

PACIFIC REGION

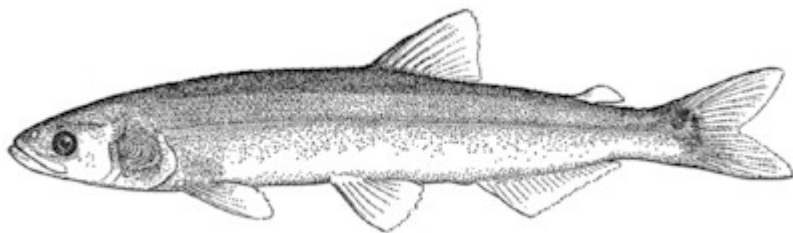
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# INTEGRATED FISHERIES MANAGEMENT PLAN

## JANUARY 1 - DECEMBER 31, 2019

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EULACHON  
FRASER RIVER



*Thaleichthys pacificus*



Fisheries and Oceans  
Canada

Pêches et Océans  
Canada

Canada

This Integrated Fisheries Management Plan is intended for general purposes only. Where there is a discrepancy between the Plan and the Fisheries Act and Regulations, the Act and Regulations are the final authority. A description of Areas and Subareas referenced in this Plan can be found in the Pacific Fishery Management Area Regulations, 2007.

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# DEPARTMENT CONTACTS

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A more comprehensive list of contacts can be found online at:

<http://www.pac.dfo-mpo.gc.ca/fm-gp/contacts-eng.html>

## **Fisheries and Oceans Canada – Pacific Region**

Website: <http://www.pac.dfo-mpo.gc.ca>

Observe, Record, and Report 1-800-465-4336

National On-Line Licencing System (NOLS) 1-877-535-7307

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Director, Conservation and Protection	Mike Carlson	(604) 666-0604
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Aquatic Science Biologist	Vanessa Hodes	(250) 756-7219
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Non-Salmon Resource Manager	Anna Magera	(604) 916-6743

# INDEX OF WEB-BASED INFORMATION

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## FISHERIES AND OCEANS CANADA – GENERAL INFORMATION

### MAIN PAGE

<http://www.dfo-mpo.gc.ca>

Our Vision, Latest News, Current Topics

Twitter:

DFO Pacific: [@DFO\\_Pacific](#)

En Français: [@MPO\\_Pacifique](#)

### ACTS, ORDERS, AND REGULATIONS

<http://www.dfo-mpo.gc.ca/acts-loi-eng.htm>

Canada Shipping Act, Coastal Fisheries Protection Act, Department of Fisheries and Oceans Act, Financial Administration Act, Fish Inspection Act, Fisheries Act, Fisheries Development Act, Fishing and Recreational Harbours Act, Freshwater Fish Marketing Act, Navigation Protection Act, Oceans Act

### REPORTS AND PUBLICATIONS

<http://www.dfo-mpo.gc.ca/reports-rapports-eng.htm>

Administration and Enforcement of the Fish Habitat Protection and Pollution Prevention Provisions of the *Fisheries Act*, Audit and Evaluation Reports - Audit and Evaluation Directorate Canadian Code of Conduct for Responsible Fishing Operations, Departmental Performance Reports, Fisheries Research Documents, Standing Committee's Reports and Government responses, Sustainable Development Strategy.

### FEDERAL SCIENCE LIBRARY

<http://science-libraries.canada.ca/eng/fisheries-oceans/>

Fisheries and Oceans Canada online library catalogue

## PACIFIC REGION – GENERAL

### MAIN PAGE

<http://www.pac.dfo-mpo.gc.ca/index-eng.html>

General information, Area information, Latest news, Current topics

## **POLICIES, REPORTS AND PROGRAMS**

<http://www.pac.dfo-mpo.gc.ca/fm-gp/species-especies/salmon-saumon/pol/index-eng.html>

Reports and Discussion Papers, New Directions Policy Series, Agreements

## **OCEANS PROGRAM**

<http://www.pac.dfo-mpo.gc.ca/oceans/index-eng.html>

Integrated Coastal Management, Marine Protected Areas, Marine Environmental Quality; Oceans Outreach, Oceans Act

## **PACIFIC REGION – FISHERIES MANAGEMENT**

### **MAIN PAGE**

<http://www.dfo-mpo.gc.ca/fm-gp/index-eng.htm>

Commercial Fisheries, New and Emerging Fisheries, Recreational Fisheries, Maps, Notices and Plans

### **ABORIGINAL FISHERIES STRATEGY**

<http://www.pac.dfo-mpo.gc.ca/abor-autoc/index-eng.html>

or <http://www.dfo-mpo.gc.ca/fm-gp/aboriginal-autochtones/index-eng.htm>

Aboriginal Fisheries Strategy (AFS) principles and objectives, AFS agreements, Programs, Treaty Negotiations

### **AQUACULTURE MANAGEMENT**

<http://www.pac.dfo-mpo.gc.ca/aquaculture/index-eng.html>

The new federal regulatory program for aquaculture in British Columbia, Program overview and administration, public reporting, and aquaculture science

### **RECREATIONAL FISHERIES**

<http://www.pac.dfo-mpo.gc.ca/fm-gp/rec/index-eng.htm>

Fishery Regulations and Notices, Fishing Information, Recreational Fishery, Policy and Management, Contacts, Current BC Tidal Waters Sport Fishing Guide and Freshwater Supplement, Rockfish Conservation Areas, Shellfish Contamination Closures, On-line Licencing

## **COMMERCIAL FISHERIES**

<http://www.dfo-mpo.gc.ca/fisheries-peches/pac-yukon-eng.html>

Links to Groundfish, Herring, Salmon, Shellfish and New and Emerging Fisheries homepages; Selective Fishing, Test Fishing Information, Fishing Areas, Canadian Tide Tables, Fishery Management Plans, Commercial Fishery Notices (openings and closures)

## **FISHERIES NOTICES**

<http://www-ops2.pac.dfo-mpo.gc.ca/fns-sap/index-eng.cfm?>

Want to receive fishery notices by e-mail? If you are a recreational sport fisher, processor, multiple boat owner or re-distribute fishery notices, register your name and/or company at the web-site address above. Openings and closures, updates, and other relevant information regarding your chosen fishery are sent directly to your registered email. It's quick, it's easy and it's free.

## **INTEGRATED FISHERY MANAGEMENT PLANS**

<http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/ifmp-gmp/index-eng.htm>

Current Management Plans for Groundfish, Pelagics, Shellfish (Invertebrates), Minor Finfish, Salmon, sample Licence Conditions; Archived Management Plans

## **LICENCING**

<http://www.pac.dfo-mpo.gc.ca/fm-gp/licence-permis/index-eng.html>

Contact information; Recreational Licencing Information, Commercial Licence Types, Commercial Licence Areas, Licence Listings, Vessel Information, Vessel Directory, Licence Statistics and Application Forms

## **NATIONAL ON-LINE LICENSING SYSTEM (NOLS)**

<https://fishing-peche.dfo-mpo.gc.ca>

E-mail: [fishing-peche@dfo-mpo.gc.ca](mailto:fishing-peche@dfo-mpo.gc.ca)

(Please include your name and the DFO Region in which you are located.)

Telephone: 1-877-535-7307

Fax: 613-990-1866

TTY: 1-800-465-7735

## **PACIFIC REGION – POLICY AND COMMUNICATIONS**

### **MAIN PAGE**

<http://www.dfo-mpo.gc.ca/media/index-eng.htm>

Media Releases; Salmon Updates, Backgrounders, Ministers Statements, Publications; Contacts

### **CONSULTATION SECRETARIAT**

<http://www.pac.dfo-mpo.gc.ca/consultation/index-eng.html>

Consultation Calendar, Policies, National, Partnerships, Fisheries Management, Oceans, Science and Habitat and Enhancement Consultations, Current and Concluded Consultations

### **PUBLICATIONS CATALOGUE**

<http://www.pac.dfo-mpo.gc.ca/publications/index-eng.html>

Information booklets and fact sheets available through Communications branch

### **SPECIES AT RISK ACT (SARA)**

<http://www.dfo-mpo.gc.ca/species-especies/index-eng.htm>

SARA species, SARA permits, Public Registry, Enforcement, Stewardship Projects, Consultation, Past Consultation, Indigenous people, Related Sites, For Kids, News Releases

## **PACIFIC REGION – SCIENCE**

### **MAIN PAGE**

<http://www.pac.dfo-mpo.gc.ca/science/index-eng.html>

Science Divisions, Research Facilities, PSARC, International Research Initiatives

### **EULACHON SCIENCE PAGES**

<http://www.pac.dfo-mpo.gc.ca/science/species-especies/pelagic-pelagique/eulachon-eulakane-eng.html>

Science projects, CSAS Documents and Stock Status Reports, Other Online Publications, Eulachon Links



## GLOSSARY AND LIST OF ACRONYMS

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Aboriginal Traditional Knowledge (ATK)	Knowledge that is held by, and unique to Aboriginal peoples. It is a living body of knowledge that is cumulative and dynamic and adapted over time to reflect changes in the social, economic, environmental, spiritual, and political spheres of the Aboriginal knowledge holders. It often includes knowledge about the land and its resources, spiritual beliefs, language, mythology, culture, laws, customs and medicines.
Abundance	Number of individuals in a stock or a population.
AFS	Aboriginal Fisheries Strategy
Area and Subarea	Defined in Section 2 of the Pacific Fishery Management Area Regulations. A map of Pacific Fishery Management Areas is available on the Department's Internet site at: <a href="http://www.pac.dfo-mpo.gc.ca/fm-gp/maps-cartes/areas-secteurs/index-eng.htm">http://www.pac.dfo-mpo.gc.ca/fm-gp/maps-cartes/areas-secteurs/index-eng.htm</a>
Biomass	Total weight of all individuals in a stock or a population.
Bycatch	The unintentional catch of one species when the target is another.
Committee on the Status of Endangered Wildlife in Canada (COSEWIC)	Committee of experts that assess and designate which wild species are in some danger of disappearing from Canada.
Communal Licence	A licence issued to Indigenous organizations under Section 4 of the Aboriginal Communal Fishing Licences Regulations, pursuant to the Fisheries Act, to carry on fishing and related activities.
CSAS	Canadian Science Advisory Secretariat chaired by DFO and including other federal and provincial government agency representatives and external participants (formerly PSARC).
Ecosystem-Based Management	Taking into account of species interactions and the interdependencies between species and their habitats when making resource management decisions.

Fishing Effort (Effort)	Quantity of effort using a given fishing gear over a given period of time.
Fishing Mortality	Death caused by fishing, often symbolized by the mathematical symbol F.
Food, Social and Ceremonial (FSC)	A fishery conducted by Indigenous groups for food, social and ceremonial purposes.
Intertidal	The area of the ocean shoreline located between the highest high water and lowest low water tidal levels.
Landing	Quantity of a species caught and landed. Harvested animals transferred from a vessel to land.
lb	Imperial pound(s), which is equal to 0.45359237 kg.
Natural Mortality	Mortality due to natural causes, symbolized by the mathematical symbol M.
Pelagic	Living in the surface or middle depths of the sea.
Population	Group of individuals of the same species, forming a breeding unit, and sharing a habitat.
Precautionary Approach	Set of agreed cost-effective measures and actions, including future courses of action, which ensures prudent foresight, reduces or avoids risk to the resource, the environment, and the people, to the extent possible, taking explicitly into account existing uncertainties and the potential consequences of being wrong.
Quota	Portion of the total allowable catch that a unit, such as vessel class, country, etc. is permitted to take from a stock in a given period of time.
Research Survey	Survey at sea, on a research vessel, allowing scientists to obtain information on the abundance and distribution of various species and/or collect oceanographic data. E.g.: bottom trawl survey, plankton survey, hydroacoustic survey, etc.

Spawner	Sexually mature individual.
Spawning Stock	Sexually mature individuals in a stock.
Species at Risk Act (SARA)	The Act is a federal government commitment to prevent wildlife species from becoming extinct and secure the necessary actions for their recovery. It provides the legal protection of wildlife species and the conservation of their biological diversity.
Stakeholders	Individuals or groups with an interest in a particular fishery or activity.
Stock	Describes a population of individuals of one species found in a particular area, and is used as a unit for fisheries management.
Stock Assessment	Scientific evaluation of the status of a species belonging to a same stock within a particular area in a given time period. Results of analyses of fisheries and research data used to evaluate the effects of fishing on a stock or population and to predict the reactions of populations to alternative management choices.
Substrate	The ground (often the ocean bottom) and its composition, in or on which animals live.
Sub tidal	A portion of the bottom of the ocean that is not exposed at low tide stages. The ocean bottom at elevations below low water or chart datum.
Ton	Short ton, 2000 lb., traditionally used as a unit of measure by fish harvesters in British Columbia.
Tonne	Metric tonne, which is 1000kg or 2204.6 lb.
Total Allowable Catch (TAC)	The amount of catch that may be taken from a stock, determined by analytical procedures, to achieve management objectives.
Traditional Ecological Knowledge (TEK)	A cumulative body of knowledge and beliefs, handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment.

