

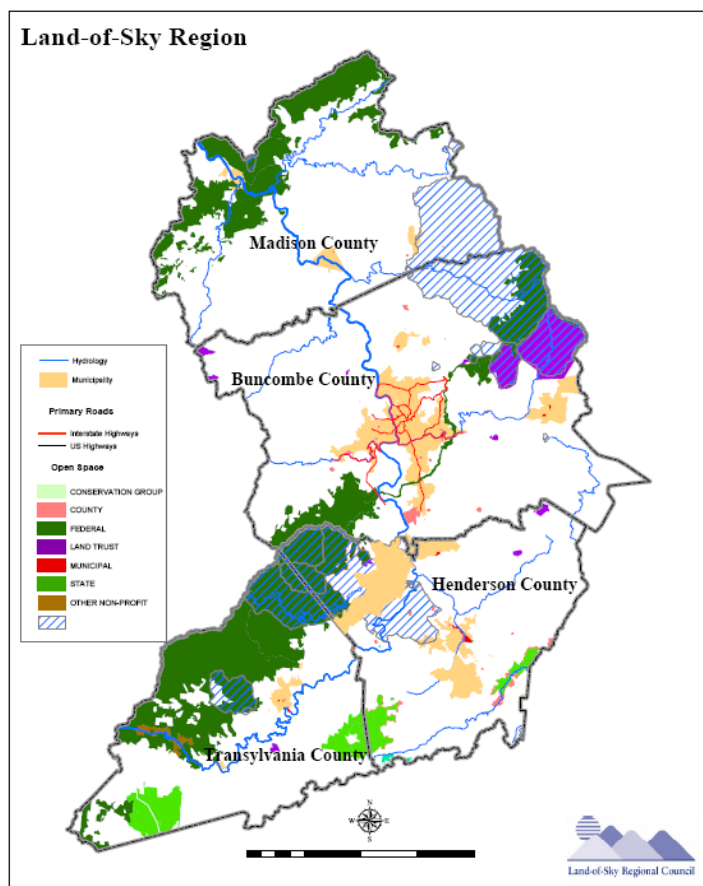
2. Need for the Project

Natural History of the Region

Spanning North Carolina's majestic western mountains, the Land-of-Sky Region is characterized by a landscape of extreme variations, with topography that ranges from fertile valleys to rugged mountains. Extending from Tennessee on the north and the South Carolina border on the south, the region is framed by the Blue Ridge Mountains on the east and the Great Smoky Mountains on the north and west. The highest point in eastern North America, Mount Mitchell, (6,684 feet) is located a few miles north in Yancey County. The 1,867 square mile region encompasses Buncombe, Henderson, Madison and Transylvania Counties, and falls almost entirely within the Upper French Broad River Basin.

The "Land-of-Sky" region can attribute much of its vitality to its unique geographic setting. Set in the Southern Blue Ridge Province, which covers most of the mountainous portions of North Carolina and extends into southern Virginia and eastern Tennessee, the region is characterized by rugged mountains, long broad ridges, steep slopes, and deep ravines. These forests are remnants of the original temperate forest formed 50-65 million years ago.

Within these ancient mountains flows the French Broad River – the third oldest river in the world. This main bloodline bisects the region, flowing north and west toward the Mississippi Valley. The river's headwaters begin just west of Rosman in Transylvania County, and it continues north, through Asheville and Madison County, until it crosses the state line of Tennessee. The entire region lies within this basin, with the exception of small sections in eastern portions of Buncombe, Henderson, and Transylvania Counties that lie in the Savannah and Broad River basins.



A Region Rich in Biodiversity

The mountains of Western North Carolina is also known for its biodiversity and the number of rare and unique species that are found here. The Southern Appalachian/Blue Ridge Ecoregion, of which the Land-of-Sky Region is a part, has been described as "Globally

Outstanding” by the World Wildlife Fund due to the high number of endemic species (species that are only found here), and species richness (the number of different species). Over 400 species have been identified that are only found here, the most found in any ecoregion in North America (NC Wildlife Action Plan, 2006).

The region’s biodiversity can be partially attributed to the extensive network of streams that have carved the Western North Carolina landscape for millions of years. The waterways here contain the highest diversity of freshwater fish, crayfish, and snails in North America and a greater number of species of mussels than anywhere else in the world. The cool and damp mountain forest environment provides ideal habitat for amphibians – animals that rely on both land and water throughout their life cycle. Rich in mineral composition, our mountain soils support many species of plant life which in turn supports various species of invertebrates on which salamanders feed. More than 50 species of salamanders (not including sub-species) are found here, representing 10% of the global salamander diversity and earning the Southern Appalachian Mountains the title of “the salamander epicenter of the world.”

The mountains of our region support such high numbers of species because they offer such a wide variety of habitats and microclimates. Variations in slope, elevation and topography create a variety of climatic conditions and niches that in turn provide suitable habitat for a wide range of species. There is significant variation even within the region, as it has both the highest and lowest annual rates of precipitation in the state, and climates ranging from warm temperate to boreal. The combination of these conditions and the fact that this region escaped glaciation has resulted in a diverse array of biologically rich habitats – many of which are found nowhere else in the world.

