

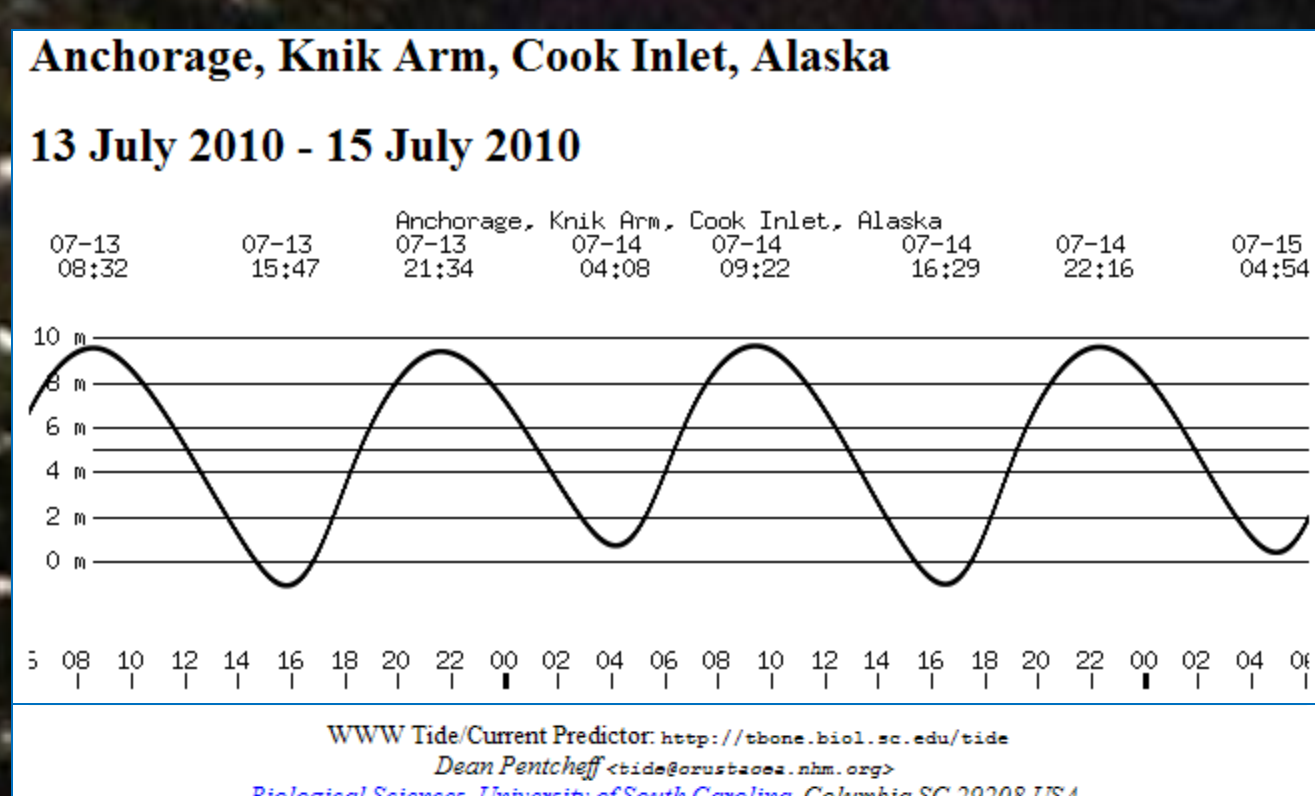
Using C3D Co-Located Side-Scan Imagery, Bathymetry, and Acoustic Backscatter for Mapping Benthic Habitat in a Shallow Tidally-Dominated Saltmarsh Environment, Eagle River Flats, Alaska

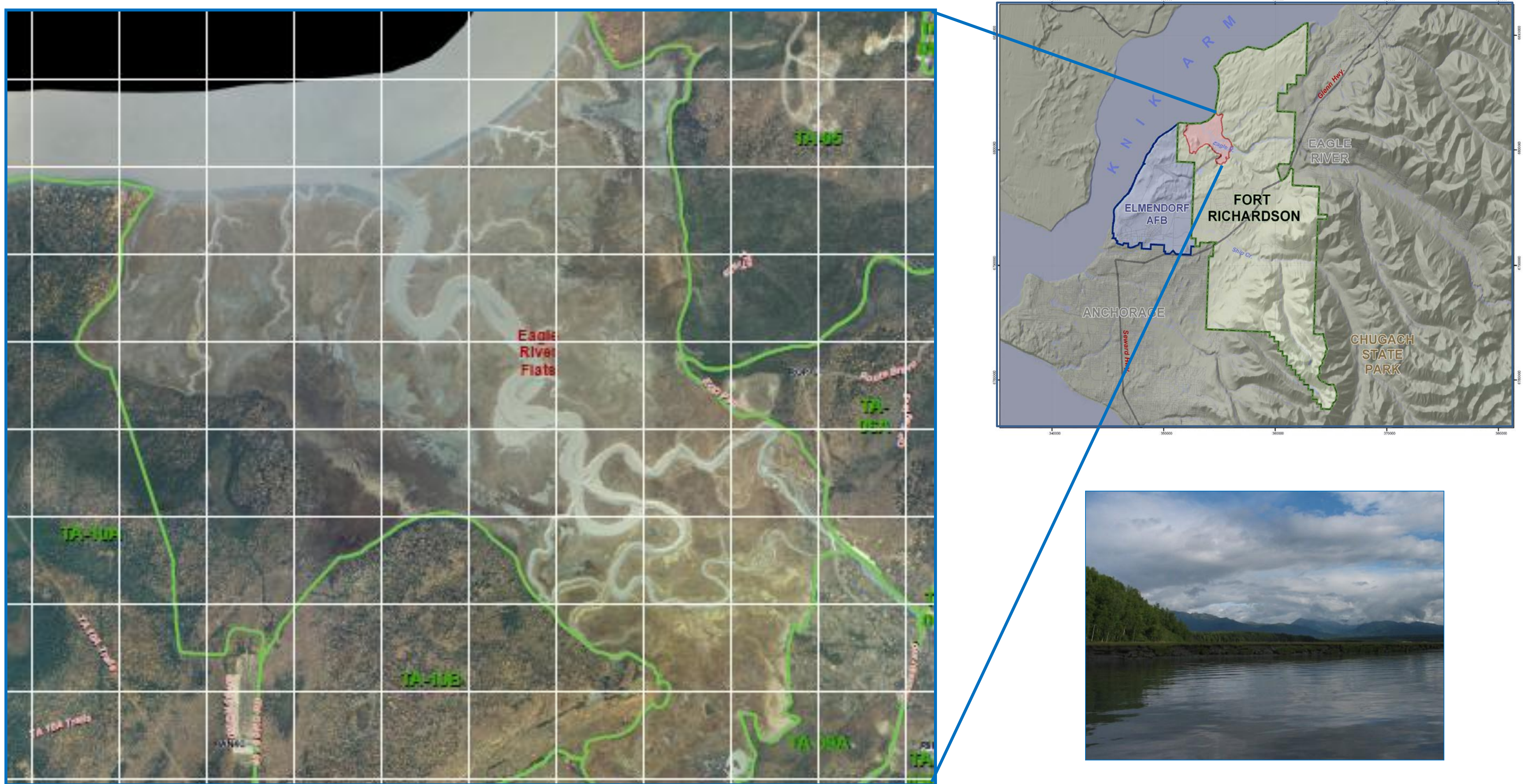
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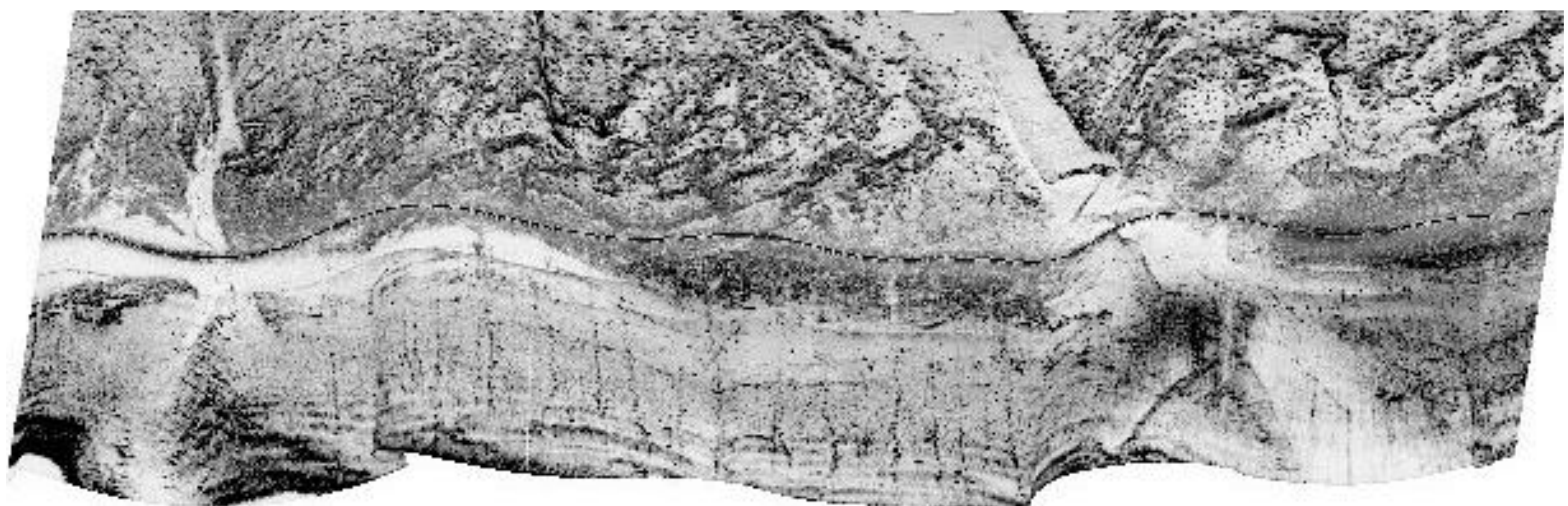
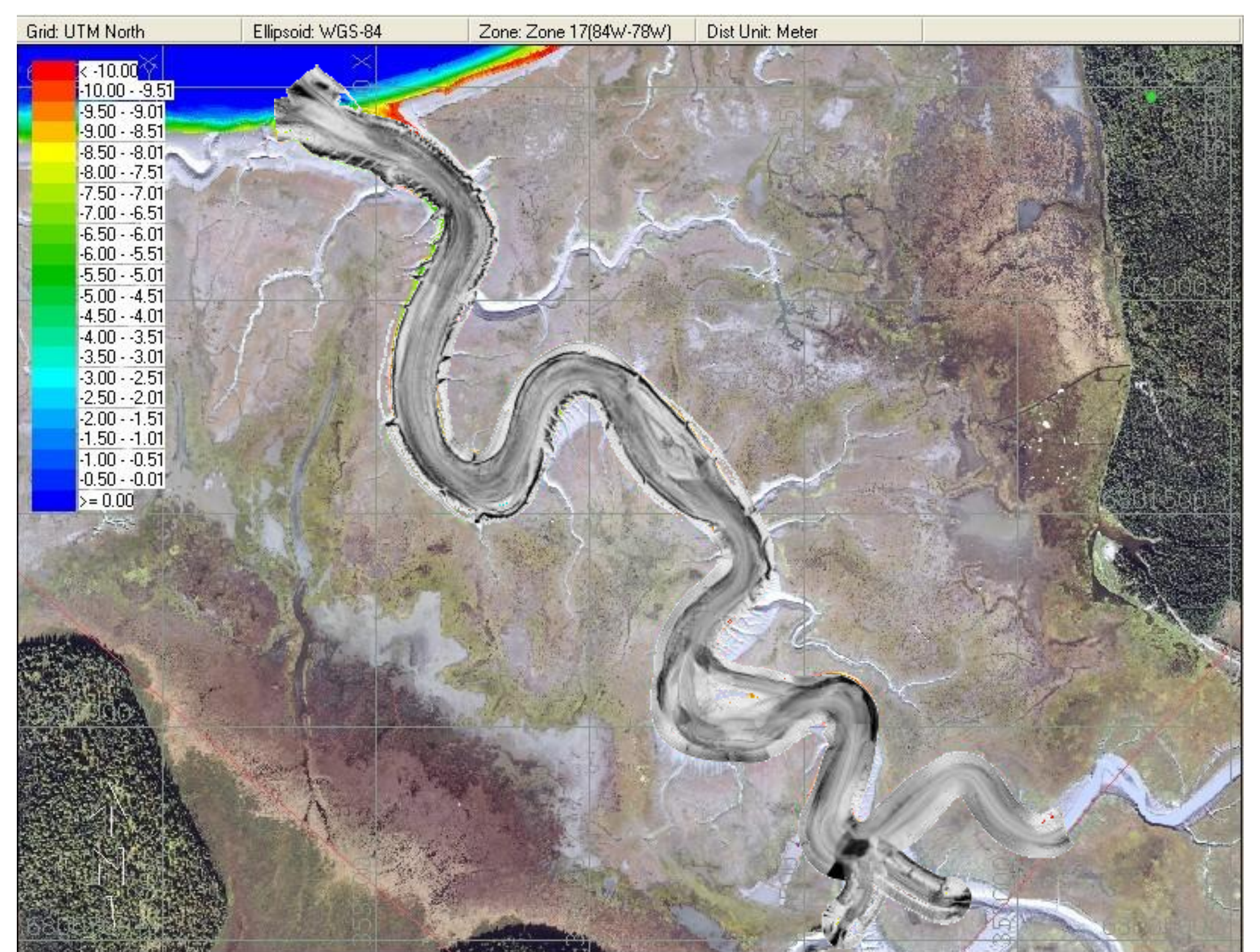
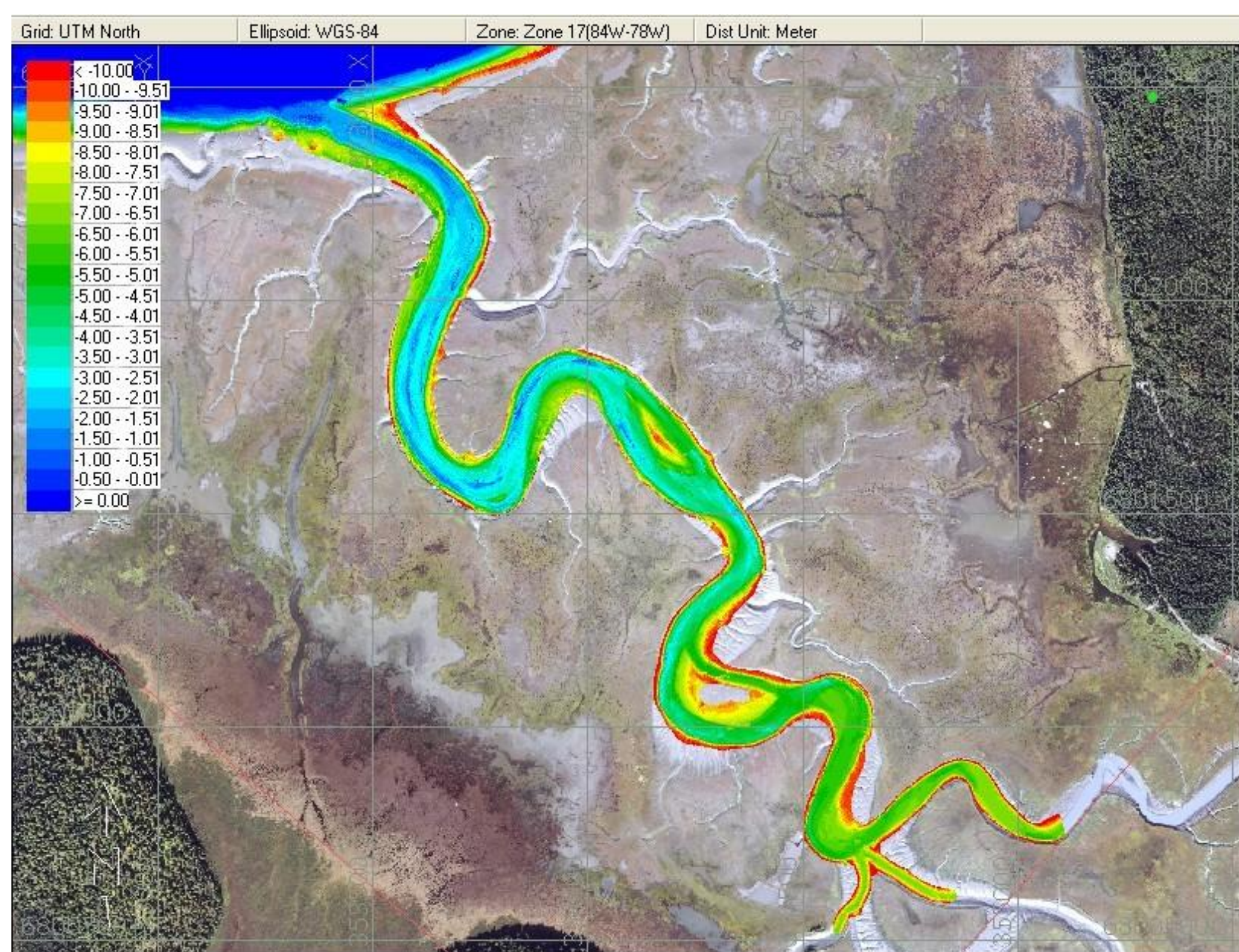
