Squamish Estuary Mapping Summary

Presentation of field work conducted October 5th through 7th, 2011

for

Squamish River Watershed Society

By

SeaChange Marine Conservation Society

November 9, 2011

Introduction- In an ongoing effort the effort to find eelgrass (*Zostera marina)* and suitable habitat for eelgrass in Howe Sound, Squamish River Watershed Society engaged a crew of three to map the Squamish River Estuary and further if time permitted. The crew of three combined the expertise of Seacology, Coastal Photography Studio and SeaChange Marine Conservation Society. This report serves to summarize the findings and provide coherence to the various data collected.

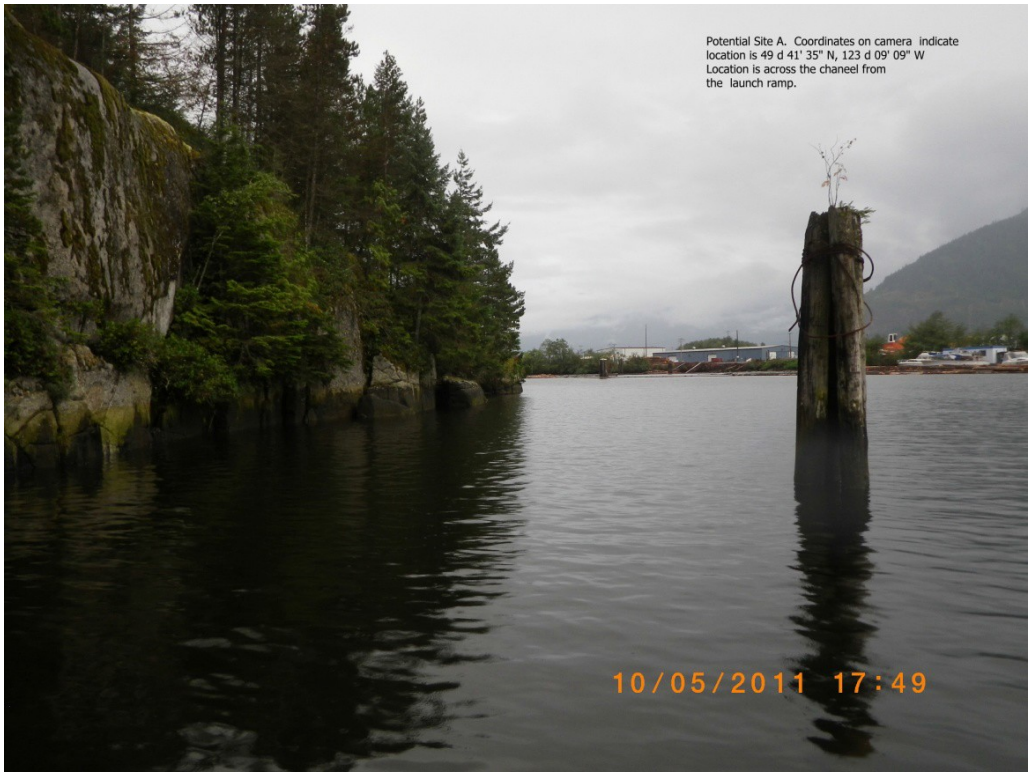
Methods- The crew travelled by boat towing an underwater camera to examine the substrate. Data from both a depth sounder and GPS unit appeared on a video overlay that appeared on the camera monitor. The same image that appeared on the monitor was also recorded onto a DVD. A second waterproof camera for shots above water was used to help place the underwater locations for a view at the surface. Waypoints on the GPS were marked intermittently to ease location of the sites on maps and note locations for remarks on data logs. "Eelgrass Mapping" data sheets were used to note comments related to waypoints. "Site Assessment Data" sheets provided more background data. The Site Assessment Data sheets were in short supply and were only used for the earliest potential sites. Finally, water chemistry testing capability for temperature, dissolved oxygen, conductivity and salinity were added to the tool kit late the morning of Oct 6th with the arrival of the YSR test instrument kit from Squamish River Watershed Society.

Corrections - The video overlay reports the depth from the depth sounder. Correction for the depth at the boat waterline and the location of the transducer is .2 m additional depth to the overlay depth. The above water camera time imprint is about 2 minutes slower than the GPS time. When matching waypoint time to photograph time subtract 2 minutes from the camera time. With the availability of the water chemistry testing meter on Oct 6th, Mamquam Blind Channel was done the afternoon of Oct 6th rather than the afternoon of Oct 5th.

Problems - Problems that delayed mapping ranged from wind the afternoon of October 6 forcing the boat back into more sheltered areas to underwater camera batteries running low and requiring some changes in power sources. A problem with the DVD recording occurred when the disc filled to capacity the morning of Oct 6 and continued to record. The result was in loss of 120 minutes of images from Oct 5th and earlier the morning of Oct 6th replaced by about 20 minutes of overwritten data later on Oct 6th. Data for the video lost from areas mapped Oct 5th and 6th still exists on the data sheets and above water camera photographs. Extremely poor visibility in Cattermole Slough led to various lighting arrangements with some improvement. Finally, the above water camera clouded with condensation just after noon Oct 7th. Photos above water of Site H were therefore taken after the mapping waypoints and video were recorded once the camera had cleared.

Summary of Sites- Following is a distillation of the area mapped into a series of potential sites for transplanting of eelgrass. Each Squamish site is represented by a surface photo and labelled in alphabetical order. Britannia Beach and Minaty Bay follow at the end. They follow in the order mapped to make reference to data sheets and under water footage easier. Google Earth maps for the areas are also included in order with waypoints noted for orientation. Each site has notes on both the photograph and below with information pertinent to the site.

