NORTH ATLANTIC LANDSCAPE CONSERVATION COOPERATIVE GRANT
2014 PROGRESS REPORT

Quarter: (circle one)   2014 1ˢᵗ   2014 2ⁿᵈ   2014 3ʳᵈ   2014 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

Abstract: Please provide a short (1-2 paragraphs) abstract that addresses EACH of the following: the objectives of your project, accomplishments to date, future plans and timelines with an estimate for when the project will be completed.

Were planned goals/objectives achieved last quarter? For Clemson, YES; for UMaine, NO

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: The Maine team received Delaware data in late July and Pennsylvania data in late August. Although we have opened the files to confirm their content, we have not comprehensively assessed the data quality or format or added these very late datasets to the overall Northeast compiled occurrence database (see Difficulties Encountered section below). During July until mid-August, Moody continued to run the species distribution models for all priority species (n=65) in the study region for the no1and no2 models sets. Our focus was on analysis of three decision points necessary to apply the PARCA guidelines to the occurrence data: 1) determining thresholds for delineating suitable habitat from the species distribution model output; 2) determining range maps to use for bounding each species' model; and, 3) determining availability of data and approach to use for mapping common species richness.

Summary of progress for each of the above decision points:
1) Thresholds for delineating suitable habitat from the Species Distribution Model (SDM) output: There are several thresholds that we are evaluating before moving forward with PARCA delineations based on the guidelines document. The SDM output is the probability of suitable habitat for the target species. Using this information in the PARCA guidelines requires identifying suitability thresholds for Tier 1, 2, and 3 species that reflect the range of suitability predictions for each species and that is weighted by the species conservation status (Tier). For example, we might want to be aggressive about capturing habitat that potentially is suitable for Tier 1 species (and therefore include habitat that has ≥50% probability of suitability for that species), but less aggressive in including habitat suitable (e.g., that is ≥75% probability) for Tier 2 species. Additionally, a species maximum habitat suitability probability in the SDM may be <100, requiring that the maximum suitability in the SDM be scaled to 100. We also are evaluating several thresholds (e.g., minimum training presence, fixed cumulative value, maximum training sensitivity plus specificity) for identifying the "best" SDM to use for each species. A subsequent analysis in this step will evaluate the number of tier 1 and 2 species to include in the combination of the SDMs across species for PARCA identification. The outcomes of these

analyses are to have a "best" SDM model for each species (based on threshold evaluation), a scaled SDM based on the maximum suitability probability for the species, and a compiled "suitable habitat" for each Tier group of species. These will be combined (we are considering addition or average) across the Tier group species, with the number of Tier group species determined by comparing the change in overall "suitable habitat area" with increasing number of species in that Tier group.

2) Determining range maps to use for bounding each species' model: We have extracted range maps for all priority species, added a 75 km buffer to the mapped ranges to account for potential mapping error in the original coarse-scale range maps, and used these maps for extracting the occurrence data for inclusion in the SDMs.

3) Determining availability of data and approach to use for mapping common species richness: The PARCA Guidelines recommend including common species richness. Digital range maps of common reptiles and amphibians are available, however, these are polygons that span the entire range and do not allow for discontinuities in distributions that would be captured in maps generated from species data at a finer resolution (e.g., township). We are attempting to compile state-level common species data from web-available state herp atlas projects and by request to calculate reptile and amphibian richness by township or county units. We have collected these data from 4 states (ME, NH, VT, MD) and are working on collecting data from the remaining states, as available. We will compare the state-centered richness with the range-map generated richness to evaluate the potential value-added contribution to the PARCA delineation with this increased spatial resolution.

Moody, Loftin, and deMaynadier continued to evaluate the flowchart for translation of the PARCA criteria via species distribution models to draft PARCAs. Loftin and deMaynadier revised a task list for SDM assessment steps and began discussion about approach for eliciting stakeholder feedback on the 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: We have completed calculating loss of climatic envelope for all target species. This information was presented at the Joint Meeting of Ichthyologists and Herpetologists in Chattanooga, TN (August 1). Additionally, this information as it applies to salamanders is currently under peer review at the journal Forests.

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

Clemson: Sutton and Barrett are in the process of summarizing species vulnerability results from climate envelope models 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.

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 and UMaine: In progress. Clemson is ready to apply the vulnerability framework to candidate PARCAs as soon as they are identified by the UMaine team. The UMaine team continues to work on developing the SDMs and applying the PARCA guidelines to the SDMs to identify draft PARCAs. The UMaine team has been discussing alternative algorithms for combining the guideline metrics for PARCA delineation,

including repeating the approach used by the SEPARCA project as well as weighting the metrics by tier and location (see objective 1). This analysis will continue in the next quarter.

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

All: Sutton presented his work at the Joint Meetings of Ichthyologists and Herpetologists on Aug. 1, 2014. In addition, the PARCA team requested time to present the project at the NEPARC meeting in New York in July, however, the team was not granted presentation time during the meeting. Given the expense of traveling to the meeting, the UMaine and Clemson teams elected to not attend the meeting this year. Nanjappa represented the team at the conference. The team anticipates eliciting feedback from stakeholders and partners regarding draft PARCA delineations in the near future. Details provided below.

Difficulties Encountered:
Dr. Allison Moody, a post-doctoral scientist leading the University of Maine's efforts at modeling, delineating, and soliciting feedback on draft PARCAs resigned from her position in mid-August 2014 with ~2 weeks' notice and within ~4.5 months from the project end date. The remainder of the PARCA team has since developed a working plan for completing the analyses by redistributing tasks and responsibilities among other team members and an undergraduate student assistant, however, the unexpected departure of our PARCA modeling scientist has created significant delays and loss of momentum. <u>The team is preparing a request for project end date extension to be provided to the NA-LCC in the next 1-2 weeks for their consideration.</u> In the meantime, with the help of an undergraduate research assistant, the team is compiling state-level common species richness data for evaluation with the range map data to determine which data will be used in the richness metric calculation.

Activities Anticipated Next Quarter:
1) (UMaine) Develop a request for modification of the project end date that includes transferring most of the remaining grant funds to Tennessee State University for their assistance in completing the project. The departure of the UMaine post-doc has significantly affected the project progress. There are limited personnel currently available at UMaine to complete the project tasks; hence UMaine will be transferring most of the remaining project funds to Dr. William Sutton at Tennessee State University to assist with completing the remaining project tasks. Loftin and deMaynadier are working with Dr. Sutton to develop a plan for completing the transfer of funds and an analysis task list and calendar for completing the project.
2) (UMaine) Loftin will continue to work with an undergraduate research assistant to develop the common species dataset and evaluate approaches for developing the richness metric to use in the PARCA delineation.

Expected End Date: The team is preparing a request for a project end date extension to be submitted for consideration by the end of November 2014.

Costs:
　　　Total life to date expenses (include this quarter): **$261,375.38** (Q2: $237,196.65 + 2014 Q3: $1,340.39 Clemson University + $12,528.24 UMaine + $10,310.10 AFWA)

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

　　　Are you within the approved budget plan and categories? YES

Signature:

Date: 10/24/2014