KATY BARLOW

THE NATURE CONSERVANCY

Climate Resiliency Science, Strategies, and Planning

The Nature Conservancy

Protecting nature. Preserving life.

OBJECTIVES

1. CONCEPTUAL FRAMEWORKS WITH EXAMPLES
2. LANDSCAPE PLANNING AND SITE-LEVEL MANAGEMENT

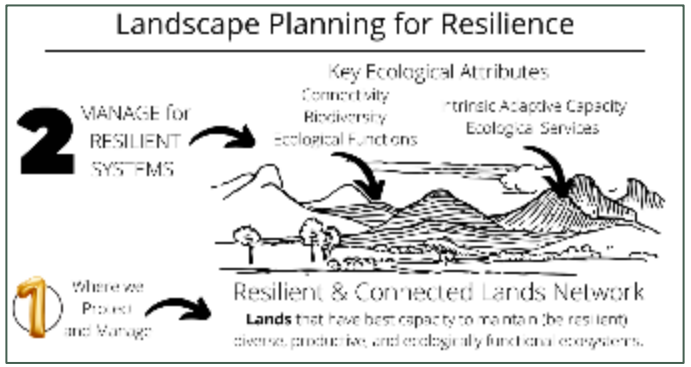
Climate Resiliency Science, Strategies, and Planning

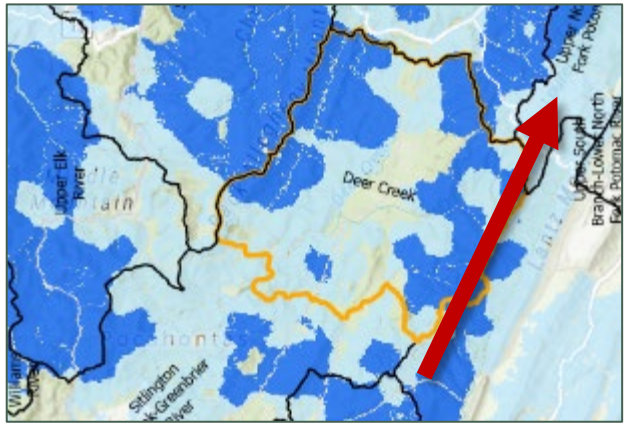
The Nature Conservancy

Protecting nature. Preserving life.

Climate Resilience

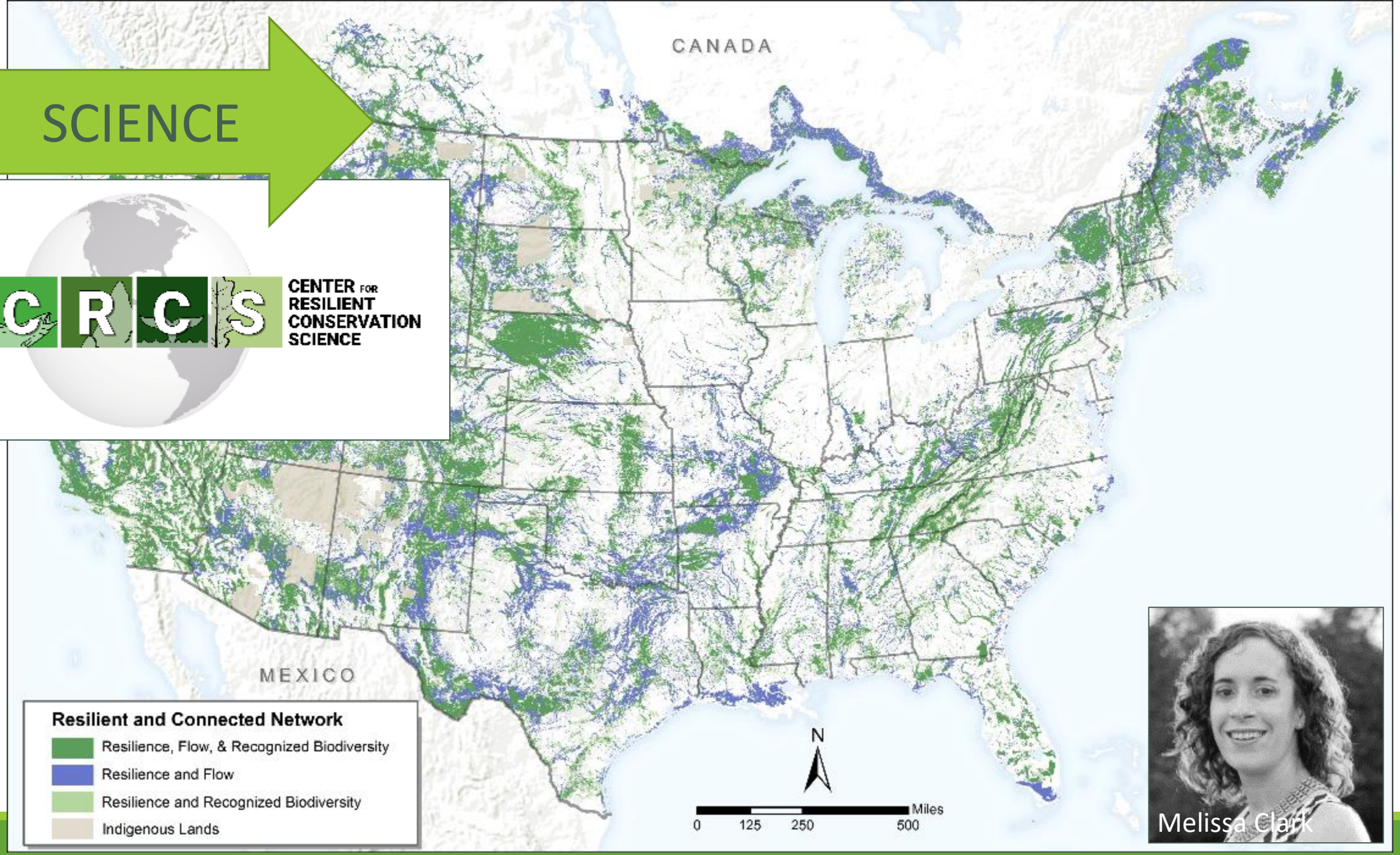
SCIENCE → STRATEGIES → PLANNING





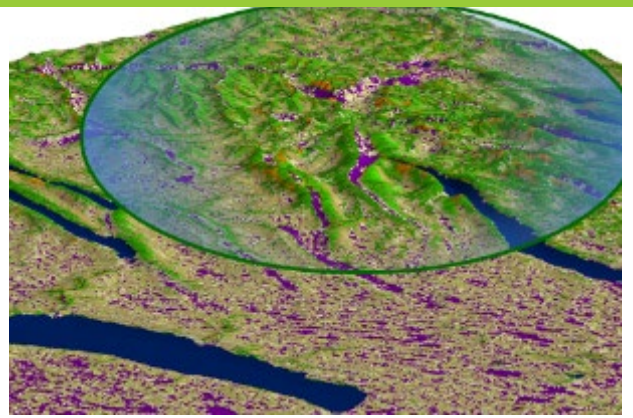
SCIENCE

CENTER FOR RESILIENT CONSERVATION SCIENCE



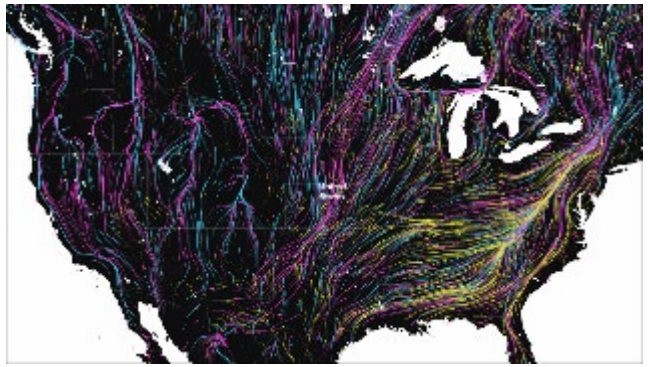
Over 250 scientists!

