



Peconic Estuary
Partnership



2020

**Comprehensive Conservation
and Management Plan**



Protecting & Restoring Long Island's Peconic Bays

Overview: CCMP 2020 at a Glance

The Peconic Estuary Partnership (PEP) Comprehensive Conservation and Management Plan (CCMP) 2020 is a strategic framework for protecting and restoring the Peconic Estuary of eastern Long Island, New York. The bays, beaches, marshes, seagrasses, and other habitats of the Peconic Estuary provide food and shelter for a rich diversity of fish, birds, and shellfish, and generate valuable economic and recreational opportunities for people who live, work, and visit on the East End.

Government and non-government partners of PEP developed CCMP 2020 by consensus over a two-year period with public input and support from PEP staff. Established in the early 1990s, PEP is dedicated to working locally—in the six Towns that surround the Peconic Estuary—to find and implement solutions to key environmental challenges.

CCMP 2020

GEOGRAPHIC FOCUS: Peconic Estuary and its watershed

PARTNERS: Municipal, county, state, and federal governments; non-government organizations (NGOs); local businesses and residents; academic institutions

TIMEFRAME: 10 years

4

Goals

8

Objectives

35

Actions



Strong Partnerships and Engagement



Resilient Communities Prepared for Climate Change



Clean Waters for Ecosystem Health and Safe Recreation



Healthy Ecosystem with Abundant, Diverse Wildlife



Mouth of the Peconic River, looking upstream (west).

Photo by Robert Waters, Suffolk County
Department of Health Services
Cover photo by Stephen Tettelbach

CCMP 2020 focuses on four goals



**STRONG
PARTNERSHIPS**
and engagement



**RESILIENT
COMMUNITIES**
*prepared for
climate change*



**CLEAN
WATERS**
*for ecosystem health
and safe recreation*



**HEALTHY
ECOSYSTEM**
*with abundant,
diverse wildlife*

CCMP 2020 FOCUSES ON FOUR GOALS:

Strong Partnerships and Engagement; Resilient Communities Prepared for Climate Change; Clean Waters for Ecosystem Health and Safe Recreation; and Healthy Ecosystem with Abundant, Diverse Wildlife.

For each Goal, PEP's partners identified a set of Objectives and Actions. The partners will implement the Actions over the next decade to advance toward the long-term Goals and Objectives. The Actions in the CCMP 2020 build on the success of work completed under PEP's previous CCMP released in 2001, and they reflect the changing conditions in the estuary, as well as advances

in scientific understanding and technical capabilities brought about in part by PEP's work.

CCMP 2020 marks the start of an exciting new phase in PEP's evolution, as the partners refocus and revitalize their collaboration in support of the Peconic Estuary ecosystem. Their collective efforts will enhance quality of life for people on the East End and boost the local sustainable use of ocean resources for economic growth, improved livelihoods, and jobs while preserving the health of the ocean ecosystem, often referred to as the "blue economy," through the 2020s and beyond.

CCMP Goals, Objectives, and Actions

OBJECTIVE A: Overarching Priority Objective

Enhance PEP's organizational structure, operational practices, and financial position to support successful implementation of CCMP Actions

→ ACTION 1

Finalize and implement the updated PEP Organizational Plan

→ ACTION 2

Develop and launch a CCMP Tracking System on the PEP website to report progress in implementing CCMP Actions

→ ACTION 3

Develop and implement a State of the Peconic Estuary reporting process with science-based ecological and social indicators of progress toward PEP's Goals and Objectives

→ ACTION 4

Secure increased funding as part of a final Financial Plan to ensure successful implementation of all CCMP Actions

→ ACTION 5

Strengthen engagement with related initiatives led by other entities

OBJECTIVE B: Overarching Priority Objective

Empower local communities to support estuary health, including underrepresented groups

→ ACTION 6

Increase community members' awareness of the Peconic Estuary, key issues relating to the CCMP's Goals, and the PEP as a resource to help them address the issues

→ ACTION 7

Involve community members in citizen science programs to cultivate personal connections to the Peconic Estuary and inspire positive behavioral change to support estuary health

→ ACTION 8

Conduct outreach events and programs that engage community members in learning about the Peconic Estuary and taking action to support estuary health

→ ACTION 9

Incorporate environmental justice considerations into public education and outreach materials and events



STRONG PARTNERSHIPS *and engagement*



Photo by Jenna Schwerzmann

OBJECTIVE C

Help local communities to take meaningful, well-informed action to prepare for and adapt to climate change impacts in the Peconic Estuary

→ ACTION 10

Incorporate climate change considerations into new and existing projects of PEP and partner organizations

→ ACTION 11

Provide tools and assistance to local government to mitigate and adapt to the impacts of climate change

→ ACTION 12

Mitigate climate change through coastal ecosystem management

→ ACTION 13

Collaborate on coastal and ocean acidification monitoring and research

→ ACTION 14

Increase public awareness of anticipated impacts of climate change on the Peconic Estuary and practical ways to mitigate and prepare for them

→ ACTION 15

Strengthen partnership with the Shinnecock Indian Nation and collaborate to implement the Climate Ready Assessment and Action Plan



RESILIENT COMMUNITIES

*prepared for
climate change*



OBJECTIVE D**Protect areas with clean water from degradation****→ ACTION 16**

Identify areas of clean water quality and deliver information that local governments and others can use to protect those areas

OBJECTIVE E**Increase understanding of nutrient pollution in groundwater and surface waters, and decrease negative impacts from legacy, current, and future nutrient inputs****→ ACTION 17**

Plan science-based approaches for monitoring and reducing nutrient pollution

→ ACTION 18

Implement science-based approaches for monitoring and reducing nutrient pollution

→ ACTION 19

Collate results of harmful algal blooms (HABs) monitoring and deliver findings to support management decision making

OBJECTIVE F**Reduce current and future inputs of toxics, pathogens, and marine debris into groundwater and surface waters, and minimize their impacts****→ ACTION 20**

Conduct analysis to understand the sources of toxic contaminants and implement measures to reduce their impacts

→ ACTION 21

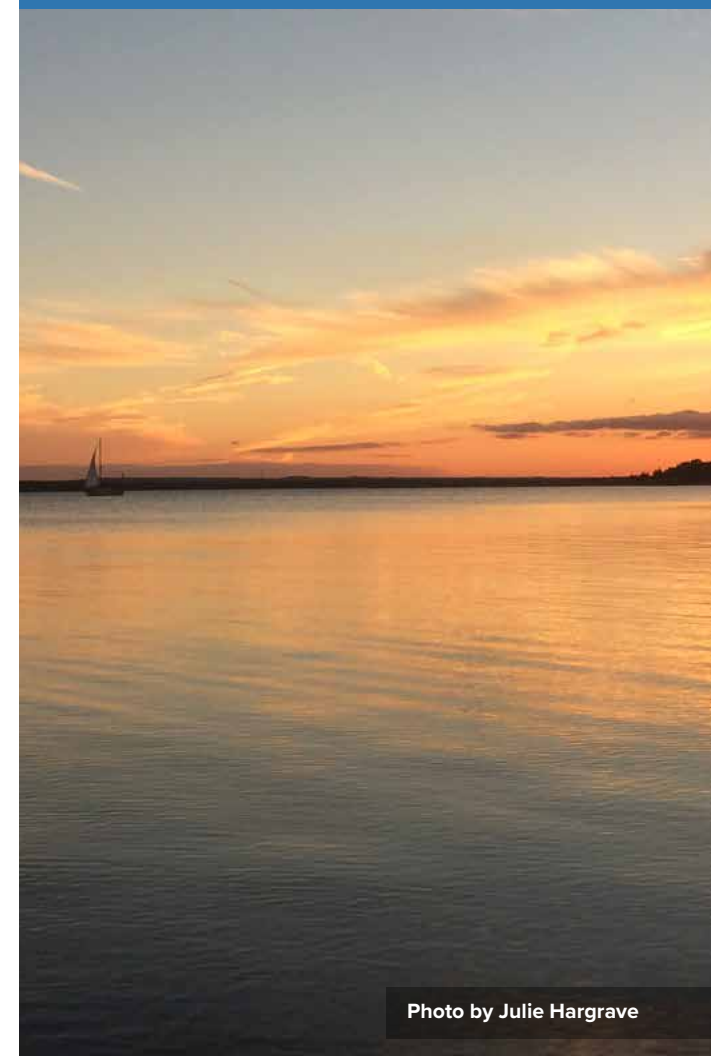
Expand non-point source subwatershed management plans to all pathogen-impaired waterbodies and continue to use existing plans

→ ACTION 22

Assess marine debris in the Peconic Estuary and develop plans to address problems that are found

**CLEAN
WATERS**

*for ecosystem health
and safe recreation*



OBJECTIVE G

Expand scientific understanding of the Peconic Estuary ecosystem and deliver information that supports management decision-making

→ ACTION 23

Conduct scientific studies to expand understanding of the Peconic Estuary ecosystem and support ecosystem-based management

→ ACTION 24

Review and update data for rare, protected and endangered species in the Peconic Estuary to support the development of protection strategies

→ ACTION 25

Quantify the recreational use and value of the natural resources within the Peconic Estuary watershed

→ ACTION 26

Quantify the impacts of fishing, aquaculture, boating, navigational dredging, and hardened shoreline structures on habitats and vulnerable species, to foster sustainable recreational and commercial uses of the Peconic Estuary that are compatible with protection of biodiversity

→ ACTION 27

Facilitate spatial planning of the Peconic Estuary to help mitigate resource-use conflicts and ensure the protection of critical habitats



Photo by Byron Young

**HEALTHY ECOSYSTEM**

*with abundant,
diverse wildlife*



Photo by Kaitlin Morris

OBJECTIVE H**Restore and protect key habitats and species diversity in the Peconic Estuary and its watershed****→ ACTION 28**

Protect critical natural resource areas and high-priority lands in the Peconic Estuary watershed

→ ACTION 29

Maintain, restore, and enhance viable diadromous fish spawning and maturation habitat in the Peconic Estuary watershed

→ ACTION 30

Monitor and protect existing eelgrass beds; where appropriate, restore and expand eelgrass beds

→ ACTION 31

Use available habitat quality assessment and climate change resiliency tools to prioritize wetland restoration projects identified in the 2020 PEP Habitat Restoration Plan, and implement the top priority projects

→ ACTION 32

Review existing wetland and shoreline protection regulations and draft model laws for Towns to strengthen protections and increase resiliency to climate change

→ ACTION 33

Implement living shoreline projects, monitor for ecological and financial benefits, and use model projects to educate planners and homeowners on the benefits of living shorelines over hardened shorelines

→ ACTION 34

Develop habitat protection and restoration strategies for key species in the Peconic Estuary and its watershed, including the river otter, diamondback terrapin, and horseshoe crab

→ ACTION 35

Monitor results of shellfish restoration efforts, share findings, and encourage creation of shellfish spawner sanctuaries

**HEALTHY
ECOSYSTEM**

*with abundant,
diverse wildlife*



Acknowledgements

Hundreds of individuals and dozens of organizations participated in developing the Peconic Estuary Partnership (PEP) Comprehensive Conservation and Management Plan (CCMP) 2020.

Their contributions of ideas, information, and recommendations during meetings, workshops, and public comment periods immeasurably strengthened the plan and set the stage for continued successful collaboration to protect and restore the Peconic Estuary. PEP's staff and committee members express their gratitude for the hard work and dedication of all who participated in the CCMP 2020 development process.

A list of government and non-government partners in the Peconic Estuary Partnership is available in **Appendix A** and at www.peconicestuary.org.

Funding for the Peconic Estuary Partnership 2020 Comprehensive Conservation Management Plan was provided by the New York State Environmental Protection Fund as administered by the New York State Department of Environmental Conservation (NYSDEC) through a memorandum of understanding (MOU No. AM09995) between the NYSDEC and Stony Brook University on behalf of the New York Sea Grant Institute. Although the information in this document has also been funded in part by the United States Environmental Protection Agency under assistance agreements (No. CE-99200219 and CE-99200219-1) to Suffolk County Department of Health Services and (No. CE-97230303, CE-97230302, and CE-97230301) to NEIWPC, it has not gone through the Agency's publications review process and, therefore, may not necessarily reflect the views of the Agency and no official endorsement should be inferred.

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Peconic Estuary Partnership: A Place-Based Partnership

The **National Estuary Program** (NEP) is a voluntary, non-regulatory initiative administered by the US Environmental Protection Agency (EPA). It was established in 1987 under the Clean Water Act to restore and maintain the water quality and ecological integrity of estuaries of national significance. Twenty-eight National Estuary Programs have been established nationwide, each unique in its goals, institutional setting, and partners. In overseeing and managing the national program, EPA provides annual funding, national guidance, and technical assistance to the local NEPs. Each NEP hosts locally based, stakeholder-driven programs that are non-regulatory and

empower communities to protect, manage, and restore estuaries according to local values and needs.

In 1992, Congress designated the Peconic Estuary as an estuary of national significance, leading to the creation of the Peconic Estuary Program as a National Estuary Program. The Peconic Estuary Program in 2019 changed its name to the Peconic Estuary Partnership (PEP) to reflect its highly collaborative approach. The PEP is a partnership of Towns and Villages, citizens' groups, local and regional non-government organizations, and county, state, and federal government agencies.

With support and guidance from PEP's director and staff, the partners collaborate on actions to protect and improve ecosystem health in the Peconic Estuary and its watershed.

The PEP Management Conference consists of the Citizens' Advisory Committee, Local Government Committee, Management Committee, Policy Committee, Technical Advisory Committee, and Program Office (see diagram on following page). In 2020, the organizational structure of the PEP will be expanded to strengthen the partnership and enable maximum visibility and effectiveness of the program. This Partnership is the PEP's greatest asset, and the changes in organizational structure will facilitate increased funding to carry out the Actions identified in CCMP 2020. In addition, the PEP Management Conference structure will be amended based on the outcome of a PEP organizational assessment, which began in 2019.



PEP and Partners installing a fish camera at Grangebel Park Fishway

Photo by Peconic Estuary Partnership

A list of government and non-government partners in the Peconic Estuary Partnership is available in **Appendix A** and at peconicestuary.org.

Peconic Estuary Partnership Mission and Governance

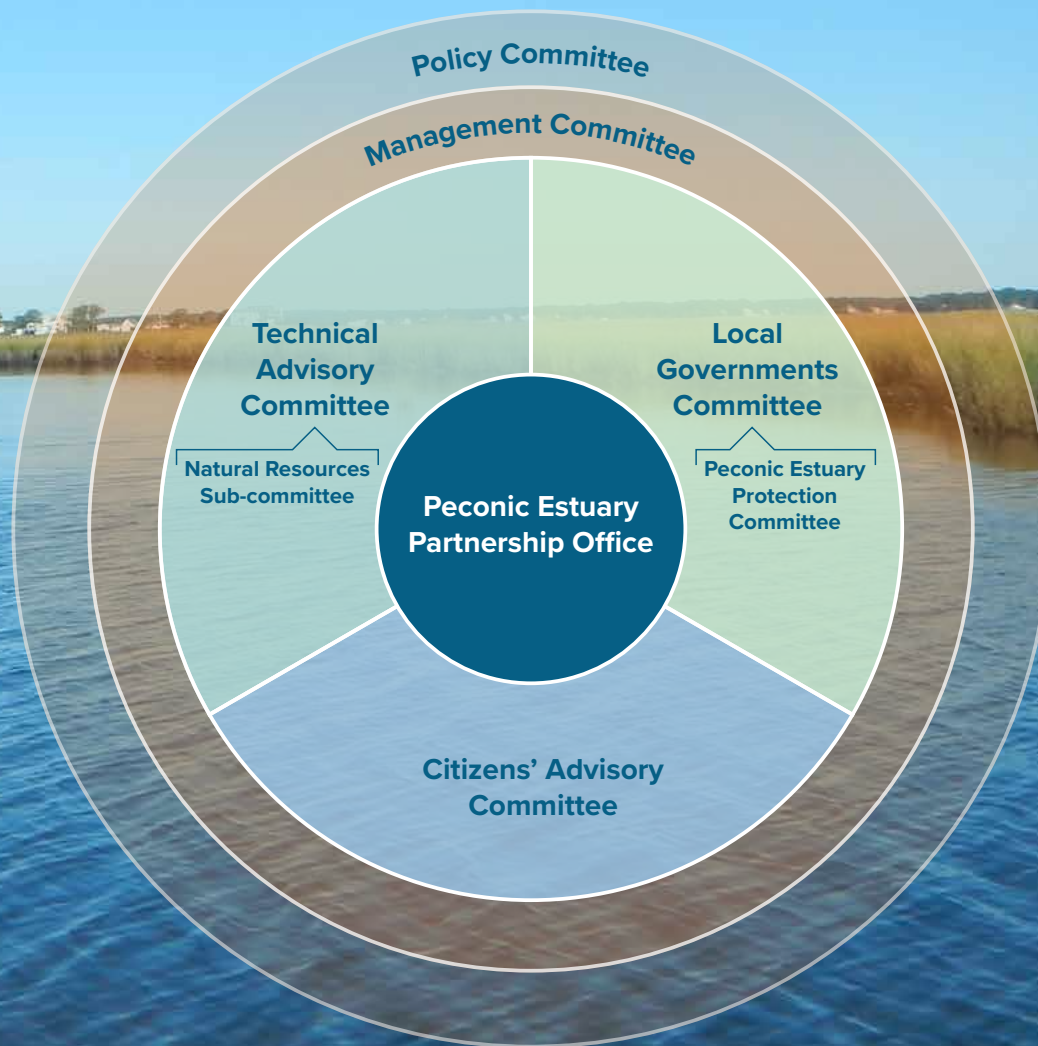
Our Mission

To protect and restore the Peconic Estuary and its watershed.

Our Vision

A successful partnership dedicated to restoring clean water, protecting and enhancing vibrant ecosystems and communicating sound science for nature-based coastal planning in the Peconic Estuary and its watershed.

This diagram shows the structure of the PEP Management Conference.



The Importance of Autonomy in the NEP Structure

It is in the spirit of the National Estuary Program that the Peconic Estuary Partnership be perceived to be autonomous and independent from any one particular interest. This shows that the office is committed to the entire range of stakeholders. It should also have a significant degree of visibility to build support for future funding of the program. The EPA's National Estuary Program (NEP) Handbook, entitled: *Community-Based Watershed Management: Lessons from the National Estuary Program*, published in 2005, discusses the importance of autonomy and visibility to NEPs.

Each NEP is initially assigned a host organization or sponsor, such as a state or local government agency, university, or nonprofit. The host organization administers the federal grant funds that support the NEP and provides a physical location for the director and staff. While the NEP sponsor provides an invaluable service to the NEP as an administrative and financial manager, among many other things, NEP directors and staff are directed not by their administrative sponsors but by the NEP committees (which typically include the sponsors as members).

The NEP director and staff serve many functions. They provide administrative and technical support to the committees, conduct public outreach and education activities, and coordinate and integrate program activities with existing efforts in the watershed. This collaboration promotes sharing of information and allows programs to make efficient use of limited staff resources. The NEP director speaks on behalf of the committees and is accountable to them. The PEP Management Conference consists of the Citizens' Advisory Committee, Local Government Committee,

Management Committee, Policy Committee, and Technical Advisory Committee, which operate under a governance structure. The NEP financial assistance regulation, 40 CFR, Section 35.9065(a), states:

“The Regional Administrator will not award funds pursuant to CWA Section 320(g) to any applicant unless and until the scope of work and overall budget have been approved by the management conference of the estuary for which the work is proposed.”

Funding awarded to the sponsor or grantee is intended to be used for purposes and activities developed and approved through consensus by all members of the committees. By requiring approval and oversight by the committees, a safeguard is built into the NEP framework to prevent individual interests from steering an NEP. To this end, many NEPs have developed and adopted operating procedures, agreements, or bylaws which outline roles and responsibilities.

It is the mission of the Peconic Estuary Partnership to protect and restore the Peconic Estuary and its watershed. With support and guidance from the Peconic Estuary Partnership director and staff, the partners collaborate on actions to carry out its mission to protect and improve ecosystem health in the Peconic Estuary and its watershed. The CCMP reflects the PEP's ability and focus to strengthen the partnership and enable maximum visibility and effectiveness of the program.

This Partnership is proud to be supported by its committees, which represent a diverse interdisciplinary network focused on its mission and goals.



Collaborative Planning for the Peconic's Future

Like the other 27 National Estuary Programs, PEP has a CCMP that serves as its blueprint for addressing locally important environmental issues. Each NEP operates autonomously to develop its CCMP based on scientific information and extensive input from partners and stakeholders. The PEP released its first CCMP in 2001. In 2017, PEP initiated a process to revise the CCMP to reflect changing environmental conditions, scientific understanding, conservation concerns, and management priorities.

Throughout the two-year revision process, the PEP convened meetings and workshops to reach a diversity of people with an interest in the Peconic Estuary and held public comment periods to receive written comments on drafts of the revised CCMP. Hundreds of people contributed their perspectives on priority issues facing the Peconic Estuary and potential solutions. Among them were members of the Shinnecock Nation, tourism operators, business owners, farmers, aquaculturists, staff members of non-profit organizations, scientists, resource managers, elected officials, and staff from local, county, and state agencies.

Lighthouse Consulting Group provided support to the PEP for organizing and conducting the meetings and workshops. Waterview Consulting supported the PEP on writing and editing the CCMP document.

CCMP 2020 Development Process



2017

Public Education and Outreach



2017–2018

Strategy, Planning,
and Initial Draft Outline



2018

Stakeholder Workshops
and Meetings



2018–2019

Initial Draft CCMP 2020



2019

Internal Review and Revision
Public Review and Comment



2020

Finalization and Submission of
CCMP to EPA

Summaries of public comments:

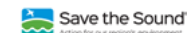
www.peconicestuary.org/about-pep/the-ccmp-revision/



Peconic Estuary Partnership

PEP's New Name Reflects Its Collaborative Work

Entering the 2020s, PEP formally changed its name from the Peconic Estuary Program to the Peconic Estuary Partnership. The PEP Management Conference made this change in recognition that efforts to protect and restore the estuary are highly collaborative, and PEP's work is accomplished through the collaboration of many partners. A full list of PEP's Partners can be found in Appendix A.



Introduction

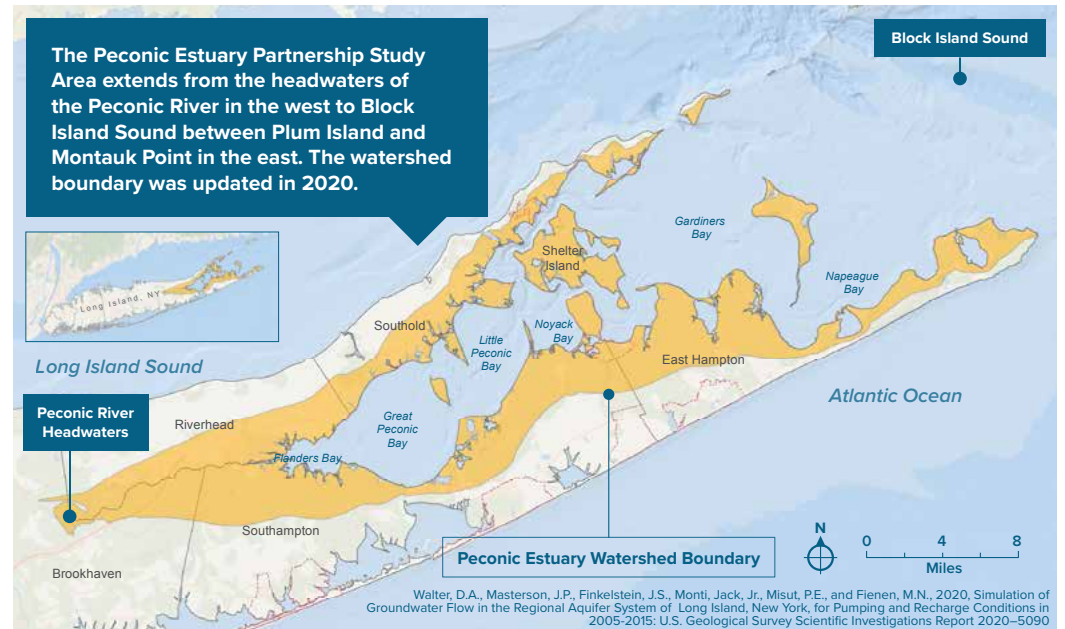
Peconic Estuary: The Heart of Long Island's East End

The Peconic Estuary is located at the eastern end of Long Island, New York, approximately 80 miles from New York City. The East End is defined by two long peninsulas—the North Fork and the South Fork—shaped by the advance and retreat of glaciers some ten thousand years ago. Between the Forks lies the Peconic Estuary, where freshwater from streams and aquifers mingles with salty ocean water.

The 250-square-mile estuary comprises Great Peconic Bay, Little Peconic Bay, Gardiners Bay, and a hundred other distinct bays, harbors, and tributaries. Most of the estuary is relatively shallow, becoming somewhat deeper to the east where it joins Block Island Sound. Altogether, the estuary's numerous necks, islands, bluffs, tidal creeks, and marshes have a shoreline totaling more than 450 miles. People use the Peconic River and the bays extensively for recreational boating, swimming, and fishing, and the bays also support commercial fisheries including bay scallop, weakfish, and winter flounder, along with a growing shellfish aquaculture industry.

