



APPALACHIAN
LANDSCAPE CONSERVATION COOPERATIVE

Outline

1. Shift: New Conservation Paradigm
2. Build: New Institution & National Network
3. Deliver: the Science
4. Network: the Conservation Delivery Partners

Secretarial Order  **1. Shift Conservation Paradigm**

Source: NRC 2009 “agencies may soon be **unable to fulfill legal and regulatory responsibilities** because of climate-related changes...”

A. Landscape: define ecologically-relevant scale to work

B. Conservation: address threats at a scale beyond that of any single entity ... *connectivity, resilience, irreplaceability*

C. Cooperative: work through a collaborative decision-making => **self-directed partnership** ...all DOI units, federal agencies, state, tribal



22 LCCs

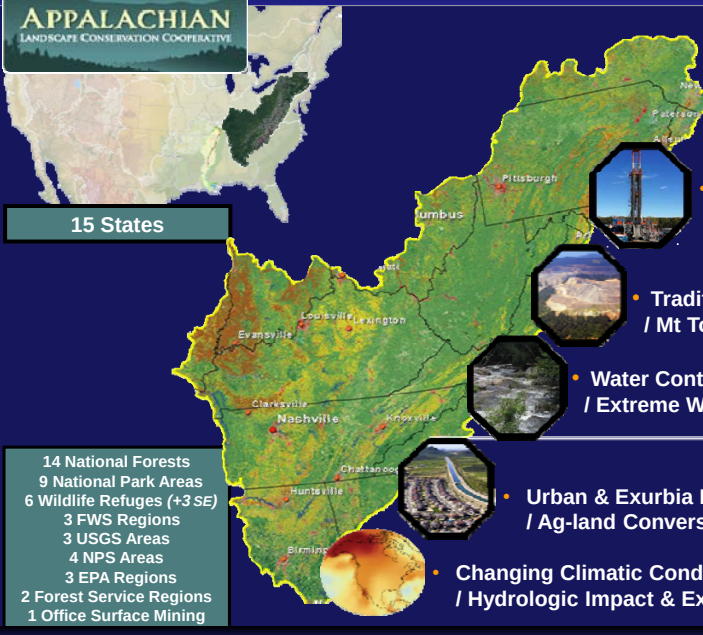
Appalachian LCC

DOI has jurisdiction **1 out of every 5 acres**

Integrating Planning - Space & Time

APPALACHIAN LANDSCAPE CONSERVATION COOPERATIVE

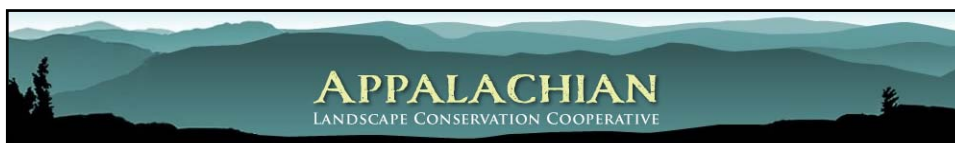
15 States



Large-scale Impacts

- Expanding Energy: NG / hydro-frac'ing
- Traditional Energy / Mt Top Mining
- Water Control & Stress / Extreme Weather Events
- Urban & Exurbia Expansion / Ag-land Conversion
- Changing Climatic Conditions / Hydrologic Impact & Extreme Weather

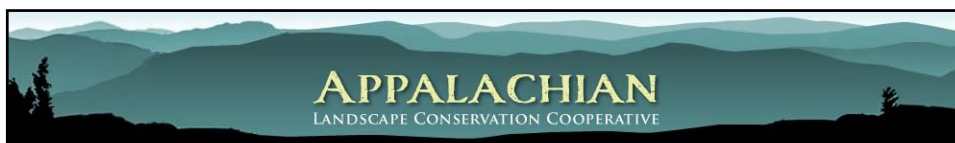
14 National Forests
9 National Park Areas
6 Wildlife Refuges (+3 SE)
3 FWS Regions
3 USGS Areas
4 NPS Areas
3 EPA Regions
2 Forest Service Regions
1 Office Surface Mining



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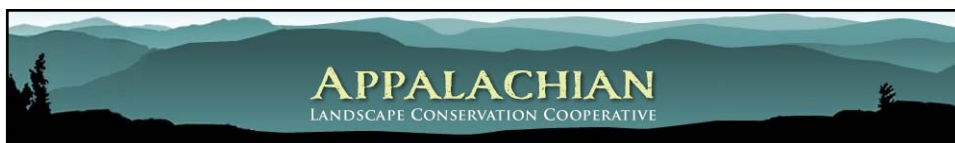


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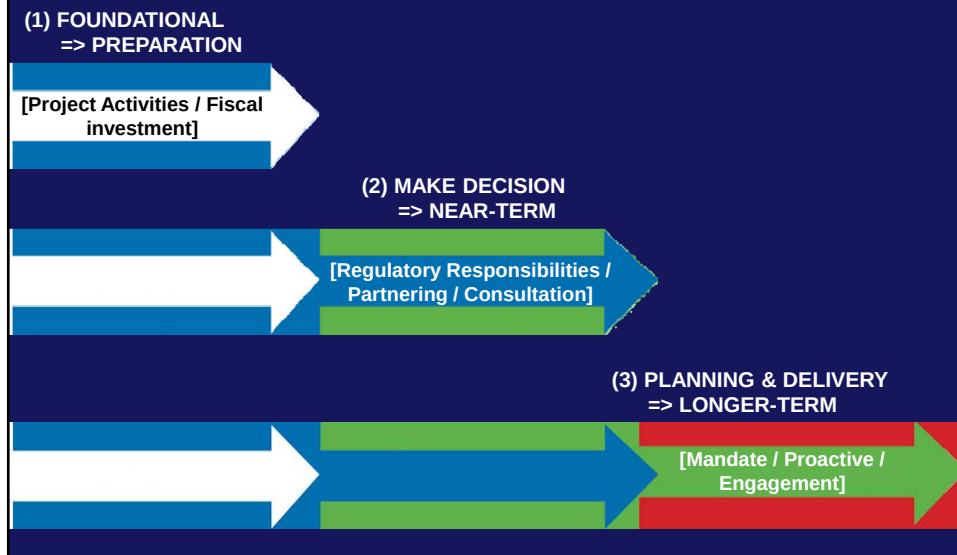
APPALACHIAN

