Landscape Conservation Cooperatives in the Chesapeake Bay watershed

The Appalachian Landscape Conservation Cooperative and North Atlantic Landscape Conservation Cooperative (LCC) are applied science and management partnerships that build upon a long history of collaborative conservation in the Chesapeake Bay watershed region -- and beyond. They are part of national network of 22 Landscape Conservation Cooperatives (LCCs) working to unite agencies and stakeholders around common goals for sustaining natural and cultural resources, and to develop tools and strategies to achieve those goals in the face of threats and uncertainty.



Foundational information, assessments, and tools supported by the Appalachian and North Atlantic LCCs offer resources for partners in the Chesapeake Bay watershed to protect important species, habitats, and landscapes now and in the future. These products were designed to address specific needs expressed by partners and partnerships in the Chesapeake Bay watershed , including:

- Regionally consistent habitat maps
- Prioritization tools for conservation of Eastern brook trout, American black duck, and other key species
- Conservation strategies to address sea-level rise and other climate change impacts
- Consistent approaches for assessing and prioritizing aquatic connectivity

Examples of LCC Science Products

AQUATIC CONSERVATION RESOURCES

Chesapeake Bay Brook Trout Assessment and Fish Habitat Decision Support Tool

A model and accompanying assessment for the Chesapeake Bay watershed that predicts brook trout occupancy, evaluates habitat quality, quantifies how human use and climate change are likely to impact both, and identifies conservation priorities at multiple scales.

Products (available now)

- Visualization tool to measure natural and human factors that influence brook trout occurrence at multiple scales
- User-defined ranking criteria for identifying priority areas
- Scenario analysis modeling in the context of future climate regimes
- Online access to Atlantic Coast Diadromous Fish Prioritization

Contacts

- Toddy Petty, West Virginia University: Todd.Petty@mail.wvu.edu
- Scott Schwenk, North Atlantic LCC: william_schwenk@fws.gov

Learn more

- Fish Habitat Decision Support Tool: http://www.fishhabitattool.org/

North Atlantic Aquatic Connectivity Collaborative (NAACC)

A network of partners sharing resources to collectively take on the work of assessing road-stream crossings across the region, the NAACC provides a framework for prioritizing upgrades to bridges and culverts in order to improve passage for fish and wildlife while increasing resiliency to future floods.

Products (available now)

- Regional network of partners coordinating to assess and upgrade road-stream crossings
- Standard protocols and training for conducting road-stream assessments
- Regional database of road-stream crossings
- Web-based tools to prioritize upgrades based on both ecological benefits and resiliency

Contacts

- Scott Jackson, University of Massachusetts Amherst: sjackson@umass.edu
- Erik Martin, The Nature Conservancy: emartin@tnc.org
- Andrew Milliken, North Atlantic LCC: andrew_milliken@fws.gov

Learn more

- North Atlantic LCC Projects page
- North Atlantic Aquatic Connectivity Collaborative

Riparian Restoration Decision Support Tool

An innovative riparian planting and restoration decision support tool allows managers and decision-makers to rapidly identify and prioritize areas along the banks of rivers, streams, and lakes for restoration, making these ecosystems more resilient to disturbance and future changes in climate, and thereby making investments in restoration more likely to stand the test of time. The tool works by identifying 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.

Products (available now)

- Report *Riparian Prioritization and Status Assessment for Climate Change Resilience of Coldwater Stream Habitats within the Appalachian and Northeast Regions*
- Riparian Restoration for Climate Change Resilience Decision Support Tool

Contacts

- Jean Brennan, Appalachian LCC: Jean_Brennan@fws.gov
- Jason Coombs, UMass Amherst: jcoombs@cns.umass.edu

Learn more

- Appalachian LCC Plan & Design page
- Appalachian LCC Tools page

Some like it cold: *With this tool, resources managers can identify streams and riverbanks that lack adequate canopy cover and shade to prevent increased solar heating from climate change from making cold-water habitat too hot for brook trout.*

Stream Classification Framework
Unifying state-based stream classifications into a single consistent system, principal investigators at The Nature Conservancy developed a hierarchical classification system and map for stream and river systems for the Appalachian LCC that represent the region's natural flowing-water aquatic habitats. The classification unifies existing geomorphic and hydrologic classifications that occur within the LCC. It represents aquatic habitat types across the region in a manner that is appropriate and useful for understanding ecological flow relationships and inform conservation planning for aquatic biodiversity in the region.

