

White Hake in 4VWX and 5

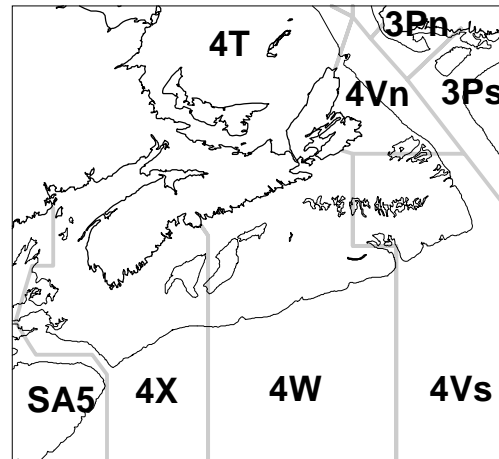
Background

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 189cm.

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 all areas have declined in recent years. Canadian fishing effort for this species was unregulated in 4VWX and 5 until 1996. It has become increasingly a directed fishery. Longliners and gillnets take about 40% of the catch each, with small druggers (less than 65') taking most of the rest. The landed value in 1997 was about \$2 million.



Summary

- Total landings have declined since 1995, and landings to date suggest that 1998 may prove the lowest in three decades.
- Commercial catch rates have declined since 1996 for all major fleets (longliners, gillnetters, trawlers), with 1998 demonstrating the lowest catch rates ever seen for all three fleets.
- Research vessel survey abundance estimates from Canadian (summer 4VWX, spring 4VsW, spring Georges Bank) and US (spring and fall offshore) sources are all near record lows.
- The size composition of the summer research vessel survey catches in 4X has been getting smaller since 1995, and mean weights of individual fish in 4VWX surveys have been declining since 1984.
- Mortality rates for 4X white hake derived from summer research vessel survey data depict exploitation at or above 50% throughout the 1990's.
- There should be no directed fishery for white hake.

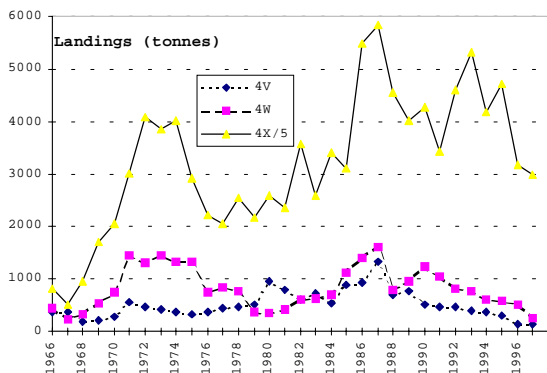
The Fishery

Landings (tonnes)

Year	1992	1993	1994	1995	1996	1997	1998
4X/5							
Land.	4593	5314	4189	4723	3175	2978	
TAC*					2920	2400	2800
4VW							
Land.	1272	1173	978	899	665	389	
TAC*					500	700	700

* Total allocated to the fixed gear sector

Reported landings have declined since 1995. Landings were already in decline throughout the 1990's in 4VW. Landings from 5Zc began to fall in 1994. Area closures in 4VW prompted a general shift in fishing effort to the 4X/5 region in 1995. Landings of white hake from 4X/5Y rose in 1995 as a result, but then dropped in 1996 to the lowest level seen since 1983, and have since continued to fall. Landings in 4VWX/5 to date (1423t to Oct. 7, 1998) suggest that 1998 may prove the lowest in three decades.



