

# APPALACHIAN

LANDSCAPE CONSERVATION COOPERATIVE

Wheeler NWR Partners Meeting  
Decatur AL  
March 2<sup>nd</sup> 2017



# Introductions

## What are you looking to get out of this event?

Thesis – Grad Student

Undergrad

Conservation knowledge

How AL AM – how lab can contribute to LCC/Partners

Geospatial \*\*

Water Quality

Meet coop

Priorities of AppLCC – how FWS can integrate and contribute

USDA – Farm Bill Funding

How AppLCC can help with state species prioritization

Ecosystem based conservation – learn from partners

Watershed/Water Quality – Soil Con

Similarities to TNC regional planning efforts

Network/Learn \*\*

What the AppLCC does

How to be involved with AppLCC

Help provide input to AppLCC

FWS Partners Program – how program can engage with AppLCC

## Workshop Objectives

- Gain knowledge of the landscape-level approach to conservation planning
- Identify how your efforts fit into this “bigger” picture
- Know how to access and use AppLCC resources
- See the utility of AppLCC resources for your conservation efforts
- Develop an understanding and identify the utility of Regional Conservation Designs
- Provide feedback to enhance AppLCC resources for end-users

## Facilitated Group Discussion

### Landscape Level Conservation

Q. Do you see a need to work at a landscape-level? –  
Are there examples (what, where, scope, priorities)?

Q. What barriers have you experienced or currently exist  
that influences your ability to work at a larger-scale?  
How have you been able to overcome those?

Q. Do you see a need to work at a landscape-level? –  
Are there examples (what, where, scope, priorities)?

- AL SHU
- Long-leaf Pine Initiative (USDA)
- Gopher T – large scale
- There is a need – all working for a common goal, setting priorities for collective action. Ground work at to “why the work should be done” is already there. Folks at the local level then need to make the decisions on what to act on.
- Barrier – implementation
- Boots on the ground – a suite of local level action that fit into landscape level priorities
- Feedback loop - continuous

Q. What barriers have you experienced or currently exist that influences your ability to work at a larger-scale? How have you been able to overcome those?

- Communication breakdown – feedback loop gets broken – challenge due to scale, number of participants
- Communication – how to communicate the importance of ecosystems instead of a species – in turn taking a larger scale approach to conservation planning
- Messaging – challenge due to larger scale – people express concern
- Capacity – limited funding, funding can not work across state line
- People see \$\$ being taken away from local efforts and moved toward larger scale initiatives
- Policy - can slow the process
- How to work across different agendas? – how should the pie be distributed
- Lack of Standardization – need guidelines that cover larger scales
- Improved Information-sharing\*\*\* – control of data can creep in, where to go to find preexisting data sets – Need central database!! – how can this be done effectively with the diverse set of partners who have their own agenda – capacity needed just to keep the database up to date – agencies are restricted to use certain software/database
- Attrition – loss of point person for data sets

# **A Forum for Landscape Conservation Collaboration & Action – Sharing Expertise, Innovation, Resources**

- Session Objectives – highlighting a key mission of the LCC, bringing diverse partners together to identify and work on key priorities to move landscape conservation forward.
- Resources to connect diverse partners and people on our Web Portal.
- Enhancing partner synergy in focal areas: Tennessee River Basin.
- Discussion and how to get involved.

**“People protect what they value”**

**— David Whitehurst,  
Director, Bureau of Wildlife Resources  
VA Dept. Game & Inland Fisheries**





# Resources to Connect: AppLCC Portal

[www.applcc.org](http://www.applcc.org)



- Cooperative
- Research
- Plan & Design
- Focal Areas
- Issues
- Partner Projects
- People
- News
- Resources

[REGISTER](#) [LOG IN](#)

You are here: Home



## Enhancing Landscape Conservation



**Delivering the Science:  
Tools and Assessments**



**Coordinating Landscape  
Planning and Design**



**Networking for the  
Conservation Community**



**Sharing Maps  
and Data**

**OVERVIEW: Using AppLCC Science Investments**



**GET STARTED**

# Resources to Connect: Information Sharing

## News

by admin — last modified Jan 23, 2015 08:26 AM — History



### Appalachian Wildlife Center - Partnering for Wildlife and People in an Economically-Depressed Region

by Wildlife Management Institute — Feb 16, 2017 08:42 AM

Partnership between the Appalachian Wildlife Foundation, the Kentucky Wildlife Resources, and others is working to establish wildlife-related

tourism in the southern Appalachian region of Kentucky and the surrounding states by building a state-of-the-art wildlife education facility designed to share with visitors the incredible natural resources of the region.

[Read More...](#)

### NFWF Monarch Butterfly Conservation Fund 2017 Funding Opportunity

by National Fish and Wildlife Foundation — Feb 09, 2017 01:37 PM

The NFWF Monarch Butterfly Conservation Fund is now accepting applications for competitive funding.

[Read More...](#)



### A Conservation Action Map for the TRB Network

by Matthew Cimitile — Feb 06, 2017 08:45 AM

During the Tennessee River Basin Network's 2016 annual meeting, members participated in exercises that helped produce a Conservation Action Map, showcasing the who, what, and where of conservation activities and projects in the Basin.

[Read More...](#)



### Biennial Spotlight on National Park Resources

by Matthew Cimitile — Feb 06, 2017 08:41 AM

A new area on our Web Portal is dedicated to a collection of talks and posters that celebrate the National Park Service Centennial and highlight the many accomplishments in natural and cultural resource management and stewardship.

[Read More...](#)

**Research Funding Opportunities**

**AppLCC Events**

- CALENDAR GRID**
- ADD EVENTS**
- EVENT FULL LIST VIEW**
- UPCOMING EVENTS**
- PAST EVENTS**

**Recent Events**

- [The Southeast Aquatic Conservation Strategy](#)
- [What is Ecological Drought? Exploring its impacts on natural and cultural resources](#)
- [Responding to Drought and Water Challenges](#)

[View All](#)

**RSS Feeds**

- [Our Work](#)
- [News](#)
- [Research](#)
- [Projects](#)

[Manage portlets](#)

- News/Events
- Partner Projects
- Partner Newsletters

**FIRE LINES** A Biennal Newsletter of the Southern Fire Exchange and the Southeastern Section of the Association for Fire Ecology

July-August 2014  
Volume 8 - Issue 4

**IN THIS ISSUE**

**Prescribed Fire Surrogates in the South**

This effective fire site vegetation treatment for reducing overstorey restoration and management... A recent review of 11 research studies in Florida focused on their key questions. Shogren and Gordon (2014) The authors' findings have relevance to other southern Coastal Plain states with more extensive... methods, such as the process and network connectivity. The authors considered their methodological and... treatment for the respective parameters to provide the appropriate value assessment structure and... treatment have been chosen by long periods without fire. The research studies reviewed indicated that... treatment, treatment, such as burning and herbicide application and associated structure during... natural vegetation conditions. These treatments are most beneficial when they are used in the early stages... of overstorey restoration and followed by a routine or regular prescribed fire regime. The authors... ecological restoration objectives, there is a need to use fire directly in the preferred management strategy. In... addition, Shogren and Gordon suggest that prescribed fire regimes are managed and applied to... appropriate ecological health. Shogren and Gordon also continued against management programs that focus on... single herbicide application to control long-term herbicide resistance... fire a large range of plant and animal species. One final... recommendation was for long-term herbicide resistance and... herbicide treatments for that provide effects on vegetation... conditions and fire management.

There general conclusions and management implications... might support your ongoing program or policy; they will... provide one insight for your personal fire management... criteria and objectives. For additional details, check out the... new volume 8, issue 4 of our newsletter Shogren and... Gordon's recommendations or see their original publication.

Shogren, R. and R. Gordon. 2014. Prescribed fire management and... herbicide use in the Southeastern United States. *Fire Ecology* 8(4): 175-186.

**CONTACT INFORMATION**

Shogren, R. and R. Gordon. 2014. Prescribed fire management and... herbicide use in the Southeastern United States. *Fire Ecology* 8(4): 175-186.

**Outdoor News Bulletin**

Volume 66, Number 10

November 16, 2012

Issued monthly by the Wildlife Management Institute

edited by Jodi Stemler [news@wmi.org](mailto:news@wmi.org)

**In This Issue**

Outdoor Ballot Initiatives Win Big on Election Day

California's Strategic Vision for Fish and Wildlife Leads to New Initiatives and New Name

Potential of Conservation Issues in Lame Duck Session of Congress

Farm Bill Prospects in the 112th Congress

78th North American Special Session to Explore the Role of Public Trust in Wildlife Management

Wildlife Management Short Course - Colorado State University - March 2013

**Outdoor Ballot Initiatives Win Big on Election Day**

Voters across the country gave strong support at the ballot box for conservation related initiatives during the 2012 election. This year, 46 of the 57 conservation funding ballots passed, an approval rate of 81 percent. There were three statewide initiatives on the ballot in 2012 as well as a number of municipal and county initiatives that ranged from bonds to tax increases. Together the **passed initiatives** will direct more than \$2 billion towards conservation to support parks, open spaces, working farms and ranches, and to improve water quality; of that \$767 million is new funding. In addition, four states supported ballot initiatives that amend the state's constitution to guarantee citizens' rights to hunt and fish, reports the Wildlife Management Institute.

[Read More >>](#)

California's Strategic Vision for Fish and Wildlife Leads to New Initiatives and New Name

**Outdoor Ballot Initiatives Win Big on Election Day**

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[Read More >>](#)

# Resources to Connect: Expertise Database

## Search Our Members Expertise Database

Check the expertise categories below or simply type in a Members Name, Organization, and/or State.  
**To see all members in the directory, just click the SEARCH button with no categories or fields selected. Hit RESET to start a new search.**



Not a Member of the ApplCC and the Expertise Database?

**JOIN NOW!**



Already a Member and want to edit your member profile?

**ADD YOUR EXPERTISE!**



Need help using the Expertise Search?

**READ OUR GUIDES**



### Taxa / Group

#### Aquatics: Fish

- Recreational/Game fisheries
- Non-Game/Native fish conservation
- Commercial fisheries
- Diadromous fish

#### Aquatics: Invertebrates

- Crayfish
- Snail
- Mussel

### Habitat / System Level Management

#### Aquatic: Freshwater

- River/stream ecology
- Cave/karst ecology
- Wetland ecology
- Hydrology and geomorphology
- Reservoirs and Lakes

#### Aquatic: Coastal/Marine

- Wetland/Marsh/Estuarine
- Intertidal

Dwight Cooley Project Leader

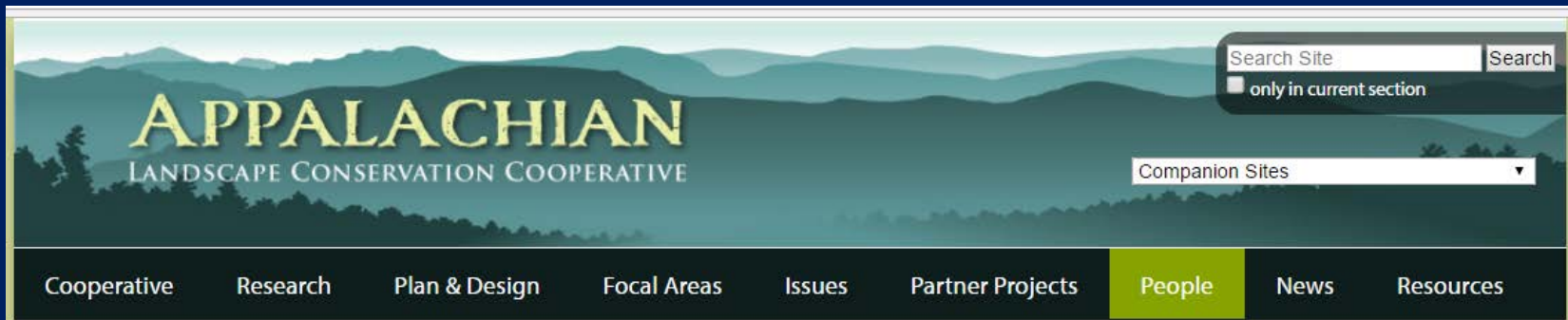
U.S. Fish and Wildlife Service

- Birds
- River/stream ecology
- Wetland ecology
- Early successional forest
- Lowland/mesic forests
- Upland/mixed forest
- Grassland/shrub
- Disturbance-dependent communities (e.g., fire-dependent forests, etc.)
- Terrestrial systems/resources (incl. geochemical, nutrients)
- Rivers/Streams - Instream Habitat
- Rivers/Streams - Streambank/Riparian
- Forest/natural cover management, restoration
- Open grassland and shrub/natural cover management, restoration
- Interior Plateau
- Southwestern Appalachians
- Alabama

Lee Holt Fish and Wildlife Biologist

- Recreational/Game fisheries
- Non-Game/Native fish conservation
- Commercial fisheries
- Benthic Macroinvertebrates
- River/stream ecology
- Cave/karst ecology
- Reservoirs and Lakes
- Aquatic systems/resources (incl. instream flow)
- Geospatial (GIS)
- Aquatic
- Aquatic Invasive animal
- Watershed and water delivery management (dams, reservoirs) (incl. dam removal/fish passage)
- Interior Plateau
- Ridge and Valley
- Southwestern Appalachians
- Alabama

# Connecting Groups through Collaborative Work Space



The header features a scenic background of mountains and trees. On the left, the text "APPALACHIAN LANDSCAPE CONSERVATION COOPERATIVE" is displayed in a serif font. On the right, there is a search bar with the text "Search Site" and "Search", and a checkbox labeled "only in current section". Below the search bar is a dropdown menu labeled "Companion Sites". A navigation bar at the bottom of the header contains the following items: Cooperative, Research, Plan & Design, Focal Areas, Issues, Partner Projects, People (highlighted in green), News, and Resources.

You are here: [Home](#) > [People](#) > [Group Work Space](#)

[REGISTER](#) [> LOG IN](#)



## Group Work Space

Welcome to the Group Work Spaces, an area of the web portal where we are supporting collaborative work for various communities. These communities range from working groups within our Steering Committee, project groups overseeing the development of Appalachian LCC funded projects, Communities of Practice or Species Specific groups with experts and concerned individuals working towards a common conservation goal related to a species or habitat.

These Work Spaces offer a platform to enhance work flow and facilitate efficient sharing of ideas, datasets, products, publications, and more with others who have similar interests or missions.

The Appalachian LCC Work Spaces are bringing together a diverse set of individuals and expertise to promote dialogue and coordination.

