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**The Status of American Eels *Anguilla rostrata* in the Scotia-Fundy Area of the
Maritimes Region as Indicated by Catch and License Statistics**

by

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Abstract

Much variability has occurred since 1950 in annual reported catches of American eels by province within the Maritimes and by Fishery Statistical District within the Scotia-Fundy and Gulf portions of the Maritimes Region. Maritimes catches of American eels peaked in 1971 at 778 t and have since fluctuated between about 300 and 500 t. Since the mid-1980s, catches of eels within the Gulf Region have declined but catches within Scotia-Fundy Region have increased, particularly in New Brunswick. Most American eels caught in Scotia-Fundy Region come from a few Fishery Statistical Districts, particularly in the Saint John River area in New Brunswick and Lunenburg to Yarmouth counties, and less so from the Eastern Shore and eastern Cape Breton in Nova Scotia. The number of commercial licenses issued and gear units authorized increased annually between 1985 and 1993 when a freeze was imposed on new licenses. Commercial license numbers increased during this period about three times and gear units increased about six times while recreational licenses and gear units increased about five and seven times, respectively. Licensing practises and the variety of gear types make comprehensive analyses of fishing effort impractical, but catch/effort has likely declined. Current biological data for stocks of American eels in Scotia-Fundy rivers are restricted to the Saint John River. The scarcity of current biological data, moderate quality of catch statistics, and crudity of information on fishing effort limit fishery management to the most basic actions.

Résumé

Depuis 1950, les prises annuelles d'anguille d'Amérique signalées dans chacune des provinces Maritimes et dans chaque district statistique des pêches du secteur Scotia-Fundy et du Golfe de la région des Maritimes montrent une grande variabilité. Les prises ont atteint un pic de 778 t en 1971, puis ont fluctué depuis entre environ 300 t et 500 t. Depuis le milieu des années 80, les prises dans le secteur du Golfe ont diminué, mais les prises dans le secteur Scotia-Fundy ont augmenté, en particulier au Nouveau-Brunswick. La plupart des anguilles récoltées dans ce dernier secteur proviennent de quelques districts statistiques des pêches, plus particulièrement de la région de la rivière Saint-Jean, au Nouveau-Brunswick, et de la région s'étendant du comté de Lunenburg au comté de Yarmouth, en Nouvelle-Écosse, et, dans une moindre mesure, de la côte est de la Nouvelle-Écosse et de l'est du Cap-Breton. Le nombre de permis de pêche commerciale délivrés et d'unités d'engin autorisés a augmenté annuellement de 1985 à 1993, lorsqu'un gel a été imposé sur la délivrance de nouveaux permis. Le nombre de permis de pêche commerciale a presque triplé pendant cette période, tandis que le nombre d'unités d'engins autorisés a presque sextuplé, le nombre de permis de pêche récréative et d'engins autorisés pour cette pêche ayant quintuplé et septuplé, respectivement. Les pratiques de délivrance des permis et la diversité des engins de pêche rendent peu réalistes des analyses de l'effort de pêche, mais il est probable que les prises par unité d'effort ont diminué. Les données biologiques disponibles sur les stocks d'anguille des cours d'eau de Scotia-Fundy ne couvrent que la rivière Saint-Jean, tandis que la rareté de données biologiques courantes, la qualité modérée des statistiques sur les prises et la crudité de l'information sur l'effort de pêche limitent la gestion de la pêche aux mesures les plus fondamentales.

Introduction

The American eel (*Anguilla rostrata*) supports many small-scale commercial fisheries throughout the Scotia-Fundy Region (joined in 1995 with the Gulf Region to form the Maritimes Region), with major fisheries restricted to specific areas, such as the Saint John River, the south and southwestern shores of mainland Nova Scotia, and the southeastern portion of Cape Breton Island (Figure 1). Little biological work has been done to assess the status of American eel stocks in Maritime Province's waters since the review by Jessop (1982), at which time a similar lack of knowledge on eel stock status was noted. Eel abundance has declined in the Gulf of St. Lawrence beginning about 1985 but no evidence of similar decline has been observed in the Scotia-Fundy Region or along the Atlantic coast of the United States (Castonguay et al. 1994a). Recent biological data are unavailable for eel stocks of specific rivers; the only available information is the number of licenses (commercial and recreational) issued and landings reported (commercial fishery) by Fishery Statistical District (FSD; Figure 1). Intermittent biological data collected from several areas of the Saint John River during the 1980s and early 1990s have not yet been analyzed and published (Jessop, unpublished data). Biological data from the yellow (growing) and silver (migrating and maturing) eel fisheries of south-shore Nova Scotia are presented in Jessop (1987).

Biology

American eels are catadromous (spawned at sea, then grow and approach maturity in freshwater) and are widely distributed throughout Maritime Province's streams and estuaries. The species ranges the western North Atlantic Ocean from southwestern Greenland, along the coast of North America from southern Labrador to the Gulf of Mexico, Panama, and the West Indies (Scott and Scott 1988). Mature eels spawn in the area of the Sargasso Sea during late winter and spring (McCleave et al. 1987). Larval eels (leptocephali) drift and swim in the upper 300 m of ocean while currents, particularly the Gulf Stream, unpredictably distribute them along the Atlantic coast of North America until they metamorphose to the glass eel stage and begin to move coastward during the next winter and spring (progressively later in more northern areas). Glass eels first enter streams of the Maritimes Provinces about late April or early May, becoming elvers and increasingly pigmented as the run progresses upstream. Young eels continue, for perhaps years, to distribute themselves throughout the available habitats. After a variable period of time, ranging perhaps from five to twenty or more years in Atlantic Canada depending on growing conditions, juvenile (yellow) eels begin sexual maturation, become silver eels, and migrate to sea during late summer and autumn. Maturation is completed at sea and the adults spawn and ultimately die in the Sargasso Sea.

