

Executive Office of Energy and Environmental Affairs
Beach Scraping Workgroup Report
May 17, 2010

Introduction

This report describes the purpose, process, and findings of the workgroup, which was asked to determine the reasonably foreseeable benefits and impacts of beach scraping on Plum Island based on review of available science and relevant management experience in other states. The report presents as attachments the workgroup membership, the scope of work, literature and materials reviewed, the experts' report, survey of beach scraping in other states, and the May 7 workgroup meeting agenda and notes. The report does not address the merits of the proposed beach scraping pilot project, described below, or make recommendations regarding beach management measures for Plum Island; these are currently under review and will be presented in the near future.

Purpose

Over the winter of 2009/2010, the beaches of Plum Island experienced very high amounts of localized erosion. While the "hotspot" of erosion on the Island over past years has been to the north of the "town center groin", erosion from last winter's storms was most severe at an area to the south of the groin. In response, the Town issued an Emergency Order under the Wetland Protection Act regulations allowing placement of sandbags, hay bales, and unconsolidated sand from upland sources in an effort to stabilize the dune, prevent further erosion, and protect homes at risk of collapse. In addition, a proposal for a pilot beach scraping project was developed by a group of Newbury homeowners for a project site extending 2,700-foot from the town center groin south along Annapolis Way, portions of Southern Boulevard and Fordham Way, to the last public beach access point. Beach scraping is the process of moving sand from the lower area of the beach up to the foredune to provide temporary protection for structures at risk. The project proposes to mechanically push material from the lower beach up and grade it along the currently scaped primary dune face to add volume and create a flatter slope. Homeowners would then fence, plant, and maintain the areas fronting their property.

The Commonwealth does not currently permit the proposed activity. Coastal beaches dissipate wave energy, serve as a sediment source for dunes and subtidal areas, and serve as a sediment source for downdrift coastal areas. The Wetlands Protection Act regulations therefore hold that projects on a coastal beach shall not have an adverse effect by increasing erosion, decreasing the volume or changing the form of any such coastal beach or an adjacent or downdrift coastal beach. The Department of Environmental Protection (the Department) and the Office of Coastal Zone Management (CZM) consider beach scraping to be an activity that will change the form of the beach and increase erosion of the primary dune and the vulnerability of landward structures. Instead, state policy recommends that communities and property owners employ an array of measures designed to

prevent or decrease the rate of erosion with ‘soft’ physical structures (coir rolls, hay bales) and/or the importation, shaping, and planting of ‘new’ sand (from upland or marine sources, typically state or federal navigational dredging projects).

To prepare for its review of the proposed project, the Executive Office of Energy and Environmental Affairs (EEA) created an ad hoc workgroup of federal, state and local agency staff, and asked three disinterested experts in coastal geology to review available literature and contextual information to determine the reasonably foreseeable benefits and impacts of beach scraping on Plum Island (see **Appendix A**). In addition, Department and CZM staff conducted a survey of other states’ environmental programs to determine how they addressed beach scraping. For both issues, the purpose of the workgroup was to provide a snapshot contemporary review of applicable coastal management principles (see **Appendix B**).

Process

The workgroup consisted of three scientists affiliated with the Provincetown Center for Coastal Studies, U.S. Geological Survey, and Woods Hole Oceanographic Institution (collectively the “Technical Panel”), and representatives from the Town of Newbury (Conservation Agent and private engineering consultant), Representative Harriett L. Stanley’s office, the Army Corps of Engineers, and the Massachusetts Office of Coastal Zone Management and Department of Environmental Protection (see Appendix A for workgroup list). A kick-off call for the workgroup was held on April 13, 2010 to review the scope and condensed timeline.

On April 15, 2010, a site visit was conducted at 11:00. (Although this was on an incoming tide, with high tide at 12:38, participants reviewed photographs showing historic and current low water conditions.) The Technical Panel and staff from the Town, DEP, and CZM with familiarity of the site walked the beach south from the center to the NWR boundary and then back to the center via Fordham Way, Southern Boulevard, and Annapolis Way. During the site visit, work was underway on installation of hay bales and coir rolls at several parcels, and recent deposits of upland sand observed.

Information for the workgroup to review was compiled and included documents and materials in three categories (see **Appendix C**):

1. Background and contextual information, including reports, maps, photographs and other documents describing the site setting and characteristics, coastal processes, history, recent conditions, and the proposal for beach scraping.
2. Survey of state management regimes concerning beach scraping. The focus was on Northeast states (based on generally similar coastal geologic setting and wave climate) but included states from other regions: Southeast, Gulf of Mexico, and West Coast.
3. Available peer-reviewed and grey literature (non peer-reviewed) on beach scraping.

This information was made available to the workgroup via electronic file sharing protocol on April 13, April 23, and April 30, 2010. The group was reminded that the literature sources and background information was assembled in a relatively short time, and that while it is a comprehensive and representative body of information, it is not exhaustive.

The workgroup convened on May 7, 2010. At the meeting the group's charge and scope was reviewed. The expert scientists "Technical Panel Summary Report" was distributed and an overview provided by Dr. Cheryl Hapke from the U.S. Geological Survey (see **Appendix D**), followed by questions from and discussion among the workgroup. A survey of relevant management experience in other states was provided by CZM (see **Appendix E**) and discussed by the workgroup. Last, a brief overview was provided of the state's policy in the context of the performance standards for Coastal Beaches contained in the Wetland Protection Act regulations at 310 CMR 10.27(3). The meeting adjourned with the review of the next steps anticipated by EEA in its development of the report. See **Appendix F** for the workgroup meeting agenda and notes.

Findings from the Technical Panel

1. Barrier islands—like Plum Island—respond to rising sea levels by migrating landward, essentially at rates that keep up with rising sea level, and they have been doing this since their initial formation. As sea-level rise accelerates over the next century and beyond, the barrier island system must migrate landward at higher rates to maintain its existence, or else potentially drown and disappear altogether.¹
2. Plum Island is a very dynamic system, especially on its northern end near the mouth of the Merrimack River. Recent sequences of photographs attest to large changes in shoreline position on a seasonal basis. As documented in a number of papers and reports, the position of the spit forming the northern end of the island fluctuated significantly until it was stabilized by construction of jetties beginning in 1882. Along the northern half of the barrier, long-term (146-yr) shoreline change rates are dominantly low-level erosional, averaging about -0.2 m/year from 1850-2000 but erosion rates since 1978 have averaged nearly -0.5 m/year (*unpublished USGS data*).
3. The site survey found a very narrow beach with a developing "swash bar" or intertidal ridge. Recent observations and photographs confirm that this ridge bar has connected with the beach and is welding back on to the beach. The scientists indicated that this was good evidence of a system in recovery.²

¹ Barrier beaches maintain themselves in the face of rising relative sea level by "rolling-over" themselves, i.e., by migrating landward through a combination of dune movement, storm wave overwash and tidal inlet deposition. (Giese, *Potential Impacts of Sea-Level Rise in Massachusetts* New England Regional Climate Change Impacts Workshop Summary Report, September 3–5, 1997)

² A normal pattern and response as described by many basic coastal geology texts is that during coastal storm events, high energy waves with steeper faces erode the beach and dune and mobilized material is deposited in the nearshore. After the coastal storms, sand in the nearshore is moved back onshore by waves with lower energy and steepness.

