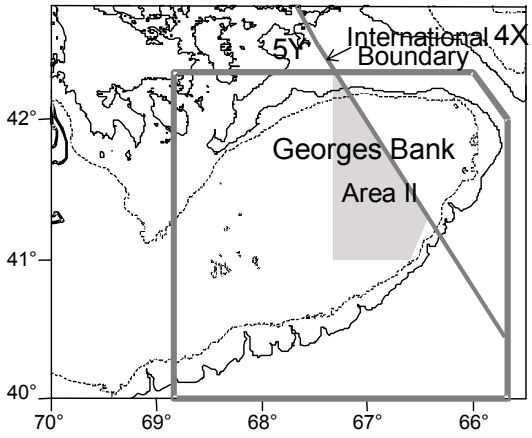
GEORGES BANK YELLOWTAIL FLOUNDER



Summary

- Combined Canada and USA catches in 2002 were about 6,100 t.
- Biomass has been generally increasing since the mid 1990s.
- Recent year classes have generally increased in abundancesince the mid 1980s and are comparable to those in the 1970s.
- Fishing mortality rates were high in the past, but recently have been reduced.
- The population age structure displays a recent expansion, however, there are fewer fish in the oldest age classes in both the catch and surveys than would be expected given the perception of recent low exploitation.
- The increased uncertainty in current stock status, more severe retrospective pattern, and the divergence in model results as well as the failure to explain the absence of older fish in the catch gives no confidence in projection results.
- Considering the trends in survey abundance and recruitment, status quo catch may be an appropriate management approach until these issues are resolved.

Fishery

Catches (thousands of tonnes) [1]

Year		1998	1999	2000	2001	2002
Canada	Quota	1.2	2.0	3.0	3.4	2.9
	Catch	1.2	2.0	2.9	3.5	3.1
USA	Quota					
	Catch	1.9	2.5	4.0	4.3	3.0
Combined	TAC					
	Catch	3.1	4.5	6.9	7.8	6.1

[1] Includes available discard estimates

Total catches of Georges Bank yellowtail flounder reached historical highs of about 20,000 t during the mid 1960s to mid 1970s. The USA fishery made most of the catches, although there were catches by other countries during the late 1960s and early 1970s. The combined Canada/USA catch has been increasing since 1995, and in 2002 was 6,123 t, less than the 7,776 t caught in 2001. (Figure 1)

The **Canadian directed fishery** started in 1993 and landings of 2,139 t occurred in 1994. Under quota control for the first time in 1995, catches were 472 t. The 2002 Canadian catches were 3,125 t, and exceeded the TAC of 2,884 t. Canadian catches of unspecified flounder from the Georges Bank groundfish fishery have been substantial in the past (523 t and 811 t in 1993 and 1994, respectively). Industry sources have indicated that most of the unspecified flounder catches were yellowtail flounder and these have been pro-rated to the yellowtail catches. With improvements in species identification through dockside monitoring, catches of unspecified flounder have decreased substantially, and in 2002 were estimated to be only 9 t. Discards of yellowtail flounder in the scallop fishery were estimated at 566 t and 483 t for 2001 and 2002 respectively, and are included in the Canadian catch.

The mean length by sex of yellowtail flounder in the Canadian fishery increased between 1994 and 1999 from 33 to 35 cm for males and from 35 to 40 cm for females. While the mean length by sex in the Canadian fishery has been stable over the past four years, males represented 65% of the total catch in 2002, compared to 60%, 46% and 25% in 2001, 2000 and 1999, respectively. In 2002, only 0.8% of fish in Canadian landings were less than 30 cm, and the size composition from the scallop fishery discards was not evaluated due to limited sampling.

USA catches for 2002 were 2,998 t, a 30% decrease from 2001, with the relative change split evenly between landings of 2,532 t and discards of 466 t. Restrictive days at sea management regulations may be causing some fishing trips to occur in coastal waters instead of on Georges Bank. Fishing trips for yellowtail flounder on Georges Bank are made along the southern and western edges of Closed Area II.

The size composition of the landings in the 2002 USA fisheries was 80% large and 20% small with a modal length of 39 cm with most (86%) in the 33-43 cm size range. Discards came mostly from the scallop fishery during the first half of the year. However, minimal logbook data and low observer coverage cause much uncertainty in the estimates of the total discard amount and the size distribution of the discards. The majority of discards (76%) were estimated to be in the 30-40 cm range. Of the total catch, 9% was below 33 cm, the US minimum legal size.

Ages 2-4 make up most of the **combined Canada/USA catch**, with very low catches of age 1 fish since 1995, following implementation of larger mesh in the cod end of US commercial trawl gear and yellowtail trip limits in the US scallop dredge fishery. The 2002 Canada/USA catch age composition was represented by the 2000 (age 2) and 1999 (age 3) year classes in equal proportions, but with age 2 dominant in Canadian catches, and age 3 in USA catches. Seasonal and geographic differences between Canadian and US fisheries may account for some of the difference in age composition observed in 2002. Most of the US fishery catches (83%) occurred during the first half of the year, while all of the Canadian catches occurred during the second half. While the Canadian fishery was well sampled in 2002, low sampling rates for the USA fishery and the continued lack of production aging for the Canadian fishery has reduced the reliability of the reconstruction of the catch and length at age in recent years.

