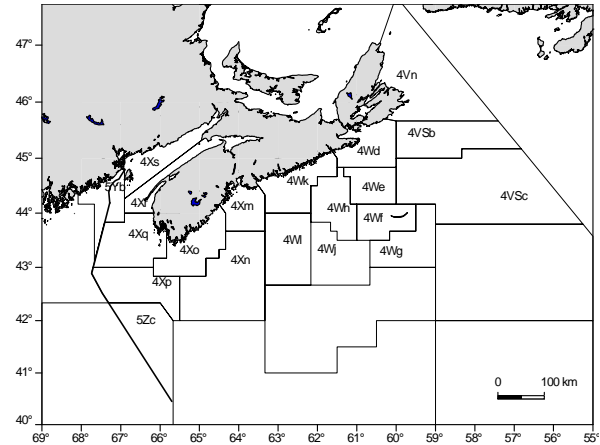


Pollock in 4VWX and 5Zc



Background

Pollock in the western Atlantic range from southern Labrador to about Cape Hatteras. The main fishable concentrations occur in the Georges Bank, Gulf of Maine, and Scotian Shelf areas.

Young pollock are closely associated with nearshore habitats, recruiting to the offshore populations at around age 2. Based on observations by fishermen and acoustic studies, pollock spend the least time on the bottom of all the cod-like fish. Pollock show strong schooling behaviour. Food of adult pollock include euphausiids and fish such as herring, sand lance and silver hake.

An evaluation of stock structure completed in 2003 indicated that the management unit is comprised of two parts: a slower-growing eastern component including NAFO Divs. 4V and 4W, as well as Unit Areas 4Xm and 4Xn, and a faster-growing component including 4Xopqrs as well as Canadian portions of Subarea 5. Pollock are mature at ages 3 to 5 depending on the area.

A variety of fishing gear is used to fish pollock, primarily otter trawl and gillnets, but also handlines and longlines. Pollock are also landed as by-catch in the small-mesh silver hake and redfish fisheries.

Summary

- Landings in recent years have been less than 10,000 t. 2004 landings are 6542 t (Apr 1 to Nov 25).
- The stock structure consists of eastern and western components.

Eastern Component

- For the eastern component, large scale directed pollock fisheries should not be considered until the component recovers.

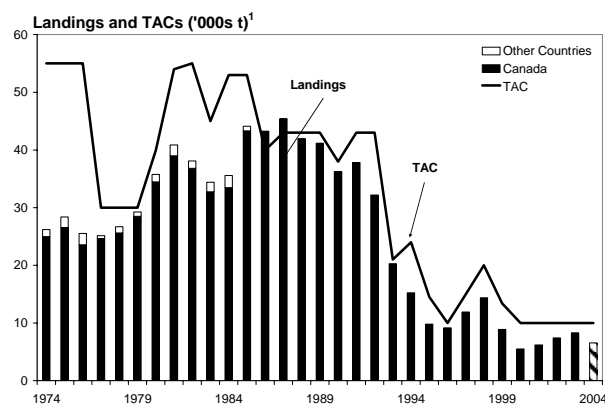
Western Component

- Mobile gear catch rates and RV biomass indices declined from the early 1980s to a low in 2000 and have subsequently increased, but remain lower than the 1980s.
- Estimates of fishing mortality have steadily increased from the early 1980s until 1994, despite decreased landings. Fishing mortality remains above the F_{ref} (0.2).
- Estimates of biomass declined from about 60,000 t in 1984 to about 10,000t in 1999 and subsequently doubled by 2004.
- The 1998 and 1999 year classes are stronger than previous year classes and there are early indications of a weak 2000 year class.
- While the population has a high likelihood of achieving a 10% increase in biomass by the end of the 2005/06 fishing year with removals as high as about 4500 t, the range of harvest strategies in the fishing year that are risk averse to risk neutral are about 2200 to 2900 t.

The Fishery

Landings ('000s t)¹

Year	1970-1979 avg.	1980-1989 avg.	1990-1999 avg.	2000	2001	2002	2003	2004
TAC		46.9	24.2	10.0	10.0	10.0	10.0	10.0
EAST	7.8	21.2	7.8	07	0.8	0.4	0.2	
WEST	13.9	16.5	11.6	4.8	5.4	7.0	8.1	
TOTAL	21.7	37.7	19.4	5.5	6.2	7.4	8.3	



1. Prior to 1999, the quota year was Jan. 1 to Dec. 31. In 1999, the quota year was 1 Jan. 1999 to 31 Mar. 2000. Subsequently, it is Apr. 1 to Mar. 31.

Landings in the fishery from April 1st through 25 Nov. 2004 are 6542 t. The fishing industry reports that catch rates in 2004 improved considerably compared with recent years, especially on Georges Bank. Fishers also reported increased catch rates and landings from the eastern portion of Div. 4X.

The pollock fishery has had significant changes in both area fished and in dominant gear type. The contribution of larger trawlers to total landings (Tonnage Class (TC) 4+), once the dominant gear type in the fishery, has been steadily declining since 1981 and accounted for less than 1% of total removals in 2003. Offshore companies are now using TC 2-3 vessels to catch their allocation. Therefore, the contributions of TC 1-3 trawlers have increased and now account for 73% of the total landings. Gillnet landings comprise 24% of the total landings.

