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Witch Flounder, American Plaice and Yellowtail Flounder in Canadian Spring and Autumn Surveys: Time Series Stock Distribution Maps

By

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Abstract

The annual stratified spring and autumn surveys conducted by the Canadian Department of Fisheries and Oceans provide information on distribution and abundance of several groundfish stocks that are assessed by the North Atlantic Fisheries Organization (NAFO). Distribution maps of each stock are often presented annually with the assessment document and it is difficult to get an overall picture of changes in distribution over time, or compare between stocks or species. To allow such comparisons, distribution plots of 4 stocks of flatfish, plotted on the same scale within each stock, are presented.

Methods

Mean number and weight (kg) per tow from Canadian spring and autumn surveys were plotted using ACON data visualization software (Black, 1991) for each stock examined; witch flounder in NAFO Divs. 2J3KL and 3NO, American plaice in Divs. 3LNO and yellowtail flounder in Divs. 3LNO. In order to allow comparisons between season and over time, all scaling is constant within each stock, using continuous scaling to display the data. For each stock, plots are in descending order of year with number per tow in the top panel and weight (kg) per tow in the lower panel. Spring surveys are on the left, autumn on the right. For years where there are only spring data in the series (fall surveys in 3N and 3O didn't begin until 1990), two years are presented on each page. For 2J3KL, only autumn surveys cover the stock area and those are presented as two years per page. All plots are Campelen or Campelen equivalent (see Brodie and Stansbury (2007) and Healey and Brodie (2009) for a detailed description of the surveys, timing of gear change, conversions and problems with coverage).

Results

Tables 1 and 2 give details of the Canadian spring and autumn surveys from 1984 to present. The survey gear changed in autumn of 1995 from an Engel trawl to Campelen 145 shrimp trawl.

Figures 1-14 show witch flounder number and weight (kg) per tow from NAFO Divs. 2J3KL from 2010-1984. Only the autumn surveys cover the complete stock area and are shown for 1984-2010.

Figures 15-38 give distribution plots for Divs. 3NO witch flounder. Autumn surveys extended into 3N and 3O in 1990 and continued until 2010. The spring survey series for this stock extends back to 1983.

American plaice plots are shown in Figures 39-63 and cover the spring time series in Divs. 3LNO from 1984-2010 and the autumn series from 1990-2010.

Last, but not least, the distribution plots for yellowtail flounder follow in figures 64-87, with spring surveys from 1983 and autumn series beginning in 1990.

References

- BLACK, J. 1991. ACON Data Visualization Software User Manual [Internet]. Version 10.7.05. Dartmouth (NS): Fisheries and Oceans Canada, Maritimes Region.
- BRODIE, B. AND D. STANSBURY. 2007. A Brief Description of Canadian Multispecies Surveys in SA2+ Divisions 3KLMNO from 1995-2006. . *NAFO SCR Doc.*, No. 18, Serial No. N5366, 24 p.
- HEALEY, B.P., AND W.B. BRODIE. 2009. Brief notes on the execution of Canadian multi-species surveys in 2007 and 2008. *NAFO SCR Doc.*, No. 12, Serial No. N5639, 26 p.

Table 1. Details of Canadian spring survey by NAFO Division for 1984-2010 (Campelen trawl from 1996 onward).

Year	Ship	Nsets	Depth Range	Nsets	Depth Range	Nsets	Depth Range	30	3LN0
1984	A. Needler	37	67 - 185 m	61	39 - 360 m	56	66 - 350 m	28-Apr	21-May
1985	W. Templeman	221	63 - 705 m	36	52 - 310 m	93	67 - 355 m	11-Apr	26-May
1986	A. Needler			49	46 - 320 m	102	66 - 326 m	18-Apr	25-May
1987	W. Templeman	211	64 - 339 m	101	41 - 354 m	100	65 - 356 m	23-Apr	01-Jun
1988	W. Templeman	181	61 - 356 m	91	46 - 344 m	84	66 - 335 m	21-Apr	24-May
1989	W. Templeman	160	65 - 558 m	77	41 - 330 m	101	66 - 337 m	20-Apr	28-May
1990	W. Templeman	205	64 - 350 m	94	45 - 352 m	93	65 - 340 m	22-Apr	04-Jun
1991	W. Templeman	156	63 - 346 m	85	42 - 320 m	116	65 - 635 m	19-Apr	29-May
1992	W. Templeman	143	66 - 685 m	93	40 - 645 m	91	66 - 630 m	22-Apr	07-Jun
1993	W. Templeman	178	64 - 710 m	94	44 - 625 m	81	66 - 620 m	27-Apr	10-Jun
1994	W. Templeman	160	64 - 680 m	85	40 - 695 m	81	66 - 862 m	30-Apr	10-Jun
1995	W. Templeman	151	65 - 646 m	89	42 - 668 m	85	65 - 640 m	03-May	14-Jun
1996	W. Templeman	188	66 - 664 m	82	42 - 665 m	86	65 - 685 m	07-May	27-Jun
1997	W. Templeman	158	60 - 681 m	71	35 - 689 m	81	62 - 669 m	30-Apr	26-Jun
1998	W. Templeman	163	53 - 721 m	88	38 - 682 m	93	64 - 657 m	12-May	30-Jun
1999	W. Templeman	177	41 - 692 m	82	40 - 659 m	86	62 - 679 m	11-May	29-Jun
2000	W. Templeman	134	61 - 681 m	81	45 - 664 m	83	61 - 694 m	11-May	29-Jun
2001	W. Templeman	154	34 - 695 m	79	40 - 650 m	79	64 - 699 m	29-Apr	24-Jun
2002	W. Templeman	146	42 - 710 m	79	40 - 641 m	79	63 - 628 m	27-Apr	22-Jun
2003	W. Templeman	156	62 - 698 m	79	39 - 681 m	79	63 - 726 m	08-May	26-Jun
2004	W. Templeman	151	47 - 710 m	79	44 - 675 m	79	61 - 636 m	12-May	26-Jun
2005	W. Templeman	133	64 - 672 m	78	45 - 691 m	79	66 - 719 m	09-May	29-Jun
2006	W. Templeman	141	60 - 701 m	4	68 - 77 m	3	75 - 84 m	10-Jun	30-Jun
	A. Needler			18	46 - 68 m	29	64 - 103 m		
2007	W. Templeman Teleost	97	61 - 702 m	79	44 - 636 m	79	64 - 719 m	03-May	12-Jul
	Teleost	40	66 - 171 m						
2008	W. Templeman Teleost	79	60 - 684 m	71	40 - 623 m	80	64 - 704 m	23-May	30-Jun
	Teleost	43	97 - 641 m						
2009	A. Needler Teleost	61	63 - 676 m	78	44 - 668 m	79	64 - 674 m	13-May	23-Jun
	Teleost	81	61 - 694 m						
2010	A. Needler	130	59 - 715 m	78	39 - 714 m	80	60 - 673 m	08-May	25-Jun

Table 2. Details of Canadian autumn survey by NAFO Division for 1984-2010 (Campelen trawl from 1995 onward).

Year	Ship	2J	3J	3K	Nsets	Depth Range	Nsets	Depth Range	Nsets	Depth Range	3N	3O	Nsets	Depth Range	1st set	23JLNO	Last set
1984	G. Atlantica	99	131 - 908 m	163	151 - 935 m	209	62 - 688 m								26-Jul	05-Dec	
	W. Templeman														09-Oct	02-Dec	
1985	G. Atlantica	131	125 - 884 m	195	143 - 932 m	232	63 - 710 m								03-Nov	11-Dec	
	W. Templeman														15-Oct	08-Dec	
1986	G. Atlantica	109	124 - 960 m	106	140 - 491 m	142	65 - 715 m								26-Oct	13-Dec	
	A. Needier														12-Oct	19-Dec	
1987	G. Atlantica	129	116 - 895 m	159	142 - 835 m	165	62 - 346 m								18-Oct	15-Dec	
	W. Templeman														18-Oct	15-Dec	
1988	G. Atlantica	110	136 - 850 m	129	138 - 499 m	189	62 - 338 m								19-Oct	17-Dec	
	W. Templeman														20-Oct	09-Dec	
1989	G. Atlantica	125	103 - 829 m	151	116 - 476 m	174	64 - 354 m								12-Oct	19-Dec	
	W. Templeman														18-Oct	15-Dec	
1990	G. Atlantica	108	116 - 921 m	135	140 - 970 m	161	65 - 685 m	80	47 - 310 m	91	63 - 495 m						
	W. Templeman														19-Oct	17-Dec	
1991	G. Atlantica	132	141 - 890 m	181	153 - 978 m	219	63 - 680 m	67	42 - 638 m	84	65 - 715 m						
	W. Templeman														20-Oct	09-Dec	
1992	G. Atlantica	139	128 - 904 m	180	149 - 950 m	215	63 - 693 m	34	40 - 437 m	54	66 - 450 m						
	W. Templeman														24-Oct	06-Dec	
1993	G. Atlantica	105	120 - 916 m	158	144 - 1239 m	153	64 - 670 m	70	44 - 670 m	75	64 - 676 m						
	W. Templeman														25-Oct	19-Dec	
1994	G. Atlantica	103	111 - 965 m	152	122 - 975 m	200	65 - 715 m	73	42 - 641 m	75	65 - 696 m						
	W. Templeman														26-Sep	25-Jan	
1995	W. Templeman	100	162 - 494 m	161	166 - 1444 m	161	63 - 640 m	90	40 - 650 m	81	63 - 730 m						
	Teleost	84	145 - 948 m	31	166 - 1444 m	5	733 - 1210 m										
1996	W. Templeman	60	126 - 472 m	180	126 - 472 m	180	51 - 671 m								19	65 - 139 m	
	A. Needier														20-Dec	12-Dec	
1997	W. Templeman	117	126 - 1410 m	115	111 - 1368 m	31	805 - 1433 m	13	390 - 1147 m	15	63 - 304 m				09-Oct	12-Dec	
	Teleost	117	123 - 1488 m	20	117 - 421 m	71	161 - 1431 m	74	41 - 769 m	73	64 - 611 m				26-Sep	20-Dec	
1998	W. Templeman	17	121 - 346 m	155	143 - 1431 m	134	35 - 714 m								10-Oct	16-Dec	
	Teleost	118	126 - 1398 m	154	122 - 1415 m	32	691 - 1437 m	12	834 - 1447 m	24	68 - 690 m				13-Oct	12-Dec	
1999	W. Templeman	115	109 - 1375 m	154	146 - 1477 m	169	63 - 1407 m	68	39 - 664 m	75	58 - 692 m				22-Sep	18-Dec	
	Teleost																
2000	W. Templeman	117	127 - 1400 m	159	113 - 1379 m	102	42 - 447 m	70	46 - 642 m	76	62 - 654 m				11-Oct	18-Dec	
	Teleost														24	752 - 1424 m	
2001	W. Templeman	55	128 - 439 m	169	38 - 702 m	70	42 - 1079 m	87	61 - 1076 m								
	A. Needier	71	105 - 574 m	4	170 - 252 m	2	187 - 203 m								10-Oct	16-Dec	
2002	W. Templeman	19	136 - 572 m	111	121 - 381 m	34	146 - 1479 m	24	739 - 1410 m	22	803 - 1391 m						
	Teleost	98	102 - 1372 m	64	156 - 1395 m	30	763 - 1431 m	24	811 - 1429 m	24	775 - 1504 m						
2003	W. Templeman	50	115 - 489 m	175	32 - 702 m	70	43 - 727 m								23-Sep	31-Jan	
	Teleost	116	123 - 1404 m	118	151 - 1474 m	30	753 - 1446 m	8	761 - 1382 m						27-Oct	01-Feb	
2004	W. Templeman	115	127 - 1385 m	135	212 - 549 m	143	44 - 653 m	69	40 - 659 m	76	63 - 634 m						
	Teleost	9	172 - 416 m	141	136 - 669 m	120	151 - 522 m	69	50 - 706 m	69	42 - 633 m						
2005	W. Templeman																
	A. Needier																
2006	W. Templeman	108	118 - 1427 m	26	150 - 1334 m	7	803 - 1351 m	17	776 - 1445 m	24	754 - 1410 m						
	Teleost														63 - 674 m	30-Sep	21-Dec
2007	W. Templeman	117	107 - 1443 m	93	109 - 480 m	151	61 - 641 m	70	46 - 650 m	74	60 - 649 m						
	Teleost														04-Oct	28-Jan	
2008	W. Templeman	79	125 - 630 m	52	147 - 608 m	83	62 - 664 m	64	38 - 643 m	66	60 - 661 m						
	A. Needier	46	148 - 455 m	43	739 - 1439 m	71	332 m								03-Oct	21-Dec	
2009	W. Templeman	51	150 - 469 m	130	62 - 682 m	64	42 - 708 m	76	60 - 696 m						02-Oct	20-Dec	
	Teleost	108	111 - 1323 m	92	123 - 478 m	141	58 - 657 m	68	40 - 614 m	75	61 - 667 m						
2010	A. Needier	62	140 - 1442 m	55	100 - 1448 m	4	855 - 1219 m								30-Sep	20-Dec	

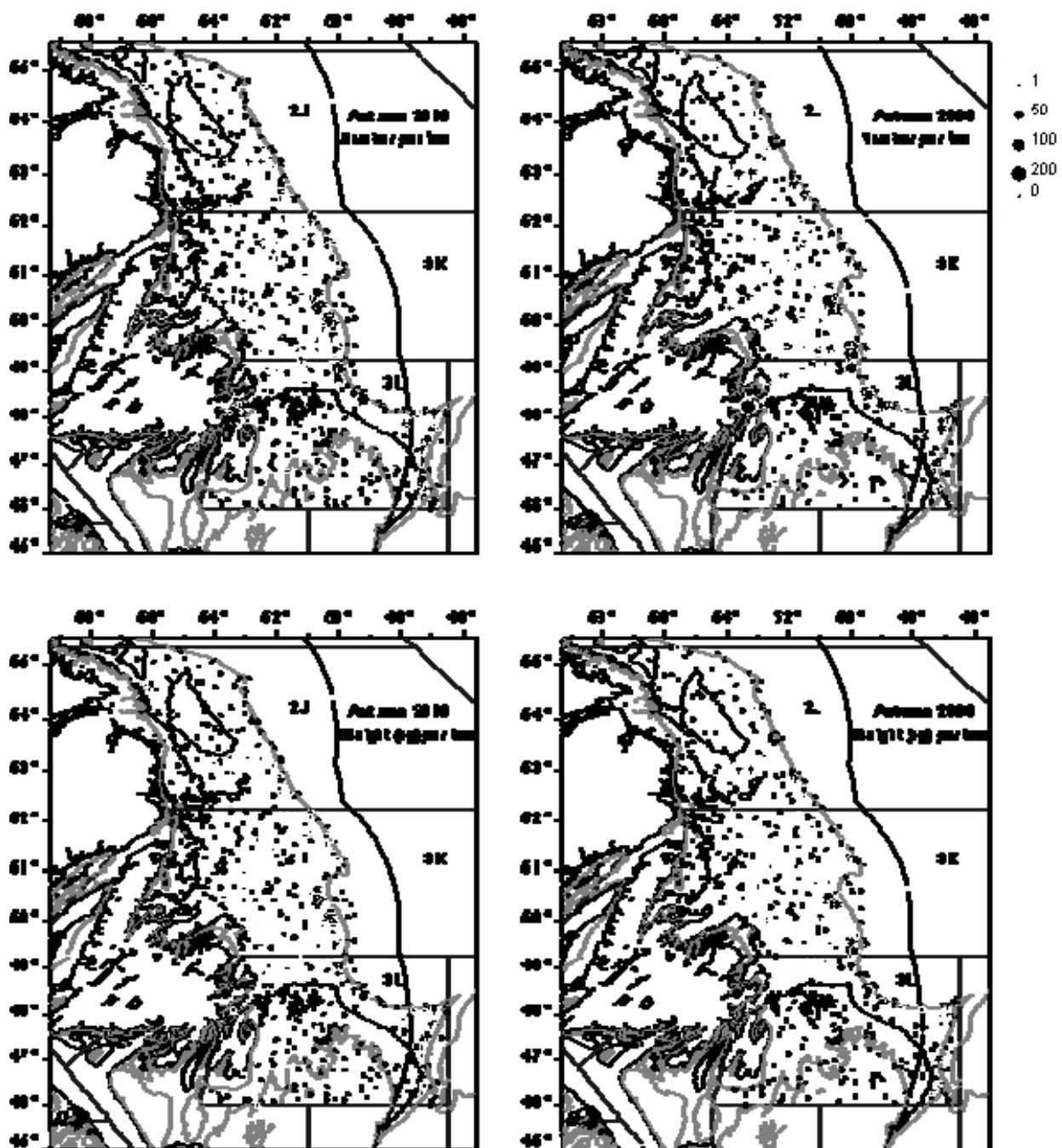


Figure 1. Distribution of witch flounder in NAFO Divs. 2J3KL: number and weight (kg) per tow in the Canadian autumn surveys for 2010 and 2009.

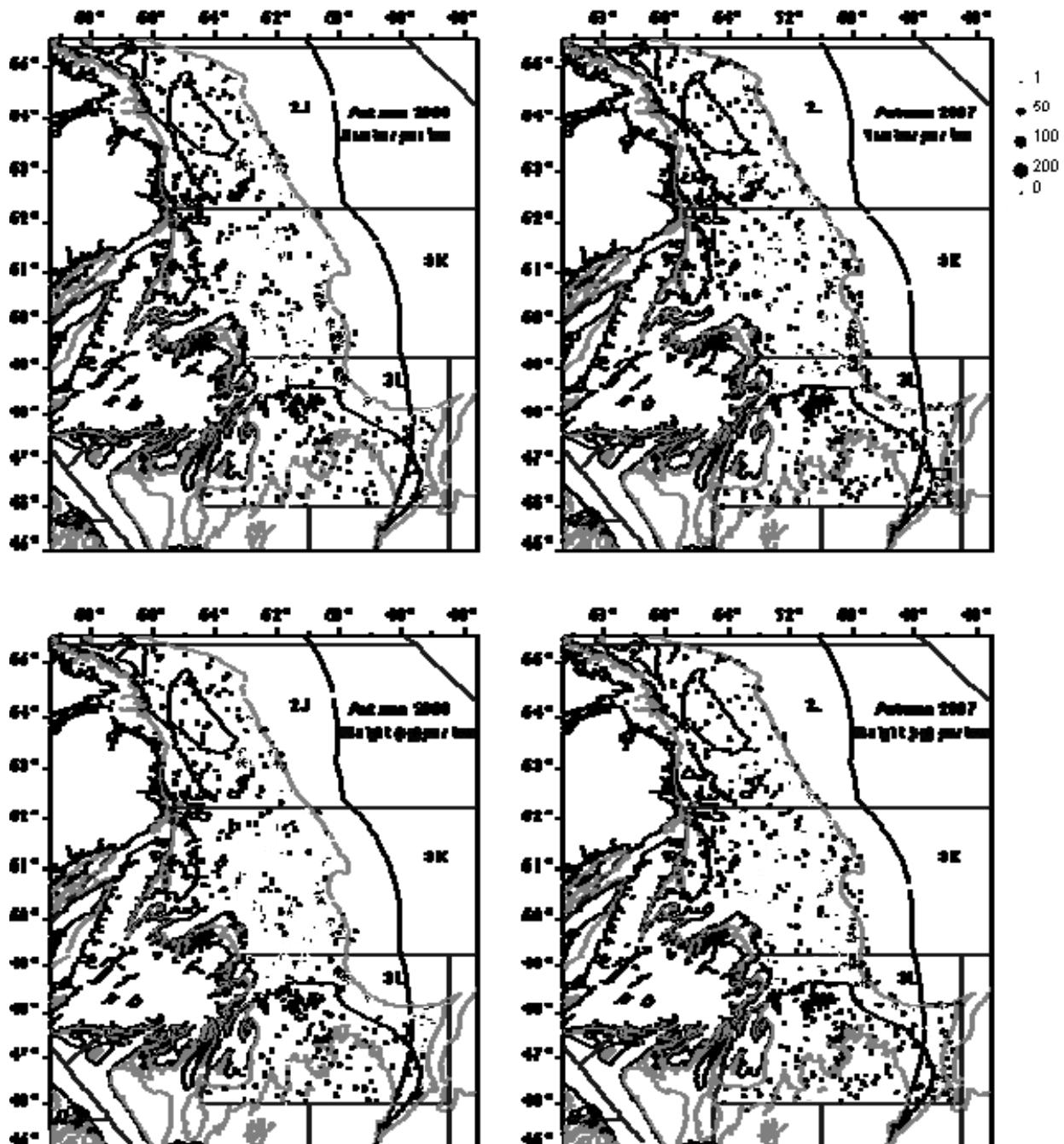


Figure 2. Distribution of witch flounder in NAFO Divs. 2J3KL: number and weight (kg) per tow in the Canadian autumn surveys for 2008 and 2007.

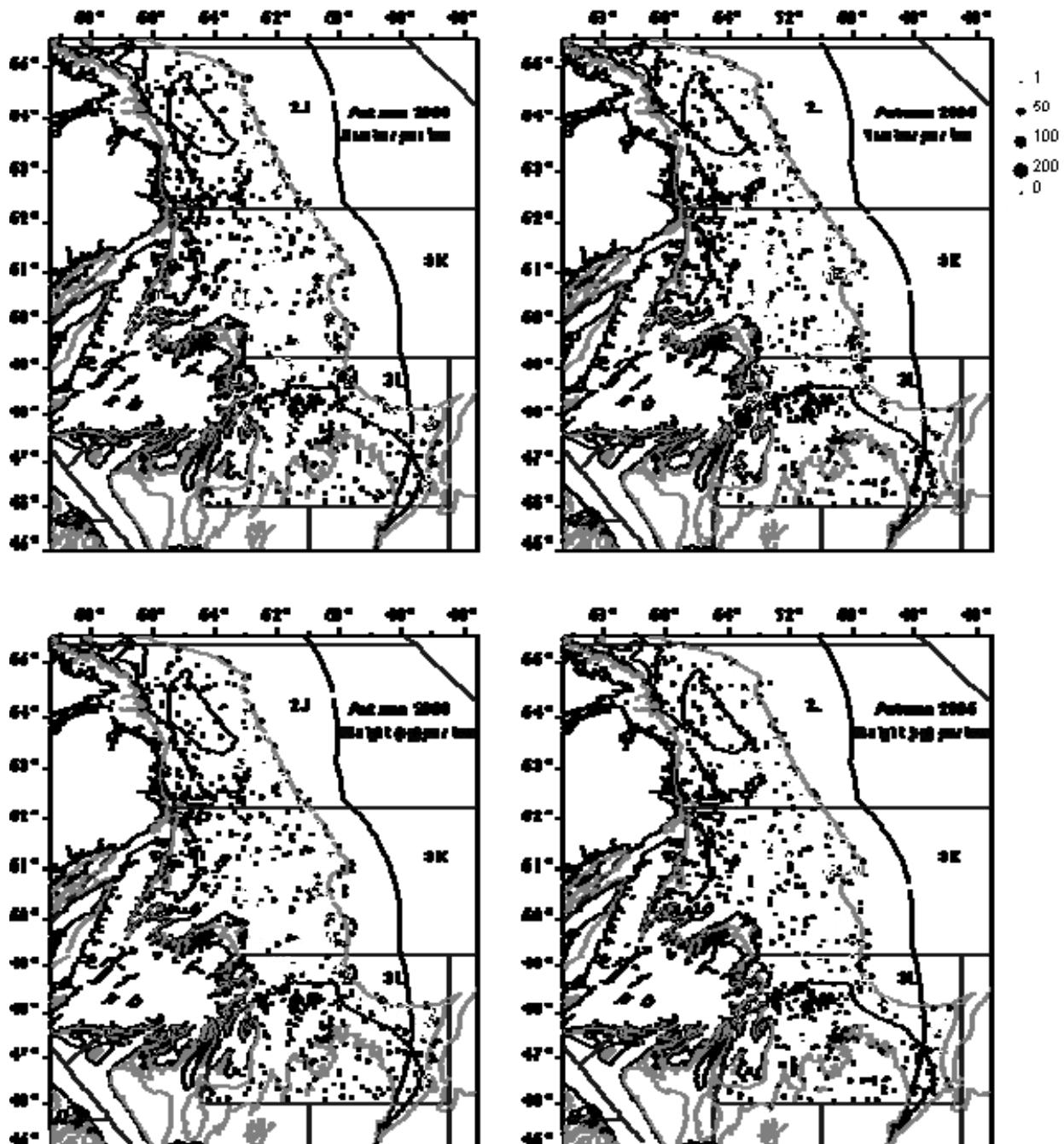


Figure 3. Distribution of witch flounder in NAFO Divs. 2J3KL: number and weight (kg) per tow in the Canadian autumn surveys for 2006 and 2005.

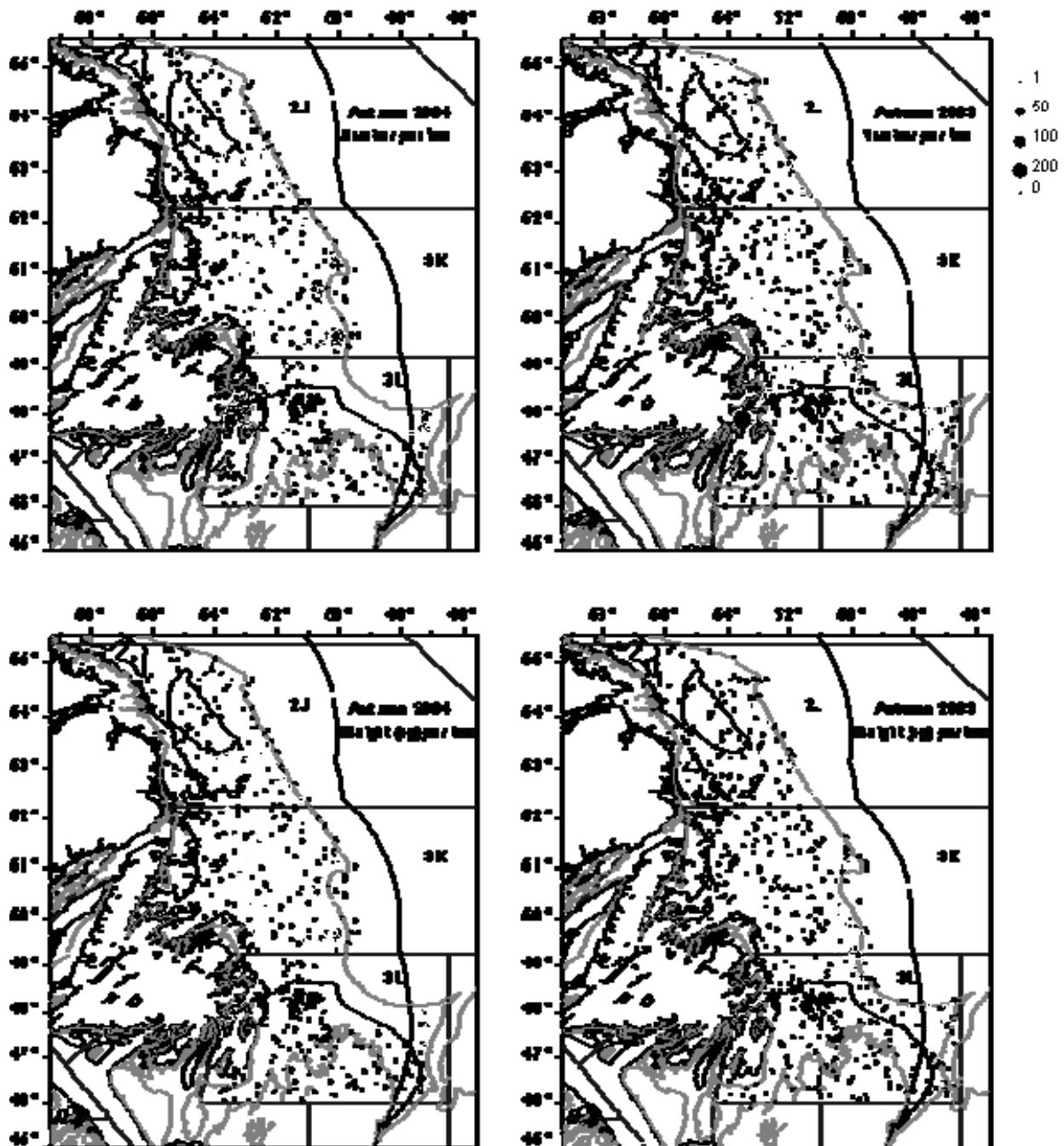


Figure 4. Distribution of witch flounder in NAFO Divs. 2J3KL: number and weight (kg) per tow in the Canadian autumn surveys for 2004 and 2003.

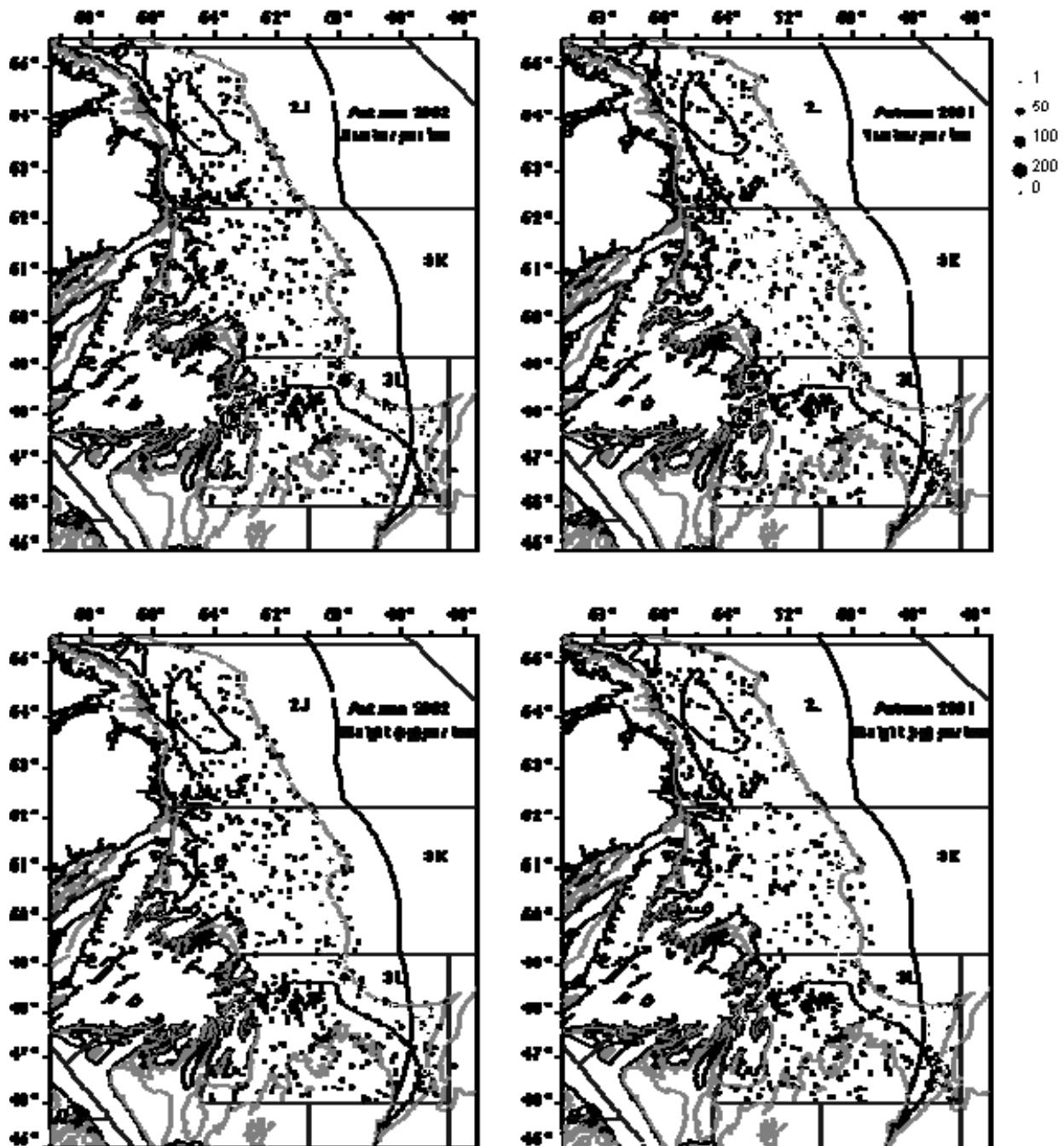


Figure 5. Distribution of witch flounder in NAFO Divs. 2J3KL: number and weight (kg) per tow in the Canadian autumn surveys for 2002 and 2001.

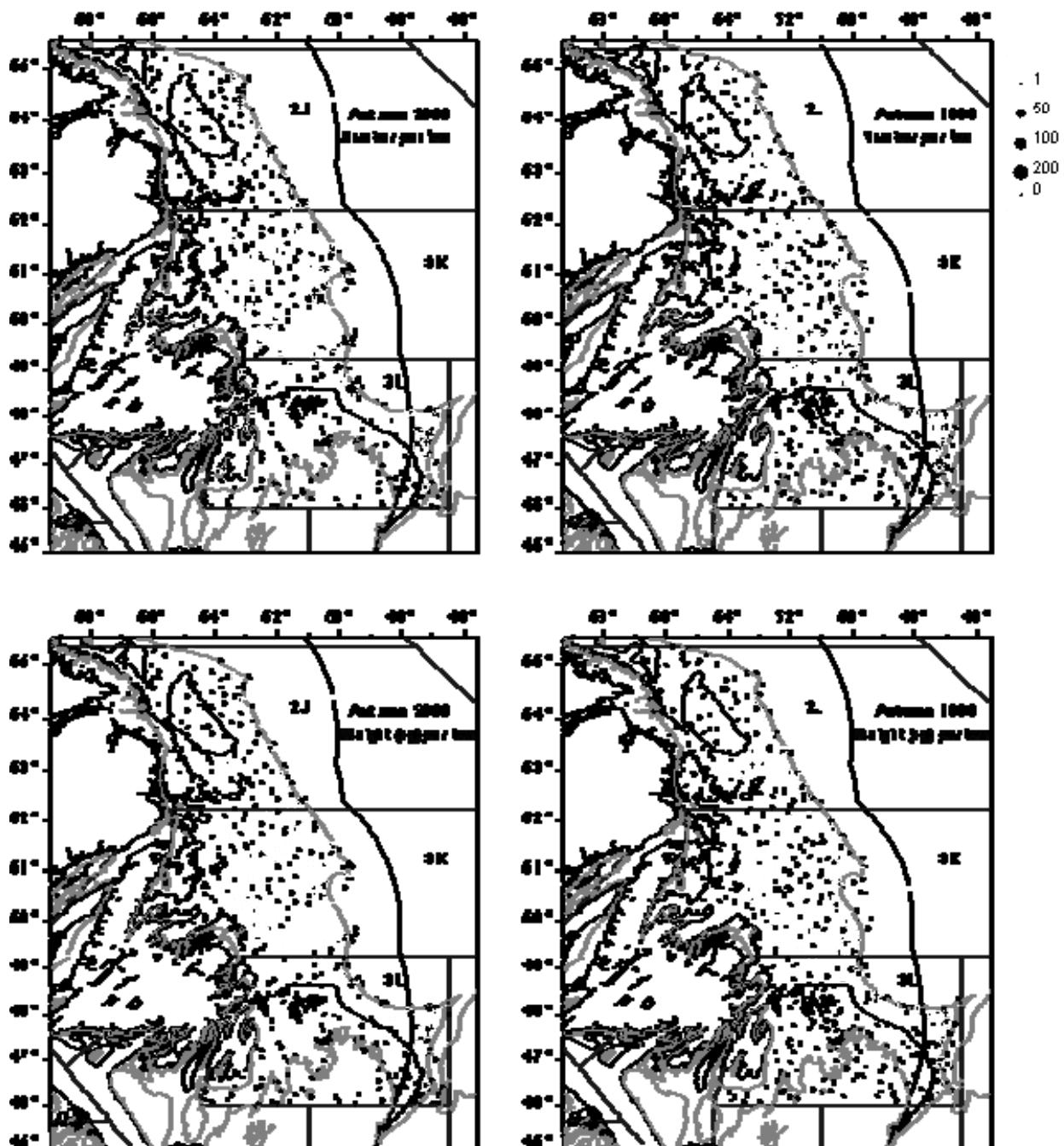


Figure 6. Distribution of witch flounder in NAFO Divs. 2J3KL: number and weight (kg) per tow in the Canadian autumn surveys for 2000 and 1999.

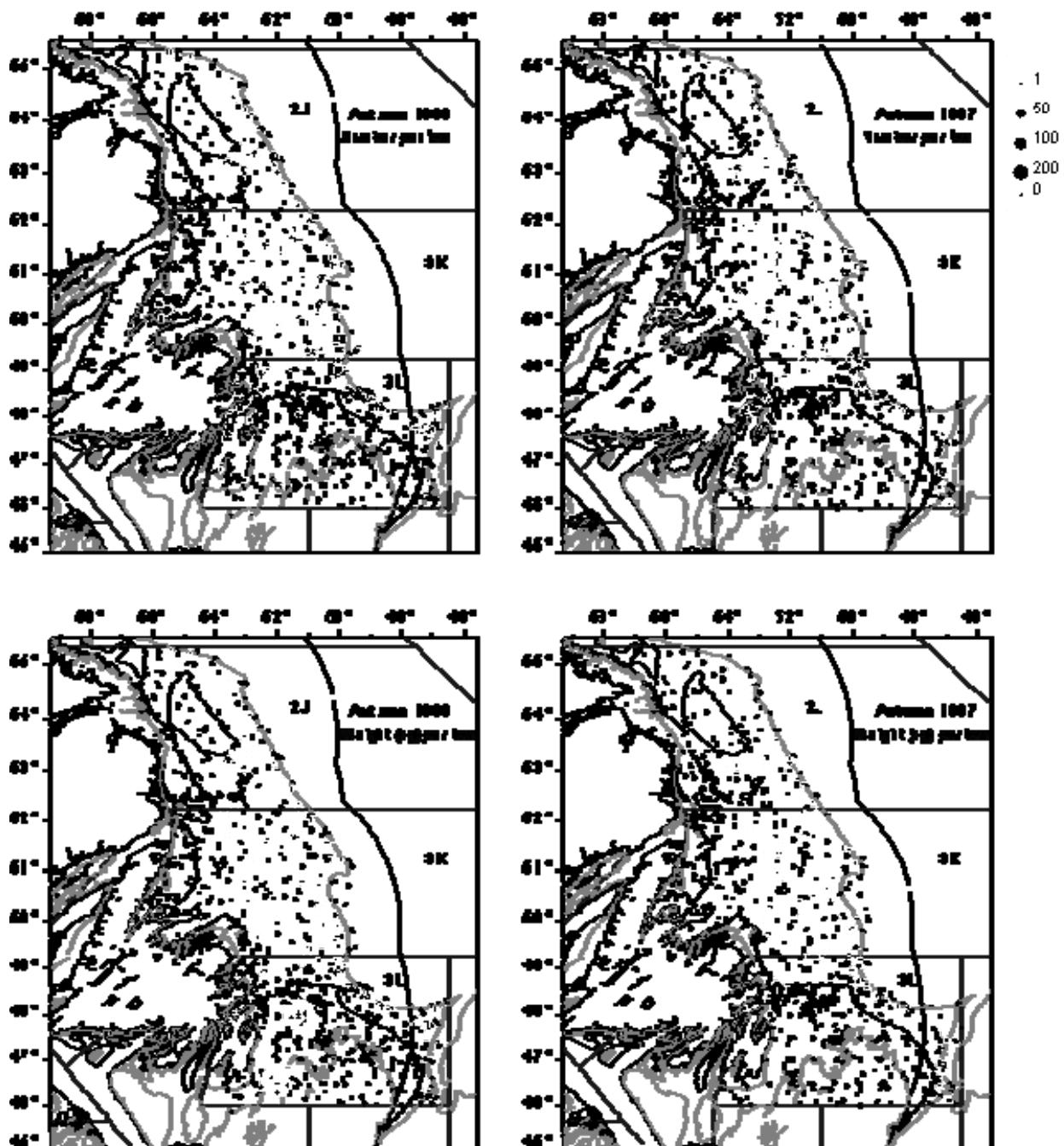


Figure 7. Distribution of witch flounder in NAFO Divs. 2J3KL: number and weight (kg) per tow in the Canadian autumn surveys for 1998 and 1997.

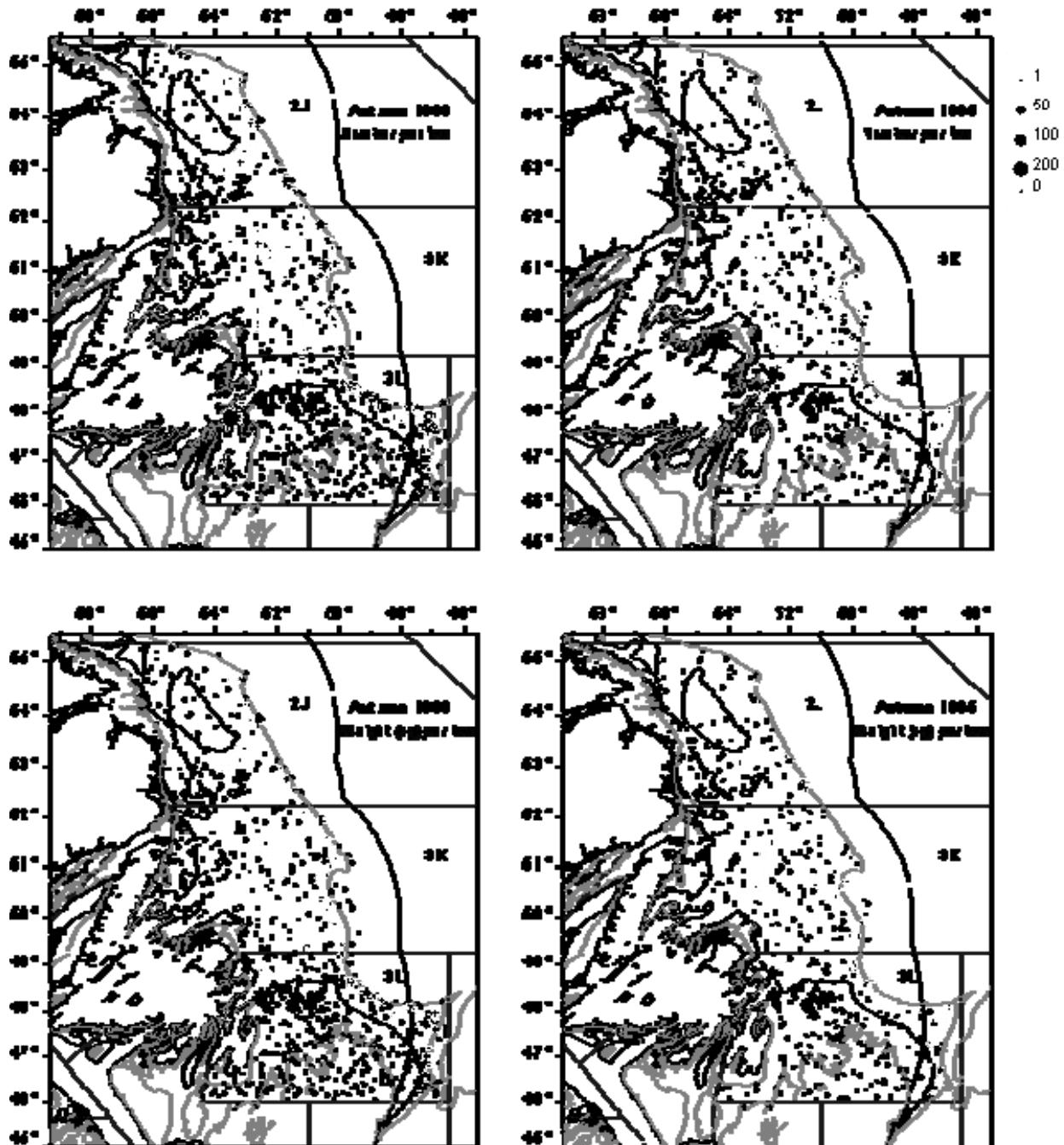


Figure 8. Distribution of witch flounder in NAFO Divs. 2J3KL: number and weight (kg) per tow in the Canadian autumn surveys for 1996 and 1995.

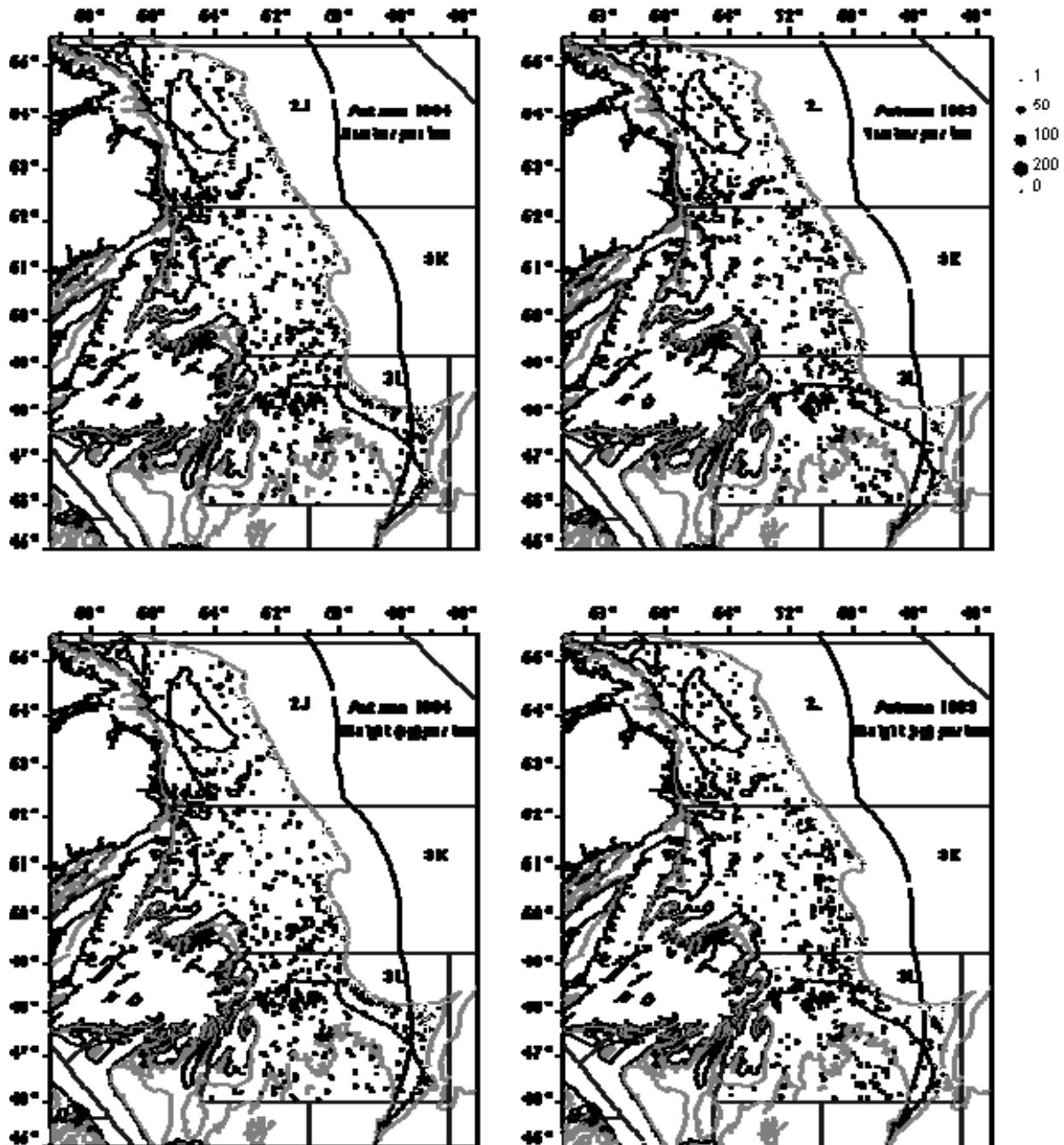


Figure 9. Distribution of witch flounder in NAFO Divs. 2J3KL: number and weight (kg) per tow in the Canadian autumn surveys for 1994 and 1993.

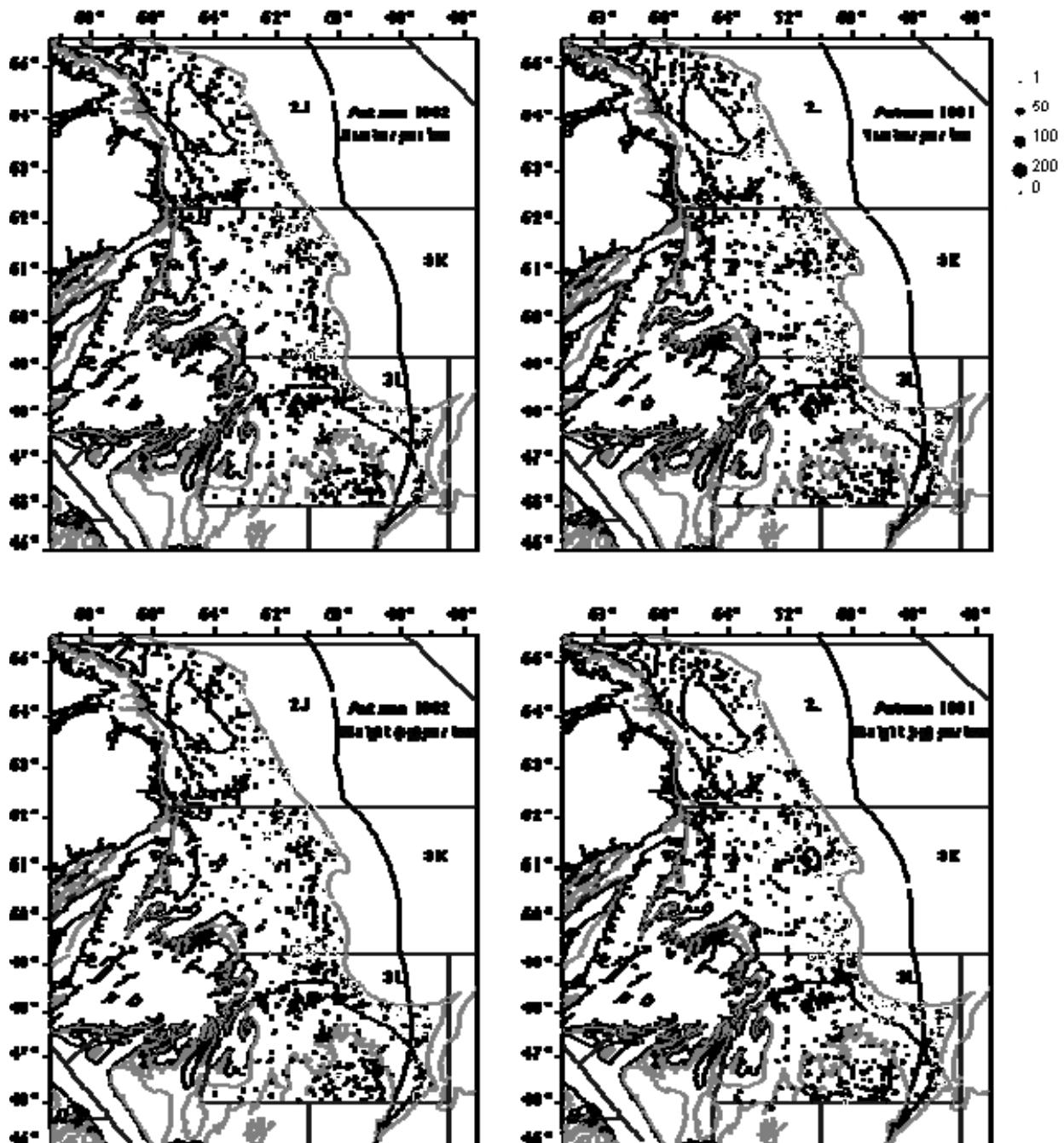


Figure 10. Distribution of witch flounder in NAFO Divs. 2J3KL: number and weight (kg) per tow in the Canadian autumn surveys for 1992 and 1991.

