22nd Annual

State of Wellfleet Harbor Conference

Saturday, November 2, 2024

9:00 AM–12:30 PM

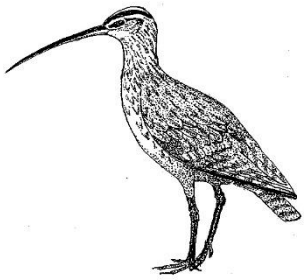
Wellfleet Harbor Actors Theater

Center for Coastal Studies Provincetown · Friends of Herring River 15 Years · Town of Wellfleet Incorporated 1763 · Sea Grant Woods Hole Oceanographic Institution · Barnstable County Cape Cod Cooperative Extension · Mass Audubon · Wellfleet Conservation Trust

22nd Annual State of Wellfleet Harbor Conference **November 2024**

Our thanks to the following for their support of the Conference:

- Cape Cod Cooperative Extension
- Center for Coastal Studies
- Friends of Herring River
- Mass Audubon's Wellfleet Bay Wildlife Sanctuary
- Town of Wellfleet, Natural Resources Advisory Board
- Wellfleet Conservation Trust
- Woods Hole Sea Great



Conference Planning Committee:

- Abigail Franklin Archer (Committee Chair), Barnstable County Cape Cod Cooperative Extension, Woods Hole Oceanographic Institution Sea Grant
- Barbara Brennessel, Wellfleet Conservation Commission, Friends of Herring River, Wheaton College
- John Duane, Wellfleet Shellfish Advisory Board, Natural Resources Advisory Board
- Mark Faherty, Mass Audubon's Wellfleet Bay Wildlife Sanctuary
- Kathy and Robert Hubby
- Bill Iacuessa, Wellfleet Conservation Trust
- Agnes Mittermayr, Center for Coastal Studies
- John Portnoy, Cape Cod National Seashore (retired), Friends of Herring River
- David Shapiro, Mass Audubon's Wellfleet Bay Wildlife Sanctuary

22nd Annual State of Wellfleet Harbor Conference **November 2024**

Conference Agenda

9:00–9:20 **Check-in, coffee and continental breakfast, poster viewing**

9:20–9:30 **Welcome and Opening Remarks**
Abigail Archer, Conference Moderator
John Wolf, Chair, Wellfleet Selectboard

9:30–9:50 **Opening up the Salt Marsh Restoration Toolbox at Wellfleet Bay Wildlife Sanctuary**
Sara Grady, Senior Coastal Ecologist, Mass Audubon

9:50–10:10 **Status of eelgrass (*Zostera marina)* in Wellfleet**
Agnes Mittermayr, Center for Coastal Studies

10:10–10:30 **Impacts of crabs eating Cape Cod salt marshes & vegetation-restoration techniques**
Stephen Smith, Plant Ecologist, Cape Cod National Seashore

10:30–10:40 **Questions & Answers**

10:40—11:00 **Break** (poster viewing)

11:00—11:10 **Herring River Restoration Project Update**
Christa Drew, Friends of the Herring River

11:10—11:20 **From Belding to Black Custard and Blister Worms: A century of scientific research in Wellfleet Harbor**
Owen Nichols, Center for Coastal Studies

11:20–11:30 **Questions & Answers**

11:30–11:50 **Hole-y Shell! Investigation of boring sponge in Wellfleet oysters**
Tommy Tucker, Center for Coastal Studies

11:50–12:10 **High Pathogenicity Avian Influenza: The View from Global to Local**
Wendy Puryear, Tufts University School of Veterinary Medicine

12:10–12:20 **Questions & Answers**

12:20–12:30 **Closing Remarks**

Poster Presentations

International Fund for Animal Welfare, Dolphin Rescue Center in Orleans

Recent Developments in Horseshoe Crab Research and Regulations
Mark Faherty, Mass Audubon

Coastal Oceanography After School Team: A Survey of Duck Harbor
Nauset High School students, advised by Katie Castagno, Center for Coastal Studies

Summary of nekton populations in Duck Harbor post tidal inundation
Matthew Bauer, Scientists in Park Intern, Cape Cod National Seashore

Marine Misfits - The Unusual Fish that Strand on Cape Cod, MA
Carol "Krill" Carson, New England Coastal Wildlife Alliance (NECWA)

Field Trip to International Fund for Animal Welfare (IFAW) Facility in Orleans

Saturday, November 2, 2:00-3:00 PM

Come see IFAW's Dolphin Rescue Center in Orleans to learn about the short-term intensive care the team provides for stranded dolphins with the goal of improving and increasing their survival post-release.

