WATERFOWL AND UPLAND GAMEBIRD PROGRAM

2015 ANNUAL REPORT
DEPARTMENT OF ENTOMOLOGY AND WILDLIFE ECOLOGY
COLLEGE OF AGRICULTURE AND NATURAL RESOURCES
Atlantic Flyway waterfowl and wetlands are facing critical challenges in an increasingly developed landscape. Under the direction of Dr. Chris Williams, waterfowl and gamebird biologist in the Department of Entomology and Wildlife Ecology, the University of Delaware aims to grow and build, in perpetuity, an internationally recognized, teaching and research program to:

• Promote science-based knowledge of waterfowl and gamebird conservation through funding undergraduate and graduate student stipends and tuition as well as provide funding for research, equipment, travel, and faculty support.
• Educate current and future undergraduate and graduate students, as well as private stakeholders about waterfowl and wetlands conservation.
• Grow UD’s Ducks Unlimited Student Chapter (established in 2013).

To donate to or sponsor this program, please contact:
Dan Sarkissian, Director of Development in the College of Agriculture & Natural Resources at the University of Delaware at 302-831-4595 or djs@udel.edu.
A Letter from Dr. Chris Williams

This last year has been busier than ever but has also provided some exciting advancements in our waterfowl and upland gamebird program. After 3 years of planning, we hosted the 7th North American Duck Symposium in Annapolis, Maryland. This was the first time the Duck Symposium has been held on the Atlantic Flyway and it was an honor to bring biologists from around North America and the globe to the Chesapeake Bay to discuss current waterfowl research and conservation issues! Four hundred and thirty people were in attendance and approximately a quarter of them were students thus assuring a continued base in the waterfowl sciences. I was especially proud of my undergraduate researcher, Sam Fino, who won the best undergraduate oral presentation award.

Over the last year and a half, multiple new projects have begun. Specifically, we were awarded 2 grants from the U.S. Fish and Wildlife Service to study the effects of Hurricane Sandy on waterfowl foods and its implications for future management. Chase Colmorgen came on board as a new M.S. student to build a predictive model of Submerged Aquatic Vegetation to better plan for the availability of this food for wintering Atlantic Brant. Second I brought Brenna Towery on as a post-Masters researcher to quantify the availability of black duck foods on three National Wildlife Refuges prior to habitat restoration efforts.

Third, I brought on Jake McPherson as a new M.S. graduate student to quantify the energy expenditure of certain behaviors in black ducks and lesser scaup. He is conducting physiological research trials at Patuxent National Wildlife Research Center.

Fourth, we began a new project to reintroduce northern bobwhite into the New Jersey Pine Barrens. In conjunction with the Audubon Society and Tall Timbers Research Station in Tallahassee, Florida, we are reintroducing 80 birds per year for 3 years. The reintroduction efforts have been very successful over the last year and we are excited for the second batch of birds to arrive this spring. I brought on a new M.S. student, Kaili Stevens, to oversee a portion of this research and she has been honored to receive the first Turner Creek/Bombay Hook graduate scholarship from Bill D’Alonzo to assist with her research. Thank you Bill!

In addition to these new projects we have been actively finishing up several other
projects. My post-doctoral researcher, Kevin Ringelman, has finished up multiple papers to better understand if landuse characteristics and/or environmental stochasticity could impact black duck use of the landscape. It was a great honor for Kevin that he was accepted as the next waterfowl professor at Louisiana State University in fall of 2014.

Second, Will Macaluso has been finishing up his M.S. degree researching reintroduction techniques for northern bobwhite restoration on Long Island, New York. His findings were instrumental in helping us design a reintroduction strategy for the New Jersey Pine Barrens.

Third, Mark Livolsi finished his M.S. degree where he researched how sea level rise will impact dabbling duck food availability on the Delaware coastline and on its State and Federal impoundments. This has provided important data for future land conservation efforts.

Last, M.S. student, Clark Nissley, with funding from Arctic Goose Joint Venture, has been researching the potential competition from lesser snow geese and cackling geese on breeding season success of Atlantic brant. He has been working on Southampton Island, Nunavut during the summers of 2014 and 2015. I was lucky to be able to join him this last summer, and after researching Atlantic brant on their wintering grounds for the last 8 years, I was excited to be heading north to their breeding grounds to explore competition as a possible limiting factor on fluctuating Atlantic brant populations.

New projects are going to be beginning this year. First I will be bringing Zach Ladin on as a post-doctoral researcher to analyze Virginia’s Canada Goose banding records to quantity harvest and survival rates. Additionally, we are working on building an integrated population model for Atlantic brant. Second, I will be bringing Kate McGrew on as a new M.S. student to better understand the hearing abilities of diving ducks so that potential deterrents can be developed to avoid divers getting caught in fishing boat nets.

Lastly our Ducks Unlimited Student Chapter is in its third year and we hosted our third annual fall dinner in 2015. Each year, we are receiving more support and the fundraising activities are increasing to support wetland and waterfowl conservation in the Mid-Atlantic. I am very proud of our students and excited to know we are training the next generation of Ducks Unlimited volunteers!