**You can join a community of practice, request to create a new group, and browse through our help section below.**



- File sharing
- Discussions
- Calendar
- Google Docs Integration

# Video Overview: Key LCC Investments

## Overview: AppLCC Key Science Investments

How can Appalachian LCC science investments work for you? This section delivers a set of short video presentations to help you learn about our many Science Investments, such as Research Products, Tools, and Data; Delivering Science; Building Capacity; and Networking Communities.



### Overview: AppLCC Key Science Investments

from Appalachian LCC

The screenshot shows the website <http://www.applcc.org>. The main content area features a section titled "Summary of Appalachian LCC Science Products" with a "READ MORE" button. Below this, a video player is highlighted with a red dashed border, showing the title "OVERVIEW: Using AppLCC Science Investments" and a "GET STARTED" button. The website header includes a search bar and a navigation menu with items like Cooperative, Research, Plan & Design, Focal Areas, Issues, Partner Projects, People, News, and Resources.

### Quick Links

Research Management  
Questions

Data and Conservation Atlas

On-line Training Courses

Networking People,  
Expertise, Projects

### The Big Questions

Why Landscape Planning &  
Design Approach?

What are LCDs (Landscape  
Conservation Design)?

How can the LCD inform  
decision-making?



# Enhancing Partner Synergy: Tennessee River Basin

Networking and information sharing  
Incorporating AppLCC science-based resources  
into collaborative conservation efforts



Across the  
TENNESSEE RIVER BASIN

[Home](#) [TRB Network](#) [Communities of Practice](#) [Science & Management](#) [Engagement](#) [Resources](#) [Training](#) [Data](#)

[REGISTER](#) [LOG IN](#)



You are here: [Home](#)

## Home

Across the Tennessee River Basin is a collaboration within the Appalachian LCC bringing together multiple agencies and stakeholders in a joint effort to plan and deliver landscape conservation actions to protect one of the most diverse areas for aquatic species in North America.

The mainstem Tennessee River winds its way for roughly 650 miles through Tennessee, Alabama, Mississippi, back into Tennessee, and finally into Kentucky, where it empties into the Ohio River. Streams from these states, but also North Carolina and Georgia, feed the river along its course. Indeed, the entire basin encompasses over 40,000 square miles. Five major physiographic provinces are represented within the basin: the Blue Ridge, the Valley and Ridge, the Appalachian Plateau, the Interior Low Plateaus and the Coastal Plain. The extent of the river basin's reach and the breadth of changes in the geography and geology help to explain why the area harbors one of the most diverse freshwater ecosystems in the world. This extraordinary diversity is one of the primary factors that led the United Nations Educational, Scientific and Cultural Organization to designate the Southern Appalachians as a Man and the Biosphere Reserve in 1988. Furthermore, The Nature Conservancy identifies the region as one of the most significant biodiversity hotspots in the United States.



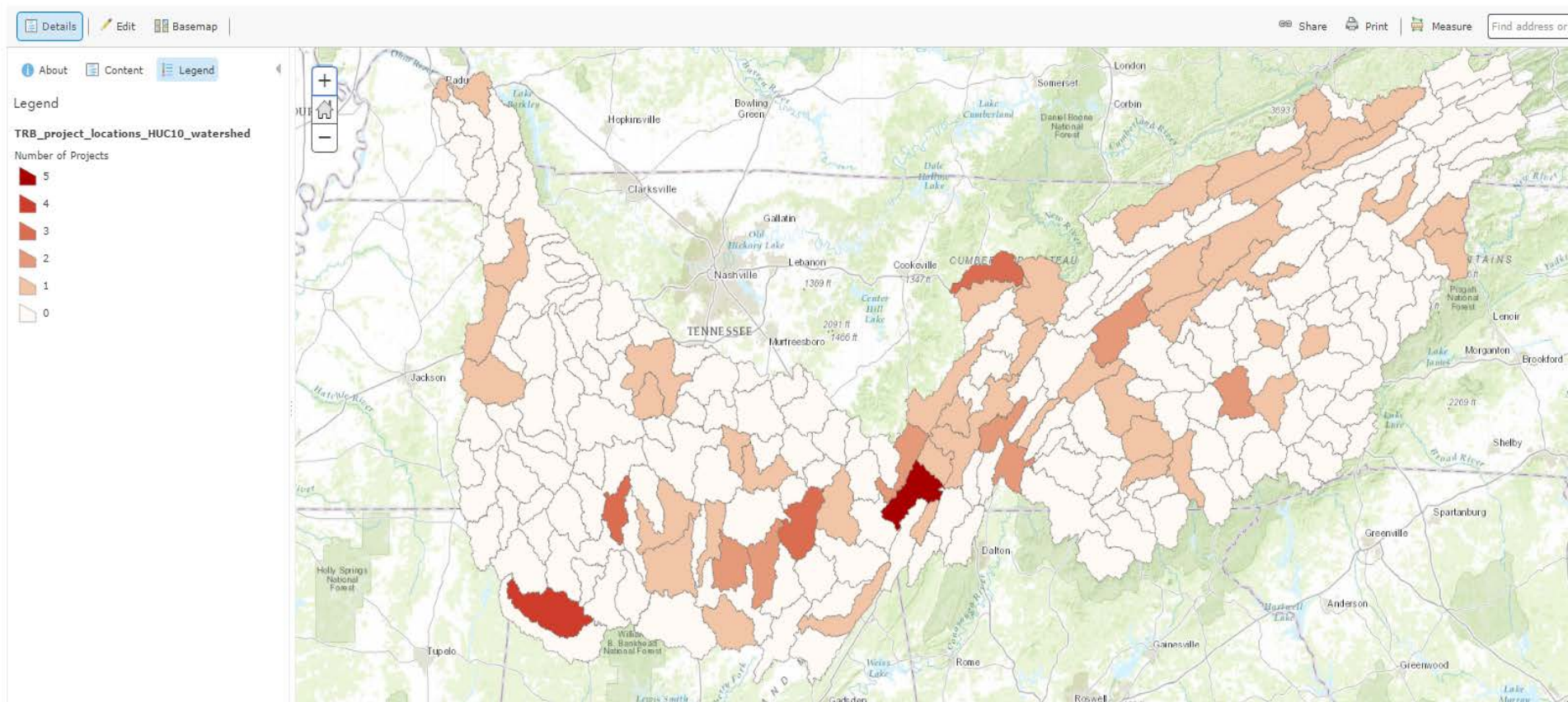
# Identifying Who is doing What, Where

## Across the TENNESSEE RIVER BASIN

- Home
- TRB Network**
- Communities of Practice
- Science & Management
- Engagement
- Resources
- Partners
- Training
- Data

You are here: Home > TRB Network > Conservation Action Map

Home > TRB Project Locations by Watershed



# Enhancing Partner Synergy: Sharing Key Resources

Videos

Management Activity Guidance

Funding

Data

Strategic Plans

Education Materials

## Videos Around the Basin

Through this collection of over 35 videos about the ecology, threats, conservation efforts, and pride within the Tennessee River Basin, we hope to increase awareness of the conservation and natural resource management taking place in the region. This inventory can give partners a better understanding of who is doing what, where in the Basin and be utilized to engage with the broader public to communicate on the many values of nature the River Basin provides human communities and wildlife.



**Threats**



**Conservation Efforts**



**Pride of Place**



**TRB Ecology 101**



# How to Get Involved

*Across the*  
**TENNESSEE RIVER BASIN**

Search Site  Search  
 only in current section

Companion Sites

Home TRB Network **Communities of Practice** Science & Management Engagement Resources Partners Training Data

REGISTER LOG IN

You are here: Home > Communities of Practice

## Communities of Practice

The Tennessee River Basin Network is comprised of two Communities of Practice (Science & Management, Communication & Outreach) to promote engagement and collective learning in a shared domain. By bringing members of shared expertise and experience together regularly, partners are given the opportunity to help one another and share information and resources. Throughout the year there will be opportunities to engage with members of your Community of Practice in addition to our Network-wide efforts. Collaborative space to build networks, identify good practices, and find solutions.

### Join a TRB Community!

**JOIN A GROUP**

**REQUEST A GROUP**

**NEED HELP?**



# AppLCC science-based resources to support the planning and action of the conservation community

## Session Outline

- Objectives of this session
- RSVP survey results
- AppLCC Portal
- AppLCC Product Categories
- Conservation Planning Atlas
- Stream Classification System
- Ecosystem Services

# AppLCC science-based resources to support the planning and action of the conservation community

## Session Objectives

- Familiarize yourself with several AppLCC resources
- Know WHICH resources can be used for WHAT
- Know HOW TO ACCESS resources
- Know how to receive additional information or TRAINING on resources when needed
- See the UTILITY of APPLICATION in your local and regional conservation planning efforts

# Workshop Participant Feedback

## Management Questions

	1	2	3	4	Total	Score
How can I make decisions to protect resources and biodiversity if their status or location is unknown or inadequately surveyed?	39.29% 11	28.57% 8	21.43% 6	10.71% 3	28	2.96
Given our limited resources, how can I make the best investment now, to protect resources into the future?	39.29% 11	25.00% 7	17.86% 5	17.86% 5	28	2.86
How can I prioritize conservation action based on future industry or land-use change projections?	14.29% 4	32.14% 9	32.14% 9	21.43% 6	28	2.39
Do I have consistent info across the range to help in my planning?	7.14% 2	14.29% 4	28.57% 8	50.00% 14	28	1.79

# Workshop Participant Feedback

## AppLCC Resources

	1	2	3	4	5	Total	Score
Ecosystem Benefits & Risks	25.00% 7	39.29% 11	17.86% 5	14.29% 4	3.57% 1	28	3.68
A Stream Classification System for the Appalachian Landscape Conservation Cooperative	32.14% 9	21.43% 6	17.86% 5	10.71% 3	17.86% 5	28	3.39
Classification and Mapping of Cave and Karst Resources	25.00% 7	7.14% 2	28.57% 8	17.86% 5	21.43% 6	28	2.96
Climate Change Vulnerability in the Appalachians	10.71% 3	17.86% 5	17.86% 5	39.29% 11	14.29% 4	28	2.71
Assessing Future Energy Development	7.14% 2	14.29% 4	17.86% 5	17.86% 5	42.86% 12	28	2.25

# APPALACHIAN

LANDSCAPE CONSERVATION COOPERATIVE

## Resources - Product Categories


AppLCC Funded Research	Science Information/Data	Decision Support Info/Tool	Inventory/Trends Analysis	Predictive/Risk Assessment
★ A Stream Classification System for the AppLCC	✘			
Assessing Future Energy Development			✘	✘
★ Classification & Mapping of Cave and Karst Resources	✘			
Climate Change Vulnerability				✘
Riparian Prioritization for Climate Change Resiliency		✘		
★ Landscape Conservation Design				✘
★ Ecosystem Benefits & Risks	✘		✘	

Know WHICH resources can be used for WHAT

# Conservation Planning Atlas

<https://applcc.databasin.org/>


[Sign Up](#) [Sign In](#) [Support](#)




## APPALACHIAN

LANDSCAPE CONSERVATION COOPERATIVE  
Conservation Planning Atlas

Search by keyword or location


powered by DATA  BASIN

[Get Started](#) [Explore](#) [Create](#) [My Workspace](#)

What is the Conservation Planning Atlas? 

What is the Appalachian LCC? 

What can I do? 

How do I start exploring? 

The Appalachian LCC Conservation Planning Atlas (CPA) is a platform for data discovery, sharing and collaboration for stakeholders throughout the Appalachian LCC region. With the CPA you can search for spatial datasets, visualize LCC-supported projects, and learn more about conservation science and design in the region.









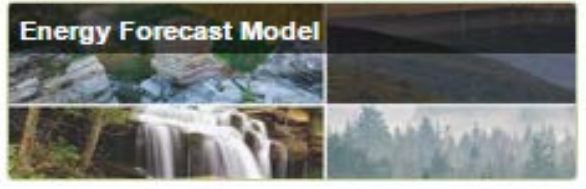
Get started quickly with the Appalachian LCC CPA

[Start Tour](#)

# Conservation Planning Atlas

# Navigate Resources

## Galleries

- Ecosystem Benefits and Risks**  

- Tennessee River Basin Biodiversity Network**  

- Landscape Conservation Design**  

- Cave and Karst Resources**  

- Energy Forecast Model**  


## Maps



### Appalachian LCC Boundary Overview



Overview map of the Appalachian LCC

Galleries - 12  
Maps - 17  
Datasets - 356

## Datasets

-   
Potential of Wind Energy Development across the Appalachian LCC - 90 ...
-   
USDA Forest to Faucets: Percent of HUC Threatened by Insects and Disease
-   
CMIP5: Projected Change in Annual Temperature Normal (2031-2060)



# Conservation Planning Atlas

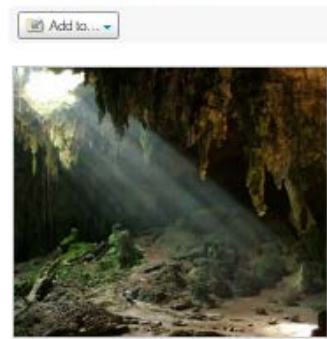
# Navigate Resources



APPALACHIAN LCC CIPA | GALLERIES | CAVE AND KARST RESOURCES

## Cave and Karst Resources

Created by AppLCC\_admin Jul 19, 2016 (Last modified)



**About**  
Cave-limited species display patchy and restricted distributions, but are challenging to study in situ because of the difficulty of sampling. It is often unclear whether the observed distribution is a sampling artifact or a true restriction in range. Further, the drivers of the distribution could be local environmental conditions, such as cave humidity, or they could be associated with surface features that are surrogates for cave conditions. If surface features can be used to predict the distribution of important cave taxa, then conservation management goals can be more easily obtained. These GIS data represent the input and results of a spatial statistical model used to examine the hypothesis that the presence of major faunal groups of cave obligate species could be predicted based on features of the Earth surface. Georeferenced records of cave obligate amphipods, crayfish, fish, isopods, beetles, millipedes, pseudoscorpions, spiders, and springtails within the area of Appalachian Landscape Conservation Cooperative (LCC) in the eastern United States (Illinois to Virginia, and New York for these faunal groups) were modeled using logistic regression with twenty predictor variables within each grid cell, such as percent karst, soil features, temperature, precipitation, and elevation. The models successfully predicted the presence of a group greater than 65 percent of the time (mean=88 percent) for the presence of single grid cell endemics, and for all faunal groups except pseudoscorpions. The most common predictor variables were latitude, percent karst, and the standard deviation of the Topographic Position Index (TPI), a measure of landscape rugosity within each grid cell. The overall success of these models points to a number of important connections between the surface and cave environments, and some of these, especially soil features and topographic variability, suggest new research directions. These models should prove to be useful tools in predicting the presence of species in understudied areas. The data within the gallery provides information and a summary of the cave/karst resources within the Appalachian LCC region.

