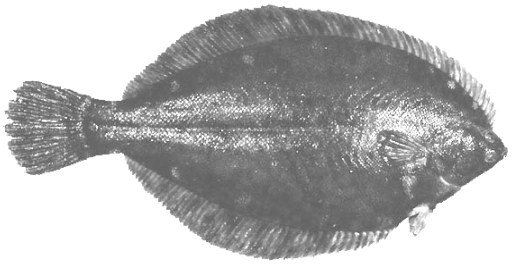
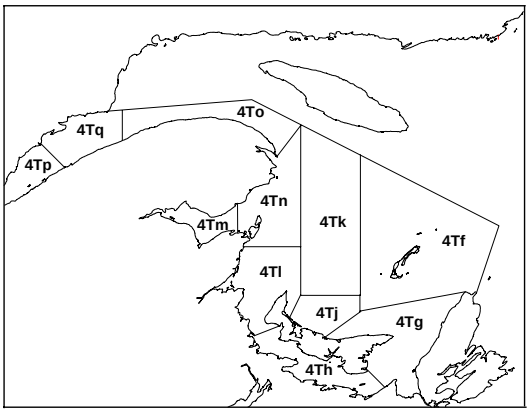


Winter Flounder in the Southern Gulf of St. Lawrence (Div. 4T)



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 sub-zero 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 some areas of the southern Gulf, modified gillnets (tangle nets) are set on the spring and fall spawning beds of herring to capture winter flounder.

Winter flounder in 4T came under quota management in 1996. 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 north-eastern US, winter flounder are commercially valued in sport and commercial fisheries.

The most recent full assessment for this stock was conducted in February 2002 (Morin et al., 2002; SSR A3-22 (2002)). This report updates fishery and survey data on this stock up to 2003.

Summary

- Landings of winter flounder were 458 tonnes in 2003, similar to landings in 2002, but less than the approximately 600 tonnes landed annually from 1998 to 2001. Directed effort on winter flounder has declined in the 1990s.
- The index of abundance from the research vessel survey could not be updated in 2003. The scheduled survey vessel, the CCGS *Alfred Needler* was disabled shortly before the September 2003 survey and was replaced by the CCGS *Wilfred Templeman*. The relative fishing efficiency of the two vessels is unknown.
- The abundance of winter flounder in the research vessel survey up to 2002 has varied about a constant level for over a decade. The abundance index is near average for the series, while the biomass index is below average.
- Winter flounder in 4T probably comprise several stock units. The survey abundance index shows regional differences in abundance trends.

- The average size of winter flounder in the survey has declined, but appears to have levelled in recent years.

The Fishery

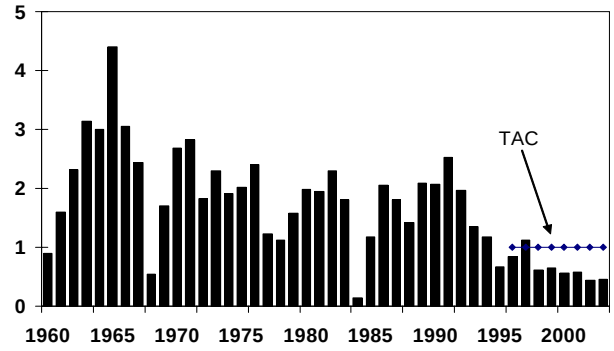
Landings and TAC's (thousands of tonnes)

Year	Average 1981-90	Average 1991-95	Average 1996-00	2001	2002	2003*
TAC			1.0	1.0	1.0	1.0
Landings	1.7	1.5	0.8	0.57	0.44	0.46

* Preliminary statistics

Winter flounder **landings**, which had remained close to 600 tonnes from 1997 to 2001, declined to about 440 tonnes in 2002 and 458 tonnes in 2003. The average since 1965 has been 1700 tonnes. Otter trawls have been the dominant gear landing winter flounder over the past four decades; however, tangle nets (modified gillnets) have contributed at least one quarter of landings in most years since 1986.

