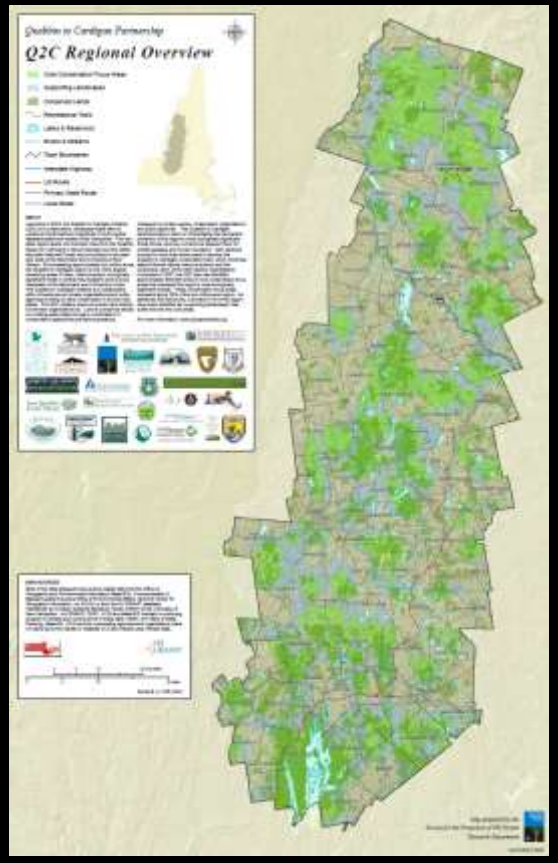
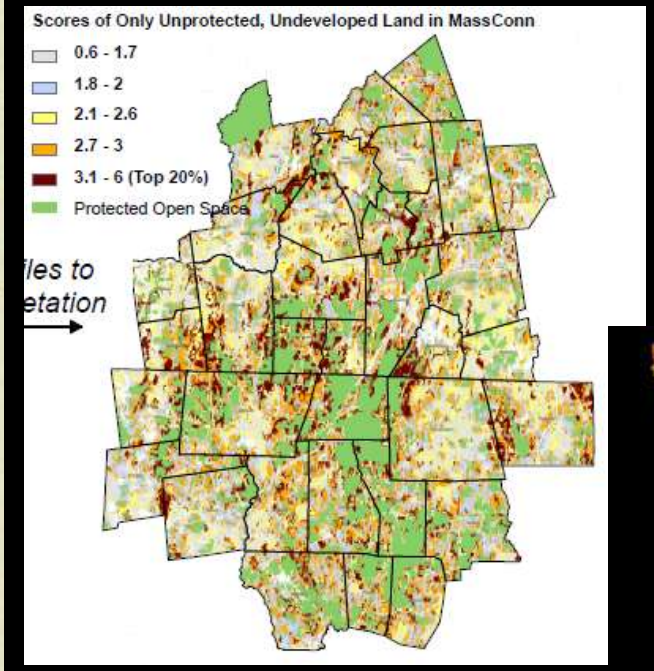
Selected NALCC Datasets and How RCPs Can Use Them

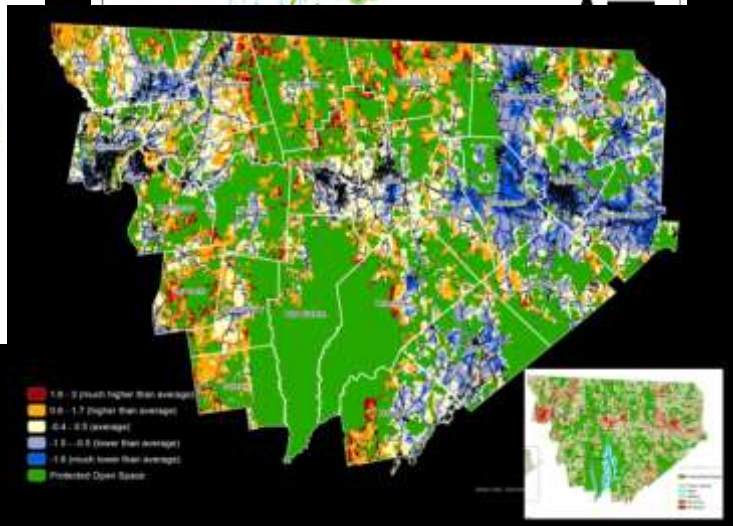
Brian Hall
Harvard Forest and Highstead
RCP Network Gathering, Nashua, NH
11/13/2014

Selected NALCC datasets

- Most useful to RCPs
- Based On Our Experiences:







But We Already Have a Plan…
Why Do We Need More Data?

- New Threats
- New Grant Opportunities
- Better Versions of Old Data
- Your Mission Changes

The Data Can Be Complex

1) Most are well described:

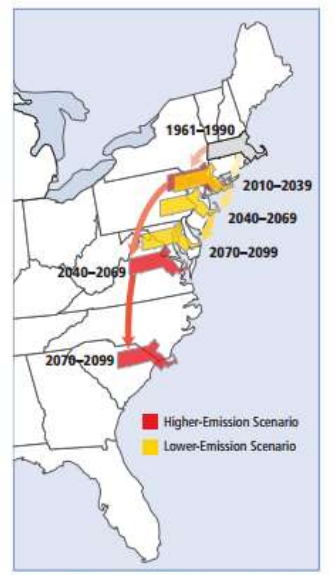
How made; What is shows; Potential use and misuse

2) Understand the data – assign specialists

- In-depth knowledge
- How to use with other datasets (redundancies, incompatibilities, etc.)

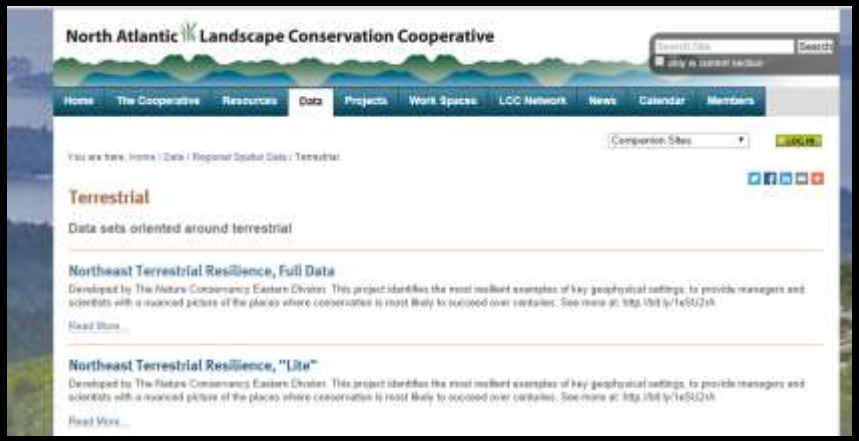
3) Help is Available! - TNC, Umass, USFW

New Threat – Climate Change



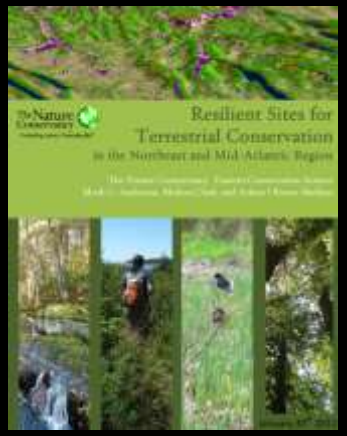
Average summer heat indices projected under two emissions scenarios
(Used by permission of Union of Concerned Scientists, 2007).

TNC Northeast Terrestrial Resilience Data Helps Planning



Uncertainties:

- Magnitude, timing
- Species' responses
- We protect land in perpetuity!



