

White Mountain National Forest



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Department of
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Forest
Service

Eastern
Region



Monitoring and Evaluation Report 2010



Cover: Campsite monitoring in the Caribou-Speckled Wilderness. WMNF photo by Nate Peters.

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Forest Supervisor's Note

I am pleased to share with you the most recent White Mountain National Forest Monitoring Report, which summarizes many of our monitoring efforts in fiscal year 2010 (FY10). As always, this report considers how well we are implementing the management direction in the Forest Plan, what effects our management is having on natural, cultural, and social resources, and how those resources are being affected by other factors. We remain committed to looking at all of our programs, identifying what is working well and what isn't, sharing the results, and learning from all that we do.

We have been implementing the current Forest Plan for five years now. While this report identifies a few cases where we are not yet meeting direction in the Forest Plan, several years of monitoring indicates that those instances are the exception. We are consistently implementing the Forest Plan as written and intended. Working with our partners, we manage all the resources on the White Mountain National Forest in an integrated way, ensuring that meeting objectives in one area doesn't adversely affect another. It is a complex challenge. I am proud of our many successes and confident we will find solutions where monitoring shows a new approach is needed.

I must consider those instances where we are not meeting Forest Plan direction to determine whether changes to the Plan are needed. This report shows that we have not been able to harvest timber or provide young forest habitat through even-aged regeneration harvest at the levels predicted in the Forest Plan. While these levels were estimates, not requirements, the goals of providing a diversity of habitats across the landscape and a sustainable supply of forest products over time remain important. Several factors have affected how much young forest habitat we create. Additional evaluation is needed to determine whether this trend will continue or if it is a result of where we have proposed projects in recent years.

Our ability to harvest at projected levels is affected by budgets and the intensity of our environmental analyses. In addition, we have chosen to develop landscape-scale integrated projects that address all the needs of an area. This level of integration and complexity of projects takes more time than looking only at harvest opportunities, but results in more comprehensive land and resource management. We continue to look for, and find, ways to improve our analyses and become more efficient in conducting them. Over time, we hope to gradually increase our harvest levels and move toward Forest Plan estimates. Therefore I find there is no need to amend the habitat objectives in the Forest Plan or correct the proposed outputs at this time.

This report identifies a heritage resources guideline and a recreational minerals standard that are not being met in some instances. In both cases, this report indicates the Forest Plan direction remains appropriate and identifies ways to address the resource concerns. There is one fisheries habitat objective that we have not been meeting, but the objective is still appropriate and we are identifying projects to achieve it if funding is available.

We are working with partners to try to understand what effect white-nosed syndrome is having on local bat species. Information from monitoring described in this document may help us adjust how we implement wildlife reserve tree direction in the Forest Plan to protect summer roosting habitat for the northern long-eared bat.

I find that the monitoring we did in FY10 and this report meet the intent of both the Forest Plan (Chapter 4) and the planning regulations at 36 CFR 219. No need to amend the Forest Plan was identified as a result of this monitoring.

Thomas G. Wagner
Forest Supervisor

**Alpine plant
monitoring. WMNF
photo by Ryan Harvey**



Introduction

Effective monitoring and evaluation helps the Forest Service and the public determine how well a Forest Plan is being implemented, whether Plan implementation is achieving desired outcomes, and whether assumptions made in the planning process are valid. It helps us improve our management and determine when we need to adjust desired conditions, goals, objectives, standards, and guidelines.

Chapter 4 of the Forest Plan is the Forest's *monitoring plan*. It identifies broad questions concerning resource conditions across the Forest and how well we are moving the Forest toward the goals and objectives outlined in the Forest Plan. The *monitoring guide* links the broad questions in the monitoring plan to actual monitoring activities. It describes the purpose, methods, locations, responsible persons, importance, and estimated costs for specific monitoring items.

This fiscal year, the White Mountain National Forest (WMNF) conducted a broad update of the monitoring guide. In the fifth year of implementing the Forest Plan, it was time to evaluate whether the monitoring items, protocols, priorities, and schedule identified in the Monitoring Guide are still appropriate. This review considered whether the monitoring program was providing the information needed to guide Forest management efforts and to inform the next Plan revision effort.

Each resource area carefully considered whether the current monitoring was effective and whether any new items needed to be monitored. Almost all monitoring items were identified as still appropriate, so few were dropped entirely. Some items were determined to be effective as described, with accurate information in the guide, and were unchanged. Others needed slight changes, such as updating costs. Several new monitoring items were identified and described in the revised guide, including woodland bat monitoring to help address questions regarding white-nosed syndrome. The fisheries and water resource monitoring items were updated to combine efforts across the two programs and better address the effects of management and climate change on these resources.

Revising the monitoring guide ensures the WMNF monitoring program remains up-to-date, comprehensive, coordinated across resources, and effective at answering the questions posed in the monitoring plan. The guide will be reviewed and revised as needed in the future. The most current monitoring guide is available at: http://www.fs.fed.us/r9/forests/white_mountain/publications/monitoring_guide.pdf.

Looking forward, the Forest Service's budget will likely be constrained in the next few years in response to national economic concerns. This situation will require us to set clear priorities on the most important outputs and services we provide on the White Mountain National Forest. However, we will continue to work across programs to implement quality projects and move toward the goals and objectives outlined in the Forest Plan. Monitoring will remain an important part of our annual program of work. We will continue to fund all the monitoring items identified in the monitoring guide as required, and as many high priority items as budgets allow each year.

We are fortunate to have many partners who are willing to work with us to maintain our roads, trails, and facilities, develop and implement projects, and monitor the status of our resources and effectiveness of our management. As funding available to the Forest and many of our partners declines, it will be even more critical for us to work together in the

future to identify needs and priorities across the landscape and keep important programs and projects moving ahead. We look forward to working with our current partners and developing new relationships in the coming years.

Required Monitoring

Sustainability

This section addresses topics in Table 4-02 of the Forest Plan. This year, we monitored the two annual items, restocking success and insect and disease levels, and one that should be evaluated every five years, appropriateness of maximum harvest opening size.

Are lands adequately restocked following harvest?

Monitoring regeneration is a legal requirement to ensure adequate restocking of tree species following regeneration harvests such as clearcut, shelterwood seed cut, single tree or group selection cut. Within five years following such harvests, we must certify that we expect an adequate number of seedlings to be established. We typically conduct a field survey about 3 years after the harvest.



Restocked clearcut in the Ramsey Basin sale. WMNF photo by Andy Colter.

harvested area, so the overall stand qualifies as being adequately restocked. Over the past five years, all stands have been certified as adequately restocked within 3-5 years of harvest.

Surveys are conducted by Forest staff as they walk through the harvested area.

Typically, surveyors establish several sample plots and make visual observations as they walk throughout the area to see if desirable seedling species are present. In 2010, 1503 acres were surveyed and all were certified as having adequate stocking

Typically, our temperate climate ensures adequate restocking after regeneration harvests. Some portions of stands that are very wet, or areas with summer skid trails, may take longer to regenerate; however, these areas are usually a minor part of any

To what extent have destructive insects and disease organisms increased?

Monitoring destructive insects and disease organisms is required annually to track trends and identify concerns as early as possible. The results can be used to determine when management action may be appropriate to control an outbreak.

The Forest Health Protection office of the State and Private Forestry branch of the Forest Service, in Durham, New Hampshire, conducts an aerial detection survey over the WMNF annually. The 2010 flight detected very little defoliation compared to last year. There were only two areas of defoliation affecting a total of about 120 acres. About half was just west of Stinson Lake. This defoliation occurred in northern red oak and was

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caused by oakleaf roller. The other 60 acres were detected in hardwoods south of Owls Head in the Pemigewassett Wilderness Area. The cause was undetermined.

Forest Health Protection staff completed ground surveys of some defoliated areas near Rumney, New Hampshire, that were detected by Forest staff and the aerial survey in 2009. The FY09 monitoring report indicated that there was significant defoliation and dieback of northern red oak. Surprisingly the root starch reserves, which are an indicator of tree health, were fine. The area will be checked again in 2011.

As mentioned in previous reports, there is continued concern about the potential risk from invasive pests, including emerald ash borer, hemlock wooly adelgid, Asian longhorned beetle and balsam wooly adelgid. Both the State of New Hampshire and the State of Maine now restrict the importation of firewood to minimize the potential for introduction of invasive species. Hemlock wooly adelgid continues to gradually spread north, especially near the southeast coast of Maine. See the non-native invasive insect discussion in this report (Other Monitoring, Annual Reports) for more information.

Is the maximum harvest opening size still appropriate?

The 1986 Forest Plan identified a maximum temporary opening size of 30 acres. This limit, which is smaller than the 40 acres allowed by the National Forest Management Act (36 CFR 219.27(d)(2)), was based on the topography, vegetation, and scenic values of the Forest. The current Forest Plan retained the 30 acre limit as a standard (Plan, p. 2-29).

Based on the FY09 Monitoring Report, we are averaging one opening per year that reaches the 30-acre limit. All other opening from even-aged regeneration harvests (clearcuts, seed tree cuts, and shelterwood seed cuts) are smaller, with an average of 12.3 acres from 2006-2009. The fact that we are not implementing more units close to the 30-acre limit implies that the size limitation is not substantially altering our management on the ground. None of our monitoring for other resources indicates adverse impacts from openings of 30 acres or less. Therefore the current maximum harvest opening size of 30 acres remains appropriate.

Outputs and Services

Appendix B of the Forest Plan identifies expected outputs and accomplishments for the first decade, as well as some limits. Most of these measures can be found in the resource goals and objectives in Chapter 1 of the Plan. Table 1 shows the accomplishment for each measure in fiscal year 2010 and the status to date for the first five years of Forest Plan implementation. Additional information on identified activities and, where appropriate, why accomplishments are different from estimates in Appendix B, is provided below the table for each of the resources.

