

White Hake in Divisions 3L, 3N, 3O And Subdivision 3Ps

Background

White hake (*Urophycis tenuis*, Gadidae) is a bottom dwelling species distributed in the Northwest Atlantic from Cape Hatteras to southern Labrador, reaching its peak abundance in the Gulf of St. Lawrence, on the Scotian Shelf and in the Gulf of Maine. It belongs to the gadoid or cod family of fishes.

Stock structure for this species on the Grand Banks is unknown. There appears to be a considerable amount of overlap between the separately managed stocks in the vicinity of the Laurentian Channel.

Adults occur over a wide range of depths from 50-1000 meters (27-547 fathoms) and prefer water temperatures in the range of 5-11°C. This preference for warmer waters restricts their distribution on the Grand Banks the southwestern edge year round.

White hake spawn at different times in different areas. On the Grand Banks, spawning occurs in mid-summer.

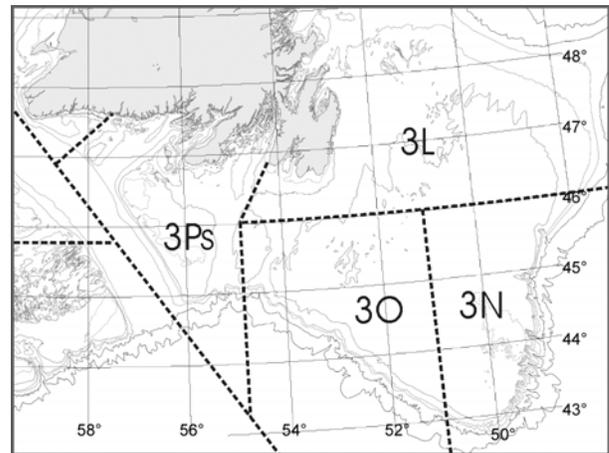
Young hake are pelagic, and do not move to the bottom until they are 8-13 cm (3-5 inches) in length.

White hake are relatively fast growing, reaching about 53 cm (21 inches) by age 5, and 75 cm (30 inches) by age 10. They can grow to a very large size; females of greater than 130 cm (51 inches) have been captured. Males mature at a smaller size (about 40 cm or 16 inches) than females (about 47 cm or 19 inches).

White hake feed on a variety of prey items including small fish, squid, large and small

crustaceans, and copepods. Fish appears to be the most important prey of larger hake.

In 3LNOPs prior to the 1990's, white hake was taken primarily by longlines in a mixed fishery. Since then, catches have declined. With the decline of the more traditional groundfish species however, interest in the fishery for white hake has increased. Currently there are no catch limits for white hake. However, closures due primarily to excessive by-catch of other species have limited white hake catches.



Summary

- Estimates of white hake biomass from research vessel surveys declined to an observed low in 1994.
- Mean length and weight of hake have declined concurrent with declining biomass. Although white hake larger than 85 cm were consistently caught in earlier years, fish of these larger sizes have been captured infrequently since 1990.
- Since 1997, biomass and abundance increased. However, it is not possible to judge if the level of biomass observed in the last 3 years is comparable in magnitude to

historic levels given the change in survey gear.

- The reduction in mean fish weight since 1997 is due to increased recruitment. The 1999 year class is dominant in both 2000 and 2001.
- During the period of decline (1988-1995), white hake on the southwest slope of the Grand Bank were compressed into a narrower band, likely as a result of colder temperatures. Since 1995, distribution of white hake has expanded to an area comparable to that of the pre-1988 period.
- Although white hake is not regulated by quota, recent catches are about 1/3 of the levels in years preceding 1993, probably due to bycatch restrictions.

southwest slope of the Grand Banks began in 1993.

Since then, reported catches have not exceeded 1200 t due primarily to closures brought about by excessive by-catch of cod and haddock.

The Canadian directed fishery for white hake during 1998-2001 occurred primarily along the southwestern shelf edge in the vicinity of the 3Ps/3O border. Much of the effort and higher catch rates were concentrated in 3Ps. Only a portion of the area where white hake are distributed was fished.

The Fishery

Reported catches of white hake have declined substantially during the last two decades, particularly since 1991.

