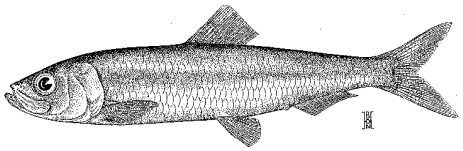
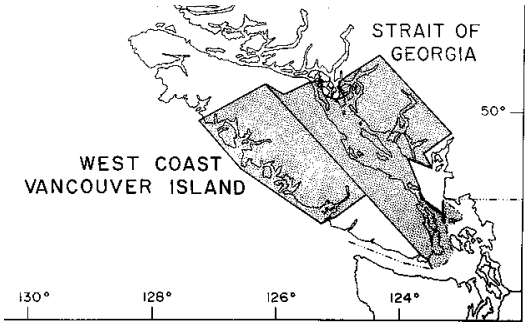


Strait of Georgia Herring



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, age-at-recruitment tends to increase with latitude.

The Strait of Georgia herring stock is one of five major B.C. herring stocks. It has been fished since 1887. Catches increased from 500 tonnes (t) in 1900 to about 35,000 t in 1927, due to the expansion of the Oriental market for dry-salted herring. The annual catch dropped between 1927 and 1935 due to market loss. The reduction fishery was established in 1924 and catches increased to a maximum of 77,000 t in 1964. The stock collapsed from overfishing 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 for the herring resource is fixed at 20 percent of the forecast mature stock biomass, when stock size is above the threshold or minimum spawning stock biomass (Cutoff). The stock achieved recent high abundance levels in the late 1970s, declined until the mid-1980s, and is now near peak levels. The 1998 assessment projects that the mature herring biomass will be about 78,900 t in 1999 in the Strait of Georgia.

The Fishery

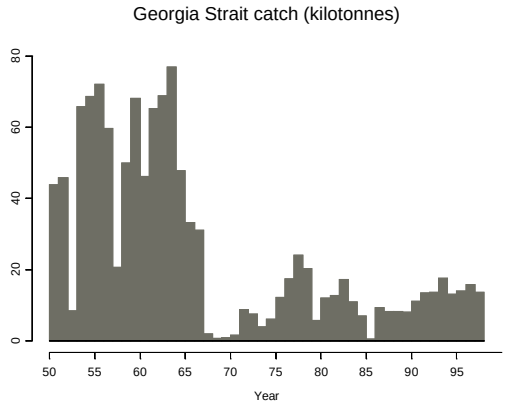
Average Strait of Georgia catch (ktonnes)

1951-60	1961-70	1971-80	1981-90
49.5	37.3	20.8	9.5

All herring spawning within the Strait are assumed to belong to a single stock that migrate into the Strait in the late fall and leave, after spawning, in March and April. Many areas in the Strait retain some resident or non-migratory herring throughout the summer but the distribution and abundance of non-migratory fish changes among years. For stock assessment purposes, these fish are considered as part of the Strait herring stock. From the late-1930s until the late-1960s, herring were harvested widely within the Strait and processed (reduced) into relatively low value products such as fish meal and oil. Commercial harvest rates increased progressively and were unsustainable by the early 1960s. By 1965, most of the older fish had been removed from the spawning population by a combination of overfishing and a sequence of poor recruitments, attributed to unfavourable environmental conditions and a low spawning biomass.

Consequently, the commercial fishery collapsed in 1967, and was closed by the federal government to allow the stock to recover.

After a four year closure and a fortuitous return of favourable environmental conditions, the stock rebuilt enough to sustain a new fishery beginning in 1972. There was a growing interest to harvest roe herring for export to Japan. A small experimental roe harvest began in 1972, and the fishery expanded until 1983, when fixed quotas were introduced to regulate the catch. The roe fishery is localized within the Strait and concentrates on the large bodies of fish in the major spawning locations. The Strait of Georgia stock also supports small food and bait and charity fisheries, and fisheries for zoo and aquarium food. The objective of the roe herring fishery is to obtain a low volume, high-quality product that is economically profitable and ecologically sustainable.



The fishery is currently managed by setting a fixed target 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 (21,200 t), the commercial fishery is closed until the stock rebuilds (Stocker 1993). In response to reduced stock levels, the Strait of Georgia fishery was closed in 1986. Since then the stock rebuilt to a recent high abundance in 1992-93 and has sustained an average catch of 12,900 t over the past decade. Recent catch levels for this stock have been:

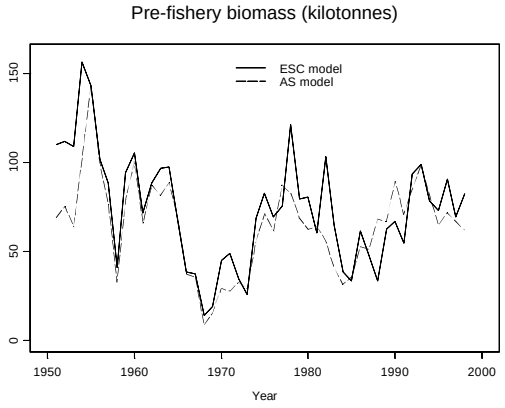
Strait of Georgia Catch (kilotonnes)

1994	1995	1996	1997	1998
17.6	13.2	14.1	15.8	13.6

Resource Status

Herring stock assessments are based on biological samples of the population age composition, historical catch data, average weight-at-age, and assessments of spawn distribution and intensity in the stock assessment area.

The fishable stock biomass is estimated by two models: an age-structured model and an escapement model (Schweigert et al. 1998). The latter relies predominantly on estimates of the number of eggs spawned. The average of the estimates for both models is used to determine the current stock level, project future run size, and recommend an allowable catch. Due to some uncertainty in the age-structured model performance, the forecast for 1999 is based solely on the escapement model.



The stock remains near historical high abundance levels, with an estimated 1998 run size of 82,000 t. The forecast pre-fishery

biomass for 1999 is based entirely on the escapement model estimate and is anticipated to be about 78,900 t, assuming that recruitment will be near the historical average. Based on the 20 percent target harvest rate this results in a potential harvestable surplus of 15,780 t.

Outlook

The Strait of Georgia stock has enjoyed a series of strong recruitments throughout the 1980s and early 1990s, which have increased the abundance to near historically high levels. Given the current large biomass, the stock should continue to support moderate fisheries over the next several years.

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