Designing Sustainable Landscapes in the Northeast

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Designing Sustainable Coastal Habitats Workshop

Scientific and Technical Advisory Committee

April 17, 2013

North Atlantic Landscape Conservation Cooperative

Overview

- The North Atlantic Landscape Conservation Cooperative (LCC)

- Efforts to identify "representative" or "surrogate" species in the Northeast

- LCC-supported project: *Designing Sustainable Landscapes*

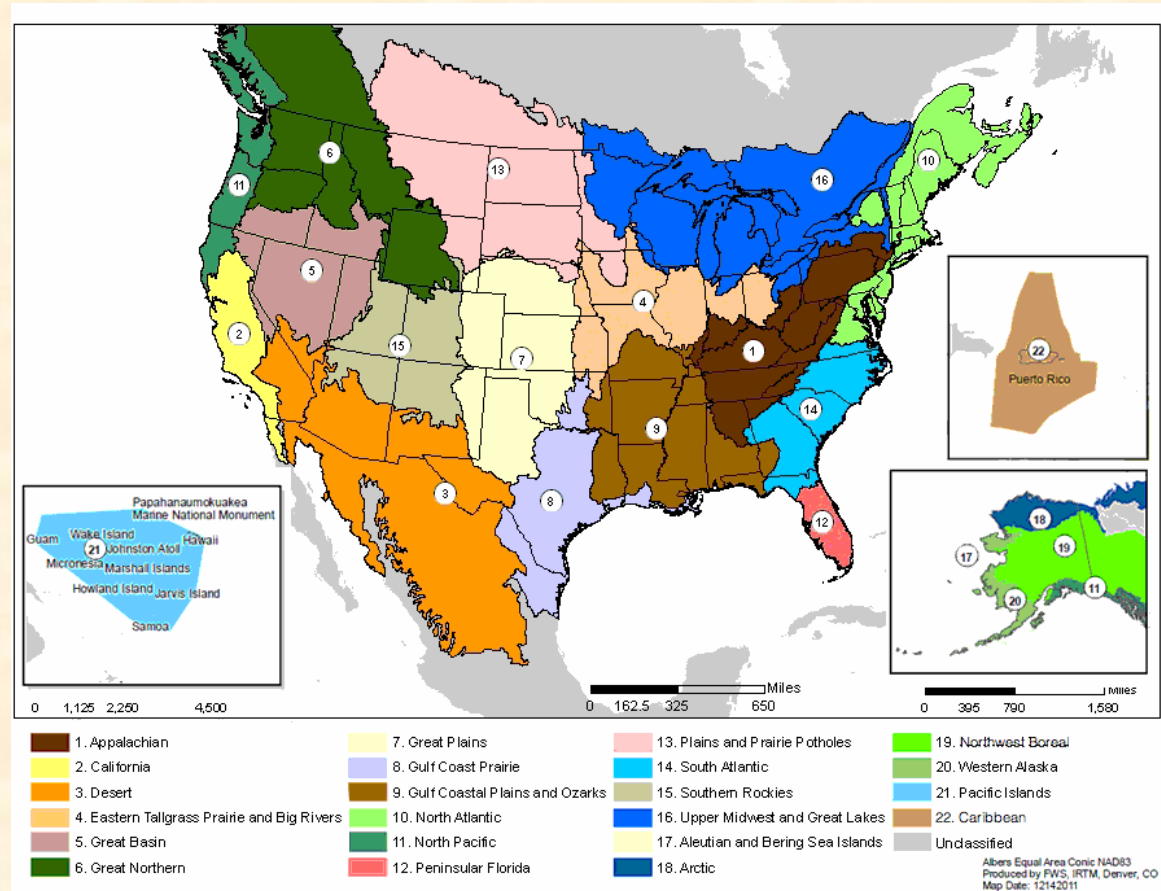- Other LCC involvement in coastal ecosystems

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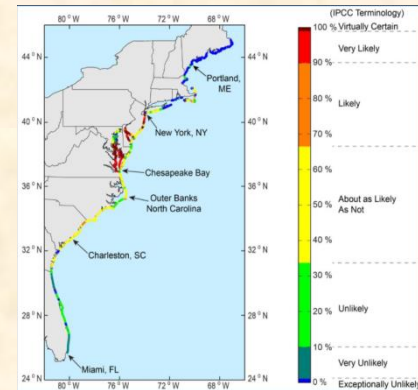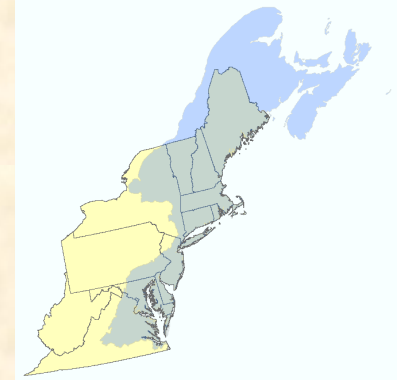
Landscape Conservation Cooperatives

LCCs Fundamental Objective

To define, design, and help partners deliver landscapes that can sustain natural and cultural resources at desired levels nationwide.

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. Northwest Boreal
20. Western Alaska
21. Pacific Islands
22. Caribbean
Unclassified

Albers Equal Area Conic NAD83
Produced by FWS, IRTM, Denver, CO
Map Date: 12142011

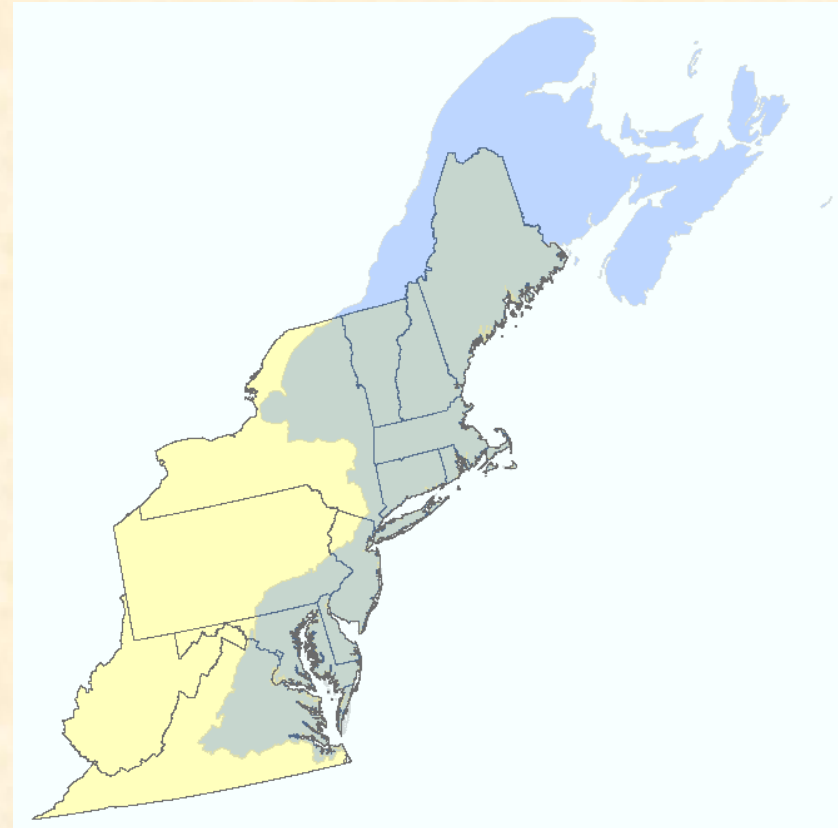**North Atlantic Landscape Conservation Cooperative**

Foundational Concepts of Landscape Conservation

- Landscape Scale: The scale necessary to ensure the future of ecosystems, fish and wildlife in the face of development, climate change, and other pressures

It is not enough anymore to work parcel by parcel, refuge by refuge, stream by stream, and hope it all fits together into a larger system. We need to work <u>cooperatively</u> and <u>strategically</u>.

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North Atlantic LCC

LCC Partners

Including:

Delaware Div. of Fish & Wildlife

Maryland DNR

Virginia Dept. of Game & Inland Fisheries

EPA, NOAA, US FWS, USGS

Ducks Unlimited, TNC

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U.S. FWS Efforts to Identify and Use "Representative" or "Surrogate" Species

- USGS – U.S. FWS 2006 report on Strategic Habitat Conservation

- Concept of identifying subset of species for conservation focus

- 2011 – U.S. FWS Northeast region: "representative species"

- 2012 – U.S. FWS draft national guidance: "surrogate species"

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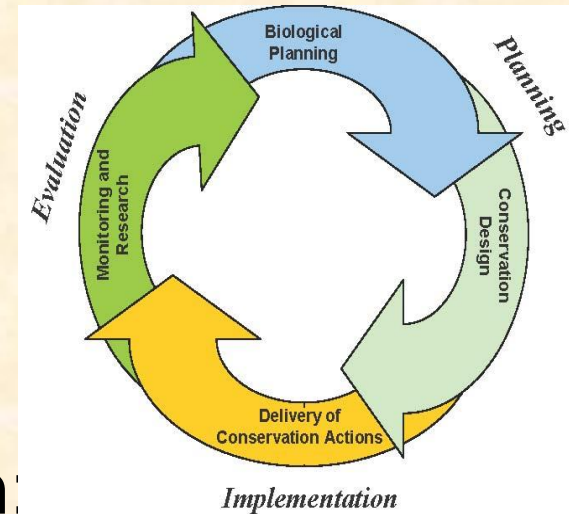
Representative Species: What and Why?

