



Resilient Connected Landscape Science for Conservation

The Perspective from the Central Appalachians

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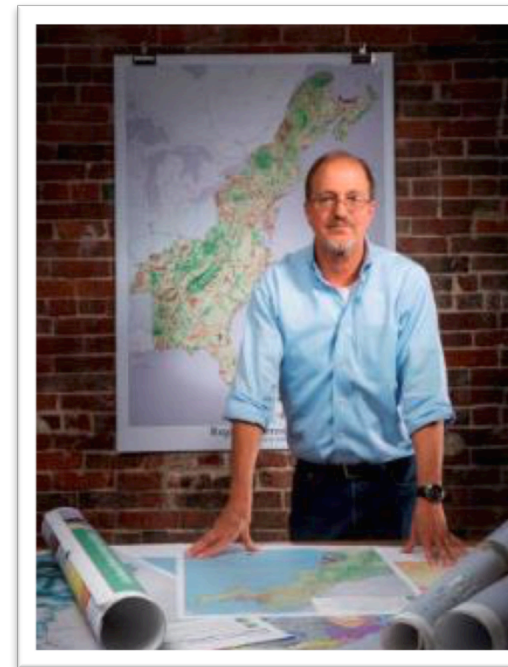
MD Sustainable Forestry Council Workshop
12.20.2018

The Nature
Conservancy 
Protecting nature. Preserving life.™

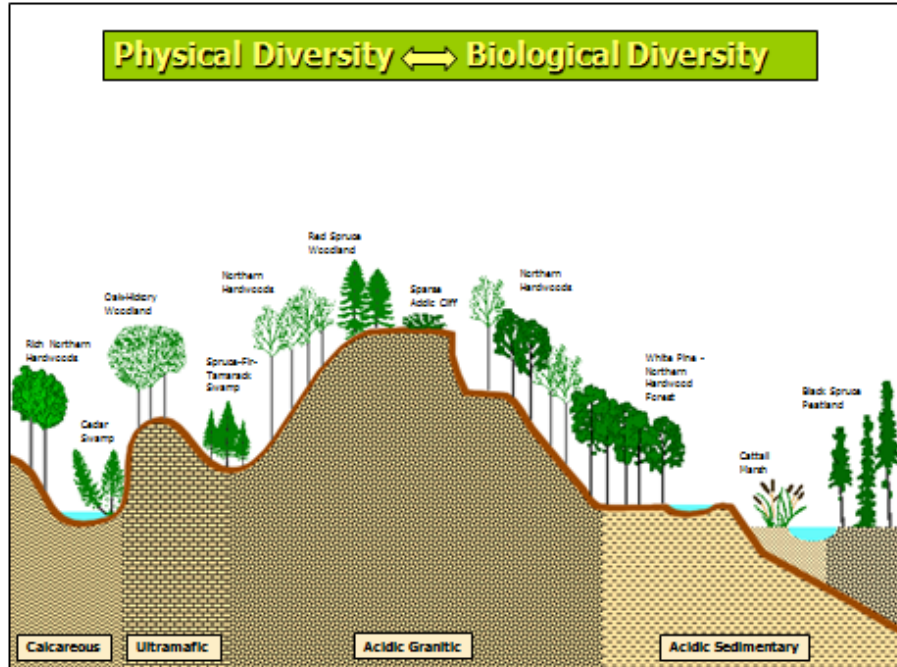
North American Science: Resilient and Connected Landscapes



