


Landscape Conservation Design in the Connecticut River Watershed: A Pilot Project

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National Wildlife Refuge System

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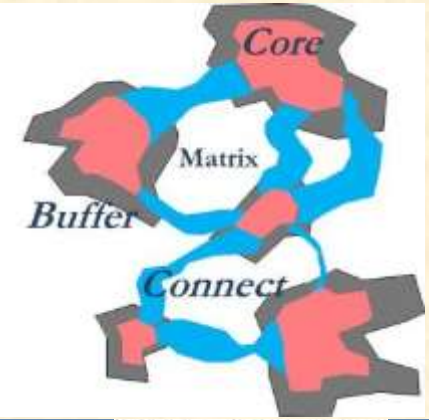
Why landscape-level conservation?

An **interconnected, resilient network** of lands and waterways has many benefits for society:

- Fish and wildlife populations
- Clean water
- Flood and erosion control
- Storm protection
- Forest and farm products
- Recreation and tourism
- Quality of life
- Employment

What is “Landscape Conservation Design?”

- A planning process
  - a collaborative effort among partners, which includes agreeing on common priorities, after considering best information available
- A product
  - a spatial plan for conservation decisions in an adaptive framework

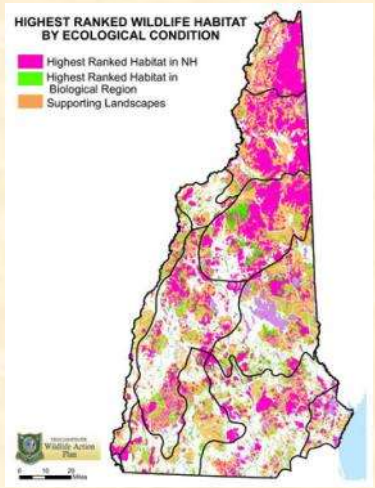


What is different from past efforts?

- Collaborative planning, not driven by one organization's agenda
- Includes an adaptation strategy (incorporates climate change, urban growth, and other future changes)
- Bigger in scope and multi-scaled

Complementing and Integrating Past or Existing Efforts

Examples



Complement or augment, <u>not</u> replace, existing planning and local knowledge

Why the Connecticut River Watershed?

Who is participating on the CT River Pilot Project Team?

- Leadership team (North Atlantic LCC staff, USFWS staff, Kevin McGarigal – UMass)
- Core team of > 30 partners: Four State fish and wildlife agencies; Federal agencies; NGOs
- Conduct monthly, in-person meetings (9 to date); plus frequent subteam meetings

Objectives for Pilot Process

1. Collaboratively prioritize places, and the strategies and actions, necessary to conserve ecosystems, and the fish, wildlife, and plants they support, into the future
2. Deliver information, maps, and tools with design options for prioritizing at scales and in formats needed by partners
3. Establish a process for conducting landscape conservation design that can be applied and adopted elsewhere in region

Progress and Accomplishments

- Agreed to 2 overarching goals
- Developed species (population and habitat) and ecosystem objectives
- Identified the major elements of the design
- Reached a series of collaborative decisions on the design
- Began deliberations on drivers of future change

Pilot Project
Conservation Goals for the Watershed

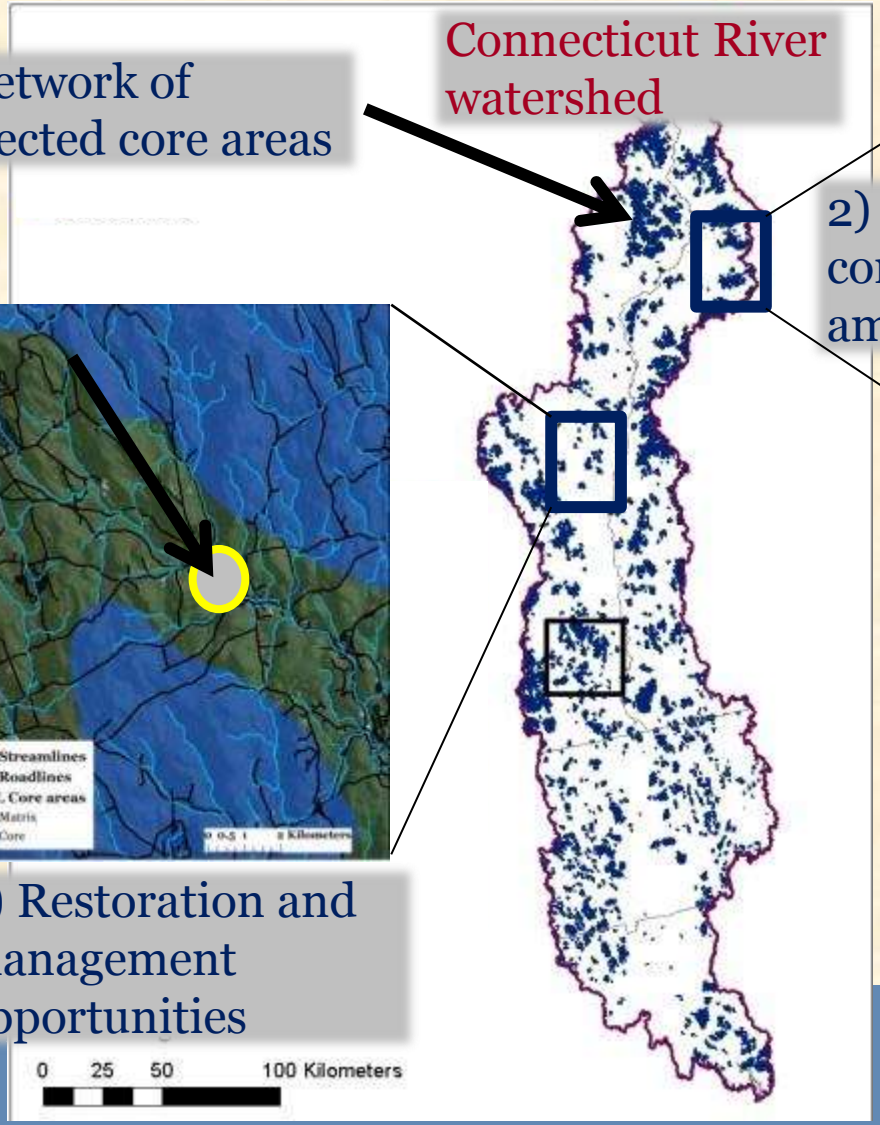
1. The Connecticut River watershed sustains a diverse suite of intact, connected, and resilient ecosystems that provide important ecological functions and services that benefit society, such as clean water, flood protection, and lands for forestry, farming, and recreation.

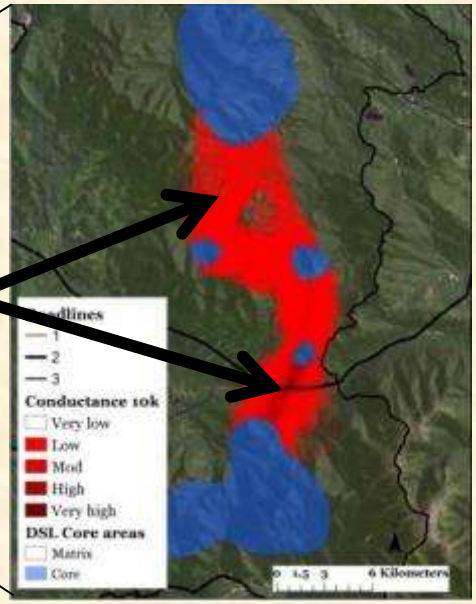
2. The Connecticut River watershed sustains healthy and diverse populations of fish, wildlife, and plant species for the continuing benefit and enjoyment of the public.

