



Component of British Columbia's
Land Use Strategy
North Coast LRMP

Background Report

Eulachon in the North Coast

Prepared by
Denise Stoffels

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This report was prepared by independent consultant Denise Stoffels as background information on Eulachon in the North Coast LRMP area. The information in this report was collected from a wide range of sources and was reviewed by government staff for accuracy and completeness. The final product is presented as the professional judgement of the authors and does not necessarily reflect the view of the Province.

Executive Summary

The eulachon (*Thaleichthys pacificus*) is a blue-listed, anadromous fish that spawns within the Skeena and Nass Rivers within the North Coast LRMP area. Eulachon are of very high value within the food chain as well as to the First Nations of the area, especially the Nisga'a and the Tsimspean Nations. Frank Calder of the Nisga'a describes eulachon as "a mainstay of our culture and an historic staple of Nisga'a trade" (Douglas & McIntyre 1993).

While First Nations fisheries continue to occur today, there has been no commercial fishery in this region since the early 1900's (DFO 2000a). The Department of Fisheries and Oceans has not actively managed the eulachon fishery. In the early 1990's First Nation groups expressed concerns over declines in the eulachon runs across the province. At this time, DFO initiated several studies on eulachon, including by-catch studies and marine larvae surveys.

There has been little research into the life history of eulachon and as a result there is much uncertainty surrounding this species. It will be some time before research can answer the uncertainties and risks with regards to the recent population decline and potential reasons that are causing this decline or inhibiting its recovery. Potential factors that are being addressed include forestry operations, pollution, bycatch issues and changes in ocean temperatures.

Management of this species must recognize the great uncertainty surrounding the eulachon while at the same time being conservative enough so as not to jeopardize this vulnerable species.

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1.0 Introduction

This report describes the life history and status of the Eulachon (*Thaleichthys pacificus*). Eulachon are a fish that play an important role in the ecology of the Nass and Skeena Rivers in the LRMP area. Eulachon are also an important cultural resource to the First Nations of this region.

The eulachon or oolichan is a small, silver anadromous fish the size of a herring. The eulachon spends most of its life in the ocean off the coast of British Columbia. Each spring in March or April they migrate in the millions to the lower reaches of coastal rivers to spawn in gravel beds. After spawning many, if not all, eulachon die and their carcasses decay enriching the stream and estuary. During this migration eulachon provide an important food source to gulls, eagles, seals, porpoises, sea lions and even killer whales (Lewis 2001).

Eulachon have been listed by the Province on the provincial blue-list. This classification identifies eulachon as vulnerable or at risk. They are of special concern because of characteristics that make them particularly sensitive to human activities or natural events.

1.1 Description

The eulachon belongs to the family Osmeridae or smelts. They are a small (15 –20 cm long, weighing 40-60 gm (DFO 2000d)) anadromous fish, spending the vast majority of their life in the ocean, returning in the early spring to coastal rivers to spawn. All known spawning streams have distinct spring freshettes and most, if not all, drain glaciers (DFO 2000d). Mature adults (2 years or older) ascend large rivers such as the Skeena or the Nass during mid-March to mid-May to spawn. Adults lay their eggs in coarse sand or gravel, in freshwater. Eggs hatch in two to three weeks time. The current carries the small larvae (4-5 mm long) to the sea where they may rear in estuaries. Larvae probably reside in estuarine waters for several months, while juveniles use deeper water as they grow, however little is known about these stages (Eulachon Research Council 2000). Eulachon migrate to the ocean environment in the first summer and stay there for 3 – 4 years (Eulachon Research Council 2000). Adults feed at moderate depths of inshore water (DFO 2000c). In BC their offshore distribution includes the Dixon Entrance, Hecate Strait, Queen Charlotte Sound and West Coast Vancouver Island generally on the shelf, often at depths of 40 – 100 fathoms (80 – 200 m) (Eulachon Research Council 2000).

It is thought that most if not all adults die after spawning. Eulachon in offshore waters have substantial teeth. In freshwater spawning adults this dentition is absent or much reduced. This is thought to be an indicator that they stop feeding as they approach their spawning rivers and resorb minerals in the teeth to assist with the increased physical demands of spawning. Toothless eulachon are not seen at sea, which suggests that post-spawning mortality probably is complete (DFO 2000a).

