Trip Report

Perryville Barge Landing

April 11 – 13, 2011

Participants

Nathan Epps – EN-CW-HH

Tu Nguyen – EN-ES-SG

Summary

This trip report documents the site visit to Perryville, Alaska on April 11-13, 2011 to investigate site conditions as part of the AKV272 (148844) Perryville Dock Study Denali Commission project.

The purpose of this visit was to measure beach profiles.

Photos taken during the site visit are located at:

O:_Projects by Location\Perryville\AKV272 (148844) Perryville Dock Study Denali Commission\Phase II Barge Landing Design and Construction\06 Photos-Maps-Drawings\2011-04-13 Perryville

Background

The project area for the barge landing and launch ramp lie approximately 1500 feet to the south of Perryville Airport.

A previous site visit was performed by the Alaska District of the U.S. Army Corps of Engineers in November of 2009 as a preliminary investigation for infrastructure improvements at Perryville. The trip report for that visit contains additional background information. This report is located at:

O:_Projects by Location\Perryville\AKV272 (148844) Perryville Dock Study Denali Commission\Phase I Dock Study\08 Reconnaissance Phase\Perryville Technical Report Nov09.pdf

Trip Report

April 11, 2011: The team travelled to Perryville, secured quarters and equipment for the trip, attended an informal meeting with representatives from the Perryville Native Village

Corporation, and performed elevation control and profile surveys of the existing landing site.

April 12, 2011: The team measured profiles of a possible boat launch north of the current offloading area and an alternate site to the south of the existing fuel tanks, measured the bathymetry of the area of interest and collected beach material samples.

April 13, 2009: The team performed preliminary post processing of the data and returned to Anchorage.

Native Village Corporation Meeting

The team met with representatives of the city to discuss the purpose of this visit, coordinate activities and discuss technical aspects of the project as currently planned. The meeting was held in the conference room of the village office on the afternoon of April 11th. Attendees from the Alaska District were Nathan Epps and Tu Nguyen. Attendees from the community included Gerald Kosbruk, Austin Shangin, and Jonathan Kosbruk. A record of attendance was not kept and other community members were present at the meeting.

The village representatives asserted that their priority interest is acquiring a facility capable of launching and recovering the local fishing fleet. A discussion of the relative cost of constructing a barge landing versus a launch ramp followed with an explanation that the project cost increases significantly when in-water work becomes a part of the project. At the end of the discussion, the community reiterated its primary concern in having a launching facility and stated that if a dual use facility could not be built that the launch ramp would be more desirable for the community.

The village attendees also described the current process used to offload cargo at the current landing site. When a vessel arrives at the community, it approached the beach as close as possible and maintains engine power to maintain position at the beach. A temporary barge ramp is created from beach material and surfaced with material from the local quarry or with polyethylene mats. For some vessels, the temporary ramp can be up to 10 feet high.

Site Investigation

An initial site check was performed immediately upon arrival to verify the location of existing survey monuments and determine the extent of survey work possible during the site visit. Conditions were clear with a temperature of 25 degrees and 50 mph winds. After a meeting with the Village Council to work out the logistics of the hydrographic measurements, a local elevation benchmark was established at the existing tank farm and the profile of the existing offloading site was measured. Two additional profiles were

measured the following day, followed by bathymetric measurements along the same profile lines to extent the measurements into navigable water. Surface samples of the beach material were also collected. Due to inclement weather, additional profiles could not be measured.

Profile Measurements

Ground measurements were performed with a Wild Heeburg NA-2 optical level and a collapsible fiber glass Philly rod. The instrument was checked in the field to ensure that the compensator functioned properly and was found to be working within acceptable limits. The rod was held with a single bubble rod level. Back sights and fore sights were balanced with a laser rangefinder to reduce systematic error. Due to the high winds, efforts were made to limit the rod height to less than ten feet. This was not possible on the beach slope, but the instrument was generally moved as soon as the rod required a third extension (increasing the rod height to roughly 15 feet) to read a measurement.

Elevation control was found off the southwest end of the runway at a survey monument named PEV C placed by the Alaska Department of Transportation and Public Facilities in 2005. The monument was found at 55.89356° N, 159.169864° W and has an elevation of 22 feet in the NAVD88 datum.