- Mark Anderson and team
- 75+ scientists
- 10 years of work



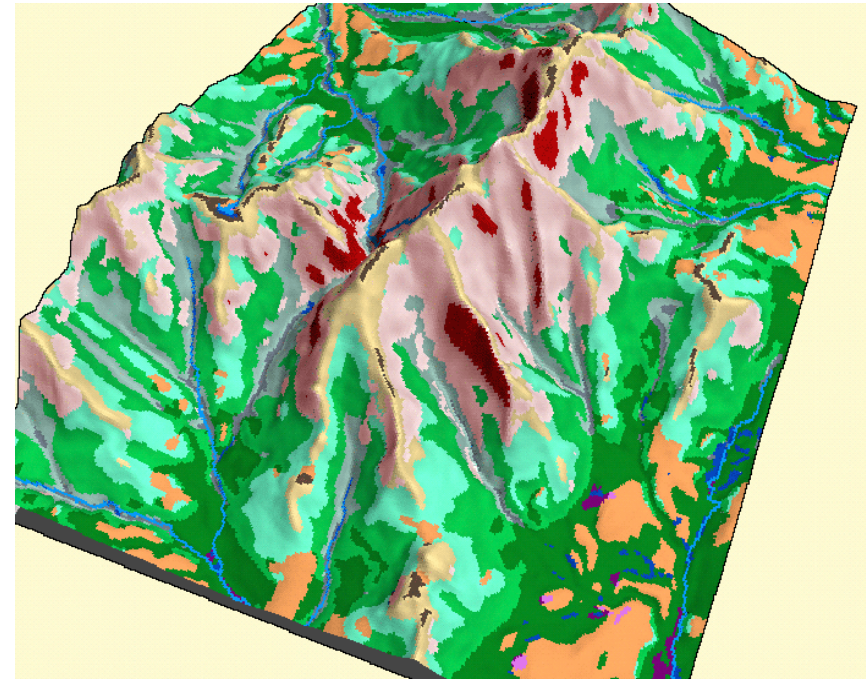
Conserving Nature's Stage



Geophysical setting

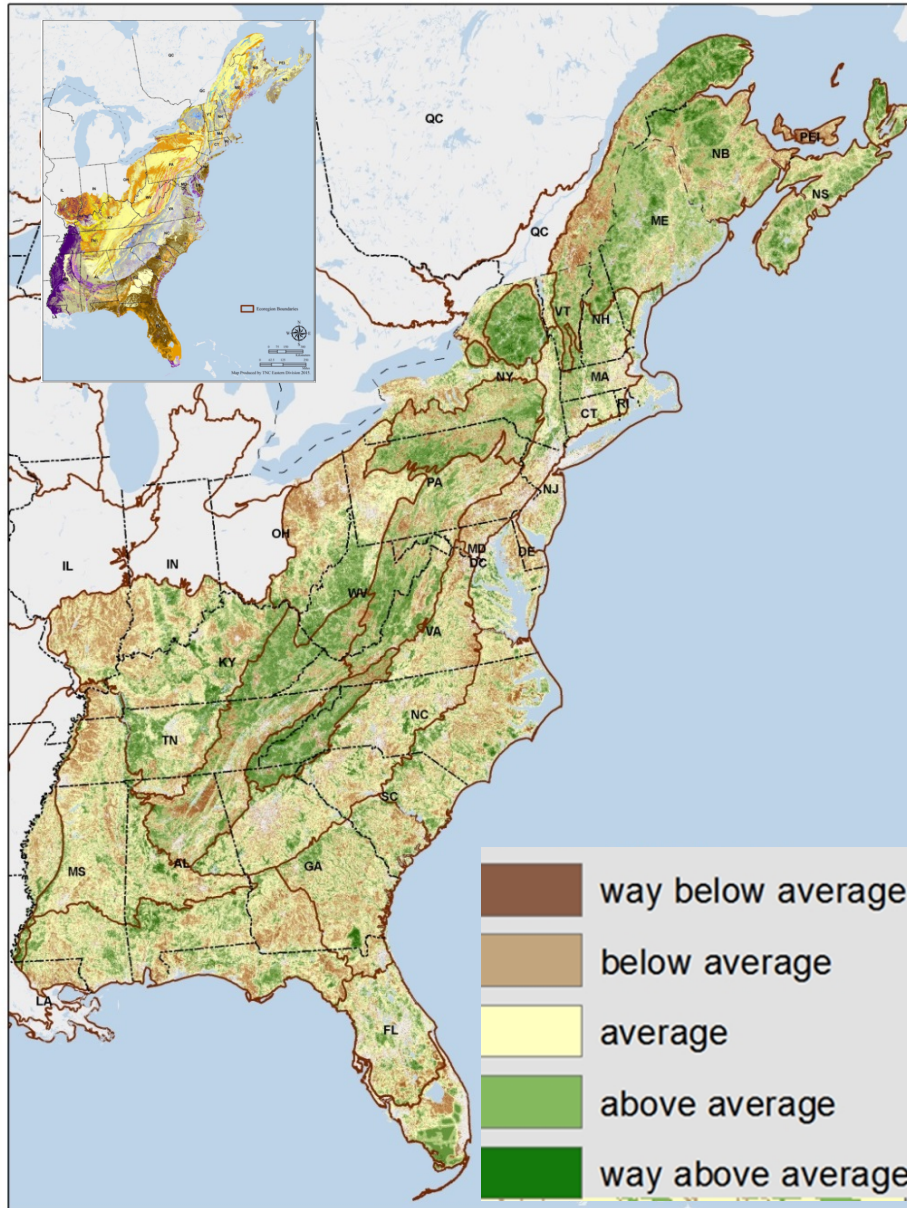
Unique combinations of geology, elevation and landforms

Natural Strongholds

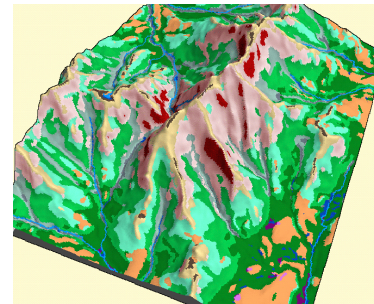


Lasting conservation depends on protecting places where effects of climate change are buffered by the natural properties of the site

Climate Resilient Sites



Resilient sites = sites that continue to support biological diversity, productivity and ecological function even as they change in response to climate change.



Complex topography

Create “micro-climates” that buffer change by providing species with a variety of local climates

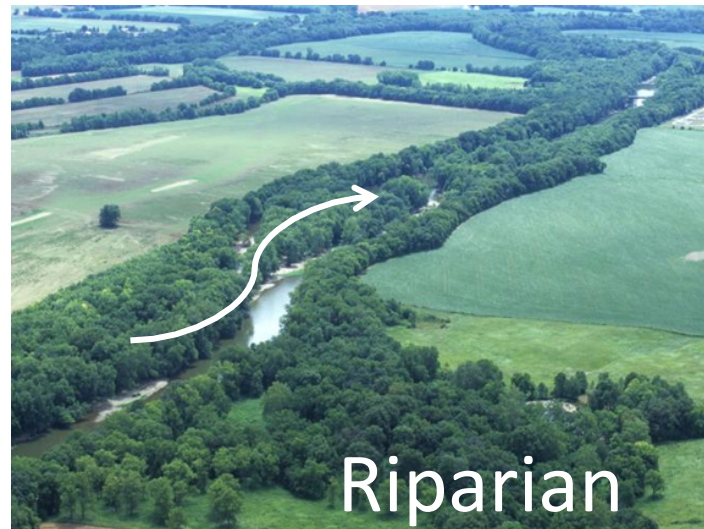
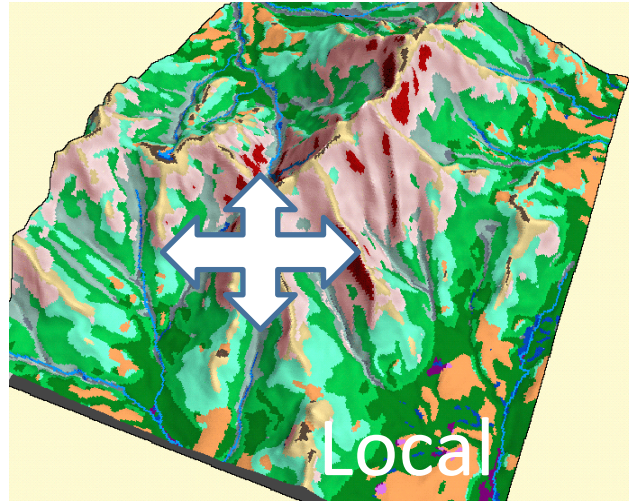
Connected land cover

