Conservation of Biodiversity in Changing Climates: Moving Targets and Practical Actions

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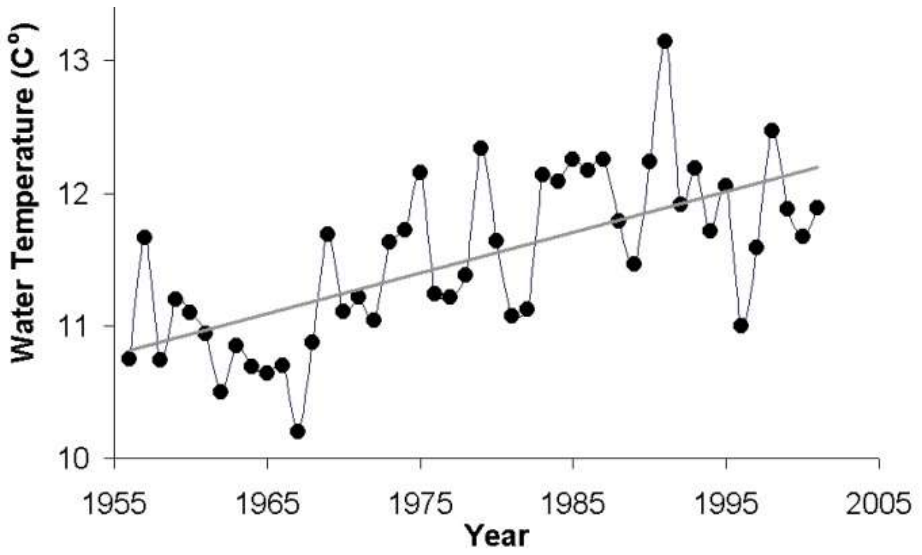
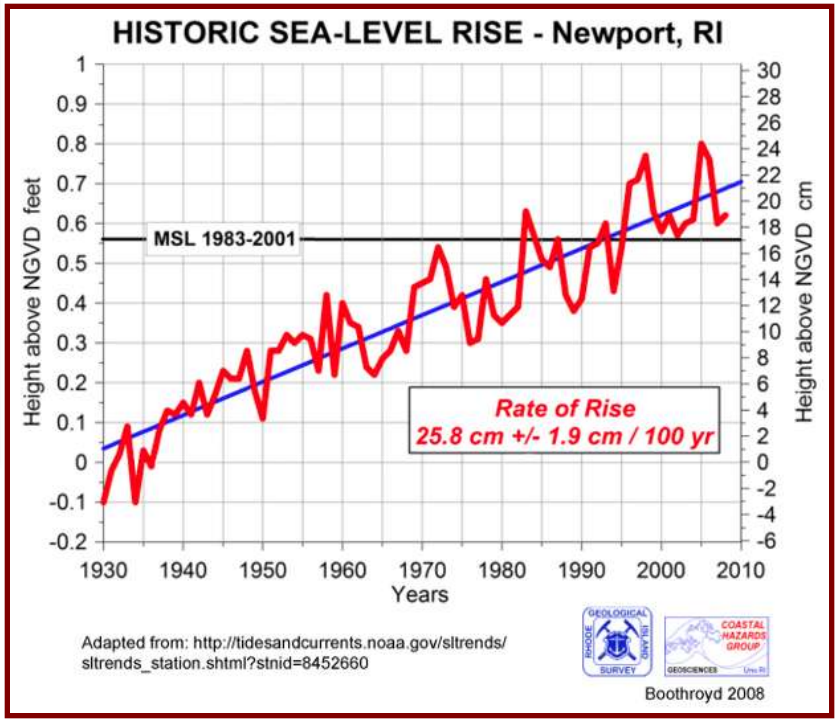
Don Robadue, URI CRC

