Multistate Conservation Grants

CFDA Number: 15.628
Final Report

Grant Number: NC M-1-HM
Grant Title: Designing Sustainable Landscapes for Bird Populations in the Eastern United States
Grant Recipient (Grantee) Name and Address:
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Report Number: 2009
National Conservation Need Addressed: 2008, NCN #2, Large-scale Habitat Conservation Design, Implementation, and Evaluation for the Conservation of Birds and Other Fish and Wildlife Species.

Costs

Are you within the approved annual budget plan? X Yes; or ___ No
Are you within the approved budget categories? X Yes; or ___ No

Progress Achieved

How does this annual report on accomplishments compare to the overall Proposed Project Work Plan? ___ Ahead of schedule; ___ On schedule; X Behind schedule?
In your prior annual report (*for multiyear grants)*, did you report that your goals/objectives were achieved? X Yes; or __ No

Goal/Objective 1: Assess the current capability of habitats in ecoregions in the Eastern United States to support sustainable bird populations.

Accomplishments:

- 40 focal species in 12 habitats were selected for analysis:

Shrub-scrub
Bachman's sparrow
Field sparrow
Henslow's sparrow
Northern bobwhite
Prairie warbler

Mature open pine
Bachman's sparrow
Brown-headed nuthatch
Field sparrow
Northern bobwhite
Prairie warbler
Red-cockaded woodpecker

Alluvial forested wetland
Black-throated green warbler
Cerulean warbler
Prothonotary warbler
Swainson's warbler
Swallow-tailed kite
Wood duck
Yellow-throated warbler

Freshwater wetland
American black duck
King rail
Least bittern
Northern pintail
Wood stork

Grassland
Henslow's sparrow
Loggerhead shrike
Northern bobwhite
Sandhill crane

Non-alluvial forested wetland
Black-throated green warbler
Brown-headed nuthatch
Chuck-will's-widow
Hooded warbler
Northern parula
Prothonotary warbler
Red-cockaded woodpecker
Red-headed woodpecker
Swainson's warbler
Yellow-throated warbler

Maritime forest and shrub-scrub
Common ground dove
Northern parula
Painted bunting
Prairie warbler
Yellow-throated warbler

Estuary
American black duck
Nelson's sparrow
Redhead
Sharp-tailed sparrow
Seaside sparrow
Wood stork

Beach
American oystercatcher
Least tern
Piping plover
Red knot

Longleaf/slash pine flatwoods and savannas
American kestrel
Bachman's sparrow
Brown-headed nuthatch
Henslow's sparrow
Loggerhead shrike
Northern bobwhite
Prairie warbler
Red-cockaded woodpecker
Red-headed woodpecker

Hardwood/pine mixed forest
Acadian flycatcher
Cerulean warbler
Kentucky warbler
Louisiana waterthrush
Swainson's warbler

Riparian/mixed mesic forest
Cerulean warbler
Kentucky warbler
Louisiana waterthrush
Swainson's warbler

- Knowledge-based presence/absence habitat models have been reviewed and run for all additional species. These models serve as a key input for the prioritization models.

- Occupancy models have been developed for 3 species demonstrating the utility of incorporating estimates of patch level persistence (colonization/extinction) as a quantitative criteria in the prioritization models.

Occupancy models are also being used to validate the knowledge-based presence/absence models.

- Conducted an online survey to evaluate our focal species list and supply additional data for our spatially-explicit models.

- A book chapter is in press detailing the expert elicitation process used to select focal:
    - Moody, A.T. & J.B. Grand. 2011. Incorporating expert knowledge in decision support models for bird conservation. In: Expert Knowledge and Landscape Ecological Applications, C. Ashton Drew & Ajith H. Perera (eds.). Springer.

Goal/Objective 2: Predict the impacts of landscape-level changes (e.g., from urban growth, succession, climate change, and conservation programs) on the future capability of these habitats to support populations of migratory birds (and other wildlife).

Accomplishments:

- Urban Growth Model: Completed. New urban growth models incorporating SLEUTH-3r (Jantz et al. 2009) and several other important changes were completed and incorporated into the Landscape Succession Modeling.

  Jantz, C.A., S.J. Goetz, D. Donato, and P. Claggett, 2010: Designing and implementing a regional urban modeling system using the SLEUTH cellular urban model. Computers, Environment and Urban Systems, 34, 1-16.

- Sea Level Rise Model: Completed. The SLAMM/Ecological System crosswalk was completed, enabling the incorporation of SLAMM output into the Land Succession Model.

- Landscape Succession Model: Completed. Both SLAMM and revised urban growth projections were incorporated. A single model run per scenario was generated due to computational and time constrains. Vegetation dynamics for 78 natural ecological systems and 6 managed systems were simulated over a 100 year time period utilizing three different climate change scenarios (A1, B2, and A1B). The impacts of projected climate change due to varying CO2 emissions were manifested through changes in fire frequency within the vegetation dynamics models.

- Species-Habitat/Landscape Change Model Integration: Completed. Species habitat models were developed for the full list of indicator species for each time step and climate change scenario. Prioritization models were developed for each species and habitat guild and utilized in the resultant Decision Support Tools.