Table 1. Estimated Management Practices and Accomplishments

Activity or Product	Unit of Measure	Estimate for First Decade	FY10 Accomplishment	FY06-FY10 Accomp.
Aquatics				
Stream habitat restoration	Miles	30	0	10.1
Restore fish passage	Road crossings	10	3	7
Fire Management				
Unplanned wildfire managed for resource benefit (previously Wildland Fire Use)	Fires	4 – 8	0	1
Forestry				
Volume Sawtimber Harvested	MMBF	137	4.7	25.0
Volume Pulp Harvested	MMBF	106	6.1	31.5
Volume of Timber Sold	MMBF	240	10.5	48.4
Even-aged regeneration harvest	Acres	9,400	317	1402
Even-Aged Intermediate harvest	Acres	5,600	566	2325
Uneven-aged Harvests	Acres	19,300	1067	4688
Total harvest	Acres	34,300	1950	8415
Recreation				
Net increase hiking trail construction	Miles	Up to 25	0	0
Net increase snowmobile trail construction	Miles	Up to 20	0	.2
Net increase developed campground sites	Sites	Up to 32	0	0
Net increase backcountry facility capacity	PAOT	Up to 40	0	0

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Activity or Product	Unit of Measure	Estimate for First Decade	FY10 Accomplishment	FY06-FY10 Accomp.
Soils				
Improved Watershed/Soil Conditions	Acres	At least 250	38.5	153.5
Transportation				
Road construction	Miles	10	1.5	3.9
Road reconstruction	Miles	70	7.1	32.8
Classification of unauthorized roads	Miles	N/A	0	1.9
Road decommissioning	Miles	5 - 40	0.7	0.83
Unauthorized road decommissioning	Miles	N/A	1.0	7.6

Aquatics

Recent management to restore stream habitat and fish passage is discussed in detail under the “objectives” heading in this report.

Fire Management

In 2010 there were no unplanned fires on the Forest that could be managed for resource benefits.

Forestry

Similar to previous reports, our outputs are lagging behind Forest Plan expectations. Harvested acres are a function of how much timber we are selling and market conditions for our timber sale purchasers. Our volume sold is just under half the allowable sale quantity (ASQ) in the Forest Plan. The Forest sold the volume that we were funded to produce in 2010. However, budget allocations have not been high enough in recent years to enable us to meet the ASQ. The allocations are based on national priorities for where funds are most needed each year and our capability to complete project environmental analyses and prepare and award timber sale contracts. In recent years, national priorities have been elsewhere and our capabilities have been limited somewhat by the intensity of analysis needed to address public concerns.

Our objective is to gradually increase the volume sold so we can better meet Forest Plan objectives, such as providing a sustained level of quality sawlogs to local businesses and enhancing important wildlife habitat.

The recession continues to affect the local forest products industry. Lumber mills have seen a slight improvement in markets but conditions are still difficult. Markets for low quality wood for firewood, chips and paper mills have been stable.

Five-Year Cumulative Observations

Our five-year totals for harvest acres and volumes sold are running about 49 and 47 percent (respectively) of Forest Plan estimates, primarily due to funding and capability as mentioned above. The harvest data from the last five years shows that our estimated harvest volume per acre (7 MBF/acre) was accurate; the five-year average was 6.7 MBF/acre. Therefore the shortfall is due to fewer acres being harvested than expected.

Forest Plan estimates for the mix of sawtimber and pulpwood harvested were not quite as accurate as volume per acre. Sawtimber harvest is running about 10 percent below Forest Plan estimates and conversely, pulpwood is running 10 percent higher. There are a number of those factors that could be causing this difference; we will be investigating those in FY11 to determine if the estimates should be revised.

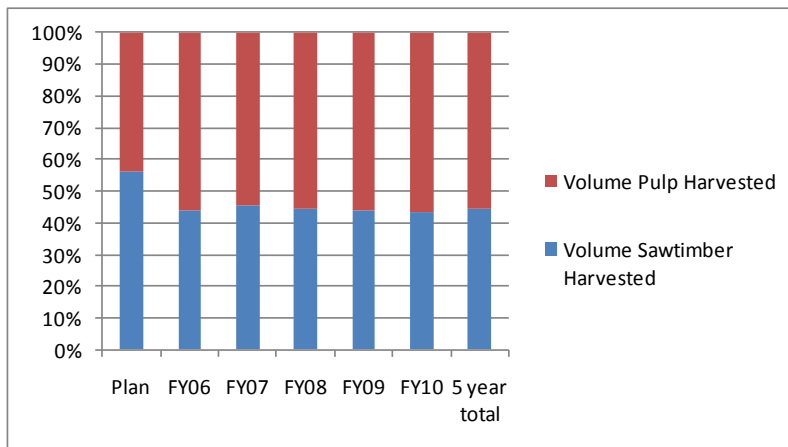


Figure 1. Harvested Pulp and Sawtimber Volumes.

The total mix of even-aged and uneven-aged harvests is exactly what the Forest Plan predicted, 44 and 56 percent of total harvest respectively. However the mix of even-aged harvest systems used is somewhat different than Forest Plan estimates. Even-aged intermediate harvest methods (e.g. thinning) make up about 10 percent more of the actual total harvest acres than was predicted while the opposite is true for even-aged regeneration harvests (e.g. clearcuts). Some of the reasons for this discrepancy are



Figure 2. Total harvest displayed by harvest type.

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discussed under the management indicator species heading below. We will investigate the reasons for reduced even-aged regeneration harvest in more detail in FY11 to determine if it is a likely to be long-term trend or has been a result of recent project location.

Recreation

The management objectives for recreation allow for limited construction or expansion of trails and facilities in order to maintain the overall recreational experience, minimize resource effects, and keep a system that it is feasible to take care of over time. In FY 2010, 0.7 miles of the Wilderness Trail was decommissioned after the removal of the Wilderness Bridge. To date, the Forest has decommissioned more miles of hiking and snowmobile trail than we have constructed, resulting in a net loss of trails across the Forest. Therefore the net increase in both hiking and snowmobiles trails, which is what Forest Plan objectives limit, remains at zero miles after five years of implementation.

Soils

The predicted accomplishment of at least 250 acres of watershed and soil improvement work was based on the average annual accomplishment before the revised Forest Plan was signed. It was identified as a minimum to allow for as much of this type of work as is needed and feasible with available funding. Our annual accomplishments are on target to exceed the minimum identified in the Forest Plan.

In FY10 watershed improvement activities included replacing culverts to restore aquatic habitat and species passage, establishment of water bars and rock steps on trails to address erosion concerns, and installing bridges across streams on snowmobile trails to eliminate impacts to streambanks.

Transportation

Road construction and reconstruction in FY10 met or slightly exceeded the expected annual average, but accomplishments in the first five years remain slightly less than predicted.

As mentioned in the 2009 Monitoring Report, the agency identifies roads that exist on the ground but are not part of the official Forest Service transportation system as “unauthorized roads.” This report begins tracking the miles of unauthorized roads that were classified and made part of the official Forest Service system during the year.

The classification of a road does not alter its condition on the ground; it is a database change that acknowledges the road will be needed for long-term management. The Forest Plan recognized the need to evaluate all roads in a project area and determine which are needed in the long-term. There was no estimate for how many miles of road would be identified as necessary and classified or as unnecessary and decommissioned. These decisions have been of interest to the public and Forest resource specialists. This report is one way to track



Unauthorized road. WMNF photo by Kori Marchowsky

and display road-related accomplishments. In FY10 and over the last five years, more unauthorized roads have been removed from the Forest transportation system than have been added.

Management Indicators Species (MIS)

A large part of the Forest's management strategy for wildlife is to provide a range of vegetative conditions (composition and age classes) to support a wide variety of wildlife species. The specific objectives to reach this goal, outlined in the Forest Plan on pages 1-20 through 1-21 are for Management Area 2.1 since that is the primary management area in which vegetation manipulation may occur. As described in the Final Environmental Impact Statement for the revised Forest Plan, changes in vegetation composition will occur slowly over a period of decades, while age class distribution is more readily managed.

As discussed in the Outputs and Service section of this report, the Forest has harvested slightly less than half of the acres expected based on Forest Plan projections. However, the acres of even-aged regeneration harvest, which is what creates much of the regeneration age class (or young forest) for wildlife, has been even less -- only 30 percent of the projected outputs.

To determine why even-aged regeneration harvests have not kept pace with overall harvest levels, specific harvest prescription data was collected for five projects with decisions signed after the revised Forest Plan was in place. For each of these projects, stands that could have been treated with clearcuts or other even-aged regeneration prescriptions were examined. For those stands whose final prescriptions were not an even-aged regeneration harvest, rationale for the change was summarized. The five most common reasons were: 1) a decision to emphasize high quality sawtimber products, (which are generally managed with uneven-aged prescriptions); 2) concern with clearcut units being seen from trails or other viewpoints; 3) a decision to minimize impacts within areas identified as having roadless characteristics; 4) a decision to emphasize softwoods (usually in stands where the current composition is mixed); and 5) the ground was too steep or rocky.

So how have changes in vegetation affected wildlife population trends? With harvest occurring on fewer acres than predicted, those species that prefer mature habitats might be expected to be at least stable, since their habitat is being maintained and perhaps even increasing as younger stands grow into the mature age class. On the other hand, species that prefer regenerating forest habitats should be reduced because more stands have grown older and moved into the young age class than have been replaced.



Two-year-old clearcut. WMNF photo by Christine Costello.

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In order to track population trends based on management, the Forest implements two breeding bird survey protocols. The first is specific to birds that are typically found in early successional habitat and was reported on in the 2009 Monitoring Report. To summarize, the Forest designed a protocol to evaluate occupancy rates of breeding birds in recent (0-9 years old) clearcuts. A pilot proposal was tested in 2007 and implemented with adjustments in 2009. Because there is only one year of data, no trends can yet be calculated. The plan is to utilize this protocol in odd-numbered years. It is expected that several replications of the survey may be needed before meaningful statistical data can be obtained. It is reasonable to assume that if fewer acres of regeneration age habitat are provided on the Forest, then abundances of the species that prefer these habitats will consequently be lower.

