

Session 1 : Marine Biodiversity, Speaker 1

DNA BARCODING OF MARINE INVERTEBRATES COLLECTED FROM MARINAS AND DOCKS ON NANTUCKET ISLAND

Andrew A. Davinack¹

¹Wheaton College, Norton, MA

Presentation: Oral

Attendance: In-Person

Abstract: Invasive species pose one of the greatest threats to global biodiversity. While most introduced species do not become invasive, those that do can cause significant negative impacts on their recipient environment. One popular biosecurity measure which has been deployed to deal with introduced species is the ‘rapid assessment survey’ or RAS. These surveys are meant to detect non-native species as early as possible in the invasion process which allows for cost-effective management and control strategies to be implemented. In this project we applied the RAS protocol to three harbors on Nantucket Island. Specimens were collected off of floating docks, identified morphologically in the laboratory, then sequenced and barcoded for species confirmation. The overarching aim of the project is to build the first DNA barcode library of marine invertebrates on Nantucket, which will then be made publicly available and will hopefully aid in future biodiversity assessment surveys. Preliminary results detected two non-native species to Nantucket: the ‘red spot’ anemone *Aiptasiogeton eruptaurantia* and the serpulid worm, *Hydroides dianthus*. Thus far, it appears as though Nantucket is the northern limit for both species. The implications of these new records will be discussed.

Additional Equipment: Power Point

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Session 1 : Marine Biodiversity, Speaker 2

ANCIENT PEAT DEPOSITS ON THE CONTINENTAL SHELF MAY FUEL FISHERIES PRODUCTION AND ENHANCE BIODIVERSITY.

Ryan Munnelly¹, Roland Smolowitz¹, James Nelson², Brian Roberts³, and Jeffrey Donnelly⁴
¹Coonamessett Farm Foundation, Inc.; ²University of Louisiana Lafayette; ³Louisiana Universities Marine Consortium; ⁴Woods Hole Oceanographic Institution

Presentation: Oral

Attendance: In-person

Shoal systems of coastal Massachusetts, including Gorges Bank, Stellwagen Bank, and the Nantucket Shoals, are among the most productive systems of the Northwest Atlantic Ocean. These features were created during the final advance of the Laurentide Ice Sheet and were once vegetated land that gradually subsided with subsequent sea level rise. Ancient peat deposits remaining from this time have been preserved beneath the shifting sandy sediments, providing an episodic nutrient source to these notoriously productive systems.

Coonamessett Farm Foundation, Inc. conducted a mapping study of the Nantucket Shoals to assess surfclam dredging interactions with essential fish habitat. Peat was collected in 94 of 372 dredge tows (2,469 kg wet weight) in the autumn of 2021 following a nor'easter. A 10 km² area of the Nantucket Shoals mapped using multibeam sonar on November 15, 2022 and again on April 14, 2023 showed depth changes of up to ± 1.2 m and an overall net gain of 274,633 m³ of sediment. This demonstrated the extent to which sediment movement within the Nantucket shoals can bury or expose benthic features such as rock and peat, creating dynamic habitat and nutrient availability. Radiocarbon dating of 18 peat samples indicated that the peat was 6,861–8,265 years old, with a mean of $7,684 \pm 125$ (SE), and median of 8,031 years before present. Stable isotope analyses from benthic fishes and invertebrates from peat collection sites will help determine the direct contribution of ancient peat to the food web of the Nantucket shoals and other similar environments.

Additional equipment: PowerPoint

Corresponding author: Ryan Munnelly, rmunnelly@cfarm.org

Session 1 : Marine Biodiversity, Speaker 3

USING TIME-LAPSE PHOTOGRAPHY TO EVALUATE DISPERSAL AND PREDATION WITHIN TRANSPLANTED SEA SCALLOP BEDS.

Farrell Davis¹, Roland Smolowitz¹
¹Coonamessett Farm Foundation, Inc.

Presentation: Oral

Attendance: In-person

Though robust, the United States sea scallop (*Placopecten magellanicus*) fishery is entirely dependent upon natural recruitment processes. Average seawater temperatures are rising throughout the range of the species and sea scallop recruitment is becoming less predictable. In response to this trend, the sea scallop fishery in collaboration with Coonamessett Farm Foundation, Inc. began investigating strategies for stabilizing sea scallop stocks. Bottom seeding, a low-intensity form of ocean ranching, has been used in Japan since the 1950s to stabilize Yesso scallop (*Mizuhopecten yessoensis*) landings. To determine if bottom seeding could be used in the sea scallop fishery, time-lapse camera stands were developed to evaluate the dispersal and predation of seeded sea scallops. The experiments were carried out in the Nantucket Lightship area in 2017 and 2018. Seeded sea scallops were monitored for 12-48 hours following their release and images from the time-lapse camera stands were annotated to track sea scallop movement and predation. Seeded sea scallop dispersal rates ranged from 34 to 66% and predation rates ranged from 0 to 7.89% of the seeded sea scallops. In addition to sea scallop predators, seeded sea scallops also attracted a wide diversity of marine life which had been observed by the time-lapse camera stands.