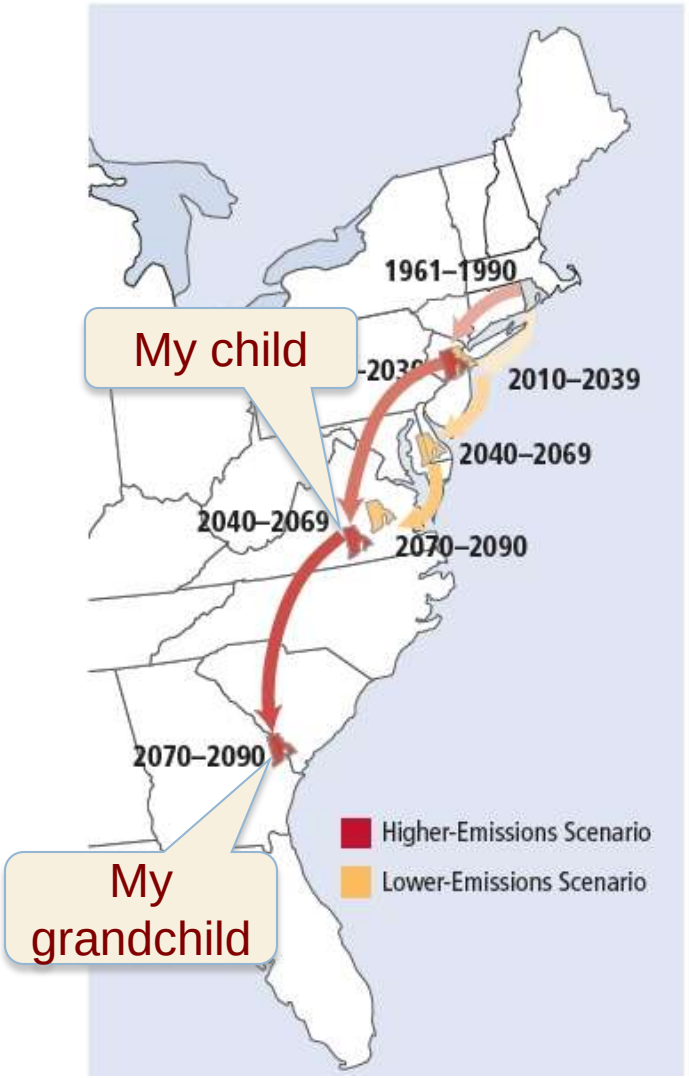
Climate Change is Here

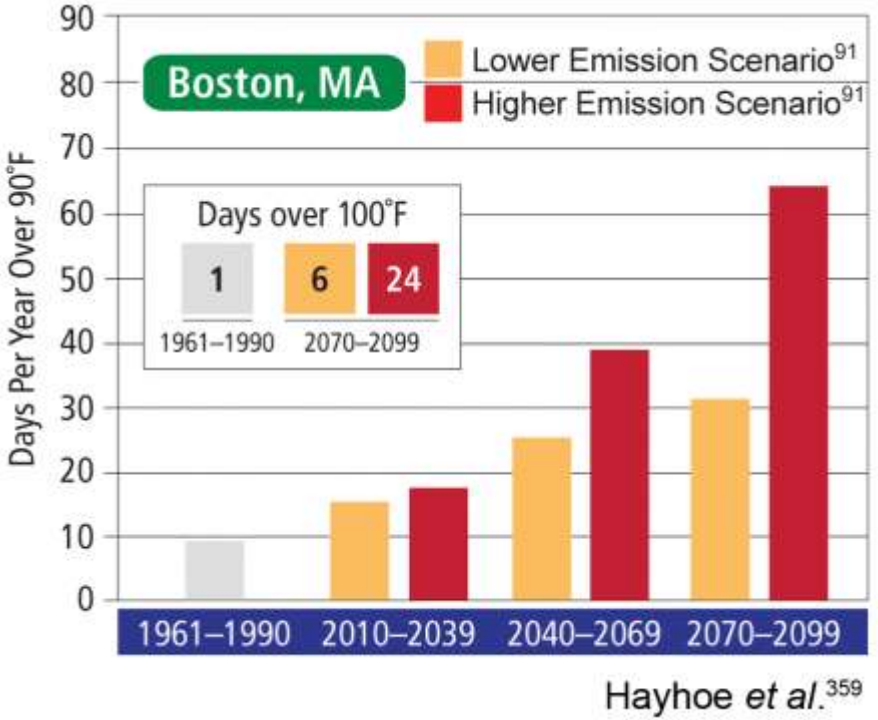
Surface Temperature
Narragansett Bay





Big Changes ... Soon



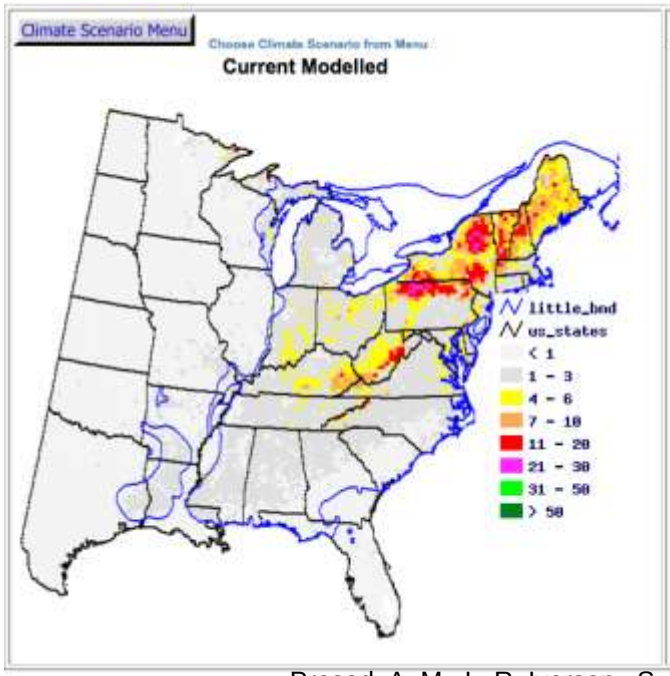


Hayhoe *et al.*[359]

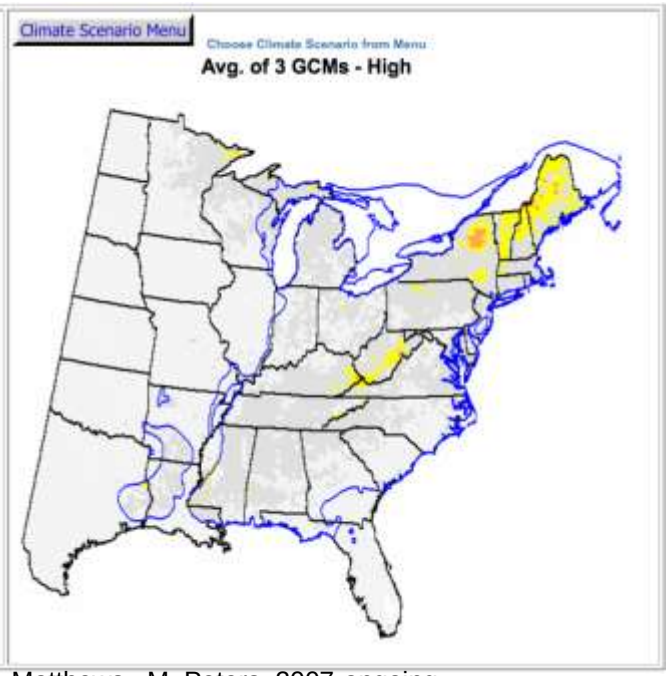
What Will Our Ecosystems Look Like?

American Beech Tree
(Fagus grandifolia)

Current



Future



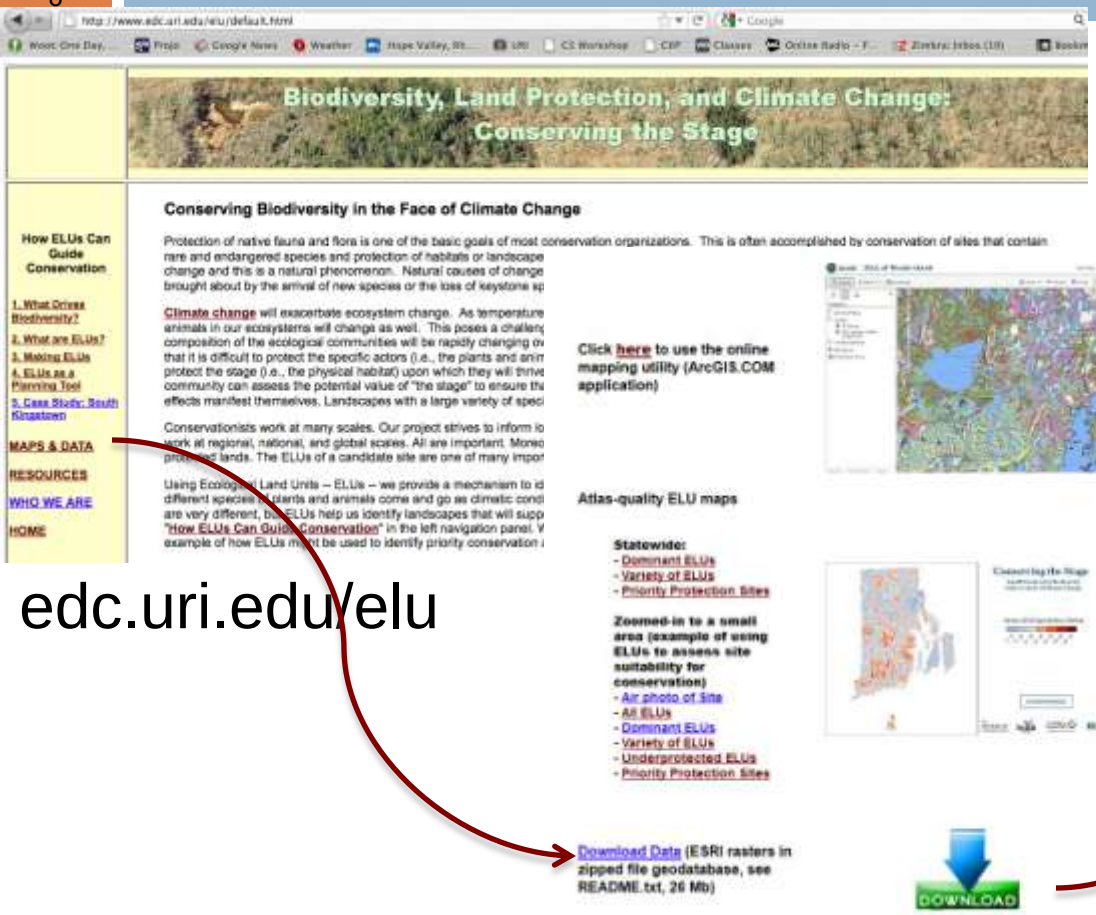
Prasad, A. M., L. R. Iverson., S. Matthews., M. Peters. 2007-ongoing.