LANDSCAPE CONSERVATION COOPERATIVE

Science Information / Data	Inventory / Trends Analysis	Planning / Risk Assessment	Decision-Support / Delivery
A Stream Classification System for the Appalachian Landscape Conservation Cooperative <i>FY 11/12</i>	Assessing Potential Future Impacts of Energy Extraction in the Appalachian Mountains (wind, oil, gas, coal) <i>FY 11/12</i>	Support for Understanding Land Use and Climate Change in the Appalachian Landscape <i>FY 11/12</i>	Ecosystem Capacity Assessment : online Landscape Resilience tool (modeling assessments and monitoring products) <i>Phase I FY15, Phase II FY16</i>
Classification and Geo-Referencing Cave/Karst Resources across Appalachian LCC <i>FY15</i>	Web-Resource (Portal) Inventory (Landscape-level) Threats & Benefits across the Appalachian Landscape <i>FY14</i>	Environmental Flow-Ecology Stream Impact of Water Withdrawal on Fish Communities in the Marcellus Shale Region <i>FY13</i>	Web-Based Tool for Riparian Restoration Prioritization to Promote Climate Change Resilience in Eastern US Streams <i>FY13</i>

3. Deliver the Science => three “categories”

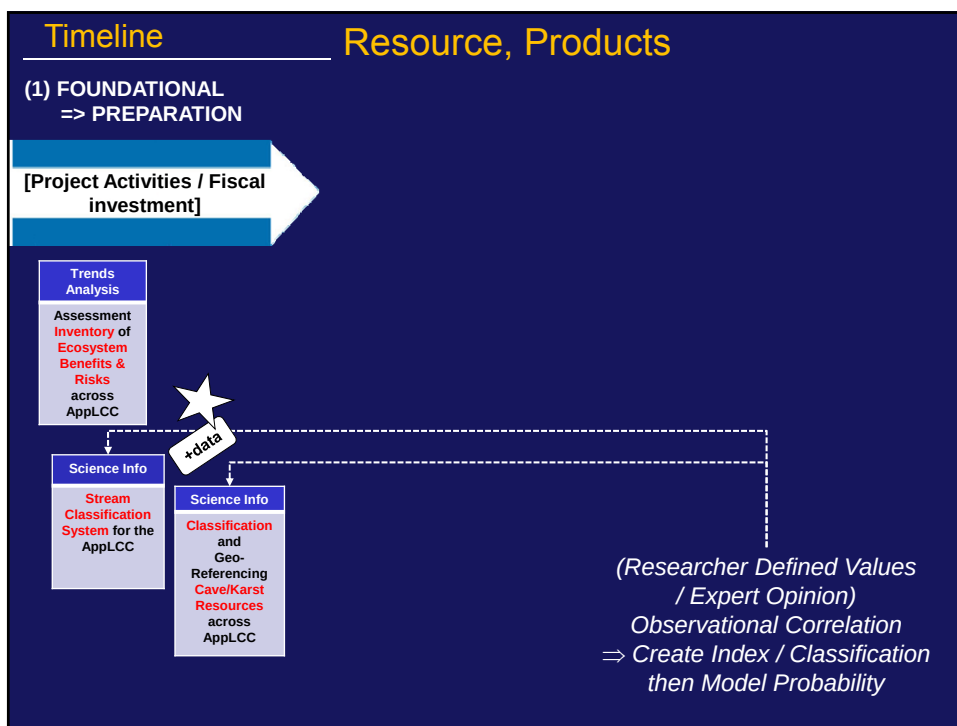
Three Points along the Management / Decision-Making Timeline



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3. Deliver: the Science
 - a) Information: data



Appalachian LCC Galleries

Riparian Resoration

Ecosystem Benefits and Risks

Caves and Karst

Energy Forecasting Models

APPLCC Funded Projects

Appalachian LCC Boundary Map

Neighboring LCC Conservation Planning Atlases

North Atlantic LCC

South Atlantic LCC

Gulf Coastal Plains and Ozarks LCC

DATA BASIN

The screenshot shows the Appalachian Landscape Conservation Cooperative website. The main navigation bar includes links for Cooperative, Research, Plan & Design, **Ecosystem Benefits & Risks** (highlighted with a red box), Delivery, People, News, and Resources. Below this, a secondary navigation bar for the 'ECOSYSTEM BENEFITS AND RISKS' section includes links for Home, About, Benefits, Risks, Assessments, Framework, ApplCC, and Comparison Sites. A search bar is also present. A red arrow points from the 'Ecosystem Benefits & Risks' link to a 'Clearinghouse' label. Below the clearinghouse, three circular icons represent different types of content: a book (Guide), a map (Atlas), and a person (Assessments). These are numbered 1, 2, and 3 respectively.

