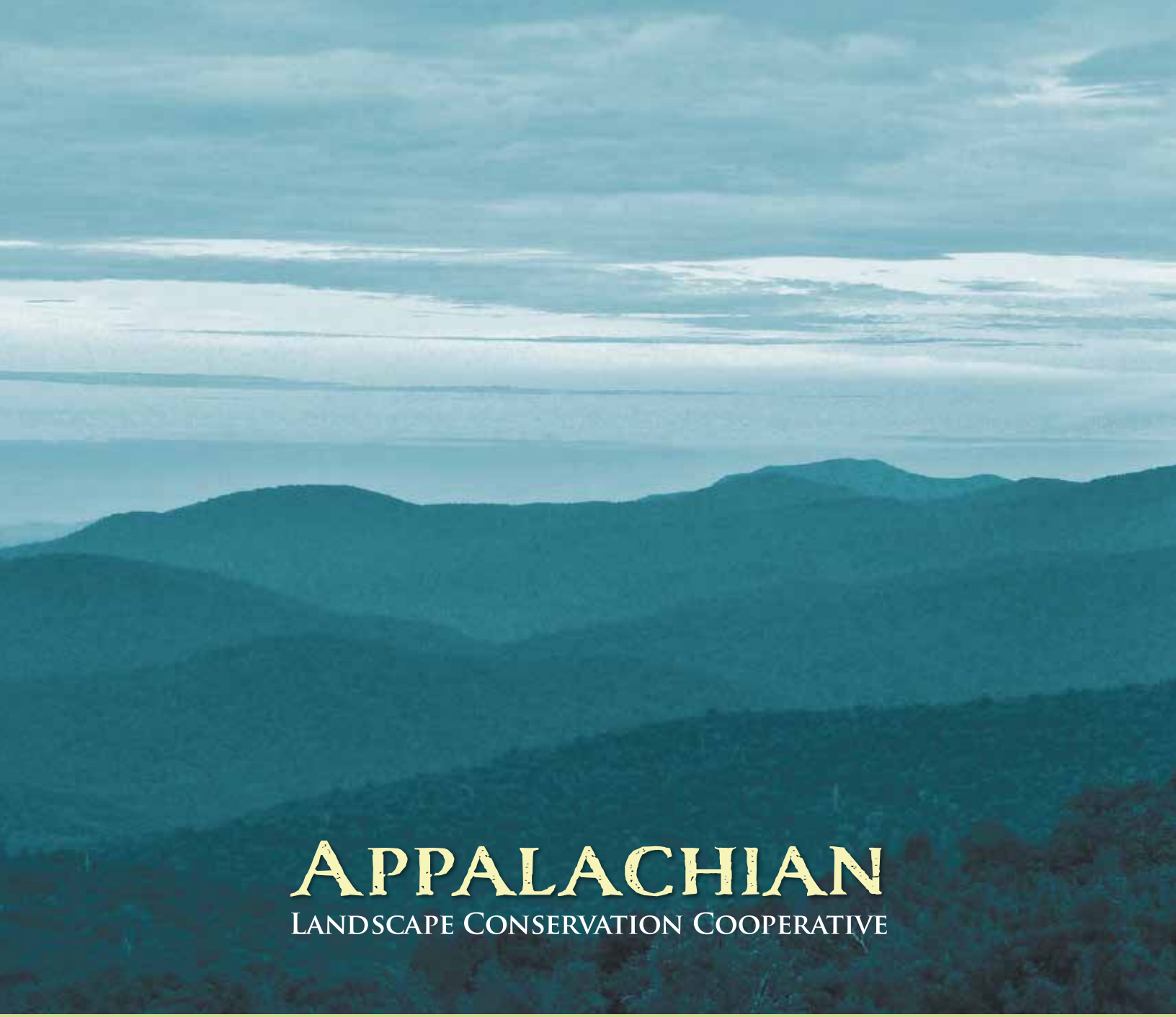


Appalachian
Landscape Conservation Cooperative

2014 ANNUAL **REPORT**

Black Rock Mountain State Park, Georgia.
Credit Matthew Cimitile

Science Delivered

Since we began, the Appalachian LCC has worked to define data and conservation science needs, invest in gathering foundational data and priority research, and build a coordinated network for those investments to pay off. Many of our funded research projects are now beginning to deliver important science information and tools to support landscape conservation for the valued natural and cultural resources in the Appalachians.

Each of our projects was initiated because it addresses a critical science information need identified by a diverse group of researchers and managers working in the Appalachian region. These major priorities and needs, documented in the *Science Needs Portfolio,* serve as the Cooperative's guide to ensure we support and fund the most vital research for conservation planning, delivery, and monitoring efforts across the region. To ensure information and products represent the most relevant science to managers, the Cooperative establishes Technical Oversight Teams for each funded project. These teams consisting of leading researchers from organizations such as the Environmental Protection Agency, The Nature Conservancy, Office of Surface Mining Reclamation and Enforcement, U.S. Fish and Wildlife Service, West Virginia Division of Natural Resources, and many more carefully review the progress of each research project. They discuss and analyze process details and interim products, and make suggestions for improvements to ensure the highest quality deliverable to the LCC.

