



United States
Department
of Agriculture

Forest
Service

**Eastern
Region**

R9-GM-ME
Report

March 2008



Green Mountain National Forest

Annual Monitoring and Evaluation Report

Fiscal Year 2007



Red bat banded during monitoring efforts in Mount Tabor, Vermont
Photo courtesy of **Chris Alexopoulos-USFS**

Note on cover photo: The red bat is rarely captured on the Green Mountain National Forest (GMNF) and is listed by the Vermont Fish and Wildlife Department as a Vermont Species of Greatest Conservation Need. This bat was captured at a high elevation in very tall net sets (approximately 30+ feet). The netting is part of the GMNF monitoring program, and is done in cooperation with the State of Vermont and the United States Fish and Wildlife Service (USFWS).

**This document is available in large print.
Contact the Green Mountain National Forest
Supervisor's Office
1-802-747-6700
TTY 1-802-747-6765**

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, or marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotope, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

Annual Monitoring and Evaluation Report

Green Mountain National Forest

USDA Forest Service
Eastern Region
Milwaukee, Wisconsin
March 2008

For further information contact Melissa M. Reichert
Green Mountain and Finger Lakes
National Forests
231 N. Main St.
Rutland, VT 05701
802-747-6720
mmreichert@fs.fed.us

Executive Summary

This is the second Monitoring and Evaluation Report compiled under the 2006 Green Mountain National Forest (GMNF) Land and Resource Management Plan (Forest Plan). The GMNF monitoring and evaluation plan are described in Chapter 4 of the Forest Plan. As explained in more detail in Chapter 4, monitoring items consist of mandatory components found in every forest plan, as well as monitoring items that are tailored to address GMNF issues raised through public scoping and interdisciplinary team review.

The Annual M&E Report provides an opportunity to track progress towards the implementation of the revised Forest Plan decisions and the effectiveness of specific management practices. The focus of the evaluation is on providing short- and long-term guidance to ongoing management. Guidance for development of the Annual M&E Report is provided in Chapter 4 of the Forest Plan and 36 CFR 219.6(a)(3) and (b)(2) requiring monitoring results be evaluated annually and provide for:

- (i) Monitoring to determine whether plan implementation is achieving multiple use objectives
- (ii) Monitoring to determine the effects of various resource management activities within the plan area on the productivity of the land
- (iii) Monitoring of the degree to which on-the-ground management is maintaining or making progress toward the desired future conditions and objectives for the Forest Plan
- (iv) Adjustment of the monitoring program as appropriate to account for unanticipated changes in conditions

The information gained from the Monitoring and Evaluation Report is used to determine how well the desired conditions, goals, objectives, and outcomes of the Forest Plan have been met. At this point with less than two years implementation of the revised Forest Plan, however, trends, patterns, and results generally are not clearly defined. Evaluations and conclusions that would lead to changes in the Forest Plan are not expected. Rather, this report focuses more on what we monitored, how it was monitored, how easy and efficient the protocols were to use, and how effective they were at answering the monitoring questions.

Highlights from the Report

In 2007, the GMNF staff monitored 58 items covering 21 areas. Highlights of these monitoring efforts include:

- Partnerships and volunteers contributed a total value of \$599,953 through formal and volunteer agreements
- 675,000 board feet were harvested
- 4.5 million board feet were offered and sold
- 23 recreation facilities and 14 miles of trails were surveyed for deferred maintenance
- 2 Wilderness areas, totaling 24,485 acres, were managed to national standard
- 7,500 acres were inventoried for heritage sites leading to documentation of 50 additional sites
- The long-term ecosystem monitoring project for soil, forest health and vegetative communities was initiated
- 7 streams were monitored for macroinvertebrates, with all but one stream (which rated poor) rating very good to excellent
- 16 streams were monitored for Atlantic salmon with an average of 1024 juvenile salmon per mile

- 6 streams were monitored for fish habitat and channel stability with all showing Habitat being maintained and channels being stable
- 5 streams in the White River watershed were monitored for temperature with all but one falling within the desired temperature range for fish habitat
- 675 acres of existing openings were enhanced and/or maintained and over 1,500 acres of openings were monitored
- Site surveys for reptiles and amphibians were initiated in areas where management activities are proposed
- 3 territorial pairs of peregrine falcons, with 2 pairs successfully reproducing, were identified on the GMNF
- 800 acres of deer wintering habitat was surveyed for use, cover condition and forage availability
- Use of a more standardized approach to data collection for Regional Forester's Sensitive Species (RFSS) was initiated, and 15 sites and 300 butternut trees were monitored
- Surveyed 6 areas for NNIS
- 2 significant ecological areas, the Cape Research natural Area (RNA) and Blue Ridge Fen candidate RNA were monitored for quality and disturbances
- 5 human caused wildfires on 10.3 acres were suppressed
- 341.5 acres were treated for hazardous fuels
- 16 teachers completed A Forest for Every Classroom training and 16 Vermont schools participated in the Vermont Envirothon
- 965 acres were purchased to complete The Broad Brook land sale in Pownal

Key Events and Achievements in Fiscal Year 2007

Completion of Monitoring and Evaluation Guide

After completing the 2006 Forest Plan, the Monitoring and Evaluation Guide was developed. The Guide provides specific information on implementing the monitoring strategy outlined in Chapter 4 of the 2006 Forest Plan. During development of the Monitoring Guide, the importance of including only those items necessary to meet the intent of measuring and evaluating the implementation, effectiveness, and validation of the Forest Plan was emphasized. Monitoring tasks were designed to link directly to monitoring questions in Chapter 4 of the 2006 Forest Plan.

The Monitoring and Evaluation Guide provides specific technical guidance that describes how, where, and when to accomplish the monitoring prescribed in the Forest Plan. It provides specific methods, protocols, and analytical procedures. The Guide establishes and schedules the priorities, and should ensure efficient use of limited time, money, and personnel. The Guide is intended to be flexible, and may be modified in response to new information, updated procedures or protocols, emerging issues, and budgetary considerations without amending the Forest Plan.

The Monitoring Guide contains a menu of activities from which monitoring actions may be selected; there is no requirement to achieve the entire list of activities. A set of questions was identified to assist in the prioritization of monitoring tasks. Monitoring Guide activities are included in the Annual Monitoring Schedule based on priorities and funding availability. The Monitoring Guide was completed in June of 2007 and is available at:

http://www.fs.fed.us/r9/gmfl/nepa_planning/monitoring_and_evaluation_reports/index.htm

Celebrating 75 years of caring for the land and serving people

In 2007 the Green Mountain National Forest turned 75 years old. As the forest has grown tract by tract from its modest beginnings in 1932 of 1,842 acres to its present 400,000 acres, our responsibilities have grown. The Forest makes up six percent of the Vermont landscape and is the largest contiguous green space in the state. Celebration events this past year included a partnership picnic at Hapgood Pond in May, the dedication of the new Moosalamoo National Recreation Area in June, the dedication of the Stafford National Recreation Area in August, an "Art in Nature" exhibit at the Chaffee Art Center in October, and providing the Capitol Christmas Tree to the Nation's Capitol in Washington D.C. in November.

New England Wilderness Act

On December 1, 2006, President Bush signed the New England Wilderness Act of 2006. This created the Glastenbury Wilderness (22,425 acres), Joseph Battell Wilderness (12,333 acres), and created additions to the Breadloaf Wilderness (3,757 acres), Big Branch Wilderness (47 acres), Peru Peak (752 acres), and the Lye Brook Wilderness (2,338 acres). The Forest's wilderness program now accounts for approximately 101,000, or 25 percent of the Green Mountain National Forest.

Broad Brook Acquisition

On June 13, 2007, the Forest closed on the last segment of the 3,420 acre Broad Brook acquisition with assistance from our partner, the Trust for Public Land. This property is unique in that it encompasses almost the entire watershed of upper Broad Brook. It also provides public recreation opportunities and contains the eastern slope of Dome (a 2,478 foot mountain), and parts of the Appalachian National Scenic Trail/Long National Recreation Trail, Dome Trail and Broad Brook Trail. Acquiring this tract will increase opportunities for wildlife habitat conservation, particularly black bears.

Catamount Trail Completion

In 2007, the final segments of the Catamount Trail on the GMNF and one the final remaining segment of the entire trail were completed. Catamount Trail is a cross country ski trail going the length of the State of Vermont. Its completion involved improvement of approximately 4-5 miles of trail on the Manchester Road in the Town of Winhall.

Other Project Monitoring

Monitoring of projects, large and small, occurs on all the districts and involves numerous resource professionals across the Forest. Examples include sale administrators checking loggers for compliance with contract specifications; field checking timber marking to determine consistency with marking guides; conducting regeneration surveys to determine stocking levels; checking harvest units to determine if results incorporated and achieved silvicultural prescriptions, Forest Plan objectives, standards and guidelines, project design criteria, and EA direction; and checking application of mitigation measures to determine if they are appropriate and effective. Often times the monitoring is informal consisting of general field observations. Other times monitoring is more formal and entails following protocols. Results from formal monitoring efforts are generally included in the Annual M&E Reports.

Public Involvement

The Forest Service continues to publish the Green Mountain National Forest Schedule of Proposed Actions, a newsletter containing information about upcoming and on-going projects to implement the Forest Plan. The purpose of the Schedule is "to give early informal notice of proposals so the public can become aware of Forest Service activities and indicate their interest in specific proposals" (FSH 1909.15, Section 07). We encourage the public to become part of our management process by commenting on project proposals through the National Environmental Policy Act (NEPA) process. Information about planning our projects and project contacts can be found on the Internet at: www.fs.fed.us/r9/gmfl/nepa_planning/index.htm

Approval

Having reviewed the GMNF Monitoring and Evaluation Report, I am satisfied with its findings and intend to consider recommendations made therein. The Monitoring and Evaluation report meets the intent of both the Forest Plan (Chapter 4) as well as the regulations contained in 36 CFR 219. As always, we encourage public involvement during the process of developing individual project proposals.



MARGARET MITCHELL
Forest Supervisor

Date: 4/7/08

Table of Contents

1.1	Introduction.....	1
1.1.1	Introduction.....	1
1.1.2	Monitoring and Evaluation Guide	1
1.1.3	Annual Monitoring and Evaluation Reports	2
1.1.4	Partnerships and Collaboration	3
2.1	Discussion of monitoring	4
	Forest Plan Implementation	6
	Recreation.....	16
	Wilderness, Wilderness Study Areas, and Roadless Areas.....	20
	Eligible Wild, Scenic, and Recreational Rivers	27
	Visuals	28
	Heritage	29
	Air	30
	Soil	31
	Water	34
	Fish	35
	Wildlife	40
	Wildlife: Management Indicator Species	48
	Botanical Resources	49
	Timber	54
	Special Forest Products.....	58
	Rare Features	59
	Insects and Disease.....	62
	Forest Health	63
	Fire	65
	Information, Education, Partnerships, and Payments to Towns	69
	Lands	74
3.	Research and Studies	76
4.	Adjustments or Corrections to the Forest Plan	78
5.	List of Preparers	79
	Appendix A: Payments to Towns	80
	Green Mountain National Forest Payments in Vermont.....	80
	Appendix B: Regional Forester Sensitive Species, Rare or Uncommon Natural Communities, and Non-Native Invasive Species	83

1.1 INTRODUCTION

1.1.1 Introduction

Monitoring and evaluation (M&E) are required by the National Environmental Policy Act and the National Forest Management Act to determine how well the Land and Resource Management Plan (Forest Plan) is being implemented. The M&E process enables the Forest Service to assess its effectiveness in moving toward stated management goals and desired conditions. The 2006 Forest Plan may be amended or revised to adapt to new information and changed conditions identified through M&E efforts. Through this adaptive management approach, the Forest Plan is kept current.

Monitoring is conducted to accomplish several objectives, including:

- To determine how well the goals and objectives of the Forest Plan have been met
- To determine how closely Forest Plan management Standards and Guidelines have been followed
- To determine if conditions or demands in the area covered by the Forest Plan have changed significantly enough to require a revision to the Plan

Monitoring of the Green Mountain National Forest (GMNF) began in 1987 with guidance provided in the 1987 Forest Plan. A revised Forest Plan was completed in February 2006 and includes programmatic direction for monitoring and evaluating Forest Plan implementation. Chapter 4 (M&E Chapter) of the 2006 Forest Plan defines the over-arching, strategic questions that must be addressed by the Forest Service through monitoring, including broad timetables and schedules for analysis and reporting.

In addition to direction for monitoring and evaluation, the Forest Plan describes the current state of the GMNF as well as the ideal state, which the Forest Service and interested publics envisioned as the Forest's "desired future condition." The Forest Plan allocated land to different management areas, each with a unique desired future condition, major emphasis, and management direction.

Coordination of management projects to bring about the desired future conditions stated in the Forest Plan is a complex task. The Forest Service wants to ensure that the highest priority projects are located in the most suitable areas, and that management of all resources in a particular area is integrated to improve efficiency and reduce impacts on the natural and social environments.

1.1.2 Monitoring and Evaluation Guide

In addition to the guidance outlined in the 2006 Forest Plan, the GMNF staff completed an M&E Guide in June of 2007. The M&E Guide provides more specific procedural guidance to implement the monitoring strategy outlined in the Forest Plan. The M&E Guide contains specific monitoring elements, along with methods, protocols, and analytical procedures to be followed. The M&E Guide is a suite of monitoring activities that may be used to help managers understand and answer the Forest Plan monitoring questions. Based on information garnered through the annual M&E Report, the M&E Guide will be updated to incorporate suggested changes. The Forest Service will select specific monitoring activities from the M&E Guide during Forest Plan implementation.

1.1.3 Annual Monitoring and Evaluation Reports

Purpose and Scope

The Annual M&E Report provides a forum for the review of current-year findings. This report displays monitoring results including:

- What monitoring activities were completed?
- What Forest Plan monitoring questions were addressed?
- How well did the monitoring address those questions?
- Do future monitoring activities need modified?

The Annual M&E Report is prepared by an interdisciplinary Forest Service team that incorporates information gathered from Forest Service specialists, partners, private citizens, and non-profit organizations. The Forest Service is grateful to the people who contribute their monitoring efforts and results and who take an interest in actively participating in the management of the GMNF.

This Annual M&E Report evaluates the results of the monitoring accomplished during Fiscal Year 2007 (October 1, 2006-September 30, 2007), hereafter referred to as FY07. This report describes monitoring items by resource category, provides data pertaining to the effects and effectiveness of Forest Plan management direction, and discusses various resource management efforts in which the GMNF engaged in FY07.

A major part of monitoring and evaluation is to determine if the resource outputs, management costs, returns, and environmental objectives were achieved as predicted in the Forest Plan. To do this, the report compares the objectives stated in the Forest Plan with what was actually accomplished during FY07.

Annual Monitoring and Evaluation Report Outline

The remainder of this report is divided into four chapters.

- Chapter 2 consists of monitoring for 17 elements from the Forest Plan monitoring requirements. Each includes where feasible: background information; brief explanation of the monitoring activities and protocols; and discussion on the evaluation, conclusions, or recommendations.
- Chapter 3 provides a brief summary of on-going research and studies on the Forest.
- Chapter 4 discusses adjustments or corrections to the Forest Plan.
- Chapter 5 is a list of the Forest Service employees that provided information contained in this report.

The activities and outputs we monitor may be traced to one of three sources:

1. NFMA implementing regulations requirements (36 CFR 219 (1982)), which outline specific activities and outputs to be monitored
2. Forest Plan requirements (Chapter 4) selected to facilitate comparison between actual conditions and desired future conditions
3. Questions derived from public comments which are particularly useful for monitoring public satisfaction with the resources and services the GMNF provides.

1.1.4 Partnerships and Collaboration

Partnerships and collaboration are essential throughout all levels of the Forest Service. Retired Chief of the Forest Service Dale Bosworth has stated that *“As we enter the Forest Service’s second century of caring for the land and serving people, a strong spirit of partnership and collaboration is more important than ever.”* The GMNF staff has worked with partners throughout its history to achieve social, economic, and ecological goals. Each year, the GMNF staff continues relationships with existing cooperators and enters into new ones. This collaboration has resulted in increased public service and improved land stewardship, both which enhance the Forest Service’s effort to meet desired conditions. This overview will share information on both formal agreements and informal cooperative efforts. Information is presented as a collective report for the Green Mountain and Finger Lakes (GMFL) National Forests for FY07 as the information is tracked regionally in a combined report.

Formal Agreements:

The Forest Service uses many types of agreements to document its work with other organizations and entities. Each of these has specific Congressional legal authority and requirements. The appropriate instrument depends on what the partnership will accomplish, who will benefit, and who is providing funding. The Forest Service must have appropriate statutory authority prior to entering into any agreement, which could result in the use, obligation, or other commitment of any Forest Service resources.

During FY07, there were a total of 34 signed grants and agreements that provided or obligated \$599,953.39 worth of cash, goods, and services to the GMFL from partners, and \$457,306.12 worth of cash, goods, and services to partners from the GMFL.

Volunteer Agreements

In FY07, 135 volunteers provided 26,376 hours of service at an appraised value of \$495,078 to the Green Mountain and Finger Lakes National Forests.

Total to the Forest:

Including formal and volunteer agreements, partners gave a total value of \$599,953.39 to the GMFL in FY07. This includes:

- cash contributions of over \$200,000
- in-kind contributions of over \$163,000
- non-cash contributions of over \$235,000.

Total to Partners:

Contributions also went to various partners for the work they provided to support the GMFL. In FY07, there was over \$405,000 in funds and over \$51,000 in non-cash contributions that were obligated and/or provided by the GMFL to partners, including: challenge cost-share agreements, law enforcement agreements, and roads agreements. There were also partnerships where Forest Service’s and partner’s funds combined to pay for land improvements.

The GMFL has had numerous on-going informal agreements with State, county, local and other federal agencies, and non-profits that benefit the Forests. These informal partnerships have not been documented through the formal agreement process and are not accounted for in the numbers listed above; however, they do greatly benefit the GMFL.

2.1 DISCUSSION OF MONITORING

The following table (Table 2.1-1) consists of elements from Tables 4.1-3 through 4.1-7 of the Forest Plan. It identifies the resource element, monitoring question and drivers, and frequency

of measurement that are discussed on the pages that follow in this report.

Table 2.1-1: Resource areas, monitoring questions and drivers, and measurement frequency discussed in this report.

	Resource	Monitoring Question(s)	Monitoring Driver	Frequency of Measurement
1	All	How close are actual outputs and services to projected outputs and services?	A quantitative estimate of performance comparing outputs and services with those projected by the 2006 Forest Plan.	Annual
2	All	How close are actual costs to projected costs?	Documentation of costs for carrying out the planned management prescriptions as compared with costs estimated in the Forest Plan.	Annual
3	All	To what extent have Objectives been attained?	Forest Plan Objectives	Annual
4	All	To what extent have Standards and Guidelines been applied?	Forest Plan Standards and Guidelines	Annual
5	All	What are the effects of management practices prescribed by the 2006 Forest Plan?	Forest Plan Management Area Guidance	Annual
6	Transportation System	Is the use of vehicles off roads causing considerable adverse effects on resources or other forest visitors; how effective are forest management practices in managing vehicle use off roads?	36 CFR 295 Use of vehicles off roads shall be planned, implemented and monitored in order to protect resources and visitors from considerable adverse effects, promote public safety, and minimize conflicts with other NFS land uses of the NFS lands	Annual
7	Recreation	Is the quality of the Forest Service trail system and recreation facilities being improved through operation and maintenance?	Forest Plan Goal 12	Annual
8	Wilderness	To what extent is Wilderness managed to preserve its Wilderness character?	Forest Plan Goal 13	Annual
9	Wild, Scenic, and Recreational Rivers	To what extent are eligible Wild and Scenic Rivers managed to preserve their outstandingly remarkable values?	Eligible Wild, Scenic, and Recreational Rivers Management Area Guidance; Wild and Scenic Rivers Act 16 U.S.C. 1271-1287, October 2, 1968, as amended 1972, 1974-1976, 1978-1980, 1984, 1986-1994 and 1996.	Annual

10	Soil, Water, and Air	To what extent are air quality and atmospheric deposition affecting sensitive components of the forest ecosystem?	Forest Plan Goals 2-8, 12 and 13	1-5 Years
11	Soil, Water, and Air	To what extent are Forest Service management and restoration activities maintaining or improving soil quality?	Forest Plan Goal 3	1-5 Years
12	Soil, Water, and Air	To what extent is Forest management affecting water quality, quantity, flow timing, and the physical features of aquatic, fisheries, riparian, vernal pool, and wetland habitats?	Forest Plan Goal 4	1-5 Years
13	Wildlife: Management Indicator Species	To what extent are forest management activities providing habitat for MIS?	Forest Plan Goal 2, Maintain and restore quality, quantity, amount, and distribution of habitats to produce viable and sustainable populations of native and desirable non-native plants and animals.	Annual
14	Native and Desired Non-Native Species	To what extent are management activities contributing toward population viability for native and desired non-native species? To what extent do management activities contribute toward restoration and maintenance of habitat for native and desirable non-native species?	Forest Plan Goal 2	Variable
15	Vegetation	Are harvested lands adequately restocked according to Plan goals?	Lands are adequately restocked as specified in the Forest Plan.	Annual
16	Insects and Disease	Are insect and disease levels compatible with objectives for maintaining healthy forest conditions?	Destructive insects and disease organisms do not increase to potentially damaging levels following management activities.	Annual
17	Interpretation and Education	In what way is the Forest Service providing information and education opportunities that enhance the understanding of the GMNF?	Forest Plan Goal 19	Annual



Forest Plan Implementation

Evaluation Question:

How do actual outputs compare to those projected in Forest Plan Appendix D, Proposed and Probable Practices, specifically related to heritage, recreation, roads, vegetation, rare, ecological, wildlife, and fisheries resources?

Monitoring Question: How close are actual outputs and services to projected outputs and services?

Monitoring Driver: A quantitative estimate of performance comparing outputs and services with those projected by the 2006 Forest Plan.

Background: This monitoring element is used to determine if resource outputs for the GMNF are being accomplished as outlined in Appendix D of the Forest Plan. In Appendix D, Table D-5 lists a summary of the proposed management practices that could be expected to occur on the GMNF over the first decade of Forest Plan implementation, as well as estimates of goods and services to be provided through implementation of the 2006 Forest Plan.

Monitoring Activities: There were numerous outputs and services provided on the GMNF during FY 2007. These outputs are displayed in Table 2.1-3 Estimated and Actual Outputs Achieved in Fiscal Year 2007.

Evaluation and Conclusions: Many resource areas provided close to the estimated amount of outputs and services. Heritage over achieved acres inventoried, sites monitored and new sites identified which is a benefit to the protection of these resources. Although timber volume is less than estimated, both the amount harvested, and the amount offered and sold have increased. This will increase the amount of acres of vegetation treatment in the future.

Recommendations: Continue to monitor outputs and services to determine if there are shortcomings in services provided and/or if adjustments should be made to the estimated outputs.

Evaluation Question:

How do actual outputs compare to those projected in Forest Plan Appendix D, Proposed and Probable Practices, specific to timber offered and sold?

Monitoring Question: How close are actual outputs and services to projected outputs and services?

Monitoring Driver: A quantitative estimate of performance comparing outputs and services with those projected by the 2006 Forest Plan.

Background: This monitoring element is used to determine if timber sale outputs for the GMNF are being accomplished as outlined in Appendix D of the Forest Plan. In Appendix D, Table D-5 lists a summary of the proposed management practices that could be expected to occur on the Green Mountain National Forest over the first decade of Forest Plan implementation. Probable timber volume offered and sold for the first decade of 197 million board feet (MMBF) would translate to an average annual offering of 38,789CCF (19.7 MMBF) in any given year.

Monitoring Activities: Forest Activity Tracking System (FACTS) was used to monitor timber offered and sold along with the type of timber harvesting practices used to implement the Forest Plan.

Evaluation and Conclusions: The Forest offered and sold 4.54 MMBF or 7,363 hundred cubic feet (CCF) of sawtimber and pulpwood in FY 2007, roughly 23% of the Forest Plan Allowable Sale Quantity (ASQ) annual average of 38,789 CCF (19.7 MMBF). ASQ is the maximum amount of timber volume that may be offered and sold during Decade 1, expressed on an annual basis.

Recommendations: Continue to monitor. With less than two years of Forest Plan implementation underway, it is early to conclude that the timber offered will not meet the decadal ASQ. As such, the Forest will continue to monitor the sale of timber and pulpwood, as well as looking at ways to become more efficient in reducing unit costs. For FY 2008, the Forest plans to offer four timber sales of various sizes along with firewood permits for a total of roughly 7,995 CCF (5.0 MMBF). Two projected sales will involve Stewardship Contracts as a way to implement the watershed and habitat work.

Proposed and probable harvest management practices:

Estimates of Management Practices	Annual Acres in Decade 1 Acres	Acres Completed FY 2007	% of Annual Acres
Even-aged Regeneration Harvest	1,750	98	5.6
Even-aged Intermediate Harvest	1,324	170	12.8
Uneven-aged Harvest	981	330	33.6
Total Harvest	4,055	598	14.7

Table 2.1-3 Estimated and Actual Outputs Achieved in Fiscal Year 2007 Forest Plan Appendix D, Proposed and Probable Practices			
Activity or Practice	Unit of Measure	Estimated Amount (Decade 1)*	Actual Amount Achieved in FY07
Heritage Resource Protection			
Inventoried Acres	Acres	2,000 to 4,000	5500
New Sites Identified	Sites	10 to 40	25
New Sites Evaluated	Sites	2 to 7	0
Sites Monitored	Sites	30 to 60	50
Recreation Resources			
Trail Improvement	Miles	10 to 20	5
Trail Rehabilitation	Miles	200 to 400	NA
Trail Maintenance	Miles	9,050	122
Wilderness Managed**	Areas	30 to 50	2
Roads Management			
Rights-of-Way Acquisition	Rights-of-Ways	40	1
Maintain Local Roads	Miles	100 to 200	88.5
Restore Local Roads	Miles	10 to 20	0
Reconstruct Local Roads	Miles	5 to 10	0
Construct Local Roads	Miles	0 to 5	0
Maintain Arterial and Collector Roads***	Miles	40 to 80	26.3
Decommission Local Roads	Miles	5 to 10	0
Vegetation Management			
Hardwood Selection Cuts	Acres	8,366	0
Hardwood/Oak Shelterwood Regeneration	Acres	11,496	3
Hardwood/Oak Shelterwood Removal	Acres	3,240	37
Hardwood Clearcut	Acres	2,376	0
Hardwood/Oak Thin	Acres	9,000	28
Hardwood Stand Improvement	Acres	2,650	0
Softwood Shelterwood Regeneration	Acres	2,814	10
Softwood Selection Cuts	Acres	1,444	0
Softwood Clearcut	Acres	10	2
Softwood Thin	Acres	1,000	2
Softwood Stand Improvement	Acres	700	0
Softwood Planting	Acres	350	0
Release Softwood from Hardwoods	Acres	1,700	0
Clearcut Hardwoods for Softwoods	Acres	90	0
Plant Softwoods for Conversion	Acres	500	0
Clearcut Aspen	Acres	146	0
Clearcut Hardwoods for Aspen Regeneration	Acres	725	0
Total Selection Cuts	Acres	9,810	0
Total Shelterwood Regeneration	Acres	14,310	13
Total Shelterwood Removals	Acres	3,240	37
Total Clearcut	Acres	3,347	2
Total Thin	Acres	10,000	30
Total Stand Improvement	Acres	3,350	102
Total Release	Acres	1,700	
Total Planting	Acres	850	29
Hardwood Sawtimber Cut	MMBF	110	.21

**Table 2.1-3 Estimated and Actual Outputs Achieved in Fiscal Year 2007
Forest Plan Appendix D, Proposed and Probable Practices**

Activity or Practice	Unit of Measure	Estimated Amount (Decade 1)*	Actual Amount Achieved in FY07
Softwood Sawtimber Cut	MMBF	10	.146
Combined Sawtimber	MMBF	120	.356
Hardwood Roundwood Cut	MMBF	41	.268
Softwood Roundwood Cut	MMBF	3	.052
Combined Roundwood	MMBF	44	.319
Total Timber Cut	MMBF	164	.675
Monitor condition of sites and species under special forest product permits	Sites	All	4
Rare or Outstanding Ecological Resources			
Monitor known rare or outstanding ecological, biological, or geological features	Sites	All (129+)	14
Inventory for TES species and rare or outstanding natural communities	Acres	4,000	749.7 acres
Prepare conservation plans for each rare or outstanding area	Sites	20	0
Establish RNAs	Sites	2	0
Wildlife, Fisheries, and Rare Plant Resources			
Protect known occurrences of TES species	Sites	All	All
Protect, and where feasible, improve or restore habitat conditions for TES plants, and for TES animals of riparian and wetland habitats.	Sites	All	2 sites for Appalachian Jacob's ladder.
Protect important habitat sites for TES bats	Roost and den trees	Adequate numbers of roost and den trees	Reserve trees marked at all sites where vegetation prescriptions were implemented
Protect important habitat sites for TES bats	Hibernacula	All hibernacula	All hibernacula
Protect nesting TES bird species from disturbance	Active nest sites	All	2 sites
Monitor known occurrences of TES species	Sites	All	Approximately 300 butternut trees and 15 sites for RFSS list plant species
Update conservation assessments for RFSS	Species	All	None for plants
Oak Released from Hardwoods, and Oak and Oak-Pine Habitat Restored/Improved	Acres	2,000	0
Mow Upland Wildlife Openings	Acres	2,000	655
Non-Commercial Clearcutting of Aspen and Paper Birch	Acres	2,000	0
Burn Upland Wildlife Openings	Acres	5,000	20
Burn Marshes	Acres	250	0
Other Wildlife Habitat Improvement	Acres	250	90
Stream Habitat Restored/improved	Miles	50	6
Lake Habitat Restored/Enhanced	Acres	10	50
Fish Habitat Monitored	Sites	80	7
Fish Passage Restored	Road Crossing	10	0

Notes: * These numbers represent the sum of annual activities in years 1 through 10.
 ** Wilderness Managed to Standard
 *** Town jurisdiction roads accessing GMNF land maintained through road cooperative agreements

Evaluation Question:

To what extent is the Forest Service providing a mix of products, services, and amenities?