Clearinghouse

1. Guide (... Key References)

2. Atlas (...Maps & Data)

3. Assessments (...~ Reviews)

The screenshot shows the 'Invasive Species and Forest Pathogens' page. The left sidebar contains a navigation menu with links for Benefits, Risks, Climate Change, Energy Development, Invasive Species and Forest Pathogens, Urbanization, Wildland Fire, Human Landscape, and Data Atlas. The main content area is titled 'Invasive Species and Forest Pathogens' and includes text about the impact of invasive species on ecosystems. A map titled 'Insect and Disease Threat to Forests Important to Surface Drinking Water 2011' is displayed. Below the map, there are three small thumbnail images. A red arrow points from the 'Data Atlas' link in the sidebar to a 'Data Atlas' section at the bottom of the page. This section includes a link to 'Forest Pathogens: Risk to Watersheds' and another link to 'Forest Pathogens: U.S. Forest Service Insect and Disease Risk Mapping' (highlighted with a red box). Below the second link is a small image of a beetle and text explaining the impact of invasive species on ecosystem services.

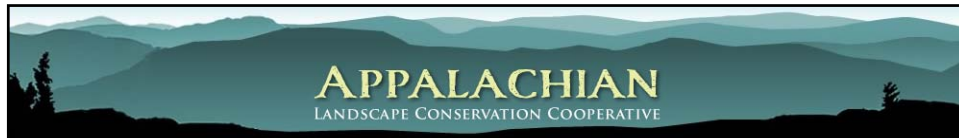
Data Atlas

Forest Pathogens: Risk to Watersheds

Hydrology in watersheds that are important to the supply of clean water can be negatively impacted by forest pathogen outbreaks.

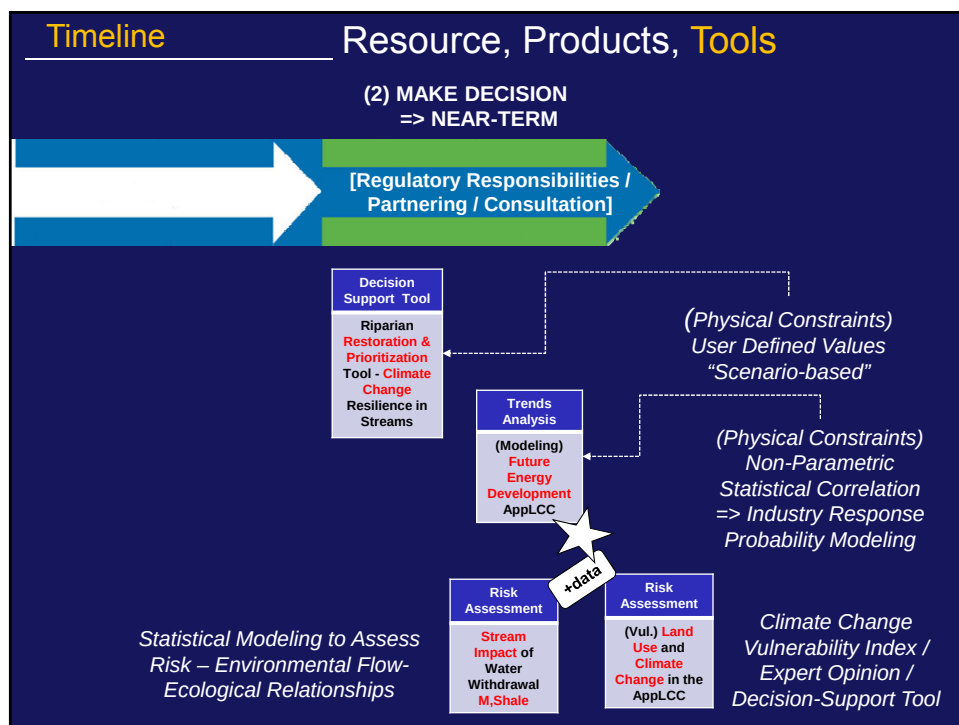
Forest Pathogens: U.S. Forest Service Insect and Disease Risk Mapping

