



LCC Information and Tools for Conservation Planning and Design in the Northeast Region

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Chesapeake Bay Program

Scientific, Technical Assessment & Reporting Team
May 26, 2016

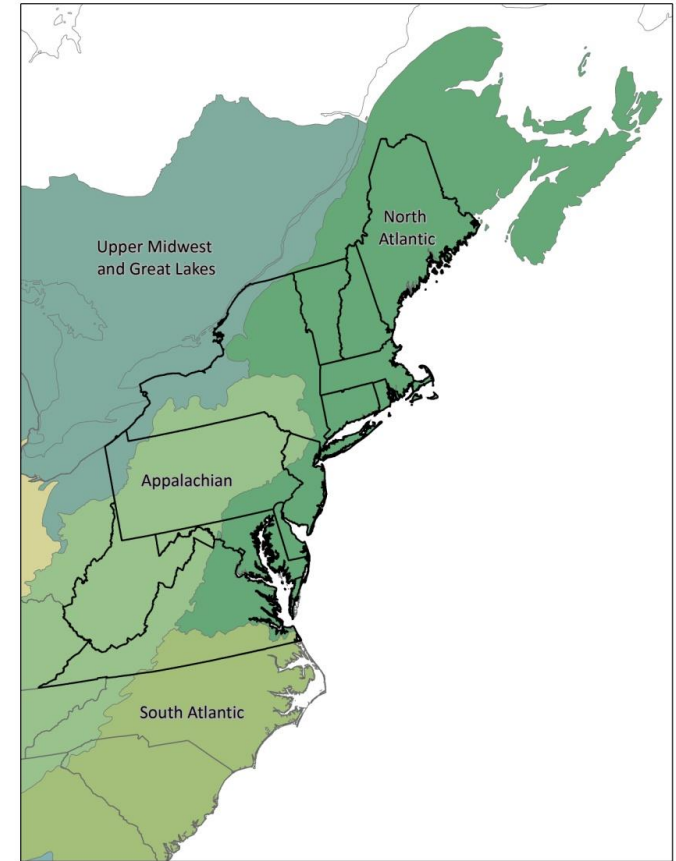


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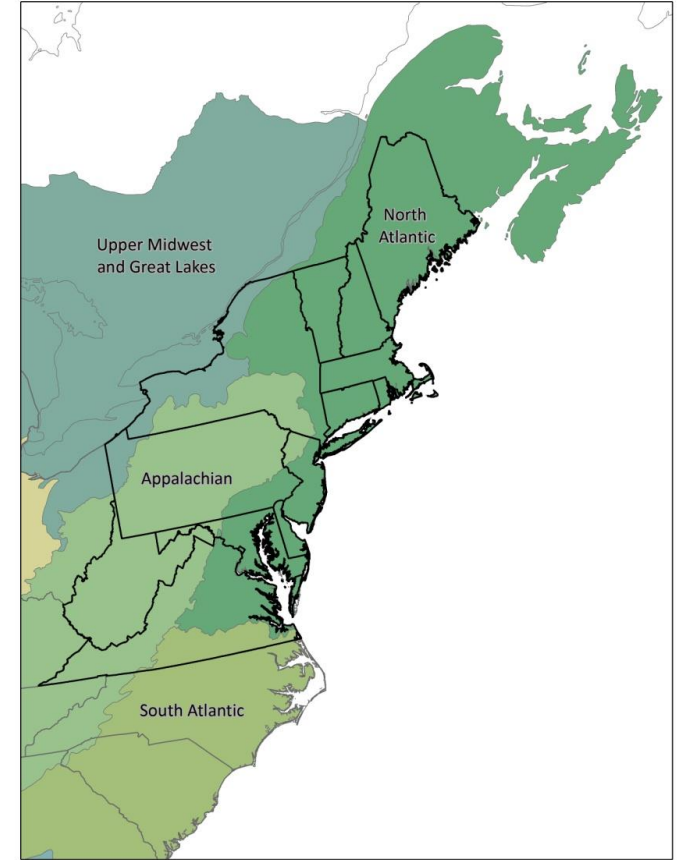
North Atlantic LCC

- 12 states + D.C.
- 4 Canadian provinces
- 15 Tribes
- Multiple partners & partnerships
- Diverse land use
- Predominantly private lands
- Diverse systems/habitats
 - Marine
 - Coastal
 - Riverine
 - Forests
 - Agriculture
 - Mountains



North Atlantic LCC – Mission

...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.

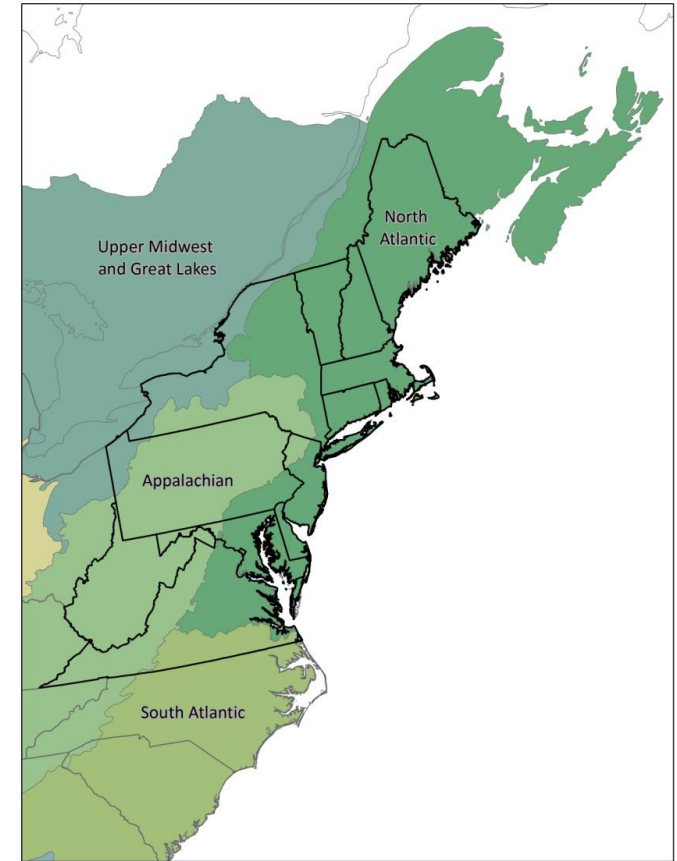
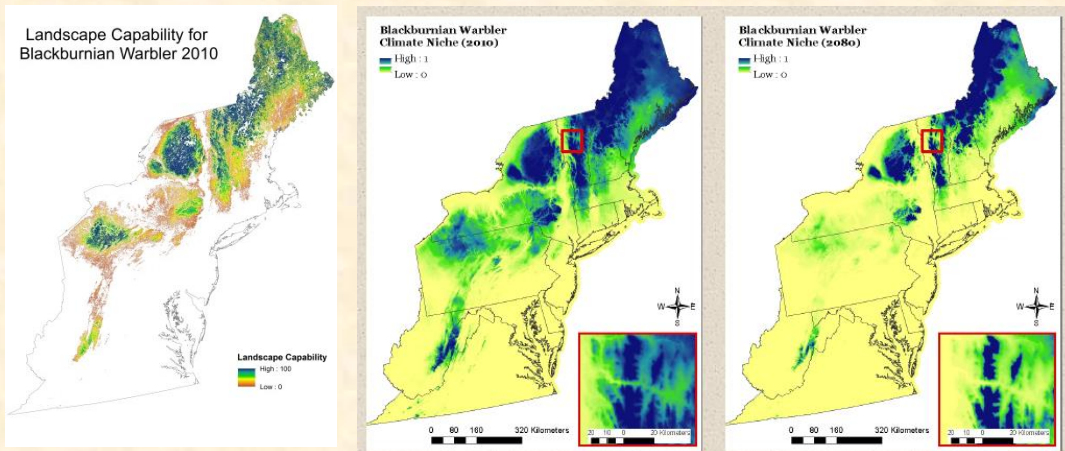


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North Atlantic LCC

- Developing and delivering scientific information and tools
- For partners to prioritize and guide conservation actions toward common goals



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LCC Science Projects

- Nearly 30 completed or ongoing science projects providing **foundational data, assessments and decision support** for terrestrial, aquatic and coastal systems
- Projects and Products tabs of LCC website

The image shows two screenshots of the North Atlantic Landscape Conservation Cooperative (NALCC) website. The top screenshot shows the 'Projects' tab highlighted with a red circle. The bottom screenshot shows the 'Products' tab highlighted with a red circle. Both screenshots show the website's navigation bar, search bar, and main content area. The top screenshot also shows a '2015 RFPs' section and a 'Featured Projects' section. The bottom screenshot shows a 'Search Results' section for 'Brook Trout in the Chesapeake Bay Watershed: On-line Decision Support Tool to Assess Current and Future Habitat'.

North Atlantic Landscape Conservation Cooperative

Home Who We Are Spatial Data **Projects** Products Work Spaces News & Events

Search Site only in current section

Companion Sites REGISTER LOG IN

You are here: Home / Projects

Projects

This area describes conservation science projects sponsored by the North Atlantic LCC, and other regional partners, that contribute regional-scale scientific information to aid decision makers who are working to sustain natural and cultural resources, including fish and wildlife populations.

2015 RFPs

The North Atlantic LCC is pleased to announce the grant awardees under the 2015 NALCC Priority Science Program.

TOPIC 1: Consistent Assessment of River Corridor and Floodplain Ecosystems and Cultural Resources Vulnerable to Flooding. Awarded to Drs. Christian Hatch and John Gertner.

FEATURED PROJECTS

Forecasting Changes in Aquatic Systems and Resilience of Brook Trout

The objective of this project is to develop tools to assist managers in protecting and restoring streams for brook trout and other aquatic resources in the face of threats such as climate change and development. The project includes developing stream temperature, stream flow, and brook trout occurrence models for headwaters of the Northeast, including projections of the potential effects of climate change. The investigators are working closely with decision makers such as state water resource agencies to ensure the tools are useful.

Search Results

Sort by: ☒ Alphabetical ☐ Most recent ☐ Oldest first

Brook Trout in the Chesapeake Bay Watershed: On-line Decision Support Tool to Assess Current and Future Habitat

To effectively manage vital freshwater resources across large geographic areas, resource managers need the capacity to assess the status of aquatic species, their habitats, and the threats they face. This on-line decision support tool provides that capability for Eastern brook trout across the Chesapeake Bay watershed. The tool allows users to characterize current and potential future aquatic conditions, target and prescribe restoration and conservation actions, set strategic priorities, evaluate management efforts, and support science-based

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How Projects and Products Fit Together

- These **science projects and their resulting products** fit together and build towards information, tools and capacity needed to make more informed conservation decisions. The projects include those that develop:
 - **foundational information** providing the basis for assessing condition of and threats to priority resources;
 - **assessments** of the condition, major threats and vulnerabilities to these resources; and
 - **decision support tools** including conservation designs that use the foundational information and assessments to help partners prioritize and decide how much of what conservation actions are needed where to sustain these resources
- **Science delivery** projects make information and tools available, understood and used by decision makers and demonstrate their applications.



Regional Information on Data Basin

Resource Category	# of Datasets
Climate change	65
Terrestrial	53
Aquatic	19
Coastal and marine	36
Conservation Design	59
TOTAL	232

North Atlantic Landscape Conservation Cooperative
Conservation Planning Atlas

Search North Atlantic LCC CPA
search by geography
powered by DATA BASIN

Get Started Browse Create My Workspace

What is the North Atlantic LCC Conservation Planning Atlas (CPA)?

What is the North Atlantic LCC?

What can I do?

How do I start exploring?

The North Atlantic LCC Conservation Planning Atlas is a platform for easy access to high-quality geospatial datasets, maps and information to facilitate partner-driven conservation.

[Learn more](http://nalcc.databasin.org)

nalcc.databasin.org

Get started quickly with the North Atlantic LCC Conservation Planning Atlas [Take a Tour](#)

North Atlantic LCC Galleries...

