NORTH ATLANTIC LANDSCAPE CONSERVATION COOPERATIVE GRANT 2015 PROGRESS REPORT

Quarter: (circle one)   2015 1st   2015 2nd   2015 3rd   <u>2015 4th</u>

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, Tennessee State University

Project Leader: Priya Nanjappa**,** Association of Fish and Wildlife Agencies
Project Scientists: Cynthia Loftin, U.S. Geological Survey-Maine Cooperative Fish and Wildlife Research Unit
Bill Sutton, Tennessee State University
Phillip deMaynadier, Maine Department of Inland Fisheries and Wildlife
Kyle Barrett, Clemson University
Allison Moody, University of Maine (resigned from project August 2014)

Were planned goals/objectives achieved last quarter? The UMaine and Tennessee State University team have made significant progress towards completing project goals and objectives. We are on track to continue this progress in the next quarter. Details are provided below.

October-December 2015 Activity Summary
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.

Draft PARCA development and distribution to state experts for review
We completed development of draft PARCAs and distributed materials to state experts for their review at the end of September 2015. Each state and the District of Columbia received a letter requesting their assistance with evaluating the modeled draft PARCAs, a printed narrative document describing our PARCA modeling process, printed maps of the draft PARCAs in each EPA Level-III ecoregion in their state, and a USB stick drive with digital copies of the maps (example packet was provided in the 2015Q3 report). We included additional supportive materials on the USB drive for reference during map review. We followed up the mailing with e-mails throughout the fall to assess the review status and invite discussion, address questions, and discuss options for returning the evaluated maps. We have been corresponding with states since approximately early November to address their questions and review their suggested revisions to the modeled PARCAs. Our reviews with VA, DC, RI, VT, and CT are complete, and our feedback from MA, ME, and NY is nearly complete. We are currently working with MD, PA, and NH to complete their review. We have not yet reviewed draft PARCAs with the NJ expert, who has not been available for consultation, nor Delaware, who has not responded to our inquiries. We hope to complete those reviews by mid-February. Our discussions have been via a combination of e-mails and conference calls, with several iterations depending on how we might address the feedback (e.g., no additional edits, additional review after revising, etc.).

Our planned approach was to receive feedback on our maps as annotations indicating the state experts' review of the draft PARCAs as "retain, modify, or delete" and their explanation for those classifications. In fact, we

have received a much broader range of responses. Much of our effort during the past quarter has been to determine an approach to incorporate the variety of feedback we have received into the revised PARCA maps to reflect the states' conservation goals, while retaining a standardized approach so that we can develop guidelines for modeling PARCAs in other regions. Our current plan is to produce several maps that reflect different levels of revision to the modeled PARCAs based on the variations of approaches we have used to revise the draft PARCAs based on the state feedback. For example, we have modeled PARCAs with two types of species richness data (state-provided and web-based species ranges), and depending on the state, PARCAs modeled with one dataset more closely approximates their knowledge about important areas for herpetofauna in their state than the other. We also have produced model output based solely on the species distribution models and others that include richness data; those versions also have received mixed review depending on the state. We have scaled the model output to within state ecoregions and at the state scale (disregarding ecoregions). We also have reviewed effects of relaxing the landscape integrity criteria (from >50% to >25%) represented by the DSL IEI value, to determine how that part of incorporating the guidelines (Sutherland and deMaynadier 2012) into our spatial process is affecting the modeled PARCAs. In summary, the particular approach we have taken to revise the original draft PARCAs developed with state-provided species richness data, state-provided species occurrence data supplemented with BISON and HerpNet data, and the DSL IEI has differed with each state, depending on their feedback. Ultimately the result from this approach likely will be a map compiled across the region that reflects the variety of state conservation goals, data quality, data depth, expert knowledge about the distribution of species, as well as the amount of development and available land for conservation in their state. However, the mapped PARCAs will differ state-to state regarding number, size, and arrangement. This outcome may be useful as a map product that reflects state-level goals, however, it does not achieve our project goal of developing a modeling process that can be applied uniformly across a region to identify PARCAs. Therefore, we plan to produce several draft PARCA map products that result from each of the modeling approaches and datasets mentioned above, with a narrative to explain the data sources and effects of those on the outcome.