Additional equipment: PowerPoint

Corresponding author: Farrell Davis, fdavis@cfarm.org

Session 1 : Marine Biodiversity, Speaker 4

DNA SEQUENCING FOR MARSH CONSERVATION

Cooper Kimball-Rhines¹, Alice Palmer¹, Brook Moyers¹.

¹ Department of Biology, University of Massachusetts Boston

Presentation: Oral

Attendance: In-person

Traditional conservation approaches in the United States operate under the federal Endangered Species Act, which turns 50 this year. Almost 2000 species of plants and animals (and lichen) have been listed for protection and recovery under the ESA. Modern conservation approaches expand the ESA's concept of biodiversity to include the interactions between species and their environment that make up whole ecosystems and the variation in genes within and between species. This integrated concept of biodiversity is especially important to consider in the context of climate change as genes allow species to adapt to shifting temperatures and continue providing services that are critical to nearby communities. In the case of Nantucket Island, salt marshes are particularly important for continuing life in the face of climate change, but they lack many of the genetic resources available for other ecosystems. We leverage third generation, mobile sequencing techniques to establish genetic and epigenetic resources for the foundational salt marsh species *Salicornia depressa*. This approach allows conservationists and researchers to identify species in the field and examine differential adaptation between populations of these plants on Nantucket and the mainland. Patterns of adaptation will directly inform marsh restoration projects by determining genetic sources that best match the restored environment.

Additional Equipment: Power point

Corresponding author: Cooper Kimball-Rhines, c.kimballrhines001@umb.edu

Session 2: Habitat Management and Restoration, Speaker 1

CHALLENGES, SUCCESSES, AND RECOMMENDATIONS FOR MANAGEMENT OF COASTAL SANDPLAIN GRASSLANDS AS REGIONAL BIODIVERSITY HOTSPOTS IN THE NORTHEASTERN UNITED STATES

Sarah Bois¹, Christopher Neill², Michael Whittmore³, Lena Champlin⁴, Karen Beattie⁵, Russell Hopping⁶, Jennifer Karberg⁵, Karen Lombard⁷, Kelly Omand⁶, Polly Weigand⁸, Robert Wernerehl⁹

¹Linda Loring Nature Foundation, 110 Eel Point Road, PO Box 149, Nantucket, MA 02554;

²Woodwell Climate Research Center, 149 Woods Hole Road, Falmouth, MA 02540; ³The Nature Conservancy, 74 Lamberts Cove Road, West Tisbury, MA 02575; ⁴Department of Biodiversity, Earth and Environmental Sciences, Academy of Natural Sciences of Drexel University, Philadelphia, PA 19104; ⁵Nantucket Conservation Foundation, 118 Cliff Road, PO Box 13, Nantucket, MA 02554; ⁶The Trustees, 200 High Street, Boston, MA 02110; ⁷The Nature Conservancy, 20 Ashburton Place, Suite 400, Boston, MA 02108; ⁸Central Pine Barrens Joint Policy and Planning Commission, 624 Old Riverhead Road, Westhampton Beach, NY 11978;

⁹Massachusetts Natural Heritage and Endangered Species Program, Mass Wildlife, 1 Rabbit Hill Road, Westborough, MA 01581

Presentation: Oral

Attendance: In-person

Abstract

A high proportion of regional plant biodiversity occurs in hotspots of species richness that cover small areas created and maintained by disturbance. Sustaining plant diversity in these areas requires region- and habitat-specific management of disturbance and, increasingly, habitat expansion or restoration to offset species losses. Coastal sandplain grasslands are threatened, disturbance-controlled plant biodiversity hotspots with a large representation on Nantucket. We formed a network of sandplain grassland managers and scientists to review the published and unpublished sandplain grassland literature and conducted interviews with grassland managers about management challenges and successes. Principal concerns of managers were increases in woody plant cover, losses of rare species, increased cover and variety of invasive species, and constraints on the ability to use prescribed fire. The literature review and managers' experiences together led to multiple recommendations. Additional considerations due to climate change impacts point to areas of further research and adaptive management projects. The Sandplain Grassland Network can work as an example of data sharing for other biodiversity hotspots.

