

Lucy Islands Eelgrass Study

Dr. Barb Faggetter

Research carried out by Ocean Ecology

In partnership with WWF

Funding provided by MEC



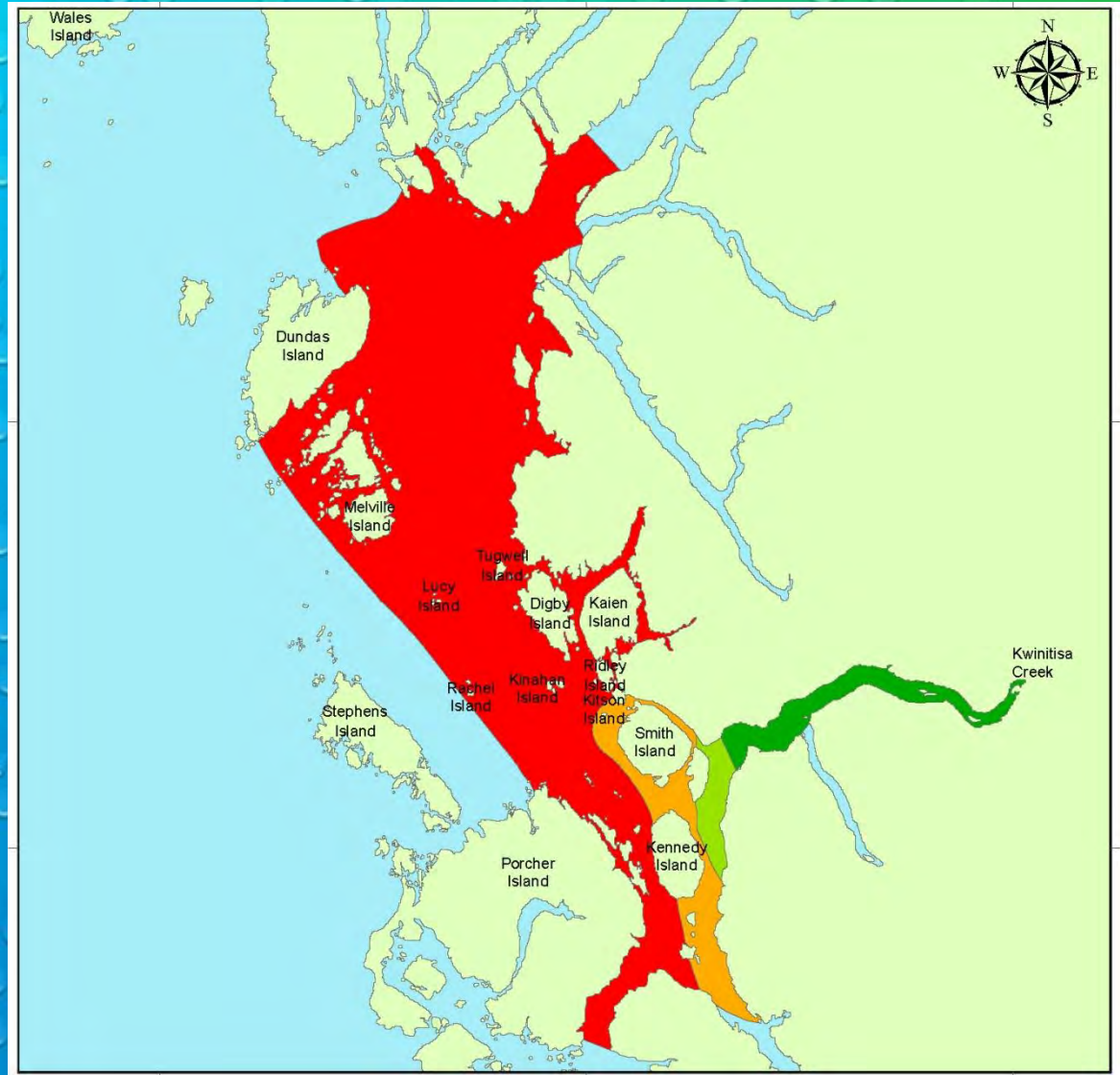
Outline

- I. Study Site
- II. Project Objectives
- III. Project Design
- IV. Project Results
- V. Future Directions



I. Study Site

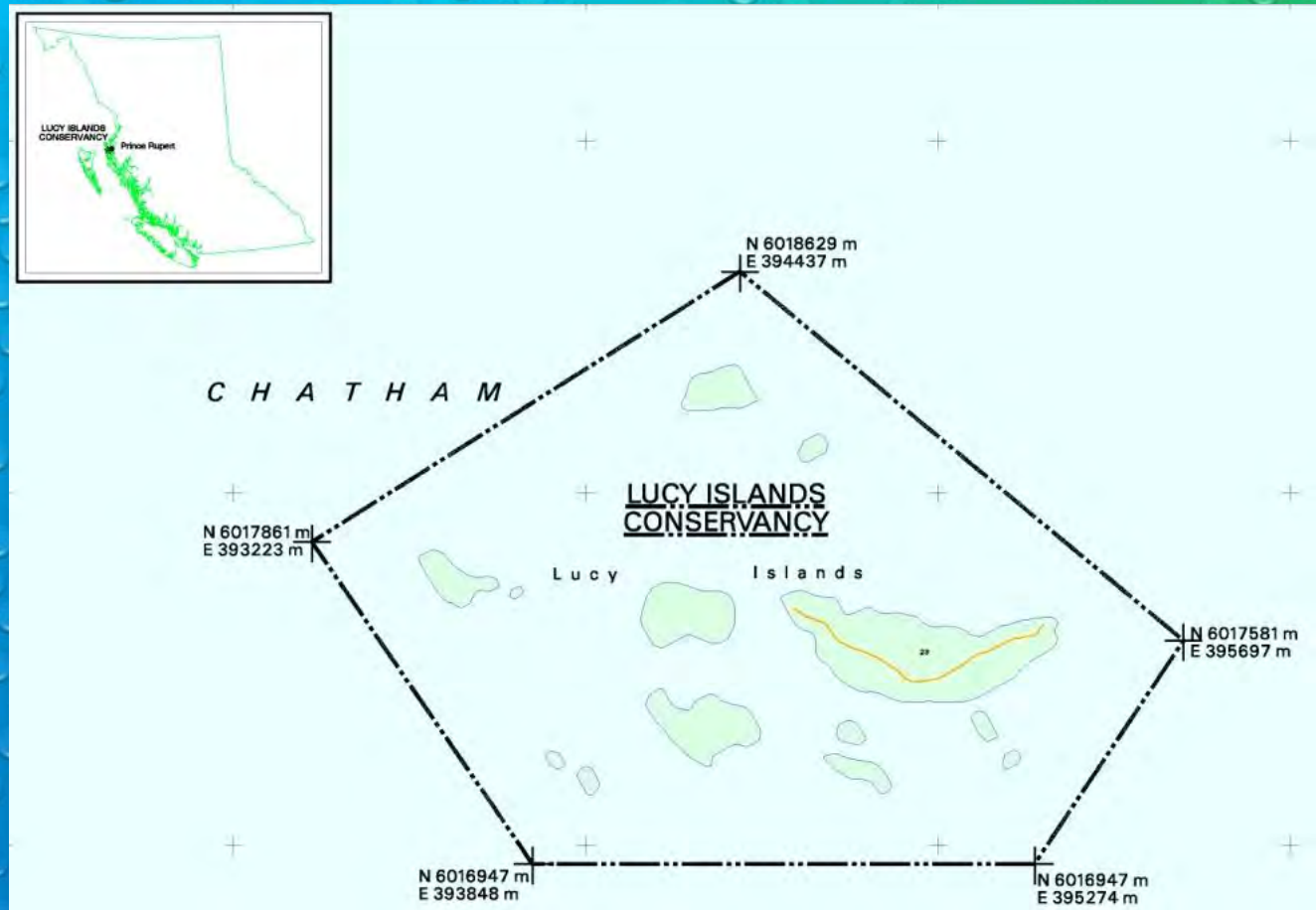
The Lucy Islands lie in the middle of Chatham Sound, approximately 21 km west of the city of Prince Rupert.



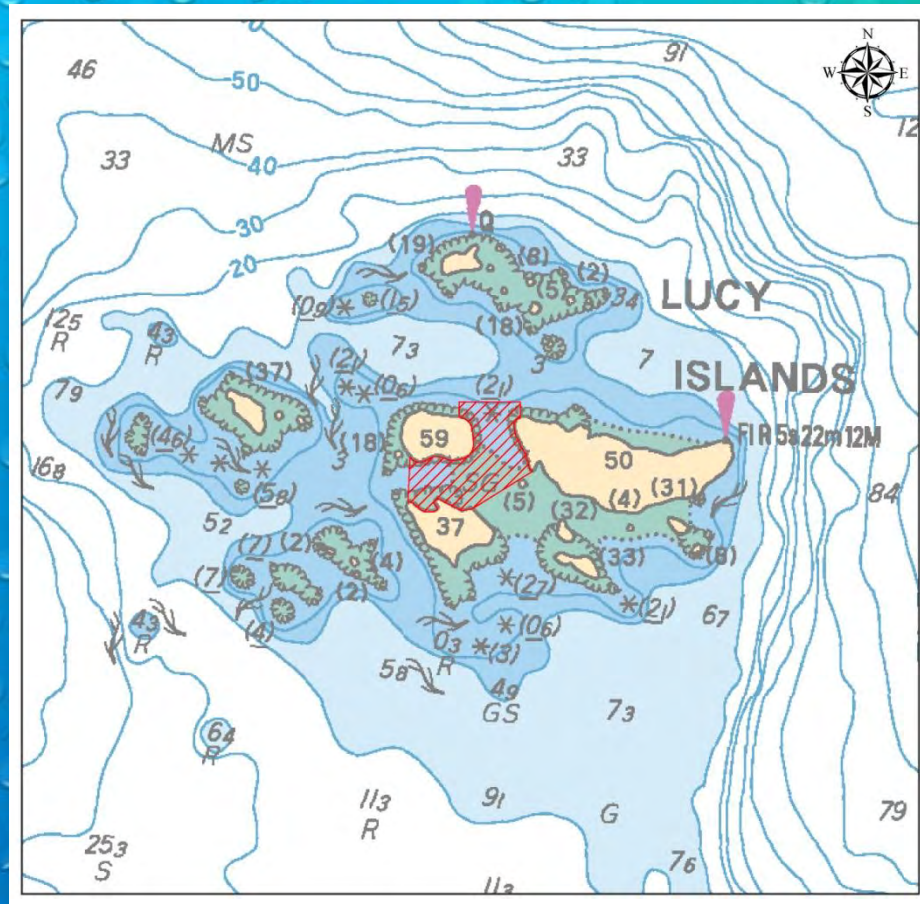
The Lucy Islands are a nationally listed important bird area (IBA) for rhinoceros auklets.



The Lucy Islands Provincial Conservancy is a new conservancy that was established pursuant to government's land use decision for the North Coast planning area.



OCEAN ECOLOGY



II. Objectives of the Lucy Islands Eelgrass Study

- ★ To assess the productivity and ecological roles of eelgrass on the north coast.



- ★ To compare the productivity of the Lucy Islands' eelgrass bed with other eelgrass beds, such as Flora Bank, in the Skeena River estuary region.



