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French archipelago of
Saint Pierre et Miquelon, 1950-2010**

Elise Bultel and Kyrstn Zylich

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Email: elise.bultel@gmail.com

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FISHERIES CATCH RECONSTRUCTION OF THE WESTERN ATLANTIC FRENCH ARCHIPELAGO OF SAINT PIERRE ET MIQUELON, 1950-2010

Elise Bultel and Kyrstn Zylich

^a*Sea Around Us Project, Fisheries Centre, University of British Columbia,
2202 Main Mall, Vancouver, BC, V6T 1Z4, Canada*

elise.bultel@gmail.com ; k.zylich@fisheries.ubc.ca

ABSTRACT

A catch reconstruction of the marine fisheries catch data for Saint Pierre et Miquelon, a small French archipelago off the coast of Newfoundland, Canada, within the northwest Atlantic (FAO Area 21) was performed from 1950 to 2010. The reconstructed catches, including estimates of unreported catches and discards, amounted to 11 million t, which is 2.9 times the 3.8 million t reported by FAO and NAFO on behalf of Saint Pierre et Miquelon and the French mainland. Only 3% of this catch was deemed to be taken from inside the EEZ of Saint Pierre et Miquelon. On average, discards accounted for 65% of the total catch, and fishing sectors as defined by the *Sea Around Us* were represented as follows: industrial (98%), artisanal (1.7%), recreational (<1%) and subsistence (<<1%). Overall, the French catch for the 1950-2010 period in the archipelago was dominated taxonomically by Gadidae (33%), Pleuronectidae (32%), Rajidae (8%) and Perciformes (5%).

INTRODUCTION

The archipelago of Saint-Pierre and Miquelon (SPM) is composed of three main islands: Saint-Pierre, Miquelon and Langlade, the two latest being linked by a sand isthmus (Fig. 1). Being a French 'overseas collectivity', the archipelago is located 25 km south of Newfoundland, Canada, and west of the Grand Banks, famous for their Atlantic cod (*Gadus morhua*) population, once one of the world's richest fishery resources (Hamilton and Butler 2001). SPM became French in 1815 through the *Traité de Paris* (Rallier du Baty 1927). The SPM's EEZ, declared in 1992 after decades of negotiations (United Nations 2009), covers around 12,300 km² of mostly continental shelf (<http://www.seararoundus.org>), and is completely surrounded by the Canadian EEZ (Fig. 1).

Fishing and fish-processing have been the main economic activities in SPM^{1,2} and the sector involved in the processing of fishery products are reported to consist of four businesses: *Interpêche*, which used to be the only processing company, right after *SPEC* which initiated an industrial fishery for cod (*Gadus morhua*) in the 1950s and went bankrupt in the 1970s (Eynaud 1986); *Les Nouvelles Pêcheries*, which processes snow crab (*Chionoecetes opilio*) sent to the United States together with lumpfish (*Cyclopterus lumpus*) and whelk (*Buccinum undatum*); *Pêcheries Paturel*, which deals with fresh-pack handling of fish, crab, lumpfish eggs, as well as smoked cod, salmon (*Salmo salar*), shark and scallops; and *Société nouvelle des pêches de Miquelon (SNPM)*, which specializes in salted cod and has recently invested in scallop farming².

French fishers started to establish themselves during the 15th century close to the Grand Banks, attracted by abundant fish resources in these waters (De Loture 1949). During the 16th century, French vessels fished in the area around Gaspé Peninsula, Nova Scotia, Cap-Breton Island, Newfoundland banks and coasts, and Labrador. After repeated conflicts and wars with England, a succession of treaties led to the disappearance of French-controlled territories in Canada – except for SPM – and increasing restrictions for French vessels operating along the "French shore" of Newfoundland. During the 19th century, further reductions of the fishing area accessible to French vessels along the coast of Canada created a movement towards Iceland and Greenland, where catches were high, but decreased

¹ http://www.domtomfr.com/economie_9.html

² <http://www.profilspm.fr/en/in-detail/economic-profile/main-economic-activities.html>

from 1925 onwards. Until 1938, Greenland catches compensated for this. Fishing stopped during WWII, and only a few vessels returned to cod fishing after the war, before this fishery disappeared (Hersart De La Villemarqué 1995; Melnychuck and Guénette 2001).

As technology and effort increased after WWII, Atlantic cod came under higher pressure from industrialized trawler fleets and despite Canada's 1976 declaration of a 200-mile EEZ-equivalent zone, which reduced fishing by foreign fleets, the cod biomass fell to one percent of its earlier level and the government declared a moratorium on cod fishing in 1992 (Hamilton and Butler 2001). Since 1994, Canada and France have agreed to work cooperatively on stock management and conservation for the 3PS and 4VS NAFO divisions shared by the two countries³.

Our aim with this report is to reconstruct total marine fishery removals for the SPM fleet (within and outside the French EEZ around SPM) from 1950-2010 in order to improve the baseline used for assessing changes in the SPM fisheries (and thus to contribute to improving their management), and to ensure that SPM is included when the global reconstructed catch of the world fisheries is estimated.

METHODS

Baseline

French reported landings in SPM were available through both FAO and NAFO, i.e., the North Atlantic Fisheries Organization, a Regional Fishery Management Organization (Cullis-Suzuki and Pauly 2010). FAO data encompassed the 1950-2010 period, whereas NAFO data started only in 1960. For the overlap period, however, the two datasets were very similar, with the FAO catches being slightly higher (2% on average). However, NAFO data were spatialized, so we decided to use them as our baseline from 1960 to 2010 and to use the FAO data for 1950 to 1959. However, NAFO data did not include catches managed by other fisheries bodies, including ICCAT (International Commission for the Conservation of Atlantic Tunas) and NASCO (North Atlantic Salmon Conservation Organization) data. A few catches were reported as 'Unknown' concerning the NAFO Divisions (i.e., 221 t among three taxa); these catches were allocated to the area where most of the catch of the related taxon originated. Some of the taxa (15 of 40) would not have equivalents in the two datasets; but from 1950 to 1969, the taxa reported were the same in the two datasets. In order to spatialize the FAO catch, we calculated the NAFO 5-year division allocation average, from 1960 to 1964, for the eight taxa reported to FAO and applied them to the FAO yearly catch per taxon for 1950 to 1959.