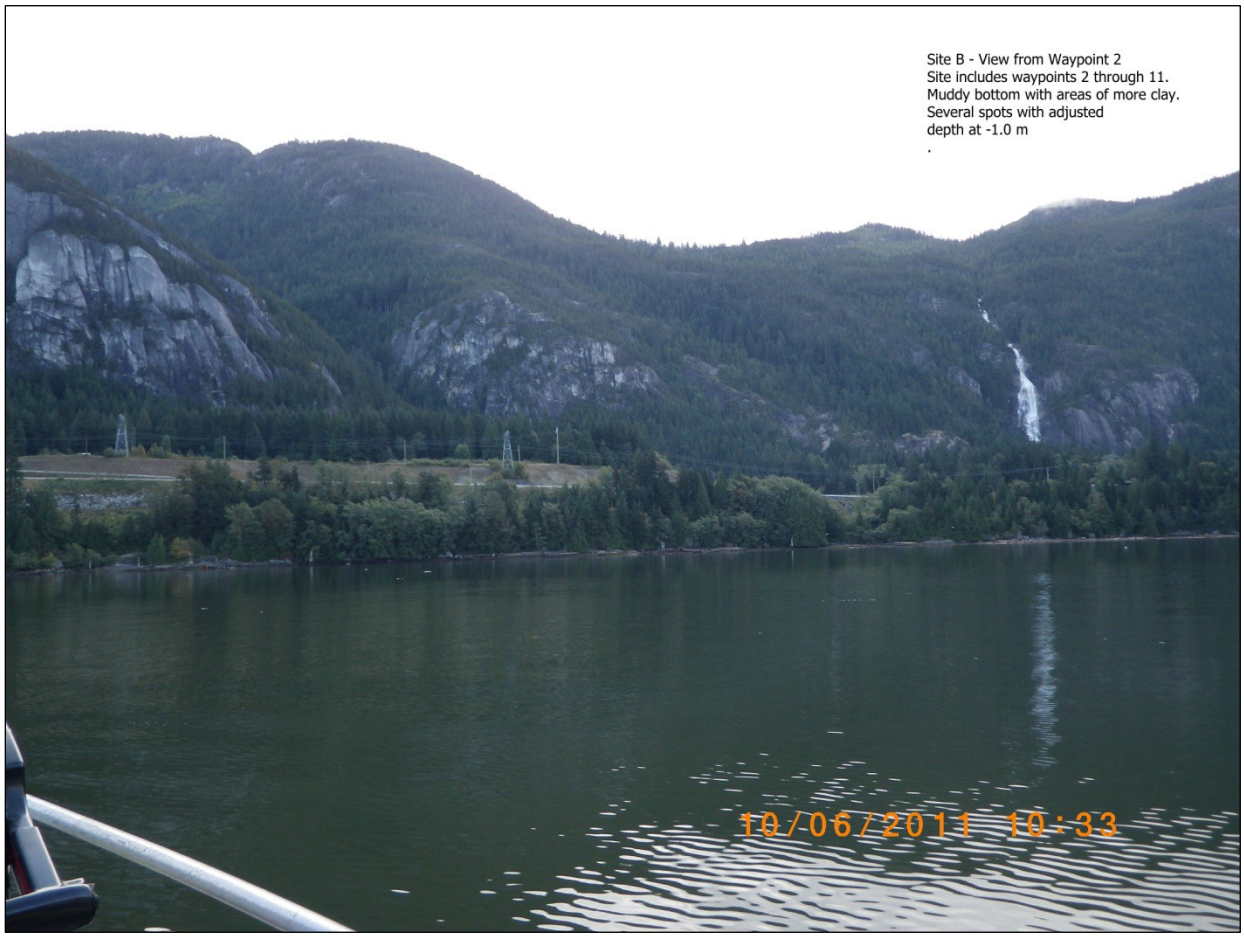
October 5, 2011, Site A



Notes for the time and photos taken near this time indicate uncorrected depth of -4.6 m. Corrections are -.2 m for transducer location and 3.6 m for tide. The adjusted depth is 1.2 m below chart datum. Crew recalls a sandy location in a fringe along this area of depth. A map of Mamquam Blind Channel is below. There is not a waypoint for Site A, but it lies midway between 30 and 32, across from the launch ramp.

