Appalachian
Landscape Conservation Cooperative

PHOTO: BECKY KELLER, AMJV

2013 ANNUAL **REPORT**

CUMBERLAND MOUNTAINS; PHOTO BY BRENT MOORE

REALIZING THE VISION

As an integral part of the National Landscape Conservation Cooperative (LCC) Network, dedicated to integrating science information and tools with on-the-ground conservation action to address climate change and other landscape-scale issues, ***the Appalachian LCC is transforming the landscape conservation vision into action.***

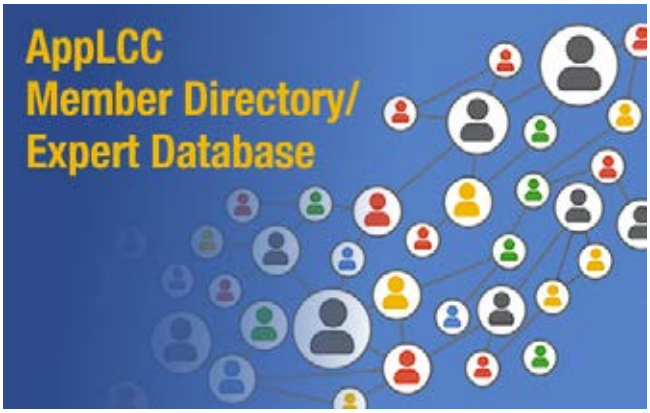
The Appalachian LCC may be a relatively new conservation actor on the national scene, but it can already point to major achievements. In the first years following its formation, the Cooperative began its work to address the critical science needs and gaps of information within the region by bringing together a diverse set of expertise and affiliations to develop a "Science Needs Portfolio", which facilitates and supports conservation planning, delivery, and applied research. In year two, the Cooperative focused on defining the organizational, decision-making, and business model of the LCC. This work lead to the drafting of a collaborative, integrated, science-driven 5-Year Work Plan that directs the energies and work of the Appalachian LCC partnership toward achievement of the major landscape-level goals and objectives. (See "Staying Relevant and Evaluating Progress" and accompanying "Report Card" Appendix for updates on both the Science Needs Portfolio and 5-Year Work Plan.)

Building upon these successes, the Appalachian LCC has taken great strides this year in ***serving as the catalyst for a collaborative network, assembling foundational data and information; providing decision support tools and products; supporting outreach, capacity, and enhancing the visibility of conservation actors; and staying relevant and evaluating progress.*** This report highlights these key achievements taking place across the broader Appalachian region and National LCC Network.

SERVING AS THE CATALYST FOR A COLLABORATIVE NETWORK

The Cooperative works to be recognized as a trusted source of conservation information in presenting the larger regional vision and accomplishments to which every partner's activities contribute. By serving as the catalyst to bring together managers and scientists from throughout the region, the Cooperative is building a collaborative network to coordinate planning and promote the superb conservation work taking place. The work highlighted below detail the activities of the entire Cooperative in producing a strong foundation to achieve sustainability of our land, water, wildlife, and cultural resources.

Building a Collaborative Network: Unique Member Directory Brings Together Diverse Range of Individuals and Expertise

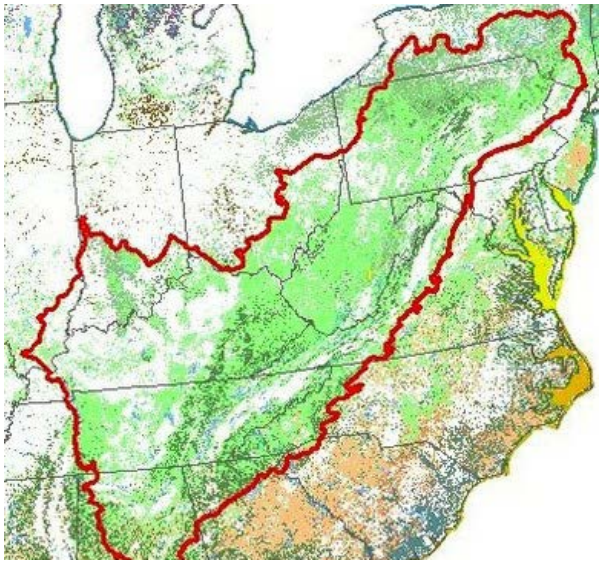


In 2013 the Appalachian LCC launched a unique expertise database tool where scientists and managers can easily seek out and communicate with others in their field of interest and identify experts to collaborate on projects. The database allows for members to identify organization, position, and areas and regions of expertise on their profile to create a dynamic conservation directory. Then others can search the database on any of these topics to generate a list of members who match those criteria and network with those of similar research, project, habitat, and funding interests. The Cooperative will utilize the database to identify individuals to serve as technical experts for project development, review, and other advisory needs. Managers and researchers within the region are encouraged to join the web portal and develop a member profile to become part of this searchable database and contribute to landscape-level conservation.

Leveraging Resources to Share Web Platform Tools, Datasets, and Products among Regional Partnerships

Hosting and Disseminating EBTJV Data to Develop Products and Support Tools

The Appalachian LCC has worked with the Eastern Brook Trout Joint Venture (EBTJV) to host and distribute vital data sets to the conservation community. Currently the Cooperative is facilitating the dissemination of data and research products to resource managers as well as coordinating with end-users to discern their information needs to guide future research activities and funding. Staff worked to reference locations of large datasets of the Joint Venture for use inside typical GIS and mapping platforms. This data will be used to create derivative products that can be downloaded via the Appalachian LCC and EBTJV cloud storage. Further, both the LCC and Joint Venture are simultaneously developing decision support tools, partially using this curated data, for dissemination on their joint GeoNode web mapper/server.



Map products like the one above are the result of various geospatial datasets assembling on the EBTJV Website; map by Paul Leonard.

Continued coordination between the Joint Venture, principal investigators, and web developers, as well as early coordination with end-users, will keep all involved poised to take full advantage of these decision support tools and data sharing opportunities. Together, the work of the LCC and the EBTJV are delivering up to date science for managers to consider when making conservation decisions.

SARP Enhances Collaboration Among Regional Partnerships

The Southeast Aquatic Resources Partnership (SARP) built its new website as a "Companion Website" that is linked and programmed within the Appalachian LCC Web Portal, allowing for the integration of resources and sharing of valuable datasets and products among a multitude of partners. Through the site, SARP has gained a vast array of web tools as well as outreach and management support including time sensitive funding announcements, online application submissions, public and private workgroup spaces to share preliminary products, and storage and dissemination of developed products. The website will also strengthen coordination and communication among members. SARP joins the Eastern Brook Trout Joint Venture as regional partnerships that are utilizing the vast resources and sophisticated networking platform within the Appalachian LCC Web Portal. SARP is a regional collaboration designed to strengthen the management and conservation of aquatic resources in the southeastern U.S.

Web Portal Facilitates Workflow and Exchange of Ideas

Collaborative workspaces set up by the Appalachian LCC 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. Communities ranging from working groups within the Steering Committee, project groups overseeing the development of Appalachian LCC funded research, and system-specific habitat groups with experts working towards a common conservation goal are collaborating within these spaces. Most recently, the Central Appalachian Spruce Restoration Initiative (CASRI) and the Southern Appalachian Spruce Restoration Initiative (SASRI) have been utilizing workspaces to help coordinate and link information between the two initiatives as they restore this vital ecosystem across the landscape.

Appalachian LCC Helps Fish Habitat Alliance Facilitate Conservation Planning and Delivery

By partnering with the Appalachian LCC, a collaborative Fish Habitat alliance is providing a needed planning and networking platform to its members and beyond. The Whitewater to Bluewater Project is utilizing the common and shared Web Portal platform of the Appalachian LCC (applcc.org) and its Companion sites (easternbrooktrout.org and southeastaquatics.net) to streamline communications and disseminate outreach products that highlight the synergies and distinguishing characteristics across individual Fish Habitat Partnerships. The Whitewater to Bluewater Project, an alliance between the Eastern Brook Trout Joint Venture (EBTJV), the Atlantic Coastal Fish Habitat Partnership (ACFHP), and the Southeast Aquatic Resources Partnership (SARP), promotes a cohesive implementation of the National Fish Habitat Action Plan. It does so through a more coordinated approach towards implementing their individual strategic plans, habitat assessments, and outreach activities. This approach is now enhanced through a new website generously supported by the Appalachian LCC, where one can access up-to-date and informative outreach materials on restoration of fish and other aquatic species as well as a Communications Strategy consisting of a variety of potential communications and outreach actions that the Alliance may select from, develop into specific projects, seek funding for, and accomplish individually or jointly in the future.

Netting fish in an Appalachian river; photo by Gary Peeples

WHO'S DOING WHAT, WHERE?

A Searchable Research and Projects Database Highlights Conservation Activities

A new user-friendly, searchable research and projects database on the Web Portal allows partners to submit project information to share with the Appalachian LCC community and search for research and conservation activities taking place within the Appalachians.

The database provides a repository not only for the research funded by the Cooperative but also for any on-the-ground conservation activities and projects in the region. Researchers and managers can submit their projects by first becoming a member of the Appalachian LCC Web Portal (applcc.org). Once logged in, members can submit to either the Research tab, which houses fundamental research that is developing vital conservation information and decision-support tools, or the Projects tab, which houses on-the-ground conservation activities. Submit by clicking on the "Research Inbox" tab beneath Research or the "Upload Projects" tab beneath Projects and follow the directions posted on the page, which describe how to add a project and what appropriate metafields to fill. Once submitted, the project will reside in the pending folder for review by relevant technical experts and the Appalachian LCC staff. Upon approval, the project will be made public and reside with other public research and projects on the Web Portal.

