

Sablefish

Background

Sablefish (*Anoplopoma fimbria*), often referred to as Blackcod, inhabit shelf and slope water to depths greater than 1500 m, from central Baja California to Japan and the Bering Sea. Although genetic studies suggest a single population throughout their range, movement of adults is limited enough to allow assessment and management on a smaller scale. Differing patterns in recruitment and growth indicate the presence of northern and southern stocks in the British Columbia waters. The U.S. National Marine Fisheries Service carries out assessments of U.S. stocks.

Spawning occurs from January to March along the continental shelf at depths greater than 1000 m. Larval sablefish are found in surface waters over the shelf and slope in April and May. Juveniles migrate inshore over the following six months and rear in nearshore and shelf habitats until age 2-5, when they migrate offshore and recruit into the fishery. Juveniles are highly migratory, travelling from nursery areas in Hecate Strait to Alaska. Growth is rapid, with mature females reaching an average length of 55 cm, and a maximum of 80 cm, in 3 to 5 years. The oldest fish aged to date is 113 years. Age, growth and maturity parameters vary considerably among areas and depths. Recruitment rates also vary, with infrequent occurrence of very large year classes interspersed with moderate to low year classes.

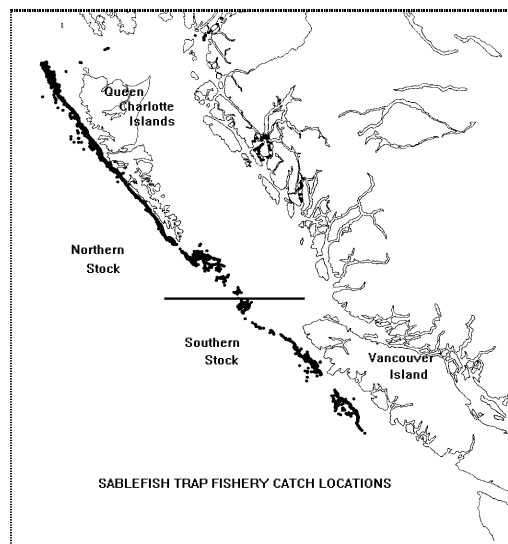


Figure 1: Sablefish trap fishery catch locations.

Summary

- The results of the tagging analysis and the survey and commercial catch rate time series suggest contradictory views of sablefish stock status:
 - The updated tagging analysis shows a steep decline in abundance during the 1990 to 1994 period, but exhibits relative stability from 1995 to 2001, with no obvious trend or outliers, and indicates a biomass of about 37,000 t with an exploitation rate of 0.1 in 2001.
 - The survey catch rate time series suggests a similar decline in abundance from 1990 to 1994. A period of stability or slow decline occurs through the mid-1990s until the influence of the 2001 survey suggests a resumption of declining abundance. This reassessment of the survey time series from the mid-1990s heightens concerns that the stock has declined over the period previously thought to be stable.
 - Commercial catch rates showed trends similar to those observed in the survey data,

with very low levels in 2001 for some regions. However, interpretation of the trends in the commercial CPUE is complicated by the adoption of escape rings in trap gear in 1998 and the variable baiting practices over time reported by fishers.

- The available data provide no clear indication of which view of stock status should be chosen. The decline in survey catch rates could be explained by factors other than a stock decline. Similarly, the tagging analysis might possess a time-dependent bias that masks a decline in abundance or may be vulnerable due to known failures of the model assumptions.
- The contradictory indicators of stock status suggest that the range in recommended yield be 2,100 t to 4,000 t. The 2,100 t is considered overly pessimistic but reflects concerns that survey data indicates a stock decline. The upper range of 4,000 t is considered overly optimistic given the new assessment. Thus, to reduce downside risk to the B.C. sablefish population a substantial reduction of the 4,000 t quota is required for the 2001/2002 and the 2002/2003 fishery.

The Fishery

Average Canadian Landings (t)

1960-69	1970-79	1980-89	1990-99	2000-01
1316	5124	4456	4617	3683

Sablefish have a long history of exploitation with the first recorded landings in 1913. Foreign fishing was conducted from 1961 to 1981 and phased out after the declaration of the 200-mile fishery conservation zone in 1977.

The directed sablefish fishery is regulated under a "K" tab license that permits longline traps or hooks to be deployed. The fishery has operated under an Individual Transferable Quota (ITQ) system since 1990. Approximately 8 percent of the total allowable catch (TAC) is allocated to the trawl fishery as bycatch. Sablefish are primarily caught using longline Korean traps, with about 11 percent of the total catch fished using longline hooks in recent years. Most trap fishing effort occurs between about 450 m and 825 m.

The sablefish fishery continues to be one of the most important in B.C., with an estimated value of CAN \$29 million from a TAC of 4,000 t in 2000. The

majority of the produce is headed, gutted and frozen at sea for export to Japanese markets. Research, management and enforcement costs are recovered from the fishery under the auspices of a Joint Project Agreement between Fisheries and Oceans Canada and the Canadian Sablefish Association.