Setting Species and Ecosystem Objectives

1. Decide on species/ecosystems (resources) to cover
2. Consider existing national/regional/state resource objectives
3. Consider importance of resources to Watershed and region
4. Consider current and future capabilities to sustain or increase resources in light of predicted landscape changes
5. Identify extent, connectedness, and distribution of resources to meet objectives
6. Revisit objectives as necessary as multiple resources are considered simultaneously

Combined Conservation Design Elements

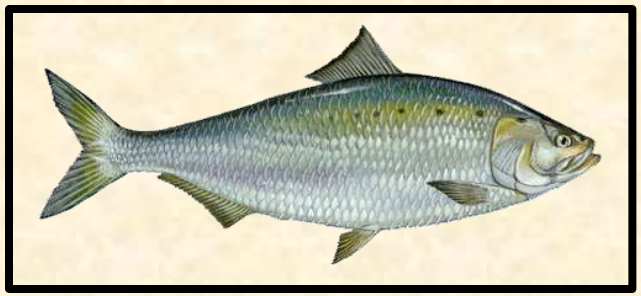




North Atlantic LCC
North Atlantic Landscape Conservation Cooperative

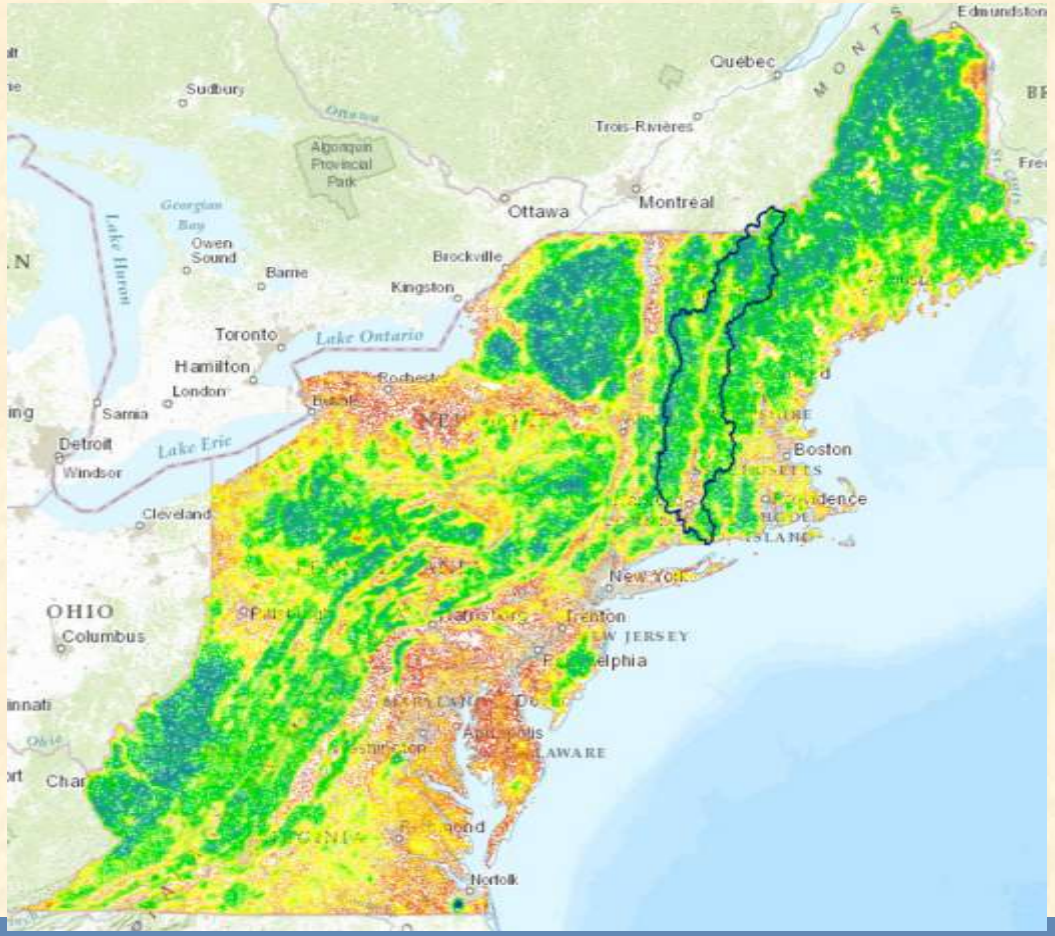
Communications

- Extensive project webpage
- Group workspace on Conservation Planning Atlas
- Presentations and posters
- North Atlantic LCC newsletters
- Survey of participants



The Pilot: It's not just about the Connecticut River Watershed

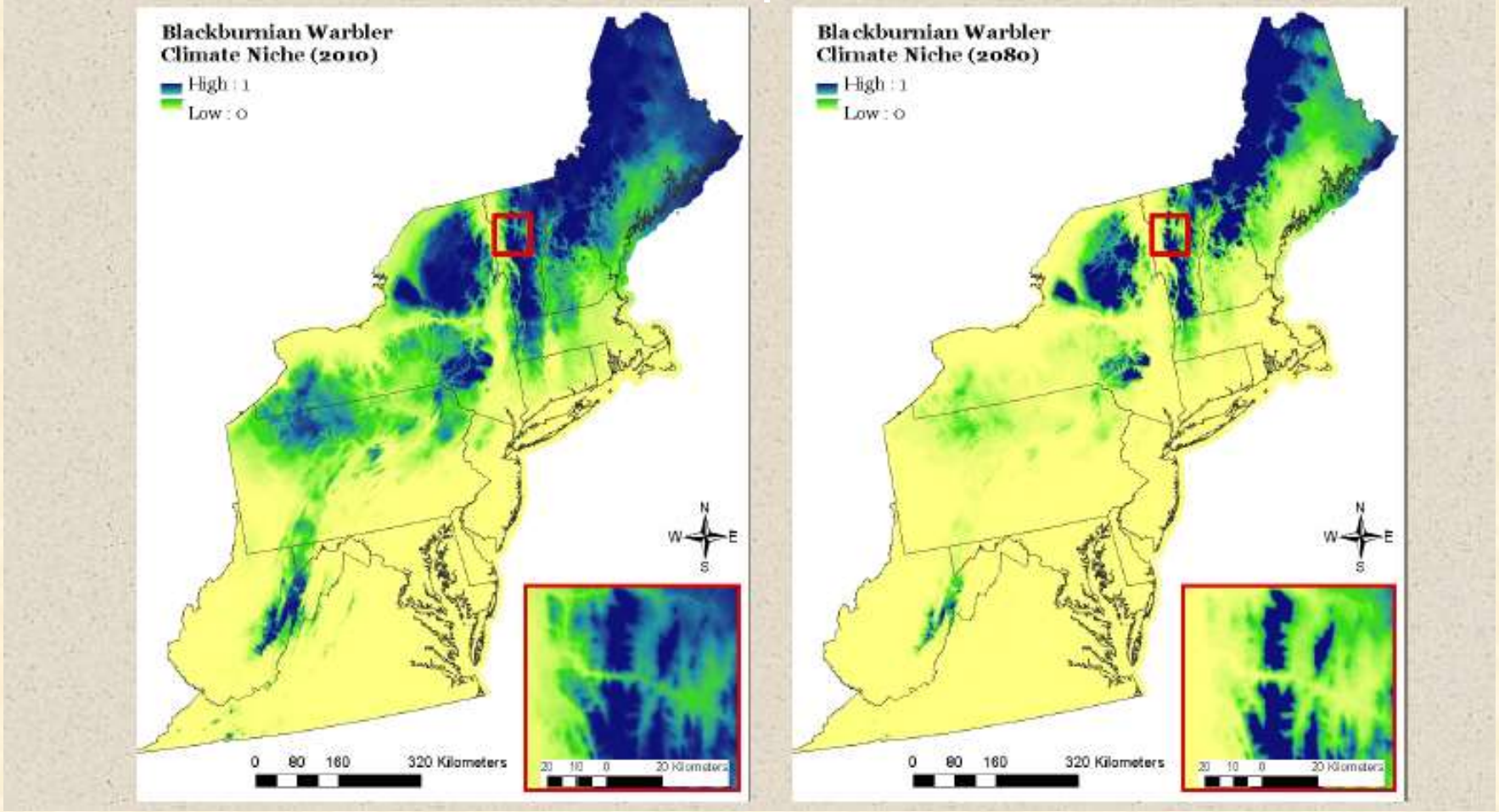
Utilizing Advances in Conservation Science, Information and Tools