Will Our Network of Protected Lands Still Work?

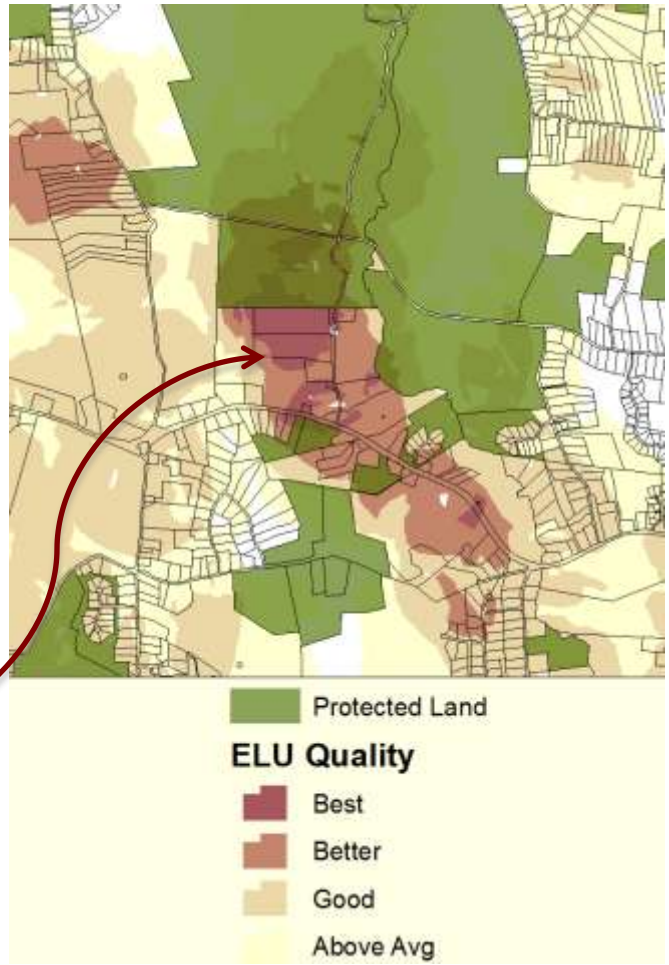
Protecting Rare Species

Protecting Unique Ecosystems

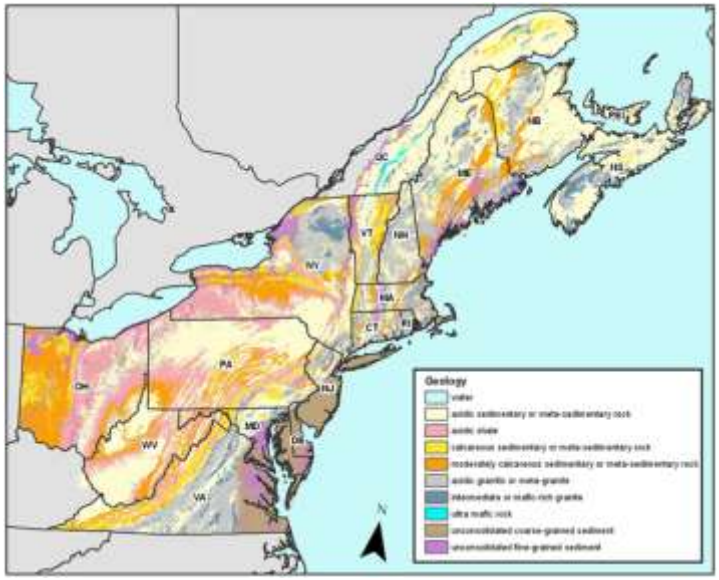
A Practical Solution

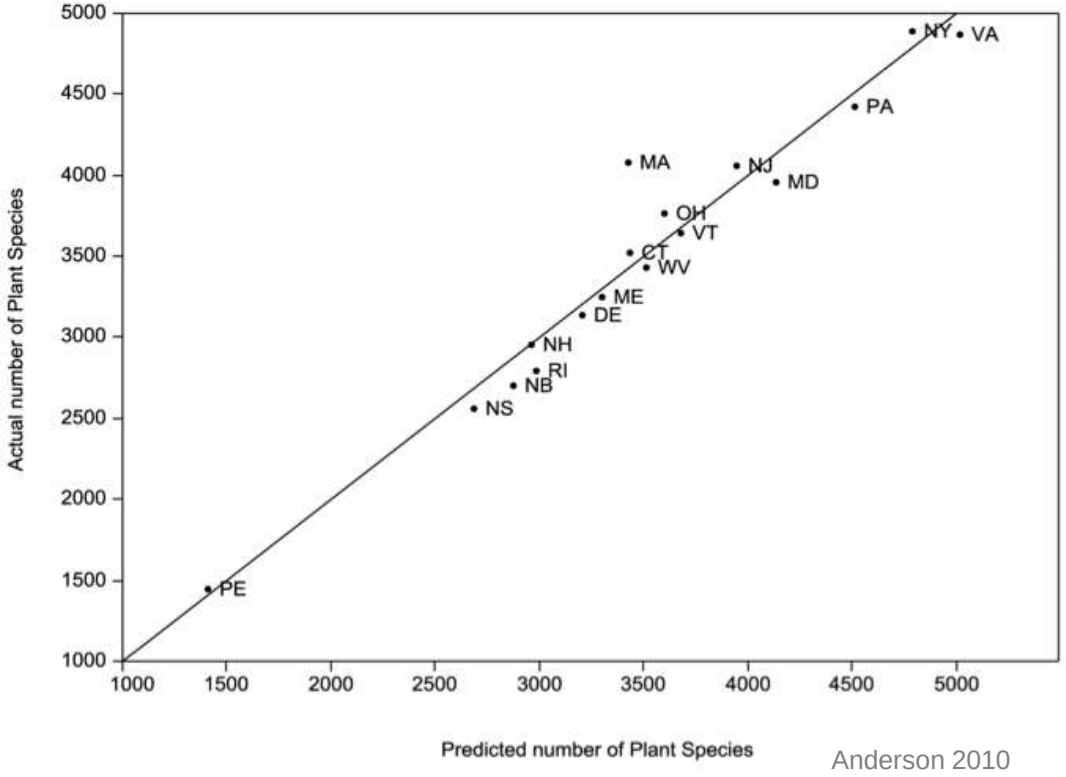


edc.uri.edu/elu



Preserving the Stage, Not the Actors

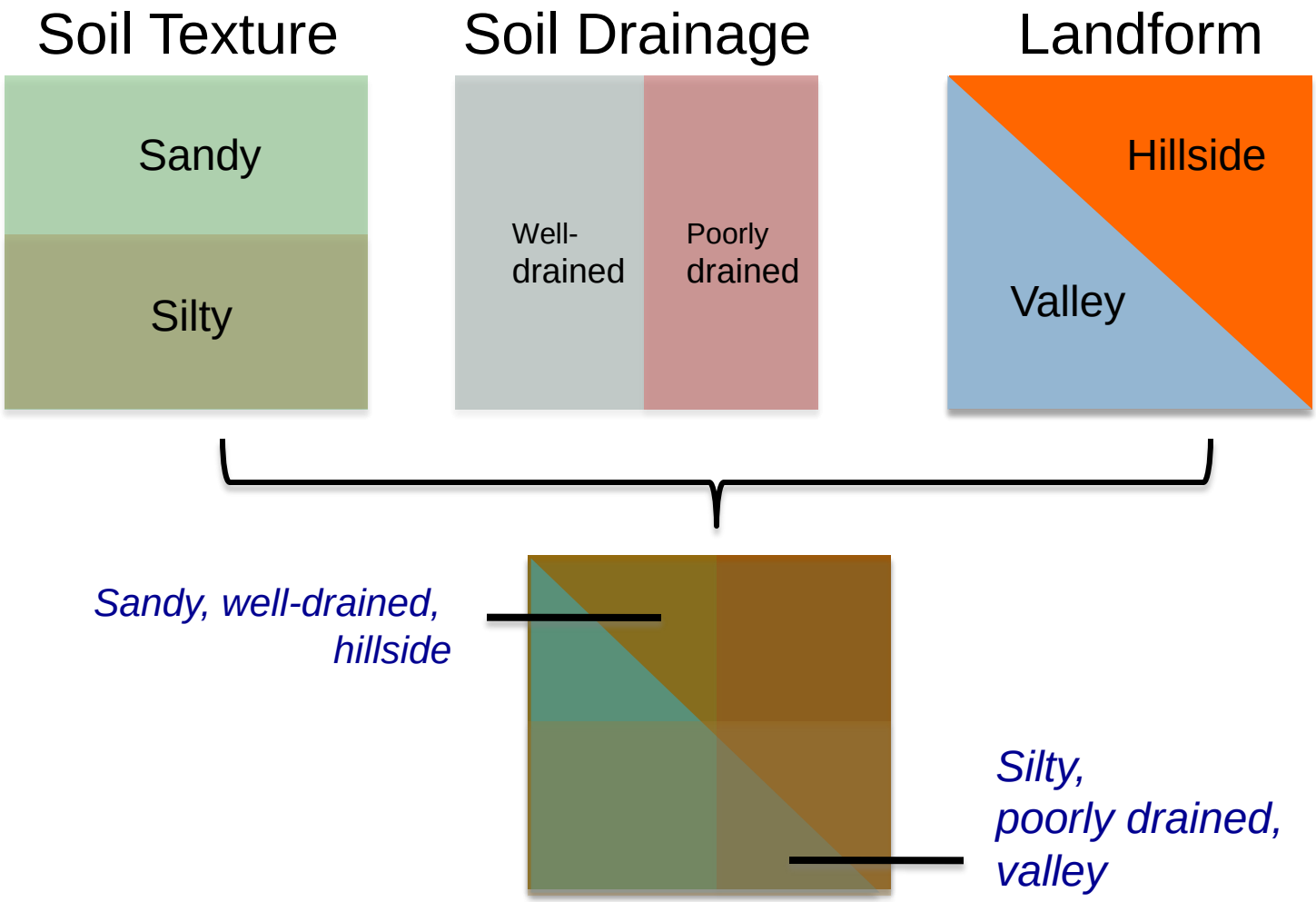