4. The findings of all of the studies evaluated by the panel were consistent: in areas experiencing high rates of erosion, scraping exacerbates erosion, within the regions scraped, by altering the morphology of the beach profile and creating a loose, more easily erodible fore-dune. Beach scraping creates a lower, narrower beach with a steeper profile that allows waves to more easily reach the base of the artificial dune. One study, from North Carolina (McNinch and Wells, 1992), found that scraping helped to mitigate erosion, but specifically stated that the project was successful because it was undertaken incrementally over long (months/years) periods of time, mimicked natural sediment transport processes, and was not undertaken as an emergency response procedure. It should be noted that the North Carolina project was assessed over a one year period, which is too short to determine if the scraping had long-term impacts.
5. The panel consensus, based on the available science, was that beach scraping at Plum Island would likely increase erosion:
 - a. The beach at Plum Island has recently been in a highly erosive state, but has also exhibited periods of natural accretion in the recent past. The present beach is quite narrow.
 - b. Scraping results in a lower, narrower beach and steepens the overall profile.
 - c. Based on fundamentals of beach behavior and the scientific literature on scraping, the present beach would be steepened through scraping and would be more susceptible to erosion during a storm. Sand scraped to the toe of the dune would be more susceptible to removal downshore, or possibly offshore.
 - d. One possible benefit of scraping at Plum Island would be a potential increase in the volume of beaches downcoast from the scraped regions that would be the recipients of the newly mobilized sediment.
6. Studies and scientific analysis of the modern coastal processes occurring at Plum Island to understand causes of erosion “hotspots” and what drives their occurrence are needed.

Findings from the Survey of States’ Management Measures

The Department and CZM conducted a survey of coastal states to determine how they address beach scraping. The survey focused on New England states, as those with most similar and relevant coastal geological processes, but also included other regional representation (New York, North Carolina, South Carolina, Texas, and Oregon) as samples for context.

1. No New England states permit scraping as a routine beach management measure. Scraping can be permitted in Maine for emergency work, and appears to be permissible for emergency work in Connecticut (see **Appendix F**: they have not had experience with such requests). New Hampshire, Massachusetts, and Rhode Island do not permit scraping for emergency work.

2. New York does not permit beach scraping as a storm response activity, but does permit municipalities to do beach “regrading”, subject to multiple conditions designed to minimize impacts to the form, volume, and functions of the beach.
3. North Carolina allows beach scraping by permit, subject to multiple conditions (more general than New York), and allows scraping as an emergency measure subject to conditions. South Carolina allows scraping as emergency work subject to conditions.
4. In Texas, private property owners are not permitted to undertake beach scraping. (Texas does not permit private activity of any kind more than 20 feet seaward from the edge of vegetation.) Municipalities are allowed limited redistribution of sand between mean high water and the line 20 feet seaward from the edge of vegetation (cosmetic grading).
5. Oregon has a dissimilar coastline and does not have experience with the type of erosion or management measures under consideration. Some regrading of sand above mean high water is permitted to address migration of dunes into/through structures, subject to permitting consistent with long-term plans.

Next Steps

The workgroup findings and information reviewed by the workgroup will be incorporated in the Department and CZM’s review of the proposed pilot beach scraping proposal, the results of which will be presented later in May.

Appendix A: Workgroup List

| Name | Organization |
|-------------------|--|
| Deerin Babb-Brott | Executive Office of Energy and Environmental Affairs |
| Cheryl Hapke | U.S. Geological Survey |
| Graham Giese | Provincetown Center for Coastal Studies |
| Rob Evans | Woods Hole Oceanographic Institute |
| John Winkleman | U.S. Army Corps of Engineers |
| David Vine | Vine Associates |
| Doug Packer | Newbury Conservation Commission |
| Brendan McGonigle | Office of Representative Harriett L. Stanley |
| Lealdon Langley | MA Department of Environmental Protection |
| Eric Worrall | MA Department of Environmental Protection |
| Bruce Carlisle | MA Office of Coastal Zone Management |
| Kathryn Glenn | MA Office of Coastal Zone Management |
| Rebecca Haney | MA Office of Coastal Zone Management |

Appendix B: Workgroup Scope

Proposed Approach to EEA Review of Beach Scraping

Background

The dune fronting several structures along the beach on Plum Island has eroded significantly in winter storms; one home has been condemned. Newbury has issued an Emergency Order allowing placement of sandbags, hay bales, and unconsolidated sand to protect the dune from further erosion. To address perennial beach erosion, Newbury residents have proposed a 'pilot' emergency "beach scraping" project for 2,700 feet of beach from the groin at Town Center southward. Beach scraping is the process of moving sand (and other unconsolidated material like gravels) from the lower area of the beach—generally in the intertidal area—up to the area of erosion to provide protection for the structures at risk. EEA has agreed to review the issue of beach scraping as the basis for a recommendation on the merits of the proposed project. In the past, DEP and CZM have not supported beach scraping as an erosion control/prevention measure, even on an emergency basis, based on a determination that beach scraping would have significant adverse impacts to the beach/dune system and interests of the Wetlands Protection Act.

Purpose

Determine the reasonably foreseeable benefits and impacts of beach scraping on Plum Island based on review of available science and relevant management experience in other states. DEP and CZM will use the workgroup findings to assist in their review of the proposed pilot project.

Approach

Convene a workgroup of CZM and DEP staff, 2-3 coastal geologists (USGS, PCCS, and WHOI), Vine Associates (consultant to the town), and Doug Packer (Newbury Conservation Agent) to:

1. Follow up on CSO survey and determine how this activity is treated in other applicable coastal states and if allowed, under what conditions.
2. Compile and review available peer-reviewed and grey literature to determine if there is a generally accepted body of knowledge regarding benefits and impacts that can be applied to Plum Island; determine reasonably foreseeable benefits and impacts to Plum Island.
3. Evaluate likely impacts within the context of regulatory authorities (especially Wetlands Protection Act rules).