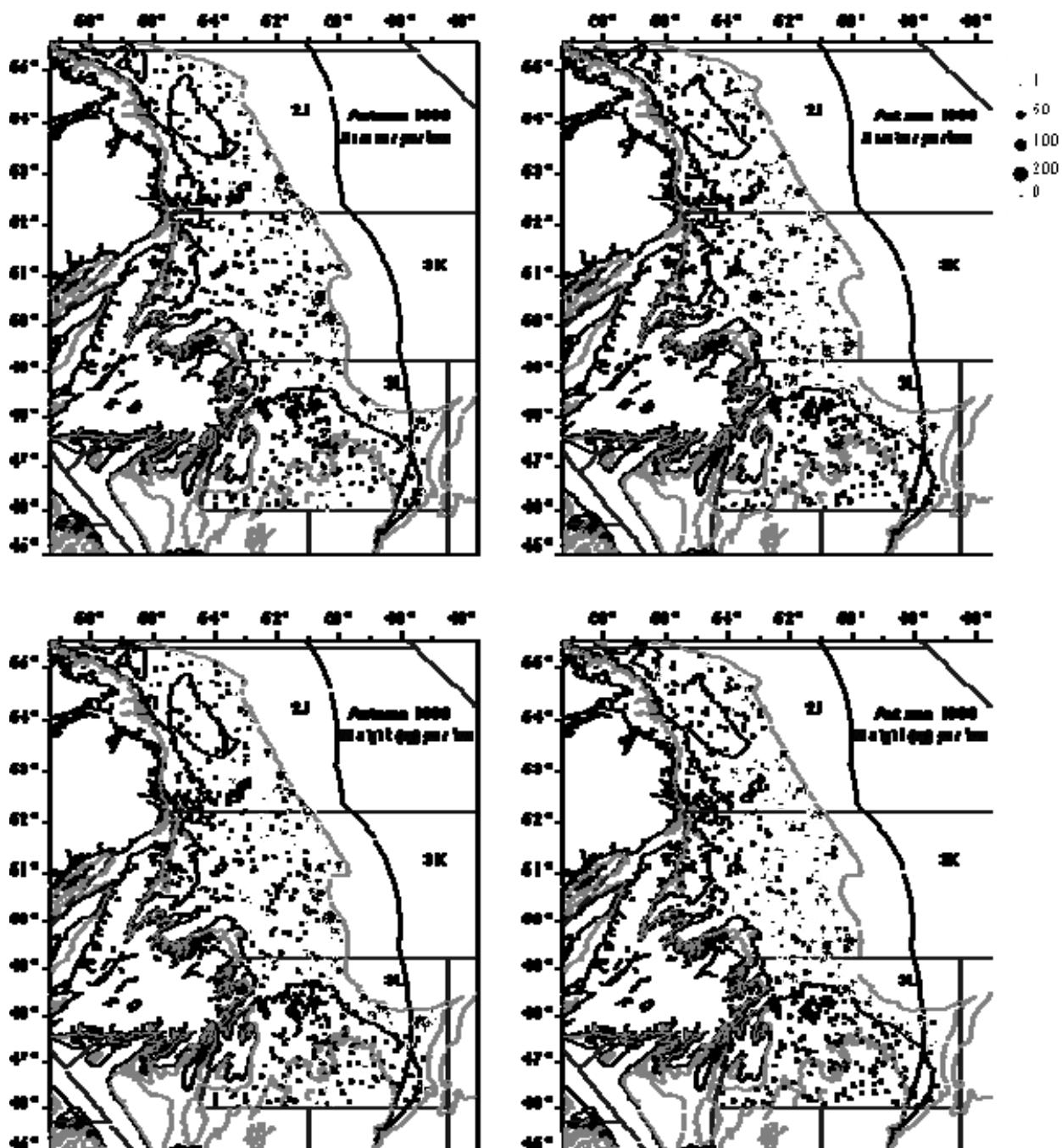


Figure 11. Distribution of witch flounder in NAFO Divs. 2J3KL: number and weight (kg) per tow in the Canadian autumn surveys for 1990 and 1989.

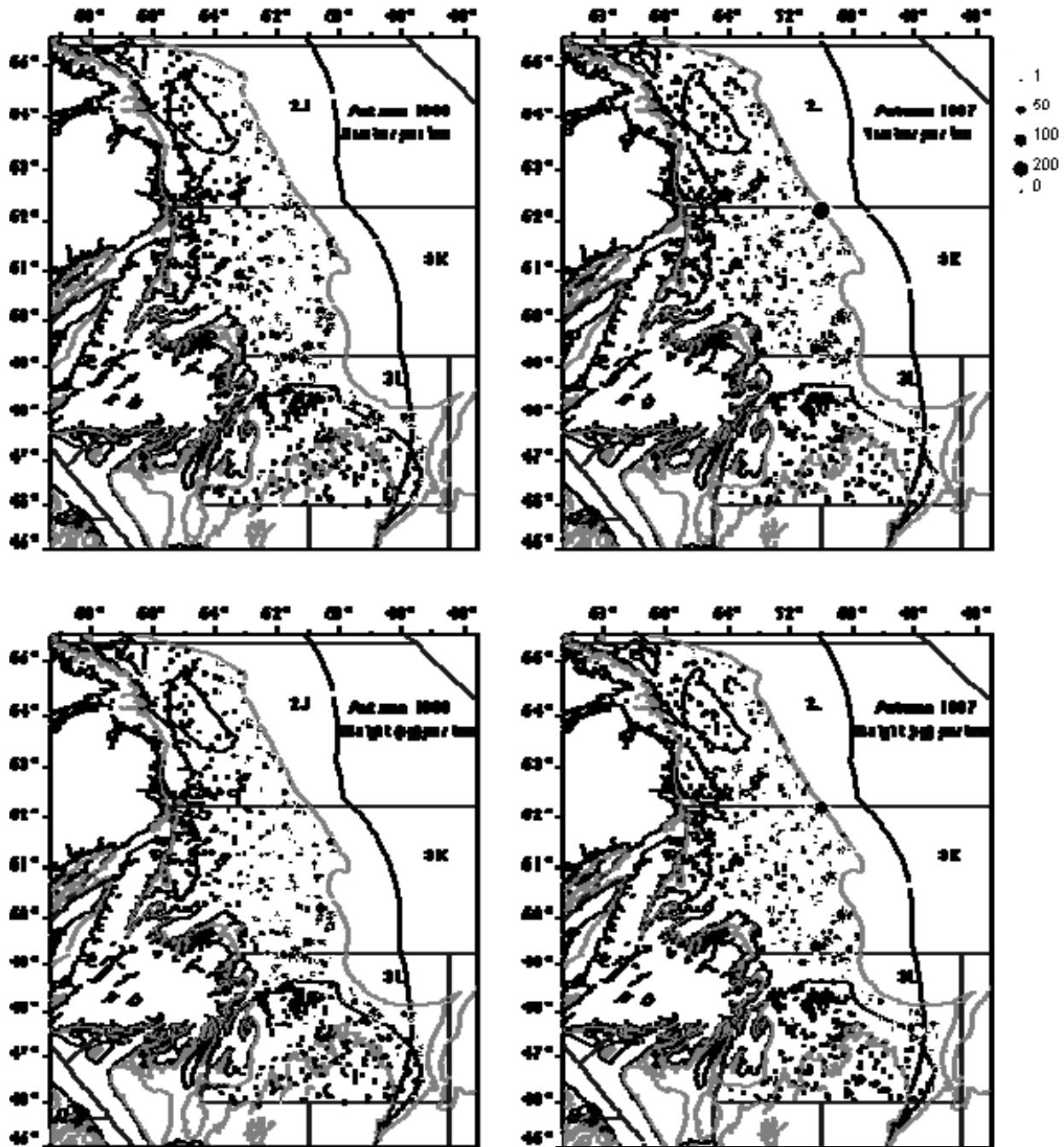


Figure 12. Distribution of witch flounder in NAFO Divs. 2J3KL: number and weight (kg) per tow in the Canadian autumn surveys for 1988 and 1987.

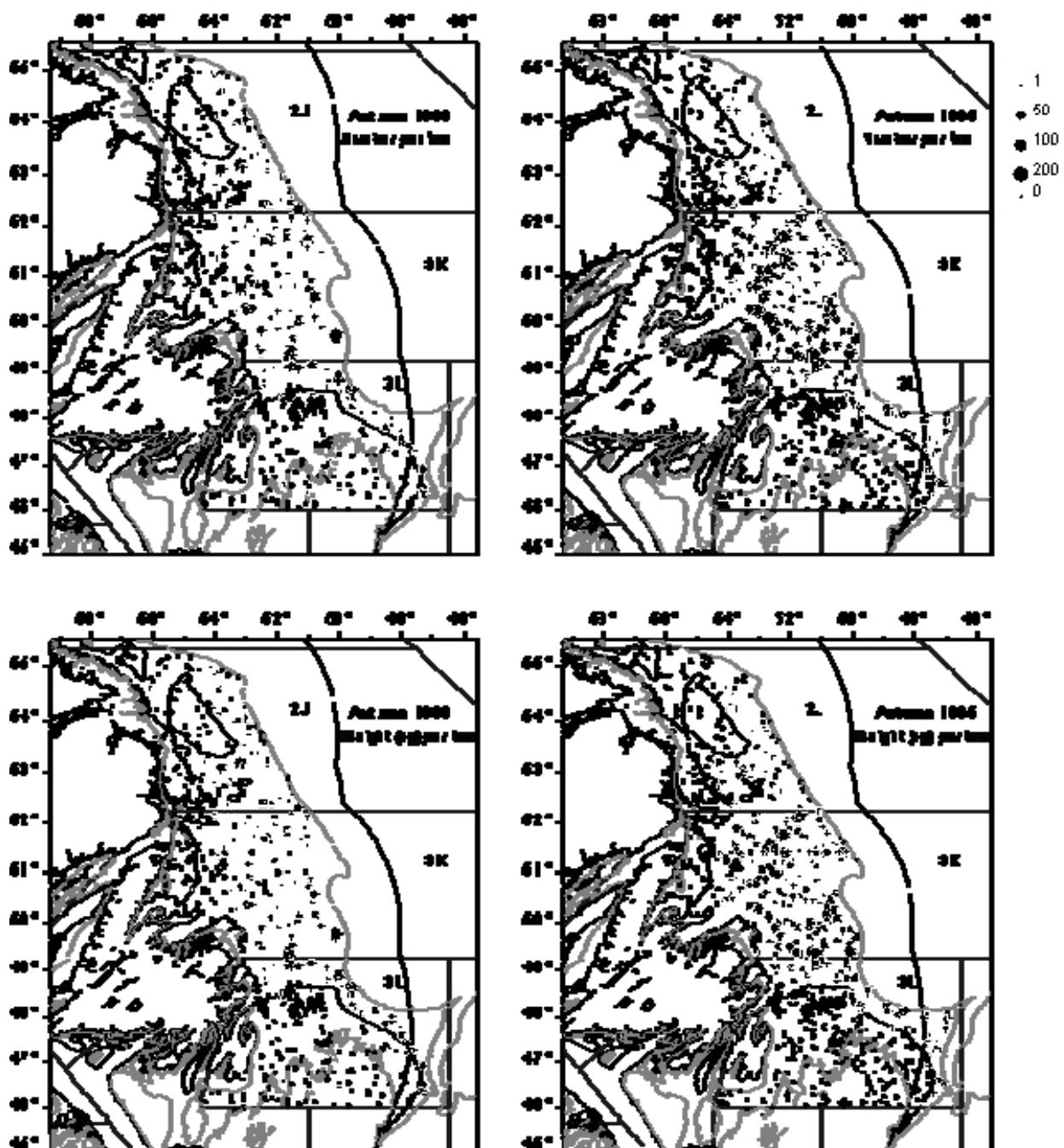


Figure 13. Distribution of witch flounder in NAFO Divs. 2J3KL: number and weight (kg) per tow in the Canadian autumn surveys for 1986 and 1985.

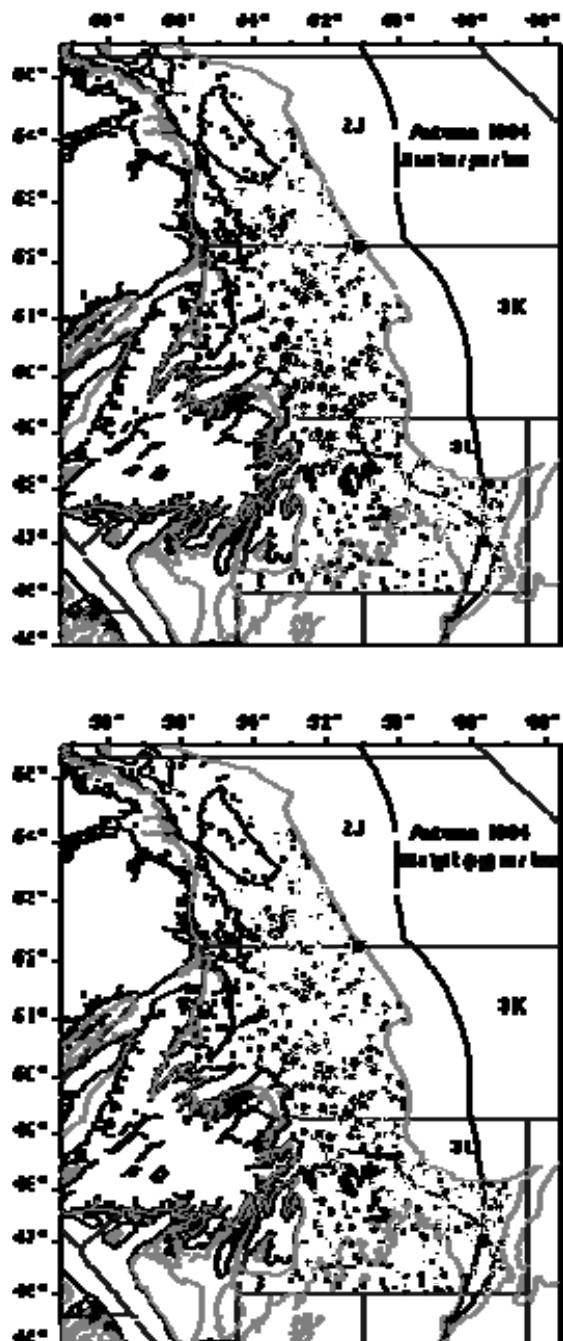


Figure 14. Distribution of witch flounder in NAFO Divs. 2J3KL: number and weight (kg) per tow in the Canadian autumn surveys for 1984.

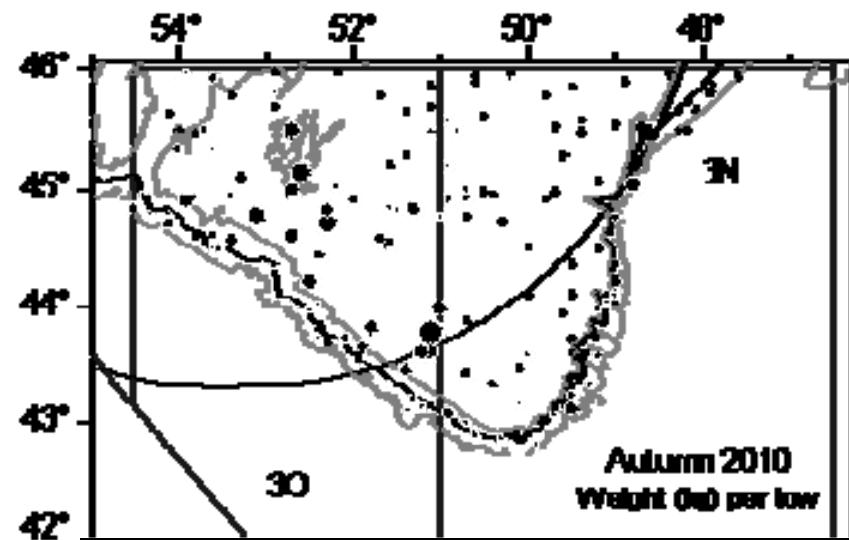
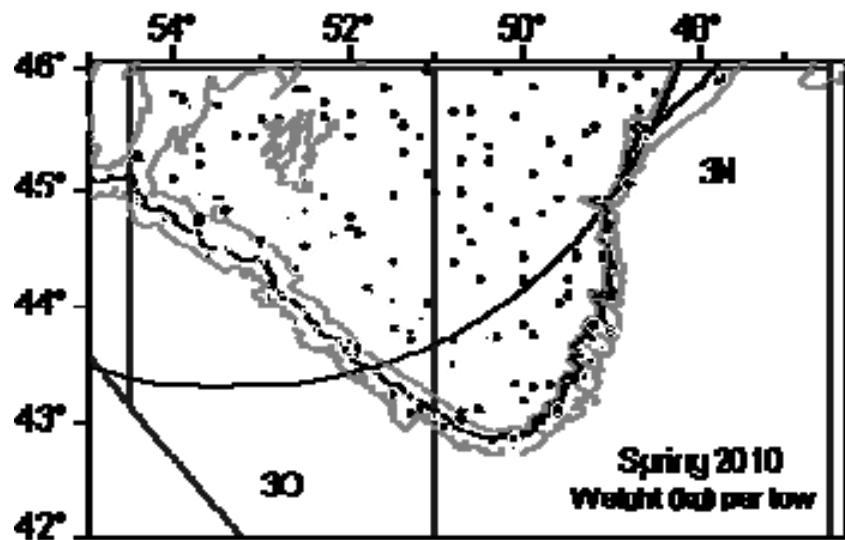
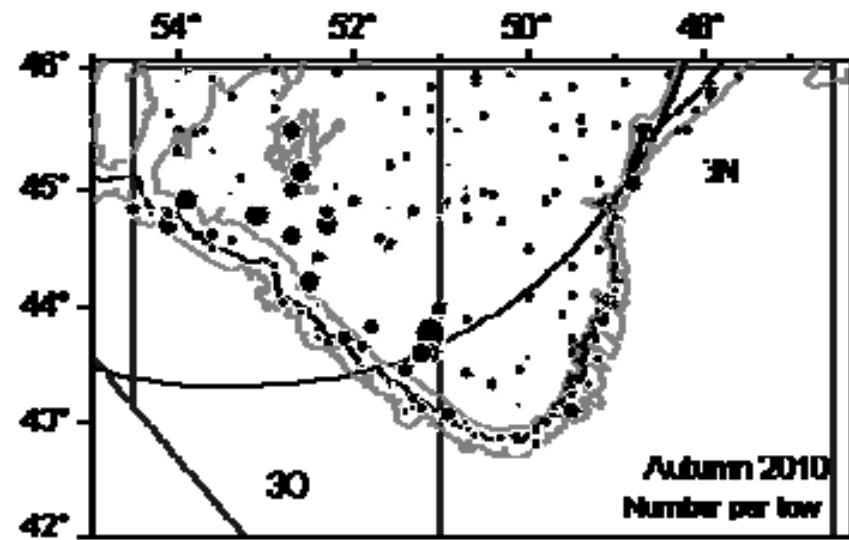
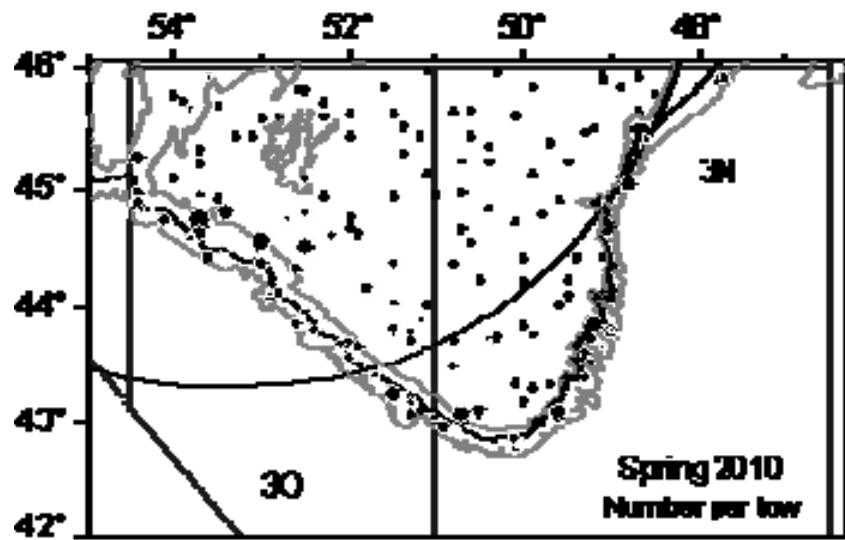


Figure 15. Distribution of witch flounder in NAFO Divs. 3NO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 2010.

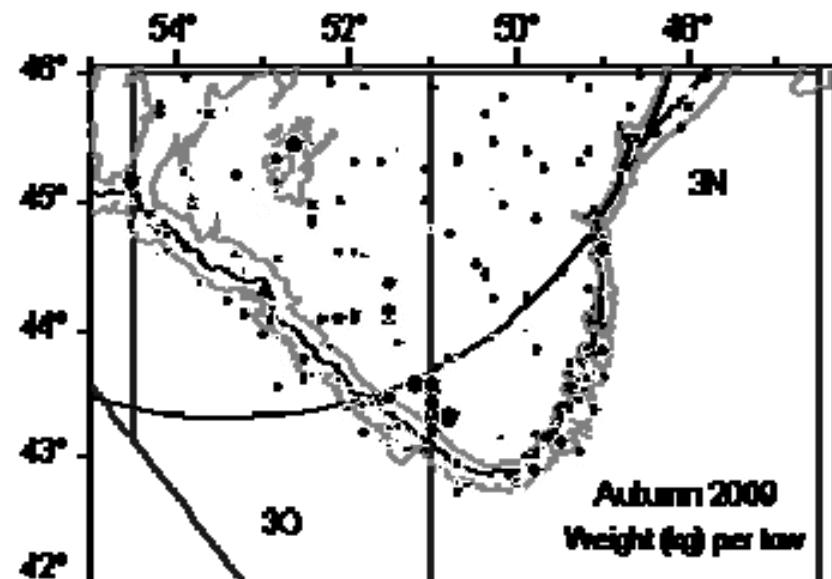
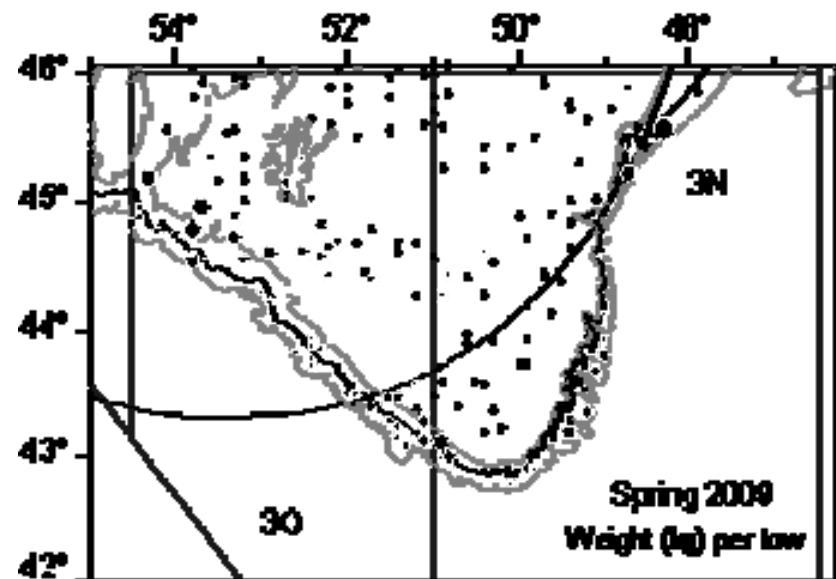
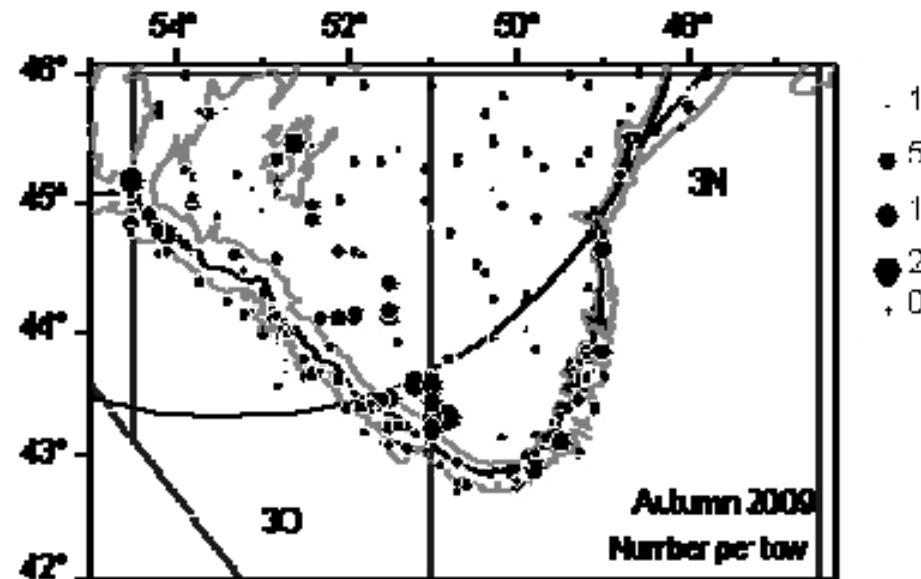
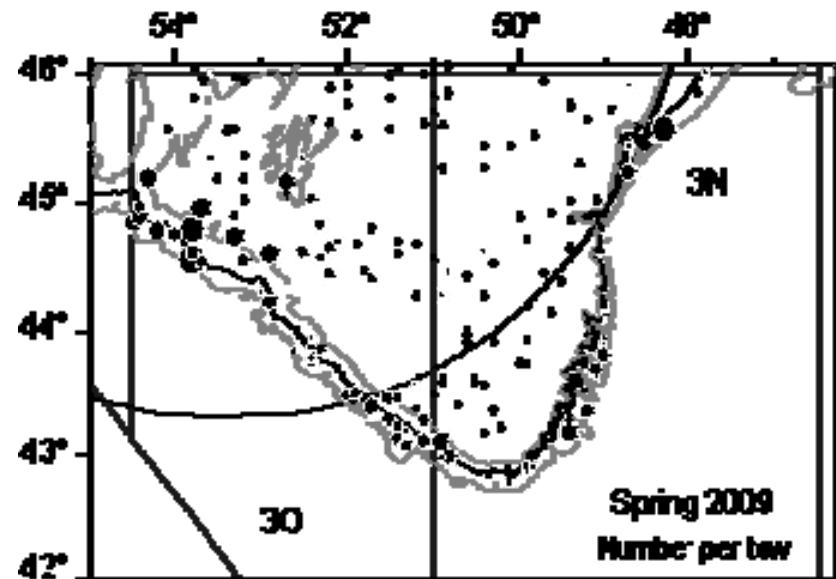


Figure 16. Distribution of witch flounder in NAFO Divs. 3NO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 2009.

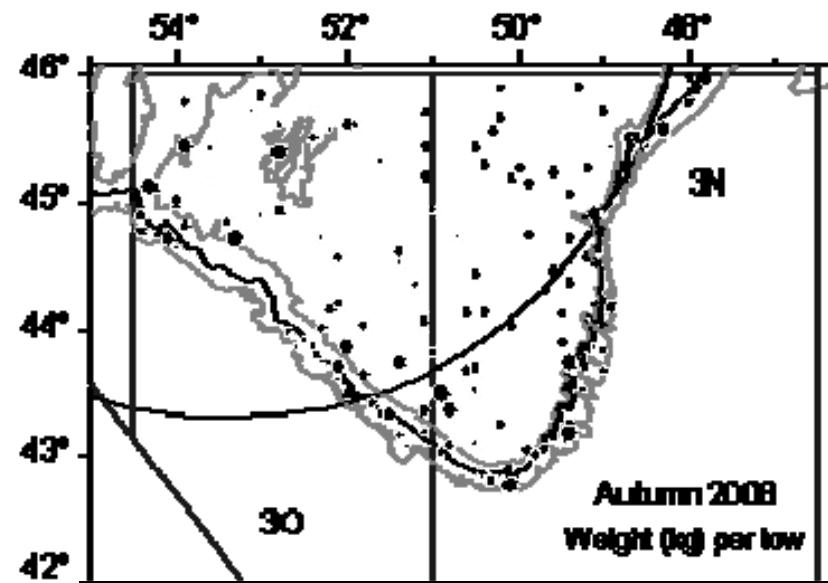
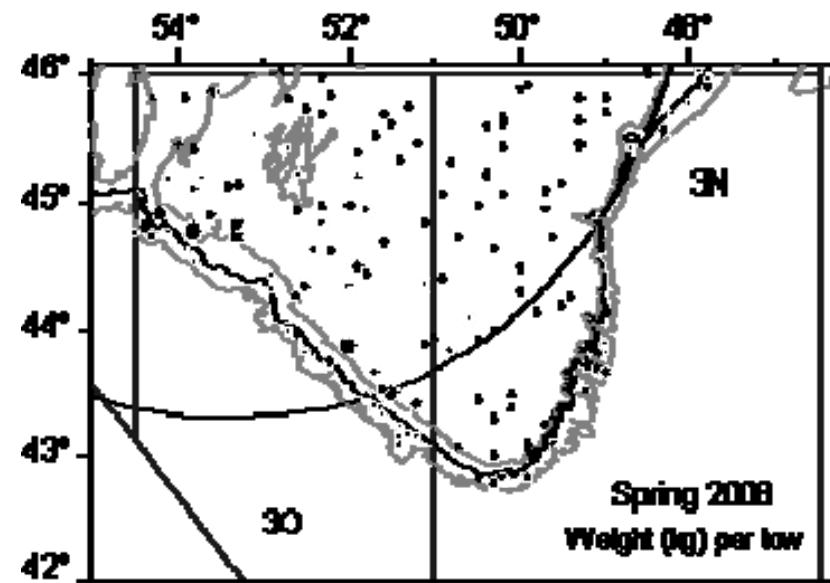
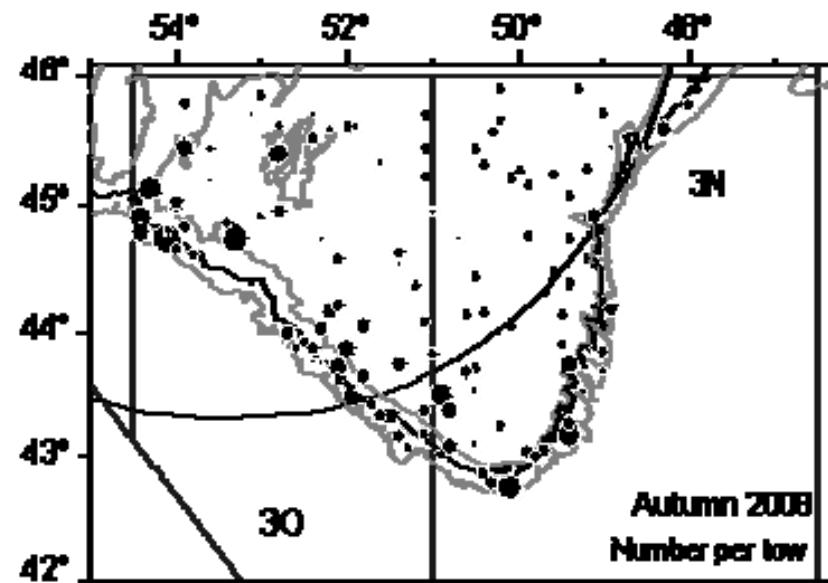
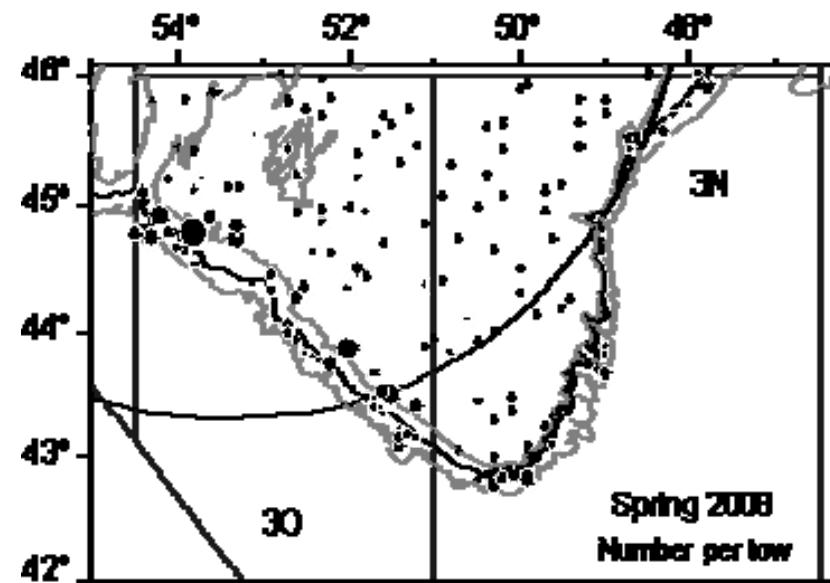


Figure 17. Distribution of witch flounder in NAFO Divs. 3NO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 2008.

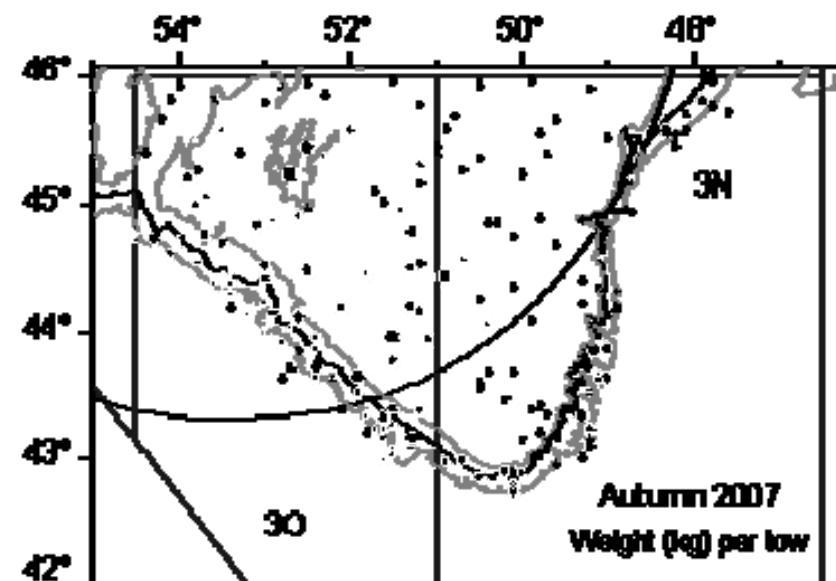
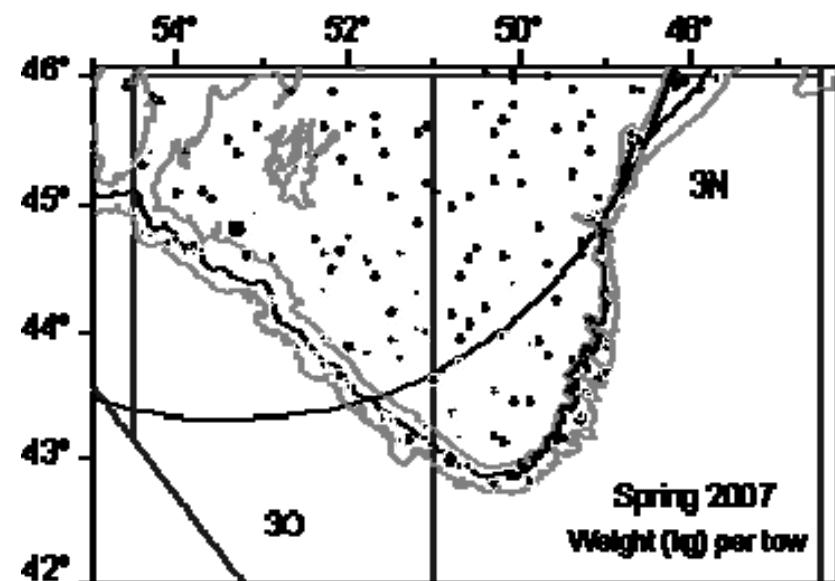
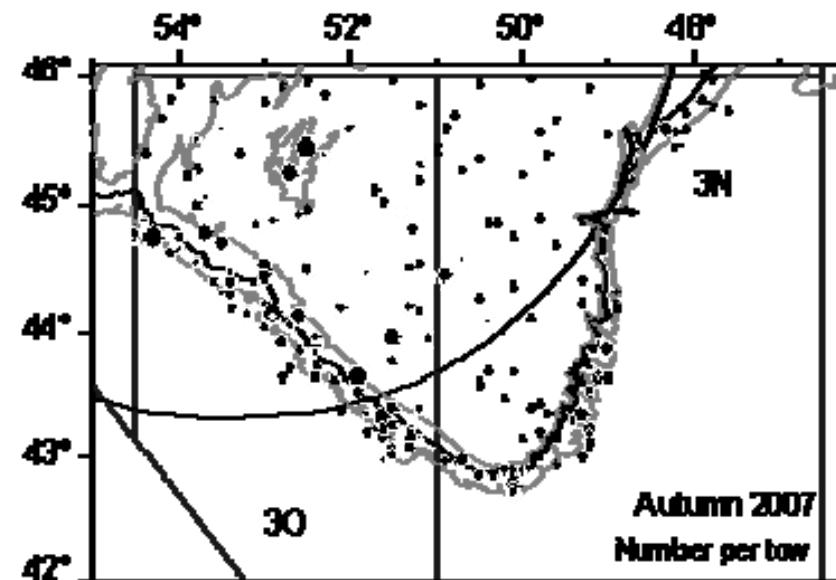
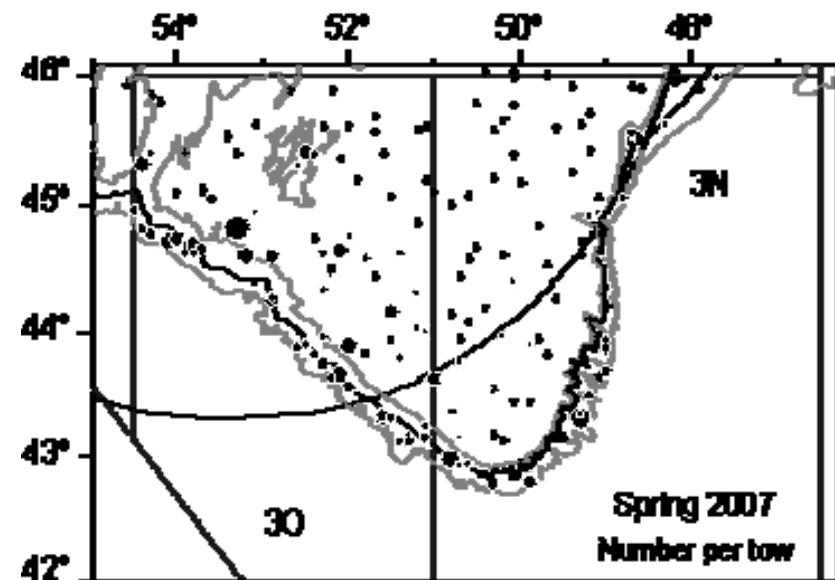


Figure 18. Distribution of witch flounder in NAFO Divs. 3NO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 2007.

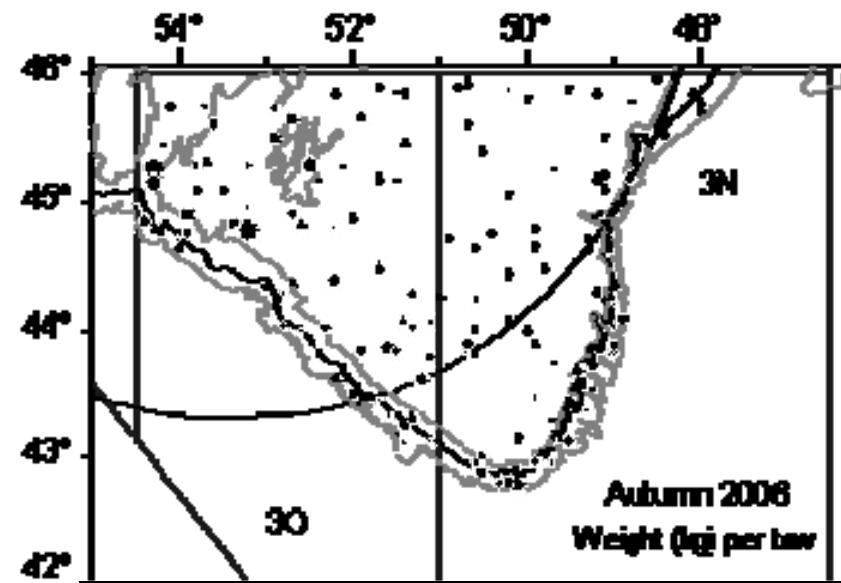
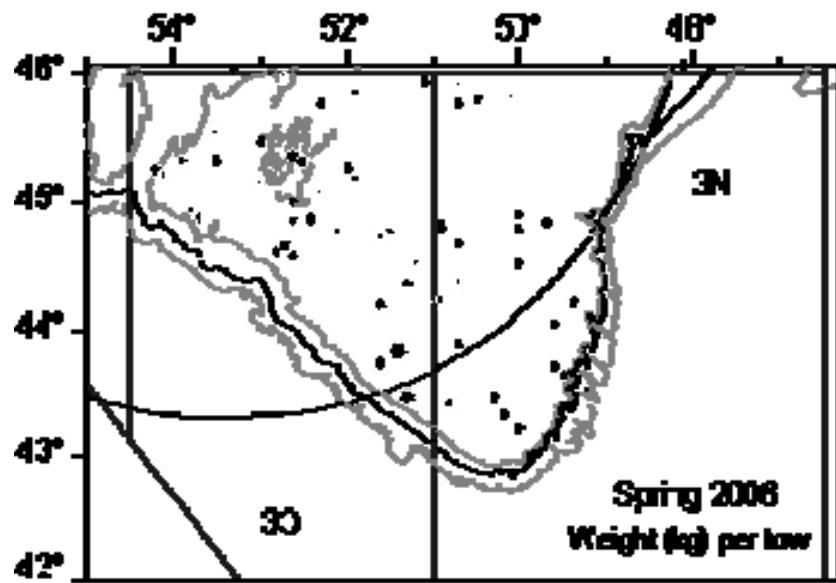
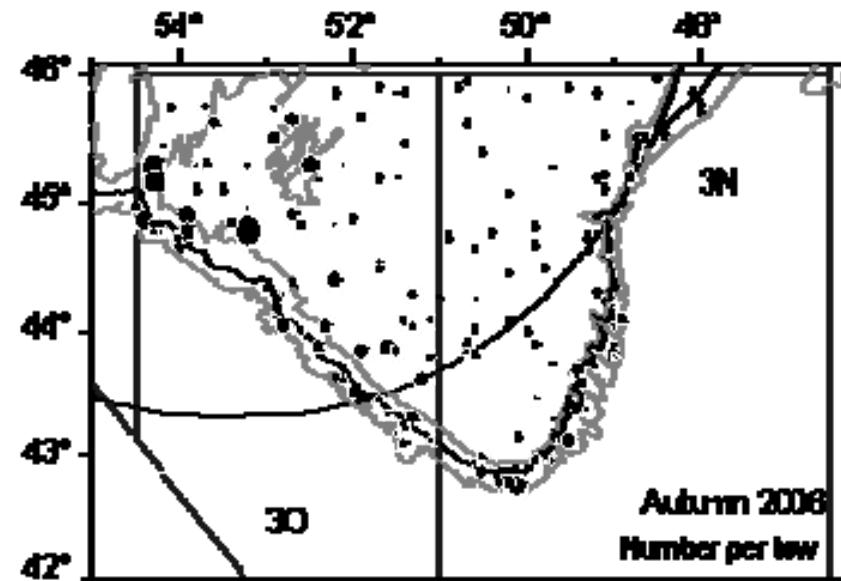
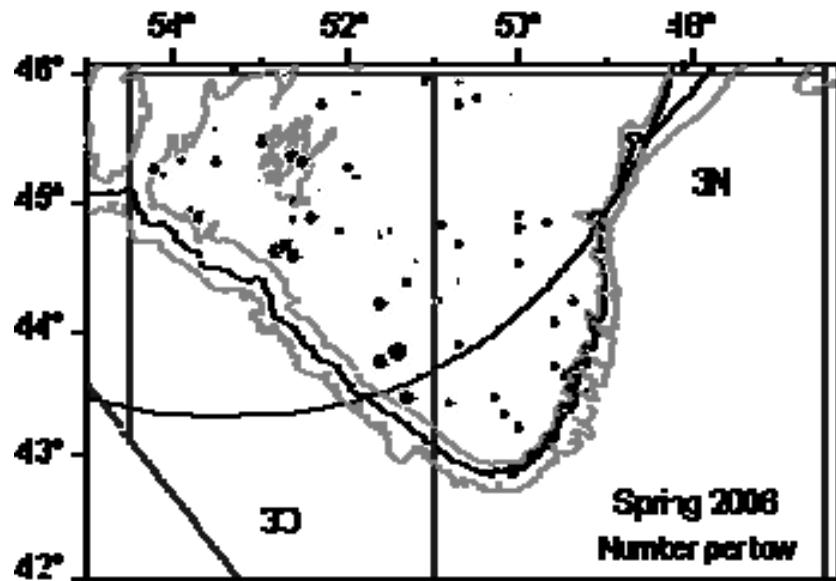


Figure 19. Distribution of witch flounder in NAFO Divs. 3NO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 2006.

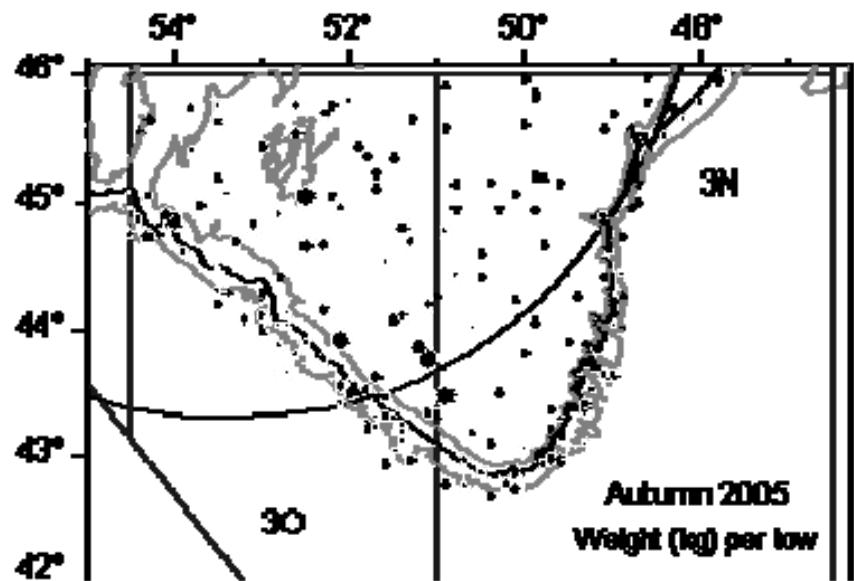
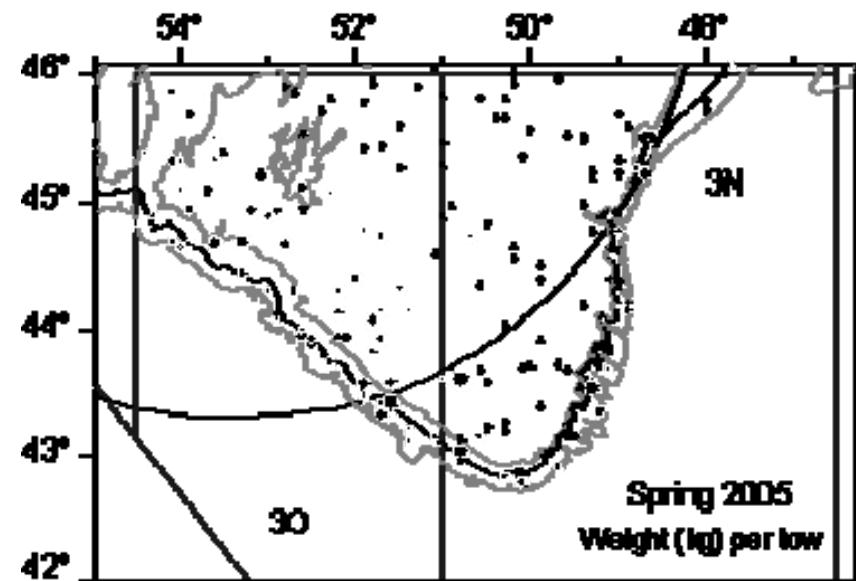
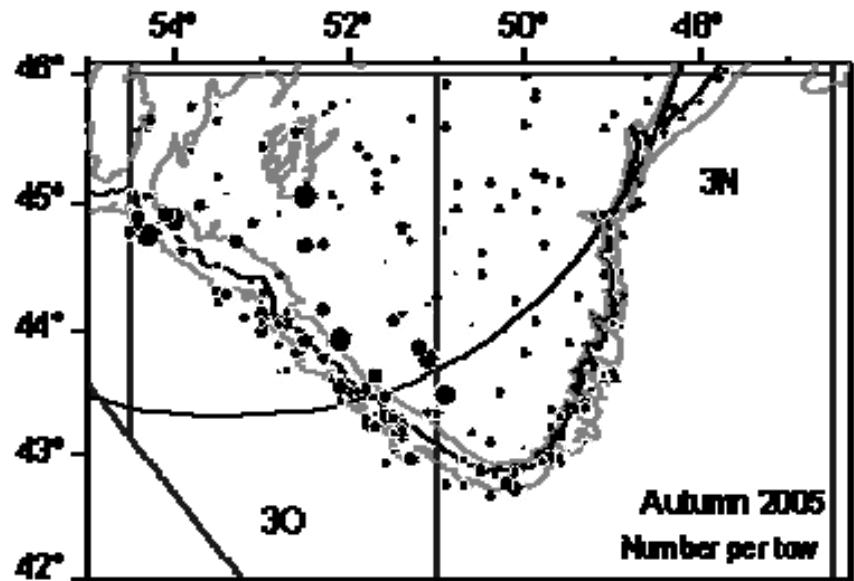
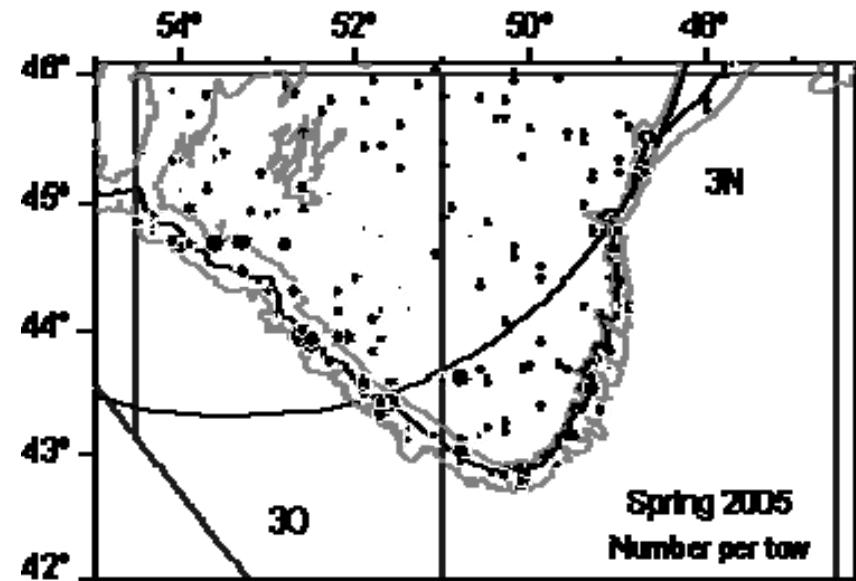


Figure 20. Distribution of witch flounder in NAFO Divs. 3NO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 2005.