Recommended by AppLCC\_admin  
This gallery is visible to everyone  
Gallery contains 30 Datasets

**Tags**  
topography, appalachian, cave, troglotitan, soils, range, biodiversity, species distribution model, baseflow, precipitation, karst, lcc

Gallery Contents | Gallery Credits

Sort by: Default | Display

**Dataset**  
Cave and Karst Biota Modeling in the Appalachian LCC - Predicted ...

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**Dataset**  
Cave and Karst Biota Modeling in the Appalachian LCC - Predicted ...

**Dataset**  
Cave and Karst Biota Modeling in the Appalachian LCC - Predicted ...

## Cave and Karst Biota Modeling in the Appalachian LCC - Predicted springtails in all 20km grid cells in karst

Uploaded by AppLCC\_admin Sep 22, 2016

Add to... | Download...

**Open in Map**

**Description:**  
We developed spatial summary (GIS) layers for a study of factors influencing the distribution of cave and karst associated fauna within the Appalachian Landscape Conservation Cooperative region, one of 22 public-private partnerships established by the United States Fish and Wildlife Service to aid in developing landscape scale solutions to conservation problems (https://connetwork.org/lcc/appalachian). We gathered occurrence data on cave-limited terrestrial and aquatic troglotitan species from a variety of sources within the Appalachian LCC region covering portions of 15 states. Occurrence records were developed from the scientific literature, existing biodiversity databases, personal records of the authors, museum accessions, state Natural Heritage programs, and The Nature Conservancy (for Tennessee). Occurrence records were identified by location and translated into a GIS database. Although the precise locations cannot be made public due to the sensitivity of the information, data sharing agreements, and restrictions under the Federal Cave Resources Protection Act of 1988, we summarized the data spatially using a coarse 20x20km vector grid. We used these occurrence records, summarized at the 20x20km grid resolution in statistical modeling to examine physical factors prediction of cave dwelling fauna. Troglotitan occurrence data within the Appalachian LCC region covering portions of 15 states.

**Details** | Data Layers (1)

**Data Provided By:**  
Young, John A.  
Nemiller, Matthew L.  
Zigler, Kirk S.  
Culver, David C.  
Christman, Mary C.  
Dozier, Daniel H.  
Weary, David J.

**Data Hosted by:**  
ScienceBase (USGS) [View Record](#)

**Map Service URL:**  
<https://www.sciencebase.gov/catalog/Maps/mapping/ows/57759844e4b07d4077c77016>

**Content date:** 2016-08-29 (Publication Date)

**Contact Organization:**  
U.S. Geological Survey, Northeast Region  
U.S. Geological Survey - ScienceBase

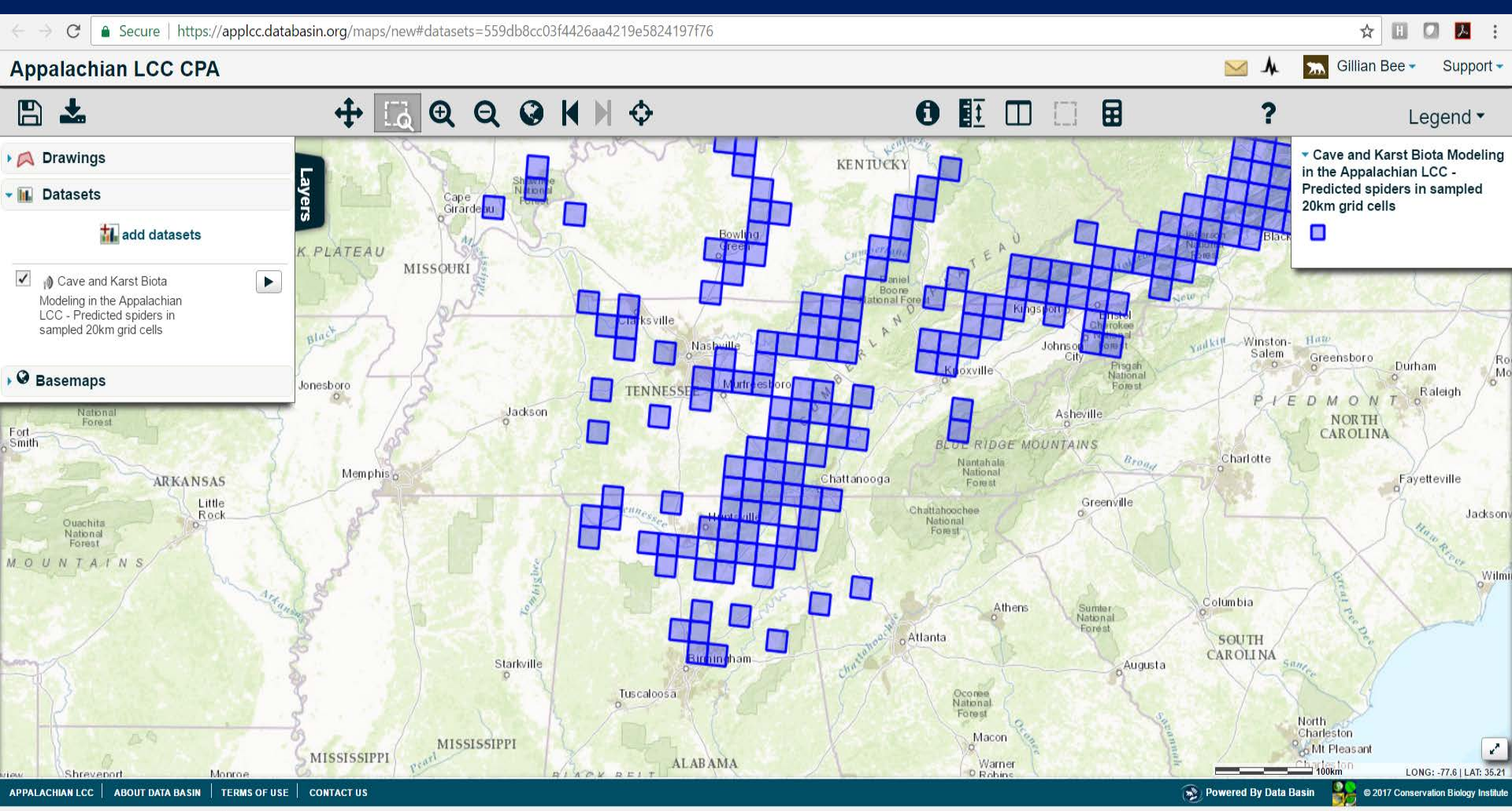
**Contact Person(s):**  
John A Young

**Use Constraints:**  
None

**Dataset Type:** External Map Service (WMS)

**Tags:** biota, caves, karst

**Included in 1 Public Gallery:**  
Cave and Karst Resources



Create your own map specific to your needs

- Add polygon, points, lines
- Add additional datasets
- Save map to your Data Basin Workspace
- Export map (PDF, PPT)

# Download Data



## Cave and Karst Biota Modeling in the Appalachian LCC - Predicted springtails in all 20km grid cells in karst

Uploaded by AppLCC\_admin

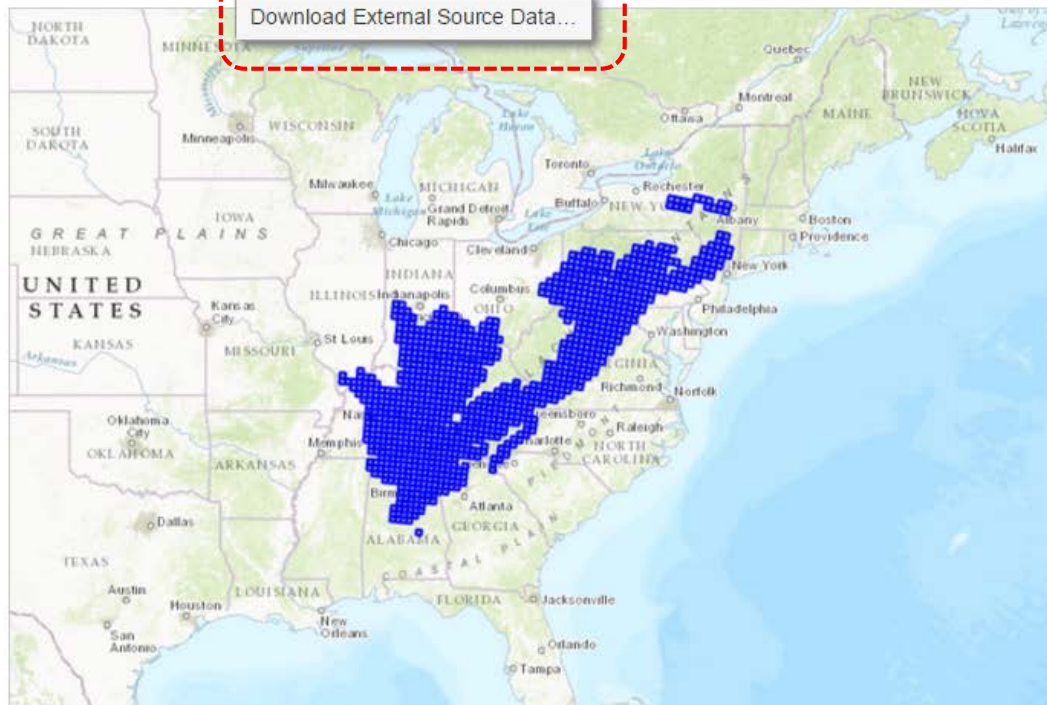
Sep 22, 2016 ( Last modified Nov 19, 2016)

Add to...

Download...

Download External Source Data...

Open in Map



### Description:

We developed spatial summary (GIS) layers for a study of factors influencing the distribution of cave and karst associated fauna within the Appalachian Landscape Conservation Cooperative, one of 22 public-private partnerships established by the United States Fish and Wildlife Service to aid in developing landscape scale solutions to conservation problems (<https://lccnetwork.org/lcc/appalachian>). We gathered occurrence data on cave-limited terrestrial and aquatic troglobiotic species from a variety of sources within the Appalachian LCC region covering portions of 15 states. Occurrence records were developed from the scientific literature, existing biodiversity databases, personal records of the authors, museum accessions, state Natural Heritage programs, and The Nature Conservancy (for Tennessee). Occurrence records were identified by location and translated into a GIS database. Although the precise locations cannot be made public due the sensitivity of the information, data sharing agreements, and restrictions under the Federal Cave Resources Protection Act of 1988, we summarized the data spatially using a coarse 20x20km vector grid. We used these occurrence records, summarized at the 20x20km grid resolution in statistical modeling to examine physical factors predictive of cave dwelling fauna. Spatial summaries were developed for all cave dwelling species in our database where we had location coordinates for nine faunal groups (five terrestrial and four aquatic) that are common components of terrestrial and aquatic cave communities: ground beetles (Carabidae), millipedes, pseudoscorpions, spiders, and springtails for terrestrial species groups, and amphipods (Crangonyctidae and Gammaridae), isopods (Asellidae), crayfishes (Cambaridae), and fishes (Amblyopsidae) for aquatic species groups.

# CPA – How to exercise

---



## APPALACHIAN LANDSCAPE CONSERVATION COOPERATIVE

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### Enhancing Landscape Conservation



Delivering the Science:  
Tools and Assessments



Coordinating Landscape  
Planning and Design



Networking for the  
Conservation Community



Sharing Maps  
and Data

OVERVIEW: Using AppLCC Science Investments



GET STARTED

**Do I have consistent information across the range to help in my planning?**



**Stream Classification System for the AppLCC**



# A Stream Classification System for the AppLCC

Standardized aquatic habitat classification & dataset

Represents region's natural flowing aquatic habitats

- Aquatic biodiversity patterns

Primary attributes:

- Size
- Gradient
- Temperature
- Hydrology
- Buffering Capacity
- Confinement

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AppLCC Funded Research

**A Stream Classification System for the Appalachian Landscape Conservation Cooperative**  
Stream classification information is essential to develop and implement flow standards and water management recommendations that will sustain aquatic biodiversity. Unfortunately, standardized information was lacking for the Appalachian landscape. The goal of this project was to develop a state-based, consistent stream classification system for aquatic ecosystems in the region. Unifying state-based stream classifications into a single consistent system, principal investigators at The Nature Conservancy developed a hierarchical classification system and map for stream and river systems for the Appalachian LCC that represents the region's natural flowing aquatic habitats.

**Assessing Future Energy Development**  
Assessing Future Energy Development across the Appalachian LCC uses models that combine data on energy development trends and identifies where these may intersect with important natural resource and ecosystem services to give a more comprehensive picture of what potential energy development could look like in the Appalachians. A web-based mapping tool allows policy makers, land management agencies, industries, and others to see where development may likely occur and intersect with important natural values to inform regional landscape planning decisions. Ultimately this information is intended to support dialogue and conservation on how to effectively avoid, minimize, and offset impacts from energy development to important natural areas and the valuable services they provide.

**Classification and Mapping of Cave and Karst Resources**  
Cave and karst systems are unique environments that occur throughout the Appalachians. They provide habitat for a diverse array of species and are an important source of domestic water supply for Appalachian communities. However, a lack of classification and mapping information on these ecosystems creates a significant barrier to conservation. In order to develop and deliver landscape-level planning tools, it is essential to develop an Appalachian-wide map depicting where cave and karst habitats and resources occur across the landscape. Researchers from an array of organizations were funded by the LCC to develop a series of deliverables, including data tables, geospatial information layers, and maps on these ecosystems.