Landings and TAC (thousands of tonnes)



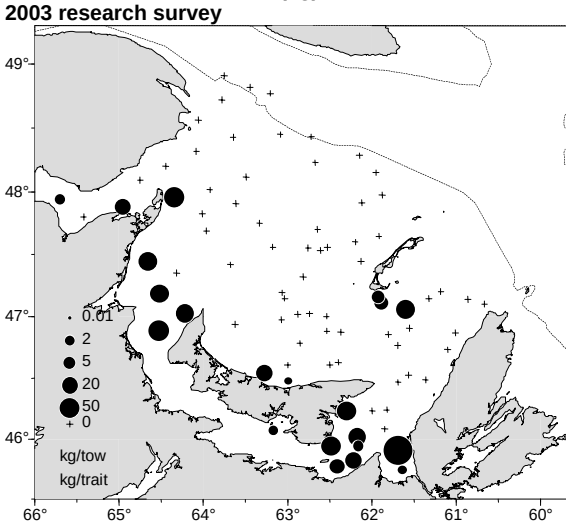
Reported landings of winter flounder have varied widely from year to year. This species has been used widely as bait in 4T, often reported as unspecified flounder or misreported as other species. Several improvements were made to landing statistics in the 1990s, such as better identification of the species caught, dockside monitoring, and the introduction of fixed gear logbooks. This has improved recent catch statistics for 4T winter flounder.

Directed effort on winter flounder declined in the 1990s, accounting for much of the recent decline. Mesh sizes have increased considerably since the 1960s. In 2000, the minimum mesh size for mobile gears in most areas of 4T with directed fisheries for winter flounder was increased from 130 to 140 mm square. In 2003, mesh sizes became 145 mm square in the 4T directed fisheries for winter flounder.

Resource Status

Winter flounder has a coastal distribution in the southern Gulf of St. Lawrence.

Catches of winter flounder (kg) in standard tows of the 2003 research survey

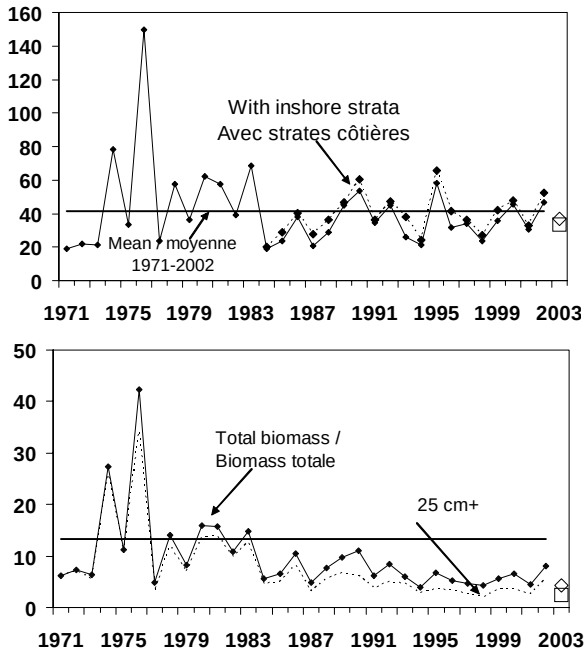


The **annual research vessel (RV) survey** has been conducted with the CCGS *Alfred Needler* since 1992. In 2003, the *Alfred Needler* was disabled shortly before the survey and replaced by the CCGS *Wilfred Templeman*. The relative fishing efficiency of the two vessels is unknown. As a result of this, the abundance of winter flounder in 2003 cannot be compared to previous years.

In the 2002 RV survey, catches averaged 46 winter flounder per tow, slightly more than the average of 42 per tow for strata sampled since 1971. Three inshore strata were added to the survey in 1984. Including these strata, the survey averaged 52 winter flounder per tow in 2002. Both abundance indices (with and without inshore strata) have varied about the long-term average for over a decade. The biomass indices from the survey, for all winter flounder and for

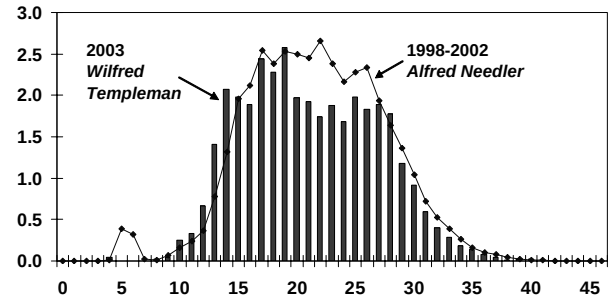
commercial-sizes only, have also fluctuated about a constant level for the past decade, but continue to be below the average for the series. It should be noted, however, that this survey does not extend to depths less than 20 m. Consequently, much winter flounder habitat, particularly that of younger fish, is not sampled.