# FOREWORD

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The purpose of this Integrated Fisheries Management Plan (IFMP) is to identify the main objectives and requirements for the Eulachon fishery in the Fraser River, as well as the management measures that will be used to achieve these objectives. This document also serves to communicate the basic information on the fishery and its management to Fisheries and Oceans Canada (DFO, the Department) staff, legislated co-management boards, Indigenous peoples, harvesters, and other interested parties. This IFMP provides a common understanding of the basic “rules” for the sustainable management of the fisheries resource.

This IFMP is not a legally binding instrument which can form the basis of a legal challenge. The IFMP can be modified at any time and does not fetter the Minister's discretionary powers set out in the *Fisheries Act*. The Minister can, for reasons of conservation or for any other valid reasons, modify any provision of the IFMP in accordance with the powers granted pursuant to the *Fisheries Act*.

Where DFO is responsible for implementing obligations under land claims agreements, the IFMP will be implemented in a manner consistent with these obligations. In the event that an IFMP is inconsistent with obligations under land claims agreements, the provisions of the land claims agreements will prevail to the extent of the inconsistency.

# I. OVERVIEW

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## I.1. INTRODUCTION

This Integrated Fisheries Management Plan (IFMP) for Eulachon covers the period from January 1 to December 31, 2019 for the Fraser River area.

The IFMP provides a history and a broad context to the management of the Fraser River Eulachon stock, including issues related to conservation. Given the short life cycle of this species, and consecutive poor returns, there are conservation concerns with Fraser River Eulachon stocks, resulting in commercial and recreational fishery closures and minimal harvest for food, social and ceremonial (FSC) purposes. Long-term closures are required to allow for stock rebuilding.

## I.2. HISTORY

Eulachon have historically been and continue to be important to Indigenous groups who harvest them for FSC purposes. The significance of the Indigenous fishery transcends the collection of fish biomass for consumption. Rather, the collection, rendering and subsequent distribution of Eulachon grease are an integral part of coastal Indigenous cultures. Eulachon are eaten fresh, or often smoked, dried, salted or made into grease. Eulachon grease is an important food source for Indigenous groups. It is widely bartered among Indigenous communities and is given as gifts in potlatch ceremonies. The harvest of Eulachon and trade of the rendered oil led to the “grease trails” trade routes. It is used in many traditional foods, to preserve fruit, as medicine and even to lubricate tools (Hay and McCarter, 2000). Central and North Coast Indigenous groups in British Columbia, as well as some Indigenous groups in Alaska, produce grease. However Indigenous groups south of Knight Inlet, including groups on the Fraser River, do not produce grease and instead focus on smoked and fresh Eulachon (Moody, 2008).

There was a minor recreational fishery for Eulachon in the Fraser River in the past; however, it has been closed since 2005.

Commercial harvest of Eulachon on the Fraser River began in the 1870s. The only other large commercial fishery of Eulachon in BC was on the Nass River and it ended in the 1940s. From 1903 to 1912, the Fraser River Eulachon fishery was the fifth largest commercial fishery in BC (Stacey, 1995). More recently, annual catches of Eulachon in the Fraser River from the 1980s to the mid-1990s averaged approximately 20 tonnes per year and peaked in 1996 with an estimated catch of at least 63 tonnes. Due to increasing catch and effort and low levels of abundance, the commercial fishery was closed in 1997. Limited entry licensing was introduced in 1998 with the introduction of the ZU Eulachon licence category. Since closing in 1997, the

commercial Eulachon fishery on the Fraser River was only opened twice: in 2002 and 2004, and it has been closed ever since.

### **1.3. TYPE OF FISHERY AND PARTICIPANTS**

#### **Indigenous**

Indigenous harvest for FSC purposes is authorized in the lower Fraser River through communal licences. Indigenous groups apply for separate communal licences for Eulachon that are issued on a case-by-case basis. Fishing is primarily by drift net (e.g. gillnet). The use of dip nets or Eulachon rakes may be authorized as gear types in traditional fishing areas upon request. Any Indigenous groups interested in developing new harvest methods or restarting historic harvest methods can contact DFO staff to develop appropriate licence and monitoring arrangements.

#### **Recreational**

The recreational fishery for Eulachon remains closed in all tidal waters and freshwater, including the Fraser River.

#### **Commercial**

The commercial Eulachon fishery remains closed in all tidal waters and freshwater, including the Fraser River.

### **1.4. LOCATION OF FISHERY**

#### **Indigenous**

Indigenous harvest may occur in portions of the lower Fraser River.

### **1.5. FISHERY CHARACTERISTICS**

Indigenous communal fishing times are restricted to a maximum of 12 hours per day, number of days in a week, and/or harvest target balances. Some management measures may be negotiated in-season. For each communal licence, participants must report catches through their respective monitoring programs and report to DFO. A strict monitoring regime is in place: DFO monitors, Fishery Officers, or Indigenous monitors may observe all sets directly or have harvesters pick their nets in the presence of the monitors.

### **1.6. GOVERNANCE**

Management of Fraser River Eulachon is directed by:

- The *Fisheries Act* and the regulations made thereunder.

- Areas and Subareas, as described in the *Pacific Fishery Management Area Regulations (2007)*, are referenced in describing Eulachon Management Areas.
- *Fishery (General) Regulations* (i.e. Conditions of Licence) and the *Pacific Fishery Regulations, 1993* (i.e. open times).
- *The British Columbia Sport Fishing Regulations (1996)*.
- *The Aboriginal Communal Fishing Licences Regulations*.
- *The Oceans Act*.

These documents are available at: <http://laws-lois.justice.gc.ca/eng/>

### **Sustainable Fisheries Framework**

The Sustainable Fisheries Framework (SFF) is a toolbox of existing and new policies for DFO to sustainably manage Canadian fisheries by conserving fish stocks while supporting the industries that rely on healthy fish populations. The SFF provides planning and operational tools that allow these goals to be achieved in a clear, predictable, transparent, and inclusive manner, and provides the foundation for new conservation policies to implement the ecosystem and precautionary approaches to fisheries management. These policies include:

- Policy on Managing Bycatch (April 2013);
- Guidance on the Implementation of the Policy on Managing Bycatch;
- Fishery Decision-Making Framework Incorporating the Precautionary Approach (April 2009);
- Guidance for the Development of Rebuilding Plans under the Precautionary Approach Framework (April 2013);
- Policy for Managing Impacts of Fishing on Benthic Habitat, Communities, and Species (April 2009);
- Ecological Risk Assessment Framework (ERAF) for Coldwater Corals and Sponge Dominated Communities (April 2013); and,
- Policy on New Fisheries for Forage Species (April 2009).

For more information on the Sustainable Fisheries Framework and its policies visit:

<http://www.dfo-mpo.gc.ca/reports-rapports/regs/sff-cpd/overview-cadre-eng.htm>

As required under the SFF, DFO annually tracks the performance of major fish stocks that it manages through the Sustainability Survey for Fisheries. The fish stocks are selected for their economic, ecological and/or cultural importance. The vast majority of the landings from fisheries managed by DFO come from these fish stocks. The survey reports on DFO's progress to implement its SFF policies, which guide the management of Canada's fisheries, and on other information about these fish stocks. The results of the 2015 and 2016 Sustainability Surveys for Fraser River Eulachon is available online:

<http://www.dfo-mpo.gc.ca/reports-rapports/regs/sff-cpd/survey-sondage/index-en.html>

### **Policy Framework on Catch Monitoring**

A complete, accurate and verifiable fishery monitoring and catch reporting program is required to successfully balance conservation, ecosystem, socio-economic and other management

objectives. Across all fisheries, work is being undertaken to improve catch monitoring programs by clearly identifying information requirements based on ecosystem risk and their supporting rationale for each specific fishery and evaluating the current monitoring programs to identify gaps. Managers and harvesters will annually work together to address those gaps.

The Department finalized the “Strategic Framework for Fisheries Monitoring and Catch Reporting in the Pacific Fisheries” (the Framework) in the spring of 2012. The Framework outlines how consistent risk assessment criteria can be applied to each fishery to determine the level of monitoring required, while allowing for final monitoring and reporting programs to reflect the fishery’s unique characteristics.

The Department is taking a phased approach to developing fishery monitoring risk assessments and engaging harvesters on risk assessment results and next steps for monitoring. Discussions will be held on an appropriate approach for Fraser Eulachon in the future.

More info is available at: [http://www.pac.dfo-mpo.gc.ca/fm-gp/docs/framework\\_monitoring-cadre\\_surveillance/page-1-eng.html](http://www.pac.dfo-mpo.gc.ca/fm-gp/docs/framework_monitoring-cadre_surveillance/page-1-eng.html)

## **1.7. CONSULTATION**

DFO has a broad mandate, with the authority to regulate and enforce activities, develop policy, provide services and manage programs. To help ensure that the Department’s policies and programs are aligned with its vision and effectively address the interests and preferences of Canadians, DFO supports consultations that are transparent, accessible and accountable.

DFO Pacific Region undertakes consultations in order to improve departmental decision-making processes, promote understanding of fisheries, oceans and marine transport issues, and strengthen relationships.

The Fraser River population of Eulachon was assessed as Endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in May, 2011 (see section 3.5). Since 2011, the Department has sought the input of Indigenous peoples and stakeholders into the development of documents that support the *Species at Risk Act* (SARA) process to consider whether or not the Government should list this Designatable Unit (DU) as Endangered under SARA. Consultations on this SARA process occurred between August 30 and November 30, 2016. A decision is anticipated in 2018 at the earliest.

## **1.8. APPROVAL PROCESS**

This plan is approved by the Regional Director General for the Pacific Region.



## **2. STOCK ASSESSMENT, SCIENCE AND TRADITIONAL KNOWLEDGE**

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### **2.1. BIOLOGICAL SYNOPSIS**

Eulachon (also known as candlefish or oolichan) belong to the family Osmeridae (smelts). The scientific name for Eulachon is *Thaleichthys pacificus*, a name derived from the Greek roots thaleia (rich), ichthys (fish), which refers to the high oil content found in these little fish, and pacificus (Pacific [Ocean]), which refers to where these fish live.

Within BC, there are 25 confirmed Eulachon spawning rivers and an additional 15 potential spawning rivers based on anecdotal information. All known spawning rivers experience increased spring runoffs known as freshets and most drain snow packs or glaciers. The major river systems where Eulachon return to spawn are the Fraser, Skeena, Nass, and Klinaklini.

Eulachon spawning is limited to the lower reaches of rivers. Spawning typically begins in April or May on the Fraser River. Indigenous people in the area have noted that runs may begin as early as February or March. During spawning, adhesive eggs, about 20,000 to 40,000 per female, attach to sand or pebbles and hatch in three to five weeks at ambient temperatures, usually between 3 and 10° Celsius.

Eulachon are anadromous. Once hatched, larvae are rapidly flushed to estuarine or marine waters. They live at sea for approximately three years before returning to natal rivers for spawning. Adults reach a length of 15 to 20 cm and weigh between 40 and 60 grams. Large post-spawning mortalities occur and most, if not all, Eulachon are expected to die after spawning.

In BC, Eulachon may be found on the offshore shelf around Dixon Entrance, Hecate Strait, Queen Charlotte Sound, and the West Coast of Vancouver Island (WCVI), and are caught in bottom trawl gear at depths of 80 to 200 m. They have also been caught in the summer at night in near surface waters (e.g. depths of 0 to 30m) off the west coast of Vancouver Island using mid water trawl gear with euphasiids in their stomachs (DFO unpublished data, 2018).

Eulachon populations coast-wide have experienced a sharp downward trend with populations on some river systems becoming nearly extirpated or severely depleted. The Fraser River population has been at extremely low levels most years since 2004.

### **2.2. ECOSYSTEM INTERACTIONS**

Eulachon are prey for many species of fish, marine mammals and birds. In-river predators include white sturgeon, Steller sea lions, harbour seals, and eagles. Salmon and Dolly Varden

trout have also been reported to feed on Eulachon eggs or larvae. Marine predators include dogfish, pacific cod, hake, salmon, pollock, halibut, rockfish and many other species of fish, marine mammals and birds.

Juvenile Eulachon and larvae stomach contents have been found to include phytoplankton, copepod eggs, copepods, mysids, ostracods and barnacle larvae. Limited samples from offshore Eulachon suggest that the euphausiid *Thysanoessa spinifera* is their main prey along with other euphausiids, fish and invertebrates.

At this time there is no information available on the appropriate conservation limits for Eulachon based on ecosystem considerations. Research is ongoing to better understand ecosystem processes and the role Eulachon play in maintaining the integrity and functioning of the ecosystem.