Monitoring Question: How close are actual costs to projected costs?

Monitoring Driver: Documentation of costs associated with carrying out the planned management prescriptions as compared with costs estimated in the Forest Plan.

Background: The cost of implementing the 2006 Forest Plan was based on current budgets for all program areas except the timber outputs. The cost of implementing the 2006 Forest Plan timber outputs was estimated to be \$1,344,000. The Washington and Region 9 Offices of the Forest Service track some outputs related to Forest Plan implementation, other wise known as targets, on a yearly basis. Cost of providing these outputs can be estimated through GMNF staff work plans.

Table 2.1- 4: Fiscal Year 07 Target Accomplishments and Estimated Cost

TARGET ACTIVITY	AMOUNT ACCOMPLISHED	ESTIMATED COST
Inventory and Monitoring		
Annual monitoring requirements completed	20 items	\$41,732
Inventory data collected or acquired to standard	11,690 acres	\$60,453
Facilities		
Forest administrative and other facilities maintained to standard	33 facilities	\$116,000
Recreation sites managed to standard	102 sites	\$115,900
Hazardous Fuels		
Treated to reduce the risk of catastrophic wildland fire	5446 acres Includes grazing acres	\$179,000
Lands		
Land Acquisitions/adjustments	970 acres	\$40,000
Boundaries marked	12 miles	\$108,000
Special use permits administered to standard	40 permits	\$45,000
Special use applications processed	2 applications	\$30,000
Rights Of Way acquired	1 easement	\$1,800
Vegetation and Watershed		
Forest vegetation established	33 acres	\$18,000
Timber stand & genetic tree improvement	102 acres	\$24,000
Treated annually for noxious weeds and invasive plants	480 acres	\$13,000
Range land vegetation improved	500 acres	\$23,473
Soil and Water resource acres improved	5 acres	\$15,000
Wildlife, Fish and Threatened, Endangered and Sensitive Species		
Lake habitats restored or enhanced	50 acres	\$41,000
Stream habitats restored or enhanced	82 miles	\$108,000

Table 2.1- 4: Fiscal Year 07 Target Accomplishments and Estimated Cost		
Terrestrial habitats restored or enhanced	400 acres	\$70,000
Range		
Grazing allotments managed to 100% standard	5053 acres	\$83,000
Recreation		
Heritage assets managed to standard	15 assets	\$25,000
Recreation site capacity operated to Standard	160,000 PAOT days	\$361,475
Number of interpretive and conservation education plans implemented	1 Plan	\$9,983
Recreation special use authorizations administered to standard	32 permits	\$78,500 (50% of estimated allocation for special uses)
Trails improved to standard	5 miles	\$30,000 (estimated portion of CMTL budget)
Trails maintained to standard	132 miles	\$340,100
Wilderness Areas managed to standard	2 areas	\$166,683
Roads		
Roads decommissioned	0 miles	0
High clearance roads maintained	16 miles	\$40,800
Passenger car roads improved	0 mile	0
Passenger car roads maintained	72.5 miles	\$201,905
Lands covered by motor vehicle use map (MVUM)	16,125 acres	\$7,250
Timber		
Timber volume sold	7,000 ccf	\$578,000

Monitoring Activities: Table 2.1-4 displays the targets that were achieved on the Green Mountain and Finger Lakes National Forests in 2007, and the estimated cost for achieving that target. Information is presented as a collective report for the Green Mountain and Finger Lakes (GMFL) National Forests for FY07 as the information is tracked regionally in a combined report.

Evaluation and Conclusions: Tracking costs of Forest Plan implementation activities will provide program managers unit cost information that is helpful in the development of work plans and out-year planning. Over an extended period, tracking these costs can be used to develop management activity unit cost trend information. This will enable managers to make more informed decisions about the costs of management activities.

Recommendations: Continue to track Forest Plan implementation achievements and estimated costs to develop trend information, and improve efficiency and effectiveness.

**Evaluation Question:**

What activities have occurred in management areas? How have these management actions helped to achieve the desired future condition of the management area? Have activities occurred that detract from the desired future condition of the management area?

Monitoring Question: What are the effects of management practices prescribed by the 2006 Forest Plan?

Monitoring Driver: Forest Plan Management Area Guidance

Background: The 2006 Forest plan describes desired future conditions (DFC) for eighteen different management areas and provides standards and guidelines that apply to these management areas. Forest Plan implementation activities are usually designed to bring the GMNF closer to the DFC. There may be times when management activities for some reason do not realize the goal of moving toward the DFC, and fact may move away from the DFC. It is important to track activities and projects that will clearly move toward or away from the DFC for a management area (MA) or that move toward meeting plan objectives in order monitor progress in Forest Plan implementation.

Monitoring Activities: A number of projects implemented in 2007 were reported to have clearly moved toward meeting Forest Plan Objectives and DFCs for management areas. These projects are:

- Butternut Tree Inventory
- Research and Monitoring Project Coordination
- Catamount Trail Completion
- Thundering Falls Appalachian Trail (AT) Relocation
- North Half Overstory Timber Sale
- Holt Mountain Timber Sale
- Dutton Brook II Timber Sale
- Patterson Brook Tree Planting

Evaluation and Conclusions:

1. Butternut inventory

Over 300 Butternut trees were inventoried on or near the GMNF in an effort to find the healthiest trees. Butternut is an uncommon species due to the Butternut canker, which degrades and eventually kills trees. The long-term objective is to collect scion (branches) from the healthiest trees, graft them to rootstock, then plant the rootstock in a tree nursery (clone bank). It is hoped that the nursery trees would be more resistant to the canker, and they would be planted in the National Forest and other locations in Vermont.

Inventory work was done in several management areas. Rather than focusing on one management area, in the long-term this project works toward Plan Goal 2: Maintain and restore quality, amount, and distribution of habitats to produce viable and sustainable populations of native and desirable non-native plants and animals. The Butternut inventory is the first step toward a long-term goal to increase the amount of healthy Butternut on the Forest.

2. Research and Monitoring Project Coordination

The following research and monitoring projects from off-Forest institutions or agencies were approved and allowed to move forward on the GMNF in 2008:

Project	Lead(s)
Cold tolerance of American chestnut trees	Northern Research Station (NRS), Univ. of VT
Carbon stocks in northern old growth forests	NRS
Nitrogen Saturation in Class I Wilderness Areas	Boston Univ., Institute of Ecosystem Studies
Amphibian and reptile inventory around Crystal and Haystack Ponds	Independent researcher
Diversity and distribution of Odonata in VT	Green Mountain College
Vermont Odonata	Independent researcher, State of VT
Causes of birch decline	NRS
Ecology, demography and genetics of globally threatened Eastern Jacob's Ladder	Univ. of VT
Effects of past agricultural land use on forest herb communities	College of Environmental Science and Forestry, Syracuse, N.Y.

Research projects are located in several management areas. These projects contribute to the "best available science" related to forest ecosystem management. The best available science may have future management implications for specific management areas, the forest, and the broader state or regional area

3. Catamount Trail Completion

In 2007, the final segments of the Catamount Trail on the GMNF and one the final remaining segment of the entire trail were completed. This involved improvement of approximately 4-5 miles of trail on the Manchester RD in the Town of Winhall. Final implementation was on-going near the end of the fiscal year. The trail segment was in the Diverse Forest Use MA. While not a specific need of this MA, this type of project is entirely consistent with MA direction. More importantly it is a key step in the completion of Goal 12 and the objective calling for the

completion of the Catamount Trail on the GMNF, an objective in both the 1987 and 2006 Forest Plans.

4. Thundering Falls Appalachian Trail (AT) Relocation

The project is a major trail relocation designed to eliminate a long road walk and locate the trail in a more scenic location. To achieve this, a bridge and boardwalk was constructed across the Ottauquechee River and several segments of trail were relocated to align with the bridge. Designed to be fully accessible for people with disabilities, the project also provides a short spur trails to an overlook near the primary waterfalls on Thundering Brook. The project was initiated in previous years but was opened for use in FY 2007. The project is located in the Appalachian National Scenic Trail MA and was identified as a critical need by the cooperating partners, the ATC, GMC and the National Park Service. The project has removed a relatively long “road walk” and has moved the trail to a very attractive scenic view of the main waterfalls on Thundering Brook. The board walk, bridge and trail to the falls vista are also designed to be fully accessible for people with disabilities.



5. North Half Overstory Timber Sale

The North Half Overstory sale helped improve growing conditions for young oak and hardwood forests established by previous shelterwood harvests. The sale was in Diverse Forest Use, Moosalamoo National Recreation Area (NRA) and Diverse Backcountry MAs. The timber sale will move these MAs closer to desired future conditions for vegetation composition, age-class distribution, and wildlife habitat diversity. The sale provided high quality sawtimber, pulpwood, and employment. This sale is completed and closed.

6. Holt Mountain Timber Sale

This project helped improve growing conditions for hardwood, softwood and mixed forests. New young stands were generated and early successional wildlife habitat was established. Temporary and permanent openings were created and patches of wild apple trees were maintained. The project is in the Diverse Forest Use MA which emphasizes a mix of habitat conditions. The sale provided high quality sawtimber, pulpwood, and employment. This sale is completed and closed.

7. Dutton Brook II Timber Sale

This sale improved growing conditions in hardwood, softwood and oak forests. New young stands were regenerated, and early successional wildlife habitat was established. Temporary and permanent openings were created and patches of wild apple trees were maintained. The project is in the Moosalamoo NRA MA. The timber sale will move the MA closer to desired future conditions for vegetation composition, age-class distribution, and wildlife habitat diversity.

The sale provided high quality sawtimber, pulpwood, and employment. This sale is not completed.

8. Patterson Brook Tree Planting

The planting of the Patterson Brook salvage area will restore a non-functioning deer wintering area with native softwood species. The project is in the Diverse Forest Use MA which emphasizes a mix of habitat conditions.

Recommendations: Continue management activities that improve the DFC for all MAs and are designed to reach plan objectives. Look for opportunities to increase Forest Plan implementation in all MAs. Continue to monitor progress in reaching DFCs.

Evaluation Question:

Are standards, guidelines, and mitigation measures being implemented on projects consistent with Forest Plan and project NEPA direction? Are these measures effective at achieving the desired results? Are there other measures that could be more effective?

Monitoring Question: To what extent have Standards and Guidelines been applied?

Monitoring Driver: Forest Plan Standards and Guidelines

Background: The 2006 Forest Plan states: "standards and guidelines (S&Gs) apply to all Forest areas for the purpose of protecting or managing forest resources. Standards and guidelines are designed to achieve the desired conditions, goals, and objectives stated in the 2006 Forest Plan. They are usually mitigation measures that minimize or negate the effects of a management action or land use." Design criteria and mitigation measures may be added during the development of a project to further protect resources or lessen impacts. These design criteria and mitigation measures are incorporated in the National Environmental Policy Act (NEPA) documentation for a project.

Monitoring Activities: S&Gs, design criteria and mitigations are monitored to determine if they are being implemented correctly; and, if implemented correctly, are these measures achieving the desired results. Monitoring for compliance with S&Gs, design criteria, and mitigation measures occurred for the four vegetation and two recreation projects described previously.

Evaluation and Conclusions: The Holt Mountain sale, part of the Greendale project, was initially implemented using the 1987 Forest Plan, and was reviewed for compliance with the 2006 Forest Plan. Field visits revealed that several stands had insufficient buffering of wetlands and were not in compliance with the 2006 Forest Plan direction or the mitigation measures stated in the Greendale Environmental Impact Statement. More specifically, some trees were marked for harvest that were in, or too close to wetlands to meet Soil, Water and Riparian Area (SWR) guideline-10, which addresses wetland protection. After these trees were identified, they were excluded from the sale, bringing these harvest areas into compliance with Forest Plan S&Gs and mitigation measures. The remainder of the sale was found to be in compliance. The modifications made to the sale were found to be adequate. The implementation of SWR guideline 10 has triggered GMNF staff to receive more wetlands identification training. This is resulting in more detailed mapping and better buffering of wetlands during project planning, NEPA analysis and pre-sale implementation.

The other projects were found to be compliance with S&Gs, design criteria and mitigation measures.

Recommendations: Develop a process for an interdisciplinary team to monitor the implementation of S&Gs, design criteria and mitigations through annual field monitoring and evaluation days. Continue to track the effectiveness of S&Gs, and make adjustments when needed to improve the performance of a

standard or guideline. Continue to evaluate the implementation of SWR G-10 for consistency and effectiveness.

Evaluation Question:

Did any project require guideline deviation or a Forest Plan amendment to modify a standard? If so, what was the project? Which standard was changed or which guideline required deviation? What was the rationale for the change or deviation?

Monitoring Question: To what extent have Standards and Guidelines been applied?

Monitoring Driver: Forest Plan Standards and Guidelines

Background: The 2006 Forest Plan defines S&Gs in this way: "Standards are Forest Plan management requirements that are applicable to all foreseeable situations. Deviation from standards requires an amendment to the 2006 Forest Plan. Standards are mandatory permissions, limitations, desirable conditions, or in some instances required courses of action needed to achieve the goals and objectives of the Plan. Guidelines are Forest Plan management requirements that are applicable to most situations but can be modified at the project level. To communicate discretionary guidance, guidelines are permissions, limitations, desirable conditions, or courses of action that should be implemented in most situations. Deviation from a guideline does not require a Forest Plan amendment, but it does require that the rationale for deviation be disclosed in the project decision documents and analysis." The occurrences of deviations from S&Gs, and the reason for these deviations are being tracked so that GMNF staff can evaluate any deviations from S&Gs.

Monitoring Activities: There were no amendments to the Forest Plan and no known deviations from guidelines in 2007.

Evaluation and Conclusions: Not Applicable

Recommendations: None.

Recreation

Evaluation Question:

Is the Forest Service reducing deferred maintenance on developed recreation facilities and sites? Is the Forest increasing the number of recreation facilities that are maintained to standard?

Monitoring Question: To what extent have Forest Plan Objectives been attained?

Monitoring Driver: Forest Plan Goal 12 and Objectives

Background: The GMNF has a great diversity of recreation facilities, and like most National Forests, has a limited budget to operate and maintain all the sites. We have a number of partners that contribute to some portion of the maintenance but this may not be sufficient to meet long term needs. With a desire to provide high quality recreation we need to monitor to determine if the management of our recreation facilities is being improved. The recreation site monitoring that we are using began in FY 1999 as a result of Congressional direction regarding deferred maintenance reporting. We have completed some level of monitoring and data clean-up since that time. During the first years of this process we were required to sample approximately 20% of the facilities in any given year. We will continue to update that data for Forest Plan monitoring through the life of the plan.

Monitoring Activities: Deferred Maintenance Condition Surveys were completed in FY 2007, using national protocols. On the Green Mountain NF, deferred maintenance condition surveys were completed for 23 separate recreation sites. These surveys were completed at a level sufficient to maintain our data to national standards. This monitoring was completed using Green Mountain and Finger Lakes NF personnel.

Evaluation and Conclusions: The protocols being used are consistent with national direction and provide very good information to answer this monitoring question. A more thorough review of recreation site data was completed in FY 2007 in conjunction with a comprehensive Recreation Facility Analysis. It appears the existing protocols will be adequate to maintain our data sufficiently to answer this monitoring question. In the future, changes in national standards may require adjustment in our monitoring procedures.

At the end of FY 2007 deferred maintenance for recreation facilities on the Green Mountain NF was approximately \$549,444. It is recommended that this number be used as a baseline for future monitoring and evaluation to determine if progress is being made on this item. Analysis shows that with projected budgets and revenues we can complete annual maintenance and still make some progress toward deferred maintenance reduction.

Recommendations: Continue to use the existing protocols for the near-term. At this time sample size appears to be adequate to maintain developed site data. Changing national direction might eventually reduce the quality of our data over time. If this occurs, it is recommended that a larger sample be completed when funding allows.

Updated deferred maintenance reports should be produced at the end of FY 2008 to begin development of trend data.

Evaluation Question:

What are the trends in the illegal use of vehicles off roads?

Monitoring Question: Is the use of vehicles off roads causing considerable adverse effects on resources or other forest visitors; how effective are forest management practices in managing vehicle use off roads?

Monitoring Driver: 36 CFR 295 Use of vehicles off roads shall be planned, implemented and monitored in order to protect resources and visitors from considerable adverse effects, promote public safety, and minimize conflicts with other uses of the National Forest System lands

Background: There is a long standing concern about the illegal use of motor vehicles on the GMNF. This is well documented in both the 1987 and the 2006 Forest Plans. In addition this is a national issue that prompted a significant change in policy and direction regarding wheeled motorized vehicles. Though a significant issue, the development of monitoring protocols is difficult due to the scattered nature of violations that often happen in remote areas at nights and during time periods when there are few patrols available. It was decided to utilize existing protocols used by law enforcement personnel as the starting point for monitoring of this activity.

Monitoring Activities: In FY 2007, monitoring continued in conjunction with routine law enforcement patrols. As patrols document incidents or the issuance of notices of violation, the records are recorded and entered into a database. Data is entered and stored in the Law Enforcement and Investigation Management Attainment and Reporting System (LEIMARS). Retrieved data can be used to show some trends, though there are some limitations since the data is dependant on the availability of personnel.

This item is being monitored as an initial step to determine if the use of vehicles off roads is causing considerable adverse effects on resources or other forest visitors; and how effective are forest management practices in managing vehicle use off roads? This type of monitoring is also required by regulatory requirement (36 CFR 295). Though there are concerns about snowmobiles, the main focus for this monitoring item is wheeled motorized vehicles.

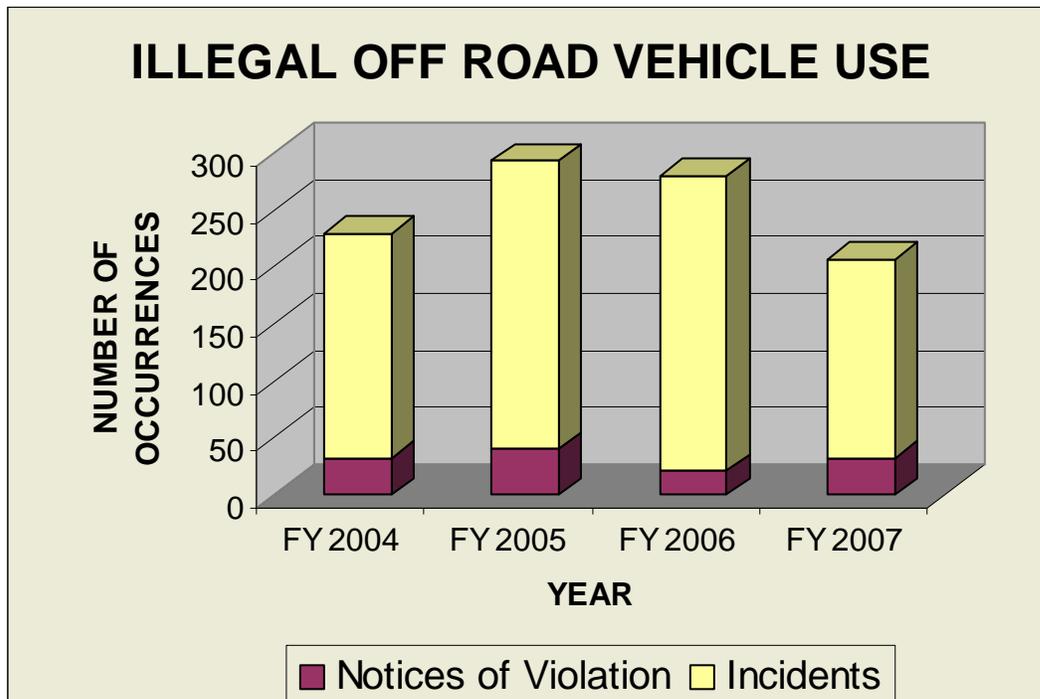


Figure 2.1-1 Illegal Off- Road Vehicle Use Occurrences

Evaluation and Conclusions: As a starting point, data entered the last three fiscal years is displayed. This shows current trends and provides baseline data to which monitoring data can be added annually. Data are separated into Incidents (includes warnings or visual identification of a violation) and Notices of Violation where somebody receives a citation for the infraction. Currently data for wheeled motorized vehicles and snowmobiles is combined under an off highway vehicle category. Four year data for the Green Mountain NF shows:

The data shows an increasing trend in the initial three year period which is consistent with various reports from the public. There was a drop in incidents but an increase in Notices of Violation in 2007. Law enforcement personnel think the drop in incidents may be related to a reduction in actual staff time in the field due to other assignments or may mean fewer incidents are actually occurring. Two consecutive years of higher, or lower, data would indicate a probable change in the amount of illegal use but further monitoring should occur to validate this information. Though it is desirable to use existing law enforcement protocols since it is an existing national data system, it is recognized that more work is needed to refine these protocols to expand on this information.

Recommendations: Continue to work with law enforcement to determine if a method can be developed to separate data for wheeled motorized vehicles from snowmobiles. Ideally this could be achieved without labor intensive review of documentation.

Continue to search for additional protocols that can measure the effects of this use on both the physical and social resource. Conversations with law enforcement show a promising possibility of using the

existing LEIMARS system and data to document physical damage to the trail system. This should be pursued for the 2008 report. New monitoring will need to be cost effective and would hopefully use an existing monitoring system or be conducted in conjunction with other Forest Plan implementation activities.

Evaluation Question:

Is the amount of deferred maintenance on the GMNF trail system being reduced?

Monitoring Question: Is the quality of the Forest Service trail system and recreation facilities being improved through operation and maintenance?

Monitoring Driver: Forest Plan Goal 12 and Objectives

Background: The GMFL has a large and diverse trail system, and like most National Forests, has a limited budget to operate and maintain the trails. There are many partners that contribute to some portion of the maintenance but this may not be sufficient to meet long term needs. With a desire to provide high quality recreation and trails, GMNF staff monitors to determine if the system is being improved. The trail system monitoring currently being used began in FY 1999 as a result of Congressional direction regarding deferred maintenance reporting. Some level of monitoring and data clean-up has been completed since that time. During the first years of this process, GMNF staff was required to sample 20% of the trail system in any given year, and will continue to update that data for Forest Plan monitoring.

Monitoring Activities:

In FY 2007, we completed required Condition Surveys using revised national protocols that reduced sample size by using a statistical sample of trails. This required Condition Surveys of about 14 miles on 6 different trails. This monitoring was completed using GMNF staff.

Evaluation and Conclusions: The protocols being used are consistent with national direction and provide very good information to answer this monitoring question. In FY 2007 we reviewed procedures and think the national sample will be insufficient to maintain the current quality of the data on a long-term basis. It is recognized that we can complete surveys to a higher standard as long as survey procedures meet national requirements.

As recommended in the FY 2006 report, GMNF staff has completed an assessment of total deferred maintenance needs on the forest trail system. Total deferred maintenance needs for the GMNF trail system (identified as reference costs in the INFRA database) are approximately \$3,645,340. This number should be considered the baseline for examination of this item for future monitoring.

The deferred maintenance total appears to be relatively large, but does represent the current data in the database. It should be recognized that some of this data is relatively old and should be examined during upcoming trail data reviews. Regardless of the quality of data, there is a significant deferred maintenance backlog that will be difficult to reduce with current and projected budgets.



Recommendations: Continue to use the existing protocols for the near-term, and consider increasing the sample size. Changing national direction that is trending toward reduced sample size is reducing the quality of GMNF data. It is recommended that a larger sample be completed when funding allows. GMNF staff is pursuing that option in FY 2008.

It is also recommended that, in conjunction with planned trail data clean-up, deferred maintenance data be critically reviewed and updates for future monitoring reports be completed.

Wilderness, Wilderness Study Areas, and Roadless Areas

Evaluation Question:

To what extent has GMNF staff been in the field monitoring wilderness boundaries and providing public education and outreach?

Monitoring Question: To what extent have Forest Plan Objectives been attained?

Monitoring Driver: Forest Plan Objectives

Background: Leave No Trace (LNT) and Wilderness information/education are taught as much as possible to help people to understand and take care of the Wilderness. Wilderness Ranger field presence in high use and remote areas continues to be the highest priority. Leave No Trace contacts, presentations and trainings are recorded for upward reporting. Greatest numbers of people can generally be reached on weekends and holidays during the summer and fall.

High priority boundaries (boundaries that abut private lands, power lines, etc.) are often checked for non-conforming activities such as motor vehicle encroachment and unauthorized trail cutting. Known problem areas are checked on a more frequent basis than those in remote areas, or which abut other Forest Service lands.

Monitoring Activities: In FY 07, the GMNF Wilderness program was composed of two full time staff, two seasonal employees, one Student Conservation Association (SCA) intern, and a Student Temporary Employment Program (STEP) student. Each of these staff was trained in speaking to visitors about the public purposes of Wilderness as well as Leave No Trace (LNT) practices.

- Wilderness staff completed updates to a comprehensive Wilderness Education Plan
- Field and frontline staff made approximately 463 LNT contacts with the public, and one LNT Trainer's course was provided to four GMNF employees.
- Staff presented two Wilderness Awareness talks at Vermont colleges/universities
- Field staff spent numerous days on overnight trips to high use areas disseminating information
- Many wilderness boundaries were checked in FY 07.
- Initiated monitoring in new wildernesses designated in the New England Wilderness Act of 2006.
- GMNF Wilderness staff posted signs at trailheads and access points in newly designated Wilderness Areas.

Evaluation and Conclusions: Staff spent a proportionate amount of time providing public education and outreach/boundary monitoring with their additional duties of trail brushing/clearing, non-native invasive species (NNIS) surveys, campsite monitoring, etc. The program is very effective in providing this information to the publics that have a basic understanding of congressionally designated wilderness (and ask for more information); however, we have the desire to expand this to the Forest's communities that abut these special places. The expansion of the wilderness system on the GMNF

has potential to reduce field presence in individual areas unless staffing is increased to cover the new areas.

Recommendations: Annually update the Wilderness Education Plan utilizing feedback received from presentation evaluations. Continue to find new audiences (other than college students) to present this information to. Continued uniformed field presence and level of LNT training for field staff should receive high priority. Continue to monitor wilderness boundaries and work with Law Enforcement to correct issues as they arise.

Evaluation Question:

How many wilderness areas are managed to national standards?

Monitoring Question: To what extent have Forest Plan Objectives been attained?

Monitoring Driver: Forest Plan Objectives

Background: During the 40th anniversary of the Wilderness Act, the Chief of the Forest Service created the 10 Year Wilderness Stewardship Challenge (10 YWSC) that identified ten key elements that help define successful wilderness stewardship. These elements are:

- 1) Fire managers consider a full range of responses with the goal of restoring natural fire
- 2) Invasive plants are successfully treated
- 3) Air quality trends are measured
- 4) Priority actions identified in a wilderness education plan are implemented
- 5) Opportunities for solitude or primitive and unconfined recreation are protected
- 6) Recreation site inventory is completed
- 7) Outfitter/guides model wilderness practices and communicate appreciation for wilderness values to clients
- 8) Adequate direction exists to protect wilderness character
- 9) Information needs are met
- 10) A baseline workforce is in place

Monitoring Activities: During FY 07, Wilderness staff concentrated on managing Lye Brook and Big Branch Wilderness areas to national standards and has made great strides in accomplishing the goals of the Chief's 10YWSC within these areas. The addition of the management direction in the recently completed Forest Plan has given us tools to use in the future stewardship of the wilderness resource (e.g., Wildland Fire Use).

