

October 8, 2014

## **Performance Report for the period January 1, 2014 to July 30, 2014**

### **Project Title**

Assessment of Landscape Changes in the North Atlantic Landscape Conservation Cooperative: Decision-Support Tools for Conservation (**Phase 2**)

**Project Sponsor:** US Fish and Wildlife Service, Region 5

### **Principal Investigator:**

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### **Project Scope and Objectives**

The specific objectives of this scope of work are as follows:

1. Extend the geographic scope of the LCAD model developed in phase 1 to the extent of the USFWS/NEAFWA Northeast Region (13 states + D.C.).
2. Develop climate-habitat capability models for an additional suite of representative species.
3. Develop the landscape design and decision-support portion of the LCAD model; specifically, to prioritize conservation actions for land protection, management and restoration.
4. Modify the succession model to incorporate spatial variability within ecological systems and multivariate trajectories in vegetation growth.

### **Accomplishments**

In our ongoing efforts to meet the above objectives, we accomplished the following tasks during this work period:

- 1) *Extend the geographic scope of the LCAD model to the extent of the USFWS/NEAFWA Northeast Region (13 states + D.C.).* As part of the expansion of the LCAD model to the Northeast, we completed a major update of the urban growth model, which was deemed necessary to realistically model urban growth across the Northeast. We have completed the statistical modeling to update the generic vegetation disturbance model, but have not yet implemented this revision. This update should not take more than one to two weeks. Thus, we are poised to run the complete landscape change model and conduct the ecological assessment of the future landscape conditions. Lastly, we have continued to improve our computing software to accommodate running the LCAD model on our computer cluster at the regional extent. I anticipate completion of the landscape change simulations and the corresponding ecological assessments and accompanying documentation by December 31, 2014.
- 2) *Develop climate-habitat capability models for an additional suite of representative species.* We have completed the development of the 14 species models targeted for

the pilot LCD project (see below). The remaining 16 species models are in various stages of development from completed to having the conceptual model designed but not implemented or tested. I anticipate completion of the species' modeling and accompanying documentation by February 28, 2014.

- 3) *Develop the landscape design and decision-support portion of the LCAD model; specifically, to prioritize conservation actions for land protection, management and restoration.* We are in the midst of working closely with the LCD partners to complete the CTR pilot project. We have completed the algorithm development to implement most of the design process, including developing ecosystem- and species-based cores areas and assessing local and regional connectivity (and prioritizing restoration activities to improve connectivity). I anticipate completion of the LCD pilot by December 31, 2014.
- 4) *Modify the succession model to incorporate spatial variability within ecological systems and multivariate trajectories in vegetation growth.* We have completed the revisions of the succession model to incorporate spatial variability in the environment and are poised to include the revision succession model in the landscape change simulations in connection with #1 above.

The UMass team been working diligently since the onset of this project to meet the expectations outlined in the project scope of work. However, developing a model of this complexity comes with all sorts of unknown and unforeseen conceptual and technical challenges. My team is committed to delivering products that are credible and the very best that they can be given available data. This has required us to redevelop several components of the LCAD model to meet the credibility standard as we have been expanding the model to the Northeast extent as part of phase 2. More importantly, none of this extra effort was forecast in the original phase 2 scope of work and associated timeline and budget. In particular, the ecological systems map (ESM) has required numerous algorithmic "fixes" to address various problems that we encountered as we expanded the geographic scope of the work and encountered new and different landscape contexts and as we attempted to combine the original TNC ESM map with newer and better sources of data for certain systems (e.g., NWI and NHD). I estimate that one of my team members has spent an extra 6 months full-time resolving these issues. Second, the urban growth model met with numerous unexpected conceptual and technical challenges that required approximately 6 months of extra full-time work by one of my team members with part-time support from the others. Lastly, the LCD pilot project has consumed a great deal of my team's time over the past several months and has far exceeded what we originally had planned on for this component of the work. This extra effort has resulted in part from the unknown and unforeseen expectations of the core team that has required additional algorithm development and additional analyses. I estimate that two of my team members have spent at least an extra 3 months full time work to support the LCD effort more than we had originally planned for.

Please note that all of the extra effort to ensure that the LCAD model is credible and the results reliable, and that the pilot LCD be done in a collaborative manner that reflects the input and needs of the partners, is appropriate and necessary. A project of this scope

and complexity simply can't foresee all of the unknown conceptual and technical challenges that might arise to meet everyone's expectations, despite what is described in the initial scope of work.

Currently, I estimate that we will be done with the phase 2 work by the end of December, 2014, but it may take until March 1, 2015 to complete all the documentation. This means that we are roughly 4-6 months behind the original schedule and budgeted scope of work. Importantly, it is important to recognize that my team has worked diligently to accomplish all of the project tasks, but that unanticipated challenges with the GIS data and algorithm development required to accommodate the LCD process has led to this delay. I am concerned that our current budget and timeline for phase 2 does not adequately cover my team's effort and that we may need to renegotiate the timing and budget for the phase 2 deliverables.