For the years where the difference in catches between the two datasets was higher than 500 t (i.e., 2004, 2005, 2007, 2009 and 2010), we used the FAO catches for the taxa that were missing or underreported in the NAFO data for the same years (Table 1). The NAFO spatial allocation percentages were kept and applied to FAO catches when NAFO catches were only underreported, otherwise NAFO percentages from previous and following years were interpolated. When no interpolation was possible, we applied the most recent allocation proportions.

³ <http://www.senat.fr/rap/r05-152/r05-15235.html>

Table 1. NAFO taxa whose catch were replaced by FAO catch (ns = not specified)

Taxa	2004	2005	2007	2009	2010
Atlantic Cod	X	X	X	X	X
Atlantic Redfishes (ns)			X	X	X
Haddock			X		
Lumpfish (lumpsucker)	X	X	X		
Marine Molluscs (ns)		X	X		
Pollock (saithe)	X	X	X		
Queen Crab		X	X	X	X
Scallops (ns)	X	X	X		
Skates (ns)		X			X
Witch Flounder			X	X	X
Yellowtail Flounder		X			

The SPM's EEZ overlaps with the 3PS and 4VS NAFO areas and represents 10.2% and 0.8% of their surface, respectively. Thus, in the absence of a better alternative, the catches reported in these areas were allocated to the EEZ using the same percentages and the remaining was allocated outside of it.

French catch from the mainland's vessels occurring in FAO's Area 21 were also considered. FAO and NAFO datasets were similar for the 1960-2010 period except for four years where the NAFO data were 1 to 9% higher than the FAO data. However, we used the NAFO data in order to benefit from the geographical catch allocation. Since catch data were not available from 1950 to 1959, as well as for 1989 and 1990, we used the FAO data instead for those years. The 1960 spatial allocation per taxon was applied to the FAO catches from 1950 to 1959. Moreover, we interpolated the spatial allocation per taxon percentages between 1988 and 1991 and applied them to the catches from 1989 and 1990. However, when no data were reported in 1991, we used the 1988 spatial allocation per taxon. Catches coming from the NAFO areas 4VS and 3PS were applied the same percentages than mentioned previously to allocate them within and outside the SPM's EEZ. The others were considered outside the SPM's EEZ.

Sector allocation

In the early 1950s, the fishing sector in SPM was mostly artisanal, targeting cod and practiced almost exclusively with hand lines using motorized *doris* (Ancellin 1955). These operations took place within a radius of a few nautical mile around the islands, i.e., inside the current EEZ.

The introduction of industrial vessels (i.e., trawlers) occurred in 1952 and matched the fall of the artisanal fishing company (Eynaud 1986). Thus, prior to 1952, it can be assumed that there was no industrial catch. The proportions of industrial versus artisanal landings for cods were estimated with data reported in Eynaud (1986) for the years 1960, 1970 and 1980. Also, industrial and traditional catch (all species included) were available for 2007 and were used to calculate the industrial/artisanal ratio. For the missing years, these ratios were interpolated from the aforementioned anchor points, except from 2008 to 2010, for which we used the 2007 ratio. Then we applied the ratio series to the catch present in the baseline. The catches of vessels from the French mainland were considered exclusively industrial.

Unreported catch

SPM's fishery is mostly focused on cod, but evidence exists that the handline cod fishery depends on some other species used as bait for the cod fishery, notably mussel, softshell clam, capelin, squid, mackerel and herring, sand eel, waved welk, great scallop, deadlet anemone and northern propeller

clam (Rallier du Baty 1927; De Loture 1949), and that the quantities necessary are enormous (Rallier du Baty 1927). These species are unlikely to have been reported since they were not 'landed' but used directly for a particular fishery. Furthermore, they are not reported in the earlier years and the miscellaneous fish category contains landings too low to make up for the amount needed. Indeed, for one day of fishing, 18 kg of bait are needed for one boat (Dumont and Provost 2008). Given that the cod season lasted six months, usually from May through October (i.e., 184 days), and that the number of *doris* was available from 1950 to 1985 (Eynaud 1986), we were able to estimate the respective tonnages for this time period. For the 1986-2010 period, we assumed that the artisanal sector of the SPM fishery compensated for the decline in the catch of the industrial sector (mostly due to the cod stock collapse and subsequent moratorium) and used the same number of *doris* reported for 1985. This is consistent with the number of *doris* reported for 1996 by the French Senate⁴. The unreported catch allocation was done equally among the 11 taxa listed above and the catch was allocated exclusively to the SPM EEZ since it was taken by artisanal fleets only.

Discards

No discards were applied to artisanal catches, as no evidence of discarding by artisanal fishers was found. However, trawlers were reported to discard $\frac{2}{3}$ of their catch (De Loture 1949), therefore we multiplied the reported industrial catch by two in order to obtain the related discards. American plaice (*Hippoglossoides platessoides*) was reported to constitute a major bycatch of trawlers targeting cod (Anon. 1976). Other species, for which fishers would have no interest in retaining, were reported to occur on the banks, such as halibut (*Hippoglossus hippoglossus*), silver hake (*Merluccius bilinearis*), tusk (*Brosme brosme*), angler (*Lophius piscatorius*), golden redfish (*Sebastes norvegicus*), Atlantic wolffish (*Anarhichas lupus*), herring (*Clupea harengus*), capelin (*Mallotus villosus*), American sand lance (*Ammodytes americanus*), mackerel (*Scomber scombrus*), witch flounder and brill (*Glyptocephalus cynoglossus*, *Scophthalmus rhombus*), as well as rays (*Malacoraja senta*, *Raja eglanteria*, and *Leucoraja erinacea*) (Rallier du Baty 1927). Therefore, we allocated 40% of the discards to the American plaice and 4% to each of the 15 other species listed above.