a) Mamquam Blind Channel Waypoints

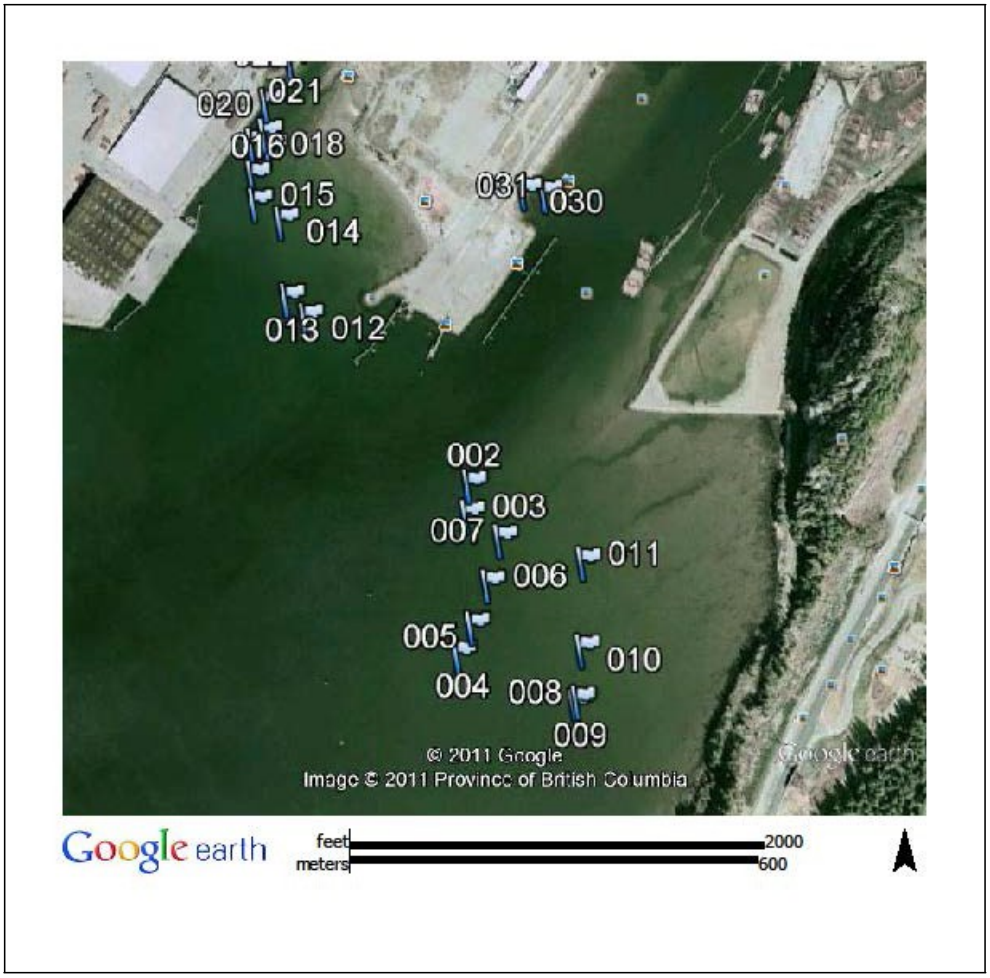
October 6- Site B



Site B, above, was a large area of muddy bottom with adjusted depths varying near chart datum. The underwater footage shows clams and occasional crab. There were intermittent areas with more clay, but softer mud was predominant. Waypoints and 5 and 9 had adjusted depths near -1.0 m. Underwater footage is available to view beginning with waypoint 9. Waypoints 2 thru 11 can be located on Google Earth Map, b following Site C photo.

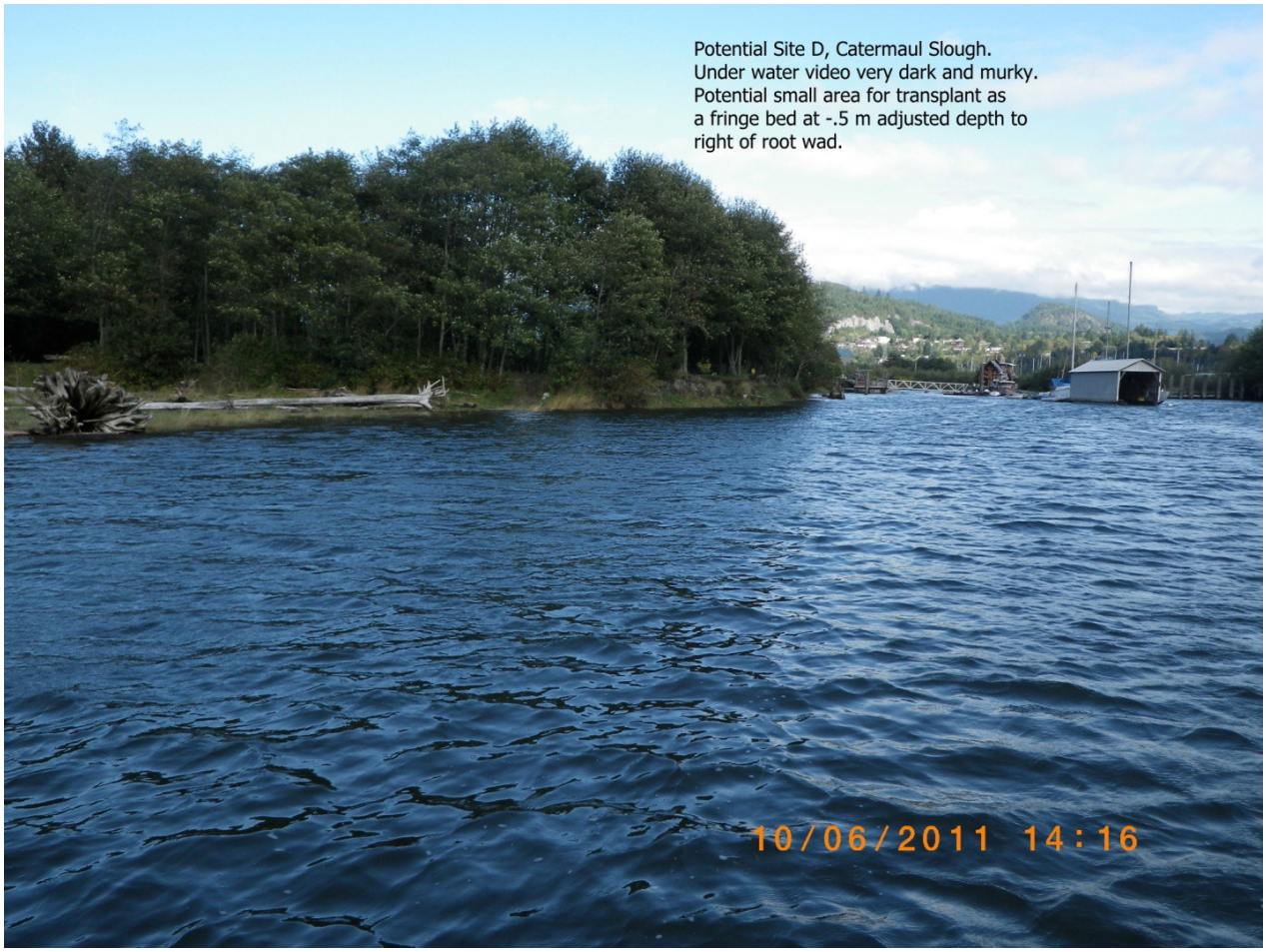
October 6, Site C

Site C showed promise for a large area with muddy bottom similar to Site B. Concern about benthic mercury from former manufacturing exists. Waypoints 12 through 21 can be located on Google Earth Map b. Waypoints further up Cattermole Slough were generally shallow and can be located on Google Earth Map c.



b) Site B waypoints 2 through 11. Site C waypoints are 12 through 21. Transplant around 30 & 31.

