

Common Definitions for The Hard and Soft of Shoreline Management: Perspectives and Tools for New Hampshire Shoreline Management

December 11, 2014

Basic Shore Terms

Shoreline management: Understanding that shorelines are fluid, actions taken to manage people and the areas adjacent to shorelines to protect human health, welfare, and infrastructure, and sustain the natural resources and benefits that shorelines provide to society. Efforts involve many components, including:

- Engineering
- The protection and planning of public and private infrastructure
- Regulations
- Natural and biological considerations such as ecology, hydrology, and geomorphology
- Natural resources impacted by shoreline management (e.g., beaches, marshes, fisheries)
- The communication and management of risk
- Economics (e.g., the differences in cost between different shoreline management options now and in the future)
- Social, cultural, and historical factors

Shoreline: The zone of contact between a body of water's surface and the land; the intersection of the mean low water line with the beach profile. Below mean low water is publicly owned and above is privately owned (NOAA, 2000). An “infinitesimally thin line that separates the water from the land” (Strayer and Findlay, 2010).

Shorezone: The “region closely adjoining the shoreline in which strong and direct interactions tightly link the terrestrial ecosystem to the aquatic ecosystem, and vice versa” (Strayer and Findlay, 2010).

Shoreline protection: A range of engineering responses that focus on protecting land or landward infrastructure from erosion, inundation, or storm-induced flooding through 1) armoring; 2) shoreline stabilization structures and enhancements designed to slow the erosion rate and dissipate wave or current energy; 3) beach maintenance. Armoring includes bulkheads, cribbing, revetment and riprap. Stabilization includes jetties, breakwaters, sills and vegetation. Beach maintenance is the replacement of beach sediment (Hauser, 2014).

Shoreline Treatment Costs: As used today, cost refers not just to dollar amounts but also to the impacts of shoreline projects on cultural resources and ecosystem services. The following definitions reflect the spectrum and overlap of various treatments:

- **Hard Shoreline Protection Treatments** – Methods that do not involve living components; typical examples are bulkheads, cribbing, revetments and breakwaters.
 - Similar terms: Altered shoreline, engineered shoreline, modified shoreline, built shoreline, shoreline construction, constructed shoreline, traditional methods.
- **Soft Shoreline Protection Treatments** – Nonstructural treatments such as beach maintenance dune building, vegetated slopes and marsh restoration, which do not include hard components such as concrete, brick, stone or steel and include living components, either vegetation or shellfish.
 - Similar terms: Bio-engineered, eco-alternatives, green, habitat-friendly, non-structural, shoreline softening, soft approach, soft engineered shoreline, soft shore protection, restored shoreline, nature based.
- **Hybrid Shoreline Protection Treatments** – Treatments that include combinations of hard (structural) and soft (living) components. Structural components provide protection from erosive forces. Structure can be manmade or natural such as concrete, brick, stone, steel and timber. Examples are live crib walls, joint planting, marsh sills and green walls.
 - Similar terms: Innovative, non-traditional, alternatives to hardening, green and grey, habitat-friendly, living, ecologically enhanced.
- **Living shoreline** – Any erosion control management system that does not introduce a fixed interruption of a natural water/land continuum and that is designed to protect or restore natural shoreline ecosystem services; it includes natural elements and may incorporate manmade elements (Restore America’s Estuaries, 2014).

Climate Adaptation Terms

(from City of Kingston Tidal Waterfront Flooding Task Force, 2013)

Accommodation: The use of strategies that allow the continued use of vulnerable lands, but that do not attempt to prevent flooding or inundation with shoreline flooding protection.

Adaptation: Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.

Fortify: The use of hard or soft structures to prevent floodwaters from reaching community assets.

Relocation or retreat: Moving development out of harm’s way in a planned and controlled manner using techniques such as abandonment, relocation and avoidance.

Resilience (also Resiliency): The capacity of an individual, community, or institution to dynamically and effectively respond to shifting climate impact circumstances while continuing to function and prosper.

Sea-level rise: An increase in the mean level of the ocean.

Other Terms

Coastal Green Infrastructure Strategies: Those strategies that create, restore, or emulate natural coastal features, as well as provide the potential benefits of reducing erosion and mitigating storm surge, wave action, and stillwater flooding associated with coastal flood events (Arcadis et al., 2014).