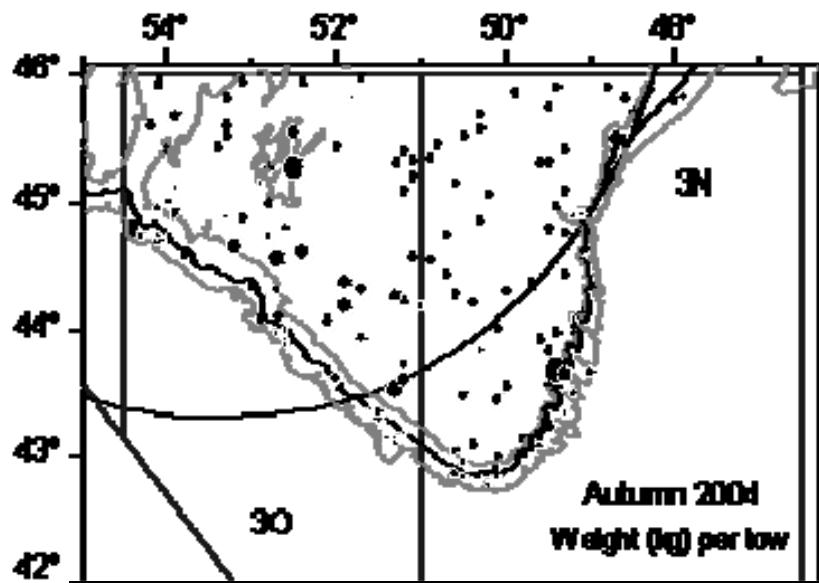
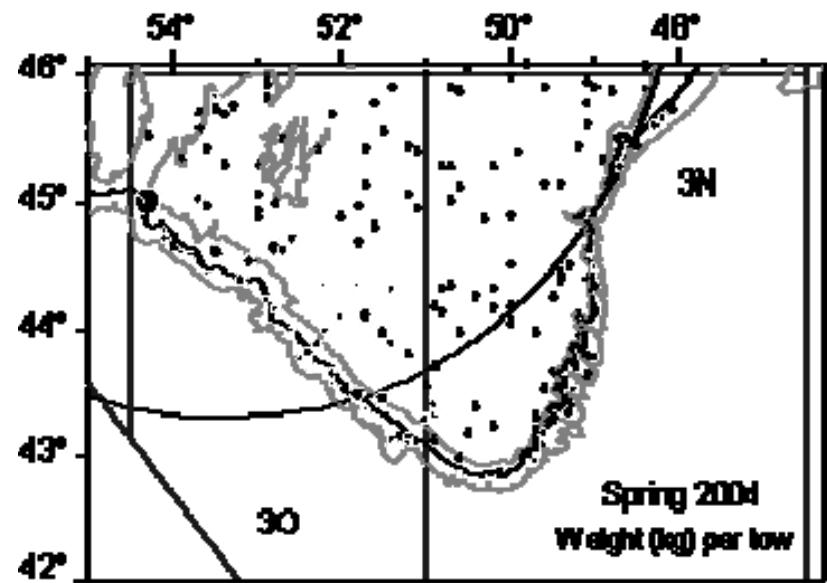
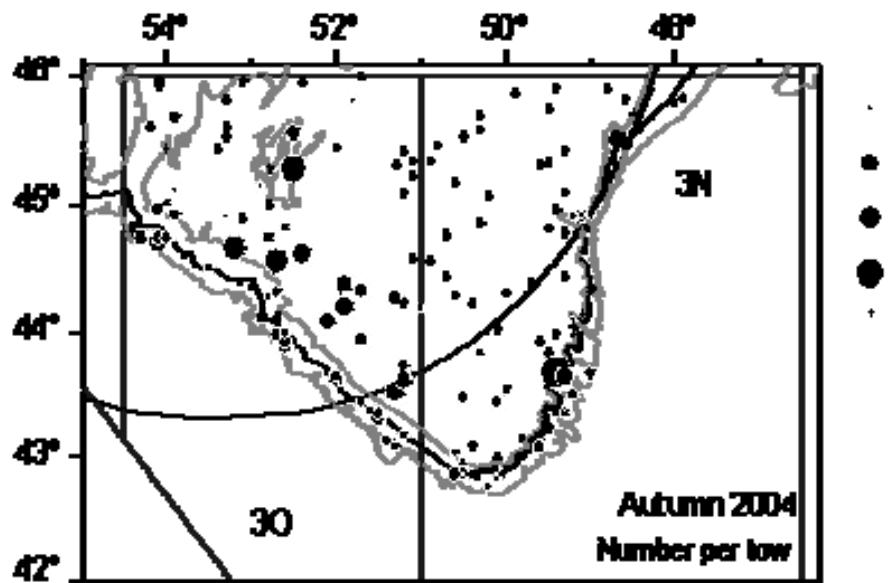
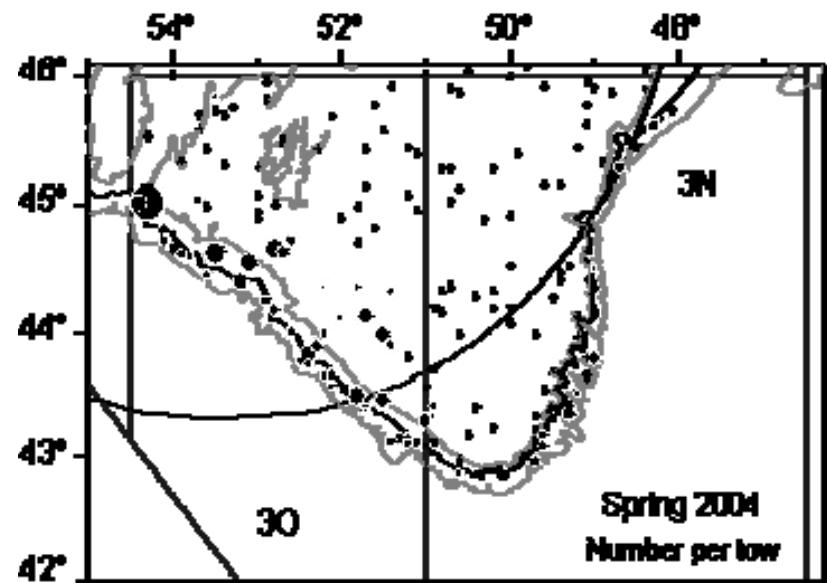


Figure 21. Distribution of witch flounder in NAFO Divs. 3NO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 2004.

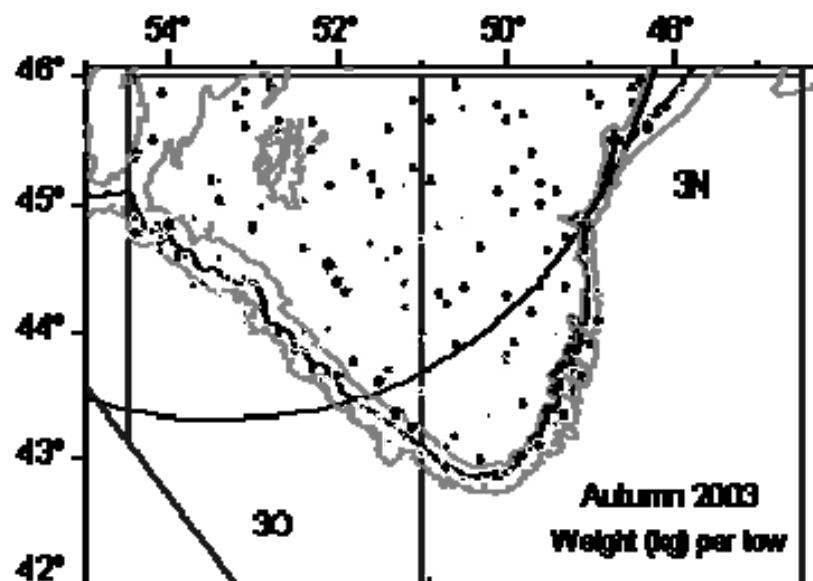
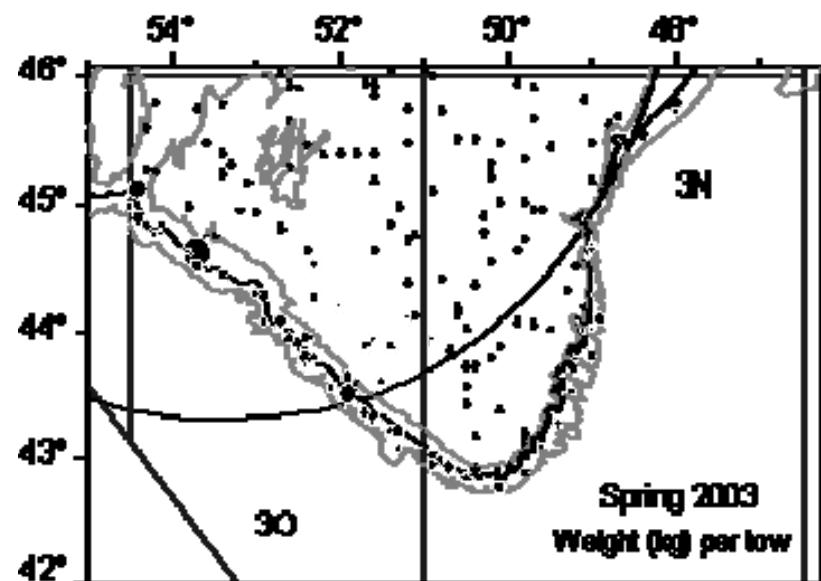
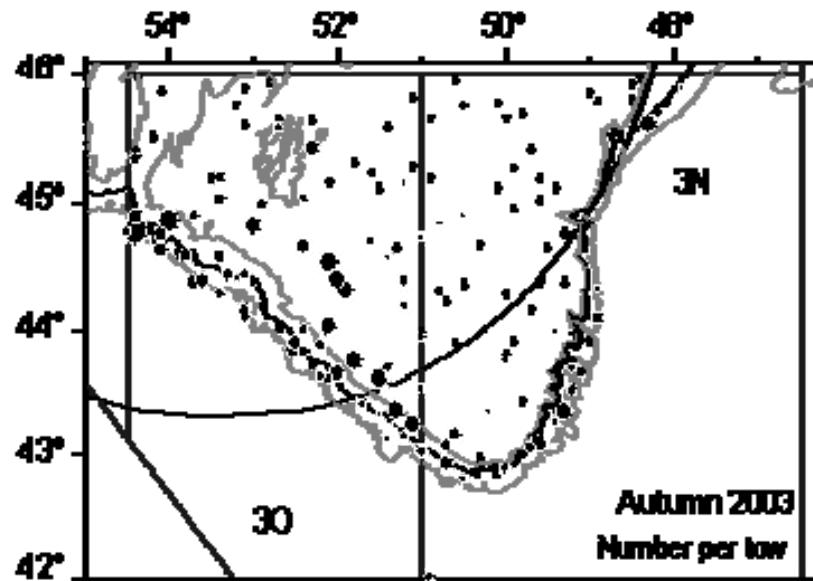
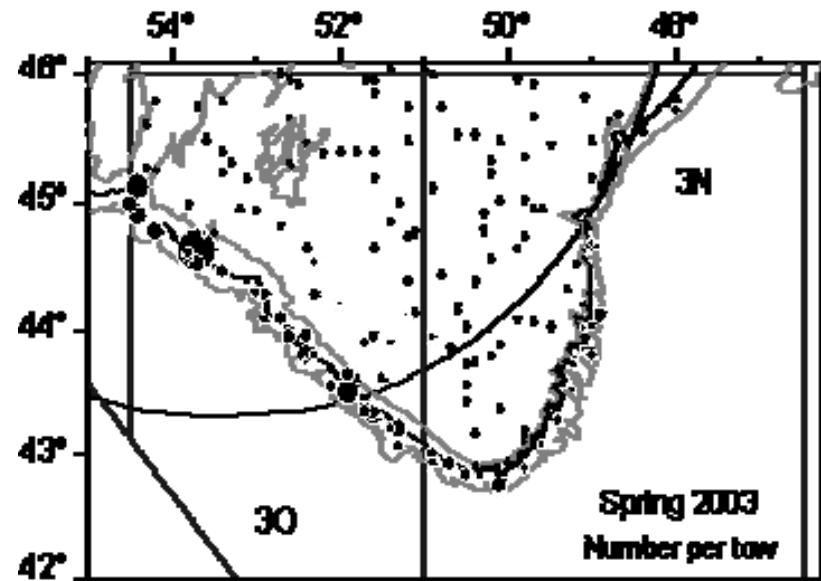


Figure 22. Distribution of witch flounder in NAFO Divs. 3NO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 2003.

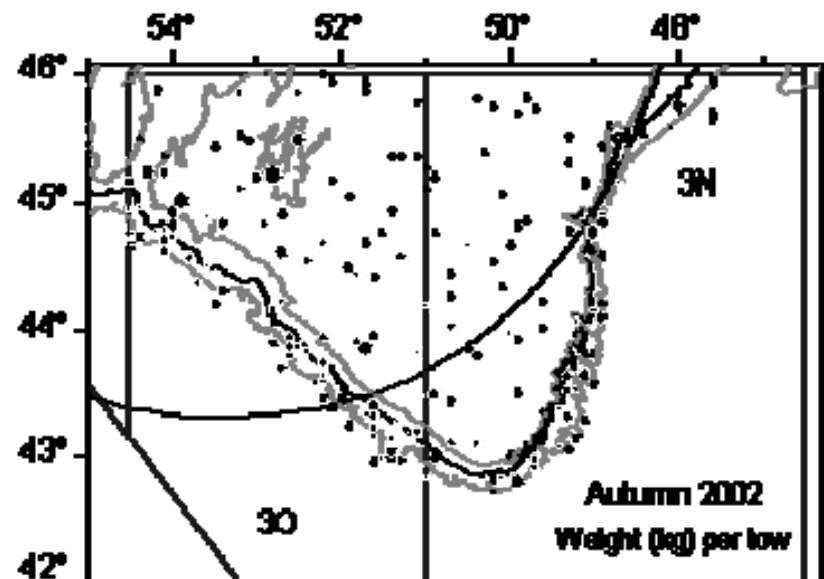
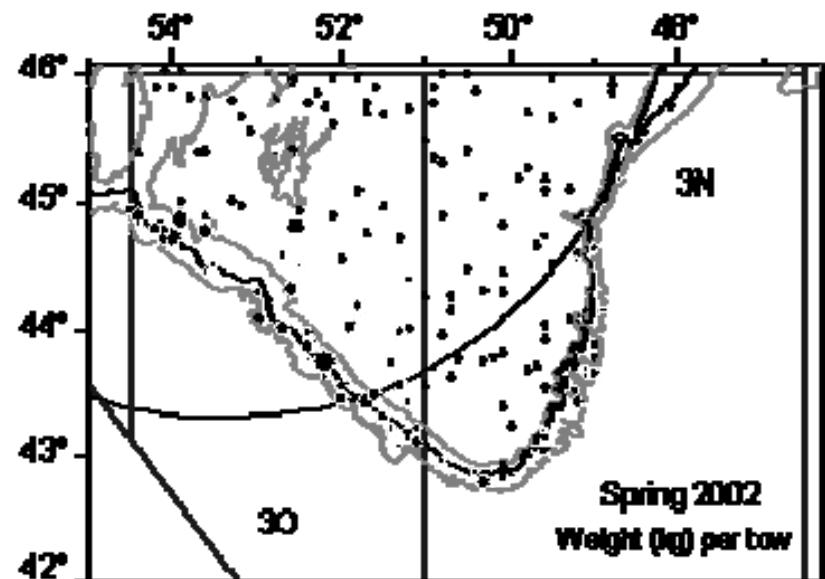
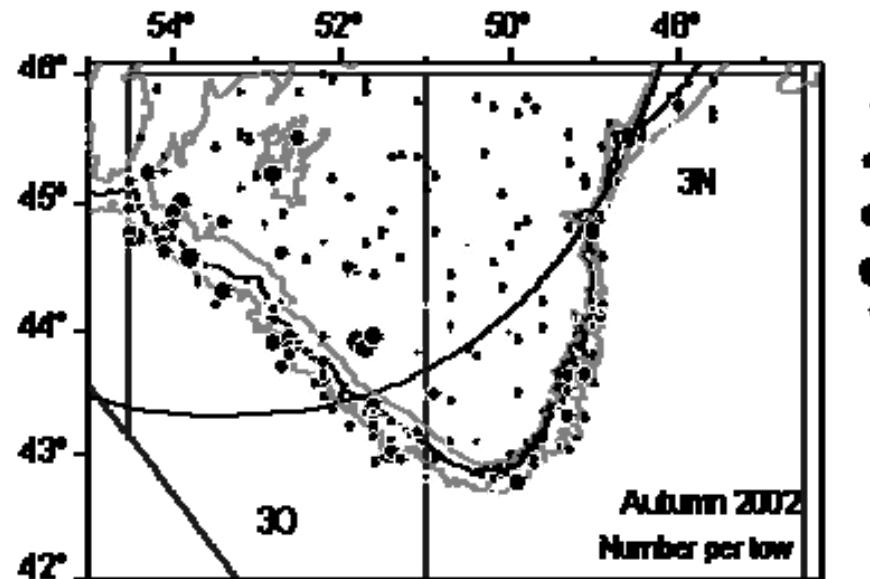
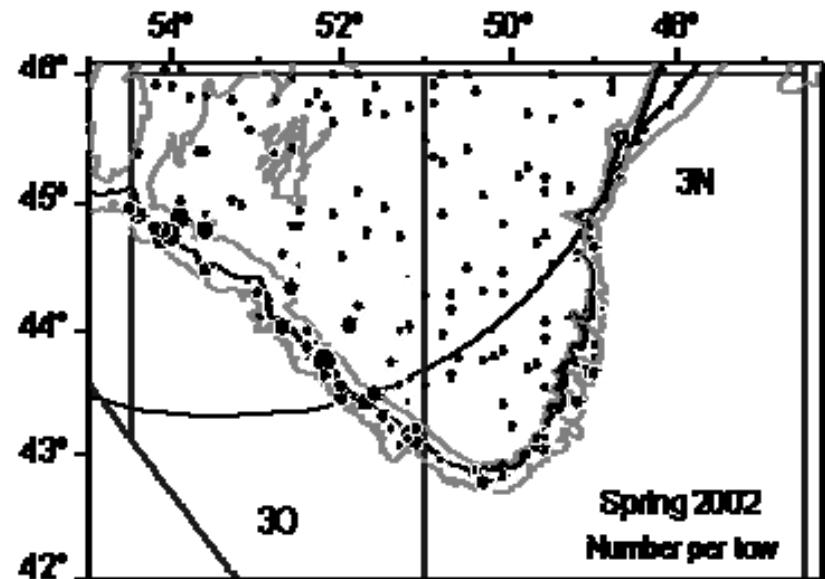


Figure 23. Distribution of witch flounder in NAFO Divs. 3NO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 2002.

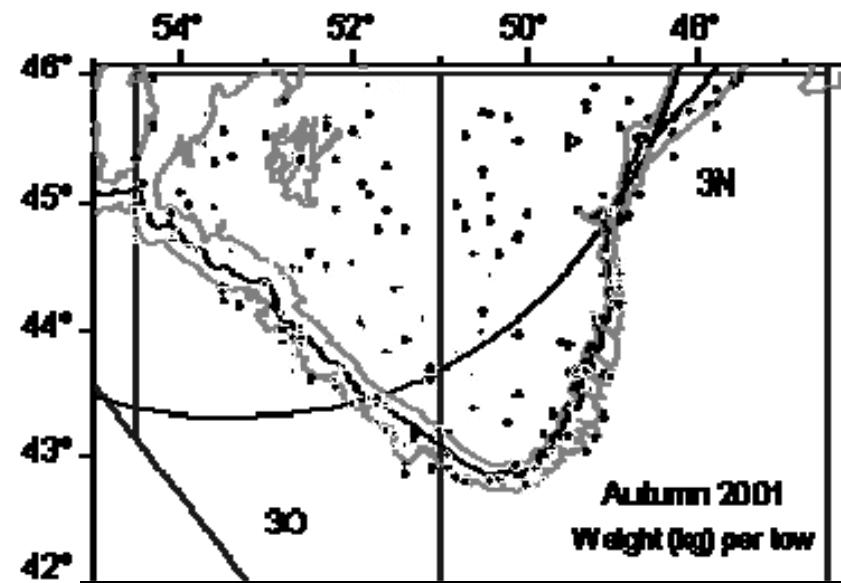
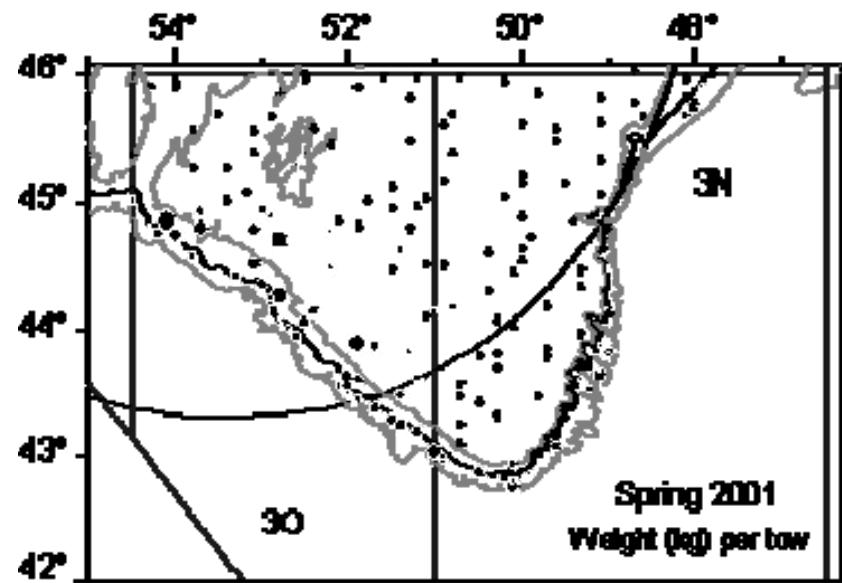
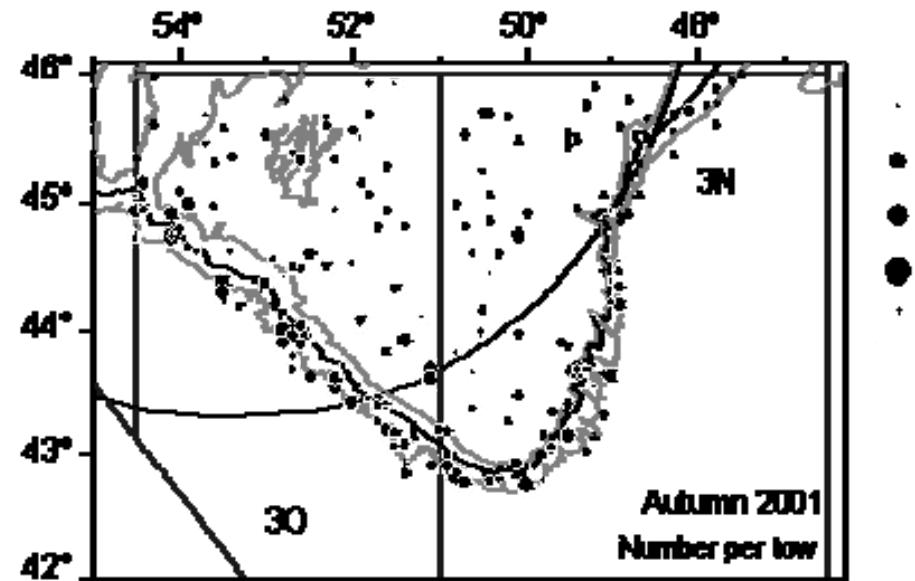
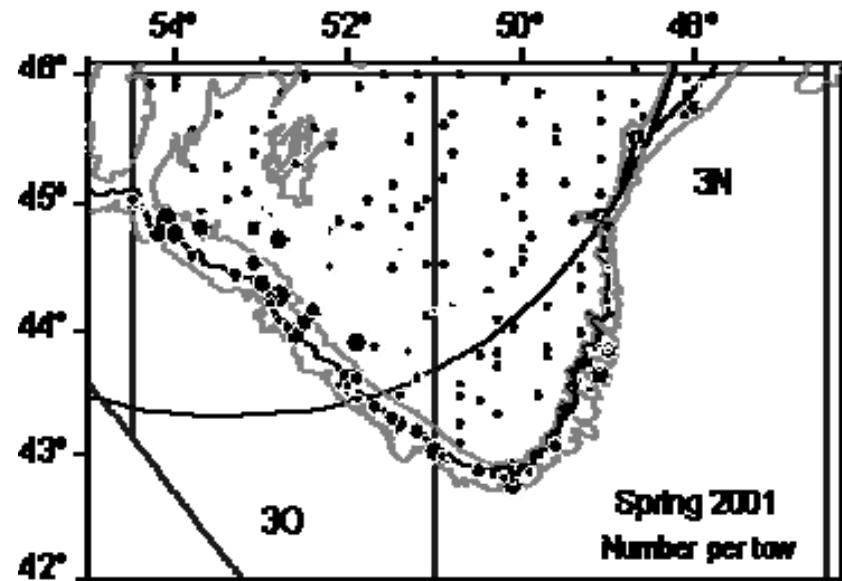


Figure 24. Distribution of witch flounder in NAFO Divs. 3NO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 2001.

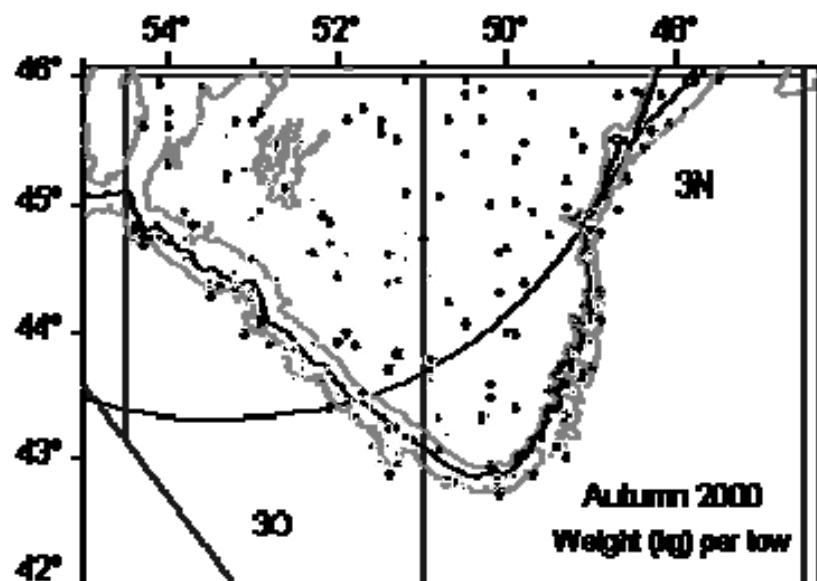
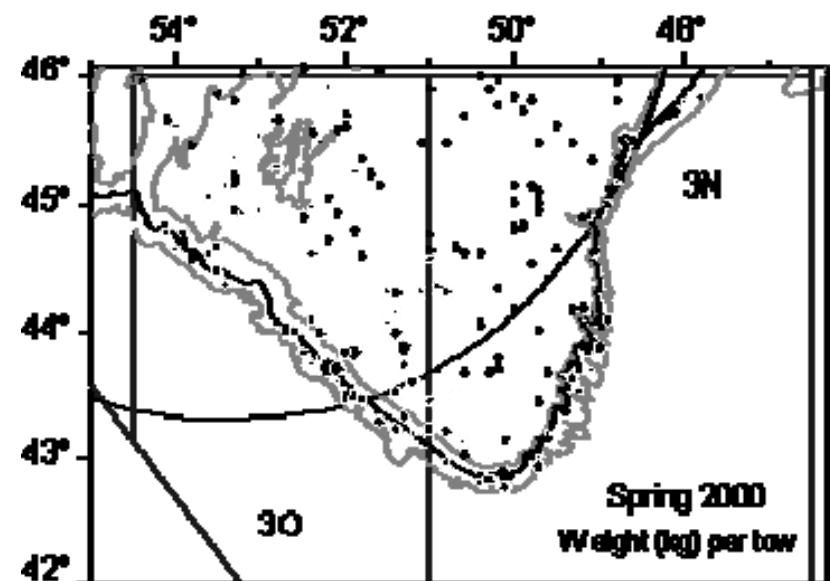
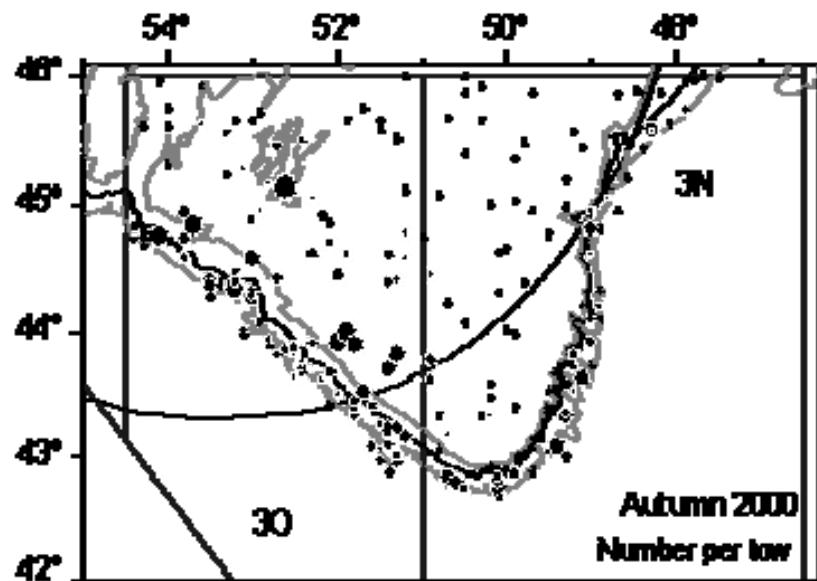
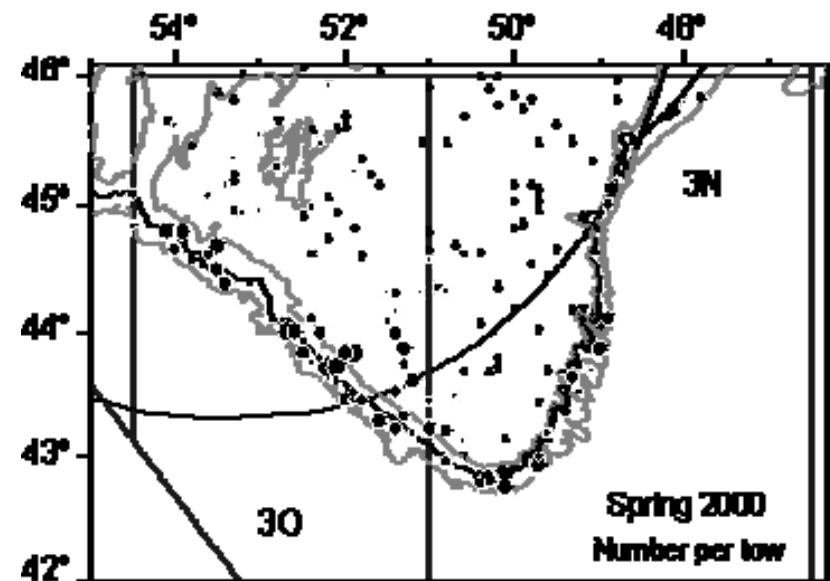


Figure 25. Distribution of witch flounder in NAFO Divs. 3NO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 2000.

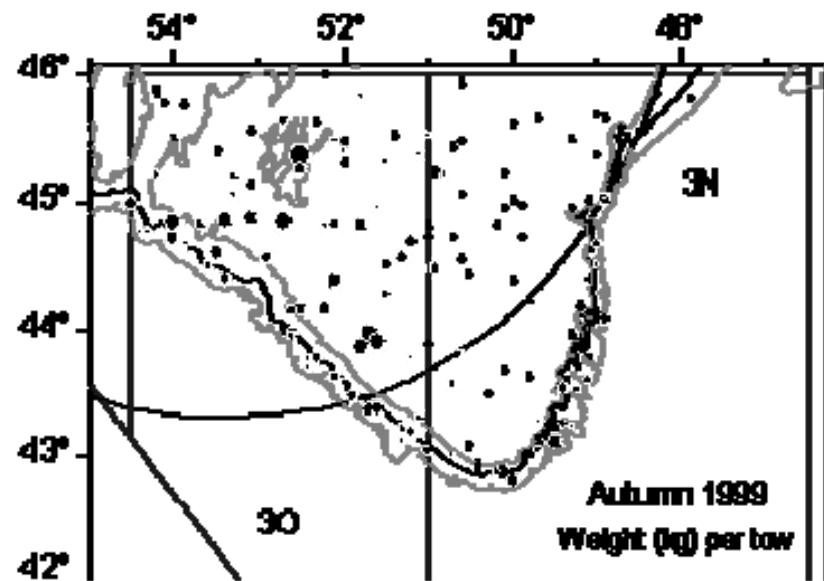
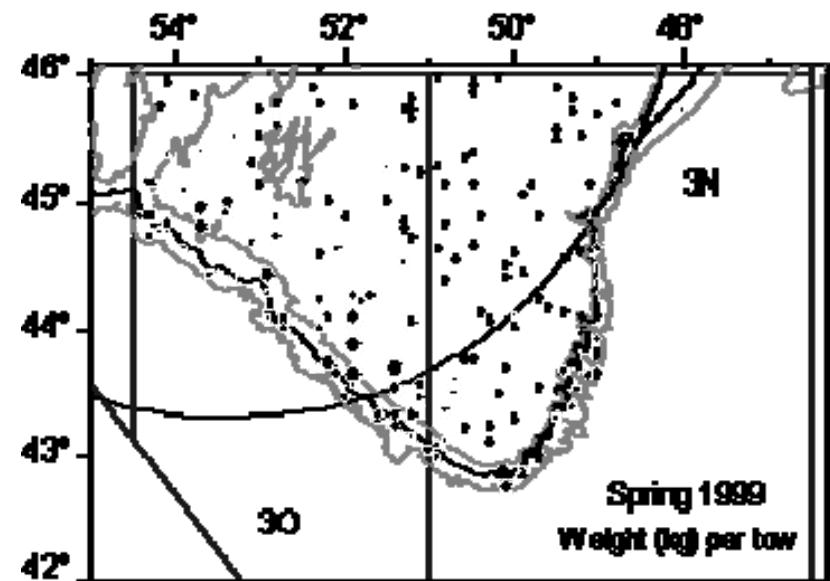
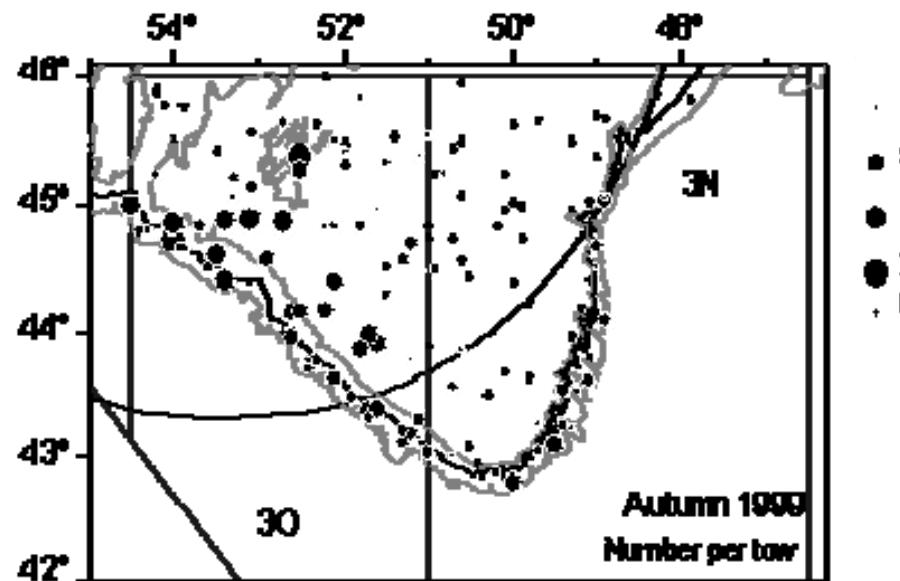
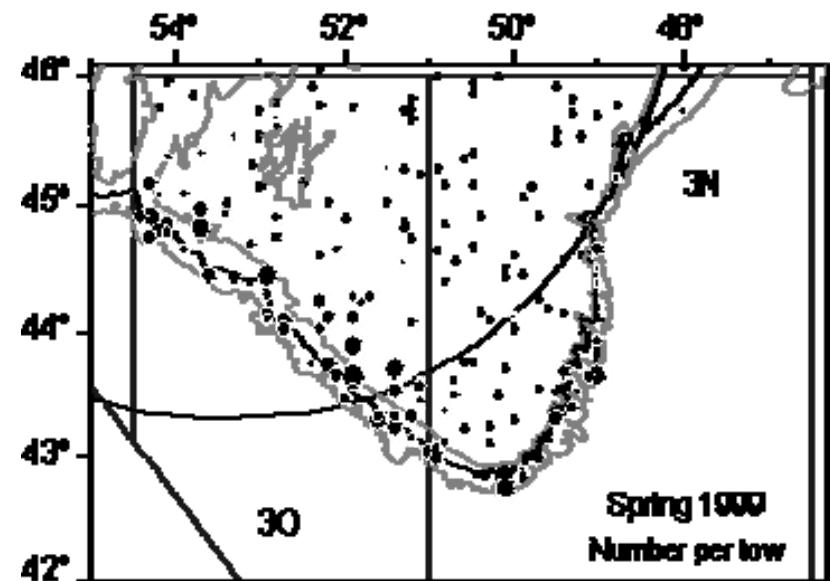


Figure 26. Distribution of witch flounder in NAFO Divs. 3NO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 1999.

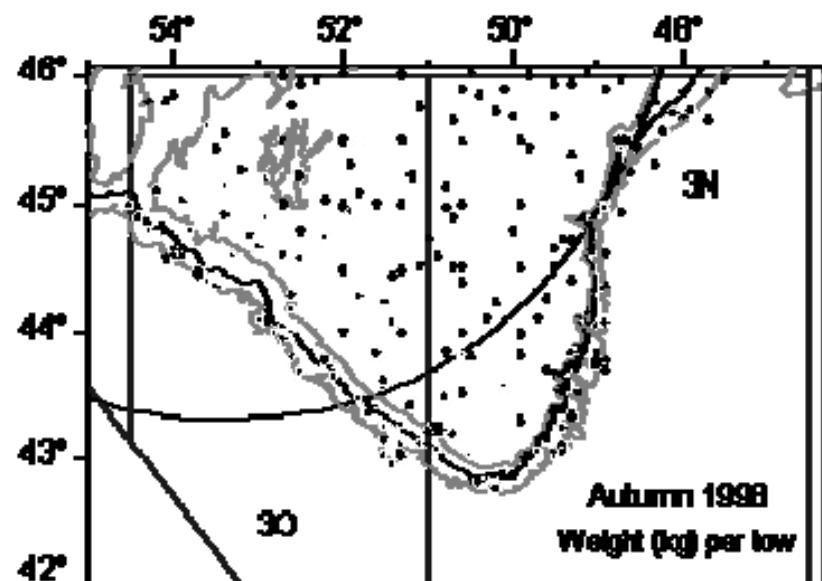
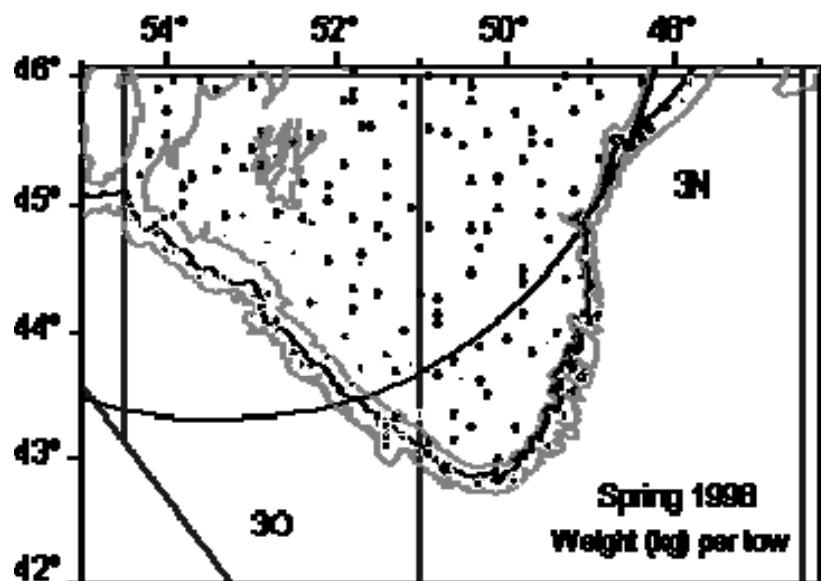
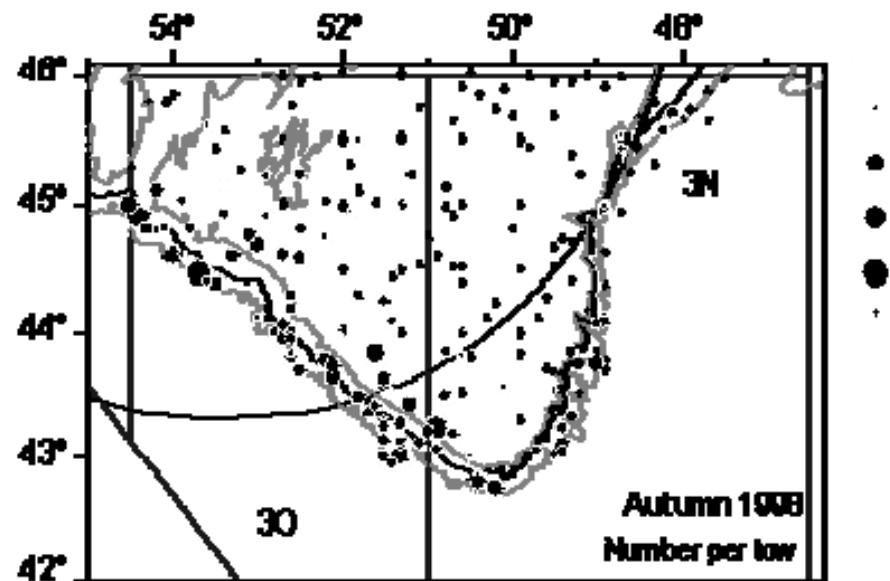
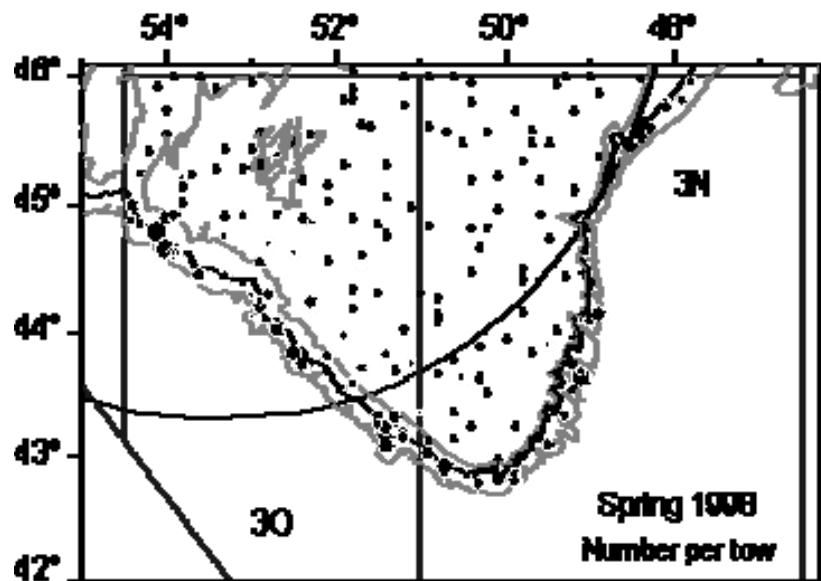


Figure 27. Distribution of witch flounder in NAFO Divs. 3NO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 1998.

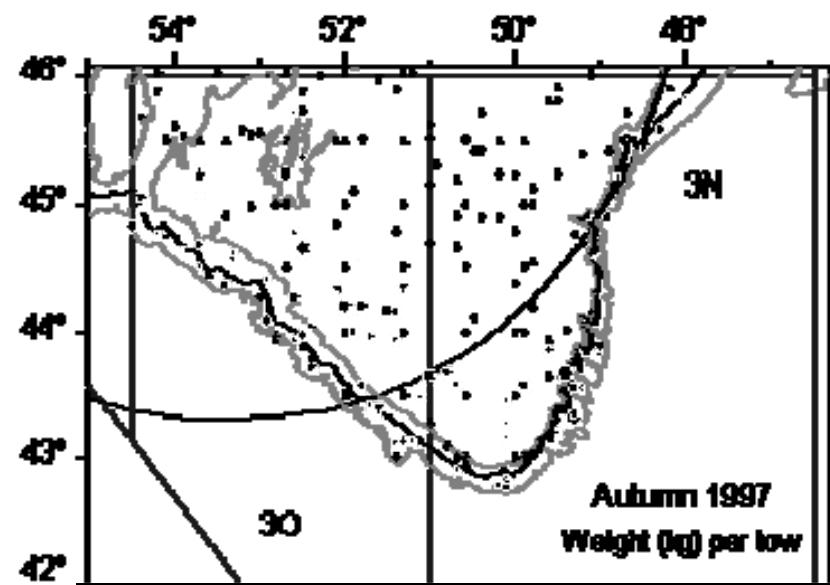
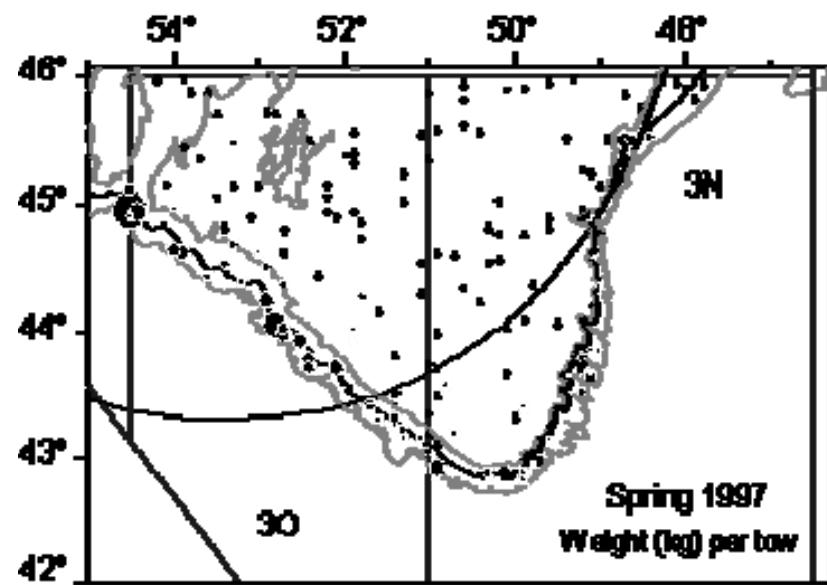
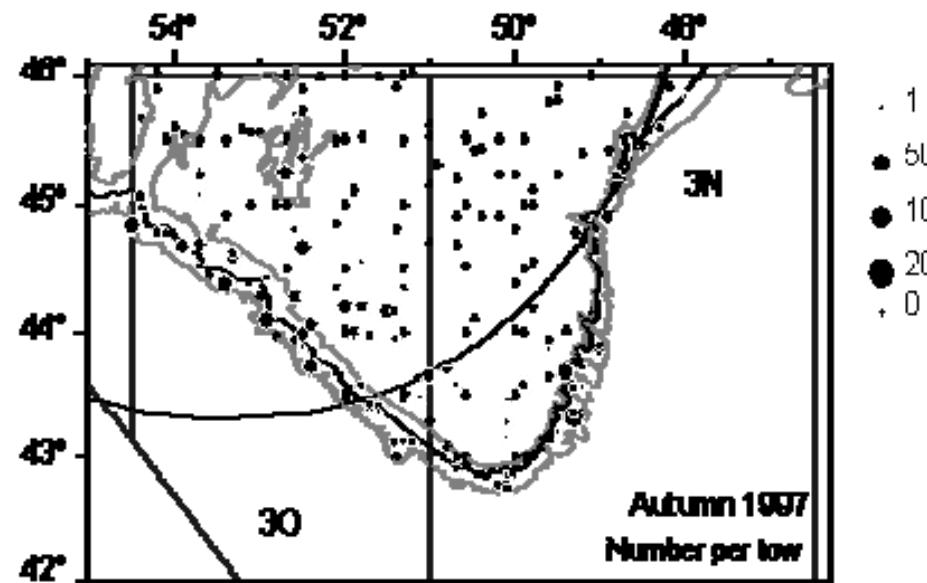
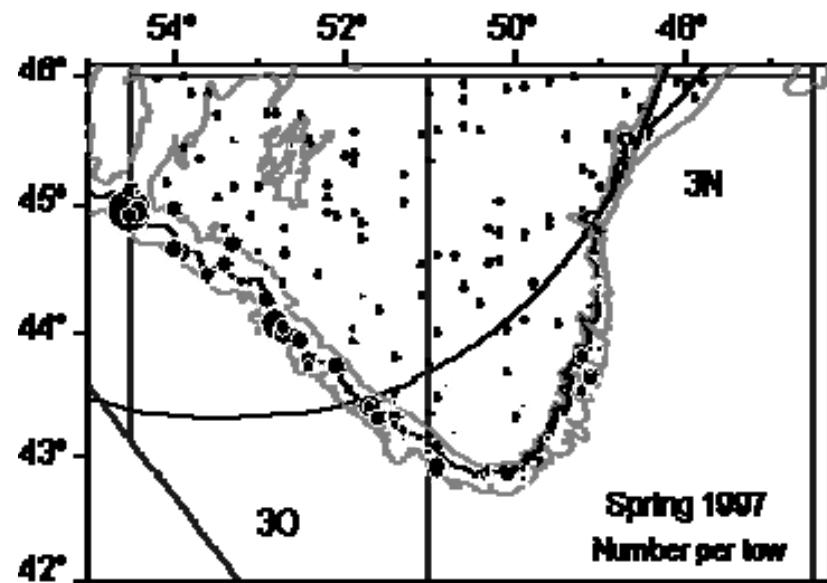


Figure 28. Distribution of witch flounder in NAFO Divs. 3NO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 1997.