Recreational catch

Recreational fishing plays an important role in Saint-Pierre and Miquelon and recreational boats are reported to be especially interested in lobster fishing². Evidence of a recreational fishery for Atlantic salmon was also found and catches were available from 1990-2010 (Herlé 2010). We assumed the fishery started in 1987, together with the legislation, and that the catches from 1987 to 1989 were equal to those of 1990. As we could not find information on the beginning of the lobster recreational fishery, it was assumed to have started in 1987 as well, and, as the reported catch seemed to be low, we estimated the recreational catch to match the annual average of reported catch from 1987 to 2010 (i.e., 1 t·year⁻¹).

Subsistence catch

The main food resources for the inhabitants of Miquelon island in the late 1930s were reported to be gardening, farming and hunting (Rallier du Baty 1927). However, with such a small land and the main activity of the archipelago being directed towards the sea, it seems likely that SPM's inhabitants would have relied on marine resources for food. Indeed, in winter, people from Saint-Pierre would fish off the coast of the archipelago for subsistence (Moselli 1923). According to Dumont and Provost (2008), capelin's contribution to family subsistence in the North Coast area is incontestable and was used for human (and dog) consumption, as well as land fertilizer in vegetable gardens. Therefore, we assumed the capelin catch for subsistence would be half the amount needed for bait per year. As a way to verify if our assumption was reasonable we calculated a yearly *per capita* rate, which, even if quite low (6 kg·person⁻¹·year⁻¹ in 1950s) and declining over time, made sense in the historical context of the archipelago.

⁴ http://www.senat.fr/rap/r97-507/r97-507_mono.html

RESULTS

Data reported to FAO on behalf of SPM were well documented and representative of the species found in the literature of the area.

Within the SPM EEZ

Artisanal

Artisanal landings amounted to just over 3,000 t·year⁻¹ in the early 1950s and increased rapidly to 6,600 t in 1957 before they gradually decreased to reach a minimum of 1,300 t in 1974 (Appendix 1; Fig. 2a). Then, the catch increased again and peaked twice to 7,000 and 7,800 t in 1987 and 1991, respectively. In 1993, the catches dropped to just under 200 t, then increased to peak in 2000 at 2,800 t and then averaged 1,800 t·year⁻¹ for the rest of the time period.

The taxa most represented in the artisanal landings were Gadidae (69%), Pleuronectidae (9%), Sebastidae (6%) and Bivalves (3%). 23 other taxa constituted the 13% remaining.

Industrial

Industrial landings within the EEZ averaged 350 t·year⁻¹ in the 1950s, then peaked at 1,500 t in 1961 and oscillated around 500 t·year⁻¹ until 1978 (Appendix 1; Fig. 2a). The catches then peaked at 3,000 t in 1986 and dropped abruptly to 18 t in 1993. An increase followed this event and the industrial landings reached almost 400 t in 2000 but then decreased to their mid-1990s level by 2010.

Most of the industrial landings were represented by Gadidae (85%), Pleuronectidae and Sebastidae (4% each), as well as Rajidae and Teuthida (3% and 2%, respectively). The 20 other taxa accounted for 3% of the catch.

Industrial discards followed exactly the same trend as they were proportional to industrial landings and amounted to almost 74,500 t. However, they were mostly composed of Pleuronectidae (48%), Rajidae (12%) and Perciformes (8%). The 32% remaining consisted in 8 other taxa.

Recreational

Catches estimated for the recreational sector started in 1987 at about 730 t and oscillated throughout the study period, reaching a minimum of 450 t in 1995 and a maximum of 1,800 t in 2008 (Appendix 1; Fig. 2a). They were almost exclusively composed of Atlantic salmon (99.9%).

Subsistence

Subsistence catches averaged 27 t·year⁻¹ in the early 1950s and then decreased to 4 t in 1984 where it stayed stable until 2010 (Appendix 1; Fig. 2a). They were composed of capelin only (Osmeridae).

Outside the SPM EEZ

Industrial reported catches and discards

Industrial landings outside the EEZ started at 133,000 t in 1950 and oscillated until 1968 where they peaked at 174,000 t (Appendix 2). Then, they dropped rapidly and reached 40,000 t·year⁻¹ in the early to mid-1970s before peaking at 48,000 t in 1986. In 1993, the catch was down to 160 t, peaked in 1998 at 3,500 t·year⁻¹ and stabilized around 2,000 t·year⁻¹ in the 2000s.

Gadidae composed most of the industrial reported catches (96%) and the remaining catches were represented by 25 other taxa.

Industrial discards outside the EEZ followed the same trend than the industrial landings and made up 7.2 million t over the whole period. The taxonomic composition was the same than the one for the industrial discards within the EEZ.

Overall, Pleuronectidae and Gadidae constituted most of the industrial catch outside of the EEZ with 32% each, followed by Rajidae (8%) and Perciformes (5%; Appendix 4). 24 other taxa made up the remaining 22%.