Anderson 2010

Basic Premise: Complex, Diverse Physical Environments Support Complex, Diverse Ecological Communities

ELUs – Ecological Land Units

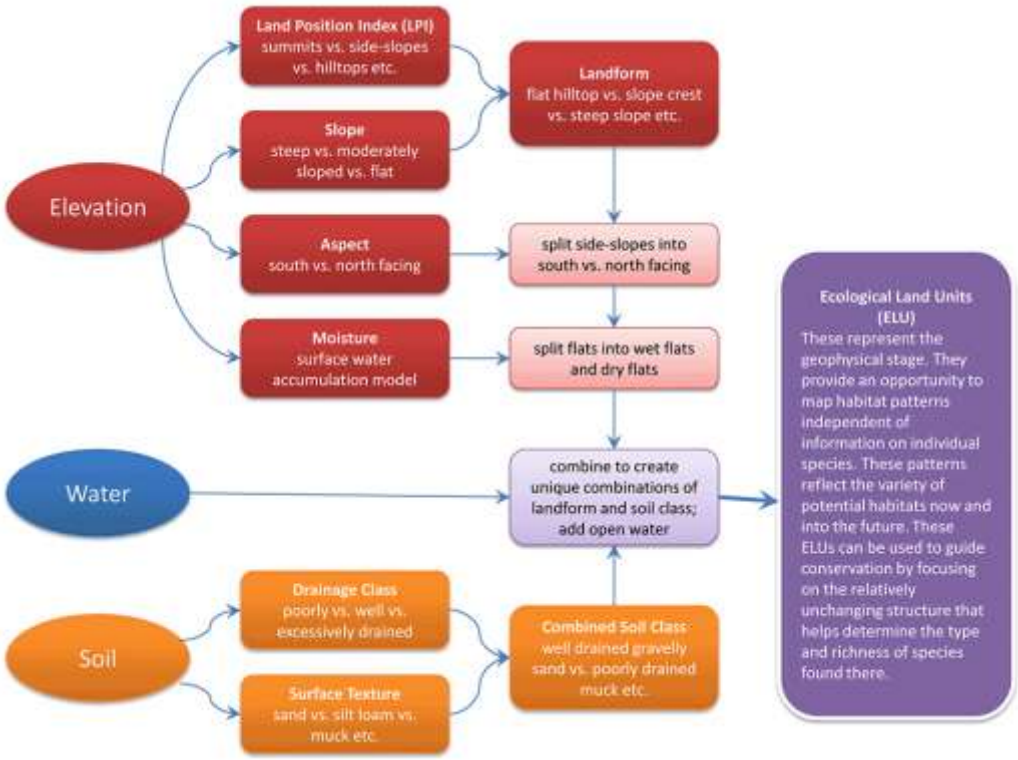


Making ELUs Local

ELU – Ecological Land Unit

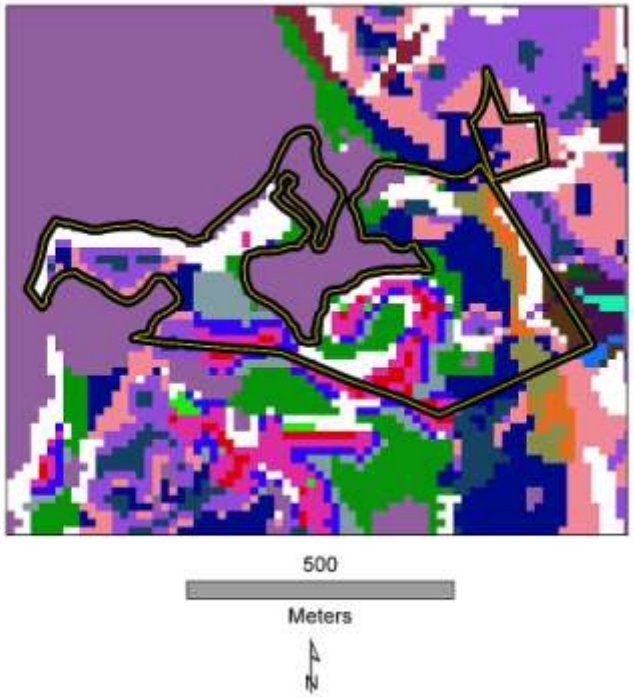
Areas of unique soil drainage, soil texture, & landform

