

Nearshore Structure Survey of Swinomish Indian Reservation: Adapted Procedures and Preliminary Results

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Introduction

The Swinomish Indian Tribal Community (SITC), a Federally Recognized Tribe, is located near LaConner, WA on Fidalgo Island east of LaConner, WA in between Skagit and Padilla Bays (Figure 1). The reservation currently has housing and development on its shoreline ranging from log yards to beach houses, though the extent of this development has historically been until recently unmonitored. Under the Point Elliot Treaty of 1855, SITC has the right to manage the shoreline up to the High High Water Mark (HHWM).

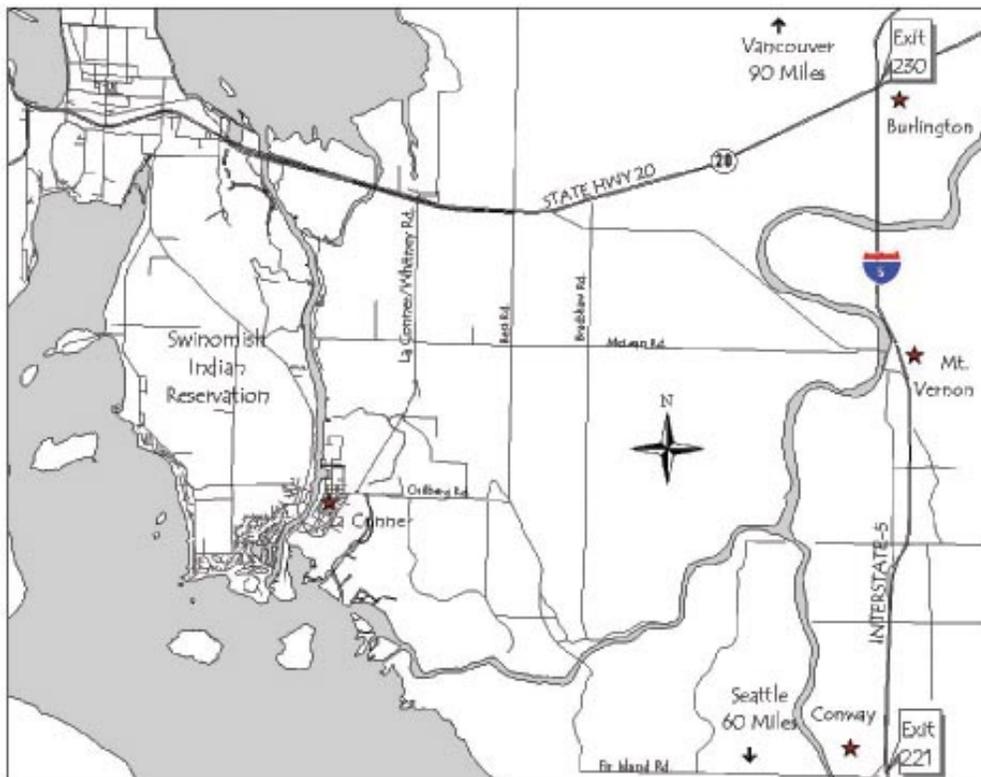


Figure 1. Vicinity map of the Swinomish Indian Reservation, LaConner, WA.

In order to manage the shoreline per the tribal Coastal Zone Management Plan, an assessment needed to be performed on the presence and type of shoreline development. Following the counsel of Pete Best of Bainbridge Island City Planning and his report on the shoreline assessment of Bainbridge Island, the Swinomish Water Resources Program (WRP) set out to reapply Best's mapping and analysis methods (Best 2002). The influence of shoreline development on the formation of beaches of the reservation, the quality of health and potential risks to environmental and human health and safety along the shoreline are a few of the issues that may be examined once the extent of shoreline modification is known. It is suspected that some of the structures along the shoreline are abandoned and may be sources of pollution. Many of the bulkheads may be within the tide line enough to be disturbing to natural shoreline processes. This study will also report on the application of the Bainbridge island study to another Salish Sea island community.

Methods

The surveying materials consisted of: a map grade GPS (Trimble), a team of 2-3 people, tape measure (m), oblique

photos, field book, compass, camera and extra batteries, oblique photos with features key, map of beach sections, paper copy of procedures/data dictionary and photo flipchart .

The surveying was test run in the summer of 2003 in order to find out what procedures did and did not work from the Bainbridge study. This study consisted of field runs with the GPS in order to adapt the data dictionary to the needs of the reservation land uses. Field work began in June of 2004 and was finished in October. Data was gathered either by walking the shoreline or by motorboat with the GPS depending on access issues. All buoys were gathered by boat. Pilings were GPSed using field counts and oblique photos.

Oblique photos were used to verify location on the shoreline, to note changes on the shoreline since their taking (2002), and to note locations of objects and photos. In the field book were recorded descriptions of objects, field numbers, photo numbers, and comments. In order for some initial land use analysis to be completed, the shoreline was broken up into eight sections related to land-use or natural barriers, for instance the northern boundary of the reservation or the agricultural area. Section four was divided into 4 and 4-1 due to field sampling difficulties. Structures or modifications to the shoreline were named with categories as suggested by Best, though several were added or definition changed to accommodate current reservation land use (Table 1).

