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**1996 Summer Groundfish Survey Update for  
Selected Scotia-Fundy Groundfish Stocks**

by

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<sup>1</sup>This series documents the scientific basis for the evaluation of fisheries resources in Atlantic Canada. As such, it addresses the issues of the day in the time frames required and the documents it contains are not intended as definitive statements on the subjects addressed but rather as progress reports on ongoing investigations.

Research documents are produced in the official language in which they are provided to the secretariat.

<sup>1</sup>La présente série documente les bases scientifiques des évaluations des ressources halieutiques sur la côte atlantique du Canada. Elle traite des problèmes courants selon les échéanciers dictés. Les documents qu'elle contient ne doivent pas être considérés comme des énoncés définitifs sur les sujets traités, mais plutôt comme des rapports d'étape sur les études en cours.

Les Documents de recherche sont publiés dans la langue officielle utilisée dans le manuscrit envoyé au secrétariat.

### **Abstract**

A synopsis of the results of the 1996 summer bottom trawl survey on the Scotian Shelf and Bay of Fundy is provided. This information will be used in upcoming assessment meetings as a key source of information on trends for the selected groundfish stocks.

### **Résumé**

On trouvera ici un sommaire des résultats du relevé de recherche au chalut de fond réalisé en été 1996 sur le plateau néo-écossais et dans la baie de Fundy. Il servira de source fondamentale de renseignements sur certains stocks de poisson de fond lors des prochaines réunions d'évaluation des stocks.

## Introduction

The annual groundfish bottom trawl survey was conducted on the Scotian Shelf and Bay of Fundy as planned from 4 July to 31 July 1996. The results of this survey were compiled to provide clients with a preliminary view of the resource trends as determined by the survey. Table 1 summarizes highlights on the abundance, recruitment, and distribution of each stock observed on the survey. The figures in this document provide this information in an historical perspective.

More comprehensive interpretations of stock status are contained in stock assessment documents prepared annually for the stocks described here. Such reports contain information on commercial fishery catch rates and other survey results when available. Therefore, the abundance trends reported here, based on the survey information only, are not directly comparable to those provided in recent assessments.

## Survey Description

The 27th annual Scotian Shelf groundfish survey was conducted from the research vessel CSS *Alfred Needler* out of the Bedford Institute of Oceanography, Dartmouth, N.S., on two trips, N246 (4-14 July 1996) and N247 (17-31 July 1996). Two hundred and sixteen fishing stations, from the Upper Bay of Fundy to the northern tip of Cape Breton and offshore to the 400 fathom contour, were completed. The distribution of sampling effort compared with the past three years is shown in Figures 1 to 4.

Samples were obtained with a Western IIA bottom trawl towed for 30 minutes at a speed of 3.5 knots. The trawl has a 106' roller-rigged footrope and 2000 pound Portuguese doors. The codend is lined with 3/4" mesh to retain smaller fish. All finfish caught were samples for length and weight and some species were samples additionally for otoliths to determine age and for evidence of sexual maturity.

As in 1995, the area of coverage was expanded this year to include depths between 200 and 400 fathoms in response to a request for improved sampling of potential redfish habitat. Environmental sampling was also expanded this year to include nutrient and oxygen profiles, as well as the standard CTD casts. A highlight of the survey was the implementation of the Groundfish Survey Entry (GSE) system to interactively edit and electronically capture sampling data. This system was first used in the 1995 survey. Quality of the data collected was enhanced with real time editing and the time between collection and having the data available for analyses has been substantially reduced.

Table 1. Summary of observations on abundance, recruitment and distribution of each stock observed on the 1996 summer bottom trawl survey.

<b>Stock</b>	<b>Fig Nos.</b>	<b>Abundance</b>	<b>Recruitment</b>	<b>Distribution</b>
4Vn Cod	5 - 8	Continues to be low	No recent good signs	Concentrated in northern 4Vn
4VsW Cod	9 - 12	At historical low	No recent good signs	Concentrated in 4W
4X Cod	13 - 16	Increase in abundance of 60 cm + fish	Poor since 1992	Similar to recent years
4VW Haddock	17 - 20	Stable since 1992 with small increase in 1996	Continuing goods signs for the 1993 - 95 year classes	Concentrated in 4W
4X Haddock	21 - 24	Continuing increase	Continuing goods signs for the 1993 - 95 year classes	Similar to recent years
4VWX Pollock	25 - 28	Not used as abundance index	Poor since 1989	Lower catches to the east
Unit 3 Redfish	29 - 32	Stable since 1993	Signs of recruiting small fish	Similar to recent years
4VW Plaice	33 - 36	Continuing decline	Signs of good recruitment	High catches on Banquereau Bank
4VW Yellowtail	37 - 40	Slow decline	No sign of recruitment	Similar to recent years
4VW Witch	41 - 44	Small increase	Signs of moderate recruitment	High catches on Banquereau Bank
4VW Winter Flounder	45 - 48	Moderate	Signs of good recruitment	Concentrated in closed area
4X Plaice	49 - 52	Stable	Signs of moderate recruitment	Restricted to Brown's Bank
4X Yellowtail	53 - 58	Continuing increase	No sign of recruitment	Restricted to Brown's Bank
4X Witch	57 - 60	Increase	No sign of recruitment	High catches north of Brown's Bank
4X Winter Flounder	61 - 64	High but stable	No sign of recruitment	Similar to recent years
4VWX Halibut	65 - 68	Declining from recent high	No sign of recruitment	Low catches everywhere
4VWX Silver Hake	69 - 72	Recent increase	Signs of moderate recruitment	Similar to recent years
4VsW Winter Skate	73 - 76	Stable	No sign of recruitment	Similar to recent years
4VWX Monkfish	77 - 80	Recent increase	Signs of moderate recruitment in 4X	Similar to recent years
4VWX White Hake	81 - 84	Stable in 4VW Low in 4X	Recent recruitment is average	Concentrated in 4Vn and 4X
4VWX Wolffish	85 - 88	Moderate recent increase	Signs of moderate recruitment in 4X	Concentrated in 4X
4VWX Cusk	89 - 92	Historical low	No sign of recruitment	Similar to recent years

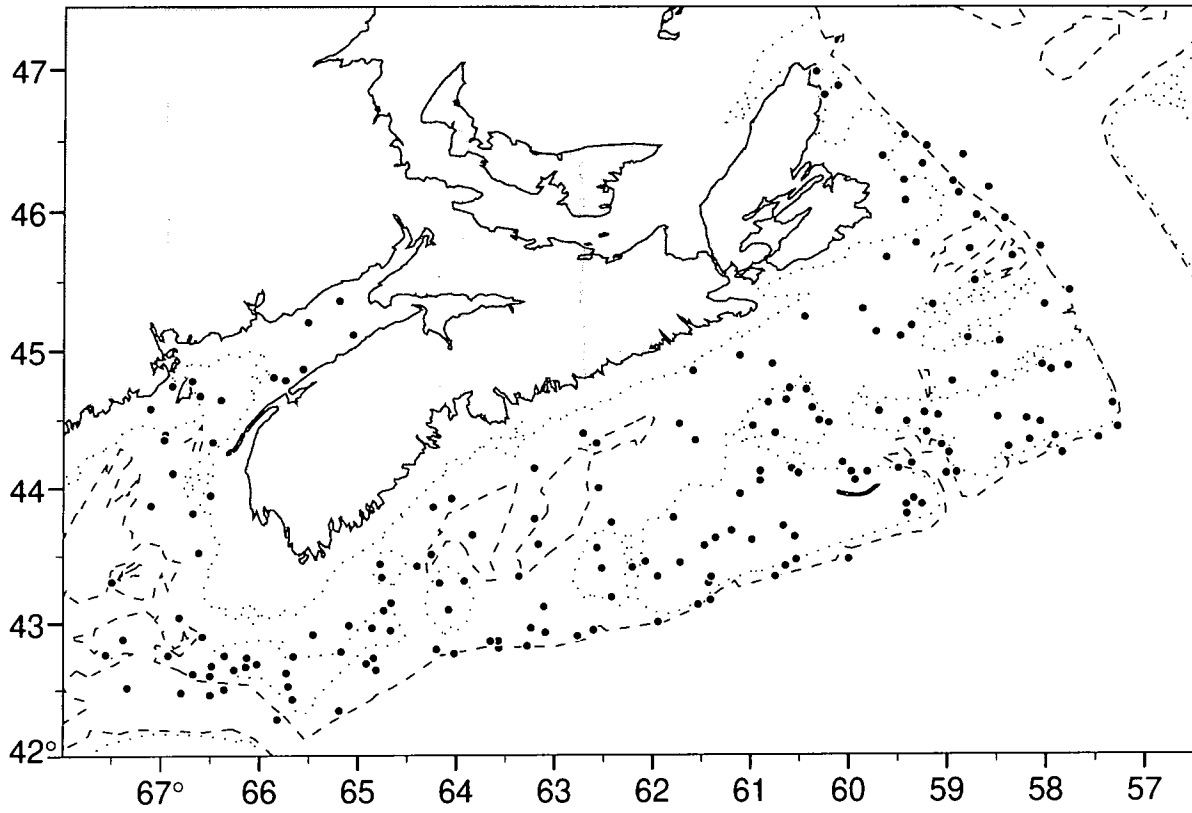


Fig. 1. Summer Groundfish Survey Positions 1993

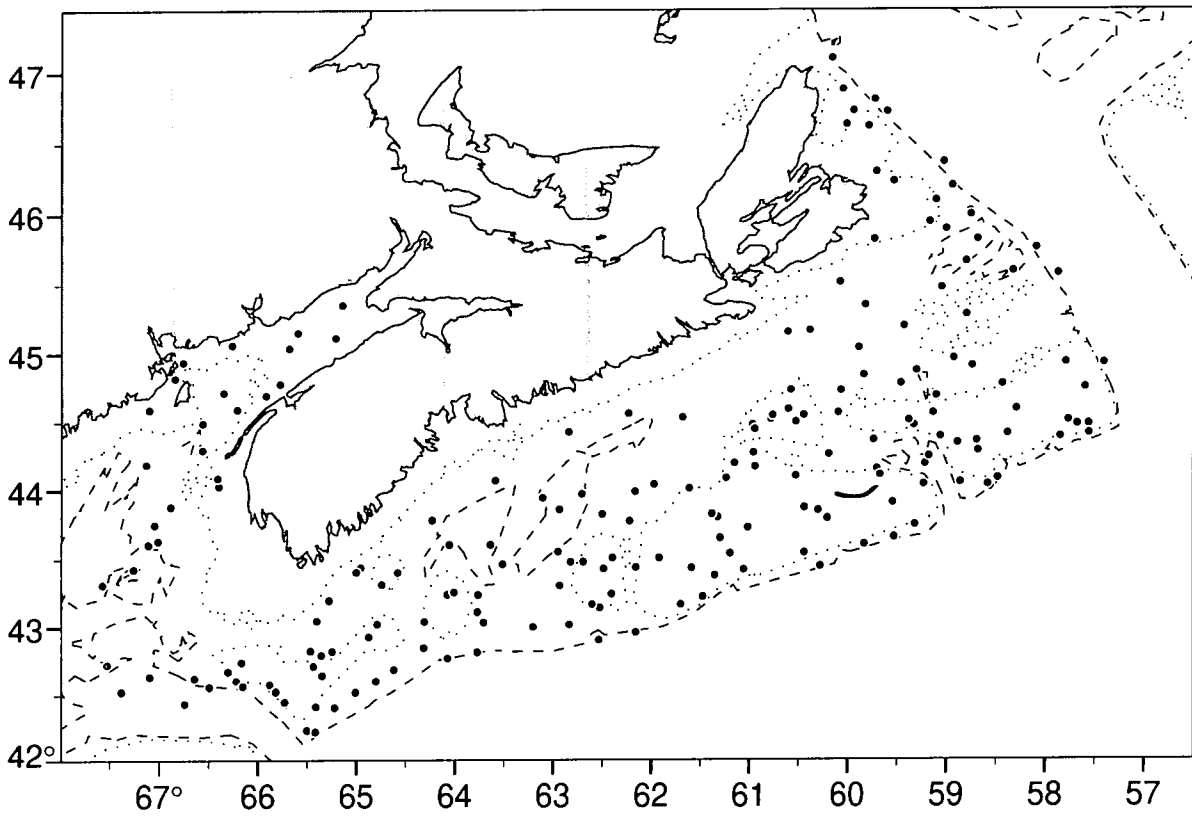


Fig. 2. Summer Groundfish Survey Positions 1994

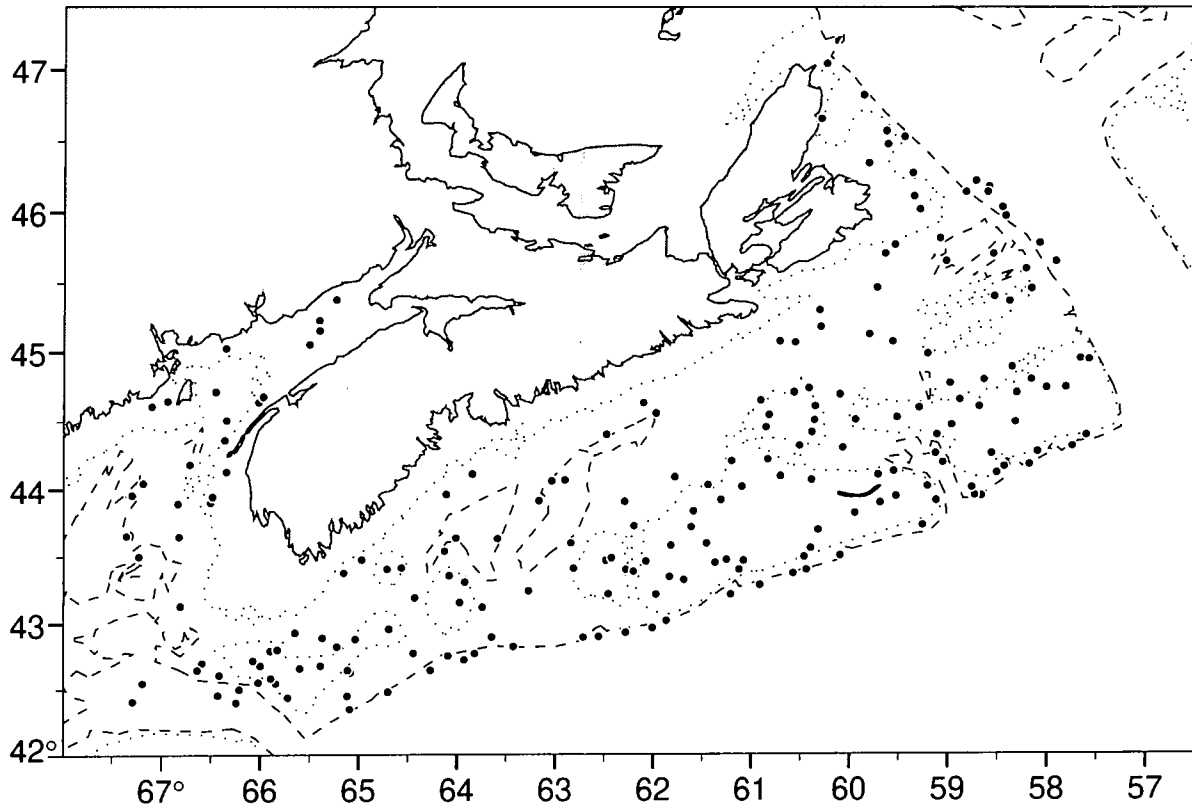


Fig. 3. Summer Groundfish Survey Positions 1995

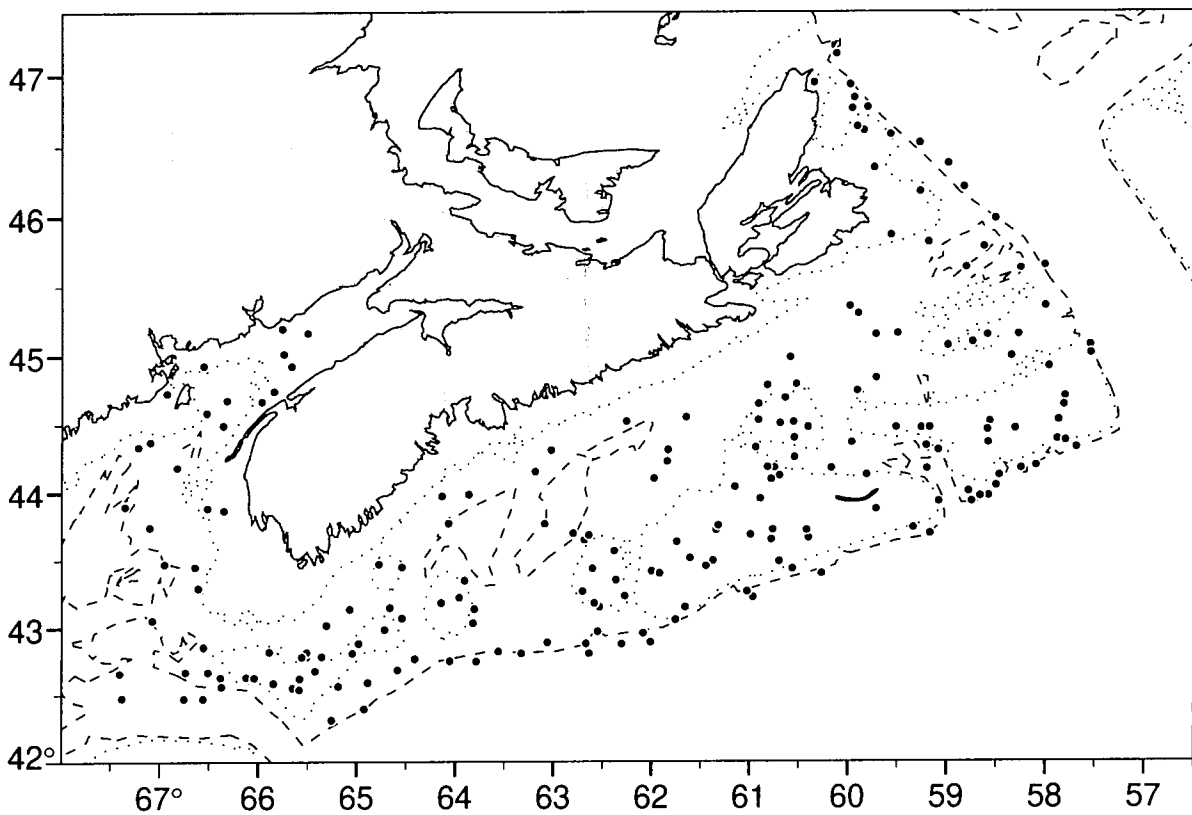


Fig. 4. Summer Groundfish Survey Positions 1996

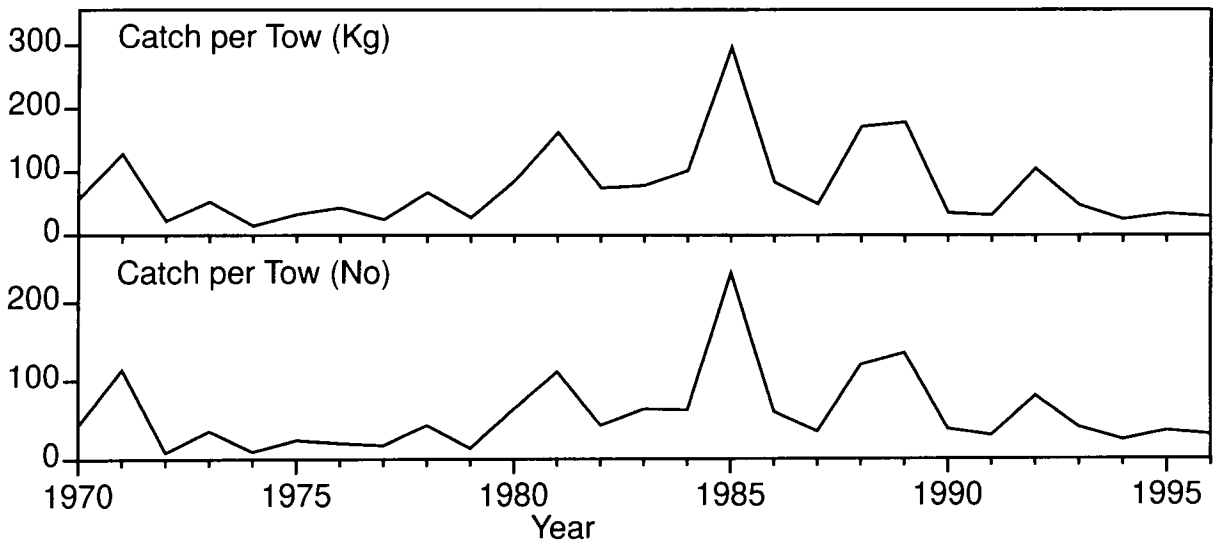


Fig. 5. 4Vn Cod stratified mean Weight and Number caught per tow from the Summer surveys.

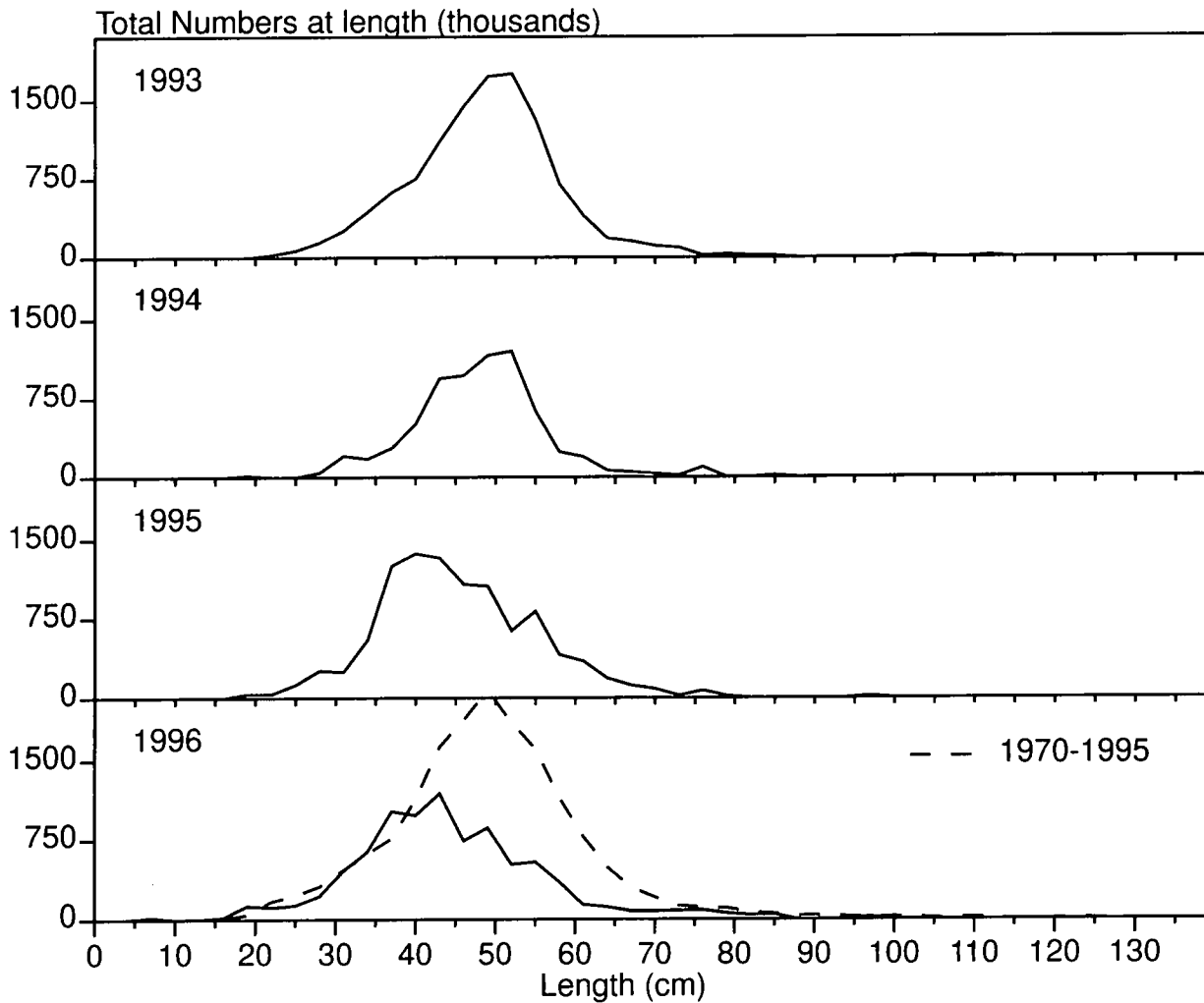


Fig. 6. 4Vn Cod length frequency distribution from the Summer surveys.

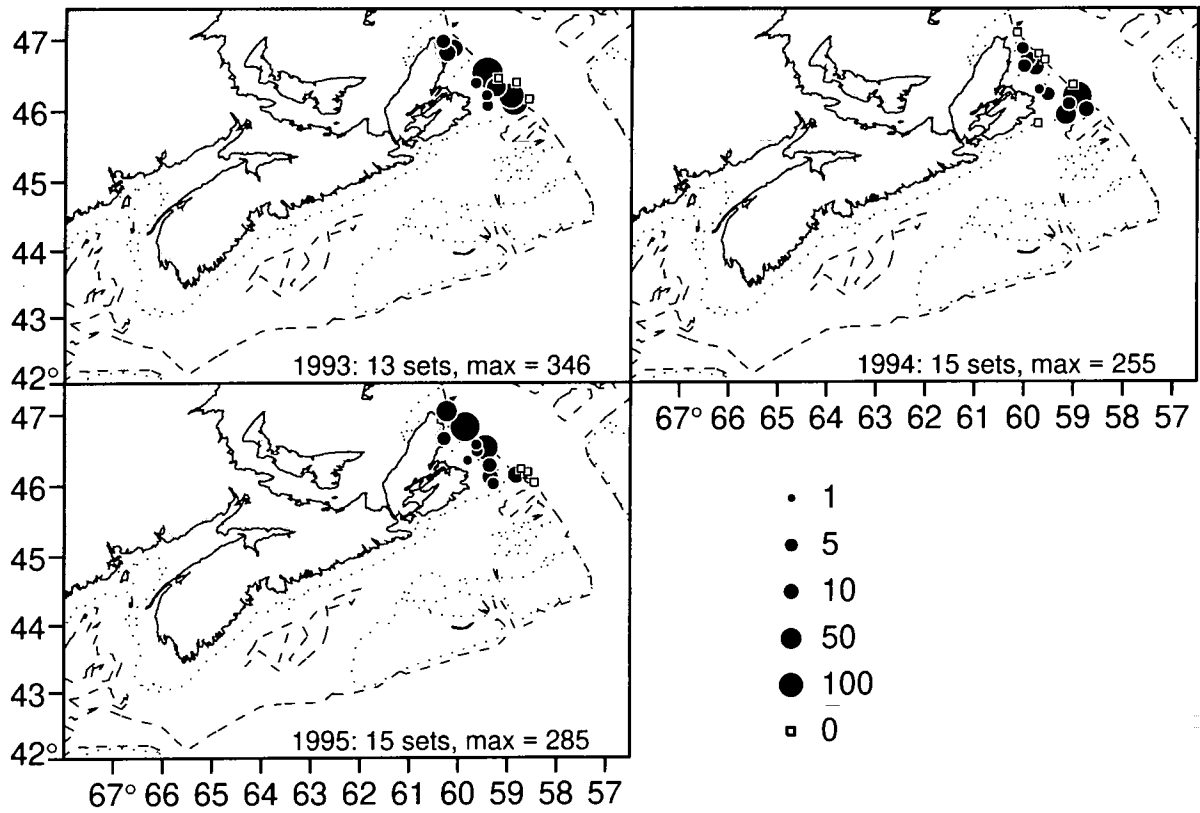


Fig. 7. 4Vn Cod Biomass (kg/tow) from the 1993-1995 Summer Groundfish Survey.

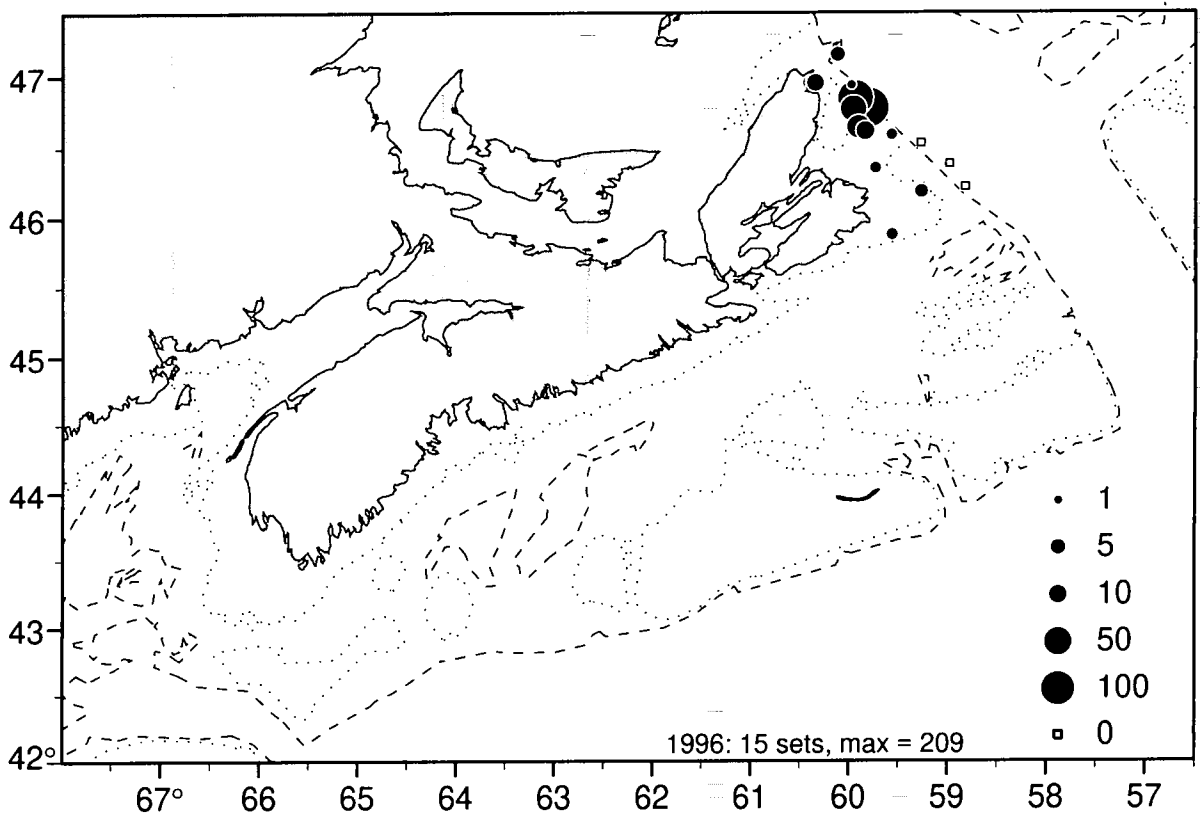


Fig. 8. 4Vn Cod Biomass (kg/tow) from the 1996 Summer Groundfish Survey.



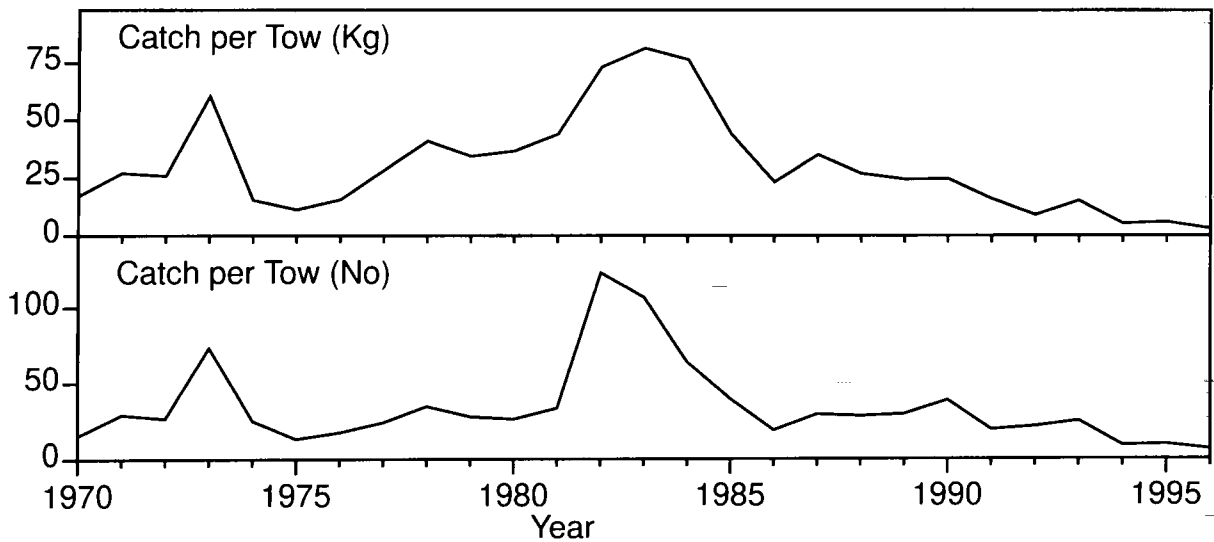


Fig. 9. 4VsW Cod stratified mean Weight and Number caught per tow from the Summer surveys.

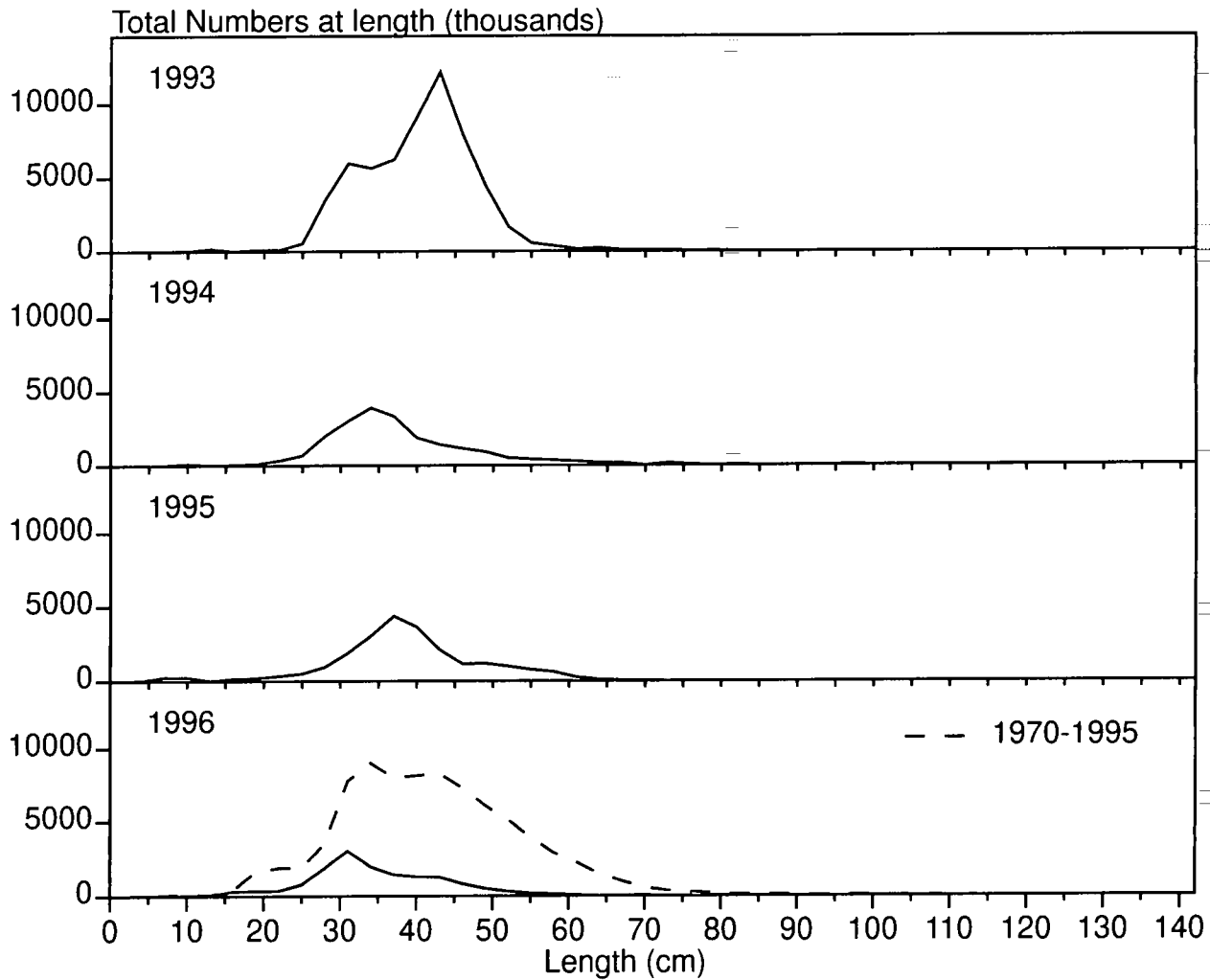


Fig. 10. 4VsW Cod length frequency distribution from the Summer surveys.