Three Ingredients



Resilient Land

Land with many *connected* microclimates representing all physical environments



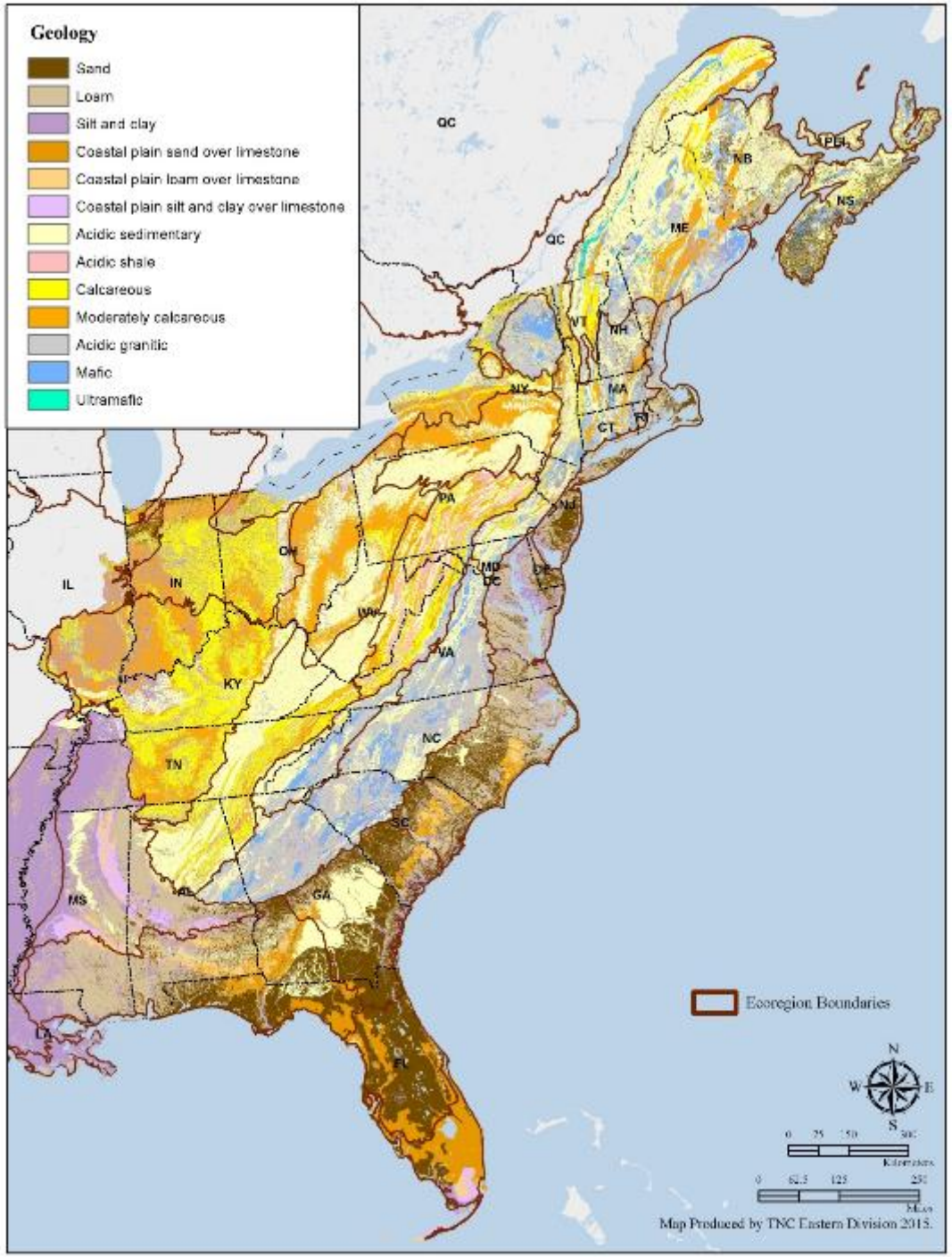
Permeable Landscape

A *connected* landscape that allows movement and facilitates range shifts

Resilient Systems & Species

Intact habitats, unique communities and rare species populations

Conserving Nature's Stage

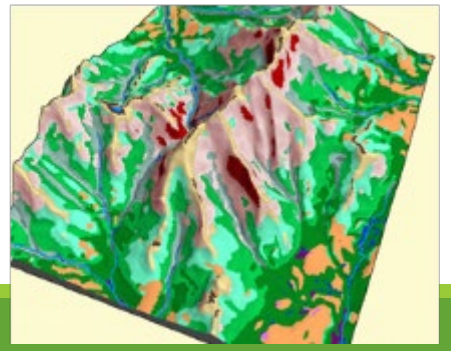


Representative Land

Biological diversity is highly correlated with **Land Properties** (Geology, Soil, Elevation, Topography, Hydrology)

Many Microclimates

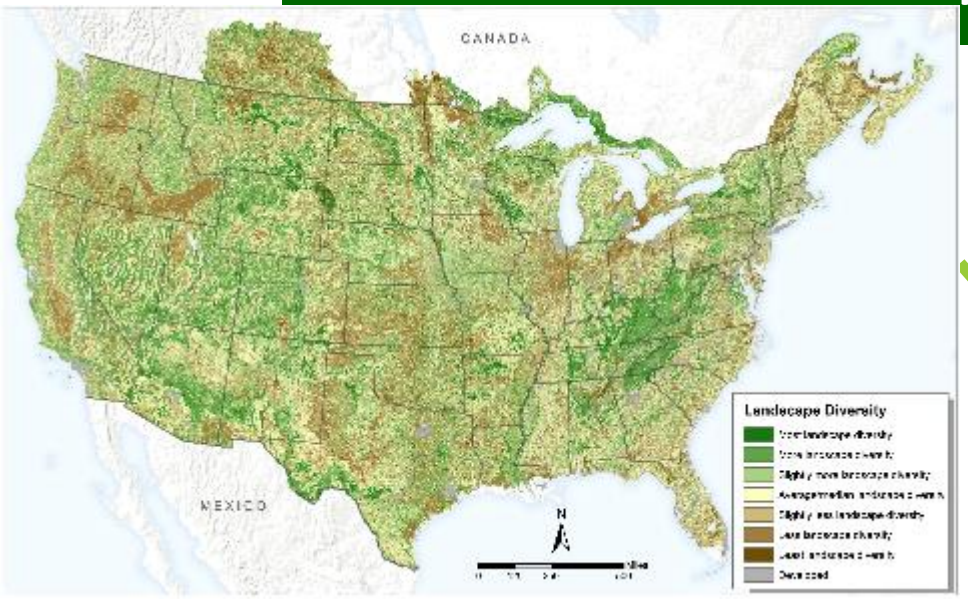
Create climate options



Locally Connected

Allows species to move

Resilient Land

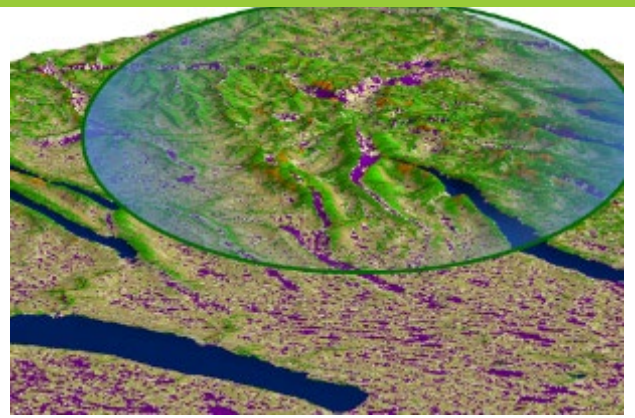


Landscape Diversity

Local Connectedness

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

Three Ingredients



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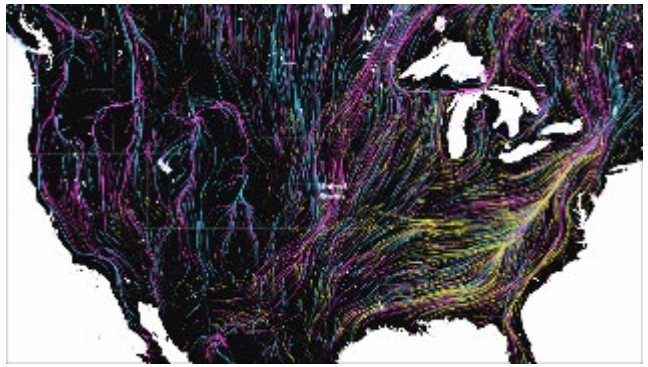

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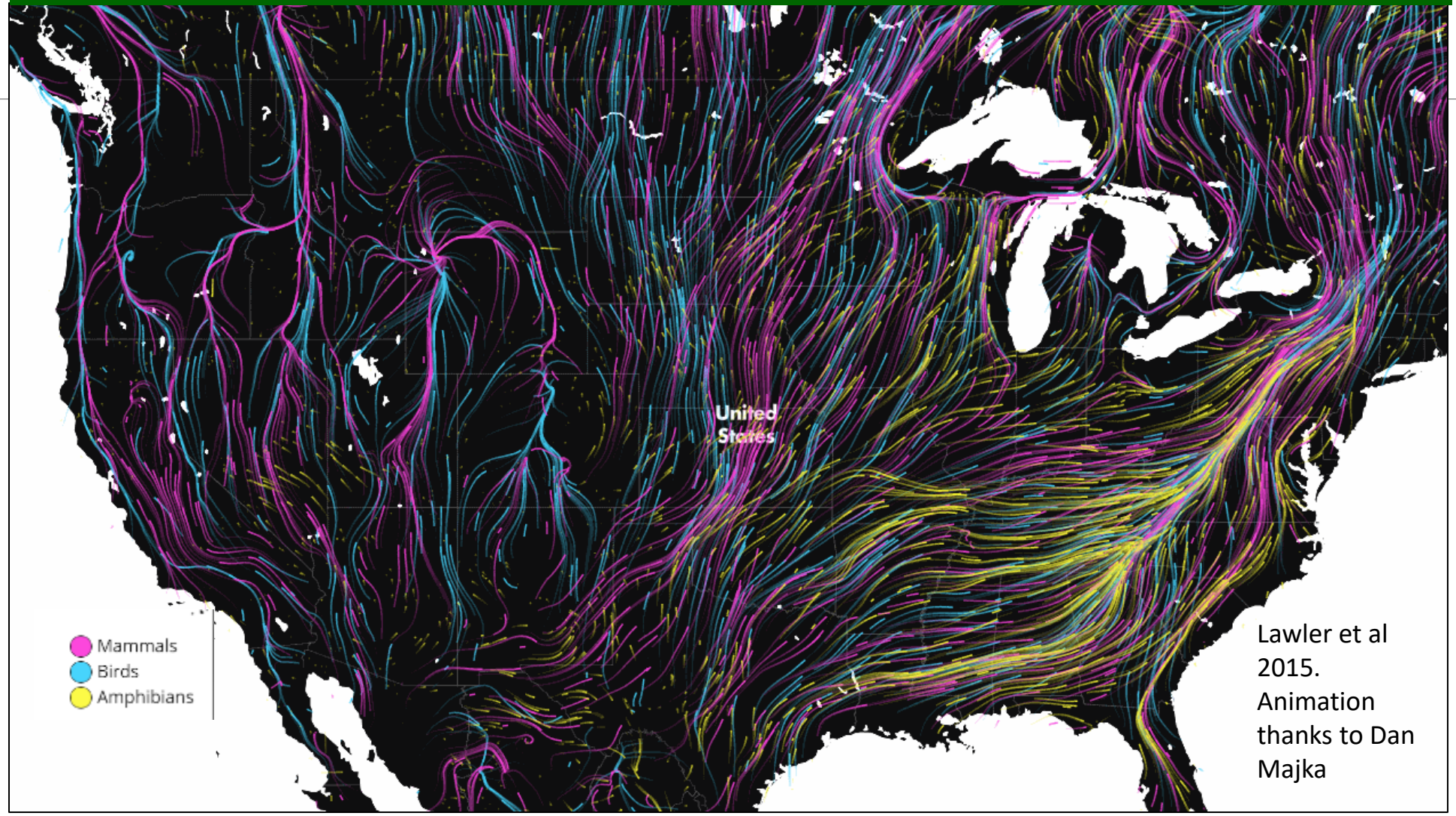
Climate Flow