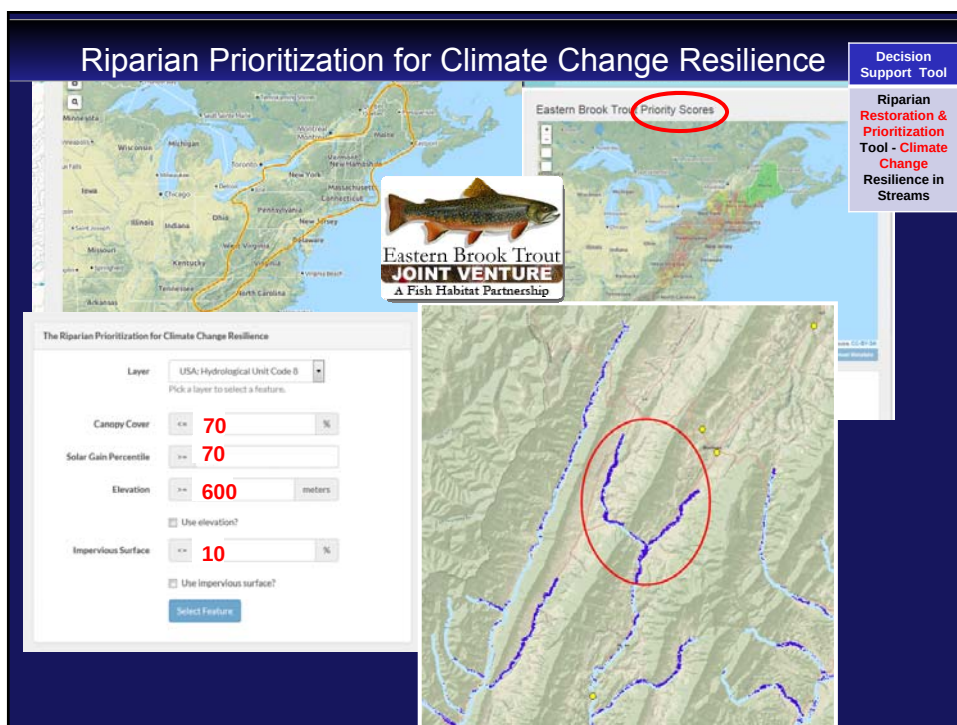
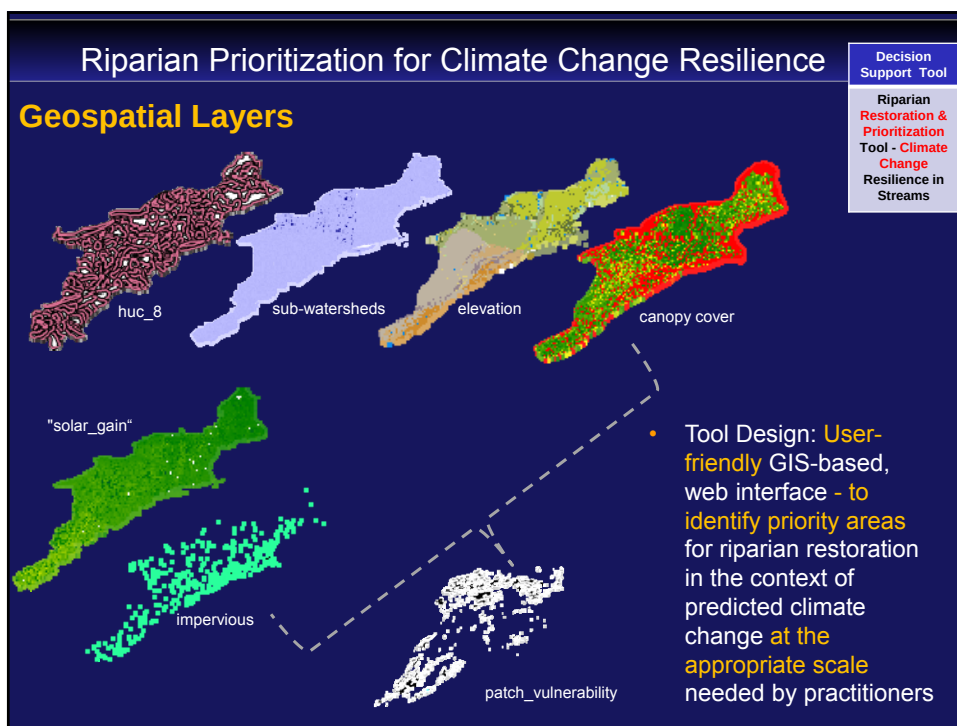
When the introduction or presence of invasive plant or animal species alters the structure or function of an ecosystem, the services provided by the ecosystem are also affected.