The Peconic Estuary watershed is nearly 180 square miles of land that drains into the estuary, including areas in the Towns of Brookhaven, East Hampton, Southampton, Riverhead, Southold, and Shelter Island and in the Villages of Dering Harbor, Greenport, North Haven, and Sag Harbor. Predominant land uses in the watershed are residential (suburban), recreational (tourism), and agricultural. Some of the lands are protected habitats, including maritime red cedar and maritime oak forests, coastal oak-holly forests, pitch pine-oak, and the rare dwarf pitch pine plain communities, as well as maritime grasslands and heathlands. The Peconic River—the longest river on Long Island—flows into Flanders Bay at the western end of the Peconic Estuary.

The Shinnecock Indian Nation, federally recognized since 2010, is located on the South Fork of Long Island and part of its lands are within and border the Peconic Estuary's watershed. PEP and the Shinnecock Indian Nation share environmental conservation goals, and PEP is committed to strengthening the partnership with this valuable part of the Peconic Estuary community.



Congressionally Recognized

1987: Established under the Clean Water Act in 1987, the National Estuary Program (NEP) operates through partnerships with EPA and other public and private sector entities to “identify, restore, and protect nationally significant estuaries of the United States.” The NEP hosts 28 locally-based, stakeholder driven programs that are non-regulatory, collaborative initiatives working with the community to craft and implement action plans to solve environmental problems at the watershed level.

1992: the Peconic Estuary became the 20th estuary in the nation to receive the designation as an “Estuary of National Significance” by the U.S. Environmental Protection Agency (EPA).

Rich History & Economic Importance

Over the past few decades, people of eastern Long Island have witnessed tremendous changes in the Peconic Estuary, the expansive network of bays and waterways nestled between the North and South Forks.

This ecosystem, where salt and fresh waters mingle, represents the geographic, ecological, and cultural heart of the East End. For thousands of years, Native Americans have fished these waters and made their homes on its shores, their culture rooted in the unique natural character of this place. When Europeans settled here, they found fertile land for farming and plentiful fish and shellfish for harvesting. Suburban growth, between the 1950s and 1970s, and improved transportation systems brought more residents and visitors to the East End. To this day, each of the Towns around the estuary retains its own identity, reflecting its particular characteristics and history.

Through it all, the estuary has been here—remaining the same in some ways, but also changing endlessly with currents, tides, species, and other influences. Today, the Peconic Estuary continues to be the local economic engine, supporting fishing, recreation, tourism, and aquaculture. Baymen still earn their livelihood harvesting wild shellfish, increasingly joined by oyster farms as the aquaculture industry expands. Anglers hook bluefish and striped bass, while tourists and locals swim at beaches and explore the waterways in kayaks and paddleboards. Scenic views of the estuary draw homebuyers and vacation renters, and agriculture continues to thrive on the lands that drain into the estuary.

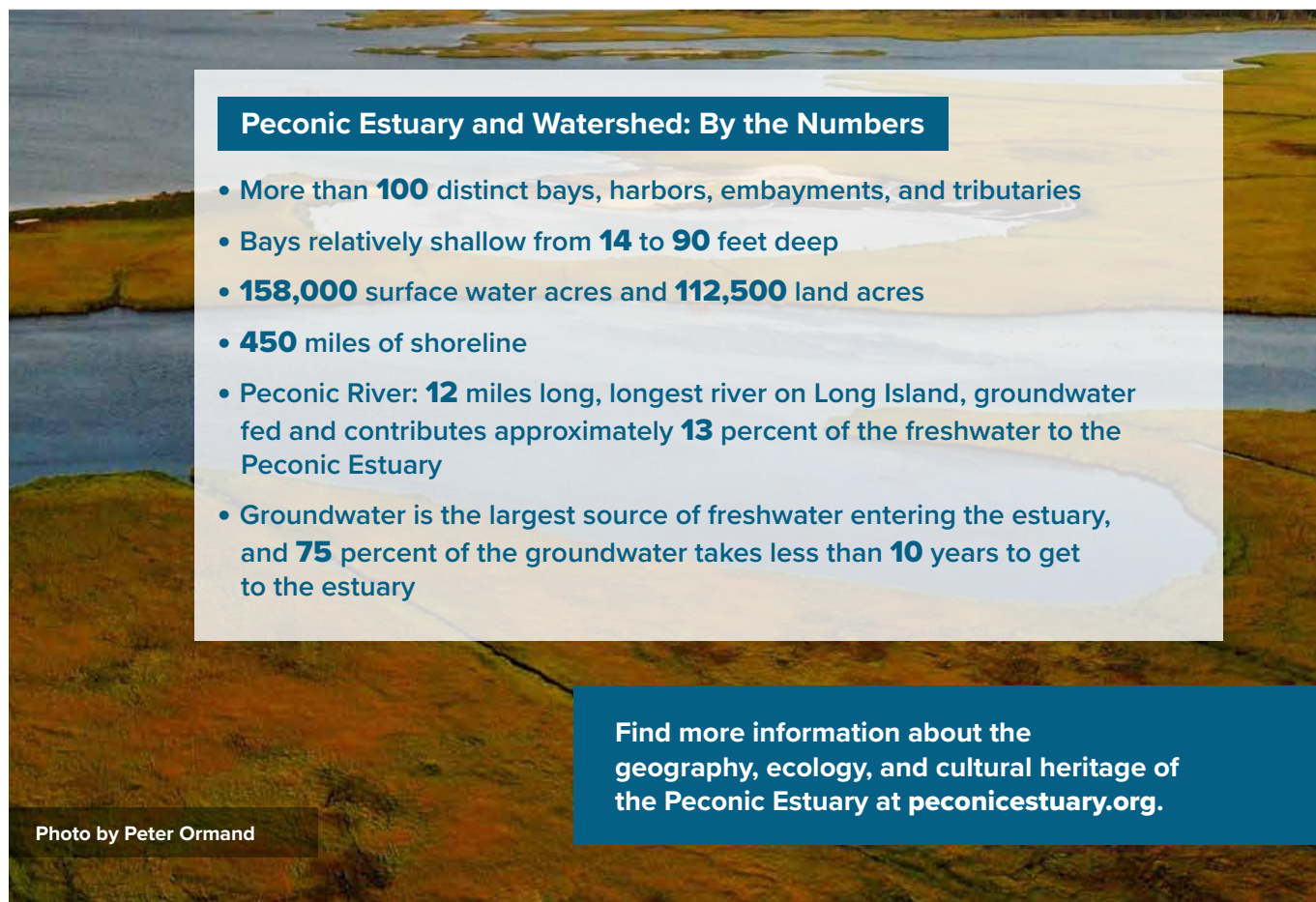


Photo by Stephen Tettelbach

Ocean Economy

According to a 2015 study, ocean-related businesses provided 5.3 percent of the total jobs in Suffolk County. Suffolk County ocean jobs account for 33,987 employees, \$983 million in wages, and \$2 billion in goods and services.

Source: NOAA Office for Coastal Management



Peconic Estuary and Watershed: By the Numbers

- More than **100** distinct bays, harbors, embayments, and tributaries
- Bays relatively shallow from **14** to **90** feet deep
- **158,000** surface water acres and **112,500** land acres
- **450** miles of shoreline
- Peconic River: **12** miles long, longest river on Long Island, groundwater fed and contributes approximately **13** percent of the freshwater to the Peconic Estuary
- Groundwater is the largest source of freshwater entering the estuary, and **75** percent of the groundwater takes less than **10** years to get to the estuary

Find more information about the geography, ecology, and cultural heritage of the Peconic Estuary at peconicestuary.org.

Photo by Peter Ormand

As is often the case, all this activity has placed the Peconic Estuary at risk. It is the eternal challenge: how to balance new and traditional uses to reap benefits from nature without overtaxing it. Worrying signs have appeared in the Peconic, but now—following decades of decline—the health of the estuary has begun to improve in important ways, giving reason for optimism.

River herring and other diadromous fish populations plummeted during the last century as dams and road culverts blocked their migratory routes to freshwater spawning areas. Today, newly built fishways will enable adult fish to swim upstream past dams and their young to swim downstream. As fish numbers increase, the ospreys, eagles, and other animals that feed on them benefit.

The estuary has been severely polluted with excessive nitrogen from fertilizers, sanitary waste, pet waste, and atmospheric deposition. This has led to harmful algal blooms, low dissolved oxygen, and degraded aquatic habitats. Nitrogen concentrations generally decrease in a west to east gradient in the estuary. Highest average nitrogen concentrations are recorded in the western estuary tributaries and peripheral embayments and decrease in deeper, open water sites where flushing is greater, more typical of the eastern estuary. The concerted efforts of many people have brought nitrogen loads down to healthier levels in some parts of the estuary, specifically in the western segment of the Peconic Estuary included in the Total Maximum Daily Load for Nitrogen (the Lower Peconic River and Tidal Tributaries; Western Flanders Bay and Lower Sawmill Creek; and Meetinghouse Creek, Terrys Creek and Tributaries) which has benefited from the completion of a wastewater treatment upgrade and water reuse project at the Riverhead Sewage Treatment Plant. The Peconic Estuary Partnership was influential in moving the **2016 Riverhead Sewage Treatment Plant upgrade and reuse project** forward to meet the TMDL requirements.

More work needs to be done to reduce non-point source nitrogen pollution in the estuary. Currently one of the largest contributors of nitrogen in groundwater is on-site sanitary wastewater. PEP has heavily supported the ongoing efforts by the State, County and Local Governments, to encourage the installation of Innovative Alternative Onsite Wastewater Treatment Systems on residential and commercial properties to reduce nitrogen loading.

Major progress has also been made in protecting the lands that surround the Peconic Estuary. More than four thousand acres of the watershed have been protected. The most significant source of funding for land protection is the Community Preservation Fund administered by the East End Towns, supplemented by county and state governments and not-for-profit organizations.

Protecting our Watershed

Of the 10,215 parcels that are undeveloped within the Peconic Estuary watershed (making up approximately 56,667 acres), 4,045 parcels are already protected (making up approximately 40,253 acres). There are 6,170 undeveloped parcels that are still unprotected (making up or 16,444 acres).

Community Preservation Fund

The Peconic Bay Region Community Preservation Fund (CPF) was established in 1998 and extended in 2006 and 2016 to run until 2050. The CPF was originally aimed solely at preserving land in the Peconic region. In 2016, voters agreed that twenty percent of the CPF was to be used for water quality improvement projects. Also allowable under the 2016 amendment was up to two percent of the total CPF to be granted to the Peconic Estuary Partnership to support its work to improve water quality in the Peconic Estuary and to match the federal dollars granted to the program. The creation of this fund by East Hampton, Southampton, Riverhead, Southold, and Shelter Island established a groundbreaking funding stream dedicated to clean water in the Peconic Estuary and its watershed.

Arshamomaque Preserve in Southold, NY

Photo by Peconic Estuary Partnership

Selected Milestones in Peconic Protection: 2000 to 2019

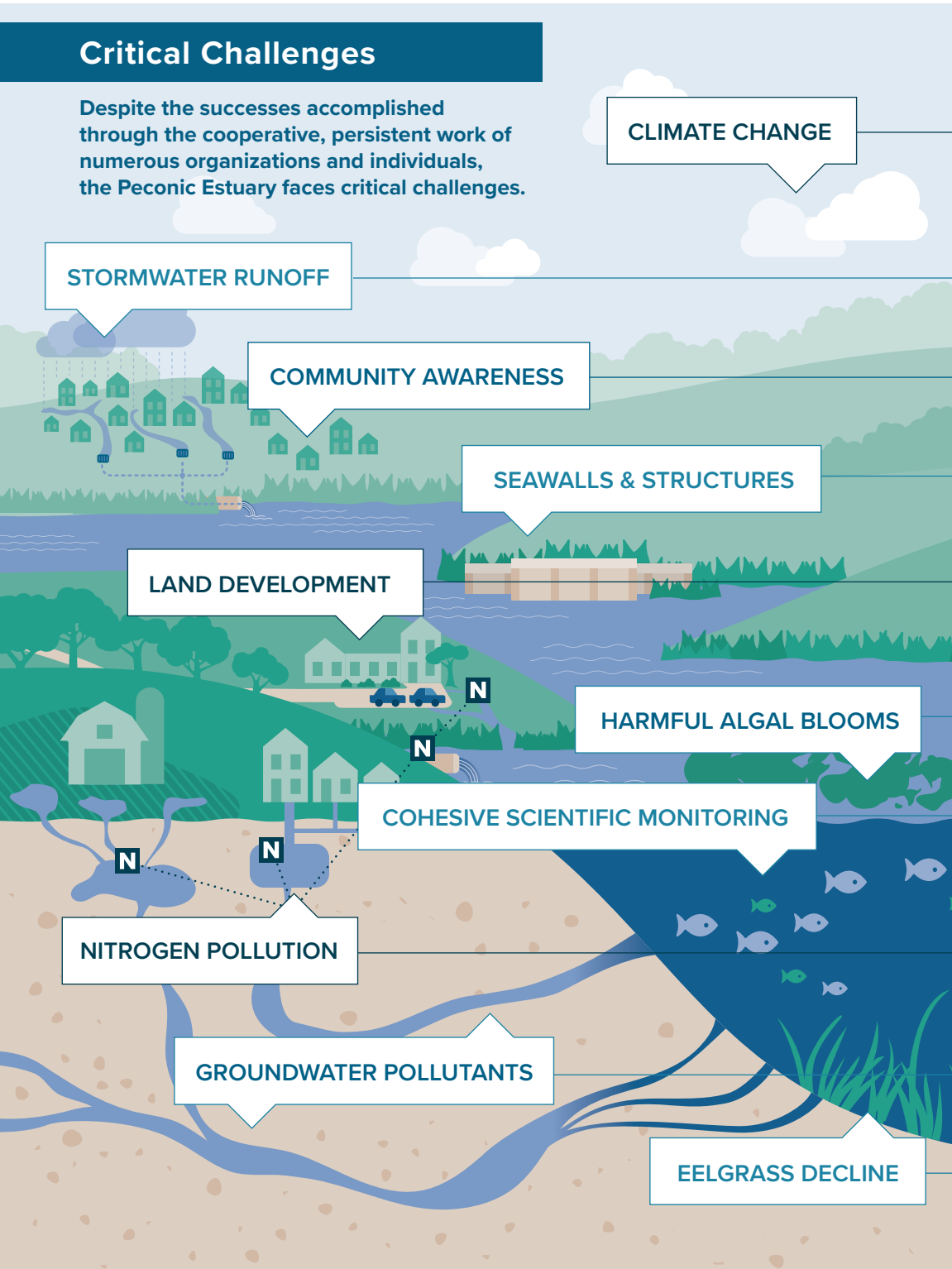
- 2000** ● **Habitat Restoration:** Since 2000, more than two dozen projects have restored shorebird habitat, wetlands, grasslands, beaches, shellfish, diadromous fish habitat, and eelgrass beds.
- 2002** ● **Vessel Waste No Discharge Zone:** Federal designation of the entire Peconic Estuary as a Vessel Waste No Discharge Zone protects water quality by prohibiting all untreated or treated discharges from boat toilets.
- 2007** ● **Fertilizer Reduction Law:** This Suffolk County law decreases nitrogen pollution in the estuary by prohibiting off-season use of fertilizers in the watershed.
 - **Total Maximum Daily Load for Nitrogen:** New York State established a limit for nitrogen pollution discharges in the watershed, leading to major upgrades in wastewater treatment plants.
- 2009** ● **Bullhead Bay Eelgrass Sanctuary:** The sanctuary protects the estuary's westernmost eelgrass bed, which provides habitat for fish and shellfish.
- 2013** ● **Shellfish Restoration:** More than one million clams and 500,000 oysters were grown and seeded into the estuary.
- 2014** ● **Homeowner Rewards Program:** Since the program's establishment, more than 70 homeowners have received funding for sustainable landscaping to help protect water quality.
- 2015** ● **Intermunicipal Agreement:** PEP initiated the creation of the **Peconic Estuary Protection Committee**, an intermunicipal affiliation comprised of Suffolk County, the New York State Department of Transportation, the six Towns within the Peconic Estuary watershed and the Villages of Greenport, North Haven, and Sag Harbor. The Committee focuses efforts on compliance with EPA's Clean Water Act and New York State's Phase II stormwater regulations for municipal separate storm sewer systems (MS4s) to achieve the Goals of the Peconic Estuary Partnership's Comprehensive Conservation and Management Plan.
- 2016** ● **Sewage Treatment Plant Upgrade and Reuse Project:** After upgrades to the Riverhead plant, highly treated wastewater is now used to irrigate the Indian Island Golf Course, reducing overall water use and diverting approximately 1.4 tons of nitrogen per year from entering the Peconic Estuary via the Riverhead Sewage Treatment plant outfall pipe, and the improved treatment technology at the plant will help to further reduce the nitrogen load down to 3 mg/L to the estuary.
- 2017** ● **Update of Suffolk County Sanitary Code:** The updated sanitary code requires installation of a compliant system including a septic tank any time a new cesspool is proposed to replace an existing cesspool. It also requires liquid waste professionals to report system pump outs through a new database and portal.
- 2019** ● **Critical Lands Protection Strategy (2004, 2019):** The strategy supports coordinated efforts of many partners with more than four thousand acres protected to date.
 - **Living Shoreline Project:** Plantings and construction of a new beach and dune in Greenport provide greater habitat value and resiliency to erosion.



Photo by Kaitlin Morris

Critical Challenges

Despite the successes accomplished through the cooperative, persistent work of numerous organizations and individuals, the Peconic Estuary faces critical challenges.



CLIMATE CHANGE

STORMWATER RUNOFF

COMMUNITY AWARENESS

SEAWALLS & STRUCTURES

LAND DEVELOPMENT

HARMFUL ALGAL BLOOMS

COHESIVE SCIENTIFIC MONITORING

NITROGEN POLLUTION

GROUNDWATER POLLUTANTS

EELGRASS DECLINE



The impacts of climate change such as sea level rise, more frequent and more intense storms, and changing weather patterns will affect habitat and living resources, water quality, and watershed management practices. See page 40 for more details on climate change impacts.



Stormwater pollution occurs as stormwater runoff flows over surfaces, collecting and transporting debris, natural and human-made pollutants into nearby waterbodies. Debris and pollutants carried by stormwater—like motor oil, fertilizers, pesticides, sediment, animal waste and garbage—can be harmful to aquatic life and create human health risks.



Many people in local communities are not aware of the importance of the estuary and what they can do to support estuary health including non-English speakers and communities who are often underrepresented in community outreach efforts.



Seawalls, bulkheads, and other shoreline structures are constructed at a rapid pace, eliminating vital habitats for many species.



Growth of the human population and associated land development are pressuring the ecosystem and habitat connectivity, affecting terrestrial, aquatic, and avian species.



Although brown tides have not hit the Peconic Estuary since the 1990s, other kinds of harmful algal blooms are more frequent.



Although scientific monitoring and research occur in the estuary, ongoing and evolving challenges mean that data gaps need to be filled, accessible reporting of findings is needed, and cohesion among these efforts is crucial for confident management decision-making.



Nitrogen pollution from septic systems and cesspools, and residential and agricultural fertilizer still plagues many areas, especially the smaller and less well-flushed embayments.



Groundwater carries pollutants from activities on land including excess nutrients, pathogens, pharmaceutical compounds and toxic contaminants such as pesticides and per- and polyfluoroalkyl substances (PFAS) into the estuary.



Eelgrass beds—which serve as nurseries for scallops and fish—have diminished dramatically and are vulnerable to further decline with climate change.

The good news is that the people who live and work on the East End have the power to determine the Peconic Estuary's future. Do they want clean water? A healthy ecosystem with abundant and diverse wildlife? A local "blue economy" that is resilient to climate change? Resoundingly, the answers are yes, yes, and yes. Local decisions and actions in the coming years will be critical to address the challenges.

From 2017 through 2019, the Peconic Estuary Partnership (PEP) convened public meetings and workshops around the watershed to listen to people's concerns, priorities, and ideas for the estuary. PEP committees and work groups analyzed scientific information to clarify the problems and potential solutions. Through this process approximately two hundred individuals representing more than one hundred government and non-government partners, stakeholders, and organizations collaborated to identify a path toward achieving the future that people want for the estuary.

The PEP CCMP 2020 is the product of that hard work. CCMP 2020 presents a collective vision for restoring and maintaining the water quality and ecological integrity of the Peconic Estuary in the face of climate change over the next ten years. Implementing CCMP 2020 will build on the important progress to protect the Peconic Estuary over the past two decades (see [Milestones, page 17](#)) and will help ensure a bright future for the East End—a future with strong estuary-wide partnerships, thriving populations of fish and wildlife, intact habitats, a functioning ecosystem, clean waters, and a robust local economy.

Critical Challenges - A Deeper Look



POPULATION: The Peconic Estuary has a year-round population of approximately 100,000, and this population nearly triples in the warmer months with a high influx of visitors and summer residents.



NITROGEN: The nitrogen load in the Peconic Estuary's watershed comes from several main sources: atmospheric deposition to surface water (39.3 percent) and to land (3.5 percent), on-site sanitary wastewater disposal systems (27.9 percent), fertilizer (25.6 percent), sewage treatment plants discharging to groundwater (0.1 percent) and directly to surface water (2.2 percent), and pets (1.4 percent). Twelve sewage treatment plants (STPs), including private development STPs and municipal STPs, discharge wastewater within the Peconic Estuary's watershed, and there are approximately 35,000 on-site sanitary wastewater disposal systems within the watershed that still need to be upgraded to the Innovative Alternative On-site Wastewater Treatment Systems to allow for improved wastewater treatment.



HABITAT: Eelgrass declined from 8,700 acres in 1930 to 1,000 acres in 2014. Between 1974 and 2005, the Peconic Estuary lost approximately ten percent of its vegetated tidal wetlands, and shoreline hardening has more than doubled over the last twenty years within the watershed.



The good news is that the people who live and work on the East End have the power to determine the Peconic Estuary's future.

Turning the Tide: Building on Success and Responding to Change

Participants in the CCMP 2020 planning process identified four long-term Goals:

Strong Partnerships and Engagement



PEP is rededicating itself to cultivating relationships with new and existing partners, local governments and NGOs. Through engagement with the community, PEP works to empower people to act as stewards in support of estuary health. In addition, PEP is re-envisioning the operation of its organizational and financial structure. These initiatives will facilitate the vital work needed for a healthy estuary.

Resilient Communities Prepared for Climate Change



Climate change is increasingly influencing the Peconic Estuary and the communities around it, and the impacts are likely to intensify in the coming years. Scientifically informed, proactive efforts by local communities can reduce the negative impacts of changes in precipitation patterns, sea level, temperatures, ocean and coastal acidification, and species and habitats.

Clean Waters for Ecosystem Health and Safe Recreation



Fishing, shellfishing, recreation, and tourism on the East End depend on clean waters in the Peconic Estuary. Through the CCMP, PEP is taking action to reduce nutrient pollution, harmful algal blooms, pathogens, toxic contaminants, and plastics in the estuary to support the wellbeing of people and wildlife.

Healthy Ecosystem with Abundant, Diverse Wildlife



Habitats and wildlife of the Peconic Estuary face several key threats that have led to the loss and degradation of eelgrass beds, marshes, pine barrens, and diadromous fish habitat. PEP's Actions in CCMP 2020 will build scientific understanding and support decision-making to address these threats.

CCMP 2020 establishes a framework of Objectives and Actions to guide PEP's work over the next ten years.



Shifts in Focus: CCMP 2001 to CCMP 2020

While the Goals and Objectives in CCMP 2020 are broadly consistent with CCMP 2001, the Actions in CCMP 2020 reflect changing conditions in the estuary along with new scientific knowledge about environmental issues and solutions. The following are the most noteworthy changes:



Severe harmful algal blooms (HABs) known as brown tides that occurred in the 1980s and 1990s were a major impetus for establishing PEP. Accordingly, CCMP 2001 placed a strong emphasis on brown tide management. Because brown tides have not happened here since the 1990s while other types of HABs increasingly occur, CCMP 2020 addresses HABs more broadly.



CCMP 2001 emphasized reduction of pathogens and toxic pollutants as the main threats to water quality. A PEP Strategic Planning session in 2013 and subsequent research by an expert working group found that nitrogen has become one of the most important pollutants in the Peconic Estuary, particularly nitrogen in groundwater. CCMP 2020 reflects these findings with a greater focus on reduction of nitrogen.



CCMP 2001 focused on stormwater runoff and sewage treatment plants as key sources of pollution. Because research now shows that groundwater is the leading contributor of pollution to the estuary, CCMP 2020 shifts the focus to addressing pollution from sources such as on-site sanitary wastewater disposal systems and fertilizers.



Extensive work by PEP's partners, including numerous stakeholder meetings and consultations with municipalities, resulted in the Peconic Estuary Partnership Habitat Restoration Plan released in 2017, with final revisions made in 2020. CCMP 2020 incorporates Goals, Objectives, Actions from the Habitat Restoration Plan, including priority habitat restoration projects.



Climate change was not incorporated into CCMP 2001. In CCMP 2020, climate change resilience is one of the four Goals, and climate change is considered in all aspects of the plan. A 2012 report on climate change adaptation in the Peconic Estuary, other related studies, and a recent Climate Ready Assessment informed how climate change was incorporated into CCMP 2020.