Activities specific to Lye Brook and Big Branch Wilderness areas (based on the 10 YWSC):

Element 1 - The 2006 Forest Plan permits the WFU in all eight of the designated wilderness areas on the Forest. This is the first year that WFU has been included in the Northeast Forests Fire Management Plan (FMP). Wilderness staff will continue to work with Fire staff to ensure that all items from the checklist are incorporated into the 2008 FMP.

Element 2 - An invasive species plan was written for Lye Brook and Big Branch Wilderness in CY 2005 with input from the Forest Botanist/NNIS coordinator. A variety of species have been identified in high priority areas (gateways, trailheads, trails, and waterways) and appropriate eradication actions have been taken. The sites treated in 2005 and 2006 were monitored in 2007 and treatment was successful. New sites identified/treated in 2007 will continue to be monitored for success. All occurrences of NNIS are reported using national protocols. All wilderness field staff received annual training in the identification/treatment of NNIS.

Element 3 - Per discussions with Region 9 Air Specialist Ann Acheson, it was determined that there is enough data to include all south half (George D. Aiken, Lye Brook, Peru Peak, and Big Branch) Wilderness' in the 10 point category for Element #3. This is based on long-term monitoring being done in and around Lye Brook because all Wilderness Areas on the south half of the Forest share a similar proximity, geology, physiography, vegetation, and climate (documentation dated 9/12/2006 available upon request).

Element 4 - A Wilderness Education Plan for all Green Mountain National Forest Wilderness areas was updated and fully implemented in FY '07. Wilderness staff provided wilderness stewardship presentations at three Vermont colleges, one Leave No Trace Trainer's Course, and numerous LNT/awareness public contacts in the field. Evaluation of the plan is on-going and modifications occur annually.

Element 6 - A recreation site inventory was updated in FY '06 and exceeds the minimum requirements of the established protocol. All campsites have been entered into Infra-Wild. In FY '06, Wilderness staff created a GIS database using the inventory points to visually display impact data. A total of 48 campsites were recorded in Lye Brook and 34 in Big Branch.

Element 10 - The total number of FTE's days for Wilderness work in FY '07 was 547. It is estimated that Wilderness staff spend approximately 25% of their time focused on Lye Brook Wilderness, or approximately 137 days, and approximately 137 days (25%) focused on Big Branch. This meets 61% and 67% of the of the baseline workforce, respectively.

Evaluation and Conclusions: The Chief's 10 YWSC has provided wilderness staff with an excellent tool to determine how well we are doing in managing the resource. The data collected in FY 05 and FY 06 will serve as a baseline for future Monitoring and Evaluation reports.

Recommendations: Establish partnerships to enable further data collection, particularly elements two and six. Continue to utilize established protocols for data collection.

Evaluation Question:

Are Wilderness Study Area Management Areas (WSA MA) being managed to maintain roadless characteristics?

Monitoring Question: What are the effects of management practices prescribed by the 2006 Forest Plan?

Monitoring Driver: Forest Plan Management Area Guidance

Background: A total of 27,473 acres (7%) of National Forest System Lands were allocated as Wilderness Study Area in the 2006 Forest Plan.

On December 1, 2006, President Bush signed into law the New England Wilderness Act of 2006. This law designated about 42,000 acres of new wilderness on the Green Mountain National Forest. Approximately 26,516 acres of this wilderness was located in the Wilderness Study Area Management Area. An administrative correction has been completed that adjusted the management area acreage to account for the changes due to this Congressional action. After completing this correction, there are only 957 acres remaining in this management area.

Monitoring Activities: After the Wilderness designation, the primary emphasis was completion of near-term actions to implement the NEWA. Monitoring was limited to actions affecting the remaining lands in this management area. Seven separate NEPA documents were signed during FY 07 on the

Green Mountain National Forest, and all were analyzed concerning their impacts to the roadless characteristics of these areas.

Evaluation and Conclusions: Specialists utilized FSM Interim Directive 1920-2006-1, FSH 1909.12 (chapter 70), and Forest Plan direction to analyze each of these individual projects. It was determined that the decisions were consistent with this management direction and maintained the roadless characteristics of the Wilderness Study Areas on the GMNF.

Recommendations: Complete a Forest Plan amendment to reallocate the remaining 957 acres in the WSA MA to other management areas. These WSA MA lands are in scattered small parcels that remained after the final wilderness boundaries were drawn. In the interim, continue to utilize management direction to analyze the effects of individual projects and activities within the Wilderness Study Area MAs.

Evaluation Question:

What are the status and trends of inholdings?

Monitoring Question: To what extent is Wilderness managed to preserve its Wilderness character?

Monitoring Driver: Forest Plan Goal 13

Background: Prior to the New England Wilderness Act (NEWA) of 2006, there were six private inholdings, totaling 113 acres all within the Lye Brook Wilderness. In addition, the GMNF administers one life tenure special use permit for a camp in Big Branch Wilderness. The NEWA designation created three inholdings in Glastenbury, one inholding in Breadloaf, and one inholding in Lye Brook.

Monitoring Activities: No specific monitoring was recorded on these inholdings for FY07.

Evaluation and Conclusions: N/A

Recommendations: Continue to annually monitor wilderness inholdings for non-conforming uses and take administrative/law enforcement actions as necessary. Continue to make acquisition of these parcels a high priority.

Evaluation Question:

What are the trends of selected biophysical conditions and processes sensitive to human threats? What are the trends of actions that control or manipulate the community of life in wilderness? What are the trends of human threats to natural conditions?

Monitoring Question: To what extent is Wilderness managed to preserve its Wilderness character?

Monitoring Driver: Forest Plan Goal 13

Background: In FY 2006, GMNF Wilderness staff worked with Region 9 Air Quality Specialist Ann Acheson, to determine Air Quality Related Values (AQRV's) and sensitive receptors to set a baseline for monitoring biophysical conditions sensitive to human threats.

Monitoring Activities: Past and current monitoring related to AQRV's includes: Breadloaf Wilderness – Vermont non-game Natural Heritage Program surveyed Significant Ecological Sites for threatened and endangered species. Determined the potential for *Polemonium vanbruntiae* (cliff-dwelling plant) occurrence.

Big Branch/Peru Peak Wilderness Areas – Surveys in 1990 and 1992 at Big Mud Pond, Lost Pond, and McGinn Brook identify several threatened and endangered species and result in classification of Lost Pond as Sensitive Habitat due to its unique bog characteristics.

Lye Brook Wilderness –

- National Atmospheric Deposition Program (NADP) monitoring site located in Bennington County.
- Through a cooperative agreement with the University of Massachusetts, the Forest Service has been monitoring ozone concentration and its effects on lichens using filtered and unfiltered growth chambers at a site five miles west of Lye Brook Wilderness since 1989.
- Integrated Monitoring of Protected Visual Environments (IMPROVE) monitoring equipment (visibility) in place includes a nephelometer installed in 1992 and a particulate sampler installed in 1991, both on Mt. Equinox, which is approximately five miles to the west of Lye Brook.
- Background visibility monitoring with a camera installed near Branch Pond Road, just south of Lye Brook Wilderness, since 1986 to document background visibility from May 1 to October 30.
- The VT Department of Forests, Parks and Recreation is participating in the New England Forest Health Monitoring program, which monitors the effects of soil and air toxins on vegetation. Four one acre plots were installed near Little Mud Pond in 1990 and measurements are scheduled annually, with foliage and soil sample extractions planned every fourth year. The State intends to maintain these plots indefinitely.
- The State of Vermont has monitored water quality in Bourn Pond, which has been identified as an AQRV for this wilderness area, four times a year since 1982.
- Since 2001, the USDA-NRCS (Thomas Villars, Soil Resource Specialist) has operated a Soil Climate Analysis Network (SCAN) station near Lye Brook Wilderness. The SCAN site collects long-term data on weather, soil moisture, and soil temperature used to complement measurements of soil physical, chemical, and biological parameters at long-term soil monitoring sites established nearby.

Evaluation and Conclusions: More work will need to be done in upcoming FY's to synthesize the findings in these studies.

Recommendations: Continue these monitoring efforts.

Also see the Rare Features Section on page 60.

Evaluation Question:

What are the status and trends of the use of motorized equipment and mechanical transport?

Monitoring Question: To what extent is Wilderness managed to preserve its Wilderness character?

Monitoring Driver: Forest Plan Goal 13

Background: With certain exceptions, the Wilderness Act of 1964 prohibits motorized equipment, structures, installations, roads, commercial enterprises, aircraft landings, and mechanical transport. Each potential activity to occur within wilderness goes through a Minimum Requirements Decision Guideline (MRDG), commonly referred to as a "minimum tool" exercise. The intent of the minimum tool is to determine both the minimum management action to meet objectives, as well as the minimum mode of accomplishing the task (i.e. cross-cut saw or chainsaw).

A minimum tool analysis was completed in 2002 to authorize the stocking of high elevation ponds within GMNF wilderness areas. This analysis utilizes the enabling legislation, Forest Plan direction, and national Forest Service direction for managing wilderness.

Monitoring Activities: The fisheries program, in coordination with the VFWD, were authorized to utilize a rotor-winged (helicopter) to stock native brook trout (*Salvelinus fontinalis*) in Bourn Pond (Lye Brook Wilderness) and Big Mud Pond (Peru Peak Wilderness) in FY 06. This stocking also occurred in FY 2007. As in previous years, each pond was staffed during this activity to provide education to Forest visitors and to monitor the impact to visitor experience.

Evaluation and Conclusions: Fisheries staff stocked brook trout fry in Bourn Pond and Big Mud Pond in June 2007. Total flight time over these ponds was less than 5 minutes, while total transport time over each wilderness was less than 10 minutes. The time of year (early June) was originally selected to provide the least impact to wilderness visitors (black fly season, low historic use period) and was validated by field staff.

Natural populations of brook trout are unable to reproduce and are not sustained due to human effects (acid precipitation and sedimentation). Stocking young/small brook trout is the least invasive means of approaching a natural condition of having a population of trout with multiple age and size classes as wild populations would have.

Recommendations: Review/update minimum tool analysis to validate mode of transport in FY 07. Continue to staff ponds on stocking dates to monitor visitor impacts.

Evaluation Question:

What are the status and trends of outstanding opportunities for unconfined recreation, solitude, and primitive recreation?

Monitoring Question: To what extent is Wilderness managed to preserve its Wilderness character?

Monitoring Driver: Forest Plan Goal 13

Background: From section 2(c) (2) of the Wilderness Act of 1964, a wilderness “has outstanding opportunities for solitude or a primitive and unconfined type of recreation”. From the 2006 Forest Plan, page 49 – “Recreation management will be towards the desired ROS class of Primitive. There will be little evidence of human development in Wilderness MAs with several exceptions including trails, trail shelters, trail blazes, and limited trail signing that provides onsite guidance to visitors. Interaction between users will vary by wilderness, specific places within each wilderness, and season of use. In general, use will be concentrated around trail corridors and other popular features. Away from trails and in low-use wildernesses, evidence of, and interaction with, other users will be low. Facilities and designated campsites may be present when necessary to protect Wilderness values”.

Monitoring Activities: GMNF wilderness staff maintains eleven trail register boxes at various trail portals to our designated wilderness areas. Information recorded on these sheets includes date, number in party, destination, length of stay, and address of visitor. Records from multiple years are available for analysis. Staff also provide a uniformed field presence where they document number in groups, destination, and what message (usually LNT) was communicated. GMNF staff and GMC monitor groups who require a special use permit to utilize National Forest wilderness.

In FY05, the Green Mountain and Finger Lakes National Forests participated in the National Visitor Use Monitoring survey, which “provides reliable information about recreation visitors to national forest system managed lands at the national, regional, and local level” (NVUM Monitoring Results, September 2006). Data collected includes general demographics, economics, and user satisfaction. Relevant to this specific question, an estimated 81,959 visited congressionally designated wilderness areas on the GMNF during FY05). Visitors were able to rate their perception of how crowded a recreation site felt to them. The results for wilderness areas were:

Crowding Rating	Designated Wilderness Areas (% of respondents)
10 Overcrowded	0.0
9	0.0
8	0.0
7	0.0
6	0.0
5	9.0
4	22.4
3	19.4
2	9.0
1 Hardly anyone there	40.1

Evaluation and Conclusions: The data shows that the visitors surveyed in FY 2005 rate the wildernesses on the GMNF as relatively uncrowded. This data will be applicable until the next round of NVUM surveys are completed on the GMNF in approximately 2010.

A comprehensive Limits of Acceptable Change study will be needed to determine the public's perception of crowding and the opportunities for unconfined recreation, solitude, or primitive recreation.

Recommendations: Continue to work closely with GMC staff to evaluate the group use system to determine the carrying capacity for these groups.

Evaluation Question:

What are the trends of physical evidence of modern human occupation or modification?

Monitoring Question: To what extent is Wilderness managed to preserve its Wilderness character?

Monitoring Driver: Forest Plan Goal 13

Background: From section 2(a) of the Wilderness Act of 1964 – “In order to assure that an increasing population, accompanied by expanding settlement and growing mechanization, does not occupy and modify all areas within the United States and its possessions, leaving no lands designated for preservation and protection in their natural condition . . .”. From the 2006 Forest Plan, page 49 – “There will be little evidence of human development in Wilderness MAs with several exceptions including trails, trail shelters, trail blazes, and limited trail signing that provides onsite guidance to visitors.” The Vermont Wilderness Act of 1984 allows for the maintenance, including reconstruction, of shelters existing at the time of the enactment of the law.

The Long and Appalachian Trails, including their side trails, pass through the Lye Brook, Peru Peak, Big Branch, and Breadloaf Wilderness areas. Evidence of modern human occupation or modification within these areas include trail improvements (punchion, waterbars, drainage dips, stone steps, corduroy, and bridges) and trail shelters/tent platforms. Each of these shelters has an accompanying privy. The Green Mountain Club (GMC) has a shelter caretaker program and a healthy volunteer corps who provide general maintenance and support to the trail system.

Evidence of previous settlement occurs throughout many areas of the GMNF wilderness areas. This includes old roads, cellar holes, and other structures and features.

Monitoring Activities: GMNF Wilderness and Trails staff work in coordination with the GMC to maintain the Long and Appalachian Trails within the Wilderness MAs. Current infrastructure is evaluated while performing this work and only annual maintenance (trail clearing, privy maintenance, etc.) occurred during FY 06.

Evaluation and Conclusions: GMNF staff will continue to work with GMC to evaluate trail infrastructure. A minimum tool analysis will be completed prior to undertaking any project.

Recommendations: Long range management plans should be considered for the management of infrastructure within the Wilderness MAs.



Eligible Wild, Scenic, and Recreational Rivers

Evaluation Question:

Are agency activities on eligible National Wild & Scenic Rivers consistent with the Outstandingly Remarkable Values for which the river segment was determined eligible?

Monitoring Question: To what extent are eligible Wild and Scenic Rivers managed to preserve their outstandingly remarkable values?

Monitoring Driver: Eligible Wild, Scenic, and Recreational Rivers Management Area Guidance; Wild and Scenic Rivers Act 16 U.S.C. 1271-1287, October 2, 1968, as amended 1972, 1974-1976, 1978-1980, 1984, 1986-1994 and 1996.

Background: The Wild and Scenic Rivers Act established the National Wild and Scenic Rivers System, stating, "It is hereby declared to be the policy of the United States that certain selected rivers of the Nation which, with their environments, possess outstandingly remarkable scenic, recreational,

geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in a free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations” (Sec. 1(b)). There are currently no federally designated wild, scenic, or recreational rivers within the State of Vermont. The Wild and Scenic Rivers Act directs federal agencies to identify eligible WSRs in their planning processes. Rivers and streams on the GMNF were inventoried and evaluated to determine their eligibility as Wild, Scenic or recreational Rivers. The 2006 Forest Plan identified seventeen eligible Recreational River segments, eight eligible Scenic segments, and three eligible Wild segments on the GMNF. The Forest Service may only recommend a river as eligible and suitable for wild and scenic river status. Designation of a river occurs through an act of Congress.

Monitoring Activities: Although there are not any standard annual monitoring activities performed on these segments, all proposed projects and activities on the Forest must be evaluated utilizing the management direction stated in Forest Service Handbook (FSH 1909.12, Chapter 82.5 – Interim Management of Eligible or Suitable Rivers). Projects may be authorized within eligible river corridors when: 1) the free-flowing character of the identified river is not modified by the construction or development of stream impoundments, diversions, or other resource projects and 2) outstandingly remarkable values (ORV's) of the identified river are protected.

Seven separate NEPA documents were signed during FY 07 on the Green Mountain National Forest and all were analyzed with the above criteria.

Evaluation and Conclusions: Each individual project was evaluated using the above criteria and were found that they were 1) not within an eligible river corridor or 2) were consistent with handbook direction.

Recommendations: Continue to utilize management direction in FSH 1909.12 to analyze the effects of individual projects and activities within these

Visuals

Evaluation Question:

Is the GMNF being managed in accordance with the Forest Plan Visuals Standards and Guidelines (S&Gs) and are the Visuals S&Gs and any additional site-specific design criteria effective in helping to meet the Visual Quality Objectives (VQOs)?

Monitoring Question: To what extent have Forest Plan Objectives been attained?

Monitoring Driver: Forest Plan Objectives

Background: The Green Mountain National Forest continues to provide a high quality scenic resource for residents and visitors. To some people the Forest is seen as a natural appearing visual backdrop to their particular vantage points. To others the scenery is more intimate and offers a variety of environments from ski areas, wildlife viewing areas, trailside areas, and Wilderness.

Monitoring Activities: The Forest Landscape Architect continues to monitor visual quality of the GMNF, using visual quality objectives (VQO's) and the S&G's set forth in the Forest Plan, with the goal of maintaining and enhancing visual quality. In FY07 our monitoring emphasized review of the overall appearance of the GMNF and examined specific visual resource concerns for project planning and implementation. In addition, within the Breadloaf Wilderness, vistas created from the 1998 ice storm along the Long Trail on the western edge of the Upper White River IRP were monitored to see if the

trees were growing back. Mapping for the foreground of the Appalachian Trail (AT) began with analysis on the Dorset/Peru integrated resource project area.

Evaluation and Conclusions: The overall appearance of the Forest met the VQO's. Monitoring of vistas in the Breadloaf Wilderness created from the 1998 ice storm, show that trees are growing back and although some vistas are still discernable, they are expected to be overgrown within the next decade. Mapping and analysis on the 4.5 mile section of the AT from Mad Tom Notch Road south to Route 11/30 show that the visual foreground depth along the trail is within the 500 foot management area corridor with the exception of vista locations where visibility is greater.

Recommendations: Timber harvest from timber contracts put out in FY 2006 and 2007 will be monitored for effects to visual quality harvest beginning in FY 2008. Continue to map visual foreground of the AT. Combine these efforts while working on future integrated resource projects.

Heritage

Evaluation Question:

Have Heritage Resource program management objectives related to: backlogged site evaluations; meeting curation guidelines; developing a Geographic Information Systems (GIS) model for prehistoric site locations; increasing partnerships for Section 110 activities; consulting with State Historic Preservation Officers (SHPO) and Tribes; and incorporating heritage components into historic building management plans been addressed?

Monitoring Question: To what extent have Forest Plan Objectives been attained?

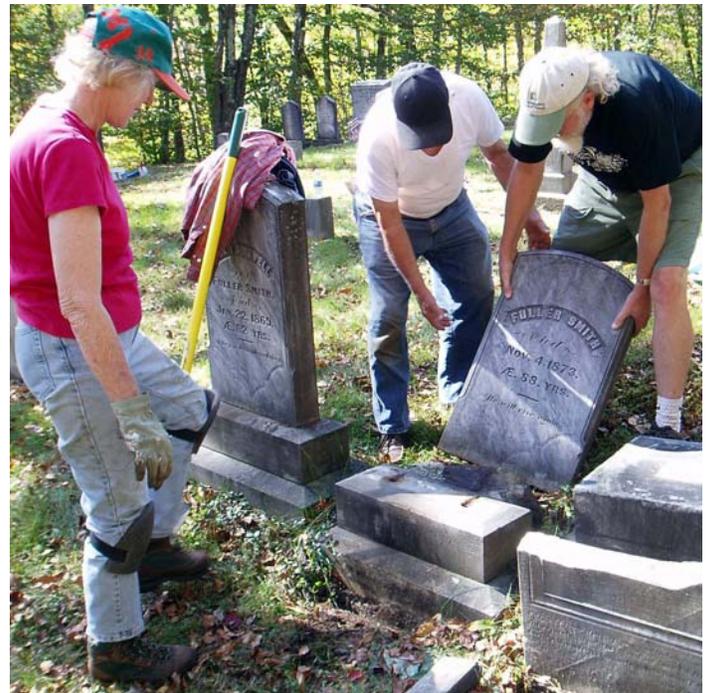
Monitoring Driver: Forest Plan Objectives

Background: These needs were identified in the course of Forest Plan Revision, and had begun to be addressed incrementally in FY06-FY07.

Monitoring Activities: Some of the objectives were identified in the annual heritage program of work, and included in the heritage work plans. These included trial implementation of a State-wide GIS-based prehistoric model which was unveiled in FY07, additional Section 110 and Partnership activities, and continued work with Tribes.

Evaluation and Conclusions: Progress was made on all these fronts – the Vermont-wide GIS model was a useful tool in compliance work; Section 110 (“Heritage outreach”) activities were numerous and a new Cost Share Agreement was developed with the VT Archaeological Society; and contact with Tribes with vested interests on both Forests continued.

Recommendations: We should continue with these activities and, as possible, address site evaluation, curation and historic building needs. We should increase the frequency with which we communicate with Tribes.



Evaluation Question:

Have Heritage Resources across the GMNF been inventoried and protected?

Monitoring Question: To what extent have Forest Plan Objectives been attained?

Monitoring Driver: Forest Plan Objectives

Background: There are hundreds of historic period archaeological sites on the GMNF. An accurate and comprehensive inventory of these sites has not been completed, but progress is made annually in small increments. The associated monitoring of these sites' condition over time has been informal.

Monitoring Activities: Forest archaeologists conducted inventory within project areas as required by the requirements of the National Historic Preservation Act. They monitored the condition of 40 previously known archaeological sites across the Forest. In addition, inventory was conducted on approximately 7,500 acres of GMNF lands leading to the documentation of an additional 50 sites.

Evaluation and Conclusions: Comparing baseline site condition information (documented on FS site forms) with the observed condition in the field allowed us to establish that a majority of the sites were in good (or at least unchanged) condition, but that numerous sites also would benefit from on-site vegetation management to mitigate the effects of encroachment.

Recommendations: We should continue inventory and monitoring activities, and make the monitoring effort more formal and rigorous.

Air

Evaluation Question:

What is the composition of particles in the air, and how are the levels of particulates changing over time?

Monitoring Question: To what extent are air quality and atmospheric deposition affecting sensitive components of the forest ecosystem?

Monitoring Driver: Forest Plan Goals 2-8, 12 and 13

Background: The condition of air quality and the effects of forest management activities on air quality are characterized in the 2006 GMNF Final Environmental Impact Statement (FEIS), p.3-41 through 3-47. To summarize this information:

- Air quality on the Forest and in Vermont meets federal and state ambient air quality standards for all ambient air quality standards (particulates, carbon monoxide, lead, nitrogen dioxide, ozone and sulfur dioxides).
- Particulate matter in the air has reduced visibility from 111 miles to 60 miles on an average day in southern Vermont. Sulfate particles currently cause over 70% of the reduction in visibility. Under natural conditions, sulfates would cause about 10% of the visibility reduction.
- Ozone monitors show that Vermont currently meets the 1-hour and 8-hour ozone standards. However, concentrations are at or near the 8-hour standard which is a concern for human health and some forest vegetation.
- When compared to other parts of the country, the levels of atmospheric deposition (primarily sulfates and nitrates) in Vermont are considered low to moderate. Acid deposition is, however, a

concern to the GMNF because of the forest's thin acidic soils and watershed with low acid neutralizing capacity.

Monitoring Activities: There are two long-term air quality monitoring sites on the southern end of the GMNF, operated via a partnership lead by the Environmental Protection Agency. Meteorological data, wet and dry deposition, and ozone data are collected at the CASNET (Coordinated Air Status and Trends Network) site. Data on the amount, composition, and origin of particulate matter in the air is gathered at the IMPROVE (Integrated Monitoring of Protected Visual Environments) site.

Evaluation and Conclusions: Data from the IMPROVE and CASNET sites, and other regional air quality monitoring sites show no significant change from 2005. Thus, air quality is the same as characterized in the FEIS.

Recommendations: Air quality monitoring on the Forest will continue for the long-term.

Soil

Evaluation Question:

How are soil/site quality and productivity changing over the long term, in response to factors such as acid deposition, climate change, invasive species, other environmental problems, and forest management? More specifically: A) Are soil nutrient levels changing, and are the changes affecting soil/site productivity? B) What toxins exist in the soil (e.g. from the atmosphere), and how are they changing in quantity and type over time? Is this affecting productivity? C) Are forest management activities affecting soil/site productivity?

Monitoring Question: What are the effects of management practices prescribed by the 2006 Forest Plan?

Monitoring Driver: Forest Plan Management Area Guidance

Background: The condition of soil quality on the GMNF, and the effects of forest management activities on soil quality, were characterized in the 2006 GMNF Final Environmental Impact Statement (FEIS), p.3-22 through 3-32. To summarize this information:

- The general health of the soil, including soil quality, is good. Good soil quality means soils on the vast majority of acres on the GMNF are stable (not eroding), they have a protective, porous, and nutrient-rich cover of organic matter, and support productive forests.
- Soil health and quality are good due to two primary reasons. First, laws and regulations are followed which protect and enhance the soil resources. Second, only a small percentage of the Forest is subject to soil-disturbing activities each year. On the vast majority of the Forest, soil processes proceed unhindered from year to year. For example, over 50% of the Forest is in management areas where no tree harvesting, road construction, recreation development, and other soil-disturbing activities are allowed.
- Small, scattered areas exist where soil quality is not good due to erosion, loss of organic matter, compaction, or slope stability. These areas are usually the result of historical management activities, natural disturbances, or a combination of both. We are continuously working to identify these areas, and where possible, improve soil quality through implementing watershed improvement projects.
- We are concerned about the potential long-term effects of acid deposition, toxins in the soil, and climate change on soil quality. We are not seeing measurable effects on productivity on middle and lower elevations of the GMNF, where nearly all soil-disturbing management activities occur.

We are, however, conducting long-term monitoring, and cooperating with the Northern Research station and academic institutions to continue to look for potential effects on soil/site productivity. Several questions remain about the interactions between forest soil, site productivity, forest health, atmospheric deposition, climate change, and other environmental influences.

Monitoring Activities: In FY07, the GMNF staff participated in soil sample collection at the five Long-term Soil Monitoring sites in Vermont (two on the GMNF), a study lead by the Vermont Monitoring Cooperative (VMC). The Cooperative seeks to facilitate the collection of environmental data, and provides to Vermonters and others, the information needed to understand, protect and manage forested ecosystems within a changing global environment. Partners in this Long-term Soil Monitoring project include the Natural Resource Conservation Service, State of Vermont – Agency of Natural Resources, FS-Northern Research Station (FS-NRS), University of Vermont (UVM), and the U.S. Geological Survey (USGS). The objective of this study is to look at the long-term effects of environmental factors, such as acid deposition, toxins, and climate change on soils. This study will also provide insight into whether soil quality and productivity is changing.

In FY07 the GMNF staff, with the same VMC partners, also began planning for a similar long-term study, expanding the number of plots on GMNF lands. Soil, forest health and vegetation community data will be collected on the first plots in 2008. Also, the GMNF and FS-Northern Research Station are participating in the new Northeastern Soil Monitoring Network, a group with long-term soil productivity and forest health monitoring goals, composed of scientists throughout the Appalachian chain and into the southeast Canadian Provinces. Through these and similar efforts, and on-going research by the FS-NRS, our understanding of the effects of acid deposition, toxins, and climate change on soil productivity will continue to improve.

Evaluation and Conclusions: Soil laboratory data and analyses of samples collected in 2007 will not be available for 1 - 3 years. It is too early to evaluate data and draw conclusions.

Recommendations:

Continue the on-going monitoring efforts. Also, explore whether cooperating with the ANR-Department of Forests, Parks and Recreation on a study they are initiating to look at the long-term effects of forest management activities on soil productivity and forest health.