DISCUSSION

This study is an attempt to estimate the total French catches taken in and near the (French) EEZ of SPM from 1950 to 2010 using various studies and information. The reconstructed catch estimated (inside and outside the EEZ) is 2.9 times the official data (i.e., 11.1 million t vs 3.8 million t), a significant discrepancy which reveals that some sectors/catch components are barely monitored (for the catch within the EEZ the discrepancy is only 1.5 times). Of the total reconstructed catch, the unreported artisanal catches represented 0.1%, unreported industrial catches (discards only) 65%, recreational catches 0.2%, and subsistence catches 0.01%. The reported landings represented 34% of the catch. We did not attempt to estimate any potential under- or un-reported industrial catches.

French catches within and outside the EEZ showed two different trends. Within the EEZ, the catches increased from 1950 to 1960, then decreased until 1975 before reaching their higher catches in the late 1980s (Fig. 2a). Indeed, the introduction of a new type of trawler (i.e., *pêche arrière*) and the increase of fishing effort led to higher catches (Anon. 1976). Catches dropped suddenly in the early 1990s, due to both the EEZ inception and cod moratorium, before reaching catch levels lower than those from the early 1950s. However, outside of the EEZ, the catches oscillated around 300,000 t-year⁻¹ and peaked in 1968 before dropping and, despite an increasing event in 1986, reached only a few thousand tonnes per year in the 2000s.

In both cases, the increase in catch occurring in the 1950s can be explained by the fact that, after WWII, industrial techniques took over artisanal fishing. Indeed, the number of sailboats (baited hooks) decreased, whereas the number of trawlers increased, which was due to the large difference in yield (De Loture 1949).

This intensive fishing led to the exhaustion of fish stocks (Forest *et al.* 1979), even outside of the 3PS division, where yields have declined by 60% (Anon. 1976). Similarly, the decline of haddock in the 1960s is explained by overfishing by St-Pierre trawlers, but mostly Newfoundland and Nova Scotia trawlers (Anon. 1976). However, it seems that, in addition to the collapse of the cod stocks, the decline of the French cod fishery is also due to a reduction of demand by the French mainland population for this particular species (Hersart De La Villemarqué 1995; Melnychuck and Guénette 2001).

Transitions in terms of taxonomic composition have occurred in the French catch in Area 21, as well as in the SPM EEZ. Gadidae, which used to make up most of the catch, represent only 29% in the 2000s, whereas Salmonidae and marine crustaceans catch, which were not significant prior to this decade, make up 31% and 6% respectively (Fig. 2b) (Appendix 3). This transition from groundfish to crustaceans was also reported in Newfoundland by Hamilton and Butler (2001).

But overall, even if catch composition has varied over time, major taxa removals estimated in our reconstruction are similar to those reported in the late 1970s (i.e., Gadidae, Pleuronectidae and Sebastidae) (Forest *et al.* 1979).

It seems that both artisanal and industrial French fisheries have declined over the years in the SPM area (Eynaoud 1986; Hersart De La Villemarqué 1995; Melnychuck and Guénette 2001) and that the recreational sector has gradually become important, representing 56% of the total catch in 2010 (Fig. 2a).

We believe that our reconstructed catch estimates for marine fisheries in FAO Area 21 provide a more comprehensive, yet conservative, baseline of total fishery removals for the 1950-2010 period. We hope that these preliminary estimates will be improved and that they will serve as a basis of future management decisions accounting for all sectors, and therefore reducing the impact we have on marine resources.

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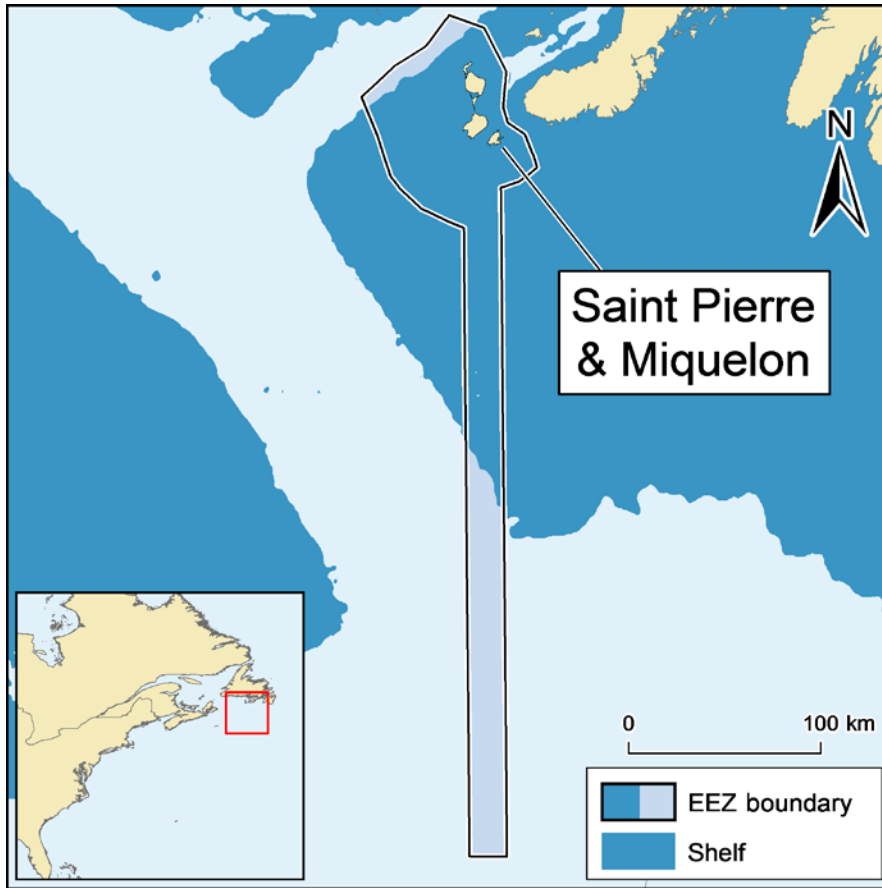


