

Living Shorelines Stacker References

Card #	Card Text	Reference
4	<p><i>Would you like to continue to enjoy these things while investing in the long-term protection of your property:</i></p> <p><i>From waves?</i></p> <p><i>From storms?</i></p> <p><i>From flooding?</i></p>	<p>Gittman, R.K., Popowich, A.M., Bruno, J.F., & Peterson, C.H. (2014). Marshes with and without sill protect estuarine shorelines from erosion better than bulkheads during a Category 1 hurricane. <i>Ocean & Coastal Management</i> 102: 94-102.</p> <p>Swann, L. (2008). The use of living shorelines to mitigate the effects of storm events on Dauphin Island, Alabama, USA. <i>American Fisheries Society Symposium</i> 64: 11.</p> <p>Knutson, P.L., Brochu, R.A., Seelig, W.N., & Inskeep, M.R. (1982). Wave damping in <i>Spartina alterniflora</i> marshes. <i>Wetlands</i> 2(1): 87-104.</p> <p>Miller, J.K. et al. (2015). An analysis of shorelines following three historic storms (case studies). Available at: https://www.hrnerr.org/shorelinesforensicanalysis/.</p> <p>Personal communications with S. Wilkinson (Wilkinson Ecological Design), J. Miller (Stevens Institute of Technology), and B. Majka (GEI Consultants Inc.).</p>
5	<p><i>In a way that looks natural?</i></p> <p><i>In a way that could save you money?</i></p> <p><i>In a way that allows you access to your shoreline?</i></p>	<p>Miller, J.K. et al. (2015). An analysis of shorelines following three historic storms (case studies). Available at: https://www.hrnerr.org/shorelinesforensicanalysis/.</p>
6	<p><i>Living shorelines are an eco-friendly option to keep you connected to the water while helping to protect your property from erosion.</i></p>	<p>Partnership for the Delaware Estuary. (2013). Living shorelines in the Delaware Estuary: Best practices from lessons learned and information collected by the Partnership for the Delaware Estuary and the Haskin Shellfish Research Laboratory, 2008 -2012. PDE Report No. 13-04. Available at: https://delawareestuary.s3.amazonaws.com/pdf/Living%20Shorelines/living_shorelines_best_practices.pdf.</p> <p>Partnership for the Delaware Estuary. (2012). Living shorelines: Healthy shores, healthy communities. Available at: https://s3.amazonaws.com/delawareestuary/pdf/Living+Shorelines/FFF_2011_LivingShorelines_ALL_REVISED+(2).pdf.</p>

