



Environmental Services



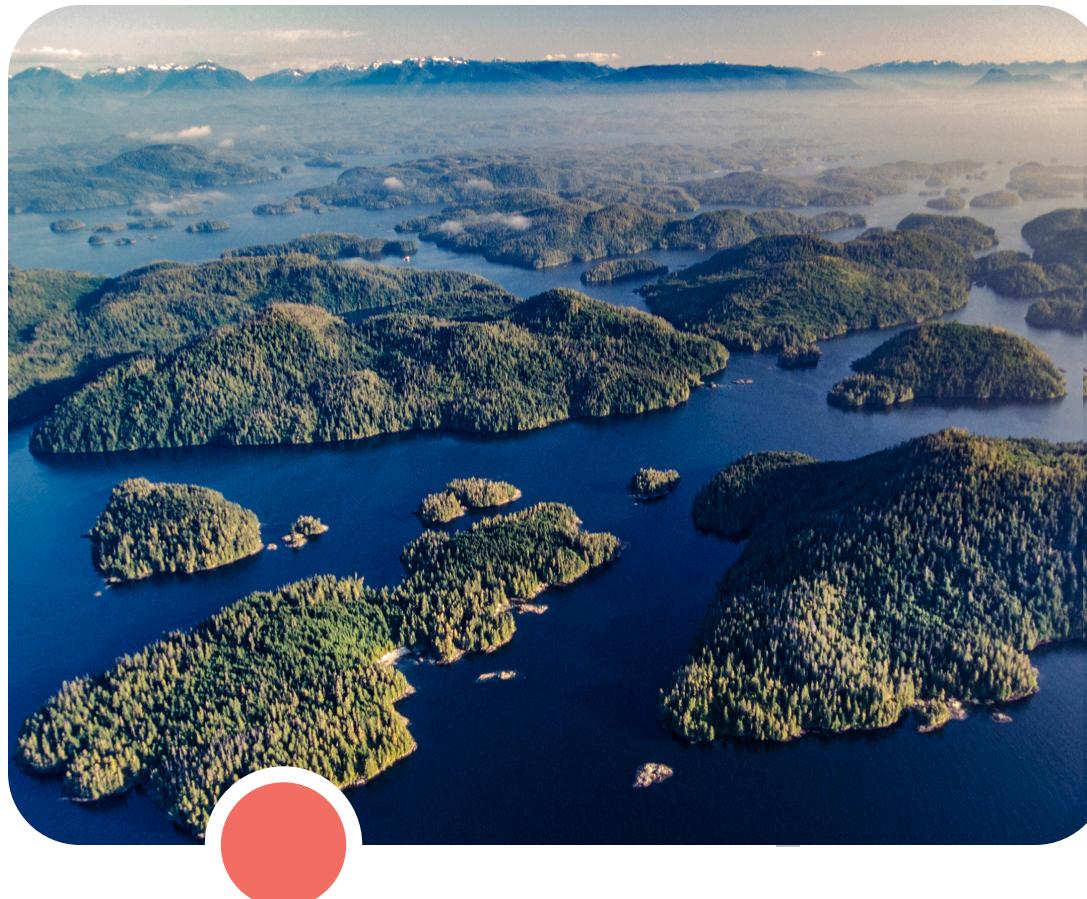