Connected area in which species can move ensures the area can adapt to climate change

Successful conservation action

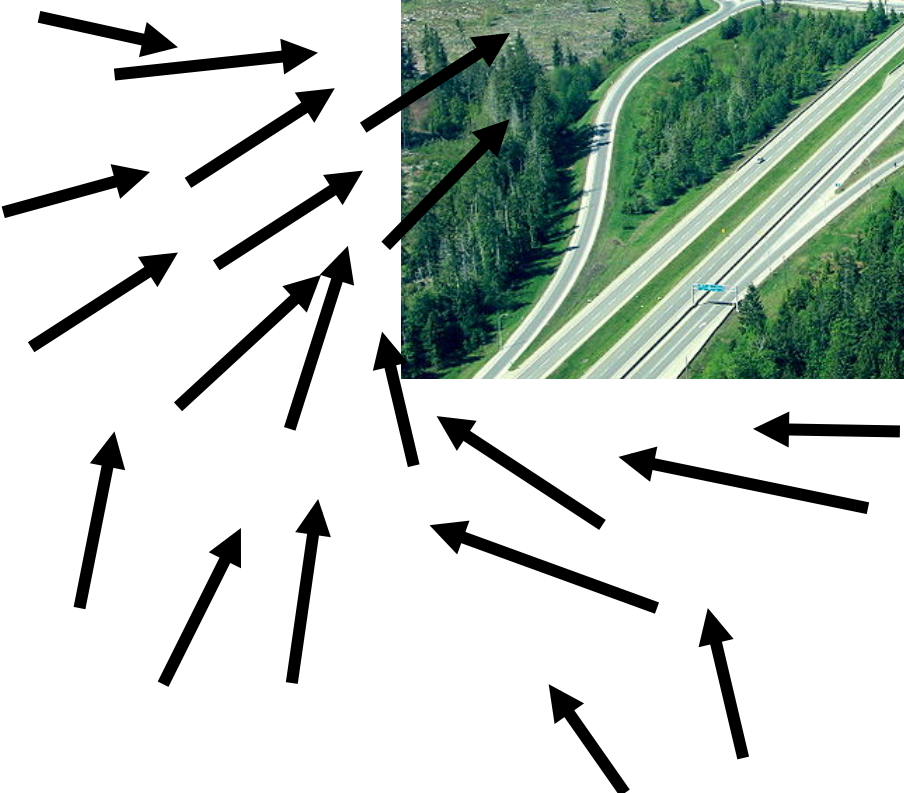
Climate Change

Species responses to Climate Change






The Bad News:
Highly fragmented landscape



Climate Corridors and Flow Zones

- Resilient Area 
- Climate Flow Zone 
- Climate Corridor 

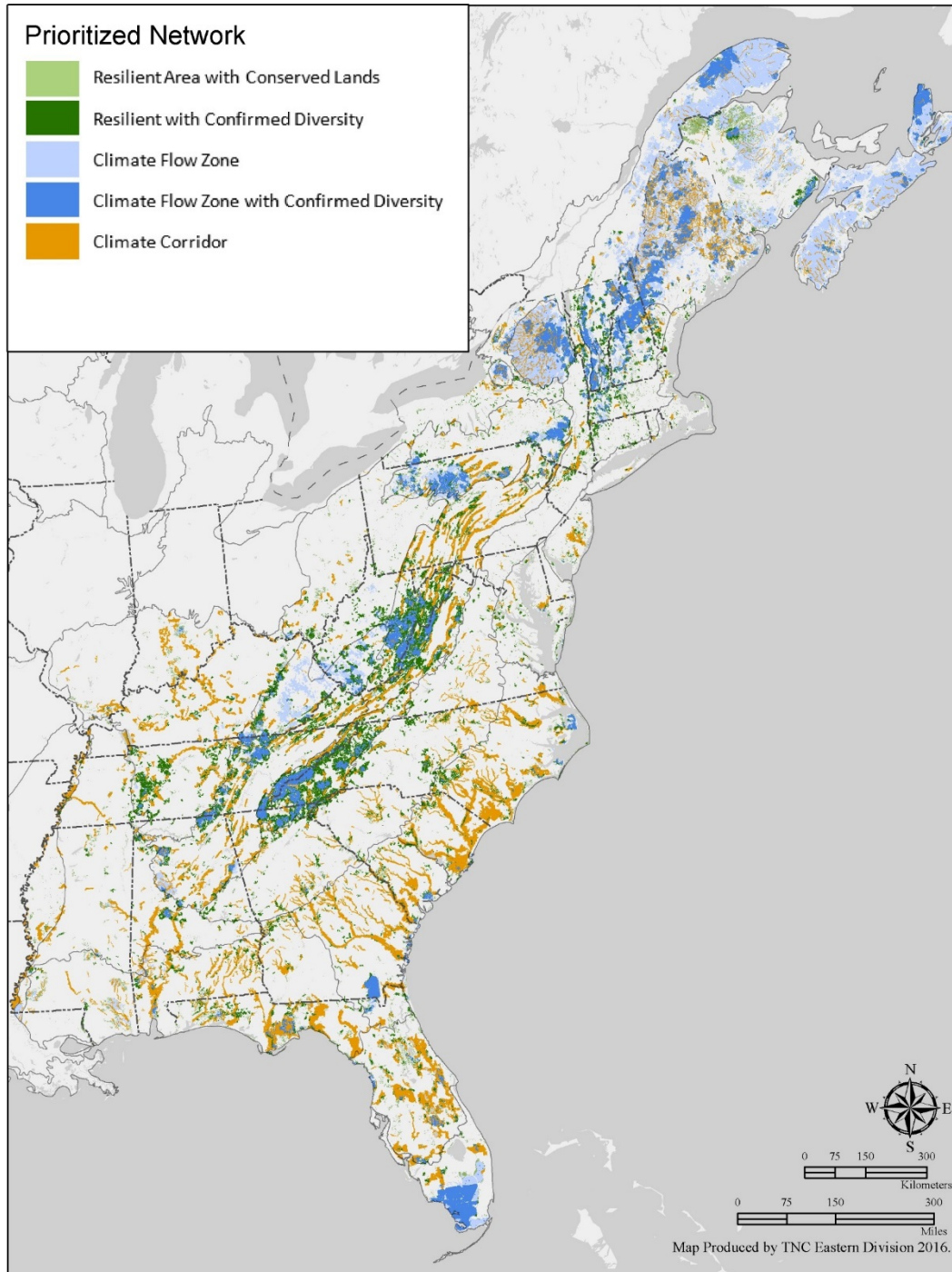
The Good News:
Opportunities to maintain, increase connections