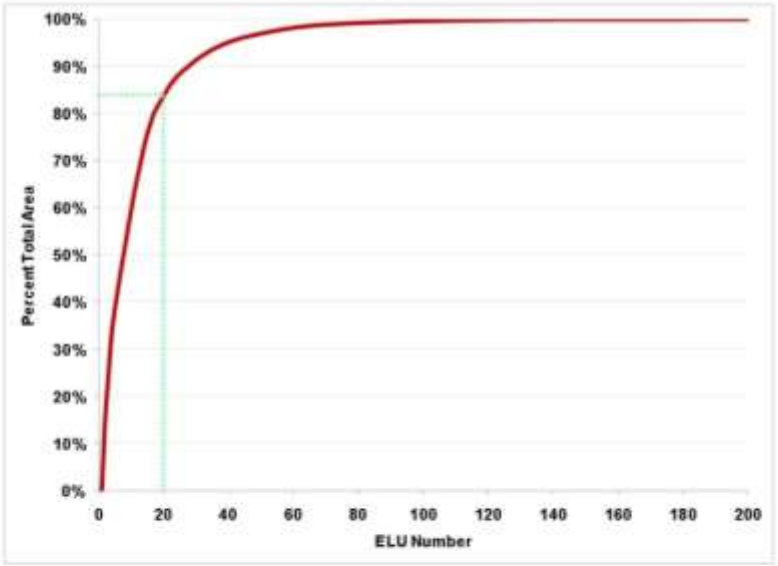
ELU Code	Description
1121	Excessively drained gravelly sand on flat hilltop
1122	Excessively drained gravelly sand on gentle slope
1123	Excessively drained gravelly sand on upper sideslope/rounded ridge
1130	Excessively drained gravelly sand on dry flat



ELUs – Ecological Land Units

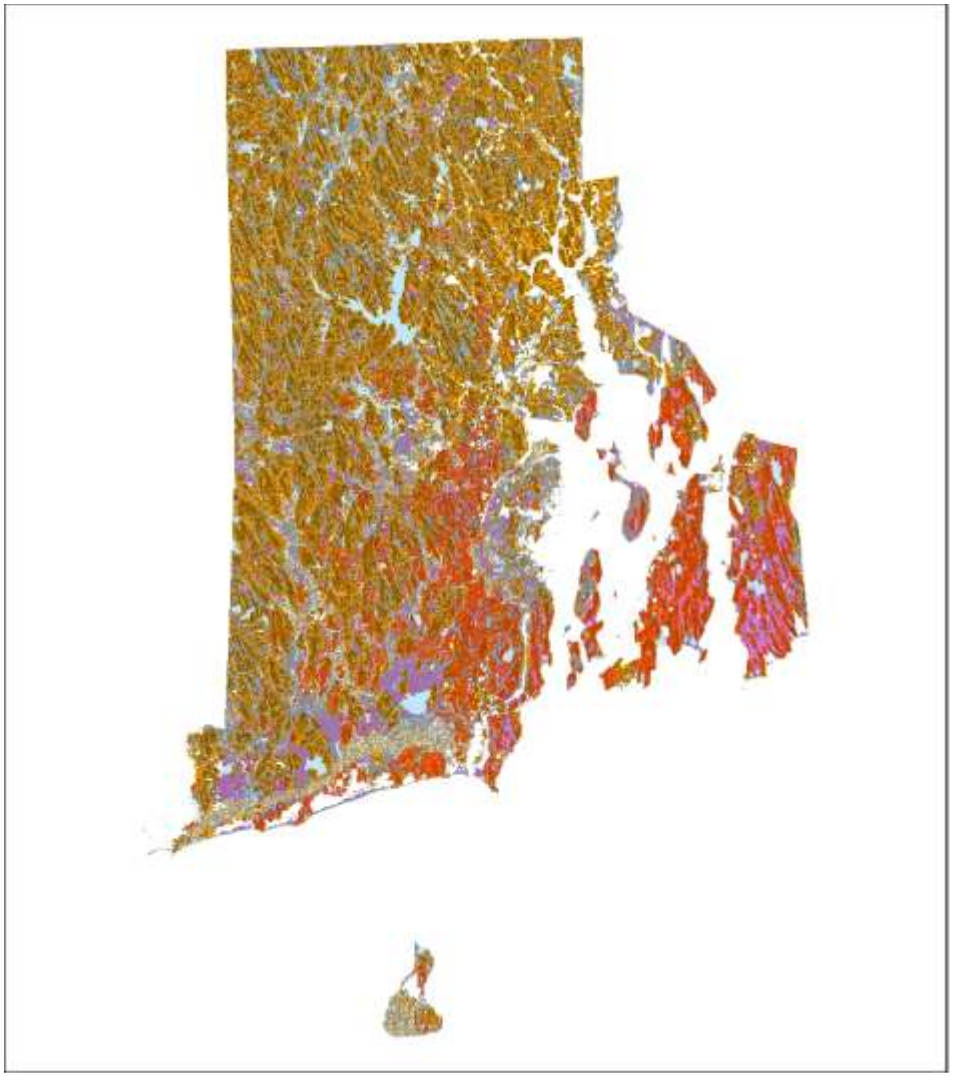
204 Unique ELUs
20 Dominant ELUs cover 85% of RI





In this graph, we plot the cumulative percent area of each type of ELU in Rhode Island. ELU's are ranked from most common to most rare (left to right). The graph shows that approximately 85% of the state is covered by only 20 of the 200+ ELU types.

