

Climate Change Adaptation for Natural Resources in the North Atlantic Region

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Preparing New Jersey for Climate Change:
A Workshop for Decision Makers,
November 29, 2011



Climate Change Adaptation for Natural Resources

- Landscape Conservation Cooperatives
 - Background and purpose
 - What is going on nationally and regionally
- How we need to address adaptation
 - Multiple scales
 - Incorporating all major stressors
 - Science and tools useful for making good conservation decisions
 - Examples of science and tools that are being developed



U.S. Fish and Wildlife Service Climate Change Strategic Plan

- Focus on Adaptation
- Landscape scale partnerships



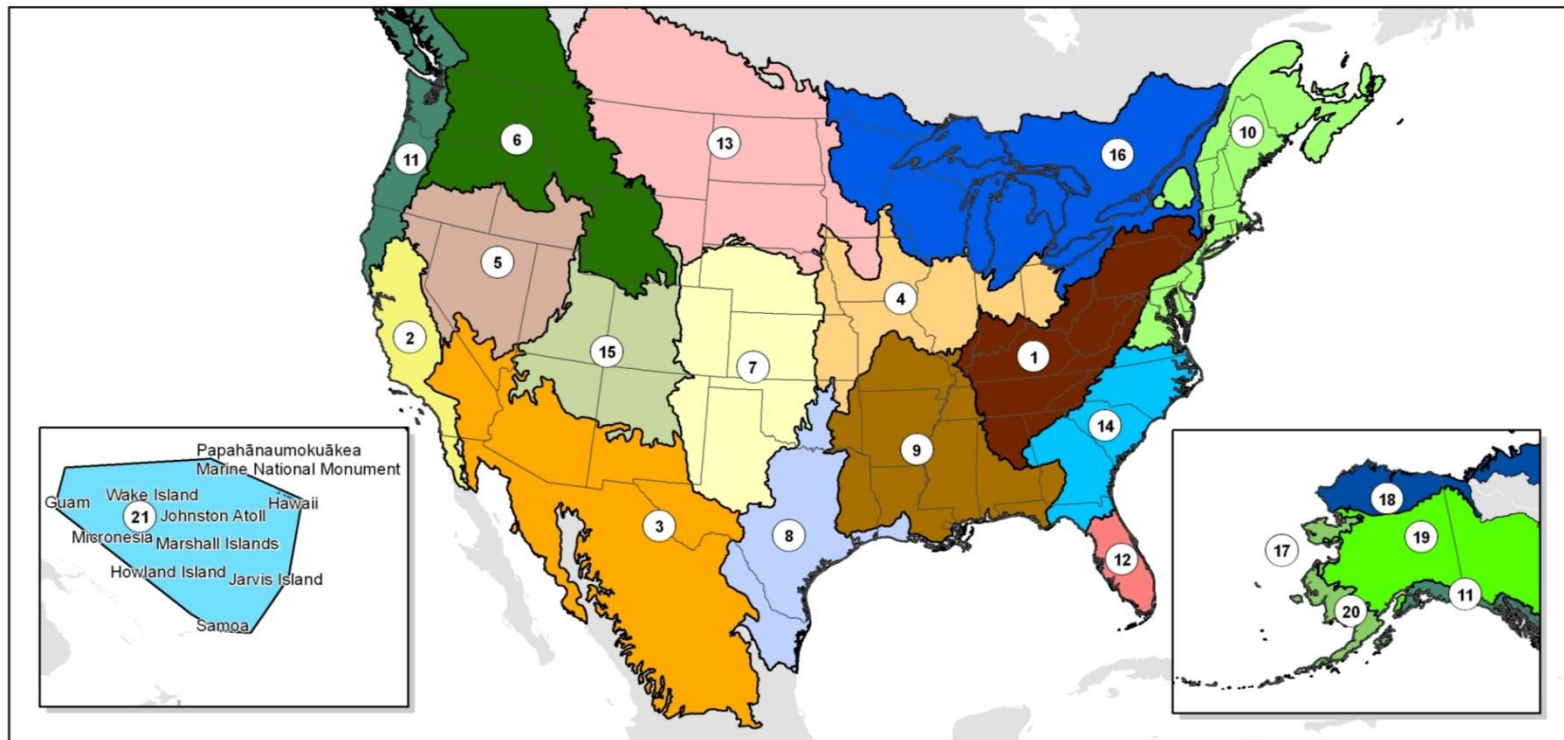
U.S. Fish & Wildlife Service

Rising to the Urgent Challenge

*Strategic Plan for Responding to
Accelerating Climate Change*



Landscape Conservation Cooperatives: Geographic Areas



Landscape Conservation Cooperatives

- 1. Appalachian
- 2. California
- 3. Desert
- 4. Eastern Tallgrass Prairie and Big Rivers
- 5. Great Basin

- 6. Great Northern
- 7. Great Plains
- 8. Gulf Coast Prairie
- 9. Gulf Coastal Plains and Ozarks
- 10. North Atlantic
- 11. North Pacific

- 12. Peninsular Florida
- 13. Plains and Prairie Potholes
- 14. South Atlantic
- 15. Southern Rockies
- 16. Upper Midwest and Great Lakes
- 17. Aleutian and Bering Sea Islands