Terrestrial

Aquatic

Coastal and Marine

Recommended Items

Gallery
Chesapeake Bay region sea-level rise modelling

Dataset
USGS National Land Cover Database (2006, 2001, 1992)

Map
Northeast Terrestrial Habitat and Secured Lands Map

Dataset
Northeast Secured Lands 2011 Gap Status 1 and 2 only

Northeast Terrestrial Habitat and Secured Lands Map

This is a pilot map for the North Atlantic LCC to begin using DataBasin.

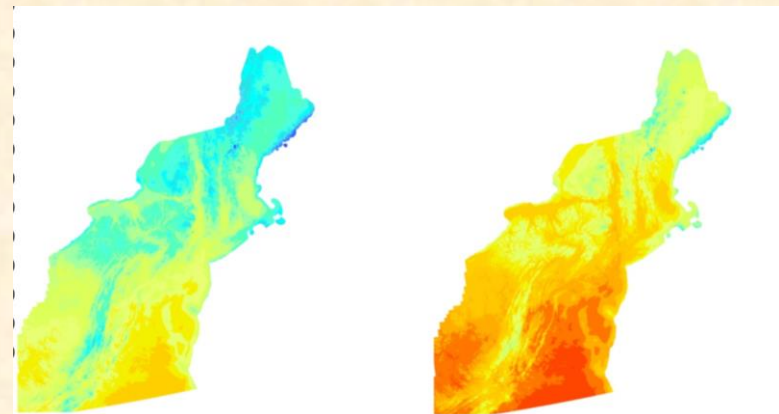
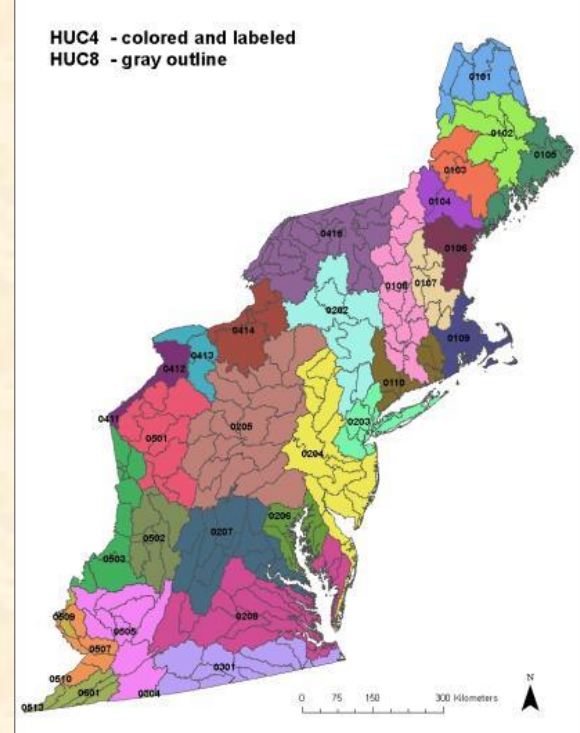


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Multiple Scales of Conservation Planning

- Spatial scales that match the decisions being made
- Ability to have scales inform each other
 - Regional context for watershed, state and local actions
- Plan based on both current and projected future conditions
 - Climate change
 - Urban growth



*Projected for 2010, RCP8.5

*Projected for 2080, RCP8.5

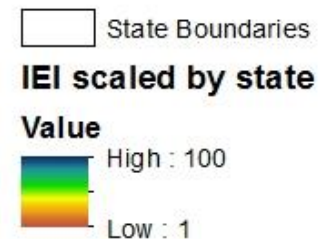
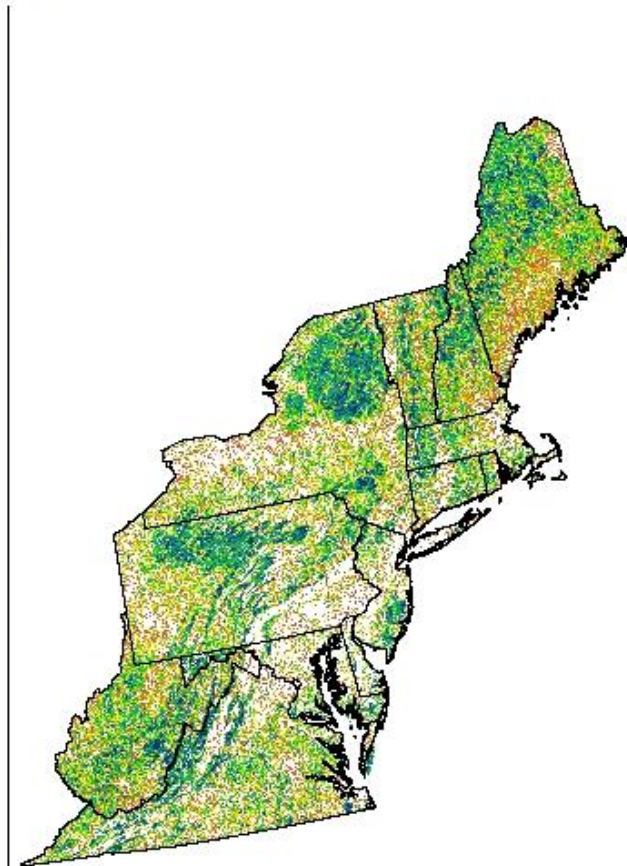
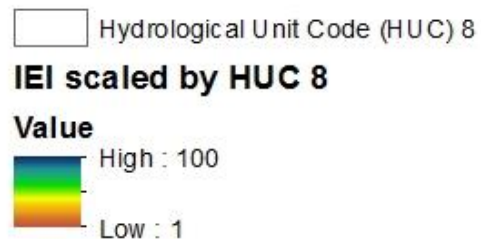
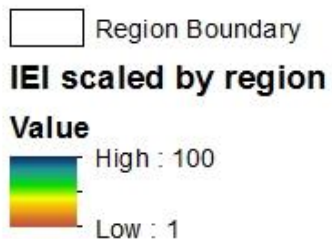
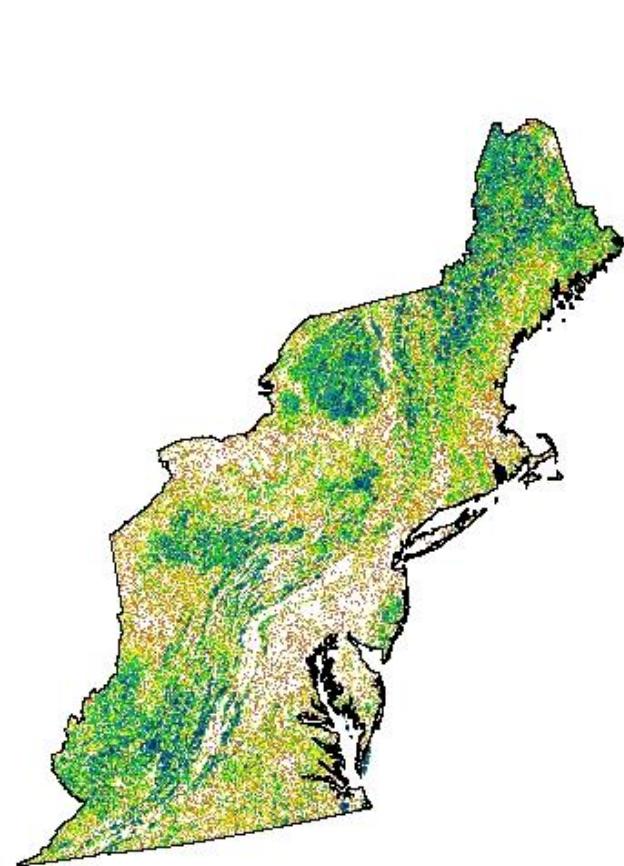
IPs are Representative Concentration Pathways of greenhouse gas concentration. Levels 4.5 and 8.5, respectively represent lower and higher levels of concentration, as within the IPCC 5th Assessment Report



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Regionally Consistent, Scalable Assessments



Resolution

- 30 meter cell resolution
- Works at regional and local scale
- Local knowledge and data can (and should) be added

