

Pollock In 4VWX5Zc

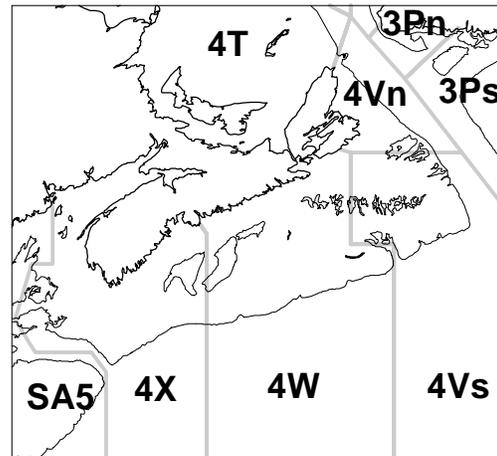
Background

Pollock in the western Atlantic range from southern Labrador south to about Cape Hatteras. The main fishable concentrations, however, 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.

Pollock are mature at ages 3 to 5 depending on the area. Pollock also show marked differences in growth rate by area, with fish in the Bay of Fundy area growing faster than those on the Eastern Scotian Shelf.

The management unit includes the Canadian portion of Georges Bank and the Gulf of Maine, and the Scotian Shelf. A variety of fishing gear are used to fish pollock, including primarily otter trawls, gillnets, handlines and longlines. Pollock are also landed as by-catch in the small-mesh silver hake fishery. The Canadian fishery is managed on the basis of a target exploitation rate of about 24% of the population, and maintenance of adequate biomass levels to promote good recruitment.



The Fishery

Landings (thousand metric tons)

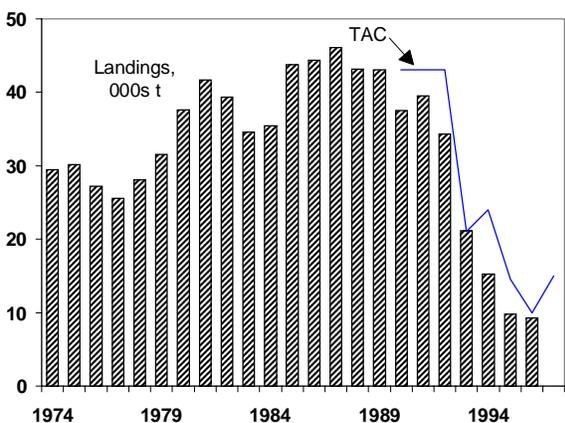
| Year | 70-79 Avg. | 80-89 Avg. | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 |
|---------------------|---------------|---------------|------|------|------|------|------|------|
| TAC | - | - | 43.0 | 21.0 | 24.0 | 14.5 | 10.0 | 15.0 |
| Canada ¹ | 23.3 | 39.5 | 32.0 | 20.3 | 15.2 | 9.7 | 9.1 | |
| TOTAL | 37.2 | 40.9 | 34.1 | 21.1 | 15.2 | 9.8 | 9.3 | |

¹ The management unit included NAFO Subarea 6 and divisions 5Y and 5Z prior to 1988. Starting with 1988, only the Canadian portions of divisions 5Y and 5Z were included in the landings.

The recent pollock fishery continues to be dynamic, with significant changes in area fished within the management unit and dominant gear type. During the 1980s, landings from Divs. 4VW accounted for about 30% of landings from the management unit. From 1993 to 1996, Div. 4VW landings have accounted for about 20% of total landings, although such changes were due in part to changes in the management regime in the eastern half of the management unit. Within Div. 4X, the proportion of landings from the western half has increased significantly. The contribution of larger trawlers to total landings (TC 4+) has been steadily declining since 1981.

In contrast, the contributions of TC 1-3 trawlers and fixed gear vessels (gillnet, longline) have been increasing over the same period.

In 1996, **landings** declined to 9280 t, the lowest observed during the period 1960 to 1996. Landings in the small mesh silver hake fishery increased to 129 t from 58 t in 1995. Landings of pollock in the expanded redfish fishery which also uses relatively small mesh gear were 297 t.



The size composition of landings in 1996 was comparable to that observed in 1995 for the aggregate fishery, with an additional mode observed in 1996 around 28 cm which was attributable to the small mesh gear fisheries. The catch at age in 1996, however, did not compare well with expectations, with considerably fewer age 7 fish caught than anticipated and considerably more age 4 and 5 fish. Average weights at age from the fishery have been stable in recent years.