Evaluation Question:

Were Forest Plan Standards and Guidelines (S&Gs) and mitigation measures implemented on selected projects, and to a lesser extent, were they effective in protecting the soil, water and wetland resources? Are soil quality standards met?

Monitoring Question: To what extent are Forest Service management and restoration activities maintaining or improving soil quality?

Monitoring Driver: Forest Plan Goal 3

Background: We typically find that most S&Gs are implemented most of the time, and they are usually effective in protecting the soil, water and wetlands resources. Deviations from S&Gs and mitigation measures are reported, along with their effects.

Monitoring Activities: The following projects and or activities were monitored in FY07:

- 1) Rose Barn, Wallingford Pond, and Sparks Pit Watershed Improvement Projects – GMNF soil and water staff visited these projects implemented in previous years, to see if the associated revegetation efforts and/or road closures were successful. These projects were designed to improve water quality and rehabilitate riparian areas in accordance with Forest Plan Goal 4: To

Maintain or restore aquatic, fisheries, riparian, and wetland habitats. Monitoring consisted of making field observations.

- 2) Greendale Sale – We monitored Unit 12 of this sale to determine if the trees marked for harvest complied with riparian area and wetland S&Gs and mitigation measures. Monitoring was done by GMNF hydrologist, soil scientist, and timber marking crew. Monitoring consisted of two field visits to make observations and adjustments in tree marking.
- 3) Turnpike Sale - We investigated whether the skid road layout and marking of trees to be cut complied with riparian area and wetland S&Gs and mitigation measures. Monitoring was done by GMNF hydrologist, soil scientist, timber sale administrator, and forest management team program leader. Monitoring consisted of three field visits prior to selling the sale, to make observations and adjustments in sale unit boundaries and tree marking.

Evaluation and Conclusions:

Rose Barn and Wallingford Pond

The Rose Barn and Wallingford Pond projects were implemented in 2006 and 2000, respectively. The projects consisted of road and campsite closures followed by road revegetation. These projects were designed to improve water quality and restore riparian areas (such as stream or pond banks and wetlands), and bring these areas into compliance with Forest Plan Protective Strip standards (see Plan, Standards S-1 and S-2, p.17-18). These projects were about 75% successful. Closed roads and other disturbed areas are slowly revegetating. The road closures have stopped most illegal four-wheel-drive and ATV traffic. Quantitative soil quality monitoring and water quality monitoring has not been done in on these projects. Based on our observations, it is reasonable to expect wetland integrity, and soil and water quality are improving because:

- Bare soils are revegetating
- Erosion and stream sedimentation is decreasing, so water quality has improved
- Soil organic matter (and therefore soil fertility) has increased, while compaction has decreased
- Wetland impacts were eliminated, since illegal vehicle access has decreased

Improvement in water quality is especially important at Wallingford Pond, since it is one of the largest remote high elevation ponds in Vermont, and because it has some uncommon aquatic species.

At Rose Barn, increased Law Enforcement worked to maintain most road closures. Perhaps more importantly, the cooperation of local landowners and Forest users has helped to make the project successful. This includes local camp owners, members of the ATV club, and members of the Woodford Selectboard. Their continuing cooperation will be important in the coming years.

Sparks Pit Watershed Improvement Project

This project was implemented about 6 years ago. The project consisted of closing the pit to future gravel extraction, smoothing the landscape, improving the drainage of surface runoff, and seeding and mulching the pit. White pine seedlings were also planted. This is a very infertile, droughty site, so GMNF staff expected it would take several years to fully revegetate with native species. The pit was checked for several years thereafter to see if the rehabilitation efforts were working. In 2007, our soil and water staff determined the project was about 70% successful, and the pit is now in compliance with Forest Plan S&Gs. Water drainage in the pit is controlled, and about ½ of the white pine seedlings have survived. Erosion is minor and soil organic matter has increased, so it is reasonable to assume soil fertility and water quality have improved.

Despite these improvements, about one acre of the pit is still only partially revegetated. This was due to the site infertility and droughtiness. Our staff saw two other needs at the pit:

- Trash cleanup including proper disposal of a large, old culvert.
- One of the two access roads to the pit is not needed, and could be closed and rehabilitated.

Turnpike and Greendale Sales

The objective of our monitoring was to assure compliance with S&Gs and Environmental Assessment mitigation measures prior to harvest of these sales. We selected these sales for monitoring because the Hydrologist, Soil Scientist, and Forest Management Team members were concerned compliance might be less than 100%. Field visits to the sales revealed that Soil, Water, and Riparian Area Protection and Restoration S&Gs were implemented, except for some needed improvement in the implementation of Guideline -10. This Guideline addresses wetland protection. More specifically, some trees were marked for harvest that were in, or too close to wetlands to meet Guideline-10. After these trees were identified, they were excluded from the sale, bringing these harvest areas into compliance with Forest Plan S&Gs and mitigation measures.

Recommendations: To make the Wallingford Pond and Rose Barn projects 100% successful, more time is needed, perhaps 3-5 years, to allow roads to naturally revegetate. Additional road closure work is also needed at Rose Barn to stop illegal vehicle use. This will be done in 2008 by placing large rocks to stop vehicle access.

All work needing to be done at Sparks Pit was approved as part of the Natural Turnpike Integrated Resource Project. This work is likely to happen within the next few years. In the meantime, since erosion in the pit is minor and drainage water is controlled, the soil and water resources will continue to rehabilitate slowly on their own.

The Turnpike and Greendale Sales will be monitored for implementation and effectiveness of S&G throughout the duration of harvesting. We will report on this monitoring over the next few years.

Water

Evaluation Question:

What is the existing status of water quality on the GMNF, and how are Forest Service management activities affecting water quality?

Monitoring Question: To what extent is Forest Service management affecting water quality, quantity, flow timing, and the physical features of aquatic, fisheries, riparian, vernal pool, and wetland habitats?

Monitoring Driver: Forest Plan Goal 4

Background: Water quality is one critical component of maintaining and restoring aquatic, fisheries, riparian, and wetland habitats, and macroinvertebrate populations are an important indicator of water quality.

Water quality monitoring on the GMNF has occurred since 2002 on sites throughout the GMNF in order to track the effects of dispersed camping, developed campgrounds, past, present, and future timber sales; and to provide information for possible future watershed assessments. Water quality macroinvertebrate monitoring on the GMNF by the State of Vermont Department of Environmental Conservation (VDEC) has occurred since 1993. Water quality and flow monitoring near Lye Brook Wilderness on a tributary to Roaring Branch using a USGS automatic sampler in cooperation with USGS, UVM and FS Research in Durham, NH has occurred since 2002.

The past water quality monitoring throughout the GMNF showed a trend of pH values below VDEC Water Quality Standards, especially in the south half of the GMNF. These low pH values were not surprising due to the amount of acid deposition in New England. Several monitoring sites showed elevated phosphorus values that may be due to historic land use practices. Monitoring sites in drainage basins with high urban development showed elevated conductivity and total dissolved solids.

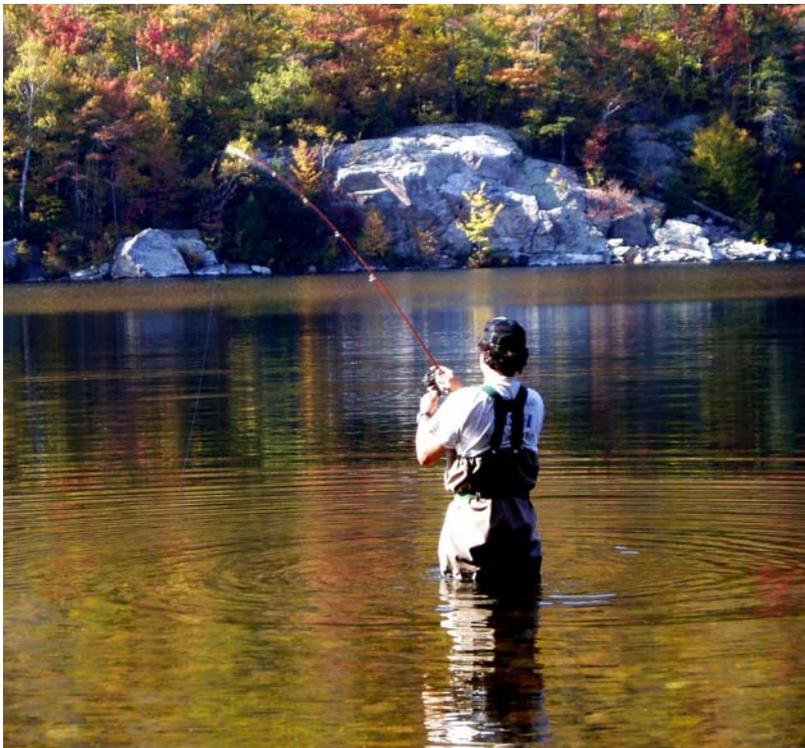
Past, present, and future timber sale monitoring sites showed normal levels of turbidity. The past VDEC Macroinvertebrate monitoring on the GMNF showed the majority of the sites rating excellent, with a few rating fair, excellent–very good, and one rating poor (Flood Brook).

Monitoring Activities: Water quality is a critical component of aquatic, riparian, fisheries, and wetland resources, and macroinvertebrate populations are an important indicator of water quality.

In 2007, the only water quality monitoring that was accomplished was the macroinvertebrate monitoring in seven streams on the GMNF by the VDEC during the summer and fall; and the water quality and flow monitoring near Lye Brook Wilderness done in cooperation with USGS, UVM and FS Research in Durham, NH that occurred bi-weekly throughout the year. (See also Soils pp. and Fish pp.).

Evaluation and Conclusions: The State of VT DEC Macroinvertebrate monitoring results showed the majority of streams rating very good or excellent, and one stream, Flood Brook, rating poor (probable cause being related to localized effects from the on-stream Hapgood Pond, resulting in high water temperatures, low dissolved oxygen, sediment build-up, and elevated nutrient levels. For impact to fish populations, see Fisheries Resource section, p. ??). The water quality and flow monitoring near Lye Brook Wilderness of discharge and chemistry results are pending from the research office in Durham.

Recommendations: In 2008, potential monitoring needs on the GMNF include continued water quality macroinvertebrate monitoring by the VDEC, re-starting the water quality monitoring on sites throughout



the GMNF to track past, present, and future timber sales, and possibly relocating the USGS automatic sampler from the Roaring Branch tributary to a stream location near another wilderness area.

Riparian, vernal pool, and wetland habitats are being maintained or restored on the GMNF by surveys and inventories that are being conducted during the planning stages of integrated resource projects, in order to protect, manage, and improve the condition of those resources. Monitoring riparian, vernal pool, and wetland habitats before and after management activities are also potential monitoring needs for 2008.

Water quality and flow monitoring on the GMNF will continue in the future as long as funding is available.

Fish

Evaluation Question:

Are Atlantic salmon populations being maintained and how are salmon parr and smolt production changing over time?

Monitoring Question: To what extent have Forest Plan Objectives been attained?

Monitoring Driver: Forest Plan Objectives

Background: Since the early 1980s, the GMNF has been a cooperator in the inter-state, inter-agency effort to restore anadromous (sea-run) Atlantic salmon to historic habitats in the Connecticut River Basin. In 1987, the GMNF became a formal member of the Technical Committee for the Connecticut River Atlantic Salmon Commission (CRASC). Forest Service fisheries biologists have been conducting salmon restoration activities since that time. One of these important activities is monitoring juvenile (parr and smolt) salmon populations in GMNF streams. Approximately 15 streams in the White River and West River watersheds are monitored annually. The data are provided to the Connecticut River Atlantic Salmon Commission so an assessment of salmon production throughout the Connecticut River Basin can be made, and if necessary, management changes prescribed. An objective in the 2006 Forest Plan is to enhance salmon populations through spawning, stocking, and habitat protection and restoration.

Monitoring Activities: Atlantic salmon population monitoring was conducted at 20 sites in 16 streams throughout the White River and West River watersheds. Monitoring data were collected using electrofishing surveys in August and early September.

Evaluation and Conclusions: An evaluation of the data collected in 2007 indicates that juvenile Atlantic salmon population trends in GMNF streams are increasing slightly from low levels observed between years 2000-2004. Atlantic salmon populations, like other fish and wildlife species, are constantly changing from year to year due to both management activities and naturally occurring events. The 2007 population of 1024 salmon per mile is substantially higher than the 2006 estimate of 612 per mile. Overall, the number of juvenile salmon in GMNF streams over the past ten years has been relatively stable, as shown in Figure 2.1-2. This has resulted in consistent numbers of smolts emigrating from GMNF streams to the Atlantic Ocean to complete the next phase of their life cycle. These salmon would be expected to return to the Connecticut River Basin as adults in 2009.

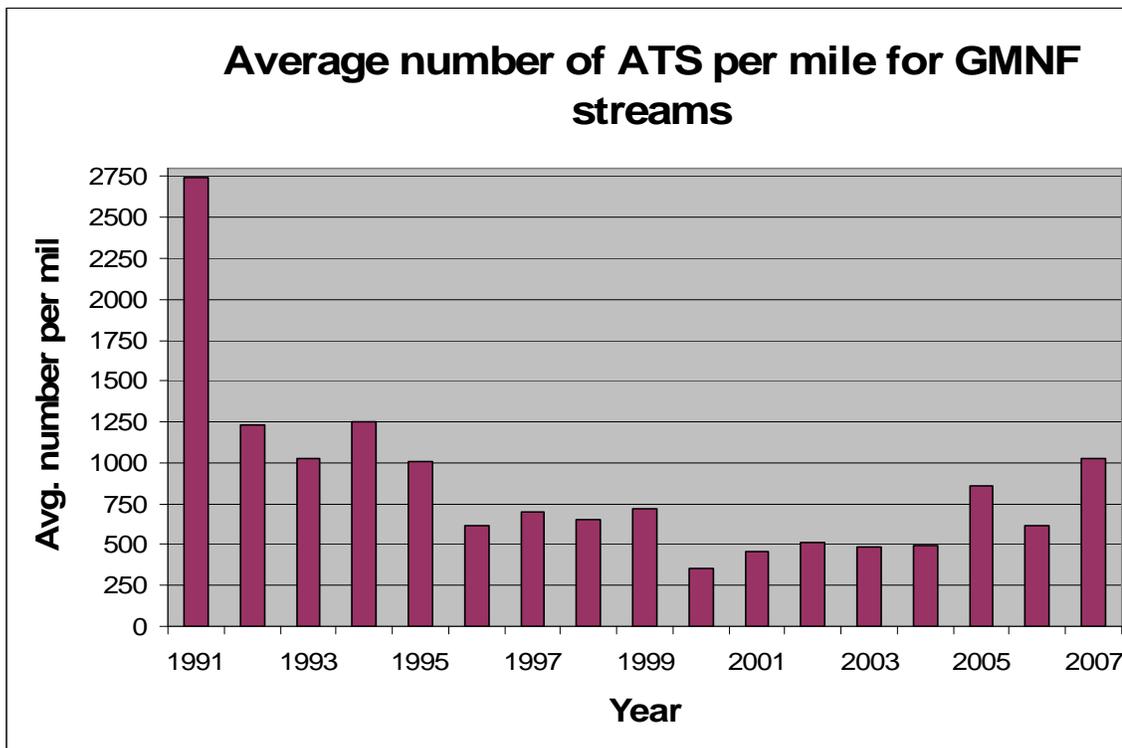


Figure 2.1-2: Average Number of Atlantic Salmon per Mile in GMNF Streams

Recommendations: To continue to stock newly hatched Atlantic salmon fry into GMNF streams and to perform annual monitoring to determine growth and survival estimates of the population.

Evaluation Question:

How are fish habitat and stream channels changing over time?

Monitoring Question: To what extent is Forest Service management affecting water quality, quantity, flow timing, and the physical features of aquatic, fisheries, riparian, vernal pool, and wetland habitats?

Monitoring Driver: Forest Plan Goal 4

Background: The GMNF has been monitoring fish habitat in streams and rivers since 1988 in compliance with the 1987 Forest Plan. This monitoring documented habitat features and physical characteristics of streams at specific locations representing different stream sizes and habitat types across the forest. In 1999, GMNF staff adopted a habitat and channel monitoring protocol based on stream geomorphology principals (called Level III stream monitoring) that would reliably and accurately document stream habitat conditions (e.g. longitudinal profile, x-sectional area, pebble counts, habitat composition) over time. Approximately 40 permanently marked (monument) sites on approximately 35 streams representing the range of stream sizes were established throughout the GMNF. Also, each management area in the Forest Plan is represented, and each of the 40 sites is monitored approximately every five years to document fish habitat and stream channel changes. This monitoring and evaluation also detects the effects of land management activities on fish habitat and channel morphology.

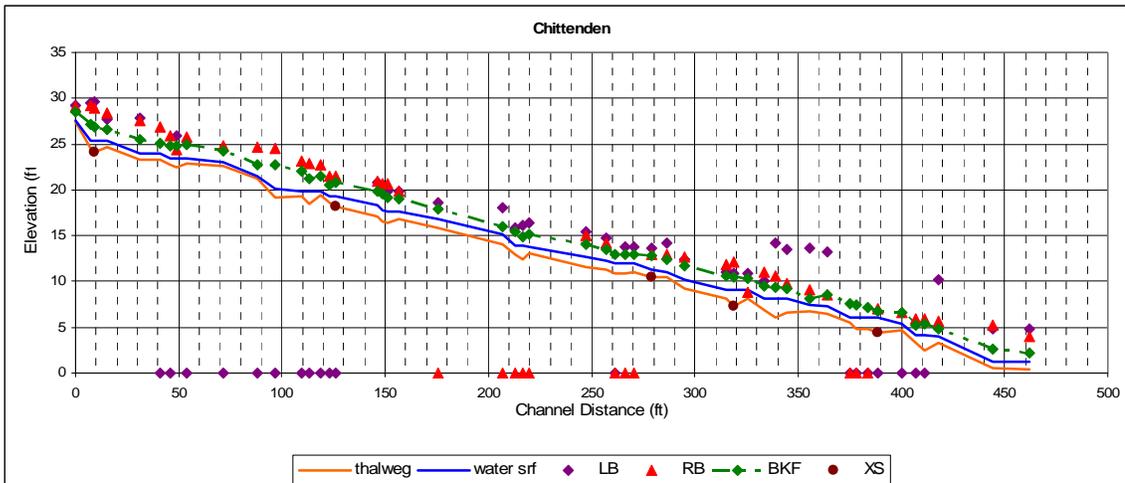
Monitoring Activities: In 2007, fish habitat and channel monitoring occurred in seven sites on six streams. These streams included: Branch Pond, Chittenden, Greendale, Mad Tom, Puss & Kill, and Steam Mill Brooks.

Evaluation and Conclusions: A Preliminary review of those data indicate that fish habitat conditions are being maintained and stream channels are stable and within the range of natural variability for upland streams. For example, Figure 2.1-3 below depicts the longitudinal profile (channel slope & bottom contour) of Chittenden Brook in 2002 and 2007. The channel's slope has not changed over the 5 years and habitat composition has remained constant, especially pool habitat as depicted small depressions on the bottom line of the graph. A more detailed analysis of these and other years data will be conducted in a future annual monitoring report.

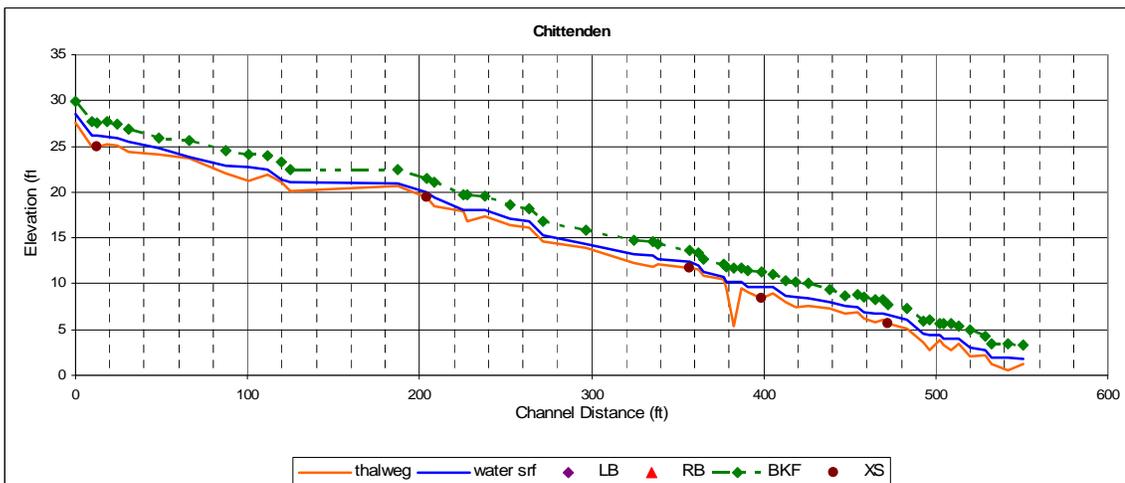
Recommendations: Continue to conduct regularly scheduled level III monitoring in FY 08.



Figure 2.1-3: Longitudinal Profile of Chittenden Brook monitoring site – summer 2007



Longitudinal Profile of the Chittenden Brook monitoring site – summer 2002



Legend - LB-left bank; RB-right bank; BKF-bank full; XS-cross section

Evaluation Question:

Are summer temperatures in upland streams suitable to maintain native fish species and have they changed over the planning period?

Monitoring Question: To what extent is Forest Service management affecting water quality, quantity, flow timing, and the physical features of aquatic, fisheries, riparian, vernal pool, and wetland habitats?

Monitoring Driver: Forest Plan Goal 4

Background: Water temperatures are critical to the survival of native fish and aquatic invertebrate populations. The forest has been monitoring water temperatures in streams and rivers since 1988. The objective of this monitoring is to determine if cold-water habitat for native fish and aquatic insects is being maintained in GMNF streams. Daily stream temperatures are recorded from spring through fall via data loggers. These data are evaluated for average, maximum and minimum temperature limits, and findings are reported annually. Also, these data are used to identify and protect high quality cold water streams, and to develop habitat enhancement projects such as planting stream bank buffers

where water temperatures are too high to support quality aquatic habitat due to poor stream shading. Under the 2006 Forest Plan, water temperature monitoring will continue to be implemented.

Monitoring Activities: Stream temperature monitoring was conducted in the upper White River, and several tributaries on the GMNF in 2007. The following summarizes the activity for the watershed:

- White River: six temperature data loggers were placed in the mainstem of the White River, Alder Meadow Brook, Clark Brook, Patterson Brook, and Thrasher Brook 6/7/07 – 10/14/07.
 - 2 in the White River.
 - 1 in Alder Meadow Brook .
 - 1 in Clark Brook
 - 1 in Patterson Brook
 - 1 in Thatcher Brook

Average temperatures 6/7 - 10/8/2007

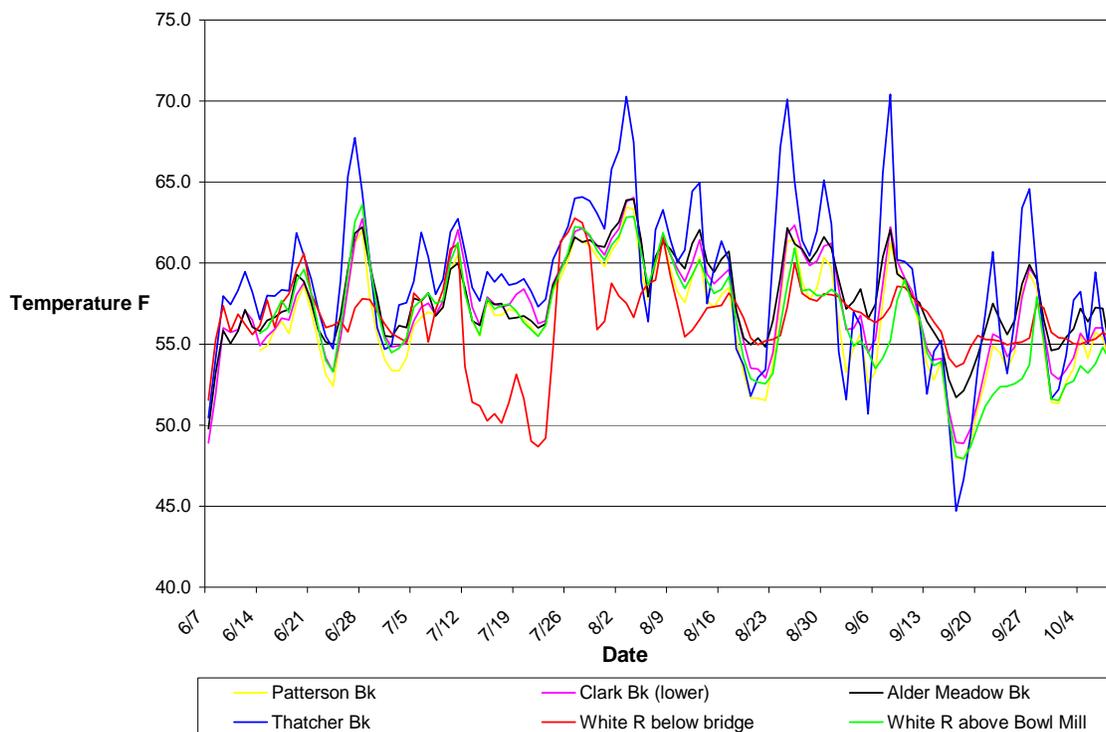


Figure 2.1-4 White River Watershed Brook Temperatures

Evaluation and Conclusions: A preliminary review of the data collected in 2007 indicates that water temperatures in the streams monitored are very good, and all but one fall within the desirable range to support healthy native fisheries and aquatic insect communities. Stream temperature in Thrasher Brook did experience several warming periods between August and early September, exceeding 70 degrees F. These warm periods, while possibly stressful to aquatic insects and fish, are not believed to be detrimental to stream populations since they were very short in duration. Extended warm water periods can result in fish mortality or cause fish to migrate to cold water refuge elsewhere in the watershed. The other four streams that were monitored in 2007 exhibited excellent temperature profiles ranging from the mid-50 to low 60's degrees F. Streams with average daily temperatures below

70 degrees Fahrenheit, (a threshold level), are not considered to be stressed by summer water temperature regimes. Figure 2.1-4 illustrates the average temperature range of all five streams monitored on the GMNF in 2007.

A more detailed analysis of these and other year's data will be done every five years based on information found in the GMNF Monitoring Guide.

Recommendations: Continue to conduct water temperature monitoring on a regular basis in GMNF watersheds.



Wildlife

Evaluation Question:

How many acres are being treated with varying management actions to maintain and increase upland opening habitats?

Monitoring Question: To what extent have Forest Plan Objectives been attained?

Monitoring Driver: Forest Plan Objectives

Background: The GMNF opening maintenance program relies on a combination of “tools” (e.g. prescribed fire, commercial timber sales, contract mowing and cutting) and adequate funding support. Forest Plan objectives call for upland open habitats to be maintained and where desirable increased to slightly higher than ecological tendencies to support species that prefer these habitats.

With an adequate prescribed burning window in the spring of each year, adequate funding to advertise contracts, and an active forest management program, GMNF staff can potentially maintain and enhance existing openings and potentially create more manageable openings to replace those that currently exceed management capabilities. In years with a short, or poor, burning period, GMNF staff

will need to rely on partners, volunteers, and budgetary support to accomplish this same level of maintenance through the more expensive methods of mowing and cutting.

Monitoring Activities: In FY07, 675 acres of existing openings were enhanced and/or maintained using a combination of management tools. GMNF staff monitored over 1,500 acres of openings, with the purpose of identifying: those stands with rare or unique habitats or species; those stands with advanced regeneration, therefore requiring a greater level of management or a more aggressive tool; and those stands with an opportunity to expand, or encompass a number of smaller stands, therefore increasing the efficiency of our maintenance program and the availability of the habitat to a more diverse cadre of early successional species.

Evaluation and Conclusions: Forest Service monitoring and evaluation of openings on the GMNF has been an ongoing process. Openings are not generally a natural part of the forest environment and therefore are quick to revert back to a more natural forested state. This can make it difficult to meet Forest Plan objectives for openings. Existing protocols include a general review of openings to identify potential opportunities to reduce the expense, and increase the productivity of each opening as well as public participation in the maintenance of these sites.

Each opening we evaluate in this way gives the forest additional information to use in the establishment of partnerships and opportunities to increase our effective and sound management of this forest resource.

Recommendations: Continue to survey and monitor sites for these early successional forest birds as well as other early successional species, increasing monitoring intensity and the number of sites monitored each year as time and funds allow, by utilizing local volunteer groups and interested organizations.

Evaluation Question:

What differences exist between wildlife use of more or less remote areas of the GMNF? Within the remote areas, what differences exist between wildlife use of areas that undergo or prohibit habitat management?