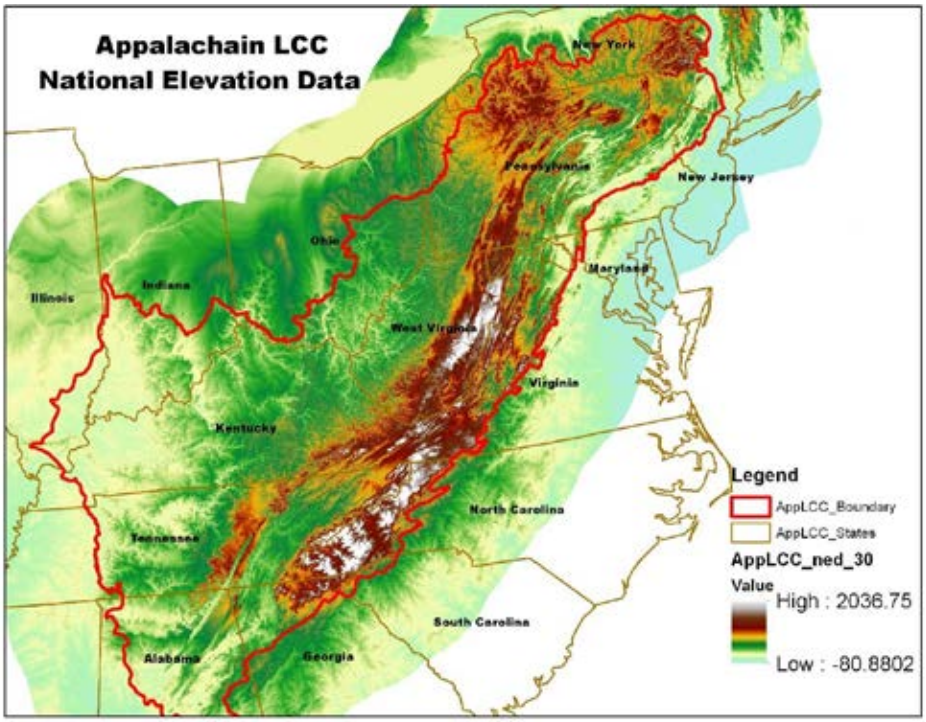
Users can perform focused searches that identify products, stressors, systems, and taxonomic groups associated with specific projects. In addition, more refined searches for Appalachian LCC funded research allow users to see how such research aligns with the Cooperative's 5-Year Work Plan, Science Needs Portfolio, and the USFWS Strategic Habitat Conservation Framework (The Strategic Habitat Conservation approach involves biological planning, conservation design, program delivery, outcome-based monitoring and assumption-driven research in a framework that allows change and repetition.)

Assessing future impacts of energy extraction, mapping and classifying cave systems, restoring streams for trout, and managing forests to create greater habitat for threatened bird species are a few of the research and conservation activities found within the database and taking place to create a sustainable landscape for wildlife and people. Research and projects from the Eastern Brook Trout Joint Venture, the Southeast Aquatic Resources Partnership, the Northeast and Southeast Climate Science Centers, and the Appalachian Mountains Joint Venture currently reside in the database and more projects from partners are to come online in 2014.

ASSEMBLING FOUNDATIONAL DATA AND INFORMATION

The LCC Network was created in response for the need to plan and prioritize conservation delivery at a landscape-level and to help facilitate adaptation to climate change impacts. A central aspect of this goal is to create an interconnected set of reserves and a matrix of managed lands that are resilient to the many environmental changes that are occurring rapidly on the landscape. To this end, the Appalachian LCC has funded two categories of research: studies that provide foundational information and studies to assemble and deliver information as a decision-support tool accessible to managers.

The Cooperative is guided by a structured, systematic process that annually reviews its science information and tool needs. Based on that extensive consultation, recommendations from technical experts help guide the research funding decisions and products to be delivered back to the Cooperative's Steering Committee. This section provides an update on the research that is acquiring vital information and filling in gaps of knowledge across the region while modeling data so partners can use it for landscape conservation designs. Systematically gathering and assembling information necessary to conduct conservation planning at a regional scale is an important pillar in achieving landscape conservation.



Map created by Rob Baldwin

Data Needs Assessment to Support Conservation Planning for the Appalachian LCC

Conservation planning identifies and prioritizes lands that encompass important natural and cultural resources across the landscape and develops protection and management strategies for these lands. With this process, the Appalachian LCC integrates science with on-the-ground knowledge and expertise of regional stakeholders. Funded research led by Clemson University is reviewing the Steering Committee conservation planning goals, available planning tools, data needs, and integrative processes for the Appalachian LCC to provide packages of available data as well as recommendations pertaining to conservation planning.

Research Progress: To date, researchers have evaluated more than 30 datasets pertaining to ecological systems, human and non-human threats, and existing assets based on relevancy to Appalachian LCC conservation planning goals. They have defined what conservation goals can be met with available data and using available conservation planning software tools. The team also identified specific data gaps and conservation needs that can be addressed with available software if data gaps were filled. For each of these tasks, researchers detailed a list of conservation planning tools and their functions, how conservation planning in the Appalachian LCC can be improved, and descriptions of data and tools that can be posted to the Web Portal. Currently, researchers are working through the final task of this research by performing an analysis of existing conservation planning initiatives being conducted by state and local partners to document the extent and size of effort, species and ecosystem goals, and landscape-level context in order to identify opportunities to integrate these efforts into a regional conservation framework.

Support for Understanding Land Use and Climate Change in the Appalachian Landscape

Future climate change adaptation and mitigation strategies will rely on the best available projections of potential changes to regional climate and the effects on natural and cultural resources. Research conducted by NatureServe is laying the critical groundwork for climate change associated impacts on natural resources by compiling vulnerability assessments and other relevant information on species and habitats. The research team will recommend the most effective and appropriate methods for adoption by the Cooperative and its partners for conservation and adaptation planning. Assessments will also aid land managers to target scarce conservation resources to help vulnerable species and habitats to best adapt to a changing climate.

Research Progress: The research team assembled a panel of climate experts to review the current literature and discern the most appropriate methodologies for use in the Appalachian LCC region. In addition, the panel dug into downscale climate data to determine what is available and how to use it and developed criteria to help partners decide what species and habitats to include in the assessments. A report from these findings was provided to the Cooperative. In the final stage, researchers will generate vulnerability assessments of species for each habitat using criteria developed by the

Expert Panel, including keystone species, species of greatest conservation need, important wetland species, species restricted to unique habitats, and species that can function as indicators of climate change already occurring. The assessments will be delivered in a Vulnerability Assessment Database accessible to partners on the Appalachian LCC Web Portal.

Longtail Salamander; photo by Ryan Hagerty, USFWS

A Stream Classification System for the Appalachian LCC

Gathering of river classification information and implementation of flow standards is critical so environmental flows can become integral to all water management decisions. Investigators at The Nature Conservancy and Oak Ridge National Laboratory are identifying and consistently mapping ecologically similar types of rivers and streams using a set of geomorphic and hydrologic variables deemed appropriate by independent peer reviewers and relevant to the scale of landscape management. A literature review of existing stream classifications, a report describing methods used to evaluate and develop classification system, a GIS stream data set, and a GIS map for aquatic ecosystems within the Appalachian LCC will be delivered upon completion.

Research Progress: This research has brought together experts from around the region to discuss and review various classification approaches and finalize project boundary, biogeographic stratification, stream size variables, geology, and flow modeling. The team produced a report reviewing the major classification approaches in the United States with a focus on the Appalachian LCC region. In the coming quarter, researchers are preparing to host a webinar to review results and finalize decisions on hydrologic classification and flow modeling and apply this information to produce a GIS map for aquatic ecosystems within the Appalachian LCC.

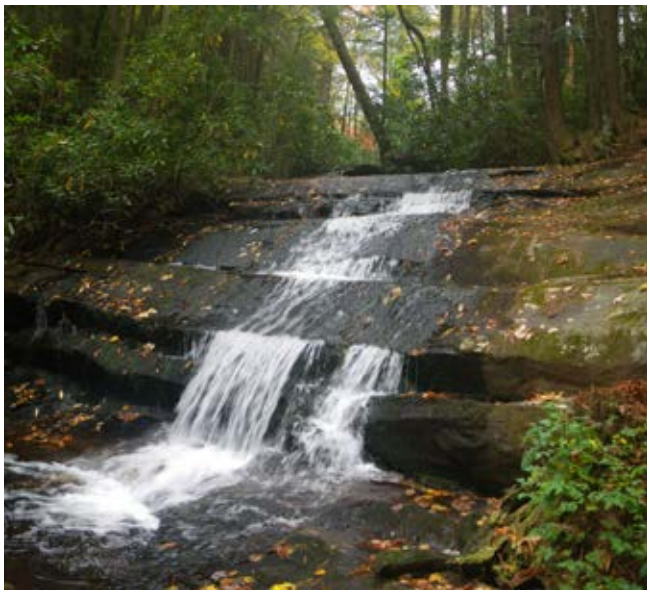
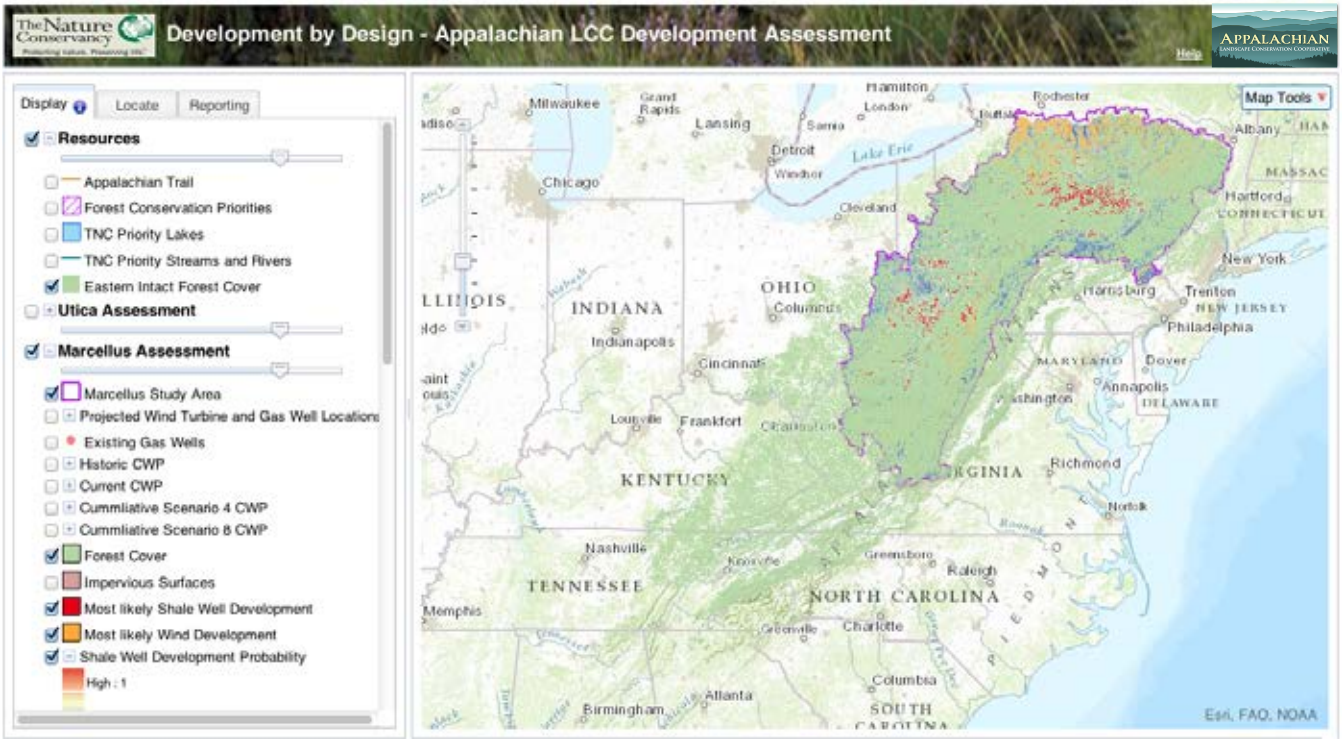


Photo by Matthew Cimitile

DELIVERING DECISION-SUPPORT TOOLS AND PRODUCTS

Upon assembling vital data and the best available scientific analysis of the data, LCCs must be able to deliver that information via tools and products to resource managers for use in supporting decisions made on the landscape. Conservation planning tools and products must not only provide resource managers and decision-makers with the most current and relevant science necessary in supporting decisions, actions, and investments, but also be accessible to the broadest possible conservation audience. They must be intuitive and easily accessible.

