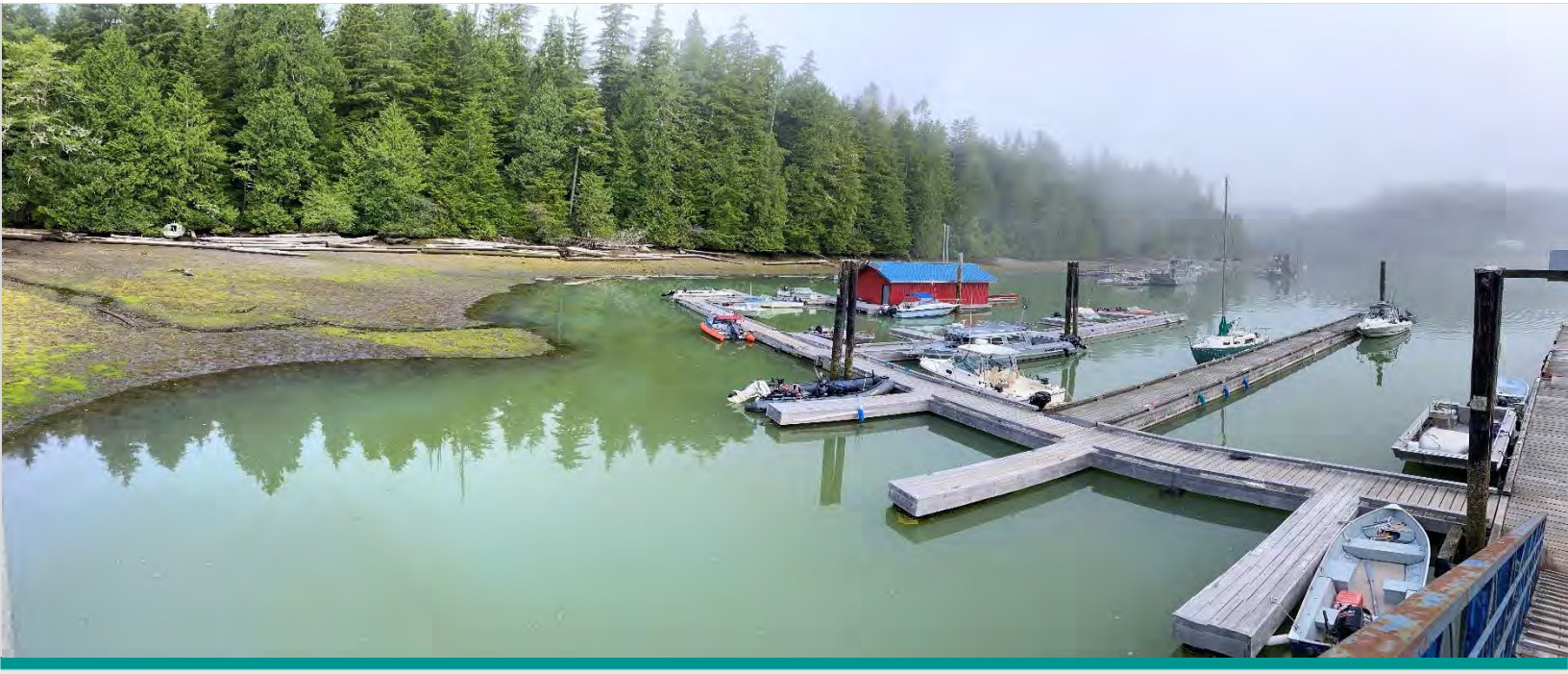
Appendix 'B'
RFP - GWR10-26

McElhanney

BEST MANAGED COMPANIES
Platinum member



Environmental Assessment – ACRD Marine Tenure Expansion, Grappler Inlet, BC.

August 2025 | F0

Submitted to: Alberni-Clayoquot Regional District

Prepared by McElhanney

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List of Acronyms Used

BC	British Columbia
BGC	Biogeoclimatic Zone
BMP	Best Management Practice
COSEWIC	The Committee on the Status of Endangered Wildlife in Canada
CDC	Conservation Data Centre (BC)
CRA	Commercial, Recreational, and Aboriginal Fisheries
CRIMS	Coastal Resource Information Management System
DFO	Fisheries and Oceans Canada
EIA	Environmental Impact Assessment
ENV	Ministry of Environmental and Climate Change Strategy
FAA	Fisheries Act Authorisation
HADD	Harmful Alteration, Disruption or Destruction of their Habitat
HWL	High Water Line
IBA	Important Bird Areas
MBCA	Migratory Bird Convention Act
MOE	Ministry of Environment (BC)
NWA	Navigable Waters Act

PoE	Pathway of Effects
QEP	Qualified Environmental Professional
RFR	Request for Review
SARA	Species at Risk Act
SEI	Sensitive Ecosystem Inventory

Executive Summary

McElhanney Ltd. was retained by the Alberni-Clayoquot Regional District to provide environmental services to support the expansion of a marine tenure in Grappler Inlet, Bamfield, BC. A field assessment (including intertidal and subtidal zones) in combination with a comprehensive desktop review of available database records for the wharf and the surrounding area (the Study Area) were completed by a Qualified Environmental Professional (QEP) to identify potential environmental sensitives.

The ACRD currently has a tenure for the use of Crown Land for the Centennial Park boat launch and moorage in the south-west corner of Grappler Inlet. The existing structure which consists of a marina and boat moorage is currently built outside of the jurisdiction of the existing, approved tenure. McElhanney understands that the ACRD are in the process of applying for an expansion to the tenure to incorporate the area where the marina and moorage currently sits. It is anticipated that repairs/upgrades to some of the moorage within the proposed tenure will take place at some point in the future, thus this assessment included a general assessment of impacts.

The Site was evaluated for potential marine aquatic habitat and habitat values for algae, marine invertebrates, marine mammals, and fish. The habitat in the Study Area can be considered high-quality value for fish habitat and is primarily used for shelter for fish and invertebrate species, as well as supporting a productive clam bed. There is eelgrass habitat within the Site, which is considered high-quality value habitat.

The waters around the Site host a variety of marine mammal, fish, and bird species, including Pacific salmon, herring and marbled murrelets. Any potential construction works for the repair or replacement of the marina should carries a risk of impact to these species through acoustic disturbance.

This report will require updates as planning and design progresses to accurately assess potential impacts and permitting needs in relation to the potential future repairs. High level mitigation strategies have been outlined to avoid or reduce environmental effect. Once a design for the moorage upgrades has reached substantial completion, this report will be updated into an Environmental Impact Assessment (EIA). The EIA can be used to support the Fisheries and Oceans (DFO) permitting process and can also be included in the tender documents. In addition, it will be used to provide a framework to develop a Construction Environmental Management Plan (CEMP), written by a QEP. Site specific environmental mitigation strategies will be planned and addressed in the CEMP.

1. Introduction

McElhanney Ltd. (McElhanney) was retained by the Alberni-Clayoquot Regional District (ACRD or the Client) to provide environmental services to support the expansion of a marine tenure in Grappler Inlet, Bamfield, BC, herein referred to as the Site (see *Figure 1*).

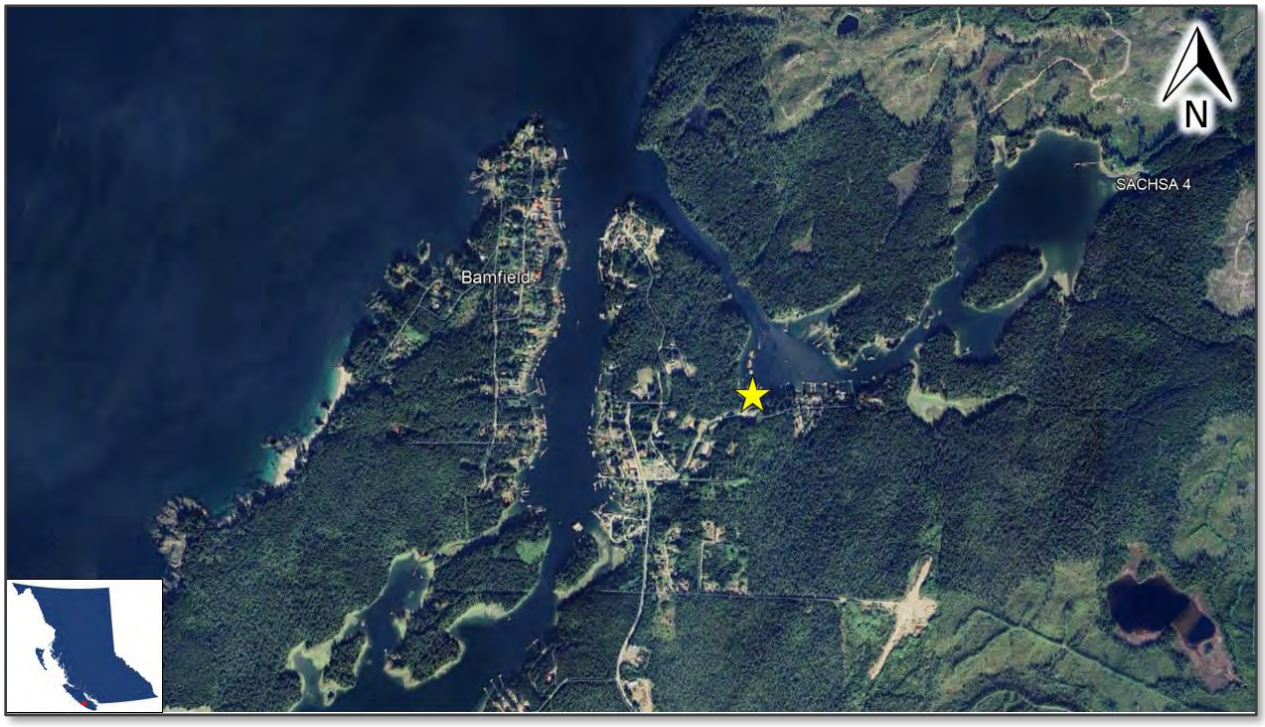


Figure 1. The general location of the ACRD marine tenure site located in Grappler Inlet, Bamfield, BC.

1.1. BACKGROUND

The ACRD currently has a tenure for the use of Crown Land for the Centennial Park boat launch and moorage in the south-west corner of Grappler Inlet (Crown Land File 0315419), *Figure 2*. The marine tenure is an agreement that grants the holder the right to use Crown land for marine activities such as that of the moorage. The existing structure, which consists of a marina and boat moorage, is currently built outside of the jurisdiction of the existing, approved tenure. McElhanney understands that the ACRD are in the process of applying for an expansion to the tenure to incorporate the area where the marina and moorage currently sits (see *Figure 2*).



Figure 2. The existing tenure (yellow polygon), comprised of Crown Land File 0315419, and the proposed new tenure area (red polygon) referred to as the Site.

As part of the application, the Land Authorization Division (LAD) requires the completion of an Environmental Assessment (EA) that details existing conditions and marine ecological sensitivities at the Site and the surrounding area, that may be impacted by future development or upgrades works. Upgrade works to part of the structure is required, specifically the firehall dock, however the timeline and specifics of design are unknown at this time. The LAD have specified that an impact assessment and specific mitigations be included with the tenure application. This EA report will include high level recommendations for mitigations; however, impacts cannot be fully assessed until a design for the upgrades is available.

A site visit was conducted in July 2025 by a McElhanney biologist/Qualified Environmental Professional (QEP), to undertake an assessment of the marine habitats within the Site as well as to document the surrounding environmental features in the area. An intertidal survey was completed at low tide and a drop-camera was used to document the subtidal conditions along the existing dock, where possible. The drop camera survey aimed to identify the surrounding marine environment including any marine biota that may be present, the substrate types present on the seabed, and any environmentally sensitive features that may be indirectly impacted by potential construction works at the Site. In addition, a comprehensive desktop review of available records for the Site and surrounding area (the Study Area) were completed to identify potential environmental sensitivities. The findings of these investigations are summarized in this report. A

heavy algal bloom was ongoing in the surrounding waters of Bamfield and other locations along the west coast of Vancouver Island during the field assessments.

