

Harbours Ecological Inventory and Rating



Project Summary

Capital Regional District | Environmental Protection

Overview

The Capital Regional District (CRD) has completed an update to the Harbours Ecological Inventory and Rating (HEIR) Project, representing the second iteration of the original 2000 project. The updated HEIR Project systematically inventories biophysical features within the CRD's core area harbours (Victoria Harbour, the Gorge Waterway, Portage Inlet, Esquimalt Lagoon, and Esquimalt Harbour) and assigns ecological ratings that reflect spatial variation in ecological value across the project area.

Key outcomes of the update include:

- Updated inventory of intertidal, backshore, and subtidal habitats across approximately 100 km of shoreline and 110 km of subtidal transects.
- Intertidal mapping using high-resolution imagery, supervised classification, and field validation.
- Subtidal mapping using towed video surveys and spatial modeling.
- Updated intertidal ecological ratings and development of a new (preliminary) subtidal rating framework.
- Identification of spatial variation in ecological values to support planning, restoration, and stewardship.
- Enhanced data accessibility through integration with CRD mapping tools.

The HEIR dataset is intended to support coastal management, stewardship, land use planning, ecological restoration, environmental research, and public education. The datasets are not a substitute for site specific environmental assessments.

Ecological Inventory

Intertidal and Backshore (Part 1)

Intertidal mapping was conducted using supervised classification of high-resolution orthophoto imagery, supported by field verification and desktop review. This represents a methodological advancement over the original shore-unit-based approach. The intertidal inventory expanded the spatial extent of the original HEIR project and mapped both biological and physical features along approximately 103 km of shoreline, including:

- Biological features: salt marsh, eelgrass, bladed kelp, turf algae, barnacles
- Physical features: bedrock, cobble, sand/mud, modified shorelines, overhanging features

Backshore conditions were characterized using existing land cover datasets to identify features such as trees, roads and built structures.

Subtidal Inventory (Part 2)

Subtidal habitats were assessed using boat-based towed video surveys, with resulting imagery interpreted by a qualified biologist, following a methodology generally consistent with the original HEIR project.

- Approximately 110 km of transects were surveyed. In Esquimalt Harbour, survey coverage was limited to the water lot administered by the Songhees and Xwsepsem Nations due to data-sharing constraints related to Department of National Defence (DND) datasets.
- Point observations include marine vegetation, substrates, invertebrates, and fish.
- Spatial modeling techniques (interpolation algorithms) were used to generate polygons for eelgrass, kelps, and selected features. This approach improves upon previous manual delineation methods. Modeled habitat polygons represent estimated distributions based on transect data and should not be interpreted as precise boundaries.
- Estimates of change over time were developed for the general distribution of eelgrass, widgeon grass, and bladed kelp.

Maps 1, 2 and 3 (attached) depict select intertidal and subtidal biological features for Victoria Harbour, Portage Inlet and the Gorge Waterway, Esquimalt Harbour and Esquimalt Lagoon.

Ecological Ratings

Intertidal ecological ratings were updated using a refined version of the original HEIR methodology. Shoreline segments ("Shore Units") were evaluated based on:

- Species-diverse assemblages
- Habitat diversity
- Degree of naturalness
- Presence of key life cycle areas

Each Shore Unit is assigned an overall ecological rating ranging from *Very High* to *Very Low*.

Additional indicators were assessed but not incorporated into the overall rating, including:

- Priority for protection
- Priority for restoration
- Vulnerability to coastal squeeze
- Fisheries value
- Habitat connectivity
- Blue carbon potential

These supplementary indicators can support management and planning decisions related to protection, restoration, and climate adaptation.

Ecological ratings are relative within the study area and are intended to:

- Identify areas of comparatively high or low ecological value
- Support prioritization for conservation and restoration
- Inform planning, development application review, and stewardship

Ratings are suitable for regional and strategic applications and are **not intended to replace site-specific environmental assessments or regulatory requirements**.

A new ecological rating framework was developed for subtidal habitats, applying similar criteria to benthic (sea floor) units defined primarily by depth and substrate. This methodology represents an initial implementation and is expected to benefit from further refinement.

Map 4 (attached) shows the overall ecological ratings for the intertidal and subtidal areas of the harbours.

Data Accessibility and Applications

HEIR datasets, along with compiled existing “Valued Fish and Marine Bird Habitat” layers, will be made publicly available through an update to the CRD Harbours Atlas (anticipated September 2026). Data will be accessible as GIS layers and through a web-based mapping interface and may also be shared with partners under data use agreements.

