ACJV Saltmarsh Conservation Workshop

Albany, NY - July 19, 2015

The purpose of this workshop is to share information regarding saltmarsh conservation science efforts that can inform implementation efforts throughout the Atlantic Flyway. This document provides brief summaries of the following projects, submitted prior to the workshop.

PROJECT SUMMARIES

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SALTMARSH HABITAT & AVIAN RESEARCH PROGRAM:

The information to protect tidal marshes in our changing land & seascapes

I. Principal Investigators *(alphabetical)*:

Jonathan Cohen (SUNY – ESF), Chris Elphick (Univ. Connecticut), Thomas Hodgman (Maine DIFW), Adrienne Kovach (Univ. New Hampshire), Brian Olsen (Univ. Maine), and Greg Shriver (Univ. Delaware)

II. Principal Project Objectives *(funded and in process)*:

A. Identify focal areas for six, tidal-marsh-obligate birds across the Northeastern US (Maine – Virginia), and generate distribution and abundance maps for 26 SGCN marsh-birds
B. Identify regions and species that are most sensitive to land and seascape changes
C. Conduct PVA for multiple focal species
D. Distinguish among alternative models for the impact of accumulated stressors
E. Describe the spatial patterning and landscape predictors of marsh resilience
F. Determine the short-term resilience of the tidal marsh bird community to Hurricane Sandy
G. Assess the efficacy of restoration efforts on federal lands
H. Develop decision-support tools for prioritizing marsh conservation at state and regional scales
I. Document the speed and progression of marsh migration into the upland with sea-level rise (Long Island Sound only)
J. Provide data to assess freshwater impoundment conversion to tidal wetlands on wildlife refuges (Delaware only)

II. Funding:

A. USFWS through the National State Wildlife Grants Competition, Northeast Regional Conservation Needs Grant, and Region 5 Division of Migratory Birds (2011 – 2015)
B. National Science Foundation (2013 – 2015)
C. USFWS Hurricane Sandy Relief (two awards: 2014 – 2016)

III. Target Species

Birds

- Seaside Sparrow
- Saltmarsh Sparrow
- Nelson's Sparrow
- Willet
- American Black Duck
- Clapper Rail

Plants

- *Spartina alterniflora*
- *Spartina patens*
- *Distichlis spicata*
- *Juncus gerardii*

IV. Data Collection:

A. Extensive surveys using a probabilistic GRTS draw with a two-stage cluster sample:
~1,500 sampling locations visited 3 times per year in all years to estimate avian abundance and plant community composition
(2011 – 2014) http://www.tidalmarshbirds.org/?page_id=1295
B. Intensive sampling to assess broad geographic trends in demography:
22 demographic sites from New Jersey – Maine to estimate fecundity and survival
(2011 – 2015) http://www.tidalmarshbirds.org/?page_id=1392
C. RTK at 260 locations to measure elevation *(2012 & 2014)*
D. Baseline plant surveys for marsh migration into the upland along Long Island Sound (2013)
~130 randomized sampling locations to estimate upland community change with sea-level

VII. Application of Results

A. A ***consistent, sub-continental-scale platform*** for monitoring change in tidal marshes
B. Standardized methods to ***assess local and regional marsh resilience*** to change
C. Methods to ***rank regional marsh importance*** to tidal-marsh endemic birds
D. ***Predictions of tidal-marsh bird viability*** in the face of changing landscapes
E. Specific conservation priorities to guide ***actions to maximize endemic biodiversity***

VI. Future Potential Directions *(grants in development or in review)*:

A. Develop sub-marsh-scale management techniques to maintain bird-suitable high marsh habitats in the face of sea-level rise (*e.g., tree-cutting, tidal booms, floating islands, tide gate manipulation, runnel cutting)*
B. Experimentally test methods to convert marsh-adjacent agricultural lands into bird-suitable high marsh (*To develop an NRCS program for adaptation to sea-level rise)*
C. Experimentally test the impacts of nutrient subsidies on the resilience of marshes to sea-level rise, and trace the landscape sources of such subsidies (*To rank marshes at risk of eroded resilience and provide actions for increasing local marsh resilience)*
D. *Quantify the ecosystem services of restored and unrestored marshes (and regional marsh complexes) using methods comparable to service estimators in other systems world-wide*
E. *Expand our state-level decision-support tools to optimize tidal marsh conservation for the entire region, combining our biological knowledge with social science data and modeling*
F. *Collaborate with identified investigators from the Southeastern US to implement a consistent platform for tidal marsh conservation from the Gulf of Mexico to the Gulf of Maine*
G. *Trial Saltmarsh Sparrow husbandry techniques to allow for the quick and successful development of a breeding program, should it become necessary*

VII. Current Graduate Student Projects

Ph.D.

Alyssa Borowske (UConn) ~ Seasonal survival and migration ecology of tidal-marsh sparrows
Meaghan Conway (UMaine) ~ Niche differentiation between tidal-marsh sparrows
Mo Correll (UMaine) ~ Decadal changes to the tidal-marsh bird communities of the Northeast US
Chris Field (UConn) ~ Survival and Population Viability Analyses of tidal-marsh sparrows
Becky Kern (UD) ~ Importance of different causes of nest failure in tidal-marsh sparrows
Alison Kocek (SUNY-ESF) ~ The impacts of marsh restoration on tidal-marsh sparrows
Kate Ruskin (UMaine) ~ Geographical gradients in tidal-marsh bird fecundity
Emma Shelly (UConn) ~ Mating systems of tidal-marsh sparrows
Jen Walsh (UNH) ~ Genetic patterns of differentiation and hybridization in tidal-marsh sparrows
Whitney Wiest (UD) ~ Mapping tidal-marsh endemic focal areas and forecasting their loss

M.S.

Bri Benvenuti (UNH) ~ Methods for maintaining high marsh in the face of sea-level rise
Laura Garey (UMaine) ~ Community ecology and trophic cascades in the high marsh
Sam Roberts (UD) ~ Foraging ecology of tidal-marsh sparrows

Synthesis of High and Low Marsh Habitat Mapping, Vulnerability and Responses to Sea-Level Rise in the South Atlantic Region

General Project Goal/Purpose:
Improved mapping of current and potential future salt marsh habitats to support future updates of the South Atlantic Conservation Blueprint

Specific Objectives:
Provide consistent spatial datasets on high & low marsh depicting historic distributions and dynamics, current distributions, and future vulnerability. Project provides estimates for the entire South Atlantic region and additional detailed information for 3 intensive study areas in NC, SC, and GA.

