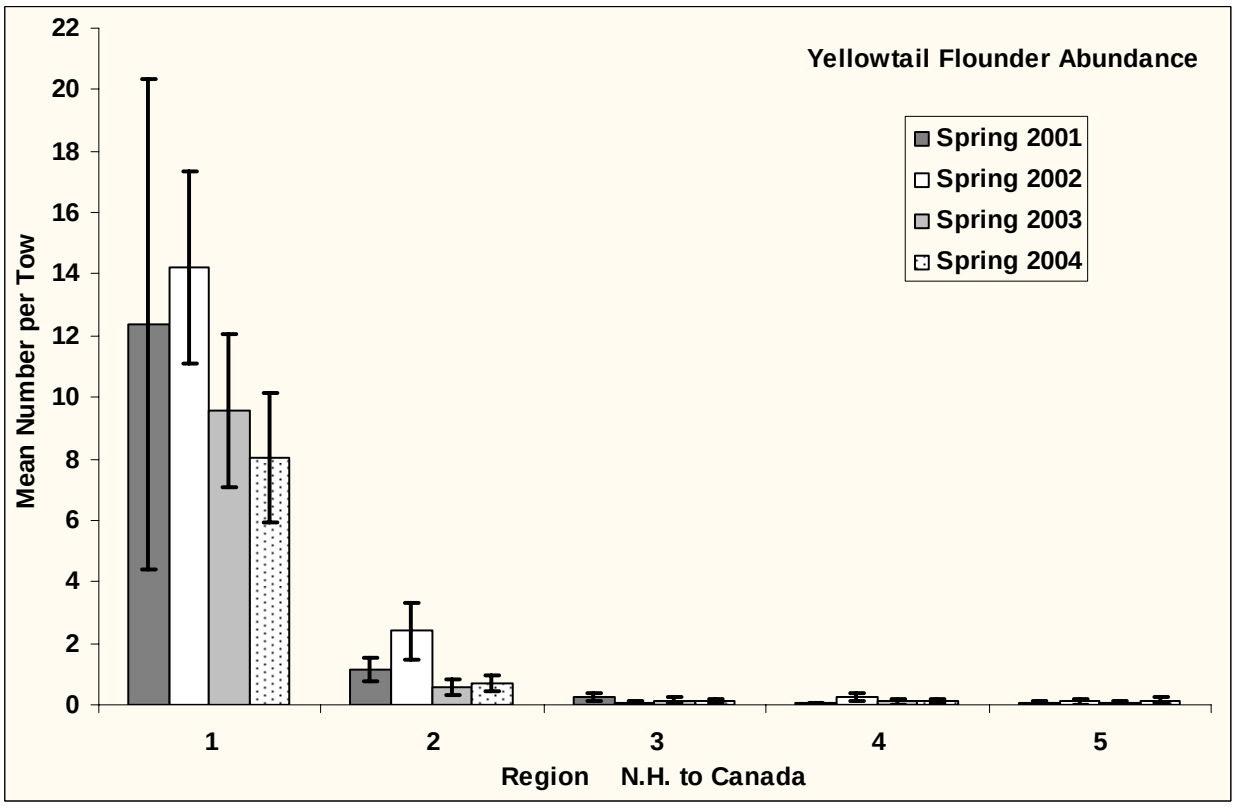
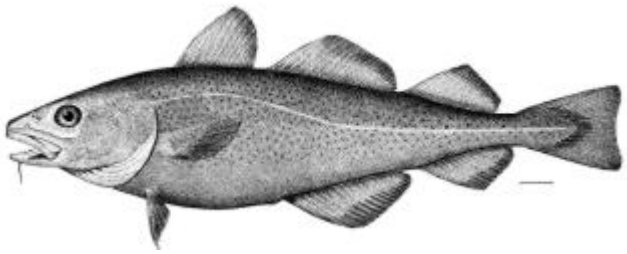


Figure 14. Regional CPUE for yellowtail flounder by season and year.



Atlantic cod (*Gadus morhua)*

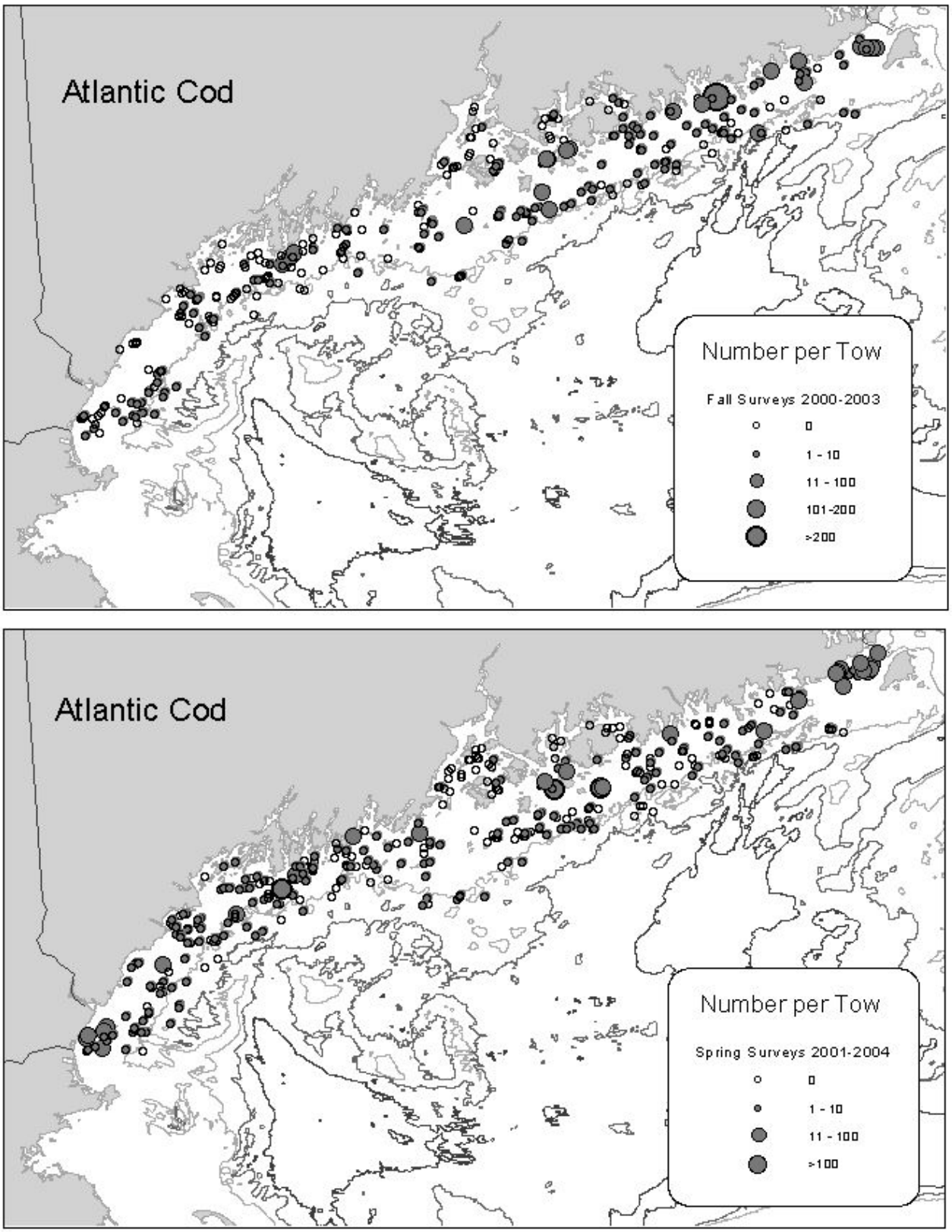
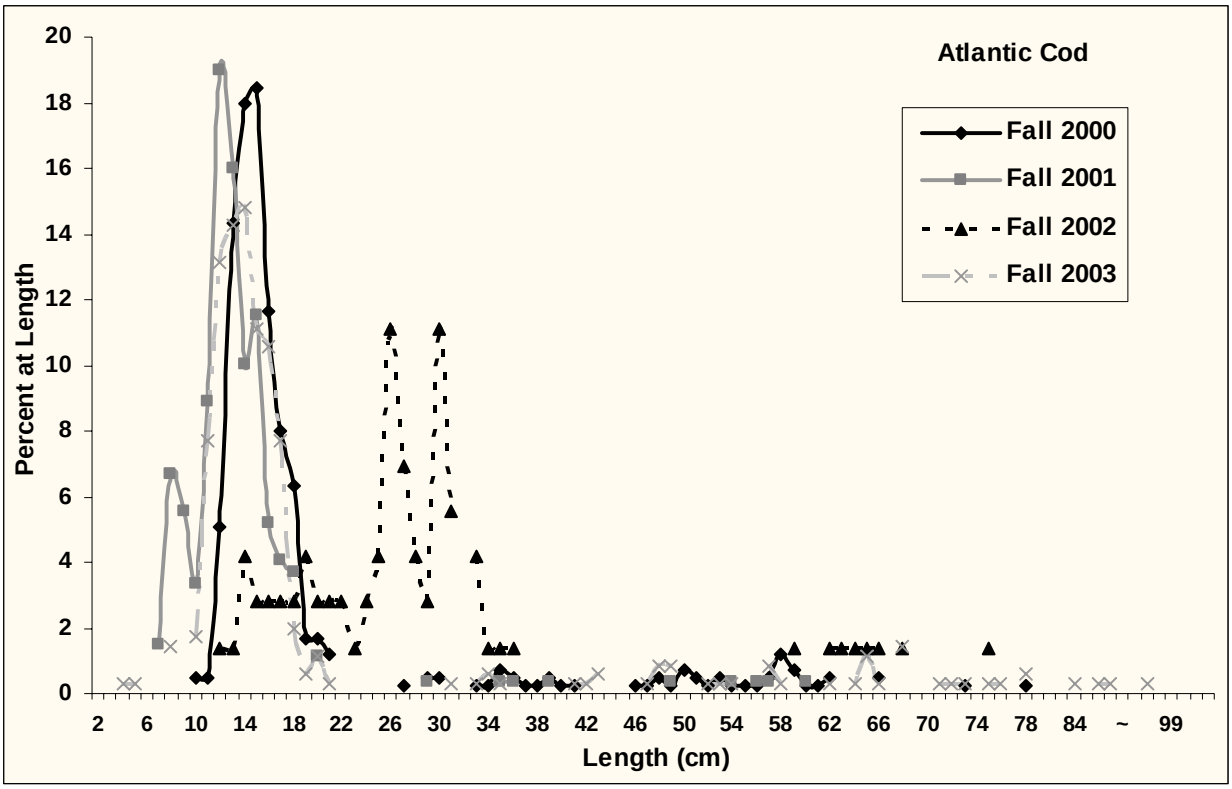


Figure 15. Fall and spring distributions of Atlantic cod.



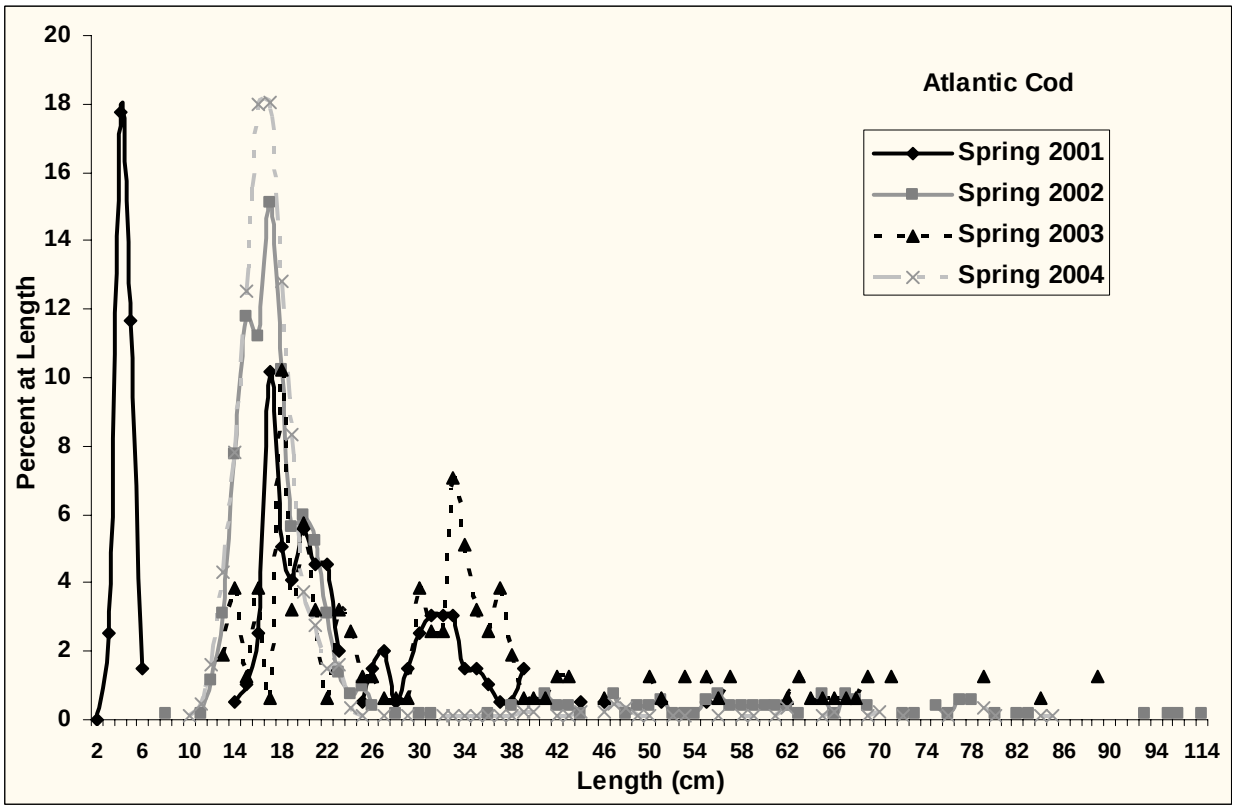
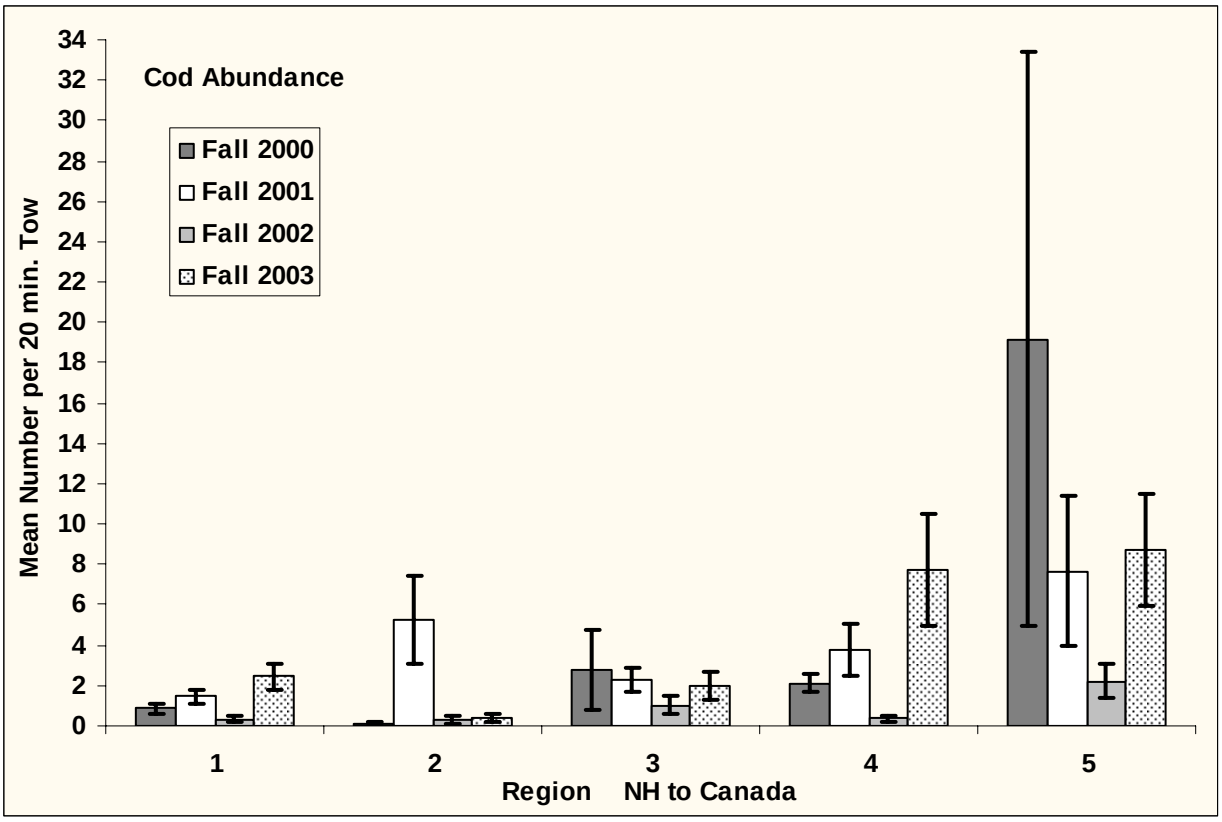


Figure 16. Length frequency plots for cod by season and year, all strata combined.



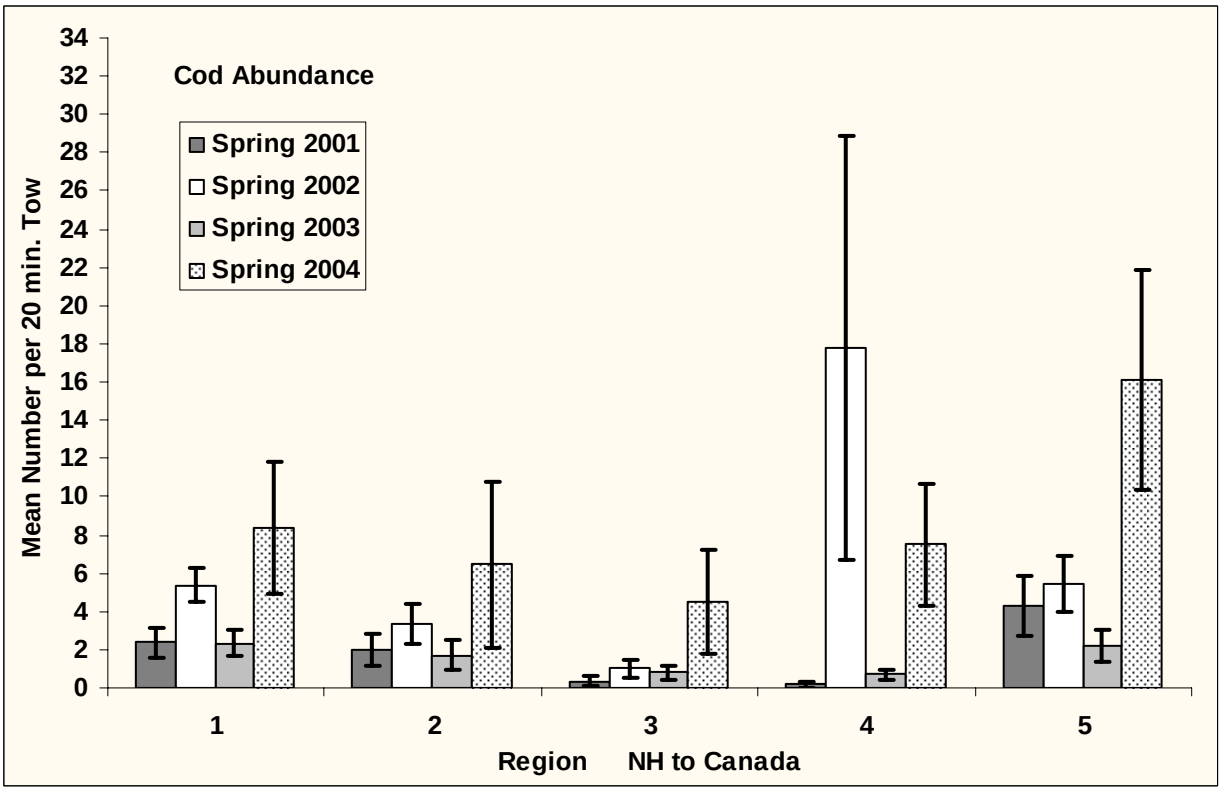
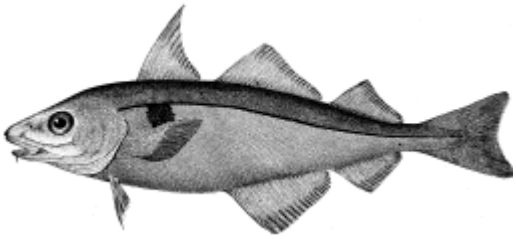
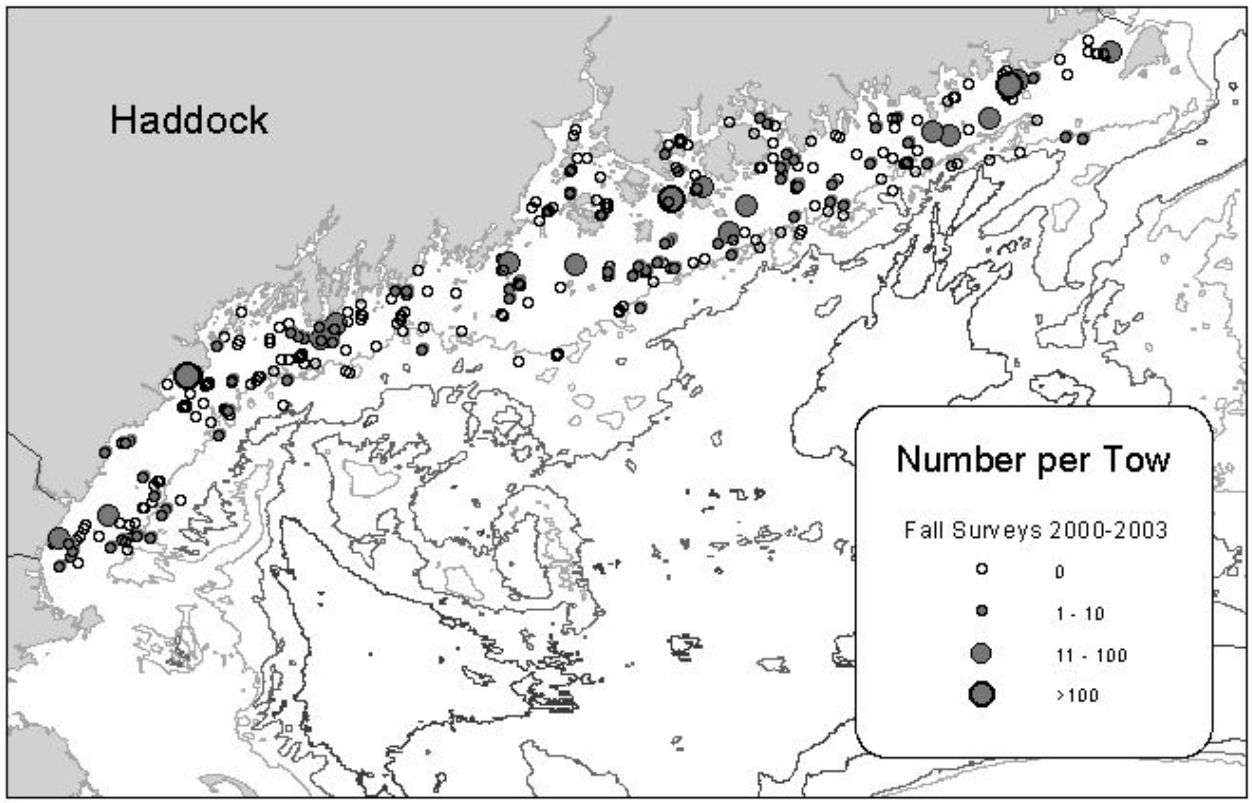


Figure 17. Regional CPUE for cod by season and year.