Key applications include:

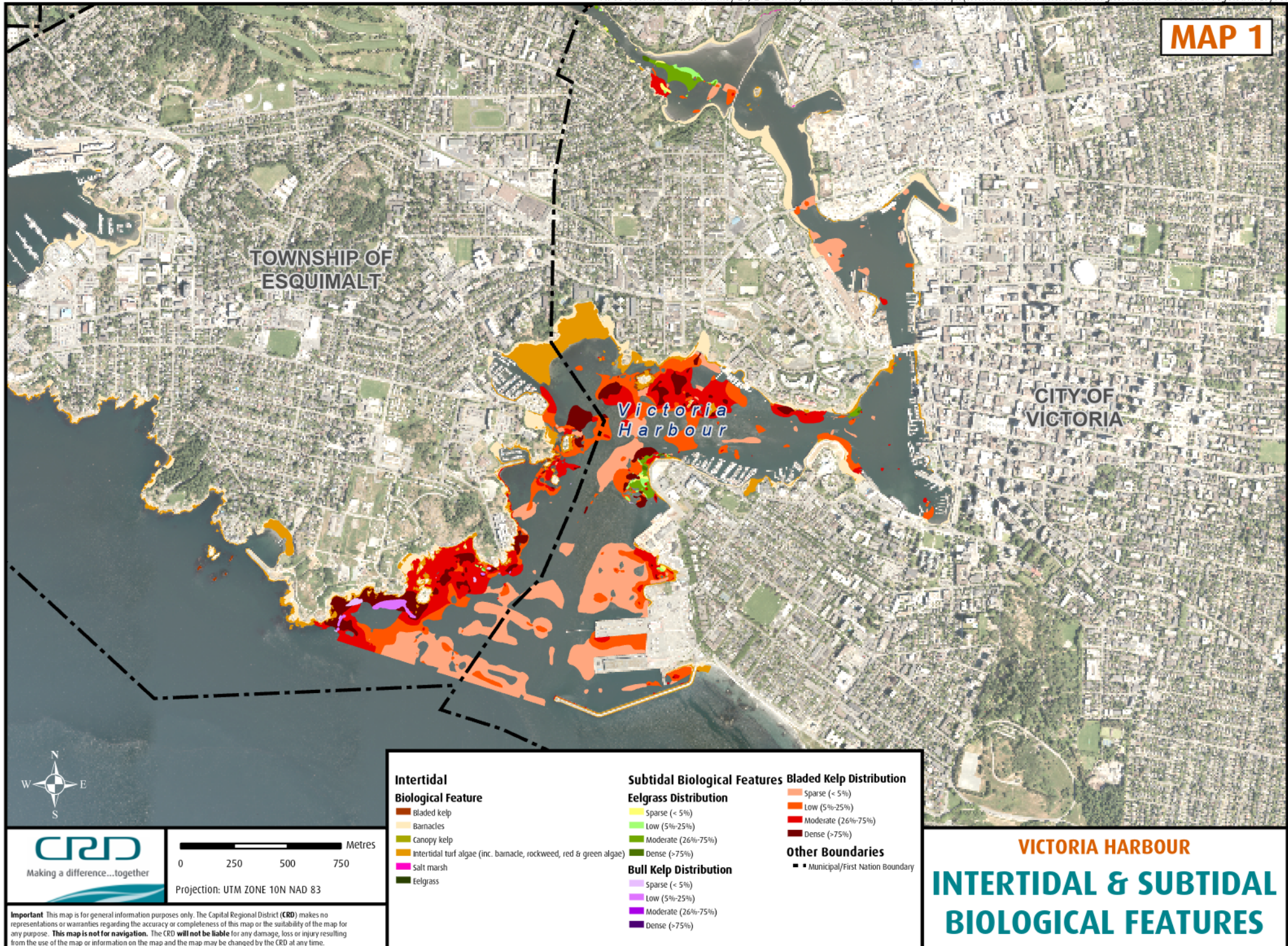
- Coastal and marine spatial planning and management
- Land use planning
- Habitat protection and restoration prioritization
- Climate adaptation (e.g., coastal squeeze, blue carbon)
- Environmental research
- Public education and stewardship initiatives

