HOME

A Subtidal Marine Plant Community Survey
Seaward of 3707 Dollarton Highway, North Vancouver, April 2015

Submitted to

Nick Ebrahim
3707 Dollarton Highway
North Vancouver, BC
V7G 1A1

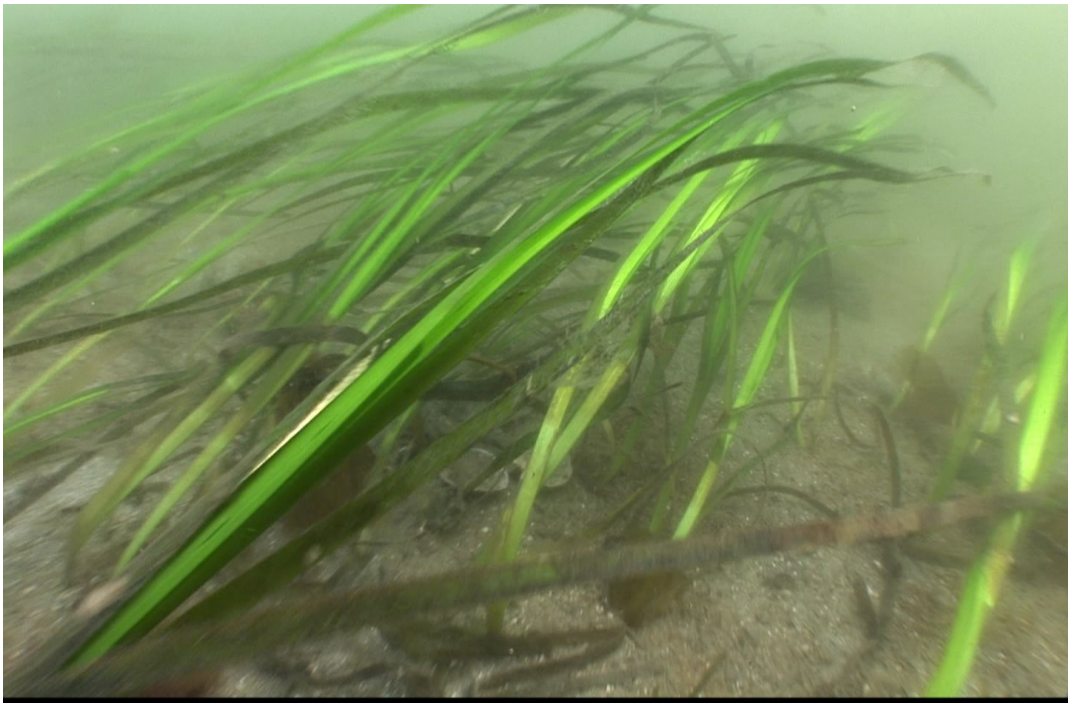

Illustration 1: Eelgrass, Zostera Japonica near -0.5 m depth relative to chart datum

by

Douglas Swanston, Seacology
3025 Sunnyhurst Road, North Vancouver, B.C., Canada, V7K 2G4
Phone/Fax: 604.987.4675 email: seacology@telus.net

Privacy

This is a confidential document intended for the use of the recipient listed on the title page and Bob Heaslop acting on behalf of Nick Ebrahim. Use of images and content in this proposal requires the permission of the author.

Overview

On Wednesday April 15th 2015 Seacology completed a subtidal marine plant community survey in front of a proposed subdivision development at 3707 Dollarton Highway in the District of North Vancouver. The area covered by the eelgrass bed has been reduced by nine percent since the 2008 survey. Macro algae subtidally is limited by substrate which is ninety percent silt and sand and ten percent pebble (modified Wentworth scale) on the eastern half of the water lease. Pebble and cobble account for twenty percent of the mostly silt and sand substrate on the western half of the water lease. Macro algae was observed on the western half of the water lease to a depth of -6.0 m depth relative to chart datum.

A major focus of the survey is to map eelgrass and macro algae plant communities. Presence of these communities can impose limitations on proposed dock installations. Depths are listed as elevations above (+) and below (-) zero chart datum. Tide heights and zero chart datum are referenced to the tide height predictions at Stenovan Tide Station in Burrard Inlet using tide height values obtained from HTTP://tbone.biol.sc.edu/tide.