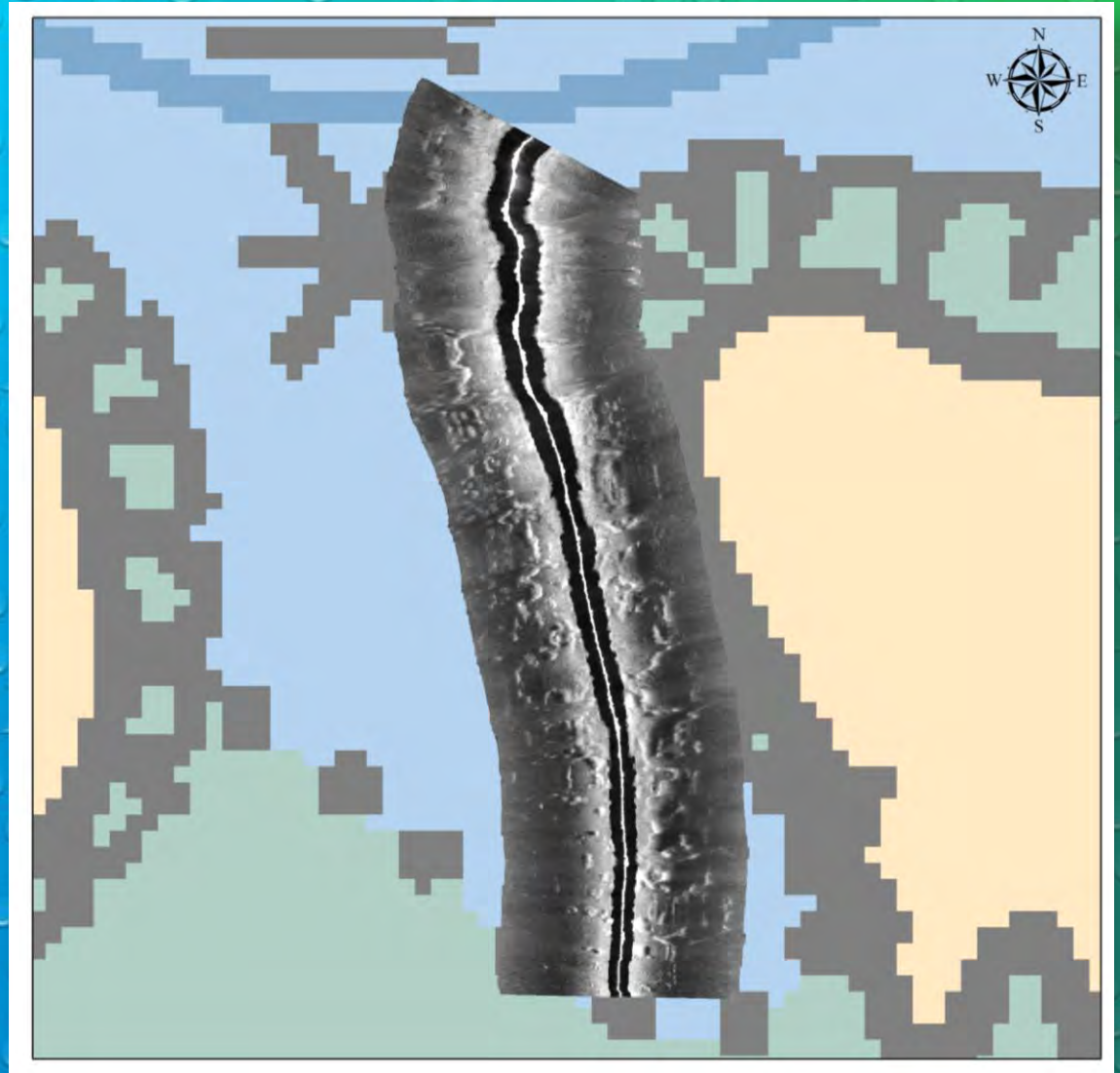
- ★ To assess the damage caused to the Lucy Islands' eelgrass bed by the use of anchors during the course of recreational boater activities in the area.



- ★ To provide a clearer understanding of the ecological relationship of the Lucy Islands' eelgrass bed to the Lucy Islands' role as an established IBA.



- ★ To assess the use of sidescan sonar as a tool to quantify subtidal eelgrass beds.



III. Project Design

Three surveys were carried out at different seasons:

- ★ July 17th to July 19th, 2010
- ★ October 27th, 2010
- ★ April 20th, 2011



The following information was collected:

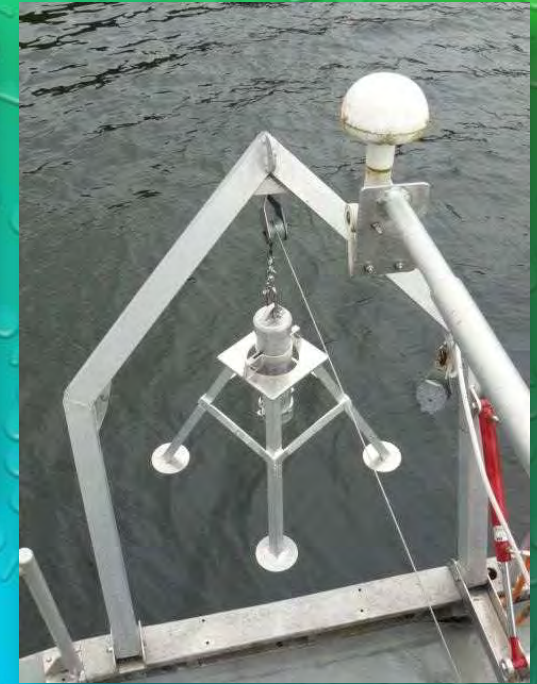
- ★ Towed benthic video camera footage
- ★ High definition video drop camera photos
- ★ Side scan sonar imagery
- ★ Multibeam and single-beam bathymetry
- ★ Fish and mobile invertebrates from beach seining
- ★ Bird, mammal, and human activity observations