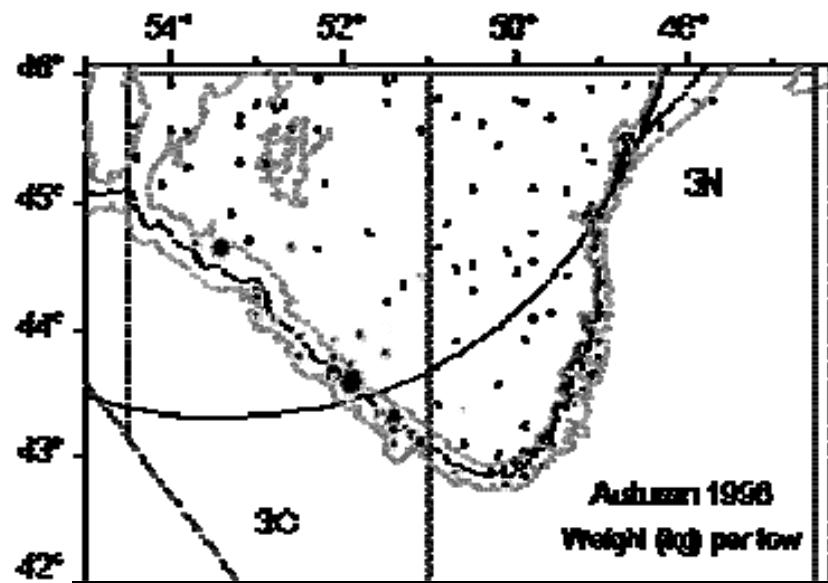
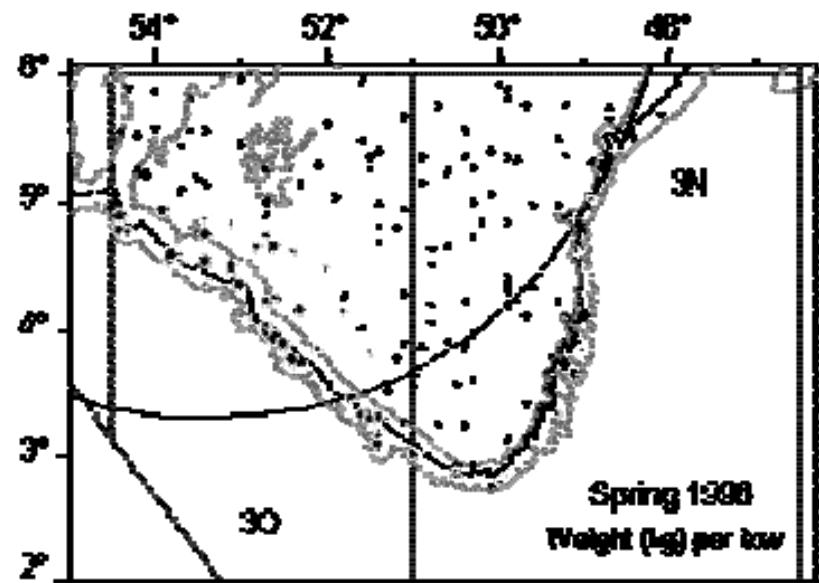
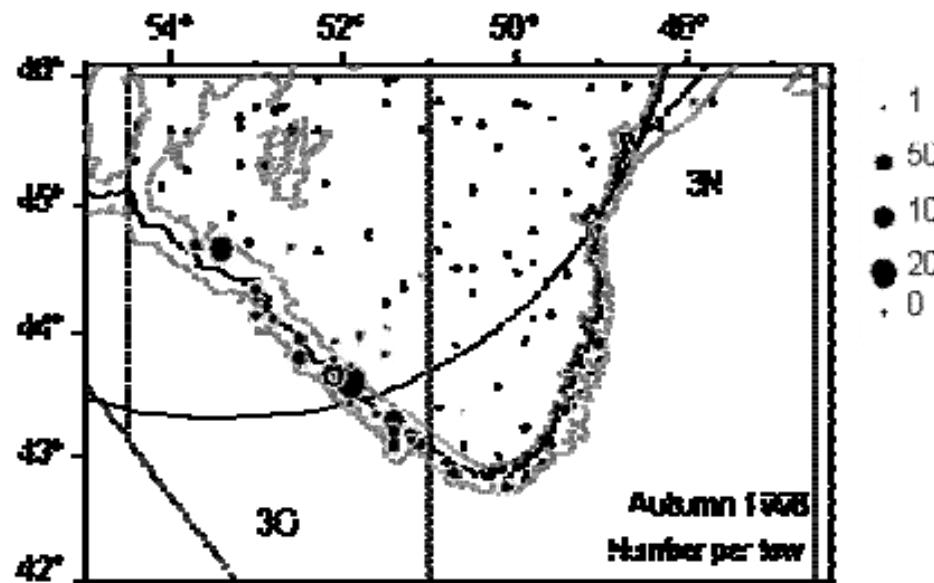
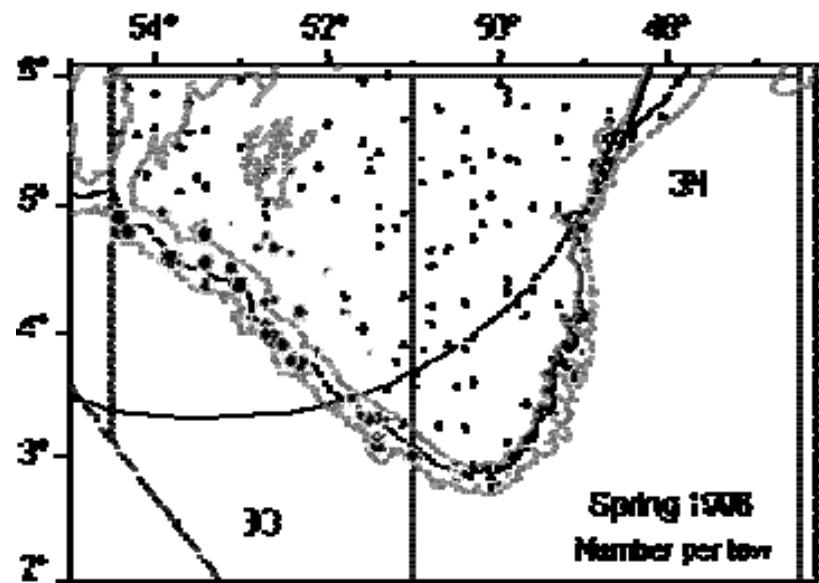


Figure 29. Distribution of witch flounder in NAFO Divs. 3NO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 1996.

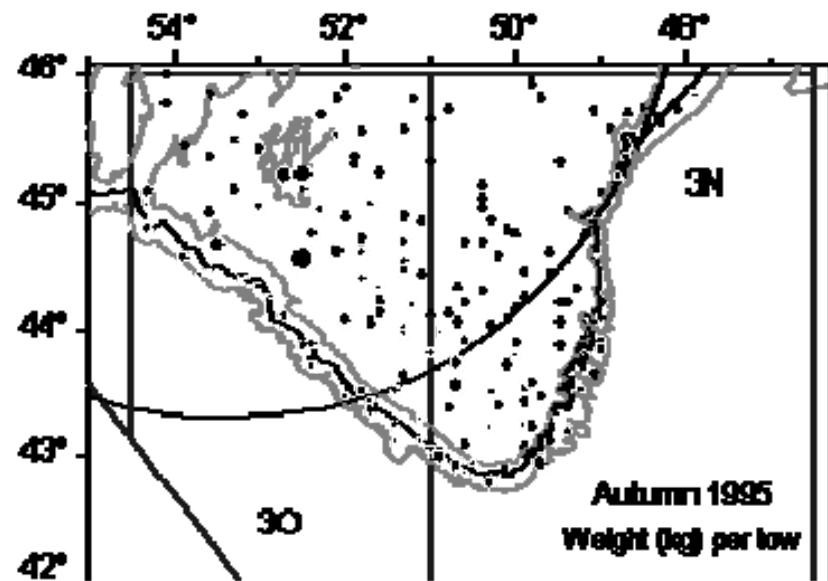
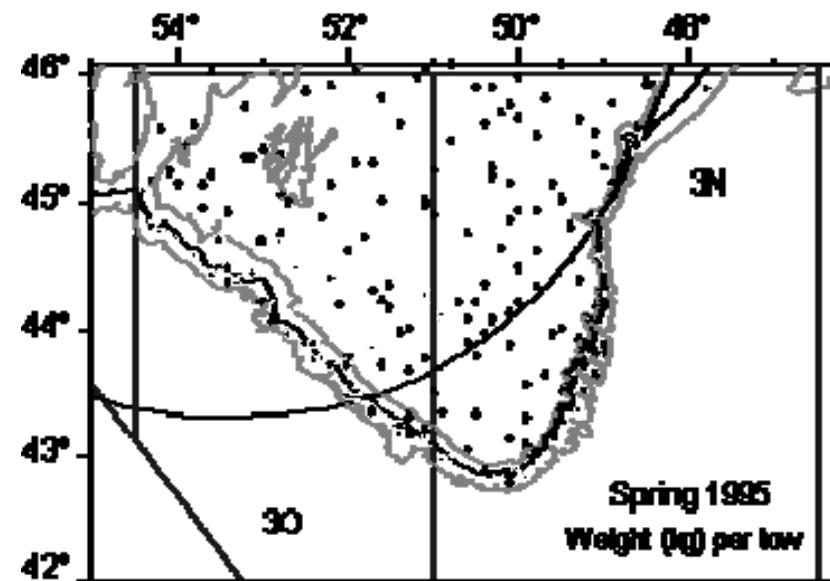
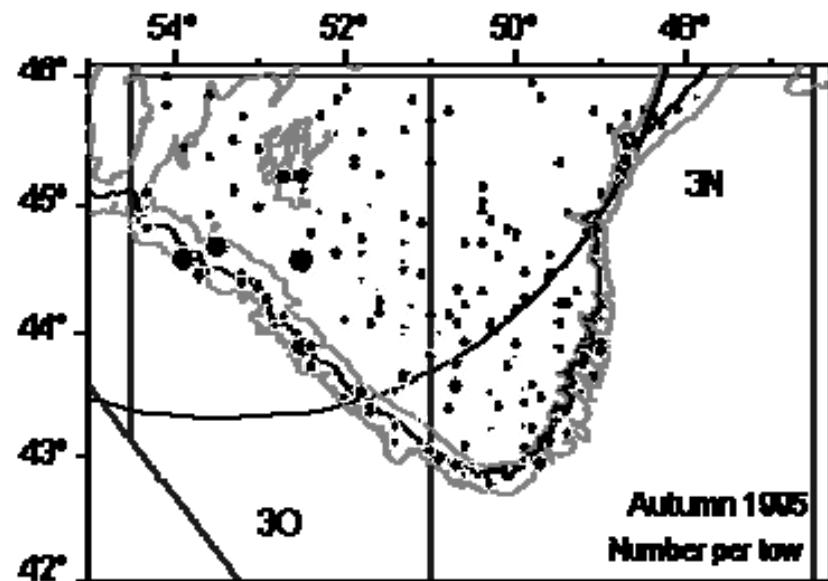
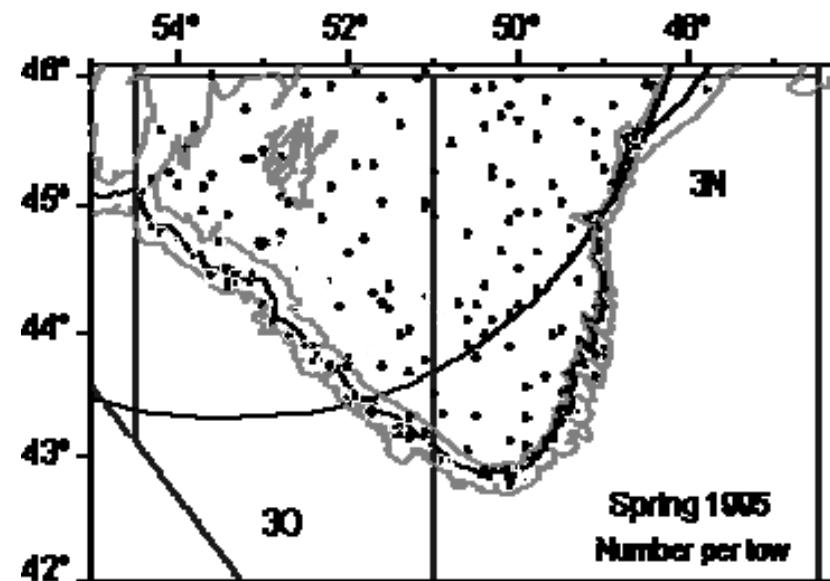


Figure 30. Distribution of witch flounder in NAFO Divs. 3NO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 1995.

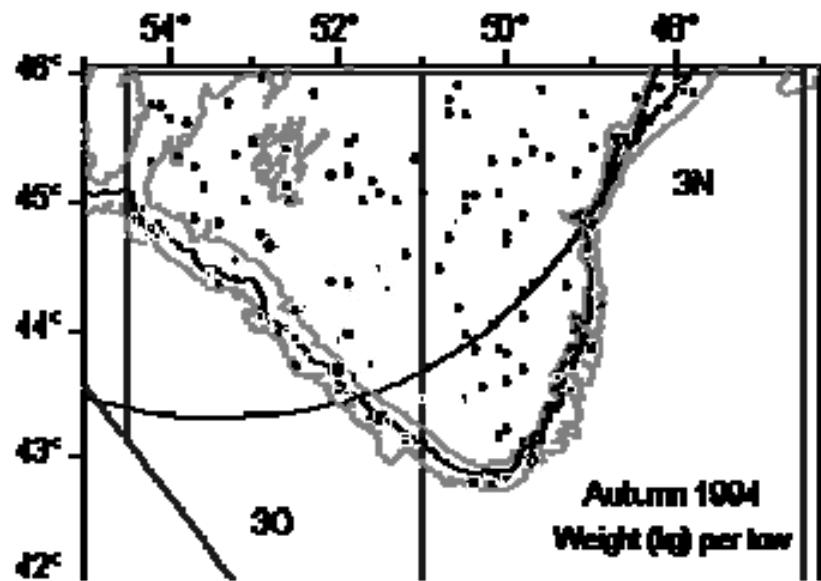
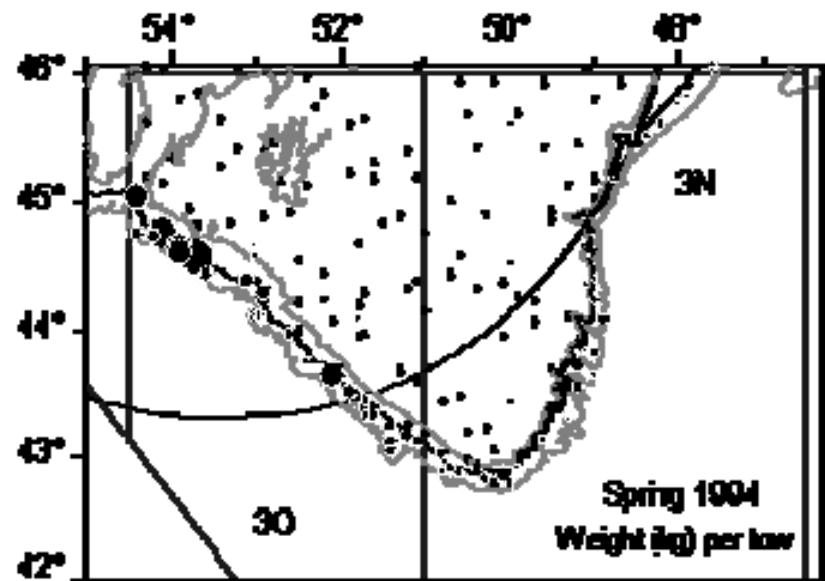
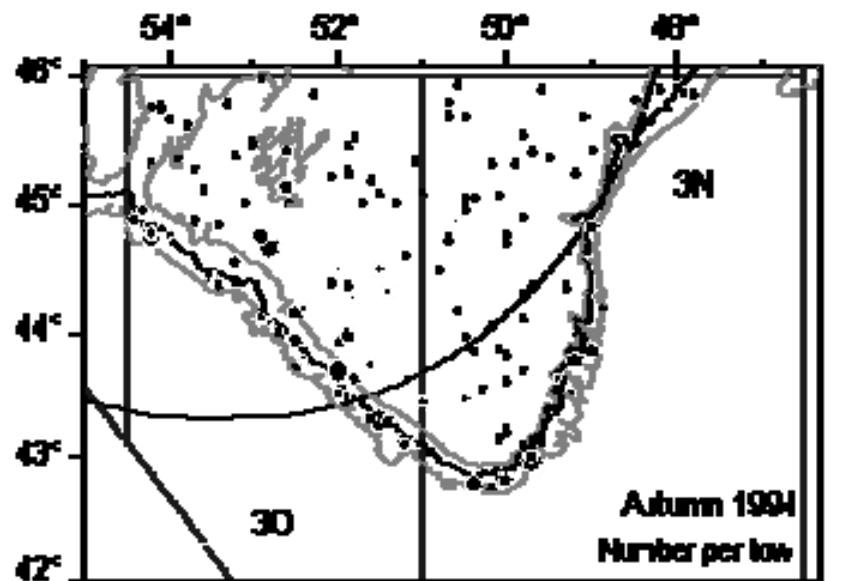
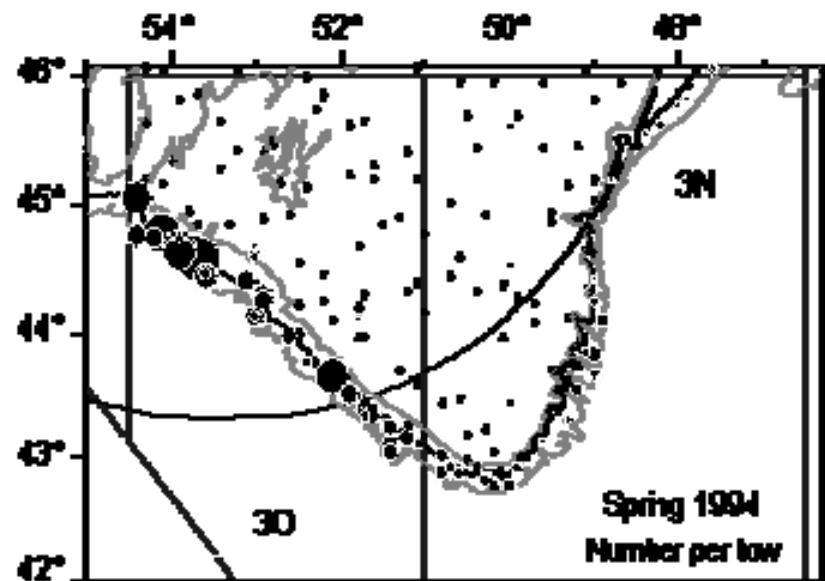


Figure 31. Distribution of witch flounder in NAFO Divs. 3NO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 1994.

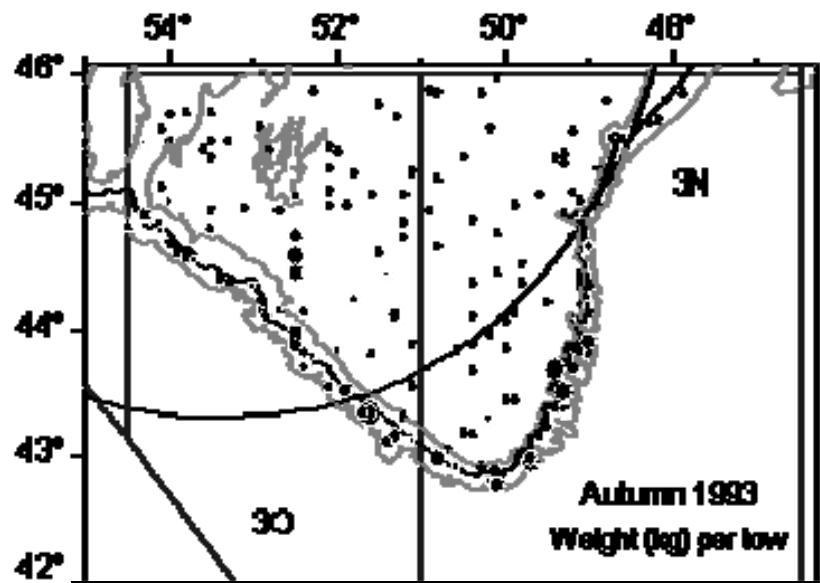
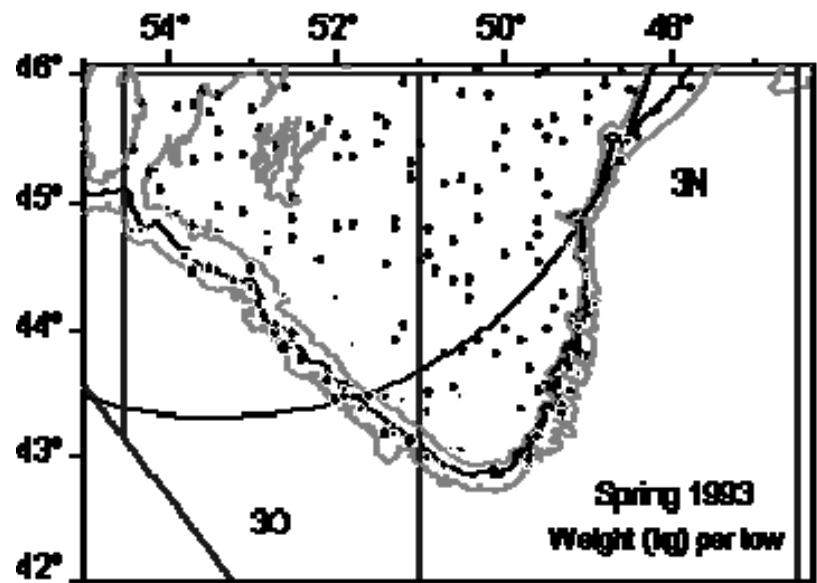
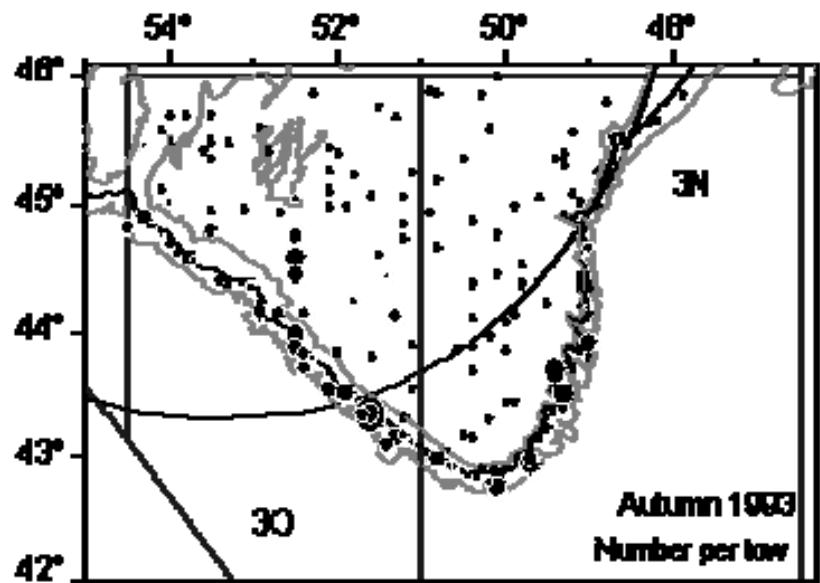
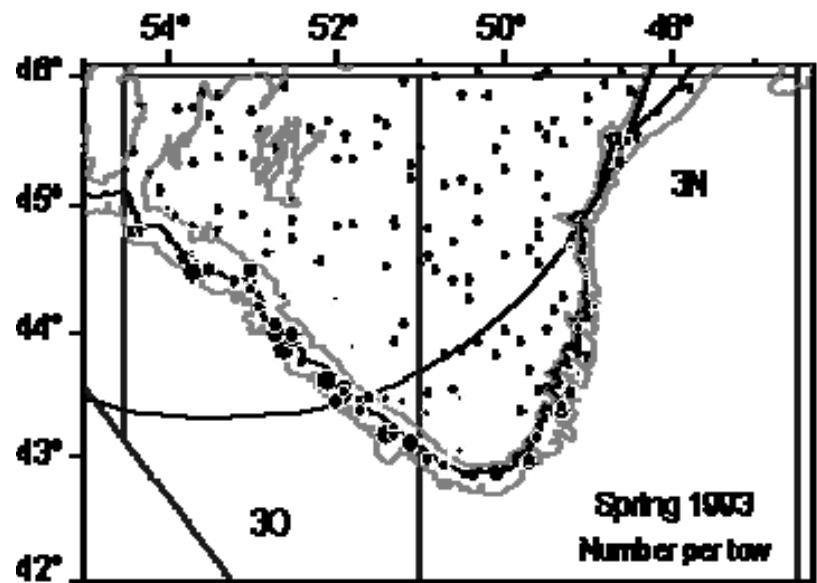


Figure 32. Distribution of witch flounder in NAFO Divs. 3NO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 1993.

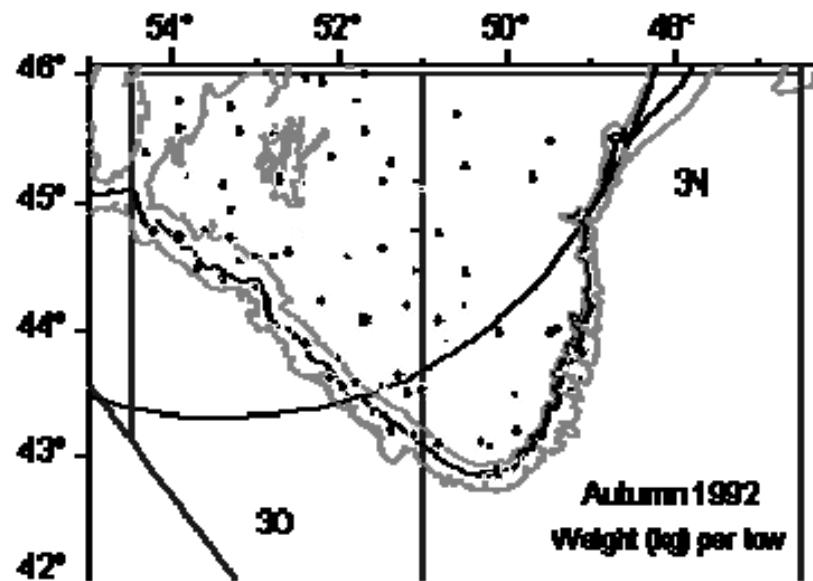
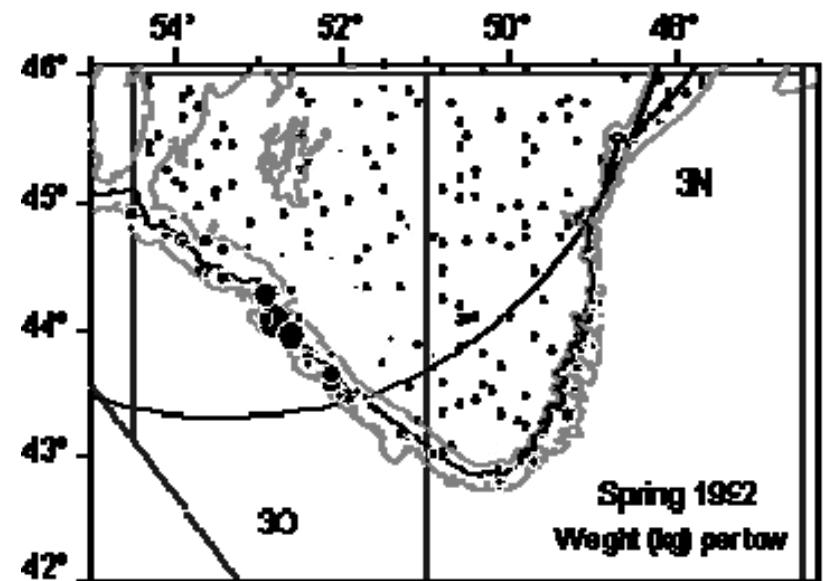
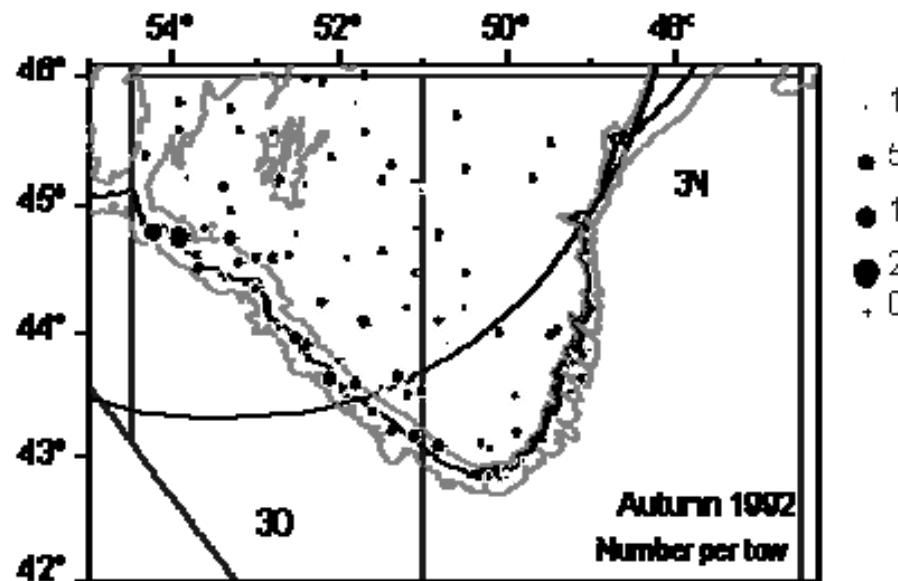
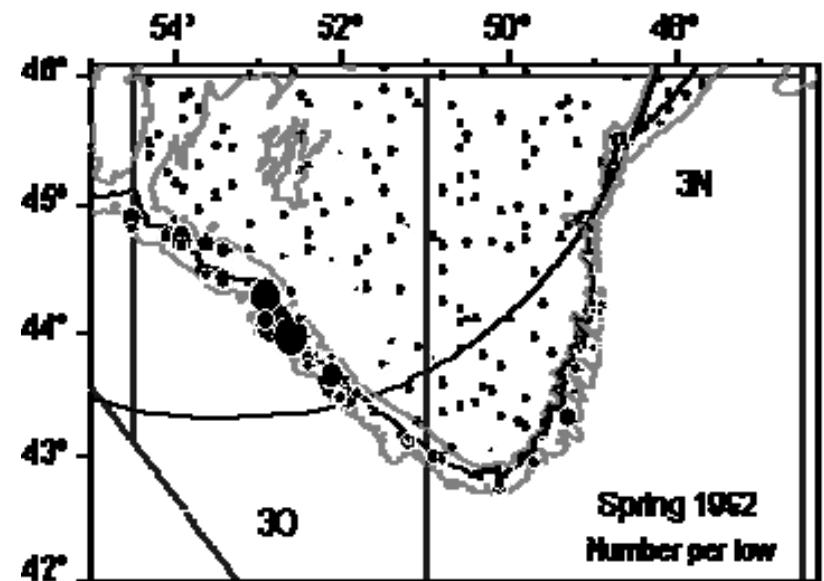
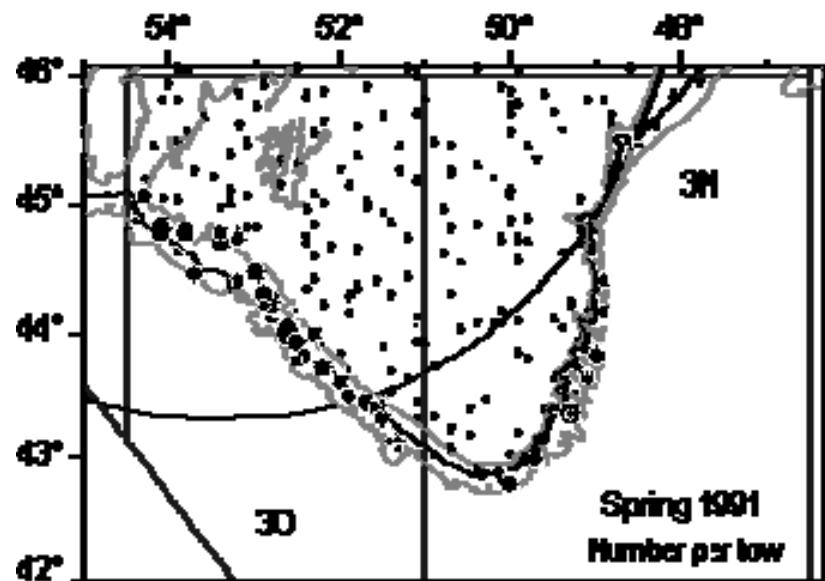
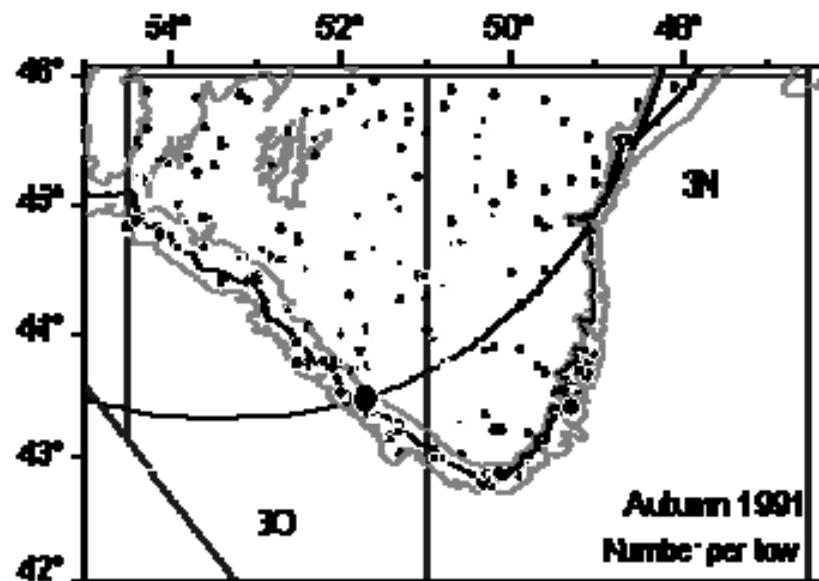


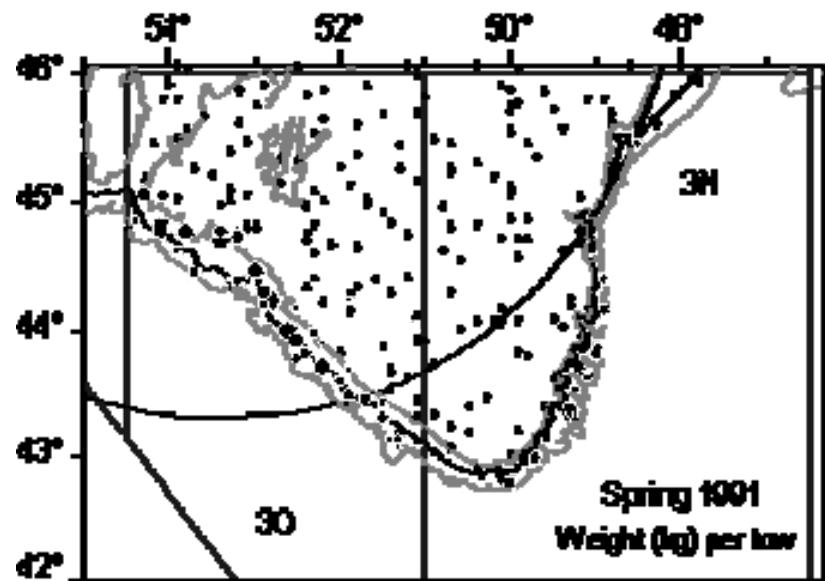
Figure 33. Distribution of witch flounder in NAFO Divs. 3NO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 1992.



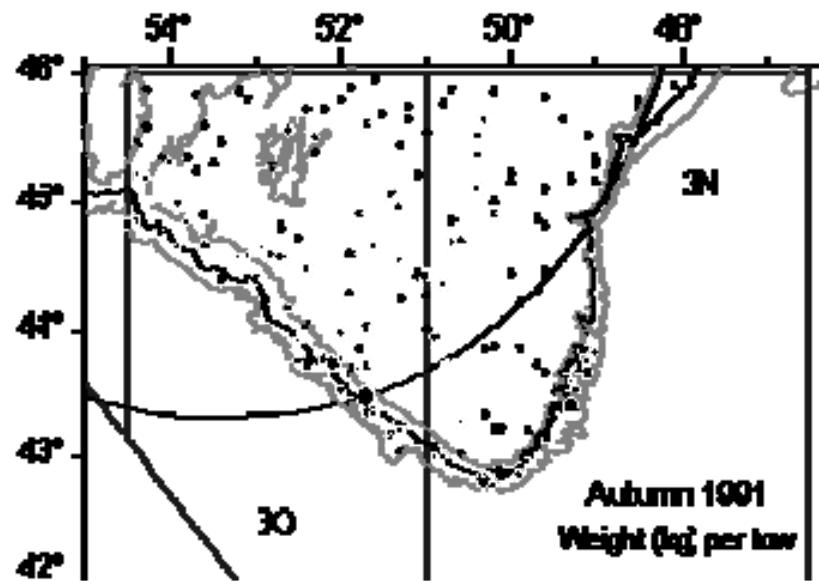
Spring 1991
Number per tow



Autumn 1991
Number per tow



Spring 1991
Weight (kg) per tow



Autumn 1991
Weight (kg) per tow

Figure 34. Distribution of witch flounder in NAFO Divs. 3NO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 1991.

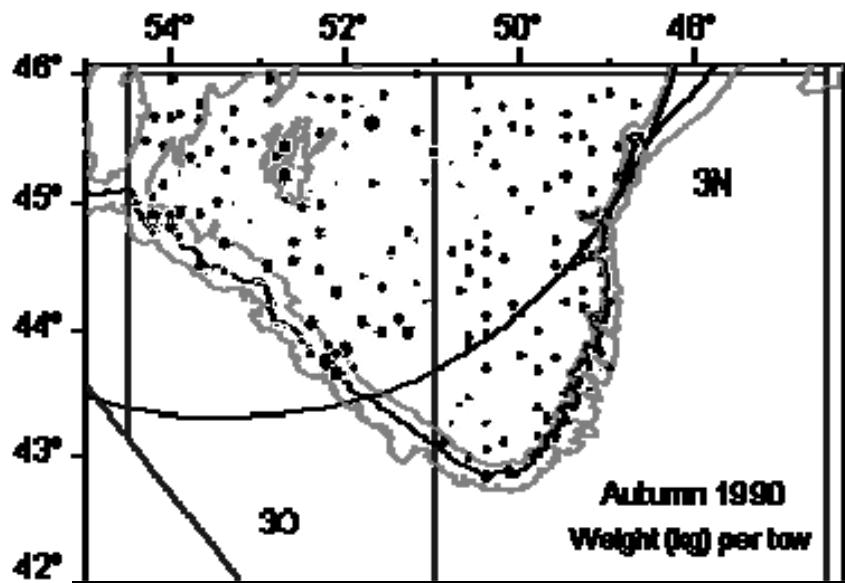
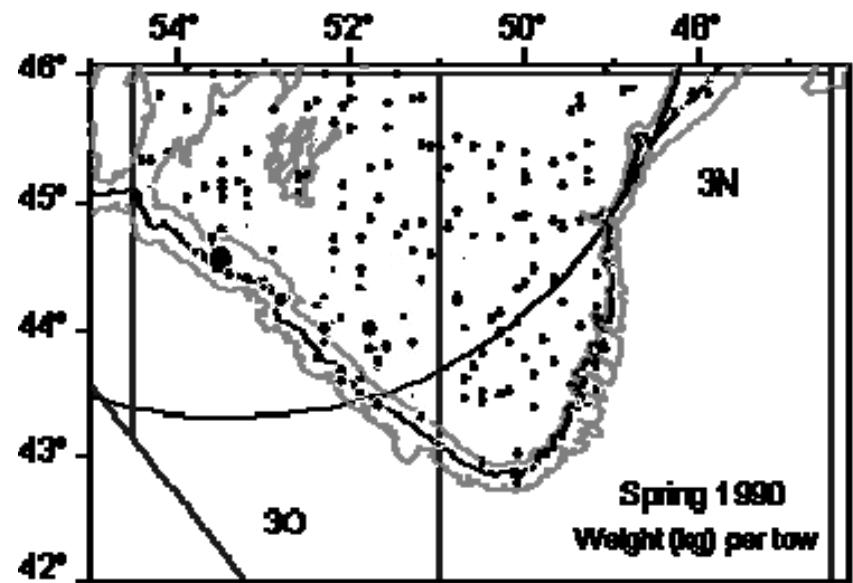
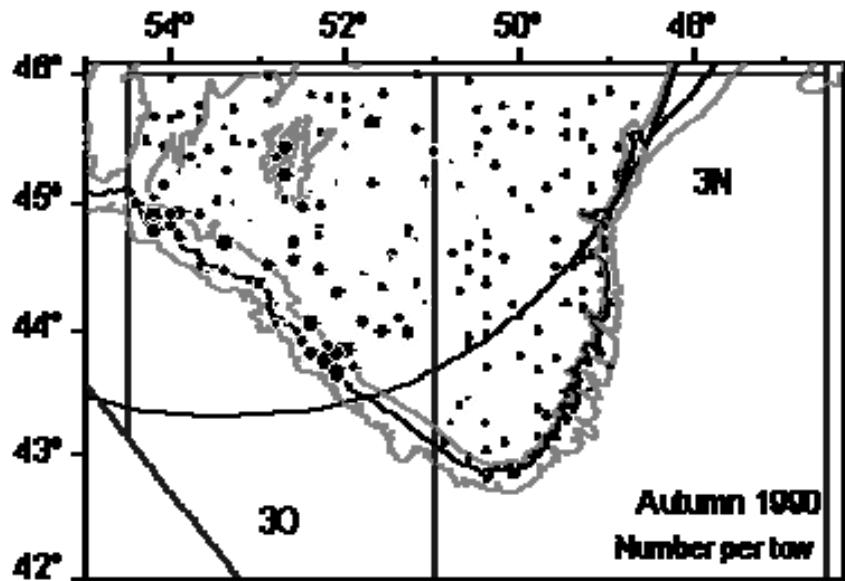
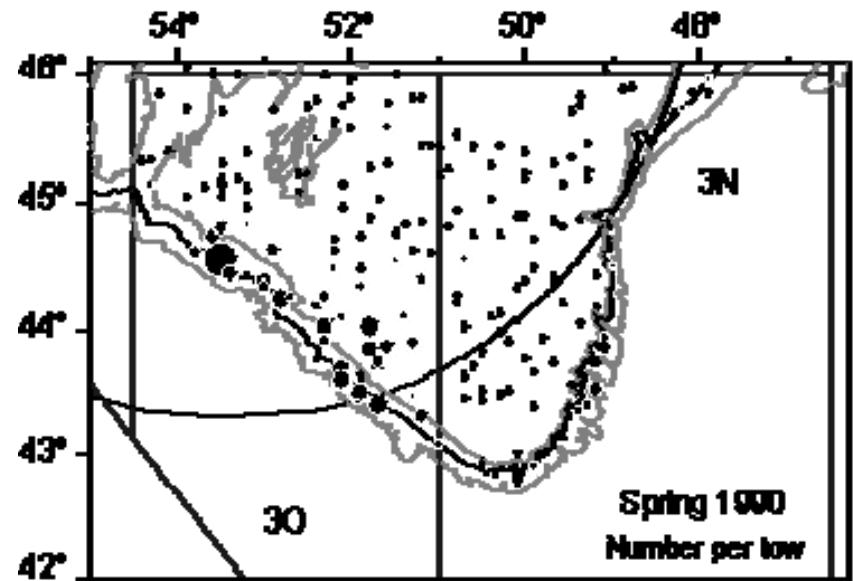


Figure 35. Distribution of witch flounder in NAFO Divs. 3NO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 1990.

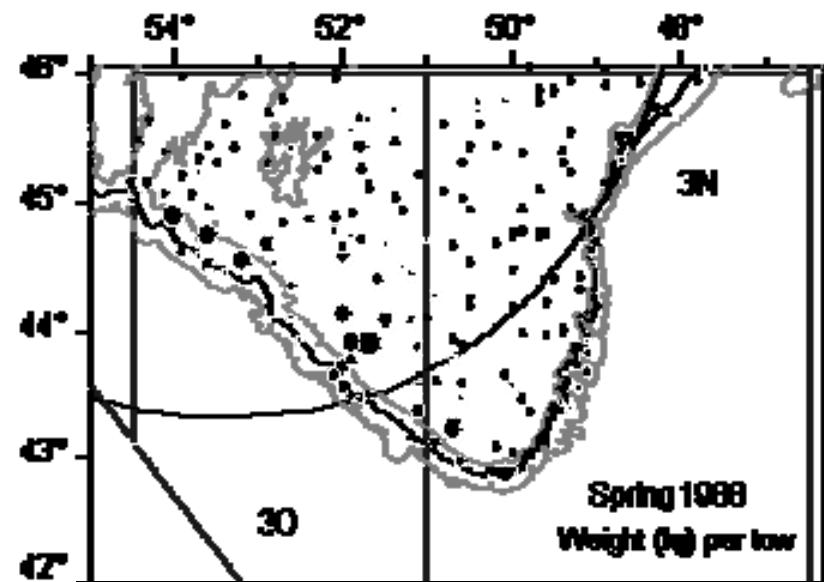
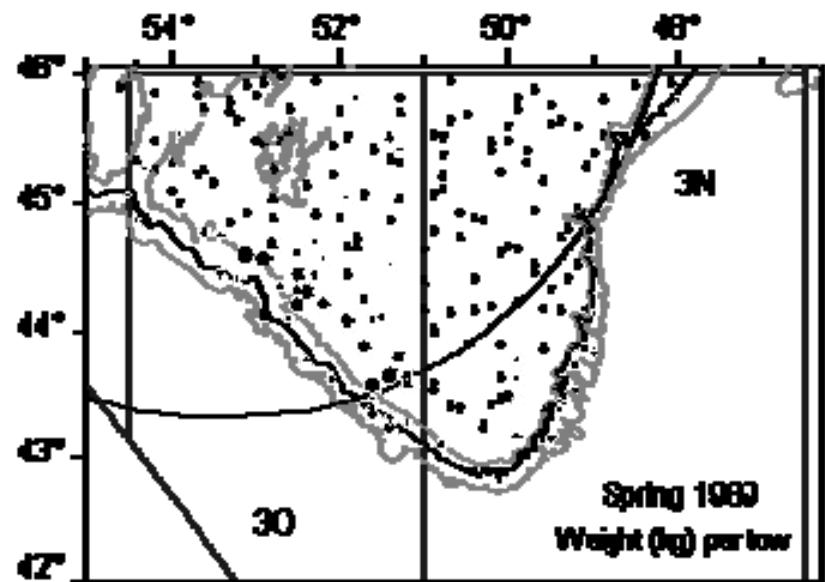
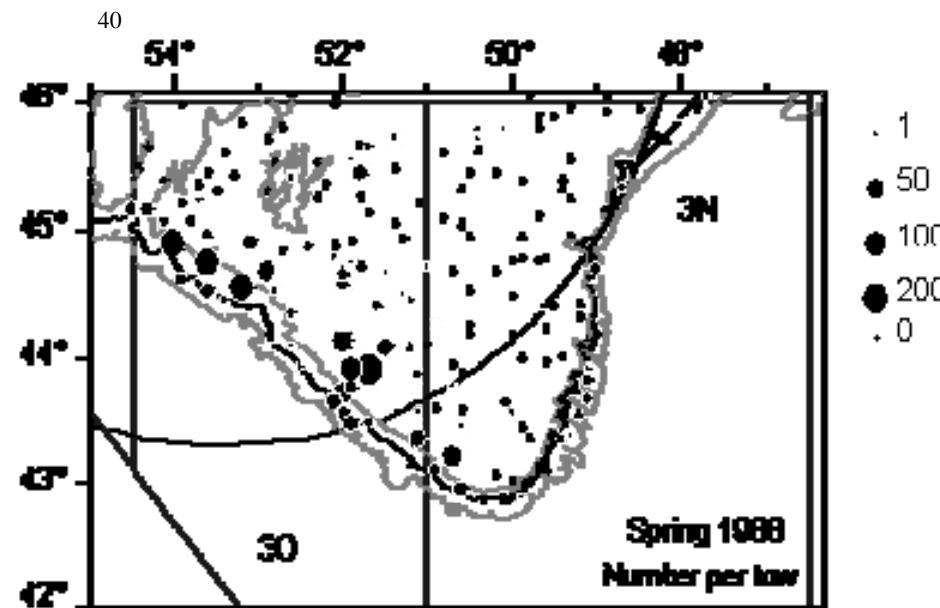
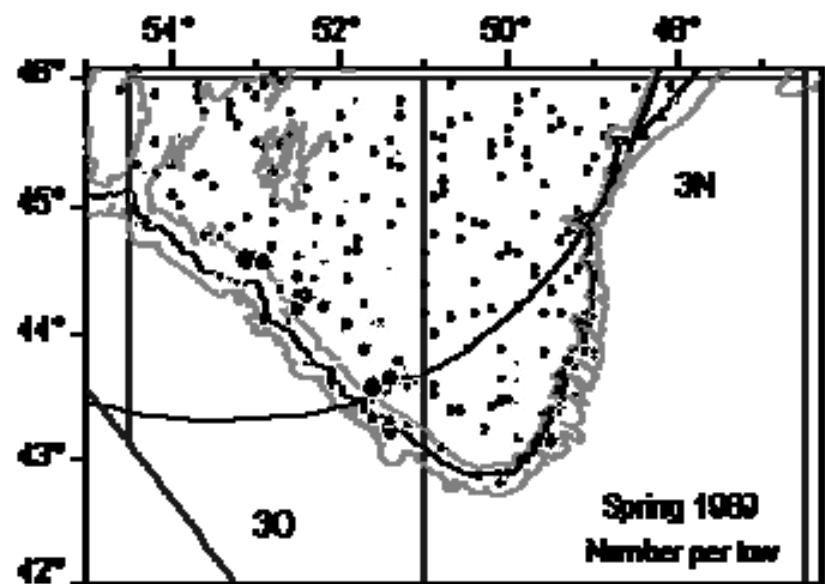


Figure 36. Distribution of witch flounder in NAFO Divs. 3NO: number and weight (kg) per tow in the Canadian spring surveys for 1989 and 1988.