American eels of various life stages occupy a wide variety of habitats - the ocean, estuaries, streams, rivers, and lakes. Their extensive geographic range, ability to occupy a wide variety of habitats, and a panmictic (intermixing of eels from all geographic areas) breeding population (Avisé et al. 1986) evidences and contributes to their adaptive plasticity. Growth rates of yellow eels are highly variable, depending upon the latitude (slower growth in northern areas) and nature (productivity) of the habitat. Within a given habitat, growth rates of individual eels vary greatly. Females are more abundant, older, and larger at sexual maturity than males in northern areas (Helfman et al. 1987; Jessop 1987). These differing life history traits may result from male and female eels experiencing different natural selection pressures (Helfman et al. 1987).

Numerous aspects of American eel biology remain unknown or poorly known, including the nature of eel spawning, the causes and rates of larval/elver marine mortality, the factors affecting offshore and inshore coastal distribution and movement, the mortality rates and distribution patterns of elvers/young eels in estuarine and fresh waters, the factors influencing young eel distribution and annual movement rates within and between river and estuarine habitats, the

freshwater and estuarine growth rates, the factors determining maturation and sex determination, the fecundity-size relation, the variability in growth and mortality rates and sex ratios within different habitats and geographic regions, the annual escapement of silver eels from individual rivers (escapement = total run size - fishery catch), and the contributions of geographic regions to the total spawning stock.

Fishery Regulations

The lack of a coherent policy for the management of American eels in the Maritime Provinces noted by Jessop (1982) continued after formation of the Scotia-Fundy and Gulf regions. Present regulations governing the conduct of fisheries for American eels (a panmictic species that randomly recruits to streams) vary widely between provinces and regions although management actions to rationalize regulations are being considered.

Existing *Maritime Provinces Fishery Regulations* require a license for all commercial and recreational eel fisheries, except for recreational angling and spear fishing for eels in tidal waters (a tidal waters recreational fishing license is scheduled for implementation in 1996). The distinction between commercial and recreational licenses has not always been enforced. No new commercial licenses have been issued for the lower Saint John River, N.B., since 1990, although a loosely enforced license freeze was implemented as early as 1980. In 1993, a freeze on new commercial licenses (with some exceptions) and on recreational licenses, except for eel pots, was imposed throughout the then Scotia-Fundy Region; in the Gulf Region of New Brunswick, license issue restrictions had been implemented in the early 1980s. New recreational licenses for pots were limited to four pots per license. The freeze on new eel licenses was intended to continue until development of a comprehensive Eel Management Plan in consultation with client groups (J. R. Angel, Fisheries and Habitat Management Branch, memorandum of 19 May 1993). Such a management plan is being developed, pending changes to the *Fisheries Act*. A minimum size limit (20 cm) was implemented in 1973 for American eels caught in the inland and tidal waters of the Maritimes Region (excluding P.E.I.), although elver (eels <10 cm) fisheries have been authorized in the Scotia-Fundy portion of the Region (Jessop 1995). The 20-cm size limit was imposed ostensibly to preserve seed stock for commercial eel aquaculture and to require the harvest of larger eels. Fishers in various parts of the Scotia-Fundy area have supported an increase in the minimum size limit to 30 cm while, in the Gulf portion of New Brunswick and Nova Scotia, minimum sizes were changed in 1995 to 48 cm and 46 cm, respectively; it is 46 cm in Prince Edward Island (Locke et al. 1995). Different minimum size limits in different areas have no identified biological rationale.

Eel traps (including fyke nets and weirs), pots, and spears are permitted gears but may be seasonally restricted in use. Thus, in the inland (non-tidal) waters of Nova Scotia, trap use is permitted between August 15 and October 31; pots have no season, and spears are prohibited. In the tidal waters of Nova Scotia, all gear types are permitted throughout the year. In the inland waters of New Brunswick, traps and spears are prohibited while pots have no season. In the tidal waters of New Brunswick (Scotia-Fundy area), traps and pots are permitted throughout the year but spear fishing is closed between September 1 and November 15. A few exceptions exist within the generality of these regulations, e.g., fyke nets were used in the middle, non-tidal reaches of the Saint John River upstream of the Mactaquac Dam between about 1974 and 1995 when the license was terminated.

In recent years, changes to the fishery regulations, e.g., increased minimum size limits, have been discussed in various Eel Advisory Committee meetings (Advisory Committees exist for Southwest New Brunswick (Saint John River) and the South and Eastern shores of Nova Scotia) but none have yet been implemented, pending further discussions with fishers. Since it makes little biological difference as to which life stage (elver, yellow, or silver eel) is harvested as long as a sufficient escapement of silver eels occurs to support the spawning population, the management

of American eel fisheries becomes a matter of balancing social (maintaining traditional fisheries and methods) and economic factors (given the large difference between elver and larger eel prices per kg; Jessop 1995).

No management target or catch quotas exist for American eel fisheries in the Maritimes Region. Rational catch quotas for the stock of eels in any river are difficult to set because of the unique life history of American eels and the limits on our knowledge of critical life history parameters. Amongst other factors, elver recruitment is difficult to measure and may vary unpredictably; elver and yellow eel mortality rates are generally unknown, difficult to measure, and likely vary geographically; the factors triggering the transition from yellow to silver eel are unknown; determining the proportion of the total spawning population contributed by any river or geographic area, i.e., the post-fishery escapement of silver eels, is difficult if not impossible to measure; and the relative contributions of fished and unfished stocks in rivers and coastal areas to the total spawning population are unknown, but are likely of major importance. In any case, good management in one region could be nullified by poor management in other regions. Consequently, a consistent management policy throughout the range of the American eel is of great importance and should be actively promoted and supported.