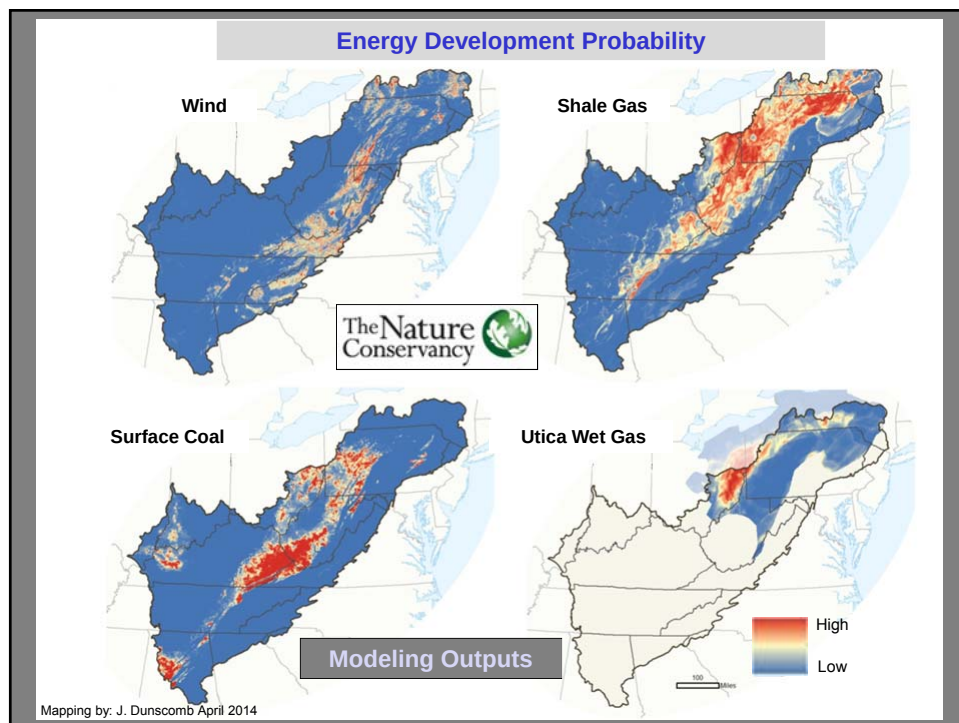
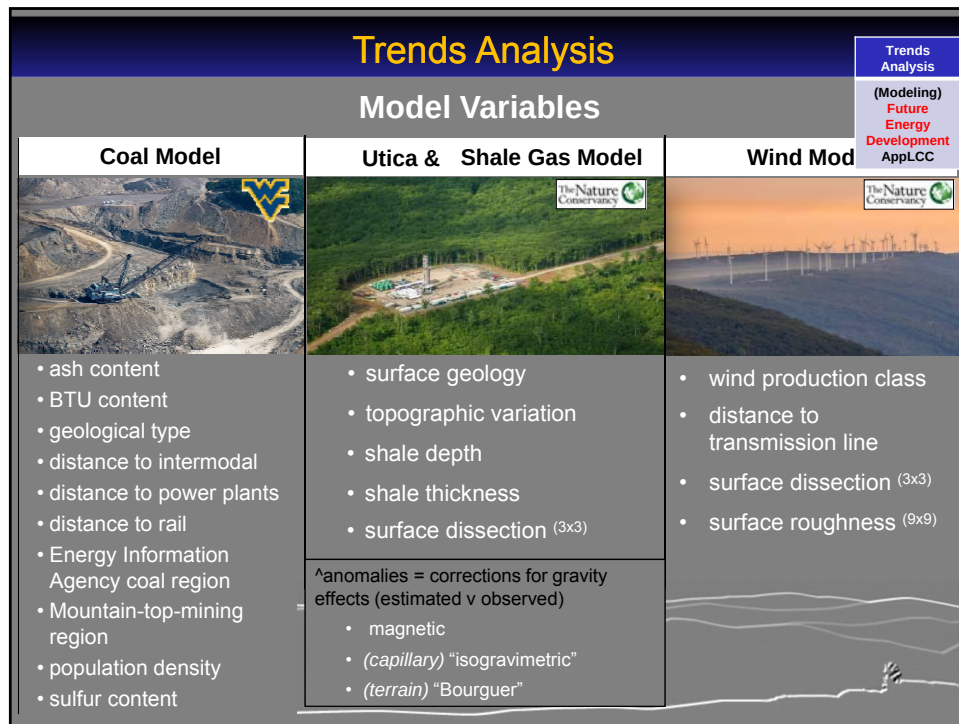


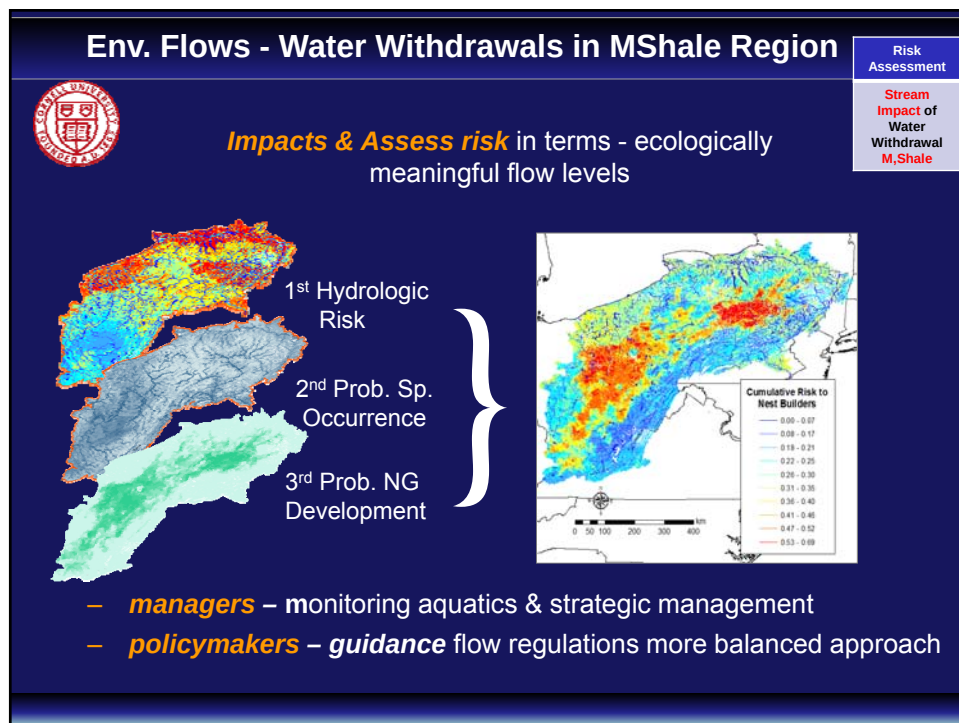
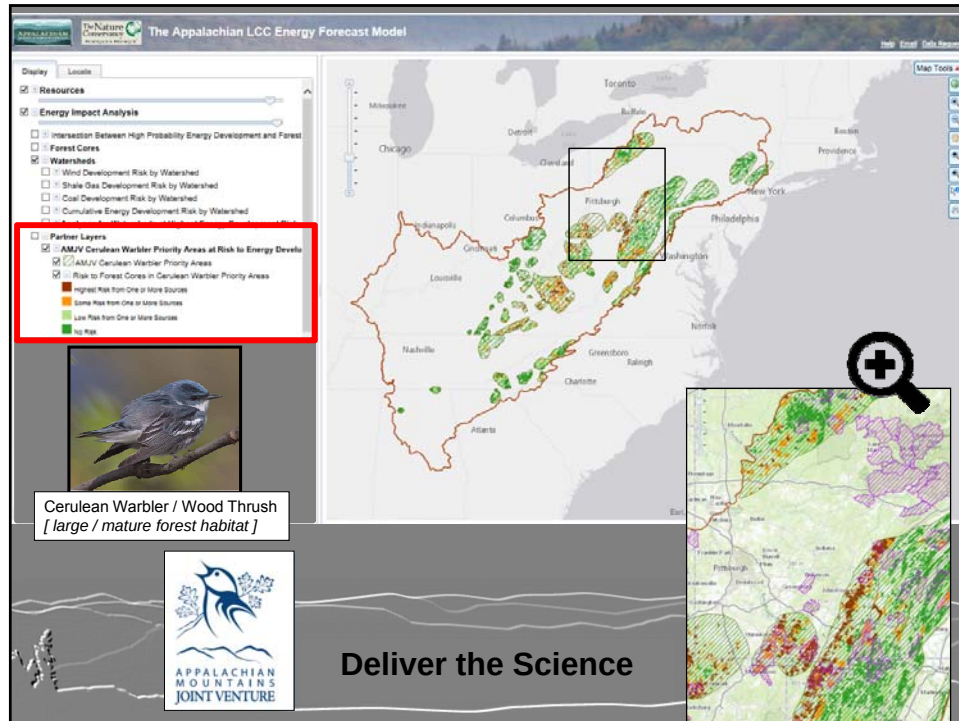
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 - a) Information: data & resources
 - b) Tools: decision-support & models









