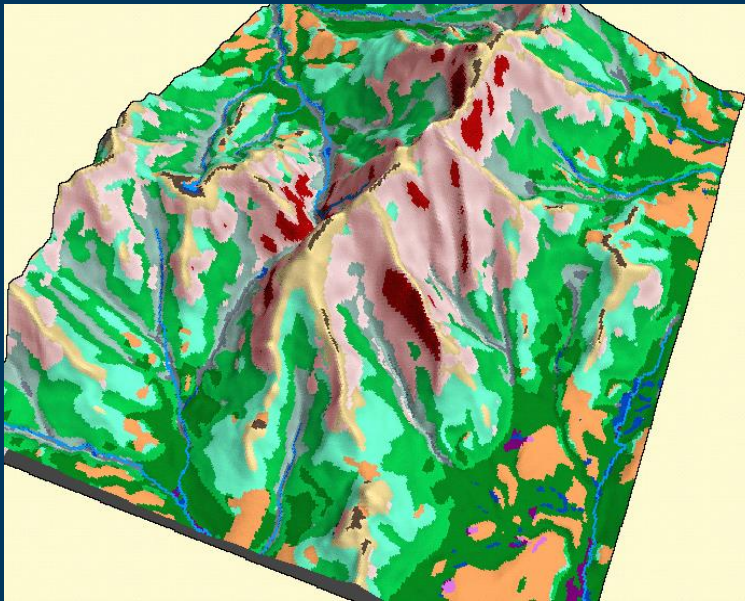




Putting Land Protection to Work for Corridors  
Corridors Workshop, Wells, ME June 2017

- Strategic landscape-scale planning and mapping
  - Brief overview of Anderson's recommendations for regional connectivity
- Understanding and Promoting installation of wildlife crossings
  - Wildlands Network NC case study
- Restoring and protecting connectivity at the project level
  - Resilient and Connected Conservation Easements (and fee ownership)
- Promoting healthy forest and natural habitat management