For mature breeding birds, the Forest relies on a survey protocol that has been in place since 1992. These surveys occur on 16 fixed transects covering a broad range of mature forest habitats across the lower elevations of the Forest. Transects are located in management areas that emphasize general forest management, as well as those that promote semi-primitive recreation to compare differences between management emphases. Three replicates are completed for each transect, with surveys completed within a 5-week period in late May-June. All species of birds seen or heard are counted. The 2010 survey was the fifteenth survey completed in a 19-year period.

Evaluation of the data was done using a non-parametric statistical analysis. For each species, count data was ranked by year and transect to obtain mean ranks by year. Then a standard regression analysis was performed on the mean ranks to obtain a slope, along with 95% confidence intervals. Raw data was also plotted to visually discern trend patterns.



Blackburnian Warbler. Wikimedia Commons, photographer not identified.

Results indicate that the two management indicator species for mature forests, blackburnian warbler (softwood forests) and scarlet tanager (hardwood forests) show statistically stable population trends. This would indicate that Forest management is providing suitable mature forest conditions for mature forest species. However, since data from many species is collected, it is possible to evaluate trends of other mature forest species. Two of these species, the wood thrush and red-breasted nuthatch, showed decreasing trends that were both statistically significant ($p < 0.05$) and visibly

discernible. Declines in wood thrush populations in general across its range have been noted for several decades and are attributable to habitat losses in both the wintering and breeding range. Based on stability of mature forest habitat and other mature forest species on the WMNF, it is likely that population declines seen on the WMNF reflect winter habitat losses.

The decline in red-breasted nuthatch numbers is more puzzling. This is a cavity-nesting bird typically found in spruce-fir or mixed-wood habitats. Unlike many of the spring breeders here, it is a resident species and does not migrate. Declines are similar in Management Area 2.1 (where active vegetation management is allowed) and in

management areas that emphasize semi-primitive recreation. Other cavity-nesting species, such as pileated woodpecker and white-breasted nuthatch, show stable trends.

Birds are notorious for having fluctuating annual populations due to a variety of conditions (food availability, weather affecting fledgling success, predator cycles), which is why long-term datasets are so important. Beginning in FY2011, the Forest will explore a more rigorous examination of this data to try and better determine if these trends are accurate and what the root cause of any declines may be.

Objective Attainment

Fisheries

Forest Plan, Page 1-16

Restore or improve 5-10 miles of in-stream habitat per year over the planning period with emphasis on 6th level watersheds best suited for managing self-sustaining wild brook trout populations and their associated coldwater aquatic communities.

Management strategies to improve coldwater stream habitats for the native brook trout focus on improving in-stream habitat complexity and improving stream connectivity (miles per year of each displayed in Table 2). Total miles improved fell short of the 5-10 miles per year outlined in the Forest Plan. In recent years, stream improvement projects have been identified and analyzed as part of larger, integrated resource management projects, which take longer than small aquatic habitat projects alone. As more integrated project decisions are made, opportunities for in-stream habitat and stream connectivity projects should increase, pending available funding for implementation.

Table 2. Stream habitat improvement accomplishments in 2006-2010

Year	Number of Watersheds	Total Miles	In-Stream Restoration Miles	Stream Connectivity Miles
2006	3	3.1	2.6	0.5
2007	3	4.2	3.2	1.0
2008	2	2.2	1.7	0.5
2009	3	3.9	2.6	1.3
2010	2	4.2	0	4.2
Total	8	17.6	10.1	7.5

In-stream Habitat Complexity

In-stream habitat complexity can be influenced in two ways: 1) aging of stream riparian forest corridors that results in natural additions of dead and down trees, and 2) projects that add wood to streams to improve in-stream habitats. The aging of riparian forest occurs very slowly and changes are seen over decades, not years. Management standards and guidelines are in place to allow downed wood to accumulate as forests age. These guidelines will be evaluated in a future monitoring report. The Forest Plan management objective only addresses wood addition projects.

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There have been four wood addition projects in four watersheds since revision of the Forest Plan in 2005: Great Brook in the Kezar Lake watershed; the Mill Brook watershed in the town of Carroll; Connor Brook in the Shelburne Tributaries watershed of the Androscoggin River; and Meserve Brook in the Ellis River watershed. The majority of wood additions were accomplished using “chop and drop” techniques where trained sawyers selectively cut down trees in the riparian area to benefit stream habitats and floodplain processes.

Implementation of the Great Brook stream restoration project began in 2003. In 2006, the final 2.1 miles of the nearly six mile project were completed. A comprehensive monitoring effort of the project was completed in 2010. Habitat complexity increased substantially in the project area as compared to reference sites, based on measurements of types and amounts of habitat (i.e riffle, pool). Wild brook trout abundance increased substantially in the stream types where increases in pool habitat were greatest, such as in transitional stream types (versus pool-riffle streams) and smaller streams where pools were scarce. In these areas, large wood accumulations appear to provide habitats that allow more young brook trout to survive to adult life stages during times of low stream flows.



Debris jam created by falling trees in Great Brook. WMNF photo by Mark Prout.

Stream Connectivity

Stream connectivity can be improved in several ways. It can be restored when infrastructure that may be a barrier to aquatic species passage, such as road culverts and dams, is removed when it is no longer needed. Where culverts are needed, they can be replaced with bridges, embedded pipes, or bottomless arch pipes. All of these methods have been implemented on the Forest since 2005.

Improvements to stream connectivity on the Forest have generally occurred in tributaries of the Saco River (Bartlett Experimental Forest) and in the headwaters of the Upper Ammonoosuc River (Bog Dam Loop Road). Two bottomless arch pipes and three embedded round pipes have been installed to date. Additional culverts have been prioritized for replacement in future years in both of these watersheds, pending funding.

Forest Plan, Page 1-16

Maintain existing impoundment structures constructed for fish and wildlife management every 1-5 years to insure their long term structural integrity and prevent downstream resource damage. Decommission structures when funds are not available for proper long-term maintenance.

Maintenance of impoundment structures for fish and wildlife management varies based on the type of structure, spillway management, and the age of the dam. Impoundments on Long Pond and Patte marsh require bi-annual manipulation of the spillway boards that control water elevations in the pond. Impoundments consisting of earthen berms require

brushing to prevent deterioration of the berm from tree root penetration deep into the berm. Other dams such as Ammo Lake and Deer Hill Bog require annual visits to clean out beaver cuttings in the spillway which can threaten the integrity of the impoundment over time. WMNF personnel perform a variety of maintenance activities each year on the majority of impoundment structures.

All impoundment structures, regardless of the structure or spillway type, eventually need more significant maintenance or reconstruction if the impoundment is to be retained. Since the majority of fish and wildlife impoundments were originally constructed many decades ago, decisions regarding significant reconstruction or decommissioning were expected to be made in the current planning period.

Structures on Broken Bridge Pond (Albany, ME) and Province Pond (Chatham, NH) were reconstructed in 2010 using federal funds appropriated in the American Recovery and Reinvestment Act (ARRA). Earthen berms and spillways were replaced at both impoundments to allow management of brook trout fisheries in these headwater ponds.

The Beaver Pond impoundment structure is scheduled for replacement in 2011, also funded by the ARRA. This impoundment was originally constructed as a source of water for fire management, but has become a wildlife and scenic viewing stop for those travelling State Highway 112 through Kinsman Notch.

A decision was made in January of 2011 to reconstruct the Ammo Lake impoundment structure. The environmental analysis for this project also considered removing the structure to foster more natural fish and wildlife habitats. The decision to invest in maintaining this structure was based on the educational, scenic, and recreational values of this pond. The timing of the impoundment reconstruction is unknown, pending the availability of funds.

The WMNF is working on impoundment structures as needed to maintain them over the long-term and prevent downstream resource damage.



Completed work at the Province Pond dam. WMNF photo by Jacob Ormes.

Recreation

Forest Plan, Page 1-14, Non-Motorized Dispersed Recreation

Conduct site-specific reviews of travel corridors for inclusion into the management approaches listed on page 2-17. Following appropriate analysis, corridors will be designated part of the Forest Trail System or closed to mountain bike use. Travel corridors designated as part of the Forest Trail System are not considered in the 25 mile non-motorized trail constraint.

After completing an environmental assessment, the Saco District Ranger issued a decision for the Moat Mountain Trail System Project, approving a multi-use trail system with mountain biking as the designed use. This decision identified 11.6 miles of incidental trails (travel corridors) as National Forest System (NSF) trails and approved the associated activities to bring the trails up to the standard described in the Forest Service Manual (FSM 2309.19). Work will include constructing drainage features, creating switchbacks or otherwise reducing the steepness of the trail where it exceeds standard, installing minor bog bridging to mitigate wet areas, installing trail signs, and marking trails. Other existing user-created incidental trails in the area that were not selected to become NFS trails as part of this project will be posted as closed and rehabilitated.



Mountain bike trail in Moat Mountain area. WMNF photo by Jana Johnson.

There are other areas that of the Forest with a network of travel corridors that need to be addressed. Conversations with local land owners and mountain bikers have begun in the Sandwich Notch area.

Transportation

Forest Plan, Page 1-17

Explore opportunities for alternative transportation methods and clean fuels that would reduce resource impacts.

In FY10 the Forest continued to work closely with three partners, the Appalachian Mountain Club, Center for Rural Partnerships at Plymouth State University, and the U.S. Department of Transportation's Volpe Center, to further advance the on-going alternative transportation study project. This project is designed to identify and analyze future alternative transportation options in and around the WMNF, primarily on the White Mountain Trial National Scenic Byway, to enhance the visitor experience and reduce adverse impacts to resources from heavy traffic and parking overflows during peak visitation times. One of the specific concerns is the protection of air quality on the Forest.

Utilizing funds received through a planning grant from the Paul S. Sarbanes Transit in Parks program, the study team reviewed findings from related local and national studies, researched alternative transportation systems on other federal lands, and gathered data on

use levels and existing infrastructure and transit opportunities on and near the WMNF. They surveyed and met with local visitors, asking what factors might influence their use of alternative transportation if it were available. The team also contacted local agencies, organizations, and individuals to build on existing initiatives and knowledge and explore potential partnerships.