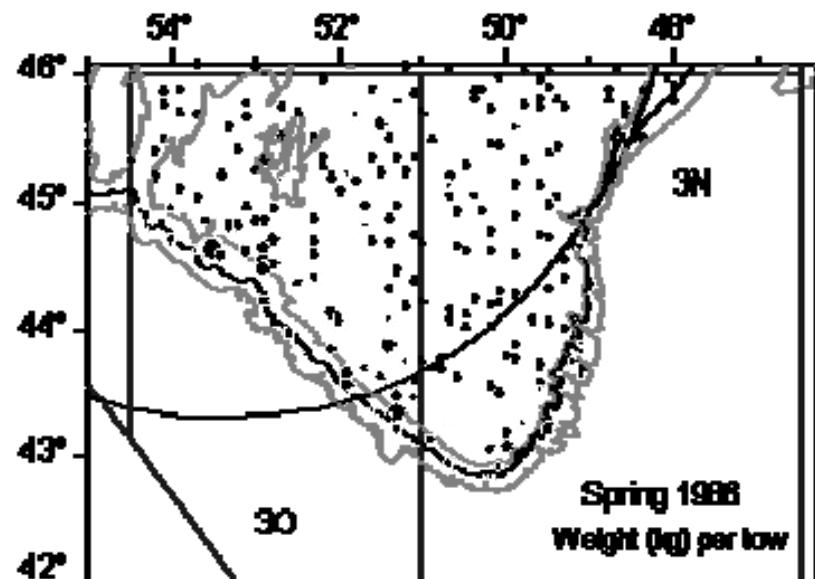
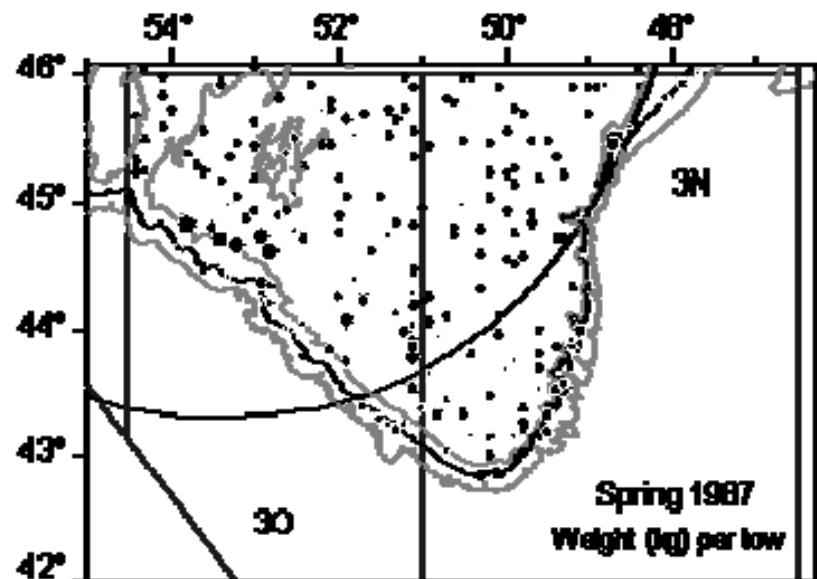
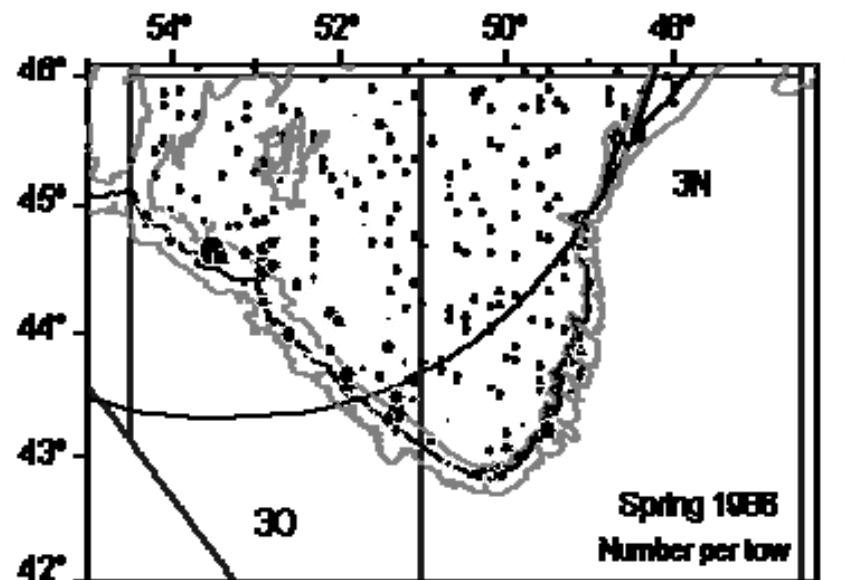
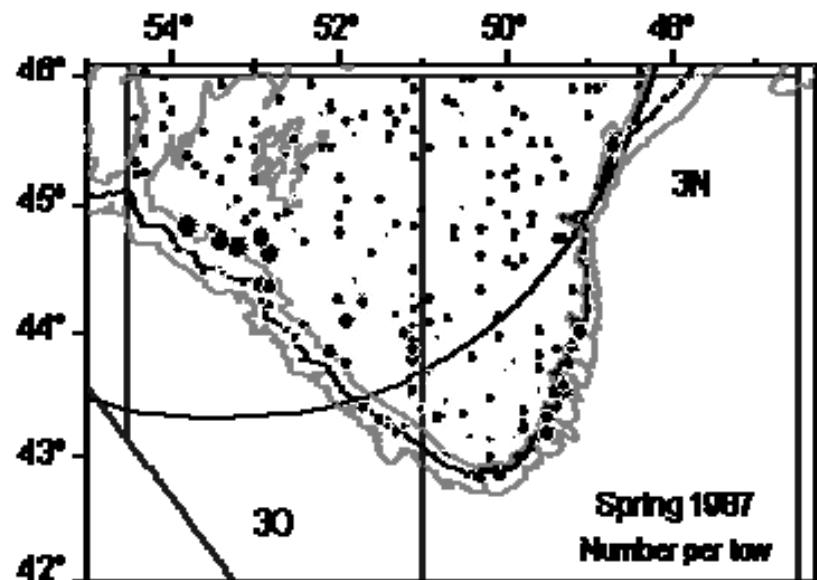


Figure 37. Distribution of witch flounder in NAFO Divs. 3NO: number and weight (kg) per tow in the Canadian spring surveys for 1987 and 1986.

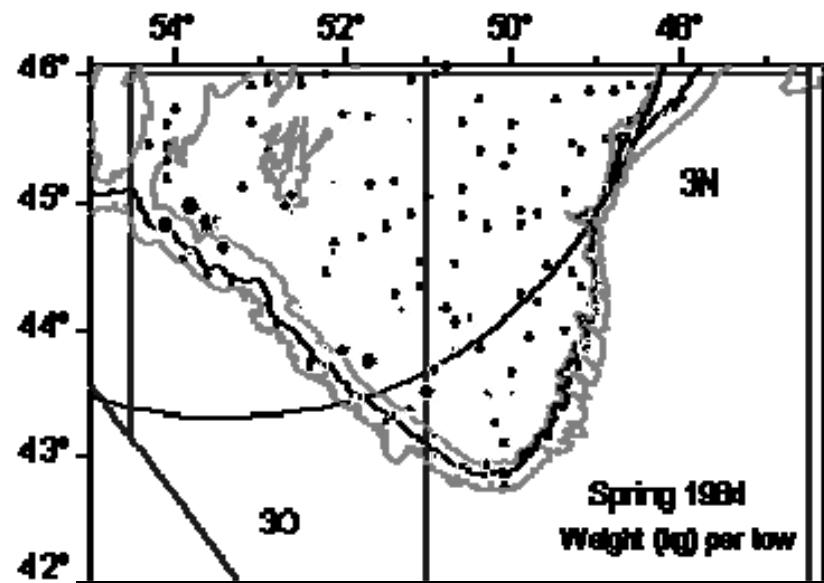
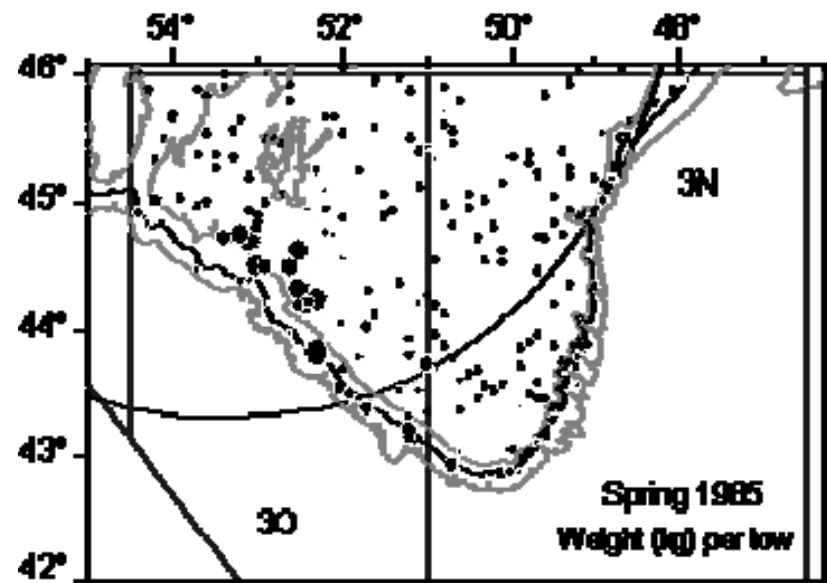
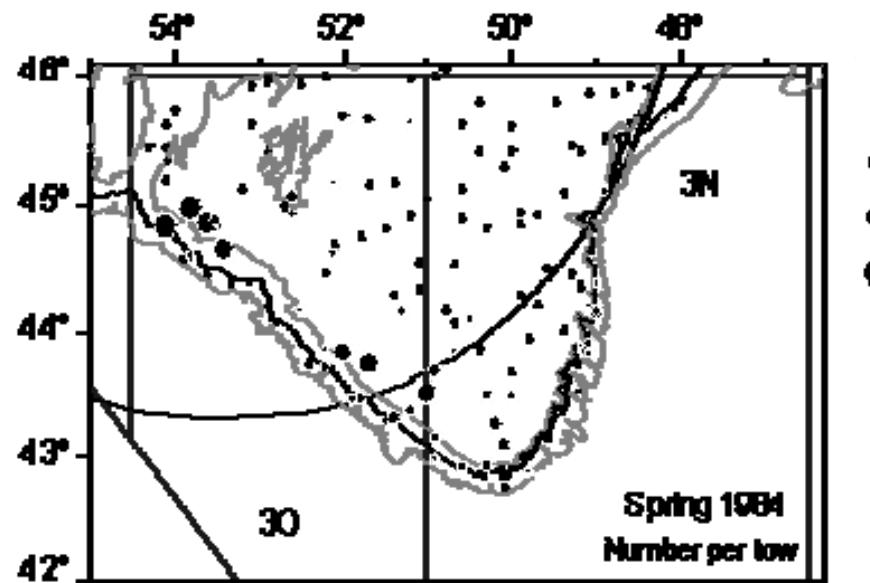
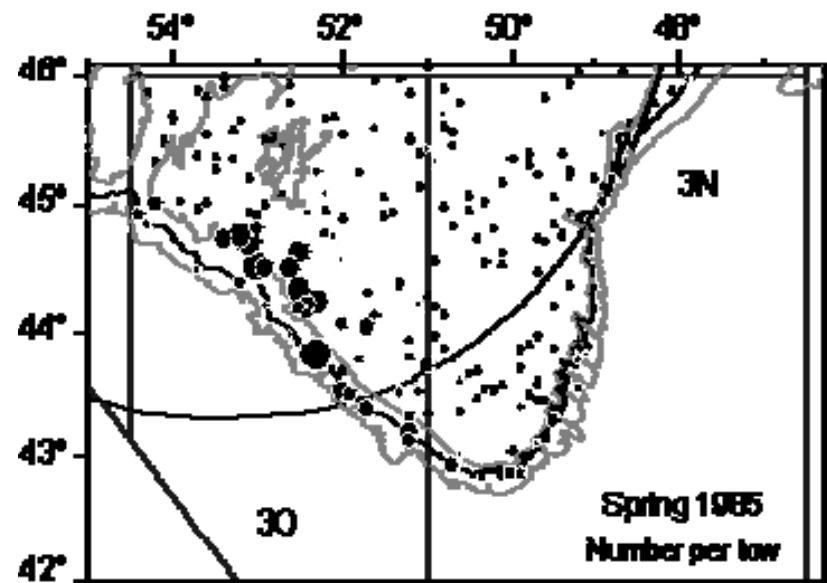


Figure 38. Distribution of witch flounder in NAFO Divs. 3NO: number and weight (kg) per tow in the Canadian spring surveys for 1985 and 1984.

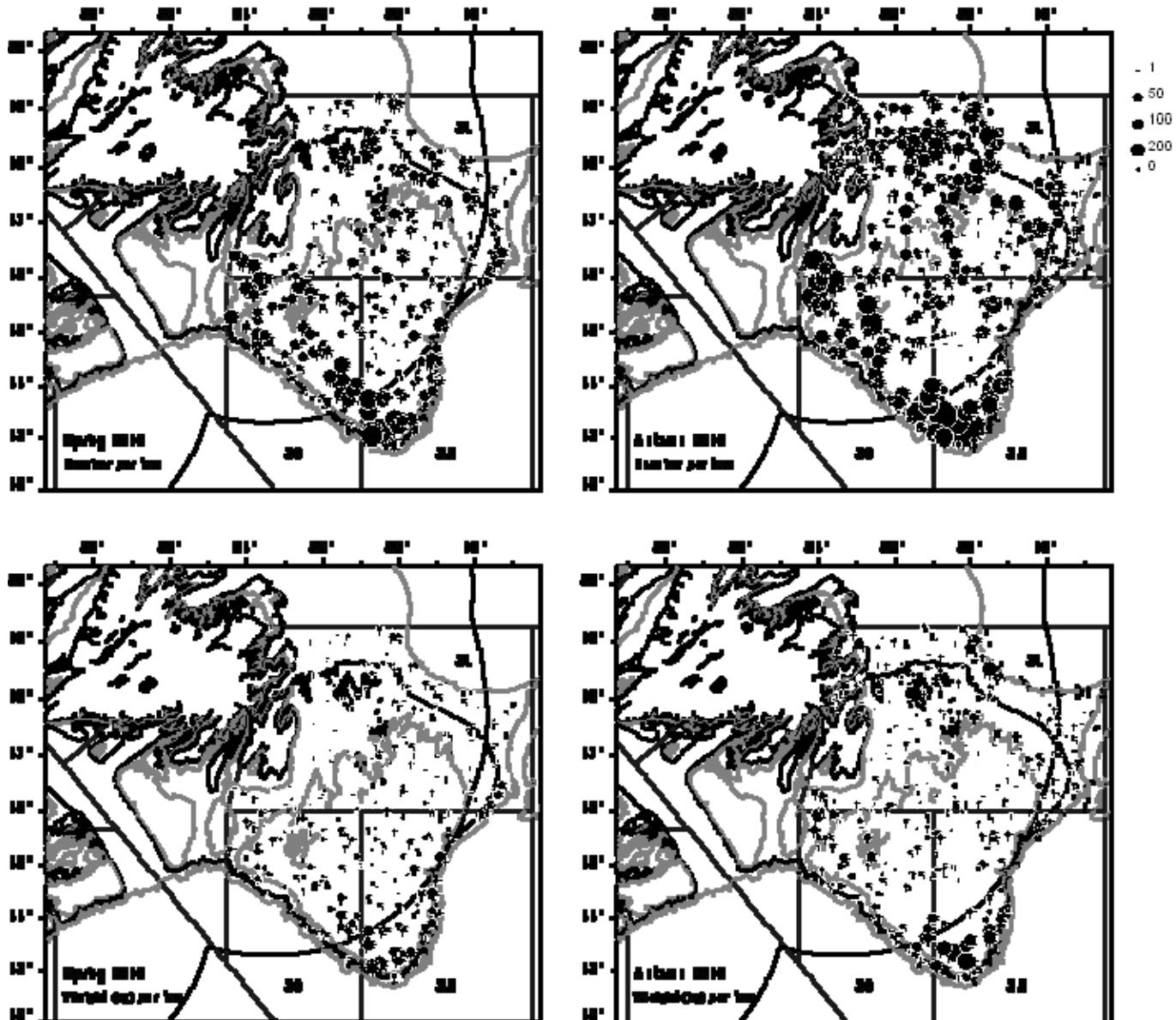


Figure 39. Distribution of American plaice in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 2010.

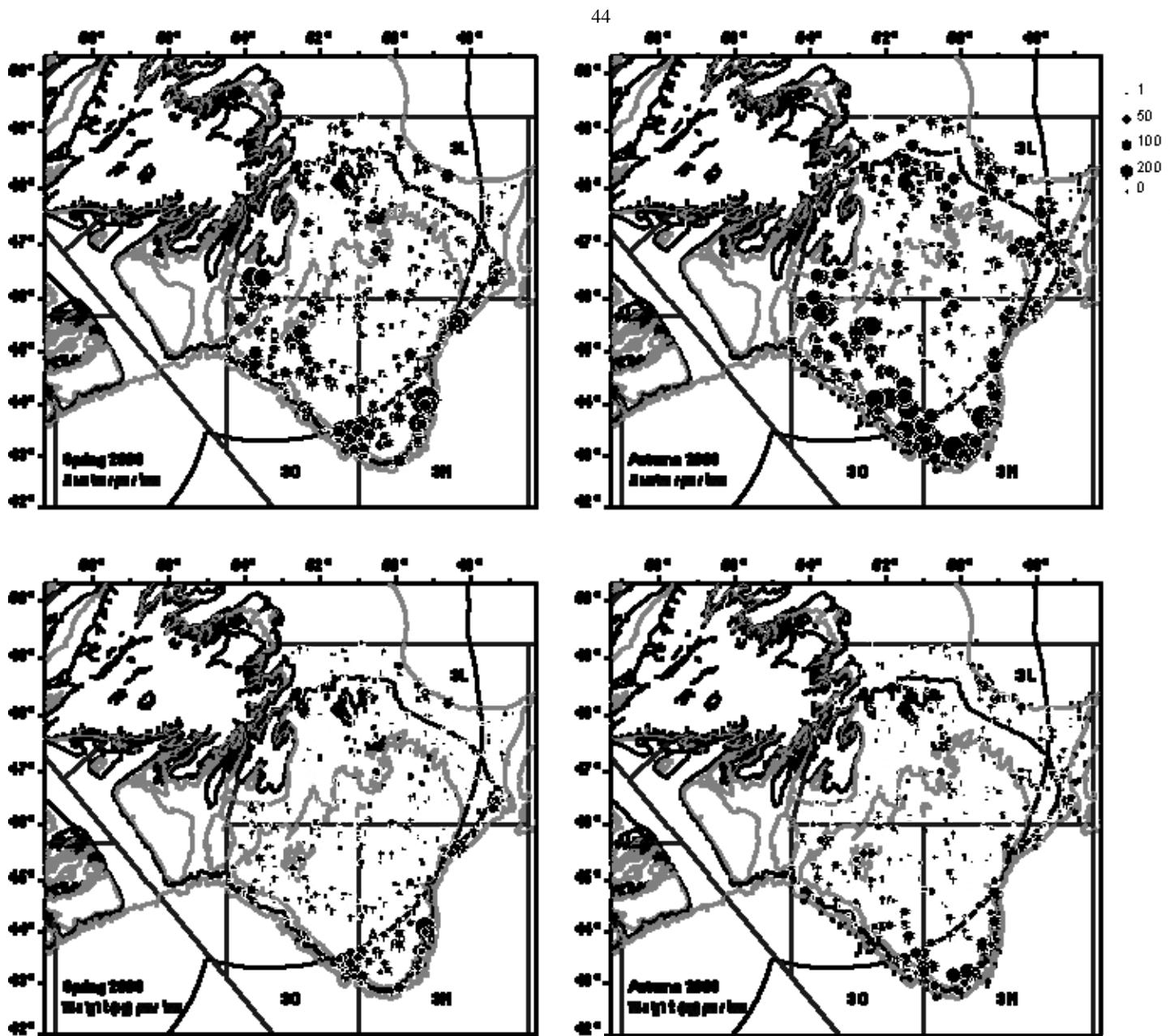


Figure 40. Distribution of American plaice in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 2009.

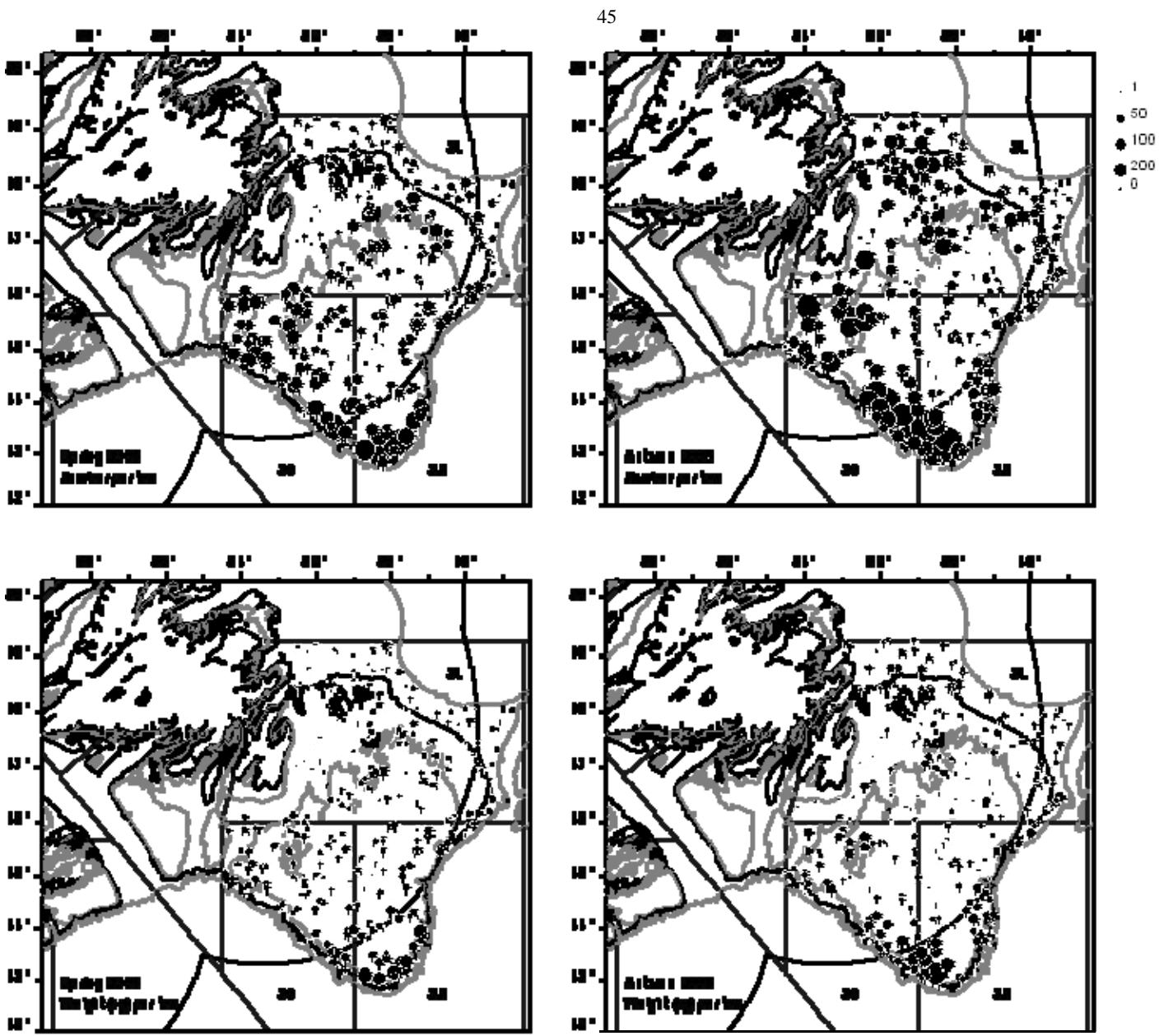


Figure 41. Distribution of American plaice in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 2008.

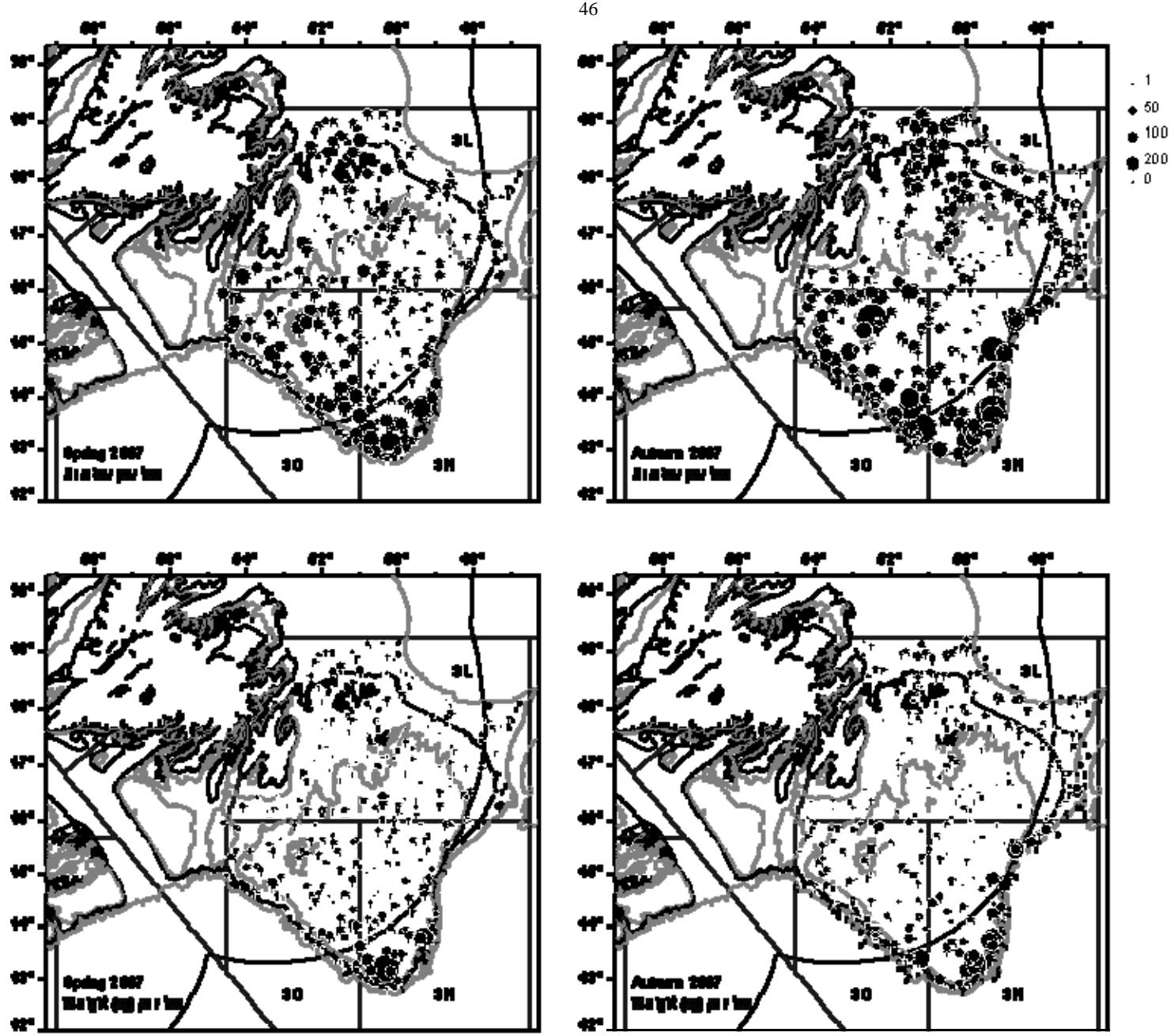


Figure 42. Distribution of American plaice in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 2007.

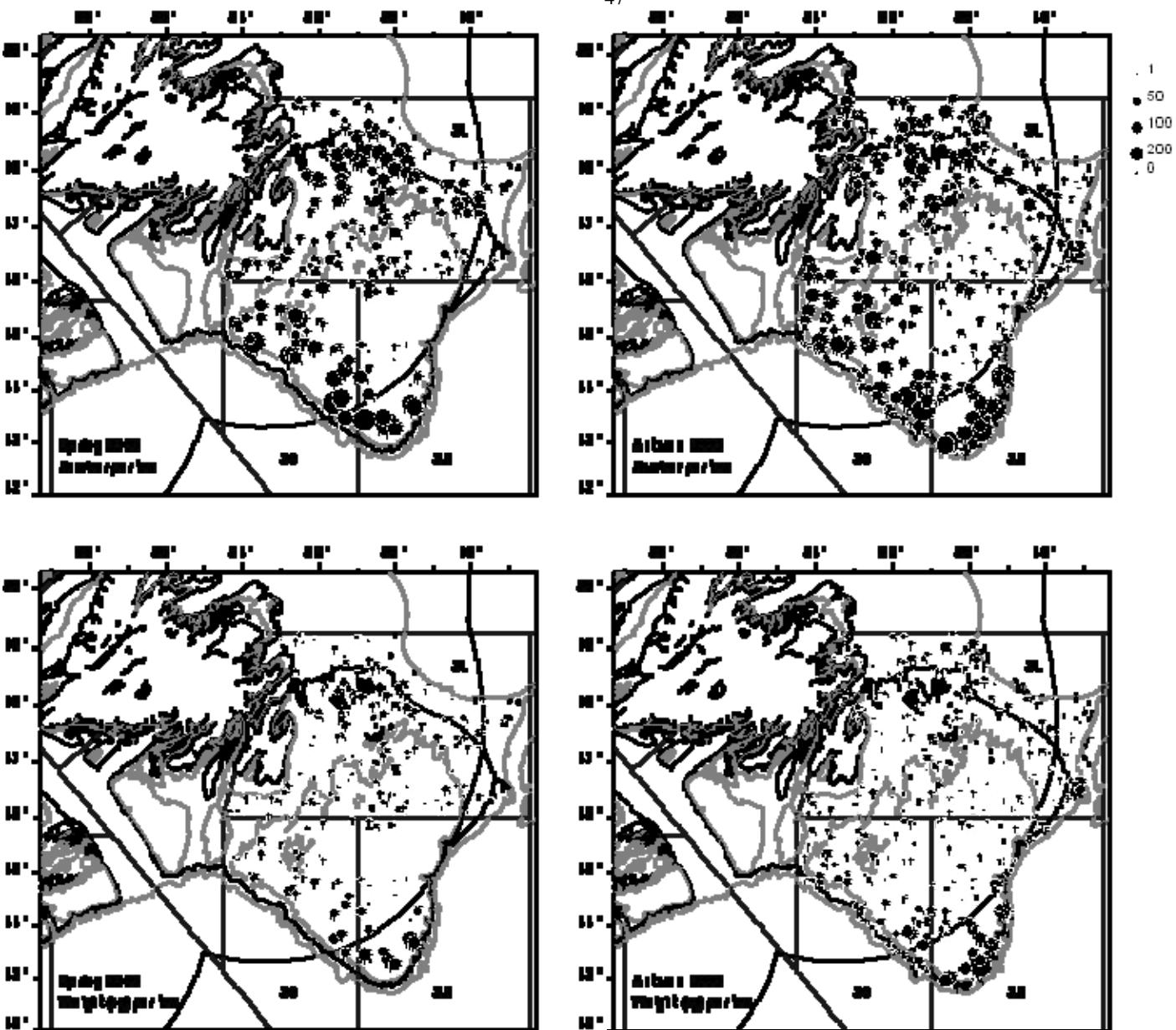


Figure 43. Distribution of American plaice in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 2006.

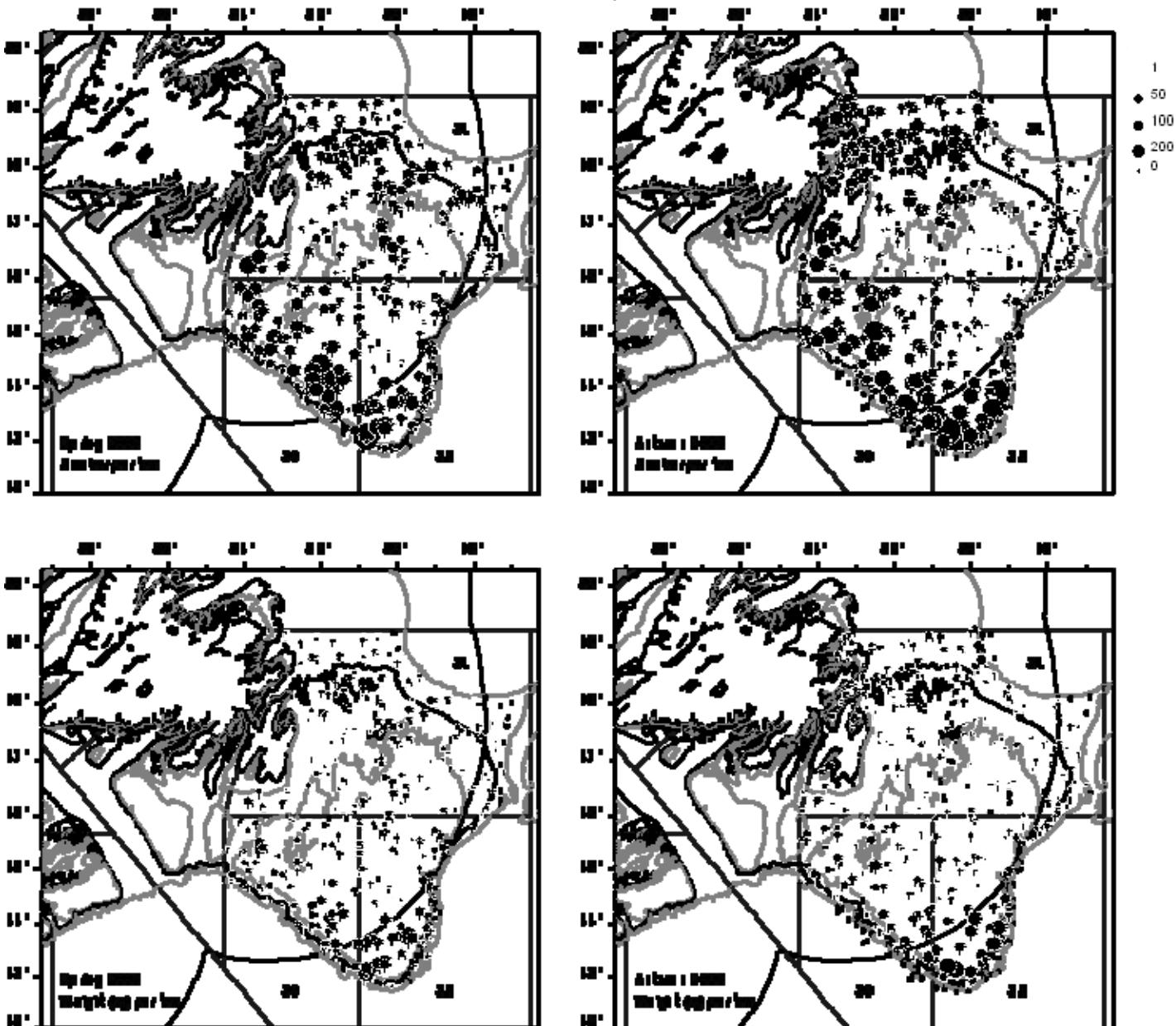


Figure 44. Distribution of American plaice in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 2005.

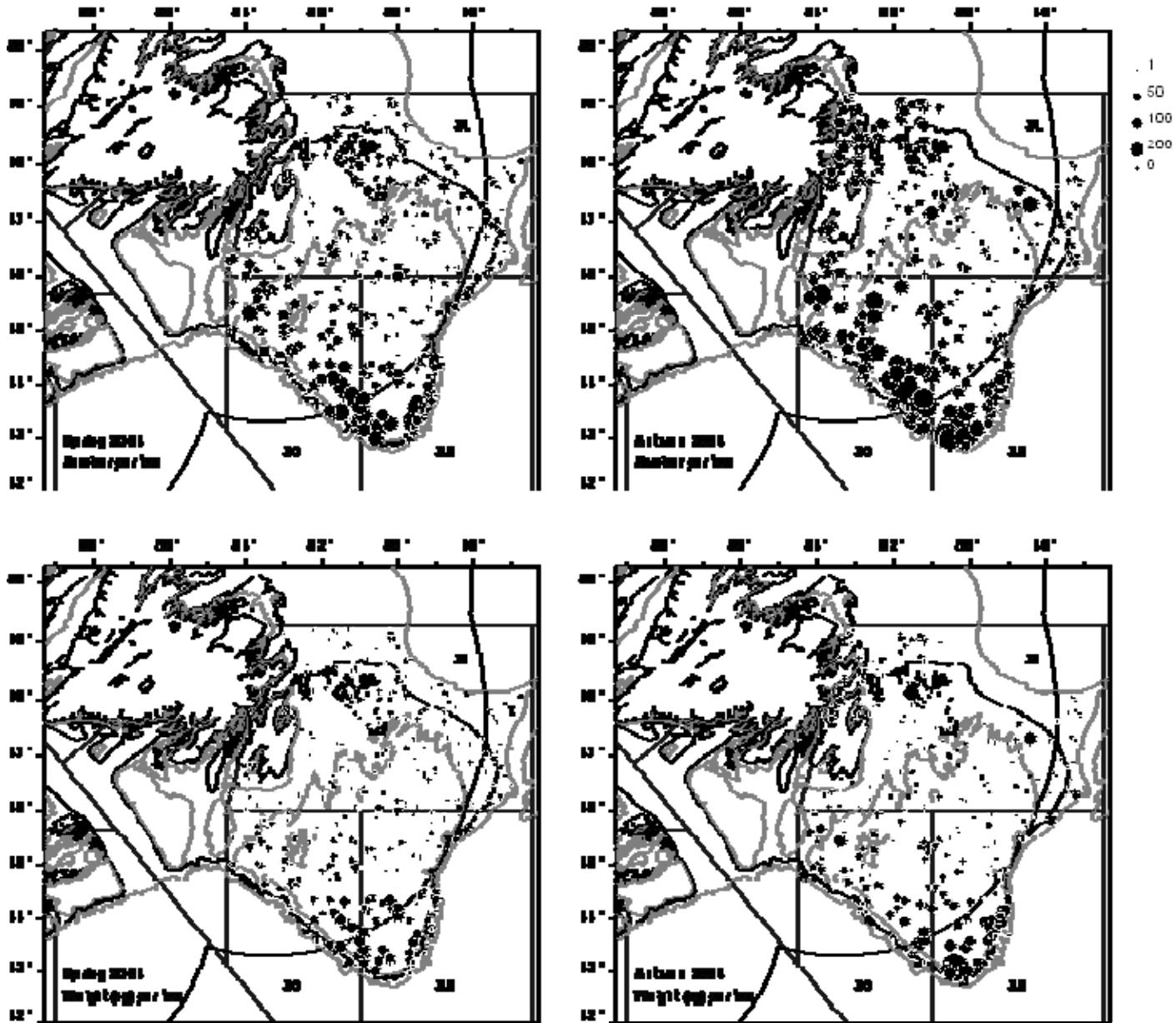


Figure 45. Distribution of American plaice in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 2004.

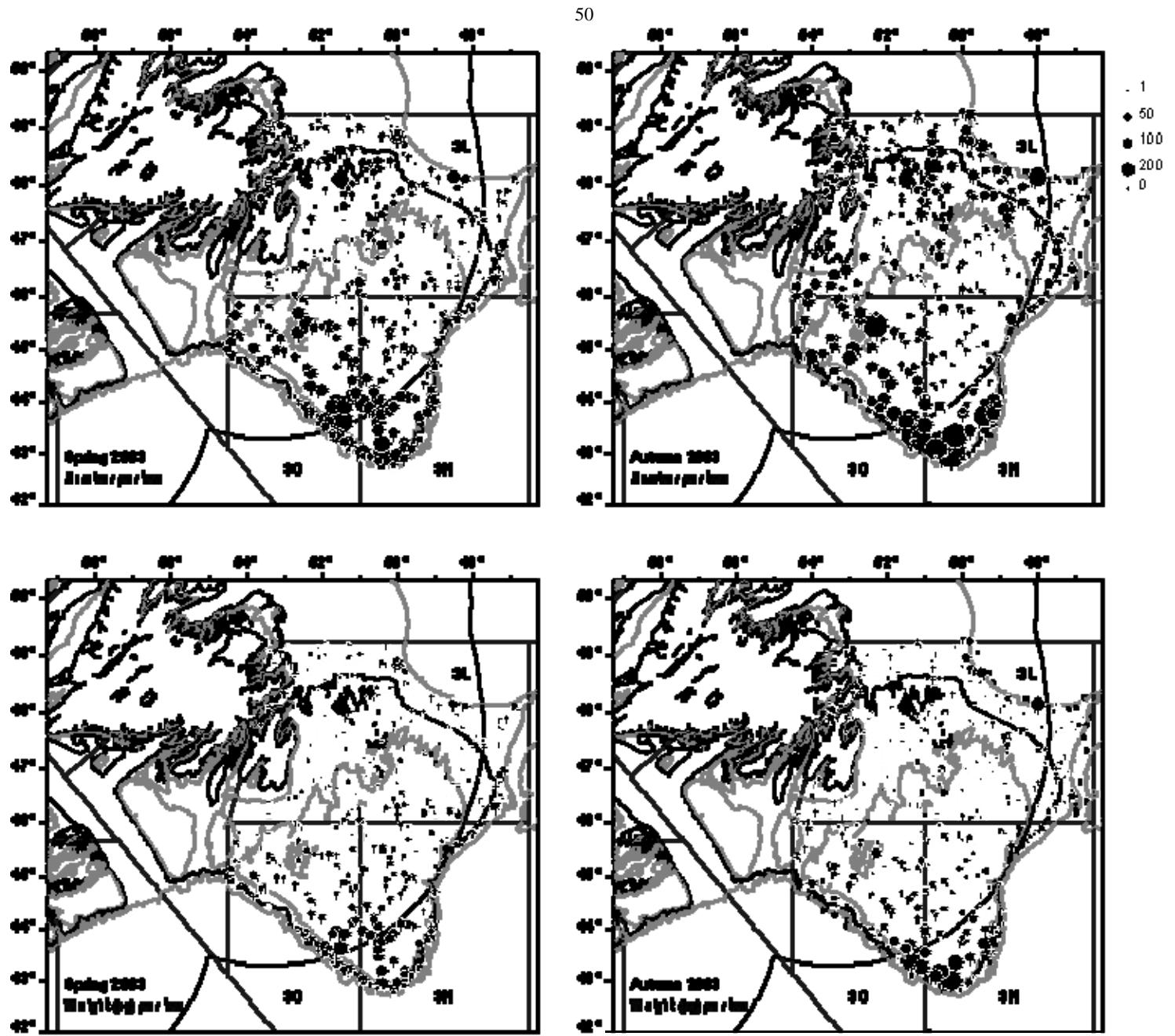


Figure 46. Distribution of American plaice in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 2003.

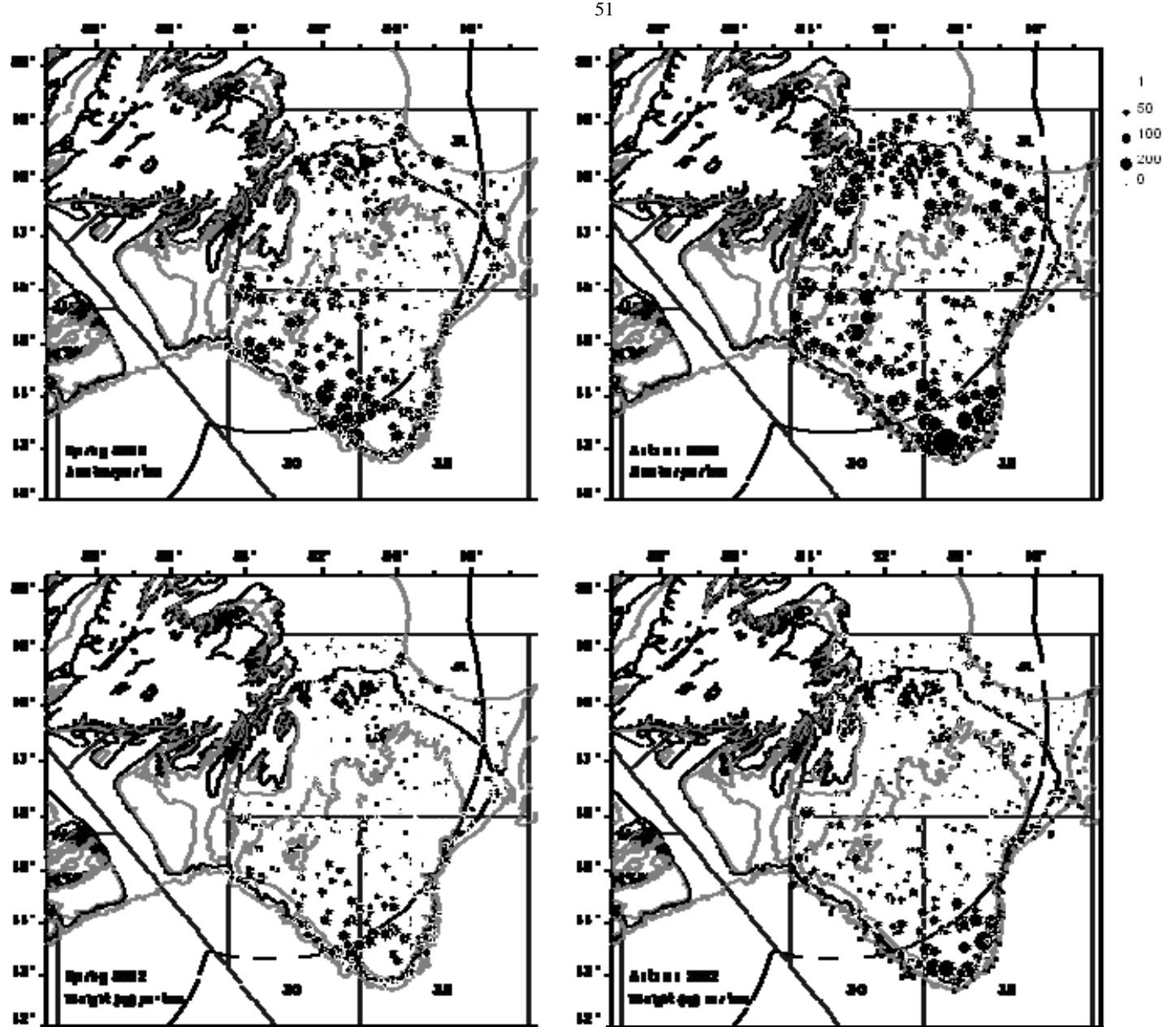


Figure 47. Distribution of American plaice in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 2002.

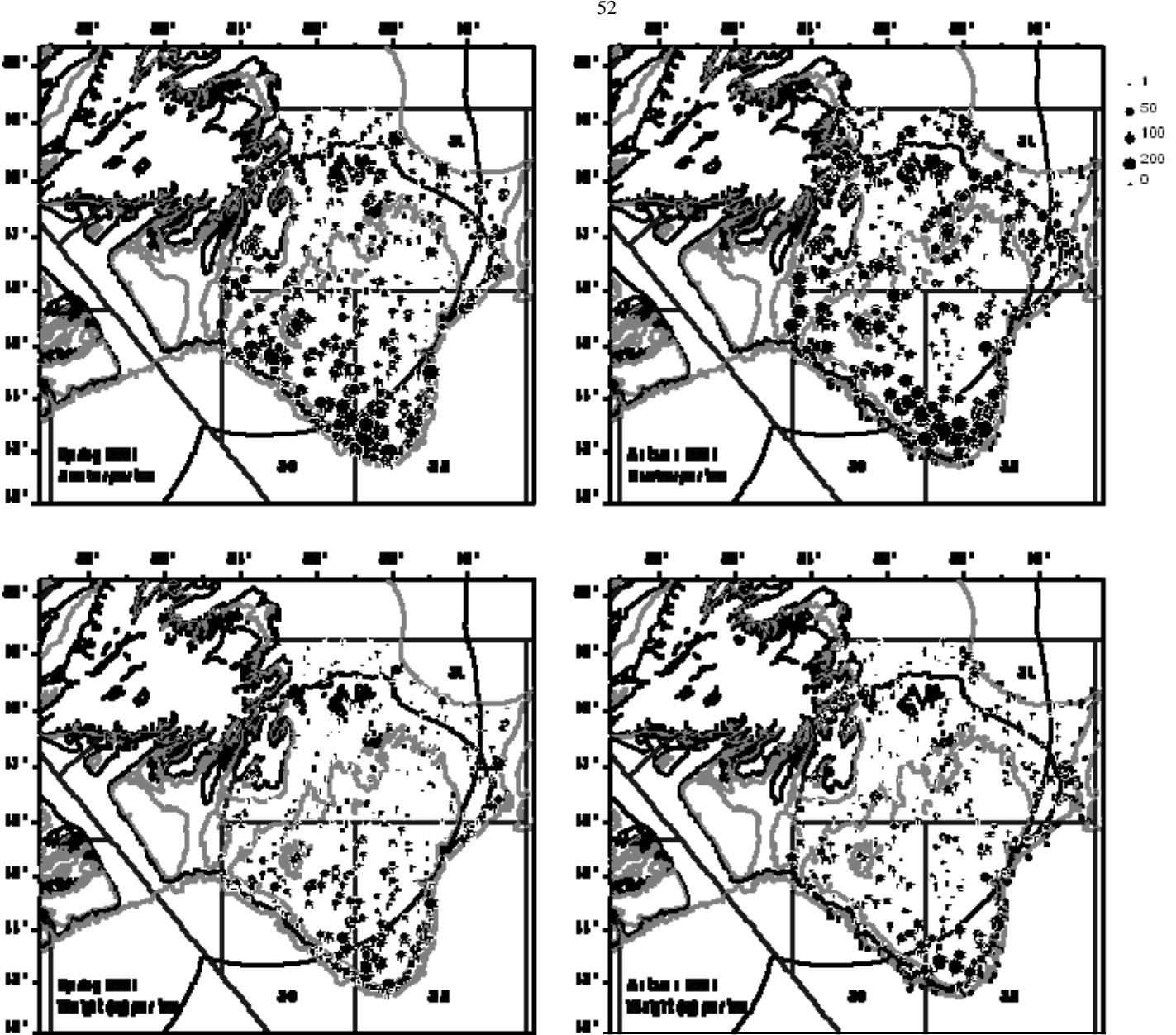


Figure 48. Distribution of American plaice in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 2001.

