DFO Atlantic Fisheries
Research Document 95/79

MPO Pêches de l'Atlantique
Document de recherche 95/79

Status of American Eels, *Anguilla rostrata* in the Gulf Region

by

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Abstract

Declining abundance of American eel (Anguilla rostrata) has been reported through much of northern North America. Reported commercial landings of eels in the Gulf Region of New Brunswick and Prince Edward Island have decreased in the past five years, relative to landings of the late 1980's. In Gulf Region, Nova Scotia, catches have not decreased in the past five years but are currently much lower than those recorded during the late 1960's and early 1970's. In all three provinces, eel fishers believe that catch per unit effort has also diminished since the late 1980's. Apart from commercial landings, there are no estimates of eel returns or abundance for this region. There is also no management target for eels.

Résumé

On a signalé une baisse de l'abondance de l'anguille d'Amérique *(Anguilla rostrata)* dans une bonne partie du nord de l'Amérique du Nord. Les débarquements commerciaux d'anguille déclarés dans la partie néo-brunswickoise de la région du Golfe et à l'Île-du-Prince-Édouard ont diminué au cours des cinq dernières années par rapport à ceux de la fin des années 1980. Dans la partie néo-écossaise de la région du Golfe, les prises n'ont pas fléchi au cours des cinq dernières années, mais elles sont actuellement très inférieures à celles de la fin des années 1960 et du début des années 1970. Dans les trois provinces, les pêcheurs d'anguille estiment que les prises par unité d'effort ont également diminué depuis la fin des années 1980. Hormis les débarquements de la pêche commerciale, il n'y a pas d'estimations des remontées d'anguille ou de l'abondance de l'espèce dans la région. Il n'y a pas non plus de cible de gestion pour l'anguille.

1 - Introduction

Because the American eel consists of a single spawning population, its status must be considered at the level of the entire species. There is no known relationship between the size of the adult stock of a given river and the future return of elvers. Recruitment to a river is related not to the number of eels that left that river to spawn, but to (1) the total number from all geographic areas that successfully spawned in the Sargasso Sea and (2) the rate of return of elvers to the river.

Declines in abundance of American eel have been reported through much of the northern portion of its range. American eel returns to Lake Ontario and tributaries of the St. Lawrence River have been in decline since the mid-1980's (Castonguay et al. 1994a, 1994b). Reductions in eel abundance have also been noted in rivers of the northern Gulf of St. Lawrence and southwestern Newfoundland, but not in more southern regions such as the Bay of Fundy or Chesapeake Bay. Stocks of the European eel, Anguilla anguilla, have also declined in northern European waters (Castonguay et al. 1994b). Both the rate of decline and the year in which it began are similar in the northern Gulf of St. Lawrence and Europe.

Castonguay et al. (1994a) reviewed the evidence for and against four possible causes of the recruitment decline: habitat change, chemical contamination, overfishing, and ocean climate change. They concluded that the number of mature eels leaving fresh waters to spawn in the Sargasso Sea was reduced by a combination of the first three factors. Additional evidence on sea conditions and the declines in European eel stocks suggested that recent changes in ocean climate were responsible for reducing returns of both the American and European species (Castonguay et al. 1994b). An apparent weakening of the Gulf Stream in the past decade could explain the observed declines. Castonguay and colleagues hypothesized that in a weaker, slower Gulf Stream, American eel larvae would metamorphose further south than in the past and/or that larvae reaching the northern area missed the optimum period for metamorphosis and hence would be lost to the population. A similar fate would affect European eels. Castonguay et al. noted a comparable effect of latitudinal displacements of the Gulf Stream on zooplankton abundance.

The data collected on American eels in Gulf Region are not sufficient to permit a full stock assessment; such an analysis would require knowledge of landings, the setting of a management target, and estimates of eel abundance relative to the target. Rather, this document represents the first step in the assessment process in summarizing the landings of American eels in Gulf Region statistical districts 63-80 (New Brunswick), 2-3, 10-13, and 45-46 (Nova Scotia) and 82-88 and 92-96 (Prince Edward Island) (Fig. 1). Landings of American eels were summarized in LeBlanc and Chaput

(1991, Tables 15-17), and this document adds recent landings. The nature of the fisheries, regulations and research needs will also be discussed.

2 - Description of fisheries

2.1 - New Brunswick

Eel fisheries in this region consist of a commercial fishery, which is primarily carried out by means of fyke nets, and a recreational spear fishery.

In 1994, there were 204 commercial eel licenses in the Gulf region of New Brunswick. Longlines, trap nets and fyke nets are the most commonly used gears (Table 1).

No license is currently required for recreational spear fishing of eels and consequently the number of spear fishers is unknown. It is estimated that there were at least 200 recreational eel fishers in 1994 (F. Albert, D.F.O., pers. comm.).

2.2 - Nova Scotia

Commercial fisheries for eels in Nova Scotia are carried out using trap nets or pots in tidal and inland waters or spears in tidal waters. Recreational fishers use pots in tidal and inland waters or spears in tidal waters.

In 1994, there were 183 commercial eel licenses in Gulf Region, Nova Scotia. In 1993, 174 commercial eel licenses were held. A licensed fisher is permitted to fish using any legal gear. Eel pots are the most commonly used gear (Table 2).

No license is required for recreational spear fishing.

2.3 - Prince Edward Island

Commercial fisheries in Prince Edward Island are carried out by means of fyke nets (e.g., trap nets, in Table 3), eel pots and flambeau fisheries (spear fishing with generator-powered lights). As of 1994, all commercial fishers were licensed, and 885 licenses were held, more than twice as many as 1993 (334 licenses), when commercial spear fishers were unlicensed.

Recreational spear fishing for eels is carried out without the use of lights. No license is required.

Unlike the other two provinces, there is no freshwater fishery for eels in Prince Edward Island.

3 - Regulations

3.1 - New Brunswick

At present there are no regulations restricting the fishing season for eels. In general, most commercial fishers operate their nets primarily in the spring and autumn. Most recreational spear fishing is carried out through holes in the ice in winter.

The minimum size of eel which may currently be retained is 36 cm (15 inches) in total length.

There is no standardized style or size of eel trap in the Gulf Region of New Brunswick, although the majority of fishers use fyke nets with leaders. Mesh size of the nets is also not regulated.

There is no bag limit for the recreational spear fishery. Fishers are not presently required to hold a license and are not permitted to sell their catch.

Landings are reported only by purchase slips and supplementary B slips.

The following regulatory changes have been proposed by the Eel Advisory Committee of Gulf Region, N.B.:

(1) increase the size limit from 36 cm (15 inches) to 48 cm (20 inches)

(2) impose a daily bag limit of 10 to 15 eels for the recreational spear fishery

(3) require recreational spear fishers to be licenced.

Proponents of the recreational spear fishery have suggested that fishers should be allowed to sell speared eels commercially, but the recommendation of the Eel Advisory Committee is that this proposal should not be considered until the spear fishery has been regulated by means of bag limits and licenses (F. Albert, pers. comm.).

3.2 - Nova Scotia

During 1994, there were no official seasons or quotas. The minimum size limit was 20 cm (8 inches).

New conservation and management measures being put in place for 1995 are as follows:

Commercial fishing is restricted by both season and location for each gear type:

(1) Trap nets: April 1 - April 30, tidal and inland waters

(2) Pots: August 16 to November 15, tidal and inland waters

(3) Spears: May 1 to August 15, tidal waters only.

All commercial fishers must be licensed and there is no bag limit. The size limit is 46 cm (18 inches). Catches must be registered.

Recreational fishing for eels by means of pots set in inland and tidal waters also requires a license. Up to five pots may be set during the seasons of April 1-April 30 and August 16-November 15. A voluntary bag limit of 10 eels, and the same size restrictions as the commercial fishery (46 cm) apply to the recreational pot fishery. Catches are not registered.

Recreational fishing using spears is unlicensed. The season is January 1 to December 30. The same size (46 cm) and voluntary bag (10 eels) limits apply as in the recreational pot fishery. Catches are not registered.

Closures are in effect in portions of Pomquet Harbour and East River of Pictou.

3.3 - Prince Edward Island

The size limit for eels in Prince Edward Island is 46 cm (18 inches). There is no limit to the number of eels that may be taken by commercial fishers (although the maximum number of traps is regulated), but recreational fishers have a voluntary bag limit of 12 eels.

The seasons for eel fisheries are as follows:

(1) Commercial spear fishery (flambeau): April 1-June 30, November 1-November 30
(2) Commercial nets: August 15-October 31
(3) Recreational spear fishery (no lights): December 1-March 31
(4) Closed to all gears: July 1-August 14.

Licenses are required for all commercial fishers but not for recreational fishing.

4 - Landings

4.1 - New Brunswick

Reported commercial landings in the Gulf Region of New Brunswick in 1917-1993 have ranged from 1.5 to 319.4 tonnes (Fig. 2, Table 4). Reported landings increased in the mid-1960's and peaked in 1971. Landings exceeded 150 tonnes in 1968-1974, 1980-1982 and 1985-1990. Landings exceeded 250 tonnes in 1969-1971. Landings in 1984-1993 averaged 165.6 tonnes, 28% higher than the previous decade (128.8 tonnes in 1974-1983).

Landings in districts adjacent to Chaleur Bay (districts 63 to 65) exceeded 5 tonnes only once since 1917, with peak landings of 12.2 tonnes in 1971 (Fig. 3, Table 5). Mean landings in 1984-1993

were 1.2 tonnes. Since the 1930's, landings in this area have accounted for less than 5% of the Gulf New Brunswick total.

Landings in districts 66 to 68 (the Gulf shore of the Acadian Peninsula) exceeded 100 tonnes in 1970 and 1971 (Fig. 4) but mean landings in the past decade were 25.2 tonnes. Since 1982, this area has usually accounted for less than 25% of the Gulf N.B. landings.

In the Miramichi area, districts 70 to 73, landings peaked at 77.3 tonnes in 1972 (Fig. 5). Mean landings in the past 10 years were 13.2 tonnes. In the past two decades this area has typically accounted for 10 to 25% of Gulf N.B. landings.

Districts 75 to 80, on the N.B. shore of the Northumberland Strait, landed more than 100 tonnes of eels in 1970-1971, 1982, and 1985-1989 (Fig. 6). Landings in the past decade were the highest in Gulf N.B., averaging 69.2 tonnes. From 1953-1966 and 1982-1993, this area accounted for over half of the Gulf N.B. landings.

4.2 - Nova Scotia

In most of the years recorded, annual eel landings in Gulf Nova Scotia have been less than 50 tonnes (Fig. 7). As in Gulf New Brunswick, landings were highest from 1968 to 1976 (Fig. 7). With the exception of 1973, landings during this period exceeded 200 tonnes. In 1977, landings declined to their original levels. An increase in landings has been observed over the past five years, and in 1993, landings were almost 100 tonnes.

With the exception of 1992 and 1993, when landings approached 30 tonnes, landings on the Northumberland Strait (statistical districts 10-12 and 45-46) have typically been less than 10 tonnes (Fig. 8).

Landings in the eastern Northumberland Strait - St. Georges Bay area (statistical district 13) were less than 10 tonnes until the late 1940's (Fig. 9). Catches increased until the late 1960's and early 1970's, peaking at about 30 tonnes. Following this period, catches again declined until the late 1980's. The peak catch, in excess of 55 tonnes, was recorded in 1993.

Statistical district 3, in southwestern Cape Breton Island, recorded substantial landings (50 to 100 tonnes) only during the late 1960's and early 1970's (Fig. 10). Current landings are less than 10 tonnes.

Most of the eel landings in Gulf Nova Scotia during the peak catches of the late 1960's and early 1970's came from statistical district 2, northwestern Cape Breton Island (Fig. 11). The maximum annual harvest in this area was 289 tonnes in 1975 (Table 6).

4.3 - Prince Edward Island

Prior to the late 1960's, reported eel landings for Prince Edward Island were less than 50 tonnes annually (Fig. 12, Table 7). Landings increased in the late 1960's and peaked in 1971 at 351 tonnes. In 1974, landings decreased to 100 tonnes and fluctuated between 100 and 150 tonnes until 1988. Average landings for the past five years have been somewhat lower, ranging from 50 tonnes to about 125 tonnes.

Landings in districts 82, 83 and 85 (Northumberland Strait) peaked in 1971 at approximately 150 tonnes (Fig. 13). Two years later, landings had dropped to 50 tonnes and fluctuated between about 20 and 30 tonnes for the following decade. Landings in the past five years have been the lowest ever reported, with the exception of the 1993 landings which were over 40 tonnes.

Landings in districts 86-88 (eastern part of the province) also peaked in 1971 at over 80 tonnes (Fig. 14). Typical landings before the peak were less than 10 tonnes. In most years after the peak, landings have been between 20 and 40 tonnes.

Landings in statistical districts 92, 93, 95 and 96 (Gulf of St. Lawrence) have been higher than most landings elsewhere in the province (Fig. 15). Landings in the 1980's (80 to 130 tonnes) exceeded those seen during the late 1960's and early 1970's (maximum 120 tonnes). Average landings have declined in the past five years, ranging from 22 to 90 tonnes.