- What: "a species whose habitat needs, ecosystem function, or management responses are similar to a group of other species"

- Why: not feasible to individually assess all fish and wildlife species

- To guide strategic decisions about *what* habitat conservation actions are needed *where*, and in *what quantity*, to sustain populations

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Critical assumptions of the surrogate species approach

- *Conservation planning and actions for a representative species will also address the needs of other species*

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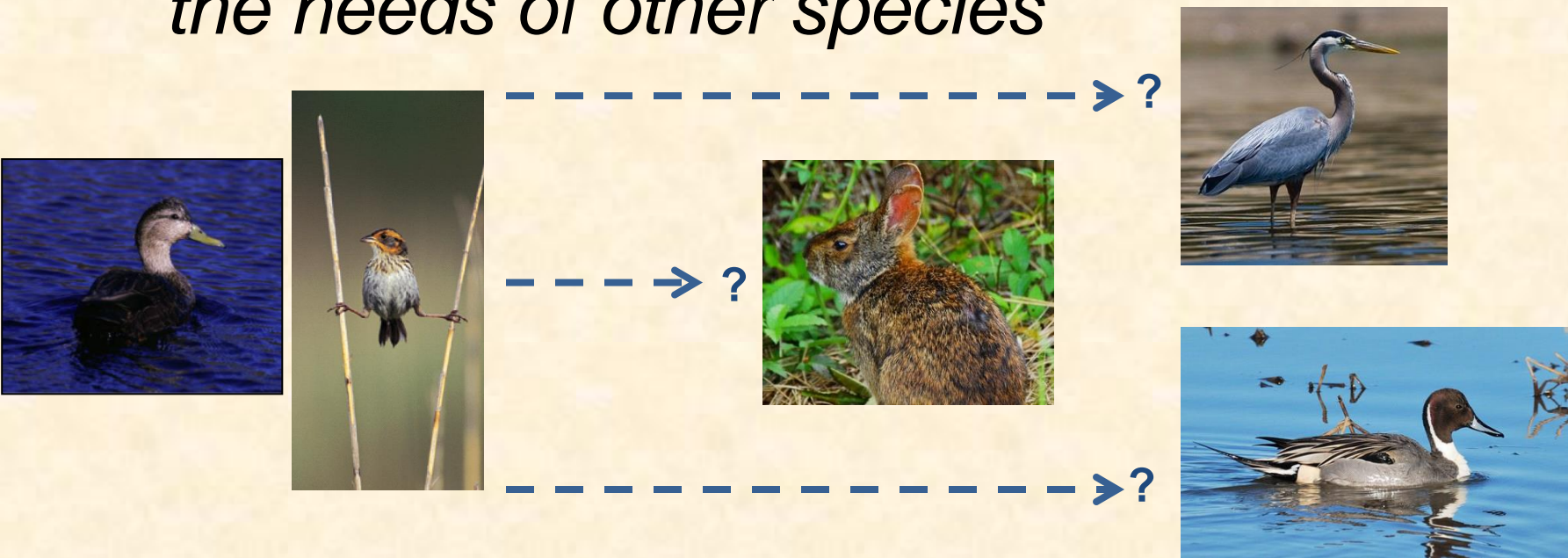
Terrestrial / Wetland Results for Northeast

- 87 species selected
  - 66 birds;
  - 13 herps;
  - 4 mammals;
  - 2 plants;
  - 2 invertebrates

35

34

54

North Atlantic Landscape Conser
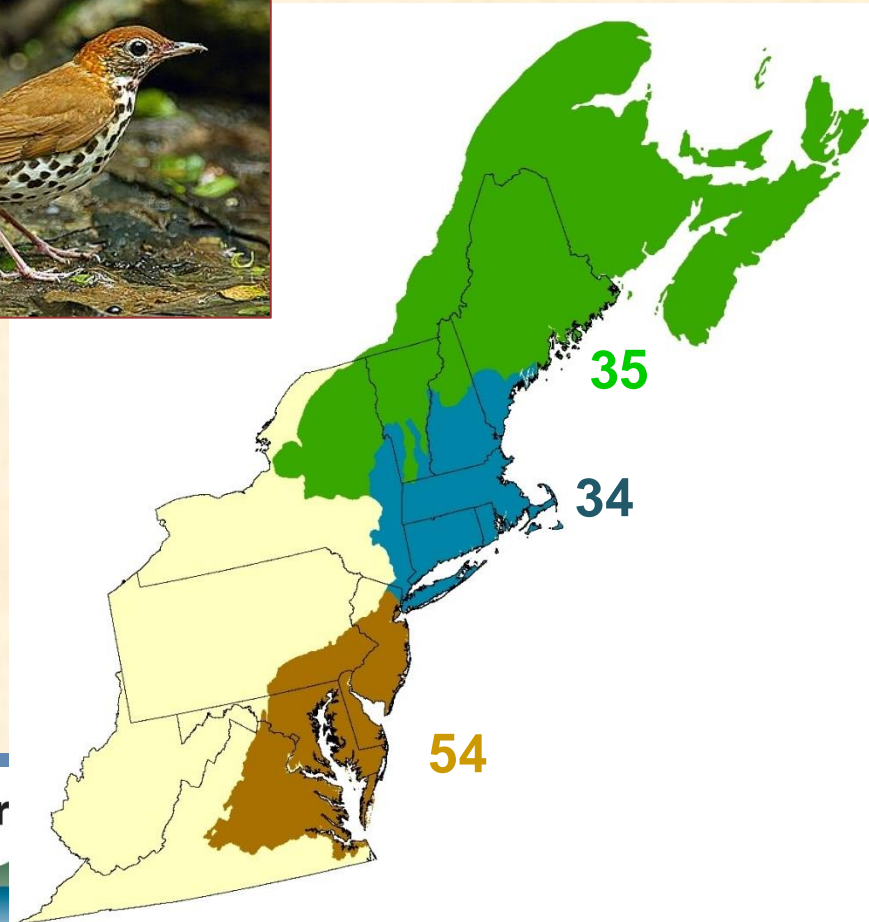
Rep. species occurring in Chesapeake coastal wetlands

Marshes
- American Bittern
- American Black Duck
- Diamond-backed Terrapin
- King Rail
- Least Bittern
- Marsh Wren
- Northern Pintail
- Saltmarsh Sparrow
- Snowy Egret
- Virginia Rail
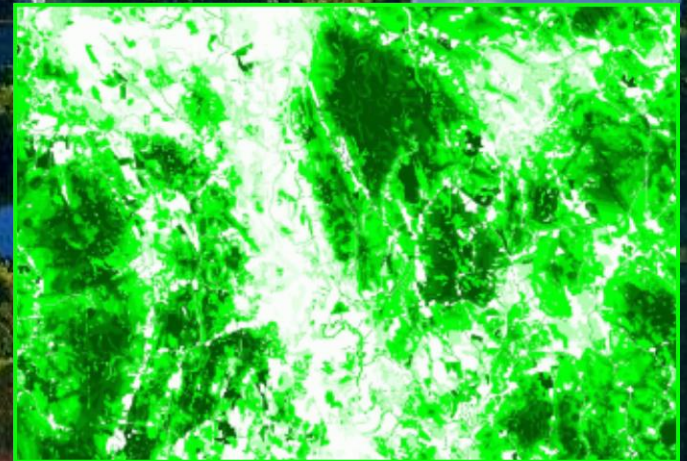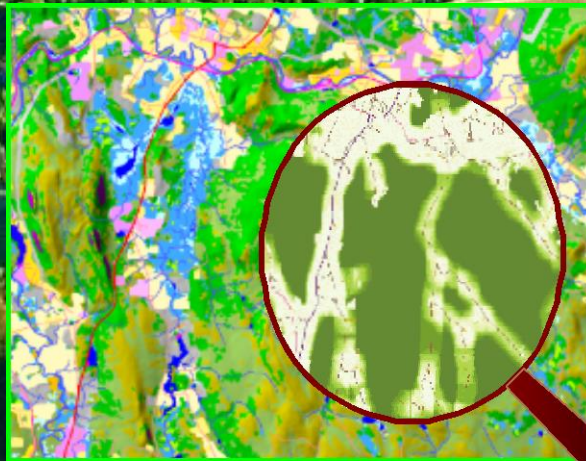- Willet