Additional Equipment needed: (Power Point required for oral presentations)

Contact Information for corresponding author: Sarah Bois, stbois@lnf.org

Session 2: Habitat Management and Restoration, Speaker 2

INCORPORATING ECOLOGICAL DATA INTO THE DESIGN OF A WETLAND RESTORATION PROJECT TO ENHANCE RARE SPECIES HABITAT AND BIODIVERSITY AT WINDSWEPT CRANBERRY BOG, NANTUCKET ISLAND, MA.

Karen C. Beattie,¹ Danielle I. O'Dell¹ and Kelly A. Omand¹

¹Department of Ecological Research, Stewardship and Restoration; Nantucket Conservation Foundation, Nantucket, MA

Presentation: Oral

Attendance: In-person

The Nantucket Conservation Foundation (NCF), Mass. Division of Ecological Restoration's Cranberry Bog Program (Mass. DER) and Fuss & O'Neill environmental engineers just completed a wetland restoration plan for NCF's Windswept Bog property, which was retired from cranberry cultivation in 2018. Project permitting is near completion and construction is scheduled to begin in January 2024. This project provides a unique opportunity to restore natural wetland functionality and connectivity to a significant portion of the Polpis area watershed. Extensive pre-restoration research to gain understanding of site conditions, rare species and exemplary habitats on the property was undertaken prior to developing the wetland restoration design. This included: 1) trapping and radio-tracking spotted turtles (*Clemmys guttata*) to determine habitat use patterns, and 2) undertaking botanical surveys to develop a property species list, identify existing rare plant communities and species, and target invasives for pre-restoration management. We present how the results of this research and monitoring extensively informed project construction plans and the development of a detailed Habitat Management Plan aimed at improving and enhancing rare species habitat and overall biodiversity at the Windswept Bog site. Additionally, this data will serve as an important baseline for determining post-restoration success in meeting ecological goals. This work underscores the importance of gaining a thorough understanding of existing site conditions, species composition and habitat use prior to initiating large scale ecological restoration work.

Additional Equipment: Power Point

Corresponding author: Karen C. Beattie, kbeattie@nantucketconservation.org

Session 2: Habitat Management and Restoration, Speaker 3

WETLAND RESTORATION AND HABITAT MANAGEMENT PRACTICES TO ESTABLISH VIABLE POPULATIONS OF THE EASTERN SPADEFOOT TOAD ON CAPE COD: A 12-YEAR CASE STUDY

Ian Ives¹ and Jay Cordeiro¹

¹Mass Audubon Cape Cod

Presentation: Oral

Attendance: In-person

The Eastern Spadefoot Toad, (*Scaphiopus holbrookii*), is a fossorial anuran typically found in sandy soil habitats interspersed with temporary ponds. In Massachusetts, the northeast corner of its range, the species was historically widespread but has declined due to habitat loss and degradation and is listed as state Threatened. Spadefoot conservation efforts involving wetland restoration and creation as well as habitat management are occurring across the region and managers need effective practices to support sustainable populations. An adaptive management approach to vernal pool creation and restoration is necessary and the effectiveness of practices should be evaluated and refined based on conscientious long-term monitoring. In 2011, Mass Audubon Cape Cod began captive headstarting and translocating spadefoot toad metamorphs into newly restored and created wetlands at the Ashumet Holly Wildlife Sanctuary in Falmouth. In 2022 and 2023 milestones were reached in the first ever documented occurrence of reproduction of a translocated spadefoot toads followed by the documentation of a second generation of spadefoots. We present a roadmap useful in determining whether to restore spadefoot wetlands on a site as part of a spadefoot toad conservation project. In addition, we share the ongoing habitat management techniques, lessons and best practices that have resulted in the establishment of a demographically diverse breeding population at Ashumet Holly. Adaptive habitat monitoring and management efforts going forward will be aimed at supporting and promoting reproductive effort and outcome at Ashumet, and maintaining appropriate long term upland and breeding habitat to accommodate a sustainable population.