October 6, Site D



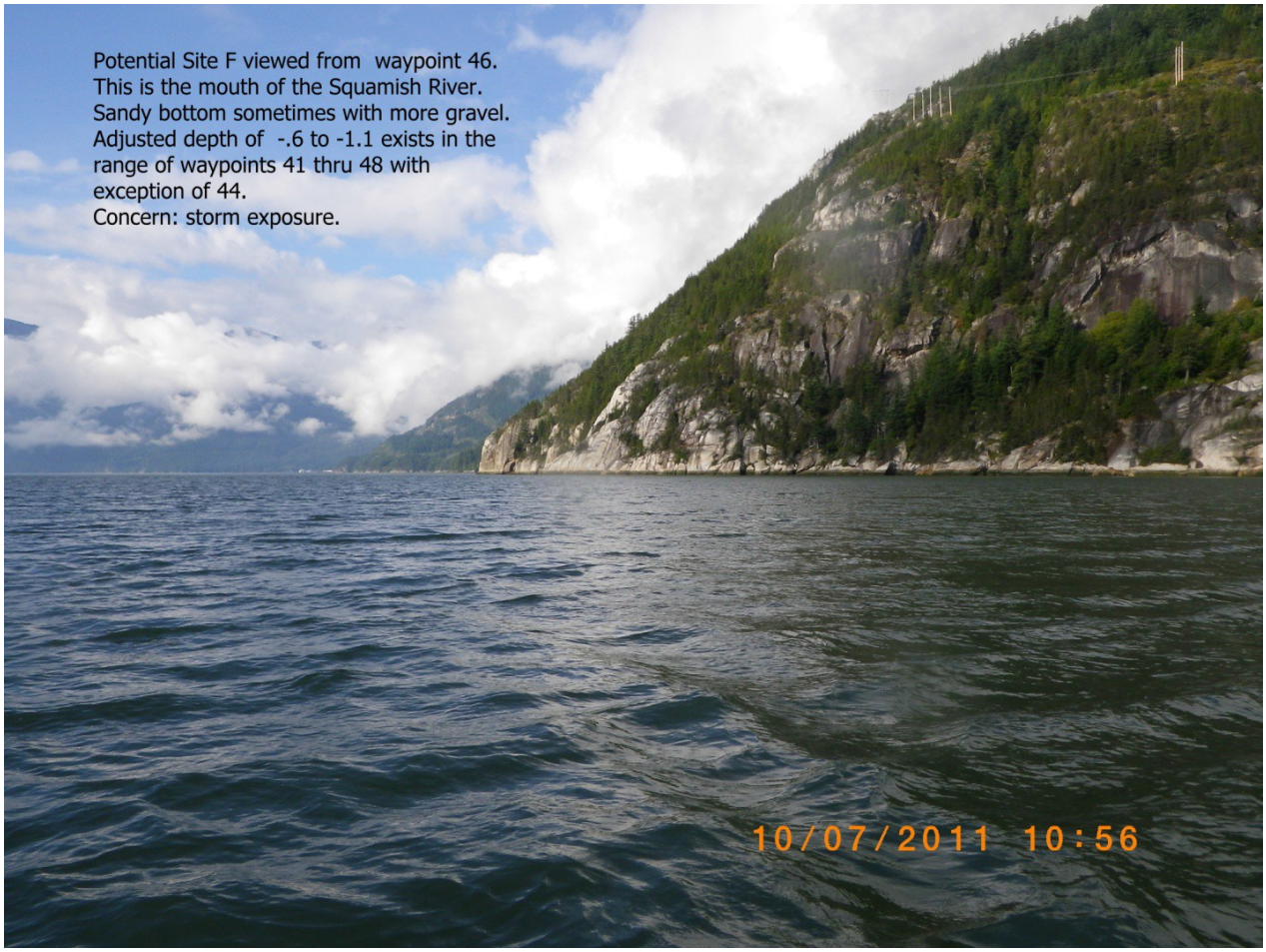
Potential Site D did not reveal much area of the proper depth. Visibility was very murky on Oct 6 in the afternoon with some wind. The protection provided by the upland makes a small transplant at an adjusted contour fringe of -.5 m to -1.0 m tempting once any intended work on the floats is completed.

c) Cattermole Slough. View also includes shallow waypoints 23 through 25 and Site C waypoints 15 through 22.

October 7, 2011 – Site E

The substrate appealed, but we were not able to find sufficient depth in the western side of the Squamish River Estuary up stream of the river mouth for suitable transplant area.