1.1.1. General Environmental Setting

The Site is in a small bay on the south-western side of Grappler Inlet that is characterized by an intertidal marine ecosystem and subtidal marine ecosystem. Grappler Inlet is situated in the inshore waters of Barclay Sound and has experienced little to no recent development. The ecosystems present are representative of natural, pristine conditions. Marine disturbances would have occurred historically during the construction of the existing dock and boat launch; however, due to the passage of time and the lack of anthropogenic influences at the Site, there were no remnants of disturbance observed.

1.2. OBJECTIVES

This EA was conducted to identify environmentally and ecologically sensitive features within the Study Area. The objective was to gather environmental data through a desktop review of existing information, and a field survey focused on the intertidal and subtidal zones. By identifying sensitive features, the assessment provides guidance on potential environmental impacts and recommends mitigation strategies to avoid or minimize disturbances resulting from the construction activities.

1.3. SCOPE OF WORK

The scope of work consisted of an assessment of the Site and surrounding area as identified above in ***Error! Reference source not found.***. The study consisted of two key components, including the review of existing project information and publicly available historical data (desktop study) and verification through a Site visit. The objective of the desktop review and field assessments were to identify existing habitat conditions and sensitive habitats (e.g., eelgrass beds or bivalve beds), commercial, recreational, and subsistence fisheries (CRS) species in order to determine the risk of harmful alteration, disruption and destruction (HADD) to these species, and species at risk (SAR) that may be present within the Study Area.

The scope of this investigation included the following:

- Conduct desktop and field investigation within and around the Site to provide a detailed description of biological and physical characteristics including:
    - Description and physical characterization of the marine environment,
    - Fish habitat features, and fish species characterization,
    - Wildlife and wildlife habitat features, including marine mammals and birds, and
    - Identification of the presence of habitat for endangered, threatened, or vulnerable species provincially or federally through species at risk database searches.
- Provide a report summarizing:
    - The findings of the desktop and Site visit,
    - Identification of potential impacts related to potential moorage upgrades,
    - Recommended measures to avoid or mitigate impacts on sensitive environmental components,

This EA identifies potential environmentally valuable resources (EVRs) and a high-level review of regulatory requirements for potential works within the proposed tenure area.

2. Methodology

The Study Area for the field assessments included a 100 m setback along the foreshore and included the immediate area around the moorage structures for the drop-camera assessment. Database queries however, included a 2.5 km search area to capture species that may move throughout the area that may not be encountered during the field assessments.

2.1. LITERATURE REVIEW

Web based sources of information reviewed in the desktop literature review included:

- iMap BC 4.0 (iMapBC, 2024) to identify sensitive ecosystems, species at risk, and fish and wildlife habitat records,
- BC Habitat Wizard (Province of BC, 2024) for information regarding fish and fish habitat,
- BC Conservation Data Centre (CDC) (BC CDC, 2023) database Species and Ecosystems Explorer,
- BC Coastal Resource Information System (CRIMMs) (Province of BC, 2021) to identify sensitive marine habitats including, the presence of eelgrass and kelp beds, CRA fisheries, herring spawning grounds, and clam beds,
- DFO Aquatic Species at Risk Map (Government of Canada, 2021),
- Sensitive Habitat Inventory Mapping (Community Mapping Network, 2021) to identify sensitive marine habitats the presence of eelgrass and kelp beds, CRA fisheries, herring spawning grounds, and clam beds, and,
- Alberni Clayoquot Regional District iMap (ACRD, 2025).

Both the federal and provincial governments provide lists of species that are designated ‘at risk’. The federal government identifies species that are extirpated, endangered, threatened, or of special concern in Canada (Government of Canada, 2002). Listed species and their critical habitat are protected under *SARA*. Known critical habitat for federally listed aquatic species can be reviewed the Fisheries and Oceans Canada (DFO) SAR Mapping system. The Study Area was evaluated for known critical habitat for federally listed species at risk as well as an assessment of the availability of potential critical habitat following the site assessment.

2.2. GENERAL SITE ASSESSMENT

A field assessment was conducted by McElhanney QEP on July 12, 2025. The assessment consisted of an intertidal survey and subtidal assessment performed using a drop camera. The camera footage was subsequently reviewed to identify marine biota and substrates present. As mentioned previously, the inshore waters of the west coast of Vancouver Island including Ucluelet, Bamfield, and Grappler Inlet were undergoing a heavy algal bloom during the field assessment. The algal bloom had been occurring in the area for the week leading up to the field assessment and continued for weeks after. It is unclear how the bloom impacted the diversity of species observed, however, from discussions with recreational fishers in Bamfield, the QEP confirmed that it did not appear to be impacted fishing in the area. Visibility was affected during the subtidal assessment.

The Study Area was reviewed for evidence of wildlife including clam shows, nests, scat, and tracks during the field visit. Wildlife and wildlife habitat were assessed for listed (federally and provincially) mammals and birds.

2.3. INTERTIDAL

The intertidal survey was conducted under the DFO Marine Foreshore Environmental Assessment Procedures (Fisheries and Oceans Canada, 2003). Transects were established perpendicular to the low water line (LWL) as seen in *Figure 3*. Visually the habitat was homogenous throughout the survey area. Eight transects were completed across the intertidal zone to account for full coverage of this area and identify any sensitivities and habitats that may be present in and around the new tenure area.

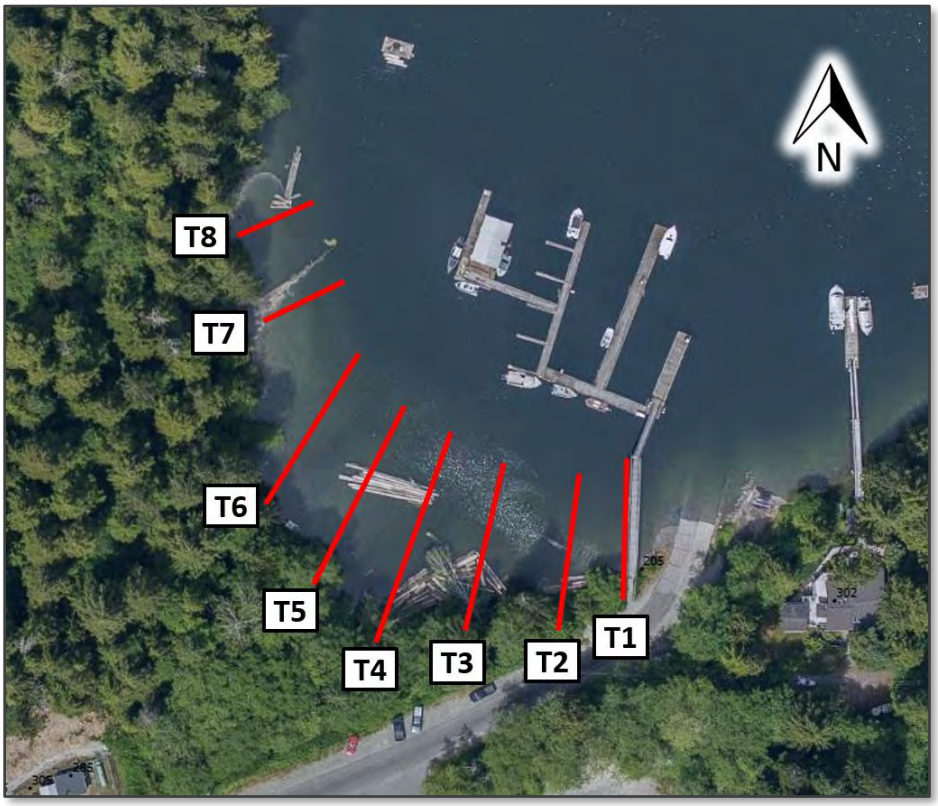


Figure 3. Approximate locations of transects (T1-T8) completed during the intertidal surveys. The image does not represent the tides during the field assessment.

The distance from the high-high water line (HWL) and LWL was measured for each transect using a measuring tape. A 0.25 m^2 quadrat (0.5 m x 0.5 m) was used to assess the marine biota every 5 m along the transect, or when obvious habitat changes occurred. Within each quadrat the following information was recorded; quadrat position in metres, substrate type and cover (%), vegetation cover (%), sessile invertebrate cover (%), and mobile invertebrate presence or absence (number of individuals). Substrate type and classification was determined using a generalized classification guide (see *Table 1*).

Table 1. Substrate Types and Classification

Substrate type	Size Range (diameter)
Bedrock/Boulder	>256 mm
Cobble	64 – 256 mm
Gravel	2 – 64 mm
Sand	0.062 – 2 mm
Silt/Clay/Mud	<0.062 mm

Substrate cover was estimated as a percentage out of a total of 100% and was rounded to increments of 5%. In addition, vegetation cover was also recorded as percentage cover. Observations were recorded in increments of 5%. Other features present in a 1 m radius of the quadrat were recorded (driftwood accumulations, waste material, etc.) and a photograph was taken of each quadrat.

2.4. SUBTIDAL

The proposed tenure area was partially located within subtidal conditions. To assess whether environmentally sensitive features were present in the proposed area, a drop camera assessment was completed. This was completed using a drop camera (GoPro) which was used to identify habitat characteristics of the seabed immediate adjacent to the existing wharf structure. Six camera transects were completed in addition to one stationary camera drop, to capture the environmental setting in the area around the existing dock structure (see *Figure 4*). The camera footage obtained was subsequently reviewed by McElhanney's QEP to verify species present, and the habitat and substrates provided within the Site.

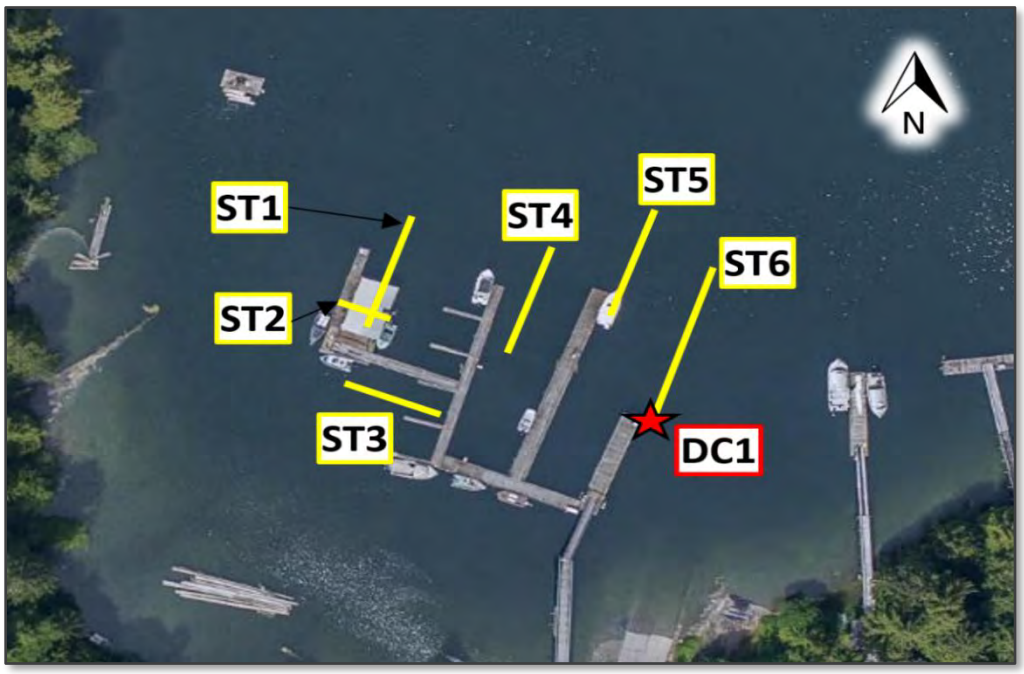


Figure 4. Approximate locations of subtidal camera drop and transects completed during the subtidal survey. Transects are shown in yellow, the stationary drop camera (DC) is shown in red.

3. Environmental Setting

3.1. CLIMATE AND RAINFALL

Climatic conditions at the Site were inferred based on data provided by Environment Canada, Canadian Climate Normals 1971-2000 (Government of Canada, 2025). Recorded climate conditions from the Bamfield East Station were considered representative of the Site, based on their proximity to that station. Average daily temperatures by month recorded between 1971 and 2000 ranged between 4.6 degrees Celsius (°C) in December to 15.2 °C in August. Annual precipitation was 2920.0 mm with monthly average lows of 53.4 mm in July and highs of 474.9 mm in November.