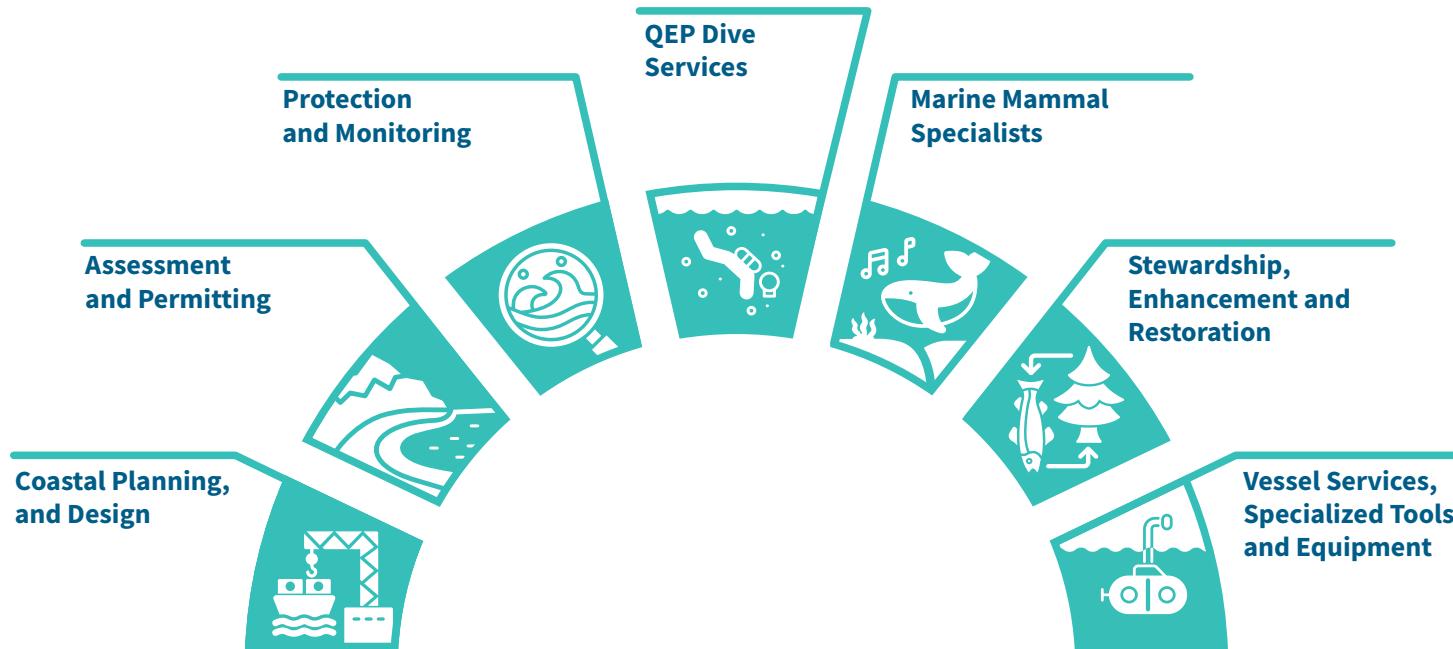