The open-source data, software, and derivative products - supported by a secure cloud-based data storage system - facilitate accessibility on the Appalachian LCC Web Portal. The Cooperative has created the web platform to house and disseminate the essential equipment agencies and organizations need to manage resources and deliver conservation. These landscape tools and products will provide essential context and demonstrate how managers' local decisions contribute to the LCC's landscape goal. In addition, the LCC has set up an oversight process that ensures a rigorous review and incorporation of expertise feedback into LCC funded products to deliver useful tools and information to the partnership.



Appalachian Energy Impact Analysis Decision-Support Tool; credit Judy Dunscomb

Appalachian Energy Impact Analysis

By creating models of wind, coal, and natural gas development potential for the entire Appalachian LCC range, this research is assessing likely impacts from future energy development on important natural resources. The analysis expands on and refines previous work on Marcellus Shale natural gas development to predict the potential energy "footprint" of these energies on intact forests, vital watersheds, and biodiversity. This research will provide science-based context for discussions among conservation organizations, policy makers, regulators, industry, and the public on how to protect essential natural resources while realizing the benefits of increased domestic energy production. Models results and a web-based map decision support tool will also inform regional and local landscape planning decisions that can effectively avoid, mitigate, or offset impacts from energy development to important natural areas and the valuable services they provide.

Research Progress: Models that depict the probability of coal, shale gas, and wind energy development across the Appalachian LCC are now completed. Coal scenarios were developed across the entire LCC range while shale gas and wind development scenarios were completed across a subset of the LCC study area for the Marcellus and Utica Shale Plays. Models and data from all development projections are available for download through the web-based map server that is delivered jointly onto the AppLCC.org Web Portal.

This research team is now generating resource layers to overlay with energy development maps to provide spatially-explicit models of the anticipated impacts of energy development to species, forests, and vital watersheds. A final report and decision support tool are being finalized and will undergo a rigorous review of functionality and accuracy and then made widely available to the conservation community in 2014.

Riparian Restoration Prioritization to Promote Climate Change Resilience in Eastern U.S. Streams

Regional climate change models predict increased stream temperatures, alterations in precipitation, and shifts in the distribution of plants and animals that can disrupt the ecological services of riparian systems, which act as a wildlife corridor by linking many aquatic and terrestrial ecosystems. The Riparian Restoration Prioritization to Promote Climate Change Resilience (RPCCR) tool is an innovative web-based tool that will allow managers to rapidly identify vulnerable stream and riverbanks that lack tree cover and shade in coldwater stream habitats. By locating the best spots to plant trees in riparian zones, resource managers can provide shade that limits the amount of solar radiation heating the water and reduces the impacts from climate change, benefiting high-elevation, cold-water aquatic communities. Both research and tools from this project are being linked directly with ongoing and future stream flow, temperature, and biological response monitoring and modeling efforts within the DOI Northeast and Southeast Climate Science Center and neighboring LCCs.

Research Progress: The research team is working with staff to build a visual component map decision support tool that will allow users to see GIS data layers pertinent to elevation and land cover of

the landscape, locations of dams and gas wells, and data pertaining to the presence of cold-water dependent species such as Eastern Brook Trout. The map tool will be easily accessible on the Appalachian LCC Web Portal and highly useful to managers.

Development of a Hydrologic Foundation and Flow-ecology Relationships for Monitoring Riverine Resources in the Marcellus Shale Region

The emergence of hydraulic fracturing and the rapid expansion of natural gas drilling in the Marcellus Shale deposit will likely put a substantial strain on regional surface and ground water supplies. It may also lead to changes in stream flow that can alter available habitat for freshwater biodiversity. A funded research project is developing models based on best practices to predict ecological responses to flow alteration within the Marcellus Shale region of the Appalachian LCC. These models will serve as the basis for discussions with diverse stakeholders to develop region-wide flow policies that will protect stream ecosystems and enhance long-term management of aquatic resources.

Research Progress: The first phase of this research has been completed, which reviewed existing tools and gathered available data within the project area on hydrologic and ecological flow models suitable for the region. Researchers are now applying the appropriate hydrologic modeling tools to build the foundation, estimate flow alteration, and develop flow-ecology relationships. Both the hydrologic foundation and flow-ecology relationships will serve as useful tools when predicting future biological changes associated with increased water withdrawals in the Marcellus Shale region.

Research Community Ensure Highest Quality Deliverables from Funded Projects

The Appalachian LCC funded research addresses the top landscape conservation science needs across the region. To ensure foundational data and information as well as decision support tools and products represent the most relevant science to managers, the Cooperative established Technical Oversight Teams. 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, discuss and analyze process details and interim products, and make suggestions for improvements to ensure the highest quality deliverable to the LCC.

Ultimately the information, tools, and resources highlighted in this section will support the conservation planning process, which is to bring together conservation experts and the best available scientific information to define and prioritize objectives, identify and assess existing projects, and develop products and tools to enhance regional conservation efforts. The Appalachian LCC is well poised to initiate this work in 2014, thanks in large part to funded research pursued in previous years' and rigorous oversight from technical experts.

SUPPORTING OUTREACH, CAPACITY, AND ENHANCING VISIBILITY OF CONSERVATION ACTORS

A vital function of LCCs is supporting conservation partners in enhancing their capacity to achieve greater work and to promote and detail how their accomplishments fit into the larger regional goals of landscape conservation. The Appalachian LCC helps fulfill this function by leveraging resources – staff, technology, and funding - to develop cost-effective science and conservation while also communicating the achievements, innovative work, and significant findings of partners to the entire Appalachian conservation community for better understanding of what is taking place on the ground and greater integration of resources and dialogue. By providing communication support and capacity to partners, the Cooperative is enhancing the visibility of many of the players in the region doing the great work of conservation.

OUTREACH:
Work Groups Develop Critical Messaging and Strategy for the Cooperative

Communication coordinators and specialists from research, natural resources, and conservation organizations have come together throughout the year to develop vital messaging about the identity of the LCC and produce strategies for rollout of major funded research. Early on in the year, communication staff from 13 organizations began working on a cooperative set of messages about the important activities and valuable roles of the Appalachian LCC for members to use with their key constituents and for use by staff in future products. Examples of messages about the Cooperative include: (1) delivers trusted, science-based information that develops the tools, methods, and data resource managers need to design and deliver landscape-scale conservation; (2) leverages funding, staff, and resources from all partners to develop cost-effective science and conservation that benefits human communities and ecosystems; and (3) coordinates conservation of large connected areas that will enhance and sustain the ecological, economic, and historical value of the Appalachian region.

In addition, the LCC has collaborated with several partners to develop a joint communication strategy for rollout of the Appalachian Energy Impact Analysis, an Appalachian LCC funded research project. The Analysis combines multiple layers of data on energy development trends and important natural resource and ecosystem services to give a full picture of what future energy development could look like in the Appalachians. A communication team composed of staff from the Cooperative, The

Nature Conservancy, and U.S. Fish and Wildlife Service meet on a continuous basis to formulate strategy detailing what target audiences to engage, when to engage them, and necessary outreach products. Outreach products such as talking points, a frequently asked questions document, a news release, and more are jointly developed by the team and used by Appalachian LCC leadership to support consistent communications on this topic.

IN-REACH: **Voices from the Appalachian Community**

Gwen Brewer, Maryland Department of Natural Resources

Video interviews with scientists and resource managers detail the conservation challenges facing the Appalachian region and describe how the Cooperative can address these landscape issues by bringing together a community to find sustainable solutions. Staff conducted interviews with representatives from the Central Hardwoods Joint Venture, Maryland Department of Natural Resources, National Park Service, The Nature Conservancy, Smithsonian Institution, Southeastern Aquatics Regional Partnership, U.S. Fish and Wildlife Service, U.S. Geological Survey, and the Wilderness Society. When asked how the Appalachian LCC can achieve landscape-level conservation for the region, partners stated the Cooperative serves as the catalyst for essential collaboration to ensure conservation efficiencies, bring managers and scientists together to work towards common goals, connect scientific efforts across the region, and increase capacity among partners to address the environmental threats that are beyond the ability of any one agency.

CAPACITY: **GIS and Conservation Planning Portal Launches**

One mission of the Appalachian LCC is to facilitate conservation planning in a new and exciting way. Although there are many conservation agencies doing work on multiple scales throughout Appalachia, these efforts are often limited in scope. To accomplish the vision of landscape-scale conservation planning, the Cooperative has developed a section within our Web Portal to share conservation

literature, tools, and other resources to help guide land managers with on-the-ground conservation action throughout the region. On this site, visitors will find a framework that supports a systematic conservation planning effort. This framework ranges from setting conservation targets to ultimately measuring conservation success. The presented tab structure is meant to progress in an intuitive manner, which fosters an environment of informed and strategic planning. In addition, tools such as a web-enabled map viewer and decision support models can be dynamically executed.

The major navigation of this section revolves first around systematic conservation planning that follows a structured and rigorous process to achieve a more representative network of ecosystems, biota, and contribute to the sustainability of natural resources. Second, delivering GIS Tools and Training on how to use these resources is provided to help aid in systematic conservation planning. Third, access to Communication and Support tools are supplied to overcome many of the inherent obstacles present in conservation planning across jurisdictions, time zones, and political boundaries. Discover more about conservation planning on our GIS and Conservation Planning Tab.

Data Sharing Agreement to Streamline Process of Acquiring Vital Information

For LCCs to function seamlessly, they need the ability to acquire and distribute data and information to benefit landscape-level modeling and conservation planning efforts. At the beginning of 2013, the Appalachian LCC brought together GIS and Data Management specialists to draft data sharing language for funded research projects that outlines the expectations for those contributing data as well as the process for requesting data and prospects for end-users. This agreement aligns with the goal of openly distributing information derived from LCC-supported projects to the conservation community and focuses on how the LCC will share data, treat sensitive data, use open source software, and other issues.