## **2.3. ABORIGINAL TRADITIONAL KNOWLEDGE/TRADITIONAL ECOLOGICAL KNOWLEDGE**

### **Aboriginal Traditional Knowledge (ATK)**

Where available, ATK has been incorporated into the Recovery Potential Assessment (Schweigert et al., 2012) (see section 3.5) that will be used to aid in informing the SARA listing decision and is also considered in management decisions. ATK was also used in informing the draft COSEWIC assessment for Eulachon.

### **Traditional Ecological Knowledge (TEK)**

TEK in the form of observations and comments collected from commercial fishery participants, fishery officers, and resource managers over many years contributes to decisions on scientific survey locations and is considered in management decisions.

## **2.4. STOCK ASSESSMENT**

### **Data Sources**

There is limited biological information available pre-season to reliably forecast Fraser River Eulachon spawner run size and guide management decisions regarding in river harvest level setting. A 2003 Canadian Scientific Advice Secretariat (CSAS) research document (Hay et al., 2003) identified four potential indicators of population abundance and 'response' points that could be used together to guide management decisions for Fraser River Eulachon: the spawning stock biomass (SSB), offshore biomass index, same year Columbia River catches, and New Westminster test fishery. However, with the low population levels, discontinuation of the New Westminster test fishery, and the closure of the commercial and recreational fisheries, the Hay et al. (2003) approach is no longer used to inform management decisions. The main data source used to determine FSC harvest levels is the Fraser River Eulachon Egg and Larval Survey, but

other data that are also considered are listed below. The methodology for setting the FSC harvest level is described in Appendix 3.

### **Fraser River Eulachon Egg and Larval Survey**

Annually since 1995, a 7-week sampling program that measures densities of Eulachon eggs and larvae has taken place in tidal waters of the lower Fraser River to generate a relative index of spawning stock biomass (SSB). This survey uses towed, plankton mesh nets to gather samples twice a week from mid-April to early June. The number of eggs and larvae gathered in each tow are counted at the Pacific Biological Station to calculate density estimates. The density estimates are mathematically integrated to daily mean river discharge water flows to estimate total egg and larvae amounts. The total estimates are then related to a Eulachon fecundity estimate (eggs produced per female) to back calculate estimates of SSB by week and to sum across a season. The SSB index is produced in the summer following spawning and provides a relative estimate of how many tonnes of Eulachon successfully spawned each year (Table 1 and Figure 1). The SSB index has been estimated since 1995 and will continue in 2019. Please refer to Hay et al., (2002) and McCarter and Hay (2003) for additional background on the survey methods and calculation of results.

Note, a previous year's SSB index is not an adequate predictor of the following year's return because it is assumed the typical lifespan of Fraser Eulachon is approximately three years.

In 2018, the peak out-migration of progeny occurred between May 10<sup>th</sup> and 20<sup>th</sup> with the highest densities observed on May 14<sup>th</sup>, which overlaps with the long term average peak dates for the time series.

In 2017 and 2018, the Department added 3 weeks of exploratory sampling before the standard 7-week survey period, resulting in 10 weeks of sampling in total. This was done in response to observations in recent years from DFO staff and Indigenous groups that suggest that the timing of peak spawning activity may be changing to earlier in the spring in the Fraser River. DFO is interested in supporting the additional 3 weeks of exploratory sampling in 2019 and is currently seeking funding to continue this work.

For more information on egg and larval survey results for 1995 to 2016, visit <http://www.pac.dfo-mpo.gc.ca/science/species-especes/pelagic-pelagique/herring-hareng/herspawn/pages/river1-eng.html>. For information on survey results after 2016, please contact Linnea Flostrand, Aquatic Science Biologist (250-756-7187 / [linnea.flostrand@dfo-mpo.gc.ca](mailto:linnea.flostrand@dfo-mpo.gc.ca)).

Table I: Fraser River Eulachon Spawning Stock Biomass (SSB) Index 1995 to 2018

<b>Year</b>	<b>South Arm (tonnes)</b>	<b>North Arm (tonnes)</b>	<b>Total (tonnes)</b>
1995	257	45	302
1996	1,582	329	1911
1997	57	17	74
1998	107	29	136
1999	392	26	418
2000	76	54	130
2001	422	187	609
2002	354	141	494
2003	200	66	266
2004	24	9	33
2005	14	2	16
2006	24	5	29
2007	34	7	41
2008	8	2	10
2009	12	2	14
2010	4	<1	4
2011	19	12	31
2012	78	42	120
2013	59	41	100
2014	53	13	66
2015	185	132	317
2016	32	12	44
2017*	29	6	35
2017**	32	7	39
2018*	298	110	408
2018**	303	111	414

\*Standard 7-week period (April 24 to June 8, 2017 and April 23 to June 7, 2018).

\*\*10-week period (April 3 to June 8, 2017 and April 2 to June 7, 2018), including 3 weeks of additional exploratory sampling.

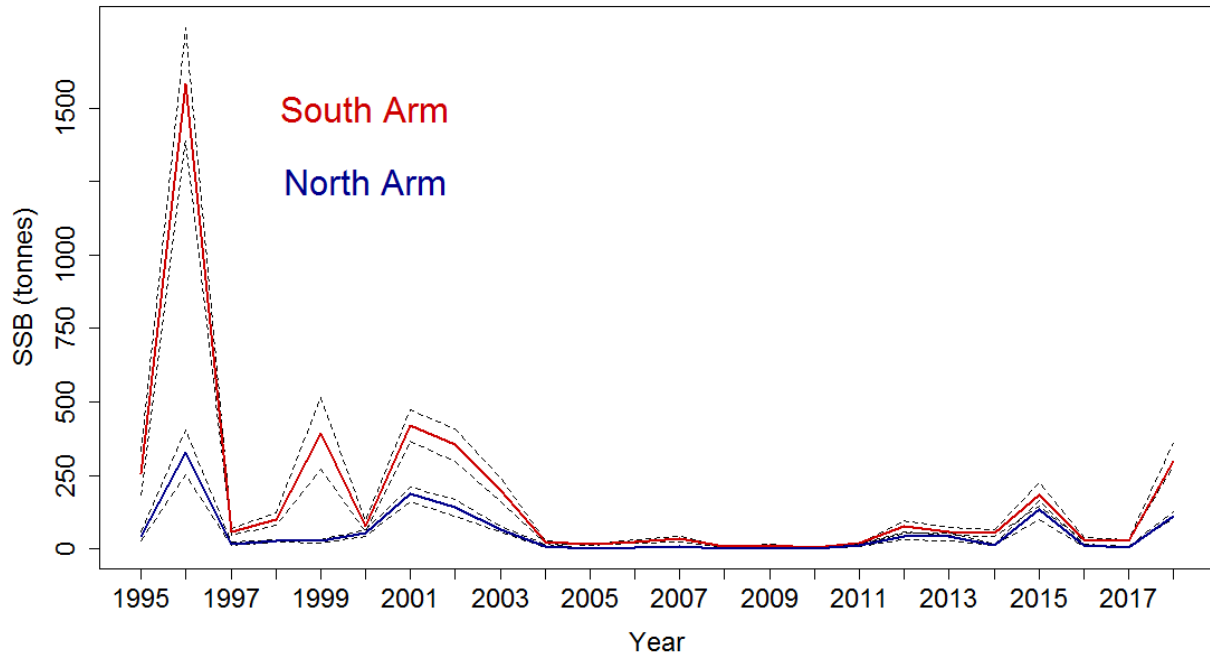


Figure 1. Spawning stock biomass (SSB) in tonnes for the South and North Arms of the Fraser River calculated from Fraser River Eulachon egg and larval survey data (1995-2018). Dashed lines are 95% credible intervals.

### Offshore Small Mesh Multi-Species Bottom Trawl Survey

The offshore small mesh multi-species bottom trawl survey was designed to provide an index of offshore shrimp abundance. The survey has been conducted by DFO annually in late April/early May since 1973. It is conducted off the west coast of Vancouver Island and Queen Charlotte Sound. Recent and past survey information can be requested from Dan Clark, Shellfish Biologist (250-756-7327 / [dan.clark@dfo-mpo.gc.ca](mailto:dan.clark@dfo-mpo.gc.ca)).

Offshore biomass index: In the past, Eulachon caught in the offshore small mesh multi-species survey were used to calculate an annual index of relative Eulachon biomass for lower WCVI (Areas 121, 23, 123, 124 and 125); however this was discontinued in 2013. It is important to note that this was an index of biomass and not a biomass estimate. Historically it was used to inform the Eulachon Action Level (EAL; i.e. the level of estimated Eulachon bycatch in the shrimp trawl fishery above which management actions may be implemented; see section 3.3). Eulachon caught in this survey include stocks from the Fraser River, the Columbia River, and other areas. The Recovery Potential Assessment (Schweigert et al., 2012) (see section 3.5) suggests that the marine trends (including the offshore biomass index) may be misleading and notes that further investigation is warranted.

Table 2: Offshore Biomass Index for Eulachon 1995 to 2012

Year	Area 23, 121, 123	Area 124 (tonnes)	Area 125 (tonnes)
1995		166	115
1996		89	52
1997		168	110
1998		19	125
1999	335	124	28
2000	1,971	846	346
2001	4,896	1340	187
2002	5,862	3993	5343
2003	4,268	2028	1488
2004	3,405	428	343
2005	902	323	336
2006	461	90	42
2007	393	205	52
2008	368	698	185
2009	753	1810	520
2010	500	1469	576
2011	1073	510	129
2012	1369	2147	1375

Catch per unit effort (CPUE) data: Eulachon length information and catch per unit effort (CPUE) is collected from the WCVI offshore small mesh multi-species survey and analysed (see Figure 2). Although not defined as one of the four indicators that could be used for managing Eulachon in Hay et al.'s 2003 work, CPUE trends may provide insight into the relative productivity of upcoming Eulachon year classes and future spawner abundance. However, they should be considered cautiously; the Recovery Potential Assessment (Schweigert et al., 2012) (see section 3.5) suggests that the marine trends may be misleading and further investigation is warranted.

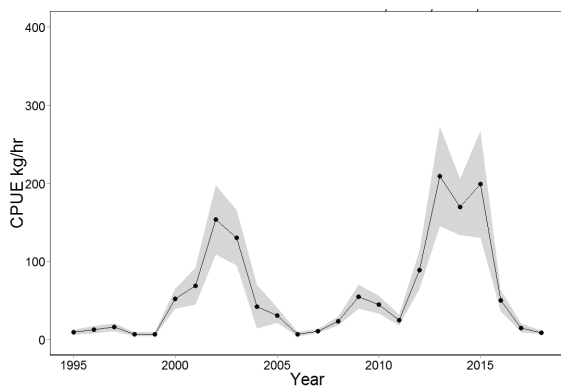
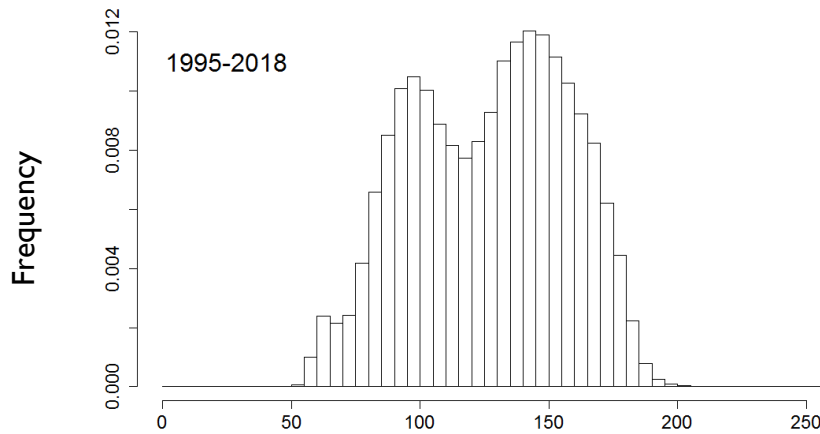


Figure 2. Eulachon catch per unit effort (CPUE) in small mesh multi-species surveys in West Coast Vancouver Island Pacific Fishery Management Areas (PFMAs) 23, 123, 124, 125. CPUE estimates are extrapolated by area.

Length data: Length-frequency histograms tend to reveal multi-modal distributions with different age classes distinguished by different length ranges, i.e. generally younger fish are shorter and older fish are longer. Fish that are typically less than 50 mm standard length are generally estimated to be less than one year old and are not well represented in the samples because they may not yet be in the survey area off of WCVI at the time of the offshore small mesh multi-species survey and may be too small for the trawl net to reliably collect. Fish that are 50 to 130 mm are generally estimated to be approximately one to two years old. However, there can be considerable overlap in length ranges between ages, especially in fish older than one year old. Characterizing age compositions with length-frequency histogram distributions may be difficult, especially when data from a number of years is pooled (see Figure 3A). Trends in length frequencies can vary considerably between years (see Figure 3B), which can be a function of changes in age compositions, as well as changes in growth rates between years and between stocks. In general, however, smaller fish are typically younger than larger fish.