Habitat Types in the Land-of-Sky Region

The landscape of the Land-of-Sky region is primarily forested, ranging from Spruce-Fir Forest and Northern Hardwoods in the higher elevations to Oak Forest (& mixed hardwood/pine), Cove hardwood Forest, Dry Coniferous Woodlands, and Floodplain Forest in the low to mid-elevations. Other non-forested habits of the region include Early Successional / Grassy Balds, High and Low Elevation Rock Outcrops, Caves and Mines, and Riverine Aquatic Communities (NC Wildlife Action Plan, 2006).

Several of these habitats have been identified as priorities for conservation and sustainable management due to high rates of degradation, fragmentation, and loss of habitat. These include high elevation communities (spruce-fir forests, beech gap forests, and high elevation rock outcroppings) that are relics of the most recent Ice Age when spruce and fir spread across the southern Appalachian highlands, and alpine tundra covered slopes and peaks above 4,000 feet. Spruce-fir habitats are considered the second most endangered habitat in North America due to declining ranges primarily attributed to invasive insect, the balsam woolly adelgid, combined with extensive logging throughout the last two centuries.

Floodplain forest and riverine aquatic communities are also considered priority habitats due to their declining ranges, important functions, and role in maintaining water quality. These declines can be primarily attributed to intense development and changes in land use that have occurred in the valleys of the region over the last century. Floodplain forests play an important role in filtering pollutants, maintaining cooler water temperatures, absorbing rainwater, stabilizing stream banks, and providing habitat for a wide range of species. Likewise, riverine communities provide human communities with clean water, recreational opportunities, and serve as critical habitat for a diversity of birds, mammals, fish, and invertebrates.

Need for Healthy Ecosystems

The primary goal of the Linking Lands and Communities project is to maintain and restore a network of healthy (and intact) natural systems (or ecosystems) at the regional scale. Ecosystems refer to the community of plants and animals that live in a particular habitat along with their interactions with each other and with physical and chemical components (e.g., soil, minerals, nutrients, sunlight).

Healthy ecosystems produce a myriad of services that our communities depend on for survival - like clean drinking water, carbon storage, flood storage, local food supplies, and other goods and services. Natural systems support the tourism, outdoor recreation, farming and forestry sectors of our economy and help attract new businesses and residents to our region. When a natural system is not functioning as it should (i.e., a stream is clogged with sediment or soil is eroding on a steep mountain slope), it loses its ability to provide these services.

Healthy ecosystems are also able to maintain their capacity to sustain the great biodiversity that is characteristic of this region; rebound and adapt to periodic disturbances and changes (e.g., wind storms, fire, climate changes); and provide services such as transforming solar energy into biomass, recycling nutrients, filtering contaminants, etc. A network of healthy ecosystems will increase the resiliency of the ecosystems in the face of both natural and human-created disturbances and changes.

It's All Connected

One feature that separates this effort from many other land use planning projects is the recognition that nature functions as a system. Like any system, a healthy ecosystem is dependent on the ability for its parts to collectively function as a whole. This is not unlike the human body, where a person's health is dependent on all the systems in the human body working together. An injury or disease that impacts one organ or a group of organs can severely disrupt the entire body's ability to function. Our ecosystems in nature function very much the same way - with many different systems - wetlands, forests, streams, riparian areas - all contributing to the larger landscape's ability to function.

When we sever these interconnected systems, or damage or remove them - other parts of landscape are affected. A new road that bisects a forested area or a wetland that is removed or

filled for another land use change the very manner in which the broader natural system functions. Lands that once provided habitat for certain species or services for human populations become fragmented and lose their ability to do so. The degradation of natural systems occurs site by site and parcel by parcel, until the cumulative effects of the fragmentation, pollution, or infestation become so great that the entire ecosystem suffers.

In order to keep our ecosystems healthy, we must work to maintain and/or restore connections between the various natural communities of our region, preserving a network of forests, streams, grassy balds, wetlands, agricultural areas, and other open spaces. This network of natural lands and waters is often referred to as a green infrastructure network, because it serves as the ecological framework that supports our economic, social, physical, and psychological health and well-being.

Why a Regional Network of Natural Systems?

Identifying a green infrastructure network – a regional network of naturally functioning ecosystems - encourages us think about our natural landscape as an interconnected system and bring this awareness into the land use decisions that are made at the site, county, and regional scales. Since nature does not adhere to the same municipal boundaries that typically govern land use decisions, the Linking Lands and Communities project looks at these systems at a large regional scale. This approach highlights the patterns that nature takes across the broader landscape, and identifies opportunities for working together to maintain and restore important connections that cross jurisdictional boundaries.

This regional network of high value ecosystems provides an important context for land use decisions that affect our ecosystems on a broader scale. Whether we are contemplating the future of a wetland, planning for a new road, developing a site plan for a new residential development, or targeting our conservation dollars, thinking about the broader context in which these actions take place can be key to protecting the ecosystems services on which our communities depend.

Using a regional approach also helps to bring together all of the agencies and organizations responsible for land use decisions to understand the broader context outside of their jurisdiction or focal area. A regional approach can encourage partnerships and collaborative activities that serve local communities as well as the natural landscape that they share.

