

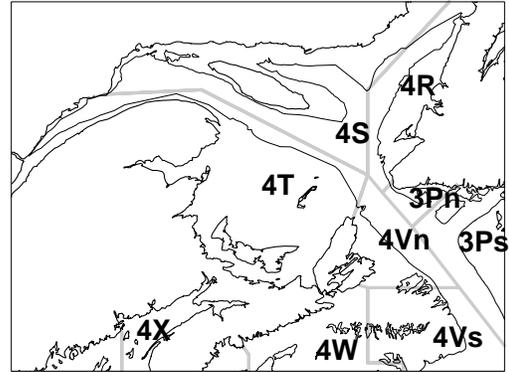
**4T Winter flounder**  
*(Pleuronectes americanus)*

**Background**

Winter flounder is a coastal flatfish distributed in the West Atlantic from southern Labrador to Georgia. In the southern Gulf of St. Lawrence (NAFO Division 4T), winter flounder are limited to the Magdalen Islands and to southern parts of 4T: Chaleur Bay, the Shediac Valley-Miramichi area, Northumberland Strait, and St. George's Bay. They are associated with soft or moderately hard bottoms and depths less than 40 m. They occupy a range of water temperatures and are capable of inhabiting freezing water conditions. Throughout their range, they migrate seasonally from the coast and in the southern Gulf they overwinter in estuaries (Hanson and Courtenay 1996). Spawning occurs in late winter or early spring. Female winter flounder release several hundreds of thousands of eggs that settle to the bottom, adhering to rocks and vegetation. The larvae drift in surface waters for 2-3 months before metamorphosis. Growth rates vary widely between regions, with female winter flounder reaching sexual maturity by about 25 cm and with males maturing by approximately 20 cm. Winter flounder feed opportunistically on a variety of benthic organisms, mainly molluscs and small crustaceans. They also feed on the eggs of other aggregations of spawning fish, in particular capelin and herring. In the southern Gulf, localized fisheries using modified gillnets (tangle nets) are set on the spring and fall spawning beds of herring to capture winter flounder.

Winter flounder in 4T have not been under quota management. With the closure of the Atlantic cod fishery in 1993, concern was expressed that species without quota restrictions, such as winter flounder, would become subject to increased directed effort. The first assessment of the stock status was made in 1994.

The 4T winter flounder resource supports localized fisheries for lobster bait and limited food markets. Winter flounder was also a bycatch in fisheries for cod, white hake and American plaice; however, since closure of the cod fishery, winter flounder has become a mainly directed fishery. The fishery in 4T is prosecuted mainly by mobile gear operated by vessels less than 45 feet. The flesh of winter flounder is of good quality and in certain parts of their range, as in northeastern US, winter flounder are commercially valued in sport and commercial fisheries.



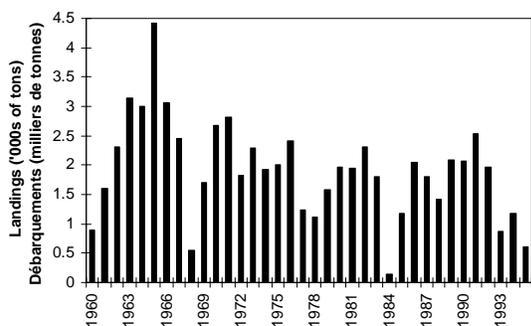
**The Fishery**

**Management:** Winter flounder in 4T has not been under quota management. The most recent regulations on mesh sizes were established in 1993. In Northumberland Strait and the Magdalen Islands, the approved mesh size for mobile gear in winter flounder-directed fisheries became 130-mm square mesh in codends. In Chaleur Bay and Miscou Bank, the approved mesh size was 135-mm square. Mobile gear fisheries targeting American plaice and witch flounder were required to adopt a minimum mesh size of 145-mm square. Gillnets were required to have a minimum mesh size of 140 mm. Restrictions were also imposed in 1993 on the minimum size of winter flounder. Fisheries were closed when winter flounder less than 25 cm in length exceeded 20% by number of the total winter flounder catch, based on at-sea observers. Closures were also imposed when the bycatch of cod, white hake or witch exceeded 10% of the weight of total catches in winter flounder-directed fisheries. In 1995, special licenses for bait fishing were eliminated in the southern Gulf to reduce the catches of juvenile flatfish. Dockside monitoring recorded the length composition of landed catches, providing a means to detect discarding at sea.

