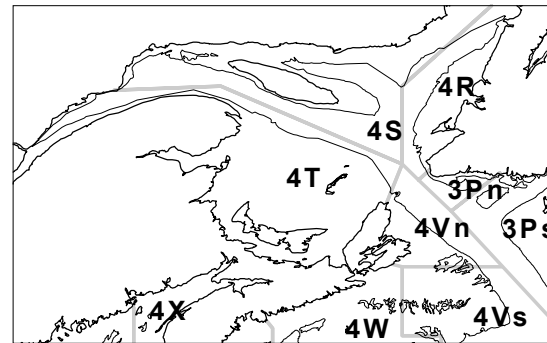


## White Hake in the Southern Gulf of St. Lawrence



### 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.

The most recent full assessment of this resource was conducted in February 2001 (Hurlbut et al. 2001; SSR A3-12 (2001)). This report updates fishery and survey data on this stock for 2001.

### Summary

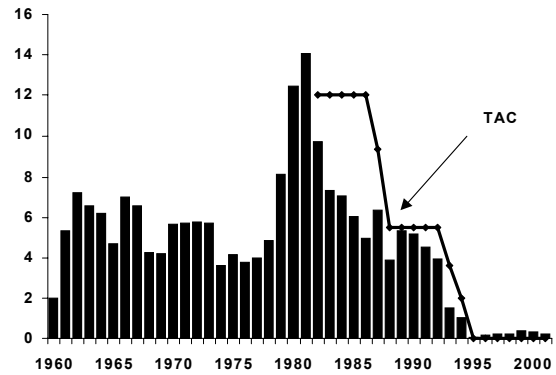
- The directed fishery for white hake in NAFO Div. 4T has remained under moratorium since 1995.
- The reported landings for 2000 and 2001 include estimates from the recreational fishery (134 t and 117 t, respectively) that are questionable and require verification.
- Population abundance and biomass have increased moderately since 1996 but still remain well below average.
- The distribution of white hake continues to be concentrated in a small part of the range that it occupied before the early 1990s.
- Recovery of the stock to the abundance observed in the late 1980s will not occur unless all sources of fishing mortality are kept at a very low level.
- Stock structure is a source of uncertainty for this resource.

**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 from 70 t in 1995 to 399 t in 1999; the landings for 2001 were 218 t. The reported landings for 2000 and 2001 include estimates from the recreational fishery (134 t and 117 t respectively) that are questionable and require verification. Since the moratorium, approximately one third of the landings have been made in the sentinel survey but the proportion from this source has declined each year since 1996 (from 68% in 1996 to 15% in 2001).

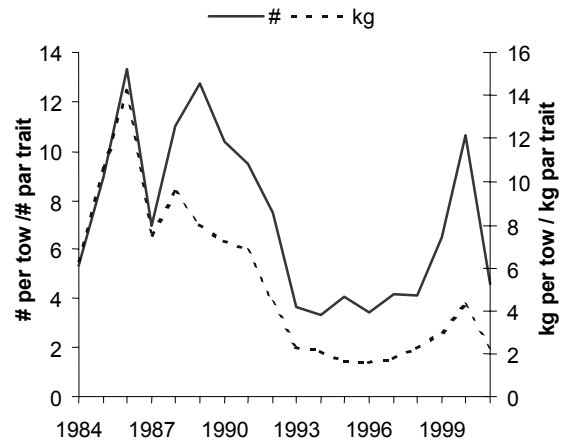
Landings and TAC's (thousands of tonnes)



**Resource Status**

The index of abundance for the **annual research vessel (RV) survey** begins in 1984, when inshore areas were added to the survey. The index (mean number per tow of all ages) declined from 10.6 in 2000 to 4.6 in 2001, back near the low values observed from 1995-1998. This catch rate (numbers per tow) is considerably less than the average of 7.2 for the period 1984-2001; the catch rate in weight per tow (2.2) was also well below the average of 5.3 for the same time period.