Challenges

Population Growth and Fragmentation of the Natural Landscape

The population in the Land-of-Sky four-county region has been steadily growing and will likely continue to grow. The population was about 200,000 in 1960, 350,000 in 2000 and it is expected to approach 500,000 in 2030. Almost all of the growth is from people moving here

from other places. As we grow, people are spreading out across the landscape, with almost two-thirds of the region's population living outside city/town limits, in the unincorporated areas of our counties. This spread-out pattern of development breaks up open spaces, forests and farmland and often results in loss of habitats and degradation of scenic quality. It makes it harder for farmers to keep farming, to provide public services to everyone, and to attract businesses which require larger tracts of land.

Human activities on the landscape often result in fragmentation of natural systems. Habitat fragmentation occurs when a large area of habitat has been cut up into a collection of smaller patches of habitat. It typically occurs when land is converted from one type of habitat (or land use) to another. A new housing development, a road, or even a paved walking trail can separate one part of a forest from another or block an animal's migration route. As our landscape becomes more and more fragmented, healthy ecosystems become less able to function as they once did. The result is a domino effect of degraded natural systems that cease to provide services to our communities and the habitat necessary for other species to thrive.

By defining a regional network, we can help to minimize and mitigate land use activities that fragment large functioning ecosystems in high quality areas. Some human activities are compatible with large intact natural systems. For example, agricultural areas, if managed sustainably, can provide habitats and transition areas between urban areas and more natural areas. A regional network of lands can help to identify compatible land uses and corridors that provide important connections between natural systems.

We also are reminded by the recent and continued drought conditions that water is a precious and finite resource that needs to be protected and conserved. We do not know how many people or how much development can be supported by our water supply. We need to protect the quality and quantity of water, as well as the integrity of adjacent lands to ensure we have clean drinking water now and into the future.

Invasive Species

Another primary threat to our mountain communities are invasive or "non-native" species. Often introduced as ornamentals or for livestock forage, non-native invasive plants and animals often outcompete native species for food. As a result, they change the entire balance of relationships within that community. Without the natural predators of insects and diseases that tend to keep native plants in natural balance, they are capable of causing immense damage to native systems. Higher elevation forests, which were compromised through extensive timber harvest in the early twentieth century, are now being devastated by an invasive species pest, the woolly adelgid. The non-native insect infects hemlocks and fir trees and ultimately kills them. Other destructive invasive species in the region include kudzu, garlic mustard, oriental bittersweet, and Japanese knotweed.

Loss of Farmland

Our region and all of North Carolina are losing open space (i.e., undeveloped land and farmland) at a fast rate as more and more people and businesses move to the state. In recent years, according to the *2008 Annual Report – North Carolina Million Acre Goal* (NCDENR, 2009) – natural and agricultural lands in North Carolina are being converted to developed lands at a rate of about 100,000 acres per year (or an average of 275 acres each day).

Agricultural land, one of the region's key assets, is diminishing. In 1950 about half of all the land in western North Carolina was farmland. The amount of land in western North Carolina devoted to crops decreased by 71 percent in the period between 1949 and 1992. The latest Agricultural Census reported that the Land-of-Sky Region contained about 2,700 farms, with 193,000 acres in farmland – which represents about 16 percent of the region's land.

Agriculture is a large part of the region's economy. It is the number one industry in North Carolina in terms of revenue and jobs, accounting for 20 percent of all the jobs and revenue across the state.

Prime farmland is often sold for development and fragmented into smaller parcels, making it harder to maintain a farming economy in the area. A recent study showed that almost half of all prime farmland in Henderson County was in parcels of ten acres or less (Resource Data, Inc., 2006). Land prices have been steadily increasing, due to development pressure. This makes it harder for people who want to farm to afford farmland and it increases the attractiveness for farmers to sell to developers.

Natural Capital: Our Economy Depends On It

Our region's economy is based on our natural resources and cultural assets. Views of rural areas and forested mountains draw more than 20 million visitors each year to the Blue Ridge Parkway and generate over \$2 billion annually in tourism spending (Blue Ridge News, Summer 2002, Vol. 2, p.7). Visitors to the Blue Ridge Parkway said they would make fewer trips to the Parkway if scenic quality declined, and many said they would stop visiting the Parkway.¹ Almost ten percent of the region's jobs are in the travel and tourism industry. Many people visit the region to hike and camp in the forests, fish in the mountain streams and enjoy the beautiful outdoors in other ways.

Communities Need Better Tools

To better face of all these challenges, communities need tools to help them make more strategic land conservation and land development decisions. Communities and counties often

¹ Mathews, L.G., S. Kask and S. Stewart. 2003. *Blue Ridge Parkway Scenic Experience Project Phase 2 Final Report*. See www.nps.gov/blri/parkmgmt/upload/blriscenicexpnc2.pdf

carefully plan where they want to build or extend infrastructure and where they want to see future development, but don't often plan where to conserve or preserve land. Communities need pro-active, coordinated and strategic planning approaches for conservation (not haphazard, reactionary), like communities plan for infrastructure and development.