Additional Equipment: Power Point

Corresponding author: Ian Ives, iives@massaudubon.org

Session 2: Habitat Management and Restoration, Speaker 4

SOUTHERN PINE BEETLE OUTBREAK ON NANTUCKET: SUPPRESSION TECHNIQUES AND LESSONS FOR PROACTIVE FOREST MANAGEMENT

Danielle O'Dell¹

¹Nantucket Conservation Foundation, Nantucket, MA

Presentation: Oral

Attendance: In-Person

The southern pine beetle (*Dendroctonus frontalis*) (SPB) is a tiny, blackish-brown bark beetle native to the southern and southwestern US and ranges as far north as southern New Jersey historically. This species is a known periodic pest in forests throughout its native range. Climate change impacts, especially warmer winters, have allowed for range expansion northward into New York and New England. Ongoing SPB outbreaks on Long Island, NY have caused extensive and rapid mortality of pitch pines (*Pinus rigida*) since 2014. Southern pine beetles can quickly overwhelm the defenses of healthy trees and cause widespread damage to pine forests. Several years of monitoring and surveillance using pheromone traps on Nantucket yielded few beetles in early years but numbers began to increase in 2022. In July of 2023, we discovered the first outbreak of SPB on Nantucket in a pitch pine stand at the West Gate entrance to Ram Pasture. A survey of the 13-acre site resulted in 97 actively infested trees. We present here the ensuing management practices for suppression of the outbreak, protocols, considerations, and lessons learned in the suppression process, suggestions for immediate forest management options, and future implications for the Island. Landowners are encouraged to assess their pitch pine stands regularly for signs of a southern pine beetle infestation as early detection is critical in mitigating the threat, minimizing tree loss, and protecting our unique pitch pine habitat. Equally important is proactive forest management to foster healthy, biodiverse forests that will be better able to resist future outbreaks.

Additional Equipment: Power point

Corresponding author: Danielle O'Dell, dodell@nantucketconservation.org

Session 3: Plant Biodiversity, Speaker 1

TWO DECADES OF CHANGE IN MARTHA’S VINEYARD PLANT COMMUNITIES

Patrick Farrar¹, Christopher Neill¹, Julia Charest^{1,2}, Glenn Motzkin³

¹Woodwell Climate Research Center, Falmouth MA; ²Current address: University of Maryland Center for Environmental Science, Cambridge, MD; ³Shelbourne, MA

Presentation: Oral

Attendance: In-person

Plant community changes in conserved areas of Martha’s Vineyard across forests to grasslands have implications for biodiversity that can guide land management. In 2022, we resurveyed 101 plots of 20 by 20 meters in forests, grasslands, shrublands, and shorelines that were first surveyed in 2000. We identified all plant species and estimated plant percent cover. Plant species richness declined island-wide across all habitats. The largest declines occurred in shorelines, shrublands, and grasslands, and among forb and graminoid species. Shrub and tree cover increased island-wide across all habitats and the largest increases occurred in forests and scrub oak shrublands. Most changes were of native species. Non-native species richness increased only in grasslands and the increase was small. Shoreline erosion caused large losses of plant species richness in shoreline habitats since 2000. Losses of forbs and graminoids and increases in shrub and tree cover in shrublands and grasslands were consistent with declines in disturbances of fire, mowing, mechanical thinning, or grazing in these early-successional, disturbance-dependent habitats. Because Martha’s Vineyard contains significant areas of these high-biodiversity habitats, declines in plant species richness have regional conservation implications and suggest management with increased disturbance frequency or intensity is needed to halt or reverse these declines.

Additional Equipment: PowerPoint

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Session 3: Plant Biodiversity, Speaker 2

CITY MARSH, COUNTRY MARSH: EXPLORING DIVERSITY IN PICKLEWEEDS AND THE PICKLEWEED MICROBIOME

Alice Palmer¹, Cooper Kimball-Rhines¹, Lexi Papamechail¹, Anisa Ahmed¹, Scarlet Taveras Guzman¹, Brook Moyers¹.

¹Department of Biology, University of Massachusetts Boston

Presentation: Oral (or Poster if there is insufficient space)

Attendance: In-person

Abstract

Salt marshes are critical ecosystems that serve many important roles, including providing habitat for vulnerable species and protecting coast areas from flooding. *Salicornia depressa*, known as pickleweed or sea beans, is a salt marsh plant species with a remarkable tolerance for salinity and soil pollution. I use genetic data from plants throughout southern New England to study how factors such as oceanographic distance, salinity changes, and pollution impact population connectivity and genetic diversity in pickleweed. I also study how the bacteria in the *Salicornia* root microbiome and surrounding soil differ within and between two Nantucket marshes, Folger's Marsh and The Creeks. These data have potential relevance for guiding marsh restoration projects and will help us better understand two understudied types of biodiversity: genetic diversity within a species and microbial diversity.