The Gradual Movement of Populations in Response to Climate Change

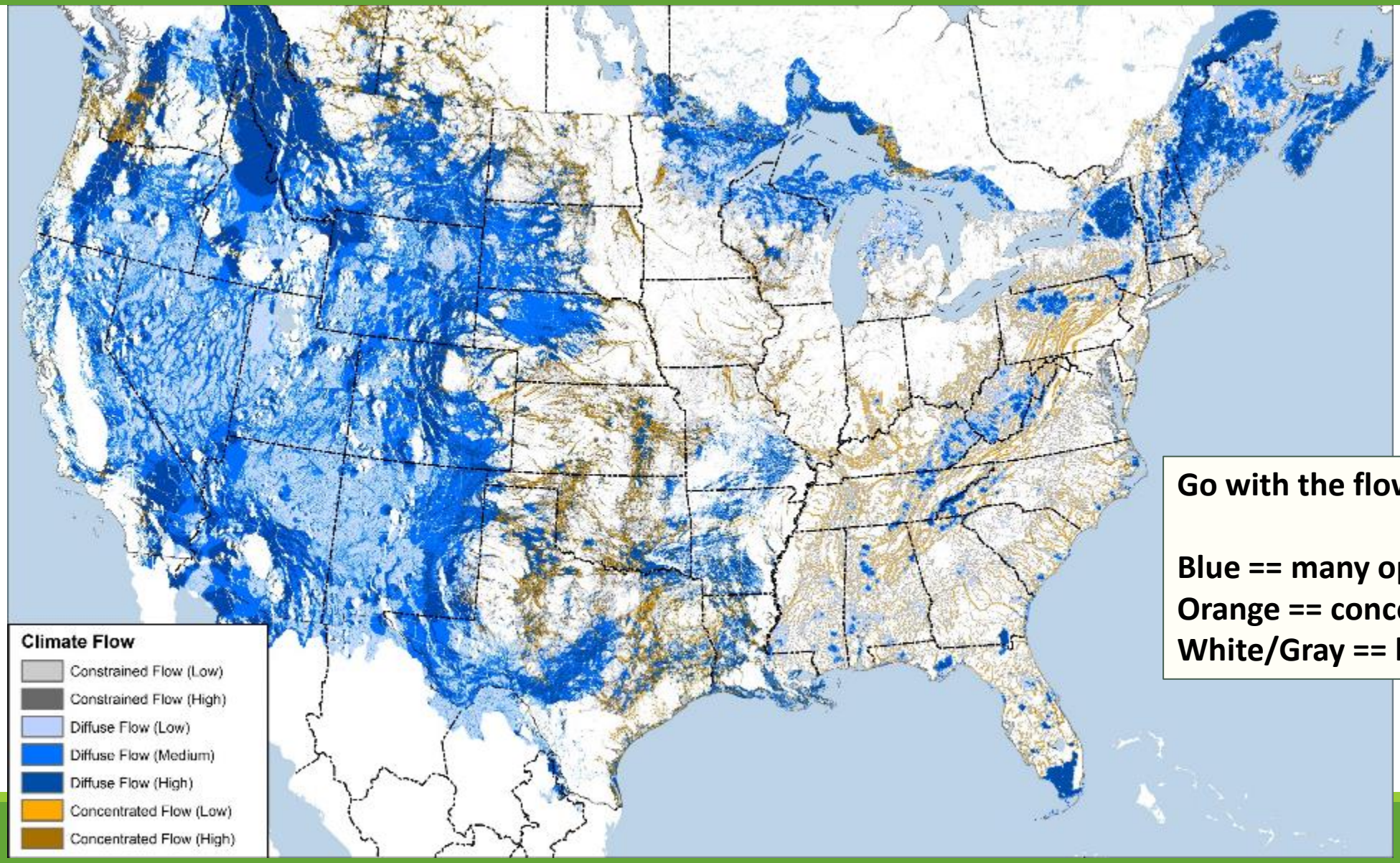


The gradual movement of populations across the landscape in response to climate change

Current Rates: 11 mile per decade North **36 feet** per decade Upslope

Climate Flow

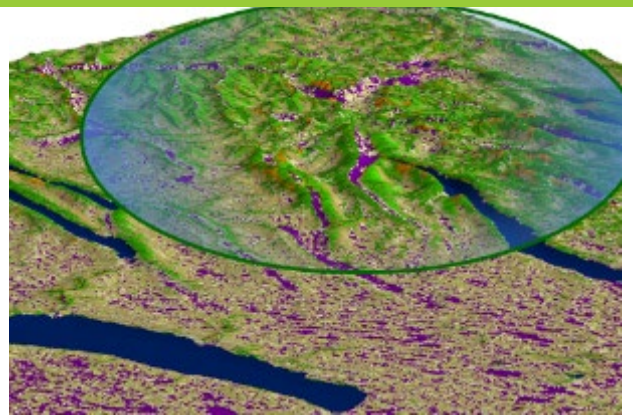
The gradual movement of species populations in response to a changing climate



Go with the flow!

Blue == many options for flow
Orange == concentrated flow
White/Gray == blocked flow

Three Ingredients



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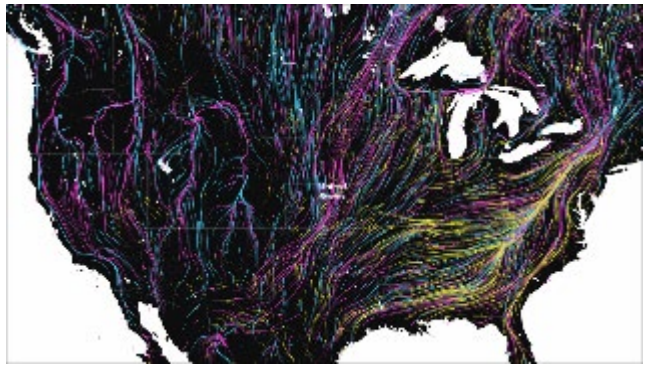

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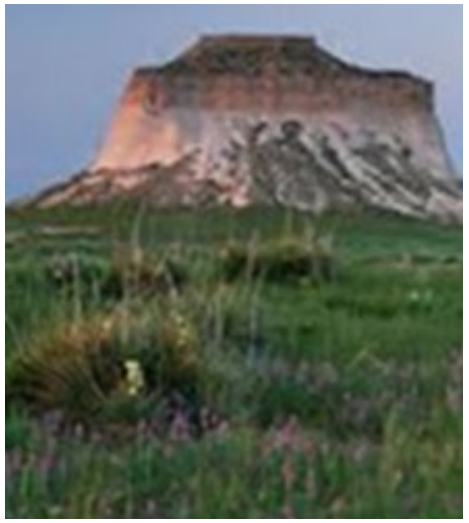
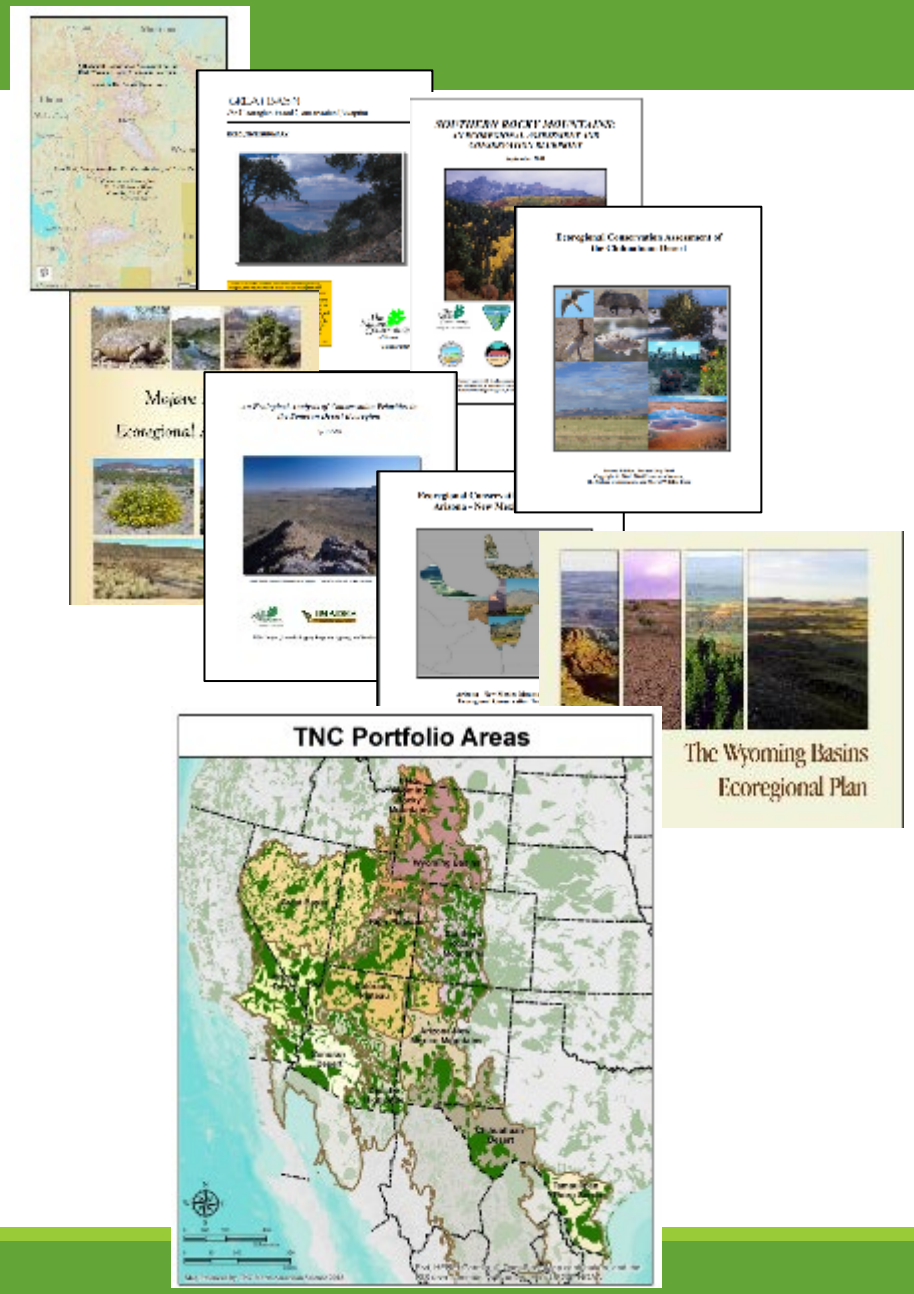
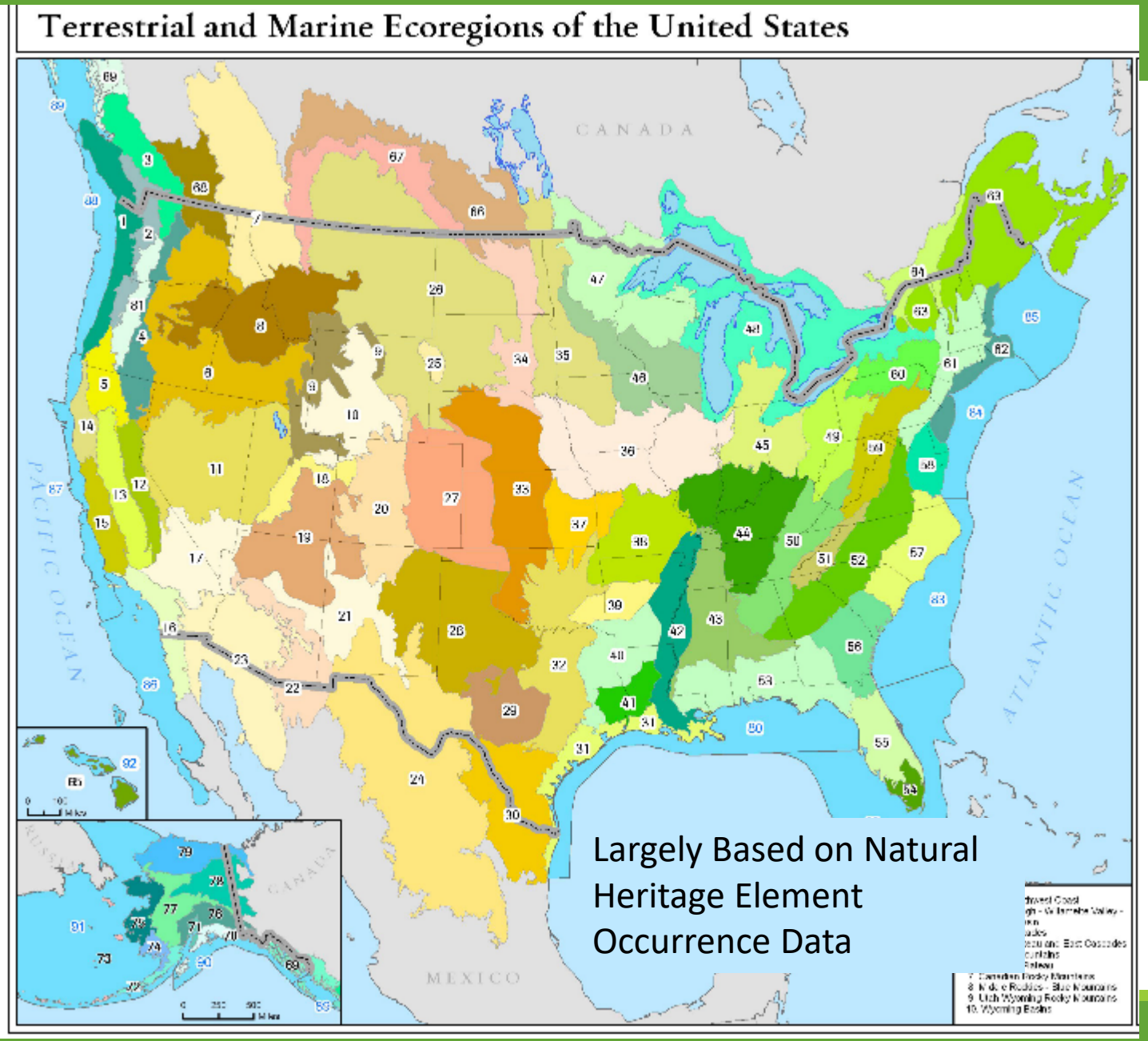