3.2. SHORE TYPE

A comprehension of the substrates and shorelines present within the Study Area is crucial to identify fish habitat and marine sensitive habitats. The substrates within the Study Area were quantified during the intertidal and subtidal surveys. The Study Area was characterized by a tidal mud flat that extended to the north-west and south-east of the existing marine tenure. A freshwater source (identified likely as storm water run off) was present to the east of the Site. The upper intertidal was dominated by a large quantity of log debris. The flats were comprised mostly of soft sediments dominated by mud and transitioned to a sandier mud to the west of the freshwater source. These substrates continued subtidally. A low diversity of marine algae was observed, with varying densities of algal bands observed primarily in the mid-intertidal zone. The habitat present was observed to support clam species, which were observed to the mid to low intertidal and subtidal zones.

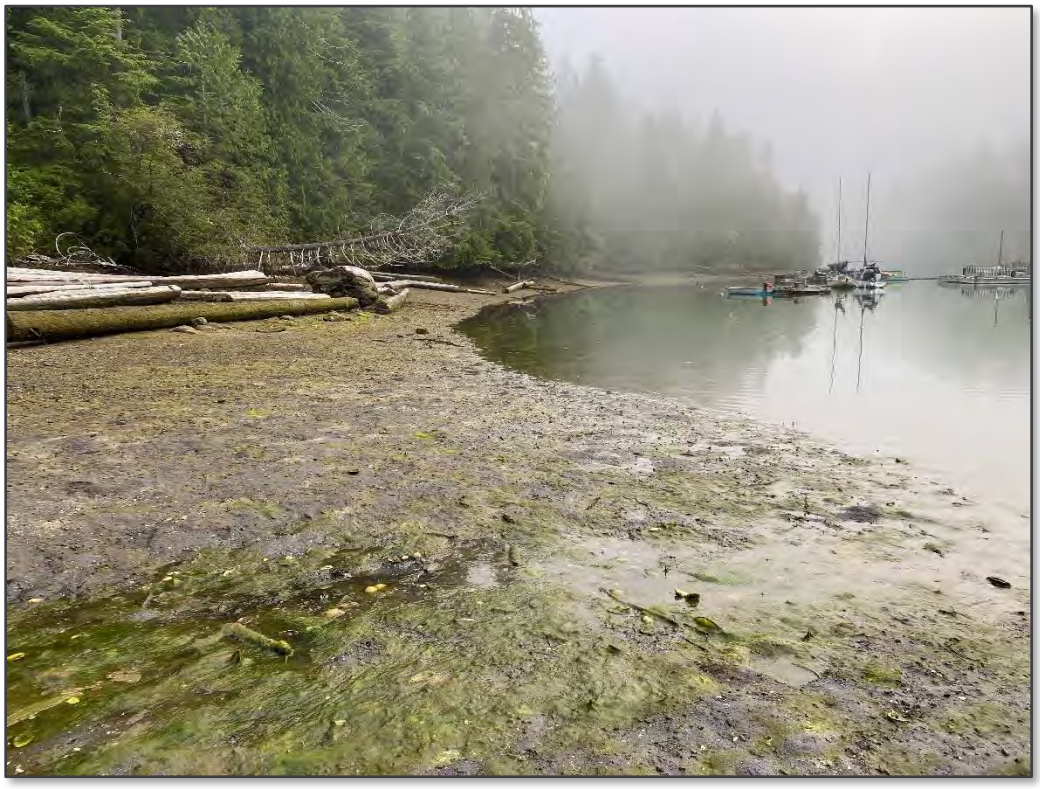
The BC Coastal Resource Information Management System (CRIMS) provides mapping of the distribution of shoreline types along Coastal BC. This mapping supports the observed shoreline classification. CRIMS defines the shoreline type present within the Study Area as a mud flat that transitions to a rock cliff to the north-west. The existing conditions of the shoreline characteristics are shown in *Photographs 1* through *5*.



Photograph 1. View of the tidal mud flat with large algal band throughout the intertidal zone, facing south-east.



Photograph 2. View of freshwater run off through the mud flat habitat, facing the north-west.



Photograph 3. View of the tidal mud flat facing the north-west. Dense forest borders the intertidal zone.



Photograph 4. Mud substrates dominated the entirety of the intertidal zone.



Photograph 5. Dense patches of filamentous green algae overlaying mud substrates.

3.1. TIDAL ELEVATION

Tidal charts from Bamfield (Station #08545) were considered the closest representation to the Site. Tide charts for 2023 show the annual semidiurnal tidal fluctuation range was between a minimum of 1.03 m to a maximum of 3.01 m, with a mean water level of 2.01 m (Government of Canada, 2025). During the July 2025 field assessments, the semidiurnal tides fluctuated between 0.2 m and 2.7 m. This captured low tidal conditions for the shoreline during the assessment.

4. Marine Resources

4.1. VEGETATION

Overall, a low diversity of algae was observed across the Study Area, with the majority concentrated throughout the mid-intertidal zone (see *Photograph 6*). Filamentous green algae (*Cladophora* spp.) was the most abundant species observed. The mid-intertidal zone was largely covered in filamentous green algae, with some patches observed along the lower intertidal. A small patch of eelgrass (*Zostera marina*) was observed in the mid intertidal zone amongst a high density of filamentous green algae. Macro algae species observed can be found in *Table 2*.



Photograph 6. Algal bands consisting predominately filamentous green algae (red polygons) were concentrated within the mid-intertidal zone with some patches in the lower intertidal.

Table 2. Algae species observed during the field assessment.

Common Name	Scientific Name	Type
Rock weed	*Fucus distichus*	Brown
Japanese wireweed	*Sargassum muticum*	Brown
Eelgrass	*Zostera marina*	Seagrass
Sea lettuce	*Ulva spp.*	Green
Filamentous green algae	*Cladophora spp.*	Green

4.1.1. Eelgrass

There was no mapped eelgrass beds identified through the review of web-based databases, including CRIMS (Province of BC, 2021). Eelgrass was however observed during the intertidal assessment in the mid-intertidal zone (*Figure 5*). The eelgrass was observed in a small patch of strands varying in length from 10 to 30 cm (see *Photograph 7*). There was no other eelgrass observed during the intertidal assessment. Poor visibility conditions during the subtidal assessment due to the algal bloom prohibited any identification of eelgrass subtidally. It is possible that this small patch of eelgrass was an isolated patch, however, a site-specific assessment will be required for the moorage upgrades to determine if eelgrass is present in that specific footprint.



Photograph 7. Strands of eelgrass observed in the mid-intertidal zone.



Figure 5. Approximate location of eelgrass (yellow star) observed in the mid-intertidal zone.

Eelgrass supports a complex web of interrelated creatures (Capital Regional District, 2019). Eelgrass grows at and below the LWL in up to 6 m of water. It is found in estuaries and sheltered bays with soft sediments. Eelgrasses provide habitat for many species including juvenile salmon, spawning herring, and crab species. It can also reduce coastal erosion. Eelgrass beds can be found in patch or continuous form. High density, continuous eelgrass beds support a much wider range of species and life stages. The presence of eelgrass of any capacity, such as that observed within the Study Area should be considered an environmentally sensitive resource.

4.2. FISH

No pelagic fish were observed during the subtidal survey; however, this could likely be due to the poor conditions from the algal bloom. Marine structures typically provide shelter and food for fish species such as perch and is it not uncommon to observe fish in these environments. A deceased sole was observed in the intertidal zone (*Photograph 8)*. A salmon shark (*Lamna ditropis*) was observed in the nearby Bamfield Inlet the day prior to the field assessments. No federally or provincially listed species of concern, or critical habitat for species of concern, were observed during the field assessments.



Photograph 8. Unconfirmed species of sole, likely slender sole, observed in the mud habitat along the lower intertidal zone.

The surrounding waters of Barclay Sound are known to support a variety of fish species including those that contribute to CRS fisheries. As fish are a mobile species, they should be considered when assessing the potential for impact. Focal species were identified for discussion using a review of available desktop information and a review of provincial and federal web-based databases. Barclay Sound supports large numbers of Pacific salmon due to its proximity to oceanic feeding grounds and significance in salmonid migratory routes; therefore, the Pacific salmon species are considered a notable species for discussion. Herring will also be discussed due to favourable habitats present in the surrounding waters.

4.2.1. Salmon

Salmon are an anadromous species whereby they migrate depending on their life stage; adult fish migrate upstream to their natal creeks and rivers to spawn. The juvenile salmon then migrate downstream and enter oceanic waters where they live until adulthood. The waters of the nearby Barclay Sound are rich fishing grounds for salmon fishing and are known to support the five species of Pacific salmon (*Oncorhynchus* spp.; sockeye [*O. nerka*], pink [*O. gorbushcha*], chum [*O.keta*], chinook [*O.tshawyscha*], and coho [*O. kisutch*]), and steelhead (*O. mykiss*) in their migrations to and from their spawning grounds.

The oceanic waters off the west coast of Barkley Sound including inlets such as Grappler Inlet, provide highly productive feeding grounds that support Pacific salmon throughout their migratory cycles (Land Use Coordination Office, 2001). Offshore areas, including key reef and upwelling zones, supply critical foraging habitat for salmon originating from rivers across the south coast. Consequently, Barkley Sound forms an important link in the migratory routes of multiple salmon populations. Within the Sound itself, several large inlets and river systems contribute to significant spawning runs, particularly for chinook, coho, and chum salmon, while smaller creeks also sustain localized populations. As in other regions of the west coast of Vancouver Island, salmonids may not consistently utilize nearshore habitats within Barkley Sound, and their presence is often incidental as they pass through the area to their natal spawning rivers and foraging grounds.

The salmon populations of British Columbia are currently under stress and considered to be in poor health (Pacific Salmon Foundation, 2024). Pacific salmon are, however, important economically, ecologically, and culturally in British Columbia. The presence of salmon in the waters surrounding the Site is dependent on the species and the time of year. Due to the critical role the wider area of Barclay Sound plays in salmonid migrations, and its proximity to the oceanic adult feeding grounds, salmonids should be considered an environmentally sensitive resource.

4.2.2. Pacific herring

Database searches and a literature review indicate that the waters around the Site have had a history of spawning locations for Pacific herring (*Clupea pallasii*) (see *Figure 6*). The habitat conditions in the area, in addition to the habitat preferences and life history strategies employed by herring, indicate that the surrounding waters of Grappler Inlet could support herring in varying stages of their life cycle.

Pacific herring are somewhat migratory, spending the summer months in offshore feeding grounds and moving into shallow more sheltered waters during the winter. They spawn in these sheltered coastal waters along 500 km of the coastline of British Columbia. Herring are cyclical and tend to return to the same areas to spawn each year (Hay, 1985). Spawning occurs on rooted algae and sea grasses in shallow waters of the intertidal and subtidal zones in the spring (Hamey, 1977), and schooling occurs in inshore waters during the winter months (Hay, 1985). Herring occupy the water column from the surface to depths of 400 m and exhibit a diel vertical migration pattern, remaining near the bottom during the daylight hours and moving to shallow waters to feed at night (Hay, 1985).

The presence of marine algae, particularly eelgrass, in the Study Area has the potential to support spawning habitat for herring. Additionally, the Inlet itself provides sheltered, calm waters, that may provide holding habitat during their winter movements. The potential for herring to utilize the habitats surrounding the Site should be considered an environmentally sensitive resource.