Ecological Land Units for RI



Conserving the Stage

Land Protection for Biodiversity in the Context of Climate Change

Dominant ELU Types

- excessively drained gravelly sand on flat hilltop
- excessively drained gravelly sand on gentle slope
- excessively drained gravelly sand on upper side slope/rounded ridge
- excessively drained gravelly sand on dry flat
- excessively drained gravelly sand on valley/toe slope
- well drained fine sandy loam on flat hilltop
- well drained fine sandy loam on gentle slope
- well drained fine sandy loam on upper sideslope/rounded ridge
- well drained fine sandy loam on SE facing sideslope
- well drained fine sandy loam on dry flat
- well drained fine sandy loam on valley/toe slope
- well drained silt loam on flat hilltop
- well drained silt loam on gentle slope
- well drained silt loam on dry flat
- well drained silt loam on valley/toe slope
- poorly drained fine sandy loam on flat hilltop
- poorly drained fine sandy loam on gentle slope
- poorly drained silt loam on flat hilltop
- poorly drained muck on flat hilltop
- water
- other categories

For more information please contact
Kevin Ruddock at kruddock@tnc.org

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Sea Grant Rhode Island

The Nature Conservancy

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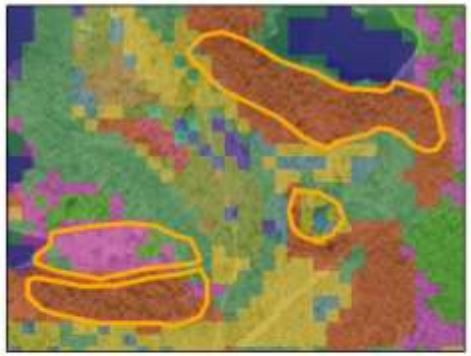
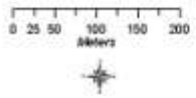
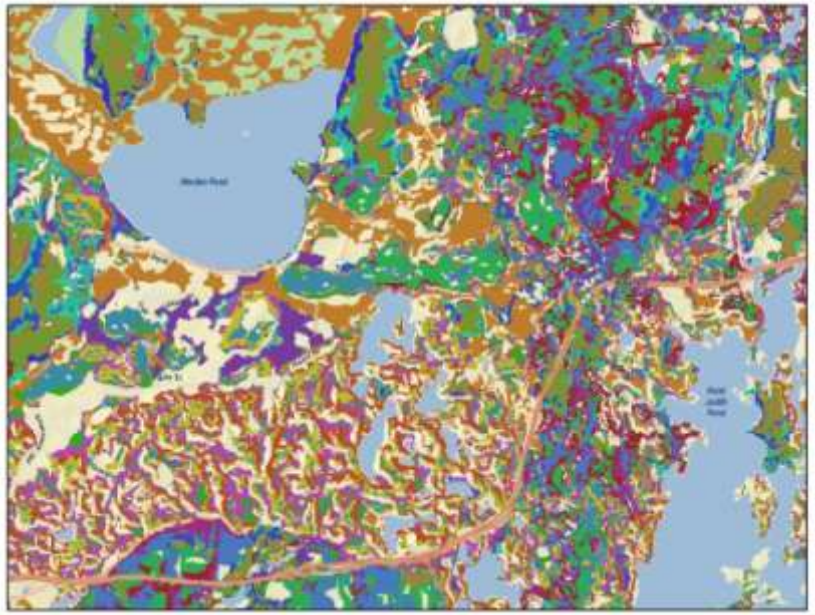
ELUs and Plant Community Types

Distinct vegetation communities in upland areas in the Matunuck Hills Kettle Ponds landscape

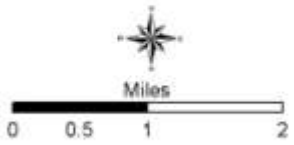


ELU's show approximate demarcation of the different vegetation communities

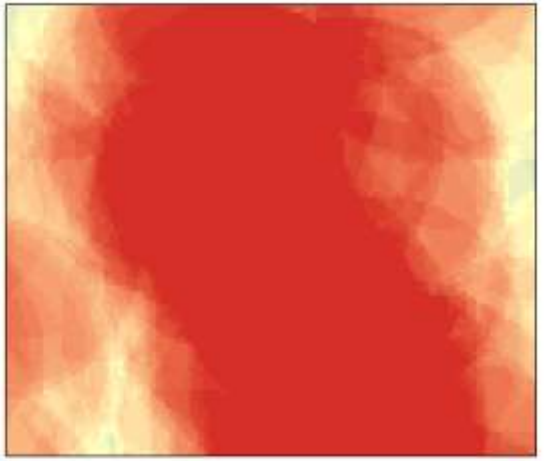




ELUs of the Matunuck Hills
South Kingstown



Mapping ELU Variety



Unique ELUs

1,121	2,421	2,432	3,421
1,122	2,422	2,521	3,422
1,123	2,423	2,522	3,521
1,130	2,424	2,530	3,621
1,132	2,430	2,532	5,900
			9,999

