

-**MA CZM Storm Smart Coasts:** this online resource provides communities and homeowners with tips and information to address coastal issues like erosion, flooding, storms, and more.

<http://www.mass.gov/eea/agencies/czm/program-areas/stormsmart-coasts/>

-**Cape Cod Cooperative Extension:** provides information on coastal flooding and erosion (flooding basics, preventative measures, coastal processes, risk reduction and building resilience)

<http://www.capecodextension.org/coastalprocesses/>

-**Homeowners Handbook to Prepare for Coastal Hazards—Second Edition:**

<https://www.capecodextension.org/wp-content/uploads/2016/04/Homeowners-Handbook-to-Prepare-for-Coastal-Hazards-Second-Edition-December-20141.pdf>

-**Cape Cod Regional Multi-Hazard Mitigation Plan:** this plan addresses natural hazards to which the Cape is vulnerable and puts forward measures to reduce the loss of damage to life, property and infrastructure. Per FEMA requirements, this plan is to be updated every five years. (Towns also develop individual hazard mitigation plans).

<http://www.capecodcommission.org/index.php?id=352>

-**Resilient Cape Cod Project :** In early 2016, the National Oceanographic and Atmospheric Administration (NOAA) awarded a three-year, \$780,000 grant to the Cape Cod Commission and partners to develop a tool and public outreach program to investigate the environmental and socio-economic effects of local and regional coastal resiliency strategies.

<http://www.capecodcommission.org/index.php?id=631>

-**Association of State Floodplain Manager's Flood Science Center:** a huge collection of materials and research about flooding across the country.

<http://www.floodsciencecenter.org/>

-**Best Practices & Case Studies Compendium:** offers examples of effective education /outreach, mapping efforts, regulations and development activities, planning and mitigation and infrastructure issues.

<https://www.floodsciencecenter.org/products/best-practices-case-studies-compendium/>

-**CRS for Community Resilience:** highlights "green" elements of the Community Rating System for planning and floodplain management ideas and also features community success stories.

<https://www.floodsciencecenter.org/products/crs-community-resilience/>

-**U.S. Climate Resilience Toolkit:** contains hundreds of tools and reports for reference and guidance

<https://toolkit.climate.gov/>



**-Selecting Appropriate Mitigation Measures for Flood prone Structures:** this manual provides assistance to officials with responsibility to minimize risk of property damage and human suffering caused by flooding through risk assessment, developing priorities, and working with other officials.

[https://www.fema.gov/media-library-data/20130726-1609-20490-5083/fema\\_551.pdf](https://www.fema.gov/media-library-data/20130726-1609-20490-5083/fema_551.pdf)

**-Substantial Improvement/ Substantial Damage Desk Reference:** this desk reference provides guidance on the minimum requirements of the National Flood Insurance Program (NFIP) regulations. Enforcing these requirements is a key duty of community floodplain managers.

[https://www.fema.gov/media-library-data/20130726-1734-25045-2915/p\\_758\\_complete\\_r3.pdf](https://www.fema.gov/media-library-data/20130726-1734-25045-2915/p_758_complete_r3.pdf)

**-Reducing Flood Risk to Residential Buildings that Cannot be Elevated:** This publication presents a range of flood protection measures available as alternatives to traditional structural elevation for homeowners whose residences are subject to possible flooding.

[https://www.fema.gov/media-library-data/1443014398612-a4dfc0f86711bc72434b82c4b100a677/revFEMA\\_HMA\\_Grants\\_4pg\\_2015\\_508.pdf](https://www.fema.gov/media-library-data/1443014398612-a4dfc0f86711bc72434b82c4b100a677/revFEMA_HMA_Grants_4pg_2015_508.pdf)

**-Guidance for Applying Engineering Standards to Flood Retrofitting and Reconstruction Projects:** this document assists local governments, designers, and property owners in identifying key design and construction requirements in the ASCE's standards that apply to flood mitigation grant projects.

[https://www.fema.gov/media-library-data/1398435734359-04a49fe783b3b3a15805d4c2c8e67630/ASCE\\_24\\_HMA\\_Guidance\\_508.pdf](https://www.fema.gov/media-library-data/1398435734359-04a49fe783b3b3a15805d4c2c8e67630/ASCE_24_HMA_Guidance_508.pdf)

**-Fuel Tanks:** this FEMA sheet provides tips on how to properly anchor fuel tanks on flood prone properties.

[https://www.fema.gov/media-library-data/20130726-1627-20490-6014/how2005\\_fuel\\_tanks\\_4\\_11.pdf](https://www.fema.gov/media-library-data/20130726-1627-20490-6014/how2005_fuel_tanks_4_11.pdf)

**-Flood Damage Resistance:** This FEMA sheet provides tips for building with flood damage resistant materials.

[https://www.fema.gov/media-library-data/20130726-1627-20490-6534/how2025\\_build\\_4\\_11.pdf](https://www.fema.gov/media-library-data/20130726-1627-20490-6534/how2025_build_4_11.pdf)

**-Massachusetts Emergency Management Agency:** the Commonwealth's resource for preparation, mitigation, and response to emergency situations such as storms and natural disasters.