Figure 1. Map of Saint Pierre and Miquelon and its Exclusive Economic Zone (EEZ)

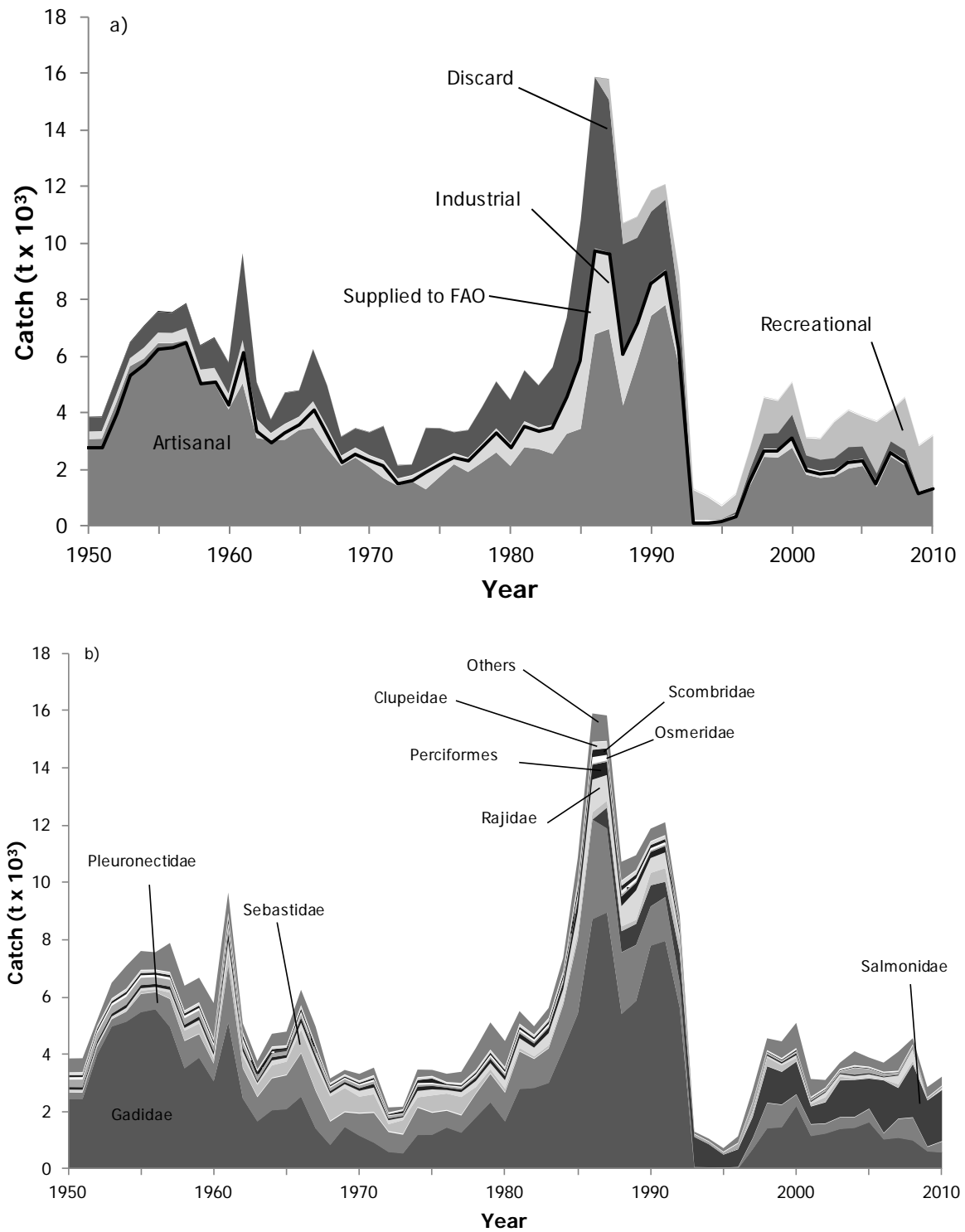


Figure 2. Total reconstructed catch of the French catch within the SPM EEZ, 1950-2010, a) by sector, with official reported data overlaid as line graph. Discards are shown separately and subsistence is too small to be visible on the graph; and b) by major taxa. 'Others' includes 19 additional taxa.

Appendix Table A1. French catch (in tonnes) within the EEZ of Saint Pierre et Miquelon as reported to FAO and NAFO, compared to total reconstructed catches by sector, discards being shown separately, 1950-2010

