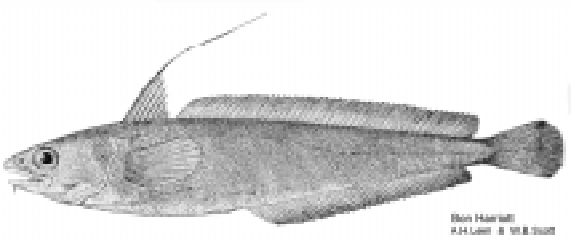
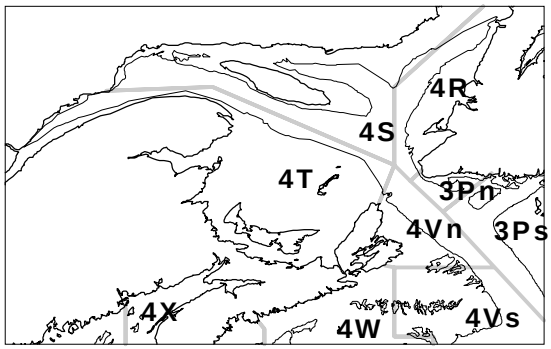


White Hake In The Southern Gulf Of St. Lawrence



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 are 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 per spawn. 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 averaging 5,238 t since 1960. The hake fishery is carried out mainly by small inshore vessels and is strongly affected by weather and local market conditions. Both fixed and mobile gears are used in the hake fishery, which 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, 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 Fishery

A precautionary quota of 12,000 tonnes 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. An allocation of 500 t for by-catch in other fisheries was established in 1997.

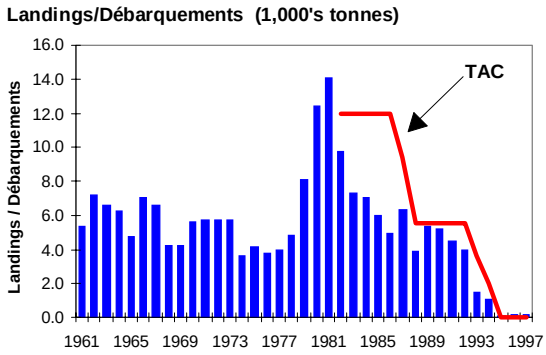
Landings were fairly stable at the 3,500-6,000 t level from 1971-1978, rose sharply to 12,423 and 14,039 t in 1980 and 1981, and then declined rapidly to the 4,000-6,000t level in 1985-1992. A substantial drop in landings occurred in 1993, concurrent with the closure of the cod fishery. Directed fishing for white hake has been closed since 1995. In 1997, 200 t were landed, mostly (112 t) in the sentinel fishery.

Landings (thousands of tonnes)

Year	70-79 Avg	80-89[1] Avg	90-93 Avg	1994	1995	1996	1997[2]
TAC		10.1	5.0	2.0	0	0	0
Total	5.1	7.7	3.8	1.0	0.1	0.2	0.2

[1]- First TAC was established in 1982 [2] - Preliminary Statistics

Canada



Landings in 1997 were dominated by ages 5 and 6 (the 1991-1992 year-classes). This differs from the older age composition of landings noted for 1995, and resembles the age composition in 1991 and 1992. The percentage of old fish (6 years and older) in the landings declined from an average of 67% in 1982-1986 to 49% in 1992-1996.

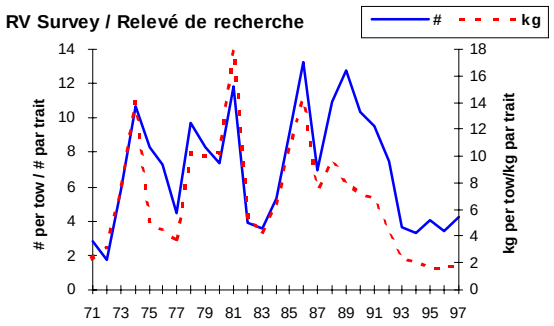
Resource Status

The evaluation of stock status was based on landings statistics, sampling for size and age composition of the fishery catch and trends in abundance from the annual (September) research survey. In 1997, most samples of landings were from the sentinel fishery.