Products (available now)
- Shapefiles and metadata of the stream classifications
- Data on stream chemistry, confinement, gradient, stream size and hydrologic classes
- Literature review and final report on stream classification in the region
- Story map of the stream classification system

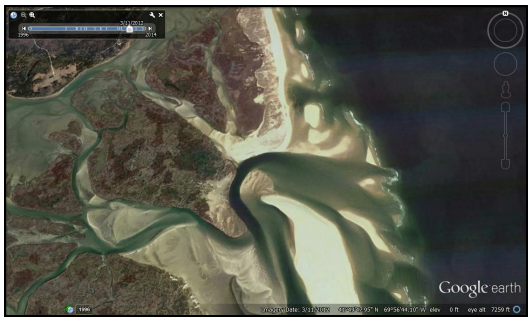
Contacts
- Jean Brennan, Appalachian LCC: Jean_Brennan@fws.gov
- Arlene Olivero Sheldon, The Nature Conservancy: Arlene_olivero@tnc.org

Learn more
- Appalachian LCC Research page

COASTAL & MARINE CONSERVATION RESOURCES

Hurricane Sandy Resilience Projects
A suite of projects that integrate monitoring, models, and tools to examine beaches, tidal marshes, and aquatic connectivity, and guide decisions about how to conduct restoration, conservation, and management in the face of increasing storms and sea-level rise associated with climate change.

Products (partial list)
- Reports on beach and inlet modifications (e.g. shoreline hardening, beach fill, inlet opening/closing, private/public ownership) before and after the storm
- iPlover smartphone app to collect data on beach nesting birds
- Best management practices for managing beaches for shorebirds after coastal storms
- Models of salt-marsh response to sea level rise and storms
- Monitoring and assessment of marsh restoration approaches
- Maps identifying coastal areas that will be the most ecologically resilient to climate change



Birds-eye view of the coast: *An inventory of the location, status, and condition of potential piping plover breeding areas based on aerial photographs taken before, right after, and three years after the storm, offers insight for users ranging from shorebird biologists to geologists.*

Contact
- Megan Tyrrell, North Atlantic LCC: megan_tyrrell@fws.gov

Learn more
- North Atlantic LCC Coastal Resiliency page

TERRESTRIAL CONSERVATION RESOURCES

The Index of Ecological Integrity (IEI)

This tool identifies areas with the greatest capability to support biodiversity now and into the future by assessing the intactness and resilience to sustain key biological functions over time, relative to other sites within the same ecological system (habitat class).

Products (available now)

- Maps of the relative integrity of ecological systems at regional, state, and watershed scales (For stratified versions, contact North Atlantic LCC GIS Analyst Renee Vieira Farnsworth: renee_vieira@fws.gov)

Contacts

- Kevin McGarigal, University of Massachusetts Amherst: mcgarigalk@eco.umass.edu
- Scott Schwenk, North Atlantic LCC: wiliam_schwenk@fws.gov

Learn more

- North Atlantic LCC Projects page
- UMass Designing Sustainable Landscapes page
- North Atlantic LCC Conservation Planning Atlas

Envision the Susquehanna

A landscape planning effort uniting partners to identify priorities and strategies for protecting the natural and cultural heritage of the Susquehanna River watershed based on regional science and community values.

Products (available now)

- Engagement campaign to identify community conservation needs
- Framework for delivering regional datasets and tools to conservation partners through presentations and workshops
- National Geographic Susquehanna Watershed map
- Community supported conservation science demonstration projects

Contacts

- Steve Fuller, North Atlantic LCC: sfuller71@comcast.net
- Carly Dean, Chesapeake Conservancy: cdean@chesapeakeconservancy.org

Learn more

- Envision the Susquehanna

Ecosystem Benefits and Risks

Ecosystem services are the benefits people receive from nature. These essential services and the natural resources that produce them are placed at risk by processes driving landscape change such as urbanization, climate change and energy development. The Appalachian LCC and the Forest Service have created a clearinghouse of existing knowledge about ecosystem benefits and threats to their sustainability in the Appalachians to inform natural resource planning and management decisions.

