**Nantucket Biodiversity Initiative 5th Biennial Research Conference**

**8:30 am to 6:00 pm, 2 November, 2013**

**Presentation Abstracts – alphabetical by Presenter**

**ACTIVITY PATTERNS, BEHAVIORS, AND POPULATION STATUS OF THE NORTH AMERICAN RIVER OTTER (*LONTRA CANADENSIS* ) IN A NORTHEAST COASTAL ENVIRONMENT, MARTHA’S VINEYARD, MASSACHUSETTS.**

**Elizabeth Baldwin1,**2, Jonathan Atwood1, and Luanne Johnson2

1Antioch University New England, Keene NH; 2BiodiversityWorks, Martha’s Vineyard, MA

The North American river otter (*Lontra canadensis*) is a high tropic level piscivore and a sentinel of ecosystem health. Rapid growth and development in the northeastern U.S. coastal environments over the last 50 years has compromised water quality in many coastal ponds. However, baseline data on behavioral and population characteristics is lacking for coastal river otter populations in the northeast. To fill this information gap, we collected data on river otter activity patterns and behavior on the Island of Martha’s Vineyard for one year using trail cameras at 20 different latrine sites across the Island. We also used the data collected to assess the status of the river otter population on the Island compared to other camera studies.

 Otter seasonal and monthly activity peaked in winter/spring and fall, and decreased in summer. These peaks coincided with the breeding season and movements of family groups. Changes in group size mirrored these trends and showed evidence of group foraging. Daily visitation patterns were cyclic with night and dawn having the highest selection indices, in all seasons. Visitation rates per functional camera day were higher (0.28 detections) compared to other published studies and reflected a high river otter population density, which is expected in coastal environments where prey are abundant. Overall, seasonal and daily activity patterns were similar to those in riverine habitats in other parts of the country. Therefore, this baseline information can be useful to managers and researchers monitoring river otters in all habitats in the northeast.

**Corresponding author:** Elizabeth Baldwin, biodiversityworksliz@gmail.com, (508)-494-0061

**DRAGONFLY AND DAMSELFLY POPULATIONS ON NANTUCKET, MASSACHUSETTS**

**Julia Blyth1,** Eric LoPresti2

1Maria Mitchell Association, Nantucket, MA; 2University of California, Davis, CA

The first comprehensive survey of Odonates (dragonflies and damselflies) on Nantucket Island occurred in 1917. Four species were added to this list by 1930. In 2011 and 2012 we surveyed several ponds bi-weekly for adults and exuviae to update the species list and provide records of relative abundance. We found five species of dragonflies that have colonized the island since 1930 and added three species to the island list that are migratory or irruptive. The damselflies are more complicated because of difficult or questionable identification, but there are certainly five species new to the Nantucket list and two species that have likely been extirpated since 1930.

**Corresponding author:** Julia Blyth, jablyth@gmail.com, (614) 565-1221

**COMPARISON OF SPOTTED TURTLE (*Clemmys gluttata*) POPULATIONS ON NANTUCKET WITH SOUTHEASTERN MASSACHUSETTS SITES**

**Barbara Brennessel** and Lindsay Petrenchik

Wheaton College, Norton, MA

The spotted turtle*, Clemmys gluttata* is a widely distributed species with complex habitat requirements. Once listed as “a species of special concern” in Massachusetts, the species was recently removed from conservation protection. However, the spotted turtle faces threats such as loss of habitat and/or habitat fragmentation. The purpose of this study is to compare the population of spotted turtles residing on Nantucket to two mainland populations in the Southeastern Massachusetts areas of Canton and Halifax. Such a comparison may possibly help to define appropriate conservation and management of remaining populations of these turtles. We used six microsatellite markers to study the population genetic structure of Sanford Farm (Nantucket) and mainland turtles. Preliminary analysis suggests that, overall; these populations are genetically similar to each other. There is a low degree of substructuring between Mainland and Nantucket populations with mainland turtles being more related to each other that either was to the Sanford Farms population. Additional comparisons are in progress between the Sanford Farm population and another Nantucket cluster of spotted turtles in the Medouie Creek system.