Schedule

This is extremely time-sensitive: Target is 2-3 weeks, as follows.

1. Pull together the group on a conference call and discuss assignments:
 - a. CZM – conduct follow-up with applicable coastal states coastal managers.
 - b. CZM/DEP – compile literature on the practice; submit materials to CZM for compilation; CZM synthesize materials into working issue summary.
 - c. Send to technical experts/consultant.

2. Schedule ½ day meeting of entire group to review materials and make findings on the reasonably foreseeable benefits and impacts of beach scraping on Plum Island and relationship to Wetlands Protection standards.

Wetlands Protection Act Regulations see 10.27(3) [underlined] below, for the basic performance standard.

10.27: Coastal Beaches

(1) Preamble. Coastal beaches, which are defined to include tidal flats, are significant to storm damage prevention, flood control and the protection of wildlife habitat. In addition, tidal flats are likely to be significant to the protection of marine fisheries and where there are shellfish, to land containing shellfish.* Coastal beaches dissipate wave energy by their gentle slope, their permeability and their granular nature, which permit changes in beach form in response to changes in wave conditions. Coastal beaches serve as a sediment source for dunes and subtidal areas. Steep storm waves cause beach sediment to move offshore, resulting in a gentler beach slope and greater energy dissipation. Less steep waves cause an onshore return of beach sediment, where it will be available to provide protection against future storm waves. A coastal beach at any point serves as a sediment source for coastal areas downdrift from that point. The oblique approach of waves moves beach sediment alongshore in the general direction of wave action. Thus, the coastal beach is a body of sediment which is moving along the shore. Coastal beaches serve the purposes of storm damage prevention and flood control by dissipating wave energy, by reducing the height of storm waves, and by providing sediment to supply other coastal features, including coastal dunes, land under the ocean and other coastal beaches. Interruptions of these natural processes by man-made structures reduce the ability of the coastal beach to perform these functions. A number of birds also nest in the coastal berm, between the toe of a dune and the high tide line. In addition, isolated coastal beaches on small islands are important as haul out areas for harbor seals. Tidal flats are likely to be significant to the protection of marine fisheries and wildlife habitat because they provide habitats for marine organisms such as polychaete worms and mollusks, which in turn are food sources for fisheries and migratory and wintering birds. Coastal beaches are extremely important in recycling of nutrients derived from storm drift and tidal action. Vegetative debris along the drift line is vital for resident and migratory shorebirds, which feed largely on invertebrates which eat the vegetation. Below the drift line in the lower intertidal zone are infauna (invertebrates such as mollusks and crustacea) which are also eaten by shore birds. Tidal flats are also sites where organic and inorganic materials may become entrapped and

then returned to the photosynthetic zone of the water column to support algae and other primary producers of the marine food web.

When a proposed project involves the dredging, filling, removing, or altering of a coastal beach, the issuing authority shall presume that the coastal beach is significant to the interests specified above. This presumption may be overcome only upon a clear showing that a coastal beach does not play a role in storm damage prevention, flood control, or protection of wildlife habitat, or that tidal flats do not play a role in the protection of marine fisheries or land containing shellfish, and if the issuing authority makes a written determination to such effect. When coastal beaches are determined to be significant to storm damage prevention or flood control, the following characteristics are critical to the protection of those interests:

- (a) volume (quantity of sediments) and form, and
- (b) the ability to respond to wave action.

When coastal beaches are significant to the protection of marine fisheries or wildlife habitat, the following characteristics are critical to the protection of those interests:

- (a) distribution of sediment grain size,
- (b) water circulation
- (c) water quality, and
- (d) relief and elevation.

When tidal flats are in a designated port area, 310 CMR 10.26(1) through 10.26(4) shall apply. When tidal flats are significant to land containing shellfish, 310 CMR 10.34(1) through 10.34(8) shall apply.

(2) Definitions.

Coastal Beach means unconsolidated sediment subject to wave, tidal and coastal storm action which forms the gently sloping shore of a body of salt water and includes tidal flats. Coastal beaches extend from the mean low water line landward to the dune line, coastal bankline or the seaward edge of existing man-made structures, when these structures replace one of the above lines, whichever is closest to the ocean. Tidal Flat means any nearly level part of a coastal beach which usually extends from the mean low water line landward to the more steeply sloping face of the coastal beach or which may be separated from the beach by land under the ocean.

When a coastal beach is determined to be significant to storm damage prevention, flood control, or protection of wildlife habitat, 310 CMR 10.27(3) through (7) shall apply:

(3) Any project on a coastal beach, except any project permitted under 310 CMR 10.30(3)(a), shall not have an adverse effect by increasing erosion, decreasing the volume or changing the form of any such coastal beach or an adjacent or downdrift coastal beach.

(4) Any groin, jetty, solid pier, or other such solid fill structure which will interfere with littoral_drift, in addition to complying with 310 CMR 10.27(3), shall be constructed as follows:

(a) It shall be the minimum length and height demonstrated to be necessary to maintain beach form and volume. In evaluating necessity, coastal engineering, physical oceanographic and/or coastal geologic information shall be considered.

(b) Immediately after construction any groin shall be filled to entrapment capacity in height and length with sediment of grain size compatible with that of the adjacent beach.

(c) Jetties trapping littoral drift material shall contain a sand by-pass system to transfer sediments to the downdrift side of the inlet or shall be periodically redredged to provide beach nourishment to ensure that downdrift or adjacent beaches are not starved of sediments.

(5) Notwithstanding 310 CMR 10.27(3), beach nourishment with clean sediment of a grain size compatible with that on the existing beach may be permitted.

When a tidal flat is determined to be significant to marine fisheries or the protection of wildlife habitat, 310 CMR 10.27(6) shall apply:

(6) In addition to complying with the requirements of 310 CMR 10.27 (3) and 10.27(4), a project on a tidal flat shall if water-dependent be designed and constructed, using best available measures, so as to minimize adverse effects, and if non-water-dependent, have no adverse effects, on marine fisheries and wildlife habitat caused by:

(a) alterations in water circulation,

(b) alterations in the distribution of sediment grain size, and

(c) changes in water quality, including, but not limited to, other than natural fluctuations in the levels of dissolved oxygen, temperature or turbidity, or the addition of pollutants.

(7) Notwithstanding the provisions of 310 CMR 10.27(3) through 10.27(6), no project may be permitted which will have any adverse effect on specified habitat sites or rare vertebrate or invertebrate species, as identified by procedures established under 310 CMR 10.37.