State of Resource

An age structured analytical assessment (VPA) that used fishery catch statistics and sampling for size and age composition of the catch for 1973 to 2002 was examined. The VPA was calibrated to trends in abundance from three bottom trawl research surveys, NMFS spring, NMFS fall and DFO and a recruitment index from the NMFS scallop survey. Assessments for several other stocks have identified a persistent and marked directional discrepancy between past and current estimates of stock status (retrospective pattern). This stock assessment continues to display a retrospective pattern, which is larger in this assessment than in previous assessments. The state of the resource was based on survey observations and the range of results from the current benchmark assessment methods (VPA and production model).

Population biomass (ages 3+) during the early 1980s was about 10,000 t, due to recruitment of the strong 1974 and 1977 year-classes whose abundance was estimated at about 50 million. However, biomass declined rapidly in the mid 1980s as subsequent recruitment was poor and year-classes were fished intensely at a young age. The biomass has steadily increased from near an historical low of about 1,000 t in 1993 to about 26,000 t at the beginning of 2003. The recent increase has been due to more consistent and improved recruitment and was enhanced by lower exploitation and by reduced capture of small fish in the fisheries. The magnitude of the current biomass is considered uncertain because of the discrepancy between the recent estimates and those estimated last year (retrospective pattern). Similarly, the age 1+ VPA population biomass for 2003 (38,300 t) was at a lower level than predicted last year (58,000 t) and considerably lower than the total biomass estimated from the surplus production model (64,000 t). The trend in spawning stock biomass (SSB) is similar to the trend in ages 3+ population biomass. All three groundfish surveys indicated a decline in biomass since 2000, but were still at relatively high levels compared to mid 1990s. Despite these uncertainties, biomass has been generally increasing since the mid 1990s. (Figure 2)

Recruitment of the 2000 year-class was estimated by the VPA to be 48 million at age 1, the largest since 1980, but this recent estimate was considerably lower than the previous estimate of 62 million recruits for this year class. The previous assessment also indicated a strong 1997 year class of 59 million, which this assessment estimates as 28 million recruits. Current indications for the 2001 year class, estimated at 44 million recruits, indicate that it may be above average, although the trend of revising terminal year recruitment estimates down could change this perspective. Survey indices of abundance indicate that the 1997 and later year classes are generally stronger than any since the mid 1980s and comparable to those in the 1970s. (Figure 2)

Fishing mortality rate for fully recruited ages 4+ averaged 1.2 from 1973 to 1995, decreased to an average of 0.6 from 1996 to 2000, then declined to 0.5 and 0.2 in 2001 and 2002, the first time below the fishing mortality reference, F_{ref} = 0.25 (Figure 1). This contrasts with the 2002 assessment which estimated the exploitation rate to be below F_{ref} since 1999. Age 3 appeared to be partially recruited to the fishery in the late 1990s but was fully recruited in 2001 and 2002. The production model trend in fishing mortality was high and variable from 1973 to 1994, then decreased rapidly in 1995 and remained low through 2002. Surveys indicate that total mortality has been high and variable with no indication of a decline since 1995.

Harvest Reference Points

The established fishing mortality threshold reference, F_{ref} = 0.25, was maintained. The pattern of recruitment indicates that the chance of a strong year-class is significantly increased for mature biomass above about 8,000 t.

Other attributes like age structure and spatial distribution reflect possible fluctuations in the productive potential and can be used to qualify reference points and acceptable risk. In both absolute numbers and percent composition, the **population age structure** displays a recent expansion, reflecting improving recruitment and lower exploitation, particularly at age 2, since 1995. However, there is still an under-representation of the oldest age classes in both the catch and surveys that is inconsistent with the perception of low exploitation. The **spatial distribution** patterns observed during the most recent bottom trawl surveys were similar to the average patterns over the previous five years. Prior to the 1980s, the Georges Bank yellowtail fishery was dominated by fishing on the Southwest Part, but the portion of the population formerly occupying the Southwest Part has not reestablished.

Outlook

The outlook is more uncertain this year than in past years due to an increase in the retrospective pattern seen in the analytical assessment and divergence

between the analytical assessment and production model results. The increased uncertainty in current stock status and the divergence in model results as well as the failure to explain the absence of older fish in the catch gives no confidence in projection results. Considering the trends in survey abundance and recruitment, status quo catch may be an appropriate management approach until these issues are resolved. (Figures 3 and 4)

Special Considerations

Consistent management by Canada and the USA is required to ensure that conservation objectives are not compromised.

An industry study in Closed Area II during fall 2002 found high densities of yellowtail flounder and indicated seasonal dispersion within the closed area. A DFO tagging study indicated low frequency of movement out of the Closed Area II to the east across the international boundary.