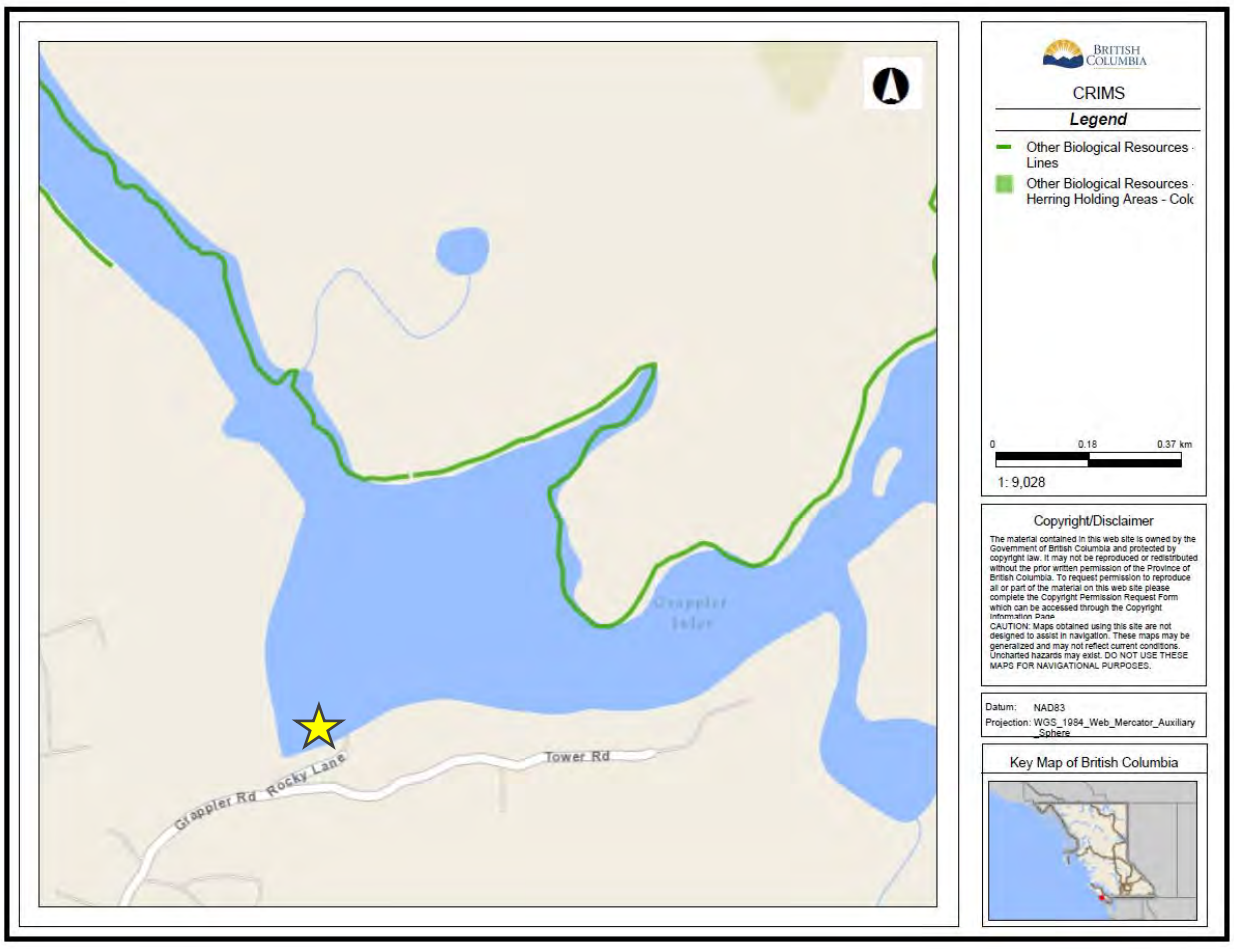


Figure 6. CRIMS mapping shows the coastline to the north of the site as a historical herring spawn area (green line).

4.3. INVERTEBRATES

A variety of invertebrate species were observed, both intertidally and subtidally. Clams (unidentified to species level) were the most abundant invertebrate species observed in both zones. Notable observations included ochre sea stars *(Pisaster ochraceus),* red rock crabs *(Cancer productus),* squid eggs and several moon snail (*Euspira lewisii*) egg casings*, see Photographs 9 to 11. Table 3* provides a complete list of invertebrate species observed within the Study Area during the intertidal and subtidal assessments.

Table 3. Marine invertebrate species observed during the field assessments.

Common Name	Scientific Name	Zone
Acorn barnacle	*Balanomorpha* spp.	Intertidal and Subtidal
Leather star	*Dermasterias imbricata*	Intertidal and Subtidal
Clam species	*Unidentified*	Intertidal and Subtidal
Moon snail	*Euspira lewisii*	Subtidal
Red rock crab	*Cancer productus*	Subtidal
Ochre sea star	*Pisaster ochraceus*	Intertidal
Bat star	*Patiria miniata*	Intertidal
Sea vomit	*Didemnum vexillum*	Intertidal



Photograph 9. Ochre sea star observed on log debris found in the upper intertidal zone.



Photograph 10. Several moon snail egg casings were observed in the lower intertidal and subtidal zones.



Photograph 11. Squid eggs observed in the intertidal zone to the west of the Site.

4.3.1. Clams

Database searches identified the waters to the north-east of the Study Area as a clam bed (*Figure 7).* Shell hash (debris) was observed throughout the Study Area in varying densities. Evidence of subsurface clams ("shows") was observed during the intertidal assessment, starting in the mid to low intertidal zone at Transect 14, and increasing in density towards the west to Transect 8 (*Photograph 12*). Clam "shows" are small circles visible in soft sediments that indicate the presence of a clam siphon below the surface. In addition, live specimens were observed along the lower intertidal and subtidal zones to the west of the Site.

Empty shells observed throughout the Study Area included littleneck clams (*Protothaca staminea*) and butter clams (*Saxidomus gigantea*). Littleneck clams are typically found in mixed substrates of gravel, sand, and mud, from the mid to lower intertidal zone (Government of Canada, 1999). Similarly, butter clams are found in a variety of mixed substrates, typically a mixture of small gravel, sand, and broken shell, in the lower intertidal zone and shallow subtidal zone (Government of Canada, 2021). The mud substrates observed clearly support habitat use for clam species. This has been identified as an environmentally sensitive resource.

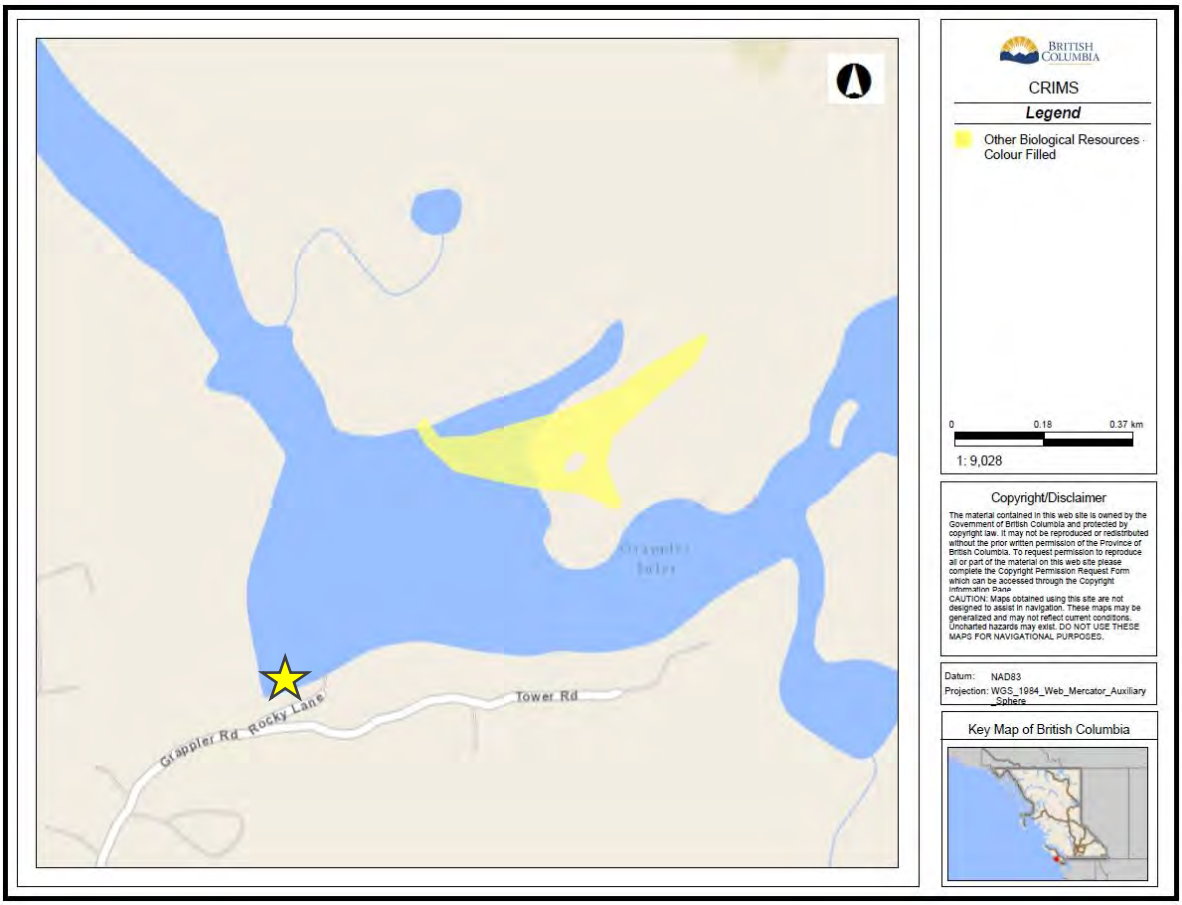


Figure 7. CRIMS mapping shows a mapped clam bed (yellow polygon) to the north-east of the Study Area (yellow star).



Photograph 12. Clam shows widespread throughout the mid to lower intertidal zone to the west of the Site.

4.4. BIRDS

A great blue heron (*Ardea Herodias*) was observed during the field assessment foraging in the mud flats. No other bird species were observed. Mud flats provide critical foraging habitat for great blue herons. Forested areas nearby, outside of the Site would provide opportunities for nesting and bird activity.

The Study Area is within Important Bird Area (IBA) BC075 (IBA, 2025): Barclay Sound. This area spans 911.80 km^2 and includes Bamfield; however, it primarily relates to the features in the Sound which include low shores backed by rugged mountains and is exposed to the Pacific Ocean on the outermost side. A dominant feature of this IBA is the Broken Group Islands which are found between Bamfield and Ucluelet to the north.

This IBA provides important habitat for the marbled murrelets (*Brachyramphus marmoratus*), a threatened coastal seabird. Historical data, based on surveys completed in 1982 found high densities of murrelets in the sound, which at the time was 1% of the North American population. Further surveys in 1992 and 1993 identified a decrease in population of 41% compared to the previous decade. Marbled murrelets have been found to congregate in the inshore and outer channel habitats of this IBA during the summer, mostly between the Broken Group Islands and Trevor Channel (IBA, 2025).

Marbled murrelets are designated as threatened under Schedule 1 of the *Species at Risk Act* (Government of Canada, 2002). They utilize coastal old growth trees for nesting and forage primarily in inshore marine waters (Government of Canada, 2022). Barclay Sound provides ample forest habitat, including coastal old growth, that is suitable for nesting of several species of birds, including murrelets. It is generally considered one of the most important breeding habitats in BC (Nature Canada, 2024). The potential presence of murrelets should be considered an environmentally sensitive resource as they rely on coastal waters, particularly those nearby, for foraging and are known to travel great distances from their nests for food

The rich waters of Barclay Sound and IBA 075 support a wide range of pelagic birds that may incidentally be present around the site, including surf scoters (*Melanitta perspicillata*), glacous-winged gulls (*Larus glaucescens*) Brandt's cormorants (*Phalacrocorax penicillatus*).

4.5. MARINE MAMMALS

No marine mammals were observed during the field assessments in July 2025. Marine mammal use of Grappler Inlet, particularly cetaceans, appears to be infrequent. However, the nearby waters of Barclay Sound support a rich diversity of marine mammals, and incidental occurrences within the inlet remain possible. Species regularly recorded in adjacent areas include grey whales (*Eschrichtius robustus*), harbour seals (*Phoca vitulina*), and both Steller (*Eumetopias jubatus)* and California sea lions (*Zalophus californianus)*.