**Corresponding Author:** Barbara Brennessel, bbrennes@wheatonma.edu, cell phone: 508-479-6553

**GALLS AND LEAF MINES OF NANTUCKET**

**Charles S. Eiseman1**, Julia A. Blyth2, Noah D. Charney1,3, and Sydne Record4

1Northern Naturalists; 2Maria Mitchell Association, 3Hampshire College, 4Smith College

Nantucket’s gall-inducing and leaf-mining insect fauna has been largely ignored in past assessments of the island’s biodiversity. To address this knowledge gap, we conducted intensive 4- to 7-day surveys for galls and leaf mines throughout the island and on Tuckernuck in September 2011, May and August 2012, and June 2013. Incidental observations and collections were made throughout the spring and summer of 2012. Each of the four main survey windows included visits to the 10 ha biodiversity plots at Squam Swamp, Coskata Woods, and Madequecham Valley, with explorations of various other sites as time permitted. Each type of gall or leaf mine was photographed, and when possible samples were collected in an attempt to rear adults. Each visit to Nantucket has yielded many new species for the island and a few new to science. About 200 gallmakers, leafminers, and associated hymenopteran parasitoids have now been found on Nantucket, most of them during our study.

**Corresponding author:** Charley Eiseman, ceiseman@gmail.com, (413) 230-9241

**SOIL MICROBES AND THEIR DIVERSITY**

Sharron Crane1, Kathleen Bongco1, Lara Agnew1, Jenifar Patel1, Georgen Charnes2, Edith Andrews3, Ginger Andrews3, Diane Holdgate4 and **Douglas Eveleigh1,5**

1Rutgers University, New Brunswick, NJ, 2 Nantucket Historical Association, Nantucket; 3 Maria Mitchell Association, Nantucket, 4 Dept. Public Works, Nantucket and 5 UMASS, Boston.

The soil microbial community is central to bulk litter decomposition, nutrient mobilization, and soil stabilization, yet only 0.1% have been cultivated. Speciation of Nantucket microbes has focused on such groups as *Frankia* non-symbiotic nitrogen fixation; *Geobacter* spp. metal transformations; *Borrelia burgdorferi* – Lyme disease, plus mushrooms, and lichens on gravestones. We now evaluate microbial soil biodiversity using samples from Newtown Cemetery, Altar Rock and the Grace Grossman Environmental Center. Cultures were obtained by plating soils via serial dilution and spread plating on two media, Malt Extract (pH 5) and Trypticase Soy (pH 7) agars. After several days at room temperature, colonies were enumerated and characterized according to morphotype. The numbers and diversity were much lower on MEA plates, yet distinct members of the community were dominant on this medium. Over 20 unique colony morphotypes were found, and a representative colony of each morphotype was chosen for isolation. To date, 16 subcultures have been prepared (6 bacteria; 10 fungi).

These initial studies also considered possible contamination of ground water through leakage of mercuric chloride from the container holding the heart of Charles Winslow. No apparent evidence of such leakage was found by direct analysis of mercury in the soil. Additionally, levels of mercury-resistant microbes were not enhanced, thus apparently no leakage had occurred. In 1947 a tablet was dedicated a little after exhumation of the intact container. EA3 was present. It now appears that the vessel has survived subsequent soil perturbation.

**Corresponding author:** Douglas Eveleigh, eveleigh@aesop.rutgers.edu (848) 932-5647

**Mainland decline and island persistence of Macrolepidoptera in New England: the case of the Imperial Moth *Eacles imperialis* (Lepidoptera: Saturniidae) and the introduced parasitoid *Compsilura concinnata* (Diptera: Tachinidae) on Martha’s Vineyard and Nantucket**

