



Catalyst Program – Resilient Landscapes Initiative

Southeast Region Definitions and Datasets May 2015

This document includes the following guidance for applicants in the Southeast to OSI's Resilient Landscapes Initiative (RLI) Catalyst Program:

- **Definitions** of terms related to “terrestrial resilience” as The Nature Conservancy (TNC) defines it in its Resilient Sites for Terrestrial Conservation in the Southeast report (2014).¹ This is the definition of *resilience science* that is used in the OSI Catalyst Program Request for Proposals and grant application.
- A list of selected **conservation and climate change-related datasets** (with links) that applicants may be interested in using for planning and applied research projects. Other relevant datasets may be used. Provide the rationale for your dataset choices in the grant application.

INTRODUCTION

Given the complexity of climate change impacts, land conservationists need strategies to identify sites that will remain relevant to biodiversity conservation. Many strategies can be limited in their relevance for land conservation due to the uncertainty in species' and habitat responses to climate change impacts. TNC's terrestrial resilience science utilizes enduring features such as geophysical settings and landforms to identify the places that will best support the full-spectrum of species diversity. This strategy is based on observations that species diversity is highly correlated with geophysical diversity in Eastern North America,² that more microclimates exist in complex landscapes, and that species can access these microclimates in response to climatic changes if the area is “permeable” for movement. Thus, the characteristics of geophysical representation, landscape complexity, and local connectedness (or “landscape permeability”) defined below are key components of analysis and conservation prioritization under this approach.

DEFINITIONS (adapted from TNC's Resilient Sites for Terrestrial Conservation)¹

Ecoregions—For the Southeast resilience assessment, *Ecoregions* follow the published TNC ecoregional boundaries with one exception (a redrawing of the boundary between Tropical Florida and the Florida Peninsula). The 2014 resilience analysis covered the entirety of these two ecoregions, as well as five others: Cumberlands and Southern Ridge and Valley; Southern Blue Ridge; Piedmont; Mid-Atlantic Coastal Plain; and South-Atlantic Coastal Plain. In addition, the resilience analysis covered only part of the following ecoregions: Low Interior Plateau, East Gulf Coastal Plain, and Upper East Gulf Coastal Plain (the data is subject to some degree of change when the analysis in these ecoregions is completed).

¹ Anderson, M.G., A. Barnett, M. Clark, C. Ferree, A. Olivero Sheldon, and J. Prince. 2014. Resilient Sites for Terrestrial Conservation in the Southeast Region. The Nature Conservancy, Eastern Conservation Science. 127 pp.
<https://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/edc/reportsdata/terrestrial/resilience/se/Pages/default.aspx>

² Anderson, M.G. and C.E. Ferree. 2010. Conserving the Stage: Climate Change and the Geophysical Underpinnings of Species Diversity. PLoS ONE 5(7): e11554. doi:10.1371/journal.pone.0011554.

Geophysical Settings—*Geophysical Settings*, designated by a unit’s elevation zone and geology type, are a critical underpinning of the resilience analysis. For this analysis, TNC classified each 30 meter grid cell in the region as having one of 35 possible Geophysical Settings based on the unit’s dominant characteristics. To determine the most resilient 30 meter cells for each Geophysical Setting, the analysis ranked the *Landscape Resilience Score* of each cell against other cells within the same Geophysical Setting and within the same Ecoregion. For example, mid-elevation granitic sites were ranked only against other mid-elevation granitic sites. Research indicates that conserving the full spectrum of biological diversity depends on conserving high-quality examples of all Geophysical Settings within each Ecoregion.

Landscape Complexity—*Landscape Complexity* is a measure of above-ground landform diversity, elevation range, and wetland density within a given area. Landform diversity includes such features as slopes, cliffs, valleys, coves, and moist flats, as well as the directional orientation (aspect) of many of these features. Some geology types, such as granite, are inherently more complex because they weather slowly and retain rugged topography. Other geology types, such as calcareous and coarse sand, weather more quickly and tend to have less topographical complexity. The resilience analysis sought to identify the most complex examples for each Geophysical Setting. *Landscape Complexity Scores* are relative to other sites with the same Geophysical Setting and in the same Ecoregion. High *Landscape Complexity* creates diverse microclimates that create the opportunity for species to moderate the effects of moisture and temperature locally.

Local Connectedness (or “Landscape Permeability”)—A measure of the relative opportunity within a given area for species to move and ecological processes to occur, based on the degree of resistance to movement created by different land uses and cover types. Like *Landscape Complexity*, *Local Connectedness* is scored relative to Geophysical Setting and Ecoregion. *Local Connectedness* is essential to providing species access to the diverse microclimates created by complex features. Note that *Local Connectedness* is not the same concept as wildlife or conservation corridors between existing projected blocks (that issue is more relevant to the concept of *Regional Flow*, defined below).