 # Kinds ELUs Within 1,500 Feet

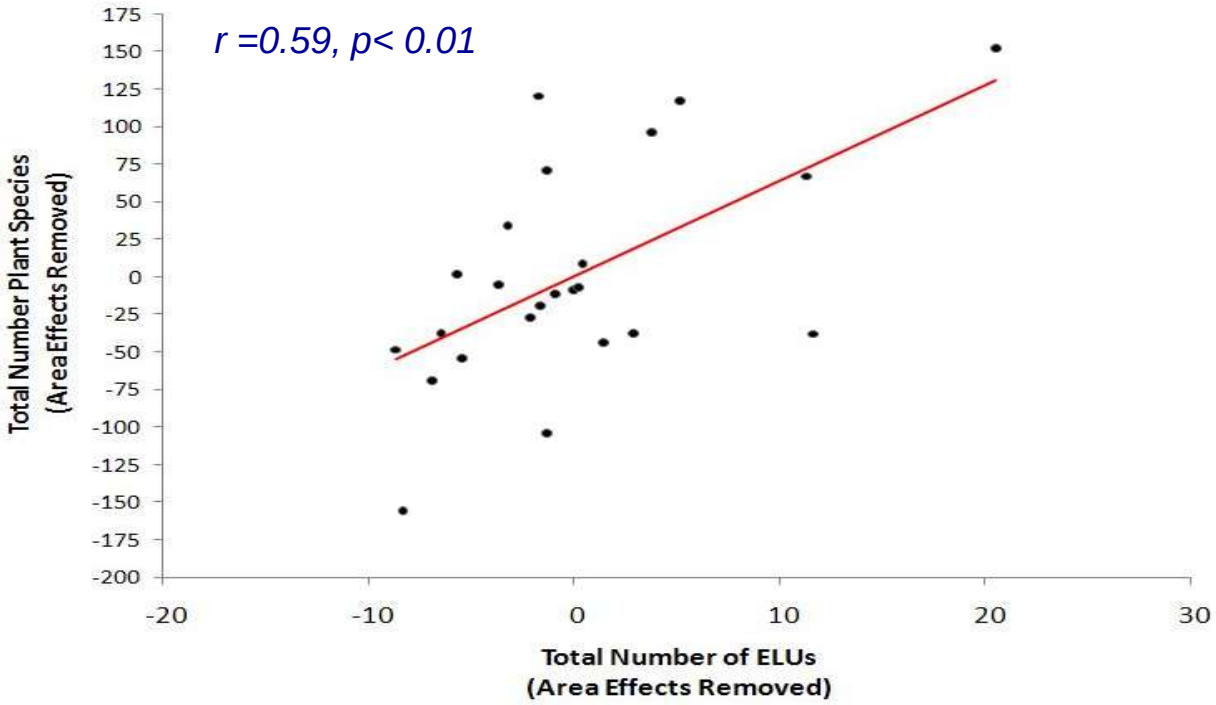
65 Types of ELUs

1 Type of ELU

Does ELU Variety = High Biodiversity: Testing the Hypothesis

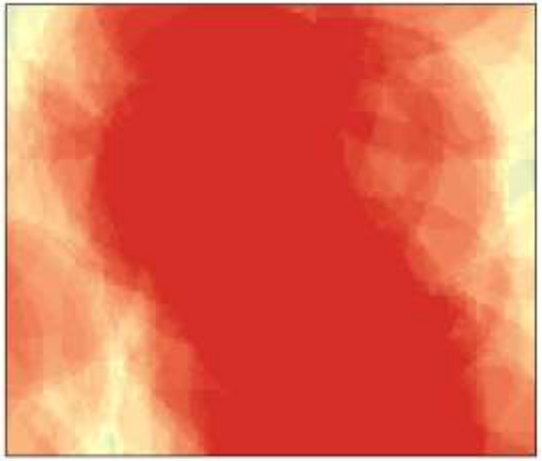
Plant Diversity

24 ASRI Bioreserves

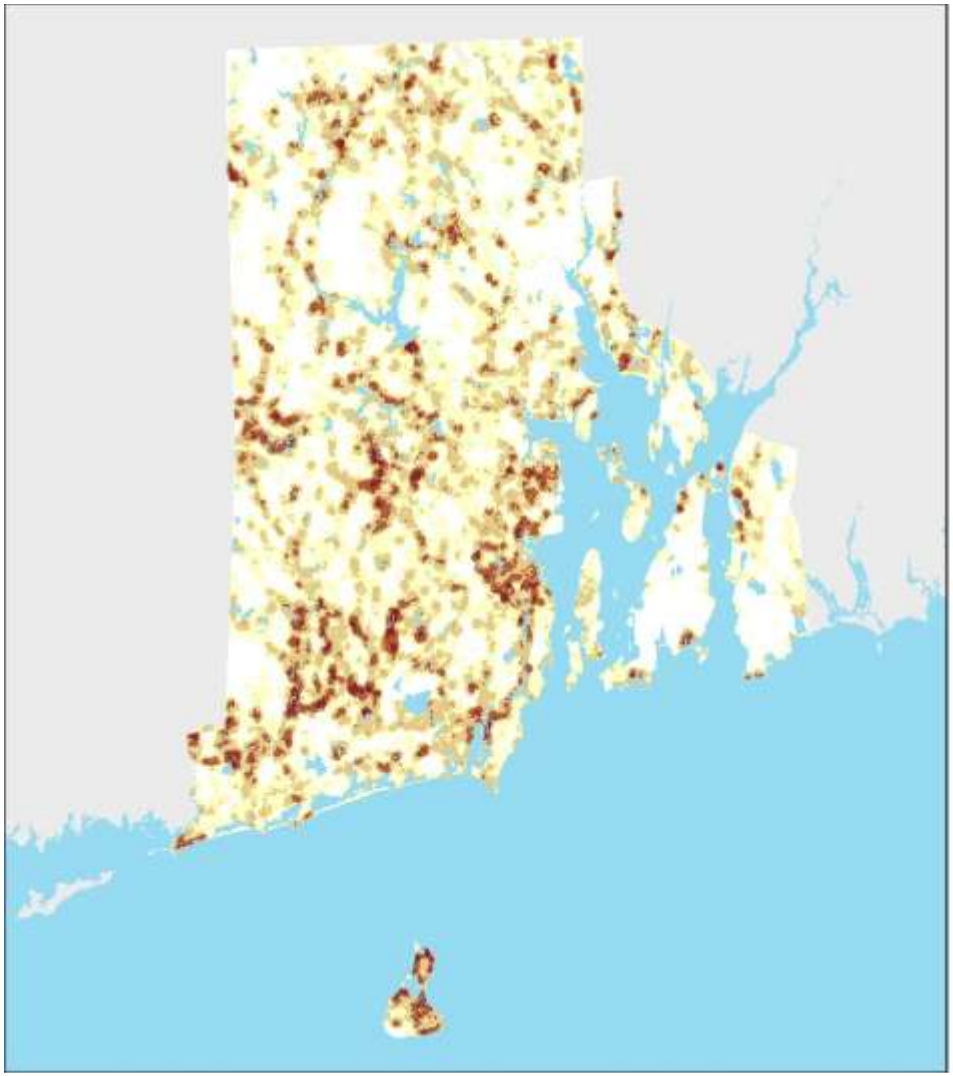


N = 24 Bioreserves
Mean Bioreserve Area = 13.4 Ha (Range 1 – 45 Ha)
Mean # Plant Species = 215

Mapping ELU Variety: A Simple Guide



A Statewide View



Conserving the Stage

Land Protection for Biodiversity in the Context of Climate Change

Quality (ELU Variety)

Above Avg | Good | Better | Best

For more information please contact
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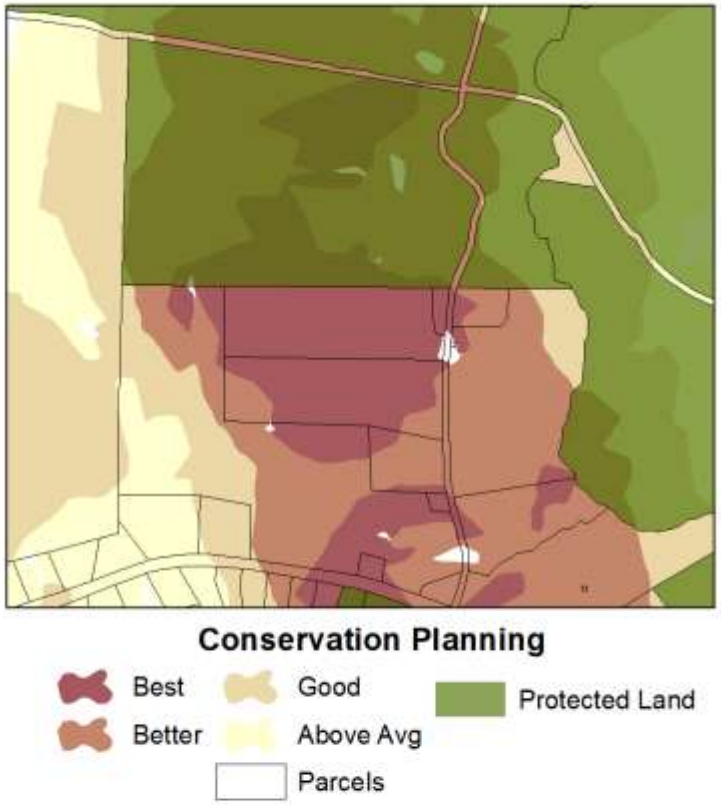
ELUs and Conservation Planning at a Parcel Scale