Indices of Abundance and Biomass from the Annual Research Vessel Survey



Landings and TAC's (thousands of tonnes)

Year	1980-89 <sup>1</sup> Avg.	1990-94 <sup>3</sup> Avg.	1995-99 <sup>3</sup> Avg.	2000	2001 <sup>2</sup>
TAC	10.1	4.4	0	0	0
Total	7.7	3.2	0.2	0.3	0.2

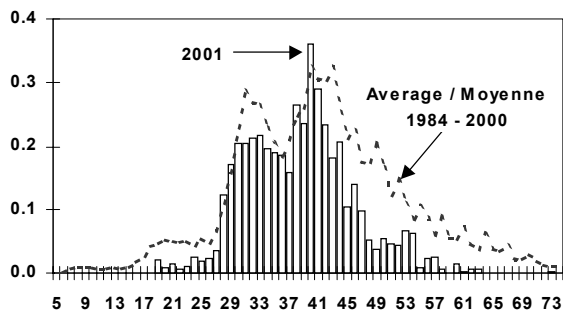
<sup>1</sup> - First TAC was established in 1982  
<sup>2</sup> - Preliminary Statistics  
<sup>3</sup> - Moratorium began in 1995

There continue to be reports of the occurrence of small white hake in the central portion of the Northumberland Strait and in shallow areas in St. Georges Bay, NS.

In the 2000 survey, four sets in the Cape Breton Trough yielded a relatively large number of small white hake between 30 and 40 cm (ages 2-4). The increased abundance of these sizes of fish contributed most to the increase in the abundance index in 2000.

The length frequency from the 2001 RV survey was more similar to those seen in the four years before 2000, and does not indicate an increased abundance of incoming size-classes. Furthermore, few or no 0-group fish (< 10 cm) have been caught since the 1996 survey, and the abundance of commercial-sized fish ( $\geq$  the small fish protocol size of 45 cm) remains very low.

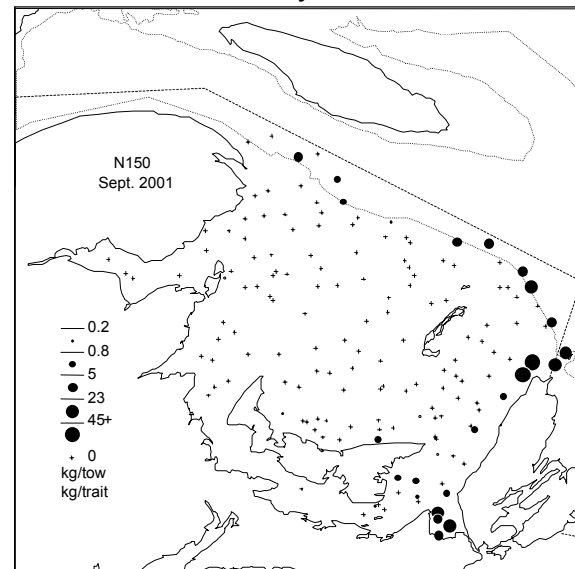
**Length Frequency (mean number per tow) from the 2001 Research Vessel Survey**



During the annual (Sept.) RV surveys of the southern Gulf, white hake have tended to exhibit a disjunct distribution, with concentrations occurring in warmer waters, either in shallow inshore areas or in deep water along the Laurentian Channel. The constancy of this disjunct distribution pattern from year to year lends support to the contention that there are separate stock components inhabiting these areas in September. The distribution in 2001 was very similar to that of recent years. The

main areas of concentration were in the Cape Breton Trough, along the Laurentian Channel and in St. Georges Bay. White hake have seldom been caught in the shallow, central zone adjacent to the Magdalen Islands. Few white hake have been caught in the western part of the southern Gulf since 1991, suggesting that there may have been a contraction of the geographic range. The information from the 1994 and 1995 RV surveys, which extended into NAFO Div. 4Vn, suggested that the distribution of white hake is continuous between this area and NAFO Div. 4T.

**Distribution of Catches (kg) of White Hake During the 2001 Research Vessel Survey**



**Sources of 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.

There is uncertainty concerning the estimated landings of white hake in the recreational fishery in 2000 and 2001 (134 t and 117 t respectively). Industry considers these gross overestimates.

There is uncertainty concerning the distribution and abundance of white hake in the areas of the Northumberland Strait that are not sampled during the annual RV survey.

Although there is much uncertainty concerning the diets of seals in the southern Gulf of St. Lawrence, some analyses suggest that predation by seals on white hake may be considerable.

### ***Outlook***

In 2000, the index of abundance from the annual RV survey increased to the highest level observed since 1989. This increase was mainly due to the catch of a relatively large number of small white hake (30-40 cm) in four sets in the Cape Breton Trough. In contrast, the results from the 2001 RV survey indicate that although abundance and biomass have increased from the historical lows reached in the early 1990s, they still remain well below average. Few or no 0-group fish (< 10 cm) have been caught since the 1996 survey, and the abundance of commercial-sized fish remains very low. Furthermore, the distribution of white hake continues to be concentrated in a small part of the range that it occupied before the early 1990s. Recovery of this stock to the abundance observed in the late 1980s will not occur unless all sources of fishing mortality are kept at a very low level.

### ***For more Information***

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