Our Cooperative is striving to build upon the best available science and deliver key tools that will make a difference as they are applied by our partners and collaborators. A few examples of our research investments include:

- **Creating models and a web-based mapping tool**

that assesses the potential future energy development of shale gas, wind, and coal across the region. Research will assist policy makers, land management agencies, and industry in assessing how energy development may overlap with valued biological and ecological resources;

- **Developing a riparian restoration decision support tool** that allows managers and decision-makers to rapidly identify and prioritize areas for restoration along the banks of rivers, streams, and lakes, making these ecosystems more resilient to disturbance and future changes in climate.

This year the Cooperative also took great strides in laying the foundation for facilitating coordinated conservation planning in the Appalachians. A three-day workshop in September helped the Steering Committee outline a process for articulating the Appalachian LCC's priority resources – considering both natural and cultural resources. Identifying and agreeing on priority resources is crucial and will focus our time, energy, and resources on setting specific conservation objectives and targets that are possible and measureable. Specific objectives and targets will inform conservation strategies needed to achieve desired outcomes, which when implemented will deliver actions to sustain these priority resources.

These are exciting times for landscape conservation in the Appalachian region. Our progress is a direct result of the invaluable expertise and commitment from our Steering Committee members and partners working together to benefit human communities across the region and the resources they value.

David Whitehurst
Virginia Department of Game and Inland Fisheries
Appalachian LCC Steering Committee Chair

Learn more about the Appalachian LCC:

www.applcc.org

Our Partners

STATES/DISTRICTS

Georgia Department of Natural Resources

Kentucky Department of Fish and Wildlife Resources

Maryland Department of Natural Resources

New York Department of Environmental Conservation

North Carolina Wildlife Resources Commission

Pennsylvania Fish and Boat Commission

Pennsylvania Game Commission

Tennessee Wildlife Resources Agency

Virginia Department of Game and Inland Fisheries

West Virginia Division of Natural Resources

NATIVE AMERICAN TRIBES

Eastern Band of Cherokee Indians

FEDERAL AGENCIES

Environmental Protection Agency

National Oceanic and Atmospheric Administration

National Park Service

Office of Surface Mining Reclamation and Enforcement

Tennessee Valley Authority

U.S. Army Corps of Engineers

U.S. Fish and Wildlife Service

U.S. Forest Service

U.S. Geological Survey

NON-GOVERNMENTAL ORGANIZATIONS

National Audubon Society

The Nature Conservancy

Wildlife Management Institute

REGIONAL PARTNERSHIPS

Appalachian Mountains Joint Venture

Central Hardwoods Joint Venture

Eastern Brook Trout Joint Venture

Southeast Aquatic Resources Partnership

Our Region

- 15 States
- Includes a mountainous geography
- Renowned for globally-significant biological diversity and cultural heritage
- Rich in energy resources
- Home to more than 6,300 plant, 250 bird, 78 mammal, 76 amphibian, 58 reptile species and a host of endemic invertebrate, crayfish, and freshwater mussel species.

Our Staff

Cal DuBrock
Editor

Jean Brennan
LCC Coordinator

Matthew Cimitile
Communications Coordinator

Jessica Rhodes
GIS Analyst and Data - Manager

OUR VISION

Protecting the valued resources and biological diversity of the Appalachian region, sustaining the benefits provided by healthy and resilient ecosystems to human communities, and helping natural systems adapt to large landscape-level stressors that may be magnified by the changing climate.

OUR MISSION

The Mission of the Appalachian LCC is to achieve sustainable landscape-level conservation in Appalachia through partnerships, shared resources, enhanced science-based management, landscape-level planning, and support for conservation actions and research as part of a national network.

OUR STRATEGY

The Appalachian LCC is helping to deliver vital science information and conservation tools to the conservation community. We do so by working on major conservation priorities, coordinated efforts, and collaborative landscape planning identified and articulated by our Steering Committee members and partners. To make our vision a reality, the Cooperative is focusing on:

- Creating and delivering a landscape-level data sharing strategy and scalable toolset;
- Delivering landscape-level conservation design for regional use;
- Creating an ongoing facilitated process to promote engagement and dialogue across the Appalachian LCC region; and
- Assessing and aligning conservation goals and actions that reflect our Cooperative members' common and shared vision.

2014 ACTIVITIES

- **Delivering Tools and Information to Enhance Decision Making**
- **Laying a Firm Foundation for Conservation in the Appalachians**
- **Conservation Planning and Design**
- **Serving as Catalyst for Collaboration**

Delivering Tools and Information to Enhance Decision Making

One of the key roles of the LCC is to facilitate the conservation community's work by developing valuable tools and data that managers and scientists can use to conserve priority resources and address environmental stressors within the Appalachians.

Assessing Future Energy Development across the Appalachians

The Appalachians are a rapidly expanding hub of energy development with coal, natural gas, and wind resources close to the most densely populated region in the United States. The region is also a global hotspot for terrestrial and freshwater diversity. Our forests and rivers provide important benefits – from clean, reliable water supplies to outdoor recreation – that reach tens of millions of people every day. For those of us working in conservation, it is essential to make informed decisions that provide for energy needs, jobs, and economic growth while protecting valued natural and cultural heritage.