Monitoring Question: To what extent are Forest Service management activities contributing toward population viability for native and desired non-native species?

Monitoring Driver: Forest Plan Goal 2

Background: There has been no specific monitoring completed in regard to this evaluation question. This question was established to quantify the establishment of the Remote Wildlife Habitat Management Area, created with the Revised Forest Plan, and also the proposal to add additional Wilderness areas on the GMNF.

Monitoring Activities: In FY 2007, the primary effort was placed on assessing existing data and identifying gaps in information. Currently there are a variety of efforts ongoing across the GMNF being lead by a variety of interested individuals, groups, and partners. These efforts are monitoring individual species and habitat conditions in a variety of situations and habitats. Surveys and monitoring continue to take place at the highest elevations for Bicknell's thrush by the VINS (VINS). Vermont Fish and Wildlife Department (VFWD), in coordination with local universities such as UVM and Middlebury College, survey and monitor everything from birds to mammals to reptiles and amphibians. The GMNF staff continues to monitor MIS, RFSS and other species of concern, and expand those monitoring efforts across the GMNF, in remote areas as well as areas having extensive activities. All of these

efforts will be analyzed so that a story can be told with regard to the benefits of management direction, whether that direction is limited activity or active manipulation.

Evaluation and Conclusions: At this point there is little information to evaluate across the spectrum of management direction. Our survey and monitoring efforts are intended to test the assumptions made with regard to remote areas and habitats on the GMNF as they compare to those areas of the GMNF under more active management recommendations.

Recommendations: Increase monitoring, evaluation, and partnerships with the goal of obtaining more and greater reliability of data.

Evaluation Question:

Do we have bald eagles on/near the GMNF? Are they nesting? Are they nesting successfully? Do they need site-specific protection or habitat management?

Monitoring Question: To what extent are Forest Service management activities contributing toward population viability for native and desired non-native species?

Monitoring Driver: Forest Plan Goal 2

Background: Until 2006 there were no nesting bald eagles in the state of Vermont. The greatest potential for nesting occurs in the Champlain and Connecticut River valleys. In 2004 a group of partners including the United States Fish and Wildlife Department, VFWD, and others, began hacking young eagles at the Dead Creek Wildlife Management Area in the Champlain Valley. In 2006 a pair of bald eagles was confirmed nesters in the Connecticut River Valley.

Monitoring Activities: GMNF staff has worked cooperatively with local conservation organizations, and State and Federal agencies. Each year, as the nation-wide bald eagle population grows, individual eagles are sighted more often in and around the GMNF. Each sighting is noted, considered, and follow-up actions including area surveys and monitoring occur to determine the status of the bird sighted. In 2006 one such local survey was done near Chittenden Reservoir with negative results. Thus far it appears as if the sightings are of transient birds late in the nesting season. Agencies such as the US Fish and Wildlife Service (USFWS) and VFWD monitor Bald Eagle nesting closely as do several local groups such as VINS and Vermont Audubon.

Evaluation and Conclusions: Given the visibility of the Bald Eagle to the general public and to agencies tasked with tracking populations of this species, it is likely that the GMNF staff will be made fully aware of any nesting eagles located on the GMNF. If and when this happens, a more site specific analysis of the management guidelines for the area hosting the nesting pair would need to be evaluated.

Recommendations: No changes needed at this point.

Evaluation Question:

What is the population trend of Bicknell's thrush on the GMNF and adjacent lands?

Monitoring Question: To what extent are Forest Service management activities contributing toward population viability for native and desired non-native species?

Monitoring Driver: Forest Plan Goal 2

Background: The Bicknell's thrush (*Catharus bicknelli*) has been a recognized subspecies of the Gray-cheeked thrush since 1995. The Bicknell's thrush is widespread at high elevations on the GMNF, where surveys conducted by VINSs (VINS) (recently established as the Vermont Center for Ecostudies or VCE), confirmed the species' presence on 42 mountains. Most of the wintering populations of Bicknell's Thrush are found in wet, broadleaf forests of the Dominican Republic. Since 1992, VINS has studied the distribution, ecology, and conservation status of Bicknell's thrush in the northeastern United States. Similar efforts are underway in Canada.

Monitoring Activities: GMNF staff has worked cooperatively with local conservation organizations, and State and Federal agencies. In December of 2005, the Bicknell's Thrush Conservation Strategy for the GMNF was completed. This Conservation Strategy was prepared by: Christopher C. Rimmer, J. Daniel Lambert, and Kent P. McFarland of VINS. This document will help guide the GMNF staff in the planning and analysis of activities in those habitats associated with breeding Bicknell's thrush.

Annual monitoring of high elevation peaks occur across the GMNF by volunteers conducted in conjunction with the Mountain Birdwatch monitoring program organized by VCE. In addition to the annual monitoring that is conducted across the GMNF, GMNF biologists and technicians also conduct survey activities using the same protocols developed for the Mountain Birdwatch program at sites where management actions may have an impact to potential thrush populations.

Evaluation and Conclusions: Populations of Bicknell's thrush continue to decline in the United States and on the Green Mountain National GMNF. Current survey protocols are adequate in assessing the occurrence of nesting populations on the GMNF, and in conjunction with the wider effort of VINS, population trends across the region are being tracked. The Conservation Strategy completed in FY 2006 is invaluable in the guidance of management activities toward the protection and enhancement of Bicknell's habitats.

Recommendations: Continue to assess specific project proposals in potential Bicknell's habitat, and assist VINS in their monitoring of known habitats on the GMNF.

Evaluation Question:

What are the population trends of wood turtle, Jefferson salamander, blue-spotted salamander, and four-toed salamander on the GMNF and adjacent lands? Do they need protection or habitat management?



Monitoring Question: To what extent are Forest Service management activities contributing toward population viability for native and desired non-native species?

Monitoring Driver: Forest Plan Goal 2

Background: The wood turtle, Jefferson salamander, blue-spotted salamander and four-toed salamander are all species that occur on portions of the GMNF, and

are all species on the Regional Foresters Sensitive Species List (RFSS). In the past, monitoring activities associated with these species was limited to the Vermont Reptile and Amphibian Atlas Project, which collects and disseminates data needed to make informed recommendations regarding the state status, state rank, and conservation of Vermont's reptiles and amphibians. The data gathered for this atlas is collected with the help of volunteers, collaborations with conservation organizations, and staff members from Middlebury College.

Monitoring Activities: In addition to the valuable information we have been able to use from the Vermont Reptile and Amphibian Atlas project, the GMNF staff began identifying sites in 2006 to survey for reptiles and amphibians. GMNF staff identified sites where activities would be taking place, had taken place and sites where activities are unlikely to take place with the goal of adding to the Vermont Atlas, as well as identifying the habitat needs and population trends of GMNF Reptile and Amphibian populations. In addition, GMNF technicians conducting annual stream inventories continue to report sightings of the species mentioned above.

GMNF biologists and technicians began conducting general site surveys for reptiles and amphibians in areas where management activities had been proposed. In subsequent years, we will expand our surveys out to areas where management activities have occurred, and where management activities are unlikely to occur.

Evaluation and Conclusions: At this point there is little information to evaluate. The Vermont Reptile and Amphibian Atlas shows that the four species listed above are generally located on the periphery of the GMNF at lower elevations. Our survey and monitoring is intended to test this assumption with a more intensive survey of areas within the GMNF's interior, and around sites under management.

Recommendations: Continue to survey and monitor sites for these Regional Foresters Sensitive Species and increase the number of sites monitored each year as time and funds allow.

Evaluation Question:

Do Indiana and Eastern Small-footed bats roost, forage, hibernate on GMNF? Do they need protection or habitat management?

Monitoring Question: To what extent are Forest Service management activities contributing toward population viability for native and desired non-native species?

Monitoring Driver: Forest Plan Goal 2

Background: GMNF staff continues to participate in forest-wide and State-wide, woodland bat surveys and monitoring. These monitoring efforts are designed to better understand how, and where, all of Vermont's woodland bats, including the Eastern small-footed bat and the federally endangered Indiana bat in particular, use the Vermont landscape. This is a cooperative effort involving the USFWS, VFWD, New York's Department of Environmental Conservation, UVM, and numerous local volunteers.

Monitoring Activities: In 2007, GMNF staff participated in a survey of Greeley Talc Mine in cooperation with UVM. The GMNF staff participated in other site specific bat surveys; and worked cooperatively with State and Federal agencies in monitoring and surveying bats on lands on and adjacent to the GMNF in an effort to gain a better understanding of bat movements and activities on the GMNF. The VFWD is the lead agency for bat survey and monitoring in Vermont. All aspects of our monitoring program are coordinated with Vermont Fish and Wildlife and the USFWS Service.

Evaluation and Conclusions: No further evaluations or conclusions were made as the result of the 2007 monitoring year. The data were consistent with previous information gathered on and near our Forests western boundaries.

Recommendations: Continue to participate in woodland bat survey and monitoring.

Evaluation Question:

Do odonate and lepidopteran RFSS occur on GMNF? In what type of habitats do they occur? Where on the Forest do they occur? Do they need protection or habitat management?

Monitoring Question: To what extent are Forest Service management activities contributing toward population viability for native and desired non-native species?

Monitoring Driver: Forest Plan Goal 2

Background: The Vermont Nongame and Natural Heritage Program do not keep records of its odonate species (dragonflies, damselflies). VINS's group of citizen scientists is currently creating an atlas of Vermont's lepidopteron (butterflies and moths). In an analysis completed on 2002, several experts and several more pieces of information were investigated and reviewed for information leading to the existence of the RFSS odonates and lepidopteron on the GMNF. These species include West Virginia white, gray petaltail, harpoon clubtail, southern pigmy clubtail, and the forcipate emerald.

The West Virginia white has been recently documented on the GMNF, primarily in rich northern hardwoods on the southern portion of the GMNF. The gray petaltail remains elusive yet is believed to occur on the GMNF. The harpoon clubtail is known from the Deerfield River, the southern pigmy clubtail is known in Bourn Brook, and forcipate emerald has been found at Grout Pond and at a wetland area near Lost Pond shelter, all of which are located in the Manchester District of the GMNF.

Monitoring Activities: Monitoring activities occurring in 2007 include the statewide butterfly survey activities being undertaken by the VINS.

Evaluation and Conclusions: It is well established that each of the RFSS odonates occur in stream side or wetland conditions, Forest Plan standards and guidelines are in place and require careful consideration of any activities that occur in these areas. Water quality has been increasing on the GMNF as evidenced by the fish and stream monitoring programs, and the revised Forest Plan has increased the protections of forested wetlands and seasonal pools, considered to be odonate prime habitat. More information is emerging about the existence of the West Virginia white as the result of the on-going atlas development of Vermont's butterflies by the VINS group of citizen scientists. As information becomes available we will incorporate the data into our analysis of management actions.

Recommendations: Continue to monitor and document reports of species and sightings. Encourage GMNF biological staff to become more familiar with odonate and lepidopteron species.

Evaluation Question:

What is the population trend of peregrine falcons on the GMNF and adjacent lands?

Monitoring Question: To what extent are Forest Service management activities contributing toward population viability for native and desired non-native species?

Monitoring Driver: Forest Plan Goal 2

Background: Due to the use of DDT, the peregrine was extirpated in the Eastern U.S. by the mid-

1960s. In Vermont, 93 young birds were released at 3 hack sites from 1982-87: Mount Horrid, Marshfield Mountain, and White Rocks. In 1984, a territorial falcon pair reoccupied the cliffs of Mount Pisgah and returned the following year to nest successfully. The peregrine falcon was removed from the Federal Endangered Species List in 1999. The peregrine falcon continues to remain on the Regional Forester Sensitive Species list for the GMNF.

Vermont's breeding population has since increased steadily, paralleling similar trends throughout much of the eastern U. S. The VINS and the VFWD has closely monitored this species' recovery. In the spring of 2005, the Peregrine Falcon was officially removed from the Vermont List of Threatened and Endangered Species.

Monitoring Activities: Although peregrine falcons are no longer federally listed under the ESA, GMNF staff continues to monitor and protect their nesting eyries. GMNF staff has worked cooperatively with local conservation organizations, State and Federal agencies for several years. Again in 2007, GMNF staff and volunteers surveyed and monitored four sites on the GMNF. The GMNF continues to monitor the species and populations to assist in the state wide and national efforts of monitoring the species, and to assess the adequacy of Forest Plan guidance and the need for any additional protective measures.



In 2007, GMNF staff identified 3 territorial pairs with two of the pairs successfully reproducing and fledging young. Also in 2007, trail closures were put in place and monitored during the nesting season to reduce the impacts of forest users on nesting falcons.

Evaluation and Conclusions: Vermont's peregrine falcon breeding population reached a new post-DDT record high of 34 territories in 2007, equaling 2006's record breaking year. Trends on the GMNF are consistent with the state wide trends.

Recommendations: Continue monitoring activities in coordination with the efforts lead by VINS Citizen Science program and provide protective mitigations where they are warranted.

Evaluation Question:

Are Forest Plan Standards and Guidelines (S&Gs) improving the quality of softwood cover in Deer Wintering Areas (DWAs)? Are S&Gs improving availability and quality of browse in and near DWAs? Is occupancy of DWAs changing over time?

Monitoring Question: To what extent are Forest Service management activities contributing toward population viability for native and desired non-native species?

Monitoring Driver: Forest Plan Goal 2

Background: Deer wintering areas, or “deer yards,” include two basic habitat components required by white-tailed deer during winter: shelter from harsh weather conditions, and food or browse. Softwood stands with high crown closure create shelter or “cover,” which provides protection from snow depth, wind, and cold temperatures. Hardwood and softwood regeneration provide accessible food or “browse.” The quality of deer wintering areas is determined by forest stand characteristics, such as species composition, maturity, height, and closure of the canopy, which vary by site specific features, such as elevation, slope, aspect, and soil type (Reay et al. 1990). The VFWD mapped potential deer wintering areas in Vermont during the 1980s. The Vermont deer herd in 2006 has approximately half the numbers as it had in the early 1980s (Vermont Deer Management Team 1997) when wintering areas were mapped. Thus, mapped deer winter areas today may represent potentially suitable wintering habitat, not necessarily areas actually occupied by deer during winter.

Monitoring Activities: In 2006, the GMNF staff embarked on a long process of inventorying habitats and deer use within existing GMNF deer wintering areas. The monitoring activities are intended to collect data regarding current animal use, cover condition, forage availability, and opportunities. This data will be used to inform project analysis, and will be shared with the State of Vermont in their management of the Vermont deer herd.

In FY 2007, approximately 800 acres of deer winter habitat was surveyed in Compartments 45 and 74. These areas included the Patterson Brook, Texas Falls and Facet Hill deer yards.

Evaluation and Conclusions: At this point in time, only enough data has been gathered to inform one project on the GMNF.

Recommendations: Continue survey efforts and increase the amount of land area surveyed in future years. Incorporate GIS into the data gathering and analysis.

Evaluation Question:

Are temporary and permanent openings being used by early successional habitat (ESH) species? What are short- and long-term changes in structural components and use of openings of different sizes?

Monitoring Question: To what extent are Forest Service management activities contributing toward population viability for native and desired non-native species?

Monitoring Driver: Forest Plan Goal 2

Background: Early successional communities typically are dependent on stand disturbing events, such as fire, wind throw, flood, timber harvest, or agriculture, that create forest openings, which allow sunlight to reach the ground. The species and characteristics of vegetation on these sites progress through reasonably predictable successional (or seral) stages, reverting eventually to mature forest. In the past we have monitored the number of acres in the 0-9 year age class and monitored the population trends of species that occupy this stand condition. In 2006, the GMNF staff embarked on monitoring protocol to measure the use of the openings and impacts to other resources resulting from the creation of early successional habitats.

Monitoring Activities: In 2006, the GMNF identified sites where activities would be taking place, had taken place and sites where activities are unlikely to take place with the goal of identifying the habitat uses and population trends of early successional and interior forest bird species. GMNF biologists and

technicians began conducting general site surveys in 2007 to identify forest birds in areas where management activities are proposed. In subsequent years, we will expand our surveys out to areas where management activities have occurred, and where management activities are unlikely to occur.

Evaluation and Conclusions: At this point there is little information to evaluate. Our survey and monitoring is intended to test common assumptions and concepts with a more intensive survey of areas within forest openings as well as forest interior, and around interior forested stands as well as sites under management.

Recommendations: Continue to survey and monitor sites for these early successional forest birds as well as other early successional species. Increase monitoring intensity and the number of sites monitored each year, as time and funds allow, by utilizing local volunteer groups and interested organizations.

Wildlife: Management Indicator Species

Evaluation Question:

What are population trends of Management Indicator Species (MIS)? To what extent are MIS responding to Forest Service management of suitable habitat?

Monitoring Question: To what extent are forest management activities providing habitat for MIS?

Monitoring Driver: Forest Plan Goal 2, Maintain and restore quality, quantity, amount, and distribution of habitats to produce viable and sustainable populations of native and desirable non-native plants and animals.

Background: GMNF staff began monitoring indicator species in 1987. Collection of population data has been facilitated through the efforts of the local universities, the VFWD, and numerous volunteer groups and individuals. While it has proven difficult to consistently collect annual population data due to a variety of factors such as weather, staffing, funding, etc, GMNF staff consistently collects some annual information about each of the Management Indicator Species (MIS).

Monitoring Activities: GMNF staff continues to work cooperatively with local conservation organizations, and State and federal agencies to gather data for GMNF MIS. In FY 2006, the GMNF staff and volunteers collected data on gray squirrels, American woodcock, and ruffed grouse. This monitoring was done in an effort to add data and continue the pursuit of quantifiable information. This will determine the trends of populations and their habitats as the result of management practices on the GMNF. Each of the monitoring activities was completed using GMNF staff and volunteers who followed protocols established for that purpose in 1982.

Evaluation and Conclusions: MIS survey data was compiled and assessed in FY2001 in an effort to detect trends; data collected since then has not changed that assessment. Our assessment reported that some species such as the blackpoll warblers, peregrine falcons and beaver (1987 Forest Plan MIS) show a growth trend, species such as the American woodcock and white-tailed deer have shown a decline. Other MIS have shown no discernable trend.

Brook Trout populations are stable in the GMNF streams. Twenty-eight sites in 23 streams monitored in FY 2006 averaged 795 wild brook trout per mile. This population is below the 10 year average of 1025 wild brook trout per mile, but within the expected range of natural variability.

Recommendations: Continue collecting data and assessing opportunities to increase effectiveness improve methods of data gathering, and increase public participation.

Evaluation Question:

What are habitat trends for MIS? To what extent is FS management accomplishing desired distribution of age class and habitat type as desired and outlined in Forest Plan objectives?

Monitoring Question: To what extent are forest management activities providing habitat for MIS?

Monitoring Driver: Forest Plan Goal 2, Maintain and restore quality, quantity, amount, and distribution of habitats to produce viable and sustainable populations of native and desirable non-native plants and animals.

Background: The vegetation on most lands in the GMNF has been growing and aging. The logical result of this trend is that MIS requiring mature habitats, such as gray squirrels would be increasing and MIS requiring early successional habitats, such as American woodcock, and ruffed grouse would be decreasing. While an analysis in 2001 showed a decline in American woodcock, the other MIS showed no discernable trend.

Monitoring Activities: GMNF staff continue to work cooperatively with local conservation organizations, and State and Federal agencies in the survey and monitoring of the GMNF MIS. In 2007, GMNF staff and volunteers continued to conduct surveys for the gray squirrel, ruffed grouse and American woodcock wherever and whenever possible on established routes. The data was added to the existing database of information for future analysis. GMNF staff continue to provide guidance regarding opportunities to increase vegetative, age class, and structural diversity whenever there is a proposed action on the GMNF. This guidance is outlined in the Forest Plan, and is transferred to each analysis area based upon the unique characteristics of the site and the opportunities each site provide.

Evaluation and Conclusions: The survey and monitoring protocols are effective in that they are easy to follow, and they can and do provide information that can be duplicated each year. The monitoring protocols, however, are limited in the amount of data they can provide, and one must use the data in conjunction with other information gathered at the state and regional levels. It is clear that the desired conditions for forest age class and species composition will be difficult to obtain, however, local opportunities exist to improve and maintain habitats necessary for the maintenance of viable populations.

Recommendations: Continue to increase monitoring, evaluation, and partnerships with the goal of obtaining more and greater reliability of data.

Botanical Resources

Evaluation Question:

What are the population trends for sensitive plants on the GMNF? To what extent is management sustaining or enhancing habitat conditions for populations?

Monitoring Question: To what extent are Forest Service management activities contributing toward population viability for native and desired non-native species?

Monitoring Driver: Forest Plan Goal 2

Background: Sensitive plant species tracked by GMNF staff have been monitored periodically by the Forest Service, the Vermont Nongame and Natural Heritage Program (VNNHP), and volunteers, including those sponsored by the New England Plant Conservation Program (NEPCoP) and the New England Wildflower Society (NEWFS). Currently, there are 71 plants on the GMNF classified as

Regional Forester Sensitive Species (RFSS) plants. VNNHP has a national database that records information about populations they track, which includes most of the plants considered RFSS on the GMNF. The database includes population data such as numbers of plants, their condition, flowering/fruitletting, any management concerns or issues, and a general rank of the occurrence from A (excellent estimated viability) to D (poor estimated viability). In addition, NEPCoP monitors plant populations that have been identified at risk in New England, including several on the GMNF, and maintains a database of monitoring actions and needs. In FY07, the Forest Service introduced its own database, NRIS TES Plants, for tracking all plant data gathered as result of inventory and monitoring activities.

Over the past 10 years, Region 9 of the Forest Service has collaborated with NEPCoP and local National Forest staff to develop conservation plans and assessments for rare plants. Several RFSS plant species on the GMNF have conservation plans and assessments as a result of this work. These conservation documents identify actions recommended in order to help conserve the species of interest.

Monitoring Activities: No changes to the RFSS list have occurred since it was updated in FY06, and we continue to track 71 plant species (see list at end of document). Monitoring activities in FY07 have included:

- A *Juglans cinerea* (butternut) project sponsored by our regional office
- Ongoing research on *Polemonium vanbruntiae* (Appalachian Jacob's ladder) by UVM PhD candidate Laura Hill
- Monitoring of several *Polemonium vanbruntiae* (Appalachian Jacob's ladder) populations by local volunteer Warren King
- Monitoring of several species by intern Barbara Finlay from Johnson State College
- A Plant Conservation Volunteer program trip to search for an historic occurrence of *Cynoglossum virginianum* var. *boreale* (northern wild comfrey)
- Developing plans to collaborate with NEPCoP to monitor two species
- Surveys of sites of many ground-disturbing projects by Forest staff

Monitoring protocols were consistent with NRIS TES Plants, the new USDA Forest Service corporate database.

Evaluation and Conclusions: Last year we reported a plan to monitor 20 sites during FY07, in order to get all our populations on a five-year schedule. While we met this expectation, we also discovered discrepancies between different sources of data for many populations and imprecise location data for many populations, making relocation difficult, at best. Keeping these complications in mind, the results of this year's monitoring were as follows:

- Close to 300 *Juglans cinerea* (butternut) trees were monitored across the GMNF by GMNF staff. Most had at least some signs of the butternut canker disease.
- During research, monitoring, and surveys for *Polemonium vanbruntiae* (Appalachian Jacob's ladder):
 - Informal monitoring of an administrative study on the effects of increasing canopy openness suggested an increase in flowering and seed set, and a decrease in deer browsing, in the opened half of the site.
 - Two large sub-populations were rediscovered and formally documented. (Both had been previously informally reported.)
 - New sub-populations were discovered for two other known populations.
 - Sub-populations for another known population were rediscovered after having been missing in previous years, but overall numbers of plants in them were down.
- The only documented population of *Uvularia perfoliata* (perfoliate bellwort) on the GMNF was monitored and discovered to have been *Uvularia grandiflora* (large-flowered bellwort),

mistakenly identified. As a result, this species will most likely be removed from our RFSS list, since any species on the list must have a documented occurrence on the Forest.

- A population of *Conopholis americana* (squaw-root) that had not been found for several years was relocated.
- One of several sites for *Blephilia hirsuta* (hairy woodmint) was monitored and found to have declined substantially. It is unclear what may have contributed to the decline.
- The only documented population of *Collinsonia canadensis* (Canada horsebalm) on the GMNF was searched for and not found.
- One of two previously documented occurrences of *Desmodium paniculatum* (paniculate tick-trefoil) was searched for and not found.
- A site where *Diplazium pycnocarpon* (glade fern), *Eupatorium purpureum* (sweet joe-pye weed), *Lespedeza hirta* (hairy bush-clover) and *Panax quinquefolius* (ginseng) were previously recorded was searched, and none was found. This site may be one of several where imprecise location information was the reason for negative results.
 - The historic occurrence of *Cynoglossum virginianum* var. *boreale* (northern wild comfrey) was not found, but one new occurrence and one old occurrence of *Aureolaria pedicularia* (fernleaf yellow false-foxglove) were located; the previously known occurrence showed a decline from earlier years; however, its population is notoriously variable. On this same site visit, a new occurrence for *Cypripedium parviflorum* var. *pubescens* (large yellow lady's-slipper) was found.

In addition to monitoring known sites plus finding the new occurrences mentioned above, three other new occurrences were found during project reviews. In the Mt. Snow vicinity a new population of *Muhlenbergia uniflora* (fall dropseed muhly) was reported. In the Oxbow area, a new population of *Desmodium paniculatum* (paniculate tick-trefoil) was found. A new occurrence of *Platanthera orbiculata* (round-leaved orchis) was found near a planned Catamount Trail extension in Winhall.

Last year we reported a desire to develop a more standardized approach to monitoring of our RFSS plant species. During FY07, we began using the new forms associated with the new NRIS TES Plants corporate database. These forms facilitated collection of data that is more consistent with that collected by VNNHP and others doing similar monitoring. Using the new protocol has had mixed results. The paperless protocol (collecting data in the field with a personal data recorder) is not yet functional nationwide, and may not be for another year or two. The paper forms are cumbersome long and detailed, and were often brought back with some of the required data missing, suggesting that a more streamlined version is needed.

Recommendations: In FY06, we reported the need to continue searching for *Panax quinquefolius* (ginseng) to determine whether populations have disappeared, or searches have simply not occurred in the right location. This still needs to occur, and if located, populations should be marked in GPS. Three of the populations that were found in FY06 had nearby infestations of non-native invasive species (NNIS); to prevent impacts to *Panax*, a plan for controlling NNIS at these sites should be developed.

Last year we reported that additional *Polemonium* populations should be monitored, and the proposed administrative study should be implemented and monitored. Three populations were monitored, and the first phase of this study occurred and will need to be monitored in future years. In addition, a model for locating likely sites for *Polemonium* in the field is needed, and an overall protocol for understanding *Polemonium* population dynamics and response to disturbance needs to be developed.

As a result of the hundreds of *Juglans cinerea* (butternut) that were monitored on the GMNF, the regional office has asked that we identify potential to establish clone banks for this species in consultation with the Regional Geneticist in FY08.

GMNF staff had planned to collaborate with NEPCoP in FY07 to monitor populations of *Calamagrostis stricta* ssp. *inexpansa* (New England northern reed grass) and *Carex aestivalis* (summer sedge) that occur on the GMNF, but they were unable to complete this work. This work should be rescheduled for FY08, and an occurrence of *Carex schweinitzii* (Schweinitzii' sedge) should be added to the list. The historic population of *Cynoglossum virginianum* var. *boreale* (northern wild comfrey) that was not located in FY07 should also be searched for again, as part of this collaborative effort.

The new paper form for monitoring plants needs to be revised to a more streamlined version that is easier to work with in the field, especially for volunteers, but still includes all the required information and is consistent with data collected by VNNHP.

Reconciliation of different sources of RFSS plant data needs to occur, followed by site visits to record accurate location information. Once complete, these two tasks will facilitate more timely and successful plant monitoring.

Evaluation Question:

To what extent are non-native invasive species impacting other Forest resources?

Monitoring Question: To what extent are Forest Service management activities contributing toward population viability for native and desired non-native species?