Forested Wetlands
- Kentucky Warbler
- Louisiana Waterthrush
- Prothonotary Warbler
- Red-shouldered Hawk
- Wood Duck
- Wood Turtle

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Designing Sustainable Landscapes in the Northeast
An application of the Representative Species concept (and more)

Kevin McGarigal
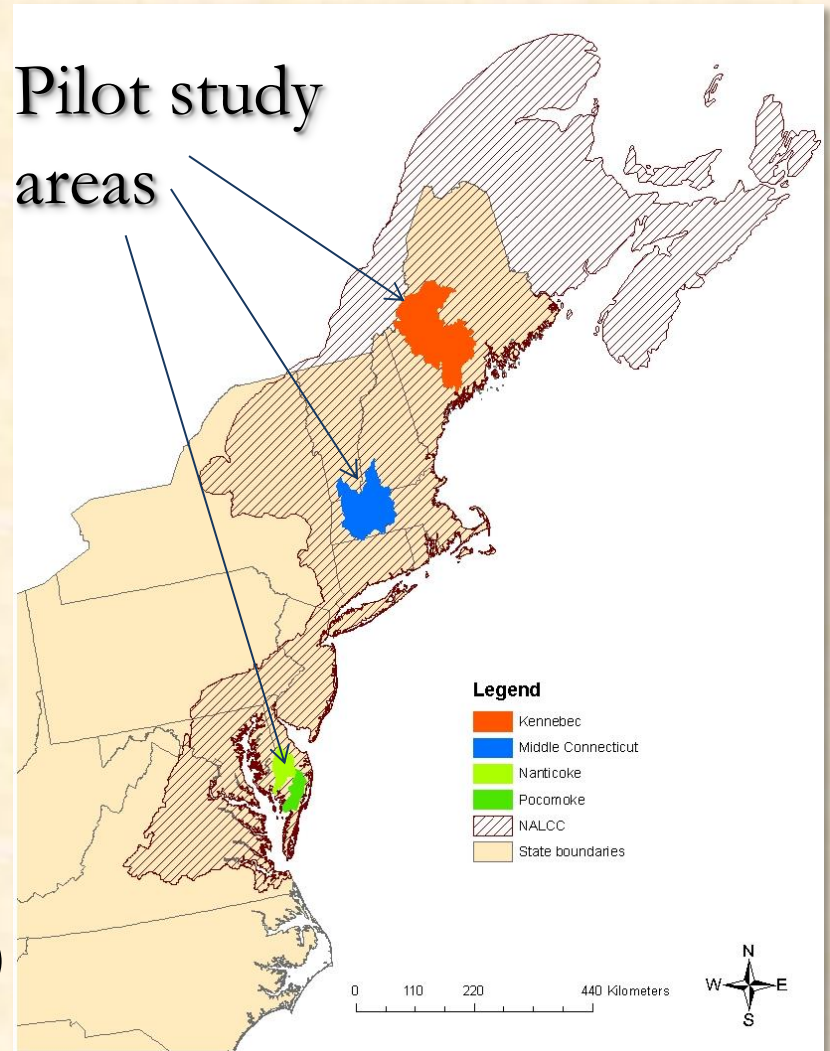University of Massachusetts Amherst

Purpose and Need

Assess the capability of current and potential future landscapes in the Northeast to provide *integral ecosystems* and *suitable habitat for a suite of representative species*, and provide guidance for strategic habitat conservation

Phase 1: pilot areas (2011-2012)
Phase 2: full Northeast (2012-2014)

Pilot study areas

Legend
- Kennebec
- Middle Connecticut
- Nanticoke
- Pocomoke
- NALCC
- State boundaries

0   110   220   440 Kilometers

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Modeling Approach

Landscape change model to predict changes in *ecological integrity* and *habitat capability* driven by:

- urban growth
- climate change
- other disturbances

And using the results to develop landscape designs and guide conservation decisions

Projected mean daily minimum temperature in January under the SRES A2 Scenario

2080

Average Daily Minimum Temperature in January

4 C

-21.5 C

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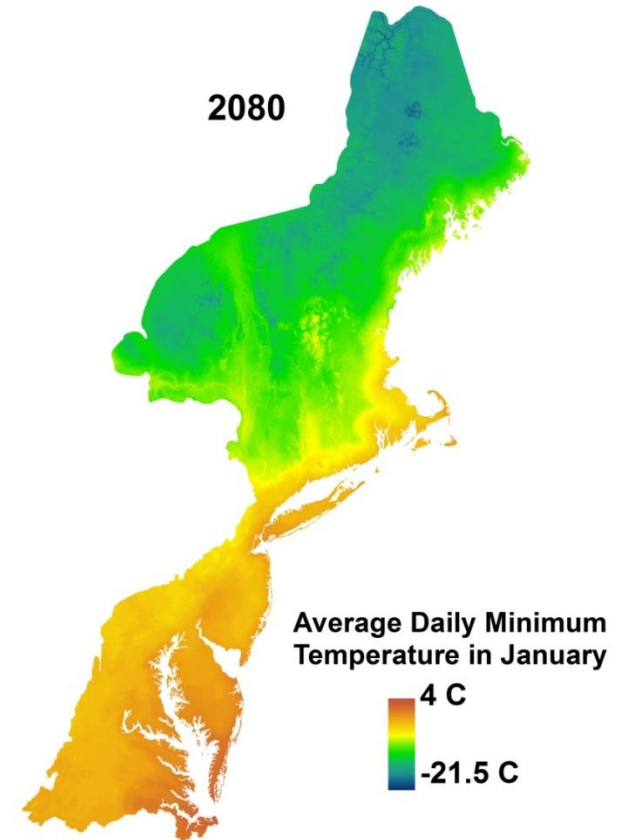
Sea-level Rise Project to Integrate into *Designing Sustainable Landscapes*

- Led by Rob Theiler, USGS Woods Hole

- Decision support models to evaluate sea-level rise impacts for Atlantic coast

- Initial work: inundation responses and stressor metrics

- Longer term: dynamic shifting of marshes and other systems

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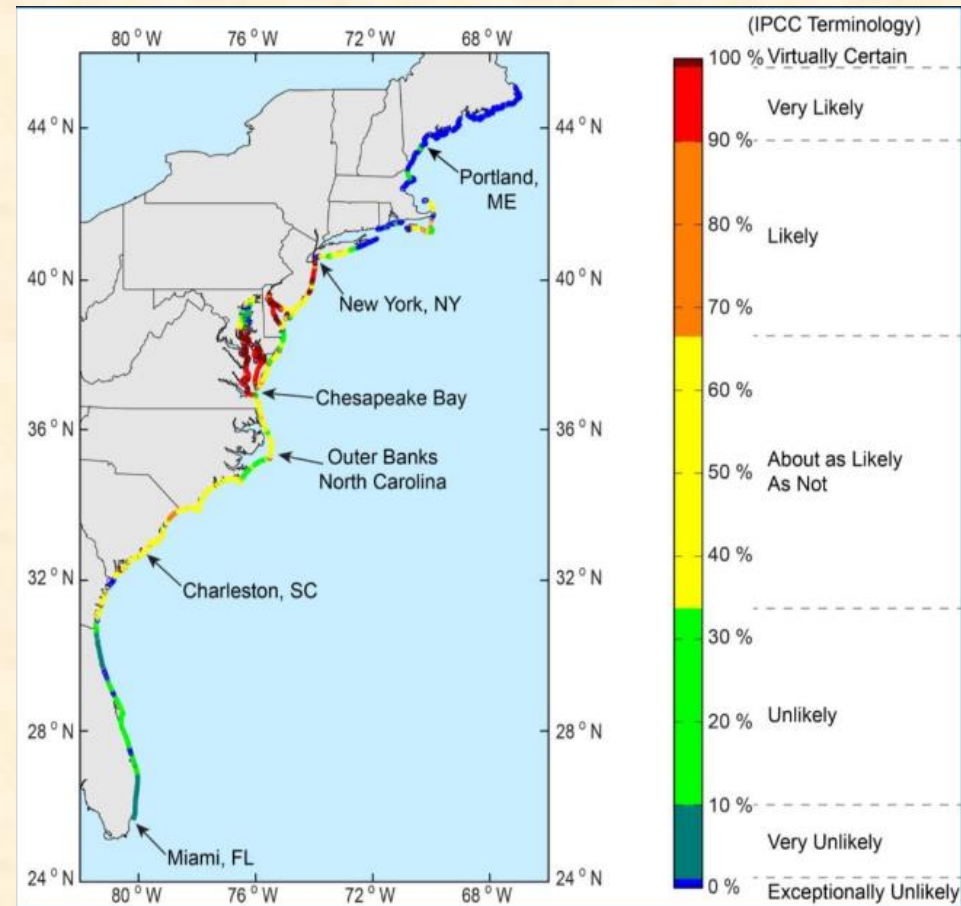
Designing Sustainable Landscapes: Chesapeake Region Species

| Phase 1 Species	Associated Habitat Types
Louisiana Waterthrush, Red-shouldered Hawk	Riparian and Floodplain Forest (deciduous)
Marsh Wren	Marshes
Wood Turtle	Streams (+ associated uplands)
Wood Thrush, Ovenbird	Deciduous Forest
Brown-headed Nuthatch	Pine Forests (southern)