Temporary elevation control named TBM 1 was established on the bolt of a pipe connection inside the existing tank farm (Photo 2). Three beach profiles were measured using this control. Originally, seven profiles were planned (Figure 1), but the number was reduced to three due to the difficulty of working in high winds. The profiles measured represent terrain at the existing offloading site (C-Line), a possible secondary ramp site (A-Line) and an alternate project site (E-Line). Each profile was referenced to TBM 1 and beach elevations were recorded at 20 foot increments along the profile alignment. Profile measurements are attached to this report and comparative beach profiles are shown in Figure 2.

The water surface elevation was recorded at each profile to relate onshore measurements to offshore measurements. The time of these measurements was recorded. The location of the water line was assumed to be the midpoint of the swash zone of the waves at the time of measurement. The predicted tide at the time of these measurements was used to convert NAVD88 elevations for these points into elevations in Mean Lower Low Water (MLLW). Due to the high winds, the water levels were probably lower than predicted tides for the area since strong offshore winds tend to cause a local depression in water level. Since the winds were roughly the same during hydrographic portion of the survey, it is reasonable to assume that the amount of water level depression is roughly the same for the two sets of measurements, however there may be up to a 5 foot difference from MLLW in these measurements.

In general, the top of the beach was found to be a near 19 feet elevation (NAVD88). This was indicated as a vegetation line and a debris line. The slope of the beach was around 12% at the time of measurement. Beach profiles at all three locations showed similar slopes (Figure 2). The slope at the C-Line gently tapers off near the top of the beach where the slope of the A-Line and E-Line have more distinctive grade breaks. This is the result of cargo offloading operations at the C-Line. Vehicular traffic creates a vertical curve which transitions from the grade of the beach to the grade of the uplands. The final profile of a hardened launch ramp will exhibit a similar profile. Note that due to the dynamic nature of beaches, these results are not reproducible as the beach changes shape daily due to wave action and tidal fluctuations.

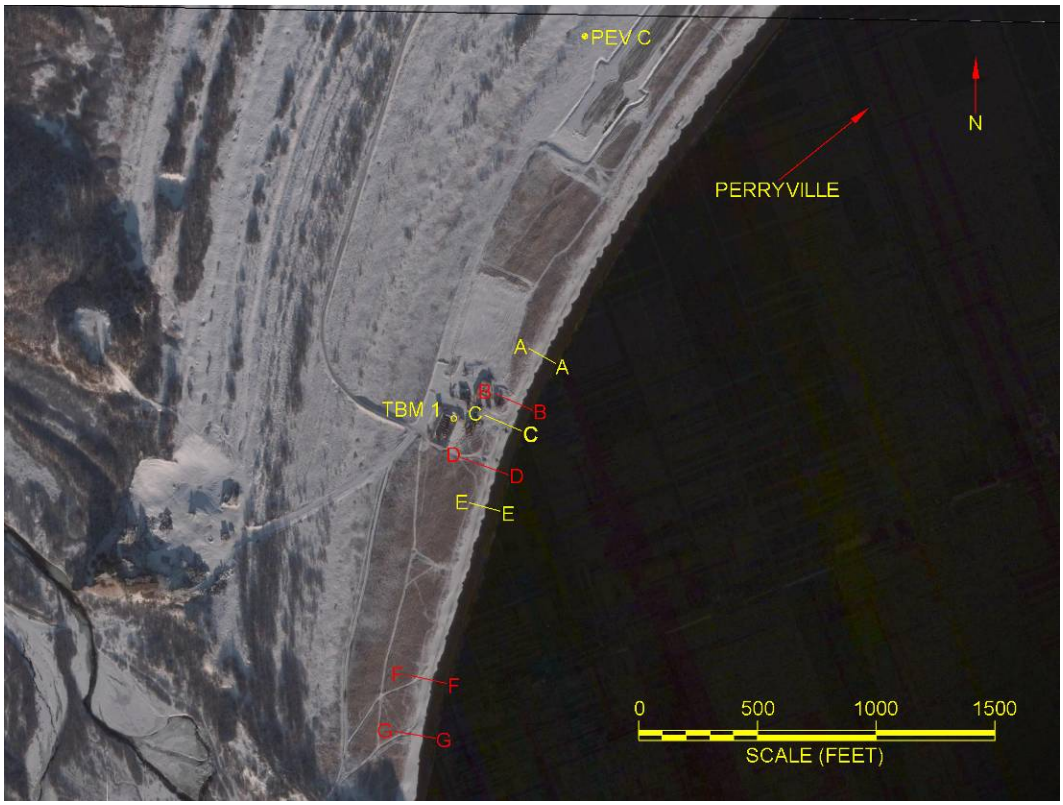

Figure 1: Survey plan for Perryville site visit. Yellow profiles were smeasured. Red profiles were not measured due to high winds at the time of the visit.