The Appalachian LCC and The Nature Conservancy released a new report and online mapping tool that provides needed research to inform discussions among conservation organizations, policy makers, regulators, industry, and the public on where to protect essential natural resources while realizing the benefits of increased domestic energy demands.

Assessing Future Energy Development across the Appalachian LCC uses models that combine data on energy development trends to give a more comprehensive picture of what potential energy development could look like in the Appalachians

over the next two decades and identify where development may intersect with valued natural resources. The final report outlines the major findings of the potential footprint from coal, wind, and natural gas development. A web-based mapping tool allows conservation partners and stakeholders to proactively see where development may likely occur and intersect with important natural resources to inform regional landscape planning discussions and decisions.

Key findings from this research include:

- Nearly 7.6 million acres of new energy-related development may expand across the Appalachian region by 2035;
- An estimated 5.3 million acres of energy-

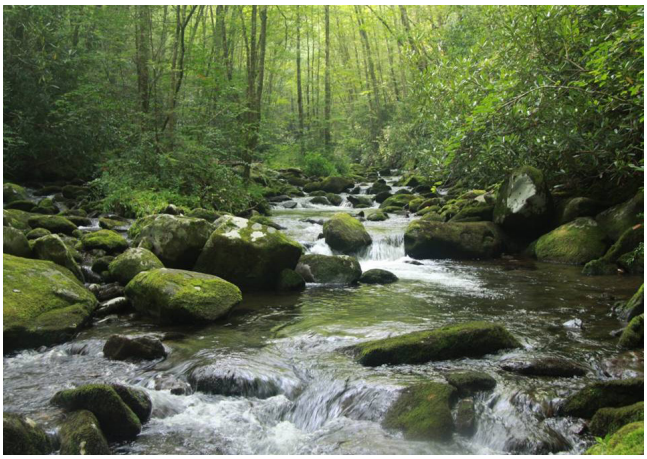
related development are most likely to occur in forested areas of Appalachia;

- More than 150 watersheds, which are reliant on forest cover to produce clean water supplies to major cities and communities, occur in these same areas; and
- Future energy development will most likely be concentrated in the Allegheny and Cumberland Plateaus.

The study builds on data and information available from a variety of agencies and organizations as well as input from industry. The modeling results and online map visualization tool identifies areas where potential energy development could take place. This is not a siting tool nor is it designed to site energy development and infrastructure in a defined geography. The findings from this study are intended to support conservation planning or discussions on how to avoid, minimize, and offset impacts to important natural and cultural areas from energy development. Discover more about the mapping tool, key findings, and the foundational research this project builds upon: http://applcc.org/assessing-future-energy-development

Protecting Aquatic Habitats through Strategic Riparian Restoration

Regional climate change models predict increased stream temperatures and alterations in precipitation that are likely to impact the abundance of coldwater species, such as Eastern Brook Trout, and pose major conservation challenges. Resource managers need tools that will help them create more resilient landscapes. An innovative riparian planting and



Lynn Camp Prong in Great Smoky Mountains National Park. *Credit National Park Service*

restoration decision support-tool has been developed to help safeguard valued aquatic resources under predicted climate changes. The *Riparian Restoration to Promote Climate Change Resilience* (RPCCR) tool works by identifying vulnerable streams and riverbanks in coldwater stream habitats that lack tree cover and shade. By focusing on the most strategic areas to plant trees in riparian zones, based on the amount of the suns energy to strike the area, resource managers can provide additional canopy cover to shade and limit the amount of solar radiation heating the water and reduce the impacts of increasing temperatures on high elevation, cold-water aquatic communities.

Developer of this Appalachian LCC-funded project presented the tool to the aquatic management and research community at the annual Eastern Brook Trout Joint Venture (EBTJV) meeting in early September. Drs. Keith Nislow and Jason Coombs of the U.S. Forest Service gave a hands-on demonstration of the use and functionality of the tool, which was enhanced through review and input by EBTJV staff and science team.

Both the research and tools from this project are linked directly with ongoing and future stream flow, temperature, and biological response monitoring and modeling efforts within the Northeast and Southeast Climate Science Centers and neighboring LCCs. Access the tool and watch a video demonstration: http://applcc.org/riparian-restoration

Data Needs Assessment Delivers a Suite of Conservation Planning Products

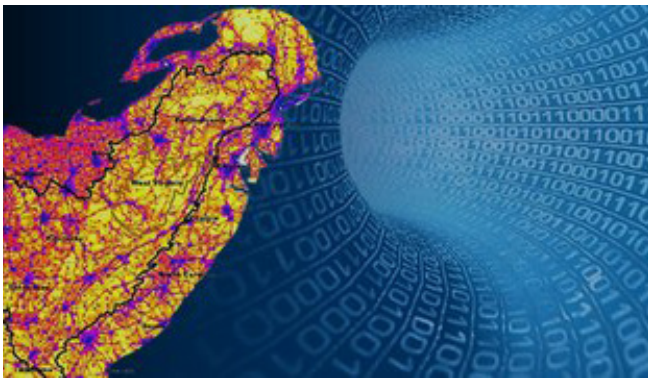
The Data Needs Assessment project was undertaken to evaluate existing data for the Appalachian LCC region, package relevant datasets, review commonly used conservation planning tools, provide interpretive text and graphics for datasets and tools, and identify data gaps that could improve conservation planning in the Appalachians. A suite of core conservation planning products and data from principal investigators at Clemson University are now available to the Cooperative and include:

- An analysis of State Wildlife Action Plans from the 15 states that intersect with the Appalachian LCC, describing how information contained in these plans can be linked to integrate state and local-scale efforts into a regional conservation framework;
- A list of 21 conservation planning tools, describing function and relevance of each towards the Cooperative's conservation planning goals;
- Interpretive text and graphics of conservation planning tools for users to learn about the tools available and what purposes they could serve;
- Interpretive text and graphics that describes the data that can be posted to the Appalachian LCC Web Portal;
- A final report that assembles all these elements and provides recommendations on how LCC members and partners can use information to collect finer-scaled data from states, expand on work accomplished at individual state levels to "scale up" to the LCC level, and deliver data in a format that is useful for individual states and regional planning.

Products and data from this assessment are being incorporated within the Appalachian LCC's funded *Interactive Conservation Planning and Modeling Project.* Initiated in 2014, this research is developing a draft regional conservation plan for the Cooperative using an interactive and iterative planning approach led by the same investigators at Clemson University (more information on that project is found in the section Conservation Design and Planning.) View all the deliverables from this research: http://applcc.org/research/data-needs-assessment

Providing Vital Data for Modeling, Visualization, and Decision Making

The Appalachian LCC GIS and Conservation Planning Web Portal is serving up spatial data for partners working in our geography. Newly developed and customized decision-support tools using the open-source *GeoNode Conservation Design* platform are allowing managers and conservation practitioners to make dynamic and scenario-based decisions using spatial data. You can find on the GIS and Conservation Planning Tool:



- ***GeoNode Conservation Design*** - The Appalachian LCC and the Eastern Brook Trout Joint Venture science-based mapping and analysis platform is designed to support the conservation community's diverse needs to view, create, and analyze spatial data and maps. This geospatial component of the Portal provides access to a suite of scientific data relevant to a variety of conservation planning tasks and goals including the execution of custom designed decision support tools;
- **Project maps** - A collection containing maps produced by Appalachian LCC staff using foundational data as well as maps resulting from our funded projects;
- **Data access** - A dynamic index of data available on the Appalachian LCC Web Portal;
- **Public data repositories** - Provides direct downloads of spatial data for typical use inside a desktop GIS environment; and
- **Species and habitat association list** - Compilation of species and habitat within the Appalachian LCC boundary range using state and federal lists.

Visit the GIS and Conservation Planning Tool:
http://applcc.org/conservation-design/gis-planning

Laying a Firm Foundation for Conservation in the Appalachians

Reviewing existing studies, inventorying previously developed datasets, and assembling expert panels to prescribe best approaches is providing the Appalachian LCC community with information needed to deliver the most effective tools and landscape science to combat environmental stressors. By collaborating with experts at all levels, the LCC is working to build the best body of knowledge for conservation planning, design, and delivery in the Appalachian region.

Assessing Climate Vulnerability of Appalachian Species and Habitats

West Virginia Northern Flying Squirrel. *Credit: US Fish and Wildlife Service*

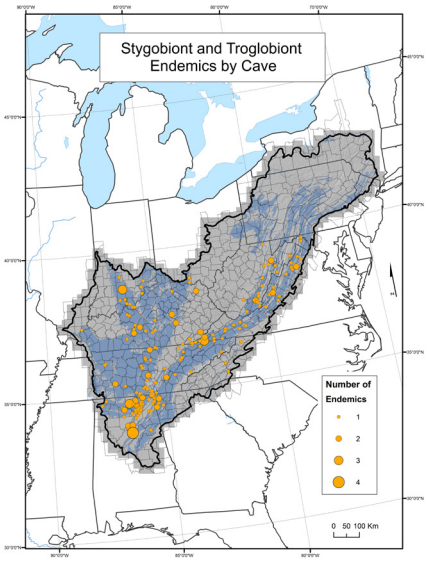
Climate change adaptation and mitigation strategies are dependent on the best available projections of how climate will change and impact a region's natural and cultural resources. Understanding the vulnerability of various species and habitats within the Appalachian LCC to climate change is of critical importance. As a first step, the Cooperative funded NatureServe to conduct a Climate Change Vulnerability Assessment that recommends how the Cooperative should acquire information about the climate vulnerability of Appalachian species and habitats in order to develop vulnerability assessments for a suite of key species and habitats.

