

FY 2008

Monitoring and Evaluation Report



Allegheny National Forest

USDA | April 2013

Approval and Declaration of Intent

This report is a snapshot of the monitoring conducted in Fiscal Year 2008 (FY2008) of the implementation of the Allegheny National Forest (ANF) 2007 Land and Resource Management Plan (Forest Plan). I have reviewed and approve the FY 2008 Monitoring and Evaluation Report for the ANF. This report meets the intent of the Forest Plan and complies with the 1982 planning regulations (36 CFR 219) under which the Forest Plan monitoring requirements (pp 37 – 51) were developed. The ANF continues to make progress toward Forest Plan goals and objectives. I am satisfied with the Monitoring and Evaluation Report's findings and agree with the conclusion that there is no need to change Forest Plan management direction based on monitoring results.

Erin Connelly
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4/11/13

Date

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Table of Contents

List of Figures	iii
List of Tables	iv
Introduction.....	1
Annual Evaluation Items for FY 2008	
Minium Legally Required Monitoring Items	
Stocking within Five Years of Regeneration Harvests.....	2
Destructive Insects and Diseases	5
Comparison of Projected and Actual Outputs and Services.....	16
Prescriptions and Effects	25
Effects of Management Practices	28
Achievement of Forest Plan Objectives	
Evaluate ANF Road System Suitable for Snowmobile Use.....	32
Facilitate Regular Grooming of Designated Snowmobile Trail System	33
Provide Snowmobile System Connectors.....	34
Maintain or Create Age Class Diversity on Lands Suitable for Timber Management.....	35
Enhance Terrestrial Wildlife Habitat.....	36
Prevent Introduction of Zebra Mussels	36
Evaluate Productivity of Bald Eagles.....	39
Acres Treated to Increase Plant Species Diversity	40
Strategic Monitoring Information	
Bald Eagle Conservation Measures	42
Indiana Bat Conservation Measures	44
Conservation Measures for Clubshell and Northern Riffleshell Mussels	48
Have Federally-Listed Plants been Identified?.....	60

Evaluation of Other Annually Monitored Items

Maximum Opening Size from Even-aged Management 61

Population Trends of Management Indicator Species – Northern Goshawk..... 62

Population Trends of Management Indicator Species – Timber Rattlesnake..... 66

Deer Densities 68

Summary of Results and Recommendations 71

List of Abbreviations 77

List of Preparers 78



List of Figures

Figure 1. Forest Health Monitoring aerial survey results and flight lines.	6
Figure 2. Emerald ash borer distribution map (January 2009).	9
Figure 3. Sediment concentration of water samples from Grunder Run and Hedgehog Run, 2000 - 2007.	56

List of Tables

Table 1. Percent of Acres Stocked within Five Years of Regeneration Harvest Cutting	2
Table 2. Comparison of Projected Recreation Activities (Forest Plan, p 21-22)	17
Table 3. Comparison of Projected Burning Activities (Forest Plan, p 22)	18
Table 4. Comparison of Projected Reforestation Activities (Forest Plan, p 22).....	18
Table 5. Comparison of Projected Fuels, NNIS, Wildlife, Fish and Stream Activities (Forest Plan, p 22)	20
Table 6. Comparison of Projected Transportation Activities (Forest Plan, p 22).....	22
Table 7. Annual Probable Timber Harvest Management Practices by Management Area Compared with Actual Completed FY 2008 Accomplishment (Forest Plan, p 23)	23
Table 8. Comparison of Average Annual ASQ to FY 2008 Volume Sold.....	24
Table 9. Post-Harvest Soil Monitoring of Payment Unit 36 FR 230 Timber Sale	29
Table 10. Wildlife Reserve Trees in Compartment 709 Stand 41	30
Table 11. Post Harvest Soil Monitoring of Payment Unit 20 FR 230 Timber Sale	30
Table 12. Watercraft at Risk Based on Personal Interviews of Boaters in 2008	37
Table 13. Trailer Counts at Forest Service Boat Launches in 2008	38
Table 14. Bald Eagle Conservation Measures	42
Table 15. Final Harvest Units' Compliance Checks for 2008.....	45
Table 16. Live and Dead Tree Summary in Final Harvest Monitoring Stands	46
Table 17. Timber Sale Monitoring Summary of Blowdown/Damaged Trees.....	47
Table 18. Live Tree and Crown Closure Summary in Partial Harvest Monitoring Stands	47
Table 19. Conservation Measures Outlined in Appendix C of Forest BA	49
Table 20. Conservation Measures for the Protection of Endangered Mussels	51
Table 21. Results from Conservation Measures Outlined in Appendix C of Forest BA.....	53
Table 22. Comparison of Road Densities within the Grunder Run and Hedgehog Run Drainages (Based on GIS).....	56

Table 23. Private OGD proposals within the 13% Area.....	58
Table 24. Size of Final Harvests by Management Area in Acres.....	61
Table 25. Roads, Trails, Age Class, Habitat, and Management Areas within 3 Buffer Distances Around 34 Northern Goshawk Nests Active within the Past 5 Years on ANF.....	64
Table 26. Deer density on the KQDC from years 2002-2008.	68
Table 27. Deer/square mile per site on the KQDC in 2008.....	69
Table 28. Deer Density on NFS Lands Outside of the KQDC in 2008.....	70
Table 29. FY 2008 Monitoring Results and Recommendations Summary.....	71

Introduction

This report documents and evaluates the results of monitoring the implementation of the Allegheny National Forest (ANF) 2007 Land and Resource Management Plan (Forest Plan) for Fiscal Year 2008 (FY 2008). This is the first full year of monitoring and evaluation since approval of the 2007 Forest Plan.

Monitoring and evaluation are separate, sequential activities required by the National Forest Management Act (NFMA). Monitoring is the collection of data by observation or measurement. Evaluation is the analysis and interpretation of monitoring data. The purpose of monitoring and evaluation is to determine whether or not Forest Plan implementation activities comply with Forest Plan direction, and whether or not the application of Forest Plan standards and guidelines is meeting Forest Plan goals and objectives. The results of monitoring and evaluation can verify implementation activities or can ultimately lead to changes in Forest Plan management direction.

The basic monitoring and evaluation requirements for the Forest Plan can be grouped into the following three categories:

- Table 13 – Minimum Legally Required Monitoring Items – as defined in NFMA in the 1982 planning regulations (36 CFR 219)
- Table 14 – Achievement of Forest Plan Objectives – pertaining to the level of accomplishment of objectives contained in Part 2 of the Forest Plan.
- Table 15 – Strategic Monitoring Information – these are strategic in nature to gain additional information. Data collection and evaluation will address these questions in the 5-year comprehensive report.