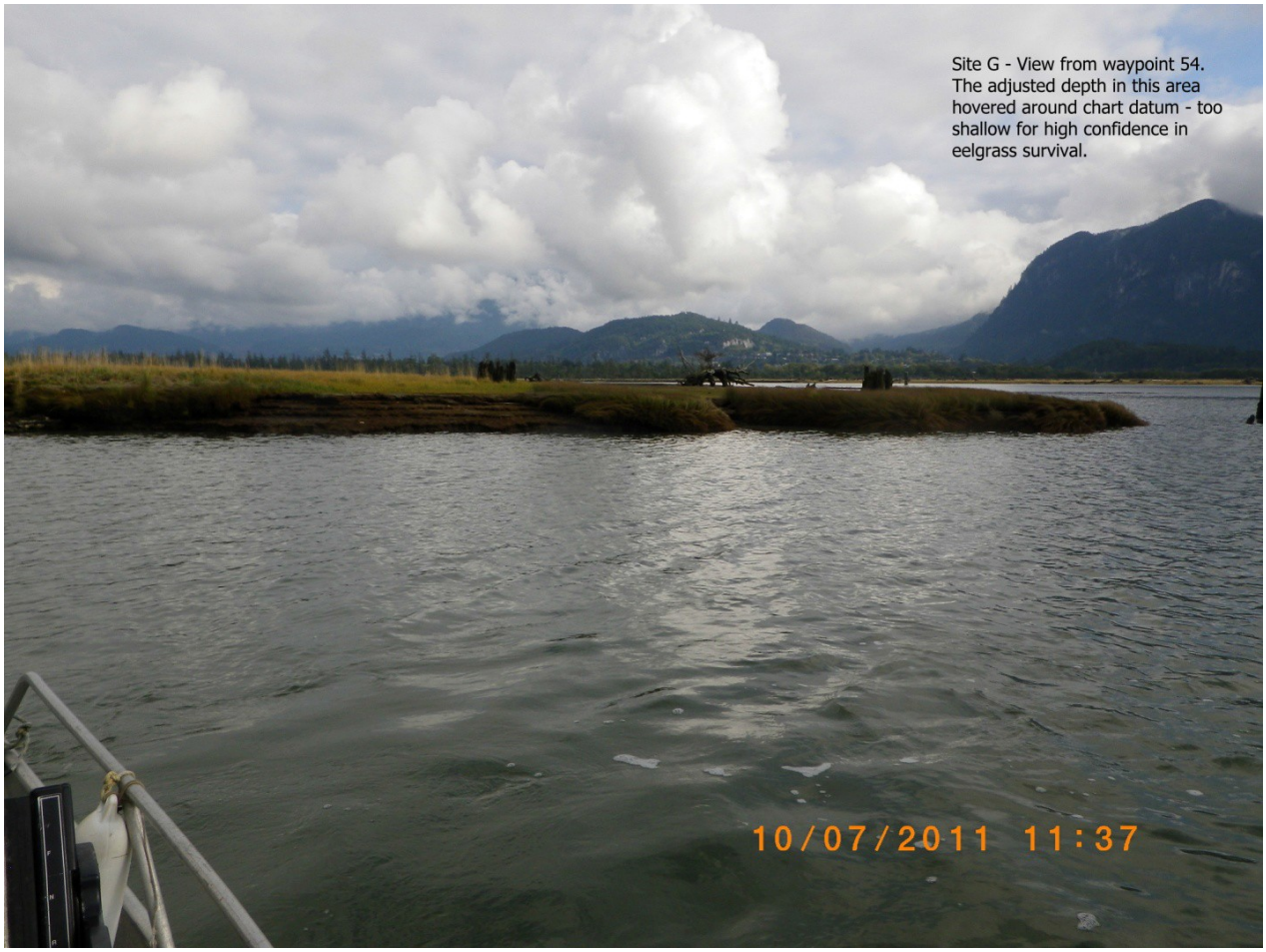
October 7, 2011- Site F



This site extended across the mouth of the Squamish River with ideal substrate and a large area at an adjusted depth from -.6 to -1.2 m. There are concerns regarding exposure to the elements. They are

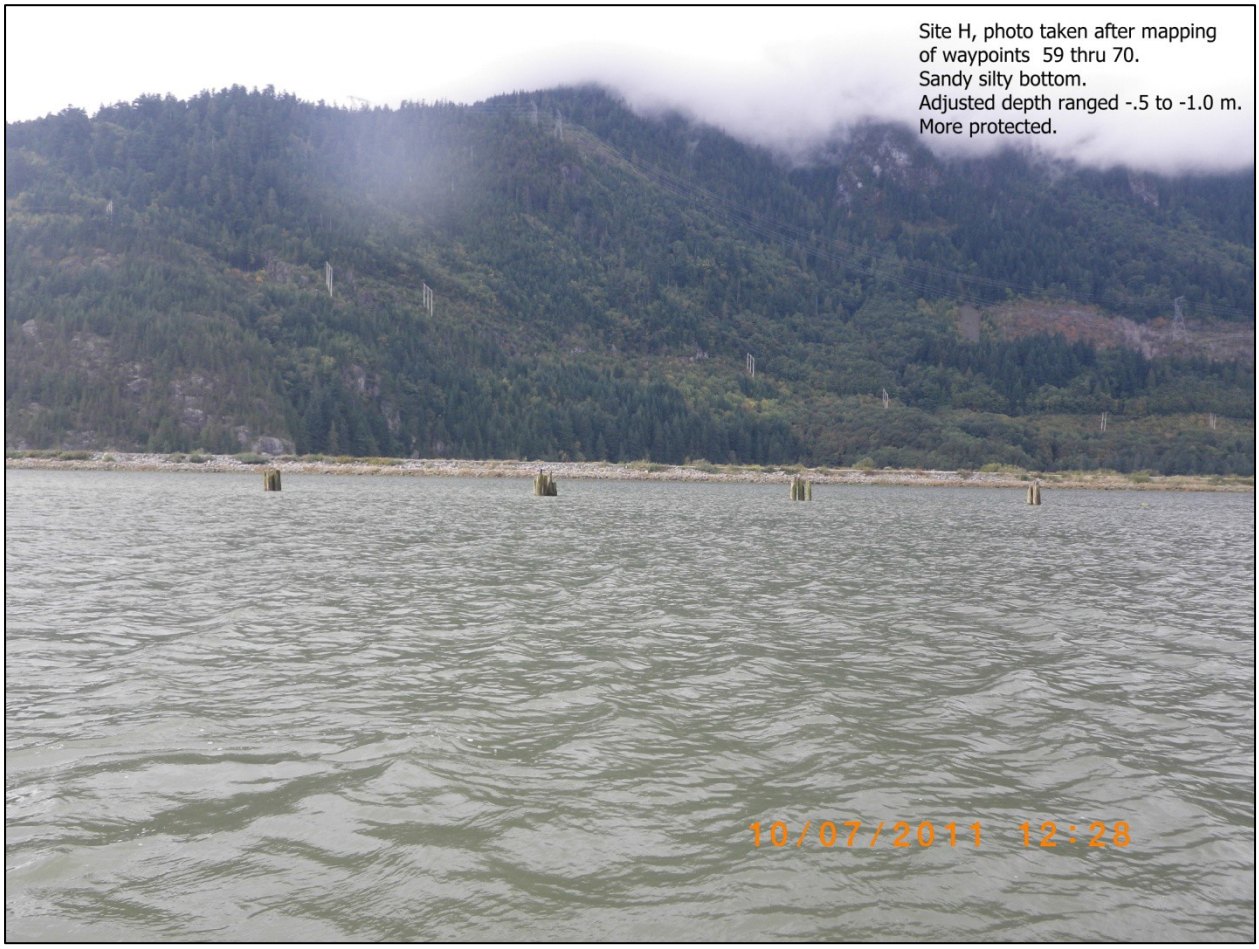
- Exposure to river outflow including large volumes of rain and snow melt from the entire watershed.
- Storm waves resulting from a 7 km fetch.
- A combination of both items above at low water would be the worst anticipated scenario.