The Archipelago Advantage

Since 1978, Archipelago's Environmental Services has advocated sustainable practices to preserve ecosystems and promote responsible resource management. Our proactive approach focuses on conservation, habitat restoration, and pollution reduction, empowering organizations to minimize their environmental footprint while maximizing long-term benefits.

Our skilled team of QEP's and biological professionals work extensively with government, First Nations, NGOs, industry, public entities, and discipline experts to navigate regulatory requirements, minimize project disruptions, and drive innovative, cost-effective solutions for sustainable development.

Our core services:



Clients

We have worked on a variety of projects including coastal development, aquaculture, remediation, habitat offsetting, fisheries management, marine mammals, environmental and habitat assessment for the following clients.

Federal:



Provincial:



Municipal:



Engineering & Consulting:



Planning:



First Nations



Construction:



NGO:





Coastal Planning & Design

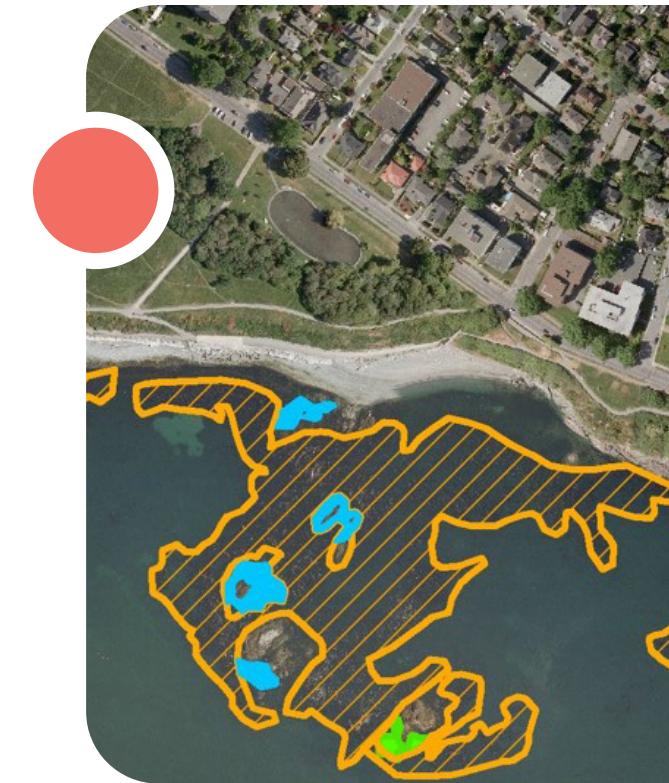
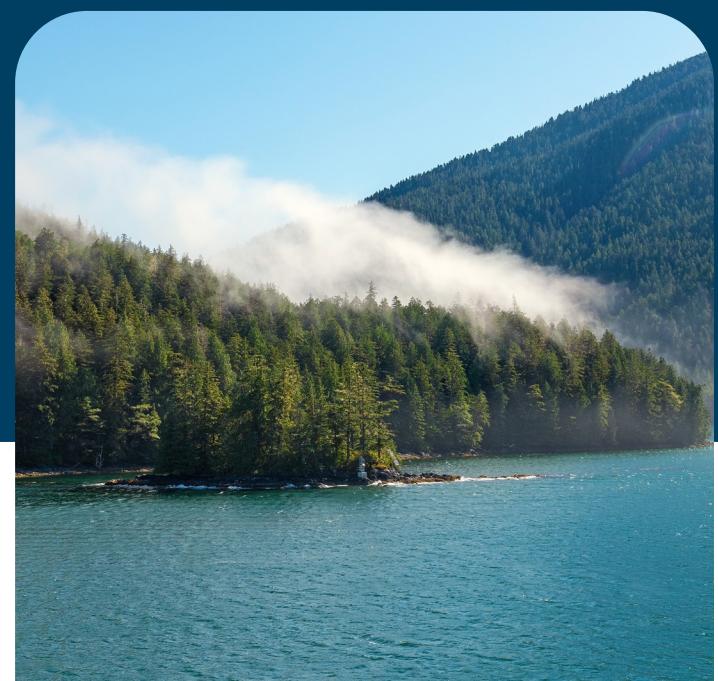
With nearly 50 years of experience serving British Columbia coastal communities, Archipelago understands balancing economic growth with environmental conservation, thereby ensuring that ecosystems remain healthy and functional for future generations.

To each project we apply our expertise in planning, development, implementation, analysis, and auditing of the project to meet economic and environmental objectives. We also have extensive knowledge of all levels of permitting; municipal, provincial, and federal. Archipelago's varied coastal planning portfolio includes residential properties, marine terminals, industrial export facilities, naval berths, ports, harbours, and public lands.

CASE STUDY Prince Rupert Marine Habitat Restoration Plan

In recent years, many development projects have been proposed for the Port of Prince Rupert. These projects generally require restoration initiatives to offset projected impacts to nearshore fish habitat. Habitat restoration is also a key priority of environmental stewardship initiatives by the port, First Nations and NGOs.

The need to provide a planning and evaluation framework for restoration projects in the region was identified with the objectives of coordinating projects that are supported by underlying ecological principles. The Marine Habitat Restoration Plan (MHRP) was developed by Archipelago as a comprehensive, ecologically based approach to restoration of marine habitats in the Prince Rupert area that can be used by all stakeholders.



CASE STUDY

Stewardship Centre for BC Green Shores Partnership, Victoria BC

Since 2005 Archipelago has partnered with the Stewardship Centre for BC in the development and implementation of Green Shores (stewardshipcentrebc.ca/green-shores-home), a credit and rating program for sustainable coastal design and development. The Green Shores program provides resources and tools for coastal landowners and managers to minimize development impacts and restore coastal ecosystem function to coastal sites, by promoting the incorporation of valued ecosystem services.