Landscape Resilience—*Landscape Resilience* is the relative ability of a site to maintain ecological function and a diversity of native species even as species composition changes in response to climate. A highly resilient site offers: (1) *Landscape Complexity* to provide species with a broad range of landforms and microclimates, and (2) *Local Connectedness*, which enables species to access these complex landforms. The *Landscape Resilience Score* represents the combination of values for *Local Connectedness* and *Landscape Complexity* for each 30 meter cell, which is then ranked relative to the *Landscape Resilience Scores* of other sites in the Southeast region with the same *Geophysical Setting* and in the same *Ecoregion*.

Regional Flow—*Regional Flow* is a measurement designed to identify potential pathways for directional movements by species at a larger-scale than *Local Connectedness*, and is not used as a factor in the final *Landscape Resilience Score*. Rather than focusing in on the most apparent corridors, *Regional Flow* data uses modeling to identify multiple options for movement that could be significant for range shifts, migrations, or other dispersal patterns in response to climate change. *Regional Flow* can highlight where land use patterns are likely to cause movements to become concentrated when limited surrounding options exist, or diffuse when many options exist. This measure is useful for identifying the linkage areas that may be important to maintaining a base level of permeability across the whole region.

Underrepresented Setting—An *Underrepresented Setting* is a *Geophysical Setting* for which protection has elevated urgency because a relatively low percentage of that setting type is currently secured for conservation and a relatively high percentage has been converted out of natural land cover. Conserving land in a broad range of *Geophysical Settings* is critical to ensure the survival of the full spectrum of biodiversity as the climate changes. Focusing protection goals on *Underrepresented Settings* will be necessary in order to protect the best remaining examples of these “at-risk” settings. OSI has identified fifteen particularly underrepresented *Geophysical Settings* in the Southeast. Tier 1 settings are important

because they have a relatively low level of protection, a high level of conversion out of natural use, and tend to be more species-rich than other geology types. Tier 2 settings tend to have a smaller number of species particularly associated with that one setting, but still have low levels of protection and high levels of conversion out of natural land cover.

Tier 1: Underrepresented and Highest Biological Significance	Elevation	
Calcareous	Low	Mid
Tier 2: Underrepresented	Elevation	
Moderately Calcareous	Low	Mid
Surficial Sediment—Mountain	Low	Mid
Mafic	Low	Mid
Ultramafic	Low	
Fine	Low	
Fine/Lime	Low	
Sedimentary—Coastal Plain	Low	
Loam/Lime	Low	
Granite	Low	
Shale	Low	

SELECT CONSERVATION AND CLIMATE CHANGE-RELATED DATASETS

Below is a sampling of datasets that may be particularly relevant to conservation planning and applied research projects for the RLI Catalyst Program in the Southeast:

TNC RESILIENCE SCIENCE AND RELATED CONSERVATION DATASETS

Datasets are available at this link unless otherwise specified:

<https://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/edc/reportsdata/mapsdata>

Southeast Terrestrial Resilience Data

All data related to the resilience analysis in the Southeast, including the Basic dataset, which includes 30 meter and 1000-acre hexagon data displaying results for resilience and its major components; the Analysis dataset, which can be used to replicate or iterate the analysis; and the Stratification dataset, which includes Geophysical Settings data.

Secured (Protected) Areas

Public and private lands and waters secured by a conservation arrangement that includes an explicit level of protection from future conversion and current incompatible uses.

CLIMATE DATASETS

Climate Wizard Custom

Browser Link: <http://climatewizardcustom.org/>

User can define a relatively small geographic area of interest and conduct site-specific analyses using both historical data and possible future conditions that are based on low, moderate, and high carbon emissions scenarios.

National Climatic Data Center

Link: <http://www.ncdc.noaa.gov/>

Historical climate data for querying and download.

COASTAL CHANGE AND SEA LEVEL RISE

NOAA Digital Coast

Link: <http://coast.noaa.gov/digitalcoast/>

Datasets related to coastal change in intertidal areas, wetlands, and adjacent uplands of the contiguous landscape; sea level rise impact viewer.

Climate Data Initiative (new NASA/NOAA-led Federal Partnership)

Link: <http://www.climate.data.gov/>

New tools related to sea level rise and coastal flooding. Other climate related datasets and tools to be added as developed.

CORRIDOR PLANNING

Conservation Corridor Planning Tools

Browser Link: <http://conservationcorridor.org/corridor-toolbox/programs-and-tools/>

VEGETATION (FOREST) CHANGE

Climate Change Tree Atlas Dataset

Browser Link: <http://www.nrs.fs.fed.us/atlas/tree/>

Current status of 134 forest species in the eastern United States, and potential changes in suitable habitat that may occur under several scenarios of climate change.