A Bibliography of Selected References to U.S. Marine Sand and Gravel Mineral Resources

U.S. Geological Survey Open-File Report 03-300

S. Jeffress Williams, Jamey M. Reid and Frank T. Manheim

Background

Coastal erosion and land loss resulting from complex natural processes (e.g. storms, sea-level rise, sediment starvation) and man-made alterations (e.g. dams, dredging, structures), often with unintended consequences, are pervasive for all coastal regions of the United States, as well as for much of the world. Development in the coastal zone continues to increase and demographic projections show these trends will continue, placing more people and development at risk. With the prospects of future climate change causing increased storminess and accelerating global sea-level rise, coastal regions are likely to experience increased erosion, inundation, and storm-surge flooding in future decades.

For developed coasts, beach nourishment is increasingly viewed as a cost-effective and environmentally sound method of mitigating coastal erosion, reducing storm and flooding risk, restoring degraded coastal ecosystems, and enhancing recreation. For beach nourishment to be viable, however, large volumes of high quality sand are necessary and must be located close to the intended project beaches. Marine sand bodies (e.g. linear shoals, paleo-valleys/channels, ebb-tide shoals) on inner to mid-shelf regions (~10m to 40m water depths) are increasingly attractive potential sand sources for beach nourishment. However, the geologic character, geometry, sediment composition and distribution of these sand bodies on the seafloor and in the subbottom are highly variable. Sand body complexity is the result of the sea-level history and associated coastal-marine processes that have affected shelf margins during the past 20,000 years, since the Last Glacial Maximum and during the Holocene marine transgression.

To meet the need for a national assessment of marine sand resources, the USGS is undertaking the Marine Aggregates Resources and Processes project, with numerous Federal, state and academic partners. Through a series of regional studies, a unified marine sediment database is being used with other geologic and geophysical information to produce a map series of seafloor sediment character, including assessments of sand resources. The literature included in this bibliography, a product of this project, is a partial listing of the results of research studies conducted over the past half-century to study the geologic character and history and evolution of shelf margins and to assess submarine hard mineral resources.

Content

The primary focus of this bibliography is on scientific literature relating to marine sand and gravel, but also included are papers pertinent to beach nourishment using offshore sand sources, the distribution and evolutionary history of marine sand bodies, and selected papers on sand and gravel and marine sand bodies in other countries that have application to the U.S. The literature on this subject is extensive and diverse, and as
such this report of 816 references is acknowledged to be only a partial listing of references available on the subject of marine aggregates. The geographic scope of the references includes the Exclusive Economic Zone (EEZ) of the United States, including the Great Lakes and some titles of special interest, which deal with foreign regions.

The sources of these references are personal scientists collections, libraries in Woods Hole, MA (MBL, WHOI, NOAA/NMFS, USGS), online search engines and databases (such as Georef, NTIS and ASFA), Federal agency collections (MMS, USACE, NOAA) and state geological survey collections (Maine, New York, New Jersey, Maryland, North Carolina, South Carolina, Florida, Alabama, Louisiana, Texas, California, Oregon, Alaska, Indiana, Illinois, Ohio, Pennsylvania, and Michigan). Reports and documents are generally accessible through libraries or retrieval services (excluding some contractor reports) with a few exceptions.

The references are stored in a bibliographic database library using Endnote version 6.0 by ISI Research Soft.

**Bibliography**


Army Engineers Waterways Experiment Station, 1992, Prediction of cross-shore movement of dredged material berms: Army Engineer Waterways Experiment Station Technical Report WES/TR/DRP/-1-09, 17 p.


Boothbay Harbor to North Haven: Maine Geological Survey Geologic Map 96-10, scale 1:100,000.


Boss, S.K., and Hoffman, C.W., Geologic framework derived from high-resolution seismic reflection, side-scan sonar, and vibracore data offshore Oregon Inlet to Duck, Dare County, North Carolina [unpublished]: Final contract report prepared for U. S. Minerals Management Service (Cooperative Agreement 14-12-0001-30348), 46 p.