**Paul Z. Goldstein1,**2, Shelah Morita1, Grace Capshaw2

1 Smithsonian Institution, Washington, DC, 2 University of Maryland, College Park, MD

Of the 11 species of giant silk moths (Saturniidae) recorded from Massachusetts’ offshore islands, three are or have at one time been listed as Threatened or of Special Concern in the Commonwealth: the Spiny Oakworm *Anisota stigma*, the Barrens Buck Moth *Hemileuca maia*, and the Imperial moth *Eacles imperialis*, the last of which persists on Martha’s Vineyard despite having been extirpated from mainland New England. The decline of this species has been variously attributed to intensive pesticide spraying in the decades following WWII, the widespread deployment of metal halide lighting, and the introduced parasitoid fly *Compsilura concinnata*, which has been implicated in the declines of other large moths with late-season caterpillars. Preliminary sampling data from Martha’s Vineyard comprising 90 trap lines (~2,250 bowl traps) recovered 27 genera of tachinids but failed to record any *C. concinnata*, consistent with the fly’s putative role in the Imperial Moth’s mainland decline. In recent years, Imperial moths have been documented with increasing regularity on the Elizabeth Islands and upper Cape Cod, and at least two species of *Anisota* previously unrecorded from Nantucket appear to have arrived here since 1992. These two related genera, *Eacles* and *Anisota*, both in the subfamily Ceratocampinae, account for all of the recorded inter-island “flux” in saturniid occurrences. As anecdotal reports of *Eacles imperialis*’ shifting its emergence earlier in the season and expanding its hostplant spectrum to include oak also accumulate, the underlying reasons for its geographic restriction may present challenges for environmental review and priority habitat designation in Massachusetts.

**Corresponding author:** Paul Z. Goldstein, drpzgoldstein@gmail.com (212) 633-4584

**Hymenopteran diversity and behavioral composition on an island sandplain: Bees of Martha’ s Vineyard, Dukes County, Massachusetts (Hymenoptera: Apoidea: Anthophila)**

**Paul Z. Goldstein1,2,** John S. Ascher3

1 Smithsonian Institution, Washington, DC, 2 University of Maryland, College Park, MD, 3National University of Singapore, Singapore

As part of an ongoing collaborative effort to document island bee faunas in the Northeast, we report the results of an intensive inventory of Martha’s Vineyard bees comprising a two-year effort that included over 300 trap lines in the island’s six towns. In all, we document 350 species of aculeate Hymenoptera (ants, bees, and non-parasitoid wasps), including 184 species in 31 genera of bees comprising over 14,000 specimen records currently databased online. Findings include several regional rarities and obligates of sandplain habitats, previously undocumented host associations for bee cleptoparasites, and at least one undescribed species, as well as the apparent demise of at least two species of bumble bee, *Bombus* (*Bombus*) *affini*s and *B.* (*B.*) *terricola*, paralleling mainland declines. The Vineyard’s bee fauna is dominated by soil nesters and solitary bees, but parasitic bees comprise an impressive 24% of the documented fauna and the assemblage of flower specialists is diverse relative both to the smaller offshore islands and to adjacent mainland counties. Distributions of parasitic, social, and solitary bees, and overlap between sampling years and among sites are consistent with the suggestion that certain guilds of resource-limited species—which exist in low numbers and are vulnerable for biological reasons in addition to simple rarity—are less readily sampled than generalist social bees with more protracted flight seasons. To the extent sampling methods are biased against parasitic or oligolectic bees, those species potentially most relevant to detecting and identifying pollinator decline are least likely to be captured.

**Corresponding author:** Paul Z. Goldstein, drpzgoldstein@gmail.com (212) 633-4584

**NANTUCKET BIODIVERSITY LIBRARY**

**Maris S. Humphreys**

Maria Mitchell Association

The Nantucket Biodiversity Library (NBL) was started in 2001 as a subsection of the Maria Mitchell Association (MMA) Science Library. It was founded by Dr. Bob Kennedy, then Director of Natural Sciences, as a component of MMA's plan to launch a coordinated effort to document and study the biodiversity of Nantucket. When the Nantucket Biodiversity Initiative was formed in January 2002, the NBL was recognized as a significant part of the Initiative and all partners agreed to contribute materials to the NBL.

The NBL goals are 1. To be the depository of all publications, reports and written materials dealing with the biodiversity (both present and past), the geology and the environment of Nantucket and its adjacent waters, plus similar materials about Cape Cod and Martha's Vineyard that relate to Nantucket.