Online Learning Platform

Enter Our Courses
Login



Riparian Restoration to Promote Climate Change Resilience

This user-friendly tool allows managers and decision-makers to rapidly identify and prioritize areas along the banks of rivers, streams, and lakes for restoration, making these ecosystems more resilient to disturbance and future changes in climate.

[Learn More](#)



Energy Forecast Modeling

Models of wind, shale gas, and coal development for the entire study area have been created to predict potential future energy development and impacts to natural resources within the Appalachians. Models and data from all development projections populate a web-based mapping tool to help inform regional landscape planning decisions.

[Read more](#)



Introduction to Landscape Conservation Planning and Design

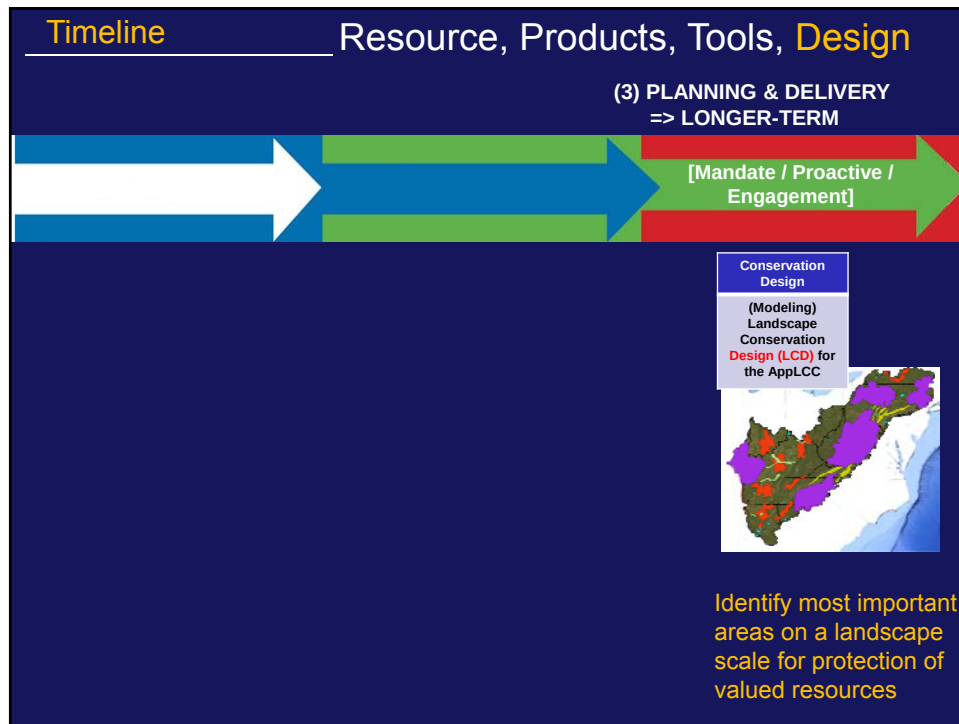
The conservation framework is an adaptive management approach to help the conservation partners and communities access key science information and tools, and to work collaboratively to plan their work to deliver on-the-ground conservation to sustain and safeguard valued resources and fulfill trust responsibilities.

[Learn more](#)



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 - b) Tools: decision-support & models
 - c) Design: Landscape Conservation Design (LCD)



Landscape Modeling: Optimization



Marxan is the most widely used conservation planning software in *the world*
Informing Conservation Decisions Globally