We are beginning to finalize the PARCA maps as we communicate with each state to confirm their edits. We anticipate completing the PARCA maps to be used in the vulnerability analysis by mid- to late-February. These maps will not label PARCAs based on species or species groups. They may be labeled with information about whether the PARCA results from the modelling approach or from output revised based on feedback from state experts. We recognize the sensitivity of location information provided to us by the states, and we are working with them to ensure we do not compromise species by revealing this information in our maps.

Other activity: We are using species GAP models to apply the process used in the SE PARCA project to the Northeast to determine how the PARCA outcome differ with approach. The SE PARCA project used national GAP maps. We reviewed availability of national GAP maps for our focal species in the NA-LCC states and determined that only Maine has a complete set of species GAP models. Therefore we will compare the outcome only for PARCAs in Maine. We also are reviewing the data and approach used in the California PARCA project; if we determine that our data area comparable, we will apply the California methods to our data to compare PARCAs mapping approaches.

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.

We have created spatially-explicit climate maps of current and future climate suitability for priority amphibian and reptile species in the northeastern United States. We have produced climate suitability maps for all species

that we were able to collect adequate species locality data across the respective geographic distributions. We have summarized these individual species rasters into a complete map of climate suitability for current, and RCP 4.5 and 8.5 greenhouse gas emission scenarios. We subtracted each of the greenhouse gas emission scenarios species sums from the current climate species sum to create a mean climate suitability map for priority amphibian and reptile species. These mean suitability maps will be incorporated as part of the PARCA vulnerability assessment process. In terms of species we are unable to model climatic suitability, two species (Wood Turtle and Spotted Turtle) present issues due specifically to their extensive ranges outside of the northeastern United States. We lack sufficient point density for these species and are therefore unable to estimate current and projected climate suitability. We are currently attempting to acquire additional points for the under-represented species and estimate current and projected climatic distributions for these species. Depending on our ability to access additional occurrences, we will develop estimates for these species. We have created an excel spreadsheet with the total number of occurrences by species for all priority species throughout the northeastern United States.

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

Our draft PARCAs are mapped with lands identified in conservation management in the PADUS v.1.3 Protected Areas Database (http://gapanalysis.usgs.gov/padus/) so that state experts can identify where draft PARCAs and conservation lands co-occur. The draft PARCAs and PADUS lands were plotted on a road network basemap to facilitate locating the proposed PARCAs, and these reference points have been useful in our conversations with state experts. We will evaluate the final PARCAs (i.e., each of the final versions discussed in Objective 3) with respect to the National Conservation Easement Database (http://conservationeasement.us/) and other conservation areas (e.g., Important Bird Areas) once the PARCA maps are finalized.

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 will be addressed during March 2016 pending feedback from state experts on draft PARCAs.

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

Significant progress on this objective has been completed. We have acquired all of the spatial data necessary for this process. We plan to assemble a region-wide vulnerability layer over the next month. We will apply the vulnerability framework developed by Drs. Sutton and Barrett to candidate PARCAs during March-April 2016.

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

We have submitted abstracts to present our findings at the Northeast Fish and Wildlife Agencies meeting in Annapolis, MD, in April (Loftin), and the North American Congress for Conservation Biology in Madison, WI, in July (Loftin and Sutton), and Loftin and Sutton have begun drafting a manuscript summarizing the PARCA modeling process.

Activities Anticipated Next Quarter:
- Complete draft PARCA feedback process and incorporate suggested edits into the PARCA maps.
- Distribute final PARCA maps to state experts.
- Continue evaluation of PARCAs resulting from SE and CA PARCA mapping approaches with

comparison to our approach.
- Evaluate draft PARCAs with respect to conservation lands in the PADUS and National Conservation Easement datasets.
- We will begin incorporating the finalized PARCAs into the vulnerability assessment.
- We will continue development of manuscripts summarizing the project.

Expected End Date:

        June 30, 2016

Costs:

Total life to date expenses (include this quarter):
- University of Maine= $164,439.82; UMaine reimbursed WMI $2,481.87. Final expenditures by UMaine =$161,957.95. No new expenses this quarter.
- Tennessee State University: financial report is forthcoming.

Are you within the approved budget plan and categories? Yes.

Signature: _Cynthia S. Loftin_

Date: January 29, 2016