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Update of the Scotian Shelf Shrimp - 1989

by

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ABSTRACT

The Scotian Shelf shrimp fishery covers three areas with depths greater than 200 m, referred to as Canso, Louisbourg and Misaine Holes. These areas have traditionally been fished by Gulf-based vessels. In 1989 only 2 New Brunswick vessels fished the Eastern Scotian Shelf (96 % of the total catch) while 1 Nova Scotia vessel under 19.8 m fished the Western Scotian Shelf. Catches were reported from May to July. Over the last 5 years catches have been very low and 1989 was the lowest.

Effort was up from last year. There was a 12 % decrease in the standardised catch-rate. In the fishery, the dominant by-catch of cod and redfish have usually been substantially above the 10% limit. In 1989 other by-catch species were somewhat less frequent and lower than in other years.

For the last two years, a biologically-derived TAC had been suggested at 2,580 t. Since the CPUEs for the last 3 years are quite similar and the quota was not reached, it seems reasonable to assume that this figure would be adequate for 1990. It will require higher catch rates to attract vessels from the Gulf, or Nova Scotia vessels from groundfishing. Until this happens this resource will continue to be underutilized.

RESUME

Sur le plateau néo-écossais la pêche à la crevette se poursuit dans trois endroits à des profondeurs supérieures à 200 m, les cuvettes de Canso, Louisbourg, et Misaine. Des navires provenant de la région du Golfe ont traditionnellement pêché ces endroits. En 1989 seulement que deux navires du Nouveau-Brunswick ont pêché le plateau néo-écossais de l'Est (96 % des prises totales) alors qu'un seul navire de la Nouvelle-Ecosse de moins de 19.8 m a pêché sur le plateau néo-écossais de l'Ouest. On a rapporté des prises de Mai à Juillet. Les cinq dernières années ont les prises les plus basses, 1989 ayant la prise la plus basse de la série.

L'effort a augmenté depuis l'an passé. Il y a eu une réduction de 12 % dans le taux de capture standardisé. Dans la pêche, les prises accessoires dominantes de morue et de sébaste ont habituellement été largement au-dessus de la limite de 10 %. En 1989 les autres espèces constituant les prises accessoires étaient moins fréquentes et de niveau plus bas que pour les autres années.

Pour les deux dernières années on avait suggéré un TPA dérivé biologiquement à 2,580 t. Etant donné que les PPUEs des trois dernières années sont fort semblables et que le quota n'a pas été atteint, il semblerait raisonnable d'assumer que ce niveau serait adéquat pour 1990. Des taux de capture plus élevés seront nécessaires pour attirer des navires du Golfe, ou de la flottille mobile de poissons de fond de la Nouvelle-Ecosse. En attendant cette ressource continuera d'être sous-exploitée.

INTRODUCTION

The Scotia-Fundy shrimp (*Pandalus borealis*) fishery has been concentrated primarily in three areas with depths >200m on the Eastern Scotian Shelf (NAFO Areas 4V and 4W) over the last 10 years. These areas are referred to as the Canso, Louisbourg, and Misaine holes (Figure 1). They have been continuously underexploited over the past several years. In 1989 only 82 t of shrimp were caught (Table 1). This amount represented 3% from a quota of 2,580 t. 2 t were also caught in NAFO Subarea 4Xs. The Cape Breton catch can be divided into 77 t from Louisbourg and 3 t from Misaine from log information (Table 2). Effort increased slightly, 13%, from that of 1988. The percentage of shrimp in relation to by-catch has increased. The potential of this fishery is seriously compromised by a 10% by-catch limit which is difficult to abide by in this area due to heavily fished local cod stocks.

METHODS

Fishery Data

The commercial fishery data was extracted from logs completed and submitted by the fishermen. The total commercial catches found in Table 2 are from Foreign and Domestic Quota Monitoring (Fisheries Operations Branch). Scotia-Fundy Statistics Branch compiles only the catch figures from those boats that land in Scotia-Fundy ports. A high percentage, almost 100% in the Cape Breton area in 1989, of the shrimp catch is fished by boats from eastern New Brunswick, Gulf Region. These boats land in both Scotia-Fundy and Gulf ports. To obtain reasonably accurate shrimp catch figures, the catches recorded by both the Scotia-Fundy and the Gulf Region Statistics Branches must be combined.

