Winter 2014 (Click images to read articles)

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Section 208 of the federal Clean Water Act enables states to address and improve water quality by developing area-wide waste treatment management plans. In 1978, Cape Cod adopted a Cape-wide water quality management plan to address water quality issues caused by increasing residential densities and seasonal summer populations. The 1978 plan, which became the Section 208 plan for Cape Cod, anticipated that future population growth would increasingly impact groundwater and surface water quality due to excess nutrients from septic systems.

Since then, the Cape experienced a large-scale building boom, and year-round population has grown significantly. Most of the Cape's wastewater is managed using on-site septic systems, while only 11 percent of wastewater flows are treated using centralized sewers. Cape Cod's soils are largely coarse sand, so nutrients from septic systems enter groundwater, surface water and coastal embayments. Stormwater runoff is a smaller source of nitrogen, contributing on average eight percent of the overall nitrogen load to embayments. As a result, many of the Cape's 57 coastal watersheds to major coastal embayments are eutrophic and require total maximum daily loads (TMDLs) to achieve water quality standards. Water quality problems are most severe in embayments on Nantucket Sound, Vineyard Sound and Buzzards Bay.

In 2013 the Commonwealth of Massachusetts authorized the Cape Cod Commission to update the 208 plan. The update involved a comprehensive public process engaging all 15 towns on how to address water quality problems. A general consensus emerged that a number of approaches would be needed to address water quality, due to differences in population densities, available land to site infrastructure, cost, and many other factors. To assist towns in decision-making, the Cape Cod Commission developed a matrix of several dozen technologies to address water quality and manage nitrogen, including advanced treatment through sewering, constructed wetlands, stormwater management, composting toilets, permeable reactive barriers, innovative/alternative septic systems, inlet widening, coastal habitat restoration, shellfish and aquaculture, and many more.

The application of many of these technologies for nitrogen management is new or emerging, such as shellfish aquaculture, shellfish bed restoration or coastal wetland restoration. For such emerging technologies, monitoring must be performed to demonstrate that the method works and that water quality standards are met. APCC is participating in a 208 committee that is developing monitoring recommendations for emerging or alternative technologies, including using shellfish and coastal habitat restoration to manage nitrogen. For more information on the 208 plan, visit http://watersheds.capecodcommission.org. For more information on APCC's work, visit http://www.apcc.org or contact APCC executive director Ed DeWitt or APCC senior scientist Jo Ann Muramoto at 508-362-4226.

In 1990, APCC published the Cape Cod Critical Habitats Atlas, which at the time was the most comprehensive set of maps available of the Cape's sensitive and high-value habitats. The publication helped raise public awareness in order to better protect habitat on Cape Cod. It was widely used as an important planning, regulatory and conservation tool.

Now, a modern update of the critical habitats atlas has been developed in the form of an interactive web-based map that is available on APCC's website.

Since publication of the original 1990 atlas, knowledge of habitat science, management and protection has evolved, and the precision of geographic information systems (GIS) technology has become the gold standard for mapping and expanding the understanding of natural resources. Still, there was no comprehensive up-to-date source of Cape Cod habitats as provided by the 1990 atlas.

In particular, the documentation of what are known as "natural communities" was largely absent from any source of information about the Cape's habitats. Natural community designations are used by the state's Natural Heritage and Endangered Species Program to identify specific assemblages of plants and animals that occur together in recurring patterns, and which can be classified by their biological and physical features, such as Atlantic white cedar swamps, coastal plain pondshores or sandplain heathland. The mosaic of exemplary natural communities found on the Cape distinguishes and defines the unique environmental qualities of the region, and are therefore worthy of protection.

Because of the scarcity of documentation of these important habitats on Cape Cod, APCC has initiated a mapping program to identify and document the Cape's natural communities. This new information is a major focus of the online atlas.

Initial natural community mapping was conducted by APCC in several locations over the course of two field seasons, and can be found on the atlas. There is much more to be mapped, and the process is ongoing. The atlas will be updated regularly as more natural communities are documented. The natural communities mapped by APCC will also be shared with the state. Continued documentation of the Cape's unique and sensitive habitats will help create a greater awareness of their value to this region so that they may be more greatly appreciated and preserved.

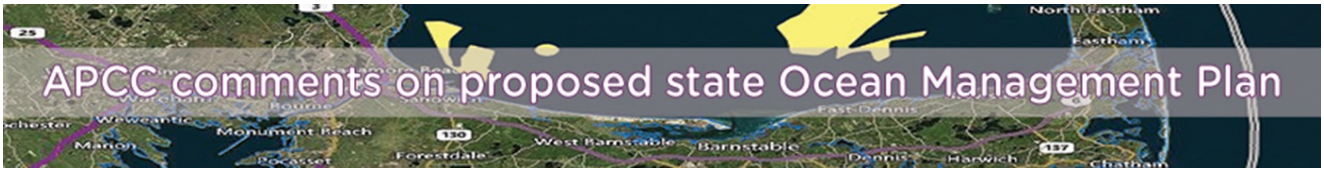
APCC is participating in a coalition of organizations advocating for the adoption of a comprehensive state planning process to address climate change impacts in Massachusetts.