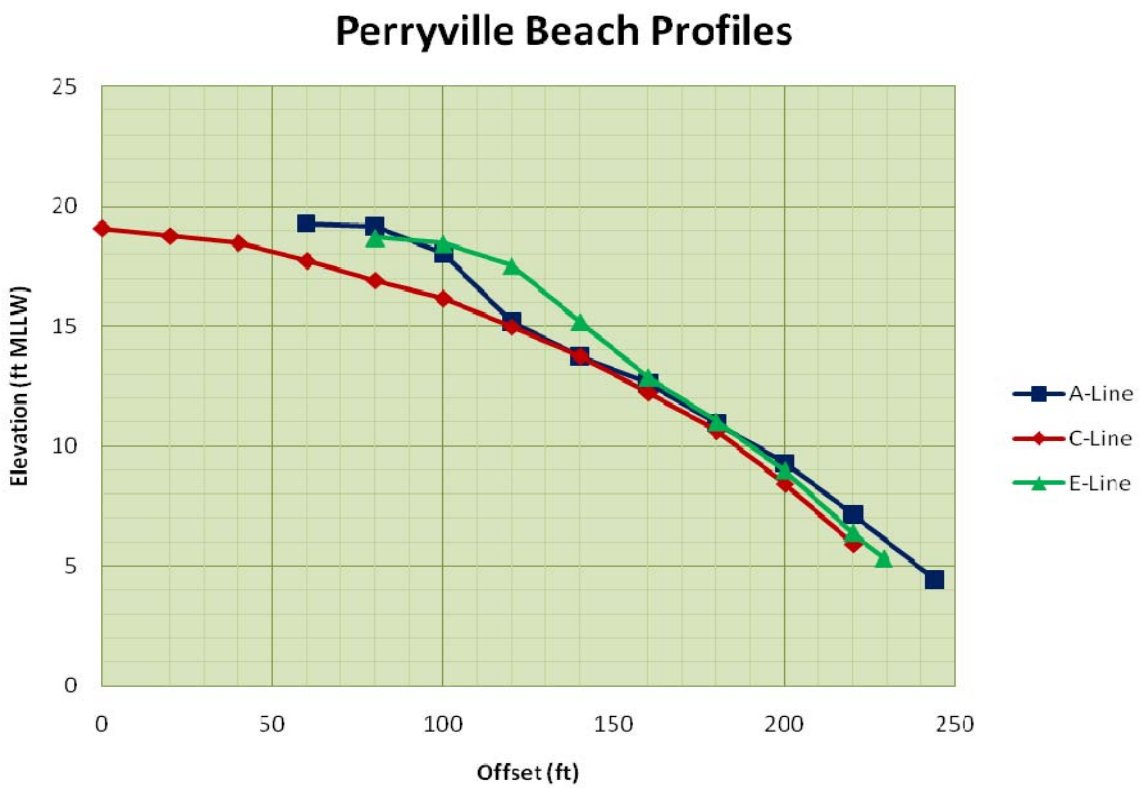

Figure 2: Profile measurements. Elevations are referenced to Mean Lower Low Water (MLLW).

Hydrographic Measurements

Water depth measurements were performed offshore of the project area using a Hydrolite TM single beam system linked to a Trimble Geo XH GPS and data recorder unit. Sonarmite software was used to record position and depth measurements. Measurements were performed from 15:20 to 16:22 on April 12th, a time frame corresponding to low tide. Ideally, the soundings would have been taken at high tide and ground profiles taken at low tide to maximize coverage of the tidal zone, however a battery failure of the GPS unit required the unit to be recharged. All of the coverage gap is in the tidal range of the beach and should have a very consistent slope. The elevation gap between high and low tide at the time of the visit was about 5 feet (Figure 3). Three survey passes were performed with the hydrographic unit. The first set consisted of transect lines corresponding to the profile lines measured on the ground. This data will be attached to the ground survey data to extend the profiles below the water. A second set of transects was taken at the offloading site to provide additional points to create a 3-d surface of the current operational area. A third set was run parallel to the shore connecting the transects to look for anomalies along the shoreline. Figure 4 shows the extents of measurements taken. Each of these surveys was indexed to a single tide elevation to relate water depths to the elevation of the profiles.