Statistics Branches in both regions compile their statistics by NAFO areas and subareas although it might not always be the best way to sectorise the fisheries for different species. Historically the three holes fished have been referred to as NAFO subarea 4Vn for Louisbourg, 4Vs for Misaine and 4Wd for Canso. Unfortunately a small portion of Louisbourg is found to overlap into 4Vs and a small portion of Misaine overlaps into 4Wd. This is taken into consideration when interpreting the Statistics figures. Only Loran bearings or latitude and longitude from the logged catch location would confirm the area in which the catch should be listed. Foreign and Domestic Quota Monitoring lists the catch according to the fishing areas instead of just NAFO areas and its figures cover the Atlantic region.

A Yankee 36 trawl was used during the previous shrimp surveys (Etter and Mohn 1989). To compare the results of the commercial and survey data, the commercial data had to be standardized. For comparisons of commercial gear types the effort had to be standardized. Each gear type was standardized to a Yankee 36 trawl and the correction factors used to standardize the effort before calculating the catch-rates.

In 1989 the commercial vessels used two types of gear, a Sputnik trawl and a Nord Sea 938 trawl. The Nord Sea 938 is a large trawl with 3 bridles instead of the standard 2 bridles. When both are standardized to a Yankee 36 the correction factors are the same (Table 3).

Table 3 indicates a difference in catch-rates between gear types. This could be attributed to the difference in size of the trawls or, as had been indicated in past years, an overcorrection when standardizing for a Yankee 36 which is a much smaller trawl than the ones used commercially. There has been a tendency towards fishing with trawls that are much larger than the

Yankee 36 in the past few years. It might be possible that the correction factors need a re-evaluation and that trawl efficiency should be researched.

RESULTS

The Scotia-Fundy Region issued 23 shrimp licenses in 1989 (Table 4). All the licenses issued were for boats <19.8m L.O.A.(length over-all). The licenses were limited to fishing in specific areas. There were 5 licenses issued for the NAFO areas 4V and 4W; 15 licenses issued for NAFO area 4X only; and 3 licenses issued for areas 4V, 4W and 4X. The number of licenses has decreased slightly over the last few years (Table 4). These licenses are usually renewed along with other licenses each year. A few may have been eliminated as they were not used for several years and there have been a few new licenses issued but none in 1989.

The Gulf Region issued 19 shrimp licenses in New Brunswick in 1989. These licenses were issued for eastern Scotian Shelf areas 4Vn, 4Vs, and 4W. Of that number, 3 licenses were issued for boats <19.8m L.O.A. and 16 licenses issued for boats 19.8m to 30.5m L.O.A. At this time the license history for previous years is not available from the Gulf Region.

The shrimp fishery continues to maintain catches well below the yearly quotas. As the quotas have decreased, the catches have generally stayed below 1,000 t. The 1989 catch as the ones for recent years are only fractions of the actual quotas set for their respective years (Figure 2). Preliminary 1989 catches were the same as the 1988 catches even though the fishery effort was higher in 1989. This may indicate a decrease in biomass if the gear standardization is correct.

Only two boats, both from New Brunswick and in the 19.8m to 30.5m L.O.A. category logged catches in the Cape Breton areas, 4Vn and 4Vs. These boats accounted for 95.7% of the total catch. Of an Eastern Scotian Shelf total of 80 t, 75 t were logged catches reported from Louisbourg and 3 t logged catches from Misaine. There was no reported fishing in Canso. The average yearly catch-rate for the Cape Breton area was 44.5 kg/h corrected for a Yankee 36 trawl (Table 5). This is a decrease from the 1988 catch-rate of 51.0 kg/h but slightly higher than the 1987 catch-rate of 39.9 kg/h. The yearly catch-rate uncorrected for 1989 was 133.4 kg/h. This was the highest uncorrected CPUE since 1979. The yearly CPUE has been steadily decreasing through the years 1979 to 1989 (Figure 3).

The Louisbourg hole had a yearly catch-rate of 43.8 kg/h from fishing in May, June and July. Misaine's yearly catch-rate was 70.5 kg/h (Table 5). However this rate was based on only one day of fishing in the month of June. All values were calculated using effort corrected for gear type.

The monthly CPUEs for the years 1984 through 1989 are shown in Figure 4. The general trend has been a decrease in CPUE through the year. Specific months of the years 1985, 1986, and 1988 do not support this observation but then a minimum of commercial fishing took place during those particular months. In some cases the monthly CPUE has been based on only one fishing day in that month. Months with no reported fishing activity (zero CPUE in graphs) have increased over the years.

The percentage of shrimp in the 1989 monthly catches increased slightly from similar months fished in 1988 and is much higher than the years previous to 1988. (Table 6). The percentage composition of the by-catch showed a general decrease again, this year, in the primary species, cod and redfish. There has also been a decrease in the number of different species caught as by-catch over the last few years. This might be attributed to the lack of availability of groundfish in 1989. It also could be due to the efficiency of the newer, larger gear or the captains could be directing more for shrimp. Some of the by-catch species are usually found only in specific

areas, on a seasonal basis. For years of peak abundance the catch of these species increases above that of shrimp.