Goal/Objective 3: Target conservation programs to most effectively and efficiently achieve habitat objectives in State Wildlife Action Plans and bird conservation plans and evaluate progress under these plans.

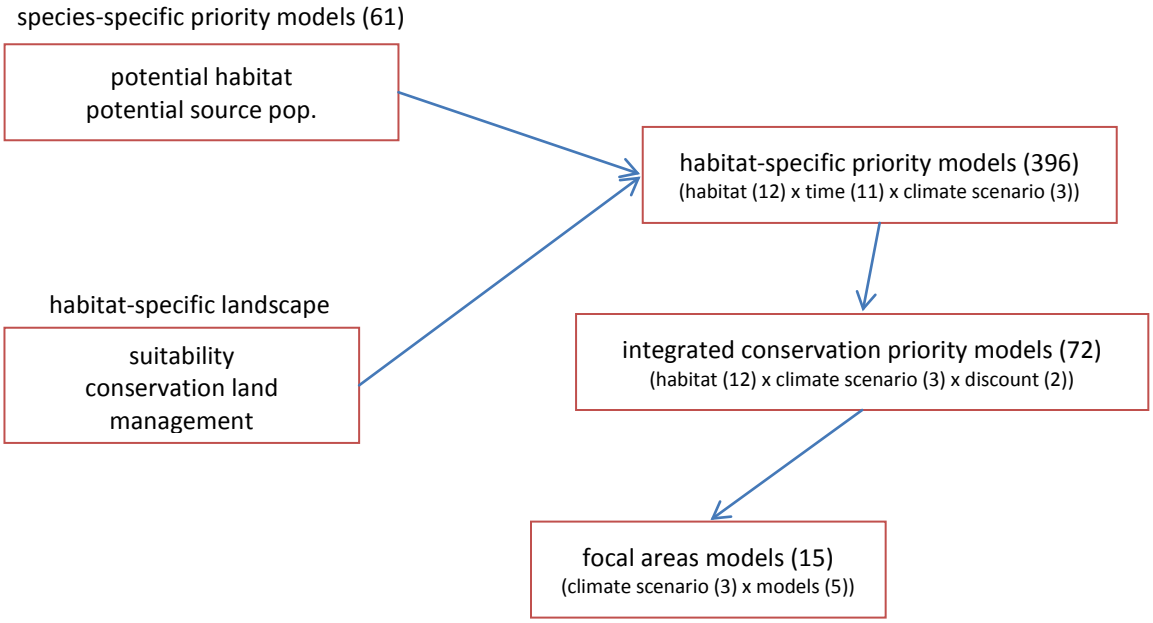
Accomplishments:

- Prioritization models have been generated for all 40 focal species at each time step for each climate scenario. Because some species occurred in multiple habitats there were a total of 74 species models for each time step yielding 2,442 species-specific priority maps in total.

- Habitat conservation priority models were created using species-specific priority models in combination with static and dynamic landscape priorities (e.g. suitability for restoration, potential for management, proximity to existing conservation estate, existing habitat, potential source populations, urban growth, climate change, and vegetative succession). This resulted in 11 priority models for each habitat, for each climate scenario.

- The habitat-specific priority models were synthesized over all years, discounted by 4% per year and undiscounted, to create integrated priority models, yielding one integrated priority model for each habitat, for each climate scenario.

- Delineated alternative habitat rankings to address competing stakeholder objectives and used alternatives to create five possible configurations for conservation prioritization for all habitats in each climate scenarios (focal area models).


species-specific priority models (61)
potential habitat
potential source pop.
habitat-specific priority models (396)
(habitat (12) x time (11) x climate scenario (3))
habitat-specific landscape
suitability
conservation land
management
integrated conservation priority models (72)
(habitat (12) x climate scenario (3) x discount (2))
focal areas models (15)
(climate scenario (3) x models (5))

Goal/Objective 4: Enhance coordination among the many partners, initiatives, and plans that have initiated efforts to be more effective with planning, implementation and evaluation of habitat conservation through conservation design.

Accomplishments:

- Presented alternative solutions to conservation prioritization: Moody, A.T. & J.B. Grand. 2011. Large-scale conservation planning: Trading meadowlarks for woodpeckers. Ecological Society of America, Austin, Texas.

Final Report Summary

Primary Project Objective: The overall goal of this project is to develop a consistent methodology and to enhance the capacity of states, joint ventures and other partners to assess and design sustainable landscapes for birds and other wildlife in the Eastern United States.

Overall Benefits Derived by the End of the Project: Several stand alone landscape change components have been developed (Sea Level Rise, Urban Growth, Succession) and will be available on the project's web site soon along with other final data products. The development of patch persistence variables from Occupancy modeling is proving to be a critical component in the ability to assess the sustainability of populations through time. Priority surfaces that integrate the requirements of the priority species have been developed for each of the natural habitats identified in the SAMBI plan. These were used to identify focal areas for each habitat type under several objective functions that reflect potential priorities of the Joint Venture stakeholders. The priority surfaces and focal area maps are available as standalone GIS layers. These maps can be used to coordinate bird conservation efforts in the SAMBI region. Finally, the spatial framework developed in this project for integrating static and dynamic landscape priorities is being adopted both in the Southeast and Northeast to help set regional conservation priorities.

Signature:_____ Date:_____