The timing of the eulachon runs provides a large influx of energy-rich food into the ecosystem at a time when food supplies tend to be low. Eulachon are important to breeding

sea lions, seals, eagles and gulls. In the spring months when the eulachon are near shore prior to entering spawning rivers they also comprise a large portion of the dietary intake of salmon, halibut and sturgeon (Lewis 2001) as well as hake, dogfish and pacific cod (DFO2000a).

First Nations

Eulachon are very important to many of the First Nations on the Pacific Coast and a significant part of the cultural heritage for some communities. The eulachon is described as a mainstay of the Nisga'a culture and an historic staple of Nisga'a trade (Frank Calder *in* Douglas & McIntyre 1993). By returning to spawn in the early spring, when food supplies were exhausted, the eulachon literally saved lives, leading to the name 'salvation fish' (Lewis, 2001). Eulachon are also known as "candle fish" because when dried, they retain enough oil to burn like a candle (Frank Calder *in* Douglas & McIntyre 1993).

Eulachon are almost 20% oil by weight. The fish are caught in March to April, allowed to ripen in large boxes and then rendered. The resulting oil or grease is used as a condiment, in bread and stews and as a preservative for dried berries. The oil is unique among fish oils in that it is a solid at normal temperatures with the consistency of soft butter and a golden hue (DFO2000d). Eulachon oil is a rich source of vitamin A and D (Isabella 1999), iodine and many essential vitamins and trace elements (Unknown).

The trails used to reach the traditional fisheries and to carry the rendered oil back for trade were known as the "grease trails". These trails extend from the coast far into the interior.

1.2 Distribution

Eulachon occur along the west coast of North America, from Alaska to central California. About one third of all known spawning rivers are within British Columbia. In BC there are a total of over 30 known spawning rivers of which about 14 are known to have regular spawning (DFO 2000a). There are two known runs within the North Coast LRMP area – the Skeena River and the Nass River systems (See Table 2). The Nass River estuary is within the plan area, but most of the spawning beds are outside of the LRMP boundary and within the Nisga'a Treaty area. The Skeena River and its tributaries such as the Ecstall are within the LRMP area.

Eulachon runs have always been somewhat unpredictable but recent declines are more widespread and sustained indicating a potential decline throughout their range (Lewis 2001). A sharp decline, perhaps coast-wide occurred in 1994 while many rivers shared a decrease in 1999 and 2000 (Eulachon Research Council 2000).

Preliminary catch data regarding the Nass River run, based on the Nisga'a Fisheries harvest is summarized in Table 1 (from Eulachon Research Council 2000). The current monitoring method used since 1997 by the Nisga'a Fisheries records the Catch Per Unit Effort (CPUE) and the net dimensions.

Year	Catch	Peak
1997	106 Tonnes	March 20
1998	296 Tonnes	March 13

1999	238 Tonnes	March 15
2000	168 Tonnes	March 17

Table 1. 1997 – 2000 Catch data for the Nass River.

The Skeena River run has historically been very short lived and difficult to harvest (Lewis 1998). Historically the eulachon spawned as far upstream as the Shames Rivers during large runs (Don Roberts, pers. comm.). Currently, an average run will extend upstream to the Kasiks and Gitnadoix River areas. The eulachon spawn in the main stem Skeena, with high value spawning grounds around the lower Skeena River Islands and around the mouth of the Kwinitza River (D. De Leeuw, MWLAP, pers. comm.). Eulachon also spawn throughout the Ecstall River system, almost up to Johnston Lake and in the Khyex, the Scotia, the Khtada, Kasiks, Gitnadoix and other tributaries in the vicinity (Don Roberts, Terrace, pers. comm.). Historical knowledge indicates that Highway 16, which runs alongside of the Skeena River, covers prime spawning area (D. Roberts *in* Eulachon Research Council 2000). In some cases the highway is built on the spawning beds and in other areas it has isolated back channels removing this spawning habitat from the system.