**Climate Change Vulnerability in the Appalachians**  
New climate change vulnerability assessments for 41 species and 3 habitats in the Appalachians are now available. The conservation community can view and search each of these assessments by vulnerability scores, conservation status ranks, state and subregion of assessment, and higher taxonomy. In addition, principle investigators NatureServe compiled the results of 700 species assessments previously completed by other researchers as well as assessments on

The Nature Conservancy

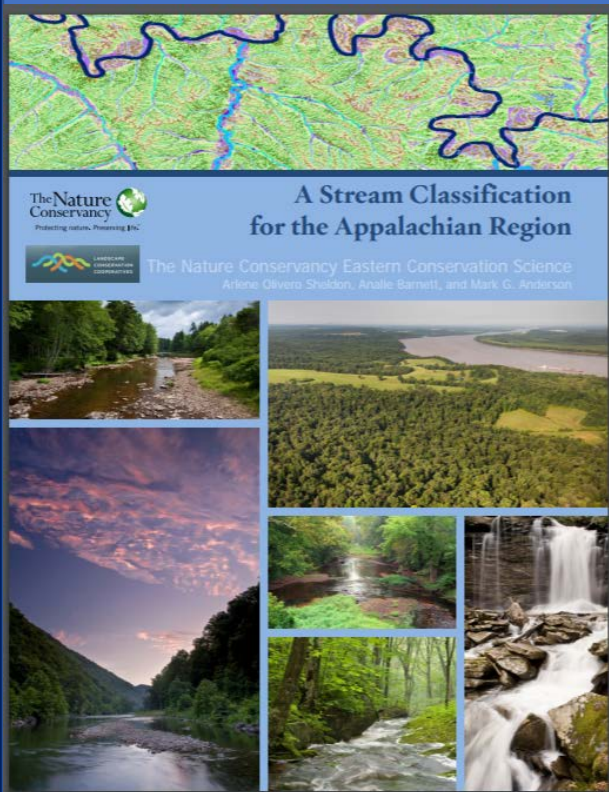
re as well as risks to their sustainability will  
otection and investments in these  
orest Service on cutting edge research that  
orm natural resource planning and  
i comprehensive resource to partners at a  
ervices conservation science.



# A Stream Classification System for the AppLCC

Science  
Information/Data

Report



Interactive Story Map

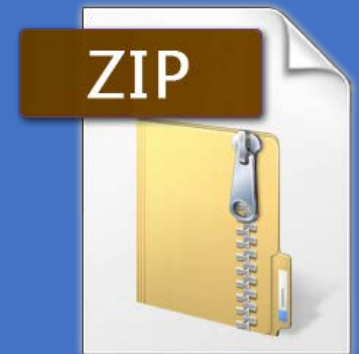
A story map

Facebook Twitter LinkedIn Esri

## A Stream Classification for the Appalachian Region

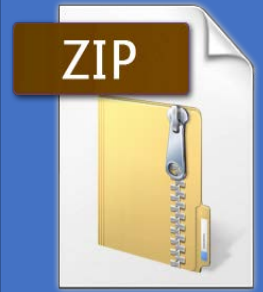
This study developed a mapped classification system for stream and river systems in the AppLCC region to inform conservation planning for aquatic biodiversity. Stream habitats were classified using six primary attributes: size, gradient, temperature, hydrology, buffering capacity, and confinement. Information on each variable was based on extensive data compiled, or modeled, for each mapped reach. Variable classes were combined to yield a regional taxonomy. Headwaters and small rivers were classified on gradient, temperature, and hydrology and medium to great rivers, on confinement, temperature, and hydrology, identifying 62 stream types within the study area.

GIS Data Set





# Geospatial Data



## Attributes

- Size
- Gradient
- Temperature
- Hydrology
- Buffering Capacity
- Confinement

## Regional Stream Types

- Simplified taxonomy
- Integration of classification variables to examine patterns and distribution
- 73 types

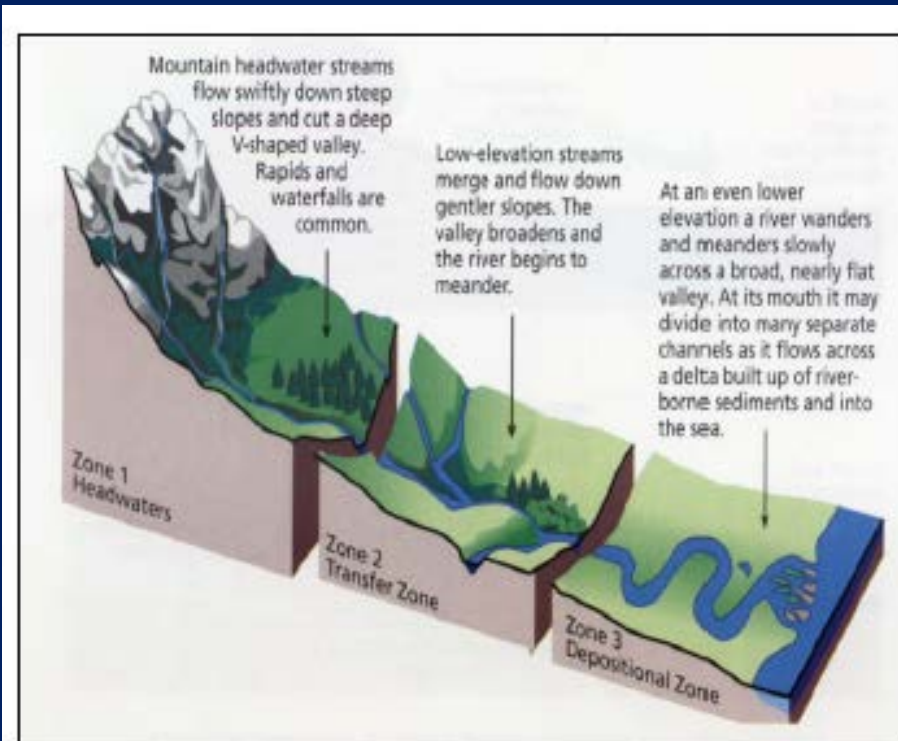
# Geospatial Data - Attribute: Gradient

Influences aquatic communities due to its impact on:

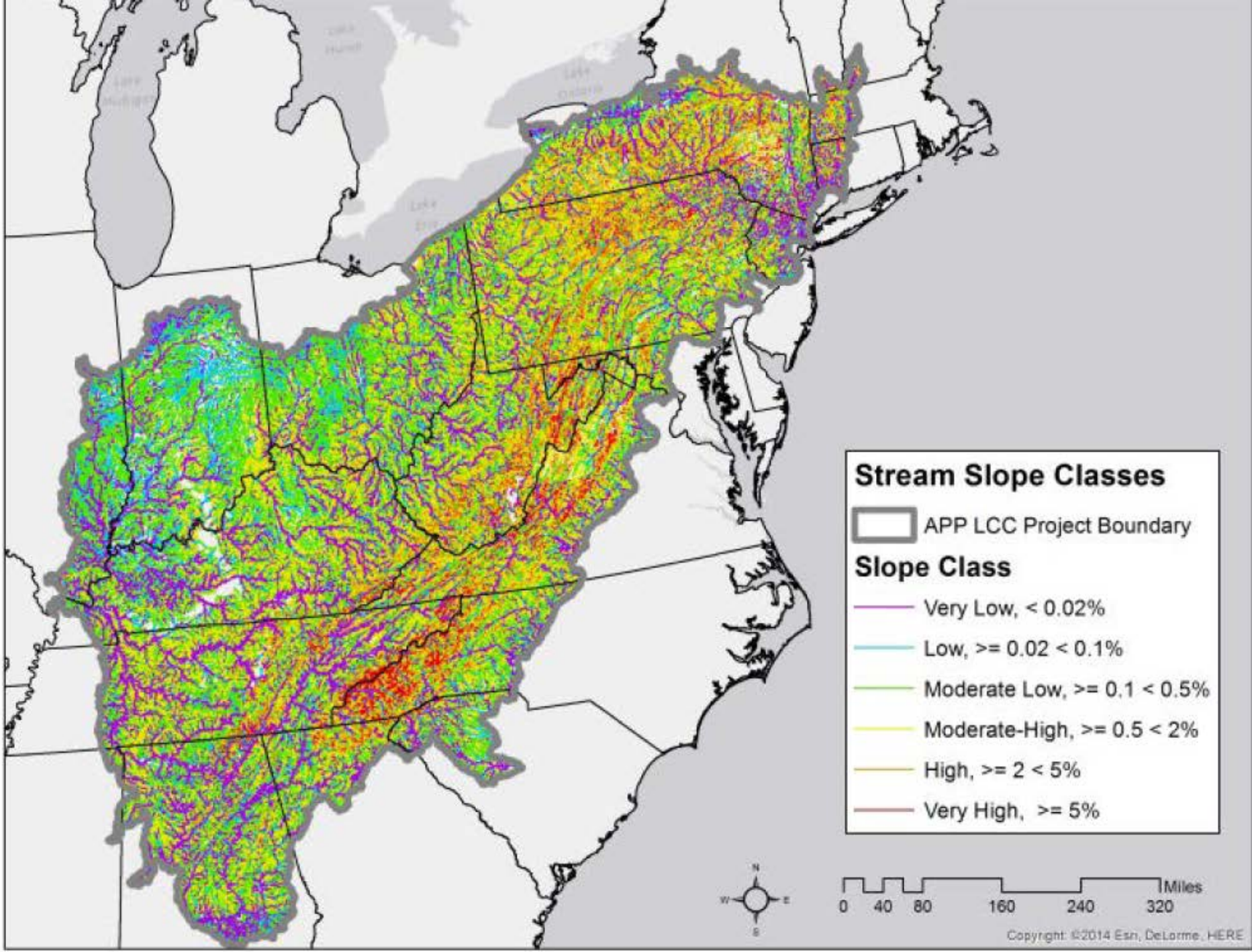
- stream bed morphology
- flow velocity
- sediment transport
- substrate
- grain size

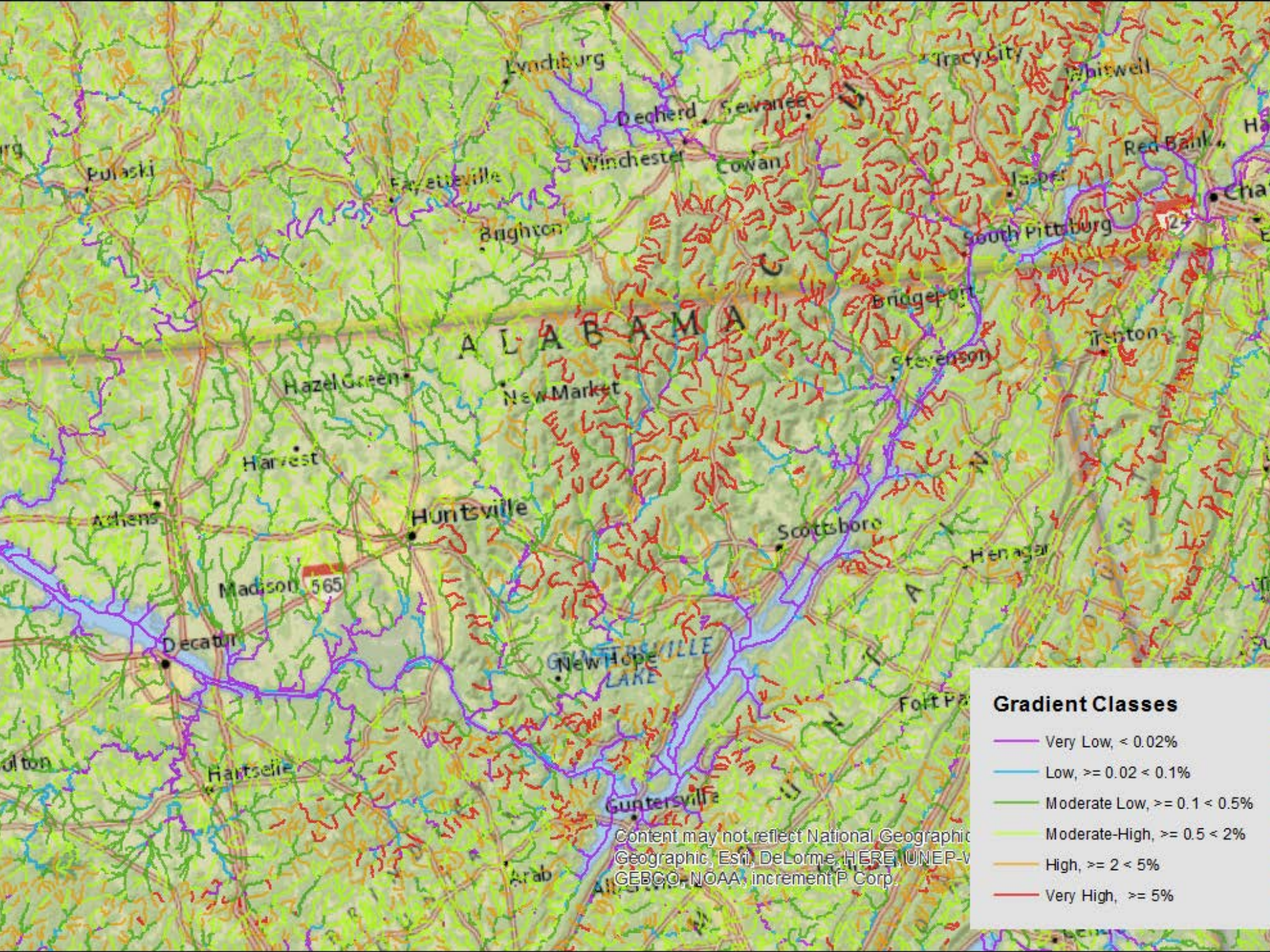
Characterized patterns of species abundance:

- Very low gradient
- Low gradient
- Moderate-low gradient
- Moderate-high gradient
- Very high gradient