The shrimp fishery takes place during different months each year (Table 6). This makes comparisons of shrimp and by-catch for different years difficult. Throughout the years 1984 to 1989 June and July (except in 1986) are the only months when fishing did take place each year (Figure 5a & 5b). In most cases when the shrimp catch increased, the by-catch of cod and redfish decreased. The exception to this was in 1985 when there was a large catch of redfish in both months of that year but a very low catch of shrimp. These figures are based on commercial catches only, which can be quite variable each year depending on the number of days fished.

During 1989, 2t of shrimp were reported from the Bay of Fundy (NAFO Subarea 4Xs) for vessels <19.8m L.O.A. Most catches of shrimp in this area in the past few years have been by-catch when directing for groundfish. 20% of the reported 2t is logged data from which a CPUE of 12.9 kg/h was calculated using a correction factor of 0.89 (to Yankee 36). The gear used was an otter trawl modified for shrimp fishing; therefore the figures used to calculate the correction factor are approximate. The unstandardized CPUE was 12.5 kg/h which is not much different from the corrected value.

DISCUSSION

The recommended quota for shrimp in 1990 is 2,580 t (Table 1). This is the same figure used for 1988 and 1989. Since the CPUEs for the last three years are quite similar and the quota in the past was not reached, it seems reasonable to assume this figure will be adequate for 1990. As no research survey work took place in 1989 to get a biomass estimate, it is difficult to calculate the quota figures as had been done in previous years (Etter and Mohn 1988).

This potentially valuable resource will likely continue to be underexploited unless there are some changes in the near future. The present catch-rates are not high enough to entice participation by current license holders. The by-catch limit poses a major problem, since it seems to be very difficult to adhere to the 10% limit when directing for shrimp, and there is no cod quota available to buffer the situation. The development of more selective trawls is required.

A separator trawl is presently under development by the Development Branch of the Department of Fisheries and Oceans. With the completion of this trawl in the next few years it is hoped that, while directing for shrimp to have a by-catch of nearly zero. The trawl has a metal grate that is attached on an angle in front of the the cod end. Holes to the side of this grate allow the fish that come up against the grate to get out of the net and the shrimp can travel through the grate and into the cod end. Apparently, the Norwegians have been developing a separator trawl of their own and are now beginning to use it in their commercial fishery.

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Table 1. Shrimp quotas (t) and actual catches (t) for Scotian Shelf (NAFO Area 4V, 4W, and 4X) 1980-1989.

Year	Quotas (t)				Actual Catch
	Canso	Louisbourg	Misaine	Total	
1980	1086	1553	2382	5021	984
1981	---	---	---	---	454
1982	1000	1400	1800	4200	569
1983	1400	2000	2400	5800	1010
1984	1400	1800	2500	5700	928
1985	1350	1790	2420	5560	133
1986	740	1460	1600	3800	126
1987	210	1070	860	2140	152
1988	370	1160	1050	2580	82
1989	370	1160	1050	2580	82*
1990**	370	1160	1050	2580	

* Preliminary catches.

** Proposed values.

Table 2. Eastern Scotian Shelf (NAFO 4V, 4W) commercial shrimp landings and CPUE.

Year	Catch (t)				CPUE (kg/h)	
	Canso	Louisbourg	Misaine	Total	Unstd.	Std.*
1977	---	---	---	269	128.5	104.5
1978	---	---	---	306	121.9	97.3
1979	534	295	8	838	174.6	128.0
1980	360	491	133	984	130.9	97.3
1981	10	418	26	454	131.8	92.8
1982	201	316	52	569	128.0	80.4
1983	512	483	15	1010	127.7	81.2
1984	318	600	10	928	109.5	77.6
1985	15	118	---	133	75.4	40.7
1986	---	126	---	126	87.3	58.1
1987	---	148	4	152	90.7	39.9
1988	1	75	6	82	85.1	51.0
1989**	---	77	3	80	133.4	44.4

* Standardized to a Yankee 36 trawl.

** Preliminary totals from commercial logs.

Table 3. Corrected catch-rates (kg/h) for commercial boats off southeastern Cape Breton, 1989.

No. of boats	Gear type	Louisbourg Area	Misaine Area	Correction factor
1	Sputnik	39.2	---	3.0
1	Nord Sea 938	49.0	70.6	3.0

Table 4. Shrimp licenses issued in Scotia-Fundy for 1985 to 1989 according to designated fishing areas.