Appendix C: Workgroup Information

The two tables below contain lists of some of the primary source documents and materials used by the workgroup. In addition to these sources, there were other photographs and maps.

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**Expert Technical Panel Summary Report to MA Office of Coastal Zone Management:
Beach Scraping at Plum Island, MA
May 7, 2010**

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Dr. Rob Evans (Woods Hole Oceanographic Institution, Woods Hole, MA)

Geologic Background

Plum Island is a barrier island located south of the Merrimack River outlet in northern Massachusetts. Its formation and evolution is similar to that of other barrier systems on the eastern seaboard of the U.S. As post-glacial sea-level rise slowed approximately 6,000 to 7,000 years ago. Barrier islands respond to rising sea levels by moving landward, essentially at rates that keep up with sea level, and they have been doing this since their initial formation. As sea-level rise accelerates over the next century and beyond, the barrier island system must migrate landward at higher rates to maintain its existence, or else potentially drown and disappear altogether.

Similar to most barrier islands, Plum Island is a very dynamic system, especially on its northern end near the mouth of the Merrimack River. Recent sequences of photographs attest to large changes in shoreline position on a seasonal basis. As documented in a number of papers and reports, the position of the spit forming the northern end of the island fluctuated significantly until it was stabilized by construction of jetties beginning in 1882. Along the northern half of the barrier, long-term (146-yr) shoreline change rates are dominantly low-level erosional (unpublished USGS data) but erosion rates have increased in the past several decades to average nearly -0.5 m/yr. As a result, private property and community infrastructure is continually threatened and the effects of the relatively high erosion rates are exacerbated during stormy periods. In response to recent erosional events, beach scraping has been proposed as an erosion mitigation measure at Plum Island. This scientific panel was asked to review the existing, pertinent scientific literature on beach scraping to provide a scientific consensus regarding the potential impacts and benefits if implemented at Plum Island.

Beach Scraping

The available literature reviewed by the scientific panel includes conceptual models of beach scraping and monitored scraping projects that have been undertaken in South Carolina, North Carolina, Maryland and New York. The findings of all of the monitoring studies evaluated by the panel were consistent: in areas experiencing high rates of erosion, scraping exacerbates erosion, within the regions scraped, by altering the morphology of the beach profile and creating a loose, more easily erodible foredune. Beach scraping creates a lower, narrower beach with a steeper profile that allows waves to more easily reach the base of the artificial dune. Only one study, from North Carolina (McNinch and Wells, 1992), found

that scraping mitigated erosion, but specifically stated that the design of the scraping project was only successful because it was undertaken incrementally over long (months/years) periods of time, and not as an emergency response procedure. According to this study, the time period of the sediment relocation needs to mimic natural sediment transport processes which would have to be determined over a relatively long monitoring period. It should be noted that the data on which the North Carolina study was based was only assessed over a one year period, which is too short to determine if the scraping had long-term impacts.

It is the consensus of this panel, based on the available science, that beach scraping at Plum Island would likely increase the erosion problem.

- a) The beach at Plum Island has recently been in a highly erosive state, but has also exhibited periods of natural accretion in the recent past. The present beach is quite narrow.
- b) Scraping results in a lower, narrower beach and steepens the overall profile.
- c) Based on fundamentals of beach behavior and the scientific literature on scraping, the present beach would be steepened through scraping and would be more susceptible to erosion during a storm. Sand scraped to the toe of the dune would be more susceptible to removal downshore, or possibly offshore.

The only foreseeable benefit of scraping at Plum Island would be a potential increase in the volume of beaches downcoast from the scraped regions that would be the recipients of the newly mobilized sediment. It may be useful to undertake a scientific analysis of the modern coastal processes occurring at Plum Island to understand causes of erosion “hotspots” and what drives their occurrence.

Suggested Readings – General Coastal Geology:

Neal, W.J, Pilkey, O.H. and Kelley, J.T, 2007, Atlantic Coast Beaches: A Guide to Ripples, Dunes and Other Natural Feature of the Seashore: Mountain Press, Missoula, MT.

A sampling of peer-reviewed publications on beach scraping:

Bruun, P., 1983 Beach scraping: Is it Damaging to Beach Stability? Coastal Engineering, v. 7, p. 167-173.

Conway, C.A., Wells, J.T., 2005, Aeolian Dynamics along Scraped Shorelines, Bogue Banks, North Carolina. Journal of Coastal Research, v. 21, no. 2, p. 242-254.

Kana, T.W., Svetlichny, M., 1983. Artificial Manipulation of Beach Profiles. International Conference of Coastal Engineering, Conference Proceedings of Coastal Engineering '83. p. 1-20.

Kratzmann, M.G., Hapke, C.J., 2008, Anthropogenic Influences on the Dune/Beach Morphology of a Moderately Developed Barrier Island: Fire Island, New York, National Park Service Technical Report NPS/NER\NRTR—2008/131, 36 pp.

McNinch, J.E., Wells, J.T., 1992, Effectiveness of Beach Scraping as a Method of Erosion Control, *Shore and Beach*, v. 60, no. 1, p. 13-20.

Tye, R.S., 1983, Impact of Hurricane David and mechanical dune restoration on Folly Beach, South Carolina, *Shore and Beach*, v. 51, No. 2, p 3-9.

Wells, J. T., McNinch, J. 1991. Beach Scraping in North Carolina with Reference to its Effectiveness During Hurricane Hugo: in Finkl, C.W. and Pilkey, O.H. (eds.), *Impacts of Hurricane Hugo: September 10-22, 1989*. *Journal of Coastal Research Special Issue No. 8*, p. 249-262.

Informal Communication

Appendix E: Survey of Beach Scraping in other State Jurisdictions

April 13, 2010

Survey of NE states and several other regional representatives (NY, NC, SC, TX, OR) to determine regulatory and other contextual treatment of “beach scraping,” generally defined as the process of moving sand (and other unconsolidated material like gravels) from the lower area of the beach—generally in the intertidal area—up to the area of erosion to provide protection for structures at risk.

Maine

Contact:

Marybeth Richardson
Licensing Coordinator
ME DEP

Steve Dickson, Ph.D.
State Marine Geologist
ME Geological Survey

Does Maine allow beach scraping as defined?

Generally no, but may be permitted for emergency work.

Conditions:

Conditions for permit:

- Volume moved should not exceed annual variability based on profile data
- Depth of scraping (borrow area) is also determined using profile data
- Time of year (TOY) restrictions apply
- Activity should not interfere with long-shore transport—must stay in shore normal position
- No impact on abutters

What is allowed?

Nourishment is the preferred method of addressing erosion. Rip-rap may be placed in front of collapsed seawalls. Scraping has been performed on beaches in Scarborough, Saco, and Wells.