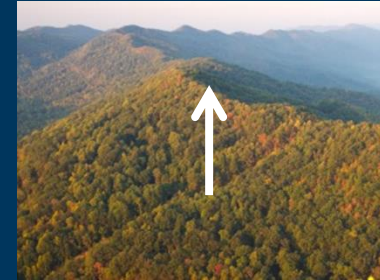
**Local  
Movements**  
microclimates



**Upslope**  
short term  
relief



**Northward**  
long term  
adjustments

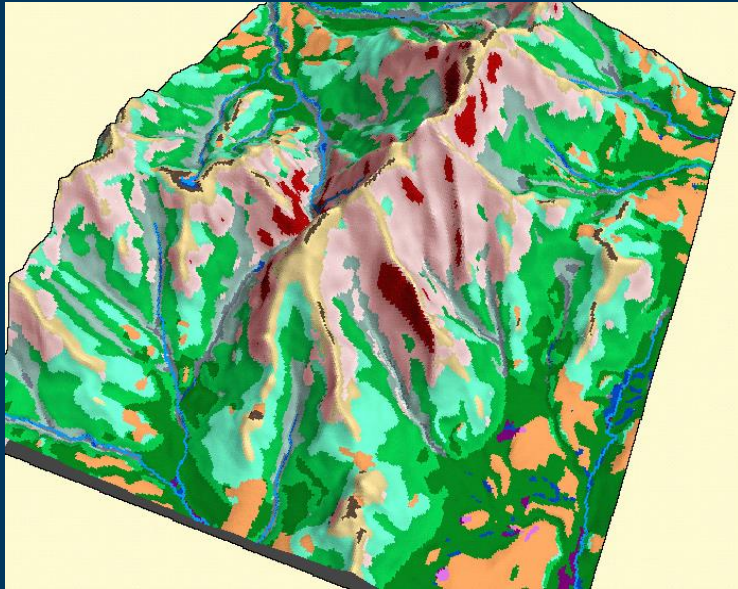


**Riparian**  
cool moist  
microclimates



## Landscape Diversity

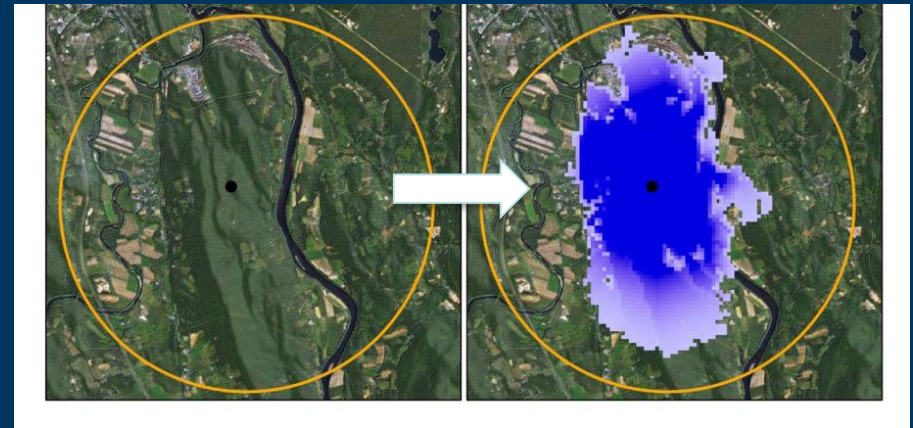
Create climate options



+

## Locally Connected

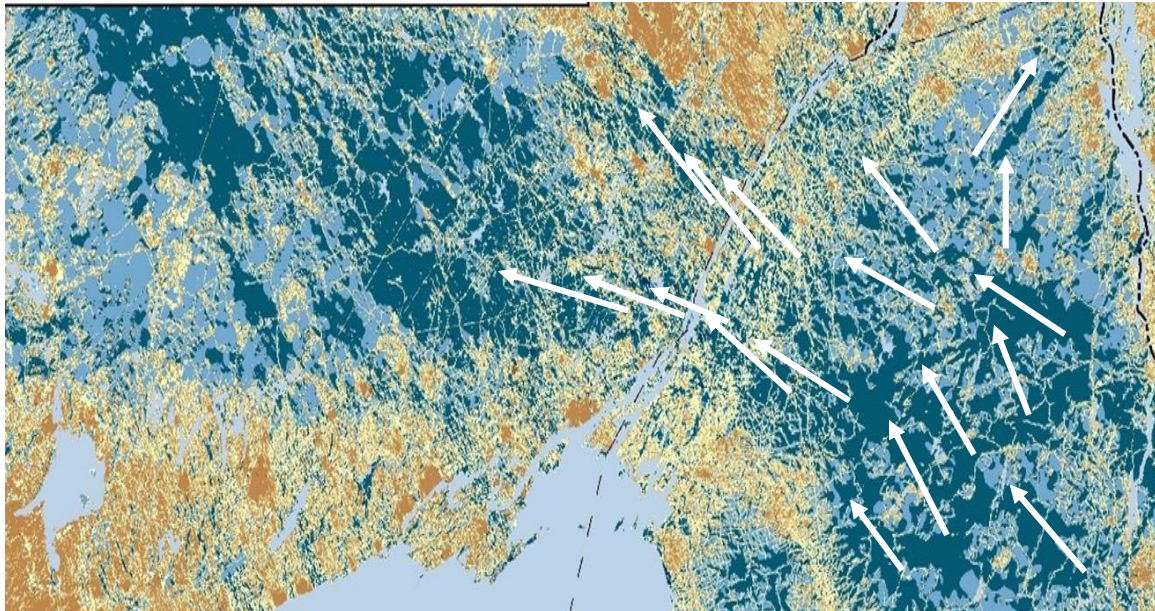
Allows species to move



= Climate Resilience

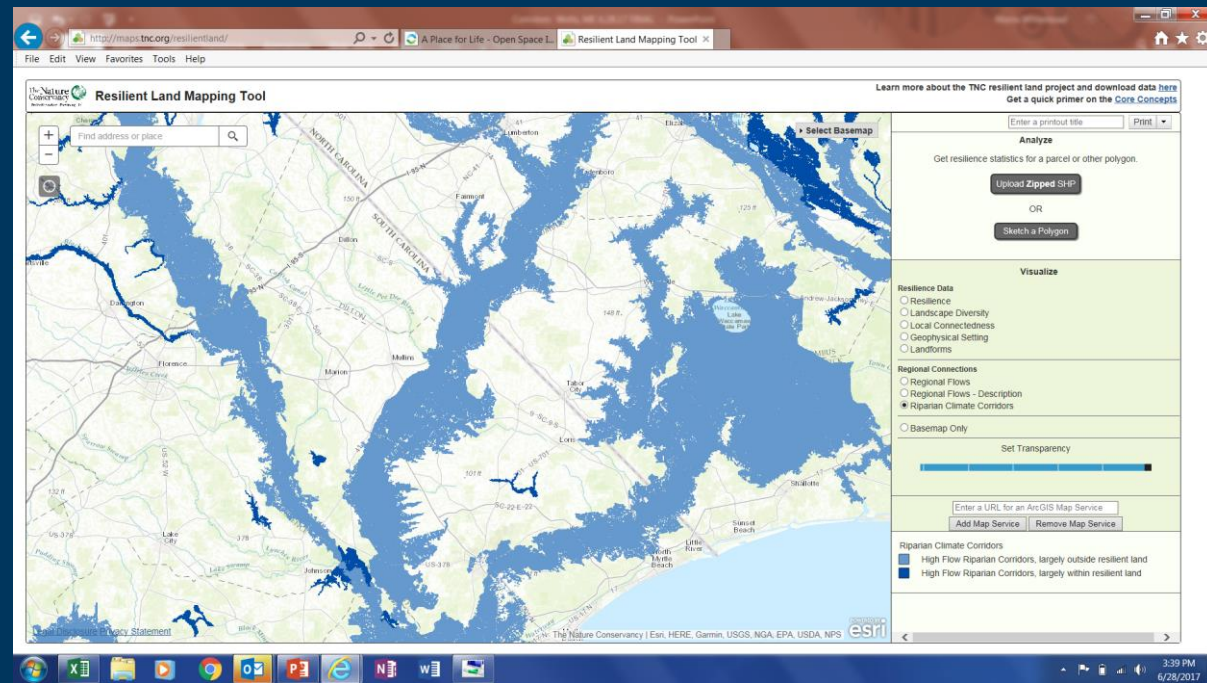
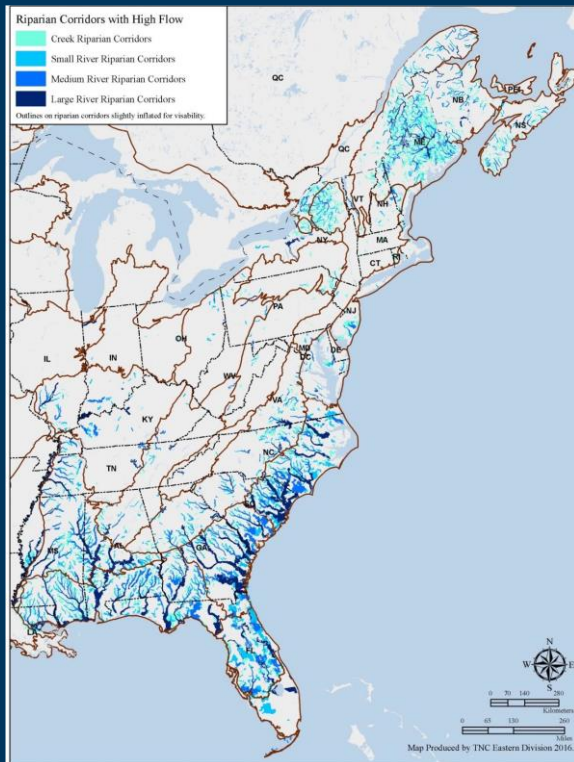
**Regional Connectivity** gradual movement of plant and animal populations in response to changes in the climate.

