Fisheries and Oceans Canada | Pêches et Océans Canada

FIELDNOTES
2024 – 2025

Pacific science field operations:
Fact sheets

Canada

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Cover illustration: Deep-sea octopus hunting on the periphery of the Explorer hydrothermal vents (2000 m depth).

Photo credit: Northeast Pacific Deep-sea Expedition Project partners and ROPOS.

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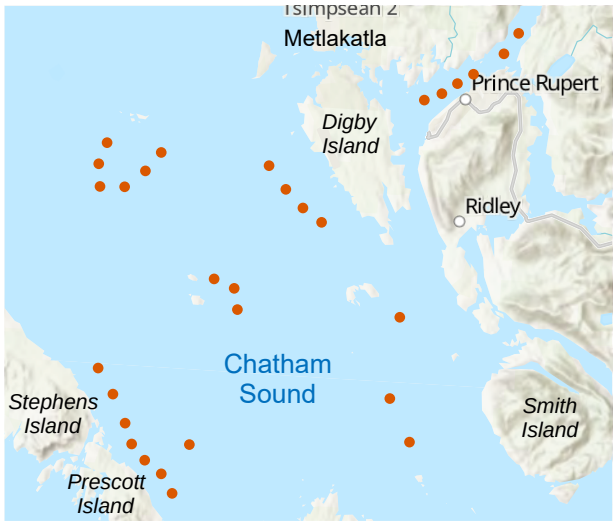
Table 1. Field operations sorted by category, then alphabetical title.

Anchorage impacts on seafloor ecosystems

Unique ID:	OSDROPES_05
Category:	Human Impacts Research and Monitoring
Dates:	August 1 to November 30, 2024
Start year:	2021
Recurrence:	Annually
Vessel:	R/V Doug Anderson
Email:	Cathryn.Murray@dfo-mpo.gc.ca
Phone:	250-363-3001



Locations: Port of Prince Rupert, Chatham Sound

Description

With the expansion of the shipping industry, ships are spending more time at anchorages and expanding to previously little used anchorage areas. Anchorages are often sited in soft sediment areas which are understudied, high diversity ecosystems important for ecosystem function. This research aims to document changes in sediment and seafloor ecosystems in commercial anchorage through remotely operated vehicle (ROV) surveys, multibeam bathymetry, and grab and core sampling.

Image 1: Biologists conducting sediment grab sampling.
Credit: Ashley Park (Fisheries and Oceans Canada)

Objectives

1. Investigate seabed disturbance from commercial anchoring activities across a gradient of anchorage use, duration, and frequency.
2. Quantify the extent of impact on sediment and seafloor species.
3. Provide a baseline for change detection in these areas.

Image 2: "Blue ROV2" used to survey anchorage sites.
Credit: Cathryn Murray (Fisheries and Oceans Canada)

Collaborators

Gitga'at First Nation, Kitselas First Nation, Kitsumkalum Band, Lax Kw'alaams Band, Natural Resources Canada

Aquaculture benthic recovery
Broughton Archipelago and Discovery Islands

Unique ID: ESDNE_12
Category: Human Impacts Research and Monitoring
Dates: June 12 to 19, August 7 to 13, 2024
Start year: 2000
Recurrence: Varied since 2000 (Broughton Archipelago); Annually since 2022 (Discovery Islands)
Vessel: CCGS Vector
Email: Terri.Sutherland@dfo-mpo.gc.ca
Phone: 604-666-2579

Locations: Broughton Archipelago, Discovery Islands

Description

Benthic recovery processes associated with seabed physical-chemical and macrofaunal indicators are not well known, since existing global studies are based on vastly different aquaculture, oceanographic, and seafloor settings. To date BC research is limited to two recovery studies with contrasting outcomes. This project will provide recovery information based on vastly different aquaculture, oceanographic and seabed settings.

Objectives

1. Establish a time-series survey to determine the rate of change in seabed recovery processes of both physical chemical and biological (fauna) variables following the removal of finfish aquaculture facilities.

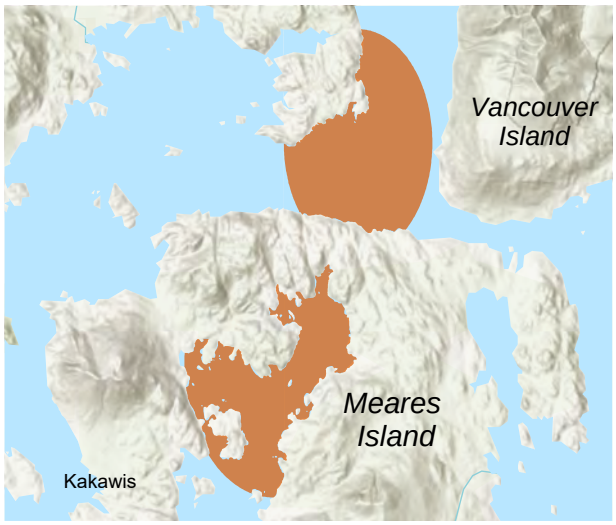
Collaborators

Local Indigenous communities, Canadian Coast Guard, Natural Resources Canada

Image 1: CCGS Vector.
Credit: Terri Sutherland (Fisheries and Oceans Canada)

Image 2: Culture of Pacific oysters (*Magallana gigas*) in the intertidal zone.
Credit: Terri Sutherland (Fisheries and Oceans Canada)

Unique ID: ESDNE_01
Category: Human Impacts Research and Monitoring
Dates: July, August, and October, 2024
Start year: 2017
Recurrence: Annually
Vessel: Zodiac Hurricane
Email: Jackson.Chu@dfo-mpo.gc.ca
Phone: 236-464-4200



Locations: Clayoquot Sound

Description

This national Aquaculture Monitoring Program aims to detect, monitor and model chemical and biological inputs from aquaculture activities in the far-field marine environment. The program helps inform policy and regulatory development and decision making to evaluate the spatio-temporal characteristics of the zone directly influenced by finfish and shellfish aquaculture.

Objectives

1. Collect benthic sediment samples to test for drugs, pesticides, trace metals, sulphides, organic content and sediment grain size.
2. Collect water samples to measure chlorophyll and organic matter.
3. Deploy oceanographic instruments to measure currents, turbidity, temperature, salinity, oxygen and chlorophyll.
4. Collect plankton tows near shellfish farm to collect zooplankton specimens.
5. Inform oceanographic model development.

Collaborators

Maaqutusiis Hahoutlhee Stewardship Society

Image 1: Zodiac Hurricane.
Credit: Jackson Chu (Fisheries and Oceans Canada)

Image 2: Deploying a Van Veen grab for benthic sampling.
Credit: Fisheries and Oceans Canada

Aquatic invasive species settlement plate survey

Unique ID: ESDNE_04
Category: Human Impacts Research and Monitoring
Dates: April 1, 2024 to March 31, 2025
Start year: 2007
Recurrence: Annually
Vessel: N/A
Email: Thomas.Therriault@dfo-mpo.gc.ca
Phone: 250-713-5484

Locations: Prince Rupert harbour Vancouver harbour

Description

The biofouling on commercial and recreational vessels by Aquatic Invasive Species (AIS) is a major contributor to their coast wide spread. Through the rotational deployment of settlement plates at both new and long-term sites, this survey seeks to identify the current distribution of sessile AIS in British Columbia waters. Priority areas include the ports of Prince Rupert and Vancouver as they are potential invasion hot spots. Understanding their distribution supports the development of effective management strategies.

Objectives

1. Early detection of new AIS.
2. Track changes over time in AIS and native sessile species to identify possible impacts of AIS or climate change.

Collaborators

Lax Kw'alaams Band, Metlakatla First Nation, Musqueam, Tsawwassen First Nation, Tsleil-Waututh Nation, Squamish Nation, Council of the Haida Nation, Coast Mountain College, Prince Rupert Port Authority, Port of Vancouver

Image 1: Settlement plate with native and invasive species.
Credit: Fisheries and Oceans Canada

Image 2: Identifying AIS specimens.
Credit: Fisheries and Oceans Canada

Community stream monitoring project (CoSMo)

Unique ID: ESDNE_14
Category: Human Impacts Research and Monitoring
Dates: April 1, 2024 to March 31, 2025
Start year: 2019
Recurrence: Annually
Vessel: N/A
Email: Nikki.Kroetsch@dfo-mpo.gc.ca
Phone: 604-358-3055

Locations: Lower Mainland (various watersheds from Howe Sound to Chilliwack)

Description

The Pacific Science Enterprise Centre's Community Stream Monitoring Project (CoSMo) aims to better understand and monitor temperatures and other factors in salmon-bearing urbanized watersheds across the Lower Mainland. The project also aims to develop and foster relations with community groups and municipal governments, and improve collaboration with external partners. These data are publicly available for research and decision-making.

Image 1: Collecting data at Silver Creek with community volunteer.
Credit: Alan James (Stoney Creek Environment Committee)

Objectives

1. Monitor and better understand temperatures, water depths,and streamflow in Lower Mainland urbanized streams with the help of numerous community partners.

2. Collaborate with partners to understand factors influencing salmon in urban watersheds (e.g. road salt on salmon via the collaborative 'Road Salt and Salmon Project').

3. Improve relationships with stewardship groups and municipal governments, and facilitate public education and engagement.

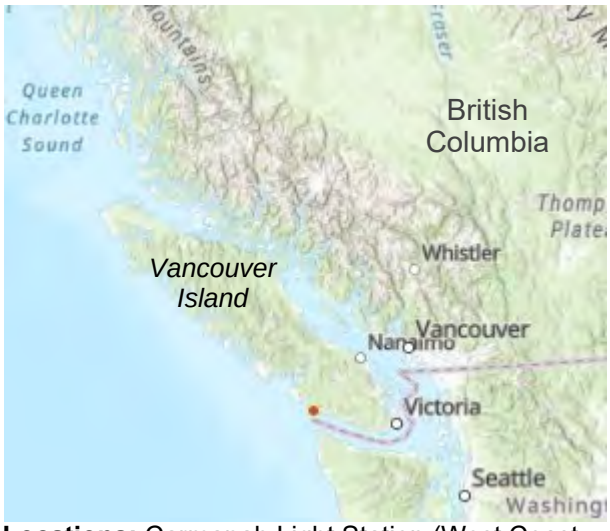
Image 2: Cypress Creek, West Vancouver.
Credit: Alan James (Stoney Creek Environment Committee)

Collaborators

BC Lower Mainland Municipalities, British Columbia Institue of Technology, Simon Fraser University, University of British Columbia, Streamkeeper organizations, other community partners

Detection and tracking of whales and vessels

Unique ID: ESDAEMMS_15
Category: Human Impacts Research and Monitoring
Dates: April 1, 2024 to March 31, 2025
Start year: 2020
Recurrence: Annually (year 5 of 5)
Vessel: N/A
Email: Harald.Yurk@dfo-mpo.gc.ca
Phone: 236-330-2257



Locations: Carmanah Light Station (West Coast Vancouver Island)

Description

The Whale Detection and Collision Avoidance Initiative under the Ocean Protection Program aims to detect and track whales and vessels simultaneously to determine the risk of acoustic and physical disturbance—including ship strikes—and to support the development of timely alerts for mariners of whale presence and whale movements.

This project aims to test the effectiveness of thermal imaging technology in combination with Automatic Identification System (AIS) / RADAR receivers to automatically track whales and vessels.

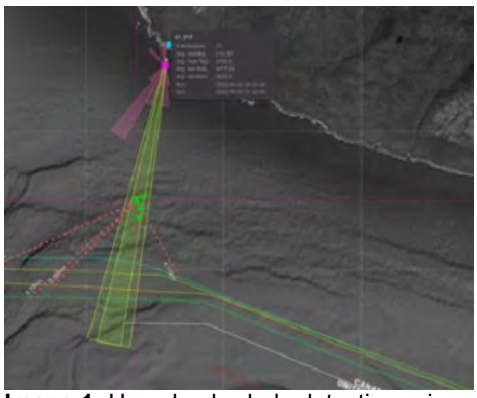


Image 1: Humpback whale detections via TI system.
Credit: Fisheries and Oceans Canada

Objectives

1. Design and deploy tracking systems, i.e. infrared and video cameras, AIS signal receivers, and marine RADAR transmitters.
2. Monitor systems remotely.
3. Deploy underwater acoustic recording equipment to confirm whale presence in the area via alternate monitoring system.

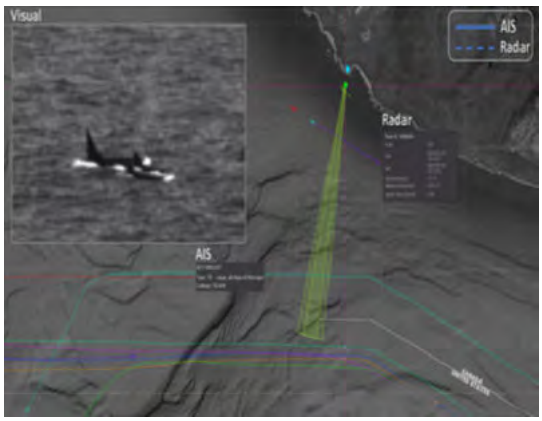


Image 2: Killer whale detections via TI system.
Credit: Fisheries and Oceans Canada

Collaborators

WhaleSpotter Inc. (Germany)

Invasive European green crab monitoring

Unique ID: ESDNE_05
Category: Human Impacts Research and Monitoring
Dates: April 1 to November 30, 2024
Start year: 2005
Recurrence: Annually (rotational)
Vessel: R/V Styela
Email: Thomas.Therriault@dfo-mpo.gc.ca
Phone: 250-713-5484

Description

This monitoring informs efforts to prevent the spread of the highly invasive European green crab throughout coastal British Columbia. Using folding Fukui fish traps deployed in the intertidal zone, crab populations are tracked, both at sites where European green crabs have become established and at new sites where they could establish in the future. This data will provide insights into the types of habitats and possible impacts of green crab.

Objectives

1. Use knowledge of green crab habitat preferences to improve early detection in the Salish Sea and the Central and North coasts.

2. Advise management/partners about the spread and potential impacts of European green crab.

Collaborators

Ahousaht First Nation, Lax Kw'alaams Band, Metlakatla First Nation, T'Sou-ke Nation, Tla-o-qui-aht First Nation, and Toquaht Nation, Council of the Haida Nation Parks Canada, Washington Department of Fish and Wildlife (USA), University of Washington (USA), Coastal Restoration Society, Puget Sound Partnership (USA), Washington Sea Grant Crab Team (USA), Prince Rupert Port Authority

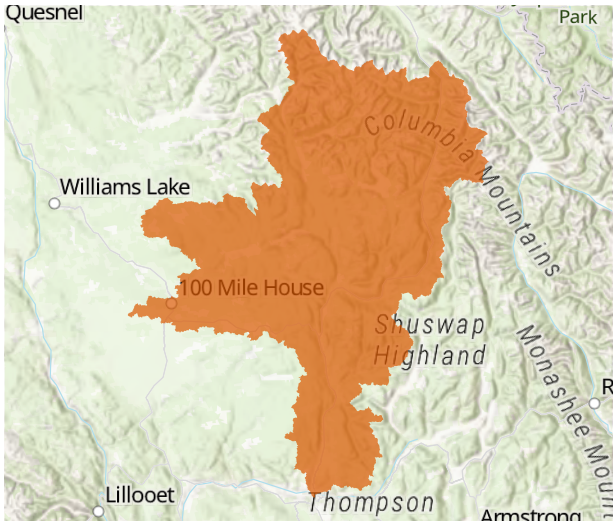
Locations: Haida Gwaii, Chatham Sound, Hecate Strait, Queen Charlotte Sound and Strait, Strait of Georgia, Juan de Fuca Strait, West Coast Vancouver Island

Image 1: R/V Styela.
Credit: Fisheries and Oceans Canada

Image 2: Green crabs (*Carcinus maenas*) caught using Fukui fish traps.
Credit: Fisheries and Oceans Canada

Land use impacts on interior juvenile coho salmon habitat

Unique ID: ESDFE_06
Category: Human Impacts Research and Monitoring
Dates: April 1 to November 30, 2024
Start year: 2019
Recurrence: Annually
Vessel: N/A
Email: Douglas.Braun@dfo-mpo.gc.ca
Phone: 604-703-9069



Locations: North Thompson River Basin

Description

This project will assess relationships between terrestrial land use and stream habitat used by juvenile coho salmon (*Oncorhynchus kisutch*) for rearing. Over twenty streams will be studied throughout the North Thompson watershed. This work has been developed in conversation with Secwepemc Fisheries Commission and Simpcw First Nation.

Objectives

1. Survey habitat characteristics including water quality, large woody debris, gradient and canopy cover in each study watershed.

2. Monitor streamflow, air and water temperature.

3. Quantify the relationship between terrestrial land use (e.g., forestry and agriculture) and habitat characteristics.

4. Develop targets for habitat indicators that can be used for planning and management.

Collaborators

Simon Fraser University

Image 1: Identifying juvenile salmonids in the field.
Credit: Fisheries and Oceans Canada

Image 2: Surveying large woody debris.
Credit: Fisheries and Oceans Canada

Long-term impacts of forestry on stream temperature

Unique ID: ESDFE_05
Category: Human Impacts Research and Monitoring
Dates: July 1 to September 15, 2024
Start year: 2019
Recurrence: Annually
Vessel: N/A
Email: Douglas.Braun@dfo-mpo.gc.ca
Phone: 604-703-9069

Description

This project builds on forest harvest experiments conducted in the Baptiste watershed as part of the Stuart-Takla-Fish-Forestry Interaction Project (1990 - 2008) and will assess the long term impacts of forest harvest practices on headwater stream temperatures. This will improve our understanding of the interaction between forest harvesting and aquatic habitats in interior British Columbia.

Locations: Baptiste Watershed (northwest of Prince George)

Objectives

1. Replicate previous network of stream temperature monitoring.
2. Quantify the long-term impacts of forestry on stream temperature.
3. Evaluate the recovery of headwater stream temperatures following forest harvest.

Image 1: Aerial view of experimental harvest area.
Credit: Fisheries and Oceans Canada

Collaborators

Simon Fraser University

Image 2: Study stream post-harvest.
Credit: Fisheries and Oceans Canada

Marine biotoxin monitoring

Unique ID: OSDOEB_10
Category: Human Impacts Research and Monitoring
Dates: February 27 to December 4, 2024
Start year: 2020
Recurrence: Annually
Vessel: CCGS Vector, citizen scientists and First Nations small vessels
Email: Andrew.Ross@dfo-mpo.gc.ca
Phone: 431-330-0027

Description

The goal of this project is to increase understanding of the dynamics and drivers of harmful algal blooms and associated biotoxins that can impact wild and farmed salmon and endangered marine mammals in British Columbia coastal waters.

Objectives

1. Collect sea water and environmental data (temperature,salinity, oxygen, nutrients) two or three times a year at up to 29 locations and monthly at up to 16 locations, including salmon farms and critical habitat for fish and marine mammals.

2. Filter sea water and analyze filters and filtered seawater for up to 26 biotoxins.

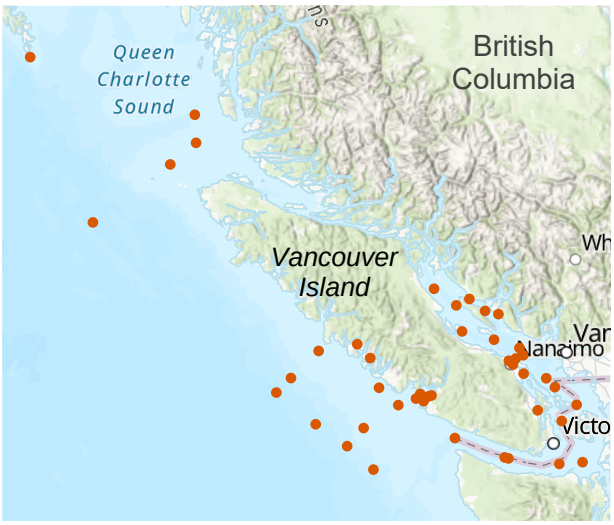
3. Identify and measure the amounts of harmful algae and the biotoxins that they produce.

4. Monitor seasonal and annual trends in the abundance of harmful algae and biotoxins.

5. Compare with temperature and other factors to help predict when toxic algal blooms may occur.

Collaborators

Snuneymuxw First Nation, Pacific Salmon Foundation (Citizen Science Program), Cermaq Canada



Locations: Queen Charlotte Sound, West Coast Vancouver Island, Juan De Fuca Strait, Strait of Georgia

Image 1: Citizen Science sampling.
Credit: Nicole Frederickson (Pacific Salmon Foundation)

Image 2: Filtering sea water for biotoxin analysis.
Credit: Nicole Frederickson (Pacific Salmon Foundation)

Sockeye salmon freshwater migratory stress

Unique ID: ESDFE_01
Category: Human Impacts Research and Monitoring
Dates: April 1 to November 30, 2024
Start year: 1997
Recurrence: Annually
Vessel: N/A
Email: David.Patterson@dfo-mpo.gc.ca
Phone: 604-666-5671

Locations: Port Renfrew, Fraser River Basin, including the Stuart, Nechako,Quesnel, Chilcotin, Shuswap, Seton, Harrison, and Chilliwack watersheds

Description

Environmental conditions impact salmon migratory and reproductive success. This research on the migration biology of Pacific salmon under variable environmental conditions informs the science advice provided to fisheries and habitat managers.

Objectives

1. Assess biological condition of juvenile and adult sockeye salmon in relation to migration conditions in the Fraser basin.
2. Research the impact of migratory stress on salmon survival (e.g., water temperature, fishing interactions, high discharge).
3. Generate quantitative models to forecast in-season estimates of loss for Fraser sockeye.
4. Apply research on migratory stress and environmental conditions to describe post-season estimates of mortality and predict in-season estimates of loss for proactive fisheries management.

Image 1: Testing adult salmon on the Fraser River near Chilliwack.
Credit: Fisheries and Oceans Canada

Image 2: Sockeye salmon (*Oncorhynchus nerka*) at the Adams River.
Credit: Fisheries and Oceans Canada

Collaborators

Lower Fraser Fisheries Alliance, Upper Fraser Fisheries Conservation Alliance, University of British Columbia, Simon Fraser University Pacific Salmon Commission (Canada and USA)

Southern resident killer whale underwater noise impacts

Unique ID: OSDSOTO_06
Category: Human Impacts Research and Monitoring
Dates: July 3 to 9, October 8 to 15, 2024
Start year: 2018
Recurrence: Annually
Vessel: CCGS Vector
Email: Svein.Vagle@dfo-mpo.gc.ca
Phone: 250-363-6339

Locations: Swiftsure Bank, Juan de Fuca Strait, Haro Strait, Boundary Pass, Strait of Georgia

Description

Monitor the underwater noise in southern resident killer whale (SRKW) critical habitats to establish baselines, track changes, and evaluate impacts of human-generated noise on SRKW. Small moorings equipped with hydrophone systems sampling the noise field continuously represent the backbone of this ongoing study.

Image 1: CCGS Vector.
Credit: Fisheries and Oceans Canada

Objectives

1. Recover, service and re-deploy eight hydrophone moorings.
2. Collect water property data.
3. Perform sound propagation studies.
4. Monitor marine mammals.