October 7, 2011 – Site G



This site included waypoints 53 through 58. Bottom varied from mud to a mix of mud and sand. However, the adjusted depth hovered close to chart datum. See Google Earth map following Site H for location of waypoints.

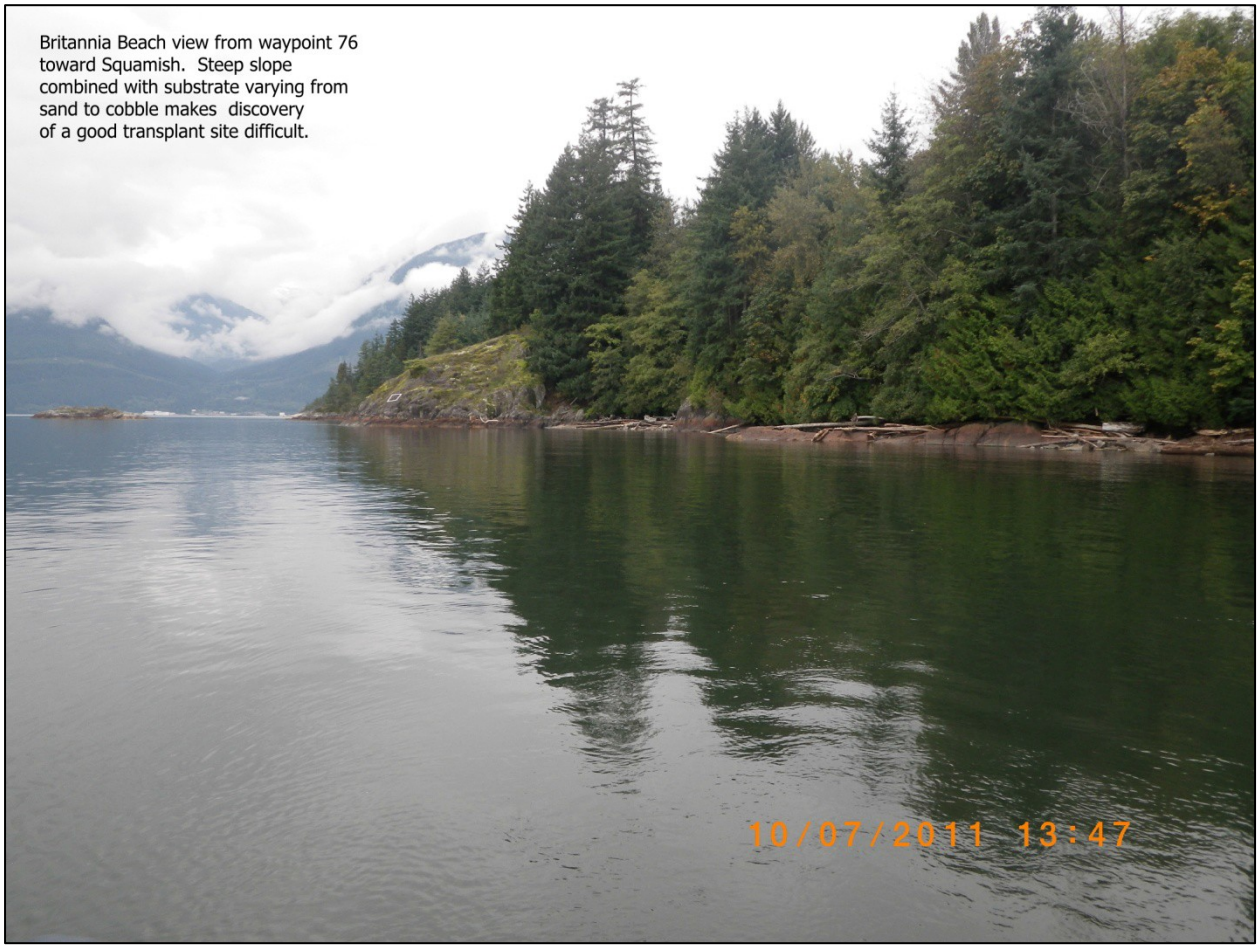
October 7, 2011 – Site H



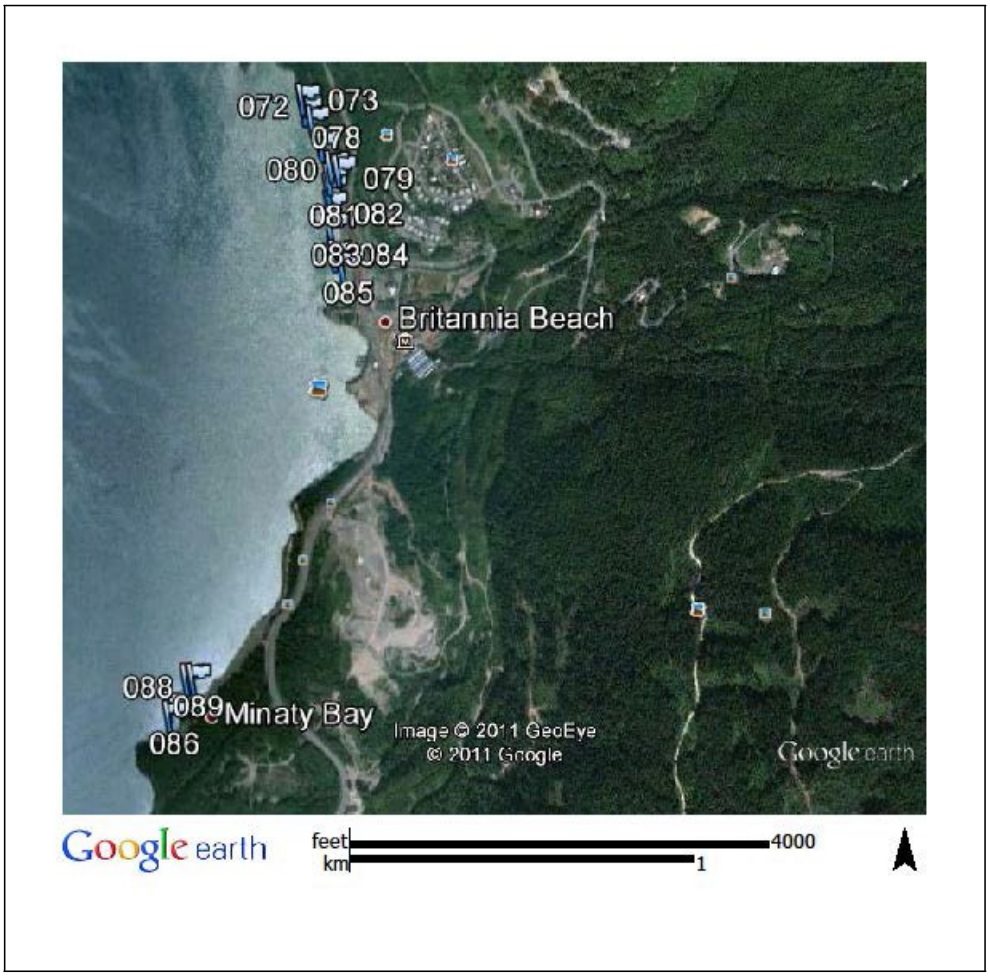
Site H mapping revealed a pocket of appropriate depth when adjusted for tide. The bottom was sand and mud that was less mucky than Site H. Salinity was 18.7 ppt which was uncharacteristically high of the samples taken. Most were nearly fresh water.