**Flow analysis** models movement in N-S and E-W direction with preference for upslope and northward movement.



# Strategies for Addressing Regional Connectivity: Riparian Climate Corridors

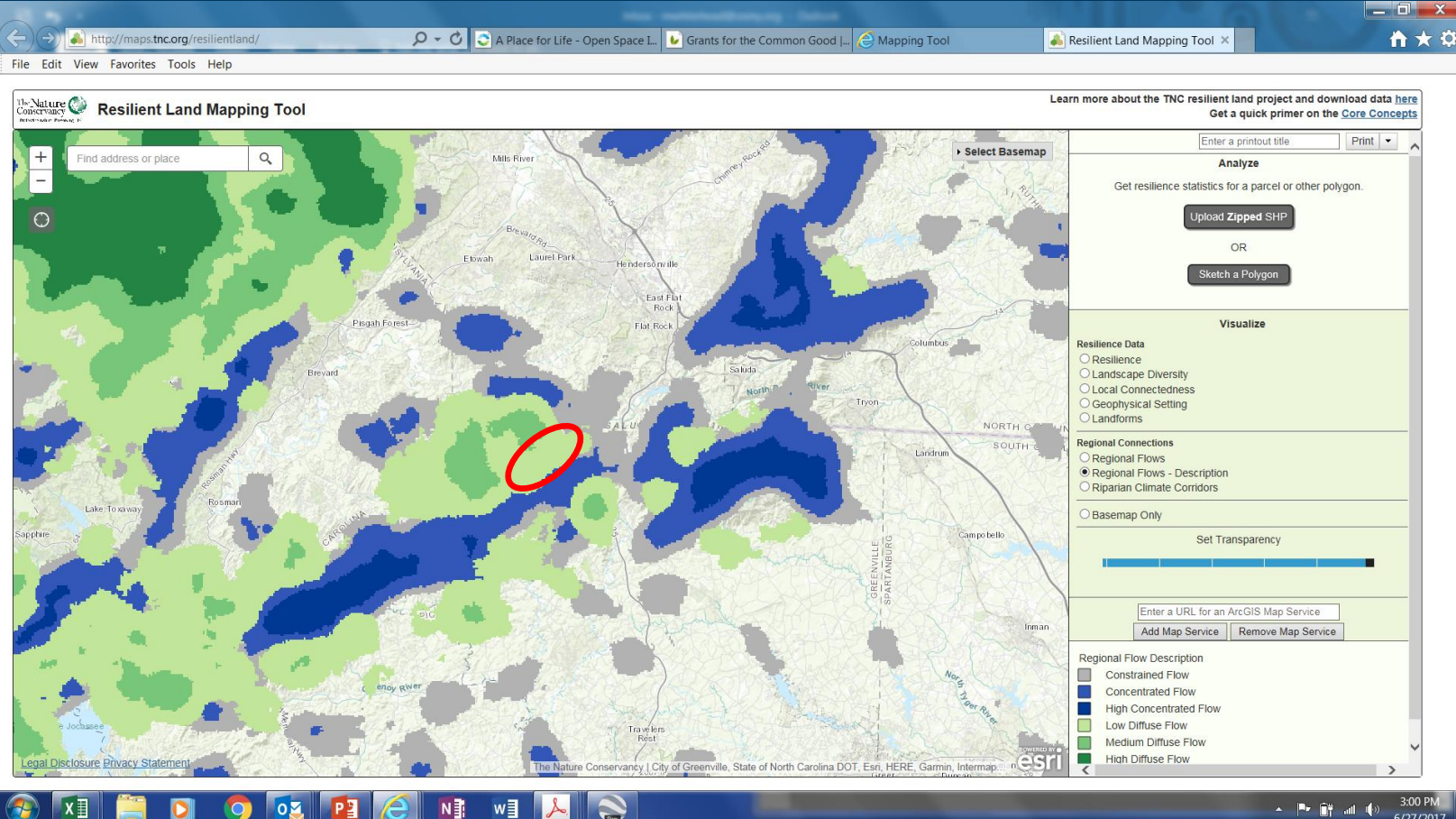
- **Riparian Climate Corridors:** Riparian areas are the floodplains and zones along water bodies that serve as interfaces between terrestrial and aquatic ecosystems.
  - Protecting and restoring intact riparian floodplain areas that serve as natural corridors will facilitate movement of plants and wildlife linearly.



# Strategies for Addressing Regional Connectivity: Incorporate connectivity as a priority in conservation planning

**Diffuse flow:** Areas that are extremely intact and consequently facilitate high levels of dispersed flow.

- Keep natural areas intact and prevent the flow from becoming concentrated. **This might be achievable through land management or broad-scale conservation easement.**



The screenshot displays the 'Resilient Land Mapping Tool' web interface. The main map area shows a geographic region with various colored overlays representing different flow types. A red circle highlights a specific area of 'High Diffuse Flow' (light green) near the center of the map. The interface includes a search bar, a legend, and several control panels.

**Resilient Land Mapping Tool**

Learn more about the TNC resilient land project and download data [here](#)  
Get a quick primer on the [Core Concepts](#)

Enter a printout title [ ] Print [ ]

**Analyze**

Get resilience statistics for a parcel or other polygon.