Image 2: Recovering a mooring from the CCGS Vector.
Credit: Fisheries and Oceans Canada

Collaborators

Canadian Coast Guard, Dalhousie University

Tailings pond monitoring
Quesnel Lake

Unique ID: OSDSOTO_11
Category: Human Impacts Research and Monitoring
Dates: October, 2024
Start year: 2014
Recurrence: Annually
Vessel: R/V Elvis
Email: Svein.Vagle@dfo-mpo.gc.ca
Phone: 250-363-6339

Locations: West basin, West arm, North arm and East arm of Quesnel Lake

Description

The 2014 breach of the Mount Polley mine tailings impoundment released 25 M m^3 of tailings and water into the West Basin of Quesnel Lake, an important sockeye salmon nursery lake. Five moorings are maintained in the lake to monitor turbidity, temperatures, and currents in support of research on ecosystem recovery.

Objectives

1. Understand water movement in Quesnel Lake and its three arms.
2. Track sediment transport in the lake.
3. Understand the influence of autumn and spring lake turnover on sediment resuspension.
4. Track year to year changes in sediment load and how these changes impact the ecosystem in the lake and the downstream Quesnel River, especially for sockeye and chinook salmon.

Collaborators

University of British Columbia, University of Northern British Columbia

Image 1: R/V Elvis.
Credit: Fisheries and Oceans Canada

Image 2: Project crew preparing to deploy a mooring.
Credit: Fisheries and Oceans Canada

Tire rubber-derived impacts on coho and chinook salmon

Unique ID: OSDOEB_15
Category: Human Impacts Research and Monitoring
Dates: April 1, 2024 to March 31, 2025
Start year: 2021
Recurrence: Annually (year 4 of 5)
Vessel: N/A
Email: Andrew.Ross@dfo-mpo.gc.ca
Phone: 431-330-0027

Locations: Vancouver Island, Metro Vancouver

Description

Tire associated contaminants have recently been discovered to be the likely cause of toxic injury and death (40-90%) of adult coho salmon returning to urban and semi urban waterways in Puget Sound, Washington, USA. This research will investigate the impacts of the recently discovered ubiquitous tire rubber antioxidant 6PPD-quinone (N-(1,3-dimethylbutyl)-N'-phenyl-p-phenylenediamine) in British Columbia freshwater.

Objectives

1. Characterize the presence and associated risks of tire-derived contaminants in creeks close to semi-urban and urban areas that feed into British Columbia's salmon bearing rivers.

2. Assess the impacts of tired-derived contaminants, including 6PPD-quinone, on the survival of Coho and other Pacific salmon.

Image 1: Taking water quality measurements.
Credit: Fisheries and Oceans Canada

Image 2: Sampling site.
Credit: Fisheries and Oceans Canada

Collaborators

Cowichan Tribes, Musqueam, Tsleil-Waututh Nation, Tsawwassen First Nation, Capital Regional District, University of British Columbia, Simon Fraser University, British Columbia Conservation Foundation, Millard Piercy Watershed Stewards, Pacific Streamkeepers, Redd Fish Restoration Society, Somenos Marsh Society, Stoney Creek Environmental Commitee, Tsolum River Restoration, Society, Tynehead Hatchery, World Fisheries Trust

Bathymetric data logger installation
West Coast Vancouver Island

Unique ID: CHSCH_01
Category: Hydrographic and Oceanographic Surveys
Dates: June, 2024
Start year: 2024
Recurrence: Annually
Vessel: Kakawin
Email: Michel.Breton@dfo-mpo.gc.ca
Phone: 250-363-6355

Description

An initiative under the Government of Canada's Oceans Protection Plan, Community Hydrography is a 5-year (2022 to 2027) program supporting coastal communities to collect and use bathymetric data and information for their own community purposes. Bathymetric data can help to improve marine safety, community planning, identification of undersea hazards and sensitive marine environments, as well as fishing and harvesting.

Objectives

1. The objective shared by Ka:'yu:'k't'h'/Che:k:tles7et'h' Nations is to collect bathymteric data in support of eelgrass monitoring and habitat mapping.

Collaborators

Ka:'yu:'k't'h'/Che:k:tles7et'h' First Nations

Locations: West Coast Vancouver Island.

Image 2: Eelgrass meadow exposed at low tide.
Credit: Sharon Jeffery (Fisheries and Oceans Canada)

Bathymetry, seabed classification and tide gauge servicing

Unique ID: CHSDATS_01
Category: Hydrographic and Oceanographic Surveys
Dates: July 10 to August 6, 2024
Start year: 1891
Recurrence: Annually
Vessel: CCGS Vector
Email: Stacey.Verrin@dfo-mpo.gc.ca
Phone: 250-363-6377

Locations: West Coast Haida Gwaii, Fisher Channel, Return Channel, Cascade Inlet, Dean Channel, Labouchere Channel, North and South Bentinck Arm, Kwatna Inlet, Kwatna Bay, Burke Channel Bute Inlet, Strait of Georgia, Strait of Juan de Fuca

Description

Mapping of the seabed and collection of bathymetry to enhance navigation safety with periodic tide gauge servicing.

Objectives

1. Collect multibeam bathymetry to improve navigational charts and products and aid scientific research.
2. Detect and classify subsurface shipping hazards.
3. Deploy and service tide gauges to support bathymetric surveying and Canadian Hydrographic Services water levels network.
4. Collect acoustic data to determine seabed classification for navigation and scientific research.
5. Deploy autonomous surface vehicle (ASV) for additional inshore bathymetry capture.

Image 1: CCGS Vector.
Credit: Fisheries and Oceans Canada

Image 2: Launching the Shoal Seeker off the CCGS Vector's deck.
Credit: Fisheries and Oceans Canada

Collaborators

Central Coast Indigenous Resource Alliance, Council of the Haida Nation, Canadian Coast Guard, Environment and Climate Change Canada (Canadian Wildlife Service, Environmental Stewardship Branch), Natural Resources Canada (Geological Survey of Canada)

Bathymetry, seabed classification and tide gauge servicing

Unique ID: CHSDATS_02
Category: Hydrographic and Oceanographic Surveys
Dates: April 1 to October 12, 2024
Start year: 1893
Recurrence: Annually
Vessel: CCGS Otter Bay, CSL Shoalseeker, CSL Kalman L. Czotter
Email: Stacey.Verrin@dfo-mpo.gc.ca
Phone: 250-363-6377

Locations: Haida Gwaii, Chatham Sound, Port of Prince Rupert; Laredo Sound, Channel, and Inlet Strait of Georgia, Gulf Islands, Squamish Harbour

Description

Mapping of the seabed and collection of bathymetry to enhance navigation safety with periodic tide gauge servicing.

Objectives

1. Collect multibeam bathymetry to improve navigational charts and products and aid scientific research.
2. Detect and classify subsurface shipping hazards.
3. Deploy and service tide gauges to support bathymetric surveying and Canadian Hydrographic Services water levels network.
4. Collect acoustic data to determine seabed classification for navigation and scientific research.
5. Capture laser scanner data for coastline delineation and shoreline features.

Image 1: CCGS Otter Bay.
Credit: Fisheries and Oceans Canada

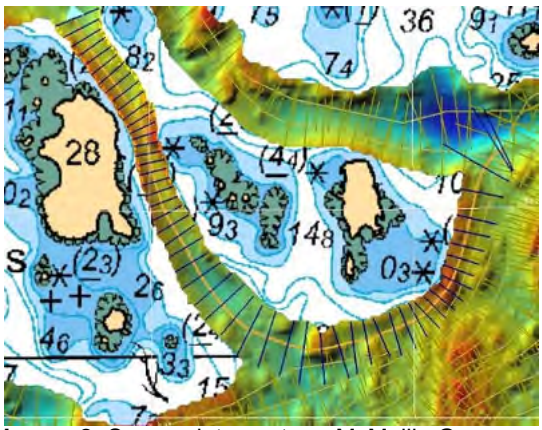


Image 2: Survey data capture, McMullin Group (Queens Sound).
Credit: Fisheries and Oceans Canada

Collaborators

T'Sou-ke Nation, Central Coast Indigenous Resource Alliance, Council of the Haida Nation, W̱SÁNEĆ Leadership Council, Canadian Coast Guard, Environment and Climate Change Canada, Natural Resources Canada (Geological Survey of Canada)

BC Shore Station Oceanographic Program

Unique ID:	OSDROPES_01
Category:	Hydrographic and Oceanographic Surveys
Dates:	April 1, 2024 to March 31, 2025
Start year:	1910's
Recurrence:	Varied
Vessel:	N/A
Email:	Jennifer.Jackson@dfo-mpo.gc.ca
Phone:	236-464-1639

Locations: Dixon Entrance, Hecate Strait, Queen Charlotte Sound, Strait of Georgia, Juan de Fuca Strait, West Coast Vancouver Island

Description

The British Columbia Shore Station Oceanographic Program collects daily sea surface temperature and salinity data at 12 shore stations on the coast of British Columbia. This is a long-term dataset with over 100 years of data from some stations. All shore stations are staffed by Fisheries and Oceans Canada, except Race Rocks and Amphitrite Point which are sampled by contracted observers.

Objectives

1. Continue the time series of observations to use as an indicator of changes including warming associated with climate change in the physical environment as part of Fisheries and Oceans Canada's State of the Ocean reporting.

2. Continue the time series of observations in support of fisheries and ecosystems management programs, for example by estimating the northern diversion of returning Fraser River salmon, and monitoring hazardous algal blooms.

3. Acquire continuous, automated, gap-free, high resolution (hourly) timeseries of sea surface temperature and salinity at key sites along the coast of British Columbia.

Collaborators

Canadian Coast Guard, multiple coastal lightkeepers

Image 1: Lightstation at Chrome Island.
Credit: Fisheries and Oceans Canada

Image 2: Sampling water at Amphitrite Point.
Credit: Fisheries and Oceans Canada

Biophysical survey
Salish Sea

Unique ID:	OSDROPES_04
Category:	Hydrographic and Oceanographic Surveys
Dates:	April 10 to 16, June 26 to July 3, October 2 to 8, 2024
Start year:	1999
Recurrence:	Annually
Vessel:	CCGS Vector
Email:	Jennifer.Jackson@dfo-mpo.gc.ca
Phone:	236-464-1639

Locations: Strait of Georgia, Juan de Fuca Strait

Description

A water properties survey first introduced in 1999 and carried out three to four times per year to collect oceanographic data in the Strait of Georgia and Juan de Fuca Strait (zooplankton, nutrients, dissolved oxygen, dissolved inorganic carbon, temperature, and salinity).

The information collected is used to monitor the seasonal cycle and year to year variability in the properties of the environment and their impact on the ecosystem, and to contribute to an archive of oceanographic information for the region upon which scientific advice can be based.

Image 1: CCGS Vector.
Credit: Fisheries and Oceans Canada

Objectives

1. Continue the time series of observations at over 80 stations.

2. Conduct long-term monitoring of the physical, chemical and biological characteristics of the region.

Image 2: Deployment of a rosette, a deep water sampling apparatus.
Credit: Fisheries and Oceans Canada

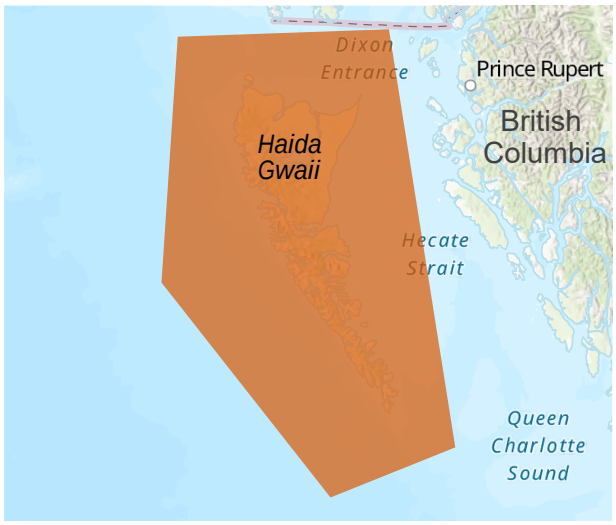
Collaborators

Canadian Coast Guard

Chaan sk̲’ada gud ahl hlg̲unggulaa | Tang.g̲wan g̲an gud ad hlg̲ang.gulx̲a

Working Together Ocean Science Expedition

Unique ID:	OSDSOTO_18
Category:	Hydrographic and Oceanographic Surveys
Dates:	June 30 to July 8, 2024
Start year:	2022
Recurrence:	Annually
Vessel:	CCGS John P. Tully
Email:	Stephen.Page@dfo-mpo.gc.ca
Phone:	250-216-4807



Locations: Haida Gwaii, Dixon Entrance, Hecate Strait, Queen Charlotte Sound

Description

The Chaan sk̲’ada gud ahl hlg̲unggulaa | Tang.g̲wan g̲an gud ad hlg̲ang.gulx̲a | *Working Together Ocean Science Expedition* - a collaborative project with the Council of the Haida Nation (CHN) and Parks Canada - will conduct a full circumnavigation oceanographic survey around Haida Gwaii, including coastal areas, inlets and offshore zones.

Objectives

1. Initiate oceanographic monitoring at priority areas including the seven new Areas of Interest around Haida Gwaii.

2. Expand oceanographic monitoring in Gwaii Haanas (Gwaii Haanas National Parks Reserve, National Marine Conservation Area Reserve, and Haida Heritage Site).

3. Extend zooplankton monitoring to the West Coast of Haida Gwaii.

4. Continue ocean carbon sampling (ocean acidification) monitoring on the West Coast of Haida Gwaii.

Image 1: CCGS John P. Tully.
Credit: Jackson Chu (Fisheries and Oceans Canada)

Image 2: 2023 Haida Gwaii Expedition Team.
Credit: Haida Gwaii Expedition Team

Collaborators

Council of the Haida Nation, Canadian Coast Guard, Parks Canada

Coastal weather station monitoring

Unique ID: OSDOMAP_03
Category: Hydrographic and Oceanographic Surveys
Dates: April 1, 2024 to March 31, 2025
Start year: 2009
Recurrence: Varied
Vessel: Local vessels
Email: Laura.Bianucci@dfo-mpo.gc.ca
Phone: 250-363-6521

Locations: Queen Charlotte Strait, West Coast Vancouver Island

Description

Numerical models used to simulate coastal water circulation require the specification of a wind field to force the movement of the surface layer of the ocean, and the heat flux to balance the transfer of heat into and out of the ocean. Models have been developed for the major aquaculture regions in British Columbia and a network of weather stations has been maintained to contribute to the wind forcing for these models.

Objectives

1. Maintain the weather stations installed at remote locations that require manual downloading of stored data.

2. Maintain the weather stations installed on fish farms that provide data via the internet.

Collaborators

Grieg Seafood BC Ltd., Cermaq Canada, Mowi Canada West

Image 1: Weather station installed at remote site. **Credit:** Glenn Cooper (Fisheries and Oceans Canada)

Image 2: Weather station installed at fish farm. **Credit:** Glenn Cooper (Fisheries and Oceans Canada)

Deep water ROV commissioning and testing

Unique ID: ADGTAT_01
Category: Hydrographic and Oceanographic Surveys
Dates: April 17 to 23, 2024
Start year: 2024
Recurrence: One time only
Vessel: CCGS Vector
Email: Benjamin.Snow@dfo-mpo.gc.ca
Phone: 250-327-4582

Locations: Saanich Inlet, Patricia Bay.

Description

Non-Destructive Survey Tools (NDST) program staff witll be conducting commissioning of new, deep water remotely operated vehicle (ROV) prior to official use in research.

This work will include training with Coast Guard crew members, testing launch and recovery and handlign equipment, and the completion of several test dives in depths of 100 to 200 m in Saanich Inlet.

This work will support future research associated with Canada's Marine Conservation targets and the establishment and ongoign monitoring of Marine Protected Areas on Canada's Pacific Coast.

Image 1: CCGS Vector.
Credit: Fisheries and Oceans Canada

Objectives

1. Determine ideal deck configurations and operating procedure for ROV system components. Test launch and recovery systems in shallow water depths.
2. Conduct test ROV dives in nearshore areas of Saanich Inlet, in water depths of 100 to 200 m.
3. Test ROV sub-system including lights, cameras, pressure sensors, altimeters and acoustic tracking systems.
4. Begin the process of developing standard operating procedures for ROV operations with this new vehicle.

Image 2: Accepting delivery of a new 2000 m rated ROV.
Credit: Jackie Detering (Fisheries and Oceans Canada)

Collaborators

N/A.

Drift prediction and nearshore modelling

Unique ID:	OSDOMAP_04
Category:	Hydrographic and Oceanographic Surveys
Dates:	October, June to August, 2024; February 2025
Start year:	2018
Recurrence:	Annually (Vancouver); One Time Only (Vancouver Island)
Vessel:	R/V Doug Anderson
Email:	Hauke.Blanken@dfo-mpo.gc.ca
Phone:	250-661-8478

Locations: Ladysmith Harbour, Sooke Harbour, Port of Vancouver.

Description

Improving drift prediction and nearshore modelling is an initiative of the Oceans Protection Plan and involves collecting physical water property data to: a) enhance environmental protection and marine safety applications (e.g., drift prediction for oil spills); and b) enhance safety for navigation and related activities (hydrographic e-navigation).

Objectives

1. Measure physical water properties such as temperature and salinity.
2. Deploy and recover surface current tracking drifters.
3. Deploy sensors to provide real-time measurements of currents and water properties.

Collaborators

Canadian Coast Guard, Environment and Climate Change Canada

Image 1: R/V Doug Anderson.
Credit: Lucie Hannah (Fisheries and Oceans Canada)

Image 2: Deployment of a current tracking drifter.
Credit: Roy Hourston (Fisheries and Oceans Canada)

Line P Monitoring Program

Unique ID: OSDROPES_03
Category: Hydrographic and Oceanographic Surveys
Dates: April 26 to May 13, September 14 to 30, 2024; February 19 to March 8, 2025
Start year: 1956
Recurrence: Annually
Vessel: CCGS John P. Tully
Email: Marie.Robert@dfo-mpo.gc.ca
Phone: 236-464-2074

Locations: Northeast Pacific Ocean

Description

Line P - a long standing program that surveys a 1,700 km long section three times per year - is the longest time series of oceanographic data in the Northeast Pacific and Fisheries and Oceans Canada's furthest offshore reaching program on the west coast. Data collected since 1956 shows evidence of the impact of climate variability on ocean productivity.

Objectives

1. Collect water property data and samples for carbon,oxygen, pH, chlorophyll, pigments, nutrients, salinity, cesium, and dimethyl sulfide.

2. Collect zooplankton and phytoplankton samples.

   Collect environmental DNA samples.

3. Recover, service and deploy oceanographic moorings.

Collaborators

Canadian Coast Guard, National Oceanographic and Atmospheric Administration (USA), Memorial University of Newfoundland, University of British Columbia, University of Victoria, University of Washington (USA)

Image 1: CCGS John P. Tully.
Credit: Jackson Chu (Fisheries and Oceans Canada)

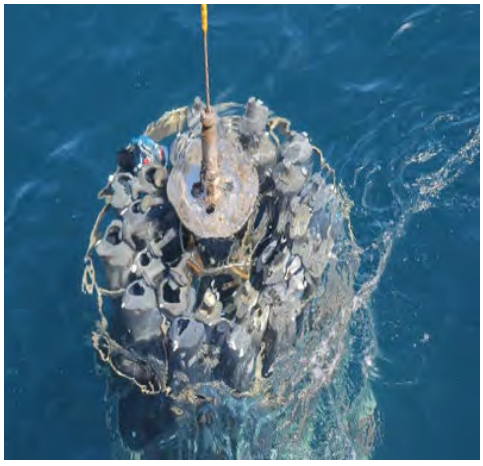


Image 2: Deployment of a rosette, a deep water sampling apparatus.
Credit: Fisheries and Oceans Canada

Marine biogeochemistry
ArcticNET Observation Network

Unique ID: OSDOEB_01
Category: Hydrographic and Oceanographic Surveys
Dates: July 1 to October 31, 2024
Start year: 2003
Recurrence: Annually
Vessel: CCGS Amundsen
Email: Lisa.Miller@dfo-mpo.gc.ca
Phone: 250-363-6673

Locations: Beaufort Sea, Canadian Archipelago, Baffin Bay, Foxe Basin, Hudson Bay

Description

In combination with improved observations and modelling, data from an annual time series of ocean carbon chemistry in the Canadian Arctic support the development of adaptation strategies to minimize negative impacts and maximize positive outcomes resulting from the human-induced transformation of the Canadian Arctic. Each year, only a sub-set of ArcticNET stations are sampled.

Objectives

1. Use a distributed network of research vessels, ocean observatories, and land-based instrument installations to measure marine biogeochemical processes across the Canadian Arctic to understand regional impacts on greenhouse gas cycling, primary production, and ocean acidification.

2. Use an expanded observational network to provide real-time environmental observations to Inuit communities,extend training and research opportunities to Northern residents, and connect with other potential stakeholders.

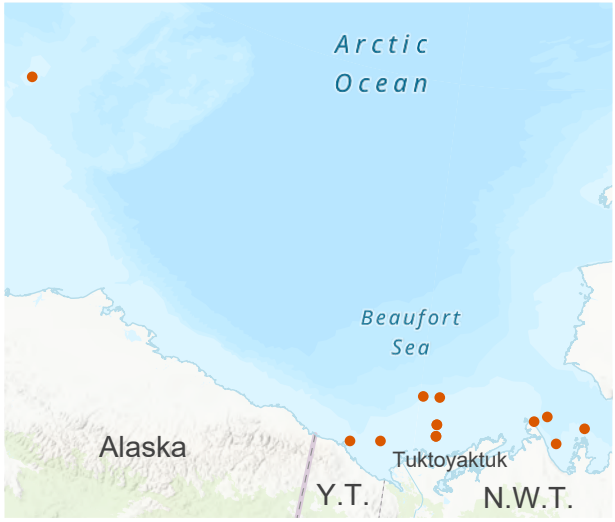
Collaborators

Canadian Coast Guard, University of Alberta, University of British Columbia, University of Calgary, University of Manitoba

Image 1: CCGS Amundsen.
Credit: Fisheries and Oceans Canada

Image 2: Sampling surface waters.
Credit: Fisheries and Oceans Canada

Unique ID:	OSDSOTO_02
Category:	Hydrographic and Oceanographic Surveys
Dates:	October 1 to October 8, 2024
Start year:	1990
Recurrence:	Annually
Vessel:	CCGS Sir Wilfrid Laurier
Email:	Bill.Williams@dfo-mpo.gc.ca
Phone:	250-858-3699



Locations: Canadian Polar Shelf - Beaufort and Chukchi seas

Description

An initiative to document conditions related to sea ice, waves and storm surge that are hazardous to coastal infrastructure, ships and offshore structures in the Arctic Ocean; as well as the progressive impacts of climate change on the marine Arctic.

Objectives

1. Recover and service recording instruments from 10 to 20 submerged moorings, retrieve data, and redeploy the observing array.

2. Collect marine mammal sound recordings, sea-surface temperature, salinity, fluorescence, water and airborne contaminants, and mapping of the seabed.

