Cassiar Cannery 2014-2016 Research Project
University of Northern British Columbia

Quarterly Report to Pacific Northwest LNG
Sept. 26, 2014

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Project activities in period:

1) *Collect and curate herbarium samples for Cassiar Cannery collection.*

In June and August 2014 plant collections were made along Inverness Passage to document species diversity in the salt marsh community, and to create a permanent herbarium collection at Cassiar Cannery (Fig. 1). Collected samples were pressed, dried, and mounted, consistent with standard herbarium practices. One copy of the collections was mounted in a herbarium cabinet at Cassiar Cannery with a duplicate set incorporated into the UNBC herbarium. Of the 63 species collected (see Appendix 1) 38 were found primarily in natural salt marsh habitats, the rest were located mainly in disturbed areas adjacent to the buildings at Cassiar Cannery. Notable in the collection was the degree to which the salt marsh community was still compromised of native species, with few introduced plants having invaded the salt marsh community. One exception was *Agropyron repens* (also known as *Elymus repens*), an introduced European species which was found in several patches in the salt marsh community. A photographic record has been created of the prepared herbarium sheets (see Fig. 2), which will be hosted on the UNBC website this coming winter as a future resource for educators and researchers.

Figure 1. Student research assistants collecting plant samples along Inverness Passage, near Cassiar Cannery in June 2014.

Figure 2. Sample photographic record of Cassiar Cannery herbarium sheet for *Lingusticum scoticom*.

2) Quantitative sampling of plant community in salt marshes.

Project activities in August focused on conducting detailed surveys of the composition of salt marsh communities along Inverness passage, including both cover and biomass measurements. Thirty field plots were located over a 4 kilometer reach at the eastern end of Inverness Passage (Fig. 3), an area with well-developed salt marsh communities on fine sediments deposited by outflow of the Skeena River. Plots were split equally between north- and south-facing aspects along Inverness Passage.

Figure 3. Location of field plots along Inverness Passage. Base map from Google maps (2014).

At each plot location a set of three belt transects (Fig. 4) were run from the upper edge of the salt marsh community (the edge of the tree canopy, see Fig. 1) to the lower edge of the salt marsh plant community near the low tide mark. The percent cover of vascular plants along the belt transects was determined using visual estimates taken within 1x1 m transect frames based on a modified Braun-Blanquet cover estimate scale. A subsample of nested 25x25 cm quadrats (see Fig. 4) were placed along the middle transect line at each plot location (Fig. 4). Above-ground

Figure 4. Nest plots placed along belt transect were used for sampling the vegetation in salt marsh communities.

vascular vegetation was clipped within these frames to provide an estimate of standing biomass at the peak of the growing season. These clipped samples were subsequently dried at Cassiar Cannery and weighed to determine total biomass. In total, vegetation cover was evaluated in 1331 quadrat frames, with biomass measurements taken in 443 frames. The relative height of each belt transect was measured using survey equipment.

Figure 5. Soil pits were used to construct a detailed stratigraphy of sediments at reference locations.

Soil pits were dug at 4 representative locations to assess soil stratigraphy and to provide a classification of soil types (Fig. 5). These assessments were conducted by Dr. Paul Sanborn, a soil scientist at UNBC. Soil samples were also collected at each of the biomass clipping frames, and will be used to assess soil properties such as salinity.

An interesting observation during the field sampling period was the abundance of elongate ponds which run along the contour interval in the upper- to mid-salt marsh community. The water in these ponds, which are perched at the upper end of the elevation gradient, is held in place by fine clays and silts, and supports an abundance of aquatic vegetation. These pools are likely influenced both by groundwater flow from adjacent upslope terrain and by tidal flooding. Many of these ponds contained numerous small fish and are a site feature that warrants further investigation.

Figure 6. The upper salt marsh community contained many small ponds which supported abundant aquatic vegetation and juvenile fish.