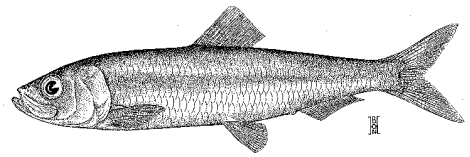
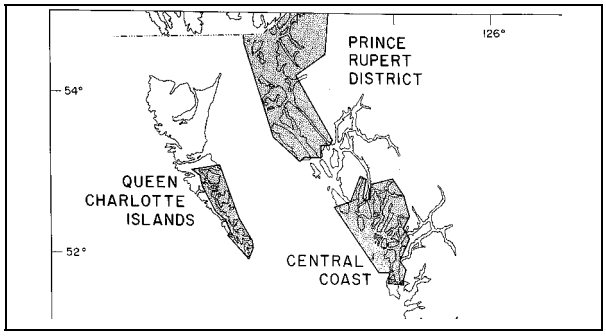


Queen Charlotte Islands Herring



Background

Pacific herring is a pelagic species which occurs in inshore and offshore waters of the North Pacific. In the eastern Pacific it ranges from California to the Beaufort Sea. Herring mature and recruit to the spawning stock predominantly between ages 2 and 5. Within this range, age-at-recruitment tends to increase with latitude. The Queen Charlotte Islands (QCI) herring stock is one of five major B.C. herring stocks. Catches were first reported from this area in 1937. Because of its remote location, QCI herring were fished intermittently until the early 1950s. This stock declined as part of the coastwide collapse from overfishing in the early 1960s, and the commercial reduction fishery was closed in 1967. Following a combination of favourable environmental conditions and a low harvest rate, the stock recovered by the mid-1970s. The current roe fishery began in 1972. The target harvest rate of roe herring is fixed at 20% of the forecast mature stock biomass, when the stock size is sufficiently above the threshold or minimum spawning stock biomass (Cutoff). The 1977 year-class was the largest in the last 40 years and supported the fishery until the late 1980s. Since then, recruitment has been generally poor and the stock has declined. Because of conservation concerns, the commercial roe herring fishery was closed from 1994 to 1996 and in 2001. A small aboriginal food fishery, and a limited spawn-on-kelp fishery were permitted in 1997 and 2001. In 1998 and 1999, small roe fisheries were carried out while the stock continued to rebuild. However, the most recent assessment indicates that the mature herring biomass is below the fishing threshold (10,700 t), and will not sustain a fishery in 2003. Recent concerns about declining size at age have moderated with larger fish returning in most areas in 2002.

Summary

- The fishery is managed by setting a fixed quota based on a harvest rate of 20% of the forecast mature stock biomass.
- To meet conservation objectives, the management strategy also enforces a minimum spawning stock biomass. If the forecast biomass falls below the fishing Cutoff threshold (10,700 t), the commercial fishery is closed to allow for stock recovery.
- For the current assessment a revised catch-at-age model was adopted as the best predictor of stock abundance.
- Assuming an average recruitment of the 2000 year-class in 2003 a forecast mature biomass of about 7,200 tonnes is anticipated with no harvestable surplus based on the 10,700 t cutoff threshold.

Canada

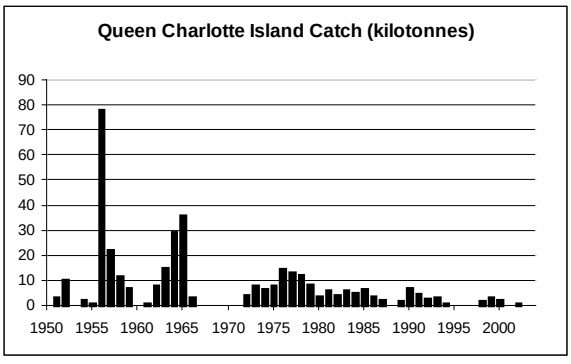
The Fishery

Average QCI Catch (ktonnes)

1951-60	1961-70	1971-80	1981-90	1991-00*
13.2	9.0	7.5	4.1	3.4

*No fishery 1994 – 97

All herring spawning from Cumshewa Inlet in the north to Louscoone Inlet in the south are assumed to be part of a single Queen Charlotte Islands stock that migrates inshore in the late fall and leaves, after spawning, in late March and early April. From the mid-1940s until the late 1960s, these herring were harvested and processed (reduced) into relatively low value products such as fishmeal and oil. The largest catch, 77,500 tonnes, was taken in the QCI in 1956. The fishery was closed in 1953 and 1958 due to industrial disputes. Catches increased dramatically and by the late 1950s were unsustainable. Although the stock was not fished commercially in 1960, by 1965, most of the older fish had been removed from the spawning population by a combination of overfishing, and a sequence of weak year-classes (1954 to 1957), attributed to unfavourable environmental conditions and a low spawning biomass. As a result, the commercial fishery collapsed, and was closed by the federal government in 1967 to rebuild the stock.