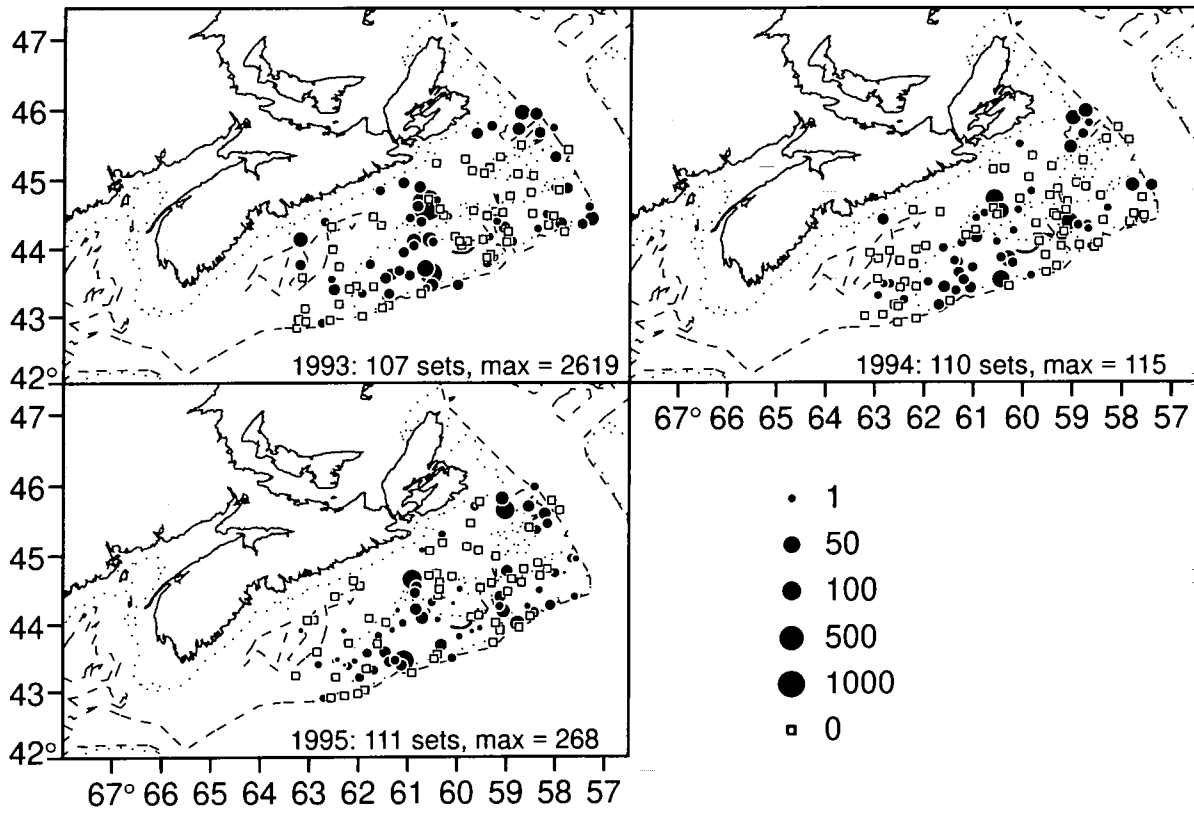


Fig. 11. 4VsW Cod Biomass (kg/tow) from the 1993-1995 Summer Groundfish Survey.

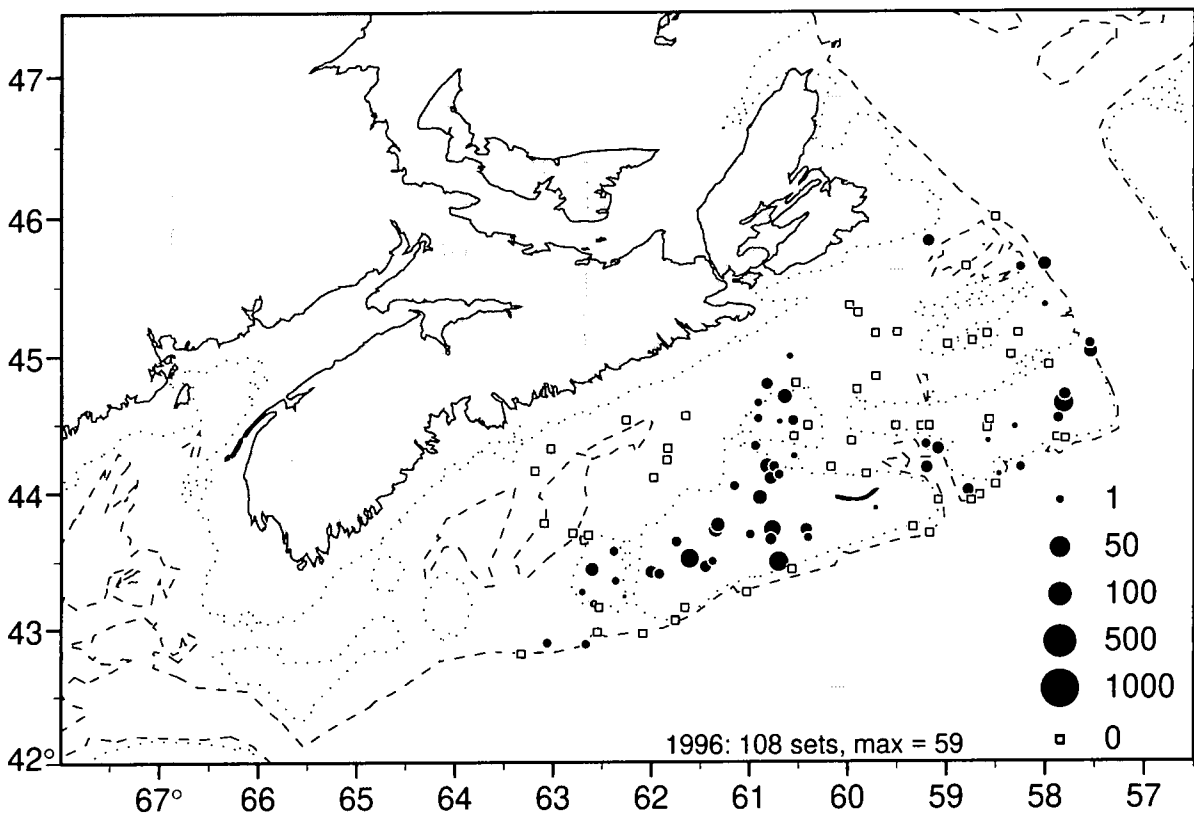


Fig. 12. 4VsW Cod Biomass (kg/tow) from the 1996 Summer Groundfish Survey.

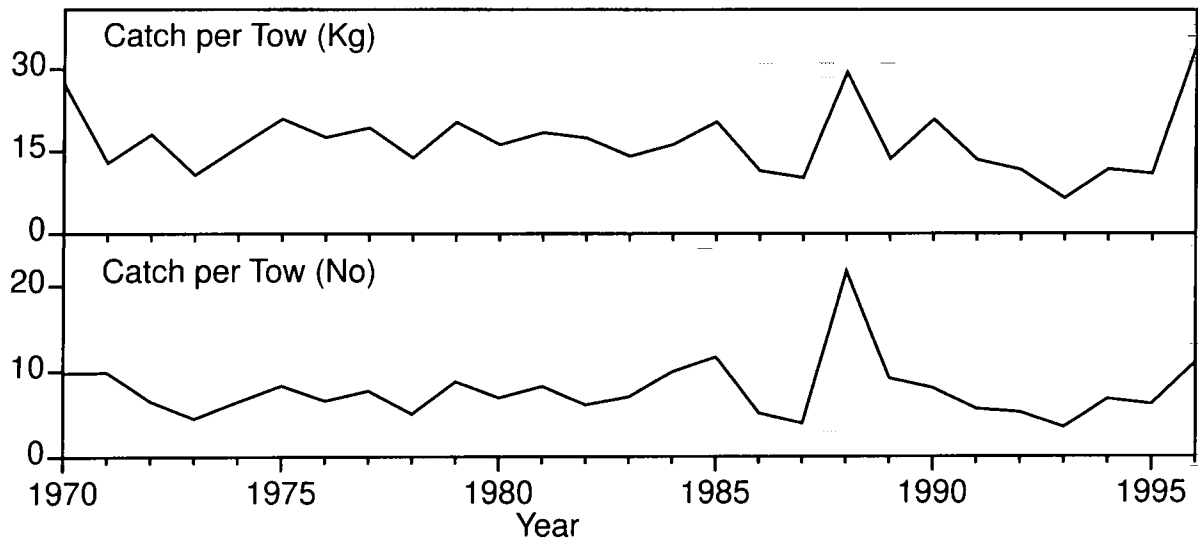


Fig. 13. 4X Cod stratified mean Weight and Number caught per tow from the Summer surveys.

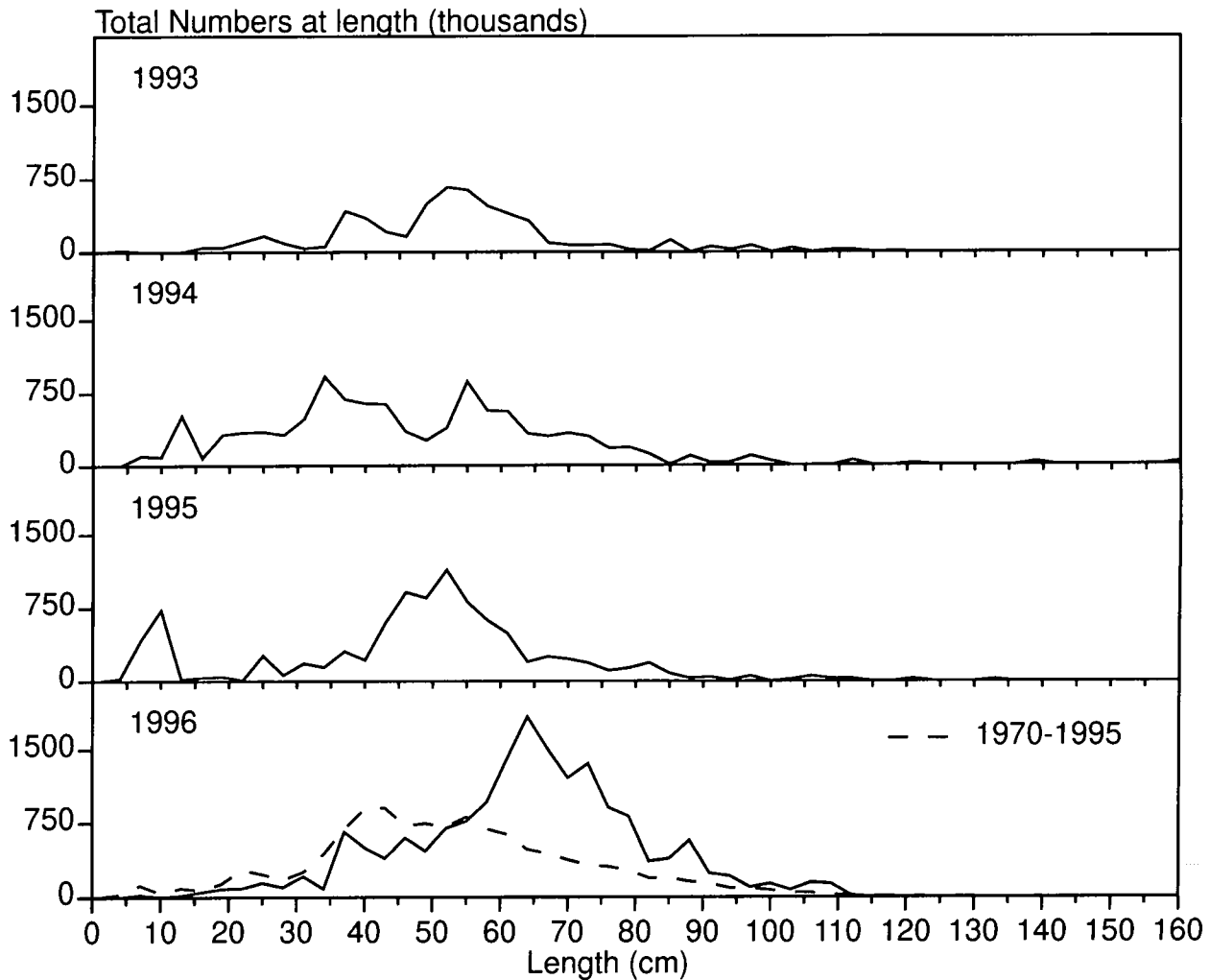


Fig. 14. 4X Cod length frequency distribution from the Summer surveys.

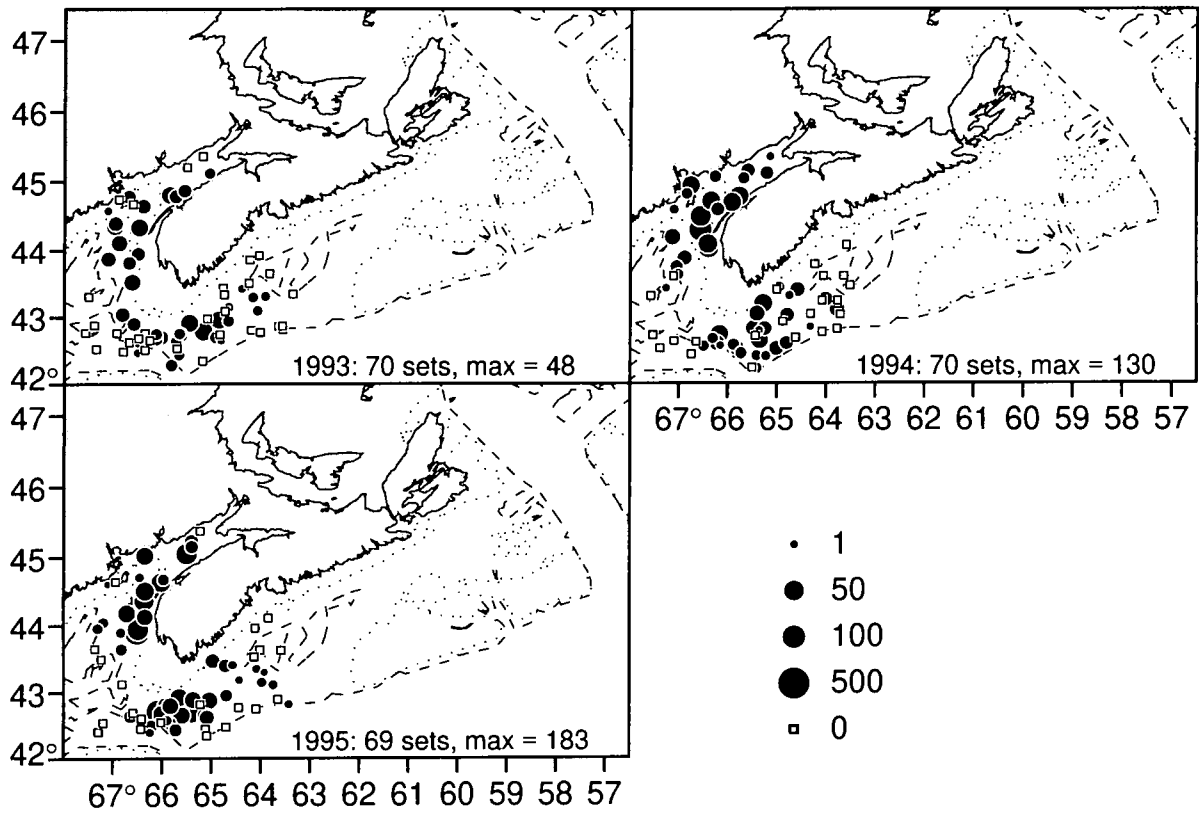


Fig. 15. 4X Cod Biomass (kg/tow) from the 1993-1995 Summer Groundfish Survey.

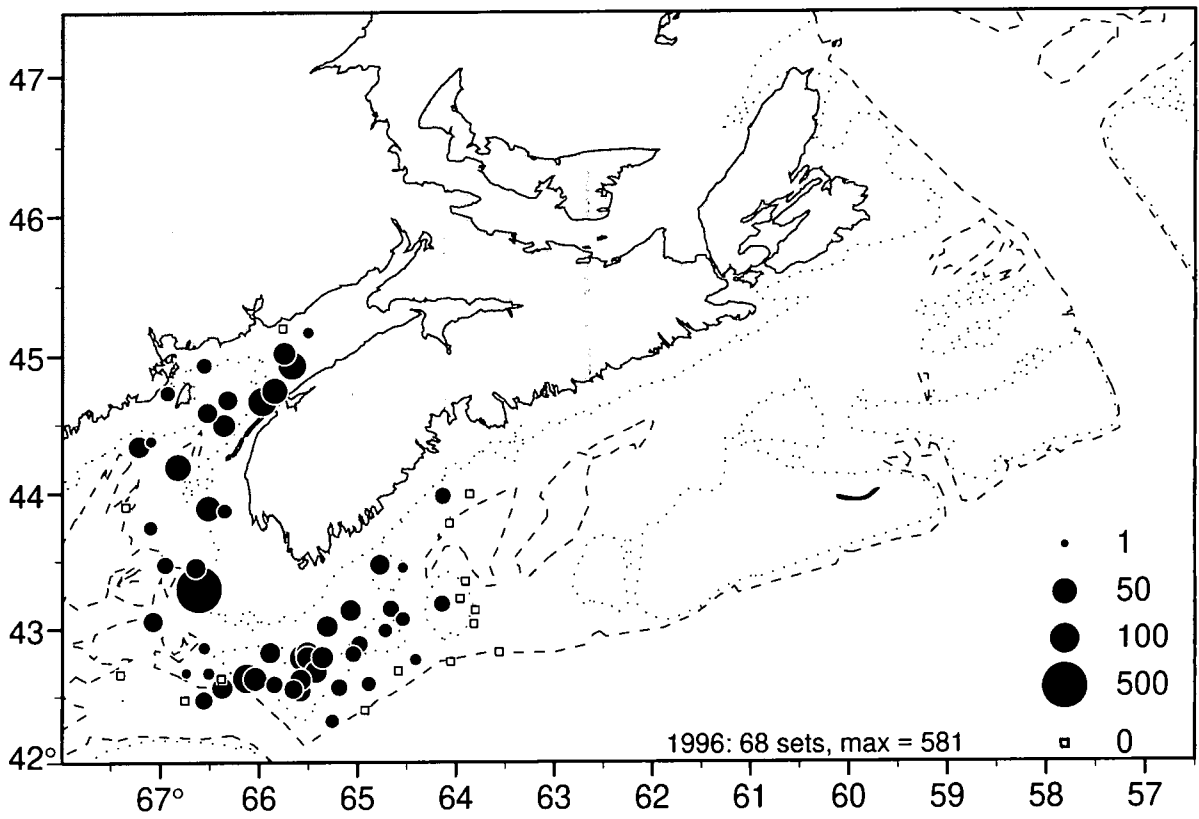


Fig. 16. 4X Cod Biomass (kg/tow) from the 1996 Summer Groundfish Survey.

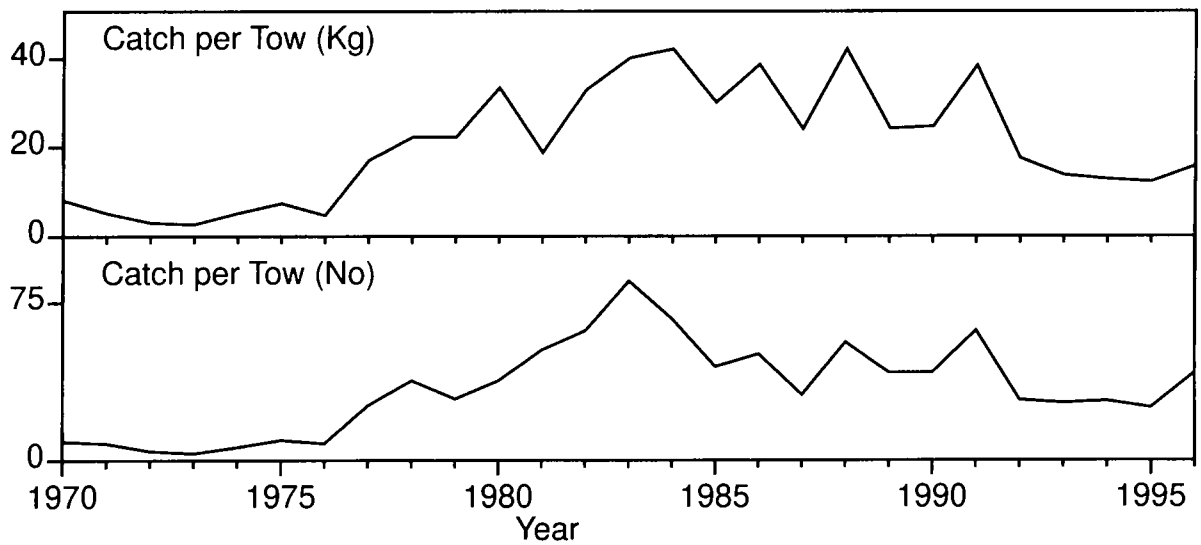


Fig. 17. 4VW Haddock stratified mean Weight and Number caught per tow from the Summer surveys.

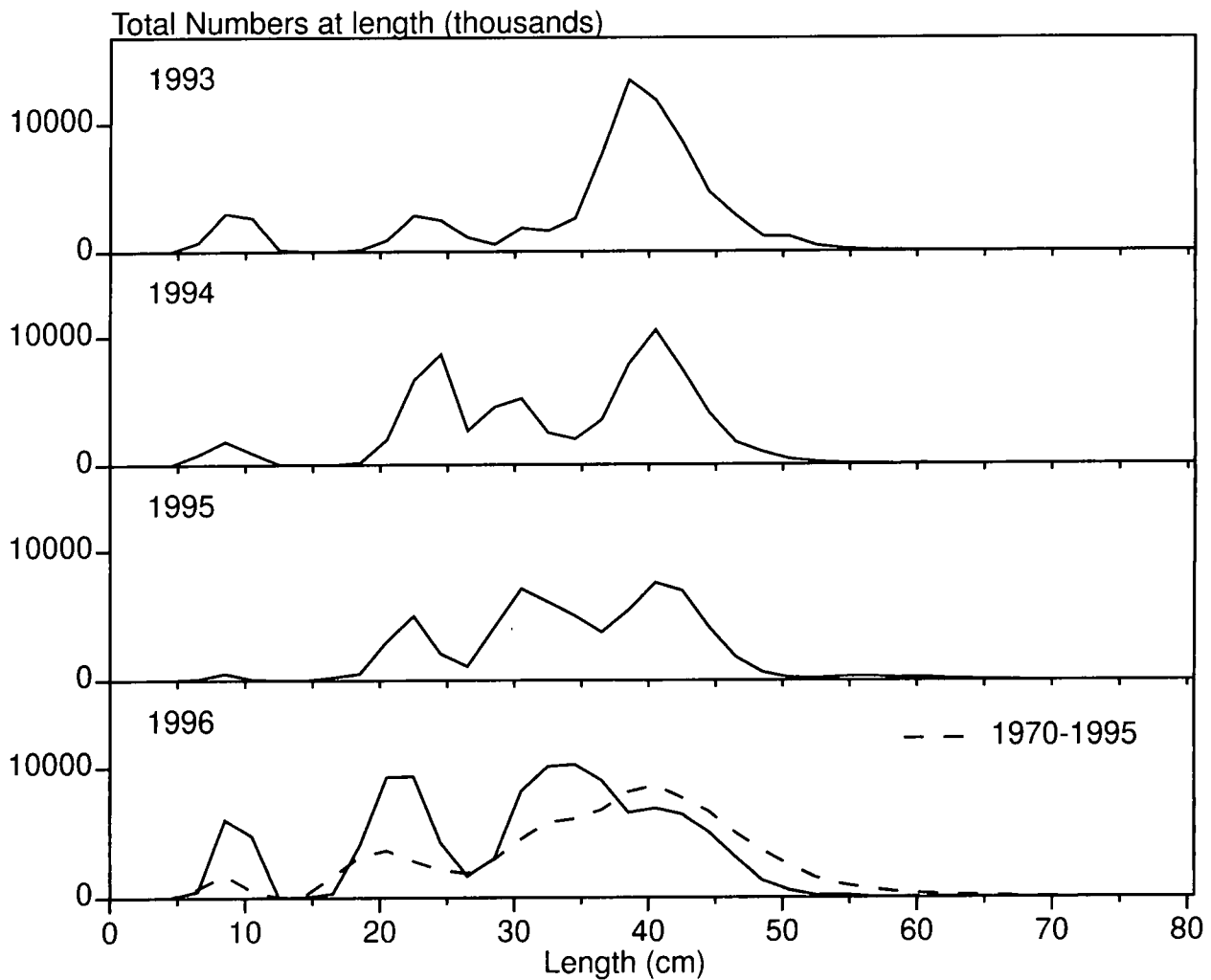


Fig. 18. 4VW Haddock length frequency distribution from the Summer surveys.

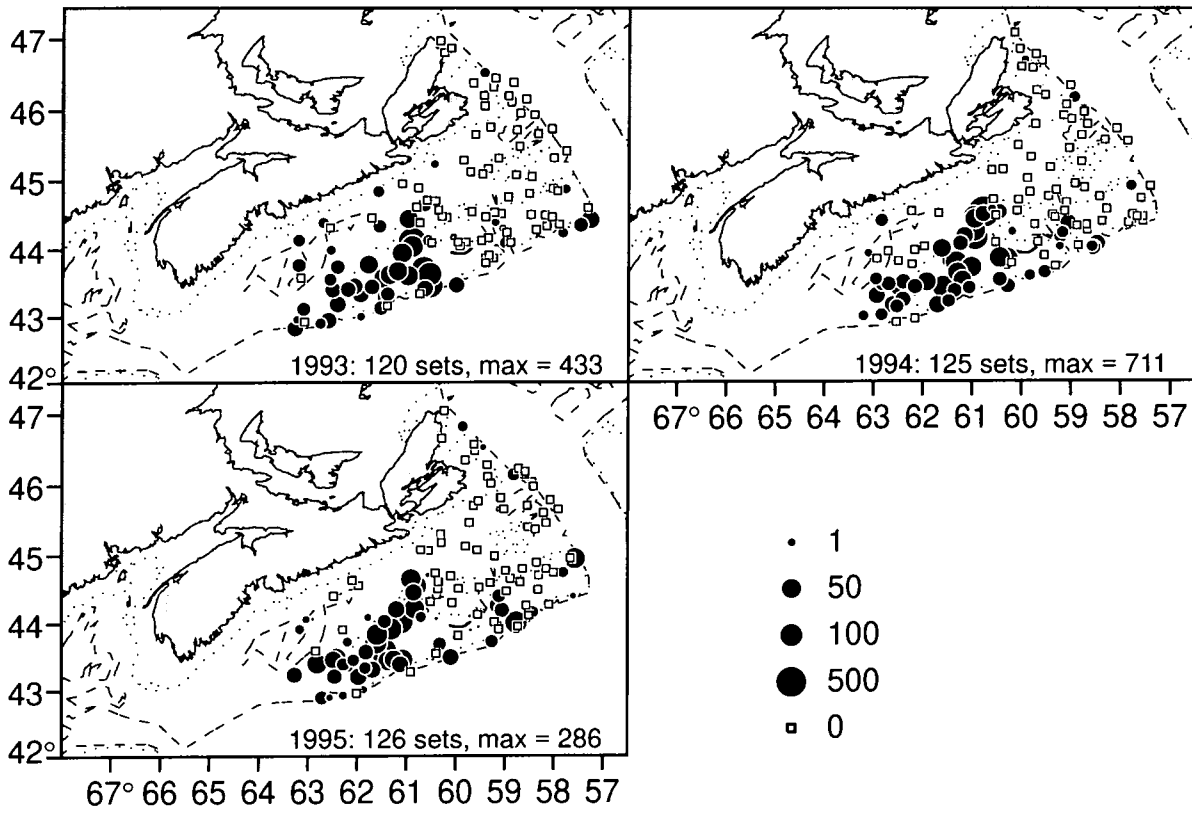


Fig. 19. 4VW Haddock Biomass (kg/tow) from the 1993-1995 Summer Groundfish Survey.

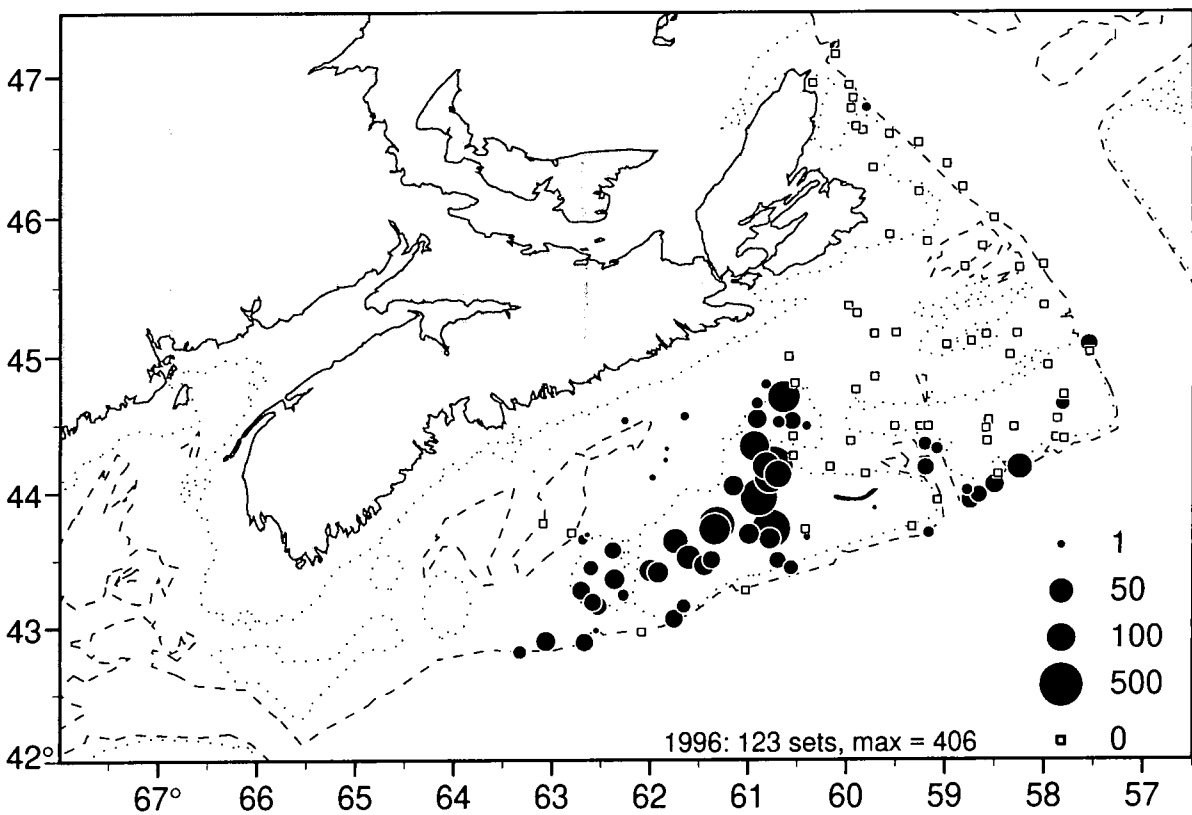


Fig. 20. 4VW Haddock Biomass (kg/tow) from the 1996 Summer Groundfish Survey.

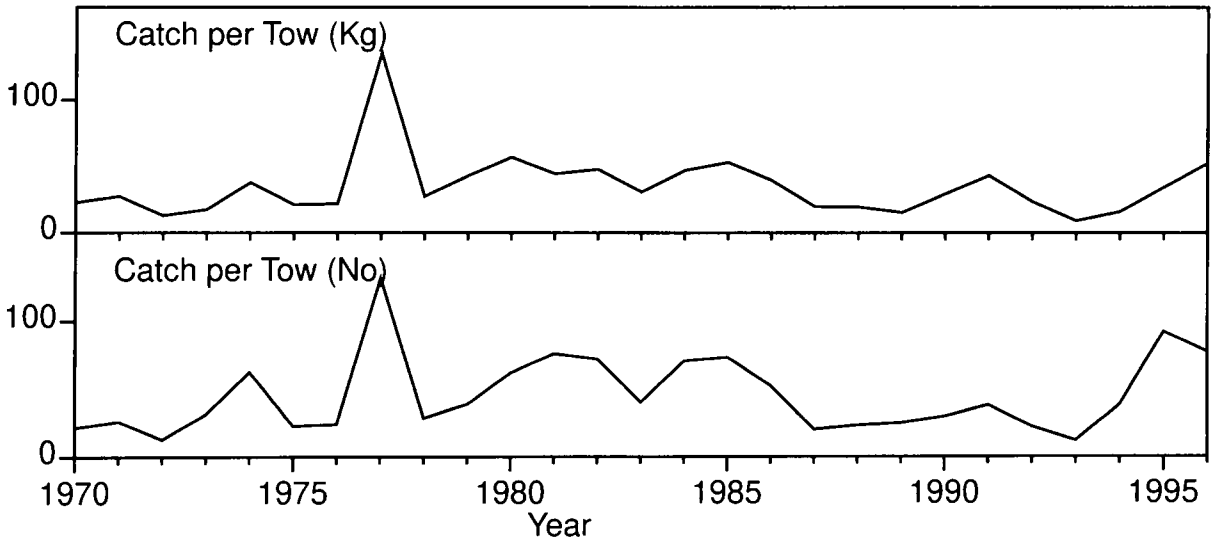


Fig. 21. 4X Haddock stratified mean Weight and Number caught per tow from the Summer surveys.

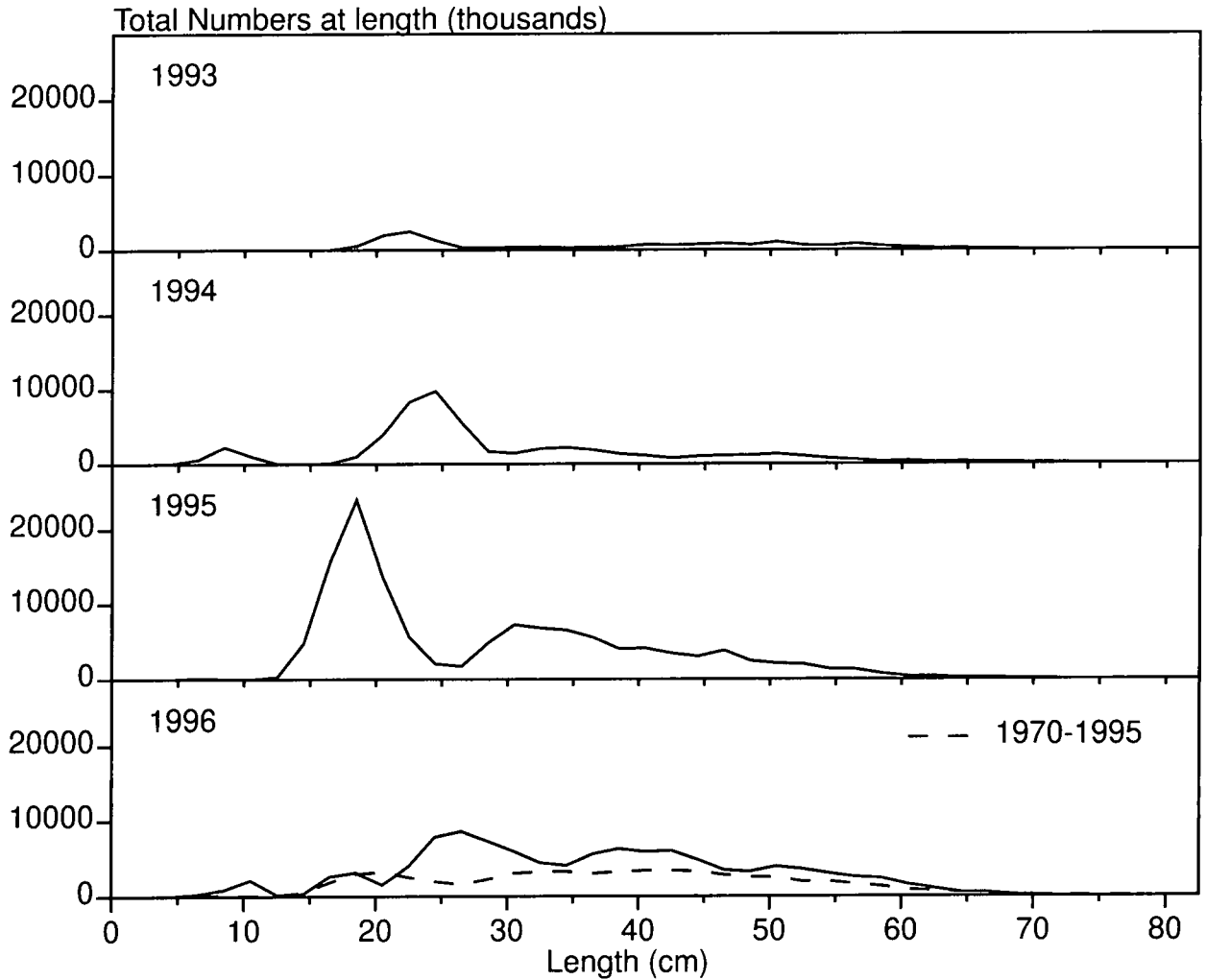


Fig. 22. 4X Haddock length frequency distribution from the Summer surveys.

