

**WATER RESOURCE ASSESSMENT for Plan Revision
Green Mountain National Forest**

EXECUTIVE SUMMARY

The Green Mountain National Forest (GMNF) Water Resource Assessment presents past and existing water resource conditions within the Forest proclamation boundary, public values and expectations relating to water resources, and water resource public issues and information needed for revision of the National Forest Land and Resource Management Plan (Forest Plan). This Executive Summary provides an overview of the contents of the water resource assessment for the GMNF, focusing on information that is most important for identifying possible problem areas for restoration opportunities, and for highlighting water resource management success areas.

The basis for public values and expectations related to water resources on the GMNF comes from the Federal and Vermont State regulations/guidelines, the recommendations of town and regional plans, a summary of the comments and concerns from Forest Service public meeting issue papers, and the current GMNF Forest Plan direction. The assessment outlines the legal and administrative regulations and guidelines (Item A) for water resource management from the 1972 Clean Water Act to the current GMNF Forest Plan direction that is the foundation for the current management of the GMNF's water resources.

The assessment summarizes the past natural and human-induced disturbances that have affected the current land condition (Item B). In addition, the assessment addresses establishing Desired Future Conditions and the capabilities for comparing reference conditions to current, disturbed conditions. The assessment defines a reference condition as a natural area that has experienced the least impact from human-induced disturbances, and discusses the streams on the GMNF that are being evaluated as possible Vermont State reference reaches.

A look at the existing aquatic ecosystem on the GMNF is important to determine the overall condition of the Forest water resources, to assess the need for future monitoring, and for comparison to the watershed conditions in the entire state of Vermont. This information is provided in detail in the assessment in Items C, D and E. Overall:

- Water quality in the GMNF ranks as some of the highest in Vermont.
- A major concern impacting the water quality on the GMNF is acid-deposition, which is being monitored and analyzed very closely by the State of Vermont.
- Forest roads (state, town, and FS roads) may be the largest long-term source of stream sedimentation on the GMNF, and continued work will be needed to correct these problems.
- There is a notable distinction between water quality, and channel morphology and habitat in terms of their rates of recovery. Physical habitat conditions have not improved as rapidly as water quality has in most GMNF streams. Current forest management direction provides the basis for recovery of riparian forest and a

long-term source of woody debris to restore channel morphology and stability, and habitat diversity.

- Streams and rivers in the GMNF have been subjected less to the range and intensity of human-imposed changes over time. As a result, GMNF streams do not pose the range of problems associated with streams elsewhere in Vermont primarily because there is less development, less agriculture, and more natural vegetation on the Forest.

The assessment addresses in detail certain public issues and questions relating to water resources (Item F), and is summarized in part below:

- Have the GMNF land management activities caused erosion? – Monitoring of the effects of management activities on soil, water, and fishery resources was conducted on 1992-1999 timber sales, as well as other GMNF projects. The results showed that soil, water, and fisheries resources adjacent to timber sales were being protected overall. Similar results were found in 2000 – 2002 from monitoring past timber sales.
- Have forest management activities caused positive and/or negative hydrological impacts? – Roads affect the overall hydrology in a watershed, particularly the quantity and timing of flow, by expanding the channel network, converting subsurface flow to surface flow, and reducing infiltration on impervious surfaces. The stream habitat restoration projects conducted on the GMNF have had a positive effect on stream hydrology by increasing the number of pools (slow water habitat) which increases water depths and storage in streams.

The identification of restoration areas is a very important result from the water resource assessment (Item G). Over the last decade, many projects were implemented on the GMNF to improve water quality and riparian areas by eliminating erosion and sedimentation problems, and by revegetating and stabilizing bare soil areas, such as:

- Several low-use campsites were closed and revegetated to correct erosion,
- Landslides along streams were revegetated,
- Old roads with erosion problems were closed and revegetated,
- Gravel pits were closed and revegetated,
- Bridges and culverts were removed along old, closed roads because these structures were causing, or had the potential to cause, stream blockage,
- Several projects on trails and roads were implemented to correct erosion and sedimentation problems by installing water bars and culverts, and by rehabilitating gullies.
- Monitoring stream habitat restoration projects has shown a 5-fold increase of large woody debris with significant changes to habitat composition (percent of stream area in pool, riffle and run habitat) and complexity (structural makeup and protective cover). There has also been an increase in aquatic insect diversity (taxa richness), community structure, and total abundance, as well as preliminary findings that trout populations are benefiting from the stream restoration projects.
- Stream restoration provides compliance with Forest Plan requirements for providing the highest water quality and enhancing Vermont's Water Quality Standards for aquatic habitat, aesthetics and recreation.

- The GMNF will continue to use state-of-the-art methods for aquatic resource protection and restoration within a framework that includes multiple management approaches and alternatives such as passive restoration (corridor protection and riparian revegetation) and active restoration (corridor protection and in-channel improvements).