Resilient & Connected Landscapes



Prioritized Network

- Resilient Area with Conserved Lands
- Resilient with Confirmed Diversity
- Climate Flow Zone
- Climate Flow Zone with Confirmed Diversity
- Climate Corridor



Resilient and Connected Network

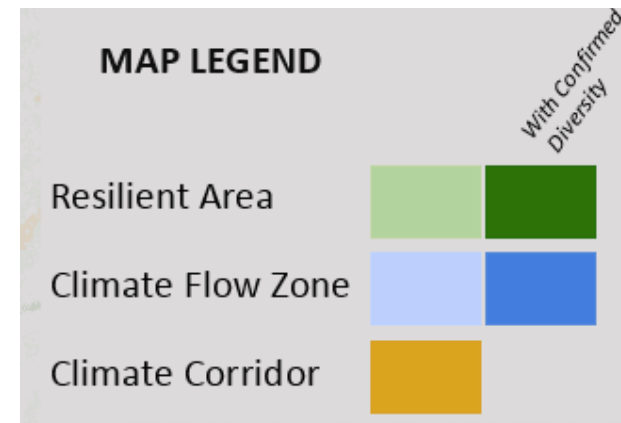
Resilience (38%)

Resilience + Flow

Resilience + Flow + Diversity

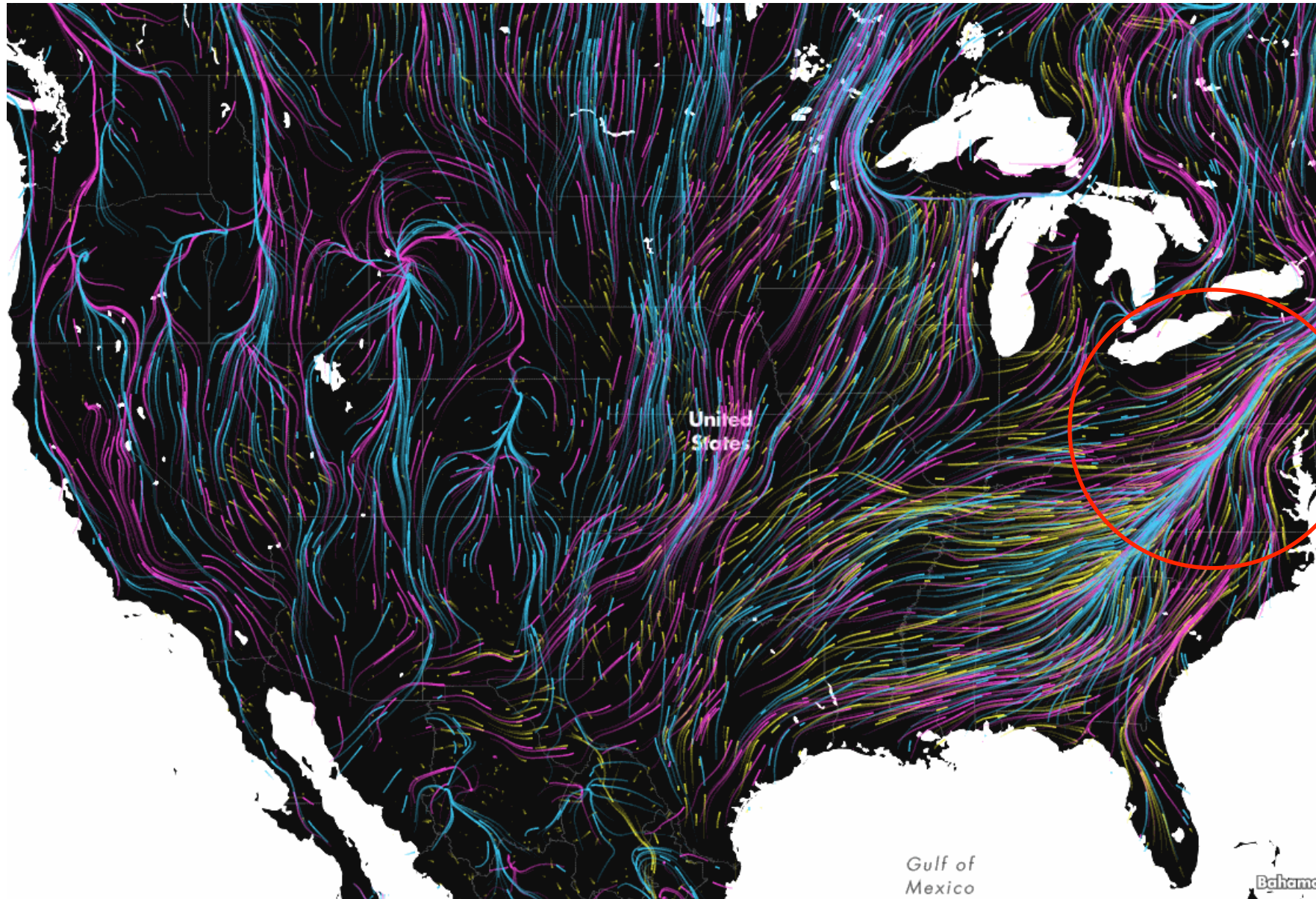
Prioritized (23%)

