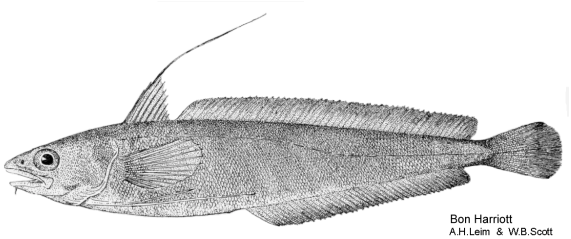
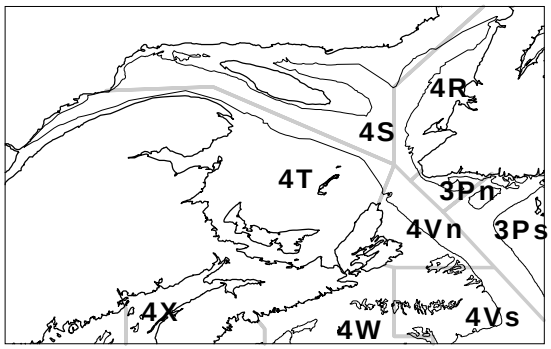
Fisheries and Oceans / Pêches et Océans
Gulf Fisheries Management Region
DFO Science
Stock Status Report A3-12(2001)





White Hake in the Southern Gulf of St. Lawrence

Background

White hake (Urophycis tenuis) are found from southern Labrador and the Grand Bank southward to North Carolina. This species is exploited throughout its geographical range by directed, seasonal fisheries. The most important catches have been taken in the southern Gulf of St. Lawrence (NAFO Division 4T). Temperatures of 5 - 11°C seem to be favored, as well as soft bottoms. White hake are among the most fertile of the commercial groundfish species, with a single female producing several million eggs each spawning. In the southern Gulf, male and female white hake reach sexual maturity at different sizes (at about 41 cm and 44 cm respectively) and at ages of 2 to 5 years. Spawning commences in the southern Gulf in early June and peaks in the second half of the same month. The diet of white hake is dominated by other fish species (such as cod, herring and flatfish).

The fishery for white hake in NAFO Division 4T has historically been the third or fourth most important groundfish fishery in the southern Gulf, with annual landings that averaged 5,675 t from 1960-1994. The hake fishery was carried out mainly by small inshore vessels and was strongly affected by weather and local market conditions. Both fixed and mobile gears were used in the hake fishery, which was concentrated in the Northumberland Strait, on the western end of P.E.I., and between P.E.I. and Cape Breton Island.

Stock structure has been a long-standing issue with this resource. The combined evidence from several studies indicates that there are at least two different stock components in NAFO Division 4T, one occupying shallow inshore areas in summer, principally the Northumberland Strait area (the 'Strait' component) and another occupying deep water along the Laurentian Channel in summer (the 'Channel' component). The extent of mixing between these two stock components is presently unknown and recent analyses indicate that the distribution of southern Gulf white hake extends outside of NAFO Division 4T in winter. The white hake fishery in NAFO Division 4T has remained under moratorium since 1995, with the only removals occurring as by-catch or landings in the sentinel survey and recreational fishery.

Summary

- The white hake fishery in NAFO 4T has remained under moratorium since 1995.
- Population abundance has increased recently because of increasing recruitment.
- Although population biomass remains low there has been a moderate increase since 1996.
- The index of abundance for the 'Strait' component, which has yielded the majority (90%) of the landings of white hake in NAFO 4T, declined to its lowest level in 2000.
- This resource appears to be in the early stages of a potential recovery with little change in the commercial stock anticipated in the short-term.
- Although the reported landings during the moratorium have been low, estimates of total mortality for 1999 and 2000 were high suggesting that removals from all sources may still be excessive.

Canada

The Fishery

A precautionary quota of 12,000 t was established for white hake in NAFO Division 4T in 1982, and the total allowable catch (TAC) has been reduced on five occasions since then. Directed fishing for white hake has been closed in the southern Gulf since 1995 and daily by-catch limits have been imposed on fisheries targeting other species.