TNC Resilience - Preserving Biodiversity in Changing Climate

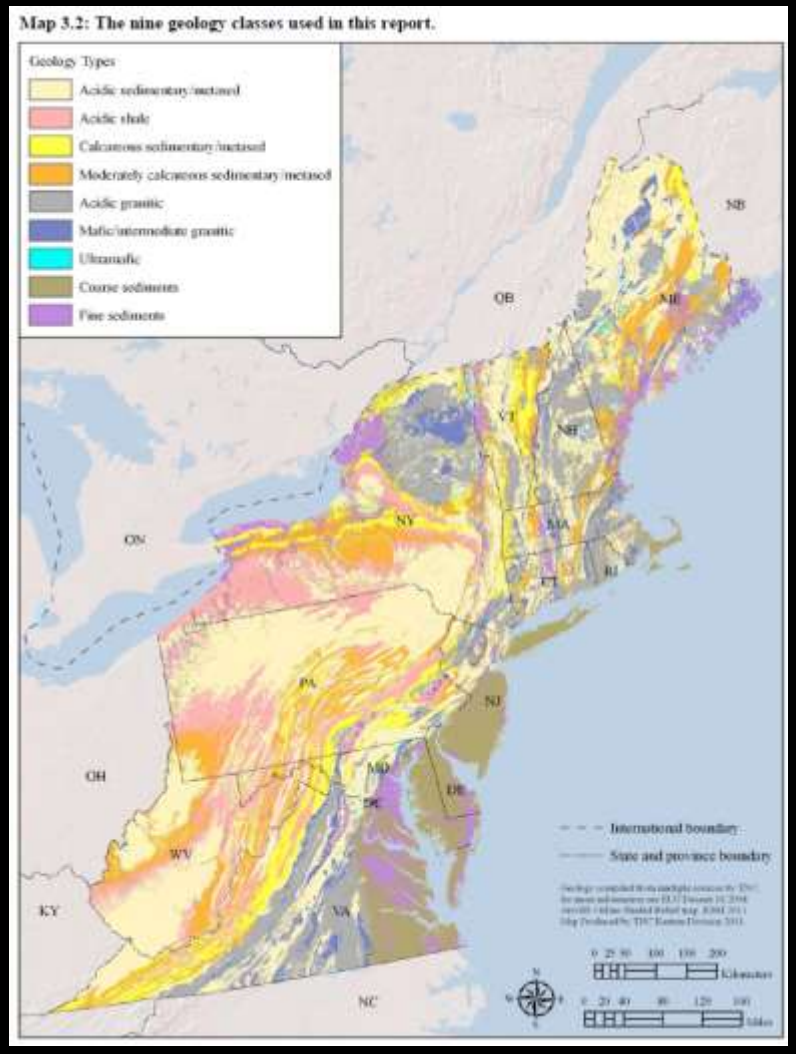
THEORY

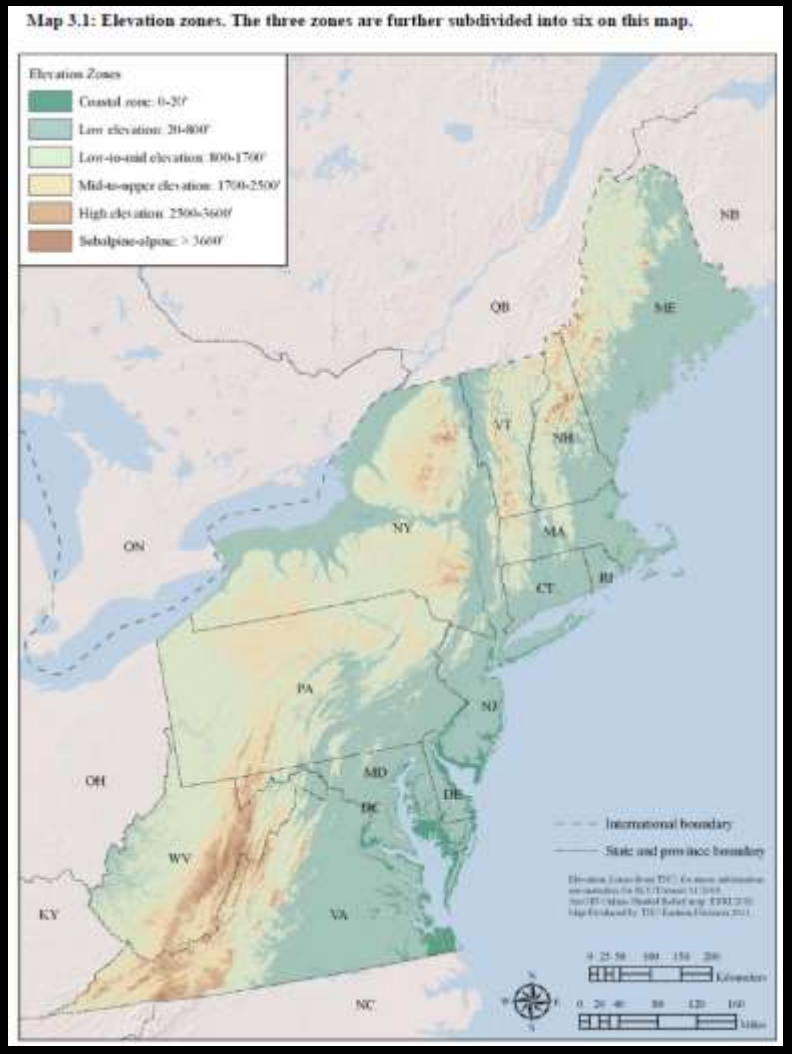
"Preserve The Stage"

- Settings endure
- Plants/animals migrate
- Diverse settings = diverse biota

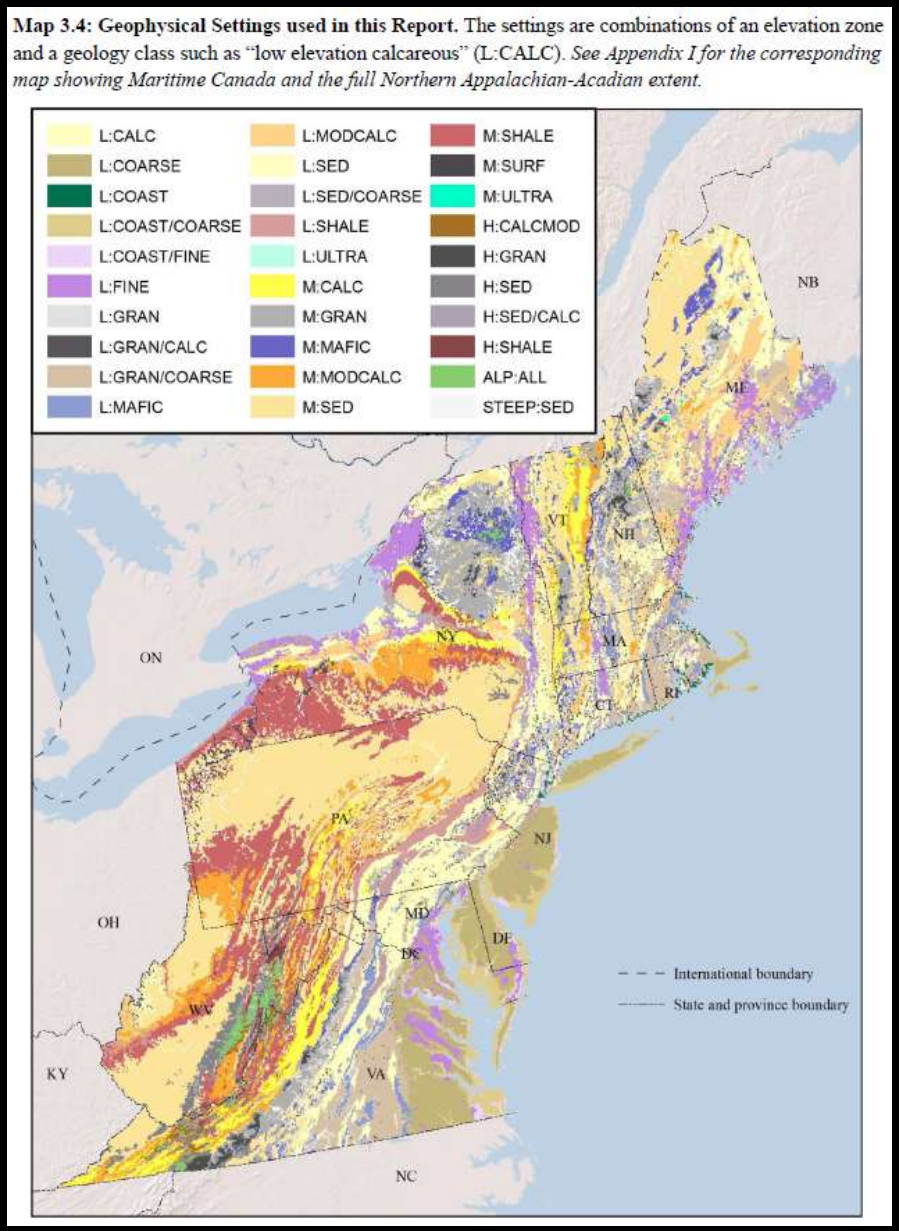
Step 1) Identify “Stages”

9 Geology Types X 3 Elevational Ranges =



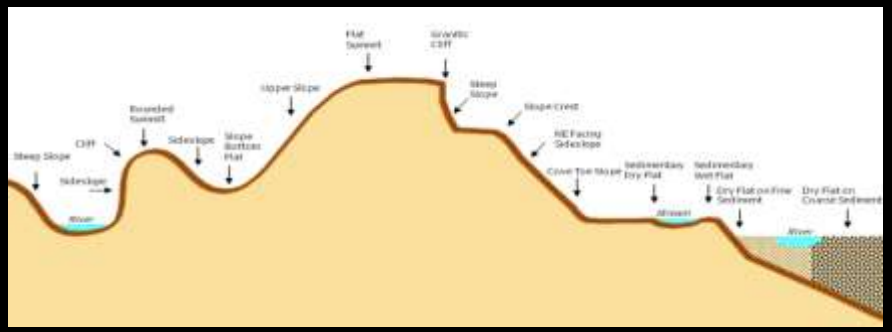


= 27 Geophysical Settings or Stages:



Each setting will have many ecosystems or habitats

Step 2) Calculate Local Resilience For Each Setting



Landform Variety

Elevation Range

Wetland Density

1) COMPLEXITY (diverse microsites)

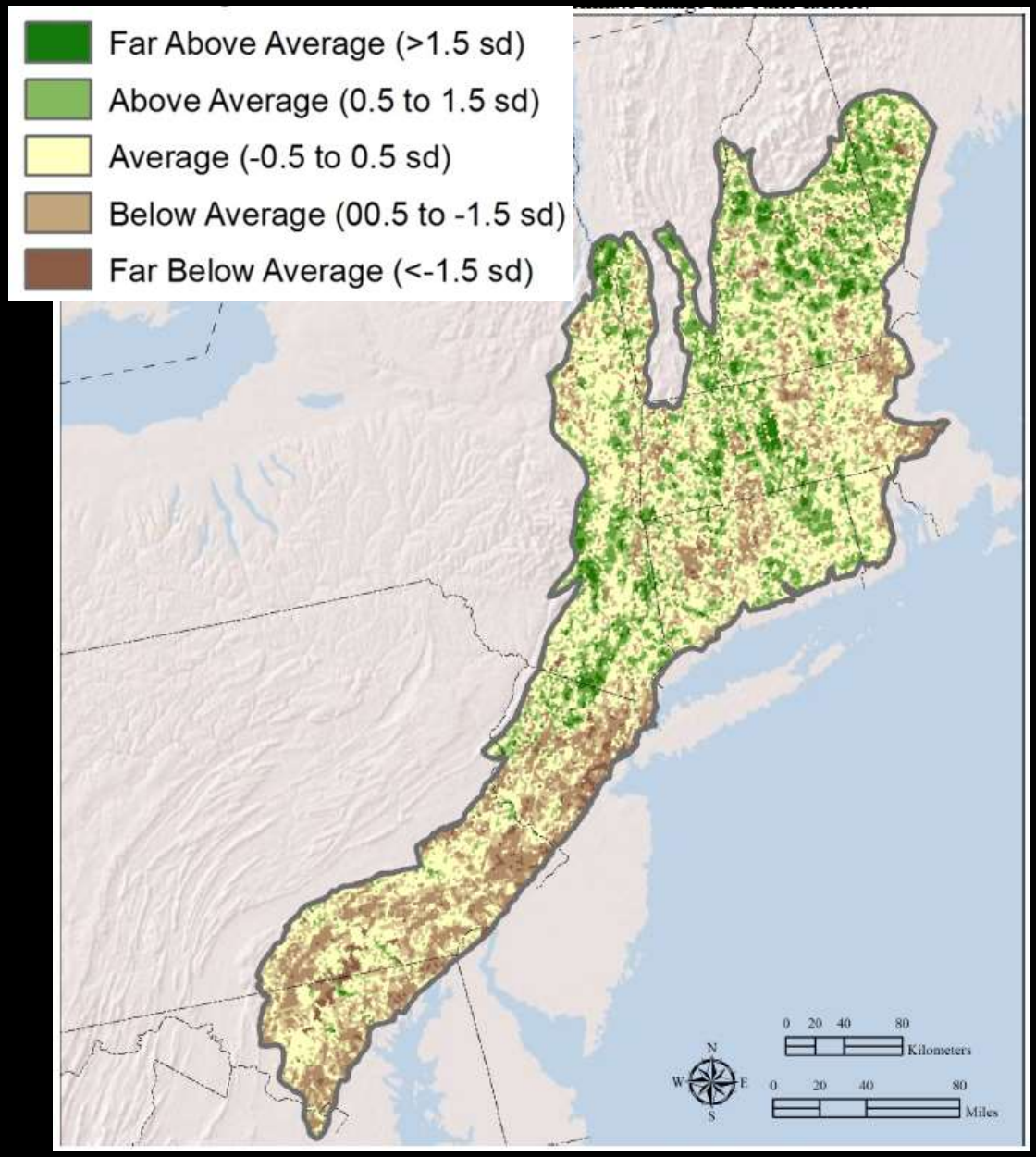
2) PERMEABILITY

Averaged Together

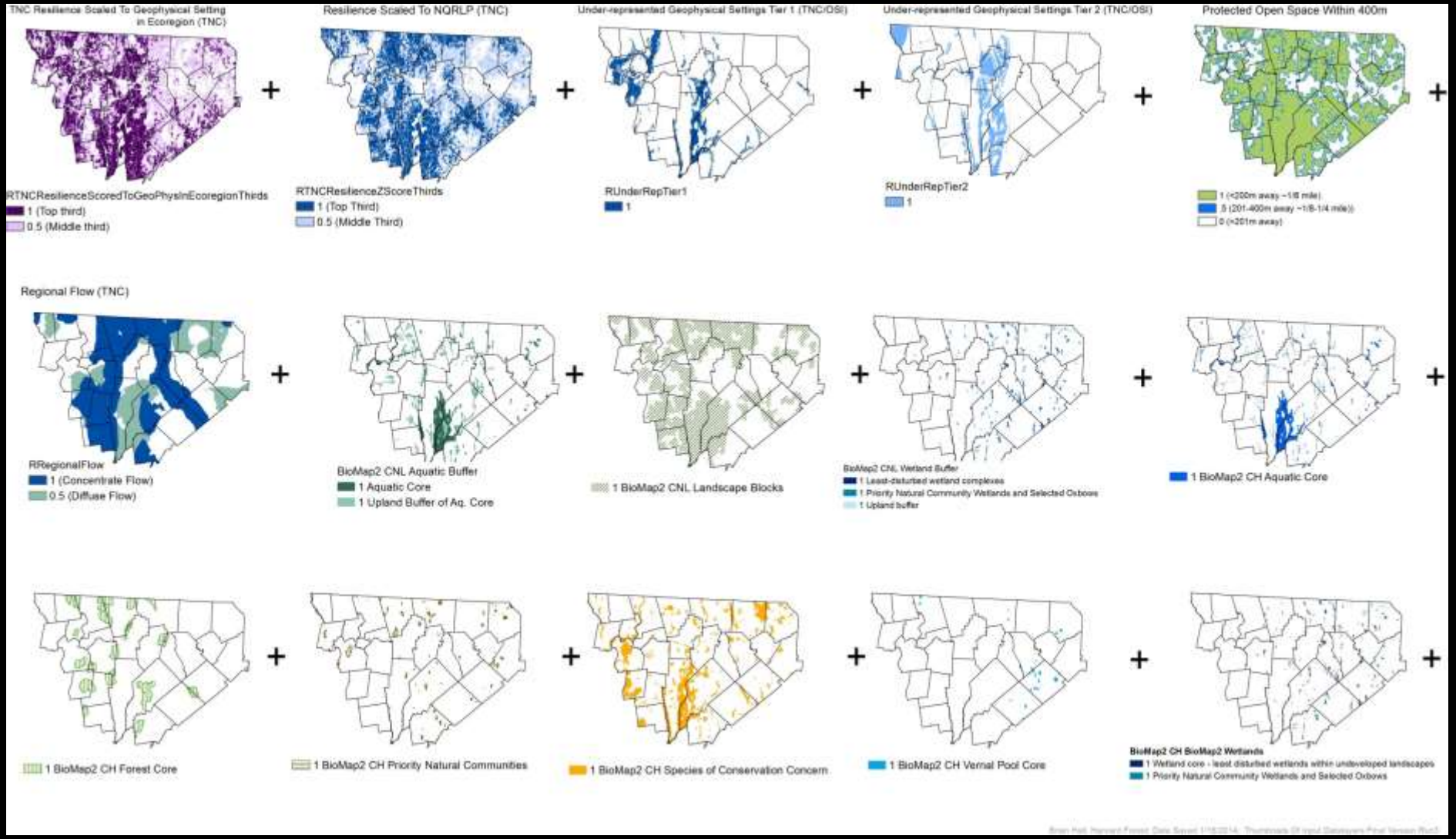
RESILIENCE

1:15 pm	**Afternoon Workshops on New Tools, Lessons, and Innovative Practice** A. **Science & Conservation Planning – Session 2: Climate Resilience for Biodiversity: Using the Data to Evaluate your Land Protection.** Abby Weinberg, Open Space Institute

How The Data Looks:



Example* of TNC Resilience Use - NQRLP

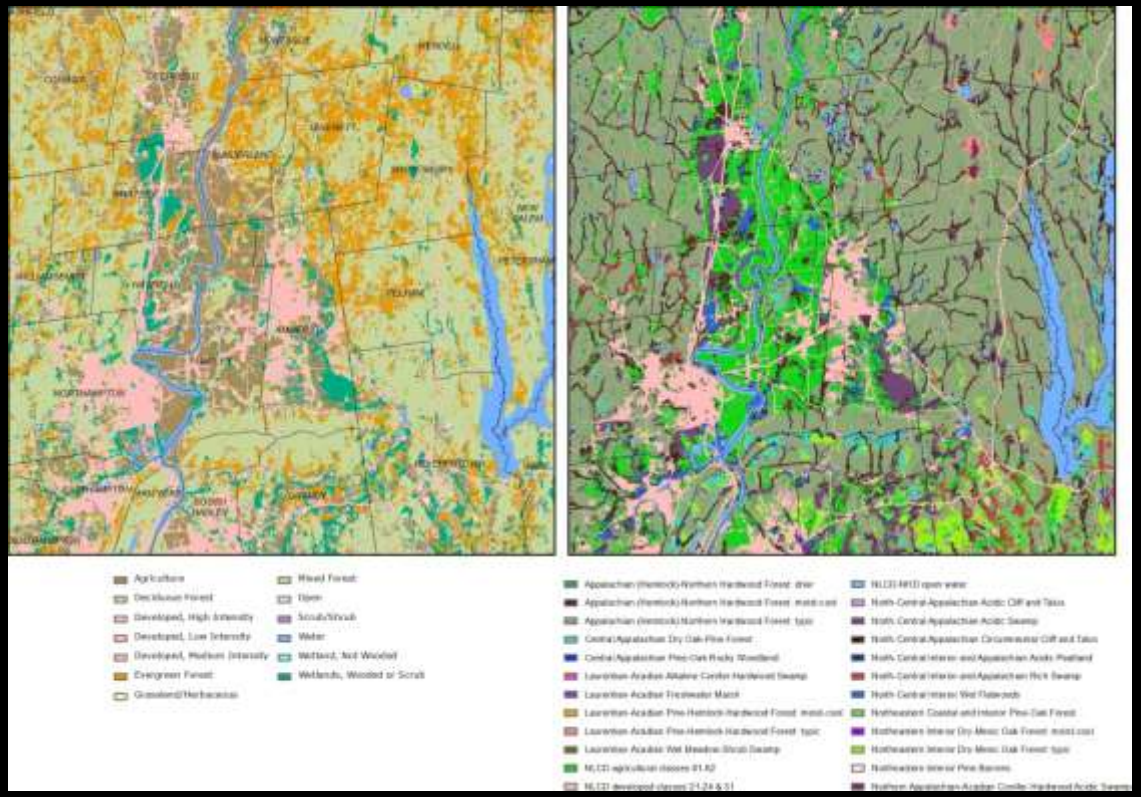


*This is an example not a prescription!

New Data – TNC Terrestrial Habitats

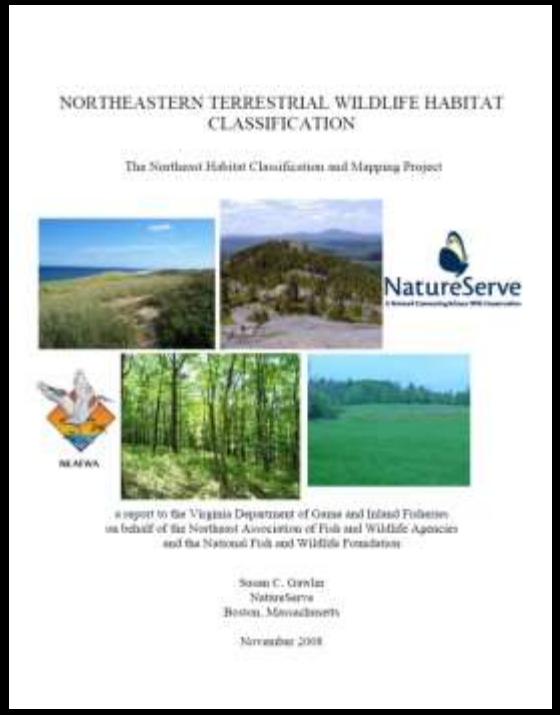
Old Data

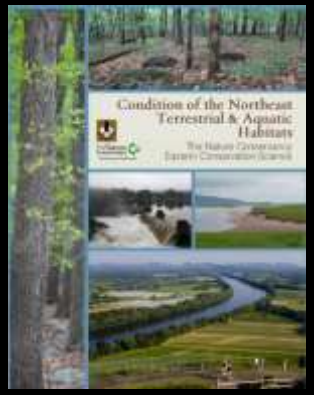
New Data



Use in Land Conservation:

- Detailed, continuous land cover
- Classes are scalable*
- Many specific habitats:
  - Habitat modeling
  - Favoring a habitat(s)
  - Ecological Representation
  - Detailed Condition report available





Scalable Less- To More Precision

FORMATION		MACROGROUP
FORMATION CLASS 1. FOREST AND WOODLAND		
1.C.1	Southeastern Upland Forest	Longleaf Pine
1.C.2	Northeastern Upland Forest	Southern Oak-Pine
		Central Oak-Pine
		Northern Hardwood & Conifer
		Plantation and Ruderal Forest
		Exotic Upland Forest
1.C.3	Northeastern Wetland Forest	Southern Bottomland Forest
		Coastal Plain Swamp
		Central Hardwood Swamp
		Northeastern Floodplain Forest
		Northern Swamp
1.D.1	Boreal Upland Forest	Boreal Upland Forest
1.D.2	Boreal Wetland Forest	Boreal Forested Peatland

Habitat/Ecosystem

- Laurentian-Acadian Northern Hardwoods Forest
- Laurentian-Acadian Northern Pine-(Oak) Forest
- Laurentian-Acadian Pine-Hemlock-Hardwood Forest
- Appalachian (Hemlock)-Northern Hardwood Forest
- North-Central Interior Beech-Maple Forest
- South-Central Interior Mesophytic Forest
- Southern and Central Appalachian Cove Forest
- Southern Appalachian Northern Hardwood Forest
- Southern Piedmont Mesic Forest
- Southern Atlantic Coastal Plain Mesic Hardwood Forest

Scalable Less- To More Precision

Formation

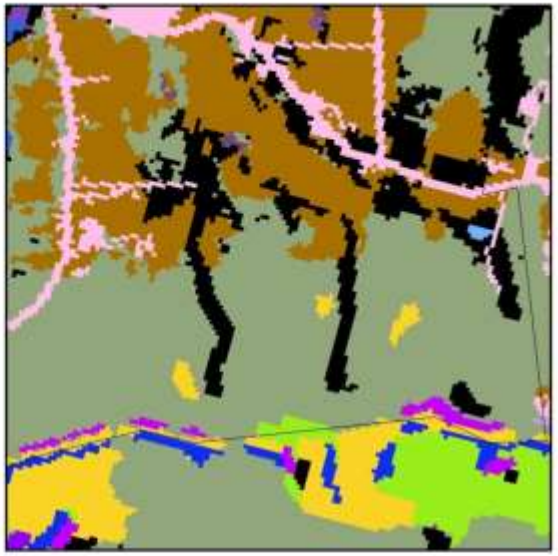
- Agricultural
- Cliff & Rock
- Developed
- Freshwater Marsh
- Northeastern Upland Forest
- Northeastern Wetland Forest
- Water

1 Mile

Macrogroup

- Agricultural
- Central Hardwood Swamp
- Central Oak-Pine
- Cliff and Talus
- Emergent Marsh
- Glade, Barren and Savanna
- Northern Hardwood & Conifer
- Northern Peatland & Fens
- Northern Swamp
- Outcrop & Summit Scrub
- Urban/Suburban Built
- Water
- Wet Meadow / Shrub Marsh

Habitat/Ecosystem



- Appalachian (Hemlock)-Northern Hardwood Forest: moist-cool
- Appalachian (Hemlock)-Northern Hardwood Forest: typic
- Central Appalachian Dry Oak-Pine Forest
- Central Appalachian Pine-Oak Rocky Woodland
- Laurentian-Acadian Freshwater Marsh
- NLCD agricultural classes 81-82
- NLCD developed classes 21-24 & 31
- NLCD-NHD open water
- North-Central Appalachian Acidic Cliff and Talus
- North-Central Appalachian Acidic Swamp
- North-Central Appalachian Circumneutral Cliff and Talus
- North-Central Interior Wet Flatwoods
- Northeastern Interior Dry-Mesic Oak Forest: moist-cool
- Northeastern Interior Dry-Mesic Oak Forest: typic

Uses of TNC Habitats

- Background Info

- Connecticut River LCD

2:45 pm	**Afternoon Workshops on New Tools, Lessons, and Innovative Practice** A. **Science & Conservation Planning – Session 3: The CT River Watershed Landscape Conservation Design: A Network of Linked Cores to Conserve.** Nancy McGarigal, Northeast Region, USFWS; Scott Schwenk, Science Coordinator, NALCC, USFWS

- Foundation of Representation/Portfolio Approach
  - What types have you conserved?
  - Enough examples of each ecosystem type?
  - Could guide future protection

New Data – Ecological Integrity

Ecological Integrity =

"the ability of an area to sustain

ecological functions over the long term"

Note: different website than NALCC →

Ecological Integrity Documentation: http://www.umass.edu/landeco/research/dsl/documents/dsl_documents.html

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

IMPORTANCE-
How Does It Help Land Conservationists?