<https://www.mass.gov/orgs/massachusetts-emergency-management-agency>

**-NOAA Digital Coasts:** this website provides a wide variety of resources that focus on helping communities address coastal planning and resilience issues.

<https://coast.noaa.gov/digitalcoast/>

**-US National Climate Assessment:** this report summarizes the impact of climate change on the U.S., now and in the future - <http://nca2014.globalchange.gov/>



# Living Shorelines and Green Infrastructure

Cape Coastal Conference

December 5-6, 2017

Hyannis Resort and Conference Center, Hyannis, MA

**--Living Shorelines in New England: State of the Practice:** this document highlights different living shoreline approaches in New England and provides background, and design and site considerations for those interested in learning more about standard and best practices.

[https://www.conservationgateway.org/ConservationPractices/Marine/crr/Documents/Final\\_StateofthePractice\\_7.2017.pdf](https://www.conservationgateway.org/ConservationPractices/Marine/crr/Documents/Final_StateofthePractice_7.2017.pdf)

**-NOAA Green Infrastructure Effectiveness Database:** this online tool allows users to search through previous research and studies on living shorelines projects as well as other coastal resilience resources from across the country. Search criteria include project type, region, implementation stage, and more.

<https://coast.noaa.gov/gisearch/#/search>

**-NOAA Guidance for Considering the Use of Living Shorelines:** this document provides direction for those considering living shoreline projects. It details general design principles, physical and ecological considerations, and policy considerations.

[http://www.habitat.noaa.gov/pdf/noaa\\_guidance\\_for\\_considering\\_the\\_use\\_of\\_living\\_shorelines\\_2015.pdf](http://www.habitat.noaa.gov/pdf/noaa_guidance_for_considering_the_use_of_living_shorelines_2015.pdf)

**-Restore America's Estuaries: Living Shorelines: From Barriers to Opportunities** – this report details the background and context of different living shoreline functions, and outlines barriers to living shoreline approaches, as well as recommended planning strategies— from education and outreach to regulatory reform. The RAE website also provides slideshows and other educational materials from workshops and seminars held around the country.

[https://www.estuaries.org/images/stories/RAEReports/RAE\\_LS\\_Barriers\\_report\\_final.pdf](https://www.estuaries.org/images/stories/RAEReports/RAE_LS_Barriers_report_final.pdf)

**-Living Shorelines Academy:** this EPA-funded organization provides numerous resources for those who are considering or interested in learning about living shoreline practices. These include a directory of living shoreline experts, a database and map of projects across the country, training modules, and links to webinars and power points.

<https://livingshorelinesacademy.org/index.php>

**-NROC Living Shorelines Group:** the goal of NROC's Living Shorelines Group is to facilitate regional knowledge-sharing around living shorelines and coastal green or natural infrastructure. This site contains general living shoreline information and a network of professional contacts.

<http://northeastoceancouncil.org/committees/coastal-hazards-resilience/living-shorelines-group/>

**-Connecticut Institute for Resilience & Climate Adaptation (CIRCA):** materials and resources from a workshop held in November of this year including case studies and site designs for different living shoreline projects .

<https://circa.uconn.edu/2017/10/18/ct-living-shorelines-nov-20-workshop/>

**-Resilient Coastal Sites for Conservation in the Northeast and Mid-Atlantic**

<http://conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/edc/reportsdata/climate/CoastalResilience/Pages/default.aspx>

**-The Value of Coastal Wetlands for Flood Damage Reduction in the Northeastern USA**

<https://www.nature.com/articles/s41598-017-09269-z>

**- Coastal Resilience**

<http://coastalresilience.org/>



- **Association to Preserve Cape Cod Restoration Coordination Center:** The Restoration Coordination Center (RCC) was established in 2015 to help towns and communities on Cape Cod with prioritization, planning, implementation, and management of restoration projects. The goal of the RCC is to increase the number and success rate of important coastal wetland restoration projects by serving as a resource and management center. The RCC also aims to build public support for restoration to improve our natural resources and environment.

<http://www.apcc.org/rcc/rcc.html>

---**Coonamassett River Restoration Project:** Currently underway in East Falmouth, the Coonamassett River Restoration Project involves the removal of two dams, culvert removal and replacement with fish crossings, and wetland restoration.

<http://www.falmouthmass.us/DocumentCenter/Home/View/1641>

-**Muddy Creek Restoration Project:** Following more than a decade of coordinated effort, local, state and federal officials recently celebrated the completion of the Muddy Creek Restoration and bridge project, a \$6.47 million investment to improve water quality and ecological vitality in an impaired tidal creek system. The project involved replacing undersized culverts that severely restricted tidal flows to Muddy Creek with a new 94-foot wide single span bridge and restored tidal channel. The creek forms the town line between Chatham and Harwich before flowing into Pleasant Bay.