**Landings:**

4T winter flounder - landings in thousands of tons.

Year	71-80	81-91	92	93	94	95	96
	Avg	Avg					
TAC							1
Total	2	2	2	1	1	1	



### Annual landings of 4T winter flounder.

Landings of winter flounder in 4T totaled 609 t in 1995, a considerable drop from landings in 1994 (1183 t). Winter flounder landings have averaged 1916 t annually since 1960. The maximum annual landings of 4T winter flounder were reported in 1965, at 4412 t; lowest landings occurred in 1984 (149 t). Otter trawls continue to be the dominant gear landing winter flounder in 4T. Winter flounder landings have declined almost continuously since 1991. However, landings have varied widely from year to year and there is not an evident long-term trend in winter flounder landings. This may reflect problems in winter flounder catch statistics: misreported and non-reported catches may have caused winter flounder landings to be underestimated in several years. Winter flounder were important in bait fisheries where catches were not fully accounted for in official landing statistics.

Nominal effort in the winter flounder fishery was evaluated since 1991 for the dominant gear, otter trawls, from vessel logbooks recording the number of days fishing. Data from vessel logbooks before 1991 were insufficient to evaluate nominal effort. The number of fishing days by all trawlers reporting catches of winter flounder declined from 12,000 days in 1991 to approximately 1000 days in 1995. In 1991, vessels targeting winter flounder totaled approximately 2000 days at sea, landing 1690 t; by 1995, nominal effort declined to 453 days, for 305 t of winter flounder landed. The strongest decline in nominal effort in both directed and non-directed fisheries for winter flounder occurred in 1993. Nominal effort since 1993 has been relatively stable.

**Biological data:** Assessments of the status of 4T winter flounder began in 1994 and biological data on the fishery have not been fully incorporated into analyses. Port sampling of commercial catches for the age-length composition has been conducted annually since 1983. Length-frequency data in research surveys have not indicated any trends in

recruitment; however, the modal size of winter flounder in the Miramichi-Shediac Valley region has declined over time.

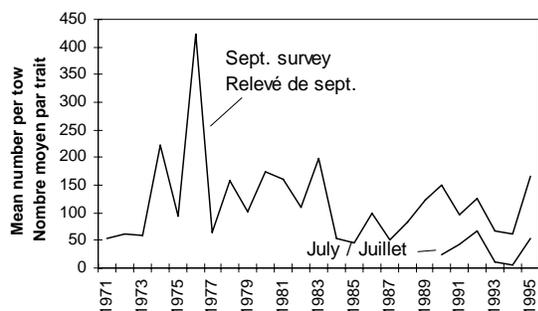
### Resource Status

**Inputs:** Stock status evaluation was based on trends in landed catches and nominal effort, combined with abundance trends in research surveys of 4T. Surveys have been conducted every year in September since 1971 using research trawlers. A trawl survey of the southwestern part of 4T (Shediac Valley) has been conducted every July since 1990 to evaluate the status of juvenile groundfish stocks.

