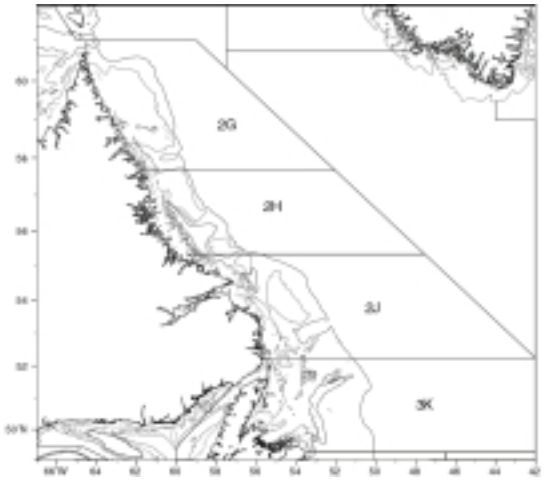
# American plaice in Subarea 2 and Division 3K




## *Background*

*American plaice, which occurs on both sides of the North Atlantic, is a bottom dwelling flatfish. In the western Atlantic, the species ranges from U.S.A. waters to the Arctic, with the largest population occurring on the Grand Bank off Newfoundland. American plaice are found over a wide range of depths and temperatures.*

*Although the population is distributed throughout Subarea 2 and Division 3K, the bulk of the stock has always been in Divisions 2J and 3K.*

*Female American plaice in Divisions 2J and 3K mature at about age 8 and 29 cm while male American plaice mature at about age 4 and 17 cm. This is a relatively slow growing species with fish not reaching 40 cm until nearly age 10.*

*Catches from this stock were highest from 1968 to 1972, during which time they averaged about 10,000 t per year. Since 1981, catches have exceeded 2000 t only twice. Through the 1980's the majority of this fishery occurred in the offshore, by otter trawl, although inshore catches, mainly by gillnets, were higher than offshore catches in some years. Both offshore and inshore catches have declined substantially and from 1994-99 the total catch has averaged only 13 tons per year. The stock has been under moratorium since the beginning of 1994.*

## *Summary*


- Stock biomass has remained low since 1992 and is currently estimated to be about 6% of the 1980-84 average.
- There has been a moratorium on directed fishing on this stock since 1994. Reported catches averaged 13 tons per year from 1994 to 1999, compared to 3500 tons per year from 1980-84.
- Age and length at maturity have declined in Div. 2J3K for both males and females.
- Survey data for 1978 to 1999 indicated that only one good year-class (1983) has been observed since 1975.
- Estimates of total mortality calculated from survey data have remained high since the beginning of the moratorium, likely indicating that natural mortality is higher than 0.2.
- There is little prospect of significant rebuilding in the short to medium term.

## *Species biology*

Growth as measured by mean length at age from research vessel data has increased slightly in recent years for both males and females (Figure 1). The large increase indicated from 1995 to 1996 cannot be explained at this time. Mean weight at age has shown a similar increasing trend over this time period**.**

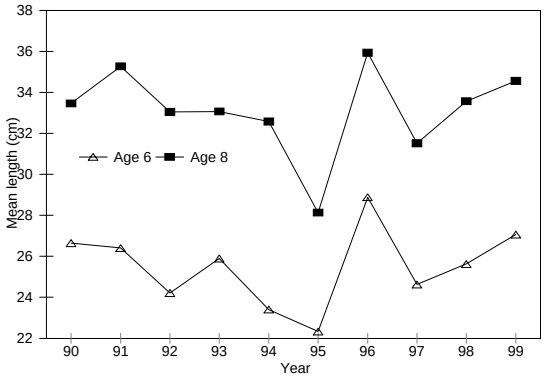



Figure 1. Mean length at age of female American plaice from research vessel surveys in Division 2J.

Male American plaice mature substantially younger and smaller than females. **Age at maturity**, calculated for each year-class, declined since the early 1970's. Currently the age at 50% maturity is 8 for females and 4 for males. **Length at maturity** has also shown a decline since the early 1970's. For males length at 50% maturity has declined from around 25 cm to less than 19 cm and for females it has declined from 41 cm to 36 cm (Figure 2).

