

CHAPTER 10: THREATS ASSESSMENT

A threats analysis that is coordinated and compatible with the Conservation Planning Tool will further refine prioritization of lands for conservation. The Wildlife Resources Commission plans to have a statewide in-depth habitat threat and risk assessment designed to identify habitats valuable to wildlife and also under threat from the impacts of population growth. This study will look at how normally-occurring habitats and working landscapes are affected by human activities such as land use conversion, fragmentation and infrastructure development. This study will examine factors that promote the integrity and functionality of these high-value land areas and provide forecasts of risks and threats for the next several decades.

In addition to impacts of population growth, other threats will need to be addressed through different studies. These threats should include, but should not be limited to: landslides, climate change and exotic invasive species. Below is some information and background on these topics and information about how they may impact conservation planning in North Carolina.

- Landslide Hazards and Landslide Hazard Mapping in North Carolina

Intense rainfall from the remnants of Hurricanes Frances and Ivan triggered at least 155 landslides that caused five deaths, destroyed 27 homes and disrupted transportation corridors throughout western North Carolina in September 2004. A similar scenario of back-to-back storms that occurred in 1916 and 1940 initiated thousands of debris flows in the region. The Aug.13-14, 1940 storm triggered more than 2,100 landslides that caused 14 deaths in Watauga County alone. High intensity summer storms and single tropical depressions can trigger landslides, especially when antecedent moisture conditions are high. This was the case in November 1977 when a tropical system caused flooding and triggered more than 60 landslides near Asheville. Weather patterns similar to those that triggered landslides in the past will likely recur, and increased development on mountain slopes exposes more people to landslide hazards. A recent publication that addresses these concerns, "Mountain Ridge and Steep Slope Protection Strategies," is available online at <http://landofsky.org/>

The N.C. General Assembly authorized the N.C. Geological Survey to begin county-scale landslide hazard mapping for 19 mountain counties in the Hurricane Recovery Act of 2005. Remote imagery, LiDAR (Light Detecting And Ranging) digital elevation models, and extensive field studies are used produce the landslide hazard maps in a geographic information system (GIS). The maps will be available to local government agencies and the public to help protect public safety and guide informed decisions on land use. Additional funding has been provided to continue mapping, which so far has been completed in six of the 19 declared counties.

- Climate Change

In the best case scenario, global temperatures are expected to rise about 2.5 Fahrenheit degrees by 2100. Globally, scientists expect more precipitation, but mainly concentrated in wet seasons and wet places. Dry seasons and dry places are actually expected to be drier. Storms are expected to become stronger as the result of a warmer, wetter atmosphere. In North Carolina, we expect warmer, wetter winters and hotter, drier summers. We also expect more severe thunderstorms, hurricanes and nor'easters. The N.C. Division of Emergency Management is tracking these changes and requires all counties to have a hazard mitigation plan to address hazards such as these.

In North Carolina, much of the state has already changed to a new, warmer USDA climate zone in just the last 15 years. In the Raleigh area, climate has changed from Zone 7 to Zone 8. USDA Climate Zones are based on winter minimum temperatures.

The numbers of unique climate-soil combinations, on which many species depend, are expected to decrease. As much as 86 percent of the unique climate-soil combinations are projected to disappear from North America within 100 years, vastly decreasing and in some cases completely eliminating the amount of habitat available for many species which require specialized habitat. This in itself will be devastating, but when combined with the speed at which it is expected to occur – will nature be able to adapt in time? Species and ecosystems have never had to adapt this fast before. During the Ice Age, the transition from the coldest temperatures to the warmest took 10,000 years. That same temperature change is predicted to occur now in only 100 years.

In the Albemarle Region, the landscape is defined by the many interactions of land and water. The Albemarle Region is critical for the conservation of North Carolina's natural heritage. This region is one of the continental areas most severely threatened by rising seas.

Relative sea-level rise in the Albemarle Region is presently 2 inches in 10 years. The rate of inundation will increase between two and three times. A million acres will be under water in fewer than 200 years – perhaps a lot sooner. About half a million of those acres are already in conservation ownership. Through the Banks and Sounds Project, The Nature Conservancy and many partners are engaged in an effort to adaptively manage the ecosystems that will be impacted by climate change.

- Population Growth and Growth Patterns

Between 1990 and 2000 North Carolina's population grew by 21 percent and is expected to increase by 50 percent by 2030. The pressures on the landscape generated by this population boom can be seen almost anywhere in the state.

More than one million acres of natural and rural land have been developed over the last decade.

North Carolina is the sixth-fastest growing state in the nation, with some counties growing as much as 50 percent between 1990 and 2000. This rapid growth has brought many good things to North Carolina – jobs, cultural diversity and new ideas. But while our population is growing, our supply of land is not (Land for Tomorrow, 2005). The rate of conversion annually is 277 acres per day or one million acres each decade. Our current patterns of development use a great deal more land per person than we did in the past, approximately two acres per person. With a strategy for both development and conservation, more informed decision can be made to maximize the benefit for people and the environment that supports them.

With increased population growth comes increased development. Using smart growth approaches with higher density and cluster development, and appropriate placement of impervious surface can minimize the impacts to the environment. In urban areas particularly, where build-out scenario models have been run, flood zone boundaries are dramatically increased due to the increase in impervious surfaces.

- Exotic Species

Invasive exotic species, including plants, animals, fungi and other pathogens, have the potential to devastate natural ecosystems. Many introduced species have become naturalized in North Carolina and some are replacing our native species. Not all exotic species are considered harmful. Invasive species are usually characterized by fast population growth rates, high rates of reproduction and efficient dispersal. Not being native to North Carolina, they lack the natural predators and diseases that would naturally control them in their native habitats. The rapid growth and reproduction of invasive species allows them to overwhelm and displace existing native populations and, in the cases of some plants, form dense one-species stands (familiar examples include kudzu and Japanese knotweed). Invasive species are especially problematic in areas that have been disturbed by human activities.

Invasive exotic species disrupt the ecology of natural ecosystems, displace native plant and animal species, and degrade our biological resources. Aggressive invaders reduce the amount of light, water, nutrients and space available to native species. Some exotic plants hybridize with related native plant species, resulting in changes to a population's genetic makeup; others have been found to harbor plant pathogens, which can affect both native and non-native plants, including ornamentals. Some invasive exotic insects such as the hemlock wooly adelgid are expected to bring about the decline of entire forest systems. Other invasive exotic insects, such as the ambrosia beetle, facilitate the growth of fungal pathogens that cause widespread destruction to plant

populations. Some invasive species compete with and replace rare and endangered species and encroach upon their limited habitat. Invasive species also cause extensive economic losses and expenditures each year for agriculture, forestry and roadside management.

Although it is important to document the spread of invasive exotic species into natural areas, no unified mapping effort has yet been undertaken to track the spread of these species throughout the state. In future versions of this plan, we hope to identify and pull together data from a variety of sources - to the extent that it is available - to characterize the areas that have been hardest hit (appropriate for restoration opportunities) and those areas that are expected to be most vulnerable to invasion (highly threatened).