CCMP 2020 calls for a new level of engagement with local communities and municipal governments, where many decisions affecting the estuary are made. PEP wants to work closely with local governments, citizens' groups, and NGOs to deliver accurate, useful, science-based information to support local decision-making and action.

Comparison of CCMP 2001 and CCMP 2020

CCMP 2001

- Overview ●
- Brown Tide Management Plan ●
- Nutrients Management Plan ●
- Habitat and Living Resources Management Plan ●
- Pathogens Management Plan ●
- Toxics Management Plan ●
- Critical Lands Protection Strategy ●
- Public Education and Outreach Management Plan ●
- CCMP Financing ●
- Post-CCMP Financing ●

CCMP 2020

OVERVIEW

- CCMP 2020 at a glance
- Acknowledgements
- Peconic Estuary Partnership: A Placed-Based Partnership

INTRODUCTION

- Peconic Estuary: The Heart of Long Island's East End
- Rich History & Economic Importance
- Turning the Tide: Building on Success and Responding to Change
- Planning for Climate Change Is Imperative

GOAL: STRONG PARTNERSHIPS AND ENGAGEMENT

GOAL: RESILIENT COMMUNITIES PREPARED FOR CLIMATE CHANGE

GOAL: CLEAN WATERS

GOAL: HEALTHY ECOSYSTEM WITH ABUNDANT, DIVERSE WILDLIFE

Alignment of CCMP 2020 with Other Related Initiatives

Several important regional and local partner initiatives and plans align with the PEP CCMP 2020.

Long Island Nitrogen Action Plan (LINAP) (2015)

LINAP is a multiyear initiative to reduce nitrogen in Long Island's surface and ground waters by the NYSDEC, the Long Island Regional Planning Council (LIRPC), and Suffolk and Nassau counties, with input from multiple partners and stakeholders.

Suffolk County Comprehensive Water Resources Management Plan (2015)

The Plan seeks to protect and improve ground and surface water quality, and enable the provision of a safe supply of potable water to residents in Suffolk County. The Plan established detailed objectives and recommendations to address the legacy problem of on-site sanitary wastewater disposal systems.

New York State Ocean Action Plan (OAP) (2017)

The OAP is a framework of short-term actions to reach long-term goals for improving ocean ecosystem health to provide sustainable benefits to New Yorkers. The OAP will guide State government funding, research, management, outreach, and education choices through 2027.

Suffolk County Harmful Algal Bloom (HAB) Action Plan (2017)

The HAB Action Plan details recommendations for limiting the inputs of anthropogenic nutrients to groundwater and surface waters to reduce future HABs in County waters.

Suffolk County Subwatersheds Wastewater Plan (SWP) (2020)

Developed in partnership with the Long Island Nitrogen Action Plan (LINAP) and numerous project partners, stakeholders, and technical experts, the SWP provides a parcel-specific roadmap to reduce nitrogen pollution through wastewater upgrades and other mitigation strategies.

The Long Island Water Quality Information Data System (LIQWIDS) (2020)

LIQWIDS is a LINAP initiative being led by the NYSDEC and the Long Island Regional Planning Council (LIRPC) designed to serve as a centralized water quality data portal to allow all interested stakeholders to share water-quality monitoring data on Long Island. LIQWIDS will have a public facing website that features an interactive mapper that enables users to visualize trends in water quality from groundwater and surface water networks across Long Island.

Alignment of CCMP 2020 Actions with Town and Village Comprehensive Plans will also be reviewed and incorporated as appropriate during CCMP implementation.

ACRONYMS

| | |
|----------------|---|
| BMPs | Best Management Practices |
| CCE | Cornell Cooperative Extension |
| CCMP | Comprehensive Conservation and Management Plan |
| CSC | New York State Climate Smart Community |
| DDT | Dichloro-diphenyl-trichloroethane |
| DO | Dissolved Oxygen |
| EPA | US Environmental Protection Agency |
| FDA | US Food and Drug Administration |
| GIS | Geographic Information System |
| HABs | Harmful Algal Blooms |
| I/AOWTS | Innovative Alternative On-site Wastewater Treatment Systems |
| LINAP | Long Island Nitrogen Action Plan |
| LIQWIDS | Long Island Water Quality Information Data System |
| NYDOS | New York Department of State |
| NYS | New York State |
| NYSDEC | New York State Department of Environmental Conservation |
| NRCS | Natural Resources Conservation Service |
| OA | Ocean Acidification |
| OWTS | On-site Wastewater Treatment Systems |
| PEP | Peconic Estuary Partnership |
| PEPC | Peconic Estuary Protection Committee |
| PFOA | Perfluorooctanoic acid |
| PFOS | Perfluorooctane sulfonate |
| SCDHS | Suffolk County Department of Health Services |
| SCSWCD | Suffolk County Soil and Water Conservation District |
| SLR | Sea Level Rise |
| TMDL | Total Maximum Daily Load |
| USFWS | US Fish and Wildlife Service |
| USGS | US Geological Survey |

Revitalizing PEP for the 2020's

Participants in the CCMP 2020 planning process identified a need for a Goal dedicated to Strong Partnerships and Engagement reflecting the importance of revitalizing PEP to meet the challenges of the 2020s and beyond. This Goal encompasses two Objectives that underpin all of PEP's work and will be integral to successful implementation of the CCMP as a whole. Accordingly, they have been designated as Overarching Priority Objectives:

OBJECTIVE A: Overarching Priority Objective

Enhance PEP's organizational structure, operational practices, and financial position to support successful implementation of CCMP Actions

OBJECTIVE B: Overarching Priority Objective

Empower local communities to support estuary health, including underrepresented groups

New Systems to Track CCMP Actions and PEP Outcomes

PEP will use three approaches to track progress in implementing CCMP 2020 over the next decade and to measure progress toward PEP's long-term Goals. These approaches will provide transparency about PEP's activities and the health of the Peconic Estuary, and they will help ensure that PEP's efforts produce the greatest possible benefits.

Two of the approaches will be implemented as Actions 2 and 3 under Objective A:

- **CCMP Tracking System:** A new section of the PEP website will be developed to report on the status of each Action and Performance Measure in the CCMP. Website users will be able to see what work is planned, underway, or completed. PEP will develop and launch the CCMP Tracking System within 3 years of the final Revised CCMP. *(See Action 2)*
- **Ecological and Social Indicators:** PEP will conduct a science-based process to develop a policy-relevant set of quantitative indicators of ecological and social conditions in the estuary and watershed. Target values will be set for some indicators as appropriate. Data for the indicators will be analyzed and reported every five years to show changes relating to PEP's Goals. *(Action 3)*

The third approach, which focuses on increased monitoring of water quality, will be implemented as Action 16 under Objective D:

- **Water Quality Reporting System:** Each year, PEP staff and partners will analyze water quality data and produce reports on water quality conditions and trends in the Peconic Estuary. The information will support decision-making about water quality protection priorities. *(See Action 16)*

Where appropriate, these approaches will use the SMART (Specific, Measurable, Achievable, Relevant, Time-bound) goal setting framework.

The Overarching Priority Objectives and associated Actions are discussed in detail in the chapter on Goal: Strong Partnerships and Engagement.

SMART is an acronym that stands for Specific, Measurable, Achievable, Relevant, Time-bound and is a goal setting framework first introduced in 1981 by George T. Doran to create criteria to help improve the focus of efforts and the chances of succeeding in accomplishing a goal. The PEP will use the framework to develop the systems to track CCMP Actions and PEP outcomes.

Planning for Climate Change Is Imperative

Recognizing that climate change is affecting the Peconic Estuary now and its impacts will increase far into the future, participants in the CCMP 2020 development process carefully considered how to incorporate climate change into the plan. One of the CCMP 2020 Goals focuses specifically on climate change resilience, and climate change is threaded throughout the whole plan. Climate change influences virtually everything that PEP does. To achieve each Goal, Objective, and Action in the CCMP, PEP recognizes that it is imperative to understand the potential impacts of climate change and adapt accordingly. As new information on climate change becomes available in the coming years, PEP will adjust its Actions as needed to accomplish the CCMP 2020 Objectives.

A Guide to CCMP 2020 Terminology

CCMP 2020 is organized in a hierarchical framework of Goals, Objectives, Actions, and Performance Measures. Each of the following chapters focuses on a Goal and presents the Objectives, Actions, and Performance Measures for that Goal. These terms are defined as follows:

GOALS



Goals are four major, long-term changes in the Peconic Estuary and its watershed that PEP seeks to help achieve. Fully realizing the Goals will take decades. CCMP 2020, which will be implemented through the next decade, is designed to accomplish important progress toward the Goals.

OBJECTIVES

Objectives are eight more narrowly defined changes that PEP will bring about toward the Goals. Some of the Objectives may be fully attainable during the ten-year timeframe of CCMP 2020 implementation, while others may take longer.

Overarching Priority Objectives are crosscutting and integral to the success of PEP's work toward all four CCMP Goals. Objectives A and B have been designated as Overarching Priority Objectives.

→ ACTIONS

Actions are thirty-five activities or approaches that PEP will use toward the Objectives during the 2020s.

PERFORMANCE MEASURES, PARTNERS AND FUNDING

Performance measures describe key steps that PEP partners will carry out for each Action. Information provided for Performance Measures:

Timeframe

- **Short-term:** primarily in first five years of CCMP 2020 implementation
- **Long-term:** primarily in last five years of CCMP 2020 implementation
- **Ongoing:** conducted throughout CCMP 2020 implementation

Partners

Partner organizations anticipated to play large roles are listed for each Performance Measure. Additional partner organizations may become involved. **Bold font indicates a lead entity.** In some cases, several partners will lead their own projects or pilot projects. In these cases, multiple leads are indicated with bold font. Where PEP is listed, it means PEP staff and/or committees will play a key role; otherwise, the Performance Measure will be implemented largely by partner organizations. A full list of PEP's partner organizations is provided in Appendix A.

Anticipated Cost Range

\$ \$0-\$25,000 \$\$ \$25,000-\$100,000 \$\$\$ \$100,000-\$500,000 \$\$\$\$ \$500,000+ ✓ Fully Funded

Potential Funding Sources

If potential funding sources have been identified, they are listed with the anticipated cost range. *Additional funding sources can be sought for implementation of Performance Measures.*



Photo by Robert Waters Suffolk County Department of Health Services



STRONG PARTNERSHIPS

and engagement



Photo by Seatuck Environmental Association

Goal: Strong Partnerships and Engagement



Overview

PEP is truly a partnership effort. The main role of PEP staff is to facilitate collaboration among numerous government bodies and non-government organizations (NGOs) with an interest in the Peconic Estuary and its watershed. PEP's partners play many different roles in accomplishing the CCMP Actions, which have been identified and prioritized through consensus.

With CCMP 2020, PEP is rededicating itself to cultivating relationships with new and existing partners, focusing particularly on engaging with the local governments and NGOs, as their on-the-ground work influences the estuary most directly. In addition, PEP is re-envisioning its organizational and financial structure and how it operates, including pursuing increased funding, developing a web-based system for tracking implementation of CCMP 2020 Actions, and establishing a reporting process for ecological and social indicators of changes in the estuary. These efforts will facilitate the vital work that needs to be done for a healthy Peconic Estuary.

Engagement with the people who live, work, and recreate in the Peconic Estuary and watershed is essential to empower them to act as stewards in support of estuary health.

To enable community members to take action toward improving and maintaining the health of the Peconic Estuary, PEP's education and outreach efforts focus on helping people answer four main questions:



Why is the health of the Peconic Estuary important to me?

Understanding

PEP helps individuals understand that the Peconic Estuary's health matters to them because it fuels the East End's economy and ensures clean beaches and waters for recreational activities, abundant and safe seafood, active ecotourism, thriving wildlife, and resilient shorelines that help protect coastal properties. Understanding how people benefit from the estuary motivates community members to be protective of it.



How do my actions impact the Peconic Estuary?

Knowledge

PEP helps people know about the consequences of their actions for estuarine health. Examples of topics include the effects of cesspools, fertilizers, pet waste, marine debris, toxins, and hardening shorelines. Instilling knowledge about their negative impacts enables community members to avoid behaviors that harm the estuary.



What can I do to improve the health of the Peconic Estuary?

Action

PEP helps people find solutions and perform positive actions for the estuary. Examples include citizen science programs, Peconic-friendly landscaping, Peconic-friendly boating and fishing, living shorelines, and elevating programs like the Suffolk County Septic Improvement Program. By taking action, community members become stewards and bring about changes that ultimately improve the health of the estuary.

Who is the Peconic Estuary Partnership?

PEP's programs and outreach activities raise awareness of PEP's role as a resource for the community and as a facilitator for work to protect and restore the Peconic Estuary. Community members learn about who we are, what our mission is, what we do, what tools we can provide, how we can work with them, and how we can provide support for community partnerships to benefit the estuary.

OBJECTIVE A: Overarching Priority Objective

Enhance PEP’s organizational structure, operational practices, and financial position to support successful implementation of CCMP Actions

KEY PARTNERS

PEP staff and voting members of the PEP Management Committee and Policy Committee will lead the Actions toward Objective A, with active involvement of all PEP partners.

➔ ACTION 1

Finalize and implement the updated PEP Organizational Plan

PEP underwent program evaluations by EPA in 2012 and 2017. In both evaluations, EPA noted a need to reassess PEP’s organizational structure. PEP is developing an organizational plan that will be added to this CCMP document by adoption of voting members of the Management and Policy Committees. An important change in the organizational structure will be ensuring the Management Conference is representative of the Peconic Estuary stakeholders.

Both Objectives under this Goal— Objectives A and B—are crosscutting and integral to the success of PEP’s work toward the other three CCMP Goals. As such, Objectives A and B have been designated as Overarching Priority Objectives; they support all four Goals.

ACTION 1: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Short Term

- Addition of the updated PEP Organizational Plan to this CCMP document within 3 years of the final Revised CCMP and will outline the recommendations adopted by the Policy and Management Committees

EPA, Local Governments, NEIWPCC, NYSDEC, PEP, Suffolk County ✓ Fully Funded

Ongoing

- Implementation of the updated Organizational Plan

EPA, Local Governments, NEIWPCC, NYSDEC, PEP, Suffolk County

\$ EPA, Local Governments, NYSDEC, Suffolk County

- Reassessment of the Organizational Plan every two years

EPA, Local Governments, NYSDEC, NEIWPCC, PEP, Suffolk County \$ EPA



Photo by Francesca Rheannon

➔ ACTION 2

Develop and launch a CCMP Tracking System on the PEP website to report progress in implementing CCMP Actions

The PEP developed CCMP 2020 to guide its collective work over the next decade. PEP's partner organizations have agreed to be responsible for carrying out the Actions in the CCMP in either leading or supporting roles. To help facilitate implementation of the CCMP, PEP will develop and maintain a new section of the PEP website that shows progress on implementation of Actions ([see New Systems to Track CCMP Actions and PEP Outcomes on page 23](#)).

ACTION 2: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Short Term

- Development and deployment of web-based CCMP Tracking System within 3 years of the final Revised CCMP

PEP \$\$ EPA

Ongoing

- All Actions updated in CCMP Tracking System at least every two years

PEP \$\$ EPA

➔ ACTION 3

Develop and implement a State of the Peconic Estuary reporting process with science-based ecological and social indicators of progress toward PEP's Goals and Objectives

Through collaboration among partners and subject matter experts, PEP will establish a set of science-based ecological and social indicators of changes in the estuary relevant to the CCMP Goals and Objectives and begin periodic analysis and reporting of the indicators ([see New Systems to Track CCMP Actions and PEP Outcomes on page 23](#)).

ACTION 3: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Short Term

- Adoption of science-based ecological and social indicators of changes relevant to CCMP Goals and Objectives

Academic Partners, Environmental Partners, EPA, Local Governments, NYSDEC, PEP, Suffolk County \$ EPA

Ongoing

- Analysis of ecological and social indicators every five years and production of a State of the Peconic Estuary Report every five years ([see Action 6 Performance Measure on producing State of the Peconic Estuary Report](#))

Academic Partners, Environmental Partners, EPA, Local Governments, NYSDEC, PEP, Suffolk County \$\$ EPA



Photo by Julie Hargrave

➔ ACTION 4

Secure increased funding as part of a final Financial Plan to ensure successful implementation of all CCMP Actions

The finalization of a Financial Plan as specified in the EPA 2017 Program Evaluation to provide robust funding must be in place for PEP to carry out the CCMP Actions. Recognizing that the Partnership Office and partner organizations have varying funding streams, PEP will pursue new and expanded initiatives to obtain increased funding in support of CCMP implementation. The funding will support PEP operations and project costs, as agreed on by the Management Committee through PEP’s annual workplan.

ACTION 4: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Short Term

- Release of a final Financial Plan within 3 years of the final Revised CCMP that includes potential sources of new and increased funding, as well as a strategic outline to securing such funding

EPA, Local Governments, NEIWPC, NYSDEC, PEP, Suffolk County **\$ EPA**

Ongoing

- Implementation of the Financial Plan

EPA, Local Governments, NEIWPC, NYSDEC, PEP, Suffolk County

\$ EPA, Local Governments, NYSDEC, Suffolk County



Photo by Kaitlin Morris

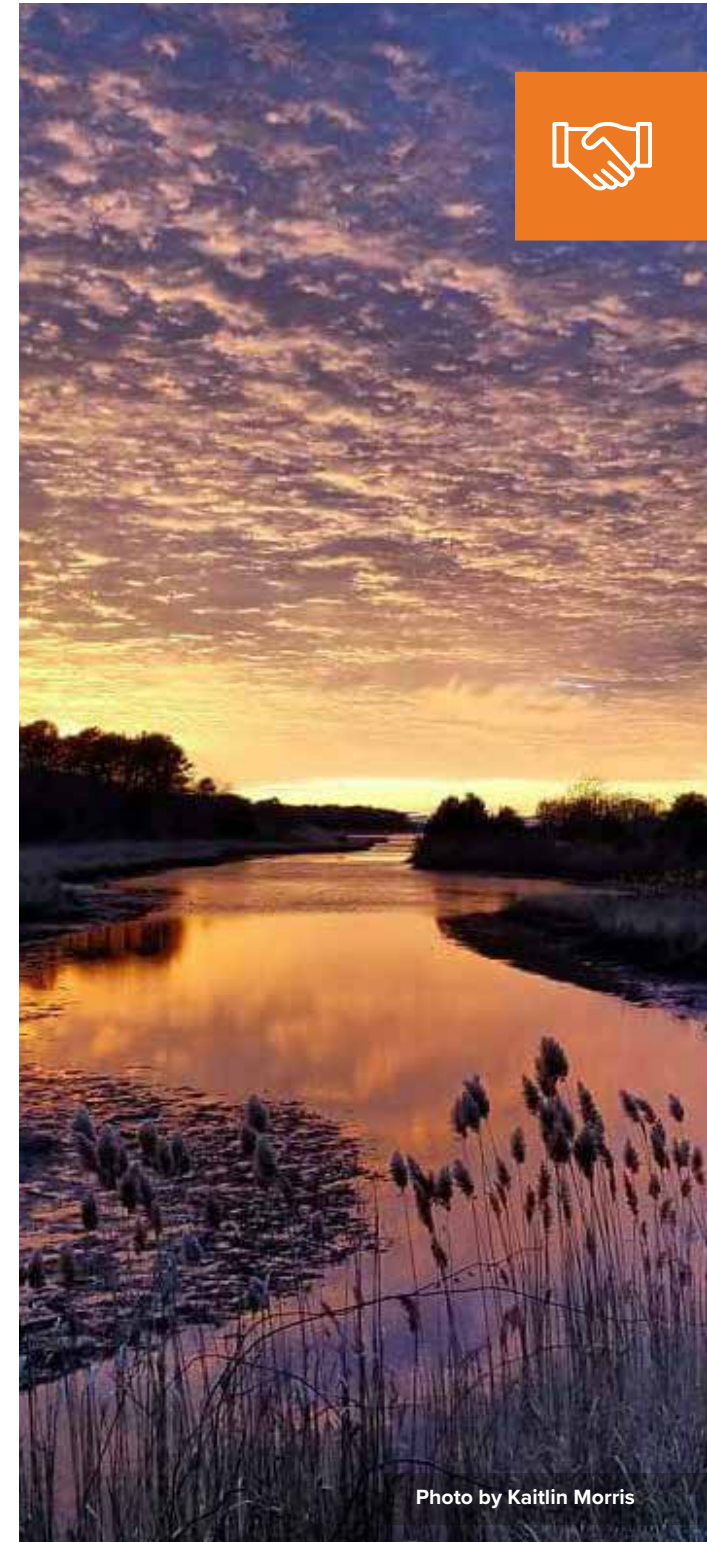


Photo by Kaitlin Morris

➔ **ACTION 5**

Strengthen engagement with related initiatives led by other entities

In addition to the PEP, other initiatives at different geographic scales have roles in improving the health of the estuary (see [Alignment of CCMP 2020 with Other Related Initiatives](#)). Building strong, mutually beneficial relationships with these related initiatives will support progress toward the CCMP Goals.

ACTION 5: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Short Term

- A partnership pledge with the Central Pine Barrens Joint Policy and Planning Commission whose focus area overlaps the watershed of the Peconic River

PEP, Pine Barrens Commission \$ EPA

- Partnership pledges with relevant initiatives led by state, county, and local governments, including but not limited to the Long Island Nitrogen Action Plan, New York Ocean Action Plan, and Suffolk County Subwatersheds Wastewater Plan

Local Governments, NYSDEC, PEP, Suffolk County \$ EPA

Ongoing

- Engagement with municipal governments (Towns of Brookhaven, East Hampton, Southampton, Riverhead, Southold, Shelter Island) and Suffolk County Legislature, including at least one meeting or presentation with each Town government and the County legislature annually

PEP \$ EPA

- Participation in relevant meetings and events of partner organizations

PEP \$ EPA



PEP and partners at the Widows Hole Preserve Living Shoreline planting event.

Photo by Jenna Schwerzmann



Photo by Peconic Estuary Partnership



The Central Pine Barrens Joint Planning and Policy Commission

In 1993 the New York State legislature declared it to be in the public interest to protect and manage the Pine Barrens-Peconic Bay system, in the County of Suffolk, by establishing a Long Island Pine Barrens maritime reserve and signed the [Long Island Pine Barrens Maritime Reserve Act](#) into law, establishing the Central Pine Barrens region and establishing the [Central Pine Barrens Joint Planning and Policy Commission](#). The Act stated that the Long Island Pine Barrens, an area encompassing over one hundred thousand acres in Suffolk County, is of critical importance to the state because it overlies the largest source of pure groundwater in New York. The Pine Barrens are interconnected to the Peconic Bay system by the Peconic River, the longest groundwater river in New York, and the ecological and hydrologic integrity of the system should be protected in a comprehensive plan adopted by the state and local governments. In addition the Act stated that the Pine Barrens-Peconic Bay system contains one of the greatest concentrations and diversities of endangered, threatened and special concern species of plants and animals to be found in the state. The purpose of the Act is to allow the state and local governments to protect, preserve and properly manage the unique natural resources of the Pine Barrens-

Peconic Bay system and to encourage coordination of existing programs and studies affecting land and water resources in the region and protect the value of the existing public and private investment that has already been made to acquire land in the region.

The Pine Barrens Commission, comprised of a governor's appointee, the county executive of Suffolk County and the supervisors of the Towns of Brookhaven, Riverhead and Southampton, is tasked to prepare, oversee and participate in the implementation of a comprehensive land use plan for the Central Pine Barrens area to guide development therein in a manner suitable to the needs for preservation of the core preservation area and compatible growth and development in the compatible growth area. Thus, the Pine Barrens Commission's mission, to manage land use within the Central Pine Barrens to protect its vital groundwater and surface water and the region's vast and significant natural, agricultural, historical, cultural and recreational resources for current and future Long Island residents, is closely intertwined with the mission and Goals of the PEP. The PEP is committed to strengthening relationships with the Pine Barrens Commission to protect this regional resource.

OBJECTIVE B: Overarching Priority Objective

Empower local communities to support estuary health, including underrepresented groups

The PEP employs multiple communication, outreach, and engagement approaches to reach a diversity of local people representing different ages, interests, and socioeconomic and cultural backgrounds to enable and inspire them to support estuary health.

KEY PARTNERS

Collaborative work is highly encouraged for Objective B Actions, with interested organizations involved as lead entities or partners. Appendix A includes a list of some potential lead or partner entities; other entities may also become involved. Current lead entities and key partners are listed with Performance Measures below where applicable.

➔ ACTION 6

Increase community members' awareness of the Peconic Estuary, key issues relating to the CCMP's Goals, and the PEP as a resource to help them address the issues

The PEP will cultivate public awareness of the importance of the estuary and key estuary issues and solutions, as well as raise the PEP's public profile as a resource for addressing the issues. This will be accomplished by increasing targeted communications and engagement, including building and strengthening partnerships, utilizing new venues and effective channels, and hosting and collaborating on engaging events and outreach programs. We will focus on consistent, multi-channel messaging of CCMP Goals and issues in a voice that engages and inspires local communities to take action.