Anyone interested can sign up at the conference check-in table. ***Space is limited to 20 people.***

Meet at 115 MA Rt. 6 Orleans, next door to Kit and Kaboodle. Please park across the street in the parking lot that serves CVS and Chocolate Sparrow.

Opening Up the Salt Marsh Restoration Toolbox at Wellfleet Bay Wildlife Sanctuary

ABSTRACT: The salt marshes of Wellfleet Bay Wildlife Sanctuary are losing vegetation as a result of sea level rise and crab herbivory, as well as elevation due to sea level rise, crab burrowing, sediment starvation, and ditching. There is limited space for migration due to steep upland slopes, but some opportunities are available via tidal restrictions. The Mass Audubon Ecological Restoration Program is "opening the salt marsh restoration toolbox" to try to increase vegetation growth, improve the lifespan of the marsh, and provide places for the marsh to migrate.

PRESENTER NAME & AFFILIATION: Sara Grady, Ph.D., Senior Coastal Ecologist, Mass Audubon

COLLABORATORS: EA Engineering, US Fish and Wildlife Service, United States Agriculture Service Natural Resources Conservation Service, US Army Corps of Engineers, Towns of Wellfleet and Eastham

BIOGRAPHICAL INFORMATION: Dr. Sara P. Grady is the Senior Coastal Ecologist in the Ecological Restoration Program at Mass Audubon. Prior to this position she spent over 18 years with the Massachusetts Bays National Estuary Partnership as South Shore Regional Coordinator, hosted by the North and South Rivers Watershed Association. Her role at Mass Audubon focuses on salt marsh and coastal cranberry bog restoration, coastal resiliency, and providing coastal ecology knowledge for multiple Mass Audubon departments.

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LEARN MORE: https://www.massaudubon.org/our-work/resilient-lands/ecological-restoration

Update on the status of eelgrass (Zostera marina) in Wellfleet

ABSTRACT: Eelgrass beds are vital coastal ecosystems that support biodiversity, fisheries, and carbon storage, yet they are declining rapidly. In Cape Cod Bay, over 3,500 acres of eelgrass have been lost since 1995, with Wellfleet accounting for 63% of Massachusetts' losses and is among the largest in New England. This decline is attributed to various stressors, including nutrient loading, climate change, and human activities. A proposed three-year study aims to identify factors hindering eelgrass recovery and prioritize management actions to restore these habitats. The project will utilize a GIS-based model to assess conditions in both stable and declining eelgrass meadows, mapping their distribution and changes over time as well as analyzing historic drivers of decline, and collecting current biological and environmental data.

PRESENTER NAME & AFFILIATION: Agnes Mittermayr, Marine Ecologist, Center for Coastal Studies

COLLABORATORS: National Park Service, Boston University, MassBays, United States Geological Survey, H. Plaisted, M. Borrello, A. Novak, J. Carr, J. Nagel

BIOGRAPHICAL INFORMATION: Agnes Mittermayr is a benthic ecologist at the Center for Coastal Studies and director of SeagrassNet. Her research focuses on benthic habitats and how they are influenced by abiotic factors such as ocean chemistry and geology, coastal development, climate change.

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LEARN MORE: www.seagrassnet.org

Continuing impacts of crab herbivory on Cape Cod salt marshes, a synopsis of vegetation-restoration techniques to reverse vegetation losses, and the future of these ecosystems in the face of climate change

ABSTRACT: On Cape Cod, densities of a native, herbivorous crab (Sesarma reticulatum L.) have exploded in recent decades, resulting in major vegetation losses. It's been hypothesized that Sesarma populations have benefitted from a decline in predation pressure, warming air and water temperatures, the presence of mosquito ditches that mimic creekbank habitat, and the softening of dense peat substrates that makes burrowing easier and increases the amount of suitable habitat. Along Cape Cod Bay, the impacts of Sesarma has eclipsed virtually every other factor acting on CACO salt marshes, including sea level rise. The consequences of marsh vegetation loss are numerous and cascading, but the erosion and oxidation of peat substrate following plant death may be the most critical since it results in elevation loss and distinct changes in marsh geomorphology such as creek widening. The process and dynamics of overgrazing that can eventually lead to permanent marsh degradation will be discussed in detail. In addition, several new techniques being developed to re-establish vegetation across bare areas will be presented and discussed within the content of future planning for salt marsh management, including overland migration.