**A.**



**B.**

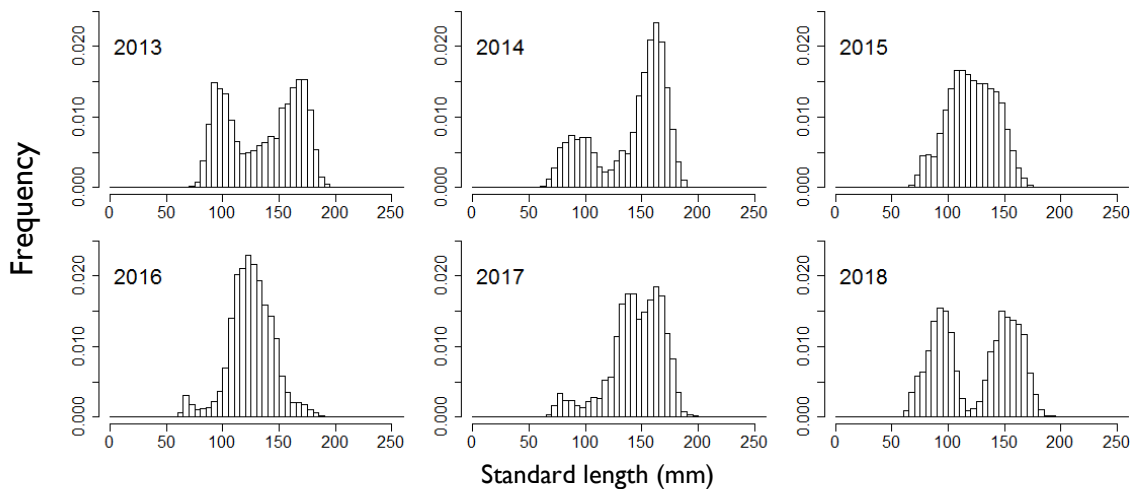


Figure 3. Eulachon length-frequency histograms (proportions by size bin) from annual May west coast of Vancouver Island offshore small mesh bottom trawl surveys: A. Pooled length measurements across years 1995 to 2018, and B. Pooled length measurements by year for 2013 to 2018.

Length-frequency histograms for earlier years can be found at:

<http://www.pac.dfo-mpo.gc.ca/science/species-especies/pelagic-pelagique/herring-hareng/herspawn/pages/ocean1-eng.html>

Ocean conditions: Eulachon growth appears to increase during “cool phases” and decrease during “warm phases”. Relatively warm ocean conditions were observed from 2014 to 2017, especially in late 2014, all of 2015, and all of 2016. However monthly average temperatures in early 2018 were relatively cool, and were more similar to long term average conditions. Pacific Decadal Oscillation (PDO) is a multi-year El-Niño-like pattern of climate variation, and information on the PDO index from 1900 to present can be found at:

<http://research.jisao.washington.edu/pdo/PDO.latest>

Genetic Information: Tissue samples are collected from Eulachon during trawl surveys and analysed to determine the most likely river or area of origin based on genetic markers. Estimates of average Eulachon stock compositions from catch samples from 2002 to 2015 were: 66% Columbia, 31% Fraser, 2% Central Coast, and 2% Nass-Skeena, with annual averages for the Fraser stock ranging between 22% and 40% (DFO unpublished data, 2016). Stock compositions estimated from genetic samples may show considerable variation within and between areas, seasons and years. Additional work is being planned by DFO to validate the characterization of spawning stocks.

### **Columbia River Catch**

The total Columbia River Eulachon harvest in a given year is considered a pre-season indicator for the same year’s Fraser River return, especially in years of low Columbia River returns. Hay et al. (2003) suggest that when there were low Columbia River catches (<500 t), Fraser River catches were also low. Columbia River Eulachon return between January and March. In contrast, Fraser River Eulachon return between late March and May.

The Southern distinct population of Eulachon was federally listed by the United States as Threatened under the *Endangered Species Act* March 18, 2010, and a draft recovery plan was released in October 2016. Columbia River catches had declined in previous years: 17,300 lb in 2008, 17,600 lb in 2009 and only 3,600 lb in 2010. After a three-year closure from 2011 to 2013 of all Eulachon fisheries, an increase in Eulachon stocks was observed. Limited Indigenous, recreational, and commercial fisheries occurred in 2014, 2015, 2016, and 2017 with total catches respectively of 229,410 lb, 317,720 lb, 154,430 lb, and 7,531 lb (JCRMS, 2018). Catches were low by Hay et al. (2003) standards, i.e. < 500 t annually. Official numbers for 2018 were not available at the time of writing. For more information on Columbia River Eulachon, please visit:

[http://www.westcoast.fisheries.noaa.gov/protected\\_species/eulachon/pacific\\_eulachon.html#](http://www.westcoast.fisheries.noaa.gov/protected_species/eulachon/pacific_eulachon.html#) and [https://wdfw.wa.gov/fishing/crc/staff\\_reports.html](https://wdfw.wa.gov/fishing/crc/staff_reports.html).

### **Fraser River (New Westminster) Test Fishery**

The Fraser River test fishery was designed to provide an in-season index of Eulachon returns to the Fraser River. The test fishery was based on the cumulative catch of Eulachon fished daily at a fixed site (New Westminster), with specific gillnet gear, at a specific tide level and for a fixed



time period. The test fishery was focussed on informing the commercial fishery and operated from 1995 to 2005 (with the exception of 1999), and was discontinued due to conservation concerns. The test fishery has not operated since 2006, and will not be conducted in 2019.

Table 3: Fraser River Test Fishery Final Catches for 1995 to 2005

<b>Year</b>	<b>Final Catch (pieces)</b>
1995	11,651
1996	42,071
1997	3,116
1998	2,052
1999	No Test Fishery
2000	12,991
2001	14,578
2002	14,754
2003	7,758
2004	12,433
2005	886
2006 - 2019	No Test Fishery

### **Fraser River (New Westminster) Lower Fraser Fishery Alliance (LFFA) 2017 and 2018 Pilot Surveys**

The Lower Fraser Fishery Alliance (LFFA) conducted a pilot gillnet survey of returning Eulachon on the Fraser River between mid-February and mid-May 2017, with partial funding through the Aboriginal Fund for Species at Risk Program. The survey methodology and location were similar to that used in the 1995-2005 Fraser River (New Westminster) test fishery, with sampling every second day, and additional gear and methodology adjustments to minimize impacts to Fraser River Eulachon. The survey collected information on return timing and an index of abundance, as well as returning adult Eulachon biological data (length, weight, sex, spawn condition). A limited number of samples were also retained for genetic analysis at a future date, and some samples were provided to DFO for aging and otolith isotope analysis studies. LFFA continued the survey work for a second year in 2018, and also assisted in collecting whole fish samples from the survey for DFO. LFFA intends to continue the survey in 2019 and is seeking funding to continue this work.

### **New DFO Research -2017 to 2019**

In 2017/2018 the Department began several new research projects to address knowledge gaps related to Eulachon biology, migration routes, geographic and temporal distribution, stock genetics, non-lethal sampling methodologies, and aging techniques. The results from this work will likely be available in late 2018 or 2019. The new projects include:

1. The deployment of periodic bottom trawl surveys to determine Eulachon biological condition, distribution, migration patterns and timing between offshore rearing areas and inshore waters adjacent to Eulachon spawning rivers.

- a. South Coast (Fraser River pathway) Strait of Georgia, south of Nanaimo to the mouth of Juan de Fuca Strait, monthly from October 2017 to June 2018.
  - b. North Coast, Chatham Sound (Skeena and Nass River pathways) monthly from late July/August to November 2018, and January to March 2019.
2. Additional genetic analysis of spawning stock and mixed stock samples collected on surveys.
3. A pilot project in collaboration with the LFFA in the Fraser River to assess whether acoustic technologies are an effective, non-lethal way to assess Eulachon returns.
4. A comparison of surface reading of otoliths (inner ear bones) and scales for age determination, and validation of otolith surface reading through isotope analysis. Currently there is no validated aging technique for Eulachon.

## 2.5. PRECAUTIONARY APPROACH

The Department follows the Sustainable Fisheries Framework (SFF), which is a toolbox of policies for DFO and other interests to sustainably manage Canadian fisheries in order to conserve fish stocks and support prosperous fisheries. The SFF includes a decision-making framework incorporating a precautionary approach to commercial, recreational, and food-social-ceremonial fishing:

<http://www.dfo-mpo.gc.ca/reports-rapports/regs/sff-cpd/precaution-eng.htm>.

In general, the precautionary approach in fisheries management is about being cautious when scientific knowledge is uncertain, and not using the absence of adequate scientific information as a reason to postpone action or failure to take action to avoid serious harm to fish stocks or their ecosystem. This approach is widely accepted internationally as an essential part of sustainable fisheries management. Information on the precautionary approach and the decision-making framework is available from:

<http://www.dfo-mpo.gc.ca/reports-rapports/regs/sff-cpd/precaution-back-fiche-eng.htm>  
and <http://www.dfo-mpo.gc.ca/reports-rapports/regs/sff-cpd/precaution-eng.htm> .

Reference points and harvest control rules as outlined in the decision-making framework for the precautionary approach have not been formally developed and evaluated for this fishery. DFO is seeking to fill some biological information gaps and evaluate available data in order to move towards abundance-based methods for setting annual harvest levels. The decline of the species and limited or lack of recovery in river systems coast wide is an ongoing concern. Maintaining harvest at low levels should increase the probability of rebuilding Fraser River Eulachon stocks. DFO continues to take an approach to managing the fishery that emphasizes conservation and sustainable use.

## 2.6. RESEARCH

The most recent scientific information compiled on the biology, distribution and fishery data of Fraser River Eulachon were compiled in the *Recovery Potential Assessment for Eulachon – Fraser River Designatable Unit* (DFO, 2015), and the *Recovery Potential Assessment of Eulachon (Thaleichthys pacificus) in Canada* (Schweigert et al. 2012).

To view the Recovery Potential Assessment (RPA) for the Fraser River Designatable Unit (DFO, 2015), please visit the following site:

[http://www.dfo-mpo.gc.ca/csas-sccs/Publications/SAR-AS/2015/2015\\_002-eng.html](http://www.dfo-mpo.gc.ca/csas-sccs/Publications/SAR-AS/2015/2015_002-eng.html)

To view the Recovery Potential Assessment (RPA) for Canada (Schweigert et al. 2012), please visit the following site:

[http://www.dfo-mpo.gc.ca/csas-sccs/Publications/ResDocs-DocRech/2012/2012\\_098-eng.html](http://www.dfo-mpo.gc.ca/csas-sccs/Publications/ResDocs-DocRech/2012/2012_098-eng.html)

The 2011 CSAS research document (CSAS 2011/101) provides background information on Eulachon in support of a Recovery Potential Assessment (RPA) (see section 3.5). To view the CSAS paper, please visit the following site:

[http://www.dfo-mpo.gc.ca/csas-sccs/Publications/ResDocs-DocRech/2011/2011\\_101-eng.html](http://www.dfo-mpo.gc.ca/csas-sccs/Publications/ResDocs-DocRech/2011/2011_101-eng.html)

To view the U.S. 2017 Recovery Plan for the Southern Distinct Population Segment of Eulachon (NMFS, 2017) please visit the following site:

<https://repository.library.noaa.gov/view/noaa/15989>

### **3. MANAGEMENT ISSUES**

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The following sections highlight the on-going or longer-term management issues that are being addressed in this fishery.

#### **3.1. LIMITED BIOLOGICAL INFORMATION**

At present, there is limited biological information available for pre-season forecasting of spawner run size for Fraser River Eulachon. The biological indicators described in the Hay et al. 2003 paper and the reference points suggested for the management of Fraser River Eulachon were developed over ten years ago and were based on a short time series. DFO is seeking to fill some biological information gaps and evaluate available data in order to move towards abundance-based methods for setting annual harvest levels.

In addition, the RPA (Schweigert et al. 2012) identifies several gaps in our knowledge of Eulachon biology and ecology, including limited information on ages, growth rates and mortality. The ability to identify genetic differences between populations, including the ability to identify the origins of fish in offshore mixed stock samples, would be useful for understanding the ecological roles of Eulachon and their responses to management actions, as well as the potential impacts from harvesting and habitat changes. Ongoing genetic analyses are being conducted to better characterize genetic variability of spawning fish within and between rivers. There is also uncertainty around the age of spawning, variability in annual growth rates, and degree to which Eulachon return to natal rivers. Based mostly on trends in fish length observations, it has been assumed that most fish live at sea for approximately three years before returning to rivers to spawn. Effects of climate change on Eulachon ecology are also uncertain but improved understanding of habitat requirements for all life history stages and adult and juvenile prey requirements would help to inform integrated management in keeping with the principles of the DFO Sustainable Fisheries Framework.

#### **3.2. FOOD, SOCIAL AND CEREMONIAL ACCESS**

Indigenous peoples in the Lower Fraser Area have expressed the concern that their needs are not being met by their current level of access to Eulachon for FSC purposes. A review of the current FSC harvest level and the development of an abundance-based approach to determine harvest levels for future years have been requested by Indigenous peoples.