Table 1. List of items surveyed and simple definitions for quick reference in field collection. Directions for collection included more in-depth definitions.

GPS Field / Definition
Armor -includes all bulkheads, revetments, and soft shore blocks
Groin -a small jetty made of rock, concrete, or mixed materials
Fill -includes soil, construction debris, and trash that is being used to fill land
STROver (structure over water)-includes decks, houses, boathouses, piers, and pilings involved in the structure
Pilings -those not attached to an overwater structure
OHWM (Ordinary High Water Mark) -defined by debris collection on the shoreline
Stairs -along the shoreline, touching the beach or not
Pollution -sheen, odor, or other; includes garbage
Marine Railways -any railroad tracks
Ramp -all boat ramps
Outfall -pipe or natural (seep, stream, spring)
USAWL(Upland Structure Above Water Level) -includes only buildings within 30'
Monument -aka benchmarker; can be USGS, NGS, State, NOAA, Tribal, or other
Point of Interest -anything interesting!
Buoy -only semi-permanent buoys
Boat -only moored boats

Results

The entire shoreline was less than half developed, with the majority of the shoreline development being on the east shore as expected (Figure 2)(Figure 3). No section is more than half armored. One third of the 610 structures on the reservation shoreline are stairs, pilings, and armor (Table 2). Most beachside residences had private beach accesses. Most pilings were creosote covered. Monuments were found that were previously not known of or were rediscovered. Only four or five structures had been abandoned along the shoreline.

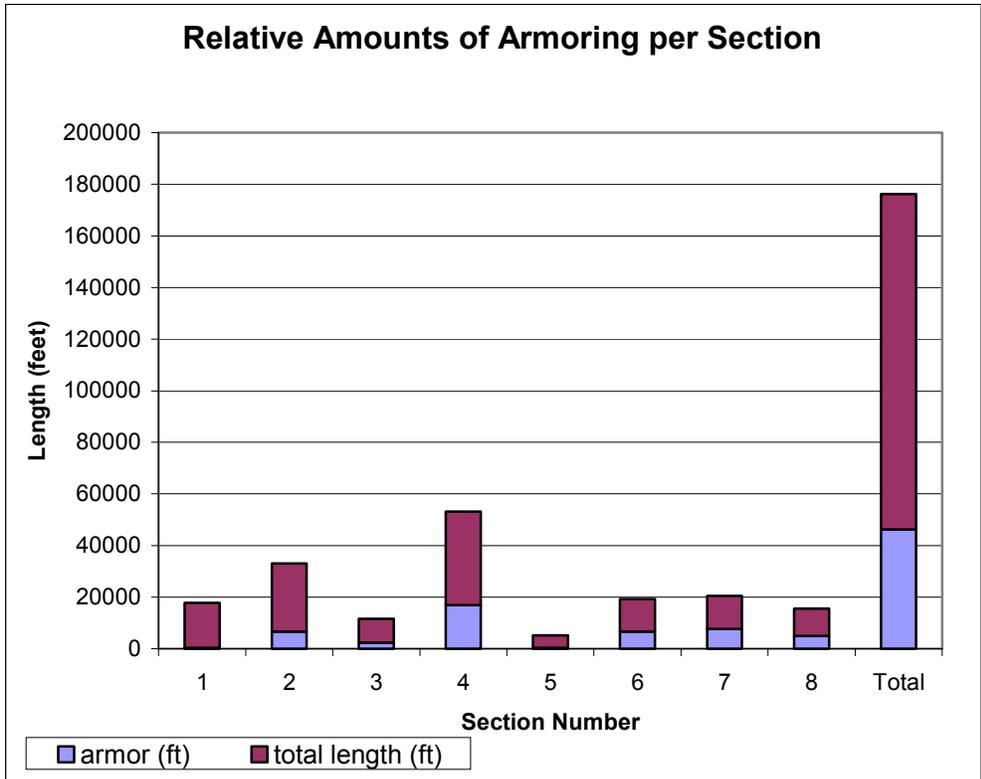


Figure 2. Relative feet of armoring per total feet of section. Included is a comparison of total armoring to total shoreline. Section four had the largest percentage of armored shoreline.

Table 2. Total number of each structure found on the entire reservation shoreline. Section total is the sum of all structures

Type of Structure	Number of Structures
Armor	112
Boat	14
Fill	1
Buoy	41
Stair	106
Monument	10
Pilings	118
Ramp	15
Outfall	86
USAWL	19
Strover	52
Railway	1
Pollution	2
Point of Interest	33
Section Total	610