Table 4. Marine Mammal Species found in the waters surrounding the Study Area (search radius of 2.5 km)

Common Name	Scientific Name	Status under SARA	Habitat Use
Northern resident killer whale	*Orcinus orca*	Threatened	• Barclay Sound is considered part of the southern end of their range. • Occurrences are dependent on salmon availability and so are largely seasonal.
Southern resident killer whale	*Orcinus orca*	Endangered	• Barclay Sound is considered part of the northern end of their range. • Occurrences are dependent on salmon availability and so are largely seasonal.
Transient killer whale	*Orcinus orca*	Threatened	• Occurs year-round in Barclay Sound. • Prey driven therefore presence is dependent on availability of prey (seals, sea lion, porpoises). • Higher numbers are present in the spring during the herring spawn which brings high densities of sealions and seals in shore.
Harbour porpoise	*Phocoena phocoena*	Special Concern	• Occurs year-round in Barclay Sound. • Prefers shallower, inshore waters.
Dall's porpoise	*Phocoenoides dalli*	Not listed	• Occurs year-round in Barclay Sound. • Prefers deeper, offshore waters.
Humpback whale	*Megaptera novaeangliae*	Special Concern	• Migrates through coastal inshore waters of Vancouver Island from May to November. • May occur outside of this range for those individuals not migrating.
Grey whale	*Eschrichtius robustus*	Special Concern	• Migrates through coastal inshore waters of Vancouver Island from May to November.
California sealion	*Zalophus californianus*	Not listed	• Area supports winter foraging grounds.
Stellar sealion	*Eumetopias jubatus*	Special	• Area supports winter foraging grounds.

Common Name	Scientific Name	Status under SARA	Habitat Use
		Concern	
Harbour seal	*Phoca vitulina*	Not listed	• Occurs year-round in Barclay Sound. • Found in shallow, inshore waters.
Sea otter	*Enhydra lutris*	Special Concern	• Occurs year-round in Barclay Sound.
Leatherback turtle	*Dermochelys coriaca*	Endangered	• Rare however sightings have been recorded in BC waters.

4.6. SPECIES AT RISK

The DFO Aquatic Species at Risk Maps were reviewed to determine what species are expected to occur within the Site. Both the CDC provincial database search results and the DFO Aquatic Species at Risk Maps indicated that there was potential for the occurrence of sensitive marine ecosystems and species in the Study Area, although it is not considered 'Critical habitat' for any federally listed species.

Several marine mammals were identified as species at risk that have the potential to be found in the waters surrounding the Site including Stellar sealions, grey whales, humpback whales (*Megaptera novaeangliae)*, transient killer whales, southern & northern resident killer whales (*Orcinus orca*), and harbour porpoises (*Phocoena erodias)*. As discussed in Section 4.4, incidences of marine mammals within Grappler Inlet are largely prey driven and can be considered incidental.

Database searches indicated that there were several at-risk fish species that could be found in the Study Area. These include yelloweye rockfish (*Sebastes ruberrimus*), longspine thornyhead (*Sebastolobus altivelis*), rougheye rockfish type 1 (*Sebastes sp. Type I*), and rougheye rockfish type 2 (*Sebastes sp. Type II*), tope (*Galeorhinus galeus*), basking sharks (*Cetorhinus maximus*), bluntnose sixgill sharks (*Hexanchus griseus*), and northern abalone (*Haliotis kamtschatkana*). There was no evidence of these species at risk identified during the field assessments. In addition, they are unlikely to be found in the immediate area of the Site due to several factors including depth, exposure levels, and habitat type.

Two at-risk bird species were identified that could be present in the Study Area, the marbled murrelets (*Brachyramphus marmoratus*) and the great blue heron fannini subspecies (*Ardea erodias fannini*). Marbled murrelets utilize coastal old growth trees for nesting and forage primarily in inshore marine waters. The terrestrial habitat surrounding the Site does not support this species. Critical habitat requirements for great blue herons include tidal mudflats, riverbanks, lakeshores, and wetlands. Available habitat was observed within the Study Area, in addition to the presence of herons foraging in the mud flats. Great blue heron is an environmentally sensitive resource.

5. Fish Habitat

Two distinct marine habitats were identified within the Study Area, which is situated on a tidal mudflat. Both the intertidal and subtidal zones are characterized by soft sediment habitats, predominately composed of mud, with some areas consisting of a higher proportion of sand. Eelgrass, known to provide important habitat for various fish species, was observed in the mid-intertidal zone, though it was limited in both size and abundance. Despite this, the Site and surrounding waters are considered to be of high value for fish habitat. Habitat classifications across the Study Area are detailed in *Section 3.2*, and sensitive habitats located within the area assessed in the field are illustrated in ***Error! Reference source not found.***.



Figure 8. Environmental sensitivities habitats around the proposed tenure area. The red star indicates the first presence of clams, and the yellow star indicates the location of eelgrass. The area is a tidal mud flat, with the field survey area marked by the orange polygon.

5.1. SOFT SEDIMENT (MUD) HABITAT

The Study Area was dominated by mud substrates that appeared to have a higher density of sands present west of the freshwater runoff. A dense band of filamentous green algae was found throughout the mid-intertidal zone of this habitat, which overlay the mud substrates beneath. A low diversity of invertebrates was present, with an increase observed in the lower intertidal zone, transitioning to subtidal conditions.

Soft sediments can provide habitat for bivalve species such as clams, which were widespread throughout the mid to lower intertidal zone. This habitat functions as a clam bed. Soft sediments, specifically mud flats are also considered high-value habitat for fish as they provide abundant food, shelter, and nursery functions that support multiple life stages of many species (Nature Conservancy of Canada, n.d.). The fine sediments of mudflats are rich in organic matter and host dense communities of invertebrates such as worms, clams, and crustaceans, which serve as critical prey for juvenile and adult fish (WHSRN, 2022). Shallow waters over mudflats warm quickly, enhancing productivity and accelerating the growth of algae and detritus-based food webs that fish rely on (WHSRN, 2022). In addition, the complex microhabitats within tidal channels and pools offer refuge from predators and strong currents, making mudflats important rearing grounds for species such as salmon, herring, and flatfish. This habitat has been identified as high-value habitat and an environmentally sensitive resource.

5.2. EELGRASS HABITAT

Eelgrass is considered high value habitat for fish use, as it provides shelter for juvenile fish and invertebrate species such as salmon and crabs and can be used a spawning substrate for herring. The small patch of eelgrass (as discussed in Section 4.1.1) observed in the mid-intertidal zone, is estimated to be outside of the proposed tenure area. There were no other patches of eelgrass observed during the field assessment, so it is inferred to be an isolated patch in this corner of the Inlet.

The area of eelgrass present is considered quite small by comparison to eelgrass beds and would likely not support the same diversity and volume of species, then that of a typical continuous form of eelgrass bed or meadow. The eelgrass habitat present can be considered high-value fish habitat. It is recommended that once a design and project area is determined for the potential moorage upgrades, that a site-specific survey be completed to determine if there is additional eelgrass present around the structures slated for replacement/repair.

6. Summary of Environmental Sensitivities

This EA was conducted to identify the presence of environmentally and ecologically sensitive features that are found in and around the proposed extended marine tenure area. Two distinctive habitat types were identified in the Study Area. A tidal mudflat, consisting of mud substrates, dominated both the intertidal and subtidal zones. A small, discontinuous patch of eelgrass was present in the mid-intertidal zone; however, it appeared to be an isolated occurrence. The presence of eelgrass and mud flats are considered environmentally sensitive features and will need protection from any future construction related impacts.

The mudflat habitat supports a high density of clams and has been identified as a clam bed. Clams would be subject to changes to water quality related to construction activities and therefore should be protected for any construction related impacts.

The surrounding waters of Grappler Inlet and Barclay Sound are also known to support a range of species including marbled murrelets. Critical foraging habitat for murrelets has been identified in the offshore waters of Vancouver Island. Incidental occurrences may therefore occur. The Site is in the waters of Barclay Sound, through which several species of marine mammal and fish frequent, including species at-risk and CRS fisheries species such as Pacific salmonids and herring. Fish are mobile and transitory by nature; however, they are both sensitive to marine noise and related disturbances, which should be considered for any future construction related impacts.

7. Regulatory and Policy Setting

Potential construction on the moorage must conduct its activities in compliance with applicable legislation associated with environmental protection. Relevant environmental legislation is indicated below in *Table 5.* Given that the timing of future upgrades is unknown, it is advised that once design is verified, the relevant regulations are confirmed because they are subject to change.

Table 5. Environmental Legislation Applicable to the Project.

Legislation	Agency	Area of Regulation	Anticipated Project Related Issue	Mitigations/Permits/ Authorizations
Federal				
Fisheries Act	Fisheries and Oceans Canada (DFO)	Prohibits harmful alteration, disruption, or destruction of fish habitat (HADD), the death of fish, and deposition of deleterious substances into fish bearing waters.	Disturbance of sediment and fish habitat through moorage upgrades.	**A Request for Project Review (RFR) will be required for works below the HWL.** This will determine if a Fisheries Act Authorization (FAA) will be required, or if a Letter to Avoid and Mitigate will suffice.
Species at Risk Act	Environment and Climate Change Canada (ECCC)	Protects wildlife and wildlife habitat listed as threatened or endangered.	Construction Noise/Disturbance.	No permitting is required; however, avoidance and mitigation strategies may be needed to avoid impacts to listed species.
Navigable Waters Act	Transport Canada (TC)	Requires approval of all projects that may impact navigation in a navigable water.	Construction activities using a marine derrick would have the potential to impact vessel traffic.	To be confirmed following the completion of the detailed design.
Migratory Birds Convention Act (MBCA)	ECCC	Prohibits injury, molestation, and destruction of migratory birds and their nests.	Construction Noise/Disturbance.	No permitting is required; however, avoidance and mitigation strategies will be needed to avoid impacts to migratory bird species.

Legislation	Agency	Area of Regulation	Anticipated Project Related Issue	Mitigations/Permits/ Authorizations
Provincial				
Wildlife Act	Ministry of Water, Land, and Resource Stewardship (MWLRS)	Regulates works that impacts breeding birds and other wildlife in the area.	Construction Noise/Disturbance.	Protects birds and their nests during the bird breeding season as well as the nests, nest trees and eggs of certain species of birds all year. Bird nesting sweeps may be needed prior to work at the wharf. Nuisance birds and their nests are exempt from protection.
Weed Control Act (Province of BC, 1996)	Ministry of Agriculture and Food	Regulates control of designated noxious plants	Noxious weeds being introduced into the Study Area and further spread within the Study Area	Act imposes a duty on all landowners to control designated noxious plants.

7.1. FEDERAL LEGISLATION

7.1.1. Fisheries Act

The Federal *Fisheries Act* (Government of Canada, 1985) and supporting policies aim to protect and manage all fish and fish habitats by providing protection against the death of fish, other than by fishing, and the harmful alteration, disruption, or destruction (HADD) of their habitat. The *Fisheries Act* regulates activities that affect fish or fish habitat including permanent alteration or destruction of habitat (Section 35) and deposition of deleterious substances into fish-bearing waters (Section 36).

The Fish and Fish Habitat Protection Provisions oversee and ensures compliance for projects that take place in and around fish habitat under the provisions from the *Fisheries Act* and *Species at Risk Act*. To ensure compliance under the *Fisheries Act*, any projects in or near water will require an understanding of the impacts the Project will have on fish and fish habitat.

To initiate regulatory engagement, a Request for Project Review (RFR) is submitted to DFO which outlines the existing environmental setting, identifies the impacts the Project will have on fish and fish habitat, and suggests measures to avoid and mitigate impacts to fish and fish habitat. Upon review of the RFR, if DFO are satisfied that the proposed mitigations will avoid a HADD of fish and fish habitat, they will issue a Letter to Avoid and Mitigate (formerly an LoA), which outlines specific mitigation measures to ensure impacts are minimized or managed in the most sufficient way possible. Should DFO determine there is a high risk of a HADD from the proposed construction activities, works may require a *Fisheries Act* Authorization.

For any works below the HWL there is the potential to impact fish and fish habitat. An RFR under the *Fisheries Act* will be required for construction works related to the marina upgrades. This will be confirmed following competition of the detailed design.

7.1.2. Species at Risk Act (SARA)

Federal lands are subject to the protection of species listed under Schedule 1 of *SARA* (Government of Canada, 2002) as extirpated, endangered, or threatened. It is an offence to kill, harm, harass, capture, or take an individual, and that species has legal protection related to the species' residence and critical habitat as specified in *SARA*. No specific permitting is required for adherence to this Act for this Project; however, an understanding of potential *SARA* protected species within the Project area is recommended. Adherence to this Act can typically be completed using Best Management Practices (BMPs) during construction.