Authorities:

Natural Resources Protection Act—Coastal Sand Dune Rules, Chapter 355 (amended 2005)

New Hampshire

Contact:

Frank D. Richardson, Ph.D.
Senior Wetlands Inspector
Southeast Region Supervisor
NH DES Wetlands Bureau: Pease Field Office

Does New Hampshire allow beach scraping as defined?

No provision in state Wetlands Bureau Code of Administrative Rules. Application for a permit to do this, even under emergency conditions, would be denied

Conditions:

n/a

What is allowed?

Alternative measures for shoreline stabilization. Have included: bringing in stone rip-rap underlain with filter fabric, using 'Jersey Barriers', trucking in sand/gravel from off site, using beach sand washed up on oceanfront parking lots.

NH does have rules which provide for the regrading and recontouring of municipal and state owned beaches which have become disturbed by winter storms. Also allow the removal of seaweed and other accumulated debris, provided that the beach sand remains on the beach. Additionally, the DES Wetlands Bureau will issue permits to individuals who have beach sand which accumulates against the face of a seawall to remove the sand and regrade it on the 'dry sand' portion of the beach immediately adjacent to their property. This is to provide for the face of the seawall to be revealed so as not to have a sand ramp form in front of the wall which would allow waves to run-up and over-top the seawall.

Authorities:

If proposed the project would be reviewed as a dredging project under dredge and fill statute. Issues would include impacts to nearshore circulation and benthic habitats.

Rhode Island

Contact:

Janet Freedman
Coastal Geologist
Coastal Resources Management Council

Does Rhode Island allow beach scraping as defined?

No. Rhode Island beaches, particularly in developed areas, are very narrow. Beach scraping is considered to be counterproductive, as taking sand from the berm and intertidal area allows the waves to break closer to the feature that the scraping is supposed to protect. RI observation is that the beaches generally recover much of the sand berm within a week or two of the storm if left alone.

Conditions:

n/a

What is allowed?

Rhode Island does allow several emergency measures such as sandbagging (with biodegradable bags), coir envelopes, and dune restoration using inland sand sources.

Authorities:

Rhode Island Coastal Resources Management Act, Section 210.1 (Coastal Beaches) and 300.2 (Removing and grading Coastal Features). The CRM Plan is online at:

<http://www.crmc.ri.gov/regulations/RICRMP.pdf>

210.1.C.2. Alterations to beaches adjacent to Type 1 and Type 2 waters (~70% of coastal waters) are prohibited except where the primary purpose of the project is to preserve or enhance the area as a natural habitat for native plants and wildlife. In no case shall structural shoreline protection facilities be used to preserve or enhance these areas as a natural habitat or to protect the shoreline feature.

210.1.D.3 Alterations to beaches adjacent to Type 1 and Type 2 waters are prohibited except where the primary purpose of the project is to preserve or enhance the area as a natural habitat for native plants and wildlife.

300.2.D.1. Filling, removing, or grading is prohibited on beaches, dunes, undeveloped barrier beaches, coastal wetlands, cliffs and banks, and rocky shores adjacent to Type 1 and 2 waters unless the primary purpose of the alteration is to preserve or enhance the feature as a conservation area or natural buffer against storms. 300.2.D.4. Mining is prohibited on coastal features.

Connecticut

Contact:

Cheryl Chase
Supervising Environmental Analyst, East Permitting and Enforcement
CT DEP, Office of Long Island Sound Programs

Does Connecticut allow beach scraping as defined?

Generally no, but have not had experience with emergency requests.

Conditions:

Emergency permits can be issued in cases of immediate, unforeseen, and unacceptable hazards of life, health or welfare, or significant loss of property. If an immediate short-term solution is required, it should involve the least amount of potential resource damage possible.

Conditions for permit:

- Work may only be done during low tide and heavy equipment may not enter the water
- TOY restrictions apply – no work may be done between March 1 and July 1 to protect piping plovers, least terns, ospreys, and horseshoe crabs
- Public comment

What is allowed?

Prefer development of long-term solutions. Recommend nourishment or sand bags for temporary measures. For beach grading activities above mean high water, CT has issued a general permit that allows grading once per calendar year. All work authorized by this general permit is prohibited between May 10 and July 15, inclusive, of any year to protect spawning horseshoe crabs.

Authorities:

If proposed, grading would be treated as a dredging project under the Structures and Dredging Act. Impacts to adjacent properties would be an important issue considered.

New York**Contacts:**

Fred Anders
Coastal Geologist
NY Dept. of State
Coastal Resources Division

Eric Star
Dept. of Environmental Conservation
Region I Office (Long Island), Division of Water
Bureau of Flood Protection and Dam Safety.

Marc Carrara
Department of Environmental Conservation
Environmental Permits.

Does New York allow beach scraping as defined?

No. NY does not allow individual residents to do any beach scraping or regrading; they must bring in upland fill.

What is allowed?

Beach scraping or regrading is not allowed as a storm response activity – they must bring in upland fill or dredge offshore.

Municipalities can apply for a beach “regrading” permit if they meet certain criteria:

- Regrading is only allowed on the dry sand beach if it equals or exceeds elevation +7 NGVD and 100 feet in width.
- Regrading may begin 10’ landward of the summer beach berm crest and extend landward 60 feet, with an excavation depth of one foot.
- Excavation is limited to 2.2 cubic yards of sand per linear foot of beach.
- Machinery is not allowed below elevation 6 NGVD at any time.
- The material excavated can only be moved within the municipality’s boundaries.
- Regrading is only permitted between April 30th and August 15th of any year.
- Sand placed to augment a dune as follows: 17’ NGVD in height, crest width of 20 feet and 1 to 3 side slopes.
- All regarded dunes shall be planted with Beach Grass on 18” centers no later than October 31st following authorized activities. An 85% survival rate shall be maintained for 5 years by replanting, irrigation and fertilization as necessary.
- Beach profile monitoring is required for areas where regrading is permitted.

Grooming is treated differently than regrading. Grooming the “major bathing beaches” to create a flat recreational beach (without major redistribution of sediment) is allowed.

Authorities:

Chapter X, Division of Water, Part 661: Tidal Wetlands – Land Use Regulations, Sections 5 and 9. Available online at: <http://www.dec.ny.gov/regs/13337.html>

North Carolina

Contact:

Does North Carolina allow beach scraping as defined?