A monitoring program was conducted in 2001-2002 to examine yellowtail flounder discards in the Canadian offshore scallop fishery. Estimates of Canadian discards were made for 2001 and 2002, but were not included in the assessment pending development of a complete historical series. Reliable estimation of discards requires an ongoing monitoring program.

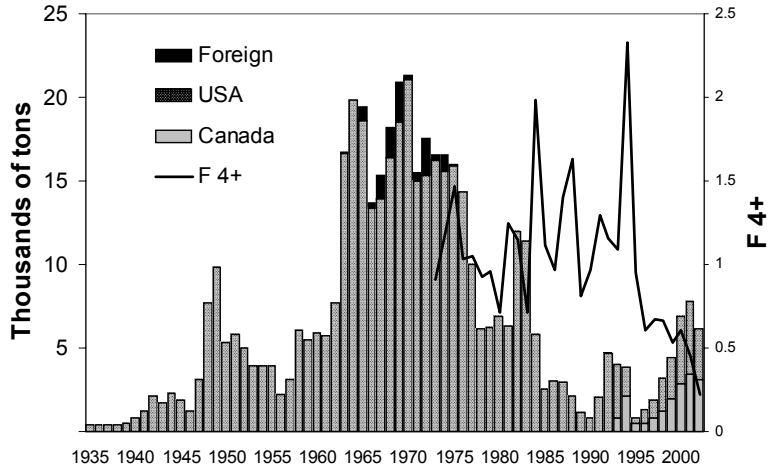


Figure 1. Catches and fishing mortality.

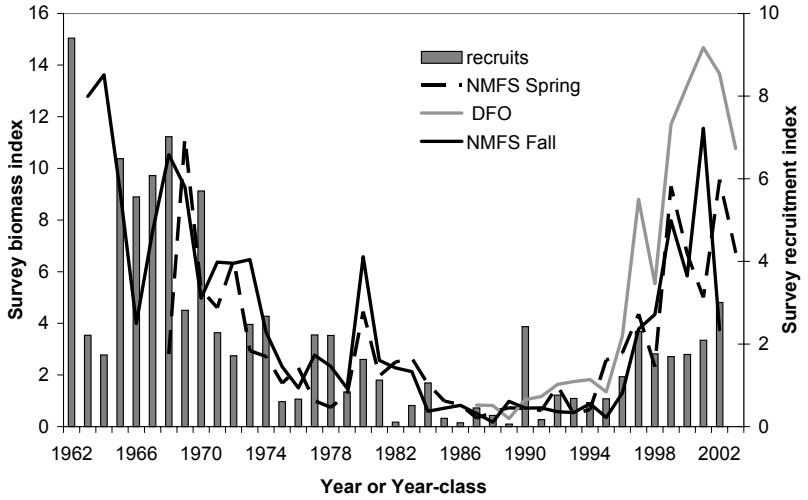


Figure 2. Biomass and recruitment indices.

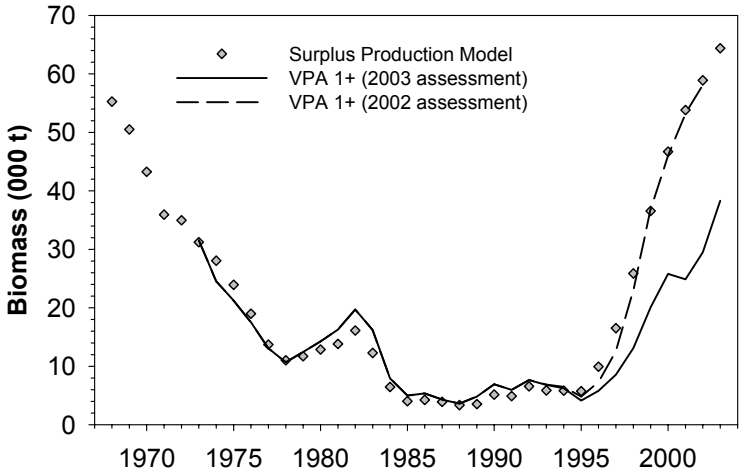


Figure 3. Divergence in model biomass estimates.

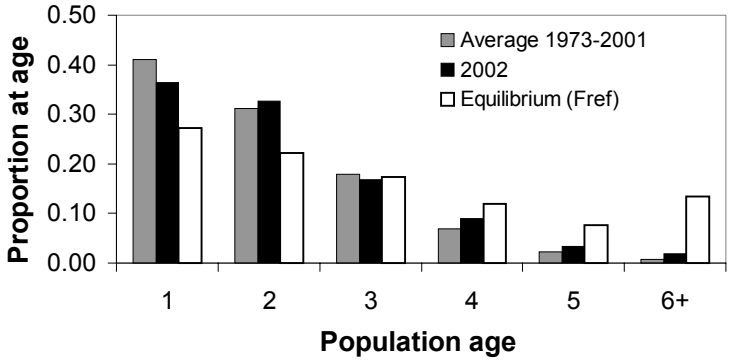


Figure 4. Estimated population age structure.