ACTION 6: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Short Term

- Development and creation of the PEP Outreach Strategy within 3 years of the final Revised CCMP

PEP \$ EPA

- Strengthened partnerships with other estuary-related programs in the region to share information and collaborate on regional projects and outreach

Long Island Sound Study, Narragansett Bay Estuary Program, New York/ New Jersey Harbor Estuary Program, PEP, South Shore Estuary Reserve

\$ EPA



Both objectives under this Goal— Objectives A and B—are crosscutting and integral to the success of PEP's work toward the other three CCMP Goals. As such, Objectives A and B have been designated as Overarching Priority Objectives.

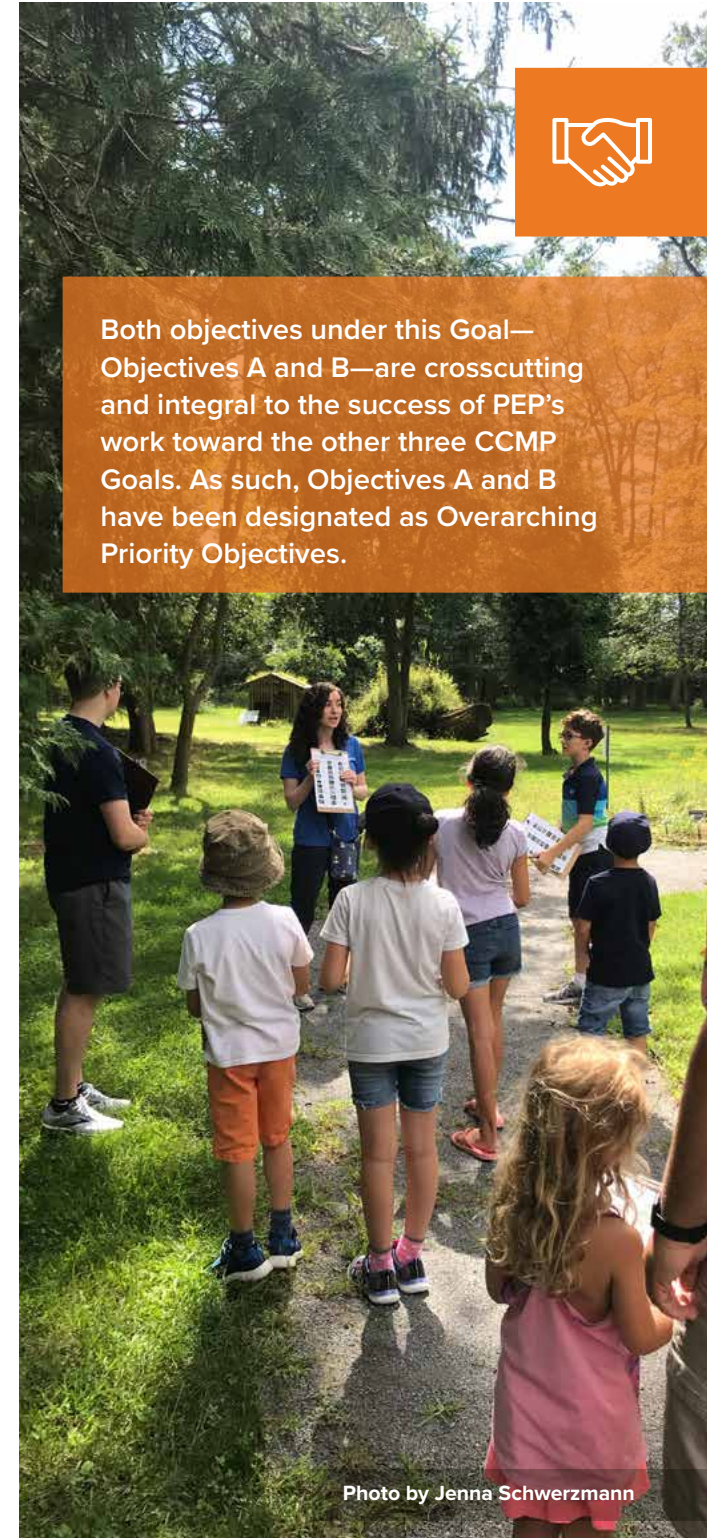


Photo by Jenna Schwerzmann

ACTION 6: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Short Term

- Creation and installation of permanent exhibit, signage, and outreach materials at the Long Island Aquarium and incorporation of key messages into the Peconic boat tours, conveying the PEP’s CCMP Goals and providing opportunities for people to take local action, including residential nutrient and toxin best management practices, citizen science involvement, and Peconic friendly boating and fishing practices

Long Island Aquarium, **PEP**, **PEPC** **\$\$ EPA**, Local Governments

Ongoing

- Strategic dissemination of key messages related to the PEP’s CCMP Goals through multiple channels (e.g., local newspapers, PEP newsletter, PEP website, video production, and social media), with periodic analysis of communication effectiveness and modification as appropriate

PEP **\$\$ EPA**

- Establishment of a biennial Peconic Estuary Conference, bringing together interested organizations and individuals to share the latest data and information on water quality, habitats and wildlife, and climate change resiliency in the Peconic Estuary and to foster partnerships and engagement around addressing those issues

PEP **\$\$ EPA**

- Production of State of the Peconic Estuary Report every five years with interim updates on select indicators presented every two years at biennial Peconic Estuary Conference

PEP **\$ EPA**



Photo by Peconic Estuary Partnership



View of the Peconic from the Long Island Aquarium Tour Boat Excursion

Photo by Lauren Scheer

➔ **ACTION 7**

Involve community members in citizen science programs to cultivate personal connections to the Peconic Estuary and inspire positive behavioral change to support estuary health

The PEP will provide community members with opportunities to learn and carry out scientific data collection methods, leading to increased appreciation for the Peconic Estuary and understanding of environmental issues and potential solutions.

ACTION 7: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Short Term

- Collaboration with educators and other community members to create a Wildlife Monitoring Network and Workgroup that develops unified messaging, increases cohesion among existing surveys, and translates data from citizen science programs into stories that engage students and the community to enable them to take action to support estuary health

CCE, Group for the East End, **PEP**, Pine Barrens Commission, Seatuck Environmental Association

\$\$ Environmental Partners, EPA

Ongoing

- Increased public participation in the PEP’s citizen science monitoring programs (i.e., horseshoe crab, terrapin, and alewife), increased visibility for other related citizen science programs, and initiation of new programs for additional species (e.g., otters, birds, invasive species) as needed

Audubon New York, CCE, Group for the East End, Long Island Invasive Species Management Area, NYSDEC, **PEP**, Pine Barrens Commission, Seatuck Environmental Association

\$\$ Environmental Partners, EPA, Local Governments, Grants

- Compilation and distribution of information about citizen science monitoring programs in the Peconic Estuary’s watershed through online tracking of results via PEP and partners as appropriate

CCE, Group for the East End, **PEP**, Pine Barrens Commission, Seatuck Environmental Association

\$ Environmental Partners, EPA

- Partnerships with local schools and colleges to integrate citizen science data, information, and activities into curriculums, including continued involvement in the annual Day in the Life of the Peconic Estuary

Brookhaven National Lab, Local School Districts, **PEP**, Pine Barrens Commission \$ EPA, Grants



Citizen scientists collecting data on Diamondback Terrapins
Photo by Peconic Estuary Partnership

➔ **ACTION 8**

Conduct outreach events and programs that engage community members in learning about the Peconic Estuary and taking action to support estuary health

The PEP will reach new audiences and strengthen relationships with existing audiences through varied events and programs that engage people to be interested in estuary issues and motivated to participate in addressing them.



Photo by Jenna Schwerzmann



Photo by Kaitlin Morris

ACTION 8: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Ongoing

- Increased participation in the PEP Citizens’ Advisory Committee and expanded membership (e.g., baymen, business owners, industry, local environmental groups) to advocate for program goals and provide input to the Management Committee on public priorities and concerns

PEP \$ EPA

- Community members engaged when appropriate in implementation of PEP projects and related science-based events (e.g., salt marsh workshops, living shoreline projects, beach cleanups, educational tours of PEP projects) and in estuary-themed events and activities that are recreational, entertaining, and art based (e.g., paddling tours, scavenger hunts, competitions, craft events, trivia games, Estuary Day) to reach and educate far-removed audiences

PEP \$ EPA

- Increased coordination and collaboration among partners on efficient and unified outreach messaging on Peconic Estuary issues

PEP \$ EPA



Photo by Peconic Estuary Partnership

➔ **ACTION 9**

Incorporate environmental justice considerations into public education and outreach materials and events

The PEP will expand its efforts to be inclusive of underrepresented members of local communities.



ACTION 9: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Ongoing

- Outreach and educational materials that provide general estuary knowledge, best management practices, fishing regulations, and other key information in both English and Spanish

PEP \$ EPA

- Identification of existing and new outreach venues and scheduling options that are accessible to underrepresented communities and, when appropriate, utilization of underrepresented communities' existing events as opportunities to incorporate estuary learning

PEP \$ EPA

- Implementation of a Bilingual Internship to aid efforts in conducting outreach to underrepresented communities

PEP \$ EPA



Photo by Kaitlin Morris



Photo by Rebecca Schwab



**RESILIENT
COMMUNITIES**
*prepared for
climate change*



Goal: Resilient Communities Prepared for Climate Change



Overview

The influence of climate change on the Peconic Estuary and the communities around it will grow profoundly far into the future. Scientifically informed, proactive efforts can reduce the negative impacts.

Projected changes in precipitation patterns, particularly increases in extreme rain events, will likely cause greater runoff of nutrients and other pollutants from land into the estuary and may also increase atmospheric deposition of pollutants. Rising sea levels are expected to result in increasingly frequent inundation of drinking water wells and septic systems on coastal properties, leading to more nutrients and pathogens entering groundwater, surface waters, and the estuary. In turn, greater nutrient loading of the Peconic Estuary can be expected to result in more frequent harmful algal blooms, reduced water clarity, and a general degradation of coastal habitats. Excessive pathogens may lead to more frequent closures of bathing beaches and shellfish harvesting areas, while herbicides and pesticides are increasingly being linked to losses of seagrasses and other marine habitats that serve as important feeding and nursery areas for recreationally and commercially important fish species.

As temperatures increase, sea levels rise, and precipitation occurs with increasing intensity, estuarine species and habitats may move or change. Where there is significant coastal development and shoreline hardening, important habitats such as salt marshes could be blocked from migrating landward as sea levels rise. Changes in air and water temperatures may lead to shifts in the relative abundance of fish and other estuarine species. Species once thought to be more southerly or warm-adapted may become more common, while those adapted to cooler climatic conditions may decline. Ocean and coastal acidification due to increased atmospheric carbon dioxide could negatively affect shell-building creatures and many other types of estuarine life. The dynamic nature of the Peconic Estuary's natural resources will require protection of critical habitats both where they exist today and where they may exist in the future.



Peconic Estuary Partnership Climate Vulnerability Assessment

Completed in 2019, the Peconic Estuary Partnership Climate Vulnerability Assessment and Action Plan, as well as other scientific resources, informed the CCMP 2020 development process. This chapter presents Objectives and Actions to help PEP and local communities prepare for climate change and to be resilient to its impacts.

Photo by Barry Udelson

The following risks were identified in the Climate Vulnerability Assessment, more information is detailed in the full [report](#):

Sea Level Rise

The greatest risk to the Peconic Estuary's management goals posed by Sea Level Rise (SLR) is two-fold: SLR will reduce the area of coastal habitats if they are unable to migrate landward, and it will cause saltwater intrusion. These occurrences will affect PEP's ability to protect habitat, water quality, species diversity, groundwater resources, and recreational access. Land preservation will be instrumental in ensuring buffers are available to allow habitat migration and prevent saltwater intrusion. **Objective C, Action 10 and 11 address this risk.**

Increased Storm Frequency and Intensity

More frequent and intense storms will lead to more stormwater entering the Peconic Estuary's surface water and groundwaters and to erosion of the nearshore habitat. All of this will affect PEP's ability to protect habitat and water quality. Adaptation strategies to protect and restore nearshore areas and emphasize soft engineering approaches will be necessary to reduce these risks. **Objective C, Action 10, 11 and 12 address this risk.**

Warmer Atmosphere/Changing Seasons

Higher mean average temperatures will affect species diversity and migration as seasonal patterns shift faster than some species can adapt. Warmer spring, summer, and fall seasons may also lead to increased use of resources, for example agricultural resources which could have impacts on nutrient and chemical usage. Such risks will affect PEP's ability to protect species diversity and water quality. **Objective C, Action 10, 11 and 12 address this risk.**

Warmer Waters

One consequence of a warming atmosphere will be warming waters, which may support some of the risks identified above related to species diversity and loss in addition to risks associated with specific chemical and physical properties

of water. Warmer water expands, which leads to additional SLR and can lead to stratification within the water column. Warmer waters may also lead to an increase in HABs. These occurrences will affect PEP's ability to protect habitat, water quality, species and diversity, and recreational access. Water quality controls will be necessary to help mitigate some of the effects of warmer water. Land preservation and conservation will also be necessary to allow habitat migration due to SLR. **Objective C, Action 10, 11, 12 and 13 address this risk.**

Increased Drought

Although overall precipitation rates in the region are expected to increase, more of the precipitation will likely fall in the winter and spring as rain, while the summer and autumn will experience periods of drought. These trends will affect PEP's ability to meet groundwater protection goals and may reduce species diversity in freshwater and brackish systems. **Objective C, Action 10, 11 and 12 address this risk.**

Rising Groundwater

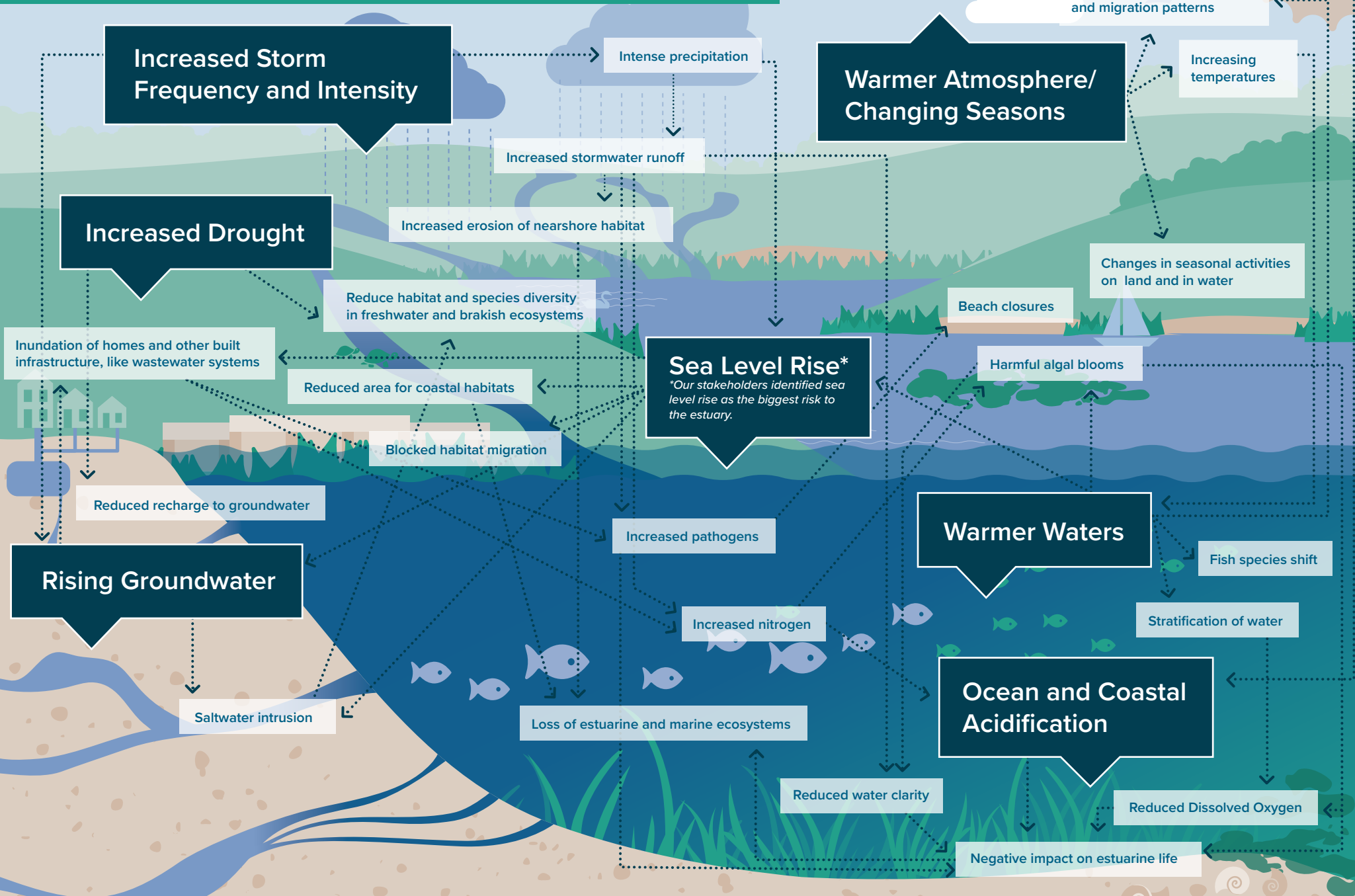
Some groundwater rise may be caused by increased precipitation. Pressure from SLR will also be a factor in groundwater rise, and it has the potential to bring the systems closer even in times of drought. The biggest risk to PEP's water quality goal from rising groundwater is cross contamination of freshwater and saltwater systems which is a risk to a variety of habitats and to water for drinking and irrigation. **Objective C, Action 10, 11 and 12 address this risk.**

Ocean Acidification

This is an area of active research in the region, and some of the full effects of ocean acidification are still being studied. Lower pH poses a high risk to species with shells and exoskeletons, and emerging research shows that high levels of carbonic acid may also harm finfish. Ocean acidification may affect PEP's ability to manage and protect species diversity, water quality, habitat, and sustainable fisheries. **Objective C, Action 13 addresses this risk.**

Risks and Impacts of Climate Change in the Estuary Ecosystem.

Due to global increases in greenhouse gases.



OBJECTIVE C

Help local communities to take meaningful, well-informed action to prepare for and adapt to climate change impacts in the Peconic Estuary

The PEP, with funding from EPA, completed an update to the Peconic Estuary Critical Lands Protection Strategy and conducted a risk-based climate change vulnerability assessment to develop the **Peconic Estuary Partnership Climate Vulnerability Assessment and Action Plan** consistent with EPA’s Climate Ready Estuaries Program. The Plan identified the tasks presented below to foster resilient Peconic Estuary communities prepared for climate change.

KEY PARTNERS

Lead entities and partner organizations for Objective C Actions are listed with Performance Measures below. Additional partners may be added over time.

➔ ACTION 10

Incorporate climate change considerations into new and existing projects of PEP and partner organizations

The PEP’s partner organizations, including local governments, need to (1) identify approaches that are environmentally sustainable and protective of Peconic estuarine resources and (2) prioritize projects, considering all aspects of habitat restoration and water quality improvement, that will remain viable into the future with anticipated changing coastal conditions related to climate change. Comprehensive plans in municipalities around the Peconic Estuary need to incorporate the potential impacts of climate change on human communities and natural resources, and to align cohesively with other municipal comprehensive plans around the estuary.

ACTION 10: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Short Term

- Incorporation of the Peconic Estuary Critical Lands Protection Strategy into current, planned, and future projects in the six East End Towns; Community Preservation Fund plans; and other land preservation initiatives

Local Governments, NYSDEC, PEP, Peconic Land Trust, Suffolk County

\$\$\$\$ Grants, Local Governments, NYSDEC, Suffolk County



PEP staff conduct Surface Elevation Table (SET) readings at the salt marsh at Indian Island County Park in Riverhead, NY to measure elevation changes and how much sediment is accumulating over time. This helps us assess if the marsh is keeping pace with rising seas. This is one of six sites monitored in the Peconic Estuary watershed under The Nature Conservancy’s Salt Marsh Elevation Monitoring Program.

Photo by Peconic Estuary Partnership

ACTION 10: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Long Term

- Incorporation of information about the potential impacts of climate change into plans for nutrient nonpoint source control, pathogen nonpoint source control, and toxic contamination management for the East End Towns

Local Governments, LINAP, NYSDEC, PEP \$ Grants

Ongoing

- Incorporation of the impacts of changing precipitation and storm patterns, sea level rise, and increasing temperatures into the identification of the sources, monitoring, and modeling of loadings of nutrients, pathogens, and toxic contaminants (e.g., pesticides, herbicides, hazardous materials, hazardous chemicals)

CCE, Long Island Farm Bureau, LINAP, Local Governments, NRCS, NYSDEC, PEP, Suffolk County, SCSWCD, USGS

\$\$ Grants

- Monitoring of long-term effectiveness of climate adaptation projects and management strategies from Action 10 Short-term and Long-term Performance Measures to improve habitat and water quality in the Peconic Estuary, and recommendations to adjust adaptation and management strategies accordingly

Local Governments, NYSDEC, PEP, Suffolk County \$\$ Grants

- Review and updating of the Climate Vulnerability Assessment and Climate Ready Action Plan every five years

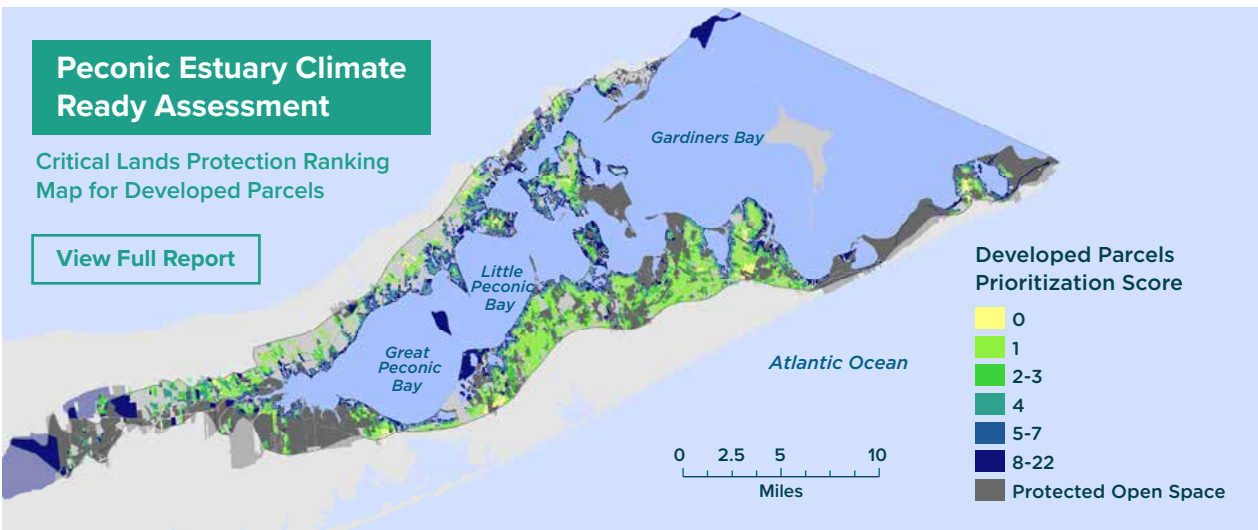
Environmental Partners, Local Governments, NYSDEC, PEP, Suffolk County \$\$ EPA, Grants



Peconic Estuary Climate Ready Assessment

Critical Lands Protection Ranking Map for Developed Parcels

[View Full Report](#)



➔ **ACTION 11**

Provide tools and assistance to local government to mitigate and adapt to the impacts of climate change

The Peconic Estuary Partnership will use tools and resources based on current research and assessments to help local municipalities and other partners to (1) conserve and acquire land and protect habitat to promote climate resiliency and (2) understand the wide impacts of climate change and develop comprehensive strategies to mitigate impacts.



ACTION 11: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Short Term

- Implementation of Actions and Strategies of the Peconic Estuary Climate Ready Action Plan

Environmental Partners, Local Governments, NYSDEC, PEP, Suffolk County

\$\$\$\$ EPA, Grants, Local Governments, NYSDEC, Suffolk County

- Development of model code for local implementation of zoning and other land use tools in The Climate Adaptation Toolbox for Land Use and Municipal Planning identified in the Climate Ready Action Plan

Local Governments, PEP \$ Grants

- Delivery of the Critical Lands Protection Strategy Maps and ArcGIS data to Peconic Estuary resource managers to utilize as a broad tool for planning and adaptation initiatives

Local Governments, NYSDEC, PEP, Peconic Land Trust, Suffolk County ✓ Fully Funded

- Use of the results of the Peconic Estuary Solute Transport Model to understand nitrogen transport in groundwater considering climate change and develop nitrogen mitigation efforts

CCE, Local Governments, Long Island Farm Bureau, LINAP, NRCS, NYSDEC, PEP, Suffolk County, SCSWCD, USGS

\$\$ Grants, Local Governments, Suffolk County

Long Term

- Create and maintain a database of zoning and other land-use tools implemented by East End Towns as part of the Climate Ready Action Plan, and changes in tools, as identified in the Climate Adaptation Toolbox, related to targets in the Action Plan

Local Governments, NYSDEC, PEP, Suffolk County \$\$ Grants

Model Local Laws to Increase Resilience

In 2019, the New York Department of State released Model Local Laws to Increase Resilience. The guide provides an overview of local land use laws and infrastructure specifications to help New York communities adapt to climate change. It is available at www.dos.ny.gov/opd/programs/resilience.