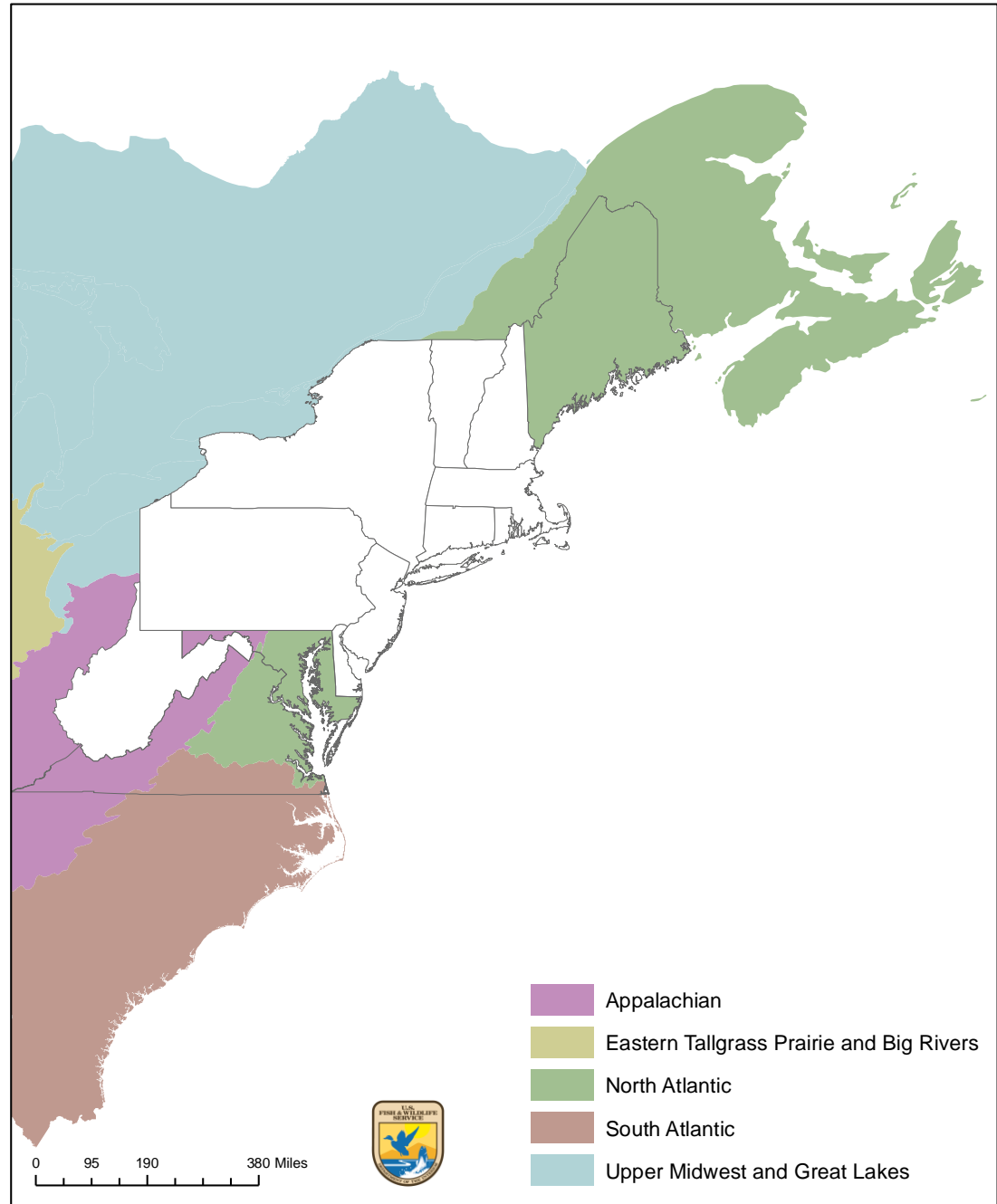
- 18. Arctic
- 19. Northwestern Interior Forest
- 20. Western Alaska
- 21. Pacific Islands
- Unclassified

Albers Equal Area Conic NAD83
Produced by FWS, IRTM, Denver, CO
Map Date: 03182010

Northeast Region LCCs

Two in New Jersey

- North Atlantic
- Appalachian



North Atlantic LCC - Mission

The North Atlantic Landscape Conservation Cooperative provides a partnership in which the conservation community works together to **address increasing land use pressures and widespread resource threats and uncertainties amplified by a rapidly changing climate.**

The partners and partnerships in the cooperative address these regional threats and uncertainties by agreeing on common goals and jointly developing the **scientific information and tools needed to prioritize and guide more effective conservation actions** by partners toward those goals.