*all environments
80,000 species/community
maximum flow
44% protected*



Migrations in Motion

Natural Flow Patterns

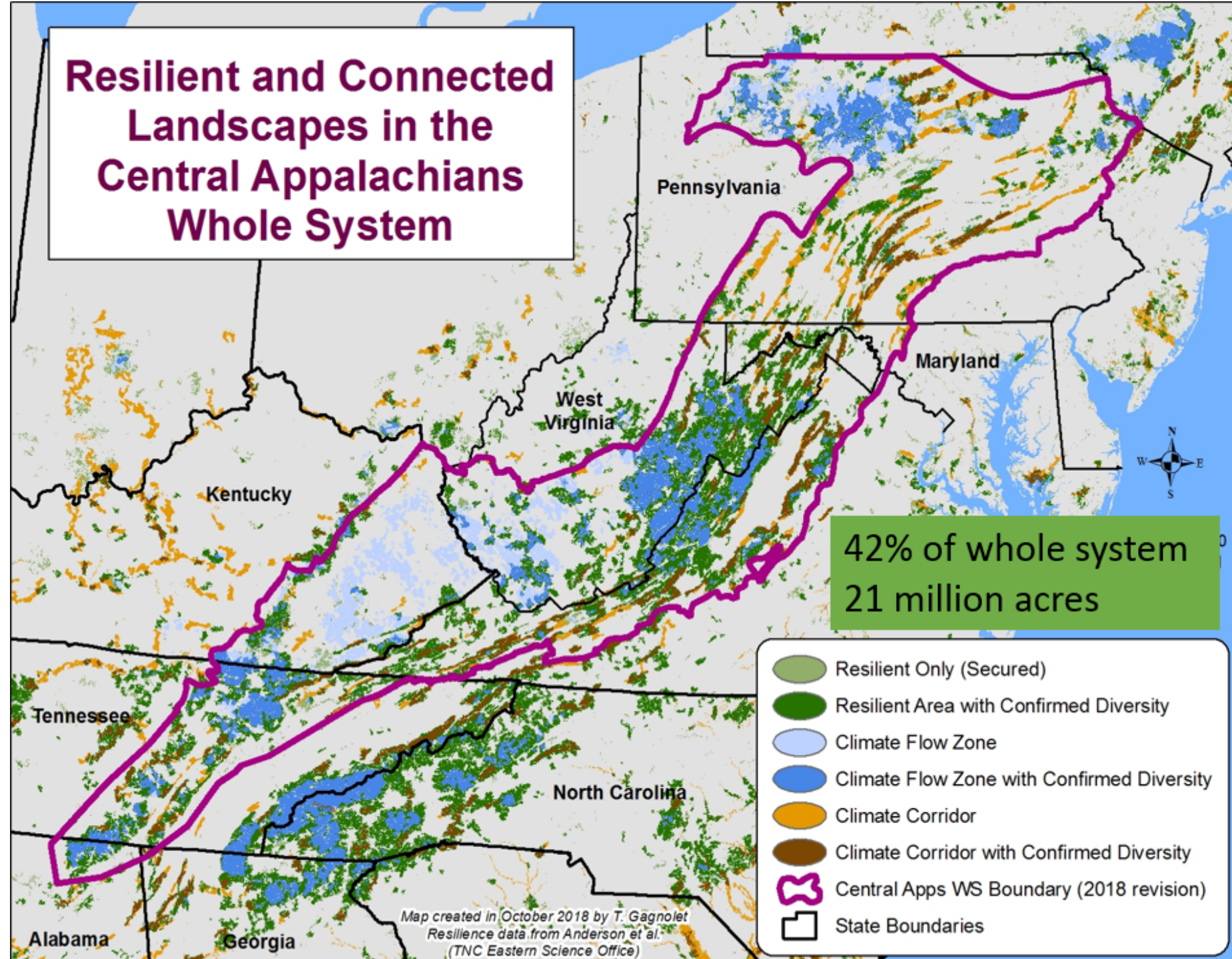


The gradual movement of populations across the landscape in response to climate change

Lawler et al
2015.
Animation
thanks to
Dan Majka

How do we
prioritize?

