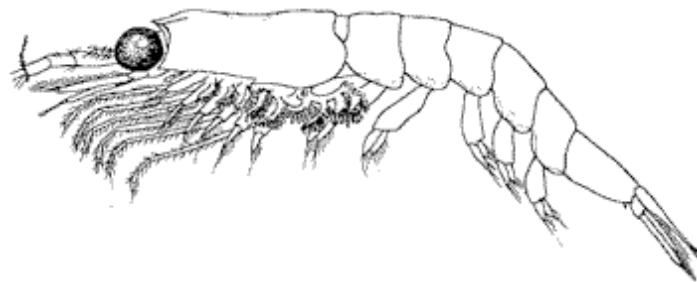


PACIFIC REGION

INTEGRATED FISHERIES MANAGEMENT PLAN

EUPHAUSIIDS

**JANUARY 1, 2023 TO
DECEMBER 31, 2027**



Euphausiids: *Euphausia pacifica*



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 regulations, the 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.

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FOREWORD

The purpose of this Integrated Fisheries Management Plan (IFMP) is to identify the main objectives and requirements for the Euphausiid fishery in the Pacific Region, 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 & Oceans Canada (DFO) staff, legislated co-management boards and other stakeholders. 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.

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ATTACHMENTS

- Appendix 1: Euphausiid Commercial Harvest Plan
- Appendix 2: Euphausiid Validation & Harvest Log
- Appendix 3: Euphausiid Quota Management Area Maps
- Appendix 4: Fishing Vessel Safety

Krill image on title page (with thanks): Kathman, R.D., J.C. Saltman, and J.D. Fulton. 1986. Identification manual to Mysidacea and Euphausiacea of the northeast Pacific Can. Spec Publ. fish Aquat. Sci. 93:411p.

1. OVERVIEW

1.1. Introduction

This multi-year Integrated Fisheries Management Plan (IFMP) for Euphausiids encompasses the period January 1, 2023 to December 31, 2027.

This IFMP provides a broad context to the management of the fishery for Euphausiids (or “krill”) in the Pacific Region (British Columbia, Canada). An overview of the fishery, biological synopsis, Indigenous knowledge and socio-economic profile are provided in Sections 1 to 4. Emerging management issues that may impact on management measures in the fishery are described in Section 5. Objectives for the fishery that reflect the biological synopsis and address emerging issues are provided in Section 6. Access and allocation are summarized in Section 7. The fishery management procedures, shared stewardship arrangements and compliance plan to achieve the objectives are described in Sections 8, 9 and 10. The ways and means by which achievement of the objectives will be measured is described in Section 11. References, a glossary and contacts are provided in Sections 12 to 15. A post-season review is provided in Section 16 to look back at previous years of the fishery based on the performance measures provided in Section 11.

The Commercial Harvest Plan is attached to this IFMP as Appendices 1 to 4. Commercial Euphausiids harvesters are advised to review the appendices for fishing and vessel safety information.

1.2. History

A trawl fishery for Euphausiids, also known as “krill”, using fine meshed plankton trawl nets began in 1970 in the Strait of Georgia, British Columbia (BC), as an experimental fishery. A 500 tonnes total allowable catch was established in 1975 to permit gear development. These limitations were established due to concerns for harvesting a forage species upon which salmon and other commercially important finfish depend. The experimental fishery was intended to be temporary and move out of the Strait of Georgia to outside waters where production was estimated to be greater if markets could be expanded above 200 tonnes.

The fishery changed from a scientific licence to a general purpose, category “C”, commercial licence in 1983. The total allowable catch was established at 500 tonnes with a season from November to March to minimise the incidental catch of larval and juvenile fish. The allowable catch was estimated to be less than 3% of the annual consumption of Euphausiids by all predator species in the Strait of Georgia (Jamieson et al. 1990).

The number of commercial licences issued increased annually from 7 in 1983 to 56 in 1990, then declined to 45 in 1991. The number of licences was limited in 1993, under category “ZF” licence, with 19 harvesters qualified after appeals.

The fishery remains small within the Strait of Georgia and a few adjacent mainland inlets. Catch is limited by low participation and few markets.

1.3. Type of Fishery and Participants

1.3.1 First Nations

First Nations are not known to harvest Euphausiids for food, social or ceremonial purposes.

1.3.2 Recreational

A recreational harvest of “other shellfish” species is permitted under the BC Tidal Waters Sport Fishing Licence and may include Euphausiids by dip net but there is little, if any, interest.

1.3.3 Commercial

The Euphausiid fishery is a commercial fishery. The commercial fishery is a limited entry, competitive fishery. A personal “ZF” licence is required to participate in the fishery. There are 16 eligible participants under this licence. The “ZF” licence is held by an individual party who must designate a commercially-licensed vessel each year (vessel length restrictions apply). One communal commercial licence (category “FZF”) is available to First Nations (Section 4.3).

Participation in the fishery is limited to a few vessels in recent years due to economics and markets. Freezer vessel(s), whose daily catches are generally limited due to freezing capacity, and “fresh” vessel(s), which have the capacity to land larger quantities of Euphausiids for onshore processing and freezing, participate in the fishery. Catch must be frozen as soon as possible after landing, generally within seven to 12 hours to avoid a significant deterioration of the market product, and corresponding reduction in quality and value. There are a limited number of buyers and registered processors involved in the BC Euphausiid industry. These facilities are located in the greater Vancouver area and, in some years, French Creek.

1.4. Location of Fishery

The commercial fishery occurs in the upper Strait of Georgia, Jervis Inlet, and other mainland inlets (Knight, Bute, and Toba Inlets and Homfray-Lewis-Pryce Channels) in the south coast of BC. Specific annual quotas are set for each area. Most of the catch comes from Jervis Inlet and the Strait of Georgia.

Euphausiid harvests have occurred in the past in Loughborough Inlet and Howe Sound and these areas continue to be included as possible harvest locations in the future as policy and stock assessment activities may provide. However, no directed fishing activities have occurred in these areas for many years.

Maps of commercial Quota Management Areas are provided in Appendix 3.

1.5. Fishery Characteristics

The Euphausiid fishery is a small limited entry, competitive commercial fishery managed through area-based quotas, seasonal openings, a precautionary 500 tonne total allowable catch (“TAC”) and a fishery notification (“hail”) and dockside validation program funded by commercial harvesters.

1.5.1. First Nations

First Nations are not known to harvest Euphausiids for food, social or ceremonial purposes.

Commitment to Reconciliation

DFO is committed to the recognition and implementation of Indigenous and treaty rights related to fisheries, oceans, aquatic habitat, and marine waterways in a manner consistent with section 35 of the *Constitution Act, 1982*, the United Nations Declaration on the Rights of Indigenous peoples, the United Nations Declaration on the Rights of Indigenous Peoples Act, and the federal Principles Respecting the Government of Canada's Relationship with Indigenous peoples. DFO-CCG Reconciliation Strategy provides a guidance document to better understand why and how reconciliation informs the work of the Department.

For further details on the United Nations Declaration on the Rights of Indigenous peoples see <https://www.justice.gc.ca/eng/declaration/index.html>

For further details on the United Nations Declaration on the Rights of Indigenous Peoples Act see <https://laws-lois.justice.gc.ca/eng/acts/u-2.2/>

For further details on the Principles Respecting the Government of Canada's Relationship with Indigenous peoples see <https://www.justice.gc.ca/eng/csjsj/principles-principes.html>

DFO's Reconciliation Strategy can be found at <https://www.dfo-mpo.gc.ca/fisheries-peches/aboriginal-autochtones/reconciliation-eng.html>

For further details on reconciliation in British Columbia and Yukon, refer to <https://www.pac.dfo-mpo.gc.ca/abor-autoc/reconciliation-pacific-pacifique-eng.html>

Information on Indigenous fisheries and reconciliation is available at: <http://www.pac.dfo-mpo.gc.ca/abor-autoc/index-eng.html>

Information on the Government of Canada work to advance reconciliation can be found here: <https://www.rcaanc-cirnac.gc.ca/eng/1400782178444/1529183710887>

FSC Fisheries

Fish and marine resources are central to the culture, society, and well-being of First Nations and provide a critical connection to language, traditional knowledge, economies and health of communities. Fisheries & Oceans Canada (DFO) remains committed to respecting First Nations' Aboriginal right to fish for food, social and ceremonial (FSC) purposes, or domestic purposes under Treaty which has priority – after conservation – over other uses of the resource.

Section 35(1) of the *Constitution Act* recognizes and affirms the existing Aboriginal and Treaty rights of the Aboriginal Peoples in Canada. However, it does not specify the nature or content of the rights that are protected. In 1990, the Supreme Court of Canada issued a landmark ruling in the *Sparrow* decision which found that the Musqueam First Nation has an Aboriginal right to fish for food, social and ceremonial (FSC) purposes. The Supreme Court found that where an Aboriginal group has a right to fish for FSC purposes, it takes priority, after conservation, over other uses of the resource. The Supreme Court has also indicated the duty to consult with Aboriginal Peoples when their fishing rights might be affected.

The Aboriginal Fisheries Strategy (AFS) was implemented in 1992 to address several objectives related to First Nations and their access to the resource. These included:

- Improving relations with First Nations
- Providing a framework for the management of the First Nations fishery in a manner that was consistent with the Supreme Court of Canada's 1990 *Sparrow* decision

- Greater involvement of First Nations in the management of fisheries
- Increased participation in commercial fisheries (Allocation Transfer Program (ATP))

AFS continues to be one of the principal mechanisms – in addition to Treaties and reconciliation agreements - to support the development of relationships with First Nations including the consultation, planning and implementation of fisheries, and the development of capacity to undertake fisheries management, stock assessment, enhancement and habitat protection programs.

Five Nations Right-Based Sale Fishery

Five Nuu-chah-nulth First Nations located on the west coast of Vancouver Island - Ahousaht, Ehatesaht, Hesquiaht, Mowachaht/Muchalaht, and Tla-o-qui-aht (the Five Nations) – have an Aboriginal right to fish for any species, with the exception of Geoduck, within their fishing territories and to sell that fish. The Department has developed a Five Nations Multi-species Fishery Management Plan (FMP). The FMP includes specific details about the fishery, such as allocation/access, licensing and designations, fishing area, harvesting opportunities, and fishery monitoring and catch reporting. Feedback provided by the Five Nations during consultations is considered and incorporated into the FMP by DFO where possible. The implementation of the Five Nations’ right-based sale fishery continues to be an ongoing process. The FMP is developed to implement the right-based multi-species fishery to accommodate the Five Nations’ Aboriginal rights consistent with the British Columbia Supreme Court’s 2018 decision. Version 2 of the 2021 FMP, issued on December 2, 2021, was the first Multi-Species FMP developed following the British Columbia Court of Appeal (BCCA) decision of April 19, 2021, in *Ahousaht Indian Band and Nation v. Canada*, 2021 BCCA 155, but it only partially implemented it. The 2022/23 FMP addressed most of the remaining issues raised by the BCCA decision, leaving some items left to review. It is DFO’s intention to continue to review the FMP and make further changes in-season and amend the FMP if required.

For further information, the FMP may be obtained online.

Treaties and Reconciliation Agreements

a) Treaties and Self Government Agreements

There are six modern treaties and self-government agreements in British Columbia, which all have fisheries chapters: Nisga’a Final Agreement, Tsawwassen First Nation Final Agreement (TFA), Maa-nulth First Nations Final Agreement (MNA), Tla’amin (Sliammon) Nation Final Agreement, Sechelt Self-government Act, and Westbank First Nation Self-government Agreement. Through these treaties, Nations work with DFO to manage treaty fisheries on an annual basis. There are also historic treaties in British Columbia (Douglas Treaties and Treaty 8). For a detailed list of treaties in BC and Yukon, please see the internet at <https://www.pac.dfo-mpo.gc.ca/abor-autoc/treaty-traites-eng.html>.

Fisheries chapters in modern treaties articulate a treaty fishing right for domestic purposes that are protected under Section 35 of the *Constitution Act*, 1982. Negotiated through a side agreement, some modern treaty First Nations have commercial access through a Harvest Agreement outside of the constitutionally protected treaty.

b) Reconciliation Agreements

In addition to negotiating treaties, the Government of Canada and Indigenous peoples can also negotiate Recognition of Indigenous Rights and Self-Determination (RIRSD) agreements, to explore new ways of working together to advance the recognition of Indigenous rights and self-determination. These agreements are led by Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC). With participation from relevant departments, DFO can also negotiate Fisheries Resources Reconciliation Agreements directly with First Nations to advance reconciliation with First Nations. These agreements seek to advance reconciliation and enhance First Nations and DFO collaborative governance and management on fisheries, marine and aquatic matters.

Reconciliation agreements work within the legislative framework of the *Fisheries Act*. The Act provides the Minister of Fisheries, Oceans and the Canadian Coast Guard with the legislative authority for the proper management and control of the fisheries, the conservation and protection of fish, and regulation of the fishery.

Since 2019, the Government of Canada entered into several framework agreements with First Nations that lay the foundation for incremental development and implementation of new arrangements for collaborative governance on fisheries and marine matters. A ‘framework agreement’ sets out the subject matter for negotiation and describes how negotiations will proceed towards a final agreement. A final reconciliation agreement includes substantive commitments the Parties have agreed to implementing and governs the relationship between the Parties for its term.

See the BC Treaty Commission at <https://www.bctreaty.ca/index.php> and CIRNAC for more information on current treaty tables at <https://www.rcaanc-cirnac.gc.ca/eng/1100100028574/1529354437231> and for current RIRSD tables at <https://www.rcaanc-cirnac.gc.ca/eng/1511969222951/1529103469169>.

Framework Agreements:

- *GayGahlda “Changing Tide” Framework Agreement* between Haida and Canada
- *Reconciliation Framework Agreement for Fisheries Resources* between A-Tlegay Member Nations (We Wai Kai Nation, Wei Wai Kum First Nation, Kwiakah First Nation, Tlowitsis Nation, and K’ómoks First Nation) and Canada

Reconciliation Agreements:

- *Haílcištut Incremental House Post Agreement* between Heiltsuk and Canada
- *Coastal First Nations Fisheries Resource Reconciliation Agreement* between Canada and Metlakatla, Gitxaala, Gitga’at, Kitsoo/Xai-Xais, Nuxalk, Heiltsuk, Wuikinuxv, and Haida Nations
- *Gwet’sen Nilt’I Pathway Agreement* between T̓silhqot’in, Canada and BC
- *Burrard Inlet Environmental Science and Stewardship Agreement* between Tsleil-Waututh Nation and Canada.

As DFO and First Nations develop and implement new fisheries and collaborative governance arrangements, DFO works with these Nations to engage neighbouring First Nations and stakeholders (e.g. commercial and recreational sectors).

1.6. Governance

The Euphausiids fishery is governed by the *Fisheries Act* (R.S., 1985, c. F-14) and regulations made thereunder, including the *Fishery (General) Regulations* (e.g., conditions of licence), the *Pacific Fishery Regulations* (e.g., open times), the *British Columbia Sport Fishing Regulations*, the *Aboriginal Communal Fishing Licences Regulations* and the *Pacific Aquaculture Regulations*. Areas and Subareas are described in the *Pacific Fishery Management Area Regulations*.

Marine Protected Areas are established under the *Oceans Act* (1996, c. 31). National marine conservation areas are established under the *Canada National Marine Conservation Areas Act* (2002, c. 18). Marine National Wildlife Areas may be established under the *Canada Wildlife Act* (1985, c. W-9).

Species listed as extirpated, endangered, threatened or special concern are governed by the *Species At Risk Act* (2002, c. 29) (SARA) which has implications for the management of fisheries that impact listed species. In addition to prohibitions under the *Fisheries Act*, it is illegal under the SARA to kill, harm, harass, capture, take, possess, collect, buy, sell or trade any listed endangered or threatened animal or any part or derivative of an individual.

These documents are available on the internet at:

<https://www.dfo-mpo.gc.ca/acts-lois/index-eng.htm> More information on the SARA is available at:

<https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html>

In addition, the Sustainable Fisheries Framework (SFF) is a toolbox of policies for Fisheries and Oceans Canada (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 for Managing the Impacts of Fishing on Sensitive Benthic Areas;
- Policy on New Fisheries for Forage Species;
- A Fishery Decision-Making Framework Incorporating the Precautionary Approach;
- Guidance for the Development of Rebuilding Plans under the Precautionary Approach Framework: Growing Stocks out of the Critical Zone;
- Policy on Managing Bycatch;
- Ecological Risk Assessment Framework (ERAF) for Coldwater Corals and Sponge Dominated Communities; and
- Fishery Monitoring Policy.

For more information on the Sustainable Fisheries Framework and its policies, please visit: <https://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, environmental 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 previous Sustainability Surveys are available online: <http://www.dfo-mpo.gc.ca/reports-rapports/regs/sff-cpd/survey-sondage/index-en.html>

Scientific advice for this fishery is peer-reviewed primarily through a committee called the Canadian Science Advisory Secretariat (CSAS). Additional non-peer reviewed reports on Euphausiids of the BC coast are included in the annual DFO State of the Pacific Ocean reports, which are available on the internet at:

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

1.7. Approval Process

The Regional Director General for the Pacific Region approves this plan.

2. STOCK ASSESSMENT AND SCIENCE

2.1. Biological Synopsis

Euphausiids are an order of marine crustaceans found throughout the oceans of the world. There are 85 species of Euphausiids in the world, ranging in size from several millimetres to the largest deep sea species reaching 15 cm in length (Baker *et al.* 1990). Twenty species of Euphausiids occur in BC waters but biomass is dominated by five: *Euphausia pacifica*, *Thysanoessa spinifera*, *T. inspinata*, *T. longipes* and *T. raschii*. *E. pacifica* typically accounts for 70 - 100% of the Euphausiid biomass in the Strait of Georgia where the commercial fishery occurs (Jamieson *et al.* 1990).

E. pacifica is a widely distributed species in the North Pacific Ocean from Japan to southern California. It has only been fished commercially in the west of its range, off Japan, and the east of its range, off BC (Nicol and Endo 1997). A number of studies have been carried out on the biology and life history of the species harvested in BC. Much of this research has been focused on *E. pacifica* since it constitutes the predominant species harvested off Japan and BC.