NE CSC Northeast Climate Science Center

Increasing Visibility of Partners to Entire Appalachian Conservation Community

"Showcase Pages" are enhancing organizations visibility while informing the conservation community about the tremendous amount of research and on-the-ground activity taking place across the landscape. The Appalachian LCC Web Portal enables Federal, State, NGO, Tribal, and University-based Partners as well as organizations that share a similar mission with the Cooperative to broadcast their major conservation activities and accomplishments, reaching new audiences while notifying researchers and managers. By working with staff, organizations can develop "Showcase Pages" that highlight their achievements, projects, recent news, or particular areas of interest while also describing the relationship between their organization and the Appalachian LCC. Such pages are either automatically updated by integrating RSS Feeds,

ensuring new updates on a partner's websites will replicate on their Showcase Page, or are manually produced and populated with new content on a periodic basis.

Currently, "Showcase Pages" featured on the Web Portal illustrate the diversity of conservation actors and activities contributing to the large, landscape-level vision of the LCC. Pages include:

FEDERAL AGENCIES:

NOAA: Highlighting regional climate impacts and outlooks as well as other climate change related information that is informing citizens of the changing environment around them.

DOI Northeast and Southeast Climate Science Centers: Webinars, projects, news, and events are featured about scientific information, tools, and techniques managers and other parties interested in land, water, wildlife and cultural resources can use to anticipate, monitor, and adapt to climate change.

REGIONAL PARTNERSHIPS

Appalachian Mountains Joint Venture: Focusing on the projects, news, and major accomplishments that are addressing the long-term sustainability of native bird populations that breed in the Appalachian Mountains.

Appalachian Regional Reforestation Initiative: Detailing the Forestry Reclamation Approach, Reclamation Advisories, and Brochures on restoring forests on coal mined lands.

Central Appalachian Spruce Restoration Initiative: Highlighting the upcoming events and successes surrounding the restoration of historic red spruce-northern hardwood ecosystems across the high elevation landscapes of Central Appalachia.

Central Hardwoods Joint Venture: Describing the processes of implementing knowledge and tools and linking habitat conditions to population response for this Joint Venture, which concentrates bird conservation efforts over an area comprising 75 million acres of rolling hills covered with hardwood forests interspersed with glades and woodlands.

Ohio River Basin Fish Habitat Partnership: Features the Overview and Strategy of this Partnership with the mission of protecting, restoring, and enhancing priority habitat for fish and mussels in the watersheds of the Ohio River Basin.

UNIVERSITY-BASED ORGANIZATIONS:

Baldwin Lab at Clemson University: Details current projects that are examining pressing ecological concerns throughout the Appalachians and an in-depth video overview of the conservation planning process.

Conservation Management Institute: Highlighting the projects and news coming out of this research center, which provides innovative solutions to multi-disciplinary research questions that affect natural resource management.

Cooperative Research Units: Describes the active and completed projects of all 9 Units working within the Appalachian LCC region to enhance graduate education in fisheries and wildlife sciences and facilitate research between natural resource agencies and universities on topics of mutual concern.

EVALUATING PROGRESS AND STAYING RELEVANT

As the Cooperative continues to engage stakeholders and fund research to contribute to landscape modeling and conservation planning, it is critical that the actions taken are assessed on a regular basis to ensure the major objectives and goals of the conservation community are met. In 2012 the LCC developed a 5-Year Work Plan to guide the Cooperative forward as an organization and decision-making body as it began to address large-scale environmental and climate impacts. The Plan reflected the Cooperative's conservation priorities, identified key conservation targets to measure achievement, and presented opportunities for collaborative and coordinated conservation efforts and planning.

Throughout the year, staff turned towards the Work Plan to ensure actions and time spent were directed at specific tasks and objectives met higher-level goals outlined in the Plan. As the year moved along, the Plan was updated to detail tasks completed, on-the-ground developments, and new information. The Cooperative will continue to update the progress taking place to provide partners a picture of tasks met and objectives achieved that meet landscape conservation goals moving forward. (See Report Card in Appendix).

Furthermore, the Cooperative is staying relevant and up-to-date with changing conditions by annually reviewing and revising the Science Needs Portfolio, the cornerstone of the Appalachian LCC Science Program that serves as a guiding framework to help facilitate and support conservation planning, delivery, applied research, and monitoring efforts. This year marked the first review and revision of the portfolio as almost 50 experts from a wide range of technical background in both natural and social sciences, as well as geographic expertise across the entire region, volunteered to participate. The Portfolio is organized by thematic areas - such as Aquatics and Human Dimensions - and structured to identify the highest-level of science and management objectives. The initial drafting of the Portfolio followed one-year of consultations with partners and culminated in the working draft that served as the starting materials for further refinement and revision through a 3-day Conservation Priorities Science Needs Workshop held in November of 2011.

NATIONAL-LEVEL WORK and RECOGNITION in 2013

Appalachian LCC Chair Receives Seth Gordon Award

David Whitehurst (right) receives the Seth Gordon award from Jeff Vonk, Past AFWA President and current Secretary of the South Dakota Department of Game, Fish and Parks; *credit Virginia Department of Game and Inland Fisheries.*

David Whitehurst, Steering Committee Chair of the Appalachian Landscape Conservation Cooperative (LCC) and Director of the Bureau of Wildlife Resources for the Virginia Department of Game and Inland Fisheries, was awarded the Seth Gordon Award at the Association of Fish and Wildlife Agencies' (AFWA) 103rd Annual Meeting held September 10th in Portland, Oregon. The Seth Gordon Award is AFWA's highest honor. Established in 1970, it is given to recognize the lifetime achievements of natural resource administrators who have worked steadfastly and effectively towards the 'best use' of North American natural resources, and to honor an individual for his/her outstanding career in fish and wildlife conservation.

Along with his work in Virginia, Whitehurst has played a leading role in conserving natural resources and wildlife across the Appalachians. He is the current Chair of the Appalachian LCC and the Appalachian Mountains Joint Venture - a partnership working together to ensure the long-term sustainability of native bird populations that breed in the Appalachian Mountains. In these positions, Whitehurst has helped to guide both partnerships in tackling some of the major environmental issues impacting the region that has led to considerable benefits for both people and wildlife.

Science Coordinator Recognized for Leadership and Integral Role in Development of Cooperative

Photo credit: Matthew Cimitile

Bridgett Costanzo was recognized at the April 2013 Appalachian LCC Steering Committee Meeting for her leadership and coordination efforts during her 2-year tenure as Science Coordinator. Chair David Whitehurst and former National LCC Coordinator Doug Austen praised Bridgett, whose detail came to an end in June, for her role in helping to identify science needs, develop research projects, and deliver information and tools to the broader conservation community as well as conducting personal outreach at both the regional and national level. The Steering Committee acknowledged Bridgett's contributions, noting she has brought to the job superb skills as well as extensive experience in conservation delivery and program administration that has been pivotal in helping to inform the direction of the Appalachian LCC. On behalf of the entire Steering Committee, the two thanked Bridgett for her dedicated service that has helped to build a key component of the national LCC network during this critical and transformational period in defining the Nation's conservation direction.

PHOTO CREDIT: STEVE HILLEBRAND, USFWS

ADVANCING THE NATIONAL LCC NETWORK

LCCs are the only forum for the entire conservation community to define, design, and enable partners to deliver landscapes that can sustain natural and cultural resources at levels desired by society. During the past year the LCC national network has greatly expanded its reach, with the Appalachian LCC helping to advance several national endeavors. Appalachian LCC staff was a key member of the National Data Management Work Group that drafted a "Best Practice" guidance on data management in which many of the LCCs incorporated standards into their own data sharing and management agreement plans. Staff also participated in the National Website Planning Team that provided input on the design and content of the National LCC Website prior to launch in the summer of 2013. Staff continues to meet monthly with this team to discuss site improvements and an efficient process to assemble content from each of the LCCs for inclusion.

Finally, the Appalachian LCC participated in the effort to catalog all LCC funded projects. The National LCC Project Catalog assembles high-level standardized and up to date information about all projects supported by LCCs to meet the needs at the National LCC office for reporting on conservation actions across the network. This catalog will allow LCCs to update data reported to Headquarters as projects are added or updated.

LOOKING AHEAD

The dedicated work and commitment of the Appalachian conservation community has established an organization in the Appalachian LCC that is realizing the vision of the LCC national network. During the three years of its existence, the Cooperative has established a governing structure and guiding philosophy for achieving landscape conservation goals. Web and networking platforms are enhancing planning while publicizing the community's achievements. And the highest priority scientific needs are being funded to develop the foundational research and decision-support tools necessary for conservation planning and delivery.

Now as the Appalachian LCC embarks on its fourth year, the Cooperative is moving forward to fully engage key partners, industry, and the broader society in order to promote dialogue on the major landscape conservation issues and solutions. Through planning tools, interactive platforms, and targeted engagement, we plan to create meaningful dialogue among diverse stakeholders on innovative ways to deliver conservation to sustain the connected landscapes and environmental benefits of the unique Appalachian region. One example of these activities will be the development of a workshop to identify the Cultural Resources and Human Dimensions needs, tools, key decision-makers, and information needs. The goal of the workshop is to help organize and focus on ways of incorporating cultural resources and socio-economic aspects of Human Dimensions into conservation planning within the LCC Network. Another is engagement with industry to begin discussions on how to protect essential natural resources while realizing the benefits of increased domestic energy production, as well as fostering a broader discussion among the Cooperative members to articulate specific conservation targets and identify appropriate natural resource indicators, including surrogate species, that would be helpful in evaluating management performance and success.

In addition, the sponsoring agency, US Fish and Wildlife Service Northeast Regional Office, is hopeful that a 3-year term position can be funded to support the Science Coordinator position that had been vacant due to funding constraints for much of 2013. Having the necessary staffing levels will surely enhance the work of the Appalachian LCC on all fronts.

It is an exciting time for conservation in the Appalachians and across the nation. The Appalachian LCC is energized about the momentum surrounding landscape conservation and the future direction of the Cooperative as it works to protect and restore landscapes that ensure the sustainability of the nation's economy, land, water, wildlife, and cultural resources.

NEWLY INITITATED RESEARCH

Classification and Georeferencing of Cave/ Karst Resources across the Appalachian LCC

Developing a consistent classification system and mapping for cave and karst environments is a foundational need for these highly unique habitats. However, fine-scale classification and mapping for biodiversity and resource management remain elusive. The lack of basic information creates a significant barrier to conservation of these systems, their contributions to water quality, and stability of the rich and unique biodiversity they support. In order to develop and deliver landscape-level planning tools for the region, it is essential to establish a standard classification system and develop an Appalachian-wide map depicting where cave and karst habitats and resources occur across the landscape.

