

# Shore Lines

Newsletter of the Association to Preserve Cape Cod | Autumn 2019

## THE GATHERING STORM

CAPE COD AND OUR CLIMATE CRISIS



# Changing times require changing strategies

BY ANDREW GOTTLIEB, APCC EXECUTIVE DIRECTOR

*NASA reports that the Earth's global surface temperature in 2018 was the fourth warmest. It ranks behind those of 2016, 2017 and 2015. The past five years are, collectively, the warmest years in the modern record, with 2019 on a similar track.*

SOURCE: NASA

There are ill winds blowing. Global temperatures continue to rise. APCC-sponsored monitoring of fresh water ponds reveals widespread presence of toxic cyanobacteria at levels previously unknown. Federal agencies slow-down reviews of alternative energy projects while fast-tracking oil and gas development and promoting continued use of coal. Sea level rise continues as the ice sheets of Greenland melt at a rate unprecedented in the human experience. The North Atlantic rises at rate exceeding the average. Cape Cod has been subjected to extreme weather and precipitation events with increasing regularity, punctuated by three tornadoes in July.

What do all these things have in common? They are all signs of the rapidly changing world we live in as predictions of global climate change become reality. A national, if not global, crisis to be sure and yet the government of the United States continues to pursue policies known to worsen, not

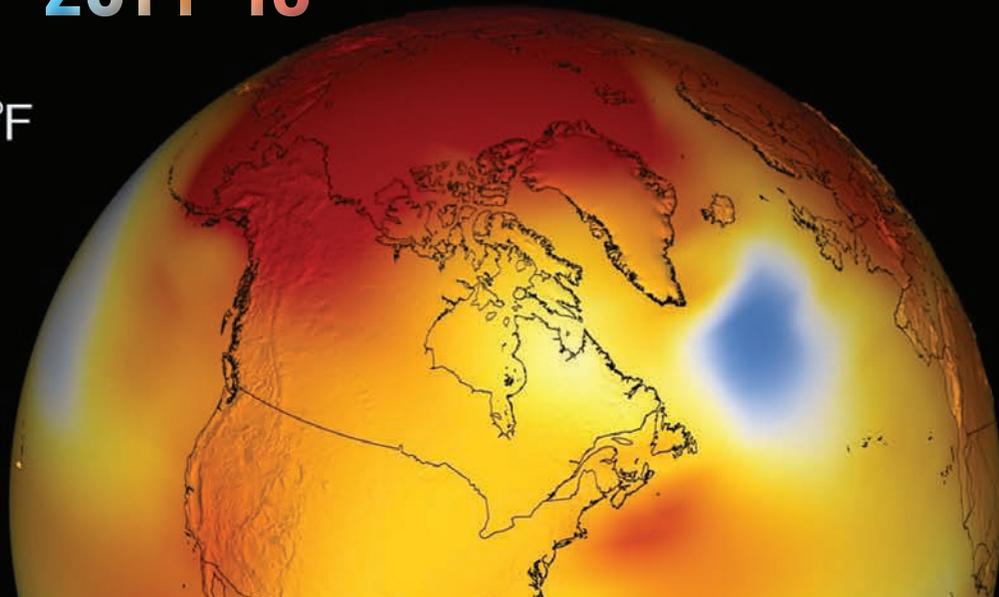
mitigate, the problem. In normal times, Cape Codders, and Americans in general, had a reason to expect their federal government to protect their interests and address looming crises. These are not normal times.

APCC was born out of a fight to prevent a deep-water port in Eastham's Nauset Marsh. We won that fight, and though we'd rather collaborate, convince and cooperate, we haven't lost the ability to oppose, to litigate, to argue and fight to protect the Cape's environment. So we continue to be rooted in scientific understanding of the environmental systems we seek to protect, but our gloves are off because these are not gentle times.

APCC will bring the case to all levels of government to insist they do what they must do, to limit our contribution to climate change and mitigate and adapt to that which is already unchangeable. Our aggressive tone may surprise some, but no one will be surprised by our determination to fulfill our mission. We are simply changing strategies in this changed world.



## 2014-18



# Cape Cod and our climate crisis

CLIMATE CRISIS



*The Cape Cod Commission's Sea Level Rise Viewer indicates areas in red where infrastructure and other critical facilities will likely be impacted with three feet of sea level rise (left) and six feet of sea level rise (right).*

SOURCE: CAPE COD COMMISSION

The debate is behind us. Climate change is real, and climate change is here. The United Nation's Intergovernmental Panel on Climate Change released a report last year detailing the dire consequences that would result unless world governments and private businesses commit to radical changes that reduce carbon emissions 45 percent from 2010 levels by 2030. The IPCC's Special Report on Climate Change and Land released this summer, which points to the role of land use in exacerbating climate impacts, further underscores the consequences of inaction.