In BC, Euphausiids release their eggs directly into the water where they develop independently. The main spawning season occurs in May to July with a second period of less intensive spawning in late August through September in the Strait of Georgia (Heath 1977). The life span is estimated to be 19-22 months with growth cessation occurring in early autumn to winter when water temperatures and phytoplankton abundance are low.

Euphausiids are gregarious and aggregate into dense patches. This "aggregation" behaviour makes them attractive and susceptible to the directed commercial fishery.

2.2. Ecosystem Interactions

Euphausiids are a forage species and prey for many other species. The consumption of adult Euphausiids was estimated for the seven most abundant fish species found on the continental shelf off southwestern Vancouver Island in August for each year from 1985 to 1997. The fish

community was estimated to consume an average of 297 kilotonnes of Euphausiids in August. Pacific Hake (*Merluccius productus*) and Pacific Herring (*Clupea harengus*) accounted for most of the total Euphausiids consumed by fish (Robinson 2000).

Blue Whales feed almost exclusively on zooplankton, primarily Euphausiids (Gregr *et al.* 2006). Euphausiids are also the primary prey for Humpback Whales, although schooling fishes are also important components of the Humpback Whale's diet (Ford *et al.* 2009; DFO unpubl. data). Fin whales feed on Euphausiids and schooling fish. Sei Whales have a more diverse diet that includes copepods and forage fish (which prey on zooplankton) (Gregr *et al.* 2006). Although predominately a benthic feeder, it is possible that grey whales, when they occur in the Strait of Georgia, may prey on Euphausiids.

Euphausiids are an important component of the Strait of Georgia ecosystem. The available information indicates that they rank only behind Copepods (subclass Copepoda) in their contribution (as percentage) to total zooplankton biomass (Mackas *et al.* 2013 and Li *et al.* 2013). Population fluctuations in Euphausiid abundance almost certainly affect the growth, survival and distribution of their predators.

Trends in zooplankton biomass have been linked to large scale climate indices, such as the Southern Oscillation Index, the North Pacific Gyre Oscillation and the Pacific Decadal Oscillation (Li *et al.* 2013 and Boldt *et al.* 2021), as well as local factors such as sea surface salinity (Perry *et al.* 2021). As with many marine ecosystems, the zooplankton community is subject to the effects of climate change. Climate change continues to be a dominant pressure acting on North Pacific ecosystems (Boldt *et al.* 2021), however the long-term effects of climate change on Euphausiid population size are not well understood.

2.3. Stock Assessment

Surveys have been ongoing since the beginning of the fishery in the early 1970s. In 1994, 1995, and 1996 acoustical mapping surveys with verification tows were conducted by DFO Science Branch in Jervis Inlet and Malaspina Strait in October and November, prior to fishing effort, and again in January and February after fishing efforts had ceased. Also between June 1994 and summer 1995, joint DFO and industry surveys were conducted monthly supported by external funding sources. The results of these surveys indicated that the present harvest levels are a small fraction of the annual average standing stock (Romaine *et al.* 1996).

In 1998, DFO Science Branch carried out hydroacoustical assessments during daylight hours in February, March, July, and October using standard gear from Canadian Coast Guard Research Vessels in the Malaspina Strait and Lower Jervis Inlet areas where the majority of commercial harvest occurs. Results suggested biomass estimates may have been 10-15% below the estimates derived from surveys conducted in 1997 (Romaine *et al.* 2002 and Mackas *et al.* 1996). These results seemed to contradict the increased yields and high catch per unit effort observed in the 1998 fishery.

A compilation of zooplankton data collected from the Strait of Georgia during the past 20 years showed decadal fluctuations shared by most zooplankton taxa including Euphausiids; declining from 1990-1995, increasing to a maximum ~1999-2002, declining to a minimum in 2005-2007, and then recovering to near-average levels by 2010. These zooplankton fluctuations correlated positively with the North Pacific Gyre Oscillation (NPGO) climate index, negatively with

temperature anomalies throughout the water column, and positively (but less consistently) with survival anomalies of Strait of Georgia salmon and herring (Mackas *et al.* 2013).

Anomalies of log-scaled annual estimates of Euphausiid biomass in the Strait of Georgia are included in BC coastwide reviews of zooplankton in DFO's State of the Pacific Ocean reports, which are available on the internet at:

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

Results for 2016, for example, indicate that annual biomass anomalies for *E. pacifica* in the Strait of Georgia peaked in 2011, were above normal from 2012-2015, but slightly below average in 2016 (Galbraith and Young, 2017). Biomass has stayed relatively stable from 2008 to 2020, with no obvious trend of increasing or decreasing biomass over that period (Young *et al.* 2020). Annual total zooplankton biomass anomalies in the Strait of Georgia have been generally above their climatological average since 2011, and Euphausiids biomass in the northern and central Strait of Georgia have been at or the above long-term average since 2008 (Young *et al.* 2020 and Perry *et al.* 2021). In 2020, biomass of zooplankton increased in the Strait of Georgia (Young *et al.* 2020 and Boldt *et al.* 2021).

2.4. Stock Scenarios

The population size of Euphausiids in the Strait of Georgia has large seasonal and interannual variability. At present and past catch limits (<500 tonnes), the fishery removes only a small fraction of the Strait of Georgia annual average biomass (estimated at less than 1% annually from 1990 to 2010, except for 2005 during which the catch may have removed between 4-8% of the standing Euphausiid biomass), and an even smaller fraction of annual Euphausiid production (Romaine *et al.* 1996, Mackas *et al.* 1996 and Mackas and Moore 1994). However, in poor years, caused mostly by climate and predator effects on the Euphausiids, fishery removals may locally intensify the degree of “poor” but there is insufficient information currently available about within-year mobility within the Strait of Georgia to determine this with any accuracy (Romaine *et al.* 2002; Mackas *et al.* 1996).

2.5. Precautionary Approach

The Department follows the Sustainable Fisheries Framework (SFF (Section 1.6), which includes a decision-making framework incorporating a precautionary approach to commercial, recreational and food, social and ceremonial fishing: <http://www.dfo-mpo.gc.ca/reports-rapports/regs/sff-cpd/precaution-eng.htm>

In general, the precautionary approach in fisheries management requires caution when scientific knowledge is uncertain. The absence of adequate scientific information should not result in postponed action or failure to take action to avoid the risk of serious harm to fish stocks or their ecosystem. This approach is widely accepted internationally as an essential part of sustainable fisheries management.

Harvest control rules compliant with the Precautionary Approach (PA) framework have not been developed for Euphausiids.

The available information on the biology and abundance of Euphausiids in BC is considered to be “data limited”. The key scientific requirement in the development of a precautionary

management strategy for “data limited” or “emerging” invertebrate fisheries has been identified as information on the abundance, distribution and productivity of the species (Perry *et al.* 1999). Euphausiids are managed based on the intent of the Precautionary Approach Policy, however moving forward on establishing PA components would need to take place over several years.

2.6. Research

A study of Euphausiid aggregation mechanisms was conducted in Knight Inlet in 2001 and 2002 (Ianson *et al.* 2011). They found that Euphausiid behaviour was cued by ambient light levels and the small-scale current shear in the bottom boundary layer, which is likely to enhance Euphausiid aggregations in strong flows at sills and on continental shelves.

Euphausiid monitoring and distribution mapping may be useful for the management of the Euphausiids’ seasonal and year-round predators, like coho, herring, sockeye and hake.

Future surveys of Euphausiids in the Strait of Georgia will provide a contemporary update to the stock assessment and ongoing State of the Ocean reporting. The availability of time series of zooplankton data from the Strait of Georgia may provide a means to understand the natural variability of this ecosystem and how Euphausiids may be impacted by climate change.

3. INDIGENOUS KNOWLEDGE

In 2019, the *Fisheries Act* was amended to include provisions for the where the Minister may, or shall consider provided Indigenous knowledge in making decisions pertaining to fisheries, fish and fish habitat, as well as provisions for the additional protection of that knowledge when shared in confidence.

The term Indigenous knowledge may not be universally used, and other terms such as Indigenous Knowledge Systems, Traditional Knowledge, Traditional Ecological Knowledge, or Aboriginal Traditional Knowledge, which all convey the similar concepts, may be used instead.

Indigenous knowledge can inform and fill knowledge gaps related to the health of fish stocks, and aid decision making related to fisheries management. The Government of Canada and the scientific community acknowledge the need to access and incorporate IK in meaningful and respectful ways. Work is underway at a National level to develop processes for how DFO receives Indigenous knowledge and applies it to inform decision making. This will include consideration of how to engage knowledge holders, and how to ensure that the knowledge can be shared and considered in a mutually acceptable manner by both knowledge holders and the broader community of First Nations, stakeholders, managers, and policy makers involved in the fisheries. This work will be an iterative process done in collaboration with First Nations, Indigenous groups and knowledge holders, to ensure protection of the knowledge provided.

4. ECONOMICS OF THE FISHERY

4.1. Commercial

This section analyses the 10-year economics of the Euphausiid fishery from 2011 to 2020.

The landed value of the Euphausiid fishery (2011-2020), according to sales slips extrapolated to verified landings, was lowest in 2014 at \$24,590 and peaked in 2012 at \$473,121^{1,2}. The annual average landed value was \$181,327. The landed price has varied between \$0.74 and \$1.96 per kg and averages \$1.18 per kg. The maximum number of vessels reporting landings in a given year was 4 in 2011. One to four vessels have fished in recent years (average 2.5 vessels/year), as shown below in Figure 1. The number of vessels active in this fishery has declined throughout the years.

Figure 1 also shows annual Euphausiid landings from 2011-2020. Landings peaked in 2012 at 260 tonnes and were lowest in 2014 at 33 tonnes. The wide variation can be attributed to the small size of the fishery; the level of participation of individual licence eligibility holders in the fishery and market demands strongly drive the amount of landings. In each year analysed, the annual TAC was never reached. Average annual landings are 115 tonnes. The majority of harvest has been taken from the Strait of Georgia and Jervis Inlet, with the two areas dominating interchangeably every year. However, there remains some variation in the areas that Euphausiids are harvested. For instance, in 2019, 40% of the harvest was taken from the Strait of Georgia, and the remainder from Bute Inlet, Toba Inlet, and Homfray/ Lewis/ Pryce Channels (D & D Pacific Fisheries Ltd.).

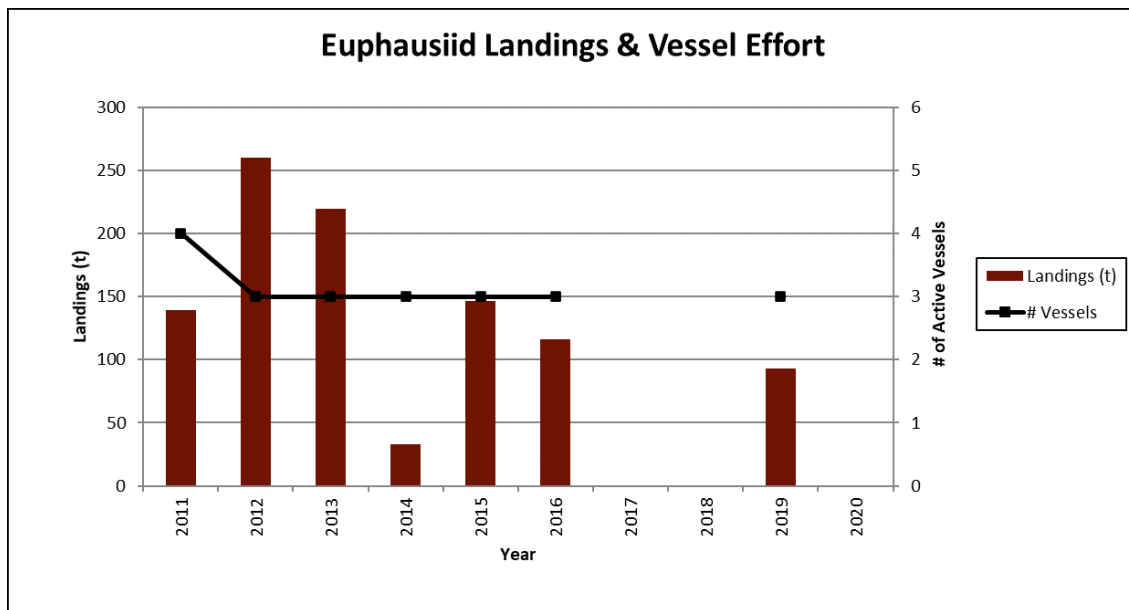


Figure 1. Annual Euphausiid Landings (tonnes) and Vessel Effort. Source: Logbooks, DFO; Validated landings, D&D Pacific Ltd. Please note that 2017, 2018, and 2020 data have been suppressed for confidentiality as fewer than 3 vessels reported landings.

Catch per unit effort ($\text{kg}\cdot\text{hr}^{-1}$) reported on harvest logs has varied from $768 \text{ kg}\cdot\text{hr}^{-1}$ in 2014 to $3,146 \text{ kg}\cdot\text{hr}^{-1}$ in 2013. Variations in catch per unit effort may result from a combination of factors such as changes in stock abundance, sea surface temperatures, stock distribution and competitive fishing effort resulting from improved markets.

¹ *Please note that all figures are in \$2021 unless otherwise specified.

² Data for 2017, 2018, and 2020 have been suppressed for confidentiality purposes as fewer than 3 vessels reported landings.

The current nominal value of a “ZF” licence is \$40,000 (Simpson, 2020). Nominally, licence values have fluctuated from \$50,000 in 2011 to \$30,000 in 2012 and 2013. However, they have remained stable at \$40,000 since 2014.

4.2. Viability and Market Trends

Most of the commercial harvest of Euphausiids in BC is frozen for use in the manufacture of fish food. A small portion of the catch is freeze dried and used as aquarium pet food. There are also developing markets for “krill”, the common marketing name, as human food products, food additives, biochemicals, enzymes, and protein concentrates (Nicol and Endo 1997). Participation is sporadic in this very small-scale fishery in BC, and returns to harvesters are marginal. Outlook for the fishery remains uncertain.

4.3. First Nations

The Allocation Transfer Program (ATP) and Pacific Integrated Commercial Fishery Initiative (PICFI) have relinquished existing commercial licence eligibilities from fish harvesters on a voluntary basis and re-issued these to eligible First Nation organizations as communal commercial licences.

One of the 17 licences is designated as a communal eligibility (“FZF”) to provide economic opportunity to First Nations through participation in the commercial fishery (Section 4.1) but there has been no interest in fishing this licence.

For more information on the Aboriginal Fisheries Strategy (AFS) ATP, contact a resource manager listed in Section 14 or see the internet at:

www.pac.dfo-mpo.gc.ca/abor-autoc/atp-ptaa-eng.html

More information on the PICFI is available on the internet at:

www.pac.dfo-mpo.gc.ca/fm-gp/picfi-ipcip/index-eng.html

5. MANAGEMENT ISSUES

The following emerging issues may impact the management measures in place for the Euphausiid fishery.

5.1. Conservation and Sustainability

Basic biological information (i.e., age, growth, recruitment and migration) in support of the management of these species is limited. There is a minimal amount of available biological data with which to assess the fishery, and from which to develop and alter management plans.

A better understanding of the influence of varying exploitation rates on the resilience of local populations in years of poor survival (caused mostly by climate and predator effects on Euphausiids) may be needed to support the Policy on New Fisheries for Forage Species (Section 1.6).

5.1.1. National Fishery Monitoring and Catch Reporting

Robust fishery monitoring information is essential for stock assessment and to effectively implement management measures such as target and bycatch limits, quotas and closed areas.

Fishery monitoring information is also needed to support the long-term sustainable use of fish resources for Food, Social, and Ceremonial and other Indigenous fisheries, commercial fisheries, recreational fisheries, and to support market access for Canadian fish products.

Following multi-sectoral consultations, DFO released the national *Fishery Monitoring Policy* in 2019, replacing the regional *Strategic Framework for Fisheries Monitoring and Catch Reporting in the Pacific Fisheries* (2012). The national *Fishery Monitoring Policy* seeks to provide dependable, timely and accessible fishery information through application of a common set of procedural steps used to establish fishery monitoring requirements across fisheries. Policy principles include respecting Indigenous and Treaty rights, linkage of monitoring requirements to the degree of risk and complexity of fisheries, linkage of monitoring programs to fishery and policy objectives while accounting for cost-effectiveness and practicality of implementation, and shared accountability and responsibility between DFO, Indigenous groups and stakeholders.

To ensure consistent national application of the Fishery Monitoring Policy, further guidance is provided through the “Introduction to the Procedural Steps of Implementing the Fishery Monitoring Policy”. Fish Stocks are first prioritized for assessment through collaboration with Indigenous groups and Stakeholders. Risk and data quality assessments are then conducted on priority stocks and associated fisheries and monitoring programs. Next, monitoring objectives are set in alignment with the Fishery Monitoring Policy, followed by specifying monitoring requirements and then monitoring programs are operationalized. Finally, a review and evaluation of the fishery monitoring programs against the monitoring objectives will be conducted and reported on.

The Fishery Monitoring Policy is part of DFO’s Sustainable Fisheries Framework and is available at:

<https://www.dfo-mpo.gc.ca/reports-rapports/regs/sff-cpd/fishery-monitoring-surveillance-des-peches-eng.htm>

The “Introduction to the Procedural Steps of Implementing the Fishery Monitoring Policy” is available at:

<https://www.dfo-mpo.gc.ca/reports-rapports/regs/sff-cpd/fmp-implementation-psp-mise-en-oeuvre-eng.htm>

In cases where assessment of monitoring programs identifies a gap between the current and target level of monitoring, discussions will be held between DFO Indigenous groups and stakeholders to identify options to address the monitoring gap, and the feasibility of these options (e.g. cost, technical considerations, etc.). To support Fishery Monitoring Policy principles, a collaborative approach is required.