 2. To be the formal depository of these materials for the Nantucket Biodiversity Initiative.

 3. To organize these materials in a user friendly format, with search capabilities.

 4. To make the NBL materials available to anyone interested in studying or researching the biodiversity of Nantucket.

In 2002, the NBL was entered into EndNote; a searchable program designed to manage bibliographies, and has expanded to 1,500 entries, numbered consecutively within the subject areas of Botany, Ecology, Geology, Habitats, Oceans, and Zoology. Materials are housed in acid-free folders in metal filing cabinets within the Natural Sciences Library. Articles and reports are copied to acid-free paper. Published materials in book format or available online are given a place-holder sheet. All entries have an EndNote record. The poster itself is hoped to present a graphic depiction of the subject areas with appropriate records from EndNote, and make searching in EndNote available via my laptop.

**Corresponding author:** Maris Humphries, khumphreys1@cox.net, 401-847-0292

**TRACKING MOVEMENTS OF COMMON TERNS AND AMERICAN OYSTERCATCHERS IN EASTERN NANTUCKET SOUND & ADJACENT WATERS: A PILOT STUDY USING NANOTAGS**

**Pam Loring1,2**, Paul Sievert1, Curt Griffin1, Caleb Spiegel2, and Scott Johnston2

1. Department of Environmental Conservation, IGERT Offshore Wind Energy Program, University of Massachusetts Amherst, 2. U.S. Fish and Wildlife Service, Division of Migratory Birds, Northeast Region

In this study, we assess the suitability of a relatively recent technology, NanoTags, for tracking the offshore movements of birds. NanoTags are light-weight (0.25‒2.6 g), digitally coded transmitters that allow hundreds of individuals to be monitored on the same frequency. During the summer of 2013, we captured and attached NanoTags to a total of 72 common terns from the nesting colony on Monomoy National Wildlife Refuge, and 14 American oystercatchers from nesting areas on Nantucket (n=10) and Monomoy NWR (n=4). On a subset of five NanoTagged oystercatchers, we also attached solar-powered satellite transmitters to validate the precision and ranges of NanoTag data. At sites throughout eastern Nantucket Sound, we constructed an array of eight automated radio telemetry stations programmed to detect NanoTagged birds around-the-clock. Six stations consisted of a 9.2-m radio telemetry tower supporting six, directional (Yagi) antennas. We also deployed an omnidirectional receiving station adjacent to the tern nesting colony on Monomoy NWR and a receiving station on a passenger ferry that crosses Nantucket Sound several times each day. In addition to these automated stations, we tracked birds using land-based, boat-based, and aerial telemetry surveys. We anticipate that results of our study will provide baseline information on the movements of common terns and American oystercatchers throughout eastern Nantucket Sound and help to evaluate the feasibility of expanding this technology for studying the offshore movements of birds in the context of marine spatial planning. Our work is being conducted in collaboration with the Atlantic Flyway Digital Tracking Network, partnership of Canadian and U.S. agencies, universities, non-profit entities throughout the Gulf of Maine region, who have collectively deployed over 50 receiving stations and 600 NanoTags on a variety of taxa including seabirds, shorebirds, passerines, and bats.

**Corresponding author:** Pam Loring, ploring@eco.umass.edu, 413-237-1213

**MUSKEGET ISLAND HAS LOW ANT BIODIVERSITY COMPARED TO ITS NEIGHBORING ISLANDS**

**Timothy Lynam1,** Luiz. A. Rodrigues1, and R. D. Stevenson1
1Department of Biology, University of Massachusetts Boston, Boston, MA

Muskeget Island (1.2 km2) is 1/3 and 1/100 the size of its neighboring islands of Tuckernuck and Nantucket, respectively. Island biogeography theory predicts that Muskeget should have 2 to 8 species of ants. We survey the island for ant species using pitfall traps, baits, and hand search techniques along five 200 m transects. In a preliminary analysis of the samples we found only three species: *Crematogaster lineolata*, *Lasius* *cf. niger*, and *Formica argenea*. *Crematogaster lineolata* is dominant numerically. Based on area alone this number of species seems low when Tuckernuck has 18 species and Nantucket has 58 species. Muskeget’s lower habitat diversity (beach, dune and fresh water ponds) and high rate of disturbance for storm over wash when compared to Tuckernuck and Nantucket are likely to contribute to the lower diversity.