NAFO Area				
Year	4V, 4W	4X	4V, 4W, 4X	Total
1985	7	17	2	26
1986	6	18	3	27
1987	4	17	3	24
1988	5	15	3	23
1989	5	15	3	23

Source: Licensing Unit, Department of Fisheries & Oceans, Scotia-Fundy Region.

Table 5. Monthly commercial shrimp fishery statistics for the Louisbourg and Misaine areas in 1989.

	May	June	July	Total
Louisbourg: Catch (kg)	10,083	49,093	16,231	75,407
Effort (uncor)	121	348	105	574
Effort (cor)	363	1,044	314	1,722
CPUE (kg/h)	27.8	47.0	51.5	43.8
Misaine: Catch (kg)		3,175		3,175
Effort (uncor)		15		15
Effort (cor)		45		45
CPUE (kg/h)		70.5		70.5
Both areas: Catch (kg)				78,582
Effort (uncor)				589
Effort (cor)				1,767
CPUE (kg/h)				44.5

Table 6. Percentage of the catch composition of commercial shrimp trips from Eastern Scotian Shelf on a monthly basis when available for the last 6 years (Etter and Mohn 1985, 1986, 1987, 1988, 1989).

1984	Species	April	May	June	July	August	September	October
	Shrimp	94.3	66.4	60.5	57.8	60.3	75.6	59.3
	Cod	5.5	12.4	7.9	12.4	7.2	15.7	6.6
	Redfish	---	19.5	29.0	26.6	28.8	7.1	29.2
	Flatfish	---	1.1	1.2	1.5	2.2	1.6	4.0
	Hake	---	0.1	0.1	---	0.4	---	0.8
	Halibut	---	----	---	---	---	---	---
	Haddock	0.3	0.2	0.9	0.7	1.1	---	0.1
	Pollock	---	0.3	0.3	0.8	---	---	---
	Misc	---	---	0.1	---	---	---	---
	Total shrimp catch (kg)	2,862	181,226	244,622	134,058	92,731	11,119	9,429

1985	Species	April	May	June	July	October
	Shrimp	55.1	64.8	32.6	24.6	55.3
	Cod	23.3	10.6	3.2	2.4	5.5
	Redfish	0.7	21.3	56.9	70.9	34.5
	Flatfish	19.6	2.4	0.8	1.2	3.2
	Hake	---	0.2	0.1	0.1	0.9
	Halibut	1.0	----	4.7	0.2	---
	Haddock	0.3	0.5	---	0.5	0.6
	Pollock	---	0.2	1.7	0.1	---
	Misc	15.9	----	---	---	---
	Total shrimp catch (kg)	756	17,903	10,593	2,455	8,429

1986	Species	May	June	September	October
	Shrimp	54.8	40.8	64.5	40.6
	Cod	5.5	4.3	7.5	2.1
	Redfish	34.2	52.6	23.3	51.5
	Flatfish	1.8	1.1	3.0	3.5
	Hake	---	0.1	0.5	0.6
	Halibut	---	0.5	---	---
	Haddock	0.1	0.1	1.0	1.4
	Pollock	3.6	0.6	0.1	0.2
	Misc	---	----	---	---
	Total shrimp catch (kg)	37,554	9,902	7,630	2,354

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Table 6. continued.

1987		Species	June	July	September		
		Shrimp	56.7	69.8	49.1		
		Cod	32.8	20.7	3.3		
		Redfish	5.4	2.9	43.8		
		Flatfish	3.1	2.0	1.8		
		Hake	0.1	---	0.4		
		Halibut	0.6	0.1	---		
		Haddock	0.1	---	0.2		
		Pollock	0.9	4.2	0.7		
		Misc	0.3	0.4	0.8		
		Total shrimp catch (kg)	14,889	34,766	11,793		

1988	Species	June	July	August	September	November	December
	Shrimp	84.4	82.0	80.3	49.9	47.6	67.7
	Cod	12.3	3.5	4.3	49.3	14.1	32.3
	Redfish	0.8	7.6	7.8	0.8	38.4	---
	Flatfish	2.1	6.7	7.6	---	---	---
	Hake	---	---	---	---	---	---
	Halibut	---	0.2	---	---	---	---
	Haddock	---	---	---	---	---	---
	Pollock	0.4	---	---	---	---	---
	Misc	---	---	---	---	---	---
	Total shrimp catch (kg)	44,182	28,828	1,471	4,284	2,465	635

