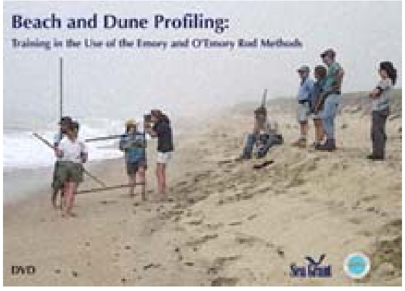
Woods Hole Sea Grant: Geomorphology, Shoreline Change

Coastal Hazards in Massachusetts: Discussions with Local Legislators
O'Connell, J.F. (ed.)
DVD, Approximately 81 minutes, 2006 WHOI-V-06-002

Beach and Dune Profiling: Training in the Emory & O'Emory Rod Methods
O'Connell, J.F. (ed.)
DVD, Approximately 48 minutes, 2004 WHOI-V-04-005



Understanding the dynamics of how beaches and dunes change seasonally and pre- and post-storm allows coastal homeowners and community officials to understand coastal dynamics firsthand and determine appropriate and effective dune enhancement and restoration measures. Beach and dune profiling is a quick, simple, and educational technique to quantify and document the dynamics of beach and dune changes over time. Furthermore, a beach and dune profile is essential to determine the level of protection a dune may (or may not) provide from storm waves and flooding, and with supplemental information determine the volume of sand necessary to enhance storm protection to a specified level. In addition, beach profiling is a highly effective educational tool that includes the use of global positioning system (GPS), basic surveying, graphing, and follow-up sediment size analysis.

New Shoreline Change Data Reveal Massachusetts is Eroding
Helpful to educators and students.
O'Connell, J.F.
Marine Extension Bulletin, 4 pp., 2003 WHOI-G-03-001
Also available online: click here

New Interpretation of Glacial History of Cape Cod May Have Important Implications for Groundwater Contaminant Transport
Mulligan, A. and E. Uchupi
EOS, Vol. 84, No. 19, 3 pp., 2003 WHOI-R-03-001

Stabilizing Dunes and Coastal Banks using Vegetation and Bioengineering: Proceedings of a Workshop Held at the Woods Hole Oceanographic Institution, Woods Hole, MA
O'Connell, J.F. (ed.)
WHOI Technical Report WHOI-2002-12, 119 pp., $6.00, 2002 WHOI-W-02-001
(Click here to view this document as a 2.8 MB PDF file.)

New Shoreline Change Data and Analysis for the Massachusetts Shore with Emphasis on Cape Cod and the Islands: Mid-1800s to 1994
O'Connell, J.F., E.R. Thieler, and C. Schupp
Environment Cape Cod, Vol. 5, No. 1, pp. 1-14, 2002 WHOI-R-02-007

The Massachusetts Shoreline Change Project: 1800s to 1994
Thieler, E.R., J.F. O'Connell, and C.A. Schupp
U.S. Geological Survey Report, 39 pp., $6.00, 2001 WHOI-T-01-001

Evaluation of Coastal Erosion Hazards: Results from a National Study and a Massachusetts Perspective
Helpful to educators and students.
WHOI Sea Grant
Focal Points, 3 pp., 2001 WHOI-G-01-003
Also available online: click here

Mapping and Analyzing Historical Shoreline Changes in Massachusetts
Schupp, C.A., E.R. Thieler, and J.F. O'Connell
In: Proceedings of CoastGIS '01: Managing the Interfaces Conference, Halifax, Nova Scotia, Canada, June 18-20, 2001, 9 pp., 2001 WHOI-R-01-001

Sustaining Coastal Landforms
Helpful to educators and students.
WHOI Sea Grant
Focal Points, 3 pp., 2001 WHOI-G-01-002
Also available online: click here

Beach and Dune Profiles: An Educational Tool for Observing and Comparing Dynamic Coastal Environments
Helpful to educators and students.
WHOI Sea Grant
Marine Extension Bulletin, 6 pp., 2001 WHOI-G-01-001

Also available online: click here

Shoreline Change and the Importance of Coastal Erosion
Helpful to educators and students.
WHOI Sea Grant
Focal Points, 3 pp., 2000 WHOI-G-00-001
Also available online: click here