Where monitoring options are determined to be feasible, the monitoring and reporting regime will be revised to incorporate these options, providing resource managers with sufficient information to meet Fishery Monitoring Policy objectives. Where monitoring options are not feasible, alternative management approaches are required to reduce the risk posed by the fishery. If there is no gap between the current and target level of monitoring, the management approach Currently, the Euphausiid fishery is 100% dockside validated (Appendix 1).

5.2. Social, Cultural and Economic

5.2.1. Commercial Fishery

Catch levels and value remain limited and most licences are not fished.

5.3. Compliance

There are no emerging issues for compliance enforcement.

5.4. Ecosystem

5.4.1. Forage Species

Euphausiids are a forage species and subject to the Policy on New Fisheries for Forage Species (Section 1.6). Under the Policy, existing fisheries for forage species that have an established record of sustainability, and the resource has been consistently conserved, may continue within the existing management approaches.

A review in 2012 of the pre-existing Euphausiid fishery indicated that the annual Euphausiid catch had not exceeded 1% of the estimated annual average Strait of Georgia Euphausiid biomass except in 2005, and the fishery was allowed to continue under the existing management approaches provided that management controls remained sufficient to adequately track area quotas and collect accurate catch and effort data. The annual biomass was calculated by adjusting the overall geometric mean biomass by the annual (log-scale) anomaly relative to average seasonal cycle. Because of year-to-year differences in sampling dates, this was considered to be more stable than the annual average of samples and the geometric mean is a more conservative estimator (biased low) than the arithmetic mean. Any future proposals to change exploitation rates, gears, seasons, or other attributes of the fishery in ways that might affect conservation of the forage species or species feeding on it will be evaluated against the pre-requisites outlined under the Policy.

The limited area and allowable catch on the Euphausiid fishery have been key mitigating factors in limiting competition with SARA-listed cetacean species in BC waters. Blue Whales (Endangered) show an on-shelf to deep water distribution off BC and are currently not at risk from direct competition with the Euphausiid fishery, which is restricted to the Strait of Georgia and mainland inlets (Gregr *et al.* 2006). Similarly, the Euphausiid fishery is not identified as a threat of prey availability for Humpback Whales (Special Concern) or Grey Whales (Special Concern). Grey Whales feed on a broader range of benthic and planktonic species (Amphipods, ghost shrimps and associated small clams, mysid shrimps, planktonic crab larvae and herring spawn). Historically, Fin Whales (Threatened) were occasionally observed in the more protected waters of the Strait of Georgia (Pike and MacAskie 1969) but contemporary sightings in Pacific Canadian waters are predominantly from the west coast of Vancouver Island, Hecate Strait and Queen Charlotte Sound (Gregr *et al.* 2006). Cetacean surveys in recent years off the BC coast and shelf-break region have not resulted in a single confirmed Sei Whale (Endangered) sighting and the number of these whales currently occurring in Pacific Canadian waters appears quite small (Gregr *et al.* 2006).

The increase in numbers of Humpback Whales in inshore waters may result in an increase in fishery interactions with whales for which the BC marine mammal response network continues to monitor and track reports (Section 14 Contacts).

5.4.2. Bycatch

Plankton trawl nets fish only the upper several metres of the water column and bycatch in the Euphausiid fishery is rare and generally limited to small quantities of hake, herring and dogfish. A few juvenile rockfish have been mentioned as a rare occurrence due to the limited nature of the fishery and that it is targeted in the upper water column. Gear limitations are in place to reduce bycatch in this fishery. A specialized small, fine-mesh plankton trawl is towed at a slow speed (0.02-0.03 knots) in the upper several metres of the water column such that most mobile organisms are able to avoid the plankton trawl. Any bycatch, if encountered, is recorded by the vessel master and service provider dockside at time of landing.

Managing bycatch and discards has long been part of Canadian fisheries management. To ensure long-term productivity, biodiversity and sustainability, Fisheries and Oceans Canada has developed a policy for managing bycatch and discards that builds on the success of existing measures. This policy is a key component of a strengthened SFF and is consistent with the ecosystem approach to fisheries management. This policy can be found at: <http://www.dfo-mpo.gc.ca/reports-rapports/regs/policies-politiques-eng.htm>

5.4.3. Other Species Concerns

5.4.3.1. *Species at Risk Act*

The *Species at Risk Act* (SARA) came into force in 2003 “to prevent wildlife species from being extirpated or becoming extinct, and to provide for the recovery of a 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.”

SARA contains several prohibitions to protect species listed on Schedule 1 of SARA. Under sections 32 and 33 of SARA, it is an offence to: 1) kill, harm, harass, capture or take an individual of a wildlife species listed as extirpated, endangered or threatened under SARA; 2) possess, collect, buy, sell or trade an individual (or any part or derivative of such an individual) of a wildlife species listed as extirpated, endangered or threatened under SARA; and 3) damage or destroy the residence of one or more individuals of a wildlife species that is listed as an endangered or threatened species, or that is listed as an extirpated species if a recovery strategy has recommended its reintroduction into the wild in Canada. 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. Section 58(1) contains provisions to prohibit the destruction of any part of the critical habitat of listed endangered or threatened species or of any listed extirpated species if a recovery strategy has recommended the reintroduction of the species in the wild in Canada. Critical habitat is the habitat necessary for the survival or recovery of a listed wildlife species and is identified in the recovery strategy or an action plan for the species.

For the most up to date list of endangered, threatened, and special concern marine species in Pacific Region currently listed under the *Species At Risk Act*, COSEWIC status reports and associated recovery documents, please visit: [Species at risk public registry](#).

The process to list a wildlife species on Schedule 1 of SARA is initiated after an assessment by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) for that species is completed. The SARA legal listing process formally begins when the Minister of Environment and Climate Change issues a response statement, detailing how he intends to proceed with the

COSEWIC species designations. Response statements can be found at: [Response statements - Canada.ca](#)

5.4.3.2. *Committee on the Status of Endangered Wildlife in Canada (COSEWIC)*

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 review information collected to assess wildlife species.

With the proclamation of SARA, COSEWIC has been established as an independent advisory panel responsible for identifying and assessing wildlife species considered to be in danger of disappearing in Canada. The assessments are carried out in accordance with section 15 of SARA, which, among other provisions, requires COSEWIC to determine the status of species it considers and to identify existing and potential threats. 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 and Climate Change's official response to the assessment results. Wildlife species that have been designated by COSEWIC may then qualify for legal protection and recovery under SARA.

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

<https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-list-species-assessed.html>

5.4.3.3. *SARA Listing process for Pacific Coast Feeding Group and Western Pacific Grey Whale populations*

The Grey Whale is a medium- to large-sized baleen cetacean. As of 2017, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) recognizes three Grey Whale populations in Canadian Pacific waters. The Eastern North Pacific population, currently Special Concern on Schedule 1 of SARA, was split into two populations. A broader North Pacific Migratory population, which migrates from winter breeding grounds in Mexico to summer feeding areas in the Bering Sea and Arctic waters, was assessed by COSEWIC as Not at Risk. A small population which over-winters in Mexico and resides and feeds in British Columbia waters in summer and fall, the Pacific Coast Feeding Group, was assessed as Endangered. A new Western Pacific population, which contains individuals that were recently shown migrate through British Columbia waters to breeding areas in Mexico, was also assessed as Endangered.

The two COSEWIC-assessed Endangered Grey Whale populations are under consideration for SARA listing. Consultations on these proposed amendments under SARA and the potential impacts of SARA listing were held in 2022. For further information, please contact the Species at Risk Program at SARA.XPAC@dfo-mpo.gc.ca.

5.4.3.4. *Shark Codes of Conduct*

Out of the fourteen shark species in Canadian Pacific waters, three species are listed under SARA. The Basking Shark (*Cetorhinus maximus*) is listed as Endangered, and the Bluntnose Sixgill Shark (*Hexanchus griseus*) and Tope Shark (*Galeorhinus galeus*) are listed as species of Special Concern. In Canadian waters, the primary threats to shark species have been identified as bycatch and entanglement. In order to address conservation concerns with shark species, it is important that measures are taken to reduce the mortality of sharks resulting from these primary

threats. As such, commercial fishing licences have been amended to include a Condition of Licence for Basking Sharks that specify mitigation measures in accordance with SARA permit requirements. Additionally, two 'Code of Conduct for Shark Encounters' documents have been developed to reduce the mortality of Basking Shark, as well as other Canadian Pacific shark species such as Bluntnose Sixgill and Tope Shark, resulting from entanglement and bycatch in commercial and recreational fisheries, and aquaculture. These guidelines include boat handling procedures during visual encounters with Basking Sharks, and best practices for handling Canadian Pacific shark species during entanglement encounters.

These documents have been posted online and can be found at the following URL links.

Code of conduct for sharks: <https://www.dfo-mpo.gc.ca/species-especies/publications/sharks/coc/coc-sharks/index-eng.html>

Code of conduct for Basking Sharks: <https://www.dfo-mpo.gc.ca/species-especies/publications/sharks/coc/coc-basking/index-eng.html>

5.4.3.5. *Marine Mammal Regulations*

The *Marine Mammal Regulations* provide direction on conservation and protection of marine mammals, provide guidance for recovery of Endangered Species under the *Species at Risk Act*, and set out provisions related to reducing human disturbance of marine mammals (e.g. viewing of marine mammals) and mandatory reporting requirements in the case there is accidental contact with a marine mammal and a vessel or fishing gear. These regulations were amended in 2018 and now specify mandatory requirements to prevent disturbance of marine mammals.

As per section 7(2) of the *Marine Mammal Regulations*, disturbance is defined as a number of human actions including:

- Feeding, swimming or interacting with a marine mammal.
- Moving a marine mammal (or enticing/causing it to move).
- Separating a marine mammal from its group or going between it and a calf.
- Trapping a marine mammal or a group either between a vessel and the shore, or between a vessel and other vessels.
- Tagging or marking a marine mammal.

Boats are required to maintain a minimum approach distance of 100 m for whales, dolphins or porpoises, 200m when whales, dolphins or porpoises are in a resting position or with a calf, and 200m from all Killer Whales in Pacific Canadian waters except when in southern BC coastal waters which requires a 400m minimum approach distance to all killer whales.

Ensure to check nautical charts for the locations of various protected areas and no go zones.

For more information on safe boating behavior around whales please visit: [Watching Marine Mammals and Be Whale Wise](#).

Any operator of a vessel or fishing gear involved in accidental contact with a marine mammal must notify DFO of the incident, as per section 39 of the *Marine Mammal Regulations*. Incident reporting includes:

- Reporting an injured, stranded, entangled or dead marine mammal to the [BC Marine Mammal Response Network \(Observe, Record, Report\)](#) 1-800-465-4336.
- Reporting as bycatch in a log book
- [Reporting accidental contact through the marine mammal interaction form](#)

- Depredation reporting to DFO by email at MarineMammals@pac.dfo-mpo.gc.ca, by calling 1-800-465-4336 or reporting accidental contact through the marine mammal interaction form.

Please note, incidents involving abuse or harassment of a marine mammal should be reported as a [fisheries violation](#), while injured, stranded, entangled or dead marine mammals should be reported to the [BC Marine Mammal Response Network](#) to enable a response if appropriate.

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:

1-800-465-4336 OR VHF CHANNEL 16

What to report:

- Your name and contact information
- Date and time of incident
- Location: Latitude/Longitude coordinates, landmarks
- Species
- Animal alive/dead (animal condition)
- Nature of injury and supporting details (if possible)
- Pictures/Video taken



Further information regarding the *Marine Mammal Regulations* can be obtained by contacting the DFO Marine Mammal Unit (MMU) (MarineMammals@pac.dfo-mpo.gc.ca).

Southern Resident Killer Whale Management Measures

The Government of Canada is taking important steps to protect and recover the Southern Resident Killer Whale population, in keeping with direction provided in *Species at Risk Act* (SARA) recovery documents. In May 2018, the Minister of Fisheries, Oceans and the Canadian Coast Guard and Minister of Environment and Climate Change determined the Southern Resident Killer Whale population faces imminent threats to its survival and recovery. Given the status of the population and ongoing threats to Southern Resident Killer Whale recovery, DFO implemented a number of measures in 2018 through 2021, including measures aimed at increasing prey availability and accessibility for Southern Resident Killer Whales - particularly Chinook salmon—and reducing threats related to physical and acoustic disturbance with a focus in key foraging areas within Southern Resident Killer Whale critical habitat.

Since 2018, Indigenous groups, the Indigenous and Multi-Stakeholder Advisory Group (IMAG), Technical Working Groups (TWGs) and stakeholders have provided recommendations and feedback to Ministers and Departments on a range of measures (including measures related to increasing prey availability, sanctuaries, vessel disturbance [both noise and physical disturbance], and contaminants) to support Southern Resident Killer Whale recovery.

For the 2023 fishing season, the Government of Canada intends to ensure actions for the 2023 season to mitigate threats of prey availability and acoustic and physical disturbance can be implemented to coincide with the return of Southern Resident Killer Whales in typically greater numbers to Canadian Pacific waters. Any in-season changes will be announced via Fishery Notices.

To address vessel disturbance in the presence of whales, a mandatory 400-metre vessel approach distance for all killer whales is in effect until May 31, 2022 in southern BC coastal waters between Campbell River and just north of Ucluelet. The Marine Mammal Regulations remain in effect year-round, and require maintaining a minimum 200 metre approach distance from all killer whales in Canadian Pacific waters other than those described above, and, 100 metres for other whales, porpoises and dolphins or 200 metres when the animal is in resting position or with a calf. Two new mandatory Seasonal Slowdown Areas are being piloted near Swiftsure Bank from June 1 until November 30, 2022 in portions of Subarea 121-1 and the near the mouth of the Nitinat River from Carmanah Point to Longitude 125 degrees west (Subarea 21-0). This measure requires all vessels to slow down to a maximum of 10 knots while in the areas, with limited exceptions.

The Government of Canada is asking vessel operators to respect the following voluntary measures:

- Stop fishing (do not haul gear) within 1,000 metres of killer whales and let them pass;
- Reduce speed to less than 7 knots when within 1000m of the nearest killer whale
- When safe to do so, turn off echo sounders and fish finders
- Place engine in neutral idle and allow animals to pass if your vessel is not in compliance with the approach distance regulations
- For more information on the best ways to help whales while on the water, when on both sides of the border, please visit: bewhalewise.org

For information regarding the Southern Resident Killer Whale management measures to support recovery, please contact the Marine Mammal Team (DFO.SRKW-ERS.MPO@dfo-mpo.gc.ca) or visit <https://www.canada.ca/southern-resident-killer-whales>

5.4.4. Gear Impacts

The Euphausiid fishery may encounter several species at risk in the Strait of Georgia and surrounding inlets. All fishing gear can pose an entanglement threat to whales. Grey Whales and Humpback Whales are two of the most commonly entangled whale species in the Pacific Northwest and can be encountered in the Strait of Georgia. The increase in numbers of Humpback Whales in inshore waters may also result in an increase in fishery interactions and potential entanglements as a result of their near coastal migration patterns and morphology (e.g. long pectoral fins). Avoid setting gear when marine mammals are near and keep your distance from marine mammals while fishing. Report all marine mammal incidents to the BC Marine Mammal Response Network Incident Reporting Hotline (1-800-465-4336) (Section 14 Contacts).

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

and the United Nations Food and Agriculture Organization (FAO) Code of Conduct for Responsible Fisheries.

The plankton trawl nets used in the Euphausiid fishery fish only the upper several meters of the water column and are known to have minimal interaction with the benthic environment as part of normal fishing operations. Glass Sponge Reefs identified and protected in the Strait of Georgia and Howe Sound do not occur within the Euphausiid fishing area.

The Cold-water Coral and Sponge Conservation Strategy is available on the internet at:<http://dfo-mpo.gc.ca/oceans/ceccsr-cerceef/conservation-eng.html>

5.4.5. Oceans and Habitat Considerations

5.4.5.1. *Canada's Marine and Coastal Areas Conservation Mandate*

In August 2019, the Government of Canada surpassed its milestone of protecting 10% of Canada's marine and coastal areas by 2020, a target which is a reflection of Canada's United Nation Convention on Biological Diversity Aichi Targets commitments, collectively referred to as Canada's marine conservation targets. The Government of Canada further committed domestically to protecting 25% by 2025, and working towards 30% by 2030.

More information on the background and drivers for Canada's marine conservation targets is available at: <http://www.dfo-mpo.gc.ca/oceans/conservation/index-eng.html>

To meet its marine conservation 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.

An overview of these tools, including a description of the role of fisheries management measures that qualify as other measures is available at:

<http://www.dfo-mpo.gc.ca/oceans/mpa-zpm-aoi-si-eng.html>

Euphausiid fishing takes place in a limited area and does not overlap with established or proposed Marine Protected Areas (MPA) under the *Oceans Act*, National Marine Conservation Areas under the *National Marine Conservation Areas Act*, nor the Northern Shelf Bioregion and Pacific North Coast Integrated Management Area.

The *Oceans Act* mandates DFO 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* 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. Future network MPAs may overlap or include Euphausiid fishing areas depending on the type and nature of the MPA.

More information on Pacific MPAs and integrated management planning under Canada's *Oceans Act* is available at:

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

5.4.5.2. *Southern BC Marine Spatial Planning*

As part of a national marine spatial planning initiative, DFO is in pre-planning phase, collaborating with Indigenous groups and organizations, the Province of BC, and other federal departments (Transport Canada, Natural Resources Canada, Environment and Climate Change

Canada, Parks Canada and others), to gather information and data relevant to a marine spatial planning process in southern BC, which includes the Strait of Georgia and Southern Shelf bioregions. The concept of marine spatial planning is to improve coordination across jurisdictions and activities in the marine space. Deliverables by 2023 include: recommendations for a trilateral governance model/approach, a Marine Atlas (working draft), and a Framework to inform future planning phases, including the development of a marine spatial plan.

5.4.5.3. *Scott Islands Marine National Wildlife Area*

The Scott Islands Marine National Wildlife Area is the first protected marine area established by Environment and Climate Change Canada (ECCC) under the *Canada Wildlife Act*. In support of the conservation objectives of the Scott Islands Marine National Wildlife Area, DFO is consulting on new regulations under the *Fisheries Act* to restrict certain fisheries that pose a risk to seabirds. A Notice of Intent was published in Canada Gazette Part 1 in June 2018 indicating the proposed regulations would prohibit fishing for three key forage fish species that serve as a key food source for seabirds (Pacific sand lance, Pacific saury, and North Pacific krill) as well as groundfish bottom trawling (in portions of the Marine National Wildlife Area consistent with existing commercial closures). The anticipated pre-publishing of the regulations in Canada Gazette 1 is expected to occur in 2022.

