STOCK STATUS REPORT

LAURENTIAN REGION

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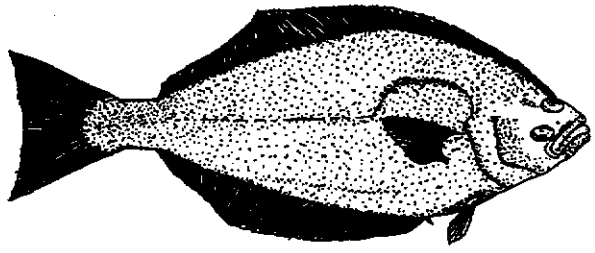
DFO, Atlantic Fisheries, Stock Status Report 96/57 June 1996

ATLANTIC HALIBUT IN THE GULF OF ST. LAWRENCE



Landings (tonnes)

Year	1991	1992	1993[1]	1994[1]	1995[1]
TAC	300	300	300	300	300
Fixed	313	100	100	109	59
Mobiles	45	41	16	9	4
Unknown	4	1	-	52	20
Total	362	142	116	170	83

[1] Preliminary data

BIOLOGY

The Atlantic halibut (*Hippoglossus hippoglossus L.*) is the largest of the flatfish and one of the largest marine fish in Atlantic Canada. It is classified as a demersal fish because it lives on or near the bottom. Halibut are found on both sides of the North Atlantic, in cold boreal and subarctic waters with a temperature of around 5 to 8°C. In the northwest Atlantic, halibut range from the coast of Virginia to the south to the central west coast of Greenland to the north (latitude 70°N). Although they occur throughout the St. Lawrence estuary and the Gulf, Atlantic halibut are more abundant in the Esquiman, Laurentian and Anticosti channels, at a depth of 200 m (110 fathoms) or more.

Atlantic halibut in the Gulf of St. Lawrence grow rapidly and steadily, by around 7.5 to 9.5 cm a year. Contrary to other flatfish, they continue to grow vigorously beyond the age of 10. A 20-year-old individual can easily measure 2 m (over 6 ft.) in length. In general, female Atlantic halibut have a faster growth rate and a larger maximum size than males. However, there does not seem to be any difference between the growth rates of the various year-classes, regardless of sex.

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Despite the limited information available on the reproduction of Atlantic halibut in the Gulf, there are some indications that this species reaches sexual maturity at approximately 10 to 11 years of age, or at a length of 70 to 100 cm (25 to 40 in.). Based on observations from scientific winter and spring (January and May) trawl surveys in the Gulf, halibut seem ready to spawn at this time of year. Although the spawning grounds of halibut have not been precisely identified in the Gulf, it is acknowledged in the literature that reproduction probably takes place at depths of over 180 m (100 fathoms). The estimated pelagic life of eggs and larvae is 6 to 7 months, a situation that promotes their dispersal by the current. Halibut metamorphose into flatfish at about 35 to 45 mm (around 1.5 in.) in length, when they adopt a demersal existence. Their diet differs according to their size. Based on an analysis of stomach contents, halibut under 30 cm (12 in.) long eat almost exclusively invertebrates, such as shrimp, small crab and krill. The diet of medium-sized halibut, from 30 to 70 cm (12 to 25 in.) in length, also includes small fish (sand lance, small Gadidae). Halibut 70 cm (25 in.) and over eat mainly fish (flounder, redfish, Gadidae). On account of their large size, active nature and burrowing existence, adult Atlantic halibut do not seem to be preyed on by other marine species.

According to tagging studies, certain individuals are capable of travelling very long distances, of around 1,000 km. The distance travelled is inversely related to fish size. Small individuals, measuring 75 cm (30 in.) or less, seem to travel further than larger, sexually mature fish, which apparently return to the spawning grounds every year. Nevertheless, tagging studies of halibut in the Gulf have shown that most recapture sites are located right in the Gulf, sometimes near tagging sites.