Additional wetland species identified so far for Phase 2:
American Black Duck, Saltmarsh Sparrow (Saltmarshes)

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Example of a Species Habitat Capability Model

- Habitat Capability Index (HRC)… reflects the *quantity*, *quality* and *accessibility* of habitat within a potential homerange centered on each cell

Marsh Wren

Low quality   High quality

© Terry Sohl

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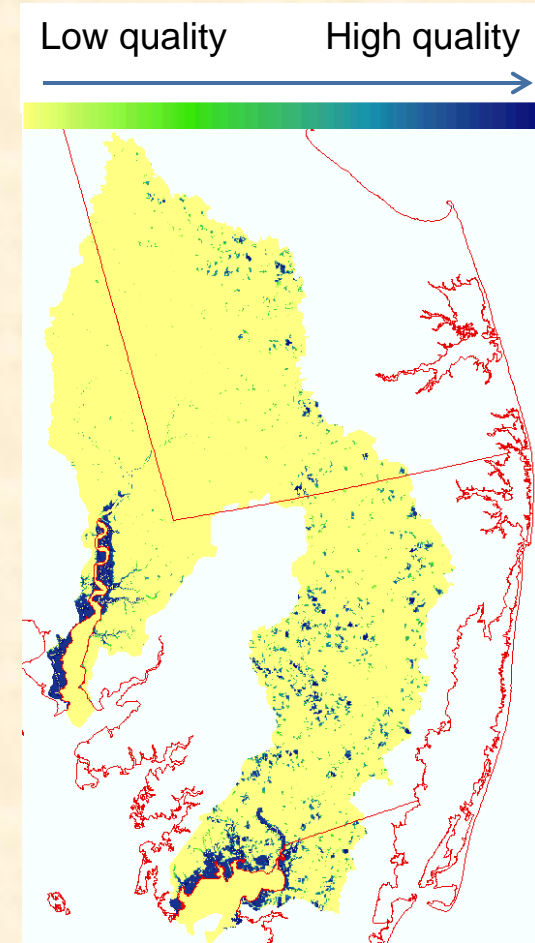
Example of incorporating potential climate change impacts on species

- Habitat-Climate Uncertainty

  - *Zone of Persistence*
  - *Zone of Contraction*
  - *Zone of Expansion*

Where within the species' current optimal area is the habitat and climate likely to remain suitable in the future?
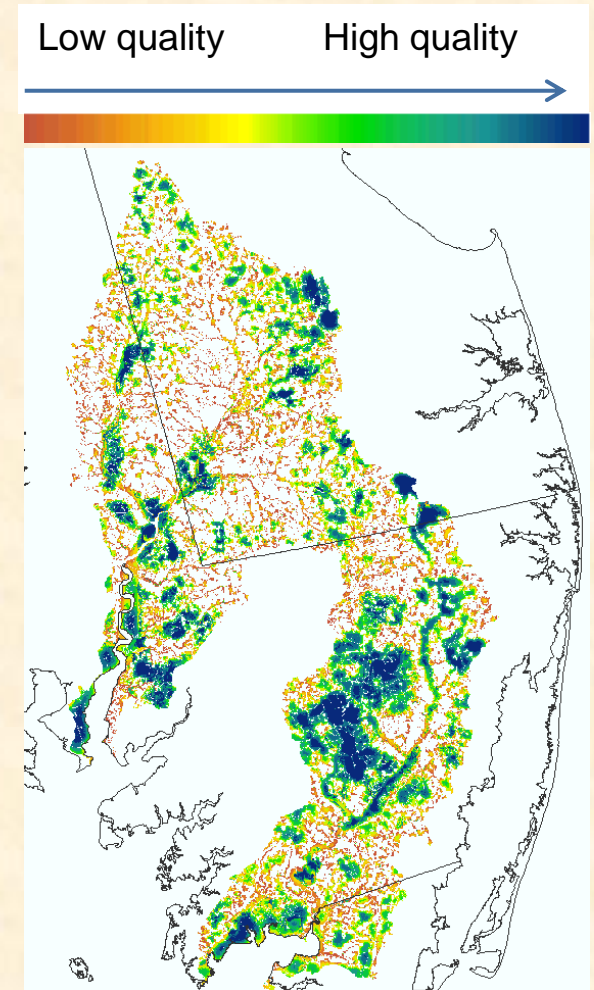

blbw
mean persist 2080
- .33
- .67
- 1
coa
- 0
- 1

North Atlantic **Landscape Conserva**
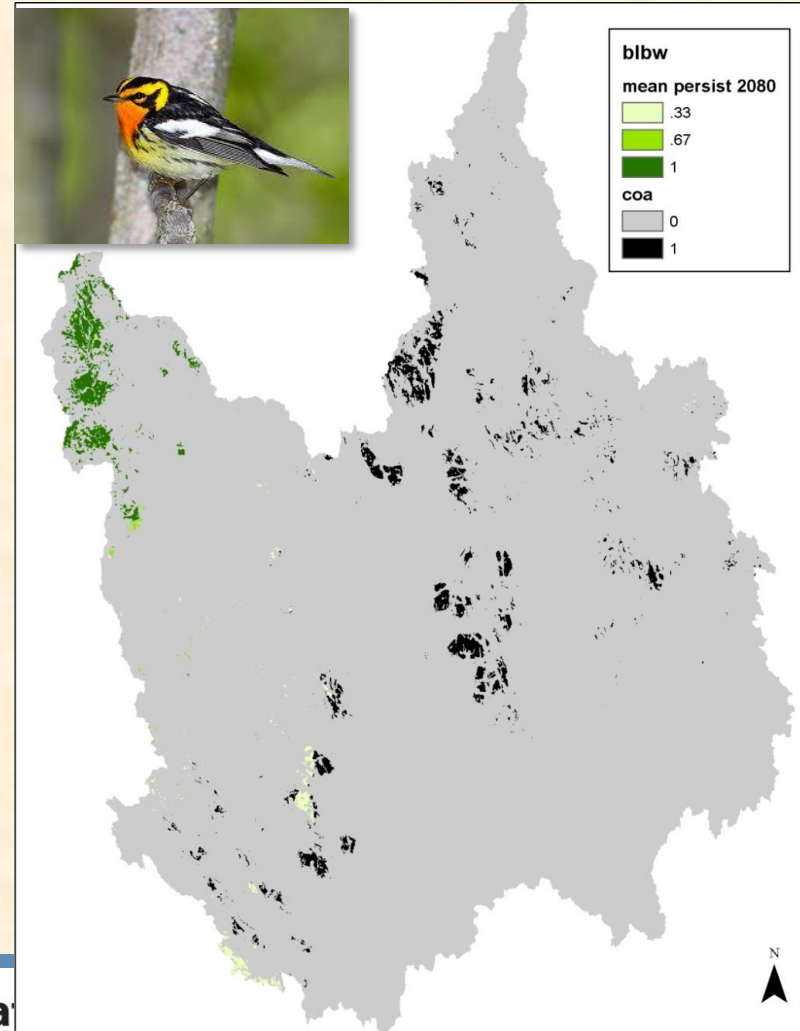
Ecological Integrity