Year	Reported landings	Reconstructed total catch	Artisanal	Industrial	Discard	Recreational
1950	2,744	3,840	3,080	244	489	0
1951	2,742	3,850	3,090	242	485	0
1952	3,988	5,180	4,320	278	555	0
1953	5,313	6,480	5,650	268	536	0
1954	5,693	7,070	5,930	371	742	0
1955	6,261	7,590	6,470	367	734	0
1956	6,284	7,550	6,460	353	707	0
1957	6,473	7,870	6,570	425	850	0
1958	5,002	6,380	5,100	419	839	0
1959	5,110	6,660	5,050	529	1,058	0
1960	4,247	5,780	4,130	543	1,085	0
1961	6,149	9,630	5,040	1,523	3,046	0
1962	3,350	5,070	3,120	643	1,286	0
1963	2,918	3,750	3,040	232	464	0
1964	3,308	4,700	3,060	543	1,086	0
1965	3,569	4,780	3,400	455	910	0
1966	4,121	6,240	3,480	914	1,827	0
1967	3,214	4,950	2,750	729	1,459	0
1968	2,215	3,140	2,150	328	657	0
1969	2,526	3,440	2,430	334	667	0
1970	2,280	3,300	2,090	400	800	0
1971	2,107	3,520	1,700	602	1,205	0
1972	1,481	2,130	1,440	228	457	0
1973	1,618	2,160	1,600	182	365	0
1974	1,875	3,450	1,310	712	1,423	0
1975	2,178	3,440	1,760	560	1,120	0
1976	2,433	3,310	2,190	369	737	0
1977	2,270	3,370	1,920	482	965	0
1978	2,766	4,200	2,260	645	1,290	0
1979	3,287	5,100	2,610	826	1,653	0
1980	2,738	4,450	2,140	769	1,537	0
1981	3,535	5,490	2,800	897	1,794	0
1982	3,323	4,960	2,730	743	1,487	0
1983	3,453	5,600	2,560	1,013	2,026	0
1984	4,536	7,350	3,270	1,361	2,722	0
1985	5,818	10,830	3,450	2,461	4,921	0
1986	9,731	15,890	6,780	3,034	6,067	0
1987	9,586	15,820	6,970	2,704	5,408	734
1988	6,084	10,710	4,270	1,900	3,801	734
1989	7,178	10,930	5,790	1,467	2,935	734
1990	8,582	11,860	7,440	1,229	2,459	734
1991	8,976	12,090	7,820	1,244	2,488	534
1992	6,234	8,850	5,570	745	1,491	1,034
1993	113	1,290	180	18	37	1,051
1994	116	1,040	180	18	37	801
1995	132	710	200	20	40	451
1996	322	1,120	360	47	95	618
1997	1,536	2,730	1,430	188	376	734
1998	2,644	4,540	2,450	273	546	1,268
1999	2,638	4,440	2,430	289	578	1,134
2000	3,082	5,080	2,780	389	779	1,134
2001	1,971	3,120	1,830	227	453	612
2002	1,844	3,090	1,710	214	429	730
2003	1,899	3,690	1,770	217	433	1,273
2004	2,213	4,090	2,040	253	506	1,286
2005	2,281	3,870	2,130	230	460	1,045
2006	1,467	3,690	1,390	157	315	1,826
2007	2,563	4,070	2,470	179	359	1,063
2008	2,252	4,550	2,150	180	360	1,847
2009	1,129	2,840	1,200	12	24	1,601
2010	1,306	3,200	1,370	15	29	1,781

Appendix Table A2. French catch outside the EEZ of Saint Pierre et Miquelon as reported to FAO and NAFO, compared to total reconstructed catches by sector, discards being shown separately, 1950-2010

Year	Reported catch	Total reconstructed catch	Industrial	Discard
1950	132,956	398,900	133,000	265,900
1951	131,858	395,600	131,900	263,700
1952	142,612	427,800	142,600	285,200
1953	118,887	356,700	118,900	237,800
1954	156,807	470,400	156,800	313,600
1955	137,139	411,400	137,100	274,300
1956	112,016	336,000	112,000	224,000
1957	121,427	364,300	121,400	242,900
1958	123,298	369,900	123,300	246,600
1959	132,590	397,800	132,600	265,200
1960	147,010	441,000	147,000	294,000
1961	174,301	522,900	174,300	348,600
1962	162,988	489,000	163,000	326,000
1963	120,338	361,000	120,300	240,700
1964	156,481	469,400	156,500	313,000
1965	136,764	410,300	136,800	273,500
1966	147,861	443,600	147,900	295,700
1967	155,394	466,200	155,400	310,800
1968	173,829	521,500	173,800	347,700
1969	110,404	331,200	110,400	220,800
1970	70,895	212,700	70,900	141,800
1971	53,887	161,700	53,900	107,800
1972	49,556	148,700	49,600	99,100
1973	40,747	122,200	40,700	81,500
1974	36,800	110,400	36,800	73,600
1975	38,645	115,900	38,600	77,300
1976	34,534	103,600	34,500	69,100
1977	37,524	112,600	37,500	75,000
1978	36,509	109,500	36,500	73,000
1979	30,244	90,700	30,200	60,500
1980	27,681	83,000	27,700	55,400
1981	29,651	89,000	29,700	59,300
1982	27,029	81,100	27,000	54,100
1983	25,855	77,600	25,900	51,700
1984	31,521	94,600	31,500	63,000
1985	38,272	114,800	38,300	76,500
1986	48,273	144,800	48,300	96,500
1987	32,554	97,700	32,600	65,100
1988	17,197	51,600	17,200	34,400
1989	16,065	48,200	16,100	32,100
1990	15,304	45,900	15,300	30,600
1991	14,964	44,900	15,000	29,900
1992	10,153	30,500	10,200	20,300
1993	161	500	200	300
1994	161	500	200	300
1995	177	500	200	400
1996	418	1,300	400	800
1997	2,017	6,100	2,000	4,000
1998	3,464	10,400	3,500	6,900
1999	3,278	9,800	3,300	6,600
2000	3,553	10,700	3,600	7,100
2001	2,235	6,700	2,200	4,500
2002	2,002	6,000	2,000	4,000
2003	1,991	6,000	2,000	4,000
2004	2,229	6,700	2,200	4,500
2005	2,275	6,800	2,300	4,600
2006	1,386	4,200	1,400	2,800
2007	2,531	7,600	2,500	5,100
2008	2,175	6,500	2,200	4,400
2009	1,257	3,800	1,300	2,500
2010	1,454	4,400	1,500	2,900

Appendix Table A3. Total reconstructed catch (in tonnes) by major taxa for Saint Pierre and Miquelon within the EEZ, 1950-2010. "Others" contain 19 additional taxa.