Based on mark and recapture studies of tagged individuals in and outside the Gulf and additional biological information on size, growth and so forth, it was decided, in 1987, that two different management units would be created for Atlantic halibut in Canadian waters: the Gulf of St. Lawrence stock (NAFO Division 4RST) and the Atlantic coast of Canada stock (NAFO Divisions 4VWX, 5Zc and 3NOPs).

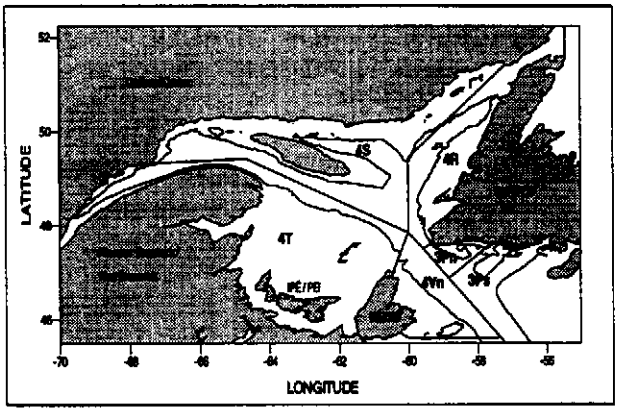

Figure 1. NAFO Divisions 4R, 4S and 4T in the Gulf of St. Lawrence (The 200m isobath is drawn).

Information from research surveys

Slightly over 400 halibut were caught during the last 26 scientific groundfish trawl surveys carried out in the Gulf of St. Lawrence between 1983 and 1995. The distribution of halibut catches during the surveys was very sporadic in that there were rarely more than two or three individuals per tow. The information available is thus limited to sizes and the geographical distribution of catches. The minimum sizes observed in the surveys

ranged from 26 to 74 cm (10 to 30 in.) and the maximum sizes, from 69 to 224 cm (27 to 88 in.). With few exceptions, the halibut were caught mainly in the Esquiman, Laurentian and Anticosti channels, at a depth of 200 m (110 fathoms) or more.

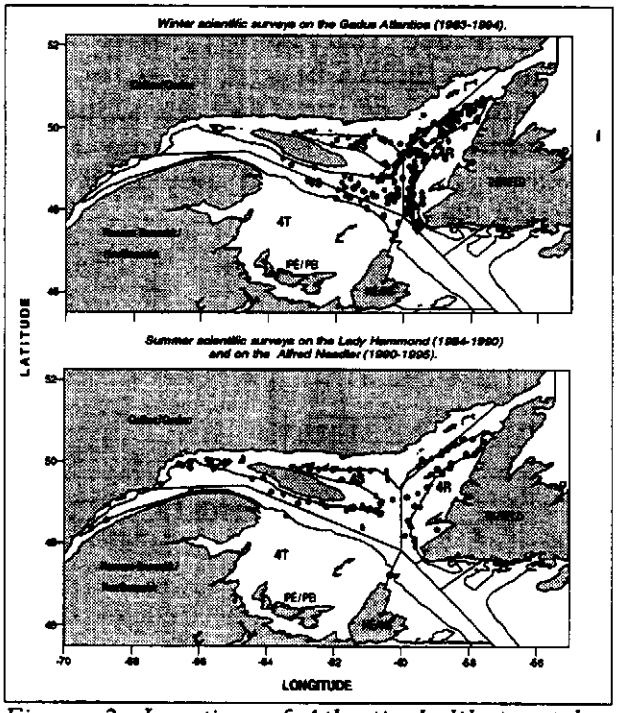

Figure 2. Location of Atlantic halibut catches during scientific trawl surveys in the Gulf (1983-1995) (The 200m isobath is drawn).

THE FISHERY

Nominal catches

Atlantic halibut catches in the Gulf of St. Lawrence used to be very large, totalling over 4,000 t in both 1893 and 1950.

