

**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 (Musick 1974). This species is exploited throughout its geographical range by directed, seasonal fisheries. The most important catches are taken in the southern Gulf of St. Lawrence (Northwest Atlantic Fisheries Organization (NAFO) Division 4T). Temperatures of 5 - 11°C seem to be favored (Scott and Scott 1988) as well as soft bottoms (i.e., silt, mud or sand) (Musick 1969). White hake are among the most fertile of the commercial groundfish species (Beacham and Nepszy 1980), with a single female producing several million eggs per spawn. In the southern Gulf of St. Lawrence spawning commences in early June and peaks in the second half of the same month (Nepszy 1968). The diet of white hake is dominated by other fish species (i.e., cod, herring, flatfish, etc.).

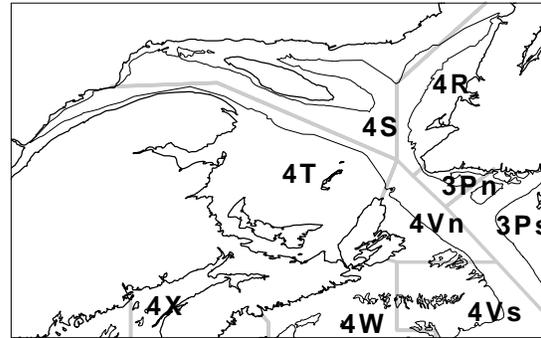
The fishery for white hake in NAFO Division 4T has historically been the third or fourth most important groundfish fishery, with annual landings averaging 5,519 t since 1960. Landings in this fishery traditionally peak between July and September and decline through October and November. The hake fishery is carried out mainly by small inshore vessels and is strongly affected by weather and local market conditions. Both fixed (gillnets and longlines) and mobile gears (small otter trawlers and larger seiners) are used in the hake fishery. The fishery is 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:

- (1) fish from the shallow inshore southern Gulf (depths less than 200 m), principally the Northumberland Strait area (the 'Strait' component) and
- (2) fish from along the Laurentian Channel in depths in excess of 200 m (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.

This is the only fishery for this species within the NAFO convention area that is managed by a quota (total allowable catch (TAC)). The TAC was reduced on five occasions after the precautionary quota of 12,000 tonnes was put in place in 1982. In response to recommendations made by the Fisheries Resource Conservation Council, the Minister of the Department of Fisheries and Oceans announced the closure of directed fishing for white hake in NAFO Division 4T on December 21, 1994.



The Fishery

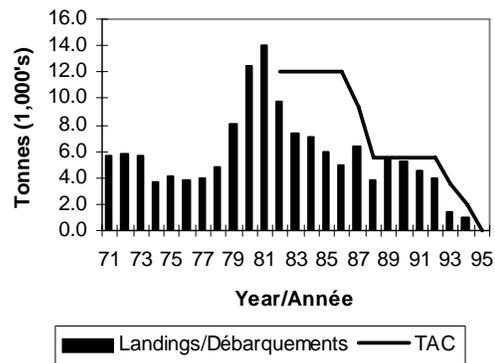
Management: Directed fishing for white hake was closed in the southern Gulf in 1995 and a daily by-catch limit of 10%, by weight, was imposed on fisheries targeting other species.

Landings: Landings peaked at 14,039 t in 1981 and have declined almost every year since to 1,042 t in 1994. Although directed fishing for white hake was closed in 1995, 66 t were landed, representing the lowest level since 1960. Since 1988, landings have been lower than the average for the period 1960 - 1995 of 5,519 t.

Landings (thousands of tonnes)

Year	71-80 Avg	81-91* Avg	1992	1993	1994	1995	1996
TAC		9.1	5.5	3.6	2.0	0	0
Total	5.8	6.8	3.9	1.5	1.0	0.1	

* - First TAC was established in 1982



Landings and TAC's for the white hake fishery in NAFO Division 4T.

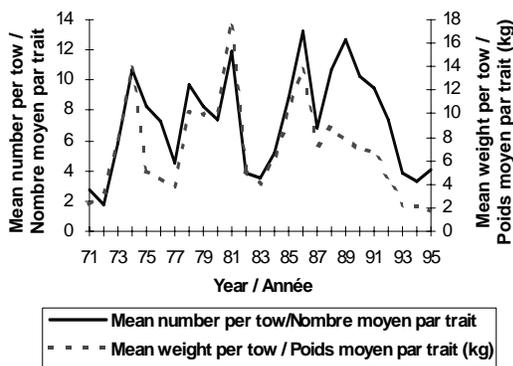
Biological data: The total number of white hake landed in 1995 was the lowest on record and the landings were dominated by ages 6 and 7 (the 1988 and 1989 year-classes). This marks a departure from a trend that has been apparent since 1989 of decreasing numbers of older fish (i.e., age 6+) and probably reflects the use of large mesh gear in 1995 (i.e., 145 mm square).