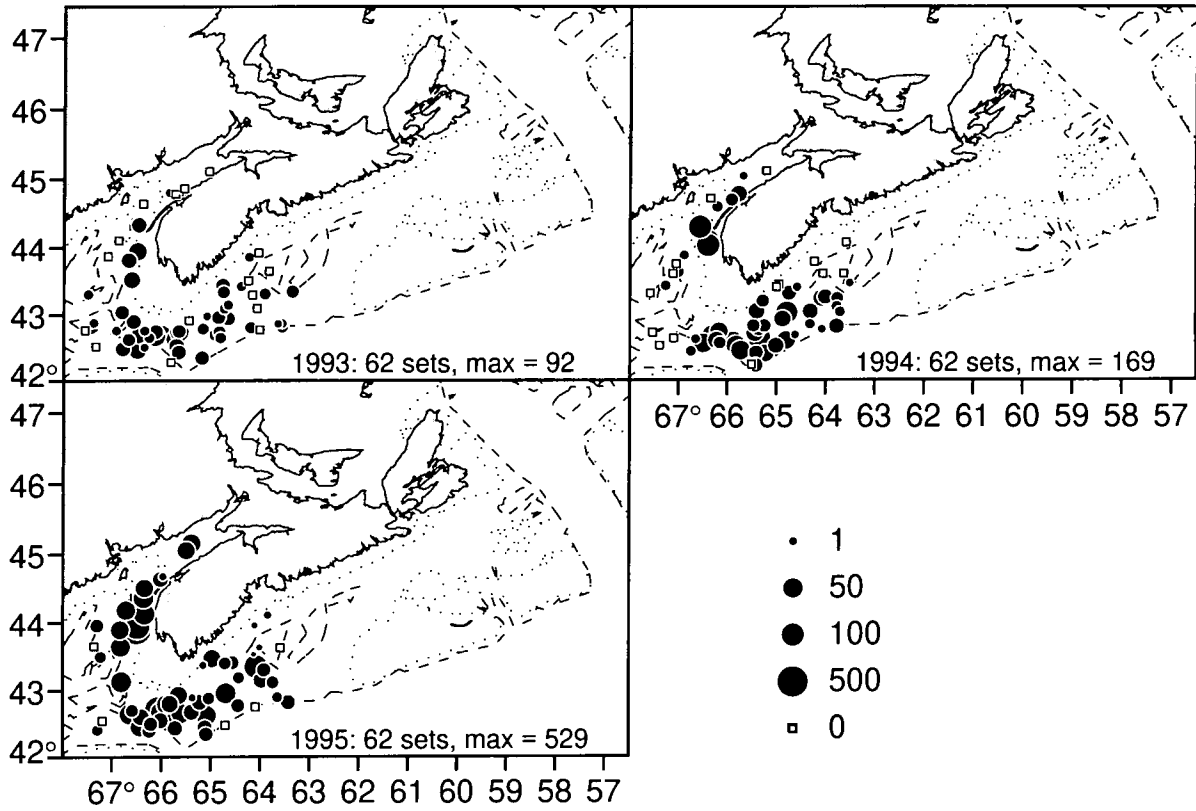


Fig. 23. 4X Haddock Biomass (kg/tow) from the 1993-1995 Summer Groundfish Survey.

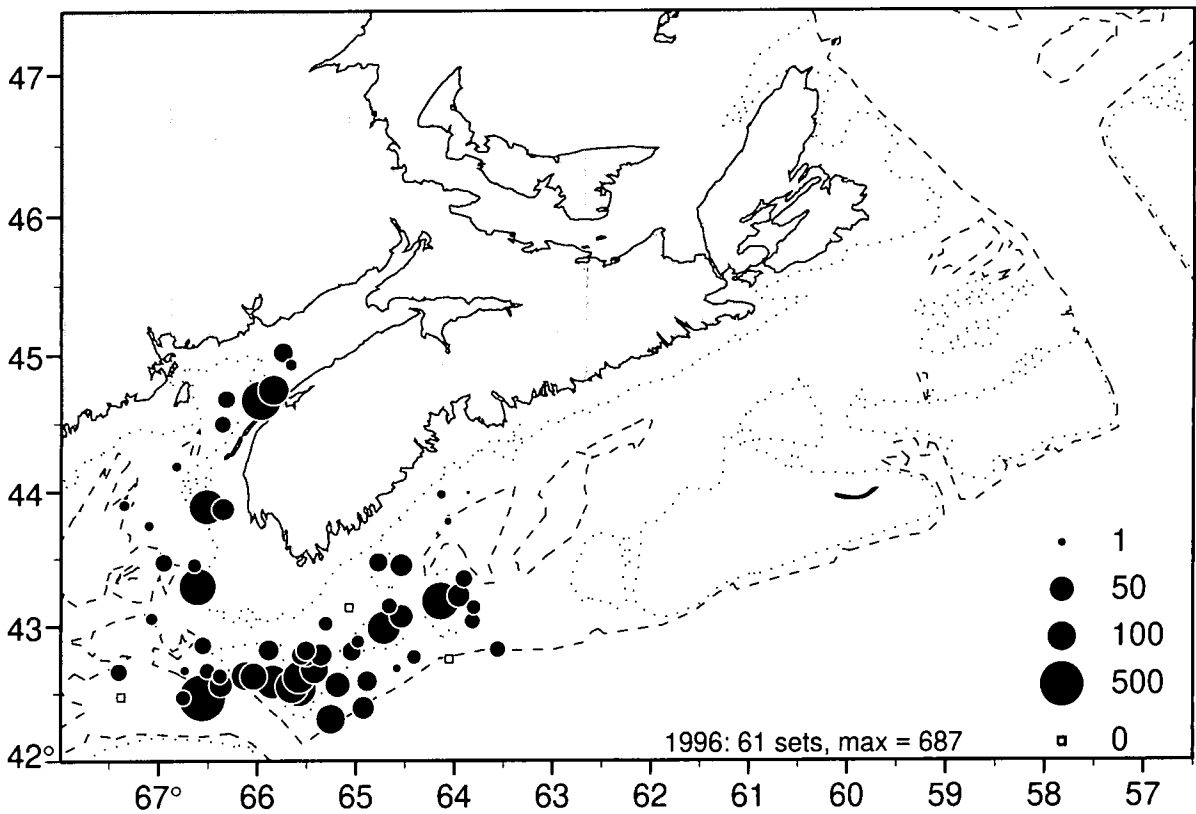


Fig. 24. 4X Haddock Biomass (kg/tow) from the 1996 Summer Groundfish Survey.



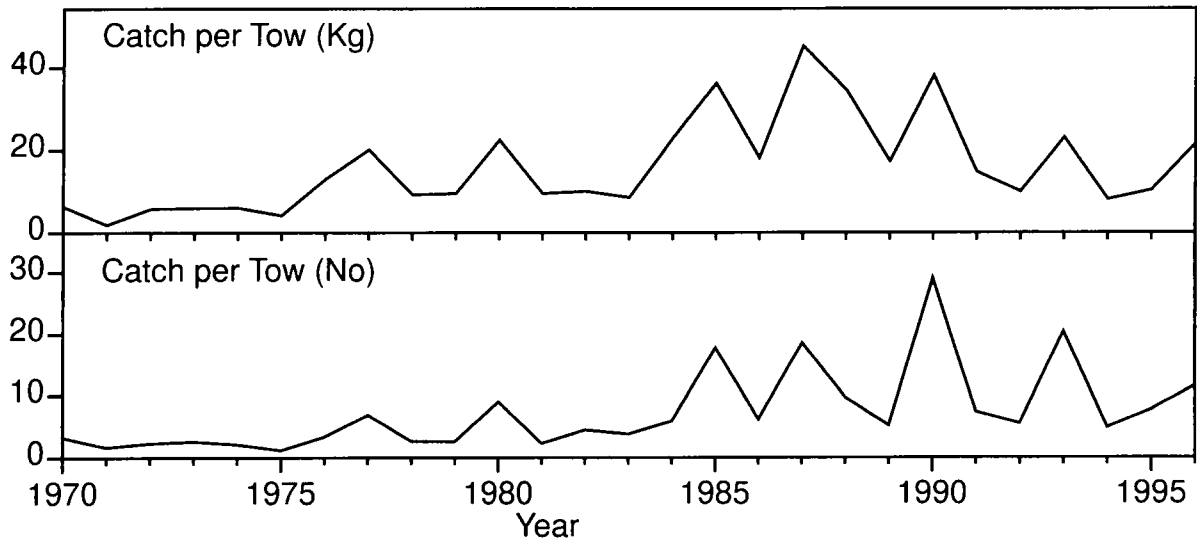


Fig. 25. 4VWX Pollock stratified mean Weight and Number caught per tow from the Summer surveys.

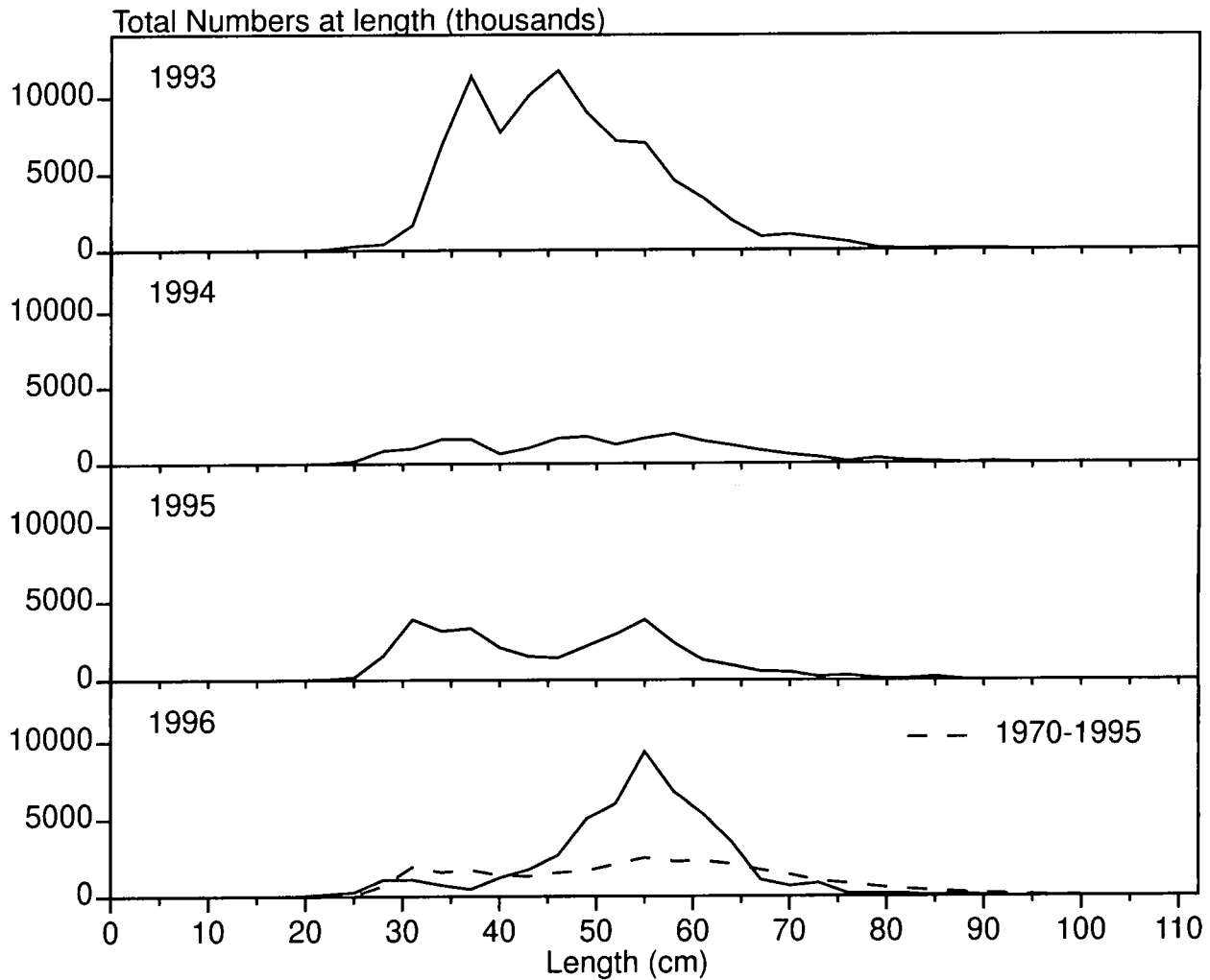


Fig. 26. 4VWX Pollock length frequency distribution from the Summer surveys.

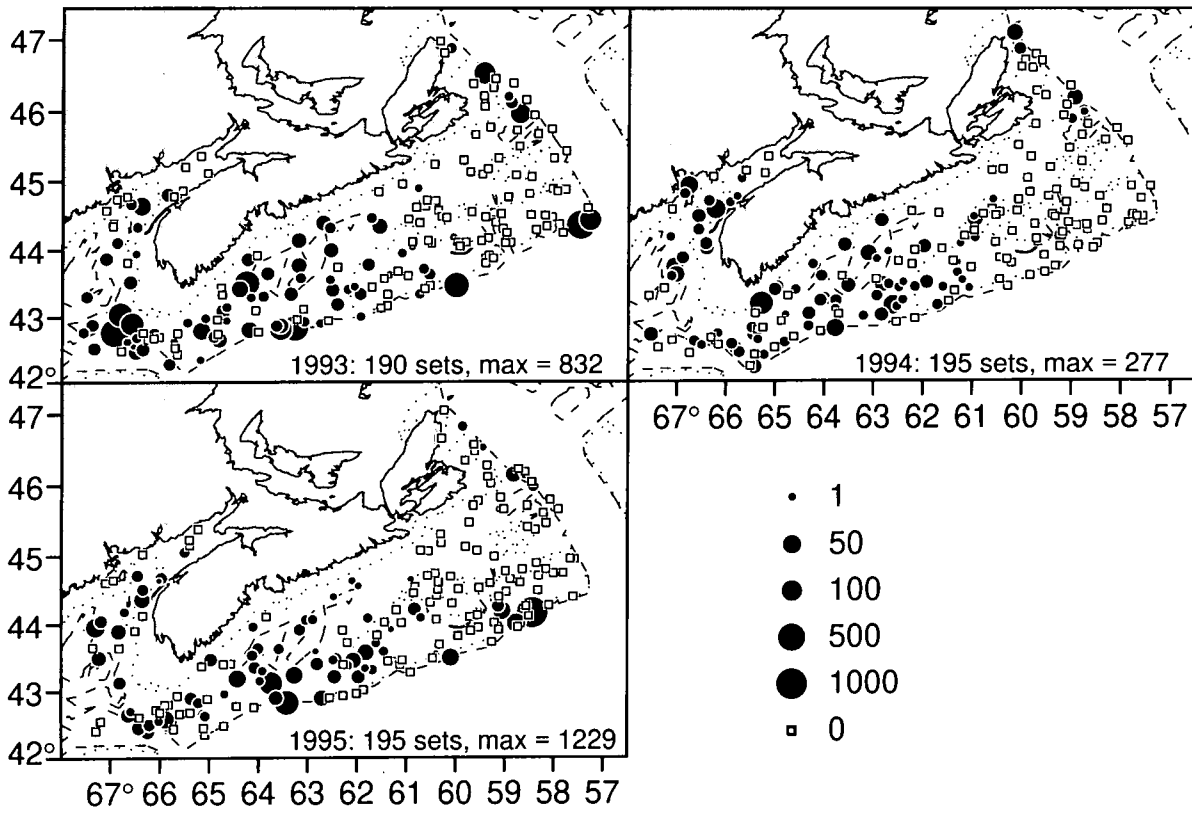


Fig. 27. 4VWX Pollock Biomass (kg/tow) from the 1993-1995 Summer Groundfish Survey.

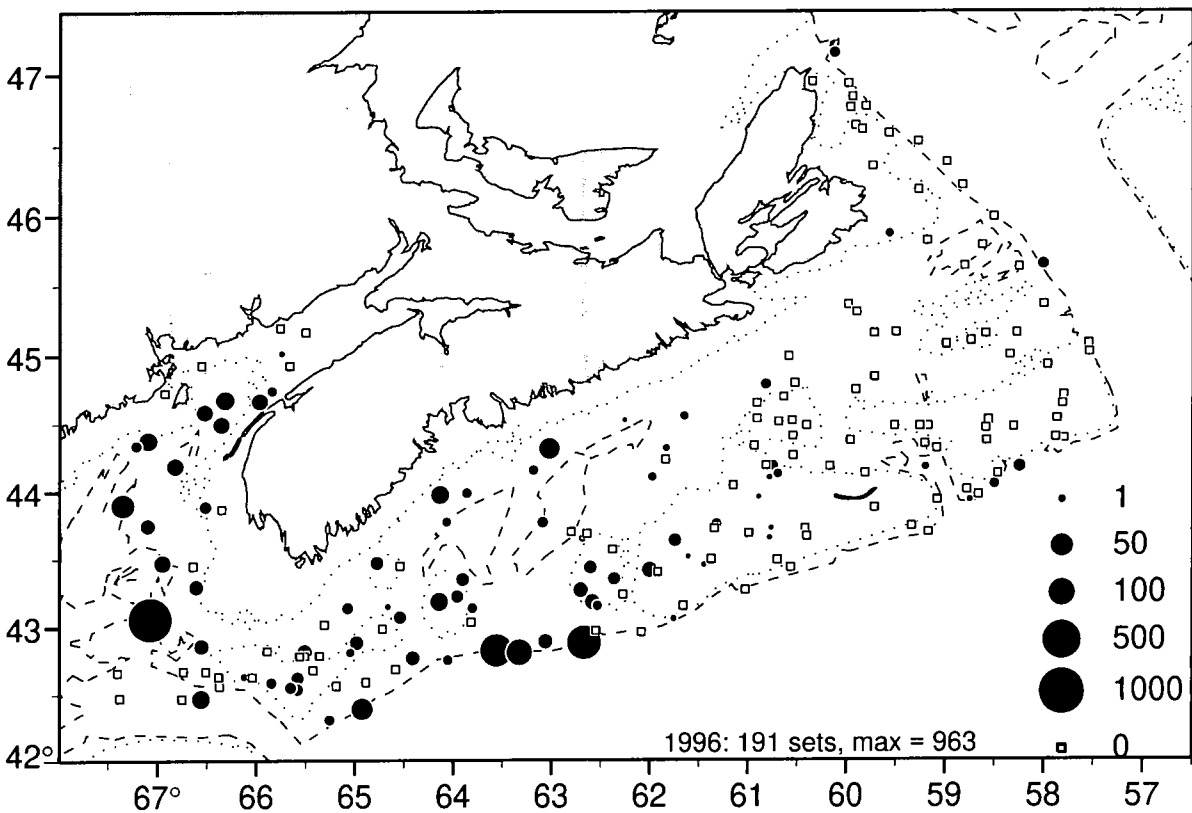


Fig. 28. 4VWX Pollock Biomass (kg/tow) from the 1996 Summer Groundfish Survey.

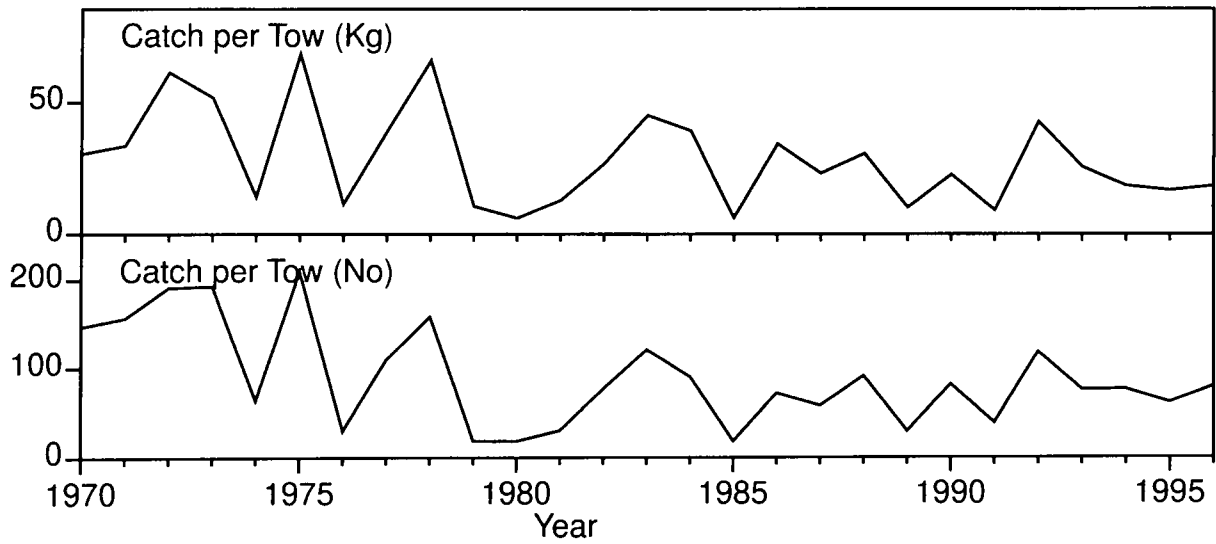


Fig. 29. Unit 3 Redfish stratified mean Weight and Number caught per tow from the Summer surveys.

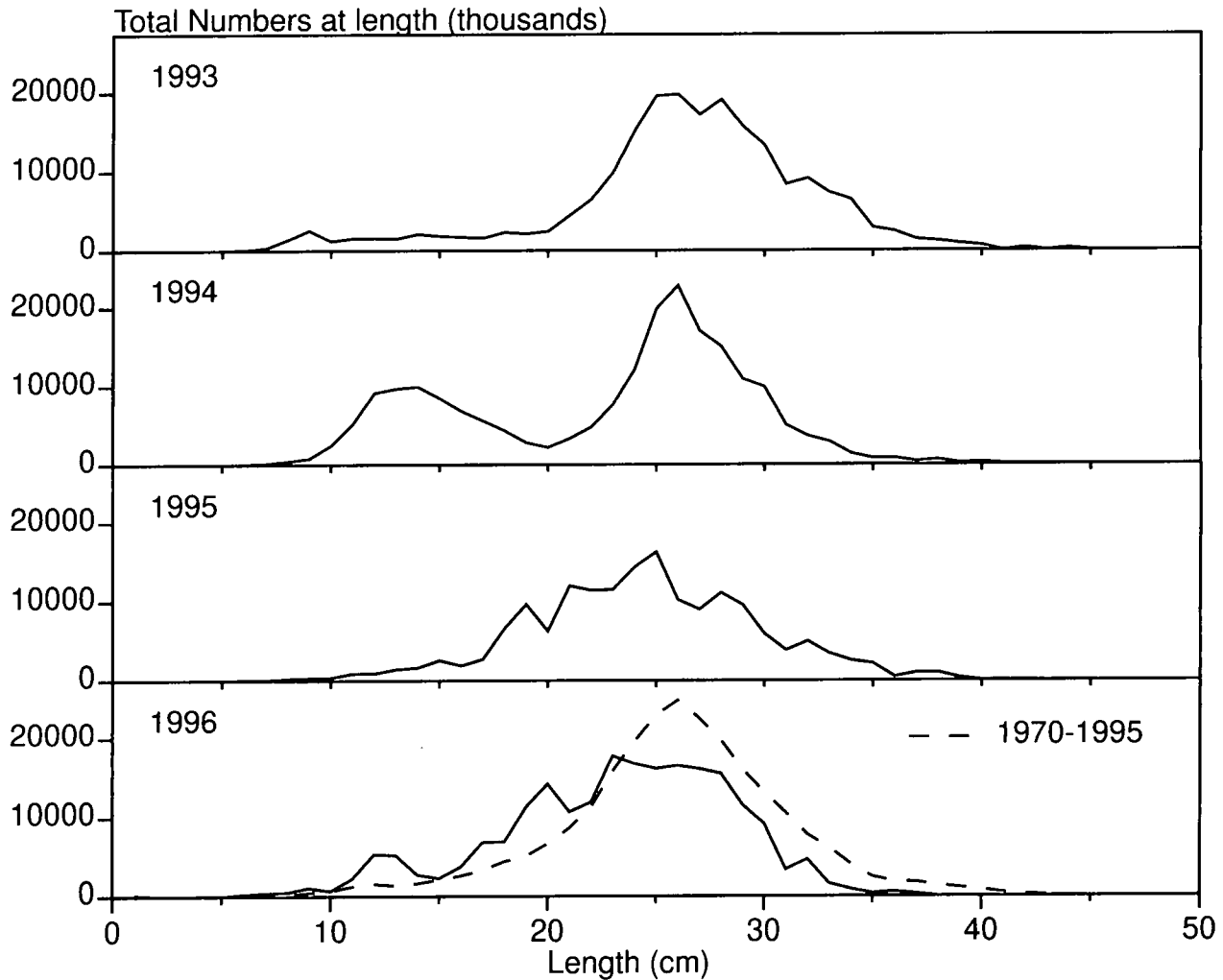


Fig. 30. Unit 3 Redfish length frequency distribution from the Summer surveys.

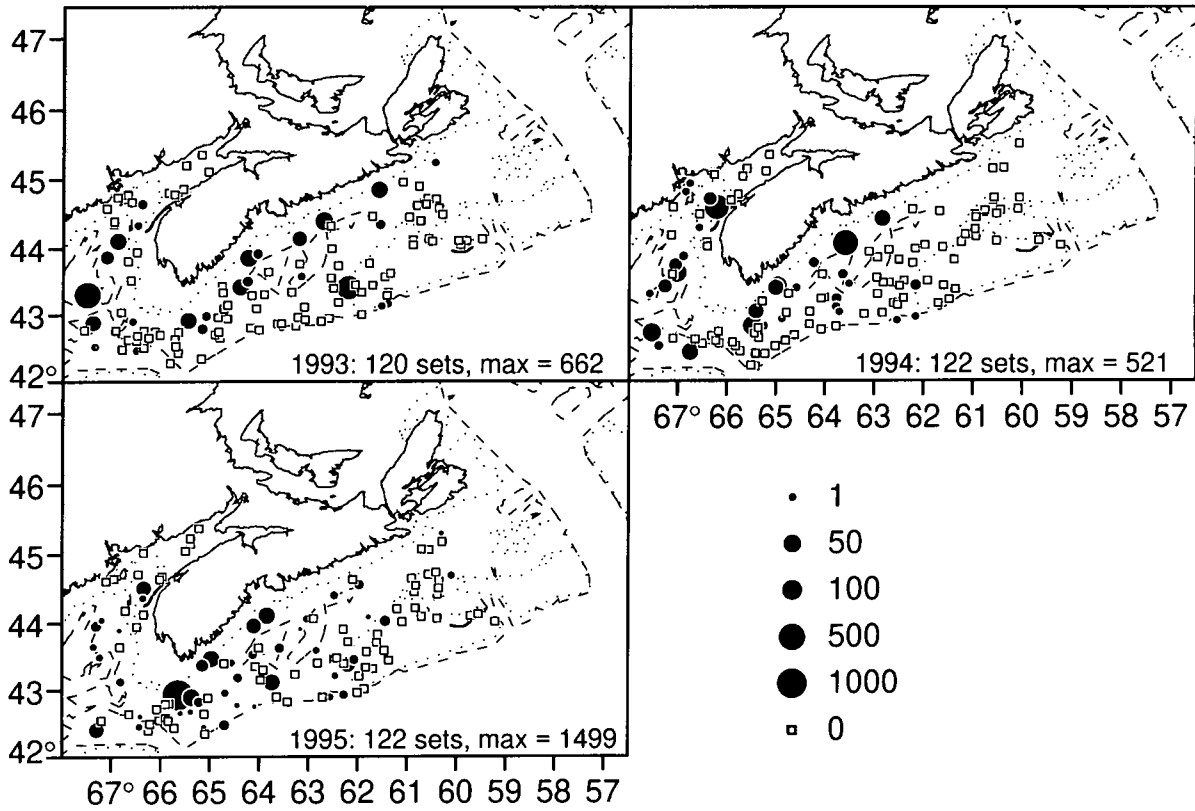


Fig. 31. Unit 3 Redfish Biomass (kg/tow) from the 1993-1995 Summer Groundfish Survey.

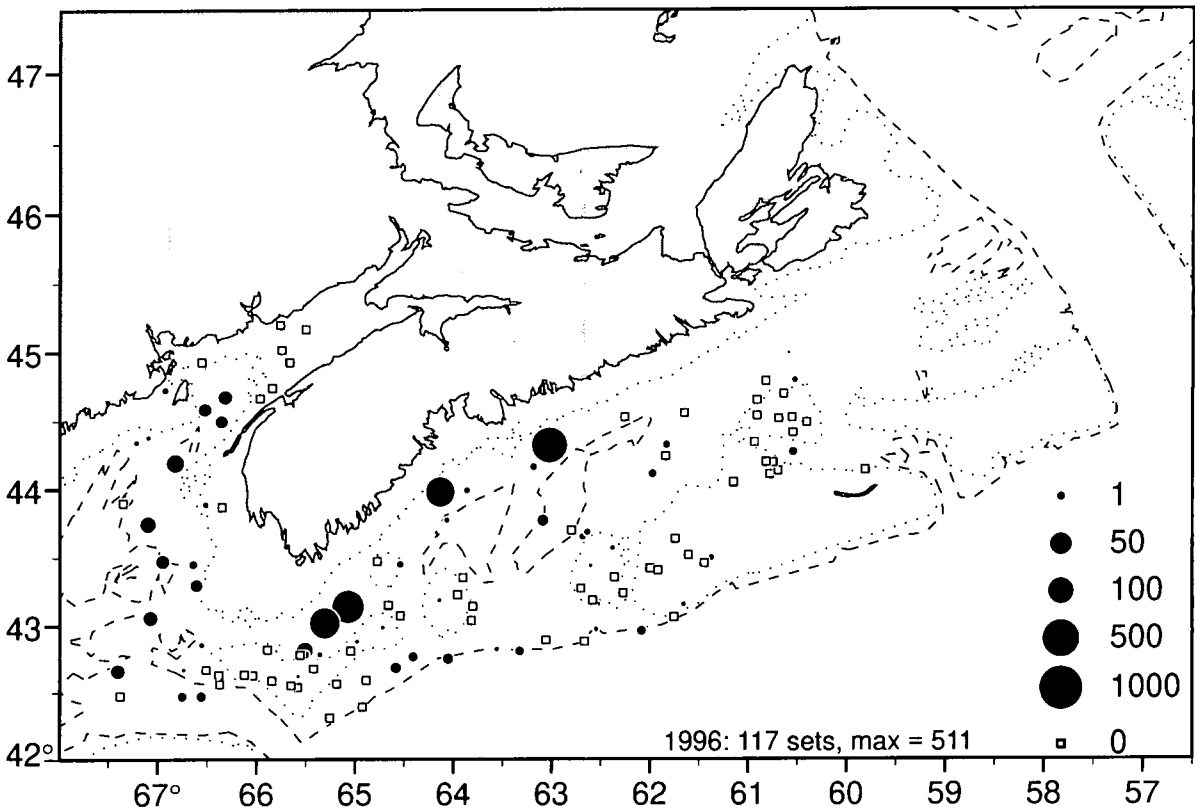


Fig. 32. Unit 3 Redfish Biomass (kg/tow) from the 1996 Summer Groundfish Survey.

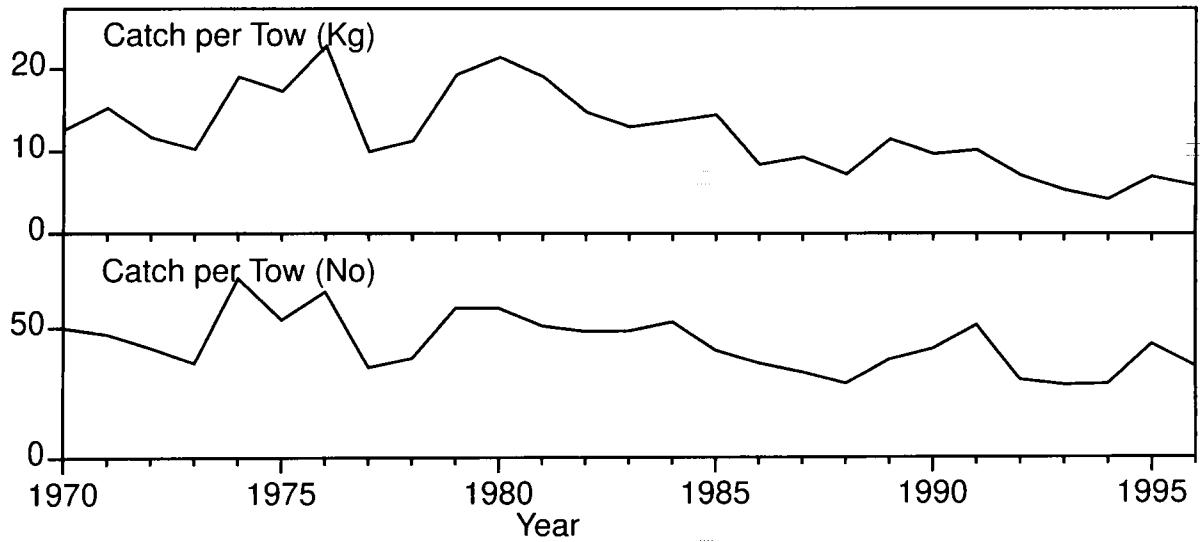


Fig. 33. 4VW Plaice stratified mean Weight and Number caught per tow from the Summer surveys.