Green Shores is based on four Guiding Principles:



Preserve the integrity or connectivity of coastal processes.



Maintain or enhance habitat diversity and function (on a local or regional scale).



Minimize or reduce pollutants to the marine environment.



Reduce cumulative impacts to the coastal environment.

Archipelago's key role in this program has been leading and coordinating the Technical Working Group which developed the Green Shores for Coastal Development rating system for larger coastal developments and Parks as well as Green Shores for Homes, a credit and rating system for single waterfront properties currently being implemented in British Columbia and Washington State. In addition, Archipelago staff provide training in these two rating systems through the University of British Columbia Continuing Studies program.

Our planning services encompass the all stages of **Planning, Design, Permitting, Analysis, Mitigation, Remediation and Auditing**.

Core planning services include:

- Responsible coastal planning for long-term sustainability
- Developing Environmental Management and Protection Plans (EMP, EPPs)
- Sustainable shore design, restoration, and enhancement
- Regulatory Compliance and Permitting
- Habitat sensitivity analysis
- Water and Sediment Quality Sampling and Screening against provincial/federal guidelines
 - *Canadian Councils of Ministers of the Environment (CCME)*
 - *British Columbia Guidelines for the Protection of Environmental and Human Health*
- Protection of Aquatic Life.
- Identification and habitat mapping using Geographic Information System (GIS) tools
- Habitat Offsetting
- Ecological Risk and Contaminant analysis and their effect on benthic communities
- Environmental Monitoring and Construction Mitigations





Habitat Assessments

We specialize in evaluating ecosystems to provide comprehensive insights into biodiversity, environmental health, and sustainability. Archipelago's experience and knowledge of marine, nearshore, aquatic and terrestrial ecosystems play a crucial role in conducting baseline and impact studies and developing effects assessments. We work closely with regulators, assessors, and industry in designing surveys and developing technical reports to meet specific objectives and requirements.

Archipelago has developed a range of innovative tools (including widely used standard classification methods for nearshore inventory) that have proven invaluable in habitat assessment and planning applications internationally. We gather data on sediment, water, and organisms; examine ecological communities and environmental factors to evaluate possible interactions; identify contaminants stressors and assess their potential impact on ecosystems. Pollution, habitat destruction, noise, and loss of habitat and biodiversity loss are key considerations when planning for infrastructure projects.

Our team includes biologists with extensive knowledge of marine mammals within Canadian waters and abroad and underwater acoustics. Decades of collective staff experience will help to navigate project complexities with regards to marine mammals.



CASE STUDY

Environmental Assessment for Offshore Wind Project – Haida Gwaii B.C.

Located off the coast of British Columbia's Haida Gwaii islands in Hecate Strait, the site of the proposed NaiKun wind energy project is said to offer some of the strongest and most consistent winds anywhere in the world—ideal conditions for a renewable energy initiative of this type. This region is also highly valued by residents and visitors alike for its natural beauty and unspoiled wilderness.

For this project to proceed, NaiKun would first need to complete a thorough habitat assessment in accordance with provincial and federal regulatory requirements. Archipelago undertook the marine ecology component of this assessment, working closely with a multidisciplinary team of industry experts from Hemmera and Pottinger Gaherty Environmental Consultants.



