

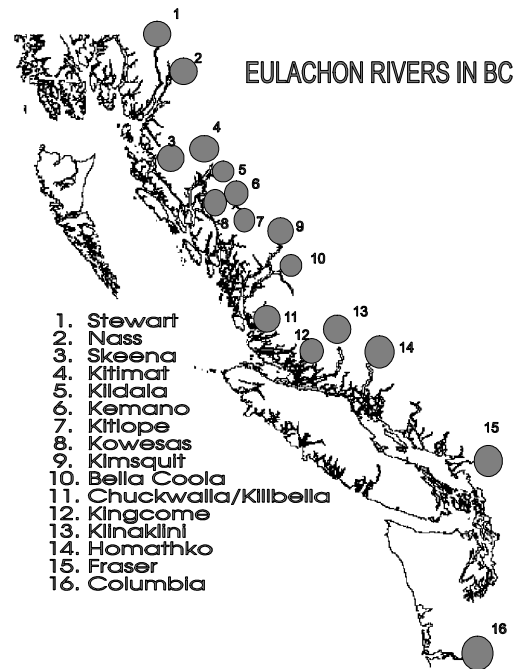
Eulachon

Background

Eulachons (Thaleichthys pacificus) are small anadromous fish that occur from the southern Bering Sea to northern California. Within their range, eulachons spawn only in 30 to 40 rivers, about 15 of them in B.C. All known spawning rivers experience increased spring runoffs, known as freshets, and most drain snowpacks or glaciers. On rare occasions, eulachons spawn in other rivers, such as the Somass on Vancouver Island.

Eulachon spawning is limited to the lower reaches of rivers and often is accompanied by spectacular throngs of predatory sea lions and birds. Their small adhesive eggs, about 30,000 per female, attach themselves to sand or pebbles and hatch in 3 to 5 weeks at ambient temperatures, usually between 3 and 10°C. Spawning begins in early March in most British Columbia rivers, such as the Skeena and Nass, but it begins later, in April and May, in the Fraser. Once hatched, larvae are rapidly flushed to marine waters. Eulachons live in the sea for the next 2 to 5 years before maturing. Large post-spawning mortalities occur and most eulachons probably die after spawning. Adults reach a length of between 15 and 20 cm and weigh between 40 and 60 grams.

Eulachons are an extremely important food source to many First Nations on the Pacific coast and are a significant part of the cultural heritage for some communities. They also support small commercial and First Nation fisheries on the Fraser and small First Nation fisheries on some smaller rivers. Although eulachons were once plentiful in most spawning rivers, their abundance has declined sharply in recent years.



The Fishery

All fishing is done on spawning runs. At peak run times, spawning eulachons can be dipped from rivers with small nets. They also can be taken with seines and gillnets.

The eulachon is unique for its high oil content. First Nations use eulachon oil, called “grease,” as a food supplement, like butter. Grease is produced and refined according to tradition and traded widely throughout the coast. In some communities it was known as the “salvation fish” because it was the first fish species to arrive after the winter. For these reasons, the eulachon was an integral part of First Nations society before European contact. Early European arrivals used it as a “candle fish” because when dried and burned, the oil content can sustain a slow-burning flame.

Traditional fisheries for eulachon grease continue to the present day on some rivers north of the Fraser, which has supported several commercial fisheries. Annual landings of several hundred

tonnes in the 1950s were used for animal feed and meal. Since the 1980s the fishery has evolved into a smaller, specialized industry to supply local markets in Vancouver with fresh fish. Small non-commercial catches for human consumption continue to the present time. Until 1994, the Columbia River, with the world's largest run, had a sustained commercial fishery of 1,000-2,000 tonnes per year and a recreational fishery thought to be about the same size. Columbia River catches fell sharply in 1994.