7.1.3. Migratory Birds Convention Act (MBCA)

The *MBCA* prohibits the disturbance, destruction, or possession of migratory birds, their nests, or eggs. Migratory bird habitat is protected under the *MBCA* which prohibits the deposit of oil, oily waters, or other substances harmful to migratory birds in any areas that they frequent (Government of Canada, 1994). No specific permitting is required for adherence to this Act; however, an understanding of potential *MBCA* protected species within the Project area is recommended.

Adherence to this Act can typically be completed using BMPs. BMPs outlined in 'Develop with Care' (Province of BC, 2014) recommend that construction activities and vegetation removal that may disturb breeding birds and their nesting activities be conducted outside of the bird-breeding season to avoid disturbance of nesting birds. Activities that may molest or disturb birds or their eggs constitutes a violation of provincial statutes. Adherence to the breeding bird window for nesting birds is required to achieve compliance with both the *MBCA* and the BC *Wildlife Act.* The following least risk timing windows are relevant for the Site:

- The general bird-breeding season for migratory birds in Canada is March 15 to August 15 of any year (Government of Canada, 2018)
- The Regional (Zone A-1) Nesting Period for coastal BC spans Late March to Mid-August of any year (Government of Canada, 2018). Atypical nesting can occur as early as March 12 in this regional zone.
- The raptor-breeding window for the west-coast region spans February 5 to September 30 (Province of BC, 2013).
- Nests of eagles, peregrine falcons, gyrfalcons, ospreys, herons, and burrowing owls are protected year-round (Section 34 of the *Wildlife Act,* see *Section 7.2.1*).

If disruptive activities (e.g., pile driving) must be conducted during the breeding period, a QEP should be engaged to survey for active nests. If an active bird or protected nest is found on the pier structure or on nearby structures or vegetation, a bird nest management plan may be prepared by the QEP for works in the vicinity of the nest, providing protection of the nest through buffers and/or by instituting appropriate exclusion windows for Project activities. If an active nest is found on the periphery of these areas, active monitoring of the nest / breeding bird / raptor may be warranted to determine levels of distress and compliance with applicable statutes. It should be noted that the nesting windows provided above are a

general guidance. Nesting may extend beyond the dates provided. Additional environmental monitoring may be required if active or protected nests are encountered.

7.1.4. Navigable Waters Act

Under the *Navigable Waters Act* (*NWA*) (Government of Canada, 1985), projects that propose to construct, place, alter, build, remove or decommission works that are in, over, under, through or across any navigable water may be subject to approval by Transport Canada.

Projects can be considered minor or major works. Minor works allow for projects to proceed without review or approval once they meet applicable criteria outlined in the Minor Work Order under the NWA. Section 13 and 14 of the Minor Works Order outlines criteria for dock, pier, and wharf structures. Major works are projects that have the potential to substantially interfere with navigation. The Major Works Order under the NWA outlines the classes of work that this applies to and includes work on bridges, ferry cables and aquaculture facilities. Work on dock structures is not classified as major works. For work that takes place on a navigable water but does not meet the criteria of a minor or major work, an application is still required for review.

Although the works associated with the moorage upgrades do not meet the criteria for minor works, and are not considered major works, an application for no interference is still required due to its location on a navigable water. Requirements under the *Navigable Waters Act* will be confirmed upon completion of the detailed design of the moorage repairs.

7.2. PROVINCIAL LEGISLATION

7.2.1. Wildlife Act

The provincial *Wildlife Act* (Province of BC, 1996), Section 34, protects birds and their nests during the bird nesting season as well as the nests, nest trees, and eggs of certain species of raptors all year. Raptors, particularly bald eagles, require large nest trees near coastal water bodies. A field visit was completed as part of this assessment and no raptors nest were observed at or near the Project location. No wildlife trees were observed during the site visit.

The provincial *Wildlife Act* Designation and Exemption Regulation (Province of BC, 2020) indicates exemptions from permitting required under the *Wildlife Act* for nuisance wildlife. Adherence to this Act can typically be achieved by using provincial BMPs. Disruptive activities such as pile driving will need to be scheduled outside of the breeding window, or a review of the area conducted by a QEP to determine that no breeding birds or their nests will be impacted by the activities. Provided that there are no active nests near the Site, or the disruptive activities are conducted outside of the bird breeding window, no specific permitting is required.

8. Potential Environmental Impacts

*Table 6*Error! Reference source not found. below summarizes the general potential environmental impacts that could occur on the existing environmental receptors if no avoidance or mitigation strategies are implemented during future construction for the moorage upgrades. These impacts can be mitigated, reduced, or avoided through design and/or with the implementation of BMPs that will be discussed further in Section 9 of this report. Following detailed design, this list should be revised to reflect anticipated Project impacts.

Table 6. Potential Environmental Impacts on Biophysical Components of the Project

Component	Potential Environmental Impact
Sediments	• Increased sediment concentrations during construction. • Increased contaminant concentrations during construction.
Marine Algae	• Damage or loss to existing marine algae.
Wildlife Species & Habitat	• Disturbance of wildlife and active breeding sites (nests) due to increased noise.
Fish & Fish Habitat	• The impact to fish habitat due to of deleterious substance (sediment laden water, fuel, or equipment spills). • Injury or death to fish and aquatically adapted species through direct contact with equipment and machinery. • Injury or death to fish and aquatically adapted species through increased noise and vibrations. • Loss or disturbance to fish habitat and cover.
Marine Mammals	• Injury or disturbance to at-risk marine mammals due to increased noise and vibrations related to construction.
Water Quality	• Accidental spill of deleterious substances such as fuel, oil or spills from equipment working around water, which would degrade the water quality. • Sediment loading during construction. • Contaminant loading during construction. • Changes to food supply through increases in organic debris.
Species at Risk	• Loss or disturbance to at-risk bird species. • Injury or disturbance to at-risk marine mammals due to increased noise and vibrations.

9. Mitigation and Avoidance Strategies

Many of the potential project impacts related to marine construction can be avoided or minimized through the implementation of environmental BMPs and mitigation strategies. These measures help reduce negative effects on the landscape, natural environment, and sensitive resources. Recommended mitigation strategies are outlined below.

A project specific EIA will be completed following detailed design to outline specific mitigation measures to assist in achieving compliance with provincial and federal regulations during construction. The EIA will support regulatory processes as well as to provide the framework for the Contractor(s) CEMP. The CEMP must be prepared to outline specific mitigation measures to assist in achieving compliance with provincial and federal regulations during construction.

The Contractor will retain an environmental monitor (EM) to monitor the use and effectiveness of mitigations implemented during construction. A marine mammal observer and a passive acoustic monitor may be required depending on construction activities related to the moorage upgrades.

The strategies recommended in the following sections are intended to reduce or mitigate the negative effects of site-level development.

9.1. FISH AND FISH HABITAT

Harm to fish and risk of HADD is one of the largest risks presented during construction activities for this Project. Project activities will involve in-water works and therefore will require the implementation of federal DFO "measures to protect fish and fish habitat." Project specific BMPs may be required under permit conditions. Impacts to sensitive resources can be minimized through the implementation of environmental BMPs. Recommended mitigation strategies to avoid causing fish mortality or a HADD are outlined below:

- Marine in-water works will be conducted during DFO's Least Risk Window.
- DFO BMPs for Pile Driving and Related Operations will be adhered to at all times during construction (Government of Canada, 2018).
- Barges and other vessels used during construction will not be permitted to ground on the foreshore or seabed. Spuds will be used to secure vessels when necessary.
- Work should be conducted during high tide where possible to ensure that there is suitable clearance between the seabed and vessels.
- Where possible, no equipment will operate in or use the intertidal zone of the foreshore.
- Measures must be taken to ensure that no harmful material (e.g., fuel and other hydrocarbons, soil, or sediment), which could adversely impact water quality, fish, and other aquatic life, and /or fish habitat, can enter the water as a result of the Project activities.
- A spill response plan should be developed and implemented by the Contractor.
- An erosion and sediment control plan should be developed and implemented by the Contractor.
- An EM will visually monitor for increases in turbidity associated with the construction works. In-situ water quality monitoring will be conducted as necessary to assess turbidity and pH.

9.2. MARINE MAMMALS

- Continuous hydroacoustic monitoring should be conducted by an appropriately qualified operator if pile driving is required during construction.
- A marine mammal exclusion zone (MMEZ) will be established around the noise source to delineate the acoustic thresholds and mitigate harm to marine mammals. The MMEZ will be established using on site acoustic monitoring data.

9.2.1. Noise and Vibration

The following mitigation measures will be used to control and mitigate increased acoustic levels in the marine environment.

- The Contractor will ensure that all equipment will be properly maintained to limit noise emissions (e.g. functioning exhaust and muffler systems).
- Engines will be turned off when not in use. Idling time will be restructured and minimized during construction.

- The Contractor will ensure that the machinery and equipment will only be operated within specifications and capacity.
- Pile driving activities should be conducted during daylight hours in good weather conditions that permit visual observations by a qualified MMO.
- A vibratory hammer will be used to drive the piles as they are known to reduce impact to fish and marine mammals.
- A timed slow-start (ramp-up) procedure will be implemented during pile driving.
- Continuous hydroacoustic monitoring should be conducted by an appropriately qualified operator during all pile removal activities.
- Exclusion zones should be established around the noise source to delineate acoustic thresholds and mitigate harm to fish and marine mammals.

9.3. WILDLIFE, BIRDS, AND BIRD HABITAT

Construction of the Project will require the implementation of provincial guidelines and BMPs to comply with federal and provincial environmental protection legislation. It is recommended that the Contractor retain a QEP to conduct a wildlife sweep of the immediate area (site plus 100 meters) prior to construction. Any important wildlife features including, active nests and hibernacula must be marked, and appropriate minimum buffer distances established (recommend 100 meters for active nests). In addition to the use of buffered setbacks, timing restrictions for the species identified must be considered.

9.3.1. Least Risk Timing Windows for Birds

Migratory breeding birds and their active nests are protected under the federal *Migratory Birds Convention Act*. As vegetation provides nesting and foraging habitat for birds and other animals, there is the potential to contravene the *Wildlife Act* and the *MBCA* with the cutting of trees and shrubs for project construction. During their breeding season, birds are especially sensitive to noise disturbances and may desert their nests and young. Construction timing windows for birds are the most suitable periods for performing works that would otherwise impact sensitive life stages.

The recommended BMP for tree and vegetation clearing is to complete works outside of the general nesting period. In addition, particularly noisy activities such as those that may be created during construction (i.e. chain saws, certain heavy equipment) should be scheduled outside of the breeding season when possible. While the nesting period for bird species varies by species, the general bird breeding period is mid-March and may extend until late August (Government of Canada, 2018). Nesting periods for migratory birds in the area can be determined through use of the nesting calendar query tool. The Site is in Zone A1 and regional nesting periods are late March to mid August by may vary based on ecosystem type (Government of Canada, 2018).

If vegetation clearing or other disruptive activities must be conducted during the breeding period, a QEP should be engaged by the Contractor(s) to survey the Site for active nests (depending on seasonal timing) and flag no-go buffer zones around active nests. QEP monitoring of active nests for disturbance within 200 m of construction noise is recommended (Province of BC, 1996). Nests should be monitored for signs of disturbance behavior until each nest has fledged. Clearing vegetation outside the general nesting period does not require a pre-clearing survey. If project activity occurs near a protected nest, a protective buffer is required so that damage or disturbance to the nest and nest tree does not occur.

9.4. AIR QUALITY

Air quality management should be addressed in the project CEMP and monitored by a qualified environmental monitor. Mitigation measures to be considered include:

- Controlling dust generated during construction with the application of water,
- Road/trail sweeping during construction and operations,
- Implementing anti-idling procedures for vehicles and equipment, and
- Securing excavated loads on haul trucks.

Preparation and implementation of a noise management plan as part of the CEMP should cover scheduling activities that will create particularly loud noises outside the bird breeding season.

