North Carolina's Forest Action Plan
Identification of Priority Forest Watersheds for Water Quality and Quantity and Strategies to Address Resource Conditions, Trends, and Threats

Water & Forests

Compared to all other land uses, forests provide the cleanest and most stable water supplies for drinking water, recreation, power generation, aquatic habitat, and groundwater recharge in the Southeastern United States. Specifically, forests are the most efficient land use at protecting and enhancing water quality and quantity, providing valuable ecosystem services related to water resources, including:

- absorbing rainfall and snow melt, recharging groundwater;
- helping to minimize flooding, dissipating energy;
- slowing storm runoff, reducing soil erosion and improving water infiltration;
- buffering and filtering pollutants from surface waters (e.g., sediments, fertilizers, pesticides, etc.); and
- providing aquatic habitat in support of biodiversity.

Project Background

With the passing of the 2008 Farm Bill, amendments to the Cooperative Forestry Assistance Act required state forestry agencies to conduct state-wide assessments of forest resources and develop strategies for forest resource conservation and management. The overarching goal of this initiative is to identify priority forest landscape areas and highlight work needed to address national, regional, and state forest management priorities. The N.C. Forest Service (NCFS), in collaboration with many agencies and organizations, began work on the State-wide Assessment of Forest Resources followed by the State-wide Forest Resource Strategy in early 2009.

In June 2010, the NCFS published *North Carolina's Forest Assessment: A statewide analysis of the past, current, and projected future conditions of North Carolina's forest resources*. The North Carolina Forest Assessment (also known as the North Carolina Forest Action Plan) can be downloaded at the following website: www.ncforestassessment.com.

Introduction

Guidance provided by the U.S. Forest Service (USFS) and the National Association of State Foresters (NASF) organized forest assessment topics into three national themes:

1. Conserve Working Forestlands
2. Protect Forests From Harm
3. Enhance Public Benefits from Trees and Forests

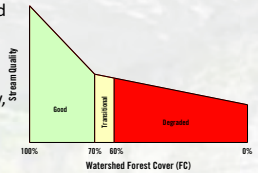
Within each national theme, strategic objectives were developed to provide additional guidance to state forestry agencies. Under the third national theme listed above, a *Protect and enhance water quality and quantity* strategic objective was created. The specific guidance provided by the USFS and NASF to achieve this strategic objective was:

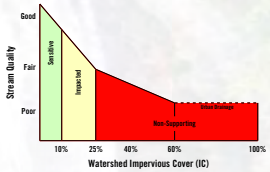
> *Assessments should identify watersheds where continued forest conservation and management is important to the future supply of clean municipal drinking water, or where restoration or protection activities will improve or restore a critical water source*.

Methods

The NCFS evaluated forested watershed conditions statewide using publicly available datasets. Two indicators of watershed water quality were used: (1) percent of forest/natural cover within a watershed and (2) percent of impervious cover (surface) within a watershed.

Research studies have documented that watershed water quality conditions commonly begin to deteriorate when forest cover percentages drop below 60 percent. Watersheds with 60-70 percent forest cover often have transitioning water quality, and watersheds with at least 70 percent forest cover often have water quality conditions that meet water quality standards for their intended uses. In addition, researchers have found that for every 10 percent increase in forest cover in a water supply source area, treatment and chemical costs decrease approximately 20 percent – up to about 60 percent forest cover.



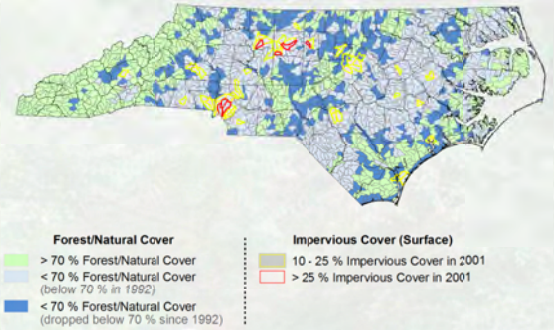


Other research studies have identified impervious cover as a key indicator of water quality. The Center for Watershed Protection summarized the findings of several research studies on water quality and watershed impervious cover and integrated the findings into a watershed planning model known as the impervious cover model (ICM). The ICM predicts that most stream quality indicators decline when watershed impervious cover (IC) exceeds 10 percent, with severe degradation expected beyond 25 percent.