Geographic Scope:
Atlantic coast from Southeast Virginia to North Florida

Available/ Expected Products & Tools:
GIS layers with improved mapping of salt marsh types and accuracy assessments, GIS layers depicting historic High/Low marsh boundaries (including decadal shifts, vegetation change, and migration rates), Detailed vulnerability assessment for focus areas in NC, SC, and GA

Anticipated Completion Date:
Summer 2016

Target Audience/User Groups:
Coastal Planners, Biologists, and Managers

Principal Investigator(s):
Tom Allen, East Carolina University
allenth@ecu.edu, (252) 328-6624

Decision Support for Hurricane Sandy Restoration and Future Conservation to Increase Resiliency of Tidal Wetland Habitats and Species in the Face of Storms and Sea Level Rise--Marsh equilibrium Model Coupled with ADCIRC Hydrodynamic Model

General Project Goal/Purpose:
Increase understanding of how marshes across a range of conditions in the Northeast are likely to respond to sea level rise and storms. Parameterize coupled marsh and hydrodynamic models for estuaries in the Northeast affected by Hurricane Sandy. The model will be applied to Plum Island Sound (MA) in the first year and in other Sandy-affected states (Virginia-Maine) in the second year.

Specific Objectives:
Forecast the evolution of marsh landscapes under different sea-level rise scenarios with and without marsh restoration and add storm surge modeling.

Geographic Scope:
ME to VA, Plum Island Sound (MA) will be modeled, remaining sites TBD but likely: Forsythe NWR, NJ, John H Chafee NWR, Inlet of Chesapeake Bay to Ocean City MD

Available/Expected Products & Tools:

- A coupled biological-hydrodynamic model (MEM and ADCIRC) that is parameterized for Plum Island estuary to forecast marsh responses to sea-level rise and forecast storm surge with sea-level rise and with altered marsh landscapes. Modeled spatial data outputs will be at a resolution that can be input by larger project partners in decision support tools.
- Integrated models MEM and ADCIRC for six other Northeast estuaries representing a range of geography, estuary type, tidal range, sediment budget and other factors and with spatial data outputs at a resolution that can be input by larger project partners in decision support tools.
- Final summary and report on model results including recommendations for next steps to apply across the region.

Anticipated Completion Date:
November 1, 2016

Target Audience/User Groups:
Federal, state and local land managers, decision-makers and conservationists

Principal Investigator(s):
James Morris, University of South Carolina, morris@inlet.geol.sc.edu;
Scott Hagen, Louisiana State University, shagen@lsu.edu,
Andrew Milliken or Megan Tyrrell, North Atlantic LCC, Megan_Tyrrell@fws.gov,
andrew_milliken@fws.gov

Decision Support for Hurricane Sandy Restoration and Future Conservation to Increase Resiliency of Tidal Wetland Habitats and Species in the Face of Storms and Sea Level Rise--Coastal Resilience

General Project Goal/Purpose: Assess the ecological resilience of the North Atlantic LCC's coastal zone defined as the region under 10' elevation containing ocean shoreline, bays, and floodplains

Specific Objectives: Provide decision-makers and conservationists with maps identifying the coastal areas that will be the most ecologically resilient to climate change and tools to explore where conservation strategies will have the greatest benefit on sustaining natural diversity
- increase the resiliency of tidal marshes, tidal marsh species and coastal communities
- improve understanding of how to best protect, manage and restore tidal marshes, tidal marsh dependent species and adjacent lands and communities to increase resiliency and persistence in the face of sea level rise and storms

Geographic Scope: Maine to Virginia

Available/Expected Products & Tools: Fine scale (30 m resolution) GIS layers that can be integrated with other ecological integrity assessment tools and used to identify sites with the highest estimated site resilience, sites of high vulnerability to climate change, and sites where management of particular characteristics could increase its potential resilience. The layers to be produced represent: accretion/erosion rates, slope, average tidal height, average wave height, relative sea level rise rate, elevation diversity, marsh migration space, sediment supply, freshwater flushing rates, anthropogenic barriers.

- Maps and data delineating the coarse-scale (embayment, lagoon, river delta, etc.) and fine-scale (salt marsh, floodplain, barrier beach, developed shoreline, etc.) coastal features of the study area
- Maps and data showing the ecological resilience of individual salt marshes and other coastal habitats (beach, maritime forest etc.) with respect to their ability to support fish, wildlife, and plants under a changing climate
- A report and datasets to allow users to easily assess an area of interest within the study area for its ecological resilience, its biodiversity value, or an integration of the two
- Web based training sessions to help users understand the content and use the tools.

Anticipated Completion Date: November 1, 2016

Target Audience/User Groups:
Federal, state and local decision-makers and conservationists

*Principal Investigator(s)***:** Mark Anderson, The Nature Conservancy, manderson@tnc.org; Andrew Milliken or Megan Tyrrell, North Atlantic LCC, Megan_Tyrrell@fws.gov, andrew_milliken@fws.gov

Decision Support for Hurricane Sandy Restoration and Future Conservation to Increase Resiliency of Tidal Wetland Habitats and Species in the Face of Storms and Sea Level Rise--Designing Sustaining Coastal Landscapes in the Face of Sea-level Rise and Storms

General Project Goal/Purpose:
More fully address coastal resilience through both ecological integrity and species habitat capability through the *Designing Sustainable Landscapes* approach. Additionally, incorporate the dynamic sea level rise model into assessment of the ecological integrity of salt marshes

Specific Objectives:
(A) Develop and apply a tidal restriction stressor metric and salt marsh ditching stressor metric and incorporate them into the overall ecological integrity assessment for coastal salt marsh ecosystems across the Northeast;
(B) Develop landscape capability models for additional tidal marsh obligate species in collaboration with partners and apply the models across the Northeast;
(C) Work with LCC partners and coastal decision-makers to test and refine the coastal ecological integrity and landscape capability models;
(D) Incorporate these additional metrics and models into the overall Designing Sustainable Landscapes Landscape Change Assessment and Design model along with sea-level rise models and test coastal conservation designs for protection restoration and management.