The following sections contain the monitoring and evaluation results of the 17 items listed for annual evaluation in Tables 13, 14, and 15 of the Forest Plan (pp 39-51). Also included is the evaluation of four additional annual monitoring items of interest to the ANF completed in FY 2008. With the exception of the four items of interest, the items are organized as they appear in the Forest Plan to allow tracking and comparison by table number and resource area. Each item lists the **monitoring question, protocol, results, conclusion, and recommendations.**

Annual Evaluation Items for FY 2008

Minimum Legally Required Monitoring Items

Stocking within Five Years of Regeneration Harvests

Action, effect or resource to be managed	Monitoring Question	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
Lands are adequately restocked within five years of regeneration harvest (36 CFR 219.12(k)5(i) and (36 CFR 219.27 (c)(3))	Have lands been adequately restocked within five years of regeneration harvest?	Annual	Annual	A ¹

¹ A class value of A in the following tables under the column Precision/Reliability employs methods appropriate for modeling or quantitative measurement. Results have a high degree of repeatability, reliability, accuracy, and precision.

Protocol – Stocking surveys were completed on the ground in each harvest area using ANF and Northern Research Station (NRS) stocking survey guidelines (Forest Plan, p 69; Appendix A, p A-2). A Forest Plan reforestation standard (Forest Plan, p 69) calls for stocking surveys in all regeneration harvests to monitor tree seedling development and to determine the need for additional reforestation treatments.

Stocking surveys were conducted during the 2008 summer growing season when species and health of the vegetation were easiest to identify. Personnel summarized stocking survey results by type of harvest activity and year the harvest cut occurred.

Results

Table 1. Percent of Acres Stocked within Five Years of Regeneration Harvest Cutting

Cut Year	5th Year Survey Year	Even-aged Prescription					Uneven-aged Prescription	
		Green		Mortality Salvage ¹		Blowdown Salvage ²	Green	Mortality Salvage
		Final Harvest	Two-age	Final Harvest	Two-age	all	all	all
1986	1991	94.8				74.1		
1987	1992	87.2				87.0		
³ 1988	1993	92.3				92.6		

Cut Year	5th Year Survey Year	Even-aged Prescription					Uneven-aged Prescription	
		Green		Mortality Salvage ¹		Blowdown Salvage ²	Green	Mortality Salvage
		Final Harvest	Two-age	Final Harvest	Two-age	all	all	all
1989	1994	85.5		89.1			61.5	
1990	1995	75.2		81.0			0.0	
³ 1991	1996	85.5		84.4			8.9	
1992	1997	81.7		100.0			6.9	
1993	1998	86.6	100.0				60.2	
1994	1999	77.1				100.0	64.5	
³ 1995	2000	79.8	0.0				36.5	
1996	2001	85.8	23.7	96.2	54.5	41.3	12.0	
1997	2002	79.2	72.0	91.8	9.1	42.5	16.2	0.0
1998	2003	91.0	69.5	100.0	53.8	100.0	5.0	0.0
³ 1999	2004	92.8	0.0	16.8	100.0		59.3	
2000	2005	88.6					0.0	
³ 2001	2006	95.0		100.0			7.5	
2002	2007	88.1		26.7	100.0		0.0	
2003	2008	91.0	100.0	100.0			⁴	
Total Cut Acres 1986-2003		22,121	498	1,624	501	4,711	4,510	50
Weighted Average Fifth-Year Restocking (Percent)		85.5	59.6	83.6	41.3	79.2	31.6	0.0

¹ Mortality salvage results primarily from insects and diseases.

² Blowdown salvage results from wind events.

³ Drought Years - when the Palmer Drought Severity Index was less than -1 (negative one) throughout the growing season.

⁴ Fifth year stocking survey data for a 31 acre stand was not available at the time of data summary.

Conclusion – Reforestation success within five years of green, even-aged (single-age) regeneration harvests (considering harvests completed between 1986 and 2003) ranges from 75.2% (1990 harvests) to 95.0% (2001 harvests). Where the fifth year survey is 2008 (cut in 2003), the success rate is 91%, an increase over the 88.1% reported the previous year. Years of reduced success rates seem to follow years where drought conditions existed during the growing season, or where substantial insect defoliation occurred (as is the case for the first half of the 1990s). For harvests since 1999, tree seedling stocking success at the end of five years has ranged from 88% to 95%. Of the categories of regeneration harvest listed, scheduled green

single-aged final harvests had the greatest success rates with a weighted average regeneration success rate of 85.5% since 1986.

Reforestation success for even-aged, two-aged regeneration harvests is 59.6% in green treatments and 41.3% in salvage treatments. These percentages are much lower than those associated with even-aged (single-age) harvests.

Mortality and blowdown regeneration harvests reflect wider yearly fluctuations in five year success rates, most likely because seedlings were not in place before the catastrophic events occurred. The highest success rate (83.6% weighted average) is for even-aged, single-age salvage. In all cases, reforestation success rates are fairly good considering these harvests are a response to a natural catastrophic event. Significantly fewer acres of salvage harvest occur than green harvest; the 1986-2003 salvage harvest program was approximately 20% of the size of the green harvest program.

Past tree seedling success rate for uneven-aged treatments was low (most of these treatments occurred during higher deer populations). Future uneven-aged treatments will be designed with updated guidelines contained in the 2007 Forest Plan, which were formulated to improve successfulness of uneven-aged treatments as a stand regeneration method

Tree seedling stocking is monitored in all regeneration harvests on the ANF until they are considered fully stocked, and the tallest seedlings are above the reach of deer.

Recommendations – No changes are recommended at this time. Continue to monitor tree seedling development success and the need for additional reforestation treatments to assure timely and adequate tree seedling stocking in regeneration harvests.

Since uneven-aged treatment success rates are less than desired, continue to implement uneven-aged treatments through an adaptive management approach, taking into account the new direction noted in the Forest Plan (Forest Plan, pp 64-66, 68-69; Appendix A, pp A-2, A-4 to A-19, A-23 to A-28). Effective evaluation of the Forest Plan uneven-aged management guidelines could take five to ten years to provide enough time for harvest, follow-up reforestation treatments, and development of tree seedlings.

Destructive Insects and Diseases

Action, effect or resource to be managed	Monitoring Question	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
Ensure destructive insects and diseases do not increase to potentially damaging levels following management activities (36 CFR 219.12(k)5(iv))	Have destructive insects and diseases increased to potentially damaging levels after management activities?	Annual	Annual	B ¹

¹ A class value of B in the following tables under the column Precision/Reliability employs methods based on project records, personal communications, ocular estimates, informal visitor surveys, and similar types of assessments. Reliability, accuracy, and precision are lower than Class A methods, but the methods still provide valuable information.