- Identifies best examples of macrogroup-level habitats
  - Now and in the future
- Has modeled data on future conditions

Calculated based on:

1) Intactness
2) Resiliency to Stress

Intactness - Based On Unique Weighted Combinations Of:

Development and Roads	Local habitat loss Watershed habitat loss Road traffic Agriculture Mowing and Plowing Negative edge effects
Pollution	Watershed road salt Watershed road sediment Watershed nutrient enrichment
Biotic Alterations	Predators ,domestic cats Predators, wild edge spp. Invasive plants (non natives) Invasive earthworms (non native)
Climate	Local climate change
Hydrologic Alterations	Watershed impervious surface Dams Sea-level rise
Coastal	Various Coastal Metrics

Resiliency -
Ability to Retain Ecological Function Following Stress Or Disturbance

Connectedness → How Connected To Neighbors for LESS Mobile Species

Similarity → How Connected To Neighbors for MORE Mobile Species

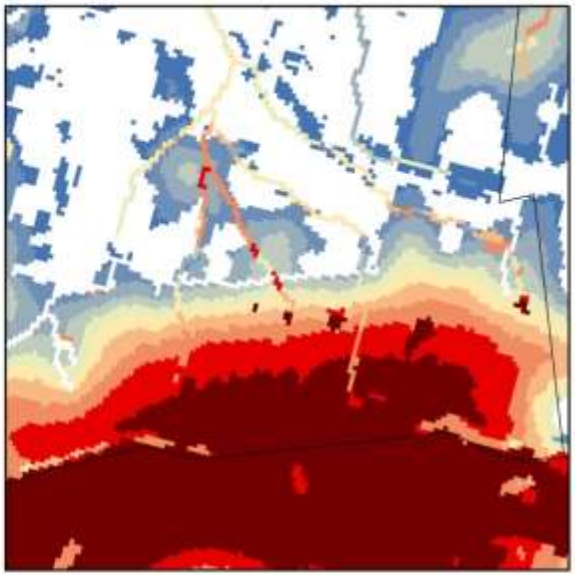
Aerial View

1
Mile

Macrogroup

- Agricultural
- Central Hardwood Swamp
- Central Oak-Pine
- Cliff and Talus
- Emergent Marsh
- Glade, Barren and Savanna
- Northern Hardwood & Conifer
- Northern Peatland & Fens
- Northern Swamp
- Outcrop & Summit Scrub
- Urban/Suburban Built
- Water
- Wet Meadow / Shrub Marsh

IEI

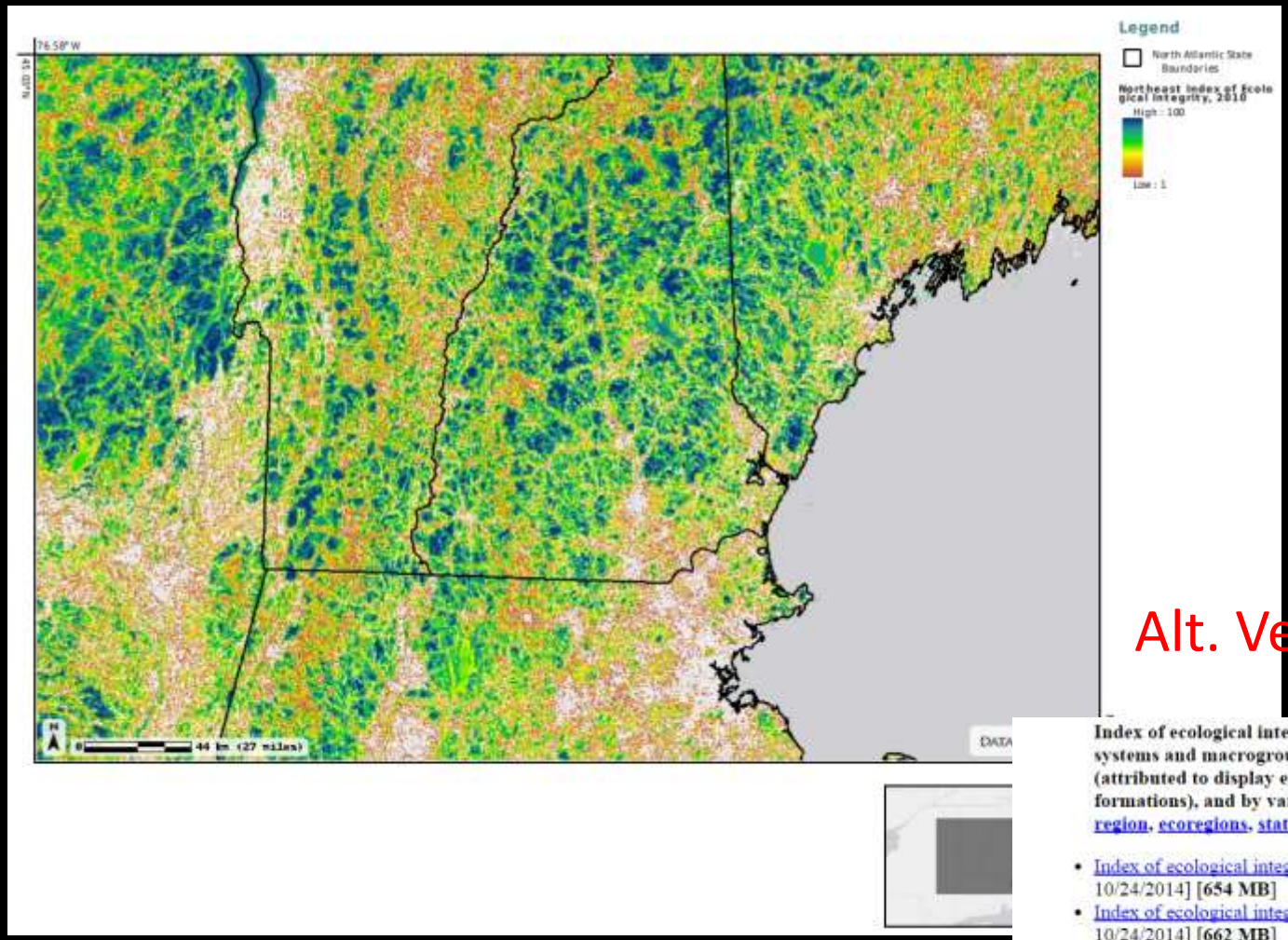


iei-s

- 1 - 10
- 11 - 20
- 21 - 30
- 31 - 40
- 41 - 50
- 51 - 60
- 61 - 70
- 71 - 80
- 81 - 90
- 91 - 100

Scaled to Macrogroups

Data Basin view:



Alt. Versions

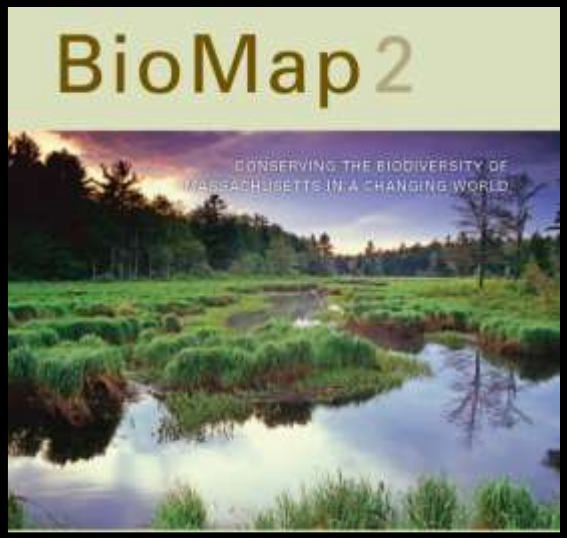
Index of ecological integrity (IEI) grids scaled by ecological systems and macrogroups, as depicted in the capsland grid (attributed to display either systems, macrogroups or formations), and by various geographic extents (Northeast region, ecoregions, states and HUC6 watersheds):