Black Bear Landscape Capability: Current Conditions
(Blues and dark greens are best)

Available on Conservation Planning Atlas, nalcc.databasin.org

Space – Regional Context
Time – Current vs. Potential Future Climate and Development



Select Representative (Surrogate) Species

- North Atlantic LCC Region (2011), CT River Watershed (2013)
- 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

Initial Surrogate Species Models (30 models in development)

Ecosystem/Habitat Types	Initial Set of Species
Deciduous forest, mature	Wood Thrush
Deciduous forest, young	American Woodcock, Ruffed Grouse
Forest, large blocks	Black Bear

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Deciduous forest, mature	Wood Thrush
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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

Designing Sustainable Landscapes in the Northeast

Kevin McGarigal, UMass Amherst

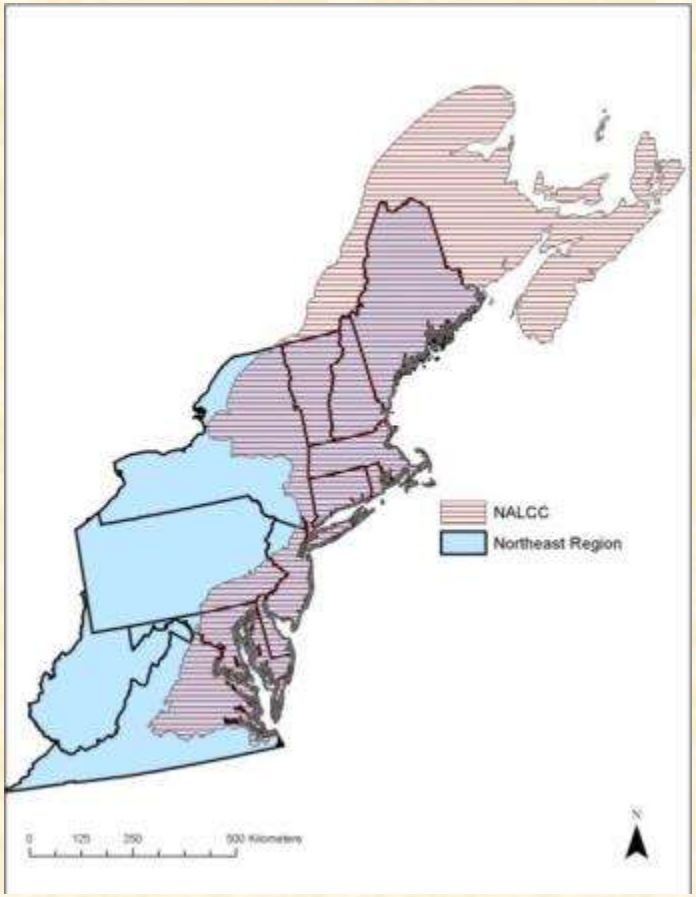
Project website:

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

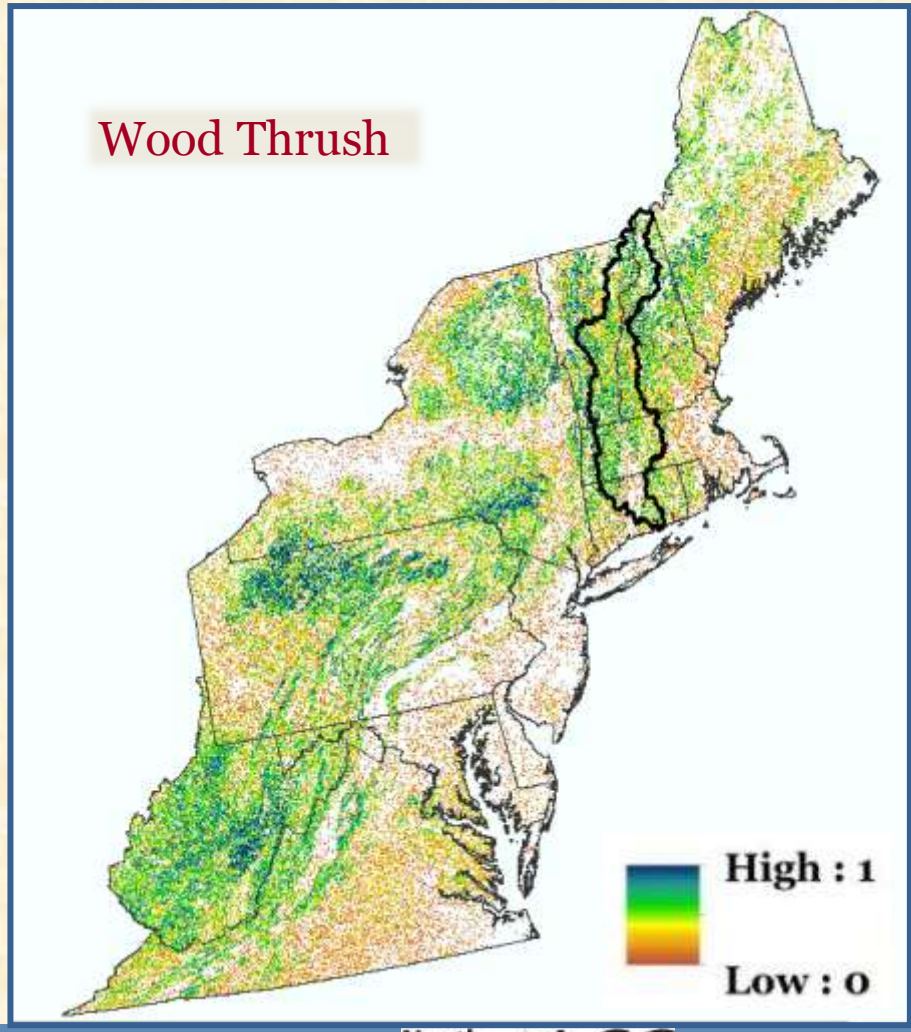
Phase 1: pilot areas (2011-2012)