Measurements were taken from just a few feet offshore to approximately 400 feet offshore. The depth ranged from about 3 feet at the beach to about 100 feet at the farthest extent of the survey. The data will be processed to provide approximate depth contours of the area measured. The profile lines of the ground measurements will be extended into the bathymetry data to provide approximate shoreline profiles from the top of the beach to deep water.

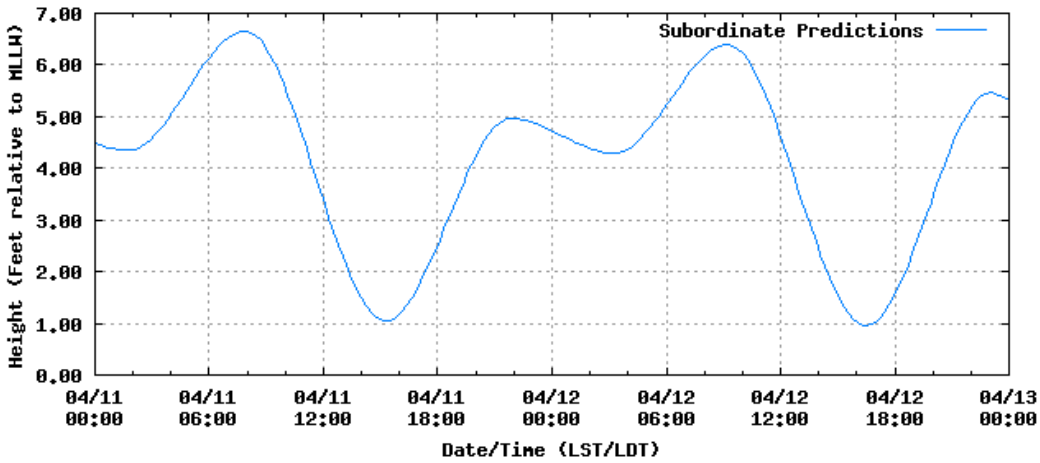

Figure 3: Tide predictions for StationID 9459085 Chiachi Island (east side), AK.