1989		Species	May	June	July		
		Shrimp	71.8	88.2	87.4		
		Cod	5.2	9.4	0.9		
		Redfish	20.7	2.4	6.2		
		Flatfish	0.8	---	0.6		
		Hake	---	---	---		
		Halibut	1.0	---	4.9		
		Haddock	---	---	---		
		Pollock	0.5	---	---		
		Misc	---	---	---		
		Total shrimp catch (kg)	10,083	52,268	16,231		

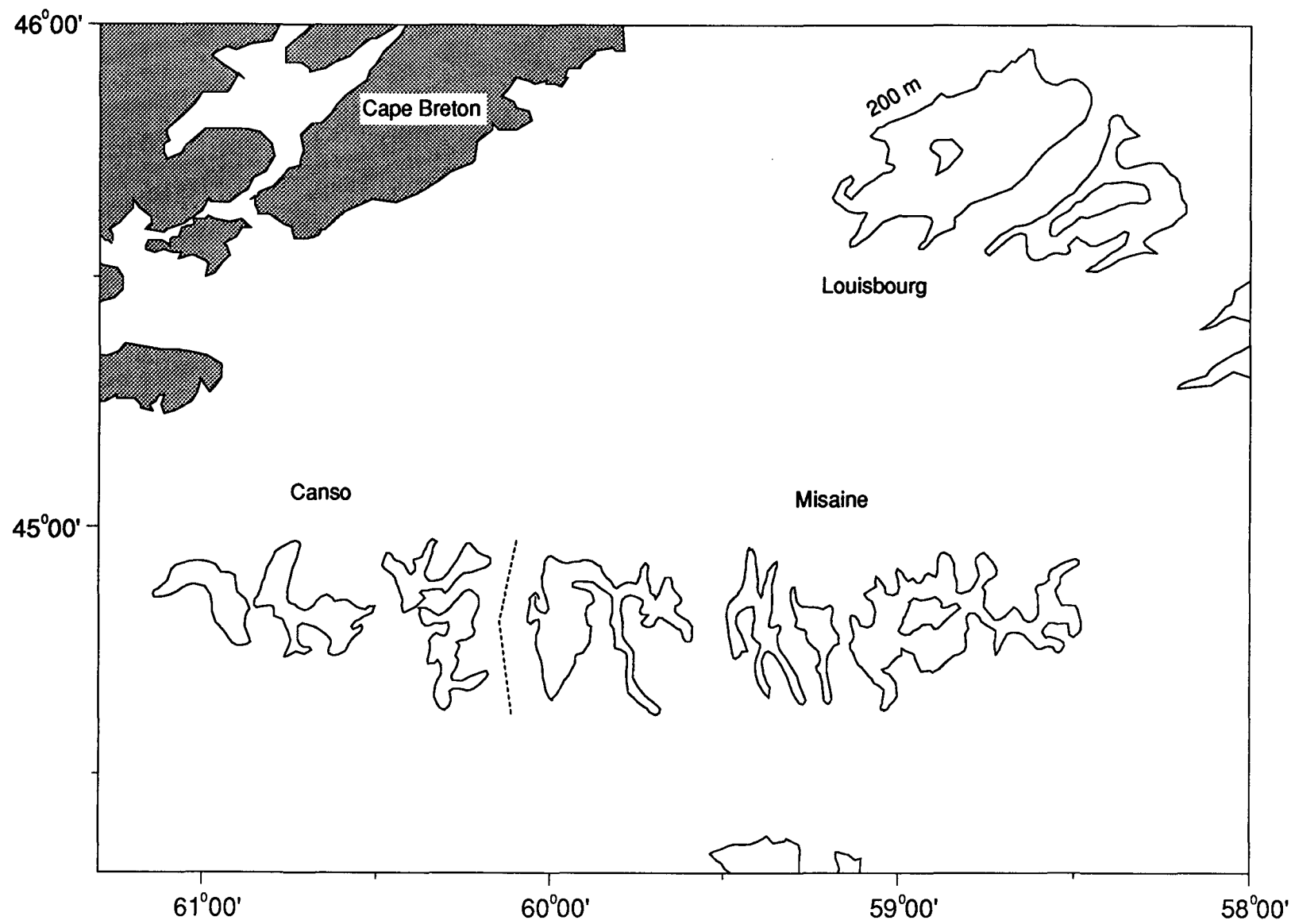


Figure 1. Eastern Scotian Shelf shrimp fishing areas of Louisbourg, Misaine and Canso.