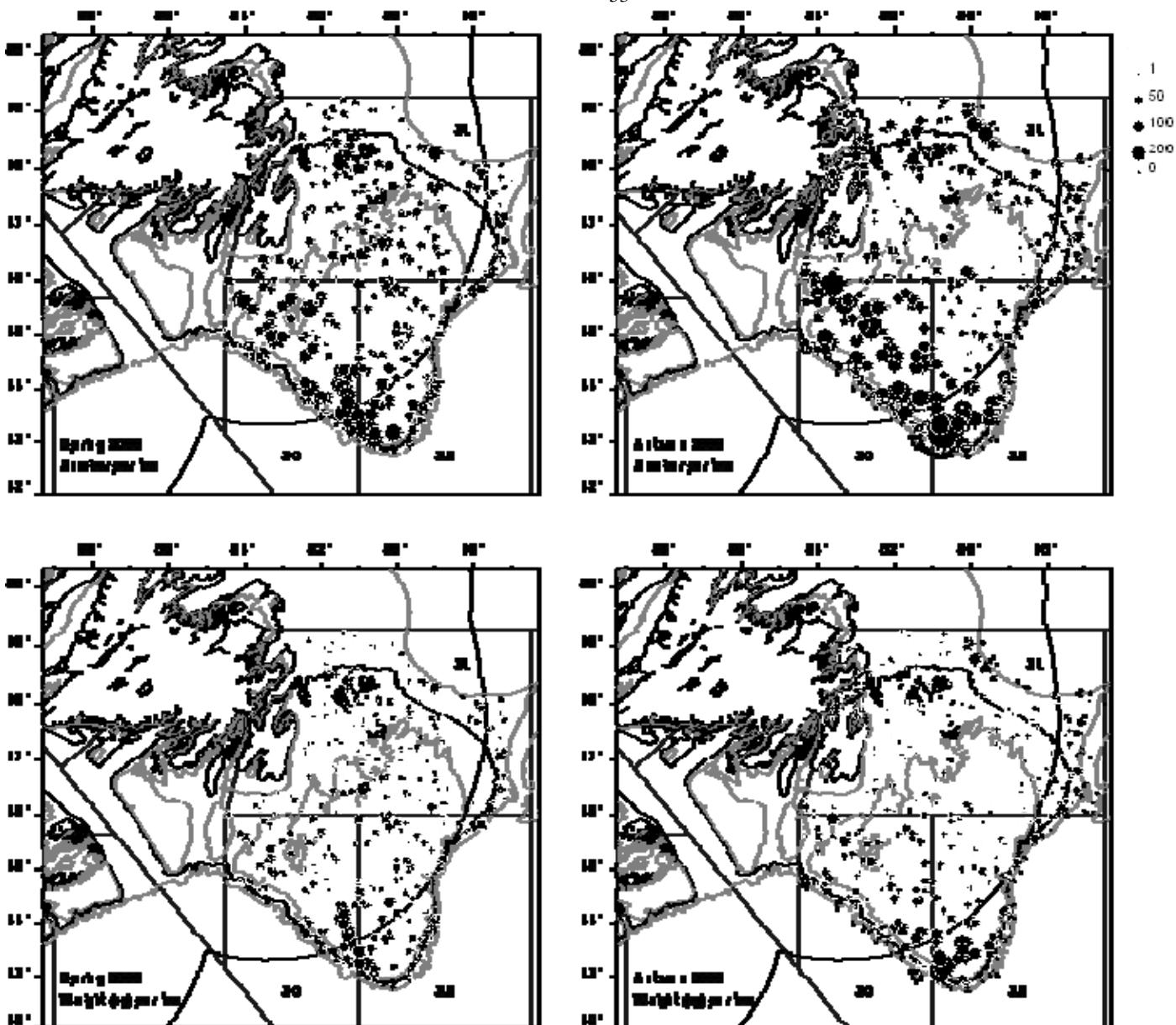


Figure 49. Distribution of American plaice in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 2000.

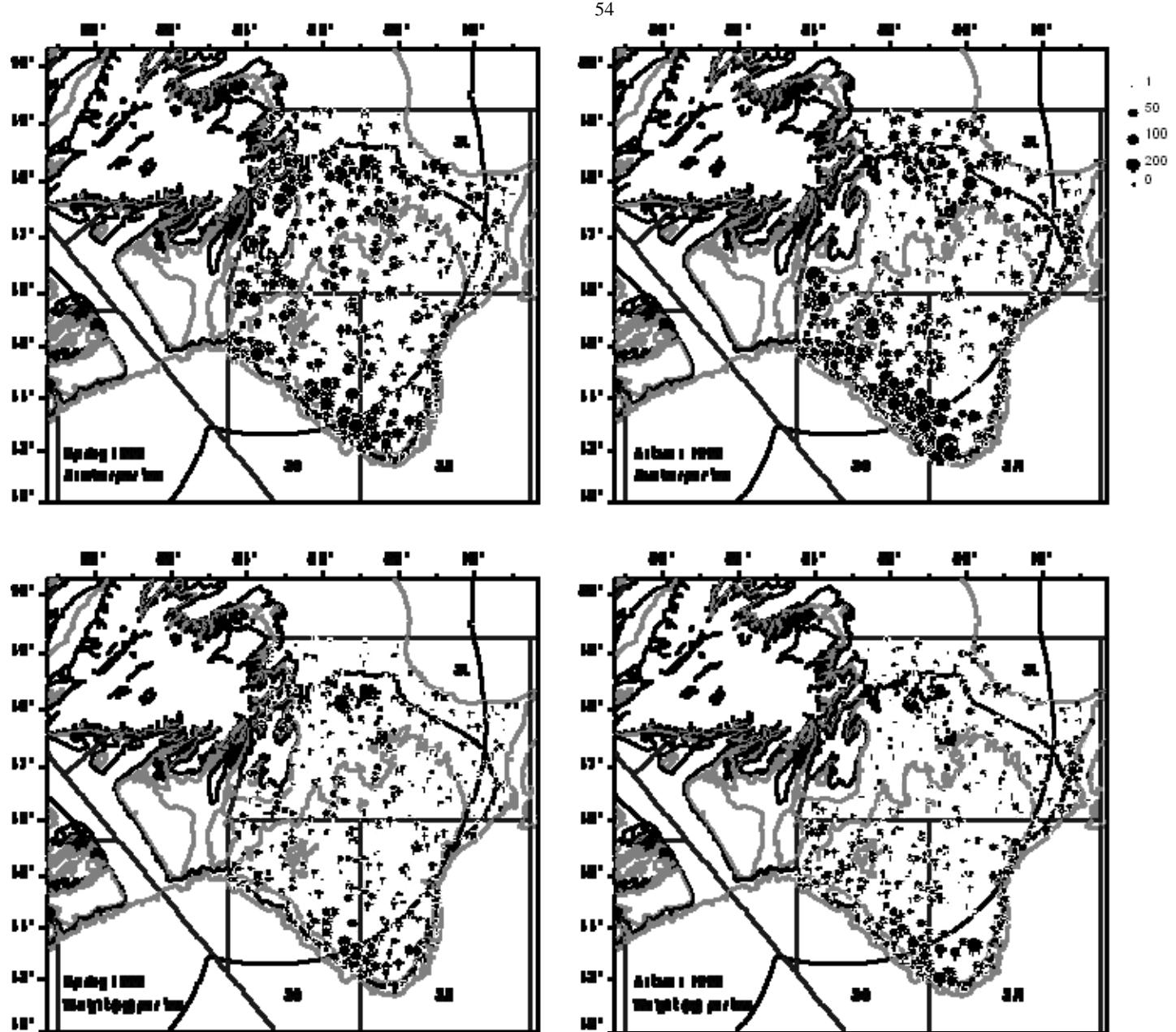


Figure 50. Distribution of American plaice in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 1999.

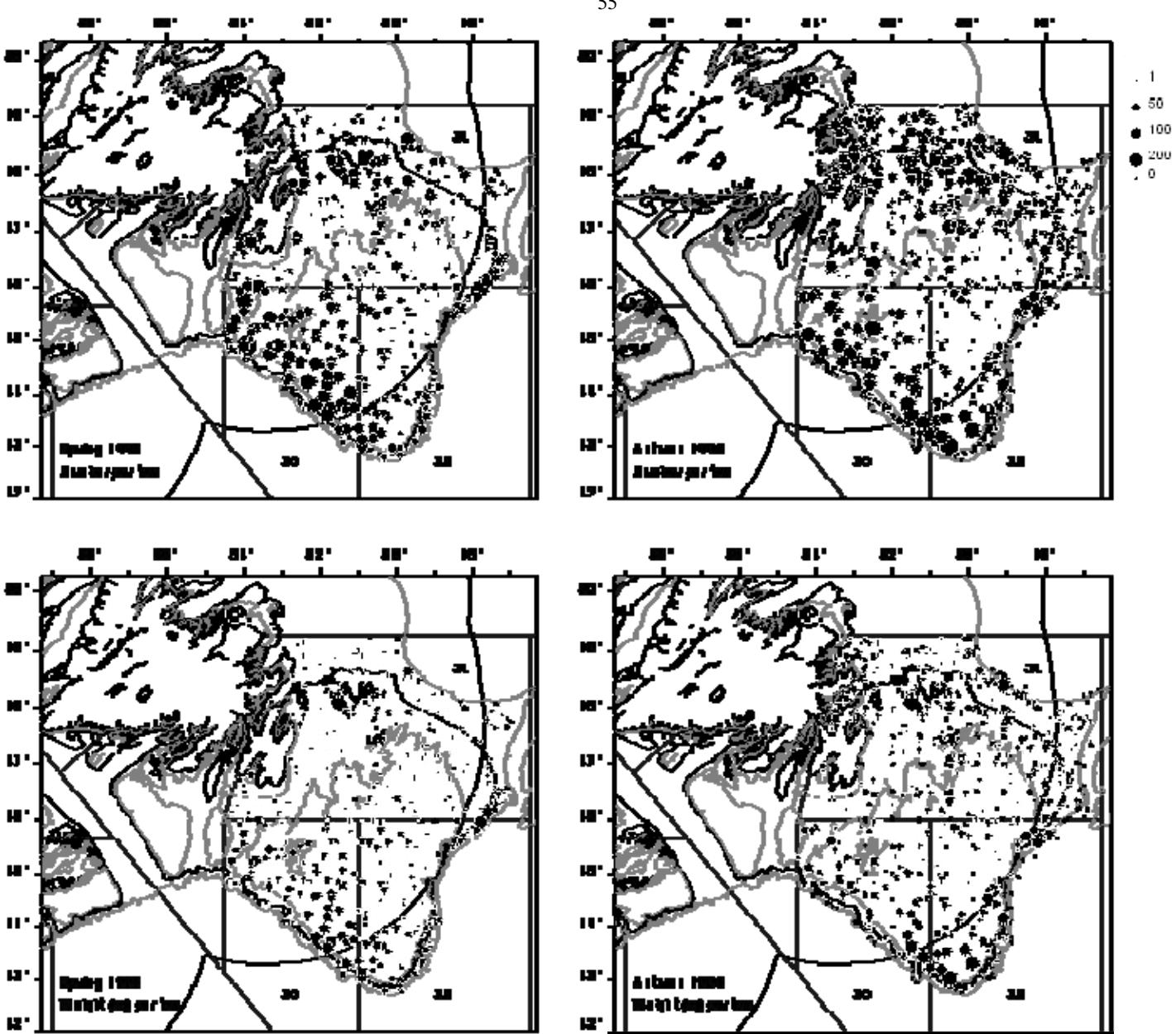


Figure 51. Distribution of American plaice in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 1998.

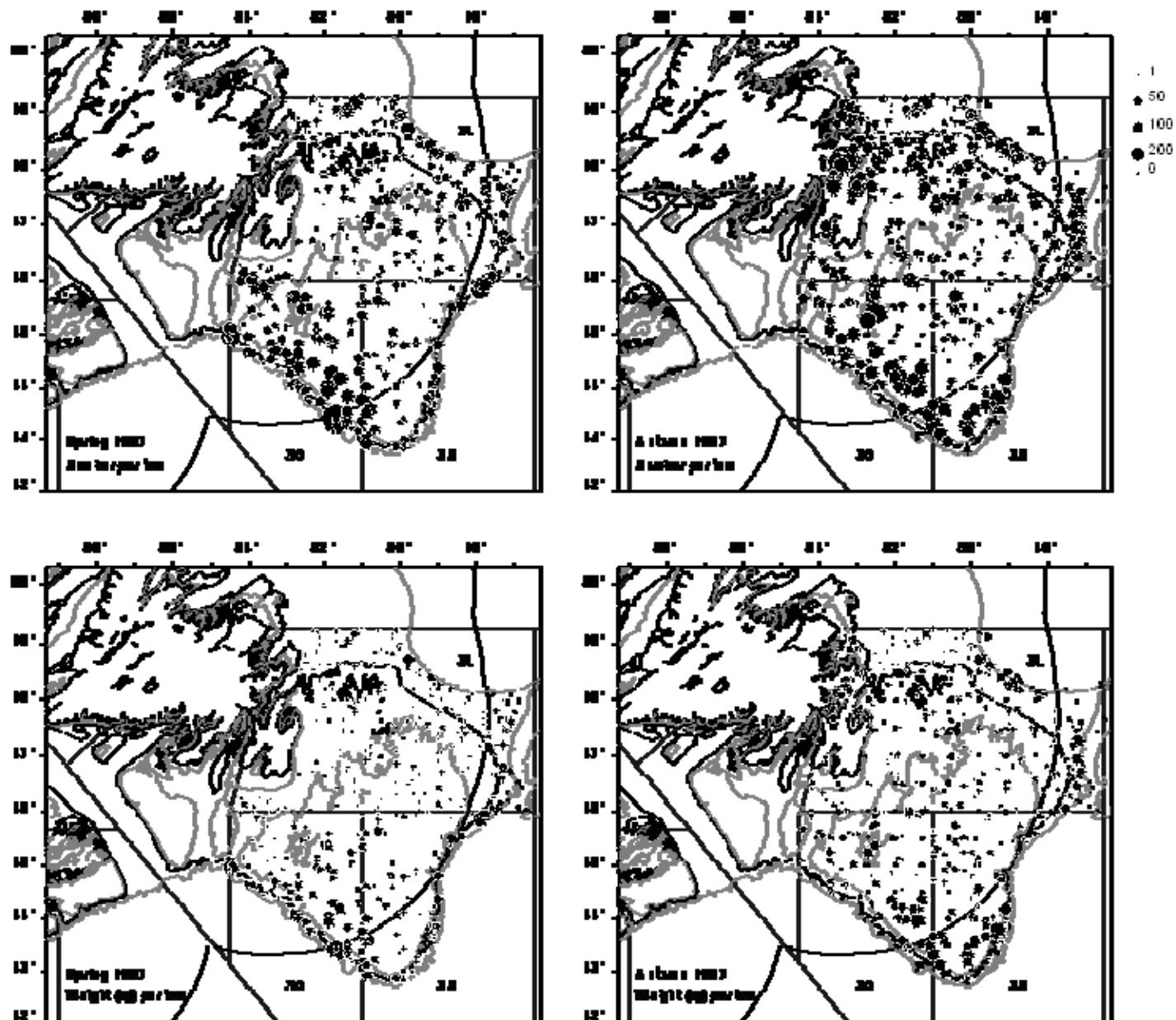


Figure 52. Distribution of American plaice in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 1997.

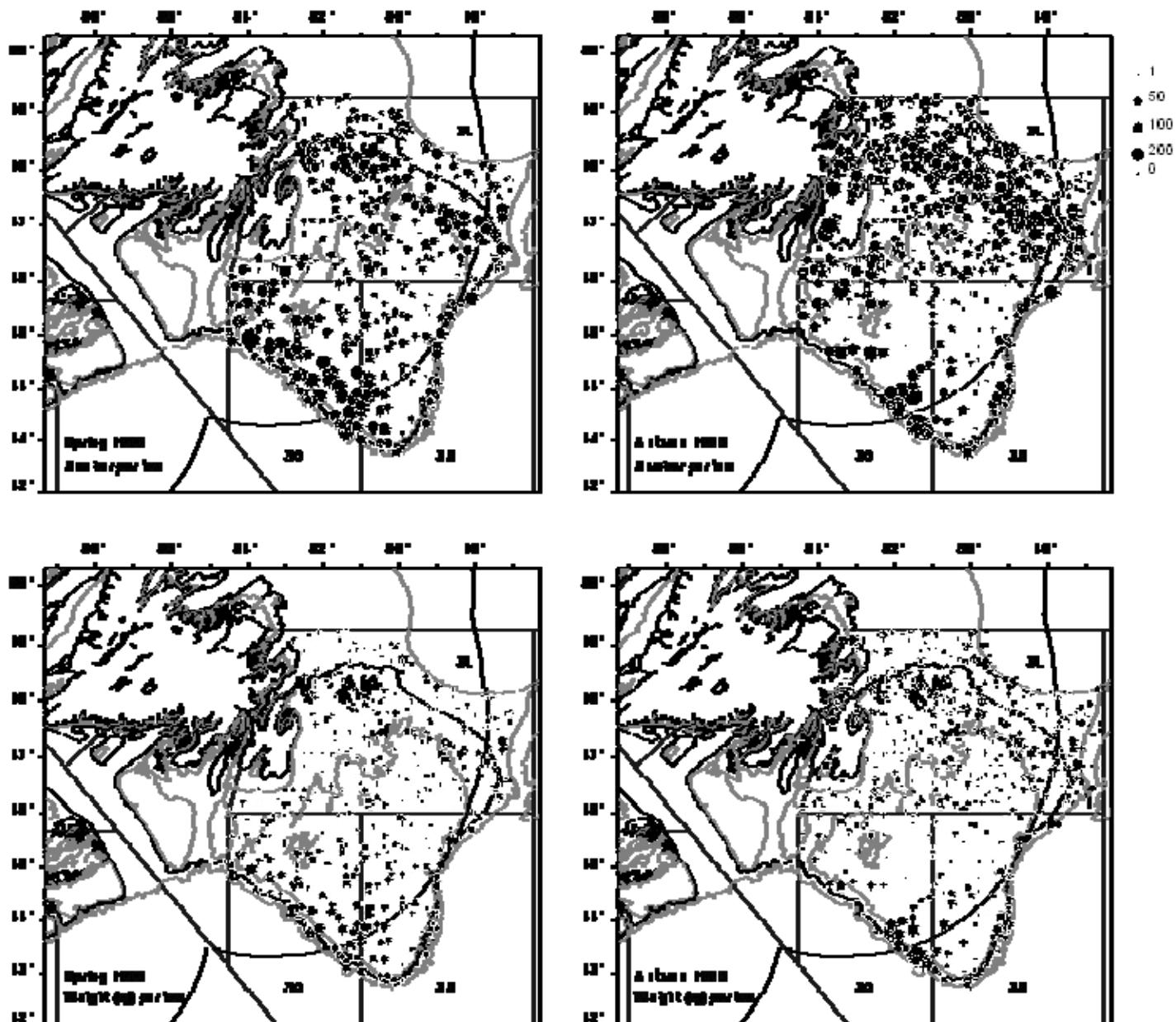


Figure 53. Distribution of American plaice in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 1996.

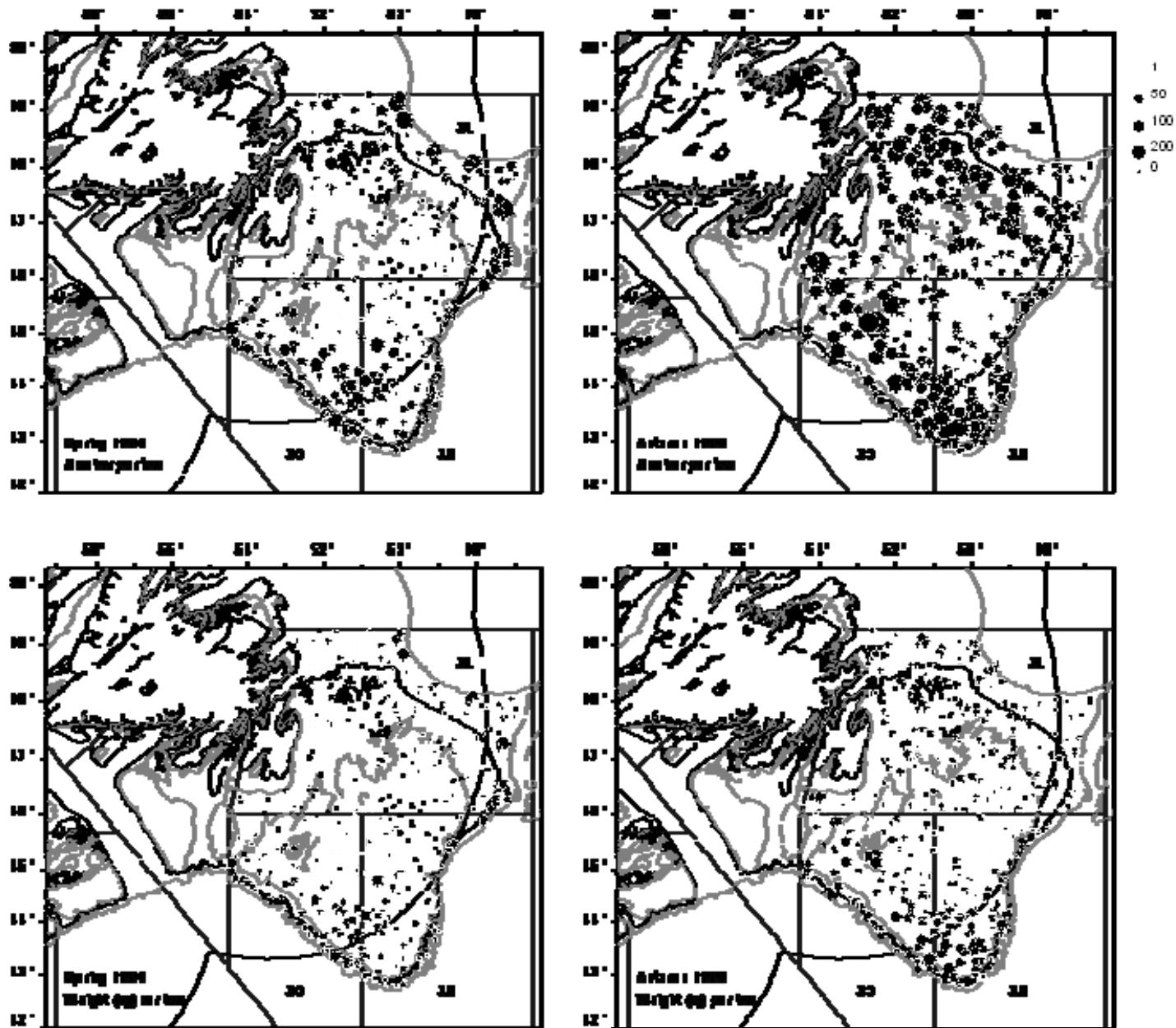


Figure 54. Distribution of American plaice in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 1995.

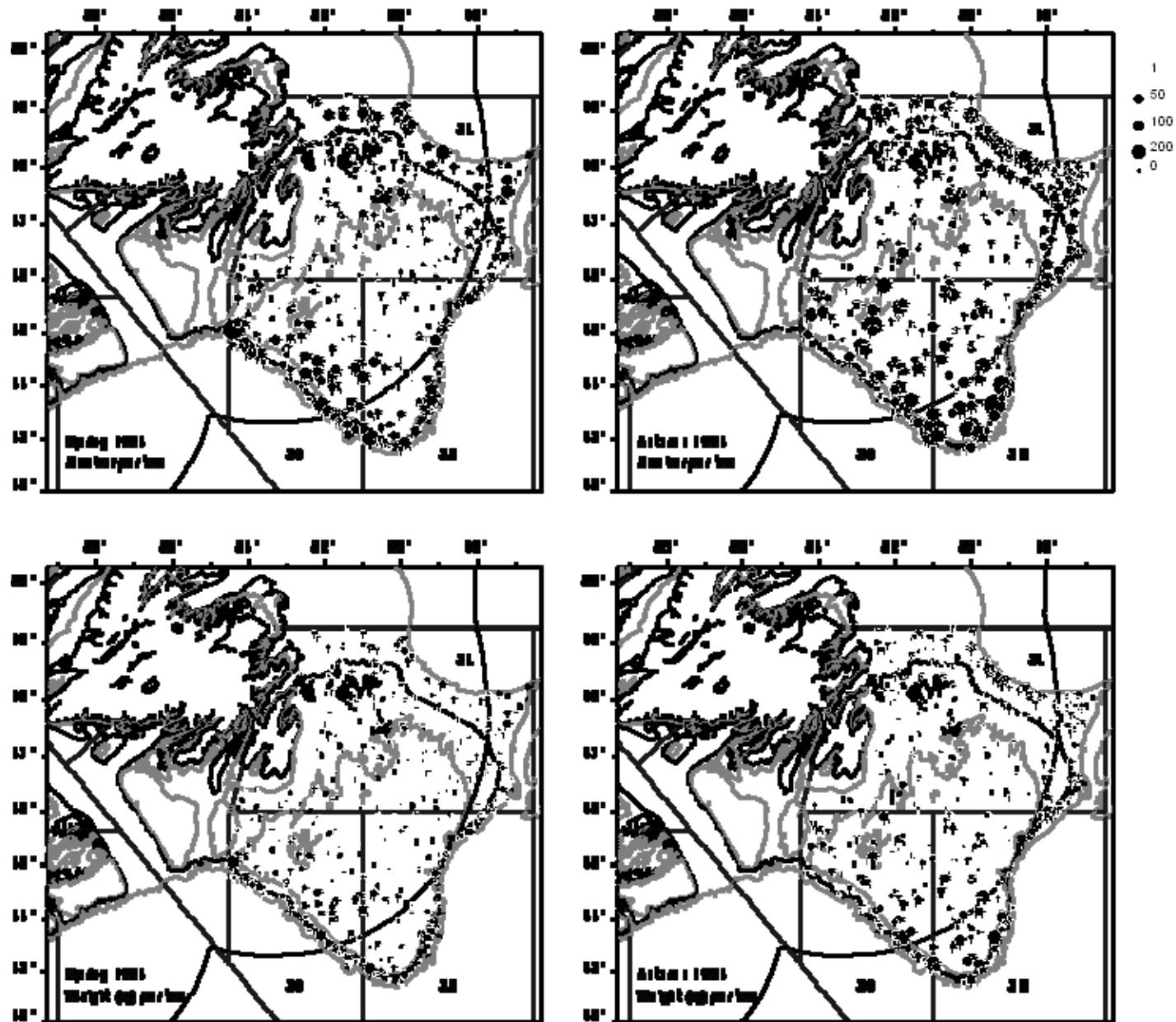


Figure 55. Distribution of American plaice in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 1994.

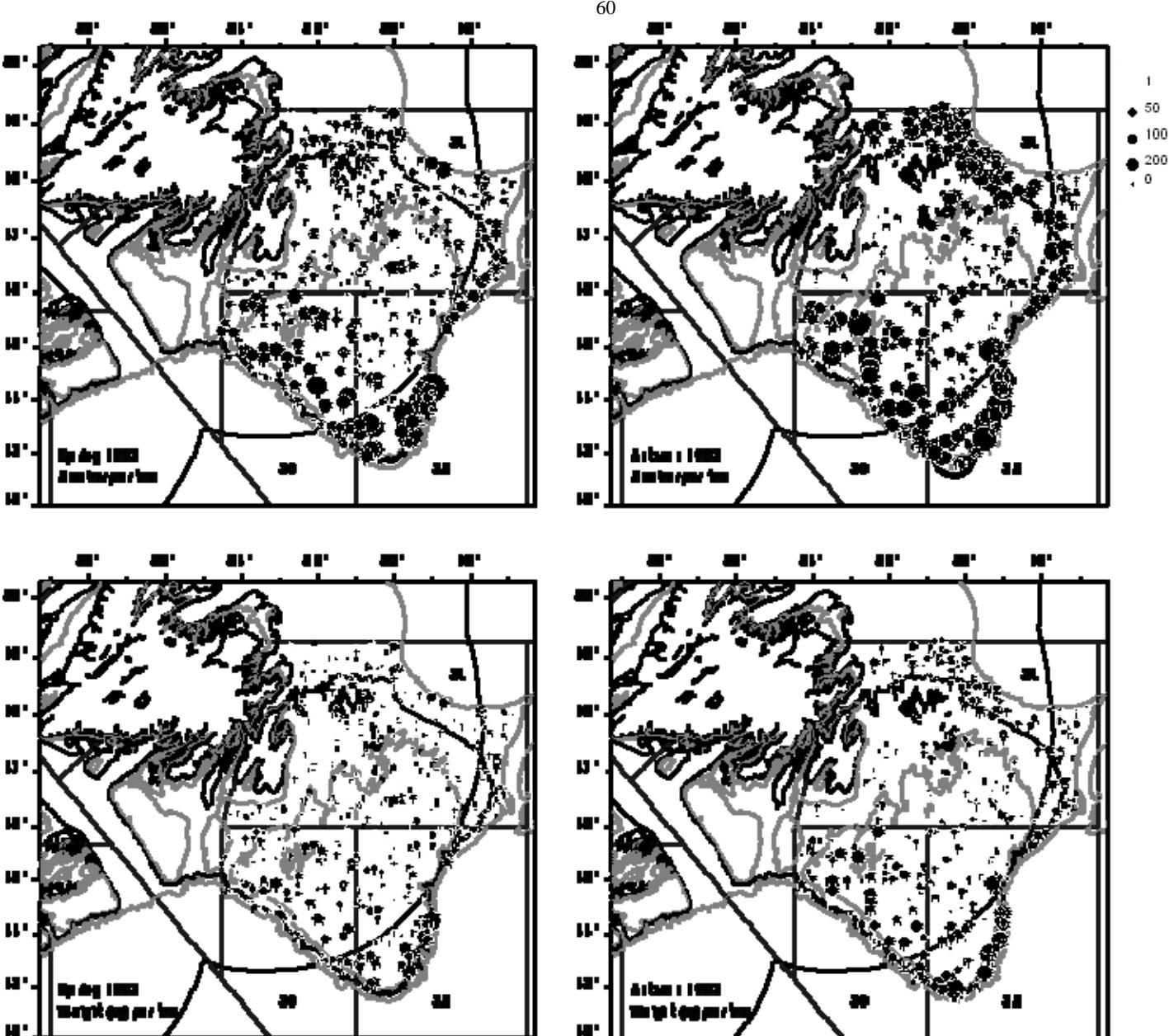


Figure 56. Distribution of American plaice in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 1993.

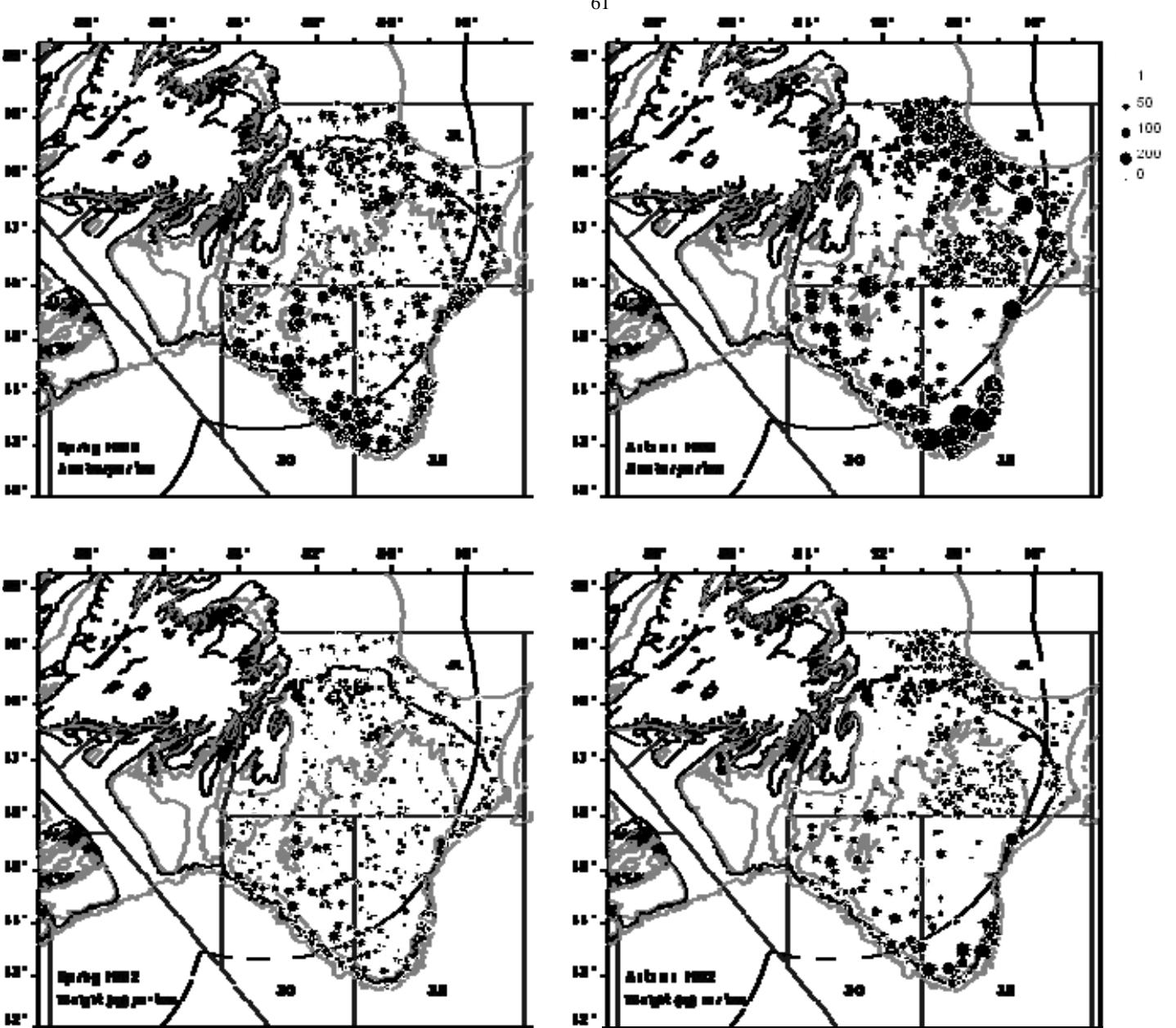


Figure 57. Distribution of American plaice in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 1992.

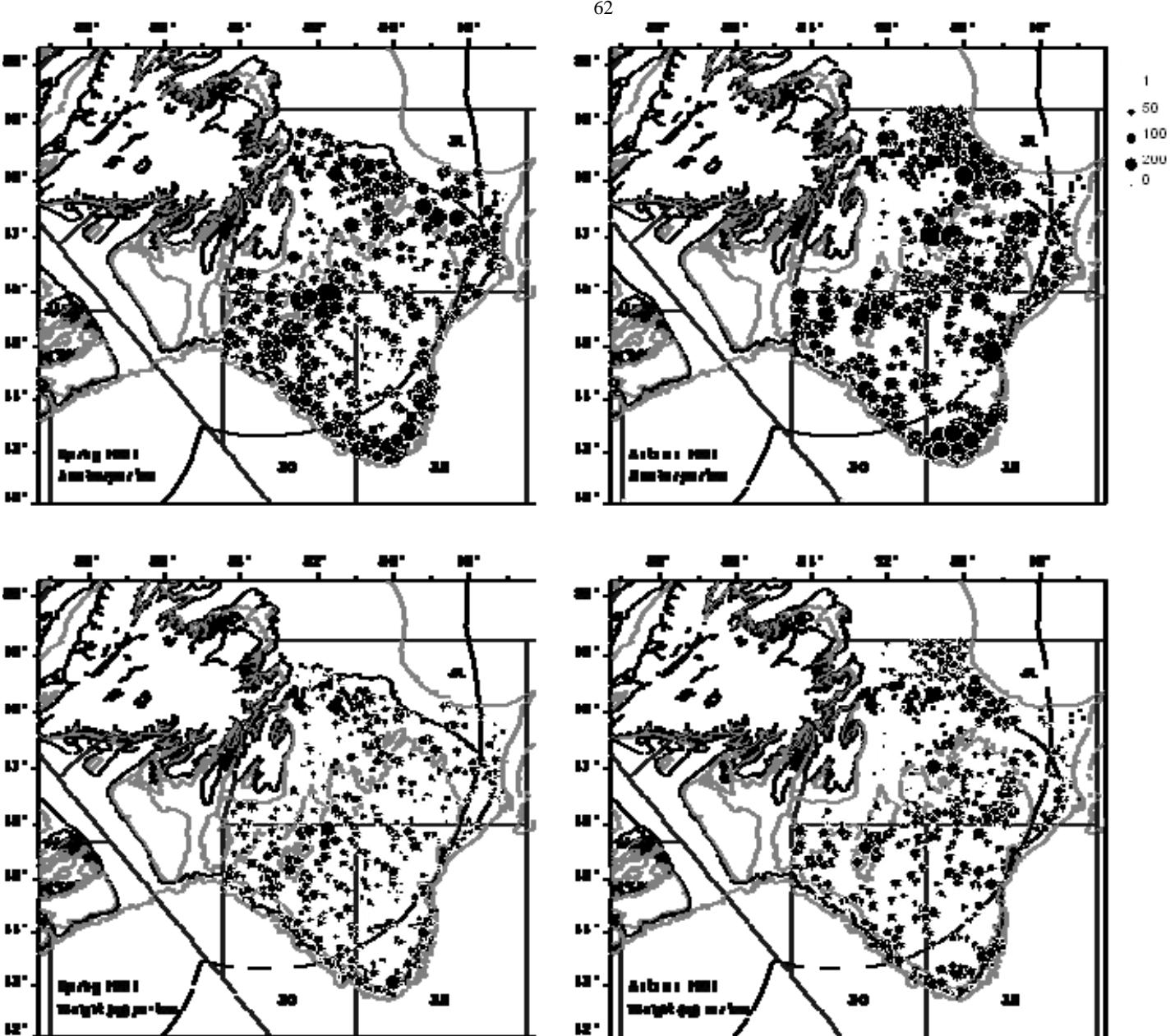


Figure 58. Distribution of American plaice in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 1991.

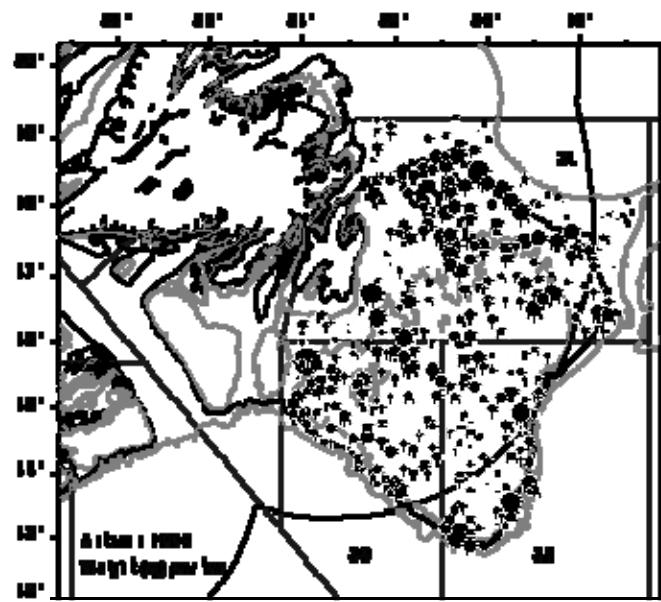
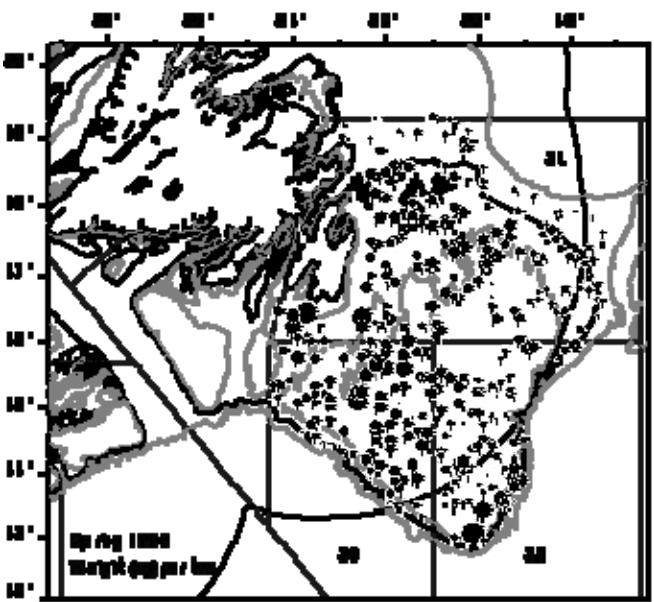
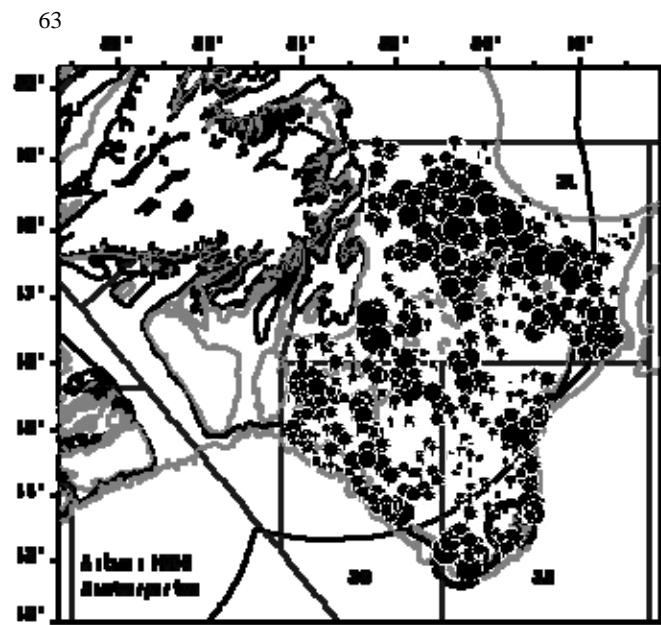
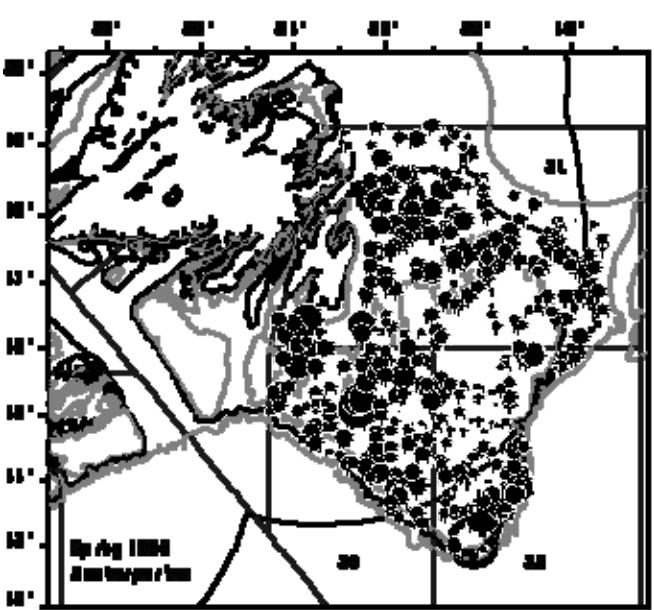


Figure 59. Distribution of American plaice in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 1990.

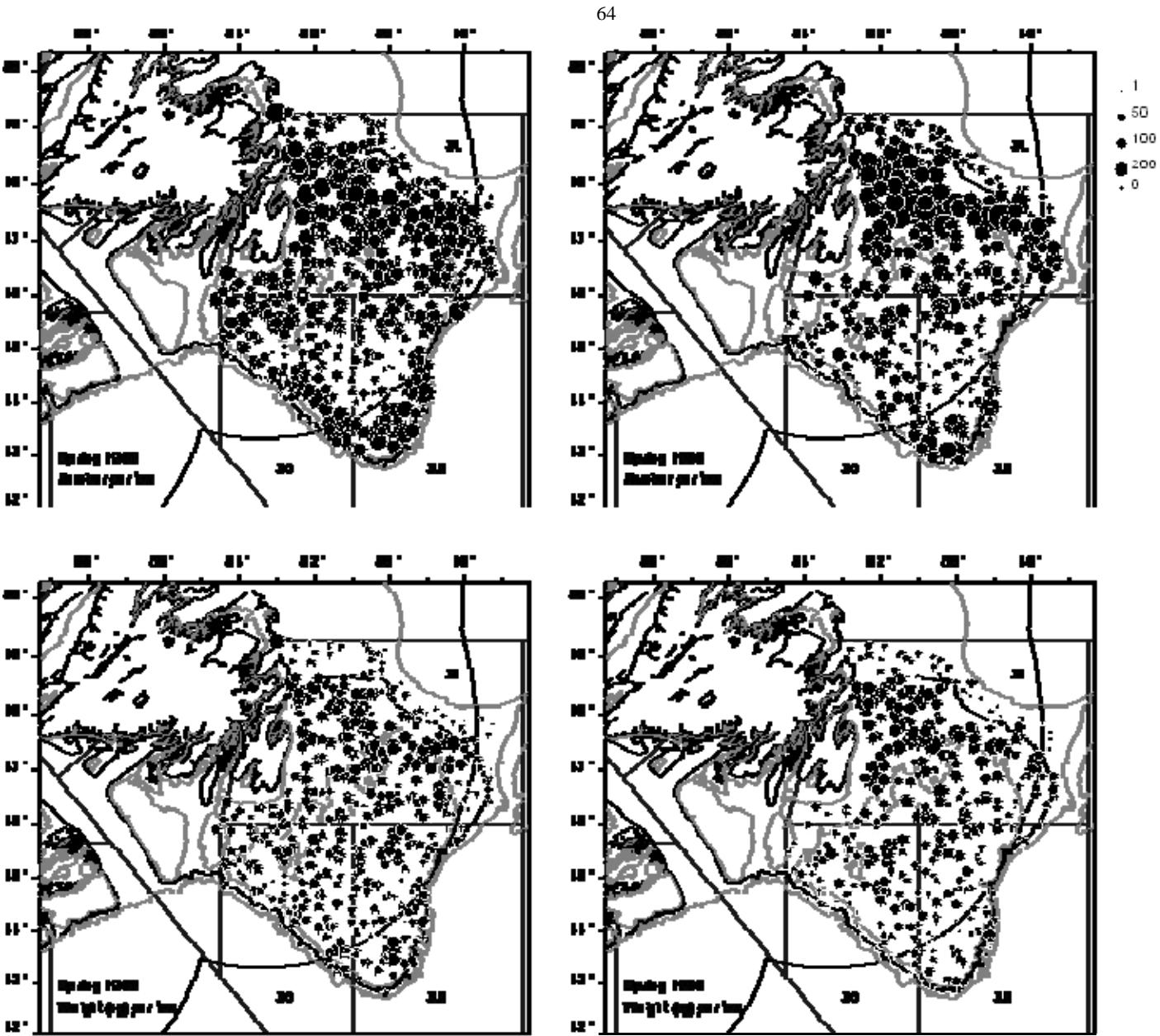


Figure 60. Distribution of American plaice in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring surveys for 1990 and 1989.

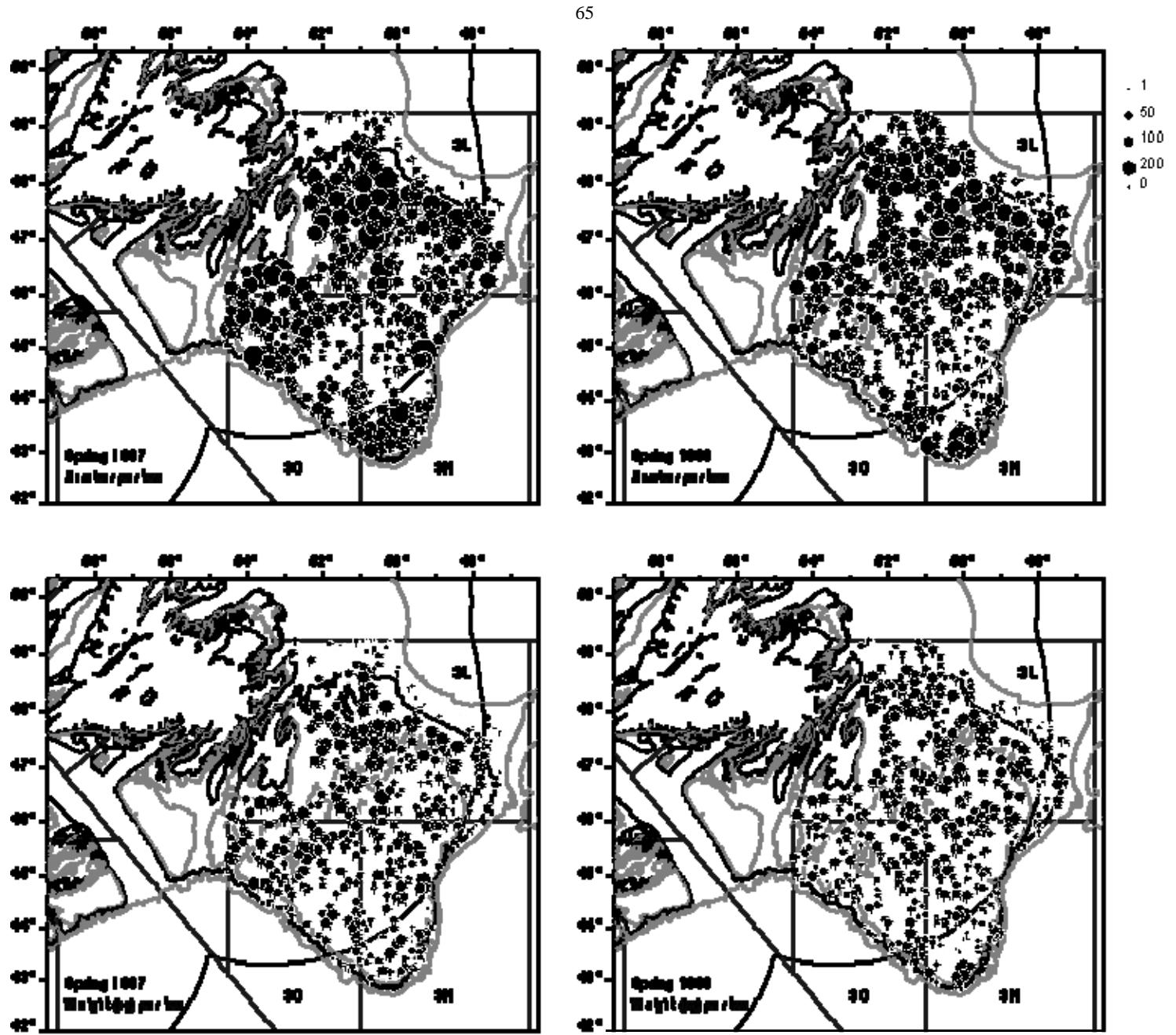


Figure 61. Distribution of American plaice in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring surveys for 1988 and 1987.

