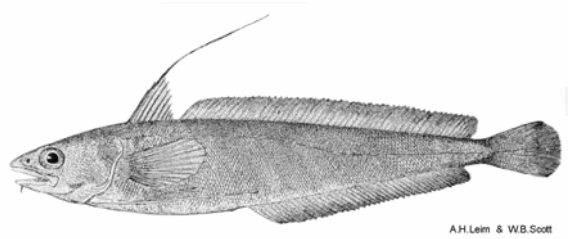
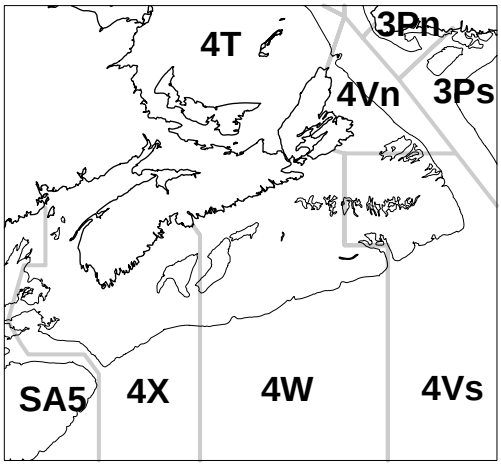


WHITE HAKE IN 4VWX AND 5Zc



Background

White hake (Urophycis tenuis) are bottom dwelling fish found in areas with a mud bottom from the Southern Grand Banks to the mid-Atlantic Bight. Their depth range varies with life history stage, with age 2 and older fish occurring predominantly at depths between 50 to 200m. They favour temperatures between 3° and 10°C. The spawning areas and times on the Scotian Shelf and in the Bay of Fundy are not well understood. There appear to be two spawning components -- late spring/early summer and late summer/early autumn. White hake are highly fecund, having several million eggs per female. They are pelagic spawners, with the eggs and larvae drifting in the upper 50 meters for about a month The larvae change shape into juveniles in the pelagic zone and subsequently migrate into the shallow coastal zone. At an age of about 2 months the small pelagic juveniles (approximately 4cm) move to the bottom in shallow water. They appear to stay in shallow water for a year and then migrate to the offshore adult distributional area at some time during their second year. In the Bay of Fundy they are about 10cm in length in August of the first year, and 30cm in length at age 1 (August). Growth rate varies with area. In the Gulf of Maine area white hake begin maturation and reproduction at ages two and three, at lengths between 35 and 45cm. The age span is about 20 years, with fish potentially growing to lengths as large as 130cm. The stock structure in 4VWX and 5Zc may be complex, with several self-sustaining components. White hake in the 4Vn Laurentian Channel slope waters are contiguous with 4T. Those in the Bay of Fundy and approaches are contiguous with 5Z and 5Y (i.e. the Gulf of Maine area). The central Scotian Shelf (parts of 4X and 4W) may be separate from those to the east and west. The present management units (4T, 4VWX, 5Zc, and USA 5+6) do not reflect discontinuities in adult distributions. About two thirds of the white hake landed in 4VWX and 5Zc are from 4X and 5Zc. The landings from 4Vn and the central part of the Scotian Shelf (4X and 4W) have declined in recent years. Landings from 4Vs and the Gulf of Maine area (western 4X and 5Zc) have been relatively stable. Canadian fishing effort for this species has been unregulated in 4VWX and 5 until 1996. It has become increasingly a directed fishery. Longliners take about two-thirds of the catch with small draggers (less than 65') and gillnets sharing most of the rest. The landed value in 1995 was about $4 million.

The Fishery

Landings (tonnes)

Year	70-79 Avg.	80-89 Avg.	1991	1992	1993	1994	1995	1996
4VWX								
Land.	4344	5201	4377	4727	4818	4270	5087	
TAC*								2500
5Zc								
Land.			563	1138	1681	955	481	
TAC*								920

* Total allocated to the fixed gear sector

Reported landings in 4VWX have been relatively stable since 1970. However, the landings in 4Vn and 4W have declined in recent years. The Canadian fishery on Georges Bank increased from about 500t in 1991 to 1,681t in 1993, but has dropped again in 1995. An increasing proportion of the landings from the central part of the Scotian Shelf is being taken further offshore.