Photo taken from: U.S. Dept of Defense, U.S. Army Pacific Command, U.S. Army Garrison Alaska, Fort Richardson, Alaska. Cook Inlet Beluga Whale Observational Study Protocol, Eagle River and Eagle Bay, 27p., May, 2009. Red circle highlights Cook Inlet beluga whale

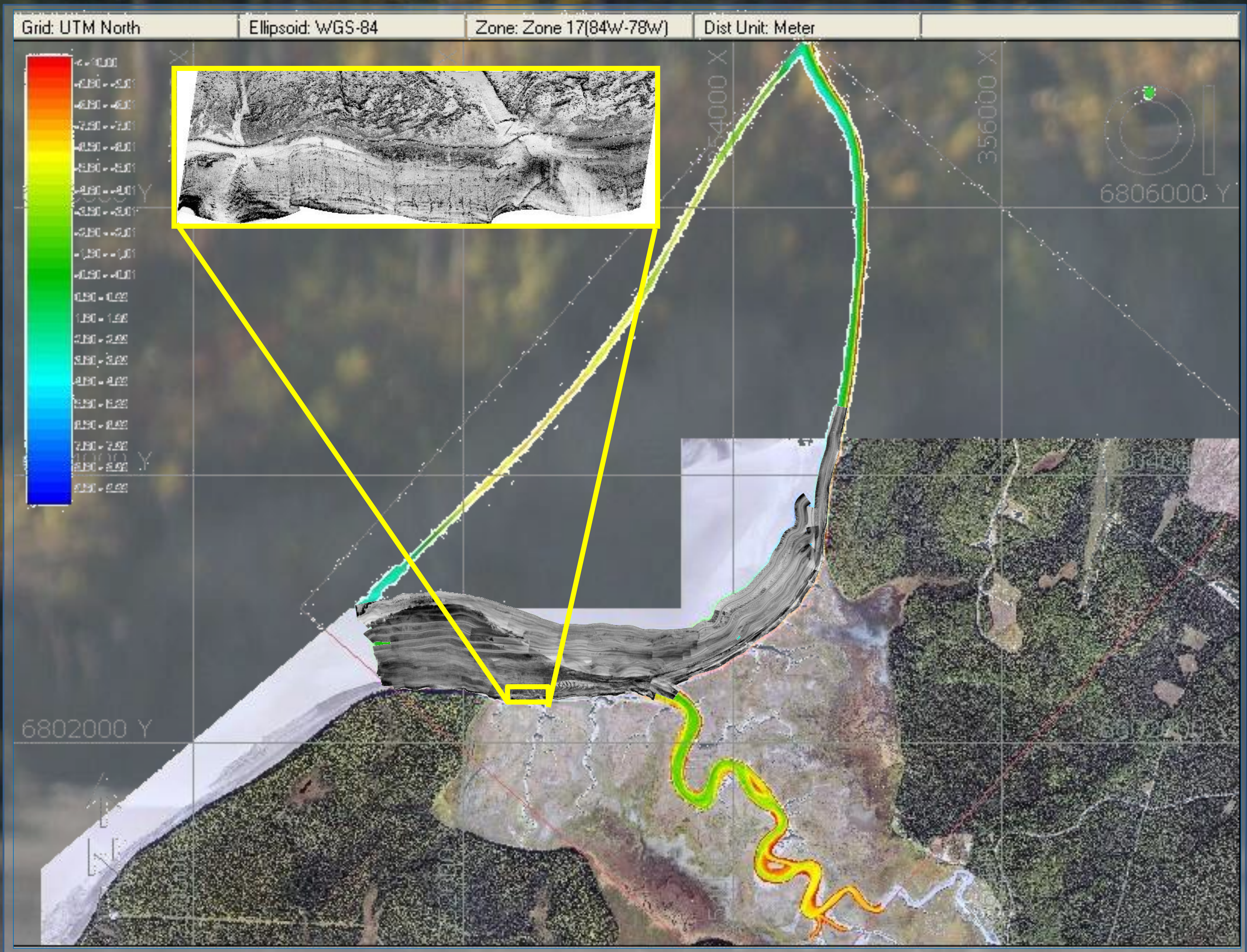




These maps taken from: U.S. Dept of Defense, U.S. Army Pacific Command, U.S. Army Garrison Alaska, Fort Richardson, Alaska. Cook Inlet Beluga Whale Observational Study Protocol, Eagle River and Eagle Bay, 27p., May, 2009