3. Establish estimates of the recurrence intervals for rare extreme marine hazards of high severity, and reliable projections of the future state of the marine Arctic under the influence of climate change.

Collaborators

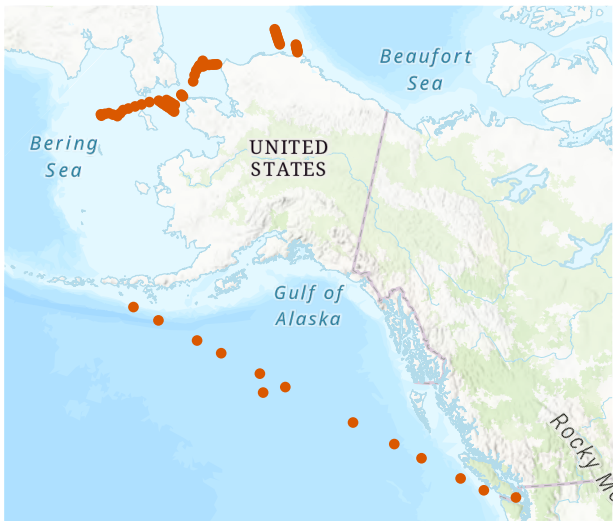
Inuit communities via the Inuvialuit Environmental Impact Screening Committee, Canadian Coast Guard, Environment and Climate Change Canada, National Oceanographic and Atmospheric Administration (USA)

Image 1: CCGS Sir Wilfrid Laurier.
Credit: Fisheries and Oceans Canada

Image 2: Crew retrieves ocean mooring among ice floes.
Credit: Fisheries and Oceans Canada

Ocean and benthos monitoring
Bering and Chukchi Seas

Unique ID: OSDSOTO_05
Category: Hydrographic and Oceanographic Surveys
Dates: July 2024
Start year: 1998
Recurrence: Annually
Vessel: CCGS Sir Wilfrid Laurier
Email: John.Nelson@dfo-mpo.gc.ca
Phone: 236-464-0186



Locations: Northeast Pacific Ocean, Bering and Chukchi seas

Description

Canada's Three Oceans program collects oceanographic, geochemical and biological data for monitoring of ocean conditions, and the distribution and abundance of benthic organisms. These data support the international Distributed Biological Observatory program.

Objectives

1. Monitor the impacts of sea ice retreat and ocean warming on benthic organisms that are acritical food for walrus, grey whales, eider ducks.

2. Monitor the Bering Sea's winter-formed "cold pool" that forms the southern boundary of the Arctic ecosystem.

3. Monitor the northward flow of nutrient-rich Pacific Ocean water, which plays a critical role in the ecology of the Canadian Arctic.

4. Monitor the northward transport and potential establishment of Pacific plankton into Arctic Ocean.

Collaborators

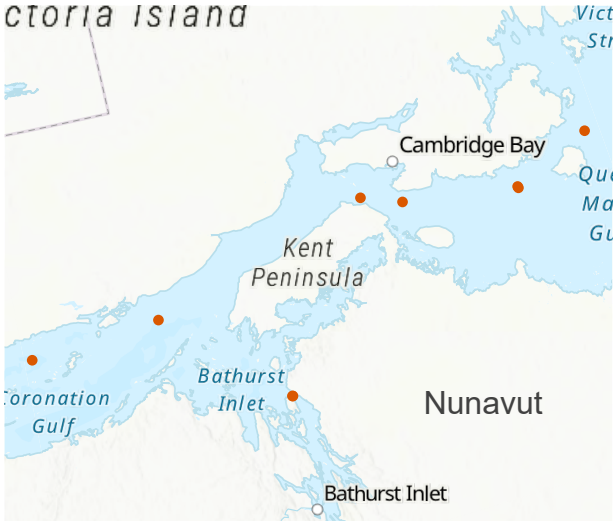
Canadian Coast Guard, National Oceanic and Atmospheric Administration (USA), Fish and Wildlife Service (USA), University of Victoria, Clark University (USA), University of Maryland (USA)

Image 1: CCGS Sir Wilfrid Laurier.
Credit: Fisheries and Oceans Canada

Image 2: A Chukchi Sea walrus (*Odobenus rosmarus*).
Credit: Fisheries and Oceans Canada

Oceanographic exploration
Kitikmeot Sea Moorings

Unique ID: OSDSOTO_21
Category: Hydrographic and Oceanographic Surveys
Dates: September 11 to 26, 2024
Start year: 2022
Recurrence: Annually
Vessel: CCGS Sir Wilfrid Laurier
Email: Bill.Williams@dfo-mpo.gc.ca
Phone: 250-858-3699



Locations: Kitikmeot Sea

Description

The Kitikmeot Sea Science Study deploys oceanographic moorings from the CCGS Sir Wilfrid Laurier to evaluate wind-driven seasonal and interannual oceanographic processes in the Kitikmeot Sea in the Northwest Passage.

Objectives

1. Evaluate large-scale circulation and nutrient balances in the Kitikmeot Sea.
2. Evaluate tidal-mixing of ocean nutrients in narrow straits with rapid tides.
3. Explore the remote and little-studied Bathurst Inlet.
4. Investigate seasonal variation of oceans and rivers through year-round moorings and Community Based Monitoring.

Image 1: CCGS Sir Wilfrid Laurier.
Credit: Fisheries and Oceans Canada

Collaborators

Canadian Rangers and Hunters and Trappers Organization from Kugluktuk, University of Manitoba, The Arctic University of Norway, University of Alaska Fairbanks (USA)

Image 2: Mooring deployment.
Credit: Fisheries and Oceans Canada

Oceanographic exploration
Sherman Basin and Inlet

Unique ID: OSDSOTO_17
Category: Hydrographic and Oceanographic Surveys
Dates: August 15 to 28, 2024
Start year: 2022
Recurrence: Annually (year 3 of 3)
Vessel: R/V Martin Bergmann
Email: Bill.Williams@dfo-mpo.gc.ca
Phone: 250-858-3699

Locations: Sherman Basin and Inlet (Kitikmeot Sea).

Description

A collaboration with the Inuit community of Gjoa Haven to study river and ocean influences on biological production in Sherman Basin and Inlet. Through this research, Inuit will be trained in ocean sampling techniques during Youth-Elder camps and aboard the Arctic Research Foundation's R/V Martin Bergmann.

Image 1: R/V Martin Bergmann.
Credit: Arctic Research Foundation

Objectives

1. Co-generate oceanographic knowledge and marine resource resilience.
2. Evaluate circulation and nutrient balances in Sherman Basin and Inlet.
3. Evaluate tidal mixing of ocean nutrients in narrow straits with rapid tides.
4. Evaluate river-to-ocean flow and geochemistry.
5. Investigate the annual cycle of nutrients and river water in Sherman Basin.

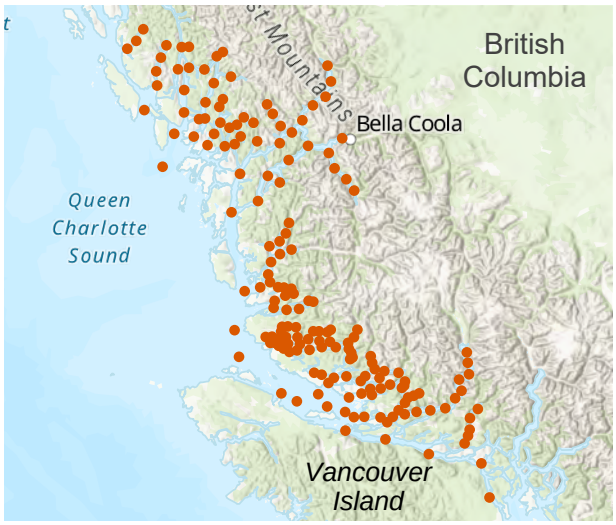
Image 2: Benthic Sampling.
Credit: Fisheries and Oceans Canada

Collaborators

Elders and youth from Gjoa Haven, University of Manitoba, The Arctic University of Norway

Oceanographic monitoring of coastal inlets

Unique ID: OSDOEB_14
Category: Hydrographic and Oceanographic Surveys
Dates: October 15 to 28, 2024
Start year: 2022
Recurrence: Annually
Vessel: CCGS Vector
Email: Sophia.Johannessen@dfo-mpo.gc.ca
Phone: 250-363-6616



Locations: Arms: Robert, North Bentinck, South Bentinck; Channels: Finlayson, Mathieson, Spiller, Fisher, Dean, Burke; Inlets: Surf, Laredo, Cascade, Hardy,Moses, Rivers, Kwatna, Draney, Smith; Passages: Meyer's, Oscar; Sounds: Laredo, Milbanke, Fitz Hugh, Thompson Channels: Tribune; Inlets: Belize, Drury, Kingcome, Knight, Loughborough, Seymour; Passages: Discovery; Sounds: Frederick, Nugget; Straits: Queen Charlotte, Johnstone.

Description

Oceanographic monitoring of the British Columbia Coastal Inlets provides baseline measurements of physical and geochemical conditions in these areas. This information helps monitor the effects of climate change and other anthropogenic impacts on British Columbia's coastal waters. The cruise will cover one section of the coast each year.

Objectives

1. Collect water samples for analysis of nutrients, oxygen,organic carbon and suspended particles.
2. Measure temperature and salinity to determine circulation and mixing patterns in the inlets.
3. Collect sediment cores to determine rates of sedimentation and burial of organic carbon.
4. Investigate long-term trends in primary production at the bottom of the food chain.

Collaborators

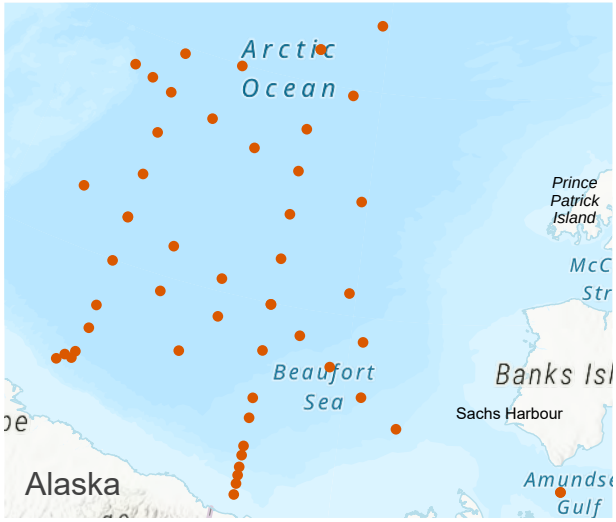
Canadian Coast Guard

Image 1: CCGS Vector.
Credit: Fisheries and Oceans Canada

Image 2: Deployment of sampling equipment.
Credit: Fisheries and Oceans Canada

Oceanographic monitoring
Beaufort Gyre

Unique ID: OSDSOTO_01
Category: Hydrographic and Oceanographic Surveys
Dates: August 28 to September 26, 2024
Start year: 2003
Recurrence: Annually
Vessel: CCGS Louis S. St-Laurent
Email: Bill.Williams@dfo-mpo.gc.ca
Phone: 250-858-3699



Locations: Beaufort Gyre, Canada Basin in the Arctic

Description

The Beaufort Gyre is one of the Arctic Ocean's primary circulation features, storing and transporting freshwater, sea ice, and heat across the Canadian Basin. The Joint Ocean Ice Study Program collects biogeochemical water samples and deploys moorings and ice buoys to monitor the response of the Beaufort Gyre to climate change.

Objectives

1. Monitor ocean acidification due to sea-ice retreat and melt.
2. Monitor the wind-forced freshwater accumulation in the gyre from Arctic rivers sea ice melt.
3. Monitor the changing contributions of Pacific- and Atlantic-origin water in the gyre.
4. Monitor the increasing summertime melt and loss of old ice.

Collaborators

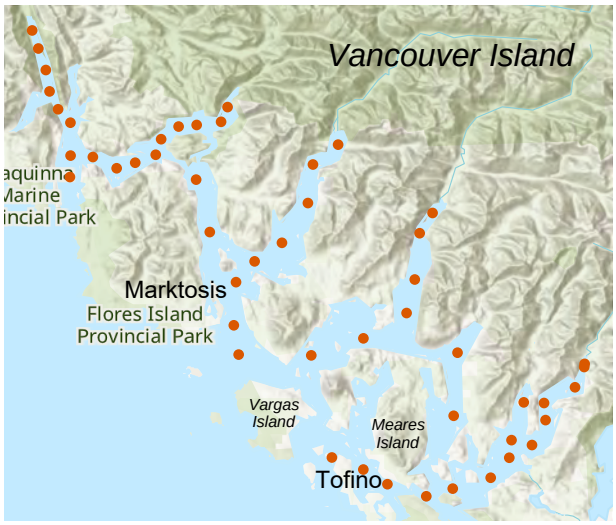
Canadian Coast Guard, Japan Agency for Marine-Earth Science and Technology, United States National Science Foundation, Concordia University, ETH Zürich (Switzerland), Kitami Institute of Technology (Japan), Oregon State University (USA), Tokyo University of Marine Science and Technology (Japan), University of British Columbia, Université Laval,University of Montana (USA), Université de Sherbrooke, Woods Hole Oceanographic Institution (USA), Yale University (USA)

Image 1: CCGS Louis S. St-Laurent.
Credit: Fisheries and Oceans Canada

Image 2: Deployment of a rosette, a deep water sampling apparatus.
Credit: Fisheries and Oceans Canada

Oceanographic monitoring
Clayoquot Sound

Unique ID: OSDOMAP_02
Category: Hydrographic and Oceanographic Surveys
Dates: April 1, 2024 to March 31, 2025
Start year: 2023
Recurrence: Varied
Vessel: R/V Doug Anderson
Email: Laura.Bianucci@dfo-mpo.gc.ca
Phone: 250-363-6521



Locations: Clayoquot Sound

Description

Moorings and monthly oceanographic monitoring of Clayoquot Sound provide baseline measurements of physical and biogeochemical conditions and their seasonal changes. Data will help improve understanding of circulation patterns, seasonality of hypoxic conditions, and physical-biogeochemical differences between fjords in a changing climate.

Objectives

1. Train and support local Nations to monitor temperature, salinity, and dissolved oxygen via monthly casts throughout the Sound.

2. Use moorings to measure ocean currents, temperature, and salinity time series at the mouth of Herbert Inlet.

3. Combine all the observations with numerical modelling efforts to improve the understanding of physical and biogeochemical mechanisms leading to hypoxia in different fjords and how these mechanisms can change in the future.

Collaborators

Ahousaht First Nation, Hesquiaht First Nation, Tla-o-qui-aht First Nation, Maaqutusiis Hahoutlhee Stewardship Society, Nuu-chah-nulth Tribal Council, Uu-a-thluk Fisheries, Canadian Coast Guard, Hakai Institute, Nature Trust of British Columbia

Image 1: R/V Doug Anderson.
Credit: Lucie Hannah (Fisheries and Oceans Canada)

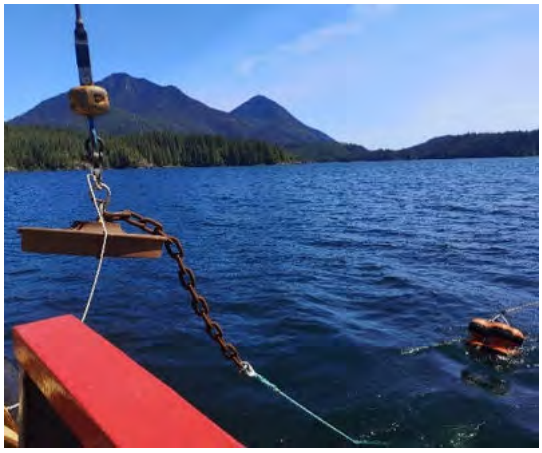


Image 2: Mooring deployment.
Credit: Fisheries and Oceans Canada

Oceanographic monitoring
Quatsino Sound

Unique ID: OSDOMAP_01
Category: Hydrographic and Oceanographic Surveys
Dates: April 1, 2024 to March 31, 2025
Start year: 2021
Recurrence: Annually
Vessel: Blackfish
Email: Laura.Bianucci@dfo-mpo.gc.ca
Phone: 250-363-6521

Locations: Quatsino Sound

Description

A numerical model has been developed to simulate physical fields (e.g., temperature, salinity, and circulation features) within Quatsino Sound to evaluate seasonal trends and analyze the effects of extreme events and climate change on the local communities and fisheries. A suite of observations, including velocity, temperature and salinity will be taken throughout the region to calibrate and validate the model.

Objectives

1. Monitor temperature and salinity through regular conductivity-temperature depth (CTD) casts and moorings.
2. Deploy drifters tracked by satellites.
3. Recover, service and deploy moorings and acoustic doppler current profilers.
4. Train and support Quatsino First Nation to deploy drifters and perform CTD sampling.

Collaborators

Quatsino First Nation, Canadian Coast Guard, Mowi Canada West

Image 1: R/V Blackfish.
Credit: Glenn Cooper (Fisheries and Oceans Canada)

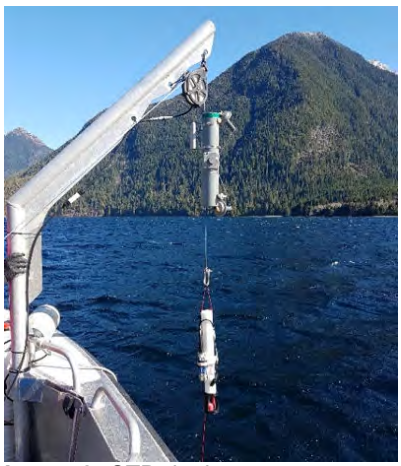
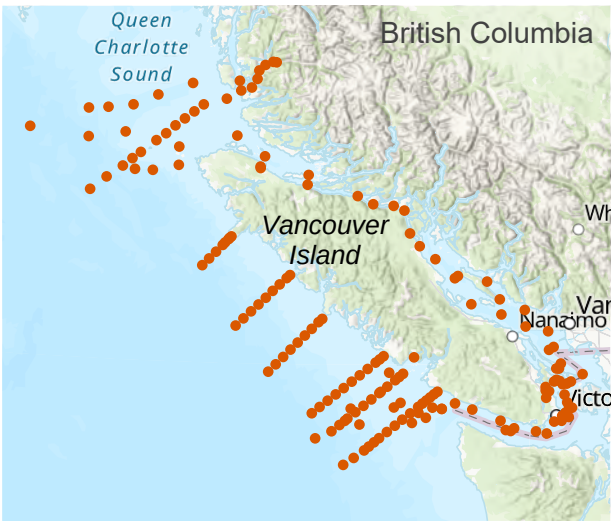


Image 2: CTD deployment.
Credit: Fisheries and Oceans Canada

Oceanographic survey
Southern Canadian continental shelf

Unique ID: OSDOEB_04
Category: Hydrographic and Oceanographic Surveys
Dates: March 18 to 27, May 14 to 27, September 3 to 14, 2024
Start year: 1979
Recurrence: Annually
Vessel: CCGS John P. Tully
Email: Akash.Sastri@dfo-mpo.gc.ca
Phone: 250-363-8288



Locations: Queen Charlotte Sound, West Coast Vancouver Island, Strait of Georgia

Description

This oceanographic survey - sometimes referred to as La Perouse - examines water properties and plankton to identify changing ocean conditions, and to inform understanding of abundance and survival of fish populations.

Image 1: CCGS John P. Tully.
Credit: Jackson Chu (Fisheries and Oceans Canada)

Objectives

1. Identify changes in species composition and abundance of plankton.
2. Understand the causes of these changes.
3. To the extent possible, forecast the consequences of these changes in plankton to marine food webs.
4. Characterise and synthesise the large-scale changes to the marine ecosystems of British Columbia, including the development of sets of indicators of ecosystem status and trends useful for management.

Image 2: “Bongo” nets used to sample the zooplankton.
Credit: Kelly Young (Fisheries and Oceans Canada)

Collaborators

Canadian Coast Guard, University of British Columbia, University of Victoria

Plankton surveys
Strait of Georgia

Unique ID: OSDOEB_06
Category: Hydrographic and Oceanographic Surveys
Dates: April 30 to May 5, May 28 to June 2, July 12 to 17, 2024
Start year: 2015
Recurrence: Annually
Vessel: CCGS Neocaligus, John P. Tully, and Vector
Email: Kelly.Young@dfo-mpo.gc.ca
Phone: 250-363-6502

Locations: Strait of Georgia

Description

These surveys of biological and physical sampling at 28 stations throughout the Strait of Georgia aim to improve the understanding of plankton seasonal cycles and year-to-year variability within the Strait of Georgia. These surveys also provide baseline prey data for fisheries research, including fine-scale variability in prey through the deployment of autonomous echosounder moorings near key sampling stations.

Image 1: CCGS Neocaligus.
Credit: Fisheries and Oceans Canada

Objectives

1. Conduct full depth conductivity, temperature, and depth (CTD) profile including oxygen and fluorometer.

2. Conduct full depth (10m off bottom to surface) zooplankton net tow (preserved in 10% buffered formalin for taxonomy).

3. At selected stations, collect water samples for salinity, nutrients, and phytoplankton biomass and composition.

Image 2: Zooplankton samples from the Strait of Georgia.
Credit: Fisheries and Oceans Canada

Collaborators

Canadian Coast Guard, University of British Columbia, University of Victoria

Recovery and deployment of oceanographic moorings

Unique ID: OSDSOTO_10
Category: Hydrographic and Oceanographic Surveys
Dates: June 11 to 30, 2024
Start year: 1976
Recurrence: Annually
Vessel: CCGS John P. Tully
Email: David.Spear@dfo-mpo.gc.ca
Phone: 236-464-2073

Locations: Haida Gwaii, Chatham Sound, Hecate Strait Johnstone Strait, Strait of Georgia, West Coast Vancouver Island, Queen Charlotte Strait

Description

This cruise is responsible for the deployment, recovery and servicing of oceanographic moorings, as well as collecting water samples. These moorings record tides, currents and water properties in support of long-term environmental monitoring programs.

Objectives

1. Recover, service and deploy oceanographic moorings.
2. Collect water property data and biogeochemical samples.
3. Collect zooplankton, phytoplankton, and sediments.
4. Deploy surface current tracking drifters.

Collaborators

Council of the Haida Nation (Gwaii Haanas National Park Reserve), Canadian Coast Guard, Environment and Climate Change Canada (Scott Islands National Wildlife Area), Parks Canada, Hakai Institute, Smithsonian Institute (Invasive Species)

Image 1: CCGS John P. Tully.
Credit: Jackson Chu (Fisheries and Oceans Canada)

Image 2: Mooring preparations.
Credit: Fisheries and Oceans Canada

Sea-ice pump project
Foxe Basin

Unique ID: OSDOEB_16
Category: Hydrographic and Oceanographic Surveys
Dates: July 1 to October 31, 2024
Start year: 2022
Recurrence: Annually (year 2 of 3)
Vessel: CCGS Amundsen, R/V William Kennedy
Email: Lisa.Miller@dfo-mpo.gc.ca
Phone: 250-363-6673

Locations: Foxe Basin

Description

Foxe Basin, a relatively enclosed basin with only one deep channel outlet, is one of three places in the Canadian Arctic where deep water forms and is an optimal site for observing the relationships between sea-ice formation, deepwater formation, and carbon dioxide sequestration. The Foxe Basin Sea Ice Pump Project (FoxSIPP) is is a 3-year study to explore these interactions and improve our capacity to predict how the polar oceanic carbon sink is changing with climate and sea-ice conditions.