Year	Gadidae	Pleuronectidae	Salmonidae	Sebastidae	Rajidae	Perciformes	Bivalves	Osmeridae	Scombridae	Clupeidae	Others
1950	2,444	235	0	20	59	92	263	99	72	72	484
1951	2,442	233	0	19	58	93	270	100	73	73	485
1952	3,988	267	0	22	67	100	276	105	77	77	199
1953	4,966	257	0	21	64	98	276	104	77	77	543
1954	5,134	356	0	30	89	115	276	112	85	85	788
1955	5,467	639	0	101	88	111	259	107	81	81	656
1956	5,567	597	0	93	85	105	243	101	77	77	604
1957	4,948	982	0	209	102	116	238	105	82	82	1,007
1958	3,511	956	0	341	101	114	234	104	80	80	858
1959	3,882	825	0	353	127	127	213	106	85	85	856
1960	3,060	621	0	144	147	125	192	101	82	82	1,221
1961	5,114	1,989	0	436	408	282	190	179	164	160	710
1962	2,464	1,055	0	397	188	144	188	131	115	89	298
1963	1,665	849	0	401	75	74	161	95	90	51	292
1964	2,056	1,111	0	431	179	114	134	86	81	70	441
1965	2,091	1,184	0	450	143	100	130	76	63	62	476
1966	2,526	1,516	0	797	257	171	125	111	102	98	533
1967	1,419	1,308	0	868	227	141	121	95	83	83	609
1968	844	818	0	850	112	87	117	61	50	50	153
1969	1,471	517	0	816	143	80	107	59	48	48	151
1970	1,168	772	0	562	212	95	96	61	51	51	231
1971	926	1,040	0	622	243	131	90	75	66	66	259
1972	603	698	0	241	149	64	84	43	44	35	171
1973	553	656	0	474	108	48	75	37	85	30	89
1974	1,195	951	0	333	231	154	67	77	107	72	265
1975	1,202	768	0	578	219	124	63	64	153	62	210
1976	1,451	590	0	569	133	87	59	47	41	41	286
1977	1,272	604	0	615	180	95	61	57	51	51	390
1978	1,803	826	0	212	218	121	63	70	64	64	759
1979	2,330	994	0	137	225	151	69	87	80	80	946
1980	1,661	1,004	0	118	305	146	75	84	77	77	901
1981	2,794	1,310	0	102	348	171	71	93	86	86	432
1982	2,831	1,012	0	67	313	151	67	90	73	73	288
1983	3,004	1,208	0	87	430	194	54	97	92	92	346
1984	4,173	1,559	0	112	420	240	42	121	117	117	452

Appendix Table A3 continued. Total reconstructed catch (in tonnes) by major taxa for Saint Pierre and Miquelon within the EEZ, 1950-2010. "Others" contain 19 additional taxa.

Year	Gadidae	Pleuronectidae	Salmonidae	Sebastidae	Rajidae	Perciformes	Bivalves	Osmeridae	Scombridae	Clupeidae	Others
1985	5,410	2,605	0	203	729	419	40	209	206	205	806
1986	8,704	3,473	2	260	1,137	520	41	258	251	250	989
1987	8,937	2,929	733	242	897	463	47	228	225	224	890
1988	5,402	2,149	734	167	711	332	76	164	160	160	652
1989	5,853	1,953	734	141	1,028	271	47	130	136	125	516
1990	7,780	1,372	733	435	518	214	50	111	107	106	434
1991	7,945	1,530	533	477	552	223	52	112	107	107	446
1992	5,611	854	1,034	487	197	137	45	72	69	67	272
1993	42	18	1,051	1	9	10	49	13	9	9	75
1994	36	18	800	1	6	10	49	14	10	9	87
1995	25	19	450	2	7	11	44	13	9	9	121
1996	19	46	617	4	12	15	145	15	11	11	226
1997	695	370	734	197	46	39	156	27	23	23	424
1998	1,425	881	1,267	299	69	53	43	33	31	29	413
1999	1,462	783	1,134	216	71	55	38	35	31	32	580
2000	2,203	399	1,134	122	103	70	43	42	51	39	876
2001	1,157	403	611	79	73	44	47	30	29	26	623
2002	1,242	346	729	171	166	42	42	30	29	25	266
2003	1,403	406	1,273	125	92	43	47	39	28	25	212
2004	1,442	370	1,286	29	104	48	240	32	28	28	485
2005	1,636	467	1,044	28	118	44	137	30	26	26	316
2006	1,040	217	1,826	24	78	33	95	24	22	20	316
2007	1,095	659	1,063	121	309	36	61	26	22	22	659
2008	1,004	796	1,847	106	437	36	38	27	24	22	209
2009	624	157	1,600	22	6	9	38	12	8	8	355
2010	585	383	1,780	8	62	10	38	12	9	9	308

Appendix Table A4. Total reconstructed catch (in tonnes) by major taxa for Saint Pierre and Miquelon outside the EEZ, 1950-2010. Others contain 18 additional taxa