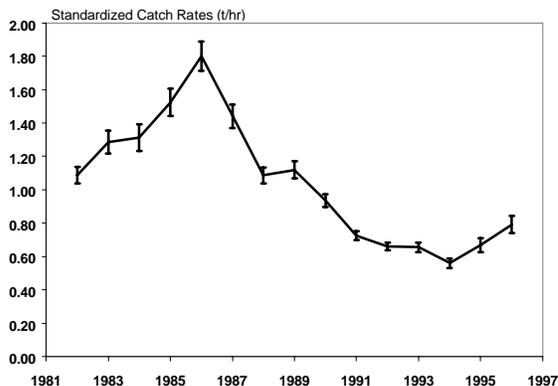
Consistent with reports last year, comments from the fishery almost unanimously indicate that pollock have increased in abundance in the western half of the management unit over the past several years. However, reports from the eastern half of the management unit have not yet indicated any recovery of the resource. Some fishermen also commented that although

pollock were relatively abundant, they were small.

Resource Status

The stock status evaluation was based on an analytical assessment using landings statistics, sampling for size and age composition of the commercial catch, and trends in commercial fishery catch rate. Changes in the 1996 assessment included a revision of the 1985-1988 catch at age using an approach which better reflected differences in growth rate by season and area within the management unit, and further development of the commercial catch rate information.

The domestic stern trawler TC5 catch rates from the Observer Program have played an important part in previous assessments of this resource. However, given the trend of diminishing contribution to total landings for this gear sector, a new index of abundance was developed which used a broader source of information from the fishery. This approach involved constructing a **standardized catch rate series** for otter trawlers of Tonnage Class 2-5 and 7. The development of the standardized catch rate series accounted for differences in catch rate by vessel tonnage class, mesh type, area, month and year.

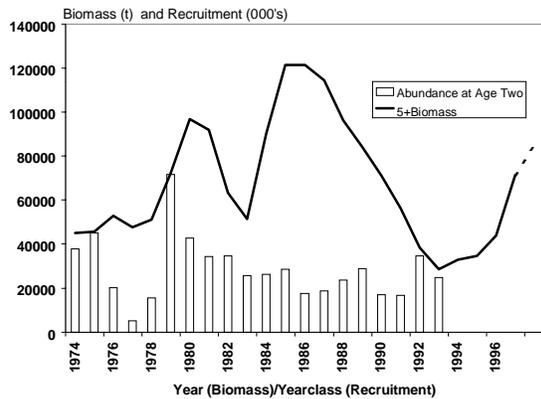


The catch rate series peaked in 1986, as the record 1979 year-class became fully recruited,

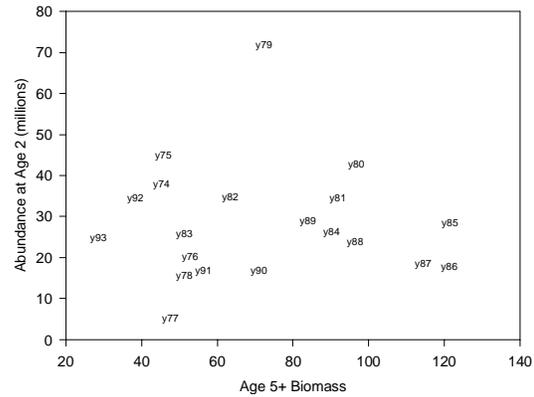
and declined thereafter. The catch rate series has been increasing for the past two years.

Research vessel survey data are not currently used as an index of abundance in this assessment, because there is considerable unexplained interannual variation of many year-classes, which is inconsistent with our knowledge of fisheries dynamics. The distribution of sets which caught pollock during the 1997 research surveys was comparable to that seen in the past. There were also relatively few large fish caught in the 1997 survey.

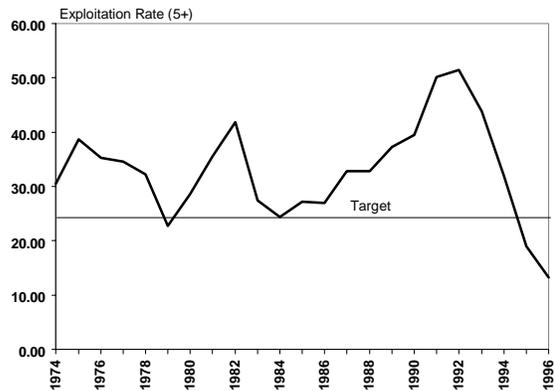
Population abundance estimates indicate that biomass declined from 1985 to the lowest level in the series in 1994. Since then, total biomass has been increasing.



Recruitment after the strong 1979 year-class remained close to the long-term average of 28 million fish for nine years. The 1989 year-class was thought to be strong last year, but now appears closer to average. The 1992 year-class appears to be stronger than average. For this groundfish resource, there does not appear to be a predictable relationship between recruitment and adult stock size.



