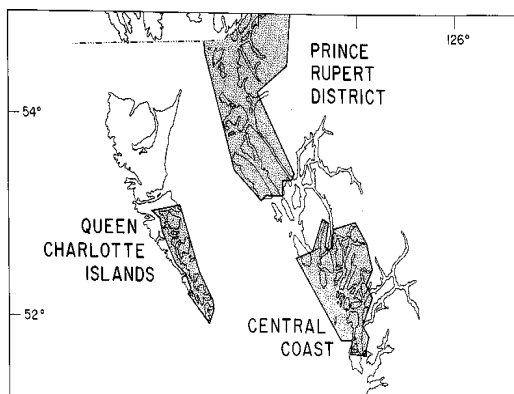


Prince Rupert District Herring



Background

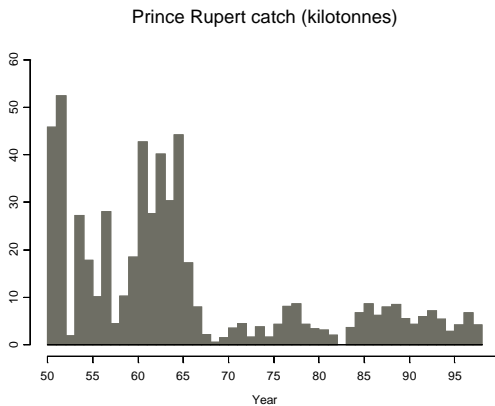
Pacific herring is a pelagic species which occurs in inshore and offshore waters of the North Pacific. In the eastern Pacific it ranges from California to the Beaufort Sea. Herring mature and recruit to the spawning stock predominantly between ages two and five. Within this range, recruitment tends to occur at younger ages in southern waters, and older ages in the north. The Prince Rupert District (PRD) 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 a 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 percent of the forecast mature stock biomass, when the stock size is sufficiently above the threshold or minimum spawning stock biomass (Cutoff). The stock achieved recent high abundance levels in the late 1980s but has subsequently declined. Recent assessments indicate that the mature herring biomass remains well above the stock conservation reference point (12,100 t), and should continue to sustain a modest fishery. However, there are concerns about the ability to harvest fish with gillnets given the declining size at age.

The Fishery

Average PRD Catch (kilotonnes)

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

All herring spawning within Statistical Areas 3 to 5 are assumed to belong to the Prince Rupert stock that migrates inshore from Hecate Strait in the late fall and leaves after spawning, in late March and April. From the mid-1940s until the late 1960s, these herring were harvested and processed (reduced) into relatively low value products such as fish meal and oil. The largest catch was taken in the 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 percent 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 (12,100 t) 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 4,700 t over the past decade. Recent catches from this stock have been:

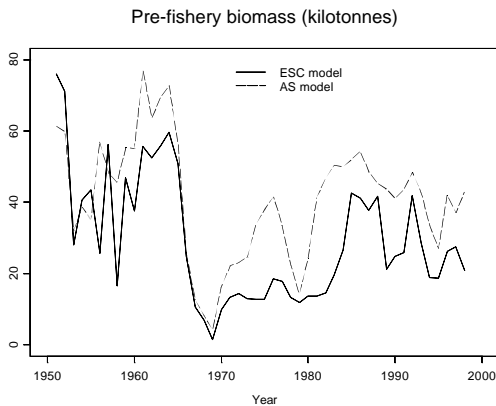
PRD Catch (thousands of tonnes)

1994	1995	1996	1997	1998
4.7	2.1	3.1	5.5	3.2

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. 1998). 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 consistent. Recent reviews of the input data have improved the correspondence between the two models. However, estimates of stock abundance based on the age-structured model are still 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 consistently from the same locations, which may have biased estimates of abundance from the age-structured model.



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 the present. The 1993 year-class which recruited in 1996 appears to be above average while the recent 1994 and 1995 year-classes are average and should result in stable stock levels in the short term. An average recruitment in 1999 should result in a run of about 24,000 tonnes and a harvestable surplus of 4,884 tonnes based on the 20 percent target harvest rate.

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 that in southeastern Alaska. If this pattern continues it will result in increased stock stability and resource levels that should sustain current levels of harvest.

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This report is available from:

PSARC Secretariat
Pacific Biological Station
Nanaimo, B.C. V9R 5K6

ISSN 1480-4913 (for English series)
ISSN 1480-4921 (for French series)

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