Methods

Eelgrass

The survey method employed SCUBA divers using underwater transects and a dive tender with a hand held Garmin GPS model 76 to determine coordinates outlining the existing eelgrass bed. SCUBA divers carried digital depth gauges to determine depths.

A transect line, marked every 5 m, was established using a start way point obtained from a previous study in 2008 and deployed parallel to the shoreline. Divers used a marker float to indicate eelgrass boundaries every few meters as they determine the extent of the eelgrass bed.

Macro Algae

Macro algae locations were determined from algae affixed to substrate (as opposed to drift) within the property boundaries extending offshore from the inter tidal zone to a depth of - 6 m below chart datum. Divers traveled in a meandering survey to determine maximum and minimum depths for macro algae.

Results

The survey was conducted on Wednesday April 15th 2015. Weather was a sunny with occasional clouds, becoming cloudy in the afternoon with an occasional shower. Visibility underwater was less than 1.5 meters and limited the accuracy of some underwater observations especially determining an accurate map of the less dense areas of eelgrass. For example in a previous survey (2008) during meandering swims over the eelgrass bed, one to two meter wide gaps in the eelgrass bed could be determined. In this survey Divers were unable to distinguish areas of sparse eelgrass with two or three shoots per meter squared and one to two meter square areas with no eelgrass within the eelgrass bed. Therefore eelgrass density was assessed using a stratified random quadrat placement with two strata identified; eelgrass at -0.75 m depth and eelgrass at or shallower than 0.75 m depth.

Eelgrass

Eelgrass was observed at depths between 0.1 and -1.5 meters relative to chart datum. The distribution of eelgrass is depicted in the Google earth image in Illustration 2 below.

Illustration 2: GPS way points plotted onto an aerial image of the site. Lines connecting way points to create the polygon are interpolations.

Three blade widths of *Zostera marina* were detected (relative abundance in brackets): shoots blade width 5 mm and shoot length less than 0.6 m (few); Shoot blade width 7 to 8 mm and shoot length 0.9 m (common); shoots width 10 mm and shoot length up to 1.2 m (most abundant).

Eelgrass quantitative features	Shallow Eelgrass (less than or at 0.75 m deep)		Deep Eelgrass (more than 0.75 m deep)	
	mean	S.D.	mean	S.D.
Eelgrass blade length (m)	0.92	0.31	0.70	0.33
Eelgrass blade width (mm)	9	2	8	3
Eelgrass shoots/m^2	25	15	3	2
Average depth of 1 m^2 quadrat (m)	-0.59	0.13	-1.22	0.33
number of quadrats (n)	8		6	

S.D. = standard deviation

Eelgrass blade length (m) derived from 2 or 3 shoots (long, short, medium) selected from each quadrat

Eelgrass blade width (mm) derived from 2 or 3 shoots (long, short, medium) selected from each quadrat

Table 1: Eelgrass quantitative features for shallow and deep sides of the eelgrass bed.

Eelgrass density was was greatest in the shallow side of the eelgrass bed averaging 25 shoots/m^2, see Table 1. above. *Zostera japonica* was not detected.

Eelgrass images captured from Video.