The western component of the management unit usually contributes the largest proportion to total landings. Landings from the eastern component traditionally are primarily made by TC 4+ otter trawlers, and

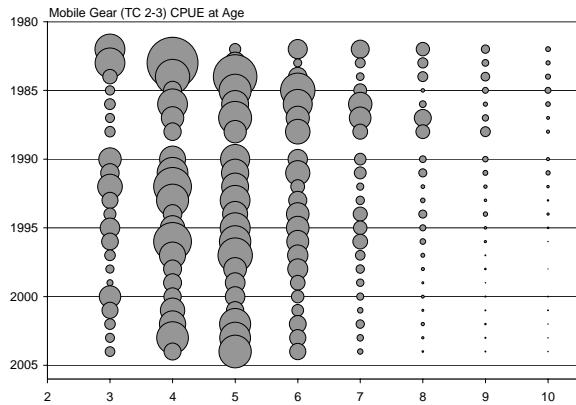
have been following a declining trend. Since 1993, much of the eastern component was closed to cod-directed fishing, which further reduces pollock landings from that area. Within the western component, landings now are reported mostly from three unit areas that include the mouth of the Bay of Fundy and Georges Bank, whereas as recently as 1997, landings were more evenly distributed among unit areas.

Resource Status

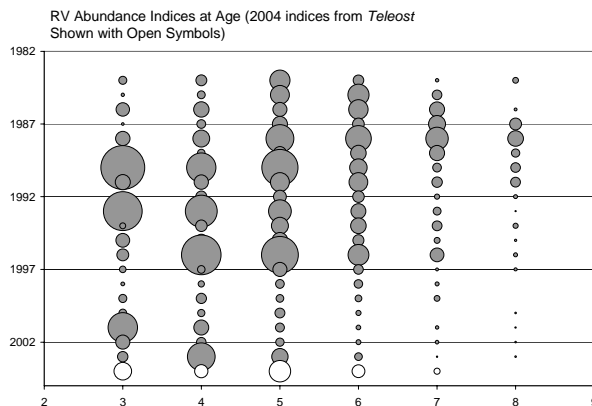
A review of assessment methodology, completed in 2004, defined western and eastern components for the pollock resource (Research Document 2004/040). An age-structured population model was developed for the western component that incorporated indices of abundance from both the DFO summer RV survey and standardized CPUE from the commercial fishery. As the fishery is almost exclusively based on the western component, the comments in this section pertain to this component. The population model results include indices and catch through 2003, but 2004 indices are also shown graphically to illustrate the most recent information. The 2004 RV survey indices were obtained using the *Teleost*, and given the lack of availability of conversion factors with the *Needler*, the 2004 data were not included in the population model.

Mobile gear catch rates and RV biomass indices declined from the early 1980s to a low in 2000 and have subsequently increased, but remain lower than the 1980s.

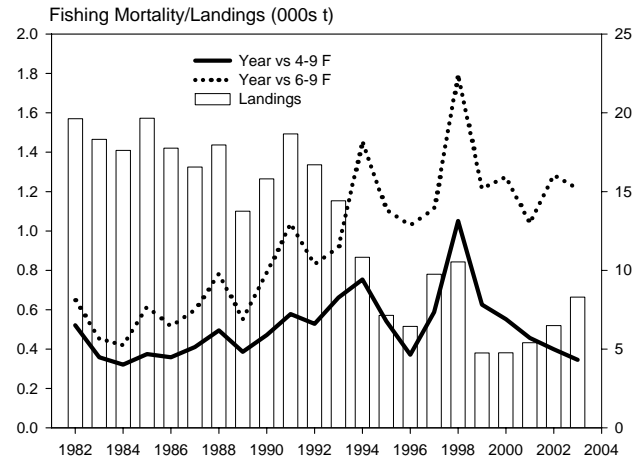
Age-specific indices of abundance from the mobile gear sector of the fishery indicate a reduction in the abundance of age 7+ fish since 1996. This contrasts with the reported increased catch rates noted in the previous section. In recent years, the 1998 and 1999 year classes were relatively strong. There are early indications of weak 2000 and 2001 year classes.



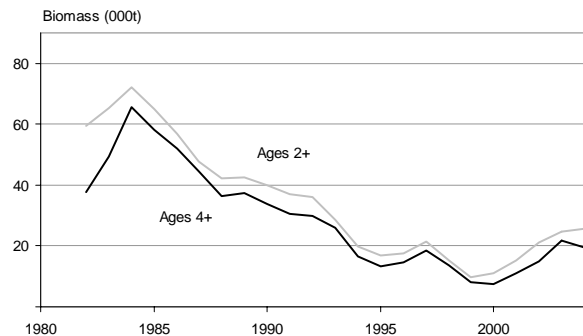
Indices of abundance from the summer RV surveys show that the 1999 year class was strong in the 2003 and 2004 surveys. The 1997 and 1998 year classes may have experienced higher survival, as the age 6 and 7 indices in 2004 are higher than those seen for other recent year classes. The 2000 year class is weak compared to the 1998 year class and the 2001 year class is close to the median.