5 - Target

There is currently no management target for eels.

6 - State of the Stock

Examination of the landings data without regard to effort and gear types suggests that eel stocks increased in the late 1960's, peaked in the early 1970's and again in the mid-1980's, and have somewhat declined in the past four years. Effort data (no. of traps fished, days fished, etc.) do not exist for eels. Anecdotal accounts suggest that fishing effort initially increased in the 1950's because of increases in the price of eels and has continued to increase in recent years. The introduction of fyke nets into eel fisheries in the mid-1960's may in part be responsible for the high eel landings of the following decade. Higher catches in recent years may also be related to better collection of statistics from purchase slips than in the past.

Fishers in all three provinces believe that eel stocks are declining and that catch per unit effort has been reduced in the past four or five years.

Effort in the spear fishery is increasing, particularly in areas where spear fishers may commercially market their catch. The

introduction of generator powered lights into the flambeau fishery in the mid- to late-1980's increased the catching power of the Prince Edward Island spear fishery.

7 - Research Recommendations

1. Catch per unit effort data should be collected in order to properly evaluate the trends in landings. This could be accomplished via a logbook program for commercial eel fishers. Data to be collected should include: method, time of day, weather, visibility, catch, location, equipment, hours fished, number of nets.

2. At present, landings from the recreational eel fishery are not reported. A partial solution to this problem might be to distribute logbooks to recreational fishers also. Data collected should include: number of hours fished, visibility, catch, type of boat (or fished through ice), number of lights (flambeau fishery), and qualitative statements on numbers of small eels seen.

3. At present size limits are different in the three provinces. A length at age table for eels in each province should be developed in order to provide a stronger biological basis for size limits.

4. There has been concern over bycatch of recreational species, especially trout, in commercial eel catches. Research is being conducted by SenPaq Consultants through the Recreational Fisheries program to examine the effects of net design on bycatch in New Brunswick estuaries.

5. Chemical contamination of eels during their estuarine residence is a concern of eel fishers and the public in New Brunswick Gulf Region. The data presently available on contaminant concentrations in eels in Gulf Region estuaries are extremely limited (W. Fairchild, D.F.O., pers. comm.). According to Hodson et al. (1994), eels at Kamouraska, Quebec had levels of polychlorinated biphenyls (PCB's), mirex and pesticides which were 10-100 times higher than those of eels in an uncontaminated reference tributary. This study concluded that contaminant levels in eels from Kamouraska were high enough that consumption by beluga whales was likely to be hazardous to the whales. Eels from industrialized estuaries in Gulf Region, such as the Miramichi, should be analysed for contaminant residues.

8 - Acknowledgements

We thank F. Mowbray, R. Pickard, J. Leger and P. LeBlanc for keypunching and graphing the landings data. Thanks are also due to F. Albert (Eastern New Brunswick Area Office), D. Sheidow and J. Jenkins (Prince Edward Island Area Office) and L. Cormier (Licensing) for information on regulations and licenses. We also

appreciate the information and comments provided by eel fishers who attended Science Workshop meetings.

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Table 1. Number of licensed eel gears in Gulf region New Brunswick, by statistical district, in 1994. Data supplied by L. Cormier (Licensing, D.F.O.).

Statistical District	Eel pot	Fyke net	Trap net	Weir	Pot/ trap	Spear	Box net	Long line	Jigger	Other
63			2							
64										
65		1	20							
66	24		7							
67		420	25							
68		76	515					100		
70			473							
71		142	6							
73		28	85							
75			81					2000		
76		22	81					6075		
77		18	93	59			2			
78			11							
80	2		2							
Total	26	707	1,401	59	0	0	2	8,175	0	0

Table 2. Number of licensed eel gears in Gulf region Nova Scotia, by statistical district, in 1994. Data supplied by L. Cormier (D.F.O., Licensing).

Statistical District	Eel pot	Fyke net	Trap net	Weir	Pot/ trap	Spear	Box net	Long line	Jigger	Other
2	230	30	9	170						
3	35	21	2	1	10					
10	92					2				
11	535	6	7	8		15				
12	60	12	54			10				
13	381	226	1			37				
45	364	21								
46	236	1				1				
Total	1,933	317	73	179	10	65	0	0	0	0

Table 3. Number of licensed eel gears in Prince Edward Island, by statistical district, in 1994. Data supplied by L. Cormier (D.F.O., Licensing).

Statistical District	Eel pot	Fyke net	Trap net	Weir	Pot/ trap	Spear	Box net	Long line	Jigger	Other
82			183			34				
83	24		355			380			1	1
85			55			8				
86	39		64			20				
87	246		242			8				
88	353		658		76	40				
92	10		1116			91				
93	54		746			136				
95	35		552			28				
96			116			11				
	761	0	4,087	0	76	756	0	0	1	1

Table 4. Eel landings (tonnes) reported in statistical districts 63-80 of the Gulf Region, New Brunswick.

Year	District 63	64	65	66	67	68	70	71	72	73	75	76	77	78	80	Gulf N.B. Total
1917	1.4		0.8			33.1		3.6	1.6	0.3		0.7	5.4	0.7	3.4	51.1
1918	1.4				1.1	36.5		2.9	3.6			8.2	1.8	2.7	3.6	61.9
1919	1.1	0.5	2.7			47.7	2.3	0.3	2.7		7.3	5.2		2.3	3	75
1920	1.1					9.4		8	1.8			2.3	0.4	0.1	1.1	24.2
1921	1.6					4.5		4.5	7			13.5	6.7	1.8	1.1	40.8
1922	1.2					4.5		3.6				2.3	1.8		0.6	14.1
1923	1.8			0.5		4.5			1.1			0.5	0.7		1.1	10.3
1924	1.2			0.9		1.1			0.9			4.4	0.4		1.1	10
1925	0.9			0.8		13.6			1.8			0.2			1.1	18.4
1926	0.3			0.7		2.3						1			1.1	5.4
1927	0.5					0.9										1.5
1928	1					4.5			1.8	8.9		0.1				16.4
1929	0.5					3.6			0.5	0.6						5.2
1930	1					8.9			0.7	1.2						11.7
1931	0.7					17			0.5	0.3		0.1	0.2			18.8
1932	0.1					6.3	0.5		0.4				1.8			9
1933						7.4	1.2		0.1			0.7	1.6			11
1934						9.4	0.5		0.1			0.8	0.5			11.3
1935						3.9	1.3		0.3			1.5	0.6			7.6
1936						1.6	1.4		0.2			0.3	0.9			4.4
1937						2	2.5		0.3			0.4	0.5			5.6
1938						2.3	4.1		1.6			1.2	0.2			9.4
1939						5.7	3.7		0.1			1	0.5			10.9
1940						0.9	2.1		0.3			1	0.5			4.8
1941							2		0.2			0.9	0.5			3.6
1942						5.1	2.7		2.7			1.5	0.5			12.5
1943						8.9	1		3.1				1.1			14.1
1944						3.9	1.3		3.8			3.5	1.4			13.9
1945						6.4	0.6		4.5			1.6	1.4			14.4
1946						10.1	1.9		3.9			7.5	1.4		4.3	29
1947						20.9	0.9		2.3			6.8	0.9			31.8
1948						17.7	0.9		1.4			4.5	4.5			29.1
1949						10.9	1.8		4.5			8.6	3.6			29.5
1950						5.4	3.6		3.2			8.2	1.8			22.2
1951						5.4	1.4		3.2			0.5	5			15.4
1952						7.7	1.8					2.7	3.6			15.9
1953						5.4	0.9					1.8	5			13.2
1954						5.4	3.2					0.9	23.6			33.1
1955		0.9				3.6	0.5					40.4	3.2			48.6
1956						3.2	0.5				0.5	1.8	4.5			10.4
1957						2.7	0.5					5.4				8.6
1958						2.7						10.9	0.9			14.5
1959						8.2	2.7				0.9	9.5	2.3			23.6
1960						10.9	1.8			0.9	1.4	13.2	2.7			30.9
1961						9.1	0.5	0.5		0.5	2.7	41.8	2.3			57.2
1962						7.3	1.8	0.5		1.4	5.9	62.7	2.3			81.7
1963					0.9	10	1.4		0.5	0.5	7.3	31.3	1.8			53.6
1964				0.5		18.2	4.1			0.5	10.9	19.5	2.7			56.3
1965						17.7	3.2	3.6		0.5	17.7	10.4	9.5			62.7
1966			0.5		0.5	21.8	7.3			0.5	24.1	30	14.5			99
1967					18.6	22.7	4.5	4.1	23.6	13.6	6.8	5	9.1			108.1
1968			0.8		1.4	34.8	8.2	21.6	28.8	7.3	9.3	10.9	15.1	12.2	0.2	150.8
1969			2.5	0.2	1.1	82.7	2	25.6	16	9	24.9	19.4	6	24.7	0.1	214.1
1970		0.7	2.3		32.7	102.3	4.9	23	8.5	5.7	26.2	70.2	11.8	6.2	0.2	294.7
1971		7.4	4.8	0	59.2	52.3	14.1	29.8	10.6	0.6	29.4	75.1	24.2	11.8	0.1	319.4
1972		4			56	38.9	44.6	22.4	10.2	0.1	20.9	56.7	9.7	9	0.3	272.7
1973			0.1		52.7	21.7	46.5	4.2	7.7	11.4	23.8	39.1	5.2	7.7	0.3	220.4
1974		0.1		2	42.4	23.3	23.1	12.9	2.7		16.1	17.2	3.7	12.4	0.3	156.2
1975				0.1	24.8	38.6	10.8	17.7	1.1		12.4	8.3	3.4	3.4	0.2	120.9
1976				0.9	30.3	26.8	2.4	15		0.8	10.7	8.3	16.8	4.7	0	118.6
1977					15	17.5	3.1	10		1.4	6.8	20	1.7	32.6	0	110.1
1978			1.2		14.2	19.2	3.7	18.7			9.3	6.4	0.3	8.6		81.5
1979					8.4	35.5	7.3	23.1		0.5	11	11.9	2.4	1.6	0.7	102.3
1980					17.7	54.2	9.1	15.7		9.3	14.8	19.3	7.5	2.6	0.2	150.5
1981			1.3		18.8	62.9	7.2	21.3		1.3	26.4	41.3	9.7	0.9	0.1	191.1
1982			0	0	13.9	17.6	4.9	19.3		0.3	17	67.7	18	0.5	0	159.2
1983						9.9	3.7	10.1		4.8	4.2	41.7	21.8	1.2	0	97.4
1984					1.5	24.7	4.1	7.7		0	11.9	66.6	5.5			122.2
1985			0.9		7.4	44.4	2.5	3.4		1.8	12.6	103.9	25.4	0	0.1	202.3
1986			1.4		6.8	10	5.4	8.9		1.9	12.5	94	89.2		0.1	230.1
1987			3.6		4.3	3.6	5.4	8.9		3.7	19.9	104.5	16.3		1.4	171.6
1988			4.2		1.4	3.5	30.8	8.2		1.6	23.8	130.4	28.9	0.3	0.4	233.6
1989			1		1	30	13	9		1	11	109	31	1	0	207
1990				4	22	7	26	11		5	10	45	20		0	150
1991			1	1	10	17	5	11			25	49	12		0	131
1992				1	3	28	3	9		0	15	53	8		0	120
1993				0	7	13	11	9		0	20	26	2	0	0	88

Table 5. Contribution of eel landings (tonnes) in four areas to the total for Gulf New Brunswick.