Image 1: CCGS Amundsen.
Credit: Fisheries and Oceans Canada

Objectives

1. Recover and redeploy a mooring instrumented with a full suite of physical and carbon sensors in the deepwater outflow channel in Foxe Basin.

2. Conduct a synoptic survey of Foxe Basin to document pre-conditioning of the surface waters for sea-ice and deepwater formation in the following winter.

3. Monitor sea-ice conditions throughout the winter by remote sensing to derive regional ice formation rates.

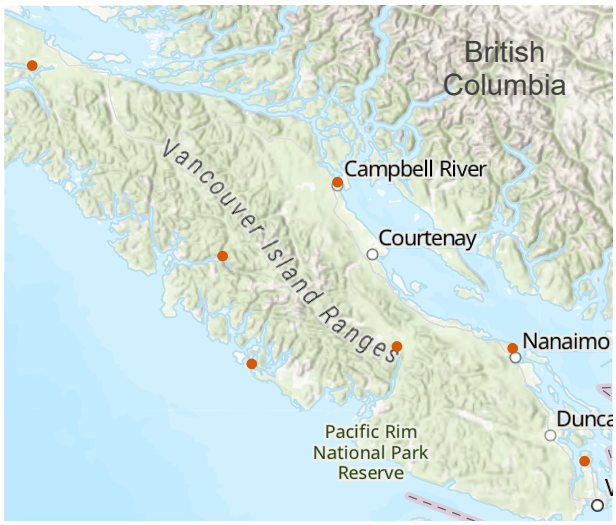
Image 2: New ice formation in a polynya.
Credit: Fisheries and Oceans Canada

Collaborators

Canadian Coast Guard, University of Alberta, University of British Columbia, University of Calgary, University of Manitoba

Sharing science-at-sea
Indigenous engagement expedition

Unique ID: SSISOAR_03
Category: Hydrographic and Oceanographic Surveys
Dates: October 16 to 23, 2024
Start year: 2022
Recurrence: Annually (year 3 of 3)
Vessel: CCGS Sir John Franklin
Email: March.Klaver@dfo-mpo.gc.ca
Phone: 250-720-5488



Locations: Coastal Vancouver Island Communities (Sidney, Port Alberni, Tofino, Gold River, Coal Harbour, Campbell River, Nanaimo)

Description

The sharing science-at-sea Indigenous engagement expedition brings a floating science centre to Vancouver Island coastal Indigenous communities to foster relationship building, reciprocal learning, and collaborative science.

Objectives

1. Engage Indigenous leadership, Elders, and youth in locally relevant research through hands-on learning and Open Houses.
2. Demonstrate DFO Science through school webinars, on-shore activities and guided vessel tours.
3. Collaborate with First Nations search and rescue, and emergency response groups to provide training and enhance capabilities.
4. Inspire First Nations youth to pursue scientific careers with DFO Science and the Canadian Coast Guard.

Collaborators

Vancouver Island First Nations, Canadian Coast Guard, Educators, Community Groups

Image 1: CCGS Sir John Franklin.
Credit: Fisheries and Oceans Canada

Image 2: 2023 Sharing Science-at-Sea Expedition Team.
Credit: Karen Geiger (Fisheries and Oceans Canada)

Tide, current and water level gauge servicing

Unique ID: CHSDATS_03
Category: Hydrographic and Oceanographic Surveys
Dates: April 1, 2024 to March 31, 2025
Start year: 1893
Recurrence: Annually
Vessel: N/A
Email: Stacey.Verrin@dfo-mpo.gc.ca
Phone: 250-363-6377

Locations: Various coastal locations in British Columbia.

Description

Installation and maintenance of temporary and permanent water level network and current meters in support of navigational safety, tsunami/storm surge response, and provision of real-time data to all clients.

Objectives

1. Service existing permanent water level network infrastructure equipment to provide tidal predictions, observations and forecasts and monitor tsunami and storm surge events. This information is used to create Canadian Tide Tables and is provided via Canadian Hydrographic Service web services.

2. Establish or reoccupy temporary tide gauges to support bathymetric surveying and Canadian Hydrographic Service water levels network, including the continuousvertical datum (CVD) model.

3. Deploy and service current meters in Prince Rupert, Masset, Kitimat, and Vancouver to support safety to navigational and dynamic hydrographic products.

Image 1: Campbell River permanent gauge station.
Credit: Fisheries and Oceans Canada

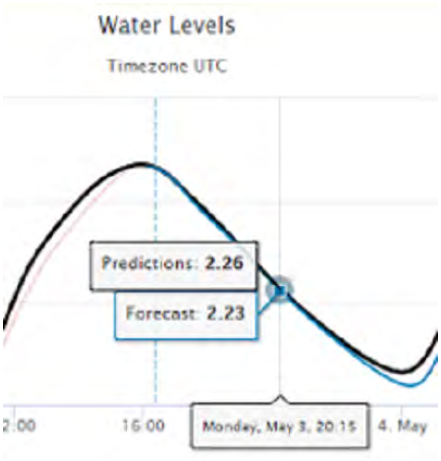


Image 2: Water level tools.
Credit: Fisheries and Oceans Canada

Collaborators

Coastal Indigenous communities, Environment and Climate Change Canada, Natural Resources Canada, Transport Canada, municipalities and cities, property owners, Port of Vancouver, Prince Rupert Port Authority, other port authorities

Underwater glider monitoring

Unique ID: OSDROPES_02
Category: Hydrographic and Oceanographic Surveys
Dates: April 1, 2024 to March 31, 2025
Start year: 2019
Recurrence: Annually
Vessel: Autonomous vehicles
Email: Tetjana.Ross@dfo-mpo.gc.ca
Phone: 250-363-6438

Locations: West Coast Haida Gwaii, Queen Charlotte Sound, West Coast Vancouver Island.

Description

Fisheries and Oceans Canada uses underwater glider technology to collect continuous, high-resolution data for ocean monitoring, prediction and other research purposes. Gliders can be operated without vessels and in all weather conditions. Data are collected continuously along three glider monitoring lines in collaboration with the Canadian-Pacific Robotic Ocean Observing Facility (C-PROOF) and are available in real-time.

Image 1: Glider fleet.
Credit: James Pegg (Fisheries and Oceans Canada)

Objectives

1. Improve understanding of understudied medium-scale flows and boundary currents along the coast of British Columbia.

2. Improve understanding of coastal currents and hypoxia in Queen Charlotte Sound.

3. Fill in gaps in oceanographic monitoring during the stormy winter season.

Image 2: Underwater photo of glider Mike sampling.
Credit: Hakai Magazine

Collaborators

Council of the Haida Nation, Canadian Coast Guard (Tofino), Parks Canada (Gwaii Haanas National Park Reserve, National Marine Conservation Area Reserve, and Haida Heritage Site), University of British Columbia, University of Victoria, Hakai Institute

Winter ocean sampling
Northwest Passage

Unique ID: OSDSOTO_03
Category: Hydrographic and Oceanographic Surveys
Dates: April 2024 and February 2025
Start year: 2009
Recurrence: Annually
Vessel: N/A
Email: Mike.Dempsey@dfo-mpo.gc.ca
Phone: 250-363-6452

Locations: Northwest Passage (Cambridge Bay, Kugluktuk, Paulatuk, Gjoa Haven)

Description

The Canadian Ranger Ocean Watch (CROW) is a partnership between DFO and the Canadian Rangers to collect winter oceanographic sampling data in frozen conditions in the Canadian Arctic Archipelago. The results add seasonality to over 30 years of summer ship based observations. Snow and ice data is shared with Canadian Ice Service.

Objectives

1. Monitor wintertime oceanographic conditions at standard locations by collecting full depth conductivity, temperature, and depth (CTD) profile, ice thickness, snow depths measurements, and geochemical (nutrients/dissolved inorganic carbon/alkalinity) and zooplankton samples.

2. Describe the seasonal cycle across the region, by combining winter and summer data.

3. Engage local residents in an exchange of information about the ocean.

Collaborators

Canadian Rangers from the Inuit communities of Kugluktuk, Cambridge Bay, Gjoa Haven, and Paulatuk; Environment and Climate Change Canada, Department of National Defence

Image 1: Ranger snowmobile patrol.
Credit: Fisheries and Oceans Canada

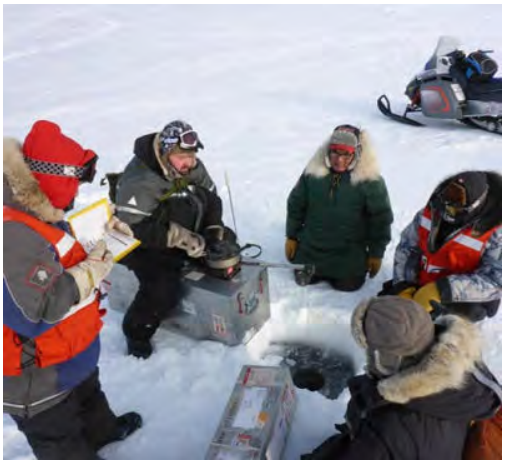


Image 2: Kugluktuk Rangers take water samples through the ice.
Credit: Fisheries and Oceans Canada

Benthic habitat mapping

Unique ID: ESDMSEA_04
Category: Population and Ecosystem Assessments
Dates: August 27 to October 1, 2024
Start year: 2013
Recurrence: Annually
Vessel: CCGS Vector
Email: Joanne.Lessard@dfo-mpo.gc.ca
Phone: 250-714-3799

Description

There is a general lack of data on shallow benthic habitats throughout the British Columbia coast. This benthic habitat mapping survey will document substrate types and associated algae and marine invertebrate species in order to map benthic habitat along the nearshore region of the British Columbia coast. Data will feed directly into existing marine spatial initiatives and provide an ecosystem approach to dive fishery stock assessment.

Locations: Queen Charlotte Strait, Johnstone Strait, Strait of Georgia, Juan de Fuca Strait, West Coast Vancouver Island

Objectives

1. Collect qualitative data on shallow benthic habitat up to a 20-metre depth, including ~100 species of invertebrates,~50 species of algae as well as other habitat information (e.g., substrate).

2. Define and map biological communities and nearshore habitats.

Image 1: CCGS Vector.
Credit: Fisheries and Oceans Canada

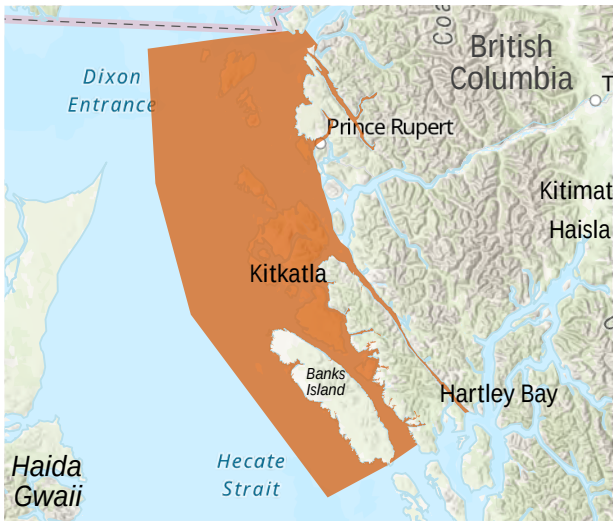
Image 2: Divers collecting invertebrate, algae, and substrate data.
Credit: Fisheries and Oceans Canada

Collaborators

Canadian Coast Guard

Cetacean abundance and distribution survey

Unique ID: ESDAEMMS_18
Category: Population and Ecosystem Assessments
Dates: February 1 to 15, 2024
Start year: 2023
Recurrence: Annually (year 2 of 3)
Vessel: R/V Tiriarnaq
Email: Janet.Mossman@dfo-mpo.gc.ca
Phone: 778-269-3458



Locations: Port of Prince Rupert, Chatham Sound, Hecate Strait.

Description

The collection of multiyear, seasonal data to provide abundance and distribution estimates of cetaceans (whales, porpoises and dolphins) will support the assessment of the impacts of marine shipping traffic on cetacean populations in areas of high or increasing marine traffic in the North Coast of British Columbia.

Image 1: R/V Tiriarnaq.
Credit: Arctic Research Foundation

Objectives

1. Complete vessel-based line transect surveys to estimate the abundance and distribution of whales, dolphins and porpoises off the North Coast of British Columbia.

2. Characterize seasonal and annual variation in abundance and distribution of whales, dolphins and porpoises as well as potential implications for ship strike risk with marine traffic.

3. Provide high-quality, open-data to all Canadians to inform science-based decision making.

Image 2: Harbour porpoise (*Phocoena phocoena*).
Credit: Christie McMillan (Fisheries and Oceans Canada)

Collaborators

Arctic Research Foundation, Ocean Wise Conservation, Association (North Coast Cetacean Research Initiative)

Cetacean monitoring and research
Southern Salish Sea

Unique ID: ESDAEMMS_13
Category: Population and Ecosystem Assessments
Dates: April 1, 2024 to March 31, 2025
Start year: 2020
Recurrence: Annually (year 5 of 7)
Vessel: M/V Manyberries
Email: Christie.McMillan@dfo-mpo.gc.ca
Phone: 236-330-1435

Locations: Strait of Georgia, Juan de Fuca Strait, Swiftsure Bank, Burrard Inlet.

Description

This project addresses data gaps on the seasonal abundance, distribution, and behaviour of whales, dolphins, and porpoises. Data collected will lead to an improved understanding of vessel strike risk to these populations.

Objectives

1. Collect abundance and distribution data every two months through boat based cetacean surveys.
2. Deploy and recover data-logging tags on humpback whales to gain insight into dive behaviour and habitat use.
3. Deploy and recover passive acoustic recorders to supplement visual survey efforts and inform porpoise distribution and habitat use.
4. Obtain photo-identification data and genetic samples from humpback whales.

Collaborators

Cascadia Research Collective (USA)

Image 1: M/V Manyberries.
Credit: CeMoRe Team (Fisheries and Oceans Canada)

Image 2: Humpback whale (*Megaptera novaeangliae*) with data logging tag.
Credit: CeMoRe Team (Fisheries and Oceans Canada)

Chinook and coho salmon environmental DNA development and application

Unique ID: ESDFE_11
Category: Population and Ecosystem Assessments
Dates: April 1 to December 31, 2024
Start year: 2022
Recurrence: Annually (year 3 of 3)
Vessel: N/A
Email: Josephine.Iacarella@dfo-mpo.gc.ca
Phone: 236-380-0955

Locations: Lower Mainland watersheds, British Columbia

Description

Successful management of critically declining Pacific salmon populations is severely hampered by the persistent lack of vital freshwater habitat use information. This research aims to develop and test environmental DNA methods to determine presence and relative abundance of chinook and coho salmon in the Fraser River basin, and to assess critical habitat use for threatened and endangered populations across life cycle stages.

Objectives

1. Develop relationships between environmental DNA (eDNA) concentrations, adult and juvenile counts, and stream flow characteristics for a full cycle of life history stages at three study locations.

2. Develop relationships between eDNA concentrations of spawning salmon and counts at 50 additional study locations.

3. Evaluate eDNA lab methodologies for relative abundance estimation.

4. Compare eDNA presence and relative abundance to environmental suitability and landscape stressors to identify priority areas for habitat restoration and conservation.

5. Develop end user guide for monitoring salmon in freshwater using eDNA.

Collaborators

N/A.

Image 1: Sampling with eDNA backpack.
Credit: Richard Chea (Fisheries and Oceans Canada)

Image 2: Sampling for eDNA.
Credit: Richard Chea (Fisheries and Oceans Canada)

Unique ID: ESDMSEA_10
Category: Population and Ecosystem Assessments
Dates: Spring 2024
Start year: 2024
Recurrence: One time only
Vessel: N/A
Email: Sarah.Dudas@dfo-mpo.gc.ca
Phone: 250-327-3501

Locations: Saanich Inlet, Vancouver Island

Description

This collaborative biodiversity survey will assess intertidal habitats and species. This data will help support Marine Conservation Targets, Integrated Marine Response Planning, Marine Spatial Planning, and the Malahat Nation.

Objectives

1. Conduct an intertidal invertebrate survey.
2. Assess intertidal invertebrate biodiversity and abundance.
3. Assess intertidal habitat.
4. Train participants in conducting biodiversity assessments and share knowledge.

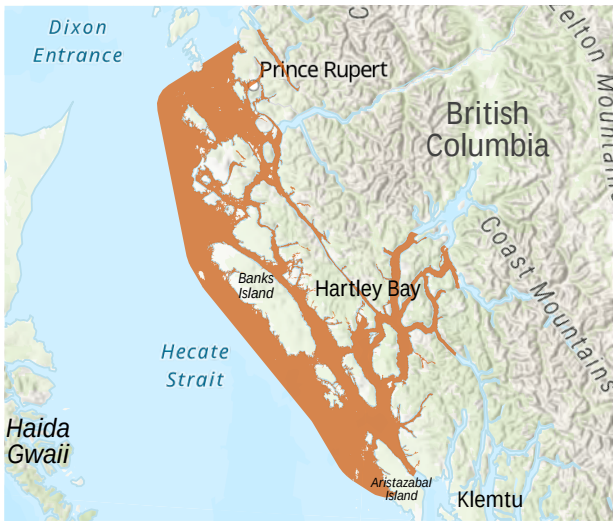
Image 1: Conducting a biodiversity assessment.
Credit: Fisheries and Oceans Canada

Collaborators

Malahat Nation

Coastal biodiversity survey

Unique ID: ESDMSEA_01
Category: Population and Ecosystem Assessments
Dates: May 15 to June 1, 2024
Start year: 2016
Recurrence: Annually
Vessel: CCGS Vector
Email: Sarah.Dudas@dfo-mpo.gc.ca
Phone: 250-327-3501



Locations: Kitkatla Inlet and surrounding coastal areas

Description

This collaborative survey will assess intertidal habitats and species from the Central Coast of British Columbia. Findings will support marine conservation initiatives and contribute to long-term monitoring.

Objectives

1. Conduct intertidal fish and invertebrate surveys including aquatic invasive species using standard and novel technologies such as environmental DNA and drones.
2. Conduct marine debris surveys and clean-ups.
3. Conduct opportunistic surveys of bird and terrestrial mammal use of intertidal habitat using wildlife cameras.
4. Conduct water samples for environmental DNA (eDNA) and microplastic analysis.
5. Conduct community outreach activities during and/or after the surveys.

Image 1: CCGS Vector.
Credit: Fisheries and Oceans Canada

Collaborators

Gitxaała Nation, Canadian Coast Guard

Image 2: Intertidal biodiversity survey.
Credit: Fisheries and Oceans Canada

Coastal Environmental Baseline Program
Port of Vancouver

Unique ID: ESDAEMMS_07
Category: Population and Ecosystem Assessments
Dates: April 1, 2024 to March 31, 2025
Start year: 2017
Recurrence: Annually
Vessel: CCGS Vector
Email: Paul.Covert@dfo-mpo.gc.ca
Phone: 250-363-6765

Locations: Howe Sound Entrance, Burrard Inlet, Fraser River delta.

Description

The Coastal Environmental Baseline Program aims to collect comprehensive data about the marine ecosystem for the Port of Vancouver, for example, rockfish distribution, phytoplankton abundance, and seasonal habitat variability.

Objectives

1. Characterize weekly, monthly, and seasonal ecosystem changes within Burrard Inlet:

    a) measure physical and chemical water properties in Burrard Inlet;
    b) characterize inter-tidal and sub-tidal habitats; and,
    c) record abundance and distribution of invertebrate and vertebrate marine biota.

2. Provide high-quality, open data to all Canadians to inform science based decision making.

Image 1: CCGS Vector.
Credit: Fisheries and Oceans Canada

Collaborators

Tsleil-Waututh Nation, Canadian Coast Guard, Ocean Wise Conservation Association

Image 2: Conducting beach surveys.
Credit: Fisheries and Oceans Canada

Crab assessment survey
Strait of Georgia

Unique ID: StARMI_05
Category: Population and Ecosystem Assessments
Dates: May 6 to 17, October 8 to 19, 2024
Start year: Spring: since 1991; Fall: since 1988
Recurrence: Annually
Vessel: CCGS Neocaligus
Email: Brendan.Aulthouse@dfo-mpo.gc.ca
Phone: 250-327-3209

Locations: Strait of Georgia, Burrard Inlet

Description

This project conducts pre- and post-commercial fishery Dungeness crab (*Cancer magister*) surveys in Crab Management Areas I (Fraser River delta) and J (Boundary Bay) to continue the long term historic record of crab catch per unit effort (CPUE). The survey also collects data on population structure between years by documenting variability in moult times, breeding times, egg extrusion and release, mortality rates, and provides an accurate record of trap bycatch.

These surveys have been used to investigate the effects of soak duration, bait and trap type, escape port efficiency, and provide tissue samples for toxicological and genetic analyses.

Image 1: CCGS Neocaligus.
Credit: Fisheries and Oceans Canada

Objectives

1. Collect pre- and post-fishery Dungeness crab biological information, including stock structure, sex ratios, shell condition, injuries, size, CPUE, tissue samples for DNA analysis, and distribution.

Image 2: Adult male dungeness crab (*Cancer magister*).
Credit: Fisheries and Oceans Canada

Collaborators

Canadian Coast Guard

Euphausiid Monitoring Program
Barkley and Clayoquot Sounds

Unique ID: OSDOEB_17
Category: Population and Ecosystem Assessments
Dates: March to November, 2024
Start year: 2022
Recurrence: Annually
Vessel: R/V Alta and charter
Email: Kelly.Young@dfo-mpo.gc.ca
Phone: 250-363-6502

Locations: Barkley and Clayoquot Sounds

Description

The DFO euphausiid monitoring program aims to characterize seasonal, inter-annual, and long-term variability of euphausiid production dynamics in Barkley and Clayoquot Sounds. Euphausiids, in particular the species *Thysanoessa spinifera*, are of particular importance to marine food web and are an essential prey item of juvenile salmon and herring.

Objectives

1. Conduct monthly surveys at night, when euphausiids are active in surface waters.
2. Conduct double oblique bongo tows (335um mesh) or ring net (200um) plankton sampling.
3. Conduct full water column CTD profiles (temperature, salinity, dissolved oxygen, and chlorophyll fluorescence).
4. Conduct surface water sampling for salinity, nutrients, chlorophyll-a and phytoplankton taxonomy (Barkley Sound only).