CASE STUDY

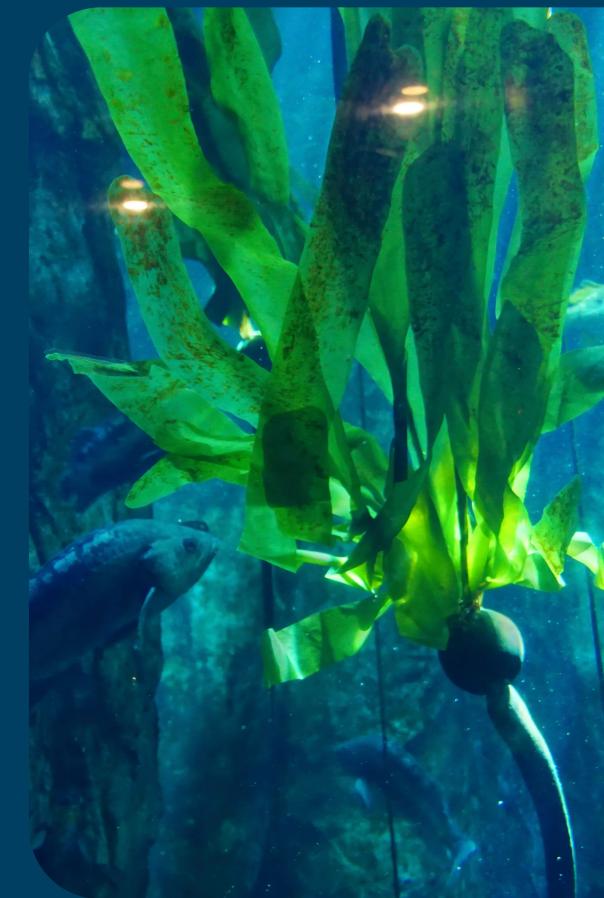
Kelp Salvage, Recolonization & Mitigation of Temporal Habitat Loss – Victoria, BC

Defense Construction Canada, on behalf of the Department of National Defense (DND), undertook dredging in Constance Cove, Esquimalt Harbour, as part of DND's multi-year, harbour-wide sediment remediation program. One of the mitigation measures recently implemented with the Constance Cove remedial dredging is the salvage of understory kelp within the project's dredge footprint prior to the dredging; the relocation of salvaged material to a temporary storage area and restocking once construction is complete.

This work has been conducted on an ongoing basis since 2017 by Archipelago in collaboration with SNC Lavalin and SLR Consulting. These kelp salvage measures are intended to address impacts on temporal fish habitat loss due to dredging activities in an area with an existing kelp bed, and to reduce the succession time required for a disturbed area to return to a functioning kelp habitat. Understory kelp provides important functions supporting the productivity of local fish such as Pacific herring, rockfish, Pacific salmon, greenling, sea perch, among others. The understory macro algae *Saccharina latissima* (sugar kelp) was the primary target species for salvage in areas within the dredge footprint. During storage of salvaged kelp and substrate, kelp enhancement lines, employing locally developed kelp cultivation techniques, were installed to provide an additional source of spores to inoculate the salvaged substrate, as well as provide additional temporary fish habitat during construction activities.

Our habitat assessment services include:

- Third-party review of habitat assessment-related documents
- Coastal species and habitat surveys, mapping, and classification
- Mitigation strategies and input to sustainable project design options
- Intertidal and subtidal habitat characterization
- Statistical and Biodiversity Analysis
- Biological sampling (biometric, tissue/otolith sampling)
- Species Surveys – Biodiversity, Species At Risk
- Vegetation Surveys
- Fish Assemblage, Forage Fish & Beach Spawning Surveys
- Long-term habitat monitoring and ecological function evaluation
- Marine Mammal Assessment and Mitigation



We use the following tools to assist us in our assessment work:

- Aerial surveys (ShoreZone) and drone surveys
- Towed underwater video surveys and dive surveys
- Electronic Monitoring
- QEP Commercial Diving
- Habitat Mapping and GIS/Spatial Planning for detailed ecosystem visualization



Environmental Monitoring

As part of a sustainable development strategy, Archipelago can monitor the environment before, during, and after construction activities to help minimize any disruption to local marine habitat. Archipelago also offers long-term environmental monitoring services to evaluate the effectiveness of habitat offsetting, measure environmental change, and assess ecosystem health.