Although 2015 was a busy year, I am happy that my students and I have been able to do so much for the advancement of waterfowl and upland gamebird conservation in the Atlantic Flyway! Here’s to a great 2016!

Sincerely,
Dr. Chris Williams

Associate Professor of Wildlife Ecology
Email: ckwilla@udel.edu
In February 2016, the University of Delaware hosted the 7th North American Duck Symposium (NADS) entitled “Ecology and Integrated Management of Waterfowl” in Annapolis, Maryland. This was a huge honor, as it marked the first time NADS has been held in the Atlantic Flyway! During NADS7, 430 conferees attended presenting more than 300 presentations during the conference.

The symposium is held every three years and provides an opportunity for waterfowl ecologists from across North America to come together to present current research and discuss future management priorities. NADS8 will be held in Winnipeg, Manitoba in the fall of 2019.

Photo: U.S. Fish and Wildlife Service
Director Dan Ashe delivers first Plenary talk
Predicting the Effects of Future Sea Level Rise on Wintering Dabbling Duck Carrying Capacity in Delaware

By Mark Livolsi, M.S. Student

Tidal saltmarshes and coastal impoundments serve as important wintering habitats for migrating waterfowl in Delaware. In the coming century, sea level rise will likely alter the quantity and composition of marshland in Delaware, which may in turn affect food availability for wintering waterfowl. Reduced food availability can lead to mortality, poor body condition, and reduced recruitment in waterfowl populations.

Funded by Delaware Division of Fish and Wildlife and Ducks Unlimited, the objective of this research was to compare food availability, waterfowl energy expenditure, and habitat use between impounded and unmanaged marshes, and to apply sea level rise models to land cover data to estimate future wintering waterfowl carrying capacities in Delaware. To address this problem, during the winters of 2011-2013, we collected soil core and nekton samples in six distinct marsh habitat types to estimate food availability and we conducted instantaneous behavioral scans to determine energy expenditure. Additionally, we conducted point counts and aerial surveys to assess habitat selection. We applied NOAA’s Sea Level Affecting Marshes Model (SLAMM) to predict changes in marsh composition several decades into the future, and in combination with energy availability and expenditure estimates, we made predictions how wintering waterfowl food resources will change with sea level rise and the value of impoundments. This research will inform decisions made by wildlife managers regarding the relative value of impoundments as compared to unmanaged marshes, and their maintenance in the face of impending sea level rise.

By Jake McPherson, M.S. Student

American black duck (*Anas rubripes*) and lesser scaup (*Aythya affinis*) populations have experienced continual declines over past decades. Research suggests that declines in these species may be the result of a complex of factors including resource availability on migrating and wintering landscapes. A logical next step toward better understanding population trends in these species is to produce carrying capacity estimates for non-breeding landscapes. Carrying capacity estimates require knowledge of 1) energy supply — the total energy available to waterfowl via existing habitats and 2) energy demand — the daily energetic requirements of a single bird multiplied by the total number of ducks to be accommodated.

Our current project is focused on refining estimates of energy demand which requires knowledge of multiple parameters including the birds resting metabolic rate, effects of temperature, the percent of time a bird spends in a given day engaged in various behaviors (e.g., swimming, feeding, diving, etc.), and the relative energetic cost of each of those behaviors. This project will estimate the energetic cost associated with a suite of behaviors, and in turn, strengthen estimates of daily energetic expenditure and carrying capacity. We are conducting this research on captive American black ducks and lesser scaup at Patuxent Wildlife Research Center in Laurel, MD.

Additional support for this project was provided by Ducks Unlimited, Inc., the Black Duck Joint Venture, Upper Mississippi River & Great Lakes Region Joint Venture, and Waterfowl Research Foundation.
Assessing the Impact of Lesser Snow Geese and Cackling Geese Competition on Breeding Atlantic Brant

By Clark Nissley, M.S. Student

The most recent mid-winter surveys suggest Atlantic brant populations are suffering their lowest numbers in over 30 years. While brant populations are known to fluctuate, there is evidence the number of young in flocks as well as the number of young per brood has declined in recent decades. This may be indicative of a limitation on the breeding grounds. Expanding populations of lesser snow geese and cackling geese, utilizing the same breeding grounds, may be contributing to the decline in brant breeding success. Identifying all forms of interspecific competition between brant and these other arctic nesting goose species is key to understanding any possible limitations that may be occurring.