Single-beam
sounder towfish →



Towed benthic
video camera ↓



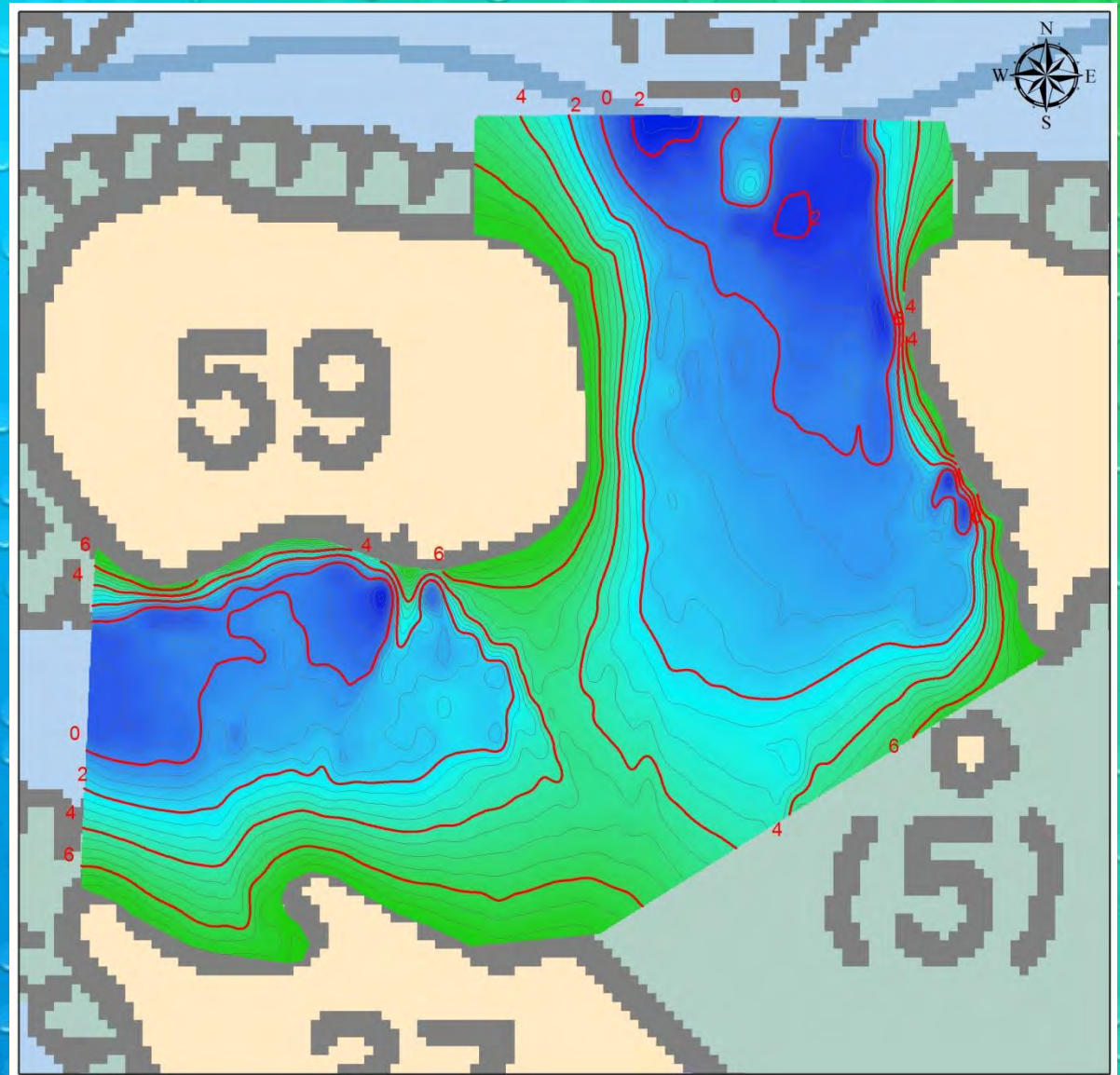
High definition
video drop camera

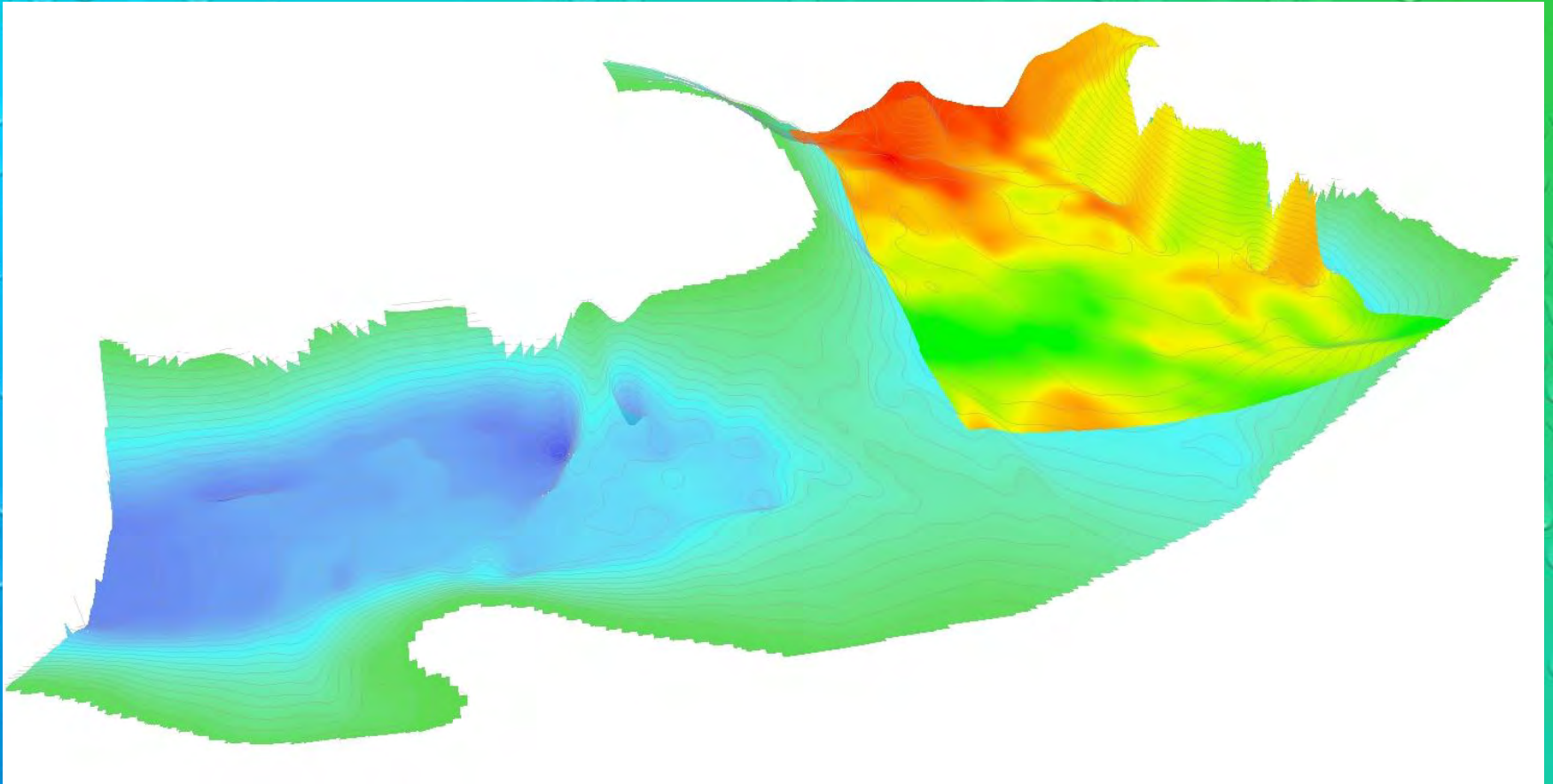


← Side scan/
multibeam sonar
towfish

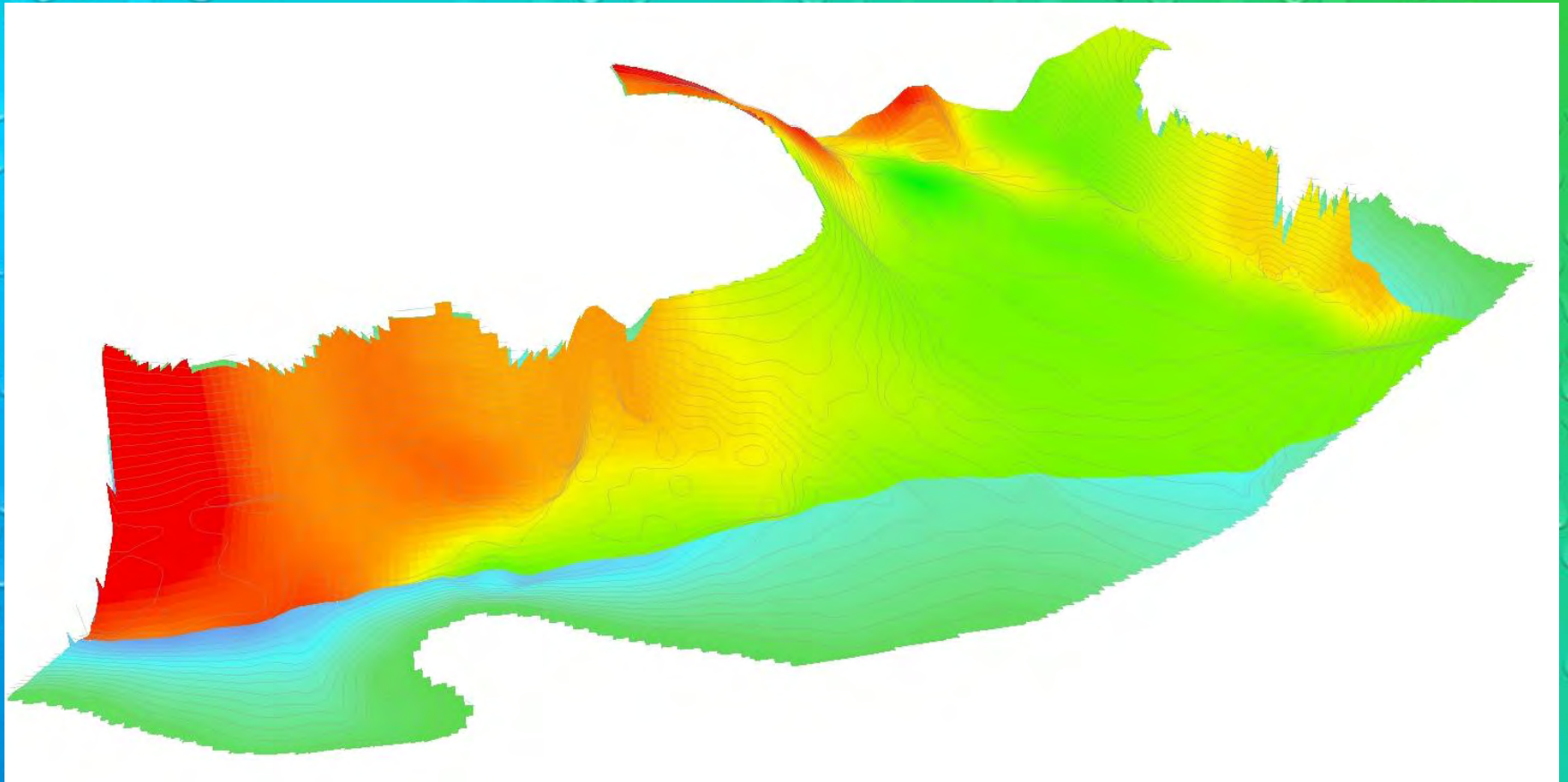
IV. Project Results

- ★ High resolution site bathymetry. Note intertidal sandbar in center of site.



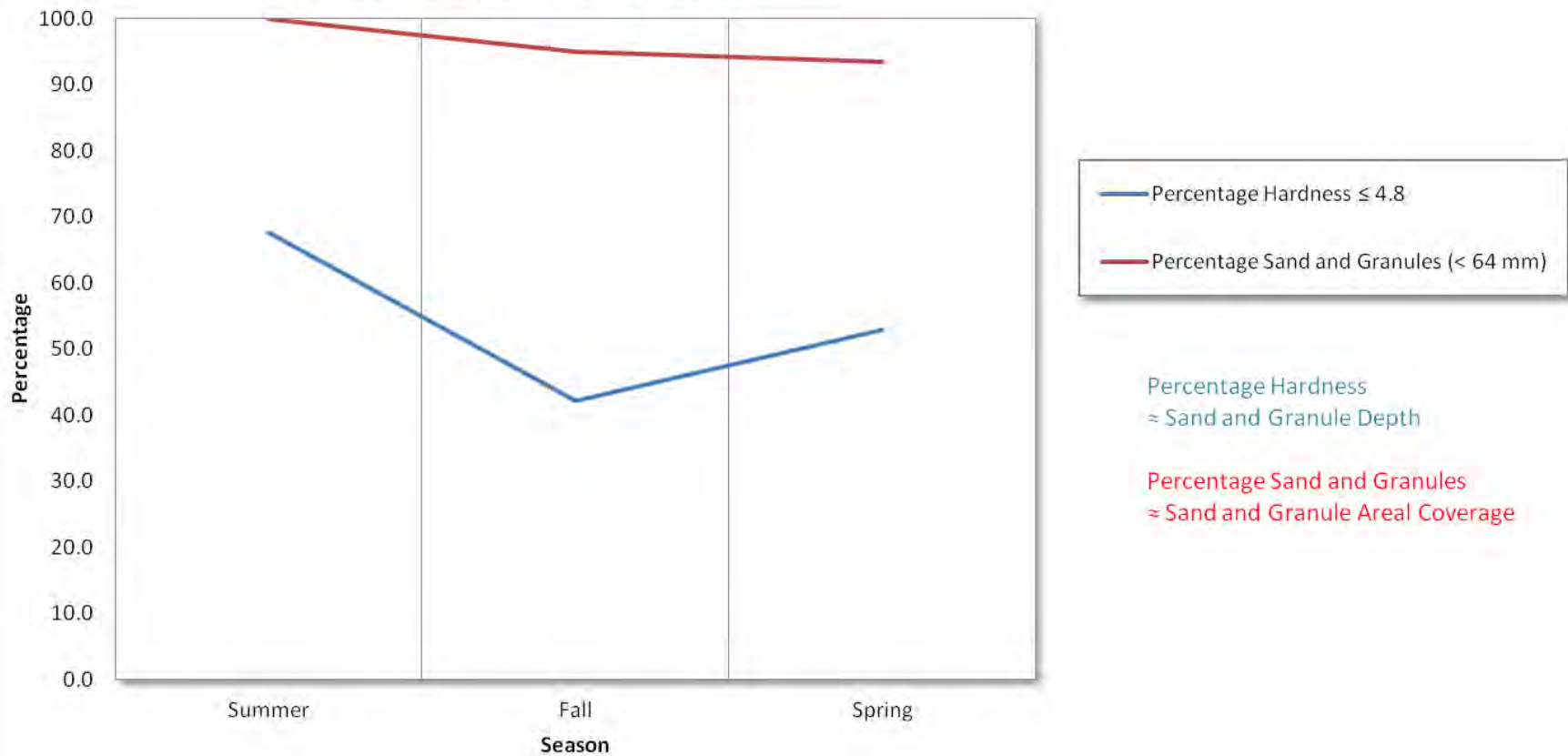


- ★ Bottom hardness. Red = rock. Green = sand. Regions of high rugosity (e.g., steep, rocky shoreline) are also colored green.