Catches

The only available index of the status of American eel stocks in the Maritimes Region is the trend in annual reported catches (landings or, more properly, sales) by geographic region (province, area (Scotia-Fundy, Gulf), and Fishery Statistical District (FSD)). The use of annual catch statistics to infer stock status assumes that fishing effort has remained constant, an unrealistic assumption since potential fishing effort (issued licenses and permitted quantity of gear units) has greatly increased over time. Catch levels also fluctuate in response to market demands, independent of stock status. Catch-per-unit-effort is a more reliable index of stock status but suitable effort data are unavailable. Consequently, simple trends in catch are subject to much uncertainty in interpretation.

Catch statistics for American eels are collected by Fishery Officers via sales slips (records of sales by individual fishers to commercial buyers) and by Supplementary As and Bs (Fishery Officer estimates of sales and personal uses, e.g., bait, not recorded by sales slips). Reduced attention has been given since the mid-1980s to the collection and submission of sales slip and Supplementary reports for eel fisheries because Fishery Officer resources were allocated to other priorities. A logbook system was developed for the Saint John River fishers during the early 1980s to obtain catch and effort data but it was indifferently supported by fishers and Fishery Officers because regulations were insufficient to enforce its use. In 1990, a logbook system was introduced throughout Scotia-Fundy Region by the Diadromous Fish Division in an effort to improve catch statistics, acquire effort data, and ultimately improve management of the American eel resource. The catch data reported by Fishery Officers often match that obtained from the logbooks but substantial differences may occur. Annual reconciliation of such differences should improve the overall quality of the catch statistics.

Reported annual catches of American eels have varied substantially among years and provinces since 1947 (Figure 2). Total Maritime Province's catches generally remained less than about 150 tonnes (t) between 1950 and 1963, then increased sharply to a peak of 778 t in 1971, and have since fluctuated between about 300 and 500 t. In Nova Scotia, eel catches varied between about 10 and 70 t (rarely higher) between 1947 and 1990 then sharply increased. New Brunswick catches gradually increased to about 100 t by the mid-1960s, then greatly increased until the early 1970s after which catches fluctuated, with much variability, about the 200 t level. Prince Edward Island catches have generally tended downward since the early 1970s peak and are now the lowest of the three Maritime Provinces. Market conditions (price, demand) may influence annual fishing effort, such as during the late 1960s when prices, fishing effort, and catches increased throughout the Maritimes, but

catches also reflect the availability of catchable-sized eels and the catch decline through the 1970s has been attributed to overfishing (Jessop 1982; Smith 1982).

The splitting, in 1981, of the Maritimes Region into Gulf and Scotia-Fundy regions (rejoined in 1995), in addition to provincial divisions, complicates the presentation of catch statistics but enables more detailed geographic and biological interpretation of the available data. Catch and value of American eels increased sharply in the Scotia-Fundy portion of Nova Scotia during the 1990s and more moderately in the Gulf portion of Nova Scotia (Table 1). The eel catch has varied irregularly but remained high since the late 1980s in the Scotia-Fundy sector of New Brunswick but has declined in the Gulf sector, as have catches in Prince Edward Island. The decline in American eel catches in the Gulf area since the mid-1980s coincides with the early-1980s decline in eel catches in the St. Lawrence River and Great Lakes and with the mid-1980s decline in recruitment of young eels to the upper St. Lawrence River (Castonguay et al. 1994b). The present decline in eel catches is likely not a consequence of declining juvenile recruitment because the lag between recruitment and silver eel migration is insufficient but decreased recruitment could be of future importance. Castonguay et al. (1994a) hypothesized that a weakening of the Gulf Stream during the 1980s has reduced recruitment of elvers to the Gulf of St. Lawrence, although more recent studies have suggested that oceanic conditions may be operating in a manner differently than originally hypothesized (personal communication, M. Castonguay, DFO, Mont Joli, Québec).

Most American eel catches occur in relatively few FSDs and during a six-month fishing season. In the Nova Scotia portion of Scotia-Fundy area, FSDs 26-28 along the South Shore consistently report the highest catches while FSDs 4-7 in Cape Breton, FSDs 17 and 19-21 along the Eastern Shore, and FSDs 31-34 in Yarmouth and Shelburne counties have active fisheries (Table 2). In the New Brunswick portion of Scotia-Fundy area, the largest American eel fishery is in the Saint John River, particularly FSDs 55-57 and 59 (Table 3). In the years 1991-1995, about 98.6% of the annual total catch was made during the months of May through October, with average monthly percentages of the total annual catch as follows: May 11.3%, June 19.0%, July 19.3%, August 16.3%, September 17.1%, and October 14.2%. Mean monthly variability in catch amongst years was about $\pm 3.5\%$ of the total annual catch.

The eel fishery in FSD 59 (Meduxnekeag River and main stem of the Saint John River downstream of Woodstock) is remarkable in that it began in 1974 and continues to harvest substantial quantities of yellow and silver eels some 28 years after the Mactaquac Dam was completed in 1968. At the Mactaquac Dam, eel (elver, because few larger eels enter the fishlift) passage became a by-product of gaspereau escapement trucking to Mactaquac Lake. Since 1980, elver passage to Mactaquac Lake via gaspereau trucking has been eliminated because elvers no longer reach the Mactaquac Dam, possibly because of increased water velocity and level fluctuations resulting from the addition of the final two (of six) turbines in 1980. Obviously the period of freshwater residence before American eels silver and migrate to sea can exceed 15 years and may reach or exceed 20-30 years. Ages of up to 35 years were reported for silver eels from Nova Scotia (Jessop 1987).