Year	Statistical districts: 63 to 65 Tonnes	%total	66 to 68 Tonnes	%total	70 to 73 Tonnes	%total	75 to 80 Tonnes	%total
1917	2.2	4.3	33.1	64.8	5.5	10.8	10.2	20.0
1918	1.4	2.3	37.6	60.7	6.5	10.5	16.3	26.3
1919	4.3	5.7	47.7	63.6	5.3	7.1	17.8	23.7
1920	1.1	4.5	9.4	38.8	9.8	40.5	3.9	16.1
1921	1.6	3.9	4.5	11.0	11.5	28.2	23.1	56.6
1922	1.2	8.5	4.5	31.9	3.6	25.5	4.7	33.3
1923	1.8	17.5	5.0	48.5	1.1	10.7	2.3	22.3
1924	1.2	12.0	2.0	20.0	0.9	9.0	5.9	59.0
1925	0.9	4.9	14.4	78.3	1.8	9.8	1.3	7.1
1926	0.3	5.6	3.0	55.6	0.0	0.0	2.1	38.9
1927	0.5	33.3	0.9	60.0	0.0	0.0	0.0	0.0
1928	1.0	6.1	4.5	27.4	10.7	65.2	0.1	0.6
1929	0.5	9.6	3.6	69.2	1.1	21.2	0.0	0.0
1930	1.0	8.5	8.9	76.1	1.9	16.2	0.0	0.0
1931	0.7	3.7	17.0	90.4	0.8	4.3	0.3	1.6
1932	0.1	1.1	6.3	70.0	0.9	10.0	1.8	20.0
1933	0.0	0.0	7.4	67.3	1.3	11.8	2.3	20.9
1934	0.0	0.0	9.4	83.2	0.6	5.3	1.3	11.5
1935	0.0	0.0	3.9	51.3	1.6	21.1	2.1	27.6
1936	0.0	0.0	1.6	36.4	1.6	36.4	1.2	27.3
1937	0.0	0.0	2.0	35.7	2.8	50.0	0.9	16.1
1938	0.0	0.0	2.3	24.5	5.7	60.6	1.4	14.9
1939	0.0	0.0	5.7	52.3	3.8	34.9	1.5	13.8
1940	0.0	0.0	0.9	18.8	2.4	50.0	1.5	31.3
1941	0.0	0.0	0.0	0.0	2.2	61.1	1.4	38.9
1942	0.0	0.0	5.1	40.8	5.4	43.2	2.0	16.0
1943	0.0	0.0	8.9	63.1	4.1	29.1	1.1	7.8
1944	0.0	0.0	3.9	28.1	5.1	36.7	4.9	35.3
1945	0.0	0.0	6.4	44.4	5.1	35.4	3.0	20.8
1946	0.0	0.0	10.1	34.8	5.8	20.0	13.2	45.5
1947	0.0	0.0	20.9	65.7	3.2	10.1	7.7	24.2
1948	0.0	0.0	17.7	60.8	2.3	7.9	9.0	30.9
1949	0.0	0.0	10.9	36.9	6.3	21.4	12.2	41.4
1950	0.0	0.0	5.4	24.3	6.8	30.6	10.0	45.0
1951	0.0	0.0	5.4	35.1	4.6	29.9	5.5	35.7
1952	0.0	0.0	7.7	48.4	1.8	11.3	6.3	39.6
1953	0.0	0.0	5.4	40.9	0.9	6.8	6.8	51.5
1954	0.0	0.0	5.4	16.3	3.2	9.7	24.5	74.0
1955	0.9	1.9	3.6	7.4	0.5	1.0	43.6	89.7
1956	0.0	0.0	3.2	30.8	0.5	4.8	6.8	65.4
1957	0.0	0.0	2.7	31.4	0.5	5.8	5.4	62.8
1958	0.0	0.0	2.7	18.6	0.0	0.0	11.8	81.4
1959	0.0	0.0	8.2	34.7	2.7	11.4	12.7	53.8
1960	0.0	0.0	10.9	35.3	2.7	8.7	17.3	56.0
1961	0.0	0.0	9.1	15.9	1.5	2.6	46.8	81.8
1962	0.0	0.0	7.3	8.9	3.7	4.5	70.9	86.8
1963	0.0	0.0	10.9	20.3	2.4	4.5	40.4	75.4
1964	0.0	0.0	18.7	33.2	4.6	8.2	33.1	58.8
1965	0.0	0.0	17.7	28.2	7.3	11.6	37.6	60.0
1966	0.5	0.5	22.3	22.5	7.8	7.9	68.6	69.3
1967	0.0	0.0	41.3	38.2	45.8	42.4	20.9	19.3
1968	0.8	0.5	36.2	24.0	65.9	43.8	47.7	31.7
1969	2.5	1.2	84.0	39.2	52.6	24.6	75.1	35.1
1970	3.0	1.0	135.0	45.8	42.1	14.3	114.6	38.9
1971	12.2	3.8	111.5	34.9	55.1	17.3	140.6	44.0
1972	4.0	1.5	94.9	34.8	77.3	28.3	96.6	35.4
1973	0.1	0.0	74.4	33.8	69.8	31.7	76.1	34.5
1974	0.1	0.1	67.7	43.3	38.7	24.8	49.7	31.8
1975	0.0	0.0	63.5	52.5	29.6	24.5	27.7	22.9
1976	0.0	0.0	58.0	48.9	18.2	15.3	42.5	35.8
1977	0.0	0.0	32.5	29.5	14.5	13.2	63.1	57.3
1978	1.2	1.5	33.4	41.0	22.4	27.5	24.6	30.2
1979	0.0	0.0	43.9	42.9	30.9	30.2	27.6	27.0
1980	0.0	0.0	71.9	47.8	34.1	22.7	44.4	29.5
1981	1.3	0.7	81.7	42.8	29.8	15.6	78.4	41.0
1982	0.0	0.0	31.5	19.8	24.5	15.4	103.2	64.8
1983	0.0	0.0	9.9	10.2	18.6	19.1	68.9	70.7
1984	0.0	0.0	26.2	21.4	11.8	9.7	84.0	68.7
1985	0.9	0.4	51.8	25.6	7.7	3.8	142.0	70.2
1986	1.4	0.6	16.8	7.3	16.2	7.0	195.8	85.1
1987	3.6	2.1	7.9	4.6	18.0	10.5	142.1	82.8
1988	4.2	1.8	4.9	2.1	40.6	17.4	183.8	78.7
1989	1.0	0.5	31.0	15.0	23.0	11.1	152.0	73.4
1990	0.0	0.0	33.0	22.0	42.0	28.0	75.0	50.0
1991	1.0	0.8	28.0	21.4	16.0	12.2	86.0	65.6
1992	0.0	0.0	32.0	26.7	12.0	10.0	76.0	63.3
1993	0.0	0.0	20.0	22.7	20.0	22.7	48.0	54.5

Table 6. Eel landings (tonnes) in Gulf Region, Nova Scotia.

Year	Statisical District 2	3	10	11	12	13	45	46	Gulf N.S. total
1917	.	.	.	0.4	4.3	7.9	.	.	12.6
1918	3.0	3.3	.	.	1.4	5.4	.	.	13.1
1919	2.3	3.2	.	.	0.8	.	.	.	6.2
1920	.	7.8	.	.	0.7	2.2	.	.	10.7
1921	.	6.2	.	.	2.4	6.2	.	.	14.8
1922	.	0.6	.	.	1.5	5.4	.	.	7.6
1923	.	.	.	.	0.2	0.5	.	.	0.6
1924	.	0.1	.	.	1.0	6.4	.	.	7.5
1925	.	0.1	.	.	1.5	2.7	.	.	4.3
1926	.	.	.	.	3.9	1.8	.	.	5.7
1927	.	.	.	.	3.0	0.5	.	.	3.5
1928	.	0.2	.	.	3.2	3.2	.	.	6.5
1929	.	0.2	.	.	0.7	3.6	.	.	4.5
1930	.	2.1	.	.	2.2	10.9	.	.	15.3
1931	.	0.2	.	.	3.5	8.2	.	.	11.8
1932	.	0.2	.	.	4.5	9.1	0.0	.	13.9
1933	.	3.2	.	.	4.0	9.5	.	.	16.7
1934	.	0.6	.	.	2.5	2.7	.	.	5.8
1935	.	0.4	.	0.0	2.1	2.7	.	.	5.3
1936	.	0.4	.	0.0	1.4	2.3	.	.	4.1
1937	.	0.5	.	.	0.5	3.2	.	.	4.2
1938	.	.	0.1	1.4	2.8	5.4	.	.	9.7
1939	.	1.3	0.1	0.3	3.4	3.6	.	.	8.6
1940	.	1.5	0.1	0.2	3.4	5.4	.	.	10.6
1941	.	1.4	.	.	.	2.0	.	.	3.4
1942	.	2.1	0.0	0.3	.	2.4	.	.	4.9
1943	.	2.3	.	0.1	.	2.6	.	.	5.0
1944	.	1.7	0.0	0.2	0.9	4.1	.	.	6.9
1945	.	0.9	0.1	0.2	6.5	3.0	.	.	10.6
1946	.	1.5	0.0	0.1	11.6	3.5	.	.	16.7
1947	.	1.8	.	.	8.6	3.2	.	.	13.6
1948	.	0.9	.	.	6.4	1.4	.	.	8.6
1949	.	4.5	.	0.9	4.5	27.7	.	.	37.7
1950	.	3.6	.	0.5	4.1	15.4	.	.	23.6
1951	.	5.4	.	1.4	5.0	9.1	.	.	20.9
1952	.	2.3	.	0.5	3.2	5.9	.	.	11.8
1953	.	1.8	.	0.9	0.5	4.5	.	.	7.7
1954	.	1.8	.	0.5	1.4	2.7	.	.	6.4
1955	.	4.1	.	0.9	1.4	4.1	.	.	10.4
1956	.	0.5	.	0.9	0.5	12.7	.	.	14.5
1957	1.4	0.5	.	2.3	.	5.9	.	.	10.0
1958	1.8	0.5	.	1.8	0.5	9.5	.	.	14.1
1959	0.5	1.4	.	.	0.9	8.6	.	.	11.4
1960	4.5	2.7	.	0.5	0.5	15.4	.	.	23.6
1961	5.0	6.4	.	0.9	0.5	15.0	.	.	27.7
1962	10.4	3.2	0.5	1.4	0.5	10.4	.	.	26.3
1963	8.2	2.7	.	0.9	0.9	10.9	.	.	23.6
1964	5.9	.	0.5	0.5	0.5	11.4	.	.	18.6
1965	5.4	.	.	.	0.5	10.4	.	.	16.3
1966	2.7	.	.	.	.	12.3	.	.	15.0
1967	15.9	0.9	.	0.5	0.9	34.1	.	.	52.2
1968	158.1	65.2	.	.	1.6	21.7	.	.	246.7
1969	205.3	84.0	.	0.3	1.7	22.8	0.2	.	314.3
1970	157.3	81.4	.	3.5	5.5	26.6	0.2	0.2	274.9
1971	158.6	92.1	.	7.4	4.3	28.1	1.1	0.0	291.7
1972	143.9	32.9	.	7.6	1.1	18.0	0.0	.	203.5
1973	4.7	1.0	.	1.2	1.5	19.6	.	.	28.0
1974	187.2	53.5	.	.	1.4	23.4	.	.	265.6
1975	288.9	63.9	.	2.3	.	14.0	5.0	.	374.1
1976	216.9	50.4	.	2.8	.	4.0	4.9	.	279.1
1977	2.4	.	.	0.6	.	2.9	.	.	5.9
1978	7.1	.	.	1.2	2.8	1.2	.	.	12.3
1979	6.1	.	.	1.0	1.1	0.3	4.1	.	12.6
1980	6.6	.	.	0.2	0.8	.	1.9	.	9.5
1981	4.3	.	.	0.3	.	0.3	2.6	.	7.5
1982	8.8	.	.	1.1	.	0.2	1.2	.	11.3
1983	5.4	.	0.0	0.1	0.2	2.6	1.1	0.2	9.6
1984	6.7	.	.	.	.	.	2.2	.	9.0
1985	4.3	.	0.0	0.0	.	0.5	0.3	.	5.1
1986	9.9	.	0.0	.	0.1	2.6	1.4	1.6	15.5
1987	4.2	0.1	.	1.3	2.1	2.3	1.9	1.3	13.3
1988	1.7	.	.	0.3	5.8	14.2	1.4	1.3	24.7
1989	2	0	.	1	4	15	3	4	29
1990	0	1	.	2	7	10	1	9	30
1991	7	1	1	1	6	18	0	3	37
1992	5	3	1	5	20	21	0	1	56
1993	4	2	.	10	14	58	2	.	90

Table 7. Eel landings (tonnes) in Prince Edward Island.