An expert panel was assembled by NatureServe to determine the selection of species and habitats to assess, approaches to vulnerability assessment, and the availability of downscaled climate data. The panel recommended in a report that the LCC:

- Determine the appropriate target of a vulnerability assessment. For example, in some cases focusing on a habitat can inform and potentially reduce the need for assessments of individual species. In regard to species, the panel noted that the highest priorities should be species that are globally rare or Federally listed, and Appalachian endemics or near endemics. Highest priority habitats are those that are unique, dominant, and/or important for high conservation value species;
- Use coarse-filter or rapidly-applied index methods to assess the vulnerability of priority habitats and species. For example, those that are globally rare, Federally listed, endemic or limited to the Appalachian LCC region. The NatureServe Climate Change Vulnerability Index works for most aquatic and terrestrial plant and animals species occurring in the Appalachian region. For habitats, an expert-interview method yielding descriptive narratives would be appropriate; and

- Finally, for species and habitats identified as most vulnerable to climate change during the coarse-filter analysis, perform more in-depth assessments. For species, use bioclimatic modeling to estimate how ranges may shift due to climate change. For habitats, use index methods such as the Habitat Climate Change Vulnerability Analysis to yield credible ecological information and timely analyses.

Identifying the most appropriate steps to acquire climate vulnerability information and using this information to inform adaptation and mitigation strategies is a major research priority for the Appalachian LCC. Researchers will now act upon these recommendations to develop vulnerability assessments. A database has been created on our Web Portal to house these assessments and make them easily accessible to partners. ***Read the report and learn more about the project at:*** http://applcc.org/research/climate-change- vulnerability



Map of endemic species that live in cave and karst environments in the Appalachian LCC. *Credit David Culver, American University*

Inventorying Appalachian Cave and Karst Resources to Inform Landscape Planning

Cave and karst systems occur throughout the Appalachian region. These unique ecosystems provide habitat for a diverse array of species and are an important source of domestic water supply for Appalachian communities. Cave and karst systems can be vulnerable to ground water pollution due to the relatively rapid rate of water flow and the lack of a natural filtration system.

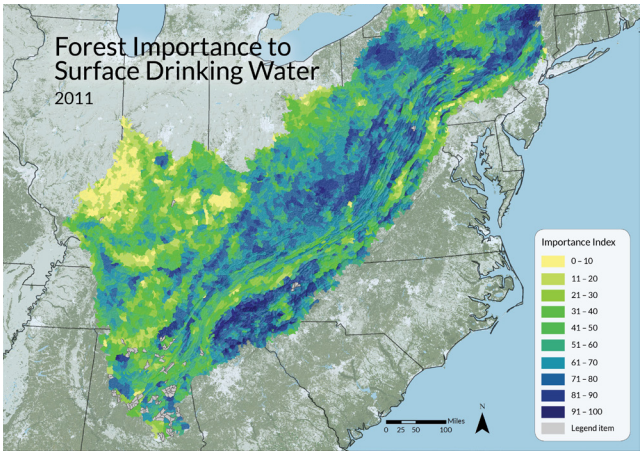
Researchers for the Appalachian LCC funded project "Classification and Georeferencing Cave/Karst Resources across the Appalachian LCC" have been gathering and analyzing region-wide data on caves and karst since 2013. The work produced a series of narratives, geospatial information layers, and a variety of maps. The maps and files will provide a comprehensive overview of data availability for examining relationships between environmental factors, biological diversity, and distribution within karst areas of the Appalachian LCC. Project deliverables focus on region-wide results, but smaller areas (e.g., states, counties, or ecoregions) could also be analyzed. Research products are also focusing on the obligate cave-dwelling fauna, but some preliminary results for cave-inhabiting bats will be presented.

This vital spatial information on the physical and biological resources of cave/karst systems – compiled by researchers at American University, U.S. Geological Survey, University of the South, University of Illinois, and University of Florida – are being incorporated into landscape conservation planning for the region. ***Learn more:*** http://applcc.org/research/cave-classification-and-mapping.

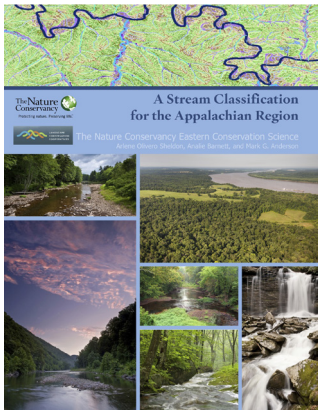
Evaluating Ecosystem Services and Vulnerabilities to Environmental Risks

Given the rapid environmental change experienced and expected across the Appalachians, it is crucial to understand the vulnerabilities of valued ecosystem goods and services to large-scale change. The Cooperative has partnered with the US Forest Service Eastern Forest Environmental Threat Assessment Center to assess ecosystem services and vulnerabilities to environmental risks throughout the Appalachians. Synthesizing current knowledge of the diverse benefits that people derive from functioning Appalachian ecosystems will help managers, scientists, industries, and the public link environmental and economic values of the region's natural assets together to encourage protection of and investments in these resources.