Index of Ecological Integrity at Regional and Local Scales

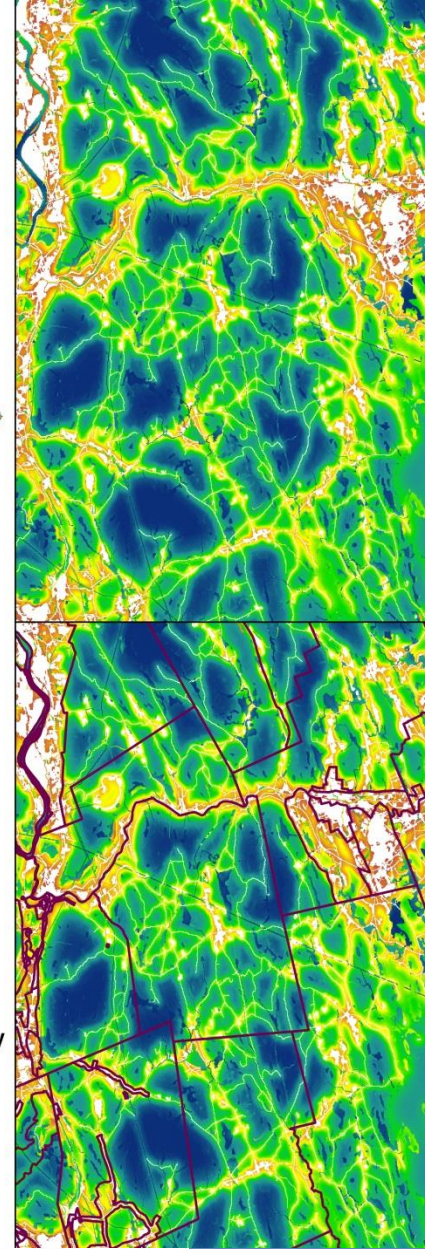


Index of Ecological Integrity

High : 100

Low : 1

Zoning

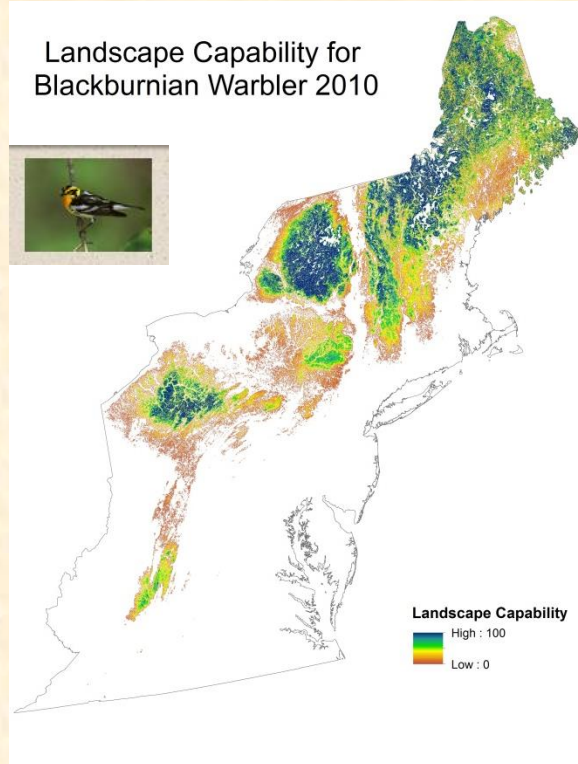


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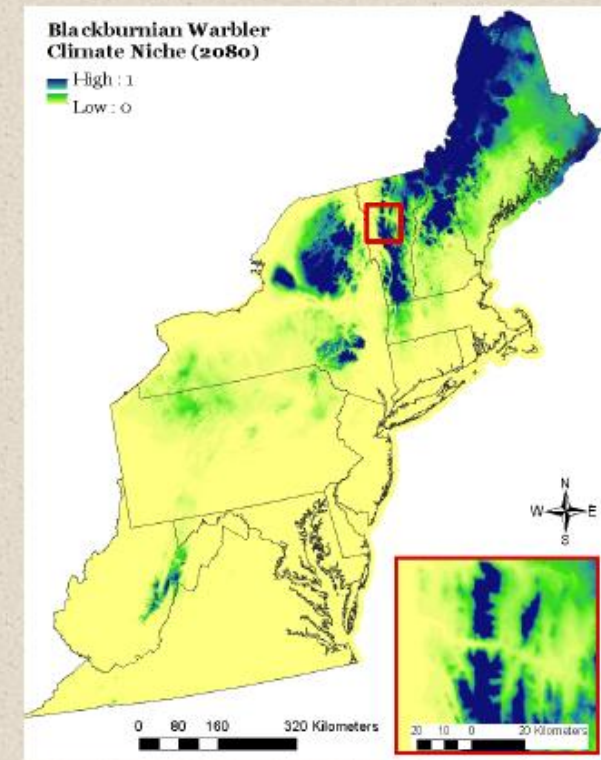
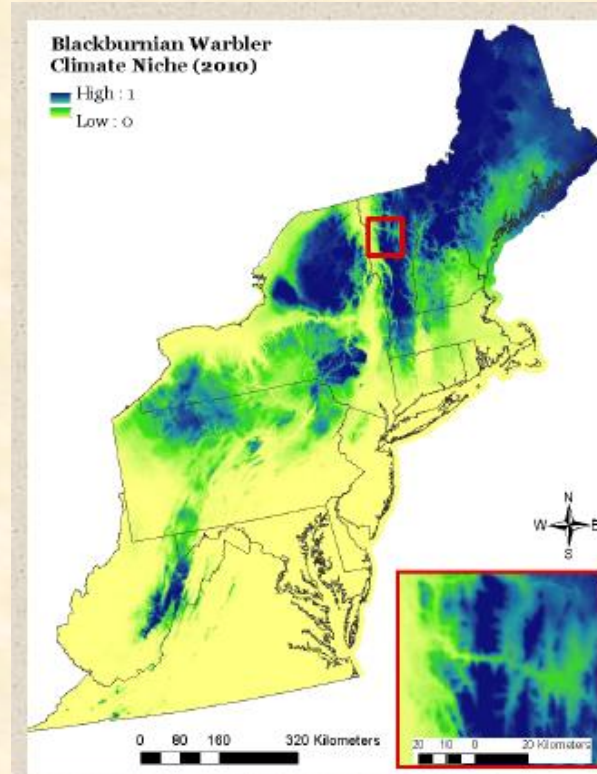


Assessments of Current and Future Conditions

Landscape Capability
Models based on species
distributions, habitat
associations, and stressors



Climate Suitability Models based on current and
projected humid temperate domain



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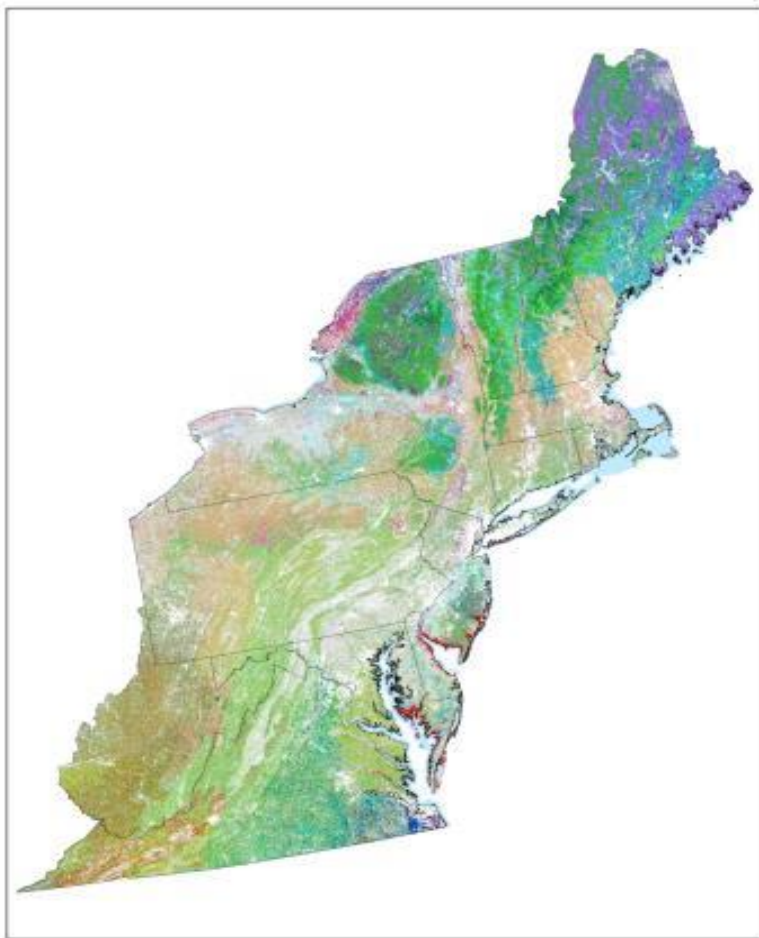
Key (conservation) Questions to be Answered by Landscape Conservation Information and Tools

- Where should we invest in **land protection**, and how much?
- How should we **manage** protected lands?
- Where should we invest in ecological **restoration**?
- Where should we focus **species protection and restoration**?
- Where and how should we influence local **land use / open space planning**?
- Where should **infrastructure** go to have least impact?



Regional Consistent Habitat Maps - Example

- Terrestrial Habitat Map
 - 130 Ecological Systems
- Aquatic Habitat Map
 - 23 lotic and 18 lentic systems
 - Detailed hydrography
- Updated NWI
- Development and roads



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Habitat Assessment: Ecological Integrity

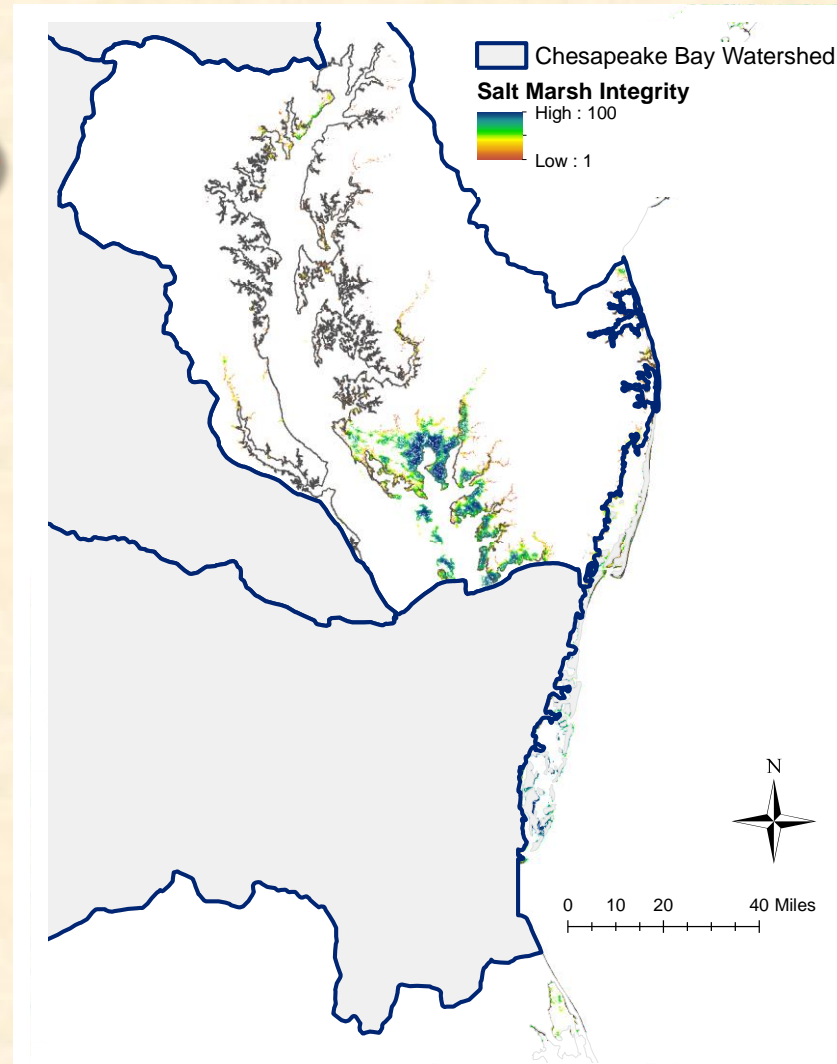
Intactness

Resiliency

Ecological
Integrity

- **Intactness**...freedom from human impairment (anthropogenic stressors)
- **Resiliency**...capacity to recover from or adapt to disturbance and stress

Assessed for each of the ecosystem types in Northeast Terrestrial & Aquatic Habitat Map

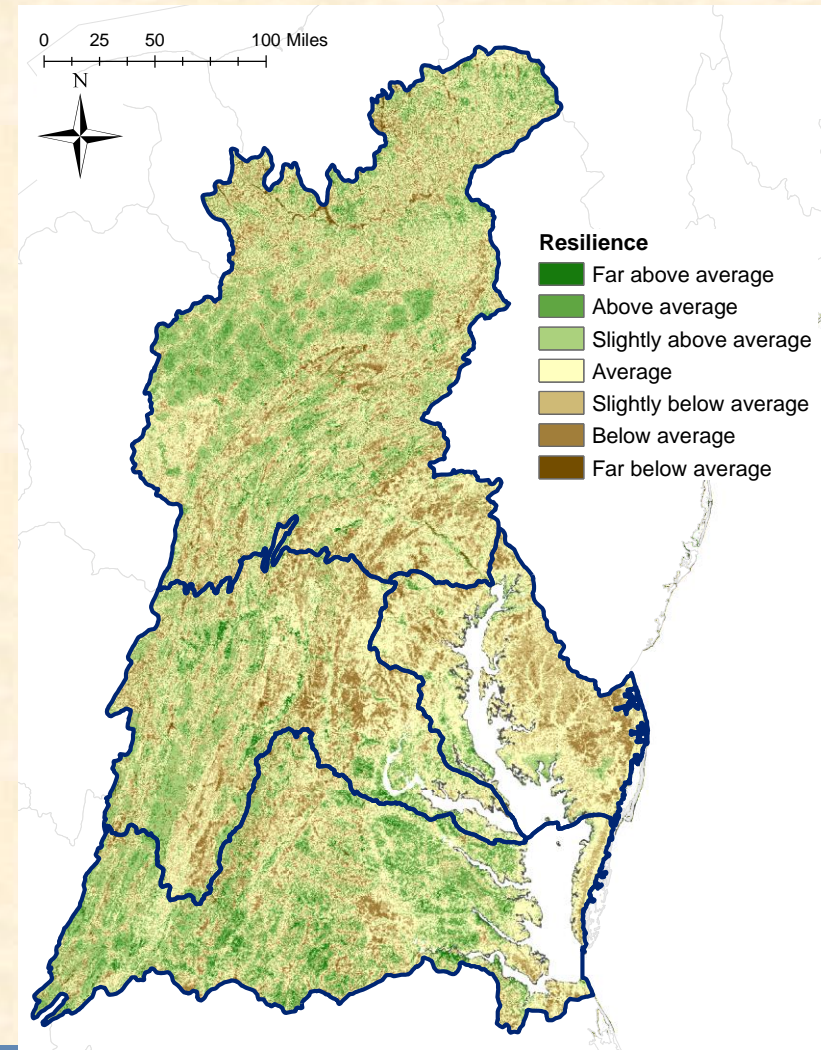


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Geophysical Assessment: Resiliency (TNC)