Upload Zipped SHP

OR

Sketch a Polygon

**Visualize**

**Resilience Data**

- Resilience
- Landscape Diversity
- Local Connectedness
- Geophysical Setting
- Landforms

**Regional Connections**

- Regional Flows
- Regional Flows - Description
- Riparian Climate Corridors

Basemap Only

Set Transparency [ ]

Enter a URL for an ArcGIS Map Service [ ]

Add Map Service Remove Map Service

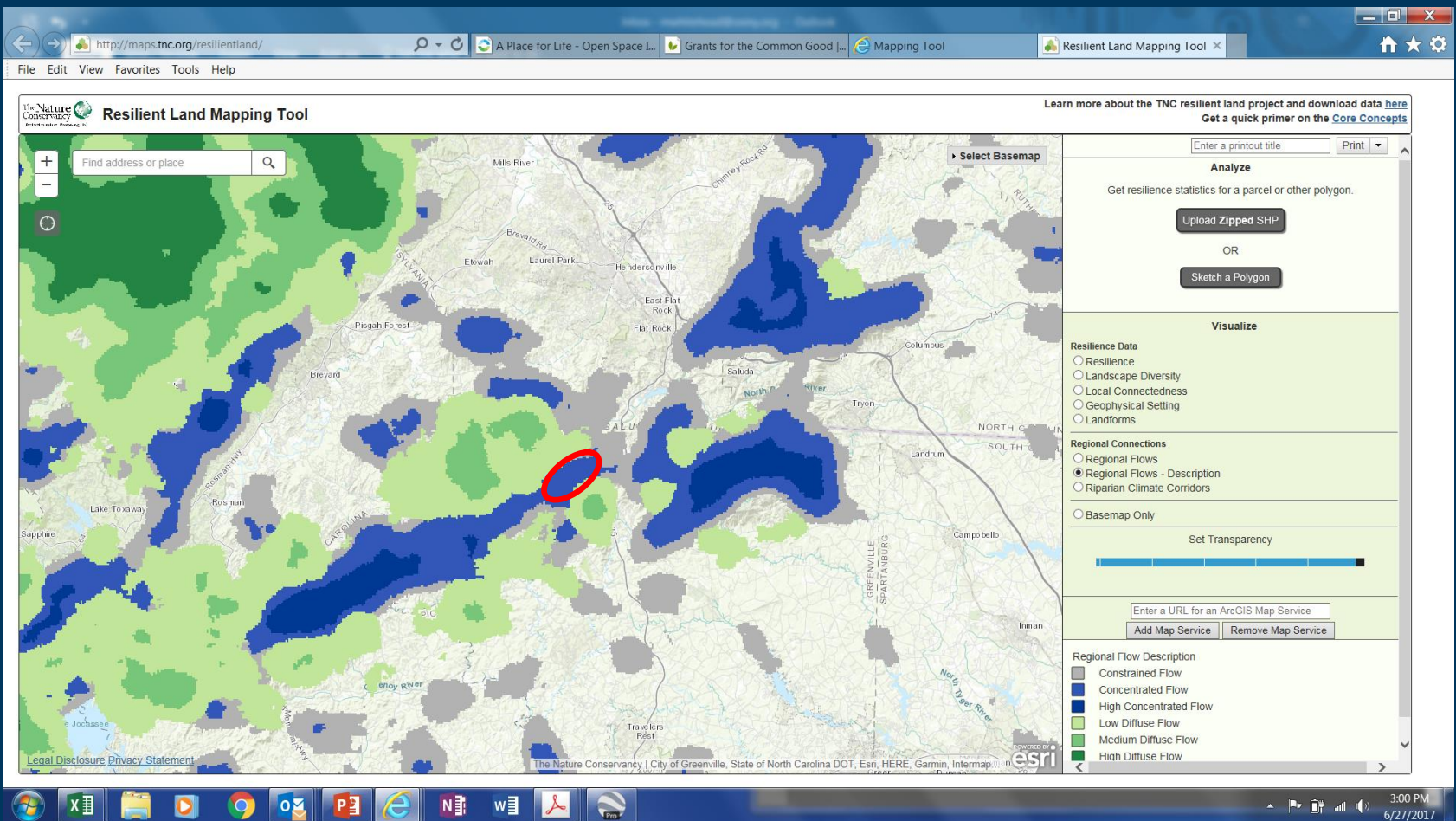
**Regional Flow Description**

- Constrained Flow
- Concentrated Flow
- High Concentrated Flow
- Low Diffuse Flow
- Medium Diffuse Flow
- High Diffuse Flow

3:00 PM  
6/27/2017

# Strategies for Addressing Regional Connectivity: Incorporate connectivity as a priority in conservation planning

- **Concentrated flow:** areas where large quantities of flow are concentrated through a narrow area.
  - Because of their importance in maintaining flow across a larger network, these pinch points are **good candidates for permanent land conservation (ideally fee simple).**



The screenshot displays the 'Resilient Land Mapping Tool' web application. The main map area shows a topographic map of the Asheville region in North Carolina, overlaid with various flow analysis data. A red circle highlights a specific area of 'Concentrated Flow' (dark blue) on the Saluda River. The right-hand panel contains several sections:

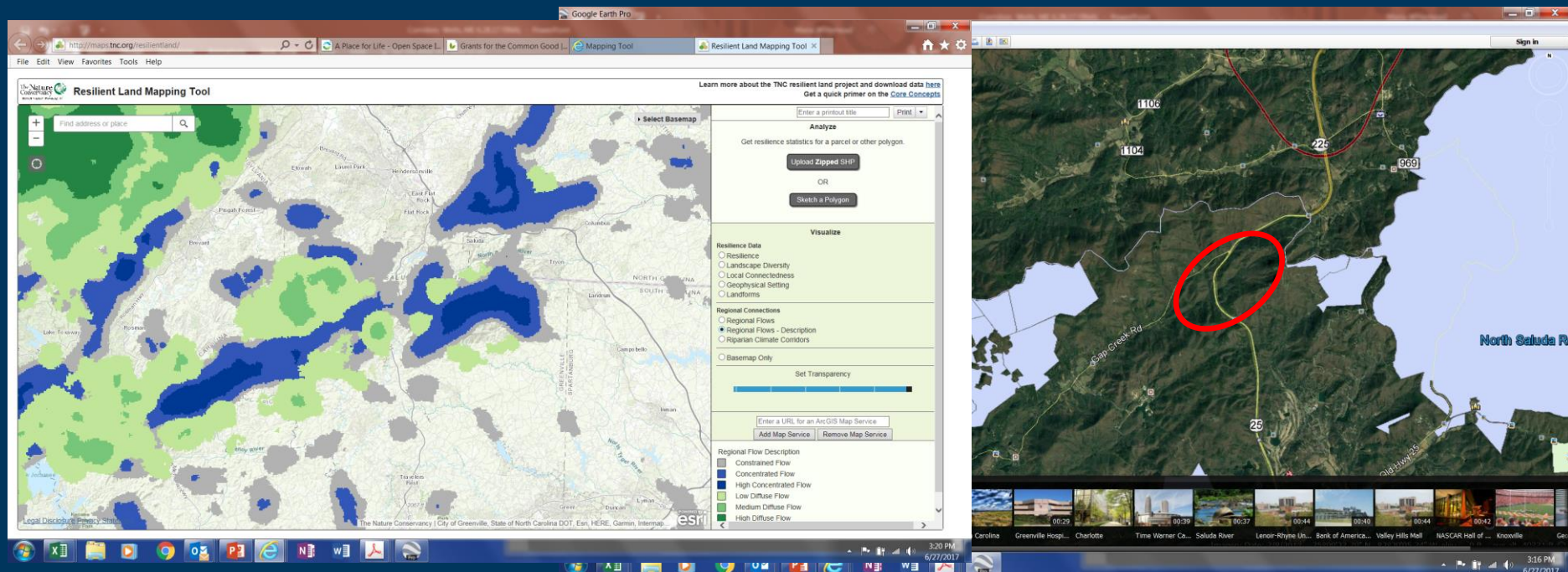
- Analyze:** Includes a search bar for 'Enter a printout title', a 'Print' button, and options to 'Upload Zipped SHP' or 'Sketch a Polygon' to get resilience statistics.
- Visualize:** Includes radio buttons for 'Resilience Data' (Resilience, Landscape Diversity, Local Connectedness, Geophysical Setting, Landforms) and 'Regional Connections' (Regional Flows, Regional Flows - Description, Riparian Climate Corridors). It also has a 'Basemap Only' option and a 'Set Transparency' slider.
- Regional Flow Description:** A legend showing color-coded categories: Constrained Flow (grey), Concentrated Flow (dark blue), High Concentrated Flow (medium blue), Low Diffuse Flow (light blue), Medium Diffuse Flow (green), and High Diffuse Flow (dark green).

The browser window shows the URL 'http://maps.tnc.org/resilientland/' and several open tabs including 'A Place for Life - Open Space L...', 'Grants for the Common Good L...', and 'Mapping Tool'. The system tray at the bottom indicates the time is 3:00 PM on 6/27/2017.



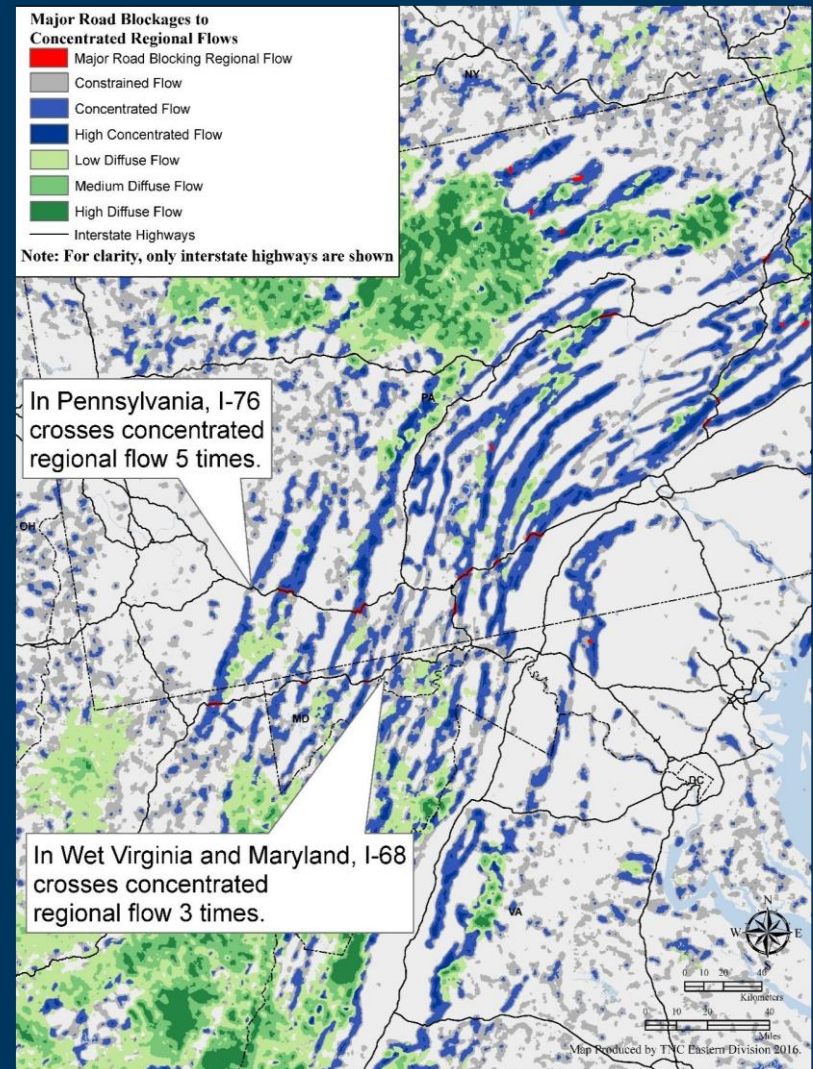
# Strategies for Addressing Regional Connectivity: Incorporate connectivity as a priority in conservation planning

- **Constrained flow:** areas of low flow that are neither concentrated nor fully blocked
  - Presents a conservation challenge in some cases **restoring a riparian network might present the best option**, concentrating the flow and creating a linkage that will be easier to maintain.
- **Blocked/Low flow:** Could be important areas to restore native vegetation or alter road infrastructure to reestablish a historic connection.