Until the early 1930s, catches were made exclusively by the US fleet and, despite a downward trend, they amounted to over 1,000 t for several years. Statistics prior to 1934 do not report any catches by Canadian vessels. Although some catches may have gone unrecorded, they were probably very small.

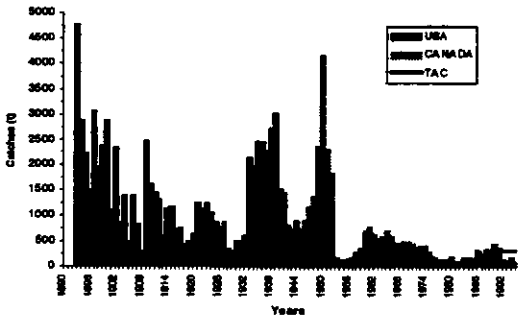

Figure 3. Commercial catches of Atlantic halibut in the Gulf of St. Lawrence (NAFO Divisions 4RST) from 1893 to 1995.

Catches rose in subsequent years, reaching over 2,000 t until 1938. This phenomenon may be attributed to increasingly intensive harvesting in the Gulf by two Canadian fleets, one from Quebec and the other from the Maritimes. Meanwhile, the Americans gradually reduced their Atlantic halibut fishery in this area, taking only a few tonnes in the 1950s and none as of 1960.

Atlantic halibut catches in the Gulf of St. Lawrence during the second half of this century have never been as large as those prior to 1950. Except in the 1960s, halibut catches amounted to under 500 t and rarely exceeded the preventive TAC of 300 t set in 1988. In 1995, they fell to 83 t, the lowest level ever recorded. The recent decline in catches, notably by the mobile gear fleet, stems largely from the cod and redfish moratoria and the use of Nordmore grates by shrimpers. In general, the west coast of Newfoundland (Division 4R) contributed the most to total halibut landings in the Gulf from 1953 to 1980. Since then, catches have been distributed fairly evenly among the three divisions (4R, 4S and 4T). Based on commercial

landings, fishing is most intensive between May and September. Halibut are caught mainly with longlines and, to a lesser extent, as by-catches in gillnets and otter trawls. At present, there is very little information available on the fishing effort of the commercial fixed gear fleet, making it difficult to calculate a valid abundance index for Atlantic halibut.

The fishery in 1995

As mentioned above, Atlantic halibut landings for the Gulf as a whole amounted to only 83 t in 1995, mainly because of the cod and redfish moratoria. Over half of the halibut catches were made in Division 4T, i.e. mainly in the sectors to the west of the Gaspé Peninsula and in the Magdalen Islands.

Table 1. Preliminary data on Atlantic halibut landings (t) in the Gulf of St. Lawrence in 1995.

Division	Gear	Region			Total
	category	Newfoundland	Maritimes	Quebec	
4R	Fixed	12.8	-	0.3	13.1
	Mobile	2.5	-	-	2.5
	Unknown	0.1	-	-	0.1
	Total	*15.4*	0	0.3	15.7
4S	Fixed	-	0.5	21.2	21.7
	Mobile	-	-	0.5	0.5
	Unknown	-	-	0.8	0.8
	Total	0	0.5	*22.5*	23.0
4T	Fixed	-	1.6	22.1	23.7
	Mobile	-	1.2	0.1	1.3
	Unknown	-	0.1	19.0	19.1
	Total	0	2.9	*41.2*	*44.1*
Total		15.4	3.4	64.0	82.8

Preliminary data.

The Quebec fleet alone took over 90% of the catches in divisions 4S and 4T, while the Newfoundland fleet landed almost all of the halibut caught in Division 4R. Nearly 70% of the catches were made exclusively with two types of fixed gear, longlines and gillnets.

Demographic structure of catches

In 1988, the Canadian Atlantic Fisheries Scientific Advisory Committee (CAFSAC) recommended that halibut under 81 cm (32 in.) be thrown back in order to reduce the mortality of immature individuals. A regulation to that effect has never been applied in the Gulf, and only as of 1995 outside the Gulf.