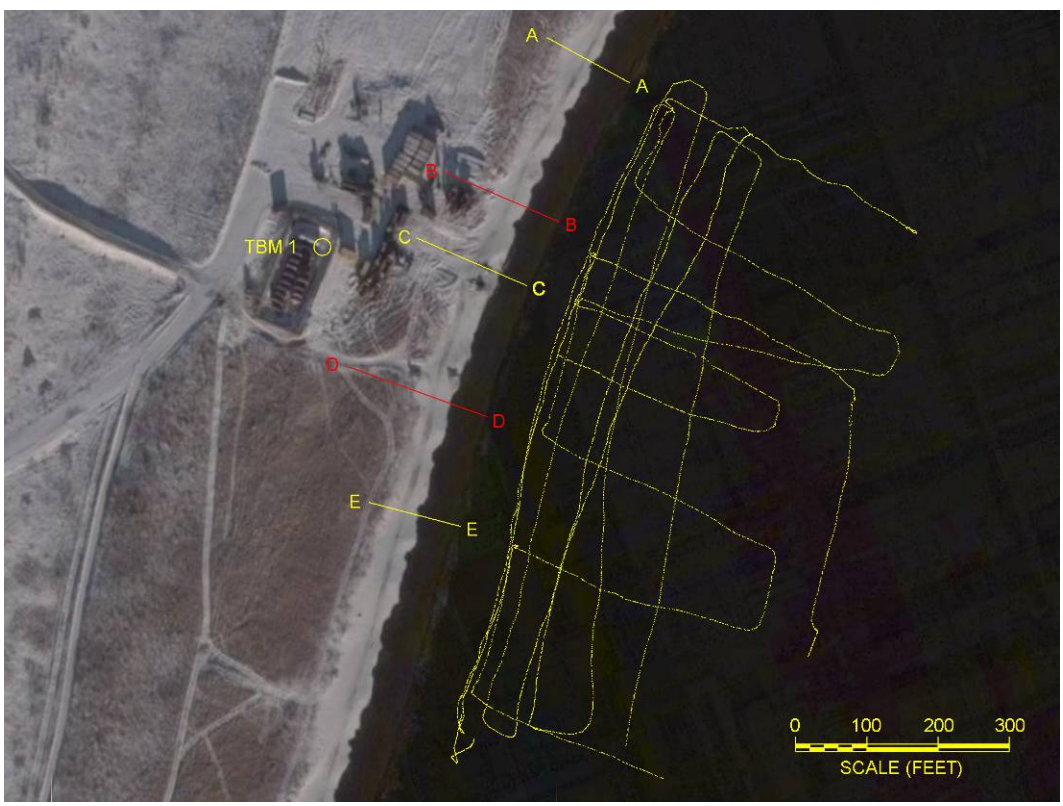

Figure 4: Bathymetry measurement points.

Beach Material Samples

Four surface samples of the beach material were taken and brought back to the Alaska District for further analysis. Samples were taken from the C-Line and E-Line near the top of the beach and near the water line at low tide. Further information concerning the beach materials will be provided in a separate report.

Site Assessment

In general, the measurements taken represent the beach after the effects of winter storms. Typically, in the winter, larger waves are experienced in the region. This tends to produce a steeper beach as high wave energy mobilizes beach sediments and transports material to an offshore berm. In the summer, gentler wave climates tend to return material from the berm to the beach creating a shallower beach slope. The beach at Perryville may not follow this typical pattern due to the severe drop off. Material deposited below the drop off probably would not be worked back into the beach as it is below the influence of wave action. Conversely, there is historical evidence that the beach around Perryville is accumulating material. Elder residents of the community remember a time when the rocky bluff to the northeast of the village dropped off directly into the ocean and a time when the large berm near the community center (Photo 8) was the top of the beach. Since that time, the beach has extended seaward creating several hundred yards of new beach. Near the project site, this has not occurred. Local elders state that the beach near the fuel tanks has not noticeably grown over their lifetimes. This may be due to the drop off; material transported to this area will seasonally be deposited into the drop off and not be reintegrated into the beach. Over time, enough material may be deposited offshore to produce a seasonal offshore berm, but insufficient information is available to determine if or when this would occur. For the purposes of this project, the beach near the fuel tanks is assumed to be stable with minor seasonal variations.

Photo 1: Village offices. Our room, the conference room and the tribal council offices are in the near unit. The clinic and other services are in the far unit.

Photo 2: Temporary benchmark at the fuel tanks.

Photo 3: The temporary benchmark is located near the northern most tank.