Landings (thousand metric tons)

Year	77-90										
	Avg.	92	93	94	95	96	97	98	99	00	01
Can.	3	2.8	1.8	.7	.6	1.1	.9	.6	.9	.7	.9
Others	2	+	+	+	+	.1	.2	.3	+	+	+
Total	5	2.8	1.8	.7	.6	1.2	1.1	.9	.9	.7	.9

* Catch less than 50 metric tons

Between 1985 and 1991, reported non-Canadian catches, occurring primarily in Div. 3N, were highly variable. Subsequently, annual non-Canadian catch has averaged about 80 t. Some mis-reporting may have occurred. Since the extension of jurisdiction (1977) until 1993, Canadian catches averaged about 3000 t annually. A Canadian experimental mixed trawl fishery on the

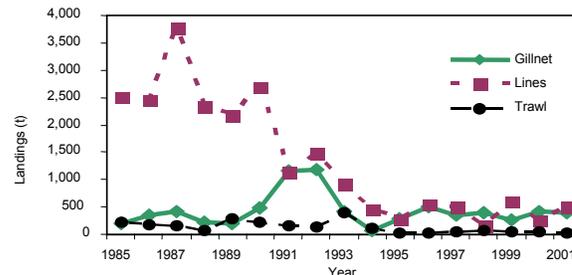
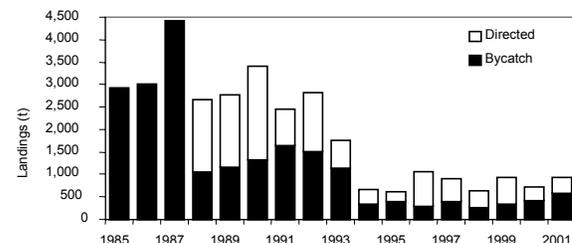
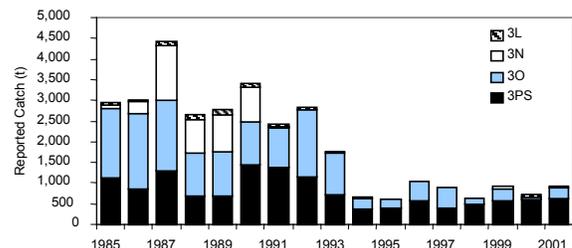


Figure 1: Reported Canadian landings of white hake.

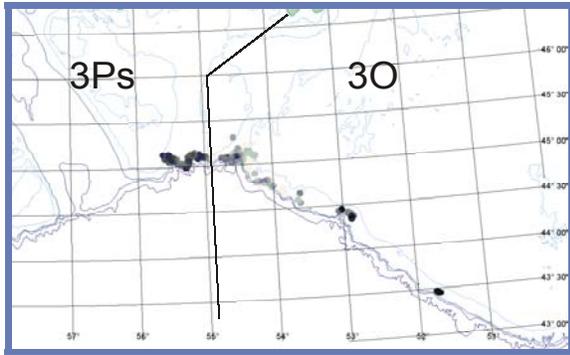


Figure 2: Distribution of the observed commercial fishery, 1998-2001. Darker shades of grey depict higher catch rates.

Resource Status

Research trawl survey biomass indices indicate that white hake are found mostly in Div. 3O and Subdiv. 3Ps. Based on spring and fall (excluding 3Ps) survey results, white hake were distributed almost exclusively along the southwestern edge of the Grand Banks and the Laurentian Channel.

Based on spring research vessel surveys that cover the entire stock area, hake biomass in both 3O and 3Ps had declined to an observed low by 1995. Concurrent with declining biomass was a decrease in the mean length and weight of hake.

A change in survey trawl gear from Engel to Campelen in fall 1995 likely affected catchability of white hake in research surveys. Hence, the two periods are not comparable. Following the change in gear, the average biomass for 1999-2001 was higher than for the period 1996-1998. A very large number of young of the year captured in the 1999 International Young Gadoids Pelagic Trawl (IGYPT) survey suggesting higher recruitment in that year. Subsequently, a mode of 25 cm fish (one year olds) dominating the 2000 survey frequency was the reason for the abrupt increase in the abundance index.

However, biomass and abundance cannot be compared to earlier years and therefore may still be at relatively low levels compared to the past.

