

**NORTH ATLANTIC LANDSCAPE
CONSERVATION COOPERATIVE GRANT
2013 PROGRESS REPORT**

Quarter: (circle one)

2013 1st

2013 2nd

2013 3rd

2013 4th

Grant Program, Number and Title: Grant 2011-07; **ASSESSING PRIORITY AMPHIBIAN AND REPTILE CONSERVATION AREAS (PARCAS) AND VULNERABILITY TO CLIMATE CHANGE IN THE NORTH ATLANTIC LANDSCAPE CONSERVATION COOPERATIVE**

Organization: Association of Fish and Wildlife Agencies, University of Maine (USGS MCFWRU), Clemson University

Project Leader: Priya Nanjappa

Were planned goals/objectives achieved last quarter? **YES**

Progress Achieved: (For each Goal/Objective, list Planned and Actual Accomplishments)

***Objective 1:** Work directly with state fish and wildlife agency personnel throughout the NA-LCC states to gather data toward PARCA criteria review and proposed conservation area identification.*

UMaine: Moody has completed data collection, with New York and DC data included in the database. We are awaiting Delaware data that has been promised. We received Rhode Island data, though at a township level, but we will likely use coarser-scale data to address this gap. Three herp experts completed the species-variable tables for all of the PARCA priority species. However, in lieu of completing our consensus table, we developed several sets of competing models using the differences among experts as a measure of uncertainty.

AFWA: Nanjappa and deMaynadier submitted a request for a related meeting at the upcoming NEAFWA meeting in Portland, Maine April 13-16. Also, deMaynadier has maintained contact with Delaware regarding promised data transfer.

Clemson and UMaine: Species locality data from NE states and online databases (i.e., HerpNet and BISON) are have been collated into a unified format and have been allocated to presence and background files for each PARCA priority species distribution models, PARCA modeling, and climate envelope modeling procedures. Over the coming months, modeled PARCAs will be developed for the northeastern region and our follow-up analysis will permit the determination of vulnerability for these modeled PARCAs.

Objective 2: Provide spatially-explicit maps of current and future climatic suitability for priority amphibians and reptiles in the NA-LCC region, and then use these data a) to rank species vulnerability to climate change based projected losses in the species' ranges, and b) to identify areas within the NA-LCC where either there are high losses of vulnerable species or there is high potential for climatic refugia for priority species, and c) identify species for which this Objective cannot be completed due to gaps in current known distributional data and thus identifies priorities for species data acquisition.

Clemson: Sutton and Barrett have constructed climatic niche models for 11 out the 13 target (high priority) amphibians and reptiles within Maine (state selected as a pilot area for PARCA assignment) except for the Wood Turtle (*Glyptemys insculpta*) and Blanding's Turtle (*Emydoidea blandingii*). We have made contacts with researchers at the University of Massachusetts-Amherst who have extensive locality information for these species and these researchers have agreed to complete the modeling process for these two rare turtle species (the UMass group has more occurrence points than we do), but, due to data sharing agreements, they are not able to share these with us). We have prepared step-by-step directions of how to complete the modeling process and are currently prepping the necessary data sets. We have finalized our list of priority species (~75 species) in the northeastern United States and have acquired locality data for these species using state-acquired records and data from online species occurrence databases (i.e., HerpNet and BISON). We have evaluated the accuracy of these data and have removed data points that appear to be inaccurate or cannot be validated. All data files have been organized with a similar format to maintain relevant metadata (e.g., locality information, data source, point accuracy, GPS coordinates, state and county information). These data are currently being used to construct current and future climate envelopes for all priority species. Currently, we have completed climate simulations for approximately 17 priority amphibian and reptile species, with approximately 25 – 30 species remaining.

We have identified species that lack distribution data throughout the known geographic range for each of the northeastern priority species. Three species in particular, *G. insculpta*, *E. blandingii*, and the Rainbow Snake (*Farancia erythrogramma*) lack adequate locality data to determine species sensitivity to climate change. As discussed above are currently preparing data to have outside parties prepare the climate models for both *G. insculpta* and *E. blandingii*. We have completed an Excel spreadsheet detailing the number of distribution points, geographic areas where points are lacking, and a ranking of predicted vulnerability assessment accuracy for each priority species.