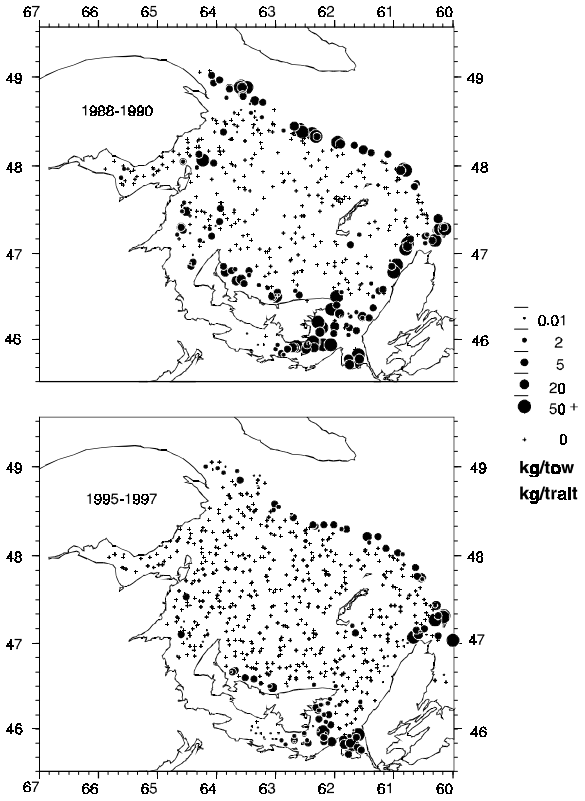
It was felt that the results of a sequential population analysis (SPA) were too uncertain to estimate population size in 1997 because of large retrospective patterns and uncertainties about stock structure.

Catch rates in the **sentinel fishery** suggest that white hake were most abundant in St. George's Bay and in the area between eastern PEI and Cape Breton, and were relatively rare in other areas of the southern Gulf in 1997. The highest catch rates were recorded with longlines in St. George's Bay and were comparable to those seen in 1996. In comparison to 1996, longline catch rates were generally higher off P.E.I. in 1997. Gillnet catch rates showed a similar spatial pattern to longline catch rates and were somewhat higher than in 1996.

The catch rate of white hake (mean number per tow of all ages) during the 1997 **research survey** increased slightly from the 1996 level to 4.2 fish/tow, but remains near the lowest historical level. The mean weight of white hake caught per tow (all ages) also increased marginally from the historical low level observed in 1996.

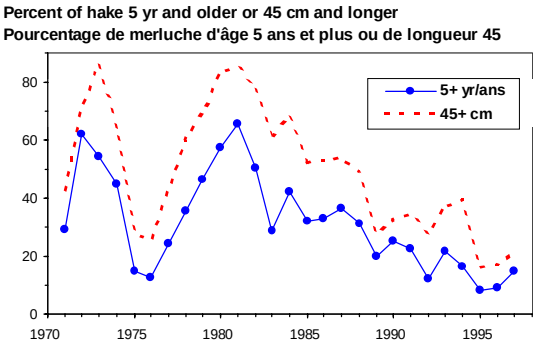


Fewer white hake have been caught in the western part of the southern Gulf each year since 1991, suggesting that there has been a contraction of the geographic range in recent years. There has also been a decline in the abundance of white hake in the area between P.E.I. and Cape Breton and in St. George's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



At a meeting with the fishing industry ('Science Workshop') held in Port Hawkesbury, N.S. in November 1997, industry representatives expressed skepticism with the results of the September (1997) 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, in 1997. Likewise, most of the respondents to a telephone survey that fished for white hake in the sentinel fishery in 1997, expressed optimistic views about the abundance of white hake in St. Georges Bay and between P.E.I. and Cape Breton in 1997. Nevertheless, these views are consistent with the results of recent research surveys which have documented concentrations of white hake in St. Georges Bay and at the eastern end of the Northumberland Strait, and in very few other places in the southern Gulf.

