

March 14, 2014

Performance Report for the period November 7, 2012 to June 30, 2013

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) Compiled and improved most of the relevant GIS data needed for the for the landscape change and assessment (LCAD) model for the entire Northeast region.
- 2) Expanded our existing ecological integrity models and species' habitat models to accommodate new ecological systems that we encountered outside of the pilot study areas within the Northeast.
- 3) Expanded our computing capabilities to handle the greater computing requirements of the larger spatial extent.
- 4) Improved our model software to achieve greater efficiency and accommodate processing large spatial grids.
- 5) Compiled and processed World Climate Research Programme's (WCRP's) Coupled Model Intercomparison Project phase 5 (CMIP5) multi-model dataset, including output from 14 *Atmospheric-Ocean General Circulation Models* (AOGCMs) downscaled to 12 km using the *Bias Corrected Spatial Disaggregation* (BCSD) downscaling approach to create an ensemble average AOGCM projection under each of 2 RCP scenarios (RCP4.5 and RCP8.5).
- 6) Developed habitat capability models for an additional 5 representative species.

- 7) Updated documentation of the overall modeling framework, ecological systems, climate downscaling, disturbance and succession process, species models, and ecological integrity model.
- 8) Developed a regional connectivity metric using a custom algorithm based on a combination of resistant kernels and graph matrix theory.