Research supported by the Nantucket Biodiversity Initiative and NSF grant 0849982 to Hong Cui.

**Corresponding author:** Timothy Lynam, Timothy.Lynam001@umb.edu

**Effects of Seasonal Burning on Broom Crowberry Plant Survival and Reproduction on Nantucket Island and Cape Cod, Massachusetts**

**William A. Patterson III1, Karen C. Beattie2**, Jennifer M. Karberg2, David Crary, Jr.3

1Dept. Ecological Conservation, University of Massachusetts, Amherst, MA, 2Dept. Science and Stewardship, Nantucket Conservation Foundation, Nantucket, MA, 3Cape Cod National Seashore, South Wellfleet, MA

Broom Crowberry (*Corema conradii*) is a regionally rare but locally abundant evergreen sub-shrub endemic to the North Atlantic Coast. In Massachusetts, at its southern range limit, *Corema* is most abundant on Cape Cod and the coastal islands. Studies suggest that reproduction is dependent on disturbance, particularly fire, to promote germination from the seed bank. *Corema* plants are extremely flammable due to volatile compounds in the leaves that promote intense fire behavior. However, many current populations are old and senescent due to lack of fire disturbance. In 2009 we initiated a project to examine the effects of spring, summer and fall burning on fire behavior, plant mortality, and seedling establishment of *Corema* on Cape Cod and Nantucket Island. We established 0.9-ha2 plots burned once in spring, summer, or fall 2009. Plant cover and frequency were documented before and after, with seedling establishment monitored for three seasons post-treatment. All mature plants were initially killed by hot fires in all three seasons, and percent cover of live *Corema* has not since recovered. Frequency of individual plants within 1-m2 subplots has recovered due to the establishment of large numbers of seedlings, apparently from the soil seed bank. Many of these seedlings thinned rapidly over the growing season, likely due to desiccation. Sampled plots showed slower seedling establishment following fall burns. As many as 3-6 seedlings/m2 survived for 2-3 years post-treatment and initial flowering was observed after 3 years. We are continuing to monitor for seed production to determine minimum return intervals for subsequent burning.

**Corresponding Authors:**

William A. Patterson III (Cape Cod), wap@eco.umass.edu, (413) 498-5460

Karen C. Beattie (Nantucket), kbeattie@nantucketconservation.org, (508) 228-2884

**A REPORT ON THE 20 YEAR EFFORT TO ESTABLISH THE AMERICAN BURYING BEETLE (*NICROPHORUS AMERICANUS OLIVIER*) TO NANTUCKET ISLAND, MASSACHUSETTS**

**Lou Perrotti1** and Andrew McKenna Foster2

**1**Roger Williams Park Zoo, 2Maria Mitchell Association

The American burying beetle (*Nicrophorus americanus Olivier*) is a federally listed endangered species once common throughout the eastern and mid-western United States and now surviving in limited habitats in seven states. From 1994-2013 an initiative to re-establish the beetle on Nantucket Island, Massachusetts has been carried out by a partnership of public and private conservation agencies. During the 20 year period, nearly 3,000 beetles were released at two sites on the 31,000 acre island. This presentation will outline this 20 year effort and show how current post-release monitoring has confirmed that substantial numbers of beetles are reproducing and surviving over winter.

**Corresponding Author:** Lou Perrotti, Lperrotti@rwpzoo.org, (401)785-3510 x 335

**2012 STUDY OF COATUE’S BIODIVERSITY PLOT VEGETATION**

**Pamela T. Polloni,** Roberta Lombardi, and Ann M. Buckley

 MBLWHOI Library Herbarium (SPWH), Woods Hole, MA, 2 University of Massachusetts Herbarium (MASS), Amherst, MA, 3Buckley Botanical Consultants, Falmouth, MA