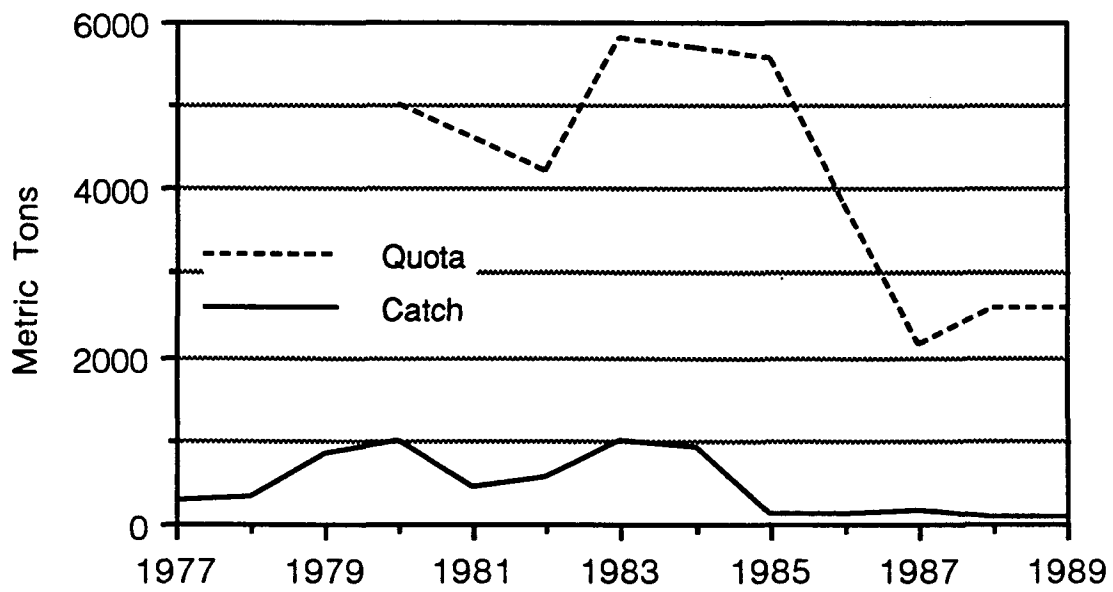


Figure 2. Eastern Scotian Shelf shrimp quotas (t) and catches (t) for the years 1977 to 1989 inclusive.

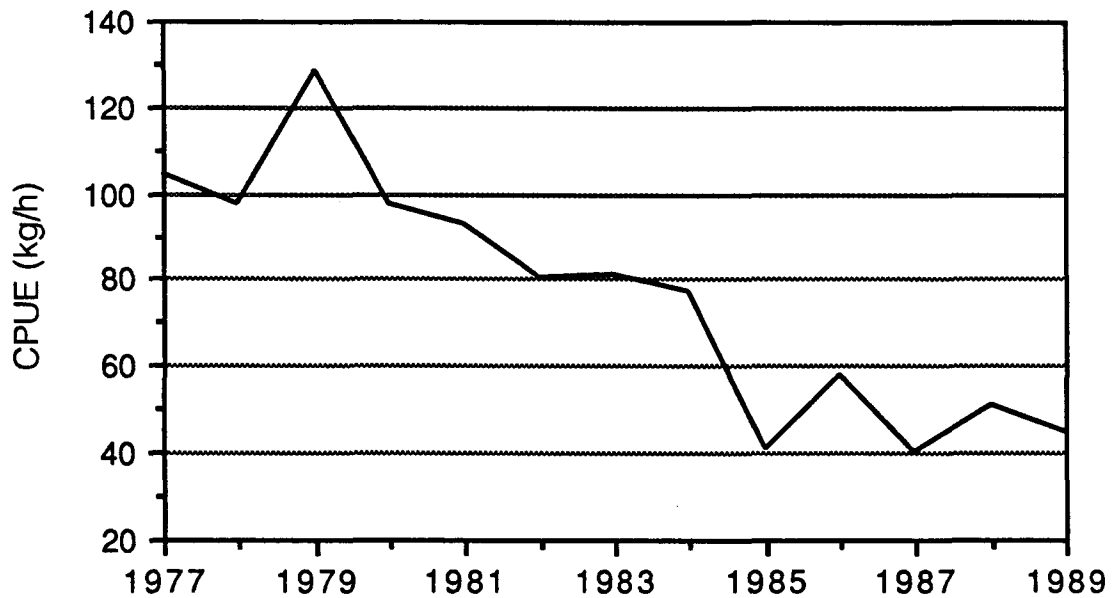


Figure 3. Eastern Scotian Shelf shrimp CPUE (kg/h) for the years 1977 to 1989 inclusive.