Phase 2: full Northeast (2012-2014)

+ Conn. River pilot watershed work



Representative (Surrogate) Species



Habitat capability models based on:

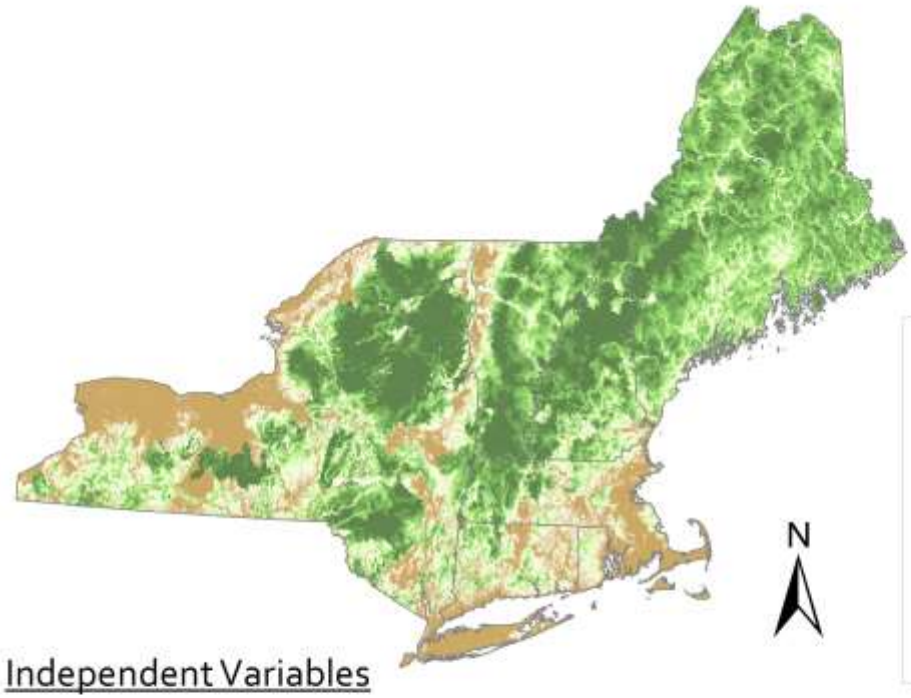
- Known habitat associations and effects of stressors

+

- Actual field data (e.g., Breeding Bird Survey routes) where available

Brook Trout Habitat Model

Brook Trout Occupancy Under Current Conditions



Independent Variables

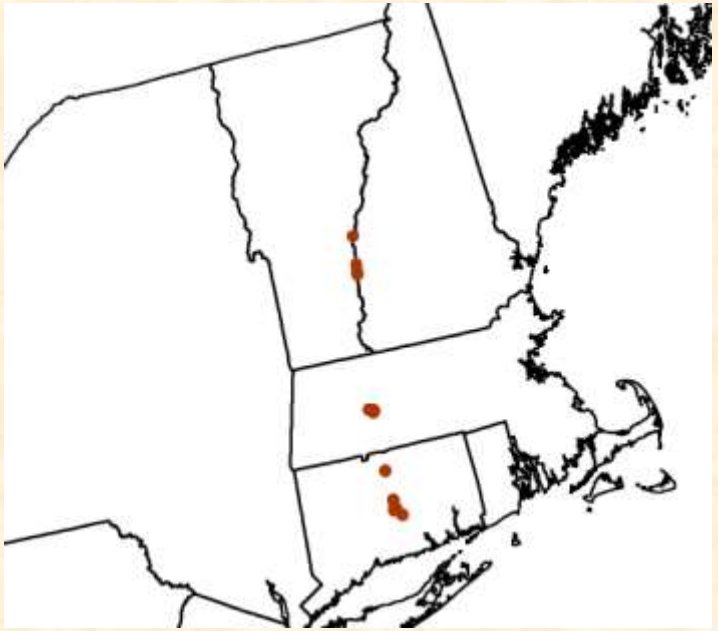
- Drainage Area
- Soil Drainage Class
- Stream Channel Slope
- % Forest*
- Annual Precip*
- Minimum Annual Temp*

* Modeled impacts of variable changes are available from the authors

Data Collection, Ecological Models, and Map Creation by
Dr. Ben Letcher, Dr. Yoichiro Kanno, Ana Rosner, and Kyle O'Neil
USGS Conte Anadromous Fish Research Center
Funding by the North Atlantic Landscape Conservation Cooperative

Rare species and others not well-represented

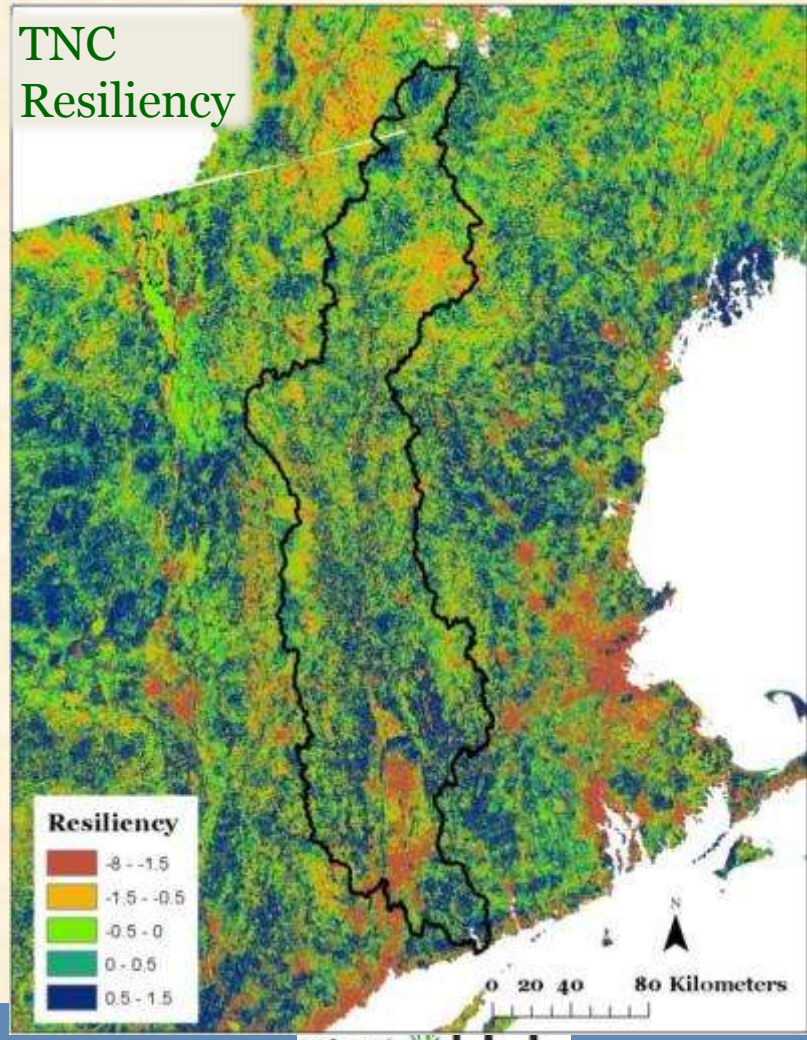
Locations of known bat caves (hibernacula)



Puritan tiger beetle locations (endangered sp.)