Collaborators

Ha'oom Fisheries Society, Bamfield Marine Sciences Centre, University of British Columbia, University of Victoria

Image 1: R/V Alta.
Credit: Fisheries and Oceans Canada

Image 2: Evening sampling on back deck of R/V Alta.
Credit: Fisheries and Oceans Canada

Follow the fish
Juvenile chinook assessment

Unique ID:	ADGTMG_02
Category:	Population and Ecosystem Assessments
Dates:	April 1, 2024 to March 31, 2025
Start year:	2020
Recurrence:	Annually
Vessel:	CCGS Vector, citizen scientists and First Nations small vessels, R/Vs Alta and Doug Anderson, small inshore, rigid inflatable, and charter vessels
Email:	Jessy.Bokvist@dfo-mpo.gc.ca
Phone:	250-327-8734

Locations: Nitinat Lake, Port of San Juan, Sooke Basin; Barkley, Clayoquot, Kyuquot, Nootka, and Quatsino sounds; Bedwell, San Juan, Sarita, and Somass/Stamp watersheds

Description

West Coast Vancouver Island (WCVI) chinook salmon face significant challenges early in their lifecycle, including changing ocean conditions, habitat loss and degradation, inadequate nutrition, harmful substances, pathogens, poor water quality, and predation. The Follow the Fish suite of pilot projects under the Pacific Salmon Strategy Initiative study juvenile WCVI chinook as they migrate from rivers in the spring into estuaries, to the nearshore marine habitats where they rear in the summer, fall, and winter. Data collected from the comprehensive assessment of the physical, biological, and environmental threats facing WCVI Chinook salmon will inform the Rebuilding Plan under the Fish Stock Provisions of the *Fisheries Act*.

Objectives

1. Sample juvenile chinook using a variety of methods: rotary screw traps in rivers,beach seining in estuaries, purse seining in nearshore environments, trawling in the fall, and micro-trolling from late summer into the winter.

2. Sample and document ecological conditions, such as: water quality, plankton and other food availability, incidence of parasites/pathogens and contaminants,predators, and more. See related field operations under these Unique IDs: SDOEB_05, OSDOEB_10, OSDOEB_15, OSDOEB_17, OSDOMAP_02

3. Perform laboratory analysis of data collected, such as: otolith micro-chemistry of spawned adults, and the use of salmon ‘Fit-Chips’ and environmental DNA for genetic analysis of cumulative stressors.

Collaborators

Ahousaht First Nation, Ditidaht First Nation, Ehattesaht/Chinehkint First Nation, Hupacasath First Nation, Huu-ay-aht First Nations, Ka:’yu:’k’t’h ’/Che:k’tles7et’h’ First Nations, Mowachaht/Muchalaht First Nation, Nuchatlaht Tribe, Pacheedaht First Nation, Quatsino First Nation, Tla-o-qui-aht First Nation, Toquaht Nation, T’sou-Ke Nation, Uchucklesaht Tribe, Yuułuʔiłʔatḥ, Ha’oom Fisheries Society, Maaqutusiis Hahoutlhee Stewardship Society, Nuu-chah-nulth Tribal Council, Uu-a-thluk Fisheries, University of British Columbia, British Columbia Conservation Foundation, Nootka Sound Watershed Society, Pacific Salmon Foundation, Redd Fish Restoration Society, Thornton Creek Enhancement Society, Charter Tofino

Image 1: CCGS Vector.
Credit: Fisheries and Oceans Canada

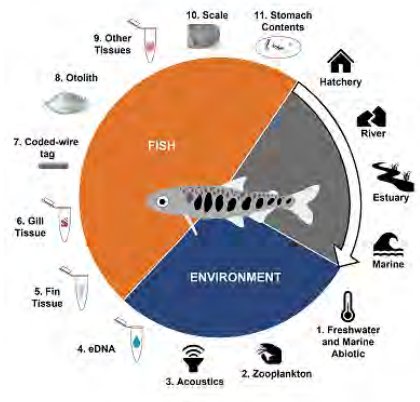
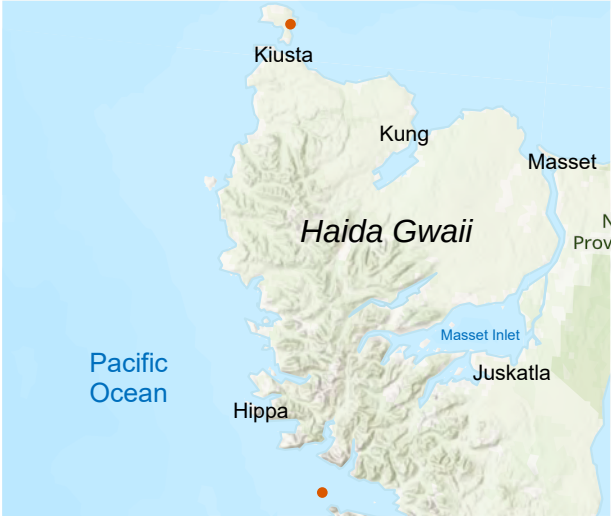


Image 2: Follow the Fish program components.
Credit: Jessy Bokvist (Fisheries and Oceans Canada)

Fraser sockeye return migration mortality

Unique ID: ESDREEF_07
Category: Population and Ecosystem Assessments
Dates: July 20 to August 10, 2024
Start year: 2024
Recurrence: Annually (year 1 of 2)
Vessel: Commercial Purse Seiner
Email: Cameron.Freshwater@dfo-mpo.gc.ca
Phone: 778-268-0865



Locations: Haida Gwaii

Description

The Applied Salmon Ecology Program tags adult sockeye salmon to estimate mortality rates during return migrations, with a particular emphasis on pinniped predation. This work informs recovery planning for at risk Fraser River sockeye salmon assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

Objectives

1. Estimate mortality rates for Fraser sockeye salmon during adult marine migrations.

2. Identify mechanisms of mortality (e.g. predation rates by different species).

Image 2: Sockeye salmon (*Oncorhynchus nerka*).
Credit: Fisheries and Oceans Canada

Collaborators

University of Alaska Fairbanks (USA)

Gíinuu/Sea cucumber survey
Haida Gwaii

Unique ID: SSISOAR_01
Category: Population and Ecosystem Assessments
Dates: August 6 to 28, 2024
Start year: 2022
Recurrence: Annually (year 3 of 3)
Vessel: M/V Canpac Valour
Email: Janet.Lochead@dfo-mpo.gc.ca
Phone: 250-327-1598

Locations: West Coast Haida Gwaii (Rennell Sound)

Description

Guided by the GayGahlda (Changing Tide) Reconciliation Agreement 'good faith' measures, these sea cucumber dive surveys support the collaborative development of a Gíinuu/ sea cucumber (*Apostichopus californicus*) stock assessment for Haida Gwaii.

Image 1: M/V Canpac Valour.
Credit: Fisheries and Oceans Canada

Objectives

1. Cooperatively plan and execute SCUBA dive surveys.
2. Collect detailed size and abundance data for sea cucumbers.
3. Collect sea cucumber tissue samples.
4. Collect substrate and algal data.

Collaborators

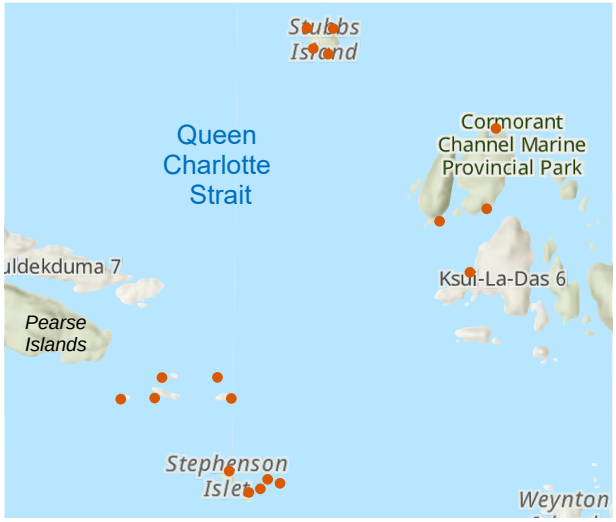
Council of the Haida Nation (Haida Fisheries Program)

HAIDA NATION

Image 2: Council of the Haida Nation logo.
Credit: Council of the Haida Nation

Green sea urchin assessment survey

Unique ID: StARMI_02
Category: Population and Ecosystem Assessments
Dates: September, 2024
Start year: 1995
Recurrence: Every 3 years
Vessel: CCGS Vector, R/V Palmira (7 m), Red Ape
Email: Lyanne.Curtis@dfo-mpo.gc.ca
Phone: 778-268-3374



Locations: Queen Charlotte Strait (Telegraph Cove)

Description

This assessment survey aims to gather data at green sea urchin (*Strongylocentrotus droebachiensis*) Index Sites in order to update the assessment models and stock status, and also to inform the Integrated Fishery Management Plan.

Objectives

1. Collect size distribution and abundance data for green sea urchins to assess stock status and to provide harvest options for the commercial fishery.
2. Gather quantitative description of habitat characteristics including substrate and algae.
3. Gather abundance data for other commercially harvested invertebrate species including red sea urchins, sea cucumbers and geoduck.
4. Gather size and abundance data for northern abalone, a species listed under the *Species at Risk Act*.

Collaborators

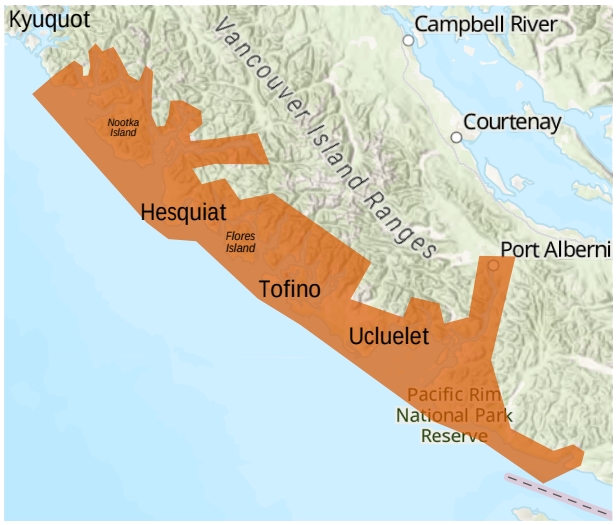
Pacific Urchin Harvester Association

Image 1: CCGS Vector.
Credit: Fisheries and Oceans Canada

Image 2: Biologist surveying quadrat for green sea urchins.
Credit: Fisheries and Oceans Canada

Grey whale foraging habitat

Unique ID: ESDAEMMS_19
Category: Population and Ecosystem Assessments
Dates: April 1 to November 30, 2024
Start year: 2022
Recurrence: Annually
Vessel: Small vessels
Email: Linda.Nichol@dfo-mpo.gc.ca
Phone: 250-616-1706



Locations: West Coast Vancouver Island.

Description

This project proposes boat surveys to photo-identify known grey whale (Pacific Coast feeding group; PCFG) and document their use of habitat in Canadian waters, investigate their diet, and develop body condition measurement methods using drone technology.

PCFGs' use of diverse foraging strategies and habitats may have provided resilience to past climate change, and thus understanding this plasticity will provide key information about how future ecosystem changes (e.g., climate, prey) may affect grey whales.

Image 1: M/V Michelle Diana.
Credit: Fisheries and Oceans Canada

Objectives

1. Photo-identify whales beginning in the spring during the herring spawn.
2. Collect biopsy skin samples from identified animals to investigate their diet.
3. Develop drone techniques for measuring body condition of individuals.

Image 2: Grey whale (*Eschrichtius robustus*) photo ID left and right.
Credit: Fisheries and Oceans Canada

Collaborators

Cascadia Research Collective (USA), Pacific Coast Feeding Group Consortium

Harbour seal and sea lion diet analysis

Unique ID: ESDAEMMS_05
Category: Population and Ecosystem Assessments
Dates: April 1 to November 30, 2024
Start year: 2015
Recurrence: Annually (varying areas)
Vessel: Small vessels
Email: Strahan.Tucker@dfo-mpo.gc.ca
Phone: 250-616-2867

Locations: Queen Charlotte Strait, Strait of Georgia, Southwest Coast Vancouver Island

Description

Diets can be estimated from an analysis of scats through both hard-part (bones) identification and genetic DNA analysis, as well as from biochemical analysis of blubber and skin samples obtained through biopsying of live animals. This survey will collect biopsies and scats from harbour seals, Steller sea lions and California sea lions on a seasonal basis from spring through fall at key locations and along salmon migratory pathways. The goal is to estimate competition between pinnipeds and southern and northern resident killer whales for salmon prey.

Image 1: M/V Kellehan.
Credit: Fisheries and Oceans Canada

Objectives

1. Approach select harbour seal and sea lion haulouts slowly by small vessel and obtain biopsy using a light weight dart fired from a crossbow.

2. Carefully move animals off their haulouts in an orderly fashion and collect and freeze scats individually.

3. In the laboratory, separate hard parts from the scat matrix and extract the remaining material for DNA analysis;undertake stable isotope and fatty acid analysis of biopsy.

4. Estimate the fish and invertebrate composition of the diet for each scat and each sample.

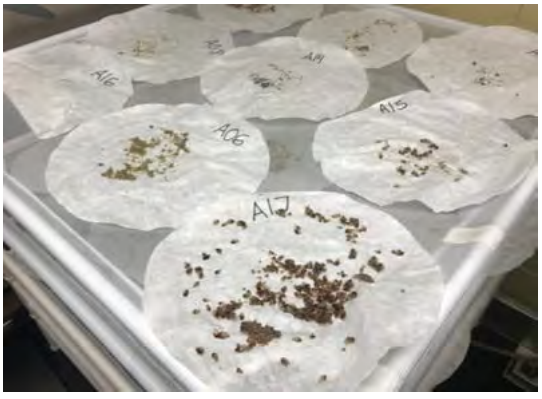


Image 2: Preparation of scat for hard part analysis.
Credit: Fisheries and Oceans Canada

Collaborators

N/A.

Hard bottom longline hook survey
Inside area

Unique ID: StARGF_03
Category: Population and Ecosystem Assessments
Dates: July 24 to September 13, 2024
Start year: 2003
Recurrence: Annually (north in odd years, south in even years)
Vessel: CCGS Neocaligus
Email: Matthew.Siegle@dfo-mpo.gc.ca
Phone: 250-327-1398

Locations: Strait of Georgia

Description

This fishing survey uses standardized longline hook gear to provide relative abundance indices for commonly caught species, distributional and occurrence data for all other species, and detailed biological data for inshore groundfish species. These data are incorporated into stock assessments, status reports, and research publications. Each year, approximately 70 randomly selected locations are fished, alternating between the northern and southern coasts of British Columbia.

Objectives

1. Collect detailed species composition data from each set.

   Collect detailed size and sex composition for all species.

2. Collect ageing structures and tissue samples from inshore rockfish species and lingcod.

3. Collect environmental data using temperature-depth recorders attached to the fishing gear as well as vertical Conductivity-Temperature-Depth (CTD) casts.

Collaborators

Canadian Coast Guard

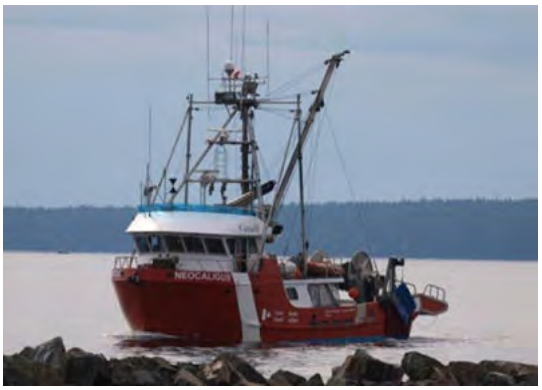


Image 1: CCGS Neocaligus.
Credit: Fisheries and Oceans Canada

Image 2: Tiger rockfish (*Sebastes nigrocinctus*), a nearshore groundfish species.
Credit: Fisheries and Oceans Canada

Hard bottom longline hook survey
Outside area

Unique ID: StARGF_01
Category: Population and Ecosystem Assessments
Dates: July 26 to August 22, 2024
Start year: 2006
Recurrence: Annually (south in even years, north in odd years)
Vessel: CCGS Neocaligus
Email: Matthew.Siegle@dfo-mpo.gc.ca
Phone: 250-327-1398

Locations: Queen Charlotte Sound, West Coast Vancouver Island

Description

This fishing survey uses standardized longline fishing gear to provide relative abundance indices for commonly caught species, distributional and occurrence data for all other species, and detailed biological data for inshore groundfish species. These data are incorporated into stock assessments, status reports, and research publications. Each year, approximately 200 randomly selected locations are fished, alternating between the northern and southern coast of British Columbia.

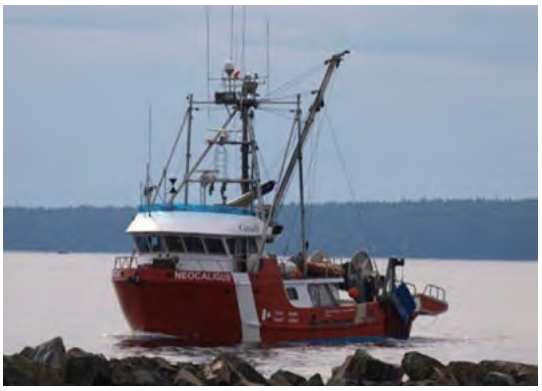


Image 1: CCGS Neocaligus.
Credit: Fisheries and Oceans Canada

Objectives

1. Collect detailed species composition data from each set.
2. Collect detailed size and sex composition data as well as ageing structures and tissue samples from inshore rockfish species and Lingcod.
3. Collect environmental data using temperature-depth recorders attached to the fishing gear.

Image 2: A yelloweye rockfish hiding behind anemones.
Credit: Fisheries and Oceans Canada

Collaborators

Pacific Halibut Management Association of BC

Integrated pelagic ecosystem science survey
West Coast Vancouver Island

Unique ID: ESDREEF_02
Category: Population and Ecosystem Assessments
Dates: June 24 to July 23, 2024
Start year: 1998
Recurrence: Annually
Vessel: CCGS Sir John Franklin
Email: Jackie.King@dfo-mpo.gc.ca
Phone: 250-756-7176

Locations: West Coast Vancouver Island, Northwest Coast Vancouver Island

Description

This survey is part of an integrated project designed to study the structure and function of the pelagic ecosystem on the Vancouver Island continental shelf (< 200 m bottom depth). The main goal of the survey is to understand factors affecting the distribution, abundance, and food web linkages of pelagic fish species, such as Pacific herring and juvenile salmon. Stations from randomly selected blocks in each stratum will be sampled with a midwater trawl net towed at the surface or 15 m depth during daylight and night time hours.

Objectives

1. Examine species distribution, composition, and abundance.

2. Collect biological and diet data, as well as biological samples.

3. Examine the prey environment by sampling zooplankton(vertical bongo net hauls) and conducting oceanographic monitoring (temperature, salinity, fluorescence).

Collaborators

Canadian Coast Guard

Image 1: CCGS Sir John Franklin.
Credit: Fisheries and Oceans Canada

Image 2: Survey participants collecting biological data from fish.
Credit: Fisheries and Oceans Canada

Intertidal clam monitoring

Unique ID: StARMI_03
Category: Population and Ecosystem Assessments
Dates: May 8 to August 23, 2024
Start year: 2021
Recurrence: Annually
Vessel: Small vessels
Email: Alexander.Dalton@dfo-mpo.gc.ca
Phone: 250-327-8724

Locations: West Coast Vancouver Island, Queen Charlotte Sound and Strait, Johnstone Strait, Strait of Georgia, Juan de Fuca Strait

Description

Under the revised *Fisheries Act*, some component of the intertidal clams (manila, butter, and littleneck) fishery in the south coast of British Columbia will likely require biological reference points to ensure they can be maintained at sustainable levels. These surveys collect data at select indicator beaches to establish biological reference points and measure clam abundance.

Objectives

1. Collect population dynamics data (for example, counts, weights, lengths, ages, etc.) at indicator beaches.
2. Establish a time series of abundance.
3. In the next few years, develop limit reference points and monitor the abundance of clam stocks.

Collaborators

Cowichan Tribes, Ka:'yu:'k't'h'/Che:k'tles7et'h' First Nations, Tla'amin First Nation, A-Tlegay Fisheries Society, Island Marine Aquatic Working Group

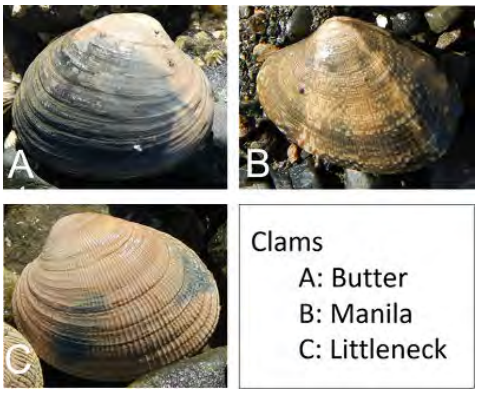
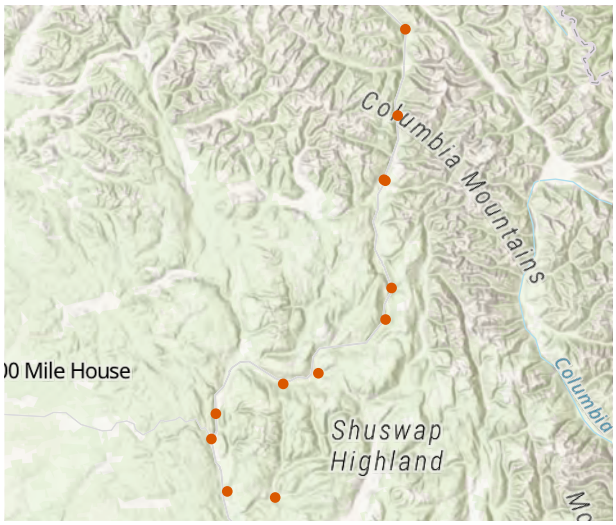


Image 1: Clams - A: Butter, B: Manila, C: Littleneck.
Credit: Amy Ganton (Fisheries and Oceans Canada)

Image 2: Digging for clams in a quadrat.
Credit: Amy Ganton, Fisheries and Oceans Canada

Juvenile coho salmon freshwater food webs

Unique ID: ESDFE_12
Category: Population and Ecosystem Assessments
Dates: 1 April to 25 October, 2024
Start year: 2021
Recurrence: Annually
Vessel: N/A
Email: Sean.Naman@dfo-mpo.gc.ca
Phone: 236-330-6263



Locations: North Thompson River Basin

Description

This research will assess food web and ecosystem processes that support juvenile coho salmon (*Onchorhynchus kisutch*) in tributaries and wetlands across the North Thompson watershed. Findings will inform predictions of coho growth and habitat quality across the watershed.

Image 1: Plankton net for sampling wetland invertebrates.
Credit: Sean Naman (Fisheries and Oceans Canada)

Objectives

1. Collect detailed information on water chemistry, nutrients,and primary productivity.
2. Measure the prey available to juvenile coho in streams and wetlands.
3. Develop models to predict juvenile coho growth and productivity in different habitats across the watershed.

