

Niblack Property Prince of Wales Island, Alaska

Eelgrass Survey

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Prepared for:



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Introduction and Purpose

The objective of this report is to identify the abundance and distribution of eelgrass (*Zostera marina*) along nearshore habitats adjacent to the Niblack property located on Prince of Wales Island, Alaska. The property includes a patented mining claim owned by the Niblack Mining Corporation. The approximately 23-acre survey area is situated near the head of Niblack Anchorage, a two-mile long inlet east of Clarence Strait.

Eelgrass is a narrow-leaved (2 to 5 mm wide and up to 1 meter long) flowering vascular plant that grows along nearshore, shallow marine waters. Eelgrass communities support habitat for many marine invertebrates and fish throughout the year, providing excellent sources of shelter and food (McRoy 1970). Eelgrass is found throughout southeast Alaska.

A consideration for the siting of nearshore developments by the Niblack Project is the presence of eelgrass beds. Federal regulations and policies (40 CFR Sec. 230.43) require projects to minimize their impacts on special aquatic sites, such as eelgrass beds, and to locate projects in those areas only if there is no practicable alternative with lesser environmental impact.

Field Survey

HDR Alaska, Inc. was contracted by Niblack Mining Corporation in January 2007 to perform a winter survey of eelgrass along approximately 1,000 feet of nearshore intertidal and subtidal waters adjacent to the Niblack property. Jeff Schively, an HDR biologist, conducted the field survey on February 20, 2007. Prior to the survey, Mark Minnilo, a habitat biologist with the Alaska Department of Natural Resources (DNR), was contacted to discuss the survey approach and potential limitations involved with conducting the survey during winter. Mr. Minnilo noted several locations where he had observed eelgrass during a previous site visit and requested that those areas be a part of the survey. As discussed with DNR, the limitations of conducting a winter eelgrass survey are primarily related to the reduced growth rate of the plant coinciding with short days, low light, and cold temperatures. Weather conditions, wave action, water turbidity, and ice cover are also issues that could reduce survey accuracy; wherever possible, the conditions of these parameters were noted in the field.

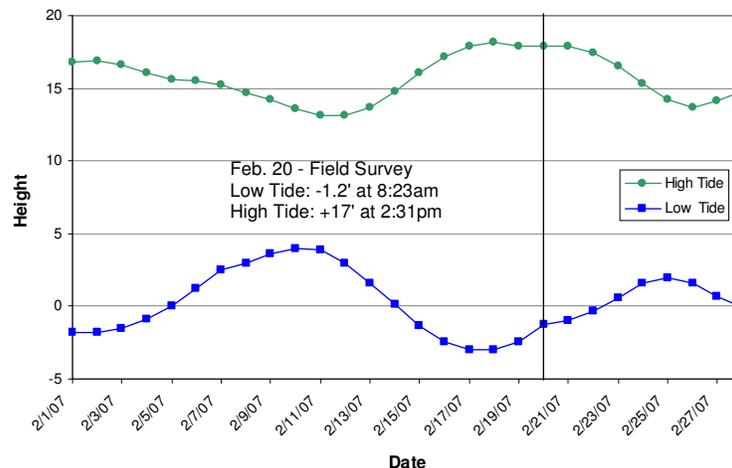


Figure 1. February 2007 NOAA Tide Predictions: Ketchikan¹

¹ From NOAA tides and currents website, available at:
http://tidesandcurrents.noaa.gov/get_predictions.shtml?year=2007&stn=1421+Ketchikan

The survey was completed during a low tide event (1.2 feet (ft) below sea level (bsl) at 8:23am) on February 20, 2007 (Figure 1). February's tidal cycle is included above to show the average tide range for the area. The survey started at 7:53am and lasted approximately four hours. Weather and field conditions were favorable during the survey. An overcast sky with occasional clear periods was present during most of the survey. No wind was present and the water surface was flat. A light rain fell for approximately 10 minutes near the end of the survey.