Landings were fairly stable and averaged 4,684 t from 1971-1978, rose sharply to 14,039 t in 1981, and then declined rapidly to an average of 5,023 t from 1985-1992. A substantial drop in landings occurred in 1993, concurrent with the closure of the cod fishery. During the moratorium, the landings have ranged in magnitude from 70 t in 1995 to 399 t in 1999, and the landings for 2000 were 300 t. The reported landings for 1999 and 2000 include estimates of landings in the recreational fishery (161 t and 134 t respectively) that are questionable and require verification. Since the moratorium, approximately one third of the total landings have been made in the sentinel survey but the proportion of the annual landings from this source has declined each year since 1996 (from 68% in 1996 to 16% in 2000).

Landings (thousands of tonnes)

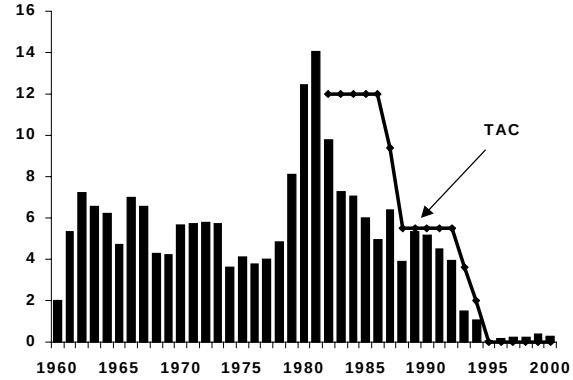
Year	1980-89[1] Avg.	1990-94[3] Avg.	1995-98[3] Avg.	1999	2000[2]
TAC	10.1	4.4	0	0	0
Total	7.7	3.2	0.2	0.4	0.3

[1] - First TAC was established in 1982

[2] - Preliminary Statistics

[3] – Moratorium began in 1995

Landings (thousands of tonnes)



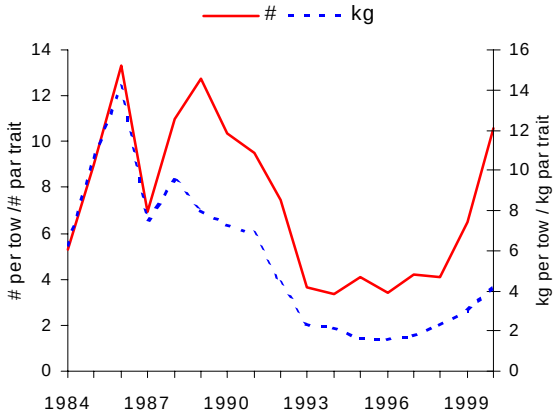
The age composition of the landings for 2000 was dominated by ages 5 and 6. Since 1982, the landings have been composed principally of ages 4-8 hake. The proportion of hake older than age 6 has declined considerably since 1989. Historically, the age composition included fish as old as 15-17 years.

Resource Status

The evaluation of stock status was based on data from the annual research vessel survey, landings statistics, sampling for size and age composition of the by-catch in the commercial fishery, catch rates in the sentinel survey and the views expressed by fishers in the annual telephone survey.

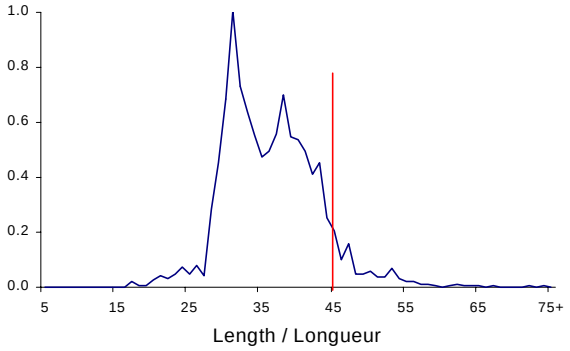
The index of abundance for the **annual research vessel survey** begins in 1984 when inshore areas were added to the survey. The index (mean number per tow of all ages) during the 2000 survey increased to the highest level observed since 1989 (10.6 in 2000 compared to 12.7 in 1989). The index of population biomass (mean weight per tow) remains low but there has been a moderate increase since 1996.

Indices of abundance and biomass from the annual research vessel survey



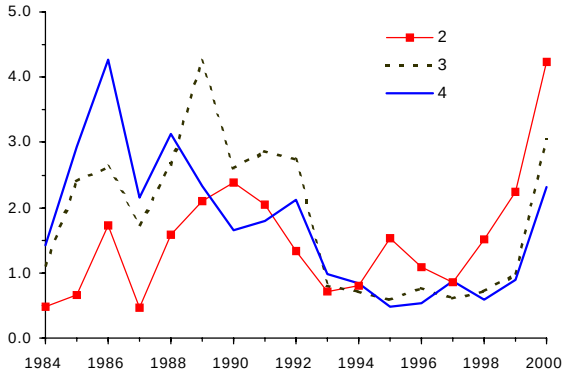
The abundance of incoming size-classes (between 30 and 40 cm, ages 2-4) appears to be considerably higher than observed since the early-1990s. However, the abundance of commercial size fish (>= 45 cm and ages 5 years and older) declined to the lowest level seen since 1984.