Haddock (*Melanogrammus aeglefinus*)



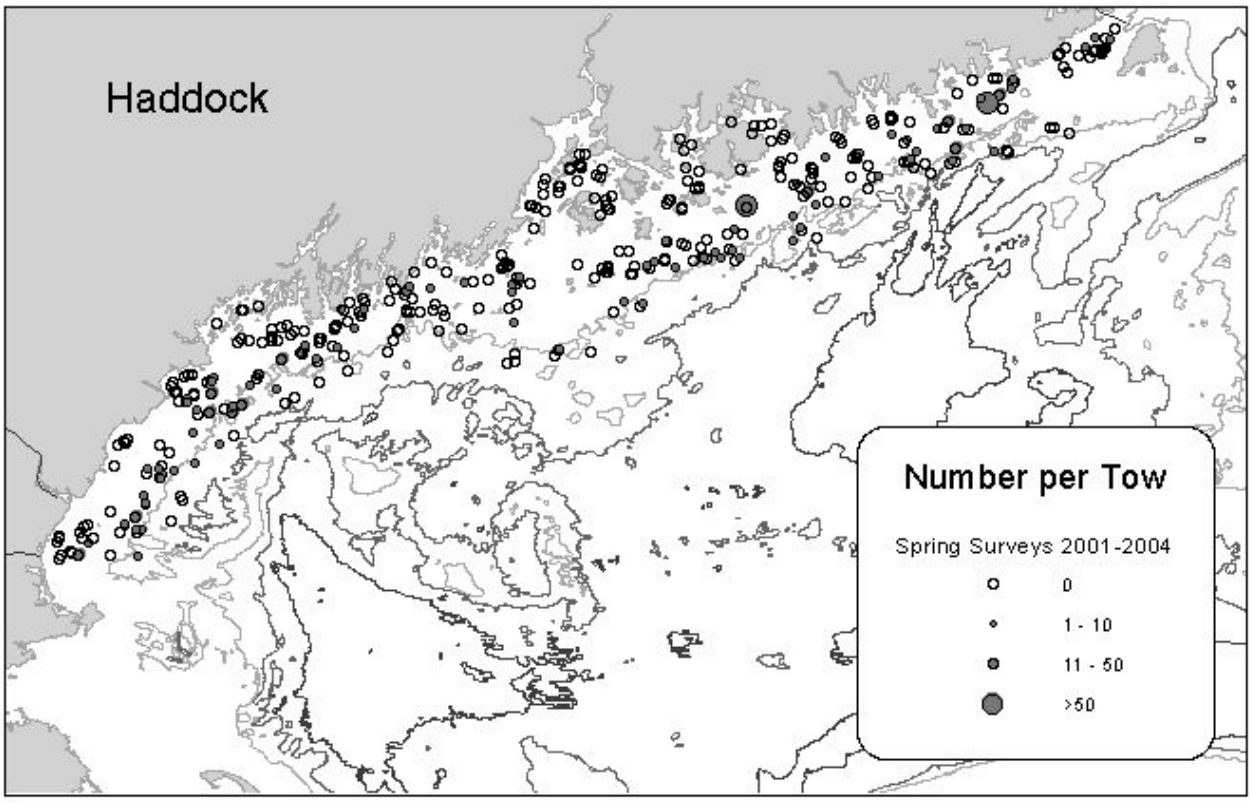


Figure 18. Fall and spring distributions of haddock.

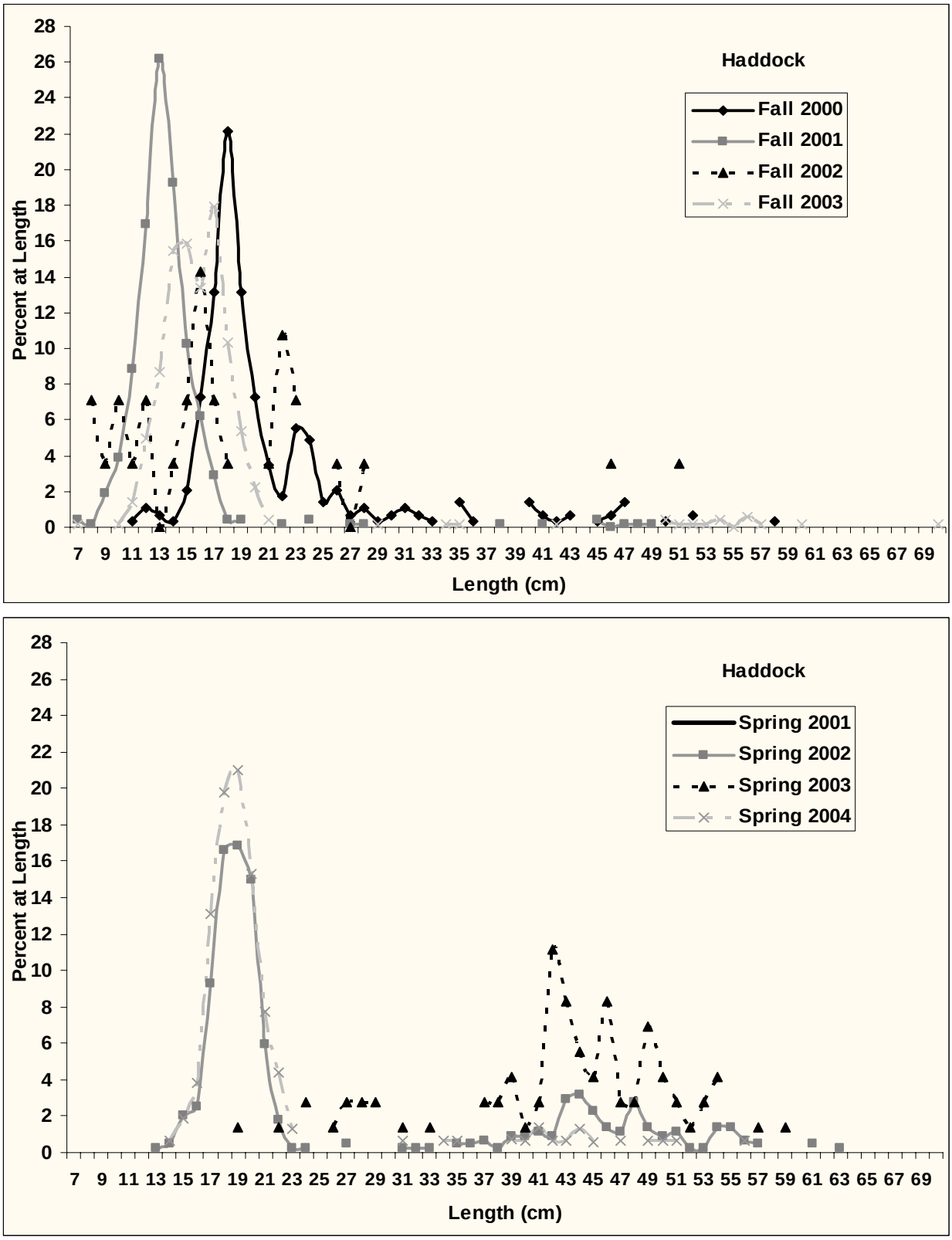
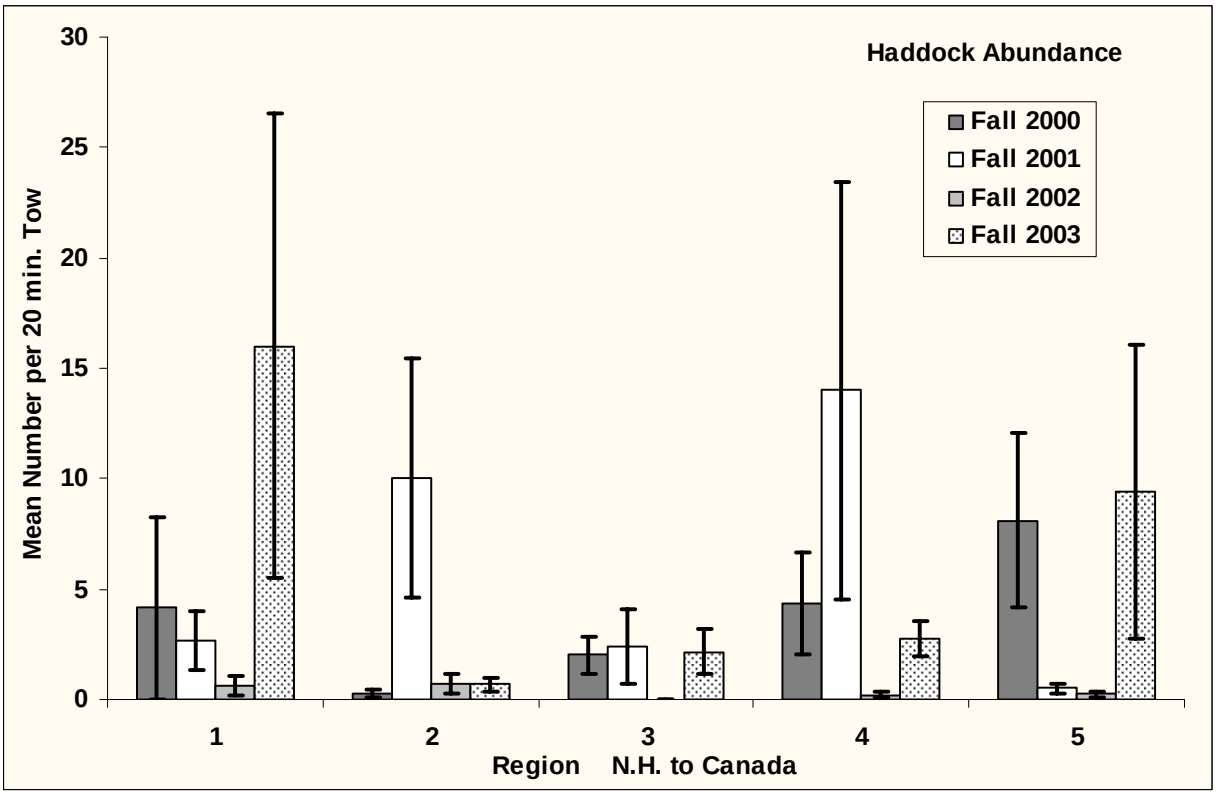


Figure 19. Length frequency plots for haddock by season and year, all strata combined. One haddock at 3 cm caught in the spring of 2001 is not represented here.



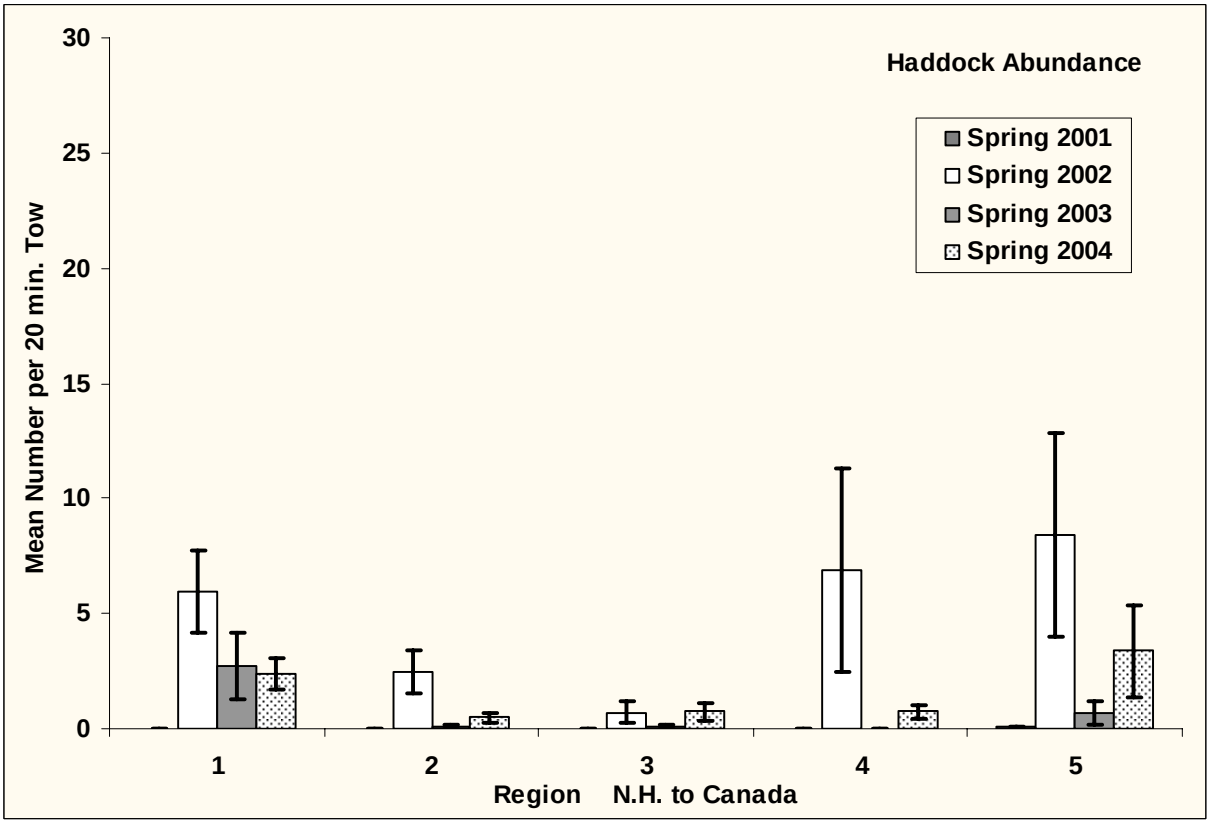
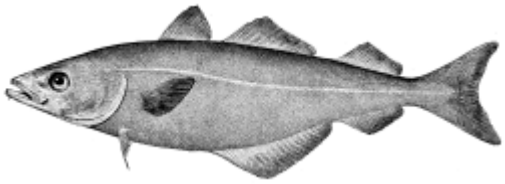


Figure 20. Regional CPUE for haddock by season and year.



Pollock (*Pollachius virens*)

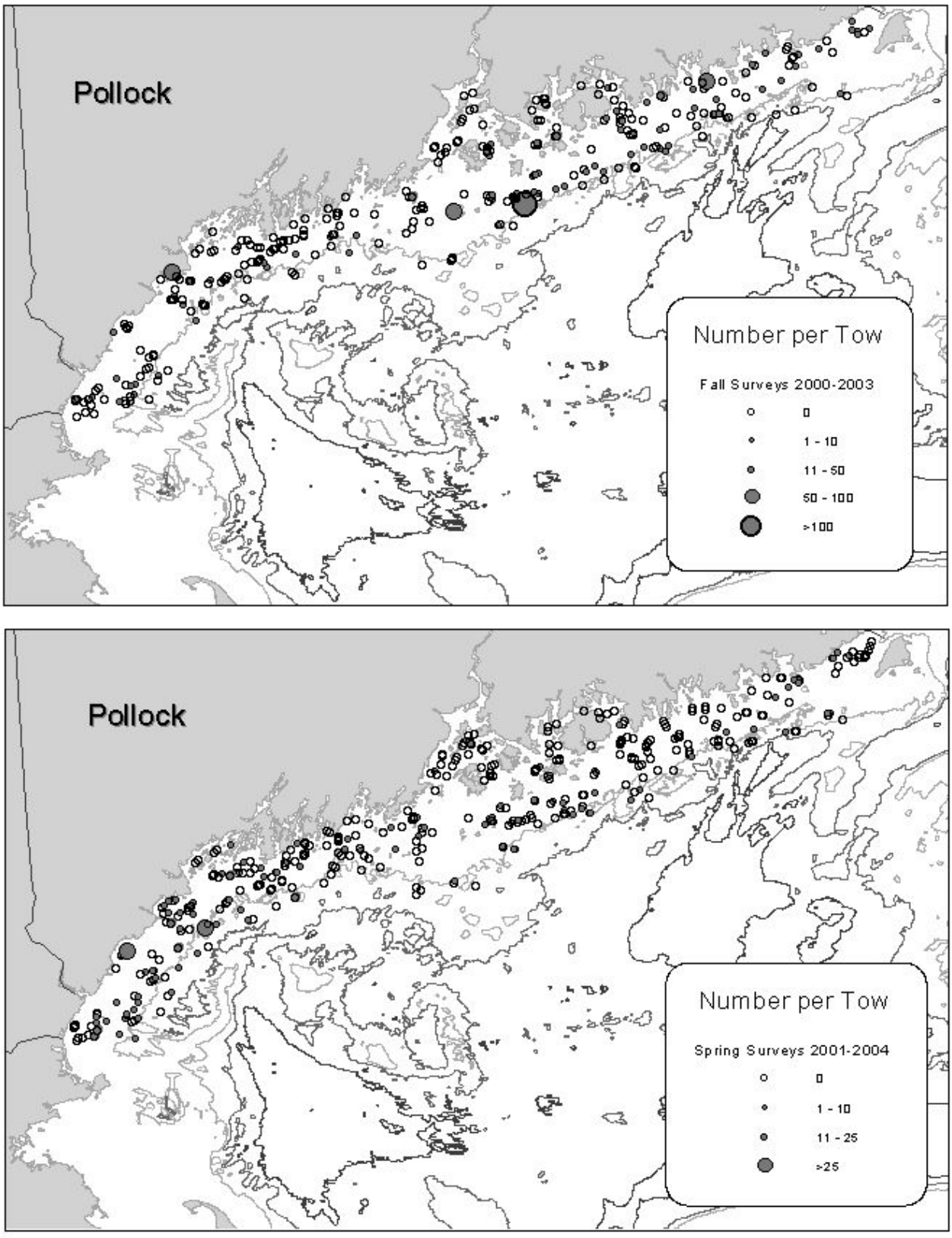
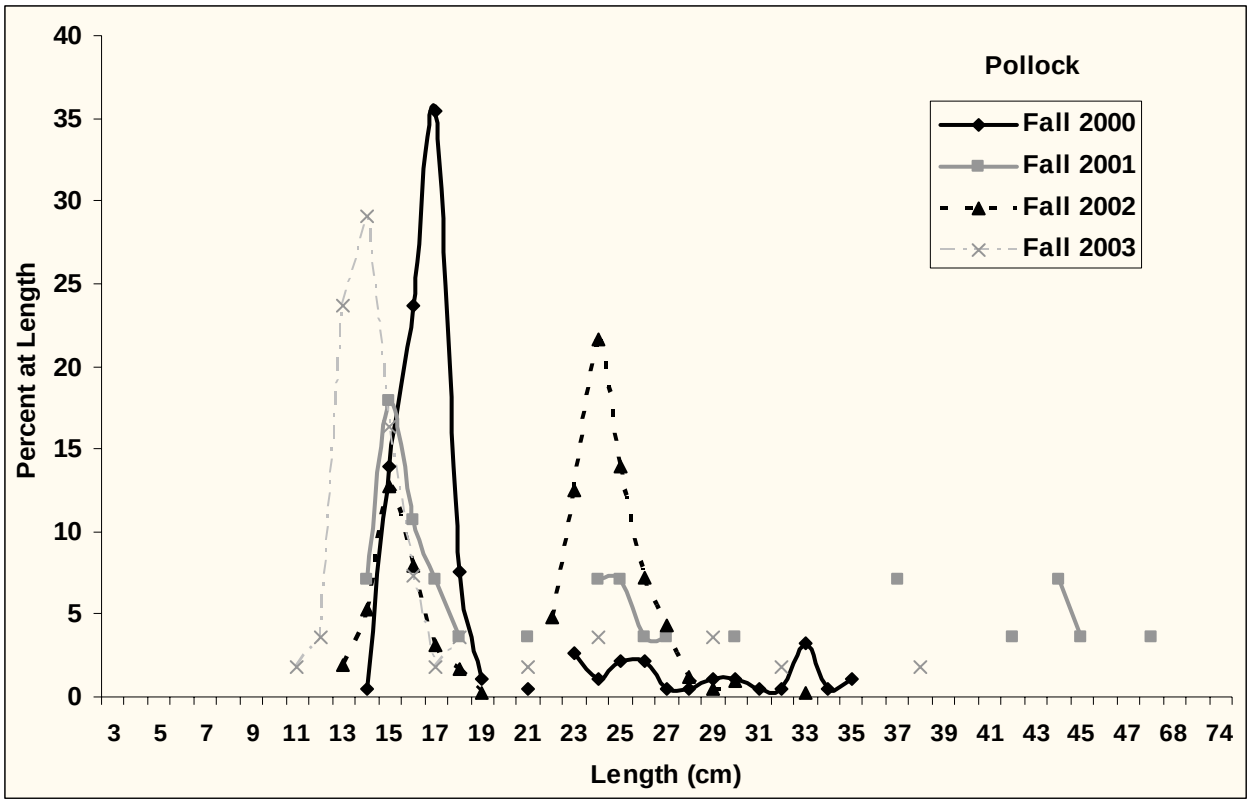


Figure 21. Fall and spring distributions of pollock.



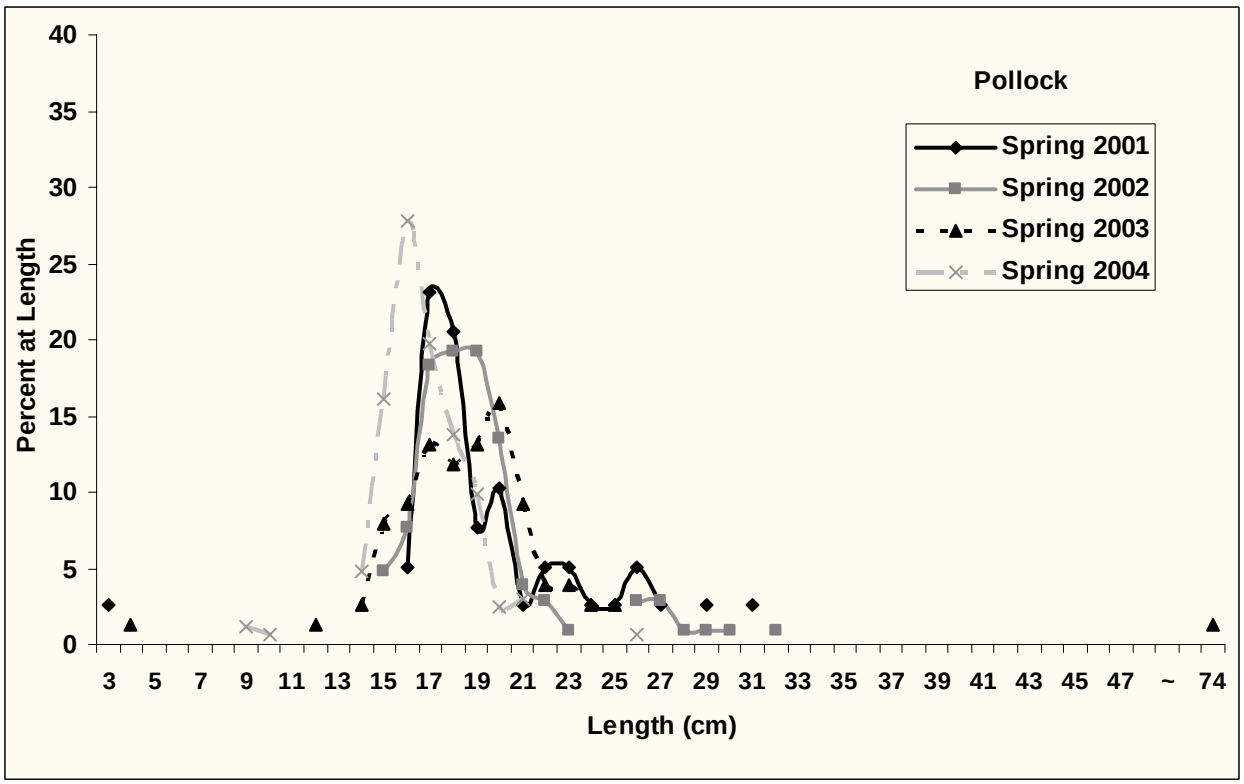
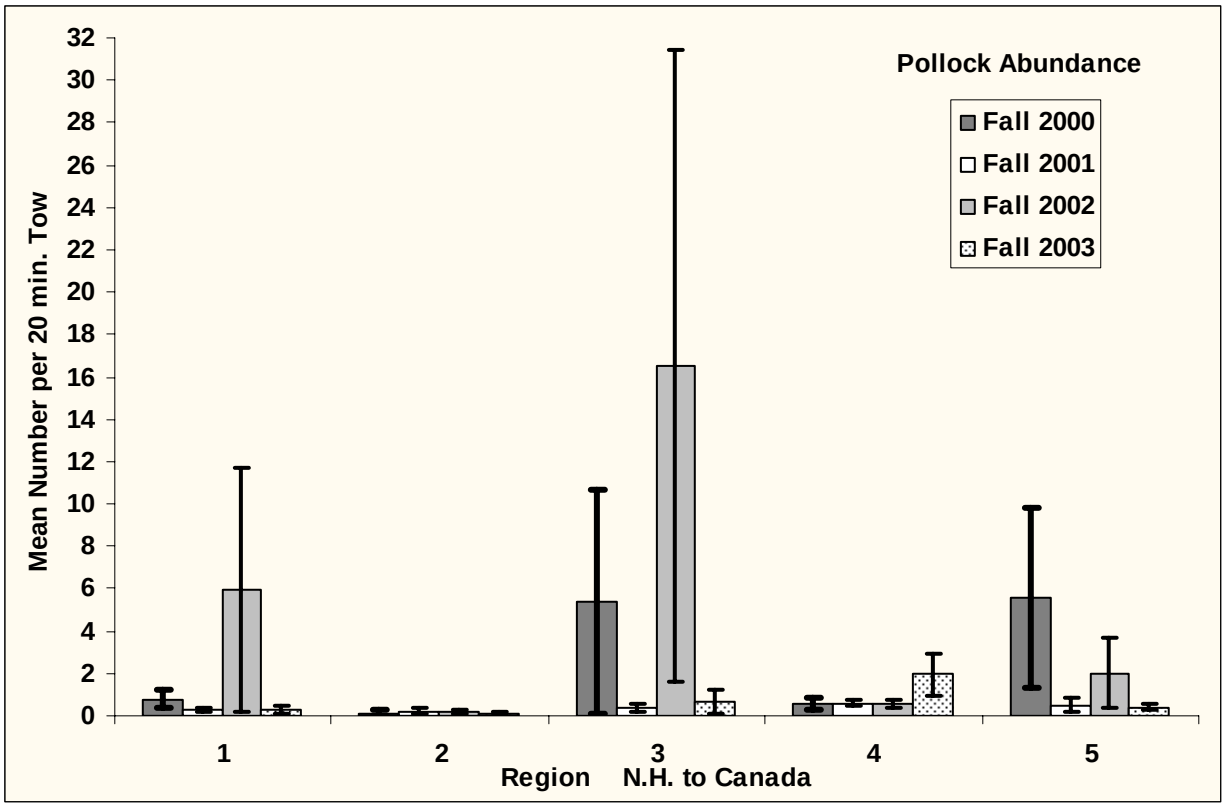


Figure 22. Length frequency plots for pollock by season and year, all strata combined.