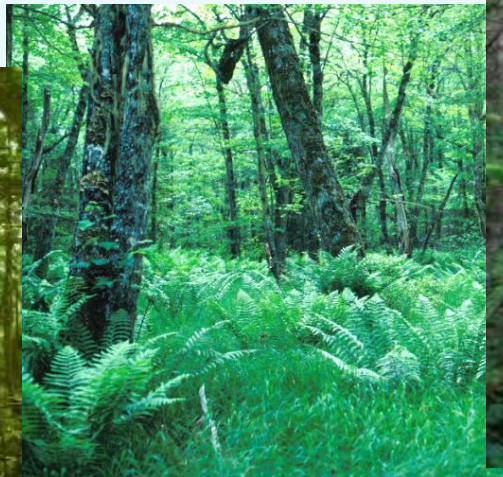




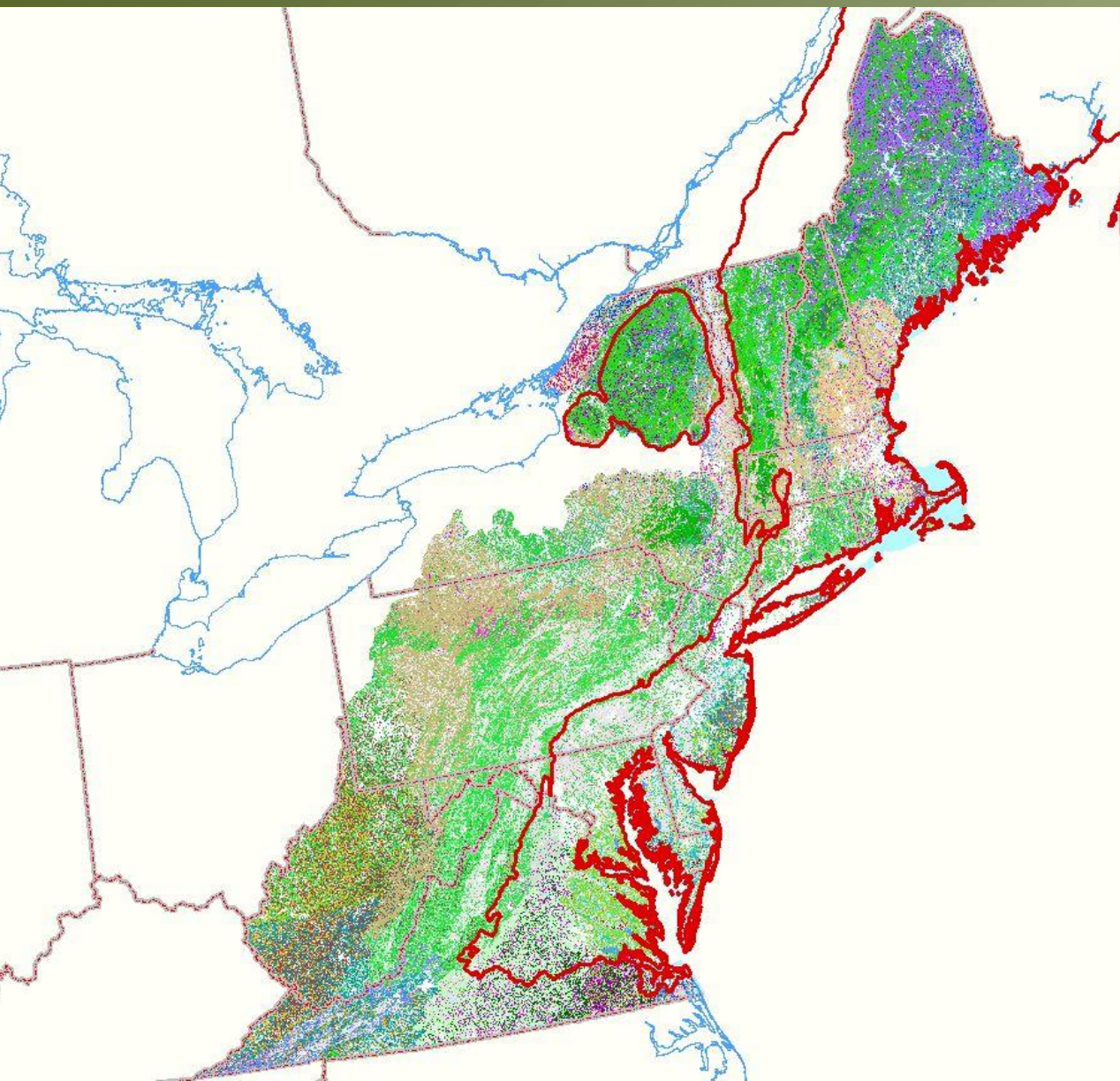
Photo by Brian Harris

Mapping Northeast Terrestrial Habitats

Based on NatureServe Ecological Systems



Terrestrial Habitats



Ecological Systems/Habitats: Wetland, U

- Laurentian-Acadian Conifer-Hwd Acid Swamp
- N-Central Appalachian Acidic Swamp
- Laur-Acad Alkaline Conifer-Hwd Swamp
- Laurentian-Acadian Freshwater Marsh
- Laur-Acad Wet Meadow-Shrub Swamp
- Boreal-Laur-Acadian Acidic Basin Fen
- N-Central Interior and Appal Acidic Peatland
- N-Central Int Wet Flatwoods (wet Clayplain Forest)
- Acadian Coastal Salt Marsh & Estuary Marsh
- Acadian Maritime Bog
- Boreal-Laurentian Bog
- Laurentian-Acadian Floodplain Forest
- Eastern Boreal Floodplain
- SP system: N Appal-Acad Rocky Heath Outcrop
- SP system: Laur-Acad Calcareous Rocky Outcrop
- SP/LP system: Central Appal Dry Oak-Pine Forest
- SP system: Central App Pine-Oak Rocky Woodland
- SP system: L-A Acidic Cliff & Talus
- SP system: L-A Calcareous Cliff & Talus
- SP system: N-Central Appal Acidic Cliff & Talus
- SP system: N-Central Appal Circumneut Cliff & Talus
- SP system: NE Interior Pine Barrens
- LP/SP system: Great Lakes Alvar
- LP/SP system: Laurentian Acidic Rocky Outcrop
- SP system: Great Lakes Dune: 4 small occ's
- SP/LP system: Acadian-Appalachian Alpine Tundra
- Mbx system: Acad-Appal Montane Spr-Fir-Hwd Forest
- LP/SP system: Acadian Sub-boreal Spruce Flat
- Mbx system: Acadian Low-Elev Spr-Fir-Hwd Forest
- Mbx system: L-A N. Hwd Forest, typic
- Mbx system: L-A N. Hwd Forest, high conifer
- Mbx system: L-A Red Oak-N. Hwd Forest
- Mbx system: L-A N. Hwd Forest, moist/cool
- Mbx system: L-A Pine-Hem-Hwd Forest, typic
- Mbx system: L-A Pine-Hem-Hwd Forest, moist/cool
- LP/SP system: Appal Hem-N. Hwd Forest, typic
- LP/SP system: Appal Hem-N. Hwd Forest, moist/cool
- LP/SP system, former mbx: Mesic Clayplain Forest

