

SEAFLOOR SEDIMENT CHARACTERIZATION OF U.S CONTINENTAL SHELVES USING usSEABED

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Continental shelves are products of the underlying geology and dynamic oceanographic processes, particularly the Holocene marine transgression. Submerged offshore regions of the U.S. Exclusive Economic Zone, larger than the continental U.S., contain complex submerged landforms and a heterogeneous sediment cover. These regions serve many purposes, but our scientific understanding is limited. For offshore regions, understanding the seafloor geologic character is a critical component of decision making for activities such as Essential Fish Habitat classification, sand and gravel resource assessments, and design of conventional and alternative energy systems.

Population and development in the coastal zone continue to increase and demographic projections show that these trends will continue, placing more people and development in vulnerable areas at increasing risk to sea-level rise and storms. With the prospects of global climate change causing increased storms and accelerating global sea-level rise, coastal regions will experience even greater erosion and storm-surge flooding in the near future. Beach nourishment, a method of dredging sand from offshore areas and pumping ashore to widen and elevate the beach and dune is viewed as an acceptable short-term method for mitigating coastal erosion. For beach nourishment to be viable, however, large volumes of high quality sand are necessary and must be located reasonably close to the beaches being considered for nourishment.

Advances in computing power and GIS mapping capability are pushing mapping organizations towards large, geo-referenced, web-based databases to meet the increasing need for geologic map products. The U.S. Geological Survey is compiling available data for the usSEABED system, a GIS-ready database of integrated seafloor characteristics populated with about 300,000 observations from the U.S. EEZ. Reports, site surveys, and other publications, including seafloor photos and descriptive observations from both nearshore and offshore areas are mined for geo-referenced geological data, sediment characteristics and geochemical and geophysical properties. Data Series reports are published for the Atlantic, Gulf of Mexico, and Pacific coasts. Similar publications for Alaska, Hawaii, and the Great Lakes are in preparation. Within the USGS, the data are being applied to seafloor aggregate resource assessments, surficial sediment distribution maps, and benthic habitat mapping described in <http://woodshole.er.usgs.gov/project-pages/aggregates/index.htm> and <http://walrus.wr.usgs.gov/usseabed/data.html>. Also, results are being used to support coastal restoration efforts by the Gulf of Mexico

Alliance, a partnership of the five Gulf states and several federal agencies, including the USGS, which is the lead organization reporting on the topic of “Gulf of Mexico Offshore Sediment Resources”.

Additional applications of usSEABED data and products are:

- Research ocean observation and monitoring
- Coastal zone/ocean management and planning
- Homeland security, military applications
- Seafloor engineering, planning, and design
- Ocean disposal site placement, monitoring
- Cultural resources investigations
- Fisheries management and marine-protected areas
- Determination of seabed roughness, bedform distribution
- Sediment transport and mobility, sediment budgets

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