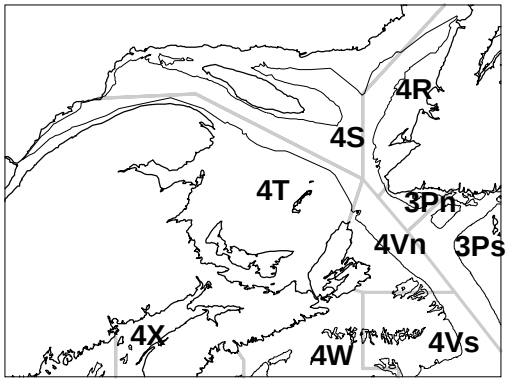
Winter Flounder in the Southern Gulf of St. Lawrence

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. 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 by-catch 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.

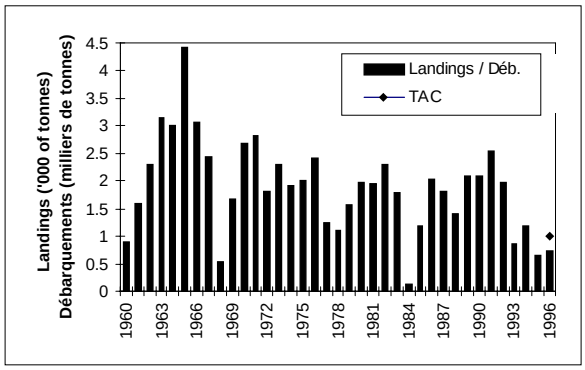


The Fishery

Management: A precautionary **quota** of 1000 t was set for the first time on 4T winter flounder in 1996. This was continued into 1997. In Northumberland Strait and the Magdalen Islands, the approved mesh size for mobile gear in winter flounder-directed fisheries was 130-mm square mesh in codends. In Chaleur Bay and Miscou Bank, the approved mesh size was 145-mm square. In 1996, mobile gear fisheries targeting American plaice and witch flounder were required to adopt a minimum mesh size of 155-mm square. Gillnets were required to have a minimum mesh size of 140 mm. Restrictions were 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 by-catch of cod or white hake 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.

4T winter flounder - landings in tons.

Year	1970-79 Avg	1980-89 Avg	1993	1994	1995	1996
TAC						1000
Total	1991	1671	869	1183	662	745



Annual landings and TAC of 4T winter flounder.

Landings of winter flounder in 4T totaled 745 t in 1996, an increase from their level in 1994 (662 t). Winter flounder landings have averaged 1886 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 64% 4T winter flounder in 1996, although gillnets have contributed annually about 35% of landings since 1993. Winter flounder landings have declined since 1991; however, landings have varied widely from year to year and there is not an evident long-term trend. 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. Nominal effort has declined since 1991, with the sharpest decline occurring in 1993 following the cod moratorium. Nominal effort since 1993 has been relatively stable. The number of fishing days by all trawlers reporting catches of winter flounder declined from 12,000 days in 1991 to approximately 1200 days in 1996. In 1991, vessels targeting winter flounder totaled approximately 2000 days at sea, landing 1690 t; by 1995, nominal effort declined to 504 days, for 387 t of winter flounder landed. In 1996, nominal effort and landings increased to 671 days and 437 t, respectively.

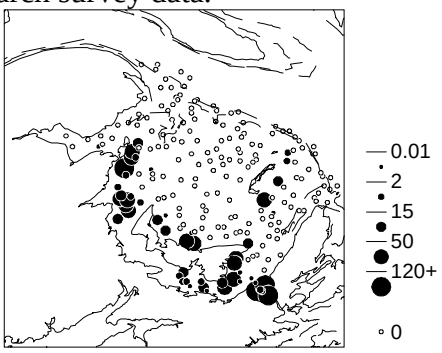
Assessments of the status of 4T winter flounder began in 1994 and **biological data** on the fishery (e.g. catch-at-age, growth, mortality estimates) have not been fully incorporated into analyses. Port sampling for the age and length composition of commercial catches has been conducted annually since 1983. Commercial length frequencies combining catches by all gears do not indicate a clear trend in modal size since 1983, although the maximum size of winter flounder in the commercial fishery may have declined since the late 1980s. Length-frequency data in research surveys have not indicated any trends in recruitment. The average weight of winter flounder captured in the research surveys has declined over time.