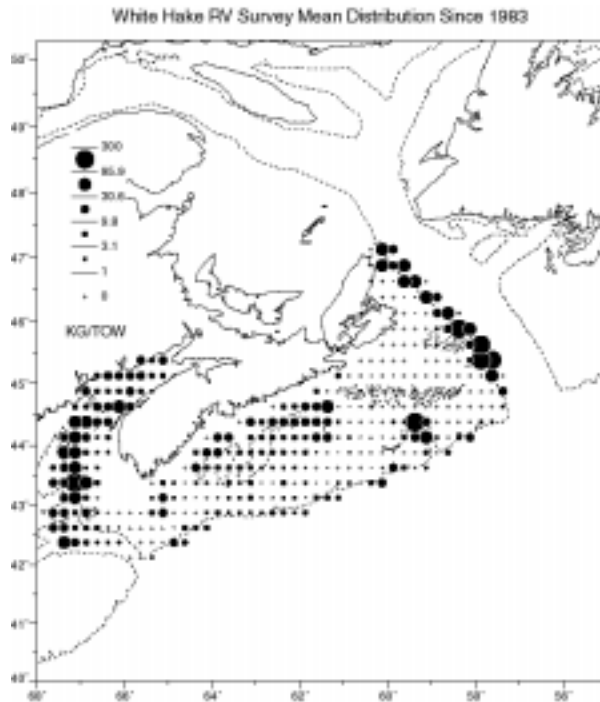
Until 1996, there were no restrictions on fishing effort for white hake in 4VWX/5, when the first TAC was introduced and allocated to the fixed gear sector. Other fleet sectors are regulated through bycatch restrictions (20% for the ITQ fleet, 10% for large trawlers).

The **size composition** of longline catches in 4X/5 increased in 1997-98 relative to previous years, while longliners in 4VW caught fewer large fish than in previous years. The increase in mean length of catches in 4X/5 may reflect a westerly shift in fishing effort in response to declines in more nearshore catches (white hake are larger to the west).

The unit price for white hake increased from \$0.37/kg in 1988 to \$1.05/kg in 1995. The price has remained at about \$1.00/kg since 1995.

Stock Structure

The current management units for white hake are 4T and 4VWX/5 in Canada and parts of SA5+6 in the USA. In light of discontinuities in white hake distribution evidenced by surveys of the Scotian Shelf, Gulf of Maine, and Gulf of St Lawrence, and differences in patterns of abundance over time from summer RV surveys, we assess 4V, 4W, and 4X/5 as separate components within the 4VWX/5 stock unit. It is likely that white hake in 4X/5 are contiguous with the US Gulf of Maine - Georges Bank white hake stock, and that the 4V fish are contiguous with the Laurentian Channel component of the 4T white hake stock.

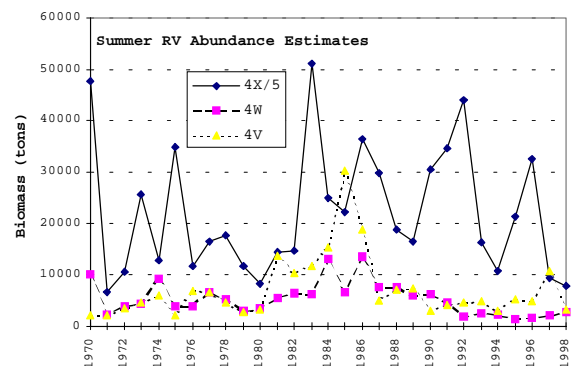


Resource Status

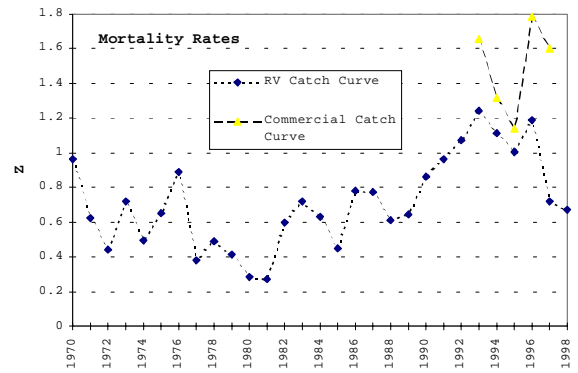
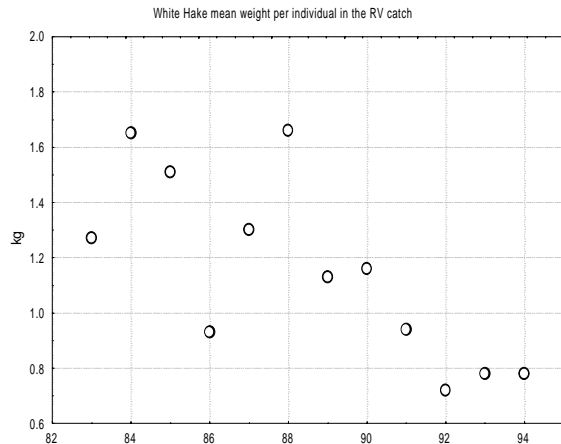
The stock status is based on evaluation of abundance estimates from groundfish research vessel and industry surveys, commercial catch rates of fishermen who have been consistently directing for white hake since 1990, and mortality estimates from the summer groundfish research vessel survey and the commercial fishery.