This funded research, led by investigators at American University and the U.S. Geological Survey, will assemble and identify key location and classification data while developing products that depict and map cave and karst habitats including biological resources across the Appalachian LCC. Based on a critical review of earlier and existing efforts, the research will collect and synthesize data to present cave and karst resource information. Researchers will then propose the most appropriate classification system for these habitats. Maps of the physical and biological resources will be made widely available in order to facilitate easy access and support coordinated conservation efforts throughout the region.

Photo by Brent Moore

Assessment and Inventory of Ecosystem Services and Environmental Threats across the Appalachians

The Appalachian landscape provides a rich bounty of natural systems and ecological services that benefit society. To get at the true value of these systems, it is essential to assess which ecosystem services are provided and who benefits from them to encourage protection of and investments in these natural resources. Newly funded research, conducted by the U.S. Forest Service Eastern Forest Environmental Threat Assessment Center, is inventorying and mapping ecosystem

Photo by Brent Moore

services with the goal of linking environmental and economic values of the region's natural assets to establish a common language for resource managers, scientists, industry, local government, and the public to substantively engage in landscape-level conservation planning.

Efforts will focus on an inventory of existing ecosystem services assessments, products, and decision-support tools in order to identify the most appropriate classification and methodology to be used. Researchers will then assemble a list of high priority economic goods and services and non-monetized values and benefits that are dependent on Appalachia's natural assets and identify the natural resources that support these goods and benefits. Finally, a geo-referenced assessment of the location of key ecosystem services linked to specific priority economic products or uses will be created. The map will depict relevant natural assets and identify locations of key services that serve critical social and environmental functions, as well as identify those that are highly vulnerable to losses associated with key ecosystem stressors.

ANTICIPATED COMPLETION OF EARLIER FUNDED RESEARCH

Data Needs Assessment to Support Conservation Planning for the Appalachian LCC:

An analysis of existing conservation planning initiatives being conducted by state and local partners is being performed to document the extent and size of effort, species and ecosystem goals, and landscape-level context in order to identify opportunities to integrate these efforts into a regional conservation framework.

Support for Understanding Land Use and Climate Change in the Appalachian Landscape:

Researchers are generating vulnerability assessments of species for each habitat using criteria developed by an Expert Panel, including keystone species, species of greatest conservation need, important wetland species, species restricted to unique habitats, and species that can function as indicators of climate change already occurring. Assessments will be stored in a Vulnerability Assessment Database accessible to partners on the Appalachian LCC Web Portal.

A Stream Classification System for the Appalachian LCC:

Researchers are finalizing decisions on hydrologic classification and flow modeling and applying that information to produce a GIS map for aquatic ecosystems within the Appalachian LCC.

Appalachian Energy Impact Analysis:

The research team is now generating resource layers to overlay with energy development maps, providing spatially-explicit models of the anticipated impacts of energy development to species, forests, and vital watersheds. A final report and decision support tool are being finalized and to be made widely available to the conservation community in 2014.

Canaan Valley Refuge; photo by Frank Ceravallo

Riparian Restoration Prioritization to Promote Climate Change Resilience in Eastern U.S. Streams: A visual component map decision support tool is being built that will allow users to see GIS data layers pertinent to elevation and land cover of the landscape, locations of dams and gas wells, and data pertaining to the presence of cold-water dependent species such as Eastern Brook Trout.

Development of a Hydrologic Foundation and Flow-ecology Relationships for Monitoring Riverine Resources in the Marcellus Shale Region: Researchers are now applying the appropriate hydrologic modeling tools to build the foundation, estimate flow alteration, and develop flow-ecology relationships.

2013 Annual Report Appendix I: "*Report Card*" to Advance the Goals and Objectives of the AppLCC as Identified in the 5-Year Work Plan (initiated in 2012)

Notes:

- Steering Committee ranked each Objective on a scale 1-5 (5 being the most important or most pressing objective) to be pursued. Those Objectives ranked highest (3.7+) are bolded in the table.
- Anticipated timeline and what staff/work group/contracting mechanism might be employed to achieve that Objective was provided at the initial drafting of the plan (prior to imposed budget cuts/sequestration and reduced staffing level.)
- If a task status appears blank it represents that efforts have not yet been directed toward addressing the task. Those identified as (*ongoing*) are to be updated annually.

	Goal 1: Create and deliver a landscape-level data sharing strategy and scalable toolsets	
	Objective 1.1 -- Conduct AppLCC data needs assessment **Ranking: {4.05 /Years 1.1}**	
Task **1.1.1**	Assess the applicability of the neighboring LCC contract and survey instruments, as a model for identifying AppLCC data needs. – Staff	**FY13: Completed**
Task **1.1.2**	Canvass and assess applicability of other LCCs efforts to identify data needs. – Staff	**FY13: Completed**
Task **1.1.3**	Assess the scope of work required to generate a data needs assessment project (internal vs. contract) and make recommendation to Steering Committee. – Work Group, contractor	**FY13:Completed**
Task **1.1.4**	Develop and define common language, standards and protocols (with consideration of National LCC Network efforts/integrate National LCC Data Mgmt. Group Recommendations while further defining AppLCC data collection protocols and management). – Staff (in collaboration with National LCC Data Management Work Group), Work Group	**FY13 update *(ongoing)*: [report out by Paul Leonard]** The National Data Management Work Group has drafted 'Best Practice' guidance. The Appalachian LCC agrees with many of the suggestions made by this group and have incorporated those standards into its own Data Sharing and Management Agreement. However, some of the guidance requires funding and staff support that the LCC is currently not equipped to undertake.
Task **1.1.5**	Identify and analyze available data sets, methodologies and approaches relative to AppLCC landscape conservation planning. (ongoing) – Staff, Work Group, contractor	**FY13 update *(ongoing)*: [report out by Paul Leonard]** This work has been contracted out to Clemson University (PI: Rob Baldwin) and is on schedule for delivery per the agreed contract (Winter 2014). Most of the datasets are already uploaded to the AppLCC cloud storage.
Task **1.1.6**	Create a "crosswalk'" report to validate identified science and data needs with member organizational priorities and AppLCC science needs portfolio. – Staff, Work Group, contractor	

Task **1.1.7**	Develop scope of work needed to address or complete a data needs assessment and initiate/fund needed work. – Staff, Work Group, contractor	**FY13: Completed**
Task **1.1.8**	Complete data needs assessment for Steering Committee review. – Staff, Work Group, contractor	**FY12 RFP - underway**
Task **1.1.9**	Formalize a strategy and timeline to address gaps based on data needs assessment. Actions to address needs will be added to relevant Goal/Objective. – Steering Committee	
	Objective 1.2 -- Identify and craft "a way forward" to overcome concerns about data sharing **Ranking {3.7 /Years 2.2}**	
Task **1.2.1**	Engage in National LCC data needs discussions/approaches to sharing data and report on how to integrate findings. – Staff, Work Group	**FY13 update *(ongoing)*: [report out by Paul Leonard]** The LCC Network Data Need Assessment group completed surveys for GIS and Data Management needs in May 2013. Findings suggest more GIS and data support infrastructure across most LCCs but this is a huge challenge for many younger LCCs.
Task **1.2.2**	Assist efforts to assemble each SC member organizations' existing data protocols, data sharing contracts/agreements, and data sensitivity issues (see 1.2.4). – Steering Committee (with Staff support) , contractor	**FY13 update:** Advancing the work – AppLCC Staff, working with the Steering Committee-led Data Issue Work Group have begun work in reviewing State, Climate Science Center and neighboring LCC materials to help draft policy and procedures to be reviewed by the full Steering Committee and subject to a vote for adoption in FY14.
Task **1.2.3**	Develop model agreements for data sharing. – Staff, Work Group, contractor	**FY13 update:** Advancing the work – AppLCC Staff drafted agreement for use in FY13 RFP Solicitation. The Data issues Work Group has reviewed and will be part of the data policy for full Steering Committee review and adoption in FY14.
Task **1.2.4**	Develop a concise and transparent data sharing policy (defining "Whys" and "Hows" of data sharing) and submit to full Steering Committee for approval and adoption. – Steering Committee (or Work Group)	**FY13 update:** Advancing the work – AppLCC Staff drafted procedural guidance for data request /data access process information file via web portal. The Data issues Work Group has reviewed and will be part of the data policy for full Steering Committee review and adoption in FY14. FWS-Region-5 and the NALCC have also been engaged in this policy and procedural discussion.
	Objective 1.3 -- Provide science information, tools, and data support to the existing habitat partnerships and joint ventures **Ranking {3.9 /Years 2.0}**	
Task	Identify, and annually review, the most immediate	**FY13 update *(ongoing)*: Completed**

1.3.1	science needs to receive support. (ongoing) – Staff facilitate Work Groups (= COPs) (SN Workshop Nov '11)	
Task **1.3.2**	Deliver findings and products (see 1.3.1) to the conservation and land use community. (ongoing) – Staff, contractor	**FY12 RFPs - underway**
Task **1.3.3**	Create effective and ongoing linkages and introduction of new learning, knowledge, and tools between LCCs and other large landscape efforts. (ongoing) – Staff / (Web portal)	**FY13 update *(ongoing)*: Advancing the work**
Task **1.3.4**	Facilitate creation of new Communities of Practice (COPs), and develop and sustain ongoing dialogue, learning, and engagement between and among all COPs to share information with the broader AppLCC community. (ongoing) – Staff facilitation Work Group (= COPs)	**FY13 update *(ongoing)*: Advancing the work**
Task **1.3.5**	Establish and support the ongoing work of experts (Integrated Landscape Planning Team) to assess landscape level science and planning needs. (ongoing) – Staff facilitate Work Group	**FY13 update *(ongoing)*: Advancing the work**
	Objective 1.4 -- Synthesize regional information to support State Wildlife Action Plans (SWAPs) and other partner action plans **Ranking {3.8 /Years 2.15}**	
Task **1.4.1**	Create inventory, summarize, and maintain key information from all relevant SWAPs, AppLCC Regional initiatives, resource management plans, and partnership efforts. (ongoing) – Staff, Work Group, contractor	**FY12 RFP - underway**
Task **1.4.2**	Report as a "cross-walk" analysis that identifies opportunities to better integrate Regional perspectives, the regional ranking/priorities within each State, and connect to AppLCC Region-wide ranking to help inform planning efforts. (Ranking is based on spatial and temporal land-use and climate change factors.) (ongoing) – Staff, Work Group, contractor	**FY12 RFP - underway**
	Objective 1.5 -- Actively maintain close working relationships with the DOI Climate Science Centers ensuring on-going communication and research support toward addressing the science needs identified by the AppLCC Members and community Ranking {3.0 /Years 2.16}	
Task **1.5.1**	Help identify and set the research-support priorities through active participation in Climate Science Center planning, review and selection efforts.-(ongoing)	**FY13 update *(ongoing)*:** Staffing limitations (Sci. Coord. position vacant) - staff participation handicapped

