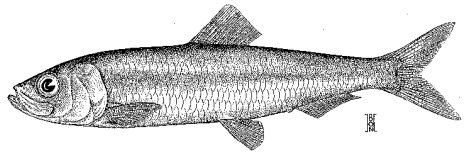
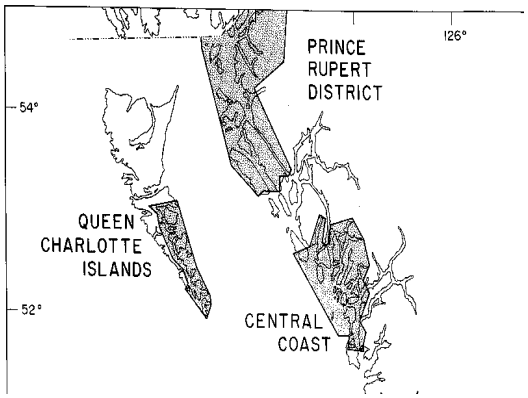
Fisheries and Oceans / Pêches et Océans
Pacific Region

DFO Science
Stock Status Report B6-01



Prince Rupert District Herring



Background

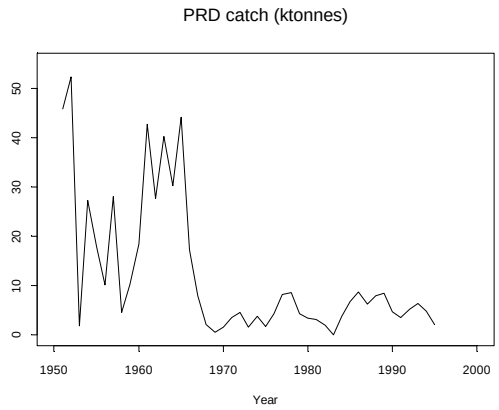
Pacific herring is a pelagic species which occurs in inshore and offshore waters of the North Pacific. In the eastern Pacific it ranges from California to the Beaufort Sea. Herring mature and recruit to the spawning stock predominantly between ages 2 and 5. Within this range, recruitment tends to occur at younger ages in southern waters, and older ages in the north. The Prince Rupert District (PRD) or north coast herring stock is one of five major B.C. herring stocks. The fishery began here at the turn of the century but did not become extensive until the expansion of the dry-salted fishery in the mid-1930s and reduction fishery in the 1940s. 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. The stock achieved recent high abundance levels in the late 1980s but has subsequently declined. Recent assessments indicate that the mature herring biomass is well above the stock conservation reference point (12,100 t), and should continue to sustain a modest fishery.

The Fishery

Average PRD Catch (ktonnes)

1951-60	1961-70	1971-80	1981-90
21.6	21.5	4.4	5.2

From the mid-1940s until the late 1960s, herring were harvested and processed (reduced) into relatively low value products such as fish meal and oil. The largest catch was taken in PRD in 1952 and the fishery was closed in 1953 and 1958 due to industrial disputes. Catches increased dramatically in the early 1960s but were unsustainable. 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, attributed to unfavourable environmental conditions and a low spawning biomass. As a result, the commercial fishery collapsed in 1967, and was closed by the federal government 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 PRD district 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 Cutoff threshold (12,100t) the commercial fishery is closed to allow for stock recovery. In response to reduced stock levels the PRD fishery was closed in 1983. Subsequently, the stock has rebuilt and sustained an average catch of 5,900 t. Recent catches from this stock have been:

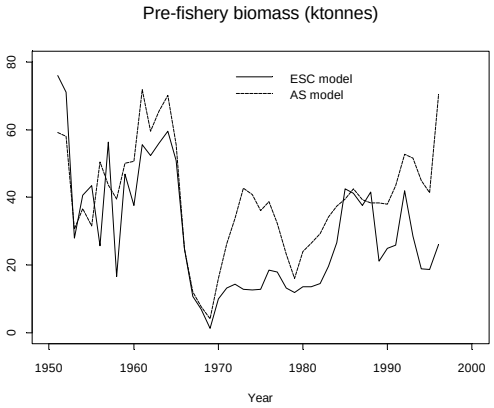
PRD Catch (thousands of tonnes)

1992	1993	1994	1995	1996
6.0	7.2	5.5	3.0	3.9

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 et al. 1996). The forecast of the pre-fishery biomass of mature herring is estimated by two assessment models: a catch-at-age and an escapement model. The catch-at-age model relies on data on population age-structure and total catch to estimate stock abundance while the escapement model determines total spawning escapement from an estimate of the total egg deposition.

Since 1970 the two assessment models have displayed very different estimates of stock abundance although the trends have remained consistant. At present, estimates of stock abundance based on the age-structured model are felt to be unrealistically high for this stock and are not used in the assessment of stock status or forecasts of future yield. It appears that estimates of age-structure have not been collected consistantly from the same locations which may have biased estimates of abundance from the age-structured model. This possibility is currently under investigation.



This stock experienced high levels of recruitment during the 1950s and early 1960s and reduced recruitment during the late 1960s and early 1970s. The fishery was closed in this area in 1983 due to low abundance levels. The stock has subsequently rebuilt to moderate levels in the late 1980s due to strong 1981, 1984, 1988, and 1989 year-classes. Recent weaker year-classes resulted in a decline in stock size from 1992 through 1995. The 1993 year-class which recruited in 1996 appears to be above average and should lead to increased stock levels in the short term.

Outlook

Since very little is known about the factors that affect recruitment, it is difficult to forecast future stock trends. However, the recent history of recruitment to the stock has indicated a good year-class occurring about every fourth year, a pattern similar to southeastern Alaska. If this pattern continues it will result in increased stock stability and resource levels that should sustain current levels of harvest.

For more information contact:

Contact: Jake Schweigert
Pacific Biological Station
Nanaimo, B.C.
V9R 5K6
Tel: (250) 756-7203
Fax: (250) 756-7138
E-Mail: schweigertj@pbs.dfo.ca

References

Hourston, A.S. 1980. The decline and recovery of Canada's Pacific herring stocks. Rapp. P.-v. Reun. Cons. Int. Explor. Mer, 177: 143-153.

Schweigert, J.F., C. Fort, and L. Hamer. 1996. Stock assessments for British Columbia herring in 1995 and forecasts of the potential catch in 1996. Can. Tech. Rep. Fish. Aquat. Sci. 2098: 66p.

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Stock Assessment Division
Pacific Region
Pacific Biological Station
Nanaimo, BC V9R 5K6
Phone number: (250) 756-7216
e-mail: ROYC@PBS.DFO.CA