Survey indices of abundance (number per tow) and biomass (kg per tow)



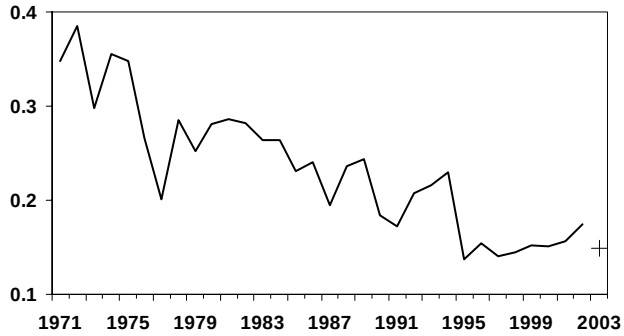
The mean catch of winter flounder in the 2003 RV survey was 37 per tow including inshore strata and 33 per tow in the area that has been sampled since 1971. Fewer winter flounder in the 20-26 cm size range were captured in the 2003 survey than in recent surveys. This difference may be due to vessel-dependent differences in size selectivity.

Length frequency of winter flounder in RV surveys



The average size and weight of winter flounder captured in the RV survey have declined since 1971, although from 1995 to 2002 it has levelled. A similar pattern of decline in winter flounder size has not been observed in samples of commercial catches since 1983.

Mean weight (kg) of winter flounder in research surveys

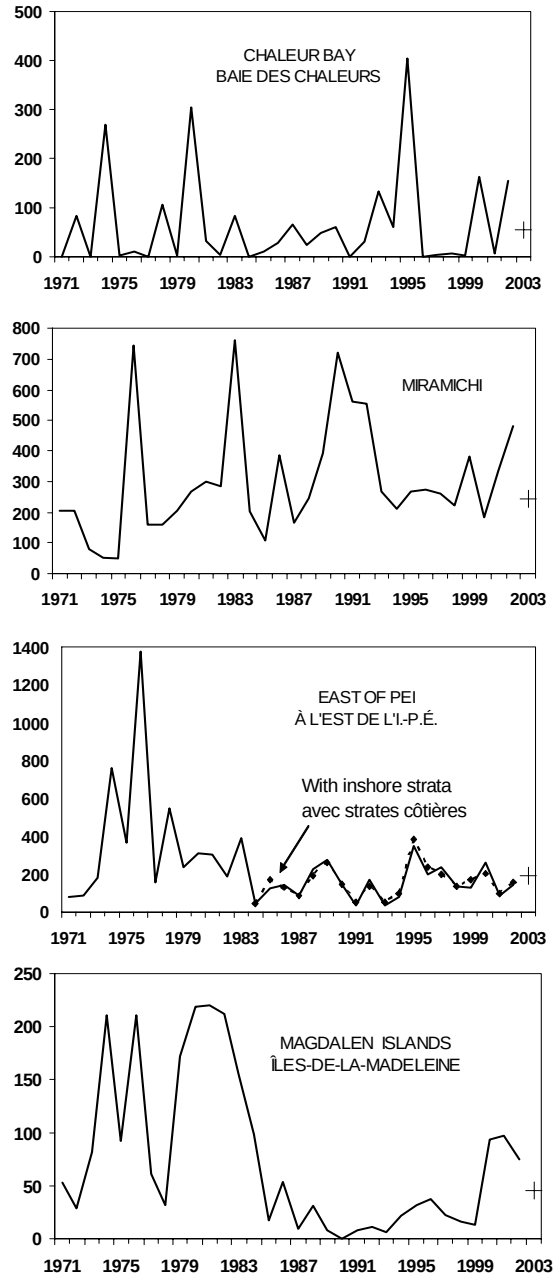


Winter flounder are believed to overwinter in estuaries of the southern Gulf. Migration studies conducted elsewhere indicate that they make limited seasonal movements. This has been supported by recent tagging of 4T winter flounder, where approximately 40% are recaptured within 5 km, up to two years following release. These results suggest that several stock units may occur in 4T. Patterns of abundance in the RV survey have varied among areas of 4T, supporting this hypothesis. In Chaleur Bay, RV catches have varied widely without any discernible trend since 1971, possibly reflecting the small number of stations sampled there. In the Miramichi area, RV catch rates were relatively low in the early 1970s, with exceptional catches in 1976, 1983, and during 1990-1992. RV catch rates in 2002 were above average. In the area east of PEI, catch rates were highest in the mid-1970s, but have fluctuated at relatively low levels since then. In the Magdalen Islands area, winter flounder catches were strong throughout most of the 1970s and early 1980s, but have remained at a low level for most of the period since then. In 2000 to 2002, catches in that area have risen, ranging from 74 to over 90 winter flounder per tow.