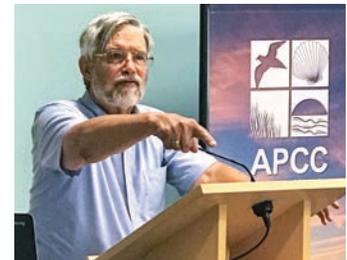
In an APCC-sponsored talk in July, Dr. John Holdren, President Barack Obama's White House science advisor, stated that without the significant emissions reductions outlined in the IPCC reports, the global community should expect more frequent and intense heat waves, more wildfires, heavier torrential downpours and flooding, destruction of most of the world's coral reefs, wider disruption of marine food webs and fisheries, more violent storms on land, more category 3-5 hurricanes making landfall, increases in frequency and intensity of droughts, food shortages, more sickness and death from heat stress and tropical diseases, and sea level rise that could reach three feet by 2050 and six feet by 2100. Cape Cod will be ground-zero for many of those impacts.

It is not up to future generations to finally act on and solve our climate crisis. It is a challenge that must be met by this generation, right now. Through our individual efforts and with coalition partners, APCC is pushing policymakers to commit our region and state to adopt more aggressive

programs to reduce carbon emissions. We are speaking out forcefully against alarming rollbacks on national climate policies, and advocating for greater investments in renewable energy, particularly offshore wind energy such as Vineyard Wind.

Meanwhile, we must effectively contend with existing and future climate impacts. APCC is advancing climate adaptation efforts to make the Cape more resilient through nature-based solutions. These include salt marsh restoration projects that increase a marsh's capacity to absorb storm surge and river restoration efforts such as the Childs River project in Falmouth that aim to improve habitat for climate-vulnerable cold water fish species such as brook trout. We have drafted model climate change bylaws, are participating in Municipal Vulnerability Preparedness programs and are advocating for increased state climate adaptation funding.

**Visit [www.APCC.org/climatechange](http://www.APCC.org/climatechange) for more information about APCC's climate change initiatives.**



*Former White House science advisor, Dr. John Holdren, spoke to an APCC audience about the costs to society and the environment of not dramatically altering the course of current climate policies.*



# Climate crisis threatens the Cape's waters

Climate change will have profound impacts on Cape Cod's water resources and water-dependent ecosystems. These impacts will in turn affect those who live on or visit the Cape. **Throughout the Northeast, climate change will impact water resources through:**

- Increased precipitation, with more of it falling as rain than snow.
- More severe storms and flash floods leading to higher runoff and erosion, causing more water pollution.
- Flash flood damage to infrastructure such as dams, stormwater systems, roads, utilities and buildings.
- Warmer temperatures, shorter winters, longer summers and more droughts that create greater demand for water.
- Increases in harmful algal blooms from warming waters and more nutrient runoff.

**Cape Cod also faces additional impacts:**

- Fish, shellfish and aquatic life will suffer from lethal effects of higher water temperatures and lower oxygen levels.

*As the climate crisis worsens, flash flooding from more severe coastal storms will cause damage to roads, utilities, buildings and other infrastructure on Cape Cod.*

PHOTO: CAPE COD CHRONICLE

- *Extreme rain events will impact water quality from runoff of pollutants such as bacteria and nutrients. High bacteria levels cause closures of shellfish beds and swimming beaches.*
- *Economic impacts from loss of tourism due to shellfishing and beach closures.*
- *Groundwater will be impacted by sea level rise. Flooding from sea level rise and storm surges will cause saltwater intrusion into the aquifer. As sea level rises, groundwater will also rise, impacting septic systems, basements, roads, utilities and other infrastructure. (see APCC article on sea level rise, page 5).*

Climate impacts are already happening. In the Cape Cod National Seashore, pond water temperatures have increased by 5.4 degrees Fahrenheit in the last 15 to 20 years. Ocean temperatures have increased by half a degree Fahrenheit per decade since 1982, causing lobster and cod to move north and disrupting other fish and wildlife populations. Cyanobacteria blooms have become more common. Sea levels have been rising for a century. These impacts will worsen, unless we act to curb carbon emissions.