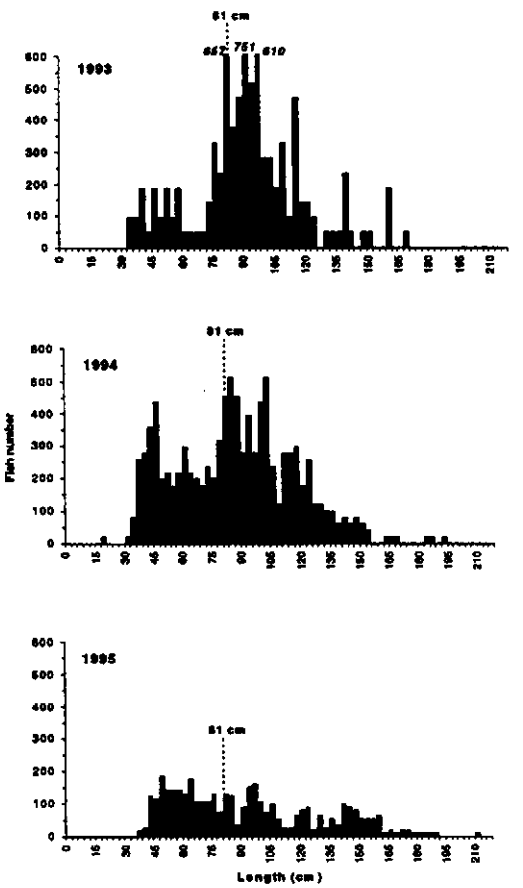

Figure 4A. Size distribution of Atlantic halibut in the commercial catches by fixed gears (the minimum size limit of 81 cm is indicated).

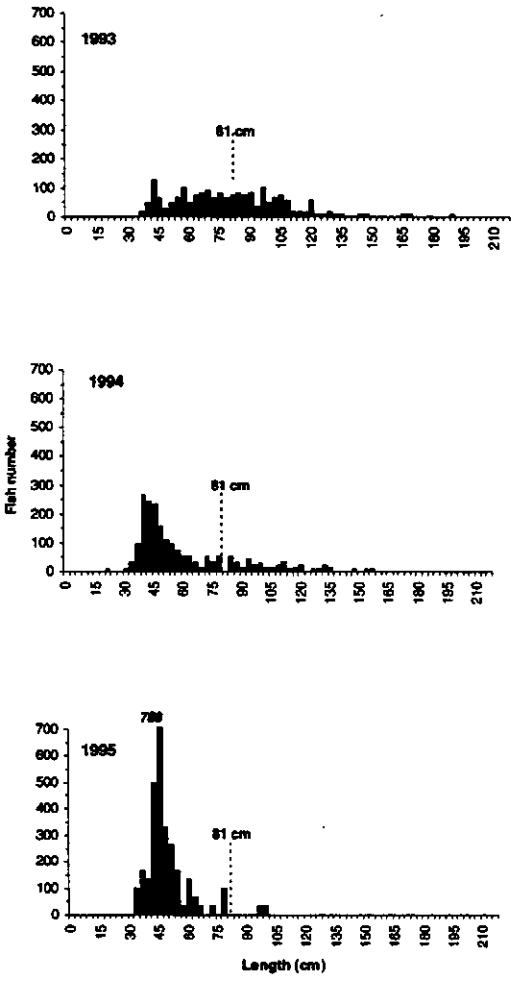

Figure 4B Size distribution of Atlantic halibut in the commercial catches by mobile gears (the minimum size limit of 81 cm is indicated).

Sufficient biological data from the commercial fishery have been available only since 1993. Most of the catches are currently made by the longline and gillnet fleets. Although catches from longlines are mostly comprised of fish greater than 81 cm, about one quarter of their landings, in number, are made of fish smaller than 81 cm. Gillnets catch fish mostly under 81 cm (71 to 94%).