Additional Equipment: Power point

Corresponding author: Alice Palmer, alice.palmer001@umb.edu

Session 3: Plant Biodiversity, Speaker 3

THE ROLE OF PHENOLOGY IN PLANT INVASION ON NANTUCKET ISLAND

Yingying Xie¹, Allison Turner¹, Bianca Turner¹, Sarah Bois²

¹Northern Kentucky University, Highland Heights, KY; ²Linda Loring Nature Foundation, Nantucket, MA.

Presentation: Oral

Attendance: In-person

Abstract

Native biodiversity in the coastal plant communities at Nantucket island, Massachusetts, USA, is increasingly threatened by invasive species over recent years. Climate change brings more challenges as studies suggested that invasive plant species may be better in adapting to the changing environment than the natives. However, monitoring and assessment of phenology plant communities at Nantucket is still limited. Lack of knowledge in the diverse phenological responses to climate change from native and invasive species prevents us addressing challenges in mitigation and adaptation to conserve the unique native biodiversity at Nantucket for the future. Our project aims to assess phenology and the responses to climate change between native and invasive plant species at Nantucket island by integrating herbarium specimens, citizen science networks, visual observations, and time-lapse cameras. Nine observation sites were set up across the diverse habitats on the island to monitor phenology of four native shrubs and six invasive plant species from spring 2023. Records from iNaturalist and digitized herbarium specimens of four species were evaluated to determine phenological information and estimate their sensitivities to climate. We found evidence that support the hypothesis that invasive species are better in tracking climate change than the natives. For example, flowering of *Rosa multiflora* has the highest sensitivity to warming in spring than other species, though its flowering time is not the earliest in the season. This project helps assess the resilience and vulnerability of the plant communities to species invasion under climate change and will inform conservation management at Nantucket island.

Additional Equipment: Power point

Corresponding author: Yingying Xie, xiey2@nku.edu

Session 4: Animal Biodiversity, Speaker 1

VAGRANCY AND DISPERSAL BY LESSER BLACK-BACKED GULLS

¹Richard R. Veit and ¹Lisa L. Manne

¹City University of New York, Staten Island, NY

Presentation: Oral

Attendance: In person

Abstract

We placed satellite-tracked transmitters (PTTs) on 15 Lesser Black-backed Gulls at Low Beach, Nantucket during February 2023 in order to quantify the long-distance dispersal and probability of colonization by these birds. Unlike many previous studies, we made sure to instrument juvenile and subadult birds in addition to adults since in general dispersal is accomplished by individuals of pre-breeding age. Our tracked birds travelled widely, and displayed substantial exploratory behavior. Four of the adults appeared to be attending nests in western Greenland in summer 2023, while immature birds variously wintered on Nantucket, Martha's Vineyard, NYC, Chesapeake Bay, and the Outer Banks. Our data revealed substantial exploration that may form the basis for the idea of "reverse migration". These data support the notion that vagrancy is the mechanism whereby Lesser Black-backed Gulls have expanded their range and colonized Iceland and Greenland by repeated instances of vagrancy, and challenge the idea of migration as a north-south phenomenon. Further, our data indicate that the individuals most likely to accomplish range change are the sub-adults.

Additional Equipment: Powerpoint.

Corresponding author: Richard R. Veit, rrveit23@gmail.com

Session 4: Animal Biodiversity, Speaker 2

**SELECTED CASE STUDIES OF 3 STRANDED MARINE MAMMALS ON
NANTUCKET**

Stephen J. St. Pierre¹, DVM

¹Marine Mammal Alliance Nantucket

Presentation: Oral

Attendance: In person

Abstract

The Marine Mammal Alliance Stranding Team is the only trained and NOAA permitted organization on Nantucket which is legally allowed to respond to live or dead stranded marine mammals on our shores. Although our foremost desire is to aid those live animals in distress, many of the strandings involve dying or dead animals. These are still important animals to examine in order to gather baseline data for biological and health issues, but also to help recognize trends in populations for improved species and habitat management.

“Why did the animal die? “ is the first question everyone asks when a dead marine mammal appears. External signs frequently do not answer that question. Three different cases will be presented using veterinary necropsy techniques to identify lesions and collect samples which are then submitted for histopathological diagnostics.

Additional Equipment: Power Point, laser pointer.

Corresponding author: Stephen J. St. Pierre, DVM, sjstpierrenan@gmail.com

Session 4: Animal Biodiversity, Speaker 3

SANDBAR SHARK (*CARCHARHINUS PLUMBEUS*) PRELIMINARY

DEMOGRAPHICS, HABITAT USE, AND MOVEMENTS IN NANTUCKET SOUND, MA.

