A Conceptual Regional Sediment Budget (CRSB) was developed for coastal beaches, bays and estuaries extending from Virginia to Maine as part of the North Atlantic Coast Comprehensive Study. Hurricane Sandy made landfall on October 30, 2012 near Bridgewater, New Jersey and generated severe coastal damage and property damage throughout this region. A CRSB is the first step in understanding sediment transport patterns and associated stakeholders, and aligning dredging and placement operations to take advantage of natural processes and identify sediment deficiency in the coastal system. Optimizing regional sediment management practices in this region is critical to (a) improving beneficial use of dredged sediments, (b) reducing the risks of future storm damage and coastal infrastructure failure, and (c) reducing the costs in maintaining coastal infrastructure. Data from 1990-2013 indicated an average of 18.7 million cu yd/year of sediment movement within the North Atlantic region. A direct link to the CRSB geospatial map is available https://geoplatform.usace.army.mil/home.

**ABSTRACT**

A Conceptual Regional Sediment Budget (CRSB) was developed for coastal beaches, bays and estuaries extending from Virginia to Maine as part of the North Atlantic Coast Comprehensive Study. Hurricane Sandy made landfall on October 30, 2012 near Bridgewater, New Jersey and generated severe coastal damage and property damage throughout this region. A CRSB is the first step in understanding sediment transport patterns and associated stakeholders, and aligning dredging and placement operations to take advantage of natural processes and identify sediment deficiency in the coastal system. Optimizing regional sediment management practices in this region is critical to (a) improving beneficial use of dredged sediments, (b) reducing the risks of future storm damage and coastal infrastructure failure, and (c) reducing the costs in maintaining coastal infrastructure. Data from 1990-2013 indicated an average of 18.7 million cu yd/year of sediment movement within the North Atlantic region. A direct link to the CRSB geospatial map is available https://geoplatform.usace.army.mil/home.

**RESULTS (continued)**

**RESULTS (continued)**

Region 3 (concluded)

- Dredging data indicated that the USACE New York and New England Districts dredged 4.9 million cu yd/year of littoral sediment within this region.
- Three harbors in Connecticut contributed 86.1 million cu yd/year total.

Region 4 (concluded)

- CEI is only shown for a portion of Region 4 in Fig. 5 (lower right); there were no areas having both high CEI and erosion or high CEI and low confidence identified; CEI were not available for the remainder of Region 4.

**CONCLUSIONS**

- In Region 1, there were 990 cells created in CRSB; 840 cells (67%) did not have data.
- Dredging data averaged 18.7 million cu yd/year, with contributions for Regions 1-4 of 9.0, 7.3, 4.9, and 0.2 million cu yd/year.
- Recommendations for better characterization and management of sediment resources within the study area included:
  - A database on dredging and placement activities including sediment type (sand, fines) and of longer duration could provide information on gross transport rates and river input to the regions.
  - Sediment dredging is a valuable resource for placement on adjacent beaches, building wetlands in the back bay, creating marshes and other activities that improve the resiliency of the coastal environment.
- Damage occurred from both ocean-facing and bayshore during Hurricane Sandy; there is a great potential for strategic placement of sediment on bayshores to reinforce bay and estuary resiliency.

**METHODS**

**RESULTS (continued)**

**RESULTS**

Region 2: Chesapeake Inlet, VA to Sandy Hook, NJ

- Net sediment transport patterns for Region 2 are shown in Fig. 3 (top left). Both nodal zones located approximately at the Delaware-Maryland border and between Barnegat Inlet and Shark River, New Jersey.
- Dredging data for 19 navigation channels and harbors within the DS for both contract and USACE dredgers; DS data indicated that 7.3 million cu yd/year of sediment was dredged within Region 2.

**RESULTS (continued)**

Region 4: Connecticut - Rhode Island Border to Northern Border of New York

- Computed paraglacial geological terrain, with end moraines, drowned glacial valleys, sand spits, salt marshes, and bedrock outcrops.
- Paraglacial coasts are located in regions formerly covered by extensive ice sheets and still retain features such as bay headlands.
- New England contains a large number of Federal channels and harbors, many of which date back to the Colonial era; today many of these harbors only serve pleasure craft and have not received dredging in recent years.
- Based on data from 1990 to July 2013, for sites with at least three dredging events, the DS data indicated that ten channels were dredged for an annual average of 193,000 cu yd/year of littoral sediment within this region.

**RESULTS (continued)**

Region 3: Virginia /North Carolina Border to Chincoteague Inlet, Virginia Including Chesapeake Bay and Tributaries

- Sediment is transported towards the bay from the Atlantic coast and into the bay from the Susquehanna River and other rivers (Fig. 2, top left). Beaches are elevated and are located on a major fluvial, floodplain, and estuarine confluence.
- Sediment transport data were available for 31 navigation channels and harbors for both contract and USACE dredges; USACE Baltimore and New England Districts averaged 4.3 million cu yd/year of littoral sediment within this region.

**METHODS**

- Documents patterns and rates of sediment transport, dredging and placement, coastal change, and volumetric change.
- Developed in the Sediment Budget Analysis System (SBSA) for rapid dissemination and viewing.

**REFERENCES**

- U.S. Army Engineer Research and Development Center, Coastal and Hydraulics Laboratory (USACE ERDC CHL), 441 G Street NW, 3Y19, Washington, D.C., 20314, Julie.D.Rosati@usace.army.mil
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