Ecosystems: Terrestrial Resiliency (The Nature Conservancy)

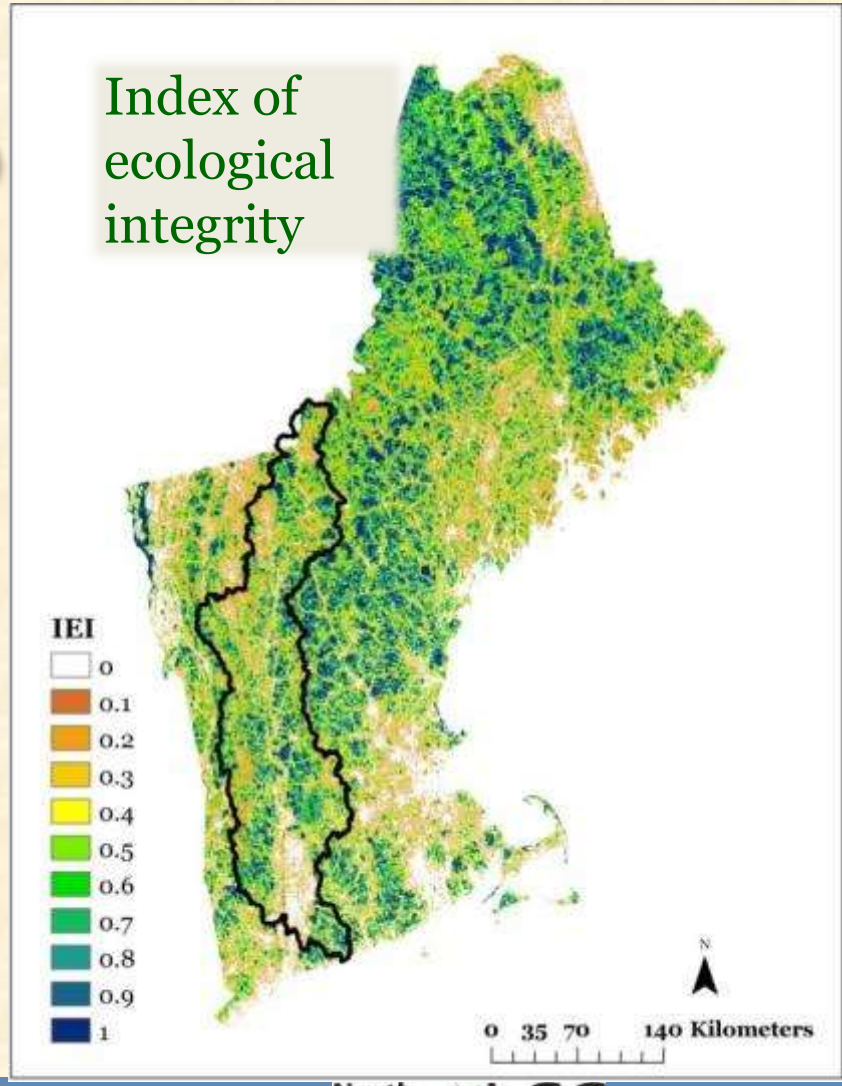
"Conserving the Stage" Approach



Ecosystems: Ecological Integrity (UMass)

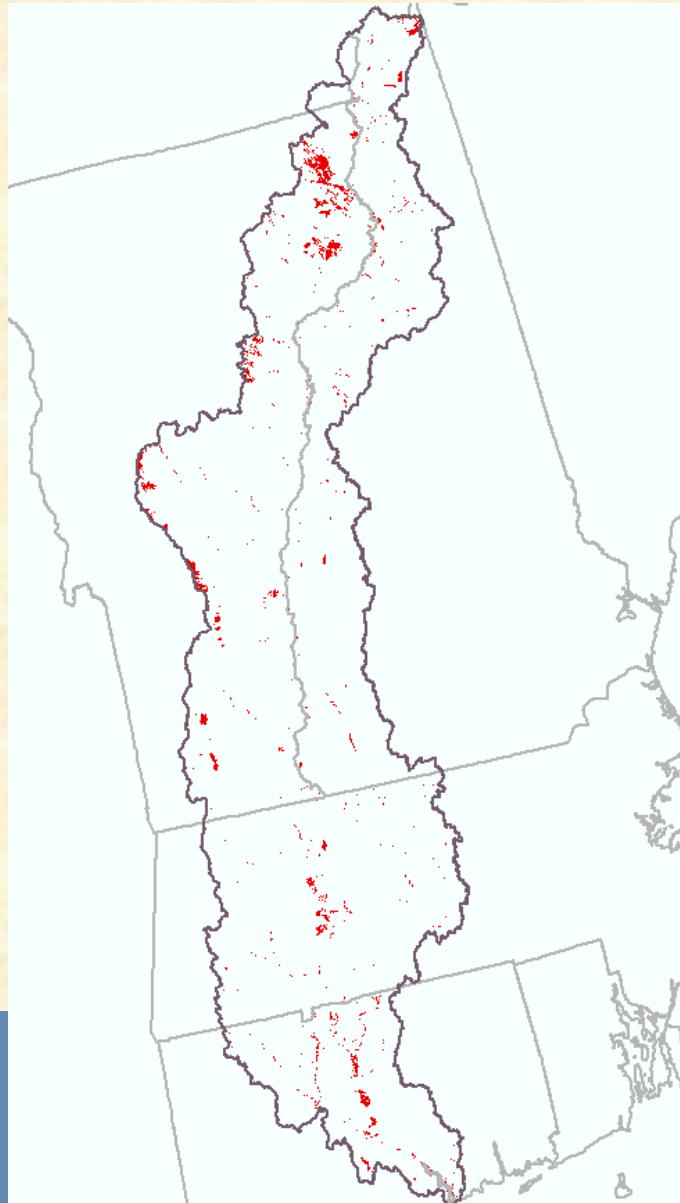
Intactness → **Ecological Integrity** ← **Resiliency**

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



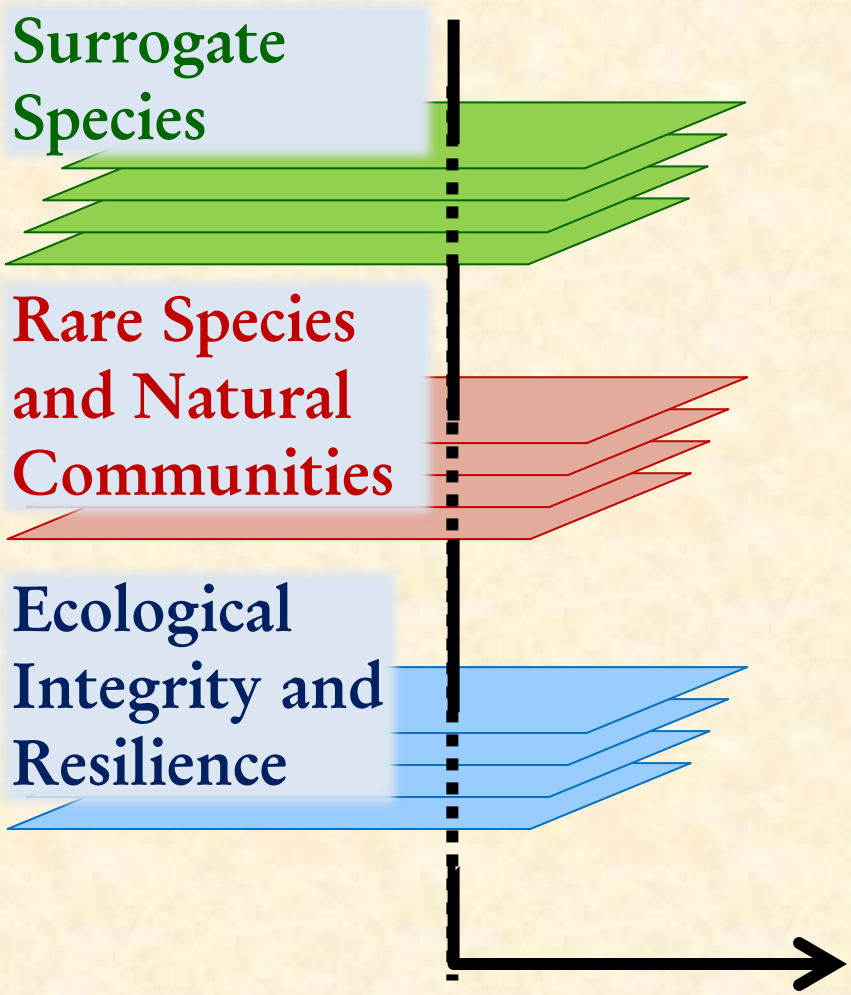
Rare Natural Communities and Intact Floodplains