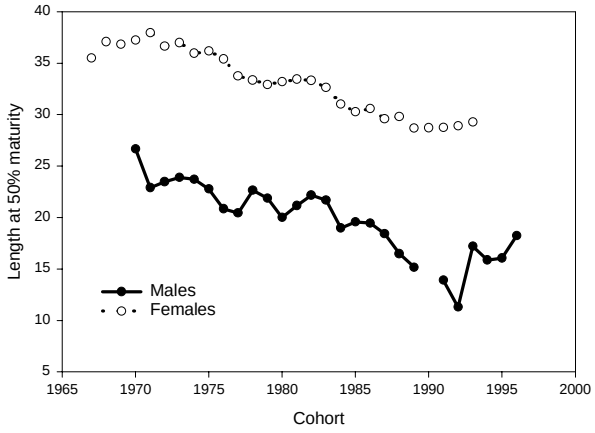



Figure 2. Length at 50% maturity for male and female American plaice in Div. 2J3K.

Distribution of American plaice in SA 2+ Div. 3K has changed in recent years. Up until the late 1980's most American plaice were found on and around the shallower areas such as Hamilton Bank. Since then most fish have been found in the deeper channels between the Banks.

## *The Fishery*

Catches from this stock were highest from 1968 to 1972, peaking at almost 13,000 t in 1970 (Figure 3). Catches by non-Canadian vessels were substantial up to 1977, and were taken mainly by vessels from USSR and Poland. Since 1991 only Canada has been involved in this fishery. Catches averaged about 2700 t during the 1980's but rapidly declined after 1991. Based on a recommendation by the FRCC the directed fishery was closed at the start of 1994. There has been no directed fishing since that time and catches in 1994 to 1999 have not exceeded 28 t in any year. The reported catch as of October 3, 2000 was 55 t, with this increase caused by the by-catch in the Greenland halibut gillnet fishery.

Catches were generally taken in offshore areas by otter trawls and in the inshore areas by gillnets.

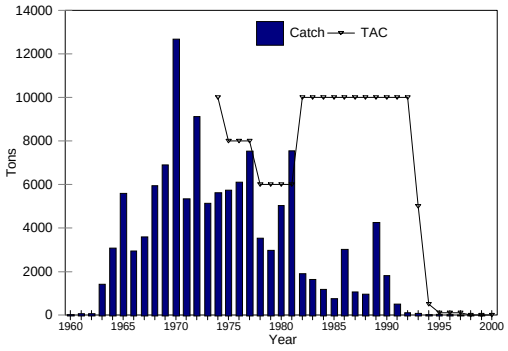



Figure 3. Reported catch and Total Allowable Catch for American plaice in SA 2 + Div. 3K

## *Industry perspective*

There are concerns about discards of American plaice due to by-catch restrictions in other fisheries, such as Greenland halibut and cod. Some fish harvesters feel that American plaice population(s) in inshore areas in Div. 3K could be separate from the remainder of the stock, and that genetic studies should be conducted.

## *Resource Status*

DFO bottom trawl surveys of Subarea 2 and Division 3K from 1978 to 1999 were used to evaluate resource status. The data from 1978 to 1994, which were collected by a different vessel and gear, were converted into values comparable with those in surveys from 1995 to the present. Based on these research vessel surveys in Divisions 2J and 3K, both **biomass** and **abundance** were variable from 1978-83 (Figure 4). From the mid 1980's to 1992 there was a large decline in the indices. Since 1992 stock size has remained very low. Current biomass is only 6% of the average from 1980-84. Abundance at all ages is low compared to the mid 1980's, and there are currently no fish at the oldest age groups which were found in the stock in the late 1970's and early 1980's. Surveys in Divisions 2GH, although not conducted annually, also indicate a substantial decline in biomass and abundance from the late 1970's to the present.