Yes

By Permit:

Beach bulldozing (defined as the process of moving natural beach material from any point seaward of the first line of stable vegetation to create a protective sand dike or to obtain

material for any other purpose) is development and may be permitted as an erosion response if the following conditions are met:

- The area on which this activity is being performed shall maintain a slope of adequate grade so as to not endanger the public or the public's use of the beach
- Slope shall follow the pre-emergency slope as closely as possible.
- The movement of material shall not exceed one foot in depth measured from the pre-activity surface elevation;
- The activity shall not exceed the lateral bounds of the applicant's property unless he has permission of the adjoining land owner(s);
- Movement of material from seaward of the mean low water line will require a dredge and fill permit;
- The activity shall not increase erosion on neighboring properties and shall not have an adverse effect on natural or cultural resources;
- The activity may be undertaken to protect threatened on-site waste disposal systems as well as the threatened structure's foundations.

Emergency exclusion from permitting:

Beach bulldozing, defined as the process of moving natural beach material from any point seaward of the first line of stable vegetation, for the purpose of preventing damage to imminently threatened structures, by the creation of protective sand dunes shall qualify for an exclusion under G.S. 113A-103(5)(b)(5).

A structure is considered to be imminently threatened by erosion when the foundation, septic system or right of way in the case of roads is less than 20 feet from the erosion scarp. Buildings and roads located more than 20 feet from the erosion scarp or in areas where there is no obvious erosion scarp may also be found to be imminently threatened when site conditions, such as a flat beach profile or accelerated erosion, tend to increase the risk of imminent damage to the structure.

Conditions for emergency action:

- The area on which this activity is being performed shall maintain a slope of adequate grade so as to not endanger the public or the public's use of the beach
- Slope shall follow the pre-emergency slope as closely as possible.
- The movement of material shall not exceed one foot in depth measured from the pre-activity surface elevation;
- The activity shall not exceed the lateral bounds of the applicant's property unless he has permission of the adjoining land owner(s);
- Movement of material from seaward of the low water line will not be permitted under this exemption;

- The activity must not significantly increase erosion on neighboring properties and must not have a significant adverse effect on important natural or cultural resources;
- The activity may be undertaken to protect threatened on-site waste disposal systems as well as the threatened structure's foundations.

Authorities:

Permit: 15A NCAC 07H .0308 (a)(4) (SPECIFIC USE STANDARDS FOR OCEAN HAZARD AREAS)

Exemption: 15A NCAC 07K .0103 (b) (MAINTENANCE AND REPAIR)

South Carolina

Contacts:

Matt Slagle
Coastal Program
Policy and Planning

Bill Eiser
Oceanographer and Assistant Director of Regulatory Programs
South Carolina Department of Health and Environmental Control (SCDHEC)

Does South Carolina allow beach scraping as defined?

Yes, under emergency authorization only.

Generally, beach scraping not allowed under normal permitting circumstances.

Circumstances that warrant emergency authorization:

Emergency authorization can be issued if a local official determines a structure is in imminent danger (erosion is within 10 feet of the structure).

Conditions of approval include:

- Sand may only be scraped from the intertidal beach.
- Scraping may only extend between extended property lines of the structure receiving the sand.
- The depth of scraping may not exceed one foot below the existing beach level.
- Sand may be placed against an eroded scarp or to replace an eroded dune that is seaward of a threatened structure.
- The dune shall not exceed six (6) feet above grade or twenty (20) feet in width as measured from dune toe to dune toe.
- Emergency orders issued between April 15th and November 1st must be reviewed for impacts to loggerhead turtle nest sites.

Authorities

SCDHEC-OCRM
South Carolina Department of Health and Environmental Control
Office of Ocean and Coastal Resource Management
Critical Area Permitting Regulations April 25, 2008
30-5. A.(1) and 30-15. H.(2)(a)-(f)

Other Activities Permitted:

In some circumstances, projects to allow mining of up drift, accreting beaches for nourishment of eroding downdrift beaches have been allowed.

General:

SC does not believe scraping provides a lasting benefit and that erosion of adjacent areas could result when "borrow" area fills in.

Texas**Contact:**

Angie Sunley
Beach/Dune Team Leader
Coastal Resources Division
Texas General Land Office

Does Texas allow beach scraping as defined?

No. Private property owners are never allowed to grade the beach. Open Beaches Act provides that no private activity can occur more than 20 feet seaward from edge of vegetation.

Generally, Beach/Dune Rules protect natural gains and losses of sediment on beaches.

Conditions:

n/a

What is allowed?

Local authorities are allowed limited redistribution of sand on upper beach between the line 20 feet seaward of the seaward extent of vegetation and the MHW line.

Scraping/bulldozing/reggrading is never allowed in the intertidal zone.

Sargassum spp. is a major issue on Texas beaches, and can be removed by local authorities.

Authorities:**Open Beaches Law**

Texas Natural Resources Code
Chapter 61, Use and Maintenance of Public Beaches

Texas Administrative Code Title 31

Part 1 Chapter 15 subsection A (15.1-15.13)

Oregon

Contact

Dale Blanton, AICP
Senior Coastal Policy Analyst
Oregon Coastal Management Program
Oregon Dept. of Land Conservation and Development

Does Oregon allow beach scraping as defined?

Oregon has a very dissimilar coast, and does not have experience with this type of erosion issue or scraping method. Most erosion control requests are for riprap. If they were to review such a request under their regulations, issues to be addressed would include modeling, benthic habitat issues, and TOY restrictions.

What is allowed?

Some regarding of sand above high tide line is allowed, particularly to address migration of dunes into/through structures. These require full permitting with long term plan. Generally, regrading of intertidal not done.

Authorities:

The Ocean Shore is governed by provisions of the Oregon Beach Bill and Statewide Planning Goal 18. The Beach Bill is outlined in ORS 390.605-390.760.
The requirements are outlined in OPRD administrative rules (OAR 736-Division 20).

**Executive Office of Energy and Environmental Affairs
Beach Scraping Workgroup Meeting
Friday, May 7, 2010, 10:00am
EEA Offices, 100 Cambridge Street, Boston, MA
Legal Conference Room**

Agenda

- Welcome and Introductions—Babb-Brott
- Review charge to group—Babb-Brott
- Report from scientific panel—Hapke, Evans, Giese
- Discussion—Group
- Report on state survey—Glenn
- Discussion—Group
- Policy context—Babb-Brott, Langley
- Next steps—Babb-Brott

Attendees

Cheryl Hapke (USGS), Rob Evans (WHOI), Graham Giese (PCCS), [collectively referenced as Technical Panel in minutes below] Deerin Babb-Brott (EEA), John Winkelman (Corps), Lealdon Langley (MassDEP), Eric Worrall (MassDEP), Brendan McGonigle (Rep. Stanley's Office), Bruce Carlisle (CZM), Doug Packer (Town of Newbury), David Vine (Consultant to Town), Becky McNight (Consultant to Town), Kathryn Glenn (CZM), Rebecca Haney (CZM)

Welcome, Introductions, and Ground Rules

Overview/scope—charge by Secretary: Review of policy. Bring in outside, disinterested scientific expertise to assist in review. Determine reasonably foreseeable benefits and impacts of beach scraping on Plum Island based on available science and relevant management experience in other states. Lots of material and background info provided for workgroup review. Thanks to those who provided information, process, agenda overview, open for input on agenda, schedule/timeline for meeting.