Brampton, A.H., 1985, Effects of dredging on the coast, in Problems Associated with the Coastline, Newport, Isle of Wright, April 17 - 18, 1985, p. 11.


Cameron, E.N., 1977, Our mineral problems - the context of ocean mining: Marine Mining, v. 1, no. 1/2, p. 73 - 84.


Coastal Geoscience Laboratory, and Center for Coastal Energy & Environmental Resources Louisiana State University, 1993, Stratigraphic assessment of the mineral aggregate resources in the St. Bernard Shoals, offshore Louisiana: Louisiana State University, 54 p.


Cocker, M.D., and Shapiro, E.A., 1992, Distribution of heavy minerals on the Georgia coastal plain and continental shelf [abs.]: Third Symposium on Studies Related to Continental Margins, Programs and Abstracts, p. 22.


Courtenay, W.R., Hartig, B.C., Loisel, G.R., and Marsh, G.A., 1980, Ecological evaluation of a beach nourishment project at Hallandale (Broward County), Florida,


Ebersole, B.A., Neilans, P.J., and Dowd, M.W., 1996, Beach-fill performance at Folly Beach, South Carolina (1 year after construction) and evaluation of design methods: Shore & Beach, v. 64, no. 1, p. 11-26.


Elsner, H., 1992, Granulometry and mineralogy of some northeastern Florida placers; a consequence of heavy mineral concentration in nearshore bars: Sedimentary Geology, v. 76, no. 4, p. 233-255.


Field, M.E., 1974, Morphology and structure of the Atlantic inner continental shelf off Delaware, Maryland, and northern Virginia [abs.]: Geological Society of America Abstracts with Programs, v. 6, no. 7, p. 734.


Finkl, C.W., Jr., 1993, Pre-emptive strategies for enhanced sand bypassing and beach replenishment activities in southeast Florida; a geological perspective, from the Workshop on beach/inlet processes and management; a Florida perspective: Journal of Coastal Research, v. Special Issue 18, p. 59-89.

Finkl, C.W., Jr., 1994, Detection and tracking of suspended particulate matter eroded from replenished beaches in Southeast Florida using thematic mapper satellite imagery, American Geophysical Union, 1994 spring meeting: EOS, Transactions, American Geophysical Union, v. 75, no. 16, Suppl., p. 179.

Finkl, C.W., 1996, What might happen to America's shorelines if artificial beach replenishment is curtailed; a prognosis for southeastern Florida and other sandy regions along regressive coasts: Journal of Coastal Research, v. 12, no. 1, p. iii-ix.


Fisher, C.H., 1969, Mining the ocean for beach sand, in Civil Engineering in the Oceans II American Society of Civil Engineers Conference, p. 717-723.


Foyle, A.M., 1994, Quaternary seismic stratigraphy of the inner shelf and coastal zone, southern Delmarva Peninsula, Virginia, Old Dominion University, Norfolk, VA, Ph.D. Thesis, 604 p.

Foyle, A.M., and Oertel, G.F., 1992, Seismic stratigraphy and coastal drainage patterns in the Quaternary section of the southern Delmarva Peninsula, Virginia, USA: Sedimentary Geology, v. 80, no. 3-4, p. 261-277.


Granat, M.A., 1976, Dynamics and sedimentology of Inner Middle Ground - Nine Foot Shoal, Chesapeake Bay, Virginia: Norfolk, Old Dominion University, M.S. Thesis, 105 p.

Green, M.O., 1986, Side-scan sonar mosaic of a sand ridge field: southern mid-Atlantic bight: Geo-Marine Letters, v. 6, no. 1, p. 35-40.


Halsey, S.D., 1996, Sustainable development and coastal zone management; the role of beach nourishment along developed barrier islands [abs.]: Geological Society of America Abstracts with Programs, v. 28, no. 3, p. 61.


Henyey, T., and Osborne, R., 1975, Offshore sand and gravel resources in California, Sea Grant Institutional Program Annual Report 1974-75, University of Southern California, Institute for Marine and Coastal Studies, p. 20 - 22.