# Preliminary Analysis of Road Mitigation

- Examined major road crossings in areas of concentrated flow
- 201 areas where major roads intersected with areas of concentrated regional flow.
- Road/flow crossings were greatest in Pennsylvania (21) followed by Florida (12), Georgia (16), and Quebec (19)





OPEN SPACE  
INSTITUTE



Wildlands Network Case Study for Prioritizing Road Crossings  
Opportunities for land trusts to restore connectivity

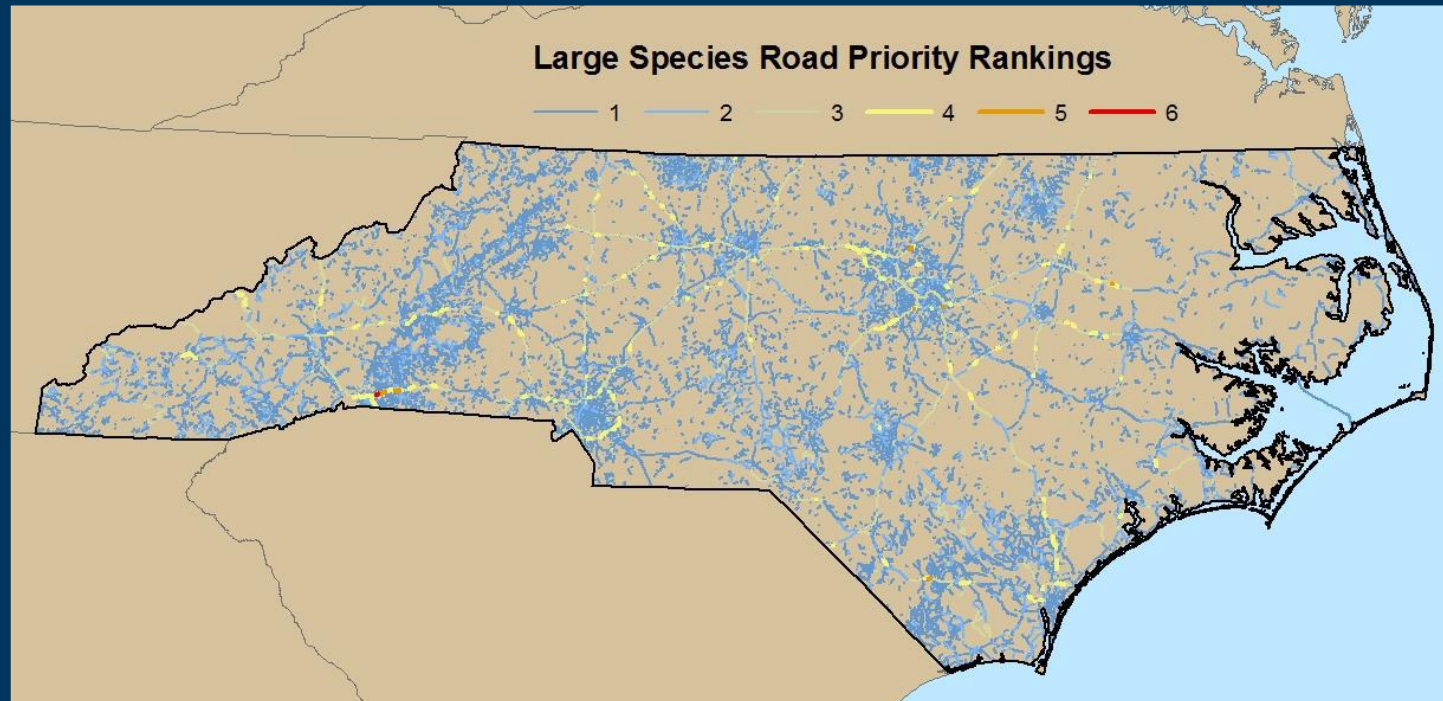
# The Case for Connectivity and Human Safety Issue

- 4 million miles of roads.
- Collisions kill up to one million vertebrates *each day*.
- NC alone (2014-2016) experienced over 61,000 wildlife-vehicle crashes, resulting in 20 human fatalities, 3,400 injuries, and \$149 million in damages.
- Wildlife underpasses and overpasses can reduce wildlife-vehicle collisions by 80 to 90% and pay for themselves when installed at collision hotspots.
- They can also restore connectivity, reduce wildlife-vehicle collisions, and improve public safety.



