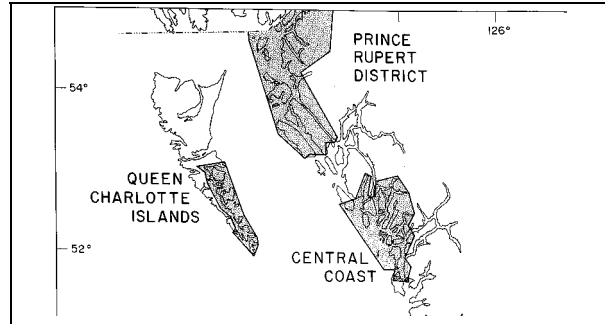


## Prince Rupert Herring

### 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 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 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, 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 fishing threshold (12,100 t), and should continue to sustain a modest fishery. 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 (12,100 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 31,660 tonnes is anticipated yielding a harvestable surplus of 6,330 tonnes.

## The Fishery

### Average PRD Catch (ktonnes)

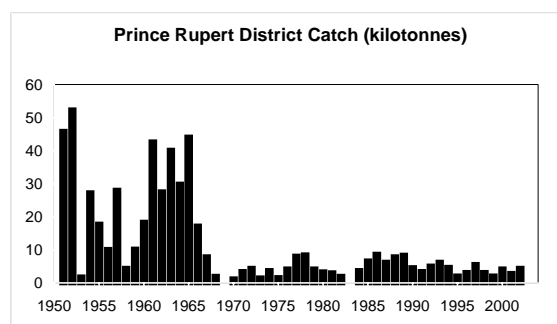
1951-60	1961-70	1971-80	1981-90	1991-00
21.6	21.5	4.4	5.2	4.1

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 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 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, 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 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 fishery 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 3,910 t over the past decade. Recent catches from this stock have been:

### PRD Catch (thousands of tonnes)

1998	1999	2000	2001	2002
3.2	2.1	4.3	2.9	4.5

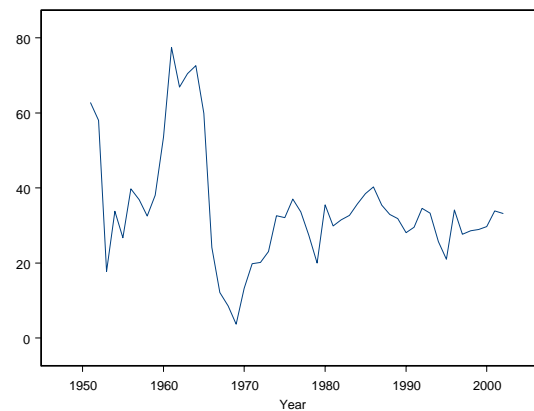
## Resource Status

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 model indicates that the PRD herring stock decreased slightly in 2002 and remains near an average level since 1980. 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 1993 to 1995 and an increase in subsequent years, with the exception of a slight decrease in 1997. The recruiting 1998 year-class was good and should result in a stable or slightly increasing stock size.

PRD pre fishery biomass (kilotonnes)



Assuming an average recruitment of the 2000 year-class in 2003, a forecast mature biomass of about 31,660 tonnes is anticipated yielding a harvestable surplus of 6,330 tonnes based on the 20% target harvest rate.

### **Outlook**

Since very little is known about the factors that affect recruitment in this stock, 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. The 1997 and 1999 year-classes were average and the 1998 year-class above average, which should maintain the stock at healthy levels for the next few years.

***For more Information***

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This report is available from the:

PSARC Secretariat  
Pacific Biological Station  
Nanaimo, B.C. V9T 6N7

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

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***Correct citation for this publication***

DFO, 2002. Prince Rupert Herring. DFO Science Stock Status Report B6-01(2002).