The Euphausiids fishery does not occur in the area and fishing would not be permitted to protect sea bird forage fish species that rely on Euphausiids.

More information on the Scott Islands Marine National Wildlife Area is available at: <https://www.canada.ca/en/environment-climate-change/services/national-wildlife-areas/locations/scott-islands-marine.html>

The Scott Islands Protected Marine Area Regulations can be found at: <https://laws-lois.justice.gc.ca/eng/regulations/SOR-2018-119/index.html>

For further information on this, please contact - DFO.ScottIslands-IlesScott.MPO@dfo-mpo.gc.ca

5.4.5.4. *Rockfish Conservation Areas*

There are 162 Rockfish Conservation Areas (RCAs) in British Columbia, covering roughly 4,350km² of the Canadian Pacific Coast. These areas are closed to a range of recreational and commercial fisheries to protect inshore rockfish and their habitat.

DFO is currently undertaking a multi-year review of the conservation effectiveness of RCAs, including meeting the national criteria and standards for marine refuges to better conserve sensitive areas and contribute towards Canada's Marine Conservation Targets (MCT). To meet these standards, the risks to inshore rockfish, their habitat, and benthic communities will need to be avoided or mitigated. Peer-reviewed science advice also recommends that boundary changes to some RCAs will improve their spatial design by better capturing rockfish habitat features. RCAs in the Northern Shelf Bioregion have been selected for the first phase of engagement to align with the MPA network planning process in that area. Workshops with First Nations and stakeholders and online consultations were held in 2019. A summary of what we heard is available online at: <https://www.pac.dfo-mpo.gc.ca/consultation/ground-fond/rca-acs/2020-heard-entendu-eng.html#6>. There will be more opportunities to provide feedback on Rockfish Conservation Areas in the Northern Shelf Bioregion in the near future. DFO is also planning to review Rockfish Conservation Areas in other regions of British Columbia at a later date.

Information about Rockfish Conservation Areas is available at: <http://www.pac.dfo-mpo.gc.ca/fm-gp/maps-cartes/rca-acs/index-eng.html>

For further information on this, please contact DFO.RCA-ACS.MPO@dfo-mpo.gc.ca.

6. OBJECTIVES

Sections 6.1 and 6.2 outline the “longer term” objectives for this and other invertebrate fisheries in the Pacific Region. Section 6.3 describes the species-specific objectives for the Euphausiid fishery.

6.1. National

DFO aims to:

- Meet conservation objectives and ensure healthy and productive fisheries and ecosystems;
- Manage fisheries to provide opportunities for economic prosperity;
- Provide stability, transparency, and predictability in fisheries management and improved governance.

6.2. Pacific Region

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, the above objective 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 national objectives for sustainable fisheries.

6.3. Euphausiids

6.3.1. Conservation/Sustainability

DFO’s objectives for forage species are applied through the Policy on New Fisheries for Forage Species (Section 1.6).

DFO’s objective for conservation and sustainability of Euphausiids is to apply scientific management principles in a risk adverse and precautionary manner based on the best scientific advice available, and through comprehensive monitoring of fishing activities.

6.3.2. Social, Cultural and Economic

DFO's objective is to continue to work collaboratively with the commercial industry on sustainable resource use and long-term economic viability of the seafood industry recognizing that commercial fisheries play a vital role in Canada's economy.

DFO's objective is to continue to provide opportunities for First Nations to harvest fish for food, social and ceremonial purposes, in a manner consistent with the decision of the Supreme Court of Canada in the *Sparrow Decision*, and subsequent court decisions. For more information, see the internet at:

www.pac.dfo-mpo.gc.ca/abor-autoc/index-eng.html

6.3.3. Compliance

DFO's objective is to pursue opportunities to monitor and enforce these fisheries in conjunction with the monitoring and enforcement priorities in the Pacific Region.

6.3.4. Ecosystem

Changes to the exploitation rate or other attributes of the fishery in ways that might affect conservation of predator species feeding on Euphausiids must be evaluated against pre-requisites specified under the Policy on New Fisheries for Forage Species (Section 1.6).

DFO's objective is to use the Ecological Risk Assessment Framework drafted under the Policy for Managing the Impacts of Fishing on Sensitive Benthic Areas (Section 1.6) to determine the level of risk in these fisheries and whether mitigation measures are required in any areas.

Ecosystem objectives may also arise with initiatives under the *Oceans Act* and reaching Canada's Marine Conservation Targets (Section 5.4.5).

7. ACCESS AND ALLOCATION

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

7.1. Commercial

The commercial fishery is limited entry, with seasonal and area closures, a total allowable catch and area-based quotas.

7.2. Recreational

A recreational harvest of "other shellfish" species is permitted under the BC Tidal Waters Sport Fishing Licence and may include Euphausiids by dip net but there is little, if any, interest. The daily limit under the BC Tidal Waters Sport Fishing Licence for "other shellfish" allows for a recreational harvest of 20 individual animals by dip net, where permitted.

7.3. First Nations

First Nations' harvest for food, social and ceremonial purposes may occur where authorized by a communal licence or, under treaty, a harvest document. Euphausiids may be allocated under treaty, but were unallocated under the Tla'amin, Maa-nulth, Tsawwassen, and Nisga'a Treaties.

7.4. Aquaculture

Consideration is given for aquaculturist access to relatively low numbers of Euphausiids (e.g., for broodstock development) for limited time periods where populations would face insignificant

to low risk from the additional harvest pressure (DFO 2004). For information on aquaculture or access to broodstock, contact the Aquaculture Management Division (Section 14 Contacts).

7.5. Experimental, Scientific, Educational or Public Display

DFO supports and facilitates scientific investigations related to Euphausiids. Scientific licence requests received from scientific, educational, and public display institutions, including biological collecting firms, are considered. Existing policies with respect to scientific licences apply.

8. MANAGEMENT MEASURES FOR THE DURATION OF THE PLAN

See the Commercial Harvest Plan (Appendix 1 and accompanying Appendices 2 to 4) for detail on the following:

- Fishing seasons / areas;
- Control and monitoring of removals;
- Decision rules;
- Licensing.

9. SHARED STEWARDSHIP ARRANGEMENTS

9.1. Commercial Fishery

The Krill Trawlers Association (KTA) was established in 1990, and has contributed significant advice toward management and research program development in this fishery. Annual harvest schedules are developed in consultation with harvesters.

DFO and the KTA agree on a fishery activity notification (“hail”) and catch validation program. The KTA funds the program, primarily through a royalty applied against the poundage landed in the fishery. Harvesters pay validation costs directly to the service provider as they occur. This includes logbooks for harvesters who have validation services provided as part of the catch validation program.

9.2. Fisheries and Oceans Canada

Two Fisheries Management personnel are directly involved in this fishery for part of their activities. Contributions to the IFMP are provided by Regional Headquarters, Science Branch, Conservation & Protection, Pacific Fishery Licence Unit, Indigenous Programs Division, Negotiations and Implementation Division, Oceans Program and administrative personnel. Generally, all personnel are multi-tasked.

10. COMPLIANCE PLAN

General information about the Compliance & Enforcement program is available at:

<https://www.dfo-mpo.gc.ca/fisheries-peches/enf-loi/index-eng.html>

DFO Compliance and Enforcement staff will pursue opportunities to monitor and enforce this fishery, in conjunction with the monitoring and enforcement priorities directed by senior managers in the Pacific Region.

Dockside monitors will continue to provide an “observe, record and report” capability.

10.1. Priorities

Priorities in the commercial fishery are to support the investigation of reports received from the service provider and dockside monitors (Observers).

11. PERFORMANCE REVIEW

11.1. Stock Assessment

The available survey results, experimental studies and biological research will be documented and updated periodically as more information becomes available.

11.2. Commercial Fishery

The effectiveness of the industry funded hail and dockside validation programs will be assessed and reviewed annually.

11.3. Compliance

The compliance evaluation will include the number of investigations based on reports.

11.4. Ecosystem

Changes arising as a result of initiatives under the *Oceans Act* or new policies under the Sustainable Fisheries Framework that may affect the Euphausiid fishery will be described.

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13. GLOSSARY

Area and Subarea	As in Schedule 2 of the <i>Pacific Fishery Management Area Regulations</i> .
Aquaculture	The process of spawning animals and rearing the progeny to marketable size, usually involving some level of intervention (e.g., feeder, predator protection) by the aquaculturist.
Catch Validation Program	A program designed to monitor, record, and verify catches. Also called the Verification Program.
Communal licence	Issued to First Nations organizations pursuant to the <i>Aboriginal Communal Fishing Licence Regulations</i> to carry on fishing and related activities.
Communal commercial licence	Issued to First Nations organizations pursuant to the <i>Aboriginal Communal Fishing Licence Regulations</i> for participation in the general commercial fishery. Licences issued are equivalent to the capacity of licences eligibilities that have been retired under the Allocation Transfer Program.
Euphausiids	An order of marine crustaceans related to shrimps and crabs. Also known and marketed as “krill”.
Forage species	A species which is below the top of the aquatic food chain, is an important source of food for at least some predators, experiences high predation mortality, and fully recruits to the fishery at ages which still experience high natural mortality due to predation. Forage species often undergo large fluctuations in abundance in response to environmental factors, on time scales comparable to or short than a generation. Forage

	species also usually form dense schools for at least part of the annual cycle, are relatively short lived and have a coastal distribution for at least part of the year.
Hail	Process of harvesters calling a service provider to advise of commencement of fishing activity.
Harvested	Euphausiids removed from the water, by means of a plankton trawl net.
Indigenous Knowledge	<p>There is no universal definition of Indigenous knowledge, and the composition of Indigenous knowledge is for Indigenous peoples to determine. Indigenous knowledge is intricately tied to Indigenous worldviews and ways of life, rather than knowledge in a western sense.</p> <p>The term Indigenous knowledge may not be universally used, and other terms such as Indigenous Knowledge Systems, Traditional Knowledge, Traditional Ecological Knowledge, or Aboriginal Traditional Knowledge, which all convey similar concepts, may be used instead. When working with Inuit, the term Inuit Qaujimagatuqangit (IQ) is more likely to be used than Indigenous knowledge. Similarly, when working with Métis knowledge holders, the term Métis Traditional Knowledge is more likely to be used than Indigenous knowledge. The term Indigenous knowledge is used throughout this document in line with the terminology in the <i>Fisheries Act</i>.</p>
Invertebrate	An animal without a backbone.
Landed or off-loaded	The transfer of Euphausiids from a vessel in water to land.
Observer	An individual who has been designated by the DFO Regional Director General for Pacific Region pursuant to Section 39 of the <i>Fishery (General) Regulations</i> to carry out fishery monitoring activities.
Quota Management Area	A defined portion of Pacific fisheries waters. Pacific Fishery Management Areas and Subareas, as described in the <i>Pacific Fishery Management Area Regulations</i> , are referenced in describing Quota Management Areas for Euphausiid fishing.
Sectoral committee	Provides a forum for the exchange of information and views between the clients and DFO on issues important to the management of all fisheries for Euphausiids.
Service provider	An agency contracted by harvesters, or their association on their behalf, to co-ordinate notification, catch validation, fishery monitoring, biological sampling and data submission requirements. The service provider may train and recommend candidates for certification by DFO as Observers.
Stakeholder	Used interchangeably with the term “resource-user”, to include all users of fisheries resources including First Nations, recreational and commercial harvesters of fish, marine mammals and aquatic plants. Depending on the fishery, it may also include crewmembers of charter

	services, other parties that provide support to the recreational fishery, and non-consumptive users.
Stock assessment	Results of analyses of fisheries and research data used to evaluate the effects of fishing on a stock or population and to predict the reaction of populations to alternative management choices.
TAC	Total allowable catch. The amount of catch that may be taken from a stock determined by analytical procedures to achieve management objectives.
Validated	An Observer has weighed the catch and entered the weight into the Euphausiid Validation and Harvest Logbook, or an approved alternative log.

14. CONTACTS

Observe, Record, and Report	1 800 465 4336
Fisheries Information and Shellfish Contamination Closure Update (24 Hours):	
Toll free	1 866 431 3474
Lower Mainland	604 666 2828
Commercial Fishery Hail Line	1 888 730 8709
D&D Pacific Fisheries Ltd.	1 800 775 5505
Marine Mammal Incident Reporting Hotline	1 800 465 4336 or VHF Channel 16

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 and report your name and contact information, date and time of the incident, species, whether the animal is alive or dead, nature of injury, location latitude/longitude coordinates and landmarks, and whether any pictures or video were taken.

Invertebrates Internet Page :

<https://www.pac.dfo-mpo.gc.ca/fm-gp/shellfish-mollusques/index-eng.html>

Fisheries Management

Regional Shellfish Co-ordinator	Lisa Mijacika	(604) 666 3869
Lead Resource Management Biologist, Euphausiids 65 Front Street, Nanaimo, B.C. V9R 5H9	Jenny Smith	(236) 330 2963
South Coast Area 65 Front Street, Nanaimo, B.C. V9R 5HR	General Inquiries	(250) 756 7270

Science

Research Scientist	Akash Sastri	(250) 363 8288
Program Head, Shellfish Data Unit	Rob Flemming	PACSDU@dfo-mpo.gc.ca

Conservation and Protection

Lower Fraser River Area		(604) 664 9250
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12551 No. 1 Road, Steveston, BC V7E 1T7

Powell River
7255 Duncan St, Powell River, BC V8A 5M6

(604) 485 7963

Licensing

Pacific Fishery Licence Unit
401 Burrard Street, Vancouver, B.C. V6C 3S4

1 877 535 7307

E-Mail: Fishing-Peche.XNAT@dfo-mpo.gc.ca

Aquaculture

Aquaculture Management Division Shellfish Inbox:
E-mail

Shellfish.Aquaculture@dfo-mpo.gc.ca

Canadian Food Inspection Agency

150-3001 Wayburne Drive, Burnaby B.C.
Inspection Specialist, Operations Branch

Timothy Delange

(604) 666 9904
(250) 248 4772

BC Ministry of Land Water and Resource Stewardship

Seafood Secretariat

1(888) 221 7141

Seafood_Secretariat@gov.bc.ca

WorkSafe BC

Occupational Safety Officer, Field Services:
Vancouver / Richmond / Delta
Courtenay
Courtenay
Central

Bruce Logan

(604) 244 6477

Cody King

(250) 334 8733

Paul Matthews

(250) 334 8741

Wayne Tracey

(604) 232 1939

Manager of Interest for Marine and Fishing

Pat Olsen

(250) 334 8777

Projects Related to Commercial Fishing

Tom Pawlowski

(604) 233 4062

Helen Chandler

(604) 276 3174

Sighting Networks

BC Cetacean and Sea Turtle Sighting Network
Email: sightings@ocean.org
On the internet at: www.wildwhales.org/
App: WhaleReport

(866) 472 9663

Basking Shark Sighting Network

1 (877) 50 SHARK

Email: BaskingShark@dfo-mpo.gc.ca

On the internet at: www.pac.dfo-mpo.gc.ca/SharkSightings

The Department appreciates your assistance in tracking the sightings of live cetaceans (whales, dolphins and porpoises), sea turtles and Basking Sharks. 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)*.

15. CONSULTATION

DFO undertakes consultations in order to improve decision-making processes, promote understanding of fisheries, oceans and marine transport issues, and strengthen relationships. Policy guidance and strategic direction for DFO's consultation activities is provided by the DFO Consultation Secretariat in the Policy Branch.

A draft IFMP is prepared by DFO incorporating any new science advice and advice received through advisory and bilateral processes, and is made available to interested parties for review and comment. The IFMP then progresses through an internal DFO approval process considering all advice received.

For more information see the internet at:

www.pac.dfo-mpo.gc.ca/consultation/index-eng.html

16. POST-SEASON REVIEW

16.1. Stock Assessment

Results from recent surveys and analyses are provided in Section 2. They include a compilation of zooplankton data collected from the Strait of Georgia during the past 20 years and estimates of annual anomalies of Euphausiid biomass in the Strait of Georgia as presented in the DFO State of the Pacific Ocean report series. Strait of Georgia krill surveys are being planned over the next few years to provide a contemporary update to the stock assessment and ongoing State of the Ocean reporting.

16.2. Commercial Fishery

Table 1 describes landings and effort in the Euphausiid fishery for the period 1983 through 2020 as reported historically on harvest logs and sales (fish) slips, and commencing in 1997 with validated landings³. Euphausiid landings in the Pacific region are minimal compared to global harvest rates. Landings between 2011 and 2020 have remained well below the total allowable catch of 500 tonnes. The highest catch in the last 10 years was 260 tonnes in 2012, compared to a low of 33 tonnes in 2014. Landings are market driven and heavily influenced by the level of participation of individual licence eligibility holders in the fishery.

³ Landings on sales slips were underestimated because product is often marketed well after the season closes, including in the following calendar year.

Table 1. Euphausiid Landings and effort for British Columbia 1983-2020 as reported on fish slips, harvest logs and validated landings.