# Wildlands Network

## Large Spp Model for Prioritizing Road Crossings

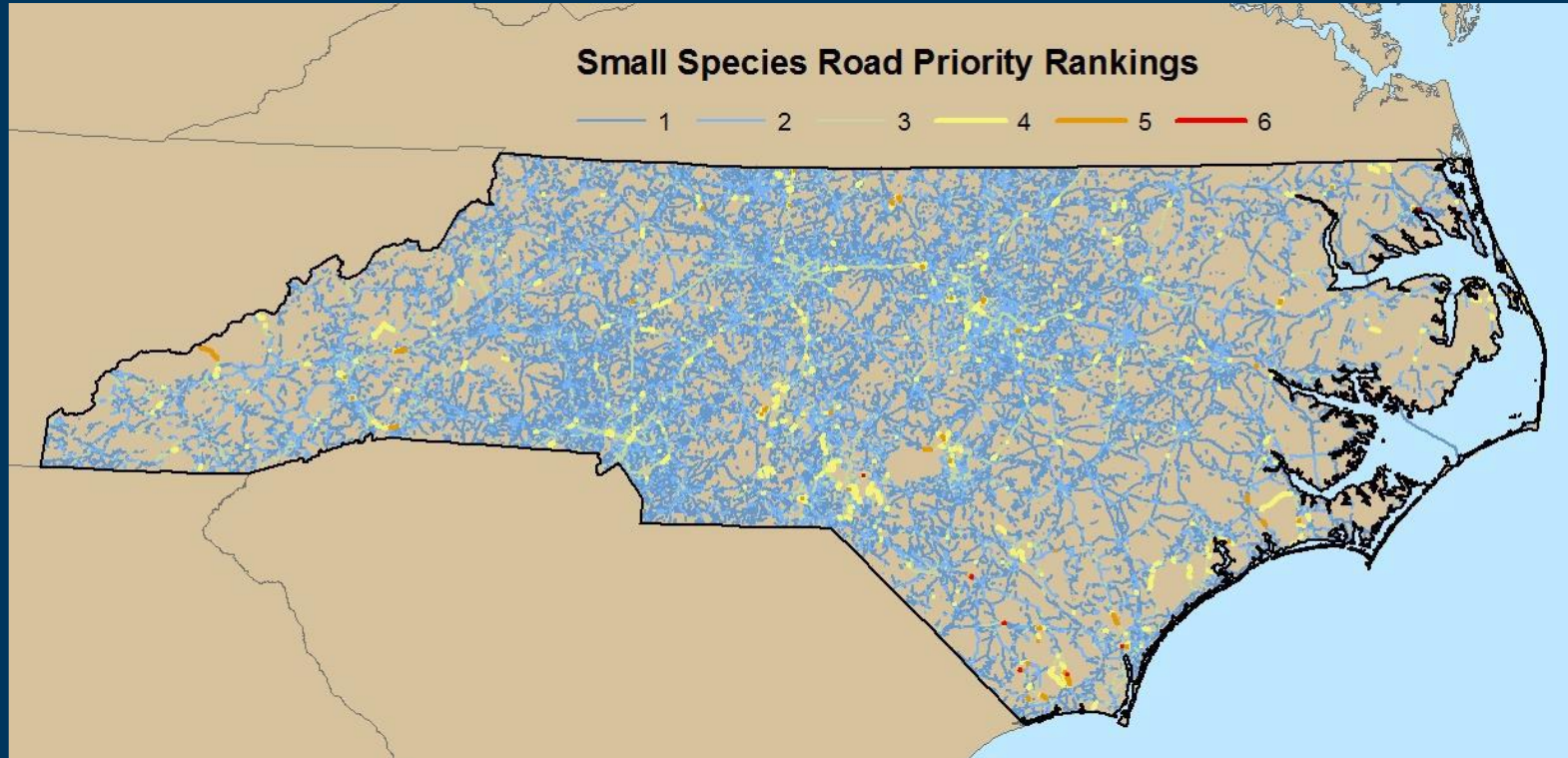


### Large Species priority road characteristics

- Traffic Volume
- Speed
- Type of median
- WVC hotspots
- Black Bear connectivity
- Rare Rare or endangered species hotspots
- Protected areas on both sides

# Wildlands Network

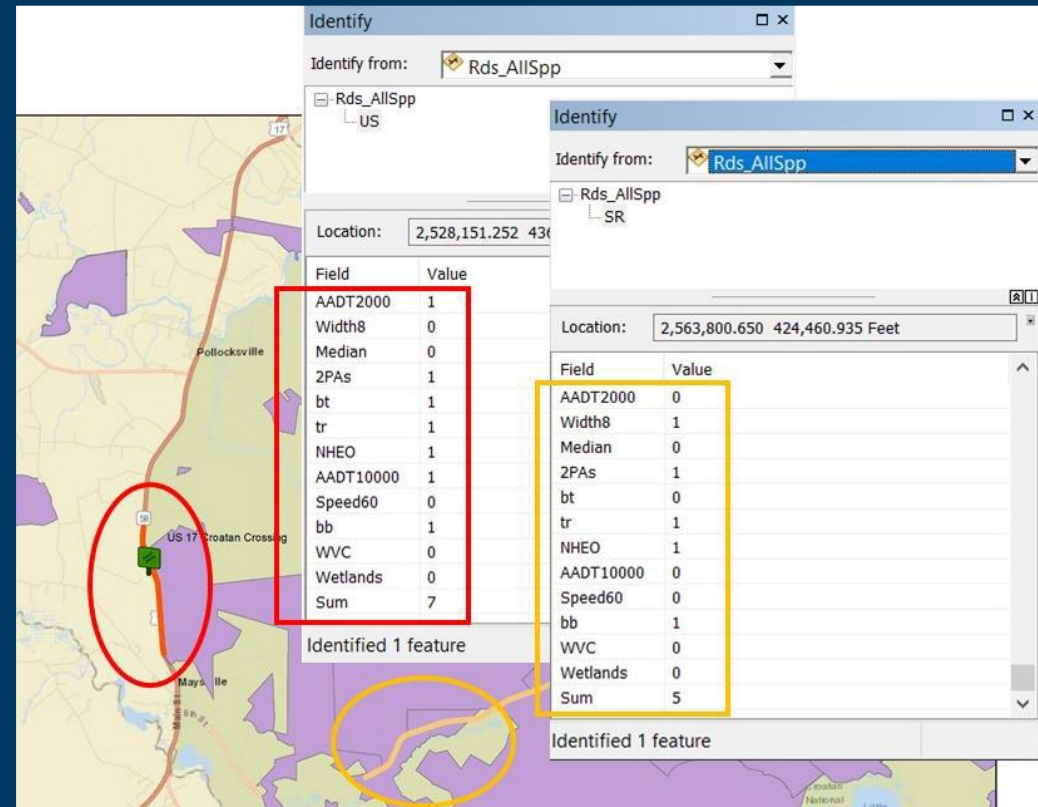
## Small spp Model for Prioritizing Road Crossings