Nass River
Skeena River and Tributaries
• Ecstall River
• Khyex River
• Scotia Creek
• Khtada Creek
• Kasiks River
• Gitnadoix River

Table 2. Known Current Spawning Streams of Eulachon within the North Coast area

Factors affecting the decline of eulachon across their range are unclear and speculative due to a lack of hard data and research. Many possible explanations for these declines have been given. Directed fisheries, both commercial and non-commercial could be influencing populations as well as marine mammal or forage fish predation (Eulachon Research Council 2000). Contamination by industry pollution is a concern, especially in the Kitimat, Fraser and Columbia Rivers (DFO 2000a). Physical changes to the spawning habitat due to dredging have been a problem in the Fraser River, (DFO 2000a), as well as shoreline construction or dikes and hydrological changes (Eulachon Research Council 2000). Forestry related impacts are suspected but have not been well documented with regards to their impacts on eulachon spawning habitat. Changes in the volume and discharge patterns of rivers draining forested areas seem to be a plausible impact given research completed on salmon spawning habitat. Debris and associated non-oxygenated water from log handling and booming in river habitats and especially in the headwaters of estuaries could also be a problem affecting both larvae and juveniles (DFO 2000a).

In offshore areas shrimp trawling operations sometimes have significant by-catch of eulachon (Hay *et al.*, 1998 and 1999 *in* DFO 2000a). While this by-catch has probably not caused the recent decline in eulachon, it could be a factor in limiting the recovery of certain stocks (DFO 2000a).

Eulachon spend the vast majority of their life in marine waters and are therefore susceptible to changes in ocean conditions. Changes in ocean temperature can lead to reduced food abundance and lower growth rates, or increased predator abundance and mortality (DFO 2000a, Lewis 2001).

More research needs to be completed to adequately assess the impacts of these activities. While numerous projects have been initiated to address the inadequate data it will be several years before critical data gaps are filled.

2.0 Management Practices (historic and current)

Historically there has been no active management of eulachon in BC (DFO 1999, DFO 2000a). DFO describes eulachon as of only marginal interest prior to 1990 (DFO 2000a). Very few studies have been conducted and as a result there is little scientific and technical literature (DFO 2000a).

For the past 80 years the only commercial fishery in BC was on the Fraser River (DFO 1999, 2000a). In the early 1900's the Nass River also supported a commercial fishery (DFO 2000a). Since then, the Nass and Skeena Rivers have supported only a First Nations fishery. It is thought that in the past the Nisga'a take several hundred tonnes annually from the Nass River (DFO 2000a). Catch data from 1997 – 2000 shows a catch range of about 100 – 300 tonnes. The fishing effort on the Skeena varies and may increase during years of large runs (DFO 1999).

In the early 1990's the Haisla First Nations raised concerns about the eulachon run in the Kitimat River and in 1994 eulachon runs in the Fraser and other rivers declined (DFO 2000a, Eulachon Research Council 2000). Since then, DFO has initiated numerous research projects including larval surveys to estimate spawning stock biomass and spawning locations and a survey of shrimp trawl by-catch.

The shrimp fishery industry has taken numerous steps to lower by-catch such as selective fishing initiatives, area closures and sampling programs (Eulachon Research Council 2000). Mandatory selectivity devices will be used in all gear used in 2000/01 and beyond. These selectivity devices allow the passive exit of by-catch through escape panels such as in a device called the Nordmore grid (Eulachon Research Council 2000).

The Eulachon Research Council is an ad hoc group made up of representatives from DFO, First Nations, forest industry representatives, academia and non-government agencies that has been meeting since 1995 to address the research needs related to eulachon. This informal group meets to exchange information about eulachon and pass on suggestions and recommendations to other agencies (Eulachon Research Council 2000).

3.0 Management Issues for the LRMP

Eulachon are a blue-listed or vulnerable species. This means that they will require special management to ensure that they do not become threatened. Eulachon are also an important part of the Skeena and especially the Nass River ecosystems. Declines in the eulachon population will have a detrimental effect on many other species. Potential resource conflicts that exist are with forestry or other industrial activities that could be changing or polluting the rivers.

4.0 Uncertainty and Risk

There is much uncertainty surrounding the knowledge of the life history of the eulachon. Because of this lack of knowledge regarding the life history of this blue-listed species it is unclear what factors or combination of factors has resulted in the recent decline. It is thought that changes in ocean temperature, by-catch and forest harvesting may all be detrimental to this species, however existing research is limited. While it is likely that these factors and others are all influencing the eulachon populations, either by resulting in a decline or preventing a recovery, certainty in this matter will not be forthcoming for many years as research continues.

5.0 Summary

The eulachon are an important resource in the planning area, especially to First Nations. There is a large amount of uncertainty regarding this species and this will necessarily be reflected in any management recommendations. These recommendations must be flexible so that as new information becomes available they can be modified.

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