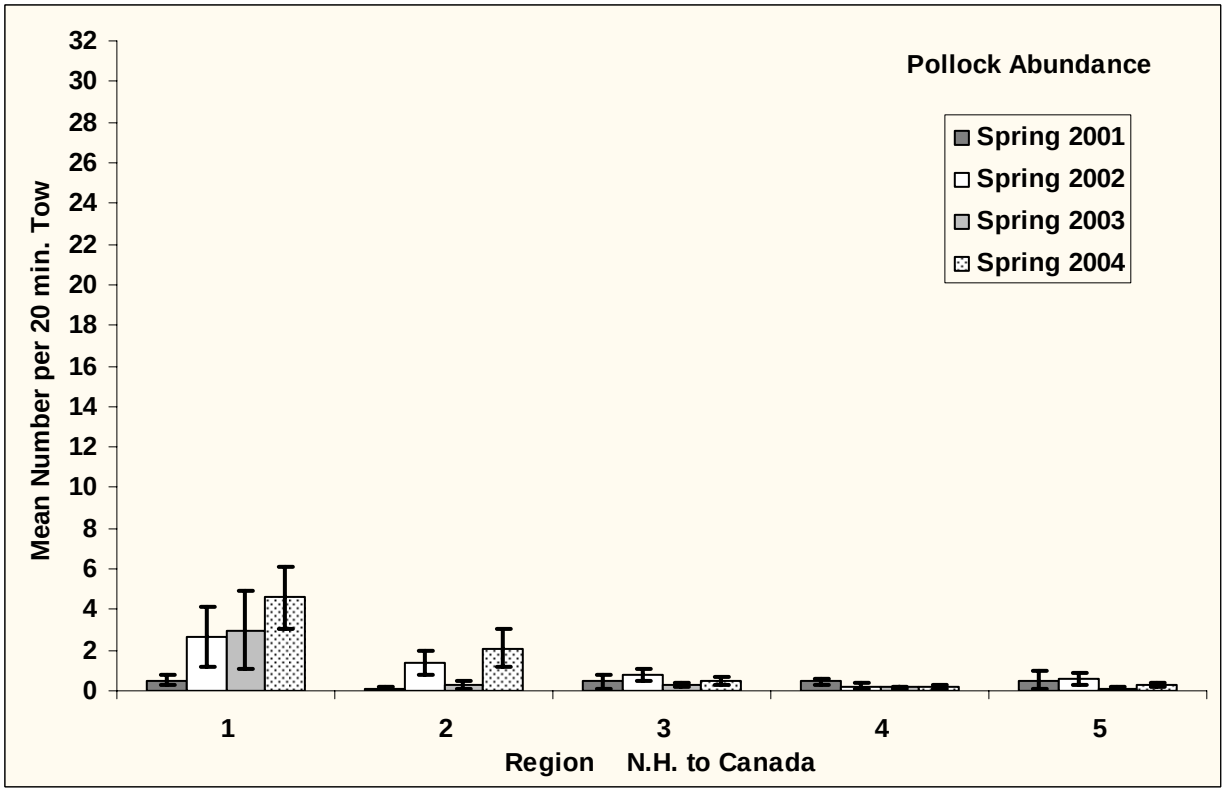
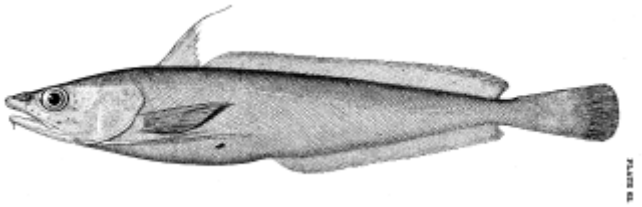
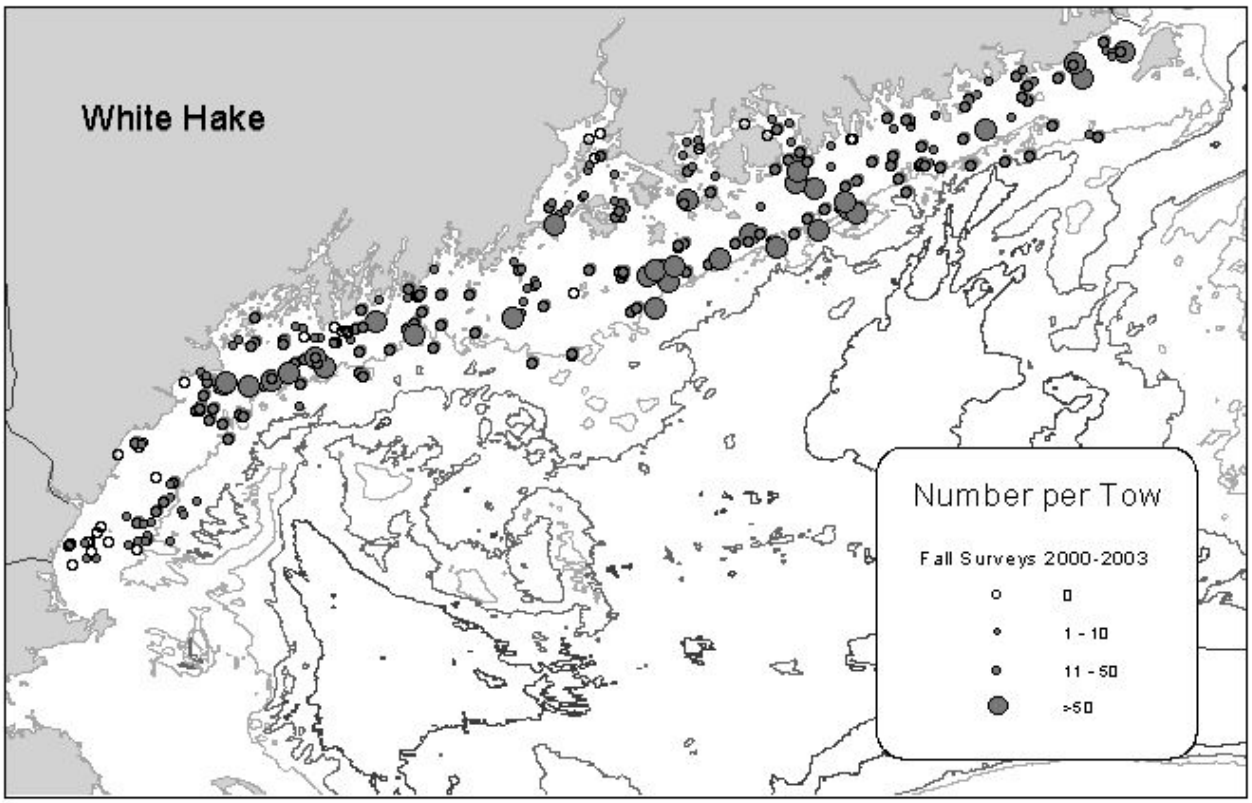


Figure 23. Regional CPUE for pollock by season and year.



White Hake (*Urophycis tenuis*)



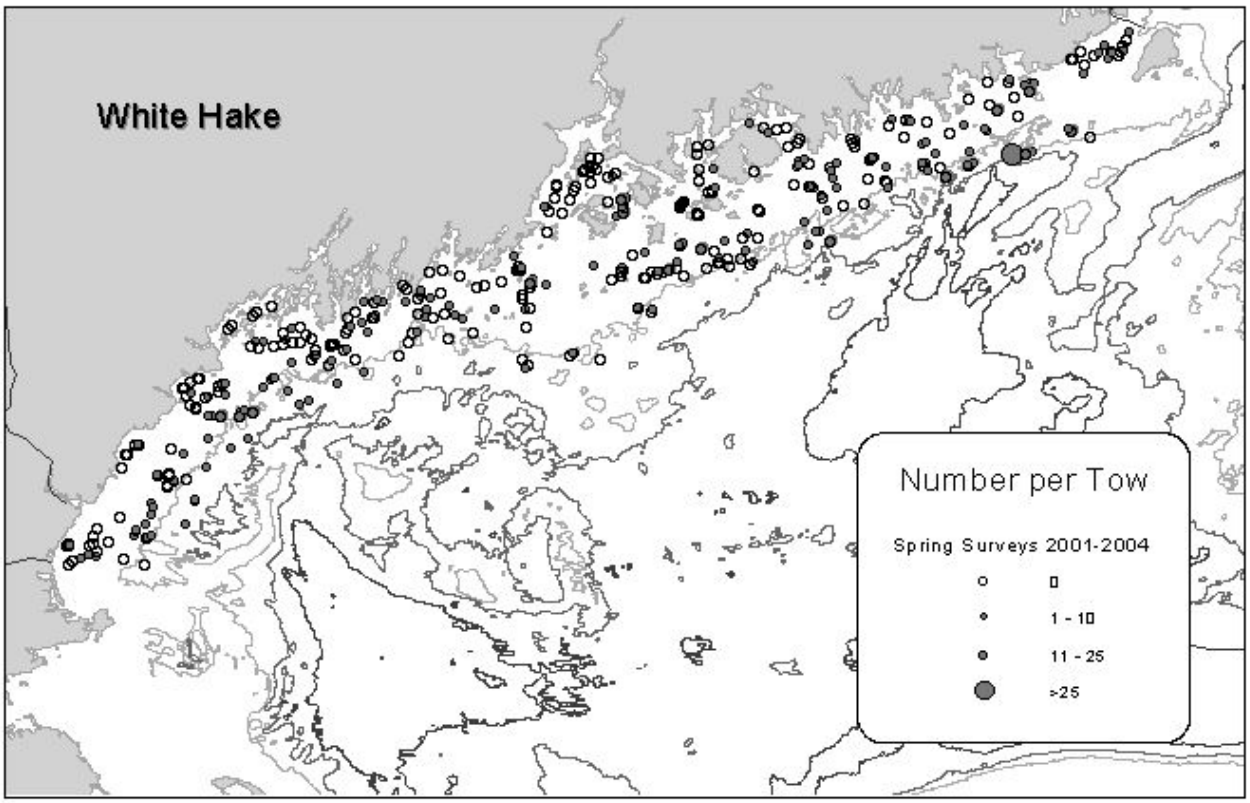
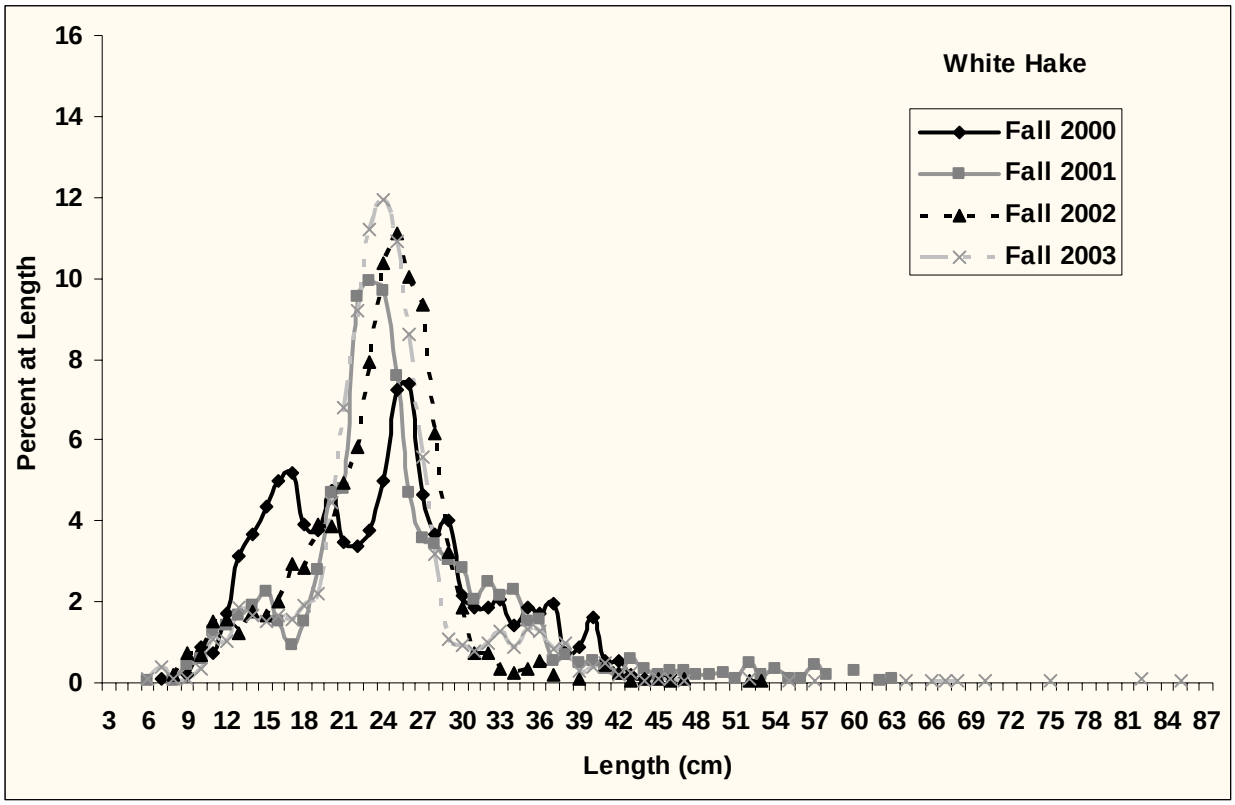


Figure 24. Fall and spring distributions of white hake.



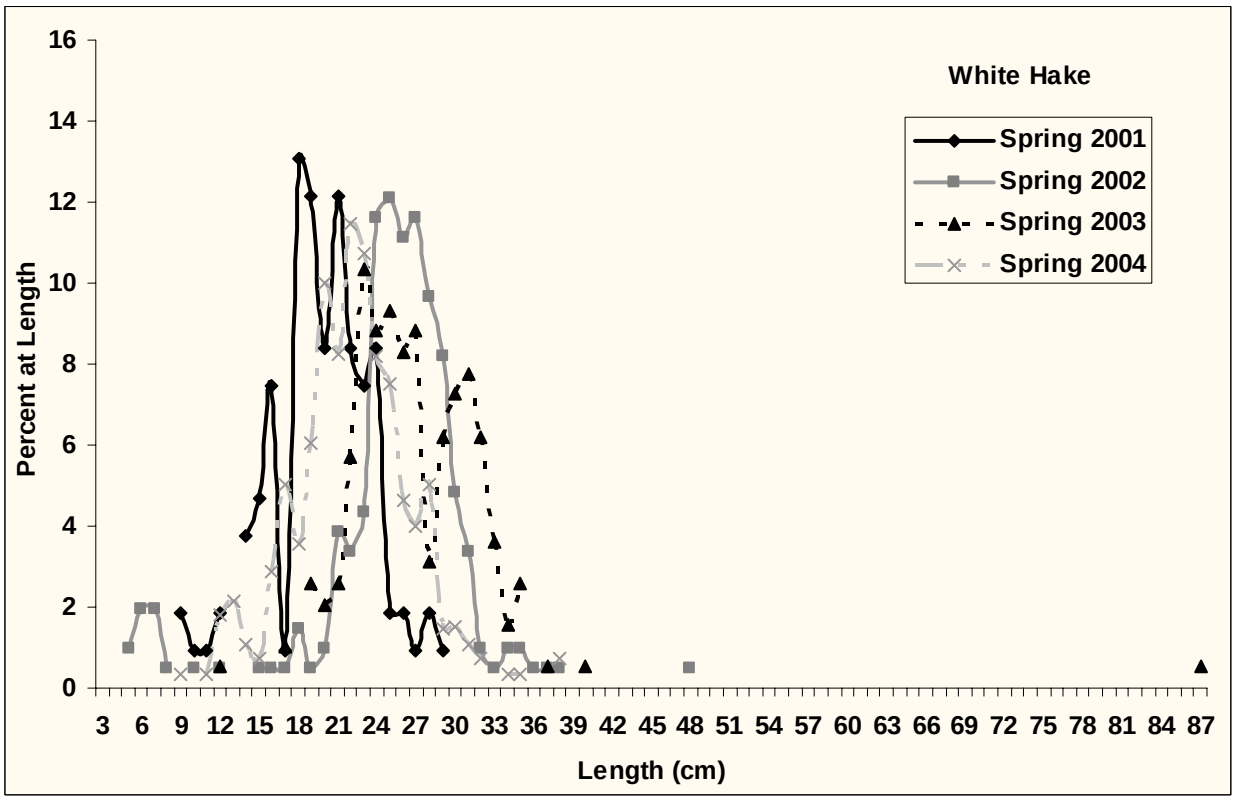
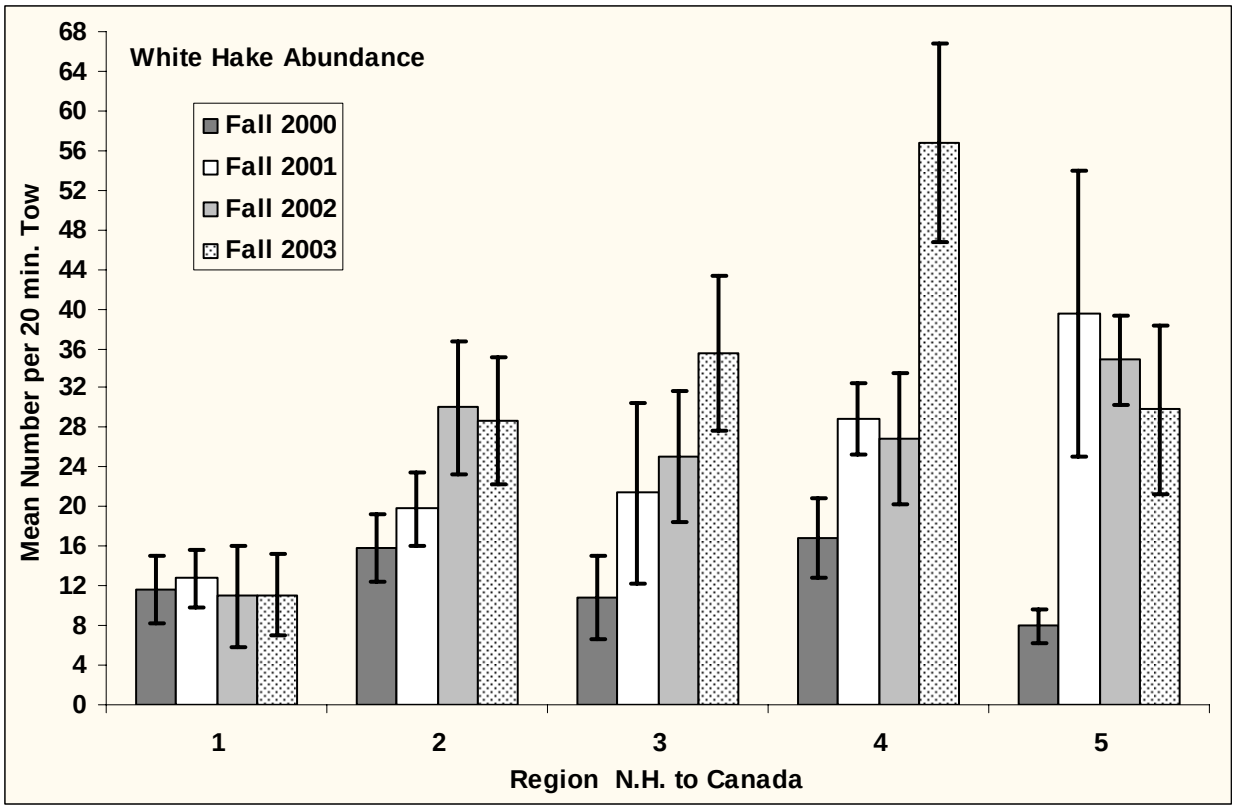


Figure 25. Length frequency plots for white hake by season and year, all strata combined.