Inaccuracies and errors in the catch statistics include incomplete or misreported catches, recording of catches by district of sale and not capture, and unreported sales by previously unlicensed but now licensed (in many FSDs) recreational fishers. Summarizing data by FSD precludes knowledge of catches by

Year	Number of Commercial Licenses	Percent Response	river system. Inaction by Fishery Officers to enforce sales slip or logbook catch submissions, because the task is viewed as a low priority, results in under-reporting of catches. Annual catch statistics derived from Fishery Officer sales slip and Supplementary report submissions to the Commercial Data Division, are often similar to those obtained from logbooks by the Diadromous Fish Division but substantial differences may occur. For example, the differences in reported catch between
1990	348	9	
1991	409	21	
1992	448	24	
1993	530	29	
1994	483	32	
1995	487	27	

collection methods ranged from 0-26 t for an FSD during the years 1991-1994 (Table 3). The larger values are probably the "correct" values. The absence of reported catches in the Commercial Data Division records for FSD 59 between 1975 and 1991 (Table 3) reflects inadequate reporting of sales slip/Supplementary report data rather than no fishery during this period. The low response rate (stabilized at about 25-30%; see text table) to the logbook system may largely result from inactive fishers failing to submit a nil report but may also indicate under-reported catch. Most fishers submitting logbooks reported catches but not all active fishers submitted logbooks. Thus, in Yarmouth County (FSDs 33,34), 1992 and 1993 reported catches by logbook totalled 0 and 1.6 t and sales slip/Supplementary report data totalled 0 and 15 t (Table 3) but one eel buyer reported purchases of 12.7 and 15.0 t (D. Crowell, R. Crowell Eel Processor Ltd., Yarmouth Co., personal communication). Reported catches by logbook for Shelburne County (FSDs 30-32) in 1992 and 1993 were 1.0 t versus 1.9 and 2.8 t sold to Crowell Eel Processor Ltd.; for Queens County (FSD 28), reported catches were 9.7 and 9.6 t versus 6.9 and 10.1 t purchased; and for Lunenburg County (FSDs 25-27), reported catches were 11.2 and 15.3 t versus 9.1 and 12.0 t. Comparisons between logbook reported catches and eel processor purchases were fairly similar in Queens and Lunenburg Counties but Crowell Eel Processor Ltd. is only one of three major buyers in these counties. Clearly, in some areas, reported catches of American eels may be substantially lower than, or at least vary from, the true catch. The inadequacies of the reported catch statistics for American eels should be considered during interpretation but they are believed insufficient to warrant disregarding the catches since these are the primary source of information on the status of the fishery and the eel stock.

License Statistics

The numbers of commercial and recreational eel fishing licenses and units of gear permitted have substantially increased in the Scotia-Fundy area since 1985 (Table 4). Commercial fishing licenses increased in number annually until the license freeze occurred in 1993, by which time their numbers had increased about three-fold and the number of gear units authorized had increased about 5.7 times. In the commercial fishery, the number of pots increased 7.1 times, traps increased 3.8 times, while the number of weirs barely doubled between 1985 and 1993. Since 1993, the number of commercial licenses has declined 15% and gear units have declined 11%. Between 1985 and 1995, recreational eel fishing licenses increased about 4.8 times and the number of gear units increased 6.7 times, mostly in pot numbers. It is believed that substantial numbers of commercial and recreational fishing licenses for eels are not actively fished. This overhang of unfished licenses impedes effective eel fishery management.

No fishing effort data are available, although the number of licenses issued to fish American eels might be considered an analogue of fishing effort. Comparisons of estimates of catch per license are of doubtful validity because of the meaning of an individual license (in terms of gear use) has varied over time and among FSDs. Thus, prior to the early 1980s, eel fishers were issued a license for each gear unit, e.g., fyke or trap net, and no license was required for baited pots. More recently, a single license might represent a variable number of fyke nets and pots. Also, different gear types may predominate in different regions, gear mixes may change over time, and catchability differs greatly among pots, fyke nets, and weirs. Having said that, a crude comparison of catch data with license and gear unit data for Scotia-Fundy area indicates a continuing decrease in catch/license between 1985, 1990, and 1995 from 0.42 to 0.28 to 0.24 t/license and a decrease in catch/gear unit from 0.013 to 0.004 to 0.003 t/gear unit.

Summary and Conclusions

Much variability has occurred since 1950 in annual reported catches of American eels by province within the Maritimes and by FSD within the Scotia-Fundy and Gulf areas. Maritimes catches of American eels peaked in 1971 at 778 t and have since fluctuated between about 300 and 500 t. Since the mid-1980s, catches of eels within the Gulf area have declined but catches within the Scotia-Fundy area have increased, particularly in New Brunswick. The substantial increase in number of fishing licenses issued and gear units authorized has undoubtedly driven these increased catches since the mid-1980s. Whether current catch levels in Scotia-Fundy area can be maintained or increased while catch/effort declines is uncertain. The probable large overhang of unused licenses is a potential threat to the stability of the fishery.

The scarcity of current biological data, moderate quality of catch statistics, and crudity of information on fishing effort limits the basis for fishery management to the most basic of actions. The ongoing reorganization, reduction, and changing priorities of DFO activities and staff make it unlikely that these limitations to fishery management will improve in the near future. Enforcement of the logbook system is achievable as is reconciliation of statistics between logbook and sales slip methods which should provide more comprehensive and reliable catch statistics. Rationalization of the different statistics collection methods is advisable. Acquiring biological data from more than a few areas and useful effort data, by gear type, will be more difficult.

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Table 1. Annual reported catch (tonnes) and value of American eels, by DFO Fishery Region and Maritime Province (1980-1994).