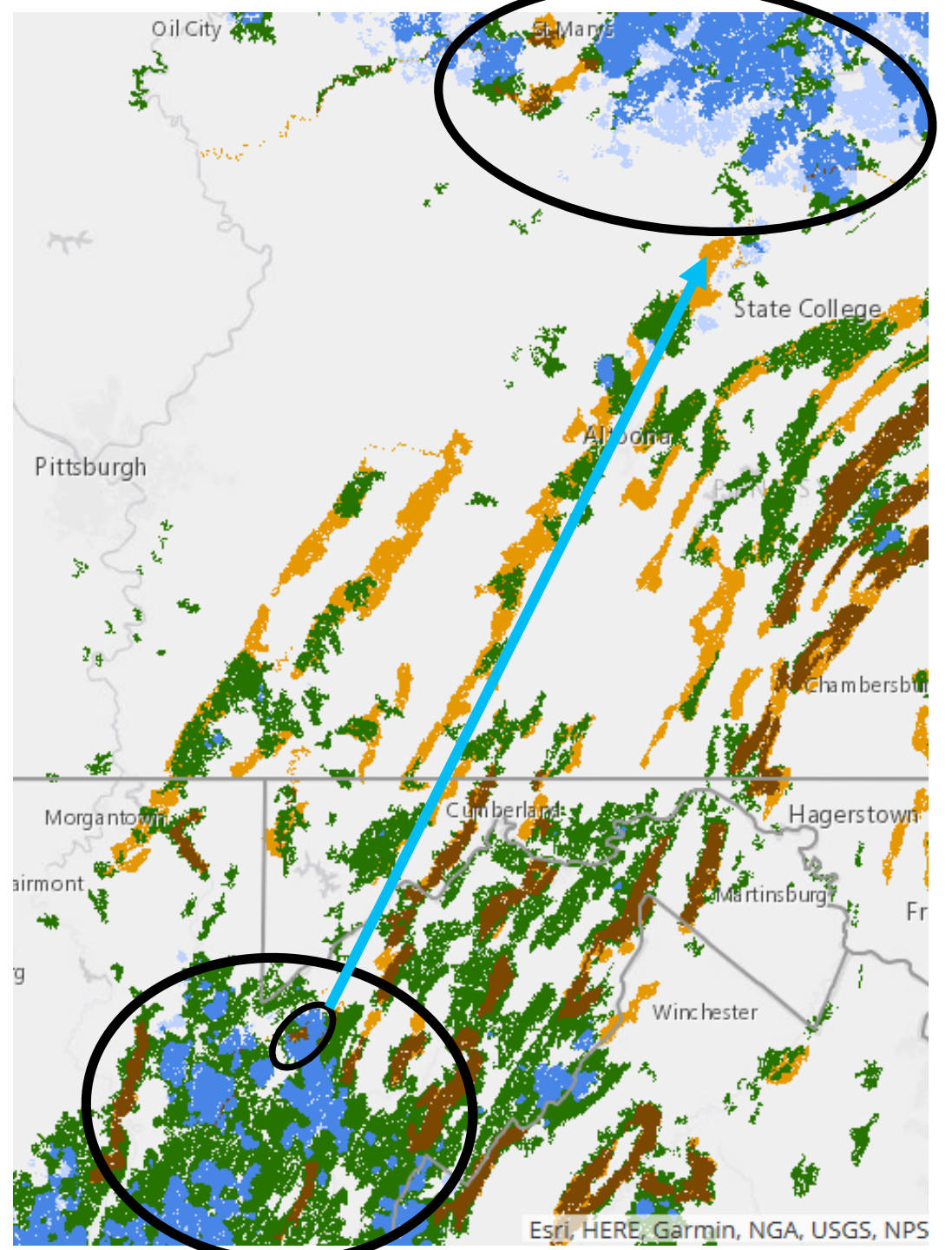
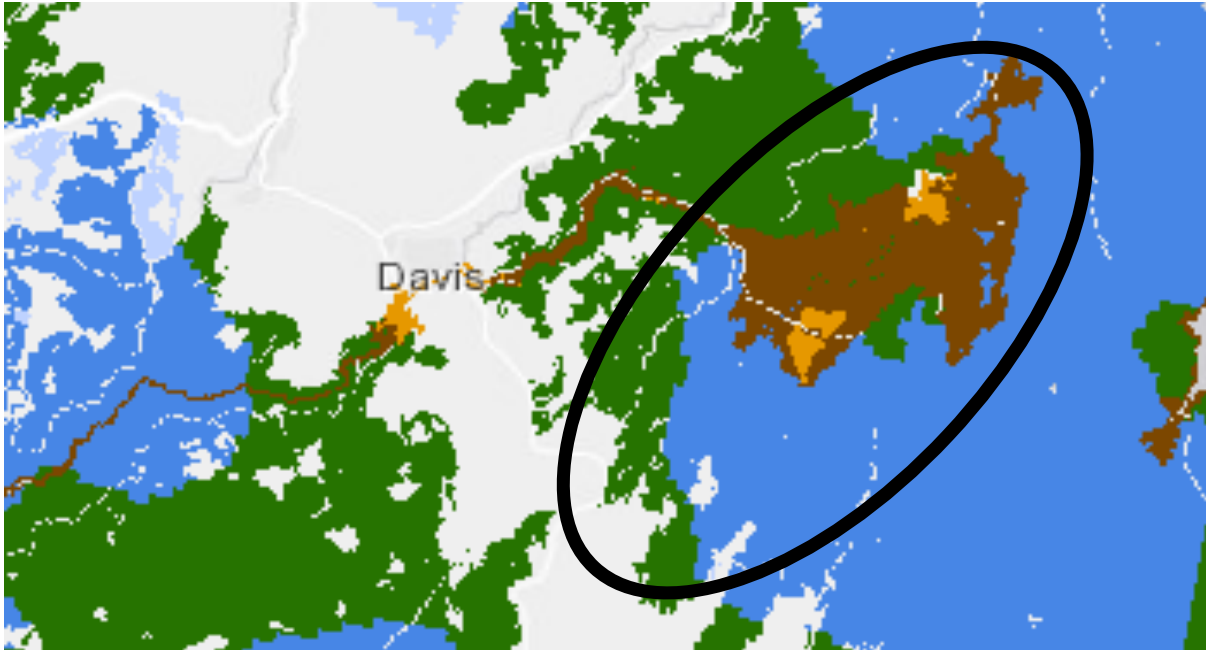
How do we
accomplish this
with partners?



Resilient Forests Program

Our GOAL:

Conserve forests in western Maryland that make up a critical conservation corridor through the Central Appalachians.



Questions/discussions...?