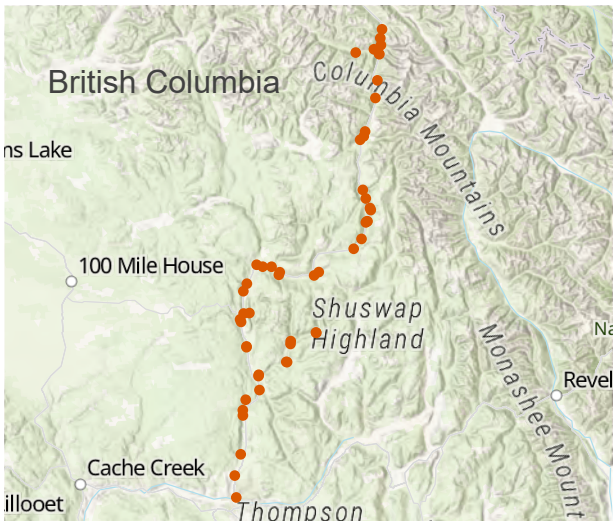
Image 2: Collecting water chemistry sample.
Credit: Sean Naman (Fisheries and Oceans Canada)

Collaborators

Simon Fraser University

Juvenile coho salmon freshwater habitat use

Unique ID: ESDFE_08
Category: Population and Ecosystem Assessments
Dates: October 1 to November 30, 2024
Start year: 2020
Recurrence: Annually
Vessel: N/A
Email: Emma.Hodgson@dfo-mpo.gc.ca
Phone: 604-702-8394



Locations: North Thompson River Basin

Description

Freshwater habitat quality and availability has been identified as a key factor in the decline of interior salmon populations. Understanding of distribution and movement within freshwater systems is limited for many of these populations. This research will identify important freshwater habitat for juvenile coho salmon (*Oncorhynchus kisutch*) during rearing and migration within the North Thompson watershed.

Objectives

1. Analyze water samples and sculpin (*Cottus sp.*) otoliths for strontium isotopes and elemental concentrations.

2. Develop an isoscape (map of water chemistry using strontium isotopes) that can be used to discern distributions of coho salmon and other species (e.g., chinook salmon).

3. Identify rearing and migratory patterns of juvenile coho salmon across years using otolith microchemistry from adults that have returned to spawn.

Collaborators

Simon Fraser University, University of Utah (USA)

Image 1: Confluence of study tributary and the Thompson River.
Credit: Fisheries and Oceans Canada

Image 2: Collecting otoliths from coho salmon (*Oncorhynchus kisutch*).
Credit: Fisheries and Oceans Canada

Juvenile coho salmon habitat productivity

Unique ID: ESDFE_07
Category: Population and Ecosystem Assessments
Dates: April 1 to November 30, 2024
Start year: 2020
Recurrence: Annually
Vessel: N/A
Email: Douglas.Braun@dfo-mpo.gc.ca
Phone: 604-703-9069

Locations: North Thompson River Basin

Description

This project will assess the availability and productivity of tributary and wetland habitats for juvenile coho salmon (*Oncorhynchus kisutch*) in the North Thompson watershed. This work has been developed in conversation with Secwepemc Fisheries Commission and Simpcw First Nation.

Objectives

1. Estimate habitat availability and coho salmon productivity (population density, age composition,growth and condition) within tributary and off-channel systems.
2. Model the relationship between mainstem flow in the North Thompson and wetland habitat availability.
3. Develop models of salmon productivity at the watershed scale.

Collaborators

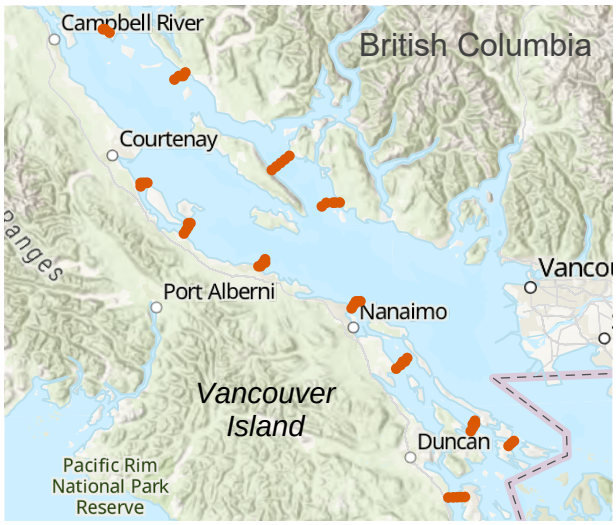
Simon Fraser University

Image 1: Minnow traps set to sample juvenile coho salmon.
Credit: Fisheries and Oceans Canada

Image 2: Juvenile coho salmon (*Oncorhynchus kisutch*) with a visible implant elastomer.
Credit: Fisheries and Oceans Canada

Juvenile Pacific herring survey

Unique ID: ESDREEF_06
Category: Population and Ecosystem Assessments
Dates: September 1 to 30, 2024
Start year: 1992
Recurrence: Annually
Vessel: R/V Walker Rock
Email: Jennifer.Boldt@dfo-mpo.gc.ca
Phone: 250-734-3224



Locations: Strait of Georgia

Description

This annual survey aims to improve understanding of Pacific herring (*Clupea pallasii*) recruitment and distribution. Samples will be collected after dusk with a small purse seine at 56 stations along 12 transects in the Strait of Georgia. Acoustic data will be collected along transects. This information informs stock assessment, state of the ocean reporting, and research publications.

Objectives

1. Estimate relative biomass of juvenile herring as an indicator of recruitment.
2. Collect biological data and estimate the relative condition of juvenile herring.
3. Examine the prey environment by sampling zooplankton and conducting oceanographic monitoring.

Collaborators

Environment and Climate Change Canada, Pacific Salmon Foundation

Image 1: R/V Walker Rock.
Credit: Jennifer Boldt (Fisheries and Oceans Canada)

Image 2: Skipper alongside a purse seine net.
Credit: Fisheries and Oceans Canada

Juvenile salmon survey
Strait of Georgia

Unique ID: ESDREEF_01
Category: Population and Ecosystem Assessments
Dates: June 11 to 24, September 16 to October 1, 2024
Start year: 1998
Recurrence: Annually
Vessel: CCGS Sir John Franklin
Email: Jackie.King@dfo-mpo.gc.ca

Locations: Johnstone Strait, Strait of Georgia, Juan de Fuca Strait, mainland inlets

Description

Early summer and fall surveys examine the abundance, distribution and condition of juvenile Pacific salmon in order to improve understanding of factors regulating their early marine survival.

Objectives

1. Improve understanding of factors regulating the early marine survival of Pacific salmon (early marine growth and energetics, interactions with salmon farms or other industry,changes in climate, etc.).

2. Determine the relationship between the growth and condition of juvenile salmon that rear in this area and their subsequent total marine survival.

3. Develop forecast methods to identify changes in trends of salmon production and/or provide early return forecasts for specific stock groups.

4. Enumerate and sample all species collected in the surface 75m to improve our understanding of species interactions and competition, as well as changes in marine productivity driven by changes in ocean climate.

Image 1: CCGS Sir John Franklin.
Credit: Fisheries and Oceans Canada

Image 2: Crew shaking down a modified trawl net.
Credit: Fisheries and Oceans Canada

Collaborators

Canadian Coast Guard

Juvenile salmon survey
West Coast Vancouver Island

Unique ID: ESDREEF_03
Category: Population and Ecosystem Assessments
Dates: October 1 to 16, 2024
Start year: 1998
Recurrence: Annually
Vessel: CCGS Sir John Franklin
Email: Jackie.King@dfo-mpo.gc.ca
Phone: 250-756-7176

Locations: West Coast Vancouver Island

Description

This survey will be used to estimate the condition and stock composition of Pacific salmon on the West Coast of Vancouver Island. Oceanographic sampling will allow us to relate salmon abundance and condition to physical sea conditions, and presence and quality of prey (zooplankton). This survey will align with First Nations microtrolling for juvenile chinook within West Coast Vancouver Island inlets (Unique ID ADGTMG_02).

Objectives

1. Determine the fall abundance, condition, distribution, and genetic stock composition of juvenile salmon, especially chinook.

2. Collect physical oceanographic and zooplankton data to relate back to salmon ecology.

3. Record biological information from all species caught, including other fish species, sharks (live release) and invertebrates (e.g. jellyfish).

Collaborators

Huu-ay-aht First Nations, Ka:'yu:'k't'h'/Che:k:tles7et'h' First Nations, Quatsino First Nation, Ha'oom Fisheries Society, Uu-a-thluk Fisheries Canadian Coast Guard

Image 1: CCGS Sir John Franklin.
Credit: Fisheries and Oceans Canada

Image 2: Sorting salmon, sablefish (*Anoplopoma fimbria*), and jellyfish.
Credit: Fisheries and Oceans Canada

Juvenile sockeye salmon acoustic and trawl surveys

Unique ID: ESDFE_02
Category: Population and Ecosystem Assessments
Dates: July 15 to November 15, 2024
Start year: 1974
Recurrence: Varied
Vessel: R/V Night Echo
Email: Lucas.Pon@dfo-mpo.gc.ca
Phone: 604-824-4707

Locations: Cultus, Bowron, Fraser, François, and Quesnel lakes

Description

Rotational surveys of juvenile sockeye salmon (*Oncorhynchus nerka*) abundance, diet, and condition in Fraser River nursery lake ecosystems. Data and outputs support the assessment and recovery of aquatic species at risk and fisheries forecasting and management decisions.

Image 1: R/V Night Echo.
Credit: Fisheries and Oceans Canada

Objectives

1. Estimate abundances and densities of juvenile sockeye salmon populations in key nursery lake ecosystems.
2. Evaluate growth and survival during lake rearing life stages.
3. Evaluate juvenile sockeye salmon diets in relation to lake food webs.
4. Evaluate juvenile sockeye salmon population condition and stock status.

Image 2: Hauling a catch of pelagic fish onboard.
Credit: Janvier Doire (Skeena Fisheries Commission)

Collaborators

Lhtako Dene Nation

Juvenile sockeye salmon nursery lake ecosystem assessments

Unique ID: ESDFE_03
Category: Population and Ecosystem Assessments
Dates: May 1 to November 30, 2024
Start year: 1985
Recurrence: Varied
Vessel: G.E. Hutchinson, K.R.S. Shortreed
Email: Daniel.Selbie@dfo-mpo.gc.ca
Phone: 604-824-4702

Locations: Cultus, Babine, and Quesnel lakes

Description

Limnological assessments of juvenile sockeye salmon (*Oncorhynchus nerka*) nursery lake food webs and productive capacity modeling. Data and outputs support fisheries productive capacity estimates.

Objectives

1. Evaluate sockeye salmon food webs in key nursery lake ecosystems.
2. Establish habitat and population-based ecosystem productive capacities for juvenile sockeye salmon.
3. Define freshwater limitations for sockeye salmon marine and freshwater fisheries.
4. Evaluate anthropogenic and natural habitat drivers on sockeye salmon important habitat and fisheries production.
5. Model nursery lake ecosystem in relation to climate change and variability.

Collaborators

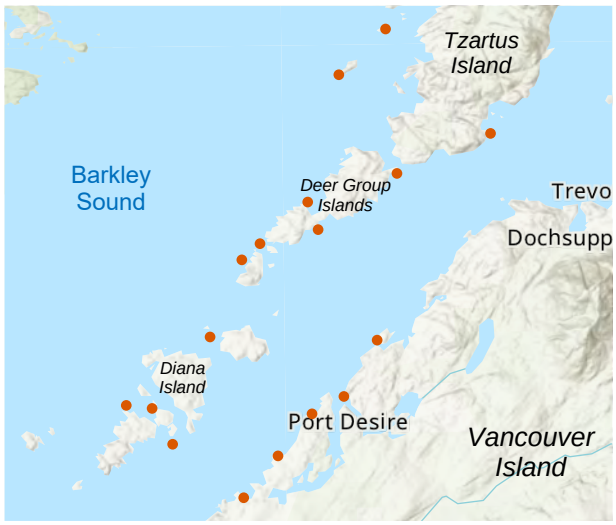
Lake Babine Nation, McGill University, University of Northern British Columbia, Simon Fraser University

Image 1: K.R.S. Shortreed.
Credit: Daniel Selbie (Fisheries and Oceans Canada)

Image 2: Limnological sampling for water chemistry and plankton.
Credit: Steve Cox-Rogers (Fisheries and Oceans Canada)

Kelp ecosystem monitoring survey

Unique ID: ESDMSEA_07
Category: Population and Ecosystem Assessments
Dates: August 6 to 19, 2024
Start year: 2021
Recurrence: Annually
Vessel: R/V Palmira (7 m)
Email: Joanne.Lessard@dfo-mpo.gc.ca
Phone: 250-714-3799



Locations: Barkley Sound

Description

This kelp monitoring project is part of a collaborative effort in British Columbia aimed at improving understanding the drivers of changes in kelp forests. This dive survey provides the under the surface data that cannot be collected by remote sensing and kayaks/boats. Subtidal and intertidal surveys will be conducted at 15 permanent sites.

Image 1: R/V Palmira.
Credit: Fisheries and Oceans Canada

Objectives

1. Identify annual changes in understorey kelp bed extent.
2. Monitor annual changes in the density and abundance of algae, invertebrate and fish species associated with rocky reefs.
3. Examine the influence of environmental variables on kelp density, diversity, and possibly productivity.
4. Survey the intertidal algae and invertebrates communities at each site.

Image 2: Luscious kelp forest.
Credit: Fisheries and Oceans Canada

Collaborators

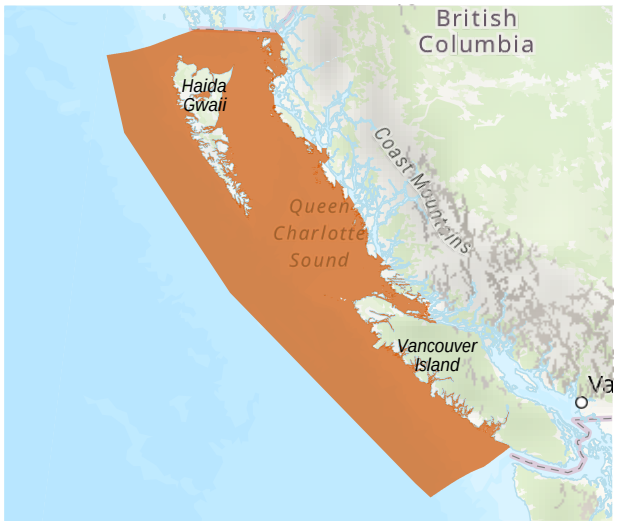
Huu-ay-aht and Tseshaht First Nations, Bamfield Marine Sciences Centre

Large whales assessment surveys

Unique ID: ESDAEMMS_09
Category: Population and Ecosystem Assessments
Dates: May 27 to June 10, 2024
Start year: 2002
Recurrence: Annually
Vessel: CCGS John P. Tully
Email: Thomas.Doniol-Valcroze@dfo-mpo.gc.ca
Phone: 250-729-8375

Description

The Cetacean Research Program assesses population abundance and critical habitat of species-at-risk, including several species of large whales. Dedicated surveys have been conducted since 2002 to improve understanding of the distribution of cetaceans and their use of habitats such as sea mounts and troughs.



Locations: West Coast Haida Gwaii, West Coast Vancouver Island.

Objectives

1. Obtain data on distribution and abundance of cetacean species.
2. Deploy and recover acoustic recorders.
3. Increase the number of confirmed sightings of sei whales and North Pacific right whales.
4. Obtain photo identification data on several species (e.g., killer whales, fin whales, North Pacific right whales)
5. Obtain biopsy samples from several species (e.g., killer whales, fin whales, North Pacific right whales).

Image 1: CCGS John P. Tully.
Credit: Jackson Chu (Fisheries and Oceans Canada)

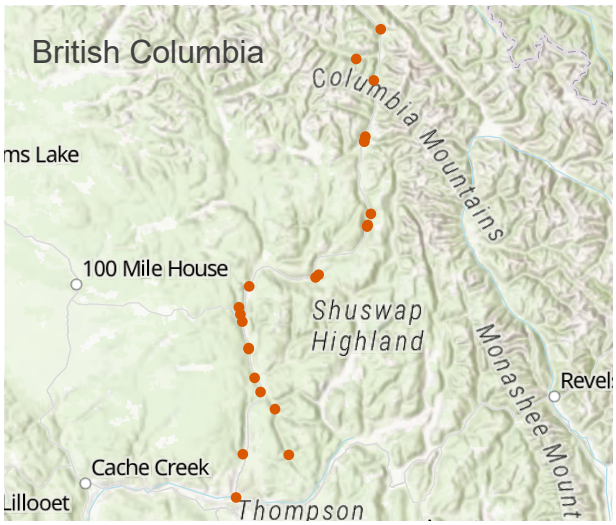
Image 2: Cetacean observers at work.
Credit: Fisheries and Oceans Canada

Collaborators

Canadian Coast Guard, Parks Canada

Low flow impacts on coho salmon rearing habitat

Unique ID: ESDFE_13
Category: Population and Ecosystem Assessments
Dates: April 1 to October 21, 2024
Start year: 2024
Recurrence: One time only
Vessel: N/A
Email: Sean.Naman@dfo-mpo.gc.ca
Phone: 236-330-6264



Locations: North Thompson River Basin

Description

This research will collect data on hydrology and physical habitat structure in Coho Salmon (*Onchorhynchus kisutch*) rearing streams. These data will inform models to predict the impacts of low flow conditions on coho salmon habitat availability, which will ultimately inform environmental flow needs.

Objectives

1. Develop relationships between flow and coho salmon habitat availability across the region to inform instream flow management.

2. Explore environmental flow needs under future climate conditions.

Collaborators

Secwepemc Fisheries Commission

Image 1: Stream habitat survey.
Credit: Sean Naman (Fisheries and Oceans Canada)

Image 2: Extreme low flow condition in 2023 in the Barrière River.
Credit: Sean Naman (Fisheries and Oceans Canada)

Multispecies benthic invertebrate monitoring

Unique ID: StARMI_09
Category: Population and Ecosystem Assessments
Dates: August 27 to October 2, 2024
Start year: 2016
Recurrence: Annually
Vessel: CCGS Vector
Email: Christine.Hansen@dfo-mpo.gc.ca
Phone: 778-268-2079

Locations: Queen Charlotte Strait, Johnstone Strait, Strait of Georgia, Juan de Fuca Strait, West Coast Vancouver Island

Description

These multispecies benthic invertebrate SCUBA surveys collect size and abundance data on sea urchins, sea cucumbers, pycnopodia sea stars and northern abalone (a species at risk), as well as benthic habitat data on algae and substrate. The data are used for invertebrate stock assessments, habitat mapping, species distribution modeling, emergency response planning and Marine Protected Areas monitoring.

Objectives

1. Collect the data necessary to evaluate stock status relative to reference points for selected benthic invertebrate species.

2. Collect long-term data to monitor benthic invertebrate populations and their habitats over time.

Collaborators

Coastal Nations in southern British Columbia, Canadian Coast Guard

Image 1: CCGS Vector.
Credit: Fisheries and Oceans Canada

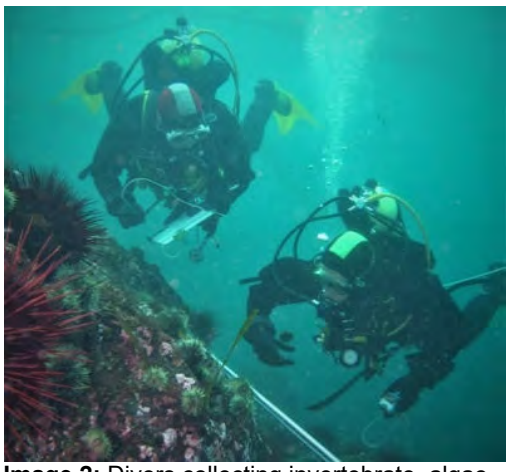


Image 2: Divers collecting invertebrate, algae, and substrate data.
Credit: Erin Herder (Fisheries and Oceans Canada)

North Pacific humpback whale physiology and metabolic rate

Unique ID: ESDAEMMS_17
Category: Population and Ecosystem Assessments
Dates: June 1 to September 30, 2024 and opportunistically throughout the year.
Start year: 2022
Recurrence: Annually
Vessel: R/V Merlin (7 m), Great Northern, and Charley C. (7.5 m)
Email: Sheila.Thornton@dfo-mpo.gc.ca
Phone: 604-364-5917

Description

Physiological biomarkers, body condition and metabolic rate of humpback whales (*Megaptera novaeangliae*) are measured to improve understanding of physiological processes and how they relate to nutritional and reproductive states of humpback whales. Breath samples are collected with drones, biopsies with a crossbow, and fecal with a fine-mesh nets. These samples allow for a comprehensive assessment of metabolic needs and reproductive state of the whales.

Objectives

Collect breath, fecal, and biopsy samples from individuals for a comprehensive assessment of physiological parameters.

Collect body and breath photos from a drone to evaluate body condition and estimate metabolic rate and energy needs.

Collaborators

Marine Education and Research Society

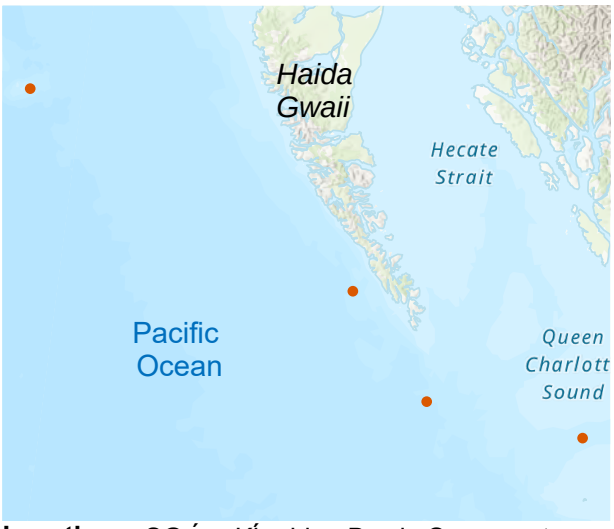
Locations: Queen Charlotte Strait, Johnstone Strait, Strait of Georgia, Juan de Fuca Strait, West Coast Vancouver Island, Swiftsure / La Perouse Bank

Image 1: Drone launching from Zodiac.
Credit: Fisheries and Oceans Canada

Image 2: Humpback whale (*Megaptera novaeangliae*).
Credit: Fisheries and Oceans Canada

Northeast Pacific deep-sea expedition

Unique ID: ESDMSEA_09
Category: Population and Ecosystem Assessments
Dates: August 13 to September 3, 2024
Start year: 2017
Recurrence: Annually
Vessel: CCGS John P. Tully
Email: Cherisse.DuPreez@dfo-mpo.gc.ca
Phone: 250-363-8288



Locations: SG̲áan K̲ínghlas-Bowie Seamount Marine Protected Area (MPA), West Coast Haida Gwaii, Tuzo Wilson Seamount Complex, Hecate Strait/Queen Charlotte Sound Glass Sponge Reefs MPA

Description

This survey will visually explore the habitats and sample the waters in and around Ecologically and Biologically Significant Areas (EBSAs) in existing, planned, and potential Marine Protected Areas (MPAs). Findings will support marine conservation initiatives and contribute to long-term monitoring.

Objectives

1. Characterize benthic habitats and fauna via visual surveys,collection of specimens, bathymetric mapping, and oceanographic sampling (e.g., environmental DNA).
2. Re-visit long term monitoring sites.
3. Conduct science outreach and communication.