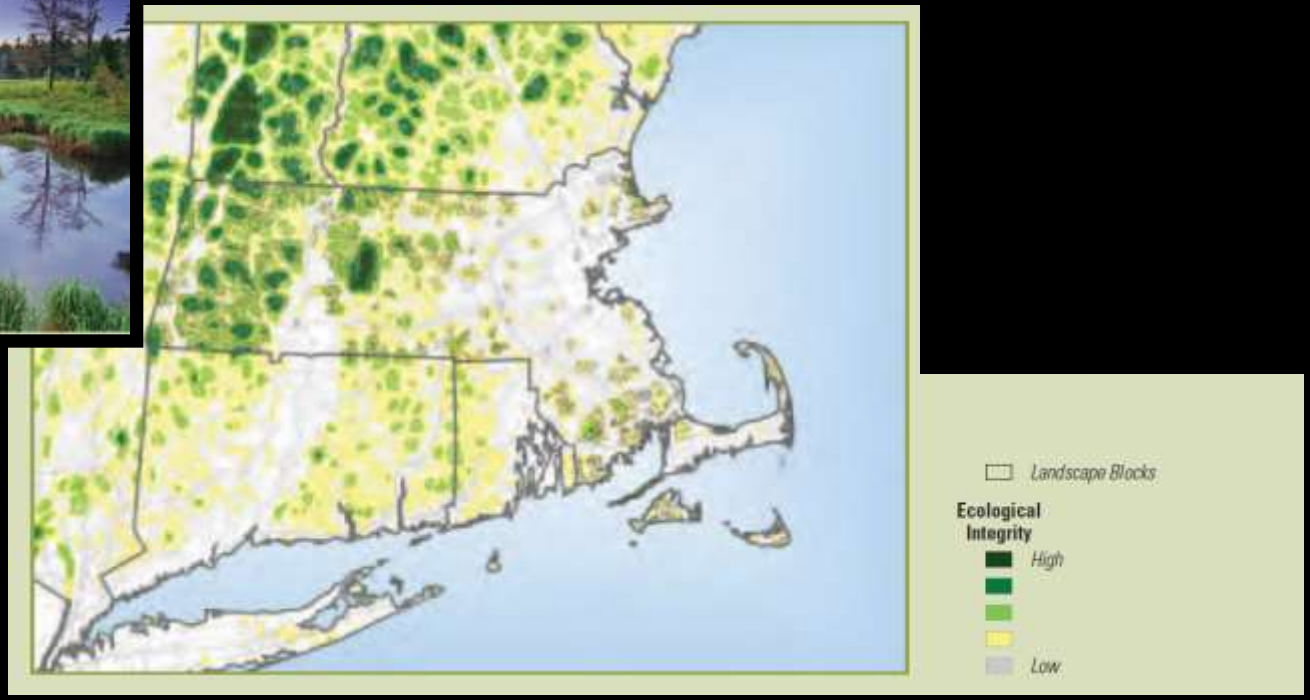
- Index of ecological integrity - scaled by macrogroup and region [update 10/24/2014] **[654 MB]**
- Index of ecological integrity - scaled by macrogroup and state [update 10/24/2014] **[662 MB]**
- Index of ecological integrity - scaled by macrogroup and ecoregion [update 10/24/2014] **[667 MB]**
- Index of ecological integrity - scaled by macrogroup and HUC6 watershed [update 11/6/2014] **[671 MB]**
- Index of ecological integrity - scaled by ecological system and region [update 10/24/2014] **[679 MB]**

2080:

- All 2080 integrity grids

Example of IEI Use

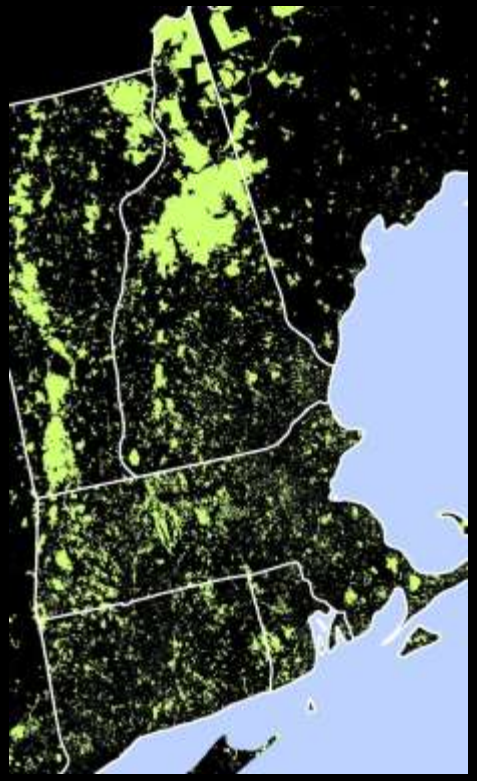




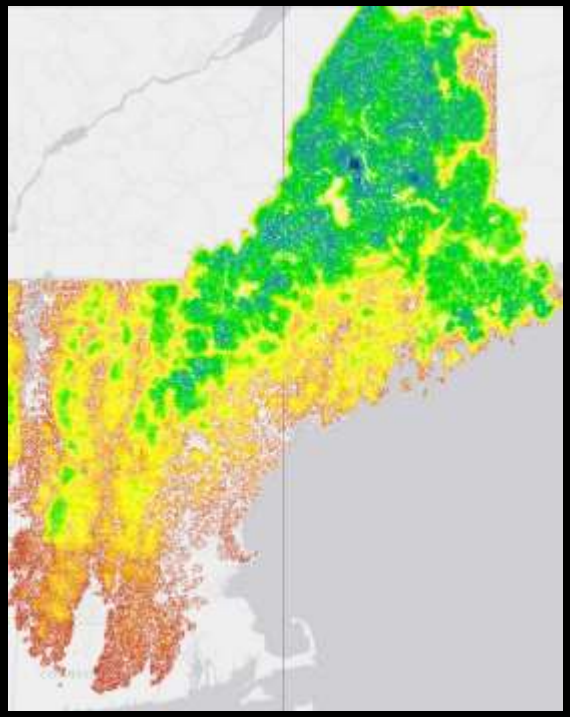
1) BioMap2
2) CT River LCD

Other Popular NALCC Datasets

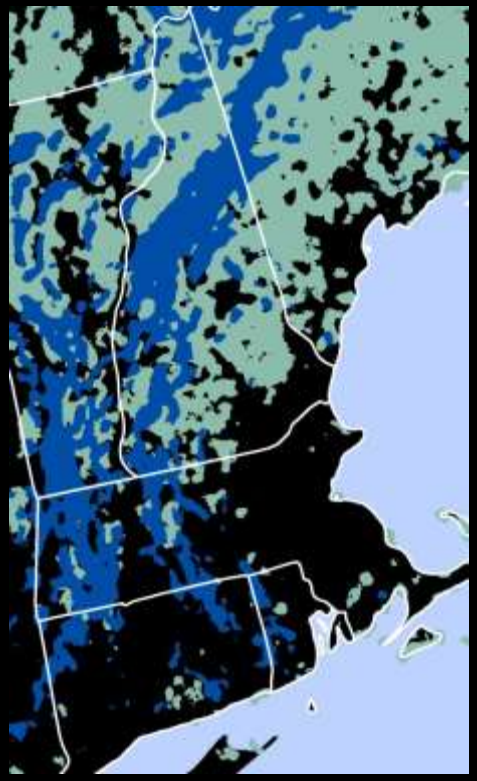
Protected Areas
(TNC SA)



Wildlife Landscape
Capability Models
For 30 Individual Species
(current and future)



Permeability
(Regional Flow)



The following are back pocket slides

Some Examples* of How To Use These Data?

Habitats – preselected representation

Habitats – find types under represented in protected lands

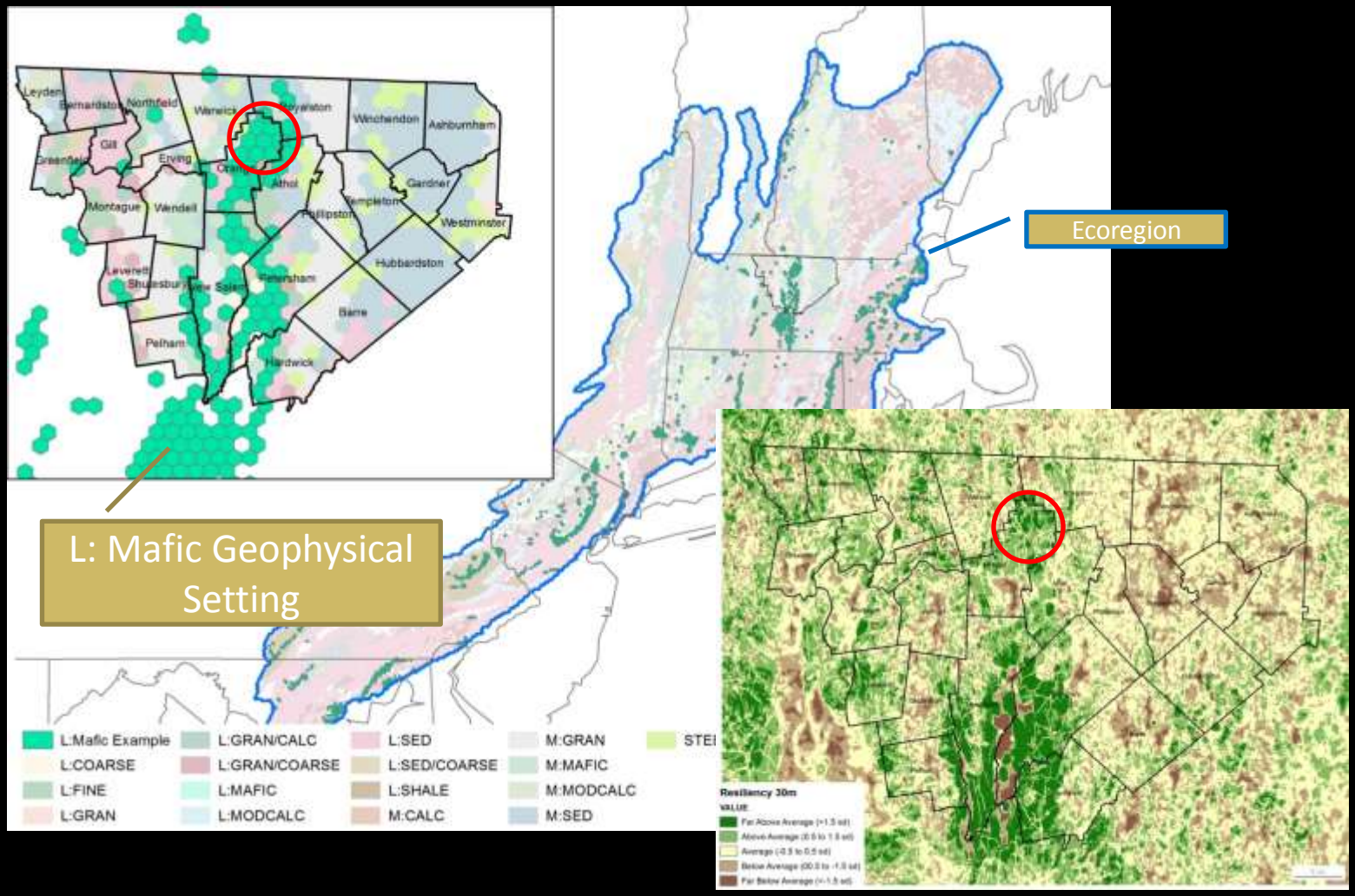
Habitats and TNC Resilience - representation and pick most resilient