Caroline Collatos^{1,2}, Jeff Kneebone¹, Greg Skomal³, Keith Dunton⁴, & Nick Whitney¹

¹Anderson Cabot Center for Ocean Life, New England Aquarium, Boston, MA, ²School for the Environment, University of Massachusetts, Boston, MA, ³MA Division of Marine Fisheries, ⁴Monmouth University, NJ

Presentation: Oral

Attendance: In-person

Abstract

Overfishing throughout the 1980s to 90s caused sandbar shark (*Carcharhinus plumbeus*) population from MA to FL to drastically decline, prompting them to be listed as a prohibited species. Recently, sandbar sharks have shown signs of recovery and are becoming more common in regions where they were once scarce, including Nantucket Sound, MA. To better understand the importance of Nantucket Sound to their continued recovery, we used acoustic telemetry and catch data to describe sandbar shark demographics, habitat use, and movements. From July to September 2020 to 2023, 155 sandbar sharks measuring 119 – 184 cm fork length (mean \pm SD: 145 cm \pm 17 cm) were caught around Nantucket (66% female, 34% male; 73% juveniles, 27% adults). Throughout 2021 and 2022, a subset of 41 sharks was tagged with coded acoustic transmitters and monitored with an array of 12 to 14 acoustic receivers deployed around Nantucket. From July to September 2021, 10 of the 41 tagged sandbar sharks were detected around the island, and from July to October 2022, 28 of the 41 tagged sandbar sharks were detected around the island. Minimum residence time ranged from 1 to 44 days (n= 39, mean \pm SD: 12 \pm 10). Sandbar sharks were detected for an average of 29 minutes, and the duration of visits varied between locations. Individuals showed high site fidelity to tagging sites. These preliminary data suggest that Nantucket Sound is a recurring habitat for adult and juvenile sandbar sharks from June to September and may be an important area for their species' recovery.

Additional equipment- PowerPoint.

Corresponding Author: Caroline Collatos, ccollatos@neaq.org

Session 4: Animal Biodiversity, Speaker 4

TICKS ON COASTAL ISLANDS: SURVEYS OF NANTUCKET, TUCKERNUCK, AND CHAPPAQUIDDICK, MASSACHUSETTS.

Allison A. Snow^{1,3,4}, Patrick Pearson^{2,4}, and Stephen Rich^{2,4}

¹Department of Biology, ²Department of Microbiology, University of Massachusetts, Amherst;

³Department of Evolution, Ecology, and Organismal Biology, Ohio State University, Columbus

⁴Laboratory of Medical Zoology, University of Massachusetts, Amherst

Presentation: Oral

Attendance: In-person

Abstract

Understanding the ecology of ticks is useful for anticipating and mitigating tick-related illness. The goal of this project was to document the relative abundance of three common tick species on Nantucket, Tuckernuck, and Chappaquiddick islands. We used a standard method of drag-sampling along public hiking trails. Findings from our NBI-funded surveys in 2020-2022 have been published in an open-access journal. In June 2023, we started a similar project on Chappaquiddick, Martha's Vineyard. Nymphs of blacklegged ticks (*Ixodes scapularis*; "deer ticks") were common in wooded habitats on all three islands. These ticks carry pathogens causing Lyme disease, babesiosis, and anaplasmosis. In 2020 and 2021, nymphal infection levels for the Lyme spirochete on Nantucket averaged 10% and 19%, respectively. Lone star ticks (*Amblyomma americanum*) have been noted on Tuckernuck and Chappaquiddick since 2015 and recently became established on western Nantucket. On Chappaquiddick, lone star nymphs and adults were most abundant in wooded habitats, where they were almost as common as blacklegged nymphs, and they also occurred in open fields. A possible health threat from lone star ticks is acquiring the alpha gal red meat allergy. Dog ticks (*Dermacentor variabilis*) were not observed on Tuckernuck or Nantucket but were common in open fields on Chappaquiddick, presumably due to the presence of skunks and raccoons. This species rarely carries human disease pathogens in New England, although occasional cases of tularemia in Chilmark, Martha's Vineyard, have been linked to dog ticks. In summary, each island has a different assemblage of common ticks.

Additional Equipment: PowerPoint

Corresponding author: Allison A. Snow, snow.1@osu.edu,

Poster Session Abstracts

SESACHACHA POND ECOLOGICAL ENHANCEMENT AND RESILIENCE STRATEGIES ON NANTUCKET, MA.

