

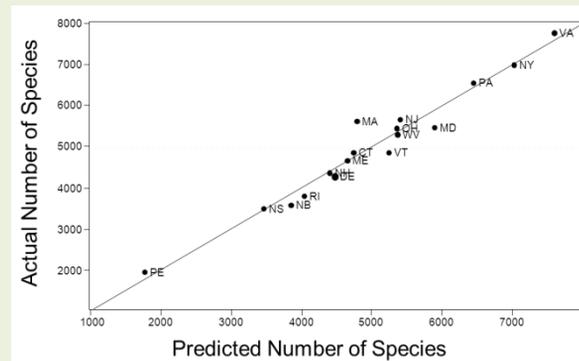
RESILIENT SITES - Natural Strongholds against Climate Change

Conserving the Stage: Climate change is rearranging natural habitats and species are moving in response. Consequently, conservationists need a way to identify important conservation areas that doesn't depend on everything staying where it is. Rather than trying to protect diversity one species at a time, the key is to protect the different "stages" upon which the drama of nature unfolds. In the American Northeast and adjacent parts of Canada, the stages consists of geological settings such as: coastal sands, limestone valleys, shale slopes, granite summits, or silt floodplains. Conserving a diversity of geophysical settings offers an approach to conservation that protects a diversity of plants and animals under both current and future climates.

Settings and Stages The diversity of plants and animals in each Northeastern State or Province is correlated with four physical factors

- 1) the number of geological settings,
- 2) the amount of limestone,
- 3) the latitude,
- 4) the elevation range.

The figure below plots the actual number of species in each state compared to the number of species predicted from those four factors.

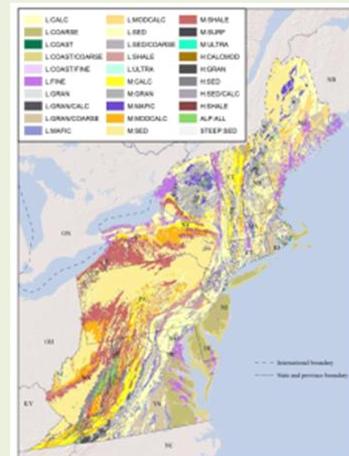


Limestone setting



Inland Sand setting

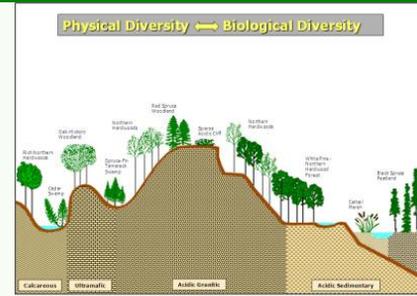
Natural Strongholds Within each type of "stage", lasting conservation depends on identifying places where the effects of climate change are buffered by the natural properties of the site. Conserving these places is vital to maintaining a diversity of species and natural processes regardless of changes in the climate..



This map shows 30 geophysical settings (stages) defined by their geology and elevation zone. They range from low coastal sand to high granite mountains. .

Within each stage, we identified places where the effects of climate are moderated by the **complexity** of the topography, and the **permeability** of the land cover.

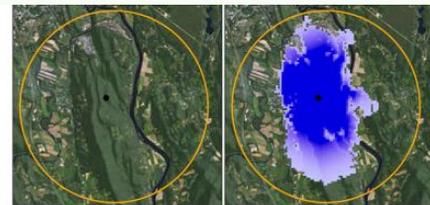
*From Anderson and Ferree 2010. conserving the stage : climate change and the geophysical underpinnings of species diversity



GEOPHYSICAL SETTINGS (STAGES) are unique combination of geology, elevation, and landforms.



COMPLEX LANDSCAPES create "micro-climates" that buffer change by providing species with a variety of local climates .



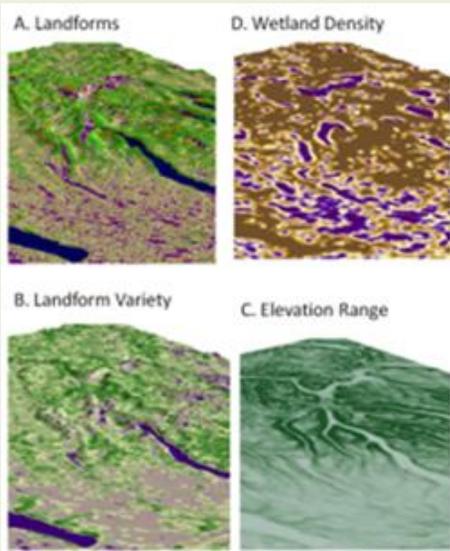
PERMEABLE LANDSCAPES offset development, roads, and agriculture that create resistance to natural movements. Maintaining a connected area (BLUE REGION above) in which species can move and processes rearrange, ensures that the area can adjust to climate