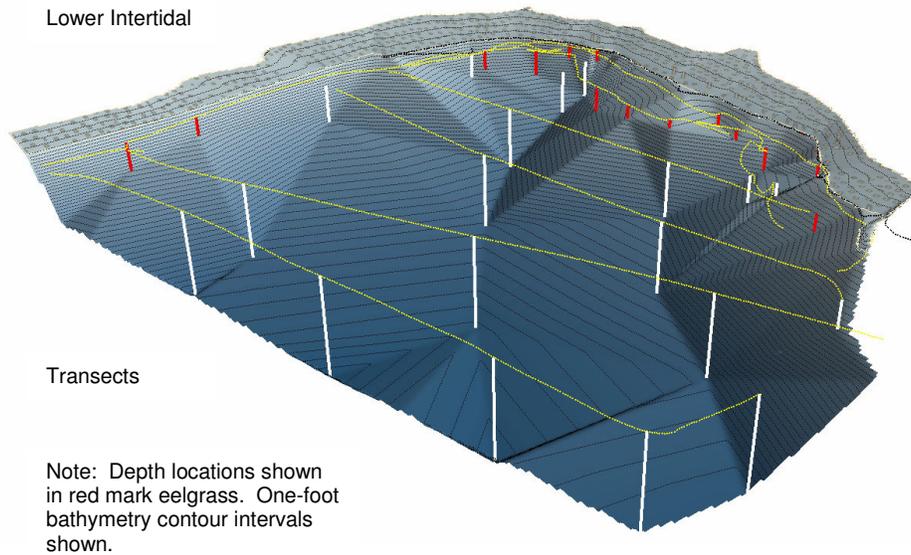


Figure 2. Bathymetry Model of Survey Area

A 26-foot skiff was used to facilitate on-water portions of the survey. The boat operator followed a series of transects extending the entire length of the study area at a slow, trolling speed (estimated at less than 2 knots). Each transect was logged into a handheld Thales MobileMapper™ Pro global positioning system (GPS) unit. GPS data was post-processed to fix differential correction errors using a National Geodetic Survey base station located on Annette Island. In deep waters (greater than 20 ft bsl), the presence of eelgrass was sought using an AquaScope II underwater viewer. Within shallower waters, the underwater viewer was not used unless excessive glare prevented a clear view of the underwater ground floor.

Since a bathymetry layer was not available for the surveyed area, an estimate of water depths was collected by logging point locations into the GPS and noting the depths of each point using a commercial-grade depth finder on the skiff. This depth information was entered into a geographic information system (GIS) database where a surface model was interpolated to obtain estimated bathymetry contours for the study area (Figure 2).

A total of six marine transects and one beach transect were completed for the survey (Figure 3). GPS locations along each of these transects were collected where eelgrass was observed, where changes in substrate occurred, and where depth readings were collected. Notes taken at each of these GPS locations are included at the end this report. Point locations and GPS surveyed transects are shown on the attached map.