Geographic Scope: Maine to Virginia

Available/Expected Products & Tools:
Enhanced Designing Sustainable Landscapes model with coastal systems and species more fully incorporated to the index of ecological integrity and landscape capability models, additionally dynamic coastal response to sea level rise outputs integrated into *Designing Sustainable Landscapes* Landscape Change Assessment and Design model

Anticipated Completion Date: January 31, 2016

Target Audience/User Groups:
Federal, state and local decision-makers and conservationists

*Principal Investigator(s)***:**
Kevin McGarigal, UMass Amherst, mcgarigalk@nrc.umass.edu; Andrew Milliken or Megan Tyrrell, North Atlantic LCC, Megan_Tyrrell@fws.gov, Andrew_Milliken@fws.gov

Tidal Wetlands After Hurricane Sandy: Baseline Restoration Assessment & Future Conservation Planning

General Project Goal/Purpose: (1) Compile and summarize initial results of assessments of impacts of Hurricane Sandy on tidal marshes and marsh-dependent species; (2) Compile regionally-consistent spatial data including elevation, tidal restrictions, ditches, and hardened structures; (3) Monitor and assess the effectiveness of tidal wetland restorations completed in response to Hurricane Sandy for increasing resiliency of marshes and marsh species to future storms and sea level rise and use this information to develop best management practices for future restorations and prioritize locations with the highest likelihood of success

Specific Objectives:

A. Collect baseline data on tidal marsh bird & vegetation communities in 2015-16 to quantify the efficacy of Hurricane Sandy restoration projects using standardized protocols that allow both integration with similar work already planned for many National Wildlife Refuges and comparison with larger regional data network (>1500 locations sampled from 2011-14).
B. Collect detailed, high-resolution, marsh elevation data in association with the existing sampling network and at new study sites associated with restoration evaluation and compare results to LiDAR data.
C. Generate a detailed, ground-truthed map of high/low tidal marshes throughout the region in order to facilitate both the evaluation of restoration work and future resiliency planning
D. Integrate work with other LCC partners in order to improve regional conservation planning.
E. Synthesize results of the initial assessment of restoration effectiveness.

Geographic Scope: Maine to Virginia

Available/Expected Products & Tools: Description of tidal marsh bird and vegetation communities at restoration and control sites surveyed through this project, associated data sets, and initial assessment of restoration effectiveness.

A. Spatially-located high resolution elevation data set for sites surveyed through this project and comparison to LiDAR data
B. Spatial data layer describing major tidal (high/low) marsh plant communities across the region
C. Compilation of SHARP data products into a centralized depository

Anticipated Completion Date: November 1, 2016

Target Audience/User Groups: Federal, state and local land managers, restoration practitioners, decision-makers and conservationists

Principal Investigator(s): Chris Elphick, University of Connecticut, chris.elphick@uconn.edu; Andrew Milliken or Megan Tyrrell, North Atlantic LCC, Megan_Tyrrell@fws.gov, Andrew_Milliken@fws.gov

Delivering Information and Tools for Increasing Resilience and Adaptation of Communities and Priority Coastal Resources Across the Network of Coastal LCCs

General Project Goal/Purpose: Coordinate, synthesize and deliver coastal resilience information, ideas, activities and lessons across coastal portion of the Landscape Conservation Cooperative (LCC) network. The initial focus is on synthesizing and delivering existing coastal resilience and adaptation information to communities and, where feasible, prioritizing conservation actions to increase resilience of coastal communities and natural resources. The LCC's ultimate goal is to have decision makers informed about potential impacts, adaptation strategies and management approaches that incorporate coastal ecological and human communities in their decisions and provide a range of ecosystem services through natural and nature-based approaches.

Specific Objectives: Relate existing projections of sea level rise (SLR) and storms to impacts to habitats and populations of priority fish/wildlife species across their range. Assess restoration and management alternatives that increase persistence and resiliency of habitats and species and how alternatives relate to use of natural and nature-based approaches to community resilience. Actions could delay/preclude listing of species that are sensitive to SLR, help sustain/recover listed species, and maintain economically important fish/wildlife populations.

Geographic Scope: Atlantic and Gulf Coasts of LCCs from Atlantic Canada to Mexico

Available/Expected Products & Tools: Compilation and synthesis of existing Gulf and Atlantic Coast vulnerability/resiliency information on priority coastal species/models that quantitatively link sea level rise and increased storm severity and frequency with system response, impacts to habitats and species, and restoration and management alternatives.

- Identify thresholds of viability for these species under different rates of sea level rise.
- Identify additional science needs and approaches to address information gaps.
- Assess restoration/management options that increase species/habitat persistence/resilience
- Assess how options relate to use of natural/nature-based approaches to resilience (i.e. do approaches to increase resilience also increase persistence/resilience of coastal resources?).
- Summarize efforts relating use of natural/nature-based approaches to community resilience.
- Pilot effort(s) to incorporate species/habitat information into community resilience planning.
- Final results compiled and made available in report, website(s), data portal(s).

Anticipated Completion Date: August 17, 2016

Target Audience/User Groups: Federal, state and local decision-makers and conservationists

*Principal Investigator(s)***:** Emily Powell, Coastal Resiliency Research Associate, John Tirpak, Gulf Restoration Program, John_Tirpak@fws.gov; Andrew Milliken or Megan Tyrrell, North Atlantic LCC, Megan_Tyrrell@fws.gov, Andrew_Milliken@fws.gov

Bioenergetics, Behavior, and Sea Level Rise: Current Status & Future Implications for Wintering Dabbling Ducks in Delaware

General Project Goal/Purpose: To quantify the population abundance, behavior, and bioenergetic carrying capacity of dabbling ducks wintering along the Delaware Bayshore in managed and unmanaged habitats, and to forecast future trends in carrying capacity based on several anticipated sea level rise scenarios.

Specific Objectives:
1. To estimate bioenergetic carrying capacity (duck use-days) for dabbling ducks at the state-level via time-energy budgets based on instantaneous behavioral scans (DEE, or daily energy expenditure) and food energy supply based on soil core, nekton, and saltmarsh snail sampling in managed impoundments and unmanaged tidal marsh sites.
2. To quantify and compare dabbling duck behavioral proportions between managed impoundments and unmanaged tidal marshes over the 24-hr period.
3. To estimate population density and abundance of wintering dabblers by habitat and at the state level via point-transect counts and aerial surveys.
4. To determine likely trends in bioenergetic carrying capacities over the next century based on sea level rise scenarios (ranging from conservative to liberal) identified as potential candidates for the state of Delaware.

Geographic Scope: Delaware Bayshore between Kent and Sussex Counties

Available/Expected Products & Tools: Hot-spot maps/GIS layers of energetic and waterfowl population density to assist managers in identifying key areas where habitat protection, modification or restoration will be most effective. Assessment of carrying capacity change based on predicted habitat changes resulting from various SLR scenarios.