## Our Summer Appeal needs YOU!

Please support our work to monitor ponds for toxic cyanobacteria and end wastewater pollution on Cape Cod. Use the attached envelope or go to [www.APCC.org](http://www.APCC.org) to make a secure online donation. Success depends on you!

**If you've already made a donation, THANK YOU!**



The Cape Cod Commission's Sea Level Rise Viewer illustrates how the Hyannis Harbor area will be significantly impacted by flooding from a projected six-foot sea level rise by 2100. SOURCE: CAPE COD COMMISSION.

## Sea level rise is an existential threat to the Cape

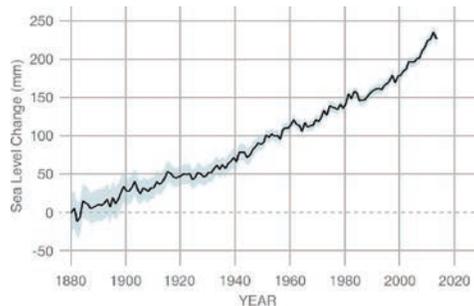
Of the many impacts of climate change, rising sea level poses the greatest threat to Cape Cod. If we do nothing to reduce emissions, by the year 2050 sea level in the Northeast is expected to have risen by three feet. By 2100 we can expect six feet of sea level rise.

Cape Cod will see loss of coastal habitat, more coastal erosion, loss of beaches and marshes, higher storm surges, more flooding, loss of property, and saltwater intrusion into water wells and septic systems. **(See [www.APCC.org/sealevelrise](http://www.APCC.org/sealevelrise) for more information.)** In the Outer Cape, saltwater intrusion into the aquifer could limit drinking water supplies. As inundation spreads, humans and wildlife will be displaced and disrupted, profoundly affecting life as we know it.

Global sea level rise over the past century is well-documented. In the Northeast, sea level is rising three to four times faster than the global rate. Sea level rises due to the thermal expansion of water as it warms from a warming climate, coupled with additional water from melting ice sheets on land and mountain glaciers.

The Greenland ice sheet is melting rapidly, losing 286 billion tons of ice per year, while the Antarctic ice sheet is losing 127 billion tons of ice per year, for a global ice loss rate of 413 billion tons per year, according to NASA.

If nothing is done to reverse this trend and the entire Greenland ice sheet melts, it could raise global sea level by 23 feet. If the entire Antarctic ice sheet were to melt, it could cause another 200 feet of sea level rise, for a total rise in sea level of 230 feet. Then, much of southeastern Massachusetts would be underwater. The only visible evidence of Cape Cod would be a handful of islands in the Upper Cape.

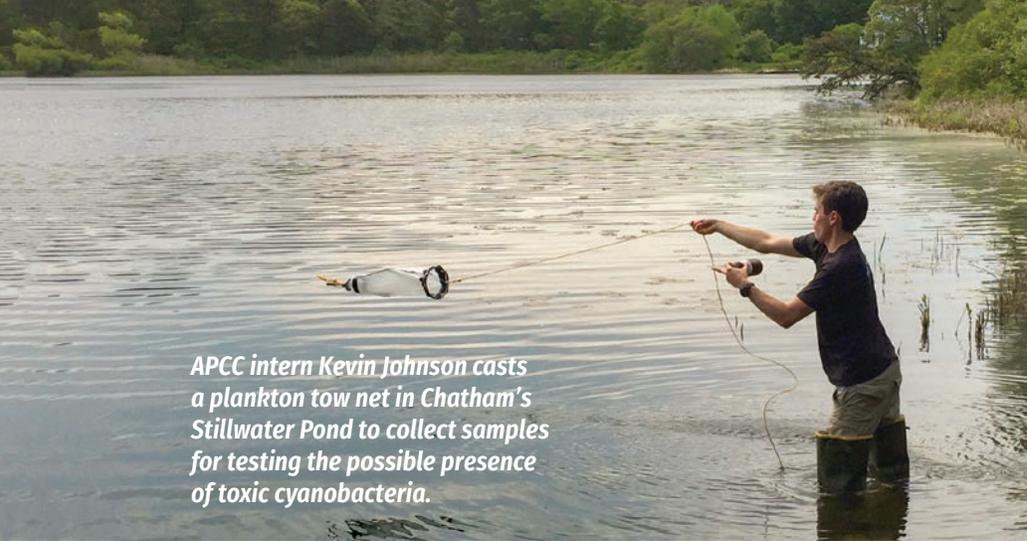


The graph illustrates the documented average global sea level rise since 1880. SOURCE: NASA

## Landscape choices make a difference in fighting climate change

Landscape can play an important role in addressing climate change. Reduce carbon emissions by making wise choices on landscape design and yard care. Here are a few tips.