Construction Projects

Our staff have worked closely with industry and proponents to develop and implement construction projects locally, throughout Canada, and internationally. Our team develops and implements mitigation strategies, ensuring the environmental impacts are minimized and regulatory requirements are fully met. We have extensive direct experience with a variety of construction activities including:

- Docks
- Foundations
- Sheet Piles
- Pile Driving
- Cofferdam
- Bridging
- Rotary & Directional Drilling
- Bubble & Silt Curtains
- Dredging
- Blasting
- Cables
- Shore Stabilization
- Coastal Engineering
- Contaminants and Capping
- Concrete
- Water Treatment & Dewatering
- Habitat Restoration and Enhancement
- Remediation & Compensation
- Wetland Conservation and Restoration
- Soil/Sediment Confirmatory Sampling
- Underwater noise monitoring
- Water quality monitoring
- Mammal Observation / Mitigation

Marine Monitoring Services

- Client, construction contractor and regulatory agency liaison
- Environmental management plan development and third-party review
- Environmental construction monitoring and post-construction impact assessment
- Habitat construction monitoring (before and during program design and implementation)

- Change detection studies (e.g. monitoring change in eelgrass over time)
- Long term marine ecosystem health monitoring
- Video survey monitoring and interpretation



CASE STUDY

Long-Term Monitoring for Esquimalt Graving dock, Victoria BC

Archipelago was contracted by the Fraser River Pile and Dredge on behalf of Public Services and Procurement Canada to provide environmental monitoring services during the South Jetty Reconstruction project at the Esquimalt Graving Dock in the Greater Victoria area. Archipelago monitored the marine environment during in-water construction to identify possible risks or impacts to the environment, and to ensure the work was being carried out in accordance with regulatory and contractual obligations. To meet these criteria, Archipelago staff monitored and documented: water quality; acoustic levels; marine fish and wildlife presence; environmental incidents and mitigation; best management practices; and site cleanliness.

Daily and weekly reports were prepared throughout the duration of the project for in-water construction activities. Archipelago employed and reported on data collected using multiple survey methods during environmental monitoring. In-situ water quality measurements were recorded and assessed using a CTD instrument. Water samples were collected and submitted for lab analysis using Niskin bottles. Construction sound levels were measured and assessed using a hydrophone. Marine fish and wildlife within the work area were documented from the research vessel. Upon the project's completion in 2020, Archipelago prepared a final report summarizing monitoring data collected, construction activities, environmental management mitigation measures, additive measures, and recommendations.

CASE STUDY

Kitimat LNG Environmental Marine Monitoring Program

Archipelago was involved in three rigorous survey programs:



Ecosystem Health Assessment



Long Term Monitoring Program



Biodiversity Monitoring and Assessment Program (BMAP).

The Ecosystem Health Assessment was developed to use biological indicators to benchmark the health of the local marine ecosystem prior to development. The Long-Term Monitoring Program centered on the collection and analysis of synoptic water, sediment, and biota quality data in Bish Cove, Emsley Cove (as a reference site), Kitimat Arm, and two nearby creeks. BMAP was an interdisciplinary initiative between Archipelago, University of Northern British Columbia, and the Smithsonian Institute. This initiative was developed to gather information about the status and trends of habitats, ecosystems and species at the project location before, during and after construction. During this work Archipelago collaborated with Haisla First Nations on the technical field surveys.