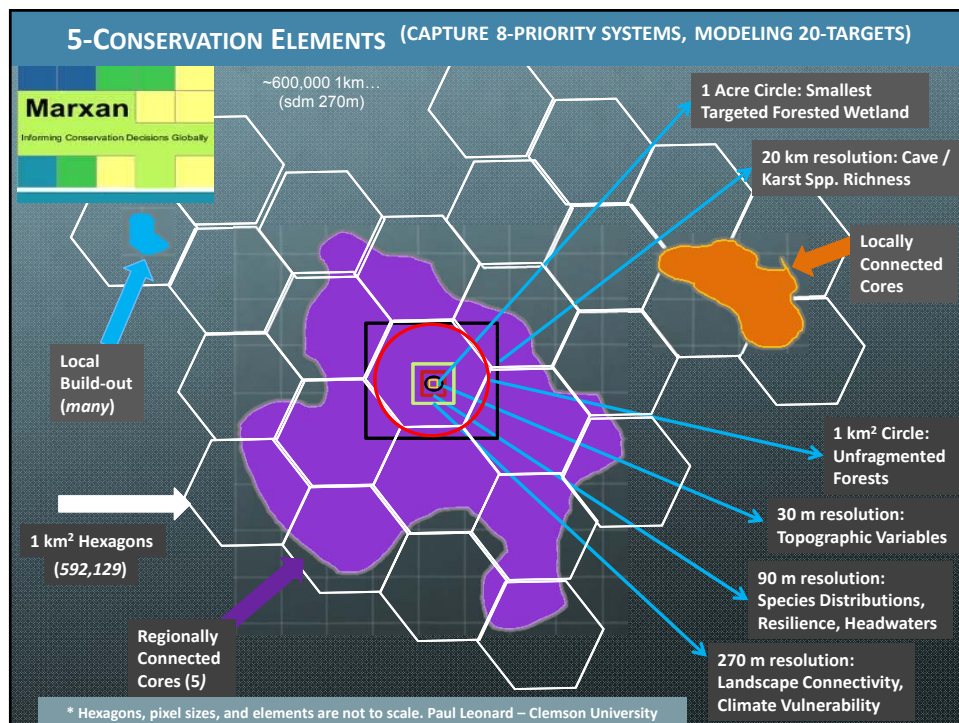
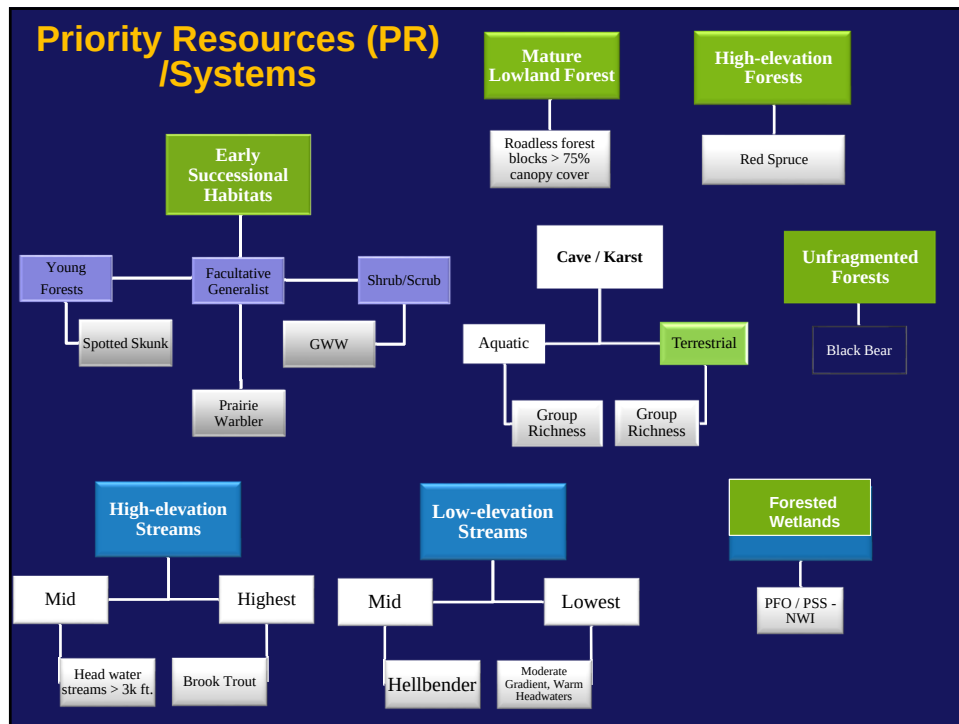
Paul Leonard PhD
Conservation Planning
Researcher &
Post-Doctoral Fellow