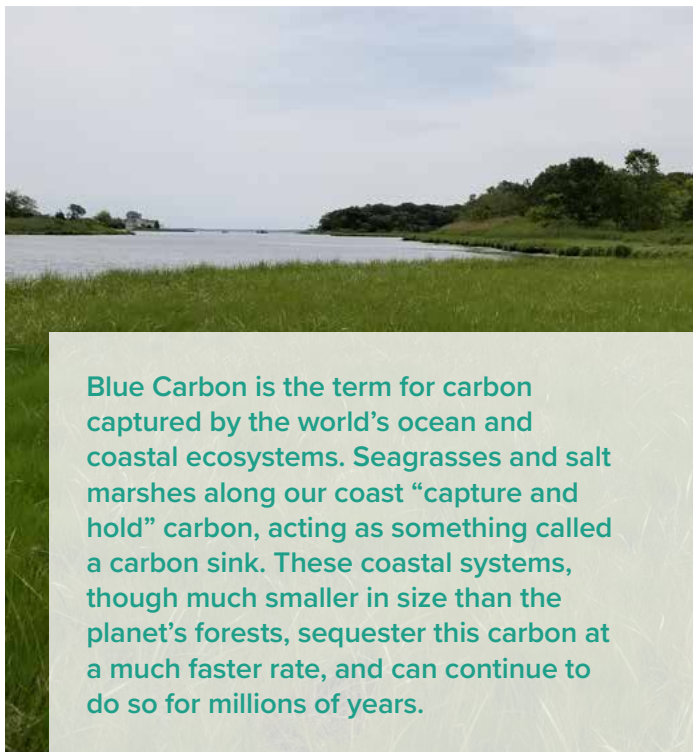
➔ **ACTION 12**

Mitigate climate change through coastal ecosystem management

Coastal ecosystems are some of the most productive on Earth. They provide us with essential ecosystem services, such as coastal protection from storms and nursery grounds for fish. We also know that they provide another integral service: the plants and sediments in tidal marshes and seagrass beds sequester and store large quantities of carbon from the atmosphere and ocean, making blue carbon an essential piece of the solution to global climate change. PEP’s partners will work together to protect and restore these important ecosystems.



Photo by Cornell Cooperative Extension Marine Program



Blue Carbon is the term for carbon captured by the world’s ocean and coastal ecosystems. Seagrasses and salt marshes along our coast “capture and hold” carbon, acting as something called a carbon sink. These coastal systems, though much smaller in size than the planet’s forests, sequester this carbon at a much faster rate, and can continue to do so for millions of years.

Photo by Peconic Estuary Partnership

ACTION 12: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Short Term

- Monitoring of seagrass beds in the Peconic Estuary to understand the conditions that affect seagrass bed health and extent (see also Action 30)

CCE, Local Governments, NYSDEC, PEP, Stony Brook University

\$\$\$\$ EPA, Grants, NYSDEC, Suffolk County

- Monitoring of wetlands in the Peconic Estuary watershed to understand the conditions that affect wetland health and extent

NYSDEC, PEP, The Nature Conservancy, USFWS

\$\$\$ Grants, NYSDEC, USFWS

- Pilot projects to provide data on carbon sequestration by wetlands, eelgrass and kelp and potential for expansion of blue carbon initiatives in the Peconic Estuary

Academic Partners, CCE, LINAP, NYSDEC, PEP, Stony Brook University, Suffolk County

\$\$\$\$ Grants

Long Term

- Monitoring of the water quality impacts of blue carbon projects, and expansion of the projects where feasible in the estuary

CCE, Local Governments, NYSDEC, PEP, Stony Brook University, Suffolk County

\$\$\$\$ Grants and NYSDEC

➔ **ACTION 13**

Collaborate on coastal and ocean acidification monitoring and research

Ocean acidification is a result of higher levels of carbon dioxide (CO₂) in the atmosphere that dissolve into surface waters, affecting oceanic pH by creating carbonic acid. The effects of coastal and ocean acidification may affect the suitability of habitat for shellfish, fish, and other species. Coastal acidification may be exacerbated through local increases in nitrogen concentrations and reduced dissolved oxygen. The PEP’s local and regional partners will work together to ensure that the best available science is used to assess and respond to this emerging threat to New York’s estuarine and marine waters and fisheries.



ACTION 13: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Short Term

- Implementation of monitoring and reporting of climate change early warning monitoring program parameters (dissolved oxygen, pH, water temperature, salinity) as identified through the Peconic Estuary Water Quality Monitoring Assessment

CCE, Local Governments, NYSDEC, PEP, Suffolk County, USGS

\$\$ NYSDEC, Suffolk County, USGS

- Participation with the New York Ocean Acidification Task Force to monitor and address ocean acidification locally and regionally

NYSDEC, PEP, Stony Brook University ✓ Fully Funded

Long Term

- Adoption of recommendations from the New York Ocean Acidification Task Force

Local Governments, NYSDEC, PEP, Suffolk County \$\$ NYSDEC



Photo by Peconic Estuary Partnership

Climate Smart Communities

The **NYSDEC Climate Smart Community (CSC)** program provides funding and support for reducing greenhouse gas emissions and adapting to climate change. In the Peconic Estuary watershed, the Town of East Hampton and the Town of Southampton are CSC certified. As of early 2020, the Town of Riverhead, Town of Southold, and Village of Greenport were participating in the pledge, and other Towns and Villages were in the process of applying. The Peconic Estuary Partnership will encourage and provide guidance as additional municipalities consider pledging to the CSC program. **Applicable CSC adaptation actions that align with the PEP CCMP are:**

- Promote Energy Conservation
- Promote Water Conservation and Reuse
- Living Shorelines
- Wetland Restoration

Photo by Jenna Schwerzmann

➔ **ACTION 14**

Increase public awareness of anticipated impacts of climate change on the Peconic Estuary and practical ways to mitigate and prepare for them

To complement efforts by local governments, PEP will help build public awareness and support for climate-ready principles and activities in communities of the Peconic watershed.



ACTION 14: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Short Term

- Public outreach campaign about likely climate change impacts and practical implications for Towns and individuals, providing information on climate change, guidance and incentives to use BMPs through targeted outreach, inclusion in school curriculum, and outreach materials

Local Governments, **PEP, PEPC, Suffolk County** **\$\$ Grants**

- Use of climate-ready habitat restoration projects to educate the public on the impacts of climate change and the importance of accommodating natural adaptation of the Peconic Estuary ecosystem

Local Governments, **NYSDEC, PEP, PEPC, Suffolk County** **\$\$ Grants**

Ongoing

- Review and update every five years of the outreach and education strategies identified in the Climate Vulnerability Assessment and Climate Ready Action Plan to ensure strategies are effective

Local Governments, **NYSDEC, PEP, PEPC, Suffolk County** **\$ EPA, Grants**



Photo by EPA



PEP talking to citizens at Suffolk County Marine Environmental Learning Center about the importance of salt marshes

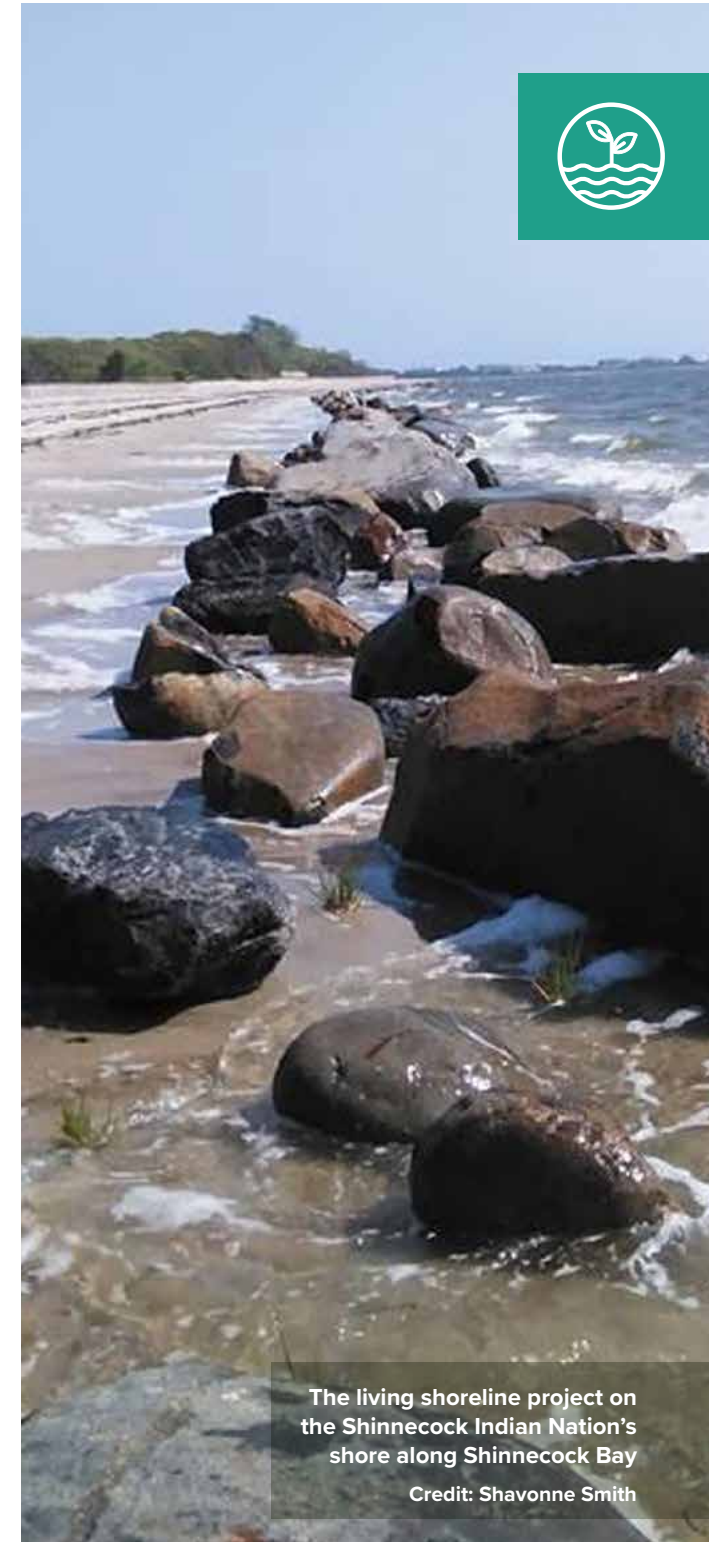
Photo by Peconic Estuary Partnership

➔ ACTION 15

Strengthen partnership with the Shinnecock Indian Nation and collaborate to implement the Climate Ready Assessment and Action Plan

The Shinnecock Indian Nation is located on the South Fork of eastern Long Island. The Nation was recognized by the federal government on October 1, 2010. Its territory consists of 800 acres of ancestral land adjacent to Southampton that supports homes, community facilities, and businesses, as well as a pristine woodland called Westwoods in Hampton Bays that serves as a tribal gathering place for spiritual and recreational purposes. The Nation’s lands are particularly vulnerable to sea level rise and major storms and associated flooding, as the 800-acre area is located on a low-lying, south-facing peninsula in Shinnecock Bay, and Westwoods includes beach and bluffs bordering the Peconic Bay. The Nation is closely tied to the marine and coastal environment; fish and shellfish have been staples of the Shinnecock diet for thousands of years. Additionally, several native coastal plant species, such as sassafras, are used in cultural practices. The Shinnecock Indian Nation has identified climate change-related sea level rise, storm intensification, and water quality issues (e.g., higher temperatures, salinity, and acidification), as potential threats to their lands and lifestyle.

In 2019, the Shinnecock Indian Nation in partnership with the Peconic Estuary Partnership and the U.S. Environmental Protection Agency Climate Ready Estuaries Program completed a **Climate Vulnerability Assessment and Action Plan**. During the process of developing this Plan, the Nation identified priority risks and potential actions for various climate change scenarios.



ACTION 15: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Short Term

- Increased coordination and collaboration with the Shinnecock Indian Nation so that climate-ready decision-making can be fully comprehensive of their interests and lands

PEP, Shinnecock Indian Nation \$\$ Grants

Long Term

- Based on the high risks identified in the **Shinnecock Indian Nation Climate Vulnerability Assessment and Action Plan**, PEP and partners will, in conjunction with the Shinnecock Indian Nation, where appropriate, secure funding and implement projects that align with PEP Objectives including habitat creation and restoration, green infrastructure, land conservation, and education

EPA, Local Governments, NYS, PEP, Shinnecock Indian Nation \$-\$\$\$\$ Grants

The living shoreline project on the Shinnecock Indian Nation’s shore along Shinnecock Bay

Credit: Shavonne Smith



Photo by Peconic Estuary Partnership



CLEAN WATERS
*for ecosystem health
and safe recreation*



Goal: Clean Waters for Ecosystem Health and Safe Recreation



Overview

Fishing, shellfishing, recreation, and tourism on the East End of Long Island are closely tied to the Peconic Estuary's health, and changes in estuarine health can affect the local economy. Expansion of land development and the human population threatens to impair water quality and the health of these economically important resources and habitats.

Poor water quality is linked to people's actions on land. In the Peconic Estuary, pollution tends to come from non-point **sources** like septic systems and residential and agricultural fertilizer, rather than point sources like sewage treatment plants. The pollution enters groundwater or surface waters, which carry it to the estuary.

One of the most serious issues affecting water quality in the Peconic Estuary is excess **nitrogen loading**, which can cause harmful algal blooms, low dissolved oxygen, and degraded aquatic habitats. **Pathogens** and **toxic contaminants** also contribute to water pollution in the estuary and can make fish and shellfish unsafe to eat. New and emerging contaminants pose a continued risk to ecological and human health in our watershed. **Marine Debris** in the aquatic environment is of increasing concern because of its persistence and effect on the environment, wildlife, and human health.



Photo by Luke Ormand

**Excessive Nitrogen:
Too Much of a Good Thing**

On a global scale, additional amounts of nitrogen activated by human activity are now so large that they significantly perturb the global nitrogen cycle. Human activities convert around 120 million metric tons of nitrogen from the atmosphere per year into reactive nitrogen forms, more than the combined effects from all Earth's terrestrial processes. Much of this new reactive nitrogen ends up in the environment, polluting waterways and the coastal zone. Anthropogenic distortion of the nitrogen cycle has shifted marine ecosystems to experience periods of anoxia and prevalent algal blooms caused by excessive nutrients. In the northern hemisphere, excess nitrogen input has led to reductions in biodiversity; accelerated climate change through the production of nitrous oxide gas; widespread air and water pollution including eutrophication; and hypoxic "dead zones" in the coastal ocean.

Peconic River Fish Kill June 2015 Due to Low Periods of Dissolved Oxygen, Caused by Excess Nitrogen Concentrations

Photo by Red Vault Productions



Excess Nitrogen:

Nitrogen is a commonly occurring element that is present in air, water, and soil. It is an essential nutrient for healthy ecosystems, supporting growth of algae and aquatic plants, which provide food and habitat for fish, shellfish, and invertebrates. However, excess nitrogen from human activities can cause detrimental impacts such as coastal acidification, harmful algal blooms, low levels of dissolved oxygen in the water, and loss of critical eelgrass and wetland habitats. Over the past two decades, nitrogen pollution has become recognized as one of the greatest threats to the Peconic Estuary. The western part of the estuary is particularly susceptible to nitrogen pollution because of multiple pollution sources and low levels of tidal flushing. Toward the eastern end of the estuary, deeper waters and greater tidal flushing lessen the potential for severe impacts from nitrogen pollution.



Harmful Algal Blooms (HABs):

Some HABs produce toxins that cause severe illness or death in humans, wildlife, or fish. Others do not pose a direct threat to human or animal health but cause poor water quality and foul odors. Decades ago, brown tide plagued the Peconic Estuary, but more recently other HABs have been prevalent. Excessive nitrogen entering the estuary from sources such as fertilizer and human and animal waste contributes to HABs.



Pathogens:

Pathogens are viruses, bacteria, fungi, and protozoans that can cause diseases in humans, animals, and plants. Untreated or partially treated human sewage and wild and domestic animal waste are major pathogen sources. People may become infected through direct contact with or ingestion of contaminated water, or by eating raw or partially cooked bivalve shellfish harvested from contaminated waters. In the Peconic Estuary, the New York State Department of Environmental Conservation monitors shellfish harvest areas for pathogens, and the Suffolk County Department of Health Services monitors bathing beaches.



Toxic Contaminants:

Toxic contaminants are manmade or naturally occurring substances that, when found in certain concentrations, can cause adverse ecosystem or human health effects. The use of pesticides, other industrial and household chemicals, pharmaceuticals, and personal care products can lead to toxic substances entering the environment. Long Island's legacy of agriculture and industry means that groundwater potentially contains toxic chemicals like DDT that were used in the past but are now banned, which is evidenced in data collected via the Suffolk County and USGS Groundwater Monitoring Programs. Additionally, new and emerging contaminants have become a focal point for Suffolk County and New York State as contaminants like Perfluorooctanoic acid (PFOA) and 1,4-dioxane are increasingly found in groundwater and surface water systems. Additional research will be required to assess their impacts on water quality, fisheries, and seagrasses.



Marine Debris:

Marine Debris is known for its persistence and effects on the environment, wildlife, and human health. Plastic bags, soda cans, fishing line, balloons, and Styrofoam containers create just a short list of the discarded or lost debris that enters our streams, rivers, bays and ocean. Marine mammals and birds can mistake debris for food causing harm and starvation, or they can become dangerously entangled resulting in injury or loss of survival. Further, plastic can break down into microscopic pieces that are consumed by marine life and accumulate in the food web.

OBJECTIVE D**Protect areas with clean water from degradation**

Some places in the Peconic Estuary and watershed currently have good water quality. Establishing protections that will keep those areas from being polluted is critical.

KEY PARTNERS

Lead entities and partner organizations for Objective D Actions are listed with Performance Measures below. Additional partners may be added over time.

Establishing Targets for Clean Water

Clean water supports fish, shellfish, and wildlife and ecosystem health. Clean water provides for safe recreation in and on the water and seafood that is safe for consumption. PEP, through consultation with its partners, has developed a set of preliminary parameter targets to define clean water.

Water Clarity: A median Secchi disk depth of 2 meters (6.56 feet) or greater during the growing season (April 1 through October 31)

Chlorophyll-a: A median chlorophyll-a concentration of 5.5 µg/L or less during the growing season (April 1 through October 31)

Dissolved Oxygen: A dissolved oxygen (DO) concentration complying with New York State's acute and chronic DO criteria: never less than 3.0 mg/L (acute), and greater than 4.8 mg/L (chronic) as a daily average in 90 percent of samples, to support the maintenance of biotic resources.

Pathogens: Concentrations of *Enterococcus* at estuarine/marine swimming beaches should not exceed 104 colony-forming units per 100 milliliter water sample (cfu)/100 mL). This is the existing threshold for fecal indicator bacteria (*Enterococcus*) that is used by Suffolk County to determine swimming beach closures; new *Enterococcus* standards are currently in review. Once these standards are in place, the pathogens target will be revised to reflect the new standards going forward.

In addition, a set of parameters have been defined as predictors for an early warning system to monitor changes in habitat suitability and ecosystem stressors: water temperature, salinity, dissolved oxygen and pH. This early warning system will be helpful to understand trends associated with climate change and anticipate events that may lead to unsuitable conditions for eelgrass, scallops, and marine life. These clean water targets will be reviewed annually to track the health of the estuary. Waterbodies in the Peconic Estuary that met the above Water Clarity, Chlorophyll-a, and Dissolved Oxygen targets were listed in the Suffolk County Subwatersheds Wastewater Plan as **"reference water bodies."**



Photo by Kaitlin Morris

→ ACTION 16

Identify areas of clean water quality and deliver information that local governments and others can use to protect those areas

The PEP Technical Advisory Committee will lead an analysis of data from several water quality monitoring programs (see box) to identify areas of the estuary that currently have clean water and determine whether those areas are adequately protected. Waterbodies will be identified using existing information provided by the Suffolk County Subwatersheds Wastewater Plan and NYSDEC. Partners including the East End Towns will collaborate on effective ways to protect any areas that are not adequately protected.

ACTION 16: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Short Term

- Completion of the Peconic Estuary Water Quality Monitoring Strategy within 3 years of the final Revised CCMP

PEP ✓ Fully Funded

- Annual review of water quality data and water quality monitoring programs with assessment and recommendation regarding changes to water quality data collection in order to adequately monitor all waterbodies in the estuary

PEP \$ EPA, Local Governments, Suffolk County

- Identification of areas with clean waters and their current levels of protection; communication of findings to local stakeholders and decision makers

Local Governments, NYSDEC, PEP, Suffolk County \$ EPA, Suffolk County

- Annual water quality data reports that support partners' efforts to increase local and regional stewardship of areas of clean water quality

PEP \$ EPA, Local Governments, Suffolk County

- A Quality Assurance Plan for citizen science partner programs carrying out water quality monitoring, such as Surfrider's Blue Water Task Force, to allow for the use of the data in protection strategy development

Environmental Partners, PEP \$\$ Grants

Long Term

- Development of model legislation collaboratively with Suffolk County, NYSDEC and East End Towns to use for planning purposes to protect areas with clean water; for example, legislation relating to fertilizer use, wastewater management, development, zoning, chemical disposal, or other topics

Local Governments, NYSDEC, PEP, Suffolk County \$\$ EPA, Local Governments, Suffolk County

Water Quality Data Sources

PEP's partners use the following data sources to assess water quality in the Peconic Estuary:

- Cornell University, Cooperative Extension of Suffolk County, PEP Long-term Eelgrass Monitoring Program
- National Atmospheric Deposition Program (NADP)
- New York State Department of Environmental Conservation (NYSDEC), Division of Water, Rotating Integrated Basin Studies (RIBS) Program; Division of Marine Resources, Shellfish Growing Area Classification Unit and Fishery-Independent Trawl Survey Data
- Stony Brook University, School of Marine and Atmospheric Sciences, Long Island Marine Monitoring Network (LIMMN) Program
- Suffolk County Department of Health Services (SCDHS), Office of Water Resources; and Office of Ecology, Bureau of Marine Resources, and Bathing Beach Monitoring Program
- United States Geological Survey Continuous Water Quality Monitoring Program

In support of collaboration under the NYSDEC supported Long Island Water Quality Integrated Data System (LIQWIDS), PEP will be contributing to the data sharing project currently being developed by the USGS. LIQWIDS will be a highly useful tool for water quality data management in the watershed.

OBJECTIVE E**Increase understanding of nutrient pollution in groundwater and surface waters, and decrease negative impacts from legacy, current, and future nutrient inputs**

The headwaters of the Peconic River arise near Brookhaven National Laboratory and the community of Ridge in the heart of the Central Long Island Pine Barrens. Just east of the Laboratory, the river flows in a west-to-east direction past the Town of Riverhead and enters into Flanders Bay, a distance of about 12 miles (19 km). The Peconic River is a groundwater-fed system and the main freshwater contributor to the western bays of the Peconic Bay complex. The USGS and Suffolk County conduct water quality sampling of the river for nutrients and other contaminants. The Lower Peconic River and Tidal Tributaries; Western Flanders Bay and Lower Sawmill Creek; and Meetinghouse Creek, Terrys Creek and Tributaries are impaired waterbodies and included in the TMDL for nitrogen in the Peconic Estuary.

In New York State, nitrogen has been established as the leading nutrient pollutant in coastal waters by both NYSDEC's Long Island Nitrogen Action Plan (LINAP) and Suffolk County's Subwatersheds Wastewater Plan. Nitrogen has also been identified as a contributing factor in coastal acidification and is being addressed by the NYS Ocean Acidification Taskforce. Groundwater that seeps into the Peconic Estuary can carry high loads of nitrogen arising from insufficient wastewater treatment and/or excess fertilizer. In 2017, Suffolk County labeled nitrogen as "public water enemy number one" and launched their ambitious Subwatersheds Wastewater Plan to combat nitrogen loading.

A comprehensive understanding of past nutrient loads within the estuary is essential, and the USGS, with PEP-designated NYS funding, is developing a solute transport model in the watershed. Understanding groundwater pathways and travel times is key to highlighting priority areas and creating strategies for the reduction of historical loads.

For many HABs, the driver is related to nutrient pollution. For that reason, efforts to reduce HABs are intertwined with efforts to lower nutrients in our waterways. Other HABs are driven, in part, by warming waters as a result of climate change, and some are brought by offshore currents. Extensive work has been carried out by Stony Brook University in the Peconic watershed to understand these variations. Researchers at Stony Brook University, in conjunction with The Nature Conservancy, track HABs in the Peconic Estuary on a yearly basis.

Through Actions 17, 18, and 19, the PEP and partner organizations will address the issues of nutrient pollution and harmful algal blooms by using a suite of complementary approaches. Several waterbodies in the Peconic Estuary have achieved an increase in water quality or have maintained clean water quality over the past two decades, and PEP aims to sustain and enhance that level of quality well into the future. This means providing accurate information to all local governments so everyone is aware and planning boards and others can make informed decisions.

KEY PARTNERS

Lead entities and partner organizations for Objective E Actions are listed with Performance Measures below. Additional partners may be added over time.