	COUNTY AND STATISTICAL DISTRICT																
	PRINCE								QUEEN						KINGS		
	TOTAL	PRINCE:	WEST		PRINCE	EAST		TOTAL	QUEEN:	WEST/OUEST		QUEEN:	EAST/EST		TOTAL		
YEAR		TOTAL	82	92	TOTAL	83	93		TOTAL	85	95	TOTAL	86	96		87	88
1917	.	.	.	.	.	.	.	.	.	.	.	.	.	3.4	.	.	3.4
1918	.	.	.	.	.	.	1.2	.	.	.	.	.	.	22.7	.	.	23.9
1920	.	.	.	.	.	.	7.3	.	.	.	.	.	.	0.9	.	.	8.2
1921	.	.	.	.	.	.	32.2	.	.	.	.	.	.	4.8	.	.	37.0
1922	.	.	.	.	.	.	7.3	.	.	.	.	.	.	2.2	.	.	9.5
1923	.	0.7	.	.	.	.	3.0	.	.	.	.	.	.	0.1	.	.	3.8
1924	.	1.1	.	.	.	.	33.6	.	.	.	.	.	.	0.9	.	.	35.6
1925	.	2.0	.	.	3.0	.	8.8	.	.	.	.	.	.	0.7	.	.	14.5
1926	.	1.7	.	.	3.8	.	3.2	.	.	.	.	.	.	.	.	.	8.7
1927	.	1.1	.	.	.	.	4.2	.	.	.	.	.	.	0.6	.	.	5.9
1928	.	0.6	.	.	1.6	.	6.7	.	.	.	.	.	.	2.2	.	.	11.1
1929	.	.	.	.	0.5	.	2.3	.	.	.	.	.	.	.	.	.	2.8
1930	.	0.5	.	.	.	.	5.4	.	.	.	.	.	.	.	.	.	5.9
1931	.	0.3	.	.	.	.	3.7	.	.	.	.	.	.	0.8	.	.	4.9
1932	.	0.7	.	.	1.2	.	5.0	.	.	.	.	.	.	1.3	.	.	8.2
1933	.	1.4	.	.	.	.	4.5	.	.	.	.	.	.	.	.	.	5.9
1934	.	.	.	.	.	.	4.4	.	.	.	.	.	.	0.7	.	.	5.1
1935	.	.	.	.	.	.	9.8	.	.	.	.	.	.	0.4	.	.	10.2
1936	.	.	.	.	.	.	8.6	.	.	.	.	.	.	.	.	.	8.6
1937	.	3.0	.	.	1.7	.	9.8	.	.	.	.	.	.	2.0	.	.	16.4
1938	.	3.0	.	.	1.9	.	4.1	.	.	.	.	.	.	0.8	.	.	9.7
1939	.	2.0	.	.	1.0	.	5.4	.	.	.	.	.	.	1.2	.	.	9.7
1940	.	2.3	.	.	4.7	.	13.2	.	.	.	.	.	.	1.3	.	.	21.4
1941	.	1.4	.	.	2.8	.	9.8	.	.	.	.	.	.	1.7	.	.	15.7
1942	.	1.7	.	.	2.5	.	1.2	.	.	.	.	.	.	1.6	.	.	6.9
1943	3.9	.	.	.	.	.	5.0	.	.	.	.	.	.	2.0	.	.	10.9
1944	1.9	.	.	.	.	.	3.5	.	.	.	.	.	.	0.9	.	.	6.3
1945	.	.	.	.	1.0	.	3.9	.	.	.	.	.	.	1.2	.	.	6.1
1946	.	.	.	.	2.2	.	2.2	.	.	.	.	.	.	2.1	.	.	6.4
1947	.	.	.	.	0.9	.	.	3.2	.	.	2.7	.	.	.	0.9	.	7.7
1948	.	.	.	.	0.9	.	.	2.7	.	.	15.4	.	.	.	10.0	.	29.1
1949	.	.	.	.	2.3	.	.	.	.	.	10.0	.	.	.	3.6	.	15.9
1950	.	.	.	.	1.4	.	.	0.9	.	.	5.9	.	.	.	2.3	.	10.4
1951	.	.	.	.	0.9	.	.	2.7	.	.	6.4	.	.	.	3.6	.	13.6
1952	.	0.5	.	.	2.3	.	.	3.2	.	.	3.2	.	.	.	5.0	.	14.1
1953	.	.	.	.	1.4	.	.	15.4	.	.	10.0	.	.	.	1.8	4.5	33.1
1954	.	0.5	.	.	1.8	.	.	7.3	.	.	3.2	.	.	.	3.2	0.5	16.3
1955	.	0.5	.	.	5.0	.	.	2.7	.	.	6.8	.	.	.	.	9.1	24.1
1956	.	0.5	.	.	8.2	.	.	.	.	.	4.5	.	.	.	2.3	2.3	17.7
1957	.	.	.	.	.	2.3	5.0	.	.	.	.	2.7	.	.	0.9	1.4	12.3
1958	.	.	.	0.9	.	9.1	5.0	.	.	.	.	0.5	.	.	1.4	1.8	18.6
1959	.	.	.	0.9	.	4.5	12.3	.	.	.	.	3.2	4.5	.	0.5	0.5	26.3
1960	.	.	0.5	1.4	.	8.2	5.4	.	.	.	.	5.4	7.3	.	1.4	2.3	31.8
1961	.	.	1.4	1.8	.	3.6	2.3	.	.	.	.	1.8	5.0	.	.	1.8	17.7
1962	.	.	0.9	2.7	.	1.4	1.8	.	.	.	.	5.4	0.9	.	.	.	13.2
1963	.	.	0.9	1.4	.	6.8	1.8	.	.	.	.	1.8	1.4	.	.	1.8	15.9
1964	.	.	0.5	1.4	.	12.7	9.1	.	.	0.9	.	4.1	2.7	.	1.4	1.4	34.1
1965	.	.	0.5	0.9	.	21.3	7.3	.	1.4	1.8	.	6.8	1.8	.	2.3	4.5	48.6
1966	.	.	0.5	0.5	.	17.3	5.4	.	0.5	1.8	.	5.0	1.8	.	.	.	32.7
1967	.	.	.	2.7	.	33.1	4.5	.	0.5	2.3	.	2.3	0.5	.	12.3	3.6	61.7
1968	.	.	0.1	25.0	.	47.2	18.7	.	.	3.8	.	4.7	3.5	.	4.8	22.9	130.7
1969	.	.	4.2	47.9	.	49.9	19.2	.	.	3.5	.	3.7	7.1	.	17.1	41.9	184.6
1970	.	.	6.4	54.4	.	76.7	25.1	.	1.4	1.6	.	1.8	9.7	.	12.4	50.4	240.0
1971	.	.	13.6	62.5	.	138.8	39.0	.	.	5.3	.	3.6	7.7	.	45.8	35.1	351.5
1972	.	.	7.8	63.9	.	89.1	25.9	.	.	21.2	.	4.1	9.6	.	20.8	30.4	272.7
1973	.	.	5.0	31.8	.	47.7	18.4	.	.	14.9	.	3.3	7.3	.	15.1	13.7	157.2
1974	.	.	.	13.2	.	34.4	10.8	.	.	5.7	.	3.7	10.9	.	12.2	10.3	101.1
1975	.	.	.	20.7	.	26.6	12.1	.	0.7	11.8	.	1.6	4.3	.	13.7	12.0	103.4
1976	.	.	1.0	24.5	.	29.5	9.9	.	.	3.9	.	3.5	1.2	.	11.9	8.7	94.2
1977	.	.	0.2	19.6	.	26.3	12.1	.	.	3.2	.	7.0	0.9	.	10.6	17.7	97.6
1978	.	.	0.2	28.0	.	26.2	17.8	.	1.5	5.4	.	0.7	2.1	.	10.5	21.2	113.4
1979	.	.	.	23.7	.	22.4	21.7	.	0.5	6.9	.	0.3	0.4	.	29.0	6.1	110.9
1980	.	.	0.1	8.5	.	18.9	27.5	.	0.1	21.9	.	0.2	2.1	.	18.8	22.0	120.1
1981	.	.	0.9	34.7	.	13.0	49.0	.	.	45.9	.	2.5	.	.	31.2	42.8	220.1
1982	.	.	0.2	39.3	.	20.1	38.4	.	.	25.8	.	0.3	0.9	.	17.5	25.1	167.6
1983	.	.	1.3	34.2	.	21.4	30.3	.	.	27.6	.	0.4	0.1	.	7.1	28.1	150.5
1984	.	.	.	30.1	.	12.6	27.6	.	.	55.9	.	0.3	0.4	.	3.8	33.9	164.8
1985	.	.	0.1	40.9	.	22.7	28.8	.	.	10.3	.	2.1	1.4	.	2.5	30.6	139.6
1986	.	.	.	28.4	.	44.9	62.8	.	5.1	21.1	.	23.6	5.5	.	2.2	32.4	225.9
1987	.	.	.	9.6	.	29.5	57.8	.	0.6	16.7	.	0.6	1.0	.	1.7	32.4	149.9
1988	.	.	.	15.3	.	7.7	31.3	.	0.3	16.6	.	5.4	1.7	.	11.3	35.1	124.7
1989			.	7		2	14		.	19		1	2		9	17	71
1990			.	16		3	56		.	17		.	.		10	18	120
1991			2	7		14	68		.	14		.	2		2	18	127
1992			.	6		3	10		.	9		.	0		2	23	53
1993			1	18		44	24		.	9		14	2		14	3	129

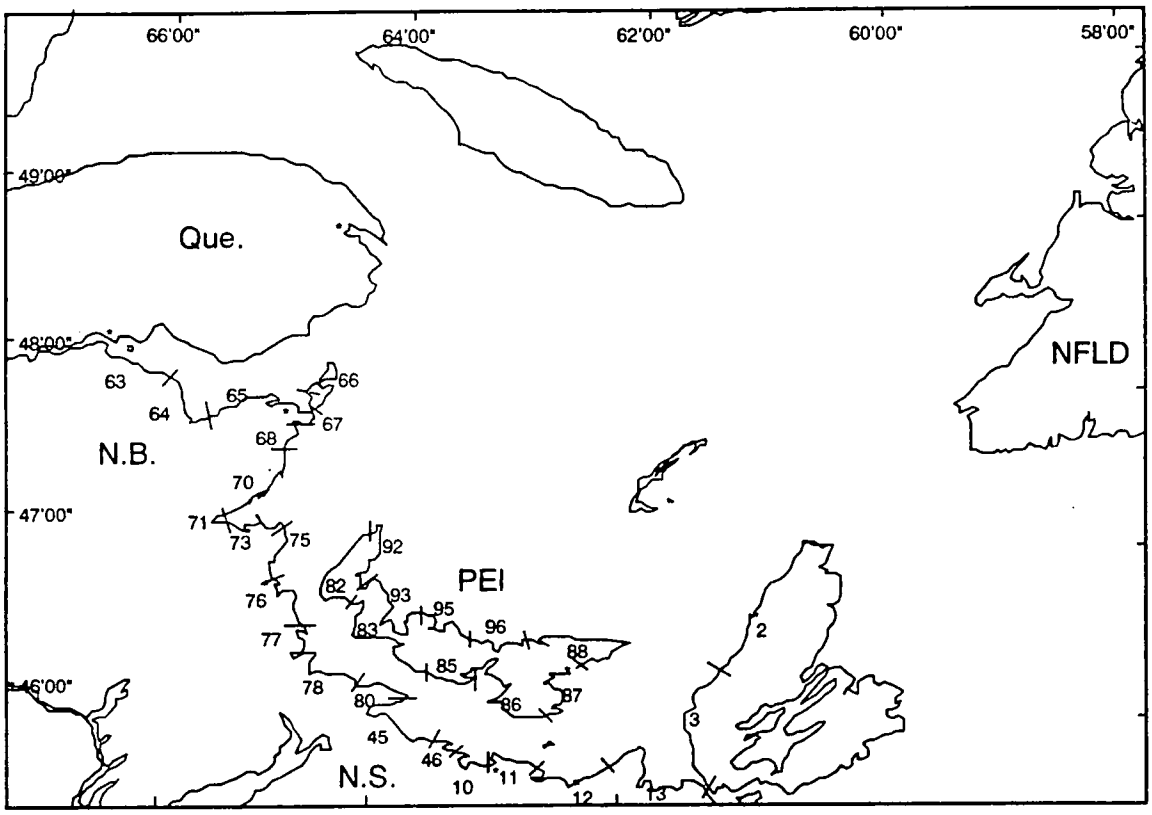


Figure 1. Southern Gulf of St. Lawrence, showing statistical districts mentioned in the text.