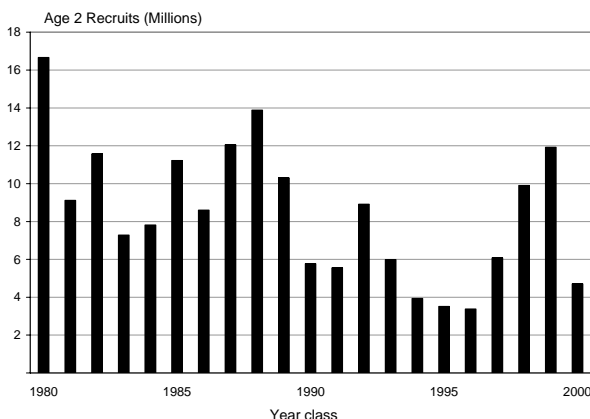
Estimates of **fishing mortality** have steadily increased from the early 1980s until 1994, despite decreased landings. Fishing mortality declined in 1995 and 1996 but increased again to a maximum in 1998 when landings also increased. Subsequent reduced quotas and harvests have contributed to a decline in fishing mortality for ages 4-9, but fishing mortality remains high, particularly for older fish (ages 6-9), and above the F_{ref} of 0.2.



Estimates of **biomass** declined from about 60,000 t in 1984 to about 10,000 t in 1999. Biomass has been rebuilding since then, doubling to about 20,000 t by 2004, but remains low compared to 1984.



Concerning **recruitment**, the 1998 and 1999 year classes are stronger than previous year classes and early indications for the 2000 year class are that it is weaker. The improved recruitment follows a period of three consecutive weak year classes (1994-1996).



Sources of Uncertainty

The results of the assessment depend, in part, on indices of abundance from the commercial fishery. Trends in catch rates may be confounded by changes in the fishery not associated with trends in abundance.

Pollock, being a semi-pelagic, schooling species, are less well sampled by the summer RV survey than other gadids. While the assessment methodology review determined that the summer RV survey (which does not include Georges Bank) reflected population abundance accurately, industry expressed concern that increased landings from Georges Bank in 2004 bring this conclusion into doubt.

The population model employs indices up to and including 2003 only. Projections of catch and population biomass for the fishing year 2005/06 therefore do not include indices available in 2004, and are necessarily more reliant on assumed recruitment.

Harvest Strategy and Reference Points

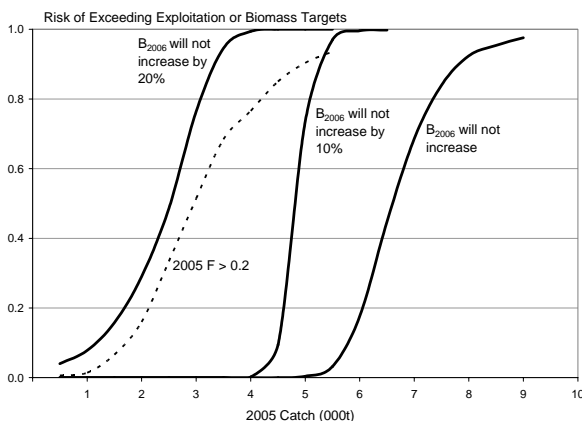
The assessment methodology review examined yield per recruit analyses and stock-recruitment patterns to derive a fishing mortality reference point of $F_{ref} = 0.2$. When stock biomass is less than 30,000 t, exploitation may be further constrained to achieve rebuilding.

Establishing a biomass at which serious harm occurs would be arbitrary due to the absence of evidence of decreasing per capita recruitment at low biomass. Under these circumstances, such a biomass reference point cannot be considered an unqualified switch for turning off or turning on exploitation. However, used in conjunction with the trends in biomass, informed management responses can be made. The basis for determining a biomass below which serious harm occurs was limited for pollock by the short time series available. A biomass of 10,000 t may be tentatively considered a biomass limit, but a secure recovery from that level has not yet been established.

Outlook

While the population has a high likelihood of achieving a 10% increase in biomass by the end of the 2005/06 fishing year with removals as high as about 4500 t, the range of harvest strategies in the fishing year that are risk averse (25% risk of exceeding F_{ref}) to risk neutral (50% risk of exceeding F_{ref}) are about 2200 to 2900 t.

Several factors indicate a conservative harvesting strategy is appropriate. Population rebuilding is still at an early stage and there are relatively few age 7+ fish. Although not included in the model, available 2004 indices from the mobile gear fishery have decreased compared to 2003. The population biomass is currently lower than that associated with improved recruitment (30,000 t).



Management Considerations

For the **western component**, the relatively strong 1998 and 1999 year classes present an opportunity to rebuild population biomass, if exploitation rates are kept at moderate levels.

For the **eastern component**, indices from the summer research vessel surveys, while extremely variable, indicate that total mortality is high and increasing, even with relatively low landings from the fishery. For the eastern component, large scale directed pollock fisheries should not be considered until the component recovers.

For more Information

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