### 3.3. BYCATCH IN OTHER FISHERIES

Fraser River Eulachon are incidentally caught throughout BC in both shrimp trawl and groundfish trawl fisheries.

#### **Shrimp Trawl Fishery**

Schweigert et al. 2012 estimated that on average 39% of the Eulachon caught off the West Coast Vancouver Island (WCVI) in the shrimp trawl fishery are derived from Fraser River stocks based on genetic information, while an updated analysis suggested an average of 31% (DFO unpublished data, 2016).

Eulachon are not permitted to be retained in the shrimp trawl fishery however there may be incidental mortality from bycatch. Eulachon bycatch in the WCVI shrimp trawl fishery from 2006 to 2014 was estimated to be 0.5 t or less annually. In 2015 and 2016 the bycatch was estimated at 3.3 t and 14.8 t respectively. In 2017 the bycatch was estimated to be much lower, i.e. 0.02 t.

Based on an estimate from genetic data that 31% of these WCVI Eulachon are Fraser River bound (DFO unpublished data, 2016), the estimated bycatch of Fraser Eulachon from 2006 to 2014 in the WCVI shrimp trawl fishery was 0.2 t or less. In 2015, 2016 and 2017 the bycatch of Fraser River Eulachon was estimated to be 1.1 t, 3.9 t, and less than 0.01 t respectively in the WCVI shrimp trawl fishery.

The Department has been working with the shrimp trawl industry to minimize Eulachon bycatch. The following management measures have been implemented in the WCVI shrimp trawl fishery to monitor and mitigate impacts of incidental catch of Eulachon:

1. In 2017/18 DFO implemented several new pilot initiatives to enhance Eulachon monitoring and support in-season management of the shrimp trawl fishery. For WCVI Pacific Fishery Management Areas (PFMAs) 124 and 125 the new initiatives included: (i) mandatory 100% at-sea observer coverage for all shrimp trawl fishing, (ii) a new non-transferable individual vessel Eulachon bycatch limit, (iii) a new individual vessel Eulachon bycatch overage adjustment, and (iv) mandatory dockside validation. At-sea observer requirements were also increased in WCVI PFMA 21, 23, 121, and 123 to a minimum of 20% coverage rate. These new pilot programs are expected to continue for the 2019/20 shrimp by trawl IFMP.
2. Increased at-sea observer days funded for other shrimp management areas along the coast.
3. Mandatory bycatch reduction devices in shrimp trawl nets: A grid designed to reduce non-target fish species from entering the shrimp trawl net is mandatory for all shrimp trawlers. Maximum spacing between the grates starting in 2016/17 was 31.75 mm (1.25

inches), a reduction of 0.5 inches from 2015/16. When fishing pink shrimp in offshore areas, 25 mm spacing is used by most harvesters.

4. Commercial closure in Queen Charlotte Sound shrimp management area. No fishing has occurred within this area since 2000.
5. Eulachon Action Levels (EAL): An annual Eulachon bycatch action level is set for WCVI Shrimp Management Areas to encourage active shrimp trawl harvesters to adjust their gear to minimize Eulachon bycatch. In the event the estimate of Eulachon bycatch in a given WCVI area reaches the Eulachon Action Level, the commercial fishery will likely close. The Department may consider allowing the fishery to continue if other options can be identified that will ensure minimal or no further Eulachon bycatch. A precautionary approach has been taken to deal with Eulachon bycatch and the EAL has been reduced since 2011. The offshore Eulachon biomass index is no longer used to set the EAL. From 2016/17 onwards, the EAL has been set at 4 t (reduced from 6 t in 2015/16). As in previous years, no in-season adjustment to the EAL is expected in 2019/20. Further discussions amongst DFO, Indigenous groups, and stakeholders will inform future EALs.

Table 4: Eulachon Action Levels for West Coast Vancouver Island

<b>Shrimp Management Area Group</b>	<b>2016/17, 2017/18, 2018/19, 2019/20 Annual Eulachon Action Levels (EAL) (t)</b>
124OFF and 125OFF	2.0
123OFF+121OFF and 23IN	2.0

In-season Eulachon bycatch estimates for WCVI Shrimp Management Area (SMA) groups are based on data collected by at-sea observers, following the Pooled In-season (PI) method, defined by Hay (1999). The Eulachon to shrimp ratio from at-sea observations are applied to total estimated shrimp catch (hails) to generate an estimate of in-season Eulachon bycatch for WCVI. If estimated Eulachon bycatch meets or exceeds the EAL, further management actions may be implemented, including closure of the fishery. In 2016 the shrimp trawl WCVI fishery in shrimp management areas 124OFF and 125OFF reached the EAL, resulting in an early closure of the WCVI fishery.

In 2018/2019, DFO took further action to reduce the risk of Eulachon mortality in the fishery, including allowing continued opportunities for testing of LED lights in the WCVI commercial fishery as a means to reduce bycatch (see Hannah et al., 2015). In addition, the Department will be working to reduce the time required in-season to implement closures if the EAL is reached. DFO is also in discussions with the shrimp trawl licence holders regarding increasing observer coverage to better collect data on the harvests in the fishery.

In April 2018 the Department conducted consultations with First Nations and stakeholders on a proposed amendment to the Pacific Fisheries Regulations section 8(1) that would allow commercial shrimp trawl 'S' licenced vessels to use artificial lights (LEDs) on their fishing gear. The use of artificial lights is currently prohibited by this Regulation. Recent scientific research in the United States has indicated that the proper placement of LED lights on the trawl gear drastically reduces the amount of bycatch of several species, including Eulachon. For example, in a 2015 study by Hannah et al., bycatch of Eulachon was reduced by approximately 90% by using the LED lights. Studies also showed that it was critical that the LED lights were placed in the proper configuration in order to be effective in reducing bycatch (ODFW, 2017 & 2018). Licence rules for the use and placement of the LEDs has been developed in the U.S. fisheries, and LED lights are required in the Oregon, Washington, and California shrimp trawl fisheries (ODFW, 2018) as part of their Eulachon Recovery Plan (NMFS, 2017).

The Department is continuing to work on the regulation amendment. If approved, the amendment may come into effect in 2019 at the earliest. The Department will work to establish licence conditions for the commercial fishery that will outline proper use and placement of the LED lights in British Columbia.

For further information on the shrimp trawl fishery, please contact Guy Parker, Resource Management Biologist (250-756-7163 / [guy.parker@dfo-mpo.gc.ca](mailto:guy.parker@dfo-mpo.gc.ca)) for a copy of the current Shrimp Trawl Integrated Fisheries Management Plan.

### **Groundfish Trawl Fishery**

The Department continues to work with the groundfish trawl industry to ensure Eulachon avoidance by the groundfish trawl fleet. The groundfish bottom trawl fishery has been subject to 100% mandatory at sea observer coverage for all fishing activities since 1996. Observer data indicate bycatch in the groundfish trawl fishery is typically low. Since 2007, Eulachon bycatch was estimated to be typically 0.7 tonnes or less, with the exception of three years: 2012 (1.8 tonnes), 2013 (1.8 tonnes), and 2014 (4.2 tonnes). Bycatch of Fraser River-bound Eulachon in the fishery was estimated to be 0.6 tonnes or less since 2007, with the exception of 2012 (1.2 tonnes), 2013 (0.8 tonnes), and 2014 (2.6 tonnes).

Current management measures in place for the groundfish trawl fishery include:

1. Groundfish trawl licences specifically prohibit the fishing for and retention of Eulachon.
2. The groundfish trawl fishery is subject to 100% at-sea monitoring of all fishing events and 100% dockside monitoring of catch.
3. DFO has implemented a minimum mesh size of 76 mm (approximately three inches) in any part of a bottom trawl or mid-water trawl net, including the cod-end, for all waters of the Pacific Ocean, except for specific areas where more restrictive rules are in place as outlined in the groundfish IFMP.

4. On April 2, 2012 DFO implemented a groundfish bottom trawl closure that “froze the bottom trawl footprint on the west coast of Canada” and implemented the industry agreed upon habitat conservation measures for protection of corals and sponges in the Pacific Region groundfish trawl fishery. A benefit for Eulachon of this closure was removal of current and future fishing activities in the shallow water habitat where Eulachon are known to be found.
5. DFO and the groundfish trawl industry will be developing encounter protocols for Eulachon that will require groundfish trawl harvesters to adjust their fishing activities when Eulachon are incidentally encountered. Encounter protocols are rapid-response procedures that could include bio sampling, enhanced monitoring and reporting requirements, immediate modification to vessel/fleet fishing activity and/or implementation of spatial/temporal closures.

For further information on the groundfish trawl fishery, please contact Rob Tadey, Groundfish Trawl Coordinator (604-666-3991 / [robert.tadey@dfo-mpo.gc.ca](mailto:robert.tadey@dfo-mpo.gc.ca)) for a copy of the current Groundfish Integrated Fisheries Management Plan.

### **3.4. OCEANS AND HABITAT CONSIDERATIONS**

#### **Oceans Act**

In 1997, the Government of Canada enacted the *Oceans Act*. This legislation provides a foundation for an integrated and balanced national oceans policy framework supported by regional management and implementation strategies. In 2002, Canada’s Oceans Strategy was released to provide the policy framework and strategic approach for modern oceans management in estuarine, coastal, and marine ecosystems. As set out in the *Oceans Act*, the strategy is based on the three principles of sustainable development, integrated management, and the precautionary approach. The *Oceans Act*, the *Canada Wildlife Act*, and the *National Marine Conservation Areas Act* have given rise to several initiatives on the BC coast, which are listed below. As goals, objectives, and management plans are finalized for these initiatives, the Department’s management of fisheries will be adapted as appropriate, in consultation with interested parties through Integrated Fisheries Management processes. For more information on the *Oceans Act*, please visit the following site: <http://www.dfo-mpo.gc.ca/oceans/index-eng.html>

#### **Canada’s Marine and Coastal Areas Conservation Mandate**

The Government of Canada is committed to protecting 10% of Canada’s marine and coastal areas by 2020, and successfully achieved the target of protecting 5% of marine and coastal areas in 2017. The 2020 target is both a domestic target (Canada’s Biodiversity Target 1) and an international target as reflected in the Convention on Biological Diversity’s Aichi Target 11 and the United Nations General Assembly’s 2030 Agenda for Sustainable Development under Goal 14. The 2017 target has been achieved. More information on the background and drivers for



Canada's marine conservation targets is available online at:  
<http://www.dfo-mpo.gc.ca/oceans/conservation/index-eng.html>.

To meet the 2020 target, Canada is establishing Marine Protected Areas (MPAs) and "other effective area-based conservation measures" ("Other Measures"), in consultation with industry, non-governmental organizations, and other interested parties. Other measures being considered in Pacific Region are a review of Rockfish Conservation Areas and protection of additional glass sponge reefs in Howe Sound. An overview of these tools, including a description of the role of fisheries management measures that qualify as Other Measures is available online at:  
<http://www.dfo-mpo.gc.ca/oceans/mpa-zpm-aoi-si-eng.html>.

Pacific Canada's State of the Ocean Annual Reports are available on the internet at:  
<http://dfo-mpo.gc.ca/oceans/publications/index-eng.html#state-ocean> .

### **Pacific North Coast Integrated Management Area**

An electronic copy of the plan is available online at: <http://pncima.org/> .

### **Marine Protected Areas**

**Marine Protected Areas:** DFO is responsible for designating Marine Protected Areas (MPAs) under Canada's *Oceans Act*. Under this authority, DFO has designated three MPAs in the Pacific Region. The Endeavour Hydrothermal Vents, designated in 2003, lie in waters 2,250 m deep 250 km southeast of Vancouver Island. The SGaan Kinghlas-Bowie Seamount Marine Protected Area (SK-B MPA), designated in 2008, is 180 km west of Haida Gwaii (formerly known as the Queen Charlotte Islands) rising from a depth of over 3,000 m to within 25 m of the sea surface. The Hecate Strait and Queen Charlotte Sound Glass Sponge Reefs MPA (Hecate MPA), implemented in 2017, is southeast of Haida Gwaii and protects glass sponge reefs that are thought to be over 9,000 years old and cover approximately 2,410 km<sup>2</sup>. MPA regulations and management plans articulate any restrictions on activities taking place within the MPA, where applicable. For more information on marine protected areas, please visit:  
<http://www.dfo-mpo.gc.ca/oceans/mpa-zpm/index-eng.html>

Work is on-going to consider MPA designation for the Race Rocks area off Rocky Point south of Victoria (currently designated as a Provincial Ecological Reserve).