“Conserving the (geophysical) Stage” Approach

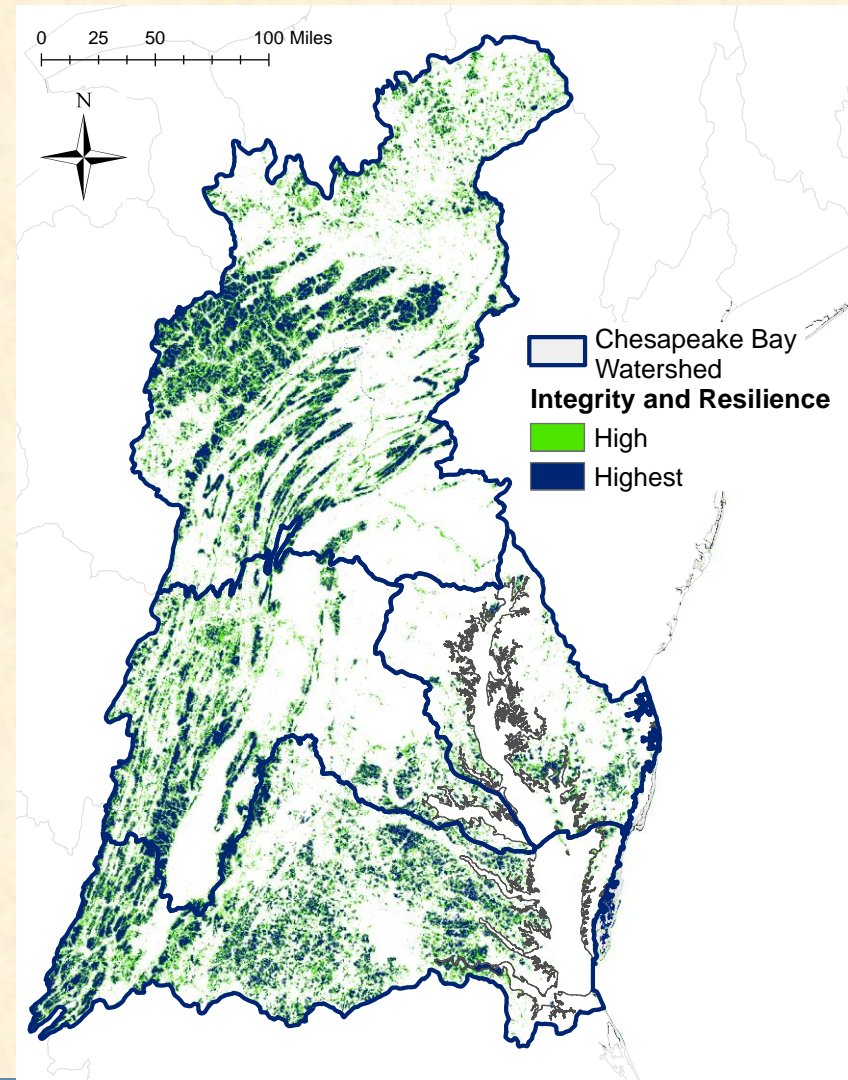


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Integral and Resilient Ecosystems

- Combination of Integrity and Resilience
- Intact areas representing all habitat types likely to be resilient in the short and long term



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Representative (Surrogate) Species



- Criteria:
 - Species typify lifecycle or habitat requirements for a larger group of species
 - All major ecosystem (habitat) types represented
 - Sensitivity to landscape change within focal region
 - Feasibility of monitoring & modeling



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30 Surrogate Species for Northeast





15 Surrogate Species Models for Conn. River watershed

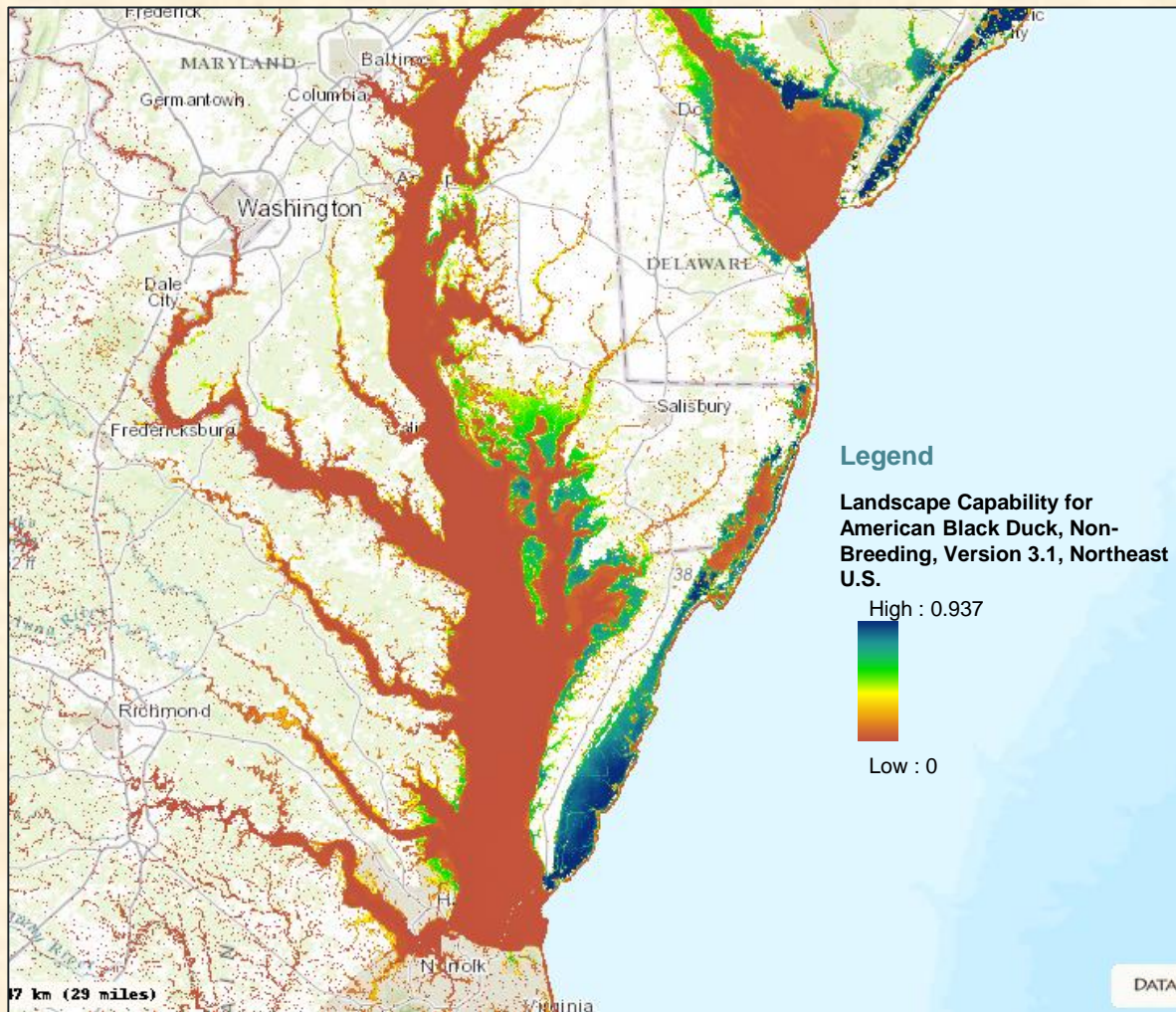


Ecosystem/Habitat Types	Initial Set of Species
Deciduous forest, mature	Wood Thrush
Deciduous forest, young	American Woodcock, Ruffed Grouse
Forest, large blocks	Black Bear
Mixed (coniferous) forest	Moose, Blackburnian Warbler
Spruce-fir forest	Blackpoll Warbler
Pine barrens (and young forest)	Prairie Warbler
Grasslands	Eastern Meadowlark
Riparian and floodplain forest	Louisiana Waterthrush
Forested wetlands	Northern Waterthrush, Wood Duck
Streams (+ associated uplands)	Brook Trout, Wood Turtle
Marshes	Marsh Wren



Representative Species Habitat Models

- American Black Duck, Non-Breeding
- Habitat and Climate Suitability

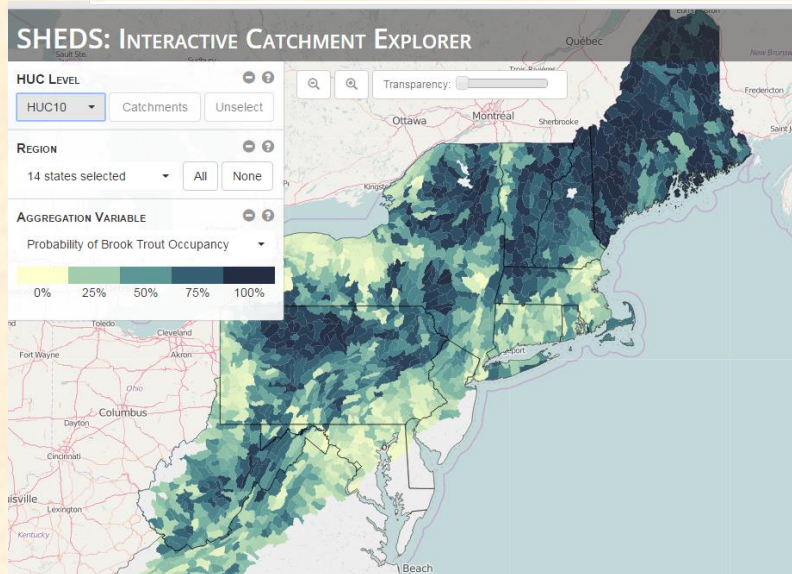


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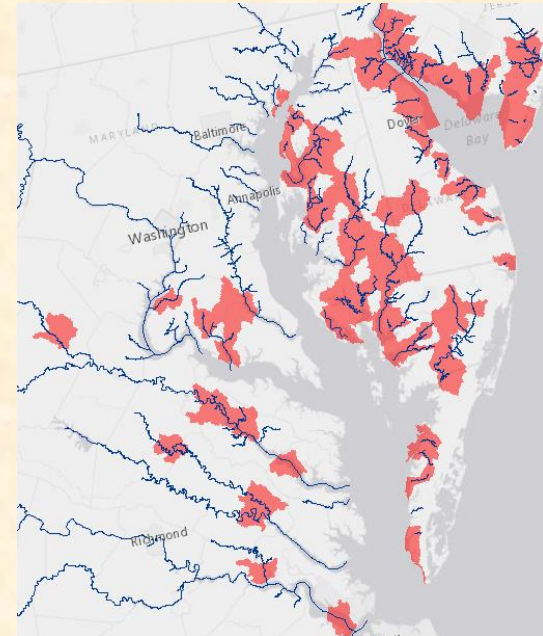
Aquatic Species Assessments and Models

Brook trout:
headwater
streams



Anadromous spp.

- Alewife
- American shad
- Blueback herring
- Shortnose sturgeon
- Atlantic Sturgeon



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Decision Support Tool Example

Ches. Bay Brook Trout Assessment

To support the management outcome of the
Chesapeake Bay Watershed Agreement:

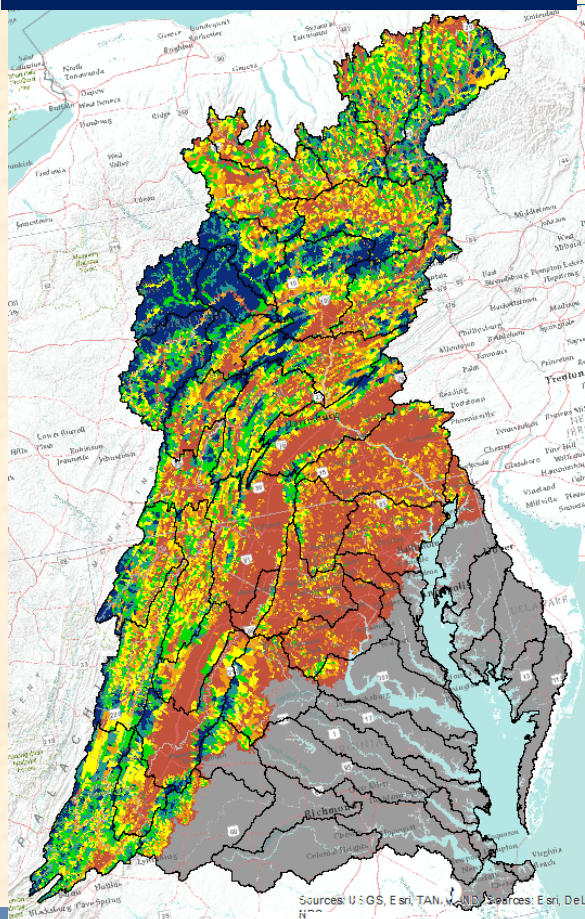
“Restore and sustain naturally reproducing brook trout populations in Chesapeake headwater streams with an eight percent increase in occupied habitat by 2025.”