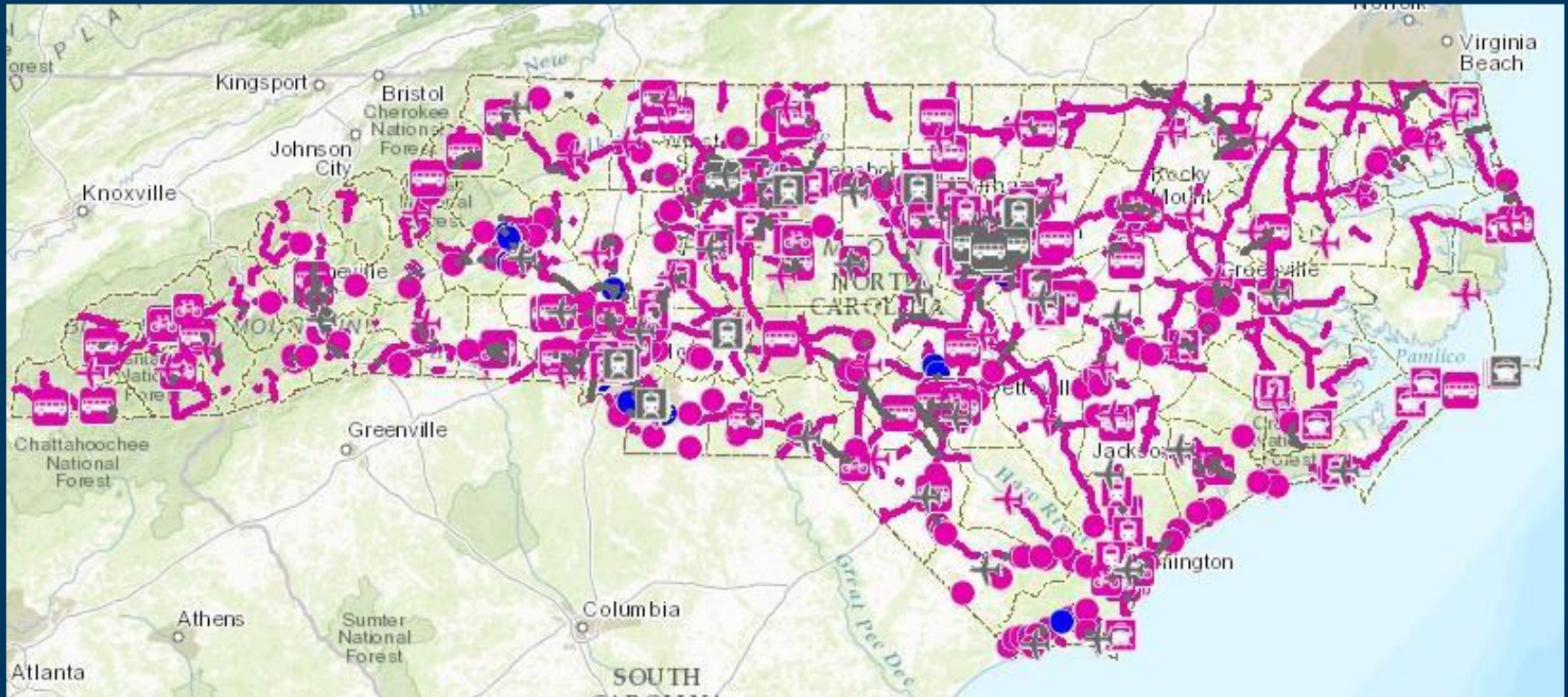


### Small Species priority road characteristics

- Traffic Volume
- Road Width
- Type of median
- Timber Rattlesnake connectivity
- Box Turtle centrality
- Rare, endemic, or endangered species hotspots
- Nearby wetlands
- Protected areas on both

- US-17 (red-priority ranking 7)
  - high traffic volume
  - adjacent protected areas
  - high box turtle centrality
  - high timber rattlesnake and black bear connectivity
  - Natural Heritage Element Occurrence.
- SR-1105 (orange-priority ranking 5)
  - lane width
  - protected areas on both sides
  - high timber rattlesnake and black bear connectivity
  - Natural Heritage Element Occurrence.





The North Carolina DOT produces a Statewide Transportation Improvement Plan (STIP) which forecasts 10-year road project priorities. This spatially-explicit version facilitate the ability of conservation organizations to align DOT project priorities to wildlife considerations.





OPEN SPACE  
INSTITUTE



## Resilient and Connected Land Protection Projects (The Challenge of Perpetuity in a Changing World)



*When the landscape changes, conservation easements may run into problems. Landscape changes can create conflicts with conservation easement purposes and specific conservation easement restrictions.*

## Conservation Easement

- Purpose
- Recitals
- Restrictions and reserved rights

Baseline Documentation Report

# Conservation Purpose Clause



- The purposes clause is often referred to as the heart of an easement and will be the standard against which current and future activities will be evaluated.
- Establishes what the conservation values are and why they are important.

# Resilient Conservation Purpose



- Conservation Easements may contain a severability clause that states when one purpose ceases to exist other purposes that persist take precedence.
- J. Olmsted suggests language that climate change effects cannot serve as a basis for modification or termination of the agreement.
  - protect emerging ecosystems
  - place priority on protecting the **resilience characteristics** and ecological processes (stage and not the actors)
  - Specifically state a conservation easement will continue to encumber the land despite changes

# Incorporating Corridors and Resilience into Recitals



Recitals can enumerate the property's values

- to conserve aquatic and terrestrial biological resources
- sustaining climate resilience, local and regional corridors.
  - the presence of any unique geology types
  - the land's role in providing microclimates
  - local and regional connectivity for wildlife.

# Reserved Rights and Restrictions



Opportunity to establish enforceable and clear standards for permanent protection of the land's native biodiversity and resilience characteristics.

The CE can ensure that:

- terrestrial and aquatic wildlife movement are maintained and/or enhanced,
- landforms providing micro-climates are not damaged,
- sensitive or under-protected geology or habitat types have special protections.
- Critical restricted flow areas are protected from conversion and development.

# Broaden Baseline Documentation Report



Include a detailed description and maps of the properties climate resilience characteristics and obstacles:

- Identify soils and geophysical settings
- Identify riparian corridors and floodplain areas.
- Map fragmenting features
  - existing roads
  - fencing
  - transmission lines
  - ditching

# Importance of Management Plans



- Adaptive-management plans include iterative processes as the land changes and as our information about land management and ecology evolve.
- Requiring a FMP as part of the conservation easement process reduces prescriptive language and avoids amendments.
- Provides opportunity to prioritize habitat retention and restoration along streams, in critical concentrated flow areas, and at the site of road crossings.
- Promote healthy understory management



# QUESTIONS?