Coatue, the barrier spit sheltering Nantucket Harbor, is a remote natural area that hosts several plant communities considered rare in Massachusetts: Maritime Juniper Woodland/Shrubland (S1) is termed “critically imperiled” and Maritime Dune (S2) is termed “imperiled” in the State. Also present, the vegetated Maritime Beach Strand (S3) is termed “vulnerable” and is increasingly rare in Massachusetts. Our 6-day, 3-visit, 2012 study of the Wyer’s Point Biodiversity Plot (Plot) was conducted to document existing conditions and to characterize the flora. We examined vegetative cover at 17 observation points in May and in a series of 23 study plots on two transects in September. Our provisional list for the Plot includes 76 species including Massachusetts Endangered Species Act (MESA)-listed Special Concern, *Polygonum glaucum*. In addition we traveled the full extent of the peninsula and sampled for genetic analysis a colony of the state endangered prickly pear cactus (*Opuntia humifusa*). This subpopulation occurs on a narrow sand spit (Maritime Dune) bordered by tidal flat near (northeast of) the First Point Biodiversity Plot. A problem invasive exotic, the horned- or sea- poppy (*Glaucium flavum*), has occurred near the tip of Coatue since at least 1974. It has spread extensively along the exposed Nantucket Sound shore, and we removed several plants from within the Wyer’s Point plot.

**Corresponding author:** Pamela Polloni, ppolloni@whoi.edu, (508) 274-5439

**PRELIMINARY SURVEYS DOCUMENT HIGH LEVELS OF ANT BIODIVERSITY ON TUCKERNUCK ISLAND**

**Luiz A. Rodrigues1**, Michelle I. Chow1, 2, Timothy. Lynam1, and R. D. Stevenson1
1Department of Biology, University of Massachusetts Boston, Boston, MA, 2Department of Biological Sciences, California Polytechnic University, San Luis Obispo, CA

Ellison (2012) recently documented 58 species of ants on Nantucket Island. This number is significantly greater than estimates of 21, 33, 36 and 40 species derived from ant-specific island biogeography models. Furthermore, Nantucket’s ant fauna comprises 50% of the species and 70% of the genera found in all of Massachusetts. Would the species richness of the close-by, but much smaller Tuckernuck Island (3.6 km2, 2.9 % of Nantucket’s area), conform to the predictions of ant-specific island biogeography models (8-26 species) or would the species richness be significantly greater following the empirical patterns on Nantucket? We surveyed the ant species on Tuckernuck Island using the ALL (Ant Leaf Liter Protocol). In our first survey effort consisting of four transects each in a unique habitat (113 samples, 2466 individuals), we found 18 distinct species. Surprisingly, one *Lasius* *cf. niger* species that is non-native to North America and has only been found once in New England, was abundant on Tuckernuck. When additional samples are analyzed, we expect the ant diversity on Tuckernuck to rise to over a 20 species, 1/3 the number on Nantucket which is a large fraction given Tuckernuck is so much smaller in size. The high diversity or supersaturation of species on both islands may be a result of the rapid rise in sea level over the last 12 thousand years and thus recent formation of the islands. Research supported by the Nantucket Biodiversity Initiative, an NSF REU grant to the Biology Department at UMass Boston and NSF 0849982 to Hong Cui.

**Corresponding author:** Luiz Rodrigues, Luiz.Rodrigues001@umb.edu

**BREEDING SUCCESS OF PROTECTED AMERICAN OYESTERCATCHERS (*HAEMATOPUS PALLIATUS*) AND PIPING PLOVERS (*CHARADRIUS MELODUS*) DURING SUMMER OF 2013 ON TUCKERNUCK ISLAND, MASSACHUSETTS**

**Melissa Scubelek1**

1 Tuckernuck Land Trust

Each summer two threatened shorebird species, the American Oystercatcher (*Haematopus palliatus*) and Piping plover (*Charadrius melodus*), migrate through Massachusetts to use coastal beach habitat for breeding, nesting, and raising their young. Both of these shorebird species have experienced great reductions in population sizes due to widespread habitat loss and threats, including predation, during breeding and nonbreeding seasons. Tuckernuck Island is a unique environment comprised of globally rare sandplain grasslands and expansive stretches of untouched beaches that are critical breeding habitats for these threatened migrating birds.