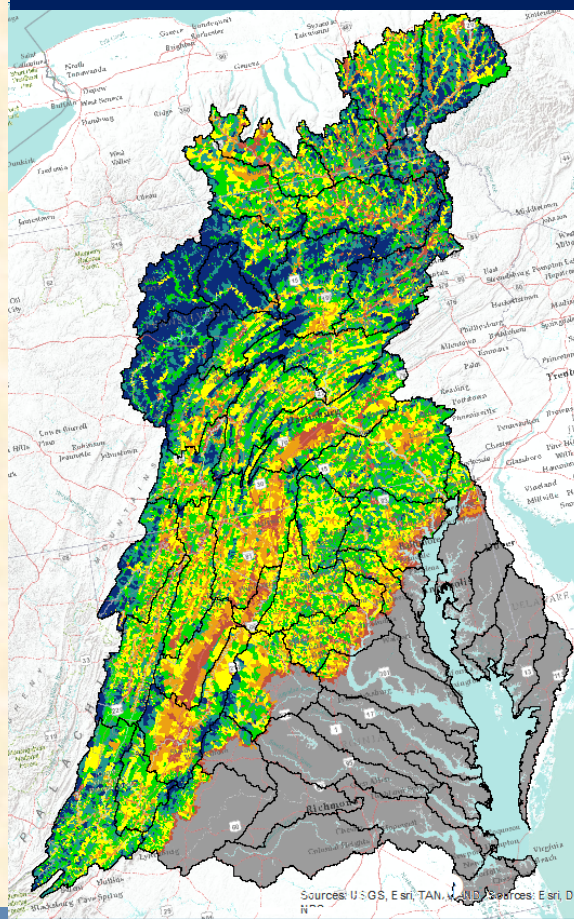
Decision Support Tool For Brook Trout

<http://www.fishhabitattool.org/>

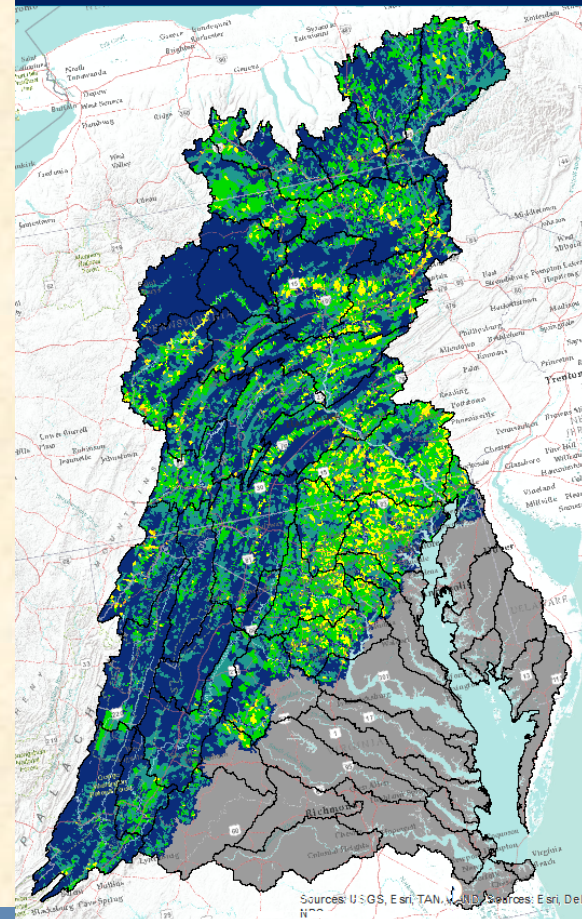
Brook Trout Current Condition



Natural Habitat Quality Index



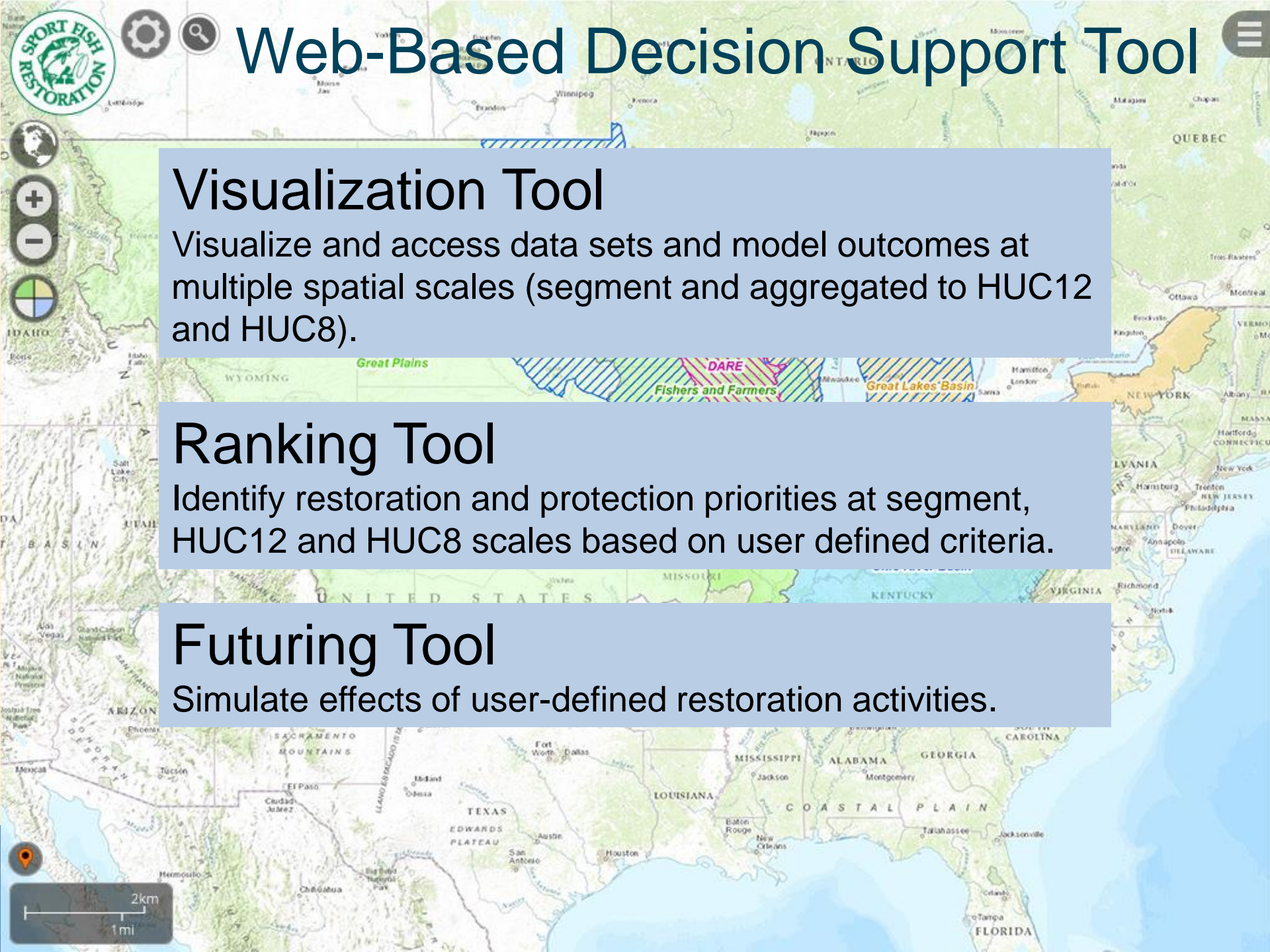
Anthropogenic Stress Index



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- Water temperature
- Slope
- Precipitation

- Impervious surface
- Agriculture
- Mining



Web-Based Decision Support Tool

Visualization Tool

Visualize and access data sets and model outcomes at multiple spatial scales (segment and aggregated to HUC12 and HUC8).

Ranking Tool

Identify restoration and protection priorities at segment, HUC12 and HUC8 scales based on user defined criteria.

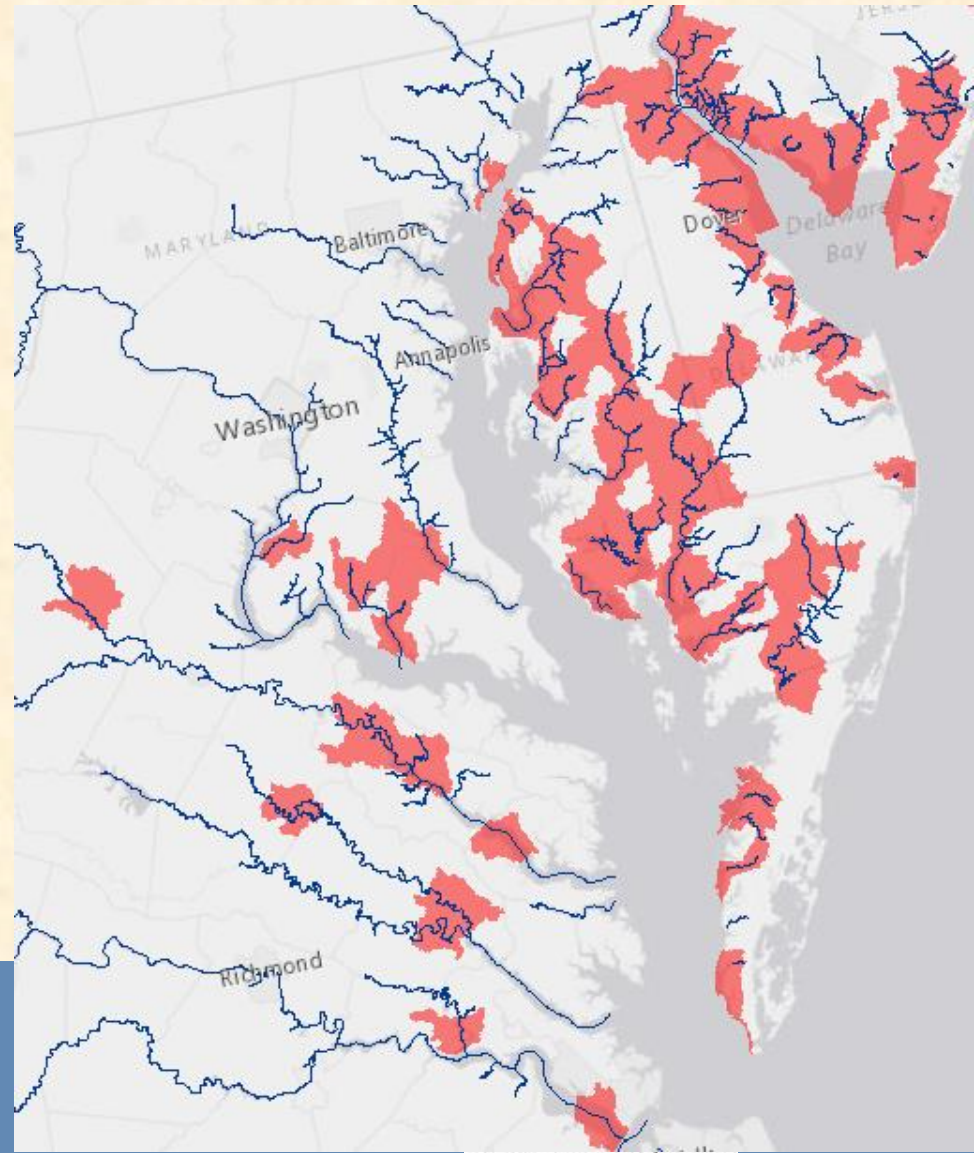
Futuring Tool

Simulate effects of user-defined restoration activities.

Decision Support Tool For River Herring

<http://www.fishhabitattool.org/>

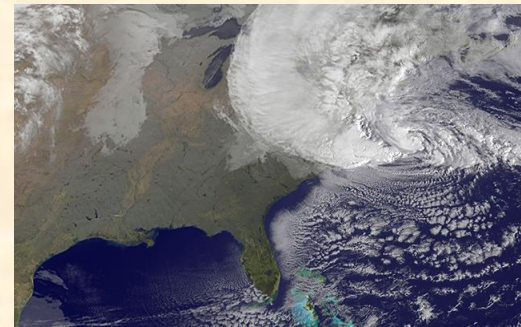
Assessment
developed by TNC
depicting top 5% of
habitat for river
herring (alewife and
blueback herring)



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Assessing Resiliency of Systems and Species to Storms and Sea Level Rise

- **Aquatic** Connectivity and Resiliency of Road Stream Crossings
- Increasing **Beach** Resiliency in the Face of Sea Level Rise and Storms
- Increasing **Tidal Marsh** Resiliency in the Face of Sea Level Rise & Storms



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North Atlantic Connectivity Collaborative

Assessing road-stream crossings to improve river and stream continuity across the North Atlantic U.S.