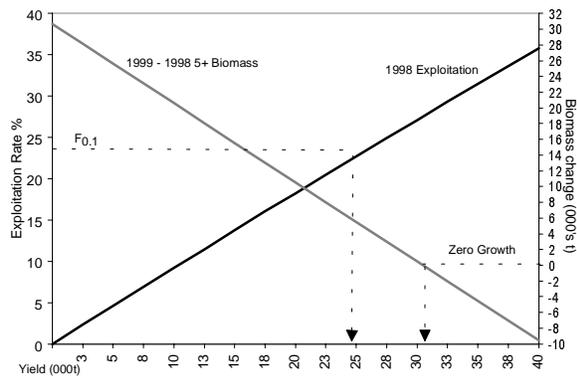
The **exploitation rate** at age 5+ has been increasing since 1984 and reached a peak in 1992. The most recent value has declined to about 13%, due in large part to the low level of removals by the fishery in recent years.



An analysis was completed for the new population model, to determine if addition of new data each year results in a change in estimates of year-class abundance. There was general consistency of estimates of year-class abundance as additional data were added. For the 1989 and 1990 year-classes, however, there was a tendency for more recent estimates to provide a more conservative interpretation of year-class abundance.

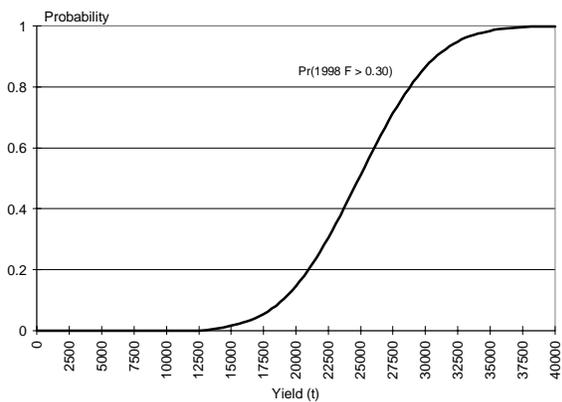
Outlook

If the TAC of 15,000 t is taken in 1997, the resulting fully recruited fishing mortality will be about 0.21. The beginning of year age 5+ biomass will increase from 71,338 t in 1997 to 85,639 t in 1998. The $F_{0.1}$ catch in 1998 is 24,698 t. The implications of various rates of exploitation on biomass change and yield are shown below.



Considerable growth in the age 5+ biomass is indicated with $F_{0.1}$ removals or less. However, the 1992-1994 year-classes are projected to make up nearly 75% of that biomass at the beginning of 1999, and the current size of these relatively young year-classes is uncertain.

The probabilities of various yield levels exceeding the target fishing mortality is provided below.



Examination of exploitation patterns by age in recent years indicated a greater proportion of younger fish in the catch. This change in selection is as yet poorly understood, but could cause an overestimation of the abundance of younger ages, an overestimation of total population abundance, and an overestimation of $F_{0.1}$ catch. An exploratory analysis which decreased recent commercial catch rates in proportion to the observed changes in recruitment by age indicated a reduction in the $F_{0.1}$ catch to 20,212 t. The 5+ population biomass under that scenario would be 66,373 t in 1998.

Management Considerations

Although there is an overall positive outlook for this resource based on the assessment and reports from the fishery, there are considerable uncertainties, even beyond those expressed in the earlier section. Such concerns relate to the geographic distribution of the resource, changes in age structure of the catch, and the use of catch rates as an abundance index. These issues are discussed in more detail below.

Based on examination of commercial fishery catch rates from otter trawlers, the increasing concentration of the pollock fishery in western 4X does not appear to be related to a reduction in the geographic range of the stock. However, this is at odds with reports from fishermen that the resource has become more scarce in eastern 4X. This issue remains unresolved and a source of concern.

Landings of pollock in the adjacent northern management unit (Subdiv. 3Ps, southern Newfoundland) have increased in 1996 to 439t, and the likely origin of these fish is thought to be the 4VWX5Zc management unit. At present, such landings are not accounted for in the assessment or in the projected stock status. Given the increased landings in the 3Ps

management unit, this convention should be reviewed along with available information on stock origin of fish caught in that management unit.

The increased concentration of the fishery on younger ages could be a danger signal, if fewer fish of older age are available. However, as indicated earlier, the fishery has undergone significant changes in recent years and the impact of such developments on the age composition of the catch requires further investigation.

Finally, the use of commercial fishery catch rates as an abundance index was considered less desirable than a fishery-independent index. However, given the limited utility of general purpose groundfish surveys for this schooling, semi-pelagic species, there are no better alternatives at present.

Given these uncertainties, a continued cautious approach to the exploitation of this resource is warranted.

For More Information

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References

Neilson, J., and P. Perley. 1997. The 1997 assessment of pollock (*Pollachius virens*) in NAFO Divisions 4VWX and Subdivision 5Zc. DFO Can. Stock Assess. Sec. Res. Doc. 97/109.

This report is available from the:

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