- Index of Ecological Integrity (IEI)…

composite of 13 separate *intactness* and *resiliency* metrics

Larger values indicate greater *intactness* and *resiliency* and thus greater "ecological integrity" (developed = white)
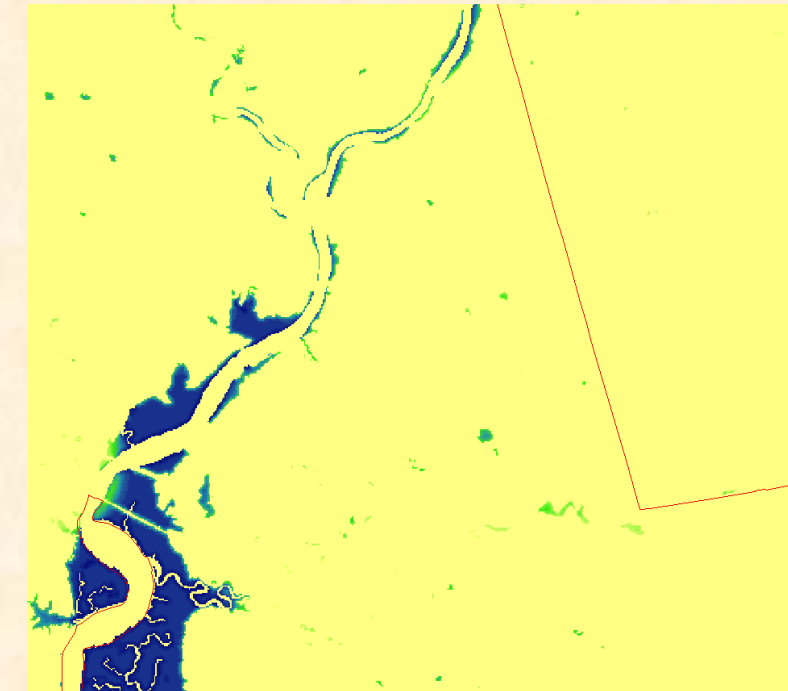

Low quality   High quality

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Example – Using multiple indicators and targets in conservation design

Zoomed in example: Nanticoke River on the MD-DE border

Yellows = agric.
Blues = water &
 wetland
Greens = forest
Purple = wetland
Olive = marsh
Black = roads
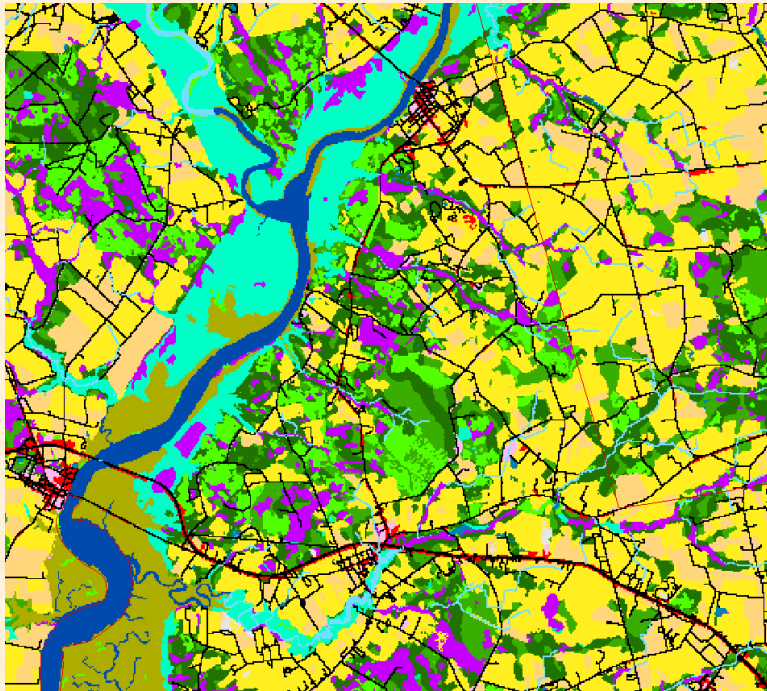Red = developed
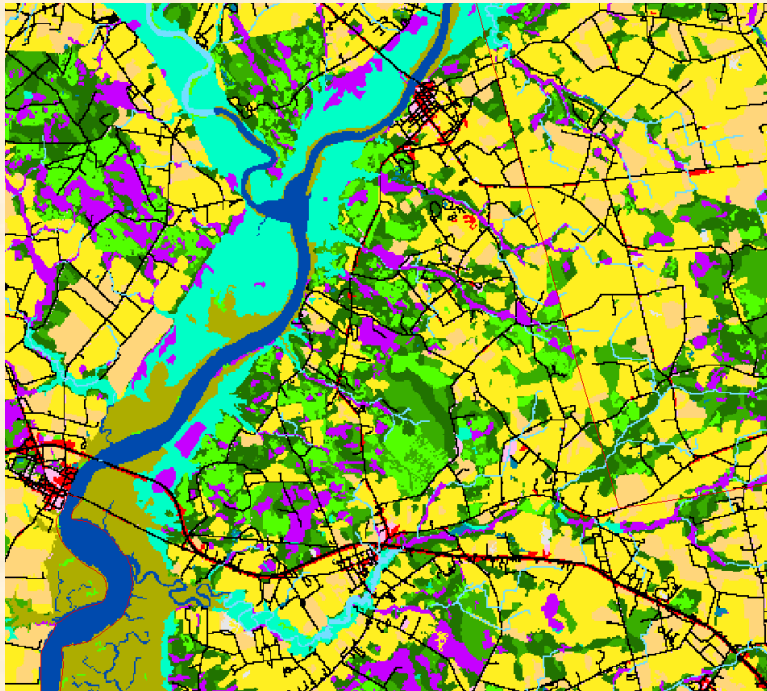
Land cover

Marsh Wren habitat capability

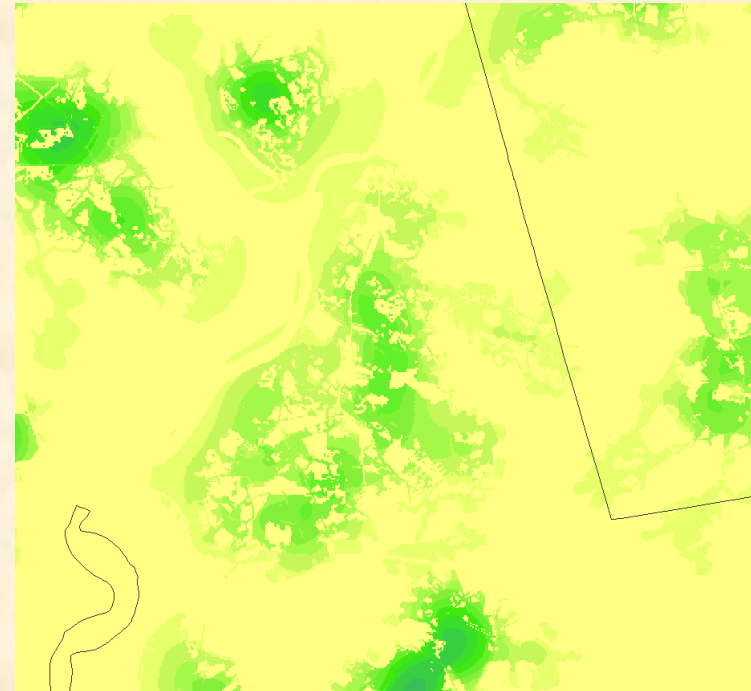North Atlantic Landscape Conservation Cooperative

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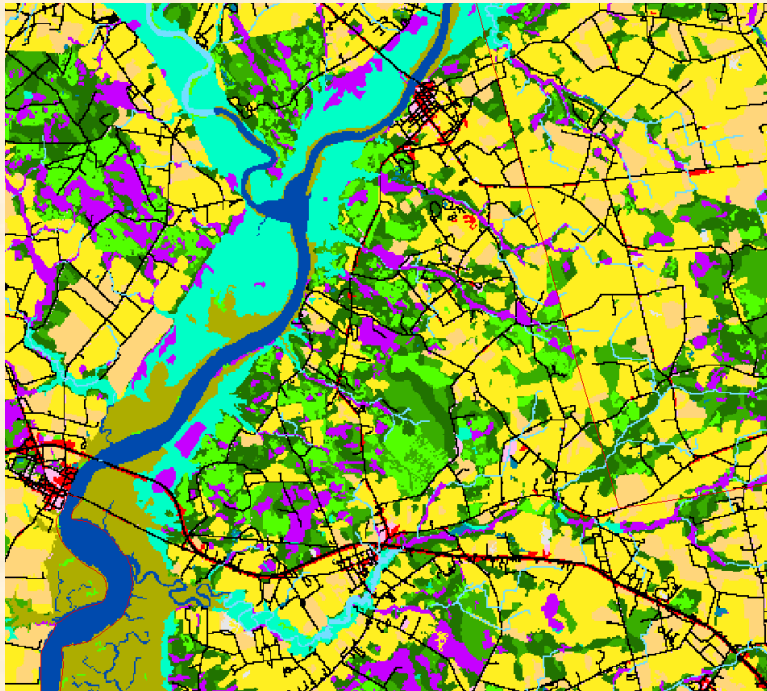Red = developed