Protocol - The following specific types of forest health monitoring occurred in FY 2008 or, in some cases, since the ANF last reported on the status of insects and diseases (FY 2001 Monitoring and Evaluation Report, pp 43-55; 2007 Forest Plan Final Environmental Impact Statement (FEIS), pp 3-78 to 3-105):

(Data collection adhered to standard agency protocol or FHM/FIA protocol, and data were stored in agency data bases or as informal field notes).

- Informal observations made by Forest field-going personnel;
- Forest Health Management (FHM)/Forest Inventory Analysis (FIA) forested land plot data collection from FY 1998 to FY 2001 with re-measurement data collected FY 2002 to 2006;
- Formal analysis of FHM/FIA FY 1998 – 2001 plot data (Morin, et al, 2006);
- Summer aerial detection surveys by Forest Health Protection (FHP), Pennsylvania (PA) Bureau of Forestry (BOF), and Forest personnel;
- Field surveys conducted by FHP entomologists and pathologists, and Forest personnel; and
- Observations by PA Department of Agriculture (PDA) and USDA-APHIS personnel.

Additional information on exotic forest pest species and their status nationwide can be found at www.aphis.usda.gov. The USDA-Forest Service Northeastern Area website (www.na.fs.fed.us) provides additional information regarding the current status of both native and exotic forest pests in the Northeastern United States.

Aerial surveys are conducted with two observers looking for signs of tree canopy discoloration, defoliation, damage, or death while flying evenly spaced flight lines in a fixed-wing aircraft in an

east-west direction, looping back until the entire ANF is covered. One of the observers uses a laptop computer to identify, sketch, and rate the severity of any areas of tree discoloration, defoliation, or tree mortality they observe. The observers also attempt to identify the cause of the discoloration, defoliation, or mortality. The laptop computer is linked to Global Positioning Satellites, so the exact location of the plane and flight lines are known, and an accurate sketch map can be produced in real time. Subsequent ground-truthing of aerially mapped tree decline, damage, or mortality occurs to further assess the extent and cause of the damage.

Results - An aerial survey flight conducted in July 2008 detected a total of 51,711 acres with visible damage within the proclamation boundary of the ANF (see Figure 1). Ground-truthing surveys revealed that a number of different agents and defoliators were active on a variety of hardwoods and conifers. The most commonly reported agents on hardwoods were beech bark disease and leaf anthracnose. The most common conifer damage appeared confined to pine plantations, and is due to various pine beetles.

Figure 1. – Aerial Survey results and flight lines.

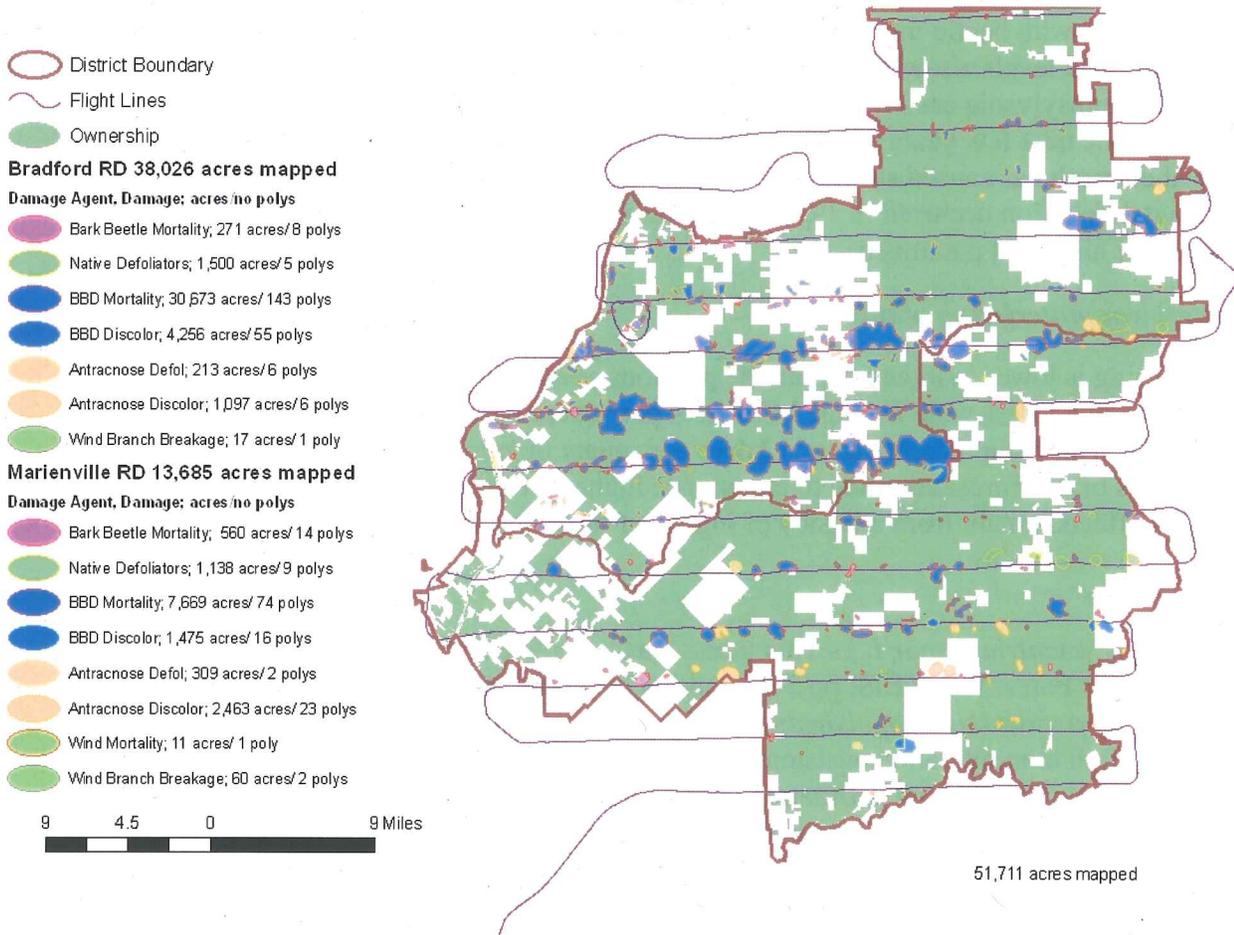


Figure 1. Forest Health Monitoring aerial survey results and flight lines.