PRESENTER NAME & AFFILIATION: Stephen Smith, Plant Ecologist, Cape Cod National Seashore

BIOGRAPHICAL INFORMATION: Stephen Smith is a Plant Ecologist at the Cape Cod National Seashore, with in plant physiology and community ecology. Stephen received a B.S. degree from Florida State University and a M.S and Ph.D. from the University of Miami. After spending 5 years working on the restoration of the Florida Everglades, he assumed his current position with the National Park Service in 2002. Stephen's current activities are focused on understanding the dynamics of spatial and temporal variability within plant communities of all the different ecosystems within the Seashore.

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Herring River Restoration Project Update

ABSTRACT: The Herring River Restoration Project in Wellfleet/Cape Cod National Seashore is now 19 months into the implementation of Phase 1-Construction. During this brief session watch some exciting timelapse video and hear high-level updates about what is happening with the main elements of this dynamic project.

PRESENTER NAME & AFFILIATION: Christa Drew, Executive Director, Friends of Herring River

COLLABORATORS: Carole Ridley, Project Coordinator, Herring River Restoration Project

BIOGRAPHICAL INFORMATION: Christa Drew brings decades of transformative leadership from co-founding and leading nonprofit organizations and consulting firms which advanced systems change and justice across a variety of sectors, including equitable community development, health, food systems, and others. Earned on a full fellowship, she has a Master's in Public Policy & Administration and previously drafted state legislation, conducted field-building research, facilitated nation-wide grantmaking and coalitions, and served as a professor in conflict transformation.

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LEARN MORE:
https://herringriver.org/
https://www.wellfleet-ma.gov/herring-river-executive-council/pages/herring-river-restoration-project

From Belding to Black Custard and Blister Worms: A century of scientific research in Wellfleet Harbor

ABSTRACT: Wellfleet Harbor is an ecologically and economically important habitat for fish and shellfish, subject to a variety of anthropogenic stressors. The harbor has long been socioeconomically important to the region due to its abundant shellfish and fishery resources as well as opportunities for swimming, boating, recreation and tourism. Established in 1987, the town's Natural Resource Advisory Board (NRAB) oversaw the creation of a Harbor Management Plan, and continues to review and update the plan while working to identify natural resources of significant importance. In order to understand the effects of human activities and impacts on the system and inform natural resource management, baseline data and long-term monitoring are necessary. The NRAB has expressed the need for a comprehensive ecological study, in part based on the work summarized in, "A Study of the Marine Resources of Wellfleet Harbor," conducted in 1968-69 by the Massachusetts Division of Marine Fisheries, which has not been replicated since. To determine the proposed scope for a new harbor survey, the town of Wellfleet funded the project, "Wellfleet Harbor Survey: Research Needs, Scope of Work and Next Steps," which included a review of previous studies as well as recently completed or ongoing work. Published ecological research in the harbor system, including 'gray literature' and technical reports, was reviewed. Engagement with researchers, natural resource managers, and other actors was conducted to gather information on recently completed or ongoing studies in order to identify data gaps and areas for complementary studies while avoiding duplicative efforts. The above information was synthesized to develop a scope of work for a future Wellfleet Harbor survey, including fieldwork, analyses of existing data, and recommendations for future long-term monitoring.

PRESENTER NAME & AFFILIATION: Owen C. Nichols, Center for Coastal Studies

BIOGRAPHICAL INFORMATION: Owen Nichols is Director of Marine Fisheries Research at the Center for Coastal Studies, 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 adjunct faculty at the University of Massachusetts - Boston and the Shoals Marine Laboratory.