Southampton Island has historically supported a breeding population of Atlantic brant; however, the number of breeding brant on the island decreased significantly in the last 30 years. The island also supports populations of nesting lesser snow geese and cackling geese. In the summers of 2014 and 2015, we set up field camps at East Bay, Southampton Island, Nunavut, Canada. Field crews conducted nest searches, behavioral scans, and vegetation surveys, deployed nest cameras, monitored predator abundance, and conducted numerous other field-based trials and experiments all in an effort to better understand the reasons for the localized brant breeding failure. Results from the two breeding seasons indicate that the brant population decline and breeding failure at East Bay may very well be due to a multitude of reasons, implicating multiple goose species. East Bay brant suffer from a degraded habitat caused by nearly 3 decades of intense grazing and grubbing by lesser snow geese. In addition, brant must compete with an increased abundance of cackling geese whose breeding population at East Bay has increased from 27 nests in 1979 to nearly 600 nests. Brant breeding success was low in both years and now we aim to use collected data to unravel the answer to why these birds are experiencing such a change in what was once one of the premier arctic breeding sites for Atlantic brant.
Building a Predictive Model of Submerged Aquatic Vegetation for Atlantic Brant

By Chase Colmorgen, M.S. Student

Atlantic brant are a species of interest due to population fluctuations in past decades, which had raised the question of what is causing these intermittent declines. Brant are unique among waterfowl in their preferred use of the intertidal zone while wintering in the mid-Atlantic region. It is within these areas that they feed nearly exclusively on submerged aquatic vegetation (SAV) during migration and winter. Thus, any change in abundance and distribution of SAV has direct implications for the distribution, survival, reproductive success, and population size of brant. The intertidal zone is exposed to frequent disturbance from environmental stochastic events (e.g. habitat degradation due to Hurricane Sandy, long term sea-level changes), as well as human degradation via development, commercial boating or dredging, and recreational boating (prop scarring).

The purpose of this project is to build a predictive model for submerged aquatic vegetation in the intertidal areas of southern Long Island, New York, and New Jersey which have the highest density of wintering Atlantic brant in the U.S. Using aerial imagery, I created an index of SAV presence based on reflectance of green pigment in the image to make a preliminary model for field work. I then randomly sampled areas where I suspected vegetation was present, as well as not present, to validate my model. I collected vegetation samples using a 1 m$^2$ quadrat, which was taken back to our lab, sorted by type, dried, and then weighed. With these data, I hope to estimate energy density availability and carrying capacity in these areas to better understand the relationship between food resources and wintering brant abundance.
The Winter Ecology and Success of Reintroduced Northern Bobwhite into the New Jersey Pine Barrens

By Kaili Stevens, M.S. Student

Over the past fifty years, northern bobwhite have suffered a dramatic population decline throughout their historic range. This is likely attributed to a shift in forest management practices, habitat degradation, and more efficient farming techniques. Though the declining bobwhite population is a concern throughout their entire range, the most dramatic hit to bobwhite numbers can be seen in the mid-Atlantic coast. In New Jersey, bobwhites may be functionally extinct from the state. Despite the downward trend in conservation, there are promising options for restoring bobwhite populations in the mid-Atlantic.

Through proper forest management and translocation, this research project aims to restore bobwhite populations in the New Jersey Pine Barrens. With funding and oversight from the New Jersey Audubon, Tall Timbers, and the first ever graduate scholarship from Turners Creek/Bombay Hook Farms, we are bringing 80 wild-caught individual bobwhite up from Georgia for release prior to the breeding season over a three year period between 2015-2017. The selected study site, provided by the Pine Island Cranberry Company, encompasses more than 17,000 acres of privately owned land in the heart of the New Jersey Pine Barrens and includes active habitat management including forest thinning, cutting, and prescribed burns which work together to bring back early successional habitat crucial for the success of bobwhites and other wildlife. This active forest management and close proximity to state forests makes this the ideal starting point for reestablishing bobwhites in New Jersey.

Each year, the 80 radio-collared individuals are being monitored for survival, habitat use, and reproductive success throughout the year. Additionally, any new birds born on site will be studied by radio-telemetry.

By William Macaluso, M.S. Student

Northern bobwhites have been experiencing range contractions and range-wide declines in abundance since the 1960s. A combination of development, habitat fragmentation, and increasing “clean” farming practices has led to a significant decrease in the amount of available habitat for bobwhites and other grassland birds. Historically, the most viable method to reestablish bobwhite populations in areas with suitable habitat has been translocation of birds; pen-reared bobwhites often demonstrate survival rates that are too low to establish a sustainable population. Unfortunately, low population numbers throughout their existing range often restricts the availability of bobwhites for translocation. This study, which is funded by the Greentree Foundation, builds on a parent-rearing method developed at the Tall Timbers Research Station. Bobwhites that were raised using this method have shown similar survival rates to wild bobwhites at release sites in the Southeast. The goal of this study is to compare the usefulness of this parent-rearing method to traditional pen-rearing methods on the periphery of the bobwhite’s historical home range - where they have effectively gone extinct. During the summers of 2013 and 2014, bobwhite quail were released onto a 460 acre property on Long Island, New York. Each bird received a unique aluminum leg band as well as a colored band to indicate their treatment group (i.e. parent-reared or non-parent-reared). In addition, a subset birds were outfitted with a radio-collar to compare survival rates and habitat use between the treatment groups. The study will conclude Spring 2016.
Past Waterfowl and Upland Gamebird Researchers


Beston, Julie. 2014. Building a predictive population model for Atlantic Flyaway resident Canada geese. Post-doctoral


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*Photo: Kate Guerena holding baby American crocodile at Florida Keys National Wildlife Refuge Complex*


RECENT PRESENTATIONS


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