The following provides an update to previous forest-wide discussion of forest health that was published in the Forest Plan (pp 3-78 to 3-105) and in the FY 2007 Monitoring and Evaluation Report (pp 5-12). Substantial detailed background information, organized by individually named insect, disease, or category of threat to forest health, can be found in these referenced documents. The following discussion is by exception; topics discussed here will include only those where there is new information to report. The information reported below applies to the Forest, both to areas that have had management activity as well as to those areas that have had little or no activity, unless otherwise noted. If references pertain to areas outside of the Forest, it will be noted as such.

Native insects and diseases

Native insects and diseases (cherry scallop shell moth, forest tent caterpillar, pine budworm, oak leaf tier, elm spanworm, anthracnose and bark and ambrosial beetles) have caused defoliation, discoloration, dieback and mortality during the past 20 years on the Forest, and throughout Pennsylvania. In FY 2008, 831 acres of conifer mortality was mapped. Most of this mortality was observed in pine plantations and was likely due to overstocking and competition among trees, combined with beetle infestations. Another one of these insects (forest tent caterpillar) has reached outbreak levels elsewhere in Pennsylvania during the past few years (in the northern tier counties of Pennsylvania east of the ANF), indicating the possibility that it may again impact the ANF within the next few years unless natural population controls prevail. Historically, cherry scallop shell moth has caused substantial defoliation approximately every ten years (the last substantial defoliation occurred in 1996), indicating the distinct possibility of an outbreak in the near future if historical patterns persist.

Deer herbivory/interfering plants

Deer browsing is lower in intensity than the previous seventy years. Deer populations have decreased from a forest-wide average of 27 deer per square mile in 2002 to 14.4 deer per square mile in 2008. This is an increase from 12 deer per square mile in 2007 (see [Deer Densities](#)). Certain areas of the Forest continue to experience higher levels of deer impact, and understory vegetation effects remain from a legacy of high deer browsing impacts.

Exotic insects

Gypsy moth (Lymantria dispar L.) - This insect was introduced into the United States from France in 1869 (Forest Plan FEIS, pp 3-96 and 3-97). Populations have been kept in check in recent years by a virus (*Nucleopolyhedrosis Virus*) along with the fungus *Entomophaga maimaiga*. High humidity and consistent temperatures are needed for the fungus to germinate and spread. While gypsy moth defoliation increased in central and eastern Pennsylvania in 2008 (766,507 acres of moderate to severe tree defoliation) (A. Steketee pers. comm., January 6, 2009), no defoliation was detected on the ANF. With the exception of a very small amount of light defoliation in 1999 and 2003, no measurable gypsy moth defoliation has been detected on the Forest since 1993. Dry spring conditions throughout those infested areas in Pennsylvania are believed to have limited the activity of fungal and viral gypsy moth population controls, whereas

moister spring conditions favoring these population controls existed on the ANF. Forest personnel expect little measurable gypsy moth defoliation in 2009.

Asian longhorned beetle (Anoplophora glabripennis) – Asian longhorned beetle (ALB) is an introduced forest pest from China, which was first discovered in the United States in 1996 in Brooklyn, NY. Since 1996, additional populations have been discovered in New York, New Jersey, and Illinois. Eradication efforts continue in Illinois, New York and New Jersey. In August of 2008 this beetle was detected in Worcester, Massachusetts far outside of the range of any previously known populations. This population is believed to be 8 to 10 years old, and efforts are currently underway to eradicate it by destroying or treating over 6,000 trees determined to be infested with ALB in a 64 square mile quarantined area (website accessed 1/21/09: http://www.aphis.usda.gov/newsroom/hot_issues/alb/documents/Tree_Removal_begins.pdf). To date, ALB has not been detected on the ANF, or anywhere in Pennsylvania.

Asian long-horned beetle



Dean Morewood, Health Canada, Bugwood.org

Emerald ash borer (Agrilus planipennis) – Emerald ash borer (EAB) is an exotic beetle (Forest Plan FEIS, p 3-104) native to Asia (China, Japan, Korea, Mongolia, and the Russian Far East) that attacks all species of ash trees. Since its detection in 2002 in Detroit, Michigan, it has also been found in Ohio, Indiana, Illinois, Maryland, Virginia, West Virginia, Missouri, Pennsylvania, Wisconsin and Ontario, Canada. In 2007, it was detected for the first time in Pennsylvania. In 2008, EAB populations were discovered in Missouri and Wisconsin for the first time (see Figure 2).

Emerald ash borer



David Cappaert, Michigan State University, Bugwood.org

Emerald ash borer is identified by its oblong, metallic green body that is about a half an inch long. It is primarily spread by humans through movement of untreated wood that is infested with EAB (such as firewood) into un-infested areas. Since 2002, it has caused the mortality of an estimated 50 million ash trees. There are presently no effective treatment options at a landscape scale.