- NLCD-NHD open water
- NLCD agricultural classes 81-82
- NLCD developed classes 21-24 & 31

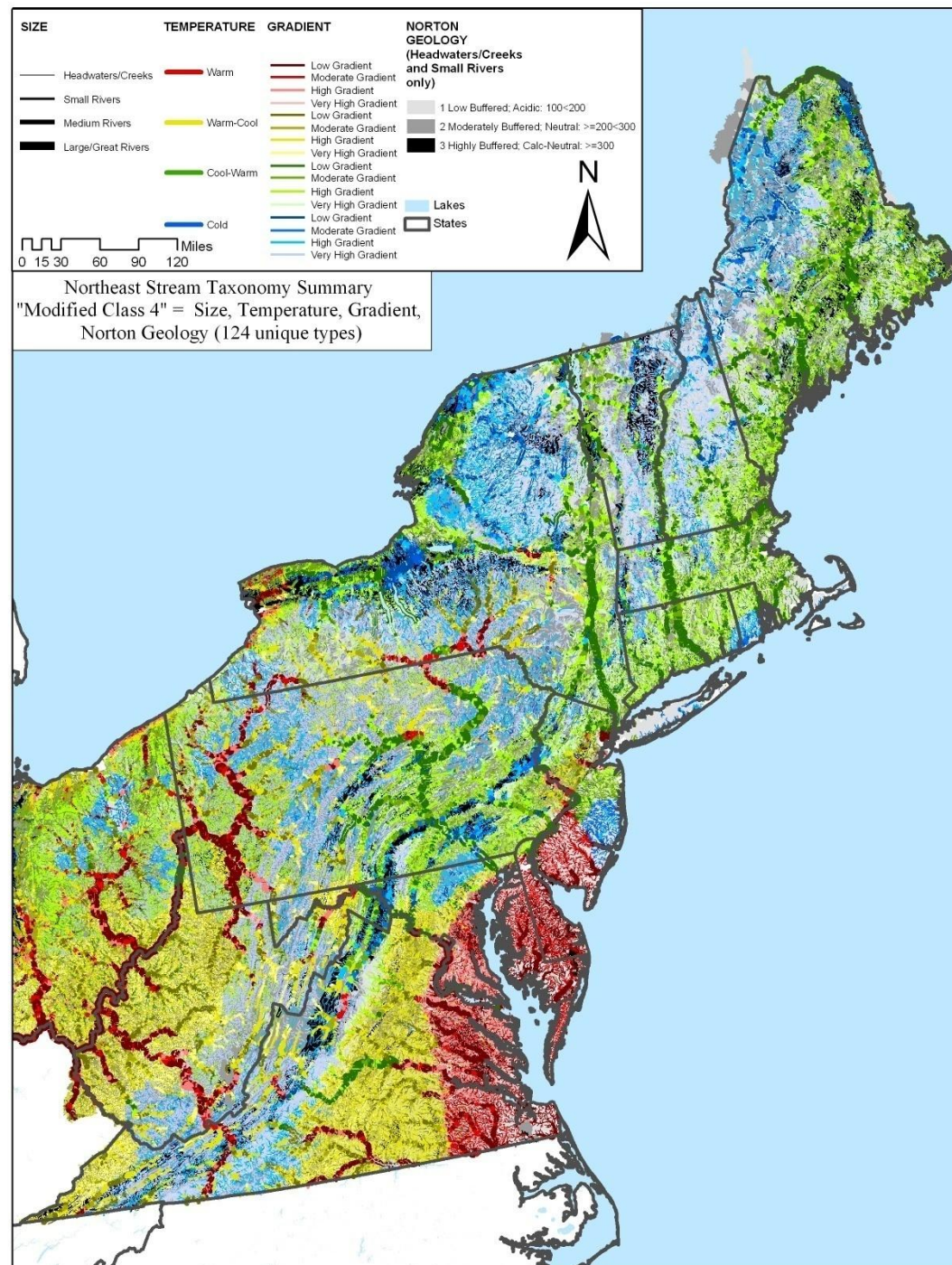
Northeast Aquatic Habitat Classification and Map

This simplified map groups them into 96 types.