The mean catch of winter flounder in 2003, although not comparable to previous years

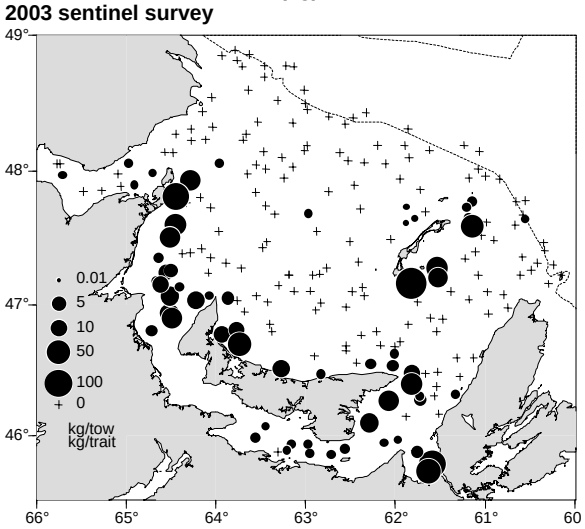
due to the research vessel change, tends to be lower than in 2002, but within the range of variability for this survey.

Survey abundance by area of 4T (mean number per tow; note different abundance scales on graphs)



A synoptic survey of 4T by four commercial trawlers was initiated in 2003 as part of the **sentinel program**. This survey adopts a similar sampling approach to the RV survey. The distribution of winter flounder catches in the 2003 sentinel program was similar to their coastal distribution in the RV survey. Winter flounder abundance averaged 14 per standard tow in the 2003 sentinel survey. As the first year of the sentinel program in its current sampling design, it is too early to say whether it will provide reliable indicators of winter flounder abundance over time.

Catches of winter flounder (kg) in standard tows of the 2003 sentinel survey



Sources of Uncertainty

The annual RV survey of 4T does not sample the full distribution of winter flounder. Small, young winter flounder are found further inshore than the area sampled by the survey. Length-frequencies of winter flounder from the research survey do not signal incoming recruitment, nor do they track size modes that indicate year-class strength. Despite these weaknesses, the RV survey provides a general long-term trend in stock abundance. The change of research vessels in 2003 has resulted in a break in the survey index and the temporary loss of an indicator of stock status. This is a source of uncertainty in the assessment of the status of the 4T winter flounder resource.

Recent improvements have been made to landing statistics for this resource. Data on landings up to the mid-1990s may be incomplete. Logbook data are available for mobile gear since 1991, but mostly for one area (4Tg).

Although there is much uncertainty in the composition of seal diets in the southern

Gulf of St. Lawrence, winter flounder has been observed in grey seal diets. A recent analysis indicates that up to 10,000 tonnes were consumed in 2001.

Outlook

Survey data indicate that the index of winter flounder abundance for the whole of 4T has fluctuated about the long-term average in the past decade. The survey indicates that there has been a declining trend in the average size of winter flounder over most of the past 32 years, but this trend appears to have levelled since 1995.

For More Information

Contact:

Roderick Morin
Fisheries and Oceans Canada
Gulf Fisheries Centre
P.O. Box 5030, Moncton
New Brunswick, E1C 9B6

TEL: (506) 851-2073
FAX: (506) 851-2620
E-Mail: morinrb@dfo-mpo.gc.ca

References

DFO, 2002. Winter flounder in the southern Gulf of St. Lawrence (Div. 4T). DFO Sci. Stock Status Rep. A3-22 (2002).

DFO, 2003. Winter flounder in the southern Gulf of St. Lawrence (Div. 4T). DFO Sci. Stock Status Rep. A3-22 (2003).

Hammill, M.O., and G.B. Stenson. 2002. Estimated consumption of Atlantic cod (*Gadus morhua*) and some other prey by grey seals (*Halichoerus grypus*) and harp seals (*Phoca groenlandica*), in the southern Gulf of St. Lawrence (NAFO Division 4T). DFO Can. Sci. Adv. Sec. Res. Doc. 2002/054.

Morin, R., I. Forest, and H. Benoît. 2002. Status of NAFO Division 4T winter flounder, February 2002. DFO Can. Sci. Adv. Sec. Res. Doc. 2002/033.

Poirier, G.A., and L. Currie. 2004. Results from the August 2003 sentinel mobile survey of the southern Gulf of St. Lawrence. DFO Sci. Adv. Sec. Res. Doc. 2004/014.

Poirier, G.A., T. Hurlbut, D.P. Swain, G.A. Chouinard, H. Benoît, C. LeBlanc, and L. Currie. 2003. Preliminary results from the September 2003 bottom-trawl survey of the southern Gulf of St. Lawrence. DFO Can. Sci. Adv. Sec. Res. Doc. 2003/112.

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Phone number: 902-426-7070
Fax Number: 902-426-5435
e-mail address: myrav@mar.dfo-mpo.gc.ca
Internet address: www.dfo-mpo.gc.ca/csas

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