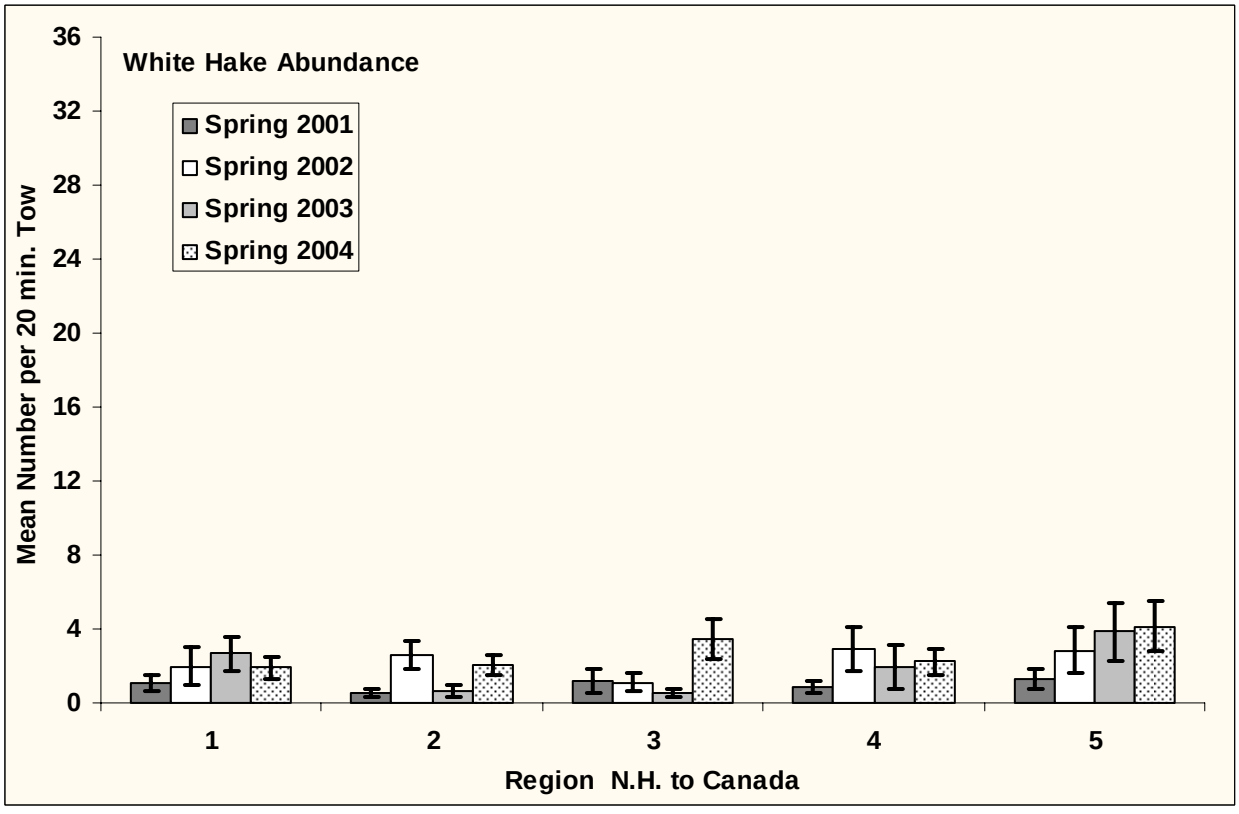
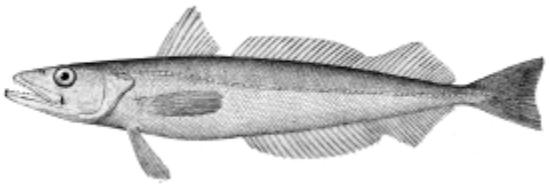
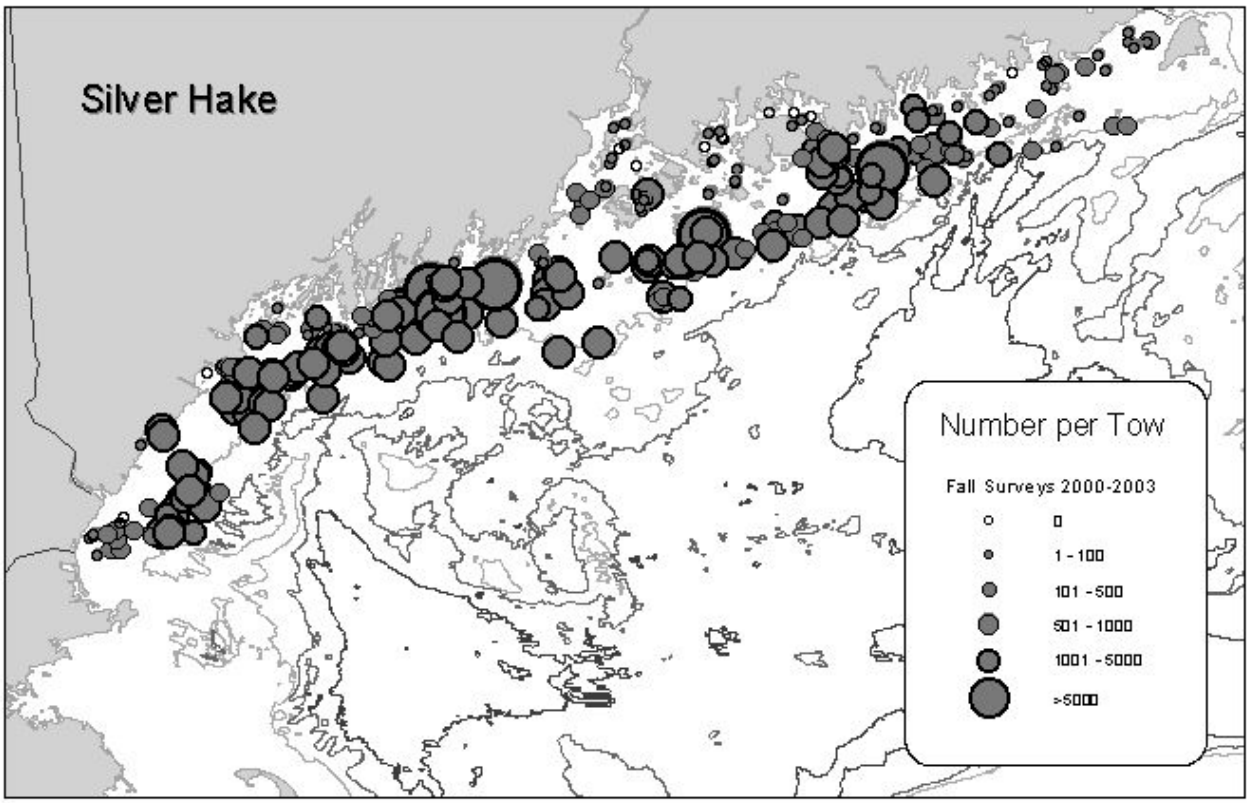


Figure 26. Regional CPUE for white hake by season and year.



Silver Hake (*Merluccius bilinearis*)



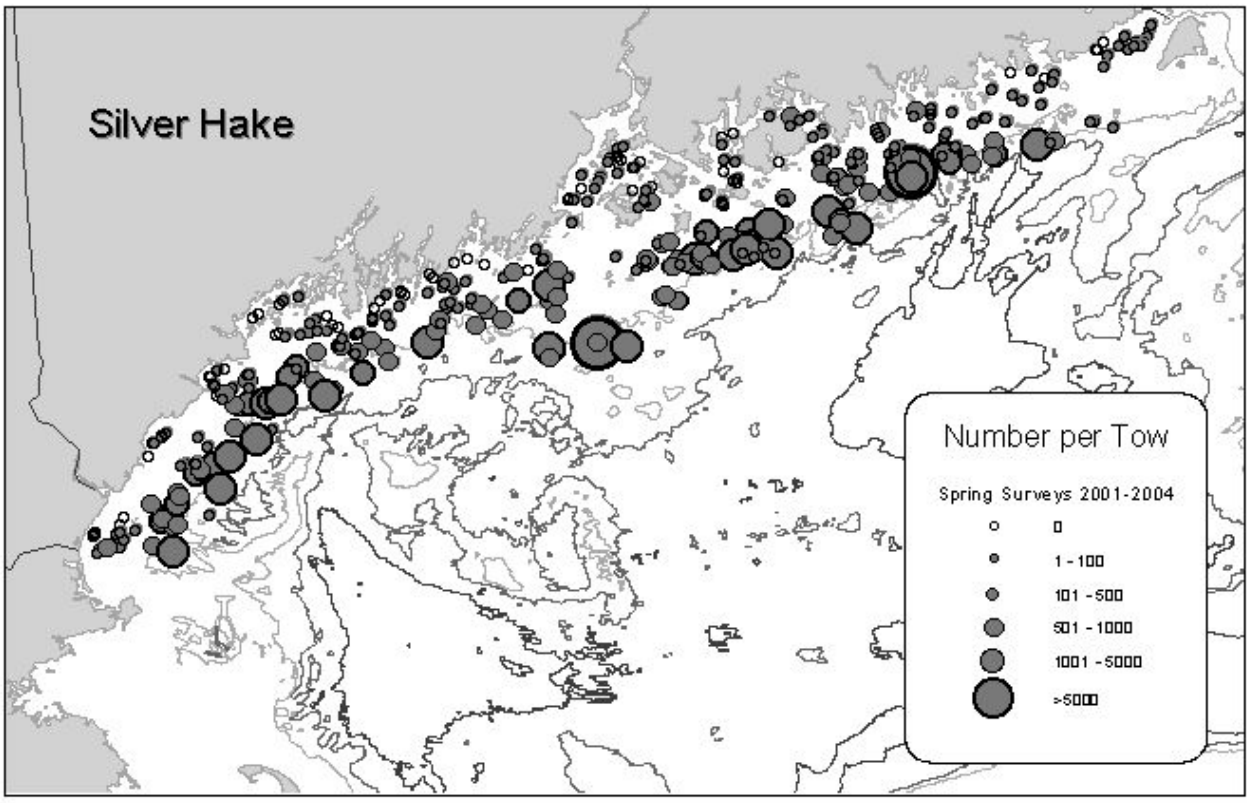


Figure 27. Fall and spring distributions of silver hake (whiting).

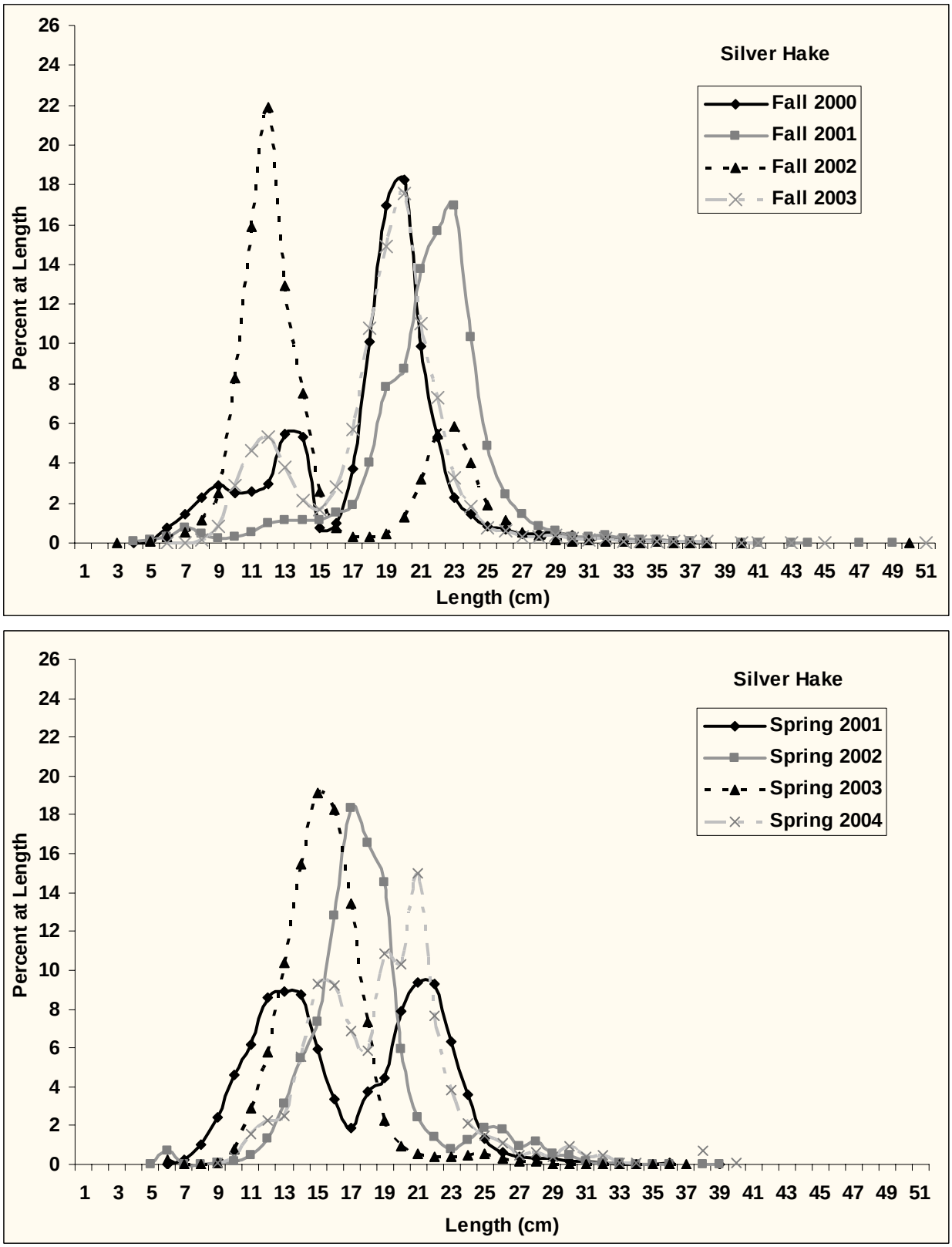


Figure 28. Length frequency plots for silver hake by season and year, all strata combined.

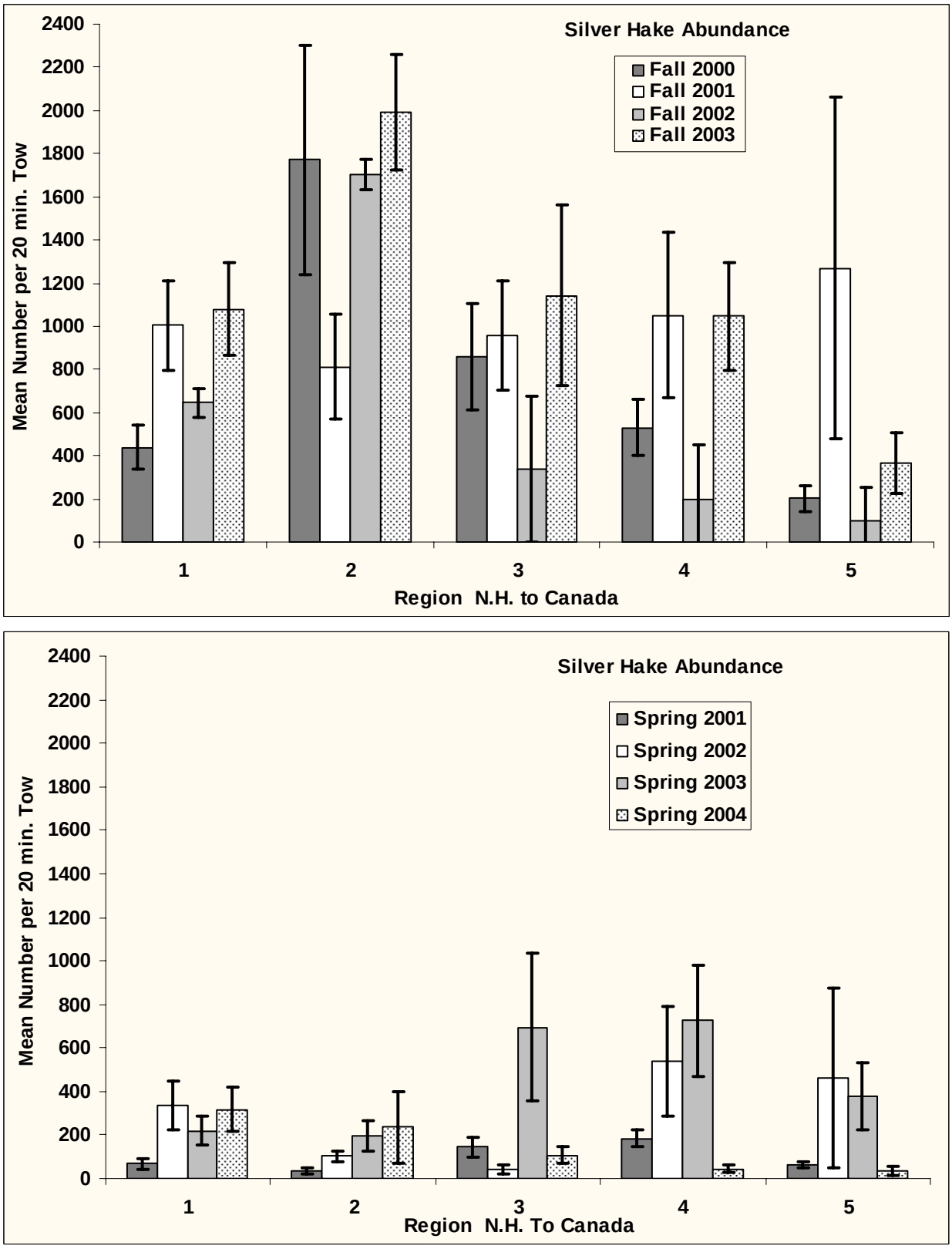
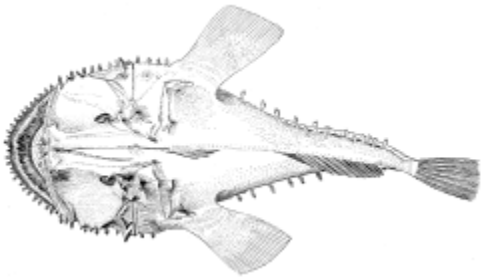
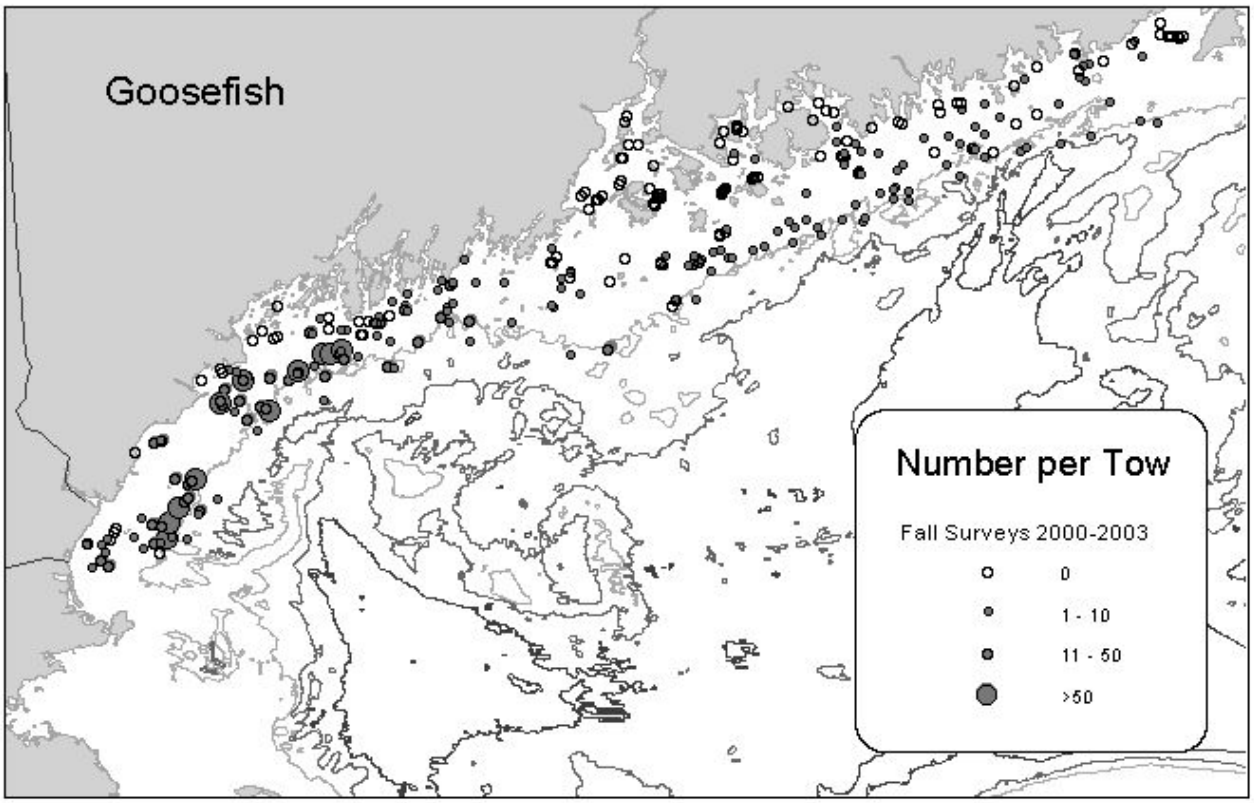


Figure 29. Regional CPUE for silver hake by season and year.



Goosefish (*Lophius americanus*)



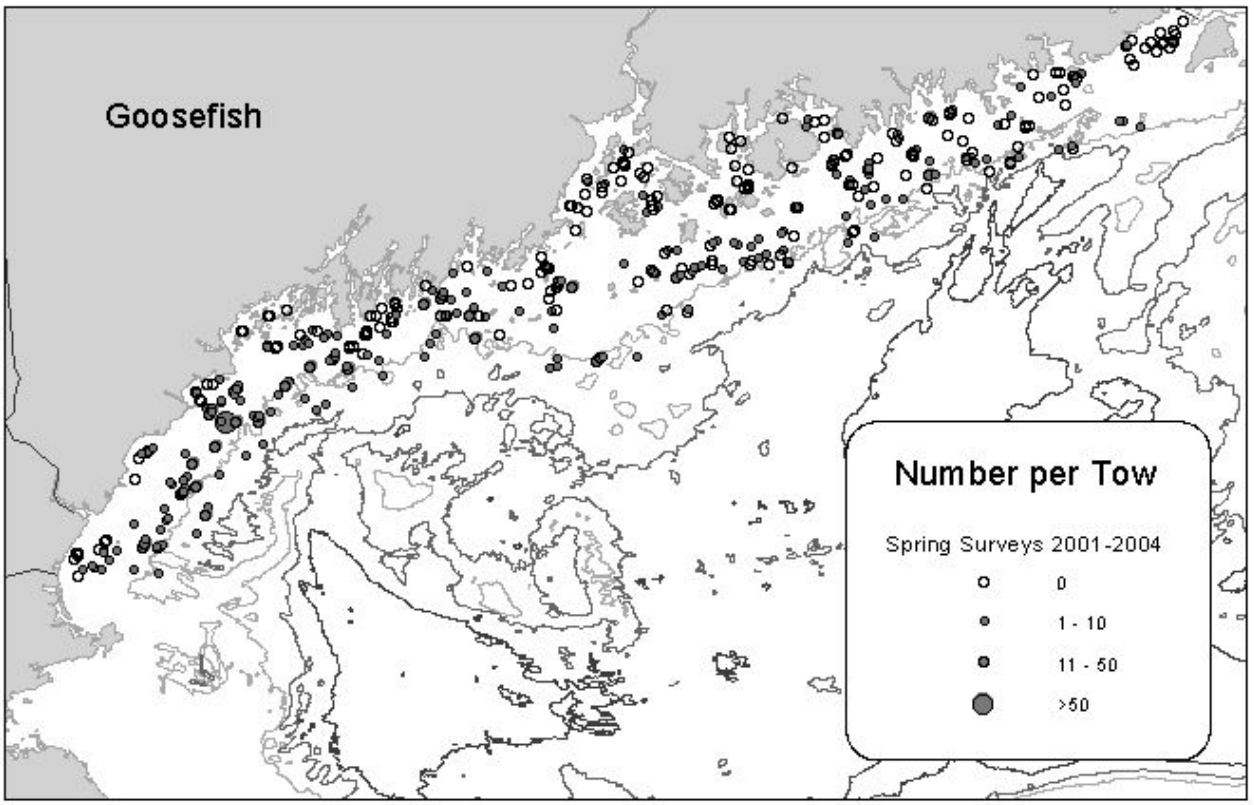
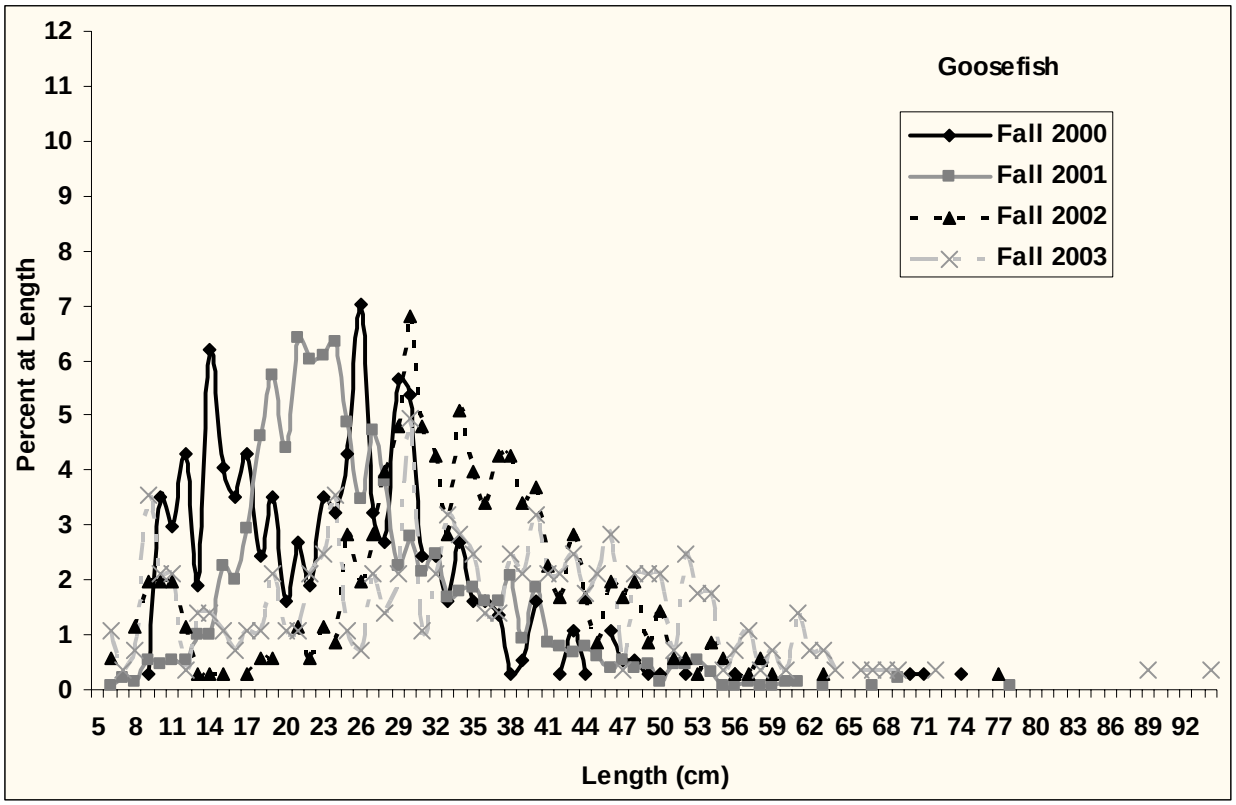


Figure 30. Fall and spring distributions for goosefish (monkfish).