	– Staff	
Task **1.5.2**	Facilitate the exchange and distribution of research products to help inform the direction of landscape-level and regional initiatives (e.g., through electronic media, jointly-sponsored proposals, workshops, etc.) ensuring planning dialogue of the Cooperative Members, while supporting associated technical and scientific communities. (ongoing) – Staff, contractor	**FY13 update *(ongoing)*: Advancing the work** via Web Portal Design/Programming
Task **1.5.3**	Coordinating with the National LCC Network and the DOI National Climate Science Centers to facilitate the exchange and distribution of research products to find and develop the best tools for AppLCC needs. (ongoing) – Staff, contractor	**FY13 update *(ongoing)*:** Advancing the work via Web Portal Design/Programming However: Staffing limitations (Sci. Coord. position vacant) - staff participation handicapped
Task **1.5.4**	Participate in other national forums to establish national investments and product strategies. (ongoing) – Staff and Steering Committee	**FY13 update *(ongoing)***: Chair & Vice-Chair Presentations at AFWA Annual Meetings
Task **1.5.5**	Facilitate efforts to identify, and assess long-term regional monitoring data sets that would also feed into the Science Centers efforts. (ongoing) – Staff and Steering Committee	**FY13 update *(ongoing)*:** AppLCC Staff working thru FWS-Region-5-SA GIS Staff to facilitate this analysis and coordination with NALCC, NE CSC, and NE RCN partner efforts
Task **1.5.6**	Coordinate with key research units and local universities to facilitate the exchange and distribution of research products to find and develop the best tools for AppLCC needs. – Staff	
	Objective 1.6 -- Develop a management process for seamless data integration and more efficient and effective sharing of tool and data sets **Ranking {3.7 /Years 2.2}**	
Task **1.6.1**	Maintain alignment between AppLCC and National LCC data and tool sharing practices and policies (reference also 1.2.1). (ongoing) – Staff	**FY13 update *(ongoing)*:** Advancing the work via Web Portal Design/Programming However: Staffing limitations (Sci. Coord. position vacant) - staff participation handicapped
Task **1.6.2**	Develop comprehensive, long-term design for: (a) ongoing cost of data; (b) data capacity; (c) data and software maintenance; and (d) data warehousing technical support. – Staff, Work Group, contractor	**FY13 update *(ongoing)*: Advancing the work** via Web Portal Design /Programming – and Networking our Partnerships via Companion & Nested sites through annual web portal contract. Note: other (proprietary system) being supported by neighboring LCCs through Data Basin (CBI) and Science Data (USGS). Require $35-40K membership fee, data storage fee, limited design features, still requires staff/GIS LCC-staff to support, and are subject to limitation to government-sponsored resources in the event of shutdown or agency funding cutbacks.

Task **1.6.3**	Operationally integrate standards and protocols into all data-driven tools and protocols that ensure interoperability of models (data outputs) and predictions between communities of modelers at appropriate levels. – Staff, Work Group	
	Objective 1.7 -- Develop and deliver a landscape-level (scalable) planning tools Ranking {3.65 /Years 3.6}	
Task **1.7.1**	Assemble common set of spatially explicit data layers based on LCC-consistent standards and definitions. (ongoing) – Staff, Work Group, contractor	**FY13 RFP initiated**
Task **1.7.2**	Identify specific needs for more effective and/or standard monitoring techniques /protocols across a large spatial scale (given the topography and endemism of the AppLCC landscapes). – Staff, Work Group, contractor	
Task **1.7.3**	Develop the framework for "next-generation monitoring" and data sharing at a Landscape-level planning scale – Staff, Work Group, contractor	
Task **1.7.4**	Further refinement (1.7.3) by documenting "best practices" and "lessons learned" for data delivery, which are consistent with LCC standards and definitions (e.g., data format, metadata etc.) – Staff, Work Group, contractor	
	Goal 2: Deliver regional landscape-level conservation plans	
	Objective 2.1 -- Conduct an overall threat assessment **Ranking {3.75 /Years 1.6}**	
Task **2.1.1**	Annually update AppLCC "Science Needs Portfolio" and develop "Top Ranked Science Needs" recommendations for SC consideration in guiding landscape planning priorities (reference 4.3.1) and decisions regarding expenditures of FY funds and/or other Member-sponsored capacity. (ongoing) – Staff facilitate Technical Group(=COPs + Integrated Planning Team)	**FY13 update *(ongoing)*: Completed**
Task **2.1.2**	Initiate threats assessment by impact [energy, urbanization and infrastructure, and climate change, etc.] that will be required to be combined and integrated to generate an overall threats assessment (ongoing) – Work Group, contractor	**FY13 update *(ongoing)*: *(partial)* FY13 RFP initiated [Energy]** Initiated in FY13 – under SE CSC funding: Down-scale Climate modeling across the entire AppLCC boundary. To be initiated in FY14 – IAA with USFS/Southern Research Center Threats Assessment Center – to conduct AppLCC-region (a) threats and (b) environmental services assessment

		with geospatial reference data
Task **2.1.3**	Conduct an overall threats assessment that integrates all relevant impacts and projected changes over time. – Contractor	
	Objective 2.2 -- Identify requirements to address the human dimension components of land-use change, including preservation of cultural resources Ranking {2.7 /Years 1.6}	
Task **2.2.1**	Identify relevant information to portray the human dimensions (cultural and social resources) in landscape-level planning. – Contractor	
Task **2.2.2**	Identify and integrate relevant cultural resource GIS Standards/Guidelines, (e.g.: CRGIS at National Parks Service; State recreational and Federal recreational plans; Economic development; Urbanization), along with other funds (e.g., Land and Water Conservation Funds/farm bill opportunities as appropriate) into landscape plans. (ongoing) – Work Group (=Integrated Planning Team), contractor	***Initiated in FY13*** – AppLCC staff working with NPS staff, Steering Committee Tribal representation, and the Southern Appalachian Man and the Biosphere (SAMAB) Executive Members to develop an NCTC-sponsored SDM Workshop (utilizing SDM tools, not focused process) in June 2014. On-going work dedicated to workshop design and process to help to identify how to address the need to integrate cultural dimensions into the planning of the LCC.
	Objective 2.3 -- Identify promising opportunities to safeguard the "best of the best" fish and wildlife habitat and plant communities or ecosystems **Ranking {4.4 /Years 1.75}**	
Task **2.3.1**	Identify current or promising management investment opportunities that reflect conservation of the "**best of the best**" resilient habitat for fish, wildlife and plant communities, including opportunities to contribute to cultural preservation priorities and to reinforce the conservation of other social resources. – Staff, Work Group (=COPs), contractor	**FY13 update *(ongoing)*: *(partial)*** Note: at the 2013 (April) Steering Committee "Programmatic Alignment Work Group" session a subset of this task was proposed ("new") to identify ***"No Regret"*** conservation investments. • JB/Coord worked with TNC/Rodney Bartgis to help flesh-out the charge of this Work giving a more narrow focus and representing a subset of the Task to "identify the 'best of the best' resilient habitat Group • Paul Leonard of the AppLCC staff initially worked to support the "No Regrets" WG in acquiring key datasets which have been acquired, curated, and stored on the AppLCC Cloud Server. • AppLCC staff has requested assistance from FWS-R5-SA GIS staff member, BJ Richardson to serve as the staff-level support person to communicate and coordinate with the Work Group POC, given the minimal staffing level of the AppLCC.

Task **2.3.2**	Develop a "dashboard decision support tool" that portrays these "best of the best" areas and opportunities to help Members maximize their conservation and resource investments. – Work Group, contractor, with Staff support	**FY13 update *(ongoing)*: *(partial) "No Regrets"*** Note: at the 2013 (April) Steering Committee "Programmatic Alignment Work Group" session a subset of this task was proposed ("new") to identify ***"No Regret"*** conservation investments. • Additional funds may be needed to deliver visualization and/or analytical presentation on the AppLCC Web Portal, depending on further clarification and guidance from this Work Group.
	Objective 2.4 -- Based on articulated conservation targets and objectives, identify and assess potential impacts of land use change on known or projected movement/migration corridors Ranking {3.55 /Years 2.5}	
Task **2.4.1**	Identify potential movement/migration corridors at appropriate level/unit (i.e. functional group, species /population /genetic level, given relevant geophysical variation, behavioral response etc. – Contract with Staff support	
	Objective 2.5 -- Establish a structured decision-making process for the ongoing integration of existing partner plans to deliver landscape-level conservation planning **Ranking {4.05 /Years 1.95}**	
Task **2.5.1**	Determine which of the currently recognized structured decision/scenario planning/strategic prioritization process to be used and engage expertise as required. – Work Group (with Staff support), contractor	**FY13 update *(ongoing)*:** Staffing limitations (Sci. Coord. position vacant) ***Initiated FY13****:* This follows the FY13 work with SC Work Group charged to develop a list of Natural Resource Indicators and application of Surrogate Species, following April 2013 workshop. ***Staff proposal (to initiate in FY14)*** to integrate the task of identifying Conservation Targets and finalizing list via an SDM process. Initial discussions have been held with AppLCC Staff, neighboring LCCs and WG coordinators and FWS-Region-5 SA.
Task **2.5.2**	Identify all key, relevant representatives (individuals and organizations) of regional community of practice, and actively engage and solicit participation in identifying common species/habitat priorities /shared values. – Steering Committee Work Group (with Staff support)	**FY13 update *(ongoing)*:** Staffing limitations (Sci. Coord. position vacant) ***Initiated FY13****:* This follows the FY13 work with SC Work Group charged to develop a list of Natural Resource Indicators and application of Surrogate Species, following April 2013 workshop. ***Staff proposal (to initiate in FY14)*** to integrate the task of identifying Conservation Targets and finalizing list via an SDM process.
Task **2.5.3**	Review and synthesize key information from existing conservation, land and resource management	**FY13 update *(ongoing)*:** Staffing limitations (Sci. Coord. position vacant)