Resource Status

Inputs: The evaluation of stock status was based on landings statistics, sampling for size and age composition of the commercial catch and trends in abundance from the annual (September) research survey. In 1995, very few samples from the commercial fishery were obtained because landings were limited to by-catch throughout the year.

Catch rates: A commercial catch rate series based on purchase slips was used in previous assessments of this resource but was not employed in this evaluation because of the closure of the fishery in 1995.

Surveys: The mean number of white hake caught per tow (all ages) during the 1995 September survey increased slightly from the 1994 level, but remains near the lowest historical level. The mean weight of white hake caught per tow (all ages) in 1995 was the lowest observed in the history of this survey.

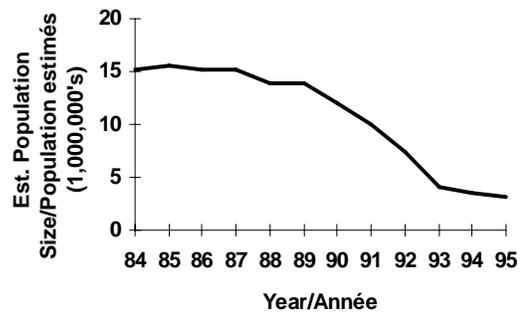


Research survey indices (mean number and mean weight per tow) for white hake in NAFO Division 4T.

Fewer white hake have been caught in the western part of the southern Gulf each year since 1991 suggesting that there has been a contraction of the geographic range in recent years. There has also been a decline in the abundance of white hake in the area between P.E.I. and Cape Breton and in St. George's Bay (N.S.) as well.

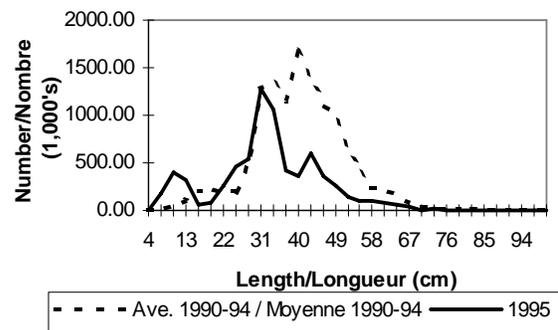
The abundance of large hake (> 45 cm) has continued to decline and was near the lowest level observed. Furthermore, the survey results indicate that the abundance of white hake in both stock components (the 'Strait' and 'Channel' components) declined to minimum values recently. From 1984 -1994, the most abundant age groups in the survey were age 3 or 4, but in 1995 the most abundant age group was age 2 (1993 yearclass). The abundance of all hake older than age 3 has declined since 1990.

Population abundance: The results of a population model were consistent with the survey results, indicating that population abundance for ages 3-10 was relatively stable from 1984-1989 (13.8-15.6 million fish), but declined rapidly from 1990-1993 and reached a minimum of 3.1 million fish in 1995.



Estimated population abundance for white hake (ages 3-10) in NAFO Division 4T.

Recruitment: The presence of small fish (less than 40 cm) and in particular of "young of the year" hake (less than 10 cm) in the 1995 survey is encouraging, but it is too early to determine whether this will result in an increase in the population.



Comparison of 1995 research survey length frequency with the average length frequency for 1990-94.

Exploitation rate: In general, the analyses of fishing mortality yielded consistent results, with all of the approaches indicating an exceptionally high exploitation rate from 1990-1992.



Estimated exploitation rate for white hake in NAFO Division 4T (age 4+).

Uncertainty: There was considerable uncertainty concerning the results of the population model but other approaches (i.e., estimates of trends in relative fishing mortality) yielded results that were in general agreement, indicating high fishing mortalities from 1989-1992. There is also uncertainty concerning the stock structure of white hake in the southern Gulf and the adequacy of the management unit (NAFO Division 4T).

Outlook

The white hake resource in NAFO Division 4T appears to be at its lowest level since the first quota was put in place in 1982.

The research survey results indicate that population biomass has declined to its lowest level in the history of this survey. Furthermore, recent research surveys suggest that there has been a contraction of the geographic range, as well as a reduction in the abundance of larger hake. Fishing mortalities were high from 1990-1992 and population abundance has declined to its lowest observed level.

Recent catches (average annual landings of 4,740 t from 1989-1992) appear to have resulted in a high rate of exploitation. Considering the low abundance and limited indications of incoming recruitment, rebuilding of this stock will occur slowly. A sustainable fishery will require a significant reduction in fishing mortality over levels prior to 1995.

Management considerations: A monitoring program in the Miramichi estuary in the fall of 1994

and 1995 found the by-catch of small white hake in the 'openwater' fishery for smelt to be very high. Smelt fishers were required to sort and release all groundfish (including white hake) from their fishing gear. This requirement should be maintained.

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