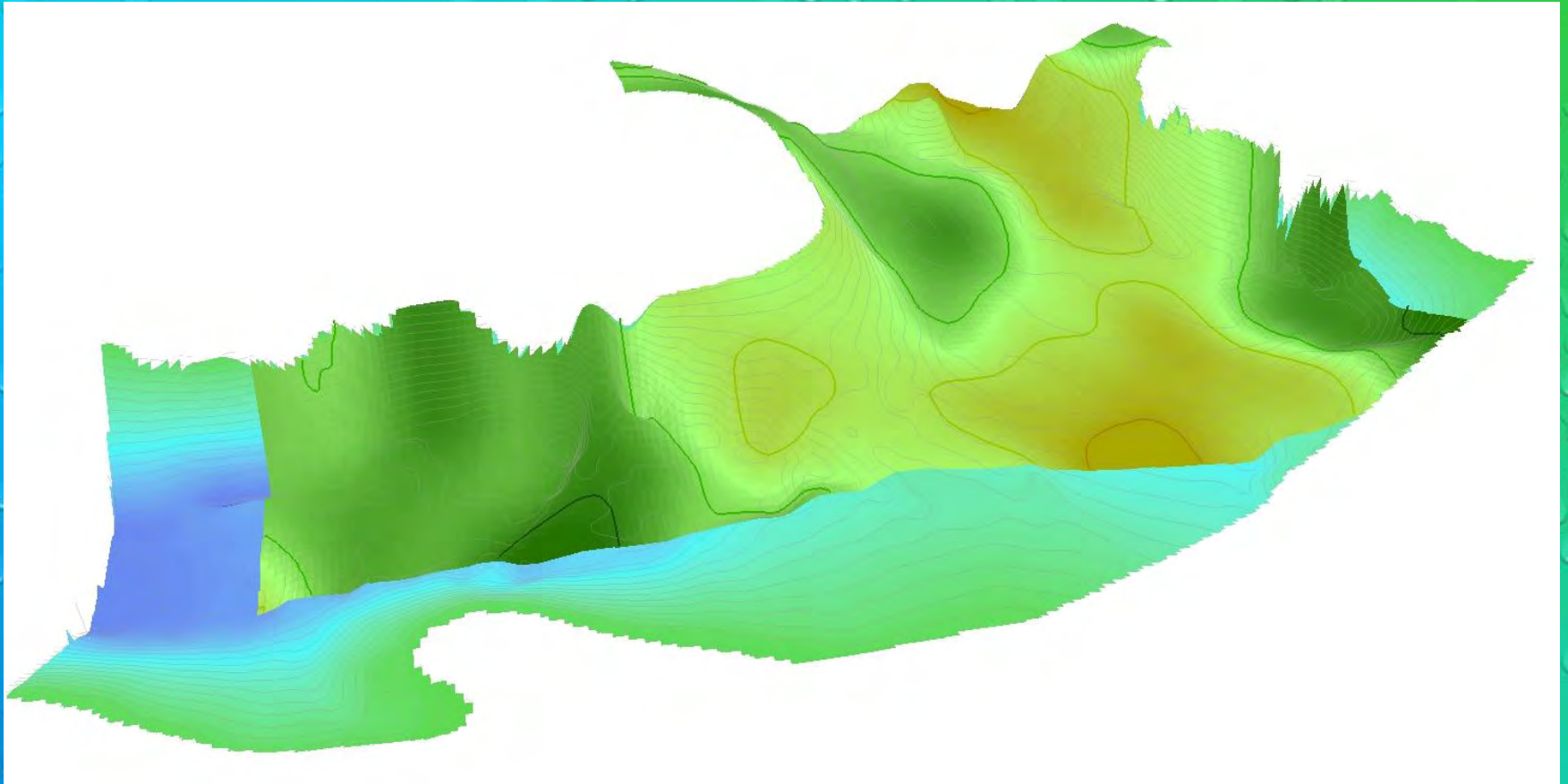


- ★ Substrate particle size.
Red = mixed substrate (> 2 mm).
Green = sand/silt (≤ 2 mm).

Seasonal Sand Migration

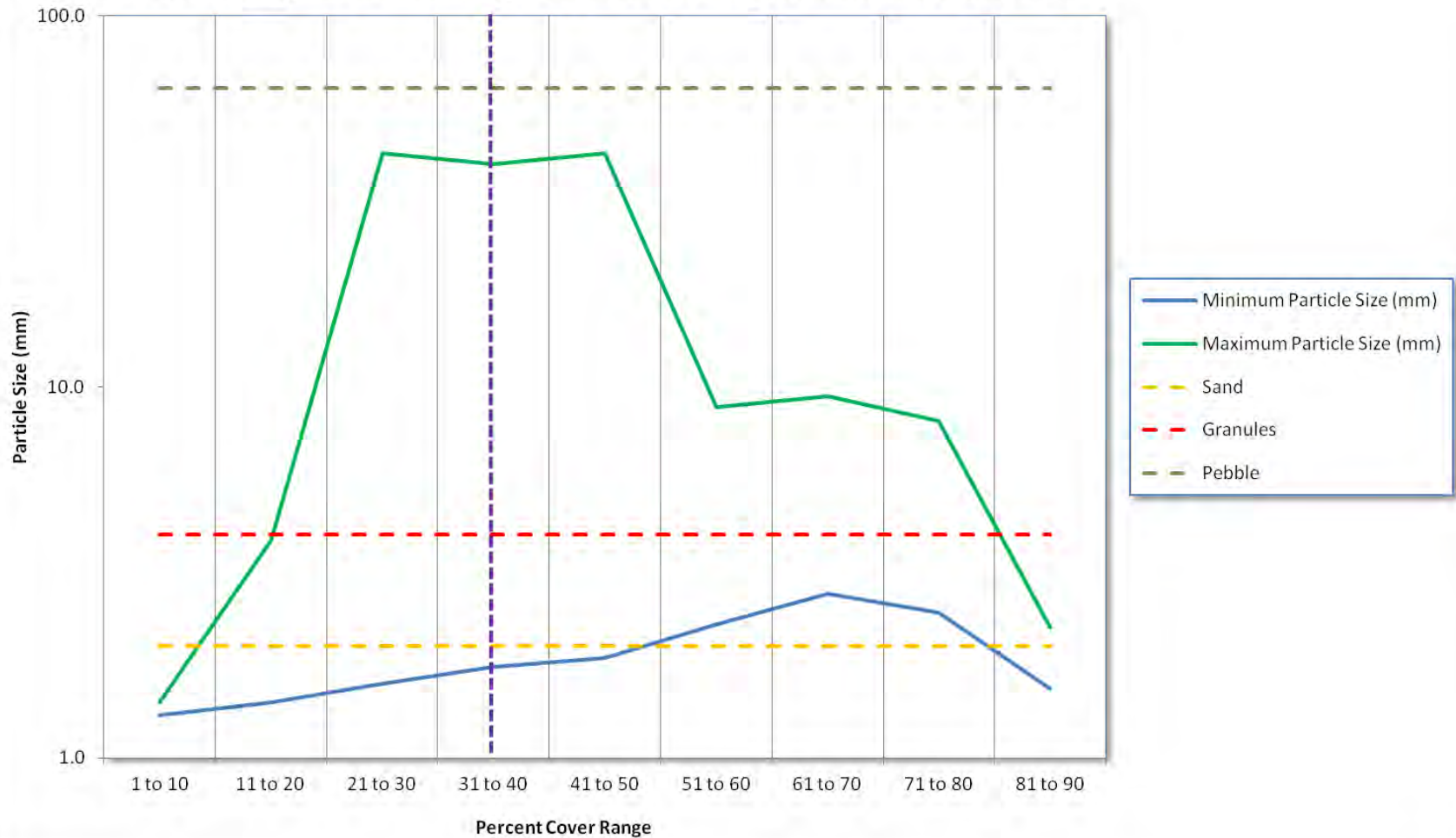


★ Strong currents and storm waves produced seasonal sand migration.



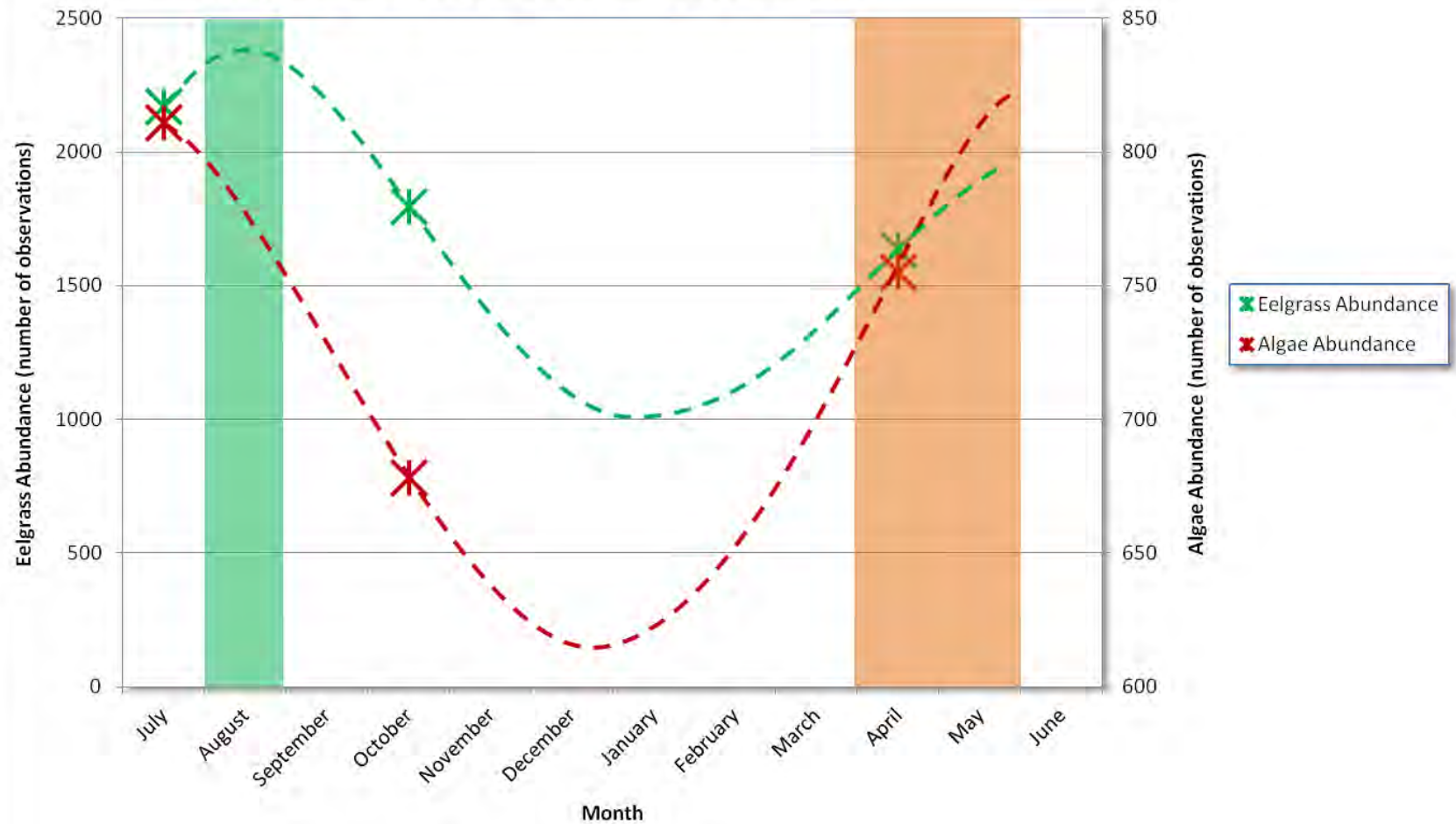
- ★ Eelgrass was most abundant at the site in areas of mixed pebble, cobble, and sand substrate.