Year	Type and Number of Licences Issued	Number of Vessels with Landings ¹	Quota (t)	Landings ² (t)	Landed Value ³ (\$10 ⁻³)	Effort ⁴ (hours)	CPUE ⁴ (kg hr ⁻¹)
1983	7 Z-F	<3	500	*	*	*	*
1984	8 Z-F	4	500	103	38	563	183
1985	5 Z-F	<3	500	*	*	*	*
1986	11 Z-F	<3	525	*	*	*	*
1987	18 Z-F	3	525	156	102	370	422
1988	24 Z-F	4	525	249	191	980	254
1989	45 Z-F	15	785	298	215	1150	259
1990	56 Z-F	17	500	499	415	1321	378
1991	45 Z-F	14	500	445	391	1211	367
1992	25 Z-F	10	500	343	318	470	730
1993	18 Z-F	<3	500	*	*	*	*
1994	18 Z-F	6	500	375	259	614	611
1995	18 Z-F	7	500	506	357	944	536
1996	18 Z-F	10	500	490	472	642	763
1997	18 Z-F	12	500	382	335	894	360
1998	17 Z-F	10	500	491	493	503	883
1999	18 Z-F	13	500	460	447	777	529
2000	18 Z-F	11	500	504	482	435	1090
2001	18 Z-F	9	500	498	464	465	1066
2002	18 Z-F	9	500	499	541	499	1012
2003	18 Z-F	7	500	205	230	217	952
2004	18 Z-F	4	500	52	57	26	1974
2005	18 Z-F	5	500	321	322	131	2412
2006	18 Z-F	3	500	58	67	49	1198
2007	18 Z-F	6	500	143	161	175	826
2008	18 Z-F	3	500	124	164	135	871
2009	18 Z-F	4	500	61	94	39	1621
2010	18 Z-F	5	500	245	378	123	2024
2011	18 Z-F	4	500	139	225	104	1399
2012	18 Z-F	3	500	260	396	122	2123
2013	18 Z-F	3	500	220	334	70	3146
2014	16 Z-F	3	500	33	21	43	768
2015	16 Z-F	3	500	147	232	113	1294
2016	16 Z-F	3	500	116	185	102	1141
2017	16 Z-F	<3	500	*	*	*	*
2018	16 Z-F	<3	500	*	*	*	*
2019	16 Z-F	3	500	93	154	103	900
2020	16 Z-F	<3	500	*	*	*	*

¹ Fish slips (1983-1996) and validated landings (1997-2020).

² Harvest logs (1983-1996; source: DFO) and validated landings (1997-2020; source: D&D Pacific Fisheries Ltd.).

³ Fish slips (source: DFO). Landed value from fish slips is nominal and is extrapolated to validated landings from 1997 onwards.

⁴ Harvest logs.

* Data not provided for reasons of confidentiality where fewer than 3 vessels report landings.

16.3. Compliance

No significant investigations initiated (2018-2022).

16.4. Ecosystem

In August 2019, the Government of Canada surpassed its target of protecting 10% of Canada's marine and coastal areas by 2020, and further committed domestically to protecting 25% by 2025, and working towards 30% by 2030 (Section 5.4.5).

DFO State of the Pacific Ocean reports series are available on the internet at:

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

Appendix 1: Euphausiid 2023-2027 Commercial Harvest Plan

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1. MANAGEMENT CHANGES FOR 2023-2027

- 1.1. Euphausiids harvesters will be apprised of changes annually, if necessary, via amendments to the Commercial Harvest Plan, notices to industry, direct contact, and/or contact through the service provider.

2. MANAGEMENT MEASURES FOR THE COMMERCIAL FISHERY

2.1. Precautionary Total Allowable Catch (TAC)

Under the precautionary management plan, an arbitrary coastwide allowable harvest of 500 tonnes was established. Fisheries and Oceans Canada (DFO) is not prepared to authorise increases in the Euphausiid allowable harvest, as Euphausiids are a forage species upon which many other species depend. As such, the existing allowable harvest for the fishery is maintained at 500 tonnes, provided that management controls are sufficient to adequately track area quotas and collect accurate catch and effort data. No increase in allowable harvest will be considered until such time as a sound scientific basis is provided and accepted by DFO. Future management decisions will need to be consistent with the objectives of the Sustainable Fisheries Framework and the Policy for New Fisheries on Forage Species.

The Sustainable Fisheries Framework and Policy for New Fisheries on Forage Species is available on the internet at:

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

2.2. Area Quotas

The coastwide commercial total allowable catch (TAC) is divided into area quotas (Section 3.1). Quota Management Areas are comprised of Pacific Fishery Management Areas, Subareas, and/or portions of Subareas. The quota for each Quota Management Area was based on historical commercial landings and from previous density surveys conducted in the lower Strait of Georgia.

Maps of the South Coast Quota Management Areas are provided in Appendix 3. Euphausiid harvesters are reminded to use these maps for reference purposes only. The final authority for the description of Areas and Subareas are set out in the *Pacific Fishery Management Area Regulations*.

2.3. Hail in and Dockside Validation

Harvesters are required to advise the service provider when their fishing activities begin and terminate, and to have all product weighed and validated as it is landed at designated locations.

2.4. Seven Percent Water Drainage Allowance

Seven percent (7%) water drainage allowance is adjusted to dockside validated weight.

3. OPEN TIMES AND QUOTA MANAGEMENT AREAS

3.1. Euphausiid Quota Management Areas and Annual Quotas

Quota Management Area	Location	Pacific Fishery Management Area and Subarea	Quota (tonnes)
12A	Knight Inlet	12-28 to 12-34 inclusive	75
13A	Bute Inlet	13-18 to 13-22 inclusive	55
13B	Loughborough Inlet	13-42 and 13-43	0
15A	Homfray-Lewis-Pryce Channels	15-5	40
15B	Toba Inlet	15-6	20
16A	Jervis Inlet	16-11 to 16-15 inclusive	85
28A	Howe Sound	28-1 to 28-5 inclusive	0
	Total – Mainland Inlets		275
16B	Other areas, Strait of Georgia	15-1 to 15-3 inclusive, 16-18 and portion 16-11 (See Section 3.2)	215
16C	Scientific Licence access	16-11 to 16-15	10
	Total Annual Allowable Catch		500 tonnes

Descriptions and maps of the Euphausiid Quota Management Areas are provided in Appendix 3.

3.2. Open Times

Mainland inlet areas of Jervis Inlet, Toba Inlet, Homfray-Lewis-Pryce Channels, Bute Inlet and Knight Inlet will open to Euphausiid fishing 12:00 hours, noon, January 5, annually. These areas will remain open until either the individual inlet area quota is caught or until March 31 in each year, when all inlet areas will close.

Inlets with quota remaining may re-open August 16 upon request to the DFO Resource Manager, Shellfish, and will remain open until the inlet quota is caught or until October 31, whichever occurs first. Harvesters are reminded that no fishing can take place until the re-opening date, and in the re-opened area, described by Variation Order and announced by Fishery Notice.

Areas of the Strait of Georgia, Subareas 15-1, 15-2, 15-3, 16-18, and that portion of 16-11 westerly of a line from Ahistrom Pt. light 175° true to a point on the shoreline on Nelson Island, will open to Euphausiid fishing 12:00 hours, November 1, annually. These

areas will remain open until either the area quota of 215 tonnes plus the balance of the inlet area quotas are attained, or until December 31, whichever occurs first.

All fishing periods will open at 12:00 hours, noon, local time.

3.3. Closure Notification

It is the fish harvesters' responsibility to ensure that an area is open before setting gear and to ensure that the area has not closed while their gear remains in the water. Closures will go into effect as required with as much notice as possible when area quotas are achieved.

General information on openings and closures is available from the DFO Fisheries Managers (see Section 14 Contacts of the Integrated Fishery Management Plan for Euphausiids), from any local DFO office, or by calling the commercial shellfish information recordings at (604) 666-2828.

4. LICENSING REQUIREMENTS FOR THE COMMERCIAL FISHERY

4.1. National Online Licensing System (NOLS) Client Support - Licensing Services

All fish harvesters/licence holders/vessel owners are required to use the National Online Licensing System (NOLS) to view, pay for and print their commercial fishing licences, licence conditions and/or receipts. NOLS website:

www.dfo-mpo.gc.ca/fm-gp/sdc-cps/licence-permis-eng.htm

Training materials, including step-by-step guides and a detailed user training manual, are available online (www.dfo-mpo.gc.ca/FM-GP/SDC-CPS/licence-permis-eng.htm) to guide users of the system in completing their licensing transactions. The Department also provides client support and assistance on how to use the system via email at fishing-peche@dfo-mpo.gc.ca or by calling toll-free at 1-877-535-7307 (7:00AM to 8:00PM Eastern, Monday to Friday).

Information on the National Online system may be found on the DFO internet site at: www.dfo-mpo.gc.ca/fm-gp/sdc-cps/licence-permis-eng.htm

For more information on how to register and use the system, visit the Department's website at the website address above or contact our client support.

4.2. Licence Category

A commercial Euphausiid by trawl (category ZF) or communal commercial (category FZF) licence eligibility is required to commercially harvest Euphausiid (also known as "krill") by plankton trawl.

Category ZF licence eligibilities are limited entry and party-based. Category FZF licence; a First Nations group is the licence eligibility holder.

4.3. Licence Renewal Fees

In accordance with the Service Fees Act, annual licence renewal fees will be adjusted by the annual rate of inflation determined by the Consumer Price Index (CPI) published by Statistics Canada.

The commercial Euphausiid (category ZF) licence renewal fee may be found on the following link:

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

There is no annual licence fee for a communal commercial category FZF licence.

4.4. Licence Application and Issuance

Renewal of a commercial Euphausiid licence and payment of fees must be done on an annual basis to retain the privilege to be issued the licence in the future, regardless of whether or not fishing is carried out. Those commercial Euphausiid licences not renewed by December 31st will cease and licence issuance requests will be unable to be considered in future.

Prior to annual licence issuance licence eligibility holders are required to annually designate the fishing vessel to hold the licence. This must be done by navigating to the ‘Submit a Request’ menu selection within the National Online Licensing System (NOLS). Full instructions are available at:

<https://www.dfo-mpo.gc.ca/fisheries-peches/sdc-cps/products-produits/request-demande-eng.html>

Prior to licence issuance, licence eligibility holder(s) must:

- Meet any Ministerial conditions placed on the licence eligibility;
- Ensure any conditions of the previous year’s licence such as submission and approval of logbooks have been met.
- Designate a registered commercial fishing vessel eligible for a commercial or communal commercial licence for salmon, schedule II, sablefish, halibut, crab, shrimp, prawn, geoduck, or groundfish trawl. The designated vessel's overall length may not exceed the maximum vessel length (MVL) of the licence eligibility. Designated vessels must have a vessel survey on record with the Pacific Fishery Licence Unit completed in accordance with DFO measurement guidelines and dated subsequent to May 1989.

To avoid delays please ensure the payment and vessel designation information is submitted all at the same time through the ‘Submit a Request’ menu selection within NOLS.

4.5. Designation of Harvesters to Fish a Communal Commercial Licence

Under the *Aboriginal Communal Fishing Licence Regulations*, every person working on a vessel that is fishing under authority of a Communal Commercial Licence must be designated by the First Nation that holds the licence. The designation must be made in writing and include the person's name and reference the Communal Commercial Licence.

The designation must be carried on-board and be produced on request of any Fishery Officer.

First Nations licence holders interested in obtaining an example template to use to designate their fish harvesters may contact a DFO Resource Manager or Pacific Fishery Licensing Unit (see Contacts in Section 14).

4.6. Licence Documents

Euphausiids licence documents are valid from the date of issue to December 31 of each calendar year.

Replacements for lost or destroyed licence documents may be obtained by reprinting the licence document through the National Online Licensing System.

4.7. Vessel Re-designation

Re-designation of a Euphausiid licence is allowed as long as any Condition of Licence, such as the completion of logbooks, have been met and accepted by the Shellfish Data Unit (Section 5.7).

Navigate to 'Submit a Request' Re-Designate a vessel in the National Online Licensing System (NOLS). Full instructions can be found at:

<https://www.dfo-mpo.gc.ca/fisheries-peches/sdc-cps/products-produits/request-demande-eng.html>

4.8. Licence Eligibility Nominations

Category ZF Euphausiid licence eligibilities may be nominated from one party to another. Nominations must be completed and submitted to the Pacific Fishery Licence Unit via the National Online Licensing System (NOLS) by the licence holder. Notarized application 'Nomination for Party-Based Licence Eligibility'. Scan the document and attach it to a 'Submit Request' in NOLS. PDF or standard picture formats are accepted (e.g., jpg, etc.).

The following requirements must be met:

- Any Condition of Licence such as the completion of logbooks have been submitted and approved by the Shellfish Data Unit.

- Communal commercial (category FZF) licences eligibilities are not eligible for Nomination.

4.9. Licence to Transport Euphausiids

Any registered vessel with a commercial or communal commercial salmon, schedule II, geoduck, sablefish, crab, shrimp, groundfish, or prawn and shrimp trap licence, a transporting licence (category D), or a herring seine licence (category HS) may transport Euphausiids under special Conditions of Licence which are included with all vessel-based licences issued for the current fishing year. For further information contact a Pacific Fishery Licence Unit.

Note: When product is transferred from one vessel to another vessel or a vehicle, that vessel or vehicle requires a provincial Fish Receiver licence. This licence is required for all types of vessels and vehicles including aircraft. The licence may also be required for personal vehicles in some instances, when a vehicle is carrying the catch from more than one vessel, even if the licence holder owns both vessels.

Fish harvesters should check the Province of British Columbia’s website for additional information:

<http://www2.gov.bc.ca/gov/content/industry/agriculture-seafood/fisheries-and-aquaculture/seafood-industry-licensing>

5. CONTROL AND MONITORING OF COMMERCIAL FISHING ACTIVITIES

An industry-funded “hail in” and “dockside validation” program was developed collaboratively between Krill Trawlers Association (KTA), DFO, and D&D Pacific Fisheries Ltd. The program has been in place since 1997. It has been effective in providing the necessary fishing activity and quota tracking information required to properly manage the area based quotas in the fishery. All landings are validated. This has resulted in significant improvements in landing data and in a more orderly and safer fishery.

The approved dockside monitoring service provider contracted by the Krill Trawlers Association to provide notification, validation and data services for the 2023-2027 Euphausiid fishery is:

D&D Pacific Fisheries Ltd.
Box 1445
Gibsons, BC V0N 1V0
Tel: (604) 886-4819
Fax: (604) 886-8288
Hail-in Line: (888) 730-8709

5.1. Species

Euphausiids (Order: *Euphausiacea*).

5.2. Gear

Plankton trawl gear only.

5.3. Designated Landing Ports

Euphausiids must be landed at one of the following designated landing ports:

(1) Lund, Earls Cove, Pender Harbour, French Creek, False Creek, Egmont and Richmond.

(2) Port McNeill and Heriot Bay, if prior arrangements have been made with the service provider. A minimum of 48 hours notice is required.

5.4. Notification Procedures Commencement, Hails, and Validation of Landings

5.4.1. Before Fishing or Moving to a New Area

The vessel master shall notify the service provider by telephoning (888) 730-8709, at least 24 hours before commencing fishing or before moving to a new fishing area, with the following information:

- a) vessel name;
- b) vessel master's name;
- c) vessel registration number (VRN#);
- d) species to be fished (i.e. Euphausiids);
- e) Subarea(s) to be fished;
- f) date and time that fishing will begin or end; and
- g) estimate of the number of days to be fished.

If the vessel is unable to arrive in the declared Quota Management Area within 24 hours of the stated time, the vessel master shall so notify the service provider by telephoning (888) 730-8709:

- a) vessel master's name, vessel name, VRN #; and
- b) details of change in fishing plans

The vessel master shall notify the service provider at least 24 hours prior to moving to a new Quota Management Area.

5.4.2. Daily While Fishing

Before 12:00 hours (noon) each day during a fishing trip, on those days when a vessel is fishing but is not making a landing, the vessel master shall report to the service provider by telephoning (888) 730-8709:

- a) vessel master's name, vessel name and VRN #;
- b) species fished (i.e. Euphausiid);
- c) number of days fished;

- d) Subarea(s) fished; and
- e) estimated catch in pounds.

5.4.3. Prior to Landing

Twenty-four hours prior to landing Euphausiids, the vessel master shall report to the service provider by telephoning (888) 730-8709:

- a) vessel master's name, vessel name and VRN #;
- b) species to be landed (i.e. Euphausiid);
- c) name of the designated port and location therein where the catch shall be landed;
- d) anticipated time of landing;
- e) the name of the observer who will be validating the catch if it is someone other than an observer acting on behalf of the Service Bureau contracted to the Krill Trawlers Association;
- f) name of the fish processor, buyer or other person who will be transporting the catch; and
- g) the method of transporting the catch from the designated landing port and the destination of the product.

5.5. Transhipment

All product harvested under a Euphausiid ZF or FZF licence must be harvested from and retrieved by the vessel designated on the licence. If product is going to be transferred from the harvest vessel to another vessel (e.g., for landing purposes), the vessel to which it is transferred must be appropriately licensed for packing purposes.

At no time should unlicensed vessels be used to harvest, retrieve, store or tranship product.

5.6. Validation

The vessel master must be in possession of a DFO approved catch Validation and Harvest Logbook assigned to the Euphausiid licence. The Validation and Harvest Logbook must be on board the licensed vessel while fishing for Euphausiids and while Euphausiids are on board the licence vessel. Validation and Harvest Logbooks which meet DFO's approval are available from the service provider.

5.6.1. Validation and Harvest Log Entries

At the first point of off-loading, all Euphausiids will be weighed with a government-certified scale. The Observer shall record in the Euphausiid Validation and Harvest Logbook:

- a) Name and VRN# of the vessel;
- b) Name and Fishers Identification Number (FIN) of the vessel master;
- c) Licence tab number;
- d) Landing date;

- e) Pacific Fishery Management Area and Subarea;
- f) Number of days fished;
- g) Name of plant, buyer or storage facility destination;
- h) Total number of containers delivered;
- i) Total net validated dock weight; and
- j) The Quota Management Area fished.

If catch cannot be weighed due to extenuating circumstances, either an average total weight of 1,400 lbs. may be used to determine weight, or for frozen product, validation shall be postponed until a scale is available.

The Euphausiid Validation and Harvest Log must remain with the licensed vessel, with copies accompanying the off-loaded product to its destination.

At each landing and validation, the Observer to ensure timeliness, completeness and accuracy of recording fishing activities must examine the harvest section (B).

5.6.2. Examination of Logbooks

The Validation and Harvest Logbook must be produced by the vessel master on request by a Fishery Officer, Fishery Guardian or an Observer.

