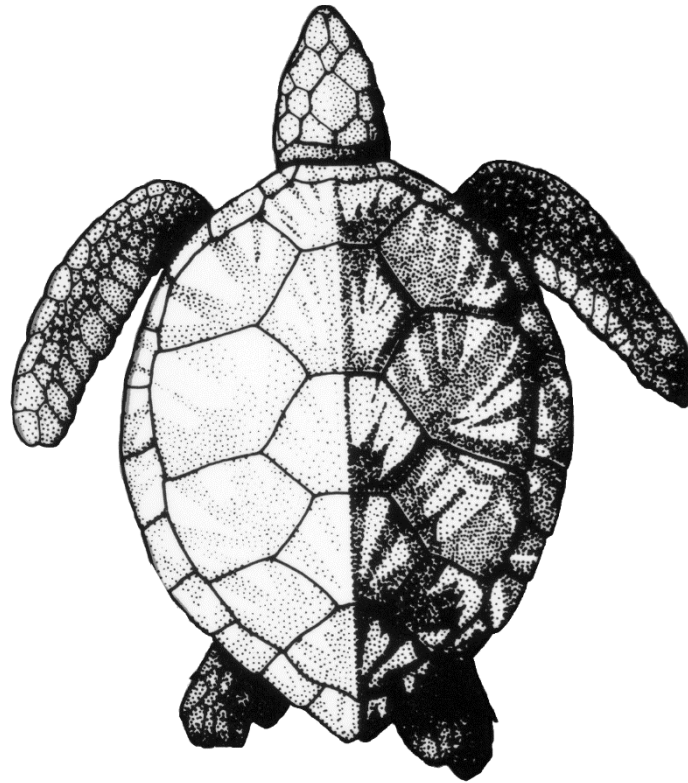

27th Annual
Cape Cod Natural History Conference



Saturday, March 9, 2024

List of Conference Supporters & Sponsors

Conference Agenda

Presentation Abstracts



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And, of course, *thanks to all of the presenters* for sharing their studies. Enjoy the conference!

Conference Agenda

- 8:30 Registration and refreshments
- 9:00 Welcome and opening remarks by Melissa Lowe, Director & Mark Faherty, Science Coordinator, Mass Audubon Cape Cod
- 9:10 **Is Pee the Key to Cleaning Up the Cape's Water Quality Problems?**
Bryan Horsley, Massachusetts Alternative Septic System Test Center
- 9:30 **Assessing the Status of Freshwater Ponds on Cape Cod**
Jessica Rempel, Cape Cod Commission
- 9:50 **Reconstructing the Past and Documenting the Present at Duck Harbor: A System in Transition**
Katie Castagno, Center for Coastal Studies
- 10:10 **Beech Leaf Disease: An Emerging Threat to New England and Cape Cod Forests**
Chris Brothers, Oyster Pond Environmental Trust
- 10:30 BREAK (20 minutes) - View poster presentations
- 10:50 **Massachusetts' First Shorebird Blitz: A Snapshot of Shorebird Migration Along our Coast**
Liana DiNunzio, Manomet, Inc.
- 11:10 **Migrating Seabird Staging Trends Observed at Norton Point in Edgartown, MA**
Jamie Infanti, Mass Audubon Coastal Waterbird Program
- 11:30 **High Pathogenicity Avian Influenza: From the Global Scene to the Local View**
Wendy Puryear, Cummings School of Veterinary Science at Tufts University
- 11:50 LUNCH BREAK in cafeteria (50 minutes) – Desserts provided.
- 12:40 **Designing and Permitting a Cranberry Bog Wetland Restoration**
Casey D. Chatelain, Horsley Whitten Group
- 1:00 **Proliferation of a Rare Grassland/Heathland Species Assemblage Within a Military Headquarters**
Jacob McCumber, Massachusetts Army National Guard
- 1:20 **Desperate Times Call for Innovative Measures: Preventing Salt Marsh Loss with Runneling & Ditch Remediation**
Jordan Mora, Association to Preserve Cape Cod
- 1:40 BREAK (20 minutes) - View poster presentations
- 2:00 **The Quashnet River Restoration in Falmouth**
Francis Smith, Cape Cod Chapter of Trout Unlimited
- 2:20 **Western Atlantic Torpedo (*Tetronarce occidentalis*) Strandings on Cape Cod From 2011 Through 2023**
John-Tyler Percy, New England Coastal Wildlife Alliance & Association to Preserve Cape Cod
- 2:40 **Green Sea Turtles around Cape Cod: What do we Know about Them?**
Karen M. Dourdeville & Jessica T. Ciarcia, Mass Audubon
- 3:00 **Intra-annual Distribution and Relative Abundance of Fishes and Invertebrates in Nauset Harbor**
Owen C. Nichols, Center for Coastal Studies
- 3:20 Closing Comments
-

Poster Presentations

Poster Presentations will be displayed in the lobby during breaks and the lunch hour and available for review and discussion. Poster Presentations include:

MARY H Climate Adapted Pound-Net Scow

Christopher George, Lone Tree Creek Sea Farm

The Marine Misfits - The Unusual Fish that Strand on Cape Cod

Kathy Miller, New England Coastal Wildlife Alliance

Restoration and Recovery: Understanding East Harbor's Horseshoe Crabs

Allison Myers, Aquatic Ecology Monitor with Americorps at Cape Cod National Seashore

Monitoring for Frosted Elfin at Camp Edwards

Sophia Roemer, Massachusetts Army National Guard

Prevalence of the bopyrid isopod *Probopyrus pandalicola* in Daggerblade Grass Shrimp from Salt Marsh Creeks and Pannes from Cape Cod, MA

Betsy Stoner & Brodie McPherson, Bentley University

Is Pee the Key to Cleaning Up the Cape's Water Quality Problems?