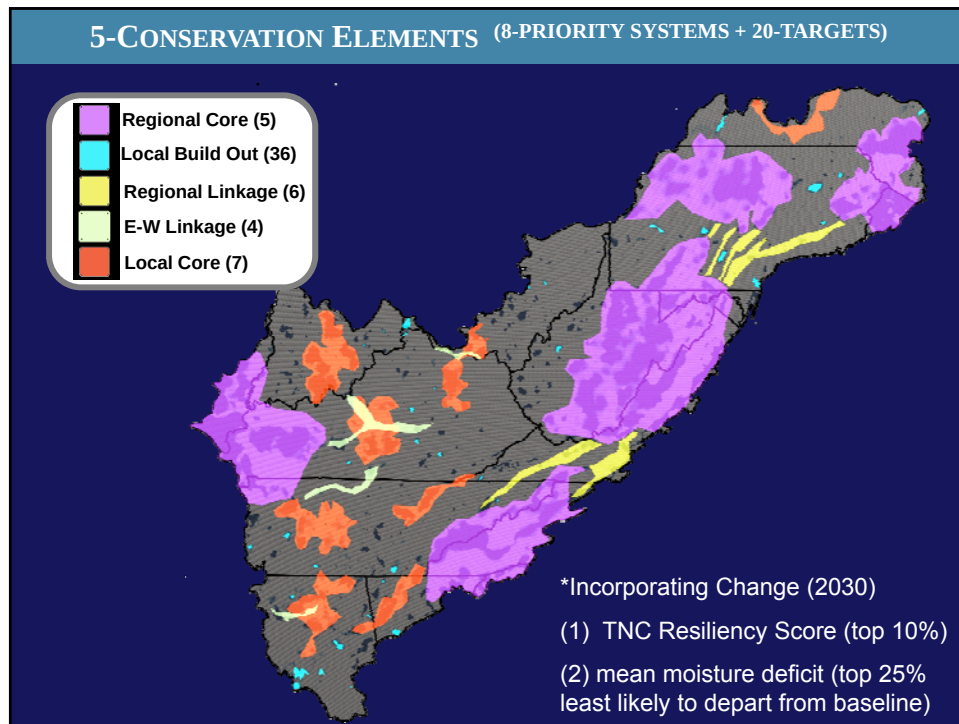


Rob Baldwin PhD
Professor of
Conservation Biology

...assist in identifying the most efficient solution possible,
i.e., one that **meets a specified set of ecological and biodiversity representation goals** for the lowest cost

‘cost’ (e.g., economic cost of acquisition, opportunity cost for other uses like fishing or forestry, long-term management cost)



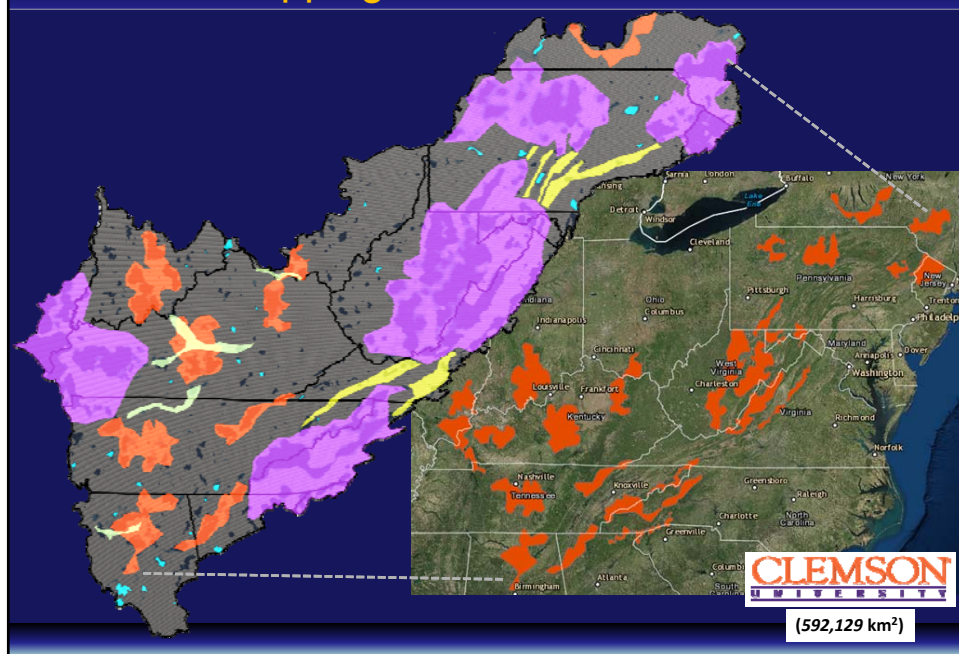


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 - b) Tools: decision-support & predictive models
 - c) Design: Landscape Conservation Design (*LCD*)
- 4. Network: the Conservation Delivery Partners**

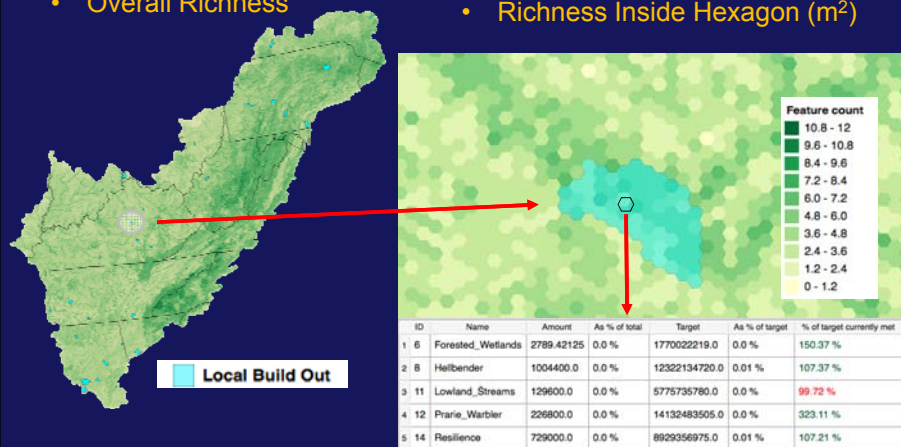
Stepping it Down & Priorities



Stepping it Down & Priorities

Capturing Priority Resources in Conservation Design

- Overall Richness
- Richness Inside Hexagon (m²)



Cultural Resources Framework



Categories

7- Tangible

- Recreation, Cultural Heritage, Agriculture, Economic, (Learning), Water, Wilderness

4- Intangible

- Aesthetic, Visual, Sense of Place, Intrinsic Cultural Heritage

CR Framework



recreation

- National Parks,
- State Forests,
- Nature Preserves,
- PA Wilds,
- Amusement Parks,
- Fishing Hotspots,
- Hiking Trails,
- Water Trails, State Game Lands,
- Bird Watching Hotspots,
- Stocked Streams,
- Boat Access,
- Picnic Areas,
- Beaches

