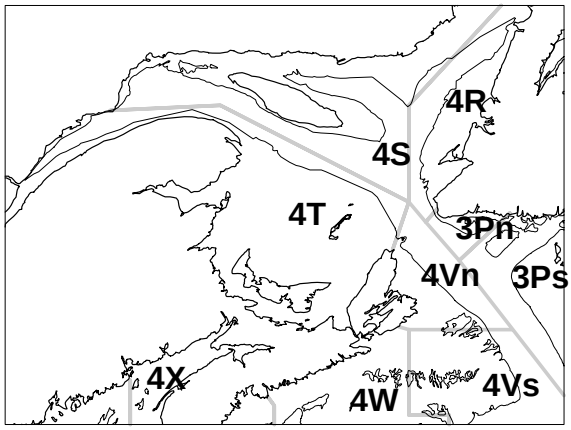
4T American plaice
(*Hippoglossoides platessoides*)



Background

American plaice are widely distributed throughout the Northwest Atlantic, from West Greenland to the Gulf of Maine. Throughout their range, they are associated with intermediate depths (about 80-250 m) and cold waters (usually from below 0°C to 1.5°C). Male and female plaice differ in their life-history traits: females grow faster and attain larger sizes than males; male plaice have shorter lives than females. Sexual maturity is reached at 7-15 years of age for females and between 5 and 7 years of age for males. Spawning occurs from early spring to summer with each female releasing hundreds of thousands of eggs. The fertilized eggs float near the water surface for several days. After hatching, plaice are pelagic until they reach a minimum length of 18 mm, when metamorphosis occurs and they become benthic. Plaice consume a wide range of organisms throughout their life cycle: young plaice consume bottom organisms such as mysid shrimp, amphipods, polychaetes, echinoderms and molluscs; older plaice consume other small fish species and invertebrates.

In the Gulf of St. Lawrence, American plaice has been under quota management in the southern Gulf (NAFO Division 4T) since 1977. Eastern and western parts of 4T have been long suspected of containing separate plaice stocks.

American plaice in 4T were exploited mainly by longlines in the 1930s, but by the 1960s most landings were made by seines and otter trawls. Plaice are now caught by a diverse fishery of fixed and mobile gear, with the dominant sector being seines operated by vessels less than 45 feet. At least half of the annual landings of 4T plaice were obtained as bycatch of the Atlantic cod fishery until 1993, the year that the cod fishery was closed. Since then, plaice has become a directed fishery. With the growth of mobile gear sectors during the 1960s, a large component of plaice catches in 4T (30-40% by weight) was commercially undersized and discarded at sea. Recent measures, including increased mesh sizes and mandatory landing of all catches, have reduced discarding; however, the practice persists in 4T. The uncertainty in plaice landings caused by discarding has been central to management of the stock. Discarding has made it difficult to estimate the level of fishing mortality in relation to a target of $F_{0.1}$.

The Fishery

Management: The quota for 4T American plaice was 5000 t in 1995. All gear sectors failed to meet their quota allocation, except mobile gear vessels less than 45 feet. Mesh size regulations established in 1993 remained in effect: mobile gear plaice-directed fisheries were required to use a minimum 145 mm square mesh in codends; winter flounder-directed fisheries had minimum 130 mm square mesh in codends; minimum mesh size for fixed gear was 140 mm. Many fishers reported using 160 and 165-mm meshes in 1995. The minimum size limit remained 30 cm and closure was imposed when undersized plaice exceeded 20% of the number of plaice caught, as estimated by observers. Closures were also imposed when cod bycatch exceeded 10% of the weight of the total catch. In 1995, cod bycatches caused most of the 14 closures affecting vessels less than 65 feet in the 4T plaice fishery. Special licenses for bait were eliminated during 1995 in the southern Gulf to reduce catches of juvenile flatfish. Dockside monitoring recorded the length composition of landed plaice catches, resulting in two closures of the plaice fishery due to discarding.

Landings:

4T American plaice - landings in thousands of tons.

Year	71-80 Avg	81-91 Avg	92	93	94	95	96
TAC	10[1]	10	10	5	5	5	2
Total	9	7	5	1	2	2	

[1] TAC was first established in 1977.