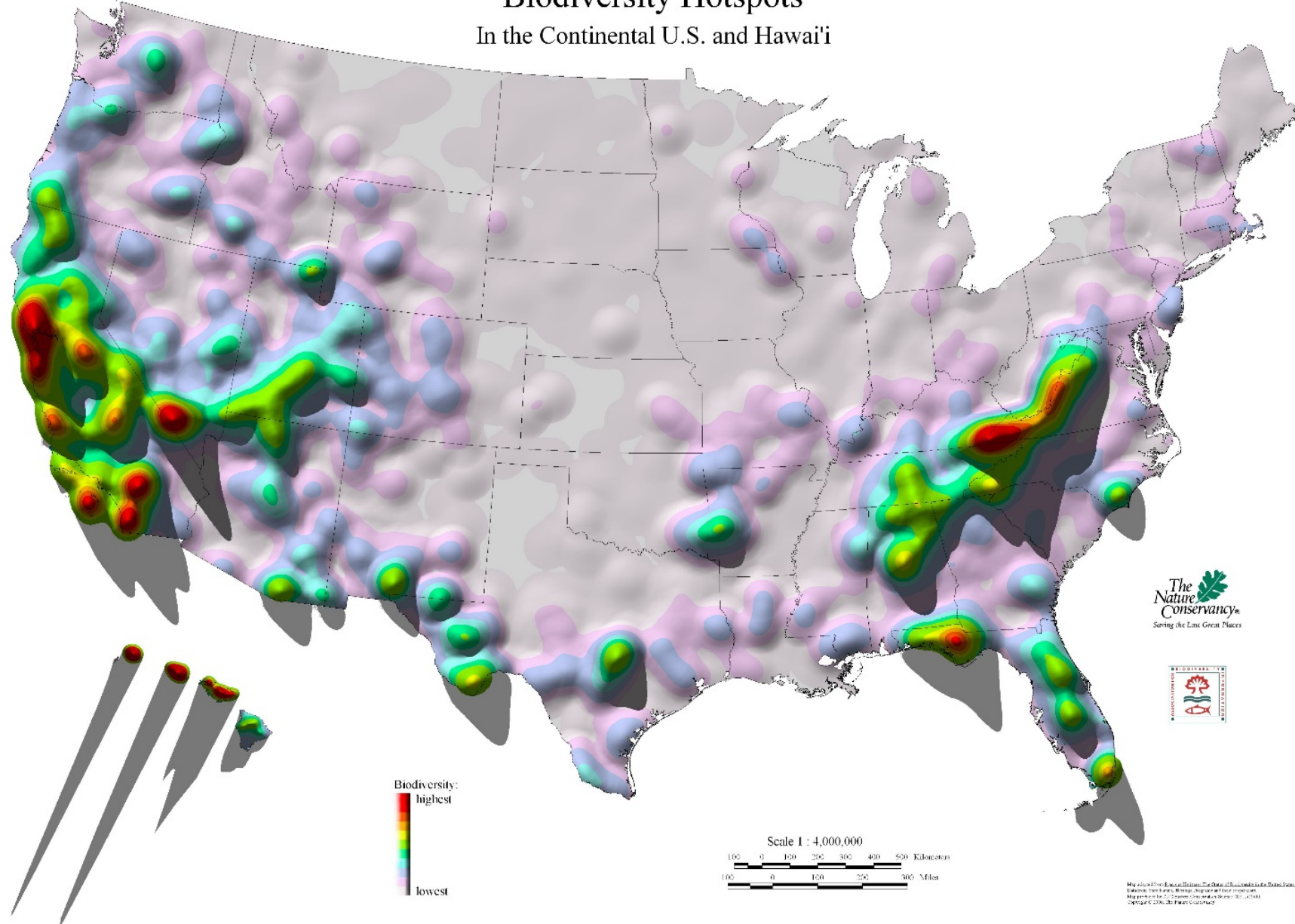


For more information:

www.conservationgateway.org

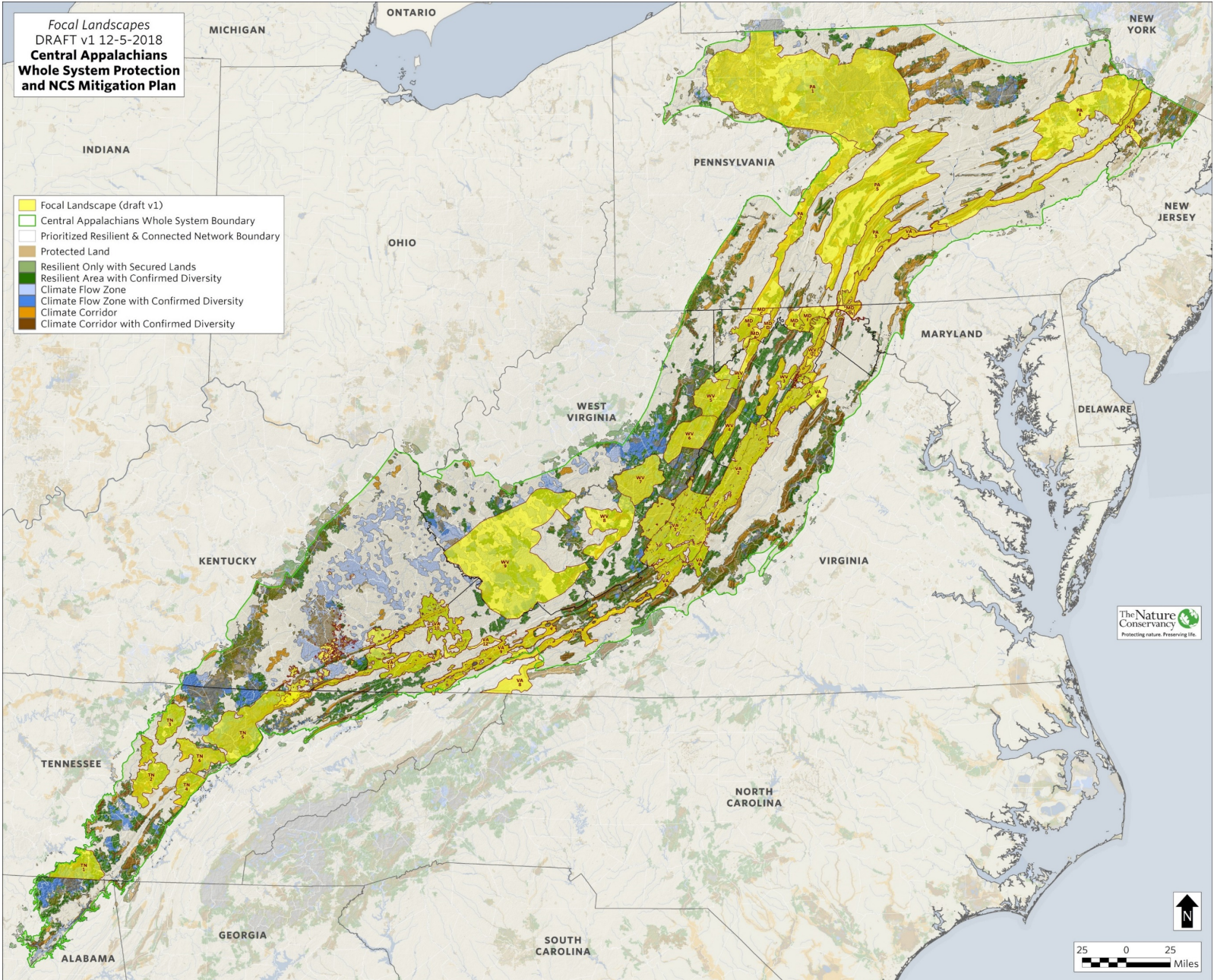
Central Appalachians

Biodiversity Hotspots
In the Continental U.S. and Hawai'i



Global Forest Loss: Temperate Mixed Forest

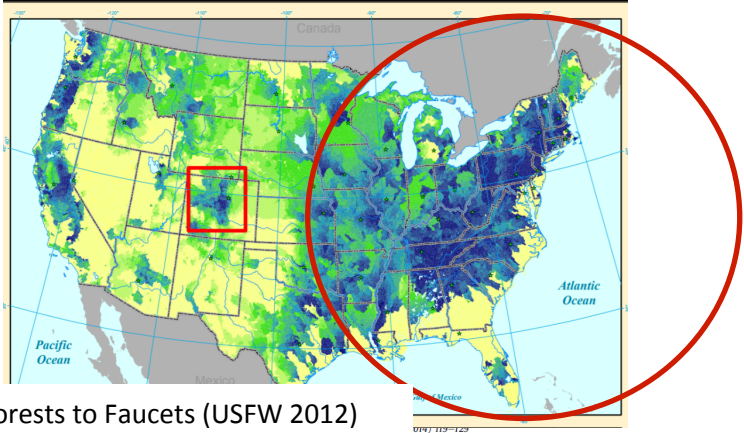




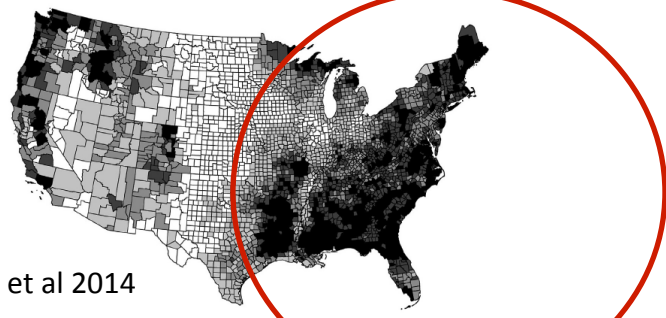
Natural Benefits



(Kellnsdorfer 2012)



Forests to Faucets (USFW 2012)



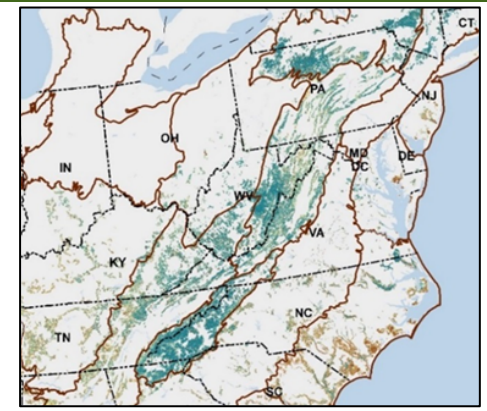
Nowak et al 2014

Pollution removal (tonnes per square kilometer)
 0.03 - 0.67 0.68 - 1.86 1.87 - 3.37 3.38 - 4.50 4.51 - 8.41

Fig. 2. Estimated removal per square kilometer of land (tonnes km⁻²) of all pollutants (NO₂, O₃, PM₁₀, SO₂) by trees per county in 2000.

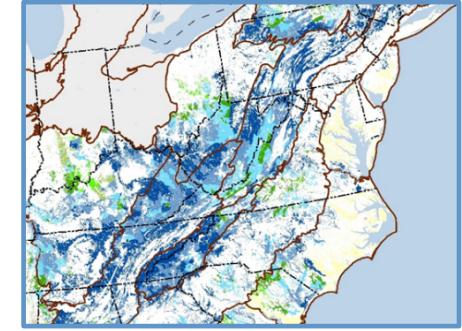
Carbon

East = 7 billion tons of Above-Ground Carbon, 56% is in the 23% (3.9 billion)
 Offset >600 M cars



Water

East = 97 M acres High Value Source Water, 75% is in the 23% network

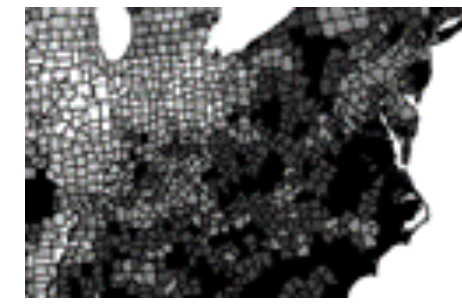


Air

East = O₂ for 2.3 billion p/yr
 23% = 1.3 billion people/yr

US Forests mitigate 17 M tons of pollution/yr

- Human health effects valued at \$6.8 billion/yr
- Avoidance of more than 850 deaths/yr



Black = 4.5-8.4 tons/sq km