- **PLANT TREES** and preserve existing trees. Trees help with cooling in summer and can block cold winds in winter, helping conserve energy. Trees also store carbon.
- **GO GAS-FREE.** Make the switch from gas-powered to electric or battery-operated yard equipment, or even a push-mower. Gas mowers contribute to carbon emissions and pollute the air.
- **REDUCE LAWN AREA.** Think of it as having an area rug, rather than wall-to-wall. Less lawn means less mowing, less fertilizing, and less watering. And more plants mean more roots below the ground help trap carbon.
- **CHOOSE NATIVE SPECIES.** Give native plants priority in the landscape. Choosing native species benefits bees, birds and butterflies that are under stress from the disrupted climate. Natives are also adapted to soils and don't require added nutrients. They have deeper roots that can weather summer drought.
- **SKIP THE BARK MULCH.** Plant more plants with the goal of them knitting together. Plants serve as green mulch and help keep unwanted plants at bay. For moisture, use mulched leaves and come fall, just leave the leaves. They contain nutrients, provide cover for overwintering butterflies and other beneficial insects, and ensure rainwater is absorbed into the soil.
- **CONSERVE WATER USAGE.** Choosing native species and reducing lawn area reduces the need for watering. A better choice for watering the garden: rain water that collects off the roof in rain barrels or in a cistern.



APCC intern Kevin Johnson casts a plankton tow net in Chatham's Stillwater Pond to collect samples for testing the possible presence of toxic cyanobacteria.



In extreme cases, harmful cyanobacteria blooms can appear on a pond surface as a thick blue-green film resembling paint, as shown in this photo of a bloom in Harwich.

## Harmful cyanobacteria blooms are widespread this year



On Cape Cod at various points this summer, APCC's cyanobacteria monitoring program has identified multiple ponds as having cyanobacteria levels of concern, many of which have produced cyanobacteria harmful algal blooms—or HABS. Cyanobacteria, formerly called blue-green algae, can produce toxins that can harm people, animals and local ecosystems. Ponds of concern include the Mill Ponds and Cliff Pond in Brewster, Santuit Pond in Mashpee, Scargo Lake in Dennis, Hinckley's Pond in Harwich and White and Stillwater Ponds in Chatham.

*Dolichospermum cyanobacteria from Santuit Pond in Mashpee.*

The town of Barnstable also issued warnings and closures advising against pet and human contact with water for Lake Wequaquet, Hinckley's Pond, Shubael's Pond, Long Pond, Barse Pond, Gooseberry Pond and Lovell's Pond. Gull Pond in Wellfleet was briefly closed by town officials when sampling showed high levels of cyanobacteria. The state Department of Public Health had posted cyanobacteria advisories for eight water bodies, including four ponds on Cape Cod—Long Pond, Lovells Pond, Shubael's Pond and Santuit Pond.

Cape Cod is not alone. This year blooms have been documented throughout the Northeast and elsewhere, resulting in a closure of part of the Charles River in Boston, beach closures along Lake Champlain in New York and Vermont, pond closures in Rhode Island, and the deaths of dogs in Vermont.

Why are cyanobacteria blooms so widespread? Cyanobacteria thrive in nutrient-rich, warm water. Frequent storms cause more runoff into ponds, carrying nutrients that stimulate growth. As climate change causes temperatures and precipitation to increase, we can expect to see more cyanobacteria blooms in our ponds and lakes.

In addition to monitoring nearly 30 ponds, APCC is working with the state Department of Public Health and partners in Barnstable, Chatham, Brewster, Dennis, Wellfleet, Yarmouth, Orleans, Harwich, Falmouth, the University of New Hampshire and elsewhere to coordinate on providing the most up-to-date information to the public. To find out more about cyanobacteria and what to do to protect pets and people, **visit APCC's webpage on cyanobacteria at [www.APCC.org/cyano](http://www.APCC.org/cyano)**. An interactive map provides information on ponds that are being monitored as well as links to useful information.



## APCC receives MET grant

APCC has received a second grant from the Massachusetts Environmental Trust to continue developing the State of the Waters: Cape Cod project. The grant will enable APCC to complete the initial round of water report cards, website and action plan to focus public attention on water quality problems. The Massachusetts Environmental Trust is one of the Commonwealth's premier environmental philanthropy organizations and is mainly funded by environmental license plate revenues. Learn more at [www.mass.gov/orgs/massachusetts-environmental-trust](http://www.mass.gov/orgs/massachusetts-environmental-trust).