Year	Nova Scotia						New Brunswick						P.E.I.	
	Scotia-Fundy		Gulf		Total		Scotia-Fundy		Gulf		Total		Gulf	
	Wt	\$'000	Wt	\$'000	Wt	\$'000	Wt	\$'000	Wt	\$'000	Wt	\$'000	Wt	\$'000
1980	40	42	10	17	50	59	25	46	150	241	175	287	120	203
1981	20	34	7	15	27	49	35	57	191	301	226	358	220	364
1982	15	26	11	21	26	47	3	6	159	276	162	282	168	281
1983	19	22	11	24	30	46	<1	<1	97	164	97	164	151	226
1984	8	16	9	16	17	32	3	6	122	185	125	191	165	272
1985	7	15	5	9	12	24	74	123	202	378	276	501	140	255
1986	6	17	15	32	21	49	54	120	230	510	284	630	215	558
1987	15	48	13	44	28	92	49	147	171	505	220	652	150	467
1988	14	42	24	77	38	119	135	440	234	694	369	1,134	125	351
1989	6	18	26	76	32	94	116	388	210	665	326	1,053	77	211
1990	5	20	21	65	26	85	91	291	149	500	240	791	120	377
1991	39	112	35	121	74	233	88	248	130	469	218	717	127	426
1992	62	236	56	232	118	468	73	235	120	444	193	679	54	182
1993	72	278	88	379	160	657	116	392	88	336	204	728	74	246
1994	100	379	42	170	142	549	131	442	68	282	199	724	46	220

Table 2. Annual reported catch (tonnes) of American eels, by Fishery Statistical District, for the Nova Scotia portion of Scotia-Fundy Region (1950-1995). Dash indicates either no catch or no reported catch. Only those FSDs reporting catches are presented.

Year	Fishery Statistical District																								Total					
	1	3 ^a	4	6	7	9	14	16	17	19	20	21	23	25	26	27	28	30	31	33	34	36	38	40		41	42	43	44	
1950	-	-	-	-	-	-	1.8	-	-	-	5.4	-	-	-	-	7.3	-	-	6.3	-	-	-	-	-	-	-	-	-	20.8	
1951	-	-	-	-	-	-	0.9	-	-	0.9	6.3	-	-	-	-	12.2	-	-	5.0	-	-	-	-	-	-	-	-	-	25.3	
1952	-	-	-	-	-	-	-	-	-	3.2	6.8	-	-	-	-	0.9	19.0	0.9	-	4.5	-	-	-	-	-	-	-	-	35.3	
1953	0.9	-	-	-	-	0.9	0.5	-	-	0.9	9.1	-	-	5.4	-	5.9	10.9	-	-	5.0	-	-	0.5	-	-	-	0.5	-	40.5	
1954	-	-	-	-	-	1.8	0.5	-	-	0.5	10.4	0.9	-	1.8	-	14.5	15.9	-	-	4.5	-	-	-	-	-	0.5	-	-	51.3	
1955	-	-	-	-	0.9	5.0	0.5	-	-	1.8	12.7	0.9	0.5	1.8	1.8	7.7	20.0	-	-	9.5	3.7	-	-	-	-	0.5	-	-	67.3	
1956	-	-	-	-	-	1.8	0.5	-	-	2.3	10.9	0.9	1.8	0.5	0.5	2.7	19.5	1.4	-	5.4	-	-	-	-	-	-	-	-	48.2	
1957	-	-	0.9	-	-	1.4	-	-	-	2.7	-	-	0.5	-	-	-	7.7	-	-	8.2	-	-	-	-	-	-	0.5	-	21.9	
1958	-	-	1.4	-	-	2.7	-	-	2.7	5.4	-	0.9	-	-	-	4.5	16.3	-	-	5.0	-	-	-	-	-	-	-	-	38.9	
1959	0.5	-	0.5	-	-	0.9	-	-	0.9	5.0	-	0.9	0.9	-	-	-	10.0	-	-	0.5	-	-	-	-	-	-	-	-	20.1	
1960	-	-	0.9	-	-	3.6	1.8	-	1.4	0.5	-	0.5	-	-	0.5	2.3	5.9	-	-	3.6	-	-	-	-	-	0.5	-	-	21.5	
1961	-	-	0.5	0.9	-	-	-	-	0.9	3.6	0.9	-	-	-	0.5	4.1	6.8	-	-	4.1	-	-	-	-	-	-	-	-	25.0	
1962	-	-	0.5	-	-	1.8	0.9	-	-	2.7	1.8	-	1.8	-	0.5	3.6	2.7	0.5	-	7.7	-	-	-	-	-	-	-	-	24.5	
1963	-	-	0.5	-	-	1.8	-	-	0.5	3.6	5.0	-	1.4	-	-	1.4	17.2	-	-	9.1	-	-	-	-	-	-	-	-	40.5	
1964	-	-	1.4	-	-	0.5	-	-	-	0.9	5.0	-	-	-	-	4.1	8.6	-	-	6.8	0.5	-	15.0	-	-	-	-	-	42.8	
1965	-	-	0.9	-	-	0.9	1.8	-	-	-	0.9	0.5	-	-	0.5	2.3	5.9	-	-	7.7	1.4	-	4.1	-	-	-	-	-	26.9	
1966	-	-	-	-	-	0.5	-	-	-	0.5	2.7	0.9	0.5	-	-	5.4	7.7	-	-	8.6	-	-	-	-	-	-	-	-	28.2	
1967	-	-	0.8	-	-	1.3	-	-	-	0.2	-	0.2	-	-	0.2	-	6.4	-	-	4.6	-	-	1.4	-	-	-	-	-	13.8	
1968	-	-	-	-	6.5	0.5	-	-	-	1.4	0.2	0.6	-	-	0.2	2.0	3.9	-	-	4.4	2.2	-	0.2	-	-	-	-	-	22.1	
1969	-	-	-	-	4.0	3.2	-	-	-	0.9	-	1.6	-	-	0.2	4.2	5.3	-	-	4.2	-	-	-	-	-	-	-	-	23.6	
1970	-	-	0.1	-	0.4	1.6	-	-	0.6	1.0	-	1.0	-	-	0.9	3.3	3.4	-	-	16.7	-	-	-	-	-	-	-	-	29.0	
1971	0.6	-	0.1	-	-	1.9	-	-	2.3	3.0	5.0	0.6	-	-	0.7	1.9	1.8	17.9	-	13.3	-	-	-	-	-	-	-	-	49.1	
1972	0.4	-	0.1	-	-	0.6	-	-	0.1	1.4	0.1	0.5	-	-	0.2	3.5	4.3	-	-	13.8	-	-	-	-	-	-	-	-	25.0	
1973	-	-	-	-	0.8	0.5	-	-	-	0.9	1.8	0.2	-	-	0.3	4.9	1.7	-	-	8.8	-	-	-	-	-	-	-	-	19.9	
1974	-	-	-	-	0.9	2.3	-	-	-	1.3	-	-	-	-	-	0.5	3.6	-	-	5.0	-	-	-	-	-	-	-	-	13.7	
1975	-	-	-	-	-	0.9	-	-	-	0.5	-	0.5	-	-	-	4.1	5.9	-	-	0.5	-	-	-	-	-	-	-	-	12.4	
1976	-	-	-	-	-	1	-	-	-	1	-	-	-	-	-	5	-	-	-	2	-	-	-	-	-	-	-	-	9	
1977	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	1	4	-	-	-	-	-	-	-	-	2	-	-	9	
1978	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	4	45	-	1	-	-	-	-	-	-	-	-	-	52	
1979	-	-	-	-	1	5	-	-	-	-	-	-	-	-	4	1	8	1	1	-	-	-	-	-	-	-	-	-	21	
1980	-	-	-	-	-	-	-	-	-	1	9.5	-	-	-	1	5	13	-	1	-	-	-	-	-	-	-	-	-	30	
1981	-	-	-	-	1	-	-	-	-	1	-	-	-	-	1	6	10	-	-	1	-	-	-	-	-	-	-	-	20	
1982	-	-	-	-	-	2	-	-	-	-	-	-	-	-	4	5	6	-	-	-	-	-	-	-	-	-	-	-	17	
1983	-	-	-	-	-	-	-	-	-	2	-	-	-	-	1	1	13	-	-	1	-	-	-	-	1	-	-	-	19	
1984	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	8	
1985	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	7	
1986	-	-	-	-	2	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	6	
1987	-	-	-	-	-	-	13	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	14	
1988	-	-	-	-	-	-	13	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	15	
1989	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	6	
1990	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	<1	4	-	-	-	-	-	-	-	-	-	-	-	5	
1991	-	-	<1	-	-	-	-	-	<1	1	10	-	-	-	11	3	9	-	-	-	-	-	-	-	-	-	-	<1	3	39
1992	-	6	2	11	-	-	3	4	-	-	3	-	-	1	8	2	10	-	1	-	-	-	-	-	1	1	-	-	62	
1993	1	9	2	10	17	1	1	-	-	-	6	<1	-	-	2	<1	4	-	-	15	-	-	-	-	-	1	1	1	72	
1994	<1	28	1	9	2	4	4	-	<1	1	8	<1	<1	<1	7	7	13	-	1	1	<1	<1	<1	<1	<1	<1	1	1	98	
1995 ^b	0.4	-	1.7	0.1	0.8	5.2	0.2	-	0.4	0.1	0.4	-	-	-	2.9	6.7	12.6	1.1	0.7	2.1	7.1	0.5	-	-	-	1.0	0.1	1.7	45.8	