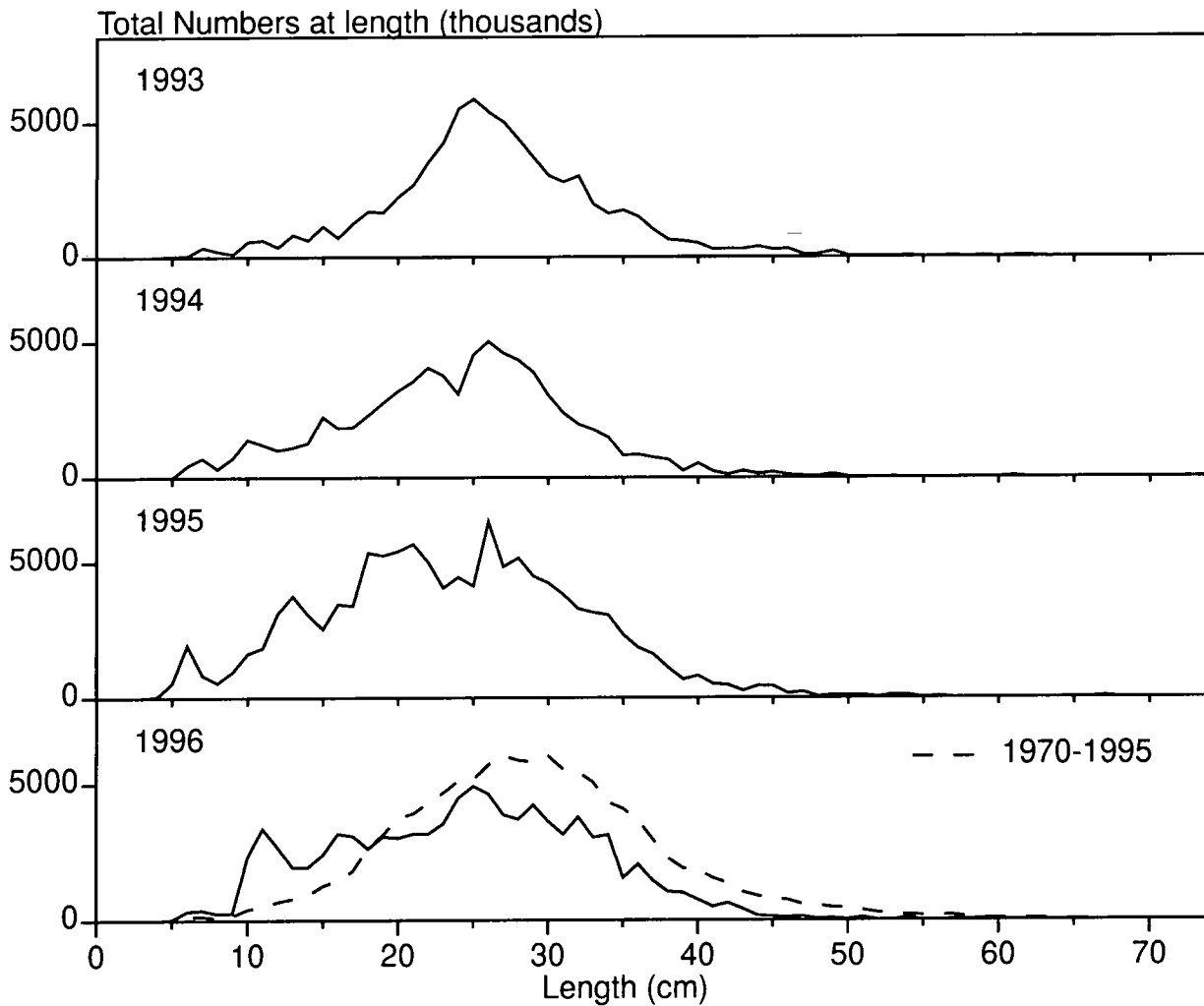


Fig. 34. 4VW Plaice length frequency distribution from the Summer surveys.

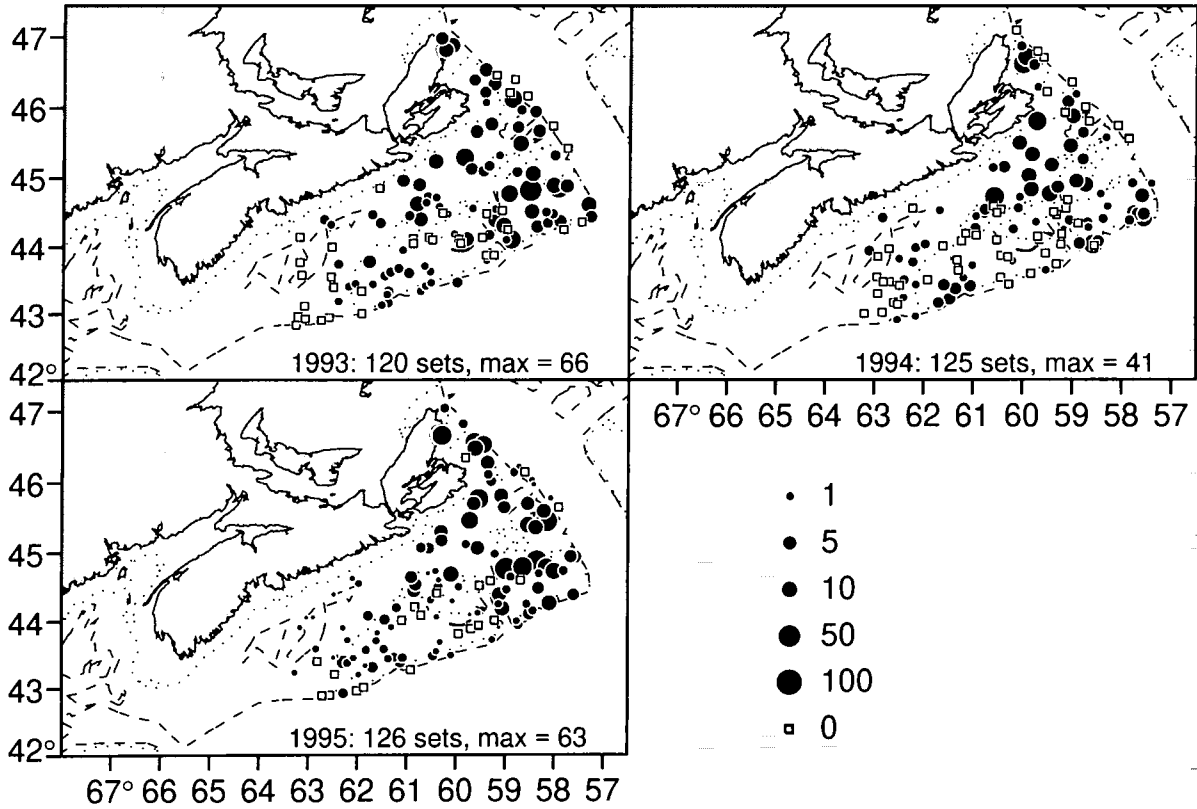


Fig. 35. 4VW Plaise Biomass (kg/tow) from the 1993-1995 Summer Groundfish Survey.

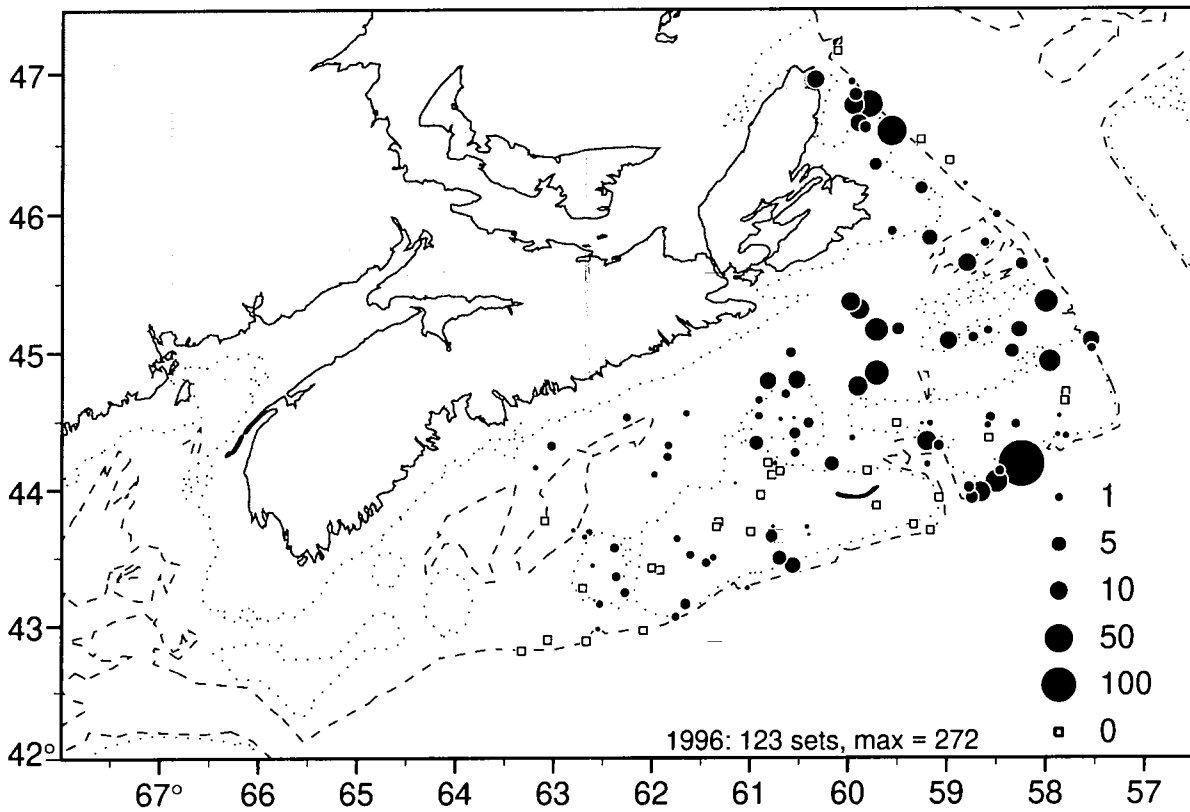


Fig. 36. 4VW Plaise Biomass (kg/tow) from the 1996 Summer Groundfish Survey.

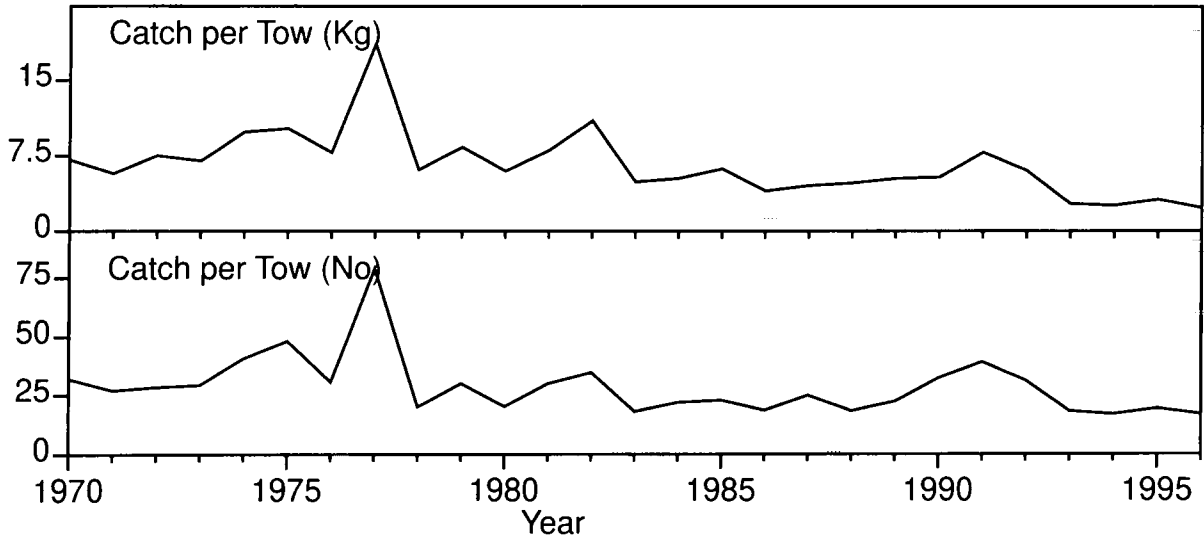


Fig. 37. 4VW Yellowtail Flounder stratified mean Weight and Number caught per tow from the Summer surveys.

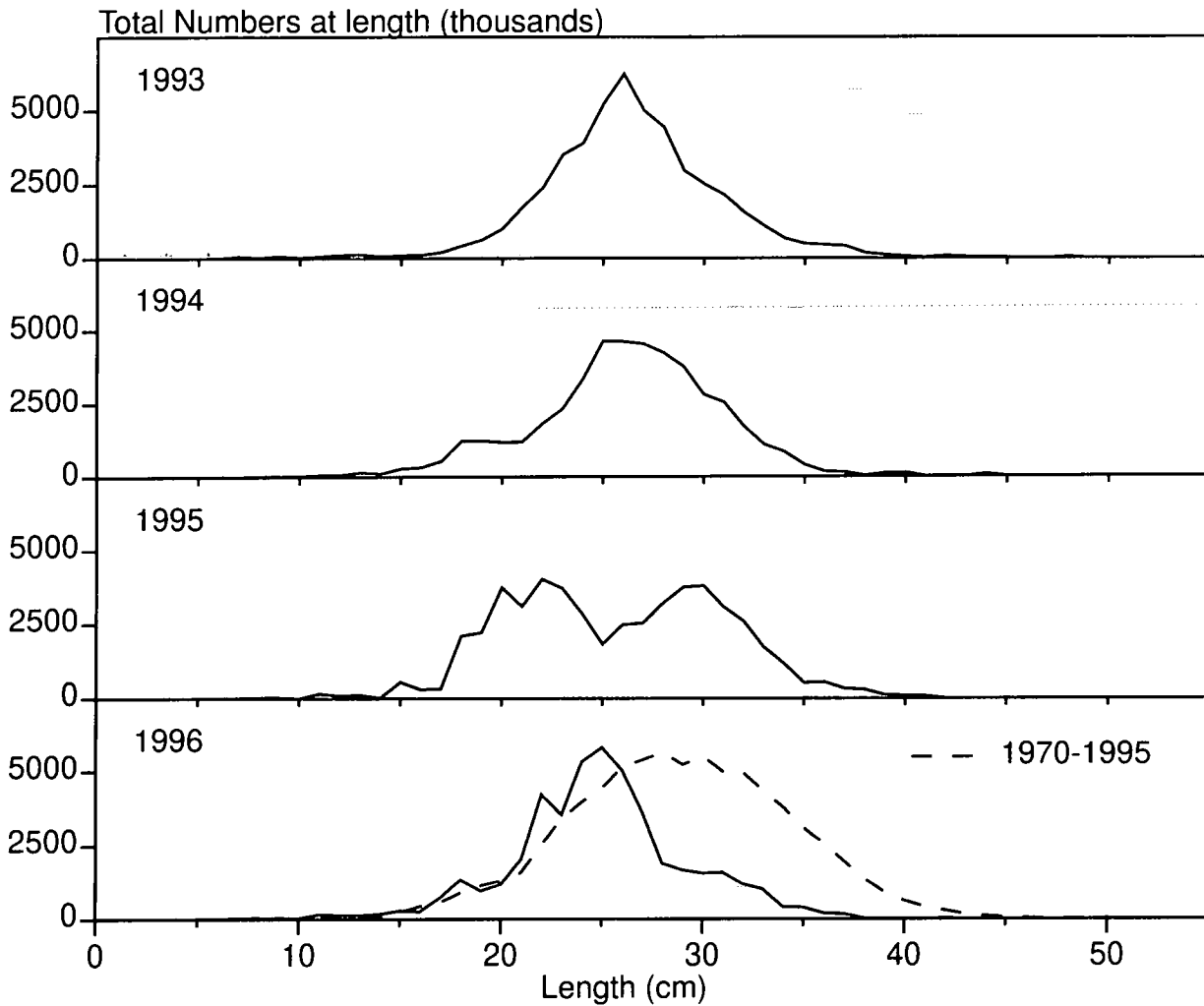


Fig. 38. 4VW Yellowtail Flounder length frequency distribution from the Summer surveys.

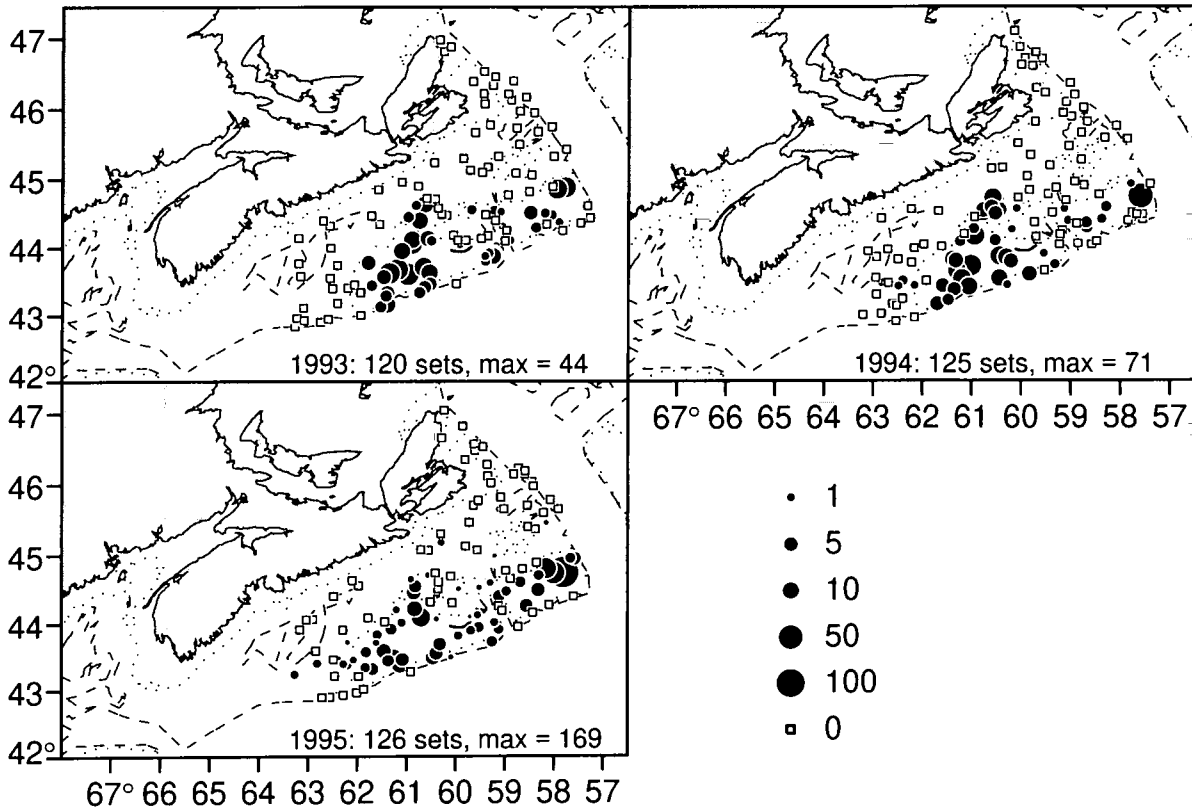


Fig. 39. 4VW Yellowtail Flounder Biomass (kg/tow) from the 1993-1995 Summer Groundfish Survey.

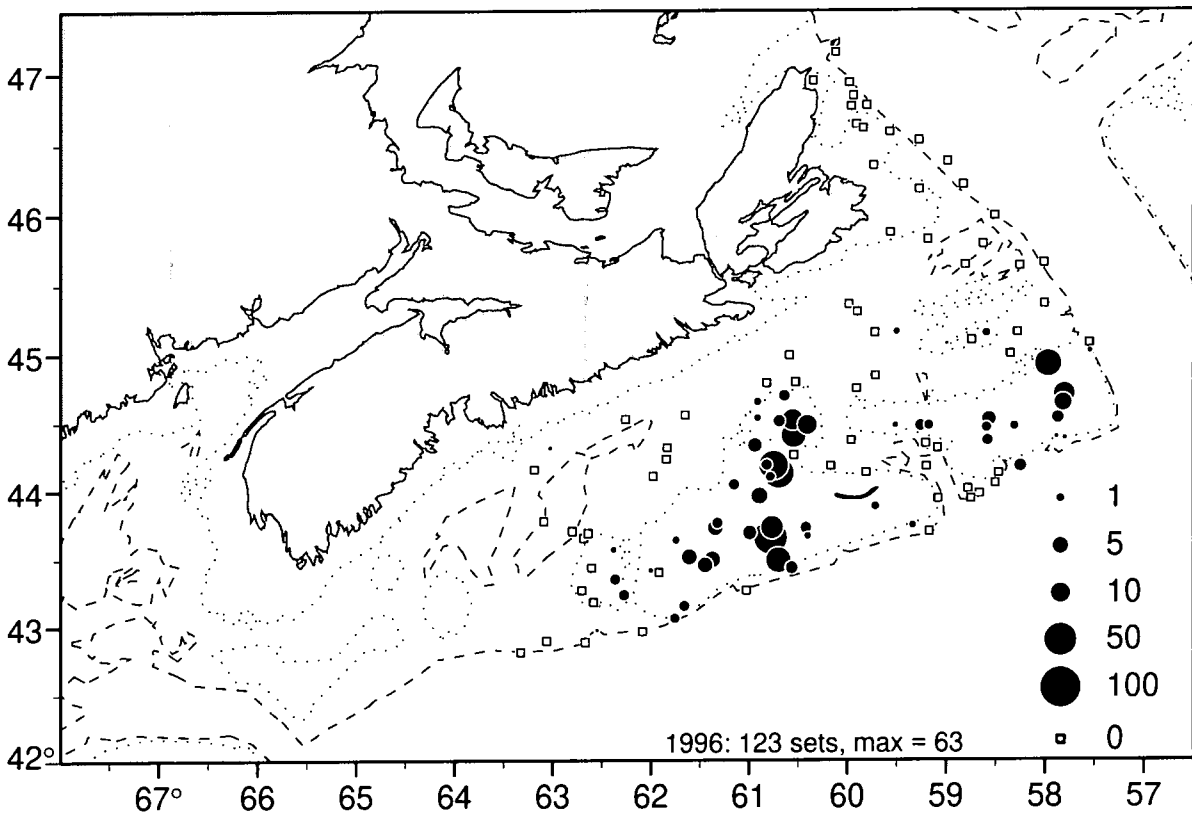


Fig. 40. 4VW Yellowtail Flounder Biomass (kg/tow) from the 1996 Summer Groundfish Survey.



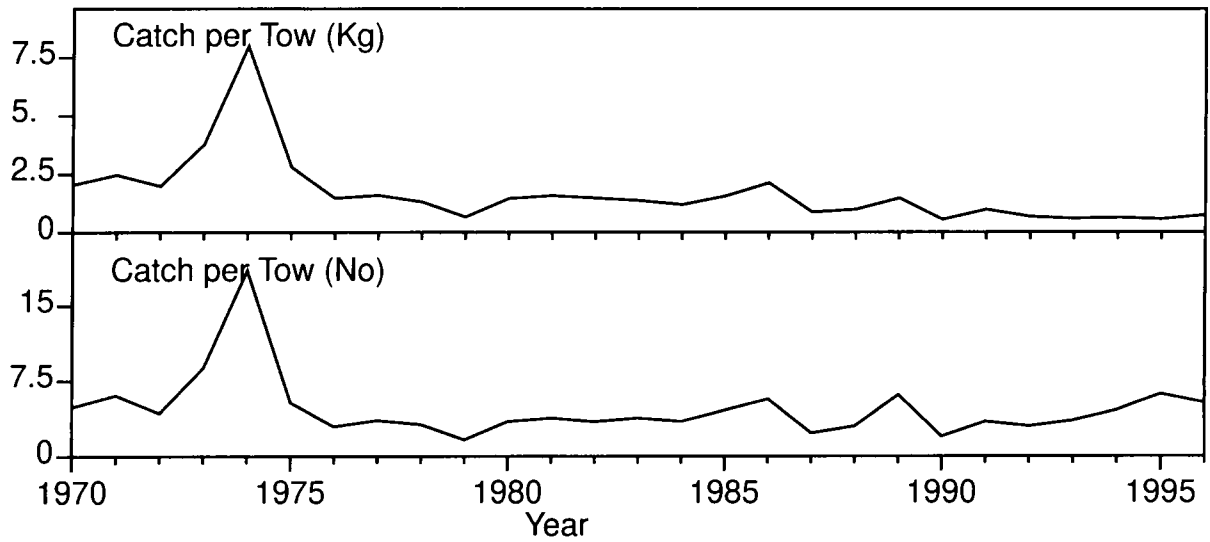


Fig. 41. 4VW Witch Flounder stratified mean Weight and Number caught per tow from the Summer surveys.

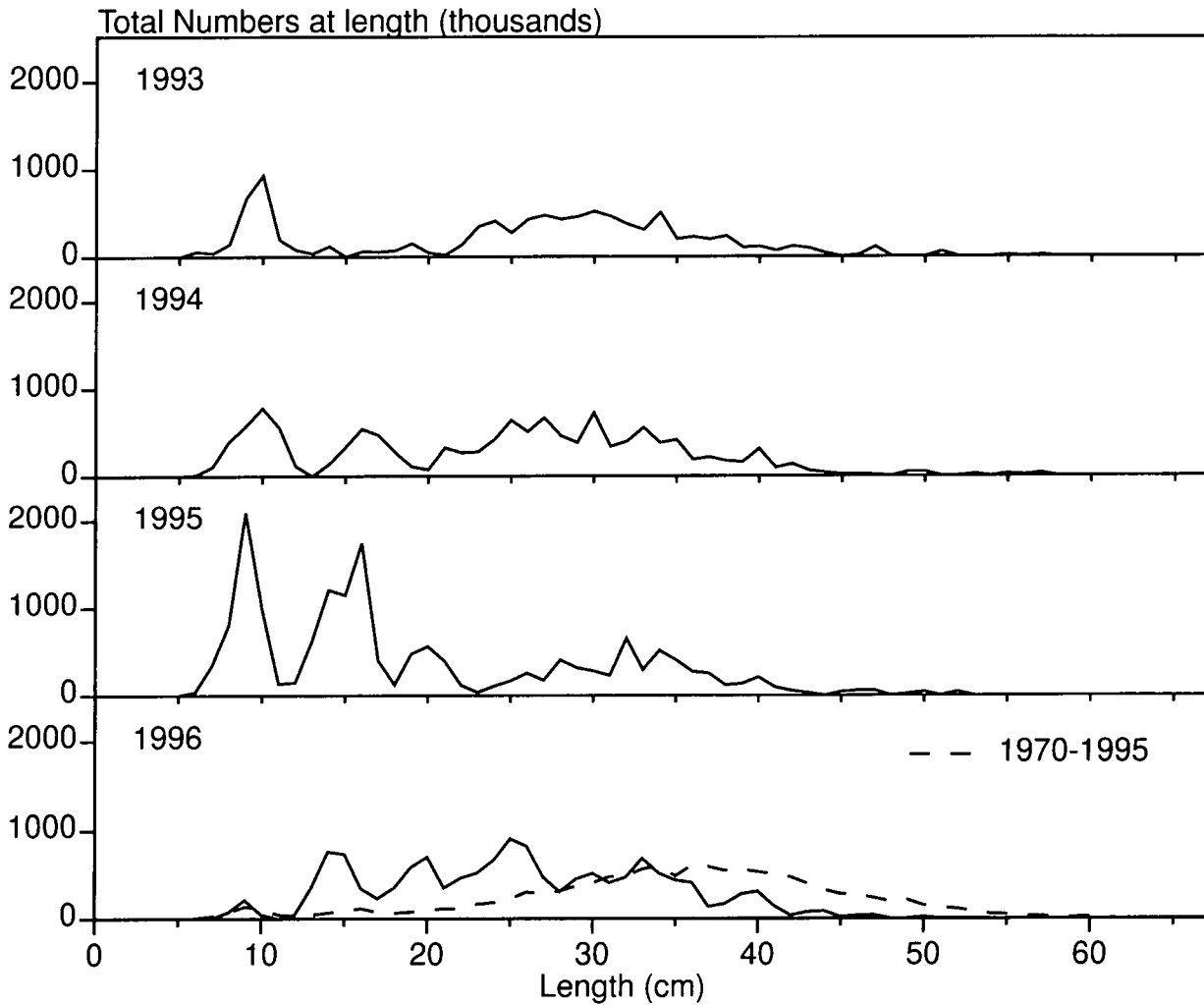


Fig. 42. 4VW Witch Flounder length frequency distribution from the Summer surveys.

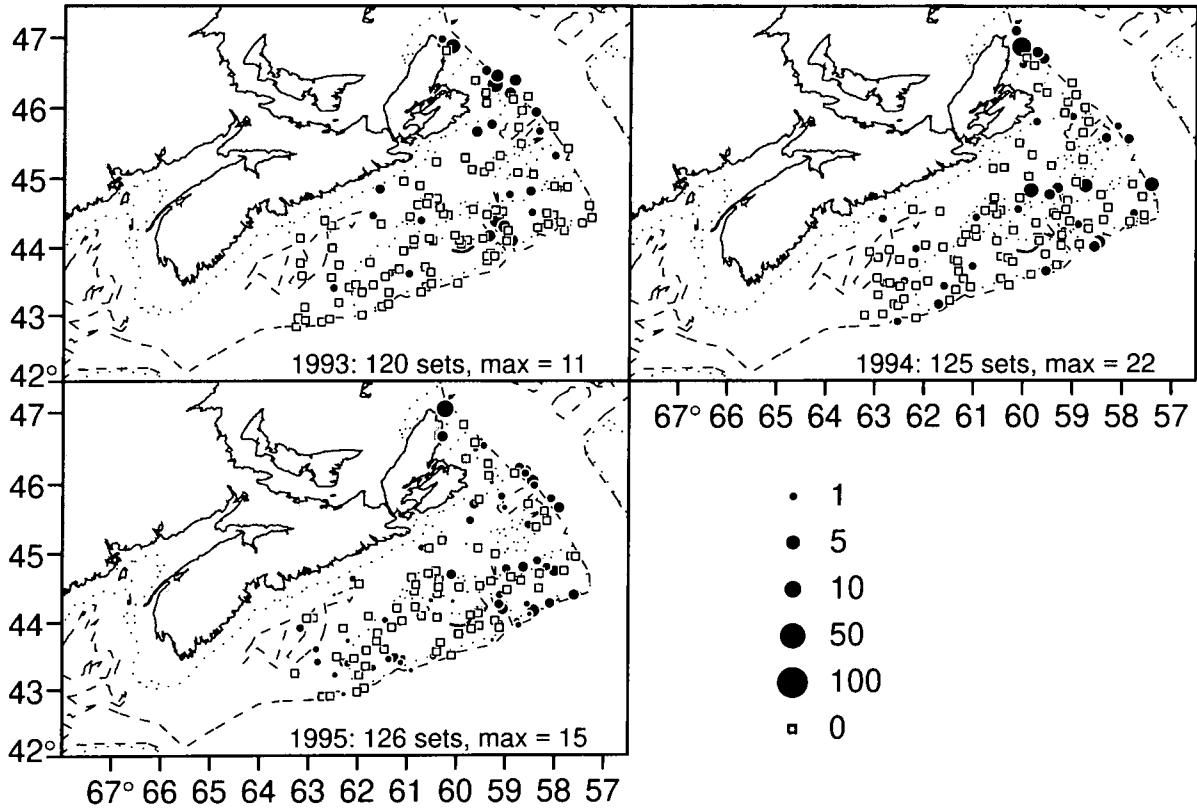


Fig. 43. 4VW Witch Flounder Biomass (kg/tow) from the 1993-1995 Summer Groundfish Survey.

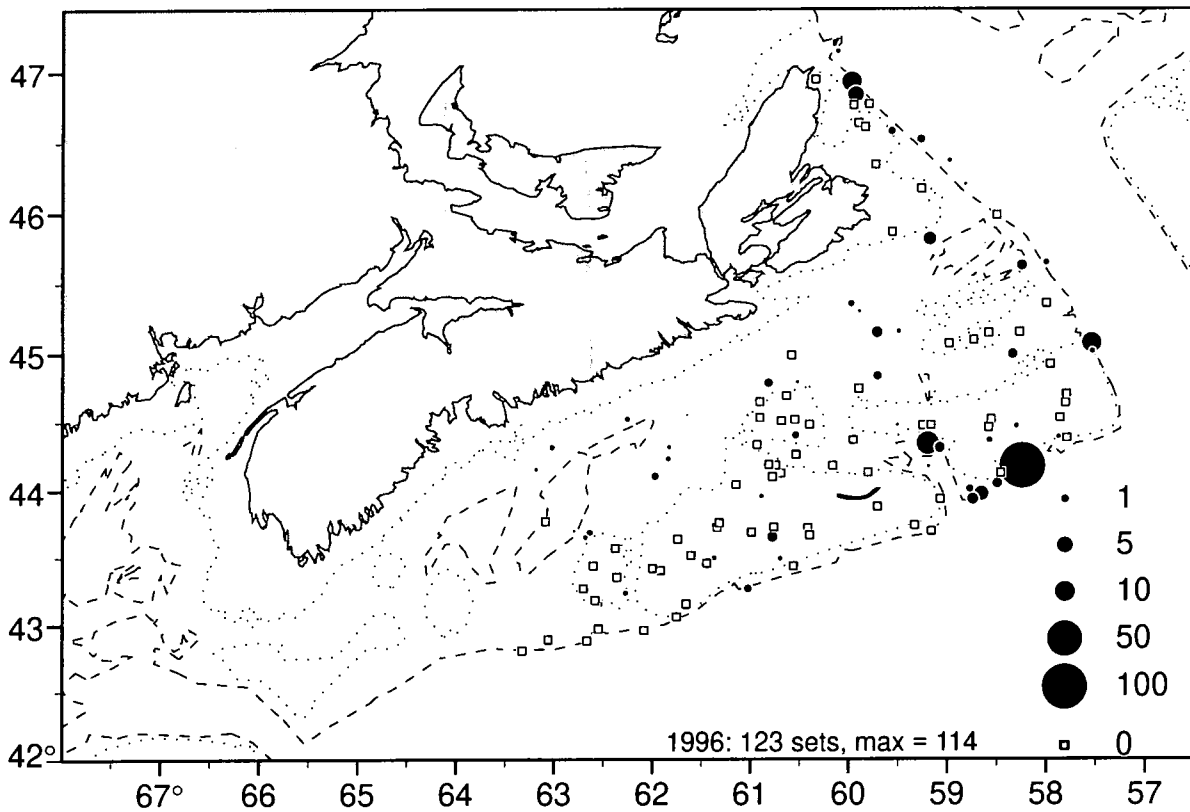


Fig. 44. 4VW Witch Flounder Biomass (kg/tow) from the 1996 Summer Groundfish Survey.

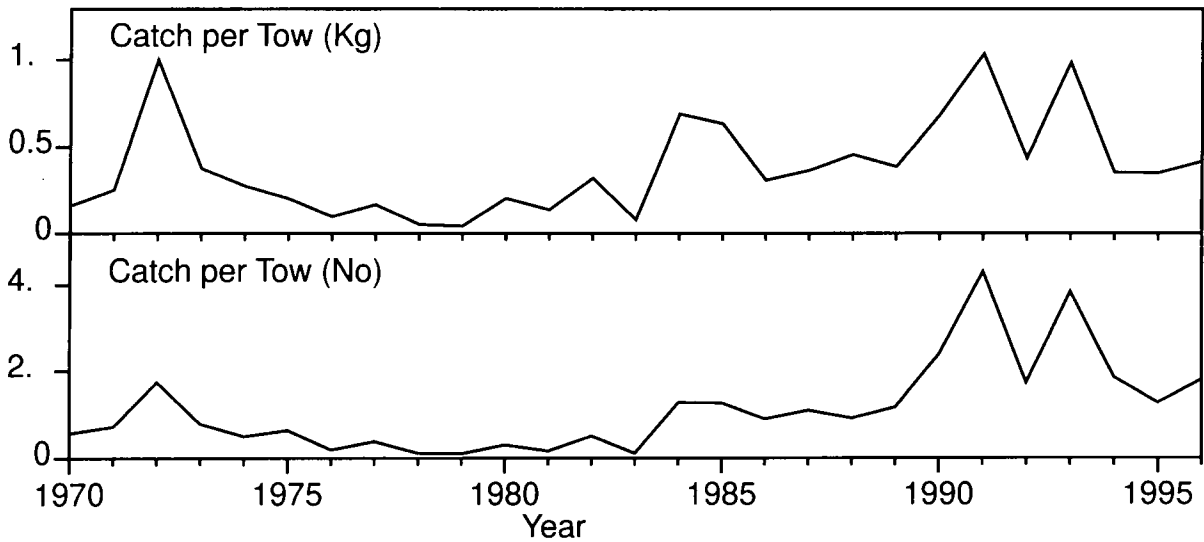


Fig. 45. 4VW Winter Flounder stratified mean Weight and Number caught per tow from the Summer surveys.