Anticipated Completion Date: June 2015

Target Audience/User Groups:
Habitat conservation planning and delivery personnel; Atlantic Coast Joint Venture

*Principal Investigator(s)***:**
Mark C. Livolsi, Department of Entomology and Wildlife Ecology, University of Delaware, 250 Townsend Hall, Newark, DE 19716. mlivolsi@udel.edu
Christopher K. Williams, Department of Entomology and Wildlife Ecology, University of Delaware, 253 Townsend Hall, Newark, DE 19711. 302–831–4592; ckwillia@udel.edu
John M. Coluccy, Ducks Unlimited, Great Lakes Atlantic Region, 1220 Eisenhower Place, Ann Arbor, MI 48108. 734–623–2010; jcoluccy@ducks.org
Matthew T. Dibona, Delaware Department of Natural Resources and Environmental Control, Division of Fish & Wildlife, Dover, DE 19901. 302-735-3604; Matthew.DiBona@state.de.us

Black Duck Breeding Distribution in Virginia

General Project Goal/Purpose: Identify numbers and locations of local breeding black ducks.

Specific Objectives: Determine location, distribution and breeding success of black ducks breeding in the coast salt marsh and barrier island system.

Geographic Scope: Coastal Salt marsh and barrier islands of Virginia.

Available/Expected Products & Tools: Evaluate local breeding efforts of black ducks. Evaluate potential management actions to increase local black duck breeding numbers and improve nesting success.

Anticipated Completion Date: Mostly completed

Target Audience/User Groups: State, Federal and private (TNC) conservation organizations

Principal Investigator(s): Gary Costanzo, VA Dept. Game & Inland Fisheries

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Assessing the Status of Black Rail (*Laterallus jamaicensis*) in South Carolina

General Project Goal/Purpose: To inventory and monitor black rails in South Carolina.

Specific Objectives:
Assess the current distribution of black rail across South Carolina using playback surveys

Geographic Scope: Coastal counties & inland locations where black rail potentially occur in South Carolina

Available/Expected Products & Tools: Preliminary information on where black rail are currently present in South Carolina

Anticipated Completion Date: Black rail surveys will continue in 2016

Target Audience/User Groups: SCDNR and land managers

Principal Investigator(s):
Amy Tegeler, Bird Conservation Coordinator
South Carolina Department of Natural Resources
803-521-2119
TegelerA@dnr.sc.gov

Avian Habitat Prioritization for the Eastern Shore at the Parcel Level

General Project Goal/Purpose: Identify parcels on the Eastern Shore of Virginia where, if habitat protection activities are completed, will provide the greatest benefit to migratory bird species. Habitat requirements, species presence within identified focus areas for migratory birds, connectivity to other areas of suitable habitat, size of contiguous habitat, and potential impacts of sea-level rise were considered in the analysis. Conservation organizations are able to use this analysis to quickly select parcels for habitat protection. Having a tool available to help identify parcels based on multiple factors is a valuable strategic planning tool and will save time and effort for the various conservation entities.

Specific Objectives:
Develop a potential habitat distribution layer for avian response guilds based on habitat requirements during breeding and foraging activities on the Eastern Shore of Virginia; identify the real estate parcels that if protected would benefit birds in the defined guilds; identify parcels that are vulnerable to sea-level rise; and create a prioritization strategy for the non-protected parcels based on their importance to migratory birds.

Geographic Scope:
Eastern Shore of Virginia (Northampton and Accomack County)

Available/Expected Products & Tools:
Data layers and map package are available for download. A web map application was also created for viewing data.

Anticipated Completion Date:
December 2013

Target Audience/User Groups:
Southern Tip Partnership group (consists of multiple conservation entities with an interest on the Eastern Shore of Virginia).

Principal Investigator(s):
Jessica Rhodes
U.S. Fish and Wildlife Service, Virginia Field Office
6669 Short Lane, Gloucester, VA 23061
Phone: 804-824-2411
Email: Jessica_Rhodes@fws.gov

SHARP: Breeding Bird Survey (Part A)

General Project Goal/Purpose: See overall SHARP summary (Page 28)

Specific Objectives:
1. Perform comprehensive survey for birds in tidal salt marsh habitat during 2011 & 2012 breeding seasons
2. Estimate distribution and abundance of 5 focal species at the state and region levels; species - clapper rail, willet, Nelson's sparrow, saltmarsh sparrow, and seaside sparrow

Geographic Scope: Northeast USA tidal salt marsh (Lubec, ME – Fisherman Island, VA)

Available/Expected Products & Tools:
1. Sampling point locations and bird survey SOP
2. Spatial layer of saltmarsh patches with estimated abundance for focal species

Anticipated Completion Date: Fall 2015

Target Audience/User Groups:
USFWS, state wildlife agencies, conservation NGOs (e.g., Audubon, TNC)

Principal Investigator(s):
Greg Shriver (UD), Chris Elphick (UConn), Brian Olsen (UMaine), & Tom Hodgman (Maine IF&W)

Graduate Student: Whitney Wiest (UD)
U.S. Fish and Wildlife Service
South Carolina Ecological Services
176 Croghan Spur Road, Suite 200
Charleston, SC 29407
843-727-4707 x 228
Whitney_Wiest@fws.gov

Adviser: Greg Shriver
University of Delaware
Department of Entomology & Wildlife Ecology
250 Townsend Hall
Newark, DE 19716
302-831-1300
gshriver@udel.edu

Make Way for Marshes: Guidance on Using Models of Tidal Wetland Migration to Support Community Resilience to Sea Level Rise

General Project Goal/Purpose:
Support the effective use of models (e.g., SLAMM) to help build a management-relevant foundation of information about tidal marsh migration in the northeastern U.S.

Specific Objectives:
- Conduct literature review and interview management, scientific, and technical practitioners about methods and applications of marsh migration modeling
- Synthesize findings into a reader-friendly document that provides expert guidance on the entire modeling lifecycle from developing a modeling approach to communicating model results

Geographic Scope:
Focus is Connecticut, Rhode Island, Massachusetts, New Hampshire, Maine. However, much of the information is transferable to other places.

