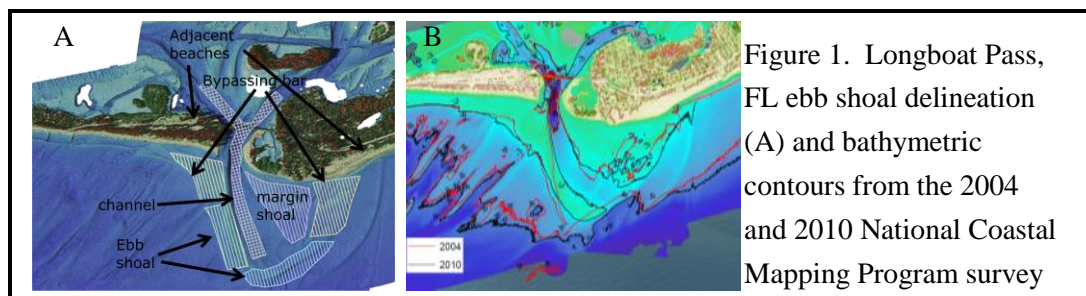




Description

Formulation of regional sediment budgets requires analysis of historical datasets representing regional and local bathymetric, topographic, and shoreline change; engineering activities; and estimation of alongshore and cross-shore sediment transport rates. Cells within the sediment budget can be delineated based on engineering activities and natural morphology. Engineering cells usually can be readily specified based on locations of navigation channels, mining/borrow sites, beach compartments between groins, placement areas. Specification of morphologic cells in the vicinity of inlets such as ebb and flood tidal shoals, bypassing bars and attachment zones is more subjective and dependent on user interpretation. In addition, the user must estimate a likely range in net and gross transport rates at the lateral (and potentially onshore/offshore) boundaries. This uncertainty in morphologic cells and ranges in transport rates can lead to variability in formulation of sediment budgets.



The Regional Process and Analysis Tool (RPAT) will calculate (a) lines and polygons from a feature extraction method developed for spatial data that can be utilized to delineate boundaries of the inlet shoals to quantify volume and volume change when multiple bathymetric surveys exist, (b) estimates for ranges in net and gross longshore sand transport rates at the lateral boundaries of the budget combining bathymetric data with available wave and tidal data, (c) metrics to group morphologically similar areas using topographic and bathymetric data to delineate regions, and (d) sediment budgets comparing existing inlet bathymetry with idealized non-inlet bathymetry generated from bathymetry that is beyond the influence of the inlet.

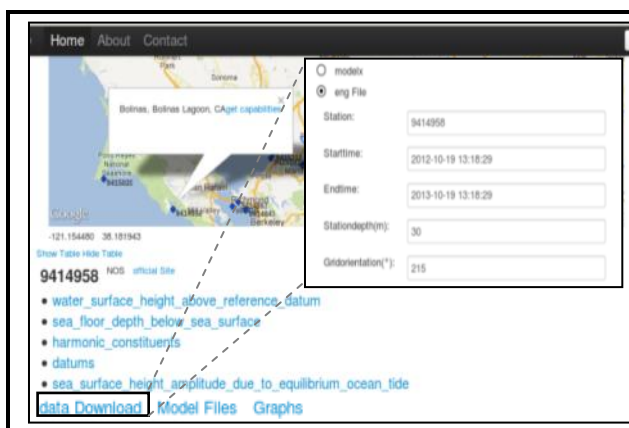


Figure 2. Oceanographic data sensors provide multiple data measurements available for download into data files or graphs. WaveNet provides the capability to view, extract and download these data over a web interface.

Issues	Sediment budgets are more frequently utilizing lidar data to calculate volume change and delineate budget cells. Several types of tools are needed to streamline formulation of sediment budgets using the lidar derived bathymetry and topography along with incorporating the oceanographic data: (a) analyses to assist in defining a “region”, (b) a standard method to quantify volume and volume change within the region, (c) calculations to quantify sediment transport rates using spatial and hydrodynamic data,(d) a central repository to host these data and their analytical programs, and (e) online documentation to transfer knowledge available online and in the literature.
Successes Lessons Learned	A major goal of this effort is to standardize the use of spatial and meteorological and oceanographic data for defining sediment budgets and transferring this knowledge through an easily accessible web service.
Expected Products	Expected products from this effort include (a) process to utilize spatial and hydrodynamic data within a sediment budget, (b) develop the spatial and process analysis tools to provide automated calculations to reduce uncertainty in estimates and variability between sediment budgets, (c) provide access to data and tool via a web service, (d) generate a report and other documentation to promote knowledge transfer, and (e) present results at annual RSM workshop.
Potential Users	USACE coastal districts developing sediment budgets.
Projected Benefits	Districts will be able to develop sediment budgets using a standardized process integrating spatial and hydrodynamic data.
Leveraging Opportunities	This effort will leverage existing spatial data from the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX) and the framework for WaveNet to develop a tool to assist with formulation of regional sediment budgets.
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Participating Partners	The RPAT is being developed with the support and participation of the JALBTCX; Coastal Inlets Research Program; and the Mobile District –Spatial Data Branch.