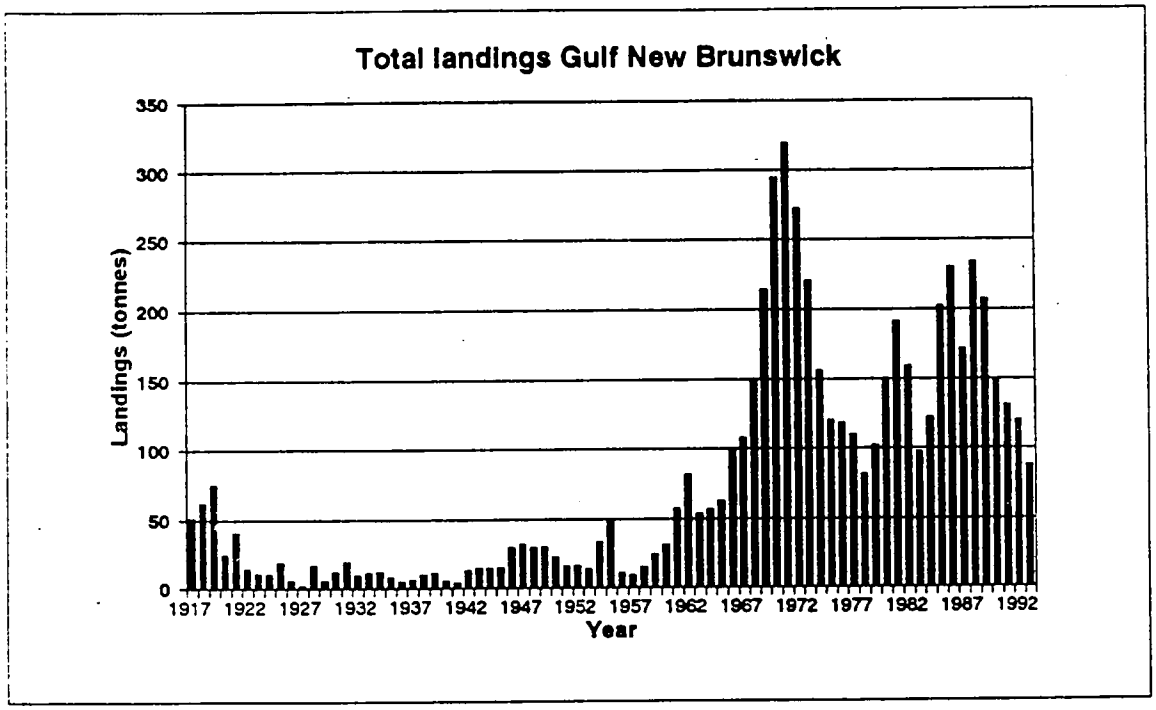
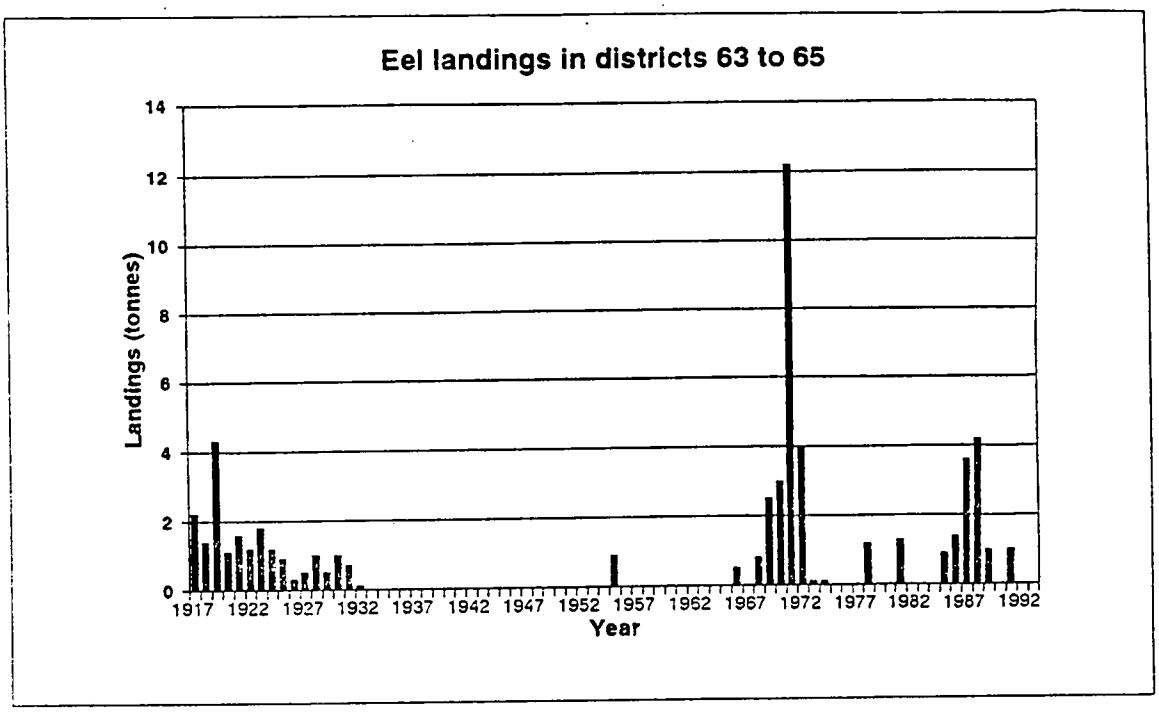


Figure 2. Total landings of American eel in Gulf region New Brunswick, 1917-1993.



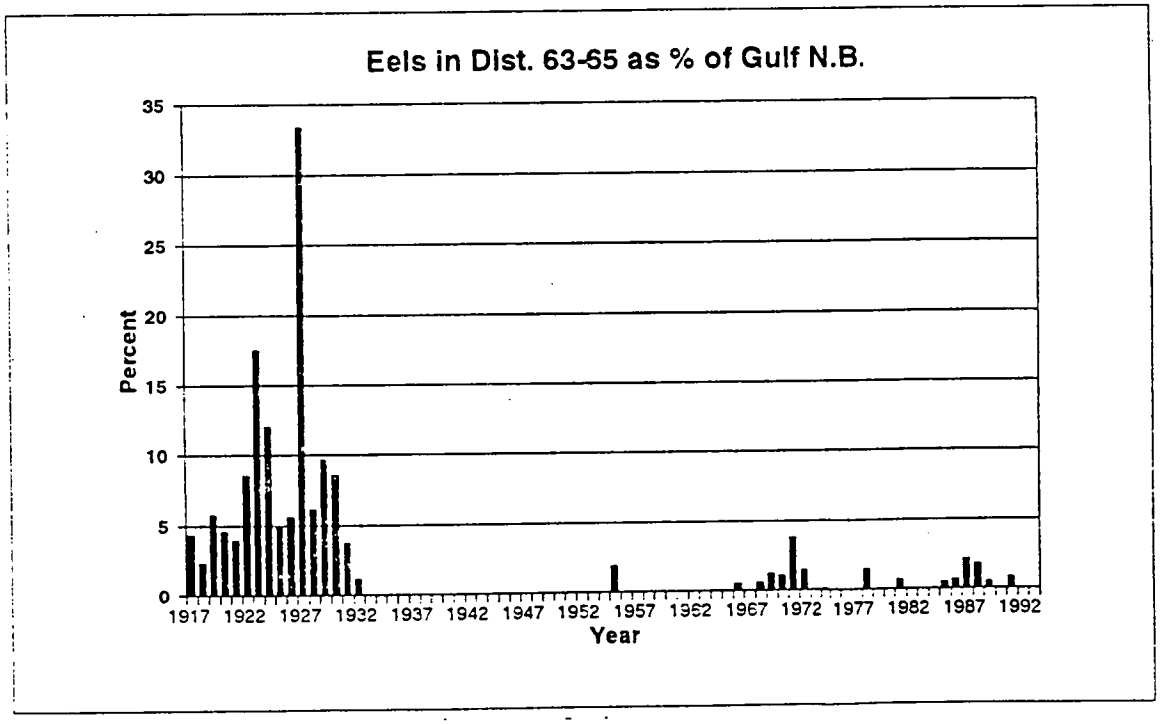
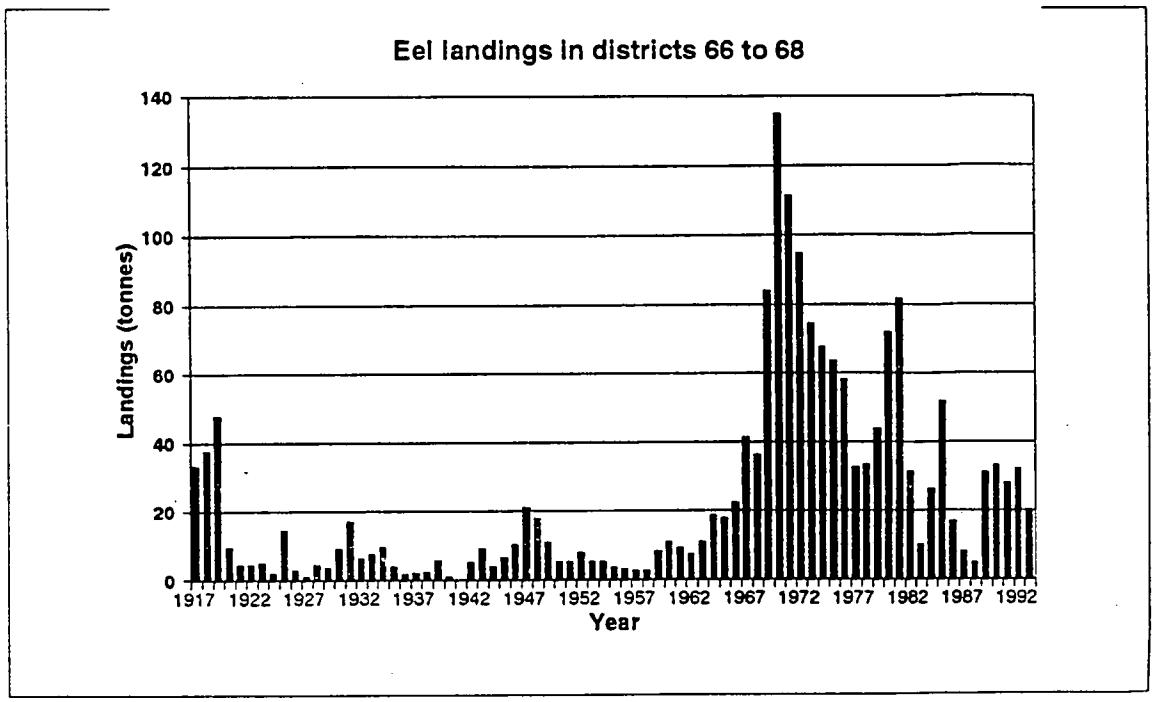


Figure 3. Landings of American eel in statistical districts 63-65 (Gulf region, New Brunswick).



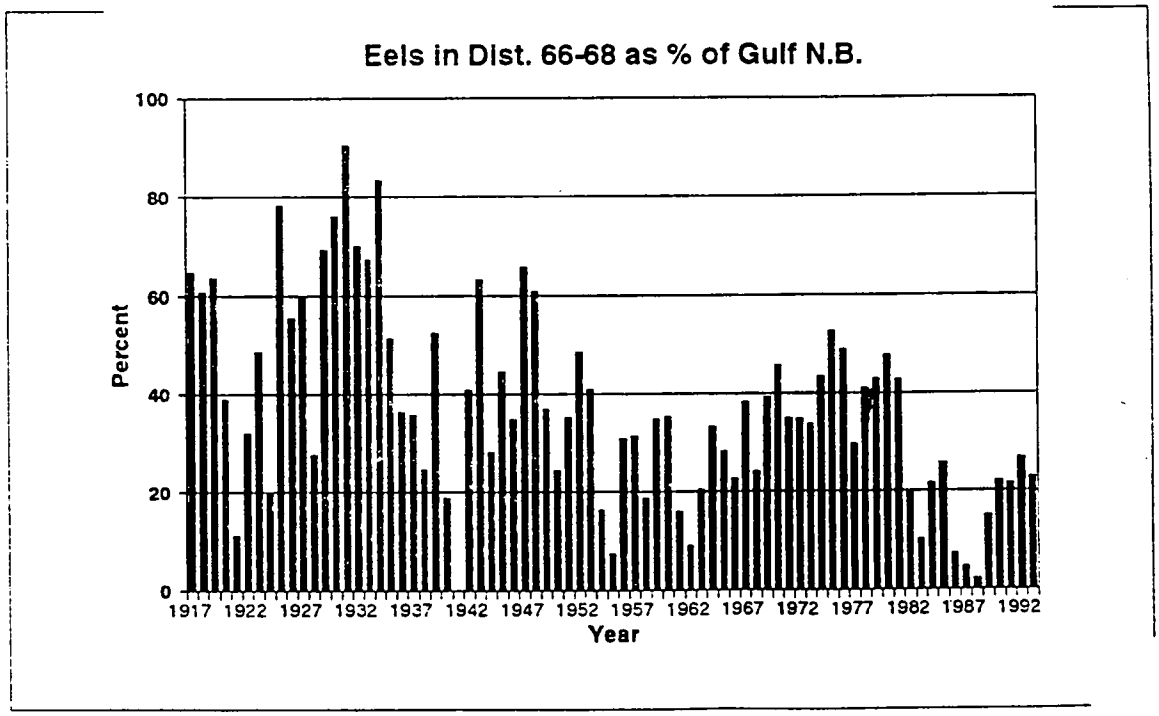
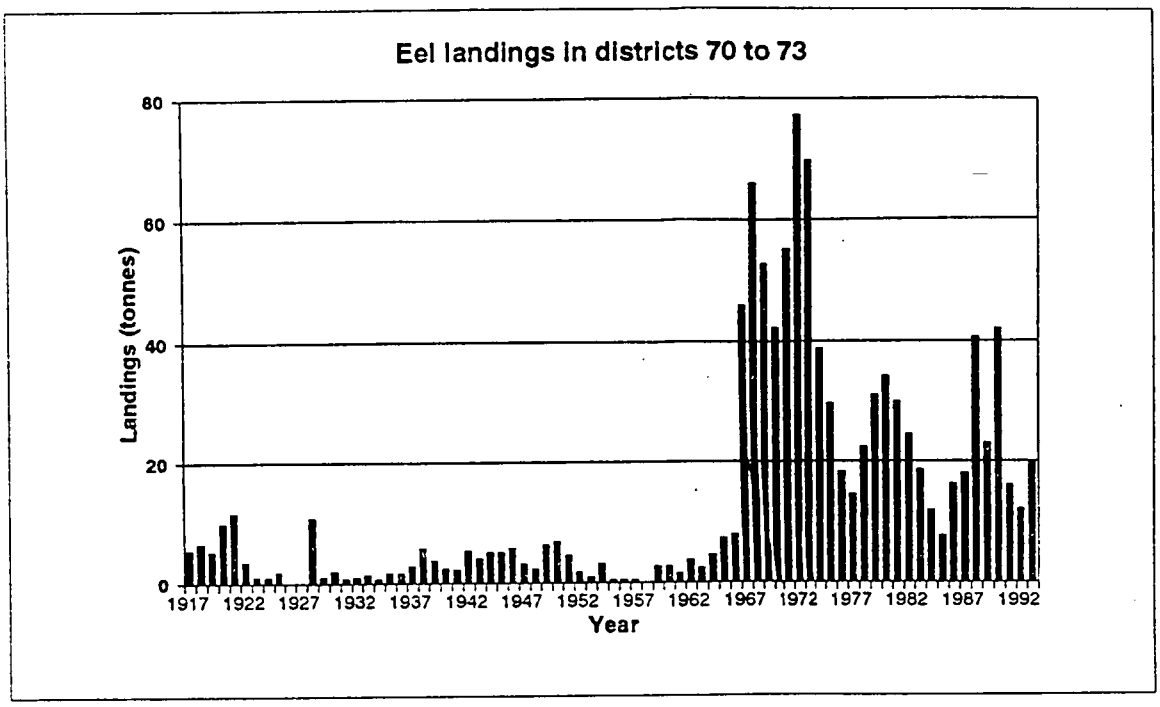


Figure 4. Landings of American eel in statistical districts 66-68 (Gulf region, New Brunswick).