DESCRIPTION: For decades we've watched the steady degradation of water quality in our lakes, ponds, bays and estuaries across Cape Cod due to nutrient pollution from human activities. The largest source of this nutrient pollution comes from inadequately treated effluent from septic systems. Around 80% of the nutrients in that wastewater enter in the form of human urine. The conventional approach to address this problem is to install miles long networks of sewer pipes with each municipal system being connected to one of a series of central wastewater treatment plants where energy intensive industrial processes remove some of the nutrients before discharging the treated effluent to the environment. This approach is concerning to many for a variety of reasons including high financial cost, high energy demand during a time where nations across the planet are pledging to reduce energy usage, and the wasting of clean water and nutrients that have great value as agricultural fertilizers. A newly emerging, innovative nutrient management approach called urine diversion, or UD, offers an alternative that can address all of the concerns associated with the conventional approach. This talk will share findings from a pilot urine diversion project that was completed in the town of Falmouth this past Fall 2023 and will discuss how increased adoption of this practice could significantly contribute to improving our ailing waters and the ecological sustainability of our existence atop Cape Cod's fragile lands.

PRESENTER: Bryan Horsley, Project Assistant at the Massachusetts Alternative Septic System Test Center

BIOGRAPHICAL INFORMATION: As a life-long resident of Cape Cod Bryan has developed a deep connection with and passion to protect the natural environment. Working as a sea kayaking tour guide for more than a decade he learned and taught about fragile coastal ecosystems and the ecological connections between humans and the environment. After earning a Bachelor of Arts degree in Ecology and Evolutionary Biology at the University of Colorado at Boulder he returned home to the Cape and worked as a restoration ecologist helping to monitor and restore natural aquatic ecosystems. Now with the Massachusetts Alternative Septic System Test Center (MASSTC), Bryan works as an Environmental Project Assistant to develop and implement innovative strategies to control wastewater borne nutrient pollution to the benefit of the Cape's ground and surface waters.

CONTACT: bryan.horsley@capecod.gov

Assessing the Status of Freshwater Ponds on Cape Cod

DESCRIPTION: Cape Cod has 890 freshwater ponds and lakes covering nearly 11,000 acres that possess unique ecological, aesthetic, and recreational values and provide significant ecosystem services to the region. The Cape's freshwater ponds are part of the region's interconnected fresh and marine water resources and are important for filtering nutrients and other pollutants before discharging waters to coastal estuaries. Ponds are also vulnerable to contaminants from the precipitation and groundwater recharging them. Pond health is declining due to impacts from development, stormwater, and wastewater, including excessive inputs of nutrients (nitrogen and phosphorus) leading to eutrophication and algal blooms. Increasing temperatures and more intense storms associated with climate change exacerbate these challenges. To better understand the factors contributing to pond degradation, develop solutions, and inspire action, the Cape Cod Commission launched the Freshwater Initiative in 2021. As part of the initiative, the Commission and its partners are collecting and analyzing available data to characterize Cape Cod's freshwater ponds, assess their overall health, and identify regional trends in water quality. These data include over 20 years of pond water quality data from approximately 200 ponds from multiple monitoring programs including the Ponds and Lakes Stewardship Program (PALs), newly developed Cape Cod Regional Pond Monitoring Program, GIS analyses of pond characteristics and potential stressors, and satellite remote sensing of pond water clarity. An overview of the Freshwater Initiative will be provided, including initial results of land use and water quality data analyses completed to date.

PRESENTER: Jessica Rempel, Natural Resources Analyst, Cape Cod Commission

COLLABORATORS: Kristy Senatori, Erin Perry, Heather McElroy, Tim Pasakarnis, Tara Nye Lewis, Kathleen Mason, and Jay Detjens – Cape Cod Commission
Andrew Gottlieb, Julie Hambrook Berkman, Sophia Feuerhake, and JT Percy – Association to Preserve Cape Cod
Amy Costa – Center for Coastal Studies
Jennie Rheuban and Dylan Titmuss – Woods Hole Oceanographic Institute
Nicole Bartlett and Megan Coffey – National Oceanic and Atmospheric Administration
Liz Moran and Pia Tapiawala – Anchor QEA

BIOGRAPHICAL INFORMATION: Jessica Rempel has been the Cape Cod Commission's Natural Resources Analyst since 2019. She provides technical expertise, analysis, and decision-support to towns and the public on planning and regulatory issues related to natural resources and open space protection. She has a background in environmental regulation and endangered species research and monitoring including restoring bald eagles to the California Channel Islands and tracking whooping cranes on their migration through the central flyway. Ms. Rempel grew up on Cape Cod and is a graduate of the Nauset public schools. She has a M.S. in Biology from California State University, Northridge.

CONTACT: Jessica Rempel
3225 Main St., Barnstable, MA 02630
jessica.rempel@capecodcommission.org

Reconstructing the Past and Documenting the Present at Duck Harbor: A System in Transition

DESCRIPTION: For the past three years, Duck Harbor in Wellfleet, Massachusetts, has experienced periodic overwash events on storm and astronomically high tides. The near-monthly overwash events have formed a persistent two-acre washover fan, the evolution of which we have monitored and documented since fall 2021. Regular inundation of salt water into the low-lying basin behind the dune resulted in ~120 acres of salt-killed vegetation, the majority of which was cleared in 2023. Duck Harbor has undergone several ecosystem transitions in the past two centuries, from an open harbor to a marsh to a forest. Using a series of more than 200 cores, we also present stratigraphic maps spanning approximately 40 acres of the low-lying basin, reconstructing how it has transitioned over time. A natural analogue to the Herring River Restoration Project, Duck Harbor can provide key insights into tidal marsh restoration.