As part of its effort to move a state climate change policy forward, the coalition will convene a high level summit in February to bring together climate change experts and the state's decision-makers to commit to development of a climate change policy for Massachusetts. Leaders in government, science, business, development, public health, energy, transportation, the environment and other key areas will participate.

Discussion at the summit will concentrate on the threats from climate change to the natural environment, infrastructure, the economy and human health and welfare. The summit will also explore which factors should be considered in the development of a comprehensive climate change preparedness plan.

The coalition is partnering with the University of Massachusetts-Bostonin planning the summit, which will be held at the university's Boston campus.

The central focus of the coalition's efforts is passage of proposed legislation known as the Climate Change Adaptation Management Plan Act, or CAMP. If adopted into law, the bill would direct the state to develop a climate preparedness plan, and all actions taken by state government would be required to be consistent with that plan. At the same time, the coalition plans to work with Governor-elect Baker's administration to encourage the adoption of policies that advance climate change preparedness.



APCC participates in Regional Policy Plan update

This November, APCC submitted comments to the state's Office of Coastal Zone Management (CZM) regarding the five-year draft update of the Ocean Management Plan for Massachusetts.

The plan's purpose is to protect critical marine habitat and natural resources in the state's ocean area, foster sustainable uses and set standards for ocean-based development. The plan also calls for coordination of federal, state, regional and local agencies regarding activities in the ocean planning area. The area covered by the plan begins 0.3 miles from the mean high water line and extends out to the limit of state ocean waters.

APCC's comments focused primarily on the plan's identification of several areas off Cape Cod for potential offshore sand mining, and on a proposal to undertake pilot projects to mine sand. The sand would be used for public projects involving beach restoration, nourishment or shore protection to mitigate coastal erosion.

Offshore sand provides valuable marine habitat for fisheries, shellfish and marine ecosystems. Sand mining would represent another impact on these resources. While APCC recognizes that communities need to adapt to coastal erosion and sea level rise, sand provides important ecosystem services that support the region's fisheries, shellfishing, aquaculture and economy. Managed retreat should be prioritized wherever feasible. However, if sand mining projects are allowed, APCC recommended that regulatory standards in the Cape Cod Commission's Regional Policy Plan should be applied, as these standards would help protect Cape Cod habitats and residents.

APCC also provided comments recommending that the nearshore boundary of the plan be extended to meet the shoreline in order to coordinate environmental protection in land-based and coastal programs.

For more information on the Massachusetts Ocean Management Plan, visit http://www.mass.gov/eea/waste-mgnt-recycling/coasts-and-oceans/ mass-ocean-plan/. To see APCC's comments, visit www.apcc.org, and look under "What's New."

Members and guests attending APCC's annual meeting this October honored three individuals who were recognized as champions of Cape Cod's environment in 2014.

Paul Niedzwiecki, executive director of the Cape Cod Commission, received APCC's Paul Tsongas Environmental Excellence Award, given in honor of the late Massachusetts senator known for his efforts in environmental conservation. As director of the Commission, Paul

spearheaded the Clean Water Act Section 208 planning process for Cape Cod, which has been recognized as a national model for water protection planning.

Former APCC board member Sandy Bayne of Eastham was added to APCC's Honor Roll. Sandy has been at the forefront of protecting freshwater resources in the town of Eastham for many years. She was a leading voice in calling for the 208 planning process to address phosphorus pollution, which impacts the Cape's freshwater ponds. She was also a local leader in advocating for the creation of a safe public drinking water supply for the town of Eastham, an initiative approved by voters last spring.

The APCC Volunteer of the Year Award was presented to Carolyn Crowell of Sandwich. Carolyn has been a volunteer since 2003, when she began monitoring salt marsh health at the Old State Game Farm in East Sandwich for APCC's Cape-wide salt marsh program. In 2011, she joined APCC's volunteer herring count program, helping to document the springtime migration of river herring at Sandwich's Lower Shawme Pond.

John Cox, president of Cape Cod Community College, delivered a keynote presentation on "The Next Generation of Environmentalists."

Also at the annual meeting, members elected Margo Fenn to her first term on the board of directors and Blue Magruder to fill an unexpired term. Katherine Garofoli and Robert Summersgill, who had previously joined the board to fill two unexpired terms, were elected to their first full terms. Anne Ekstrom was reelected for a third term and Daniel Webb was reelected for a second term. Brief profiles of APCC's two newest board members are shown on page 6.

Margo Fenn is an environmental consultant, currently working with the Friends of Herring River, the National Park Service and other local, state and federal agencies to oversee the Herring River salt marsh restoration project. She was executive director of the Cape Cod Commission from 1999 to 2007 and was the Commission's chief planner/deputy director from 1990 to 1999. Prior to joining the Commission, Margo served in other planning positions in Chatham, St. Lawrence County, New York and Teton County, Wyoming. She is currently a member of the Harwich Real Estate and Open Space Committee. Margo lives in Harwich with her husband, Dan Hamilton.