Biodiversity

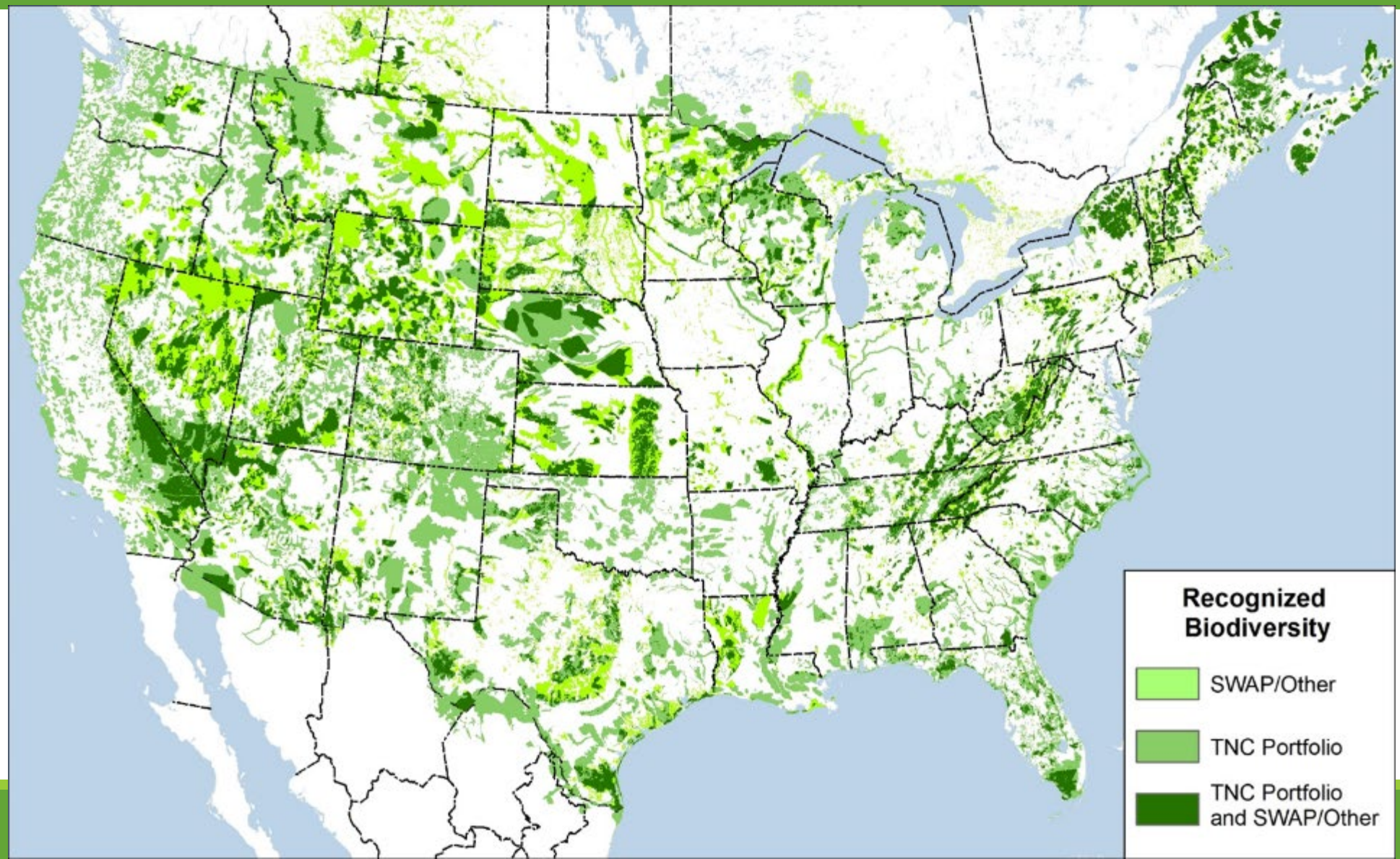
Biodiversity Assessments





Biodiversity

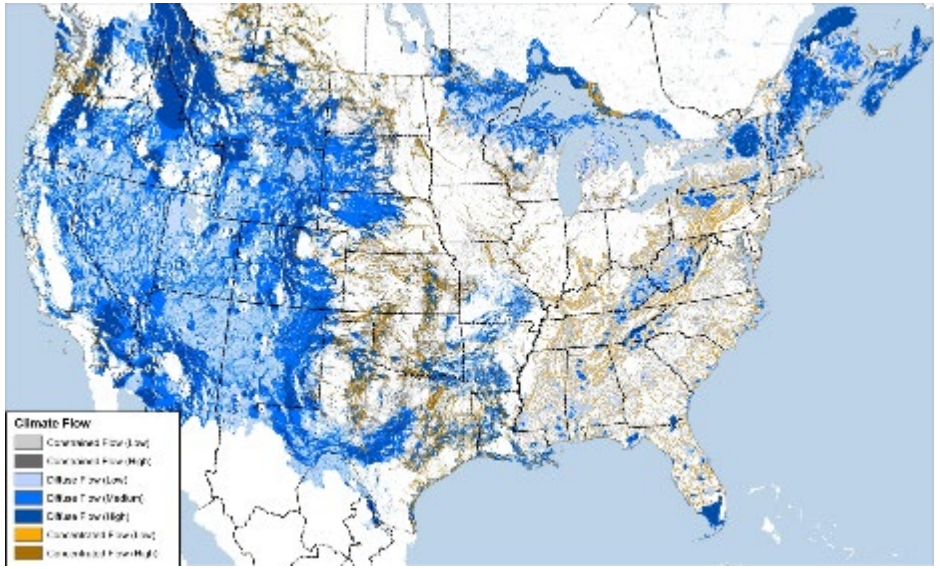
(TNC Ecoregional Plans, SWAPs, NHP)