^aRecent landings from this FSD reported from Scotia-Fundy ports.

^bPreliminary data.

Table 3. Annual reported catch (tonnes) of American eels, by Fishery Statistical District, for the New Brunswick portion of Scotia-Fundy Region (1950-1995). Dash indicates either no catch or no reported catch. Data in parentheses are from logbooks.

Year	Fishery Statistical District										Total
	48-49	52	53	55	56	57	58	59	81		
1950	-	-	-	3.7	14.0	0.8	-	-	-	-	18.5
1951	-	-	-	1.2	0.8	0.8	-	-	-	-	2.8
1952	-	-	-	2.4	5.8	0.4	-	-	-	-	8.6
1953	-	-	-	3.7	16.9	0.4	-	-	-	-	21.0
1954	-	-	-	5.4	4.1	-	-	-	-	-	9.5
1955	-	0.5	-	4.1	28.8	6.2	-	-	-	-	39.6
1956	-	-	-	1.6	0.8	-	-	-	-	-	2.4
1957	-	0.5	-	4.5	-	-	-	-	-	-	5.0
1958	0.5	-	-	6.6	-	-	-	-	-	-	7.1
1959	-	-	-	-	-	-	-	-	-	-	0
1960	0.8	-	-	-	-	-	-	-	-	-	0.8
1961	1.2	-	-	7.4	-	-	-	-	-	-	8.6
1962	0.5	-	-	7.8	0.4	-	-	-	-	-	8.7
1963	-	4.5	-	7.0	1.6	-	-	-	-	-	13.1
1964	0.5	0.9	-	8.3	-	-	-	-	-	-	9.7
1965	-	-	-	3.3	2.0	-	-	-	-	-	5.3
1966	-	-	-	18.9	0.4	0.4	-	-	-	-	19.7
1967	-	1.7	-	1.6	0.4	0.4	-	-	-	-	4.1
1968	-	0.8	-	10.3	0.4	0.8	-	-	-	-	12.3
1969	-	2.0	-	14.8	43.2	0.4	-	-	-	-	60.4
1970	-	2.3	0.1	13.2	30.5	7.0	1.2	-	-	-	54.3
1971	3.6	-	0.1	9.9	36.2	12.3	4.9	-	0.1	-	67.1
1972	1.3	-	-	0.8	25.9	7.4	-	-	-	-	35.4
1973	-	-	-	7.0	15.6	4.5	-	-	-	-	27.1
1974	-	-	-	4.9	13.2	-	-	2.8	-	-	20.9
1975	-	-	-	0.4	33.7	11.5	-	^b 6.3	-	-	51.9
1976	1	-	-	7	56	14	-	-	-	-	78
1977	-	-	-	30	49	21	-	-	-	-	100
1978	-	-	-	17	24	3	-	-	-	-	44
1979	^a 46	-	-	23	25	26	-	-	-	-	120
1980	8	-	-	16	-	-	-	-	-	-	24
1981	4	1	-	20	9	-	1	-	-	-	35
1982	-	-	-	3	-	-	-	-	-	-	3
1983	-	-	-	-	-	-	-	-	-	-	0
1984	-	-	-	3	-	-	-	-	-	-	3
1985	6	-	-	51	15	1	-	-	-	-	73
1986	5	-	-	32	17	1	-	-	-	-	55
1987	2	-	-	10	23	9	-	-	5	-	49
1988	65	-	-	60	-	-	-	-	10	-	135
1989	-	-	-	100	9	2	-	-	5	-	116
1990	8	0.1	-	41	28	3	2	-	8	-	90.1
1991	17	<1	-	1	41	7	-22	-	<1	-	88
	(16.6)	(0.1)	-	(1.2)	(40.7)	(7.0)	(22.0)	-	(0.1)	-	(87.7)
1992	2	1	-	2	49	2	-	-	3	-	59
	(0.4)	(1.1)	(0.1)	(1.8)	(49.2)	(1.7)	-	(10.3)	(2.6)	-	(67.2)
1993	17	-	-	31	49	7	2	10	-	-	116
	(1.2)	(0.8)	(0.1)	(5.0)	(53.2)	(5.1)	(-)	(11.4)	(-)	-	(81.8)
1994	10	<1	-	24	62	16	4	11	2	-	131
	(25.7)	(0.5)	(-)	(14.5)	(60.4)	(18.8)	(4.4)	(17.5)	(1.7)	-	(143.5)
1995 ^c	0.4	0.4	-	0.3	37.4	16.8	0.6	13.4	-	-	69.3