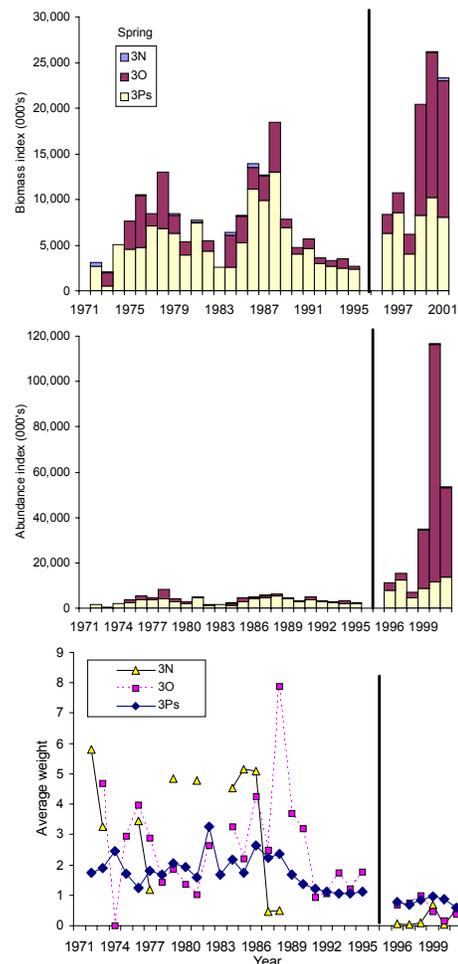


Figure 3: Spring RV survey biomass (upper panel), abundance (middle panel) indices and mean size for the period 1986-2001.

Fall biomass indices for Div. 3O are greater than those from spring surveys but have a similar trend over time. This is thought to be because the fish are distributed more on the bank and more available to the gear during the fall period when bottom temperatures are warmer. Seasonal differences in 3Ps are unknown as the area is not surveyed in the fall.

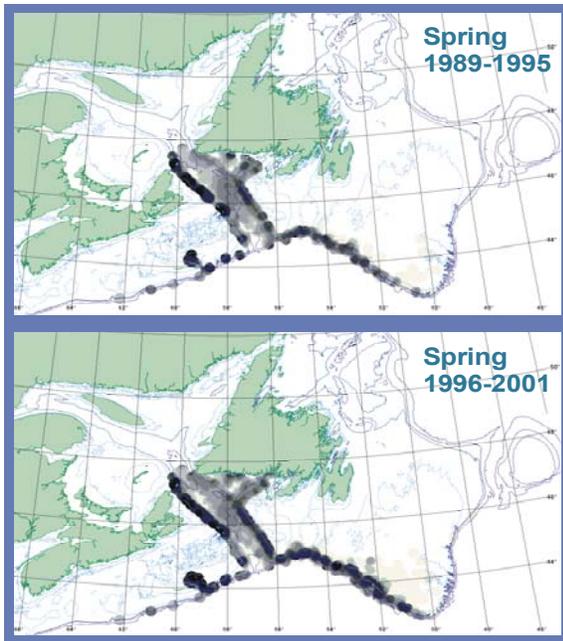


Figure 4: Distribution of white hake in 3LNOP from spring surveys, 1989-1995 and 1996-2001.

Sources of Uncertainty

There is a paucity of data on white hake in the 3LNOPs area as there has been no directed research on this species. Ages are not available, and data on length, individual weights, and maturity of fish in research survey catches is incomplete. Sampling of commercial catches is deficient.

No information on stock affiliation is available although there appears to be overlap with the Scotian Shelf, Gulf of St. Lawrence and Grand Banks fish in the vicinity of the Laurentian Channel. It is unclear whether the 3LNOPs management unit comprises more than one stock.

Current biomass levels cannot be compared to years prior to 1996 due to the change in research survey gear. Although abundance increased substantially in 1999-2001, how current levels compare to earlier years cannot be determined. Likewise, catchability of

small fish in Campelen vs. Engel gears is unknown, creating uncertainty about the relative recruitment and proportion of adults in the population between the two periods. A longer time series of Campelen data or a conversion factor for Engel gear is required to elucidate any trends.

Non-reported discarding by all fleets could have resulted in a bias in our perception of catches in earlier years. Reported catches of white hake by non-Canadian fleets may not reflect true catches. Current catch records may not be adequate for separating landings originating from by-catch and directed fisheries.

Outlook

Since recent biomass indices cannot be related to those of previous years, the current state of the stock cannot be compared to earlier years. The declines in the numbers of large fish and the declining trend in survey biomass observed prior to the change in research gear are causes for concern.

However, the increase in biomass and abundance in 1999-2001 due to recruitment and the re-expansion of white hake onto the bank along the southwest edge of the Grand Bank may be positive signs that the stock maybe recovering. The 1999 year class, dominating in the 2000 survey catches, has persisted as a major component into 2001.

White hake landings occur both as bycatch and from a directed fishery. Catches are currently below historical averages, likely a result of bycatch restrictions. Low catches in recent years may also be indicative of low abundance of commercial sized white hake. Good

survival of the recent year class could result in recruitment to the fishery.

At present, closures due to bycatch of other species are the only limit on directed fishery effort. If this constraint is removed, catches could increase beyond acceptable levels.

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References

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