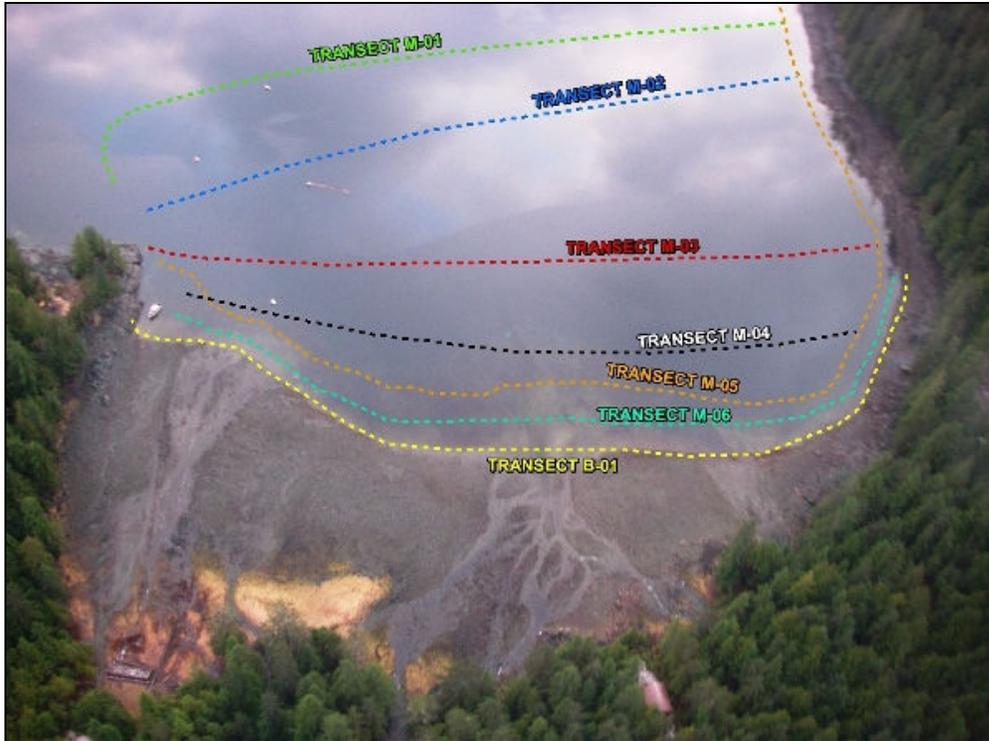


Figure 3. Approximate Locations of Survey Area Transects

Results

Eelgrass was observed at several locations within the study area. These locations are shown on Figure 5. In general, most subtidal areas were too deep to permit eelgrass growth; an estimated 76 percent of the surveyed subtidal areas are deeper than 15.0 ft bsl. The deepest elevation where eelgrass was observed was 11.9 ft bsl; the shallowest elevation was 3.0 ft bsl. During the survey, it was difficult to view the bottom of Niblack Anchorage at depths greater than 25.0 ft bsl. Eelgrass was absent within the entire intertidal zone that was surveyed (Figure 4 – photograph 1).

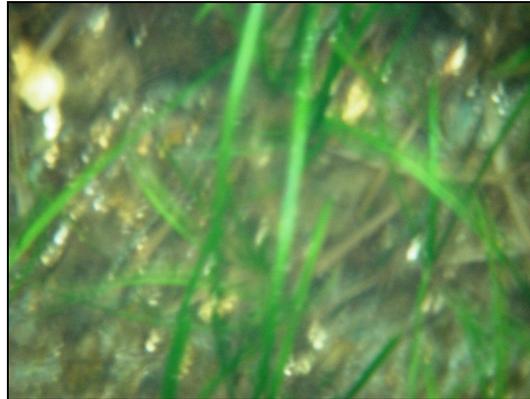
The largest bed of eelgrass is located approximately 20 ft beyond the intertidal and subtidal boundary in the northwestern portion of the study area (see GPS points 25, 26, 38, and 39 on the attached map). This bed was initially observed from the beach survey (GPS points 7 and 8) and then verified while conducting transects M-05 and M-06 (Figure 3 and 5). Plant density was greatest and most widespread within this bed. The underlying substrate within this bed is a mix of sand and gravel (Figure 4 - photographs 2 and 3).

A total of nine smaller, isolated patches of eelgrass were observed along transects M-04, M-05, and M-06. Only a single shoot was observed at GPS point 28, only three shoots at GPS point 27. In general, no dense beds of eelgrass were observed at any other location, only sparse beds were seen. At all locations where eelgrass was observed, a mix of sand and gravel made up the underlying substrate.

No eelgrass was seen growing in any of the rocky or coarse gravel beds surveyed (Figure 4 – photographs 4 and 5). A large area in the upper subtidal zone near GPS point 4 was covered by a thick layer of detritus (Figure 4 – photograph 6); no eelgrass was observed in that location.