Image 1: CCGS John P. Tully.
Credit: Shelton Du Preez (Fisheries and Oceans Canada)

Image 2: ROPOS deployment.
Credit: Nicole Holman and Northeast Pacific Deep Sea Expedition partners

Collaborators

Council of the Haida Nation, Nuu-chah-nulth Tribal Council Canadian Coast Guard, University of Victoria, Challenger 150, Ocean Networks Canada, United Nations Oceans Decade

Northern abalone index sites survey

Unique ID: StARMI_01
Category: Population and Ecosystem Assessments
Dates: April 23 to May 14, 2024
Start year: 1978
Recurrence: Every 5 years
Vessel: CGS Vector
Email: Erin.Herder@dfo-mpo.gc.ca
Phone: 250-327-9711

Locations: Hecate Strait, Queen Charlotte Sound

Description

Northern abalone index sites survey in Hecate Strait and Queen Charlotte Sound. Northern abalone (*Haliotis kamtschatkana*) are listed as endangered under the *Species at Risk Act* and the survey results will be used in the assessment of northern abalone in British Columbia.

Objectives

1. SCUBA dive survey of northern abalone index sites to collect information on density, size, recruitment, genetics,and habitat.

Image 1: CCGS Vector.
Credit: Fisheries and Oceans Canada

Image 2: Northern abalone (*Haliotis kamtschatkana*).
Credit: Fisheries and Oceans Canada

Collaborators

Gitga'at First Nation, Gitxaała Nation, Heiltsuk Nation, Kitasoo/Xai'xais Nation, Canadian Coast Guard

Northern resident and Bigg's killer whale physiology and body condition

Unique ID: ESDAEMMS_10
Category: Population and Ecosystem Assessments
Dates: June 1 to September 30, 2024 and opportunistically throughout the year.
Start year: 2018
Recurrence: Annually
Vessel: R/V Merlin (7 m) and Charley C. (7.5 m)
Email: Sheila.Thornton@dfo-mpo.gc.ca

Description

Physiological assessment of individual northern resident and Bigg's killer whales to improve our understanding of physiological parameters and how they relate to nutritional and reproductive state, and body condition. Prey sampling, fecal and breath sampling, biopsies and drone imaging inform foraging efficiency, prey selection and define physiological parameters of whales.

Locations: Caamano Sound, Beauchemin Channel, Wright Passage, Laredo Channel, Laredo Sound,Milbanke Sound, Finlayson Channel, Hecate Strait,Queen Charlotte Sound, Fitz Hugh Sound, Hakai Passage, Queens Sound, Raymond Passage,Seaforth Channel, Lama Passage, Gunboat Passage, Lillooet Passage, Fisher Channel, Queen Charlotte Strait, Johnstone Strait

Objectives

1. Collect prey samples from sharing events during encounters where whales are foraging.
2. Collect breath, fecal, and biopsy samples from individuals.
3. Collect data on body condition from drone imaging to correlate with physiological parameters.
4. These data will build upon our understanding of foraging behaviour from previous tagging studies.

Image 1: R/V Merlin.
Credit: Fisheries and Oceans Canada

Image 2: Killer whale (*Orcinus orca*) with suction cup tag.
Credit: Fisheries and Oceans Canada

Collaborators

National Oceanic and Atmospheric Administration (USA), Raincoast Conservation Foundation

Northern resident killer whale annual census

Unique ID: ESDAEMMS_01
Category: Population and Ecosystem Assessments
Dates: May 1 to August 31, 2024
Start year: 1973
Recurrence: Annually
Vessel: M/V Roller Bay
Email: Thomas.Doniol-Valcroze@dfo-mpo.gc.ca
Phone: 250-729-8375

Locations: Dixon Entrance, Chatham Sound, Hecate Strait, Queen Charlotte Sound, Queen Charlotte Strait, Johnstone Strait.

Description

The Cetacean Research Program has been conducting an annual census of the northern resident killer whale (NRKW) population since 1973, making it one of the longest time series of data for any marine mammal. This information is important to monitor changes in abundance, population structure and life-history parameters.

Objectives

1. Using visual and acoustic methods, locate NRKW and collect photo identifications of all members of group present.
2. Deploy and recover acoustic devices.
3. Collect prey samples from sharing events during encounters where whales are foraging.
4. Document each animal in the population.
5. Document new offspring since previous year's census and identify the mother.

Image 1: M/V Roller Bay.
Credit: Fisheries and Oceans Canada

Collaborators

Gitga'at First Nation, Canadian Coast Guard, Parks Canada, University of British Columbia, Bay Cetology, CetaceaLab, OrcaLab, North Coast Cetacean Society, Ocean Wise Conservation Association, Coastal and Ocean Resources

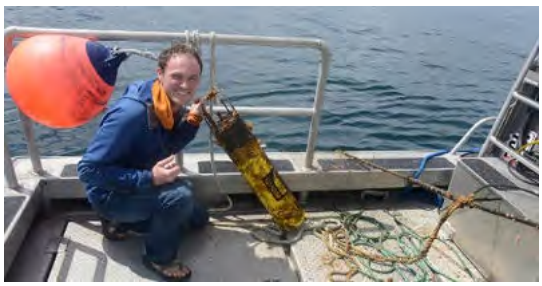
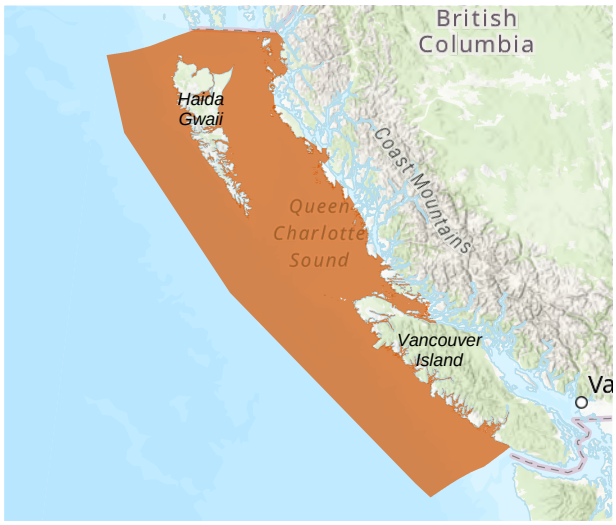


Image 2: Recovering acoustic recorder.
Credit: Fisheries and Oceans Canada

Offshore killer whale diet and contaminants

Unique ID: OSDOEB_18
Category: Population and Ecosystem Assessments
Dates: May 1 to September 30, 2024
Start year: 2023
Recurrence: Annually (year 2 of 2)
Vessel: CCGS John P. Tully
Email: Thomas.Doniol-Valcroze@dfo-mpo.gc.ca
Phone: 250-729-8375



Locations: West Coast Haida Gwaii, West Coast Vancouver Island

Description

Much remains unknown about the diet composition and contaminant levels in Offshore Killer Whales. This study supports the recovery of this Threatened population by informing two identified threats: the reduction in the availability of prey and elevated levels of endocrine disrupting contaminants which could affect survival and constrain the recovery of the population.

Objectives

1. Obtain biopsy samples from offshore killer whales.
2. Obtain prey samples, including various shark species, Pacific salmonids, Pacific halibut, sculpin, and opah from offshore killer whale habitats.
3. Measure stable isotopes of carbon and nitrogen, over 40 dietary fatty acids, and contaminants in killer whale biopsies and prey samples.
4. Characterize the diet composition and contaminant levels in offshore killer whales.

Image 1: CCGS John P. Tully.
Credit: Jackson Chu (Fisheries and Oceans Canada)

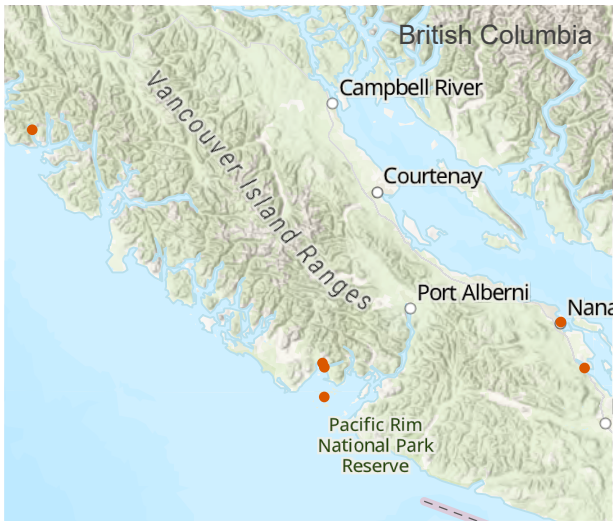
Image 2: Offshore Killer Whales (*Orcinus orca*) foraging.
Credit: B. Gisborne

Collaborators

Canadian Coast Guard, Raincoast Conservation Foundation

Olympia oyster monitoring
East and West Coast Vancouver Island

Unique ID: StARMI_04
Category: Population and Ecosystem Assessments
Dates: April 15 to August 31, 2024
Start year: 2010
Recurrence: Annually
Vessel: N/A
Email: Erin.Herder@dfo-mpo.gc.ca
Phone: 250-327-9711



Locations: Transfer Beach (Ladysmith), Swy-a-lana Lagoon (Nanaimo), Hillier Island, Harris Point, and Joes Bay (Barkley Sound), and Port Eliza (Nootka Sound)

Description

The Olympia oyster (*Ostrea lurida*) is one of two oyster species found on the British Columbia coast. The only native oyster on the west coast of North America, the Olympia oyster is listed under the federal *Species at Risk Act* as a species of special concern and is protected under the federal *Fisheries Act*.

Objectives

1. Index the relative abundance of Olympia oysters using a standardized survey protocol.

Image 1: Olympia oyster at Hillier Island, Barkley Sound.
Credit: Erin Herder (Fisheries and Oceans Canada)

Collaborators

Cowichan Tribes, Ehattesaht/Chinehkint First Nation, Nuchatlaht Tribe, Nuu-chah-nulth Tribal Council, Parks Canada

Image 2: Surveying a quadrat for Olympia oysters at Hillier Island, Barkley Sound.
Credit: Erin Herder (Fisheries and Oceans Canada)

Pacific hake assessment survey

Unique ID: OSDOEB_07
Category: Population and Ecosystem Assessments
Dates: August 6 to September 3, 2024
Start year: 1995
Recurrence: Every 1 to 2 years
Vessel: CCGS Sir John Franklin, Bell M. Shimada
Email: Stephane.Gauthier@dfo-mpo.gc.ca
Phone: 250-363-6587

Description

The fisheries acoustic trawl survey is the primary source of fishery-independent data informing the stock assessment of Pacific hake along the West Coast of Canada and the U.S. This stock is jointly managed by Canada and the U.S. under the international Pacific Hake / Whiting Treaty. The survey occurs coastwide in odd years and at a select locations only for research purpose in even years.

Objectives

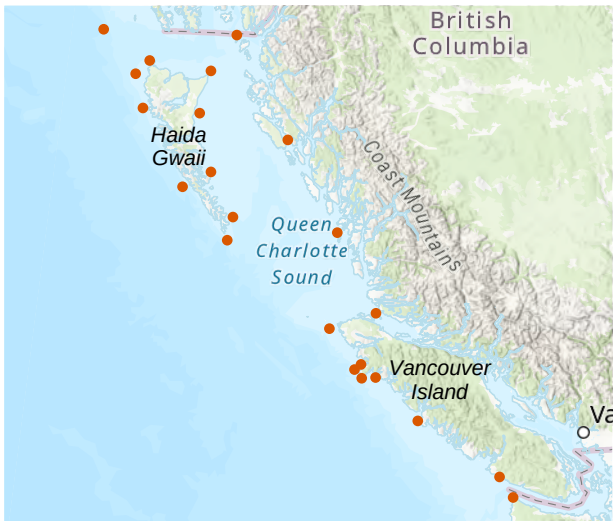
1. Estimate the abundance and distribution of Pacific hake along the West Coast using fisheries acoustics techniques.

2. Collect midwater trawl samples to verify species composition of acoustic marks, collect biological samples to estimate fish size and conditions, and collect oceanographic data to better understand distribution and movements.

3. Collect information on prey species, such as krill and mesopelagic fishes.

Collaborators

Canadian Coast Guard, National Oceanographic and Atmospheric Administration (National Marine Fisheries Service - USA)



Locations: Haida Gwaii, Dixon Entrance, Hecate Strait, Queen Charlotte Sound, West Coast Vancouver Island, Queen Charlotte Strait

Image 1: CCGS Sir John Franklin.
Credit: Stéphane Gauthier (Fisheries and Oceans Canada)

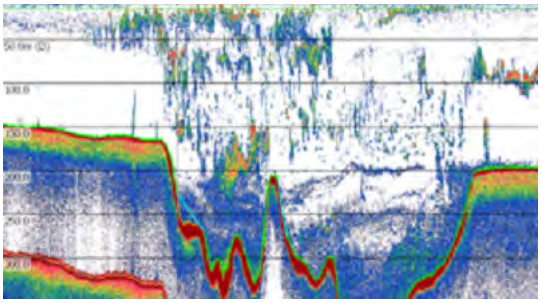


Image 2: Echogram of detected fish schools in water column.
Credit: Stéphane Gauthier (Fisheries and Oceans Canada)

the

Pacific herring biological sampling surveys

Unique ID: StARQAM_01
Category: Population and Ecosystem Assessments
Dates: April 1 to 30, 2024; February 15 to March 31, 2025
Start year: 1972
Recurrence: Annually
Vessel: Seine vessels, dive skiffs, float planes
Email: Jaclyn.Cleary@dfo-mpo.gc.ca
Phone: 250-616-7009

Locations: West Coast Haida Gwaii, Chatham Sound, Hecate Strait, Queen Charlotte Sound, Strait of Georgia, West Coast Vancouver Island

Description

These surveys aim to collect biological samples from pre-spawning aggregations of Pacific herring throughout the British Columbia coast. Monitoring of herring biology helps track changes in age and growth which informs stock status.

Objectives

1. Identify pre-spawning aggregations of herring in each stock area using vessel based sounders.
2. Use a purse seine to hold herring and collect herring sample (~100 fish) using a hoop net; or use a cast net to sample herring in nearshore habitats.
3. Transport herring sample to laboratory where data on age, length, weight, sex, and maturity is gathered.
4. Use equations to estimate the size and age distribution of herring for each area.
5. Provide data for stock assessment.

Image 1: Seine vessel.
Credit: Fisheries and Oceans Canada

Image 2: Removing Pacific herring (*Clupea pallasii*) scales for age sampling.
Credit: Fisheries and Oceans Canada

Collaborators

Ehattesaht/Chinehkint First Nation, Heiltsuk Nation, Hesquiaht First Nation, Huu-ay-aht First Nations, Kitasoo/Xai'xais Nation, Mowachaht/Muchalaht First Nation, Nuchatlaht Tribe, Toquaht Nation, Wuikinuxv Nation, A-Tlegay Fisheries Society, Nuu-chah-nulth Tribal Council, Herring Conservation and Research Society

Pacific herring spawn surveys

Unique ID: StARQAM_02
Category: Population and Ecosystem Assessments
Dates: April 1 to 30, 2024; March 1 to 31, 2025
Start year: 1951
Recurrence: Annually
Vessel: Seine vessels, dive skiffs, float planes
Email: Jaclyn.Cleary@dfo-mpo.gc.ca
Phone: 250-616-7009

Locations: West Coast Haida Gwaii, Chatham Sound, Hecate Strait, Queen Charlotte Sound, Strait of Georgia, West Coast Vancouver Island

Description

Monitoring of Pacific herring spawn (egg deposition) helps to track changes in stock abundance. These surveys aim to measure herring spawn on kelps and eelgrasses in intertidal / subtidal habitats using SCUBA surveys.

Objectives

1. Identify herring spawning activity from float planes and from small First Nation vessel charters.
2. Confirm the presence of herring eggs and measure egg layers, substrate type, and coverage within quadrats placed along transects that are perpendicular to shore.
3. Calculate egg biomass for each spawn and from that use equations to estimate the number of adult spawners for each area.
4. Map herring spawning and provide data for stock assessment.

Image 1: SCUBA divers measuring herring spawn.
Credit: Fisheries and Oceans Canada

Image 2: Pacific herring (*Clupea pallasii*) spawn.
Credit: Fisheries and Oceans Canada

Collaborators

Ehattesaht/Chinehkint First Nation, Gwa'sala-Nakwaxda'xw Nations, Heiltsuk Nation, Hesquiaht First Nation, Huu-ay-aht First Nations, Kitasoo/Xai'xais Nation, Mowachaht/Muchalaht First Nation, Nuchatlaht Tribe, Toquaht Nation, A-Tlegay Fisheries Society, Council of the Haida Nation, Musgamagw Dzawada'enuxw Tribal Council, Nuu-chah-nulth Tribal Council, Herring Conservation and Research Society

Pacific oyster and Pacific razor clam stress response

Unique ID: ESDNE_13
Category: Population and Ecosystem Assessments
Dates: April 1, 2024 to March 31 2025
Start year: 2023
Recurrence: Annually (year 3 of 3)
Vessel: Local vessels
Email: Chris.Pearce@dfo-mpo.gc.ca
Phone: 250-756-3352

Locations: Haida Gwaii (North Beach), Strait of Georgia (Departure Bay)

Description

Field trials will assess candidate gene sets as means of monitoring stress responses of Pacific oysters and Pacific razor clams during acute warming and low oxygen events (e.g., heatwaves, hypoxia). Findings will support the development of an early warning system to aid managers and industry in mitigating such events.

Objectives

1. Carry out laboratory heatwave and hypoxia experiments to identify candidate gene sets for monitoring stress responses of Pacific oysters and Pacific razor clams in the field.

2. Track stress response of Pacific oysters (Departure Bay, Strait of Georgia) and Pacific razor clams (North Beach, Haida Gwaii) during summer months.

3. Monitor temperature and dissolved oxygen conditions at both sites during summer months.

Collaborators

Council of the Haida Nation

Image 1: Pacific oyster bed.
Credit: Claire Mackenzie (Fisheries and Oceans Canada)

Image 2: Pacific razor clam (*Siliqua patula*).
Credit: Rick Harbo (Fisheries and Oceans Canada)

Pacific salmon water temperature monitoring

Unique ID: ESDFE_04
Category: Population and Ecosystem Assessments
Dates: April 1, 2024 to March 31, 2025
Start year: 1950
Recurrence: Annually
Vessel: N/A
Email: David.Patterson@dfo-mpo.gc.ca
Phone: 604-666-5671

Locations: Fraser River basin, including the Upper Fraser, Stuart, Nechako, Quesnel, Chilcotin, Thompson,Seton, Harrison, and Chilliwack watersheds

Description

Monitoring and forecasting of water temperatures in salmon migratory corridors of the Fraser River helps inform fisheries and habitat management.

Objectives

1. Provide water temperature information on migratory conditions for Pacific salmon in Fraser River watershed.
2. Monitor water temperatures in select migratory corridors for Pacific salmon.
3. Analyze water temperature information in relation to changes associated climate and land use activities.
4. Forecast water temperatures to predict likelihood of exposure of adult sockeye salmon to adverse migration conditions.
5. Input data into mortality models.

Image 1: Chilcotin River, a migration corridor monitored for temperature.
Credit: Fisheries and Oceans Canada

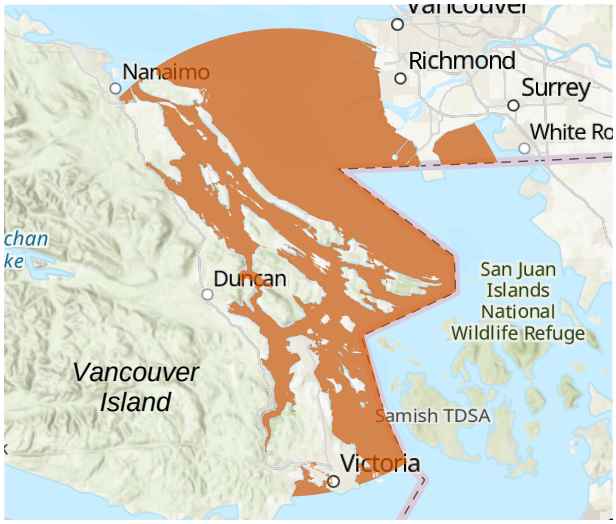
Image 2: Real time water temperature logger installation on Stuart River.
Credit: Fisheries and Oceans Canada

Collaborators

Environment and Climate Change Canada, Province of British Columbia, Simon Fraser University

Pacific sand lance acoustic monitoring

Unique ID: OSDOEB_05
Category: Population and Ecosystem Assessments
Dates: April 1 to October 31, 2024
Start year: 2020
Recurrence: Annually (year 3 of 5)
Vessel: Small inshore and rigid inflatable vessels
Email: Stephane.Gauthier@dfo-mpo.gc.ca
Phone: 250-363-6587



Locations: Western Strait of Georgia, Gulf Islands (e.g., Sydney Channel, Cordova Channel)

Description

Pacific sand lance (*Ammodytes hexapterus*) is an important forage fish species in British Columbia waters. It is a key prey for many predators, including marine birds and chinook salmon, and little is known about their population status. This pilot project focuses on the potential detection and monitoring of Pacific Sand Lance using fisheries acoustics technologies. This data will inform future monitoring efforts and species distribution models.

Objectives

1. Test the use of portable scientific echosounders to detect and discriminate Pacific sand lance schools from other fish echoes (such as those from Pacific herring).

2. Test the use of moored autonomous echosounders to detect and monitor Pacific sand lance while they are foraging through the water column.

3. Test the use of moored autonomous echosounders to detect and monitor Pacific sand lance as they are entering and exiting sand substrate.

Collaborators

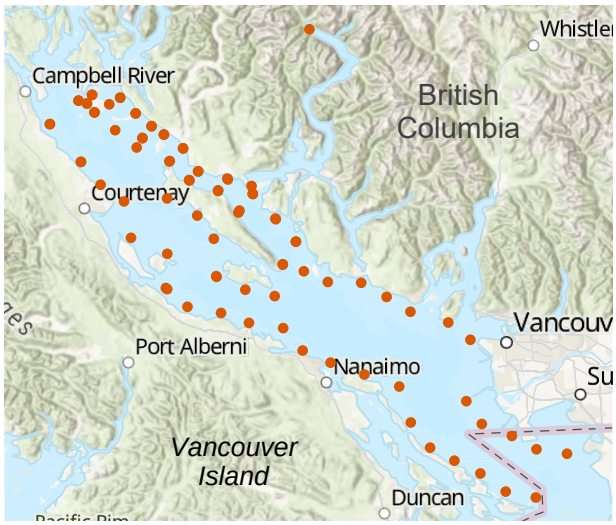
Environment and Climate Change Canada

Image 1: M/V Pallasii.
Credit: Stéphane Gauthier (Fisheries and Oceans Canada)

Image 2: Acoustic mooring before deployment.
Credit: Stéphane Gauthier (Fisheries and Oceans Canada)

Pelagic ecosystem acoustic survey

Unique ID: OSDOEB_12
Category: Population and Ecosystem Assessments
Dates: February 18 to March 4, 2025
Start year: 1995
Recurrence: Biennially
Vessel: CCGS Sir John Franklin
Email: Stephane.Gauthier@dfo-mpo.gc.ca
Phone: 250-363-6587



Locations: Strait of Georgia and Jervis, Toba, and Bute inlets

Description

Acoustic-trawl survey within the Salish Sea to assess the pelagic ecosystem. The survey particularly assess the distribution and abundance of local stocks of Pacific hake and walleye pollock, as well as Pacific herring and other pelagic species within the open water of the Strait of Georgia and Jervis, Toba, and Bute inlets.