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LEARN MORE: https://www.wellfleet-ma.gov/natural-resources-advisory-board

Hole-y Shell! Investigation of boring sponge in Wellfleet oysters

ABSTRACT: This presentation will introduce the audience to shell-boring sponges and how they impact oyster farms, ways to identify infested "spongey" oysters, an outline of research to date, and methods of controlling infestation. Boring sponges are a type of sponge that drill (or bore) into calcareous material (e.g. mollusc shells) to colonize. Boring sponges are a nuisance for oyster farmers because the shells become brittle as result of infestation, making the oysters difficult to open cleanly and therefore unmarketable to most consumers. Shellfish farmers must also expend additional effort to treat their oysters for control of sponge infestation. Beginning in 2023, multiple organizations partnered to study boring sponges (*Cliona* spp.) living in Wellfleet oysters with the goals of identifying sponge species and spawning times in order to inform the timing of control methods, which include brining and/or air drying. In summer and fall 2023 and ongoing in 2024, researchers and harvesters worked together to collect spongey oysters biweekly. Infested oysters were then taken to the lab to record oyster condition index and preserve samples of sponge tissue for histological analysis. Samples were collected from June 7 through October 26, 2023, and the 2024 sampling season began June 3 and will extend through the month of November to examine if there is a late fall spawning and settlement event. As of mid-October 2024, 105 Wellfleet oysters have been processed in two seasons of study; 55 of which were sampled in 2023. In 2023, preliminary results suggest oocyte production occurring in June and July, but stopping by September and October. An improved understanding of boring sponge life history could improve the efficiency of sponge control methods and minimize the pest's economic impact on shellfish farmers.

PRESENTER NAME & AFFILIATION: Tommy Tucker, Center for Coastal Studies

BIOGRAPHICAL INFORMATION: Tommy Tucker (they/ them) is a researcher and conservation-based crafter at the Center for Coastal Studies. They joined the Marine Fisheries Research Program in fall 2023 after working with the Land-Sea Interaction Program at Duck Harbor as a field assistant and interning with the Right Whale Ecology Program doing vessel-based photo ID.

COLLABORATORS: John Carroll (Georgia Southern University), Jake Dalby (Holbrook Oyster), Rachel Hutchinson and Josh Reitsma (Cape Cod Cooperative Extension), Owen C. Nichols (Center for Coastal Studies)

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High Pathogenicity Avian Influenza: From the Global Scene to the local view

ABSTRACT: 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, widespread, and species diverse, than any form of IAV to date. In the past three years HPAI has reached nearly all regions of the globe, decimated many wild bird populations, and spilled over into numerous mammalian species. Through extensive collaborations throughout the region, we've assessed thousands of avian, terrestrial, and marine mammals in an effort to rapidly detect new variants of the virus, investigate how the virus is evolving and adapting, and to better understand how the virus is impacting individual species and moving through the ecosystem. In this presentation, I will discuss what we currently know about HPAI, and where the challenges still lie.

PRESENTER NAME & AFFILIATION: Wendy Puryear, Tufts University School of Veterinary Medicine

COLLABORATORS: This work encompasses partnerships from a large number of people, representing numerous organizations including Cape Wildlife Center, Center for Coastal Studies, Center for Wildlife, College of the Atlantic, Fish & Wildlife Service, International Fund for Animal Welfare, Maine Inland Fish and Wildlife, Marine Mammal Alliance Nantucket, Marine Mammals of Maine, Monomoy National Wildlife Refuge, Mystic Aquarium, National Aquarium, National Marine Life Center, New England Wildlife Center, National Oceanic & Atmospheric Administration, Northeast Fisheries Science Center, National Park Service, Seacoast Science Center, Tufts Wildlife Center, UMass Nantucket Field Station, Wild Care, Wildlife Clinic of Rhode Island

BIOGRAPHICAL INFORMATION: Wendy Puryear is a Scientist at the Cummings School of Veterinary Medicine at Tufts University. She 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. 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 wild animals and tries to unravel how and why certain viruses persist

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LEARN MORE:
https://sites.tufts.edu/runstadlerlab/
https://www.researchgate.net/profile/Wendy-Puryear/research