Available from: Maritimes Regional Advisory Process, Department of Fisheries and Oceans, 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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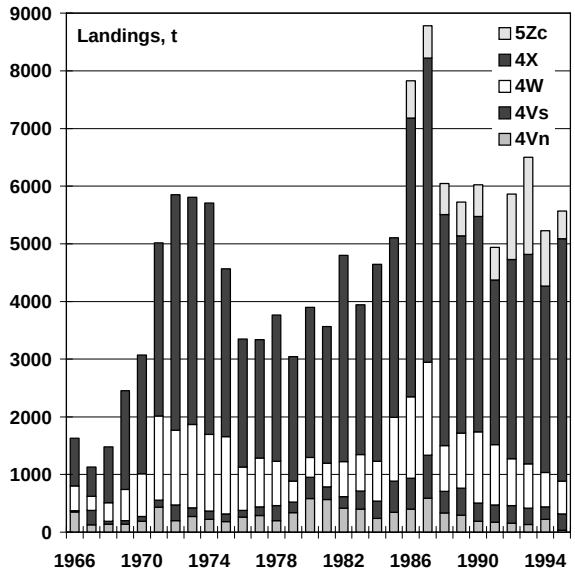


For most of the Shelf, the fishery peaks in July and August, with the exception of a predominantly April to June peak in 4Vs. In 1995, the fishery has continued for a larger part of the year (April to December), suggesting that fishing effort has been increasing. Also, there has been a gradual increase between 1988 and 1996 in the proportion of the landings that are directed for white hake, rather than being by-catch. The unit price for white hake has increased marginally during the 1990s.

Until 1996, there were no restrictions on fishing effort for white hake in 4VWX and 5Zc. The 1996 TAC for 4VWX is 2,500t, which was allocated to the fixed gear sector less than 65ft (2,000t for 4X and 500t for 4VW). Other fleet sectors have been regulated through by-catch regulations: 20% by weight for the ITQ fleet (less than 65ft draggers), and 10% by weight for the larger trawlers. The 4X fixed gear (less than 45ft) quota has been broken down by season:

	Quota	**Landings**
April 1-June 30	552	927.7
July 1 - Sept 30	928	955.0
Oct 1 - Dec 30	360	

The October to December quota has not been reduced following the over-runs. The 5Zc fixed gear 1996 quota was set at double the 1994 and 1995 landings, based on the increase in cod and haddock TACs between 1995 and 1996. The mobile gear are on the same by-catch regulations in 5Zc as for 4VWX.

A comparison of the **size composition** of the longline landings indicates that fewer large fish (greater than 70cm) are being landed in western 4W/eastern 4X area compared to the Gulf of Maine part of 4X. This is consistent with comments by fishers about the lack of large white hake on the Scotian Shelf in recent years. Comparison of size composition of landings between gear types in 4X indicates that small draggers (less than 65ft) and gillnet fisheries are landing a similar size range (predominantly fish between 60 to 80cm). Longliners are landing a large proportion of fish between 40 and 60cm as well as the larger fish.

Stock Structure

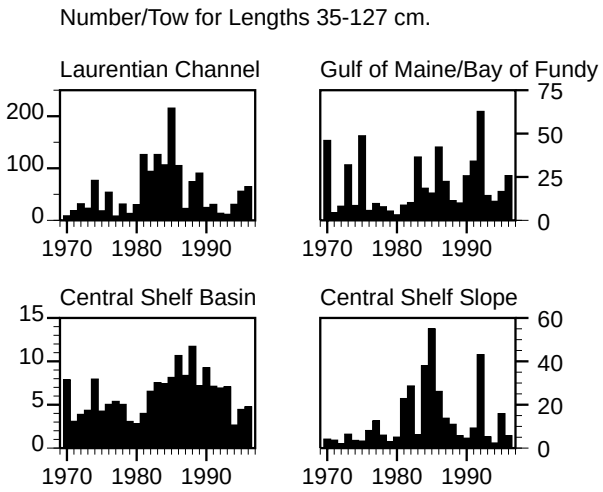
The current management units for white hake are 4T, 4VWX, and 5Zc in Canada and parts of SA5+6 in the USA. The information on spawning times and on distributions of early life history stages (larvae and 0-group) suggests that the Gulf of Maine area (including western 4X) is a separate stock complex from that of the Scotian Shelf. Tagging studies, meristics/ morphometrics and distributional information suggest that there are two stock components in the 4T/4Vn area -- a Laurentian Channel and a Northumberland Strait component. The white hake in 4Vn along the Laurentian Channel appear to be a continuation of the 4T management unit. Given the different temporal

trends in landings for white hake in 4Vn and 4VW, there may be a stock discontinuity between these two areas. White hake in the central Scotian Shelf basins (western 4W/eastern 4X) are discontinuous in their distribution with the rest of the area at the late juvenile and adult stages. Indeed, juveniles are observed in all areas which is consistent with an interpretation of multiple stocks. Finally, the relationship between the white hake found along the central Scotian Slope and the aggregations in the central Scotian Shelf basins is unclear. It is evident that the stock structure of white hake is complex and likely does not coincide with the current management units.