Length frequency (mean number per tow) from the 2000 research vessel survey



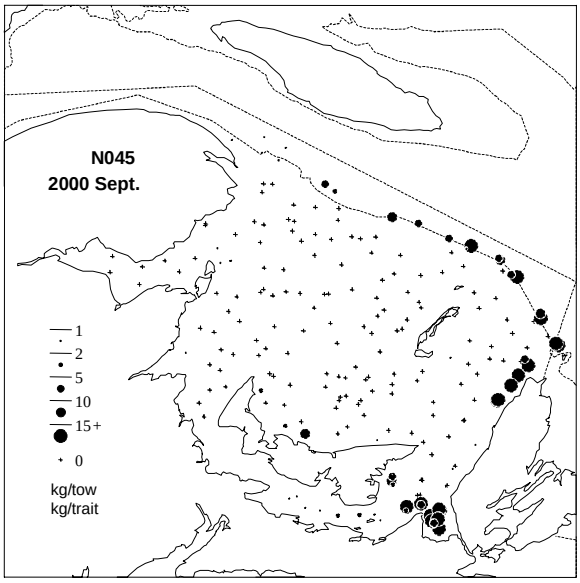
The age distribution for the 2000 survey indicates the greatest abundance of age 2 white hake since 1984, and the greatest abundance of ages 3 and 4 since 1989.

Catch rates (#/tow) for ages 2-4 in the research vessel surveys



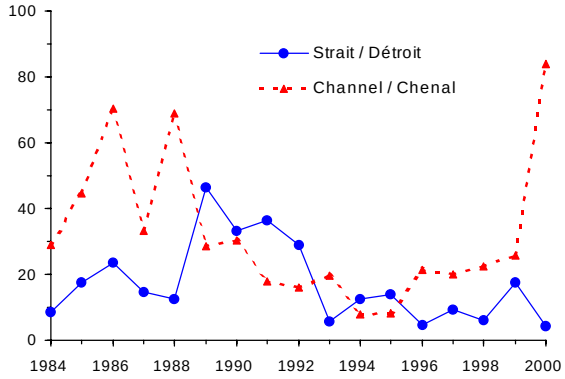
In the 2000 survey, four sets in the Cape Breton Trough yielded a relatively large number of white hake between 30-40 cm (ages 2-4). It was the increased abundance of these sizes of white hake that contributed most to the increase in the abundance index in 2000. The main areas of concentration were the Cape Breton Trough, along the Laurentian Channel and St. George's Bay, N.S. Few white hake have been caught in the western part of the southern Gulf since 1991, suggesting that there has been a contraction of the geographic range.

Distribution of catches (kg) of white hake during the 2000 research vessel survey



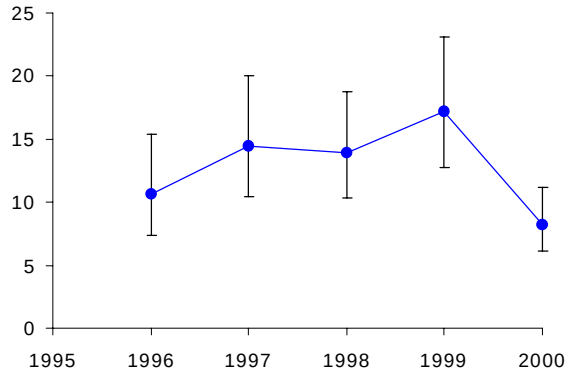
The abundance index for the 'Channel' component (see Background) increased gradually from 1997-1999 and then increased in 2000 to the highest level in the time series. In contrast, the abundance index for the 'Strait' component fluctuated at a low level from 1997-1999 and then declined to the lowest level in the time series.