	plans. – Staff, Work Group, contractor [see "103 Report"]	***Initiated FY13**:* This follows the FY13 work with SC Work Group charged to develop a list of Natural Resource Indicators and application of Surrogate Species, following April 2013 workshop. ***Staff proposal (to initiate in FY14)*** to integrate the task of identifying Conservation Targets and finalizing list via an SDM process.
Task **2.5.4**	Charge Work Group with crafting the framework and identifying the priority elements to be included in the integrated plans generated under 2.5.1 [SDM/Scenario Planning], and review of products. – Work Group (with Staff support)	**FY13 update *(ongoing)*:** Staffing limitations (Sci. Coord. position vacant) ***Initiated FY13**:* This follows the FY13 work with SC Work Group charged to develop a list of Natural Resource Indicators and application of Surrogate Species, following April 2013 workshop. ***Staff proposal (to initiate in FY14)*** to integrate the task of identifying Conservation Targets and finalizing list via an SDM process.
Task **2.5.5**	Oversee an ongoing structured decision process that provides ongoing planning integration recommendations to the Steering Committee for use in conservation planning actions and for development of dashboard tools. – Work Group (with Staff support)	
	Objective 2.6 -- Based on the underpinnings of resiliency, identify the management approaches to achieve, restore or enhance system integrity, function, and reflect the conservation prioritization and relative ranking of the systems Ranking {3.55 /Years 2.5}	
Task **2.6.1**	Establish and oversee an **ongoing** structured process that provides the Steering Committee recommendations for: (a) utilizing existing data to **rank conservation targets**, and (b) **identifying data gaps and providing priority recommendations** for closing. (ongoing) – Work Group=COP (with Staff support)	**FY13 update *(ongoing)*:** Staffing limitations (Sci. Coord. position vacant) ***Initiated FY13**:* This follows the FY13 work with SC Work Group charged to develop a list of Natural Resource Indicators and application of Surrogate Species, following April 2013 workshop. ***Staff proposal (to initiate in FY14)*** to integrate the task of identifying Conservation Targets and finalizing list via an SDM process.
Task **2.6.2**	Identify the components, function and relationships that **define resiliency and management approaches** to achieve, restore, or enhance system function. – Contractor	
Task **2.6.3**	Identify and rank the core areas, components and interrelationships that help **reinforce resilience**. Continuously refine the details and status describing those areas based on threats and opportunities to	

	help facilitate coordination and planning prioritization. (ongoing) – Work Group=COP (with Staff support), contractor	
	Objective 2.7 -- Facilitate the use of natural resource indicators and surrogate species to inform landscape-level planning, identify and establish data needs and monitoring design that reflect management objectives and conservation targets. Ranking {3.05 /Years 2.7}	
Task **2.7.1**	Ensure adequate representation of the AppLCC expertise in relevant US Fish and Wildlife Service Regional [surrogate species] workshops and events. – Staff and Steering Committee	**FY13 update *(ongoing)*: Completed**
Task **2.7.2**	Assemble or develop and adopt agreed upon vegetation of habitat classification systems and geospatially recognize areas of rare or unique ecosystems. – Work Group=COP (with Staff support), contract	**FY13 RFP (Aquatic) - underway** **(Terrestrial) - update *(ongoing)*:** – remains problematic. AppLCC Staff working thru FWS-R5-SA GIS Staff to facilitate this analysis and coordination with NALCC, NE and SE Gap representatives; TNC/NE/Anderson team/NE RCN partner efforts.
Task **2.7.3**	Assemble or develop and adopt agreed upon species classification and distribution data and geospatially recognize areas of rare and endemic species and unique habitats. – Work Group=COP (with Staff support), contract	
Task **2.7.4**	Identify appropriate natural resource indicators and candidate taxa or surrogate species, and develop explicit population objectives or natural resource appropriate targets. – Work Group=COP (with Staff support), contract	**FY13 update *(ongoing)*:** Staffing limitations (Sci. Coord. position vacant) ***Initiated FY13****:* This follows the FY13 work with SC Work Group charged to develop a list of Natural Resource Indicators and application of Surrogate Species, following April 2013 workshop. ***Staff proposal (to initiate in FY14)*** to integrate the task of identifying Conservation Targets and finalizing list via an SDM process.
Task **2.7.5**	Identify factors believed to be the most limiting to specific (surrogate species or targets) and identify monitoring efforts to track changes in these factors and response – Work Group=COP (with Staff support), contract	
Task **2.7.6**	Develop species-habitat models to fully operationalize the integration of natural resource indicators and use of surrogate species measures across the AppLCC landscape-level planning, monitoring, and assessment.	

	– Work Group=COP (with Staff support), contract	
Task **2.7.7**	Further refine selection of indicators, species, and targets as needed. – Work Group=COP (with Staff support)	
	Objective 2.8 -- Project future landscape conditions cumulatively/over time, based on best available science/scenarios, indicating probable patterns and changes Ranking {3.6 /Years 2.9}	
Task **2.8.1**	Consult with end-users/resource managers to determine what predictive tools are needed to support their work. – Staff, Work Group, contractor	**FY13 update *(ongoing)*: (*partial*)** Cave/Karst Classification System and Mapping. This consultation will be part of the science delivery the AppLCC will help facilitate following the foundational work conducted under FY13 research grant to AmU. Consultation to be initiated in FY14 (with FY13 research budgeted funds.)
Task **2.8.2**	Assess currently available predictive tools to determine if they meet needs identified under 2.8.1[managers needs], and evaluate tool functions, model assumptions, etc. for applicability to AppLCC needs. – Staff, Work Group, contractor	
Task **2.8.3**	Develop the Charter to guide the Integrated Planning Team (subset of COPs with expertise in landscape-level planning and modeling) to serve as a standing Advisory Team to support the work of Staff and facilitation of consultation and integration of assessments and recommendations from the various COP. (ongoing) – Staff and Steering Committee	
Task **2.8.4**	Identify landscape-level models and articulate potential scenarios. – Work Group (see 2.8.3)	
Task **2.8.5**	Deliver freely accessible (open source) data outputs and products that will feed to desktop decision-support tool (e.g. focus on landscape level habitat/species mitigation opportunities). – Staff support Work Group (with Staff support), contractor	***(re: 1.2.4)*** **FY13 update *(ongoing)*:** Staff awaiting WG guidance. ***Initiated in FY13*** AppLCC staff developing data request/access process information file via web portal. ***(re: 2.8.1)*** **FY13 update *(ongoing)*: (*partial*)** Cave/Karst Classification System and Mapping. This consultation will be part of the science delivery the AppLCC will help facilitate following the foundational work conducted under FY13 research grant to AmU. Consultation to be initiated in FY14 (with FY13 research budgeted funds.)

Task **2.8.6**	Assess data gaps and define an ongoing "futuring" process to fill knowledge gaps, monitor emerging trends, and adapt existing efforts. (ongoing) – Staff support Work Group, contractor	
	Objective 2.9 -- Provide guidance on how much habitat is necessary for sustainable/resilient (healthy ecosystem) outcomes Ranking {3.0 /Years 3.7}	
Task **2.9.1**	Define and offer recommendations on what type and how much habitat is necessary for sustainable/resilient (healthy) outcomes and to achieve conservation targets. – Work Group (with Staff support)	
Task **2.9.2**	Develop tools and models to identify strategic opportunities (including integration of private lands into the broader conservation matrix). – Work Group (with Staff support), contractor	
	Goal 3: Create an on-going facilitated process to promote engagement and dialogue across the Appalachian LCC region	
	Objective 3.1 -- Create ongoing opportunities for dialogue and enhance capacity for sharing among Cooperative Members **Ranking {4.9 /Years 1.6}**	
Task **3.1.1**	Assemble a glossary of terms to ensure a consistent use of terminology in all internal and external communications. – Staff	**FY13 update: (*partial)*** initial list included in the 5-Year Work Plan
Task **3.1.2**	Maintain a list of communication staff/point-of-contact (POC) across the AppLCC area, and engage POC to enable conversations with Member organizations and partners about ongoing efforts (e.g., professional society meetings, organizational communication and public affairs officers and other communities of practice – Staff working with Steering Committee	**FY13 update *(ongoing)*: Completed**
Task **3.1.3**	Pursue grants/funding opportunities to support the development and integration of a new, web-based communication media: On-line 'brown bag' panel discussion and real-time digital dialog [elements of this new model come from earlier platforms, e.g., Yale 360, Cambridge Nights, TED talks, etc.] – Staff working with Steering Committee	

	Objective 3.2 -- Define strategies to engage regional land development, water delivery, roads and energy sector representatives Ranking {3.4 /Years 1.8}	
Task **3.2.1**	Identify and prioritize existing opportunities to address these communities of practices at ongoing meetings and events. – Steering Committee with Staff support	
Task **3.2.2**	Identify, prioritize, and leverage opportunities to communicate to their constituencies and plug into their existing communications channels. – Steering Committee with Staff support	
Task **3.2.3**	Develop and communicate messages to these communities of practice about how their existing efforts fit with the work of the LCC (and National Network) and how integral their work is in contributing to the conservation matrix. (ongoing) – Staff and Steering Committee	**FY13 update *(ongoing)*: (*partial*)** AppLCC Communication staff works with the National LCC Communication team and generates a bi-monthly update (and also with DOI CSC teams)
Task **3.2.4**	Define how broad and deep our reach needs to be (e.g., engaging county/municipal government and other civil society organizations) – Steering Committee with Staff support	
	Objective 3.3 -- Serve as the focal point for dissemination of regional information **Ranking {3.7 /Years 2.1}**	
~~Task **3.3.1**~~	~~Host an Annual Stakeholder Meeting as a listening and feedback session to reach/access the Steering Committee. (ongoing)~~	**FY13 update (task removed):** At the April 2013 meeting the full Steering Committee agreed to drop this reference in the AppLCC Charter based on recommendations from the Executive Steering Committee acting as Finance Committee -- due to limited operating funding level
	Objective 3.4 -- Communicate the human dimension benefits of landscape conservation in terms relative to human dimensions and values **Ranking {4.4 /Years 2.2}**	
Task **3.4.1**	Conduct a survey to identify key audiences and develop messages of concern to those groups (e.g., specific messages related to jobs, health, clean water, ecosystem services and cultural components, etc.) – Work Group with Staff support, contractor	
Task **3.4.2**	Communicate the impacts of major land use changes due to energy extraction, urban sprawl, and climate change. (ongoing) – Work Group, contractor	**FY13 update *(ongoing)*: (partial) [Energy]** AppLCC Communication Team working with TNC Communications and Research Team developing general outreach and communication mes-

		saging, FAQs, and briefing (for Steering Committee members) prior to release of FY12-funded RFP results (anticipated in March 2014).
Task **3.4.3**	Utilizing appropriate social science tools and surveys, determine attitudes/values of target audiences and the most effective means to communicate with and engage those groups. – Staff, Work Group, contractor	
	Goal 4: Assess and align conservation goals and actions that reflect the Cooperative Members' common and shared vision	
	Objective 4.1 -- Ensure LCC planning products are coordinated in consideration of Member goals Ranking {2.4 /Years 3.4}	
Task **4.1.1**	Prepare and update the information that reflects the conservation recommendations derived from Goal 1. [Data] & Goal 2. [Landscape Planning] for prioritization by Steering Committee approval. (ongoing) – Steering Committee with Staff support	
Task **4.1.2**	Provide a strategic assessment that both identifies gaps in existing SC Member goals and actions, and offers the greatest potential return on AppLCC investment. (ongoing) – Steering Committee with Staff support	
	Objective 4.2 -- Manage Cooperative Membership Ranking {1.5 /Years 3.8}	
Task **4.2.1**	Identify strategic linkages and opportunities for Steering Committee representation or engagement. – Steering Committee with Staff support, contractor	
Task **4.2.2**	Define an engagement strategy for each identified opportunity that includes recruitment, expectations, and a formal agreement of cooperation for use with identified entities. – Steering Committee with Staff support, contractor	
Task **4.2.3**	Determine most effective means and most appropriate individuals for implementing the strategy [4.2.2]. – Steering Committee	
	Objective 4.3 -- Be THE FORUM which integrates science and management to achieve landscape-level planning and coordinated conservation delivery **Ranking {3.8 /Years 2.6}**	
Task **4.3.1**	Facilitate development of landscape-level planning guidelines.	