They identified the strengths and weaknesses with the local transportation system, and many possible ways to address the weaknesses and build on the strengths. These issues and options were grouped into four categories to facilitate discussion with potential partners: traveler information and signage, bicycles and pedestrians, transit, and policy and planning.

In FY11, a final report on the study will be completed. The Forest will work with existing and new partners to move forward on some of the identified opportunities. As a result of the planning grant, two implementation grant applications have been submitted requesting funding for the Twin Mountain Bike Path, which would connect the Twin Mountain community to the Franconia Notch State Park Recreational Trail, and to enhance and expand the existing AMC Hiker Shuttle program.



In the area of clean fuels, the Forest continues to increase the use of biofuels, is working hard to reduce overall fuel consumption through higher MPG vehicles and driving techniques, and received a grant to convert two vehicles to cleaner burning propane. Additionally, the biomass (wood pellet) heating and co-generation systems at the new Forest Headquarters in Campton have proven to be very efficient and effective investments.

Biomass boiler at WMNF Headquarters building. WMNF photo by Bill Dauer.

Standard and Guideline Implementation

All Resources and Management Areas

Forest Plan, Page 2-3, Firewood

G-1 Firewood permits should be issued for dead and down wood only.

The terms and conditions on Forest firewood permits clearly state, “Permit for dead and down only. Standing dead may not be cut without written permission of Forest Officer.” These terms are reviewed with people who purchase permits to ensure they understand the limitations.

Forestry

Forest Plan, Page 2-30, Vegetation Management

G-8 Logging slash within 50 feet of a maintenance level 3 road, a trail, or private property should be treated or removed. Slash may be treated or removed at a greater distances when necessary to protect resource values.

All timber sale contracts are reviewed by the Forest Timber Sale Contracting Officer before advertisement. Based on that review, almost every contract has a road, trail, or property boundary where this guideline is applied. Typically, there is a 50 foot slash removal zone as directed in this guideline, and an additional 50 foot zone where the slash is lopped and scattered it will lie within 3 feet of the ground to minimize visual impacts.

Forest Plan, Page 3-8, MA 2.1, Vegetation Management

G-1 Harvest restrictions, such as time of day, day of the week, or season, should be considered in high-use recreation areas or other sensitive areas, such as private residences, on a case-by-case basis.

During the analysis process of each project, public input is requested to identify potential concerns that this guideline could address. The District Ranger includes appropriate measures in the project decision document to address these concerns. The timber sale contract then includes restrictions to implement the measures. Timber sale contracts on the WMNF regularly include these types of restrictions and sale administrators monitor operations to ensure they are properly applied. Some recent examples include requiring reduced haul-truck speed limits on the Than Timber Sale and restricting weekend harvest operations to reduce potential impacts on snowmobile trails on the Upper Ammonoosuc Timber Sale.

Geologic and Mineral Resources

Forest Plan, Page 2-5, Recreational Rock and Mineral Collection

S-1 The collection of mineral specimens for personal use is allowed without a permit, as long as there is no surface disturbance, except within officially designated fee collecting areas, closure areas, and other restricted areas.

The intent of this standard was to allow a small amount of personal, non-surface disturbing mineral collecting across the majority of the Forest prior to the implementation of a Forest-wide permit system. A permit system has not been established to date, except for the local one at Deer Hill, so any other surface-disturbing recreational mineral collection that occurs on the Forest is in violation of this standard.

Active monitoring of this standard took place at several sites across the Forest in 2010. Efforts were made to follow up on rumors of collecting in the vicinity of Mount Huntington (off the Kancamagus Highway) and along Witcher Brook in Benton, NH. In both cases no evidence of surface disturbing activity could be located. At Lords Hill in Stoneham, ME there is evidence of continued collecting activity within the limits of the existing pit but as this activity remains confined within the pit it is not an immediate concern.

The primary place where activity that violates this standard is known to occur is the Moat Mountain Smokey Quartz Site in Hales Location. While this is an identified mineral collection site, it is not a designated fee collecting area and lacks the controls that would help to limit resource damage. Some substantial resource damage has been occurring: trees have been undermined, the banks of intermittent streams have been excavated, and spoil piles from diggings are visible from trails that run through the area. The extent of surface-disturbing mineral collection at the Moat Mountain site was documented for the first time and the current boundary of the activity was recorded using GPS.



Unacceptable impacts at the Moat Mountain Smokey Quartz site. WMNF photo by Elaine Swett.

One way to correct this situation is to designate the Moat Mountain Smokey Quartz site as a permitted collecting area similar to Deer Hill. Implementing the same controls at Moat Mountain as at Deer Hill would result in the following:

- Provisions for a user to get a permit that lists the rules for recreational mineral collecting on the permit as outlined in Forest Plan standards for recreational mineral collecting S-3, S-4, and S-5 (Forest Plan p. 2-5 to 2-6),
- A defined area in which surface-disturbing collection activities can occur, and
- A Forest Supervisor order that can be enforced by Forest Service Law Enforcement or Forest Protection Officers.

Designating a permitted collecting area at Moat Mountain is estimated to exceed the current budgetary resources of the minerals program. Extensive collaboration would be required between the Forest Service, current users of the area (walkers and mountain bikers), and mineral collectors. Until that occurs, a minerals specialist will continue visiting the site, monitoring use, and informing collectors about the rules to try to limit adverse impacts.

Heritage Resources

Forest Plan, Page 2-7, Heritage Resources

S-1 Management of heritage resources must be coordinated with State Historic Preservation Offices (SHPOs), appropriate Tribal Historic Preservation Offices (THPOs), and Federally recognized Indian Tribes and their representatives. Any mitigation plans must include the above consultation, with the addition of The Advisory Council on Historic Preservation (ACHP) when projects might affect resources eligible for the National Register of Historic Places. Consulting parties may include local governments or other interested parties.

Every year WMNF heritage program staff and paraprofessionals conduct surveys and evaluate the potential for effects on cultural resources during all project planning efforts.

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Recommendations of site significance and determination of effects are validated through the National Historic Preservation Act Section 106 consultation process with the appropriate SHPO. Where loss of historic values during project implementation is unavoidable, mitigation measures are developed in coordination with the SHPO and others, as appropriate, to capture the existing condition and history of the site before project implementation and to interpret those historic values in a public format. For example, on the Androscoggin Ranger District the proposed removal of the Perkins Notch recreation shelter was determined to be an adverse effect on this historic property in Wild River Wilderness. Through consultation with the New Hampshire SHPO, development of an overview of historic recreation shelters on the WMNF was identified as an appropriate mitigation strategy. That overview is underway (see next guideline) and the proposed shelter removal was implemented.

The WMNF heritage program works extensively with partners, including the SHPOs, to interpret the rich history of the White Mountains. A conservation and historic preservation ethic that reflects federal historic preservation law is part of that message.

G-1 Heritage resources should be evaluated to determine their eligibility for listing in the National Register of Historic Places. Priority should be placed on situations where resources are most at risk or management options are limited.

An integral element of cultural resource management is the determination of National Register of Historic Places (NRHP) eligibility for cultural sites on the Forest. It is this evaluation of significance and a site's status as an "historic property" that guides the management strategy for each site.

Many of the shelters on the Forest are of an age that they require structural maintenance or replacement if they are to remain safe for public use; otherwise they need to be removed. The Forest Plan (page 2-20, Shelters, cabins, and tent platforms, S-1 and S-2) requires us to remove or maintain and repair shelters. Decisions about which shelters to repair or remove and how to make repairs have the potential to substantially alter individual shelters and the system. During 2010, the WMNF heritage and recreation programs made significant progress on an overview of recreation shelters on the Forest. The overview, scheduled for completion in 2012, will capture the historic background of the Forest's recreation shelter system, describe the existing condition of each shelter, and establish criteria for assessing the NRHP eligibility of the shelter system as a whole (as a NHRP district) and each of its component shelters. The overview will form the historical basis for decision-making in the long-term management of the shelter system. It should ensure the preservation of historic values while providing a tool to make the best resource decisions and streamline implementation.

Non-native Invasive Species

Forest Plan, Page 2-11 to 2-12, NNIS

S-4 Gravel and fill must come from weed-free sources. The Forest Service will be available to work with owners of local gravel sources to identify weed-free borrow material in their pits. The entire pit or fill area need not be identified as weed-free; material may be used that is not likely to contain invasive plants or seeds. If gravel or fill cannot be identified as weed-free, project monitoring must be conducted for three years

following implementation to assure no new infestations occur. If infestations are found, eradication must occur within a suitable timeframe to prevent further spread.

S-5 When sources of certified weed-free mulch and seed are available locally at reasonable cost, they must be used on erosion control projects requiring mulch and seed.

Literature and off-Forest experience indicates that using gravel, fill, and mulch from places with NNIS plants is an easy way to start new invasive species populations or bring new species into an area. Therefore use of weed free gravel, fill, and mulch is imperative in limiting the spread of NNIS plants on the White Mountain National Forest. Maine and New Hampshire do not have certified weed-free programs for these materials. In order to assure that gravel, mulch, and fill utilized are free of NNIS, the WMNF has implemented a program of site specific inspection and certification by the Forest botanist. Gravel sources are generally free of weeds in the White Mountain region, but sources of fill and mulch are of great concern. Typically invasive plants have heavier concentrations in the southern areas of New Hampshire and New England and decreasing amounts in more northerly locations. Increased commerce, development, and tourism in the White Mountain region are causing these species to expand northward at an alarming rate. Historically utilized sources of fill and mulch are now at risk of infestation.

To date, three off-Forest gravel pits have been inspected. Four old on-Forest borrow pits and gravel sources/storage areas also have been inspected. The off-Forest gravel sources were found to be free of NNIS and have been approved for use. Inspections of on-Forest gravel sources yielded mixed results. Of the four sites inspected, two were found to be free of NNIS and two contained small populations of undesirable species. The two infested locations are being treated to eradicate the NNIS present. These locations will be unavailable for use until the species have been completely eradicated from these sites. There are no sources of non-gravel fill that have been inspected or approved for use on the Forest.