From
Very high gradient, acidic, cold
headwater creek
(1a_6_1_1)

To
Very low gradient, calcareous,
warm Great River
(5_1_3_3)

Code =
Size, Gradient, Geo, Temp



Vulnerabilities to Climate Change of Northeastern Fish and Wildlife Habitats

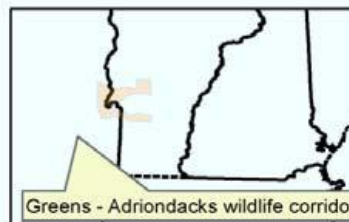
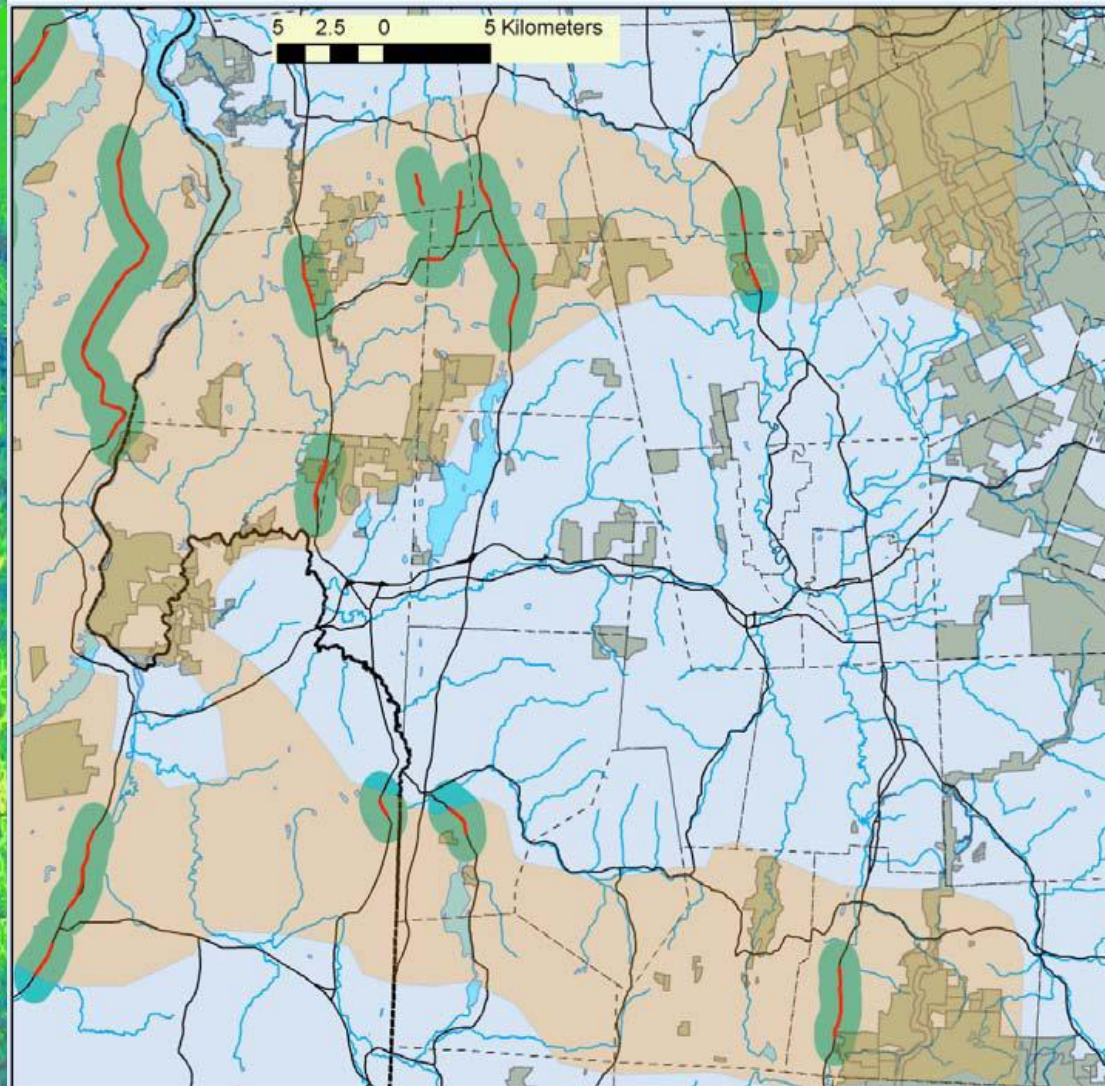
- A expert-driven predictive model of habitat vulnerability has been built
- This model will be consistently applied to selected habitats across the Northeast
- Results will provide basis for mapping geographical variation in vulnerability



Connectivity:

Network Connectivity

DRAFT Greens to Adirondacks - 1st and 2nd tier priorities for NRCS



Legend

- Wildlife Road Crossing
- TNC/State/Federal conservation lands
- Priority 1: Road crossings
- Priority 2 - Habitat linkage area