In May 2017, DFO announced a new Area of Interest (AOI) within the Offshore Pacific Bioregion off the coast of British Columbia, with the intention of making it one of Canada's largest Marine Protected Areas (MPAs) by 2020. The Offshore Pacific AOI is located in the southern portion of the Offshore Pacific Bioregion extending from the continental shelf break, west of Vancouver Island, to the Exclusive Economic Zone (EEZ) boundary with an area of approximately 140,000 km<sup>2</sup>. In advance of potential MPA designation, fishery closures within the Offshore Pacific AOI were put in place in 2017. The Offshore AOI was closed to commercial and recreational bottom contact fisheries using bottom trawl, hook and line, and trap gear for groundfish, halibut, sablefish, and shellfish. More information on the Offshore Pacific AOI can

be found at: <http://www.dfo-mpo.gc.ca/oceans/aoi-si/offshore-hauturiere-eng.html>. The fishery closures are outlined in Fishery Notice 1241 (2017): [https://notices.dfo-mpo.gc.ca/fns-sap/index-eng.cfm?pg=view\\_notice&DOC\\_ID=203516&ID=all](https://notices.dfo-mpo.gc.ca/fns-sap/index-eng.cfm?pg=view_notice&DOC_ID=203516&ID=all).

**Marine Protected Area Network Planning:** Canada's *Oceans Act* mandates the Minister of Fisheries and Oceans Canada with leading and coordinating the development and implementation of a national system (or network) of marine protected areas. The National Framework for Canada's Network of Marine Protected Areas (National Framework) provides strategic direction for the design of a national network of marine protected areas (MPAs) that will be composed of a number of bioregional networks. This is an important step towards meeting Canada's domestic and international commitments to establish a national network of MPAs. Regionally, the Canada-British Columbia Marine Protected Area Network Strategy has been developed jointly by DFO and the Province of B.C. The MPA network planning process is underway for the Northern Shelf Bioregion (encompassing the area from Northern Vancouver Island to the Alaska-Canada Border) in collaboration with First Nations and the Province of B.C. Stakeholder engagement and advisory processes will continue through 2019.

Areas identified for protection under the MPA Network Planning process could potentially overlap with shrimp trawl fishing areas, depending on the type and nature of the MPA. More information on MPA Network Planning can be found at: <http://mpanetwork.ca/bcnorthernshelf/whats-happening/>.

### **Other Effective Area Based Conservation**

**Strait of Georgia and Howe Sound Glass Sponge Reef Conservation Areas:** Glass sponge reefs are a globally unique ecosystem that provide important habitat for many marine animals including spot prawns, rockfish, herring, halibut, and sharks. The protection of coral and sponge reefs is a key component to a number of international commitments made by Canada through the United Nations Convention on Biological Diversity.

After reviewing input from the 2014 consultation process under the Sensitive Benthic Areas policy (Section 1.6), DFO implemented fishery closures to protect nine glass sponge reefs in the Strait of Georgia and Howe Sound. All commercial, recreational and FSC bottom contact fishing activities for prawn, shrimp, crab and groundfish (including halibut) were prohibited within 150 metres of all nine glass sponge reefs. The closures protect approximately 29 km<sup>2</sup> of sensitive benthic areas. In 2017, nine additional reefs were placed under voluntary avoidance until formal protection could be established. Overview maps of the Strait of Georgia and Howe Sound Glass Sponge Reefs Conservation Areas (and newly identified Howe Sound reefs where voluntary avoidance is being requested) can be found on the internet at: [www.dfo-mpo.gc.ca/oceans/ceccsr-cerceef/closures-fermetures-eng.html](http://www.dfo-mpo.gc.ca/oceans/ceccsr-cerceef/closures-fermetures-eng.html).

More information on the occurrence, ecological function, and sensitivity to fishing of coldwater corals and sponges is available on the internet at: [http://www.dfo-mpo.gc.ca/csas-sccs/Publications/SAR-AS/2010/2010\\_041-eng.html](http://www.dfo-mpo.gc.ca/csas-sccs/Publications/SAR-AS/2010/2010_041-eng.html).

## **National Marine Conservation Areas**

**Gwaii Haanas:** Detailed information on Gwaii Haanas closures can be found at:

<http://www.pac.dfo-mpo.gc.ca/fm-gp/rec/tidal-maree/a-s2-eng.html>

**Southern Strait of Georgia:** Parks Canada, in partnership with the Government of British Columbia, launched a feasibility assessment for a National Marine Conservation Area Reserve (NMCAR) in the southern Strait of Georgia in 2004. Since then, consultations with Indigenous peoples, key stakeholders, communities and the public have occurred. Informed by those discussions, a proposed boundary for consultation was announced by the provincial and federal Ministers of Environment in 2011. Since 2011, the two governments have been consulting with Indigenous peoples, local governments and industry. A preliminary concept is currently being developed to help advance consultations on the feasibility assessment. If the results of the feasibility assessment indicate that establishment of an NMCAR is practical and feasible, an establishment agreement between the Governments of Canada and British Columbia will be negotiated and an interim management plan developed. If the NMCAR is determined to be feasible, further consultations related to establishment agreements and Indigenous rights will also take place with Indigenous peoples. Commercial and recreational fishing sectors, communities, landowners, recreation and environmental organizations and other stakeholders will also have opportunities to provide input to the development of the interim management plan.

More information on the proposed National Marine Conservation Area Reserve in the Southern Strait of Georgia is available on the internet at:

<https://www.pc.gc.ca/en/amnc-nmca/cnamnc-cnmca/dgs-ssg>.

## **Marine National Wildlife Areas**

Under the *Canada Wildlife Act*, Environment and Climate Change Canada may establish marine National Wildlife Areas (NWAs). The Scott Islands Marine National Wildlife Area, located off the northern tip of Vancouver Island, was designated on June 27, 2018. DFO will continue to regulate and administer fisheries within the proposed area and is proposing a regulation under the *Fisheries Act* to restrict fisheries in the area. Environment and Climate Change Canada and DFO will continue to work together on additional research and management measures to support conservation objectives in the area. More information on NWAs can be found at:

<http://www.ec.gc.ca/ap-pa/default.asp?lang=En&n=2BD71B33-1>

## **3.5. SPECIES AT RISK ACT (SARA)**

The *Species at Risk Act* (SARA) came into force in 2003. The purposes of the *Act* are “to prevent wildlife species from being extirpated or becoming extinct, and to provide for the recovery of wildlife species that are extirpated, endangered or threatened as a result of human activity and to manage species of special concern to prevent them from becoming endangered or threatened.”

To view the list of endangered, threatened, and special concern species currently listed under Schedule 1 of SARA, please visit: [http://www.sararegistry.gc.ca/species/schedules\\_e.cfm?id=1](http://www.sararegistry.gc.ca/species/schedules_e.cfm?id=1).

In addition to the existing prohibitions under the *Fisheries Act*, it is illegal to kill, harm, harass, capture, take, possess, collect, buy, sell or trade any SARA-listed endangered or threatened animal or any part or derivative of an individual. These prohibitions apply unless a person is authorized, by a permit, licence or other similar document issued in accordance with SARA, to engage in an activity affecting the listed species or the residences of its individuals. Species listed as special concern are not included in these prohibitions.

The formal SARA legal listing process begins when the Minister of Environment issues a response statement, detailing how he or she intends to proceed with the Committee on the Status of Endangered Wildlife Species Assessments (COSEWIC) species designations. Response statements can be found at:

[http://www.sararegistry.gc.ca/search/advSearchResults\\_e.cfm?stype=doc&docID=19](http://www.sararegistry.gc.ca/search/advSearchResults_e.cfm?stype=doc&docID=19)

COSEWIC was formed in 1977 to provide Canadians with a single, scientifically sound classification of wildlife species at risk of extinction. COSEWIC began its assessments in 1978 and has met each year since then to assess wildlife species.

With the implementation of SARA, COSEWIC has been established as an independent body of experts responsible for identifying and assessing wildlife species considered being at risk. This is the first step towards protecting wildlife species at risk. Subsequent steps include COSEWIC reporting its results to the Canadian government and the public, and the Minister of the Environment's official response to the assessment results. Wildlife species that have been designated by COSEWIC may then qualify for legal protection, recovery or conservation under SARA.

For a full list of species identified and assessed by COSEWIC, please visit:

<http://www.cosewic.gc.ca/>

### **SARA Listing Process for Fraser River (and Central Pacific Coast) Eulachon**

**COSEWIC Assessment May 2011:** In May 2011, COSEWIC assessed Eulachon in BC as three populations based on their criteria for discreteness and evolutionary significance; both the Fraser River and Central Pacific Coast populations were assessed as Endangered, and the Nass/Skeena population unit was originally assessed as Threatened, but it was reassessed in 2013 as Special Concern based on new information.

**SARA Listing Process:** In developing the SARA listing recommendation, DFO will consider the following components for species assessed as Extirpated, Endangered or Threatened (such as the Fraser River and Central Pacific Coast populations of Eulachon):

- best scientific advice (e.g. Recovery Potential Assessments, COSEWIC Assessment);

- development of management scenarios;
- a Socio-Economic Analysis; and
- consultation with Indigenous peoples, affected stakeholders and the Canadian public.

Given the Nass/Skeena population was assessed as Special Concern, and the prohibitions do not apply, a simplified process occurred and was completed in 2016.

It is anticipated that this listing process for all three populations of Eulachon will be completed in 2018 at the earliest.

**Recovery Potential Assessment (RPA):** The RPA provides the Department's scientific advice in support of this SARA decision. Please see section 2.6 for further information.

**Management Scenarios:** Management scenarios were developed in consultation with Indigenous peoples and commercial sector representatives. These scenarios were finalized in October 2014 and outline actions the Department may take in the event that the Fraser River and/or Central Pacific Coast populations of Eulachon is listed under SARA, as well as those actions that will be taken under existing legislation (e.g. the *Fisheries Act*) in the event that Eulachon are not listed under SARA.

**Socio-Economic Analysis:** Federal policy (Cabinet Directive on Regulatory Management, 2012) requires an analysis of benefits and costs for regulatory decisions, such as whether or not to list a species under SARA. The Socio-Economic Analysis (SEA) of the management scenarios provides an estimate of the benefits and costs to Canadians of a SARA listing, as well as the distribution of these benefits and costs among stakeholders. The Canadian Cost-Benefit Analysis (CBA) Guide (2007) provides the framework and methodology to be used for all regulatory changes, including SARA listings.

The CBA identifies, quantifies and monetizes, where possible, the incremental costs and benefits of the actions identified in the Management Scenarios. Where the impacts cannot be monetized or quantified, they are described in qualitative terms. The SEA also considers the potential social impacts of the scenarios, specifically examining measurable impacts such as employment and income impacts across affected parties and regions. A full draft of the SEA was completed in 2016.

**Listing Consultations:** The Department has sought input since 2011 into the development of the RPA, Management Scenarios, and Socio-Economic Analysis for the Fraser River and Central Pacific Coast populations. An Indigenous technical review of the Socio-Economic Analysis was conducted in 2015.

In recognition of the cultural significance of Eulachon, an Indigenous specific consultation plan was developed in fall 2011. Initial consultations were conducted in February to June 2012 with

Indigenous peoples throughout the coast to clarify the SARA process and create an opportunity for discussion on the topic.

Consultation with Indigenous peoples, stakeholders, and interested members of the public on whether or not to list the Fraser River and/or Central Pacific Coast population as Endangered under SARA occurred August 30-November 30, 2016. The consultation process for the Nass/Skeena population concluded in 2016. Input was sought online via a web-based survey, by phone, letter, email, webinars, and meetings. The Department's Recovery Potential Assessment, Management Scenarios, and Socio-Economic Analysis for the Fraser River and Central Pacific Coast populations of Eulachon were made available during this consultation period.

### **Whale, Leatherback Turtle and Basking Shark Sightings**

The Department welcomes assistance in the reporting of any whale, leatherback sea turtle or basking shark entanglement or sighting. While there are many whale species found in Pacific Canadian waters, sightings of Basking Shark and Leatherback Sea Turtles are infrequent. The collection of sighting data is useful to scientists in determining population size and species distribution and aids in recovery efforts under the Species at Risk Act (SARA).

### **Marine Mammal Incident Reporting Hotline**

The Department is responsible for assisting marine mammals and sea turtles in distress. If your vessel strikes a whale, or if you observe an entangled, sick, injured, distressed, or dead marine mammal in B.C. waters, please contact the B.C. Marine Mammal Response Network Incident Reporting Hotline immediately. To report whale or turtle sightings contact the BC Cetacean Sighting Network:

Toll free: 1.866.I.SAW.ONE (1-866-472-9663)

**1-800-465-4336 OR VHF CHANNEL 16**

- Your name and contact information
- Date and time of incident
- Species
- Animal alive/dead
- Nature of injury
- Location: Latitude/Longitude coordinates, landmarks
- Pictures/Video taken

Email: [sightings@ocean.org](mailto:sightings@ocean.org)

Internet: <http://wildwhales.org/>

App: WhaleReport



To report basking shark sightings contact the Basking Shark Sightings Network:  
Toll free: 1-877-50-SHARK (1-877-507-4275)  
Email: [BaskingShark@dfo-mpo.gc.ca](mailto:BaskingShark@dfo-mpo.gc.ca)  
Internet: <http://www.dfo-mpo.gc.ca/species-especes/sharks/report-form-eng.asp>

### **3.6. GEAR IMPACTS**

Under normal operating circumstances, there is minimal to no environmental impact from gear types used in the Eulachon fishery.