Limitations

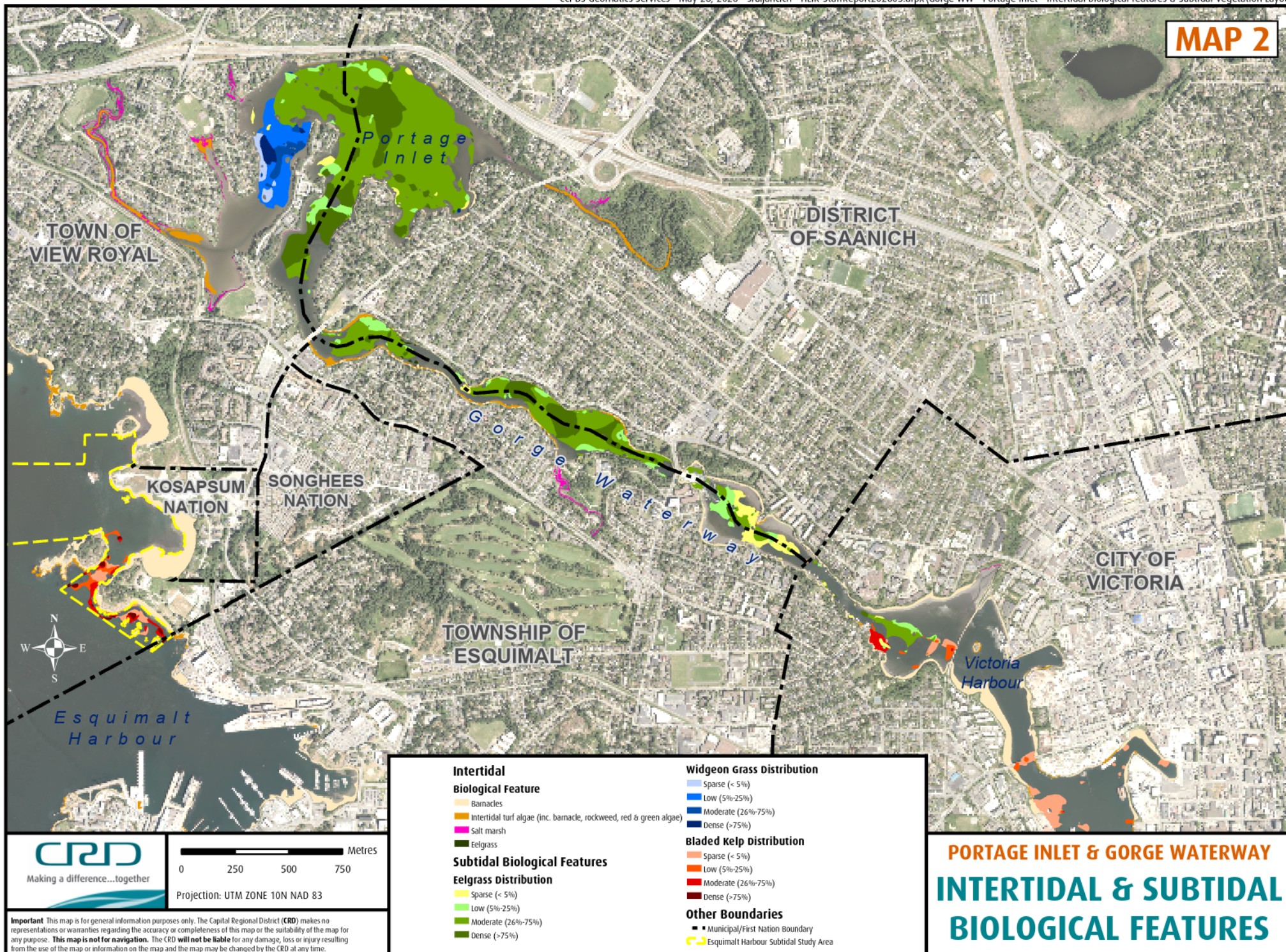
The HEIR dataset should be interpreted with consideration of the following limitations:

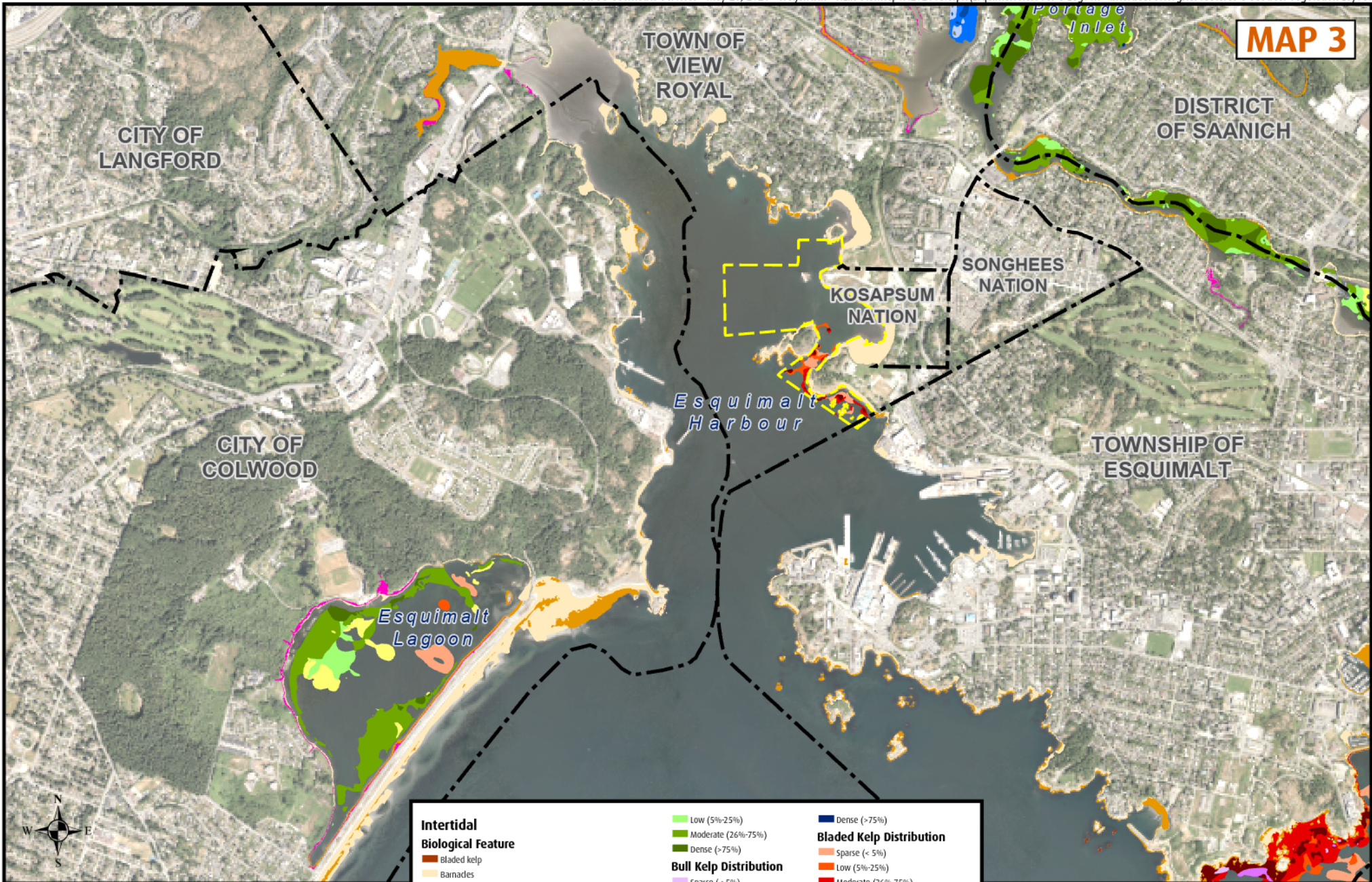
- **Spatial coverage constraints:** Subtidal data gaps exist in portions of Esquimalt Harbour
- **Modeling uncertainty:** Interpolated subtidal habitat polygons and some intertidal polygons represent estimated distributions
- **Temporal variability:** Data was collected over multiple seasons and years
- **Detection limitations:** Towed video surveys are influenced by visibility and field conditions, and intertidal mapping is influenced by orthophoto image quality
- **Data resolution:** Not intended for detailed site-level decision-making
- **Backshore data dependence:** Based on existing land cover datasets with varying accuracy

MAP 1



MAP 2



MAP 3

CRD
Making a difference...together

0 250 500 750 Metres
Projection: UTM ZONE 10N NAD 83

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ESQUIMALT HARBOUR & LAGOON
INTERTIDAL & SUBTIDAL
BIOLOGICAL FEATURES

MAP 4

CRD
Making a difference...together

0 200 400 600 800 1,000 Metres
Projection: UTM ZONE 10N NAD 83

Intertidal Overall Ecological Rating

- Very High
- High
- Medium
- Low
- Very Low

Subtidal Overall Ecological Ratings

- High
- Medium
- Low

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**CORE AREA HARBOURS
INTERTIDAL & SUBTIDAL
ECOLOGICAL RATINGS**