Cape Cod Coastal Erosion: A Case Study
Helpful to educators and students.
WHOI Sea Grant
Focal Points, 2 pp., 1998 WHOI-G-98-001
Also available online: click here

The Late Quaternary Construction of Cape Cod, Massachusetts. A Reconsideration of the W.M. Davis Model
Only available on loan from the National Sea Grant Library
Uchupi, E., G.S. Giese, D.G. Aubrey, and D.-J. Kim
The Geological Society of America, Special Paper 309, 69 pp., 1996 WHOI-T-96-001

The Eroding Shores of Outer Cape Cod
Helpful to educators and students.
Giese, G.S. and R.B. Giese
Information Bulletin No. 5, The Association for the Preservation of Cape Cod, Orleans, MA, 15 pp., 1974 (Reprinted 1994) WHOI-G-94-001

We Have Met the Enemy and It Is Us
Helpful to educators and students.
Hendrickson, L. and G.S. Giese
In: Hornig, D. (ed.) State of the Cape 1994: Progress Toward Preservation, Association for the Preservation of Cape Cod, Orleans, MA, pp. 157-174, 1994 WHOI-R-93-008

Coastal Bench Formation at Hanauma Bay, Oahu, Hawaii
Bryan, W.B. and R.S. Stephens
Geological Society of America Bulletin, Vol. 105, pp. 377-386, 1993 WHOI-R-93-001
A coastal bench that developed from 1 to 6 m above sea level in basaltic tuff at Hanauma Bay conforms to the upper limit of wetting by wave wash at high tides associated with present sea level; it does not constitute evidence for a recent Holocene highstand on Oahu. The bench forms as a result of the disintegration and retreat of the unprotected cliff. The same process can satisfactorily explain the formation of Koko Bench. Use of similar benches as geological indicators of past sea levels requires a detailed understanding of the coastal setting and exposure to waves, and the different responses of specific rock types at and above the air-sea interface.

Morphodynamic Evolution of a Newly Formed Tidal Inlet
Liu, J.T., D.K. Stauble, G.S. Giese, and D.G. Aubrey
In: Aubrey, D.G. and G.S. Giese (eds.), Formation and Evolution of Multiple Tidal Inlets, Coastal and Estuarine Studies, American Geophysical Union, Washington, D.C., Vol. 44, pp. 62-94, 1993 WHOI-R-93-009

Cyclic Spit Morphology in a Developing Inlet System
Weidman, C.R. and J.R. Ebert
In: Aubrey, D.G. and G.S. Giese (eds.), Formation and Evolution of Multiple Tidal Inlets, Coastal and Estuarine Studies, American Geophysical Union, Washington, D.C., Vol. 44, pp. 186-212, 1993 WHOI-R-93-012

December Storm Damages Cape Coastline - Falmouth's Surf Drive Takes Another Hit
Helpful to educators and students.
Crago, T.I. and G.S. Giese
Woods Hole Oceanographic Institution Sea Grant Program Marine Advisory Bulletin, No. 1, 2 pp., 1992 WHOI-G-93-001

The Story Behind the New Tidal Inlet at Chatham
Helpful to educators and students.
Giese, G.S.
Nor'easter, Vol. 2, No. 1, pp. 28-33, 1990 WHOI-R-90-002
Coastal erosion and the periodic breaching of barrier beaches are relatively common occurrences in the Northeast. Yet, when the new tidal inlet at Chatham Harbor, Massachusetts, first formed--during the winter of 1987--it attracted a lot of attention in Chatham and beyond. The residents of Chatham, however, were not surprised; the question had not been "if there's a breach," but rather where and when. Nevertheless, individuals and the town and state were then faced with the consequences, which were very costly to some. This article recounts the event and offers some suggestions for dealing with such events in the future.

Cyclical Behavior of the Tidal Inlet at Nauset Beach, Chatham, Massachusetts
Giese, G.S.
In: Aubrey, D.G. and L. Weishar (eds.), Hydrodynamics and Sediment Dynamics of Tidal Inlets. Lecture Notes on Coastal and Estuarine Studies, Springer-Verlag New York, Inc., Vol. 29, pp. 269-283, 1988 WHOI-R-88-025
Study of historical data concerning shoreline forms and change on southeastern Cape Cod over the past 200 years revealed a cyclical pattern of change in the barrier beach system off Chatham, Massachusetts, within a period of approximately 150 years. Based on the observed patterns and deduction concerning the processes controlling those patterns, predictions of breaching of the barrier beach and new inlet formation were provided to local coastal resource managers, reducing the negative impacts accompanying the formation of the new inlet when it eventually occurred.