Each summer American Oystercatcher and Piping plover productivity is monitored through daily reports of bird behavior, nest survival and chick fledgling success based on band identification. Nesting locations included four regions: Whale Point, East pond, North pond and Bigelow’s Point. The total number of nesting American Oystercatcher pairs was 12, fledging 9 chicks, resulting in productivity of 1.33 fledglings per breeding pair. The total number of nesting Piping plover pairs was 5, fledging 6 chicks, resulting in productivity of 1.2 fledglings per breeding pair. Tuckernuck Island serves as an important habitat that is imperative for the breeding success of these threatened shorebird species. Continued protection of Tuckernuck is essential to promote the propagation of American Oystercatcher and Piping plover species.

**Corresponding author:**  Melissa Scubelek, MScubelek@gmail.com, 610-334-8662

**STATUS OF THE NORTHEASTERN BEACH TIGER BEETLE IN MASSACHUSETTS**

**Tim Simmons1** and Paul Z. Goldstein2

1 MA Natural Heritage & Endangered Species Program, 2 National Museum of Natural History

The Northeastern Beach Tiger Beetle, *Cicindela d. dorsalis* (Coleoptera: Carabidae), is a federally Threatened obligate of Atlantic Ocean beach and fore dune habitats. Life history and habitat requirements are reviewed. Formerly widespread, the last remaining population in New England persists on Martha’s Vineyard and has been monitored for 24 years, during which time the only known mainland population was extirpated, and another population successfully restored at Monomoy National Wildlife Refuge. As of 2013, the reintroduced Monomoy population has surpassed the source population from which it was drawn, numbering at least 5000 adults. The source population has fluctuated between peak adult numbers of 200 and 3000 counted in the years between 1990 and 2013, with tropical storms playing a key role in habitat structure and dynamics. Vehicle-free beaches with persistent dune structure are sought for continued recovery efforts.

**Corresponding author:** Tim Simmons, tim.simmons@state.ma.us, 508 389-6325

**ECOLOGY OF THE SNAKES OF NANTUCKET AND TUCKERNUCK: DOCUMENTING SOME IMPORTANT DIFFERENCES**

**Scott D. Smyers**

Oxbow Associates, Inc.

Islands offer unique ecological settings for studies of organisms with limited dispersal capabilities. The snakes of Nantucket County have been studied using standardized field techniques since 2007. I will discuss the origins of this collaborative effort and summarize the methods, results, and findings. The study sites include Squam Farm, Coskata Woods, Wyer’s Point, Linda Loring Nature Foundation, and Tuckernuck. I will describe the habitat characteristics at each location and discuss the general biology of each species: garter snake, *Thamnophis sirtalis*, ring-neck snake, *Diadophis punctatus*, milk snake, *Lampropeltis triangulum*, ribbon snake, *T. sauritus*, water snake, *Nerodia sipedon*, and smooth green snake, *Opheodrys vernalis*. I will also elaborate on habitat preferences, current distribution records within Nantucket County, observations on diet, body size comparisons, trends in population sizes, recapture rates, seasonal fluctuations in capture rates, and environmental preferences. I will also focus on the variable color patterns of garter snakes from coastal and island populations, including Nantucket and Tuckernuck. In general, island snakes have discontinuous dorsal stripes compared to mainland snakes and I will explain how these patterns differ from mainland snakes and suggest alternative hypotheses explaining why these differences occur in the local populations. I will also explain why such long-term studies are important in the context of New England by comparing data from other locations in Massachusetts to Nantucket County and what I endeavor to investigate in the near future.

