Appalachian
Landscape Conservation Cooperative

NatureScape

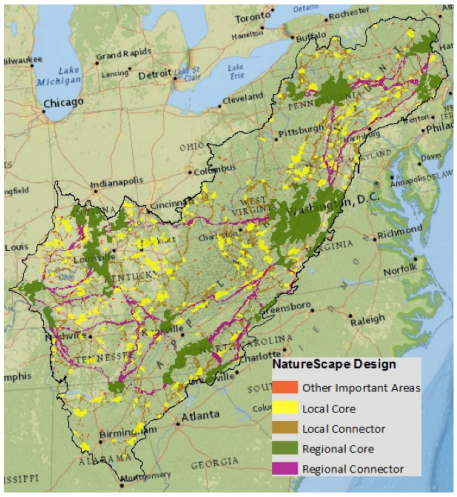
Landscape Conservation Design and On-Line Conservation Planning Tool

"Why is this place important?" Is the simplest question conservation biologists, resource managers, and land stewards to answer. They work on-the-ground, on site-based issues and know the relative importance of the area to the protection of the conservation target they are trying to conserve. But the far-more-difficult question, and one they have had difficulty answering is: ***"What other resources and conservation targets are also within the area?"*** or ***"Where do we get the most conservation 'bang for the buck'?"*** These answers require examining the area as part of a much greater geographic region and to consider future projections of land-use changes and threats. It requires a systems-level analysis, which is to move ones focus from species and habitat focus to the inter-relatedness of the many physical and biological elements that make up healthy and resilient ecosystems. It requires a balanced approach that also integrates human values and influence that impacts conservation and sustainability. It answers the most important question: ***"What is the wisest, sustainable long-term investment of our conservation efforts?"***

NatureScape takes a holistic approach to conservation planning (vs the traditional single-species or taxa –specific project focus) to help address this greater conservation objective. It provides users the ability to incorporate regional information and future trends of a changing landscape into their own local land use and natural resource decisions. The tools delivers the most advanced, cutting-edge science of the research team at Clemson University (Drs. Paul Leonard, Robert Baldwin, and Daniel Hanks) funded by the Appalachian Landscape Conservation Cooperative (LCC). The Clemson researchers and Appalachian LCC staff coordinated a series of consultations with experts across the region to ensure priority species (aquatic & terrestrial), habitats, and ecosystems were included in ***NatureScape***. These experts helped the LCC identify appropriate frameworks for assessing aquatic integrity, key conservation targets and threats to ecosystems, and delve further into representative databases of the region.

Researchers employed super-computing technology and Marxan^ software (the most widely used conservation planning tool in designing networks of terrestrial, aquatic, and marine conservation areas) to identify ecologically significant habitats and natural resources that are connected across the landscape and will be resilient to future threats.

NatureScape is considered a conservation planning tool, but is in fact a suite of tools, drawing from many individually research projects funded by the LCC^^ (2012-2017). But the "integrated modeling" approach represents a "second generation" in the state-of-the science pioneered by the Clemson team. It goes beyond any previous effort to capture the interplay between aquatic and terrestrial systems Marxan-approach. First, overcoming the statistical challenges that the aquatic system must 'marry' the aquatic condition scores that have been assessed at unique planning units (catchments, watershed, sub-basin) to the uniform terrestrial units such as



km2. Second, the focal aquatic model captures the dynamics of aquatic systems – defining four key variables influencing aquatic environment at both the catchment and stream reach–level, and then further characterizing the dynamics that modify the aquatic condition based on terrestrial buffer areas influencing that unit;

To learn more about this project, visit ***www.applcc.org***

NatureScape is a conservation planning tool that:

» incorporates and models newly developed data and information from all Appalachian LCC funded research projects as well as key existing datasets from partners to produce a series of resources (maps, tools and datasets);

» delivers a conservation design map (Landscape Conservation Design or 'LCD') that can be used by conservation partners to identify shared areas of conservation interest, potential collaboration, and collective action towards greater efficiency;

» is a suite of geospatial data sets which help illustrate areas of least-cost and greatest value to regional conservation objectives and considers areas that may be more resilient to large-scale impacts (i.e. energy development, urbanization, changing climate factors);

» reflects the core analysis or computer modeling results – using a cluster or super computer – to generate the Best Near Optimal Solution or cost-benefit approach to arrive at the final design or 'optimal solution'. Cost (fragmentation or loss of connectivity) is entered in its mathematical calculations as a 'penalty' applied to an investment to identify the least cost to reach the overall conservation goals;

» incorporates socio-economic variables (ecosystem benefits and services, carbon storage, and watershed areas important to drinking water supply) into the design;

» represents partnership-prioritization, reflecting programmatic interests of the diverse conservation community across an ecologically-defined landscape; and thus

» helps to identify and prioritize lands and waters important for functioning ecosystems and biodiversity impending environmental challenges -- meaning a design to represent areas of opportunity for balanced development while delivering a healthy and resilient natural landscape or ***"NatureScape"***.

Online Training:

A self-paced, free, training course has been developed to walk end users through the suite of resources available through the Appalachian NatureScape. The course includes: videos, readings, presentations, discussions, a course quiz, and a downloadable certificate of completion.
You can access the course at: www.scienceapplications.org.

NatureScape tool suite includes:

A **NatureScape Design Map** – represents broad, well-connected landscapes required to protect biodiversity and sustain many critical ecological processes and patterns across the AppLCC geography.

A **Suite of Geospatial Data Sets** - illustrates the landscapes required to protect biodiversity and sustain many critical ecological processes and patterns. These data sets can be used in conjunction with other data sets of interest to tailor to an end user's conservation planning objectives.

Information is also displayed geospatially as maps of:

- *Selection Frequency* (how often an area was selected by the model to deliver the priority resource targets);
- *Richness* (the geospatial distribution of priority resources as defined by the Appalachian research and management community engaged in setting these conservation (and modeling) targets); and
- *Priority Based on Large-scale Threats* of each planning unit (these units were defined of terrestrial system by 1km2 hexagon, and aquatic system by catchment).

Online Visualization Tool – allows user to visualize the specific data driving the modeling output for their specific area of interest (reflecting the resolution of the source data (at its finest resolution) then present a summary tally by 1km2.

NatureScape Design: identifies five conservation elements covering many ecologically significant habitats and processes across the Appalachians. These elements included:

- ***regional interconnected cores*** (broad areas of regional significance having high landscape connectivity); as well as
- ***broad corridors*** that connect these cores;
- ***small areas*** that are likely to contain larger ecological significance than their size would suggest or act as buffers around existing protected areas were also mapped.

^ for more information see marxan.net

^^ funded studies include: • Energy Forecast Analysis, • Stream Classification System, • Classification & Geo-referencing Cave/Karst Resources, • Ecosystem Services and Environmental Risks.

APPALACHIAN LANDSCAPE CONSERVATION COOPERATIVE
National Conservation Training Center
698 Conservation Way, Shepherdstown, WV 25443
communications@applcc.org • www.applcc.org