9.5. CONTAMINANT AND SPILL MANAGEMENT

The following are BMPs used to control and mitigate the effects of potential spills:

- Plan activities such that materials such as paint, primers, rust solvents, degreasers, grout, poured concrete or other chemicals do not enter the water or permeable surfaces.
- Develop a response plan that is to be implemented immediately in the event of a sediment release or spill of a deleterious substance and keep an emergency spill kit on site.
- Report any spills of sewage, oil, fuel, or other deleterious material whether near or directly into a water body.
- Ensure clean-up measures are suitably applied so as not to result in further alteration of the shoreline.
- Clean up and appropriately dispose of the deleterious substances.

9.6. SEDIMENT CONTROL PRACTICES

The Contractor will develop and implement Sediment Control Plan for the Site that minimizes risk of sedimentation during all phases of the Project. The Sediment Control plan should, where applicable, include the following BMPs:

- Monitoring for signs of sedimentation should take place during all phases of the Project.
- All work must be undertaken and completed in a manner as to prevent the discharge or introduction of soils, sediment, or sediment laden water into the marine environment.
- An EM will visually monitor for increases in turbidity associated with the construction works.

9.7. WILDLIFE, BIRDS, AND BIRD HABITAT

Due to an increase of noise levels associated with the Project, construction will require the implementation of provincial guidelines and BMPs to comply with federal and provincial environmental protection legislation. It is recommended that the Contractor retain a QEP to conduct a wildlife sweep of the immediate area (site plus 100 meters) prior to construction. Any important wildlife features including active nests must be marked, and appropriate minimum buffer distances established (recommend 100 meters for active nests). In addition to the use of buffered setbacks, timing restrictions for the species identified must be considered.

9.7.1. Least Risk Timing Windows for Birds

Migratory breeding birds and their active nests are protected under the federal *MBCA*. During their breeding season, birds are especially sensitive to noise disturbances and may desert their nests and young. Construction timing windows for birds are the most suitable periods for performing works that would otherwise impact sensitive life stages.

The recommended BMP for the protection of birds is to complete Project activities such as pile installation outside of the general nesting period. In addition, particularly noisy activities such as those that may be created during construction (i.e., chain saws, vibratory hammers, certain heavy equipment) should be scheduled outside of the breeding season when possible. While the nesting period for birds varies by species, the general bird breeding period is mid-March and may extend until late August. Nesting periods for migratory birds in the area can be determined through use of the nesting calendar query tool.

If disruptive activities must be conducted during the breeding period, a QEP should be engaged by the Contractor to survey the Site for active nests and flag no-go buffer zones around active nests. QEP monitoring of active nests for disturbance within 200 m of construction noise is recommended. Nests should be monitored for signs of disturbance behavior until each nest has fledged. Clearing vegetation outside the general nesting period does not require a pre-clearing survey. If Project activity occurs near a protected nest, a protective buffer is required so that damage or disturbance to the nest and nest tree does not occur.

9.8. AIR QUALITY

Air quality management should be addressed in the Project CEMP and monitored by a qualified EM. Mitigation measures to be considered include:

- The Contractor will ensure that all equipment and vehicles will be well maintained and used at optimal loads to minimize emissions.
- Equipment showing excessive wear or malfunction will be replaced or repaired. Implementing anti-idling procedures for vehicles and equipment.
- Vehicles and equipment will be turned off when not in use.
- Equipment should be fitted with standard emission control devices in compliance with federal, provincial, and municipal regulations and standards.
- Ensure appropriate dust suppression occurs during construction. Protocols should be outlined in the Contactor's CEMP.

9.9. CONTAMINANT AND SPILL MANAGEMENT

The following are BMPs used to control and mitigate the effects of potential spills:

- Plan activities such that materials such as paint, primers, rust solvents, degreasers, grout, poured concrete or other chemicals do not enter the water or permeable surfaces.
- Develop a spill response plan that is to be implemented immediately in the event of a sediment release or spill of a deleterious substance and keep an emergency spill kit on Site.
- Report any spills of sewage, oil, fuel, or other deleterious material whether near or directly into a waterbody.

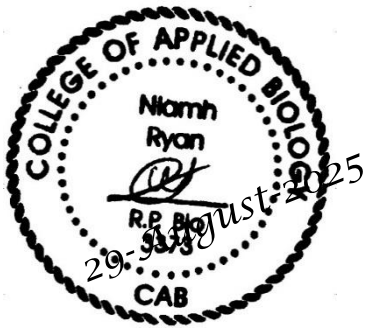
- Ensure clean-up measures are suitably applied so as not to result in further alteration of the shoreline.
- Clean up and appropriately dispose of the deleterious substances.

10. Professional Statement

The information presented in this report is for use by the ACRD for the Grappler Inlet marine tenure expansion project. This assessment and its recommendations are based on data collected from field reviews conducted in July 2025, and a review of readily available web databases. This review identified environmentally sensitive features to be protected during the Project design and construction. Conclusions and recommendations presented here may change with additional information. We trust the information provided is sufficient to meet your needs at this time.

McElhanney Ltd.

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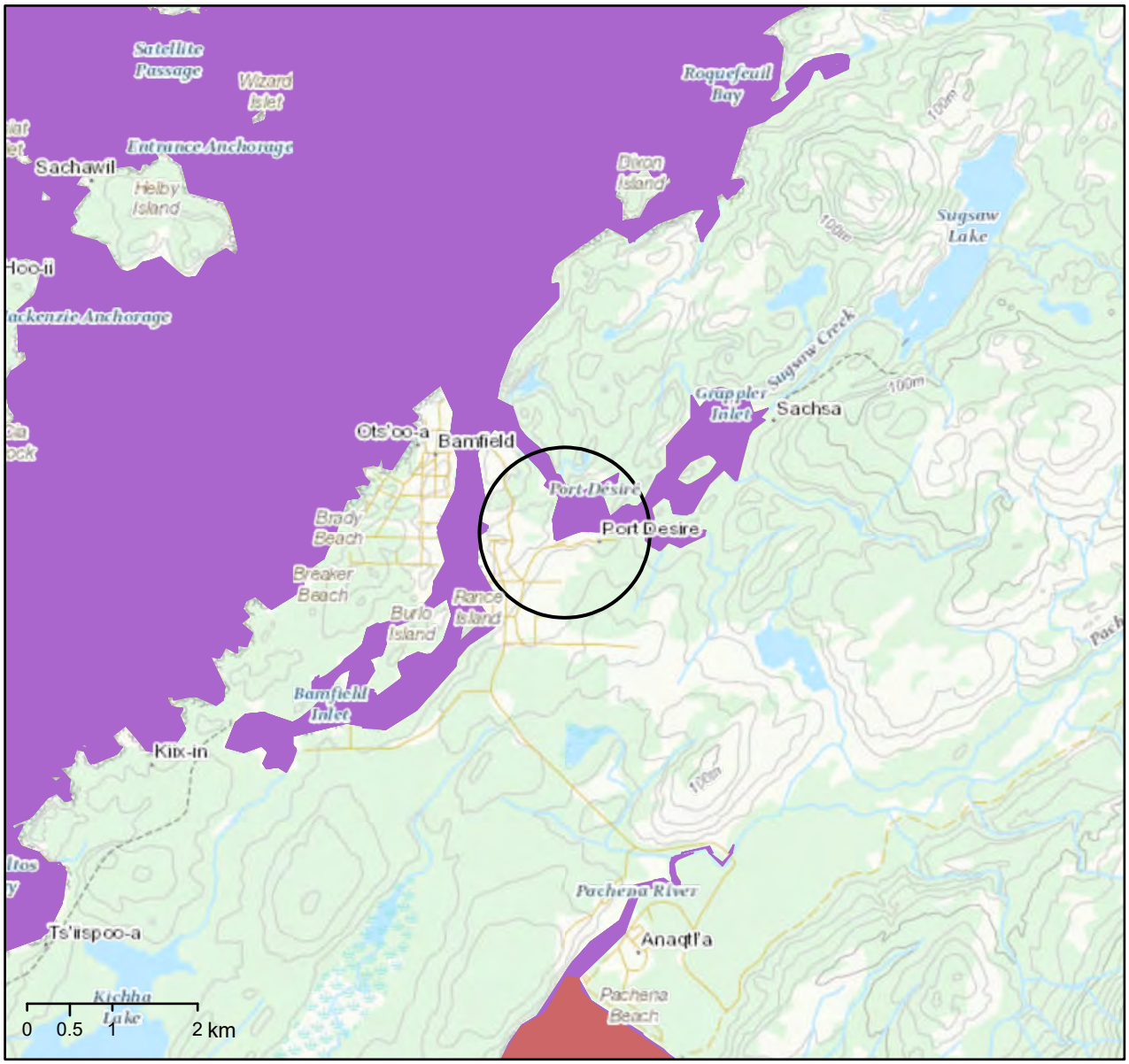
APPENDIX A:

Additional Database Information

Fisheries and Oceans Canada | Pêches et Océans Canada

Aquatic Species at Risk Report

Canada





One or more aquatic species listed under the Species at Risk Act are found (or potentially found) within the coloured areas.

- Critical Habitat
- Extirpated, Endangered, or Threatened
- Special Concern

How to use this information:

1. The map and species list are intended to provide a general overview of aquatic species at risk and their critical habitat that may occur within the mapped area.

2. To assess your project go to: www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html

If you encounter an aquatic species at risk in an area that is not currently mapped, please notify your regional Fisheries Protection Program office to ensure that you are compliant with the Species at Risk Act. The official source of information for species at risk is the Species at Risk Public Registry https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html

To protect fish and fish habitat, including aquatic species at risk, their residences, and their critical habitat, efforts should be made to avoid, mitigate and/or offset harm. Following the measures to avoid harm will help you comply with the Fisheries Act and the Species at Risk Act.

Critical habitat for these species is found within the outlined area

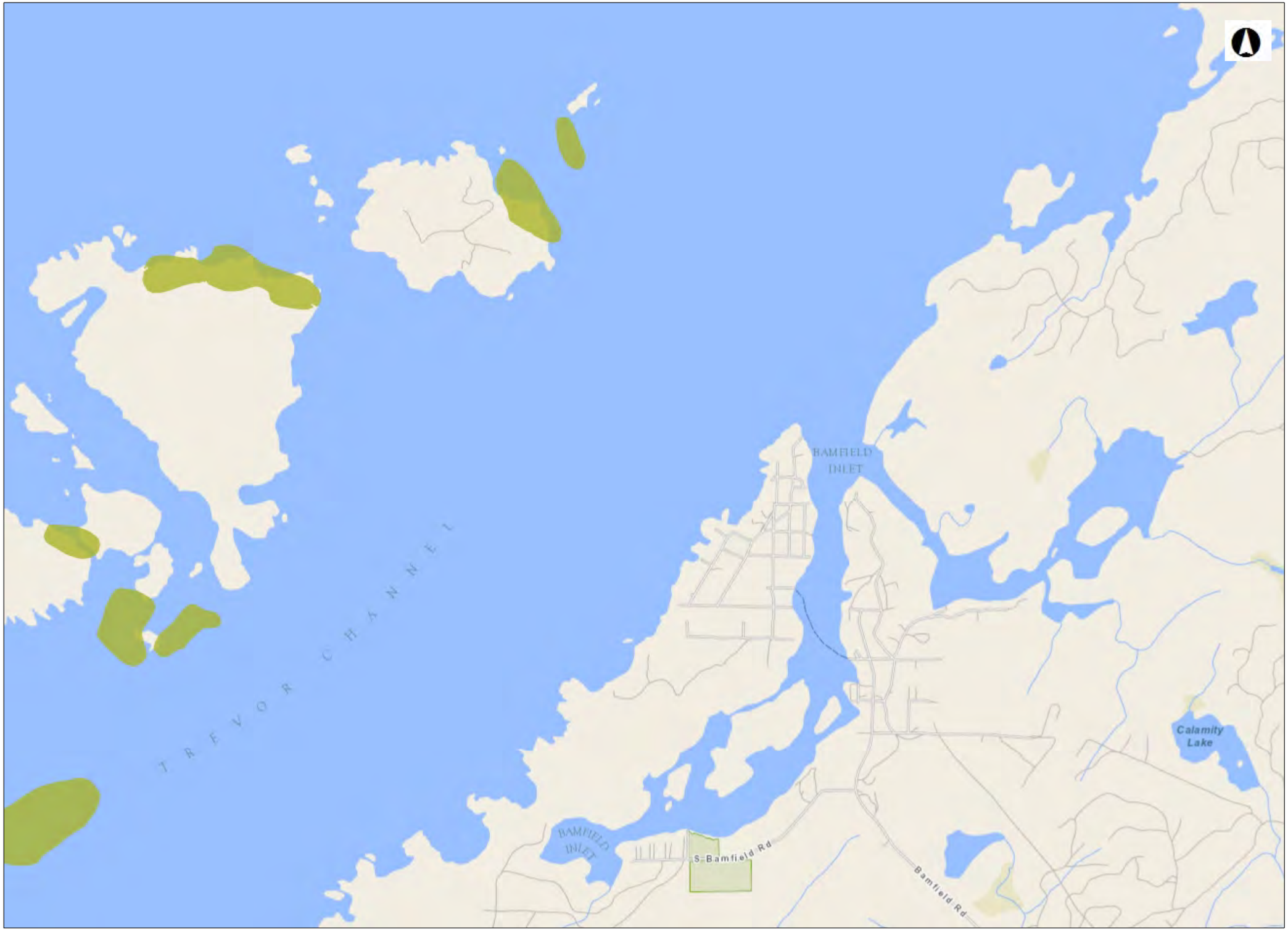
Critical habitat is identified in recovery strategies or action plans for species listed under Schedule 1 of the Species at Risk Act as extirpated, endangered or threatened.