Abstract: Eagle River Flats, saltmarsh estuary, supports beluga whale feeding, yet has been used for artillery practice by Fort Richardson Army Base. A survey with C3D provided high-resolution, co-located side-scan, bathymetry, and acoustic backscatter data, within time constraints of 10m spring high tide inundation. Results supported better understanding of this habitat.





Summary: At the mouth of the glacially-fed Eagle River, laden with silts and muds, the endangered Cook Inlet beluga whales have often been sighted feeding on anadromous fishes. A characterization of habitat in Eagle River Flats saltmarsh estuary was made to support restoration monitoring, following impacts from artillery shelling which began in the 1940's. The spring high tide in this estuary reaches 10m and is critical to support survey navigation. Therefore, survey time was limited under 3 hours a day. Survey days were further limited by season, weather, and avoiding the presence of beluga whales. To overcome time constraints, the Teledyne Benthos C3D swath side-scan and bathymetry survey system was used. This system provided high-resolution and wide swath coverage area, allowing rapid mapping of the benthic habitat, especially in shallows. The C3D simultaneously collected co-located 5cm resolution datasets of bathymetry, side-scan imagery, and backscatter. The swath spanned more than 180 degrees, covering the estuarine channel, from bank to bank. Despite combined complications from extreme tides and currents, marine mammal avoidance and weather-related limitation on time, the survey effort was successful. The resultant bathymetry data clearly defined the complexity of the estuary's meandering channels. The side-scan imagery revealed geomorphic features, related to estuarine tidal currents and fluvial outfall, along with a few boulders reaching 2-3m in size. The acoustic backscatter data provided the resource for classifying sediment distribution and patches. Altogether, the survey succeeded in providing new insight and a better understanding of the habitat in the Eagle River Flats saltmarsh estuary.