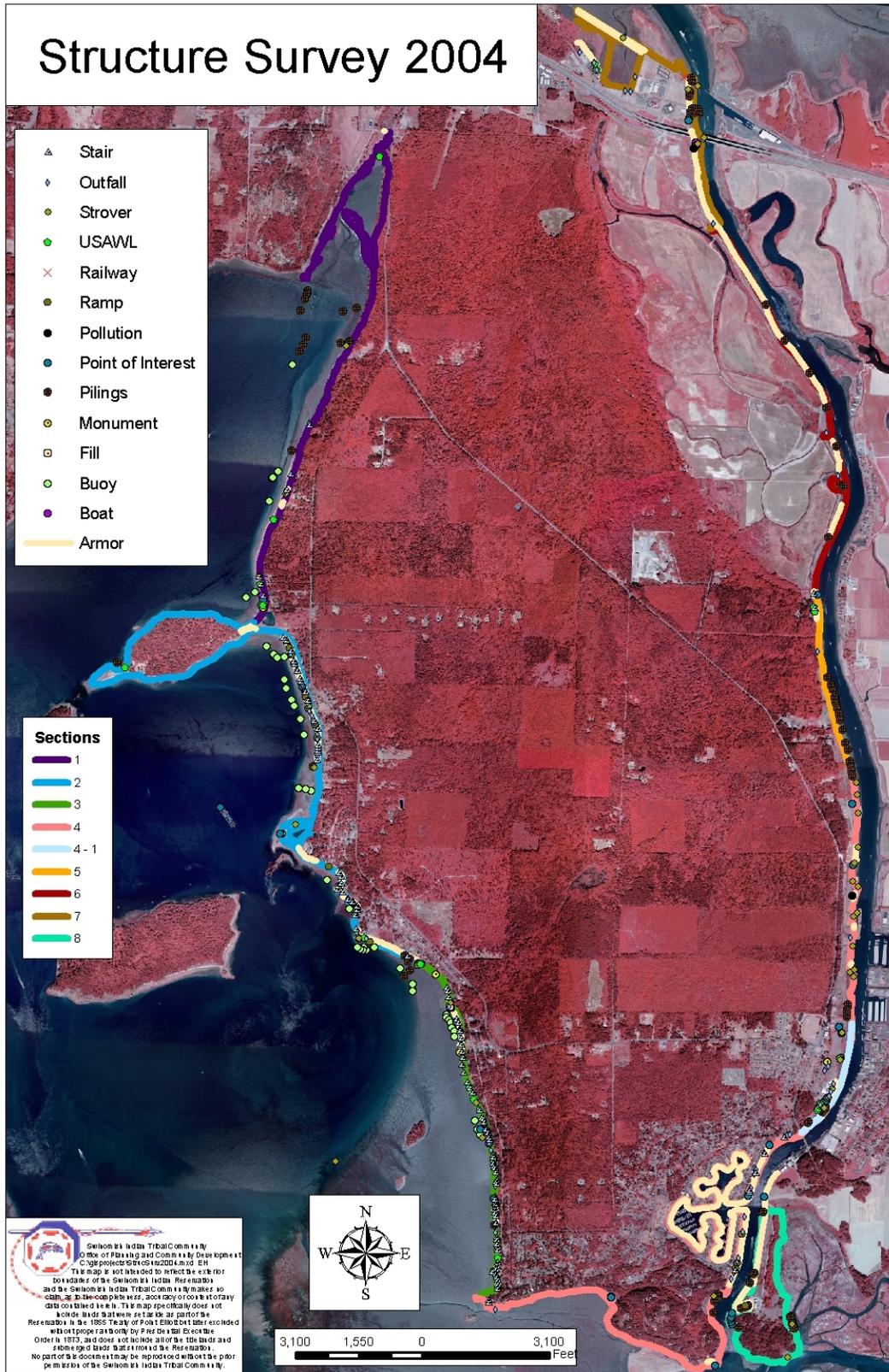


Figure 3. Resulting map of shoreline structures and sections as delineated by use.

Discussion

The Swinomish shoreline, although less than half bulkheaded is in a more natural state relative to other similarly inhabited Salish islands, there is a potential for shoreline modification and habitat threat due to the density of bulkheads in certain areas. Although a majority of the bulkheaded areas are along the Swinomish Channel, there are also bulkheads along the west shore where much shellfish harvest is done.

Pilings are the main source pollution problem along the shoreline and work will be done to see to the removal or covering of those that threaten tideland health.

Stairs, being one of the major structures on the shoreline, bring issues of access and beach activity which introduces another health issue to shoreline health. No use studies have been completed on the beach, though the tribe is in the process of completing a seafood consumption survey which will give an estimate of tribal harvest rates or seashore organisms.

Best's example worked well for the reservation, most likely because of the similar island size. This similarity made the survey possible to complete in a summer's time without having to do timely survey work every day. Also, four to five people were able to help with the survey, all with knowledge of GPS workings, and boat access was guaranteed. That, combined with the property rights of the tribe presented little, if any obstacles to the gathering of data. Modifications of Best's methods existed only in our definitions and data dictionary of shoreline structures as was specific to the area for example whether or not the tribe installed a benchmark versus the USGS. Included in Best's report was a review of the Rapid Shoreline Inventory along with other inventory methods. We concur with Best's review and suggest the implementation of his methods for further Salish Sea island shoreline structure surveys.

For more information about the application of the shoreline data, please contact the author.

Reference

Best, P; Williams, G; Evans, N; Thom, R; Miller, M and D. Woodruff, 2002, Bainbridge Island Nearshore Assessment: Summary of Best Available Science, City of Bainbridge Island.