Leah Hill¹

Town of Nantucket Natural Resources Department¹

Presentation: Poster

Attendance: In-person

Abstract: Nantucket Island experiences high wind, wave energy, flooding and erosion which will be exacerbated by climate change and sea level rise. In 2018 a winter storm event led to severe episodic erosion that caused Polpis Road, the roadway that runs along the southwest side of the Pond, to fail. As a result, the road was impassable for several weeks and a temporary retaining wall was installed between the Pond and Polpis Road. Later work on the retaining wall was found to be a partial encroachment and unpermitted.

This project is focused in one of Nantucket's brackish Great Ponds, Sesachacha. This pond is facing water quality degradation due to increased nutrient loading. The decline in water quality has led to a reduction in habitat for benthic species including the Pond's natural oyster population. The Town of Nantucket in collaboration with Mass Audubon are working on a project to address these issues within and along Sesachacha Pond by creating a nearshore oyster reef using reef balls and developing conceptual shoreline protection options, such as a living shoreline. The project is intended to increase biodiversity in and around the pond while making Polpis Rd more resilient.

Additional Equipment needed: stand for poster

Contact Information for corresponding author: Leah Hill, lhill@nantucket-ma.gov

Poster Session Abstracts

DESCRIPTION OF THE BLACK-CAPPED CHICKADEE SONG TYPE ON TUCKERNUCK ISLAND, MASSACHUSETTS

Skyler K. Kardell¹ and Lily C. Morello²

¹Connecticut College, New London, CT, ²Southern New Hampshire University, Manchester, NH.

Presentation: Poster

Attendance: In-person

The Black-capped Chickadee (*Poecile atricapillus*) sings a consistent two-note song throughout most of its distribution, a mnemonic “fee-bee”. In a few isolated localities, this song differs in the number of notes, the frequency, the length, and/or the number of song types. Multiple viva voce sources indicate that Tuckernuck Island, Massachusetts is one of these unique localities, with Black-capped Chickadees singing a mnemonic three-noted “fee-bee-bee.” This call has been known for years by local observers but has not been quantified. We recorded and analyzed the songs of Black-capped Chickadees on Tuckernuck Island. During early summer of 2022, we collected data in the field and analyzed the frequency and length of each note, the number of notes per phrase, and the time between notes and phrases. We found that the majority of Black-capped Chickadee phrases on Tuckernuck Island consist of three notes rather than the typical two of mainland birds. We also found significant variation in frequency and length of notes within the Tuckernuck Island chickadees.

Corresponding author: Skyler Kardell, skardell@conncoll.edu,

Poster Session Abstracts

BUMBLE BEES OF WINDSWEPT

Shalit, Amanda G.¹

¹Nantucket Conservation Foundation; Department of Ecological Research, Stewardship, & Restoration

Presentation: Poster

Attendance: In-person

Abstract:

Bumble bees (*Bombus* spp.) are generalist pollinators who provide invaluable ecosystem services. Previously, 11 species were documented in Massachusetts, but now only 7 are believed to remain in the state. On Nantucket, little information exists regarding our bumble bee populations, their foraging preferences, and nesting habits. Nests are notoriously difficult to find, since colonies are annual and nest sites are rarely reused, but understanding bumble bee nest site selection and preferences is key in bumble bee conservation. Previously operated as a certified organic cranberry bog by the Nantucket Conservation Foundation (NCF), Windswept Bog is now the site of a multi-phased restoration project with aims to return the bogs to a more naturally functioning wetland system surrounded by upland grassland habitat. In preparation for this project, NCF staff have been documenting rare and threatened species at Windswept. While mapping rare plants, I began incidentally collecting bumble bee observations in and around the bogs. Windswept is an ideal place for a case study on bumble bees due to the variety of habitat types available. Areas of wetland, upland, and mesic environments provide high plant species diversity for foraging and diverse nesting grounds. I present data on five active bumble bee nests I located and documented this summer, three of which are located at Windswept Bog. Using observation-based community science databases such as iNaturalist and Bumble Bee Watch to document and map habitat, foraging, and nesting is essential in tracking bumble bee populations, locating rare or endangered populations, and determining their conservation needs.

Additional Equipment Needed: None

Contact Information: Amanda Shalit, ashalit25@gmail.com

Poster Session Abstracts

HOW FRESHWATER WETLAND RESTORATION LAYS THE FOUNDATION FOR LONG-TERM COASTAL RESILIENCE

Michael Soares¹, Wetland Scientist

¹Fuss & O'Neill, Inc., 1550 Main Street, Springfield, MA.