Two sources of hay (for use as mulch) have been inspected. Although the hay fields themselves were found to be free of any NNIS, the woodlands surrounding both locations contained several woody invasive plant species. An evaluation of the species found in these woodlands and the management regime of the fields revealed that there was little or no risk of introduction of NNIS onto the WMNF through use of hay produced in these fields. Both locations were approved for use on the Forest.

The approved sources of these materials will be re-inspected on a three to five year basis to ensure they remain free of NNIS. The botanist will inspect new sources of materials as requested by various program areas and contractors.

Recreation

Forest Plan, Page 2-20, Shelters, cabins, and tent platforms

S-2 Shelters, cabins, and tent platforms that are retained must be maintained. Native materials should be emphasized for maintenance and repair activities. Non-native material may be used if native material is unavailable or impractical. Materials should be replaced in-kind. Any material used should be durable and blend closely with the natural surroundings.

Past shelter management projects have shown that meeting this standard can be challenging as we balance ease of maintenance, structural integrity, historic character,

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and suitability with natural surroundings. In FY10, the AMC reconstructed the Eliza Brook Shelter. Constructed in 1963, the shelter was in an advanced state of deterioration and was replaced in-kind with a similar three-sided Adirondack-style shelter. Native timber of the appropriate size was unavailable in the immediate area. Instead, the lumber used for the new shelter came from a regional source and is a species native to this region. The former tin roof that was on the shelter was replaced with a green metal roof that blends in well with the landscape and helps minimize visual impacts from the Appalachian Trail. This project is one example of how this standard influences our management decisions and how it helps us continue to meet the goal of maintaining a low development level at backcountry facilities.



*Replacing the Eliza Brook Shelter.
AMC photo.*

Effects of Management Practices

Heritage Resources

The WMNF Heritage Monitoring Strategy recognizes that management practices and uses of the Forest can have the potential to adversely affect cultural resources. Two areas of potential effects are highlighted in the monitoring guide: recreation management and use and vegetation management (timber harvest). Monitoring during 2010 identified three areas of concern and set in motion actions to improve site protection in each case.

Effects of Recreation

It is an inevitability of hiking and camping that a good place to walk or a good place to camp has been used by people in the historic (and possibly prehistoric) past. On the WMNF, modern campers often choose campsite locations in the vicinity of historic archaeological sites (cellar holes, mills, barns, etc.). Monitoring of historic sites has found that modern campers have occasionally disturbed an historic site: using a rock from an historic house foundation in a modern fire pit, cutting an historic telegraph pole to use as firewood, building a modern campfire ring within an historic site. Most of these effects are inadvertent and a byproduct of recreation use. Efforts are underway to raise the general awareness of historic preservation issues with both Forest employees and the public in an educational format. In situations where effects seem to be purposeful, law enforcement involvement may be needed.

Effects of Vegetation Management

Monitoring at timber sales in recent years has shown that, in some cases, buffers established to protect cultural sites have been inconsistently marked, resulting in harvest too close to historic features. A monitoring trip in FY10 (see Ramsey Basin Timber Sale summary below) prompted renewed discussions of buffers. As a result of that trip, heritage specialists and foresters began working together more closely to ensure that adequate buffers are marked and that communication between these resources is open. An ongoing dialogue will help ensure that historic properties are adequately protected during timber harvest and related activities.

Effects of Road and Snowmobile Trail Maintenance

As in many parts of the eastern United States, the modern transportation system on the Forest (highways, roads, snowmobile trails) often overlays and overlaps with a transportation system that has been used for over 200 years. In many cases the historic (more than 50 year-old) elements of the road are considered historically significant. And in many cases modern roads and trails occupy the same bed as the road that once connected historic farm sites and communities. Project surveys and resource monitoring have helped us realize that maintenance of currently used roads and trails may affect historic features of the road or trail and historic sites located adjacent to the road. Heritage specialists are working with maintenance crews and leaders (Forest employees and partners) to ensure historic values are considered as maintenance plans as developed and implemented.

Water Resources

Effects of recreation on water quality

Forest staff monitor water bodies near a number of recreation sites each year to determine whether recreation use is impacting water quality. A few sites are selected to represent different types of recreational use, and water samples are taken upstream and downstream of the site when possible. Observers also document stream and riparian condition to determine whether restoration is necessary or to establish a baseline where projects are already proposed. The sites monitored in 2010 included Dolly Copp and Barnes Field Campgrounds, Tripoli Road dispersed camping area, Moat Mountain Trail System project area, and Lower Falls on the Swift River.

Turbidity was at or near the lower detection limit at all sites, indicating that activities at these sites are not contributing to suspended sediment during typical flow conditions. Conductivity is a measure of charged particles in the water, and values greater than 100 μS may indicate pollution due to road salt, septic systems or other chemicals. Conductivity values were below 35 μS at all sites, and did not increase downstream of recreation areas. Nutrient concentrations, including nitrate, ammonia and phosphorus, were comparable to reference sites on the WMNF and below thresholds indicative of impacted waters¹.

E. coli bacteria counts are indicators of contamination by human and animal waste. All samples met the applicable state standard for Class B waters (less than 406 counts/mL in

¹ New Hampshire Volunteer River Assessment Program. 2008. Interpreting VRAP Water Quality Monitoring Parameters. New Hampshire Department of Environmental Services. Accessed April 13, 2011 at http://des.nh.gov/organization/commissioner/pip/publications/wd/documents/vrap_parameters.pdf

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a single sample or 126 counts/mL mean value). The highest value (92 counts/mL) occurred at Dolly Copp Campground below a beaver dam. In the Tripoli Road dispersed camping area, *E. coli* counts increased slightly below streamside campsites, based on the average of 5 dates. Because of the variation in values, Tripoli Road sites will be monitored again in 2011. While these water bodies are safe for recreation and the higher value is likely wildlife-related, users of these sites should not drink untreated surface water. At Dolly Copp campground, potable water is provided from a groundwater source that meets drinking water standards.

A greater level of riparian alteration is present at developed recreation sites such as Dolly Copp and Lower Falls than other areas of the WMNF, in part due to the presence of major roads in these areas. Surveys found undersized culverts leading to altered channel shape at Dolly Copp Campground and Tripoli Road.

Field assessments also identified loss of riparian vegetation and 30 sites with eroding banks or slopes along streams in the Tripoli Road dispersed camping area. Due to concerns with riparian condition, safety, and water quality, a proposal to relocate campsites along streams in the Tripoli Road area is under development. In contrast, only minor bank impacts were found on user-created trail crossings in the Moat Mountain area.



Riparian impacts to soil and vegetation from heavy use on Eastman Brook along Tripoli Road. WMNF Photo by James Sherrard Jr.

While water quality near recreation sites is generally high, concerns related to stream and riparian condition will be incorporated into proposals for future activity in these areas to ensure that use of these sites is sustainable.

Effects of timber harvest on water quality

The water monitoring program includes pre- and post-harvest monitoring in selected vegetation management project areas. Recently, the Forest has focused monitoring in the Stevens Brook, Wild Ammonoosuc, and Swift River watersheds in New Hampshire and the Crooked River watershed in Maine. Pre-harvest data collection is underway. Stream reaches in these areas are generally in proper functioning condition and meet water quality standards. Post-harvest monitoring will include water sampling and observation of best management practice implementation and effectiveness. Results of this monitoring effort will be summarized in a future monitoring report once post-harvest data has been collected and analyzed.

Project Reviews

Nancy Pond Trail Bog Bridging

This trail goes through dense forest and wetlands in the Nancy Brook Research Natural Area and the Pemigewasset Wilderness Area, providing hikers with views of Nancy, Little Norcross, and Norcross ponds. Increased beaver activity along the Nancy Pond Trail was flooding existing bridging and flooding the trail tread. Hikers created new paths to get around the water, including cutting live trees to make paths through thick forest. The new treadways were eroding and multiplying, creating extensive damage to the vicinity.



Old and new bog bridging along the Nancy Pond Trail. WMNF photos by Cristin Bailey.

This project replaced rotten bog bridges, installed new bridges where needed, installed rock steps on an eroding slope, and used step stones as needed to create a user-friendly treadway. As the project was nearing completion, it was reviewed to determine the effectiveness and impacts of the work. All of the activities had been implemented as designed. Putting stepping stone between bridges allowed us to install bog bridges across a longer distance, improving the trail more than expected. The staging area for the work was less impacted than anticipated, resulting in the need for less rehabilitation work at the close of the project. And as an added reward, the hiking community responded very positively to the new trail tread, which should mean less potential for user-created side trails and damage. Future monitoring should look at the long-term effectiveness of the improvements and public use patterns along the trail.

Fishhook Landing Timber Sale

This sale was visited by several members of the interdisciplinary team and the marking and sale administration staff to review the layout and marking before it was finalized.

One unit was visited to determine whether the season of operation could be expanded from winter only to fall and winter while staying within what was analyzed for in the Mill Brook Environmental Assessment (EA). It was confirmed that conditions in the unit

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should support either fall or winter logging. Measures needed to protect perennial and intermittent streams also were discussed to ensure marking is appropriate.

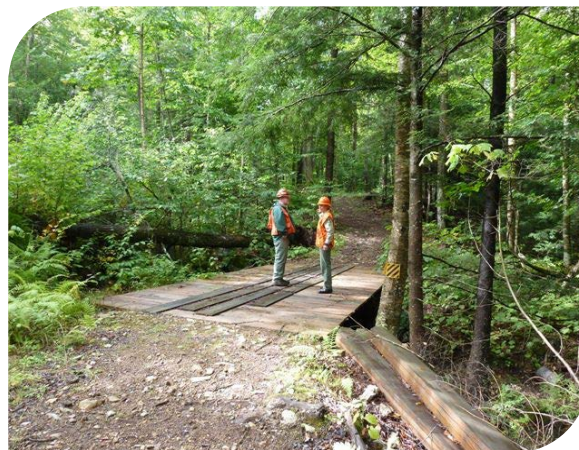
Several other sale units were visited to evaluate whether completed marking adequately protected springs, seeps, existing hemlock and other softwoods, and other key features. The monitoring group agreed that marking was appropriate. They identified features that needed to go on sale area maps and noted an area that needed repainting to ensure visibility.