PRESENTER: Katie Castagno, Center for Coastal Studies

COLLABORATORS:

Tommy Tucker, Center for Coastal Studies

Mark Borrelli, Center for Coastal Studies

BIOGRAPHICAL INFORMATION:

Dr. Katie Castagno is the director of the Land-Sea Interaction Program at the Center for Coastal Studies. Katie's research interests focus on the intersections among coastal resilience, salt marsh restoration, and sediment transport. Katie received a PhD in Geological Oceanography from the MIT/WHOI Joint Program in Oceanography and an MA in Marine Affairs from the University of Rhode Island.

CONTACT: kcastagno@coastalstudies.org

Beech Leaf Disease: An Emerging Threat to New England and Cape Cod Forests

DESCRIPTION: Beech leaf disease is a recently discovered disease that can affect and kill both native and ornamental beech trees. It was first reported in Ohio in 2012. BLD has been expanding eastward and reached MA in 2020. It is now found across 12 states and Ontario, Canada. The Cape Cod National Seashore documented BLD in 2021, its first report on Cape Cod. BLD has emerged as a significant worry for forest conservation on the Cape. The disease is thought to be caused by a parasitic nematode, a microscopic roundworm. The nematode overwinters in the leaf buds of the trees, damaging the leaves before they emerge in the spring. The affected leaves look striped with dark green bands. As the infection progresses, leaves become shriveled and leathery, then die and fall from the tree. Leaves that emerge from uninfected buds remain healthy through the growing season. If the trees are healthy and receive enough rainfall over the summer, they may be able to re-leaf. These new leaves are not infected. However, trees can become re-infected in the fall; it is unclear how the disease spreads. Most trees can re-leaf for a few years, but if they are stressed by drought or other diseases, will likely die within 6-10 years. By the time trees show symptoms, they may already have been infected for five or more years. Treatment for BLD is in the experimental phase including applications of a potassium phosphite fertilizer and spraying with a foliar fungicide. Concerns related to treatment include potential development of resistance by the nematodes, increased salt concentration in the soil when fertilizer is applied to larger trees, and the fungicide's potential effects on beneficial insects. Treatment may be more effective in residential areas, rather than in natural forests, where accessibility and ecological repercussions are more complex.

PRESENTER: Chris Brothers, Administrator, Oyster Pond Environmental Trust

BIOGRAPHICAL INFORMATION: Chris has been the Administrator of the Oyster Pond Environmental Trust for the past three years. OPET's mission is to protect the water quality, habitats, and wildlife of Oyster Pond (Falmouth) and its surrounding headwaters, including 30 acres of land and 1.5 miles of hiking trails. Chris is also the Science Department Head at Falmouth High School where she has taught biology and environmental science for 29 years. As a former Education Coordinator at the Wellfleet Bay Wildlife Sanctuary, she helped organize the very first Cape Cod Natural History Conference.

CONTACT: Chris Brothers, info@opet.org

Massachusetts' First Shorebird Blitz: A Snapshot of Shorebird Migration Along our Coast

DESCRIPTION: In August 2023, Manomet held the first annual Massachusetts Shorebird Blitz, a coordinated shorebird survey of sites throughout coastal Massachusetts during peak southbound migration. The goal was to produce a snapshot of how shorebirds use our coastline during migration and to identify significant stopover locations. The surveys followed the International Shorebird Survey (ISS) protocol, with additional guidelines to reduce double-counting birds that may be using multiple sites.

During the 10-day survey window, 89 participants counted shorebirds at 115 sites throughout the coast and islands. Participants included volunteers, bird clubs, and 17 local conservation organizations. A total of 73,088 shorebirds of 29 species were counted. The results highlighted important shorebird sites throughout the coast, such as Monomoy National Wildlife Refuge, which had the most shorebirds and species of any site. The survey also produced information on how shorebirds use sites, whether for feeding or roosting, and if they use a network of sites to fulfill all their needs during a stopover.

Data collected during the Blitz will contribute to the ISS database and guide future research and conservation work in the state. For example, these survey methods can be applied to different seasons and for species-specific surveys. Furthermore, an important outcome of the Blitz was engaging the local shorebird community and connecting partners who are interested in furthering shorebird conservation initiatives.

PRESENTER: Liana DiNunzio, Shorebird Biologist, Manomet, Inc.

COLLABORATORS: Lisa Schibley and Alan Kneidel (Manomet, Inc.)

BIOGRAPHICAL INFORMATION:

Liana is a Shorebird Biologist for Manomet's Resilient Habitats program. Her work focuses on improving our understanding of how shorebirds use the Massachusetts coast during migration in order to guide conservation efforts. Before joining the Manomet team, Liana was involved in many aspects of the environmental field including research, education, ecological restoration, permitting, and habitat management. She holds a bachelor's degree in Zoology from the University of New Hampshire and a Master's degree in Environmental Science and Management from the University of Rhode Island.

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(508) 209-1575

Migrating Seabird Staging Trends Observed at Norton Point in Edgartown, MA

DESCRIPTION: Cape Cod and the Islands are important coastal habitats for supporting significant numbers of migrating terns that pass through on their journey to wintering grounds. 75-90% of Northwest Atlantic Roseate Terns (*Sterna dougalli*) rely on Cape Cod for their fall migration (NHESP, State Cooperator's meeting, 2022). Roseate Terns are a federally protected endangered species. With coastal habitats threatened by climate change, sea level rise, and human disturbance, determining key staging locations for seabirds has become increasingly important in conservation efforts.