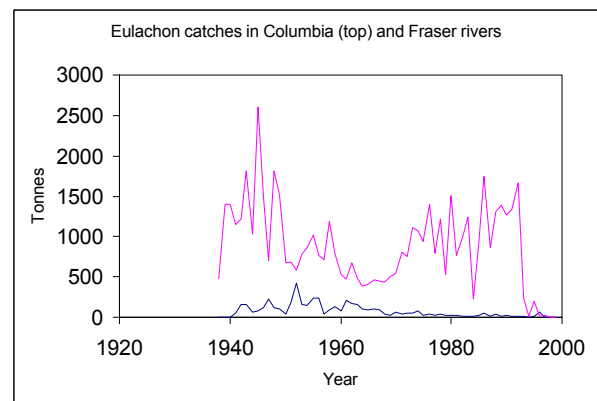
Catch

Since the 1920s, the only commercial fishery in B.C. was on the Fraser, where several hundred tonnes of eulachons per year were used mainly as an inexpensive food for fur farms. The more recent commercial fishery of the 1980s and 1990s takes about 30 to 40 tonnes per year, most of it destined for the Vancouver market. In most other rivers, the fishery has been conducted by First Nations. Aside from the Fraser River, annual catch data are not available for most rivers, except for a few during the last decade. For example, on the north coast of B.C. the Haisla usually take an estimated 50 to 100 tonnes from rivers in the Gardner Canal and Douglas Channel area, and the Nisga'a take a similar amount from the Nass River. In the late 1890s the Nass landings were much larger, usually exceeding 300 tonnes per year.

The largest eulachon run occurs in the Columbia River where, until 1994, about 1,000 tonnes have been taken annually by a commercial fishery. This catch is in addition to a recreational catch that is thought to take about the same quantity. Catch records have been taken on the Fraser and Columbia for about 50 years, but few catch data from other rivers are available. The records on the Fraser might under-represent the actual catch from the 1960s through the 1980s because of incomplete reporting.

In 1994 there was an unexpectedly low biomass of returning adults in at least 3 rivers: the Columbia, Fraser and Klinaklini (at the head of

Knight Inlet). Catches were also sharply lower than in previous years. It is possible that the spawning runs were lower in some other rivers, such as the Skeena and Kemanan, but the decrease was most pronounced in the southern rivers. Since 1994, spawning runs have remained low in the Columbia and Fraser. Based on egg and larval surveys, the spawning biomass in the Fraser River was estimated at less than 100 tonnes for 1995 and 1997, although 1996 may have had a substantial return greater than 1,500 tonnes. Larval densities in 1998 were low, indicating a low spawning biomass.



Effort

The effort varies among river systems, and by year. Fishing effort on the Nass is lower than 90 years ago, when the Nass eulachon run constituted the fifth-largest commercial fishery in B.C. In the Skeena, effort varies and may increase during years of large runs, signaled by intense bird and mammal activity following the returning eulachons. Effort has decreased on the Kitimat because of decreased run size and polluted spawning habitat, but increased on the Kemanan, in part in response to decreased availability on the Kitimat. The effort in other central coast rivers is uncertain, but more information may become available in the future. Effort in the Johnstone Strait stocks may have declined in response to an apparent decline in run size. Effort has fallen steadily in the Fraser, in response to limited markets and decreasing availability. In the mid-1990s about 20 commercial vessels fished the Fraser River regularly.

Fishery Management

There has been no active management of eulachons in any river except the Fraser. Even there, the main activity of Fisheries and Oceans staff until recently was to monitor catches. Following concerns about the low 1994 catch, however, active management and assessment programs were introduced in 1995. The fishery was restricted to 3 days per week and weekly hauls were required to monitor the catch. Stock assessment programs included the requirement for detailed harvest logbooks, test fisheries, biological sampling, and egg and larval surveys to estimate spawning biomass. In 1996, more than 60 fishermen entered the fishery, most in anticipation that rumoured future licence limitations would preclude them from future fisheries. Based on low apparent availability of eulachons in 1997, as well as an estimated spawning return of less than 50 tonnes, continued low runs in the Columbia River and low offshore abundance indices, the Fraser River was closed to commercial eulachon fishing in 1998. The closure was extended to all fisheries including First Nation fisheries in 1999.

Future Fraser River management will depend on the ability to assess eulachon spawning runs and establish catch targets. In many rivers, First Nations have maintained a degree of control over the times and place of fishing activities. Several First Nations, in cooperation with Fisheries and Oceans Canada and other agencies, have initiated stock assessment activities.

Current management activity includes the restriction of dredging activities during the eulachon spawning season. Bycatch monitoring programs, meanwhile, will determine the impact of other fisheries that capture eulachons as non-target species. An informal Eulachon Research Council has met annually to present the latest research information and collect information from local stakeholders in the First Nations and commercial fisheries. Future management will depend on the ability of eulachon populations to recover. The hopeful vision is for a number of

small, sustainable fisheries that are assessed and managed by local communities in cooperation with the federal government.