Relationship Between Eelgrass Cover and Substrate Particle Size



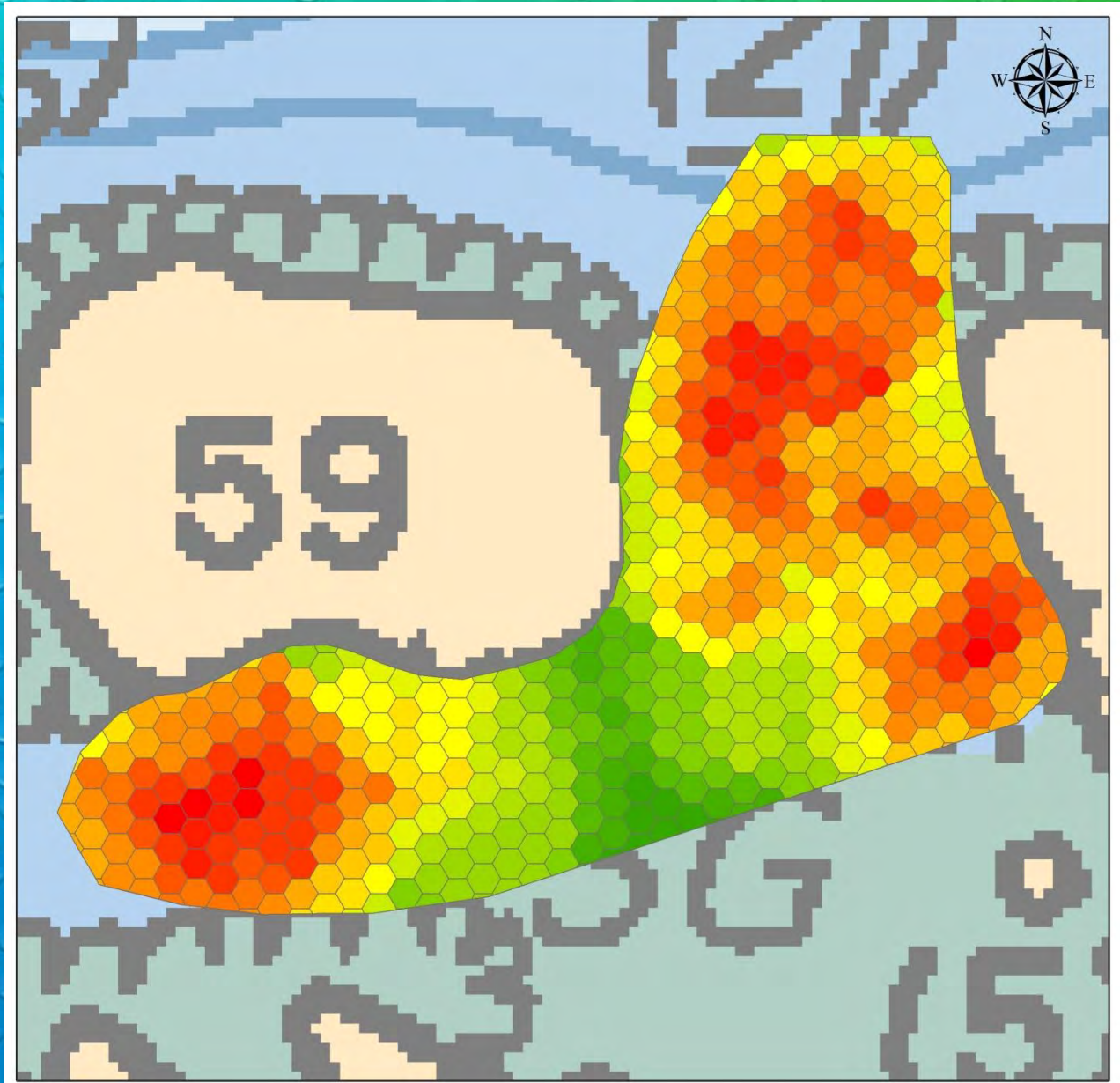
★ Mixed substrate probably reduced sand migration and prevented loss of eelgrass plants.

Eelgrass and Algae Seasonal Abundance

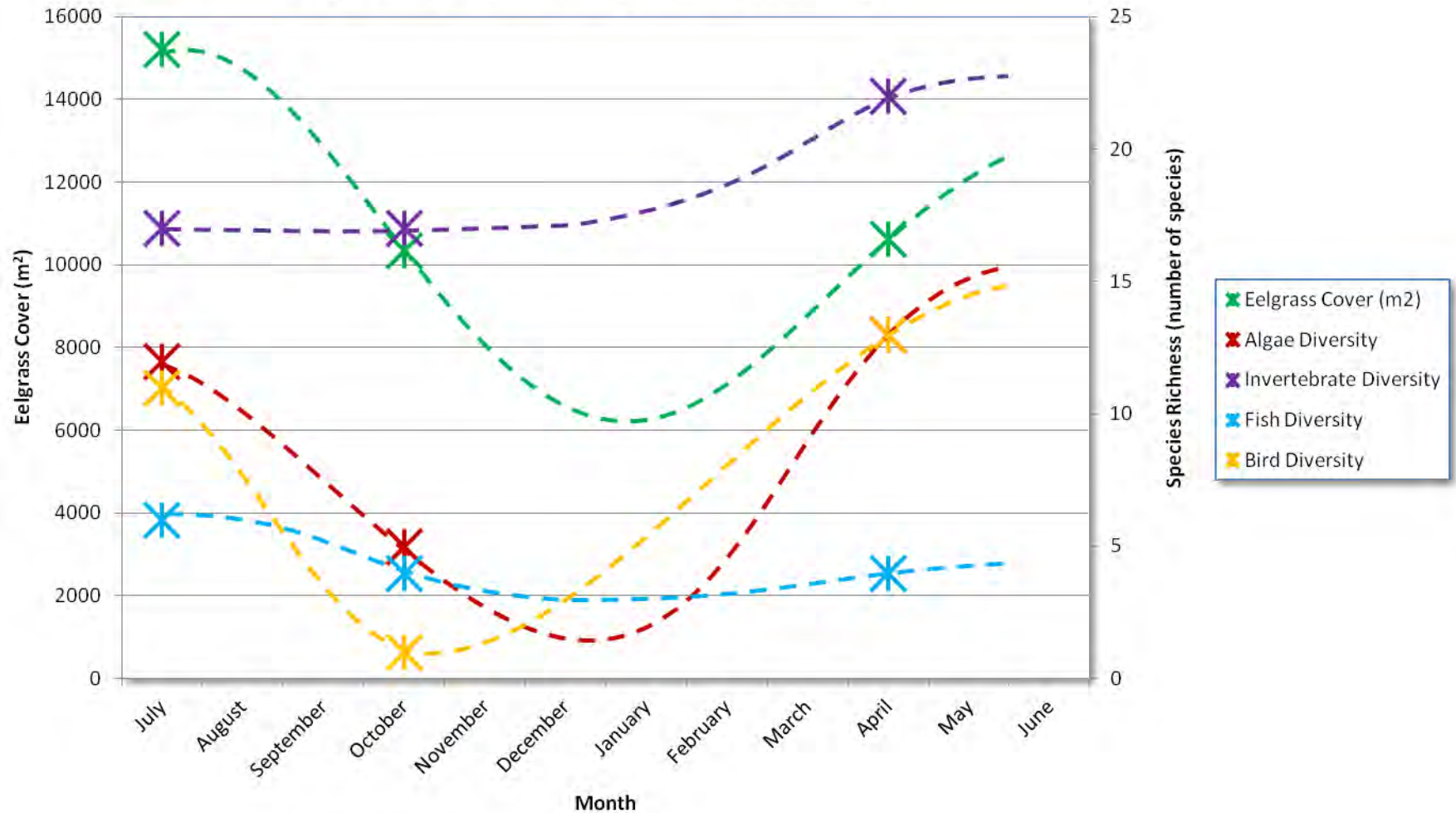


★ Algae reached its maximum abundance after April, whereas eelgrass reached its maximum abundance after July.

- ★ High marine species richness (red) was correlated with high eelgrass density.