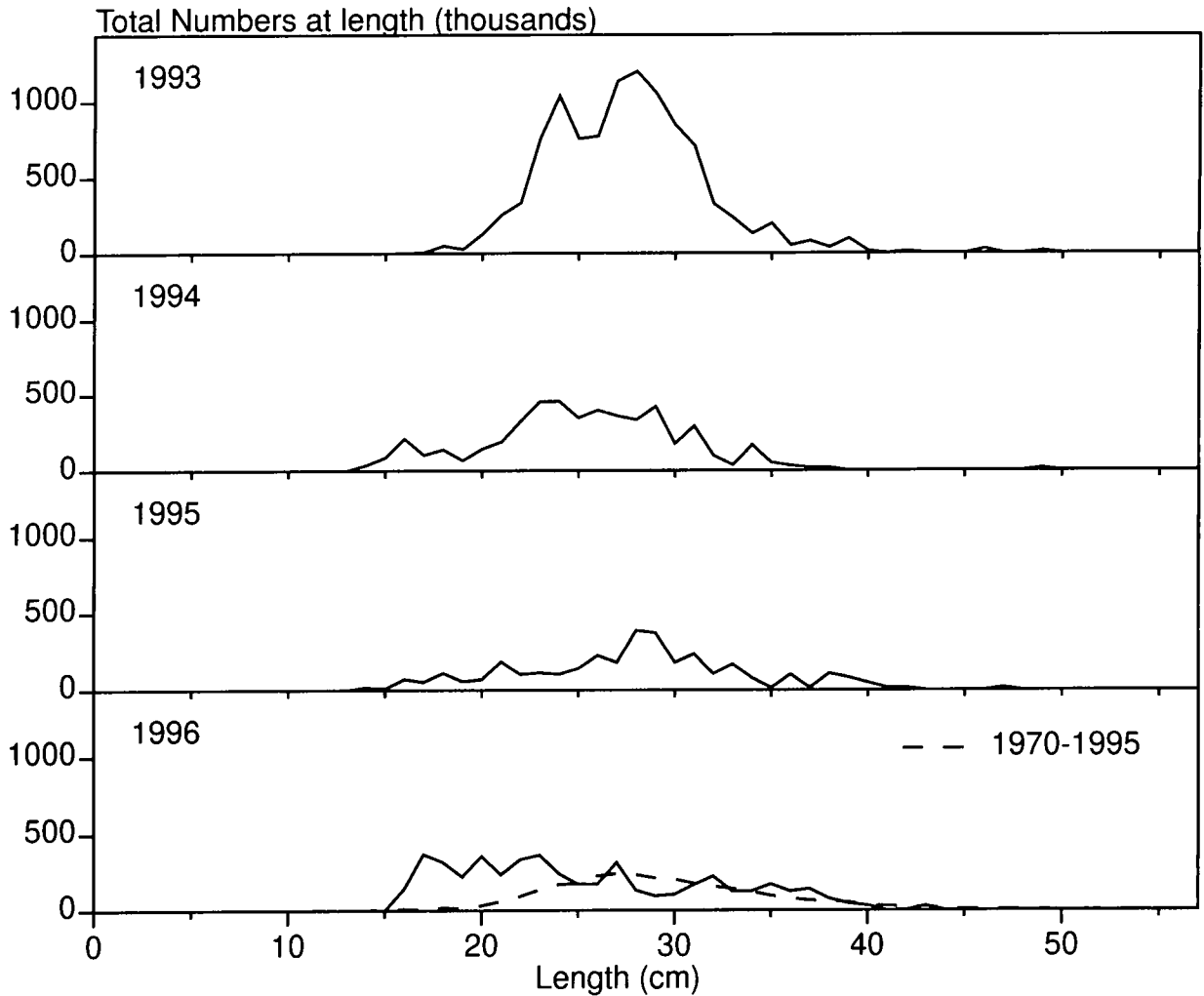


Fig. 46. 4VW Winter Flounder length frequency distribution from the Summer surveys.

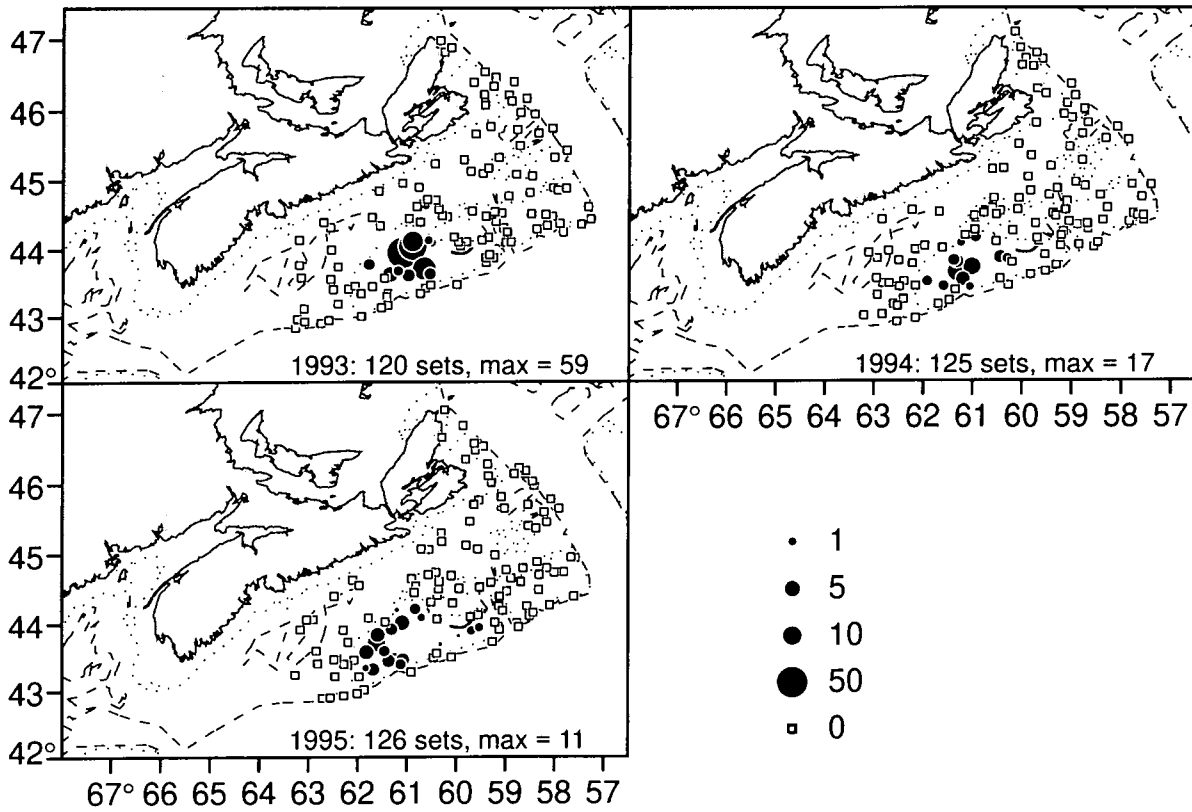


Fig. 47. 4VW Winter Flounder Biomass (kg/tow) from the 1993-1995 Summer Groundfish Survey.

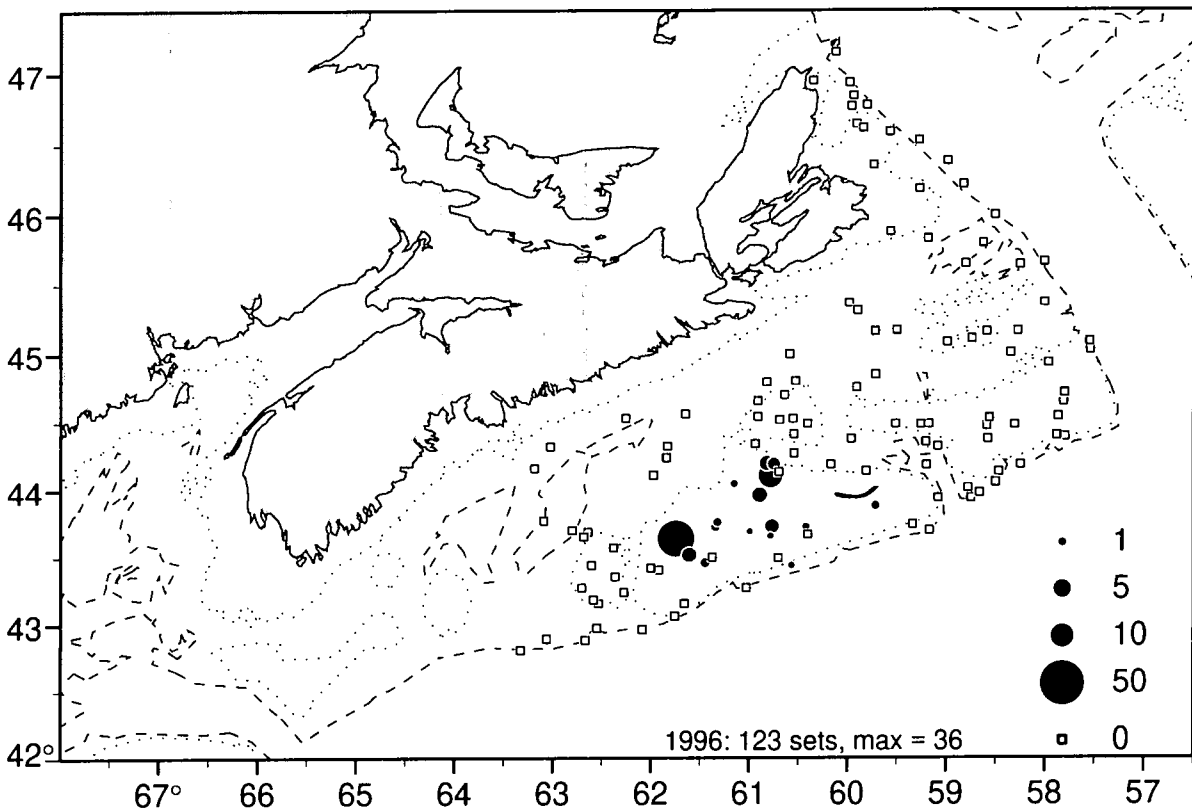


Fig. 48. 4VW Winter Flounder Biomass (kg/tow) from the 1996 Summer Groundfish Survey.

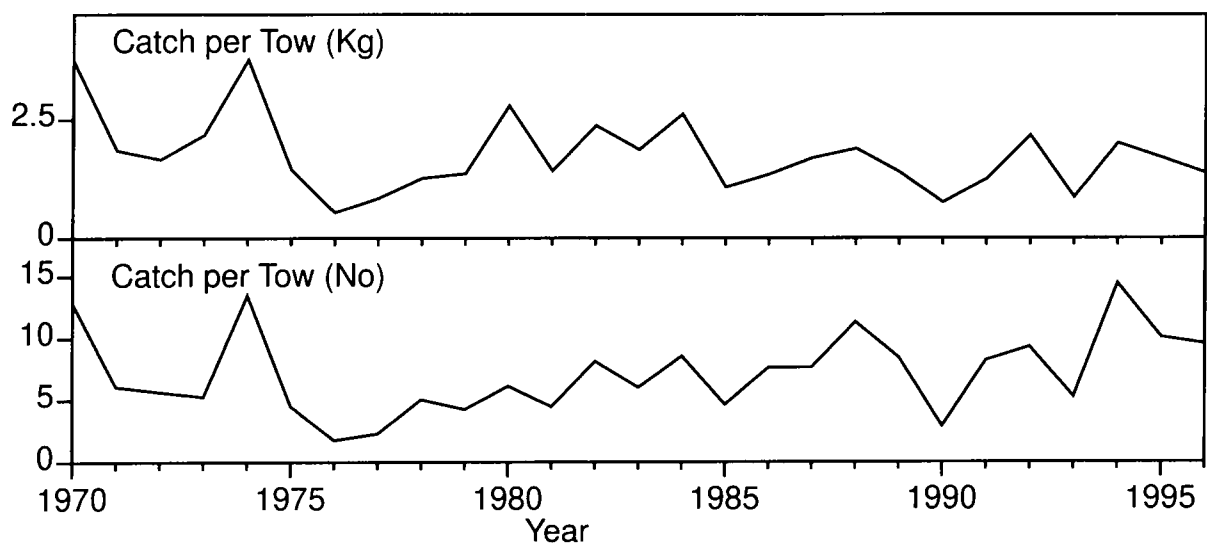


Fig. 49. 4X Plaice stratified mean Weight and Number caught per tow from the Summer surveys.

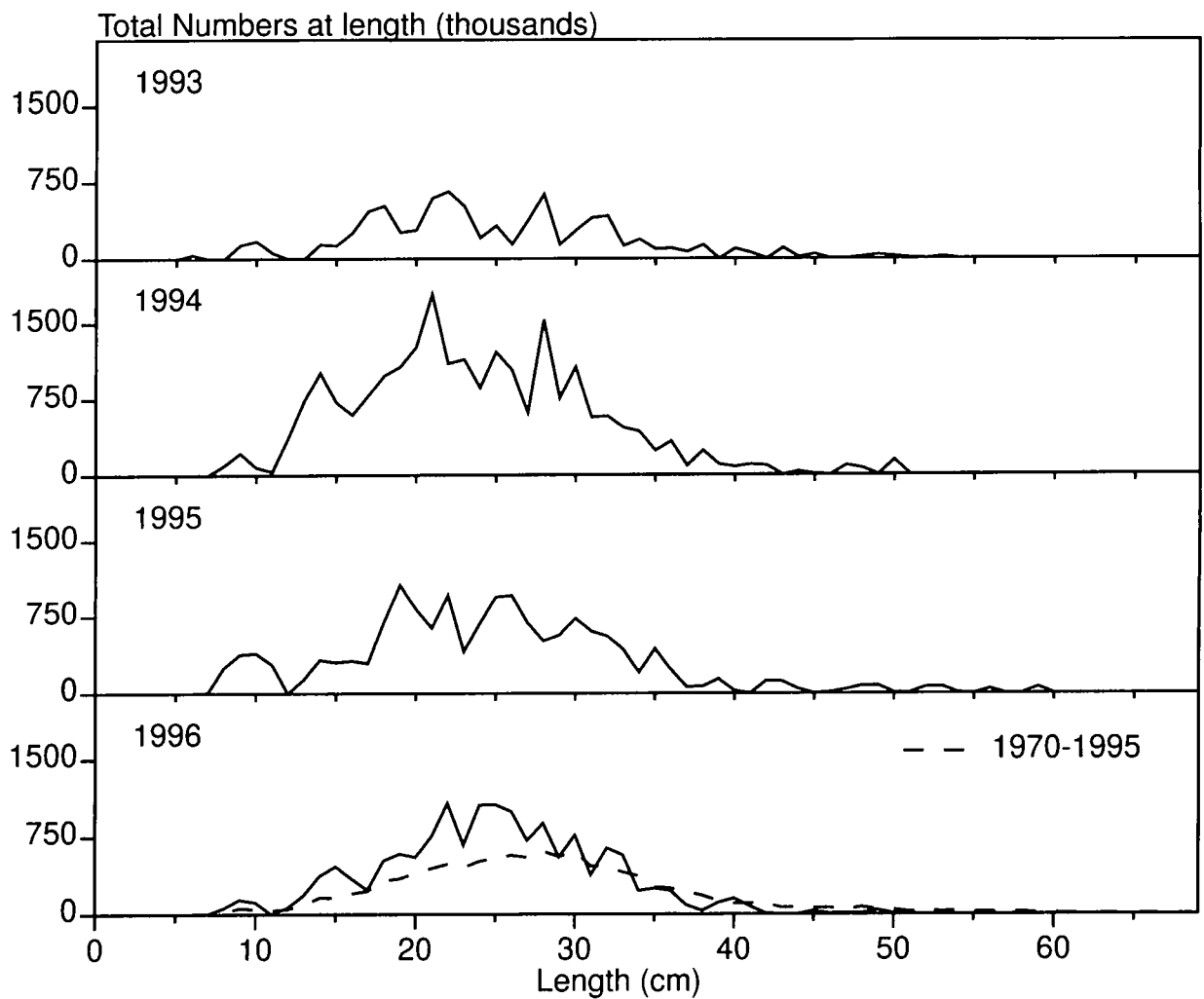


Fig. 50. 4X Plaice length frequency distribution from the Summer surveys.

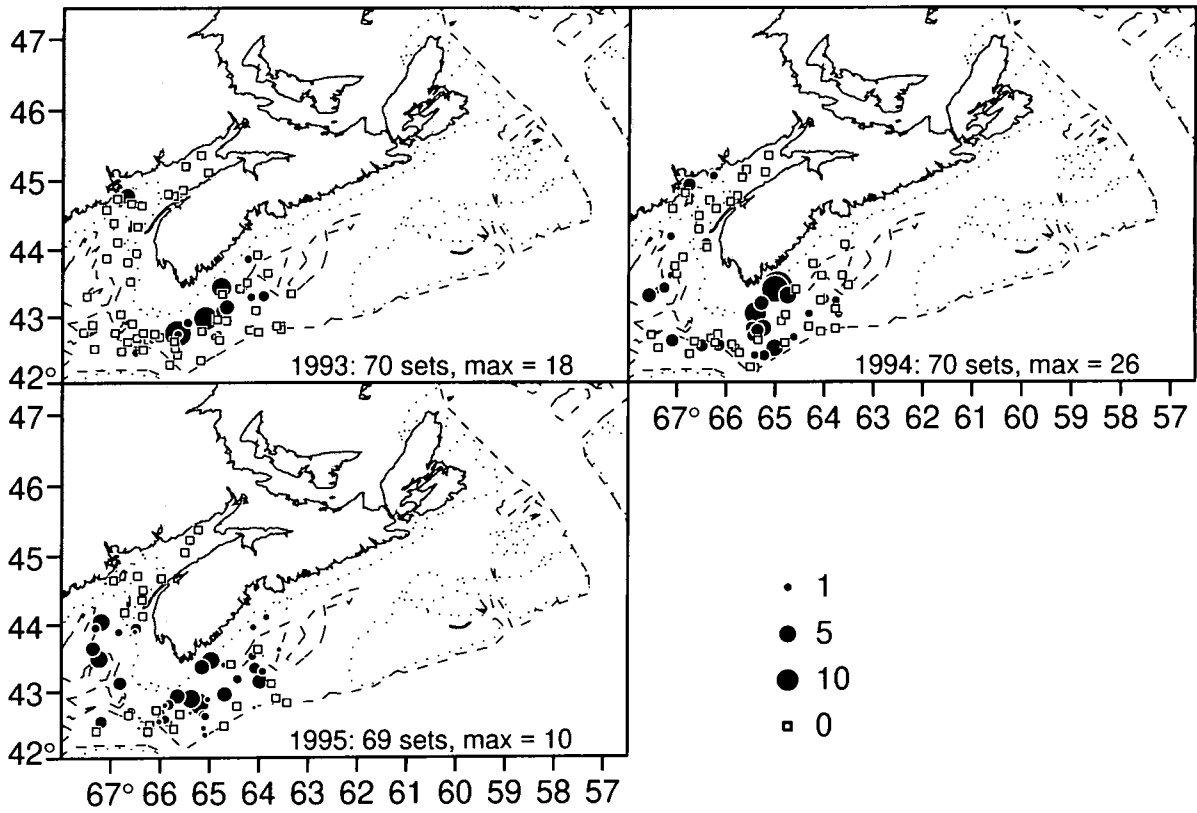


Fig. 51. 4X Plaise Biomass (kg/tow) from the 1993-1995 Summer Groundfish Survey.

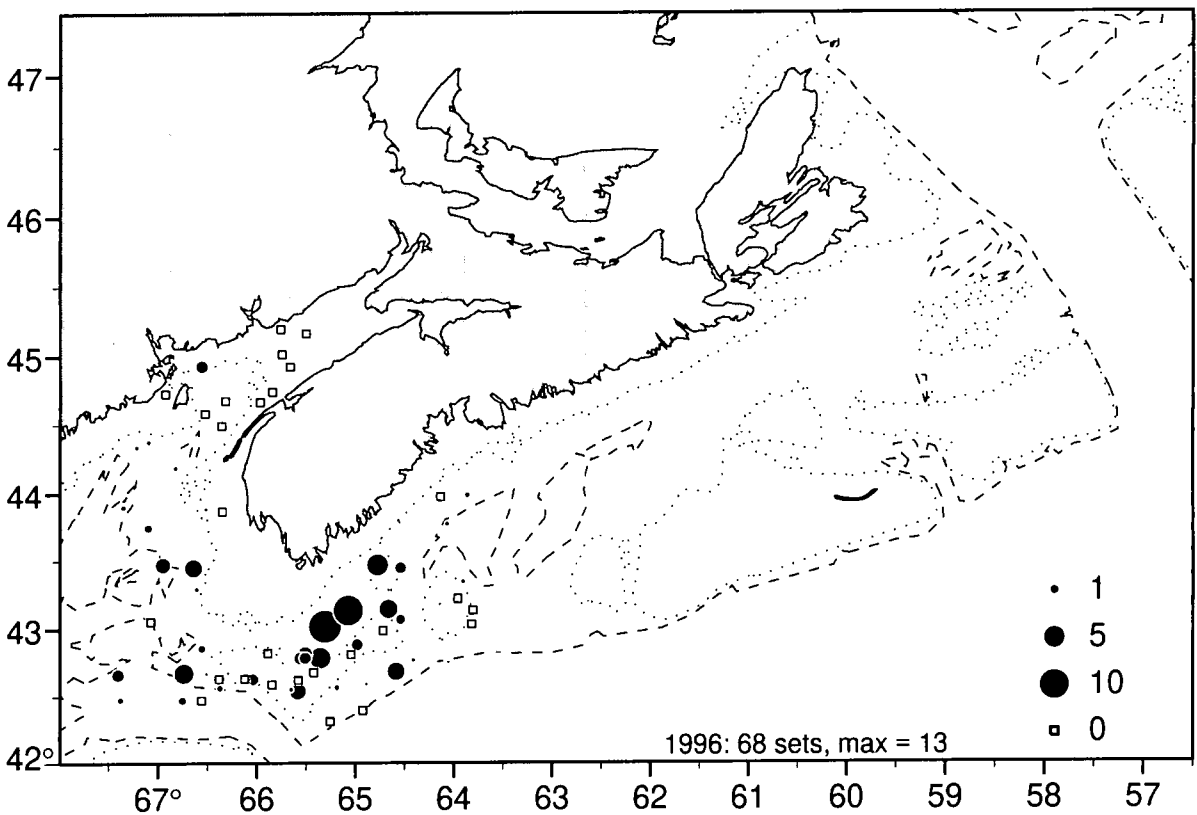


Fig. 52. 4X Plaise Biomass (kg/tow) from the 1996 Summer Groundfish Survey.

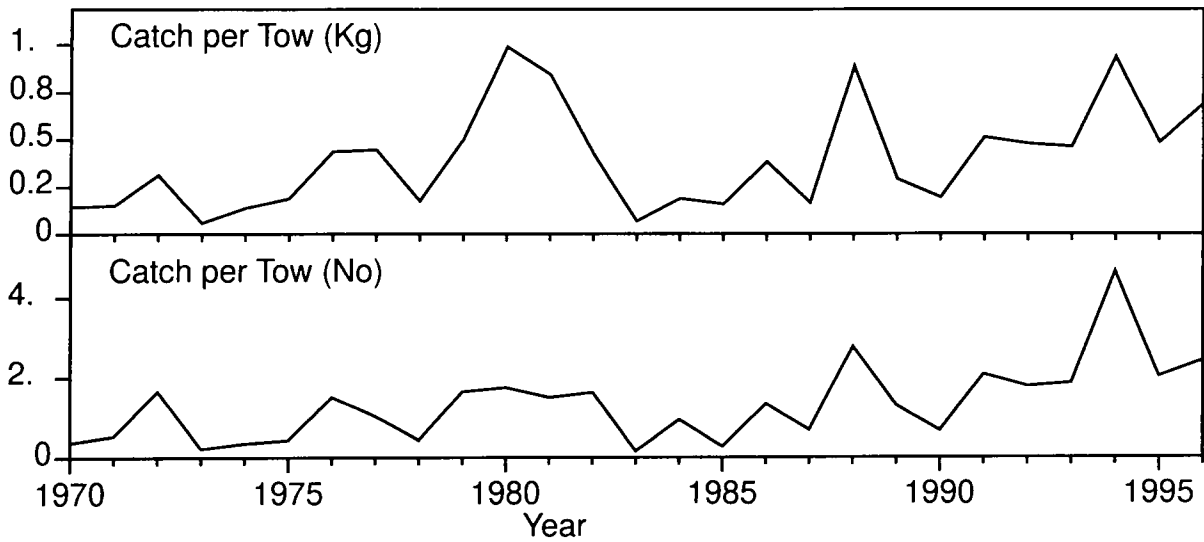


Fig. 53. 4X Yellowtail Flounder stratified mean Weight and Number caught per tow from the Summer surveys.

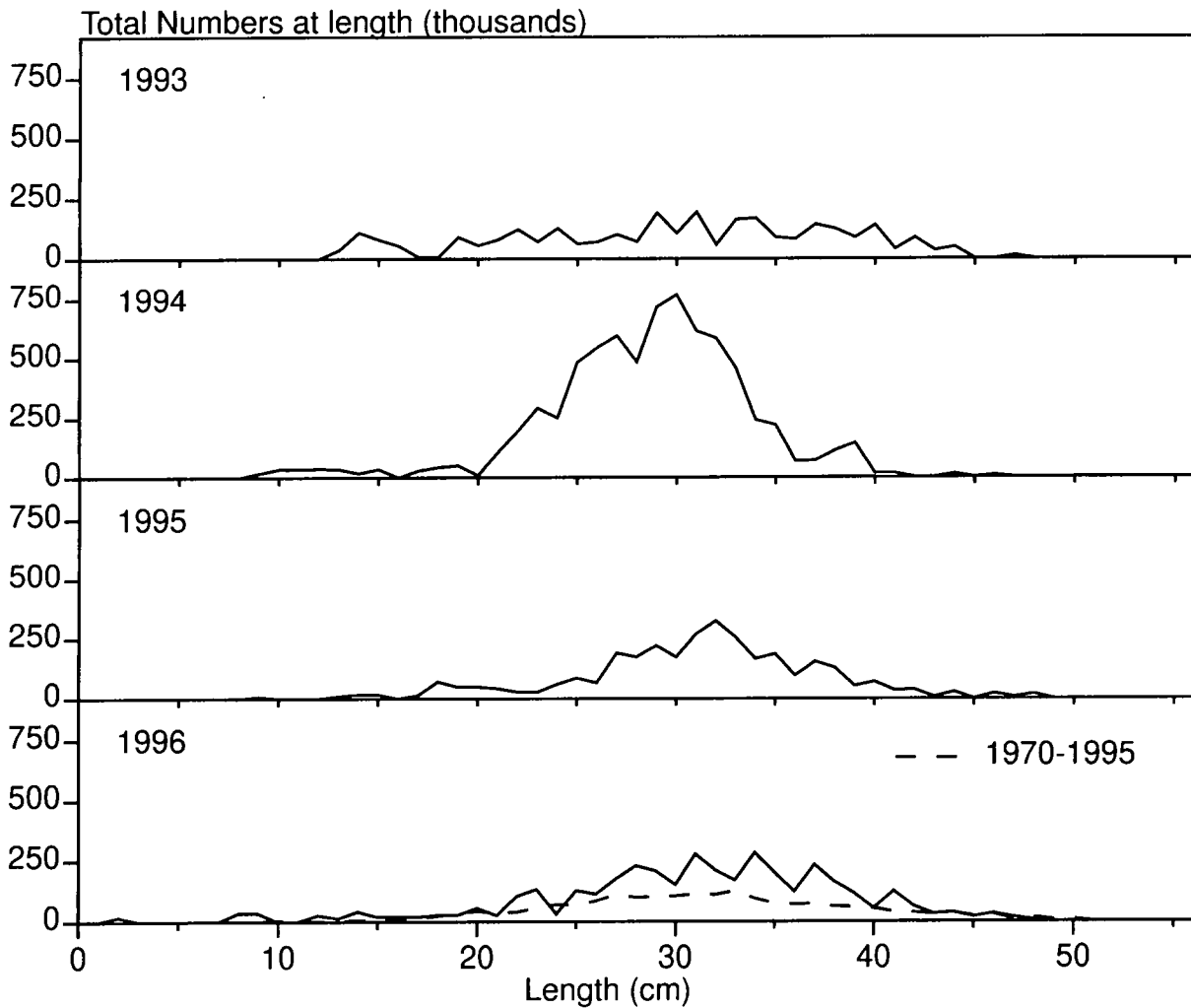


Fig. 54. 4X Yellowtail Flounder length frequency distribution from the Summer surveys.

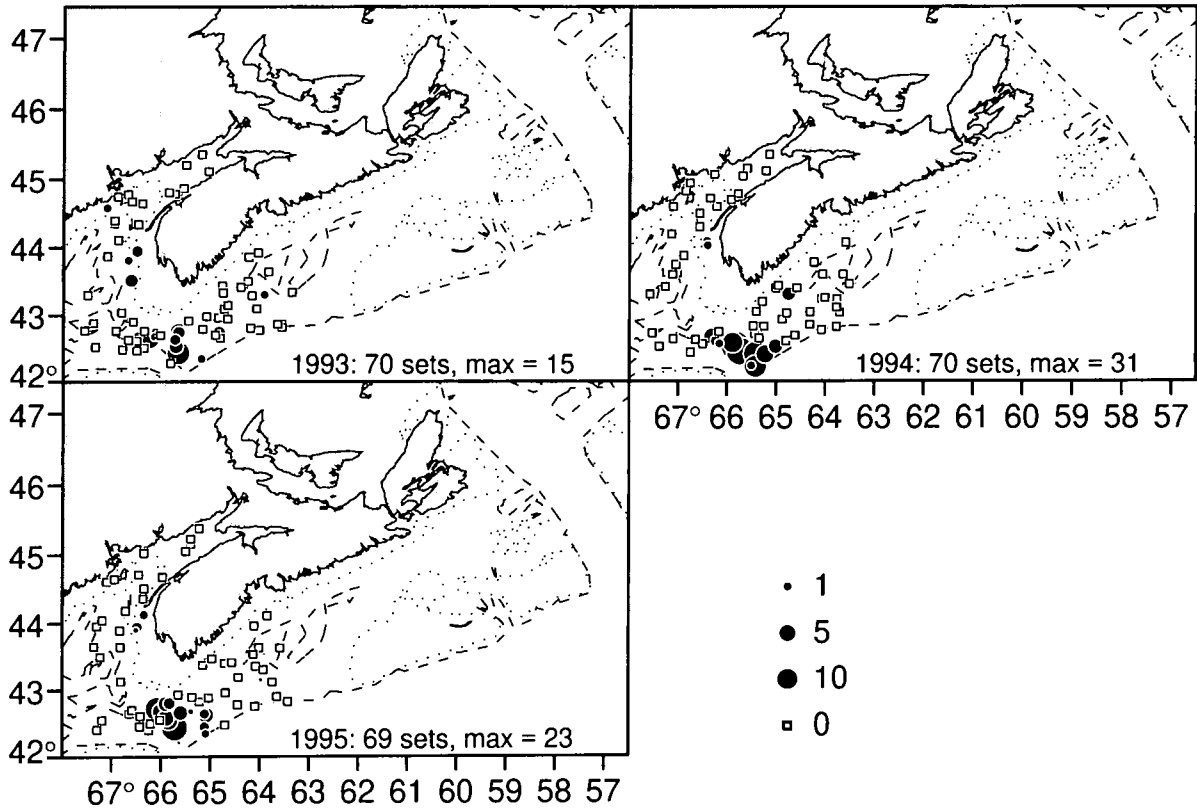


Fig. 55. 4X Yellowtail Flounder Biomass (kg/tow) from the 1993-1995 Summer Groundfish Survey.

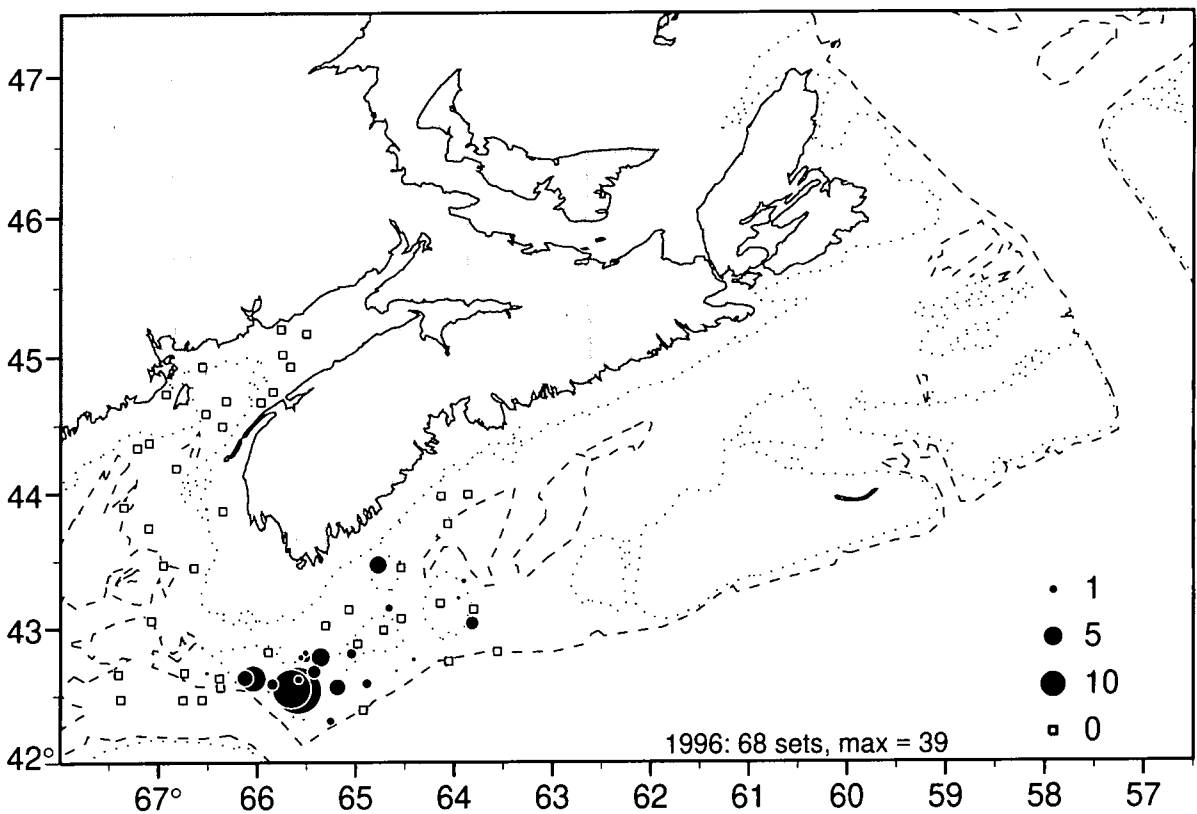


Fig. 56. 4X Yellowtail Flounder Biomass (kg/tow) from the 1996 Summer Groundfish Survey.



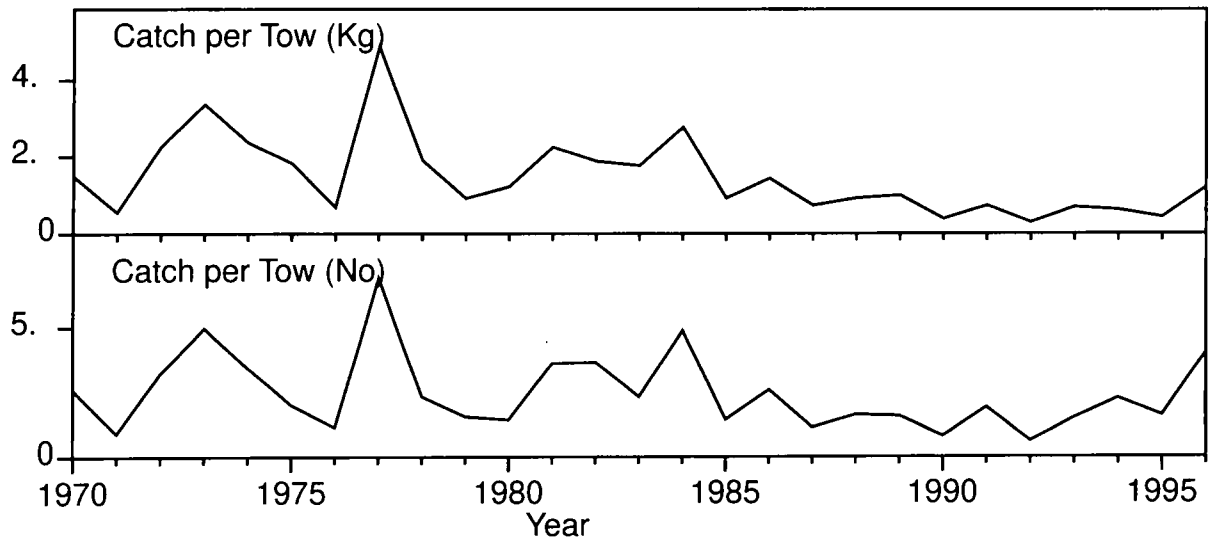


Fig. 57. 4X Witch Flounder stratified mean Weight and Number caught per tow from the Summer surveys.