In 2023, Mass Audubon's Coastal Waterbird Program documented extensive Roseate Tern and Common Tern staging activity on Norton Point in Edgartown, MA on Martha's Vineyard. Flock counts of tern species were conducted on a regular basis from May through September to assess habitat use by staging birds. The occurrence of these flocks was compared to sets of different habitat conditions, including month, time of day and tide. One of these comparisons found that the highest percentage (42%) of staging Roseate Terns at Norton Point were seen at mid-tide. Also notably, 5000 staging Roseate Terns were seen on site on August 23rd as a flock size equal to over 80% of the entire Massachusetts population in one place. Understanding these key staging grounds along with extensive resighting efforts, will aid in determining key habitat protection efforts and lead to better understanding of bigger population pictures of many species.

PRESENTER: Jamie Infanti, Program Manager, Mass Audubon Coastal Waterbird Program and Caroline Baker, Islands Coastal Waterbird Program Field Coordinator, Felix Neck

COLLABORATORS: Sam Kefferstan, Suzan Bellincampi, Lyra Brennan, Rose Caplan, Shea Fee, Jeff Spindelov, Town of Edgartown

BIOGRAPHICAL INFORMATION: Jamie Infanti brings seven years of coastal conservation experience to the Coastal Waterbird Program and joined the leadership team in 2021 after overseeing post-restoration management efforts on Dead Neck Sampson's Island. Jamie worked closely with Common Terns in New Jersey at the Wetlands Institute and has a degree in Natural Resources and Wildlife Management from the University of Connecticut. In addition to overseeing field staff efforts across Cape Cod and the North Shore, she focuses on coastal research projects and disturbance management at high traffic beaches.

CONTACT: jinfanti@massaudubon.org

High Pathogenicity Avian Influenza: From the Global Scene to the Local View

DESCRIPTION: Wild birds, especially waterfowl, seabirds, and shorebirds, have long been considered the natural reservoir for Influenza A virus (IAV). The majority of IAV subtypes in wild birds are considered Low Pathogenicity Avian Influenza (LPAI) and cause little to no disease. High Pathogenicity Avian Influenza (HPAI) H5N1 has recently entered into migratory wild birds and has proven to be significantly more lethal, wide spread, and species diverse, than any form of IAV to date. In the past two years HPAI has reached nearly all regions of the globe, decimated many wild bird populations, and spilled over into numerous mammalian species, including seals within the Gulf of Maine. Through numerous partnerships with wildlife professionals throughout New England, we have conducted a broad surveillance of wild life, assessing over 5,000 birds and over 1,000 marine mammals since HPAI first arrived in North America in late 2021. By merging these efforts into a detailed analysis of viral evolution and an ecological context of species interactions, we seek to better define how HPAI evolves, and the factors that impact transmission within and between species.

PRESENTER: Wendy Puryear, Scientist, Cummings School of Veterinary Science at Tufts University

BIOGRAPHICAL INFORMATION: Dr. Puryear is especially interested in understanding the wide range of factors that impact viral infections in wildlife, from adaptations of the virus itself, to the impacts of environmental contaminants, shifting populations, and climate change. In the thick of winter, she spends much of her time organizing and conducting field work on seals off of Cape Cod, where the largest US pupping colonies of grey seals are located. Throughout the year, she works closely with wildlife professionals and stranding networks to look at wildlife ranging from birds to terrestrial and marine mammals. Back at the lab, she works to determine which viruses are circulating in the animals and tries to unravel how and why certain viruses persist.

CONTACT: wendy.puryear@tufts.edu

Designing and Permitting a Cranberry Bog Wetland Restoration

DESCRIPTION: As cranberry farming becomes less and less profitable on Cape Cod, many are being retired and restored to natural wetland systems. As with all wetland restoration projects, the Chop Chaque Cranberry Bog Restoration Project in Mashpee, MA, required a significant amount of field monitoring, project engineering, and environmental permitting. This 6.5-acre cranberry bog restoration project, which completed environmental permitting in Fall 2023, will create varied wetland types and improve rare species habitat.

PRESENTER: Casey D. Chatelain, Environmental Scientist, Horsley Witten Group, Inc.

COLLABORATORS: Town of Mashpee, Massachusetts Division of Ecological Restoration

BIOGRAPHICAL INFORMATION: Casey is an Environmental Scientist with the Horsley Witten Group, Inc., an environmental consulting firm that works to provide their clients with sustainable environmental solutions. She has a BA in Environmental Studies from College of the Holy Cross and a Master of Oceanography from the University of Rhode Island Graduate School of Oceanography.

CONTACT: cchatelain@horsleywitten.com

Proliferation of a Rare Grassland/Heathland Species Assemblage Within a Military Headquarters

DESCRIPTION: The grassland and heathland habitat at Camp Edwards has a dynamic history. Existing for decades as a vast scrub oak barren, the area was built into the US Army's 26th Yankee Division headquarters during World War II. As missions changed and infrastructure was removed, a thriving habitat mosaic was integrated within what is still the administrative area of an active military training site. Habitat conservation and rare species recovery are key requirements of national Department of Defense natural resources efforts and contribute to the ecological successes at Camp Edwards. One representative patch of this habitat is highlighted along with a variety of survey results to illustrate the change over time and the remarkable natural community that exists today. A small sample of rare species includes Grasshopper Sparrow, Frosted Elfin Butterfly, Pink Streak Moth, Purple Tiger Beetle, Walsh's Digger Bee, and Slender Ladies'-Tresses Orchid, all of which are listed under the Massachusetts Endangered Species Act. Many more plant and animal species are thriving together with active management and monitoring, even including a native moth specializing on Wild Indigo and not documented anywhere else in New England. Grassland and heathland habitats are a significant component of southern New England's natural and cultural heritage. Camp Edwards and Joint Base Cape Cod play an important role in managing and increasing biodiversity through active conservation efforts in these and other natural communities.