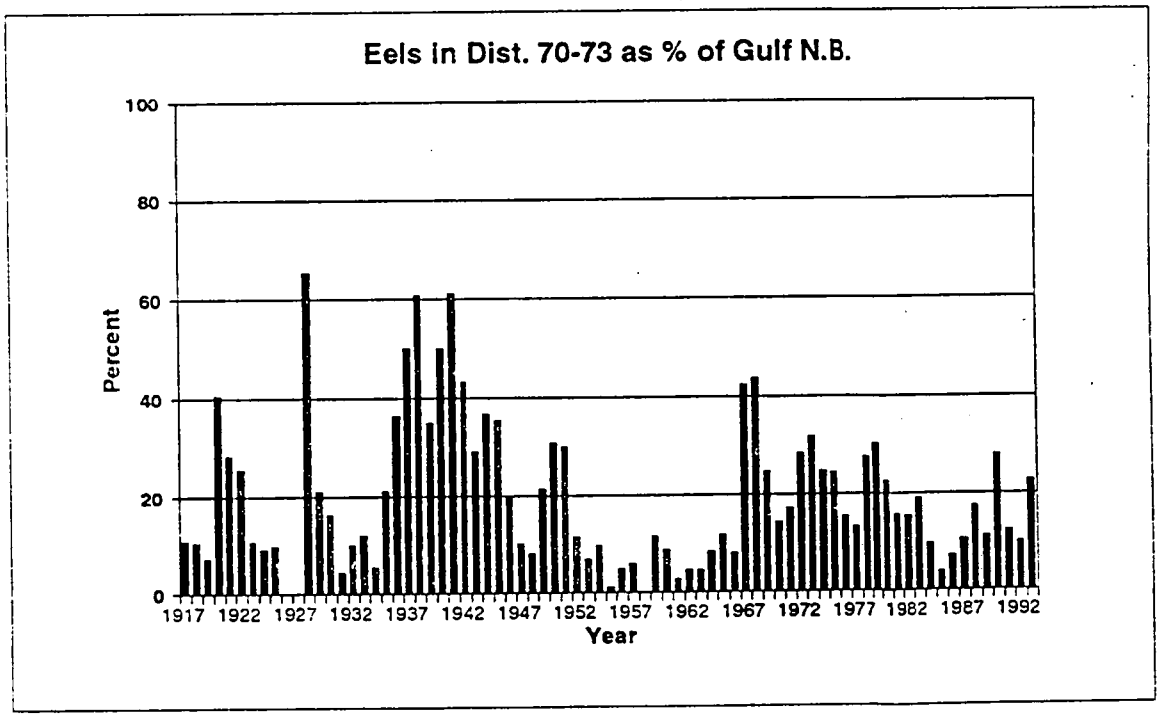
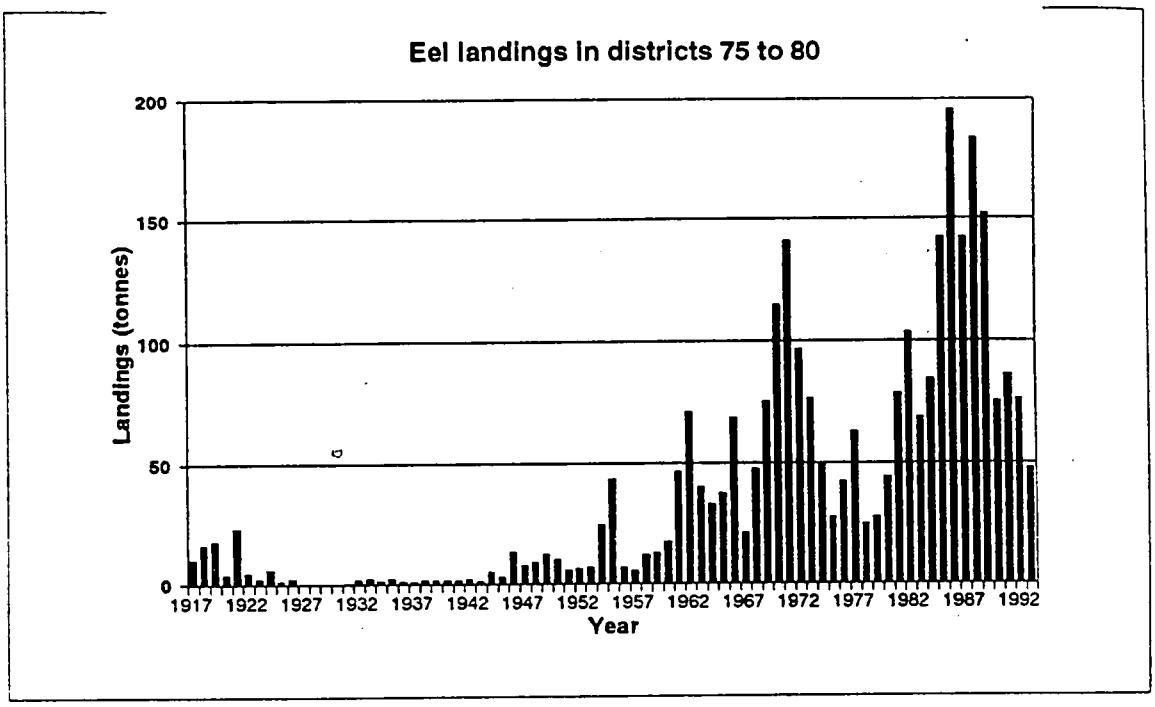


Figure 5. Landings of American eel in statistical districts 70-73 (Gulf region, New Brunswick).



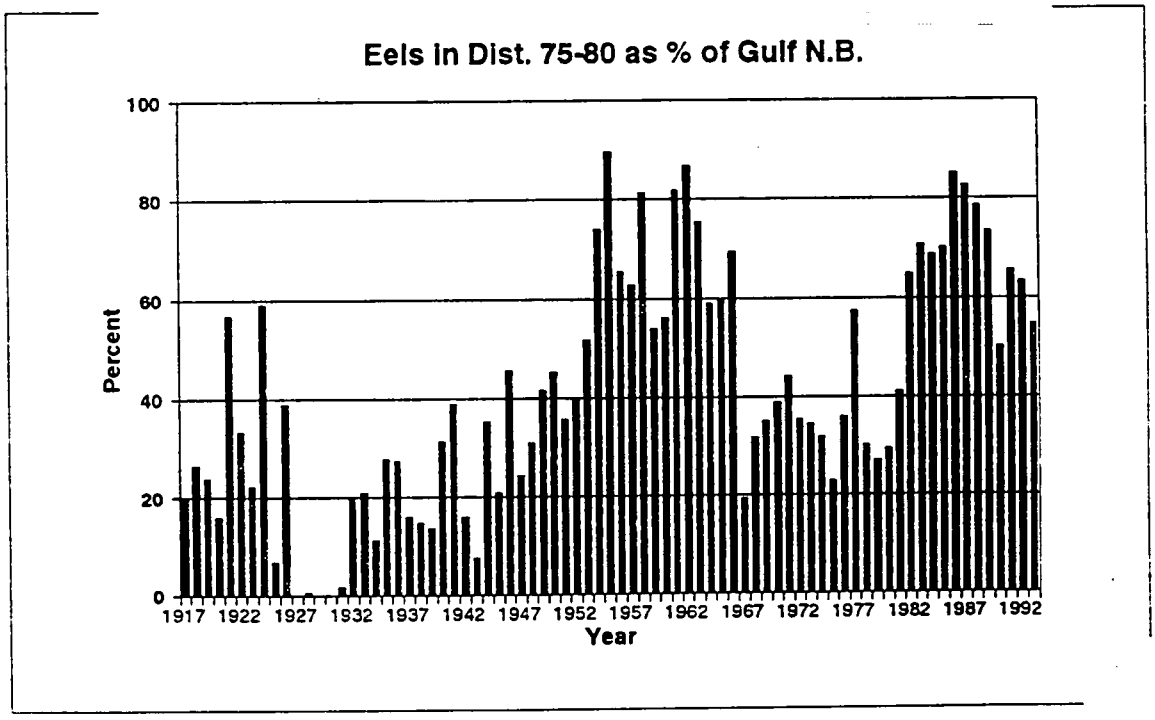


Figure 6. Landings of American eel in statistical districts 75-80 (Gulf region, New Brunswick).

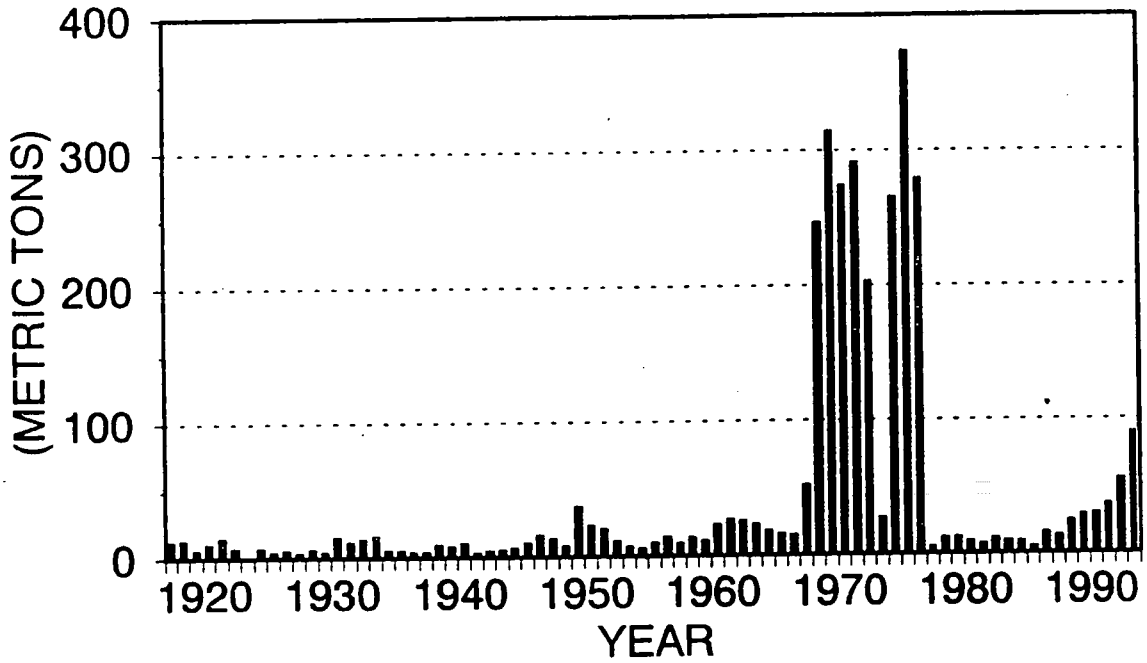


Figure 7. Total landings of American eel in Gulf region, Nova Scotia, 1917-1993.

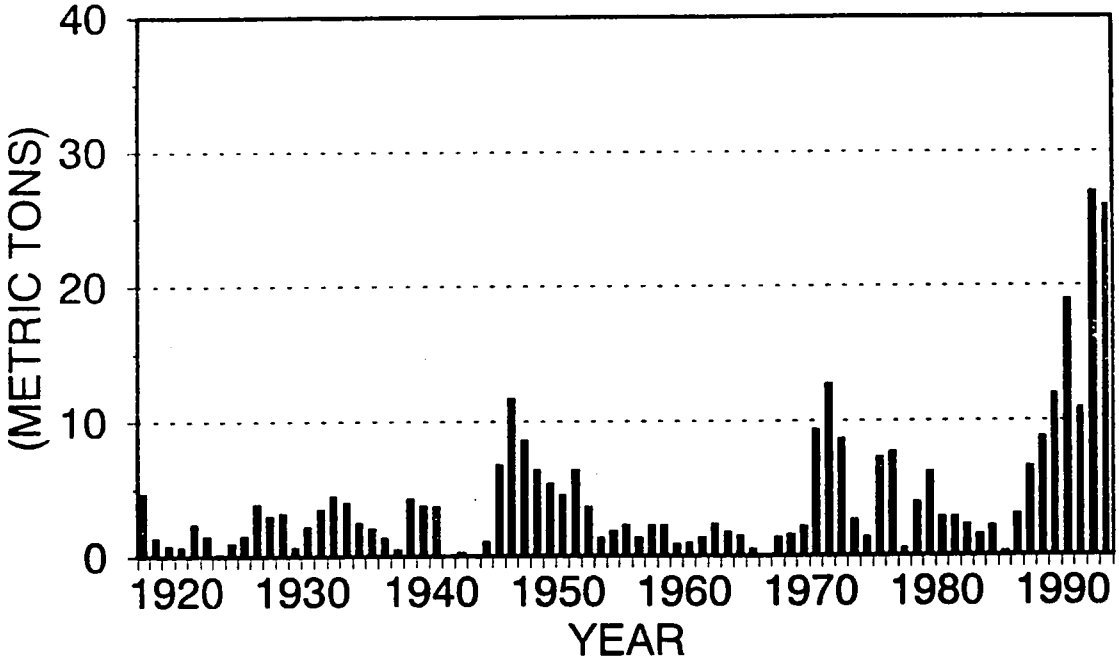


Figure 8. Landings of American eel in statistical districts 10-12 and 45-46 (Gulf region, Nova Scotia).