**Nitrogen and Ocean Acidification**

In 2016, New York State created the Ocean Acidification (OA) Task Force to identify the causes and factors contributing to ocean acidification. Coastal acidification caused by excess nitrogen in the water column adds to OA caused by atmospheric carbon dioxide. This coastal acidification can decrease the pH even more than would be expected from eutrophication/hypoxia and ocean acidification alone, suggesting that hypoxia reduces the ability of eutrophic waterbodies to buffer ocean acidification. It is clear that nitrogen is a problem contributing to coastal acidification globally, and there is evidence that it is also occurring in New York's coastal waters. Continuing efforts to implement more stringent nitrogen water quality standards could help reduce coastal eutrophication, increasing the ability of Long Island's coastal waters to buffer ocean acidification.

Wastewater Policy Creating Local Change

Wastewater is the largest land-based contributor of nutrients to the Peconic Estuary. Much of the nitrogen pollution has been linked to unsewered areas, specifically properties that use septic systems, also known as Onsite Wastewater Treatment Systems (OWTS), which have limited ability to reduce the amount of nitrogen in wastewater. Historically, grandfathered commercial parcels had a perpetual tacit approval to continue exceeding Article 6 density requirements so long as they met one of the codified exemptions.

In 2017, the Suffolk County Legislature took a monumental step toward extinguishing the perpetual as-of-right grandfathering of commercial parcels by approving revisions to Article 6 of the Suffolk County Sanitary Code that set forth new requirements for the practice of grandfathering. Under this amendment to Article 6, certain currently grandfathered sites would no longer have an exemption.

The **Suffolk County Reclaim Our Water Initiative** provides increased protection of water resources. Suffolk County has taken action to protect water resources by making changes to the Suffolk County Sanitary Code to allow for the use of Innovative Alternative Onsite Wastewater Treatment Systems (I/A OWTS) to effectively treat wastewater. A number of I/A OWTS technologies are being evaluated to determine which ones will be most effective in areas throughout the county. Suffolk County is providing grants and low-interest financing to make the installation of new nitrogen reducing septic systems affordable for homeowners through the **Septic Improvement Program**.

In addition to Suffolk County’s program, some East End Towns are offering additional funding through the Community Preservation Fund for upgrades of septic systems and cesspools in certain areas:

- **East Hampton Septic Incentive Program**
- **Southampton I/A OWTS Rebate Program**
- **Shelter Island Innovative Advanced/ Onsite Wastewater Treatment System Rebate Program**



Installation of an I/A OWTS at a home within the Peconic Estuary watershed.
Photo by Peconic Estuary Partnership



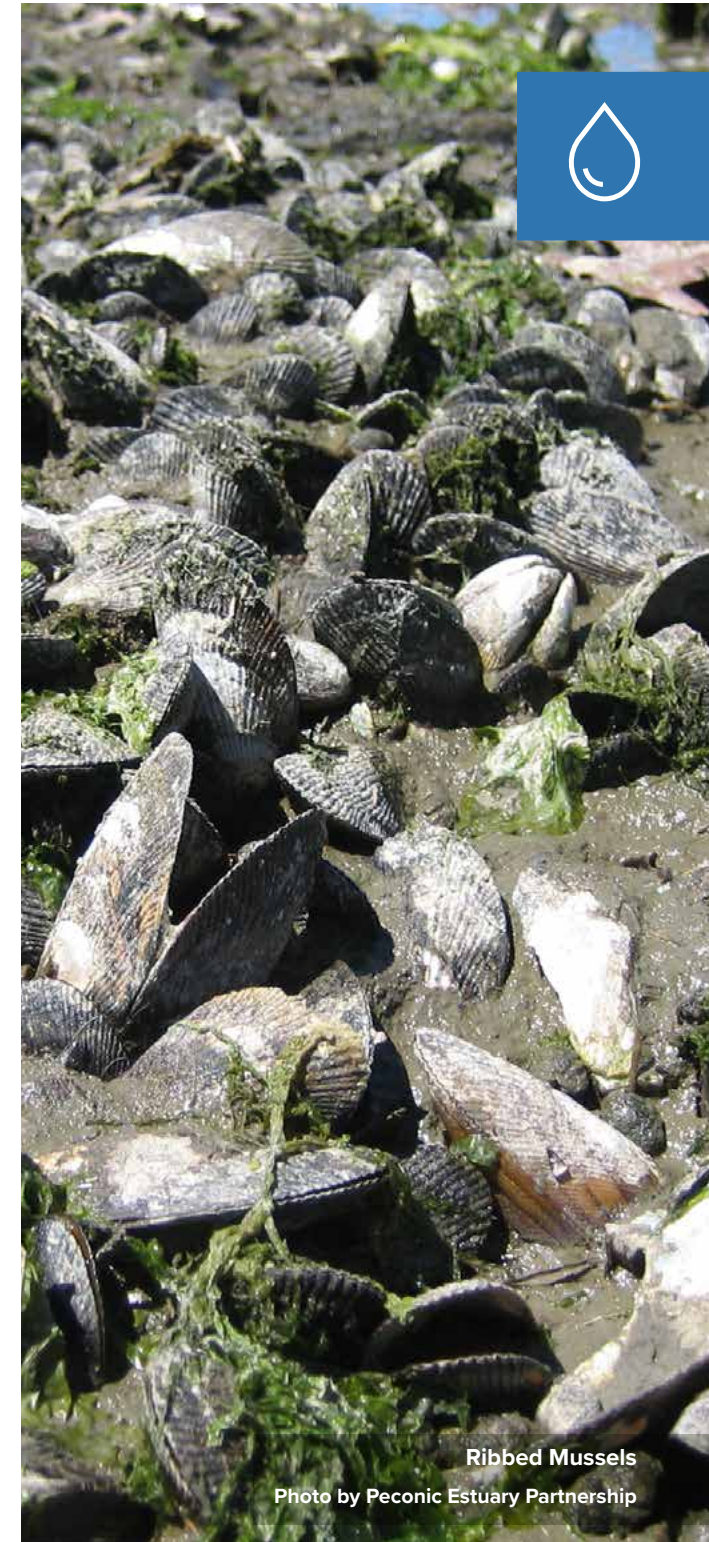
Synergy of LINAP and CCMP

Under the leadership of the Department of Environmental Conservation, New York State launched the Long Island Nitrogen Action Plan (LINAP), which has led the state in developing plans and creating funding sources for the reduction of nitrogen in waterways. LINAP and CCMP 2020 converge in the Peconic watershed for a strong, partner-led plan to reduce and abate nitrogen in our watershed while providing access to funding for numerous water quality-related projects for both individual homeowners and local governments.

→ ACTION 17

Plan science-based approaches for monitoring and reducing nutrient pollution

PEP and partners will collect and analyze water quality data to identify problem areas, and they will investigate potential nutrient pollution reduction solutions



ACTION 17: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Short Term

- Completion of the Peconic Estuary Water Quality Monitoring Strategy within 3 years of the final Revised CCMP

PEP ✓ Fully Funded

- Completion of the Peconic Estuary Solute Transport Model analysis to understand historical nitrogen loading and to develop management strategies based on future scenarios

NYSDEC, PEP, Suffolk County, USGS \$\$ EPA

- Completion of BMP cost per pound of nitrogen removal from nature-based point and non-point source removal techniques. This will help to develop cost-effective, subwatershed-specific strategies to achieve target nutrient load reductions

Local Governments, PEP, Suffolk County ✓ Fully Funded

- Collaborate with the NYSDEC to compile and update a database of completed nitrogen management projects within the Peconic Estuary watershed to guide current and future nitrogen management actions. Utilize database to track nitrogen reduction efforts within the watershed

Local Governments, LINAP-NYSDEC, PEP, PEPC, Suffolk County \$ EPA, Local Governments, NYSDEC

Long Term

- Utilize Action 17 Short-term Performance Measures to further refine draft code and model local laws relating to nutrient management actions such as fertilizer use, wastewater management, development and zoning for all six East End Towns

Environmental Partners, Local Governments, NYSDEC, PEP, Suffolk County \$\$ EPA, Local Governments

- Development of strategies with municipalities and water districts to manage water use, conserve water, and maintain existing and protect future buffers to prevent saltwater intrusion into the groundwater, such as irrigation BMPs that guide the amount and frequency of irrigation

Local Governments, Municipal Water Districts, NYSDEC, PEP, Suffolk County, Suffolk County Water Authority

\$\$\$\$ Grants

- A review of existing non-point source recommendations in the TMDL report and establishment of a reduction target as part of the CCMP Tracking System

EPA, Local Governments, NYSDEC, PEP, PEPC \$-\$\$\$\$ Grants

Ribbed Mussels

Photo by Peconic Estuary Partnership

➔ ACTION 18

Implement science-based approaches for monitoring and reducing nutrient pollution

PEP staff and partners will use findings from Action 17 and other sources to enable municipalities and property owners to implement solutions to nutrient pollution such as improved septic treatment systems, ordinances, and innovative nutrient removal technologies.



The Suffolk County Subwatersheds Wastewater Plan

The Suffolk County Subwatersheds Wastewater Plan evaluated the 75 individual subwatersheds within the Peconic Estuary watershed, to assess the nitrogen load reductions required to achieve water quality goals. The targeted sanitary wastewater nitrogen load reduction goals ranged from 0 percent for the better-flushed open waters located in the eastern parts of the estuary to 91 percent for the more densely populated and less-well flushed subwatersheds more typical of the western estuary. In general, the nitrogen load reduction targets are highest for the subwatersheds located in the western estuary, and on the North Fork. The overall nitrogen load reduction goal from sanitary wastewater for the watershed is 43 percent. The Plan details a phased wastewater treatment upgrade implementation timeline for parcels within identified management areas within the Peconic Estuary watershed to achieve nitrogen load reduction targets. More information on the identified management areas, number of parcels included and estimated pounds of nitrogen to be removed daily are listed in the [Plan](#).

Phases:

Phase I (2019–2023) - 0 to 2 year groundwater contributing area

Phase II (2024–2053) - Surface water and groundwater priority area 1 (includes 0 to 2 year contributing area)

Phase III (2054–2068) - Surface water priority area 2-4 and Groundwater priority area 2. 2-25/50 year contributing area.

Phase IV (Beyond 2069) - Remaining Surface Water and Groundwater Protection Parcels.

ACTION 18: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Short Term

- Implementation of monitoring programs recommended in the Peconic Estuary Water Quality Monitoring Strategy

CCE, NYSDEC, PEP, Suffolk County, USGS

\$\$\$ EPA, CCE, Grants, NYSDEC, Suffolk County, USGS



SCDHS Monitoring Water Quality along the Peconic River

Photo by Peconic Estuary Partnership

ACTION 18: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Short Term

- Work in conjunction with our partners to contribute to the NYSDEC effort to centralize water quality data with the creation of a portal to allow all interested stakeholders, such as local monitoring groups, non-profits, or governmental agencies, to share water-quality monitoring data through the Long Island Water Quality Information Data System (LIQWIDS)
Academic Partners, NYSDEC, Local Governments, PEP, Suffolk County, USGS **\$ EPA, NYSDEC**
- Phased implementation of the Suffolk County Subwatersheds Wastewater Plan to abate septic-related current and future nitrogen loading
Local Governments, PEP, Suffolk County **\$\$\$ EPA, NYS, Suffolk County**
- Use of existing legal framework and County and Town grant and loan opportunities to assist homeowners in upgrading to Innovative and Alternative On-Site Wastewater Treatment Systems (I/A OWTS)
Local Governments, PEP, Suffolk County **\$\$ Local Governments, Suffolk County**
- Increased funding and expanded outreach for PEP’s Homeowner Rewards Program, which provides financial incentives for homeowners to install rain gardens, native plantings, and/or rain barrels on their properties that benefit the environment
EPA, PEP **\$\$ EPA, Grants**
- Support for the planning and implementation of wastewater re-use initiatives
Local Governments, LINAP, NYSDEC, PEP, Suffolk County, Town of Shelter Island, Village of Greenport
\$\$\$\$ Grants, LINAP, NYSDEC, Suffolk County

Long Term

- Assistance to farmers in completing nutrient management plans as specified in the Agricultural Stewardship Plan
CCE, Long Island Farm Bureau, LINAP, NRCS, PEP, Suffolk County, SCSWCD **\$\$ EPA**
- Pilot projects to evaluate innovative technologies and practices (e.g., permeable reactive barriers, bioextraction, living shorelines, hydromodification) and determine their usefulness for reducing impacts of existing contaminated groundwater on the Peconic Estuary
Local Governments, NYSDEC, PEP, Suffolk County **\$\$\$ Grants, LINAP**
- Additional lands protected using the Peconic Estuary Critical Lands Protection Strategy as a guide
Local Governments, NYSDEC, PEP, Peconic Land Trust, Suffolk County
\$\$\$\$ CPF Funds, Grants, Peconic Land Trust, Suffolk County



Photo by Peconic Estuary Partnership

➔ ACTION 19

Collate results of harmful algal blooms (HABs) monitoring and deliver findings to support management decision making

PEP staff and partners will collect key data on HABs and translate the data into information for decision making on a local level.

ACTION 19: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Short Term

- Identification of funding sources to carry out recommendations in the Suffolk County Harmful Algal Bloom Action Plan

NY Sea Grant, NYSDEC, PEP, Suffolk County \$ EPA, NYSDEC, Suffolk County

- Implementation of the Suffolk County Harmful Algal Bloom Action Plan

NY Sea Grant, NYSDEC, PEP, Stony Brook University, Suffolk County, USGS \$-\$\$\$ Grants, NYSDEC, Suffolk County

- Communication of accurate and sound science as part of PEP annual water quality reporting to local decision makers

NYSDEC, PEP, Stony Brook University, Suffolk County, USGS \$\$ EPA

Long Term

- Development of a HABs reporting system that streamlines the efforts of partner organizations

Academic Partners, NYSDEC, PEP, Stony Brook University, Suffolk County, USGS \$\$ Grants



Aerial of Rust Tide bloom in the Peconic Estuary
Photo by Robert Waters, SCDHS



Microscope image of *Cochlodinium polykrikoides*, the organism that causes Rust Tide
Photo by Suffolk County Department of Health Services

OBJECTIVE F

Reduce current and future inputs of toxics, pathogens, and marine debris into groundwater and surface waters, and minimize their impacts

Some **toxic contaminants** are well known, while others have been identified only recently. Contaminants newly identified as hazardous to human and ecological health have been found in Peconic groundwater systems, most notably 1,4-dioxane and perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA). In 2019, Governor Cuomo signed Senate Bill S4389B, which prohibits household cleansing products, cosmetic products, and personal care products that contain 1,4-dioxane. This is a start to cleaning up these toxics in our waters. However, while regional studies have linked agricultural herbicides to eelgrass loss, widespread use of herbicides still occurs in agriculture and landscaping, and use of pesticides against mosquitoes and ticks has also continued throughout the Peconic Estuary's watershed. In the decades since PEP's inception, it has become clear that the Peconic Estuary is fed by a complicated network of groundwater pathways and sub-aqueous discharge zones forming a direct link between the health of the estuary and contaminants in groundwater. While groundwater testing for human health and drinking-water wells has continued throughout the watershed, a network of groundwater wells dedicated to supporting estuarine health does not currently exist.

Pathogen contamination is another issue in the Peconic Estuary. Sources of pathogens are untreated or partially treated human sewage and wild and domestic animal waste. Pathogens can enter marine waters via stormwater runoff, wildlife and waterfowl, illegally discharged sanitary wastewater from boats, and on-site sanitary wastewater disposal systems. Humans may encounter pathogens through direct contact with or ingestion of contaminated water, or by eating raw or partially cooked bivalve shellfish harvested from contaminated waters. High levels of pathogens in local waterways may make shellfish unsafe to eat and may result in fishing closures of shellfish beds in the Peconic Estuary. High levels of pathogens can also make water unsafe for swimming, leading to beach closures. The closure of shellfish beds and beaches can result in economic losses for fishermen and businesses.

Marine debris has long been a problem in coastal waterways. Large plastic products such as balloons can maim and kill sea turtles, birds, and marine mammals, while microplastics can accumulate in the bodies of a wide range of estuarine organisms. Recent legislation passed in East Hampton and Southampton prohibiting the intentional release of balloons and in Suffolk County banning the use of Styrofoam and plastic straws in take-out restaurants signals the growing concern of local communities and law makers.

KEY PARTNERS

Lead entities and partner organizations for Objective F Actions are listed with Performance Measures below. Additional partners may be added over time.



Monofilament fishing line recycling receptacle

Photo by Kaitlin Morris

→ ACTION 20

Conduct analysis to understand the sources of toxic contaminants and implement measures to reduce their impacts

PEP staff will work closely with partners to identify sources of toxic contaminants in the watershed and to complete a range of practical steps to reduce inputs and impacts of toxics.

ACTION 20: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Short Term

- Research into the types, sources, and impacts of toxic contaminants existing in and entering the Peconic Estuary and development of recommendations for reducing toxic contamination

National Atmospheric Deposition Monitoring Program, PEP, Suffolk County, Suffolk County Water Authority, USGS, Water Districts

\$\$-\$\$\$\$ Grants, Suffolk County, USGS

- Establishment of hydrodynamic modeling of the Peconic Estuary that links with other relevant models to inform the movements of toxic contaminants in the watershed (e.g., solute transport model)

Suffolk County, PEP, USGS \$\$\$ Grants

- Support Suffolk County to implement Integrated Pest Management Plans as specified in the Suffolk County Agricultural Stewardship Plan

CCE, PEP, Suffolk County, SCSWCD \$\$ Suffolk County

- Promotion of Stop Throwing Out Pollutants (S.T.O.P.) days

Local Governments, PEP \$ EPA

Long Term

- Utilize Action 20 Short-term Performance Measures to develop sustainable landscaping BMPs and further refine draft code and model local laws for all six East End Towns for chemical disposal and to curb pesticide and herbicide use on residential properties

CCE, Local Governments, NYSDEC, PEP \$\$ EPA, Local Governments

- Development of a marina management plan for the Peconic Estuary, using the NYSDEC Marina Operations for Existing Facilities document as a guide

Association of Marine Industries, Local Governments, PEP \$\$\$ Grants, NYSDEC

- Reduction in pesticide usage in marsh habitat and implementation of alternative pest control methods, including establishment of mosquito breeding surveys and control plans in East End communities, using the East Hampton pilot project as a model

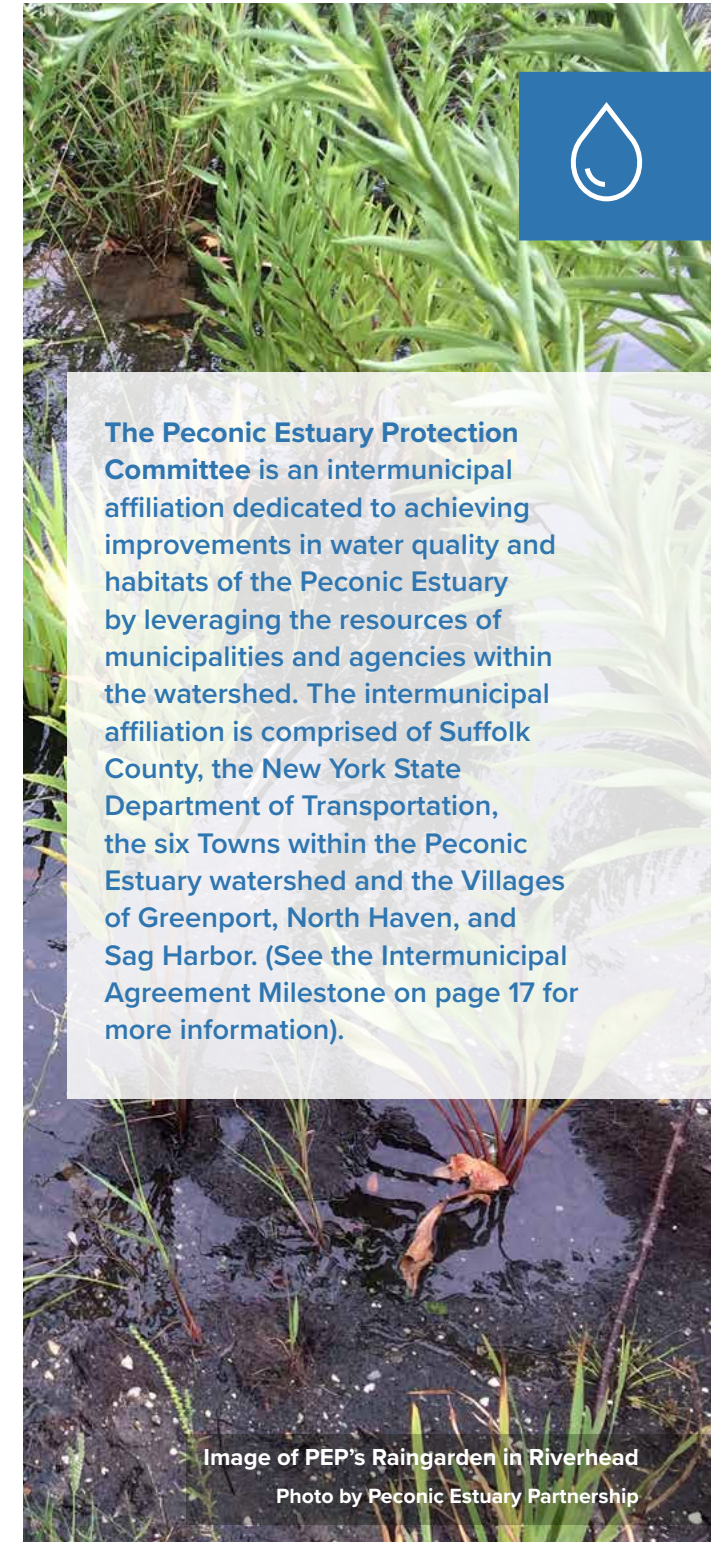
CCE, Local Governments, PEP, Suffolk County, The Nature Conservancy, Town of East Hampton \$-\$\$ Grants



➔ ACTION 21

Expand non-point source subwatershed management plans to all pathogen-impaired waterbodies and continue to use existing plans

PEP has developed twelve subwatershed management plans for the Peconic Estuary that identify cost-effective strategies to help reduce pathogen and stormwater runoff pollution. PEP will work with our partners to build on these efforts and will work closely with NYS in the development of pathogen TMDLs for all recommended embayments in the Peconic watershed.



ACTION 21: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Short Term

- Development of pathogen TMDLs for applicable Peconic Estuary waterbodies
 EPA, NYSDEC, PEP \$\$-\$\$\$\$ Grants, NYSDEC
- Development of strategies and outreach materials to help achieve stormwater reduction goals
 PEP, PEPC \$\$ Grants, Local Governments, PEPC
- Development of a Quality Assurance Management Plan (QAMP) to enable sampling, analysis, and reporting of ground and surface water by municipalities for use in NYS, Suffolk County, and East End municipality decision making and management actions
 EPA, NYSDEC, PEP, PEPC, Suffolk County, Towns of Brookhaven, East Hampton, Riverhead, Shelter Island, Southampton, and Southold
 ✓ Fully Funded
- Compilation of a database of completed stormwater management projects and future green infrastructure needs for East End municipalities to guide current and future pathogen management actions
 Local Governments, PEP, PEPC, Suffolk County \$ EPA, Local Governments
- Collation and dissemination of information about stormwater outfalls and sources to enable comprehensive management of inputs to the Peconic Estuary watershed
 Local Governments, PEP, PEPC, Suffolk County \$ Grants, Local Governments
- Review of current PEP Non-Point Source Subwatershed Management Plans and initiation of select viable projects
 Local Governments, PEP, PEPC \$\$\$\$ Grants, Local Governments

Long Term

- Development of additional Non-Point Subwatershed Management Plans for all pathogen impaired waterbodies as necessary
 Local Governments, NYSDEC, PEP, PEPC \$\$\$\$ Grants

The Peconic Estuary Protection Committee is an intermunicipal affiliation dedicated to achieving improvements in water quality and habitats of the Peconic Estuary by leveraging the resources of municipalities and agencies within the watershed. The intermunicipal affiliation is comprised of Suffolk County, the New York State Department of Transportation, the six Towns within the Peconic Estuary watershed and the Villages of Greenport, North Haven, and Sag Harbor. (See the Intermunicipal Agreement Milestone on page 17 for more information).

Image of PEP’s Raingarden in Riverhead
 Photo by Peconic Estuary Partnership



Photo by Jenna Schwerzmann

ACTION 21: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Long Term

- Reporting and monitoring of vessel pump-out facilities

Local Governments, NYSDEC, PEP \$ Grants, Local Governments, NYSDEC, Suffolk County

- Funds identified for a US Food and Drug Administration (FDA)-certified lab in Suffolk County to enable increased water quality sampling to inform shellfish closures

EPA, FDA, NYSDEC, PEPC, Suffolk County \$\$\$\$ Grants

➔ ACTION 22

Assess marine debris in the Peconic Estuary and develop plans to address problems that are found

Common trash from consumer goods makes up the majority of what eventually becomes marine debris, polluting our waterways and oceans. Plastics in the aquatic environment are of increasing concern because of their persistence and effect on the environment, wildlife, and human health. EPA's Trash-Free Waters Initiative is reducing the volume of trash entering U.S. waterways.