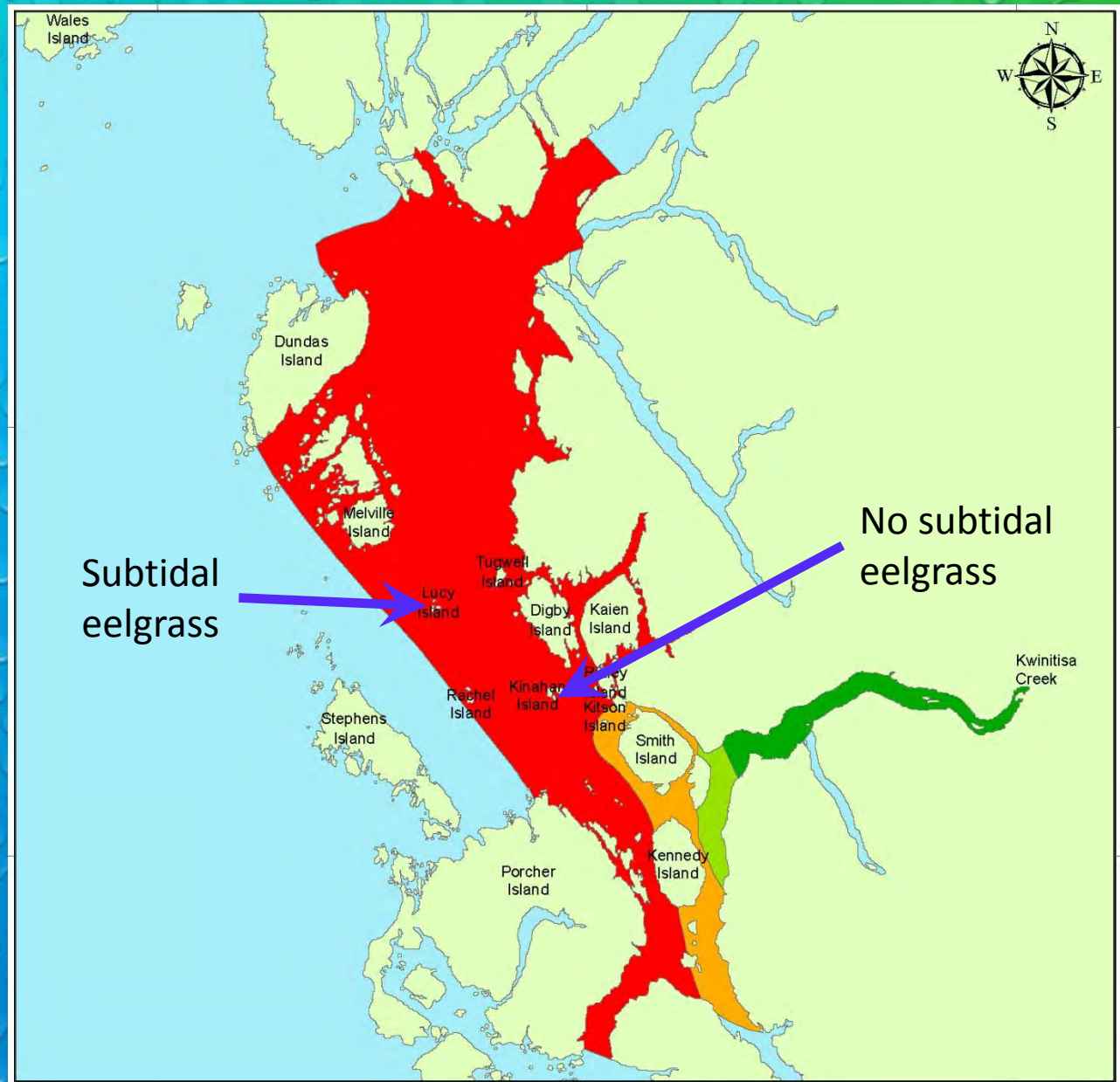


Eelgrass Cover and Species Diversity

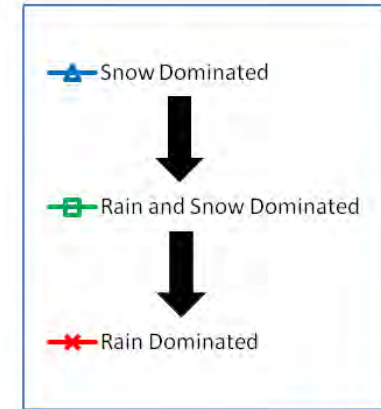
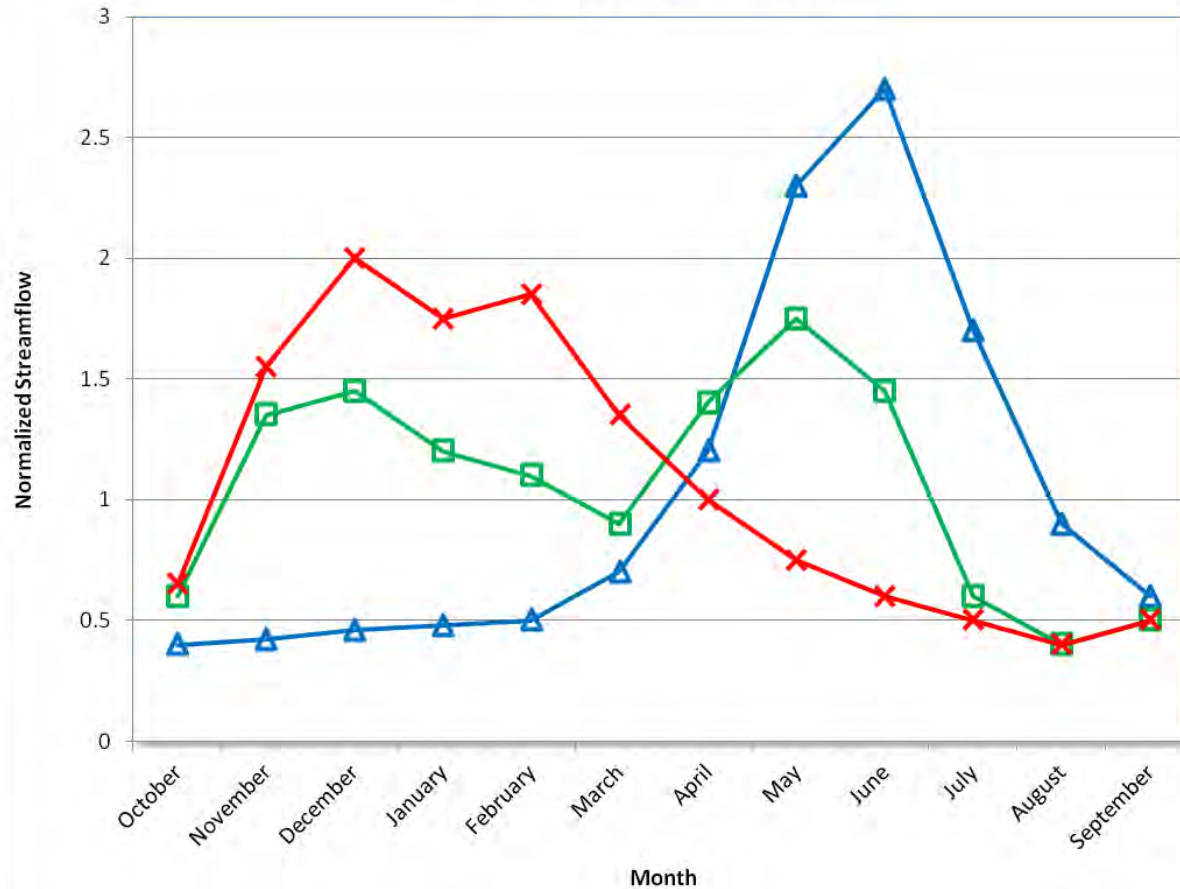


★ Eelgrass is probably providing suitable niches for a number of organisms, and feeding grounds for some bird species.

★ The Lucy Islands eelgrass bed receives terrestrial nutrients from the Skeena River, but does not experience the full impact of the plume turbidity.

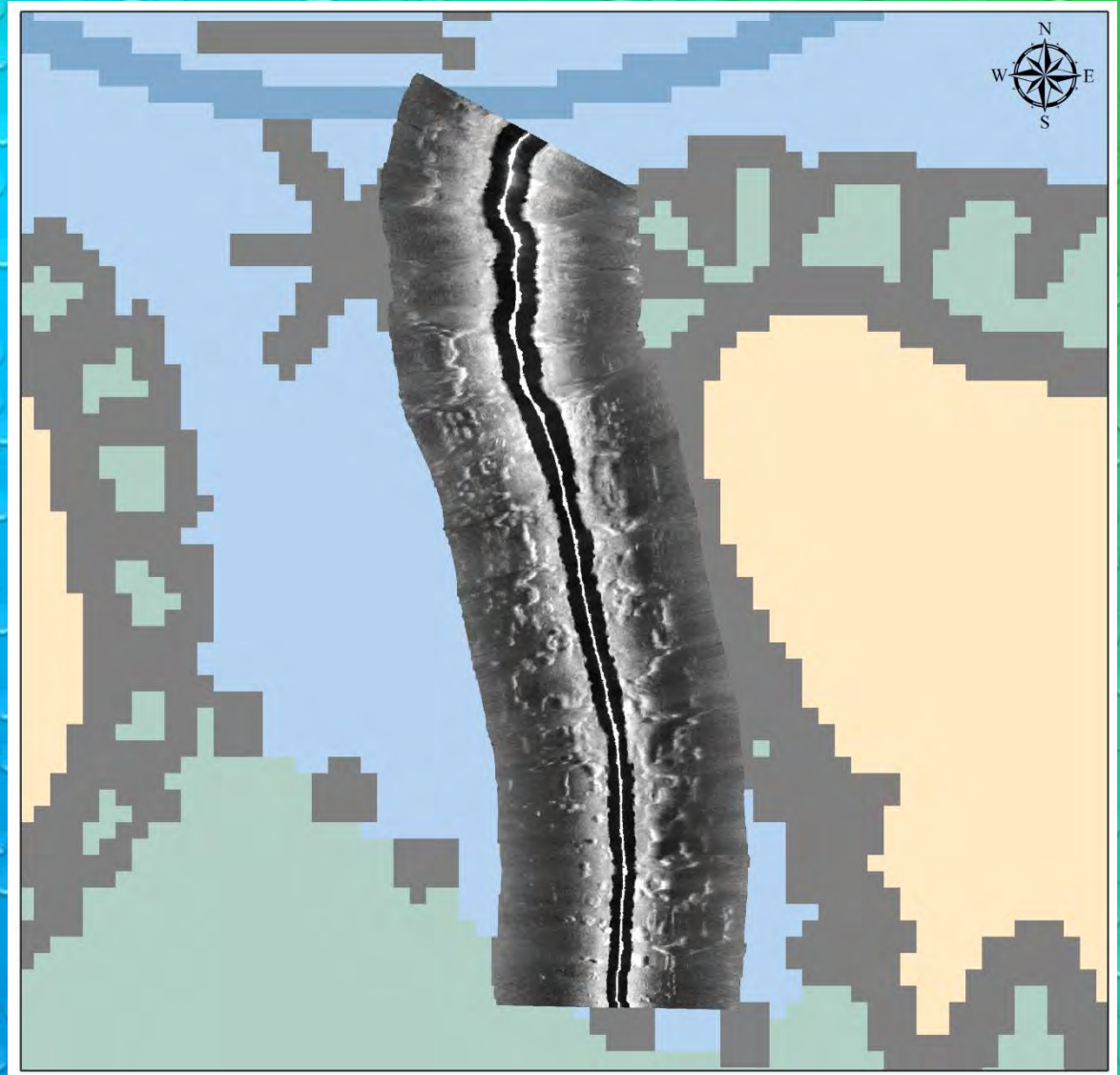


River Flow Regimes

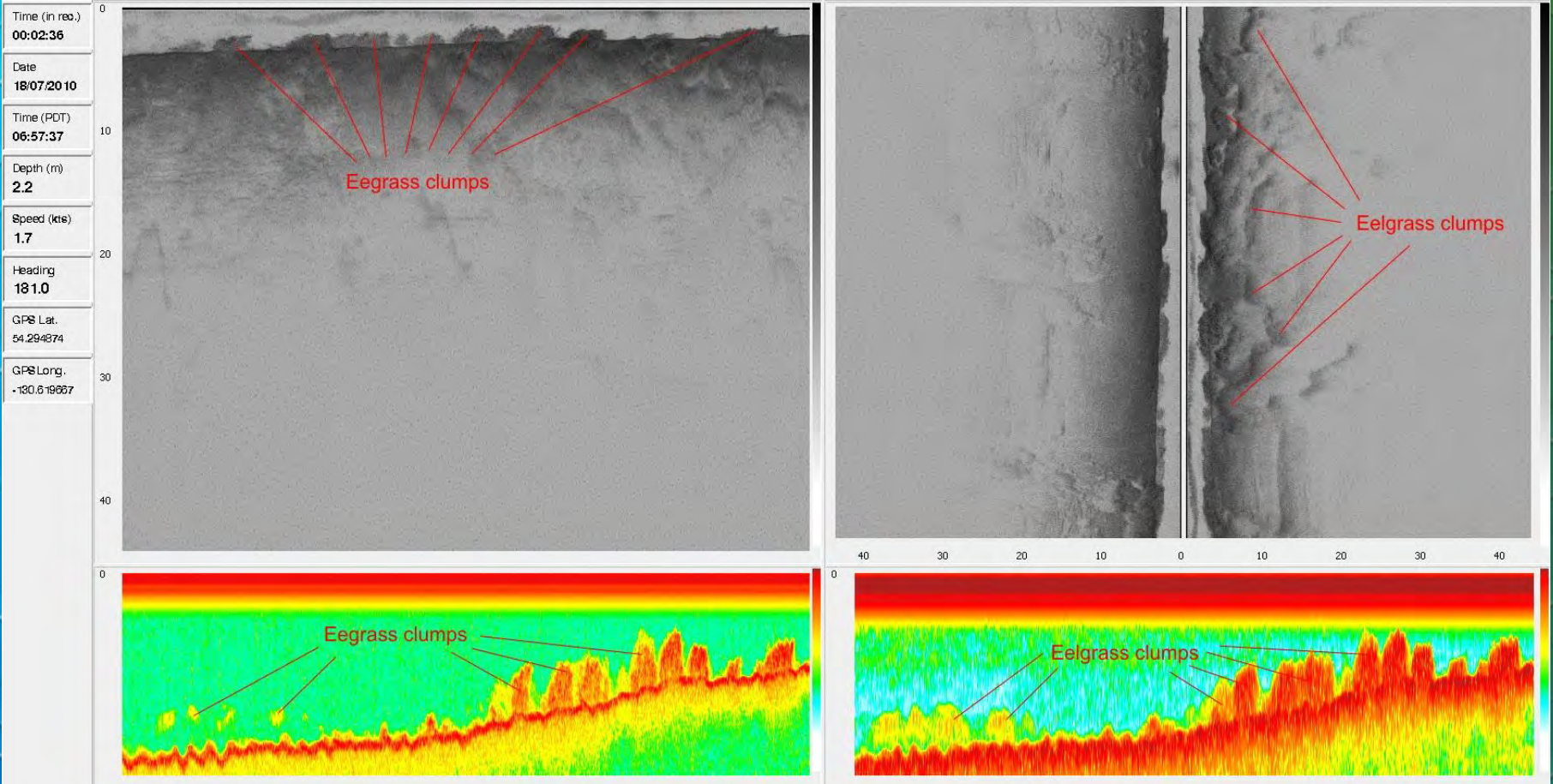


★ Changes in the Skeena River flow regime as a result of global warming may increase riverine sediment.

- ★ The image quality of the side scan data produced by the inexpensive Humminbird 997c SI unit was comparable with that of images produced by more expensive systems.