### **3.7. AQUACULTURE**

On December 19, 2010 DFO assumed the role of lead federal department for sustainable management of aquaculture. Under the *Fisheries Act*, the *Pacific Aquaculture Regulations* and the *Aquaculture Activity Regulations* govern finfish, shellfish and freshwater aquaculture operations in BC. Cultivation of fish within the province requires a federal aquaculture licence issued by Fisheries and Oceans Canada. Approvals from other agencies may be required, depending upon the location and type of aquaculture activity proposed.

Pacific Aquaculture Regulations:

<http://laws-lois.justice.gc.ca/eng/regulations/SOR-2010-270/FullText.html>

Aquaculture Activity Regulations:

<http://laws-lois.justice.gc.ca/eng/regulations/SOR-2015-177/page-1.html>

Integrated Management of Aquaculture Plans (IMAPs) consistent with IFMPs, which are used to govern wild harvest fisheries, have been developed to provide an overview of the management framework for aquaculture. For further information refer to:

<http://www.dfo-mpo.gc.ca/aquaculture/aquaculture-eng.htm>.



## 4. OBJECTIVES

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### 4.1. NATIONAL

Fisheries and Oceans Canada aims to:

- Meet conservation objectives and ensure healthy and productive fisheries and ecosystems;
- Base management decisions on the best available scientific information;
- Manage Indigenous fisheries for FSC purposes in a manner consistent with the Sparrow Decision (SCC 1990) and other relevant court decisions (*R v. Gladstone 1996 and Ahousaht*) and treaty obligations;
- Provide stability, transparency, and predictability in fisheries management and improved governance; and
- Foster shared stewardship.

### 4.2. PACIFIC REGION

The overall goal of Fisheries Management in the Pacific Region is the conservation of Canada's fisheries resources to ensure sustainable resource utilization and generate economic prosperity, accomplished through close collaboration with resource users and stakeholders based on shared stewardship consistent with treaty and Indigenous rights. Fisheries Management is responsible for management of the Indigenous, commercial and recreational fishing in the Pacific Ocean and creating the conditions for a vibrant and innovative aquaculture industry.

Fisheries Management will continue to develop and implement the Sustainable Fisheries Framework by integrating the precautionary and ecosystem approach frameworks into IFMPs with the goal of protecting vulnerable marine and freshwater ecosystems and vulnerable stocks from significant adverse impacts, and to help ensure long term sustainability and support economic prosperity.

In 1994, the Biological Objective Working Group of the Pacific Scientific Advice Review Committee (PSARC) identified three biological objectives for management of Pacific Region fish and invertebrate stocks (Rice et al, 1995):

- Ensure that subpopulations over as broad a geographical and ecological range as possible do not become biologically threatened (in the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) sense of "Threatened").
- Operationally, Objective 1 requires at least that management allow enough spawners to survive, after accounting for all sources of mortality (including all fisheries and natural mortality), to ensure production of enough progeny that they will, themselves, be able to replace themselves when mature.



- Fisheries may have collateral effects on other species, mediated by the ecological relationships of the target species. Fisheries should be managed in ways that do not violate the above objectives for ecologically related species, as well as target species.

The objectives remain relevant today, particularly in light of development of the national objectives around sustainable fisheries.

### **4.3. EULACHON RESOURCE MANAGEMENT**

The objective of the current Eulachon fishery is to respond to conservation concerns with Fraser River Eulachon stocks and introduce measures to allow for stock rebuilding. Specific objectives are detailed below, and respective performance measures are further described in the management measures for the Indigenous, recreational and commercial fishing plans (Appendices 3, 4 and 5):

#### **Recovery Target**

A coast-wide recovery target for Eulachon is, at a minimum, to “promote the populations’ recovery such that it can qualify as special concern within the COSEWIC assessment criteria”, with an interim goal of observing “positive growth in Eulachon spawning in river systems throughout” the designatable unit ranges, and a long term goal of seeing the populations reach historic levels (Schweigert et al. 2012).

For the Fraser River population, COSEWIC assessed this population as endangered based on an observed population decline of greater than 50% over three generations (approximately 10 years for Eulachon). Recovery for Fraser River Eulachon “should be reflected in an increase in this index to historical levels.” The first goal “would be a population increase that would exceed COSEWIC’s criteria for endangered status, and bring the assessment down to a species of special concern,” and “additional rebuilding would be required to bring the Fraser River [designatable unit] to a point where it was not at risk based on COSEWIC criteria” (Schweigert et al. 2012). In addition, “distribution targets for the population would include an expansion of sustained spawning ranging to the historical extent” (Schweigert et al. 2012).

#### **Environmental and Ecological Conservation**

To ensure conservation and protection of Eulachon stocks and their habitat, and manage for ecosystem impacts through the application of scientific management principles applied in a risk averse and precautionary manner based on the best scientific advice available.

#### **Consultation Process**

Conduct an open and transparent consultation process for discussions of harvest management issues related to Eulachon harvest. DFO currently does not have a consultative body related to harvest planning for this fishery, but is conducting extensive consultation with Indigenous peoples and stakeholders.

### **Indigenous Peoples**

To ensure that, subject to conservation needs, first priority is accorded to Indigenous peoples for opportunities to harvest Eulachon for FSC purposes. Feedback from consultations sessions is relied on to measure the performance of providing priority to Indigenous peoples for opportunities to catch fish for FSC purposes.

Limited harvest opportunities will provide access to Indigenous peoples for FSC purposes while meeting conservations objectives. Maintaining harvest at low levels will increase the probability of rebuilding Fraser River Eulachon stocks. The Department will manage the Fraser Eulachon fisheries conservatively in 2019.

## **4.4. COMPLIANCE**

Conservation and Protection (C&P) staff promote, monitor and enforce compliance with legislation, regulation and management measures to ensure conservation and sustainable use of fisheries resources, including Eulachon.

For more information see the Compliance Plan, section 7.

## **5. ACCESS AND ALLOCATION**

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The Minister can, for reasons of conservation or for any other valid reasons, modify access, allocations, and sharing arrangements as outlined in this IFMP in accordance with the powers granted pursuant to the *Fisheries Act*.

### **5.1. INDIGENOUS**

Indigenous harvest of Eulachon for FSC purposes may occur where authorized by a communal licence. The Department will provide Indigenous peoples with priority access to the resource for FSC purposes. FSC quotas may be determined through bilateral discussions between Indigenous peoples and the Department.

### **5.2. RECREATIONAL**

Recreational harvest of Eulachon is closed coast wide in tidal waters and freshwater.

### **5.3. COMMERCIAL**

The commercial harvest of Eulachon is a limited entry fishery. There are currently 16 party-based ZU licence eligibilities; however the fishery has been closed since 2004.

## 6. SHARED STEWARDSHIP ARRANGEMENTS

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In the past, some co-operative work has been done coast-wide, including donations of time, money, vessels, gear, samples, and offshore surveys. These measures have contributed to our knowledge about Eulachon in the Pacific Region. Indigenous peoples and stakeholders have provided assistance in obtaining information on spawner distribution, in-season test fishery data, and survey data. Also, the commercial shrimp trawl industry provided survey assistance for the offshore index (WCVI and Queen Charlotte Sound).

The Department's AFS (Aboriginal Fisheries Strategy (<http://www.dfo-mpo.gc.ca/fm-gp/aboriginal-autochtones/afs-srapa-eng.htm>)) has provided funds for Indigenous peoples to assist in the spawner distribution work and the egg and larval surveys including the egg and larval survey that provides the annual SSB estimate for the Fraser River area.

## 7. COMPLIANCE PLAN

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DFO's Conservation and Protection (C&P) program is responsible for enforcing the *Fisheries Act*, pursuant regulations and related legislation. Enforcement activities are carried out by Fishery Officers across Canada who conduct patrols on land, at sea and in the air.

The Department promotes compliance with the law through a range of activities from education and awareness activities that encourage Canadians to protect fishery resources and habitats, patrol activities to detect violations, and major case management. These activities are further outlined in the C&P National Compliance Framework.

There are approximately 173 fishery officers stationed in the Pacific Region, which encompasses British Columbia and Yukon Territory. They are designated as "Fishery Officers" under Section 5 of the *Fisheries Act*. The *Fisheries Act* and the *Criminal Code of Canada* are the primary pieces of legislation outlining the powers and responsibilities of Fishery Officers. Officers are designated under other Acts as well, such as the *Coastal Fisheries Protection Act* and *Species at Risk Act*.

Conservation and Protection Fishery Officers are supported by the National Fisheries Intelligence Service, whose staff provide intelligence analysis services and assist in identifying targets for enforcement action. A process to incorporate information of value to the intelligence cycle has been developed. This process allows Fishery Officers, Resource Managers and stock assessment staff to collect and submit this information on a timely basis.

Users of the resource have a responsibility to report violations. Any suspected or actual fisheries, wildlife or pollution violations can be quickly and discretely reported to the appropriate enforcement officer by using the toll free observe, record and report hotline. This toll free number is available 24 hours a day.

OBSERVE, RECORD AND REPORT 1-800-465-4DFO (1-800-465-4336)

Enforcement enquiries can also be directed to the local field offices during regular office hours.

### 7.1. MAIN PROGRAM ACTIVITIES

#### **Priorities for 2019**

Enforcement priorities and strategies for the 2019 Eulachon fisheries will be developed and coordinated with local C&P and Fisheries Management staff.

In-season and post-season reviews will be conducted to ensure the best approach and strategies are used in the management of this fishery.

### **In-season**

Fishery Officers will conduct directed and opportunistic patrols of the fishing area. Patrols during open and closed times will be conducted taking into consideration competing priorities and resources. Fishery Officers may also conduct general compliance inspections at various locations such as border crossings, air cargo locations, fish processing facilities or fishing supply and tackle stores where baitfish are sold.

Illegal fishing activity may be reported through the Observe, Report, and Record line at 1-800-465-4336. Fishery Officers attempt to follow through on the reports as often as priorities, time and resources allow.

Table 5: Enforcement Issues and Strategies

<b>Issue</b>	<b>Strategy</b>
Fishing during closed time/area	Enforcement patrols will be conducted when opportunities exist.
Purchase, sell or possess any fish without a licence	Investigations will occur when violations are encountered or reported.

## **8. PERFORMANCE REVIEW**

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### **8.1. MANAGEMENT PLAN EVALUATION CRITERIA**

#### **National**

Eulachon conservation objectives are met.

Reasonable effort has been made to provide harvest opportunities and still maintain conservation objectives.

Consultation and management processes are stable, transparent, and predictable.

#### **Pacific Region**

Both the commercial and recreational fisheries remain closed and Indigenous peoples may apply for harvest of small amounts of Fraser River Eulachon for FSC purposes that are considered on a case by case basis.

#### **Eulachon Resource Management**

##### **Environmental and Ecological Conservation**

- Conservation and protection of Eulachon stocks will be carried out by applying a conservative management regime in light of the limited biological information available for Fraser River Eulachon
- Collect relevant information by geographic location and time period when possible.

##### **Consultation**

- Where possible, facilitate consensus building among stakeholders on issues related to the management of the fishery.

##### **Indigenous Peoples**

- DFO will consult with Indigenous peoples in order to determine their FSC requirements. Indigenous peoples will be authorized to fish for FSC purposes on a priority basis for small amounts for Fraser River Eulachon through use of a communal licence.

##### **Commercial**

- Maintain a precautionary closure of the fishery for population rebuilding in tidal waters and freshwater.

##### **Recreational**

- Maintain a precautionary closure of the fishery for population rebuilding in tidal waters and freshwater.

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## APPENDIX I: 2018 POST-SEASON REVIEW

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**Indigenous Fisheries:** In 2018, Indigenous peoples' access to Eulachon for food, social and ceremonial (FSC) purposes was managed through communal Aboriginal fishing licences on the Fraser River. In 2018, harvest opportunities were provided on a case-by-case basis per Band up to the maximum harvest level target of 6,275 lb (2.85 t) total; the total Eulachon harvest in 2018 was 5,481 lb (2.49 t).

**Recreational Fisheries:** There were no recreational fisheries for Eulachon on the Fraser River in 2018.

**Commercial Fisheries:** There were no commercial fisheries for Eulachon on the Fraser River in 2018.

**New Westminster Test Fishery:** The New Westminster test fishery was not conducted in 2018.

**LFFA Pilot Survey Project:** This survey was completed in the 2017 and 2018 seasons and will be evaluated for future seasons.