Ecosystem functions: The habitat, biological or system properties or processes of ecosystems. Ecosystem goods (such as food) and services (such as waste assimilation) represent the benefits human populations derive, directly or indirectly, from ecosystem functions (Costanza et al., 1997).

Ecosystem services: The benefits people obtain from ecosystems that communities would have to replace artificially if the natural systems were lost. These benefits include, among others, flood control, water-quality improvement, storm protection, food production, nursery grounds, wildlife habitat and carbon sequestration (NYS Sea Level Rise Task Force, 2010).

Mean Higher High Water (MHHW): The average of the higher high water height of each tidal day observed over the National Tidal Datum Epoch. For stations with shorter series, comparison of simultaneous observations with a control tide station is made in order to derive the equivalent datum of the National Tidal Datum Epoch (NOAA, 2000)

Non-structural measures to shoreline risk reduction: Modifications in public policy, management practices, regulatory policy and pricing policy (e.g., structure acquisitions or relocations, flood proofing of structures, implementing flood warning systems, flood preparedness planning, establishment of land use regulations, emergency response plans) (SAGE, in press).

Storm Surge: A dramatic elevation of the ocean surface that leads to rapid flooding (NYS Sea Level Rise Task Force, 2010).

Tidal Buffer Zone: The area extending landward 100 feet from the highest observable tide line. This area can contain wetlands, transitional areas, and natural and developed upland (NHDES Wetlands Bureau, 2014).

Citations

1. Arcadis, Stevens Institute, and others. (2014). Research Plan to Advance the Understanding of Potential Coastal Green Infrastructure Strategies in New York City (DRAFT dated October 2014).
2. City of Kingston Tidal Waterfront Flooding Task Force. (2013). Planning for Rising Waters: Final Report of the City of Kingston Tidal Waterfront Flooding Task Force Published by the City of Kingston 420 Broadway Kingston, NY 12401 (845)-331-0080. http://www.kingston-ny.gov/filestorage/76/6654/6656/Kingston_Tidal_Waterfront_Flooding_Task_Force_-_Final_Report.pdf
3. Costanza et al. (1997). The value of the world's ecosystem services and natural capital. *Nature*, vol. 387, p. 253-260.
4. Grannis, J. (2011). Georgetown Climate Center Adaptation Tool Kit: Sea-Level Rise and Coastal Land Use, How Governments Can Use Land-Use Practices to Adapt to Sea-Level Rise. <http://www.georgetownclimate.org/resources/adaptation-tool-kit-sea-level-rise-and-coastal-land-use>
5. Hauser, E. (2012). Terminology for the Hudson River Sustainable Shorelines Project. In association with and published by the Hudson River Sustainable Shorelines Project, Staatsburg, NY 12580, <http://hrnerr.org>
6. New Hampshire Department of Environmental Services Wetland Bureau. (2014) Frequently Asked Questions. <http://des.nh.gov/organization/divisions/water/wetlands/categories/faq.htm>
7. New York City Department of City Planning. (2013). Coastal Climate Resilience, Urban Waterfront Adaptive Strategies. http://www.nyc.gov/html/dcp/pdf/sustainable_communities/urban_waterfront_print.pdf
8. New York State Sea Level Rise Task Force Report. (2010). http://www.dec.ny.gov/docs/administration_pdf/slrtffinalrep.pdf
9. NOAA. (2000). *Tidal Datums and Their Application*, NOAA Special Publication NOS CO-OPS 1, 132 pp. http://tidesandcurrents.noaa.gov/publications/tidal_datums_and_their_applications.pdf
10. Restore America's Estuaries. (2014). Living Shorelines from Barriers to Opportunities <http://www.estuaries.org/living-shorelines-from-barriers-to-opprtunities-draft-report>
11. Systems Approach to Geomorphic Engineering. (2014, in press). Natural and Structural Measures for Shoreline Stabilization brochure. <http://www.crm.vims.edu/sage/docs/communications/Living%20Shoreline%20Brochure%20v21.pdf>
12. Strayer, D.L., and S.E.G. Findlay. (2010). Ecology of freshwater shore zones. *Aquatic Sciences* 72: pp. 127-163.