^a Believed to be error.

^b Fishery Officer report.

^c Preliminary data.

Table 4. Number of licenses for fishing American eels by type (commercial, recreational) and gear (trap, pot, weir) and number of units of each gear type issued annually in Scotia-Fundy Region, 1985-1995.

License	Gear	1985		1986		1987		1988		1989		1990	
		Lic.	Gear	Lic.	Gear	Lic.	Gear	Lic.	Gear	Lic.	Gear	Lic.	Gear
Commercial	Trap	42	830	58	1,490	68	2,005	65	1,979	71	2,199	74	2,552
	Pot	148	5,041	166	9,648	191	11,559	211	12,294	293	19,386	296	19,781
	Weir	16	30	14	32	21	56	22	55	23	57	24	47
	Misc.	16	235	15	365	13	284	10	259	10	259	7	225
	Total ^a	195	6,136	216	11,535	240	13,904	262	14,587	343	21,901	341	22,605
Recreational	Trap	13	25	10	29	10	38	10	60	8	49	10	99
	Pot	66	524	83	948	86	1,510	105	1,548	101	2,038	114	2,544
	Weir	5	5	6	6	10	12	6	6	6	6	7	7
	Misc.	2	3	3	5	2	3	1	2	1	2	1	2
	Total ^a	86	557	97	988	103	1,563	120	1,616	115	2,095	128	2,652
Commercial		1991		1992		1993		1994		1995			
	Trap	74	2466	99	2,818	118	3,140	118	3,102	111	2,980		
	Pot	386	24,163	462	32,090	515	35,908	456	33,072	439	31,851		
	Weir	59	61	34	65	36	56	32	54	27	48		
	Total ^a	436	26,690	511	34,981	576	39,112	510	36,236	490	34,887		
Recreational	Trap	12	100	7	27	12	42	12	90	11	89		
	Pot	118	2,676	107	2,746	179	3,114	267	3,388	404	3,647		
	Weir	2	2	1	1	0	0	0	0	0	0		
	Misc.	1	3	0	0	0	0	0	0	0	0		
	Total ^a	125	2,781	110	2,774	189	3,156	274	3,478	410	3,736		

^aLicense numbers for individual gear types may not sum to total number of licenses issued because multiple gear types may be authorized on one license.