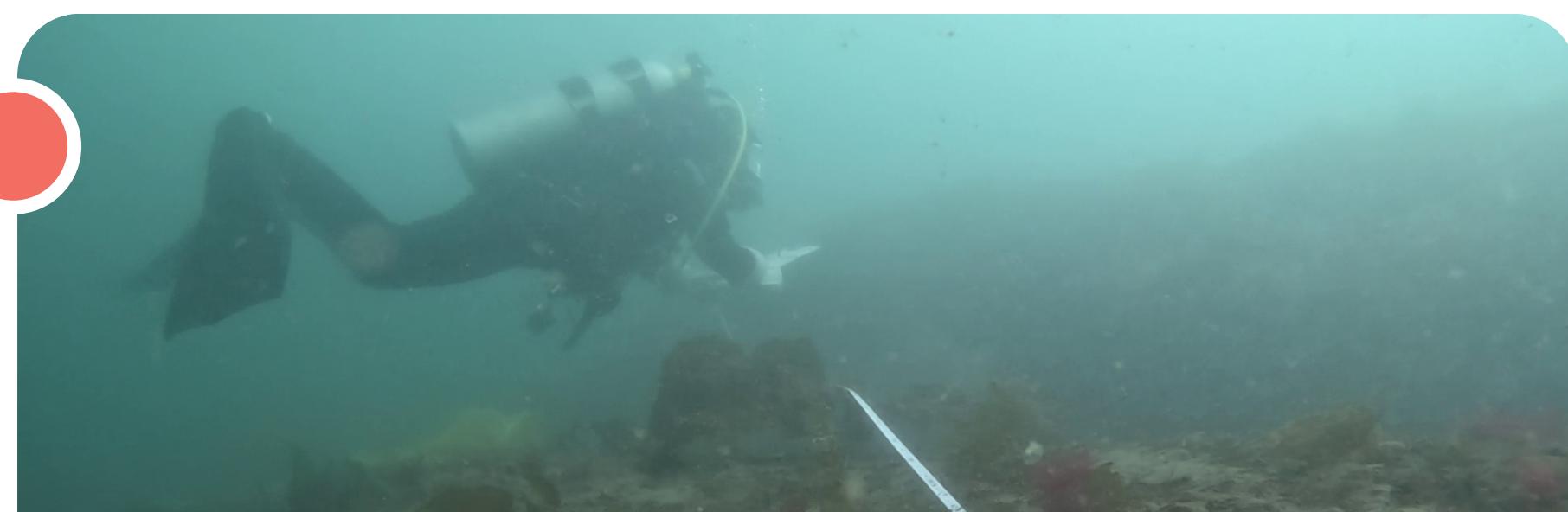
Commercial Diving Expertise

Since the 1980's, Archipelago has been conducting scientific dive programs throughout BC, Canada, and internationally. In order to appropriately staff projects, we choose vessel types and diver specialists to best meet the demands of each project. Our science-focused team includes QEP biologists and we often incorporate subcontracted professional divers into projects. Archipelago-led programs have previously included jet-probing, sediment coring and sampling, as well as surface-supply dive biophysical surveys where SCUBA precludes access.

Core Services

- Biophysical surveys (abundance, distribution, and diversity metrics)
- Biodiversity specialists capable of identifying 200+ species
- Habitat compensation and offset habitat stability assessments
- Species-At-Risk identification and relocation
- Sensitive habitat mapping (e.g. eelgrass, kelp, clam beds)

- Collection of organisms for tissue sampling
- Aquatic life salvage and husbandry
- Underwater survey design
- Rockfish surveys
- Debris surveys and removal
- Sediment sampling, coring, and Residuals Management Cover assessment



Certifications

The Archipelago Environment Services team have the following professional certifications:

WORK SAFE BC

SCUBA

Archipelago's in-house SCUBA team is commercially certified in accordance with provincial WorkSafe BC Regulations Part 24 and Canadian Standard Association Z275:4-22 standards.



RPBio

Our team includes registered professional biologists (RPBio) / Qualified Environmental Professionals (QEP) who specialize in applying proven solutions and effectively navigating challenges through all stages of a project lifecycle — from initial concept to final execution.



QEP

A QEP (Qualified Environmental Professional) in BC is a registered professional biologist (RPBio) or Registered Biology Technician (RBTech) accredited by the BC College of Applied Biologists who have specific expertise and qualifications in biology and environmental sciences.



MMO

Marine Mammal Observers are certified in:

- **JNCC** Marine Mammal Observer,
- **BOEM/BSEE** Protected Species Observer, and
- **JNCC** Passive Acoustic Monitoring



Our Experience

The Environmental Services division specializes in ecosystem functions while also leveraging our in-house Electronic Monitoring and Fisheries Monitoring Services division staff to drive innovative software and hardware solutions. We further enhance our capabilities through a trusted network of interdisciplinary experts—from First Nations custodians and government policy advisors to coastal engineers, GIS specialists, architects, taxonomists, environmental scientists, human health specialists, archaeologists, engagement experts, and analytical chemists—ensuring comprehensive, value-driven solutions for diverse project needs.