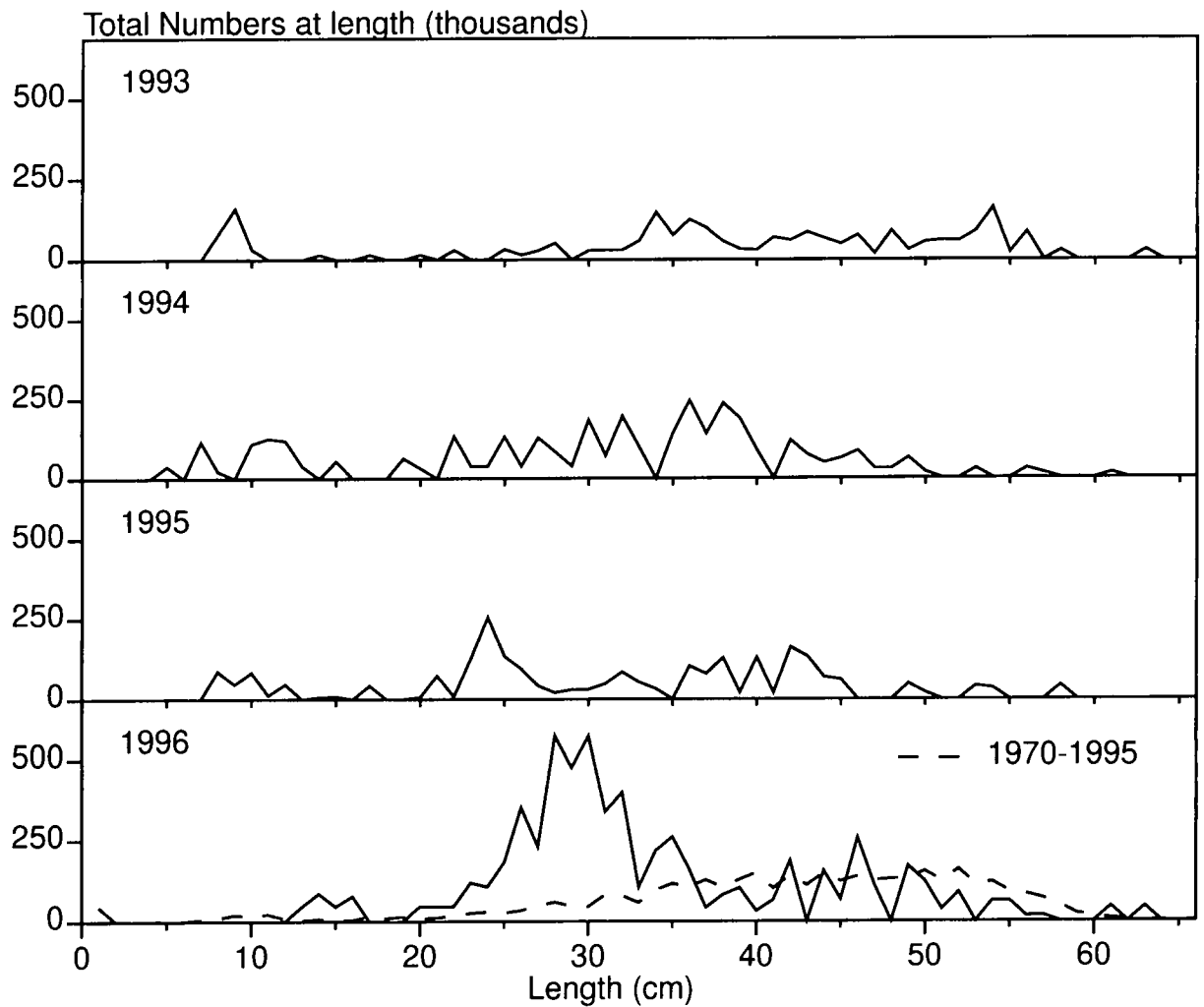


Fig. 58. 4X Witch Flounder length frequency distribution from the Summer surveys.

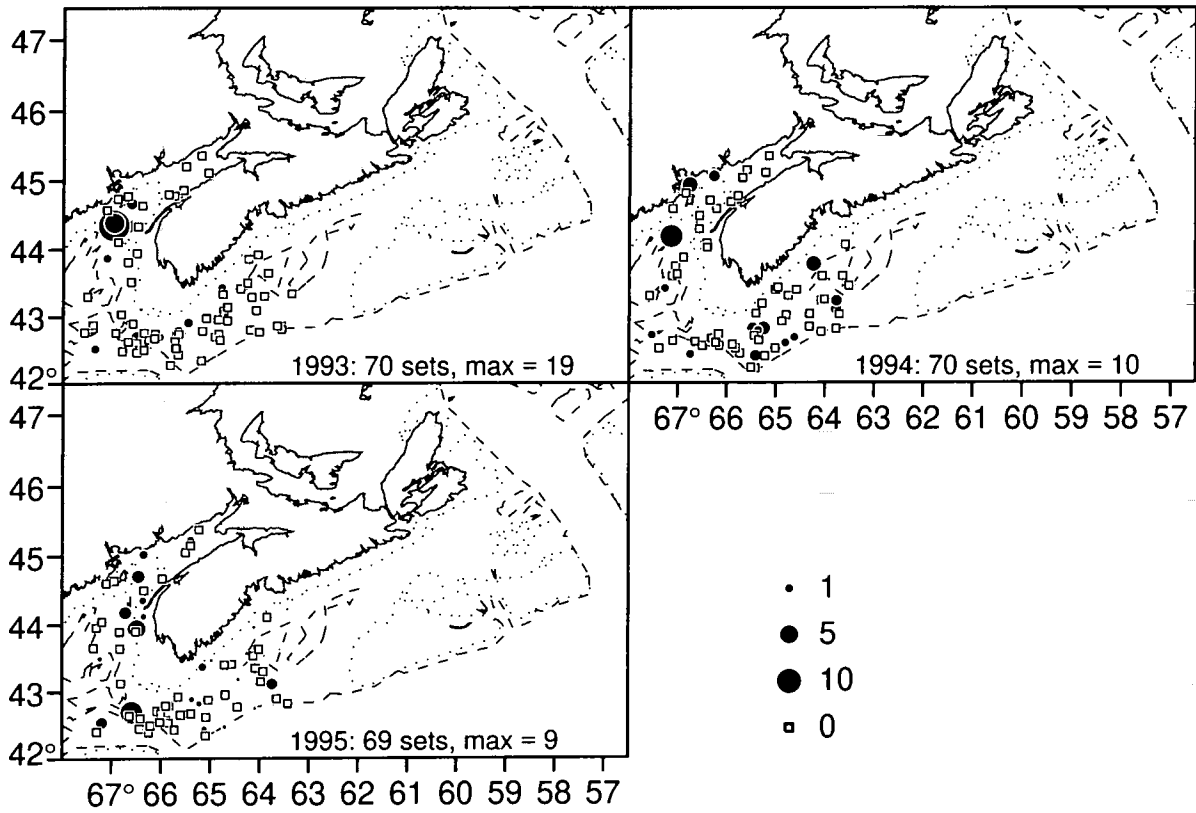


Fig. 59. 4X Witch Flounder Biomass (kg/tow) from the 1993-1995 Summer Groundfish Survey.

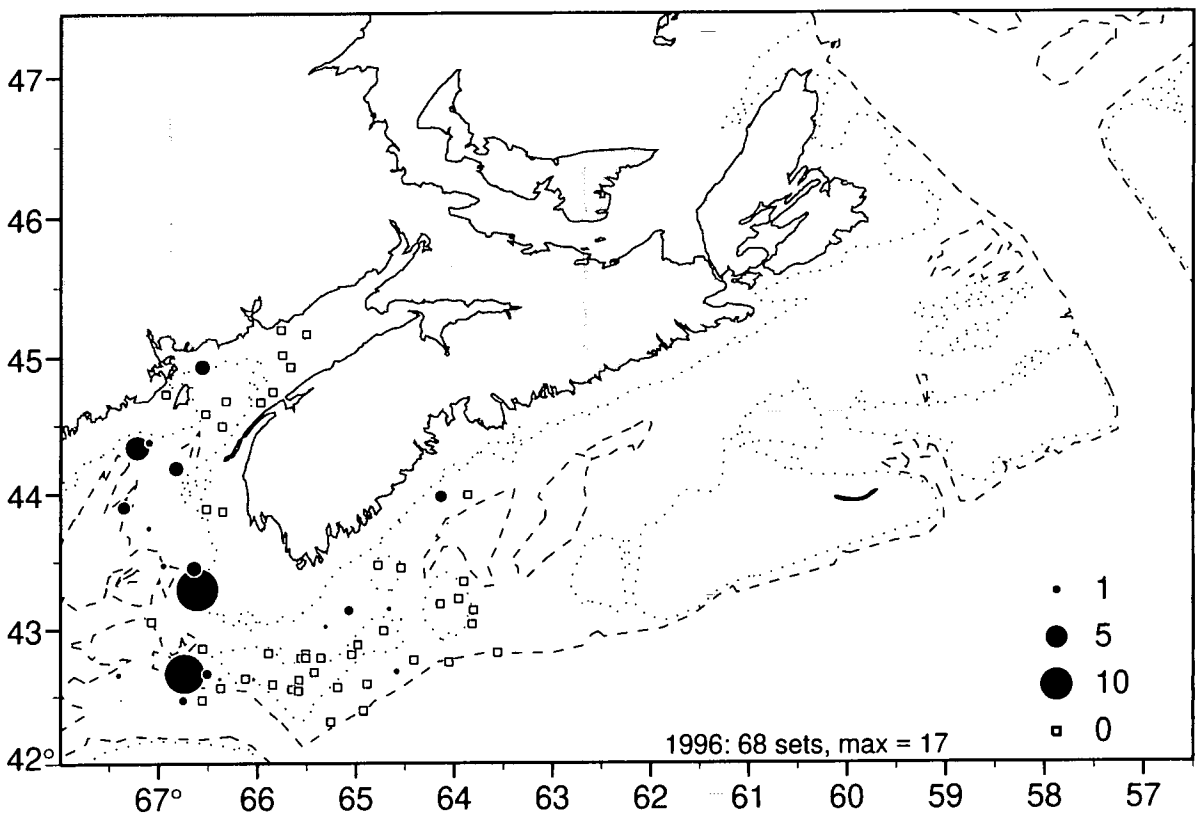


Fig. 60. 4X Witch Flounder Biomass (kg/tow) from the 1996 Summer Groundfish Survey.

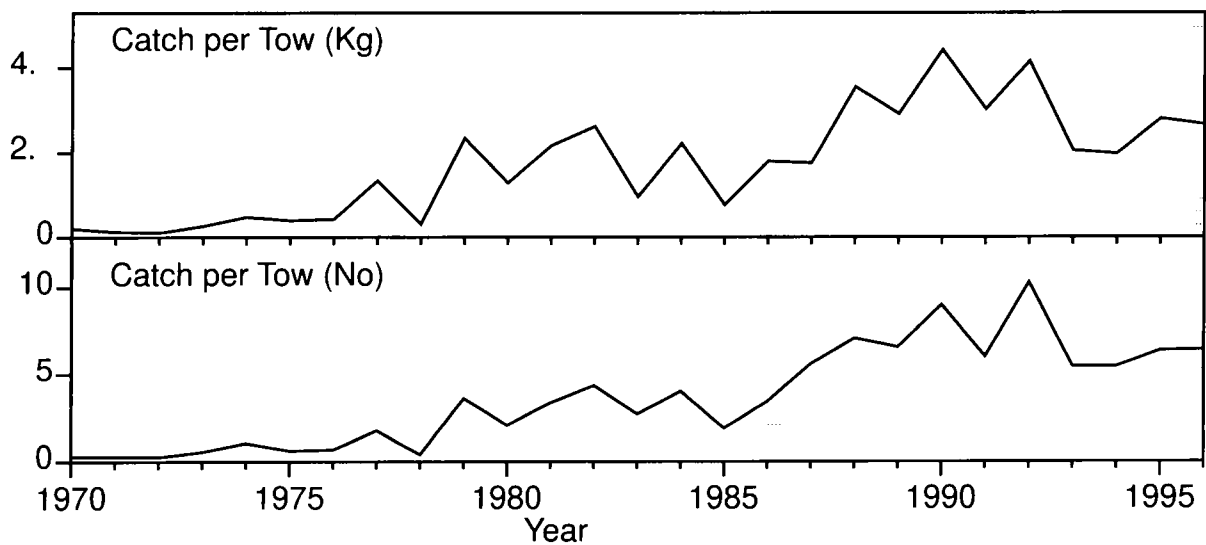


Fig. 61. 4X Winter Flounder stratified mean Weight and Number caught per tow from the Summer surveys.

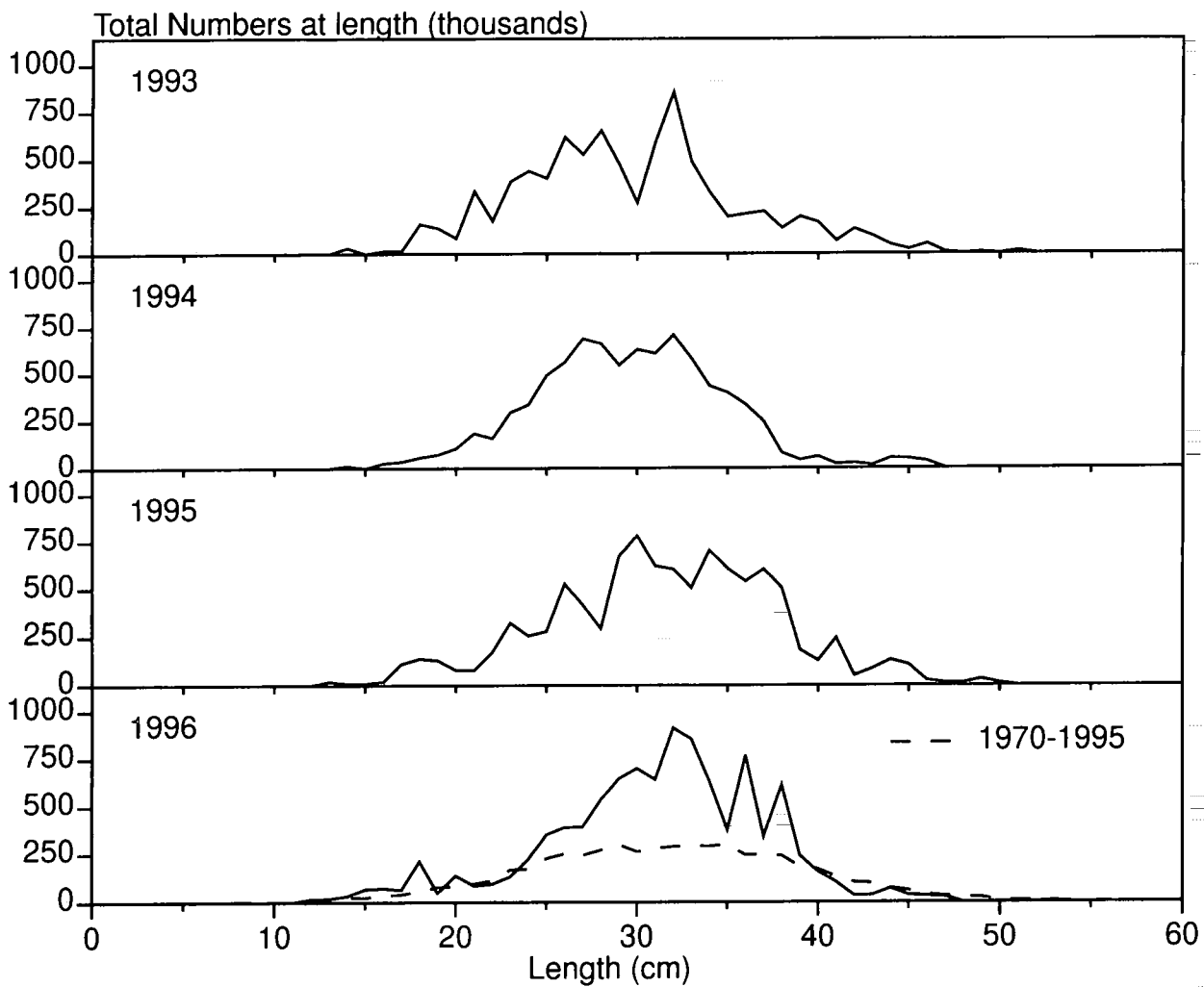


Fig. 62. 4X Winter Flounder length frequency distribution from the Summer surveys.

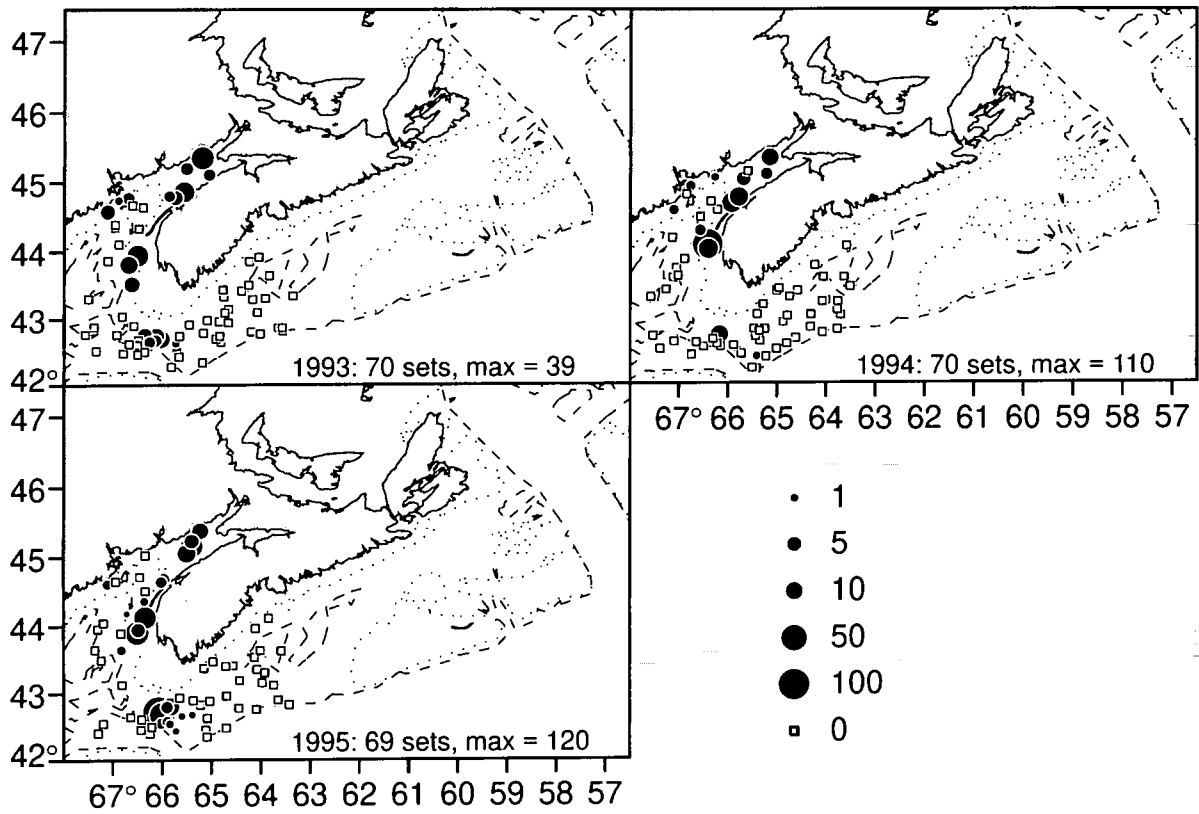


Fig. 63. 4X Winter Flounder Biomass (kg/tow) from the 1993-1995 Summer Groundfish Survey.

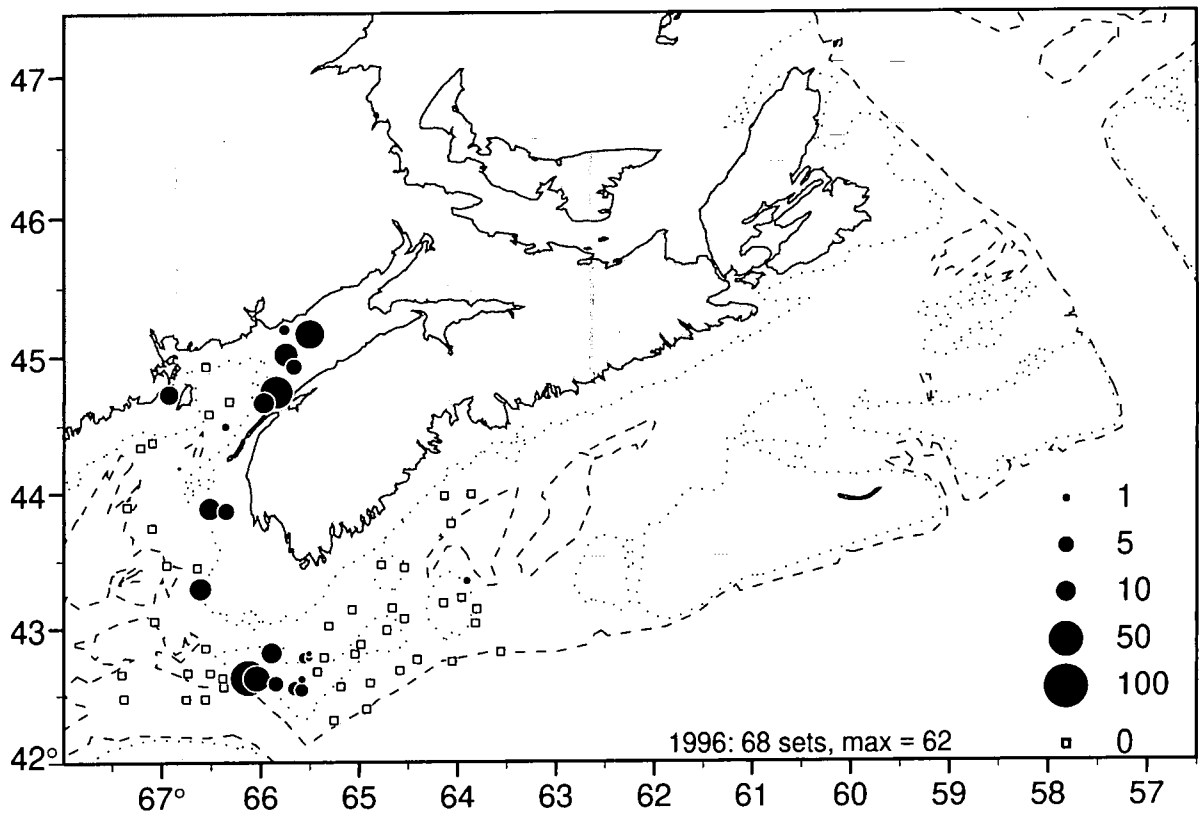


Fig. 64. 4X Winter Flounder Biomass (kg/tow) from the 1996 Summer Groundfish Survey.

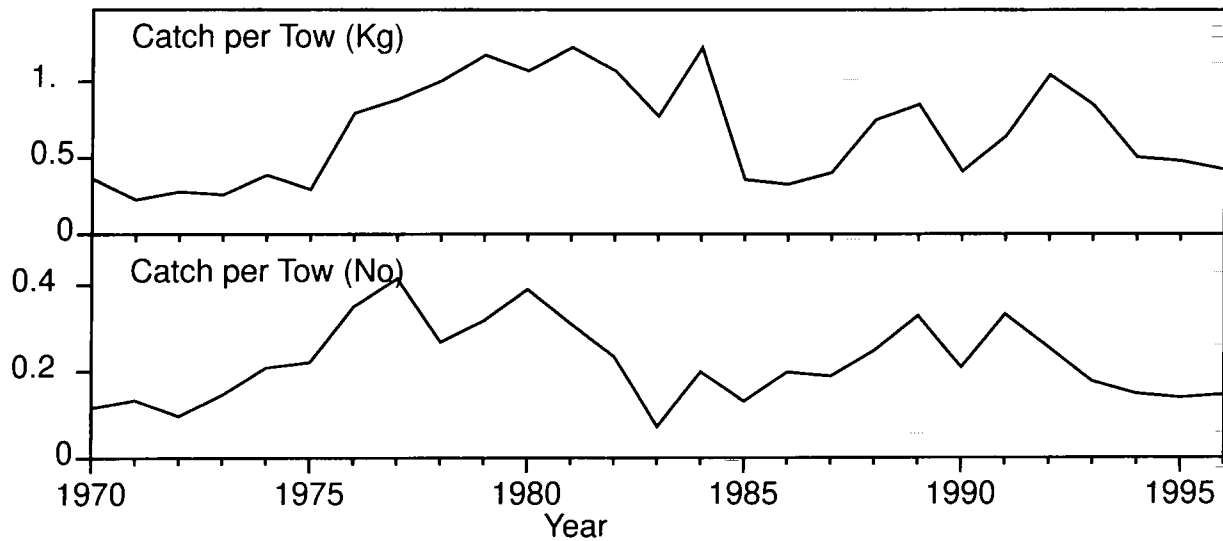


Fig. 65. 4VWX Halibut stratified mean Weight and Number caught per tow from the Summer surveys.

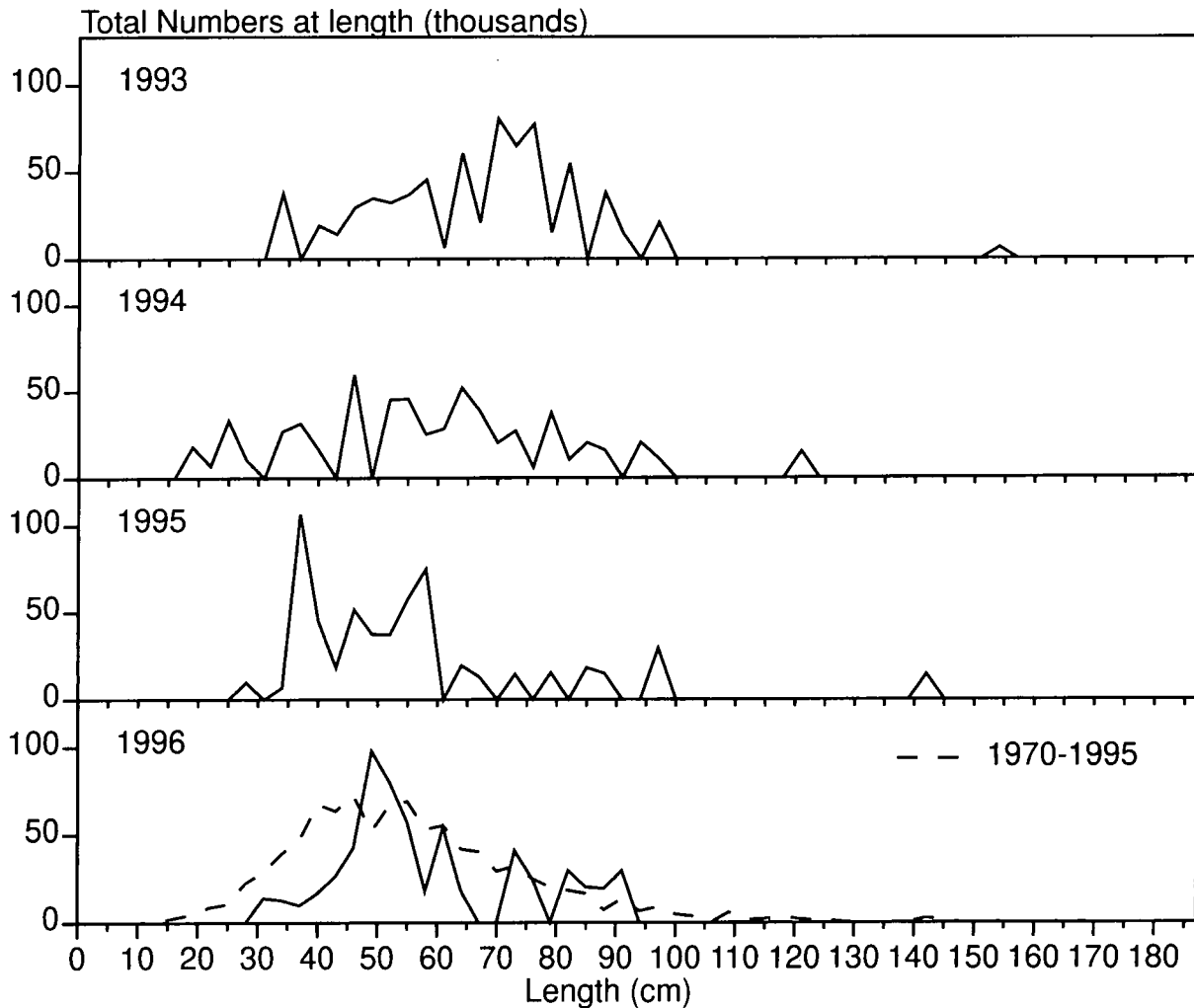


Fig. 66. 4VWX Halibut length frequency distribution from the Summer surveys.

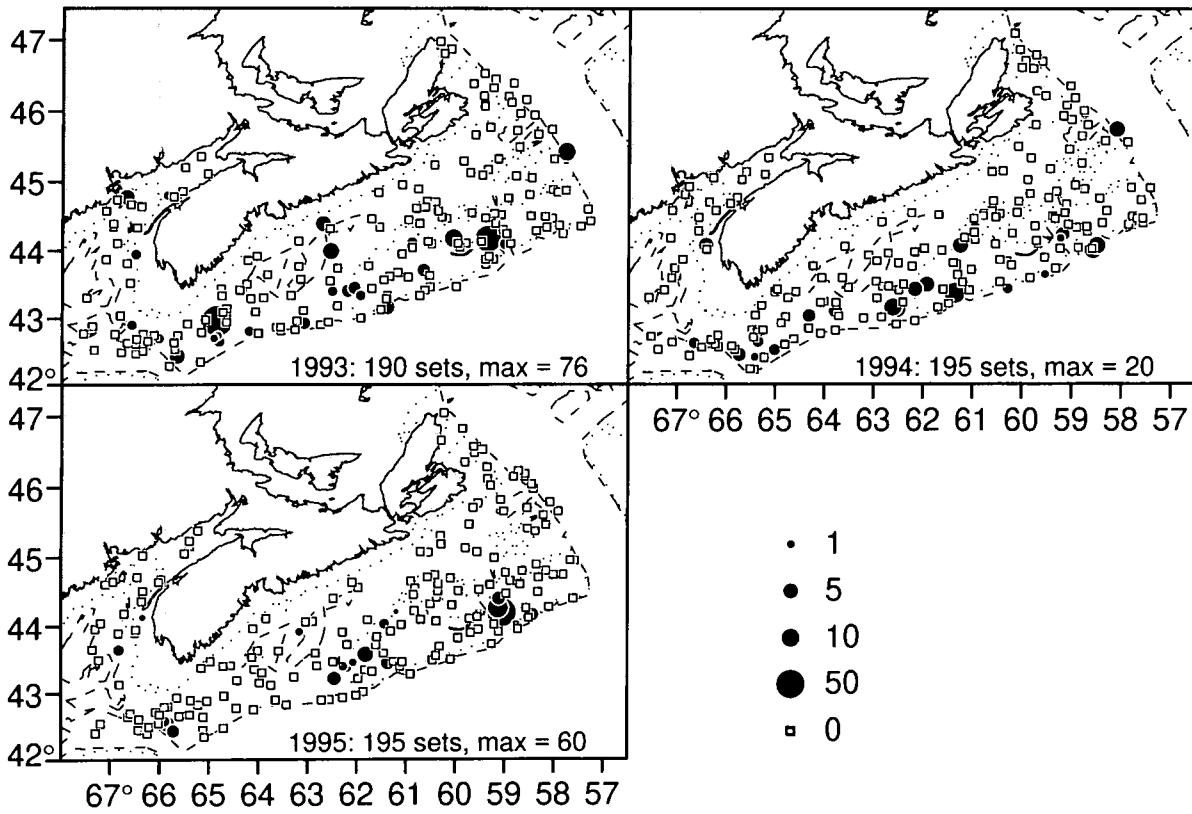


Fig. 67. 4VWX Halibut Biomass (kg/tow) from the 1993-1995 Summer Groundfish Survey.

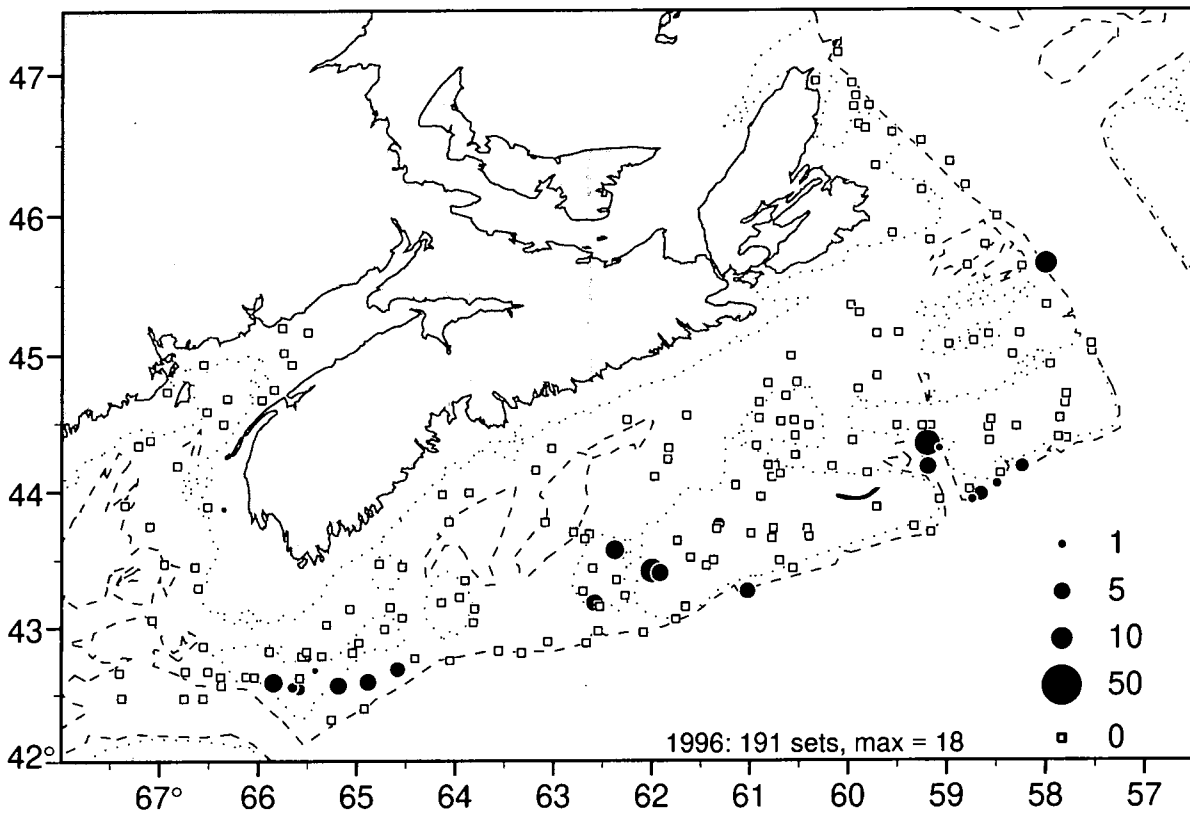


Fig. 68. 4VWX Halibut Biomass (kg/tow) from the 1996 Summer Groundfish Survey.

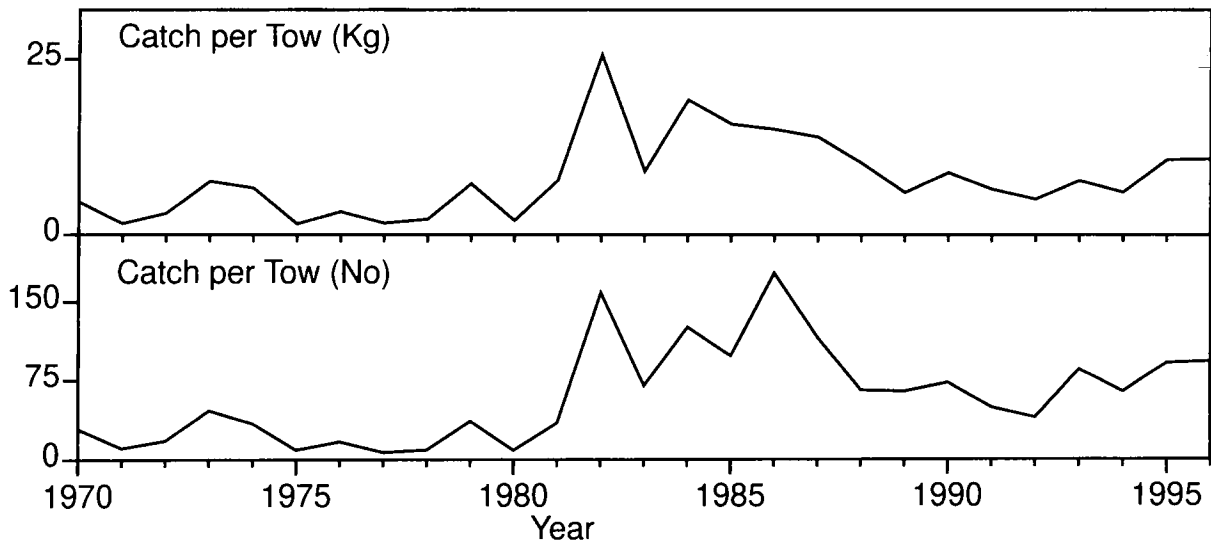


Fig. 69. 4VWX Silver Hake stratified mean Weight and Number caught per tow from the Summer surveys.