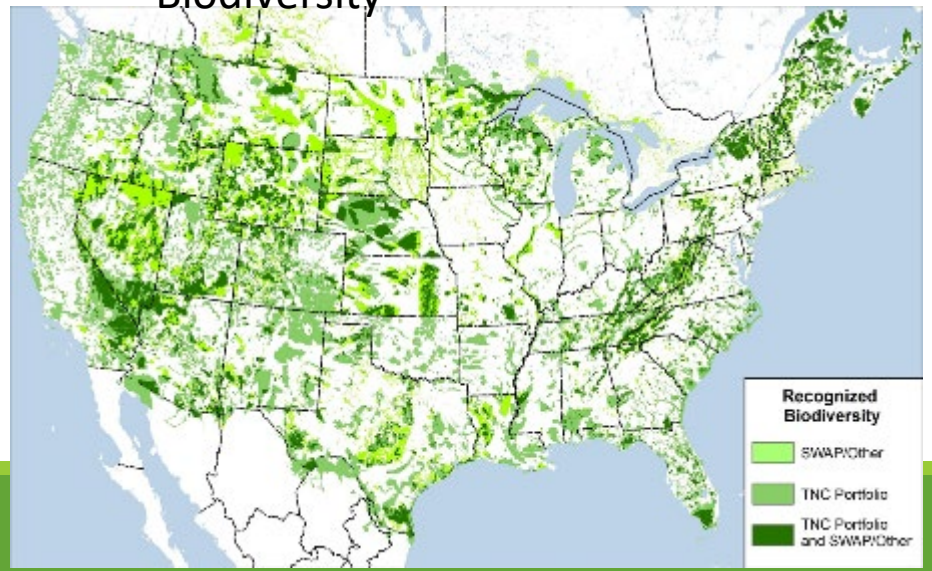
Resilient and Connected Network

Site Resilience

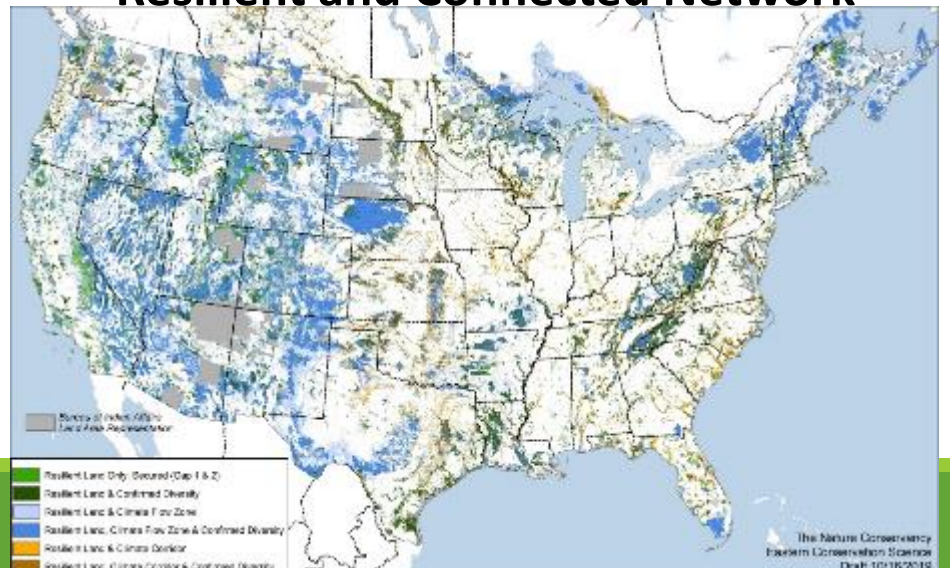
Climate Flow



Biodiversity



Resilient and Connected Network



Access the Data

http://crcs.tnc.org

http://nature.org/climateresilience

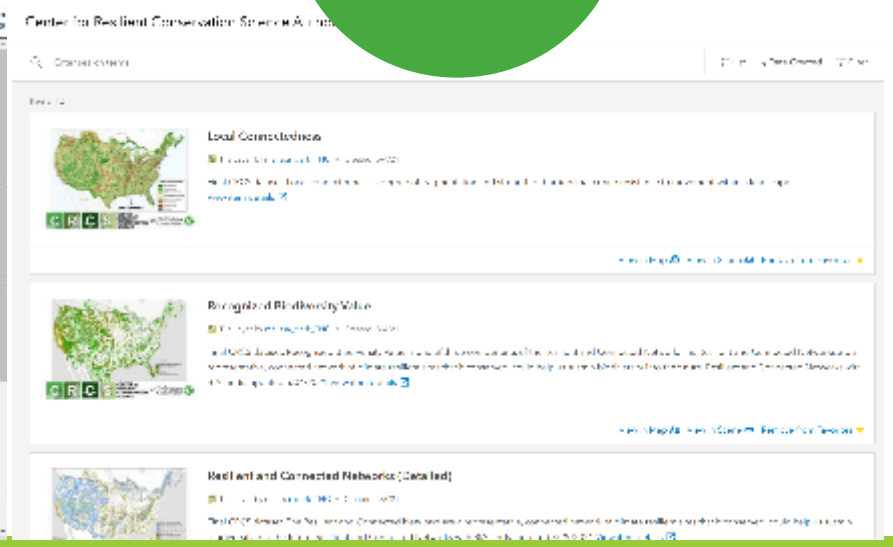
http://maps.tnc.org/resilientland

--Easiest--

Resilient Land Mapping Tool

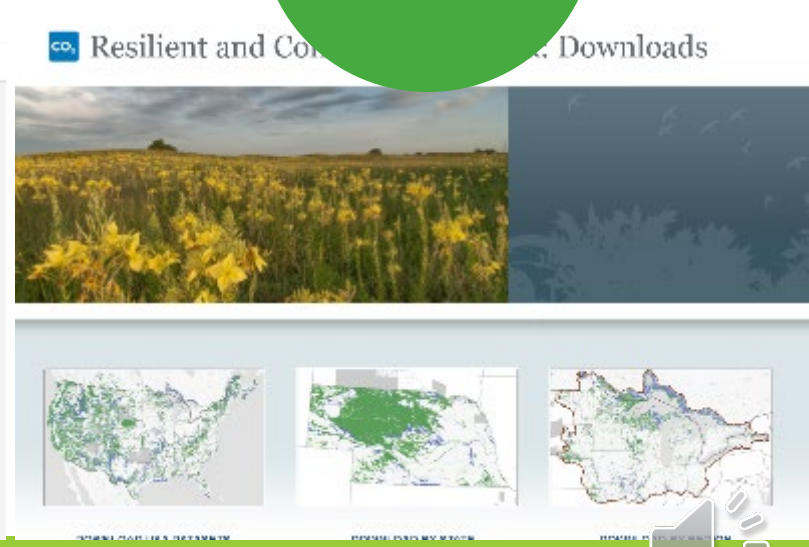
--Intermediate--

ArcGIS Online Authoritative data



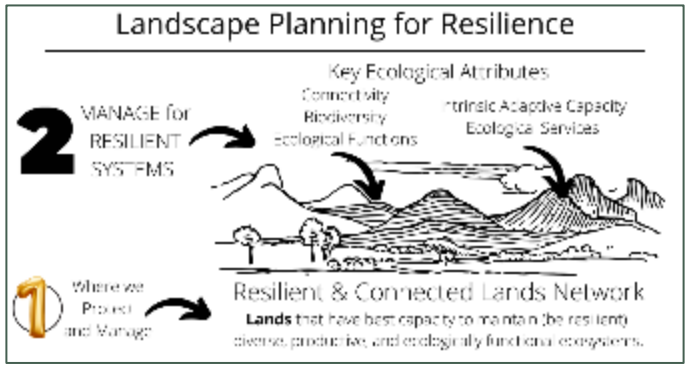
--Advanced--

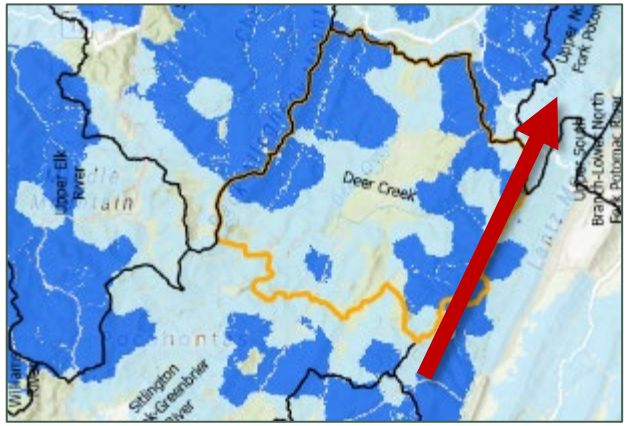
Download the Data



Climate Resilience

SCIENCE → **STRATEGIES** → PLANNING





Landscape Planning for Resilience

Key Ecological Attributes

Connectivity
Biodiversity
Ecological Functions

Intrinsic Adaptive Capacity
Ecological Services

2 MANAGE for RESILIENT SYSTEMS

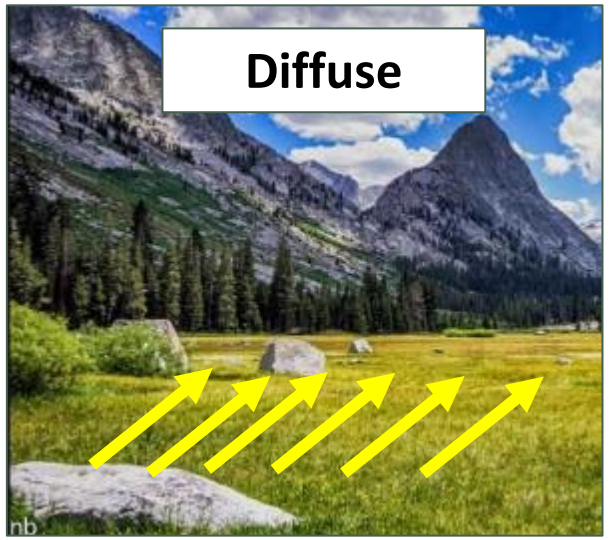
1 Where we Protect and Manage

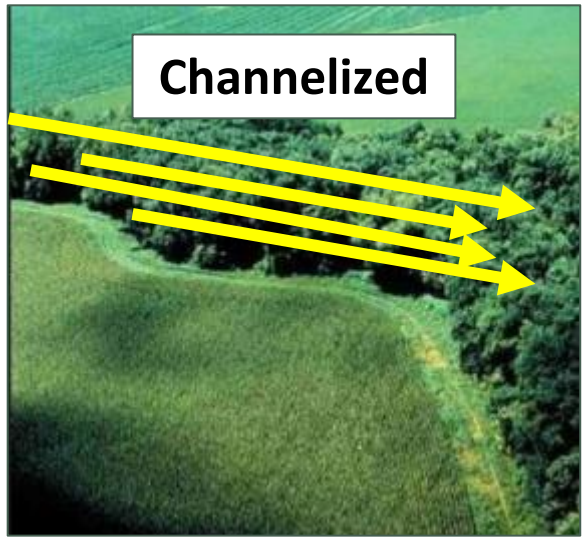
Resilient & Connected Lands Network

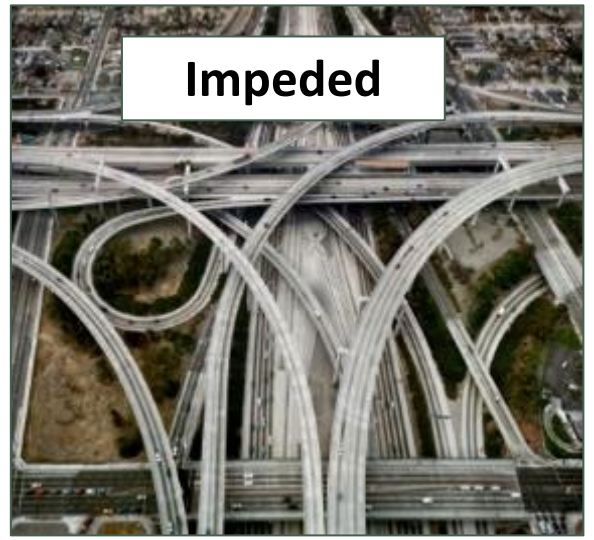
Lands that have best capacity to maintain (be resilient) diverse, productive, and ecologically functional ecosystems.