Our science-focused dive team includes biologists with extensive knowledge of flora and fauna. 100+ years of collective staff experience will help to navigate the requirements and challenges of your project.



Specialized Tools and Equipment

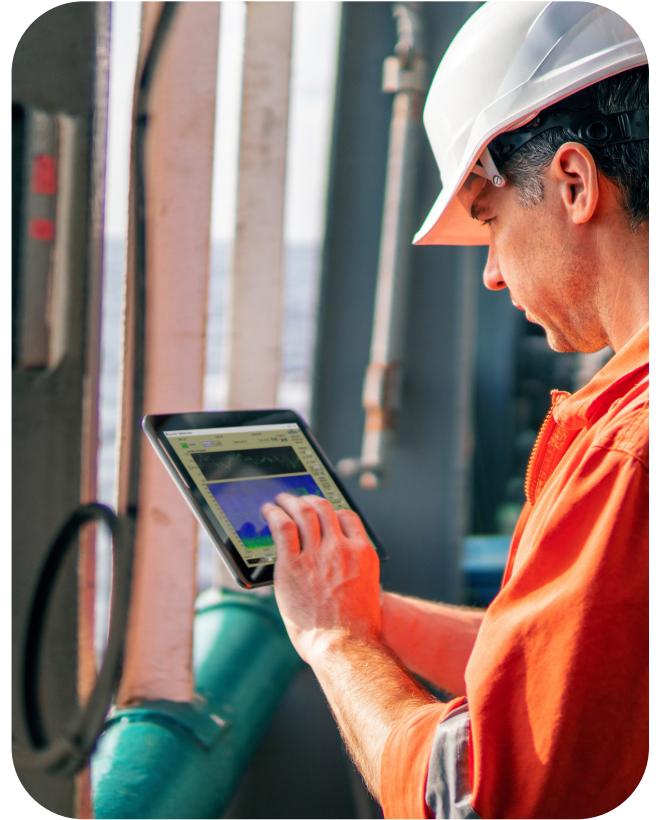
In support of our Assessment and Monitoring programs Archipelago brings the following specialized tools and equipment:

GIS - Digital mapping and geospatial data is crucial for effective resource management. Archipelago combines the latest Geographic Information Systems (GIS) technology with a broad suite of equipment to collect, analyze, and interpret real-world features to develop meaningful outputs that convey complex interactions.

Passive Acoustic Monitoring allows us to monitor anthropogenic noise against established injury thresholds for the protection of marine mammals and identification of marine mammal acoustic signatures.

Specialized Equipment

- Certified vessels with davits, winches & advanced navigation
- Full-face diver masks with through water-communications
- Diver-to-Surface-GPS platforms for underwater positioning
- Sediment samplers and corers
- Multi-depth water samplers
- Diver-operated underwater HD cameras
- Underwater towed video
- Hydrophones and sonar
- Drone and LiDAR surveys
- Jet-probing



Archipelago

Archipelago Marine Research is a global provider of sustainable marine resource management products and services. From its headquarters in Victoria, British Columbia, the company's team of 80+ industry professionals help fisheries, coastal communities, NGOs and government organizations around the world to implement sustainable practices through at-sea and dockside observer services, electronic monitoring programs, and environmental services.

Over the past 5 decades, Archipelago has addressed a wide range of environmental and fisheries management challenges, working with a wide range of fishery types, target species, gear types, geographic locations, technological complexities, and organizations.

Through an ongoing commitment to our shared ocean resources - and to the businesses, communities and individuals that rely upon them - Archipelago is helping to drive positive change on a global scale. We support sustainable practices for marine resource management by providing an objective, third-party approach that meets the needs of all stakeholders.

Established in 1978 and headquartered in Victoria, BC, Archipelago has regional office in Canada, the United States, and Asia Pacific. To learn more contact us at:



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