Report from Science Panel

Review conducted by 3 scientists who have wealth of experience. Invited to participate, focus on peer reviewed publications, do a site visit, provide best assessment of beach scraping impacts on PI. Emphasis on science, not anecdotal information in analysis. Background

geology: this is one of largest barrier beach systems, similar to origin and evolution of other barrier beaches in the northeast. Barrier beaches are very dynamic. Their behavior is cyclic; it can change in very short periods of time, due to storms, climatic events, North Atlantic oscillation, and need to migrate landward to keep up with sea level rise (SLR). If they aren't allowed to migrate, there will be implications...such as possible drowning and disintegrating. USGS recently calculated shoreline change for US—publication not published yet—the long term erosion rate for Plum Island is -0.2 m/year from 1850 -2000. Erosion rates in the short term increased. Since 1978, the erosion rate has been -0.5 m/year.

Scraping literature reviewed – NC, SC, MD, NY, specifically CH had Masters student focused on Fire Island NY so is very aware of the details of beach scraping and associated literature.

If system is in a highly erosive state, scraping will exacerbate the erosion. The reason is that scraping changes the morphology of beach profile, lowers elevation of beach, which steepens the beach. Steepened beaches erode faster. This is fundamental geology. Site observations: beach width very narrow, wide swash bar is welding back on to the beach, which is evidence of a system in recovery. Conclusions: any time the beach profile is altered, changes will occur. It's difficult to predict the exact results. Current state of beach suggests scraping will exacerbate the problem.

Need to understand why erosion is increasing, and why it is localized. Definitely related to disruption in sediment supply. What that disruption is – difficult question. Material taken from swash berm, may not be replaced the way it has been in the past. But without deeper knowledge, they can't say one way or another. CH asked GG or RE to chime in if she missed anything.

Workgroup reviewed photographs from 3 days ago that show the ridge has fully welded onto beach.

There were several questions relating to timing, and to when scraping might be appropriate. The Technical Panel responded that if system isn't in a chronically erosive state, impacts would be much less. However, based on the work on Fire Island, the material scraped up is loosened and would erode more quickly.

It was noted that one of references – McNinch and Wells – suggested possible benefits of beach scraping.

TP responded that the study concluded that scraping appeared to help mitigate erosion from storm when it was done very slowly over a long period of time. Very small volumes of sediment were taken from the intertidal, they waited for system to recover, then scraped a little bit more. TP felt their monitoring only went on for very short period of time – too short term to feel comfortable with. The statistics of their analysis concluding that there was no adverse impact were not overwhelming.

Comment that from the scientific perspective, if you do something, it will have impacts on barrier beach. However, scraping represents a possible solution to difficult situation. The property owners had a dune that until 5-6 months ago had width 20 + feet more seaward of their homes. The sand went away - it's on the beach – know where it went – want to restore to where it was.

Comment that local perspective is important. We have conclusive statement by scientists. Town has passionate opinion about this – they have done it before – didn't see impact – they're thinking "what's the problem?" Where we have sand welding back on to the beach - how do we think about this?

There was discussion about the geologic processes as to how the sand welding back onto beach moves back up to dune. Wind? Yes, primarily. Are there ways to help accelerate this cycle?

TP responded that seeing bars welding back on – situation not a dire emergency as much as it was a month ago. Why not wait and see what happens with natural processes? See how dune naturally comes back?

There was discussion regarding timing related to these processes, and that for the part we are trying to put back (dune), the water won't do it – only wind will do it. Where people want the sand – mother nature is too slow.

There was discussion about the erosion rate, and it was noted that there is not a high background erosion rate here. Different set of dunes than down south. Have there been any design exercises to see how much they would want to take out of the dunes? Based on three cross-sections along a 1200' stretch of shoreline, they came up with an estimate of 5,000 cubic yards (4 yards per foot). The goal is to bring back to less steep slope.

There was discussion about long term responses based on a recommendation from the TP that for long term, community should be thinking about moving homes back. Very little space. Something they looked at back in the 70's was to offer land that the Town owned to local

property owners. It is very difficult to get someone to relocate to a back lot. There have been at least one prior offer that was not accepted.

Adaptation was discussed, including elevating houses on open pilings. Allows dunes to migrate, minimizes storm surge damage. It was acknowledged that under state building code, property owners are required to do this if they expand or add on, but elevating is economically not an option.

Pre-requisite criteria might be for FEMA programs. The FEMA program to acquire houses no longer exists. However, there are hazard mitigation grant programs that can provide funding to help homeowners elevate on pilings, move back, etc. The pre-requisites include the Town having a FEMA approved hazard mitigation plan where the hazard and the options to address them are identified. The Town would submit an application for federal funding. There is typically a federal cost-share with the property owner. There are insurance benefits for the property owner—advantages of elevating homes; cost savings in insurance payments pay for work over time.

There was discussion about the next steps on Plum Island being organized by scale or time-frame and suggestion was made to discuss options with the MRBA and the Town, including the immediate need to do something, mid-term options (e.g. nourishment, enhance town capacity to access hazard mitigation programs, etc.) and longer term options. The TP suggested that the Town needs to be thinking ahead - there are benefits to considering long-term worst case sea level rise scenarios.

It was discussed that the Town have started the FEMA Hazard Mitigation planning process with the Merrimack Valley Planning Commission, but it is not completed and is focused on inland flooding. Like the beach management plan, the FEMA plan should be from a regional perspective.

It was stated that most of references allowing scraping seemed to indicate that – 1.5 foot is about as much as you can take. Less is OK. Given a theoretical maximum of 1 to 1.5 feet of allowable scraping – is that really going to change the system?

TP responded that if you lower the profile and we get a storm, lowering may allow more incursion onto the beach – loose pile of sand just goes. Even though it isn't much volume.

The costs of importing material were discussed. A rough cost estimate for trucking in 5,000 cubic yards - transported and placed was about \$40/yard. ~\$200,000. Corps looking at 120,000 cubic yards over longer area.