Land cover

Red-shouldered Hawk capability

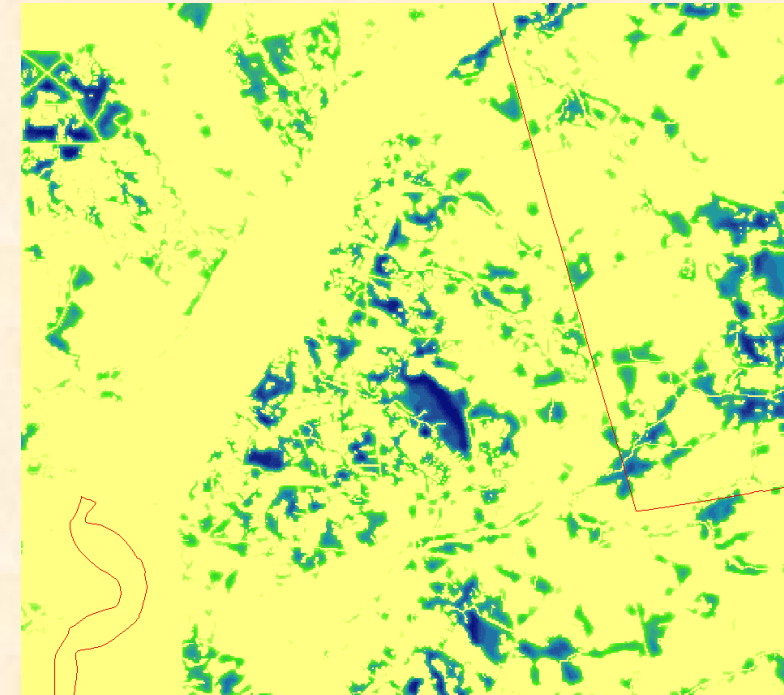**North Atlantic Landscape Conservation Cooperative**

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Land cover

Wood Thrush habitat capability

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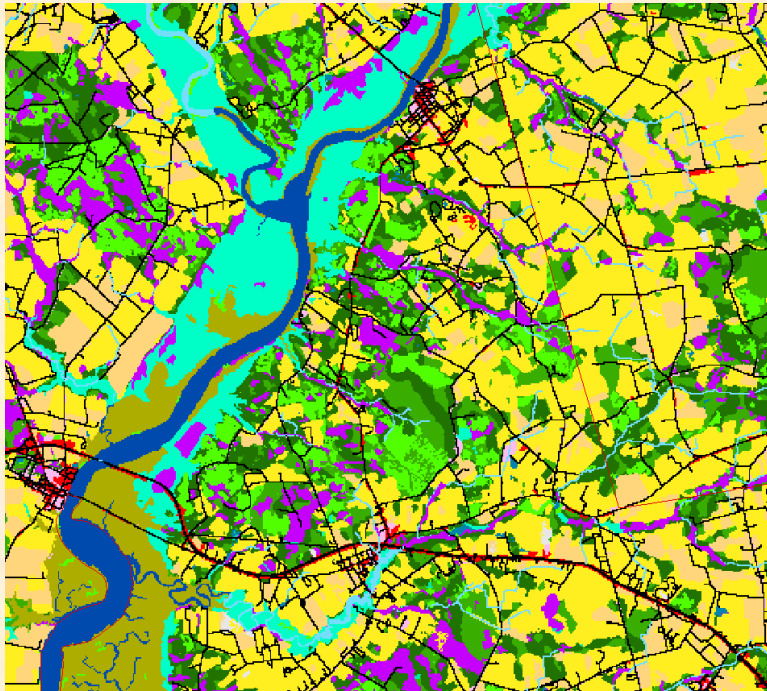Red = developed

Land cover

Louisiana W. habitat capability

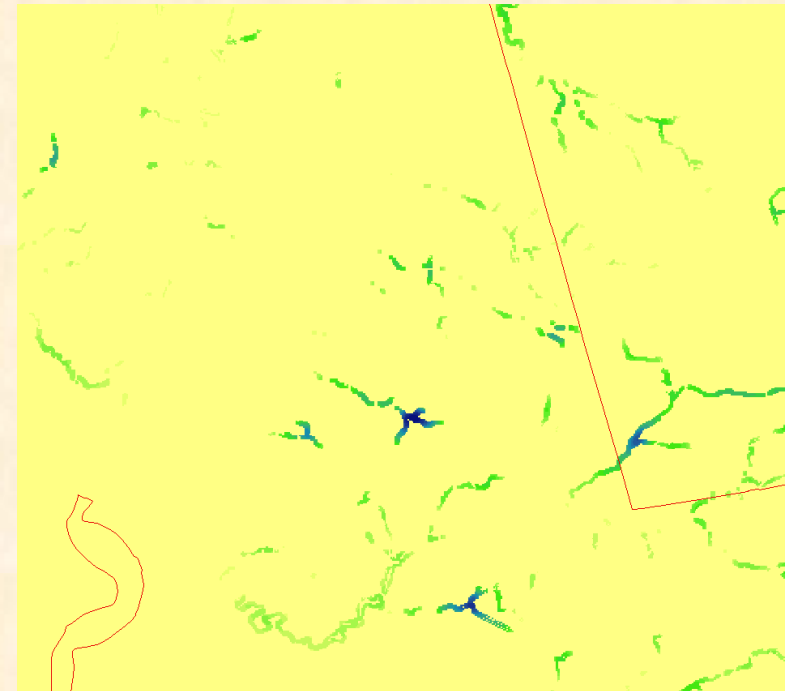**North Atlantic** 🌾 **Landscape Conservation Cooperative**

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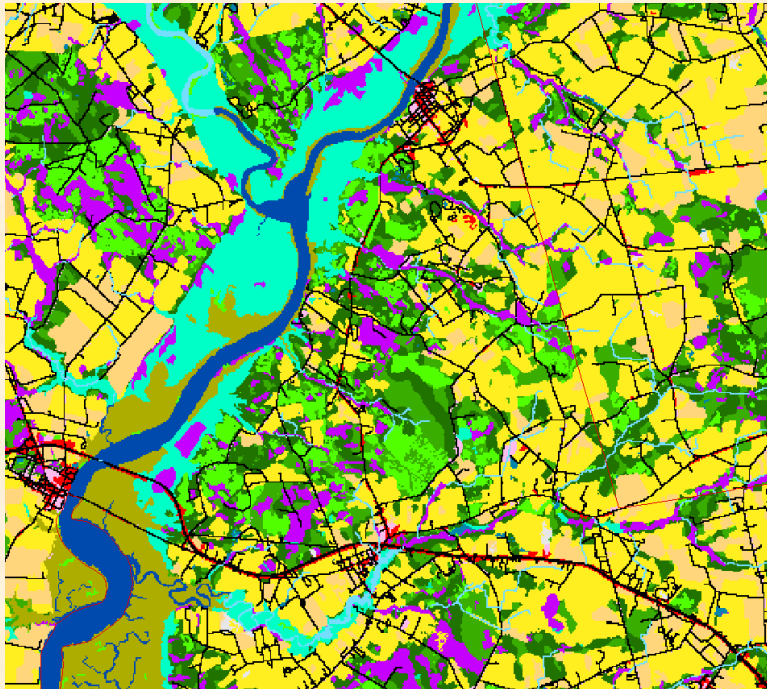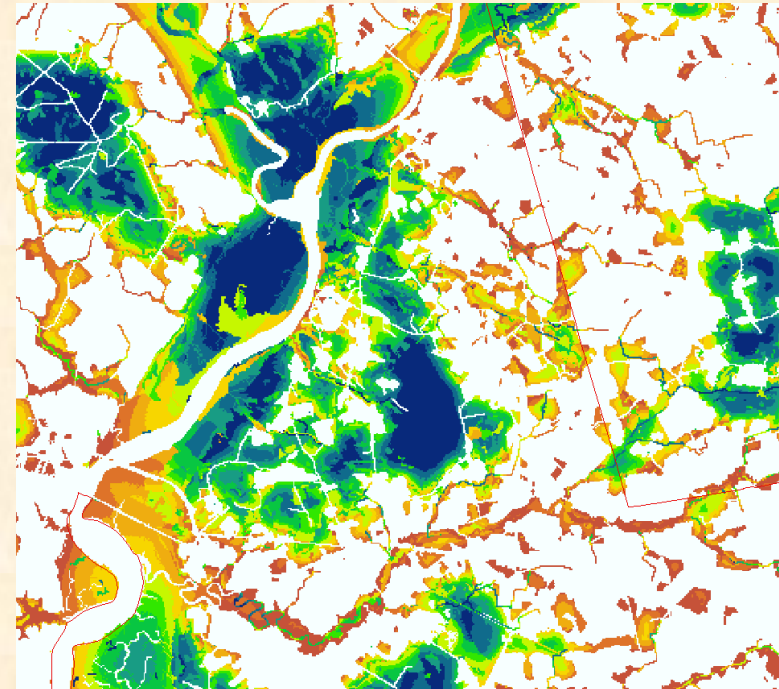Red = developed