STRATEGIES

Connectivity

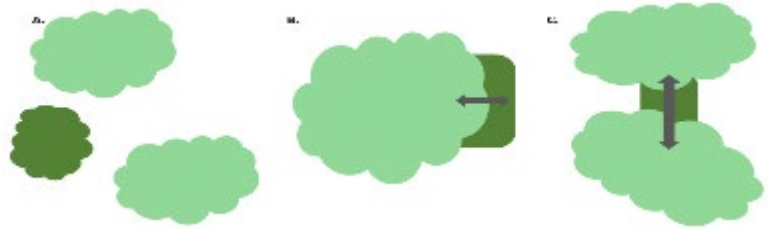






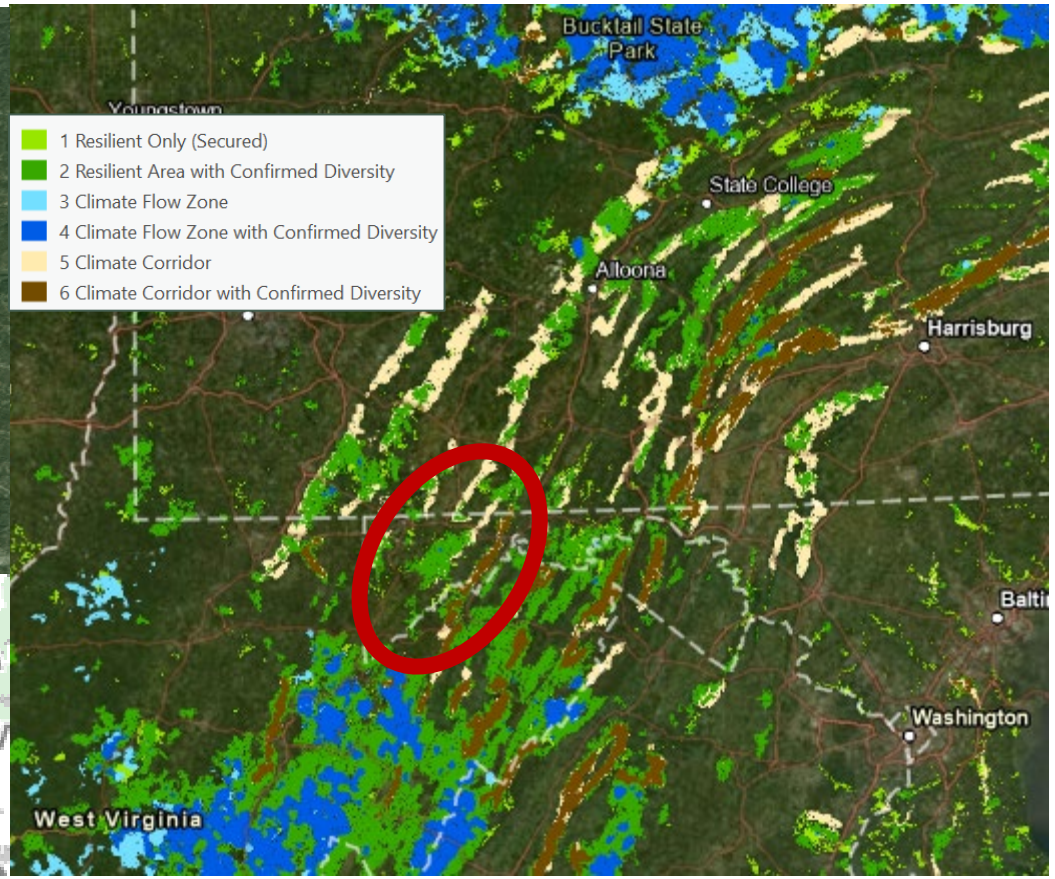
WHY? Connectivity enables species movement for maintaining ecosystem functions and gene flow for maintaining biodiversity

Management Options

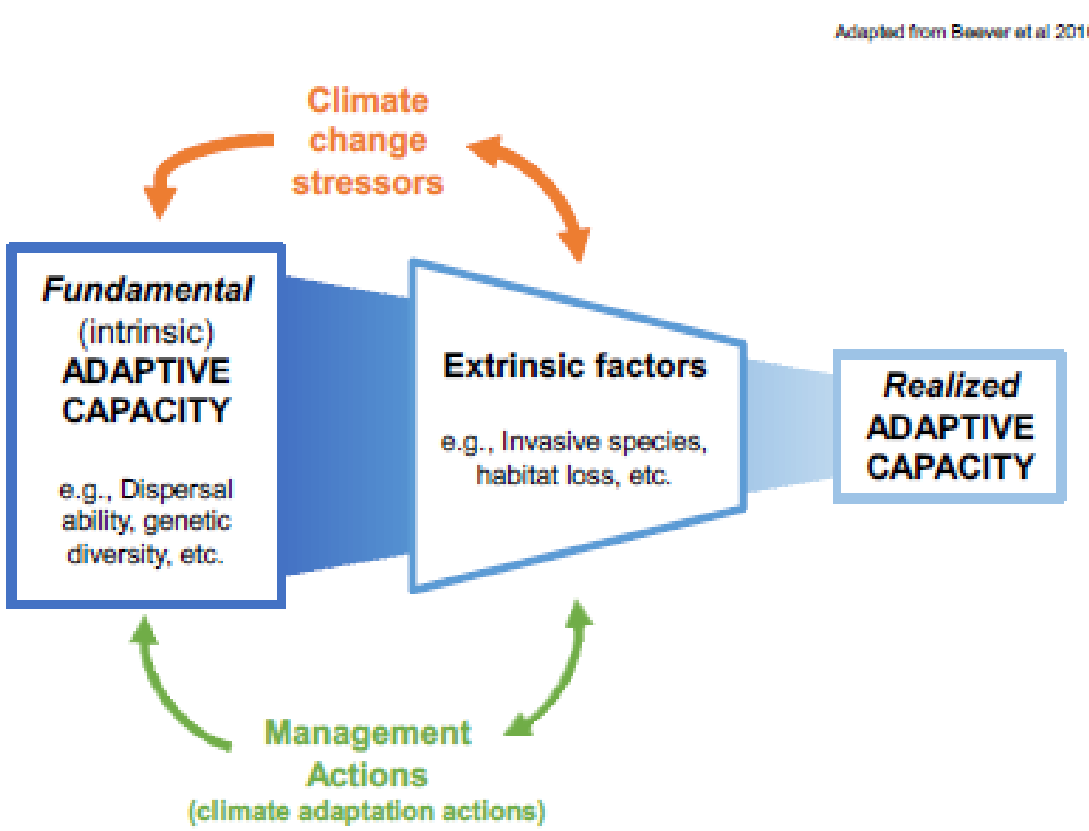


Visuals by Kim Hall and Melissa Clark

Connectivity



Adaptative Capacity



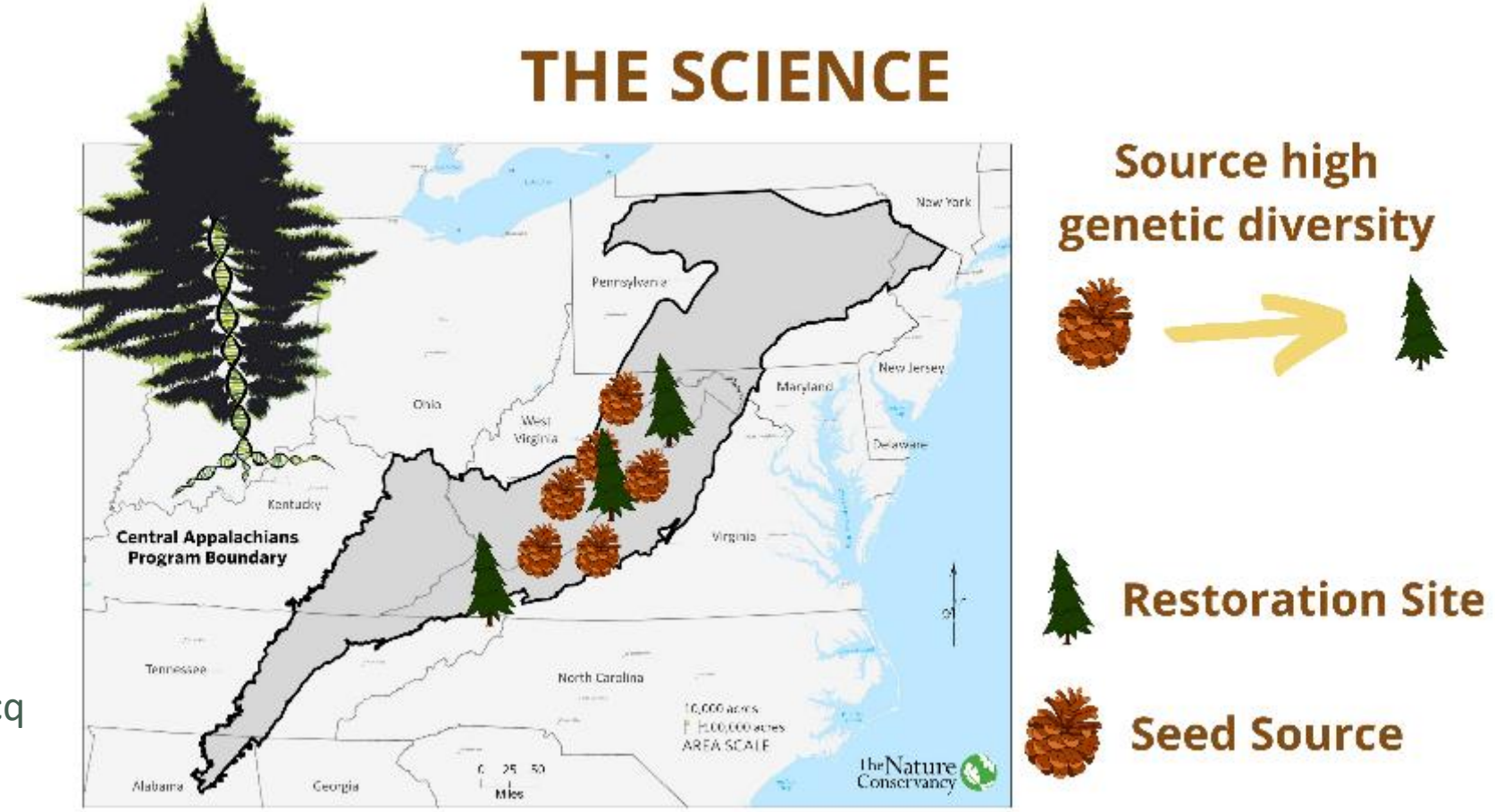
Visuals from Bruce Stein presentation, Advances in Understanding Adaptive Capacity – An Introduction, NAF 2019