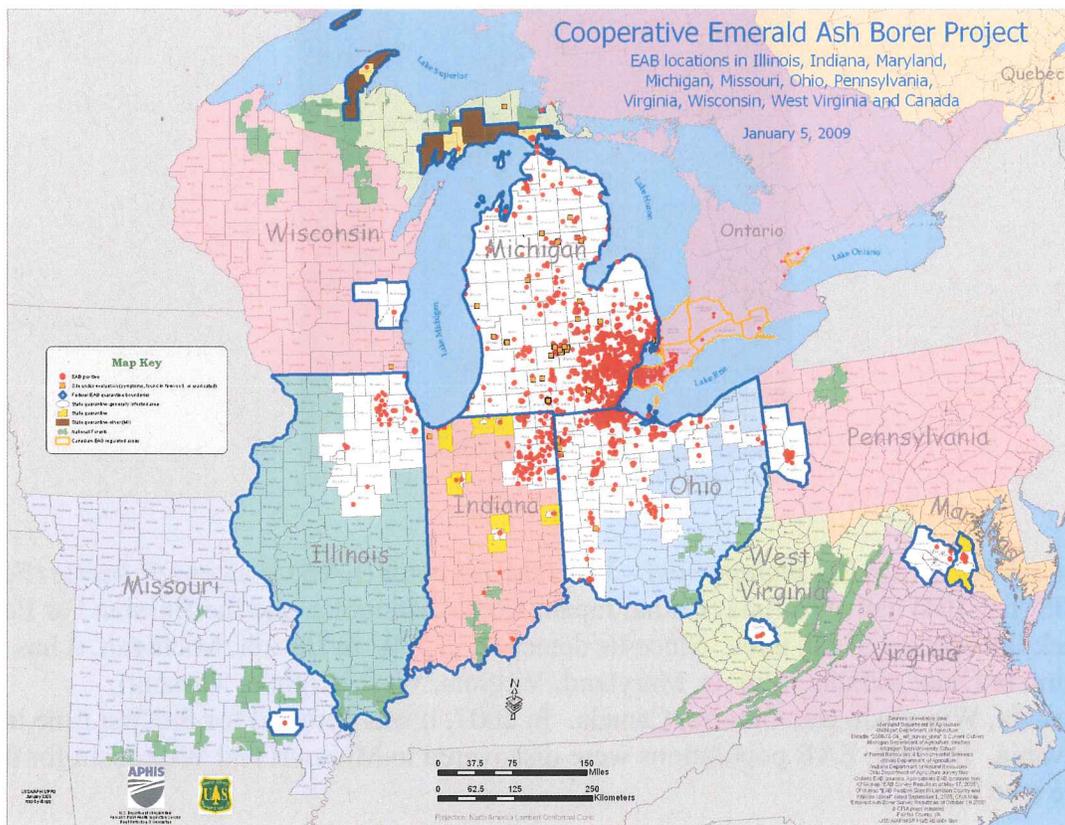


Figure 2. Emerald ash borer distribution map (January 2009).

The Pennsylvania Department of Agriculture has imposed quarantines in Butler, Allegheny, Beaver and Lawrence Counties to slow the spread of emerald ash borer. Pennsylvania's quarantine restricts the movement of ash nursery stock, green lumber and any other ash material, including logs, stumps, roots and branches, and all wood chips from the quarantined area. There is also a quarantine on the movement of any firewood of any species into the state of Pennsylvania from any other state. In 2008, two levels of survey were used in Pennsylvania to try and detect EAB. One was a delimiting survey using a 1.5 x 1.5 mile grid (1 trap/grid) in areas within 100 miles of the quarantined counties and the other was a detection survey outside the generally infested counties. Both surveys were used to determine whether additional infestations were present. In total, 8,000 purple prism traps baited with manuka oil were deployed within the state across 35 counties. Mercer County, Pennsylvania had the only new population detected by these surveys, and has since been added to the Pennsylvania Emerald Ash Borer Quarantine.

Emerald ash borer prism trap



As part of the state-wide 2008 EAB delimiting survey, 924 prism traps were placed within the ANF proclamation boundary; 594 of these were placed on ANF lands. Additionally, Forest Service Forest Health Protection personnel placed prism traps at 11 locations on the ANF, focusing trapping efforts around high use recreation areas with ash trees present. Visual and sweep net surveys were periodically conducted in conjunction with the prism trapping efforts. No EAB detections were made in the immediate ANF area (Warren, Elk, Forest, and McKean Counties).

In order to prevent movement of infested firewood to the ANF, a firewood closure order has been in effect since July 2007. Periodic surveys of campers were conducted in 2007 and 2008 to ascertain the origin of firewood brought to the ANF, as well as educate visitors about the importance of not moving firewood. In 2007, the year EAB was discovered in Pennsylvania, 51% percent of firewood brought to the ANF originated from quarantined counties in

Pennsylvania, or from out of State. This figure was 25% in 2008, and 93% of campers use firewood during their stay. The reduction in firewood movement to the ANF is likely due to widespread public education efforts by a number of federal and state agencies. The ANF has developed an EAB communication plan, which is periodically reviewed and updated.

Planning is underway for additional EAB education, awareness, and survey programs (including detection surveys in or near high-use recreation areas on the ANF where ash trees exist). Beginning in mid-May 2009, the PDA will begin installing purple detection traps in western Pennsylvania. There will be a grid survey in 15 western counties, including Warren and Forest Counties. In the rest of the state including the remaining two counties (McKean and Elk) of the ANF, surveys will focus on high risk areas: campgrounds, industrial areas, highways and private lands. State personnel are also stepping-up public education and outreach efforts within Pennsylvania. ANF personnel hope to collect ash seed in 2009 to conserve ash germplasm at national and regional seed storage facilities.

Hemlock woolly adelgid (Adelges tsugae) –Hemlock woolly adelgid (HWA) is a non-native insect native to Asia that has the potential to cause substantial hemlock mortality or decline during the next five to fifteen years (Forest Plan FEIS, pp 3-103 and 3-104). Significant tree mortality normally occurs within four to seven years after infestation, threatening the unique and valuable ecosystem services hemlock provides. First detected in the United States in 1924 in the Pacific Northwest, the adelgid was introduced into the Eastern United States from Asia in the early 1950's near Richmond, Virginia. First detected in southeastern Pennsylvania in the late 1960's, it now can be found in 49 out of 67 counties in Pennsylvania, and has been detected in 18 mid-Atlantic and northeastern states to date. In 2005, HWA was detected in Elk County approximately 25 miles from the Forest boundary. The infested trees were destroyed; however, HWA still persists in the area of the initial detection. In 2007, HWA was detected for the first time in Cameron County, and in 2008 a new infestation was detected in Potter County.

Hemlock woolly adelgid (waxy coating)



Connecticut Agricultural Experiment Station

Hemlock woolly adelgid is tiny and has egg sacs that look like woolly cotton on the base of needles on hemlock trees. It is also unique in that populations consist of females that reproduce asexually. Most hemlock woolly adelgid populations are detected by the egg sacs. Since 2004, Forest personnel have annually surveyed 48 to 104 hemlock stands and, to date, they have not detected any HWA on the ANF. Detection surveys will continue in 2009.

Sirex woodwasp (Sirex noctilio) - This non-native woodwasp of Eurasian origin (Europe, Asia, and northern Africa) was discovered in New York State in 2004 and in north central Pennsylvania (Tioga and Bradford counties) in 2006. In 2007, it was detected in numerous counties in northern, central, and western New York, including McKean County. The McKean County detection site was near Scots pine trees in an abandoned Christmas tree plantation east of Kane, PA, where both adult and larvae were found. In 2008, it was detected in Potter County; in a red pine stand. The *Sirex* woodwasp has caused severe economic damage in other countries where it has been introduced.

Sirex woodwasp damage to stem of pine tree



Photo by Dennis Haugen, Bugwood.org

The wasp leaves tell-tale damage such as resin (sap) streaks on the trees it has infected. Typically, *Sirex noctilio* attacks suppressed, or otherwise weakened, pine trees. Pine areas characterized by overstocked conditions, containing overtopped/damaged trees, or growing on poor sites are likely areas where tree mortality caused by *Sirex noctilio* could occur. In New York, the insect has been found colonizing Scots, red, and white pines. In the Southern Hemisphere where it has also been inadvertently introduced, it has caused up to 80% tree mortality in exotic pine plantations, most of which are planted with North American pine species, such as Monterey pine. In other countries, *Sirex* woodwasp has been successfully managed using biological control agents, such as a parasitic nematode and hymenopteran parasitoids. Survey efforts will continue in Pennsylvania in 2009.