Land cover

Index of ecological integrity

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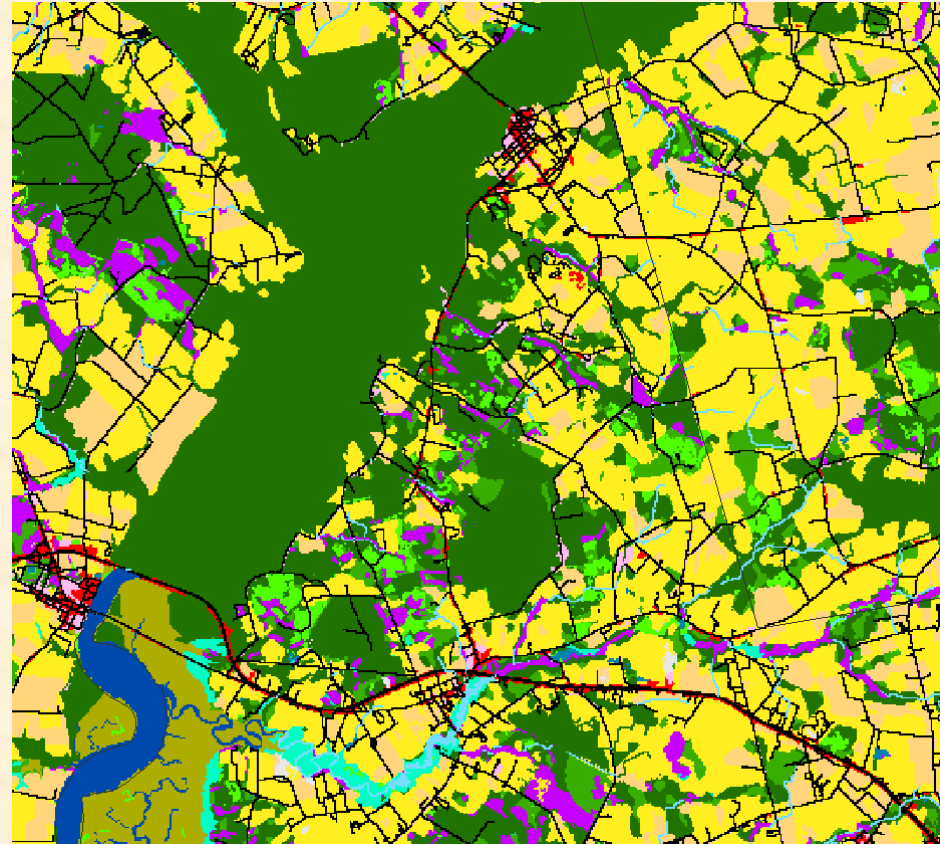
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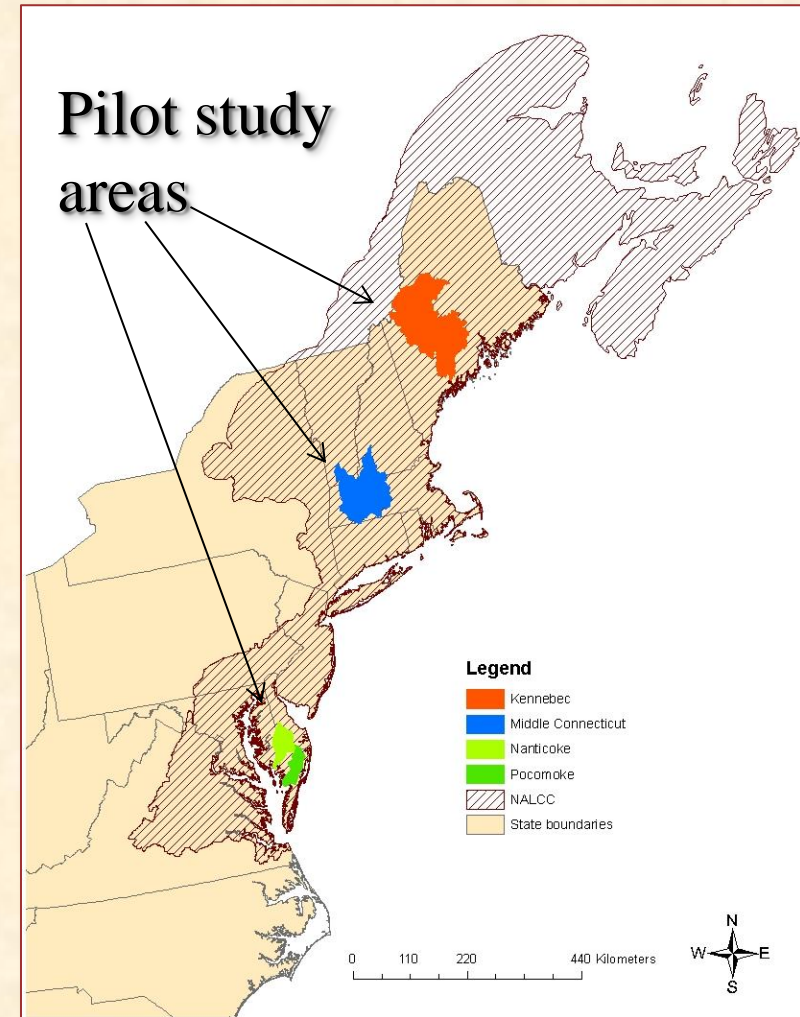Zoomed in example: Nanticoke River on the MD-DE border

Hypothetical Example –

Dark green = areas of high ecological integrity *and* habitat for representative species

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Engaging Managers in Designing DSTs

Three workshops, October 2012:

- Increase understanding among conservation decision makers
- Actively involve potential users to make decision support tools relevant and useful
- Begin a long-term collaboration on shared conservation issues across a broad landscape

Pilot study areas

Legend

- Kennebec
- Middle Connecticut
- Nanticoke
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0   110   220   440 Kilometers

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- **Project website:**

www.umass.edu/landeco/research/nalcc/nalcc.html

Links to documents:
- **Overview**
- **Technical docs**

Feedback:
- **Manager online survey**

- **Personal contact:**

mcgarigalk@eco.umass.edu

413-577-0655

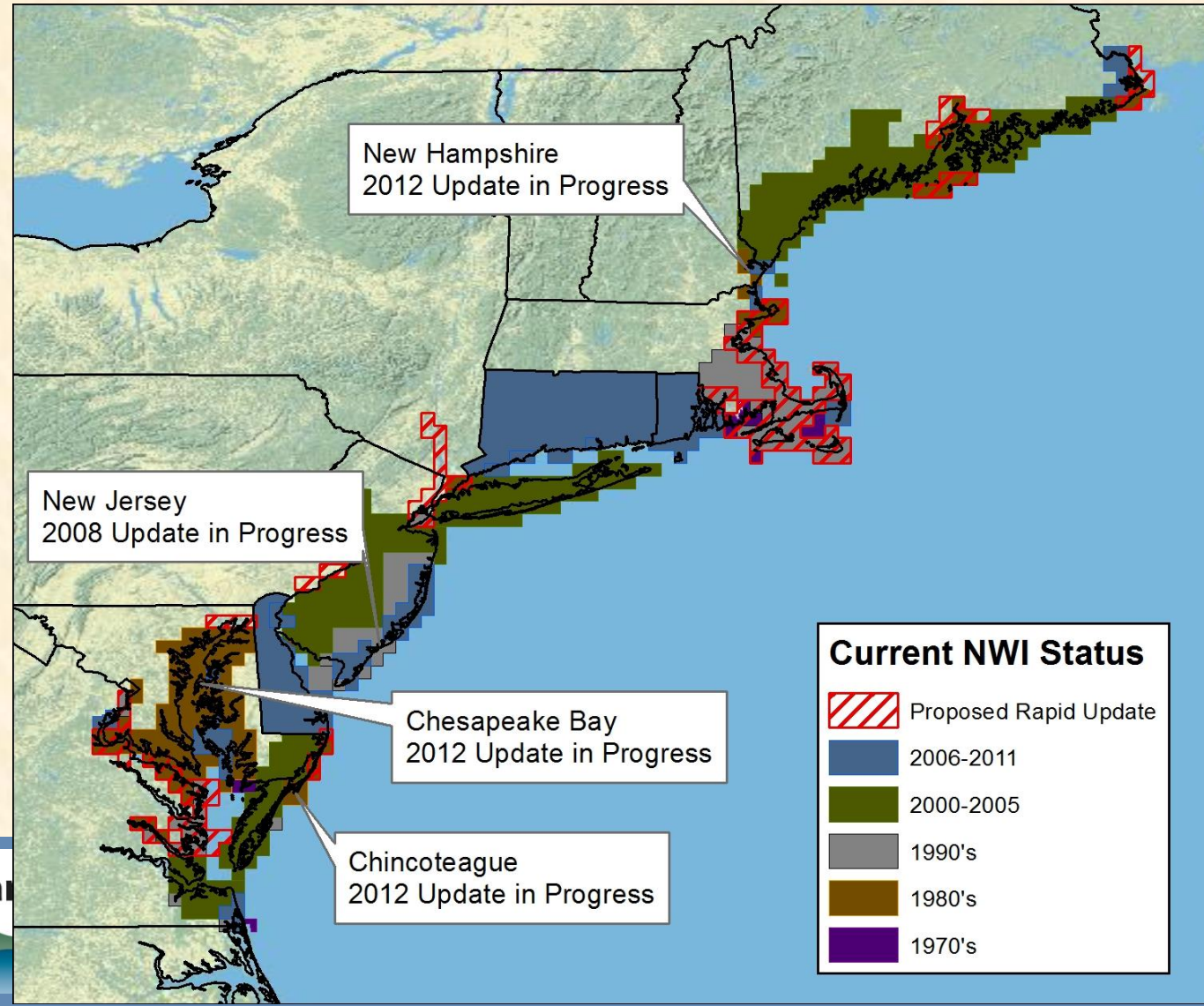North Atlantic Landscape Conservation Cooperative