Name	Where Found	Species Status
	No critical habitat	

Species found (or potentially found) within the outlined area

Name	Where Found	Species Status
Basking Shark - Pacific	Pacific Ocean/Océan Pacifique	Endangered
Bluntnose Sixgill Shark	Pacific Ocean/Océan Pacifique	Special Concern
Grey Whale - Eastern North Pacific	Pacific Ocean/Océan Pacifique	Special Concern
Harbour Porpoise - Pacific Ocean	Pacific Ocean/Océan Pacifique	Special Concern
Humpback Whale - North Pacific	Pacific Ocean/Océan Pacifique	Special Concern
Killer Whale - Northeast Pacific Northern Resident	Pacific Ocean/Océan Pacifique	Threatened
Killer Whale - Northeast Pacific Southern Resident	Pacific Ocean/Océan Pacifique	Endangered
Killer Whale - Northeast Pacific Transient	Pacific Ocean/Océan Pacifique	Threatened
Leatherback Sea Turtle - Pacific	Pacific Ocean/Océan Pacifique	Endangered
Longspine Thornyhead	Pacific Ocean/Océan Pacifique	Special Concern

Northern Abalone	Pacific Ocean/Océan Pacifique	Endangered
Rougheye Rockfish type I	Pacific Ocean/Océan Pacifique	Special Concern
Rougheye Rockfish type II	Pacific Ocean/Océan Pacifique	Special Concern
Steller Sea Lion	Pacific Ocean/Océan Pacifique	Special Concern
Tope	Pacific Ocean/Océan Pacifique	Special Concern
Yelloweye Rockfish - Pacific Ocean Inside Waters	Pacific Ocean/Océan Pacifique	Special Concern
Yelloweye Rockfish - Pacific Ocean Outside Waters	Pacific Ocean/Océan Pacifique	Special Concern



BRITISH COLUMBIA

CRIMS

Legend

- Marine Plants - Eelgrass - C
- Marine Plants - Kelp Beds -

0 0.73 1.5 km

1: 36,112

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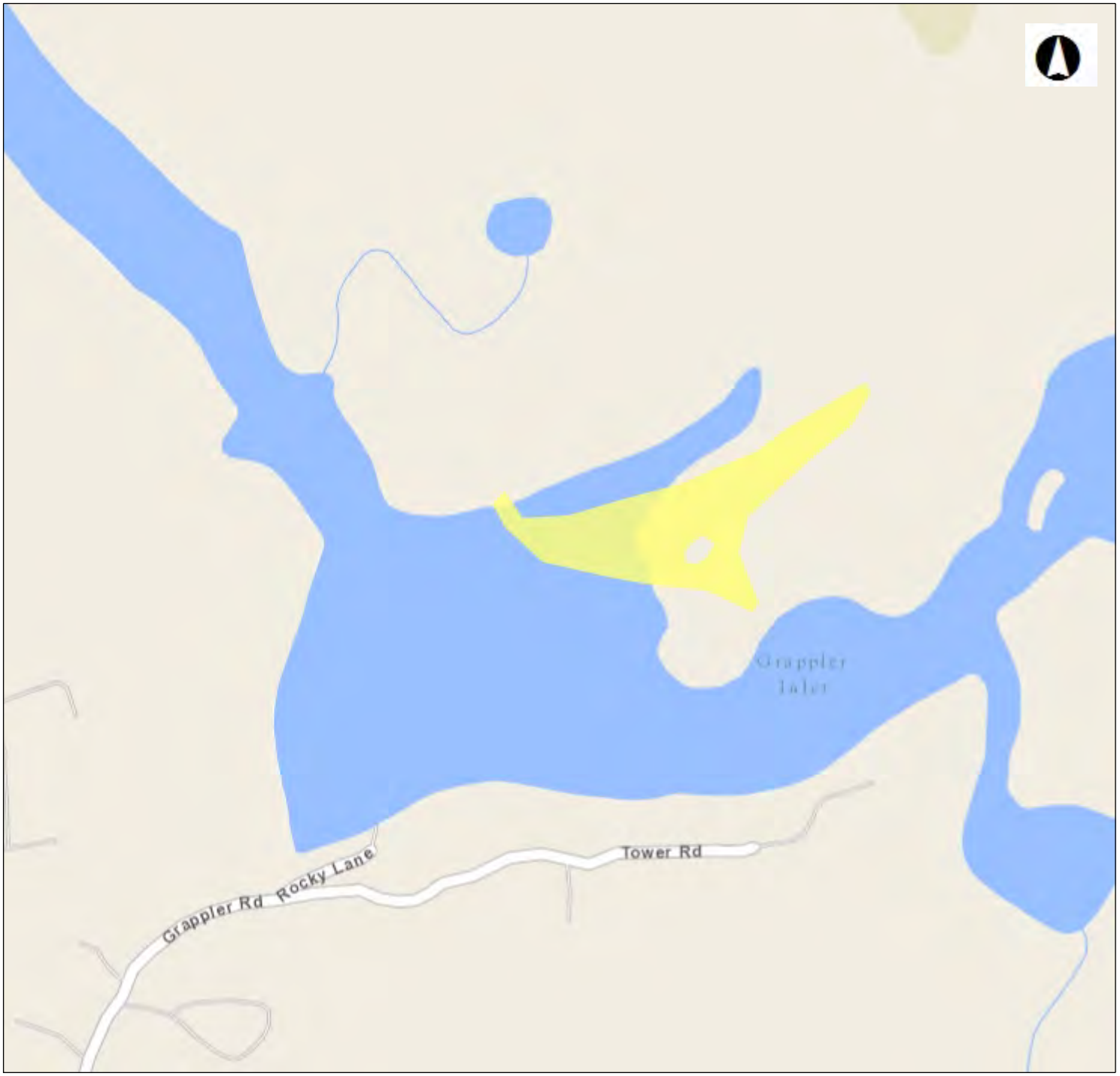
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Datum:	NAD83
Projection:	WGS_1984_Web_Mercator_Auxiliary_Sphere

Key Map of British Columbia





BRITISH COLUMBIA

CRIMS

Legend

Other Biological Resources Colour Filled

0 0.18 0.37 km

1: 9,028

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Datum: NAD83

Projection: WGS_1984_Web_Mercator_Auxiliary_Sphere

Key Map of British Columbia





BRITISH COLUMBIA

CRIMS

Legend

- Other Biological Resources Lines
- Other Biological Resources Herring Holding Areas - Colc

0 0.18 0.37 km

1: 9,028

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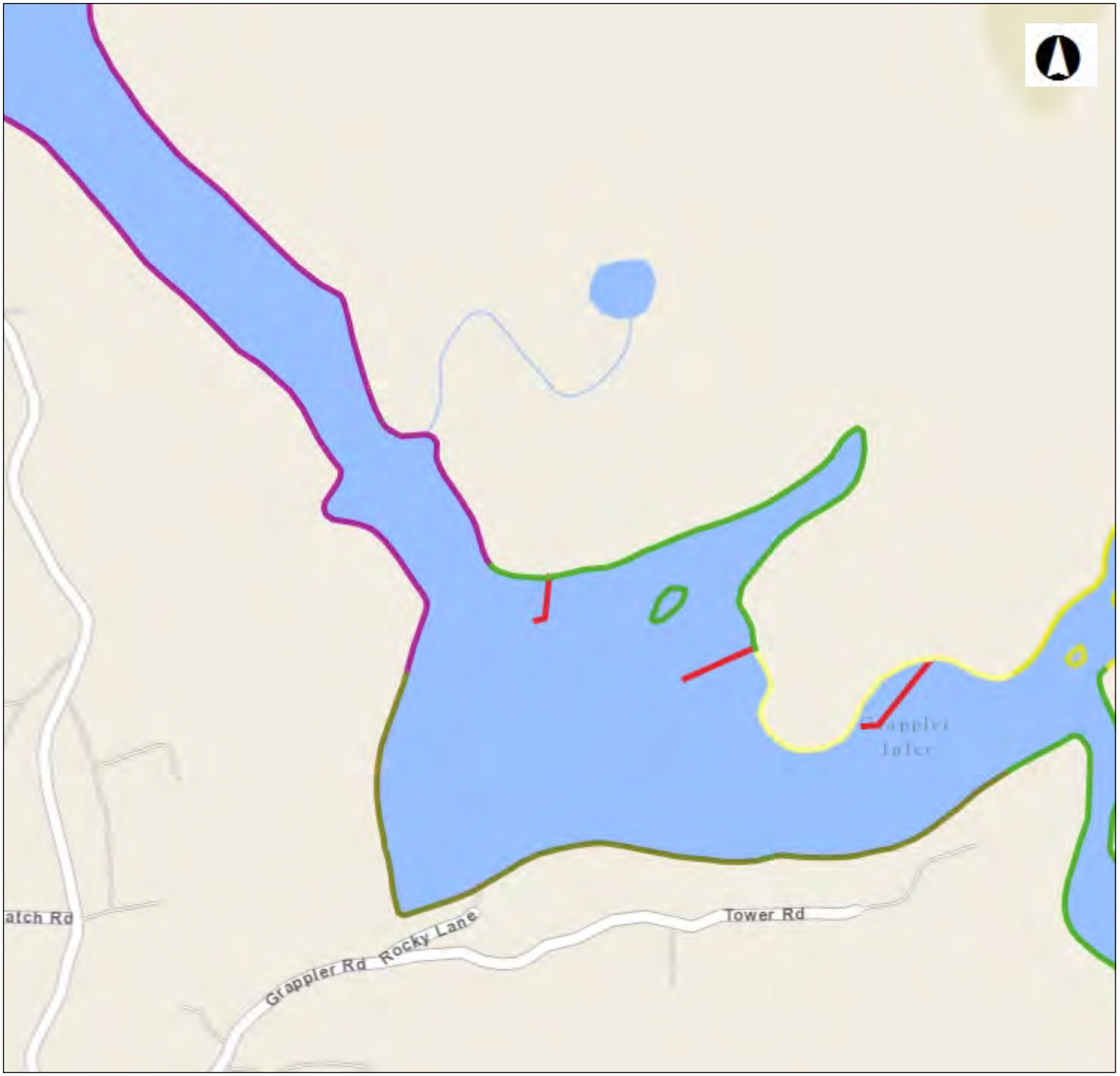
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Key Map of British Columbia





BRITISH COLUMBIA

CRIMS

Legend

Shoreunits - Shoreline Type

REP_TYPE_NAME

- No Data Available
- Man-made
- Estuary Marsh or Lagoon
- Channel
- Mud Flat
- Gravel Beach
- Gravel Flat
- Sand Beach
- Sand and Gravel Beach
- Sand Flat
- Sand and Gravel Flat
- Rock Cliff

0 0.18 0.37 km

1: 9,028

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Key Map of British Columbia



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