POSTER ABSTRACTS

Recent Developments in Horseshoe Crab Research and Regulations

ABSTRACT: For 25 years Mass Audubon's Wellfleet Bay Wildlife Sanctuary has researched and advocated for better management of horseshoe crabs, and no year has been more eventful than 2023-2024. Horseshoe crabs were the target of state and local eradication programs for decades and are currently harvested for bait and also bled for the biomedical industry. Various data sets indicate a very low population of horseshoe crabs in most Massachusetts waters, especially Cape Cod Bay. In 2023, after a new biomedical firm set up in Harwich and spiked demand for horseshoe crabs, the Horseshoe Crab Conservation Association and Mass Audubon petitioned DMF to protect horseshoe crabs from harvest during spawning season, eventually resulting in a ban on all forms of harvest from April 15 – June 7. Anecdotal reports in Nantucket Sound showed far more spawning this year from Chatham to Yarmouth and beyond, most likely due to the new protections allowing Monomoy crabs to once again spawn outside the refuge. Data from Cape Cod Bay, where the population is much lower, showed no such increase. Since horseshoe crabs take ten years to mature, it may take a more than a decade to see signs of recovery in Cape Cod Bay. Though a burgeoning new horseshoe crab population documented by Cape Cod National Seashore biologists in Truro's tidally restored East Harbor shows the potential for recovery of this resilient, 450-million-year-old species.

PRESENTER NAMES & AFFILIATIONS: Mark Faherty, Mass Audubon

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Coastal Oceanography After School Team: A Survey of Duck Harbor

ABSTRACT: The Coastal Oceanography After School Team (COAST) is a new program piloted at Nauset Regional High School for girls and gender-expansive youth by the Center for Coastal Studies. COAST gets students outside and engaging with the world around them through hands-on activities, including field trips, sample collection, and lab work. After a successful pilot survey season in spring 2024, this fall's team is focusing their explorations on Duck Harbor in Wellfleet. Students used a variety of techniques to survey the geologic and biologic aspects of Duck Harbor, including sediment traps, seine surveying, and sediment cores.

PRESENTER NAMES & AFFILIATIONS: Katie Castagno, Center for Coastal Studies; Sofia Filep, Iona Mckenna Kaplan, Carter Peters, Jessie Swain, Annika van de Wende & Caledonia Wortherspoon, Students, Nauset Regional High School

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Summary of nekton populations in Duck Harbor post tidal inundation

ABSTRACT: Duck Harbor was once an open embayment and developed into a freshwater forested wetland as beach shoaling closed its inlet by the end of the 19th century. Due to a breach in the dunes that once protected this area from Cape Cod Bay, Duck Harbor now receives monthly inputs of salt water and has recently begun to transform into a saltmarsh. This area is going through many changes, one being the colonization of nekton communities. Cape Cod National Seashore is interested in summarizing the current nekton communities and looking into how the monthly overwash affects these populations. Nekton sampling was completed on a monthly basis at four different sites throughout Duck Harbor. The samples were collected using a seine net along four 20 meter transects. Each specimen collected was identified and counted. The amount of time since the last overwash and water quality variables were recorded for each sampling event to compare how the proximity to an overwash and environmental conditions may affect the nekton community. Shannon's Diversity Index was used to grade the diversity based on the time since the last overwash and each site's proximity to the overwash fan. This data will help to inform management of Duck Harbor and provide insight into expected changes throughout the Herring River as tidal flow is restored pro-actively.

PRESENTER NAMES & AFFILIATIONS: Matthew Bauer, Scientist in Parks, Cape Cod National Seashore

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

ABSTRACT: Each fall and early winter, three species of marine wildlife strand on the shores of Cape Cod. These “Marine Misfits” include the Ocean Sunfish (*Mola mola*), the Western Atlantic Torpedo (*Tetronarce occidentalis*), and the Gray Triggerfish (*Balistes capriscus*). The New England Coastal Wildlife Alliance (NECWA) rescues and conducts research on these animals to learn about their biology, life history, and ecology. NECWA rescues live stranded animals and necropsies carcasses that wash ashore. Necropsies include photographs, body measurements, weights, and the collection of parasites, stomach contents, and internal tissues. This information and material is shared with researchers in the United States and around the world to better understand and protect these unusual but deserving species.

PRESENTER NAMES & AFFILIATIONS: Carol "Krill" Carson Marine Biologist and President, New England Coastal Wildlife Alliance (NECWA)

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LEARN MORE:
www.necwa.org
www.nebshark.org