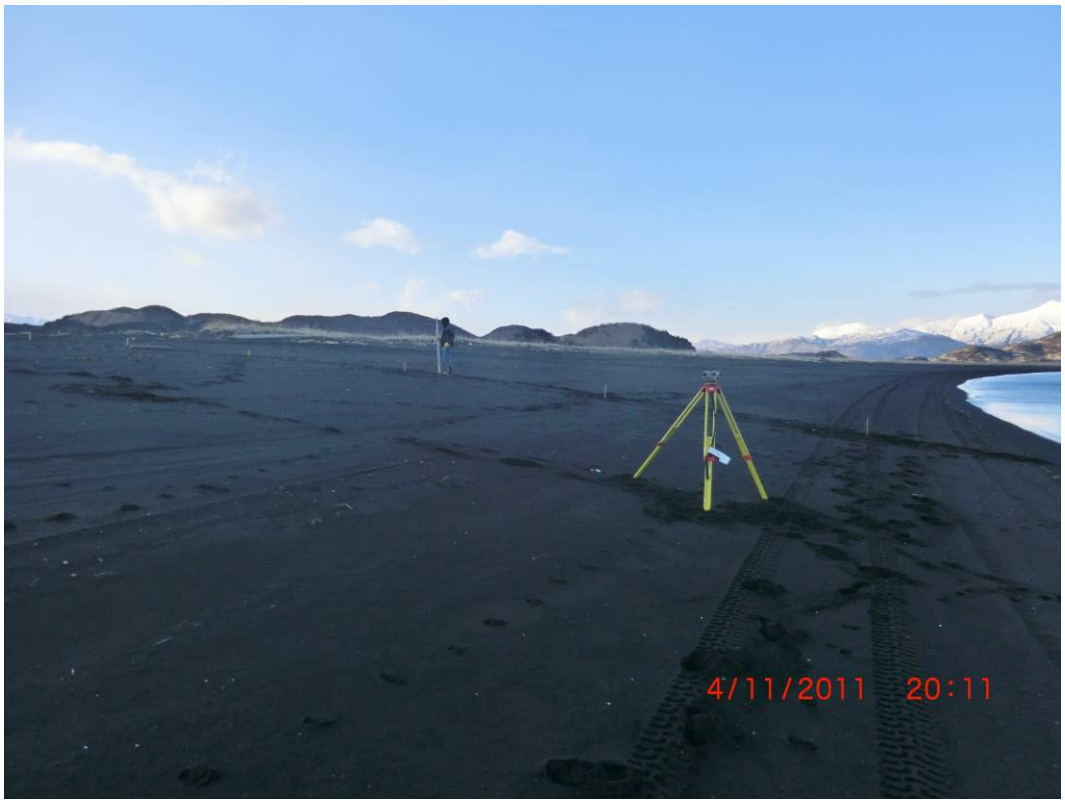

Photo 4: Profile setup along the C-Line at the current offloading site.

Photo 5: Profile setup along the A-Line, a possible launch ramp alignment.

Photo 6: Profile setup along the E-Line, an alternative site.

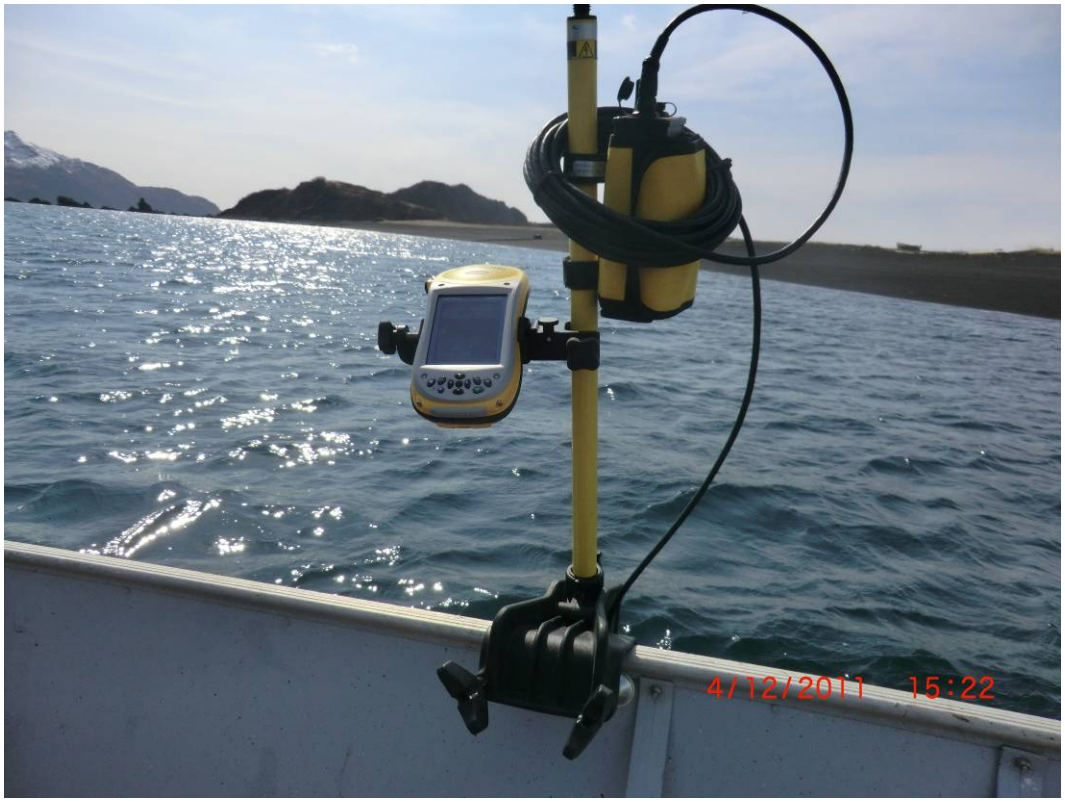

Photo 7: Hydrographic unit setup. The unit was mounted to the port gunwale of a 16 foot aluminum skiff. The battery and data collector are shown; the sounder unit is immersed in the water.

Photo 8: Historic beach dune at Perryville.