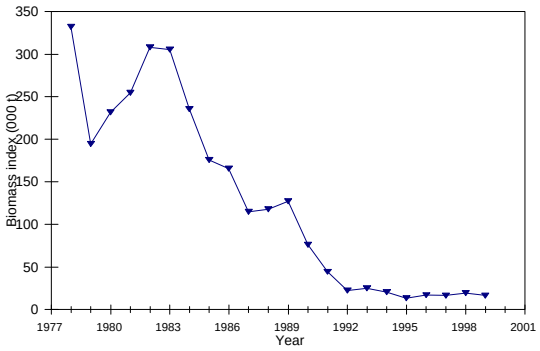



Figure 4. Biomass index of American plaice from research vessel surveys in Div. 2J3K from 1978-99. Data from 1978-94 are converted to Campelen equivalents from the Engel data.

**Estimates of total mortality** from survey data have consistently been higher than 0.7 and increased sharply during the first half of the 1990's despite very low catches. This may indicate an increase in natural mortality over that time period.

Analyses of **recruitment** from 1978-99 survey data indicated that the 1973, 1974, and 1983 year-classes were strong relative to other year-classes. There were no good year-classes after 1983.

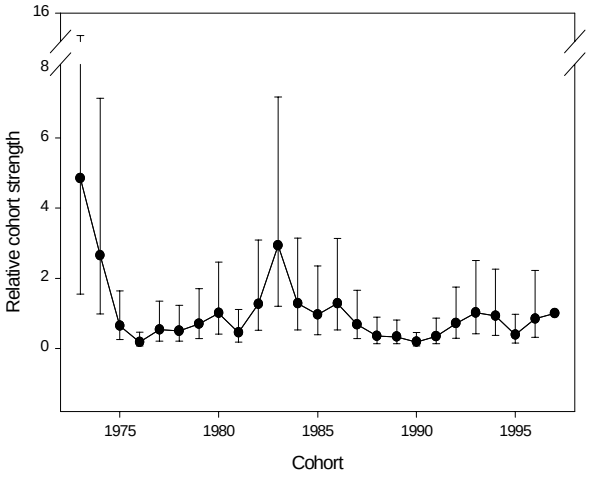



Figure 5. Estimates of recruitment (cohort strength) of American plaice from research vessel surveys in Divisions 2J and 3K.

The ratio of reported catch to research vessel biomass, used as an index of **exploitation rate**, was very low after 1993 (< 0.2%), and did not exceed 4% in any year from 1979 to 1999.

## *Sources of uncertainty*

This assessment is based solely on analyses of survey indices and trends in catch. There has been insufficient sampling of the commercial catch in many years, mainly due to the very small catches, to construct a catch at age. Even if this had been possible, these low catches in recent years mean that it would not have been possible to use standard age-structured models to estimate total population size.

There has been some debate on the extent that fishing played in the decline of this stock. It has been suggested that the role of fishing in the decline needed to be re-evaluated and that the mortality of American plaice through unreported by-catch in the northern cod fishery may have been considerable. Analyses were presented which looked at various sources of data, including observer estimates of catch and discards from fisheries in the 1980's and overlap in the distributions of cod and American plaice. These analyses supported the conclusion that fishing was not the cause of the decline of this population of American plaice.

Possible causes of the high mortality estimates for this stock are diverse and uncertain. For example, the most recent estimate of the amount of American plaice consumed by seals is about 15,000 t although this is for Div. 2J3KL, not 2GHJ3K.

## *Outlook*

Given the current low stock size, the lack of recruitment and high estimates of total mortality indicated by the surveys, and the slow growing nature of American plaice there is little prospect of significant rebuilding in the short to medium term. By-catches should be kept at the lowest possible level.

## *Management Considerations*

Since the imposition of the moratorium catch of American plaice has consisted of bycatch from other fisheries such as shrimp, cod, Greenland halibut, and winter flounder. Catches of American plaice will increase as catches of other species increase. This is already occurring in the Greenland halibut gillnet fishery. With restrictions on bycatch of American plaice in Conservation Harvesting Plans there is a potential for substantial discarding such that landings may significantly underestimate catch. These two factors will result in an increase in fishing mortality. Increased monitoring of

catches and landings would result in better estimates of removals from the fishery and may result in less discarding.

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