Available/Expected Products & Tools:
Reader-friendly document that provides expert guidance on the entire modeling lifecycle from developing a modeling approach to communicating model results

Anticipated Completion Date: August 2015

Target Audience/User Groups:
Government (federal, state, municipal) and NGO staff involved in tidal wetland management, adaptation to sea level rise, coastal resilience, and related issues

Principal Investigator(s):
Peter Taylor, Waterview Consulting
peter@waterviewconsulting.com
207-522-8043
www.waterviewconsulting.com

Coastal Habitat Integrated Mapping & Monitoring Program (CHIMMP)

General Project Goal/Purpose:
Identify current mapping and monitoring programs across the state, foster collaboration among statewide and local programs, identify data gaps, and evaluate monitoring protocols for salt marshes and mangroves.

Specific Objectives:
Hold two workshops (April 2014 and Sept 2015) for statewide coastal wetland scientists and stakeholders. Complete inventory and report on statewide mapping and monitoring programs in salt marshes and mangroves. Initiate pilot study to assess monitoring protocols and complete recommendations for future monitoring endeavors.

Geographic Scope:
State of Florida

Available/Expected Products & Tools:
Website summarizing results of first workshop currently available: http://ocean.floridamarine.org/CHIMMP/. The 2nd CHIMMP workshop is to be held in September 2015. A statewide report is currently being compiled in collaboration with over 40 contributors across Florida and is expected to be published as a FWRI technical report.

Anticipated Completion Date:
The CHIMMP report is expected to be published in the 2016/2017 fiscal year. The pilot monitoring program is currently underway in the Tampa Bay area. CHIMMP is currently funded through June 30 2016, however if funding continues through the 2016/2017 fiscal year CHIMMP will also conduct GIS-based habitat change analyses and ground-truthing.

Target Audience/User Groups:
All stakeholders involved in the mapping, monitoring, and management of salt marshes and mangroves. This includes local, state, and federal agencies, non-governmental organizations, and academic research.

Principal Investigator(s):
Ryan P. Moyer, Ph.D.
CHIMMP Principle Investigator, Fish and Wildlife Research Institute
Florida Fish and Wildlife Conservation Commission
ryan.moyer@myfwc.com
1-727-892-4153 (office)
1-727-543-2968 (mobile)

Species Occupancy, Abundance, and Density of Select Marsh Birds in the Big Bend Region of Florida

General Project Goal/Purpose:
Several marsh birds in Florida are listed under the State Wildlife Action Plan as Species of Greatest Conservation Need, including the black rail (*Laterallus jamaicensis*), clapper rail (*Rallus crepitans*), and least bittern (*Ixobrychus exilis*). Additionally, Florida has two state listed subspecies of seaside sparrow (*Ammodramus maritimus*), the Scott' seaside sparrow (*A. m. peninsulae*) and Wakulla seaside sparrow (*A. m. juncicola*), and the state listed Marian's marsh wren (*Cistothorus palustris marianae*), collectively referred to as saltmarsh songbirds. As Florida's human population continues to grow, demand for coastal development continues to increase, leading to potential increases in loss, degradation, and fragmentation of saltmarsh habitat. Marsh bird surveys will allow FWC to fill current data gaps for imperiled saltmarsh songbirds and also better understand the impacts of sea level rise and other coastal impacts on coastal saltmarsh ecosystems. Additionally, these surveys will help to better understand hunting impacts to rails on the Big Bend WMA and also inform future wildlife viewing opportunities.

Specific Objectives:
1. Determine species presence and detection probability for black rails, clapper rails, least bitterns, seaside sparrows, and marsh wrens in saltmarsh habitat on the five management units of the Big Bend WMA.
    a. Using detection probabilities, calculate species density and abundance at the Big Bend WMA for the 5 species of marsh birds that are being surveyed.
2. Determine habitat associations for the 5 surveyed marsh birds at the Big Bend WMA.

Geographic Scope:
The Big Bend WMA is made up of 5 smaller management units, all of which include saltmarsh habitat, including the Jena, Tide Swamp, Spring Creek, Hickory Mound, and Snipe Island units. The saltmarsh of the Big Bend WMA is tidally influenced and dominated by cordgrass (*Spartina spp.*) and black needle rush (*Juncus roemerianus*).

Available/Expected Products & Tools:
Final report discussing species population estimates for Florida clapper rail, black rail, least bittern, seaside sparrow, and marsh wren at the Big Bend WMA; occupancy mapping for imperiled saltmarsh songbirds.

Anticipated Completion Date: Anticipated completion date - December 2017

Target Audience/User Groups:
Florida Wildlife Management Area Staff & Regional Biologists

Principal Investigator(s):
Kevin Oxenrider, Florida Fish and Wildlife Conservation Commission
Kevin.Oxenrider@myfwc.com

Black Rail Occupancy at Nine Historical Sites in Florida

General Project Goal/Purpose:
The decline of black rails is an emerging issue throughout the Atlantic Flyway. Surveys are needed to assess the status of this highly-secretive and potentially highly-imperiled species while there is still time to act. Although state-wide surveys for this species would not be feasible at this time, focused surveys at known historical locations would provide information about potential declines at these previously occupied sites.

Specific Objectives:
1. Determine black rail occupancy at nine historically occupied sites
2. Assess influence of habitat characteristics on black rail occupancy using remote sensing data.

Geographic Scope: Florida

Available/Expected Products & Tools:
Results from these surveys can be used as an indicator of possible declines of black rail populations in Florida and can assist the USFWS in determining the status of this at-risk species. Survey data could act as a baseline for trend analysis and survey methodology could be repeated at both these sites and at other locations in Florida, ensuring comparability of data.

Anticipated Completion Date: Dec 31, 2016

Target Audience/User Groups:
Land managers, researchers

Principal Investigator(s):
Amy Schwarzer
Florida Fish and Wildlife Conservation Commission
amy.schwarzer@myfwc.com

Worthington's Marsh Wren & MacGillivray's Seaside Sparrow Abundance and Habitat Associations in Northeast Florida

General Project Goal/Purpose:
Little is known about Worthington's marsh wren (*Cistothorus palustris griseus*) or MacGillivray's seaside sparrow (*Ammodramus maritimus macgillivraii*) population sizes, trends, or habitat needs in Florida. Research on these parameters is critical to develop management actions to achieve population stability across their historical range in Florida.

Specific Objectives:
1. Estimate occupancy rates of marsh wren and seaside sparrow breeding seasons as a function of patch and landscape variables.
2. Estimate abundance of marsh wrens and seaside sparrows (# of breeding individuals) along the northeast coast of Florida to provide baseline information for determining population sizes and trends.
3. Identify habitat features associated with nest-site selection by nesting Worthington's marsh wrens.
4. Estimate nest survival as a function of habitat features at multiple spatial scales.
5. Identify habitat use/resource selection of fledgling Worthington's marsh wrens.
6. Estimate post-fledging survival of the marsh wrens as a function of habitat features at multiple spatial scales.
7. Synthesize results from survey and survival studies, and make management recommendations about habitat features required to support high densities and productivity of marsh wrens and seaside sparrows.

