EXECUTIVE SUMMARY

In March 2008, the N.C. Division of Forest Resources (NCDFR) completed a two-year survey to evaluate the implementation of voluntary forestry Best Management Practices (BMPs) on active logging sites statewide. The BMP Implementation Survey (Survey) continues to be an integral part of NCDFR's efforts to assess, develop, and promote BMPs for the protection of North Carolina's water resources during forestry operations.

This report summarizes the results of 212 site survey field evaluations conducted between May 2006 and March 2008 and represents the second statewide survey of active logging sites. The previous report, titled *Final Report for the North Carolina Forestry BMP Implementation Survey 2000-2003* (2005 BMP survey report, NCDFR 2005), established a baseline of BMP implementation in the state.

The Division's field surveyors only evaluated BMPs that applied to each site at the time of the Survey. A qualitative assessment of water quality risk was also noted in association with implementation or non-implementation of a BMP. Additionally, an assessment of compliance with North Carolina's Forest Practices Guidelines Related to Water Quality (FPGs) was completed to determine the influence of BMP implementation on FPG compliance.

Statewide, BMP implementation was 85 percent. Implementation during this Survey period increased slightly from the 2000-2003 period, which had an overall implementation rate of 82 percent. When compared to the previous survey, implementation of BMPs increased in the Coastal Plain and Piedmont and decreased in the Mountains.

BMP implementation was 66 percent in the Mountains, 88 percent in the Piedmont, and 91 percent in the Coastal Plain. On average statewide, when BMPs were properly implemented, there was no risk to water quality nearly 100 percent of the time. Conversely, when BMPs were not implemented, it resulted in a risk to water quality 54 percent of the time. Regionally, risk to water quality resulting from non-implementation of BMPs was the highest in the Mountains (70%) followed by the Coastal Plain (61%) and Piedmont (30%).

On average statewide, BMPs for streamside management zones (SMZs), stream crossings, debris entering streams, rehabilitation of the project site (rehab), and skid trails represent 73 percent of the non-implemented BMPs and 94 percent of the observed risk to water quality. BMPs for rehab and stream crossings had the lowest implementation in all regions of the state. Implementation of BMPs for skid trails was notably lower in the Mountains, compared to other regions.

FPG compliance was more common on harvest sites with higher BMP implementation. Conversely, as BMP implementation decreased, the number of compliant FPG standards also decreased (more non-compliant standards). Similar to the FPG program data, violation of (.0201) Streamside Management Zones, (.0202) Prohibition of Debris entering streams and Waterbodies, (.0203) Access Road and Skid Trail Stream Crossings, and (.0209) Rehabilitation of Project Site represented the majority of the non-compliant FPG standards on surveyed sites. These data clearly indicate that implementation of BMPs can yield higher FPG compliance on forestry sites and lower implementation of BMPs can yield a larger number of non-compliant FPG standards.

Where applicable, riparian buffer rule compliance was equal to or greater than 90 percent across the state. BMP implementation was notably lower in river basins that are largely located within the Mountains (e.g., Broad, French Broad, Hiwassee, Little Tennessee, New, and Watauga), and risk to water quality was higher in these river basins. These data indicate high riparian buffer rule compliance (for the assessed rules) and also highlight the challenges and value of implementing BMPs in the mountainous areas of the state.

Average SMZ width was estimated in the field for each surveyed SMZ. Surveyors qualitatively evaluated all SMZ widths to determine if BMP recommendations were followed and whether there was a risk to water quality associated with the width of the SMZ. This large scale evaluation of SMZ widths on active logging sites is possibly the first instance of such an assessment in North Carolina. Data indicate that a SMZ greater than 10 feet in width notably reduces risk to water quality when compared to SMZ widths of less than 10 feet. Also, the average width of all SMZs surveyed statewide that had no risk to water quality was 50 feet on perennial streams and 36 feet on intermittent streams.

BMP implementation was higher and risk to water quality was lower on sites that received technical assistance and / or preharvest planning. While BMP implementation was lower in Districts with Water Quality Foresters (WQFs), risk to water quality was also lower. BMP implementation was higher on sites harvested by ProLoggers and risk to water quality was lower. FPG compliance was higher when technical assistance, preharvest planning, WQFs, and / or ProLoggers were associated with a harvest site. These data clearly indicate that technical assistance, preharvest planning, and training can increase BMP implementation and FPG compliance and decrease risk to water quality.

BMP implementation and risk to water quality varied by ownership and forest management type. While implementation was higher on forest industry land, so was risk to water quality. In contrast, "intensively managed forests" had higher BMP implementation and lower risk to water quality when compared to "passively managed forests." Therefore, the influence of ownership and forest management on BMP implementation and risk to water quality may not be as important as harvest site characteristics (e.g., streams, soils, slope, etc.) and other factors related to the harvest sale and operation (e.g., timber buyer, logger, etc.).

BMP implementation was higher and risk to water was lower on sites with less topographic slope. Sites with medium textured soils and soils with higher erodibility generally exhibited a lower BMP implementation and higher risk to water quality. These data clearly indicate the influence of site geographic features on BMP implementation and risk to water quality. Also, the influence of slope, soil texture, and soil erodibility on BMP implementation and risk to water quality closely aligns with regional implementation and water quality risk data (i.e., Mountains, Piedmont, and Coastal Plain).

Survey results indicate that improving BMP implementation of stream crossing BMPs will have the most positive influence on reducing the risk to water quality on active harvest sites, followed by BMPs for rehabilitation, debris entering streams, skid trails, and SMZs.

In summary, the results of the Survey indicate that adherence to a three-phased approach to implementing BMPs can reduce risk to water quality and provide appropriate protection for water quality during forest harvesting operations.

- Phase 1 – Plan for BMPs
  - Evaluate the characteristics of a proposed harvest site in advance of conducting harvesting operations, identifying potential hazards and BMP implementation needs. This planning could be a brief site walk-through or a detailed preharvest plan.
- Phase 2 – Implement Applicable BMPs
  - Implement BMPs identified during Phase 1, adding implementation of other applicable BMPs as needed based on harvest site characteristics. Where applicable, emphasis should be placed on BMPs where operations are closest to streams / waterbodies (e.g., stream crossings, debris entering streams, SMZs, etc.) and where high traffic areas could expose soil and produce accelerated erosion (e.g., skid trails).
- Phase 3 – Conduct Rehabilitation
  - Conduct rehabilitation activities where needed as early as possible with emphasis on operational areas closest to streams / waterbodies and where the potential for accelerated erosion is high.