PRESENTER: Jake McCumber, Massachusetts Army National Guard

COLLABORATORS: Peter Trimble, Erin Hilley, Annie Curtis, Rob Crevey, Joel Carlson, Sophia Roemer, Sean Rigney, and past members of the MA Army National Guard Natural Resources & Training Lands Team

BIOGRAPHICAL INFORMATION: Jake McCumber is the Natural Resources & Training Lands Manager for the Massachusetts Army National Guard. He specializes in long-term conservation planning, endangered species management, pine barrens conservation, and landscape scale restoration. Wildlife of particular interest include birds and moths and he is an avid hiker and naturalist.

CONTACT: jacob.c.mccumber.nfg@army.mil

Desperate Times Call for Innovative Measures: Preventing Salt Marsh Loss with Runneling & Ditch Remediation

DESCRIPTION: A salt marsh's capacity to adapt to sea level rise (SLR) through elevation gain is determined by its biological and physical structure (i.e., elevation, vegetation, and hydrology). Where that biological or physical structure has been undermined by human practices (current and historical), the marsh cannot keep up with the accelerating rate of SLR. In an attempt to reverse and eliminate scenarios which are inhibiting marshes from adequately adjusting to SLR, wetland scientists have started implementing innovative restoration strategies with promising results. First, runneling is the creation of small grooves in the marsh (generally ≤ 30 cm wide and deep) to drain standing water on the marsh surface. Second, ditch remediation is a method of restoring groundwater table depths to slow decomposition by removing ditches through natural salt marsh processes. APCC has been working closely with Mass Audubon and other regional partners to explore the use of these restoration strategies to prevent the loss of two degraded salt marshes on the north side of Cape Cod, the Barnstable Great Marsh (BA GM) and Chase Garden Creek (CGC). At BA GM, Mass Audubon is leading a team to implement these restoration techniques, and APCC has completed one year of pre-restoration monitoring. At the CGC, APCC has employed two different standardized assessment methods, the unvegetated-to-vegetated-ratio (UVVR) and the salt marsh rapid assessment method (MarshRAM), to identify areas of high vulnerability where restoration actions may be necessary to reconstruct the marsh's natural structure and rebuild its defenses to SLR.

PRESENTER: Jordan Mora, Association to Preserve Cape Cod

COLLABORATORS: Annalee Tweitmann, Mass Audubon

BIOGRAPHICAL INFORMATION: Jordan Mora, Restoration Ecologist at the Association to Preserve Cape Cod, has over fifteen years of experience in aquatic systems research and monitoring. She spent ten years at Waquoit Bay National Estuarine Research Reserve investigating the impacts of climate change and excess nutrient loading on estuarine habitats before starting with APCC in September 2021. At APCC she oversees monitoring and data management of salt marsh restoration projects. She obtained her MS in Water Resources from the University of New Hampshire where she studied tidally restricted salt marshes and holds bachelor's degrees in environmental studies and music performance from Denison University.

CONTACT:

Jordan Mora
Restoration Ecologist
Association to Preserve Cape Cod
jmora@apcc.org

The Quashnet River Restoration in Mashpee and Falmouth

DESCRIPTION: The Quashnet River Restoration is an all-volunteer effort which has been ongoing since 1976. The Quashnet River flows through the towns of Mashpee and Falmouth before entering Waquoit Bay and Nantucket Sound. The goal has been to restore both aquatic and riparian habitat to significantly increase a remnant population of wild sea-run brook trout. These “Salters” as they are called, are rare in Massachusetts. The effort has led to a great success resulting in an enormous increase in the numbers of brook trout in the lower 8,000 feet of the Quashnet River. Work to further improve both riparian and aquatic habitat for brook trout continues today. Those interested in the project are welcome to visit the Martin Rd. site off Route 28 in Falmouth or visit our website for dates of work parties.

PRESENTER: Francis H. Smith, Cape Cod Chapter of Trout Unlimited

COLLABORATORS:

Cape Cod Chapter Trout Unlimited
Southeastern Massachusetts Chapter Trout Unlimited
Greater Boston Chapter Trout Unlimited
Trout Unlimited, Vienna, VA
Massachusetts Division of Fisheries and Wildlife
Mashpee Conservation Commission
Falmouth Conservation Commission
United States Fish and Wildlife Service
Waquoit Bay National Estuarine Research Reserve
Falmouth Rod and Gun Club, Incorporated
Mashpee National Wildlife Refuge

BIOGRAPHICAL INFORMATION: Francis H. Smith is a United States Air Force Special Operations Veteran with duty assignments in the United States, Europe and Vietnam. He was also a plumbing, heating and cooling contractor for 26 years with a 14-man shop in Falmouth, MA. Fran has recently been recognized by Trout Unlimited National with their highest award for conservation work, the Ray Mortensen Award. The Cape Cod Museum of Natural History recognized Fran too, with the Nature's Ambassador Award, and he is helping build an exhibit of the project.