**Figure 5-1.** Stream gradient diagram (Vanotte et al. 1980).





### Gradient Classes

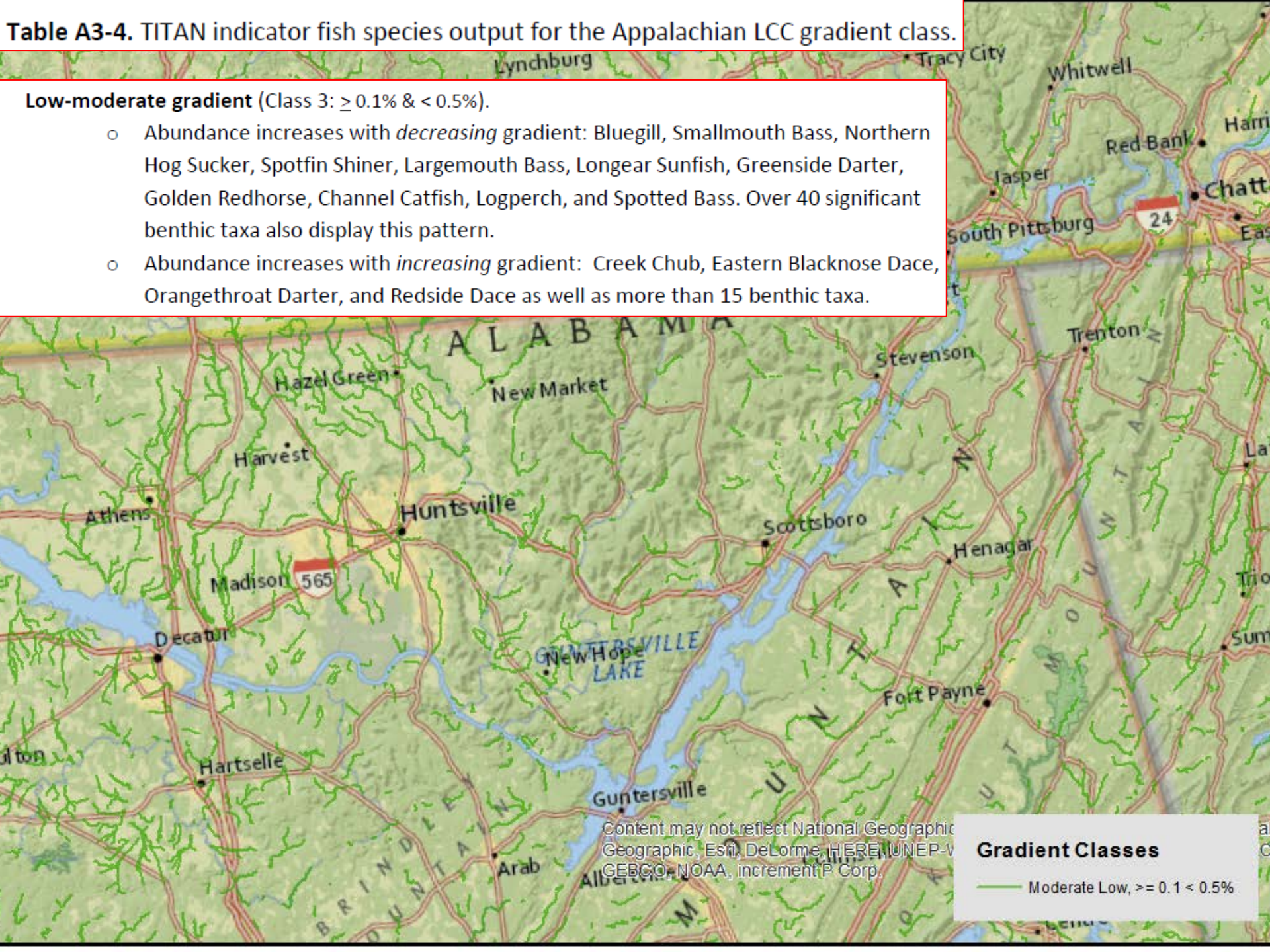
- Very Low, < 0.02%
- Low,  $\geq 0.02$  < 0.1%
- Moderate Low,  $\geq 0.1$  < 0.5%
- Moderate-High,  $\geq 0.5$  < 2%
- High,  $\geq 2$  < 5%
- Very High,  $\geq 5\%$

Content may not reflect National Geographic  
Geographic, Esri, DeLorme, HERE, UNEP-  
GEBCO, NOAA, incrementP Corp.

**Table A3-4.** TITAN indicator fish species output for the Appalachian LCC gradient class.

**Low-moderate gradient** (Class 3:  $\geq 0.1\%$  &  $< 0.5\%$ ).

- Abundance increases with *decreasing* gradient: Bluegill, Smallmouth Bass, Northern Hog Sucker, Spottfin Shiner, Largemouth Bass, Longear Sunfish, Greenside Darter, Golden Redhorse, Channel Catfish, Logperch, and Spotted Bass. Over 40 significant benthic taxa also display this pattern.
- Abundance increases with *increasing* gradient: Creek Chub, Eastern Blacknose Dace, Orangethroat Darter, and Redside Dace as well as more than 15 benthic taxa.

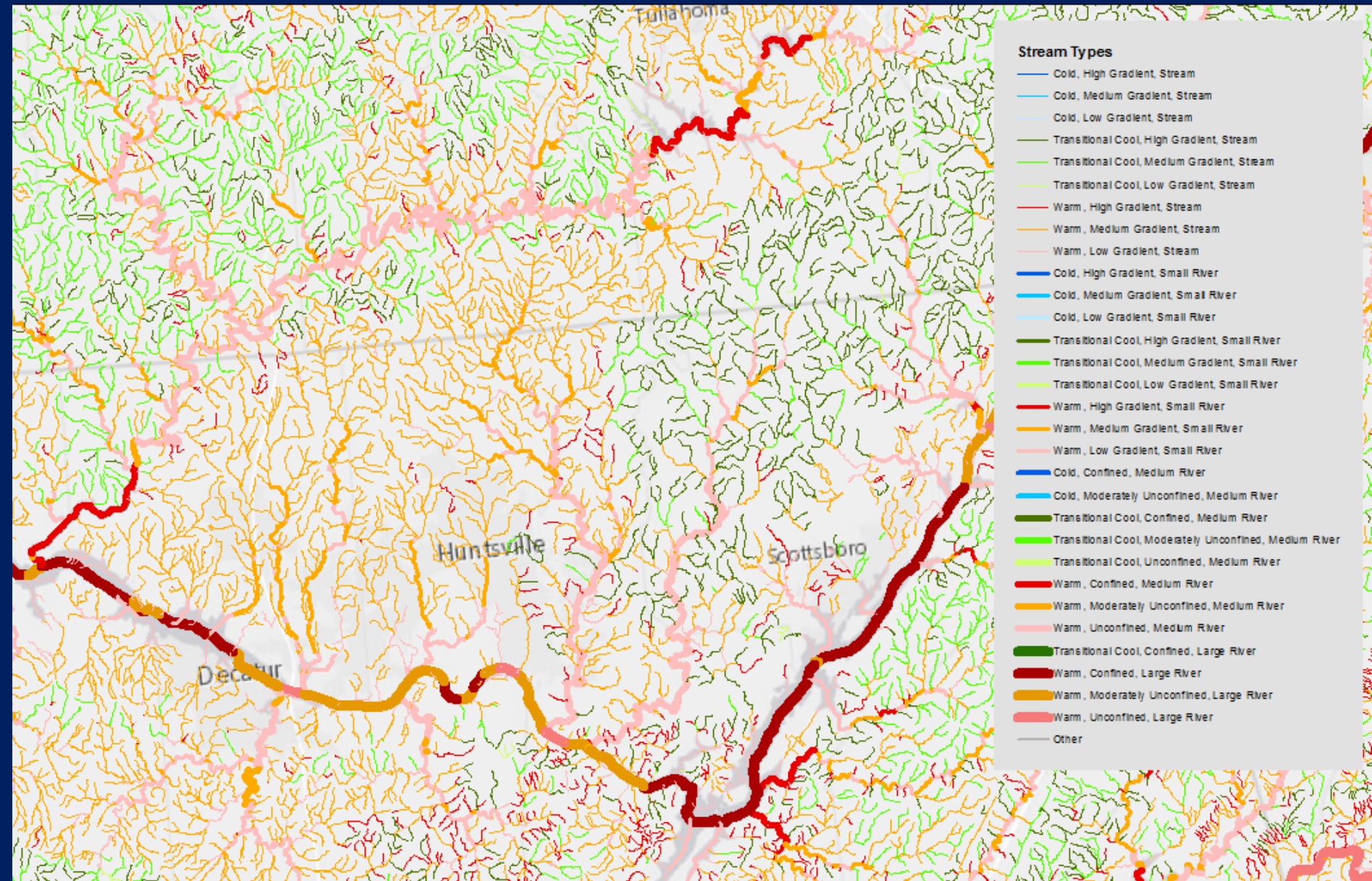


Content may not reflect National Geographic  
Geographic, Esri, DeLorme, HERE, UNEP-  
GEBCO, NOAA, incrementP Corp.

**Gradient Classes**

— Moderate Low,  $\geq 0.1 < 0.5\%$

# Geospatial Data: Regional Stream Types



# Ecosystem Services across the Appalachian LCC



Eastern Forest Environmental  
Threat Assessment Center,  
Southern Research Station  
USDA Forest Service



## ECOSYSTEM BENEFITS AND RISKS

Guide



Atlas & Data

- **Clearinghouse** for Appalachian ecosystem services knowledge and data,
  - providing users with **key information** they need to make informed resource management decisions
  - **that support healthy ecosystems and**
    - **sustain the benefits to people**



# The type of information you can access



## Forest Industry

Economic and social factors have an important relationship to the production of timber and nontimber products in the Appalachian region. Areas with strong timber markets and working forests not only support ecosystem services such as clean water and wildlife habitat, but can also provide economic and social benefits through jobs in the forest industry.



### Benefits

- Forest Carbon
- Harvested Species
- Landscape Values and Sense of Place
- Water and Soils



### Risks

- Climate Change
- Energy Development
- Invasive Species and Forest Pathogens
- Urbanization
- Wildland Fire

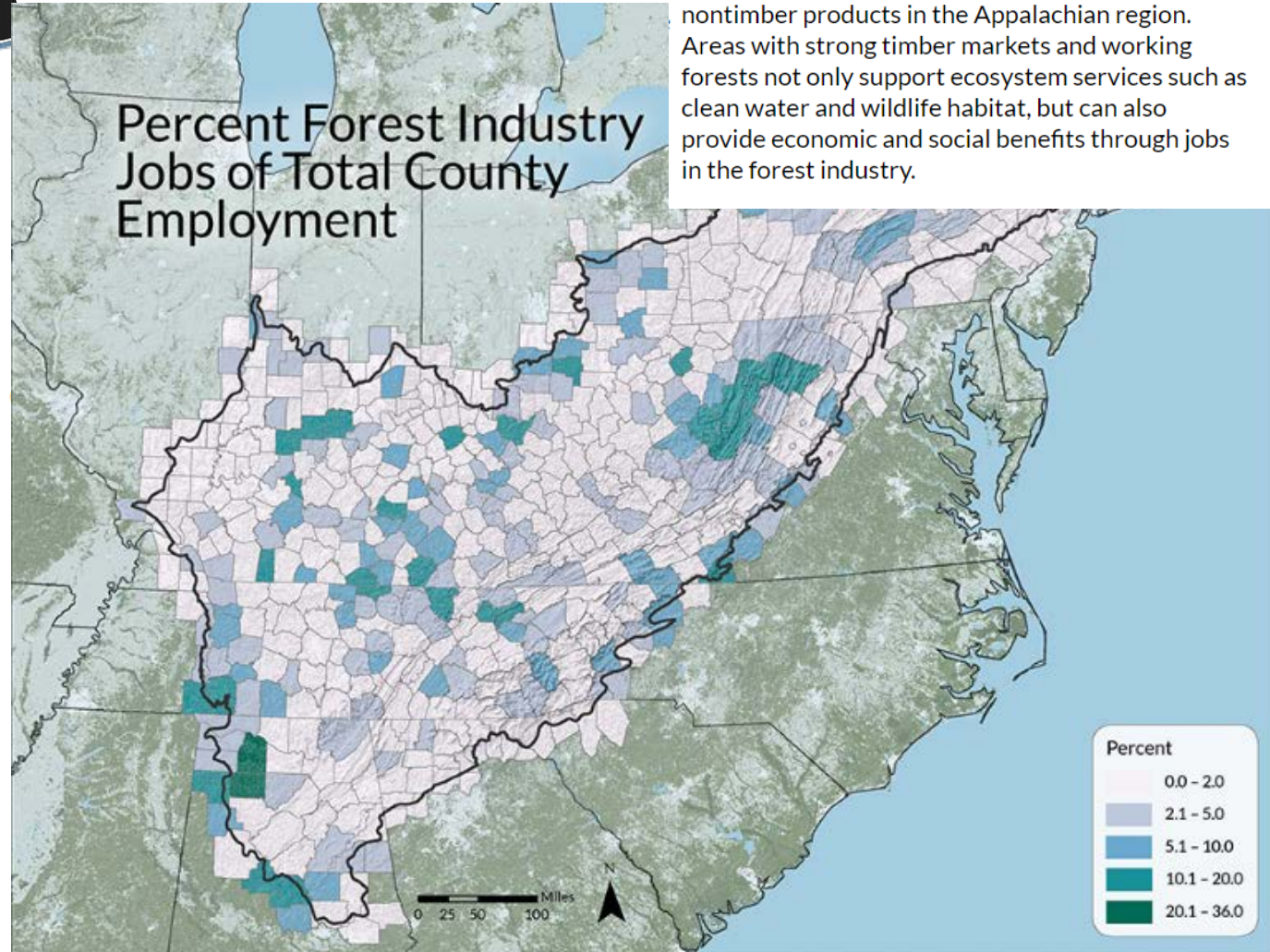


### The Human Landscape

- Demographics
- Economics
- Land Use



### Data Atlas



# The type of information you can access

# Navigate Resources

APPALACHIAN LANDSCAPE CONSERVATION COOPERATIVE  
Conservation Planning Atlas

powered by DATA BASIN

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APPALACHIAN LCC CPA | GALLERIES | ECOSYSTEM BENEFITS AND RISKS

## Ecosystem Benefits and Risks

Created by ApplCC\_admin Jul 19, 2016 ( Last modified Sep 29, 2018)

**About**  
Ecosystem services are the benefits people receive from nature. These are abundant in the Appalachians, from clean drinking water and sustainably harvested forest products to nature-based tourism. They also include the sense of home that communities find in rural landscapes and the values that Americans place on conserving biodiversity.

These essential services and the natural resources they depend on are extremely valuable to society, but are placed at risk by processes driving landscape change in the Appalachians such as urbanization and climate change. Some processes, such as energy development, produce both risks and benefits to society.

This gallery includes a collection of data which comprises the ecosystem benefits and risks within the Appalachian LCC region.

**Tags**  
risks, appalachian, lcc, ecosystem benefits, applcc

This gallery is visible to everyone

**Gallery contains**  
4 Folders  
41 Datasets  
1 Maps

**Gallery Contents** Gallery Credits

Sort by: Default Display

- Benefits (8 items)
- Data Atlas (4 items)
- Human Landscape (16 items)
- Risks (14 items)

## USDA Forest to Faucets: Forest Importance to Drinking Water

Updated by Ian Johnson Sep 29, 2016

Download... Open in Map

**Description:**  
The USDA Forest Service Forests to Faucets project uses GIS to model and map the continental United States land areas most important to surface drinking water, the role forests play in protecting these areas, and the extent to which these forests are threatened by development, insects and disease, and wildfire fire.

The Forest to Faucets dataset provides a watershed index of surface drinking water importance, a watershed index of forest importance to surface drinking water, and a watershed index to highlight the extent to which development, fire, and insects and disease threaten forests important for surface drinking water.