Resource Status

Data sources include catch from longline, trawl, and trap fisheries, release and recovery data from tagging programs conducted in 1991-2001 and survey index data in 1990-2001. Stock abundance and harvest rate are estimated from tag recovery data. The estimated abundance in 2001 was approximately 37,000 t with a harvest rate of 10%. These estimates are believed to apply to the vulnerable adult biomass because data included in the analysis are derived from tags applied in the core fishing area. Following a steep decline in the 1990 to 1994 period, estimates of abundance and exploitation rate have been low and stable since the mid-1990s.

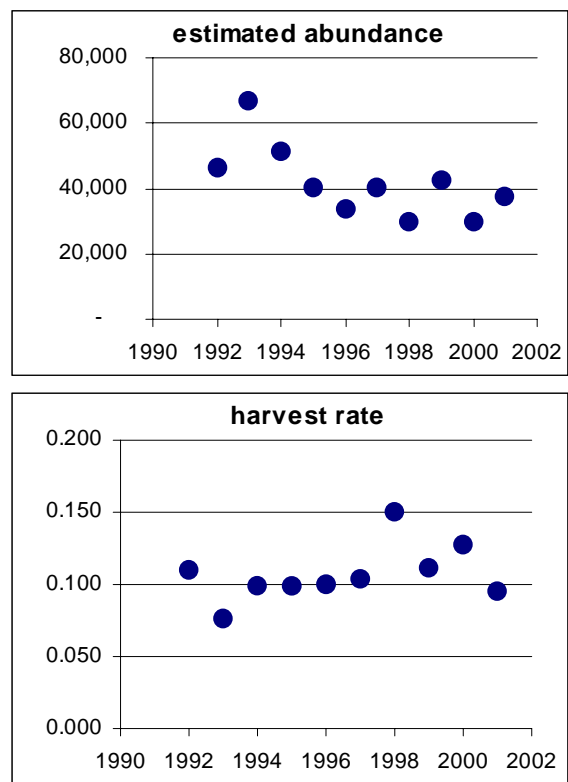


Figure 2: Implied abundance trends and total harvest rate.

A contradictory view of stock status is provided by a standardized sablefish survey. The survey catch rate time series suggests decline in abundance from 1990 to 1994 similar to that computed from tag recoveries.

A period of stability or slow decline occurred through the mid-1990s until the influence of the 2001 survey suggests an accelerated decline in abundance. The decline is present in most survey localities and at most depth strata surveyed. This reassessment of the trend in the survey time series from the mid-1990s heightens concerns that the stock has declined over the period previously thought to be stable.

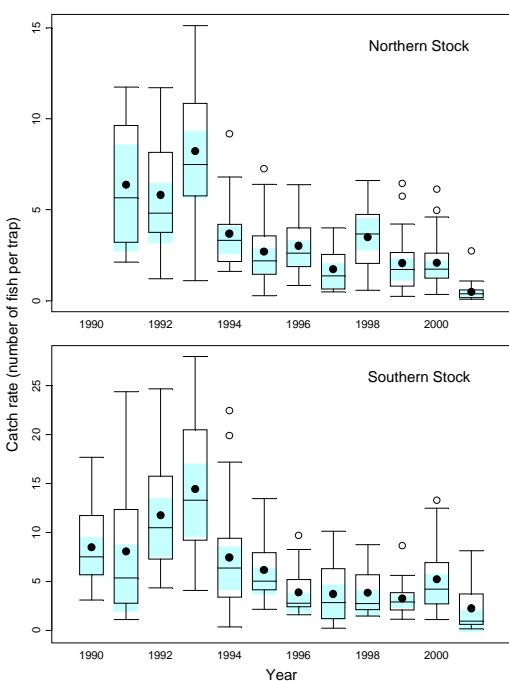


Figure 3: Distribution of sablefish survey catch rates (number of fish per trap) for each set by year and stock. Boxplots show the distribution of catch rates observed on each set. The filled circles show the mean annual catch rate. The lightly shaded rectangle indicates an approximate 95 percent confidence interval on the median annual catch rate.

Unresolved problems in the reliability of sablefish ageing have postponed the accumulation of catch at age information since 1996. The lack of recent ageing data, and unsuitability of length-based methods for sablefish, precludes stock projections. Investigation of improved ageing methodology is ongoing.

Outlook

The lack of recent ageing data means that no population dynamics model is available for sablefish assessment and therefore stock projections have not been conducted. Recruitment during the 1990s was regarded as below average in B.C., and for U.S. stocks in the eastern Gulf of Alaska and off the

southern U.S. coast north of Point Conception. Studies of juvenile catch rates in the sablefish inlets survey and Hecate Strait assemblage survey, along with anecdotal reports from sablefish and trawl fishers suggest that 1998-99 may yield successful year classes. However, the relative contribution of these year classes will not be evident until recruitment to the fishery about 2004 or 2005.

This assessment represents a more pessimistic view of the sablefish resource compared to the November 2001 assessment. The contradictory indicators of stock status suggest that the range in recommended yield be 2,100 t to 4,000 t. The 2,100 t is considered overly pessimistic but reflects concerns that survey data indicates a stock decline. The upper range of 4,000 t is considered overly optimistic given the new assessment. Thus, to reduce downside risk to the B.C. sablefish population a substantial reduction of the 4,000 t quota is required for the 2001/2002 and the 2002/2003 fishery.

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