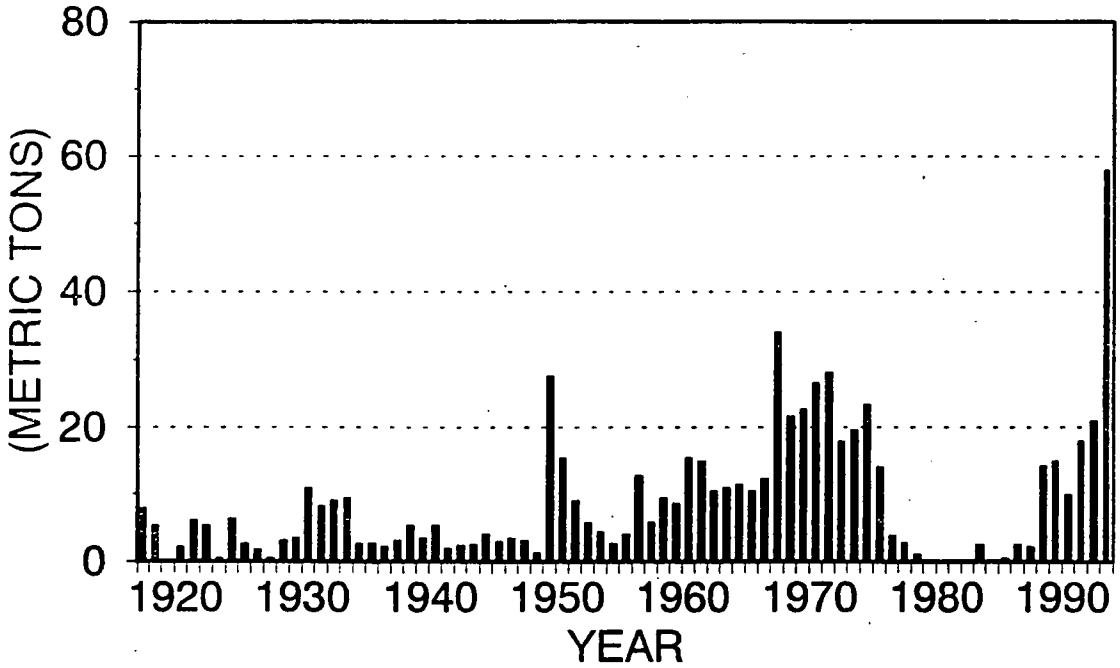


Figure 9. Landings of American eel in statistical district 13 (Gulf region, Nova Scotia).

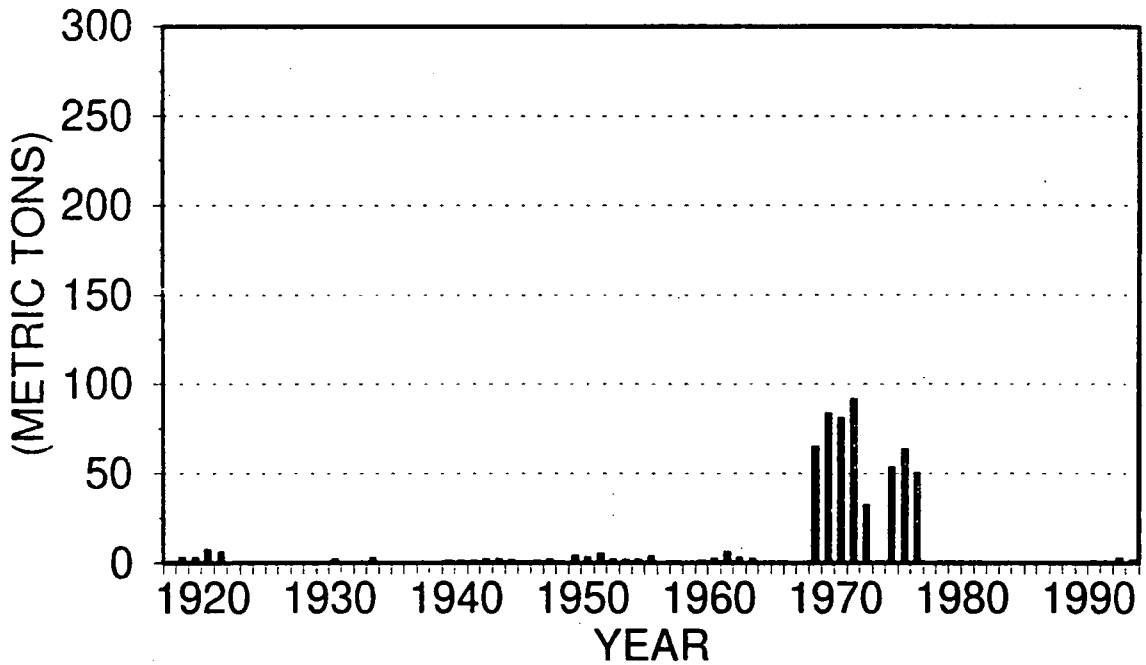


Figure 10. Landings of American eel in statistical district 3 (Gulf region, Nova Scotia).

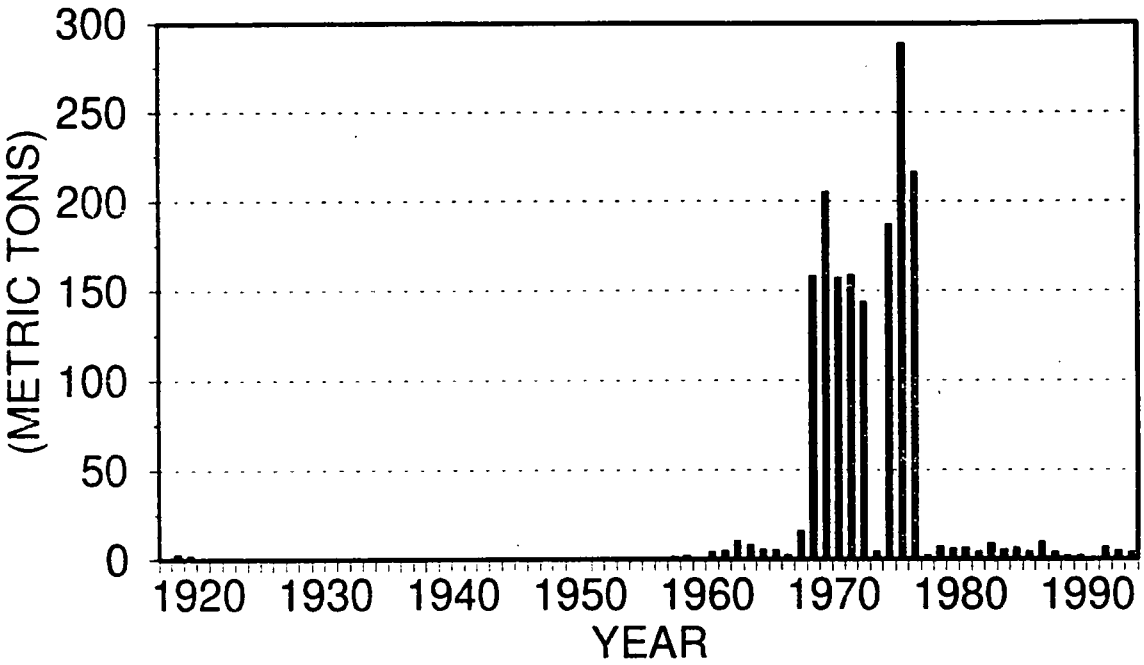


Figure 11. Landings of American eel in statistical district 2 (Gulf region, Nova Scotia).

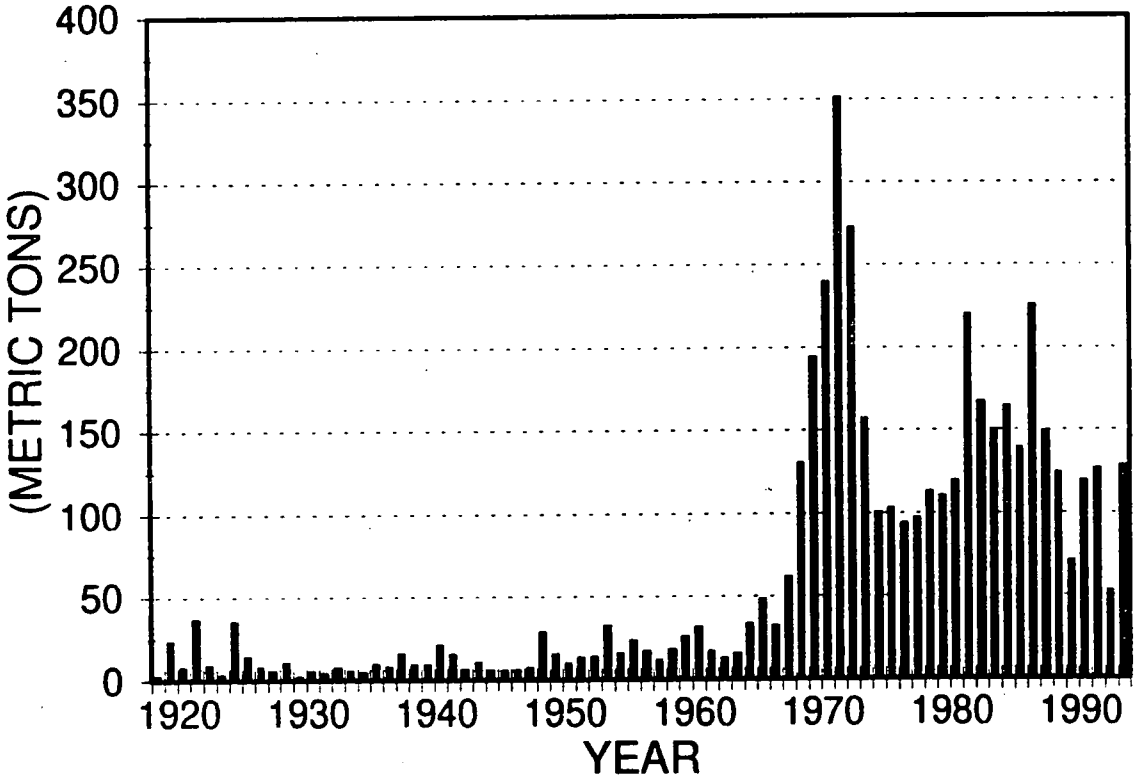


Figure 12. Total landings of American eel in Prince Edward Island, 1917-1993.

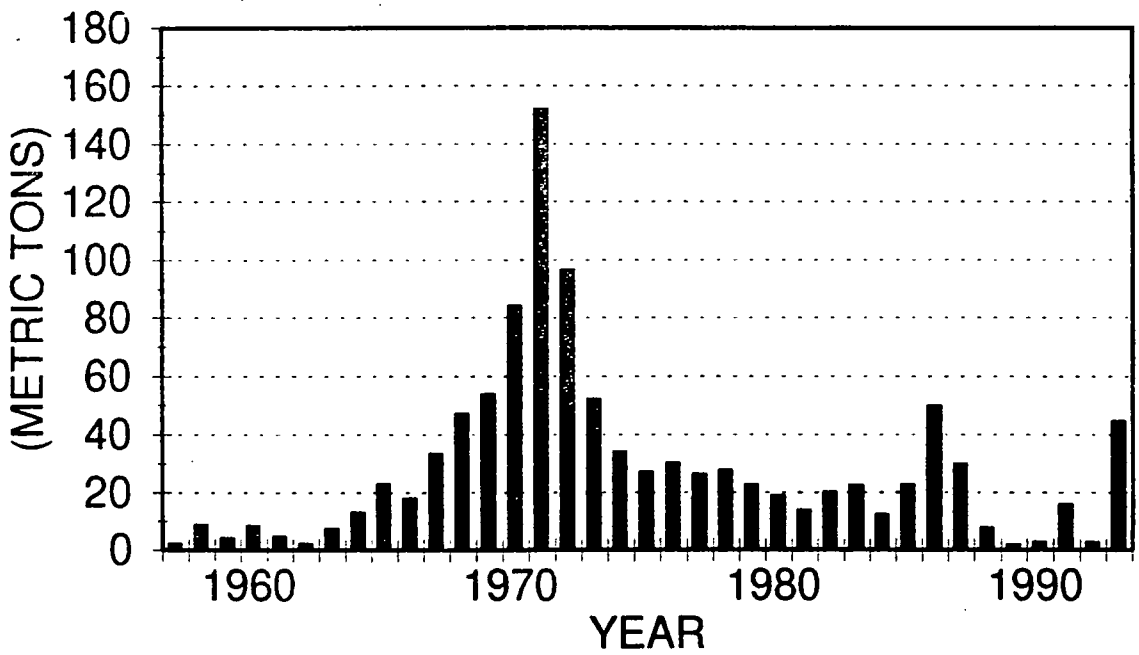


Figure 13. Landings of American eel in statistical districts 82, 83 and 85 (Prince Edward Island).