IEI and Habitats - representation and most intact + highest resiliency

TNC Resilience and IEI – resilience and resiliency – similar but different…but too similar?

IEI without macrohabitats - request unscaled data and rescale to broader (less detailed) landscape levels

CAUTION #1 - Every 30m cell's score is expressed relative to the average score of all other cell's in the same geophysical setting ("stage") within the ecoregion.

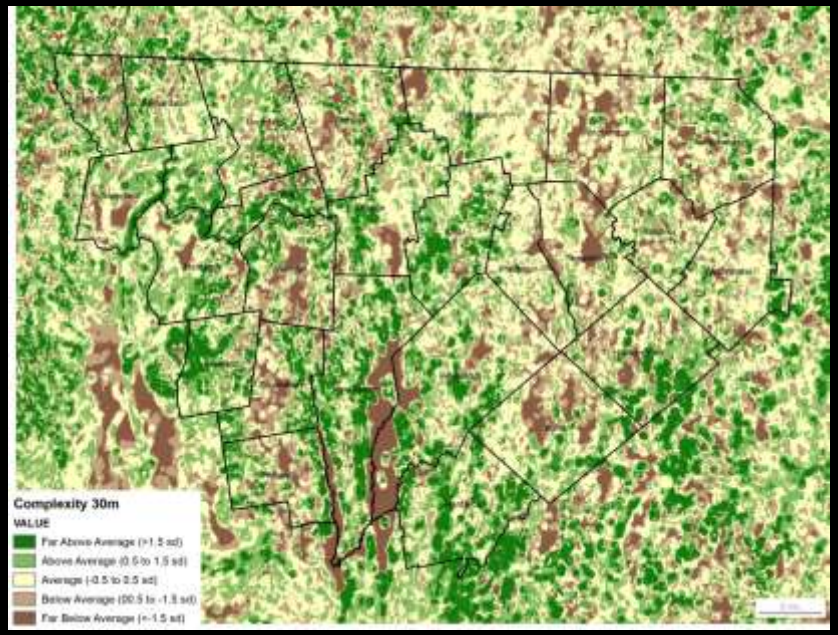


CAUTION #2 – Data is scored in 1000-acre hexagons

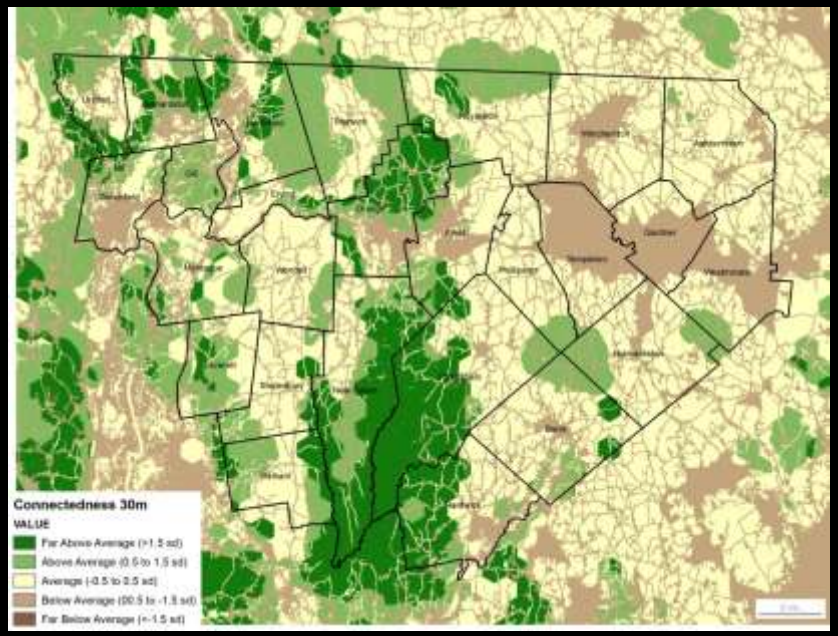
NQRLP Membership thoughts/decisions about our model

- Three meetings + GIS group
- Members were enthusiastic
- Biodiversity focus
- Partnership-level priorities
- Grantors' criteria important
- Simple model (math and data)
- Climate change planning