Holliday, B.W., 1971, Observations on the hydraulic regime of the ridge and swale topography of the inner Virginia shelf: Norfolk, Old Dominion University, Master's Thesis, 84 p.


Indiana Department of Natural Resources - Division of Soil Conservation, 1999, Use of sand or pea gravel in underwater beach construction: Lake & River Enhancement Program, 2 p.


James, W.R., 1974, Beach fill stability and borrow material texture, in Coastal Engineering Conference, 14th, Copenhagen, Denmark, U.S. Army Coastal Engineering Center, p. 1334 - 1349.


Knebel, H.J., 1987, Map and diagrams showing the distribution, thickness, and textural characteristics of Holocene sediments, Penobscot Bay, Maine: Miscellaneous Field Studies Map MF-1899.


Kraft, J.C., 1996, Transgressive barriers along the Midatlantic Coast; Delmarva Peninsula [abs.]: Geological Society of America Abstracts with Programs, v. 28, no. 2, p. 18-19.


Lewis, R.S., and Neff, N.F., 1992, Continental margins program - years five and six: stratigraphic and depositional history of Long Island Sound [abs.]: Program and abstracts from the Third Symposium on Studies Related to Continental Margins: a summary of year-five and year-six Activities, p. 32.


Lu, Y., and Osborne, R.H., 1993, Sources for Quaternary sand and the effects of selective transport on grain-shape composition, Santa Monica Bay, California [abs.]: Geological Society of America Abstracts with Programs, v. 25, no. 6, p. 274.

Lubchansky, B.J., 1999, Stratigraphic relationships of nine core samples collected from off-shore shoals located in federal waters off Atlantic City, New Jersey, in 1999 Assateague Shelf and Shore Workshop, 25th, Lewes, DE, University of Delaware, unpaginated.

Lubchansky, B.J., 1999, Stratigraphic relationships of nine core samples collected from off-shore shoals located in federal waters off Atlantic City, New Jersey: Lawrenceville, NJ, Rider University, Senior Thesis Project, with appendix.


Ludwick, J.C., 1977, Jet-like coastal currents and bottom sediment transport off Virginia Beach, Virginia: Transactions American Geophysical Union, v. 58, no. 6, p. 408.


Muller, F.L., Uptegrove, J., Miller, K.G., Aubry, M.-P., Browning, J.V., Bukry, D., Burckle, L.D., Feigenson, M.D., Goss, M., Gwynn, D., Heibel, T., Kent, D.V., Liu, C., Mullikin, L., Pekar, S.F., Powars, D., Queen, D., Sugarman, P.J., and Van Fossen, M.C., 1997, Data report; Heavy mineral analysis of the upper Miocene(?) to Pleistocene sands, Cape May site, in Ocean Drilling Program, Scientific Results; New Jersey coastal plain; covering onshore boreholes as part of the New Jersey sea-level transect, Island Beach and Atlantic City sites, March-August 1993, Cape May site, March-April 1994, Texas A & M University, Ocean Drilling Program, College Station, TX, United States, p. 75-79.


Ocean Innovators, 1979, Offshore sand sampling north and windward shores, Oahu, Unpublished report prepared under contract to the Marine Affairs Coordinator, Office of the Governor, State of Hawaii, Task Order 163.


Pasho, D.W., 1986, The United Kingdom offshore aggregate industry: a review of management practices and issues: Ocean Mining Division, Canada Oil & Gas Lands Administration, 30 p.


Peterson, I., 1995, Off the beach; how waves create sand ridges on the continental shelf: Science News, v. 148, no. 8, p. 120-121.


Rowland, J., 1990, Assessment of marine sand deposits, in Coastal Zone '90, San Diego, CA.

Rowland, J., 1991, Cooperative studies of continental shelf mineral deposits, in Marine Technology Conference, Baltimore, MD, MTS.