Available from: Maritimes Regional Advisory Process, Department of Fisheries and Oceans, P.O. Box 1006, Stn B105, Dartmouth, Nova Scotia, Canada B2Y 4A2 Telephone: (902) 426-8487 E-Mail: d_geddes@bionet.bio.dfo.ca

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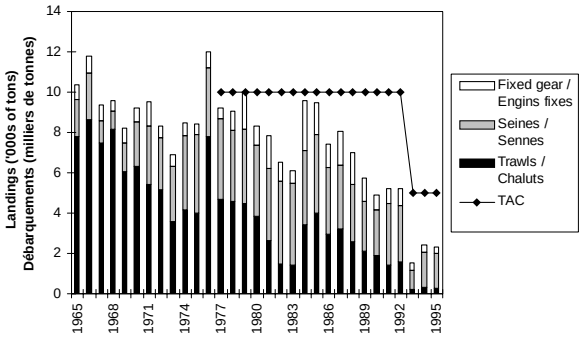


Annual landings of 4T American plaice.

Landings of 4T plaice totaled 2310 t in 1995, similar to the 1994 landings of 2419 t. Annual landings since 1965 have averaged 7647 t, with a maximum in 1976 (11193 t) and a minimum in 1993 (1403 t). Seines have been the dominant gear in most years since 1981, contributing roughly 75% of 4T plaice landings in 1995. Plaice landings by fixed gears declined sharply in 1995. Since 1993, plaice catches have been concentrated in eastern 4T. Consultations with industry revealed divergent views of fishers on the status of plaice in western and eastern parts of 4T.

Trends in nominal effort in the plaice fishery, recorded in vessel logbooks as the number of days spent fishing, are monitored to detect changes in fishing pressure since closure of the cod fishery. Effort was similar in 1994 and 1995. In 1995, seines fished for 1007 days and trawls fished 347 days (in 1994: 1008 and 304 days, respectively). Nominal effort on plaice was significantly lower in 1993. The number of vessels directing for plaice increased for seines from 49 vessels in 1994 to 53 vessels in 1995, while a strong increase was noted in the number of trawlers directing for plaice: 23 vessels in 1994, 41 vessels in 1995. Since plaice bycatch in the cod fishery has ceased and there has been no marked increase in plaice-directed effort, plaice fishing mortality is probably lower since 1993 than in the period before closure of the cod fishery.

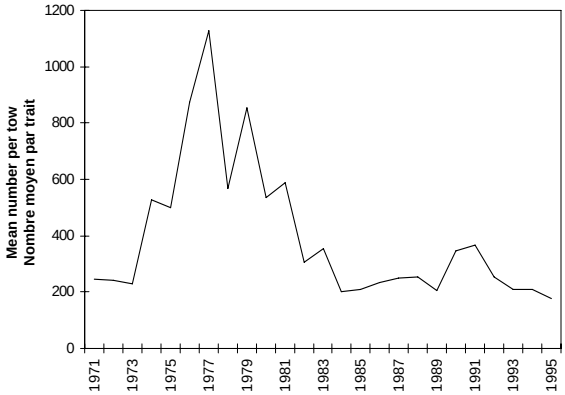
Biological data: The total estimated catch of plaice in 1995 was similar to the estimate for 1994 and considerably greater than catches in 1993. The number of landed plaice aged less than 8 years of age declined in 1995. The last assessment noted an increase in the number of landed plaice aged less than 9 years of age during 1994. This was interpreted as an increase in landings of plaice less than 30 cm in length, the result of management measures to reduce discarding. However, it appears that some discarding of commercially undersized plaice continues in the fishery. When the length composition of plaice catches measured by observers at sea is compared with landed catches measured at port, the landed catches tend to have fewer plaice less than 30 cm.

Resource Status

Inputs: Stock status evaluation was based on commercial landings, the age composition of commercial catches, and abundance trends in research surveys conducted annually since 1971.

Catch rates: Commercial catch rates were not calculated for this resource due to recent gear changes and the shift towards directed effort since the closure of the cod fishery.