5.6.3. Termination of Fishing

After a fishing trip is completed, or when a vessel will not be fishing again within 24 hours, the vessel master shall report to the Observer validating the last landing or to the service provider by telephoning (888) 730-8709 the following information:

- a) Vessel master's name, vessel name and VRN#;
- b) Species fished (i.e. Euphausiid); and
- c) Date and time that fishing stopped.

5.6.4. Quota Confirmation

Prior to fishing, the vessel master must confirm the remaining area quota from the service provider.

5.7. Validation and Harvest Log Data

It is a condition of licence and the responsibility of the licence eligibility holder to ensure that harvest information is received by the DFO Shellfish Data Unit, and meets the conditions outlined in Section 5.6. Harvesters who have validation services completed by D&D Pacific Fisheries Ltd. will receive these services as part of that contract. For harvesters who wish to have validation completed by an Observer other than the service provider under contract to the KTA, it will remain the licence eligibility holder's responsibility to ensure the requirements are fully completed.

5.7.1. Harvest Log Data

The vessel master is responsible for the provision and maintenance of an accurate record, a “log”, of daily harvest operations. This log must be completed and a copy submitted in both hard (paper) copy and electronic form in an approved format as defined by Fisheries and Oceans Canada Stock Assessment and Research Division’s Shellfish Data Unit.

To fulfil stock assessment objectives it is imperative that precise fishing locations be reported in this fishery. The vessel master is responsible for reporting latitude/longitude position on the harvest log in the “location” field for the starting position of each tow.

The original white page copy of the log, the accompanying location information and the electronic copy must be forwarded twice annually within four weeks following the termination of the euphausiid spring and fall fisheries. The information must be sent to:

Fisheries and Oceans Canada
Shellfish Data Unit
Pacific Biological Station
3190 Hammond Bay Road
Nanaimo, B.C., V9T 6N7

Email: DFO.PACSDU@dfo-mpo.gc.ca
Tel: (250) 756-7022

Complete and accurate catch information must be recorded in the harvest log no later than 12:00 p.m. for each 24 hours fished. The logbook must be kept aboard the licensed vessel. Logbooks must be produced for examination on demand of a fishery officer, guardian or an Observer designated under the *Fisheries Act*.

5.7.2. Submission and Release of Harvest Log Data

The licence eligibility holder is responsible to ensure that the vessel master has completed and submitted a copy of the harvest log data. DFO can only release harvest log data to the licence eligibility holder of record reported with the Pacific Fishery Licence Unit, and only upon written request.

5.7.3. Nil Report for Harvest Log – Licence Issued but not Fished

In the event that a licence is issued but not fished, the licence eligibility holder is responsible for submitting a nil report for the season. The nil report must be submitted prior to the issuing of approval for licence renewal. One page from the harvest logbook identifying the vessel, licence tab number and the year with “nil” entered in the body of the log and signed by the licence holder constitutes a nil report.

DFO wishes to remind fish harvesters that harvest logs must be completed accurately during fishing operations and submitted to DFO in accordance with the timing set out in Conditions of Licence. Failure to complete or submit logs in a timely manner is a violation of Condition of Licence.

5.7.4. Confidentiality of Harvest Data

Harvest data, including fishing location data supplied through latitude/longitude coordinates, or chart records, collected under the Validation and Harvest Logbooks for shellfish fisheries programs, are collected for use by DFO in the proper assessment, management and control of the fisheries. Upon receipt by DFO of harvest data and/or fishing location information supplied by the harvester in accordance with conditions of licence, Section 20(1)(b) of the *Access to Information Act* prevents DFO from disclosing to a third party, records containing financial, commercial, scientific or technical information that is confidential information. Further, Section 20(1)(c) of the *Act* prevents DFO from giving out information, the disclosure of which could reasonably be expected to result in material financial loss or could reasonably be expected to prejudice the competitive position of the harvester.

5.8. Fish Slip Requirements

An accurate written report shall be submitted by the vessel master on a fish slip of all fish and shellfish caught. A written report must be submitted even if the fish and shellfish landed are used for bait, personal consumption, or otherwise disposed. The written report shall be posted not later than seven days after the offloading and sent to:

Fisheries and Oceans Canada
Fisheries Management Branch, Regional Data Unit
Suite 200 - 401 Burrard St.
Vancouver, B.C. V6C 3S4

Fish slips may be downloaded and printed at
<https://www.dfo-mpo.gc.ca/fisheries-peches/sdc-cps/fishslips-carnets/index-eng.html>

Fish slip books may also be ordered from the printer at user cost at <https://www.dfo-mpo.gc.ca/fisheries-peches/sdc-cps/fishslips-carnets/index-eng.html>

Phone (604) 666-2716 for more information.

6. OTHER RESTRICTIONS AND GENERAL INFORMATION

Vessel masters are requested to cease trawling in any location if the catch of larval or juvenile fish exceeds 10 per litre drained catch. Under these circumstances, the vessel master shall advise the Observer and the DFO Fishery Manager of the date, location, and level of by-catch so appropriate action can be taken to prevent any fishing of larval or juvenile fish.

EUPHAUSIID VALIDATION & HARVEST LOGBOOK										
SECTION 'A' OBSERVER USE ONLY					SECTION 'B' COMPLETED BY VESSEL MASTER					
FROZEN BLOCK COUNT		AVG. WT. / BLOCK		VALIDATION ID #						
No. OF CONT.	CONT. TYPE	AVG. NET CONT. WT.	GROSS DOCK WT	TARE WT	NET DOCK WT	# OF CONTAINERS	OTHER VAL. ID #			
OBSERVER		LANDING PORT		7% SHRINKAGE	ADJUSTED NET DOCK WT	SPLIT LOAD <input type="checkbox"/> Y <input type="checkbox"/> N		SITUATION REPORT #		
DATE		START	FINISH	WAIT	TOTAL TARE WT + 7%		CONT. CHECK <input type="checkbox"/> Y <input type="checkbox"/> N	LABEL CHECK <input type="checkbox"/> Y <input type="checkbox"/> N		
COMMENTS:										
SKIPPER NAME			SKIPPER FIN #		VESSEL NAME		VRN	ZF TAB #		
QUOTA AREA	DAYS FISHED	Frozen Block Count	LOAD ESTIMATE	Fresh Cont. Count	PACKER NAME		PACKER VRN	BUYER NAME		
HARVEST DATE	HARVEST LOCATION (starting point of each tow) Latitude & Longitude Coordinates			STAT AREA	SUB AREA	DEPTH: FT / FM / ME MIN. MAX.	START TIME 24 hr clock	MINUTES FISHED	Est. CATCH lb (circle one) kg	COMMENTS
1										
2										
3										
4										
5										
6										
7										
8										

D&D PACIFIC FISHERIES

WHITE COPY - OBSERVER

YELLOW COPY - BUYER VIA TRUCKING

PINK COPY - REMAINS IN LOGBOOK

Revision: Dec.05, 2007

Appendix 3: Euphausiid Quota Management Area Maps

Quota Management Areas Descriptions

Quota Management Area	Name	Description (Pacific Fishery Management Area and Subarea)
12A	Knight Inlet	12-28 to 12-34 inclusive
13A	Bute Inlet	13-18 to 13-22 inclusive
13B	Loughborough Inlet	13-42 and 13-43
15A	Homfray-Lewis-Pryce Channels	15-5
15B	Toba Inlet	15-6
16A	Jervis Inlet	16-11 to 16-15 inclusive
28A	Howe Sound	28-1 to 28-5 inclusive
16B	Strait of Georgia	15-1 to 15-3 inclusive, 16-18 and that portion of 16-11 westerly of a line from Ahistrom Pt. light 175° true to a point on the shoreline on Nelson Island
16C	Jervis Inlet - scientific Licence access	16-11 to 16-15 inclusive

Harvesters are reminded to use the following maps for reference purposes only. The final authority for the descriptions of Areas and Subareas are as set out in the *Pacific Fishery Management Area Regulations*. The *Pacific Fishery Management Area Regulations* are available through the Internet at:

<http://laws-lois.justice.gc.ca/eng/acts/F-14/>

Maps of Pacific Fishery Management Areas and Subareas are available at:

<https://www.pac.dfo-mpo.gc.ca/fm-gp/maps-cartes/areas-secteurs/index-eng.html>

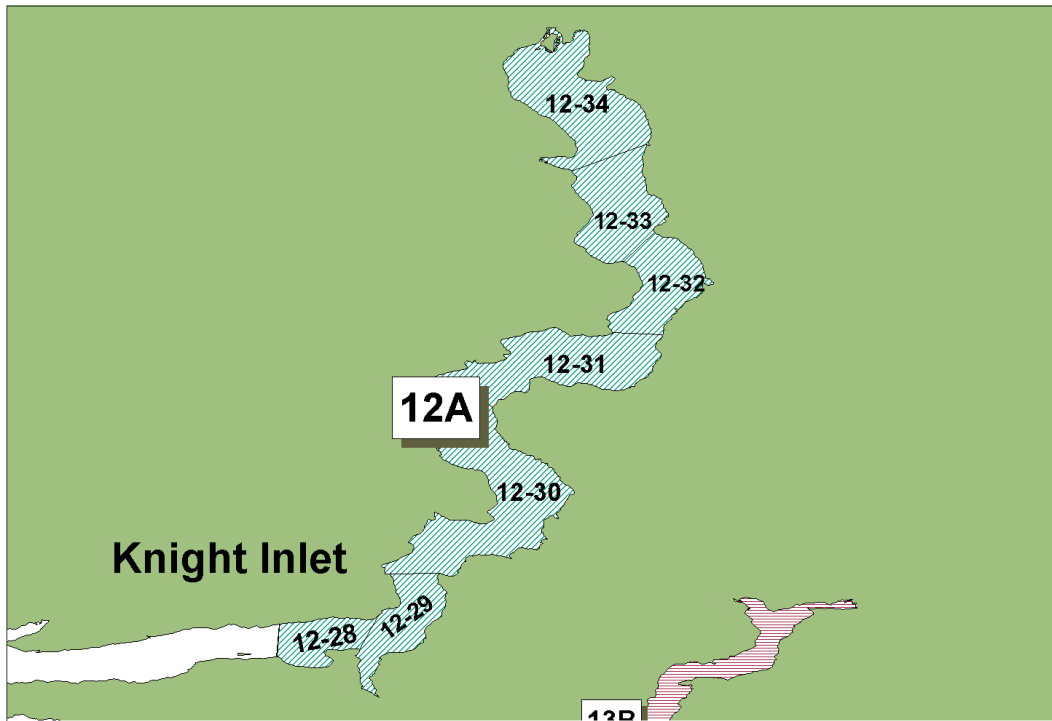


Figure 1: Quota Management Area 12A – Knight Inlet

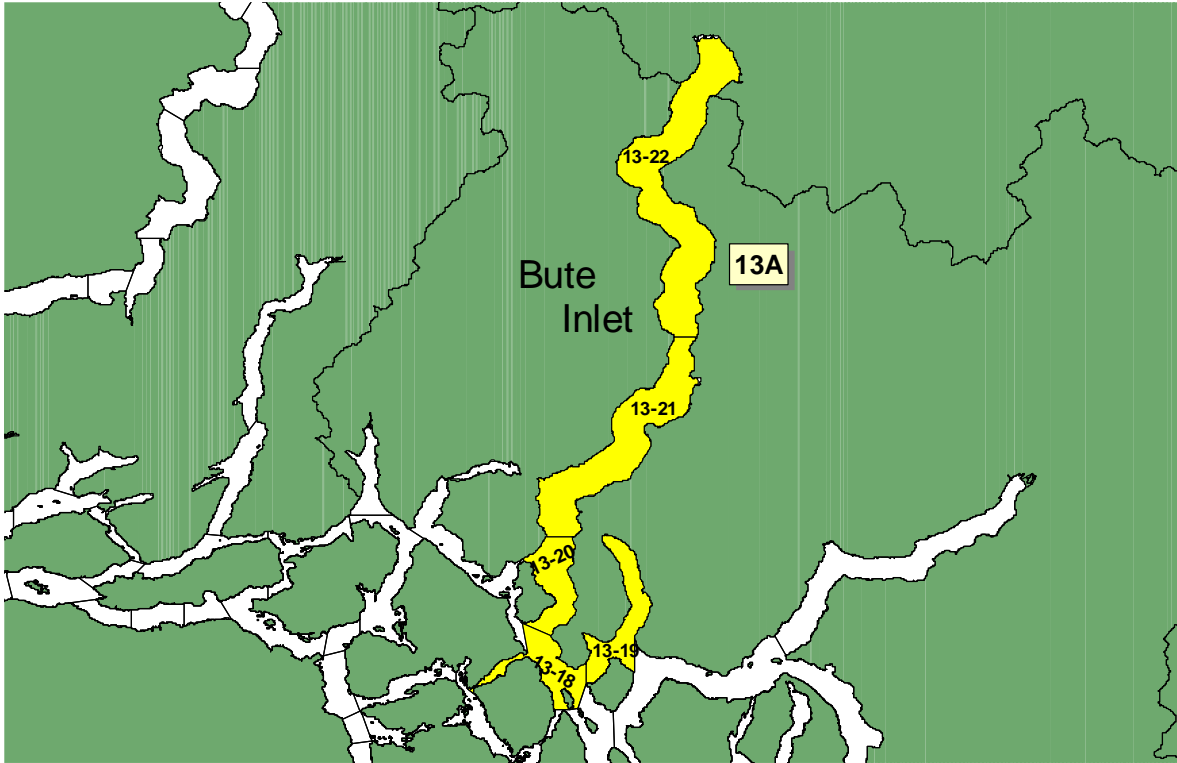


Figure 2: Quota Management Area 13A - Bute Inlet

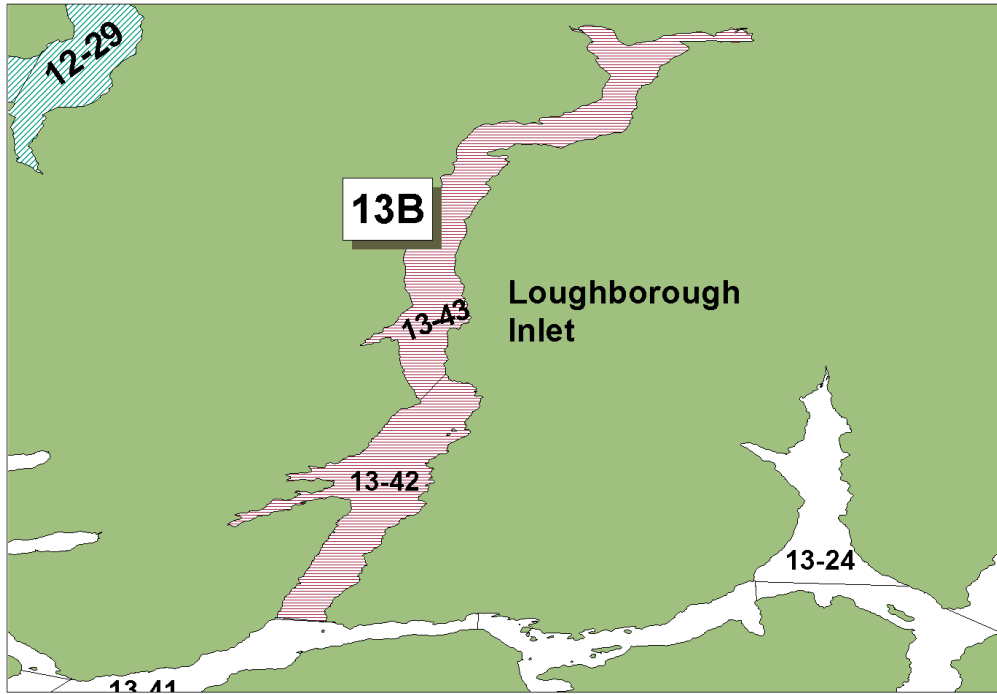


Figure 3: Quota Management Area 13B - Loughborough Inlet

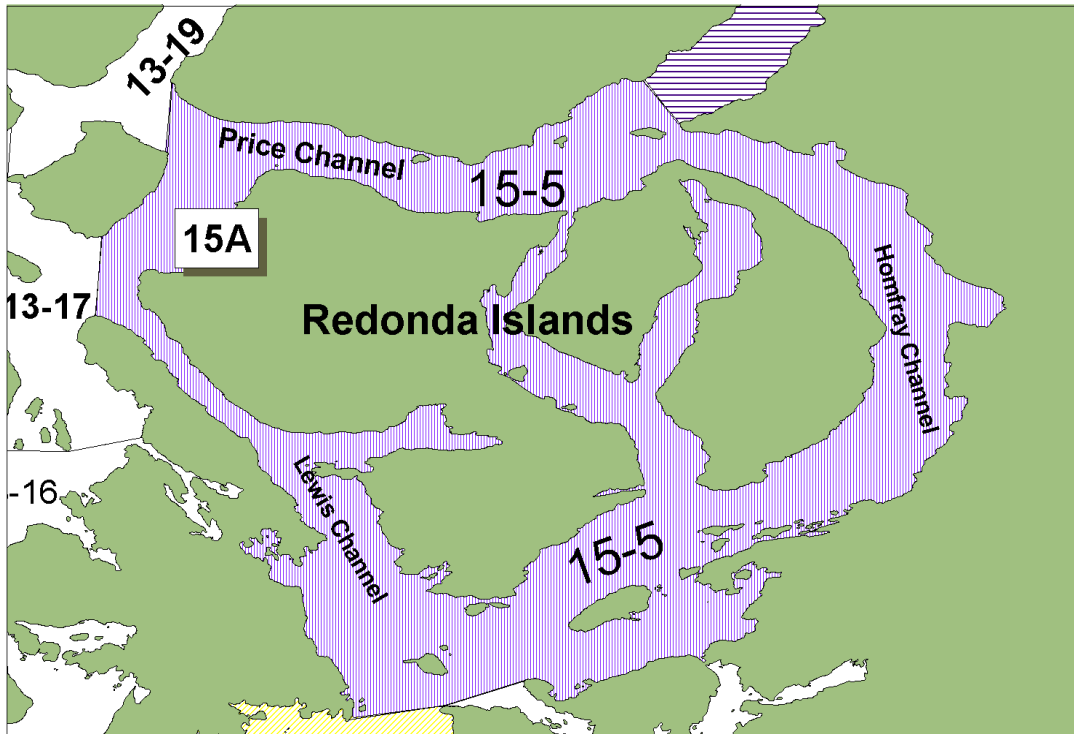


Figure 4: Quota Management Area 15A – Homfrey-Lewis-Price Channels

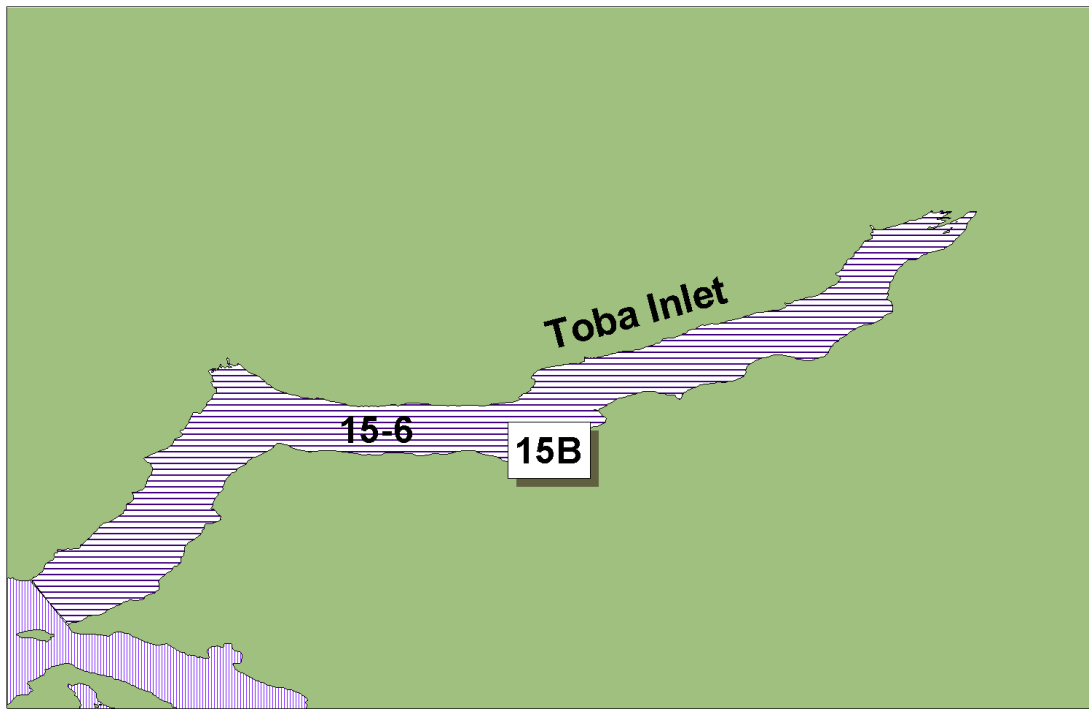


Figure 5: Quota Management Area 15B – Toba Inlet

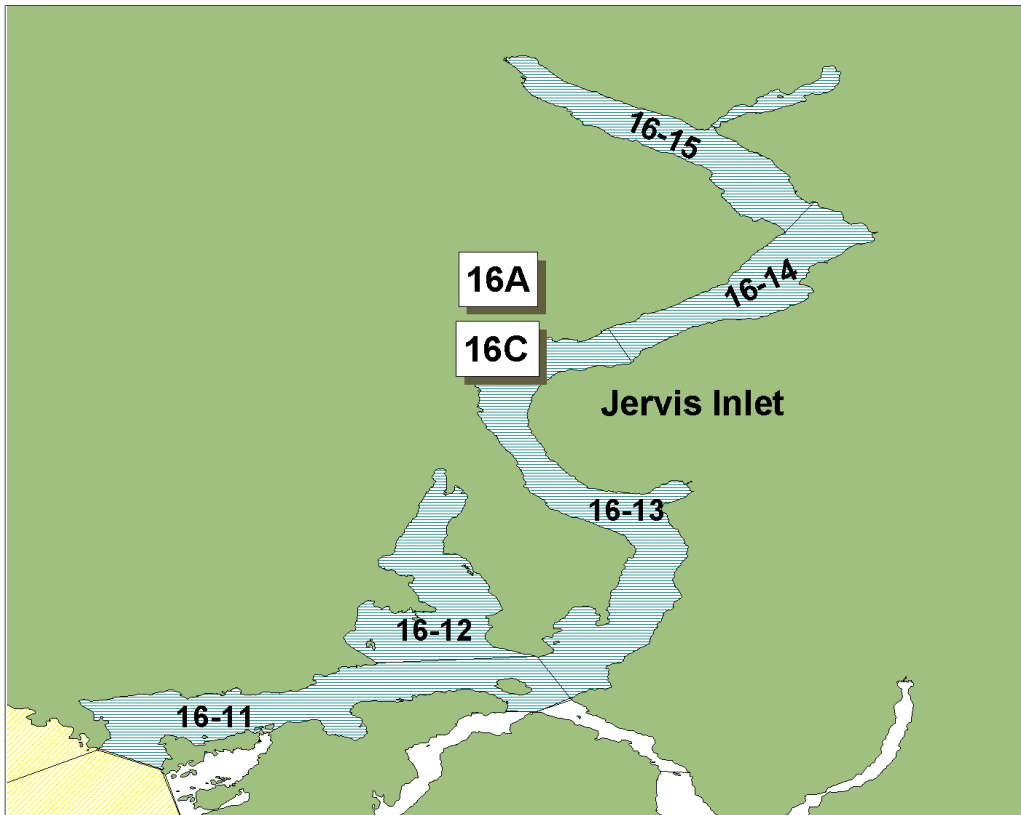


Figure 6: Quota Management Area 16A and 16C – Jervis Inlet

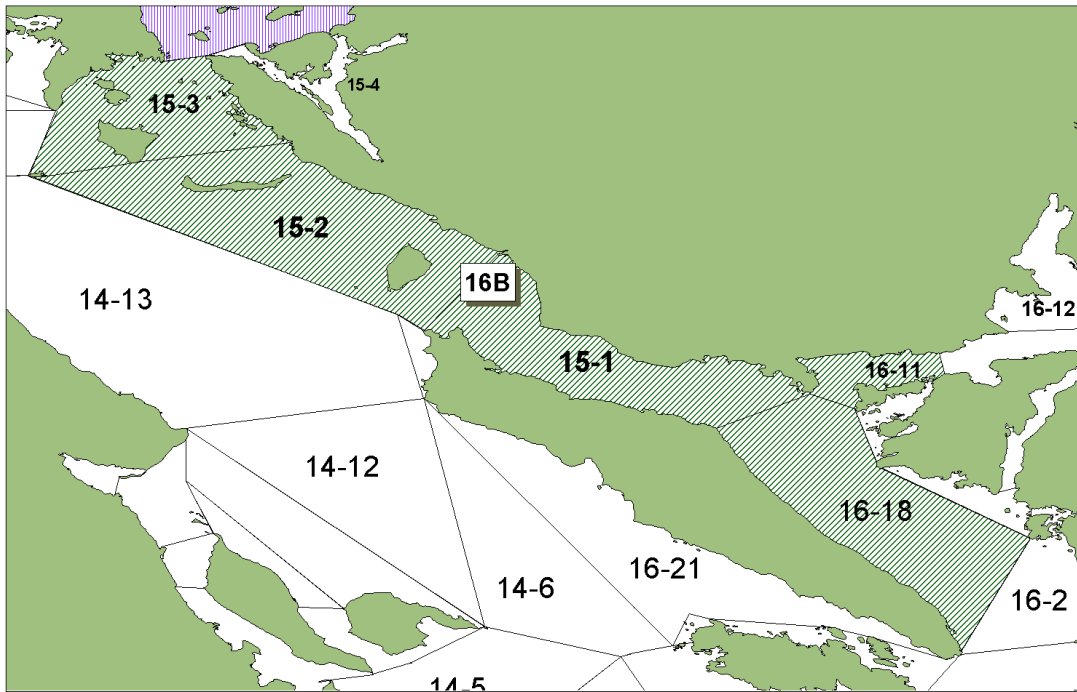


Figure 7: Quota Management Area 16B – Strait of Georgia

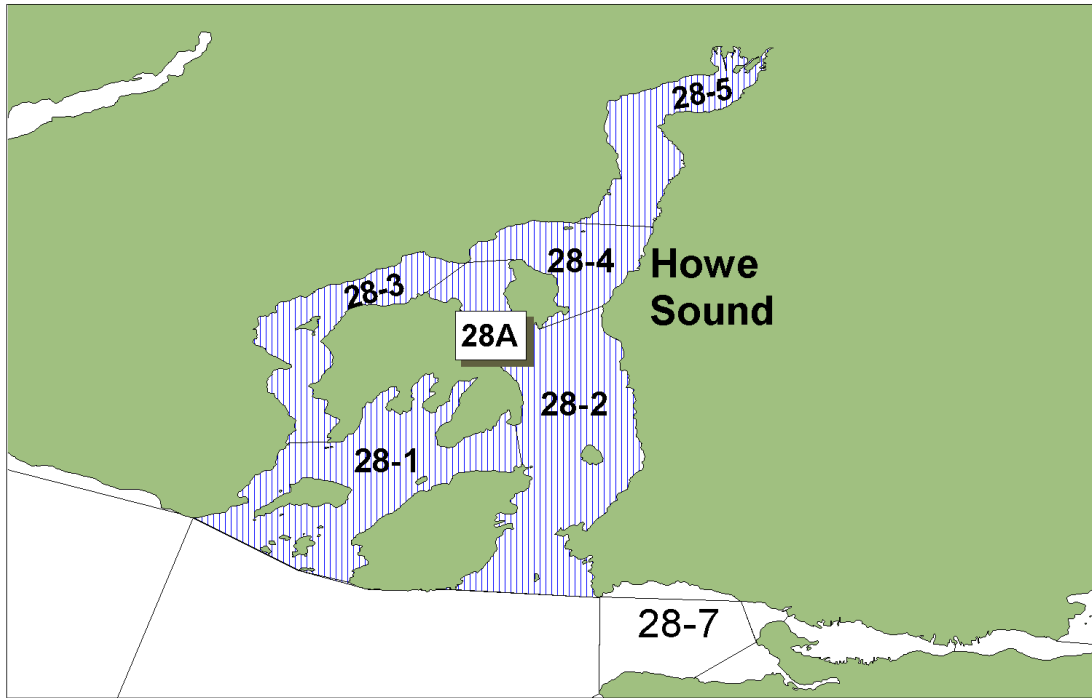


Figure 8: Quota Management Area 28A

Appendix 4: Fishing Vessel Safety

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OVERVIEW – FISHING VESSEL SAFETY

Vessel owners and masters have a duty to ensure the safety of their crew and vessel. Adherence to safety regulations and good practices by owners, masters and crew of fishing vessels will help save lives, prevent vessel damage and protect the environment. All fishing vessels must be in a seaworthy condition and maintained as required by Transport Canada (TC), WorkSafeBC, and other applicable agencies. Vessels subject to inspection should ensure that the certificate of inspection is valid for the area of intended operation.

In the federal government, responsibility for shipping, navigation, and vessel safety regulations and inspections lies with TC; emergency response with the Canadian Coast Guard (CCG) and DFO has responsibility for management of the fisheries resources. The Transportation Safety Board is an independent agency that advances transportation safety by investigating selected occurrences in the air, marine, pipeline and rail modes of transportation including fishing vessel occurrences. In BC, WorkSafeBC exercises jurisdiction over workplace health and safety and conducts inspections on commercial fishing vessels in order to ascertain compliance with the Workers Compensation Act (WCA) and the Occupational Health and Safety Regulation (OHSR).

Before departing on a voyage the owner, master, or operator must ensure that the fishing vessel is capable of and safe for the intended voyage and fishing operations. Critical factors for a safe voyage include the seaworthiness of the vessel, having the required personal protective and life-saving equipment in good working order, adequate number of properly trained crew, and knowledge of current and forecasted weather conditions. As safety requirements and guidelines may change, the vessel owner, crew, and other workers must be aware of the latest legislation, policies and guidelines prior to each trip.

There are many useful tools available for ensuring a safe voyage. These include:

- Education and training programs
- Marine emergency duties training
- Fish Safe – Stability Education Program & 1 Day Stability Workshop
- Fish Safe – SVOP (Subsidized rate for BC commercial fishers provided)
- Fish Safe – *Safest Catch* program – **FREE** for BC commercial fishers
- Fish Safe *Safe At Sea* DVD Series – Fish Safe
- Fish Safe Stability Handbook – *Safe at Sea* and *Safest Catch* – DVD Series
- Fish Safe *Safest Catch* Log Book
- Fish Safe *Safety Quiz*
- First Aid training
- Radio Operators Course (Subsidized rate for BC commercial fishers provided)
- Fishing Masters Certificate training
- Small Vessel Operators Certificate training

Publications:

- *Gearing Up for Safety* - WorkSafeBC

- <https://tc.canada.ca/en/marine-transportation/marine-safety/tp-15393e-adequate-stability-safety-guidelines-fishing-vessels> TP 15393E - Adequate stability and safety guidelines for fishing vessels
- TP 15392E - Guidelines for fishing vessel major modification or a change in activity. <https://tc.canada.ca/en/marine-transportation/marine-safety/tp-15392e-guidelines-fishing-vessel-major-modification-change-activity>
- Transport Canada Publication TP 10038 Small Fishing Vessel Safety Manual (can be obtained at Transport Canada Offices from their website at: <http://www.tc.gc.ca/eng/marinesafety/tp-tp10038-menu-548.htm>)
- Amendments to the Small Fishing Vessel Inspection Regulations (can be obtained from: <http://www.gazette.gc.ca/rp-pr/p2/2016/2016-07-13/html/sor-dors163-eng.php>)
- Safety Issues Investigation into Fishing Safety in Canada report can be accessed: <https://www.tsb.gc.ca/eng/rapports-reports/marine/etudes-studies/M09Z0001/M09Z0001.html>

For further information see: <https://tc.canada.ca/en/marine-transportation>
www.fishsafebc.com
www.worksafebc.com
www.tsb.gc.ca/eng/rapports-reports/marine/index.html

IMPORTANT PRIORITIES FOR VESSEL SAFETY

There are three areas of fishing vessel safety that should be considered a priority. These are: vessel stability, emergency preparedness, and cold water immersion.

1.1. Fishing Vessel Stability

Vessel stability is paramount for safety. Care must be given to the stowage and securing of all cargo, skiffs, equipment, fuel containers and supplies, and to correct ballasting. Fish harvesters must be familiar with their vessel's centre of gravity, the effect of liquid free surfaces on stability (e.g. loose water or fish on deck), loading and unloading operations, watertight integrity and the vessel's freeboard. Know the limitations of your vessel; if you are unsure contact a naval architect, marine surveyor or the local Transport Canada Marine Safety Office.

Fishing vessel owners are required to develop detailed instructions addressing the limits of stability for each of their vessels. These instructions must include detailed safe operation documentation kept on board the vessel.

In 2017, Transport Canada Marine Safety (TC) issued Ship Safety Bulletin (SSB) [No. 03/2017](#) announcing the coming into force of the New Fishing Vessel Safety Regulations. The initial regulations were published in the Canada Gazette Part II on July 13, 2016 and came into force on July 13, 2017. The bulletin includes important information on changes to requirements for Written Safety Procedures, Safety Equipment and Vessel Stability.

As of July 13, 2017, new regulations pertaining to stability assessments to be performed by a competent person came into effect, as follows:

- A new fishing vessel that has a hull length of more than 9 m where the vessel construction was started or that a contract was signed for the construction after July 13, 2018;
- A fishing vessel more than 9 m and that has undergone a major modification or a change in activity that is likely to adversely affect its stability;
- A fishing vessel that is fitted with an anti-roll tank at any time;
- A fishing vessel more than 15 gross tonnage and used for catching herring or capelin during the period beginning on July 6, 1977 and ending on July 13, 2017
- For an existing fishing vessel that is not required to undergo a stability assessment, the owner shall be capable of demonstrating that their vessel has adequate stability to safely carry out the vessel's intended operations. Guidelines have been developed and are available online to help small fishing vessel owners and operators meet their regulatory requirements
- Two good resources can be found here: [TP 15393 - Adequate stability and safety guidelines for fishing vessels \(2018\)](#) and [TP 15392 – Guidelines for fishing vessel major modification or a change in activity \(2018\)](#)

Further, the new Regulation requires a “Stability Notice” to be developed after a stability assessment. This notice includes a simple diagrammatic of the vessel, its tanks and fish holds, or deck storage as the case may be. It is intended to assist fishing vessel crews in quickly determining the safe carriage limits of the vessel without having to reference a complicated Trim and Stability Book.

Additionally, Transport Canada published a Stability Questionnaire ([SSB No. 04/2006](#)) and Fishing Vessel Modifications Form ([SSB No. 01/2008](#)) which enable operators to identify the criteria which will trigger a stability assessment. Please contact the nearest Transport Canada office if you need to determine whether your vessel requires a stability assessment, or to receive guidance on obtaining competent assessor.

In 2019, TC provided an updated [SSB 03/2019](#), which sets out a voluntary record of modifications for the benefit of owners/masters of any fishing vessels. For vessels of more than 15 gross tons, the record of modifications was to be reviewed by TC inspectors during regular inspections and entered on the vessel's inspection record. However, information gathered during the Transportation Safety Board's (TSB) Safety Issues Investigation into the fishing industry showed minimal recording of vessel modifications prior to this date.

The TSB has investigated several fishing vessel accidents since 2005 and found a variety of factors that effected the vessel's stability were identified as contributing factors in vessels capsizing, such as with: [M05W0110](#) - *Morning Sunrise*, [M07M0088](#) - *Big Sisters*, [M08W0189](#) - *Love and Anarchy*, [M09L0074](#) – *Le Marsouin I*, [M10M0014](#) - *Craig and Justin*, [M12W0054](#) – *Jessie G*, [M12W0062](#) - *Pacific Siren*, [M14P0121](#) – *Five Star*, [M15P0286](#) – *Caledonian*, [M16A0140](#) – *C19496NB*, [M17C0061](#) – *Emma Joan*, [M17P0052](#) – *Miss Cory*, [M18P0073](#) – *Western Commander*, [M18A0425](#) – *Charlene A* and [M18A0454](#) – *Atlantic Sapphire*.