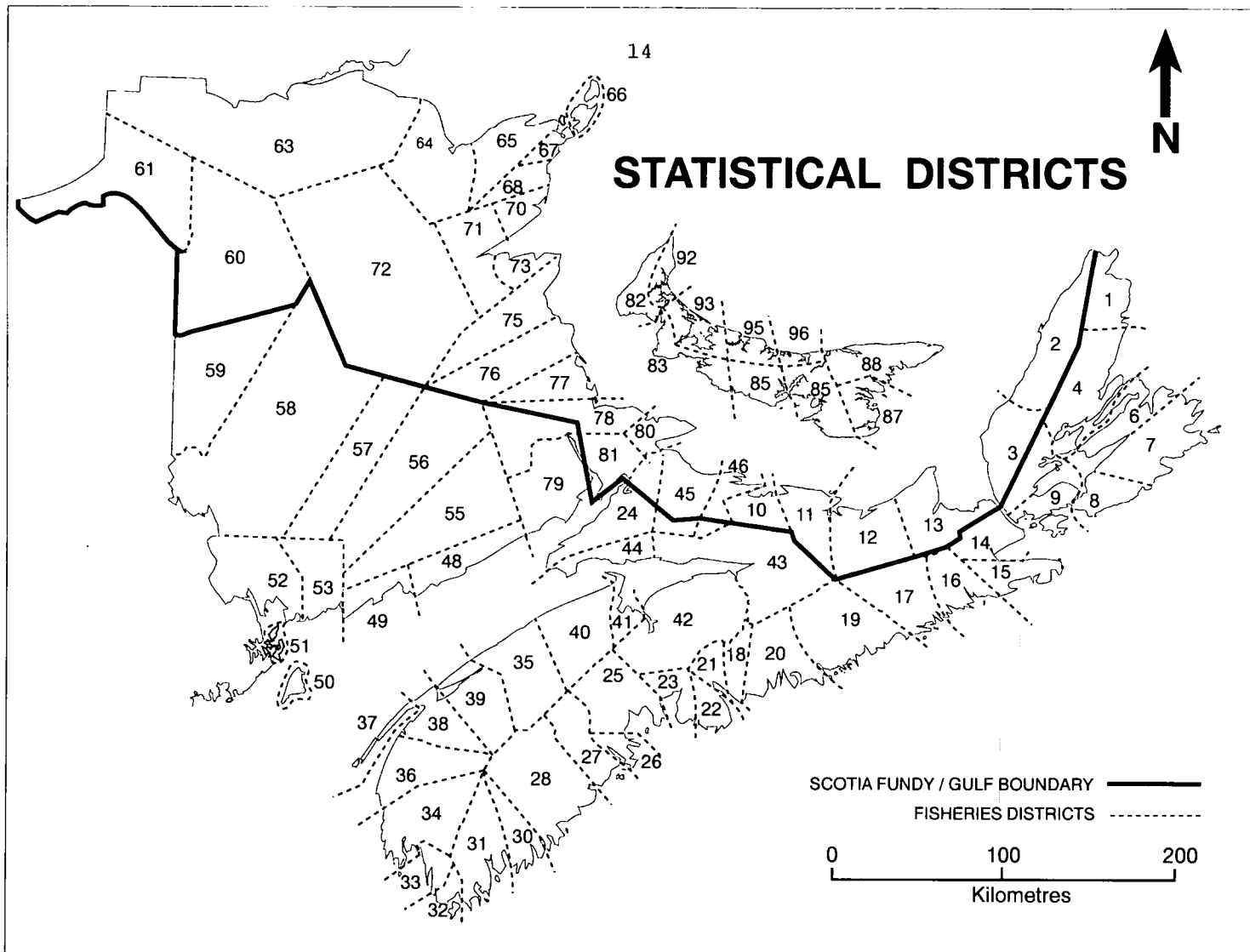


Figure 1. Map of Maritimes Region showing division into Scotia-Fundy and Gulf regions and Fishery Statistical Districts.

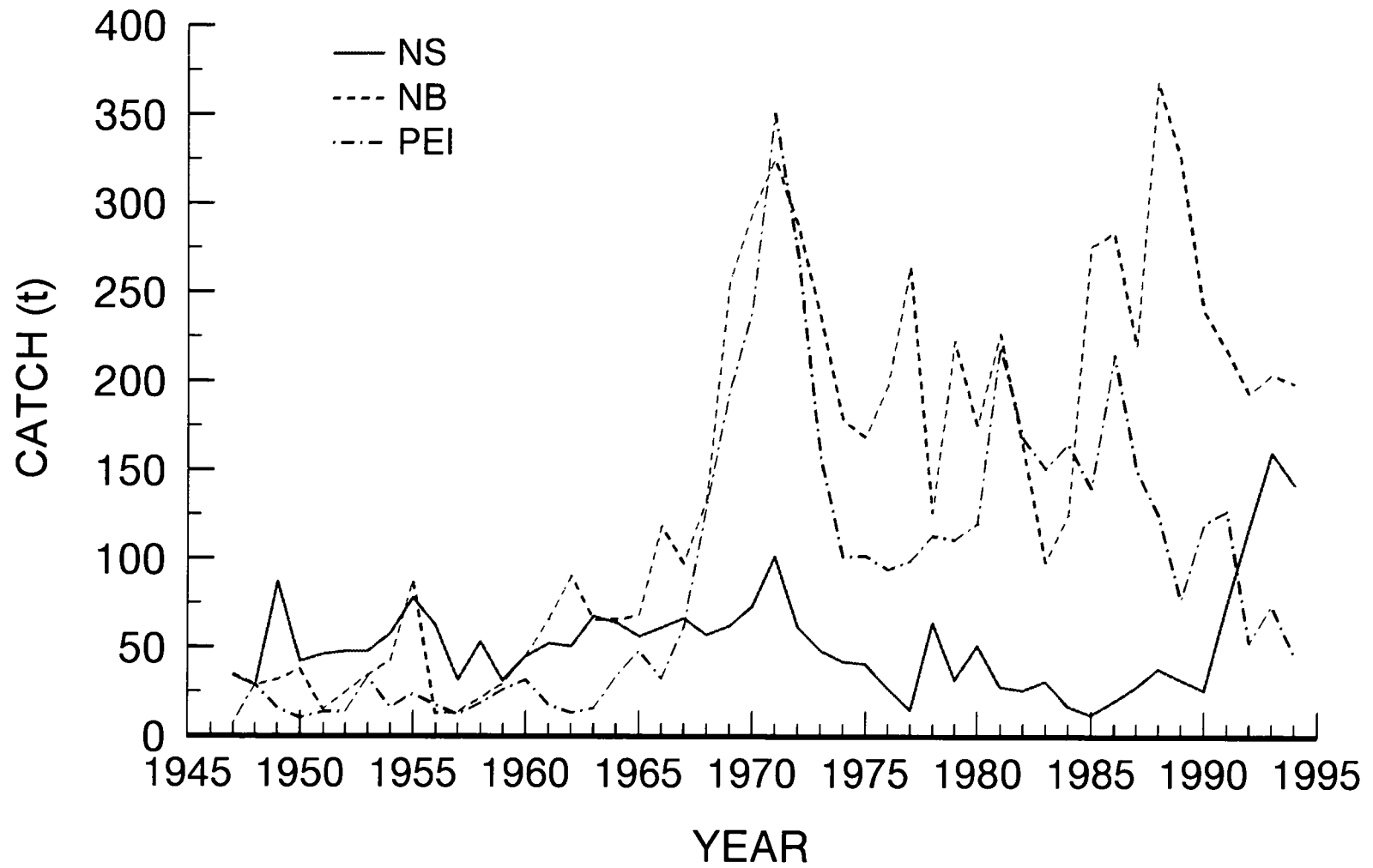


Figure 2. Reported catches (tonnes) of American eels, by province, 1947-1994.