Photograph 1. Intertidal beach at low tide



Photograph 2. Eelgrass as seen from the AquaScope



Photograph 3. Sand/gravel mix substrate



Photograph 4. Coarse gravel substrate



Photograph 5. Rocky substrate



Photograph 6. Detritus covered substrate

Figure 4. Site Photographs

Discussion

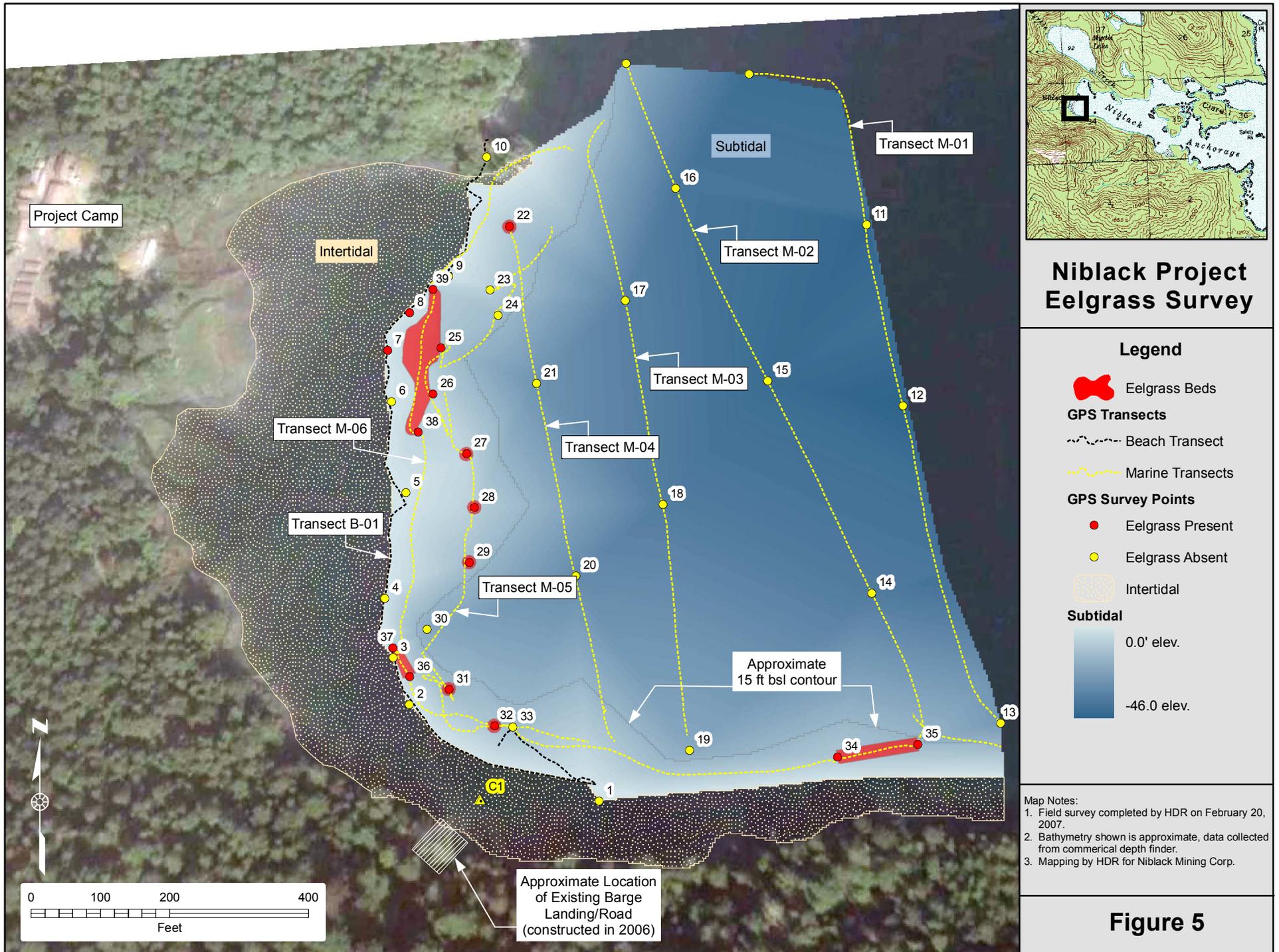
A winter survey of eelgrass has the opportunity to underestimate the overall coverage of the plant. Our study included looking for additional indicators beyond just the visual presence or absence of

the plant. Physical parameters such as substrate type, water depth, wave scour, detritus cover, ice cover, and proximity to freshwater streams were evaluated. For summary purposes, we offer the following conclusions concerning the surveyed area:

1. Most of the study area is likely too deep to permit extensive growth of eelgrass.
2. Along the southwestern portion of the study area, a significant change of underlying substrate occurs. This substrate change includes a change from finer gravels and sand to larger gravels and rock. Based on our observations of where eelgrass occurs within the study area, the likelihood that eelgrass colonizes the rocky, coarse gravel substrates, even during summer, is probably low.
3. A thick bed of detritus exported from the southern freshwater stream appears to accumulate in the lower intertidal and upper subtidal zones. This may have a blanket effect in some areas and limit growth of eelgrass and other marine plant-life. Very little plant growth was observed in that area at the time of the field survey. This blanketed area may fluctuate throughout the year.