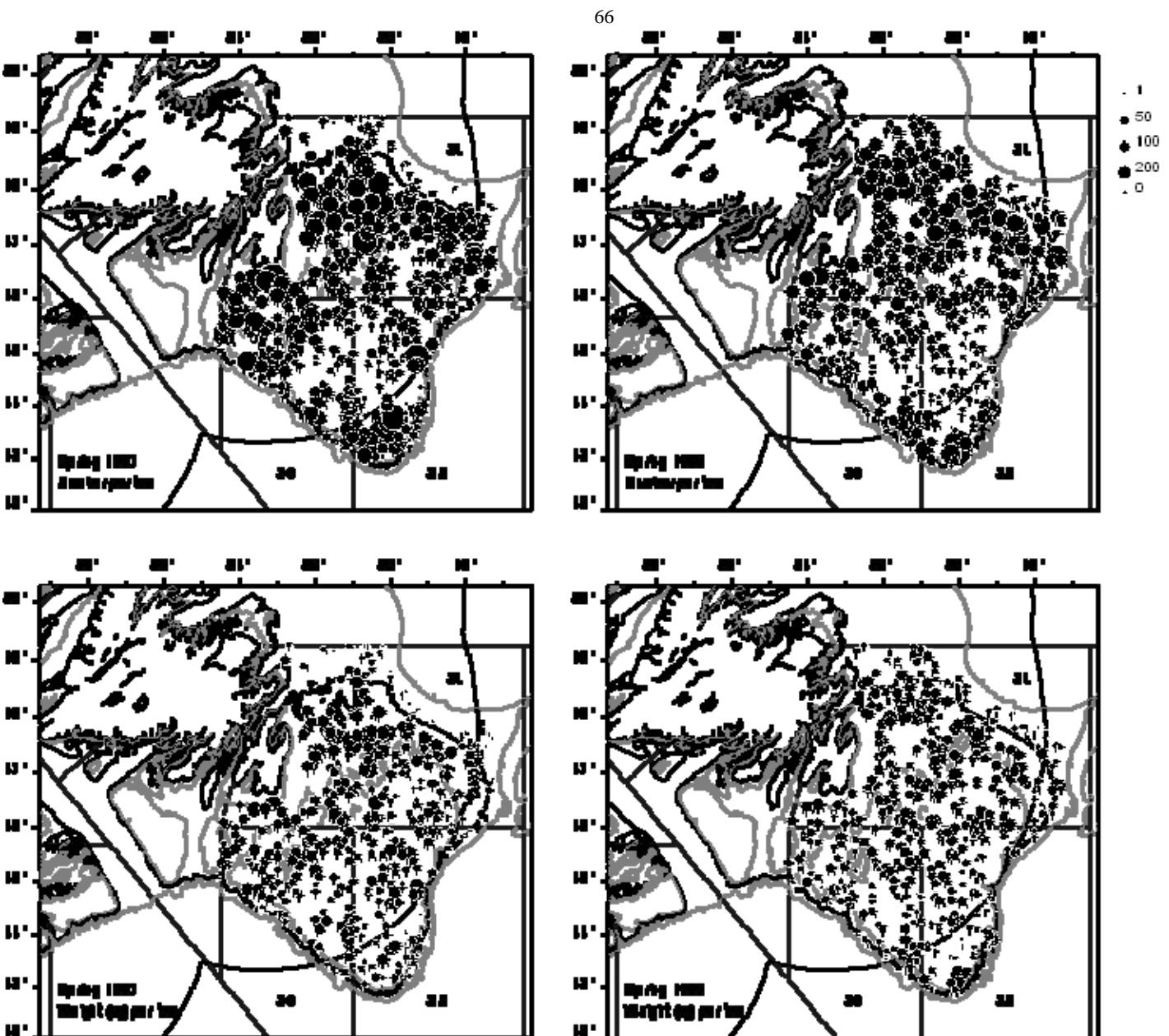


Figure 62. Distribution of American plaice in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring surveys for 1987 and 1986.

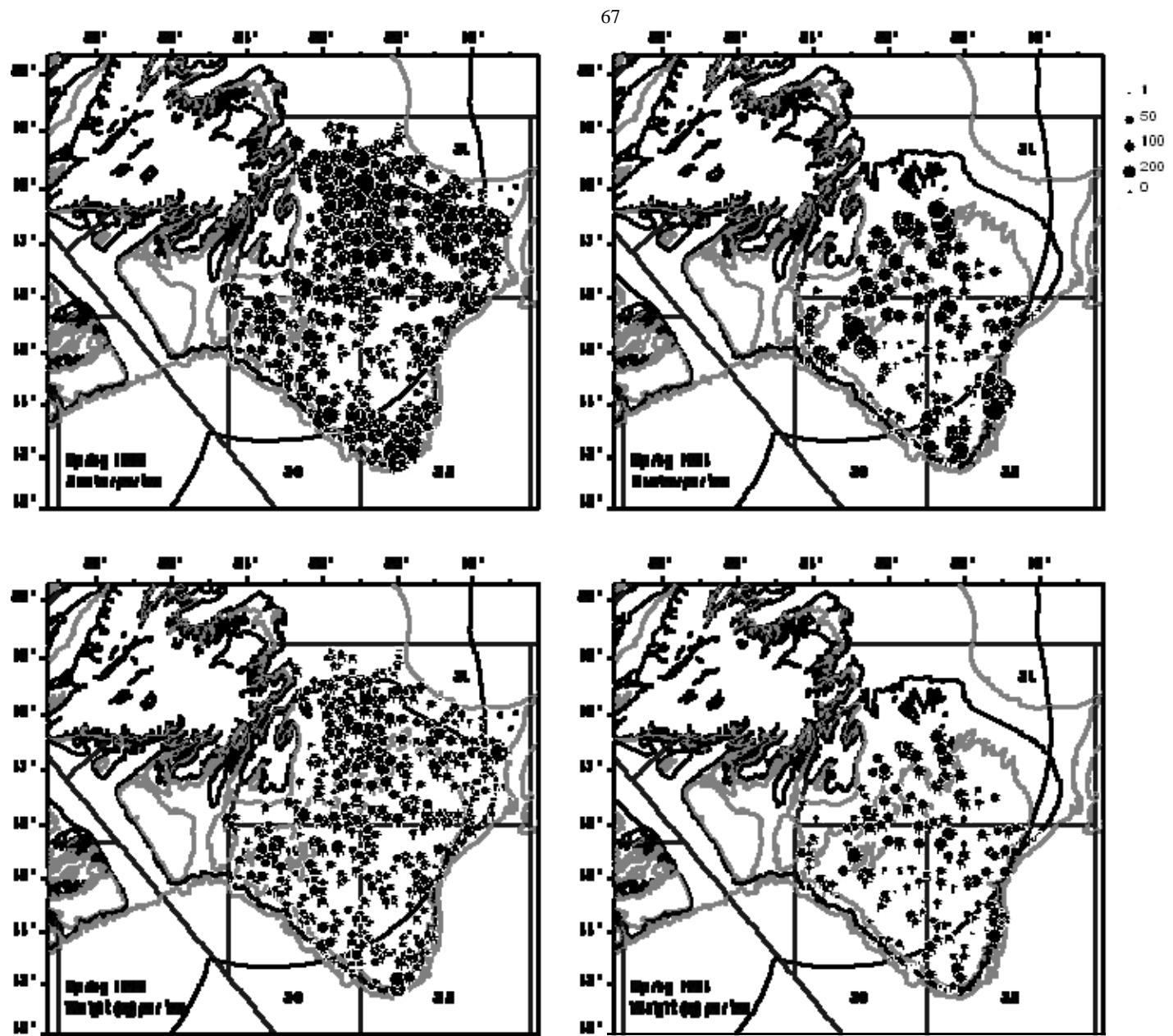


Figure 63. Distribution of American plaice in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring surveys for 1985 and 1984.

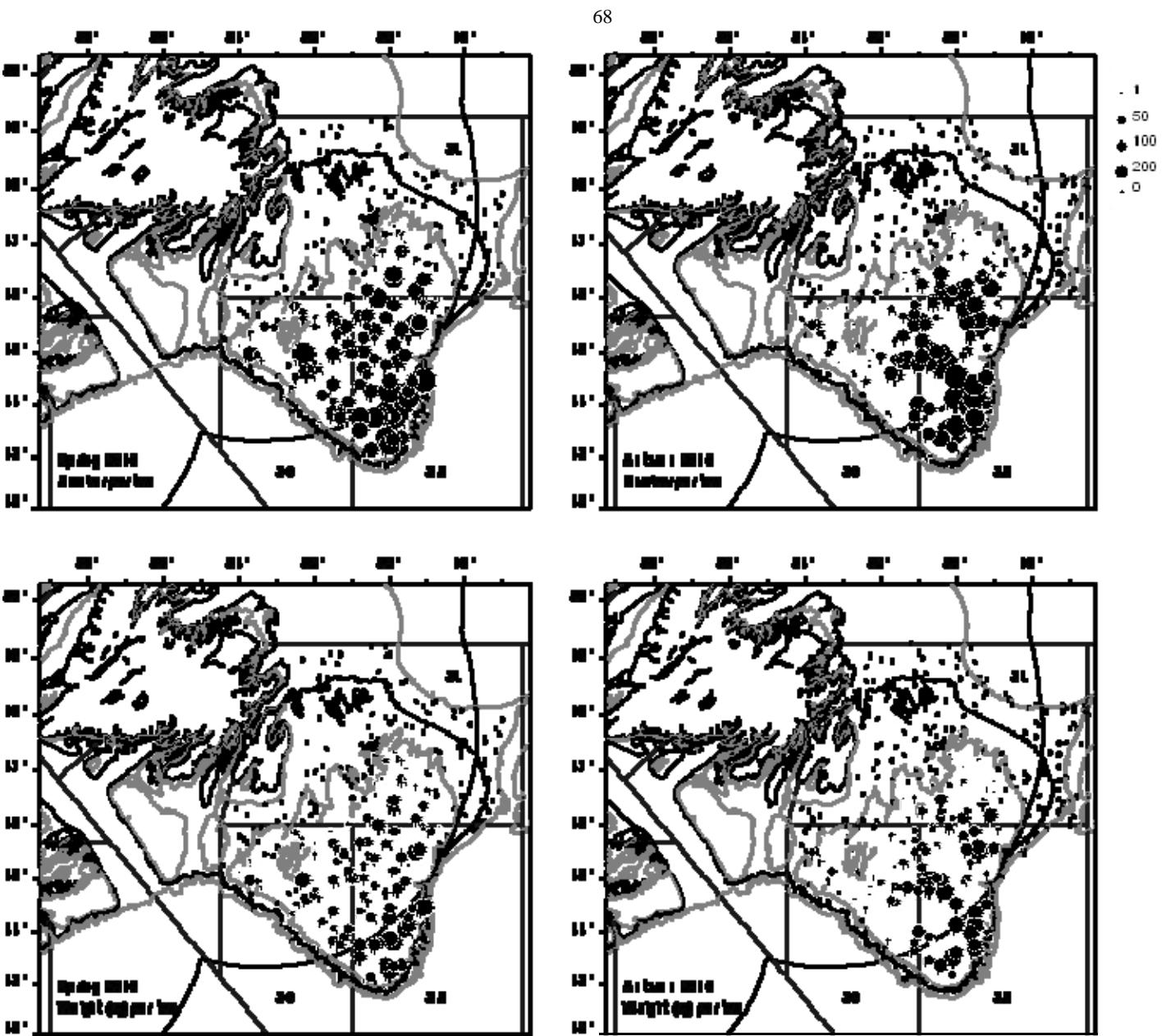


Figure 64. Distribution of yellowtail flounder in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 2010.

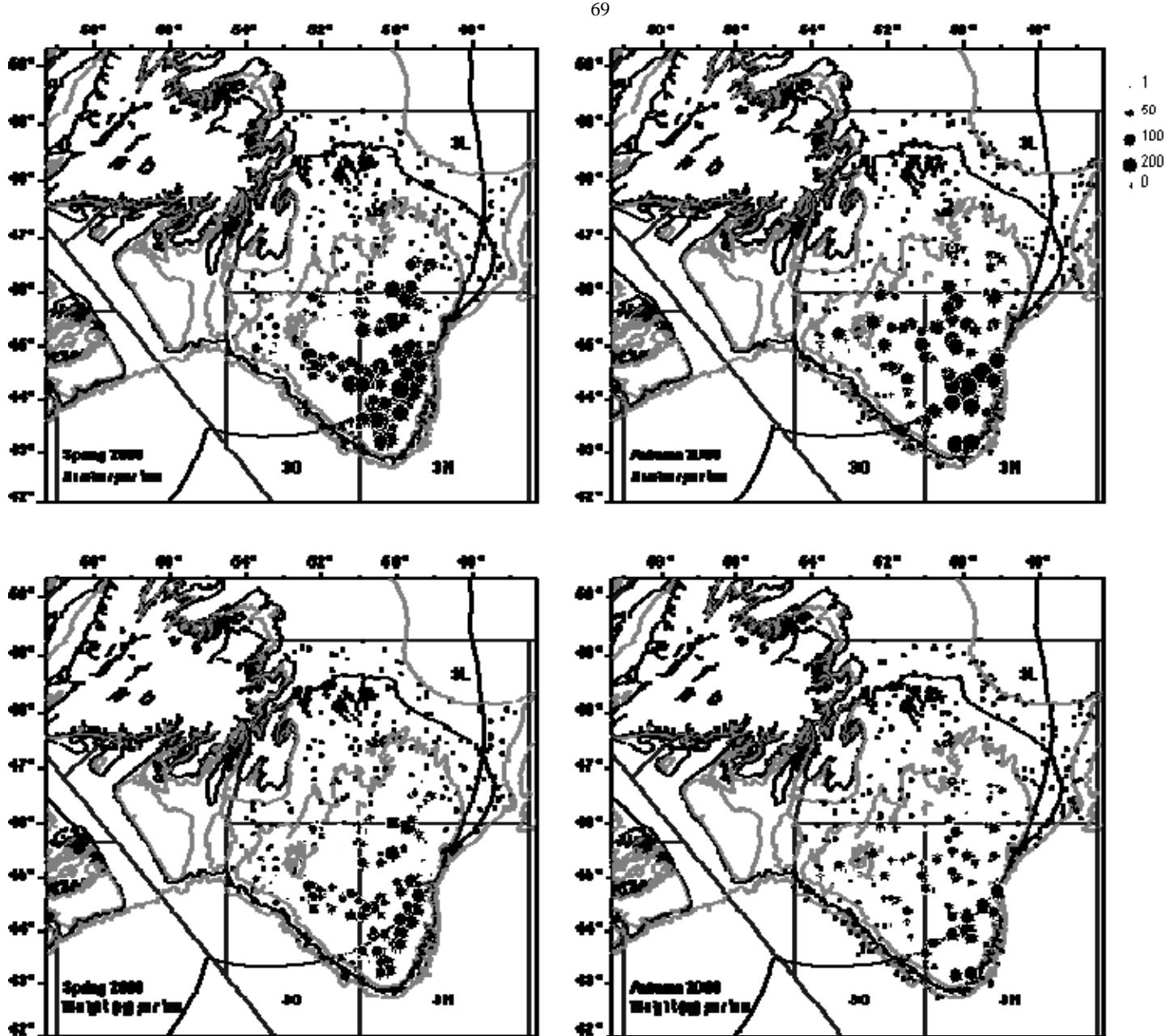


Figure 65. Distribution of yellowtail flounder in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 2009.

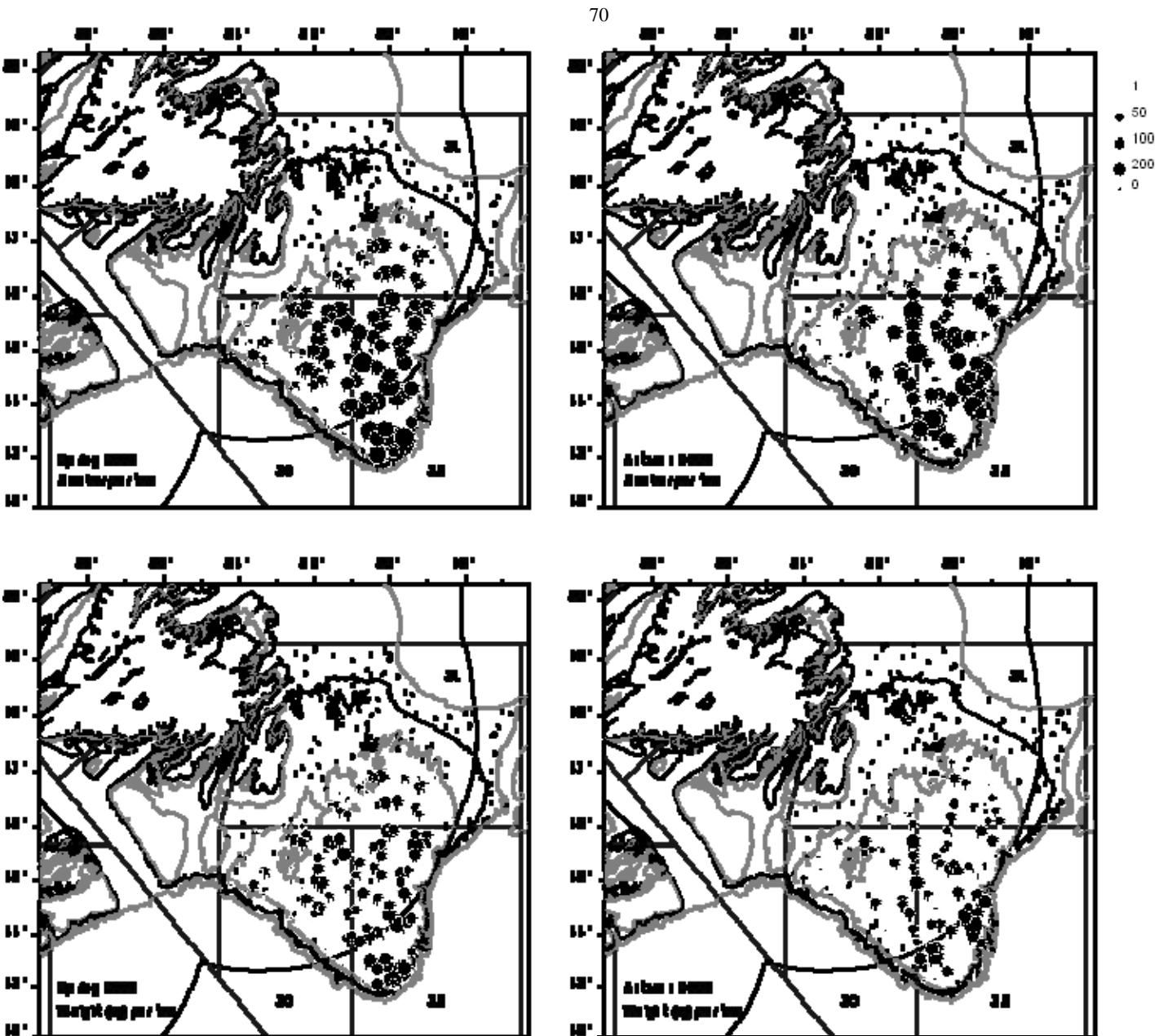


Figure 66. Distribution of yellowtail flounder in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 2008.

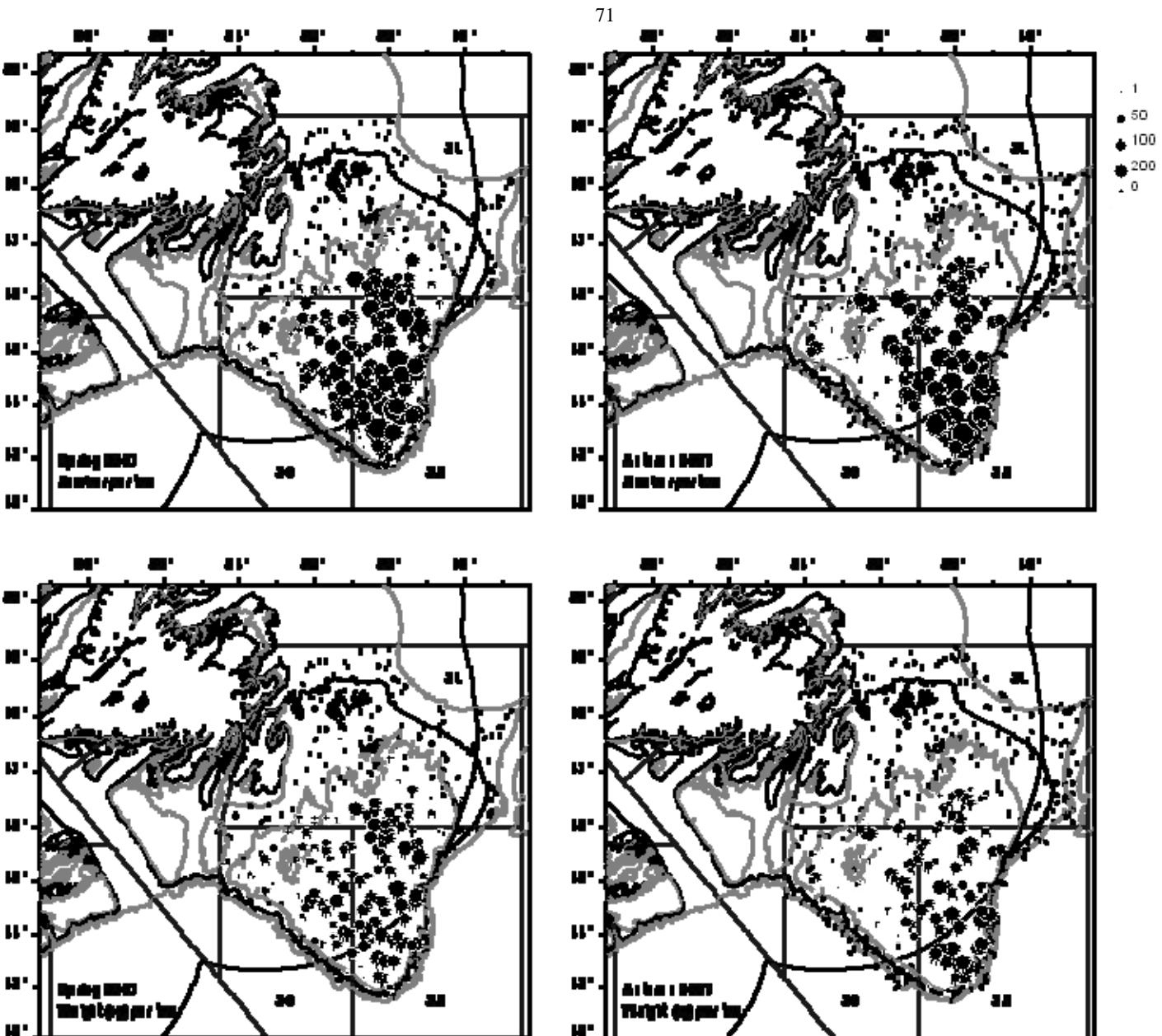


Figure 67. Distribution of yellowtail flounder in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 2007.

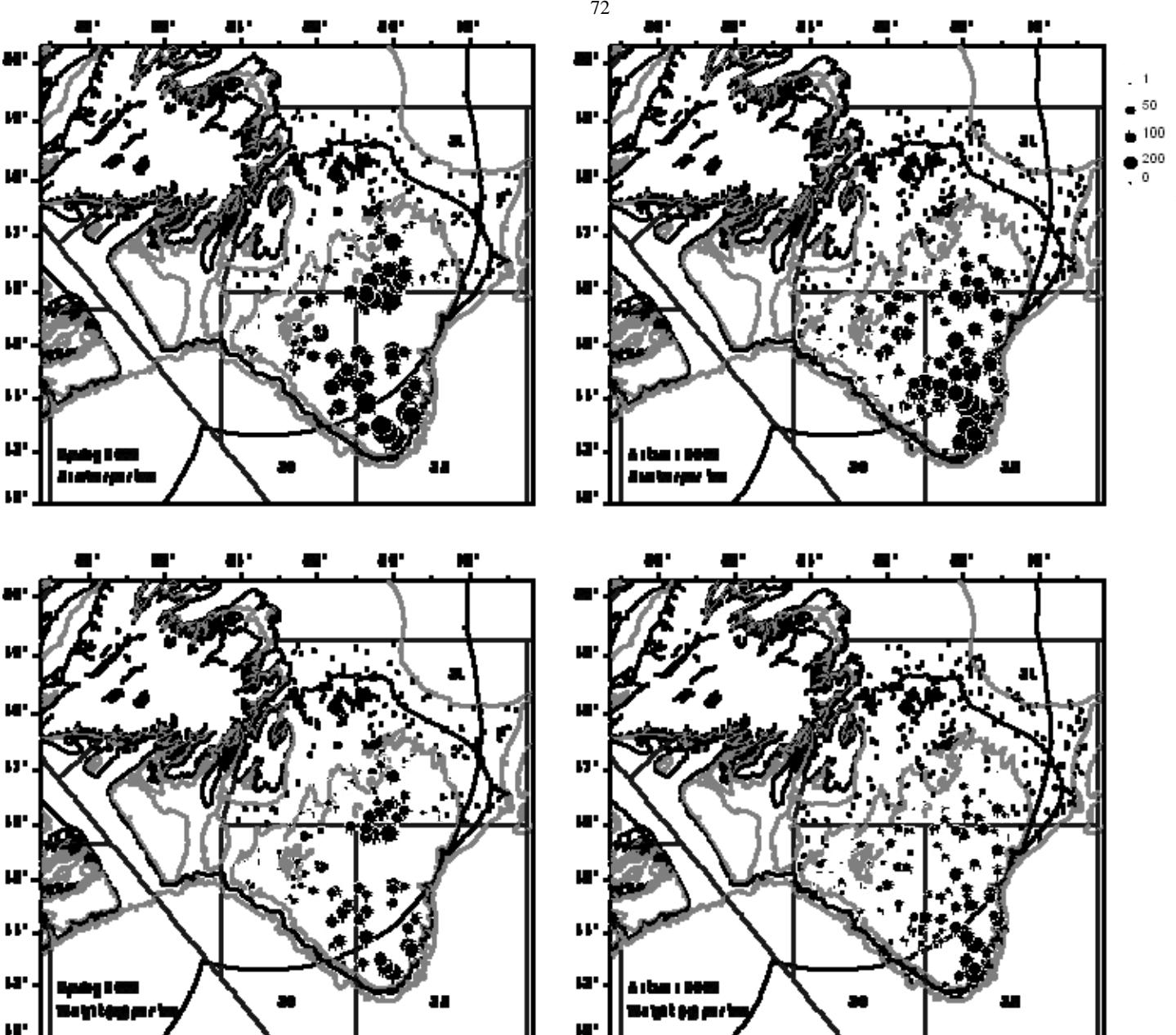


Figure 68. Distribution of yellowtail flounder in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 2006.

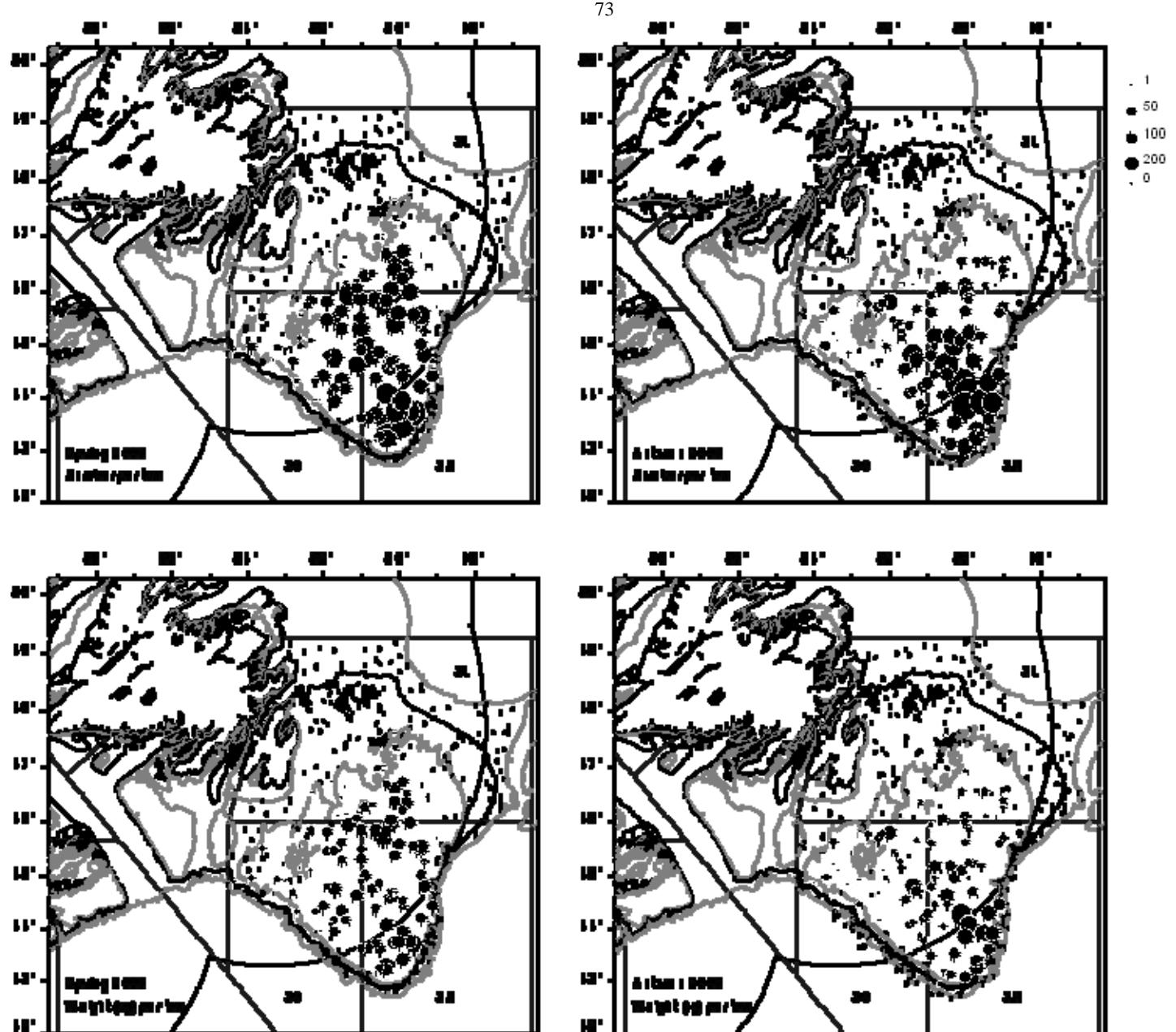


Figure 69. Distribution of yellowtail flounder in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 2005.

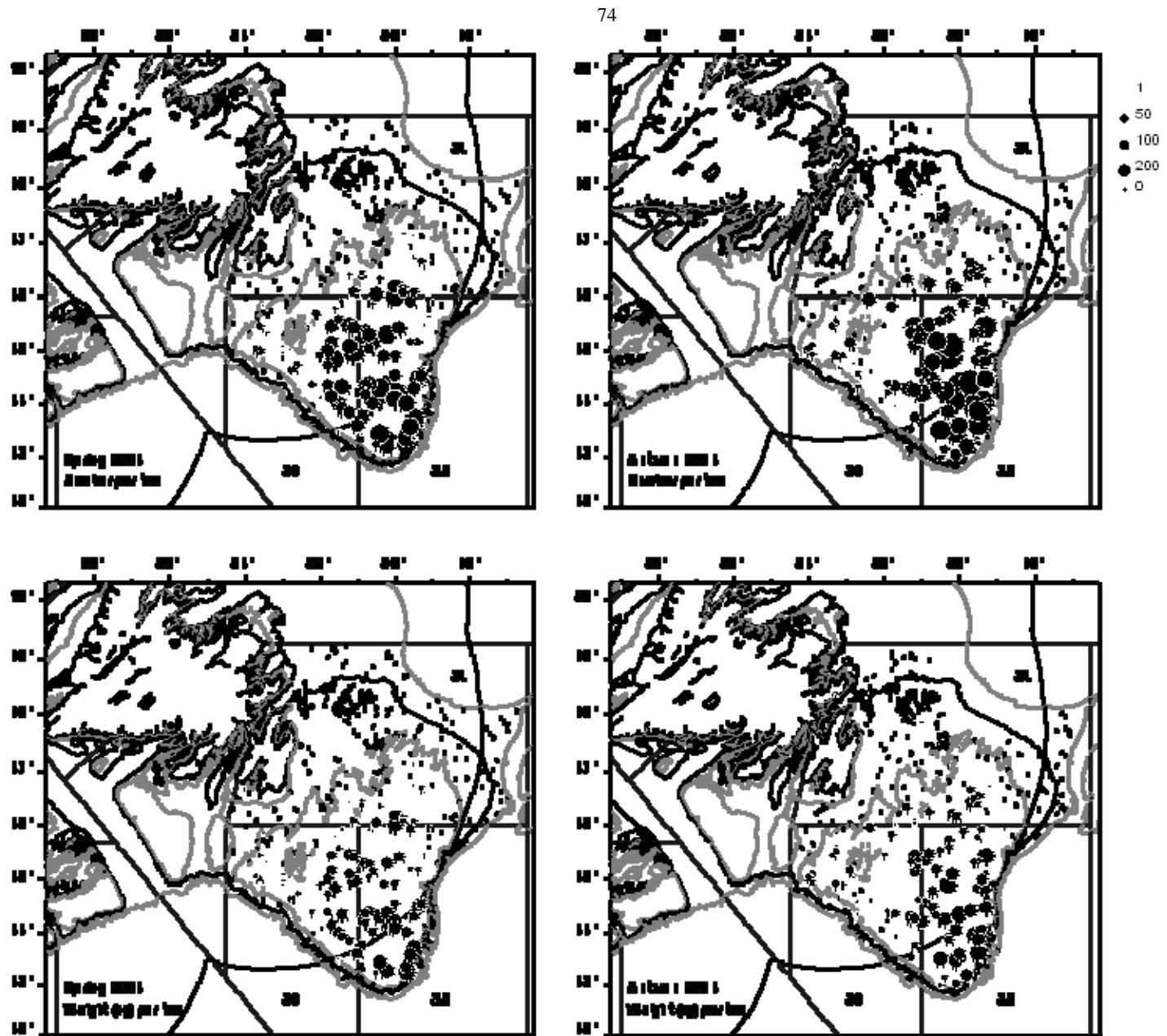


Figure 70. Distribution of yellowtail flounder in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 2004.

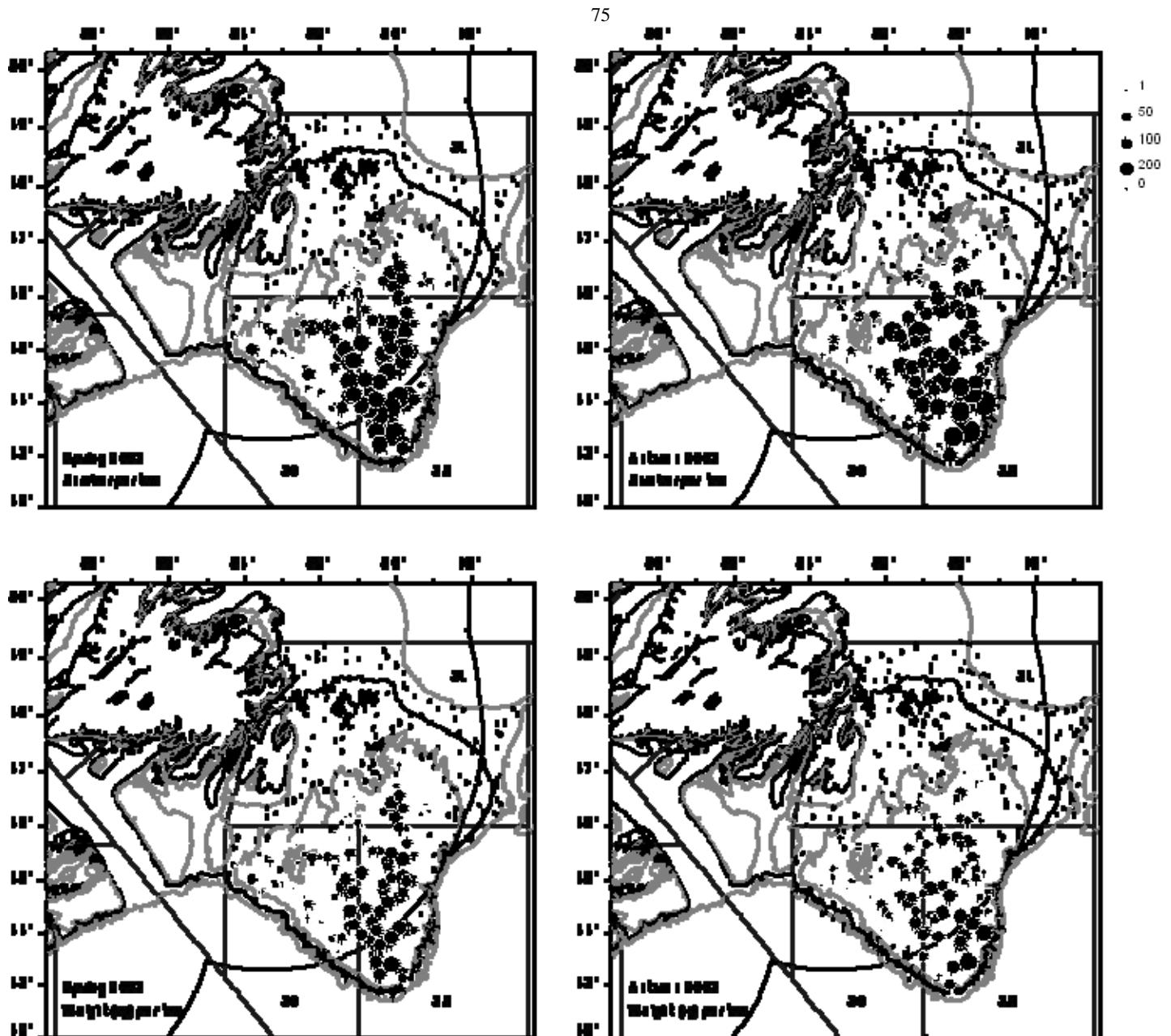


Figure 71. Distribution of yellowtail flounder in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 2003.

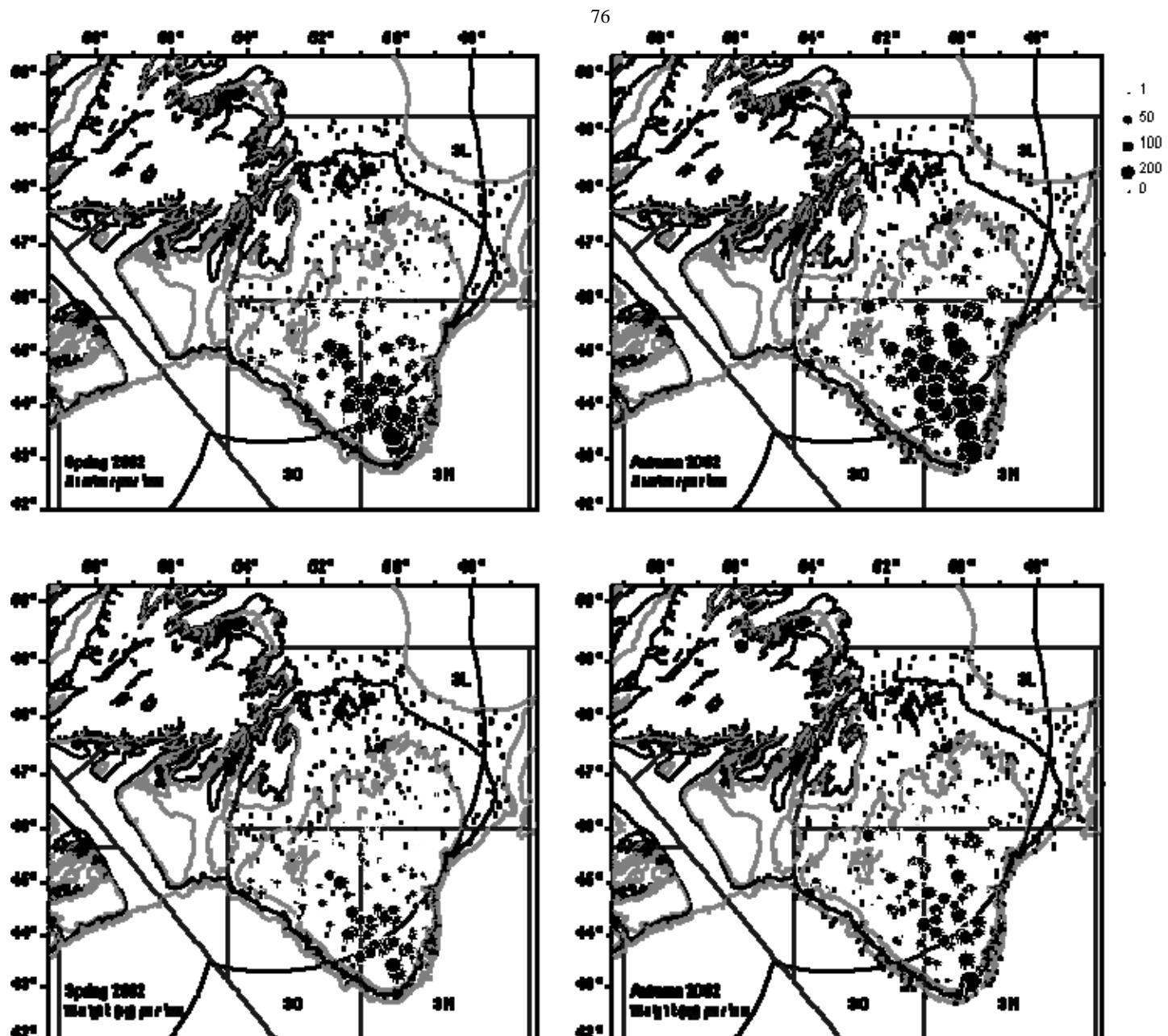


Figure 72. Distribution of yellowtail flounder in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 2002.

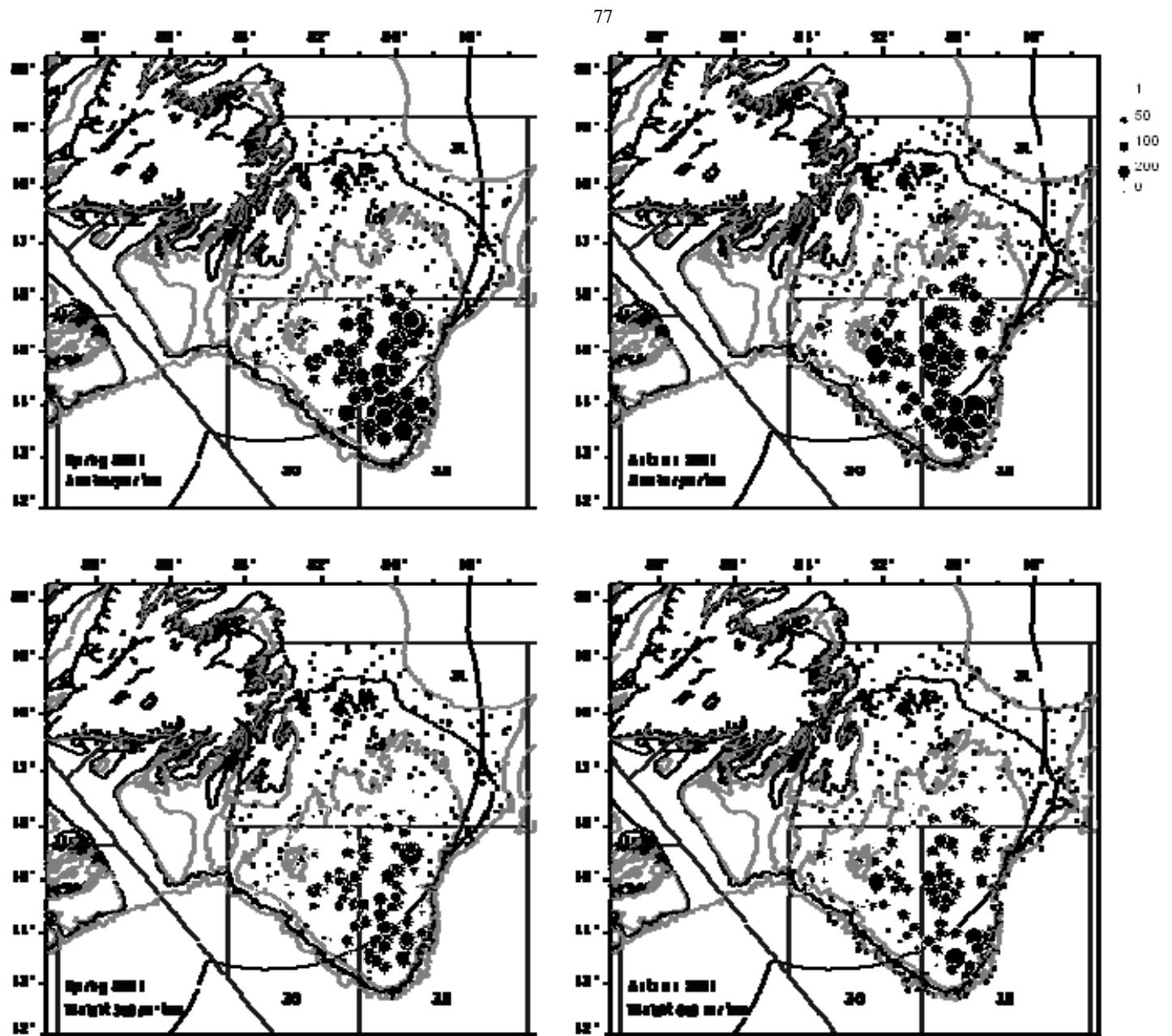


Figure 73. Distribution of yellowtail flounder in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 2001.

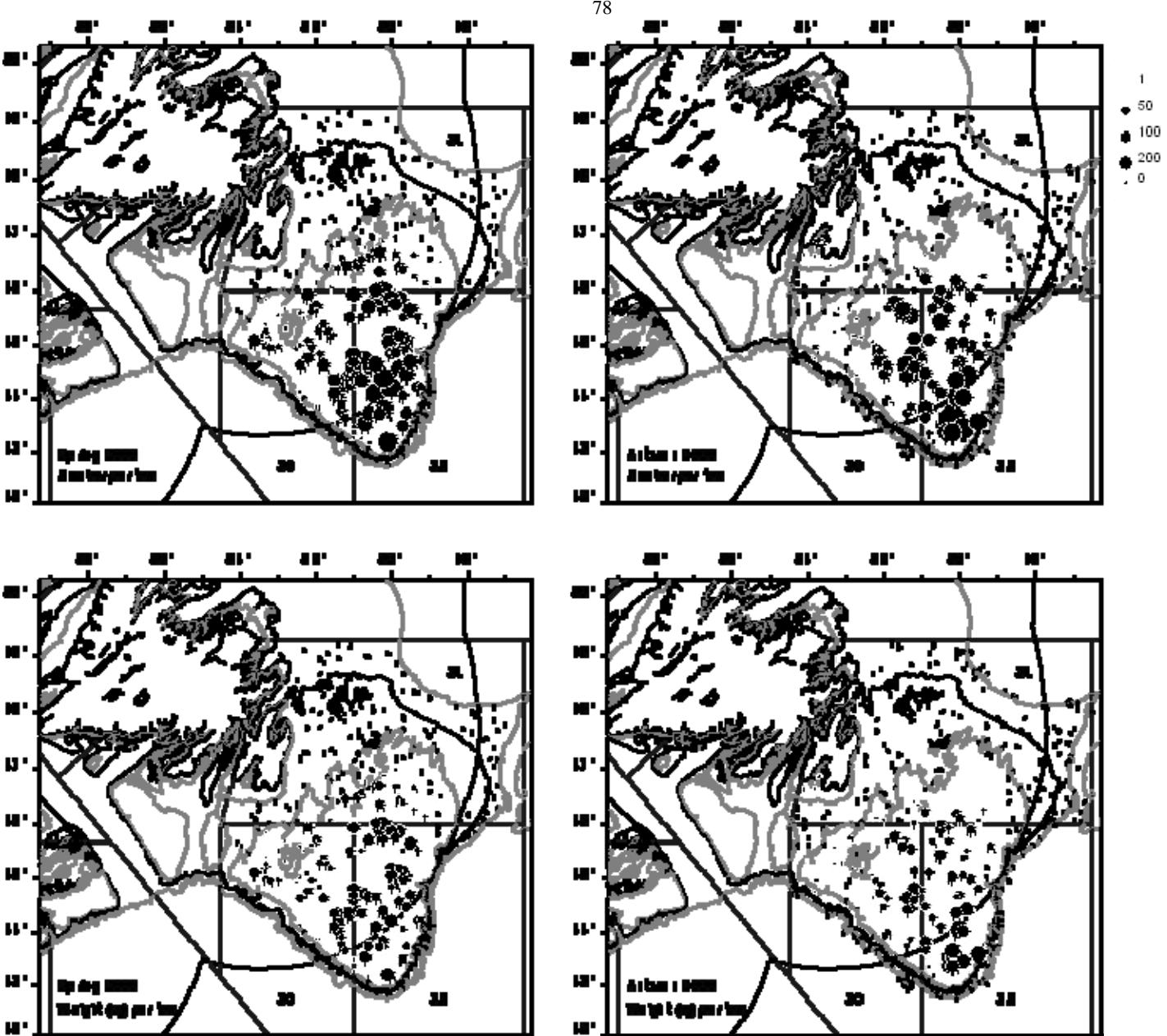


Figure 74. Distribution of yellowtail flounder in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 2000.