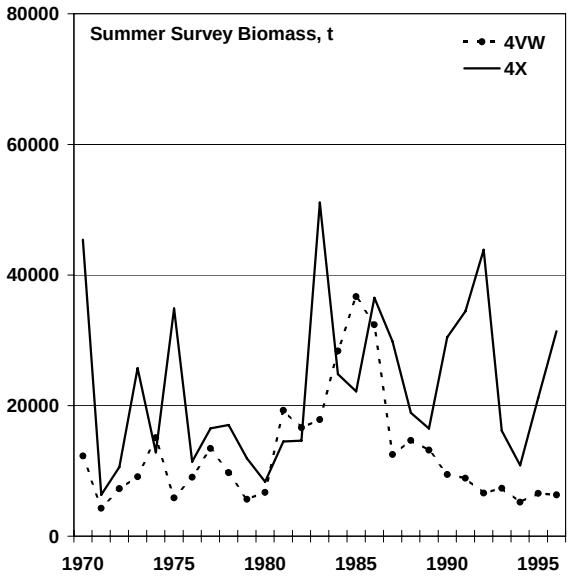
Resource Status

The stock status is based on evaluation of 1989 to 1995 commercial catch rates, and abundance estimates from the summer groundfish research vessel survey. The effort data is based on a small proportion of the overall fishery and thus need to be interpreted cautiously. The longline catch rates have not been increasing in 4VW in spite of the observations that white hake is increasingly directed for. Longline catch rates in 4X may be increasing in recent years, although the gillnet and trawl catch rates do not show such a trend.

The **summer research vessel survey** shows that adult white hake abundance levels have been at moderate levels in recent years along the slope of the Laurentian Channel in 4V, and in the Gulf of Maine/Bay of Fundy area. On the central Scotian Shelf of 4W and 4X (both in the basins and along the slope) recent abundance levels are below average.

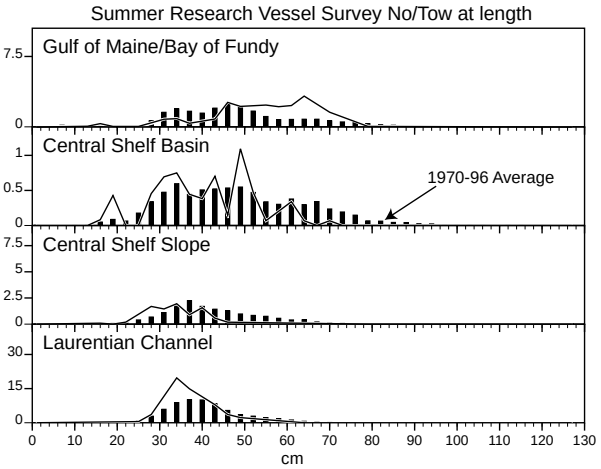


There are no trends in **recruitment** between 1970 and 1996. When the survey data is aggregated by NAFO Division, a downward trend in stock biomass is observed in 4VW, whereas biomass in 4X is at intermediate levels with respect to the long term average. The 1996 trawlable biomass estimate of white hake larger than 35cm for 4VW in 1996 is 4,700t and for 4X is 31,000t.



There are less large fish (greater than 60cm) on the central Scotian Shelf (Basin and Slope) during recent years compared to the long-term

average. In contrast, in the Gulf of Maine/Bay of Fundy area and along the Laurentian Channel current length compositions are similar to the long-term average.



Fishing mortalities in the Gulf of Maine/Bay of Fundy and on the central Scotian Shelf (western 4W and eastern 4X) are estimated to have been above F_{max} during the past decade. The Gulf of Maine estimates made in the 1994 USA assessment for a similar time period, were closer to F_{max}. In contrast, the ratio of recent landings to trawlable biomass estimates from the summer research vessel survey suggest that fishing mortalities in 4X have been closer to $F_{0.1}$, whereas those in 4VW have been above $F_{0.1}$.

Outlook

The present management units 4VWX and 5Zc comprise respectively, a stock complex (4VWX) and part of a stock (5Zc). Both are transboundary to the USA. In some areas, white hake biomass is presently at moderate levels (Gulf of Maine/Fundy, Laurentian Channel). For others, the biomass is at relatively low levels (western 4W/eastern 4X, slope of Scotian Shelf). Recent recruitment for all areas of 4VWX and 5 appears to be at average levels.

The spatial description of the resource and the fishery in 4VWX and 5Zc suggests that the management measures to reduce fishing effort in 1996 are appropriate for the central Scotian Shelf. The reduction in the abundance of large white hake in the central Scotian Shelf and along the shelf/slope edge, is a concern, particularly given the potentially high levels of egg production of large fish of this species. Further measures need to be made to reduce fishing effort on the central Scotian Shelf. Given the transboundary nature of the stock fished in western 4X and 5Zc, benefits of effort reduction in this area will depend on equivalent measures being taken within USA waters.

For More Information

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Reference

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