CONTACT:

Francis H. Smith
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508-889-1135

Western Atlantic Torpedo (*Tetronarce occidentalis*) Strandings on Cape Cod From 2011 Through 2023

DESCRIPTION: The Western Atlantic torpedo (*Tetronarce occidentalis*) is a batoid species inhabiting coastal waters off the Gulf of Maine; little is understood regarding its movements, habits, and life history. From 2011 through 2019, researchers with the New England Coastal Wildlife Alliance (NECWA) had informally documented torpedo strandings each fall and early winter in the New England area, predominantly along the northern shores of Cape Cod. In 2020, NECWA conducted a formal investigation of this species and documented 63 carcasses (34 Female, 15 Male, 14 CBD) that stranded from August 1, 2020 through January 12, 2021. Since that time, NECWA has continued studying torpedoes, rescuing live animals and/or conducting necropsies on carcasses. Necropsies involve the collection of sighting information, photographs, body weight, body measurements, and tissue collection; when possible, the sex of the carcass was determined through external and internal examinations. For all fresh or moderately decomposed carcasses, the digestive tract is examined; to date, the majority of prey items identified have been various species of fish species, with one exception – a whole long-tailed duck (*Clangula hyemalis*) in the stomach of a large female torpedo. In late December 2021, NECWA documented a mass stranding of 41 torpedoes on Long Point, Provincetown, MA. Historical records indicate the occurrence of large numbers of torpedoes in the vicinity of Provincetown, including those that stranded on the eastern shore of Long Point. These annual strandings remind us that little is known regarding the biology and ecology of this species and encourages further investigation into the causes of both singular and mass stranding events.

PRESENTER: John-Tyler Percy, New England Coastal Wildlife Alliance

COLLABORATORS: Krill Carson, New England Coastal Wildlife Alliance

BIOGRAPHICAL INFORMATION: John-Tyler Percy is a Senior Pond Monitoring Technician currently working for the Association to Preserve Cape Cod (APCC). As a field technician, John-Tyler provides complete water quality profiles of freshwater ponds selected to be part of APCC's Freshwater Initiative. In addition to using field instruments to monitor water quality-related parameters and secure water samples for lab analyses, John-Tyler curates and performs QA/QC on data collected in the field, trains and delegates tasks to volunteers, and prepares field reports for stakeholders. John-Tyler also volunteers with the New England Coastal Wildlife Alliance (NECWA), a Southcoast-based non-profit dedicated to researching Cape Cod marine wildlife. As a year-round volunteer, John-Tyler trains NECWA interns as a drone instructor, responds to reported wildlife strandings, assists with field data collection, and engages with local communities.

CONTACT:

jpercy@apcc.org
860-466-0652

Green Sea Turtles around Cape Cod: What do we know about them?

DESCRIPTION: Green sea turtles, *Chelonia mydas*, are one of the four sea turtle species that feed in waters off Massachusetts in the summer and fall, but they are the least seen. We will present a brief look at the natural history of greens, then discuss their occurrence in two Mass Audubon Cape Cod sea turtle programs: the summer/early fall sightings hotline and website for boaters, seaturtlesightings.org, and the late fall/early winter cold-stunned sea turtle rescue and research program. Sea turtle staff have begun a new research project on green turtle DNA collected during necropsies of deceased cold-stuns. This project will examine how cold-stunned, juvenile greens off Massachusetts relate to a possible new sub-population of “northern nesting greens” along the US east coast. Determination of a distinct sub-population could have regulatory implications for species management purposes. Lastly, we will explain an unusual green turtle event that occurred in our waters in September, 2022. Based on species-specific crawl tracks, a mature female green sea turtle made a nesting “false crawl” at Siasconset, on the southeast shore of Nantucket. Although this was an outlier occurrence, since sea turtle nesting activity has never been documented this far north in the NW Atlantic, it demonstrates the trend seen in areas such as in the Mediterranean, where sea turtle nesting ranges are shifting relative to climate change-driven warming waters and beaches.

PRESENTER: Karen M. Dourdeville, Sea Turtle Research Coordinator, Mass Audubon Cape Cod & Jessica T. Ciarcia, Turtle Research Coordinator, Mass Audubon Cape Cod

COLLABORATOR: Robert L. Prescott, Sanctuary Director Emeritus, Mass Audubon Wellfleet Bay Wildlife Sanctuary

BIOGRAPHICAL INFORMATION: Karen Moore Dourdeville’s work with protected marine species began in the Marine Mammals Lab at Woods Hole Oceanographic Institution. She has worked with sea turtles since 2002 and is currently the Sea Turtle Research Coordinator for Mass Audubon Cape Cod. This work includes all aspects of the Sea Turtle Rescue, Recovery and Research Programs: cold-stun rescue/research, summer stranding response, summer sightings database and conservation science from sea turtle necropsies. Karen earned an M.S. degree in Biology from the University of Massachusetts.

Jess Ciarcia earned a Wildlife Biology degree from Colorado State University, before moving to Cape Cod. She started working with turtles in 2019 when she first came to Mass Audubon. Jess is currently Turtle Research Coordinator at Wellfleet Bay Wildlife Sanctuary, coordinating the annual Cold Stun Rescue and Rehabilitation program, as well as the Diamondback Terrapin Conservation Program.

CONTACT:

Karen M. Dourdeville
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Shift Happens: Seasonal Distribution and Relative Abundance of Fishes and Invertebrates in Nauset Harbor during Climate Change

DESCRIPTION: The Nauset Harbor system is currently undergoing changes driven by many natural and human- induced causes, and the understanding of those changes can better inform future management decisions. As part of a larger multi-phase interdisciplinary study, we completed subtidal and intertidal fish and invertebrate surveys in Nauset Marsh and Town Cove from November 2020 through October 2021, using a variety of fixed and mobile sampling gears supplemented by benthic grab sampling and underwater video. Additional opportunistic trap sampling began in July 2021 and continued at a long-term monitoring site from September 2021 to the present. Where practical, we conducted sampling efforts using similar methods and gears to previous studies in the same area or more recent studies in the region. Fish and macroinvertebrate community composition and seasonal patterns of abundance during this study were broadly similar to those observed during other recent studies along the eastern shore of Cape Cod, with notable exceptions. This comprehensive inventory indicated that Nauset Harbor is home to a diverse and changing assemblage of marine species, some of which utilize the bay as spawning or nursery habitat. We observed native species undergoing range shifts as well as tropical fishes and invasive species. Long-term monitoring is necessary to place our observations in the broader contexts of short-term variability and long-term change.