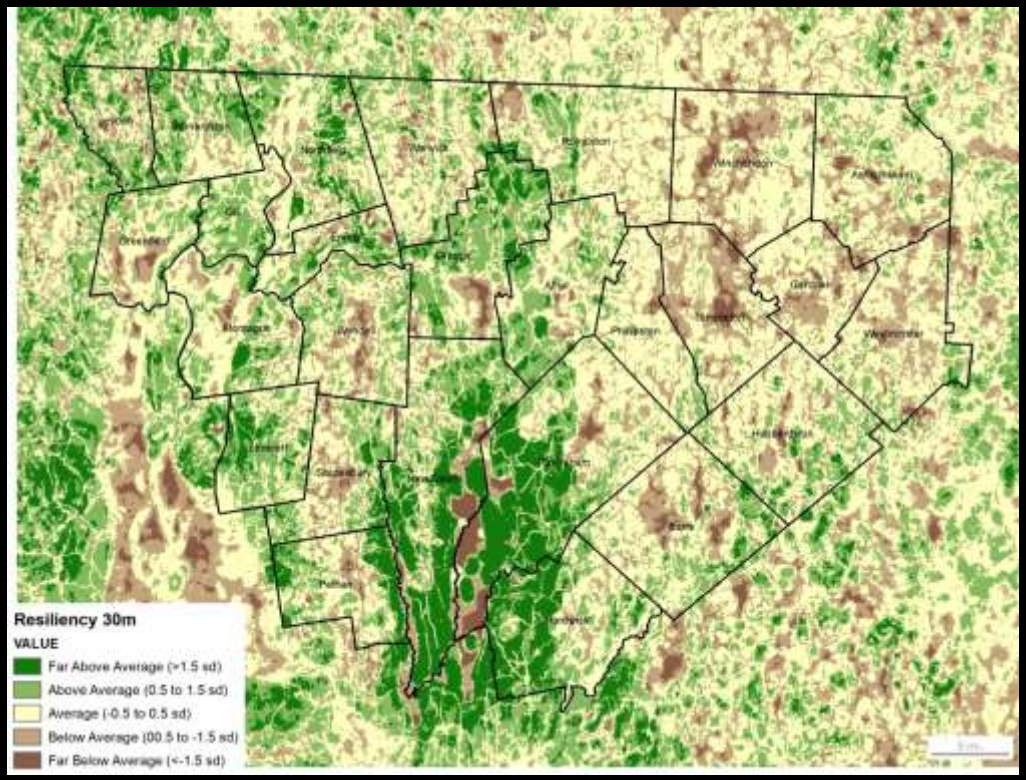
Complexity



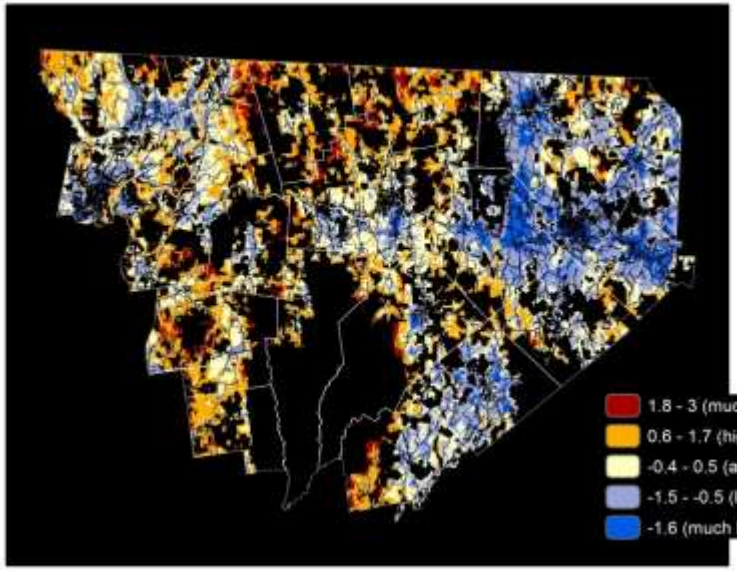
Permeability



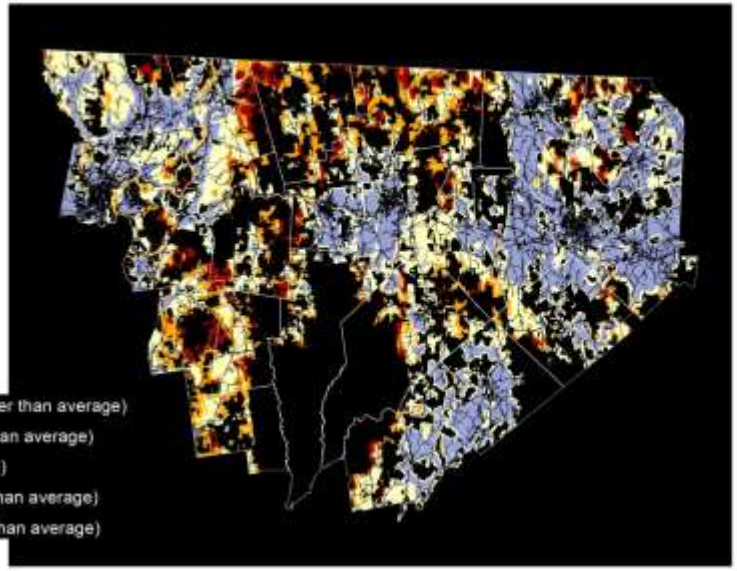
Resilience



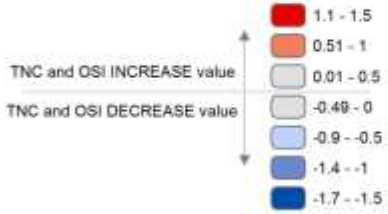
With TNC and OSI

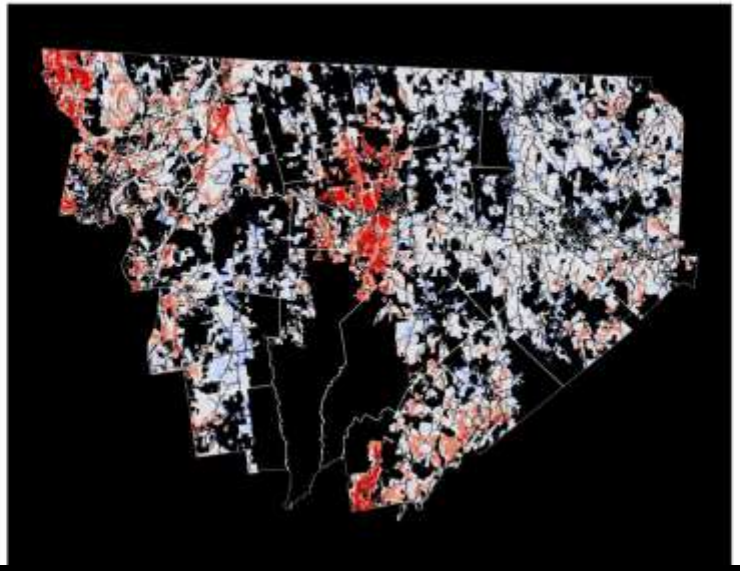


Without TNC Resilience and OSI Underrep.

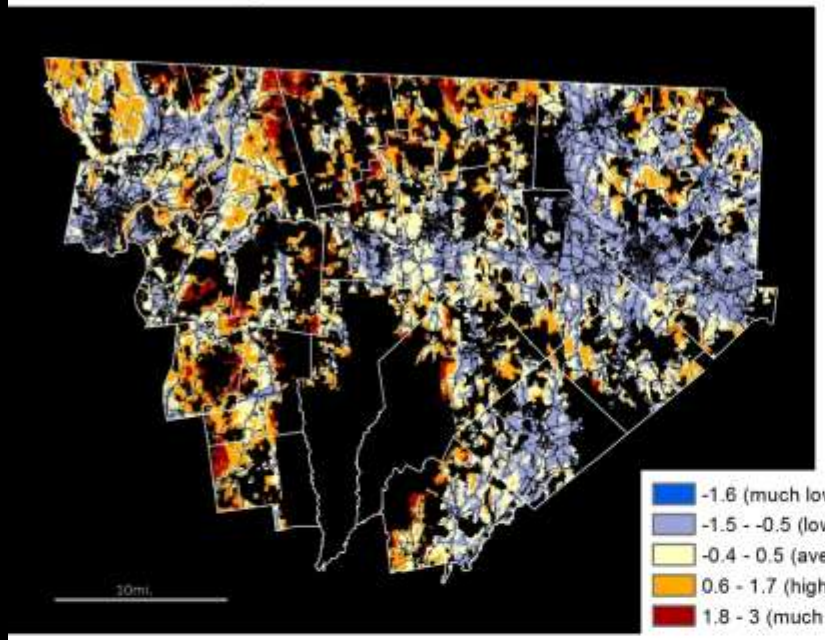


With TNC and OSI Minus Without (Difference)

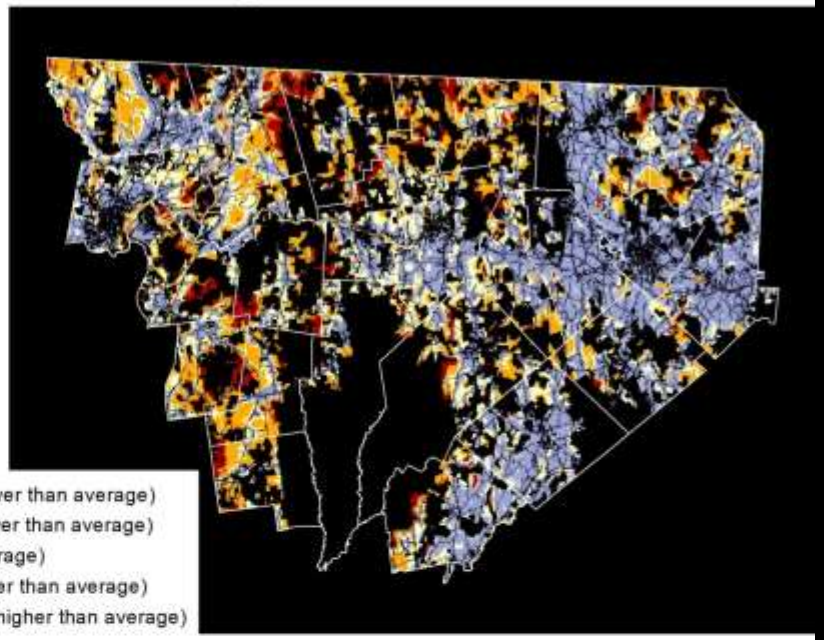




Run1 Voted Weights

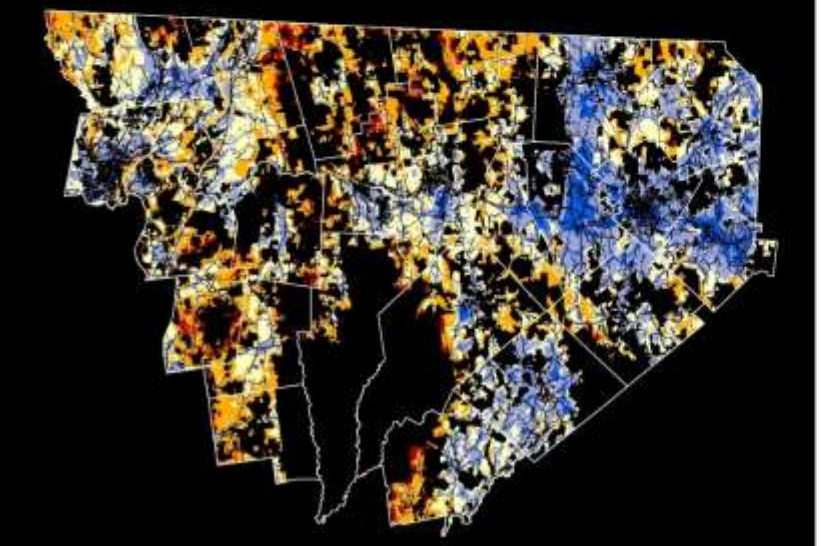


Run4 Voted Weights But No Resilience Data



-1.6 (much lower than average)
-1.5 - -0.5 (lower than average)
-0.4 - 0.5 (average)
0.6 - 1.7 (higher than average)
1.8 - 3 (much higher than average)

Run2 Simple Weights



Run 3 Simple Weights Favor BioMap2