d) Waypoints for Sites G are 53 through 58. Site H waypoints run from 59 through 70. Water chemistry checked at 71.

October 7, 2011 – Britannia Beach



There was a possible viewing of eelgrass near Waypoint 84, but we were not able to confirm it. Two general areas for consideration included the mouth of Britannia Creek (waypoints 72-85) and Minaty Bay near another creek mouth (waypoints 86 through 89). Clean up of the toxins from the mine make the possibility of restoration in suitable substrate worth consideration. In the limited time available, we did not find a large area of proper depth and substrate.



e) Waypoints for Britannia Beach and Minaty Bay.

Conclusion

The only confirmed eelgrass found was that which had been transplanted previously. Additional data accompanies this summary report for more detailed consideration.

- The original DVD recording discs of the underwater footage with video overlay of location coordinates, depth, time and speed.
- The original data sheets completed in the field.
- A table of all the waypoints appears at the end of this report.
- A data disc containing the above water photos, the waypoint database and this report are also included on a data disc with the video discs.

The data is presented as information for interested people to use along with their own knowledge or experience regarding suitability for restoration sites.

Waypoint Details

Waypoint	Latitude	Longitude		UTM, east	UTM, north		
1	49.6975	-123.1508		5505013.2918	489124.5720		05-OCT-11 5:13:21PM
2	49.6811	-123.1633		5503182.3306	488223.4228		06-OCT-11 10:35:46AM
3	49.6807	-123.1633		5503137.1974	488219.9081		06-OCT-11 11:13:40AM
4	49.6788	-123.1635		5502926.6381	488206.5469		06-OCT-11 11:33:34AM
5	49.6791	-123.1632		5502968.8455	488227.2768		06-OCT-11 11:37:26AM
6	49.6797	-123.1629		5503032.2738	488250.9668		06-OCT-11 11:42:37AM
7	49.6803	-123.1626		5503100.2707	488269.5269		06-OCT-11 11:47:09AM
8	49.6781	-123.1610		5502856.6552	488386.9245		06-OCT-11 11:56:30AM
9	49.6781	-123.1610		5502851.7814	488382.6568		06-OCT-11 11:57:47AM
10	49.6788	-123.1609		5502934.1193	488393.0466		06-OCT-11 12:02:05PM
11	49.6800	-123.1609		5503065.4180	488395.1905		06-OCT-11 12:07:32PM
12	49.6833	-123.1667		5503434.3235	487977.1058		06-OCT-11 12:29:11PM
13	49.6836	-123.1671		5503463.8161	487948.5294		06-OCT-11 12:34:03PM
14	49.6846	-123.1672		5503579.9663	487940.3226		06-OCT-11 12:41:41PM
15	49.6849	-123.1678		5503608.0403	487900.3164		06-OCT-11 12:46:18PM
16	49.6852	-123.1678		5503648.8452	487897.3360		06-OCT-11 12:51:28PM
17	49.6856	-123.1675		5503689.9162	487921.5702		06-OCT-11 12:54:45PM
18	49.6858	-123.1675		5503712.2193	487915.8160		06-OCT-11 12:57:55PM
19	49.6857	-123.1678		5503697.8076	487897.1915		06-OCT-11 1:00:49PM
20	49.6862	-123.1675		5503757.5872	487918.7404		06-OCT-11 1:05:56PM
21	49.6868	-123.1670		5503822.1855	487956.2127		06-OCT-11 1:09:12PM
22	49.6870	-123.1667		5503844.5147	487976.7217		06-OCT-11 1:11:11PM