The size at which winter flounder spawn was evaluated in relation to the current minimum size regulation for winter flounder of 25 cm. Data were analyzed from two surveys conducted during the spawning season, in May 1987 and April 1991. The size at which 50% of the females spawned was 23.6 and 26.4 cm in the two surveys; 95% of the females had spawned by 29.5 and 29.7 cm. For males, 50% maturity was attained by

23.8 and 20.4 cm and 95% maturity by 31.2 and 24.8 cm.

Resource Status

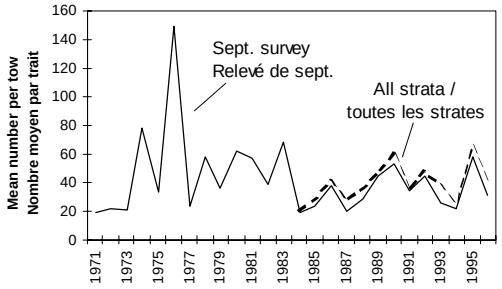
The distribution of the winter flounder in the southern Gulf can be described using research survey data.



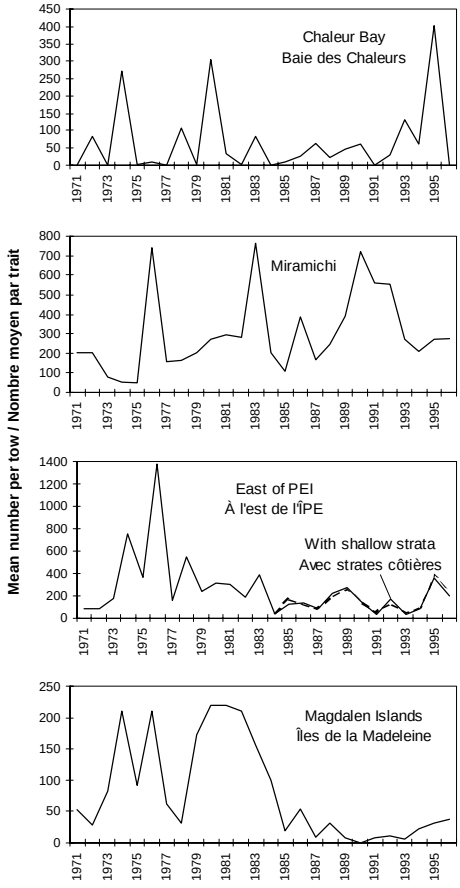
Catches of winter flounder (kg per tow) in the 1996 research survey of 4T.

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.

In the 1996 **research survey**, the average catch in the main strata was 32 winter flounder per tow; including the shallow-water strata, 42 winter flounder per tow were caught in 1996. Abundance has varied differently within sectors of 4T. In the Chaleur Bay sector, catches have fluctuated widely, rising to an average of 404 per tow in September 1995, but declining in 1996 to an average of less than one per tow. Similar abrupt increases in the index occurred in 1974 and 1980. 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 to an intermediate level. In the area southeast of PEI, catch rates were highest in the mid-1970s, but declined to relatively low levels in recent years. Catches of winter flounder near the Magdalen Islands increased yearly 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.

All estimates of winter flounder **population and biomass** should be considered as minimal estimates or indices of winter flounder abundance. The total population of 4T winter flounder in 1995 was around 75 million fish, representing a minimum biomass of 11,600 t.

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.

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

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.

Outlook

It is not presently possible to **project** 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. In addition, there is a need to provide the advice by smaller geographic areas to match the stock structure.

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Reference

Morin, R. and I. Forest-Gallant. 1997. Assessment of NAFO Division 4T winter flounder in 1996. (in press) Canadian Stock Assessment Secretariat Res. Doc. 97/69.

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