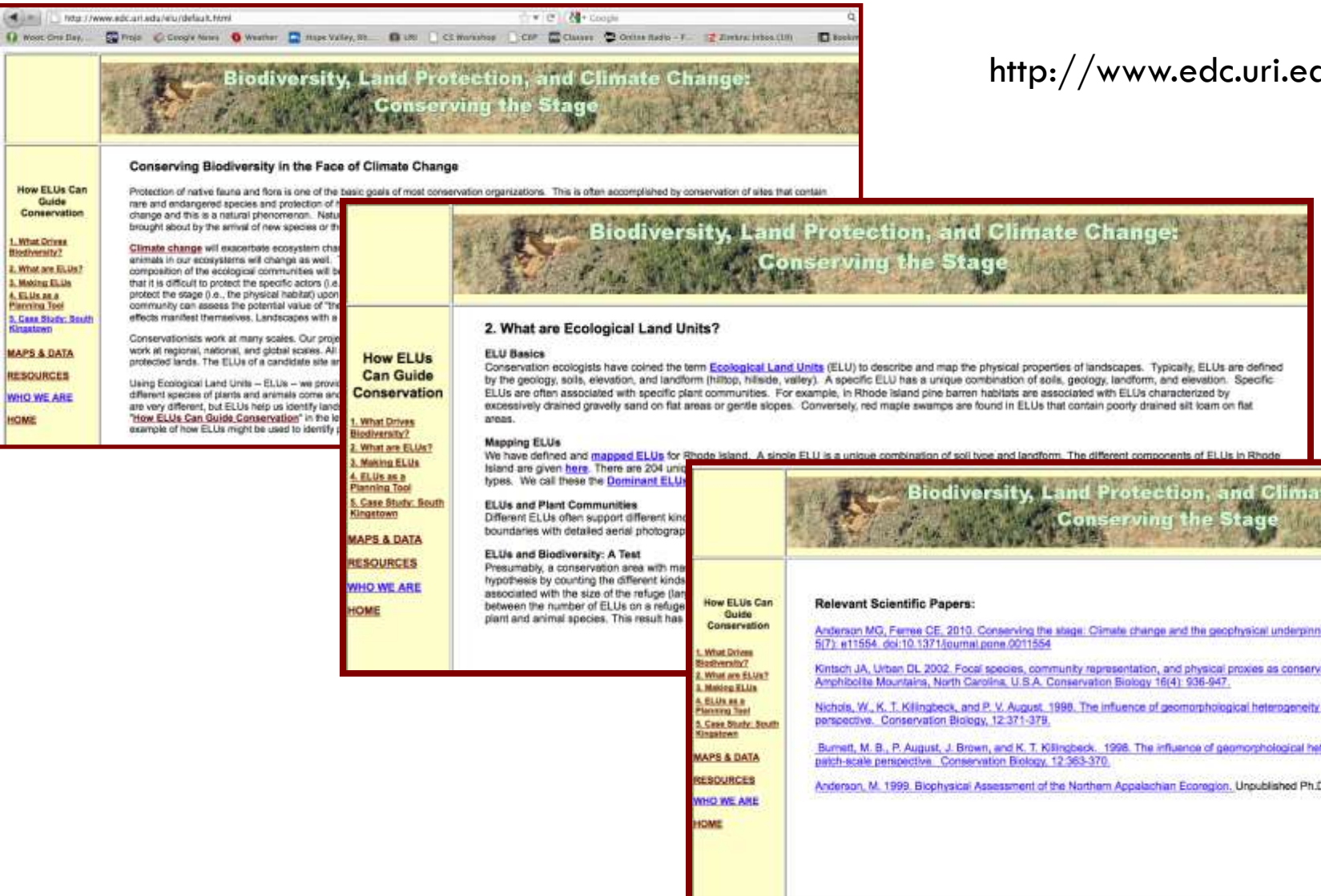
ELU one of many criteria

Use in combination with other criteria (size, corridors)

Disturbance, invasives, pests, pathogens can trump ELU effects



Getting the Word Out



http://www.edc.uri.edu/elu

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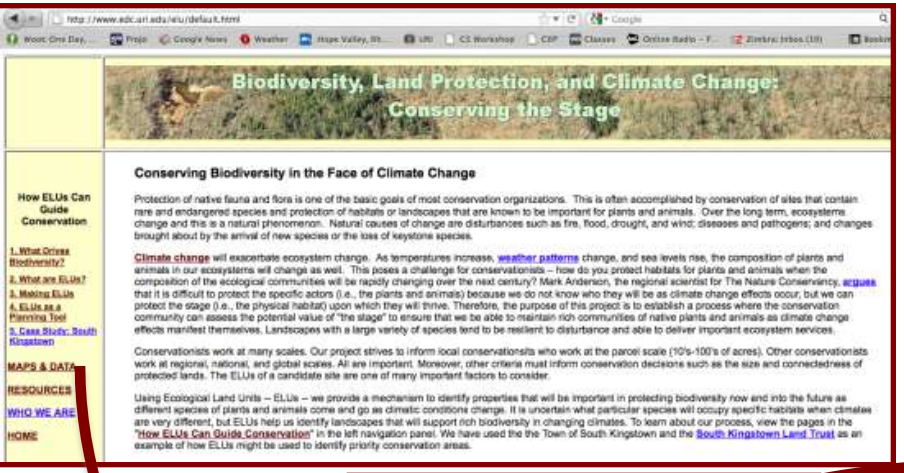

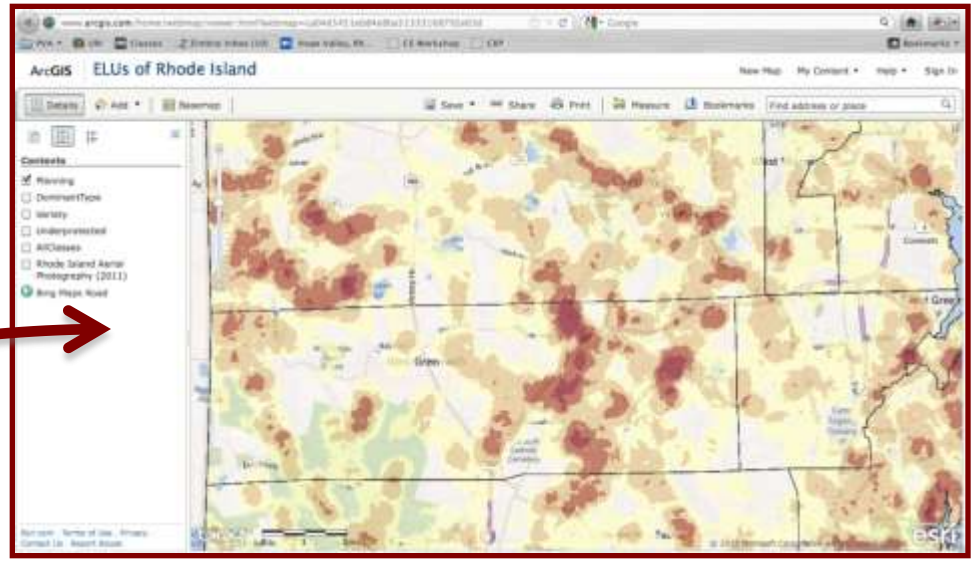

http://www.edc.uri.edu/elu

Building a GIS Community

Thanks!!

Lynn & Shane

RIGIS, NEURISA, Applied Geographics,
Mapping and Planning Services,
New England GeoSystems, Brown U