Forest Service researchers are collaborating with the National Environmental Modeling and Analysis Center to inventory and synthesize assessments, which will be delivered as an integrated component of the Appalachian LCC Web Planning Portal (applcc.org). Researchers have organized a large number of assessment documents, related peer-reviewed publications, and geospatial data sets, and are developing web portal content on the basis of this ongoing inventory. Development of a framework for new assessment work and identification of key services and stressors is also well underway. Future assessment work will identify vulnerabilities associated with key stressors in a spatially explicit way across the LCC, and provide managers with new understandings of the potential effectiveness of alternative management strategies, given expected environmental change. ***Learn more:*** [http://applcc.org/research/ecosystem-services-environmental-threats.](http://applcc.org/research/ecosystem-services-environmental-threats)



Map of forest importance to surface drinking water. *Credit Lars Pomara, U.S. Forest Service.*



Developing a Unified System and Region-wide Map of Streams and Rivers

Conservation design and planning for aquatic biodiversity requires specific river classification information to develop and implement instream flow standards and water management recommendations. Unfortunately, standardized information was lacking for the Appalachian landscape. This project developed a state-based, consistent stream classification system for aquatic ecosystems in the Appalachian LCC region.

Investigators at The Nature Conservancy developed a classification system and GIS map for stream and river systems that represents the region's natural flowing-water aquatic habitats. The classification will unify existing geomorphic and hydrologic classifications that occur within the AppLCC and across the SE Region. The classification consistently represents the natural flowing-water aquatic habitat types across this region in a manner that is appropriate and useful for building ecological flow ecology relationships and other conservation planning tools.

An advisory steering committee of 41 aquatic ecologists and conservation planners representing states and the region provided critical guidance during development of this project to ensure the final product is useful to state and federal agencies and that reflects a local understanding of stream and river ecosystems and their management. Members provided specific datasets and gave advice and feedback. These discussions highlighted the classification variables that the majority of states currently use, or would like to use, for a regional classification.

Learn more:
http://applcc.org/research/stream-classification

Assessing Environmental Flows from Water Withdrawals in the Marcellus Shale Region

The emergence of hydraulic fracturing has led to the rapid expansion of natural gas drilling in the Marcellus Shale deposit in portions of Pennsylvania and West Virginia, and SW New York. Millions of gallons of water are needed per fracturing event and places a substantial strain on regional surface and ground water supplies that can lead to changes in stream flow and alter available habitat for freshwater biodiversity. There is a great need for the development of region-wide flow policies to protect stream ecosystems and enhance long-term management of aquatic resources as this new energy source is developed. This research developed models that predict ecological responses based on the observed impacts due to flow alteration within the Marcellus Shale region of the Appalachian LCC.

In the first phase of this project, researchers from Cornell University reviewed existing tools and gathered available data on hydrologic models that would be suitable for the region. The reviewed models predict discharge thresholds and frequency of both high and low flow events and discern the

vulnerabilities these extremes will create for conservation targets. The team of researchers then developed a georeferenced stream gage database, coordinated with users and developers on stream flow modeling tools, and developed a geo-referenced stream biological database for the Marcellus Shale region. All this information was assembled into the "Phase 1 Project Report."

The second phase of the project applied appropriate models to build a hydrologic foundation and estimate flow alteration. The hydrologic foundation relates existing biological data to flow alteration metrics to develop flow-ecology relationships. Researchers conducted a pumping and risk analysis designed to discern the nature and degree of potential impacts from gas-related water withdrawal, and predict which streams within the Marcellus Shale region may be at highest risk to flow alteration. Altogether the hydrologic foundation, flow-ecology relationships, and pumping- and risk analyses will provide guidance for establishing credible and ecologically meaningful flow standards to ensure human and ecosystem water demands are balanced in the Marcellus Shale region.

Learn more:
http://applcc.org/research/aquatic-ecological-flows

Conservation Planning and Design

All the information, tools, and resources highlighted in the previous sections are being integrated into our conservation planning and design process. The Cooperative actively worked during the year to bring together conservation experts and the best available scientific information to initiate the process of defining and prioritizing objectives and targets that are possible and measureable. Such objectives and targets will inform conservation strategies needed to achieve desired outcomes, which when implemented will deliver actions to sustain priority resources in Appalachia.

Steering Committee members and partners at the 2014 Appalachian LCC Steering Committee Meeting and Workshop. *Credit David Eisenhauer.*

Steering Committee Advances the Cooperative's Conservation Planning Process

Appalachian LCC Steering Committee Members and natural and cultural resource experts met for three days at the National Conservation Training Center in September to advance the Cooperative's landscape planning initiative. During the workshop, Steering Committee members and invited experts began developing a process for articulating the Appalachian LCC's priority resources – considering both natural and cultural resources.

A team of National Park Service (NPS) staff organized a full day of presentations and facilitated discussions on how cultural resources can be incorporated into landscape planning and design along with natural resources. The presentations developed by the NPS team provided an excellent orientation to the vast array of cultural resources available (National Heritage Areas, state historic preservation and national registry information, and related cultural geospatial datasets). NPS participants and Steering Committee members suggested the LCC review data needs for cultural resources, understand local values to help guide a strategy, and identify the common ground

between biological and cultural resource conservation. Ongoing collaboration with NPS has positioned the Appalachian LCC to serve as a case study of how NPS can work more closely with LCCs to integrate landscape-level planning.