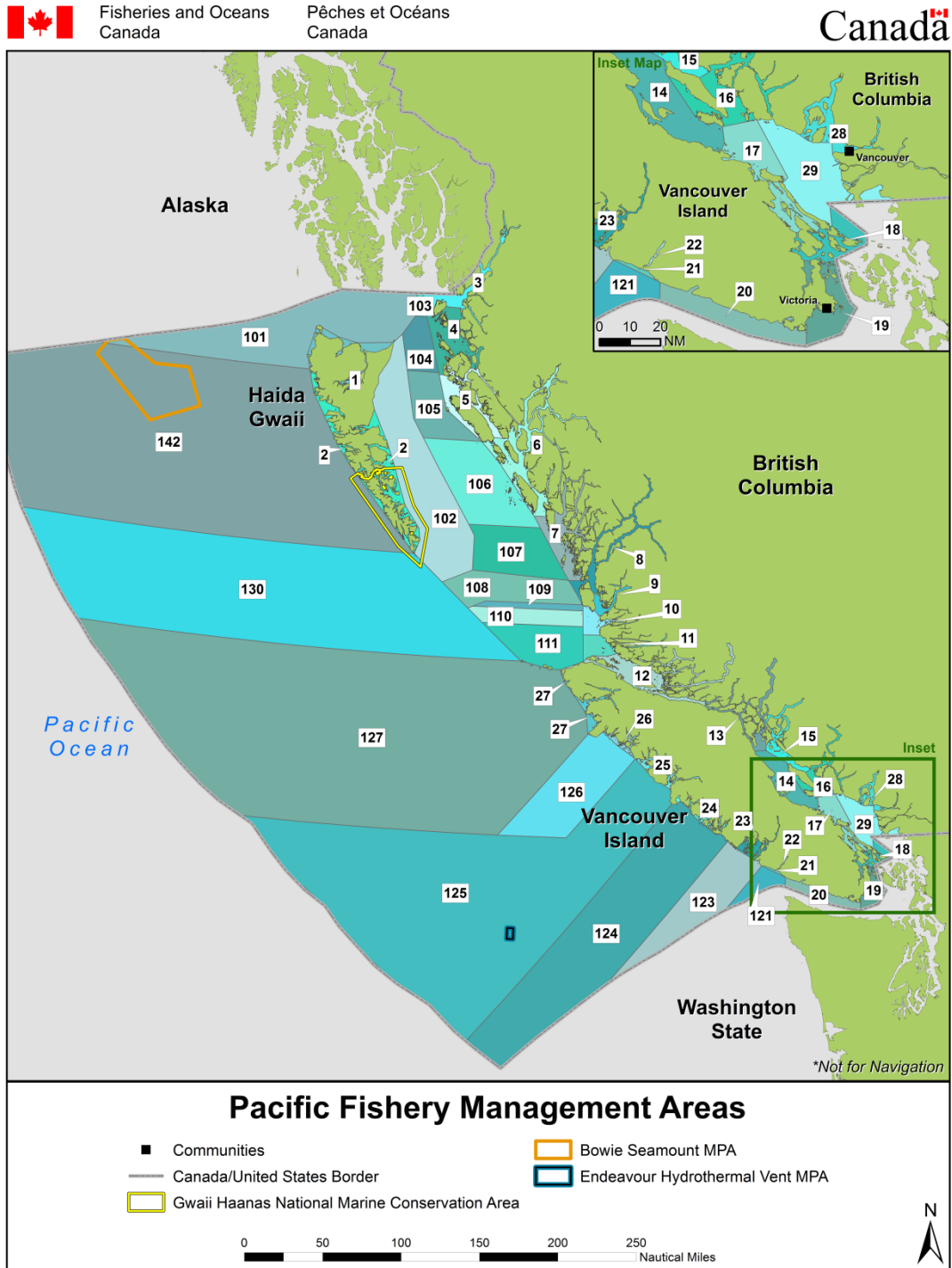
**Egg and Eulachon Larval Survey:** The survey was conducted again in 2018, over the standard 7-week period and a 10-week period, which added an additional 3 weeks to the front end of the standard 7-week period.

Number of Survey Weeks	Timing	North Arm SSB Index (tonnes)	South Arm SSB Index (tonnes)	Total SSB Index (tonnes)
7	April 23 - June 7	110	298	408
10	April 2 - June 7	111	303	414

The peak out-migration of progeny in 2018 was during May 10 to 20, with the highest densities observed May 14.

For more information on the survey results for 1995 to 2016, visit <http://www.pac.dfo-mpo.gc.ca/science/species-especes/pelagic-pelagique/herring-hareng/herspawn/pages/river1-eng.html>. For information on survey results after 2017, please contact Linnea Flostrand, Aquatic Science Biologist (250- 756-7187 / [linnea.flostrand@dfo-mpo.gc.ca](mailto:linnea.flostrand@dfo-mpo.gc.ca)).

# APPENDIX 2: MAP OF FISHING AREAS



## APPENDIX 3: 2019 INDIGENOUS FISHING PLAN

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The Department is committed to improving its relationship with Indigenous people. Indigenous fisheries play an important role in this relationship and, therefore, are an integral part of fisheries resource management in the Pacific Region. Through consultation, cooperative management and stewardship activities, DFO and Indigenous groups are working together to build strong, healthy relationships and a sustainable fishery.

Through the Aboriginal Fisheries Strategy, the Department seeks to negotiate with Indigenous groups regarding access for food, social and ceremonial (FSC) purposes. Subject to conservation, this access has priority over access for commercial and recreational harvest.

Due to conservation concerns and an ongoing recovery process, a maximum FSC harvest for Fraser River Eulachon of 9,652 pounds (lb) (4.38 tonnes (t)) will be permitted in 2019. In 2018, FSC licences for Eulachon were issued to individual Indigenous groups up to a maximum harvest level (total) of 6,275lb (2.85 t). This was an increase from the 6,059 lb (2.75 t) limit in 2017, the 3,445 lb (1.56 t) limit in 2016, the 2,469 lb (1.12 t) in limit in 2015, and the 800 lb (0.36 t) limit in 2014.

Since 2015 the method used to calculate the maximum harvest level has involved using a percentage of the average of Fraser Eulachon egg and larval survey Spawning Stock Biomass (SSB) index for a 2 to 3 Eulachon generation time span (i.e. assuming typically 3 years = 1 generation). In 2015, the maximum harvest level was set at 2% of the average of the previous 6 years (i.e. 2 generations) of SSB index values. In 2016, the method was revisited and instead the maximum harvest level was set at 2% of the average of the previous 9 years (i.e. 3 generations) of SSB index values. The longer time span was chosen in order to take into account year-to-year variation in SSB index values and Eulachon returns. Moreover, evaluating three generations or 10 years (whichever is greater) is the International Union for the Conservation of Nature (IUCN) criterion commonly used by the Committee of the Status of Endangered Wildlife in Canada (COSEWIC) for evaluating population trends. Two percent was chosen as a conservative harvest rate. In 2017 and 2018, 3.5% of the average of the previous 9 years was used to calculate the maximum harvest level. The harvest level was still conservative and accommodated requests for an increased harvest to meet the FSC needs of Indigenous peoples. Advice is being sought from DFO Science to inform future harvest levels and the Department is committed to discussing the FSC harvest level methodology with Indigenous people going forward. In 2019, a harvest level of 3.5% of the average of the previous 9 years of the SB index will be used.

Table I. Recent Fraser River Eulachon Indigenous food, social and ceremonial fishery harvest level setting methodologies and maximum harvest levels

Year	Harvest Rate	SSB index timespan used to calculate harvest level	Maximum harvest level (tonnes)	Maximum harvest level (pounds)
2014	NA	NA	0.36	800
2015	2%	Average of previous 6 years	1.12	2,469
2016	2%	Average of previous 9 years	1.56	3,445
2017	3.5%	Average of previous 9 years	2.75	6,059
2018	3.5%	Average of previous 9 years	2.85	6,275
2019*	3.5%	Average of previous 9 years	4.38	9,652

This approach will provide access to Indigenous peoples for FSC purposes while supporting conservation and rebuilding objectives. Access to Fraser River Eulachon will be determined on a case-by-case basis through discussions with Indigenous groups and the DFO Fraser and Interior Area office staff. Specific fishing plans are developed through these consultations and fishing plan discussions.

DFO will continue to use management measures for communal licences, such as: gear restrictions, shorter opening times, and increased monitoring. These licence conditions are designed to ensure the total harvest target is not exceeded and to facilitate achievement of shared objectives between Indigenous people by allowing all Indigenous groups an opportunity to catch their harvest targets. Licence conditions will include the following management measures:

- Gillnet length: Maximum of 100 m;
- Fishing time: Maximum of 12 hours or as negotiated in-season;
- Soak time: Maximum of 20 minutes or as negotiated in-season;
- Consideration of dip nets or Eulachon rakes as a gear type in traditional fishing areas, and;
- Enhanced monitoring program. Going forward, this will be informed by an ecological risk assessment performed as directed in the Strategic Framework for Fishery Monitoring and Catch Reporting in Pacific Fisheries (more information is available in section 1.6).

Any Indigenous group interested in developing new harvest methods or restarting historic harvest methods will work with DFO staff to licence and monitor appropriately.

The Department will consider further management actions following the completion of the SARA listing process.

For additional information on DFO's Treaty and Aboriginal Fisheries programs, please visit: <http://www.pac.dfo-mpo.gc.ca/abor-autoc/index-eng.html>

## APPENDIX 4: 2019 RECREATIONAL FISHING PLAN

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DUE TO CONSERVATION CONCERNS, THE RECREATIONAL FISHERY IS CLOSED IN 2019.

### General Information on Tidal Water Sport Fishing - Licensing and Regulations

The recreational harvest of various fish and invertebrate species in BC is regulated via the *British Columbia Sport Fishing Regulations, 1996* made under the *Fisheries Act*. A Fisheries and Oceans Canada Tidal Waters Sport Fishing licence is required for the recreational harvest of all species of fish. More information on licences is available online via the National Recreational Licensing System (NOLS) at:

<http://www.pac.dfo-mpo.gc.ca/fm-gp/rec/licence-permis/application-eng.html>

The regulations for recreational fishing of finfish are summarized in the British Columbia Tidal Waters Sport Fishing Guide which lists closed times, bag limits, size limits (where applicable) and closed areas: <http://www.pac.dfo-mpo.gc.ca/fm-gp/rec/index-eng.html>. Fishery Notices are issued to advise of changes to the regulations which are kept up-to-date in the online Sport Fishing Guide; view or sign-up to receive Fishery Notice notifications by email at:

<http://notices.dfo-mpo.gc.ca/fns-sap/index-eng.cfm>. The Sport Fishing Institute of BC has recently developed the 'FishingBC App', a free app you may optionally download to your mobile device if you wish to receive up-to-date sport fishing regulation details.

The Sport Fishing Advisory Board (SFAB) is the primary consultative body for the recreational fishing community, and includes representatives from all geographic regions in BC, and the BC Wildlife Federation, and the Sport Fishing Institute of BC. If you have any questions or need further information, please contact a recreational fisheries co-coordinator or a local Fisheries and Oceans Canada office (see Departmental Contacts).

## APPENDIX 5: 2019 COMMERCIAL FISHING PLAN

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**DUE TO CONSERVATION CONCERNS, THE COMMERCIAL FISHERY IS CLOSED IN 2019.**

The commercial Fraser River Eulachon fishery has limited entry licensing with sixteen licence eligibilities in ZU licence category, however for 2019 the fishery is closed. Since the fishery is closed, licence eligibility holders will not be required to designate a vessel or pay licence renewal fees. No action is required at this time to maintain 2019 licence eligibility.

### **General Information on Licensing Service Changes – Effective since 2013**

Fisheries and Oceans Canada (DFO) introduced the web-based National Online Licensing System (NOLS) in the spring of 2013. This web-based system replaces in-person counter service at Pacific Fishery Licensing Units. Fish harvesters/licence holders/vessel owners will now use the new online system to view, pay for and print their commercial fishing licences, licence conditions and/or receipts. Fish harvesters must log into the NOLS to register and activate their accounts using the DFO Passcode that has been mailed to them in order to pay the fees and request issuance of a licence.

With the exception due to the Fraser Eulachon commercial fishery closure mentioned in the first paragraph above, licence renewal is mandatory on an annual basis prior to the expiry date of each fishery in order to maintain eligibility in the future, and licence eligibility will cease if not renewed annually.

Telephone: 1-877-535-7307 (ask for “Pacific Region”)  
Fax: 604-666-5855  
Email: [fishing-peche@dfo-mpo.gc.ca](mailto:fishing-peche@dfo-mpo.gc.ca) (specify “Pacific Region” in subject line)

Please be sure to visit the Pacific Region Licensing website and subscribe to fishery notices for updates on the National Online Licensing System and licensing services at: <http://www.pac.dfo-mpo.gc.ca/fm-gp/licence-permis/index-eng.html>.  
Information on the new system may be found on the DFO internet site at: <http://www.dfo-mpo.gc.ca/fm-gp/sdc-cps/licence-permis-eng.htm>.