Products/Outcomes

- Regional network of practitioners
- Linking natural resources, transportation, emergency management sectors
- Standard road-stream crossing survey protocol and training
- Regional online database
- Support for targeted crossing assessments
- Tools to prioritize crossings for upgrade based on increasing ecological benefit and resiliency to floods



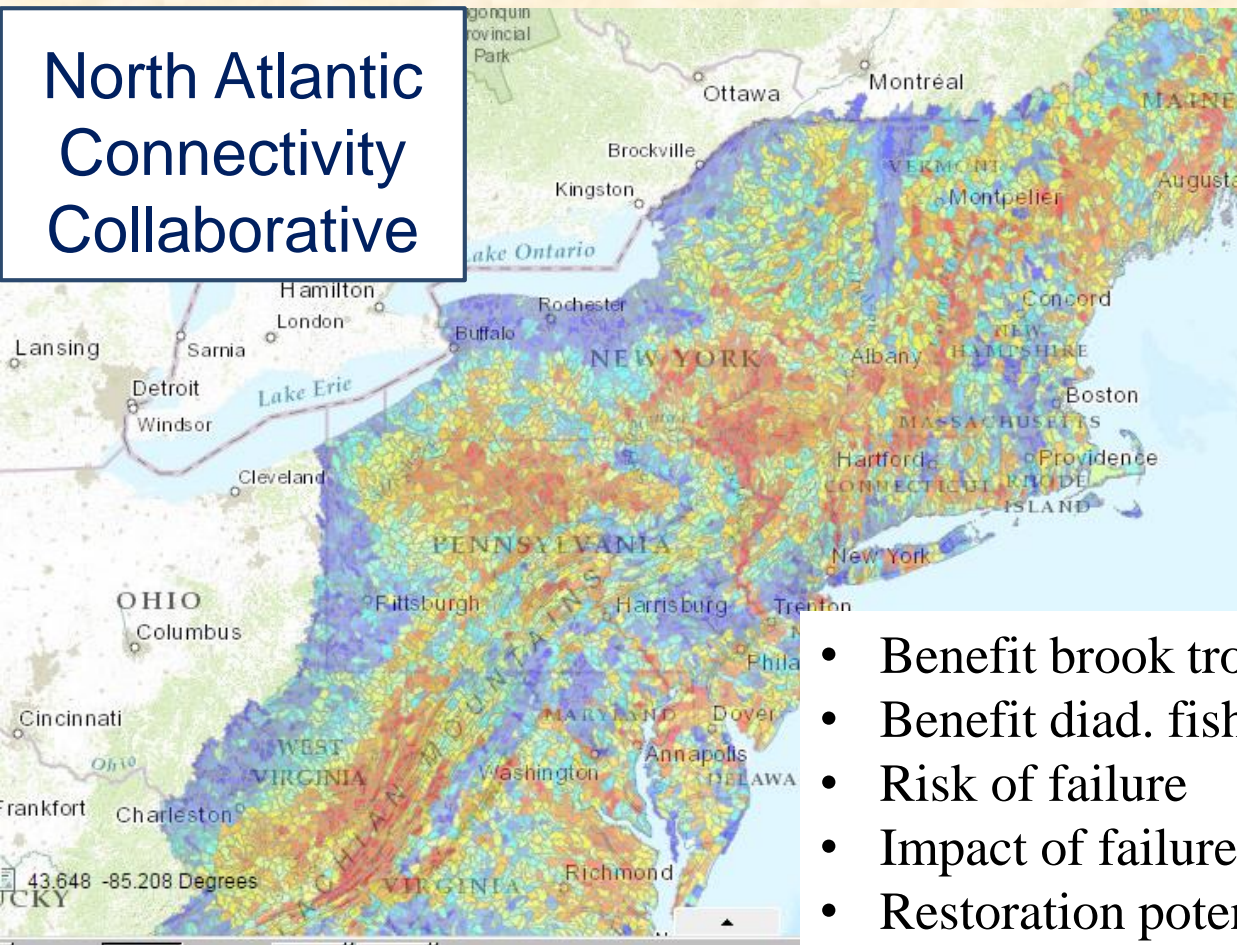
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Habitat Restoration:

Where should we focus effort to restore Aquatic Connectivity and Flood Resilience?

North Atlantic Connectivity Collaborative



- Benefit brook trout
- Benefit diad. fish
- Risk of failure
- Impact of failure
- Restoration potential

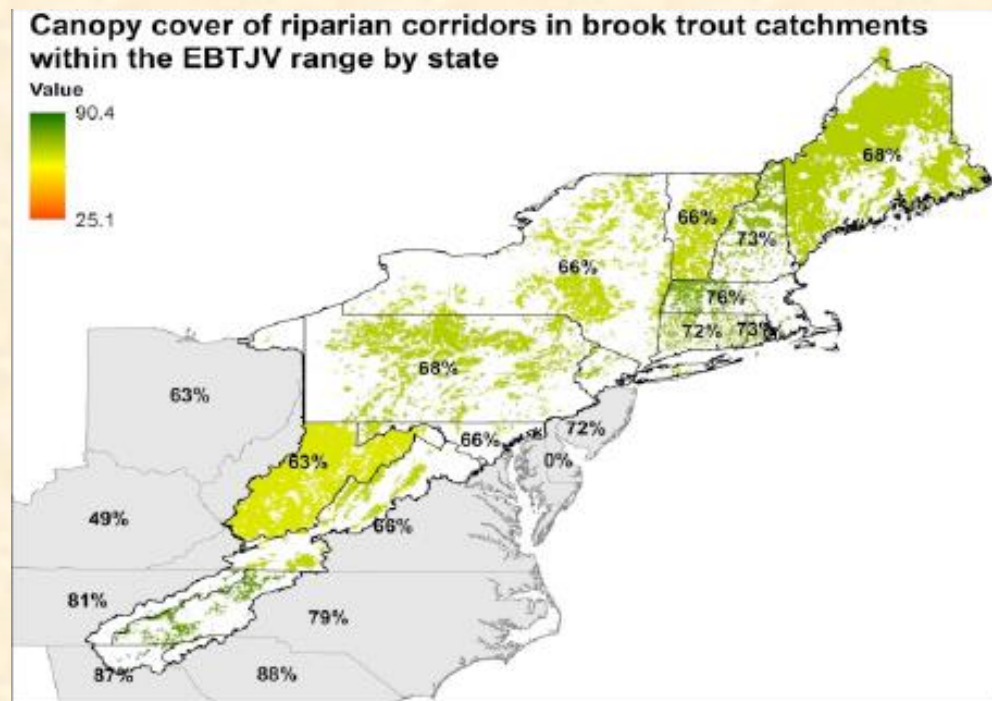


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Riparian Restoration Decision Support Tool

- Online tool works by identifying vulnerable stream and riverbanks that lack tree cover and shade in coldwater stream habitats to focus riparian restoration

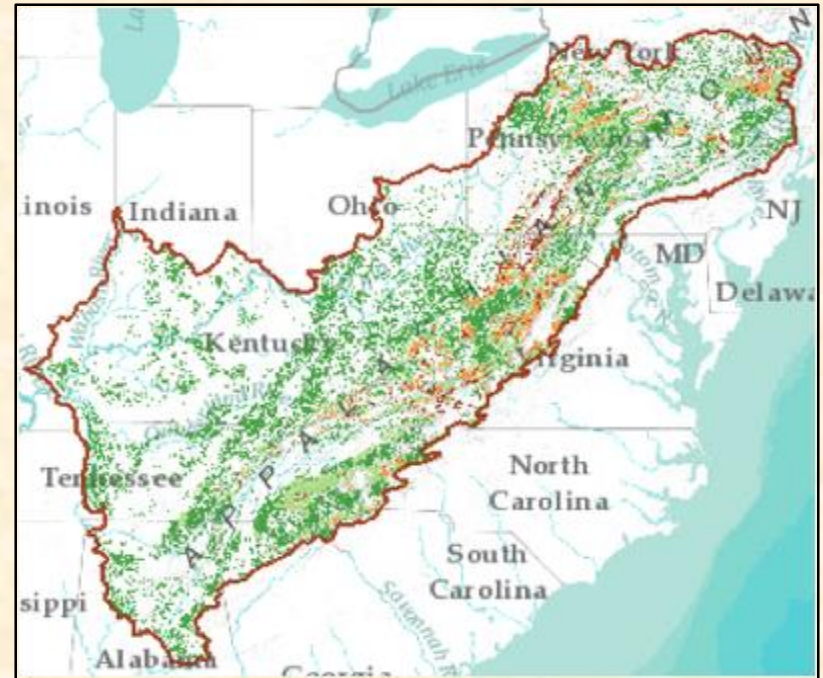


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Assessing Future Energy Development across the Appalachians

- Models of future development potentials for coal mining, gas drilling, and wind farm creation
- Web-based mapping tool with spatially explicit energy development projections

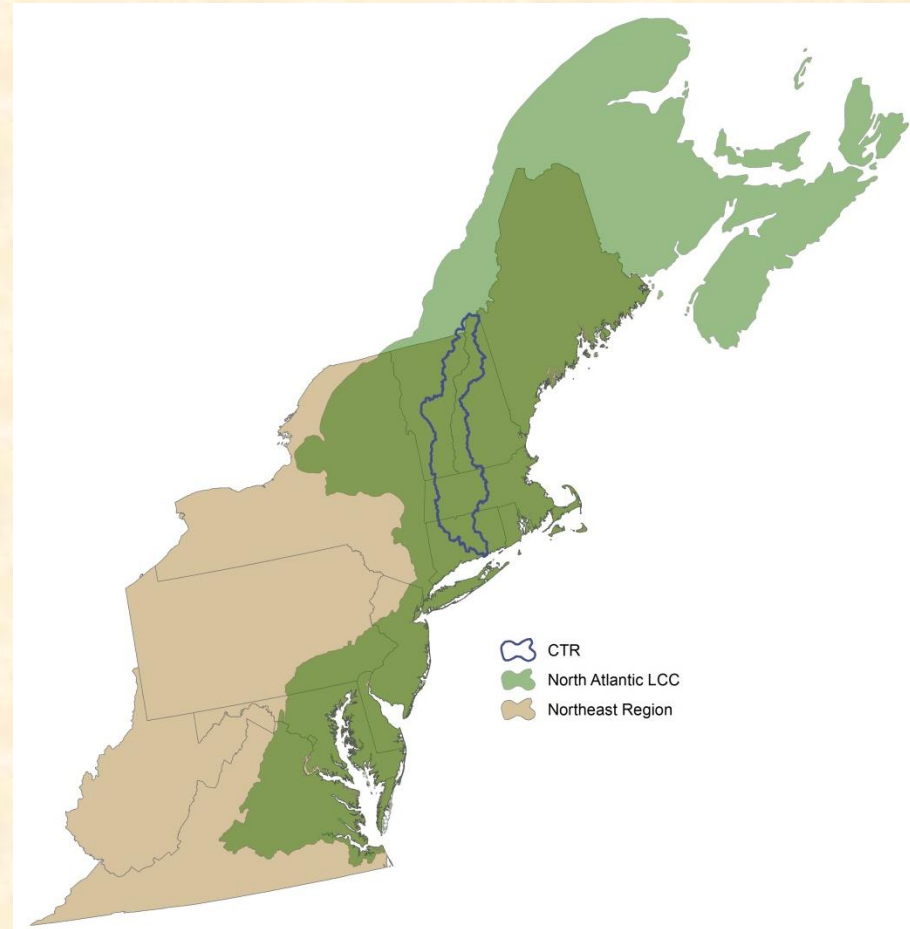


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Conservation Design in the North Atlantic LCC

- A planning process
 - a collaborative effort among partners, which includes agreeing on common priorities
- A set of products
 - spatial plans for conservation decisions in an adaptive framework



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NATIONAL *fish, wildlife & plants* CLIMATE ADAPTATION STRATEGY

Goal 1

Conserve habitat to support healthy fish, wildlife, and plant populations and ecosystem functions in a changing climate.