At the September meeting, success stories were presented by partners who had made progress in integrating natural and cultural resource conservation in the Appalachians. Dr. Jim Fox, Director of the University of North Carolina-Asheville National Environmental Modeling and Analysis Center, gave a demonstration of the "Vitality Index" tool developed by the Center. The Vitality Index reports on the 27 counties of western North Carolina through the perspectives of the region's natural, social, built, and economic environments. Angie Chandler, Executive Director of the Blue Ridge National Heritage Area, then presented an illustrative demonstration of how partners used the Vitality Index tool to allow planners, decision-makers, and the public access to information necessary to inspire discussion and craft decisions on issues impacting natural and cultural areas.

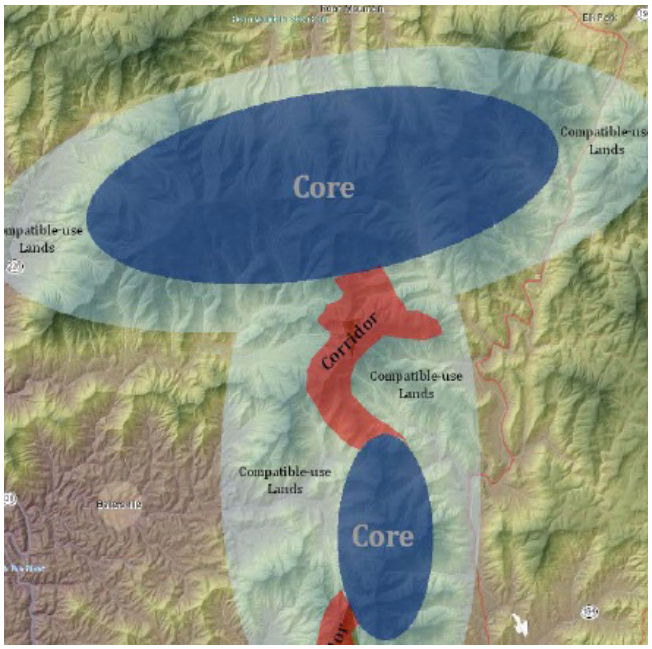
Also presented were preliminary natural resource modeling outputs developed by Clemson University and Appalachian LCC staff. Researchers at Clemson used the open-source landscape design model MARXAN to describe resource choices, solicit feedback regarding meeting future data needs, and discuss a process to identify measureable priority resources for the Appalachians. After running through several model exercises that spurred in-depth conversations, the Steering Committee agreed to a process for articulating priority resources in the Appalachian LCC.

Steering Committee members agreed to submit nominees to a technical team (comprised of around 15 experts) to work with the Clemson research group on drafting a list of priority resources. The LCC Chair agreed to correspond with States and other appropriate data sources (e.g. NatureServe) to obtain datasets of interest to the LCC, especially species occurrence and key cultural resource datasets. The technical team was advised to use the Appalachian LCC guiding principles to set parameters on potential priorities for decision-making. Additionally, the technical team was tasked to assess the quality and appropriateness of the datasets to support species-specific modeling, narrow down the list of priority resources, and select species to model for priority habitats.

Interactive Conservation Modeling and Planning for the Appalachian LCC

A Clemson University research group is actively engaged in an effort to develop a draft regional conservation plan for the Cooperative. Using available data, researchers are developing conservation planning models that include site selection, ecological threat assessments, and broad ranging habitat and ecological connectivity analyses.

The research team is working closely with designated technical teams on an on-going basis from each major region in the Appalachian LCC that are offering unique insights and input to help guide the process. Conservation scenarios will be completed and presented to the Steering Committee in July 2015. The Committee has an opportunity to further engage with the research team to help refine the plan and prepare it for a broader release to other stakeholders. Following Steering Committee input and revision, conservation planning map products will be produced and posted on the Web Portal for public dissemination.



Serving as Catalyst for Collaboration

The Appalachian LCC has taken great strides in serving as the catalyst for a collaborative network by bringing together expertise to identify major research needs and priorities, strengthening outreach capacity, and enhancing the visibility of conservation actors through the Web Portal.

LCC Coordinator Invited Speaker at Tennessee Fish and Wildlife Commission Meeting

On October 30, Dr. Jean Brennan was the invited speaker at the Tennessee Fish and Wildlife Commission meeting in Greenville, TN. The Tennessee Fish and Wildlife Commission is the elected, governing body of the Tennessee Wildlife Resources Agency, which preserves, conserves, manages, protects, and enhances the fish and wildlife of the state and their habitats for the use, benefit, and enjoyment of the citizens and visitors of Tennessee. Dr. Brennan provided information to the Commission on the evolution of the LCC network, the science and conservation planning process underway within the Appalachians, and reviewed currently funded projects that are developing critical management tools.

"Having the Appalachian LCC speak at our Commission meeting shows how significant landscape conservation is to the state of Tennessee," said Mark Thurman, Appalachian LCC Steering Committee member and Regional Fisheries Program Manager for the Tennessee Wildlife Resources Agency. "We very much value the tools, information, and collaboration that are being developed through these regional partnerships for our resource planning and management."

(Left to right) Tennessee Wildlife Resources Agency Executive Director Ed Carter, Dr. Jean Brennan, and Tennessee Fish and Wildlife Commission Chairman Jeffrey Griggs.