## Interns play vital role in the success of APCC programs.

APCC was fortunate to once again host talented individuals for our summer internship program. APCC interns used their skills to assist on several important projects to protect Cape Cod's environmental resources.



### Jordanne Feldman

Jordanne, APCC's 2019 Whitlock Intern, worked on APCC's State of the Waters project, which is focused on creating a better understanding of water quality across Cape Cod and to inform the public about actions needed to improve water quality. She analyzed monitoring data collected from organizations and government agencies to create scores for the Cape's coastal embayments and ponds. These grades will be used to create a "report card" that the community and policy makers can use for future decisions about water quality. Jordanne turned these report cards into maps using ArcGIS.

Jordanne is originally from upstate New York and graduated from the University of Rhode Island in May with a B.S. in geology and a graduate certificate in hydrology. She will be a member of AmeriCorps Cape Cod in September and hopes to someday work in community environmental education.



### Kevin Johnson

Kevin, this year's Maggie Geist intern, returned for a second summer as part of APCC's cyanobacteria monitoring program. He worked with APCC staff in coordination with University of New Hampshire researchers, town officials and volunteer groups to study and report occurrences of toxic cyanobacteria blooms. Kevin sampled ponds and collected samples from volunteers, which he analyzed in the lab. Using methods developed by UNH researchers, he determined the approximate cyanobacteria concentrations currently in the pond to predict the likelihood of a bloom.

Kevin is from Brewster and is a senior environmental science and economics double major at College of the Holy Cross in Worcester, MA. He hopes to continue in the study of water resources.



### Conor McDonnell

Conor joined APCC as our second cyanobacteria monitoring intern for 2019, helping collect samples from ponds that are known or suspected to be at risk of cyanobacteria blooms. Conor analyzed these samples and organized and uploaded the extensive amount of collected data from the monitoring program, which allowed him to track trends the data produced. APCC staff used the information to alert town officials and residents about potentially toxic pond conditions and to update the status of ponds on APCC's Cyanobacteria Interactive Map at [www.APCC.org/cyano](http://www.APCC.org/cyano).

Conor is from Harwich and is an Earth system sciences major at Worcester State University in Worcester, MA. He hopes to someday work in the field of ecological science.



### Carl DePuy

Carl returned as APCC's summer field assistant for a tenth summer season, working on an analysis of the impacts of tidal restoration projects on Cape Cod. He conducted site visits to several marshes, collecting information on trends in plant communities, impacts to invasive phragmites distribution and general changes to the salt marsh. The data will be included in a report that helps resource managers understand the impacts of tidal restoration projects.

Previously for APCC, Carl conducted salt marsh monitoring. He also wrote a research paper on salt marsh migration in relation to sea level rise and another on using thin layer deposition in salt marshes to help keep pace with sea level rise. Carl teaches biology and ecology at Dennis-Yarmouth Regional High School.



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## Association to Preserve Cape Cod

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The Association to Preserve Cape Cod is a 501(c)(3) non-profit organization founded in 1968 to foster policies and programs that promote the preservation of natural resources on Cape Cod.

Support comes from over 3,000 members, and from gifts and grants from individuals, foundations and businesses.

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# Leaving the World a Better Place

APCC has benefited greatly over the years from bequests from our members. Making a bequest is as easy as adding the following language to your will:

*"I bequeath to the Association to Preserve Cape Cod, Inc. (APCC), a charitable corporation established by law in the Commonwealth of Massachusetts, the sum of \_\_\_\_\_ dollars (or percentage of estate)."*

You can direct how you want your legacy gift to be used by choosing "the general purposes of APCC at the direction of its Board of Directors," or if you'd prefer to have your legacy live on in an endowment, you can direct it "to be added to APCC's permanent endowment."

### Wise Ways to Give

Donating appreciated securities may be a prudent way to be charitable, as you can avoid paying tax on capital gains. It's also easy! And, if you are 70 ½ or over and make a gift to APCC directly from your IRA, it counts toward your required minimum distribution—and avoids tax.

To learn more, please contact Andrew Gottlieb at 508-619-3185 or [agottlieb@apcc.org](mailto:agottlieb@apcc.org).

*Please note: This information should not be considered as legal, tax or financial advice.*

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