Human Population Density by County



Northeast Region Urban Growth

1990

2000

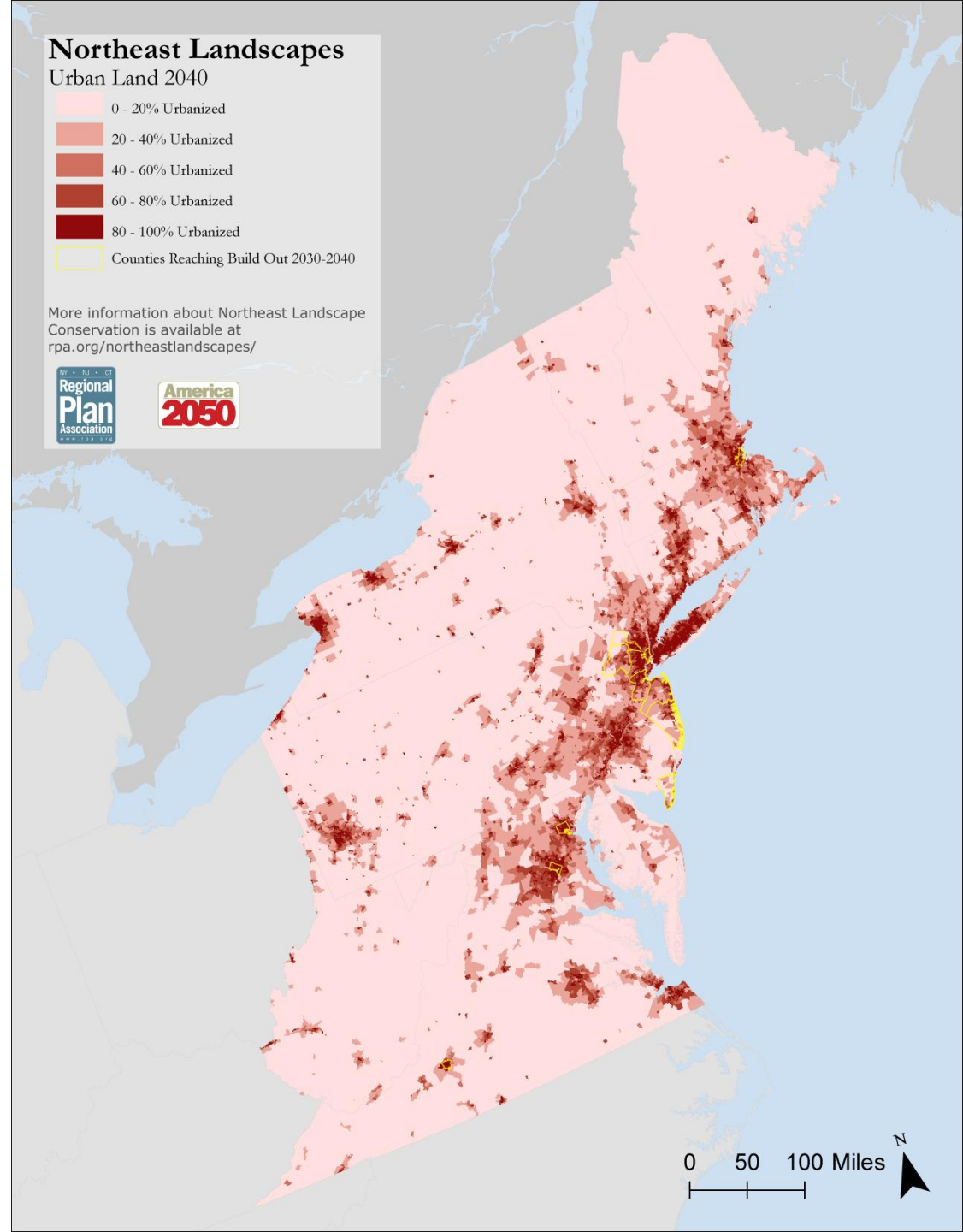
2010

2020

2030

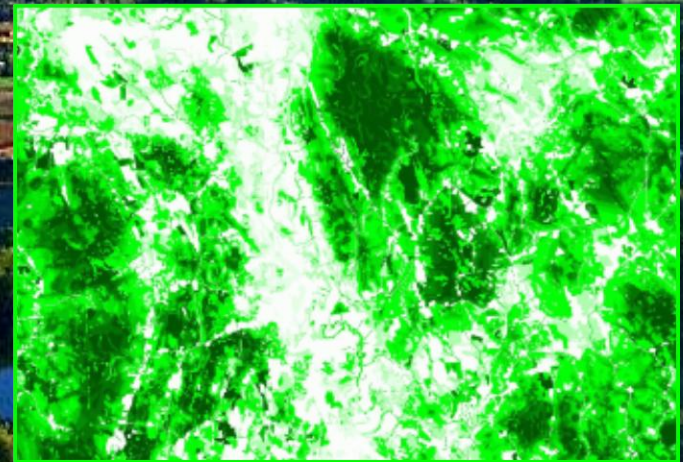
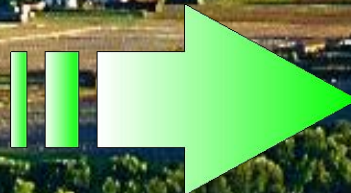
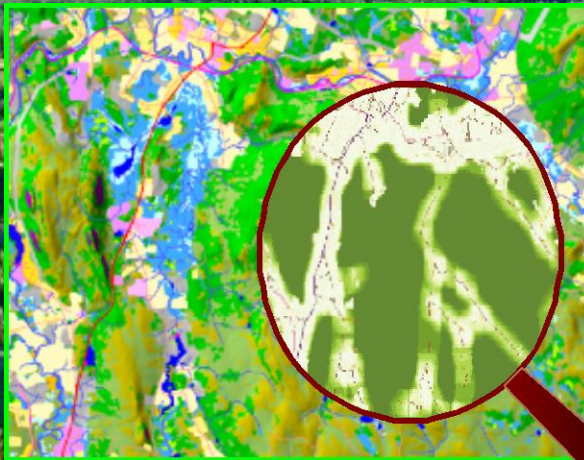
2040

Regional Plan Association, 2011



Designing Sustainable Landscapes for Wildlife

Decision-Support Tools for Conservation



In the face of major threats the **objective** is to maximize the quantity, quality, and connectivity of habitats and ecological systems, subject to the real world socio-economic constraints of development