PRESENTER: Owen C. Nichols, Director, Marine Fisheries Research, Center for Coastal Studies

COLLABORATORS: Agnes Mittermayr, Tommy Tucker, Bryan J. Legare and Ted Lucas, Center for Coastal Studies

BIOGRAPHICAL INFORMATION: Owen Nichols is Director of Marine Fisheries Research at the Center for Coastal Studies in Provincetown, Massachusetts, where he conducts research in collaboration with Cape Cod fishermen and shellfish farmers. His primary interests include distributional ecology, fisheries oceanography, marine mammal/fishery interactions, and ecosystem-based fishery management. Owen is a Ph.D. candidate at the University of Massachusetts - Dartmouth School for Marine Science and Technology, a guest investigator at the Woods Hole Oceanographic Institution, and an adjunct professor at the University of Massachusetts - Boston, the Massachusetts Maritime Academy and the Shoals Marine Laboratory.

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MARY H Climate Adapted Pound-Net Scow

DESCRIPTION: Lone Tree Creek Sea Farm in Yarmouth Port is building a sail and electric motor propulsion work boat for use in aquaculture, the MARY H, funded by a grant from the MA Division of Marine Fisheries for environmental economic innovation. The design will be based on a historical Cape Cod bay pound-net scow on file with the Smithsonian. The boat aims to affect environmental restoration through greener equipment, and by promoting EV power and the movement to return to sail auxiliary and skills. Because the farm's need for a workboat is geographically small enough, it is expected that commercially available electric boat engines will serve in a true capacity. And, as a sailboat, the MARY H aims to be a visible part of the northside Yarmouth water community on runs from the mooring at Mill Creek to the boat ramp and hatchery/wholesaler at Bass Hole. I am constructing the boat myself with a small team of subject matter experts including construction workers, boat builders, and sailors. Though of old the pound-net was implicit in the stock collapse of river herring through seining entire creek openings, the new idea is to be consonant with the regenerative goals of climate adaptation, in a sense redeeming this classic boat shape and hopefully moving Cape Cod's aquaculture one step toward a more resilient future.

PRESENTER: Christopher George, Shellfish Farmer, Lone Tree Creek Sea Farm

COLLABORATORS: MA Div. of Marine Fisheries; Community Racing, Inc. (lbay.org); Massachusetts Air and Space Museum

BIOGRAPHICAL INFORMATION: Christopher George, MS in Conservation Biology from Antioch University New England, began working in aquaculture in South Korea in polychaete worm hatchery. While studying river herring he built several video monitoring stations around Cape Cod. MARY H is named after his wife.

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The Marine Misfits - The Unusual Fish that Strand on Cape Cod

DESCRIPTION: Each fall and early winter, three unusual species of marine wildlife strand along the shores of Cape Cod and surrounding areas. These "marine misfits" include the Ocean Sunfish, the Western Atlantic Torpedo Ray, and the Gray Triggerfish. The New England Coastal Wildlife Alliance (NECWA) rescues and conducts research on these animals to learn more about their biology, life history, and ecology. NECWA rescues live stranded animals and conducts necropsies (animal autopsies) on carcasses that float ashore. Necropsies include photographs, body measurements, weights, and tissue collection to support NECWA's research and that of other scientists in the US and abroad. This poster will provide photos and general information on these marine animals and will provide information on how the community can assist NECWA with this project.

PRESENTER: Kathy Miller, Emily Tirone & Seth Cohen, New England Coastal Wildlife Alliance

COLLABORATORS:

Dr. John Logan, Fisheries Biologist at Massachusetts Division of Marine Fisheries

John Chisholm, Fisheries Biologist at the Anderson Cabot Center for Ocean Life

Dr. Kate Bemis, Research Zoologist, NOAA Fisheries

BIOGRAPHICAL INFORMATION: Kathleen Miller is a retired librarian and art teacher. She grew up in the coastal community of Milford Connecticut and was a family employee of Milford Seafood. She describes herself as a continually wondering naturalist. She volunteers for NECWA, Audubon, Cape Cod Museum of Natural History and the Brewster Pond Coalition.

Her work with NECWA involves rescuing stranded animals, collecting tissue samples for data and research, and sharing what is gathered and learned with the public. She loves engaging children in artwork projects that help connect them to the animals and work NECWA does.

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Restoration and Recovery: Understanding East Harbor's Horseshoe Crabs

DESCRIPTION: East Harbor, located in North Truro, is a brackish water lagoon that was artificially isolated from Cape Cod Bay for over 100 years. As a result, the system transitioned to a freshwater lake, marine life was extirpated, and water quality declined significantly. In response to the poor conditions, tides were partially restored to the system in 2002 via a 700-foot-long culvert reconnecting East Harbor to Cape Cod Bay. This partial tidal restoration improved water quality and supported a resurgence of marine life, including horseshoe crabs. In recent years, we have undertaken efforts to examine the recovery of East Harbor's marine ecosystem, which is protected from harvest and development. To gain an understanding of the horseshoe crab population dynamics and habitat use of East Harbor, we started a tagging study in 2022. Since, our team has individually tagged 935 crabs within East Harbor. Of these crabs, 61% were adults, and 39% were juveniles, highlighting use of East Harbor as a breeding and nursery site. In addition, we placed radio tags on 25 female crabs to track their movements around the lagoon and into Cape Cod Bay. Over 50% of the radio tagged females were detected at all 5 receivers spanning the entire lagoon, and 3 crabs have moved into Cape Cod Bay. These results show that there is a thriving horseshoe crab population in East Harbor that maintains connection with Cape Cod Bay.