Ex.: Limestone Bluff Cedar-Pine Forest



Landscape Conservation Design

Integrating the Elements

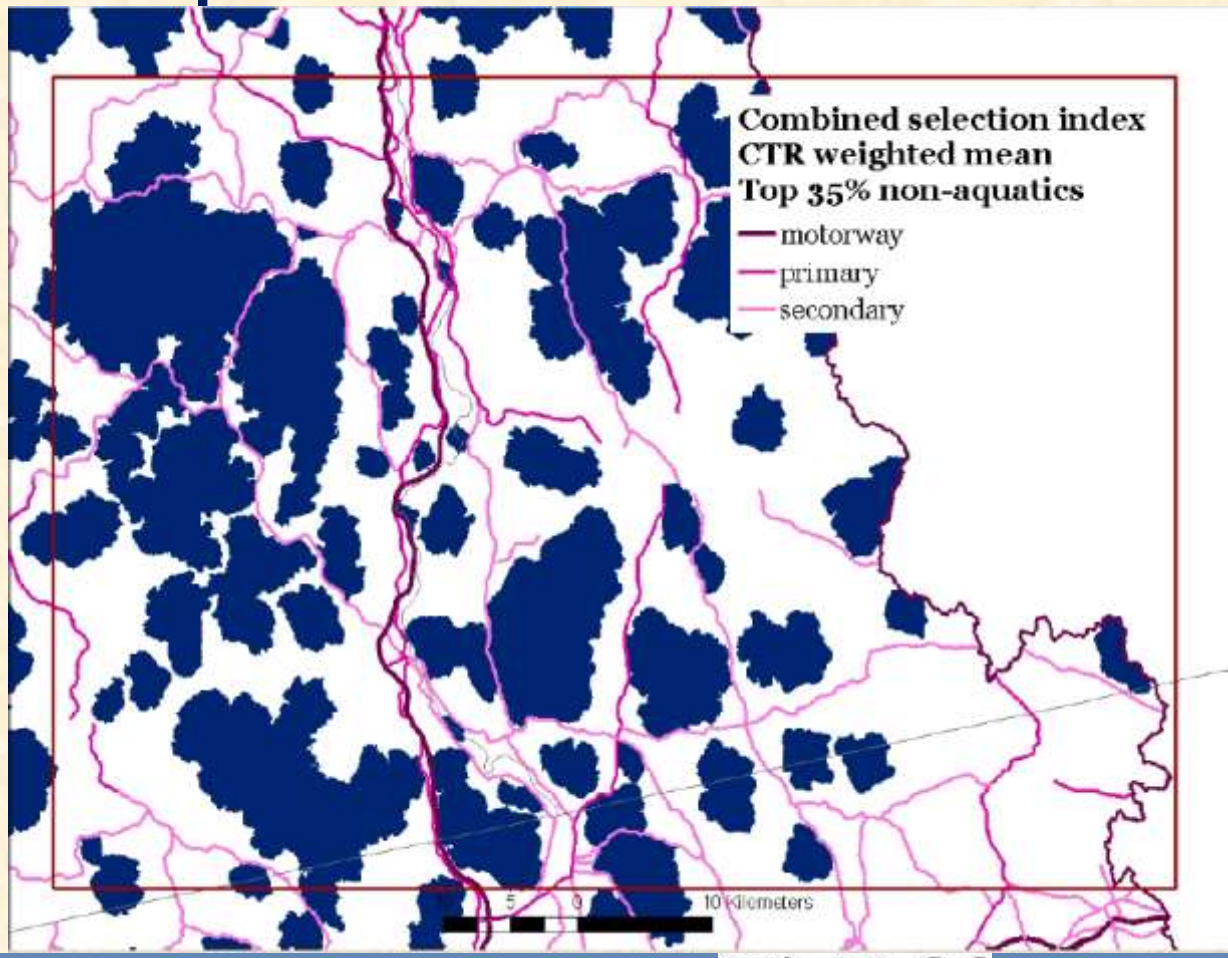


Landscape Conservation Design

Integrating Ecosystem Components

Identify highest priorities for conservation – "core areas"

"grow out starting with the best"