Geographic Scope: Northeast Florida

Available/Expected Products & Tools:
Data on abundance, distribution, habitat associations, nest survival, and post-fledging survival (wrens only) will help inform future management of these subspecies.

Anticipated Completion Date:
Dec 31, 2017

Target Audience/User Groups:
Land managers, researchers

Principal Investigator(s):
Amy Schwarzer
Florida Fish and Wildlife Conservation Commission
amy.schwarzer@myfwc.com

Blackwater Climate Adaptation Project
(Funded by WCS Climate Adaptation Fund)

General Project Goal/Purpose:
To pilot and demonstrate habitat management techniques for facilitating transition of uplands (forested and agricultural landscapes) to tidal marsh suitable for salt marsh birds.

Specific Objectives:
The objectives of this project are both experimental and to serve as demonstrations of these experimental techniques. Our project had two principal elements:

1. Demonstrate experimental forest management techniques for transitioning upland salt-stressed forest to brackish tidal marsh that is suitable for salt marsh birds. We are calling this management goal/suite of technique "Managed Marsh Transition"). 13 acres of trees in both salt-stressed and adjacent healthy loblolly pine forest were removed in July 2014.
2. Demonstrate experimental agricultural techniques for facilitating transition of croplands to tidal marsh, by using switchgrass as a transition crop which can provide an income for farmers and reduce nutrient loading of soils as land becomes tidally influenced. 40 acres of cropland at Woolford, MD was converted from corn to switchgrass in summer 2014 under a 3-year agreement between the farmer and TNC.

Geographic Scope:
Southern Dorchester County, MD (Lies within the Southern Dorchester County Important Bird Area.

Available/Expected Products & Tools:
Project report to WCS (November 2014)
Future anticipated research publications on the impacts of forest management techniques by:

- Glenn Guntnerspergen (USGS): Impacts of forest removal on marsh surface elevation, vegetation, physical and hydrological marsh processes.
- Matt Kirwen (VIMS, College of William and Mary): Impacts of tree-girdling on marsh surface elevation, vegetation, physical and hydrological marsh processes.

Anticipated Completion Date:
November 2014

Target Audience/User Groups:
Public land managers, coastal zone climate adaptation practitioners.

Principal Investigator(s):
Erik Meyers (The Conservation Fund). emeyers@conservationfund.org
David Curson (Audubon Maryland-DC). dcurson@audubon.org
Matt Whitbeck (Blackwater NWR, USFWS). matt_whitbeck@fws.gov

Increasing Climate Resiliency at Blackwater National Wildlife Refuge
(Funded by NFWF Hurricane Sandy Coastal Resilience program)

General Project Goal/Purpose:
To increase tidal marsh resilience within Blackwater National Wildlife Refuge and surrounding Dorchester County, MD.

Specific Objectives:
1. Sediment enhancement at Blackwater NWR. *Objective:* To raise the surface elevation of approximately 30 acres of eroding high marsh by spraying locally derived sediments onto the marsh surface, a process called thin-layering.
2. Remedying hydrological issues at Farm Creek Marsh: *Objective:* Reduce the extent and duration of inundation for a declining 80 acre area within a 200-acre area high/transitional brackish marsh preserve. Our ultimate goal is to implement the most appropriate management remedy, likely to include the creation of a tidal channel network and/or sediment enhancement.
3. Phragmites control at Blackwater NWR: *Objective:* Map current extent of invasive Phragmites on a 13,200 acres portion of the Refuge and eliminate up to 1,500 acres.
4. Chesapeake Bay Nutria Eradication Project: *Objective*: Accelerate the elimination of remaining populations of destructive introduced nutria which could quickly reverse efforts to stabilize and slow tidal marsh loss.

Geographic Scope:
Southern Dorchester County, MD (Lies within the Southern Dorchester County Important Bird Area.

Available/Expected Products & Tools:
On each of the four project elements, USGS Water Science Center will produce a report on source and characteristics of surface floodwater at Farm Creek Marsh.
Article in Audubon magazine. Other media reports and articles.

Anticipated Completion Date:
September 30, 2016

Target Audience/User Groups:
Public land managers, coastal zone climate adaptation practitioners, coastal policy

*Principal Investigator(s)***:**
Erik Meyers (The Conservation Fund), emeyers@conservationfund.org
David Curson (Audubon Maryland-DC), dcurson@audubon.org
Matt Whitbeck (Blackwater NWR, USFWS), matt_whitbeck@fws.gov

Assessing Effects of Salt Marsh Restoration & Mosquito Control at Silver Sands State Park (CT) on Black Duck Winter Ecology & Energetic Carrying Capacity

General Project Goal/Purpose:
The goal of this project is to obtain empirical estimates of the effects of common salt marsh restoration activities on the quality and quantity (i.e., carrying capacity) of black duck habitat and use

Specific Objectives:

1. Quantify the net change in energetic carrying capacity (kcal/acre) of a salt marsh before and after restoration activities and between control and treatment sites;
2. Quantify the net change in black duck density in a salt marsh before and after restoration activities and between control and treatment sites;
3. Quantify the net change in black duck behavior in a salt marsh before and after restoration activities and between control and treatment sites;
4. Quantify changes in black duck movement (distance and frequency) in and out of a salt marsh before and after restoration activities and between control and treatment sites;
5. Quantify changes in salt marsh vegetation before and after restoration activities and between control and treatment sites using Integrated Waterbird Monitoring and Management protocols.

Geographic Scope: Connecticut

Available/Expected Products & Tools:
Empirical estimates of the effects in terms of changes in available food and energy for winter black ducks and habitat use as a result of salt marsh restoration

Anticipated Completion Date: September 2017

Target Audience/User Groups: Wetland managers

Principal Investigator(s):
Min Huang, Connecticut Department of Energy and Environmental Protection. Franklin Wildlife Management Area, North Franklin, CT 06254. 860–642–6528; min.huang@ct.gov
John Coluccy, Ducks Unlimited, Great Lakes Atlantic Region. 1220 Eisenhower Place, Ann Arbor, MI 48108. 734–623–2010; jcoluccy@ducks.org
Roger Wolfe, Connecticut Department of Energy and Environmental Protection. Franklin Wildlife Management Area, North Franklin, CT 06254. 860–642–6528; Roger.wolfe@ct.gov
Paul Capotosto, Connecticut Department of Energy and Environmental Protection. Franklin WMA, North Franklin, CT 06254. 860–642–6528; paul.capotosto@ct.gov
Patrick Devers, U.S. Fish and Wildlife Service. 11510 American Holly Drive, Laurel, MD 20708. 301–497–5549; Patrick_devers@fws.gov

Development of Decision Support Tool to Inform Non-Breeding Waterfowl Habitat Delivery in the Atlantic Coast Joint Venture Considering Current & Future Landscape Conditions

General Project Goal/Purpose:
To develop a decision framework to identify how much and what types of wetlands are needed and where to achieve the goals of the NAWMP.