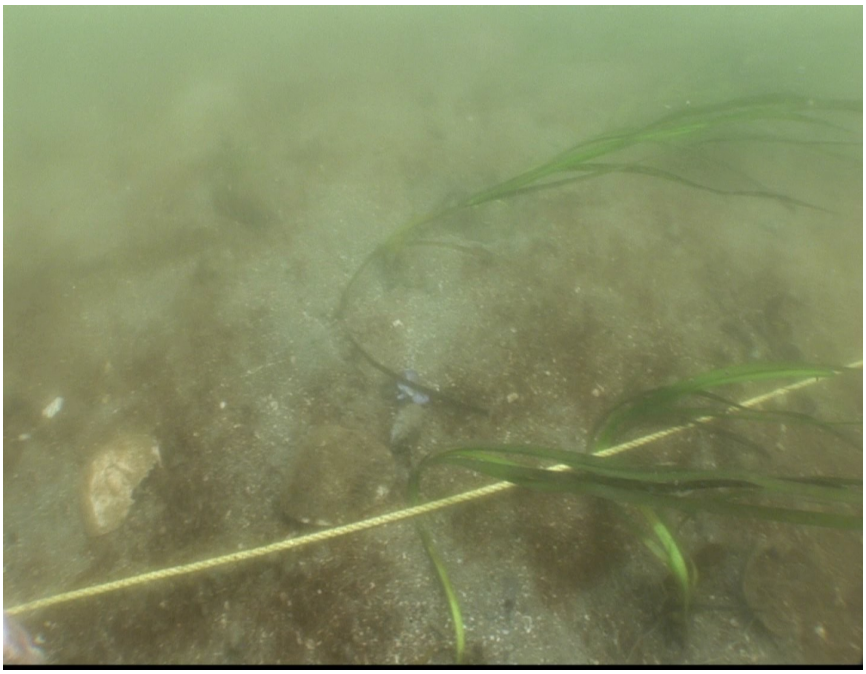

Illustration 3: Eelgrass near -1.5m depth relative to chart datum density 3 shoots per meter squared with diatom mat visible.

Illustration 4: Eelgrass shoot with closeup of sheath and first node exposed. Excavation appeared to be the result of dungeness crab.

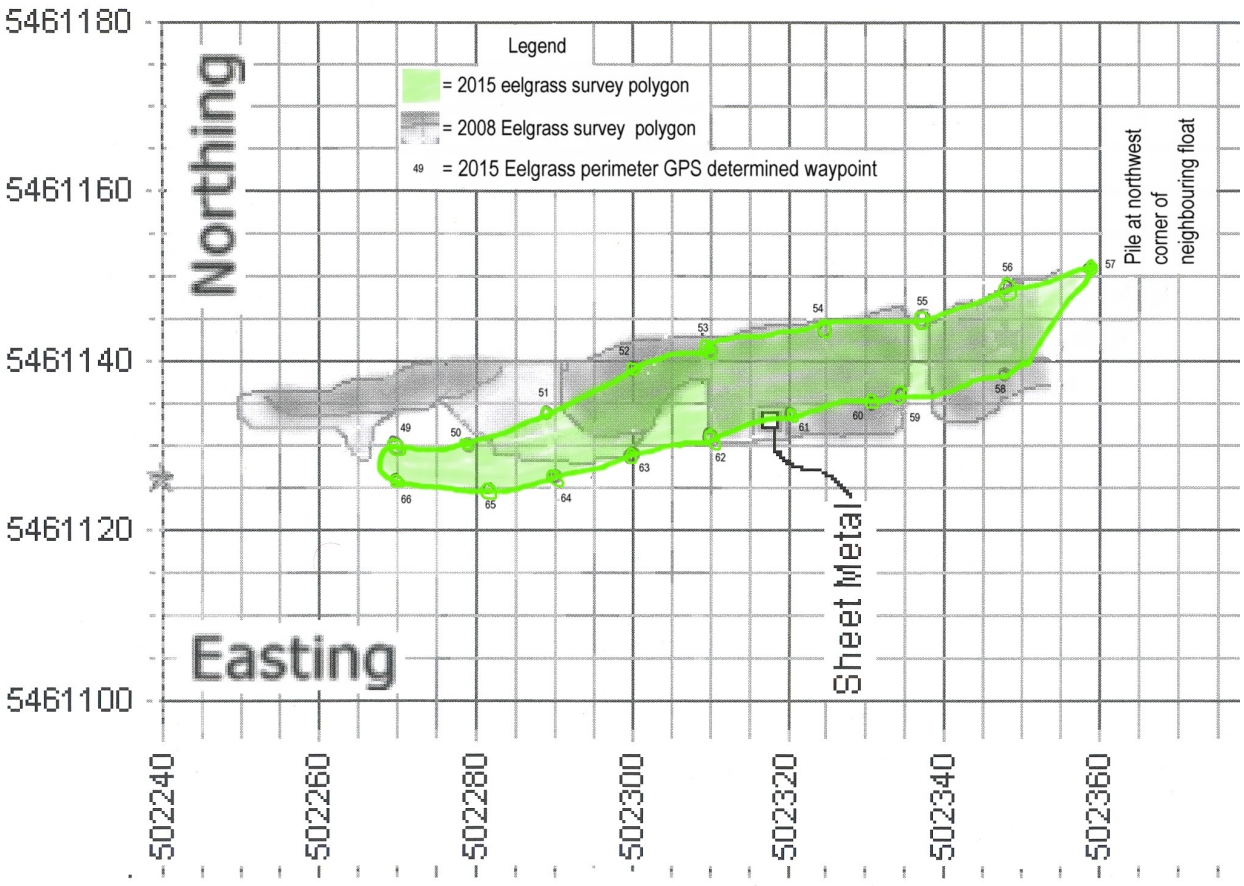

Illustration 5: 2015 Eelgrass survey with GPS way points polygon shaded in green with grey shaded 2008 eelgrass surveyed polygon plotted onto a UTM Grid with way points obtained using WGS84 datum.