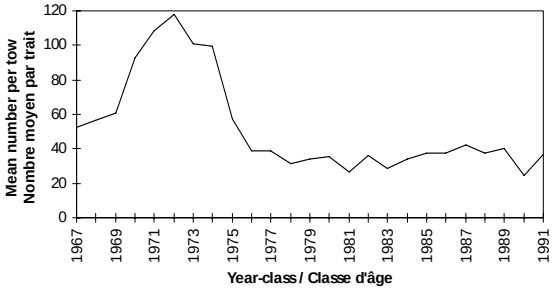
Surveys: The average catch of plaice in the survey was 176 per standard tow in 1995, the lowest level recorded in the data series. The plaice catch was highest in 1977 at a average of 1127 plaice per tow. The stock declined in the late 1970s and since 1982 it has fluctuated at a level below the long-term average of 395 per tow.



Abundance index of 4T American plaice based on research surveys.

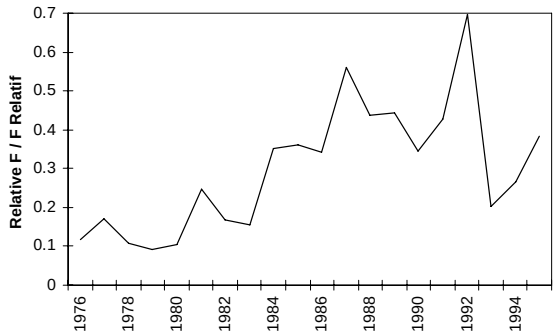
Distribution maps and analyses of the aerial extent of plaice in surveys indicate that plaice of all age classes tend to occupy the same sectors in periods of high and low abundance (Swain and Morin 1996). The pattern since 1994 is exceptional, as we observe a decline in the abundance of plaice in Chaleur Bay, off the coast of Gaspé and on the Magdalen Shallows. Consistent with the views of fishers, survey results indicate that plaice abundance has remained relatively stable in eastern 4T, off the coast of Cape Breton (Swain 1996).

Recruitment: Estimates of year-class strength from research surveys revealed abundant year-classes during the early 1970s. Since 1976, year-classes have been average.



Abundance of year-classes of 4T American plaice (males and females combined), based on research survey catch-at-age data.

Exploitation rate: Uncertainty in the landings of American plaice, due mainly to discarding of catches, makes it difficult to define targets corresponding to $F_{0.1}$. We examined trends in exploitation rate, using an index (relative F of Sinclair et al. 1993) based on the ratio of commercial to research survey catches. The index was size-based, including plaice greater than 30 cm, the non-discarded portion of commercial catches. The results indicated a rapid increase in fishing mortality beginning in 1984 and peaking in 1992. The index declined sharply in 1993 when the cod fishery was closed and plaice catches dropped. Fishing mortality has increased moderately since 1993 to a level that is intermediate in the range of relative F since 1976.



Index of fishing mortality on 4T American plaice greater than 30 cm.

Uncertainty: There is uncertainty in landings caused by the discarding of small plaice at sea. Other sources of uncertainty are misreporting of catches and inadequate estimates of removals in past bait fisheries.

Ecosystem: American plaice and Atlantic cod are the two main groundfish species in the southern Gulf. Their seasonal migrations to and from the Gulf are similarly timed and they appear to consume the same prey early in their lives. Further work is required on the nature of cod-plaice interactions and the role of environmental effects and habitat in this relation.

Outlook

Projection: Plaice population size was projected for 1996 on the basis of previous catches in research surveys. The analysis examined the effect of removals by the fishery on estimates of fishing mortality (relative F). Landings of 1500-2000 t would maintain fishing mortality at the level observed in 1994 and 1995. Reducing mortality to the level recorded in the late 1970s would require landings reduced to approximately 1000 t.

Uncertainty: Our projection is based on the index of fishing mortality calculated for plaice greater than 30 cm. Measures taken to reduce plaice landings without restricting fishing effort would probably result in increased discarding of commercially undersized plaice.

Management considerations: Discarding is a central issue in the management of 4T plaice and our ability to set appropriate targets. Comparisons of the length composition of plaice catches at sea and in landing ports suggest that discarding persists in this fishery. It will be necessary to continue measures that reduce the capture and discarding of undersized plaice. Although nominal fishing effort by mobile gear was stable in 1994 and 1995, the number of vessels directing for 4T plaice increased in 1995. A trend of increasing participation in the fishery would probably increase the fishing effort on plaice and result in more discarding.

For more information

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