Presentation: poster

Attendance: In-person

Windswept Bog is a retired cranberry farm owned by the Nantucket Conservation Foundation (NCF). Uplands and wetlands were altered extensively for its conversion to agriculture and include a drainage/irrigation system of ditches, weirs, culverts, and buried irrigation. The result is a simplified landscape that concentrates water's flow through the site, reducing its residence time and hindering wetland development in the retired bogs. Since 2018, NCF has partnered with Fuss & O'Neill and MA Division of Ecological Restoration to restore 40.6 acres of retired cranberry bogs to historical freshwater wetlands and adjacent uplands. The key to the successful re-establishment of inland wetlands is restoring wetland hydrology. Main objectives for wetlands restoration are (1) habitat enhancement/creation for rare species and locally unique habitats and (2) attenuation of peak flows to surface and coastal waters following storm events.

In addition, sea-level rise scenarios by NOAA predict that portions of Windswept Bog will be affected by the year 2100. Losses of estuarine habitats and their buffering capacity have been identified as two of the main coastal resilience challenges facing Nantucket. While stream crossings downstream currently prevent tidal influence at the site, Windswept Bog is well-positioned to accommodate saltmarsh migration and sea level rise. In response, restoration in the site's northwest quadrant has been designed to expand the footprint of low-lying wetlands, offering an opportunity to improve the coastal resilience of Nantucket and Polpis Harbors. Restoration will be implemented to support the Town of Nantucket's future resiliency actions by increasing the acreage of near-coast wetlands.

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RESTORATION AND RESILIENCY PLANNING WITH THE LINDA LORING NATURE FOUNDATION

Sarah Bois¹, Linda Loring Nature Foundation, Nantucket, MA

Presentation: Poster

Attendance: In-person

Abstract text

The Linda Loring Nature Foundation (LLNF) is planning a Resilience Restoration Project along the banks of the North Head of Long Pond in collaboration with Wilkinson Ecological. We know that diverse habitats are more resilient to change. This project will revert the project site from a developed landscape with non-native invasive species to a more resilient, native biodiverse ecosystem. This restoration is planned with resilience to climate change impacts in mind. In addition, the project will serve as a focal point for education programs at LLNF so students, volunteers, and community members can learn about the process of ecological restoration considering climate change impacts. This project will serve as an example of retreat and adaptation to sea level rise. This project's goals are the restoration of a Sandplain Grassland plant community on upland portions of the project site and restoring a native plant community on project areas abutting North Head of Long Pond, with a focus on resiliency using salt tolerant plant species. These goals will be met through the following proposed activities:

- Removal and management of invasive and non-native plant species while conserving any existing native vegetation.
- Removal of the existing structures and landscape features from the project area.
- Seed and planting with appropriate native species to restore the targeted native plant communities.

LLNF is monitoring pond salinity as well as water levels and tidal cycles of the pond. We are conducting pre- and post-restoration vegetation monitoring as well as drone-based aerial monitoring to evaluate success of the project.

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Poster Session Abstracts

SpongeBob In Real Life (IRL)

Zacil Nash,¹ Franco Alonzo, Leighton Capizzo, Niko Coutinho, Emmett Graziadei, Sidney Hanson, Nikol Kirilova, Julia Nogueira, Ava Perron, Sofia Sultanova

¹Dreamland, Nantucket, MA

Presentation: Poster

Attendance: In-person

Abstract

Stephen Hillenburg, an American animator, writer, producer, director, and marine science educator, is widely known for creating the Nickelodeon animated television series *SpongeBob SquarePants*. As an educator, I wanted to bring that idea to the kids working on *SpongeBob the Musical*. I wanted them to learn and understand the creatures upon which the characters are based.

Over two weeks in the summer, participants in the Extended Education Program met with marine biologist Jack Dubinsky at The Maria Mitchell Aquarium and station director Yvonne Vaillancourt at the UMass Boston Nantucket Field Station. They explored from Smith's Point to Sconset's Low Beach while comparing and contrasting the characters of the stage production to the real-life sea creatures while visiting the natural habitats.

After learning how green crabs, an invasive species from Europe, affect the habitats of local sea creatures by overeating the eelgrass, students created an action plan to address the issue and collected green crabs that they donated to the Maria Mitchell Aquarium. Guided by Artists Association Nantucket's teaching artist and illustrator Nicci Aguiar, students created posters to visually represent what they had learned. The class culminated with a final presentation of their work of these posters.

This program was funded by the Massachusetts Service Alliance and the Department of Education and Secondary Education.

People have to come together and realize how important our oceans are. Hopefully, if you watch *SpongeBob*, you see Plankton and the crabs and starfish, and you'll want to take care of our oceans." Stephen Hillenburg (2009).

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