Summer **research vessel (RV) survey** biomass estimates for 4X, which typically contains about 75% of the biomass for the 4VWX/5 stock unit, have dropped sharply since 1996, with the 1998 estimate the lowest since 1971. The size composition has shifted towards smaller fish since 1995. Biomass estimates from the Canadian March Georges Bank RV survey dropped since 1991 to a record low in 1996, and remain low. US spring and fall surveys from 1970 to 1997-98 track reasonably well within themselves, but vary considerably from the Canadian summer

RV survey, especially prior to 1982. Mean weights per tow for both spring and fall since 1983 are generally lower than previous years, and have been at or near record lows since 1994. Summer RV survey estimates for 4W declined from 1986 to a record low in 1995, and have since risen slightly but consistently each year thereafter, mostly due to growth rather than recruitment. They are still the lowest of the three components (4X/5, 4W, 4V). Summer RV estimates for 4V dropped sharply from 1985 to 1987, and have since remained low but relatively stable. An increase in 1997 was not maintained in 1998. The spring RV survey of 4VsW indicates extreme decline in biomass since 1987 to a record low in 1993, and began to rise back in 1996. Catches in the 4VsW Sentinel survey dropped from 1996 to 1997. Catches in the 4Vn Sentinel survey dropped from 1994 through 1996, but rose in 1997.



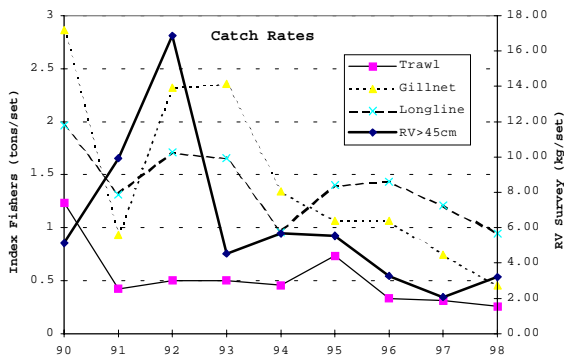
Mean individual weights of white hake in RV surveys in general have declined since the early 1980's.



Commercial **catch rates** of representative white hake fishermen have declined since 1996 for all major fleets (longline, gillnet, otter trawl), and 1998 represents the lowest catch rates in the series (1990-98) for all fleets. The commercial and RV fishable biomass catch rates track one another quite well in most years.

Outlook

The downward trends in abundance indices for 4X/5 suggest that this portion of the stock may be at risk of collapse. Abundance indices of the 4W and 4V components of the stock have remained near record lows. Estimates of exploitation rates in excess of 50% are well above acceptable exploitation targets. Present management has not been effective in protecting white hake. The fishery in 1999 should be restricted to bycatch only, with the lowest possible landings. Should this create management problems for other stocks, consideration should be given to establishing closed areas in western 4X to provide refugia for white hake. Refugia might also be considered to aid stock rebuilding in 4V and 4W.



Mortality rates for the 4X white hake derived from RV survey catch at length data depict an increase in fishing mortality from 1981 through 1993, after which they remained at or above 1.0 until 1997. Mortality rates derived from commercial catch at length data for the 1993-1997 period in 4X reflect a similar pattern to the RV mortality rates. Assuming natural mortality of 20%, at a total mortality (Z) of 1.0 the exploitation rate is 55%.

For More Information

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