Resource Status

Eulachon runs appear to have declined in a number of rivers and the decline seems more pronounced in southern rivers. It is not clear if there have been any declines in Alaskan populations. The year 1994 stands out because there were sharp simultaneous declines in the Columbia, Fraser and Klinaklini Rivers, even though there is a 4-month difference in spawning times among these rivers. There also is some evidence of low spawning runs in some other B.C. rivers that year.

There may be as few as 30 eulachon runs in the world. Based on preliminary genetic analyses, however, the different runs do not appear to be unique. If so, there must be extensive straying and mixing among different rivers. Further analyses are required to confirm the apparent genetic non-differentiation among rivers. Until this is done, management should be based on the precautionary assumption that each eulachon-spawning river represents a separate biological stock. Analyses of population differences based on microchemical analyses of inner-ear structures known as otoliths was non-conclusive. There were some small differences among populations but there is evidence that some individuals moved among rivers. These tentative genetic and microchemistry results are consistent with the observation that eulachon runs in some rivers change with time. In the Columbia River, spawning sites change within the river and occasionally eulachons spawn in previously unused rivers. For instance, in 1994, when spawning runs were reduced in other rivers, there was an unprecedented eulachon spawning in the Chehalis River, north of the Columbia, in Washington State. In the 1950s, eulachons spawned in the Somas River on Vancouver Island and there are accounts of other unusual spawnings that do not appear to result in established eulachon runs. On the other hand, differences in run timing

(March for most rivers, February for the Columbia and April for the Fraser) indicate that different runs may represent separate populations.

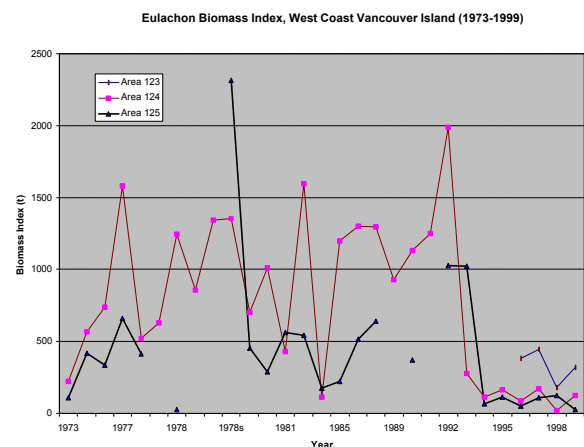
The causes of the recent stock declines are unknown. Also, we are uncertain whether we have witnessed a single decline in a widespread stock that readily mixes among different spawning sites, or a series of synchronous declines in a number of independent populations. Widespread changes in ocean climate could explain synchronous declines in different populations with different spawning times. Changes in spawning habitat, however, would probably result in more gradual declines and not be synchronous among different rivers. The Fraser River has seen both an apparent slow decline in abundance over that last 30 years and a sharp decline in 1994. Therefore, in the Fraser, and perhaps other rivers, eulachons may be affected by changes in both habitat and ocean climate.

Outlook

Based on available information, and the events of the last 3 years in particular, there is concern for the long-term sustainability of eulachon runs, although the reasons for the declines are unclear. One possible explanation is climate change, specifically a warming of the coastal waters where eulachons live, but there are other explanations, including subtle changes in the hydrology of the relatively small numbers of rivers used for spawning. Industrial pollution has affected eulachons in several rivers and bycatch in trawl fisheries and increased marine mammal predation also may be partly responsible as well.

If change in ocean climate is part of the ultimate cause for the decline, and if the recent warming trend continues, the long-term outlook for eulachons may be bleak. Exacerbating the concern are habitat changes in many watersheds and eulachon bycatch from offshore trawl fisheries, although the magnitude of bycatch is unknown at present. This synopsis is pessimistic because the problems are profound and the capacity for remediation is limited. Possible

remedial actions include protection of spawning habitat, limiting bycatch and regulation of fisheries by conducting assessments, and catch-monitoring programs. Even with a concerted effort directed at these activities, eulachon runs may continue to decline. This pessimistic outlook could change rapidly however, if there were one or two years of strong spawning runs in some of the largest rivers, particularly the Fraser or Columbia. Such returns would be evidence that the recent decline is reversible and that abundant eulachon populations can be sustained in all major spawning rivers.



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