<http://pleasantbay.org/programs-and-projects/wetlands-protection/muddy-creek-restoration>

**Cape Cod Water Resources Restoration Project (CCWRRP):** In October 2017 the USDA Natural Resources Conservation Service approved \$10 million in funding for the next phase of Cape-wide coastal reconstruction projects lead by the Cape Cod Conservation District. The money will fund 16 priority projects that range from stormwater runoff management, marsh restoration, and fish passage improvements. These will be a continuation of CCWRRP's overall plan to improve over 75 sites across the Cape, 23 of which were completed during Phase I, which began in 2011.

-<https://www.nrcs.usda.gov/wps/portal/nrcs/detail/ma/newsroom/releases/?cid=NRCSEPRD1356249>

-<http://capemedia.org/cape-cod-coastal-restoration-projects-receive-10m-in-federal-funds/>

-[https://www.nrcs.usda.gov/wps/portal/nrcs/detail/ma/programs/planning/wo/?cid=nrcs144p2\\_013971](https://www.nrcs.usda.gov/wps/portal/nrcs/detail/ma/programs/planning/wo/?cid=nrcs144p2_013971)

-**Pleasant Bay Ecosystem Assessment :** this project will produce maps and inventories of submerged marine areas that depict bathymetry, sediment type, geomorphology, ecological habitats, and archeological resources to be used for various purposes including serving as a baseline for measuring change and the design and implementation of resilience strategies.

<https://www.nps.gov/caco/learn/news/cape-cod-national-seashore-receives-funding-for-hurricane-sandy-restoration-and-research-projects.htm>



# Renewable Energy Session - Case Study Highlights

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## **Vineyard Wind-** <https://www.vineyardwind.com/>

Vineyard Wind is hoping to develop the first utility-scale offshore wind energy project off the coast of Massachusetts, generating clean, renewable and cost-competitive energy to power thousands of homes and businesses across the state. Vineyard Wind has leased an area of about 160,000 acre lease area about 14 miles from Martha's Vineyard, where it hopes to build as much as 1,600 megawatts of wind energy.

## **Cape Cod Canal Turbine Project-** <http://www.capecodtimes.com/news/20171004/tidal-turbine-test-site-at-cape-cod-canal-gets-green-light>

The Marine Renewable Energy Collaborative has been approved to install the first tidal turbine test site in the country along the Cape Cod Canal. The project will include underwater hydrokinetic turbines that will be able to produce energy using the canal's currents, which can flow up to four knots in either direction. The turbines will be placed on a platform that can be raised and lowered from the canal, which will allow developers to test the equipment without making it a permanent installation. Bourne officials hope the project will encourage an increased interest in the development of marine technology in the Buzzard's Bay area and along the canal.

## **Muskeget Channel Turbine Project-** <https://vineyardgazette.com/news/2016/06/29/tidal-energy-project-gains-fresh-momentum>

Another hopeful project led by the Marine Renewable Energy Collaborative will showcase tidal turbines in Muskeget Channel, between Edgartown on Martha's Vineyard and Nantucket Island. With tide flow velocities between 3.3- 3.8 knots, the currents could easily power the fourteen proposed underwater turbines, providing power to up to 1,500 homes in Edgartown (5% of the Vineyard's power needs). The project also aligns with Edgartown community goals to exploit tidal power for the production of clean energy.



-**Massachusetts Department of Public Health:** the following link provides numerous resources related to cyanobacteria including safety advisories, fact sheets, educational materials, and more.

<https://www.mass.gov/news/algae-information>

-**Environmental Protection Agency:** the EPA's website on cyanobacteria and cyanotoxins provides general information on how these organisms grow, thrive, and threaten aquatic ecosystems across the country. A great resource for those with little prior knowledge.

<https://www.epa.gov/nutrient-policy-data/cyanobacteriacyanotoxins>

--**National Park Service:** this file discusses some of the general questions regarding freshwater kettle ponds (found all over Cape Cod), how they function, and how they react to different factors. Included is information on cyanobacteria growth in these pond environments

<https://www.nps.gov/caco/learn/nature/upload/pondatlasFAQ.pdf>

-**Cyanobacteria Monitoring Collaborative:** this resource provides information on how educated citizens can become cyanobacteria monitors in their own community, offering tips and tools on how to do so. It also provides a network of information for those who wish to report algal blooms in their neighborhood or check to see if their favorite ponds are under safety advisory alerts.

<https://cyanos.org/>

-**bloomWatch! App:** this cellular app allows citizens to report potentially hazardous algal blooms or cyanobacteria presence in local ponds and to help scientists understand how these blooms occur and effect Massachusetts ponds. The app reports this information to the state Department of Environmental Protection. The app was developed by New England Interstate Water Pollution Control Commission, CitiSci.org and EPA Region 1. The following link will allow you to see where cyanobacteria has been reported across the country using the bloomWatch! App. Download it from the App Store.

[http://www.citsci.org/cwis438/Browse/Project/Project\\_Info.php?ProjectID=822&WebSiteID=7](http://www.citsci.org/cwis438/Browse/Project/Project_Info.php?ProjectID=822&WebSiteID=7)