ACTION 22: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Short Term

- Collect additional data on microplastics by USGS in the Peconic Estuary and dissemination of existing information

PEP, USGS \$\$ EPA, USGS

- Deployment, maintenance, and promotion of monofilament fishing line collection receptacles

Local Governments, Marinas, PEP \$ EPA, Local Governments

- Annual coastal clean-ups

PEP \$ EPA

Long Term

- Development of local government initiatives to reduce plastic pollution

Environmental Partners, Local Governments, PEP \$ Local Governments

- Engagement of local communities to reduce aquatic trash with support from EPA

EPA, Local Governments, PEP \$ EPA, Local Governments

Microplastic Assessment Methods

The US Geological Survey is working with federal, state, and local partners to develop advanced sampling techniques and innovative analytical methods for the assessment of microplastics in natural waters. The recent regional study conducted by USGS Water Science Centers from Massachusetts to Virginia sought to create a snapshot of conditions in urbanized streams. Here in New York, the Peconic River at the County Road 105 bridge (USGS Station ID 01304562) was sampled during wet- and dry-weather conditions as part of this regional study. Preliminary results reveal a range of sizes, shapes, colors, and types consistent with other urban areas throughout the country; a report on the findings is being drafted. Future studies being proposed by the USGS New York Water Science Center include point-source assessments that can inform microplastics loading to Long Island estuaries and will utilize the new USGS Microplastics Laboratory in Troy, New York.

Photo by Jenna Schwerzmann

Priorities for Research and Monitoring: Clean Waters

PEP's partners and stakeholders identified the following priorities for research and monitoring to help achieve the Goal of clean waters. While the CCMP Actions will help advance some of these priorities, initiatives by other entities are necessary to fully address them.



Implement the Peconic Estuary Water Quality Monitoring Strategy.



Produce an annual water quality report to allow for widespread use of the data for planning and targeted clean-up efforts by all partners and local communities.



After completion of the solute transport model currently in development, produce a new hydrodynamic model to link results of the solute transport model and other relevant models, and use the model to understand water dynamics of the Peconic Estuary.



Characterization of subaqueous freshwater discharge zones in the Peconic Bays.



Research and monitor dry atmospheric deposition from town centers, suburban development, and agricultural areas in the Peconic Estuary watershed to improve estimates of atmospheric deposition and understanding of total nitrogen inputs within the Peconic Estuary watershed.



More fully understand atmospheric deposition of ammonia to the Peconic Estuary watershed and how it affects total nitrogen loads.



Develop better information about mercury deposition by precipitation in the Peconic Estuary watershed and its implications for human and ecological health.



Expand pathogen monitoring to include identification of sources on a subwatershed scale to enable the comprehensive management of inputs into the watershed.



Collate and make available information about wastewater outfalls and sources to enable comprehensive management of inputs into the watershed.



Increase understanding of how wildlife management influences pathogen loading, nutrient uptake, and associated impacts on cover crop reduction.



Investigate the impacts of nutrient loading on coastal and ocean acidification and establish a set of tools to help offset negative impacts in the Peconic Estuary.





HEALTHY
ECOSYSTEM
*with abundant,
diverse wildlife*


Goal: Healthy Ecosystem with Abundant, Diverse Wildlife





Overview


Physical alterations to the Peconic Estuary and its watershed such as navigational channel dredging, hardening of the shoreline with bulkheads and other erosion control structures, and clearing of land for roads and buildings all harm the habitats and living resources within and around the estuary. At the headwaters of the Peconic River, the sensitive pine barrens ecosystem protects important drainage areas to the aquifer, which eventually outfall into the main estuary system. These alterations, along with pollution and climate change, have led to the loss and degradation of critical habitats such as the pine barrens, eelgrass beds, marshes, and diadromous fish habitat.


The habitats of the Peconic Estuary face several key threats

- 

Development and other human activities have resulted in habitat loss, fragmentation, and degradation, and remaining open space is under increasing development pressure.
- 

Dams built on streams flowing into the Peconic Estuary prevent the movement of diadromous fish into freshwater.
- 

Invasive species often outcompete native plants and animals, threatening biodiversity and reducing habitat value.
- 

The interacting effects of rising seas and lack of sediment threaten to drown tidal wetlands and shoreline habitats, especially if they cannot migrate inland due to natural or manmade barriers.
- 

Nitrogen pollution, warmer water temperatures, and human disturbance are contributing to the loss of eelgrass beds within the Peconic Estuary.

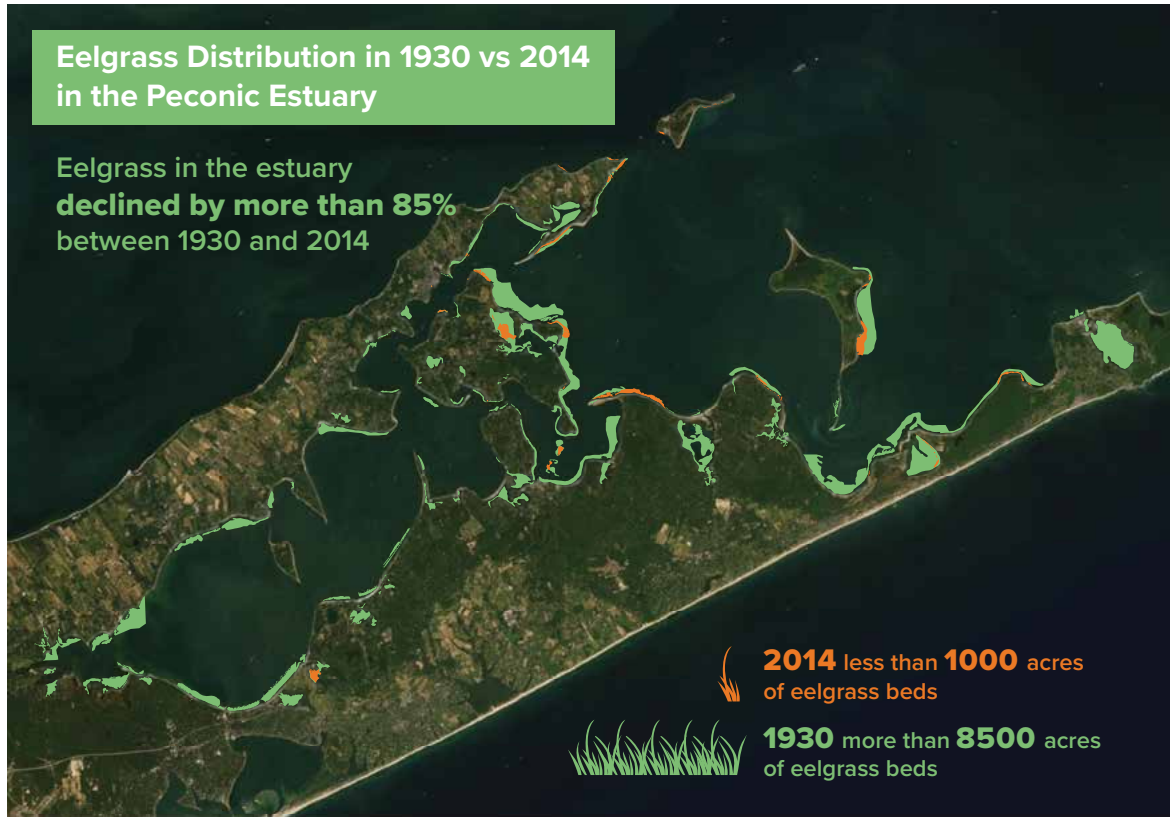


Fifty acres of marshland surrounding Narrow River in Orient, NY is choked with invasive Phragmites. PEP is working with its partners to restore tidal flow to the marsh to promote the re-establishment of native vegetation and increase important waterfowl and bird habitat.
Photo by Jim Feaga

Dramatic Declines in Eelgrass Beds and Tidal Wetlands

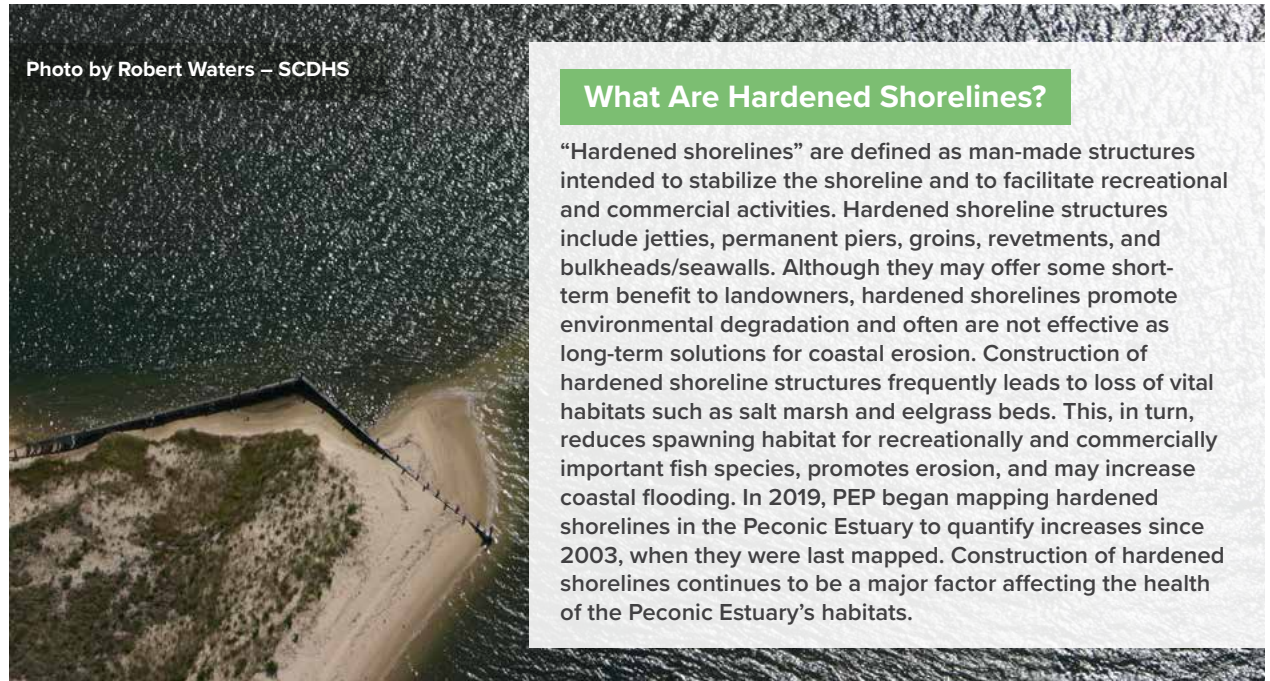
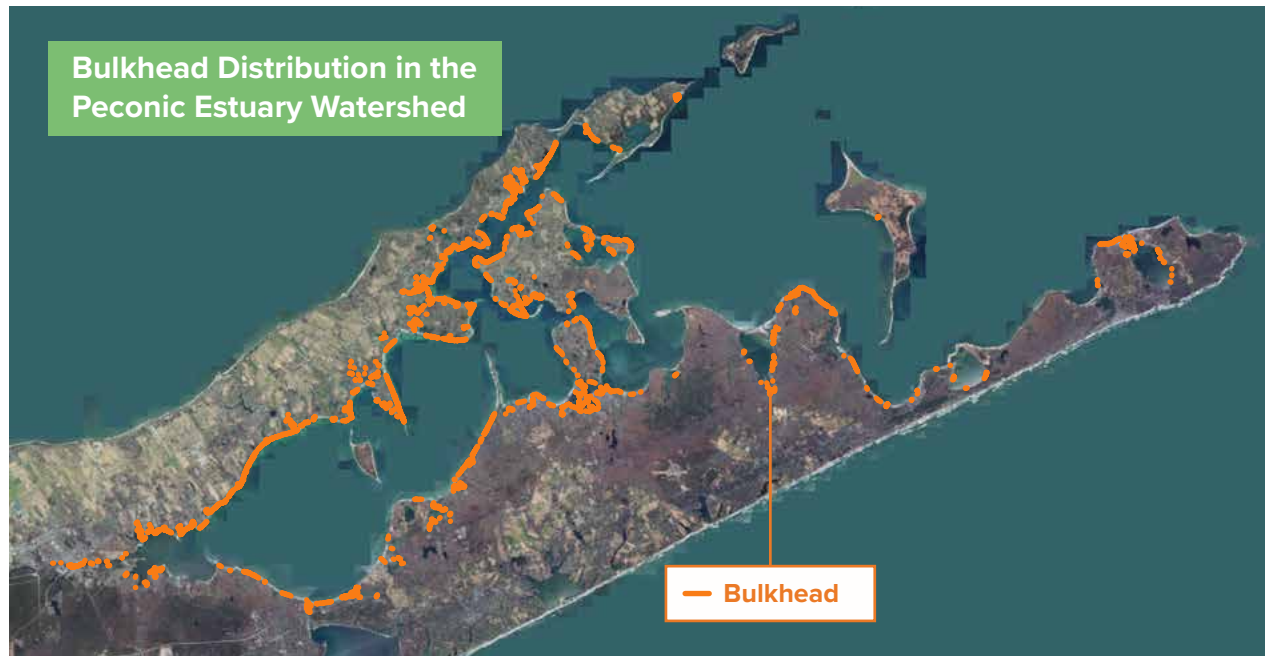
Once bountiful throughout the Peconic Estuary, eelgrass has declined significantly over the last century. In 1930, there were more than 8,700 acres of eelgrass beds in the estuary. In 2014, less than 1,000 acres remained—a decline of more than 85 percent. Aside from a meadow in Bullhead Bay, no eelgrass persists in the Peconic Estuary west of Shelter Island. Loss of eelgrass beds affects the many commercial and recreational fish and invertebrate species that rely on them for food and shelter.

An eelgrass disease epidemic along the Atlantic seaboard in the 1930s and a series of harmful algal blooms in the Peconic Estuary in the 1980s and 1990s were major factors in the loss of eelgrass habitat. Globally, seagrasses have decreased dramatically in the last few decades, and climate change is believed to play a major role. Warmer water temperatures stress eelgrass and may render historical locations of eelgrass beds no longer suitable for eelgrass growth. Long-term monitoring in the Peconic Estuary indicates that water temperatures in the western section of the estuary no longer fall within the optimal range for eelgrass. Rising sea level is another important climate-related threat to eelgrass survival in locations where seawalls and other types of shoreline hardening make it impossible for eelgrass beds to shift landward to remain in a favorable water depth. In addition, nutrient enrichment, algal blooms, water quality, boating and fishing practices, and shoreline stabilization structures are all collectively threatening the health and extent of eelgrass. Over the last decade eelgrass restoration has been attempted at multiple sites within the Peconic Estuary with limited success. A further understanding of suitable environmental conditions for eelgrass growth is needed to better inform eelgrass protection and restoration efforts.



Tidal wetlands are among the most productive and ecologically valuable habitats on Earth. Between 1974 and 2005, the Peconic Estuary lost approximately ten percent of its vegetated tidal wetlands, with the greatest losses occurring in East Hampton and Shelter Island. Eighty-six marsh complexes, out of 159 identified in the Peconic Estuary, have been categorized as at risk (defined as marsh loss greater than ten percent). Of particular concern is the rapid decline of approximately 25 percent of high marsh habitat between 1974 and 2005. These trends suggest significant marsh drowning is occurring. Marsh drowning is related to the interacting effect of the failure of marsh accretion processes (such as deposition of organic sediments and accumulation of plant biomass) to keep pace with sea-level rise. Hardening of the shoreline, excess nutrients, tidal restrictions, and other land and human-use activities all affect marsh accretion and erosion processes and contribute to the degradation of these habitats. Marshes can migrate inshore gradually with rising sea levels, but the rapid rate at which sea level is now rising makes it difficult for them to migrate inshore fast enough. Additionally, in some cases, natural or manmade barriers—such as seawalls and other hardened shoreline structures—will prevent marshes from migrating inland.

Another significant reason for the loss of native high marsh communities in the Peconic is the invasion of the common reed, *Phragmites australis*. An 88.5 percent increase in *Phragmites australis* was recorded in the Peconic between 1974 and 2005. Tidal wetland loss means reduced feeding, breeding, and nursery habitats for waterfowl, wading birds, shorebirds, fish, and invertebrates. It also means a reduction in important ecosystem services, such as sediment retention, nutrient and organic matter recycling, and storm and flood buffering.



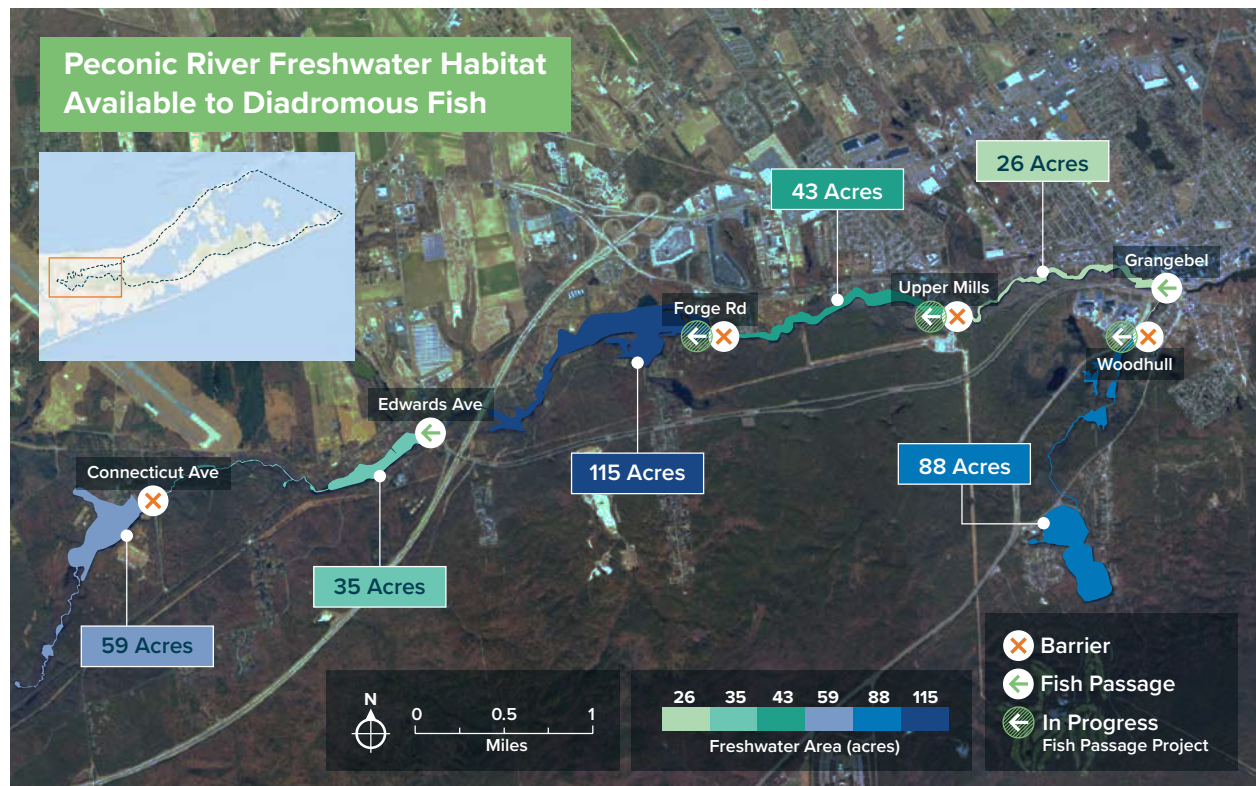
What Are Hardened Shorelines?

“Hardened shorelines” are defined as man-made structures intended to stabilize the shoreline and to facilitate recreational and commercial activities. Hardened shoreline structures include jetties, permanent piers, groins, revetments, and bulkheads/seawalls. Although they may offer some short-term benefit to landowners, hardened shorelines promote environmental degradation and often are not effective as long-term solutions for coastal erosion. Construction of hardened shoreline structures frequently leads to loss of vital habitats such as salt marsh and eelgrass beds. This, in turn, reduces spawning habitat for recreationally and commercially important fish species, promotes erosion, and may increase coastal flooding. In 2019, PEP began mapping hardened shorelines in the Peconic Estuary to quantify increases since 2003, when they were last mapped. Construction of hardened shorelines continues to be a major factor affecting the health of the Peconic Estuary’s habitats.

Restoring Habitat for Diadromous Fish

The Peconic River and the other streams, creeks, and lakes in the Peconic Estuary’s watershed provide critical spawning and maturation habitat for diadromous fish species. Diadromous fish are those that spend part of their life cycle in freshwater and part in the ocean.

In the late 1800s and early 1900s, dams were built on nearly all of Long Island’s freshwater tributaries for grist mills, cranberry bogs, and other industrial uses, and as property line demarcations. These dams cut off historic migratory routes for diadromous fish, notably river herring and American eels, blocking access to hundreds of acres of freshwater habitat. Other physical structures such as road culverts can also block access to freshwater habitats. River herring and American eel populations have declined over the past century, in part due to this loss of freshwater habitat. The decline of these diadromous fish has negative impacts on the health of the Peconic Estuary ecosystem. The movement of diadromous fish between salt and freshwater is especially important in transferring ocean-derived energy into estuarine, freshwater, and upland habitats. River herring and American eel also provide prey for countless species during their annual migration. The Peconic Estuary Partnership has been working with its partners to restore historic access to freshwater habitat for diadromous fish by installing fish passage structures that allow fish to go around or over the dam, and replacing undersized road culverts with larger, fish-friendly culverts.



OBJECTIVE G

Expand scientific understanding of the Peconic Estuary ecosystem and deliver information that supports management decision-making

KEY PARTNERS

Lead entities and partner organizations for Objective G Actions are listed below with Performance Measures. Additional partners may be added over time.

➔ ACTION 23

Conduct scientific studies to expand understanding of the Peconic Estuary ecosystem and support ecosystem-based management

NYSDEC conducts a comprehensive trawl survey in the Peconic Estuary that provides valuable long-term information on the finfish and mobile invertebrate communities. An initial spatial and temporal analysis of this data set indicated there have been several large-scale community shifts over time and identified certain areas of the estuary that are diversity hotspots. It was recommended that more detailed analyses be conducted to further improve understanding of the estuary ecosystem. Funding has been secured to conduct a more detailed spatial and temporal analysis of the Peconic trawl dataset and to characterize the estuarine food web through modeling. These studies will provide a set of quantitative tools that can be used by managers to identify vulnerable estuarine species and critical habitat areas, assess the overall health of the ecosystem, identify knowledge gaps, and evaluate future management scenarios. Targeted data analysis and modeling will support an ecosystem-based approach to management.

ACTION 23: PERFORMANCE MEASURES, PARTNERS AND FUNDING**Short Term**

- Development of an ECOSIM model to characterize the estuarine food web and examine structural changes in ecosystem properties over time

NYSDEC, PEP, **Stony Brook University** ✓ Fully Funded

- Detailed spatial and temporal analysis of the Peconic Estuary trawl survey data to assess how species use the estuary and how species and communities have responded to local and regional environmental changes over time

NYSDEC, PEP, **Stony Brook University** ✓ Fully Funded



Photo by NYSDEC

ACTION 23: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Long Term

- Identification of key indicator species to monitor, based on the ECOSIM model and trawl survey analysis

NYSDEC, PEP, Stony Brook University \$ EPA

- Expanded research partnerships to facilitate the collection of additional ecological data to address identified knowledge gaps

CCE, NY Sea Grant, PEP, Pine Barrens Commission, Stony Brook University, SCSWCD, USGS

\$\$\$\$ EPA, Grants, NYSDEC, Suffolk County

➔ **ACTION 24**

Review and update data for rare, protected, and endangered species in the Peconic Estuary to support the development of protection strategies

A number of organizations collect data on rare, protected, and endangered species. This information needs to be reviewed and collated, and monitoring needs to be expanded in some cases.

ACTION 24: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Short Term

- Review and collation of recent data on rare, protected, and endangered species in the estuary

Atlantic Marine Conservation Society, Audubon, Local Governments, New York Natural Heritage Program, NYSDEC, PEP, Pine Barrens Commission

\$ EPA

Long Term

- Expansion of monitoring of rare, protected, and endangered species, where needed. Multiple and varying partners will be identified for individual efforts related to this performance measure

Atlantic Marine Conservation Society, Audubon, Group for the East End, Local Governments, New York Natural Heritage Program, NYSDEC, PEP, Pine Barrens Commission, Seatuck Environmental Association

\$\$\$ EPA, Local Governments, NYSDEC, Suffolk County

- Delivery of information to support updates to New York State Significant Coastal Fish and Wildlife Habitats and the development of protection strategies. Information will be delivered by multiple partners that may change over time, as such no lead is identified here

Atlantic Marine Conservation Society, Audubon, Group for the East End, Local Governments, New York Natural Heritage Program, NYSDEC, PEP, Pine Barrens Commission, Seatuck Environmental Association

\$\$ EPA, NYSDEC



Photo by Cornell Cooperative Extension Marine Program



Measuring and monitoring horseshoe crabs

Photo by Peconic Estuary Partnership

➔ ACTION 25

Quantify the recreational use and value of the natural resources within the Peconic Estuary watershed

The last economic valuation study for the Peconic Estuary was completed in the 1990s. An updated study is needed to understand the current value of the natural resources within the Peconic watershed to help garner support and funds for natural resources protection and restoration.