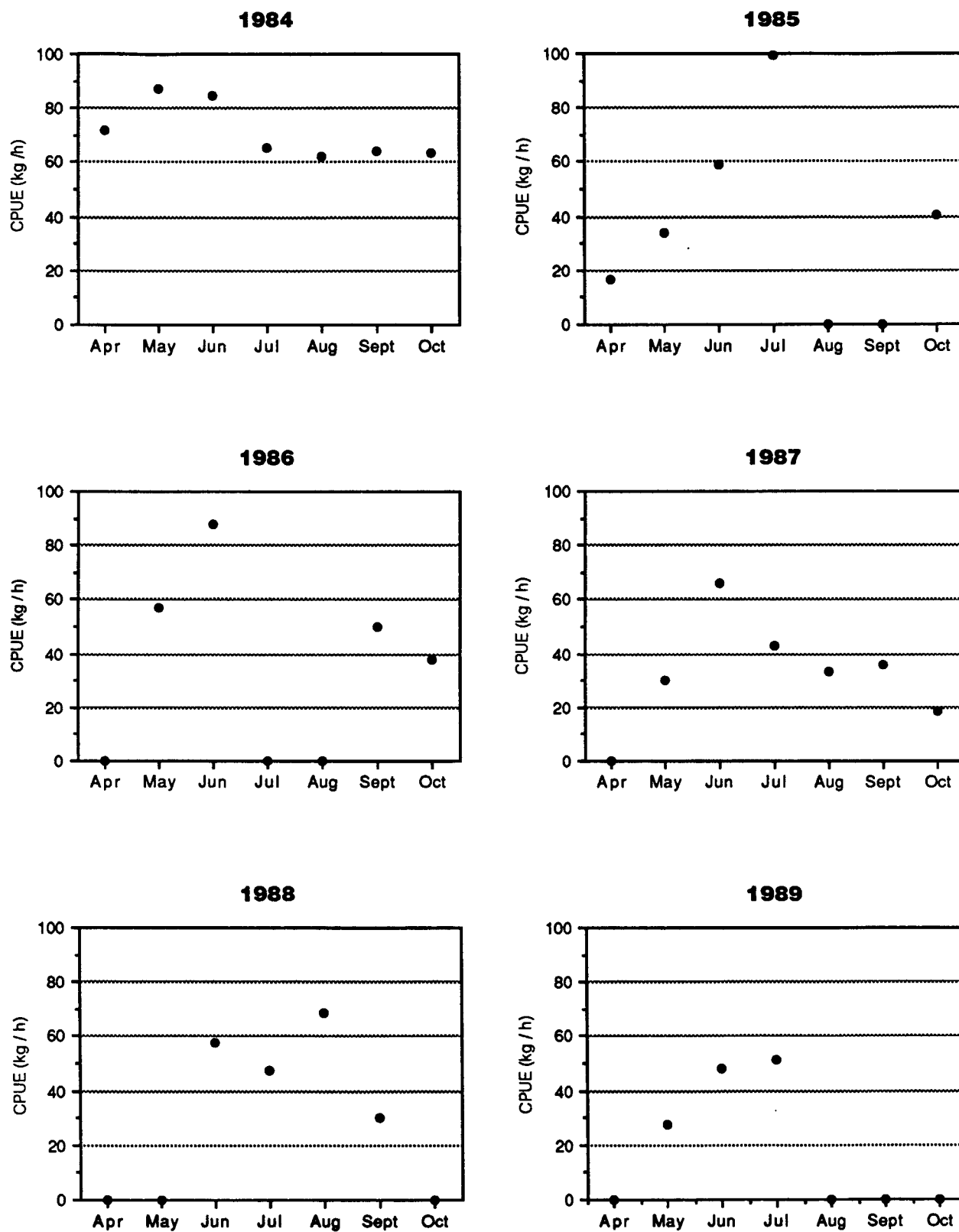


Figure 4. Monthly CPUE (kg / h) for the years 1984 to 1989 inclusive.