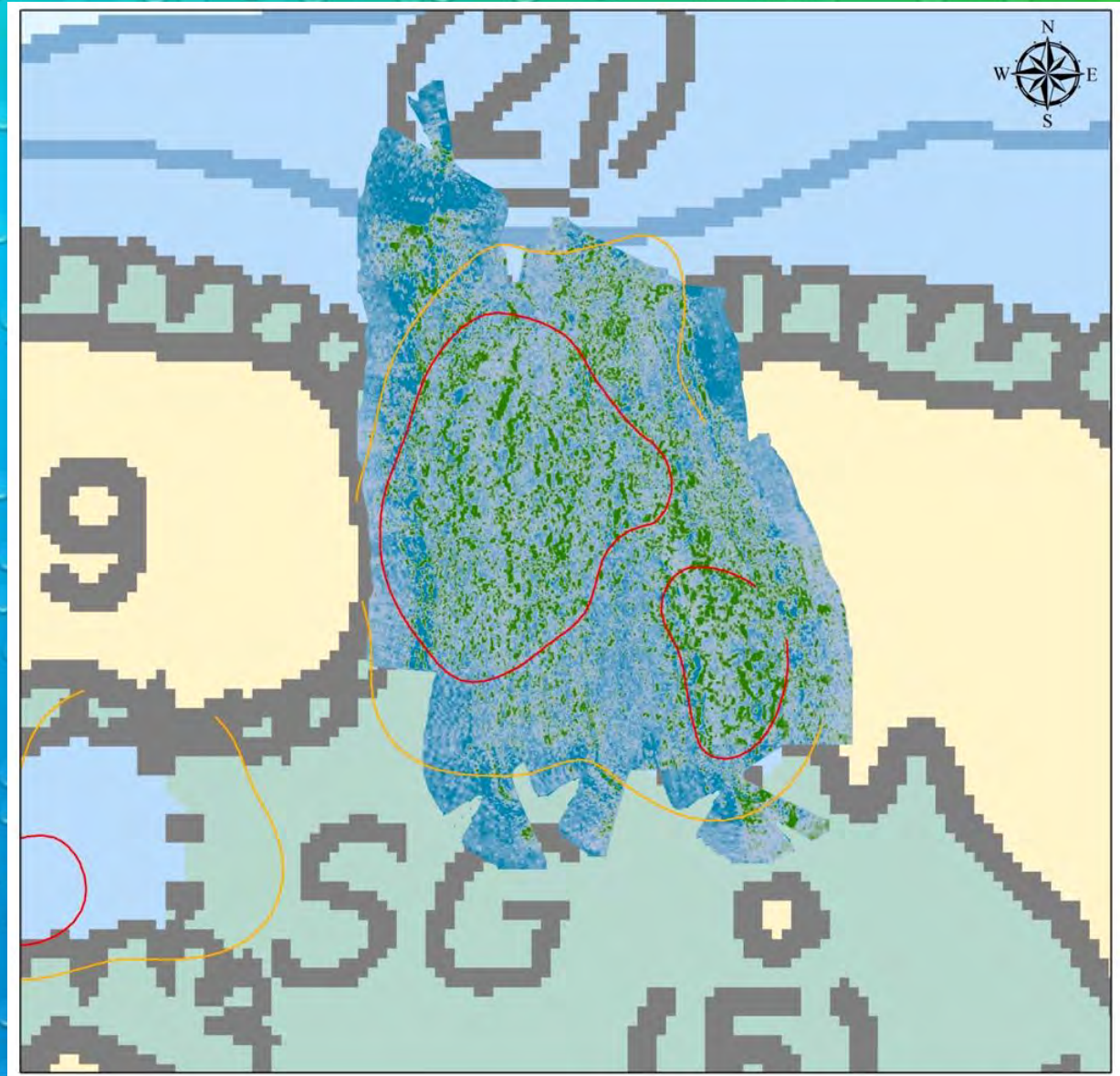


Snapshot created by HumViewer - Recording R00021 started 18/07/2010 06:57:37 PDT

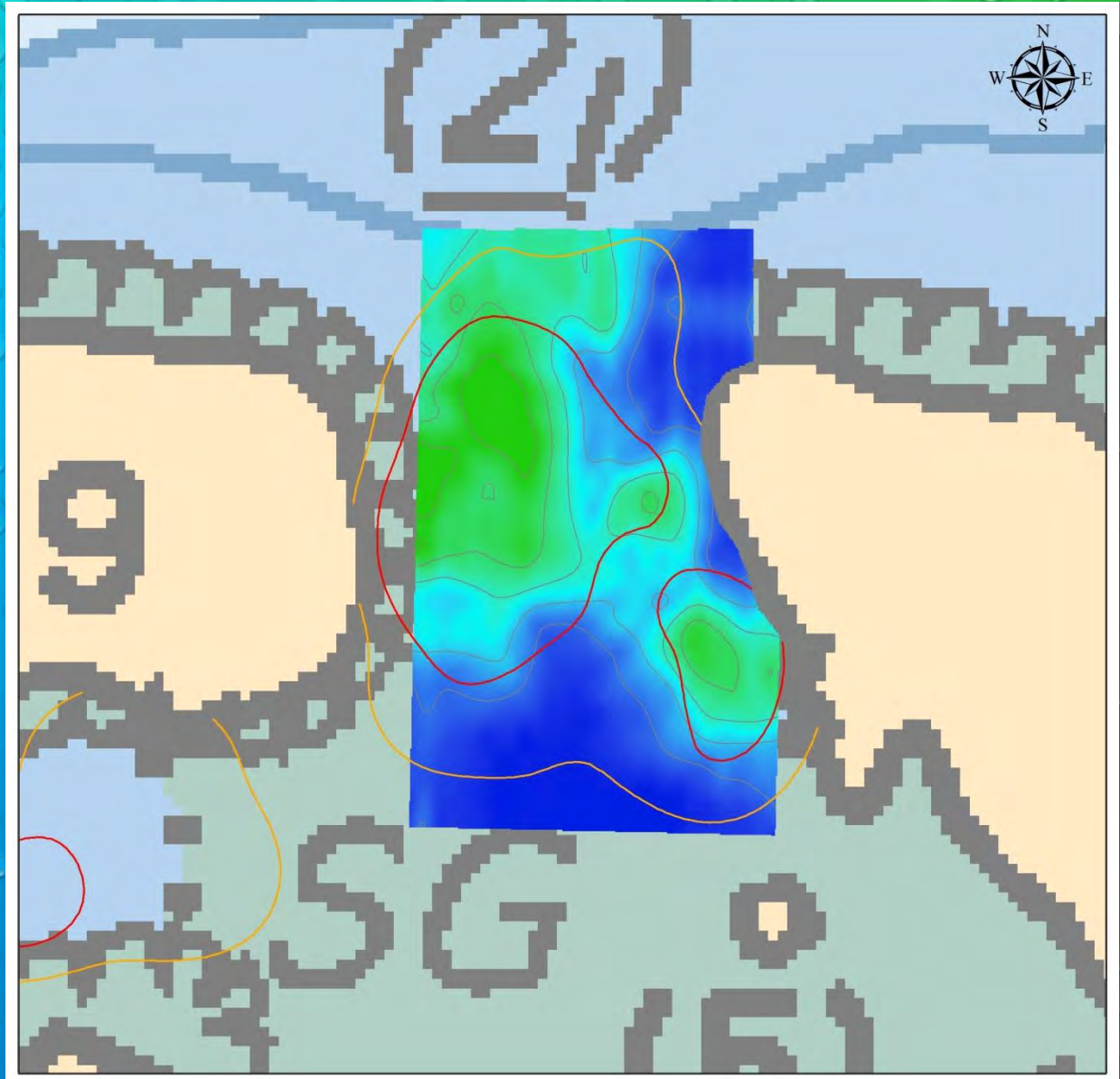


★ Side scan imagery showed that eelgrass was present as discontinuous clumps.

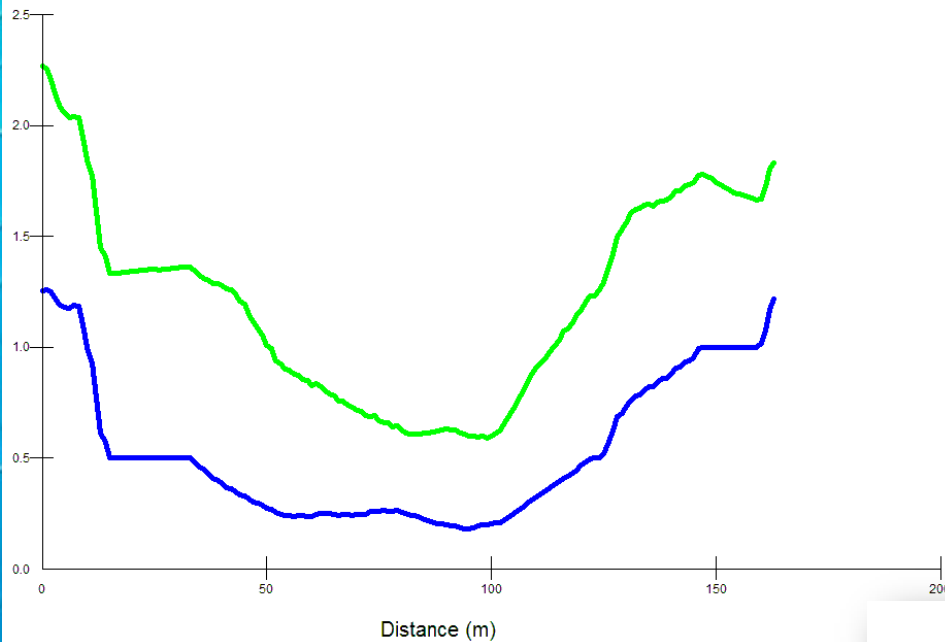
- ★ Side scan image processing techniques (GLCM, false coloring of back scatter intensity) were used to assist in the identification and measurement of eelgrass areal coverage.



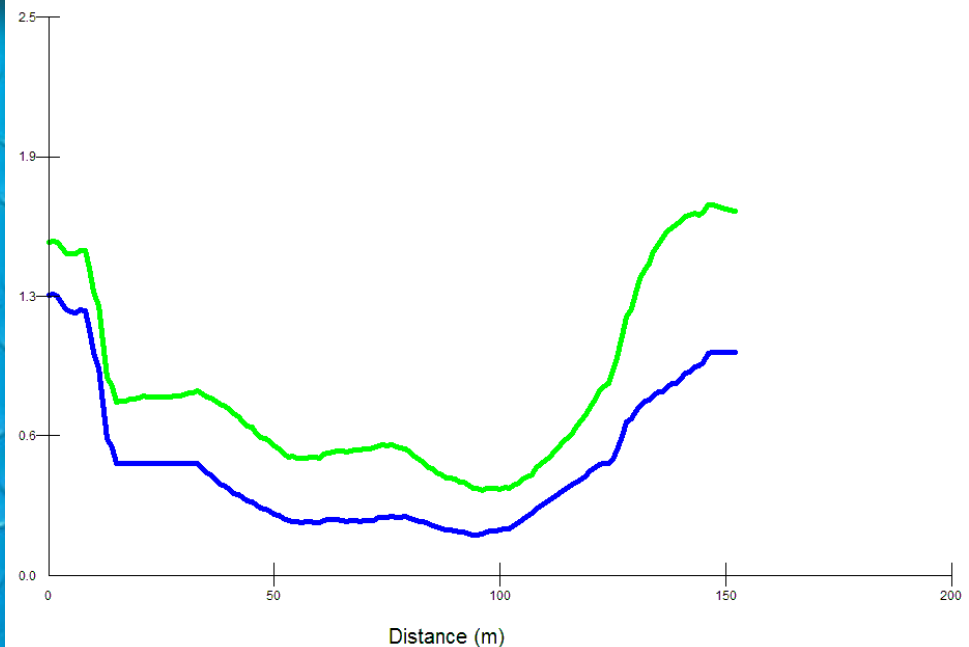
- ★ Measurement of eelgrass height using the downward-looking sonar was successful, although it does not differentiate between eelgrass and macroalgae.