Photo by Ashley Oliver

ACTION 25: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Short Term

- An updated economic valuation study for the Peconic Estuary and dissemination of results to partners and the public

PEP, Suffolk County \$\$ EPA, Grants, Suffolk County

➔ ACTION 26

Quantify the impacts of fishing, aquaculture, boating, navigational dredging, and hardened shoreline structures on habitats and vulnerable species, to foster sustainable recreational and commercial uses of the Peconic Estuary that are compatible with protection of biodiversity



Photo by Peter Topping

ACTION 26: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Short Term

- Small-scale research studies evaluating local impacts of fishing, aquaculture, boating, navigational dredging, and hardened shoreline structures on habitats and vulnerable species, as appropriate

Academic Partners, Association of Marine Industries, Baymen, CCE, Local Governments, NY Sea Grant, NYSDEC, PEP, Stony Brook University, Suffolk County, SCSWCD

\$\$\$ Grants

- Report summarizing results of local studies and relevant findings from research studies in other locations

Association of Marine Industries, Baymen, Local Governments, NY Sea Grant, NYSDEC, PEP, SCSWCD, Suffolk County

\$ EPA

ACTION 26: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Long Term

- Development of BMPs to help reduce any negative impacts from boating, fishing, aquaculture, and other activities, based on results from Short Term Performance Measures under Action 26; communication of BMPs to local stakeholders and decision makers

Association of Marine Industries, Baymen, Local Governments, NY Sea Grant, NYSDEC, PEP, SCSWCD, Stony Brook University, Suffolk County

\$ EPA

➔ ACTION 27

Facilitate spatial planning of the Peconic Estuary to help mitigate resource-use conflicts and ensure the protection of critical habitats

With increasing interest in shellfish and seaweed aquaculture in the Peconic Estuary, there is a need to conduct spatial planning to mitigate resource-use conflicts and to ensure the protection of vulnerable species and habitats. The results from studies conducted through other Actions under Objective G will help support this work.

ACTION 27: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Short Term

- Final revised Suffolk County Aquaculture Lease Program Management Plan and Aquaculture Lease Map, using current best available science to make ecologically sound decisions

NYSDEC, Suffolk County ✓ Fully Funded

Long Term

- Creation of GIS-based map for the Peconic Estuary watershed that includes information on critical habitat areas in the estuary, key estuary species, and recreational and commercial uses of the estuary to support future planning decisions

Association of Marine Industries, Baymen, Local Governments, LINAP, NYSDEC, PEP, Pine Barrens Commission, Stony Brook University, Suffolk County

\$\$ EPA, NYSDEC



Photo by Kate Rossi-Snook

OBJECTIVE H

Restore and protect key habitats and species diversity in the Peconic Estuary and its watershed

KEY PARTNERS

Lead entities and partner organizations for Actions under Objective H are listed below with Performance Measures. Additional partners may be added over time.

→ ACTION 28

Protect critical natural resource areas and high-priority lands in the Peconic Estuary watershed

The 2019 Critical Lands Protection Strategy used three classes of criteria to prioritize undeveloped, developed, and agricultural land parcels for protection: (1) Habitat and Water Quality Protection, (2) Inundation Areas, and (3) Groundwater Protection. The resulting map products can be used by East End municipalities for land-use planning and zoning, and to identify potential opportunities for developed or agricultural lands to be converted back to a natural state to increase resilience to climate change. PEP and partners will work to protect the high-priority lands identified in the Critical Lands Protection Strategy and to update the Strategy every five years.

ACTION 28: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Short Term

- Meetings with all relevant partners to disseminate and discuss Critical Lands Protection Strategy and garner support for implementation

PEP \$ EPA

- Develop a target for the number of protected acres agreed on and incorporated into PEP CCMP Tracking System

Local Governments, NYSDEC, **PEP**, Peconic Land Trust, Pine Barrens Commission, Suffolk County \$ EPA

Long Term

- Assistance provided to municipalities in land use planning and conversion of high-priority developed areas back to a natural state

Local Governments, Long Island Farm Bureau, **PEP**, Peconic Land Trust, Pine Barrens Commission, Suffolk County, The Nature Conservancy

\$\$\$\$ Grants, Local Government CPF Funds, NYS



Photo by Barry Udelson

ACTION 28: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Long Term

- Critical Lands Protection Strategy updated every five years

Local Governments, NYSDEC, PEP, Peconic Land Trust, Suffolk County, The Nature Conservancy

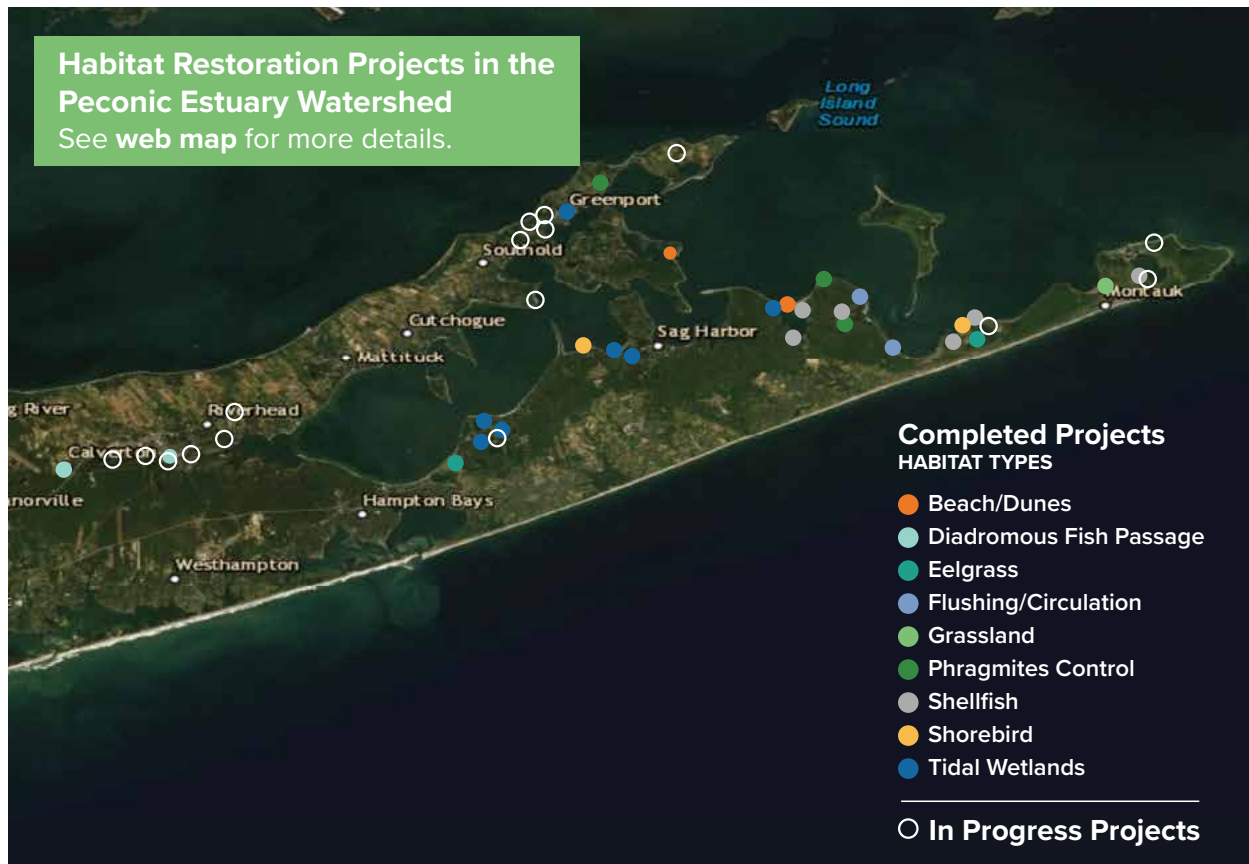
\$\$ EPA, Local Governments

Ongoing

- Assistance to PEP partners in identifying and applying for land protection grants

PEP \$ EPA

Habitat Restoration Projects in the Peconic Estuary Watershed
See web map for more details.



PEP Habitat Restoration Plan

In 1997, the Peconic Estuary Program Habitat Restoration Workgroup (now the Natural Resources Subcommittee) was formed and charged with identifying important Peconic natural habitats with enhancement or restoration potential and identifying and prioritizing potential restoration projects. The end product was the Habitat Restoration Plan for the Peconic Estuary released in December 2000. The Habitat Restoration Plan was subsequently updated in 2009 and 2017 with final priority sites added in 2020. The **2020 Habitat Restoration Plan** provides the basis for the majority of the actions and performance measures under Objective H. This plan will be submitted to EPA for approval by December 2020. The 2020 Habitat Restoration Plan describes the many valuable and unique habitats that exist within the Peconic Estuary watershed, the major threats to these habitats, habitat restoration progress to-date, and identifies goals, objectives, and actions to guide habitat restoration in the Peconic Estuary watershed over the next 10 years. The plan also includes a list of priority habitat restoration projects, which will be reviewed every two years and new priorities will be added by consensus of the Natural Resources Committee and approval by the TAC.

➔ ACTION 29

Maintain, restore, and enhance viable diadromous fish spawning and maturation habitat in the Peconic Estuary watershed

Three diadromous fish connectivity projects (Woodhull Dam, Forge Road Dam, and Upper Mills Dam) were in progress on the Peconic River as of early 2020. The completion of those three projects, combined with two connectivity projects that have already been completed, will result in the restoration of three hundred acres of diadromous fish habitat on the Peconic River (see map on page 70). Other priority diadromous fish restoration projects have been identified through the PEP Habitat Restoration Plan and the Long Island Diadromous Fish Restoration Strategy.



Alewife—a diadromous fish
Photo by Byron Young



Hubbard County Park Fish Passage
Photo by Peconic Estuary Partnership

ACTION 29: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Short Term

- Completion of the Woodhull Dam, Forge Road Dam, and Upper Mills Dam diadromous fish connectivity projects on the Peconic River

NYSDEC, PEP, Seatuck Environmental Association, Suffolk County, Town of Brookhaven, Town of Riverhead, Town of Southampton

\$\$\$\$ Grants; funding secured for Forge Road project and partially secured for Woodhull project

- Development of an alewife survey to monitor the population and assess the success of fish connectivity projects

Academic Partners, Local Governments, NYSDEC, Peconic Baykeeper, PEP, Seatuck Environmental Association

\$\$ EPA, Grants, NYSDEC

Long Term

- Completion of culvert improvements on Alewife Creek to enhance the largest alewife run on Long Island

NYSDEC, Peconic Baykeeper, PEP, Seatuck Environmental Association, Suffolk County, The Nature Conservancy, Town of Southampton

\$\$\$\$ Grants; funding partially secured

- Completion of priority diadromous fish habitat connectivity projects identified in the PEP Habitat Restoration Plan or Long Island Diadromous Fish Restoration Strategy, or through the Volunteer Alewife Monitoring Survey, in other areas of the Peconic watershed to restore additional habitat

Local Governments, NYSDEC, PEP, Seatuck Environmental Association, Suffolk County \$\$\$\$ Grants

➔ ACTION 30

Monitor and protect existing eelgrass beds; where appropriate, restore and expand eelgrass beds

PEP’s partners recently developed a Seagrass Bio-Optical and Habitat Suitability Model to better understand the specific light and temperature requirements for eelgrass in the Peconic Estuary. Results from this model will be used to identify potential sites for eelgrass restoration or enhancement. To protect existing eelgrass, BMPs and management areas will be developed and implemented.



ACTION 30: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Short Term

- Identification of sites where eelgrass restoration or enhancement is feasible, and implementation of projects

CCE, Local Governments, NYSDEC, PEP, Stony Brook University \$\$\$\$ Grants and NYSDEC

- Identification of sites where water quality improvements could potentially increase habitat suitability for eelgrass, and implementation of projects

CCE, LINAP, Local Governments, NYSDEC, PEP, Stony Brook University, The Nature Conservancy
 \$\$\$\$ Grants and NYSDEC

- A comprehensive aerial survey of eelgrass in the Peconic Estuary to support future management decisions

Long Island Sound Study, NYSDEC, PEP ✓ Fully Funded

Long Term

- BMPs developed for eelgrass protection, such as conservation moorings and other low-impact boating and shellfish harvesting practices

Environmental Partners, Local Governments, NYSDEC, PEP \$\$ Grants and NYSDEC

- Collaboration on implementation of New York’s Seagrass Protection Act and toward creation of Seagrass Management Areas with associated management plans

Local Governments, NYSDEC, PEP \$\$\$\$ NYSDEC

Ongoing

- Financial and logistical support for the Annual Long-Term Eelgrass Monitoring Program to monitor changes in eelgrass density and extent

CCE, PEP, Suffolk County \$\$ EPA

Photo by Stephen Tettelbach

➔ ACTION 31

Use available habitat quality assessment and climate change resiliency tools to prioritize wetland restoration projects identified in the 2020 PEP Habitat Restoration Plan, and implement the top priority projects

Numerous wetland restoration projects were identified in the 2020 Habitat Restoration Plan. The projects largely seek to restore/recreate lost marsh habitat, remove barriers to tidal flow and sediment supply, enhance the habitat by increasing native wetland communities, and allow for natural marsh migration necessitated by rising seas. There are several available tools that can help to prioritize these projects, including the Long Island Tidal Wetland Trends Analysis, other ongoing marsh health assessment work, and the recently completed PEP Critical Lands Protection Strategy. The prioritization of projects will be updated every two years.



ACTION 31: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Short Term

- Complete construction of priority wetland restoration project at Indian Island to restore five acres of habitat
 CCE, NYSDEC, PEP, Suffolk County, The Nature Conservancy, Town of Riverhead, Town of Southhold
 ✓ Fully Funded
- Complete engineering designs and construction of the Cedar Beach Creek Wetland Restoration to restore five acres of wetland habitat
 ACOE, CCE, NYSDEC, Town of Southhold ✓ Fully Funded
- Complete engineering designs for ongoing, priority wetland restoration project at Narrow River/ Broad Meadows marsh
 Ducks Unlimited, PEP, NYSDEC, Town of Southold, Suffolk County, The Nature Conservancy \$\$\$ Grants
- Complete engineering designs for ongoing, priority wetland restoration project at Paul Stoutenburgh Preserve
 PEP, Suffolk County, Town of Southold, The Nature Conservancy \$\$ Grants
- Complete engineering designs for ongoing, priority wetland restoration project at Meetinghouse Creek
 EPA, NEIWPCC, NYSDEC, PEP, Suffolk County, Town of Riverhead ✓ Fully Funded
- Identification of the top five projects from the 2020 Habitat Restoration Plan that have yet to be initiated and secured funds for conceptual design plans
 CCE, Local Governments, NYSDEC, PEP, Suffolk County, The Nature Conservancy \$\$ EPA

ACTION 31: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Long Term

- Complete construction of Narrow River/Broad Meadows Wetland Restoration, Paul Stoutenburgh Wetland Restoration, and Meetinghouse Creek Wetland Restoration projects to restore over 50 acres of habitat

CCE, Ducks Unlimited, NEIWPC, NYSDEC, PEP, Suffolk County, The Nature Conservancy, Town of Riverhead, Town of Southold

\$\$\$\$ Grants

- Completion of design and implementation of at least three priority projects identified through the Short-term Performance Measures under Action 31

CCE, Local Governments, NYSDEC, PEP, Suffolk County, The Nature Conservancy \$\$\$\$ Grants

➔ **ACTION 32**

Review existing wetland and shoreline protection regulations and draft model laws for Towns to strengthen protections and increase resilience to climate change

NYDOS and NYSDEC have recently created model local laws for Towns and Villages to increase resilience. PEP will work with the East End municipalities to review these model local laws and adapt them to the East End.

ACTION 32: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Short Term

- Meetings of PEP staff and municipalities to develop draft model policies

Environmental Partners, Local Governments, NY Sea Grant, NYSDEC, PEP \$ EPA



Photo by Andrew Seal SCDHS

➔ **ACTION 33**

Implement living shoreline projects, monitor for ecological and financial benefits, and use model projects to educate planners and homeowners on the benefits of living shorelines over hardened shorelines

One pilot living shoreline project has been completed, and one will soon be completed in the Peconic Estuary. Post-project monitoring will occur to determine success and benefits. PEP will work with partners to implement additional living shoreline projects and create user-friendly guides for homeowners who want to construct living shorelines on their properties.



Horseshoe Crab
Photo by Luke Ormand



Green Heron
Photo by Luke Ormand

ACTION 33: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Short Term

- Dissemination of monitoring results from two pilot living shoreline projects
CCE, NY Sea Grant, NYSDEC, PEP, Peconic Land Trust, Suffolk County \$ EPA, NYSDEC
- Identification of additional sites to carry out living shoreline projects and project implementation
CCE, NY Sea Grant, NYSDEC, PEP, Suffolk County \$\$\$ Grants

Long Term

- Development of user-friendly living shoreline guides for homeowners
CCE, NY Sea Grant, NYSDEC, PEP \$\$ EPA and/or NYSDEC



Spartina alterniflora plantings for living shoreline project at Widow's Hole in Greenport
Photo by Elizabeth Hornstein

➔ ACTION 34

Develop habitat protection and restoration strategies for key species in the Peconic Estuary and its watershed, including the river otter, diamondback terrapin, and horseshoe crab

There is a need and interest from many partners to expand monitoring for key wildlife in the Peconic Estuary and to develop habitat protection and restoration strategies.



ACTION 34: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Short Term

- Expansion of monitoring and research for river otter, terrapins, and horseshoe crabs to understand habitat utilization and identify threats to these species

Audubon, CCE, Group for the East End, Local Governments, NYSDEC, PEP, Seatuck Environmental Association

\$\$ Environmental Partners, EPA, Grants

- Information about key species presented in State of the Peconic Estuary reports to guide habitat restoration and protection efforts

Audubon, CCE, Group for the East End, Local Governments, Long Island Nature Organization, NYSDEC, PEP, Seatuck Environmental Association

\$\$ EPA, Grants

Long Term

- Development of estuary-wide habitat restoration and protection strategies for the river otter, diamondback terrapin, and horseshoe crab based on the results of the Short Term Performance Measure under Action 34

Audubon, CCE, Group for the East End, Local Governments, Long Island Nature Organization, NYSDEC, PEP, Seatuck Environmental Association

\$ EPA, NYSDEC

- Identification of additional key species for which habitat restoration and protection strategies are needed

Audubon, CCE, Group for the East End, Local Governments, NYSDEC, PEP, Seatuck Environmental Association

\$ EPA, Grants

➔ ACTION 35

Monitor results of shellfish restoration efforts, share findings, and encourage creation of shellfish spawner sanctuaries

Several shellfish restoration efforts are underway in the Peconic Estuary, primarily for bay scallops, hard clams, and eastern oysters, all of which are regularly harvested in the Bay. Information about the outcomes of these efforts is needed to guide future restoration efforts. Establishing shellfish spawner sanctuaries will help propel shellfish restoration efforts and protect biodiversity.



ACTION 35: PERFORMANCE MEASURES, PARTNERS AND FUNDING

Short Term

- Initiation of stock assessment of bay scallops, eastern oysters, and hard clams in the Peconic Estuary

Academic Partners, Baymen, CCE, NYSDEC, PEP, Stony Brook University \$\$\$ Grants

Long Term

- Dissemination of information about the Peconic Estuary’s shellfish resources and restoration efforts

CCE, Local Governments, Long Island Oysters Growers Association, NYSDEC, PEP, Stony Brook University, Suffolk County

\$ EPA

- Designation of shellfish spawning sanctuaries

Local Governments, NYSDEC, PEP \$\$ Local Governments, NYS










Photo by Stephen Tettelbach

Photo by Barley Dunne

Priorities for Research and Monitoring: Healthy Ecosystem

PEP identified the following priorities for research and monitoring to help achieve the Goal of a healthy ecosystem with abundant, diverse wildlife. While the CCMP 2020 Actions will help advance some of these priorities, initiatives by other entities are necessary to fully address them.

-  Research on eelgrass habitat in the Peconic Estuary, including studies of eelgrass traits, population genetics, and groundwater influences on eelgrass health, including potential positive (cooling effect) and negative (pesticide/herbicide) impacts
-  Research on the distribution and value of submerged aquatic vegetation (SAV) habitats other than eelgrass, such as widgeon grass (*Ruppia*)
-  Monitoring of amounts and types of natural, hardened, and living shorelines in the Peconic Estuary, repeated every three to five years, and analyzed for trends in shoreline changes
-  Monitoring to track changes in marsh extent and condition, and to evaluate the success of wetland and shoreline restoration projects, based on wetland and shoreline monitoring efforts of New York State (e.g., Unvegetated to Vegetated Marsh Ratio Analysis, Tidal Wetland Rapid Assessments, Protocol for Monitoring Nature-based Shorelines)
-  Alewife monitoring for the Peconic Estuary to track population status and the success of fish passage projects
-  Zooplankton surveys to monitor spatial and temporal trends in abundance of zooplankton taxa
-  Continue to monitor the fish communities in the Peconic Bays through the NYSDEC Peconic trawl survey and expand monitoring to Gardiners Bay if feasible.



Appendix A: Peconic Estuary Partners List

Peconic Estuary Townships and Associated Boards and Committees

Town of Brookhaven
Town of East Hampton
Town of Riverhead
Town of Shelter Island
Town of Southampton
Town of Southold
Village of Dering Harbor
Village of Greenport
Village of North Haven
Village of Sag Harbor
Village of East Hampton
Village of Sagaponack
Village of Southampton
Village of West Hampton Beach
Village of West Hampton Dunes
Village of Quogue

Peconic Estuary Trustees

East Hampton Town Trustees
Southampton Town Trustees
Southampton Village Trustees
Southold Town Trustees
Sagaponack Village Trustees
East Hampton Village Trustees
Village of Dering Harbor Trustees
Village of Westhampton Beach Trustees
Village of Westhampton Dunes Trustees

Organizations and Civic Associations

Accabonac Protection Committee
Association of Marine Industries
Association of National Estuary Programs
Atlantic Marine Conservation Society
Atlantic States Marine Fisheries Commission
Brookhaven National Lab
Central Pine Barrens Joint Planning and Policy Commission
Citizens Campaign for the Environment
Concerned Citizens of Montauk
Congressman Lee Zeldin – District 1
Cornell Cooperative Extension of Suffolk County
Dark Sky Society
Defend H2O
Ducks Unlimited
East Hampton Shellfish Hatchery
East Hampton Trails Preservation Society
Eastern Long Island Audubon Society
Friends of the Big Duck
Friends of the Long Pond Greenbelt
Group for the East End
Group to Save Gold Smith Inlet
Hallockville Museum Farm
Hofstra University
Long Island Aquarium
Long Island Clean Water Partnership
Long Island Commission for Aquifer Protection
Long Island Farm Bureau
Long Island Invasive Species Management Area



Photo by Kaitlin Morris

Long Island Native Plant Initiative
Long Island Nitrogen Action Plan
Long Island Oyster Growers Association
Long Island Paddlers, Inc.
Long Island Pine Barrens Society
Long Island Regional Planning Council
Long Island Sound Study
Long Island University
Long Island Wine Country
National Audubon Society
National Oceanic and Atmospheric Administration
NEIWPCC
New York Marine Rescue Center
New York Seafood Council
New York Sea Grant
New York State Assemblyman Anthony Palumbo—
District 2
New York State Assemblyman Fred Thiele—District 1
New York State Assemblyman Steve Englebright—
District 4
New York State Department of Environmental
Conservation—Division of Marine Resources &
Division of Water
New York State Department of State
New York State Department of Transportation
New York State Senator Kenneth LaValle
North Fork Chamber of Commerce

North Fork Environmental Council
Northwest Alliance
Peconic Baykeeper
Peconic Bay Power Squadron
Peconic Estuary Protection Committee
Peconic Green Growth
Peconic Land Trust
Perfect Earth Project
Peconic River Fish Restoration Commission
Peconic River Sportsman's Club
Preserve Plum Island Coalition
Riverhead Sewer District
Riverside Estates Civic Association
Safe Harbor Marinas
Save the Great South Bay
Save the Sound
SeaCoast Enterprises Associates, Inc.
Seatuck Environmental Association
Shinnecock Bay Restoration Program
Shinnecock Indian Nation
Sierra Club- Long Island Chapter
Southampton Baymens Association
South Fork Natural History Museum
South Shore Estuary Reserve
Stony Brook University

Stony Brook University's Center for Clean Water
Technology
Stony Brook University School of Marine and
Atmospheric Sciences
Suffolk County Community College
Suffolk County—Department of Health Services,
Department of Economic Development and
Planning, Department of Parks, Recreation and
Conservation, Department of Public Works
Suffolk County Legislator—District 1 - Al Krupski
Suffolk County Legislator—District 2 - Bridget
Fleming
Suffolk County Soil and Water Conservation
District
Suffolk County Water Authority
Surfrider Foundation
The Nature Conservancy
The Safina Center
Third House Nature Center
United States Department of Agriculture—Natural
Resource Conservation Services
United States Environmental Protection Agency
United States Fish and Wildlife Service
United States Geological Survey
Waterwash Projects



Photo by Kaitlin Morris



**STRONG
PARTNERSHIPS**
and engagement



**RESILIENT
COMMUNITIES**
*prepared for
climate change*



**CLEAN
WATERS**
*for ecosystem health
and safe recreation*



**HEALTHY
ECOSYSTEM**
*with abundant,
diverse wildlife*

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