Rowland, J., 1999, Geo-system approach to assessments of continental shelf sand resources, in Offshore Technology Conference, OTC '99, Houston, TX, Proceedings: Houston, TX, Society of Mining Engineers.


Rutan, C., 1981, Isopach map: sand sized materials sand inventory study offshore Mission Beach to Leucadia Southern California, scale 1:24,000.

Rutan, C., 1981, Seafloor texture & grain size contours sand inventory study offshore San Diego Southern California, scale 1:24,000.

Rutan, C., 1981, Isopach map: sand sized materials sand inventory study offshore Leucadia to Oceanside southern California, scale 1:24,000.


Schlee, J.S., 1964, New Jersey offshore gravel deposit: Pit and Quarry, v. 57, no. 6, p. 80-81, 95.


Schwarzacher, W., and Hunkins, K., 1961, Dredged gravels from the central Arctic Ocean, Geology of the Arctic, volume 1: Toronto, Ontario, Univ. Toronto Press.

Sea Engineering Inc., 1993, Beach nourishment viability study, Unpublished report prepared for the Office of State Planning, Coastal Zone Management Program, Honolulu, HI.

Selby, I., and Ooms, K., 1996, Assessment of offshore sand and gravel for dredging: Terra et Aqua, no. 64, p. 18 - 28.


Stauble, D.K., 1991, Native beach assessment techniques for beach fill design: U.S. Army Engineer Waterways Experiment Station, CETN II-29, 10 p.

Stauble, D.K., 1991, Recommended physical data collection program for beach nourishment projects: U.S. Army Engineer Waterways Experiment Station CETN II-26, 14 p.


Stauble, D.K., Hansen, M., and Blake, W., 1984, An assessment of beach nourishment sediment characteristics, in International Conference on Coastal Engineering, 19th, Houston, TX, American Society of Civil Engineers, p. 1471-1487.


Stetson, H.C., 1938, The sediments of the continental shelf off the eastern coast of the United States: Massachusetts Institute of Technology Papers Physics, Oceanography and Meterology, v. 5, no. 4, p. 5-48.


Storlazzi, C.D., and Field, M.E., 2000, Sediment distribution and transport along a rocky, embayed coast; Monterey Peninsula and Carmel Bay, California: Marine Geology, v. 170, no. 3-4, p. 289-316.


Tait, J., Anima, R.J., and Griggs, G.B., 1992, Shoreface storage and transport of littoral sediments along the central California coast, from the American Geophysical Union 1992 fall meeting: Eos, Transactions, American Geophysical Union, v. 73, no. 43, Suppl., p. 302.


Toscano, M.A., and Kerhin, R.T., 1990, Subbottom structure and stratigraphy of the inner continental shelf of Maryland: Bureau of Economic Geology, University of Texas, Austin.


U.S. Army Corps of Engineers, 1998, Ocean City, Maryland and vicinity water resources study: Baltimore, MD, U.S. Army Corps of Engineers, 1 CD-ROM.


U.S. Army Engineer Waterways Experiment Station, 1993, Dredging research technical notes; a rapid geophysical technique for subbottom imaging: U.S. Army Engineer Waterways Experiment Station Technical notes DRP-2-07, 11 p.


Waterway Survey and Engineering Ltd., 1986, Engineering study for disposal of dredged material from Atlantic Ocean channel on Sandbridge Beach between Back Bay and Dam Neck: Report prepared for Norfolk District U.S. Army Corps of Engineers largely by Cyril Galvin, 79 p. plus appendices.


Williams, S.J., 1982, Use of high resolution seismic reflection and side-scan sonar equipment for offshore studies: U.S. Army Engineer Waterways Experiment Station, Coastal Engineering Research Center Technical Aid 82-5, 22 p.


Williams, S.J., 1986, Potential offshore aggregate, Gulf of Mexico, in Underwater Mining Institute, 17th, Biloxi, Mississippi, p. 2.


Coastal Sediment Processes, Coastal Sediments '91, Seattle, WA, American Society of Civil Engineers, p. 1082-1095.


