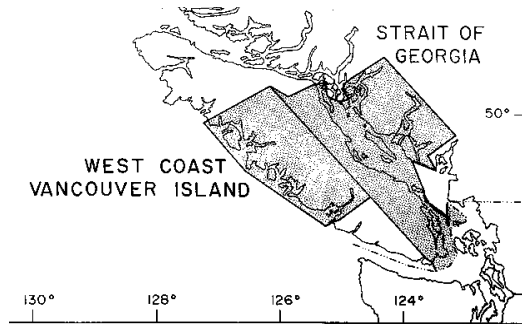


Strait of Georgia Herring



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 2 and 5. 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 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 1968. 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% 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 1996 assessment projects that the mature herring biomass will be about 77,000 t in the coming season.

The Fishery

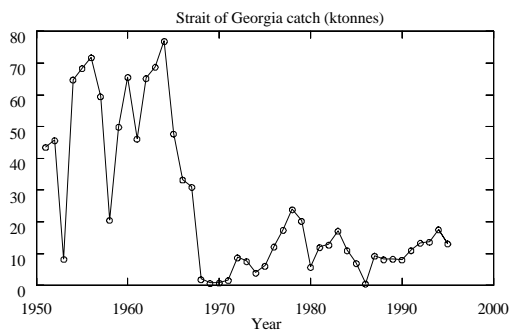
Average Strait of Georgia catch (ktonnes)

1951-60	1961-70	1971-80	1981-90
49.5	37.3	10.8	9.5

From the late 1930s until the late 1960s, most herring were harvested 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 weak year-classes, 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 Strait of Georgia 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% 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 10,400 t over the past decade. Recent catch levels for this stock have been:

Strait of Georgia Catch (ktonnes)

1992	1993	1994	1995	1996
13.4	13.7	17.6	13.2	14.0

Climatic Factors

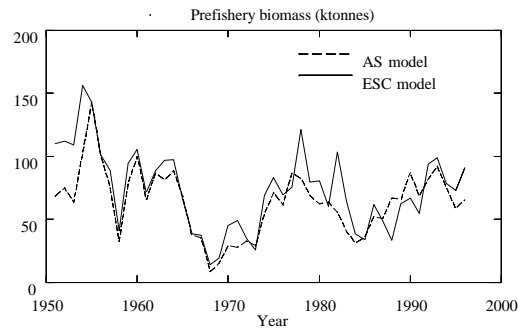
Several studies have examined the influence of climatic variation on recruitment of Strait

of Georgia herring. Stocker et al. (1985) found there was a dome-shaped relationship between temperature and spawning success with an optimal temperature during larval stages resulting in maximum production of recruits. Increased spawning success was associated with increased river discharge. They also found that recruitment was density-dependent; it was low at higher spawner biomass. Schweigert and Noakes (1991) tested several models developed to forecast recruitment. They also found that spawner abundance and salinity appear to affect recruitment. Juvenile surveys began recently. The purpose was to determine if abundance at some time in the first year of life could forecast recruitment. Preliminary results are encouraging.

Resource Status

Herring stock assessments are based on biological samples of the population age composition, average weight-at-age, historical catch data, and assessments of spawn distribution and intensity in the stock assessment area (Schweigert et al. 1996).

The fishable stock biomass is estimated by two models: an age-structured model and an escapement model. The latter relies predominantly on spawn estimates. The average of the estimates for both models is used to determine the current stock level, project future run size, and forecast an allowable catch.



Recent trends show that the Strait of Georgia herring stock had an average pre-fishery biomass of 80,700 t over the last five years. The forecast pre-fishery biomass for 1997 is about 77,000 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 be able to sustain a moderate fishery over the next few years.

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