Monitoring Driver: Forest Plan Goal 2

Background: The impact of non-native invasive species (NNIS) of concern on the GMNF has been monitored by surveying the extent of infestations in areas we want to protect or in areas most likely to be sources of seeds or plant propagules that could be dispersed to areas we want to protect. It also includes the results of treatment efforts, and in the future may include determinations of invasiveness. So far, most monitoring efforts have focused on surveying the extent of infestations, in preparation for developing a proposal to treat invasive plants across the GMNF. Forest Service staff, contractors, interns, and volunteers have surveyed the extent of infestations along many trails, skid roads, and at trailheads, parking lots, and developed recreation sites (all are potential sources of seeds or other plant propagules for dispersal), as well as Special Areas, candidate Natural Research Areas, along the main stems of the Batten Kill and White River and their tributaries, and in project sites. With the exception of riparian areas, most sites surveyed have had few or no infestations of NNIS, and many infestations are small and isolated. Some species that were not expected to occur on the GMNF (because of high elevation or relatively low disturbance) have been found there. In addition, riparian areas, especially the main stems of major rivers, are often found to have extensive infestations of NNIS, especially Japanese knotweed along the White River. All high elevation ponds have been surveyed for aquatic NNIS with negative results. Lower elevation ponds, such as Lefferts Pond, have infestations of purple loosestrife along their banks. The GMNF NNIS list includes one species from the Federal Noxious Weed List, the Class B portion of the Noxious Weeds on the Vermont Quarantine list (Class A plants are not known to occur in Vermont), and a portion of the State Watch List (those most likely to occur or be problematic on the GMNF (see Appendix B, pp. B4-B5 or, to see the entire quarantine and watch list with fact sheets for individual species, go to <http://www.vtinvasiveplants.org/>).

Monitoring Activities: In May through September of 2007, as in previous years, ongoing monitoring (mostly surveys for infestations) occurred in the following places:

- Parts of the Batten Kill main stem, many tributaries and adjacent trails and roads
- Tributaries of the White River
- Ten sites along the White River where floodplain restoration, including manual control of Japanese knotweed, is occurring

- Trailheads trails in and adjacent to Wilderness areas
- Mt. Snow ski area
- Sites where projects were proposed, including the Natural Turnpike integrated resource project area

These surveys completed by GMNF staff, an intern from the Student Conservation Association; The Nature Conservancy (TNC) volunteers as well as local volunteers. In the White River floodplain restoration project, groups of volunteers are also cutting back Japanese knotweed a minimum of three times per growing season, and the resulting infestation is monitored by GMNF.

Monitoring NNIS infestations along rivers, their tributaries, and adjacent trails and roads occurred after discovering the extent of Japanese knotweed infestations along the main stem of the White River. Since this species can be dispersed by water or by road or construction equipment, the widespread nature of these infestations suggested that control would only be possible if adjoining tributaries, trails, and roads were surveyed, followed by development of a Cooperative Weed Management Area (CWMA) with adjacent landowners. This monitoring approach is being duplicated in the Batten Kill watershed. Monitoring Japanese knotweed at floodplain restoration sites occurred to determine whether ongoing manual control could be successful in small, relatively isolated



settings, where other restoration work was occurring. Monitoring in Wilderness areas occurred because Wilderness is a resource we want to protect, and Wilderness managers are required to develop NNIS management plans. Sites of proposed projects were monitored to evaluate the potential for NNIS to spread during project implementation, per Forest Plan direction. Monitoring NNIS at ski areas occurred because past surveys indicated that at least two NNIS, purple loosestrife and wild chervil, were becoming widespread in these managed settings, and had the potential to spread to adjacent natural habitats.

Last year we reported that in order to address NNIS infestations on the GMNF, information about NNIS, the threats they pose, and how to survey them must be shared with adjacent landowners and other interested parties. We also reported that CWMA should be formed to expand the monitoring that occurs on National Forest system lands, and also on adjacent lands, including roadsides which provide avenues of dispersal for NNIS. This year TNC worked with Forest staff to organize members of the Champlain Basin Invasive Plant Partnership of Vermont, a CWMA in which we are both partners, to help survey for NNIS in the Natural Turnpike integrated resource project area.

All data was gathered using the USDA Forest Service Natural Resources Information System (NRIS) protocol, and will be recorded in the newly revised NRIS corporate database. All monitoring was completed between mid-May and late September.

Evaluation and Conclusions: While monitoring indicated the extent of NNIS infestations, we do not currently have a means of measuring the effect of NNIS on other resources, nor do we usually have measurements of the same infestations over time, which would indicate how invasive a particular NNIS can be. An exception is the White River floodplain restoration sites, where monitoring and control of the same Japanese knotweed infestations occurs annually. Monitoring protocols were otherwise efficient and easy to use; an indication of this is that volunteers were easily trained and assigned to projects.

Results of river surveys indicate the need to work cooperatively with other landowners to control NNIS in riparian areas that cross the GMNF; NNIS infestations are often continuous across lands under different ownership, and infestations controlled by one land owner but not by adjacent landowners, would simply re-establish on land where they have been controlled. Results of monitoring the volunteer Japanese knotweed control sites continue to indicate that while there has been a small reduction in Japanese knotweed at these sites over time, it is unlikely that manual control will be adequate for controlling this species. This result is not unexpected, since Japanese knotweed is known to be an aggressive plant that is hard to control; what was unknown was that these relatively small isolated patches would be this hard to control. Results of the Wilderness surveys showed that there are not many infestations, and most are fairly small, isolated, and capable of being manually controlled. Results of the monitoring of project areas indicated that NNIS are sometimes present in surprising places, although often in small amounts. Results of surveys in the Natural Turnpike integrated resource project area indicate that wild chervil is becoming increasingly widespread and is no longer confined to just roadsides. Overall, monitoring results showed that sizes of infestations, amount of labor needed to control them manually, ineffectiveness of manual control techniques on some species, and the potential for increased distribution of NNIS across the GMNF, all point to the need to develop a plan for integrated pest management for all NNIS, forest-wide.

Recommendations: Last year GMNF staff reported that in order to address NNIS infestations on the GMNF, information about NNIS, the threats they pose, and how to survey them must be shared with adjacent landowners and other interested parties. This information sharing has begun, through our involvement with the Champlain Basin Invasive Plant Partnership of Vermont; however, continued cooperative efforts will be needed to begin controlling the NNIS found during those surveys. It was also reported that CWMA should be formed to expand the monitoring that occurs on National Forest system lands, and also on adjacent lands, including roadsides which provide avenues of dispersal for NNIS. While we have worked effectively this year with members of the Champlain Basin Invasive Plant Partners of Vermont, CWMA are needed in other geographic areas, and should be developed in future years. It was previously reported that controlling and monitoring the effectiveness of NNIS infestations should be part of project proposals, especially large integrated resource projects. This year, in the Natural Turnpike integrated resource project, project design criteria were included to address this need; however, our “toolbox” for treating invasive plants is currently limited to manual methods for small infestations. Ultimately, GMNF staff should develop a proposal for integrated pest management of NNIS, forest-wide; proposal development is expected during FY08.

Timber

Evaluation Question:

Are lands adequately restocked according to stocking surveys?

Monitoring Question: Are harvested lands adequately restocked according to Plan goals?

Monitoring Driver: Lands are adequately restocked as specified in the Forest Plan.

Background: The National Forest Management Act (NFMA) of 1976 provided requirements that all

stand regeneration harvest activities on suitable timberlands that create forest openings be quickly reforested. For the GMNF, this requires that any harvest activity effectively beginning stand-origination is reforested within 5 years of the harvest event. This monitoring item helps to determine if the Forest is meeting the requirements of NFMA.

Monitoring Activities: First year evaluation surveys were completed in 15 stands by GMNF staff skilled in identifying tree seedling species. These stands had even-aged and uneven-aged regeneration harvests. The work involves visiting harvested stands and sampling the new regeneration using numerous 1/700 and 1/100 acre sized circular plots to count seedlings and saplings. A plot is considered stocked if at least one acceptable seedling or sapling occurs in it. The plot data is summed and a percent of total stocking is determined for each stand. Surveys were completed on 67 acres of the Peabody Hill sale, 44 acres on the Holt Mountain sale, and 29 acres for the Patterson Brook sale and results are reported in the FACTS data base.

Evaluation and Conclusions: Review of evaluation surveys completed in FY 2007 indicates that reforestation efforts underway are sufficient to meet stocking certification for all units within the required timeframes. Monitoring protocols have been rigorously tested, certifications of successful reforestation have requisites, and procedures are detailed in the Forest Service Handbook (FSH 2409.17, Silvicultural Practices). Reforestation success is measured on new plantations or harvested stands in years one, three, and five (if needed) following the planting or other regeneration effort. Successful reforestation is assured when new stands are certified as “free to grow” by year five

Recommendations:

This monitoring item is on track. Continue to conduct first, third, and if necessary fifth year plantation survival evaluations to determine if survival and growth of planted stock is adequate following reforestation efforts and that adequate reforestation has been undertaken and achieved on all other units of regeneration harvesting.

Evaluation Question:

Is the maximum opening size for even- aged harvesting being met and are we accomplishing resource objectives. Are we meeting wildlife habitat regeneration objectives in both size and quantity of openings by habitat types? This is a required Forest Plan monitoring item. It helps whether we have met standards for maximum opening size and scenic integrity.

Monitoring Question: Are maximum size limits for harvest areas appropriate, and should these limits be retained?

Monitoring Driver: Opening size is consistent with Forest Plan S&G 2.3.5 – Openings, and NFMA requirement on opening size.

Background: The 2006 Forest Plan S&Gs state that temporary openings created through even-aged regeneration harvests should not exceed 30 acres in size; exceptions may include salvage of timber resulting from natural catastrophes caused by fire, insects, disease, ice or windstorm. Permanent upland openings may exceed 30 acres if it addresses site specific needs such as beaver flowages. In deer wintering areas, the size of these openings should not exceed 20 acres.

Monitoring Activities: GMNF staff analyzed the size of even-aged regeneration harvest units, (clearcuts, shelterwoods or variants) that were offered for sale in FY 2007. Eleven of these types of units were sold and the size of openings ranged from a minimum of 1 acre to one 19 acre opening being the largest.

During public meetings in discussing the Natural Turnpike Project, the GMNF staff heard from citizens that even-aged regeneration cuts of 20-30 acres were too large and out of character for the area. There was concern these temporary openings would negatively affect the visual character of forests in which that they live and play. There were also concerns some birds species would be negatively affected by larger cuts. In May 2007, the GMNF staff hosted a meeting with FS researcher David King and forest stakeholders to discuss the current research regarding size of temporary openings. He presented his work regarding impacts on distribution, habitat use, reproduction, and nest predation to early successional shrubland birds. In June 2007, the GMNF staff hosted meeting attendees and other members of the public to the GMNF in Ripton to discuss specific stands being proposed for treatment in the Natural Turnpike project. The result was the Natural Turnpike ID team created alternatives that reduced the size of some proposed permanent wildlife openings to 20 acres or less to better achieve wildlife and habitat, especially for interior neo-tropical migrant birds. The team maintained the larger sizes of most proposed temporary openings to 20-30 acres to maintain habitat needed for other bird and wildlife species. This was done in a manner where visual quality would be maintained in character with the management area and historical use.

Evaluation and Conclusions: The 30 acre size limit for temporary openings created by even-aged regeneration harvest has not been exceeded. The trend in achieving openings closer to the full 30 acre size limit continues to be difficult to implement due to public desires, and may affect the ability to achieve the desired future condition (DFC) for acres of treatments, age classes and habitat. In many cases, stand acres proposed for this type of harvest are reduced to maintain other resource conditions such as deer wintering habitat, visual quality guidelines along roads, trails and visually prominent locations or to buffer wetlands. Future efforts planned in FY 2007, including the Natural Turnpike Project show improvement in addressing this situation. This proposal includes five stands treated by even-aged regeneration cuts ranging from 20-30 acres in size, for 121 acres.

The trend observed is the difficulty in achieving the DFC for 0-9 year old age class objectives. Short of maintaining cultural treatments every ten years in a given area, the GMNF staff will not meet or maintain the 0-9 year age class DFC for suitable stands in a given project or analysis area. This condition is due to the potential distribution of openings, the constraint in the size of openings and the limitations of the GMNF vegetation management program. Budget and logistical constraints affect how much forestland is analyzed and planned for vegetation management treatments with the result that not all suitable timber areas with regeneration harvests are reviewed every 10 years. It is likely the trend of not maintaining the 0-9 year old age class objectives for all forest types and related habitats will continue for new projects into the future as well.

Recommendations: The GMNF staff will continue to incorporate openings through even-aged management to the extent possible in vegetation management proposals, and look for opportunities to create the maximum acre size of units in those proposals. Initial planning for the upcoming Upper White River Integrated Resource Project (IRP) in FY 2008 shows there is opportunity to plan for and achieve larger temporary opening sizes. GMNF staff will continue to identify stands with the proper condition in future IRPs, and propose them for even-aged regeneration harvest as appropriate. We will continue to locate them away from areas where standards and guidelines or other desired resource conditions might limit cutting unit size to better achieve stand sizes and acres treated.

Evaluation Question:

Are lands termed unsuitable for timber production adequately described and mapped?

Monitoring Question: To what extent is timber management occurring on lands suitable for such production?

It

Monitoring Driver: This is a NFMA legally required item. This monitoring helps identify where timber harvest can take place.



Background: Stand mapping involves use of aerial photographs, digital orthographic quadrangle maps, various GIS data layers such as the national wetlands inventory layer as well as on the ground inventories to help map unsuitable lands. During this process, wetlands, cliffs and other non-forested areas are mapped. They are compared to existing maps and other information gained from the field. GMNF field crews then visit the stands to verify past inventory results or to update that information to help stand diagnosis, and form timber treatment prescriptions.

Monitoring Activities: Using these maps and current information, GMNF staff conducted field reviews for potential projects such as the Natural Turnpike Project during 2007. GPS units were used to help map wetlands, and to mark specific spots such as vernal pools and ledge outcrops. GMNF staff found that when applying Forest Plan Standards and Guidelines for buffering and protecting wetlands that there were more acres of unsuitable land consisting of forested wetlands, riverine wetlands and shallow soil than previously thought. GMNF staff have conducted office and field training to help field crews and specialists better identify and map wetlands and other unsuitable lands.

Evaluation and Conclusions: Currently, all lands unsuitable for timber production have not been adequately described and mapped. Extra emphasis in field training and improved mapping in 2007 has resulted in a refinement of project proposals, and better identification and mapping of the composition of unsuitable land. The amount of detailed work to produce this is substantial and wetlands work for example can only be done during the spring and summer when the ground can be seen, soils examined and certain wetland plants emerge. GPS mapping of unsuitable lands will be used to edit the GIS stand layer and better determine actual acres. More attention given to identifying and mapping unsuitable land during the initial stand inventory process, specifically for shallow soil, ledge outcrops and forested wetlands will increase efficiency and accuracy.

Recommendations: GMNF staff have met and discussed how to continue employing such mapping for the Upper White River IRP, and what new resources or partners can be used to assist in this effort. In addition, GMNF staff is working to determine a minimum size to trigger mapping of unsuitable acres, with the intention to continue with better mapping of unsuitable lands prior to, or concurrent with, developing project proposals for vegetation management.

Special Forest Products

Evaluation Question:

How many and what special forest products (SFPs) do people gather? How many require permits, and how many permits were issued annually, for which products/species? How many requests for permits were denied? How many SFPs are being evaluated for permit requirement?

Monitoring Question: To what extent have Forest Plan Objectives been attained?

Monitoring Driver: Forest Plan Objectives

Background: The Forest Service currently issues permits for gathering of the following special forest products on the GMNF: maple sap, Christmas trees, boughs, saplings, seedlings, dead/down wood, miscellaneous sawtimber/pulp, and firewood. The agency evaluated this level of gathering for the revision of the Forest Plan, and found it to be ecologically sustainable, but little was known about gathering of other desirable products for which permits are not ordinarily issued. During revision, Marla Emery of the Northern Research Station (NRS) in Burlington drafted a proposal to assess the uses of special forest products in and around the GMNF, which the agency did not implement at that time. We believe that this assessment would still be a valuable tool to help the agency identify which species require permits, and what permit rules should apply. This will lead to greater certainty both within the Forest Service, and among the public, regarding which products can be collected sustainably, in what locations, and what type of permit or restrictions apply.

Monitoring Activities: Currently, GMNF staff monitors the quantity and type of SFPs that had permits issued for gathering, as well as those for which permits were denied. In addition, the NRS regularly monitors our maple tapping areas to evaluate the health of the maple trees and to determine if any adjustments to, or suspensions of, operations are required. In FY07, permits were issued for the following products:

Product	Quantity
Maple sap	2,031 taps
Firewood	199 cords
Dead/down wood	0
Christmas trees	212 trees
Boughs	2 tons
Seedlings	0
Saplings	0
Miscellaneous	0
Botanical samples (fungi)	200 lbs

During FY07, NRS visited five maple sap permit areas to evaluate the effects of a major forest tent caterpillar outbreak in Vermont and New England over the past several years. They determined that all five areas had recovered from the insect damage, and were healthy enough to support continued maple tapping, including a site that had been closed during the previous two years. In addition, GMNF staff monitored maple sap permit areas during the sugaring season in 2007, and minor compliance issues were noted for one of the permittees. No areas were closed due to compliance issues.

Evaluation and Conclusions: The number of permits issued in FY07, over 300, is at the high end of the range in numbers of permits typically issued on the GMNF. The increase is due mostly to a

doubling of the number of Christmas tree permits issued this year compared to last year. Numbers of taps for maple sap also increased, but across fewer permit areas. Review by NRS of the maple tapping areas suggests that this increase in tapping did not have negative impacts on the health of the maple stands. Fuelwood harvest was reduced somewhat from FY06, but remained above average. Other gathering continues at a low level, and requests for SFP permits beyond the usual kind were rare. Two requests for collection of botanical products were received (one for research and one for personal use), but were unable to be processed during FY07.

Several changes in regulations and policy regarding permitting of collection of botanical products for personal use are being developed at the national level, leading to a more cautious approach by the GMNF in issuing permits for new types of botanical product collection. The most significant change is related to a legal requirement that fees be charged for non-commercial harvesting of botanical products, unless the harvest levels fall below a pre-determined "personal use harvest level". This requirement is related to a law enacted by Congress in 2003 that will expire in October 2010 unless extended or made permanent by Congress. "Personal use harvest levels" have not yet been established on the GMNF for the myriad products that could or have been requested over the years, with the exception of some tree-related products like boughs and Christmas trees, or in special cases related to large amounts of gathering associated with research or bioprospecting. As a result of these new requirements, GMNF staff has moved cautiously in granting new free use or botanical product permits until some personal use harvest levels can be established.

Regular monitoring of sugarbushes, both for maple health and for permit compliance, have proven useful for alerting managers to problems, which are quickly resolved. An assessment of SFP uses across the Forest is still desirable, and was built into the Monitoring Guide, which will be published in FY08. Otherwise, current methods and data collected appear to provide an effective measure of SFP use and sustainability for those products requiring permits.

Recommendations: The Monitoring Guide identifies the need to implement the assessment proposed by Marla Emery of NRS on the SFP use across the GMNF. We hope to work with Marla in FY08 to refine the project plan, and then implement the assessment sometime in the following 2-3 years. We anticipate that as a result of this assessment, we will have more data with which to evaluate the need for product plans, and establish personal use harvest levels for some types of botanical gathering. Depending upon the requests we receive for botanical product collecting in FY08, we may develop some preliminary personal use harvest levels if it can be done in a timely manner.

Rare Features

Evaluation Question:

To what extent are rare and outstanding biological, ecological, or geological features on the GMNF being protected, maintained, or enhanced? To what extent are ecological types on the Forest represented within the ecological reference area network? To what extent do ecological types recognized on the Forest accurately represent the diversity of ecosystems and potential natural vegetation on the Forest?

Monitoring Question: To what extent have Forest Plan Objectives been attained?

Monitoring Driver: Forest Plan Objectives

Background: The significant ecological features to be monitored and evaluated for this question are listed in Table 3.11-6 of the Final Environmental Impact Statement for the revised Forest Plan. The primary emphases of monitoring to address this question during plan implementation will be (1) to evaluate these significant ecological features in terms of quality and disturbances, and (2) to maintain

them at their current level of quality or higher. This may mean controlling incursions of non-native invasive species and ATVs, and it could mean using prescribed fire to maintain a natural disturbance regime. Monitoring will occur before and after any management activities to determine if actions contributed to or detracted from composition, structure, and function of the sites in relation to their values.

A monitoring schedule was established in FY06 in which on average 12 significant sites are visited every year, and every site is visited at least once every 5 years. Sites in which concerns are identified may be revisited more frequently. Also during FY06, indicators were identified that would be used as measures to address this question. These indicators include number of conservation actions, ranked condition of the sites (A-D ranks based on Natural Heritage Program [NHP] methodology), and number of acres surveyed for rare or outstanding features. During early 2007 existing Natural Heritage Program monitoring protocols were evaluated and adapted for use during monitoring, and these protocols were tested during the summer field season.

Monitoring Activities: Two sites on the GMNF were formally monitored this year: The Cape RNA and Blue Ridge Fen cRNA, although several sites in Wilderness were informally monitored by Wilderness rangers. The Cape RNA has a rank of A+ based on conditions evaluated in 1986. Subsequent monitoring at the site in 1992, 1995, 1998, and 2006 suggested that the site was still A-ranked. GMNF staff revisited The Cape RNA in 2007 based on the previous year's visit that noted an unusual abundance of yellow jewelweed in order to determine if this was a unique occurrence or was also occurring in 2007, and to determine an obvious cause. GMNF staff visited Blue Ridge Fen cRNA with Eric Sorenson of the VNNHP to evaluate the condition of this fen, as the last visit had been in 1996. At that time the site was given a B ranking due to its small size. One objective was to determine whether the fen could be classified as "rich" or "intermediate", as there has been debate about that; another objective was to re-evaluate the landscape context, as the new boundaries of the cRNA include the entire drainage basin in which it sits which might affect its rank.

At each site, field notes are taken addressing the condition and quality of the site, as well as its landscape context. In general, because these sites have been inventoried and evaluated in the past, notes highlight distinctive features (such as rare or unusual species), new information that had not previously been collected, and changes in size, disturbance levels, and conditions of the surrounding landscape. These notes are then incorporated into site reports that are prepared during the winter months.

Also during FY07, GMNF Wilderness Rangers visited and monitored several sites within Breadloaf, Bristol Cliffs, Battell, Big Branch, Peru Peak, and Lye Brook Wildernesses. Gilmore Pond, Bourn Pond, Lost Pond Bog, Skylight Pond, Little Pond, and Big Mud Pond are popular camping areas within Wilderness and some like Bourn Pond get frequent visitors. Wilderness Rangers clean up trash and camping debris and return the sites to a relatively natural condition. Rangers also check these areas for non-native invasive species (NNIS); a honeysuckle was noted and removed from the Lost Pond area. Rangers visited Breadloaf Mountain, Mount Roosevelt to Mount Wilson, Bristol Cliffs, the Winhall River area of Lye Brook, Mt. Horrid, and Bald Mountain as part of patrols or trail clearing. Barberry was noted near the Bristol Cliffs Wilderness boundary; no other NNIS were noted. Motor vehicle access to Little Pond has been a concern, but no access was noted in FY07. The other concern noted was evidence of bouldering and new trail cutting to Pinnacle Rock near Mt. Horrid, and in September the relocation of ice caves at Mt. Horrid was publicized in a local newspaper. No other reports of unauthorized motor vehicle use or new trails were noted for these areas.

No conservation actions had previously been identified for any significant ecological features, and so no actions were taken or planned in FY07. There was no inventory conducted this year to evaluate potential areas for ecological significance.

Evaluation and Conclusions: At The Cape RNA, conditions in the southern half of the site appeared to be very similar to 2006, with abundant yellow jewelweed in a relatively open understory. Informal discussions with several Vermont ecologists suggest that this condition may not be unusual, considering the shallow mesic soils and steep slopes at the site. There did not appear to be any major changes in the size, quality, or landscape context of the site to warrant a change in rank. There were no indications of any non-native invasive species (NNIS), unauthorized trails, or major recreational impacts at the site that would precipitate the need for management action.



At Blue Ridge Fen, a rare sedge identified from this site was located again, and additional rare or uncommon plant species were identified. There were fewer indications of moose using the less vegetated center of the fen than there had been in 1996. This site continues to be a high quality example of an intermediate/rich fen at a high elevation in Vermont. There were no indications of any NNIS, unauthorized trails, or major recreational impacts at the site that would lead to the need for management action. This site visit was conducted in cooperation with VNNHP, and they will be preparing a site report for this visit, which is expected sometime in the Spring.

There were no indications of any NNIS, unauthorized trails, or major recreational impacts at the site that would lead to the need for management action. This site visit was conducted in cooperation with VNNHP, and they will be preparing a site report for this visit, which is expected sometime in the Spring.

Overall, the monitoring protocols and evaluation procedures worked well. The inability to formally monitor the desired 12 sites is a concern, and will force some sites to be visited at intervals longer than 5 years if it cannot be rectified. One solution GMNF staff will be exploring in FY08 is involving other biological technicians in the monitoring process. By training 1-2 technicians to use the basic site reporting protocols and gather enough information at these sites, it will enable the GMNF ecologist to evaluate condition and quality, and determine if the rank has decreased or if management actions are required.

It has been beneficial to have Wilderness rangers patrolling some of the sites in Wilderness that are also significant ecological features. While the information provided is informal and consists of notes on activities, it is very effective at catching, and in some cases mitigating early NNIS invasions, illegal trail uses, and recreational use impacts. It would be helpful to incorporate the Wilderness rangers more formally in the monitoring program, and have them fill out forms similar to those done by the biological technicians. Monitoring visits for rare plants will continue to be coordinated with the GMNF botanist.

The unauthorized cutting of trails at Mt. Horrid, and the publication of pictures with arrows showing ice caves at the site is of significant concern. Mt. Horrid is considered a botanical hotspot, known to provide habitat for around 19 rare or uncommon plants, and identified as such in the early part of the 20th century. A significant number of these plants are associated with the cliffs. During plan revision, GMNF staff considered adding language to the Plan concerning rock climbing, but did not because it continued to be of limited extent and did not anticipate it being a concern. With the publication of photos and directions to ice caves at the base of the cliffs, there is a concern that this site could receive much higher levels of recreational use than is desirable for a candidate RNA, and this use could threaten the habitat for the rare plants at the site.

Recommendations: In FY08, monitor 12 significant ecological features on the GMNF, and evaluate their condition and quality to determine if management actions are needed. Monitor these 12 sites with the help of biological technicians in our workforce by providing them with new skills and increasing their awareness of significant ecological features, which will increase the likelihood that new potentially significant sites are identified and evaluated. Conduct some field inventories within the Upper White River Integrated Resource Project during 2008 to evaluate vegetation conditions; such inventories may lead to the identification of new potentially significant sites. If such sites are identified, they will be evaluated more intensively with the VNNHP, and if warranted may be proposed for special management provisions.

Examine the need to administratively correct the Forest Plan to clarify that Mt. Horrid continues to have candidate RNA status, and that its inclusion in the Battell Wilderness did not affect this status. Continue to be manage it as a cRNA, with limitations on recreational use, and the potential for closure orders if such use threatens the values for which it was designated a cRNA. Clarify desired management for any of the significant ecological features that occur within Wilderness. In addition, coordinate more effectively with GMNF wilderness and recreation staff on monitoring these significant features that fall within Wilderness, to ensure their ecological values are protected and maintained.

Insects and Disease

Evaluation Question:

To what extent have destructive insects and disease organisms increased?

Monitoring Question: Are insect and disease levels compatible with objectives for maintaining healthy forest conditions?

Monitoring Driver: Destructive insects and disease organisms do not increase to potentially damaging levels following management activities.

Background: This monitoring item helps track trends in insect and disease (I&D) activity on the Forest. Monitoring of insect and disease pathogens can be employed to determine when, how much, and what kinds of management actions, if necessary, should take place to prevent or suppress undesirable I&D agents. As the GMNF provides a portion of host material for a variety of I&D agents found within the State of Vermont, this monitoring element is best undertaken in a more “landscape” context with adjacent landowners, municipalities and local, state and federal monitoring organizations. For instance, monitoring of emerging insect or disease agent threats, such as the emerald ash borer, an exotic insect pest, has become a national monitoring effort. In this case, early detection efforts are the combined focus of forest research and management organizations at the state, federal and university levels.

Table 2.1-8 Insect and Disease Tracking

Insect or Disease Agent	Organization & Date of Monitoring	Type of Monitoring Effort
Forest tent caterpillar, gypsy moth, powdery mildew, septoria leaf spot, defoliation of white birch	Northeastern Area State & Private Forestry, USDA Forest Service - June 26 & 27, 2007	Aerial Detection Survey of forest health conditions with 3,730 acres mapped by damage class
(as above)	Northeastern Area State & Private Forestry, USDA Forest Service - July 10 & 11, 2007	Aerial observations aboveground checked by Robert Cooke

Monitoring Activities: In FY 2007, a number of insect and disease monitoring efforts were undertaken on the GMNF, in concert with numerous individual and agency partners. The following insects and diseases were tracked, and listed below are the organizations or agencies involved in, and the dates and types of insect and disease (I&D) monitoring efforts used.