Adaptative Capacity

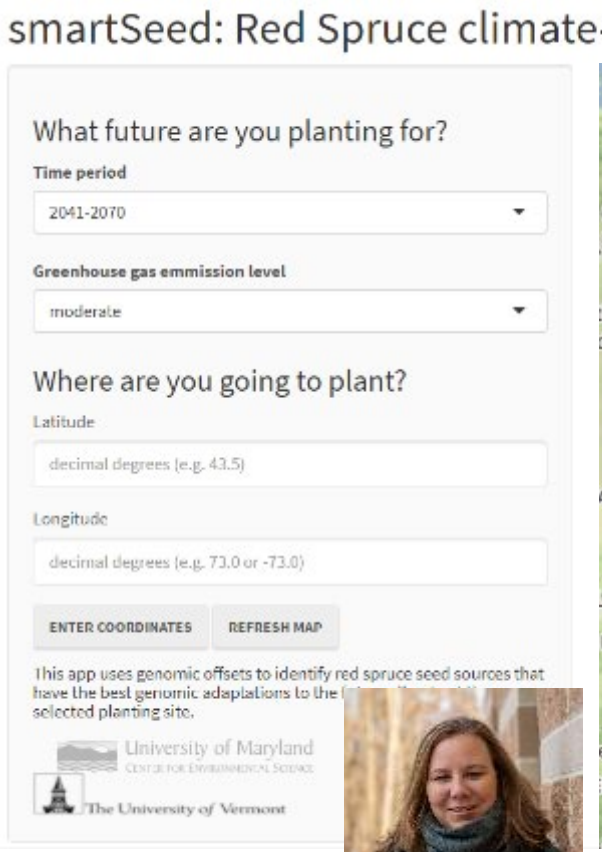
Optimal Sources

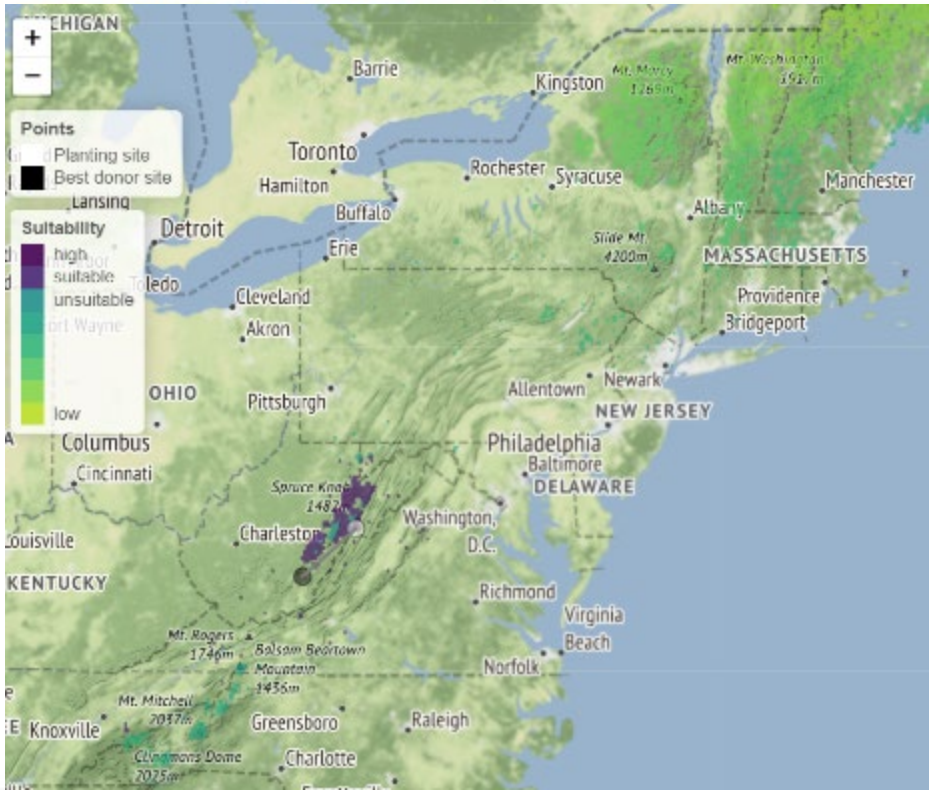
1. **Maximize Genetic Diversity**
2. **Minimize Genetic Load**
3. Optimize Local Adaptation

Dr. Thibaut Capblancq



Intrinsic Adaptative Capacity





Dr. Susanne Lachmuth

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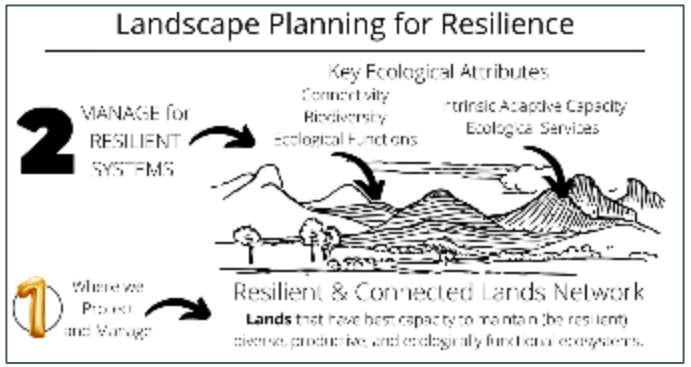
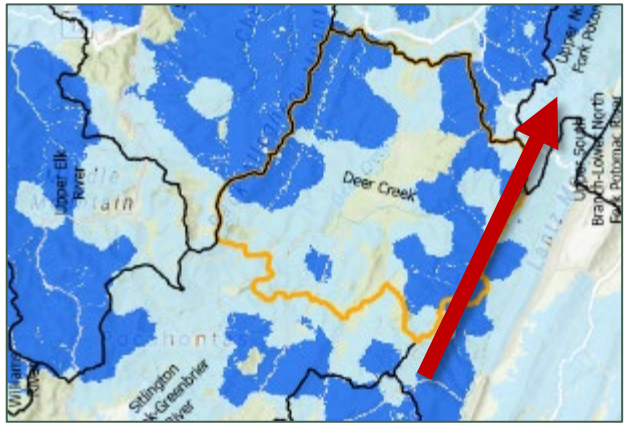
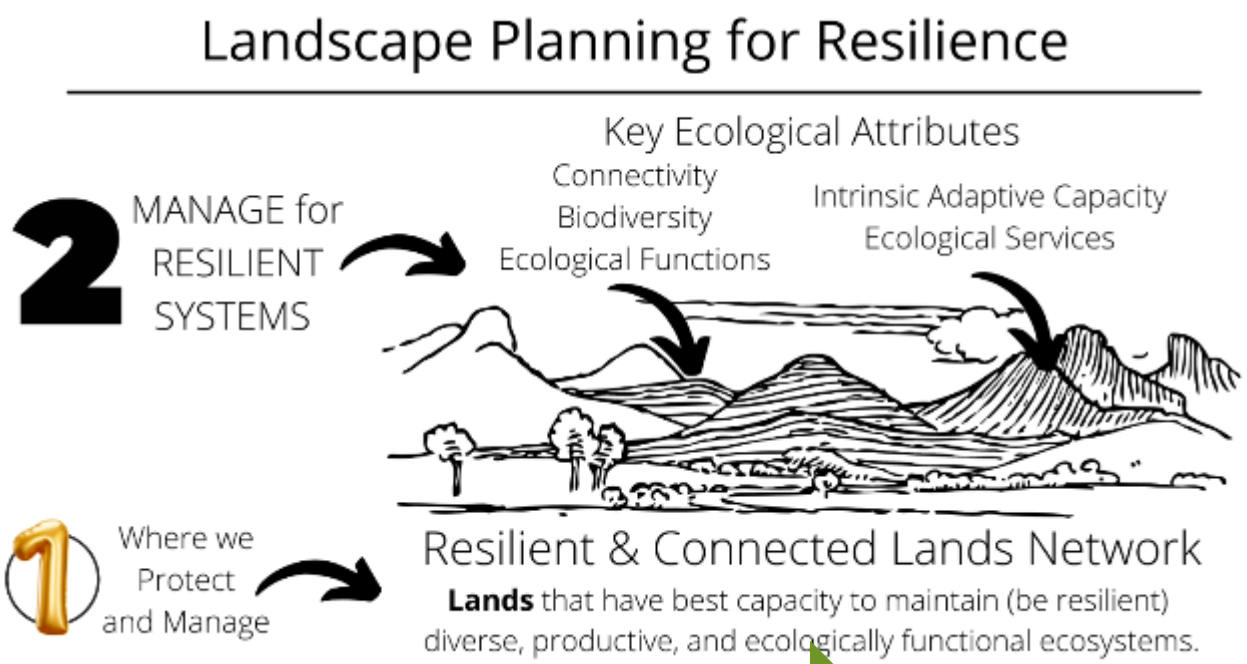
Climate Resilience