The dataset displayed here displays the index of forest importance to surface drinking water, by each HUC-12 watershed.

For more information on this dataset, please visit:  
ApplCC's Ecosystem Services Conservation Atlas | From the Forest to the Faucet

**Details** Data Layers (1)

This dataset is visible to everyone

**Data Provided By:**  
USDA Forest Service  
USDA Forest Service's EFETAC  
UNIC Asheville's NEMAC

**Data Hosted by:**  
ScienceBase (USGS) View Record

**Map Service URL:**  
<https://www.sciencebase.gov/catalog/item/58f9598bbe4b08e9d4007ed/MapServer/>

**Content date:** 2001-2006

**Citation:**  
USDA Forest Service, Forests to Faucets

**Spatial Resolution:** EPSG: 4326

**Contact Organization:**  
Ecosystem Services & Markets, ecosystemservices@fs.fed.us  
USDA Forest Service, Cooperative Forestry/Washington, DC

**Contact Person(s):**  
not specified

**Use Constraints:**  
CC BY-NC-ND This work is licensed under a Creative Commons Attribution 3.0 License.

**Dataset Type:** External Map Service (ArcGIS)

**Tags:**  
usfs, forests to faucets, usda forest service, applcc

**Included In 1 Public Gallery**  
Ecosystem Benefits and Risks

**Gallery Contents** Gallery Credits

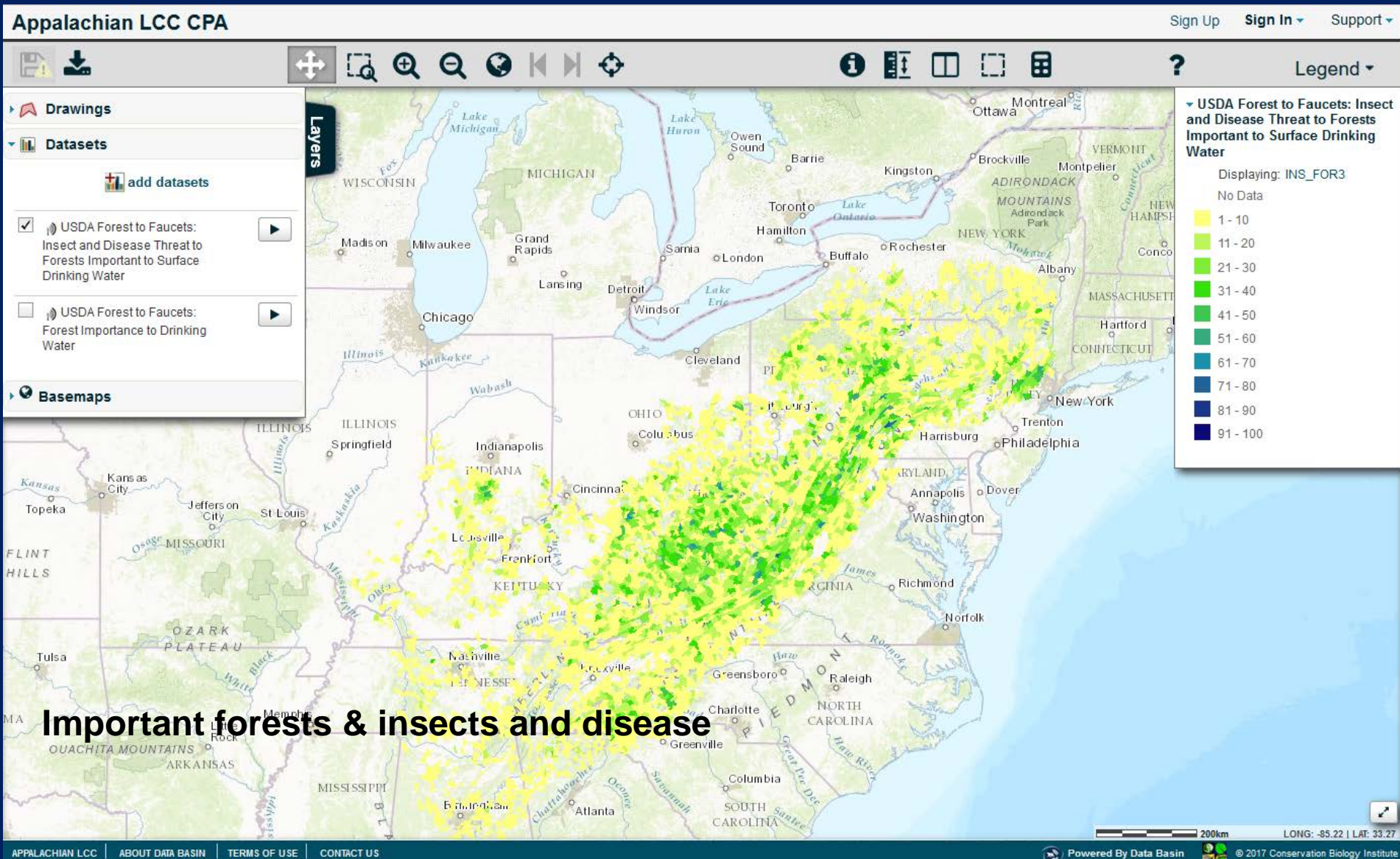
Sort by: Default Display

Benefits (8 items)

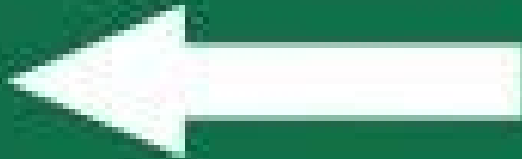
- PRISM: Summer Maximum Temperature Normal (1981-2010)
- USDA Forest to Faucets: Forest Importance to Drinking Water**
- PRISM: Average Annual Normal Precipitation (1981-2010)
- PRISM: Average Normal Annual Temperature (1981-2010)
- ForWam: Mean Summer NDVI, 2009-2013
- Total Basal Area of All Tree Species, 2012



# How might insects and disease affect drinking water?



# Questions



# Cave and Karst Resources across the Appalachian LCC





# Classification and Mapping of Cave and Karst Resources across the Appalachian Landscape

- Mapped cave locations region wide
- Developed classification system for cave biodiversity
- Modeled probable level of biodiversity in areas not yet surveyed

Science  
Information / Data

The screenshot shows the AppLCC website with a navigation bar containing: Cooperative, Research, Plan & Design, Focal Areas, Issues, Partner Projects, People, News, Resources. A dropdown menu under 'Research' is open, listing: AppLCC Funded Projects, Research Search, Share Your Research, Funding Opportunities. Below the navigation is a search bar and social media icons. The main content area features an article titled 'Classification System for the Appalachian Landscape Conservation' with a map thumbnail. Below it is another article 'Assessing Future Energy' with a landscape photo. At the bottom, a third article 'Classification and Mapping' is highlighted with a red dashed border, featuring a photo of a cave entrance. The text for this article reads: 'Cave and karst systems are unique environments with a diverse array of species and are an important part of the landscape. Due to a lack of classification and mapping information, it is difficult to develop and deliver landscape-level information where cave and karst habitats and resources occur across the landscape. This project will develop a series of deliverables, including data tables, geospatial maps, and a classification system for cave and karst resources across the Appalachian Landscape.' To the right of the website screenshot is a blue box containing a list of organisms.

- amphipods
- crayfish
- isopods
- beetles
- millipedes
- pseudoscorpions
- spiders
- springtails

# Available Resources – Guide to Cave/Karst Resources across the Appalachian LCC

## Quicklinks

► Classification and Mapping of Cave and Karst Resources

Cave/Karst Resources Across the Appalachian LCC: A Visual Guide

Gallery: Cave and Karst Maps

Cave and Karst Data Access

Review of Subterranean Faunal Studies of the Appalachians and Models of Subterranean Species Richness

Background Materials:  
Classification and Mapping of Cave and Karst Resources Project

## Cave/Karst Resources Across the Appalachian LCC A Visual Guide to Results

David C. Culver (P.I.)  
American University

Mary C. Christman (Co-P.I.)  
University of Florida & MCC Associates

Daniel H. Doctor (Co-P.I.)  
U.S. Geological Survey

Matthew L. Niemiller (Co-P.I.)  
University of Illinois

David J. Weary (Co-P.I.)  
U.S. Geological Survey

John A. Young (Co-P.I.)  
U.S. Geological Survey

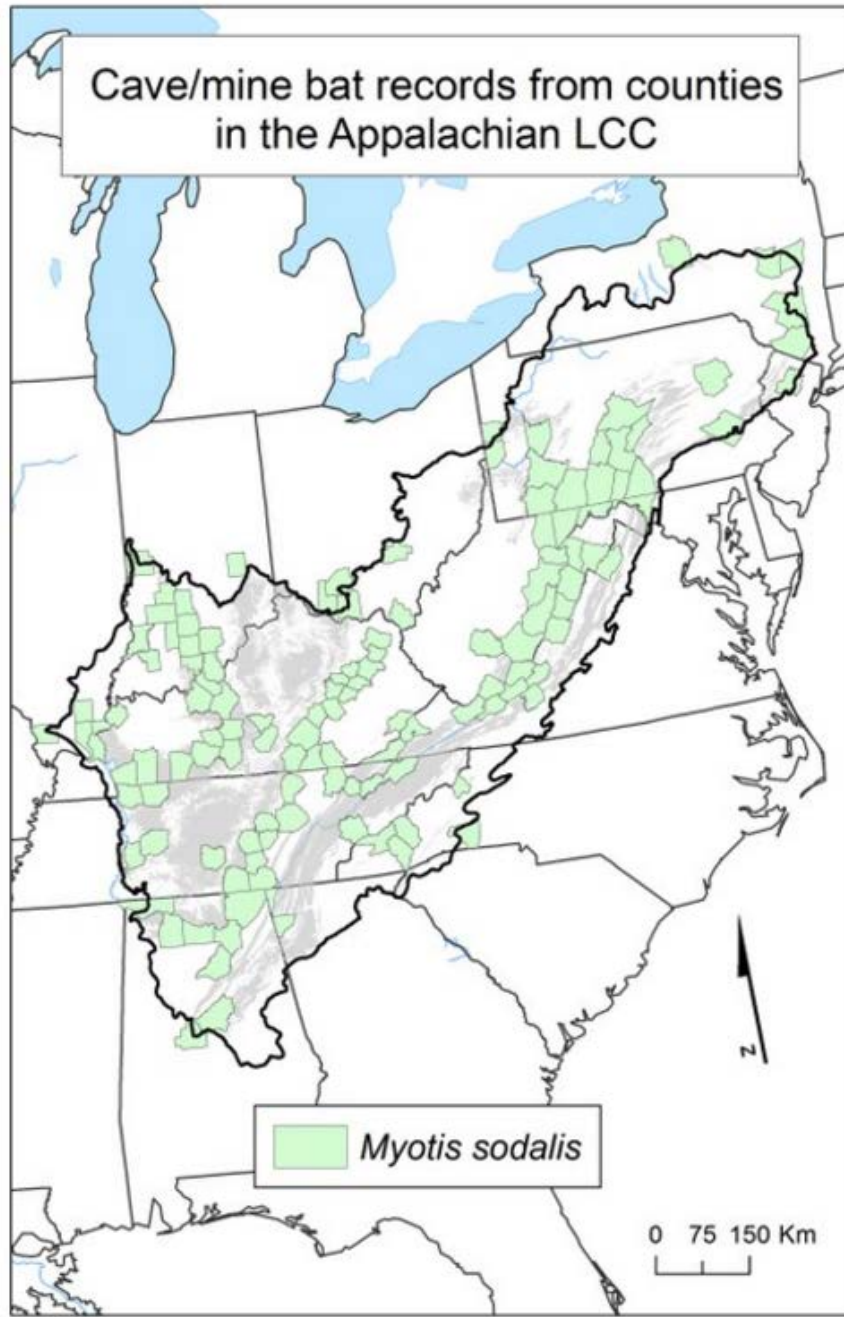
Kirk S. Ziegler (Co-P.I.)  
University of the South

Science  
Information / Data

- Distribution of known caves and karst within the region
- Taxonomic distribution of obligate cave-dwelling fauna
- Geographic patterns of species richness and ranges of major faunal groups
- Landscape and physical features that are potential predictors of species richness
- Predictions of the presence of nine major ecological groups
- Geography of risk to the subterranean fauna
- Geographic patterns of bat utilization of caves



# Available Resources – Cave and Karst Map Gallery



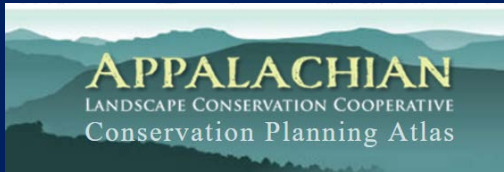
Maps of:

- Foundational datasets
- Land-use and potential risks
- Modeling inputs
- Probability of presence of species groups
- Bat Records by county

\* To obtain specific datasets inquire American University

# Available Resources – Predictive Models of Cave Organisms

## Cave and Karst Data Access



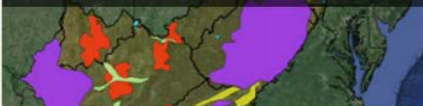
### Ecosystem Benefits and Risks



### Tennessee River Basin Biodiversity Network



### Landscape Conservation Design



### Cave and Karst Resources



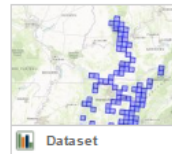
### Energy Forecast Model



<https://applcc.databasin.org/>

## Gallery Contents Gallery Credits

Sort by:  Display:



### Cave and Karst Biota Modeling in the Appalachian LCC - Predicted troglotibotic fish in sampled 20km grid cells

Young, John A.  
Niemi, Matthew L.  
Zigler, Kirk S.  
Culver, David C.  
Christman, Mary C.  
Doctor, Daniel H.  
Weary, David J.

30 Datasets

We developed spatial summary (GIS) layers for a study of factors influencing the distribution of cave and karst associated fauna within the Appalachian Landscape Conservation Cooperative region, one of 22 public-private partnerships established by ...