Strategy 1.1

Identify...an ecologically-connected network of terrestrial, freshwater, coastal, and marine conservation areas that are likely to be resilient to climate change and to support a broad range of fish, wildlife, and plants under changed conditions.

Action 1.1.1

Identify and map high priority areas for conservation using information such as **species distributions (current and projected), habitat classification, land cover, and geophysical settings** (including areas of rapid change and slow change).



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Chesapeake Conservation Partnership Goals

- Habitats: Protect a network of large natural areas and corridors sufficient to allow nature to respond to a changing climate and land development and to support thriving populations of native wildlife, migratory birds, fish and plants.



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Initial Strategy for Cons. Design

- Facilitate collaborative conservation designs at key scales to both support planning at those scales and apply lessons learned to future efforts
 - Initial **landscape scale** conservation designs is focused on in **large watersheds** or other similar scale ecoregions where there are **active partnerships** working with an initial pilot in the Connecticut River Watershed
 - Initial focus at the **regional scale** is a collaboration with state fish and wildlife agencies to support the development of **Regional Conservation Opportunity Areas** (RCOAs) for State Wildlife Action Plan Updates



Connecttheconnecticut.org

Connect the CONNECTICUT

A roadmap for conserving the Connecticut River
watershed for future generations



Our Approach

Developing a conservation design for the Connecticut River watershed



Our Science

Resources to support conservation decisions at multiple scales



Our Partners

The people and organizations behind Connect The Connecticut

What are we designing conservation for?

Inclusive view of biodiversity and natural resources

- Ecosystems [habitat types]
 - Including the functions they perform and services they provide
 - Ecological Integrity
 - Resiliency (“conserving the stage”)
 - Rare Natural Communities not captured
- Species
 - Species that represent the needs of others (surrogate species)
 - *Priority species not well-represented (e.g., rare) included at local scales*

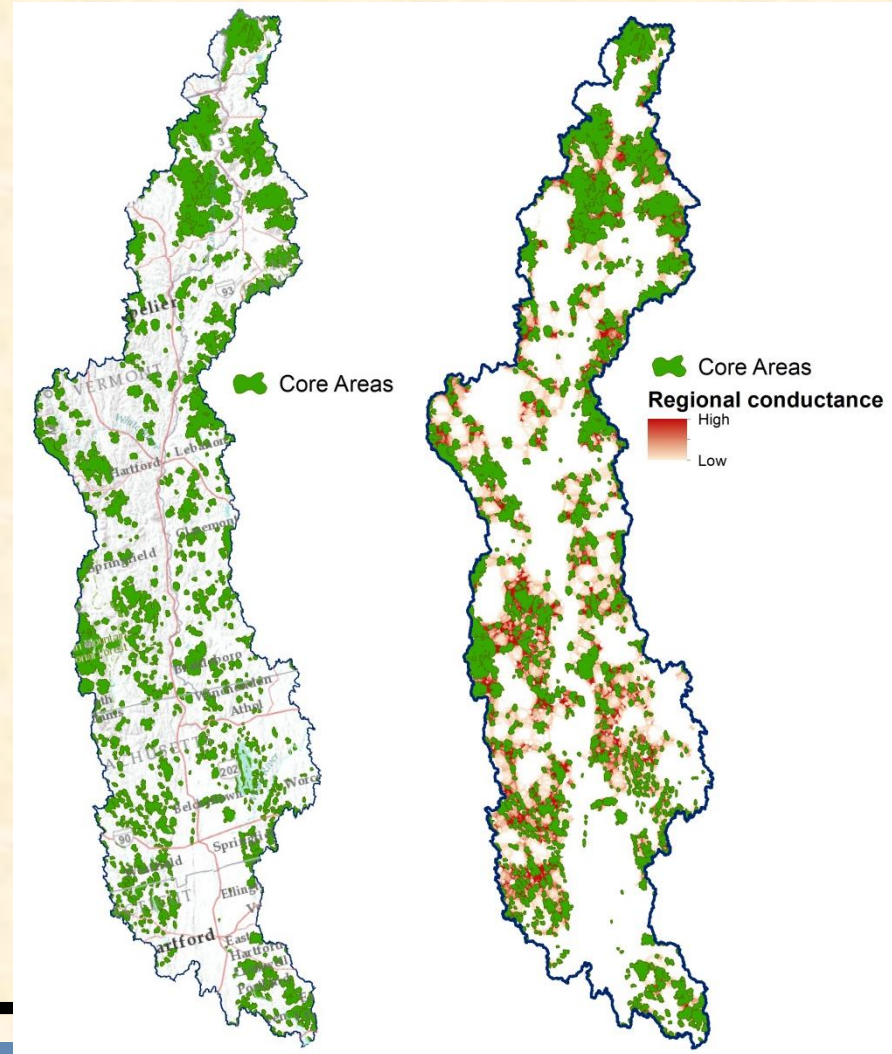
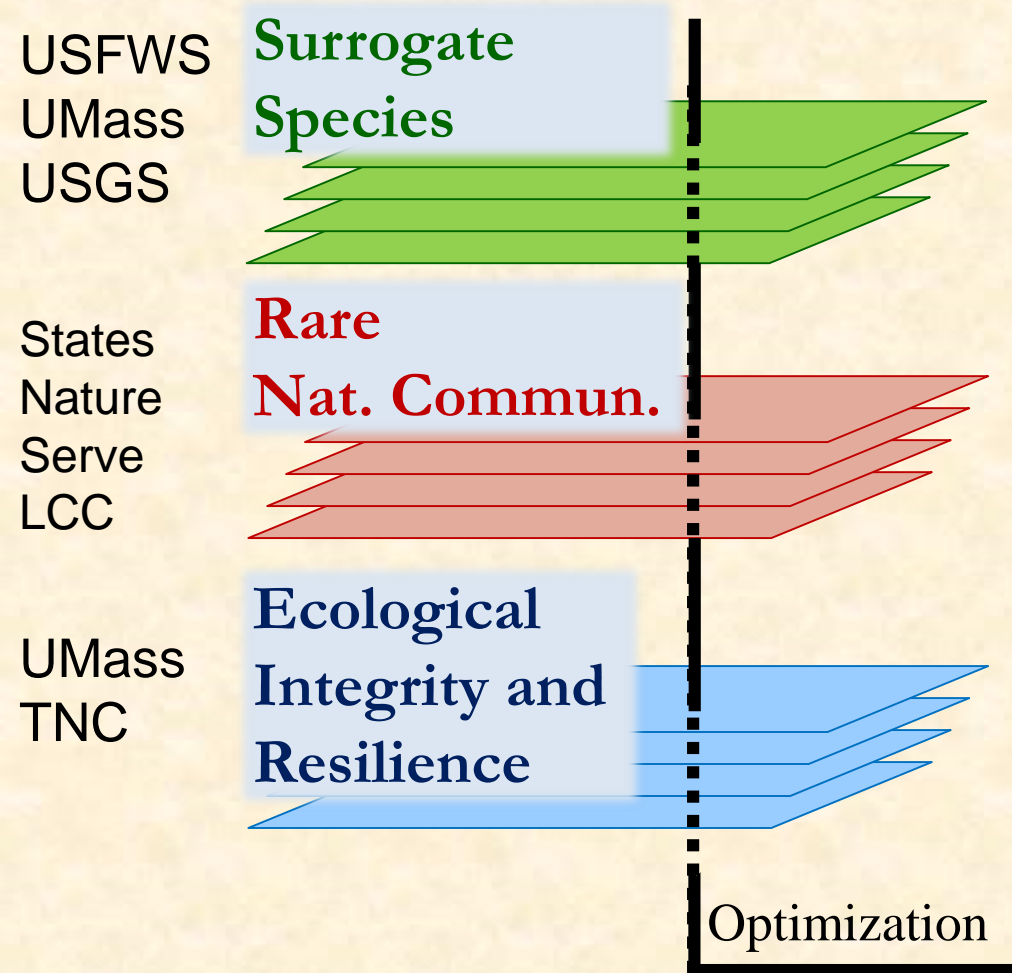


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Integrating Elements

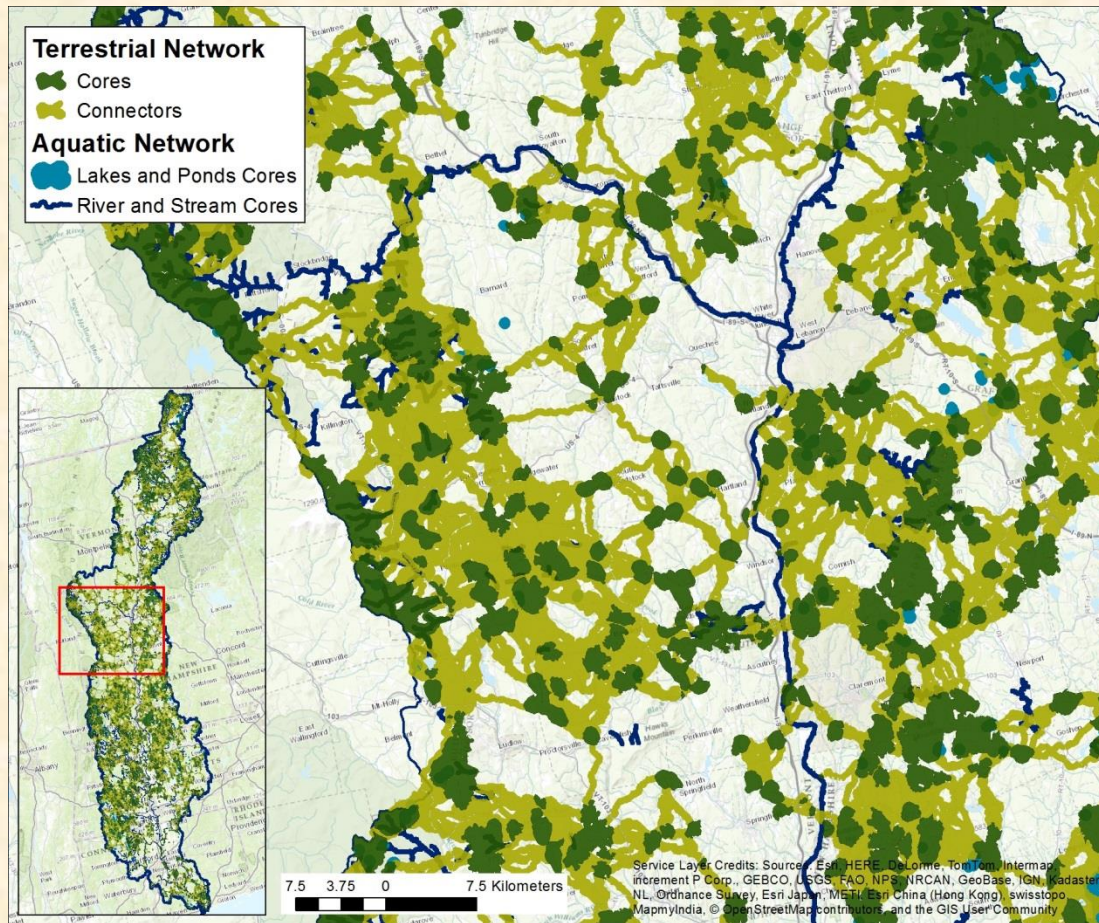
Core area
network



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Suggestions for Using the Products: Core Area Network



Strategic starting point for land conservation and stewardship

Compare to priorities identified at other scales to further rank areas for protection.