Abundance index (mean number per tow) for the 'Strait' and 'Channel' stock components



Throughout the **sentinel surveys** conducted in the southern Gulf, the highest catch rates of white hake have been recorded by longliners in St. George's Bay, N.S. and in the area between eastern PEI and Cape Breton. Analysis of the catch rates by longliners in the sentinel survey shows an increasing trend from 1996 –1999 followed by a significant decline in 2000 to the lowest level in the series. These results are consistent with the reports from some participants in the 2000 sentinel survey longline project who indicated that the amount of white hake available (in St. George's Bay) was much lower than in previous years.

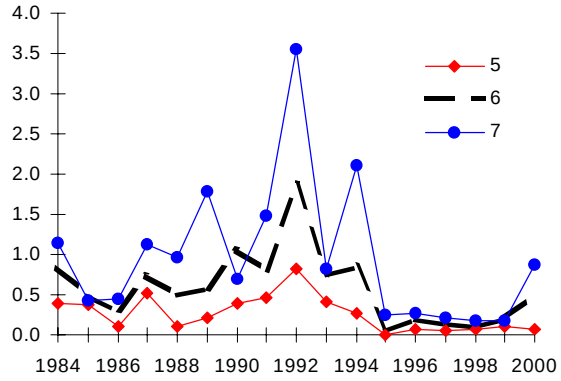
Catch rates by longliners in the sentinel survey



The respondents to the **annual telephone survey** continued to express optimistic views about the abundance of white hake in 2000. Industry representatives have repeatedly expressed skepticism with the results of the September research survey and indicated that they felt there was an abundance of white hake in the eastern end of the Northumberland Strait, especially in St. Georges Bay.

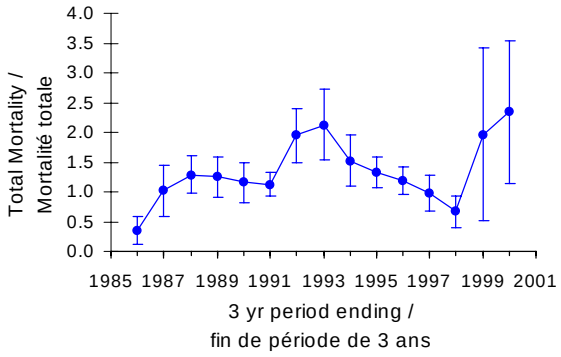
Trends in the **index of fishing mortality (F)** for the 'Strait' component and for the whole management unit (NAFO 4T) suggest that fishing mortality declined after 1994 to near minimum values in 1995. The index of F fluctuated at low levels after the closure of the fishery but increased in 2000 for ages 6 and 7.

Trends in the index of fishing mortality (F) for ages 5-7 in NAFO 4T



Analyses of survey data for the 'Strait' component and for the entire NAFO 4T area suggest that **total mortality (Z)** declined in the mid-1990's. However, the analyses suggest that total mortality increased in 1999 and 2000, though uncertainty about these estimates is high.

Trends in estimates of total mortality (Z) for ages 5-8 in NAFO 4T



Uncertainty

There is uncertainty concerning the stock structure of white hake in the southern Gulf and the adequacy of the present management unit (NAFO Division 4T). There is also uncertainty about the stock affiliation of white hake that occur in the Cape Breton Trough. Migration into or out of the survey area or between the areas occupied by the two stock components could influence mortality estimates. Until these uncertainties can be resolved it may be prudent to continue to consider white hake in NAFO Division 4T as a stock complex.

The estimates of total mortality (Z) suggest that it increased in 1999 and 2000, but the data are too sparse to quantify the magnitude of the increase with any certainty.

There is much uncertainty concerning the magnitude of the estimated landings of white hake in the recreational fishery in 1999 and 2000 (161 t and 134 t respectively). Industry members expressed considerable skepticism about the reliability and accuracy of the estimates, feeling that they are extreme overestimates.

There is also uncertainty about the magnitude of the apparent increased recruitment of hake between 30-40 cm in the 2000 survey because the majority of these fish were caught in a very localized area of the survey distribution.

Outlook

The index of population abundance has increased in 2000 because of increasing recruitment, however, the abundance of commercial size fish remains low. The index of biomass is showing some improvement but remains near the low values observed since 1992. While there are encouraging signs of recruitment, it will take a few years for this recruitment to contribute significantly to the fishable population. Although the reported landings during the moratorium have been low (average of 220 t from 1995-2000), estimates of total mortality (fishing and natural) for 1999 and 2000 were high suggesting that removals from all sources may still be excessive.

For more Information

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