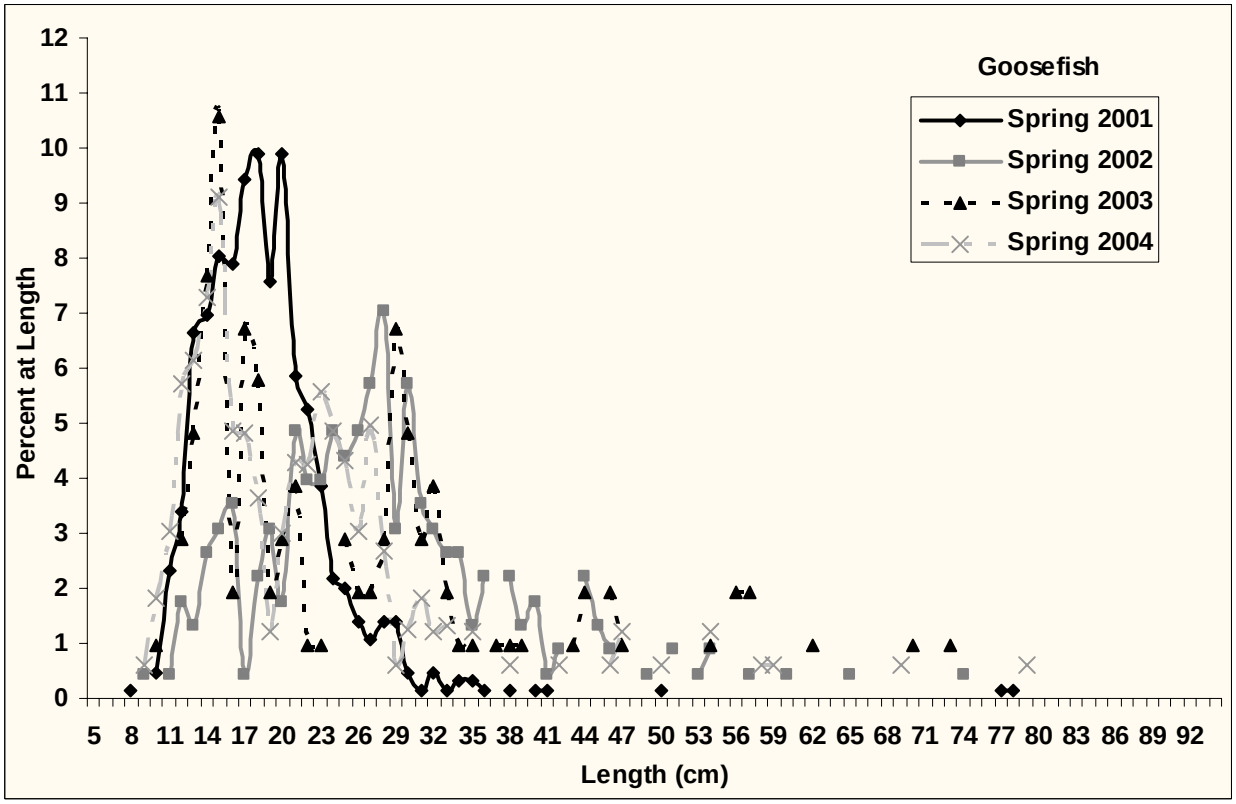
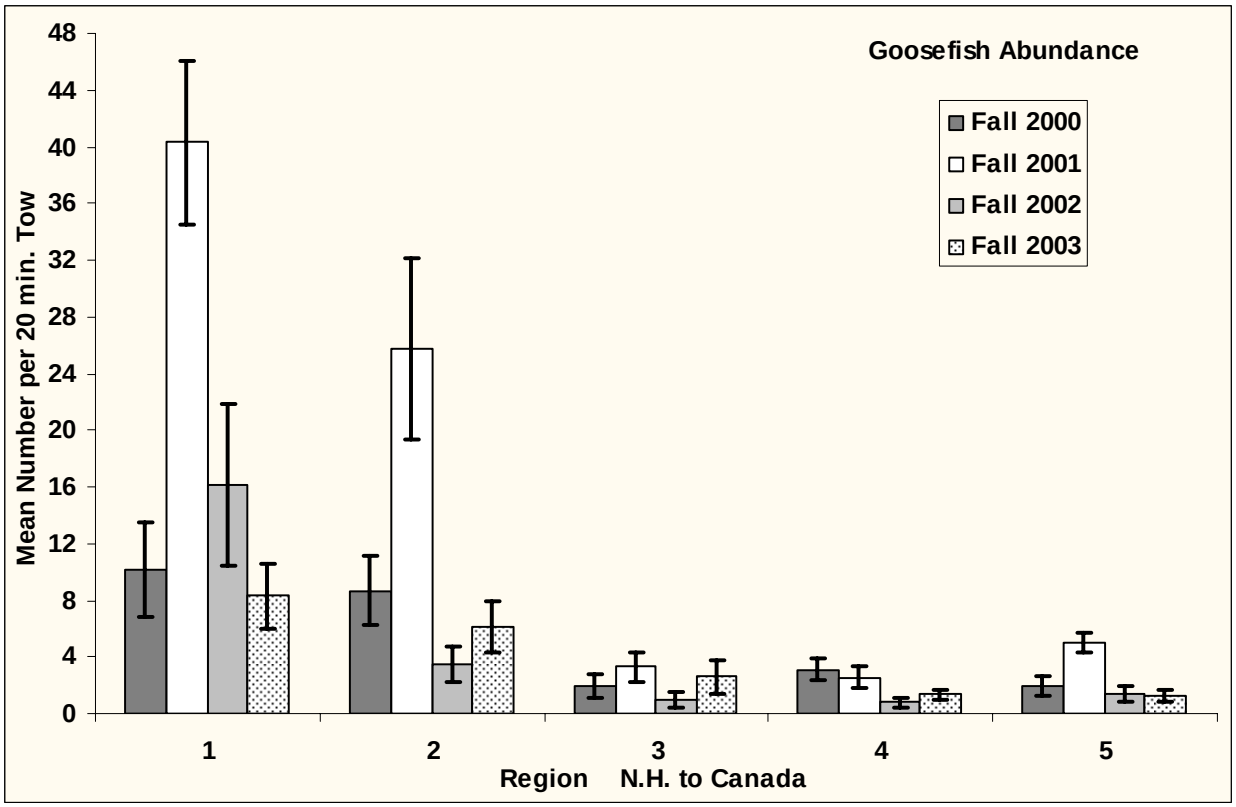


Figure 31. Length frequency plots for goosefish by season and year, all strata combined.



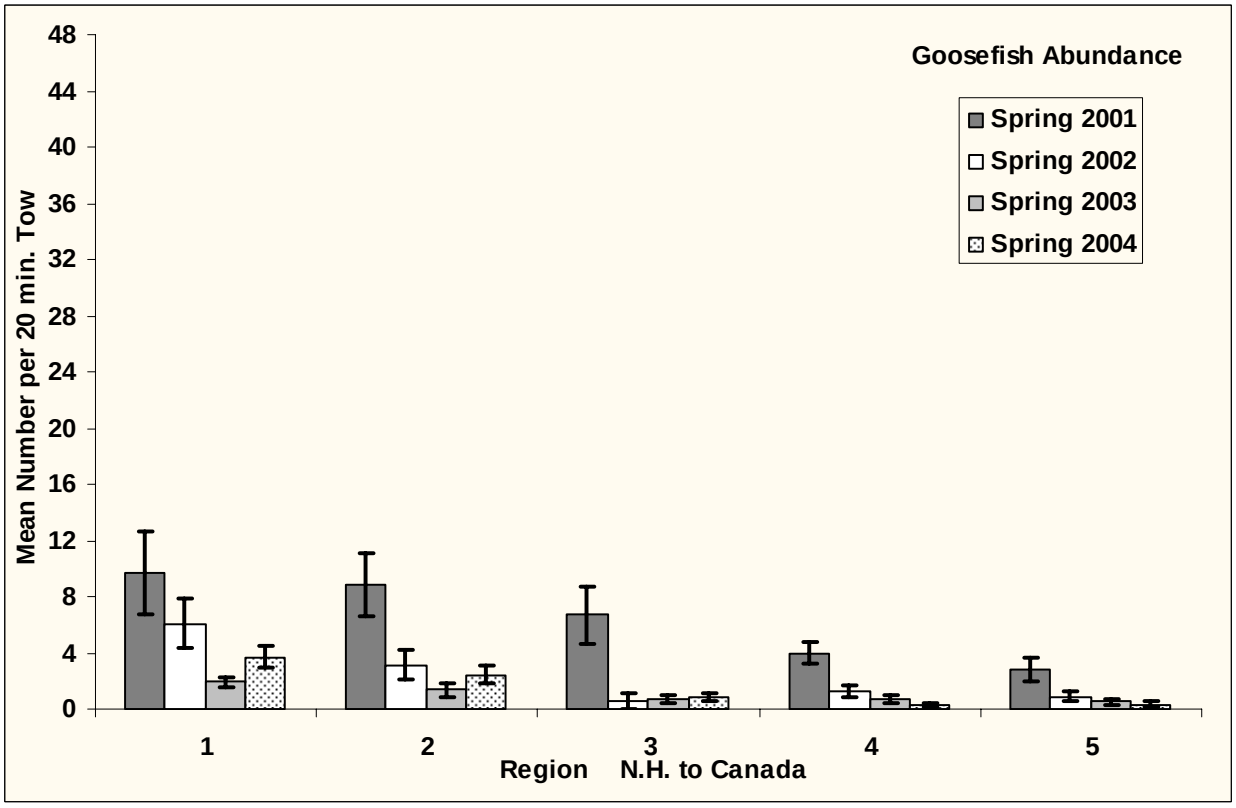


Figure 32. Regional CPUE for goosefish by season and year.

Atlantic Herring (*Clupea harengus*)

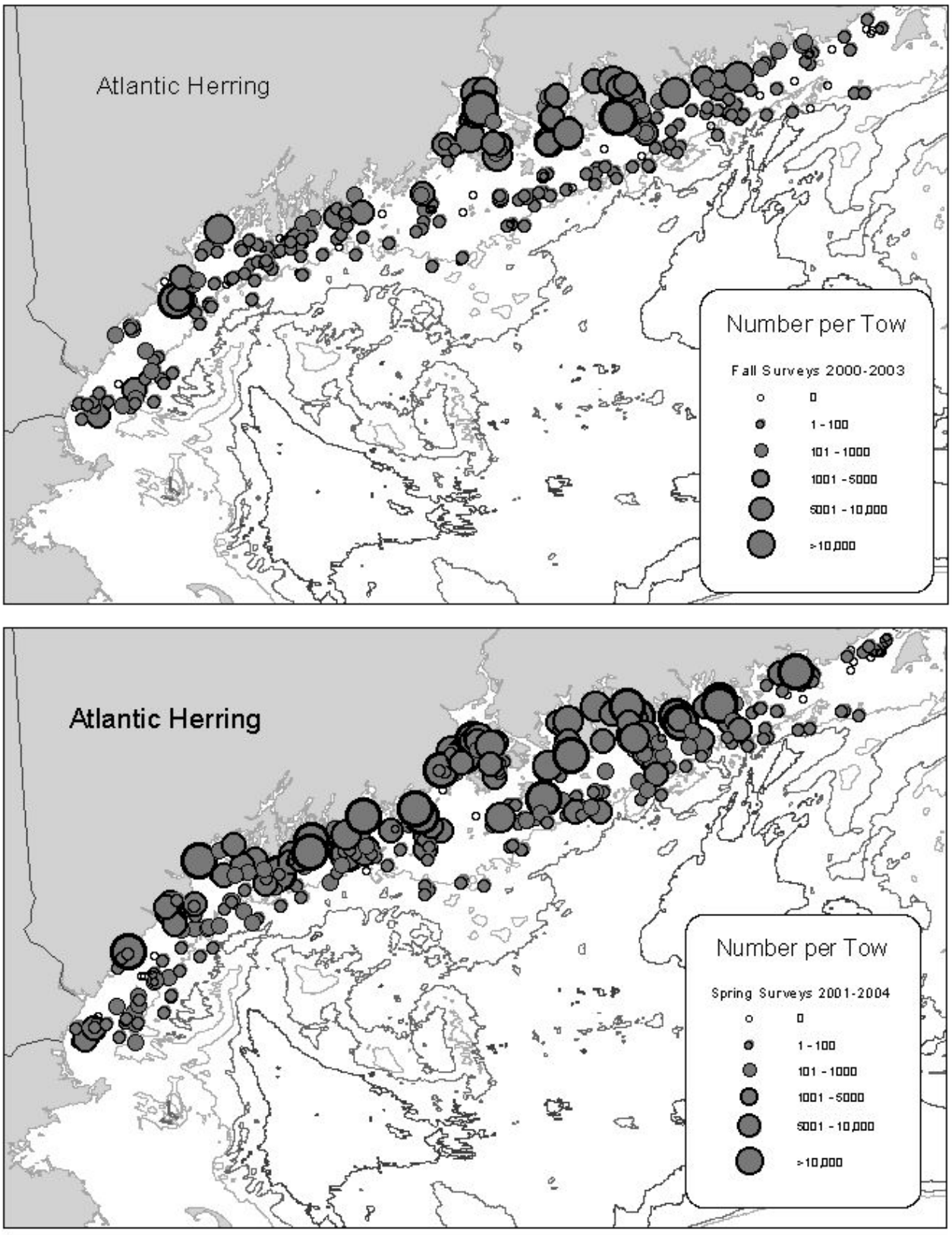
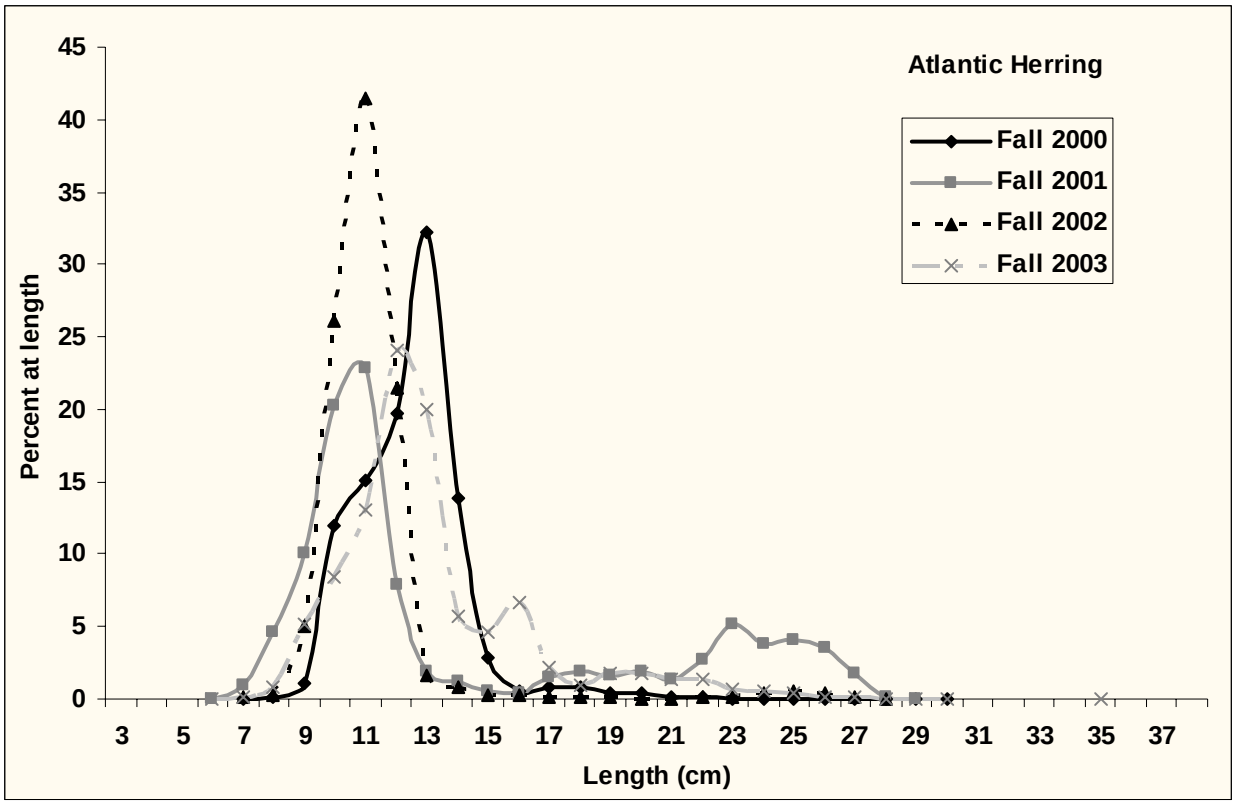


Figure 33. Fall and spring distributions of Atlantic herring.



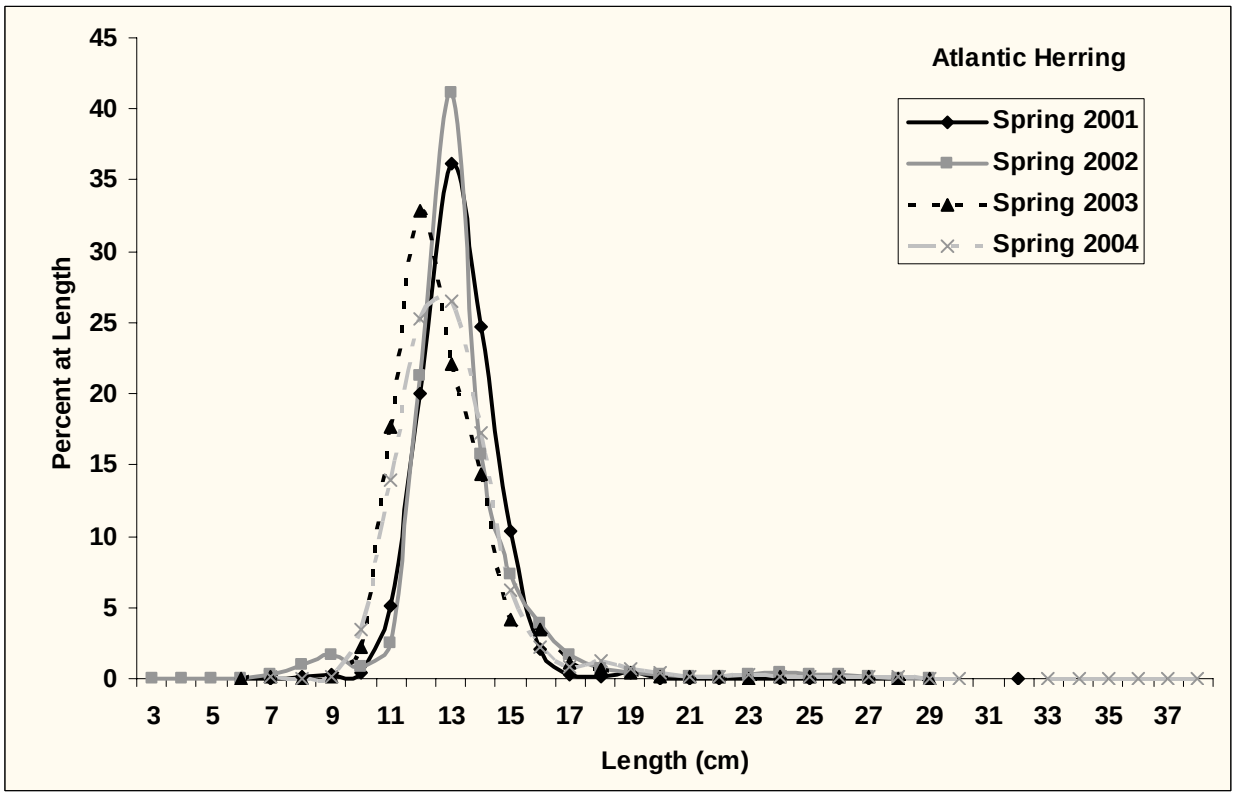
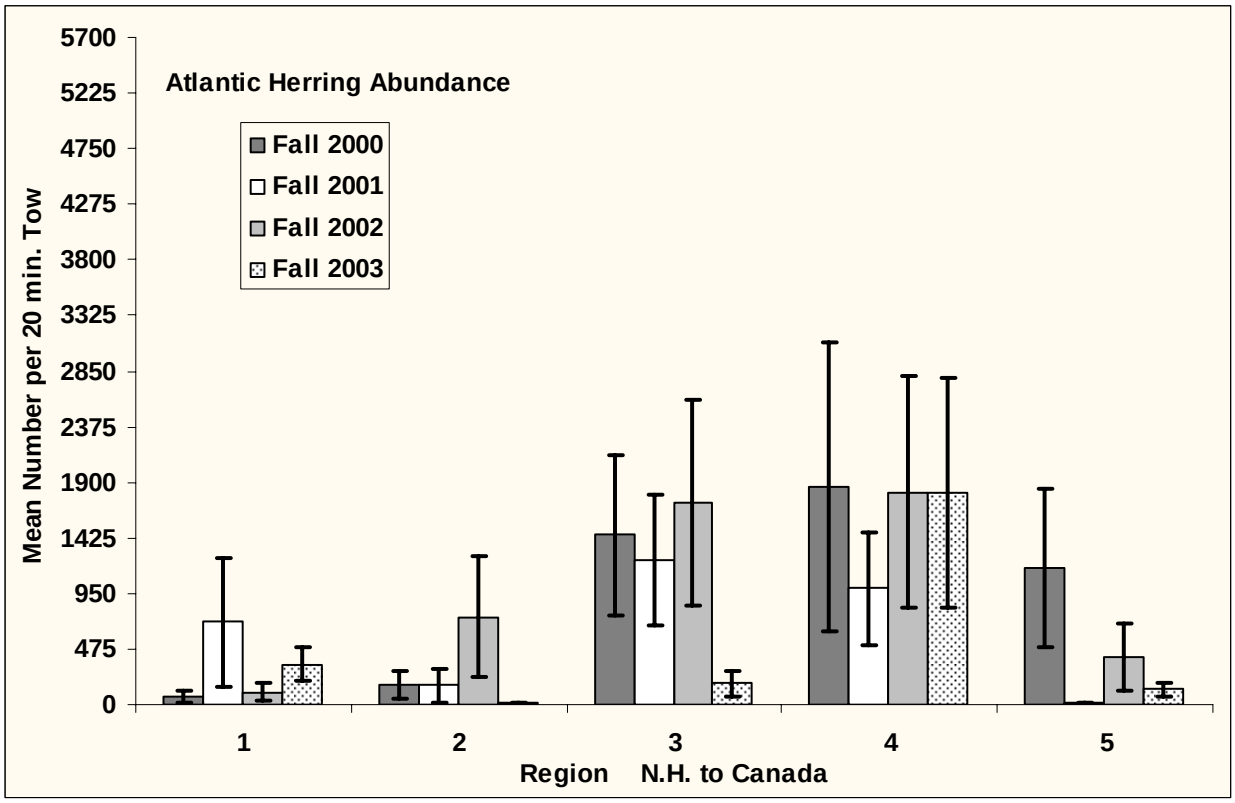


Figure 34. Length frequency plots for herring by season and year, all strata combined.