Representative Species: One Tool in Landscape-scale Assessment Toolbox

- Species-habitat based approaches

  - Consistent habitat maps

  - Species-habitat models

  - Projections of changes to habitats and capability of supporting populations

- Coarse Filter/Ecological integrity (current and future)

- Rare or unique species and natural communities

- Geophysical approaches to resiliency (TNC)
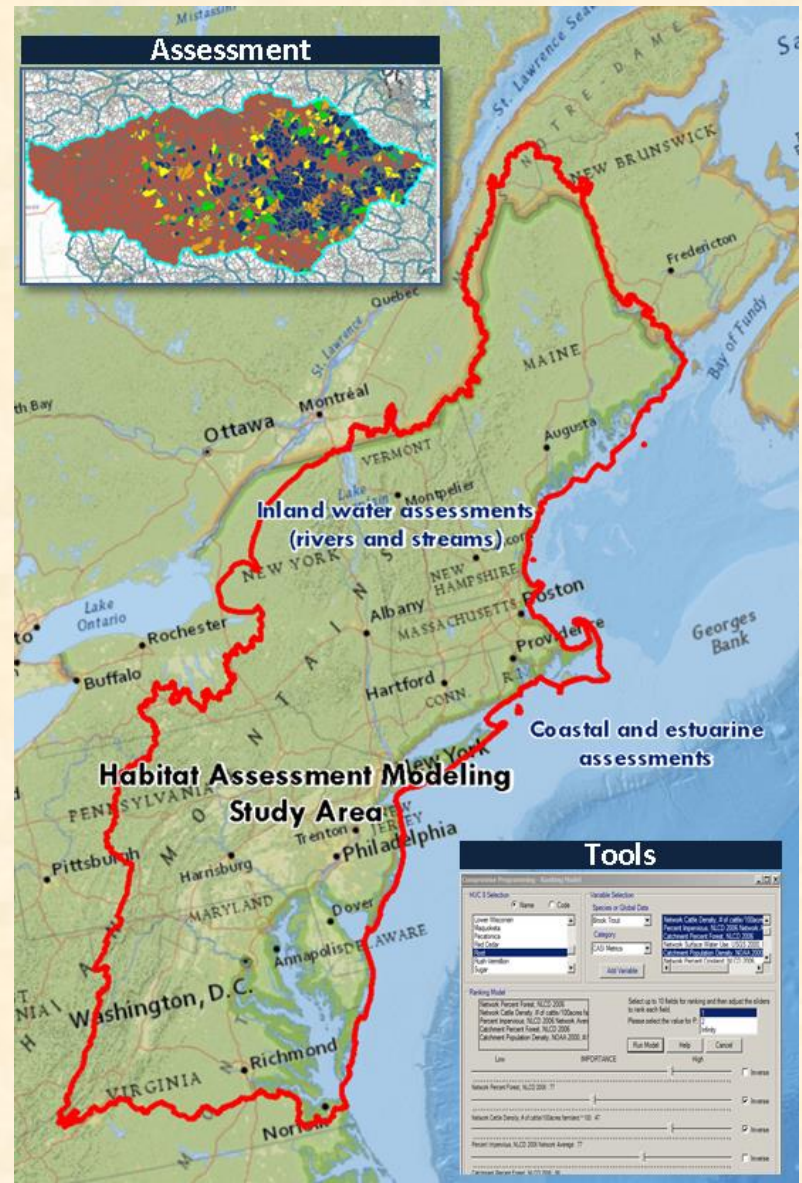
- Species and habitat vulnerability assessments

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Another North Atlantic LCC project: Update of NWI Coastal Wetland Quads

Conservation Management Institute at Virginia Tech

New Hampshire
2012 Update in Progress

New Jersey
2008 Update in Progress

Chesapeake Bay
2012 Update in Progress

Chincoteague
2012 Update in Progress

Current NWI Status

Proposed Rapid Update

2006-2011

2000-2005
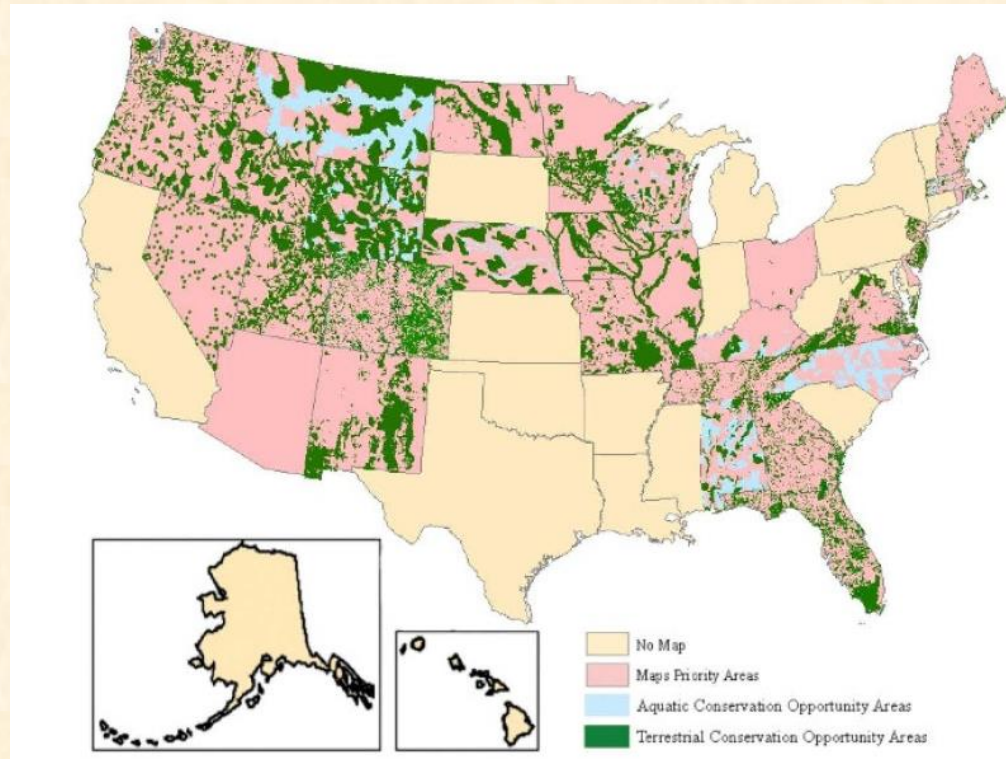
1990's

1980's

1970's

North Atlan

Aquatic counterpart to *Designing Sustainable Landscapes*

Downstream Strategies: Decision support tool to assess aquatic habitats and threats in North Atlantic watersheds and estuaries (with Atlantic Coastal Fish Habitat Partnership)

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One Possible Vision - Contribute to an Emerging Habitat Network

No Map
Maps Priority Areas
Aquatic Conservation Opportunity Areas
Terrestrial Conservation Opportunity Areas

- As recommended by the Wildlife Habitat Policy Research Program
- 2012 focus for North Atlantic LCC: supporting regional component of Northeastern State Wildlife Action Plans

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Acknowledgements

Thanks to our many investigators, their students and staff, and our partners

www.northatlanticlcc.org

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