The Quantitative Description of Beach Cycles
Aubrey, D.G. and R.M. Ross
Marine Geology, Vol. 69, pp. 155-170, 1985 WHOI-R-85-013
A quantitative method is developed to describe sequential changes in beach profile morphology. The method provides a uniform way to objectively discriminate energetic beach cycles, and yields a concise representation for beach modeling and prediction. It should be a valuable tool for uniform, quantitative intercomparison of beaches and beach cycles.

Rhythmic Beach Cusp Formation: A Conceptual Synthesis
Seymour, R.J. and D.G. Aubrey
Marine Geology, Vol. 65, pp. 289-302, 1985 WHOI-R-85-017

The Louisiana Response to Land Subsidence and Coastal Erosion
Silva, M. and M. Meo
Ocean Engineering and the Environment, Conference Record, Nov. 12-14, 1985, San Diego, California, pp. 594-599, 1985 WHOI-R-85-008

Updrift Migration of Tidal Inlets
Aubrey, D.G. and P.E. Speer
Journal of Geology, Vol. 92, pp. 531-545, 1984 WHOI-R-84-009
Migration of tidal inlets and the associated changes in adjacent barrier beaches have profound implications on both the geological evolution of inlet/estuary systems and the short-term stability of these features. Past studies have documented many instances of inlets migrating in the direction of the net littoral drift along sandy shores but have uncovered few cases where inlets appear to migrate in directions opposed to the dominant longshore transport direction. Previous attempts to explain a reversal in direction of inlet migration suggest a change in direction of net littoral drift, causing a change in migration direction. This explanation is not realistic for some inlets where wave forcing and nearshore bathymetry have remained constant through time. This study presents three alternatives to explain the tendency of some inlets to migrate updrift, each supported by historical observation at a site with a large-volume, directionally-biased littoral drift.

Rapid Formation and Degradation of Barrier Spits in Areas with Low Rates of Littoral Drift
Aubrey, D.G. and A.G. Gaines Jr.
Marine Geology, Vol. 49, pp. 257-278, 1982 WHOI-R-82-018
Three possible mechanisms cause barrier spits to elongate; two are generally known, while a third is presented in this paper. The most commonly cited mechanism for spit elongation, according to the authors, is downdrift buildup on the tip of a barrier spit from sand introduced by longshore transport. A second mechanism is accretion on the end of a barrier spit bordering a tidal inlet; this is generally accompanied by erosion of the spit on the opposite side of the inlet. A third mechanism, proposed in this paper, is self-generative in the sense that it does not require an external sediment source to elongate a barrier spit (although an external source could accelerate the process). This mechanism operates under a restrictive set of conditions, so it is not as common an occurrence as the mechanisms mentioned above. The paper discusses a prototype (Popponesset Beach, MA) used by the authors to illustrate this mechanism and describes, in detail, this unconventional method for increasing barrier spit length. The authors also suggest that, based on this third mechanism, estimates of directions and rates of longshore sand transport based on spit development must be scrutinized on a case-by-case basis.

Recent Evolution of an Active Barrier Beach Complex: Popponesset Beach, Cape Cod, Massachusetts
Only available on loan from the National Sea Grant Library
Aubrey, D.G. and A.G. Gaines Jr.
Woods Hole Oceanographic Institution Technical Report WHOI-82-3, 77 pp., 1982 WHOI-T-82-001

Beach Changes at Nauset Inlet, Cape Cod, Massachusetts, 1670-1981
Only available on loan from the National Sea Grant Library
Speer, P.E., D.G. Aubrey, and E. Ruder
Woods Hole Oceanographic Institution Technical Report WHOI-82-40, 92 pp., 1982 WHOI-T-82-002

A Preliminary Study of Tidal Erosion in Great Harbor at Woods Hole, Massachusetts
Only available on loan from the National Sea Grant Library
Miller, R.L., C.S. Labro, J.M. Cohen, and J.F. O'Sullivan

1972 WHOI-T-72-001

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