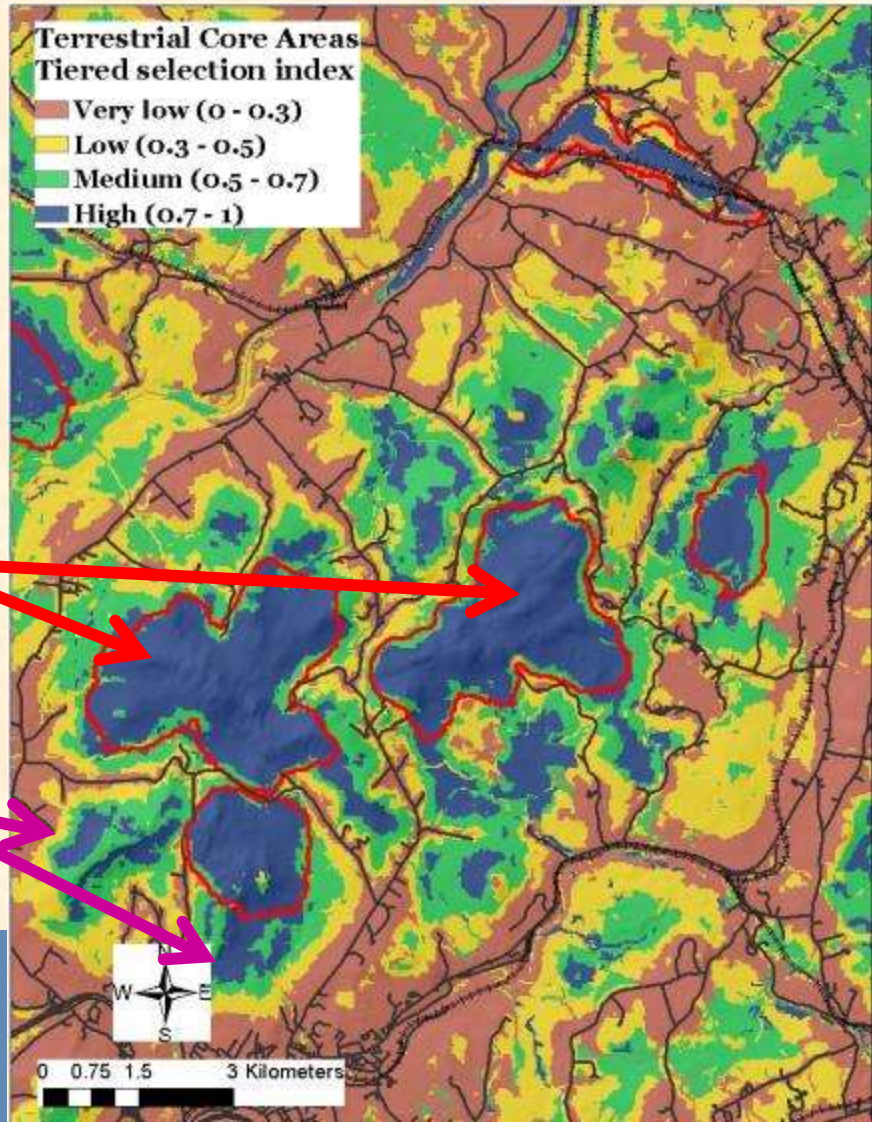


Additional Step in Integrating Ecosystem Components

Depict tiers or degree of priority for areas outside of "cores"

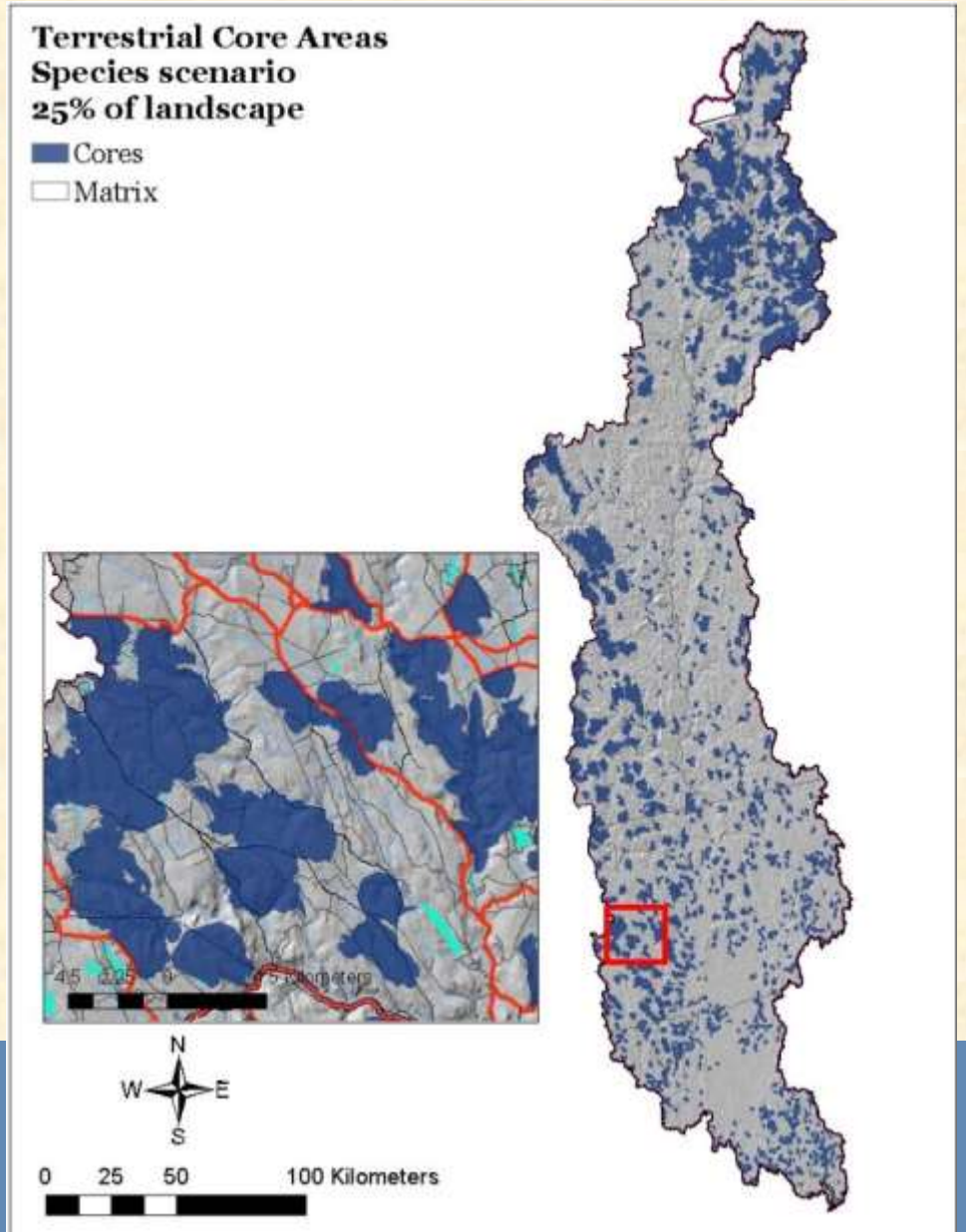
Core areas

Also important but outside cores



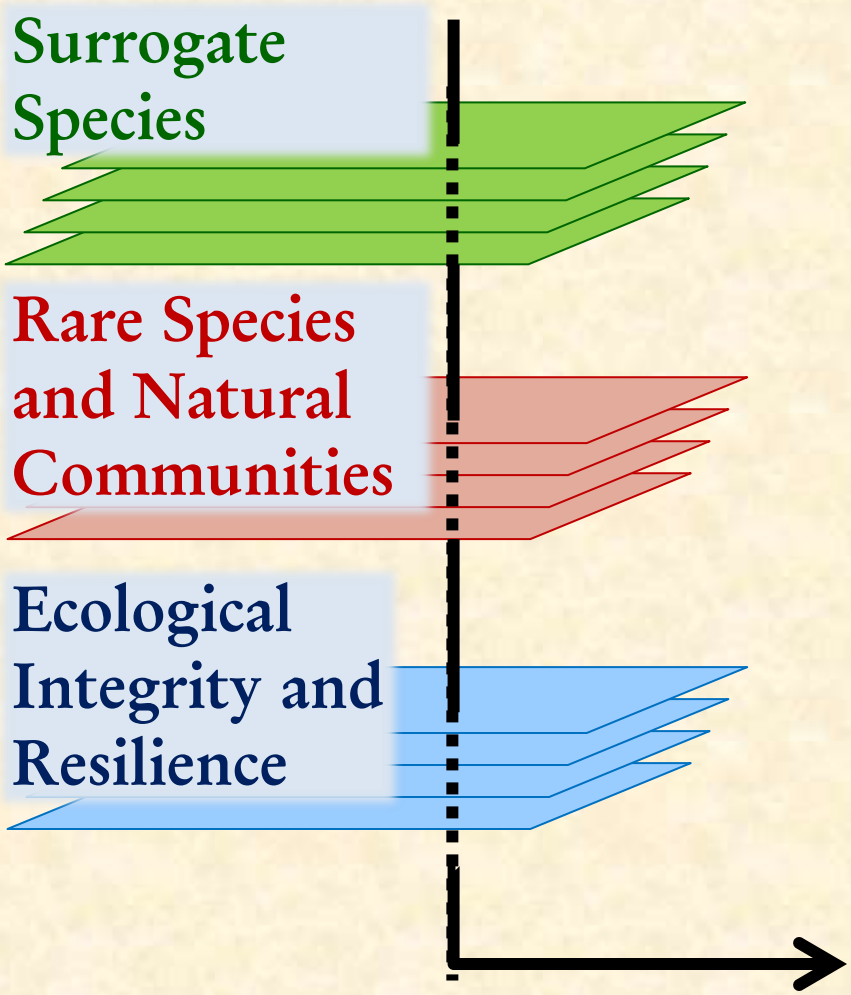
Integrating Species Components

Species Core Areas: Optimize to select the best habitat for multiple species, while achieving population objectives for each species