Products (available now)

- Descriptions of regional ecosystem services
- Identification of threats to regional ecosystem services
- Conservation Atlas of Ecosystem Services with access to dozens of maps of ecosystem services

Contacts

- Jean Brennan, Appalachian LCC: Jean_Brennan@fws.gov
- Lars Pomara, U.S. Forest Service: lazarusypomara@fs.fed.us

Learn more

- Ecosystem Services Conservation Atlas
- Ecosystem Services Data Atlas
- Ecosystem Benefits and Risks

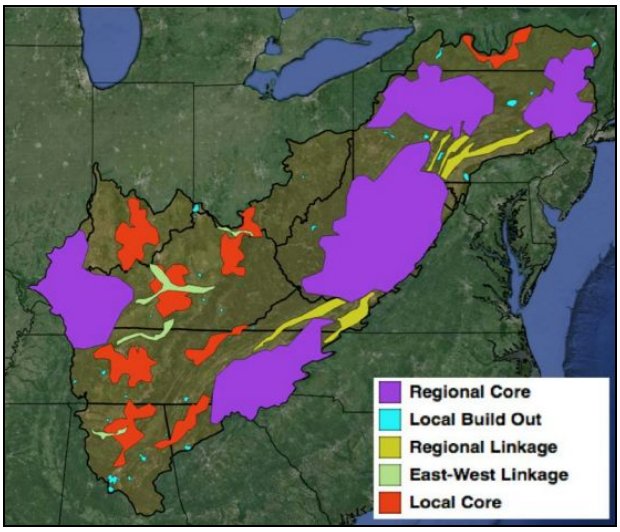
Accounting for natural benefits: *A clearinghouse for information and tools integrating the societal value of ecosystems with future threats offers a resource for informed planning and management.*

Landscape Conservation Design

The Appalachian LCC is identifying and prioritizing important lands and waters that help sustain functional ecosystems throughout the Appalachians. Using input from an expert advisory team, researchers at Clemson University are identifying ecologically significant landscapes and corridors of connectivity that are critical to conserving regional biodiversity. The final design framework will provide public land managers, nonprofit organizations, and private landowners the ability to incorporate landscape data into local decisions and conservation actions.

Products (available now and under development)

- Report and videos on the initial project results
- An interactive map of the conservation design elements



Contacts

- Jean Brennan, Appalachian LCC, Jean_Brennan@fws.gov
- Paul Leonard, Clemson University, pbleona@g.clemson.edu

Learn more

- Appalachian LCC Interactive Conservation Planning page
- Appalachian LCC Research page

Energy Development Assessment

This product identifies the scale, scope and intensity of potential energy development in the Appalachian LCC region, demonstrating land use change impacts relevant at a landscape level scale. The information presented will help decisionmakers understand the need for avoidance and mitigation of adverse impacts to key areas of regional biodiversity.

Products (available now)

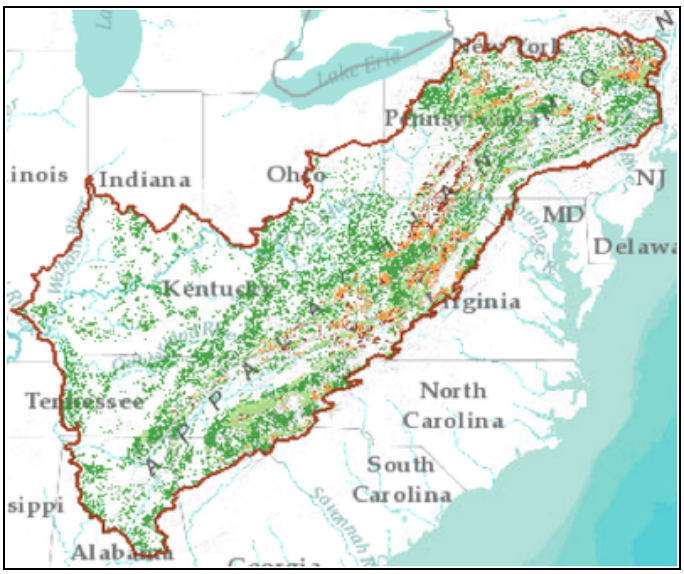
- Models of future development potentials for coal mining, gas drilling, and wind farm creation
- Web-based mapping tool with spatially explicit energy development projections

Contacts

- Jean Brennan, Appalachian LCC: Jean_Brennan@fws.gov
- Beth Wheatley, The Nature Conservancy: ewheatley@tnc.org

Learn more

- Appalachian LCC Research page



To learn more about the LCCs, please visit:

www.appalachianlcc.org

www.northatlantic.lcc.org