Dr. Brennan's presentation discussed the creation of LCCs to meet the challenges that population pressures and climate change are having on biological diversity, the benefits nature provides, and recreational opportunities. LCCs determine how, where, and when to respond to and anticipate major changes on the landscape. She also discussed the science and conservation planning process the Appalachian LCC is facilitating. The Cooperative is coordinating with the Appalachian conservation community and stakeholders to collaborate on the LCC's projects and activities addressing factors affecting fish and wildlife and cultural resources. The final part of the presentation focused on the critical research the Cooperative is funding to deliver decision-support tools and products for resource management.

Facilitating Networking, Workflow, and Exchange of Ideas

The Appalachian LCC Web Planning Portal brings together communication, content management, learning systems, and geospatial tools for the conservation community to use in coordinating work products, disseminating information, and developing tools for on-the-ground conservation delivery. This integrated Knowledge Management System allows members to communicate with colleagues, upload and store data, and work through private workspaces to share preliminary data and products. It also provides up to date news and information about the Appalachian LCC's work, ongoing projects, funding opportunities, and publications. Major products delivered through the Portal include:

- **Expertise database search**, providing the conservation community the ability to identify colleagues with needed expertise, to identify common interests or research, and to facilitate the exchange of knowledge and sharing "lessons learned."
- **"Showcase" pages** for partnerships and affiliates that bring in live content from external sites and introduce the many conservation actors and organizations working independently across the region. These pages offer enhanced visibility to highlight major projects and accomplishments to our conservation community while detailing the relationship between the Appalachian LCC and individual partners.

- **Collaborative workspaces** are offering a platform to enhance workflow and facilitate efficient sharing of ideas, datasets, products, publications, and more with others who have similar conservation interests and objectives.
- **Thematic or "Nested Sites"** can be created as the need is identified – to facilitate joint planning and access to share collaborative workspace, tools, and data. Because they reside within the shared portal, the nested site is fully integrated with the Appalachian LCC planning portal and has access to its resources as well as those of other partners. The Whitewater to Bluewater site offers an opportunity for three regional fish habitat partnerships (Eastern Brook Trout, Southeast Aquatic Resources Partnership, and the Atlantic Coast) to plan and coordinate on-the-ground conservation work, streamline communication, and maximize their collaboration on assessment and restoration.

LCC Coordinator Gives Keynote Address at Earth Day Celebration

Appalachian LCC Coordinator Dr. Jean Brennan was a featured speaker for the Distinguished Lecture Series at Northwest Missouri State University during its 2014 annual Earth Week Celebration. Internationally recognized for her work with the Intergovernmental Panel on Climate Change and her work on natural resource adaptation, Jean was one of the featured speakers for the James H. Lemon Memorial Lecture. Jean's talk discussed the link between climate change and issues that have immediate, demonstrable impact on humans, wildlife, and ecosystems as well as how working to address this problem requires building partnerships with public and private institutions. She introduced the audience of students, faculty, and members of the community to the US Fish and Wildlife Service's efforts in promoting Landscape Conservation Cooperatives as a new and emerging conservation approach to address climate change impacts and land-use changes.

"Dr. Brennan brought a heightened awareness of environmental responsibility and a passion to promote the United States' premier natural resources conservation agency (U.S. Fish and Wildlife Service), which is pertinent and infectious," said John Jasinski, President of Northwest Missouri State University.

Dr. Jean Brennan (right), with Professor Johanne Fairchild who started the Northwest Missouri State University Arboretum, was among the honored guest at the Earth Day celebrations and participated in the President's Women in Science Luncheon.

Along with the keynote address, Dr. Brennan participated as a panelist at the President's Women in Science luncheon that provided an opportunity to discuss issues relating to encouraging more women into STEM (Science, Technology, Engineering, and Math) disciplines.

"Having this large group of partners really gives states like mine, which are a piece of the puzzle, a chance to see where we fit in and a chance to work with partners to achieve conservation at the kinds of scales that we can't do on our own."

GWEN BREWER, MARYLAND DEPARTMENT OF NATURAL RESOURCES

"As we look across the landscape in the Appalachians, we are rich in biodiversity but also in natural resources such as water and energy. As we think about how to balance conservation and energy development in this landscape, planning within an LCC that collaborates with federal and state agencies, NGOs, and industry across boundaries will be incredibly valuable in leading to effective solutions."

THOMAS MINNEY, THE NATURE CONSERVANCY

"The LCC is helping us keep our eye on the ball so we are all consistently moving in the same direction and by strengthening relationships in science and management, it is making us collectively stronger."

CLYDE THOMPSON, U.S. FOREST SERVICE

"The Cooperative is providing us with the science that will help us make better decisions when we set goals for species and habitats and inform many other natural resources decisions at the state level."

MARK THURMAN, TENNESSEE WILDLIFE RESOURCES AGENCY

The Appalachian LCC is a self-directed regional partnership.
The Department of the Interior through the
U.S. Fish and Wildlife Service is providing project support
and staff to facilitate this partnership.

Visit our website at www.applcc.org