Specific Objectives:

1. Develop stepped down NAWMP population and associated habitat goals for black ducks, large dabblers, small dabblers, divers, and wood ducks using bio-energetic approach;
2. Develop GIS based model to estimate current and future habitat delivery needs conditional on estimates of habitat loss rates, particularly due to urban growth and sea level rise;
3. Develop a decision analysis framework to identify optimal portfolios of potential acquisition and restoration projects for funding.

Geographic Scope: ACJV geography/entire black duck non-breeding range

Available/Expected Products & Tools:
GIS based model with estimates of habitat goals (by wetland types), current habitat, habitat delivery needs for species and or guilds

Anticipated Completion Date: June 2016

Target Audience/User Groups: ACJV staff and partner agencies

Principal Investigator(s):
Tim Jones, ACJV; John Coluccy, Ducks Unlimited; Kirsten Luke, ACJV; Pat Devers, BDJV

Assessing the Influence of Winter Habitat Quality on Black Duck Home Range, Habitat Use & Survival

General Project Goal/Purpose:
The goal of this project was to evaluate the effects of winter weather conditions and habitat availability (i.e., salt marsh, forested wetlands, upland) and quality (estimates of energetic capacity) on black duck home range size and survival.

Specific Objectives:

1. Refine estimates of available black duck habitat based on human disturbance and avoidance behavior;
2. Identify habitat and weather factors driving variation in home range size and composition; and
3. Identify habitat (landscape and home range scales) and weather factors driving variation in winter survival.
4.

Geographic Scope: Connecticut to Virginia

Available/Expected Products & Tools:
Empirical estimates of home range size as a function of weather and available habitat (i.e., coastal salt marsh). Manuscript in review at Journal of Wildlife Management.

Anticipated Completion Date: December 2015

Target Audience/User Groups:
Habitat conservation planning and delivery personnel; Atlantic Coast Joint Venture.

Principal Investigator(s):
Christopher K. Williams, PhD, Assistant Professor of Wildlife Ecology
Department of Entomology and Wildlife Ecology, University of Delaware
253 Townsend Hall, Newark, DE 19711
302–831–4592
Email: ckwillia@udel.edu

John M. Coluccy, Ph.D., Director of Conservation Planning
Ducks Unlimited Inc., Great Lakes Atlantic Regional Office
1220 Eisenhower Place
Ann Arbor, MI 48108
734–623–2010
Email: jcoluccy@ducks.org

Development of Field Protocols to Estimate Waterfowl Abundance & Wetland Characteristics in Coastal Saltmarshes Using Unmanned Aerial Systems

General Project Goal/Purpose:
The overall purpose of this project is to develop methods to accurately monitor the abundance of waterfowl and characteristics of coastal wetlands over time to understand the effects of salt marsh restoration on waterfowl habitat use, survival, and dynamics over time.

Specific Objectives:
1. Evaluate effects of altitude, survey platform, environmental conditions, species, & observer effects on abundance estimates, detection under controlled conditions (i.e., waterfowl decoys).
2. Evaluate effects of altitude, survey platform, environmental conditions, species, and observer effects on estimates of abundance, detection under natural field conditions (i.e., wild birds).
3. Develop protocols for the use of Unmanned aerial systems (UAS) to estimate waterfowl abundance, detection rates, and behavior at the local scale.

Geographic Scope: Field work is being conducted in Connecticut and New Jersey across several salt marshes consisting of different sizes, condition (natural, ditched, etc), and seasons so we believe the results will be applicable across most of the ACJV coastal geography.

Available/Expected Products & Tools:
Recommended field protocols including survey platform, photographic equipment, flight altitude and speed, and estimated detection rates for monitoring waterfowl abundance at the local scale (i.e., marsh) during the non-breeding season using UAS.

Anticipated Completion Date: September 2017.

Target Audience/User Groups: Researchers and managers involved in habitat management and research at the local scale (i.e., including wildlife management area/refuge).

Principal Investigator(s):
John Coluccy, Ducks Unlimited, Great Lakes Atlantic Region. 1220 Eisenhower Place, Ann Arbor, MI 48108. 734-623-2010; jcoluccy@ducks.og
Min Huang, Connecticut Department of Energy and Environmental Protection. Franklin Wildlife Management Area, North Franklin, CT 06254. 860-642-6528; min.huang@ct.gov
Paul Castelli, US Fish and Wildlife Service, National Wildlife Refuge System, Northeast Region, 800 Great Creek Road, Oceanville, NJ, 08231-0072; 609-748-1535; paul_castelli@fws.gov
Lance Brady, U.S. Geological Survey, Southwest Region, 980 W. 6th Avenue and Kipling Street, Building 25, Lakewood, CO 80225. 303-236-5507; jlrbrady@usgs.gov
Jeff Sloan, U.S. Geological Survey, U.S. Geological Survey, Southwest Region, 980 W. 6th Avenue and Kipling Street, Building 25, Lakewood, CO 80225. 303-236-1308; jlsoan@usgs.gov
Patrick Devers, US Fish and Wildlife Service, Division of Migratory Bird Management, 11510 American Holly Drive, Laurel, MD 20708. 301-497-5549; Patrick_devers@fws.gov

Habitat Use, Food Resources, Carrying Capacity, Over-Winter Survival & Breeding Ground Affinities of Black Ducks Wintering at the Northern Limit of their Range

General Project Goal/Purpose:
The goal of this project is to obtain empirical estimates of winter carrying capacity based a bio-energetics approach.