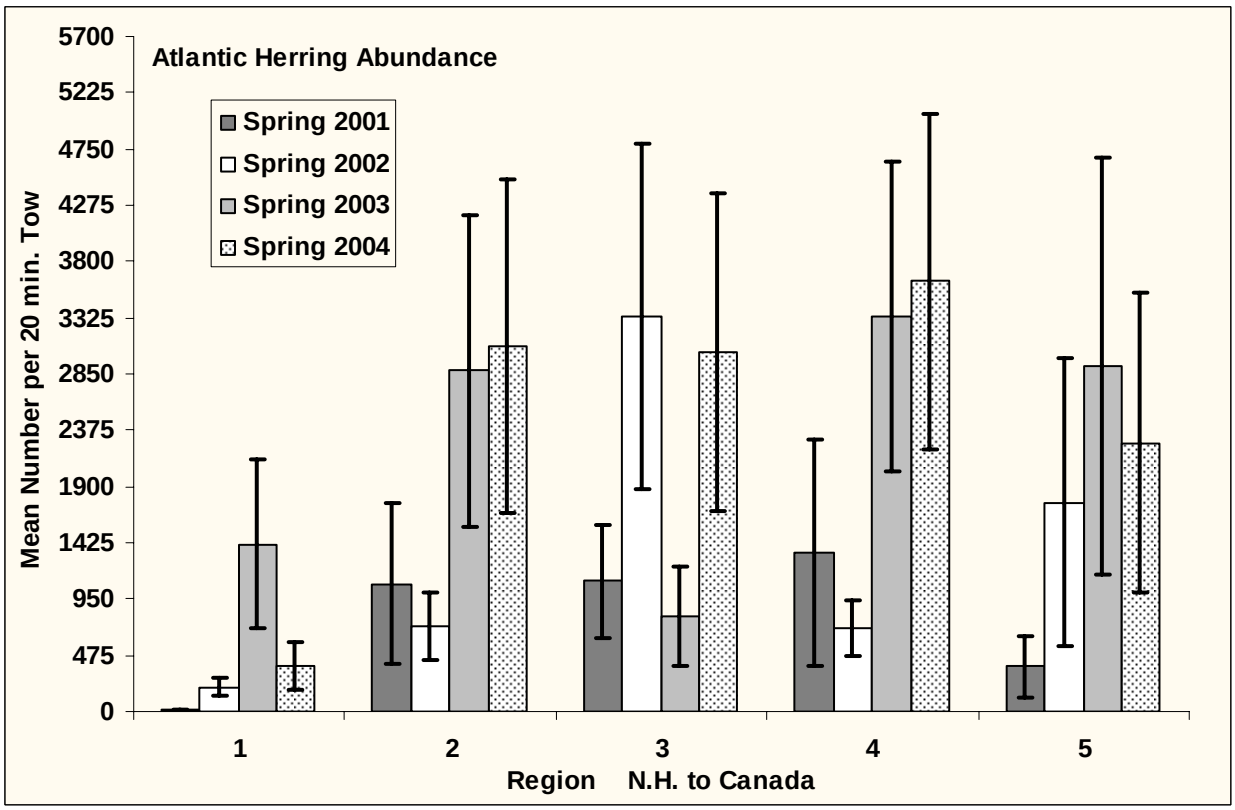
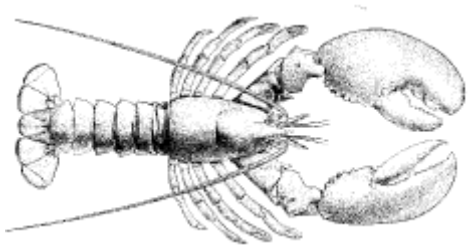
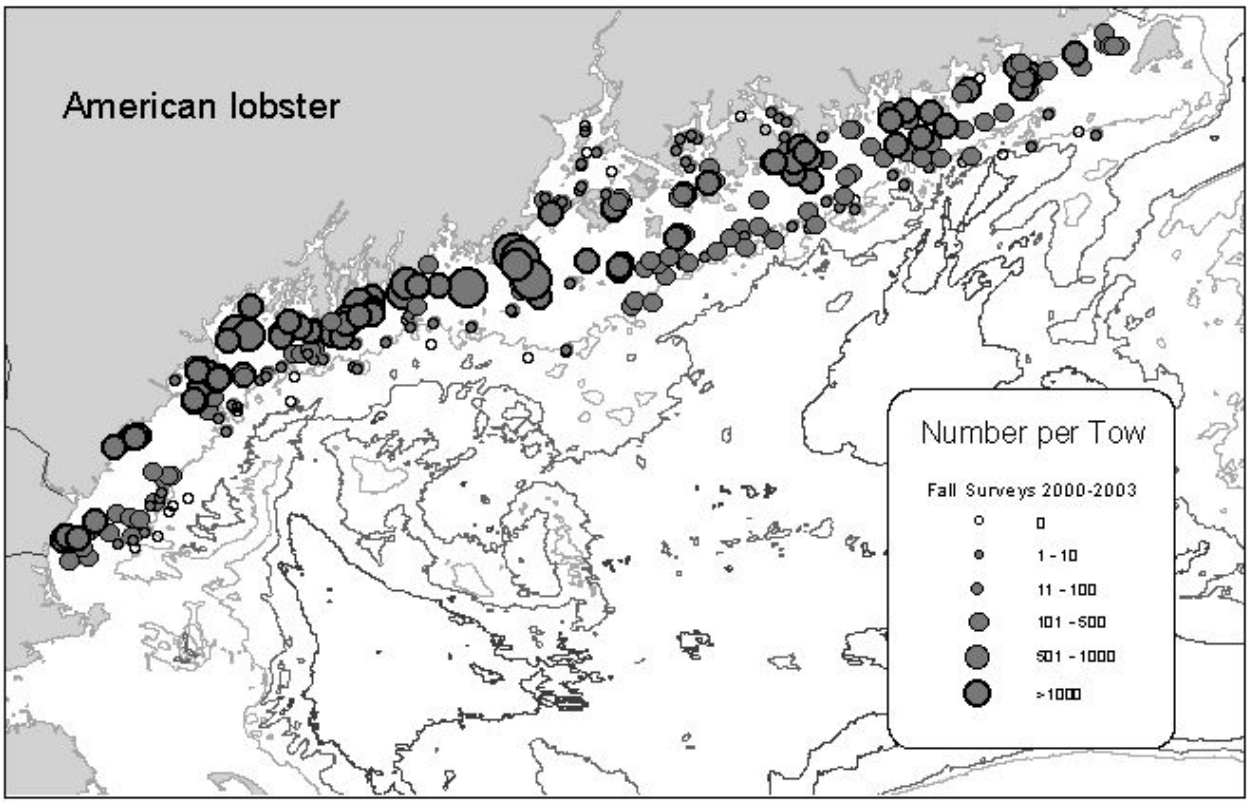


Figure 35. Regional CPUE for herring by season and year.



American Lobster (*Homarus americanus*)



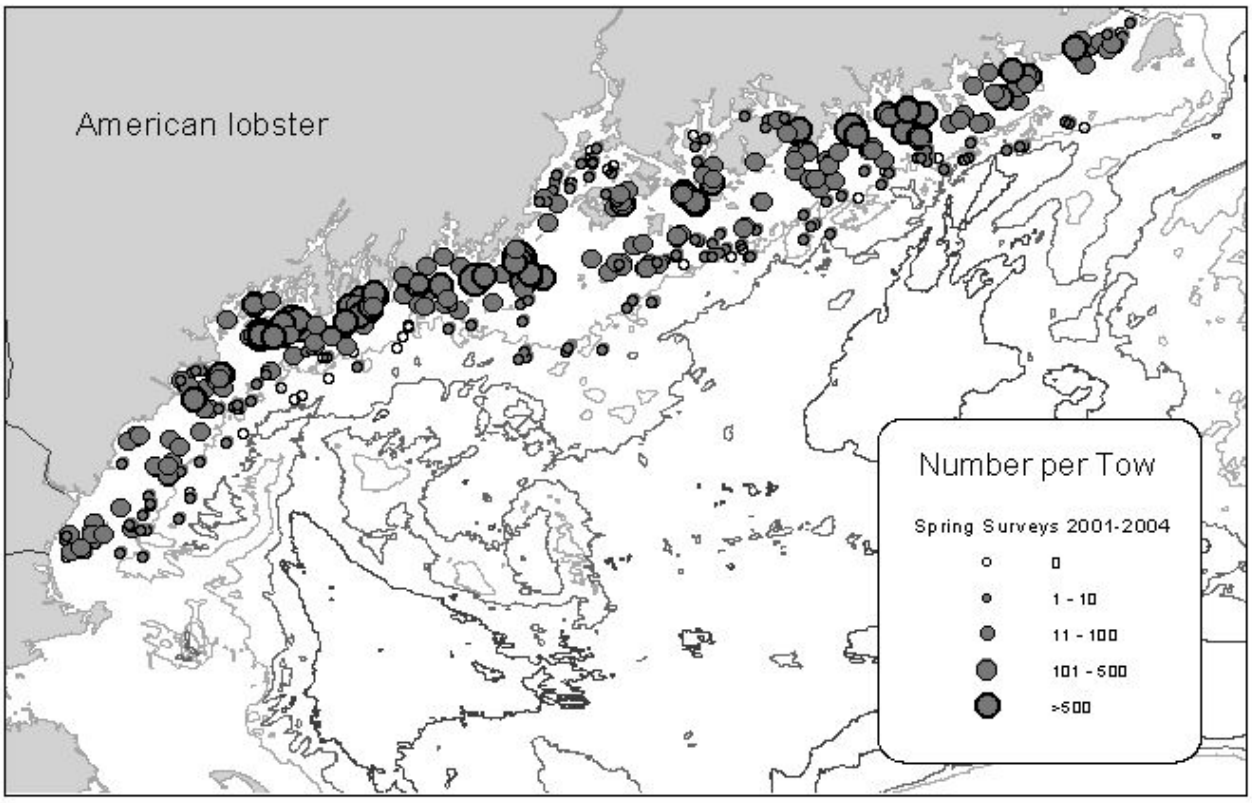
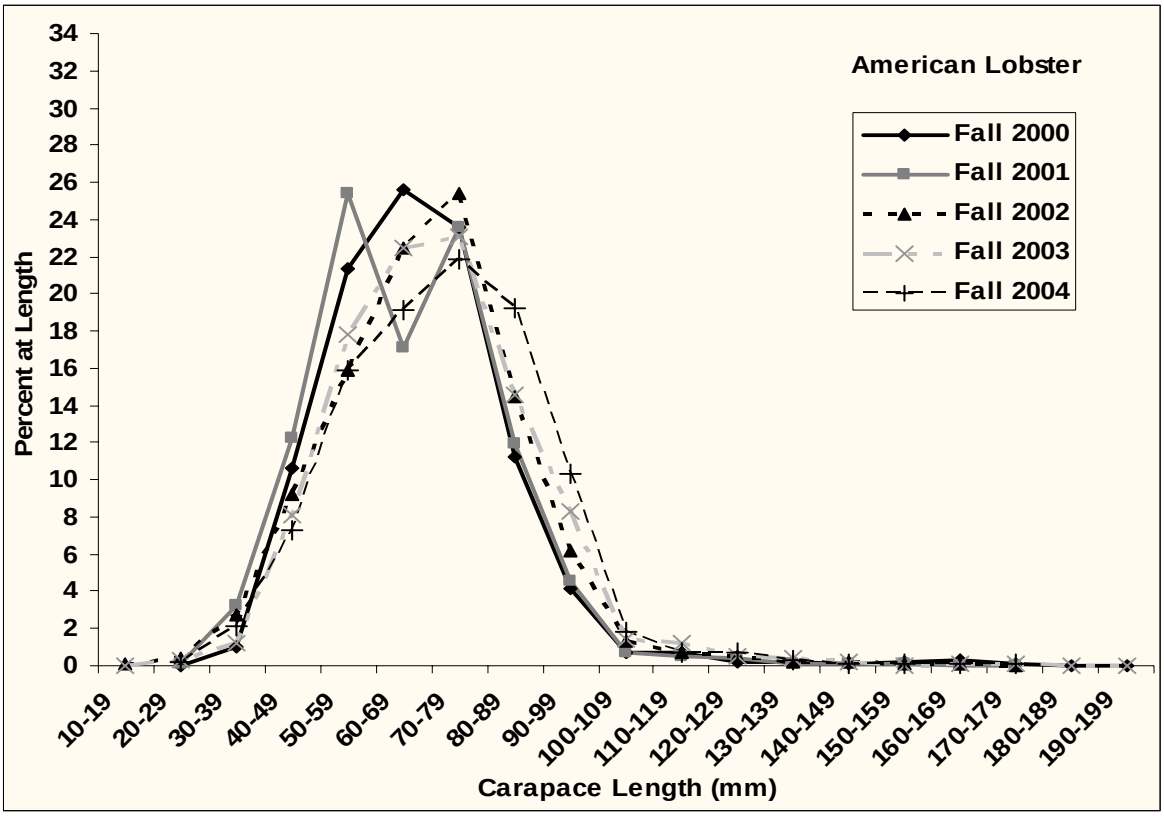


Figure 36. Fall and spring distributions of American lobster.



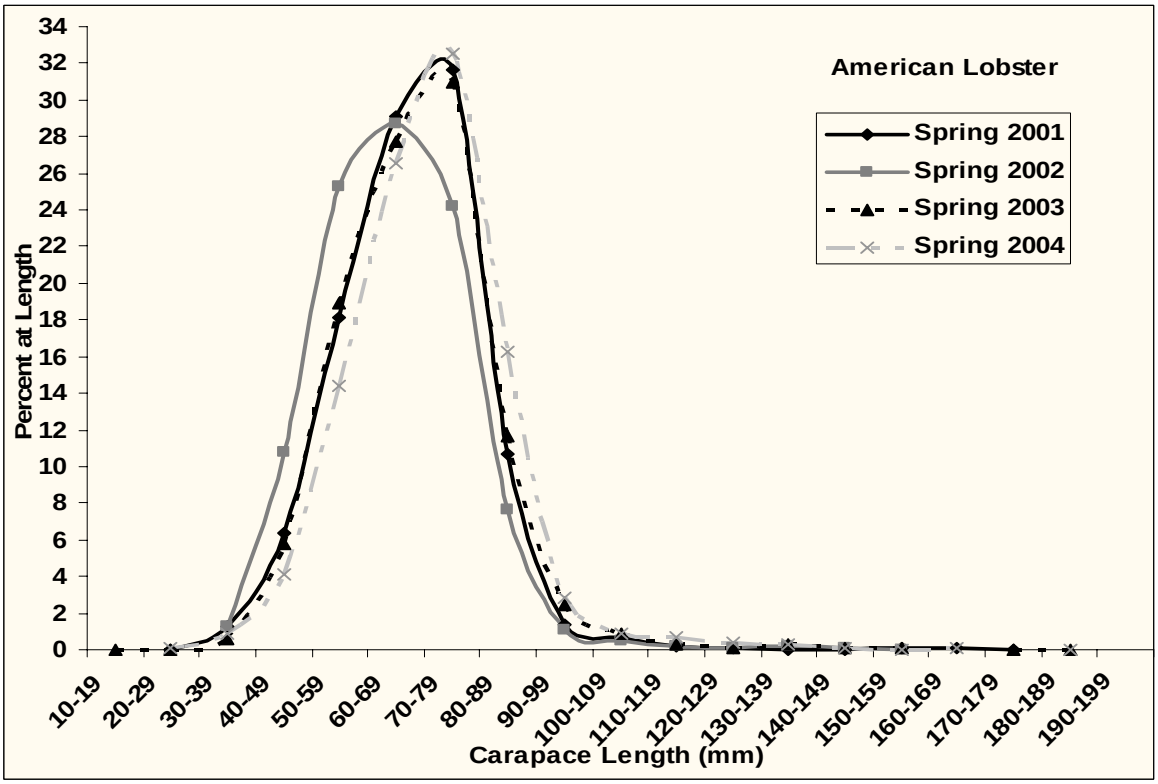


Figure 37. Seasonal length frequency plots for lobster, binned in 10 mm increments, by year, all strata combined.

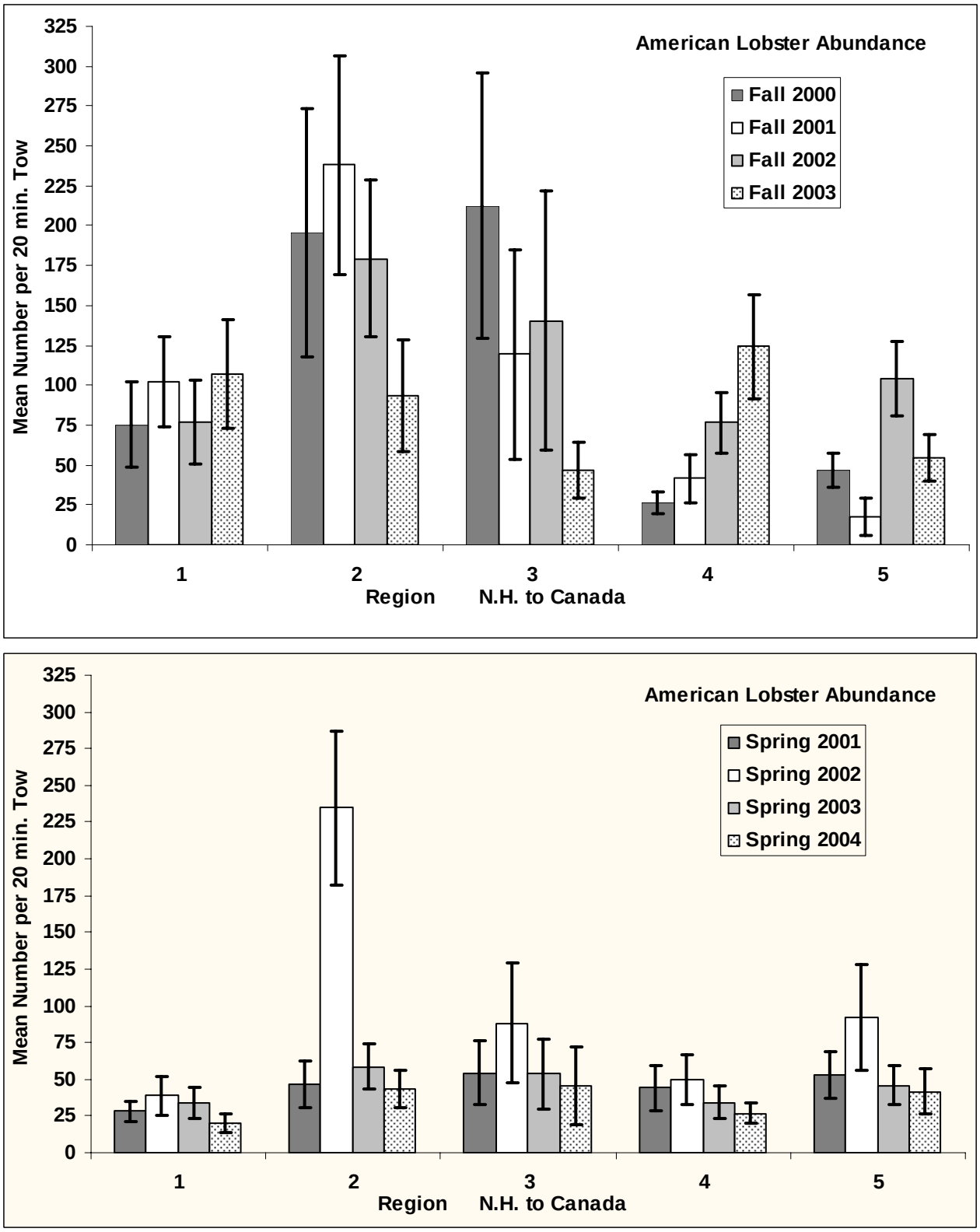


Figure 38. Regional CPUE for lobster by season and year.

CONCLUSIONS

After four 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 eight 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.

Consistent data collection is paramount in the assumptions of survey data analysis. The acquisition of the NetMind™ Trawl Monitoring System has made data qualification easier. The ability to certify that each tow's performance is consistent with the quality of previous tows helps ascertain the uniformity of each tow's collected data. With the net mensuration equipment, tows can be aborted and repeated more quickly. Previously, the decision to repeat the tow was made by assessing the condition of the net, discovering possible interaction with fixed gear, and by examining the catch at the end of each tow. Now problems can be seen in the output of the NetMind™ system and the tow can be aborted earlier on and repeated.

This is the fourth 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 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.

Examples of uses of the data to date are:

- Inshore trawl survey data are a key component of the new American lobster stock assessment model.
- Monkfish assessment
- Herring assessment
- Winter flounder; data provided for use in developing Amendment I to the fishery management plan.
- American shad assessment
- Northern shrimp, data used in the determination of fishing season
- Sea Scallop, data used in designing a species specific survey
- Jonah Crab, data used in the design of a video resource assessment project
- Atlantic Sturgeon

Furthermore, various scientists and managers have expressed interest in data collected on several other species such as sturgeon, cod and alewives, and the survey can provide valuable information for assessment of essential fish habitat and marine protected areas.