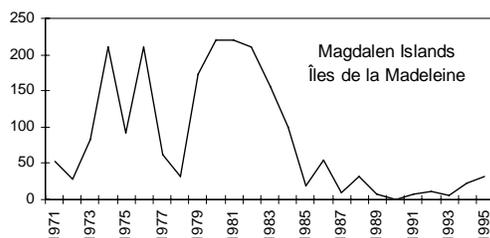
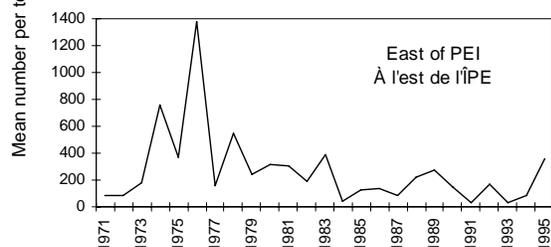
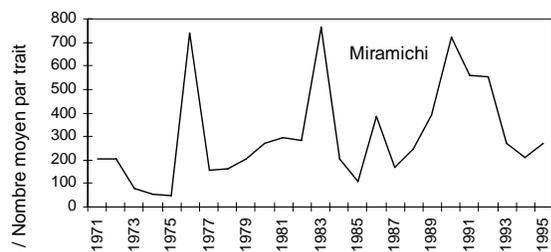
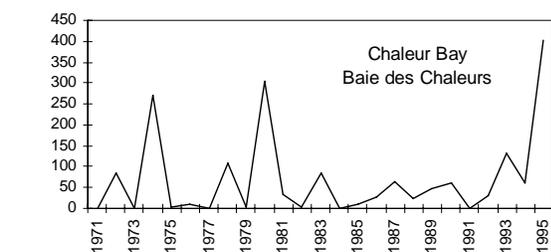
**Catch rates:** Commercial catch rates were not calculated for 4T winter flounder due to recent gear changes and increased directed fishing on winter flounder.

**Surveys:** Research surveys may poorly reflect the abundance of 4T winter flounder. Winter flounder are distributed in shallow water at the inshore edge of groundfish surveys. Annual variations in the depth distribution of winter flounder or the distribution of sampling could contribute to fluctuations in the catch rates.

In 1995, the average catch in all 10 strata with winter flounder was 165 winter flounder per tow, a substantial rise over the number caught in 1994 (61 per tow). The juvenile groundfish survey, conducted in the Shediac Valley-Miramichi area since 1990, showed a similar trend in winter flounder abundance to that of the September survey. In the sector of Chaleur Bay, large catches in September 1995 caused the catch index to rise to its highest level on record. Similar abrupt increases in the index occurred in 1974 and 1980, but were not maintained over time. In the Miramichi sector, catch rates were relatively low in the 1970s, with exceptional catches in 1976 and 1983. Catch rates rose during the late 1980s to peak levels in 1990-1992, then dropped. In the area southeast of PEI, catch rates were highest in the mid-1970s, but declined to relatively low levels in recent years. The catch rate in this area increased sharply in 1995. Catches of winter flounder near the Magdalen Islands increased in 1994 and 1995 from their level in the 1989-1993 period, but remained well below the maximum catch rates recorded from the mid-1970s to early-1980s.



**Population size and biomass of 4T winter flounder, based on research surveys.**



**Abundance index of winter flounder in sectors of 4T, based on September survey.**

**Population abundance:** All estimates of winter flounder population and biomass are uncorrected for catchability and should be considered as minimal estimates or indices of winter flounder abundance. The total population of 4T winter flounder in 1995 was around 100 million fish, representing a minimum biomass of 12,540 t.

**Uncertainty:** There is uncertainty in landings caused by misreporting of winter flounder as American plaice and by unreported catches destined for lobster bait or private sale. Research surveys are conducted near the limit of the depth distribution of the stock. Age determination of 4T winter flounder was suspended in 1995 due to difficulties in the interpretation of age structures.

### Outlook

**Projection:** It is not presently possible to forecast the abundance of winter flounder in 4T. In certain areas of the southern Gulf, indices of abundance indicate that the resource is at an intermediate level of abundance relative to the past 25 years. Several stock units of winter flounder probably occur in 4T and their abundance varies differently over time. Landings of 4T winter flounder have declined since 1991; however, the decline has been accompanied by lower fishing effort by otter trawls, the main gear landing 4T winter flounder.

**Management considerations:** Improvements are required in the reporting of winter flounder catches to eliminate misreporting and to provide better estimates of non-reported catches. Measures have been taken to reduce the discarding at sea of commercially undersized winter flounder. It will be important to continue monitoring the size composition of commercial catches at sea and in landing ports to detect discarding whenever it occurs and to take appropriate measures.

### For More Information

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***References***

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