References

- McRoy, C. P. 1970. *On the Biology of Eelgrass in Alaska*. University of Alaska. Fairbanks, AK. 156pp.
- U.S. Federal Register. December 24, 1980. Rules and Regulations, Vol. 45, No. 249. U.S. Department of Defense. Corps of Engineers, Department of the Army. 40 CFR Sec. 240.43.



Field Notes

GPS Site #	Approximate Depth (from sea level)	Eelgrass Present (Z. marina)	Alaska Stateplane Zone 1, NAD27 coordinates		Notes
			Northing	Easting	
C-1	n/a		1,183,821.56	3,004,996.14	GPS control point (tied to local ground control survey)
B-01	n/a		1,183,815.95	3,005,167.77	Beach transect
1	-1.0		1,183,960.07	3,004,896.82	Rocky intertidal. Substrate made up of 6"-2' diameter angular blocky rocks. No mud or sand substrate.
2	-1.0		1,184,027.68	3,004,874.41	Substrate type change in both intertidal and subtidal. Rocky (similar to site #1) to south, coarse gravel/sand mix to north. Barnacle covered intertidal rocks. Seaweed present. Mink seen in this location.
3	-1.0		1,184,113.30	3,004,864.05	Substrate type and beach gradient change. Beach is flatter than sites 1 and 2. Accumulated debris line on beach above water line. Smaller cobbles/rocks (mixed rounded and angular).
4	-1.0		1,184,265.61	3,004,897.27	Subtidal habitat buried under organic detritus. Thick layer of bark, branches, needles, etc.
5	-1.0		1,184,396.73	3,004,879.21	Freshwater stream/Marine mixing location. Seaweed present. 80% 2"-4" angular rock, 10% sand, and 10% gravel in upper subtidal. Gravel/cobble mix throughout intertidal.
6	-1.0		1,184,470.71	3,004,875.06	Shallow/low-gradient subtidal. 95% small gravel, 5% 2-4" diameter rock.
7	-1.0	X	1,184,524.81	3,004,907.57	Shallow/low-gradient subtidal. 30% sand, 50% gravel, 20% 2-4" diameter rock. Several small single plants of eelgrass (count 3 shoots from beach) approximately 12" long, 4 to 5 blades per shoot.
8	-1.0	X	1,184,575.88	3,004,964.84	Eelgrass bed approximately 100 degrees east from GPS point, about 20 feet from edge of water (-1 feet). Depth of eelgrass is approximately 3 feet bsl. Sparse growth but consistent cover. 30% sand, 50% gravel, and 20% 2-4" diameter rock.
9	-1.0		1,184,747.18	3,005,022.97	No eelgrass from this GPS point back to point #8. Rocky subtidal. 2-8" diameter rock (60%), 30% gravel, 10% sand.
10	-1.0		1,184,639.14	3,005,569.25	Barge landing area. No eelgrass. 20% sand, 40% gravel, 40% 4-6" diameter rock.
M-01	-42.0				Outer study area transect. Thick with jellyfish. Starting transect at north end.
11	-44.7		1,184,639.14	3,005,569.25	Depth point. Unable to see bottom.