REFERENCES

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 W	LORAN X	LAT deg/min	LON deg/min	Start Time	Tow Duration	Average Depth (FA)	Temp C °	Salinity ppt
Fall 03											
10/13/03	1	FL03__1	13752.3	25965.6	42 56.34	70 44.70	0827	18	14.1	13.7	31.7
			13758.8	25965.7	42 55.77	70 45.38			13.3		
10/13/03	1	FL03__2	13739.4	25947.5	42 55.67	70 42.41	1018	16	22.7	8.8	32.6
			13733.6	25946.1	42 56.01	70 41.84			23.6		
10/13/03	1	FL03__3	13677.4	25988.1	42 55.30	70 32.59	1204	20	45.4	6.8	32.6
			13685.2	25888.1	42 54.96	70 33.45			44.1		
10/13/03	1	FL03__4	13641.8	25878.9	42 57.31	70 28.78	1416	21	52.6	6.3	32.8
			13634.5	25872.8	42 57.34	70 27.71			56.0		
10/13/03	1	FL03__5	13613.7	25845.4	42 56.43	70 23.61	1607	20	67.0	5.9	32.8
			13618.5	25852.4	42 56.70	70 24.58			65.0		
10/13/03	1	FL03__6	13648.7	25873.0	42 56.23	70 28.90	1728	20	56.3	6.5	32.7
			13656.2	25876.8	42 55.98	70 29.83			53.4		
10/14/03	1	FL03__7	13564.7	25864.7	43 02.43	70 20.92	0827	20	65.5	NA	NA
			13572.6	25869.3	43 01.82	70 22.00			64.3		
10/14/03	1	FL03__8	13530.1	25867.2	43 04.89	70 18.17	1018	22	77.7	NA	NA
			13524.0	25870.8	43 05.62	70 18.01			74.9		
10/14/03	1	FL03__9	13567.2	25902.5	43 05.34	70 24.41	1208	20	48.7	NA	NA
			13559.7	25902.0	43 05.86	70 23.75			50.0		
10/16/03	1	FL03_10	13346.6	25921.3	43 23.69	70 07.23	1127	20	59.5	7.8	33.0
			13341.0	25926.9	43 24.42	70 07.55			54.0		
10/16/03	1	FL03_11	13398.7	25909.2	43 18.70	70 10.57	1426	20	62.3	6.4	33.0
			13391.0	25909.2	43 19.25	70 09.91			61.4		
10/17/03	1	FL03_12	13573.3	26014.7	43 15.41	70 34.58	0816	20	9.7	10.1	31.6
			13566.3	26016.6	43 16.13	70 34.20			8.0		
10/17/03	1	FL03_13	13531.3	26000.7	43 17.36	70 30.01	0959	17	18.4	9.6	32.7
			13526.2	26001.5	43 17.85	70 29.65			17.7		
10/17/03	1	FL03_14	13395.4	25976.3	43 25.43	70 16.63	1302	15	36.7	8.8	32.9
			13395.9	25981.0	43 25.84	70 17.10			33.6		
10/17/03	1	FL03_15	13349.0	26007.0	43 31.83	70 15.82	1524	16	14.3	9.9	33.0
			13355.6	26010.8	43 31.77	70 16.64			13.6		
10/17/03	1	FL03_16	13328.9	25980.4	43 30.77	70 11.49	1640	20	33.7	9.2	33.0
			13336.4	25979.8	43 30.18	70 12.06			34.5		
10/20/03	2	FL03_17	13263.5	25879.9	43 25.58	69 55.84	0752	20	83.8	5.5	33.4
			13270.6	25879.0	43 25.00	69 56.37			84.4		
10/20/03	2	FL03_18	13224.6	25906.4	43 30.98	69 55.10	1020	16	61.0	7.1	33.1
			13219.9	25903.0	43 30.97	69 54.34			60.0		
10/20/03	2	FL03_19	13256.6	25936.7	43 31.81	70 01.02	1517	20	53.8	7.6	33.0
			13264.7	25934.8	43 30.96	70 01.51			52.0		
10/20/03	2	FL03_20	13302.3	25952.2	43 29.94	70 06.47	1729	15	49.0	8.0	33.0
			13300.4	25957.6	43 30.60	70 06.83			43.8		
10/21/03	2	FL03_21	13270.5	26014.9	43 38.48	70 10.09	0747	16	15.1	10.2	32.7
			13265.2	26015.9	43 38.97	70 09.76			15.6		
10/22/03	2	FL03_22	13229.6	25929.3	43 32.89	69 57.89	0724	20	59.1	7.2	33.0
			13228.8	25935.6	43 33.56	69 58.45			58.8		
10/22/03	2	FL03_23	13171.0	25913.6	43 35.47	69 51.14	0945	16	49.1	7.8	33.0

Appendix A
Individual Station Descriptions

DATE	REGION	TOWID	LORAN W	LORAN X	LAT deg/min	LON deg/min	Start Time	Tow Duration	Average Depth (FA)	Temp C °	Salinity ppt
			13175.6	25910.6	43 34.86	69 51.22			46.8		
10/22/03	2	FL03_24	13166.8	25922.4	43 36.65	69 51.71	1132	20	42.0	7.9	33.0
			13175.3	25922.5	43 36.07	69 52.44			45.0		
10/22/03	2	FL03_25	13159.5	25975.9	43 42.50	69 56.78	1541	17	17.8	9.8	32.8
			13156.9	25971.7	43 42.35	69 56.13			17.8		
10/23/03	2	FL03_26	13042.2	25907.4	43 43.75	69 38.96	0919	16	38.3	9.4	32.8
			13037.9	25909.2	43 44.24	69 38.79			37.1		
10/23/03	2	FL03_27	13098.7	25939.8	43 43.18	69 47.63	1349	20	6.9	10.1	31.6
			13105.2	25937.5	43 42.52	69 47.93			10.0		
10/23/03	2	FL03_28	13063.3	25913.4	43 42.93	69 41.54	1631	20	35.3	9.8	32.8
			13059.9	25918.6	43 43.70	69 41.83			32.5		
10/24/03	2	FL03_29	13012.8	25860.5	43 40.86	69 30.84	0854	20	68.4	7.7	33.2
			13006.6	25864.1	43 41.64	69 30.69			64.8		
10/24/03	2	FL03_30	13003.0	25830.8	43 38.42	69 26.39	1112	20	83.3	6.4	33.3
			13003.8	25825.1	43 37.77	69 25.78			83.9		
10/24/03	2	FL03_31	12939.3	25902.7	43 50.23	69 29.10	1421	20	34.2	9.4	32.9
			12945.2	25899.4	43 49.50	69 29.23			37.6		
10/30/03	3	FL03_32	12643.1	25899.8	44 09.57	69 01.15	0707	15	27.1	11.1	32.2
			12647.2	25897.1	44 09.00	69 01.15			28.4		
10/30/03	3	FL03_33	12637.7	25882.2	44 07.96	68 58.12	1327	18	37.7	10.7	32.2
			12629.4	25882.7	44 08.55	68 57.40			36.3		
10/31/03	3	FL03_34	12583.4	25842.3	44 06.99	68 46.83	0657	20	12.7	11.1	31.6
			12586.2	25838.2	44 06.36	68 46.49			13.1		
10/31/03	3	FL03_35	12569.4	25845.8	44 08.29	68 45.94	0825	18	31.3	10.9	32.1
			12569.3	25841.9	44 07.87	68 45.35			34.2		
10/31/03	3	FL03_36	12567.1	25856.6	44 09.66	68 47.37	1302	17	10.7	11.4	31.0
			12565.6	25860.7	44 10.22	68 47.82			8.1		
11/1/03	3	FL03_37	12839.4	25722.5	43 37.30	68 56.01	1018	20	71.5	9.0	33.6
			12845.9	25720.2	43 36.63	68 56.41			69.7		
11/1/03	3	FL03_38	12901.1	25738.4	43 35.13	69 04.69	1303	20	74.1	7.6	33.5
			12908.1	25740.4	43 34.93	69 05.68			76.4		
11/2/03	3	FL03_39	12659.8	25780.0	43 55.07	68 45.28	0658	20	53.6	10.2	33.2
			12665.7	25776.7	43 54.32	68 45.38			47.5		
11/2/03	3	FL03_40	12683.3	25718.9	43 46.61	68 38.48	0927	20	64.8	9.4	32.8
			12691.2	25718.6	43 46.09	68 39.32			62.1		
11/2/03	3	FL03_41	12641.3	25759.2	43 53.85	68 40.12	1134	20	50.4	9.9	33.5
			12647.8	25756.1	43 53.11	68 40.34			50.9		
11/2/03	3	FL03_42	12626.2	25755.3	43 54.34	68 37.88	1316	20	50.4	9.9	33.5
			12619.2	25756.2	43 54.90	68 37.27			45.5		
11/2/03	3	FL03_43	12626.0	25759.9	43 54.91	68 38.58	1435	20	52.2	9.8	33.5
			12622.5	25764.3	43 55.61	68 38.87			52.0		
11/3/03	4	FL03_44	12483.7	25812.7	44 09.85	68 32.07	0801	16	15.0	10.8	32.6
			12491.8	25811.7	44 09.40	68 32.52			13.0		
11/3/03	4	FL03_45	12553.1	25772.0	44 00.90	68 32.61	1124	15	40.0	10.2	33.2
			12559.0	25771.9	44 00.52	68 33.22			42.0		
11/3/03	4	FL03_46	12591.5	25738.3	43 54.88	68 31.35	1327	20	53.0	10.1	33.3
			12583.0	25740.5	43 55.29	68 30.88			51.0		
11/3/03	4	FL03_47	12600.2	25752.4	43 55.67	68 34.59	1511	20	48.0	10.0	33.4

Appendix A
Individual Station Descriptions

DATE	REGION	TOWID	LORAN W	LORAN X	LAT deg/min	LON deg/min	Start Time	Tow Duration	Average Depth (FA)	Temp C °	Salinity ppt
			12596.4	25756.7	43 56.39	68 34.86			47.0		
11/4/03	4	FL03_48	12501.9	25722.8	43 58.35	68 18.60	0829	20	57.0	9.6	33.6
			12511.4	25722.1	43 57.67	68 19.58			56.0		
11/5/03	4	FL03_49	12425.9	25841.9	44 17.10	68 30.62	0823	20	16.0	11.0	32.4
			12423.2	25846.3	44 17.77	68 31.07			17.0		
11/5/03	4	FL03_50	12391.2	25871.2	44 22.72	68 31.99	1016	20	15.0	11.2	32.2
			12397.0	25868.4	44 22.03	68 32.10			16.0		
11/5/03	4	FL03_51	12375.6	25866.1	44 23.15	68 29.53	1132	20	14.0	10.9	32.2
			12378.8	25861.8	44 22.46	68 29.12			13.0		
11/5/03	4	FL03_52	12437.3	25808.0	44 12.45	68 26.10	1406	16	14.0	10.7	32.4
			12431.2	25807.8	44 12.80	68 25.40			15.0		
11/6/03	4	FL03_53	12329.9	25753.0	44 12.81	68 04.06	0757	15	43.0	10.3	33.1
			12330.4	25756.5	44 13.21	68 04.78			40.0		
11/6/03	4	FL03_54	12340.4	25766.9	44 13.81	68 07.92	1019	20	37.0	10.4	33.0
			12335.0	25770.0	44 14.52	68 07.89			36.0		
11/6/03	4	FL03_55	12393.5	25709.3	44 03.51	68 03.30	1246	20	64.0	9.9	33.4
			12400.6	25708.3	44 02.95	68 03.96			66.0		
11/6/03	4	FL03_56	12328.6	25708.0	44 07.44	67 55.06	1510	20	55.0	9.6	33.7
			12328.0	25704.1	44 07.00	67 54.22			55.0		
11/6/03	4	FL03_57	12323.0	25722.9	44 09.63	67 57.37	1632	16	47.0	10.1	33.2
			12328.6	25723.0	44 09.28	67 58.06			45.0		
11/7/03	4	FL03_58	12322.2	25777.2	44 16.20	68 07.78	0700	20	35.0	9.8	32.4
			12316.4	25780.5	44 16.96	68 07.73			36.0		
11/7/03	4	FL03_59	12296.3	25774.6	44 17.55	68 04.32	0852	20	35.0	8.4	32.4
			12303.4	25775.1	44 17.16	68 05.22			37.0		
11/7/03	4	FL03_60	12290.1	25783.0	44 18.97	68 05.20	1045	20	32.0	10.4	32.8
			12286.3	25786.6	44 19.63	68 05.44			30.0		
11/7/03	4	FL03_61	12336.0	25791.8	44 17.05	68 12.07	1257	18	22.0	10.3	32.8
			12335.5	25787.8	44 16.62	68 11.31			27.0		
11/10/03	5	FL03_62	12292.8	25733.9	44 13.50	67 56.86	0847	19	40.4	9.9	33.2
			12290.9	25742.4	44 14.03	67 57.35			33.0		
11/10/03	5	FL03_63	12245.3	25704.1	44 12.29	67 43.72	1115	20	70.4	9.3	33.8
			12245.6	25708.2	44 12.76	67 44.62			66.3		
11/11/03	5	FL03_64	12163.8	25767.4	44 25.33	67 47.01	0855	17	22.7	NA	NA
			12160.2	25770.2	44 25.91	67 47.16			22.2		
11/11/03	5	FL03_65	12158.7	25739.9	44 22.34	67 40.38	1138	20	34.0	9.8	33.3
			12152.1	25740.7	44 22.86	67 39.73			32.2		
11/11/03	5	FL03_66	12116.8	25737.4	44 24.82	67 34.41	1338	17	35.8	9.8	33.2
			12122.3	25738.0	44 24.52	67 35.25			36.4		
11/12/03	5	FL03_67	12186.6	25719.9	44 18.05	67 39.56	0732	20	48.6	9.7	33.3
			12191.9	25721.2	44 17.87	67 40.53			44.6		
11/12/03	5	FL03_68	12148.2	25699.1	44 17.99	67 29.74	0928	20	60.8	9.5	33.5
			12154.9	25698.9	44 17.53	67 30.57			61.3		
11/12/03	5	FL03_69	12115.3	25688.2	44 18.79	67 22.57	1227	20	99.1	8.4	34.4
			12108.9	25688.3	44 19.23	67 21.69			94.2		
11/12/03	5	FL03_70	12086.0	25682.7	44 20.07	67 17.04	1416	20	80.6	8.6	34.1
			12080.2	25682.7	44 20.46	67 16.19			79.9		
11/17/03	5	FL03_71	11859.0	25734.9	44 42.62	66 57.32	1023	20	55.6	9.4	32.9

Appendix A
Individual Station Descriptions

DATE	REGION	TOWID	LORAN W	LORAN X	LAT deg/min	LON deg/min	Start Time	Tow Duration	Average Depth (FA)	Temp C °	Salinity ppt
			11865.5	25733.2	44 41.95	66 57.83			52.9		
11/17/03	5	FL03_72	11871.6	25736.6	44 41.89	66 59.71	1142	20	43.3	9.4	33.0
			11864.6	25737.5	44 42.51	66 58.94			44.0		
11/17/03	5	FL03_73	11877.6	25733.8	44 41.11	66 59.83	1250	20	44.4	9.4	32.9
			11869.6	25733.3	44 41.87	66 59.08			46.0		
11/17/03	5	FL03_74	11911.7	25744.2	44 39.86	67 07.84	1500	18	43.2	9.4	33.0
			11906.9	25745.6	44 40.43	67 07.37			40.4		
11/18/03	5	FL03_75	11978.0	25745.5	44 35.20	67 17.65	0759	18	30.2	9.2	33.0
			11983.6	25745.7	44 34.92	67 18.46			28.4		
11/18/03	5	FL03_76	11960.7	25760.4	44 38.30	67 19.06	0909	20	9.1	7.8	31.6
			11967.4	25758.9	44 37.66	67 19.59			10.4		
11/18/03	5	FL03_77	12004.7	25765.9	44 35.88	67 26.38	1059	20	8.4	7.2	32.4
			12011.2	25765.8	44 35.43	67 27.19			8.4		
11/18/03	5	FL03_78	12059.1	25755.6	44 30.90	67 31.26	1322	20	16.4	8.2	32.6
			12058.1	25759.6	44 31.48	67 31.85			11.3		
Spring 2004											
5/3/04	1	SP04__1	13758.60	25964.90	42 55.60	70 45.27	0952	20	15.4	4.3	32.4
			13751.60	25965.20	42 56.19	70 44.75			16.4		
5/3/04	1	SP04__2	13708.10	25943.90	42 57.85	70 39.55	1119	18	22.2	3.1	32.4
			13714.30	25944.10	42 57.38	70 40.04			23.6		
5/3/04	1	SP04__3	13717.90	25935.70	42 56.33	70 39.66	1249	20	27.9	3.2	32.4
			13724.90	25936.00	42 55.77	70 40.27			28.2		
5/3/04	1	SP04__4	13693.00	25919.70	42 56.967	70 36.164	1518	20	31.6	3.0	32.5
			13700.80	25921.20	42 56.40	70 37.10			31.5		
5/4/04	1	SP04__5	13670.40	25843.00	42 51.78	70 28.28	0858	20	66.3	3.2	32.8
			13668.20	25848.90	42 52.456	70 28.604			62.1		
5/5/04	1	SP04__6	13647.60	25899.80	42 58.71	70 30.96	0746	20	46.6	2.9	32.6
			13640.80	25898.70	42 59.158	70 30.268			48.4		
5/5/04	1	SP04__7	13633.70	25873.80	42 57.424	70 27.616	0901	20	56.4	3.0	32.7
			13640.80	25879.00	42 57.35	70 28.641			53.6		
5/5/04	1	SP04__8	13594.20	25910.10	43 03.881	70 27.272	1038	20	47.0	2.9	32.6
			13592.30	25903.30	43 03.412	70 26.552			49.7		
5/5/04	1	SP04__9	13527.00	25868.90	43 05.248	70 18.009	1214	20	79.7	3.4	33.2
			13531.30	25864.10	43 04.471	70 17.953			79.6		
5/5/04	1	SP04_10	13531.70	25916.10	43 09.256	70 22.666	1359	20	50.3	2.9	32.5
			13539.80	25917.50	43 08.808	70 23.379			51.4		
5/5/04	1	SP04_11	13545.60	25943.80	43 10.907	70 26.127	1519	20	37.3	3.0	32.4
			13551.50	25941.10	43 10.131	70 26.38			34.4		
5/5/04	1	SP04_12	13523.00	25930.20	43 11.305	70 23.032	1638	13	45.7	2.9	32.5
			13527.70	25929.60	43 10.955	70 23.422			43.2		
5/6/04	1	SP04_13	13555.90	26004.30	43 15.76	70 32.22	0717	20	18.9	3.2	32.3
			13549.00	26006.00	43 16.45	70 31.83			18.5		
5/6/04	1	SP04_14	13536.00	26001.50	43 17.08	70 30.38	0808	20	19.4	3.2	32.3
			13527.70	26001.20	43 17.65	70 29.69			18.6		
5/6/04	1	SP04_15	13430.10	25932.50	43 18.566	70 15.372	1125	20	51.1	2.8	32.5
			13436.20	25937.60	43 18.59	70 16.36			42.5		

Appendix A
Individual Station Descriptions

DATE	REGION	TOWID	LORAN W	LORAN X	LAT deg/min	LON deg/min	Start Time	Tow Duration	Average Depth (FA)	Temp C °	Salinity ppt
5/6/04	1	SP04_16	13412.00	25894.50	43 16.25	70 10.26	1336	17	70.6	3.1	32.8
			13408.00	25889.90	43 16.08	70 09.48			71.1		
5/6/04	1	SP04_17	13343.60	25927.70	43 24.46	70 07.55	1607	22	60.4	2.8	32.5
			13344.50	25920.30	43 23.68	70 06.92			63.9		
5/6/04	1	SP04_18	13325.40	25915.20	43 24.58	70 04.84	1801	20	67.9	2.8	32.6
			13321.90	25920.20	43 25.31	70 04.94			61.9		
5/7/04	1	SP04_19	13401.60	25979.90	43 25.26	70 17.44	0916	20	31.7	2.9	32.4
			13393.70	25980.20	43 25.87	70 16.82			34.5		
5/7/04	1	SP04_20	13387.90	26018.20	43 30.01	70 19.94	1129	20	13.2	3.4	32.1
			13393.00	26014.50	43 29.24	70 20.00			14.2		
5/7/04	1	SP04_21	13355.40	26011.80	43 31.82	70 16.75	1302	20	13.5	3.3	32.2
			13348.70	26006.00	43 31.75	70 15.57			16.0		
5/7/04	1	SP04_22	13330.70	25980.30	43 30.54	70 11.60	1409	20	35.5	2.9	32.4
			13338.70	25980.20	43 29.96	70 12.23			35.9		
5/10/04	2	SP04_23	13189.70	26029.80	43 45.78	70 04.94	0818	19	8.3	6.3	31.7
			13194.50	26026.70	43 45.14	70 05.00			8.0		
5/10/04	2	SP04_24	13152.10	25919.90	43 47.51	70 00.83	0955	20	7.2	6.5	31.4
			13159.70	26019.10	43 46.88	70 01.32			7.3		
5/10/04	2	SP04_25	13228.00	25987.20	43 38.76	70 03.66	1307	21	30.1	3.4	32.1
			13220.50	25989.30	43 29.49	70 03.26			29.0		
5/10/04	2	SP04_26	13206.10	25974.10	43 39.02	70 00.43	1504	20	28.9	3.1	32.3
			13199.20	25973.50	43 39.43	69 59.82			27.9		
5/11/04	2	SP04_27	13256.90	25937.30	43 31.67	70 01.04	0813	20	55.0	2.8	32.4
			13264.10	25936.20	43 31.07	70 01.54			51.6		
5/11/04	2	SP04_28	13255.30	25907.50	43 28.83	69 57.86	0957	20	66.7	3.0	32.7
			13261.90	25904.90	43 28.12	69 58.17			68.1		
5/11/04	2	SP04_29	13261.10	25880.10	43 25.70	69 55.61	1122	20	88.8	3.4	32.1
			13268.90	25880.00	43 25.15	69 56.26			88.8		
5/11/04	2	SP04_30	13179.20	25869.70	43 30.38	69 47.13	1408	20	68.8	2.9	32.0
			13186.30	25873.60	43 30.30	69 48.15			70.9		
5/11/04	2	SP04_31	13131.00	25860.70	43 32.81	69 41.72	1555	20	67.7	2.7	32.5
			13130.80	25866.50	43 33.39	69 42.33			62.9		
5/12/04	2	SP04_32	13155.50	25901.20	43 35.23	69 48.40	0720	20	54.3	2.8	32.4
			13164.00	25901.50	43 34.66	69 49.20			60.3		
5/12/04	2	SP04_33	13167.30	25923.20	43 36.56	69 51.83	0912	19	44.8	2.9	31.7
			13177.10	25923.10	43 35.91	69 52.63			46.9		
5/12/04	2	SP04_34	13154.50	25929.90	43 38.19	69 51.34	1026	20	31.2	3.2	32.3
			13161.60	25928.70	43 37.55	69 51.88			36.1		
5/12/04	2	SP04_35	13121.40	25920.80	43 39.55	69 47.52	1148	20	19.2	3.5	32.2
			13129.90	25921.00	43 38.99	69 48.26			20.6		
5/12/04	2	SP04_36	13142.40	25943.30	43 40.716	69 52.092	1311	20	12.9	3.8	32.1
			13134.30	25946.00	43 41.26	69 51.35			12.2		
5/13/04	2	SP04_37	13007.90	25931.70	43 48.57	69 38.65	0739	20	17.8	3.7	32.1
			13012.70	25928.80	43 47.93	69 38.73			20.8		
5/13/04	2	SP04_38	13031.50	25916.50	43 45.33	69 38.99	0907	20	32.1	3.3	32.2
			13036.40	25912.40	43 44.60	69 38.95			35.7		
5/13/04	2	SP04_39	13082.00	25925.80	43 42.83	69 44.54	1107	20	16.1	3.8	32.1
			13088.10	25922.90	43 42.12	69 44.73			18.5		

Appendix A
Individual Station Descriptions

DATE	REGION	TOWID	LORAN W	LORAN X	LAT deg/min	LON deg/min	Start Time	Tow Duration	Average Depth (FA)	Temp C °	Salinity ppt
5/13/04	2	SP04_40	13006.80	25864.70	43 41.64	69 30.69	1412	20	65.0	2.8	32.4
			13012.30	25861.00	43 40.89	69 30.76			69.2		
5/14/04	2	SP04_41	12930.30	25849.60	43 45.16	69 21.64	0705	20	47.5	3.1	32.3
			12923.30	25852.00	43 45.86	69 21.27			46.5		
5/14/04	2	SP04_42	12924.50	25865.30	43 47.19	69 23.05	0821	20	44.1	3.0	32.3
			12931.30	25862.70	43 46.47	69 23.36			46.9		
5/14/04	2	SP04_43	12957.80	25878.50	43 46.36	69 27.79	1026	20	43.5	3.1	32.2
			12964.10	25875.70	43 45.66	69 28.02			45.4		
5/14/04	2	SP04_44	12938.50	25903.80	43 50.34	69 29.06	1158	20	33.8	3.2	32.0
			12944.90	25900.90	43 49.61	69 29.30			38.2		
5/14/04	2	SP04_45	12873.70	25911.10	43 55.48	69 24.04	1455	20	11.7	5.9	32.1
			12867.10	25913.30	43 56.15	69 23.71			13.4		
5/17/04	3	SP04_46	12874.50	25826.50	43 46.34	69 13.34	0855	20	48.0	3.4	32.2
			12873.90	25832.00	43 46.96	69 13.99			47.6		
5/17/04	3	SP04_47	12783.10	25830.50	43 52.69	69 04.94	1045	20	33.5	4.1	32.1
			12787.50	25826.30	43 51.99	69 04.80			34.5		
5/17/04	3	SP04_48	12777.50	25853.90	43 55.63	69 07.60	1303	20	19.3	5.5	31.7
			12786.10	25853.40	43 55.04	69 08.34			19.3		
5/17/04	3	SP04_49	12772.00	25809.90	43 57.77	69 09.22	1522	20	15.7	6.6	31.4
			12764.80	25867.80	43 58.01	69 08.24			16.0		
5/18/04	3	SP04_50	12657.90	25899.80	44 08.60	69 02.36	0737	20	22.3	3.9	31.7
			12649.10	25900.90	44 09.22	69 01.79			24.5		
5/19/04	3	SP04_51	12607.90	25890.30	44 10.75	68 56.33	0659	20	28.4	4.6	31.7
			12600.70	25892.00	44 11.40	68 55.84			28.1		
5/19/04	3	SP04_52	12530.60	25903.10	44 17.20	68 50.79	1020	20	16.4	5.0	31.5
			12535.30	25902.70	44 16.87	68 51.15			13.6		
5/19/04	3	SP04_53	12528.20	25887.60	44 15.61	68 48.14	1336	13	15.0	5.4	30.6
			12527.80	25884.60	44 15.31	68 47.65			15.7		
5/19/04	3	SP04_54	12565.70	25846.80	44 08.59	68 45.65	1540	20	27.9	5.9	31.5
			12569.70	25842.50	44 07.85	68 45.36			37.7		
5/19/04	3	SP04_55	12548.40	25855.30	44 10.65	68 45.25	1718	20	30.8	5.8	31.5
			12556.30	25852.70	44 09.86	68 45.61			30.9		
5/19/04	3	SP04_56	12565.60	25862.30	44 10.33	68 48.01	1831	20	8.2	6.6	30.7
			12566.70	25857.50	44 09.74	68 47.39			8.4		
5/20/04	3	SP04_57	12822.70	25802.50	43 47.08	69 05.10	0729	20	45.8	3.6	32.2
			12815.80	25804.80	43 47.79	69 04.71			44.2		
5/20/04	3	SP04_58	12851.80	25784.70	43 43.27	69 05.68	0940	20	53.2	3.1	32.3
			12859.50	25782.90	43 42.60	69 06.19			56.0		
5/20/04	3	SP04_59	12921.20	25737.40	43 33.72	69 06.59	1212	20	80.5	3.0	32.6
			12920.10	25743.00	43 34.37	69 07.16			74.7		
5/20/04	3	SP04_60	12841.20	25722.60	43 36.95	68 56.24	1500	19	72.2	2.8	32.5
			12849.30	25719.90	43 36.30	68 56.62			65.9		
5/21/04	3	SP04_61	12659.30	25779.60	43 55.05	68 45.21	0701	20	52.7	3.7	32.1
			12665.30	25776.20	43 54.30	68 45.33			47.5		
5/21/04	3	SP04_62	12624.40	25756.30	43 54.62	68 37.90	0957	20	52.4	3.2	32.1
			12616.60	25757.00	43 55.19	68 37.19			48.6		
5/21/04	3	SP04_63	12688.90	25718.90	43 46.30	68 39.17	1241	20	68.1	3.0	32.5
			12681.00	25718.70	43 46.75	68 38.31			70.0		