Camp 7 Timber Sale

The review of this sale, which was harvested 3-4 years prior to the monitoring trip, focused primarily on how best to meet white pine regeneration objectives and how the snowmobile trail bypass worked.

The timber harvest alone did not result in sufficient pine regeneration to meet project objectives. The Ellsworth project decision included a possible prescribed burn to encourage regeneration. The group agreed that the prescribed burn should proceed whenever conditions are appropriate.

The Ellsworth project EA considered whether to build a snowmobile trail bypass or allow dual use of the road by log trucks and snowmobiles. The decision was to construct a bypass to avoid dual use during logging operations. The monitoring group discussed what dual use would have looked like and agreed that the bypass was a good decision. After the harvest, the temporary winter road was closed and drainage structures were removed; erosion control measures were working as expected. The snowmobile trail remained on the bypass. The monitoring group agreed that the bypass location was so close to the old location that there was no mileage increase and the new location is appropriate and working well. The bypass was well constructed, but a couple of the bridges are slightly narrower than desired and will be discussed with the local snowmobile trail club.



***Bridge along the Snowmobile Trail Bypass.
WMNF photo.***

All mitigation measures reviewed were in place as described in the environmental assessment and functioning as expected.

Ramsey Basin Timber Sale

This monitoring trip focused on protection of heritage resources and implementation of soil and water best management practices (BMPs), especially at the completion of the operations. Three sale units and a road that had a landing and temporary bridge along it during harvest activities were visited.

Heritage resources were properly protected in a clearcut unit by a no-cut buffer. At another location, a heritage resource specialist indicated that mitigation to avoid disturbing a heritage resource adjacent to a landing was inadequate. There was no apparent damage to the heritage resource, but could have been given how close the active landing was to the site. The monitoring group recommended the heritage resource staff on the Forest work with the forestry staff to review the current approach to avoiding heritage sites and refine it as needed to ensure protection of heritage resources.

Review of skid trail stream crossings in an overstory removal harvest unit showed that BMPs were implemented to the minimum acceptable level. No evidence was seen of sediment reaching a stream, but water bars on one trail were limited and a small amount of active erosion was visible. That erosion was stopped by another water bar before reaching the stream, but its presence indicated the need for one additional water bar.

The slash-mat placed at a stream crossing to minimize impacts to the stream channel appeared effective at preventing impacts to the stream banks. However the slash-mat was left in the riparian zone at the close of the sale, which likely will slow establishment of riparian vegetation slightly. The Forest hydrologist asked that slash be moved farther into the unit in future sales.

Review of the temporary bridge location showed that closure work after the bridge was removed was satisfactory and use of the road had not caused any negative effects to Davis Brook. However the Forest hydrologist noticed that the existing bridge abutments, which may be historic, were mis-aligned with the natural flow of the brook. Heritage resource staff will research whether the bridge abutments are a historic structure and work with the hydrologist to determine if they can be removed or relocated to restore the stream's natural flow.



*Ramsey Basin Monitoring Field Trip.
WMNF photo by Andy Colter*

Dry River Trail Suspension Bridge

Several years ago flooding damaged a suspension bridge on the Dry River Trail in the Presidential/Dry River Wilderness. The bridge was closed because it posed a safety hazard to the public. The Dry River Trail begins along Highway 302 in Crawford Notch State Park and is used by diverse visitors with a range of skill levels. Removing the bridge would have made the trail impassable for some users and unsafe for all in high-flow conditions.



Old and new suspension bridges on the Dry River Trail. WMNF photos by Holly Jewkes.

In 2009, a new suspension bridge was completed. Though the new bridge uses metal for the support towers, it has fewer cables and a lower profile than the previous bridge. Informal polling of Forest visitors was conducted in 2010 to assess whether they considered the new bridge to be appropriate in a Wilderness area. Most visitors are happy with the new bridge and find it consistent with their expectations for a Wilderness experience.

Saco Ranger District Timber Sales

Specialists in a wide variety of resources from the Forest Supervisor's Office and Saco Ranger District looked at three timber sales at three different stages of implementation. Than was harvested a year earlier, Popple North was recently completed, and Chase Hill was being harvested at the time of the review.

Two units in the Than sale were visited to evaluate whether the effects were within what was disclosed in the environmental assessment (EA). A member of the public expressed concern about soil movement in one unit. The group walked part of this unit and discussed language in the EA that acknowledged there would be "short-term, local sedimentation." There was no evidence that soil or water was able to go from the skid trails or other disturbed areas to streams or wetlands. The terrain and mitigation measures (slash, water bars) limited soil movement. Therefore the group agreed the effects were within what was disclosed in the EA and considered by the line officer.

The uphill skid to a flat landing in unit 10 did not result in any adverse effects. The slash disposal zone in that unit met the intent stated in the EA. It also was noted that a couple of large snags were left in this clearcut unit, which is often difficult to do safely. This was

a positive accomplishment toward meeting snag retention guidelines and providing important habitat.

At the Popple North sale, discussion focused on a landing near a stream and a non-native invasive species (NNIS) population, mitigation measures for Meserve Brook, and how to ensure the sale administrator understands any resource concerns in a sale area and is involved in developing appropriate, feasible mitigation measures to address those concerns. The group agreed that the landing was located in the best place and the site-specific conditions appropriately minimized the risk of sediment reaching the stream. Preventing spread of the known NNIS population was a key consideration in project implementation. While most landings on the Forest can be allowed to seed in naturally, given how rapidly areas revegetate, the group agreed that this landing will be seeded to reduce the potential for NNIS seed to take root.

The Popple project decision included placement of logs across an old dry stream channel in the Meserve Brook floodplain near a skid road to try to keep the water in the main stream channel during high water events and prevent erosion. Logs were placed as recommended and the Forest hydrologist and fisheries biologist agreed that the logs worked as expected. Despite a three inch rain event just days before the monitoring trip, there was no evidence of the stream flowing into the old channel or of erosion associated with that old channel or the skid road.

The bridge over Meserve Brook had a log on each side to minimize dirt and debris entering the water from equipment and wood crossing the bridge. The hydrologist noted that one log was very tight against the planks and had captured material very effectively. The other log had small gaps between it and the planks. It captured some material but allowed a small amount to fall through into the stream. The analysis acknowledged the potential for a small amount of sedimentation, so the project was within what was expected.

At the Chase Hill sale, slash was well distributed throughout the unit because harvest was done through hand-felling and bucking, not mechanized harvest equipment. The bridge over a stream seemed effective at preventing sedimentation. It was too late in the season to determine if the harvest improved habitat for the known *Triphora* population, but monitoring specific to that question will occur in the future.

Other Monitoring

Assessment of Recreation and Wilderness Monitoring

In 2010, an evaluation of the recreation and Wilderness monitoring program began. The first step was to bring together visitor use data and information from across the WMNF and determine how to make it more consistent and useable. Previously the data for visitor use, such as campground numbers and backcountry shelter report numbers, were kept in varying locations and formats. Wilderness monitoring data was reported district by district through separate spreadsheets with different formats that made year to year and Wilderness to Wilderness comparison very difficult.

Over the summer of 2010, two databases, one for wilderness monitoring and one for general visitor use monitoring, were created to centrally house both historical and future data. In addition to offering consistent information storage, each database has several

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queries and reports to help summarize the data and illustrate trends at a glance. By the end of the fiscal year, the Wilderness visitor trail use and destination use monitoring was entered into the database and analyzed. Results are summarized under the Wilderness subheading later in this report.

A discussion of Wilderness monitoring among Districts indicated a need for more consistent protocols for dispersed campsite monitoring. Wilderness program staff will work on this in coming years.

The evaluation of the recreation and Wilderness monitoring program will continue in FY11 with an analysis of the recreation use monitoring data.

Water Resources

Groundwater Dependent Ecosystems

In 2010, the White Mountain National Forest was one of five national pilot sites to assess a groundwater-dependent ecosystem (GDE) monitoring protocol. GDEs are sites where groundwater emerges at the surface, including springs, seeps and wetlands. Due to their small size and unique characteristics, many of these sites are not represented in existing wetland, soil, or surface water inventory and monitoring protocols. The integrated



Soil, water, and vegetation monitoring of groundwater-dependent ecosystems. WMNF photo by James Sherrard Jr.

assessment process included collection of hydrology, soils, vegetation and disturbance data at several sites across the National Forest. The survey found that GDEs on the WMNF generally experience little disturbance, encompass a variety of hydrologic and chemical conditions, and are inhabited by a diversity of species. Through a partnership with Plymouth State University, an intern collected and analyzed water isotope data at each site. This information provides insight into the role groundwater plays in these ecologically valuable systems. The data collected in 2010 will serve as a baseline, allowing future assessment of land use, climate change, or other environmental effects.

Wilderness

Wilderness Visitor Trail Use and Destination Use Monitoring

In the Forest Plan (p. E-14), Wilderness visitor trail use and destination use are identified as social indicators for Wilderness character. These indicators help determine whether an area offers the “outstanding opportunities for solitude or... unconfined type of recreation” that are discussed in the Wilderness Act. Both monitoring items are designed to assess changes in use of a Wilderness area and indicate whether the Forest is meeting desired conditions for Wilderness.

For visitor use monitoring, there are four destinations and three trail locations identified in each Wilderness that are monitored for one day each year. The locations are stratified across the four Wilderness zones. At each established location, the monitoring is conducted on the same relative day each year. For example, for one site the monitoring is always done on the 2nd Saturday of July.