GPS Site #	Approximate Depth (from sea level)	Eelgrass Present (Z. marina)	Alaska Stateplane Zone 1, NAD27 coordinates		Notes
			Northing	Easting	
12	-46.0		1,184,377.21	3,005,616.93	Depth point. Unable to see bottom.
13	-25.0		1,183,917.09	3,005,749.00	AquaScope survey. Sand/gravel/large rock bottom. Unvegetated.
M-02	-17.0				Start of marine transect #2. Starting transect at south end of study area. Bottom characteristics same as GPS #13.
14	-35.8		1,184,107.92	3,005,566.67	Depth point. Unable to see bottom.
15	-42.4		1,184,416.93	3,005,422.66	Depth point. Unable to see bottom.
16	-37.5		1,184,696.53	3,005,294.93	Depth point. Unable to see bottom.
M-02	-20.0				AquaScope survey. Sand/gravel/large rock (boulders) bottom. Unvegetated.
M-03	-12.9				Start of marine transect #3. Starting at north end of study area. Sea stars. Sand/gravel mix. AquaScope survey throughout.
17	-33.5		1,184,536.14	3,005,219.35	Depth point. Unable to see bottom.
18	-35.4		1,184,241.41	3,005,268.00	Depth point. Unable to see bottom.
19	-19.5		1,183,886.27	3,005,299.53	Depth point.
M-03	-12.0				AquaScope survey to -12 ft. bsf. Silt and gravel over 6"-2' diameter rocks.
M-04	-16.0				Start of marine transect #4. Starting transect at south end of study area. AquaScope survey throughout.
20	-30.0		1,184,140.44	3,005,140.45	Depth point. Unable to see bottom.
21	-27.1		1,184,419.01	3,005,089.09	Depth point. Unable to see bottom.
22	-8.0	X	1,184,646.18	3,005,054.32	Eelgrass present. 10% sand, 80% gravel, 10% 4"-6" diameter rock. Sparse growth, approximately 1'-2' apart, 2'-3' long blades.
M-05	n/a				Start of marine transect #5. Starting transect at north end of study area.
23	-6.5		1,184,555.55	3,005,024.00	Depth point. AquaScope survey.
24	-13.0		1,184,518.63	3,005,035.38	Depth point. AquaScope survey. Large mooring anchor.
25	-11.0	X	1,184,473.32	3,004,951.97	Eelgrass throughout. Thick patch. Gravel/sand substrate.
26	-5.0	X	1,184,406.82	3,004,939.19	End of eelgrass. Eelgrass bed between this GPS point and #25.
27	-4.2	X	1,184,319.74	3,004,986.09	Small isolated patch of eelgrass. Three shoots observed. 80% gravel, 15% sand, 5% 4"-6" diameter rock.
28	-6.5	X	1,184,242.11	3,004,996.13	75% detritus and silt, 10% gravel, 10% sand, 5% 4"-6" diameter rock. A single shoot of eelgrass observed.
29	-11.9	X	1,184,163.37	3,004,987.20	Small isolated patch of eelgrass. Approximately 10'x15' in size.

GPS Site #	Approximate Depth (from sea level)	Eelgrass Present (Z. marina)	Alaska Stateplane Zone 1, NAD27 coordinates		Notes
			Northing	Easting	
30	-7.0		1,184,067.88	3,004,924.43	No eelgrass. Sand/silt mix.
31	-13.0	X	1,183,980.72	3,004,954.41	Very sparse patch of eelgrass. Only several, small isolated shoots. Silt/gravel substrate.
32	-10.0	X	1,183,926.77	3,005,018.92	Change in underlying substrate. Very sparse eelgrass at this point (to north). Mud/silt substrate. Angular 6"-2' diameter rock embedded in silt/sand to north. No eelgrass observed throughout rocks. Zig-zag AquaScope survey throughout.
33	-12.5		1,183,924.47	3,005,045.40	AquaScope survey done. No eelgrass observed. Silt over 4"-1.5' diameter angular rock. Sand/silt substrate. Some detritus.
34	-9.0	X	1,183,872.52	3,005,513.04	Small, isolated patch of eelgrass observed. Several large boulders in areas. Sand, mud, and gravel substrate.
35	-14.0	X	1,183,889.08	3,005,629.19	Sparse, isolated patches of eelgrass between this GPS point and #34, all occurring at the -10' bathymetry contour. Gravel and sand with large boulders.
M-06	n/a		1,184,000.35	3,004,898.13	Start of marine transect #6.
36	-6.2	X	1,184,041.86	3,004,874.51	Start of eelgrass bed.
37	-6.1	X	1,184,352.08	3,004,916.81	End of eelgrass. Eelgrass bed between this GPS point and #36.
38	-5.3	X	1,184,557.19	3,004,941.75	Start of sparse eelgrass.
39	-6.5	X	1,184,000.35	3,004,898.13	End of eelgrass. Eelgrass bed between this GPS point and #38 (plant density higher on later 1/3 closest to #39).