Appendix A
Individual Station Descriptions

DATE	REGION	TOWID	LORAN W	LORAN X	LAT deg/min	LON deg/min	Start Time	Tow Duration	Average Depth (FA)	Temp C°	Salinity ppt
5/21/04	3	SP04_64	12694.40	25731.10	43 47.34	68 41.70	1526	17	58.0	3.0	32.4
			12700.70	25731.50	43 46.99	68 42.42			56.4		
5/24/04	4	SP04_65	12485.20	25812.10	44 09.87	68 32.00	0802	20	15.4	6.9	31.7
			12492.90	25811.40	44 09.31	68 32.69			12.5		
5/24/04	4	SP04_66	12559.20	25772.00	44 00.55	68 33.32	1217	20	42.6	3.9	32.0
			12551.30	25772.00	44 01.04	68 32.52			40.6		
5/24/04	4	SP04_67	12588.90	25754.60	43 56.66	68 33.75	1353	20	49.7	3.3	32.0
			12581.60	25754.50	43 57.10	68 32.96			49.3		
5/24/04	4	SP04_68	12596.10	25737.10	43 54.17	68 31.73	1520	20	52.0	3.3	32.3
			12588.80	25738.40	43 54.77	68 31.15			55.2		
5/25/04	4	SP04_69	12539.20	25730.70	43 56.96	68 24.30	0928	20	54.7	3.5	32.3
			12546.40	25730.20	43 56.47	68 25.01			50.5		
5/25/04	4	SP04_70	12533.50	25721.10	43 56.19	68 21.97	1109	20	58.8	3.6	32.3
			12525.80	25721.00	43 56.65	68 21.09			58.3		
5/25/04	4	SP04_71	12506.20	25711.20	43 56.71	68 17.09	1409	20	56.8	3.6	32.4
			12499.60	25713.50	43 57.40	68 16.73			57.3		
5/25/04	4	SP04_72	12509.00	25723.40	43 58.00	68 19.54	1551	20	56.5	3.6	32.3
			12501.70	25722.60	43 58.34	68 18.61			57.8		
5/26/04	4	SP04_73	12405.20	25827.00	44 16.73	68 26.08	0648	20	28.4	6.8	31.8
			12408.00	25822.50	44 16.04	68 25.55			30.8		
5/26/04	4	SP04_74	12432.00	25824.00	44 14.60	68 28.42	0817	20	16.0	7.7	31.6
			12434.80	25819.31	44 13.91	68 27.80			11.3		
5/27/04	4	SP04_75	12430.40	25807.70	44 12.87	68 25.43	0751	20	15.8	6.9	31.8
			12438.10	25807.40	44 12.35	68 26.15			14.7		
5/27/04	4	SP04_76	12414.60	25761.80	44 08.47	68 15.55	1000	13	27.1	4.5	31.9
			12414.70	25758.80	44 08.14	68 15.07			27.0		
5/27/04	4	SP04_77	12327.90	25756.30	44 13.37	68 04.51	1158	20	39.2	3.9	32.0
			12326.90	25752.30	44 12.94	68 03.62			41.5		
5/27/04	4	SP04_78	12308.20	25740.70	44 12.73	67 59.14	1320	20	42.1	4.0	32.1
			12301.20	25740.60	44 13.17	67 58.26			42.0		
5/27/04	4	SP04_79	12354.50	25723.30	44 07.65	68 01.17	1442	20	52.9	3.9	32.3
			12347.10	25724.80	44 08.34	68 00.70			53.0		
5/27/04	4	SP04_80	12398.70	25709.20	44 03.13	68 03.84	1604	20	66.0	3.8	32.4
			12391.30	25709.40	44 03.61	68 02.99			59.4		
5/28/04	4	SP04_81	12286.70	25760.80	44 16.54	68 00.58	0749	20	37.0	4.0	31.9
			12293.00	25757.90	44 15.80	68 00.75			37.1		
5/28/04	4	SP04_82	12293.00	25785.30	44 19.07	68 06.02	0927	20	33.5	4.2	31.8
			12290.80	25781.60	44 18.79	68 05.08			32.3		
5/28/04	4	SP04_83	12309.80	25783.40	44 17.74	68 07.60	1152	20	34.5	4.3	31.8
			12316.50	25780.90	44 17.02	68 07.88			35.5		
5/28/04	4	SP04_84	12359.20	25801.10	44 16.66	68 16.46	1452	20	12.9	6.6	31.8
			12367.10	25800.90	44 16.15	68 17.30			10.0		
5/31/04	5	SP04_85	12269.00	25765.10	44 18.22	67 59.30	0733	20	34.6	4.0	31.8
			12261.70	25765.20	44 18.69	67 58.49			33.5		
5/31/04	5	SP04_86	12257.50	25735.30	44 15.34	67 51.92	0940	16	41.9	4.2	32.0
			12263.20	25735.00	44 14.94	67 52.53			41.6		
5/31/04	5	SP04_87	12214.10	25776.40	44 23.02	67 54.94	1121	20	21.1	5.4	31.7
			12218.10	25771.40	44 22.28	67 54.52			20.9		

Appendix A
Individual Station Descriptions

DATE	REGION	TOWID	LORAN W	LORAN X	LAT deg/min	LON deg/min	Start Time	Tow Duration	Average Depth (FA)	Temp C °	Salinity ppt
5/31/04	5	SP04_88	12221.40	25753.10	44 19.83	67 51.12	1350	20	30.6	4.3	31.7
			12227.30	25750.10	44 19.11	67 51.22			31.5		
6/1/04	5	SP04_89	12135.30	25765.00	44 27.09	67 43.30	0708	20	20.2	5.2	31.5
			12130.00	25769.80	44 27.90	67 43.47			20.3		
6/1/04	5	SP04_90	12153.30	25710.30	44 22.74	67 39.94	1325	20	32.2	4.6	31.6
			12160.60	25739.70	44 22.21	67 40.72			33.1		
6/1/04	5	SP04_91	12164.70	25724.70	44 20.08	67 37.91	1443	20	39.3	4.5	32.1
			12171.30	25724.60	44 19.64	67 38.73			39.6		
6/1/04	5	SP04_92	12192.30	25721.70	44 17.91	67 40.81	1603	20	45.4	4.6	32.2
			12186.80	25720.50	44 18.13	67 39.84			47.7		
6/2/04	5	SP04_93	12131.20	25711.20	44 20.64	67 30.33	0840	20	54.6	4.9	32.4
			12124.90	25711.10	44 21.05	67 29.46			55.7		
6/2/04	5	SP04_94	12155.50	25699.10	44 17.53	67 30.77	1020	20	59.8	5.4	32.9
			12149.00	25699.20	44 17.96	67 29.96			65.5		
6/2/04	5	SP04_95	12083.70	25686.90	44 20.65	67 17.57	1354	20	83.6	5.1	32.8
			12089.10	25688.00	44 20.44	67 18.60			81.6		
6/3/04	5	SP04_96	11864.70	25733.80	44 41.98	66 57.70	1012	20	55.1	4.3	31.5
			11858.30	25735.50	44 42.67	66 57.18			58.7		
6/3/04	5	SP04_97	11869.60	25737.20	44 42.04	66 59.42	1438	20	45.7	4.4	31.6
			11874.30	25735.20	44 41.55	66 59.87			43.5		
6/7/04	5	SP04_98	12085.40	25723.80	44 25.27	67 27.19	0849	20	42.3	5.0	32.0
			12092.10	25723.30	44 24.76	67 27.95			44.7		
6/7/04	5	SP04_99	11983.10	25746.10	44 35.02	67 18.68	1510	20	28.5	5.0	31.8
			11977.00	25746.10	44 35.47	67 17.82			28.0		
6/7/04	5	SP04100	11985.20	25738.50	44 33.96	67 17.05	1801	20	39.0	5.0	31.9
			11991.70	25738.70	44 33.54	67 17.99			33.1		
6/8/04	5	SP04101	11984.30	25757.60	44 36.34	67 21.76	0810	20	12.4	5.1	31.7
			11980.50	25755.50	44 36.35	67 20.69			17.9		
6/8/04	5	SP04102	11898.20	25748.80	44 41.44	67 07.28	1039	20	29.2	4.6	31.6
			11889.70	25749.70	44 42.16	67 06.32			31.9		
6/8/04	5	SP04103	11862.60	25745.90	44 43.73	67 01.15	1223	20	45.0	4.5	31.6
			11853.80	25747.50	44 44.45	66 59.97			45.5		

Appendix B
Survey Catch Index

	2000-2001		2001-2002		2002-2003		2003-2004	
Stratified Means	**Mean**	**SE**	**Mean**	**SE**	**Mean**	**SE**	**Mean**	**SE**
Selected Species	**Number**		**Number**		**Number**		**Number**	
Fall Surveys*								
Acadian Redfish	0.61	0.444	6.87	5.971	2.57	2.238	17.12	27.139
Alewife	224.83	156.067	144.61	125.274	367.11	220.359	184.13	90.870
Alligatorfish	0.31	0.419	0.33	0.290	1.73	1.946	0.07	0.064
American Lobster	113.35	45.800	115.58	46.639	127.28	52.589	89.71	16.995
American Plaice	22.35	13.972	21.91	4.989	14.51	6.124	45.86	11.917
Am. Sand Lance	0.06	0.129						0.000
American Shad	0.57	0.429	0.22	0.282	1.16	0.995	6.38	8.301
Atlantic Cod	4.03	4.283	3.31	1.541	0.93	0.496	3.93	1.509
Atlantic Halibut	0.16	0.146	0.22	0.200	0.16	0.093	0.16	0.088
Atlantic Herring	898.13	674.645	717.91	385.084	1132.48	739.003	439.70	356.051
Atlantic Mackerel	2.14	2.155	11.61	15.136	14.47	15.069	25.91	15.940
Atlantic Menhaden	17.14	13.940			43.47	33.869	11.40	5.815
Atlantic Silverside	4.73	3.111	0.19	0.240	1.38	0.655	3.29	2.951
Atlantic Sturgeon	0.05	0.126	0.14	0.346	0.13	0.247		
Blueback Herring					4.20	3.711	7.65	4.779
Butterfish	2.23	1.964	11.88	7.395	51.32	33.091	14.27	8.303
Cunner	0.20	0.254	0.10	0.140	1.22	2.502	1.32	1.303
Daubed Shanny			0.01	0.022				0.000
Fourbeard Rockling	0.34	0.229	1.50	0.851	1.09	0.527	1.96	0.706
Fourspot Flounder	0.23	0.153	0.52	0.273	0.09	0.082	0.21	0.186
Goosefish	4.73	1.370	12.61	2.894	3.73	1.865	3.66	1.079
Greenland Halibut			0.03	0.042	0.04	0.050	0.03	0.040
Haddock	3.90	2.896	6.06	4.635	0.35	0.295	6.34	4.723
Jonah Crab	1.77	0.888	14.97	3.881	5.99	4.003	5.53	1.662
Little Skate	2.44	2.288	1.90	0.869	2.90	3.394	0.87	0.400
Longfin Squid	4.59	2.570	0.28	0.181	24.12	9.216	2.16	1.527
Longhorn Sculpin	32.13	14.682	24.81	12.315	46.25	16.396	29.39	7.128
Lumpfish	0.04	0.053	0.14	0.130	0.16	0.142	0.51	0.433
Northern Shrimp	87.55	123.720	48.02	55.677	30.74	37.965	244.50	127.733
Ocean Pout	0.07	0.066	0.36	0.300	0.02	0.030	0.11	0.078
Ocean Quahog	0.32	0.633	0.28	0.566	1.20	3.304	0.06	0.087
Octopus unclass.	0.09	0.095			0.35	0.348	0.08	0.103
Pollock	2.19	2.699	0.32	0.169	4.90	7.639	0.69	0.439
Rainbow Smelt	51.10	58.466	63.70	53.521	31.99	50.992	31.33	13.937
Red Hake	26.19	7.661	36.69	10.995	19.20	6.499	28.15	4.747
Rock Crab	2.82	2.429	6.61	3.852	1.79	1.068	1.25	0.784
Scup	6.69	4.488			1.53	1.807	1.38	1.784
Sea Cucumber	0.81	0.802	3.55	8.443	2.81	5.352	0.16	0.327
Sea Raven	1.78	0.697	1.16	1.028	2.06	1.464	1.18	0.748
Sea Scallop	39.34	24.620	33.82	23.223	7.64	4.714	3.34	2.920
Sea Urchin	0.01	0.017	0.04	0.050	0.19	0.255	0.08	0.091
Shortfin Squid	1.25	1.565	15.33	6.512	0.95	0.477	2.50	0.930
Shorthorn Sculpin	0.30	0.268	0.09	0.188	0.41	0.523	0.05	0.044
Silver Hake	782.02	154.019	744.53	273.118	507.60	186.268	1066.49	172.909

Appendix B
Survey Catch Index

	2000-2001		2001-2002		2002-2003		2003-2004	
Stratified Means	**Mean**	**SE**	**Mean**	**SE**	**Mean**	**SE**	**Mean**	**SE**
Selected Species	**Number**		**Number**		**Number**		**Number**	
Smooth Skate	0.20	0.205	0.43	0.399	0.15	0.174	0.23	0.161
Snakeblenny			0.03	0.043	0.09	0.128	0.02	0.030
Spiny Dogfish	3.92	1.259	8.85	5.760	14.15	5.168	18.72	6.411
Thorny Skate	0.26	0.174	0.23	0.263	0.36	0.474	0.47	0.251
White Hake	12.66	2.480	18.93	5.644	23.26	4.678	32.05	5.416
Windowpane	4.15	1.465	2.22	1.242	13.12	5.551	8.01	2.729
Winter Flounder	37.05	7.424	31.73	9.640	33.02	13.829	32.35	10.225
Winter Skate	0.26	0.229	0.11	0.132	0.39	0.366	0.11	0.116
Witch Flounder	3.79	1.733	32.55	12.712	4.47	2.351	7.30	2.417
Wrymouth	0.15	0.193	0.45	0.310	0.06	0.061	1.11	1.265
Yellowtail Flounder	2.51	2.848	1.44	1.096	0.83	0.606	0.61	0.711
Spring Surveys*								
Acadian Redfish	1.83	1.312	1.65	0.793	6.93	6.03	2.57	2.00
Alewife	187.53	137.022	160.12	101.345	118.96	45.17	85.87	26.87
Alligatorfish	1.99	2.264	1.58	1.712	1.30	1.36	1.46	1.59
American Lobster	45.80	16.697	100.06	32.096	43.95	14.09	34.32	14.08
American Plaice	16.43	7.659	33.84	8.465	58.71	33.99	45.46	13.38
Am. Sand Lance	13.82	28.848	0.43	1.103	0.03	0.05	0.08	0.14
American Shad	1.00	0.763	2.82	1.284	1.51	0.61	0.48	0.24
Atlantic Cod	1.83	1.041	7.05	5.646	1.60	0.68	8.26	4.29
Atlantic Hagfish	0.03	0.052	0.01	0.029	0.02	0.03		
Atlantic Halibut	0.04	0.056	0.34	0.313	0.21	0.14	0.19	0.12
Atlantic Herring	776.18	621.223	1446.98	870.344	2179.91	942.52	2462.28	1111.65
Atlantic Mackerel			0.02	0.053	0.37	0.83		
Atlantic Silverside	0.01	0.026					0.01	0.02
Atlantic Sturgeon			0.02	0.058	0.02	0.03		
Blueback Herring	49.69	44.431	9.89	10.697	42.74	29.99	7.99	3.78
Butterfish	0.04	0.072	0.03	0.057				
Cunner	0.05	0.063	0.04	0.055	0.04	0.04	0.14	0.11
Cusk					0.01	0.02		
Daubed Shanny	0.60	0.375	0.08	0.075	0.04	0.04	0.43	0.31
Fourbeard Rockling	0.41	0.408	0.69	0.453	1.03	0.61	0.84	0.45
Fourspot Flounder	0.07	0.073	0.08	0.078	0.09	0.09	0.11	0.08
Goosefish	6.11	2.047	2.23	0.724	0.99	0.30	1.59	0.40
Greenland Halibut			0.02	0.043	0.09	0.07	0.04	0.05
Haddock	0.01	0.025	4.90	3.265	0.64	0.60	1.50	1.06
Jonah Crab	4.27	3.493	3.87	2.793	4.70	1.39	6.06	2.98
Little Skate	0.72	0.487	0.49	0.288	0.56	0.32	0.58	0.40
Longfin Squid	0.06	0.063	0.07	0.123	0.12	0.10	0.03	0.04
Longhorn Sculpin	51.15	13.795	53.78	20.127	47.11	11.13	74.43	16.84
Lumpfish	0.10	0.092	0.09	0.090	0.33	0.25	0.14	0.11
Northern Shrimp	142.87	112.402	152.70	150.515	549.88	140.48	676.61	202.78
Ocean Pout	0.48	0.378	0.41	0.432	0.30	0.18	0.63	0.34
Ocean Quahog	0.47	0.475			0.80	1.52	0.41	0.96

Appendix B
Survey Catch Index

	2000-2001		2001-2002		2002-2003		2003-2004	
Stratified Means	**Mean**	**SE**	**Mean**	**SE**	**Mean**	**SE**	**Mean**	**SE**
Selected Species	**Number**		**Number**		**Number**		**Number**	
Octopus unclass.	0.50	0.687			0.02	0.03	0.02	0.03
Pollock	0.38	0.300	1.18	0.773	0.76	0.86	1.54	0.90
Rainbow Smelt	8.78	15.092	0.76	0.653	1.08	0.83	6.75	10.36
Red Hake	5.30	2.300	10.34	3.062	9.09	2.43	6.54	3.72
Rock Crab	10.32	4.969	1.33	0.711	5.32	3.77	3.50	1.95
Sea Cucumber	8.41	17.639	3.76	6.457	1.87	2.20	17.11	27.33
Sea Raven	2.98	1.846	2.58	1.270	2.06	0.98	2.12	0.96
Sea Scallop	30.41	19.237	16.54	12.306	4.38	2.29	1.31	0.75
Sea Urchin	0.30	0.436	0.02	0.045	0.14	0.19	0.35	0.62
Shortfin Squid	0.02	0.041	0.20	0.179				
Shorthorn Sculpin	0.19	0.154	0.05	0.058	0.14	0.14	0.05	0.07
Silver Hake	95.39	29.349	267.77	275.927	439.51	167.23	167.33	93.32
Smooth Skate	0.22	0.196	0.22	0.573	0.07	0.06	0.52	0.46
Snakeblenny	0.55	0.501	0.28	0.249	0.69	0.44	1.16	0.69
Spiny Dogfish			0.10	0.125	0.15	0.22		
Thorny Skate	0.41	0.569	0.09	0.107	0.44	0.32	0.51	0.30
White Hake	1.01	0.557	2.14	1.020	1.82	0.78	3.00	0.98
Windowpane	5.82	3.598	2.82	1.161	7.46	2.69	4.10	1.24
Winter Flounder	30.41	8.837	24.47	9.074	18.60	5.93	40.28	11.59
Winter Skate	0.02	0.034	0.01	0.024	0.07	0.08	0.09	0.11
Witch Flounder	4.28	3.024	1.87	2.350	2.00	1.06	1.84	0.74
Wrymouth	0.17	0.191	0.11	0.111	0.99	0.83	0.46	0.34
Yellowtail Flounder	2.64	3.967	3.21	1.654	1.85	0.82	1.72	0.78

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

Gadids

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

Other Benthics

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

Appendix C
Taxa List

American sand lance	*Ammodytes americanus*
Atlantic silverside	*Menidia menidia*
Three-spine stickleback	*Gasterosteus aculeatus*
Black sea bass	*Centropristis striata*
Atlantic tomcod	*Microgadus tomcod*
Cunner	*Tautogolabrus adspersus*
Grubby	*Myoxocephalus aenaeus*
Slender snipe eel	*Nemichthys scolopaceus*
Striped seasnail	*Liparis liparis*
Seasnail	*Liparis atlanticus*
Gulf seasnail	*Liparis coheni*
Gelationous seasnail	*Liparis fabricii*
Radiated shanny	*Ulvaria subbifurcata*
Wolf eelpout	*Lycenchelys verrillii*
Pearlsides	*Maurolicus muelleri*
Wrymouth	*Cryptacanthodes maculatus*
Sturgeon	*Acipenser spp.*
Sea Lamprey	*Petromyzon marinus*

Pelagics

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

Invertebrates

Crustaceans

American Lobster	*Homarus americanus*
Jonah Crab	*Cancer borealis*
Rock Crab	*Cancer irroratus*
Spider Crab unclass.	*Majidae spp.*
Northern Stone Crab	*Lithodes sp.*
Snow Crab	*Chionectes opilio*
Green Crab	*Carcinus maenus*

Sevenspine Bay Shrimp	*Crangon septemspinosa*
Spiny Lebbeid	*Lebbeus groenlandicus*
Bristled Longbeak	*Dichelopandalus leptocerus*
Aesop Shrimp	*Pandalus montagui*
Northern Shrimp	*Pandalus borealis*
Mantis Shrimp	*Stomatopod sp.*
Hermit Crab (unclass.)	*Diogenidae/Paguridae spp*
Pink Glass Shrimp	*Pasiphaea multidentata*
Propinquus	*Pandalus propinquus*
Krill	*Euphausid spp.*

Molluscs

Blue Mussel	*Mytilus edulis*
Sea Scallop	*Placopecten magelanicus*
Iceland Scallop	*Chlamys islandica*
Horse Mussel	*Modiolus modiolus*
Ocean Quahog	*Arctica islandica*
False Quahog	*Pitar morrhuana*
Northern Cardita	*Venercardia borealis*
Ax Head Clam	*Yoldia thraciaeformis*
Waved Astarte	*Astarte undata*
Squid (unclass.)	*Rossia spp.*
Shortfin Squid	*Illex illecebrosus*
Longfin Squid	*Loligo pealei*
Octopus (unclass.)	*Cephalopoda spp.*
Ten-Ridged Whelk	*Neptunea decemcostata*
Stimpson's Whelk	*Colus stimpsoni*
Quahog	*Mercenaria mercenaria*

Others

Sand Dollar	*Echinoidae sp.*
Sea Urchin	*Stronglyocentrotus droebachiensis*
Starfish (unclass.)	various species
Boreal Asterias	*Asterias vulgaris*
Sea sponges	various species
Rat-tail Cucumber	*Caudina arenata*
Sea Cucumber	*Cucumaria frondosa*
Anemone	various species
Barnacle	various species