Evaluation and Conclusions: Insect epidemics tend to occur with great variations in population numbers, a result of the combination of susceptible host habitats, favorable weather conditions, and previous year population levels. In 2007, there were no significant outbreaks detected from any major pest. Aerial detection resulted in mapping of roughly 3,730 acres of damage, a dramatic decrease from the 161,000 acres mapped in 2006.

Recommendations: Continue annual aerial detection monitoring efforts.

Forest Health

Evaluation Question:

What effect has gypsy moth defoliation caused over time to the growth and productivity of the oak timber resource in the Escarpment Management Area?

Monitoring Question: Are insect and disease levels compatible with objectives for maintaining healthy forest conditions?

Monitoring Driver: A series of 20 1/10th acre square plots were established by S&PF-Forest Health Protection and the GMNF on April 3, 1991. The purpose was to monitor the effectiveness of Bt spraying to protect oaks and measure growth overtime. The plots were re-measured on March 18, 1996 and July 30, 2001.

Background: Periodic defoliation from gypsy moth caterpillars has occurred in the Green Mountain Escarpment. During 1980 and 1981 a significant amount of defoliation occurred in the Escarpment and elsewhere in New England. This prompted more research and study of the gypsy moth problem as it moved in a killing front from east to western states. Researchers determined areas like the Escarpment were focal points for moth populations to first appear and build up to significant levels. They indicated that there were likely about six defoliations since the non-native insects were introduced to Vermont. These outbreaks would occur about every 7 to 9 years. In 1989, field crews reported gypsy moth egg masses. Monitoring demonstrated that it had reached the threshold of 1500 egg masses per acre, and a serious defoliation would likely occur in 1990. In 1990, another serious outbreak occurred in the Escarpment and elsewhere. By conducting hazard mapping and risk rating of stands an area for aerial suppression spraying with a bacterial insecticide was developed. After National Environmental Policy Act (NEPA) analysis, public involvement, and notification, about 3000 acres of the forest and Escarpment were sprayed in 1990. This was a partnership with Vermont Department of Forests, Parks and Recreation (VFPR), the Forest Health Protection Group from the Durham NH State and Private Forestry Field Office (DFO). The spraying was effective and helped suppress defoliation; some areas were located in contracted timber sale areas. Operations were temporarily suspended in these sales until afflicted stands could recover for two growing seasons after defoliation. This scenario was also playing out in the adjacent New England states.

At the 4th Hemlock Woolly Adelgid Symposium (February 11, 2008), Jeff Ward, Chief Scientist at the Connecticut Agricultural Experiment station reported that during this same time period 1.5 million acres of oaks were defoliated in Conn. and 80% of sub canopy oaks were dead. These trees were replaced by birches and maples.

Monitoring Activities: At about the time spraying efforts for gypsy moth in the Escarpment were taking place in 1990, a fungus that killed gypsy moths was being reported as being widespread in the Northeast, resulting in greatly reduced populations. This continued in subsequent years and since 1990, gypsy moth populations on the GMNF have been monitored by the DFO. Set plot locations are visited each year and aerial surveys are conducted, off color areas area mapped, and then field checked. Monitoring Reports are provided to the GMNF annually.

Evaluation and Conclusions:

Since 1990 no significant moth population build ups on the Escarpment or other forest health issues have occurred where suppression has been considered. Monitoring of compartment inventory data in the 1990's by foresters in Middlebury and field observations showed the same effects to the oak resources in the Escarpment that Connecticut and other New England states experienced. Loss of sub canopy oaks, especially white oak, and that maples and birches were increasing in numbers in the understory. Examination of tree core growth rings from the Escarpment indicated suppressed growth partially explained by the periodic gypsy moth defoliations.

Oak trees in the Escarpment were not experiencing similar diameter growth rates during the same time period that other hardwoods or oaks outside of the Escarpment. Since the last serious defoliation, dominant oak tree crowns and tree health seems to be rebounding in the Escarpment. In 2007, field observations of the Dutton Brook II Timber sale in the Escarpment indicate improved growth and tree health in units 12 and 13 that were thinned in 2006 and 2007.

Recommendations: Continue to use the monitoring data from the DFO to determine if gypsy moths are present and to what levels. If serious defoliation is eminent or building we would conduct the hazard and risk rating to determine with DFO and Vermont Forests, Parks and Recreation an appropriate Integrated Pest Management response.

Adjustments were made to the maturity guide used for marking oak timber by reducing the target diameter size for oaks from 24 "as a mature tree on good sites to 22" inches, realizing that because of past impacts, oak trees in the Escarpment would probably not achieve the 24 inch diameters in a 100 year rotation as seen in other parts of the forest on similar sites. In addition the annual monitoring and mapping for gypsy moth and other forest health threats will continue and will be evaluated each year by Forest health and GMNF staff.

It appears that the GMNF is in a similar situation with other neighboring states in that gypsy moth is not seen as a current or emerging problem. The oak resource has been impacted, growth was suppressed, and oak is being lost to more shade tolerant hardwoods. The abundance of sub canopy oaks, and oak regeneration is very limited in the Escarpment.

More research is needed to help refine silvicultural prescriptions for oak at the northern edge of its range in Vermont, and to determine the proper use, timing and sequence of prescribed fire, fencing to reduce deer browsing on oaks or other technologies to help secure advanced oak regeneration. At the same time the slow, steady increases of maples and other hardwoods in the Escarpment are changing the makeup of leaf litter from oak to hardwoods, thereby reducing the flammability of understories in the Escarpment. This may affect application of prescribed fire and may facilitate in managing for oaks.

There are many stands of hemlock and or hemlock mixed with oak along the Escarpment. The hemlock woolly adelgid (HWA) is an insect that kills hemlock trees very quickly, and its killing front has affected and changed forests in the Southern Appalachians and southern New England. This insect is now located at the southern border of Vermont, and if it becomes established in Vermont, it will likely have additional impacts to oaks in the Escarpment. As the hemlocks die they are replaced by more shade tolerant birches and maples, potentially contributing to a loss of oak in the future as described

above. Monitoring for HWA will continue as color information sheets are given to the public and GMNF staff to use in HWA identification each year. In addition VFPR and DFO staff will also monitor for presence of this non-native invasive insect.

Fire

Evaluation Question:

How many wildfires were suppressed with no reportable accidents/injuries or damage to private property? How many acres of private property burned from fires with ignition on Forest Service land?

Monitoring Question: To what extent have Forest Plan Objectives been attained?

Monitoring Driver: Forest Plan Objectives

Background: Wildfire has typically played a small-scale ecological disturbance role within the GMNF. Large fires have occurred in the past but most were a result of human activities such as land clearing and logging slash. The GMNF has had 33 wildfires, totaling 391 acres, during the 20-year period from 1983 to 2002. This averages approximately 3.4 fires per year burning an average of 8.2 acres annually. Ninety-eight percent of the wildfires occurring on the GMNF have been human-caused. Although most current day wildfires are relatively small on the GMNF, nearly all of the wildland fires that have occurred have been within the wildland urban interface (WUI).

The Wildland Urban Interface (WUI) is considered to be those areas where human development and the "wildland" intermix, and which are prone to wildfires or the rapid spread of wildfires under certain climatic conditions. Factors including fuels, slope of the land, and climate are all taken into consideration when determining whether or not property is susceptible to wildfire. On the GMNF, factors that contribute to increased fuel loadings and potential fire hazards close to encroaching development include: ice storm damage, logging slash and natural thinning from second-growth timber stands that are over-stocked.

Although wildland fire is not causing the widespread damage to property that occurs in western US, the potential for destructive wildland fire is increasing on the GMNF as development on private lands intermingled with GMNF lands continues.

Monitoring Activities: In FY07, there were 5 reportable wildland fires that were suppressed by GMNF staff. These fires resulted in no structures being destroyed. With the exception of the Silver Lake Fire, all of the fires were completely on GMNF, land and resulted in no injuries. The Silver Lake fire began on private land burning .10 acre of private property, then spreading to the GMNF, where it burned over 9 acres of the GMNF. Volunteer Fire Departments were the first to attack the fire. During their effort, two volunteer firefighters succumbed to heat exhaustion, were transported to the hospital, and later released.

Table 2.1- 9: 2007 Wildland Fires on the GMNF

GMFL	Date	District	State	Acres	Cause
Lost Pond Shelter	November 24, 2006	Manchester	VT	.05	Human
Yigal	December 9, 2006	Manchester	VT	.10	Human
Snow	February 5, 2007	Manchester	VT	.05	Human
Silver Lake	April 1, 2007	Middlebury	VT	10	Human
Edgar	August 2, 2007	Manchester	VT	.10	Human
Total # fires: 5				Total Acres: 10.30	

Evaluation and Conclusions: As demonstrated in FY07, human caused fire ignitions have and will remain the primary ignition source for the GMFL. Fire preparedness and suppression needs in response to the fire activity in FY07 were sufficient. There was adequate: monitoring of predictive services, preparedness of suppression personnel and equipment, organizational response, and incident management to all the wildfires.

Recommendations: Fire preparedness and suppression is geared to small, short duration fires, however, GMNFL staff recognizes the need to establish improvements related to the preparedness and management of more complex fires (Type 3 and higher). Focused training relating to the management and response for complex fires will be an important and future focus for Fire Managers, Incident Commanders, Agency Administrators, Firefighters, and support staff.

Evaluation Question:

To what extent have hazardous fuels been reduced?

Monitoring Question: To what extent have Forest Plan Objectives been attained?

Monitoring Driver: Forest Plan Objectives

Background: There is concern that increased fuel loading across the GMNF will lead to an increased risk of larger wildfires occurring within the wildland urban interface areas. Currently, timber harvesting and mechanical treatments are the primary management tools used to reduce hazardous fuels, and meet ecological objectives on the GMNF. Mechanical treatments include the use of chainsaws, brush saws, brush-hogs or related equipment to remove or reduce specific vegetation from a site.

In addition to fuels reduction through mechanical and harvest treatments, fire provides an additional tool for mimicking natural processes and disturbance. There are different effects on resources when using fire versus timber management as a tool to achieve ecological objectives and fuels reduction. Fire contributes to a host of functions and processes in ecosystems. Fire reduces accumulations of organic material, which in turn reduces wildfire hazard. It recycles nutrients and alters soil chemistry, aids in decomposition, and influences soil structure and stability. Fire effects can vary depending on fire intensity, severity, and frequency, the primary factors that define fire regimes

Monitoring Activities: The GMNF accomplished a variety of Hazardous fuels treatments utilizing both mechanical fuels reduction and prescribed fire implementation.

In total there were 341.5 acres treated to reduce hazardous fuels in the Wildland Urban Interface (WUI).

- 18 acres were treated in Middlebury RD.
- 197.5 acres were treated in Rochester RD.
- 126 acres were treated in Manchester RD.

Fire Regime Condition Classes, both pre and post treatment observations were made. Post-treatment observations showed a move to a better condition class and all treatments were reported in FACTS.

Evaluation and Conclusions: The use of mechanical treatments to reduce hazardous fuels was effective in FY07. Fuel treatments targeted woody vegetation encroachment, and in particular larger diameter vegetation that would be more difficult to injure and/or kill if prescribed fire was used exclusively. These hazardous fuels treatments also provided secondary benefit objectives, which included ecosystem restoration and wildlife habit maintenance and improvement.

Recommendations: Due to the short windows of opportunity to implement prescribed burns, mechanical treatments provide an effective alternative, as they can be conducted throughout the year,

in a variety of weather conditions. Therefore, the increase of hazardous fuels reduction using mechanical means should be increased. Due to the higher costs per acre associated with mechanical treatments than with prescribed fire, more efficient technologies and workforces should be evaluated and used to minimize costs.

Although vertical arrangement and density were significantly altered by using mechanical treatments, accumulation of forest floor fuels increased with the treatments. Therefore, follow-up treatments should be designed, planned and implemented to reduce forest floor fuel loads. This might include: prescribed fire use, biomass utilization, and piling with subsequent burning.

Evaluation Question:

Is prescribed fire being effectively used as a tool to meet management objectives set forth in the Forest Plan? Are prescribed burns meeting the fire effect objectives set forth in each burn plan?

Monitoring Question: What are the effects of management practices prescribed by the 2006 Forest Plan?

Monitoring Driver: Forest Plan Management Area Guidance

Background: Throughout the 20th century, fire management policy has continued to evolve in response to land and resource management needs, growing knowledge of the natural role of fire, and increased effectiveness of fire suppression. During the earliest years of wildland fire management (i.e. 1940s), the existing state of knowledge indicated that aggressive, total suppression was the best solution to limit widespread, damaging fires. As knowledge, understanding, and experience expanded, it became apparent that complete fire exclusion was not the best management direction to support a balanced resource management program. Fires can be managed for resource benefits through the use of management-ignited prescribed fire. On the GMNF, prescribed fire can be used to meet particular objectives in management areas that allow its use. Some of these objectives include:

- Reduce hazardous fuel loading in the Wildland Urban Interface to reduce the risk of intense wildfire
- Create, maintain, or improve wildlife habitat
- Prepare sites for restoration of species such as oak, pine, and aspen
- Create, maintain or improve plant community composition by influencing the scale and pattern of vegetation across the landscape including changing successional patterns while maintaining ecological functions and processes
- Control interactions between plant communities and insects and/or disease
- Promote blueberry production
- Create or maintain scenic vistas

The use of prescribed fire is an integral component of the GMNF fuels treatment program which started in earnest during the mid-1970s to achieve multiple vegetative management objectives. The program consists of both mechanical as well as prescribed fire activities. Mechanical treatment includes the use of chainsaws, brush saws, brush-hogs or related equipment to remove or reduce specific vegetation from a site. The use of prescribed fire will almost always accomplish multiple objectives within the same treatment area or unit. For example, a prescribed burn to maintain wildlife habitat may also reduce fuel loadings. An under-story burn to promote fire adapted oak may also benefit individual fire adapted ground flora.

Management area direction specifically addresses the need for prescribed fire use to attain ecological objectives with this guideline: "Prescribed fire in association with mechanical means, including timber

harvesting, should be used for regenerating oak and pine dominated natural communities, and when maintaining or establishing fire-dependent species.”

Monitoring Activities: Prescribed fire planning was accomplished with over 15 prescribed burn plans being shelf stocked for use in FY08. Each prescribed fire plan based parameters on pre-burn observations of the site. There are two main objectives associated with each plan, one objective focused on broad resource results, and the other targeting specific objectives resulting to the fuels from the prescribed fire. In general, the resource objectives are: to truncate approximately 80% of invading woody vegetation consisting of shrubs and tree seedlings/saplings through repeated fire entrances; and promote an increase of native grasses and forbs to cover approximately 90% of the unit by repeated fire entrances, maintaining an open grass like state. Although, site specific, the majority of the burn plans had prescribed fire objectives with the acceptable range of results being to reduce the one hour fuels by 75% and ten hour fuels by 50%,

Pre and post burn monitoring was conducted on all of the prescribed burns implemented in FY2007. Monitoring focused on measuring pre and post dead fuel accumulations as well as examining fire's effects on reducing woody encroachment (mortality)

Evaluation and Conclusions: Post burn results from prescribed fire implementation did show success in reducing overall fuel loads of the burn units. One hour and ten hour fuels were reduced to acceptable levels as prescribed. 100 hour and 1000 hour accumulations were not a considerable factor for these units, therefore not evaluated. Mortality of small diameter woody vegetation (shrubs and tree seedlings/saplings) acceptable levels for prescribed burns that were implemented further into the spring season as opposed to burns implemented in early spring, which produced less mortality. In all of the units, there were small increases of Native grasses and forbs. Fire Regime Condition Class improvements were obtained in all burn units.

Recommendations: Prescribed fire will continue to be an effective tool for managing hazardous fuels on the GMNF. Although, monitoring showed that prescribed burning in Spring produced favorable results for reducing light dead fuels (1hr and 10hr) and small diameter woody vegetation, delaying prescribed fire implementation for warmer months (growing season) may produce better results in the promotion of native grasses and forbs, as well as effecting increased mortality in woody vegetation.

Evaluation Question:

Do wildland fires managed using Wildland Fire Use successfully meet objectives set forth in the Forest Plan and the Fire Management Plan? Did the fire stay within the allowed management areas and the Fire Management Plan? Did the fire stay within the allowed management areas and fire behavior parameters presenting low risk to firefighter and public safety? Did the fire function as a natural ecosystem process to restore and/or maintain natural plant communities? Were hazardous fuels reduced?

Monitoring Question: What are the effects of management practices prescribed by the 2006 Forest Plan?

Monitoring Driver: Forest Plan Management Area Guidance

Background: Wildland Fire Use (WFU) consists of the management of naturally ignited fire to achieve predetermined vegetative management objectives. The GMNF has not utilized this tool as of yet, and has instead suppressed all wildland fires. The main objectives of using WFU includes restoring fire to its natural role in the ecosystem, such as allowing natural ignitions to burn without suppression in Wilderness, as well as to maintain the viability of fire-adapted vegetation communities such as oak. Objectives are accomplished in a manner that remains consistent with the safety of people, property,

and other resources

Monitoring Activities: In FY2007, the Fire Management Plan approved WFU as a viable management tool for specific management areas on the GMNF. Fire management staff trained on WFIP procedures, and began communicating with external partners (State of Vermont/VFD's) on this new management option. There were no naturally ignited wildfires that met WFU criteria in FY 2007.

Evaluation and Conclusions: The GMNF was well prepared administratively for managing WFU fires. Due to no WFU fires occurring in FY2007, evaluations and conclusions cannot be obtained.

Recommendations: Although natural ignitions are rare, the GMNF should continue preparing for WFU opportunities by: Fire Management and Agency Administrator training; increasing information and coordination with the public and cooperators concerning the use of WFU; and continuously monitoring the GMNF needs, objectives, benefits, and potential negative impacts from a resulting WFU.

Information, Education, Partnerships, and Payments to Towns

Evaluation Question:

Are partnerships active and effective on the GMNF and are Forest Service personnel participating in partnership activities?

Monitoring Question: To what extent have Forest Plan Objectives been attained?

Monitoring Driver: Forest Plan Objectives

Background: Partnerships and collaboration are essential throughout all levels of the Forest Service. Retired Chief of the Forest Service Dale Bosworth has stated that *“As we enter the Forest Service’s second century of caring for the land and serving people, a strong spirit of partnership and collaboration is more important than ever.”* The GMNF staff has worked with partners throughout its history to achieve social, economic, and ecological goals. Each year, the GMNF staff continues relationships with existing cooperators and enters into new ones. This collaboration has resulted in increased public service and improved land stewardship, both which enhance the Forest Service’s effort to meet desired conditions. This overview will share information on both formal agreements and informal cooperative efforts. Information is presented as a collective report for the Green Mountain and Finger Lakes (GMFL) National Forests for FY07 as the information is tracked regionally in a combined report.

Monitoring Activities: The Forest Service uses many types of agreements to document its work with other organizations and entities. Each of these has specific Congressional legal authority and requirements. The appropriate instrument depends on what the partnership will accomplish, who will benefit, and who is providing funding. The Forest Service must have appropriate statutory authority prior to entering into any agreement, which could result in the use, obligation, or other commitment of any Forest Service resources.

Formal Agreements:

During FY07, there were a total of 34 signed grants and agreements that provided or obligated \$599,953 worth of cash, goods, and services to the GMFL from partners, and \$457,306 worth of cash, goods, and services to partners from the GMFL.

Volunteer Agreements

In FY07, 130 volunteers provided 30,776 hours of service at an appraised value of \$553,968 to the

Green Mountain and Finger Lakes National Forests.

Total to the Forest:

Including formal and volunteer agreements, partners gave a total value of \$1,153,920 to the GMFL in FY07. This includes:

- cash contributions of over \$200,383
- in-kind contributions of over \$163,817
- non-cash contributions of over \$789,720.

Total to Partners:

Contributions also went to various partners for the work they provided to support the GMFL. In FY07, there was over \$403,673 in funds and over \$51,904 in non-cash contributions that were obligated and/or provided by the GMFL to partners, including: challenge cost-share agreements, law enforcement agreements, and roads agreements. There were also partnerships where Forest Service's and partner's funds combined to pay for land improvements.

The GMFL has had numerous on-going informal agreements with State, county, local and other federal agencies, and non-profits that benefit the Forests. These informal partnerships have not been documented through the formal agreement process and are not accounted for in the numbers listed above; however, they do greatly benefit the GMFL

Evaluation and Conclusions: Formal and informal agreements with State, county, local and other federal agencies, and non-profits can increase the amount of management and educational activities that occur on the GMNF. Partnerships also increase the ownership that these organizations have in the GMNF. These agreements also provide GMNF staff with an opportunity to contribute to work that partner organizations value.

Recommendations: Continue working with existing partners and volunteers and cultivate new partners and volunteers where there is an interest from partner groups, and a potential benefit to the GMNF and nearby communities.

Evaluation Question:

Did teacher professional development in Forest stewardship occur?

Monitoring Question: In what way is the Forest Service providing information and education opportunities that enhance the understanding of the GMNF?

Monitoring Driver: Forest Plan Goal 19

Background: As described in the 2006 Forest Plan, the role of the GMNF includes emphasis on playing an increasingly important educational role. It is the role of the Forest Service to provide people with a clearer understanding of the origins of the natural resources they use in everyday life so as to develop a greater conservation ethic and sense of personal responsibility for their actions.

Monitoring Activities: In alignment with the role of the Forest, three professional development opportunities occurred in FY06 on the GMNF. Specifics on these opportunities are provided here:

- A Forest For Every Classroom:** New England Partnership builds capacity in teachers in forest stewardship and using public lands as living classrooms.

Location: Green Mountain National Forest in Vermont (since 1999) and White Mountain National Forest in New Hampshire (since 2006).

Project Summary: A Forest for Every Classroom creates a forest stewardship program to build capacity in teachers. They learn about forests, ecology, stewardship, citizenship, place-based learning, service learning, and using public lands as outdoor classroom.

Innovation: A Forest for Every Classroom stands out in the education landscape of Vermont and New Hampshire as a collaboration of federal, state, non-profit organizations with common missions and visions around conservation, public lands and especially forests in the Northeast. The partners "adopt" 15 teachers every year and help them teach kids to love nature, forests, their communities, and take ownership in their environment.

When the year-long program is over, the 15 teachers, through the partnership, continue to be offered:

- Additional natural resource-based courses in a reunion setting
- Scholarship help for conferences and workshops
- Small grants for classroom service-learning projects

Partners: Green Mountain National Forest, Marsh-Billings-Rockefeller National Historical Park, Conservation Studies Institute, Shelburne Farms, National Wildlife Federation. Replication of A Forest For Every Classroom is being done in Texas and Montana in 2007/2008.

In 2007, an additional 16 teachers completed **A Forest For Every Classroom**. Since 2001, a total of 81 teachers have completed it.

- b. **Vermont Envirothon** is one of the most successful partnerships that takes place in Vermont. The Vermont Association of Conservation Districts sponsors the yearly event with the following collaborators: the Natural Resource Conservation Service, Forest Service, Vermont Agency of Natural Resources, Vermont Forests and Parks, Vermont Fish & Wildlife, and several environmental groups such as Vermont Recyclers and Audubon.

For 13 years, the **Vermont Envirothon** has been challenging young minds to consider conservation, stewardship and environmental issues that affect their schools, community, country and the globe. High-school aged students become empowered as they work through the multi-faceted study of the environment and many go on to college and study natural resource-based careers. After college, they come back to the agencies that they learned about during their experience with the **Envirothon**.

Teachers who coach the Envirothon have stated that the learning curve of their students in this program jumps because they better understand, from field experiences with the **Envirothon** program, why they need to learn math, reading, writing, and life skills. They also see the passion natural resource professionals have for their careers and the assessments, investigations, findings—real life issues—in which they are involved.

The goal of the **Vermont Envirothon** Program is not only to teach environmental concepts and realities, but also to instill an understanding of the ecological and community factors that are involved in environmental decisions and actions. The program sets up a different environment challenge each year as well as teach basic concepts in soils, forestry, aquatic environment and wildlife. Students also learn decision-making, problem solving, team-building and communications skills.

In 2007, 16 Vermont schools participated in the Vermont Envirothon totaling 132 students and educators who participated.

- c. **A Trail To Every Classroom:** Teachers who are in towns along the Appalachian Trail are targeted to participate in teacher training with the goal of stewardship of the Appalachian Trail. This is a similar program to A Forest For Every Classroom. In FY07, one teacher participated.

Evaluation and Conclusions: Education programs make use of the GMNF and familiarize students with natural resources and connects them to public lands. A Forest for Every Classroom does a yearly evaluation that is available on the website.

Recommendations: Continue to provide professional teacher development opportunities through the continuation of these three programs.

Evaluation Question:

How many agreements for fire management have been developed and maintained with outside partners?

Monitoring Question: To what extent have Forest Plan Objectives been attained?

Monitoring Driver: Forest Plan Objectives

Background: GMNF staff has had and continues to maintain strong partnerships with the Department of Defense. The GMNF staff maintains agreements with the U.S. Army Environmental Center (State and Private Forestry-NA) for Ft. Drum (Army) in New York, Westover Air Reserve Base (Air Force) in Massachusetts, and New Boston Air Force Station in New Hampshire. Although each has separate agreements, the scope of work is similar: to plan and implement prescribed burns for the reduction of hazardous fuels; and to provide fire training to DOD employees. These partnerships are very beneficial to the Forest Service for a number of reasons. The Department of Defense issues Military Interdepartmental Purchase Requests, providing supplemental funds to the GMNF's fire program. The implementation also is beneficial by providing good experience and training opportunities to fire personnel.

The GMNF staff also maintains numerous agreements and partnerships with Volunteer Fire Departments and a Mutual Aid Association. These agreements are very beneficial by providing suppression support if needed on Wildland fire incidents as well as aiding in the preparedness planning across the GMNF. The following tables displays the VFD's under agreement and the location on the GMNF in which the agreement serves.

GMNF District	Fire Department
North	Bristol Fire Company
North	Chittenden VFD
North	Dunmore Hose Company (BRANDON)
North	Goshen VFD
North	Granville VFD
North	Hancock VFD
North	Lincoln VFD
North	Middlebury , Town of, Fire Dept
North	Pittsfield VFD
North	Ripton VFD

North	Rochester VF Company
North	Salisbury VFD
North	Sherburne VFD
North	Stockbridge VFD
North	Warren VF Company
South	Arlington Fire Dept.
South	Bennington County Mutual Aid Association
South	Dorset VFD
South	East Dorset VFD
South	East Wallingford VF Company
South	Manchester Fire Company
South	Peru VFD
South	Phoenix No. 6 Fire Company (Londonderry)
South	Readsboro VFD
South	Rupert VFD
South	Shaftsbury Fire Dept
South	Stamford VF Company
South	Stratton Fire Dept
South	Wallingford Fire Dept #1
South	Weston Fire Company
South	Wilmington, Town of
South	Winhall Fire Dept

The Forest Service also maintains an agreement with the Northeast Forest Fire Protection Compact for interagency fire planning benefits. GMNF staff participates on an on-going basis with a variety of working teams within the compact. The Forest Service is also Part of three way Cooperative Fire agreement with the State of Vermont and the USFWS that provides numerous benefits relating to coordination and collaboration on fire preparedness, suppression, etc

Monitoring Activities: Management of the agreements is continuous and on-going requiring coordination with all parties within the agreement. With the exception of a few, most agreements are re-written every 5 years, with operating plans being done on an annual basis. In FY07, the GMNF staff provided hazardous fuels project planning, and implementation for Fort Drum Military installation. In early May, GMNF fire staff burned over 3233 acres over a three day period at Fort Drum using a combination of ground and aerial ignition.

Preliminary discussions were conducted with The Nature Conservancy (TNC) in New York in developing a prescribed fire and fuels Memorandum of Understanding between the two agencies. This MOU would allow for the exchange of personnel and resources for implementing prescribed burning on the GMNF and TNC lands.

Evaluation and Conclusions: Partnership agreements provide valuable services that help the Forest Service achieve desired management objectives. It is essential that agreements be kept current.

Recommendations: Desired partnerships with organizations (Land trusts, Clubs, private landowners, etc.) that provide opportunities to assist with GMNF and adjacent lands' fuels management should be targeted. This might offer opportunities to reduce financial burdens on the Forest Service by offering more cost effective means to treat hazardous fuels and possibly increase the amount of acres treated per year.

Evaluation Question:

What was the amount paid to each GMNF town through PILT, 25% fund or Secure Schools? What type of communications has occurred on this topic with each town?

Monitoring Question: To what extent have Forest Plan Objectives been attained?