Table 2. Sizes of Atlantic halibut caught with fixed gears (1991-1995).

Year	Gear category	Number of measured fish			Length (cm)		
		Total (n)	< 81cm (%)	≥ 81cm (%)	minimum	maximum	mean
1991	Gillnets	0	-	-	-	-	-
	Lines	208	25.00	75.00	57	200	96.81
1992	-	-	-	-	-	-	-
1993	Gillnets	41	70.73	29.27	34	143	66.56
	Lines	110	4.55	95.45	73	169	102.18
1994	Gillnets	111	93.69	6.31	32	121	49.93
	Lines	382	23.82	76.18	42	192	97.43
1995	Gillnets	90	93.33	6.67	37	117	54.02
	Lines	343	32.36	67.64	43	210	102.24

Catches of Atlantic halibut by mobile gears are currently very low. The average size of halibut in their catches has decreased from 80 cm (31.5 inches) in 1993 to 50 cm (19.5 inches) in 1995, which represents about half the size of a sexually mature fish. The selectivity of the otter trawls changed considerably during that period with the introduction of the Nordmore grate in the shrimp fishery, and with the closures of the cod and redfish fisheries which used meshes of 140 mm (5.5 inches) and 90 mm (3.5 inches) respectively. These changes in the size structure of the landings by otter trawl are mostly cased by these changes in selectivity, and probably do not represent incoming recruitment.

However, the size distribution of fish in the population is still relatively broad, as large individuals (100 cm and more – approximately 10 years old) are found regularly in the landings. It is therefore possible that their survival is good, at least when they reach sizes of 80-90 cm

(32-36 in.). It is likely that these large fish are less vulnerable to the otter trawl and gillnets, being only subject to moderate exploitation by the longlines.

INFORMATION FROM THE INDUSTRY

Comments from the industry concern fishing practices and the quality of landing figures. Halibut is acknowledged to be a relatively rare species in the Gulf but one that nevertheless has a high market value. However, according to some fishermen, by-catches are not always declared and thus not counted fully in the statistics. Total catches may therefore be larger than indicated by official figures. Certain longline fishermen deplore that fact that even shrimpers equipped with Nordmore grates catch small halibut. Similar comments were made with respect to longliners using overly small hooks (No. 12). Some fishermen recommend that larger hooks, *i.e.* Nos. 14 and 16, be used.

On the basis of information on fishing activities in previous years, some twenty fixed gear (gillnet and longline) fishermen were contacted in 1995 to participate in the Index Fishermen Program. The goal was to obtain more data on the directed fishery for halibut in the Gulf with respect to catches per unit of effort, fishing depths, etc. Apparently, however, several of these fishermen fished very little, or not at all, last year because of the scarcity of groundfish and the cod moratorium. According to the limited information obtained from three longline fishermen, halibut catches in 1995 amounted to between 0 and 32.5 kg (0 and 71.5 lb) /250 hooks/24 hours and were not very large compared with those recorded for the stock outside the Gulf. Fishing depths varied widely, from 28 to 240 m (15 to 185 fathoms).

STATUS OF THE RESOURCE AND PROGNOSIS

Catches of Atlantic halibut were at their lowest level in 1995, mostly because of the reduction of fishing effort in the groundfish fishery. This has rendered even more arduous the collection of biological data from the commercial fishery.

In spite of the limited information available, it appears the stock is currently stable, with relatively large numbers of old individuals in the landings. However, the current landings, put into an historical perspective, indicate that the stock is at a very low level. Landings made between 1893 and 1950 show that this stock was able to sustain catches considerably larger than those made in the last few decades.

The current exploitation of individuals smaller than 81 cm (32 in.), sexually immature, is too high and will likely affect the spawning potential of the stock. It is unlikely that the stock levels that produced high catches in the past can ever be rebuilt unless mortality on young fish is considerably reduced.

For more information:

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