**Corresponding author:** Scott Smyers, smyers@oxbowassociates.com (978) 929-9058 ext. 3

**Summer Sea Turtles of the Cape and Islands: The Other Stranding Season**

**Michael Sprague1, 1**Research Assistant, Mass Audubon/Wellfleet Bay Wildlife Sanctuary

Mass Audubon’s Wellfleet Bay Sanctuary is well known for our cold-stunned sea turtle stranding work in November and December. During this season, cold-stunned Kemp’s ridley, loggerhead, and green turtles are rescued from Cape Cod Bay beaches and transported to the New England Aquarium for treatment and rehabilitation. We are less well known for our summer work collecting data on live sea turtle sightings by boaters and dead turtles that wash up on beaches. Leatherback sea turtles make up the majority of the sightings by boaters as well as the dead specimens seen on beaches during the summer. Causes of death for these largest of the world’s turtles include entanglement in fishing gear, boat strikes, and plastic ingestion. We are in the process of trying to better understand how and where these and other turtles utilize our waters in the summer months. In 2003 Mass Audubon’s Wellfleet Bay Sanctuary started a sea turtle sighting hotline for boaters. Sightings can be reported to either <http://www.seaturtlesightings.org/> or 1-888-SEA-TURT. The hotline has generated over 900 sightings, with 150 this year alone. We also respond to sightings of beached, mostly dead sea turtles in the summer, from which we take measurements and tissue samples. We are seeking volunteers on Nantucket to help us collect this important data on these critically endangered animals.

Corresponding Author: Michael Sprague, msprague@massaudubon.org

**REFUGES FOR FRESHWATER TURTLES IN HUMAN-IMPACTED REGIONS**

**Kristin M. Winchell1** and James P. Gibbs2

1Department of Biology, University of Massachusetts Boston, Boston, MA, 2Department of Environmental and Forest Biology, State University of New York College of Environmental Science and Forestry, Syracuse, NY

Nantucket Island is experiencing rapid growth associated with seasonal tourism. Resulting habitat loss and increased road traffic threatens wildlife, particularly wetland-associated species that travel overland to complete critical seasonal activities. Research from tourist-impacted and urban areas indicates that private green spaces play critical roles in wildlife management and that protected area management alone may not be sufficient in human-dominated systems. I draw on research conducted in 2009 and 2010 in Syracuse, NY, where we assessed the ability of golf courses to act as habitat refuges for freshwater turtles, which are threatened worldwide by wetland loss and degradation associated with expanding urbanization. We examined populations of snapping turtles (*Chelydra serpentina*) and painted turtles (*Chrysemys picta*) and their habitats in 88 wetlands located in three contexts: golf courses, urban areas, and wildlife refuges. Golf course wetlands were equivalent to protected area wetlands for key habitat variables and were surrounded by fewer roads than urban wetlands. Golf course populations had relative abundances similar to protected area populations, female fractions near parity, and heavy turtles in good health. Golf course wetlands supported viable turtle populations in urban contexts similar to those observed in protected areas. Based on observed turtle-habitat associations, we provide management recommendations for golf courses and private green spaces. Golf courses provide unique opportunities to increase quality wetland habitat for Nantucket freshwater turtles and reduce levels of seasonal road-mortality. The paucity of published studies on turtle road-mortality and habitat use in human-dominated areas on Nantucket warrants further research in this region.

**Corresponding Author**: Kristin M. Winchell, Kristin.Winchell001@UMB.edu, (617) 302-6254

**POPULATION GENETICS OF INVASIVE WEEDS *CENTAUREA MACULOSA* AND *CENTAUREA JACEA* ON NANTUCKET ISLAND**

 **Tomáš Závada 1**

1 University of Massachusetts Boston, 100 Morrissey Blvd., Boston, MA 02125

 The current flora of New England, including Cape Cod and the Islands, consists of both native and non-native species. Non-indigenous plants have been introduced since the first Europeans landed in North America in 15th century. It was estimated that of the approximately 3,000 vascular plants that comprise New England's flora, about a thousand are non-native plant species, 200 of which can be considered invasive. *Centaurea maculosa* (Spotted Knapweed) and *Centaurea jacea* (Brown Knapweed) are members of the Composite family (Asteraceae) and natives of Eurasia. *C. maculosa* is a major invasive plant in North America, dominating large stretches of grassland. Both species were introduced on Nantucket Island, and aim of this study is to describe genetic structure and diversity of these weeds. Haplotype analysis based on chloroplast DNA sequence data suggested just one introduction of these species on Nantucket Island. The only outlier was one of the hybrid-like specimens, and based on its morphology it appears that we found *Centaurea nigrescens* on Nantucket Island. The further analysis of nuclear DNA with microsatellite markers clarifies whether gene flow and hybridization between *C. maculosa* and *C. jacea* have produced the hybrid-like weeds or if these plants represent environmental plastic morphs of Brown Knapweed.

**Corresponding author:** Tomáš Závada, tomas.zavada@umb.edu, 617-287-6643