AppLCC\_admin (Last modified September 22, 2016)

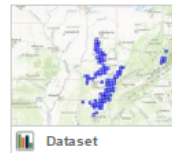


### Cave and Karst Biota Modeling in the Appalachian LCC - Predicted troglotibotic fish in all 20km grid cells in karst

Young, John A.  
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Zigler, Kirk S.  
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AppLCC\_admin (Last modified September 22, 2016)

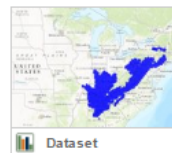


### Cave and Karst Biota Modeling in the Appalachian LCC - Predicted troglotibotic crayfish in sampled 20km grid cells

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Niemi, Matthew L.  
Zigler, Kirk S.  
Culver, David C.  
Christman, Mary C.  
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AppLCC\_admin (Last modified September 22, 2016)

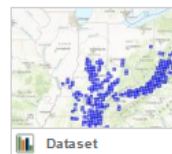


### Cave and Karst Biota Modeling in the Appalachian LCC - Predicted troglotibotic crayfish in all 20km grid cells in karst

Young, John A.  
Niemi, Matthew L.  
Zigler, Kirk S.  
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Christman, Mary C.  
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We developed spatial summary (GIS) layers for a study of factors influencing the distribution of cave and karst associated fauna within the Appalachian Landscape Conservation Cooperative region, one of 22 public-private partnerships established by ...

AppLCC\_admin (Last modified September 22, 2016)



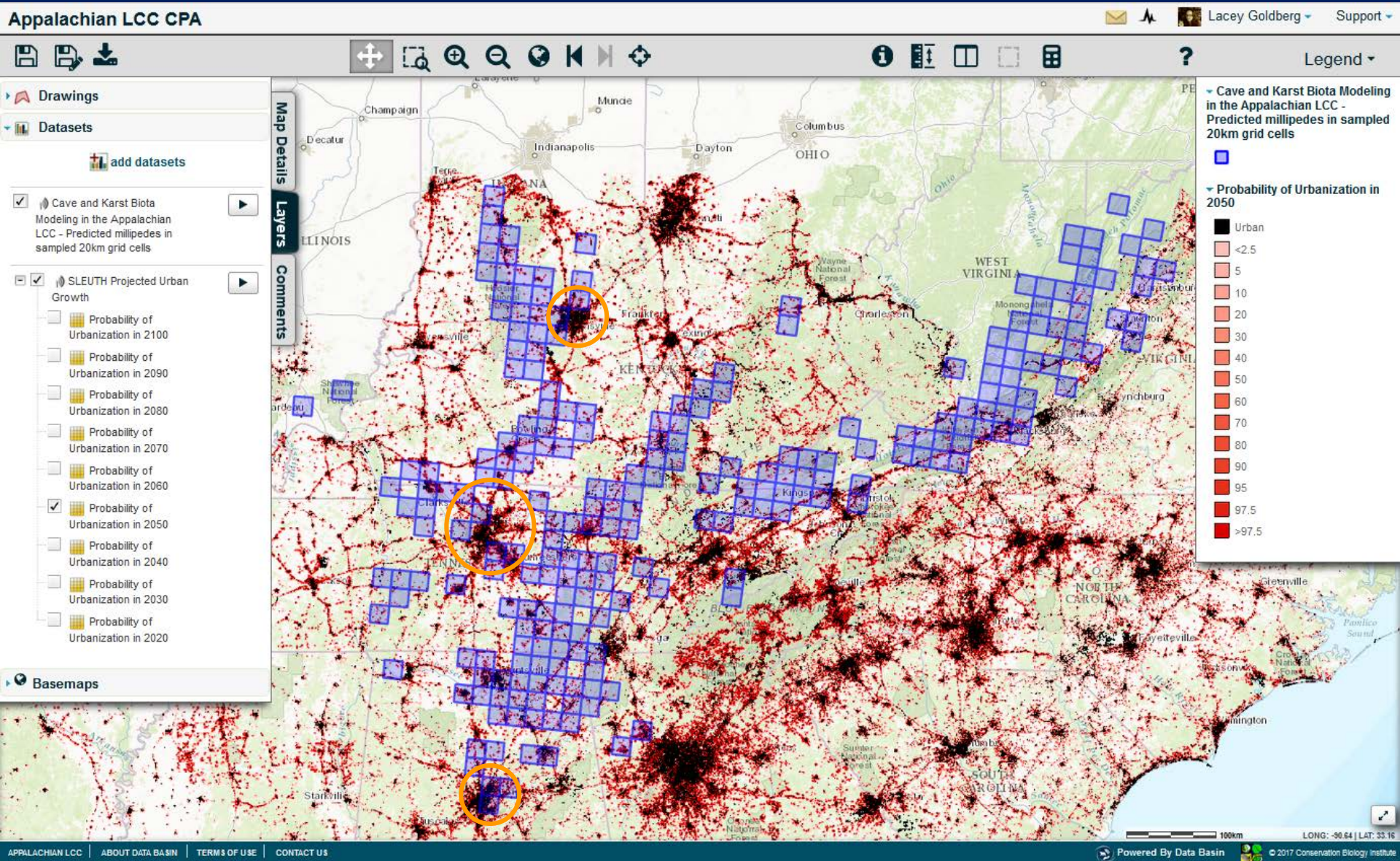
### Cave and Karst Biota Modeling in the Appalachian LCC - Predicted springtails in sampled 20km grid cells

Young, John A.  
Niemi, Matthew L.  
Zigler, Kirk S.  
Culver, David C.  
Christman, Mary C.  
Doctor, Daniel H.  
Weary, David J.

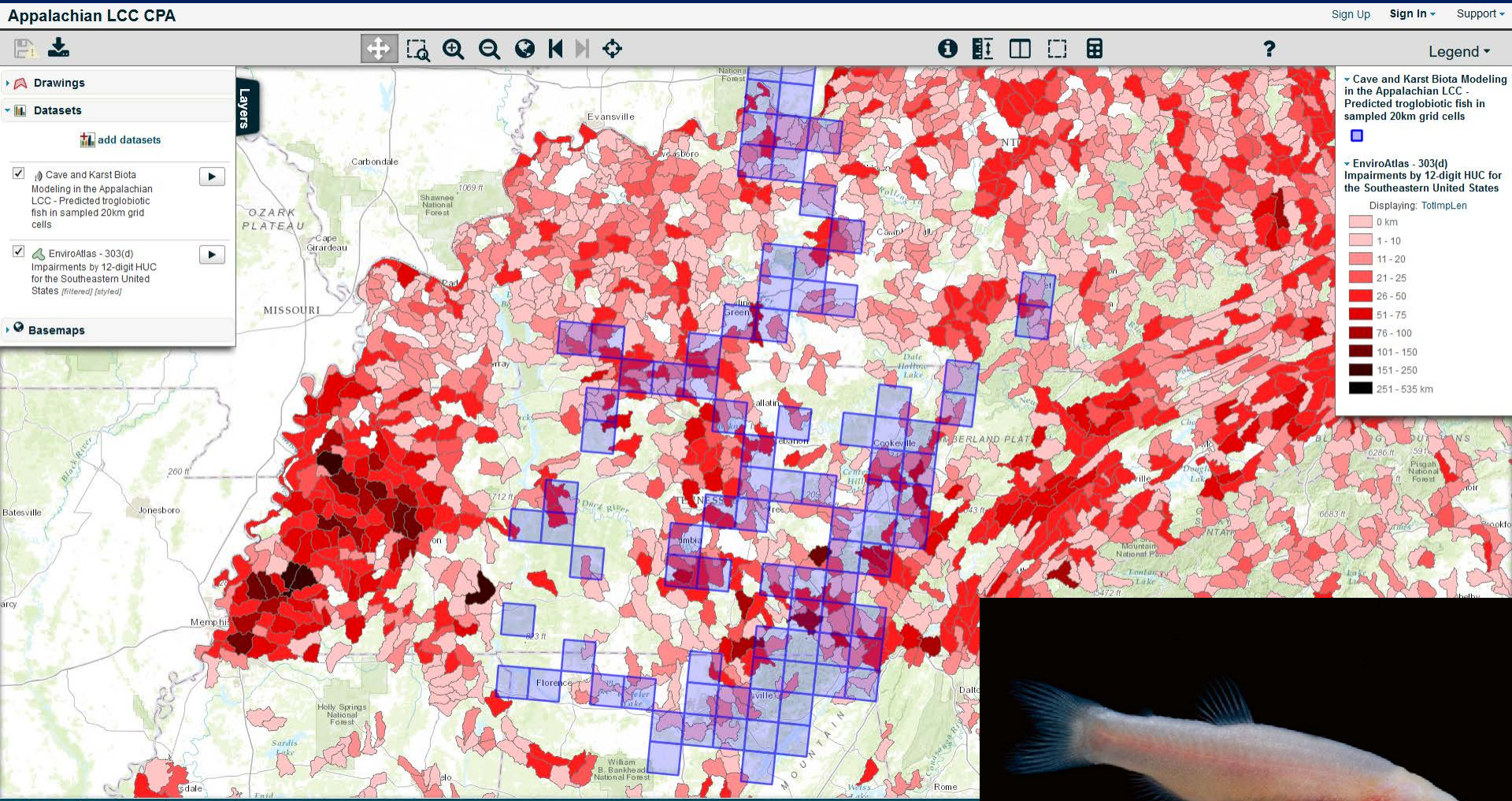
We developed spatial summary (GIS) layers for a study of factors influencing the distribution of cave and karst associated fauna within the Appalachian Landscape Conservation Cooperative region, one of 22 public-private partnerships established by ...

AppLCC\_admin (Last modified September 22, 2016)

# Risk to cave-obligate millipede habitat due to projected urban growth



# Potential risk to troglobiotic fish due to impaired streams



# Case Scenario

---





## Management Question:

What cave-limited species in the Southeastern United States are at highest risk due to potential ground water contamination from agricultural sources, namely from pesticides, herbicides, and fertilizers?

\*For this exercise, we will be looking at predicted Amphipod habitat

## Data Layers for this tutorial:

- I. Cave and Karst Biota Modeling in the Appalachian LCC - **Predicted Amphipods** in all 20km grid cells in karst
- II. EnviroAtlas - **Percent Agricultural Land Cover** for the Southeastern United States
- III. EnviroAtlas - **Manure application to agricultural lands** from confined animal feeding operations by 12-digit HUC for the Southeastern United States, 2006

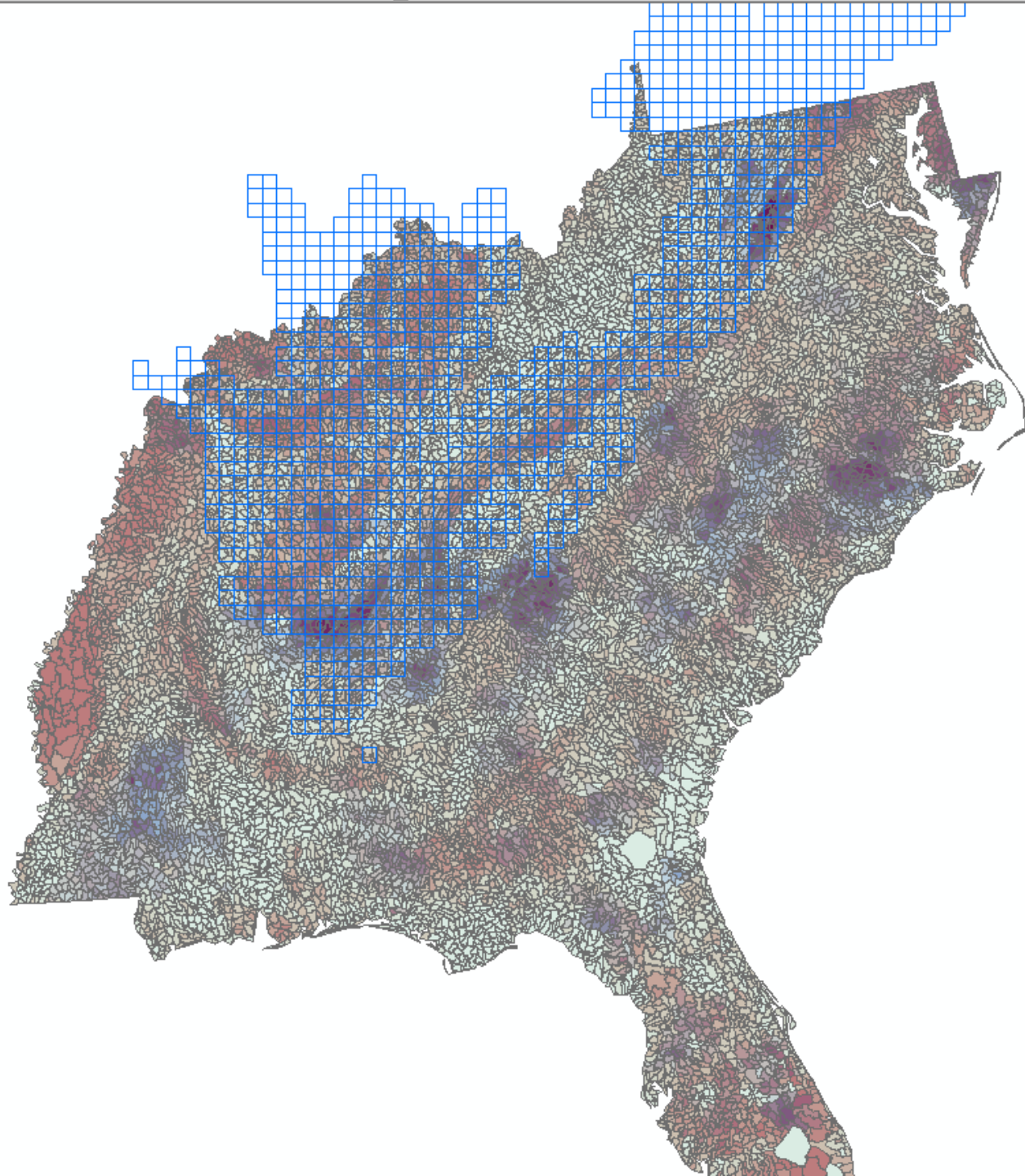
<https://applcc.databasin.org/datasets/>

**Layers** cavekarst\_amphipod\_predicted\_karst\_AppLCC\_20kmgrid percent\_ag\_southeast

PAGT

 0.000000 - 7.920600 7.920601 - 14.472300 14.472301 - 21.081600 21.081601 - 27.901100 27.901101 - 35.113998 35.113999 - 43.030701 43.030702 - 52.209599 52.209600 - 63.093800 63.093801 - 76.941200 76.941201 - 98.283600 manure\_southeast

MEAN

 0.000000 - 2.509110 2.509111 - 7.401390 7.401391 - 14.314100 14.314101 - 23.550301 23.550302 - 35.337101 35.337102 - 50.282398 50.282399 - 70.982803 70.982804 - 102.165001 102.165002 - 147.593994 147.593995 - 226.557999



# Refine Prioritization: Create subset of areas where amphipod presence intersect with PALC and Manure Application

The screenshot displays the ArcMap interface with the 'Select By Location' dialog box open. The dialog box is configured as follows:

- Select features from one or more target layers based on their location in relation to the features in the source layer.**
- Selection method:** select features from
- Target layer(s):**
  - cavekarst\_amphipod\_predicted\_karst\_AppLCC\_20kmgrid
  - percent\_ag\_southeast
  - manure\_southeast
- Only show selectable layers in this list
- Source layer:** cavekarst\_amphipod\_predicted\_karst\_AppLCC\_20kmgrid
- Use selected features (0 features selected)
- Spatial selection method for target layer feature(s):** intersect the source layer feature
- Apply a search distance: 200000.000000 Meters
- Buttons: [About select by location](#), OK, Apply, Close

The map in the background shows a coastal area with a grid overlay. A large, irregularly shaped area is highlighted in cyan, representing the intersection of the selected target layers. A blue arrow points from the 'Apply' button in the dialog box to the cyan selection on the map.