Waypoint	Latitude	Longitude		UTM, east	UTM, north		Date and Time
23	49.6874	-123.1661		5503883.9584	488020.5697		06-OCT-11 1:14:01PM
24	49.6877	-123.1659		5503916.0251	488032.9807		06-OCT-11 1:16:44PM
25	49.6882	-123.1655		5503972.2831	488062.5606		06-OCT-11 1:19:35PM
26	49.6930	-123.1593		5504514.0593	488510.2198		06-OCT-11 1:59:29PM
27	49.6930	-123.1594		5504514.5159	488505.6807		06-OCT-11 2:01:24PM
28	49.6925	-123.1607		5504450.6444	488413.3663		06-OCT-11 2:05:13PM
29	49.6929	-123.1595		5504503.6689	488496.9164		06-OCT-11 2:44:53PM
30	49.6850	-123.1621		5503623.7352	488307.1612		06-OCT-11 3:53:34PM
31	49.6850	-123.1617		5503620.6925	488339.5625		06-OCT-11 3:55:45PM
32	49.6934	-123.1531		5504547.7822	488959.3534		06-OCT-11 4:13:38PM
33	49.6937	-123.1525		5504587.9402	488999.2182		06-OCT-11 4:15:20PM
34	49.7000	-123.1486		5505283.1771	489283.4710		06-OCT-11 4:23:14PM
35	49.6910	-123.1833		5504286.0232	486778.3323		07-OCT-11 9:57:47AM
36	49.6910	-123.1834		5504292.5089	486774.4368		07-OCT-11 10:04:36AM
37	49.6838	-123.1835		5503487.2246	486762.4106		07-OCT-11 10:28:56AM
38	49.6842	-123.1839		5503534.4950	486737.6998		07-OCT-11 10:30:30AM
39	49.6839	-123.1823		5503498.1823	486851.0834		07-OCT-11 10:41:16AM
40	49.6837	-123.1815		5503474.9455	486906.8052		07-OCT-11 10:45:14AM
41	49.6836	-123.1812		5503470.6156	486932.3896		07-OCT-11 10:46:27AM
42	49.6836	-123.1808		5503468.9238	486957.6470		07-OCT-11 10:47:52AM
43	49.6834	-123.1806		5503446.3010	486975.6896		07-OCT-11 10:49:11AM
44	49.6828	-123.1805		5503381.9822	486979.6527		07-OCT-11 10:50:55AM
45	49.6829	-123.1799		5503386.2301	487022.8900		07-OCT-11 10:52:54AM

Waypoint	Latitude	Longitude		UTM, east	UTM, north		
46	49.6831	-123.1802		5503413.1227	487004.0645		07-OCT-11 10:54:44AM
47	49.6831	-123.1797		5503407.3528	487035.9823		07-OCT-11 10:56:21AM
48	49.6832	-123.1793		5503426.4386	487070.5355		07-OCT-11 10:59:31AM
49	49.6817	-123.1783		5503256.6689	487140.3741		07-OCT-11 11:02:54AM
50	49.6832	-123.1761		5503428.1314	487296.9132		07-OCT-11 11:13:24AM
51	49.6846	-123.1781		5503574.2708	487150.6264		07-OCT-11 11:16:20AM
52	49.6907	-123.1781		5504255.9179	487156.0753		07-OCT-11 11:34:55AM
53	49.6908	-123.1783		5504265.0280	487141.9746		07-OCT-11 11:37:45AM
54	49.6908	-123.1783		5504262.7776	487143.9340		07-OCT-11 11:39:32AM
55	49.6908	-123.1784		5504264.5113	487132.0467		07-OCT-11 11:40:29AM
56	49.6909	-123.1784		5504277.1447	487137.1248		07-OCT-11 11:41:55AM
57	49.6909	-123.1784		5504280.5869	487135.7185		07-OCT-11 11:42:55AM
58	49.6911	-123.1783		5504297.2386	487140.2133		07-OCT-11 11:45:32AM
59	49.6895	-123.1764		5504125.9450	487279.5892		07-OCT-11 11:56:15AM
60	49.6894	-123.1765		5504114.1219	487270.2569		07-OCT-11 11:57:14AM
61	49.6893	-123.1766		5504097.1592	487263.2285		07-OCT-11 11:58:20AM
62	49.6893	-123.1767		5504102.2482	487255.0186		07-OCT-11 11:58:34AM
63	49.6893	-123.1767		5504095.6438	487258.0137		07-OCT-11 11:59:18AM
64	49.6892	-123.1765		5504092.9972	487269.6151		07-OCT-11 12:07:31PM
65	49.6894	-123.1767		5504114.2969	487259.2123		07-OCT-11 12:09:04PM
66	49.6895	-123.1765		5504124.6594	487271.2431		07-OCT-11 12:10:58PM
67	49.6896	-123.1763		5504134.1213	487285.6967		07-OCT-11 12:12:03PM
68	49.6895	-123.1764		5504117.5842	487276.3411		07-OCT-11 12:14:14PM

Waypoint	Latitude	Longitude		UTM, east	UTM, north		Date and Time
69	49.6895	-123.1763		5504127.5327	487285.7598		07-OCT-11 12:16:41PM
70	49.6896	-123.1762		5504138.6500	487294.0626		07-OCT-11 12:18:01PM
71	49.6900	-123.1760		5504179.1073	487308.1645		07-OCT-11 12:32:00PM
72	49.6299	-123.2091		5497507.3842	484901.9736		07-OCT-11 1:42:36PM
73	49.6299	-123.2090		5497500.1584	484906.9170		07-OCT-11 1:43:07PM
74	49.6296	-123.2090		5497469.8725	484910.0464		07-OCT-11 1:44:16PM
75	49.6293	-123.2086		5497433.4999	484933.9164		07-OCT-11 1:46:07PM
76	49.6287	-123.2083		5497369.9450	484960.7496		07-OCT-11 1:49:43PM
77	49.6286	-123.2082		5497353.4551	484965.9824		07-OCT-11 1:50:38PM
78	49.6279	-123.2077		5497279.9898	484998.0978		07-OCT-11 1:53:20PM
79	49.6277	-123.2074		5497263.1435	485024.5103		07-OCT-11 1:54:08PM
80	49.6275	-123.2078		5497238.1432	484993.3515		07-OCT-11 1:55:41PM
81	49.6272	-123.2079		5497207.8288	484989.9622		07-OCT-11 1:56:45PM
82	49.6267	-123.2078		5497150.1840	484992.7936		07-OCT-11 1:58:42PM
83	49.6261	-123.2078		5497078.3940	484995.2529		07-OCT-11 2:00:56PM
84	49.6253	-123.2076		5496987.1946	485007.3078		07-OCT-11 2:05:47PM
85	49.6250	-123.2072		5496953.6755	485033.9481		07-OCT-11 2:07:22PM
86	49.6115	-123.2152		5495457.6684	484453.0883		07-OCT-11 2:26:43PM
87	49.6118	-123.2152		5495489.9363	484454.3676		07-OCT-11 2:28:09PM
88	49.6126	-123.2144		5495580.3038	484512.0418		07-OCT-11 2:31:31PM
89	49.6126	-123.2141		5495581.2601	484533.0445		07-OCT-11 2:33:28PM