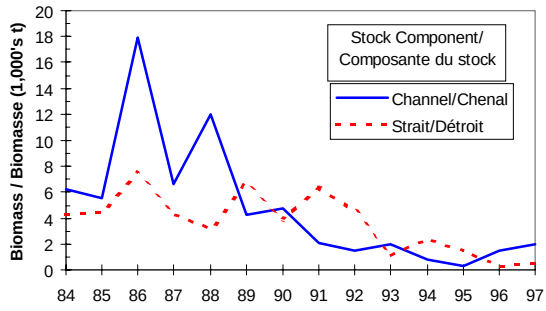
The abundance of large, mature hake, aged 5 years and older in the population declined to the lowest level observed in the mid 1990's but increased in 1997. The proportion of hake 45 cm or longer in the survey catch averaged 61% in the 1971-1985 period but declined to less than 17% in 1995 and was less than 22% in 1997. Similarly, hake 5 years and older averaged 40% of the survey catch in 1971-1985 but were less than 15% in 1997. From 1984-1994, the most abundant age groups in the survey were age 3 or 4. The catch-at-age for 1997 was bimodal, with the most abundant age group being age 4 (the 1993 year-class) and the next most abundant group consisting of ages 1 and 2 (the 1995 and 1996 year-classes).



The length frequency from the 1997 survey indicates that the abundance of small fish (less than 40 cm) and in particular of 0-group or **"young of the year"** hake (less than 10 cm) is considerably less than observed in 1995 and 1996.

The survey results indicate that the abundance of white hake in both stock components (the 'Strait' and 'Channel' components) has declined to minimum values recently. Research survey estimates of the trawlable biomass (ages 3+) for both stock components also reached minimum values in the mid-1990's and remain at low levels.

Age 3+ Trawlable Biomass
Age 3+ Biomasse chalutable



Estimates of **total mortality** based on analyses of the survey data for the 'Strait' component and for the entire NAFO 4T area suggest peak levels in the early 1990's. Total mortality appears to have declined somewhat in recent years but remains very high despite low reported landings of hake.

Total Mortality Ages 5-8 (± 2 standard errors)
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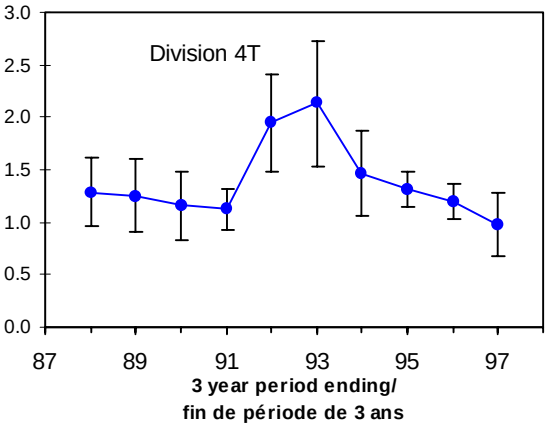

There is uncertainty concerning the stock structure of white hake in the southern Gulf and the adequacy of the management unit (NAFO Division 4T). Migration into or out of the survey area could influence mortality estimates.

The sharp decline in the survey abundance index between 1992 and 1993 is not well understood. It appears to be too large to be accounted for by the reported landings, which also declined sharply between 1992 and 1993.

Outlook

The white hake resource in NAFO Division 4T remains near its lowest level since the first quota was put in place in 1982. The recent abrupt decline in hake abundance and continuing high mortality despite limited fishing raise grave concern for the state of this resource.

The research survey results indicate that population biomass increased in 1997 from the historical low reached in 1996, but it remains at a very low level. 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 appear to have been high in the early 1990's. However, despite the low landings in recent years, total mortality remains high suggesting that removals from all sources (fishing and natural) may still be excessive.

Management Considerations

A monitoring program in the Miramichi estuary in the fall of 1994 and 1995 found the by-catch of 1 and 2 year old white hake in the 'openwater' fishery for smelt to be very high (approximately 40 t and 20 t respectively or more than 275,000 fish each year). Smelt fishers were required to sort and release all groundfish (including white hake) from their fishing gear. This requirement should be maintained.

Biomass appears to be very low and total mortality very high for this stock. Chances for stock conservation would improve if catches from all sources (including the sentinel fishery) were kept well below the

500 t by-catch allocation that was set for 1997. The landings in 1997 (200t) did not result in a significant reduction in mortality and may have been excessive.

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