Following the closure, a series of above average year-classes occurred in the early 1970s rebuilding the stock quickly and providing opportunities for a new fishery. During the closure, the small traditional fisheries continued locally for food and bait (Hourston 1980). At this time there was a growing interest to harvest roe herring for export to Japan as their stocks became decimated. A small experimental roe harvest began in 1971, and expanded rapidly until 1983, when fixed quotas were introduced to regulate the catch. A significant quantity of QCI herring is also utilized for spawn-on-kelp, and aboriginal food fish.

The objective of the current herring fishery is to obtain a low volume, high-quality product that is economically profitable and ecologically sustainable. The fishery is managed by setting a fixed quota based on a harvest rate of 20% of the forecast mature stock biomass. To meet conservation objectives, the management strategy also enforces a minimum spawning stock biomass. If the forecast biomass falls below the fishing Cutoff threshold (10,700 t), the commercial fishery is closed to allow for stock recovery. Low stock levels caused the QCI roe fishery to be closed in 1988. In 1994 and 2001, the forecast run was close to the Cutoff, so fishing was restricted to aboriginal food fish and commercial spawn on kelp while in 1995 and 1996, only food fishing was permitted. Abundance rebounded in 1997 but a cautious approach was taken to resuming harvest of the stock and only a limited spawn-on-kelp fishery was permitted, while 1998 to 2000, and 2002 saw small roe fisheries take place. An average catch of 1,430 t has occurred

over the past decade[1]. Recent catches from this stock have been:

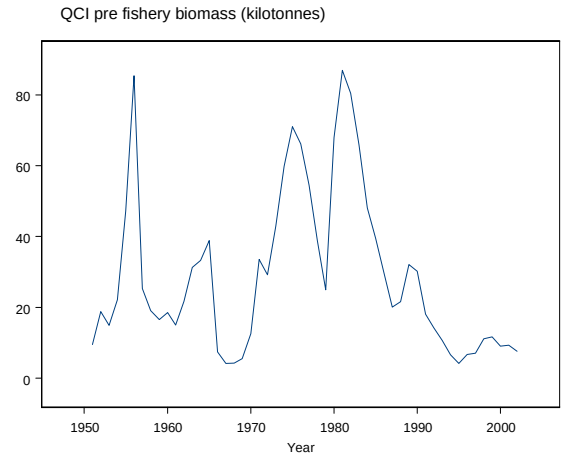
QCI Catch (thousands of tonnes)

1998	1999	2000	2001	2002
1.5	3.0	1.8	0.0	0.7

Resource Status

Herring stock assessments utilize information from biological samples for determining the population age composition and average weight-at-age, historical catch data, and an assessment of the distribution and intensity of egg deposition in the stock assessment area (Schweigert 2001). Prior to the 2002 assessment, the forecast of the pre-fishery biomass of mature herring was estimated by two assessment models: a catch-at-age and an escapement model. For the current assessment a revised catch-at-age model with two spawn conversion parameters (RASM-2q) was adopted as the best predictor of stock abundance (Schweigert 2001).

The Pelagics Assessment Subcommittee annually reviews decision criteria to provide advice on a recommended allowable catch. The RASM-2q models indicates that the QCI herring stock continues to decrease slightly in 2002 and remains at reduced levels relative to the 1970s. Historically, the 1977 year-class was exceptional. It produced the largest recruitment to the QCI stock in the last 40 years. The 1951 year-class was also very strong. However, since 1980, eleven of the last 22 year-classes have been of below average strength. Recently, three year-



classes, 1993-95, have been average or stronger resulting in the rapid recovery of stock abundance following the commercial fishery closure from 1994-1997. Recent trends show that the QCI herring stock declined from 1990 to 1995, has increased through 1999 and has decreased in subsequent years. Assuming an average recruitment of the 2000 year-class in 2003 a forecast mature biomass of about 7,200 tonnes is anticipated with no harvestable surplus based on the 10,700 t cutoff threshold.

Outlook

Since very little is known about the factors that affect recruitment in this stock, it is difficult to forecast future stock trends. The strong 1995 year-class is rapidly declining in abundance as it ages and the average 1997 and 1999 year-classes may not maintain the current level and offer little opportunity for increase in abundance of this stock in the short term.

Climatic Factors

Various studies have suggested that herring recruitment is determined by variations in the size of the parent stock, and environmental conditions during the

[1] Excluding years where commercial fisheries were closed.

first year of life. Recruitment variability in the QCI stock has been correlated with March Sea Surface Salinities and sea levels in the stock area during the year of birth (Schweigert and Noakes 1991). Although there is a risk that these correlations might be spurious (i.e. not meaningful), they could have a biological basis. For example, variations in surface salinity and sea level reflect differences in wind induced upwelling and mixing, freshwater runoff and nutrient supply. These factors could directly affect the planktonic food supply of the young herring, and indirectly alter juvenile herring losses to predators. Research on these factors is being pursued.

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