Vessel masters are advised to carefully consider stability when transporting gear. Care must be given to the stowage and securing of all traps, cargo, skiffs, equipment, fuel containers and supplies and also to correct ballasting. Know the limitations of your vessel; if you are unsure

contact a reputable marine surveyor, naval architect or the local Transport Canada Marine Safety office.

WorkSafeBC's Occupational Health and Safety Regulations (OHSR) require owners of fishing vessels to provide documentation on board, readily accessible to crew members, which describes vessel characteristics, including stability.

Fish Safe has developed a code of best practices for the food and bait/roe herring fisheries and the prawn fishery: These Best Practices are available on Fish Safe's website for convenient download here: <https://www.fishsafebc.com/best-practices> Please contact Ryan Ford at Fish Safe for a copy of the program materials they developed to address safety and vessel stability in these fisheries. Ryan Ford – office: (604) 261-9700 - Email: ryan@fishsafebc.com.

1.2. Emergency Drill Requirements

The *Canada Shipping Act, 2001* requires that the Authorized Representative of a Canadian Vessel shall develop procedures for the safe operation of the vessel and for dealing with emergencies. The Act also requires that crew and passengers receive safety training. The Marine Personnel Regulations require that all personnel on board required to meet the minimum safe manning levels have received MED (Marine Emergency Duties) training to an A1 or A3 level, depending on the vessel's voyage limits, within 6 months of serving aboard. MED A3 training is 8 hours in duration and is applicable to seafarers on fishing vessels less than 150 GRT that are within 25 miles from shore (NC2). MED A1 training is 19.5 hours duration and is applicable to all other fishing vessels.

To assist fishers in meeting their crew training requirements, Fish Safe has created a downloadable '*New Crew Orientation Form and How To Guide*' available on Fish Safe's website here: <https://www.fishsafebc.com/downloadable-tools>

MED provides a basic understanding of the hazards associated with the marine environment; the prevention of shipboard incidents; raising and reacting to alarms; fire and abandonment situations; and the skills necessary for survival and rescue.

WorkSafeBC's Occupational Health and Safety Regulation (OHSR) requires written rescue and evacuation procedures for work on or over water. Additionally, fishing vessel masters must establish procedures and assign responsibilities to each crew member to cover all emergencies, including the following: crew member overboard, fire on board, flooding of the vessel, abandoning ship, and calling for help. Fishing vessel masters are also required to conduct emergency drills at the start of each fishing season, when there is a change of crew, and at periodic intervals to ensure that crewmembers are familiar with emergency procedures.

Between 2011 and 2015 the TSB investigated 17 fishing vessel accidents which resulted in 17 fatalities. The report's findings highlighted the lack of safety drills and safety procedures and practices. The *Safest Catch* program, delivered by Fish Safe and free to BC commercial fishers, includes comprehensive practice of drills such as abandon ship, man overboard and firefighting drills.

1.3. Cold Water Immersion

Drowning is the number one cause of death in BC's fishing industry. Cold water is defined as water below 25 degrees Celsius, but the greatest effects occur below 15 degrees C. BC waters are usually below 15 degrees C. Normal body temperature is around 37 degrees Celsius; cold water rapidly draws heat away from the body. The effects of cold water on the body occur in four stages: cold shock, swimming failure, hypothermia and post-rescue collapse. Know what to do to prevent you or your crew from falling into the water and what to do if that occurs. More information is available in the WorkSafeBC Bulletin Cold Water Immersion (available from the WorkSafeBC website at www.worksafebc.com).

Under the recently amended (June 2019) OHS Regulation, section 24.96.1, a crewmember must wear a PFD or lifejacket when on board a fishing vessel that has no deck or deck structure or when on the deck of a fishing vessel that has a deck or deck structure. The use of a PFD will prepare a crewmember to remain afloat, to survive the effects of cold shock, reduce the need to swim and give rescuers time to respond.

Section 8.26, which requires workers to wear a PFD or lifejacket when working "under conditions which involve a risk of drowning", would continue to apply to fishing crewmembers and other workers (e.g. when they are working on shore, docks and other vessels). The specific requirements can be found on WorkSafeBC's PFD Primer provided on Fish Safe's website here: <https://www.fishsafebc.com/cold-water-survival>.

It has been demonstrated time and again that, when worn, PFD's save lives - and the chance of surviving a mishap increases significantly when these devices are worn while working on deck.

Resulting from the TSB investigations into the *Diane Louise* - [M14P0110](#) and the *Caledonian* - [M15P0286](#) fishing vessel accidents the Board recommended that both TC and WorkSafeBC require that persons wear a suitable personal flotation devices (PFDs) at all times when: on the deck of a commercial fishing vessel; or, when on board a commercial fishing vessel without a deck or deck structure, and ensure that programs are developed to confirm compliance.

1.4. Other Issues

1.4.1. Weather

Vessel owners and masters are reminded of the importance of paying close attention to current weather trends and forecasts during the voyage. Marine weather information and forecasts can be obtained on VHF channels 21B, Wx1, Wx2, Wx3, or Wx4. Weather information is also available from Environment Canada website at: http://www.weatheroffice.gc.ca/marine/index_e.html

1.4.2. Emergency Radio Procedures, EPIRB's and AIS

Vessel owners and masters should ensure that all crew are able to activate the Search and Rescue (SAR) system early rather than later by contacting the Canadian Coast Guard (CCG). All fishing vessels greater than 20m in length must carry a Class A AIS, as well as a float free 406 MHz Emergency Position Indicating Radio Beacon (EPIRB). These beacons must be registered with the Canadian Beacon Registry. When activated, an EPIRB transmits a distress call that is picked up or relayed by satellites and transmitted via land earth stations to the Joint Rescue Co-

ordination Centre (JRCC), which will task and co-ordinate rescue resources. The TSB notes that there have been several recent occurrences on board vessels not equipped with an EPIRB, and that were either unable or did not use any other means of emergency signaling distress (e.g. [M14P0121](#), [M14A0289](#), [M15A0189](#), [M16A0327](#), [M18A0076](#), [M18A0303](#), [M18A0078](#), [M18P0184](#), [M19A0082](#), [M19P0242](#), [M20A0258](#), [M20A0160](#), [M21A0315](#)) which resulted in 26 fatalities. The carriage of both AIS and EPIRB is strongly encouraged for all fishing vessels who do not fall under the mandatory threshold.

Fish harvesters should monitor VHF channel 16 or MF 2182 KHz and make themselves and their crews familiar with other radio frequencies. All crew should know how to make a distress call and should obtain their restricted operator certificate from Industry Canada. However, whenever possible, masters should contact the nearest Canadian Coast Guard (CCG) Marine Communications and Traffic Services (MCTS) station (on VHF channel 16 or MF 2182 kHz) prior to a distress situation developing. Correct radio procedures are important for communications in an emergency. Incorrect or misunderstood communications may hinder a rescue response. Further information is available at [Radio Aids to Marine Navigation General](#)

Since August 1, 2003 all commercial vessels greater than 8 metres in length are required to carry a Class D VHF Digital Selective Calling (DSC) radio. A registered DSC VHF radio has the capability to alert other DSC equipped vessels in your immediate area and MCTS that your vessel is in distress. Masters should be aware that they should register their DSC radios with Industry Canada to obtain a Marine Mobile Services Identity (MMSI) number or the automatic distress calling feature of the radio may not work. For further information see the Coast Guard website at: <http://www.ccg-gcc.gc.ca/eng/CCG/Home> or go directly to the Industry Canada web page: www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf01032.html

A DSC radio that is connected to a GPS unit will also automatically include your vessel's current position in the distress message. More detailed information on DSC can be found here: [TC DSC Safety Bulletin](#). Questions regarding Coast Guard DSC capabilities can be obtained by contacting your local MCTS centre (Prince Rupert MCTS (250)627-3070 or Victoria MCTS (250)363-6333).

1.4.3. Collision Regulations

Fish harvesters must be knowledgeable of the *Collision Regulations* and the responsibilities between vessels where risk of collision exists. Navigation lights must be kept in good working order and must be displayed from sunset to sunrise and during all times of restricted visibility. To help reduce the potential for collision or close quarters situations which may also result in the loss of fishing gear, fish harvesters are encouraged to monitor the appropriate local Vessel Traffic Services (VTS) VHF channel when travelling or fishing near shipping lanes or other areas frequented by large commercial vessels. Vessels required to participate in VTS include:

- a) every ship twenty metres or more in length,
- b) every ship engaged in towing or pushing any vessel or object, other than fishing gear,
- c) where the combined length of the ship and any vessel or object towed or pushed by the ship is forty five metres or more in length; or
- d) where the length of the vessel or object being towed or pushed by the ship is twenty metres or more in length.

Exceptions include:

- a) a ship towing or pushing inside a log booming ground,
- b) a pleasure yacht **less than** 30 metres in length, and
- c) a fishing vessel that is **less than** 24 metres in length and not **more than** 150 tons gross.

More detailed information on VTS can be obtained by calling either Prince Rupert MCTS (250)627-3070 or Victoria MCTS (250)363-6333 or from the Coast Guard website:
<https://www.ccg-gcc.gc.ca/publications/mcts-sctm/ramn-arnm/part3-eng.html>

1.4.4. Buddy System

Fish harvesters are encouraged to use the buddy system when transiting and fishing as this allows for the ability to provide mutual aid. An important trip consideration is the use of a sail/voyage plan which includes the particulars of the vessel, crew and voyage. The sail plan should be left with a responsible person on shore or filed with the local MCTS. After leaving port the fish harvester should contact the holder of the sail plan daily or as per another schedule. The sail plan should ensure notification to JRCC when communication is not maintained which might indicate your vessel is in distress. Be sure to cancel the sail plan upon completion of the voyage.

WORKSAFEBBC

WorkSafeBC exercises jurisdiction over workplace health and safety, including the activities of crews of fishing vessels. Commercial fishing, diving and other marine operations are subject to the provisions of the *Workers Compensation Act (WCA)* and requirements in Part 24 of the Occupational Health and Safety Regulation (OHSR). Examples of Part 24 regulatory requirements related to fishing include, but are not limited to, the requirement to establish emergency procedures, to conduct emergency drills, to provide immersion suits for the crew, to provide stability documentation for the vessel, safe work procedures, injury reporting, correction of unsafe working conditions, the requirement to wear personal floatation devices (PFDs), etc.

Other sections of the OHSR also apply to commercial fishing operations. For example, Part 3 addresses training of young and new workers, first aid, and employer incident/accident investigations. Part 4 addresses general conditions such as maintenance of equipment, workplace conduct and impairment. Part 8 addresses issues related to safety headgear, safety footwear, eye and face protection, limb and body protection and personal floatation devices (PFDs) when working on the dock. Part 12 addresses issues related to tools, machinery and equipment, including safeguarding. Part 15 addresses issues related to rigging.

Both owners and masters of fishing vessels are considered to be employers. Under the *Workers Compensation Act* and the OHS Regulation (OHSR) they have varying and overlapping duties and responsibilities. Masters, because they have the most control during

fishing and related activities, are considered to be the employer with primary responsibility for the health and safety of the crew.

The OHSR and the WCA are available from the Provincial Crown Printers or by visiting the WorkSafeBC website: www.worksafebc.com

NOTE: Regarding the OHSR requirement to wear PFD's, WorkSafeBC has produced a video entitled "Turning the Tide – PFD's in the Fishing Industry". For more information on PFD use, including a link to the video, please access the following site:

<https://www.worksafebc.com/en/about-us/news-events/news-releases/2018/November/new-fishing-industry-safety-video?origin=s&returnurl=https%3A%2F%2Fwww.worksafebc.com%2Fen%2Fsearch%23q%3DTurning%2520the%2520Tide%26sort%3Drelevancy%26f%3Alanguage-facet%3D%5BEnglish%5D>

For further information, contact an Occupational Safety Officer:

Bruce Logan	Field Services	Vancouver/Richmond/Delta	(604) 244-6477
Cody King	Field Services	Courtenay	(250) 334-8733
Paul Matthews	Field Services	Courtenay	(250) 334-8741
Wayne Tracey	Field Services	Central	(604) 232-1939

or the Manager of Interest for Marine and Fishing, Pat Olsen (250) 334-8777

For information on projects and initiatives related to commercial fishing health and safety please contact Tom Pawlowski, Manager, OHS Consultation and Education Services, at (604) 233-4062 or by email: tom.pawlowski@worksafebc.com or Helen Chandler, OHS Consultant at (604) 276-3174 or by email: helen.chandler@worksafebc.com.

FISH SAFE BC

Fish Safe encourages Vessel masters and crew to take ownership of fishing vessel safety. Through this industry driven and funded program Fish Safe provides fishing relevant tools and programs to assist fishers in this goal. The Fish Safe Stability Education Program and 1 Day Stability Workshop are available to all fishers who want to improve their understanding of stability and find practical application to their vessel's operation. The SVOP (Small Vessel Operator Proficiency) Course is designed to equip crew with the skills they need to safely navigate during their wheel watch. The *Safest Catch* Program, along with fisher-trained Safety Advisors, is designed to give fishers the tools they need to create a vessel specific safety management system.

As referenced throughout the above documentation, Fish Safe provides a broad range of courses, programs and services that are either free for BC commercial fishers or highly subsidized.

Fish Safe is managed by Ryan Ford, Program Manager and support staff including John Krgovich, Program Coordinator, Stephanie Nguyen, Program Assistant, Rhoda Huey, Bookkeeper/Administrative Assistant, and an experienced team of fisher Safety Advisors. All activities and program development is directed by the Fish Safe Advisory Committee

(membership is open to all interested in improving safety on board fishing vessels). The Advisory Committee meets two to three times annually to discuss safety issues and give direction to Fish Safe in the development of education and tools for fish harvesters.

Fish Safe also works closely with WorkSafeBC to improve the fishing injury claims process. For further information contact:

Ryan Ford
Program Manager
Fish Safe
#100, 12051 Horseshoe Way
Richmond, BC V7A 4V4

Cell: (604) 739-0540
Office: (604) 261-9700
Email: ryan@fishsafebc.com
www.fishsafebc.com

TRANSPORTATION SAFETY BOARD

The Transportation Safety Board (TSB) is not a regulatory board. The TSB is an independent agency that investigates marine, pipeline, railway and aviation transportation occurrences to determine the underlying risks and contributing factors. Its sole aim is the advancement of transportation safety by reporting publicly through Accident Investigation Reports or Marine Safety Information Letters or Advisors. It is not the function of the Board to assign fault or determine civil or criminal liability. Under the TSB Act, all information collected during an investigation is completely confidential.

In 2014 the TSB pacific region released three investigation reports:

- the collision between trawl fishing vessel [Viking Storm](#) and US long line fishing vessel *Maverick* and the subsequent fatality,
- the person over board off the prawn fishing vessel [Diane Louise](#) and the subsequent fatality, and
- the capsizing of the crab fishing vessel [Five Star](#) and subsequent fatality.

In 2016 the TSB pacific region released one investigation report:

- the capsizing of the trawl [Caledonian](#) and subsequent fatalities.

In 2018 the TSB pacific region released two investigation reports:

- the capsizing and sinking of the [Miss Cory](#) and subsequent fatality
- the sinking of the [Western Commander](#) and loss of life

In 2020 the TSB pacific region is currently investigating the fatal accident involving the [Arctic Fox II](#) on August 11.

The TSB issued five recommendations following the *Caledonian* report. Three recommendations issued are aimed at ensuring all crews have access to adequate stability information that meets their needs. That means:

- All commercial fishing vessels should have a stability assessment appropriate for their size and operation.

- The information from that assessment must then be kept current, and it must be used to determine safe operating limits.

Moreover, these operating limits must be easily measurable, and relevant to the vessel's operation. For example, that could mean marking the sides of a vessel's hull to indicate the maximum operating waterline, or maximum permitted loads can be specified in the most relevant unit of measure—total catch weight for instance, or the safe number of traps. Regardless, for it to be of real, practical use, the information must be presented in a format that is clearly understood and easily accessible to crew.

The other two recommendations address the most basic step that harvesters can take: wearing a personal flotation device. Here in British Columbia, roughly 70 percent of all fishing-related fatalities in the past decade came while not wearing a PFD. Yet many harvesters still do not wear them. TC regulations currently require that PFDs be worn only if harvesters identify a risk, however; you never know when you could end up in the water. So the TSB is recommending to TC to require persons to wear suitable personal flotation devices at all times when on the deck of a commercial fishing vessel or when on board a commercial fishing vessel without a deck or deck structure and that programs are developed to confirm compliance. In June 2019, WorksafeBC amended its fishing regulation related to the use of PFDs. Under the amendments, crewmembers must wear a PFD or lifejacket when on board a fishing vessel that has no deck or deck structure, or when on the deck of a fishing vessel that has a deck or deck structure. Crewmembers are not required to wear lifejackets or PFDs below deck or when inside a deck structure where there is risk of entrapment. This amendment removes the need for a risk of drowning to be present before a PFD must be worn.

For more information about the TSB, visit the website at www.tsb.gc.ca
For information about the TSB's investigation into fishing safety, or to view a brief video, visit: <http://www.tsb.gc.ca/eng/medias-media/videos/marine/m09z0001/index.asp>

To view information on the TSB's recent safety Watchlist, visit:
<http://www.tsb.gc.ca/eng/surveillance-watchlist/marine/2020/marine-01.html>

Reporting an Occurrence: www.tsb.gc.ca/eng/incidents-occurrence/marine/
After a reportable occurrence happens; you can fill out the TSB 1808 form or call the TSB at the contact information below.

Recently the TSB produced a Safe at Sea: Activity book on fishing safety intended for the next generation of fish harvesters (ages 4-7). Download a copy.
[www.tsb.gc.ca > eng > medias-media > prudence-safe > safe-at-sea](http://www.tsb.gc.ca/eng/medias-media/prudence-safe/safe-at-sea)

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