Native tree diseases

Many native tree diseases were active on the forest but at background levels, with the exception of oak, maple and sycamore anthracnose and leaf spot which were locally heavy on 4,082 acres across the forest. These diseases tend to rise and fall based on local environmental conditions and species mix.

Exotic tree diseases

Sudden oak death (Phytophthora ramorum) - In 2008, stream side baiting was conducted along three streams in Delaware County; all samples were negative for this disease.

Chestnut blight – There is no new information to report.

Butternut canker – Butternut is on the Regional Forester’s Sensitive Species List, and it is listed as “sensitive” for the Forest. Across its range in the central and eastern United States, butternut is declining due to a butternut canker disease (*Scirococcus clavigignenti-juglandacearum*), an exotic pathogen that was first detected killing butternut in the United States in 1967. In some places, populations have decreased over 75 percent between 1980 and 1994 (Ostry et al., 1994). Once a tree is infected, there is no known cure for this fungal disease (canker). There is good evidence, however, that some resistant butternut trees are growing among severely diseased trees, and these trees need to be conserved for future research, tree breeding, and restoration.

In 2007, a Forest Service special project provided funds to locate, document (with a Global Positioning System), and assess the health of as many butternut trees as possible in and near the ANF. Prior to the beginning of this butternut search, approximately 80 individual butternut trees were suspected to exist within the Forest. Through this search, a total of 254 butternut trees were located; 95 (37%) were canker free on the main bole. Most of these trees had no crown dieback. A number of these trees were being negatively impacted by vines or competition from adjacent large trees. Butternut is a very shade intolerant species, and it requires abundant sunlight to thrive.

Beech bark disease complex – Beech bark disease (BBD) complex is an exotic insect/disease complex that is causing substantial beech mortality on the ANF and in the eastern United States (Forest Plan FEIS, pp 3-97 to 3-99). The scale insect was first detected on the Forest in the early 1980s, and is now present throughout the entire Forest. In 2003, the killing front covered 42 percent of the Forest; it continues to expand southwest through the Marienville District. In 2008, aerial surveys identified 44,073 acres of new BBD related mortality and discoloration across the ANF.

Forest Plan guidelines provide for retaining those beech trees that have characteristics indicating they may be resistant to the beech bark disease complex (Forest Plan, p 94). Forest personnel are participating in a joint research project designed to test whether additional growing space created by removing or killing susceptible beech trees and beech sprouts creates sufficient growing space around resistant stems to give resistant root sprouts an advantage, thereby increasing the resistant beech composition in the young forest that develops. Shelterwood harvest and herbicide

treatments have been completed in these areas, and tree regeneration monitoring is in progress. A few of the resistant trees had scion collected in February 2008, with the long term objective of developing a seed orchard that consists of genetic material from these potentially resistant trees. The scions collected were sent to the Northern Research Station at Delaware, OH, where they were grafted to beech root stock. Once these grafted seedlings are further challenged by beech scale to confirm their resistance to the scale insect, they will be sent back to the ANF to establish a resistant beech seed orchard. Similar efforts are underway in Michigan, Wisconsin and other lands within the state of Pennsylvania. This project is a joint effort with the USDA-FS, NRS (Morgantown, WV, and Delaware, OH), USDA-FS Northeastern Area State and Private Forestry (Morgantown, WV), and Michigan and Pennsylvania state agencies. Additional scion will be collected in 2009 for the future seed orchard on the ANF. Forest Service personnel will continue to monitor the effects of BBD on the ANF and research study sites in 2009.

Climate/Environmental Factors

Drought - Precipitation is normally plentiful throughout the year, averaging 40 to 45 inches per year. Between 1972 and 1987, the Forest experienced a relatively drought-free period, however significant droughts occurred in 1988, 1991, 1995, 1999, and 2001 based on the Palmer Drought Severity Index (PDSI less than or equal to -1, predominantly during the growing season). Between 2002 and 2008, rainfall has been close to, or above, historical average conditions. Drought can be an important contributor to forest decline or tree mortality, particularly when it occurs during successive years, or when it is concurrent with, closely precedes, or closely follows periods of substantial tree defoliation or some other environmental or biological factor that significantly stresses the trees.

Ozone - Survey data was collected from 2002 through 2007, and analysis and summary of the data is in progress.

Site/Species nutrient capability - There is no new information to report.

Atmospheric deposition - There is no new information to report.

Wind events – Wind events are a fairly common disturbance on the ANF. On September 14 and 15, 2008, high winds from the remnants of Hurricane Ike caused tree damage and numerous down trees across central Pennsylvania and the ANF. The damage resulted in scattered blown down trees on the ANF, of fairly light intensity relative to other wind events in the recent past.

Ice storms - There is no new information to report.

Tree mortality/decline

FIA/FHM data collected between 2002 and 2006 - FIA/FHM plots measured between 1998 and 2001 were re-measured from 2002 to 2006 and a formal analysis of the data is planned.

Tree mortality/decline in the Tionesta Research Natural Area (TRNA) - In 2007, personnel conducted a special Forest Health Evaluation Monitoring Project in the TRNA. Fifty-two plots, installed in 1979, were re-measured to determine the impact of beech bark disease complex on

unmanaged, old growth beech-hemlock forest type, as an indicator of the potential long term outcome of management that promotes development of a northern hardwood forest type dominated by beech and hemlock (pre-European settlement conditions). The TRNA (2,080 acres, together with the adjoining 1,894 acre Tionesta National Scenic Area) represents one of the few remaining old growth remnants of this forest type in the United States. Overstory species composition consists roughly of 40% American beech, 40% eastern hemlock, and 20% other tree species. HWA, an exotic insect known to cause high rates of tree mortality in Eastern hemlock, has been found about 50 miles away from the TRNA.

Beech mortality in the Tionesta Research Natural Area, 2008



A quick visual review of the 2007 data collected in TRNA indicates that close to 80% of the beech has died (most of it since 2002), and half of the remaining live beech is significantly declining (has less than 50% of its normal live crown). Therefore, only 10% of the overstory beech component that existed in 1979 is still alive and healthy. A more thorough analysis of the plot data is in progress.

Permanent forest health monitoring plots were installed in 2007 (5 plots) and 2008 (15 plots) in the TRNA to continue with this monitoring effort into the future.

Conclusion – With the exception of beech bark disease complex and bark beetle activity in pine stands, insect and disease activity has been at background levels on the ANF in recent years. In fact, little defoliation activity has been detected. Though droughts did occur in 1999 and 2001, they were less significant than the three that occurred during the previous ten year period when heavy tree defoliation occurred concurrent with, or within a year or two of, drought. Though

some trees and sites still show significant effects of those repeated stresses (prompting the need for silvicultural treatments), others are on the way to recovery.