Year	Pleuronectidae	Gadidae	Rajidae	Perciformes	Sebastidae	Clupeidae	Scombridae	Lophiidae	Osmeridae	Merlucciidae	Others
1950	127,600	132,960	31,910	21,270	10,640	10,640	10,640	10,640	10,640	10,640	21,300
1951	126,600	131,860	31,650	21,100	10,550	10,550	10,550	10,550	10,550	10,550	21,100
1952	136,900	142,610	34,230	22,820	11,410	11,410	11,410	11,410	11,410	11,410	22,800
1953	114,100	118,830	28,530	19,020	9,510	9,510	9,510	9,510	9,510	9,510	19,100
1954	150,500	156,670	37,630	25,090	12,550	12,550	12,550	12,550	12,550	12,550	25,200
1955	131,800	136,830	32,910	21,940	11,000	10,970	10,970	10,970	10,970	10,970	22,100
1956	107,700	111,630	26,880	17,920	9,000	8,960	8,960	8,960	8,960	8,960	18,100
1957	117,000	120,350	29,140	19,430	9,840	9,710	9,710	9,710	9,710	9,710	20,000
1958	118,900	121,890	29,590	19,730	10,160	9,860	9,860	9,860	9,860	9,860	20,300
1959	128,100	130,720	31,820	21,210	11,000	10,610	10,610	10,610	10,610	10,610	21,900
1960	141,400	144,820	35,310	23,520	11,940	11,760	11,760	11,760	11,760	11,760	25,300
1961	168,400	172,230	41,910	27,890	14,500	13,940	13,950	13,940	13,940	13,940	28,300
1962	157,400	161,070	39,180	26,080	13,630	13,040	13,080	13,040	13,070	13,040	26,400
1963	116,800	117,630	28,920	19,260	10,350	9,630	9,690	9,630	9,670	9,630	19,800
1964	151,500	153,910	37,650	25,040	13,220	12,520	12,540	12,520	12,520	12,520	25,500
1965	132,900	133,650	32,890	21,880	11,720	10,940	10,940	10,940	10,940	10,940	22,500
1966	143,300	144,740	35,560	23,660	13,180	11,830	11,840	11,830	11,830	11,830	24,000
1967	150,500	151,850	37,390	24,860	13,970	12,430	12,430	12,430	12,430	12,430	25,500
1968	167,900	170,830	41,780	27,840	15,710	13,910	13,910	13,910	13,910	13,910	27,900
1969	106,400	107,510	26,620	17,680	10,720	8,830	8,830	8,840	8,830	8,830	18,100
1970	68,900	68,320	17,260	11,370	6,770	5,670	5,670	5,680	5,670	5,670	11,700
1971	52,700	51,320	13,140	8,660	5,480	4,310	4,310	4,320	4,310	4,310	8,800
1972	48,700	45,920	12,100	7,950	4,440	4,460	3,980	3,970	3,960	3,960	9,200
1973	40,300	34,340	9,990	6,530	4,540	6,050	3,370	3,280	3,260	3,260	7,400
1974	36,200	30,310	9,210	5,960	3,940	7,020	3,020	2,950	2,940	2,940	5,900
1975	37,800	30,490	10,080	6,250	4,620	7,940	3,290	3,100	3,090	3,090	6,200
1976	33,900	29,580	8,750	5,570	4,120	3,960	2,760	2,770	2,760	2,760	6,700
1977	36,500	31,970	9,620	6,030	5,140	3,000	3,000	3,000	3,000	3,030	8,300
1978	35,700	30,840	9,050	5,860	3,670	2,920	2,920	2,920	2,920	2,920	9,800
1979	29,700	24,490	7,470	4,890	2,780	2,420	2,420	2,420	2,420	2,420	9,300
1980	27,500	23,320	7,280	4,450	2,520	2,210	2,210	2,210	2,210	2,210	7,000
1981	29,800	26,750	7,560	4,780	2,550	2,370	2,370	2,370	2,370	2,370	5,700
1982	26,700	25,070	6,780	4,370	2,200	2,160	2,160	2,160	2,190	2,160	5,200
1983	25,400	24,350	6,650	4,190	2,120	2,070	2,070	2,070	2,070	2,070	4,500
1984	30,900	29,320	8,230	5,080	2,530	2,520	2,520	2,520	2,520	2,520	5,900

Appendix Table A4. Total reconstructed catch (in tonnes) by major taxa for Saint Pierre and Miquelon outside the EEZ, 1950-2010. “Others” contain 18 additional taxa.

Year	Pleuronectidae	Gadidae	Rajidae	Perciformes	Sebastidae	Clupeidae	Scombridae	Lophiidae	Osmeridae	Merlucciidae	Others
1985	37,300	36,440	10,010	6,160	3,080	3,060	3,070	3,060	3,060	3,060	6,600
1986	47,400	45,370	12,810	7,780	3,910	3,860	3,860	3,860	3,870	3,860	8,200
1987	31,900	30,570	8,390	5,250	2,720	2,600	2,610	2,620	2,600	2,600	5,800
1988	17,100	15,420	4,660	2,790	1,470	1,380	1,380	1,410	1,380	1,380	3,300
1989	16,400	13,190	5,050	2,630	1,420	1,290	1,300	1,310	1,290	1,290	3,000
1990	15,000	13,430	4,030	2,470	1,920	1,220	1,230	1,260	1,230	1,230	2,900
1991	14,900	12,970	3,980	2,420	1,950	1,200	1,200	1,220	1,200	1,200	2,700
1992	10,000	9,040	2,460	1,640	1,590	810	820	820	810	810	1,700
1993	200	60	50	30	10	10	10	10	10	10	100
1994	200	50	40	30	10	10	20	10	10	10	100
1995	200	30	50	30	10	10	10	10	20	10	200
1996	400	20	100	70	30	30	30	30	30	30	500
1997	2,200	880	490	330	410	160	160	160	160	160	900
1998	4,300	1,740	840	560	650	280	280	280	280	280	900
1999	3,900	1,730	790	530	490	260	260	260	260	260	1,100
2000	3,400	2,520	860	570	390	280	300	280	280	280	1,400
2001	2,400	1,280	560	360	250	180	180	180	180	180	1,000
2002	2,100	1,330	600	320	330	160	160	160	160	160	500
2003	2,100	1,460	520	320	270	160	160	160	170	160	500
2004	2,300	1,450	580	360	190	180	180	180	180	180	1,000
2005	2,500	1,600	610	360	190	180	180	180	180	180	700
2006	1,400	980	370	220	120	110	110	110	110	110	500
2007	2,900	1,000	850	410	310	200	200	200	200	200	1,100
2008	2,700	920	900	350	260	170	180	170	180	170	500
2009	1,400	710	310	200	120	100	100	100	100	100	600
2010	1,800	670	420	230	120	120	120	120	120	120	500