	– Steering Committee with Staff support	
Task **4.3.2**	Integrate and coordinate with other landscape planning entities or initiatives. – Work Group (see 2.8.3) with Staff support	**FY13 update *(ongoing)*: (partial) [GIS & Planning]** AppLCC staff (Paul Leonard) has greatly enhanced the delivery of GIS training materials, resources, and has developed the web platform to deliver/display our funded GIS-based Decision Support Tools. *http://applcc.org/gis-planning* **FY13 update *(ongoing)*: (partial) [Climate Change – "Climate Ready"]** AppLCC staff (JB/Coordinator) with assistance from SECSC Staff Associate are developing a web-delivery of key climate information, resources, training materials on a "nested site" within our portal (currently not visible to the public). [Note: the intent is to share the materials, and especially the self-directed, on-line training materials being developed by staff as guidance in assisting Managers plan for implement climate adaptation response options.]
Task **4.3.3**	Develop and implement a targeted communications campaign that conveys brand awareness of AppLCC as the focal point for Appalachian landscape conservation. – Steering Committee with Staff support	
	Objective 4.4 -- Assist, support and utilize State Wildlife Action Plans (SWAPs) and other planning documents to assist with landscape-level integration Ranking {2.2 /Years 3.5}	
Task **4.4.1**	Appoint a Work Group, drawn from the SC Members, to identify relevant information and opportunities to integrate information from the State Wildlife Action Plans (SWAPs) and other planning document into landscape-level plans, models, and efforts to set conservation targets. [The work of the Work Group may be informed by the guidance provided in "SWAP Best Practices" produced by AFWA.] (ongoing) – Steering Committee (Work Group) with Staff support	**FY12 RFA – underway (partial)** AppLCC staff has worked repeatedly via email to try to link contractor with FWS-R5-SA & NE RCN (WSM) partner/staff to coordinate and share information. Effort could be enhanced with greater communication with the other regional efforts.
	Objective 4.5 -- Proactively identify threats and develop policies/strategies to get ahead of them Ranking {2.5 /Years 3.7}	
Task **4.5.1**	Carryout ongoing review and refinement of conservation targets and objectives. (ongoing) – Steering Committee with Staff support	**FY13 update *(ongoing)*:** Staffing limitations (Sci. Coord. position vacant) ***Initiated FY13****:* This follows the FY13 work with SC Work Group charged to develop a list of Natural Resource Indicators and application of Surrogate Species, following April 2013 workshop.

		Staff proposal (to initiate in FY14) to integrate the task of identifying Conservation Targets and finalizing list via an SDM process.
Task **4.5.2**	Establish and conduct ongoing threats assessment briefings/communications for Steering Committee Members and key partners to develop proactive AppLCC organizational policies and strategies. (ongoing) – Staff, Work Groups (=COP)	
	Objective 4.6 -- Align existing Member conservation investments to maximize AppLCC impact **Ranking {3.85 /Years 3.7}**	
Task **4.6.1**	Assess ways to more fully align conservation efforts via shared human and other resource capacities contributing toward identified AppLCC priorities and make recommendations to the full Steering Committee.(ongoing) – Work Group with Staff support	**FY 13 update (ongoing):** Chair's effort to reinforce this at the April 2013 Workshop "skin in the game" messaging.
Task **4.6.2**	Review recommendations (4.6.1) and take appropriate actions. (ongoing) – Steering Committee	
	Objective 4.7 -- Design the mechanism to improve LCC specific in-reach communication to member agencies and organizations Ranking {3.3 /Years 1.5}	
Task **4.7.1**	Design specific communication strategy, processes, and tools for improving internal communication within Member organizations. – Work Group, contractor	**FY13 update (ongoing):** Communication staff began initial discussions with FWS Region-5 SA Communication staff to outline internal strategy, processes, tools for improving internal communication with FWS and other LCC member organizations.
Task **4.7.2**	Identify and integrate an **ongoing process** to help integrate the Steering Committee insights and reflection on organizational commitments to refine the "Who/What/Why" of AppLCC and effectively communicating what we are about. – Steering Committee, contractor	
Task **4.7.3**	Develop concise messaging on Steering Committee identified topics for Member's use with their legislators and key constituents. – Steering Committee, contractor	**FY13 update (completed):** AppLCC Communication staff brought together (virtually) communication coordinators/specialists from around the region, staff helped to develop concise messaging on the identity of the Appalachian LCC for Steering Committee member use. The messages were reviewed and revised by Steering Committee during April Workshop and unanimously approved by members during June 2013 call. Messages were shared with each member and can be found on "The Cooperative" – About Us - page of our

		Web Portal.
Task **4.7.4**	Design meetings, events, and virtual opportunities that ensure ongoing opportunities for Steering Committee Member sharing and dialogue. (ongoing) – Steering Committee with Staff support	**FY13 update (ongoing):** Both Staff and operating funding limitations imposed
	Objective 4.8 -- Sustain and enhance AppLCC and Member organization conservation funding Ranking {3.2 /Years 3.5}	
Task **4.8.1**	Establish an annual review of AppLCC SC Member- and related Partner-funding support for Steering Committee consideration. (ongoing) – Steering Committee with Staff support	
Task **4.8.2**	Establish a Finance Committee to monitor, review and make recommendations to the Steering Committee and Members regarding funding for AppLCC and AppLCC Member initiatives. – Steering Committee with Staff support	**FY13 update *(ongoing)***: at the April 2013 meeting it was decided/approved that the elected body (Executive Steering Committee) members would serve as the Finance Committee. Formal review of budget has not happened outside the FY13 RFP budget decision and application of covering FY13 meeting expenses (generally considered Program/1410-related items) covered with carry-over FY12 (Project/1420) funds.
Task **4.8.3**	Establish a fiscal mechanism to allow AppLCC (as a partnership organization) to apply for, and to manage, grants and support from outside Federal sources – Staff supports Steering Committee	
	Objective 4.9 -- Establish ongoing process for dialogue, engagement, and alignment with regional planning entities Note: {Aligns w/ Objective 3.2}	
Task **4.9.1**	Through active engagement and participation in National fora, to monitor and align the work and decisions of the AppLCC with National strategy being created for connecting to regional land and water planning entities. (ongoing) – Steering Committee	
Task **4.9.2**	Identify and, through the work and decisions of the SC, actively seek opportunities to align and engage regional water, energy and land use planning entities. (ongoing) – Steering Committee	
	Objective 4.10 -- SC Members provide leadership and guidance to the broader Cooperative and Members to proactively engage communities of practice Note: {Aligns w/ Objective 3.1}	
Task	Establish an SC Work Group to identify and encour-	

4.10.1	age organizational representation and engagement of subject-matter experts (communities of practice) to participate in and assume membership-specific actions/tasks. (ongoing) – Steering Committee (with Staff support)	
Task **4.10.2**	Provide ongoing guidance toward coordinating efforts to consider key science and issues and initiatives assigned to communities of practice. (ongoing) – Steering Committee (with Staff support)	

Appendix II
Appalachian LCC 2013 Annual Report Links
Visit our website to learn more about these projects and resources

Expertise Database Tool - http://applcc.org/Members
Eastern Brook Trout Joint Venture - http://easternbrooktrout.org
Appalachian LCC/EBTJV Geonode Web Mapper/Server - http://conservationdesign.org
SARP Companion Website - http://southeastaquatics.net
Central Appalachian Spruce Restoration Initiative - http://www.restoreredspruce.org
Whitewater to Bluewater Project - http://easternbrooktrout.org/groups/whitewater-to-bluewater
Appalachian LCC Research Home Page - http://applcc.org/research
Projects Home Page - http://applcc.org/projects
Data Needs Assessment to Support Conservation Planning for the Appalachian LCC - http://applcc.org/research/data-needs-assessment
Support for Understanding Land Use and Climate Change in the Appalachian Landscape – http://applcc.org/research/climate-change-vulnerability
A Stream Classification System for the Appalachian LCC – http://applcc.org/research/stream-classification
Appalachian Energy Impact Analysis - http://applcc.org/research/energy-forecasts
Riparian Restoration Prioritization to Promote Climate Change Resilience in Eastern U.S. Streams – http://applcc.org/research/riparian-restoration
Development of a Hydrologic Foundation and Flow-ecology Relationships for Monitoring Riverine Resources in the Marcellus Shale Region – http://applcc.org/research/aquatic-ecological-flows
Voices from the Appalachian Community - http://applcc.org/the-cooperative/voices-from-app-community
GIS and Conservation Planning Portal - http://applcc.org/gis-planning
5-Year Work Plan - http://applcc.org/the-cooperative/our-work/5-year-work-plan
Science Needs Portfolio – http://applcc.org/the-cooperative/science-need-portfolio
Appalachian LCC Chair Receives Seth Gordon Award – http://applcc.org/news/appalachian-lcc-chair-david-whitehurst-receives-seth-gordon-award
National LCC Website - http://lccnetwork.org
Project Catalog of all LCC Funded Projects - http://lccnetwork.org/OurWork/Projects
Classification and Georeferencing of Cave/Karst Resources across the Appalachian LCC – http://applcc.org/research/cave-and-karst-classification-and-mapping
Assessment and Inventory of Ecosystem Services and Environmental Threats across the Appalachians – http://applcc.org/resarch/ecosystem-services-and-threats-assessment

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.

LANDSCAPE
CONSERVATION
COOPERATIVES

Appalachian LCC website www.applcc.org