Underlying data developed by The Nature Conservancy's Eastern Science Office with support from the Northeast Association of Fish and Wildlife Agencies, and the Doris Duke Foundation

For the full report and large maps go to:

<http://conserveonline.org/workspaces/ecs/documents/resilient-sites-for-terrestrial-conservation-1>

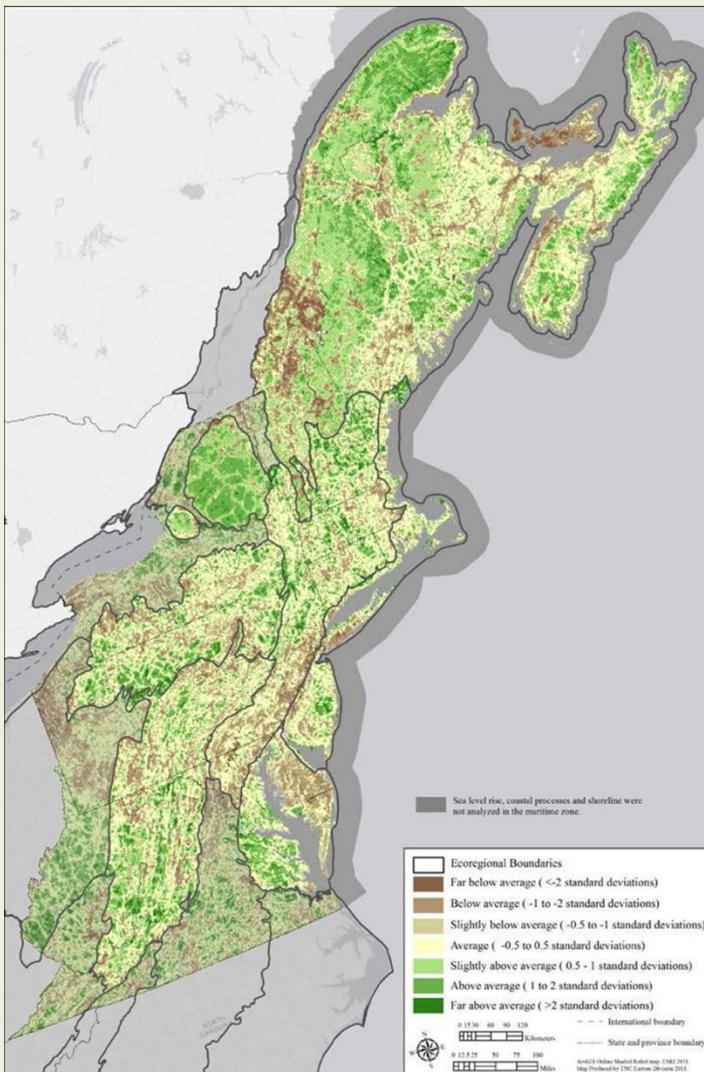
Flat and Fragmented OR Complex and Connected



Complex Landscapes: are places that have a variety of small, connected, local climates creating a wide range of climate options for the species within. In essence, complex topography and elevation gradients break the regional climate into a wide array of “micro-climates,” buffering the inhabitants from the direct effect of change.

Permeable Landscapes: are places that allow species to move throughout, and processes like water-flow to occur unimpeded. This facilitates the rearrangements necessary for the natural world to stay balanced with the climate. Permeable landscapes have an abundance of connected natural cover.

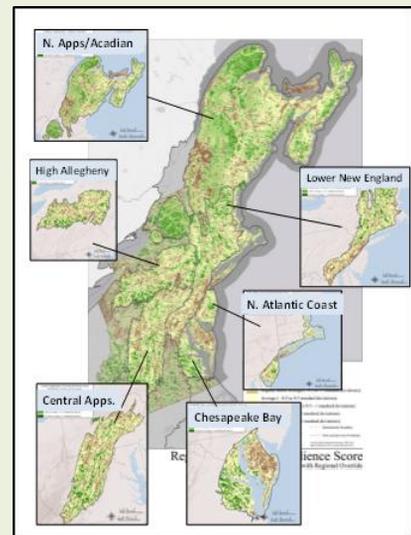
Resilient Sites. With a changing climate, many places will see degradation and species loss, but some places will retain high quality habitat and continue to support a diverse array of plants and animals. Sites that have both **complex** topography and **permeable** land cover offer the possibility of lasting conservation.



Resilient Sites. The map shows areas that are both complex and permeable with respect to one of the 30 geophysical settings (stages) evaluated. A dark green color indicates that the area has high estimated resilience relative to its setting type and relative to the ecoregion it falls within. Brown indicates areas vulnerable to climate change

Permanent conservation of the resilient areas should be prioritized to ensure they can continue to provide habitat for species

Ecoregions: The map is a composite of six ecoregion maps. Grey areas were not fully assessed (e.g. the coastal zone)



For more information and full sized maps see the full report.