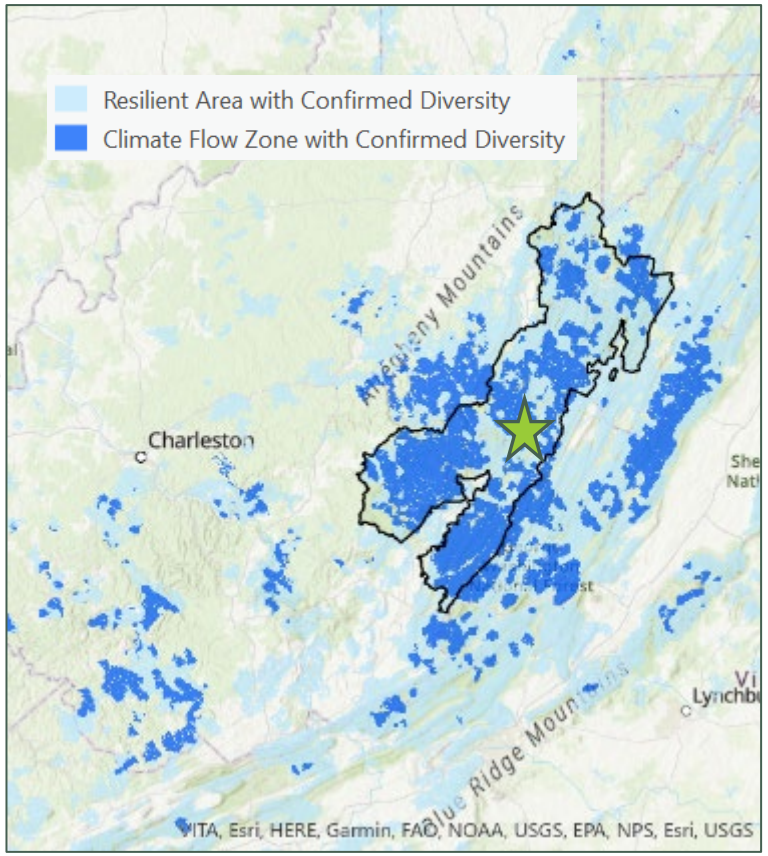
SCIENCE → STRATEGIES → **PLANNING**





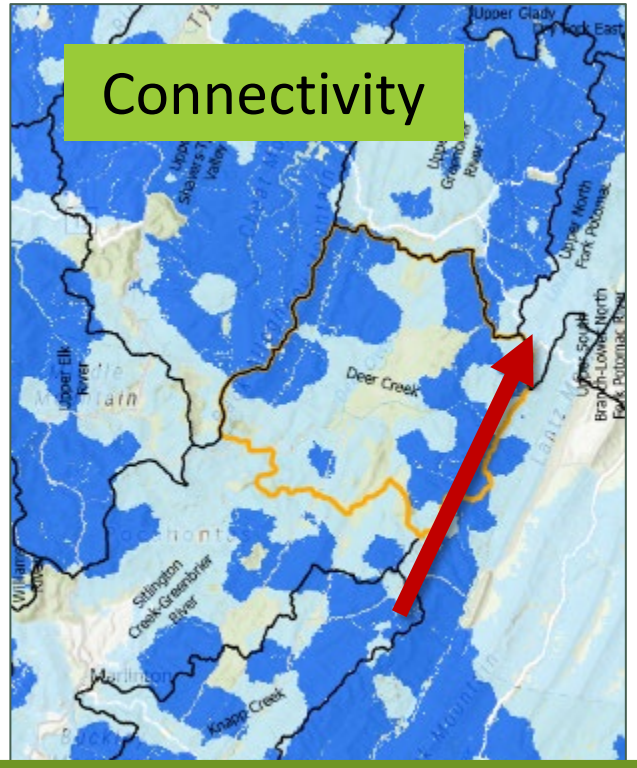
Planning - Deer Creek example

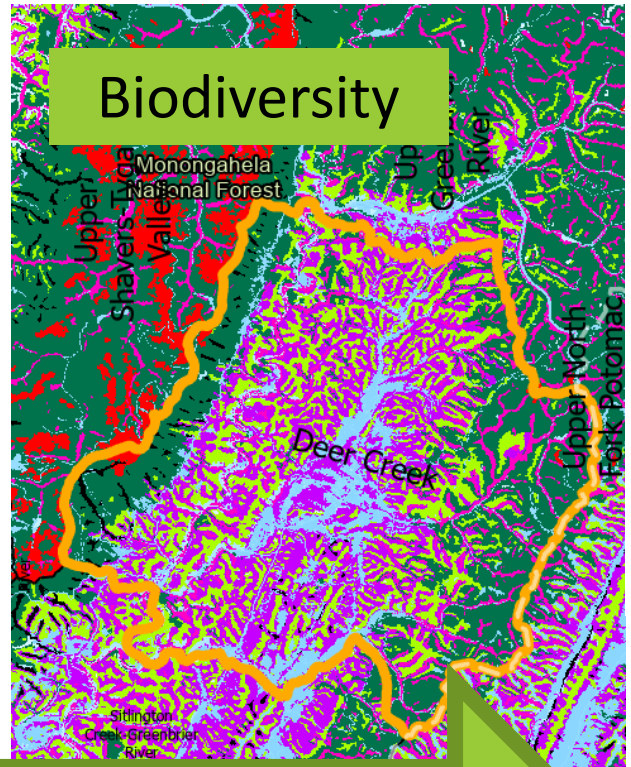




1. Where?

Planning - Deer Creek example





2. Ecological Attributes

Planning

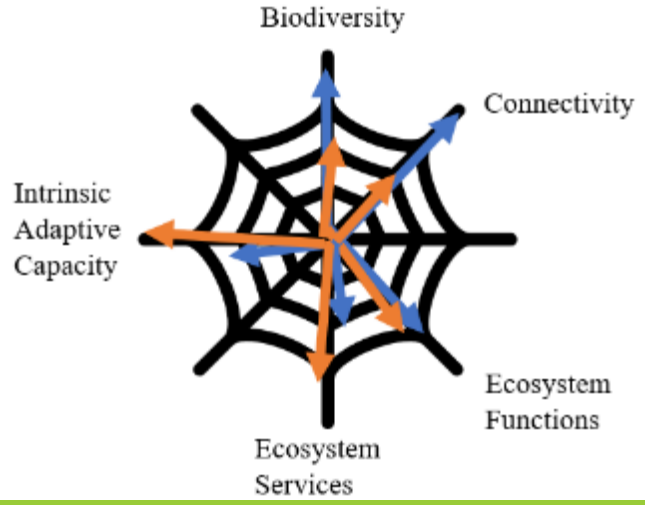
3. Strategies & Tactics

Increase Options (i.e., increase habitat connectivity)

Restore Processes (i.e., decompact soil)

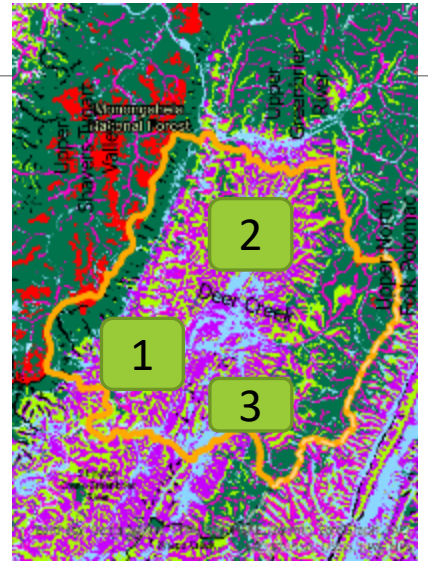
Nurture Sources Renewal (i.e., Rx for regen)

4. Overlap & Tradeoffs



Planning

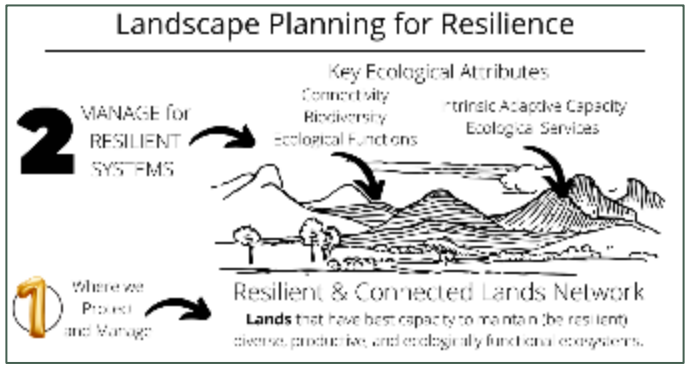
5. Prioritize

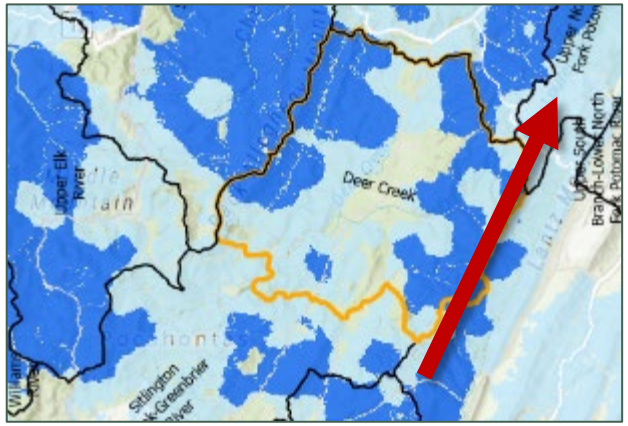


6. Take Action & Adapt

Climate Resilience

SCIENCE → STRATEGIES → PLANNING





Questions, Comments, Feedback

Katy Barlow

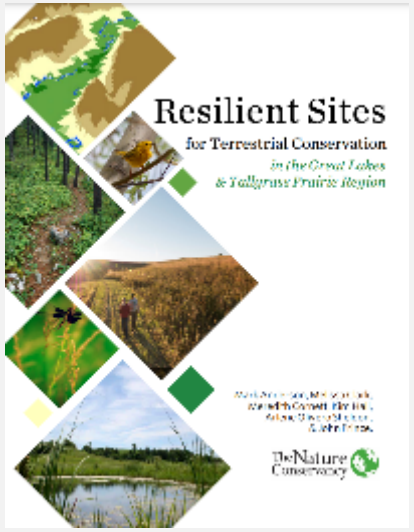
TNC Central Appalachians Program

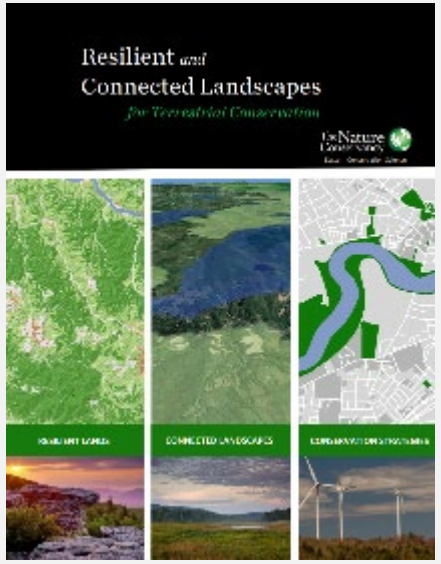
kathryn.barlow@tnc.org

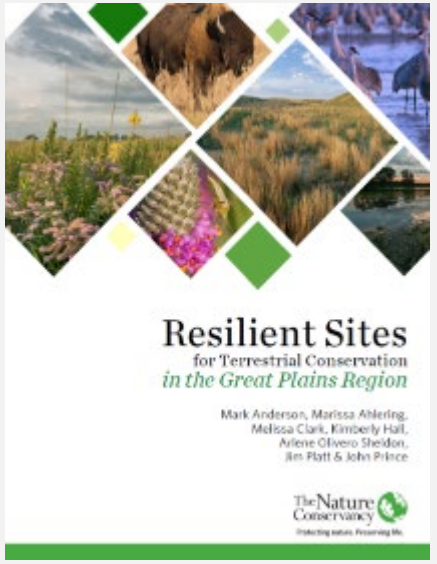
References and Resources

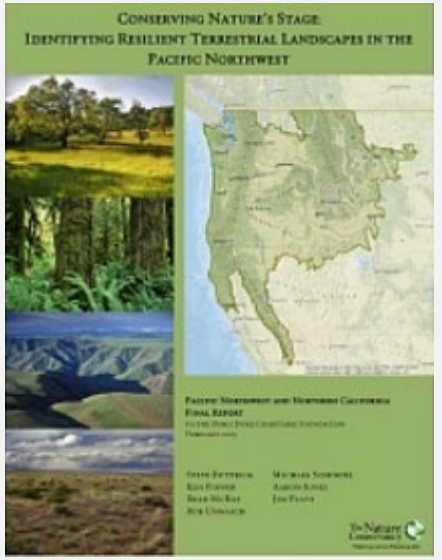
Learn More

REPORTS









MEDIA

Conserving a Network of Climate Resilient Sites

ArcUser Article

Preserving not just the most beautiful landscapes, but the most resilient

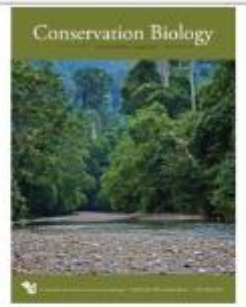
Boston Globe Ideas Op Ed

Natural Highways and Neighborhoods: Conserving a Network of Climate-Resilient Lands

Nature.org Story

Road Map to Refuge

Nature Conservancy Magazine Article



Estimating Climate Resilience for Conservation across Geophysical Settings

Conservation Biology

http://nature.org/climateresilience