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Combined Conservation Design Elements

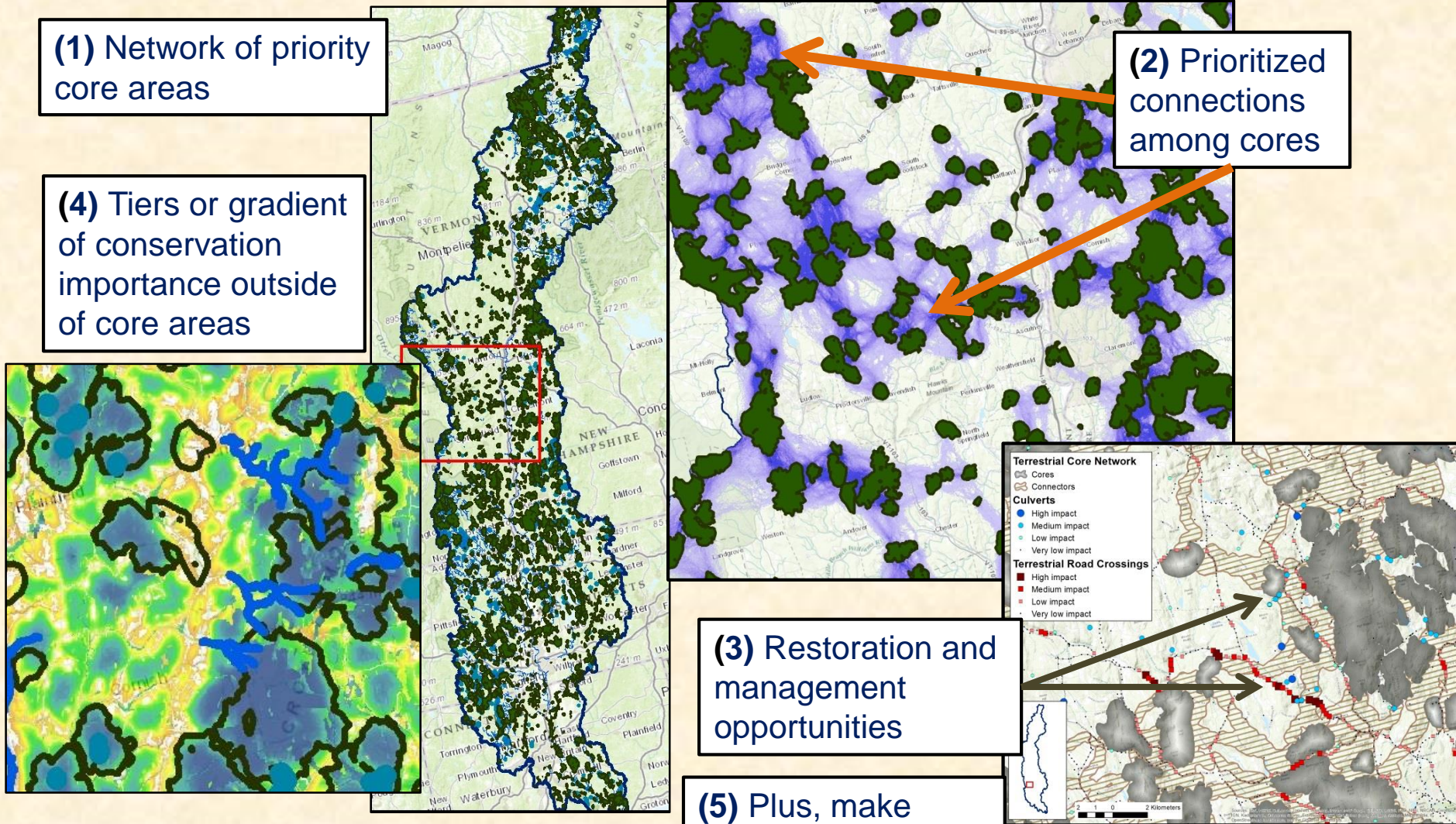
(1) Network of priority core areas

(4) Tiers or gradient of conservation importance outside of core areas

(2) Prioritized connections among cores

(3) Restoration and management opportunities

(5) Plus, make individual (input) datasets available



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Regional Conservation Design “Pilot”

Regional Conservation Opportunity Areas (RCOAs) Version 1.0

RCOAs will identify a **connected** network of **resilient** and **ecologically intact** habitats that will support **biodiversity** under changing conditions across the Northeast Region

RCN &
LCC
SCIENCE



CORE AREAS

RSGCN
SPECIES &
HABITATS

RESTORATION

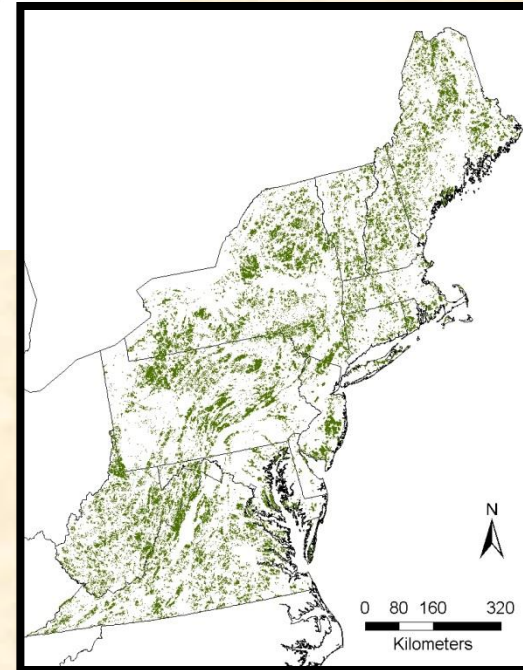
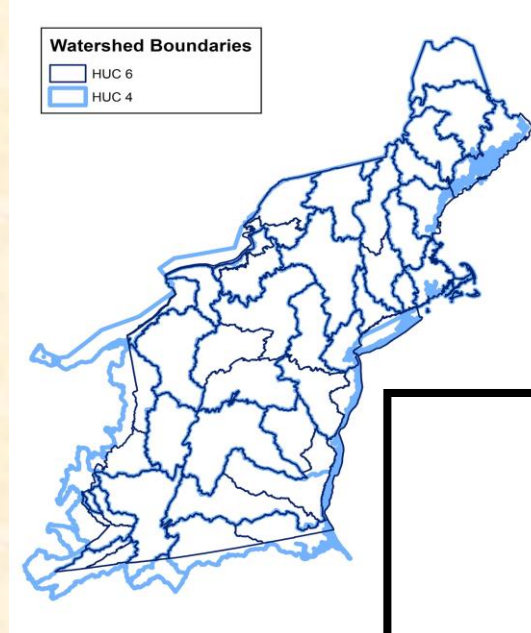
CONNECTIVITY

Regional
Conservation
Opportunity
Areas

RCOAs complement state efforts by providing a regional context...which species and habitats depend on my state the most?

Regional Conservation Opportunity Areas

- Regional Conservation Design
- Applying approaches and lessons learned from Conn. River LCD
- Stratified by Watersheds
- First iteration – Version 1.0 - summer 2016
- Review, testing, revisions

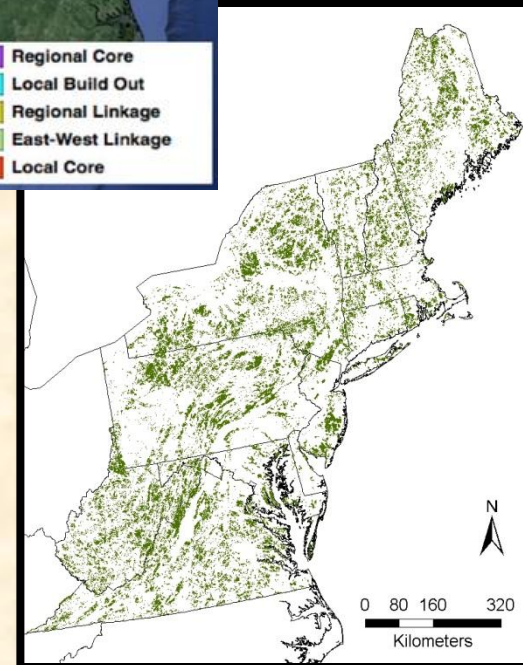
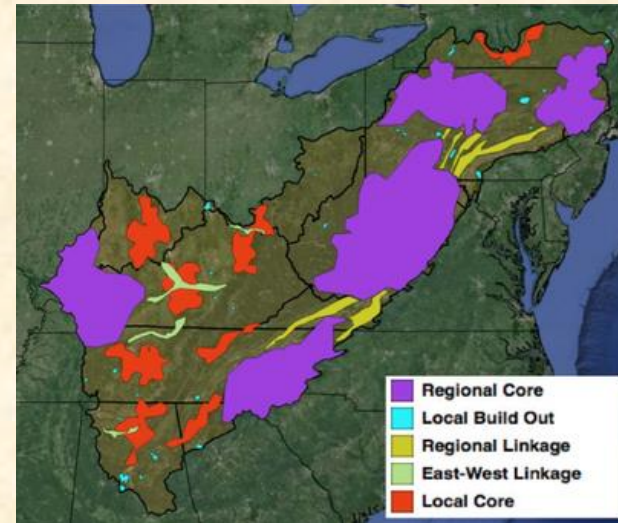


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Next Steps for Conservation Design in the Northeast Region

- Continue to develop, refine and deliver regional information and tools
- Implement and test CTR and Regional LCD (RCOAs)
- Use regional information and designs as starting point for **additional collaborative LCDs within watersheds (Ches. Bay)**
- Compare Neighboring LCC Designs



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Summary – Some Potential Contributions of LCC Tools to Chesapeake Bay Management Strategy

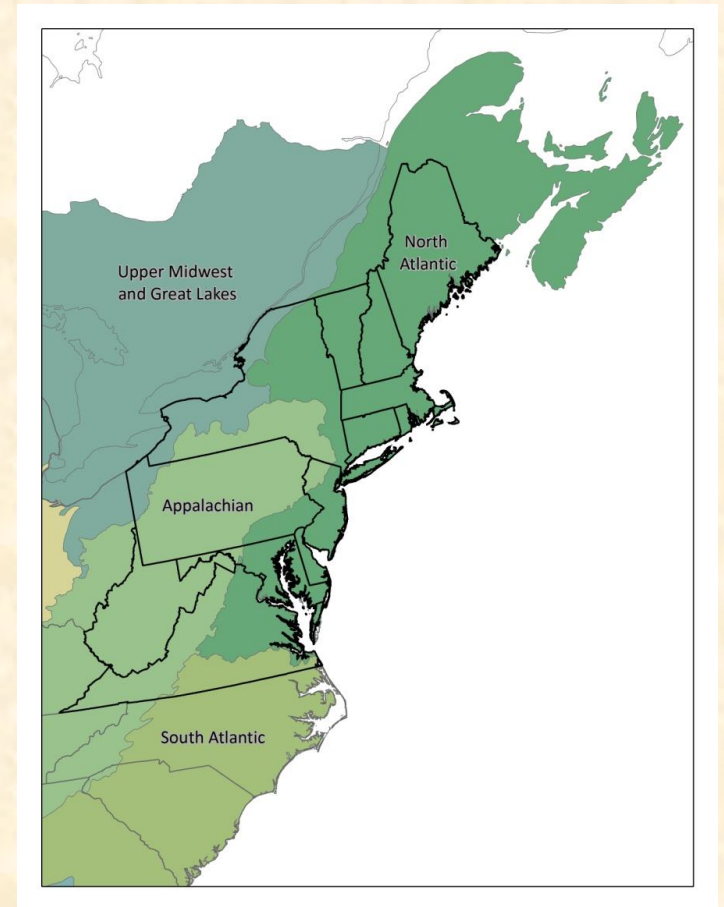
In concert with Bay-specific tools

Management Strategy	North Atlantic LCC Tools
Black duck	Assessment and prioritization of black duck and marsh habitats
Brook trout	Assessment and prioritization of brook trout habitat
Fish passage	North Atlantic Aquatic Connectivity Collaborative
Wetlands	Prioritization of existing wetlands
Stream health	Index of Ecological Integrity; fish habitat tools; riparian restoration

Plus putting it all together with Landscape Conservation Designs

Thanks. For More Information:

- North Atlantic LCC:
<http://northatlanticlcc.org/>
- Conservation Planning Atlas:
<http://nalcc.databasin.org/>
- Coordinator:
andrew_milliken@fws.gov
- Appalachian LCC:
<http://applcc.org/>
- Coordinator:
jean_brennan@fws.gov



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