

Characterization of near-shore marine vegetative habitat throughout Fortune Bay and Bay d'Espoir

Methodologies

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Objective:

Data is being collected on targeted components of coastal ecosystems throughout Fortune Bay, Connaigre Bay and Bay d'Espoir to develop a baseline dataset characterizing seagrass, macroalgae and other habitats created by structure-providing species. Throughout ten sites in this region, transect data will be collected detailing seagrass and macroalgae species frequency, abundance, and distribution. As part of this characterization, marine sediments will be documented along each transect, and in-situ water quality data collected. Additionally, pole seines will be conducted at each site to collect baseline data on the presence and diversity of fish and invertebrate species present within these habitats.

Marine Vegetation

To collect data on the distribution, abundance, density, and frequency of seagrass meadows, macroalgae, and other structure-forming species.

Marine Sediment

To characterize intertidal and subtidal marine sediment profiles along survey transects.

Water Quality

To collect in-situ water quality data (temperature, pH, salinity, dissolved oxygen, conductivity, turbidity) along marine vegetation transects.

Species Inventory

To collect data on nearshore fish and invertebrate community assemblages near marine vegetation transects.

Habitat Mapping Surveys

To delineate the boundaries and extent of current eelgrass meadows and map the probability of occurrence using ROV, video transects and RPAS aerial surveys.

Methods:

Marine Vegetation Transect Surveys

Transect surveys are conducted bi-annually in the spring and autumn to record marine vegetation present. Three transects are established perpendicular to the shoreline. Each transect begins at the wrack line of each beach and extends 100 meters across the intertidal and subtidal zones of each site. Estimates of seagrass density and other macroalgae present are recorded every 5 meters along the transect by snorkel using a 0.25m² quadrat. Seagrass density is estimated to be in one of eight density coverage which include:

- Absent from quadrat.
- Single shoot
- Less than 5% coverage, less than 5 shoots
- Less than 5% coverage, more than 5 shoots
- 5% coverage to 25% coverage
- 26% coverage to 50% coverage
- 51% coverage to 75% coverage
- 76% coverage to 100% coverage

Density for all other macroalgae recorded in each quadrat is estimated at the following density coverages:

- Absent from quadrat.
- 1% coverage to 25% coverage.
- 26% coverage to 50% coverage.
- 51% coverage to 75% coverage.
- 76% coverage to 100% coverage.

Each transect is video recorded and each quadrat photographed and georeferenced.

Marine Sediments Classification

For each quadrat sampled along the transects surveyed, a sediment classification is recorded. The dominant sediment class within the quadrat is recorded and categorized as:

- Silt/Clay (<0.062 mm)
- Sand (0.062 - 2 mm)
- Gravel (2 - 4 mm)
- Pebble (4 - 64 mm)
- Cobble (64 - 256 mm)
- Boulder (>256 mm)

Other Transect Data Collected

The presence of any aquatic invasive species is documented along each transect. Water depth is recorded at each quadrat and water quality is documented at the beginning and end of each transaction using an in-situ handheld multimeter, turbidity is acquired with a portable turbidimeter. Parameters that are recorded include:

- Temperature
- Salinity
- pH
- Specific conductivity
- Total dissolved solids
- Turbidity

Species Inventory Surveys

Pole seines are conducted annually during spring sampling. Each survey is conducted parallel to the shore and adjacent to transect surveys. As part of each survey, a 10-meter seine net with a mesh size of 3/16th inch is hauled parallel to the shore by foot, for 100 meters depending on shoreline availability. Species captured are identified and enumerated before release on site. All aquatic invasive species captured during pole seine are removed from site and any species at risk are documented and reported immediately.

Habitat Mapping Surveys

Underwater video transects are completed throughout each site bi-annually using a remotely operated vehicle and/or underwater GoPro footage. Data collected from video surveys for classification and ground truthing for eelgrass meadow delineation maps.

Aerial surveys are completed at each site bi-annually using a multi-rotor remotely piloted aerial system. Flights paths are completed at 100 meters altitude capturing RGB and multispectral images within the site boundaries. Aerial images captured are processed to develop an Ortho mosaic map of the site surveyed and classified using an object-based classification analysis based on four categories:

- Eelgrass
- Rockweed
- Bare ground
- Deep water