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**

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 now has occurrence data from Connecticut, a state from which we initially had difficulty obtaining data. We are exploring the possibility of getting data from Pennsylvania via another NA-LCC group, though the team will use data from other sources and proceed without Pennsylvania's data if we are unable to obtain it by mid-October 2013. Finally, Moody is in contact with a researcher in Quebec who has agreed to provide information on models for our species of interest that occur in his area.

AFWA: Nanjappa continues to assist in pursuing Pennsylvania data via other contacts in the state. Following in-person discussions deMaynadier had with their respective state personnel, data sharing arrangements with Delaware are in progress, and with New York are complete; we remain hopeful that we will receive data from Rhode Island as well, and continue to work with them.

Clemson: These state species occurrence data, and those from online databases (i.e., HerpNet and BISON), are currently being collated to into a unified format and will be used to develop species distribution models (see Objective 2).

UMaine and Clemson: In July 2013 at the annual Northeast Partners in Amphibian and Reptile Conservation

(NEPARC) meeting in New Jersey, pilot PARCA results for the state of Maine were presented. The team also held a workshop to discuss how PARCAs could or should be delineated, and defined associations between species assemblages and variable layers. Twelve people participated and contributed information. Following this workshop, we were able to receive several derived data layers were obtained from researchers in Dr. Kevin McGarigal's lab at the University of Massachusetts. Over the coming months, modeled PARCAs will be developed for the northeastern region.

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.

UMaine: In the pilot area, Moody created spatially-explicit maps of suitable habitat for priority species using Maxent. She drafted four (4) potential methods for selecting high priority areas for single species conservation: 1) using watershed boundaries; 2) based on thresholds in the probability of suitable habitat; 3) using current protected areas and adjacent regions; or 4) based on land use/land cover. These methods were introduced to stakeholders during the July NEPARC meeting for discussion, but no method was preferred over the others. Spatially-explicit models of species richness were also created for the pilot areas, looking at both richness of all species, and richness of priority species. The team contracted three expert herpetologists to provide species-variable associations for all priority species in the Northeast region. The information the experts provided will be used to create the initial model set for the region-wide species distribution models.

Clemson: Sutton and Barrett have constructed climatic niche models for all target (high priority) amphibians and reptiles within Maine (state selected as a pilot area for PARCA delineation). In addition, these models have been used to evaluate future climatic suitability for these same species (mid-century). They have finalized their list of priority species (~75 species) in the northeastern United States and have acquired locality data for these species using state-acquired records, where available, and data from online species occurrence databases (i.e., HerpNet and BISON). They 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 being used to construct current and future climate envelopes for all priority species.

Previously, Sutton and Barrett 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. They have identified two species lacking sufficient distribution data points throughout the known geographic range for each, which may prevent a vulnerability assessment: Wood Turtle (*Glyptemys insculpta*) and Rainbow Snake (*Farancia erytrogramma*). The team has discussed the potential of collaborating with Massachusetts state biologists to assist with modeling the distribution of Wood Turtles and Blanding's Turtles (*Emydoidea blandingii*). This collaboration will be potentially useful given that locality data for these two turtle species are difficult to acquire.

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

UMaine: Moody compared focal areas predicted using species distribution models in the pilot area to protected areas set aside for Blanding's Turtle conservation. These and other species results for the pilot area will be summarized in the final report.

Clemson: Sutton and Barrett have acquired spatial data detailing protected areas throughout the northeastern United States. As they complete species distribution models, they will summarize species vulnerability results across state and federally managed lands.

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.*

This objective has not yet been addressed.

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. They 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. They will use this framework to rank PARCAs on a scale of high – low vulnerability. They presented their draft vulnerability framework at the 2013 NEPARC meeting in New Jersey.

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

UMaine and Clemson: Moody, Loftin, deMaynadier, Sutton and Barrett attended the 2013 annual NEPARC meeting in New Jersey, 24-26th July. Moody gave a presentation about the project to NEPARC which included justification for the project, preliminary results for the pilot region, and projected next steps. Sutton also provided an overview of the climate-niche and -suitability modeling.

The team held a breakout workshop to elicit feedback stakeholders and partners on focal species and habitat associations at the NEPARC meeting as well; attendees included representatives from several universities, state and federal government employees and interested private herpetologists.

All: On the 29th of August, Nanjappa, Moody and Sutton also presented project summaries as part of the NA-LCC Webinar series. There were approximately 20 people at the meeting in person, and another 20 who participated by webinar from throughout the region. Moody attended and presented in person at the Region 5 US Fish and Wildlife Service (USFWS) offices in Hadley, Massachusetts, and engaged in further conversation and discussion about the project both before and following the webinar. Specifically, Moody met and discussed

the project and potential partnerships with several people including Scott Schwenk, Lori Pelech, and Steve Fuller (USFWS), and Brad Compton, Ethan Plunkett, Joanna Grand and Bill Deluca (University of Massachusetts).

Difficulties Encountered:

We have not had any luck hearing back from Pennsylvania regarding data sharing. There is a possibility we may be able to access some of their data via another NA-LCC project, if existing data sharing agreements allow this. Meanwhile, Nanjappa is pursuing Pennsylvania data via other contacts in the state. These will be our final attempts; data acquired via other sources (e.g., HerpNet and BISON databases) will be used for modeling if we do not have data provided specifically by the state.

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) Continue review of Maine priority species and habitat/climate associations with experts in the state
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) (Clemson) Test vulnerability framework and make necessary adjustments to determine PARCA vulnerability
6) (UMaine) Complete regional model set for species-variable associations
7) (UMaine) Develop protocol for use by state biologists to assess the initial PARCAs.
8) (UMaine and Clemson) Continue to acquire available data

Expected End Date: Dec. 31, 2014

Costs:

Total life to date expenses (include this quarter): **$158,019.13** (2013 Q2: $119,515.32 + 2013 Q3: $17,240.42 Clemson University + $20,695.79 UMaine + $567.60 AFWA)

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

Are you within the approved budget plan and categories? YES

Signature:

Date: 18 October 2013