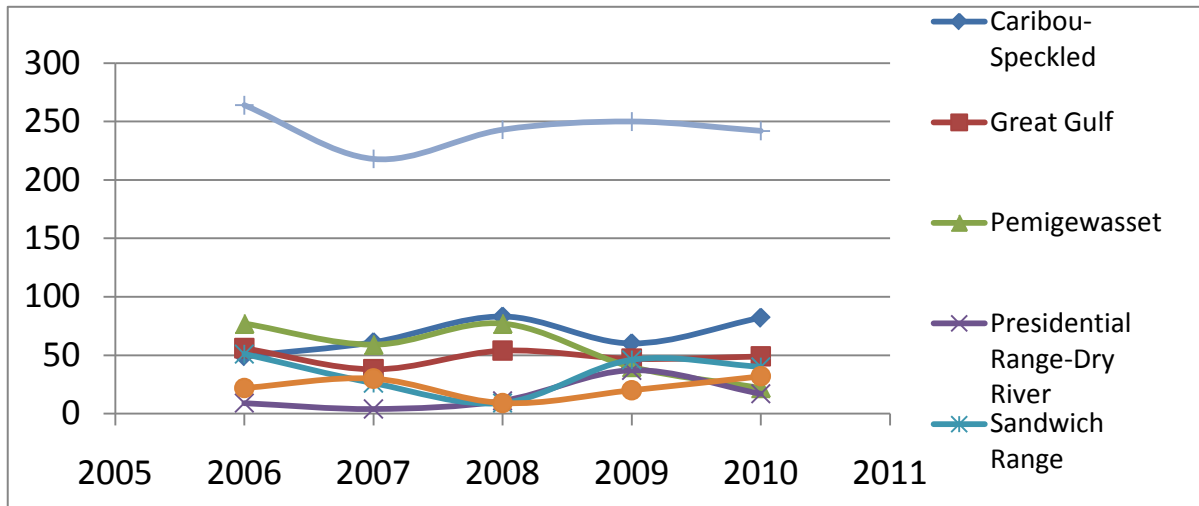


Figure 3. Total visitors seen each year by Wilderness Area.

With data collection beginning in 2006, there are currently five years of data. Overall the monitoring data indicates use in the Wilderness areas is fairly stable, with no three consecutive years showing an increase in total use. From 2006-2010, during 46% of the monitoring days no visitors were seen over the five-hour time block. This alone suggests that there are opportunities for solitude in each of the Wilderness areas.

Group sizes were also monitored on sampling days. During the past five years, Wilderness visitor group sizes averaged about 2.5 people per group. In a survey conducted in the backcountry and Wilderness areas in 2000, an average group size of 3.2 adults and .9 children was recorded in primitive areas. During this survey, respondents in primitive areas reported being satisfied with “solitude” and “exploration and remoteness.” The current monitoring indicates that group size has not increased since the 2000 survey.

Wildlife

Acoustic bat surveys

In 2007, a new disease was identified in bats hibernating in New York. This disease, known as white-nose syndrome (WNS), often infects bats with a white fungus on their ears, muzzle, wings, and tail membrane. Current thinking is that this new fungus invades skin and other tissue, causing catastrophic dehydration and fluid imbalance. Affected bats arouse from hibernation more frequently than normal, using precious energy reserves. These bats either die in their hibernation site or leave too early, often with snow still on the ground and no food source available. WNS has spread rapidly across the northeastern U.S., south to Tennessee and west to Oklahoma and mortality rates at some hibernacula have exceeded 90 percent.

In the northeastern U.S., all bats known to hibernate here have tested positive for WNS. In order to track the effects of this new disease, the WMNF implements two separate monitoring protocols designed to assess bat population trends. Both use acoustic bat detectors that record the ultrasonic calls bats use as they navigate and search for prey. By measuring the number of calls recorded, biologists can obtain an index of bat activity and associated population trends.



Little Brown Bat with WNS. Photo by Ryan von Linden, NYDEC

In 2009, the WMNF joined a number of other National Forests and partners across the eastern U.S. to implement a newly developed survey. By applying the same protocol in multiple areas, biologists hope to be able to gain an understanding of bat levels over large regional areas. By repeating this monitoring in future years, changes in bat populations in summer habitats can be determined.

The initial 2009 survey included five transects placed at least partly on the WMNF in areas that were considered good bat habitat (relatively open, flat conditions). Each transect consists of a road or series of roads that are driven slowly (20 mph) at night with the bat detector strapped to the roof of the vehicle. The WMNF is somewhat limited because of its mountainous terrain and few suitable roads. For safety's sake, only roads that can be safely driven at 20 mph were considered (e.g., only low volume roads, not major highways). Each transect was completed three times over the course of the summer and all data was submitted to be analyzed by a contracted bat expert. In 2010, four additional transects were added for a total of nine.

Across the eastern U.S., transects have been surveyed as far south as the Florida panhandle and as far west as Oklahoma and Minnesota. Data is being evaluated through a contract, expected to be completed in the fall of 2011.

WMNF staff also initiated a separate but similar monitoring effort in 2009, setting up stationary bat detectors at 11 sites with previous (pre-WNS) acoustic survey data or at sites with suitable habitat (e.g., near ponds or cliff faces). These sites were again

monitored in 2010, with an additional 8 sites surveyed. Table 3 shows a summary of the data collected at the 11 stationary sites surveyed in both years.

Table 3. Summary of WMNF stationary acoustic bat survey data, 2009-2010.

Site	District	Survey date	2009 Total bat files*	2010 Total bat files*
Godfrey Dam	Andro	7/15/09	123	
		7/18/10		206
Wild River	Andro	7/20/09	87	
		7/20/10		90
East Royce Marsh	Andro	7/22/09	49	
		7/23/10		104
Spring Brook wildlife opening	Andro	7/30/09	235	
		7/27/10		57
Basin Road	Saco	7/24/09	19	
		7/17/10		42
Basin Pond	Saco	7/26/09	177	
		7/18/10		121
Cave Mountain	Saco	6/17/09	17	
		7/20/10		40
Passaconaway	Saco	7/28/09	348	
		8/4/10		419
Elbow Pond	Pemi	6/24/09	76	
		6/21/10		112
Rumney Rocks Parking Lot	Pemi	8/5/09	109	
		8/5/10		58
Lake Tarleton	Pemi	8/14/09	80	
		8/12/10		27
TOTALS			1320	1276

**Bat files at a stationary site cannot be assumed to be different individuals, but can be used as a measure of general bat activity at a particular site.*

Unfortunately, the earlier, pre-WNS data from 2002 and 2004 did not indicate start and stop times for acoustic monitoring, so direct comparisons about abundance can't be made. However, the level of activity in general at many of these sites is encouraging. Although individual files have not all been identified to species level, we are confident that the vast majority of files are from little brown bats, with other species present as well. In general, species that were present in earlier surveys appear to have been present in 2009 and 2010. While more bat files were recorded at some sites in 2010 and more in 2009 at others, the overall level of bat activity appears to have remained relatively stable over the two years. Plans are to repeat these surveys on an annual basis to follow trends over time.

Estimating longevity of northern long-eared bat roost trees

In the early 1990s, a graduate student at the University of New Hampshire, Blake Sasse, completed his Master's thesis on woodland bat roost trees on the WMNF. Sasse captured 26 northern long-eared bats in mist nets, outfitted them with radio transmitters, and

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followed them to their roost trees. He then took detailed measurements of the roost tree itself, as well as the surrounding stand. A total of 49 roost trees were identified in this way and collectively painted a picture of northern long-eared bat roosting habitat on the Forest. It appears these bats will use a variety of tree species and conditions, ranging from snags to live trees, as long as there is some defect (crack, hole, etc.) on the tree to provide shelter.

Sasse's data was collected without the use of GPS coordinates. Present-day concern over WNS and its effects to summer bat populations renewed the interest in Sasse's findings. Biologists were curious how long roost trees might remain usable on the landscape, so with special funding from the Forest Service regional office in Milwaukee, the WMNF partnered with Sasse to relocate and reassess the conditions of his original roost trees. During June, 2010, Sasse determined the outcomes of 33 of the original 49 roosts. A total of 7 roost trees (14%) were considered still usable by bats, 21 (43%) were confirmed as being down on the ground or otherwise unusable, 5 roosts (10%) were not conclusively relocated but their sites were precisely known and after a thorough search should have been found if they were still standing, and 16 (33%) roosts were not relocated and their status is unknown.



Northern long-eared bat. Photo by Al Hicks, NY Dep't of Environmental Conservation

The seven still usable roost trees are half of what was considered usable in 2004 (10 years after the original study), when Sasse did a similar search.

Interestingly, while some of these trees have obviously decayed over time, others appear quite alive, with no readily discernible defect. It would appear that at least some roost trees can remain standing for some time.

To evaluate whether the remaining standing roost trees were still actually being used by bats, Sasse also performed exit counts (watching the roost tree at dusk to view emerging bats). He saw no bats, although he admitted his time was limited.

Additional follow-up acoustic monitoring was performed by WMNF staff at two sites, with a bat detector set up for three hours at night near the roost trees. A total of 31 bat files were recorded at the two sites, which is lower than the activity recorded at other stationary survey sites on the Forest. However, species diversity was high, with perhaps as many as five different species recorded, including one northern long-eared bat. The presence of bats at the sites doesn't necessarily imply that they were using the original roost trees, but at least indicates the surrounding area supports habitat of some kind.

Biologists plan to use the information gained from Sasse's work to refine existing Forest Plan standards and guidelines for reserve trees to increase the likelihood that suitable maternity roost tree habitat is maintained on the WMNF.

Annual Updates

There are many resources and activities that are monitored every year on the Forest. Some of these are reported on periodically when enough data has been collected to show trends or when a change in conditions is noted. The Monitoring Guide recommends reporting on others annually because the resource can change rapidly or questions on the topic arise regularly from the public. This section provides a brief summary for the annually-reported items. Periodically a more thorough evaluation of each of these topics will be presented under a different heading in the monitoring report.