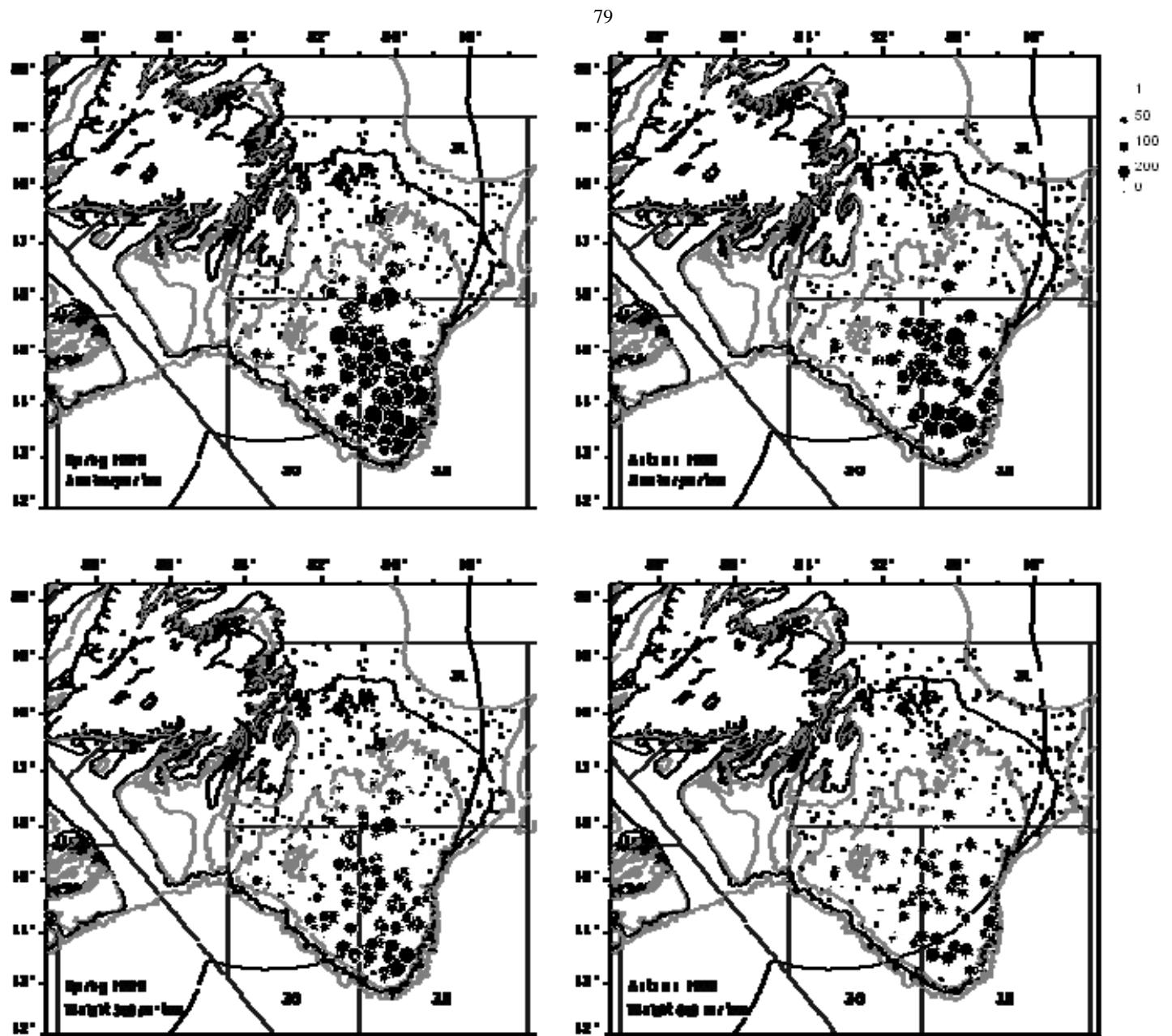


Figure 75. Distribution of yellowtail flounder in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 1999.

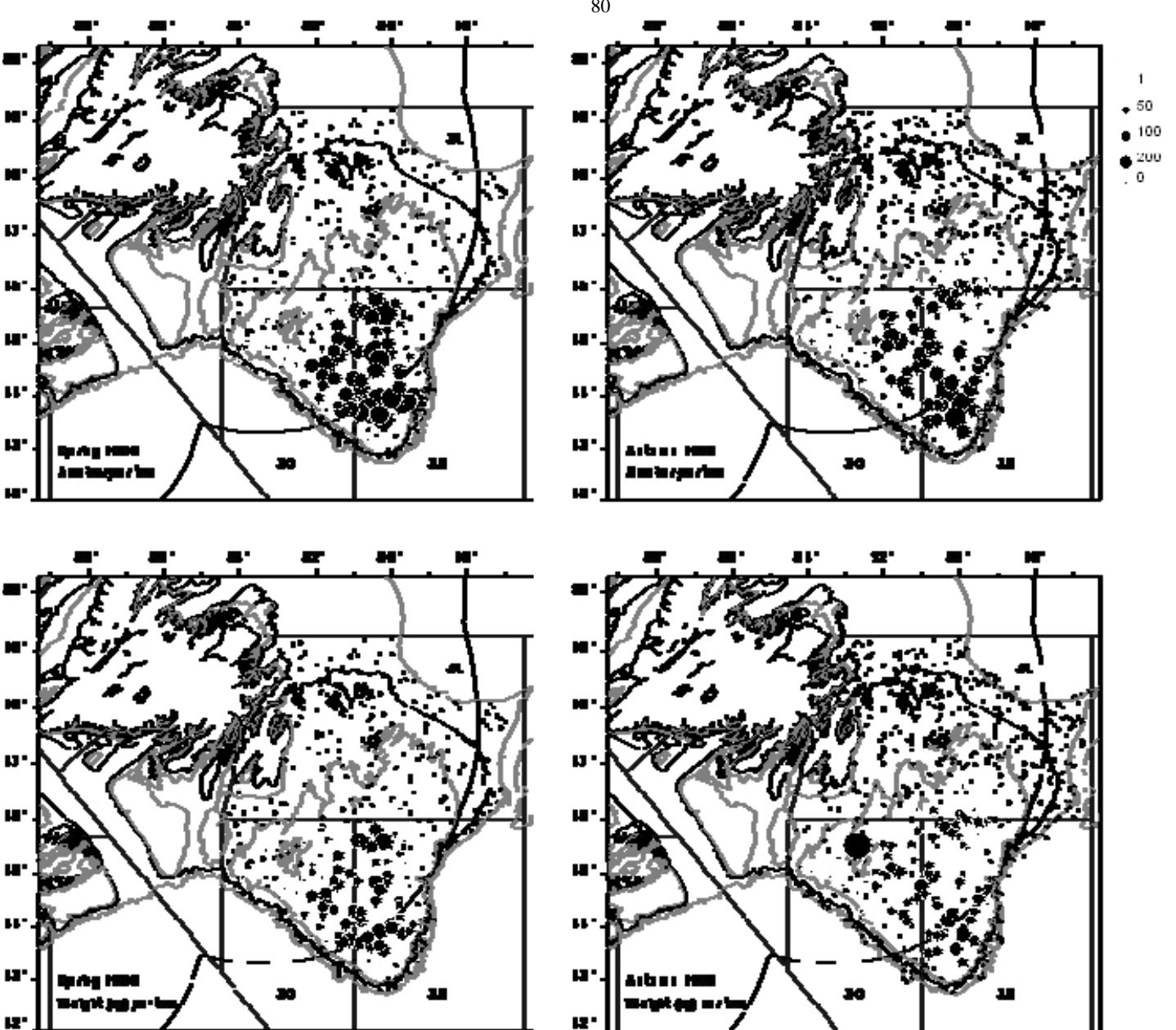


Figure 76. Distribution of yellowtail flounder in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 1998.

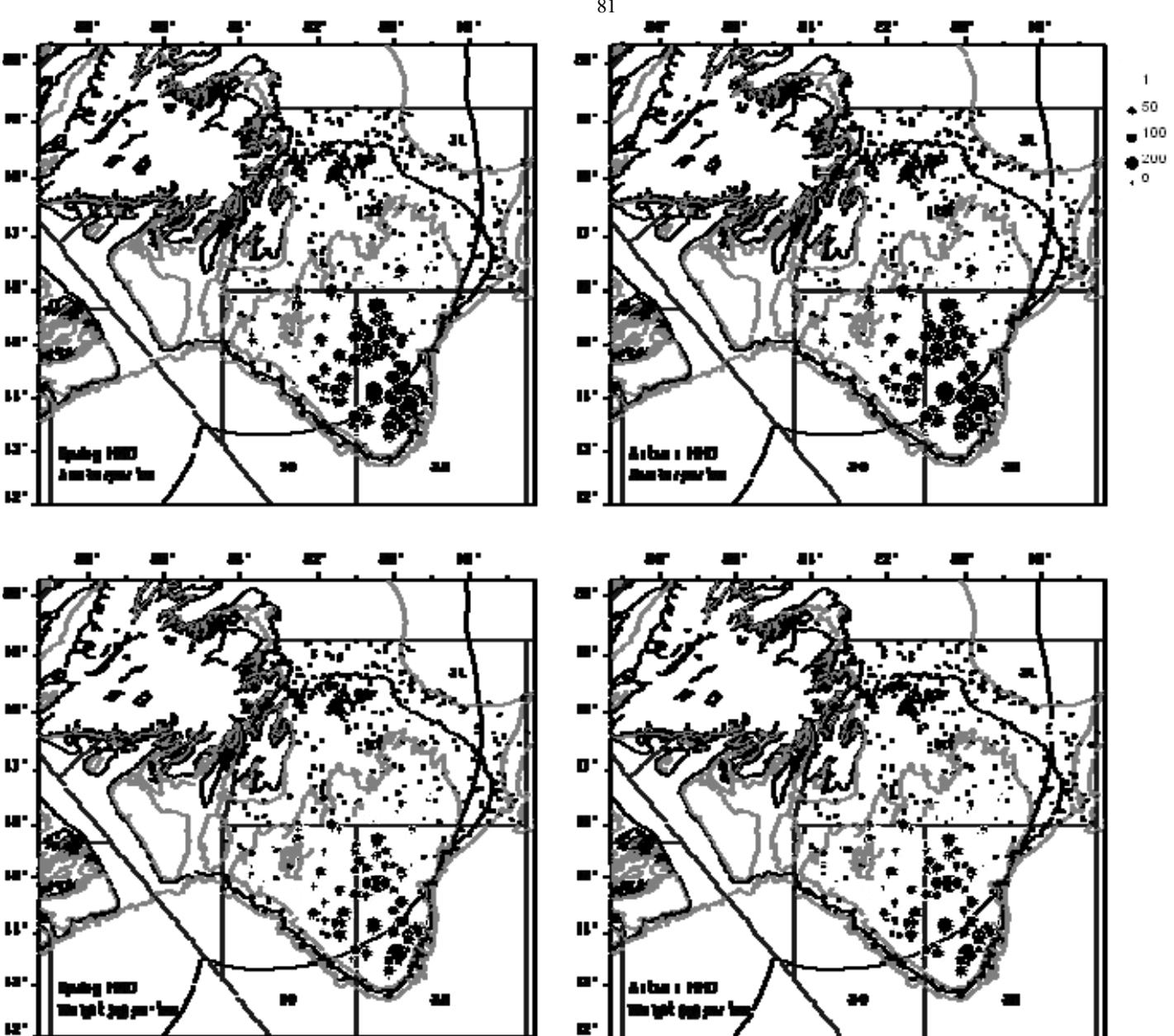


Figure 77. Distribution of yellowtail flounder in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 1997.

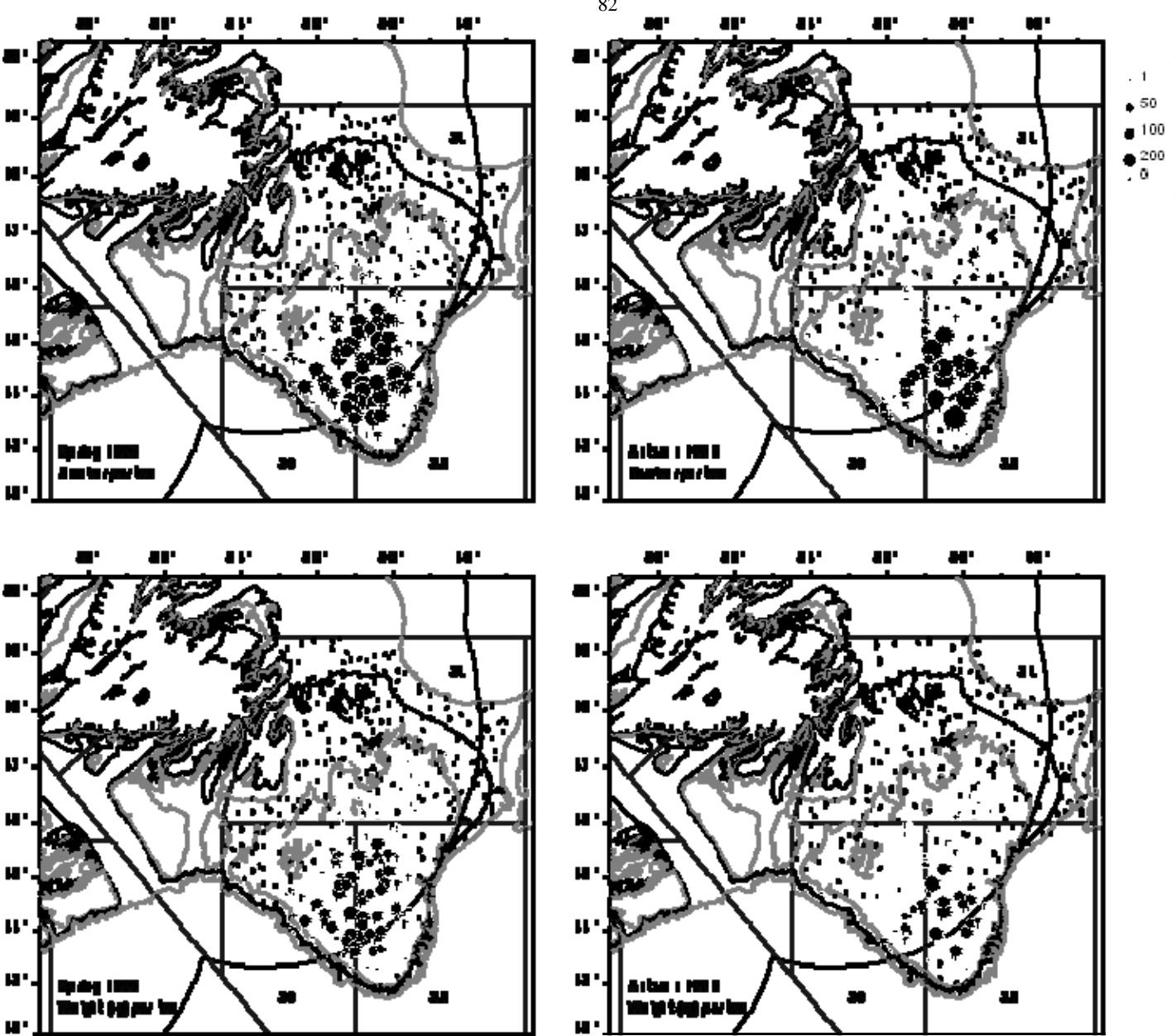


Figure 78. Distribution of yellowtail flounder in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 1996.

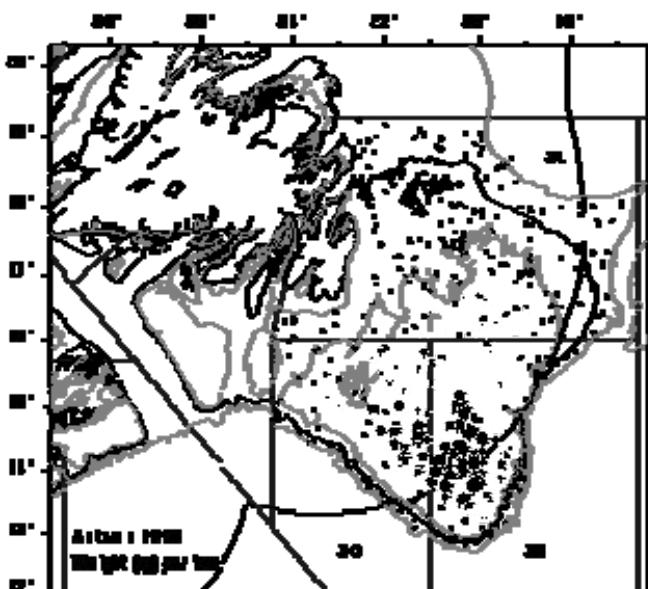
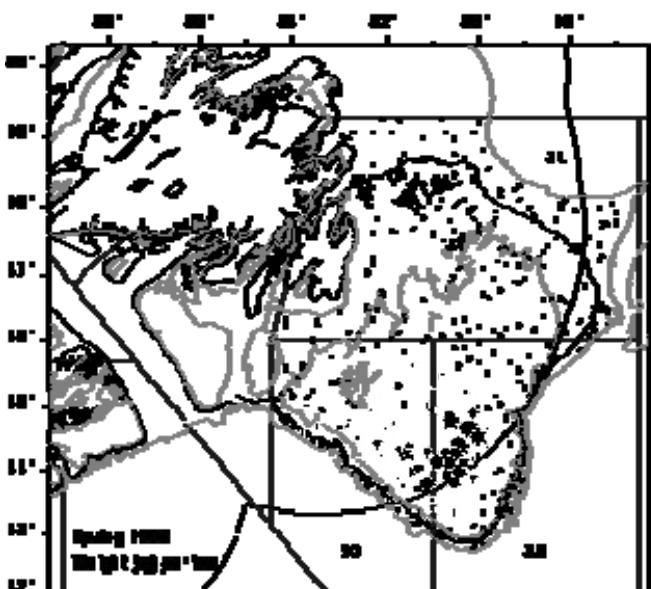
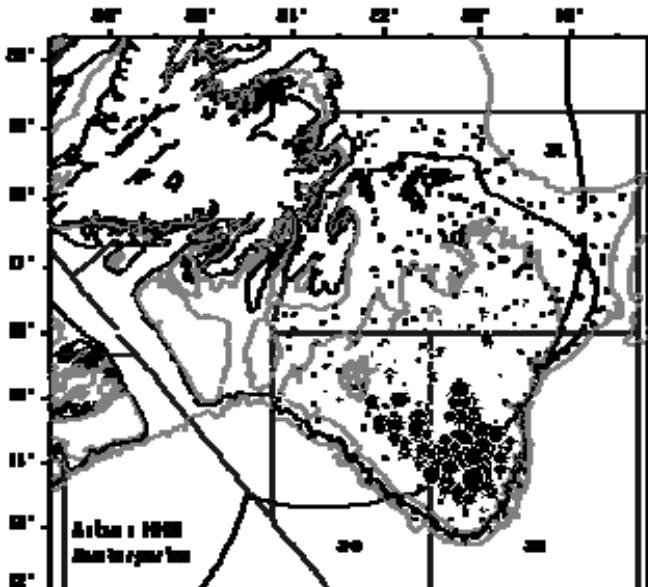
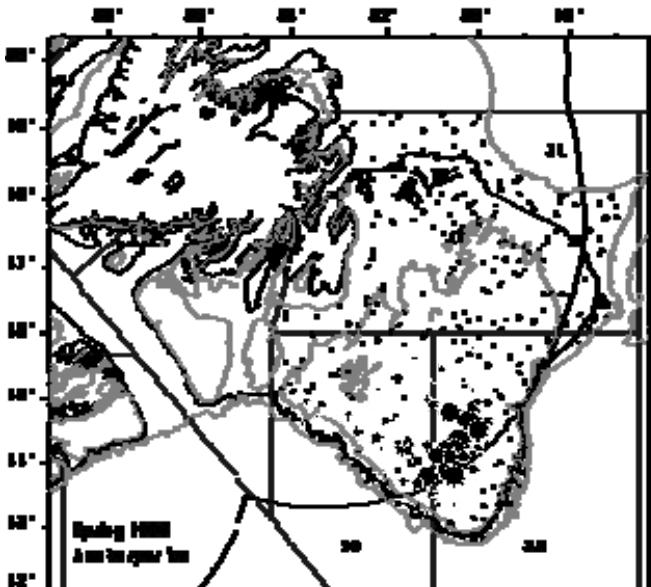


Figure 79. Distribution of yellowtail flounder in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 1995.

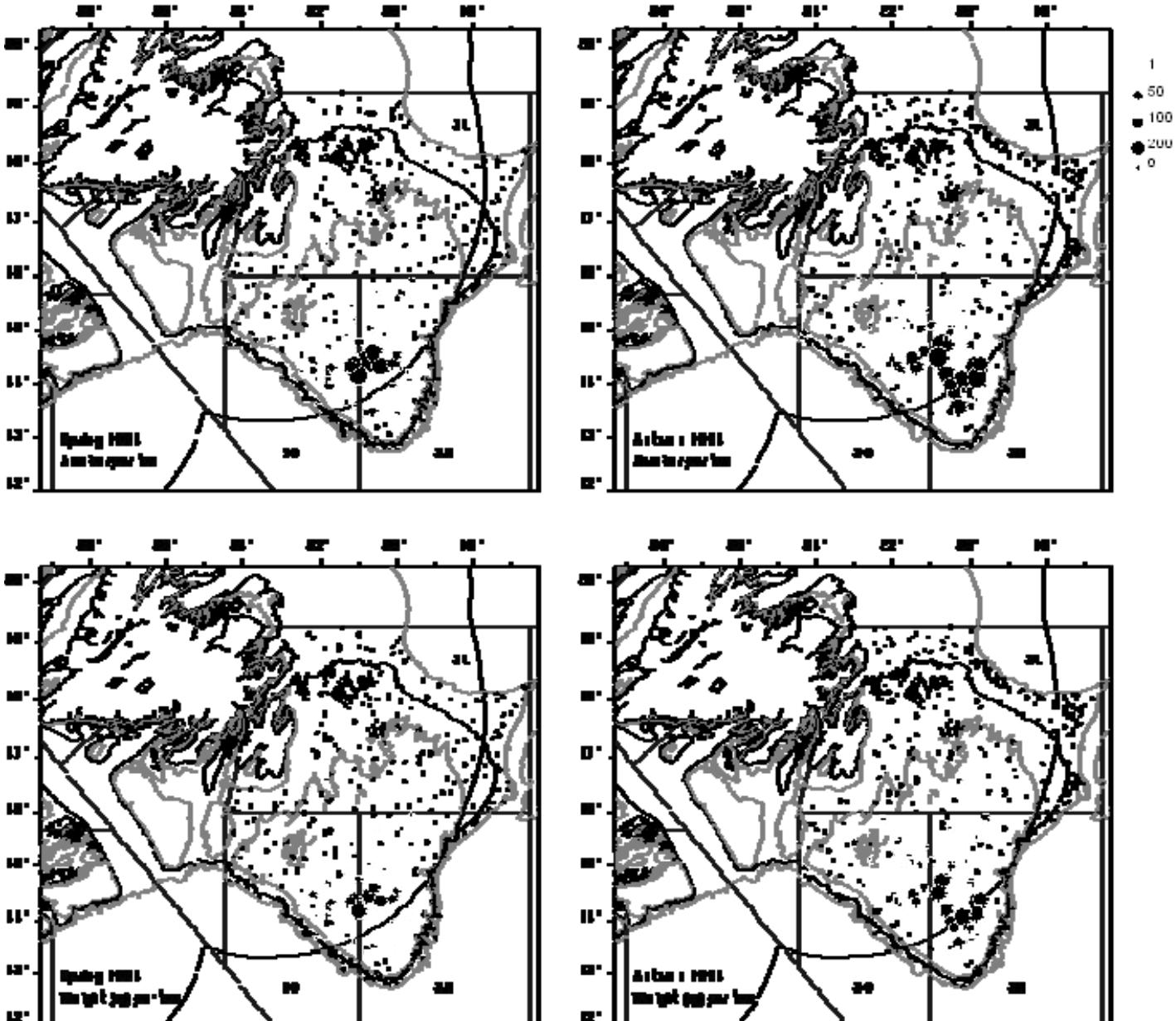


Figure 80. Distribution of yellowtail flounder in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 1994.

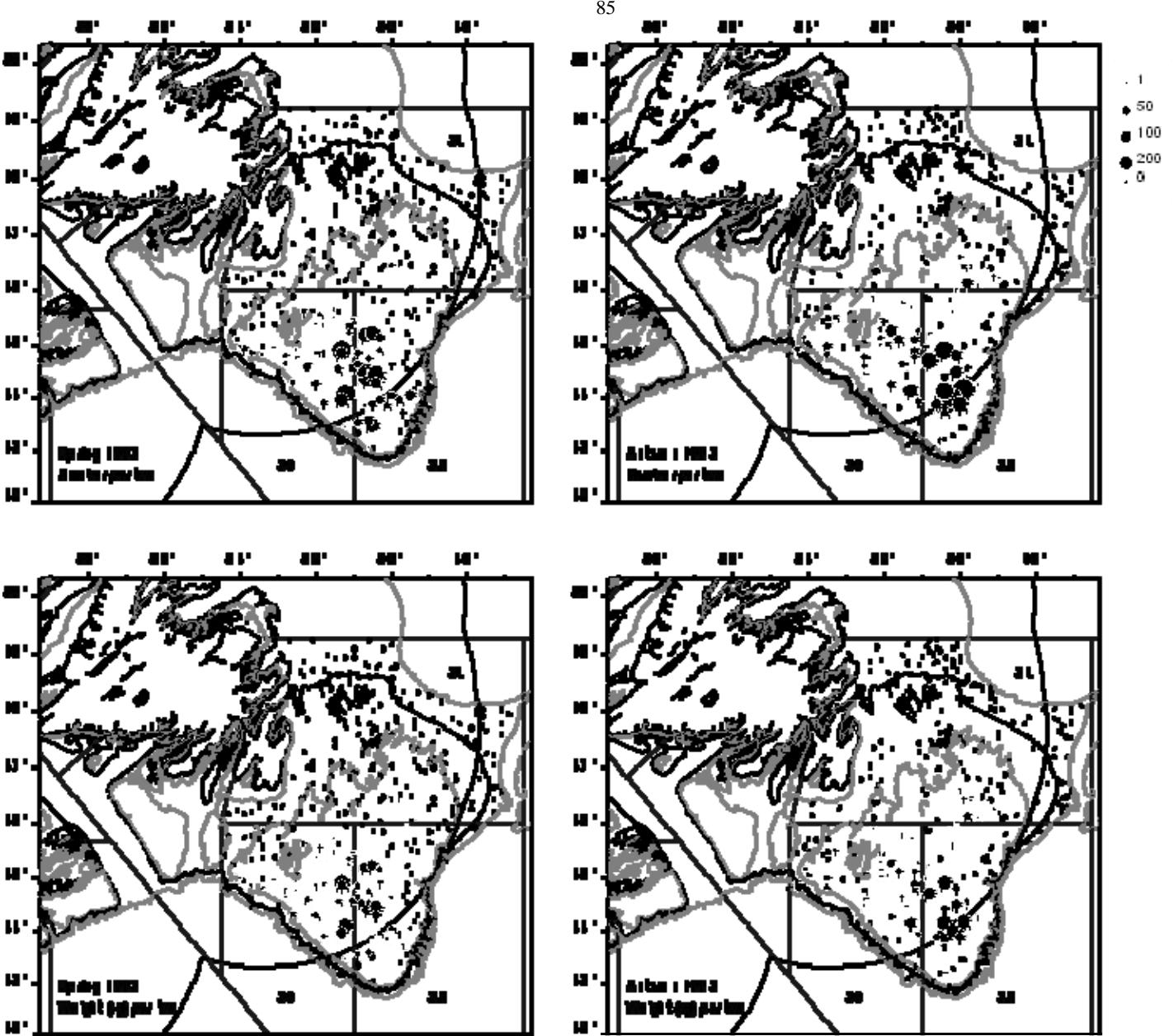


Figure 81. Distribution of yellowtail flounder in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 1993.

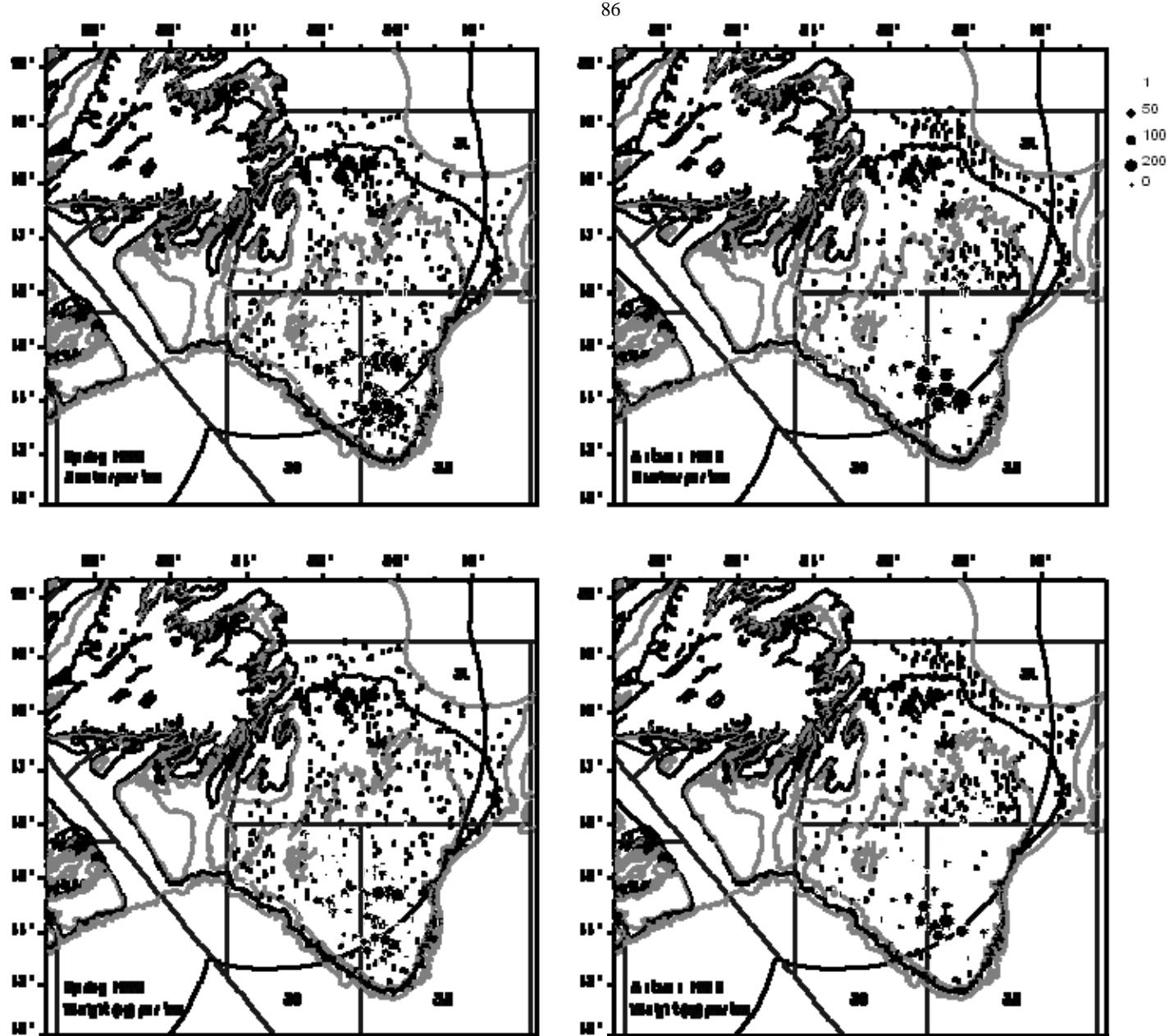


Figure 82. Distribution of yellowtail flounder in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 1992.

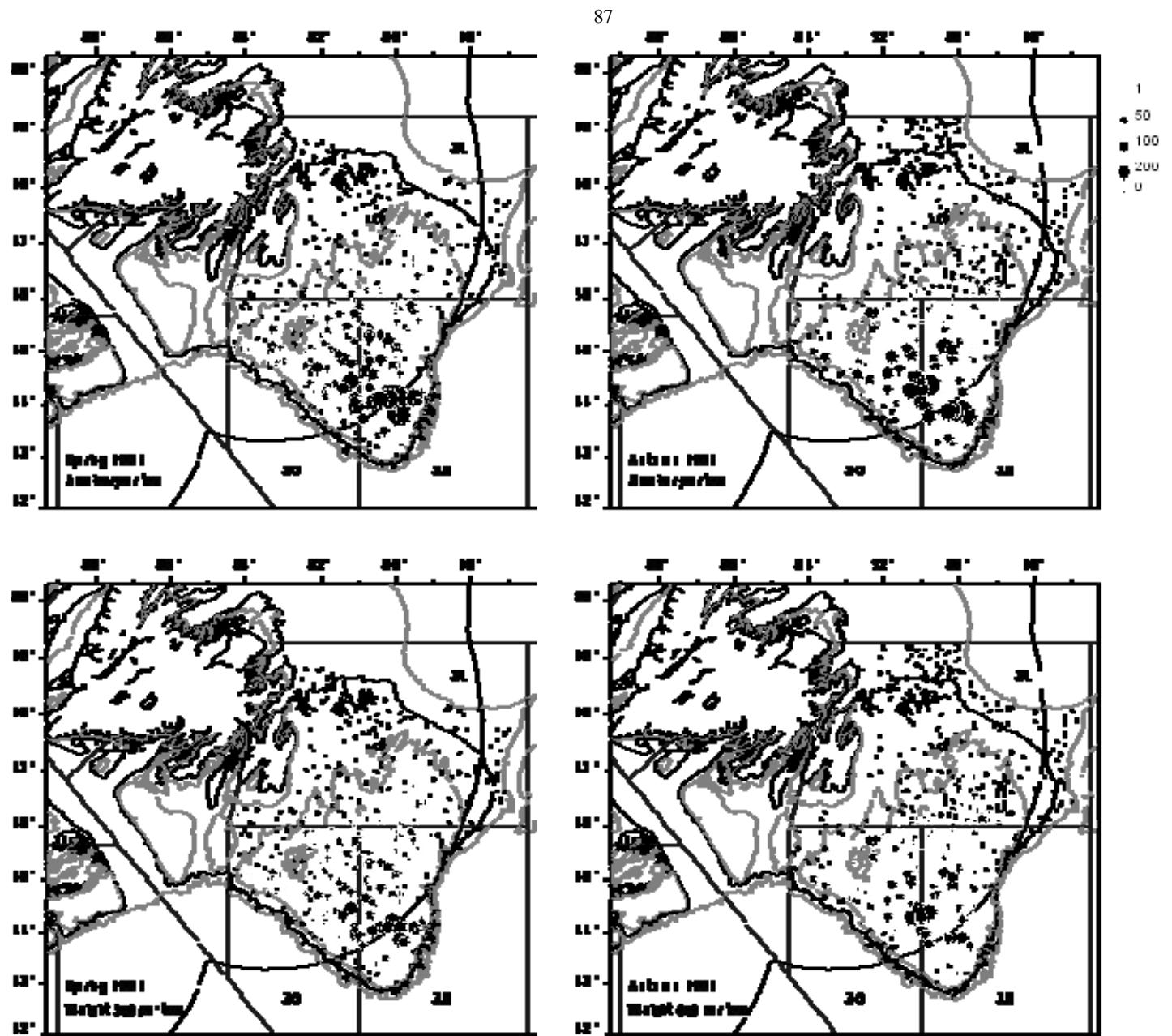


Figure 83. Distribution of yellowtail flounder in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 1991.

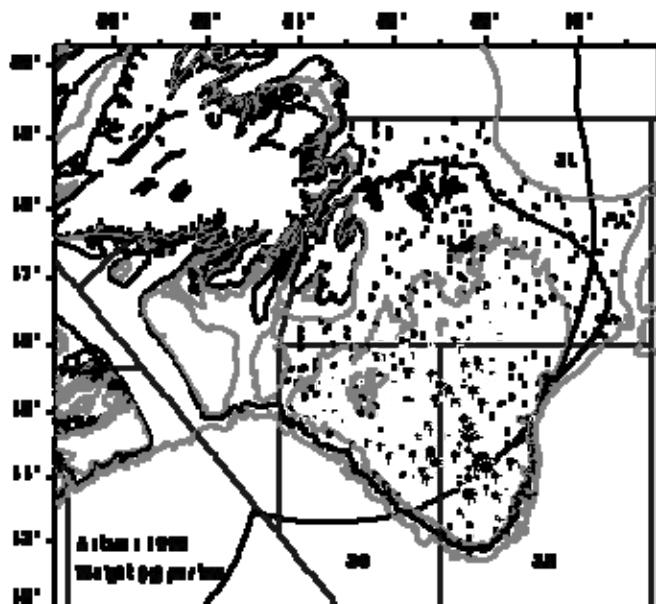
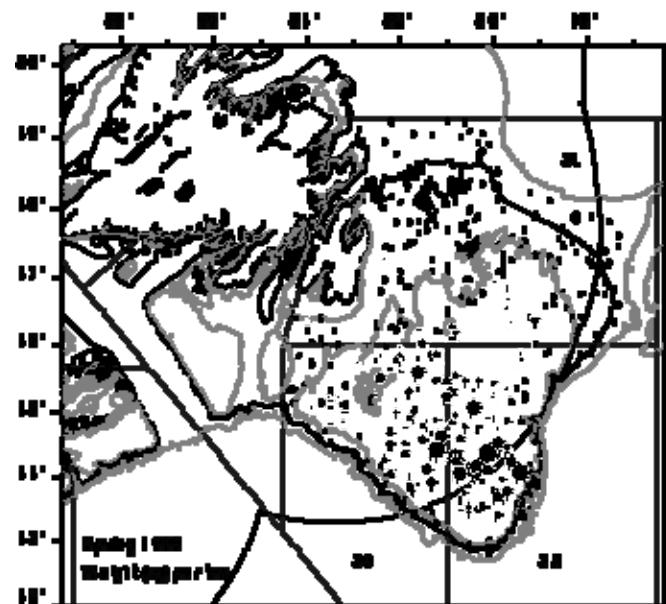
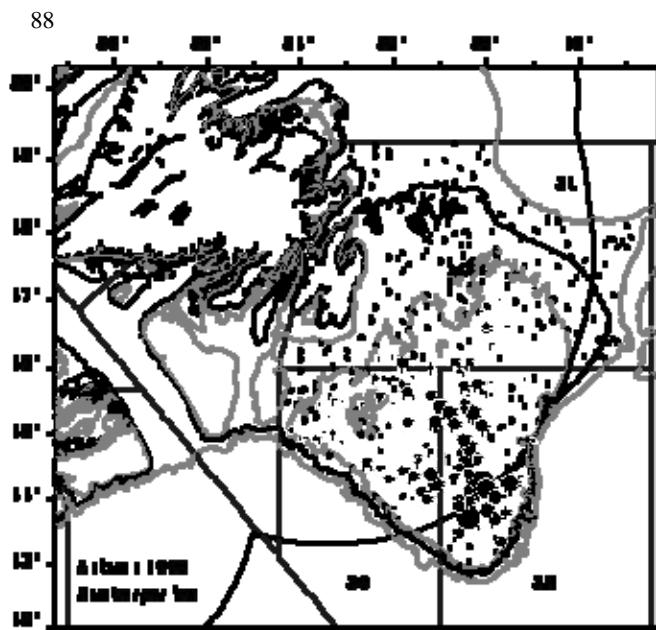
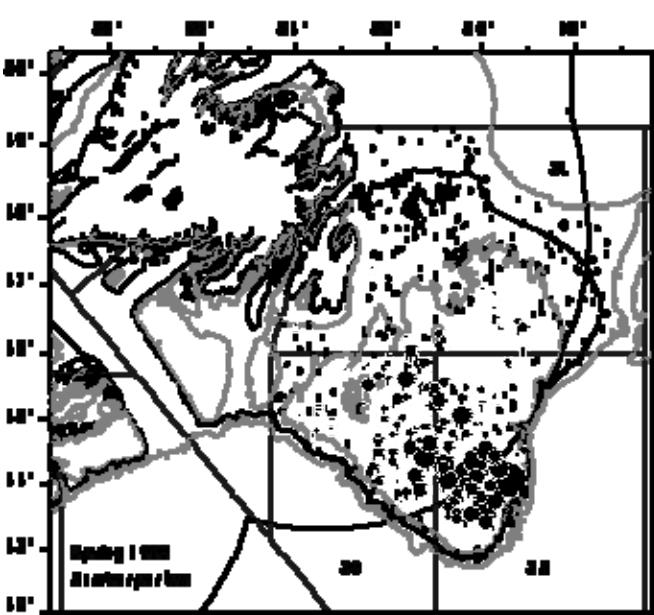


Figure 84. Distribution of yellowtail flounder in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring and autumn surveys for 1990.

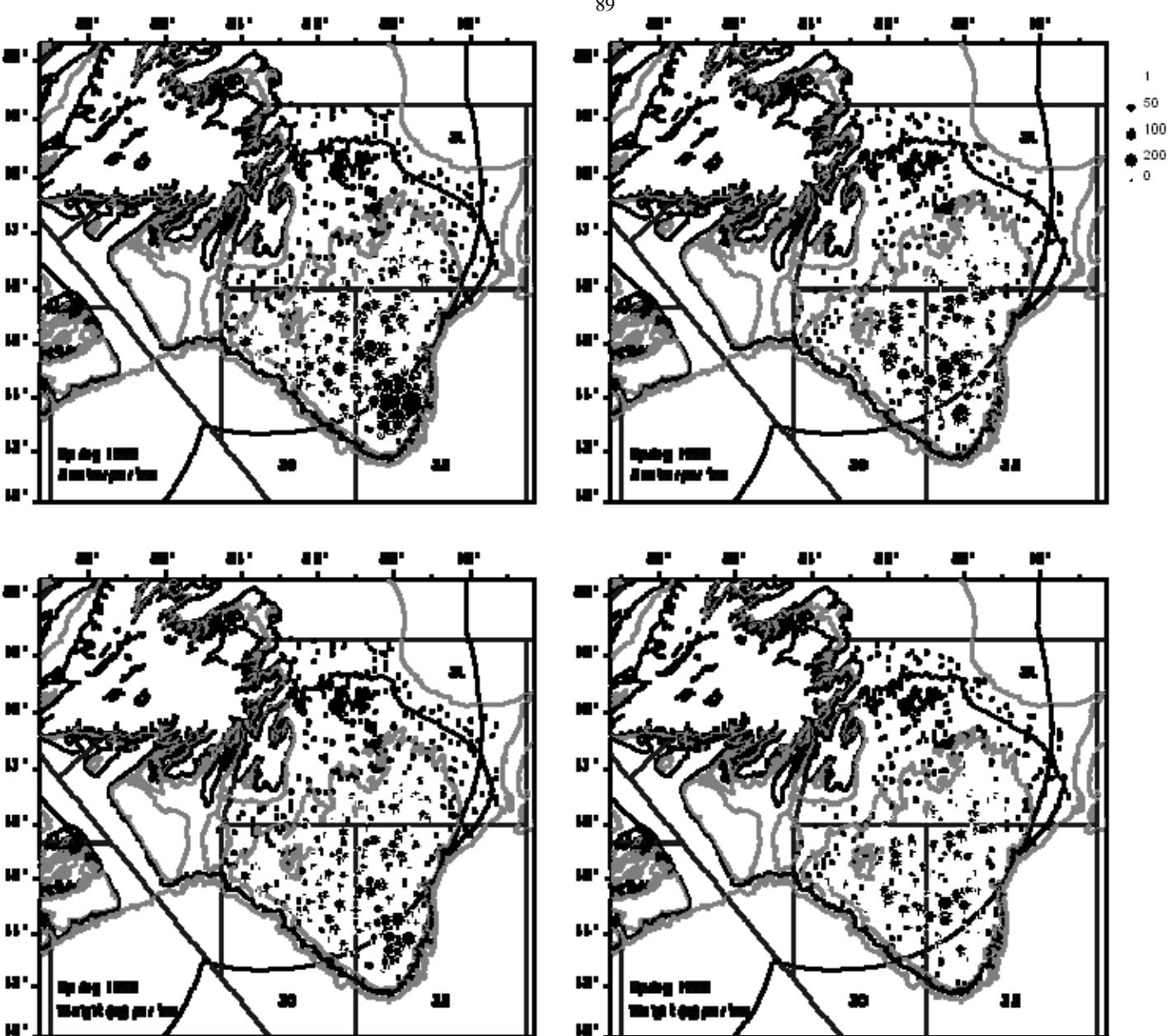


Figure 85. Distribution of yellowtail flounder in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring surveys for 1989 and 1988.

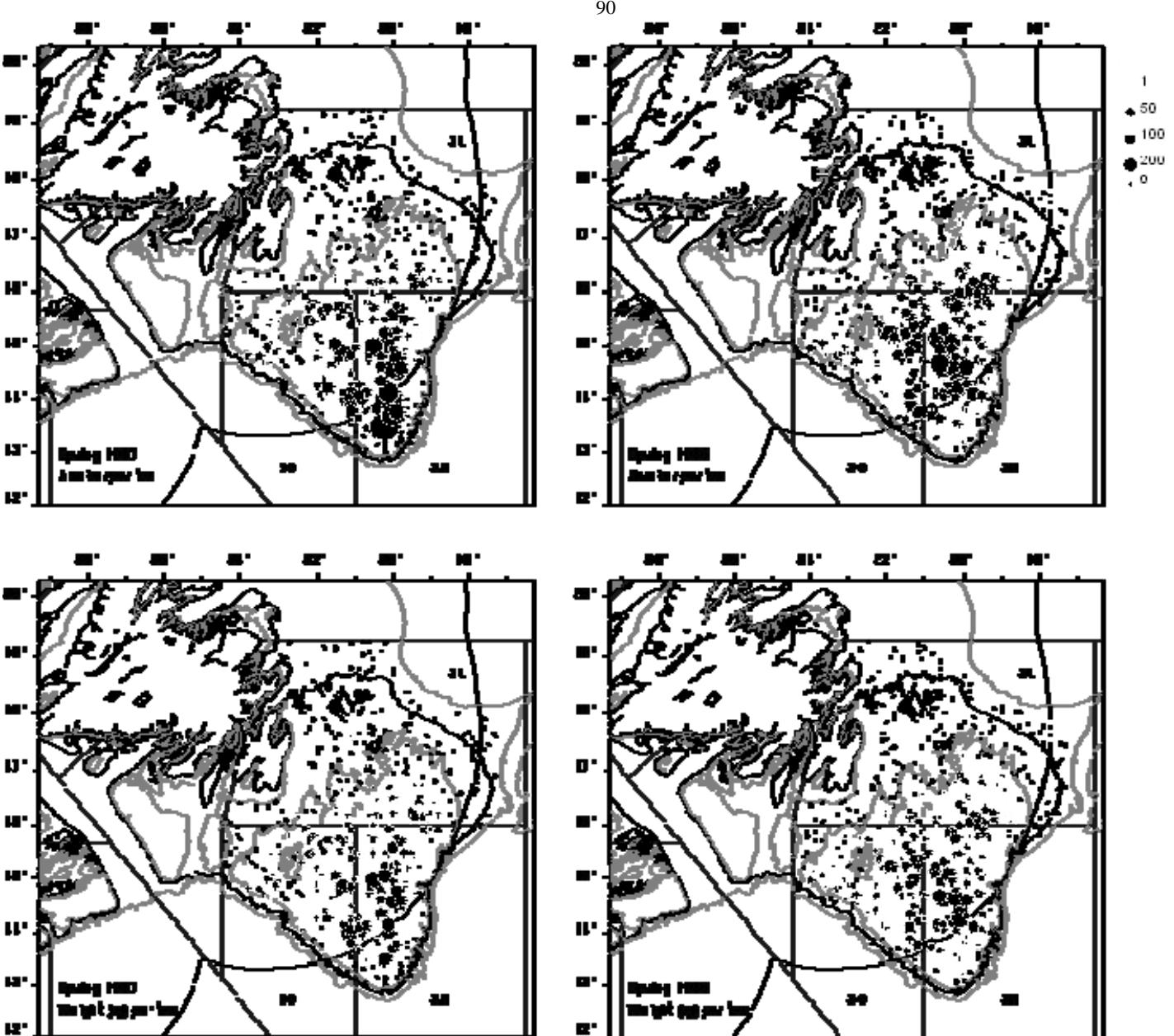


Figure 86. Distribution of yellowtail flounder in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring surveys for 1987 and 1986.

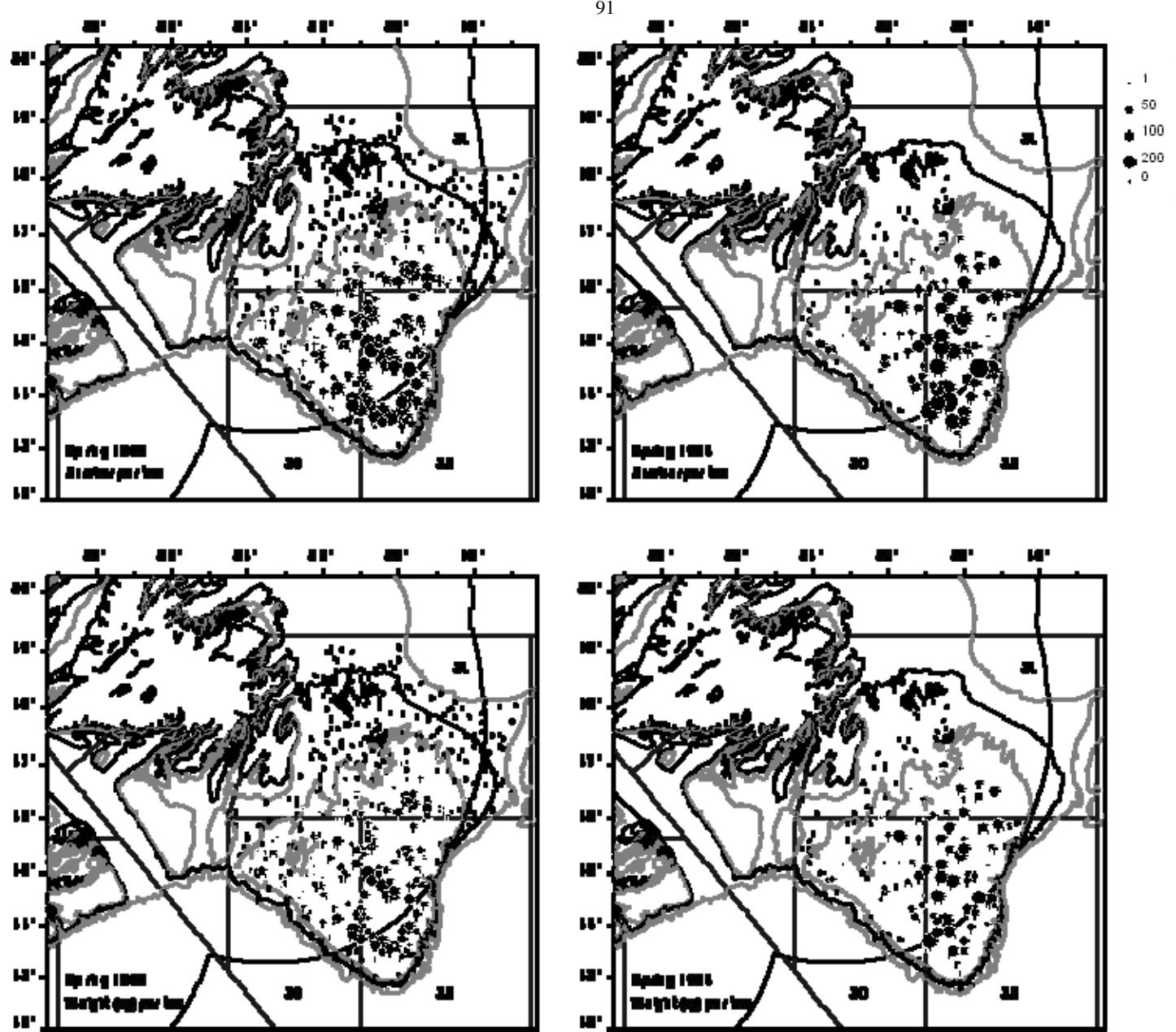


Figure 87. Distribution of yellowtail flounder in NAFO Divs. 3LNO: number and weight (kg) per tow in the Canadian spring surveys for 1985 and 1984.