Eelgrass EW Profile for July

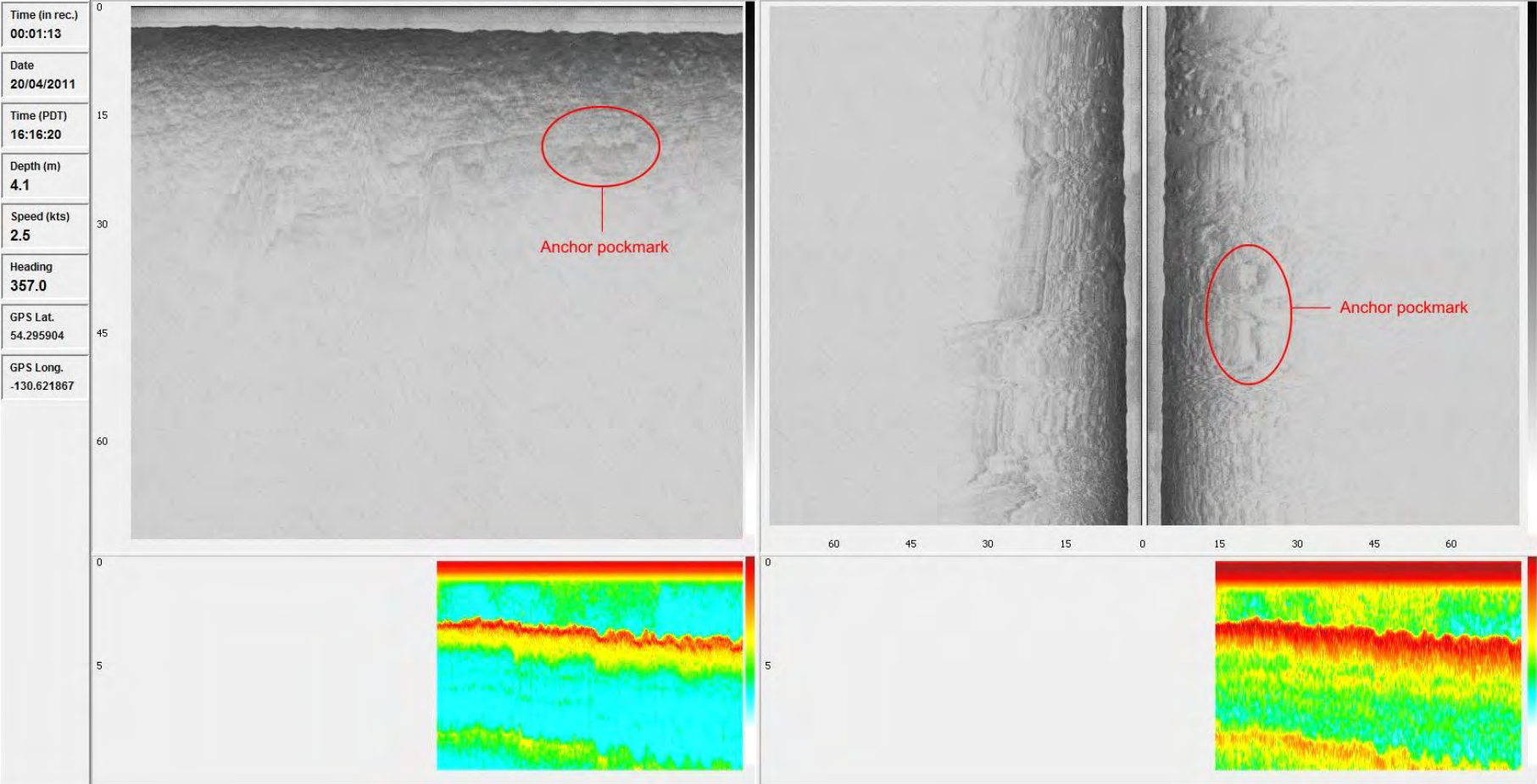


Eelgrass EW Profile for October



★ Sonar can be used to track changes in eelgrass productivity throughout the year.

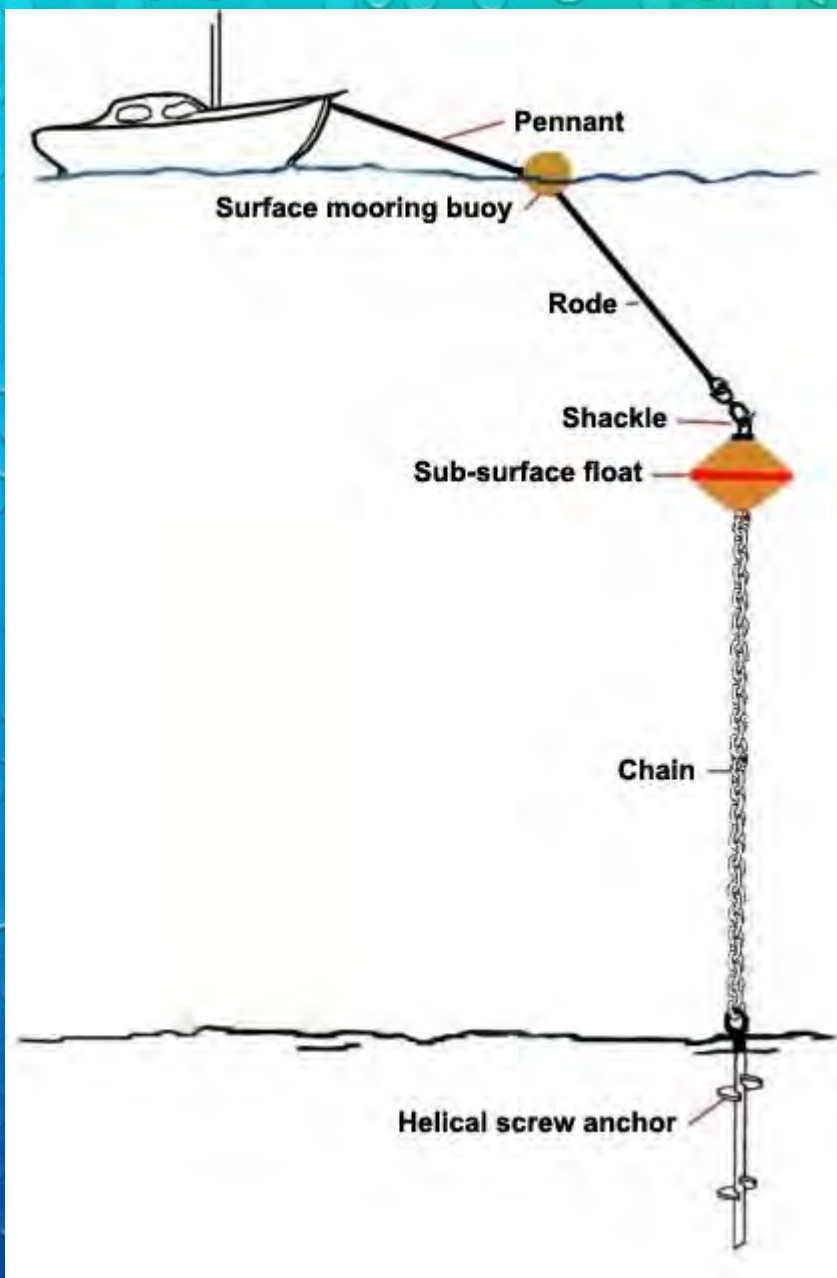
Snapshot created by HumViewer - Recording R00043 started 20/04/2011 16:16:20 PDT



★ Constant up-rooting of eelgrass plants as a result of anthropogenic activities may eventually decrease the productivity of the eelgrass bed.

- ★ Fortunately, evidence of anthropogenic damage to the eelgrass bed was rapidly obliterated by moving sand at the Lucy Islands site.

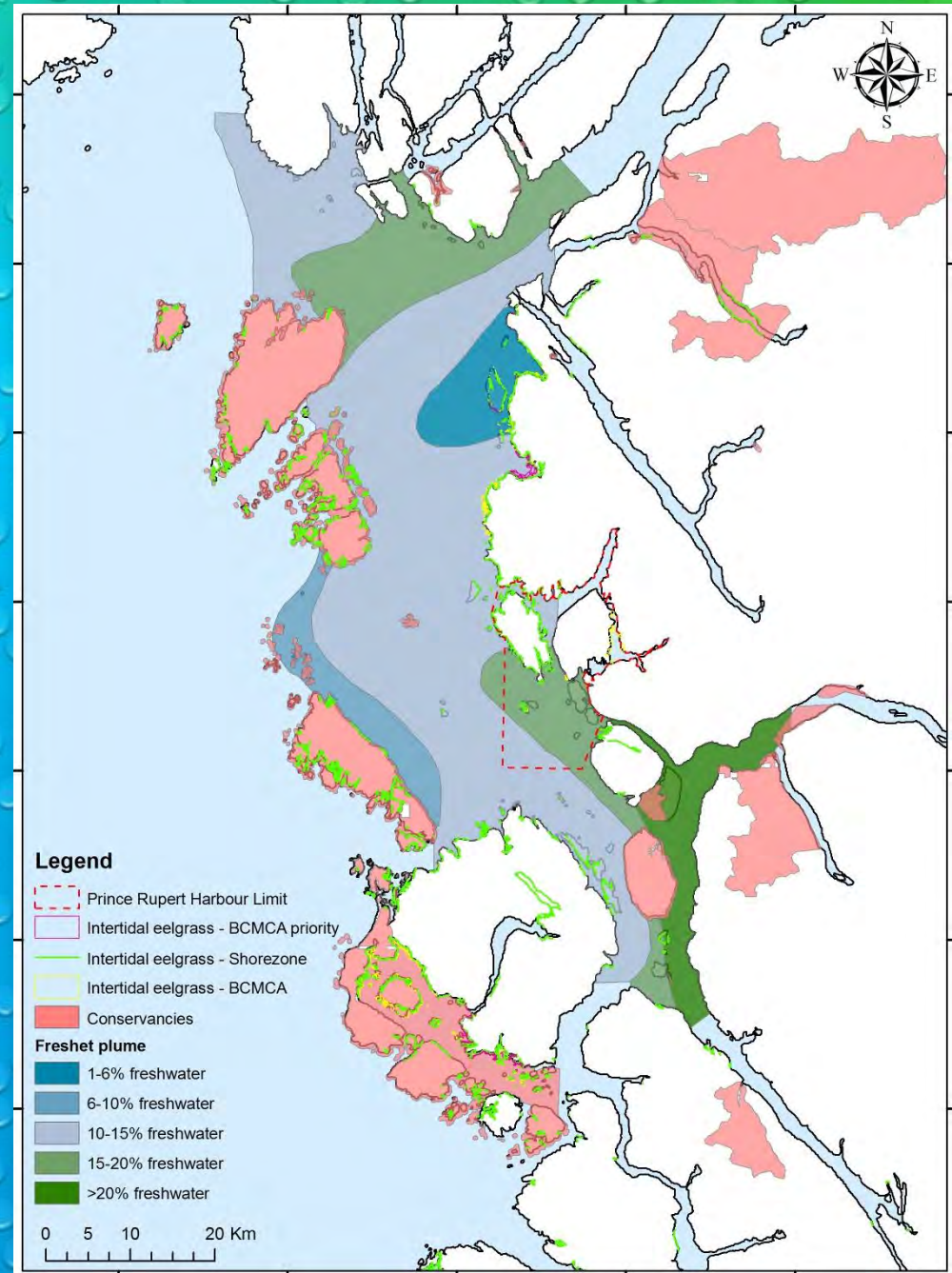




- ★ Since the site is located at the trailhead of the Lucy Islands trail, which will encourage anchoring at the site, it is recommended that some type of fixed anchor system be put in place at the site.

V. Future Directions

- ★ Baseline survey of subtidal eelgrass in the Skeena River estuary region.
- ★ Oceanographic modeling of the impacts of climate change and sediment rate changes on eelgrass beds.



★ Collaborations with communities and government to assist in development of management strategies for eelgrass in Conservancies and other areas.





For more information, see report at
www.oceanecology.ca