Monitoring Driver: Forest Plan Objectives

Background: See Appendix A

Monitoring Activities: See Appendix A

Evaluation and Conclusions: Towns are sent information regarding payments as soon as it is released.

Recommendations: Continue informing towns of the status of the Payment to Towns legislation as well as the yearly appropriations.

Lands

Evaluation Question:

To what extent has the GMNF land base been adjusted through purchase, exchange, transfer, interchange, boundary adjustment and donation?

Monitoring Question: To what extent have Forest Plan Objectives been attained?

Monitoring Driver: Forest Plan Objectives

Background: In FY06, eleven properties were purchased, totaling 3,392 acres. Many of the Forest Plan guidelines for landownership adjustment, including watershed and wildlife and fish habitat conservation and providing for outdoor recreation and outstanding scenery, were met. The 2,450 acre Broad Brook parcel encompasses almost the entire watershed of Broad Brook. The Trust for Public Land assisted in this purchase. The Conservation Fund assisted us with the purchase of a 16 acre critical wildlife corridor crossing area. A land exchanged also occurred, where 2.21 acres of land were exchanged for 10 acres adjacent to a popular hiking trail, and within the Moosalamoo National Recreation Area. Other properties acquired provide important black bear habitat and additional public access.

Monitoring Activities:

In FY07, the last phase of the Broad Brook purchase, was completed, adding 965 acres in Pownal. Within the entire parcel is the eastern slope of the Dome (a 2,478 foot mountain), and parts of the Appalachian National Scenic Trail/Long National Recreation Trail, Dome Trail and Broad Brook Trail. In addition, the entire property has been mapped as black bear production habitat, which supports high densities of cub producing females. One other acquisition consisted of purchasing a small in-holding in the Town of Winhall, which will eliminate the needs and costs associated with boundary maintenance.

Also occurring in FY07 was the sale of a facility known as the Wright house, located in Killington. Originally purchased in 1990 along with 18 acres of land adjacent to the Appalachian National Scenic Trail and Long National Recreation Trail corridor (AT/LT), the purchase occurred to meet the Forest Plan goal of acquiring lands near the AT/LT to protect this Trail of national significance. In the mid 1990's the AT/LT was relocated and while the original location remains as access for short hikes to

Deer Leap Mountain from Route #4, the facility, which was part of the original purchase was no longer needed. The sale of Wright House eliminated deferred maintenance and other annual costs of \$14,467.00.

Conservation partners, state and local colleagues and interested citizens have provided tremendous assistance in identifying lands from willing sellers that would benefit the national forest system. Monitoring activities in the form of the information sharing described above will continue to enhance the land adjustment program.

Evaluation and Conclusions: The partners, who assisted us in FY06 and FY07, were invaluable in making acquisitions occur. In concert with the District Ranger and lands staff, the Trust for Public Land spearheaded an in-depth community relations effort to educate the residents of the town of Pownal on the benefits of purchasing the Broad Brook Property. The information gained from this partnership experience highlights the importance of partnerships and community involvement.

Recommendations: Continue to work with partners, state entities and communities to help identify, evaluate and subsequently acquire properties for the land adjustment program.

3. RESEARCH AND STUDIES

Cold Tolerance of American Chestnut Trees

The cold tolerance of chestnut trees from several sites in Vermont was tested. Trees at the chestnut plantation on the Manchester Ranger District were included in the study. The work was accomplished by a research plant physiologist from the FS Research Station in Burlington and a UVM grad student. For the project, twig samples were taken from the trees in November 2006, February 2007 and April 2007.

Carbon Stocks in Northern Old Growth Forests

Greenhouse gas emissions and climate change have sparked an interest in carbon storage by forests. Goals and objectives of this project were: 1) develop a benchmark of maximum soil carbon storage for northern forests, 2) construct comprehensive estimates of old growth forest carbon stocks and, 3) formulate basic guidelines for forest management to sustain and enhance forest carbon storage. The project was implemented by two researchers from the FS Research Station in Durham, NH.

Determination of Atmospheric Deposition and Nitrogen Saturation in Class I Wilderness Areas of the Northeastern United States

Nitrogen and Sulfur emissions to the atmosphere have led to increased deposition of these nutrients onto forests of the northeast. Once nitrogen entering the forest environment exceeds the biological demand for nitrogen, negative responses by the forest can occur. Goals of this project were to: 1) determine rates of atmospheric deposition and throughfall nitrogen in Class I areas of the northeast, 2) assess nitrogen saturation status of Class I forests in the northeast. The project proponents, a professor from Boston Uni. and a researcher from the Institute of Ecosystem Studies in Millbrook, NY, work within Lye Brook Wilderness, a Class I Wilderness.

An Inventory of Amphibians and Reptiles in and Around Crystal and Haystack Ponds on Haystack Mountain in Wilmington, Vt.

The results of this survey will be used for comparison of other amphibian and reptile populations throughout southern New England to provide a better understanding of geographic variation in size and other life history variables. This was a catch, photograph, measure and release project was carried out by an independent private researcher from Acton, MA.

Diversity and Distribution of Odonata (dragonflies and damselflies) in Vermont

A complete Odonata survey of the State of Vermont has not been done, this project is part of that ongoing survey. The project will also help in the understanding of the flight season of these insects and their conservation status. A professor from Green Mountain College in Poultney was the project proponent.

Vermont Odonata (dragonflies and damselflies) Survey

This project was also part of the state wide Odonata survey. The researcher focused his surveys on GMNF peatlands because there are few opportunities for survey work in bogs and fens in southern Vermont. The project proponent, an independent researcher from Plainfield, Vt. worked under a State Wildlife Grant from the State of Vermont.

Preliminary Research into the Cause(s) of Birch Decline in Vermont

Paper birch trees in Vermont are declining and dying from some currently unknown cause(s). It is important to determine what factors have instigated or influenced the decline of paper birch in region because the likely trajectory and impact of decline, as well as potential management responses to it,

will depend upon the cause(s). This project is being carried out by a research plant physiologist from the FS Research Station in Burlington.

The Ecology, Demography, and Genetics of the Globally Threatened Perennial Plant, Eastern Jacob's Ladder (*Polemonium vanbruntiae*)

Effective conservation plans are often hindered by a lack of information about a species' biology and ecology. Research into the ecological, demographic and genetic factors affecting the persistence of the Eastern Jacob's ladder will be crucial to success of long-term management. This is an ongoing study started in 2006 and continuing into 2008 by a doctoral student at UVM.

4. ADJUSTMENTS OR CORRECTIONS TO THE FOREST PLAN

Administrative corrections to the Forest Plan are defined at 36 CFR 219.31(b) in the 2000 Planning Rule and may be made at any time. Administrative corrections are not plan amendments or revisions, and do not require public notice or the preparation of an environmental document under Forest Service NEPA procedures. Administrative corrections include the following:

1. Corrections and updates of data and maps,
2. Updates to activity lists and schedules (proposed actions, anticipated outcomes, projected range of outcomes);
3. Corrections of typographical errors or other non-substantive changes; and
4. Changes in monitoring methods other than those required in a monitoring strategy (referring to the requirements for monitoring sustainability criteria in the 2000 rule.)

Corrections (“errata”) to the Final Environmental Impact Statement to accompany the Forest Plan are permitted by Forest Service Environmental Policy and Procedures Handbook, FSH 19809.15, Chapter 10, Sections 18.1 and 18.2.

Following release of the 2006 Forest Plan, the staff of the GMNF began gathering information and errors contained within the final documents. In August 2007, the GMNF staff issued three administrative corrections and one errata to the Forest Plan set of documents. The corrections and errata were made available on the following website:

http://www.fs.fed.us/r9/gmfl/nepa_planning/plan_amendments/index.htm

These include administrative corrections to:

- Remove a typographical error in Forest-wide Guideline (G-16)
- Clarify a Forest Plan Wilderness Management Area Standard and to add a Wilderness Management Area Guideline
- Add the 2006 New England Wilderness Act to the Wilderness Management Area Major Emphasis and Standards and Guidelines
- Change the White Rocks National Recreation Area to the re-designated name, Robert T. Stafford White Rocks National Recreation Area, throughout the 2006 Forest Plan
- Change of Management Area Allocation Table acreages and Maps based on the 2006 New England Wilderness Act
- Remove a typographical error reporting incorrect trail miles in Appendix A, Table A-4

And errata to correct:

- Inconsistent acreage figures reported in analysis tables and document text in the Final Environmental Impact Statement (EIS)

We will likely issue administrative corrections in the future. Corrections as well as the corrected pages from the set of Plan documents will be posted at the above internet link and we encourage people to use this resource for accessing the most up to date information on administrative corrections. We will continue to provide opportunity for public involvement at the project level and during any substantive changes to the Forest Plan.

There have been no amendments to the revised Forest Plan.

5. LIST OF PREPARERS

The following people collected, evaluated, or compiled data for the fiscal year 2006 Monitoring and Evaluation Report:

Name	Position
Melissa Reichert	Interdisciplinary Team Leader/Forest Planner
Diane Burbank	Ecologist
Nancy Burt	Soil Scientist
Chris Casey	Forest Silviculturist
Pat D'Andrea	Realty Specialist
Mary Beth Deller	Botanist
Kathleen Diehl	Partnership and Conservation Education Coordinator
Kathy Donna	NEPA Coordinator
Chris Fors	Law Enforcement Officer
Pam Gaiotti	Budget and Accounting Officer
Rob Hoelscher	Wildlife Biologist
Holly Knox	Writer-Editor
Dave Lacy	Archaeologist and Heritage Resource Specialist
Donna Marks	Landscape Architect
Susan Mathison	Eastern Region Winter Sports Team NEPA Coordinator
Bill Peterson	Forest Management Team Leader
Steve Roy	Fisheries Biologist
Brian Schaffler	Fire Management Officer
John Sease	Wildlife Biologist
Doreen Urquhart	Realty Specialist
Chad VanOrmer	Recreation Planner
Greg Wright	Recreation Forester

APPENDIX A: PAYMENTS TO TOWNS

Green Mountain National Forest Payments in Vermont

There are three types of federal payments reaching municipalities that have U.S. Forest Service land: 1) Payments in Lieu of Taxes (PILT); and Public Law 106-393 – **Secure Rural Schools and Community Self-Determination Act of 2001**, comprised of the 2) 25-Percent and 3) Full Payment Funds. PILT funds are directed to towns, and the Public Law 106-393 funds (either the 25-Percent or the Full Payment Funds) are directed to school districts.

PAYMENTS IN LIEU OF TAXES (PILT)

Generally, federal lands may not be taxed by State or local governments unless they are authorized to do so by Congress. Since local governments are often financed by property or sales taxes, this inability to tax the property values or products derived from the federal lands may affect local tax bases significantly. Instead of authorizing taxation, Congress created various payment programs designed to make up for lost tax revenue.

Under current federal law, local governments are compensated through various programs for losses to their tax bases due to the presence of most federally owned land. The most widely applicable program, while run by the Bureau of Land Management (BLM), applies to many types of federally owned land, and is called "Payments in Lieu of Taxes" or PILT.

The level of PILT payments is calculated under a complex formula which takes into account figures such as acres of eligible lands, population, and previous year payments from other federal agencies. The PILT, made in or around October, is indexed by the inflation rate and set by federal law. Congress, however, rarely appropriates the full amount of the PILT.

Each town can receive additional PILT dollars if they contain other federal lands, such as National Park Service or Army Corps of Engineer lands. Not all federal acres within the towns however, are entitled to PILT payments.

SECURE SCHOOLS ACT

The **Secure Rural Schools and Community Self-Determination Act of 2001** (Secure Schools Act) was promulgated by Congress to restore stability and predictability to the annual payments made to states and counties containing National Forest System lands for the benefit of schools, roads, and other purposes. Prior to the passage of the Secure Schools Act, these payments were based upon income generated by the U.S. Forest Service, typically through timber sales. As this timber sale-related income fluctuated and generally waned, communities that relied on the annual payments for the support of their schools suffered from a lack of funding stability and predictability, to the detriment of their educational systems. The Secure Schools Act severs the tie between rural school funding and timber sale income so as to offer rural school systems continual, level funding.

in 2007, the Secure Schools Act was slated to be reauthorized by Congress; however that didn't occur and the legislation will be taken up again in 2008. The full distribution was made in 2007 but it is unknown, at the present time, where the funding will come from if Congress doesn't authorize the legislation and identify the funding source in 2008.

FY07 Payments to Towns

County	Town	Acres	PILT 2007	Secure Schools 2007	Total Payment to Town (\$)
Addison	Bristol	5,528	7,946	5,430	13,376
Addison	Goshen	7,562	10,911	7,428	18,339
Addison	Granville	14,895	21,341	14,612	35,953
Addison	Hancock	19,287	27,830	18,946	46,776
Addison	Leicester	2,746	3,963	2,697	6,660
Addison	Lincoln	11,375	15,698	11,174	26,872
Addison	Middlebury	3,366	4,698	3,306	8,004
Addison	Ripton	22,204	32,034	21,811	53,845
Addison	Salisbury	3,830	5,526	3,762	9,288
Addison Total		90,793	129,947	89,166	219,113
Bennington	Arlington	3,333	4,810	3,274	8,084
Bennington	Bennington	1,292	1,864	1,269	3,133
Bennington	Dorset	5,577	7,774	5,478	13,252
Bennington	Glastenbury	26,630	21,447	26,159	47,606
Bennington	Landgrove	811	1,165	797	1,962
Bennington	Manchester	5,503	7,800	5,406	13,206
Bennington	Peru	17,235	24,798	16,930	41,728
Bennington	Pownal	4,062	4,461	3,990	8,451
Bennington	Readsboro	8,303	11,981	8,156	20,137
Bennington	Rupert	168	5,526	165	5,691
Bennington	Searsburg	7,632	9,003	7,497	16,500
Bennington	Shaftsbury	1,234	2,765	1,212	3,977
Bennington	Stamford	11,823	17,060	11,614	28,674
Bennington	Sunderland	21,932	31,577	21,544	53,121
Bennington	Windhall	15,918	22,814	15,637	38,451
Bennington	Woodford	26,752	36,147	26,279	62,426
Bennington Total		158,205	210,992	113,024	324,016
Essex	Granby	1,660	2,395	1,631	4,026
Essex Total		1,660	2,395	1,631	4,026
Rutland	Brandon	89	128	87	215
Rutland	Chittenden	29,409	42,435	28,889	71,324
Rutland	Killington	1,791	5,512	1,759	7,271
Rutland	Mendon	3,203	4,003	3,146	7,149
Rutland	Mt. Holly	3,360	4,848	3,301	8,149
Rutland	Mt. Tabor	25,117	19,555	24,673	44,228
Rutland	Pittsfield	7,698	11,108	7,562	18,670
Rutland	Wallingford	8,560	13,087	8,409	21,496
Rutland Total		79,227	100,676	77,826	178,502
Washington	Warren	7,224	10,214	7,096	17,310
Washington Total		7,224	10,214	7,096	17,310
Windham	Dover	5,248	7,572	5,155	12,727
Windham	Jamaica	720	2,076	707	2,783
Windham	Londonderry	437	1,013	429	1,442

Windham	Somerset	9,423	7,444	9,256	16,700
Windham	Stratton	18,238	16,554	17,916	34,470
Windham	Wardsboro	3,104	4,479	3,049	7,528
Windham	Wilmington	1,750	2,525	1,719	4,244
Windham Total		38,920	41,663	38,231	79,894
Windsor	Rochester	12,600	18,172	12,377	30,549
Windsor	Stockbridge	810	1,173	796	1,969
Windsor	Weston	9,104	13,136	8,943	22,079
Windsor Total		22,514	32,481	22,116	54,597

APPENDIX B: REGIONAL FORESTER SENSITIVE SPECIES, RARE OR UNCOMMON NATURAL COMMUNITIES, AND NON-NATIVE INVASIVE SPECIES

GMNF Regional Forester Sensitive Species (RFSS): Plants, 2007

<i>Agrostis mertensii</i>	<i>Lespedeza hirta</i>
<i>Asclepias exaltata</i>	<i>Muhlenbergia uniflora</i>
<i>Aureolaria pedicularia</i> var. <i>pedicularia</i>	<i>Myriophyllum farwellii</i>
<i>Blephilia hirsuta</i>	<i>Nabalus trifoliolatus</i> (=Prenanthes trifoliolata)
<i>Calamagrostis stricta</i> ssp. <i>inexpansa</i>	<i>Panax quinquefolius</i>
<i>Cardamine parviflora</i> var. <i>arenicola</i>	<i>Peltandra virginica</i>
<i>Carex aestivalis</i>	<i>Phegopteris hexagonoptera</i>
<i>Carex aquatilis</i> var. <i>substricta</i>	<i>Pinus rigida</i>
<i>Carex argyrantha</i>	<i>Plantago americana</i> (=Littorella uniflora)
<i>Carex backii</i>	<i>Platanthera orbiculata</i>
<i>Carex bigelowii</i> ssp. <i>bigelowii</i>	<i>Polemonium vanbruntiae</i>
<i>Carex foenea</i>	<i>Potamogeton bicupulatus</i>
<i>Carex haydenii</i>	<i>Potamogeton confervoides</i>
<i>Carex lenticularis</i> var. <i>lenticularis</i>	<i>Potamogeton hillii</i>
<i>Carex michauxiana</i>	<i>Pyrola chlorantha</i>
<i>Carex schweinitzii</i>	<i>Pyrola minor</i>
<i>Carex scirpoidea</i>	<i>Quercus muehlenbergii</i>
<i>Ceratophyllum echinatum</i>	<i>Rhodiola rosea</i> (=Sedum rosea)
<i>Clematis occidentalis</i> var. <i>occidentalis</i>	<i>Saxifraga paniculata</i> ssp. <i>neogaea</i>
<i>Collinsonia canadensis</i>	<i>Scheuchzeria palustris</i>
<i>Conopholis americana</i>	<i>Selaginella rupestris</i>
<i>Cryptogramma stelleri</i>	<i>Sisyrinchium angustifolium</i>
<i>Cynoglossum virginianum</i> var. <i>boreale</i>	<i>Sisyrinchium atlanticum</i>
<i>Cypripedium parviflorum</i> var. <i>pubescens</i>	<i>Solidago patula</i>
<i>Cypripedium reginae</i>	<i>Solidago squarrosa</i>
<i>Desmodium paniculatum</i>	<i>Stellaria alsine</i>
<i>Diplazium pycnocarpon</i>	<i>Utricularia resupinata</i>
<i>Draba arabisans</i>	<i>Uvularia perfoliata</i>
<i>Dryopteris filix-mas</i>	<i>Vaccinium uliginosum</i>
<i>Eleocharis intermedia</i>	<i>Woodsia glabella</i>
<i>Eleocharis ovata</i>	
<i>Equisetum pratense</i>	
<i>Eupatorium purpureum</i>	
<i>Galium kamtschaticum</i>	
<i>Geum laciniatum</i>	
<i>Hackelia deflexa</i> var. <i>americana</i>	
<i>Helianthus strumosus</i>	
<i>Huperzia appalachiana</i>	
<i>Isotria verticillata</i>	
<i>Juglans cinerea</i>	
<i>Juncus trifidus</i>	

**Rare or Uncommon Natural Communities Recognized as Significant by the GMNF
2006 Forest Plan FEIS: Table 3.11-6**

South Half GMNF

Site Name	2006 Plan Management Area Designation
Beebe Pond	Ecological Special Area
Big Branch	Wilderness.
Big Mud Pond	Wilderness.
Bourn Pond	Wilderness.
Branch Pond	Ecological Special Area
Colebrook Trail Swamp	Escarpment
Devil's Den	White Rocks NRA
Downer Glen	Wilderness.
Fifield Pond	White Rocks NRA
French Hollow	Ecological Special Area
Glastenbury Mountain	Wilderness Study Area
Green Mountain Ridge	White Rocks NRA
Griffith Lake	White Rocks NRA
Grout Pond	Ecological Special Area
Little Mud Pond	Wilderness.
Little Pond	Wilderness Study Area
Little Rock Pond	White Rocks NRA
Lost Pond Bog	Wilderness.
Lye Brook Headwaters	Remote Backcountry
Lye Brook Ledge	Wilderness.
McGinn Brook	Wilderness.
Moses Pond	Diverse Forest Use
Mt. Tabor Work Center Swamp	Ecological Special Area
Peabody Hill	Ecological Special Area
Somerset Fen	Ecological Special Area
Stamford Meadows	Ecological Special Area
Stamford Stream Wetland Complex	Ecological Special Area
Stratton Mountain	Ecological Special Area
The Burning	Wilderness.
Thendara Camp Fen	Ecological Special Area
Wallingford Pond	White Rocks NRA
West of Mt. Tabor	Wilderness.
West River Headwater Cove	Diverse Forest Use
White Rocks	White Rocks NRA
Winhall River Headwater Flowage	Wilderness/Remote Backcountry

North Half GMNF

Site Name	2006 Plan Management Area Designation
Beaver Meadows and Abbey Pond	Ecological Special Area
Blue Ridge Fen	Candidate Research Natural Area
Breadloaf Mountain	Wilderness.
Bristol Cliffs	Wilderness/Escarpment
Bryant Mountain	Escarpment
Bryant Mountain Hollow	Ecological Special Area
Burnt Mountain	Escarpment
Chandler Ridge	Escarpment
Crystal Brook Glacial Kettle	Wilderness.
Dutton Brook Swamp	Ecological Special Area
Elephant Mountain	Ecological Special Area
Gilmore Pond	Wilderness.
Hat Crown/Silent Cliff	Wilderness.
Leicester Hollow	Eligible Scenic River
Lincoln Ridge	Alpine Subalpine Special Area
Middlebury Gap	Wilderness Study Area
Monastery Mountain	Wilderness Study Area
Mount Abraham	Alpine Subalpine Special Area
Mount Moosalamoo	Escarpment
Mt. Horrid	cRNA
Mt. Roosevelt to Mt. Wilson	Wilderness.
North Pond	Diverse Backcountry Forest
Rattlesnake Point	Ecological Special Area
Skylight Pond	Wilderness.
Texas Falls	Ecological Special Area
The Cape	Research Natural Area

Additional Rare or Uncommon Natural Communities on GMNF-administered lands identified by the Vermont Non-game and Natural Heritage Program as Significant

Site Name	2006 Plan Management Area Designation
Bald Mountain (S)	Wilderness
Dana Hill Pool	AT
Griggs Mountain	AT
Happy Hill Pool	AT
Jenny Coolidge Wetland (S)	Diverse Forest Use
Jones Brook (S)	Diverse Forest Use
Killington/Little Killington Peaks	AT
Lincoln Gap (N)	Diverse Backcountry Forest
Lottery Road Swamp	AT
Mosley Hill Pool	AT
Mud Pond-Peru (S)	Diverse Forest Use
Pico Peak	AT
Stamford Pond (S)	Diverse Backcountry Forest
Stratton Meadow Bog (S)	Wilderness
Thistle Hill	AT
Totman Hill Fen	AT

Green Mountain National Forest Non-native Invasive Species Listⁱ

The GMNF non-native invasive species (NNIS) list includes the “Class B” portion of the Vermont Quarantine list, one species from the Federal Noxious Weed list, and six species from the State Watch List. These species are tracked during surveys of NNIS; they are species for which we would consider management actions.

To see the entire Vermont Quarantine rule and list, the State Watch List, and fact sheets for all species listed go to:

<http://www.vtinvasiveplants.org/>

GMNF NNIS LIST

Scientific Name	Common Name	National I-Rank ¹
Species listed in federal noxious weed legislation		
<i>Heracleum mantegazzianum</i>	giant hogweed	Medium/Low
“Class B” Noxious Weeds: any noxious weed that is not native to the state, is of limited distribution statewide, and poses a serious threat to the State, or any other designated noxious weed being managed to reduce its occurrence and impact in the State.		
<i>Aegopodium podagraria</i>	goutweed	Medium/Insignificant
<i>Ailanthus altissima</i>	tree-of-heaven	Medium/Low
<i>Alliaria petiolata</i>	garlic mustard	High/Medium
<i>Butomus umbellatus</i>	flowering rush	Medium/Low
<i>Celastrus orbiculatus</i>	Oriental bittersweet	High/Medium
<i>Hydrocharis morsus-ranae</i>	frogbit	
<i>L. maackii</i> , <i>L. morrowii</i> , <i>L. tatarica</i> , & <i>L. x bella</i>	Shrubby honeysuckles (amur, morrow, tatarian, & Bell’s honeysuckle)	
<i>Lonicera japonica</i>	Japanese honeysuckle	High/Medium
<i>Lythrum salicaria</i>	purple loosestrife	
<i>Myriophyllum spicatum</i>	Eurasian watermilfoil	High
<i>Nymphoides peltata</i>	yellow floating heart	
<i>Phragmites australis</i>	common reed	
<i>Polygonum cuspidatum</i>	Japanese knotweed	
<i>Potamogeton crispus</i>	curly leaf pondweed	Medium
<i>Rhamnus cathartica</i>	common buckthorn	High/Medium
<i>Rhamnus frangula</i>	glossy buckthorn	
<i>Trapa natans</i>	water chestnut	Medium
<i>Vincetoxicum nigrum</i> (= <i>Cynanchum louiseae</i>)	black swallow-wort	

¹ National I-Ranks are from NatureServe (2005) and are based on an assessment of invasiveness. Species w/out ranks have not yet been assessed.

List of Watch Species

Scientific Name	Common Name	National I-Rank ¹
<i>Acer platanoides</i>	Norway maple	High/Medium
<i>Anthriscus sylvestris</i>	wild chervil	
<i>Berberis thunbergii</i>	Japanese barberry	High/Medium
<i>Berberis vulgaris</i>	common barberry	
<i>Centaurea biebersteinii</i> = <i>C. maculosa</i>	spotted knapweed	High/Medium
<i>Rosa multiflora</i>	multiflora rose	Medium/Low

Species listed in federal noxious weed legislation	
<i>Heracleum mantegazzianum</i>	Giant hogweed
Class A Noxious Weedsⁱⁱ	
<i>Cabomba caroliniana</i>	fanwort
<i>Egeria densa</i>	Brazilian elodea
<i>Hydrilla verticillata</i>	hydrilla
<i>Hygrophila polysperma</i>	E. Indian hygrophila
<i>Myriophyllum aquaticum</i>	Parrot feather
<i>Myriophyllum heterophyllum</i>	variable-leaved milfoil
<i>Salvinia auriculata</i>	giant salvinia
<i>Salvinia biloba</i>	giant salvinia
<i>Salvinia herzogii</i>	giant salvinia
<i>Salvinia molesta</i>	giant salvinia
<i>Vincetoxicum hirundinaria</i>	pale swallow-wort
Class B Noxious Weedsⁱⁱⁱ	
<i>Aegopodium podagraria</i>	goutweed
<i>Ailanthus altissima</i>	tree-of-heaven
<i>Alliaria petiolata</i>	garlic mustard
<i>Butomus umbellatus</i>	flowering rush
<i>Celastrus orbiculatus</i>	Oriental bittersweet
<i>Hydrocharis morsus-ranae</i>	frogbit
<i>Lonicera x bella</i>	Bell honeysuckle
<i>Lonicera japonica</i>	Japanese honeysuckle
<i>Lonicera maackii</i>	Amur honeysuckle
<i>Lonicera morrowii</i>	Morrow honeysuckle
<i>Lonicera tatarica</i>	tatarian honeysuckle
<i>Lythrum salicaria</i>	purple loosestrife
<i>Myriophyllum spicatum</i>	Eurasian watermilfoil
<i>Nymphoides peltata</i>	yellow floating heart
<i>Phragmites australis</i>	common reed
<i>Polygonum cuspidatum</i>	Japanese knotweed
<i>Potamogeton crispus</i>	curly leaf pondweed
<i>Rhamnus cathartica</i>	common buckthorn
<i>Rhamnus frangula</i>	glossy buckthorn
<i>Trapa natans</i>	water chestnut
<i>Vincetoxicum nigrum</i> (= <i>Cynanchum louiseae</i>)	black swallow-wort

ⁱ The GMNF list is based on the Noxious Weed Quarantine Rule created in 2002 by the Vermont Agency of Agriculture, Food and Markets. The Noxious Weed Quarantine Rule has the force of law. It was created to regulate the importation, movement, sale, possession, cultivation and/or distribution of 32 invasive plants.

ⁱⁱ "Class A Noxious Weed" means any noxious weed on the Federal Noxious Weed List (7 C.F.R. 360.200), or any noxious weed that is not native to the State, not currently known to occur in the State, and poses a serious threat to the State.

ⁱⁱⁱ "Class B Noxious Weed" means any noxious weed that is not native to the state, is of limited distribution statewide, and poses a serious threat to the State, or any other designated noxious weed being managed to reduce its occurrence and impact in the State.