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7	<p><i>There are many terms used to describe living shorelines:</i></p> <ul style="list-style-type: none"> <i>Green infrastructure</i> <i>Nature-based protection</i> <i>Bioengineering</i> <i>Soft engineering</i> 	<p>Hauser, E. (2012). Terminology for the Hudson River Sustainable Shorelines Projects. Available at: http://www.dec.ny.gov/docs/remediation_hudson_pdf/shorelineterminology.pdf.</p> <p>National Oceanic and Atmospheric Administration. (n.d.). Restoration techniques - Living shorelines. Available at: http://www.habitat.noaa.gov/restoration/techniques/livingshorelines.html.</p> <p>U.S. Army Corps of Engineers. (2015). Systems approach to geomorphic engineering glossary. Available at: http://www.sagecoast.org/info/glossary.html.</p>
8	<p><i>Living shorelines are:</i></p> <p><i>An alternative shoreline protection option to rock or concrete structures.</i></p>	<p>Partnership for the Delaware Estuary. (2013). Living shorelines in the Delaware Estuary: Best practices from lessons learned and information collected by the Partnership for the Delaware Estuary and the Haskin Shellfish Research Laboratory, 2008 -2012. PDE Report No. 13-04. Available at: https://delawareestuary.s3.amazonaws.com/pdf/Living%20Shorelines/living_shorelines_best_practices.pdf.</p> <p>Miller, J.K., Rella, A., Williams, A., & Sproule, E. (2016). Living shorelines engineering guidelines. Available at: http://www.nj.gov/dep/cmp/docs/living-shorelines-engineering-guidelines-final.pdf.</p>
9	<p><i>Living shorelines are:</i></p> <p><i>Created using natural elements and materials (sand, wetland plants, biodegradable materials, etc.).</i></p>	<p>Partnership for the Delaware Estuary (2013). Living shorelines in the Delaware Estuary: Best practices from lessons learned and information collected by the Partnership for the Delaware Estuary and the Haskin Shellfish Research Laboratory, 2008 -2012. PDE Report No. 13-04. Available at: https://delawareestuary.s3.amazonaws.com/pdf/Living%20Shorelines/living_shorelines_best_practices.pdf.</p> <p>Personal communications with S. Wilkinson (Wilkinson Ecological Design), L. Schwanof (GEI Consultants Inc.), & B. Majka (GEI Consultants Inc.).</p>
10	<p><i>Living shorelines are:</i></p> <p><i>An approach that allows you to access your shoreline, benefits wildlife, and looks natural.</i></p>	<p>Currin, C.A., Delano, P.C., & Valdes-Weaver, L.M. (2007). Utilization of a citizen monitoring protocol to assess the structure and function of natural and stabilized fringing salt marshes in North Carolina. <i>Wetlands Ecology and Management</i>, 16: 97-118. doi:10.1007/s11273-007-9059-1.</p> <p>Patrick, C., Weller, D.E., Li, X. & Ryder, M. (2014). Effects of shoreline alteration and other stressors on submerged aquatic vegetation in subestuaries of Chesapeake Bay and the Mid-Atlantic coastal bays. <i>Estuaries and Coasts</i>, 37: 1516-1531.</p> <p>Seitz, R.D., Lipcius, R.N., Olmstead, N.H., Seebo, M.S., & Lambert, D.M. (2006). Influence of shallow-water habitats and shoreline development on abundance, biomass, and diversity of benthic prey and predators in Chesapeake Bay. <i>Marine Ecology Progress Series</i>, 326: 11-27. doi:10.3354/meps326011.</p>

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12	<p><i>Slope: The flatter, the better. Flatter slopes are more stable and allow for vegetation growth. If you don't have a flat slope, it can be created.</i></p>	<p>Majka, B. (2015). Living shorelines and ice (Presentation). Available at: http://clear.uconn.edu/climate/docs/living-shorelines/6-2015/Majka.pdf.</p> <p>Miller, J.K. et al. (2015). An analysis of shorelines following three historic storms: Common project performance factors (for the Hudson River Sustainable Shorelines Project). Available at: https://www.hrnerr.org/doc/?doc=273625839.</p> <p>U.S. Department of Agriculture. (n.d.). Table I: Vegetative treatment potential for eroding tidal shorelines in the mid-Atlantic states. Available at: http://www5.njit.edu/tab/sites/tab/files/lcms/docs/NRCS_Vegetative_Treatment_Potential_Rating_Sheet.pdf.</p> <p>Personal communications with B. Majka (GEI Consultants Inc.), J. Roberge (RACE Coastal Engineering), J. Miller (Stevens Institute of Technology), A. Rella (Stevens Institute of Technology), L. Schwanof (GEI Consultants Inc.), & S. Wilkinson (Wilkinson Ecological Design).</p>
13	<p><i>Tidal range: Knowing the tidal range along your shoreline, especially the reach of the highest high-tide line, is important for determining where living shoreline vegetation can be planted. Keep in mind that the tidal range could shift landward in the future with sea level rise.</i></p>	<p>Melillo, J.M., Richmond, T.C., & Yohe, G.W. (Eds). (2014). Climate change impacts in the United States—Highlights. The Third National Climate Assessment. U.S. Global Change Research Program. Available at: http://s3.amazonaws.com/nca2014/low/NCA3_Highlights_LowRes.pdf?download=1.</p>
14	<p><i>Waves: Waves and boat energy are important considerations for living shorelines. Smaller waves may make living shorelines easier to install.</i></p>	<p>Manis, J.E., Garvis, S.K., Jachec, S.M., & Walters, L.J. (2014). Wave attenuation experiments over living shorelines over time: A wave tank study to assess recreational boating pressures. <i>Journal of Coastal Conservation</i>, 18 (5).</p> <p>Personal communications with J. Roberge (RACE Coastal Engineering), D. Burdick (University of New Hampshire), J. Miller (Stevens Institute of Technology), A. Rella (Stevens Institute of Technology), & B. Majka (GEI Consultants Inc.).</p>