PRESENTER: Allison Myers, Aquatic Ecology Monitor with Americorps at Cape Cod National Seashore

COLLABORATORS: Allison Myers¹, Kelly McCusker², Kta'n Weeden¹, Katie Button³, Rachel Thiet², Sophia E. Fox³, Kelly Medeiros³

¹American Conservation Experience and Cape Cod National Seashore; ²Antioch University New England;

³Cape Cod National Seashore

BIOGRAPHICAL INFORMATION: Allison holds a BS in marine biology from the University of Rhode Island. She is a dedicated professional in the field of natural resource management, with a focus on sustainable fishing and marine conservation. Allison is committed to responsible environmental stewardship, and strives to make a positive impact through her work.

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Population and Habitat Assessments for the State-listed Frosted Elfin Butterfly (*Callophrys irus*) at Camp Edwards, MA

DESCRIPTION: The Frosted Elfin (*Callophrys irus*) is a small state-listed butterfly species that is dependent on Wild Indigo (*Baptisia tinctoria*) or Wild Lupine (*Lupinus perennis*) as host plants. It is considered at high risk of extirpation in Massachusetts and is under review for federal listing due to range-wide declines and isolation of remaining North American populations. Wild Indigo thrives at Camp Edwards in grasslands, barrens, and other open habitats maintained through active habitat management. The Natural Resources Program at Camp Edwards has been surveying for Frosted Elfin annually since 2017 to document and track the population. Adult butterfly surveys are conducted during the May flight season, but can be challenging with the small, cryptically colored butterfly. Nighttime larval (i.e., caterpillar) surveys using ultraviolet light compensate for this and are used to confirm or supplement the results of adult surveys. Monitoring for Frosted Elfin on Camp Edwards provides insight into the condition of Camp Edwards' habitats and success of active management practices. These surveys have documented many new Frosted Elfin locations at Camp Edwards and confirmed populations in grasslands and healthlands, powerline rights-of-way, and soldier firing ranges. Recent surveys have documented the colonization of Frosted Elfin in newly restored habitat, mirroring success observed in multiple other state-listed species. Through continued efforts to monitor and improve habitat for Frosted Elfin, Camp Edwards excels in supporting biodiversity and plays an important role in recovering rare species populations.

PRESENTERS: Sophia Roemer (Conservation Field Specialist) and Sean Rigney (Training Lands Field Specialist), Massachusetts Army National Guard Natural Resources & Training Lands Program

COLLABORATORS: Jake McCumber, Annie Haines, and Erin Hilley

BIOGRAPHICAL INFORMATION: The Natural Resources & Training Lands Program of the Massachusetts Army National Guard is committed to conserving and managing Camp Edwards' unique landscape, home to a rich diversity of plants and wildlife. Sophia and Sean are two of seven full time staff in this program. Their work focuses on wildlife surveys for rare and threatened species as well as maintaining soldier training areas for biodiversity and resilience to soldier use.

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Prevalence of the Bopyrid Isopod *Probopyrus pandalicola* in Daggerblade Grass Shrimp from Salt Marsh Creeks and Pannes from Cape Cod, MA

DESCRIPTION: In salt marsh ecosystems, daggerblade grass shrimp, *Palaemon (Palaemonetes) pugio*, play a crucial role in food webs and serve as the definitive host for the bopyrid isopod *Probopyrus pandalicola*. These ectoparasites infect the branchial chambers of grass shrimp which can lead to decreased energy and sexual sterilization of infected hosts. While bopyrid isopod infestation of daggerblade grass shrimp have been widely reported in coastal marshes from the Southeastern U.S.A, this parasite has not been well-documented in daggerblade grass shrimp from marshes of Northeastern U.S.A. The goal of this project was to quantify the prevalence of *P. pandalicola* in *Palaemon pugio* across Cape Cod, Massachusetts. We evaluated bopyrid isopod prevalence from shrimp collected from five different salt marsh habitats along Cape Cod in August 2021. Bopyrid isopod infestations were found in shrimp at four of five salt marshes, with prevalence ranging from 0.04% to 14.1%. Seasonal resampling of one of the salt marshes revealed highest average parasite prevalence in spring (<17.1%) and an isolated high of 30.3% prevalence in a single salt panne. A series of linear and multivariate models confirmed that panne area, shrimp abundance, and distance to shoreline were related to *P. pandalicola* shrimp infestations in salt pannes in summer. This study describes the prevalence of the bopyrid isopod parasitizing daggerblade grass shrimp in salt marshes north of Maryland, documenting that certain regions and time of year play a role in driving parasite infestations of grass shrimp on Cape Cod.

PRESENTER: Brodie McPherson & Betsy Stoner, Bentley University

COLLABORATORS: Rachel Harris (Florida Fish and Wildlife Conservation Commission), Joseph Morton (University of Florida), Eliza Wilczek (Duke University) and Brian Silliman (Duke University)

BIOGRAPHICAL INFORMATION:

Betsy

Dr. Stoner is a marine ecologist with 13 years of experience researching coastal marine ecosystems, including seagrasses and salt marsh habitats. Dr. Stoner has based her research in The Bahamas, South Florida, and Cape Cod, where she seeks to answer questions related to how human activities influence the role that benthic organisms play in nearshore systems. Dr. Stoner is an Assistant Professor at Bentley University in Waltham, MA.

Brodie

Brodie is a laboratory coordinator and research assistant in Bentley University's Department of Natural and Applied Sciences where he graduated with a degree in Sustainability Science in 2022. His research interests include both natural and social sciences, broadly focusing on how environmental issues, particularly those in marine systems, impact coastal communities.

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