Recommendations - Continue insect and disease detection and monitoring activity as a cooperative effort with USDA-FS, FHP. Maintain health of conifer stands by maintaining adequate growing space and site resources through thinning.

Continue to collect and use FIA/FHM intensified forest health monitoring data to assess the health of individual tree species and complex forest ecosystems on the ANF (and compare them with the surrounding region).

For those insects and diseases that present new threats to Forest tree species (such as emerald ash borer, hemlock wooly adelgid, and sirex woodwasp), continue monitoring for their presence on or near the ANF, and develop strategies and action plans for these pests that integrate newly identified or state-of-the-art pest control techniques. Continue to assess the need for public education, control and monitor the movement of forest products (including firewood), and monitor effectiveness of education and outreach efforts.

Comparison of Projected and Actual Outputs and Services

Action, effect or resource to be managed	Monitoring Question	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
Comparison of projected and actual outputs and services (36CFR 219.12(k)(1))	How do actual outputs and services compare to those projected?	Annual	Annual	A

Protocol - A listing of the outputs and services projected under the Forest Plan are found in Part 2-Strategy under the section Estimated Forest Activities (pp 21 – 23). To facilitate a comparison on the progress toward these activities, the tables that follow display the same activities by resource area with the average annual amount projected for the first decade and the FY 2008 actual accomplishment.

The activities shown in Tables 2 and 3 (Forest Plan, pp 21 – 23) are not Forest Plan decisions and should not be confused with Forest Plan objectives. These estimates are neither minimums nor limitations. They are the result of prescriptions applied in the SPECTRUM model or amounts projected by ANF resource specialists for Alternative Cm (the selected alternative) that move the current conditions toward the desired conditions described in the Forest Plan. The actual treatment level for FY 2008 reflects the rate of movement toward the desired conditions. For some new activities it may take several years for site-specific project planning to be completed and then build up toward the level of activity projected in the Forest Plan.

The Allowable Sale Quantity (ASQ) in Table 4 (Forest Plan, p 24) is a Forest Plan decision and represents the maximum amount of timber that can be harvested from the ANF lands that have been determined to be suitable for timber production. Although the ASQ is identified as an annual average quantity for each decade of the plan, the amount produced in any one year may be either below or above the identified ASQ as long as the totals for the decade are not exceeded.

Results, Conclusion, and Recommendations by Resource Area

Description of Recreation Accomplishments in FY 2008

Table 2. Comparison of Projected Recreation Activities (Forest Plan, p 21-22)

Recreation Activities	Average Annual Decade One	FY 2008 Actual Accomplishment
Motorized Trail Construction (miles)	4	0
Non-motorized Trail Construction (miles)	5	0
Dispersed Site Enhancement in CUAs+ (each)	1	1
Construction/Reconstruction of Developed Facilities (each)	2	0
Wilderness Areas Managed to Standard (each)	2*	0

+ **Concentrated Use Area (CUA)**

* **The Allegheny only contains two congressionally designated wilderness areas that are subject to this management activity.**

Dispersed Site Enhancement in Concentrated Use Areas (CUA) - Dispersed sites along the Clarion River from Millstone Creek to Irwin Run received work in 2008 to reduce resource damage. User developed sites were reduced from 46 to 23 and hardening parking areas has protected the recreation resource from the impact of overuse. Regular law enforcement patrols ensure camping occurs in designated areas.

In the Kelly Pines dispersed area, maintenance projects were accomplished through a partnership with volunteers from the Fayette County Chapter of the Pennsylvania Equine Council. Projects in the camping area included work such as cleaning of tie stalls, roofs, restrooms, and fire rings, refreshing stall bedding, and mowing, removing brush, and trimming and falling of hazard trees.

Wilderness Areas Managed to Standard - In order to meet this goal, the Forest Service initiated a national 10 Year Wilderness Stewardship Challenge (WSC) in 2005. The Forest Service has developed both national and regional strategies to accomplish this task.

Description of Prescribed Burning Activities in FY 2008

Table 3. Comparison of Projected Burning Activities (Forest Plan, p 22)

Management Activity	Average Annual Decade One	FY 2008 Actual Accomplishment
Prescribed Burning by Resource Objective (Acres)		
Silviculture/Reforestation	104	0
Wildlife	300	23
Hazardous Fuels Reduction	250	7

Wildlife - Prescribed burning for wildlife habitat improvement occurred in the Buzzard Swamp area on 23 acres in 2008.

Hazardous Fuels Reduction - A prescribed fire project for hazardous fuels reduction occurred on the Hall Barn area (7 ac) in 2008. This project also improved existing wildlife habitat, but was not counted toward wildlife habitat enhancement acres.

Description of Reforestation Activities in FY 2008

Table 4. Comparison of Projected Reforestation Activities (Forest Plan, p 22)

Management Activity	Average Annual Decade One	FY 2008 Actual Accomplishment
Reforestation Activities (Acres)		
Scarification for Oak	104	0
Release for Species Diversity	1,727	239
Site Preparation	1,992	1,545
Pre-commercial Thinning	80	11
Fencing	1,701	39
Fertilization	215	0
Herbicide Treatment for reforestation (excludes 107 acres of re-treatment)	2,368	582

Release for Species Diversity - The number of acres receiving release treatments is lower than that projected in the Forest Plan, primarily because less final harvesting occurred in the past five years than projected in the Forest Plan. Additionally, 112 scheduled acres were not completed in

2008, as the contract to perform this work was terminated. The ANF is currently reviewing its release program, including an evaluation of methods to improve contract performance.

Site Preparation - The acreage treated with site preparation to develop seedlings is somewhat lower than that projected in the Forest Plan. This is likely because shelterwood seed cut and even-aged regeneration acres are lower than those projected in the Forest Plan.

Pre-commercial Thinning - Pre-commercial thinning removes trees in a stand that are not old enough for a commercial treatment. Trees are left on site where they are felled. The objectives of the treatment are to control species composition, maintain stand diversity, improve stand quality, and to increase growth rates on preferred trees. The acreage treated with pre-commercial thinning is lower than that projected in the Forest Plan.

Fencing - Personnel closely monitor the need to use area fencing to reduce deer browsing impacts, and decide to fence areas only after it has been determined deer browsing impacts are causing insufficient seedling numbers or species diversity to develop on specific sites of the Forest. Forest Plan projections for the use of fencing were based on full Forest Plan implementation at 2005 deer population levels. In 2005, the average deer density was estimated to be 26.6 deer per square mile. Since 2005, average deer densities have dropped to an estimated 14.4 deer per square mile (see [Deer Densities](#)). Additionally, regeneration harvesting that occurred in 2008 is less than that projected for Forest Plan implementation (see Table 7). As a result, the need to fence has greatly declined.