Regarding overall dynamic and the request for scraping, the TP suggested useful to think of a sand budget as being similar to a financial budget or a bank. If you borrow money, there are different rates of inflow and outflow. Area on the south side of groin is like a bank. There is a deposit of sand, and the weather moved sand away. Any material you take out of the deposit costs something. In the fall, sand starts moving away in response to storms. If what has been taken out add to costs of that erosion, there won't be enough left in the bank to protect the dune and houses. The beach is river of sand, which is an active zone of transport. Dune isn't yet under wave action – that only happens when the bank account is empty. Then you have to get money from somewhere else – out of dune, instead of beach. More erosion of the dune brings the waves closer to the houses.

Not just looking at coastal deposit of sediment. Shore is between land and sea. Beach is system in which sediment is moving. That system is the buffer between sea and land. When sand goes up on dune, that has nothing to do with waves. Slope they talk about on beach is what dissipates waves – slope is what is comfortable with waves at the time. That is the system you don't want to lose sand from.

It was noted that this is a “joint” checking account – areas on either side of groin in the center are linked – in the same account, and there was a question about the overall balance/

TP responded that that the budget is already depleted – beach already thin compared to where the use of it is. Not enough buffer.

A revised version of the proposed pilot project was presented as context, which outlined on the plan (sand ridge) along a 1200' section of shoreline south of the groin would be moved up onto the face of the dune just a little farther south than where it is excavated, where they have isolated lots that are more critical than the others.

There was discussion about the merits of onshore v. nearshore beach nourishment, and the upcoming Corps beach nourishment. The sand was supposed to be placed further to the north. Placing the material to the north would still benefit this area, because some of the sand would migrate to south. Most of profile where it will be placed, will be in upper part of the profile. The nourishment planned profile is already skewed to landside, so even if the sand was placed north of center – will migrate south.

What about artificially moving sand to the south or higher up on beach/dune? What would happen to Section 204 study if sand is pushed to south? Appears that if you have similar erosion rates, the benefits would be similar. Economics are the same – their section 204 study was based on very rough calculations.

Would be OK as long as the modification in where the material goes won't delay the project, it doesn't change the game. If you have to get new permits and easements, that would change the timeline and could delay the project.

Possible that depositing sand on north side is overkill given the recent accretion. So could you, once it is place, could Town on parallel path, put in place permits to move it in fall after it is placed, stockpile in winter, and then place in the critical area in spring?

It was noted that the profile will adjust almost instantaneously when the material is placed on the beach. Hard to determine how this will equilibrate because of large bar offshore – not sure how fill and bar with interact - haven't done any analysis related to that.

If they are pumping to the center anyway, look at the proposed profile relative to the accretion that has taken place. Put the excess sand not needed to create the proposed profile up onto the parking lot, then they transport it to Olga Way, then back to dune south of the center? General discussion about logistics and permitting as an option.

Report on Survey of Relevant Management Experience in Other States

KG gave an overview of how beach scraping is handled in other states. She explained that focus was on efforts to get information on northeast states, but also spoke to representative states in other parts of the country (Southeast, Gulf, West Coast). The question asked other state contacts was if their state allowed beach scraping, as it has been proposed on Plum Island. If so, what do you allow and under what conditions?

There was general discussion about the range of management measures imposed by other states, homeowners' expectations, and technical feasibility when compared to soft measures, timing and impacts.

Policy Context

The basic regulatory standard of the Wetlands Protection Act regulations was reviewed: Not alter form of the beach in a way that will have an adverse impact by increasing erosion or

changing volume on beach or adjacent or down-drift beach. Based on information and what they heard today – difficult to meet this standard. General agreement.

It was noted that the second piece of this whole review process is for the state to consider a pilot project or study. But it is important to say that engaging in this workgroup wasn't an agreement to participate in pilot. This isn't refining the terms of that. Trying to develop something that is responsive. Put in context of short, medium, and long term; package will come out of this.

A lot referenced about what is going on in this system. We would like to get input from scientists: Thinking about a robust analysis of the overall system, what are key points to inform how we can get a better handle on this system?

TP responded that there is a fair amount of data available for this area – existing LIDAR [elevation data] – analyze for morphologic change. Some bathymetric data, Corps flying LIDAR this summer – use these to get a sense of the morphology. Critical thing she hasn't seen – how has shoreline change changed through time and why? Understand onshore offshore system. What is controlling how these hot spots migrate? Data needs to be compiled and assessed. Processes very important – what are the physical processes, waves, tides, suspended sediment, characteristics. Get as much understanding of process as you can. Multi-year multi-parameter would be optimal. Have info about what the form has been, have fair amount of info about tides, have a lot on waves, ...put them together, you might be able to get process.

There was general discussion about the complexity of the system. Where is sand going? Cross shore, long shore, where is it going? Direction, volume, net sediment transport – typically how we talk about it, but that isn't the way sand moves. What are the pathways, under what conditions is it moving to north, to south? Take WIS [Corps' Wave Information Studies (WIS)] data – modeled set of data – has imperfections. Complex morphology – ebb shoal, offshore bar, etc. State of art analysis – has uncertainties. Shoreline change based on annual studies. There is variability just on weekly basis. Video cameras – get daily and weekly changes. He tends to think about longer term regarding the barrier beach system. They move landward over time. Sand is moved landward over time by overwash. Developed systems don't allow that to happen. Don't allow the barrier's own systems to function. Any project Corps does has to factor in high sea level rise curves.

Plum Island barrier beach has room to move but won't be allowed to. ACOE has to look at 50 year project life now – if you have adequate sand you can keep up with it (SLR). 5,000 cubic yards won't keep up with it. Need NJ/NY level type of project.

The TP was asked its opinion on existing coastal structures and effect on system.

There was general discussion about the jetties, groins and the overall system. Need lots of information. Good to study jetties, since sand bar nearshore goes entire length of barrier beach. Field trip guidebook had topography and bathymetry around Merrimack River inlet. If you look at the scale of the jetty relative to sand system – it doesn't appear that it could be influencing patterns. (caveat – rough look based on old data). Geologist working locally feels that on the whole, given scale of sand system, unlikely that jetties are cause of the erosion – appears to be related to the offshore sand bar.

One of least expensive techniques that would provide a lot of information would be to get a video camera set up. Need to mount on something pretty high. Use time series mode of looking at waves breaking on bar. Is bar influenced by anything that's being done out there? Is there something you can do to jetty or groin system? Watch trends in how it moves in video. Possibly help you understand effect of groins.

It was suggested that the ebb shoal system could be mined– done quite a bit in south – BUT need to know what effects it would have on bars or other system.

Next steps discussed

Meeting adjourned