Landscape Conservation Design

Integrating the Elements



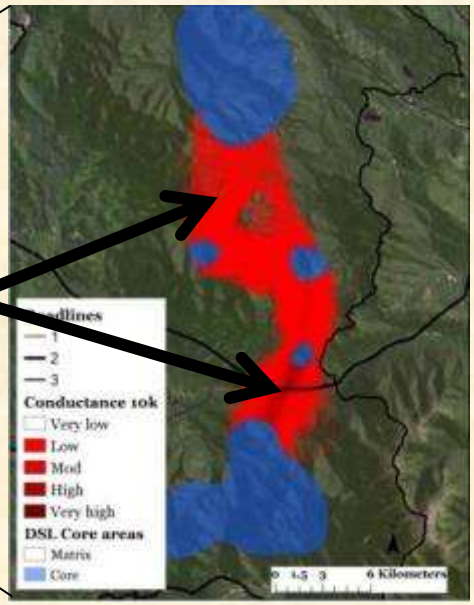
Landscape Conservation Design

Combined Conservation Design Elements

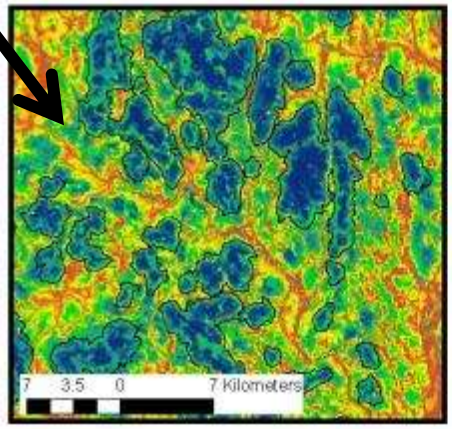
1) Network of protected core areas

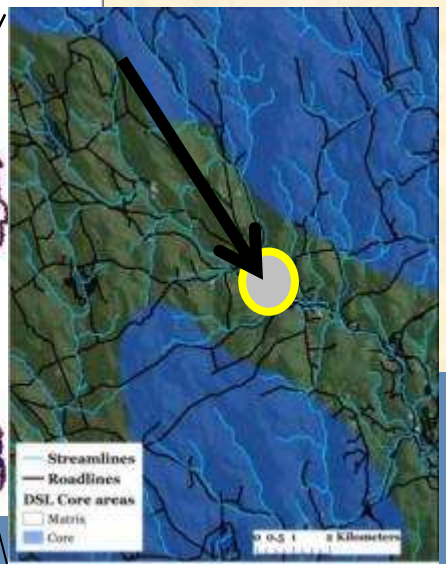
Connecticut River watershed

2) Prioritized connections among cores



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





3) Restoration: road passage structures and improved culverts to restore connectivity

N
W E
S
0 25 50 100 Kilometers

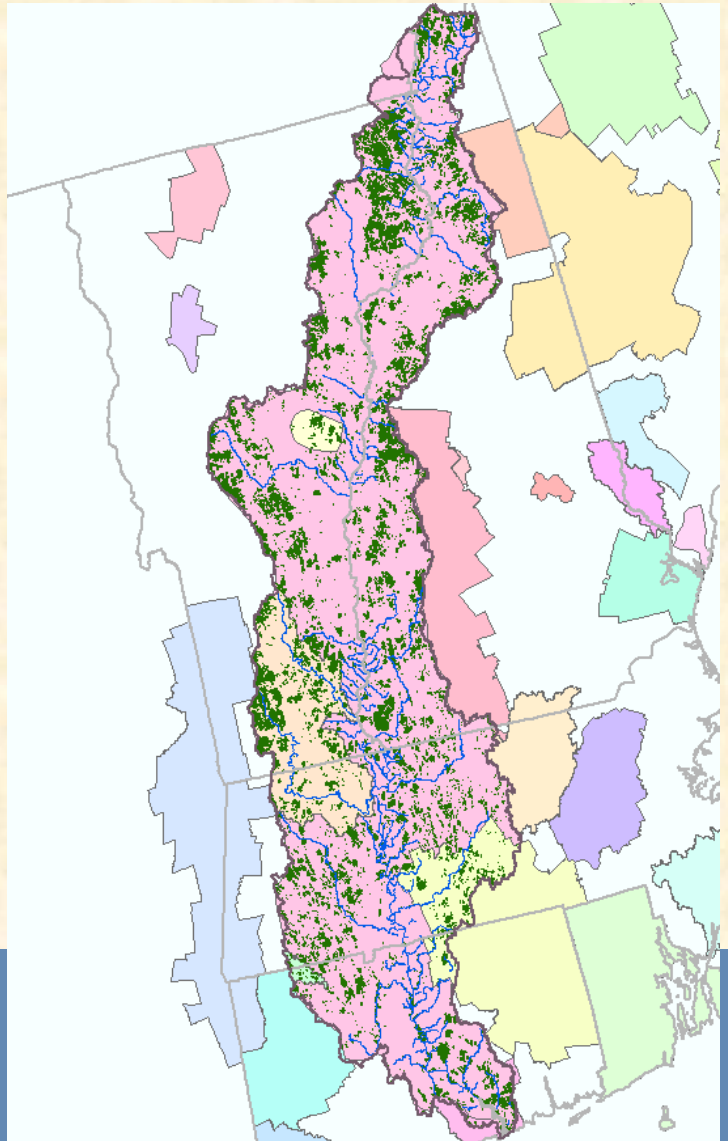
5) Plus, make individual (input) datasets available

Intersection of Design with RCPs
(preliminary example)

Core areas (green)

Overlain on RCPs

(multiple colors)



Next Steps

- Incorporate landscape and climate change
- Finalize design (e.g., integrating ecosystem and species approaches)
- Communicate and distribute results and tools
- Foster implementation
- Monitoring and evaluation plans
- *For discussion – helping apply approach and tools elsewhere in Northeast; integrating with local tools*

Final Thoughts

Why? An **interconnected, resilient network** of lands and waterways has many benefits for society:

- Fish and wildlife populations
- Clean water
- Flood and erosion control
- Forest and farm products
- Recreation and tourism
- Quality of life

<u>Huge thanks</u> to many partners and participants, including Bill Labich of Highstead!

More info.: http://northatlanticlcc.org/groups/connecticut-river-watershed-pilot

Questions for Discussion

- Would you find the final conservation design useful in your conservation planning? Would it integrate with local planning?
- How might you use the design or other products?
- How to implement the design?
- How to put the pieces together in a way that tells a compelling story?
- Ideas for further outreach and dissemination of design products?
- How to export to other landscapes?