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15	<p><i>Ice cover: Like waves, ice can scour shorelines.</i></p> <p><i>If your shoreline experiences ice in the winter, you may need some additional elements to protect your living shoreline.</i></p>	<p>Georgas, N., Miller, J.K., Wang, Y., Jiang, Y., & D'Agostino, D. (2015). Tidal Hudson River ice cover climatology. Stevens Institute of Technology. Available at: https://web.stevens.edu/ses/documents/fileadmin/documents/pdf/Tidal%20Hudson%20River%20Ice%20Climatology.pdf.</p> <p>Majka, B. (2015). Living shorelines and ice (Presentation). Available at: http://clear.uconn.edu/climate/docs/living-shorelines/6-2015/Majka.pdf.</p> <p>The Nature Conservancy/Stevens Institute. (2015). Restoration Explorer. Available at: http://maps.coastalresilience.org/newjersey/.</p> <p>Personal communications with J. Roberge (RACE Coastal Engineering), D. Burdick (University of New Hampshire), J. Miller (Stevens Institute of Technology), A. Rella (Stevens Institute of Technology), B. Majka (GEI Consultants Inc.), & R. Lathrop (Rutgers University).</p>
17	<p><i>Costs of shoreline protection: Upfront costs of living shorelines are low compared to other shoreline stabilization options. However, they may require more maintenance over time.</i></p>	<p>Chesapeake Bay Foundation. (n.d.). Living shorelines for the Chesapeake Bay watershed. Available at: http://www.cbf.org/Document.Doc?id=60.</p> <p>Partnership for the Delaware Estuary. (2012). Living shorelines: Healthy shores, healthy communities. Available at: https://s3.amazonaws.com/delawareestuary/pdf/Living+Shorelines/FFF_2011_LivingShorelines_ALL_REVISIED+(2).pdf.</p> <p>Rella, A., & Miller, J.K. (2012). A comparative cost analysis of ten shore protection approaches at three sites under two sea level rise scenarios. In association with and published by the Hudson River Sustainable Shorelines Project. Available at: https://s3.amazonaws.com/nyclimatescience.org/240186100-A-Comparative-Cost-Analysis-of-Ten-ShoreProtection-Approaches-at-Three-Sites-Under-Two-Sea-Level-Rise-Scenarios.pdf.</p> <p>Sutton-Grier, A., Bamford, H., & Wowk, K. (2015). Future of our coasts: The potential for natural and hybrid infrastructure to protect our coastal communities and economies. <i>Environmental Science and Policy</i>, 51: 137-148.</p> <p>Personal communication with: J. Miller (Stevens Institute of Technology), A. Rella (Stevens Institute of Technology), & S. Wilkinson (Wilkinson Ecological Design).</p>

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19	<p><i>Professional help:</i></p> <ul style="list-style-type: none"> • <i>Successful living shorelines are designed by teams of engineers, landscape architects, and ecologists.</i> • <i>Discuss your property conditions and characteristics with them (slope, ice cover, etc.).</i> • <i>Ask them about their living shoreline experience.</i> • <i>Your state coastal management office can help point you in the right direction.</i> 	<p>Personal communication with: J. Roberge (RACE Coastal Engineering), D. Burdick (University of New Hampshire), J. Miller (Stevens Institute of Technology), A. Rella (Stevens Institute of Technology), B. Majka (GEI Consultants Inc.), & L. Schwanof (GEI Consultants Inc.).</p>
24	<p><i>Living shoreline projects have been completed throughout New England—ask your state coastal management office about one near you!</i></p>	<p>Projects permitted by Massachusetts Office of Coastal Zone Management, Maine Department of Environmental Protection, and Connecticut's Department of Energy and Environmental Protection.</p> <p>U.S. Army Corps of Engineers. (2015). Systems approach to geomorphic engineering database (select "North Atlantic"). Available at: http://sagecoast.org/info/sagesearch.html.</p> <p>U.S. Army Corps of Engineers. (2015). Systems approach to geomorphic engineering mapper. Available at: http://cmap.vims.edu/SAGE/SAGE Mapper/SAGE Mapper.html.</p> <p>National Oceanic and Atmospheric Administration. (2016). Restoration atlas mapper. Available at: https://restoration.atlas.noaa.gov/src/html/index.html.</p>