UMaine: Most data layers have been clipped to the project extent and re-projected to a common projection in preparation for analysis. We will use hydrology layers from UMass, however, these are not yet complete. There are significant gaps in the wetlands layer (National Wetlands Inventory) for New York that (hopefully) the UMass data will address. We also are exploring availability of alternative data layers to represent hydrological environments, such as the NLCD data, while we await the UMass data.

Objective 3: Summarize these results with respect to species occurring on lands under current state and federal management.

Clemson: Sutton and Barrett have acquired spatial data detailing protected areas throughout the northeastern United States. As we complete species climate envelop models, we will summarize species vulnerability results across protected areas.

Objective 4: *Conduct an analysis of candidate PARCAs to help identify those highest priority conservation areas supporting reptiles and amphibians in the Northeast that are not currently protected.*

UMaine: We discussed various options for how landscape viability should be measured. Sutton sent Loftin D.M Theobald's landscape assessment layer as well as other data layers used in Theobald's landscape change assessment to explore using the approach for our evaluation of landscape integrity to be incorporated in the PARCA delineations. (Theobald, D.M. 2010. Estimating natural landscape changes from 1992 to 2030 in the conterminous US. Landscape Ecology 25:999-1011.)

Objective 5: *Incorporate climate vulnerability projections into final PARCA analysis, including a ranking of high priority current and future conservation areas.*

Clemson: This objective has not been fully addressed, but Sutton and Barrett have developed a vulnerability framework to assess exposure, sensitivity, and adaptive capacity of each proposed PARCA based on an array of spatially-explicit climate, landscape, and species locality data layers. We have acquired all data sources including projected landuse, projected climate and precipitation change, sea-level rise, species locality, protected areas, natural landscapes, and digital elevation model data layers. We will use this framework to rank PARCAs on a scale of high – low vulnerability. They will present further results at the 2014 NEAFWA meeting in Maine.

Objective 6: *Communicate results to key state, federal, and NGO partners via publications and a Northeast regional workshop.*

All: The larger PARCA group discussed presenting results to interested parties at the annual Northeast Fish and Wildlife Conference (NEAFWA) held in April in Portland, Maine. Moody and Sutton will prepare updated presentations; Loftin, deMaynadier and Moody will draft an agenda for a breakout session at this meeting, and deMaynadier and Nanjappa submitted a related meeting request for this purpose to the NEAFWA conference planner.

Difficulties Encountered:

Our largest difficulty included obtaining species locality data in a timely fashion. Multiple team members including deMaynadier, Moody, and Nanjappa made several attempts to acquire species locality data from Rhode Island, Delaware, and Pennsylvania with very little luck or slow to no response. In particular, we received no response at all from Pennsylvania. The unexpectedly lengthy process of acquiring species locality data slowed progress on the development of species climate models. That being said, all relevant and accurate species locality data have been uploaded and formatted and are currently being used to model current and future climate scenarios for priority amphibian species.

Activities Anticipated Next Quarter:

- 1) (All) Continue monthly progress update conference calls among the team
- 2) (Clemson) For species with sufficient data, continue to build climatically-based niche models.
- 3) (UMaine) Share modelling framework and landscape variables with UMass Group (Drs. Mike Jones & Liz Willey) so they can run species distribution models for Blanding's Turtles and Wood Turtles and provide preliminary peer review of our proposed MaxEnt modeling methodology.
- 4) (UMaine) Finalize a draft protocol for delineating PARCAs in Maine as a pilot state, informed by a combination of priority species distribution models, species richness, and landscape viability.
- 5) (UMaine) Evaluate the draft protocol for PARCA delineations (based on Maine pilot effort) and begin applying protocol in PARCA delineations in other states.
- 6) (Clemson) Test vulnerability framework and make necessary adjustments to determine PARCA vulnerability.
- 7) (UMaine and Clemson) Prepare oral presentation and participatory breakout session for NEAFWA meeting.

Expected End Date: Dec. 31, 2014

Costs:

Total life to date expenses (include this quarter) **\$192,646.29** (Q3: \$158,019.13 + 2013 Q4: \$13,629.26
Clemson University + \$19,607.34 UMaine + \$1390.56 AFWA)

Total Approved Budgeted Funds: **\$315,902**

Are you within the approved budget plan and categories? YES

Signature:



Date: 10 February 2014