Air Quality

The WMNF Forest Supervisor is the delegated Federal Land Manager (FLM) for the two Class I wilderness areas on the Forest. Under the federal Clean Air Act Amendments, the FLM is responsible for reviewing Prevention of Significant Deterioration (PSD) Permits for regional major new sources of air pollution to determine if they would have an adverse effect on air quality related values (AQRVs) in the Class I areas (Presidential Range/Dry River and Great Gulf Wilderness areas). These reviews also help the Forest meet Forest Plan direction (p. 2-4 and 3-12) concerning management of Class I airsheds.

During Fiscal Year 2010, the FLM reviewed a PSD permit for the proposed Laidlaw Berlin Biomass (LBB) Facility. This proposal is for a 70 megawatt electric generating facility in Berlin, NH, near the two Class I areas within the WMNF. Proposed emissions and emission factors were reviewed and a Class I area visual plume impact analysis was completed. The FLM reviewed results from deposition and visibility modeling suggesting that the expected emissions will not significantly impact the air quality-related values of the Great Gulf and Presidential Range/Dry River Wilderness areas. In their draft permit to LBB, the NH Department of Environmental Services-Air Resource Division (NHDES-ARD; the permitting authority) has required that a continuous opacity monitor and a continuous emission monitor for nitrogen oxides be installed. The NH DES-ARD has also committed that nitrogen oxides offsets will be required at a minimum ratio of 1.15:1. nitrogen oxides offsets allows owners of LBB to obtain emissions reduction credits from other companies that operate facilities located in the same air quality control region. Companies that have a surplus of emissions reduction credits can sell their credits to those companies that are required to offset emissions from new emission sources. This offset system limits the amount of nitrogen oxides released in a region. Limiting this precursor to ozone will reduce ground level ozone, which can trigger many health problems. As part of the PSD permit review, the FLM requested, and NHDES-ARD agreed, that the FLM will be notified of the names and locations of LBB's proposed sources of nitrogen oxides offsets.

The WMNF continues to monitor for the visibility AQRV by maintaining the IMPROVE (Interagency Monitoring of Protected Visual Environments) site at Camp Dodge. Data and information regarding this site was included in the FY 2008 monitoring report.

NNIS Eradication

Forest staff control invasive plant infestations each year across the Forest to help us attain our goals and objectives for non-native invasive species. In 2010, approximately 78 acres of NNIS were controlled using an integrated pest management approach. This approach relies on hand pulling, cutting, herbicide use, and biological controls of purple loosestrife through the release of predatory beetles. Herbicide application was the most utilized

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control method. The greatest number of sites treated was on the Pemigewasset Ranger District. Most of the acreage treated was on the Saco Ranger District.

Table 4. NNIS plant treatment in FY10

	Pemigewasset District	Saco District	Androscoggin District
Acres	17.7	56.2	4.8
Sites	22	10	6

Most sites treated range from one-tenth of an acre to one-half acre in size. There are a handful of sites that range in size from 20 to 40 acres. Five infestations previously treated were found to be completely eradicated in 2010. Since 2007, seven infestations have been completely eradicated.

Non-Native Invasive Insects

No NNIS insect species are known to occur on the Forest, although range expansions have brought hemlock woolly adelgid, Asian long-horned beetle, and emerald ash borer to within 200 miles of the Forest boundary. In 2010, the Forest Service's Forest Health Protection staff partnered with federal land managing agencies in the northeast to conduct early detection insect surveys at developed campgrounds on federal land. Twenty-one of the 23 developed campgrounds on the Forest were surveyed (two campgrounds were inaccessible at the time of the survey). A total of 523 campsites and 12,878 trees were surveyed. Although insect damage and human-caused damage to trees was observed within each campground, no damage associated with NNIS insects was discovered.

Additionally, the State of NH deployed 'purple sticky traps' baited with an attractant for emerald ash borer (EAB) in campgrounds along the Kancamagus Highway. These traps were collected and specimens processed by the State. A variety of common and unusual insects were discovered, but there was no evidence of EAB.

No specific monitoring for hemlock woolly adelgid was conducted in 2010. Forestry, wildlife and botany staff are familiar with the signs of infestation and spend considerable amounts of time on the ground during the field season. To date, no signs of infestation have been observed.

Early detection monitoring efforts for these species will continue on an annual basis.

Soil Resource Monitoring

Timber harvest

Every year monitoring occurs while activities are being implemented on the ground to see whether Forest Plan standard and guidelines to minimize soil movement are being followed and track the effectiveness of best management practices (BMPs). In 2010, monitoring took place on the following active timber sales: Lower Loop on the Androscoggin Ranger District, Stevens Brook on the Pemigewasset Ranger District, and Kanc 7 on the Saco Ranger District. Post implementation monitoring occurred on the Ramsey Basin sale on the Pemigewasset Ranger District and Popple South on the Saco Ranger District.

Standards and guidelines were generally being followed as proposed. The FY2009 Monitoring Report indicated that if a skid trail ran through a harvest unit, slash wasn't always scattered across the harvest unit, as required by vegetation management standard S-3 (Forest Plan p. 2-29). The Forest soil scientist and forestry staff continue to work together on how best to implement this requirement; monitoring in FY 2010 showed better results, with slash being spread more evenly across the sites.



Clearcut with slash left evenly distributed. WMNF photo.

Selecting the right operating season for the ground is a best management practice for minimizing impacts to soil and water resources. As discussed in the 2009 Monitoring Report, climate change predictions indicate that the feasibility of winter logging may eventually decline on the WMNF. Effects of harvest on soils were monitored to determine whether adverse impacts occurred due to the season of operation. Based on the active sales looked at in FY10, impacts matched what was analyzed for in project environmental assessments and were not detrimental. No change to the Forest's operating seasons is needed at this time.

Monitoring showed that other BMP's, such as water bars and slash in the trails to prevent compaction, erosion and puddling, were being implemented on harvesting operations when appropriate. BMP's are designed for "the control and dispersal of water collecting on truck haul roads, skid trails, and log landings to minimize erosion and reduce sediment and temperature changes in streams." (New Hampshire Best Management Practices A Pocket Field Guide, 2004) On the WMNF, these practices appear to be successful in meeting that objective. None of the monitored sales had any active detrimental erosion occurring where water bars were in place. Where slash was placed in the skid trails, there wasn't any active detrimental rutting that would lead to compaction taking place.



Main skid trail at Popple South sale after harvest. WMNF photo by Andy Colter.

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Prescribed burning

Prescribed fire is used on the Forest to reduce hazardous fuel loading, prepare sites for restoration of some species, and create, maintain, or improve wildlife habitat. Prescribed burning to maintain the Fire Point wildlife opening was monitored to determine whether soil organic matter in the Oa horizon was consumed by the fire and whether burning resulted in any erosion. While some surface soil organic matter (Oi horizon) may be lost during a prescribed fire, local experience indicates that prescribed burning does not affect rainfall infiltration rates or soil calcium levels. This is because prescribed fires are typically of low severity so most of each site remains covered by organic matter and mineral soil aggregation is not changed. This was the case in the Fire Point opening. No organic matter in the Oa horizon was consumed and only some of the Oi and Oe horizons were affected. Some soil nitrogen is probably lost when any organic matter burns, but nitrogen is not considered a limiting factor in tree growth on the WMNF. As a result, there were no detrimental effects.

Trail reconstruction

Relocation of the Swan's Way cross-country ski trail in Waterville Valley was reviewed to see if BMP's were being followed and applied correctly. The Forest has been actively working with permit holders to relocate sections of trail that are negatively affecting soil or water resources to better locations. This year, part of Swan's Way cross-country ski trail was relocated. The work took place in the summer and monitoring showed that BMP's such as water bars and straw mulch in the trails to prevent erosion and puddling were implemented when appropriate. The decommissioned segment of trail was properly closed by removing the culverts, placing water bars where needed, and blocking the trail to prevent future use.



*Straw mulch to prevent erosion and puddling.
WMNF photo by Andy Colter*

TES Plants

Presence in Project Areas

Every year project areas for large and small ground-disturbing projects are evaluated for the presence of federally-listed threatened, endangered, and sensitive (TES) plant occurrences and habitat. In 2010, project related surveys revealed 17 new populations of Regional Forester sensitive species and updated two known TES plant occurrences. Project areas surveyed included three large integrated resource management projects (Province, Albany South, and North Chatham) and numerous small projects, such as the Blueberry Ledge and Bradley Brook Snowmobile trail relocations, and Glen Ellis Day Use Area redesign.

Population Monitoring

Forest staff and partners monitor a portion of the known occurrences of TES and state-listed plant species on the Forest each year to assess population health and trends. In 2010, the total number of occurrences monitored was down about 50% from 2009, largely because partners focused on areas outside the Forest and WMNF staff were committed to other priorities. Many additional populations (particularly of alpine species) were casually observed to confirm their continued presence, but no population data were recorded.

A total of 18 occurrences were monitored by volunteer botanists from the New England Wild Flower Society, New Hampshire Natural Heritage Program, and Appalachian Mountain Club, and by Forest staff. No significant changes were identified at any of the populations monitored in 2010.

Monitoring and Research by Partners and Cooperators

A wide variety of short- and long-term inventory, monitoring, and research studies are conducted every year on the White Mountain National Forest by individuals, organizations, and universities. In FY10, this work included micromorphology of alpine soils, phenology of vegetation as related to climate change, effects of timber harvest on glossy buckthorn, invasive insect monitoring, population dynamics for several species of wildlife and plants, and limnology of several lakes and ponds, among other topics. All proposals for non-Forest Service research and monitoring on the Forest are reviewed by appropriate specialists before a permit is issued. Often limitations are placed on the location, type of activity, or intensity of work that can occur on the WMNF to ensure that resources are protected and Forest Plan direction is applied. Project proponents are expected to provide a summary of work done or copies of any reports generated by activities on the WMNF so the Forest will have access to any information that could help us in our management.



The Hancocks in autumn. WMNF photo by Forrest Seavey.