Blue Magruder is a life-long summer resident of Cape Cod, commuting between Cambridge and her Barnstable home located on land once farmed by her great grandparents. She has a career in marketing and public relations, promoting public understanding of the field sciences, environmental conservation and natural history. After almost three decades as head of media relations and volunteer recruitment at Earthwatch Institute, she is now director of public affairs for the Harvard Museums of Science & Culture, and its flagship,

Harvard Museum of Natural History. A graduate of Harvard, she currently serves as an appointed director of the Harvard Alumni Association. Blue shares an enthusiasm for sailing with her husband, John Hurwitch.

In October, APCC, the MassBays Program and the Barnstable County Coastal Resources Committee (CRC) co-hosted a workshop on using green infrastructure for stormwater management. A new handbook on green infrastructure, developed by the U.S. Environmental Protection Agency for the MassBays Program and coastal communities, was introduced at the workshop.

The workshop was timely. In late September, EPA issued the draft Municipal Separate Storm Sewer System (MS4) stormwater permit for Massachusetts, which requires most towns to develop stormwater management plans to protect and improve water quality.

On Cape Cod, untreated or poorly treated stormwater runoff is responsible for at least eight percent of the nitrogen loading to coastal embayments. Untreated runoff also carries fecal bacteria into coastal waters, closing shellfish beds and swimming beaches, and also causes poor water quality in freshwater ponds.

Conventional stormwater management utilizes infrastructure such as catch basins, collection pipes, leaching trenches and outfalls. In contrast, green infrastructure relies more upon natural processes, including vegetated filter strips and swales, rain gardens, vegetated bioretention basins, constructed wetlands and permeable (or porous) pavement.

As a next step to the workshop, APCC and the CRC are working to establish a Cape Cod Stormwater Managers Group to tackle Cape-wide stormwater management needs.

The draft handbook is posted at http://www.mass.gov/eea/agencies/ mass-bays-program/. Visit APCC's webpage at www.apcc.org for news on upcoming meetings and workshops. For more information on the draft MS4 stormwater permit, visit http://www.epa.gov/region1/npdes/stormwater/ MS4_MA.html. For more information, contact APCC senior scientist Dr. Jo Ann Muramoto at jmuramoto@apcc.org or (508) 362-4226.

A study by APCC, the Brewster Conservation Trust, Cape Cod Conservation District and

Colonial Seed Company is taking a look at a native grass that could help protect the Cape's environment by reducing the amount of fertilizer and watering needed to maintain a lawn. The study focuses on a grass called Deschampsia flexuosa, also known as wavy hairgrass or coastal hairgrass.

D. flexuosa is a native grass of southeastern Massachusetts that is naturally adapted to sandy, nutrient-poor soils such as those found on the Cape. Its purported qualities include the ability to thrive without fertilization or artificial watering. It's also known as a slow-growing grass that doesn't require frequent mowing.

The study will examine the native seed for its potential to be used as a low impact, environmentally friendly alternative to typical seed mixes, which require fertilization and watering to stay green. Runoff from lawn fertilizers can adversely impact the Cape's saltwater bays and freshwater ponds. For the study, two test plots were set up at the Brewster Conservation Trust's community garden property. One plot was sown with the native seed and one "control" plot was sown with a typical retail lawn seed mix. The two plots will be monitored over several growing seasons to compare how they respond without fertilizer or artificial watering.

If D. flexuosa proves to be successful, it could be a desirable turf alternative that would help reduce the use of fertilizers, conserve water resources, and even save money for homeowners, businesses and municipalities.

When considering the varied natural resources that define Cape Cod, the night sky is one that may not immediately come to mind. Yet for the many generations who have lived on the Cape or have visited it, the starry night sky pinned above a tranquil ocean, or a dark woods, or a windswept heath has been—and continues to be—an integral part of the allure of this peninsula.

But for Cape Cod and elsewhere, the beauty of the night sky is increasingly threatened by the intrusive glare of artificial light.

NASA reports that a typical suburban night sky has about five to ten times more glare than the natural sky. Incredibly, ninety-nine percent of the United States population lives in areas that are impacted to a varying extent by light pollution. It's estimated that approximately two thirds of the people in the U.S. are unable to see the Milky Way from their homes.

Light pollution is not merely an aesthetic issue; it has ecological implications as well. Scientific research shows that a broad range of animal behavior—including feeding, breeding and migration—can be adversely affected when artificial light competes with the night. Growing evidence also links some human health issues with excessive artificial nighttime light, which can disturb a person's normal body rhythm set to the natural cycle of daylight and darkness.

For many, though, the most compelling reason for protecting the night sky is because it is a source of inspiration and wonder. It is our connection to the Universe, and a reminder of where we are standing.

So, take a drive to a remote corner of the Cape on a clear, moonless winter night. Pick out the constellations, track satellites on their path, be on the lookout for meteors streaking across the sky. And marvel at the Milky Way.