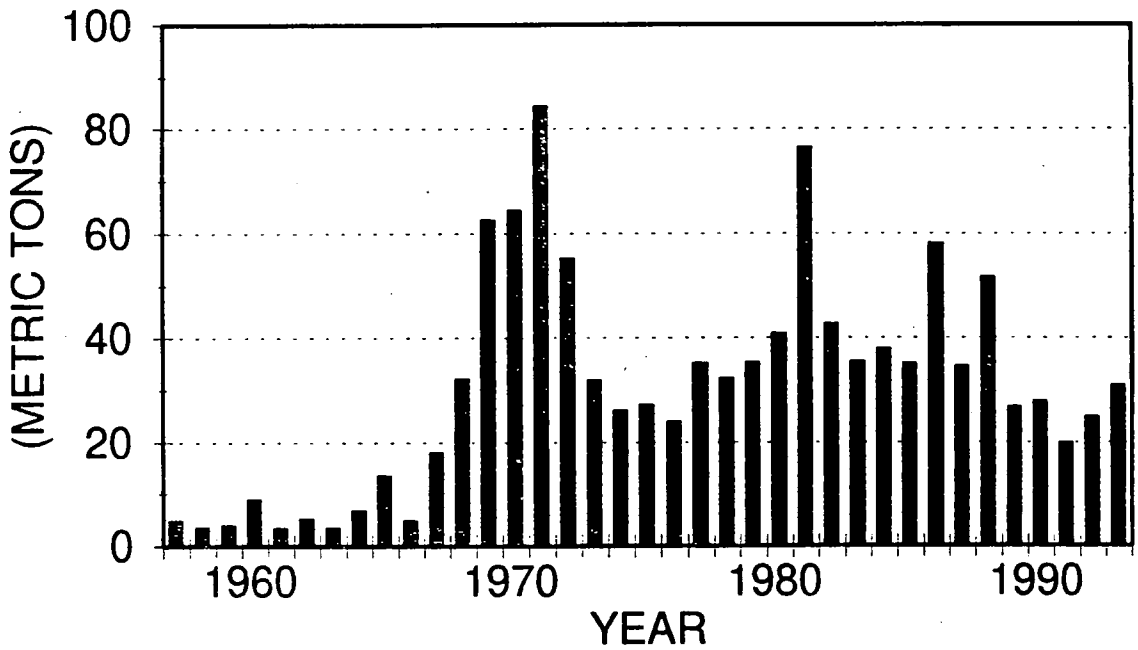


Figure 14. Landings of American eel in statistical districts 86-88 (Prince Edward Island).

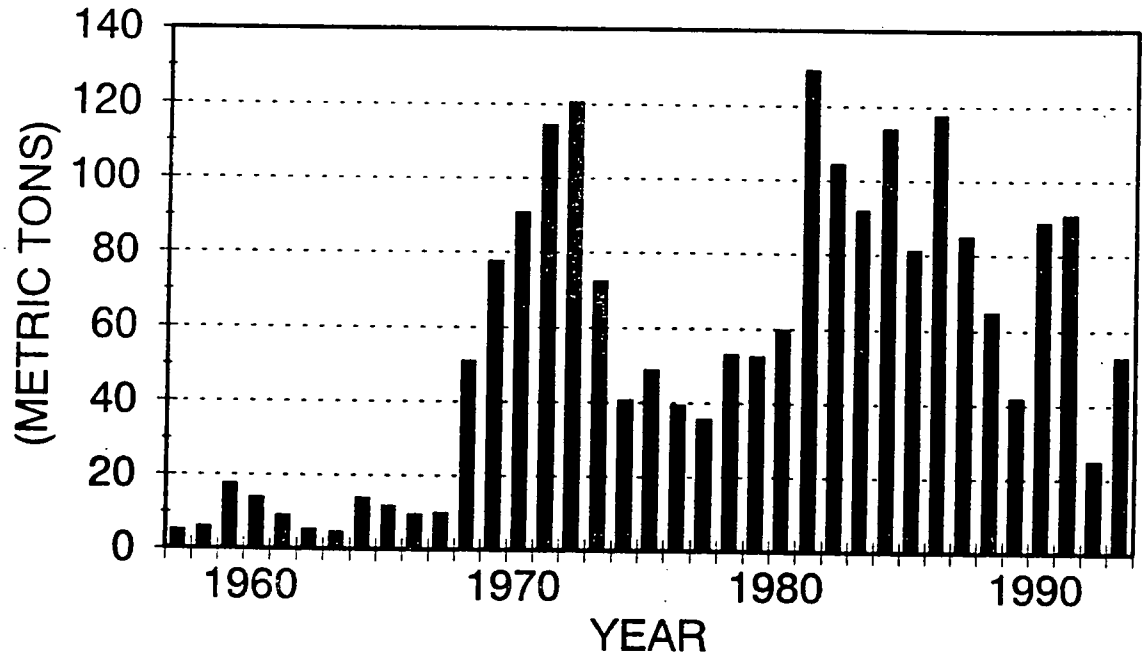


Figure 15. Landings of American eel in statistical districts 92-96 (Prince Edward Island).

Appendix 1a. Minutes from regional stock assessment meetings, New Brunswick, 1994

Minutes of Science Workshop on Eels of Eastern New Brunswick

1. General Comments

Minutes from the Advisory Committee meeting on May 5, 1994, had not yet been sent to participants.

- The purpose of this meeting was not clear. Next time an agenda will be sent to all participants before the meeting.

2. Landings

- Landings were low until the 1960s, increased until mid-1970s, and have declined to present.
- Participants agreed that landings were low before the 1960s for several reasons: there were no licences before 1960; fyke nets were introduced in the late 1960s; overseas markets for eels opened in the early 1970s; and the minimum length on eels retained was removed in 1968.
- Participants also agreed that the decline in landings since mid-1970 was because of overfishing of small eels and no recruitment.
- The recent increase in landings, 1988-1992, was because of an increase in fishing effort and because the processors will buy all sizes of eels, even very small eels.

3. Abundance

- Participants agreed that before 1960s, landings did not reflect abundance, but during the 1970s and 1980s, landings did indicate changes in abundance.
- Today, eels are believed to be at low abundance. The high fishing effort and the absence of any size limit suggests that eels are being seriously overfished.
- Another reason for declines in eel abundance is trapping of beavers and loss of beaver ponds and prime eel habitat and loss of nutrients that beavers bring into food chain. This problem is evident on Pokemouche River.
- Eels also appear to be disturbed by outboard motors, which stir up the bottom.

- Several biological questions were asked: Were eels near Tracadie feeding on eggs of other fish? Do eels move among watersheds? Why are eels bigger in some rivers? Why do eels of all sizes move out of rivers throughout the summer? Have elvers disappeared from rivers on the Acadian Peninsula?
- Fishers are reluctant to keep logbooks because of income tax and unemployment insurance.

4. Management Targets

- Fishers felt that a minimum size needs to be implemented immediately. The suggested size is 20 inches. Does this size make sense biologically?
- Fishers also felt that there should be limits on the number of eel nets. Is there a biological basis for limiting fishing effort?
- Fishers did not feel that there was any need to establish fishing seasons. Seasons would be different for each river.
- Fishers would like a device that allows small eels to escape nets efficiently. The results of L. Lanteigne's eel trap selectivity study will be made available.
- Fishers wondered why eel pots, a more selective gear, were not as effective as fyke nets.
- Need method to limit fishing effort in the recreational fishery.

5. Issues

- A logbook program needs to be initiated. Catch rates in the eel fishery would provide excellent indicators of stock abundance. Currently, there is no adequate method to record catch and fishing effort by watershed.

PARTICIPANTS WORKSHOP ON EELS OF EASTERN NEW BRUNSWICK MAY 5, 1994		
Mike Chadwick	DFO/MPO, Moncton	506-851-6206
Florence Albert	DFO/MPO Tracadie-Sheila	506-395-7740
Arthur Arsenault	Tracadie	
Ludger Benoit	DFO/MPO Tracadie-Sheila	506-395-6159
Lucien Brideau	Pont LaFrance	506-395-4374
Irénée Comeau	Tracadie-Sheila	
Edmond Drysdale	Shediac	506-532-4162
Arcade Fontaine	Richibucto	506-876-2907
Jacques Fontaine	Richibucto	506-523-9419
Camille Godin	Val Comeau	506-395-5402
James Gregan	Fisherman, Baie Ste-Anne	506-228-6761
Patrick Labillois	Eel River Bar	506-684-5048
Brian LeBouthillier	Tracadie	506-395-4863
Gérald LeBouthillier	Tracadie	506-395-4863

François Mondo	MPA, Caraquet	506-726-2400
Edward Nowlan	ALCPRP, Pokemouche	506-727-3716
Earl Rivers	Pokemouche	506-727-6646
Alvin Scott	Douglastown	506-773-7209
George St-Coeur	Lower Néguac	506-776-8228
France Vautour	St-Louis de Kent	506-876-2045
Norbert Vienneau	Sheila	
Kenneth Williston	Fisherman, Bay du Vin	506-228-4740
Theodore Williston	Fisherman, Baie Ste-Anne	506-228-4223

Appendix 1b. Minutes from regional stock assessment workshops, Prince Edward Island, 1994.

Smelt and Eels Prince Edward Island
Stock Status Workshop

Dec. 1, 1994
DFO Area Office, Charlottetown, PEI

Participants:

Ivan Baglole	Representative Smelt and Eel Ad. Comm.
Hubert Ashley	Representative Smelt and Eel Ad. Comm.
Kenny Tuplin	Representative Smelt and Eel Ad. Comm.
Norman MacLeod	Representative Smelt and Eel Ad. Comm.
Alvin Gunn	Representative Smelt and Eel Ad. Comm.
Don Strongman	Representative Smelt and Eel Ad. Comm.
Michael Gauthier	Representative Smelt and Eel Ad. Comm.
Joe Knockwood	Abegweit Native Guardian
Dave Younker	PEI - Dept. of Fish. and Aqua.
J.F. Gaudet	DFO - Fishery Officer
Ross Claytor	DFO - Science
Helene Dupuis	DFO - Science
Jim Jenkins	DFO - Resource Allocations

Smelt:

Landings and effort:

- Dip in smelt landings in 1959 and 1960 was the result of the St. Lawrence seaway opening and creating poor markets for Maritime smelt

- It is common to catch fish in one area and sell them in another and this must be taken into account when interpreting landing statistics by area
- Smelt gillnets are hauled once a day and box nets are checked every second day. Voluntary logbooks to record catch and effort should ask for catch sold and number of nets used. It would be possible to keep a record of all species caught and sold but not for species which are not sold. The size of net and mesh should be included
- The location of landing and selling should also be recorded
- Recreational smelt shacks could also provide useful data on catch and effort. Holland college students are currently working on a project to measure number of smelt shacks
- No one currently uses bag nets in the PEI smelt fishery

- There is also a recreational gillnet smelt fishery which allows one gillnet to be used to harvest smelt for personal use
- Markets have been very good for smelt in recent years

Abundance:

- Abundance is generally felt to be down and predation from cormorants and seals were identified as potential problems
- Small dams on many rivers may also be interfering with spawning runs of smelt and preventing them from reaching preferred spawning habitat

Eels:

Landings and effort:

- Fyke nets were introduced in 1965 and landings went up
- Generator powered lights were introduced into the flambeau fishery in the mid to late 80s increasing the catching power in that fishery
- Weather is a critical factor in the flambeau fishery
- Voluntary logbooks should record amount of hours fished, catch, type of boat, number of lights, and qualitative statements on numbers of small eels
- Fyke nets are mobile, data for voluntary logbooks should include number of nets, location, when checked, and other species sold
- There is no freshwater fishery for eels in PEI as there is in other provinces
- Markets have been very good for eels in recent years

Abundance:

- Eel abundance was felt to be declining

Gaspereau and Silversides:

- Concerns were also raised by this group over the high fishing pressure on silversides and gaspereau
- Because the rivers are small, beach seines and dipping can be used to catch a high proportion of these fish during spawning run