Objectives

1. Estimate the abundance and distribution of pelagic and demersal species using fisheries acoustics techniques.

2. Collect midwater trawl samples to verify species composition of acoustic marks, collect biological samples to estimate fish size and conditions.

3. Collect oceanographic data through CTD (conductivity, temperature, depth) rosette and plankton nets to better understand distribution and movements.

Image 1: CCGS Sir John Franklin.
Credit: Fisheries and Oceans Canada

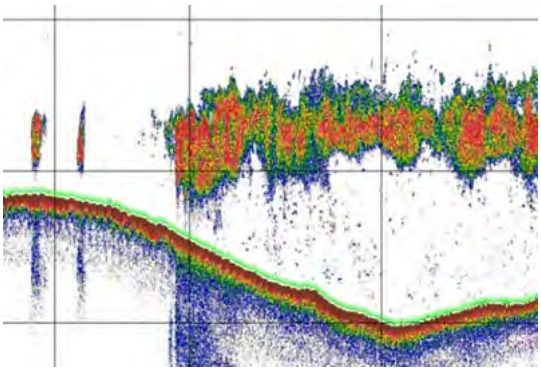


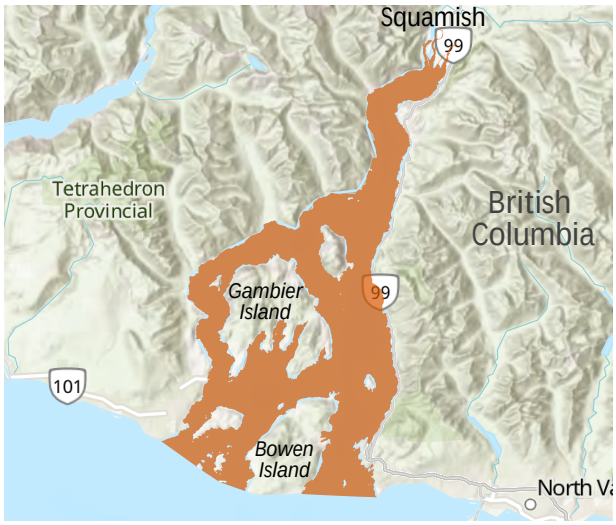
Image 2: Echogram of detected fish schools in the water column.
Credit: Stéphane Gauthier (Fisheries and Oceans Canada)

Collaborators

Canadian Coast Guard, National Oceanographic and Atmospheric Administration (National Marine Fisheries Service - USA), Canadian Groundfish Research and Conservation Society, Pacific Salmon Foundation

Prawn assessment survey
Howe Sound

Unique ID: StARMI_06
Category: Population and Ecosystem Assessments
Dates: October 30 to November 9, 2024
Start year: 2001
Recurrence: Annually
Vessel: CCGS Neocaligus
Email: Kyle.Krumsick@dfo-mpo.gc.ca
Phone: 778-268-6017



Locations: Howe Sound

Description

Prawn assessment trap surveys provide estimates of key biological parameters (e.g., natural morality, recruitment, spawner abundance) which are used in the development and refinement of the spawner escapement index for prawns.

This index forms the basis of the assessment and management of prawn stocks. The prawn survey in Howe Sound is an ongoing assessment program that provides data necessary to assess and manage all prawn stocks along the British Columbia coast.

Image 1: CCGS Neocaligus.
Credit: Fisheries and Oceans Canada

Objectives

1. Collect detailed catch, size, and sex data for estimating recruitment parameters.

2. Monitor stock response of escapement based thresholds.

Image 2: Spot prawns (*Pandalus platyceros*).
Credit: Fisheries and Oceans Canada

Collaborators

Squamish Nation, Canadian Coast Guard, Simon Fraser University

Sablefish
research and assessment survey

Unique ID: StARGF_06
Category: Population and Ecosystem Assessments
Dates: September 27 to November 13, 2024
Start year: 2003
Recurrence: Annually
Vessel: Chartered commercial trap vessel
Email: Malcolm.Wyeth@dfo-mpo.gc.ca
Phone: 778-268-1184

Locations: Queen Charlotte Sound, West Coast of Haida Gwaii, mainland inlets, West Coast Vancouver Island

Description

This fishing survey uses standardized longline trap gear to capture sablefish for tag and release and to provide a stock abundance index. Detailed biological data are also collected from sablefish and selected rockfish species. Each year, approximately 90 randomly selected offshore locations and 5 specific sites in mainland inlets are fished. These data provide annual estimates of harvestable biomass that inform the fishery and are incorporated into stock assessments, status reports, and research publications. An additional 15 sets are conducted at offshore locations to study the selectivity of different gear configurations.

Image 2: Sablefish (*Anoplopoma fimbria*).
Credit: Fisheries and Oceans Canada

Objectives

1. Collect detailed species composition data from each set.

   Tag and release sablefish from each set.

2. Collect detailed size and sex composition data as well as ageing structures and tissue samples from sablefish and selected offshore rockfish species.

3. Collect environmental data from temperature-depth recorders attached to the fishing gear.

Collaborators

Wild Canadian Sablefish Ltd.

Sea otter population assessment

Unique ID:	ESDAEMMS_14
Category:	Population and Ecosystem Assessments
Dates:	March 9 to 19, 2025
Start year:	2001
Recurrence:	Annually
Vessel:	CCGS Tanu, aluminum (5.5 m) and rigid hull inflatable (6.5 m) vessels
Email:	Linda.Nichol@dfo-mpo.gc.ca
Phone:	250-616-1706

Locations: Queen Charlotte Sound, Queen Charlotte Strait, West Coast Vancouver Island

Description

This sea otter assessment collects data to inform estimates of population abundance, growth and distribution in British Columbia. Annual surveys are conducted in a core index area (with a 40-year longitudinal time series). Additional areas in the occupied range will be surveyed for trends, abundance, and distribution.

Objectives

1. Conduct surveys of the sea otter population over the range using standardized approach with 2-3 observers and a boat driver.

2. Search complex areas with binoculars and obtain counts of the number of animals in rafts.

3. Develop and improve the field methodology utilizing unmanned aerial vehicle technology with the aim to improve efficiency of counting rafts.

Collaborators

Vancouver Island University

Image 1: Cetacean research vessel.
Credit: Fisheries and Oceans Canada

Image 2: Resting sea otters (*Enhydra lutris*) in kelp.
Credit: Fisheries and Oceans Canada

Seamount Exploration

Unique ID: StARQAM_03
Category: Population and Ecosystem Assessments
Dates: September 3 to 16, 2024
Start year: 2022
Recurrence: One year only
Vessel: CCGS Vector
Email: Chris.Rooper@dfo-mpo.gc.ca
Phone: 250-756-7050

Locations: Cobb, Brown Bear, Eickelberg, Vance and Warwick seamounts

Description

This joint Canada-U.S. survey will deploy underwater cameras to examine the distribution of deep-sea corals, sponges, fishes and benthic invertebrates at four seamounts in international waters of the North Pacific. The study will contribute to our knowledge of seamount ecology and management of international fisheries.

Image 1: CCGS Vector.
Credit: Fisheries and Oceans Canada

Objectives

1. Survey the distribution of deep-sea corals and sponges using a random-stratified survey design and estimate the population abundance for dominant species.

2. Groundtruth model predictions of the distribution of deep-sea corals and sponges on seamounts in the eastern North Pacific Ocean.

3. Collect ancillary data on oceanography, environmental DNA and fish-invertebrate associations for seamount fauna.

Image 2: Deep-sea coral (Primnoidae) and sponge (Hexactinellida).
Credit: Fisheries and Oceans Canada

Collaborators

Canadian Coast Guard, National Oceanographic and Atmospheric Administration (Alaska Fisheries Science Center - USA), Japan National Research Institute of Far Seas Fisheries, North Pacific Fisheries Commission (International)

səlilwətaɬ and DFO Collaborative Clam Beach Monitoring
Burrard Inlet

Unique ID: SSISOAR_02
Category: Population and Ecosystem Assessments
Dates: May 1 to September 31, 2024
Start year: 2023
Recurrence: Annually
Vessel: Say Nuth Khaw Yum
Email: Stephen.Healy@dfo-mpo.gc.ca
Phone: 236-330-5063

Locations: Burrard Inlet, Indian Arm

Description

This Burrard Inlet Environmental Science and Stewardship Reconcilliation Agreement project builds off of ongoing work by Tsleil-Waututh Nation that aims to better manage and understand clam beaches in its traditional territory. This project involves the deployment of data loggers and collection of physical/habitat data with paired population surveys to better understand clam beaches in Burrard Inlet.

Objectives

1. Monitor environmental and physical factors at Burrard Inlet clam beaches prioritized by Tsleil-Waututh Nation.

2. Gain a better understanding of factors influencing clam productivity and invasive species in Burrard Inlet.

Image 1: Say Nuth Khaw Yum vessel.
Credit: Stephen Healy (Fisheries and Oceans Canada)

Collaborators

səlilwətaɬ (Tsleil-Waututh)

Image 2: səlilwətaɬ (Tsleil-Waututh Nation) logo.
Credit: səlilwətaɬ (Tsleil-Waututh Nation)

Shrimp assessment survey
Chatham Sound

Unique ID: StARMI_10
Category: Population and Ecosystem Assessments
Dates: September 6 to 28, 2024
Start year: 1998
Recurrence: Annually
Vessel: CCGS Neocaligus
Email: Virginia.Noble@dfo-mpo.gc.ca
Phone: N/A

Locations: Chatham Sound

Description

Shrimp assessment surveys estimate the abundance of shrimp stocks (smooth and spiny pink shrimp, and sidestripe shrimp) in select Shrimp Management Areas. The results from these surveys are used to track long-term trends in abundance of shrimp stocks and to set annual quotas for the commercial shrimp trawl fishery.

Objectives

1. Conduct fishery independent surveys of shrimp grounds using bottom trawl gear to determine stock status of pink and sidestripe shrimp in Shrimp Management Areas PRD (PFMA 4 – Chatham Sound).

2. Maintain pink shrimp and sidestripe shrimp abundance index time series for monitoring trends in abundance.

3. Collect species distribution and abundance information on other fish and invertebrate species.

Image 1: CCGS Neocaligus.
Credit: Fisheries and Oceans Canada

Image 2: Smooth pink shrimp (*Pandalus jordani*).
Credit: Fisheries and Oceans Canada

Collaborators

Canadian Coast Guard

Shrimp assessment survey
Strait of Georgia

Unique ID: StARMI_07
Category: Population and Ecosystem Assessments
Dates: June 3 to 19, 2024
Start year: 1998
Recurrence: Annually
Vessel: CCGS Neocaligus
Email: Virginia.Noble@dfo-mpo.gc.ca
Phone: N/A

Locations: Strait of Georgia

Description

Shrimp assessment surveys estimate the abundance of shrimp stocks (smooth and spiny pink shrimp, and sidestripe shrimp) in select areas. The results from these surveys are used to track long-term trends in abundance of shrimp stocks and to set annual quotas for the commercial shrimp trawl fishery.

Objectives

1. Conduct fishery independent surveys of shrimp grounds using bottom trawl gear to determine stock status of pink and sidestripe shrimp in Shrimp Management Areas Fraser,Comox, GSTE and Statistical Areas 16, 18, and 19.

2. Maintain pink shrimp and sidestripe shrimp abundance index time series for monitoring trends in abundance.

3. Collect species distribution and abundance information on other fish and invertebrate species.

Collaborators

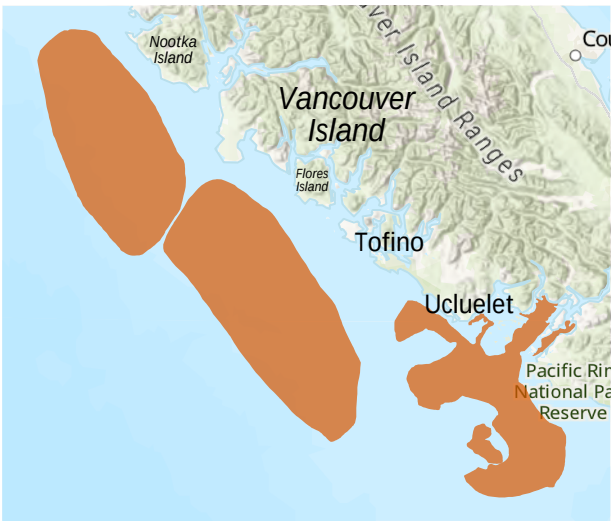
Canadian Coast Guard

Image 1: CCGS Neocaligus.
Credit: Fisheries and Oceans Canada

Image 2: Smooth pink shrimp (*Pandalus jordani*).
Credit: Fisheries and Oceans Canada

Small-mesh multi species bottom trawl survey
West Coast Vancouver Island

Unique ID: StARMI_08
Category: Population and Ecosystem Assessments
Dates: April 16 to May 9, 2024
Start year: 1973
Recurrence: Annually
Vessel: CCGS Sir John Franklin
Email: Andres.Araujo@dfo-mpo.gc.ca
Phone: 250-327-3209



Locations: West Coast Vancouver Island

Description

The West Coast Vancouver Island (WCVI) small-mesh multi-species survey was implemented in 1973 and now serves as one of the longest continuous bottom trawl time series for monitoring a diversity of fish and invertebrate species on the west coast of British Columbia.

Data gathered from this survey provide pink shrimp stock status for management of the commercial shrimp trawl fishery; inform the annual State of the Oceans report, as well as inform stock assessments for groundfish and pelagic fish species.

Image 1: CCGS Sir John Franklin.
Photo credit: Fisheries and Oceans Canada

Objectives

1. Index the abundance of pink shrimp off WCVI using a fishery independent trawl survey.

2. Multi-species indexing of other invertebrates, pelagic fish,and groundfish species.

Image 2: Smooth pink shrimp (*Pandalus jordani*).
Credit: A. Denbigh

Collaborators

Canadian Coast Guard

Southern resident killer whale physiology and habitat use

Unique ID: ESDAEMMS_06
Category: Population and Ecosystem Assessments
Dates: June 1 to September 30, 2024, and opportunistically throughout the year
Start year: 2018
Recurrence: Annually
Vessel: Zodiac Hurricanes (7 m)
Email: Sheila.Thornton@dfo-mpo.gc.ca
Phone: 604-364-5917

Locations: Gulf Islands, Juan de Fuca Strait, Swiftsure / La Perouse Bank, Fraser River delta

Description

Behavioural assessment of southern resident killer whales (SRKW) to improve understanding of habitat use patterns and identify key foraging areas. Prey sampling, fecal sampling, breath sampling, and drone imaging inform foraging efficiency, prey selection and physiological parameters.

Objectives

1. Using visual and acoustic methods to locate SRKW, identify behavioural state and collect photo-identifications of individuals encountered.
2. Collect prey samples from sharing events during encounters where whales are foraging.
3. Collect information on vessel presence in the vicinity of whales.
4. Collect fecal and breath samples from SRKW.
5. Collect overhead images of the whales using drones.

Collaborators

National Oceanic and Atmospheric Administration (USA)

Image 1: Zodiacs.
Credit: Fisheries and Oceans Canada

Image 2: Field crew on southern resident killer whale habitat use project.
Credit: Fisheries and Oceans Canada

Steller sea lion haulout monitoring

Unique ID: ESDAEMMS_16
Category: Population and Ecosystem Assessments
Dates: April 1, 2024 to March 31, 2025
Start year: 2022
Recurrence: Annually (year 3 of 3)
Vessel: N/A
Email: Strahan.Tucker@dfo-mpo.gc.ca
Phone: 250-616-2867

Locations: Seabird Rocks (Pacific Rim National Park)

Description

A multi-year deployment of autonomous cameras at Seabird Rocks, Pacific Rim National Park Reserve, will collect photos to assess the daily variation in haulout numbers as well as to identify branded animals in support of an on going NOAA led Steller sea lion program.

The photos will also capture the seasonal presence and abundance of California sea lions in British Columbia waters and gauge species interactions.

Finally, the photos will be used to test and refine computer automated counting software with mixed Steller and California sea lion species.

Image 1: Seabird Rocks.
Credit: Fisheries and Oceans Canada

Objectives

1. Service cameras and swap memory cards one year after deployment and undertake image analysis.
2. Obtain daily counts of Steller and California sea lions.
3. Generate a list of branded animals.

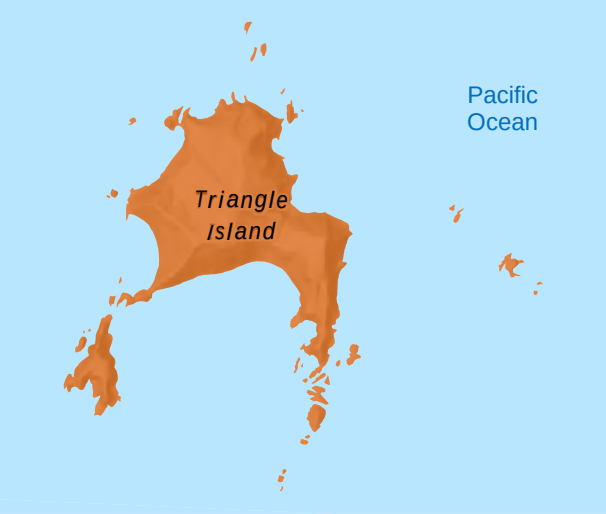
Image 2: Steller sea lion (*Eumetopias jubatus*) haulout.
Credit: Fisheries and Oceans Canada

Collaborators

Parks Canada, North Pacific Wildlife Consulting (USA)

Steller sea lion satellite telemetry deployment

Unique ID: ESDAEMMS_21
Category: Population and Ecosystem Assessments
Dates: May 1 to June 30, 2024
Start year: 2024
Recurrence: Annually (year 1 of 2)
Vessel: N/A
Email: Strahan.Tucker@dfo-mpo.gc.ca
Phone: 250-616-2868



Locations: Triangle Island (approximately 45 km northwest of Vancouver Island)

Description

Steller sea lion population estimates generated from counts taken during aerial surveys need to be corrected for the proportion of animals in the water and not counted. A correction factor is developed by following the behavior of a sample of satellite tagged seals. The last tags were deployed in the 2000's. This project will update correction factors by deploying satellite tags and tracking sea lions behavior over several months.

Image 2: Steller sea lion (*Eumetopias jubatus*).
Credit: Fisheries and Oceans Canada

Objectives

1. Capture adult and sub-adult animals of mixed sex and age and immobilize them using a Pneu-Dart remote delivery system.

2. Temporarily attach 10 satellite tags to fur of sea lions; these tags will relay summaries of the wet dry sensor during their deployment.

3. Calculate correction.

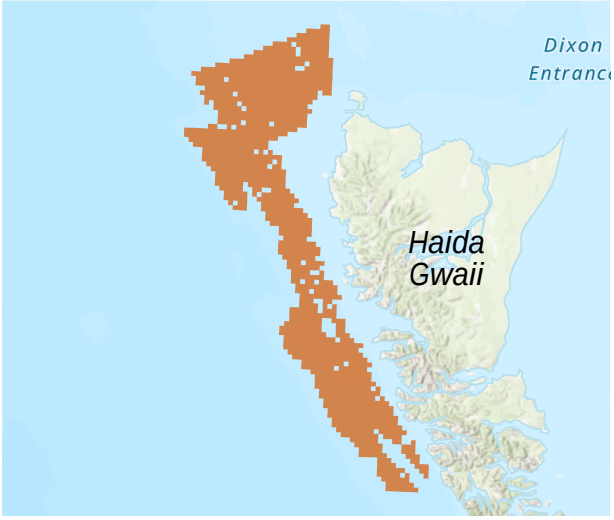
4. Using sea lion dives and movements, assess the amount of time sea lions spent foraging, and model foraging movements to reveal sea lion predation hotspots.

Collaborators

Vancouver Aquarium

Synoptic bottom trawl survey
West Coast Haida Gwaii

Unique ID: StARGF_08
Category: Population and Ecosystem Assessments
Dates: August 25 to September 30, 2024
Start year: 2006
Recurrence: Biennially
Vessel: Chartered commercial trap vessel
Email: Malcolm.Wyeth@dfo-mpo.gc.ca
Phone: 778-268-1184



Locations: West Coast of Haida Gwaii

Description

This fishing survey uses bottom trawl gear to provide relative abundance indices for commonly caught species, distributional and occurrence data for all other species, and detailed biological data from groundfish species. These data are incorporated into stock assessments, status reports, and research publications. Each year, approximately 125 randomly selected locations are fished.

Image 2: Juvenile giant blobsculpin (*Psychrolutes phrictus*).
Credit: Fisheries and Oceans Canada

Objectives

1. Collect detailed species composition data from each set.

   Collect detailed size and sex composition for all species.

2. Collect ageing structures and tissue samples from selected species.

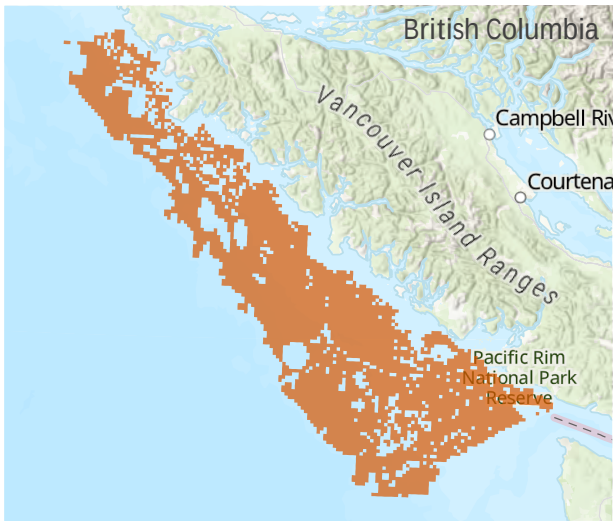
3. Collect environmental data including temperature, conductivity, and dissolved oxygen from recorders attached to the fishing gear.

Collaborators

Canadian Groundfish Research and Conservation Society

Synoptic bottom trawl survey
West Coast Vancouver Island

Unique ID: StARGF_04
Category: Population and Ecosystem Assessments
Dates: May 9 to June 11, 2024
Start year: 2004
Recurrence: Biennially
Vessel: CCGS Sir John Franklin
Email: Malcolm.Wyeth@dfo-mpo.gc.ca
Phone: 778-268-1184



Locations: West Coast Vancouver Island

Description

This fishing survey uses bottom trawl gear to provide relative abundance indices for commonly caught species, distributional and occurrence data for all other species, and detailed biological data from groundfish species. These data are incorporated into stock assessments, status reports, and research publications. Each year, approximately 175 randomly selected locations are fished.

Image 1: CCGS Sir John Franklin.
Credit: Fisheries and Oceans Canada

Objectives

1. Collect detailed species composition data from each set.

   Collect detailed size and sex composition for all species.

2. Collect ageing structures and tissue samples from selected species.

3. Collect environmental data including temperature, conductivity, and dissolved oxygen from recorders attached to the fishing gear.

Image 2: Green sturgeon (*Acipenser medirostris*).
Credit: Fisheries and Oceans Canada

Collaborators

Canadian Coast Guard