In addition to evaluating watershed water quality, the NCFS conducted a Geographic Information System (GIS) analysis to address the guidance provided by the USFS and NASF, targeting watersheds that are important to the future supply of clean drinking water in North Carolina.

Watershed Water Quality Conditions

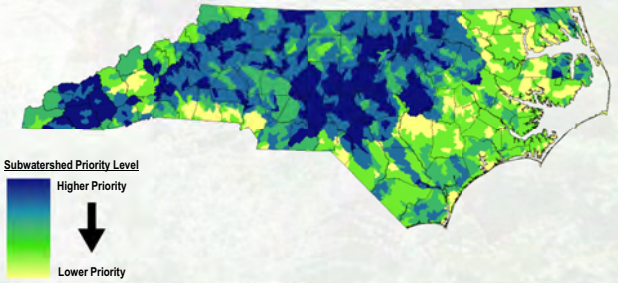
According to the National Land Cover Database (NLCD) in 1992, 829 of the 1,775 subwatersheds (12-digit hydrologic units) that occur within North Carolina were less than 70 percent forested. From 1992 to 2001, due largely to the conversion and loss of forestland, an additional 361 subwatersheds dropped below 70 percent forested. In addition, according to the 2001 NLCD Impervious Cover Dataset, 63 subwatersheds within the state are more than 10 percent impervious. By 2030, this number is expected to double.



Priority Forest Watersheds for Water Quality & Quantity

The NCFS conducted a spatial analysis to *identify watersheds where forest conservation and management are important to the future supply of clean municipal drinking water, or where restoration or protection activities will improve or restore a critical water source*. This analysis used five existing datasets combined through a weighted overlay. The five datasets used are listed below, ranked in order of their weighting:

1. N.C. Conservation Planning Tool – Water Service Assessment
2. N.C. Rural Economic Development Center – Forecasted Water Demand
3. Southern Forest Lands Assessment – Forestland Layer
4. N.C. Source Water Assessment and Protection Areas
5. Southern Forest Lands Assessment – Development Layer



Forest Strategies for Water Quality & Quantity

The NCFS developed Goals, Objectives, and Strategies to address resource conditions, trends, and threats. Water resources are addressed with Goal 6 (Water Goal). The Water Goal and associated Objectives (O-) and Strategies (S-) are listed below.

Goal 6: Manage, conserve, restore, and enhance forestlands important to current and future supplies of clean water for economic, social, and ecological uses.

O-6.1: Increase implementation of forestry Best Management Practices (BMPs) and compliance with water-quality regulations.

S-6.1.1: Evaluate forestry operations for implementation of forestry BMPs and compliance with water quality regulations.

S-6.1.2: Develop threshold criteria for determining when a noncompliant forestry operation directly contributes to a degradation or loss of in-stream aquatic habitat sufficient to warrant restoration or remediation of the affected water resource.

S-6.1.3: Increase the use of portable temporary bridging for crossing streams or ditches during forestry operations.

O-6.2: Retain or increase the area of forestland within priority watersheds.

S-6.2.1: Conserve and acquire forestlands in priority watersheds for the purposes of protecting or restoring water quality, water supply, and aquatic habitat.

O-6.3: Conduct education and outreach on the relationships between forests and water resources.

S-6.3.1: Educate natural resources professionals and landowners on how to protect water quality from nonpoint source pollution that may result from forestry operations.

S-6.3.2: Raise awareness of landowners, the general public, policy-makers, and K-12 schoolchildren on the relationship between forests, water quality, and nonpoint source pollution prevention.

O-6.4: Offer landowners technical assistance that incorporates water resource management with forest management.

S-6.4.1: Assist landowners with assessing and managing their forests to protect watersheds or restore degraded aquatic conditions.

S-6.4.2: Evaluate and promote the utilization of forestry practices to manage nonpoint source runoff from nonforested lands in transition areas between rural, suburban, and urban environments.