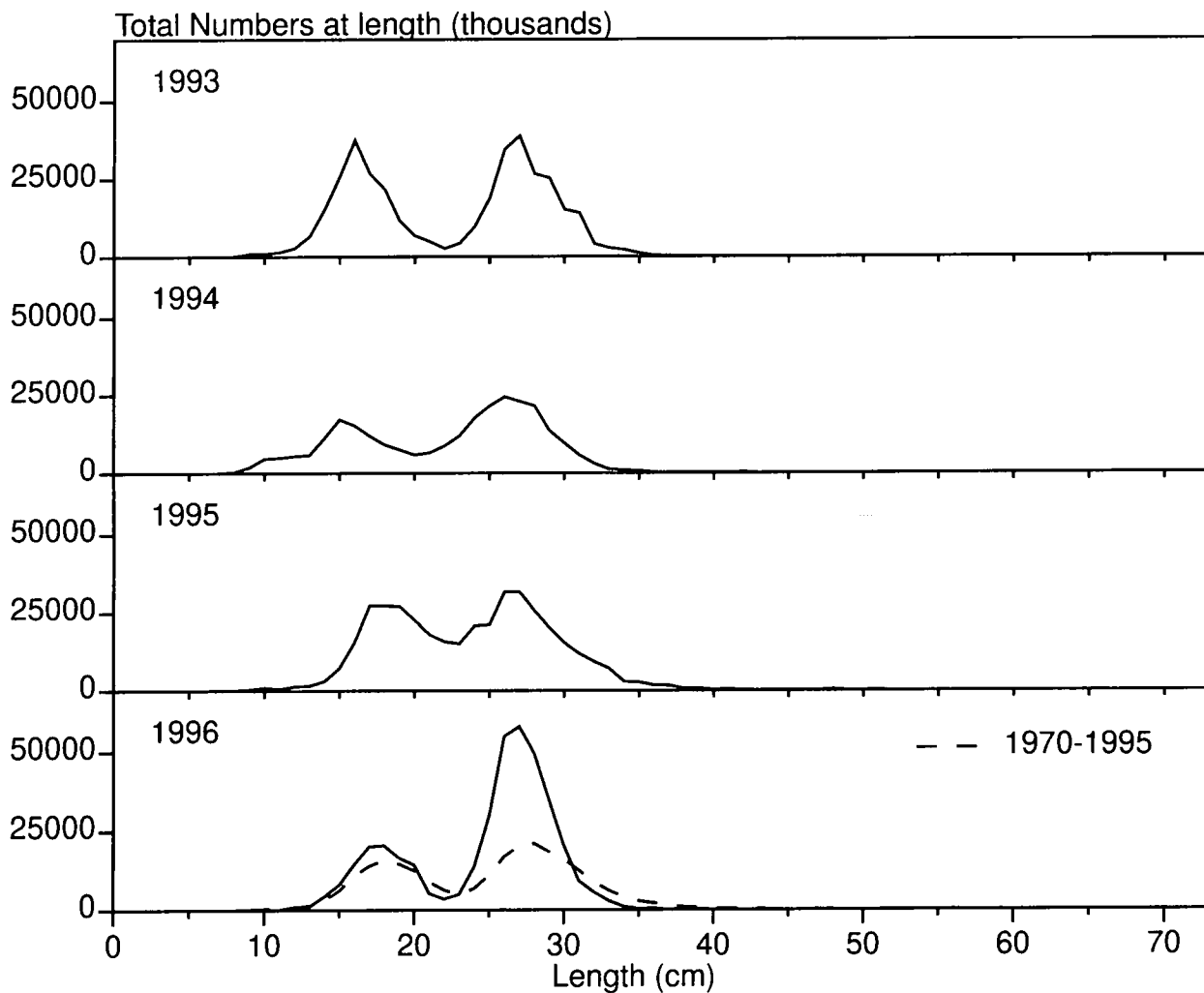


Fig. 70. 4VWX Silver Hake length frequency distribution from the Summer surveys.

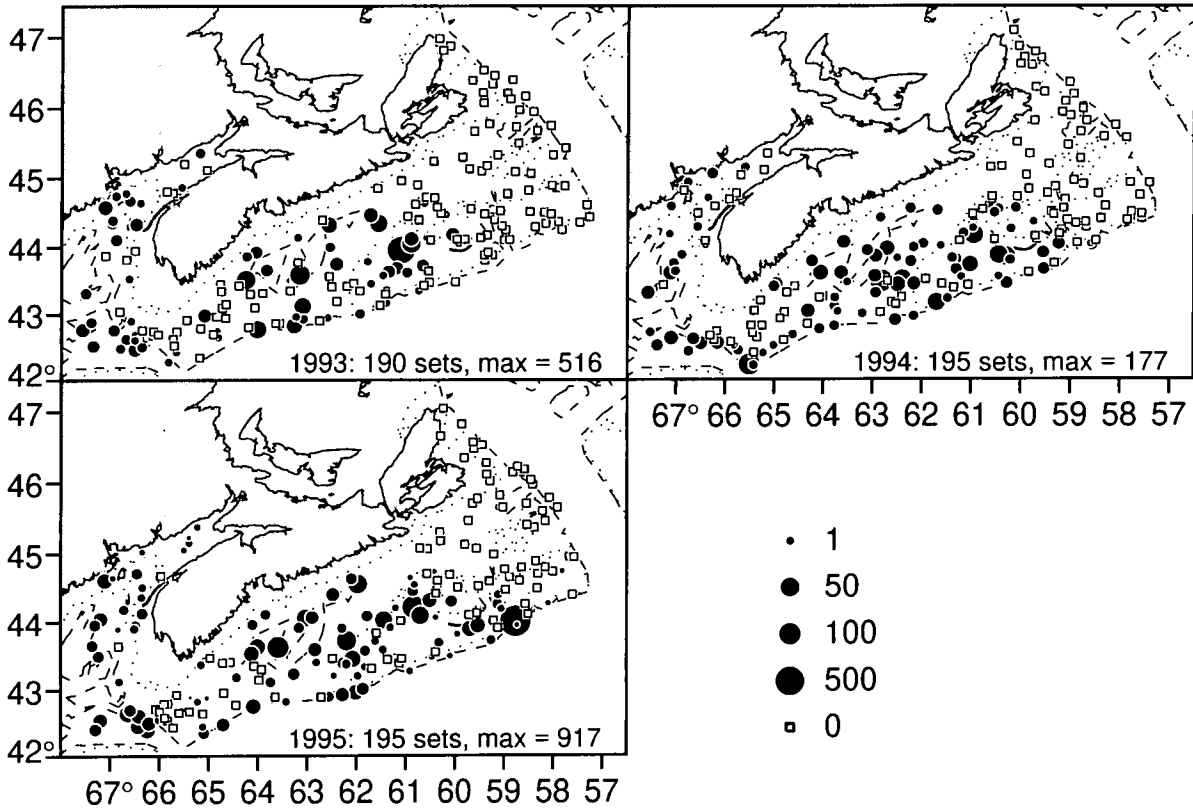


Fig. 71. 4VWX Silver Hake Biomass (kg/tow) from the 1993-1995 Summer Groundfish Survey.

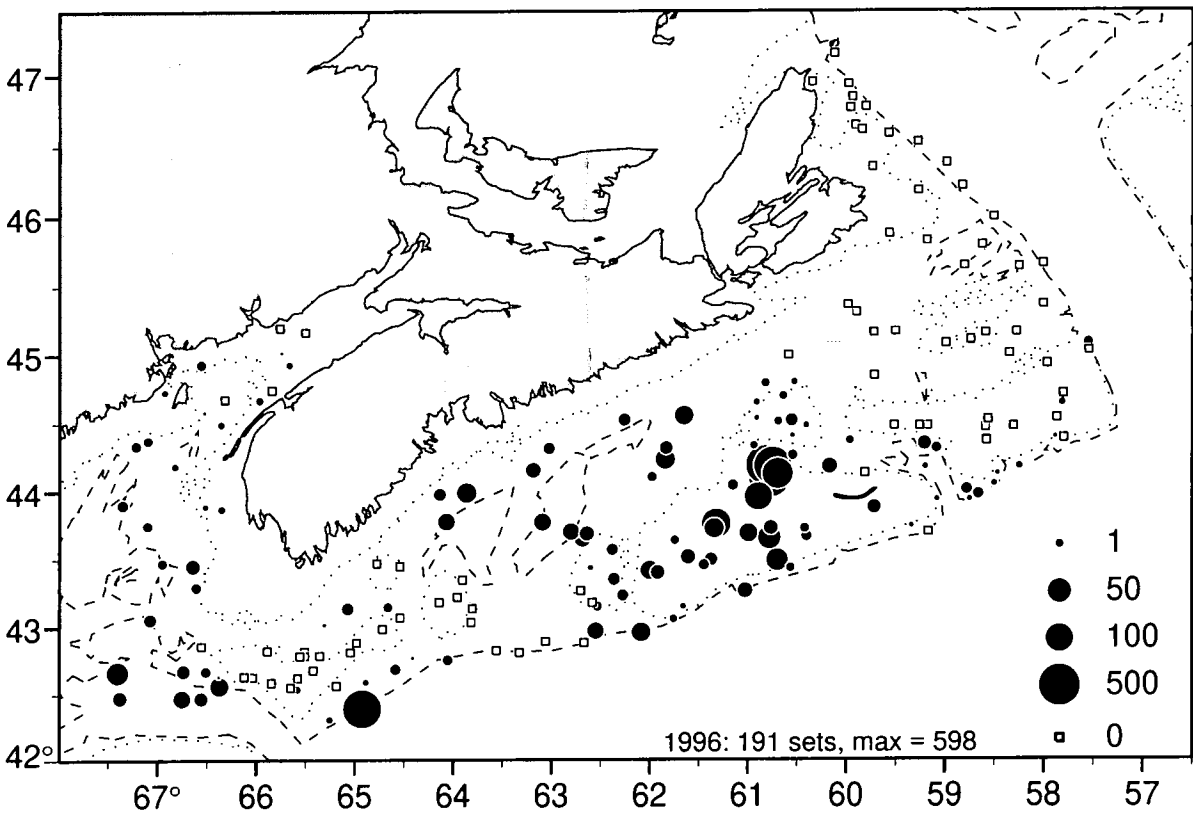


Fig. 72. 4VWX Silver Hake Biomass (kg/tow) from the 1996 Summer Groundfish Survey.



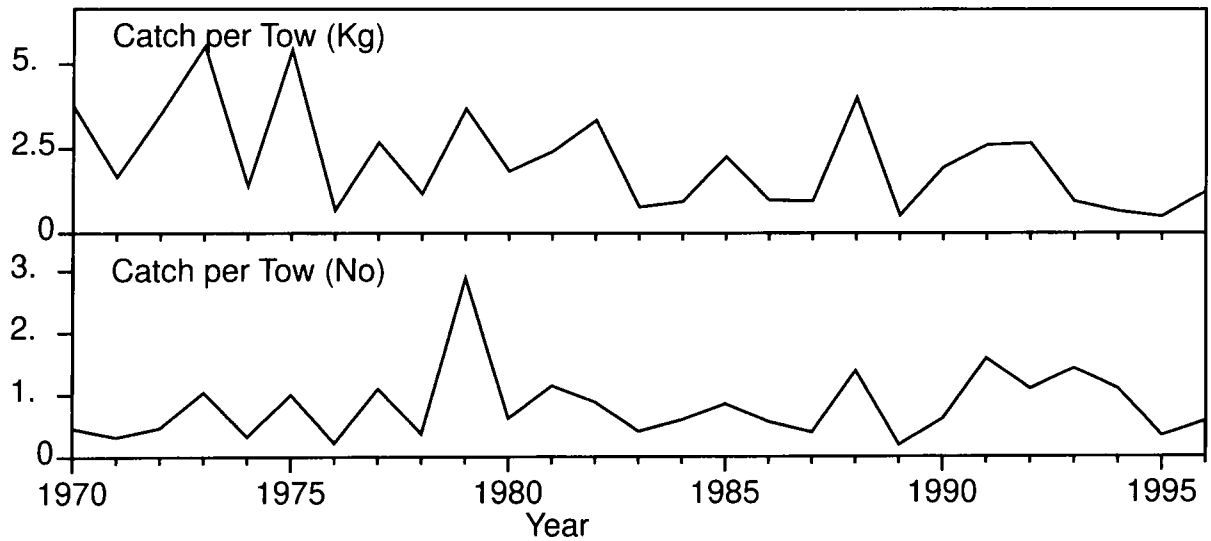


Fig. 73. 4VsW Winter Skate stratified mean Weight and Number caught per tow from the Summer surveys.

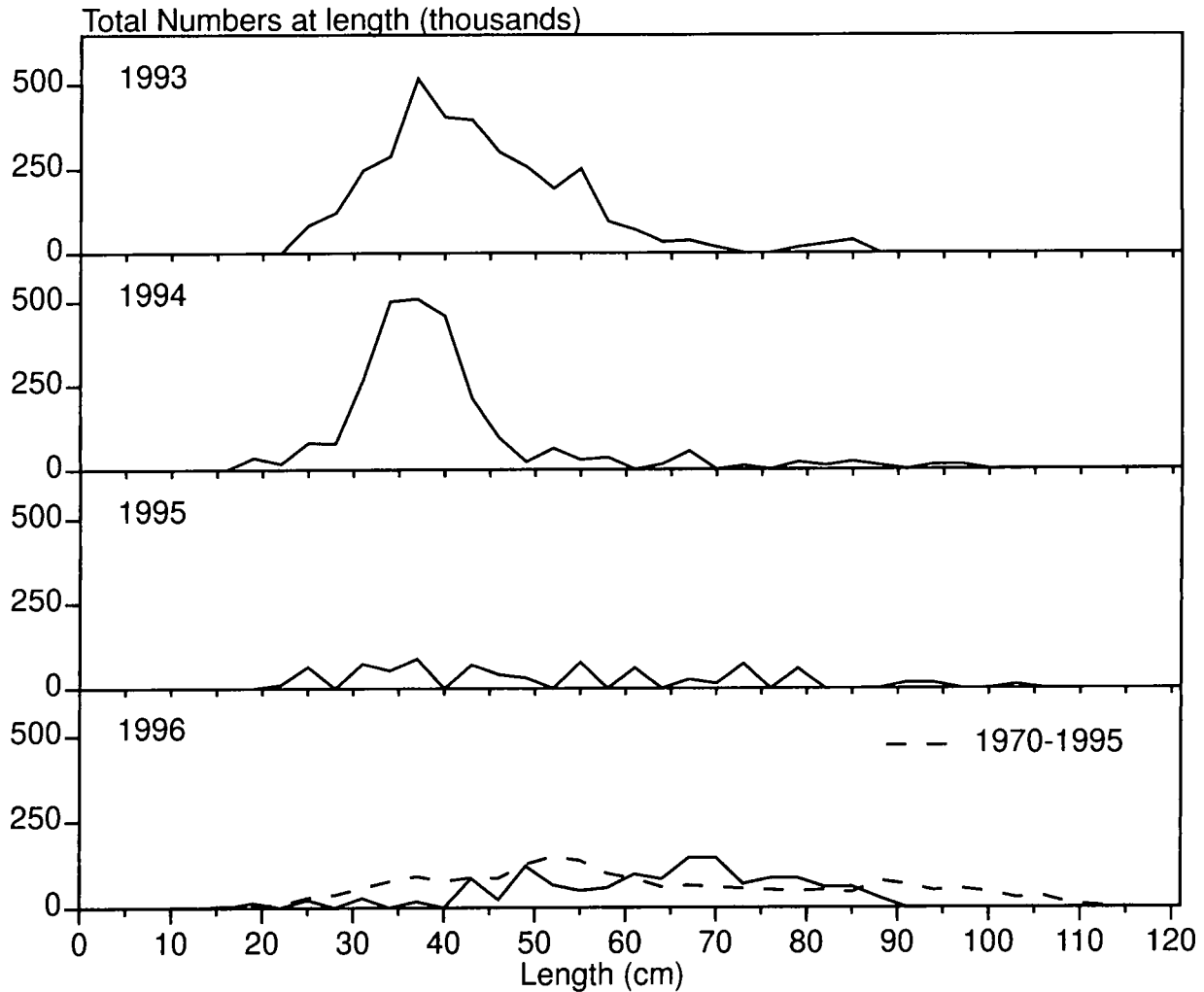


Fig. 74. 4VsW Winter Skate length frequency distribution from the Summer surveys.

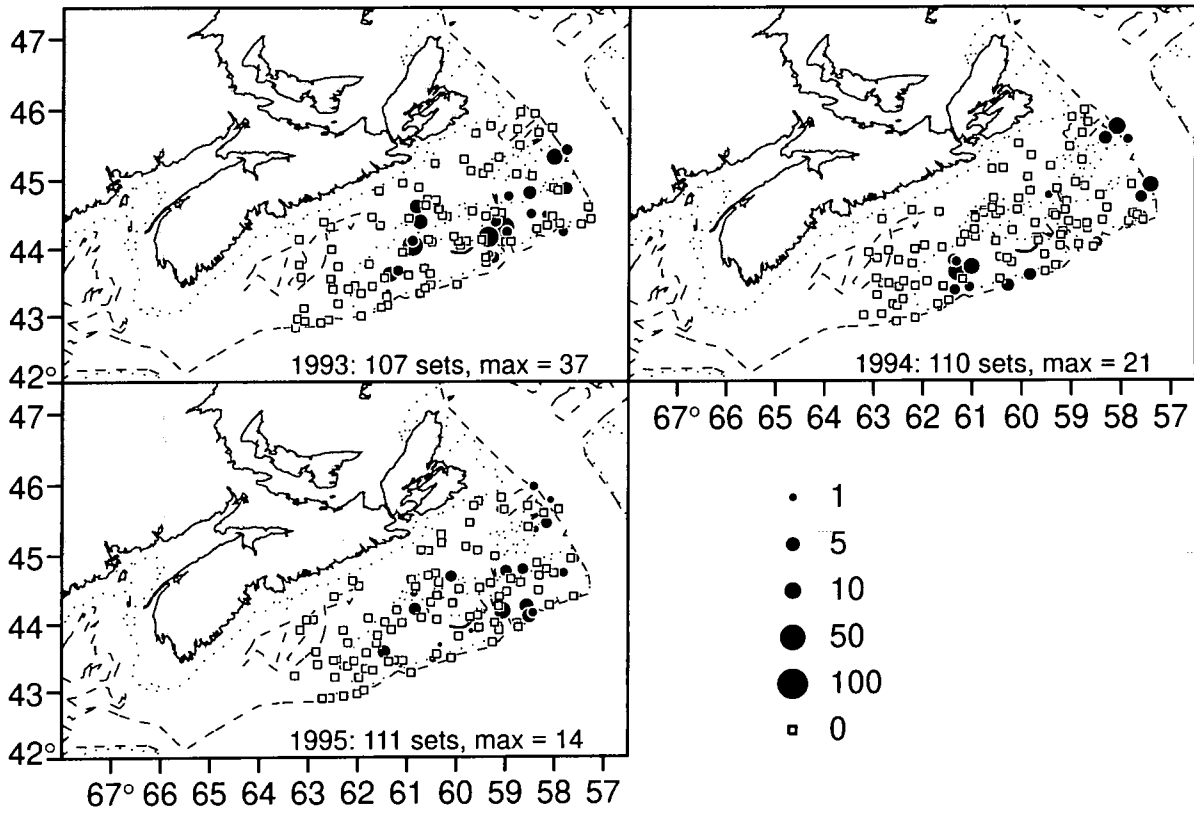


Fig. 75. 4VsW Winter Skate Biomass (kg/tow) from the 1993-1995 Summer Groundfish Survey.

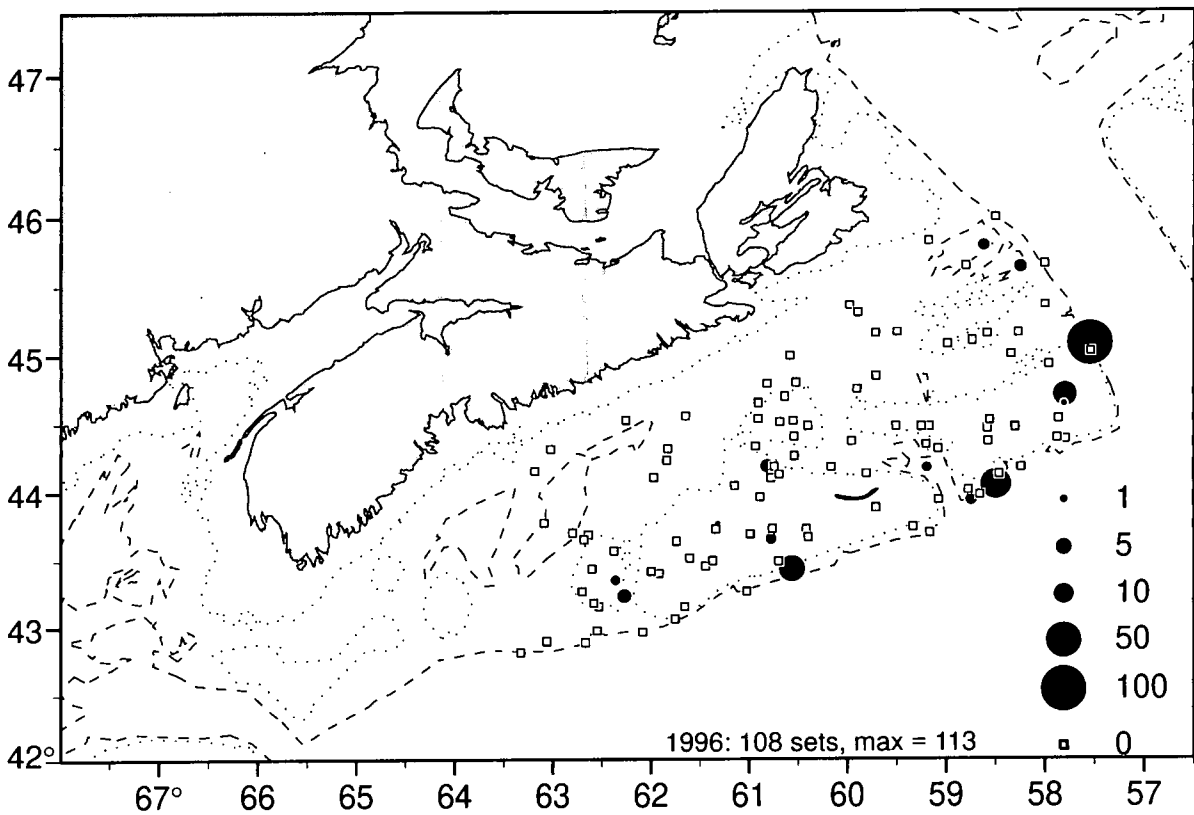


Fig. 76. 4VsW Winter Skate Biomass (kg/tow) from the 1996 Summer Groundfish Survey.

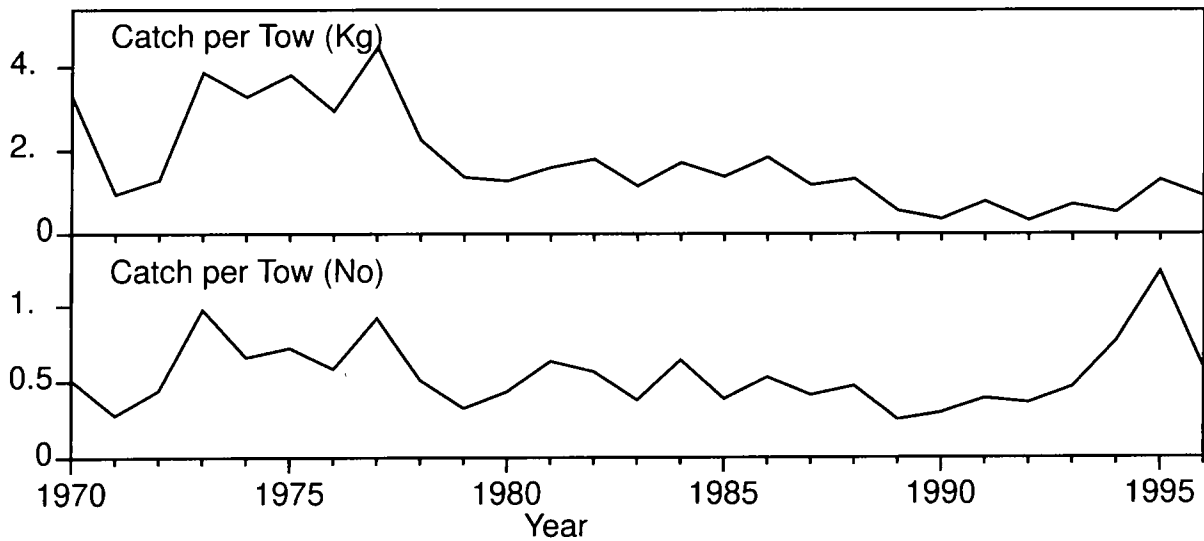


Fig. 77. 4VWX Monkfish stratified mean Weight and Number caught per tow from the Summer surveys.

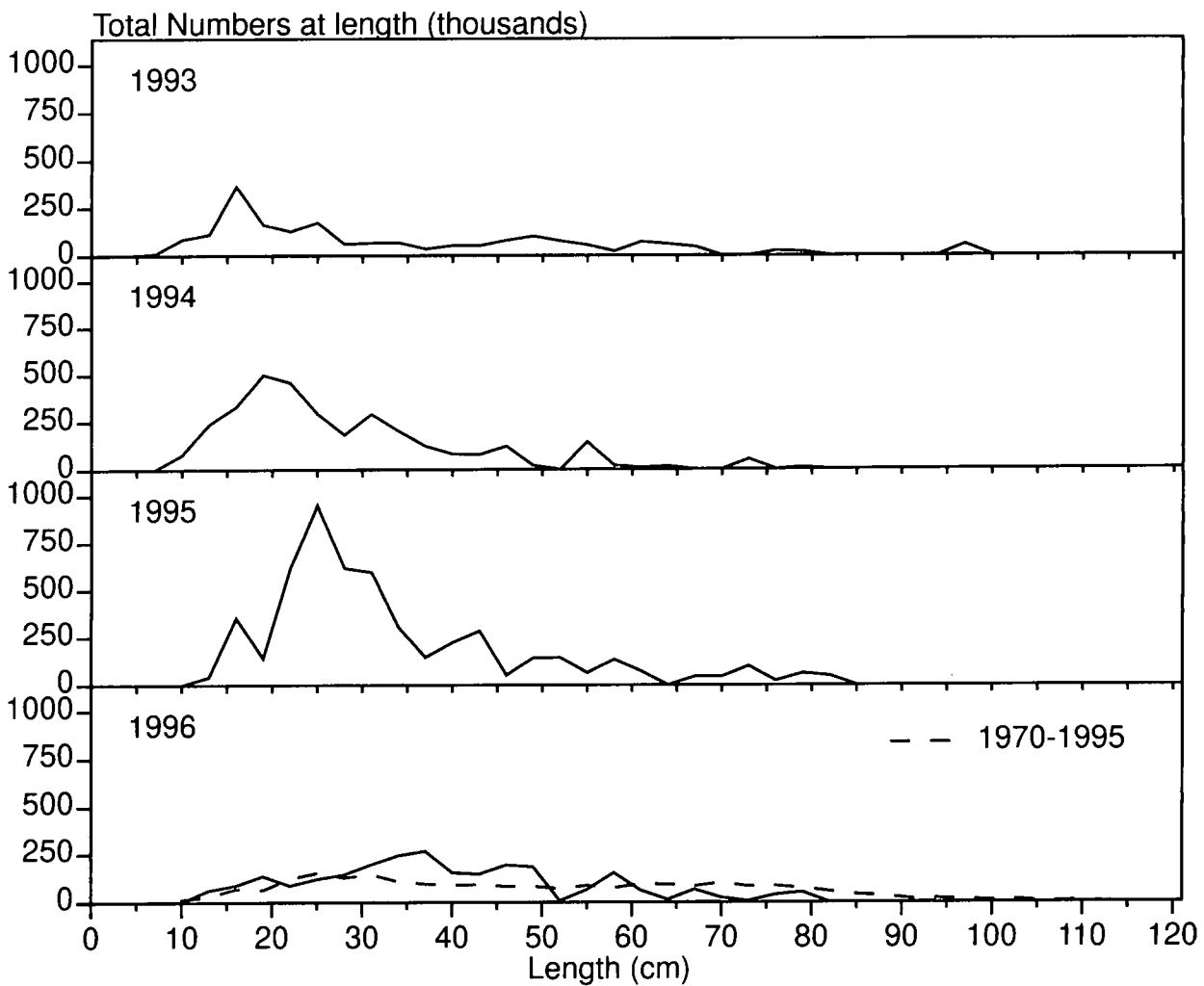


Fig. 78. 4VWX Monkfish length frequency distribution from the Summer surveys.

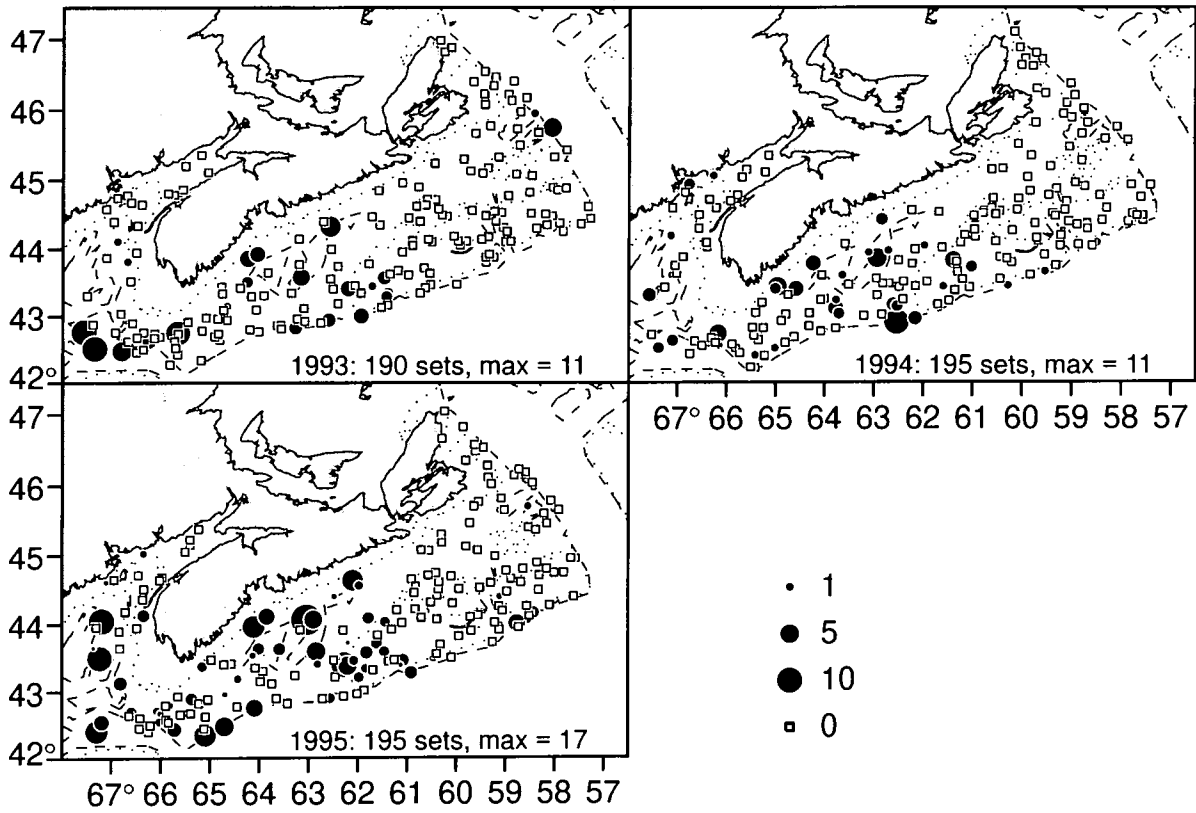


Fig. 79. 4VWX Monkfish Biomass (kg/tow) from the 1993-1995 Summer Groundfish Survey.

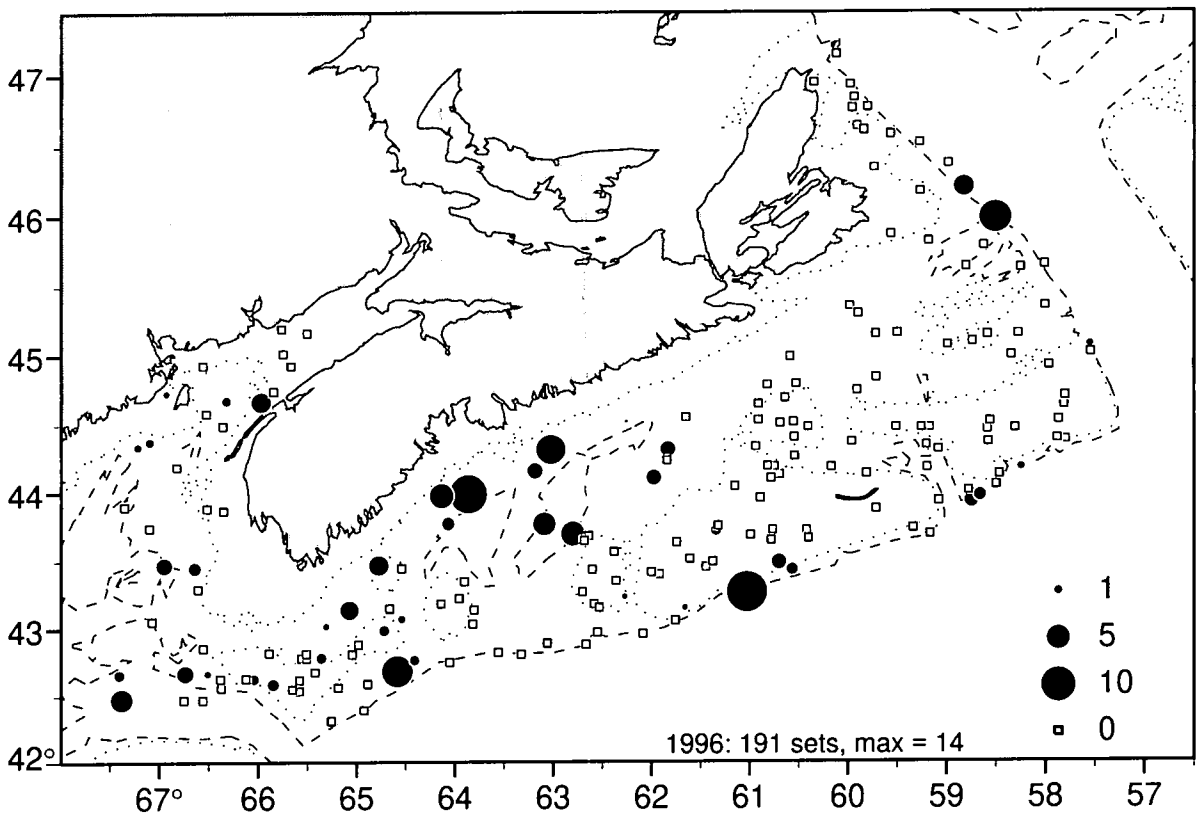


Fig. 80. 4VWX Monkfish Biomass (kg/tow) from the 1996 Summer Groundfish Survey.