Specific Objectives:

1) *Assess trends in numbers and distribution of black ducks wintering around Nova Scotia using approximately 40 years of winter survey data*.
2) *Determine winter habitat use of black ducks wintering in Atlantic Canada*. Specifically, we will determine the relative importance of natural coastal saltmarshes versus anthropogenically-influenced wintering locations (e.g. sewage out flows and other impoundments, urban parks).
3) *Determine winter diet of black ducks wintering in Atlantic Canada, and in particular the relative contributions of marine versus freshwater/urban food sources*. *Determine the carrying capacity of winter black duck habitat in Atlantic Canada*. This objective will combine the results of the habitat use and diet information to more fully assess the true carrying capacity in Atlantic Canada, and whether it is indeed a function of available habitat.
4) *Determine over-winter survival of black ducks in Atlantic Canada*.
5) *Determine the breeding ground affiliations of black ducks wintering in Atlantic Canada*.

Geographic Scope: Nova Scotia

Available/Expected Products & Tools: Empirical estimates of energetic carrying capacity at the northern edge of black duck non-breeding range; empirical estimates of the abundance and change over time of black ducks wintering in Nova Scotia.

Anticipated Completion Date: September 2017

Target Audience/User Groups: Habitat conservation planning and delivery personnel; Eastern Habitat Joint Venture, Atlantic Canada Provinces.

Principal Investigator(s):

Mark Mallory
Biology Department
Acadia University
Wolfville, Nova Scotia B4P 2R6
Ph: 902 585 1798
Fx: 902 585 1059
mark.mallory@acadiau.ca

Greg Robertson
Wildlife & Landscape Science Division
Environment Canada
6 Bruce St, Mount Pearl, Newfoundland
709 772 2778
709 772 5097
greg.robertson@ec.gc.ca

Marsh Dieback Health Assessment

General Project Goal/Purpose: To monitor the recovery of marsh dieback in known dieback areas

Specific Objectives:
1) To collect data on the biological & chemical metrics associated with marsh dieback locations
2) To track these data at marsh dieback locations long-term

Geographic Scope: Jerico River, Liberty County dieback site & seven other sites monitored by partners

Available/Expected Products & Tools:
Long-term dataset at U. of Georgia, Georgia Coastal Research Council (http://www.gcrc.uga.edu/).

Anticipated Completion Date: Ongoing

Target Audience/User Groups: State resource managers, academia

*Principal Investigator(s)***:** Jan Mackinnon, Biologist, GA DNR, CRD; One Conservation Way, Brunswick, GA 31520, (912) 617-1743 cell

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Marsh Edge Nekton Survey

General Project Goal/Purpose:
To quantify use of the *Spartina* edge at oyster reefs & mud flats by nekton species

Specific Objectives:
1. To develop an index of aquatic nekton species that use the wetland edge (tall form *Spartina*) associated with oyster reefs and mud flats
2. To conduct sampling to quantify the use of the edge habitat by the nekton species
3. To determine elevations of associated wetland edge (not currently monitored, but may in 2015)

Geographic Scope: Currently, Glynn County Jointer Creek

Available/Expected Products & Tools: Report will include protocol and analysis of data.

Anticipated Completion Date: Pilot phase ended May 2015, Jointer sampling (2 years) will be reported in October 2016. Sampling will be long-term and expand into different habitats.

Target Audience/User Groups: State and federal resource managers

*Principal Investigator(s)***:** Jan Mackinnon, Biologist, GA DNR, CRD; One Conservation Way, Brunswick, GA 31520, (912) 617-1743 cell

Black Rail Surveys in Saltmarsh

General Project Goal/Purpose:
To determine if black rails occur in areas of high marsh along the Georgia coast.

Specific Objectives:
1) Develop Digital Elevation Model to delineate potentially suitable habitat areas
2) Conduct aerial reconnaissance to determine which areas appear suitable
3) Field-truth areas that appear suitable to further refine areas to survey
4) Conduct nocturnal call playback surveys to try to detect black rails

Geographic Scope:
High marsh areas along the entire Georgia coast

Available/Expected Products & Tools:
A coarse digital elevation model (DEM), location data & maps for potential habitat areas & habitat areas that have been field-truthed, and coordinates and other information for any black rails detected

Anticipated Completion Date: Three years of survey work has be completed. Anticipate continuing this effort for several more years.

Target Audience/User Groups:
Wildlife biologists, land use planners, land managers, conservation agencies and organizations

Principal Investigator(s):
Todd Schneider, Wildlife Biologist; Georgia DNR, Wildlife Resources Division, Nongame Conservation Section; 116 Rum Creek Drive, Forsyth, GA 31029; (478)994-1438; todd.schneider@dnr.ga.gov

Assessing the Population Status of Macgillivray's Seaside Sparrows in Georgia

General Project Goal/Purpose:
To provide a population estimate, important nesting demographics, habitat models, and other information for breeding seaside sparrows in Georgia.

Specific Objectives:
1) Develop preliminary Digital Elevation Model (DEM) to use to find nesting sites
2) Conduct point counts to provide a means to develop a population estimate
3) Conduct nest monitoring to determine nesting demographics (e.g., causes of nest failure)
4) Develop nesting habitat suitability models
5) Develop models of habitat migration/change with various sea level rise scenarios

Geographic Scope: Entire coast of Georgia.

Available/Expected Products & Tools:
Breeding population estimate, habitat suitability models, habitat migration models, life history data, estimates of nesting success & causes of nest failure.

Anticipated Completion Date: Survey work will be completed by August 2015. Models and dissertation will be completed 1-2 years later.

Target Audience/User Groups:
Wildlife biologists, land use planners, land managers, conservation agencies/organizations.

Principal Investigator(s):
Elizabeth Hunter (Ph.D. candidate), Warnell School of Forestry and Natural Resources, University of Georgia; Athens, GA; e-mail: eahunter@uga.edu

Sharp-tail Sparrow Survey

General Project Goal/Purpose:
Expand knowledge of wintering sharp-tailed sparrows (Nelson's Sparrow and Saltmarsh Sparrow) in coastal Georgia

Specific Objectives:
Document the species and subspecies makeup of wintering sharp-tailed sparrows in coastal Georgia. Assess degree of intra and inter-year site fidelity among wintering sparrows. Assess habitat selection among different species and subspecies

Geographic Scope: Remote marsh islands & causeway sites from Tybee Island in the North to St Andrews Sound in the South, including Medway River, Wolf Island NWR, Andrews Island, Jekyll Causeway, Hwy 17 Brunswick

Available/Expected Products & Tools:
Report and publication summarizing findings

Anticipated Completion Date: 2016

Target Audience/User Groups:
Bird conservationists and biologists and wildlife agencies

Principal Investigator(s):
Tim Keyes