- Protect, manage & restore habitat in the right places



- Design landscapes to ensure connectivity



- Minimize forces of habitat degradation



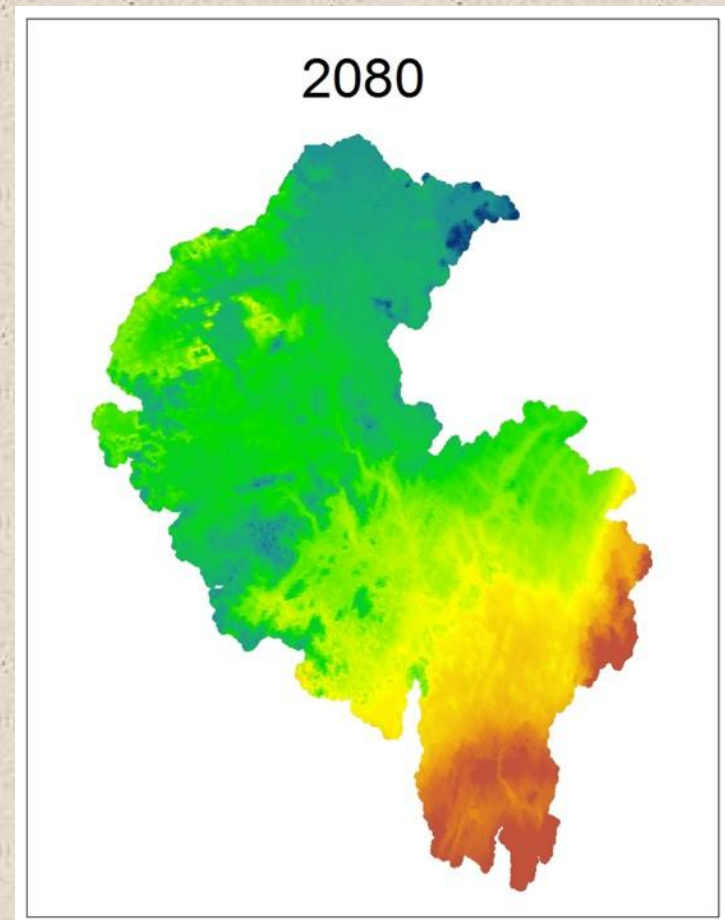
Utilizing complementary **fine-** and **coarse-filtered** approaches



Landscape change models

Now building a **landscape change model** to predict changes in *ecological integrity* and *habitat capability* driven by urban growth, climate change and other anthropogenic (e.g. timber harvest) and natural disturbances (e.g., fire)