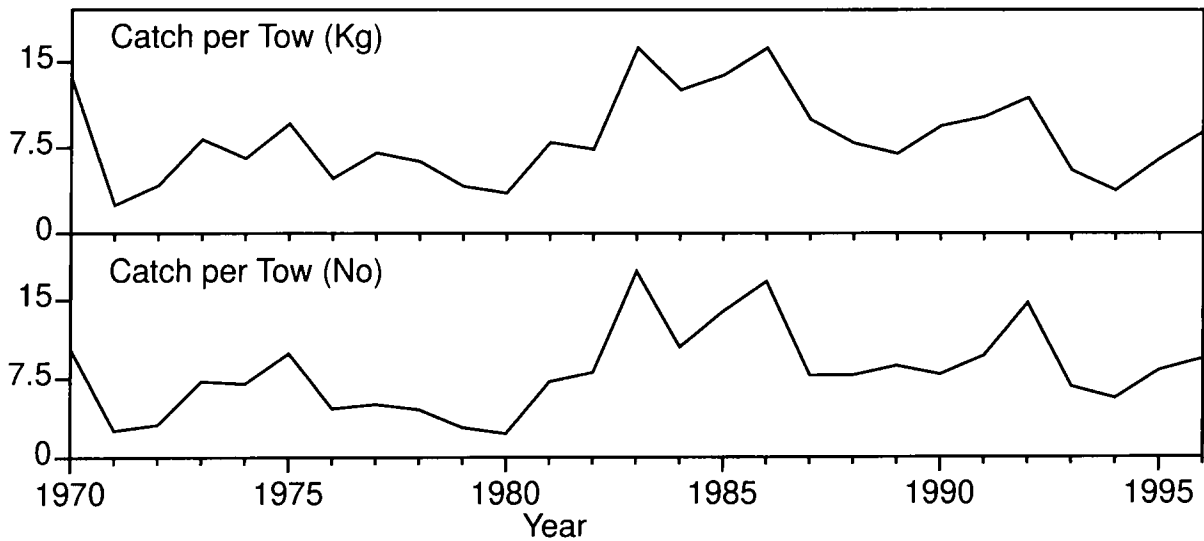


Fig. 81. 4VWX White Hake stratified mean Weight and Number caught per tow from the Summer surveys.

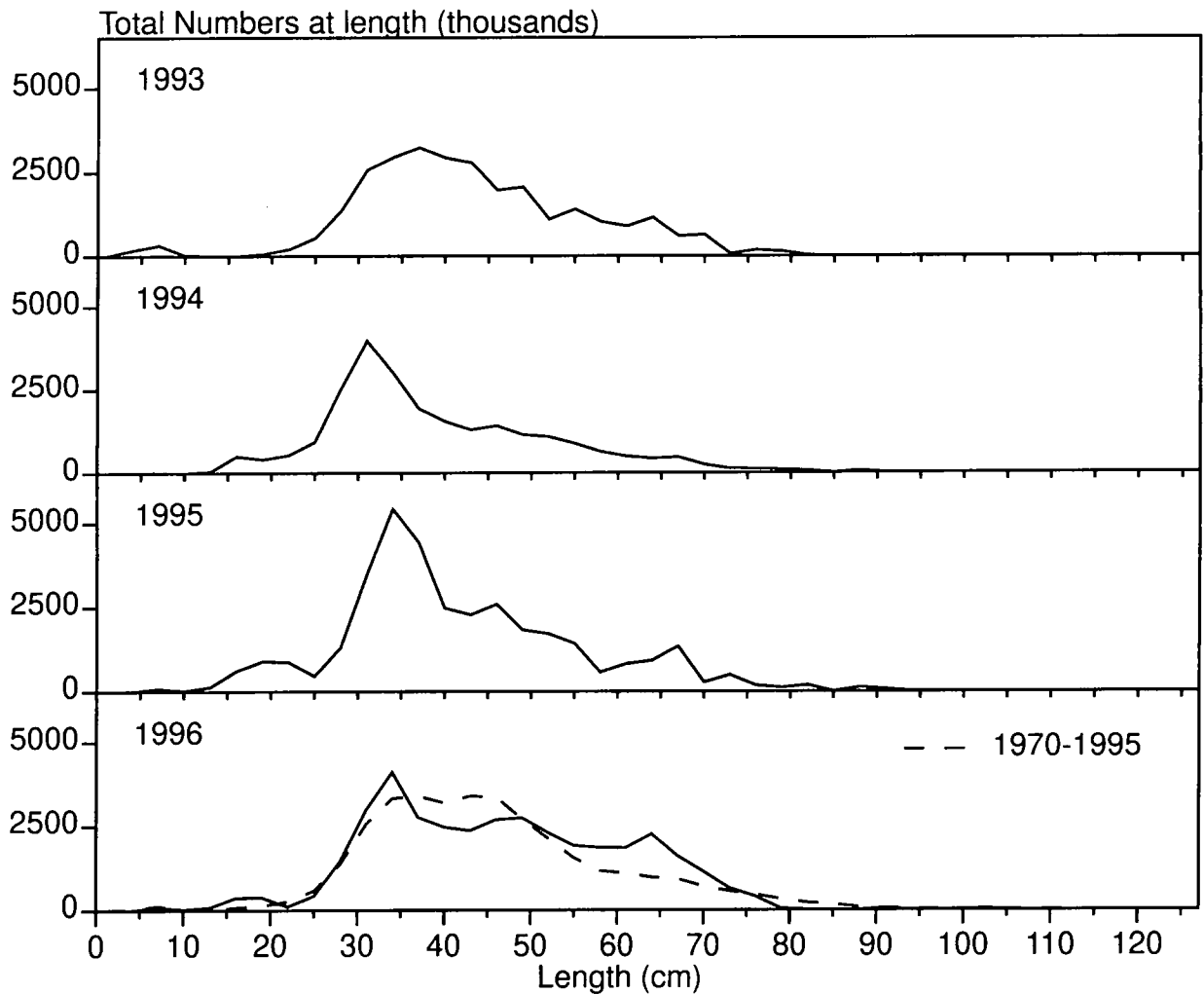


Fig. 82. 4VWX White Hake length frequency distribution from the Summer surveys.

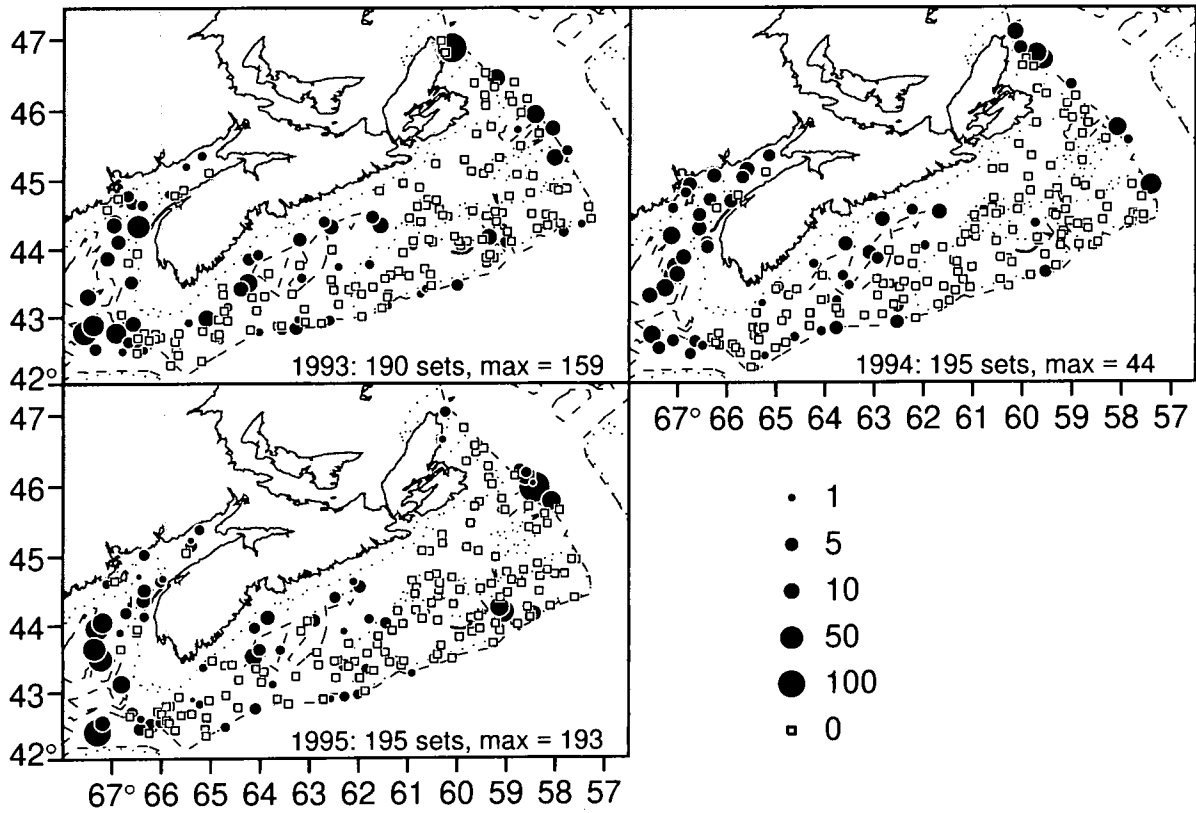


Fig. 83. 4VWX White Hake Biomass (kg/tow) from the 1993-1995 Summer Groundfish Survey.

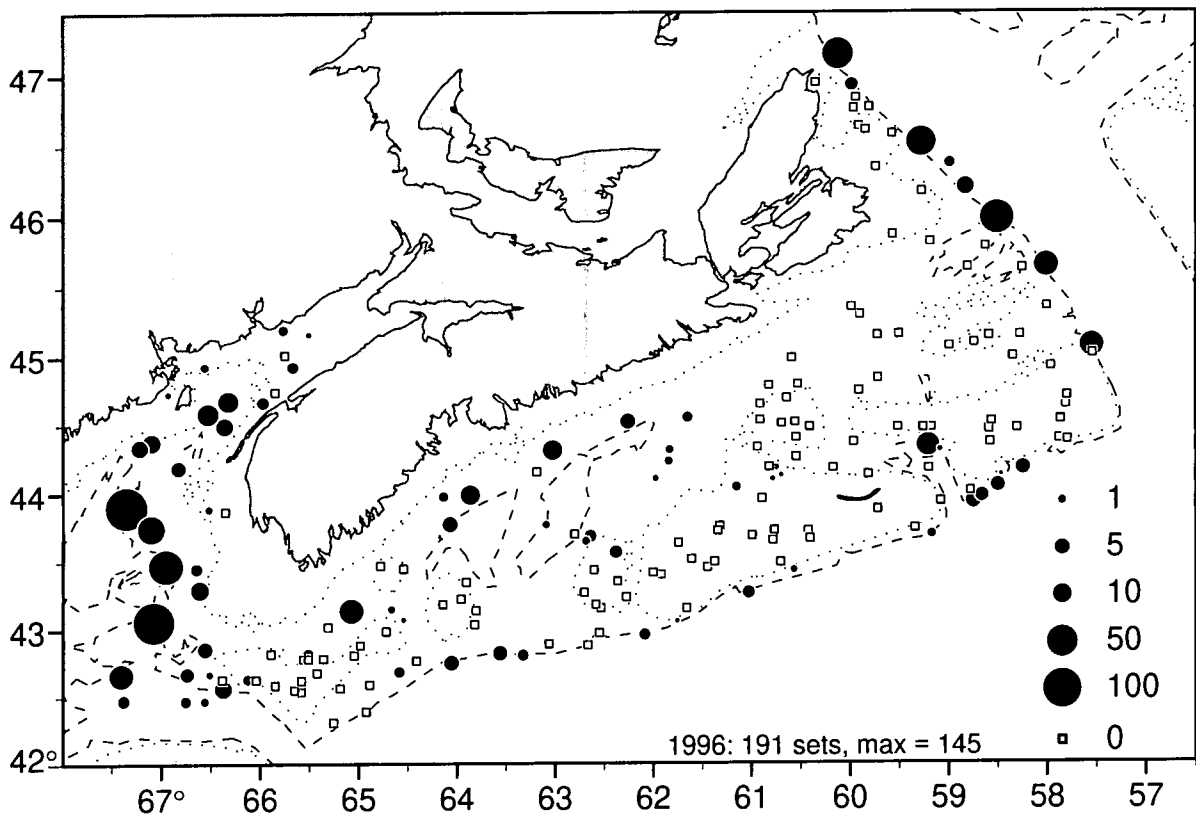


Fig. 84. 4VWX White Hake Biomass (kg/tow) from the 1996 Summer Groundfish Survey.

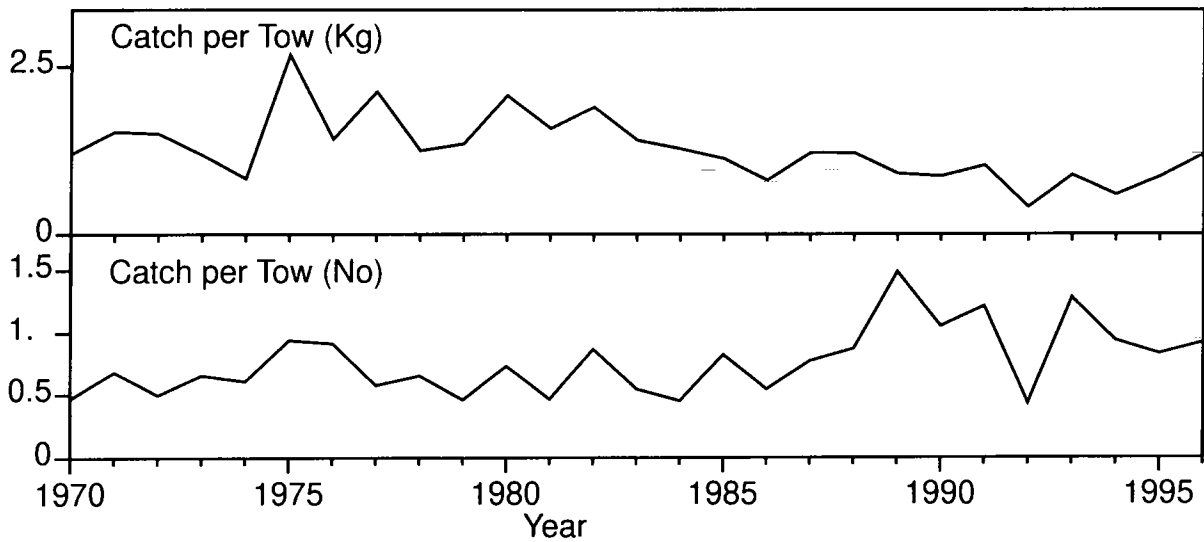


Fig. 85. 4VWX Wolffish stratified mean Weight and Number caught per tow from the Summer surveys.

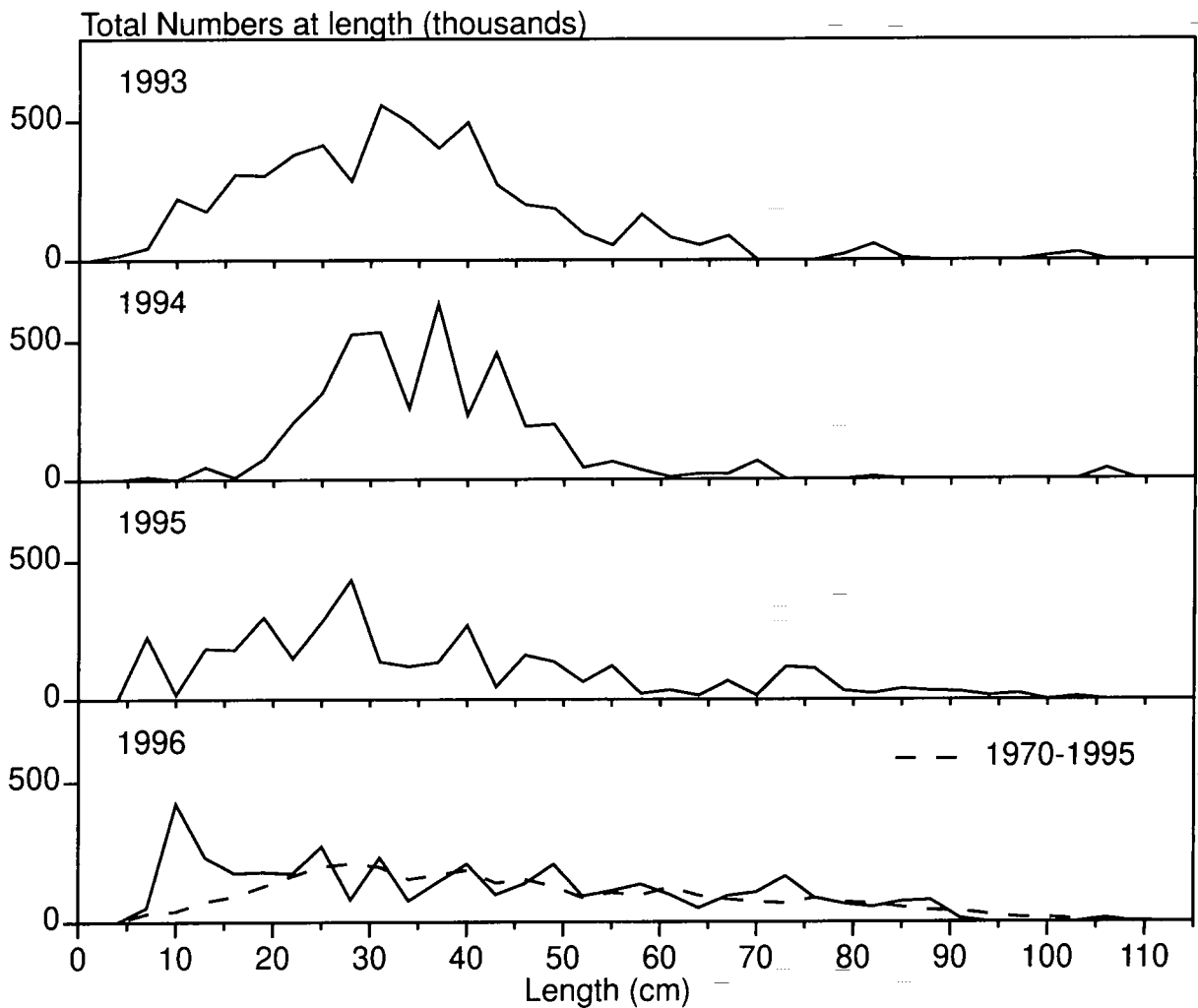


Fig. 86. 4VWX Wolffish length frequency distribution from the Summer surveys.

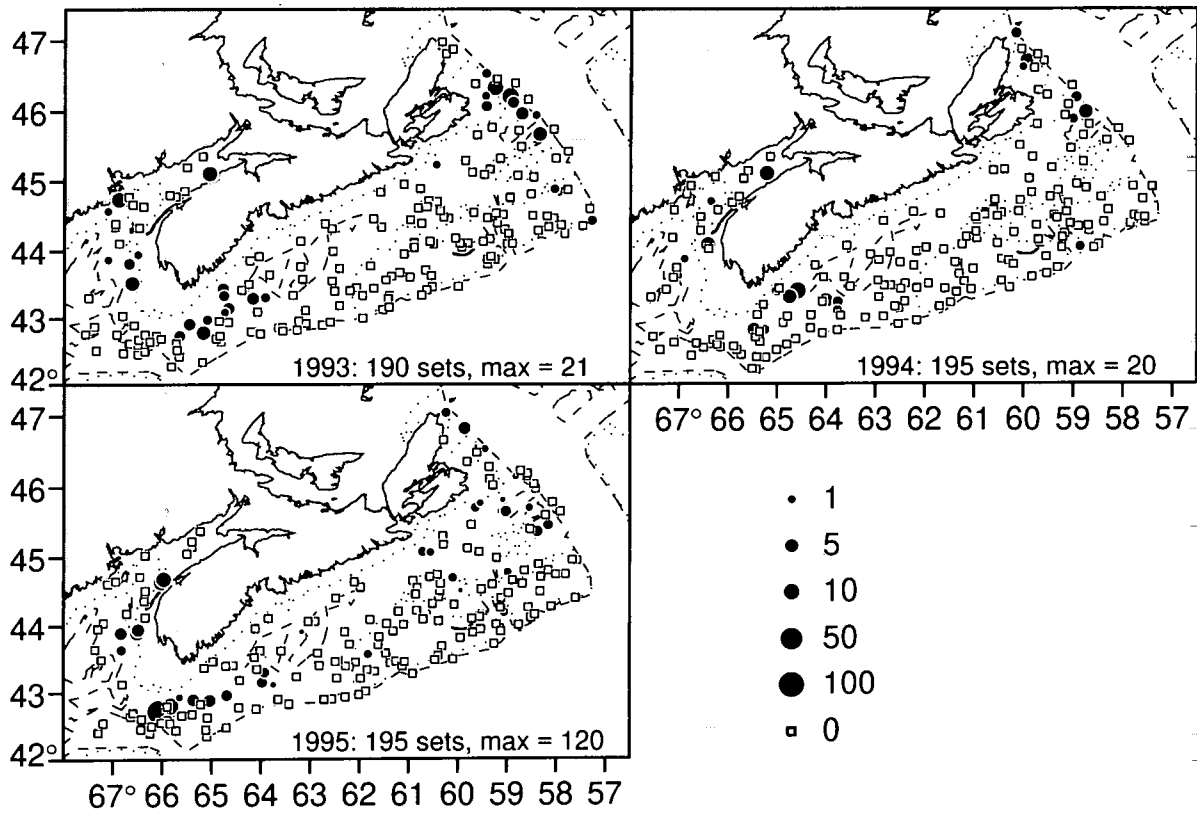


Fig. 87. 4VWX Wolffish Biomass (kg/tow) from the 1993-1995 Summer Groundfish Survey.

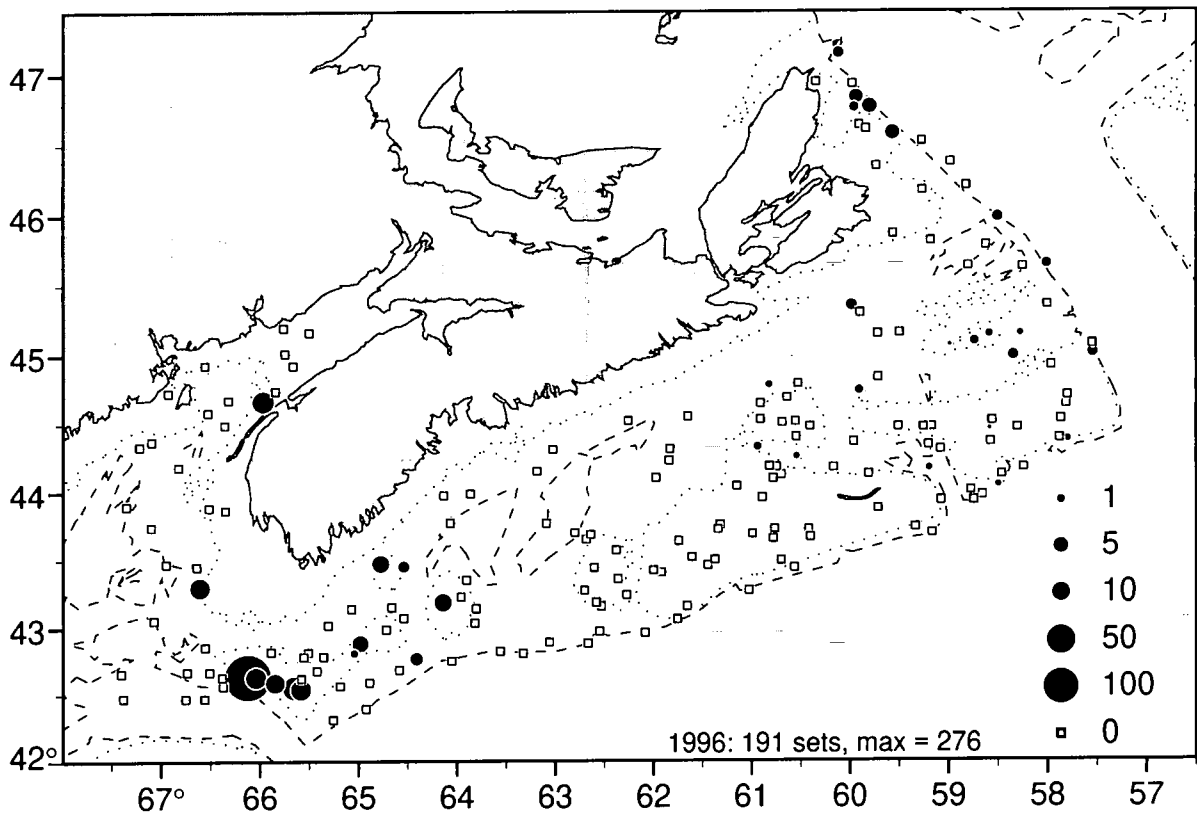


Fig. 88. 4VWX Wolffish Biomass (kg/tow) from the 1996 Summer Groundfish Survey.



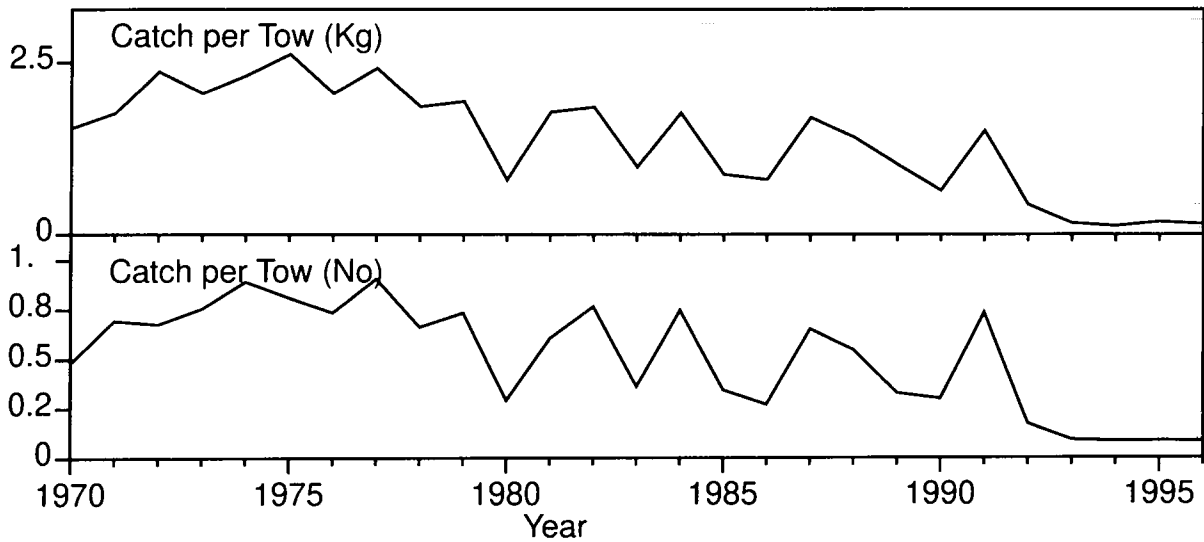


Fig. 89. 4VWX Cusk stratified mean Weight and Number caught per tow from the Summer surveys.

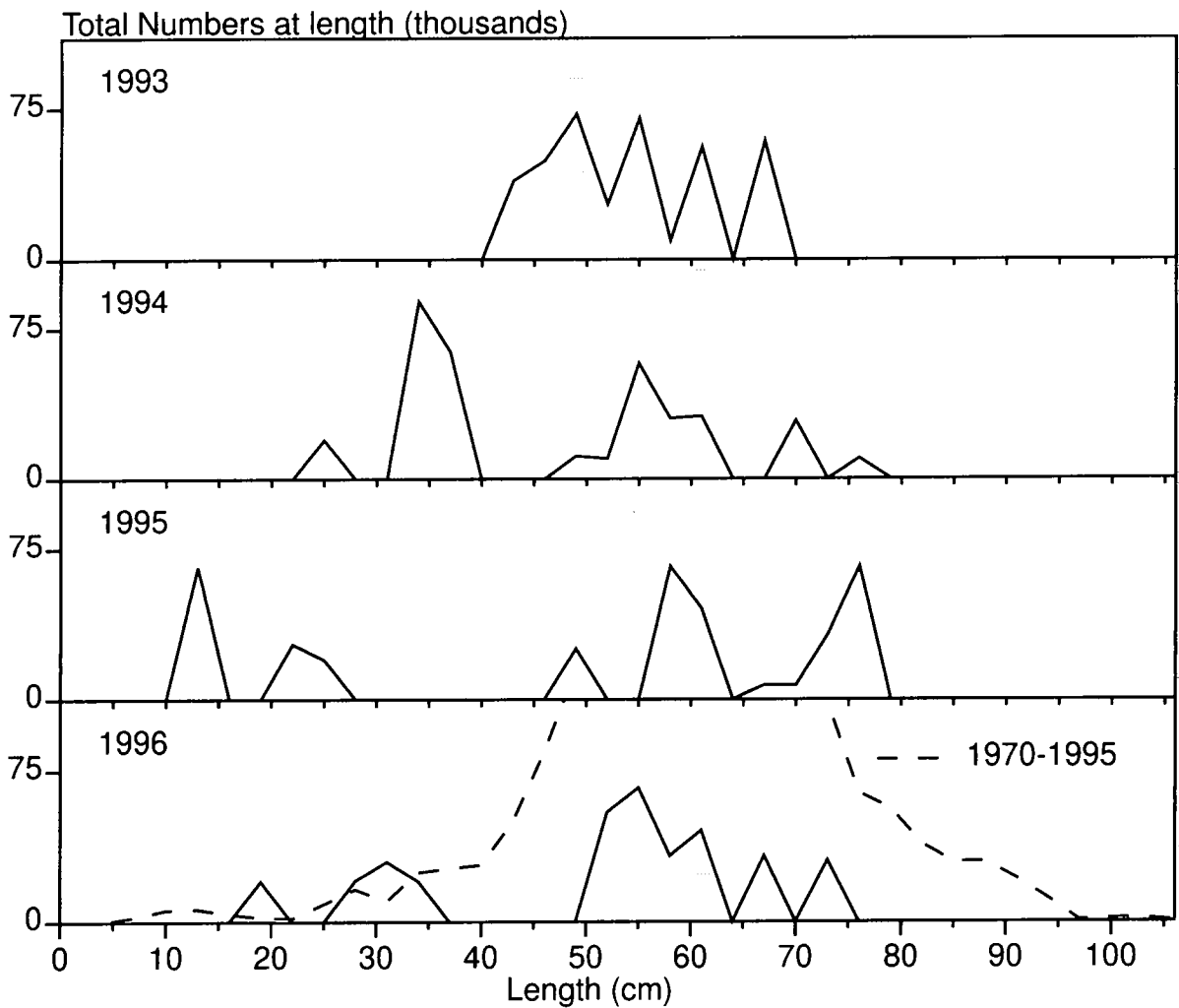


Fig. 90. 4VWX Cusk length frequency distribution from the Summer surveys.

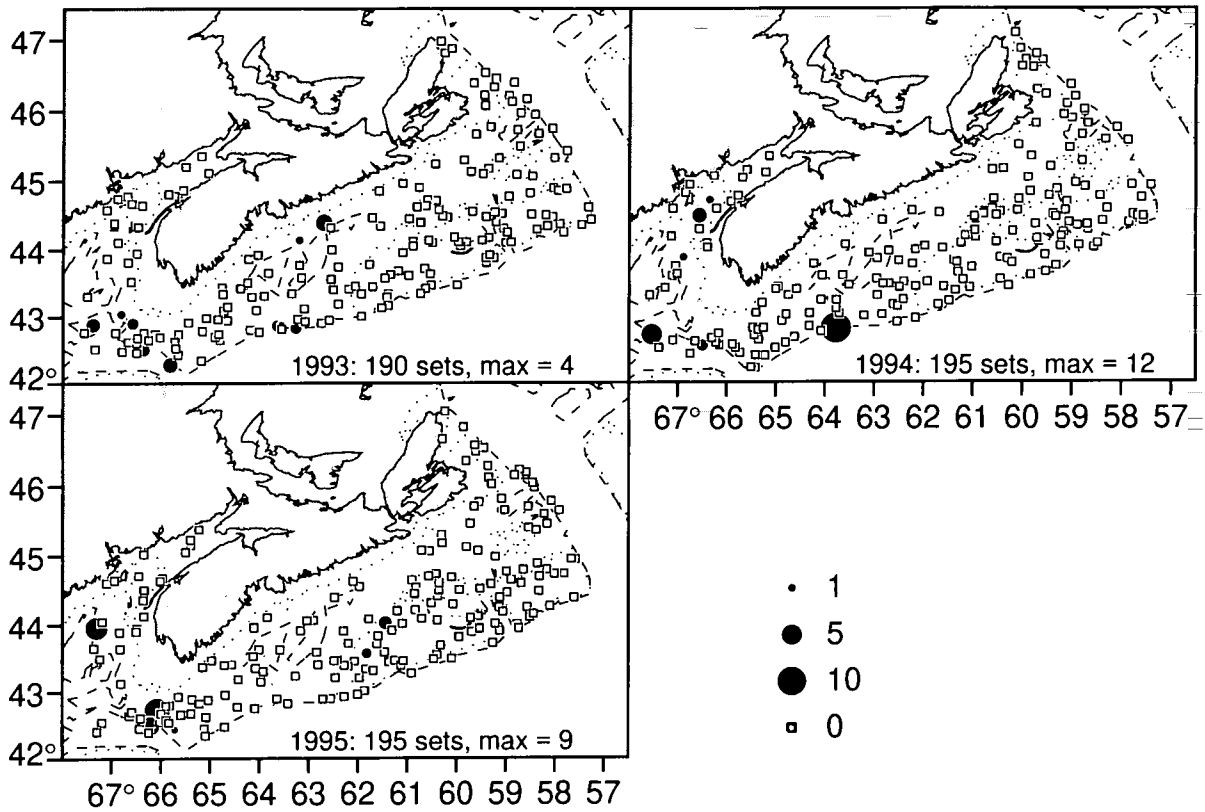


Fig. 91. 4VWX Cusk Biomass (kg/tow) from the 1993-1995 Summer Groundfish Survey.

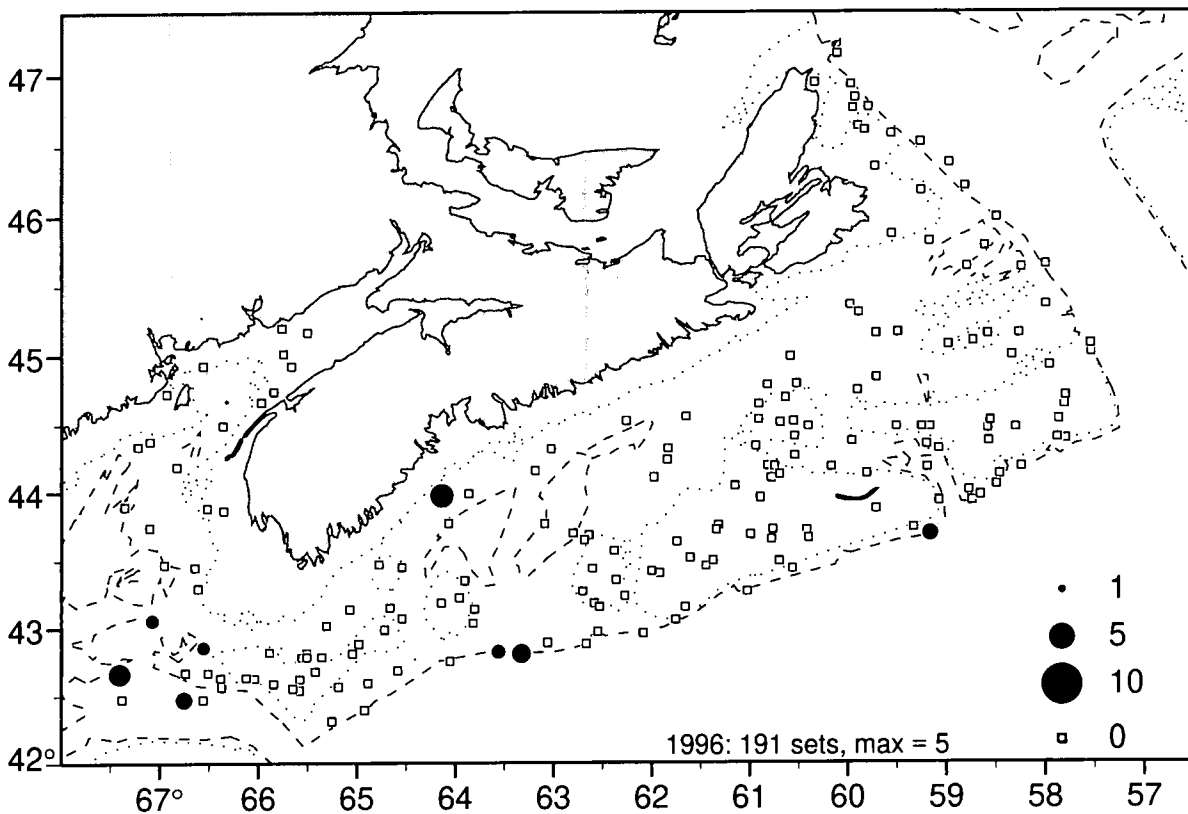


Fig. 92. 4VWX Cusk Biomass (kg/tow) from the 1996 Summer Groundfish Survey.