Eelgrass losses since the 2008 survey at the site have occurred at the western end of the eelgrass bed and possibly at the eastern end of the eelgrass bed in the adjacent foreshore lease, see illustration 2 above. There is a small creek that enters the foreshore lease at the western end of the eelgrass bed and debris from previous extreme high runoff events since 2008 may have contributed to losses here. A pile secured floating dock structure, not present during the 2008 eelgrass survey, may have contributed to eelgrass bed area reductions at the eastern side of the area surveyed.

Waypoint and description	Northing Y Projection	Easting X Projection	Depth (m) relative to Chart Datum
49 – Shallow perimeter of eelgrass	5461130	502270	0.2
50 – Shallow perimeter of eelgrass	5461130	502279	0.2
51 – Shallow perimeter of eelgrass	5461134	502289	0.2
52 – Shallow perimeter of eelgrass	5461139	502300	0.0
53 – Shallow perimeter of eelgrass	5461142	502310	0.0
54 – Shallow perimeter of eelgrass	5461144	502325	0.0
55 – Shallow perimeter of eelgrass	5461145	502337	0.1
56 – Shallow perimeter of eelgrass	5461149	502348	0.1
57 – Shallow perimeter of eelgrass and Neighbours NW float pile	5461152	502358	0.1
58 – Deep perimeter of eelgrass	5461138	502347	1.5
59 – Deep perimeter of eelgrass	5461136	502334	1.5
60 – Deep perimeter of eelgrass	5461135	502331	1.2
61 – Deep perimeter of eelgrass	5461134	502320	1.5
62 – Deep perimeter of eelgrass	5461131	502310	1.5
63 – Deep perimeter of eelgrass	5461129	502300	1.5
64 – Deep perimeter of eelgrass	5461127	502290	1.3
65 – Deep perimeter of eelgrass	5461125	502282	1.4
66 – Deep perimeter of eelgrass	5461126	502270	1.1

Table 2: Eelgrass bed survey perimeter way points and depths using WGS84 datum.

Sea lettuce, *Ulva* sp. complex appeared to be the only Eelgrass blade epiphytes. A strong signal of diatoms represented by a brown diatom mat was present covering over 60% of the substrate within the eelgrass bed. A few 3mm long snails, 100mm long colonies of hydroids and 8 mm diameter bryozoan colonies were observed on the eelgrass blades.

Macro Algae

Macro algae growth on the site was observed intertidally and subtidally to a depth of -6.0 m relative to chart datum, on cobble and boulder substrate, See table 3 below. Two boulders were observed within the eelgrass bed. One of the boulders had broad acid weed, *Desmarestia ligulata* and smaller second boulder was not colonized by macro algae. Cobble, pebble substrate, when present (twenty percent cover) was colonized on the western portion of the water lease. It is lickly this larger substrate originated from the upland stream. An unidentified elongate-tear drop shaped red foliose algae approximately 50mm in length was observed on cobble substrate at -6.0. No attached macro algae was observed subtidally on the eastern half of the water lease. This may be due to the lack of suitable substrate which was mostly sand and silt (less than ten percent cobble and pebble as percent cover).

Macro algae

Macro algae	Maximum depth (m)	Minimum depth (m)	Substrate
Brown (*Saccharina latissima*)	-5.37	intertidal	Sand 80% Pebble to cobble 20%
Red foliose	-5.98	intertidal	Sand 80% Pebble to cobble 20%
Red filamentous	-5.98	intertidal	Sand 80% Pebble to cobble 20%
Green macro algae (*Ulva* sp. complex)	-4.77	intertidal	Sand 80% Pebble to cobble 20%

Table 3. Depth distribution limits of subtidal macro algae.

Anthropogenic Influences

A sheet metal structure was partially exposed near the middle of the eelgrass bed. It may be the transom of an aluminum car-topper boat or one side of a large metal tote, see illustration 5 above. Removal of this debris could increase the area colonized by eelgrass by its footprint approximatle 1.5 m^2.