Projected min January temp,
Kennebec watershed,
SRES A2 scenario

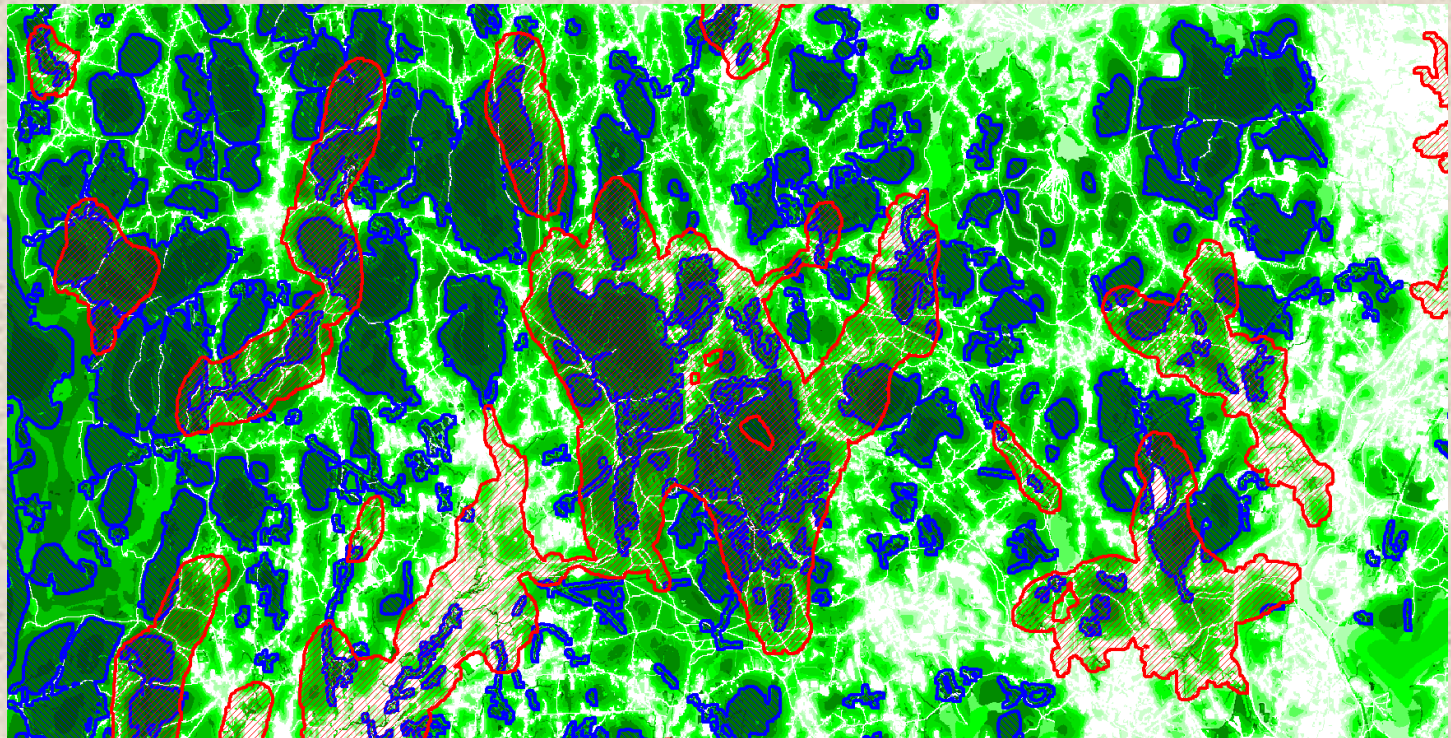


Model outcomes: *Strategies for maximizing habitat and integrity*

Top 20% (plus buffer)
wood turtle habitat

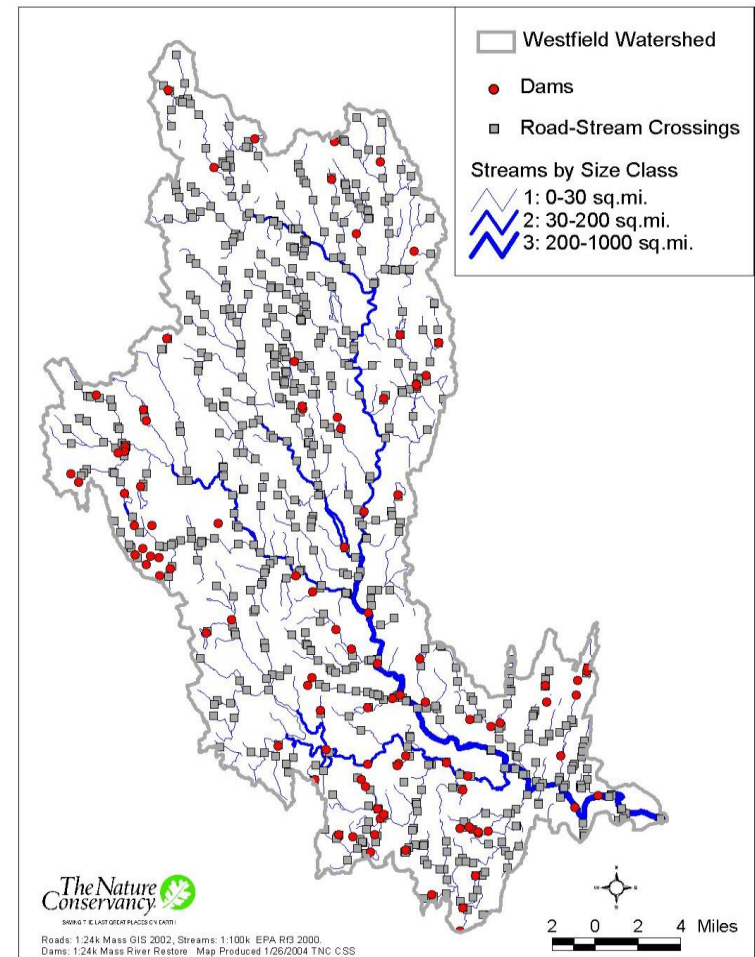


Top 20%
ecological
integrity



Threats to Aquatic Systems and Species

- Habitat fragmentation
 - ▣ Isolated populations
- Water withdrawals
 - ▣ Seasonal effects of stream flow
- Land use/land change
 - ▣ Riparian buffer, impervious surfaces
- Climate change
 - ▣ Air temperature and precipitation affecting:
 - Stream flow and temperature
- Interactions



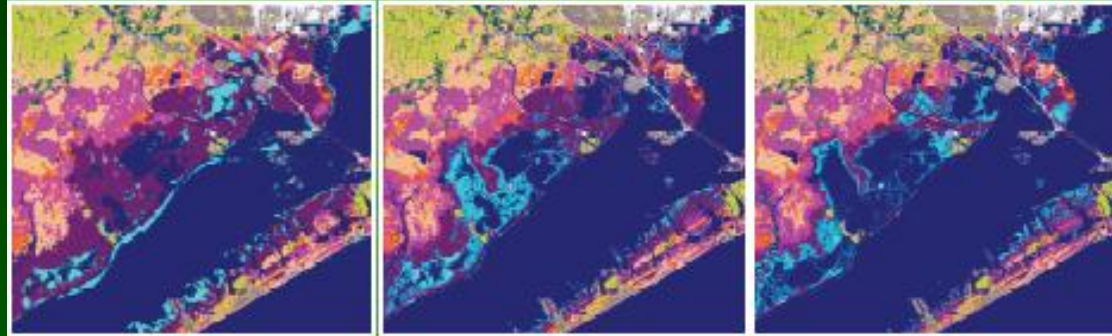
Piping plover habitat and sea level rise

- Understand impacts of sea level rise on beach habitats (sea level rise models)
- Relate these changes to plover populations (locally and regionally) (plover species habitat models)
- Inform current and near-term decisions regarding coastal stabilization (scenarios)



Science Translation

- Science and tools at scale and in format that is useful to managers
- Guidance to increase understanding and use



Marshes on the Move

A Manager's Guide to Understanding and Using
Model Results Depicting Potential Impacts
of Sea Level Rise on Coastal Wetlands

Adaptation Planning and Actions for Natural Resources

- Local and state scales informed by regional scale
- Plan for systems, habitats and species
- Incorporate multiple drivers (e.g. climate change and urban growth)
- Science and tools developed and available to managers

Goal: landscapes that sustain natural resources and human uses in the future



Thank You

North Atlantic LCC

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Appalachian LCC

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