Legend:

- 50.282399 - 70.982803
- 70.982804 - 102.165001
- 102.165002 - 147.593994
- 147.593995 - 226.557999

# Refine Prioritization: Create subset of areas with high PALC and Manure Application

Select By Attributes

Layer: percent\_ag\_southeast

Only show selectable layers in this list

Method: Select from current selection

"FID"  
"FID\_usa\_re"  
"Id"  
"region"  
"FID\_WBD\_HU"

= <> Like  
> >= And  
< <= Or  
\_ % ( ) Not  
Is In Null Get Unique Values Go To:

SELECT \* FROM percent\_ag\_southeast WHERE:  
"PAGT" >=50

Clear Verify Help Load... Save...  
OK Apply Close

Select By Attributes

Layer: manure\_southeast

Only show selectable layers in this list

Method: Select from current selection

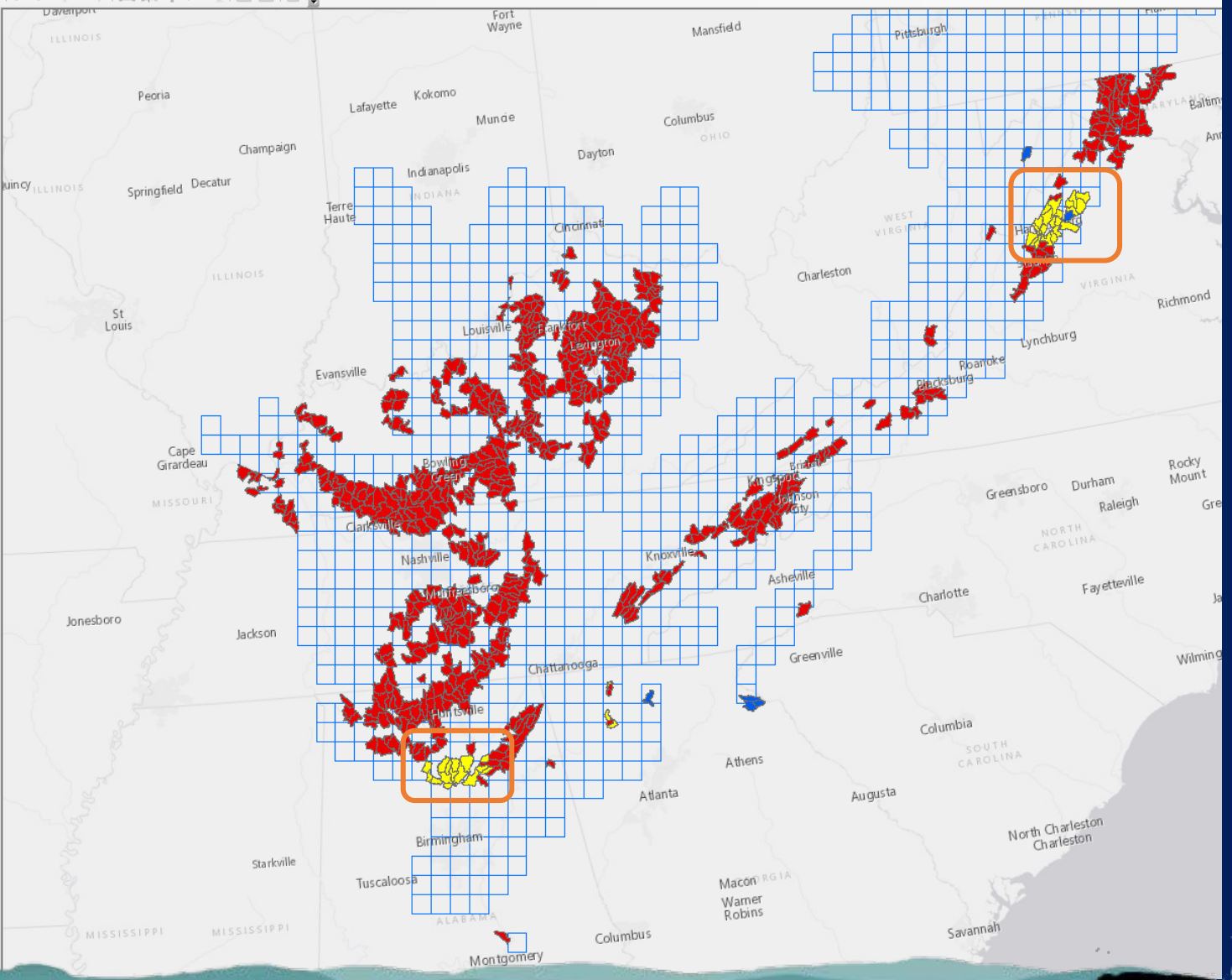
"FID\_WBD\_HU"  
"HUC\_12"  
"OBJECTID"  
"HUC\_12\_13"  
"MEAN"

= <> Like  
> >= And  
< <= Or  
\_ % ( ) Not  
Is In Null Get Unique Values Go To:

SELECT \* FROM manure\_southeast WHERE:  
"MEAN" >=75

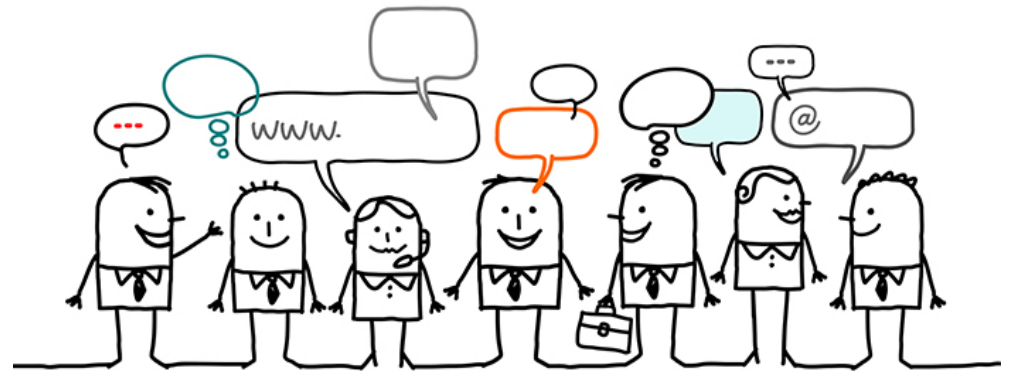
Clear Verify Help Load... Save...  
OK Apply Close

- Layers
  - final\_selection
  - Reference
  - manure\_app\_subset75
  - percent\_ag\_subset50
  - cavekarst\_amphipod\_predicted\_karst\_AppLCC\_20kmgrid
  - percent\_ag\_southeast
    - PAGT
    - 0.000000 - 7.920600
    - 7.920601 - 14.472300
    - 14.472301 - 21.081600
    - 21.081601 - 27.901100
    - 27.901101 - 35.113998
    - 35.113999 - 43.030701
    - 43.030702 - 52.209599
    - 52.209600 - 63.093800
    - 63.093801 - 76.941200
    - 76.941201 - 98.283600
  - manure\_southeast
    - MEAN
    - 0.000000 - 2.509110
    - 2.509111 - 7.401390
    - 7.401391 - 14.314100
    - 14.314101 - 23.550301
    - 23.550302 - 35.337101
    - 35.337102 - 50.282398
    - 50.282399 - 70.982803
    - 70.982804 - 102.165001
    - 102.165002 - 147.593994
    - 147.593995 - 226.557999
  - Basemap
    - World Light Gray Canvas Base



# Team Break- Out Session

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Ways YOU might apply AppLCC  
Cave and Karst resources

# Team Break-out session – Report Out

**FWS – help better monitor species in caves**

**Able to know what is in a certain area – help with outreach with landowners**

**Key Cave – species present**

**What layers are available to overlay with AppLCC resources– recharge, sinks, surface ownership**

**Threat Layers – non-point vs. point source, 303d, ag contaminants, sinkholes**

**Help with prioritization of local projects**

**Support in funding proposals/solicitation of funds**

**Use in conversations with decision-makers, messaging**

**Where should we put our limited resources? Who owns or manages land?**

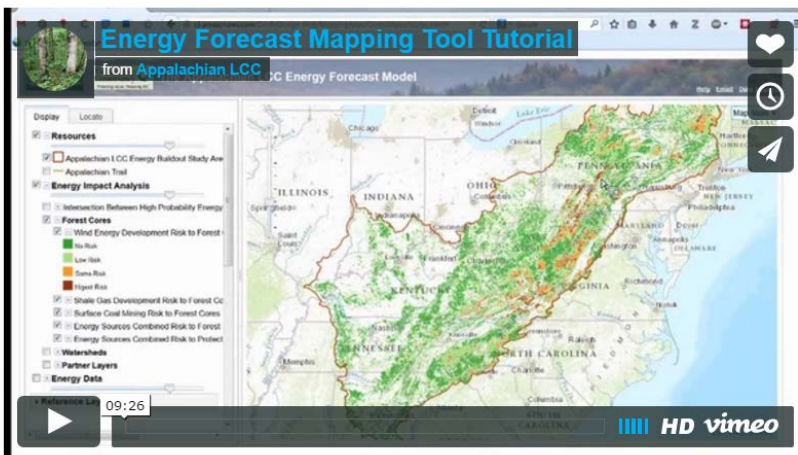
**Areas with high biodiversity could be mapped and utilized in conversations with partners (land protection conversations)**

**Justification for management activities – indicate areas where we should survey site because initial data is showing us a high level of diversity – aid in ground truthing**

# Training Opportunities

## Pre-recorded Webinar

View a video presentation that provides a detailed overview of how to use the Energy Forecast Mapping Tool



## Self-paced On-line Classes



The Science Applications Online Learning Management System's self-paced tutorials and classes highlight the intended uses of decision-support tools and other products by giving a step-by-step demonstration of how to apply tools to specific natural resource issues. Once completing the course, users can work with LCC staff directly to discuss how to incorporate these LCC products in their own work.

[ENTER THE ONLINE LEARNING MANAGEMENT SYSTEM](#) ▶

# Science Applications ONLINE LEARNING MANAGEMENT SYSTEM

*Building Capacity for Science Delivery*

COURSES ▾ MARXAN TRAINING COMPANION SITES ▾

- Decision Support ▸
  - Overview and Registration
  - Energy Forecast Modelling
  - Riparian Restoration to Promote Climate Change Resilience



ations.org/course/view.php?id=3

<http://www.scienceapplications.org>



## Energy Forecast Modeling

### Introduction

Module 1 - The Science behind Energy Forecast Model

Module 2 - How to Use Energy Forecast Model

Module 3 - Decision Support Tool Using Case Study Examples

Module 4 - Case Study Activity

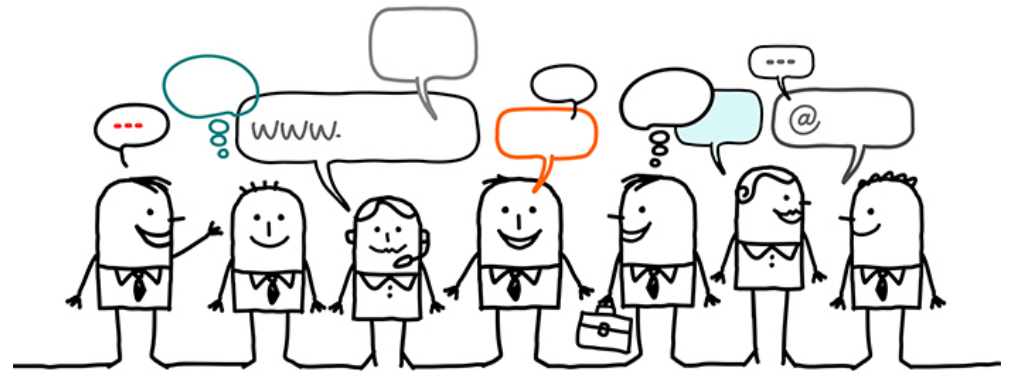
Module 5 - Assessment Quiz

Module 6 - Participant Feedback



# Team Break- Out Session

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## Team Break-out Session

**How AppLCC resources can enhance workshop participants' work and how participants may apply these resources in their own conservation planning efforts.**

Q. Do you think these resources can make the work in supporting the Refuge more effective and sustainable?

Q. Are there opportunities to utilize these resources to knock down barriers identified by the community?

Q. How might these resources serve as guidance or be applied in the work plans to support the Wheeler Refuge and broader Refuge System?

# Team Break-out Session – Report Out

How AppLCC resources can enhance workshop participants' work and how participants may apply these resources in their own conservation planning efforts.

AppLCC resources available will help planning and collaborative efforts

Information is public-facing and FREE – good source of info

LCD – can this identify land ownership (for GAP 1 & GAP 2 conserved lands)

Resources can help with communication/networking – you know who to go to

Knowledge of connectivity / geography

Work with planning departments (county, city) – inform them of these resources which promote information sharing. Where they can access data sets to then use as guidance for development.

Use resources to work with industry and decision-makers

Can be a good tool IF utilized

Creditable resources – helps to sell mission

Education of the public – outreach efforts – help to educate as to why LCD is here and why it is important

Cast a broader net due to LCC members

## Wrap-up

- Revisit introduction notes and first facilitated group discussion notes
  - Were your objectives for this event met?
  - Were there resources presented to help barriers?
  - Are there barriers that AppLCC can enhance support for?
- Feedback – online survey & Meeting Sphere event
- Use us! – we are here to help
- Thank YOU and Wheeler Refuge Staff!!!!