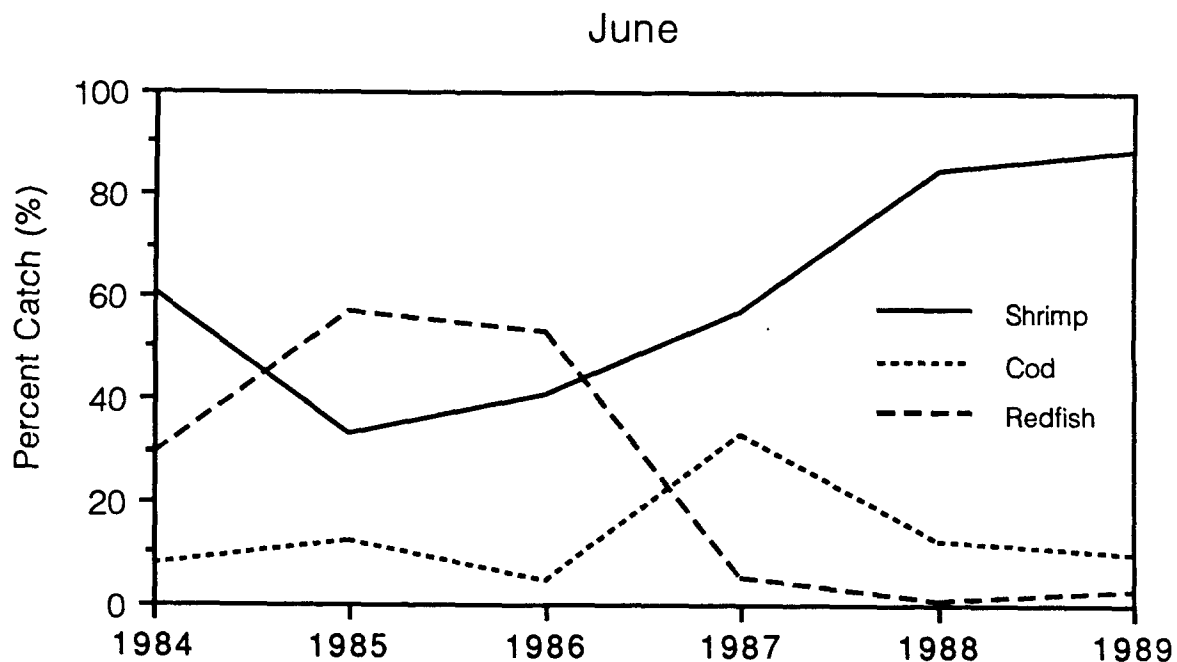


Figure 5a. Percentage by-catch of cod and redfish with shrimp for the month of June in the years 1984 to 1989 for the eastern Scotian Shelf.

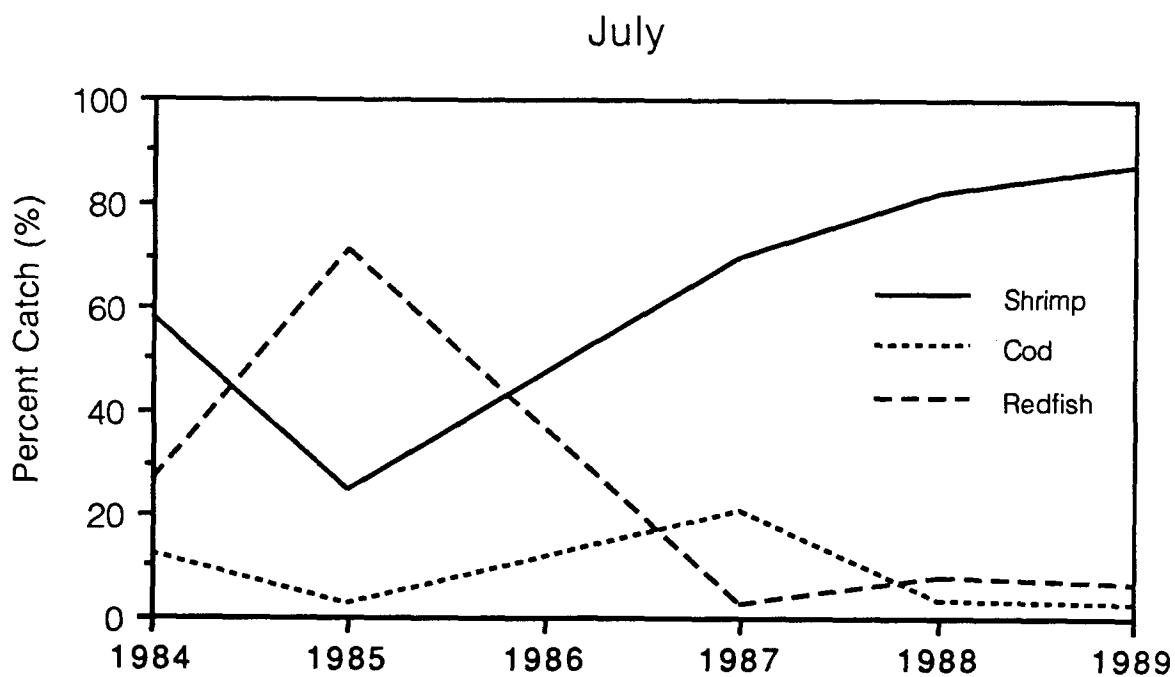


Figure 5b. Percentage by-catch cod and redfish with shrimp for the month of July in the years 1984 to 1989 for the eastern Scotian Shelf.