Fertilization - Fertilizer to promote rapid seedling growth was not applied in 2008. This is because of the deer herd decline in many areas, reducing the need to apply fertilizer.

Herbicide Treatment for Reforestation - Approximately 25% of the annual acreage projected for herbicide application in the Forest Plan was treated in 2008. This is most likely due to the lower amount of shelterwood seed cutting and regeneration harvesting (both even-aged and uneven-aged) during the past three to five years. Twenty-eight acres were re-treated by hand to target individual interfering plants.

Planting - The ANF has experienced very good success in reforesting areas with natural seedling regeneration (see [Stocking within Five Years of Regeneration Harvests](#)). Fill-in, or supplemental planting, was conducted on 41 acres of the ANF in May 2008. These areas were planted primarily to restock areas damaged by catastrophic wind damage that occurred in June 2003, or to supplement natural seedling abundance and diversity. Species planted included white oak, chestnut oak, red oak, cucumber-tree, tulip poplar, and eastern white pine. Initial survival of a sample of planted seedlings was monitored in early fall 2008, and seedling survival was over 99%. A sample of planted seedlings will have their survival monitored in 2009 (first year survival) and 2011 (third year survival). The National Arbor Day Foundation was a partner in providing funding to plant one area heavily damaged by storms in 2003 (see photo below).

Successfully planted seedlings in tree shelters to protect them from deer browsing in a wind damaged area



Description of Fuels, Non-Native Invasive Plant Species (NNIS), Wildlife, Fish and Stream Activities in FY 2008

Table 5. Comparison of Projected Fuels, NNIS, Wildlife, Fish and Stream Activities (Forest Plan, p 22)

Management Activity	Average Annual Decade One	FY 2008 Actual Accomplishment
Fuels, NNIS, Wildlife, Fish and Stream Activities		
Mechanical Hazard Fuel Treatments (acres)	350	0
Manual/Mechanical Treatment for Non-native Invasive Plant Species (acres)	500	18
Herbicide Treatment for Non-native Invasive Plant Species (acres)	110	0
Herbicide Treatment for Wildlife Objective (acres)	105	0
Wildlife Opening Creation (acres)	15	23
Wildlife Enhancements (acres)	1,600	1173
Stream Restoration (miles)	2	2
Fish Habitat Structures (acres)	32	27

Manual/Mechanical Treatment for Non-native Invasive Plant Species - During FY 2008, 18 acres of non-native invasive species plant species (NNIS) were treated through manual (hand-pulling, cutting) and/or mechanical (weed eaters) methods by Forest Service staff and volunteer groups. Some treatment sites are in their six year of treatment and have shown a decrease in the amount of extant vegetation (less percent cover or foot-print of the infestation). The majority of the species treated in FY 2008 include: Japanese barberry (*Berberis thunbergii*), Canada thistle (*Cirsium arvense*), bull thistle (*Cirsium vulgare*), Japanese knotweed (*Fallopia japonica*), multiflora rose (*Rosa multiflora*), non-native bush honeysuckle (*Lonicera* sp.), purple loosestrife (*Lythrum salicaria*), and garlic mustard (*Alliaria petiolata*).

Treatment effectiveness monitoring plots will be officially established in 2010 for a sub-sample of new and/or existing treatment areas for evaluation every five years (Forest Plan, p 50). Treatment efficacy monitoring data reported each fiscal year in FACTS is based on the year of treatment, and does not reflect 'biological monitoring'.

Non-native invasive species program initiatives for FY 2008 included the Certified Weed Warrior Program. Participants attended a training session on invasive plants, their impacts on wildlife and other plants, plant identification, and control practices. This training leads to certification as a Certified Weed Warrior after participation in one Weed Warrior event, in which participants then have the ability to manually treat invasive plants in designated areas on the ANF. Eleven individuals donated 72 hours of time.

Herbicide Treatment for Non-native Invasive Plant Species – Project-level planning for herbicide treatment was completed for three projects, and treatment is anticipated to occur in FY 2009.

Wildlife Opening Creation - In FY 2008, twenty three acres of wildlife openings were created. This involved clearing the area of trees, shrubs, and large rocks; followed by seeding, fertilizing, and planting. Some openings were planted in warm season grasses while others were planted in cool season grasses with a scattering of shrubs and fruit trees. These openings provide summer brood rearing habitat for grouse, turkeys, and songbirds where young poults and parent birds feeding nestlings can forage on insects. Openings planted with shrubs and trees provide late fall mast for a variety of wildlife species.

Wildlife Enhancements - Wildlife enhancement work is described below (see [Enhance Terrestrial Wildlife Habitat](#)).

Stream Restoration - Two miles of stream restoration work occurred in FY 2008. These improvements were related to the installation of an open-bottom arch culvert to allow fish passage, and the planting of woody vegetation along a section of stream.

Fish Habitat Structures - Fish habitat structures were placed in the Allegheny Reservoir with volunteers from Kinzua Fish and Wildlife Association; this equated to 27 acres of improvement.

Description of Transportation Activities in FY 2008

Table 6. Comparison of Projected Transportation Activities (Forest Plan, p 22)

Management Activity	Average Annual Decade One	FY 2008 Actual Accomplishment
Transportation Activities		
Road Construction Existing Corridor (miles)	13	4.8
Road Construction New Corridor (miles)	5	2.8
Road Reconstruction (miles)	100	23.9
Road Decommissioning (System) (miles)	2	0
Area Cleared for Gravel Pits (acres)*	5	2.2

*** Conversion from cubic yards of stone to acres cleared for pits: 9700 cubic yards per acre**

No Forest Plan objectives were set for road construction, reconstruction, or area cleared for gravel pits. The level of annual accomplishment is dependent on the location and amount of timber offered for sale each year. These actions support the Transportation System Goal listed in the Forest Plan on page 16 (Forest infrastructure..., is in balance with needed management actions). In FY 2008, the majority of the road construction and reconstruction occurred on timber sales to provide access for hauling timber, and protecting soil and water resources from adverse effects attributed to runoff.

Description of Timber Harvest Management Practices by Management Area in FY 2008

Table 7 displays Forest Plan estimates of timber harvest activities by management area (MA) during the first decade as compared with the actual amount awarded (sold to an operator) accomplishment in FY 2008. The Average Annual Decade One column displays the acreage of projected timber harvest treatments that could occur under full implementation of the plan. The Actual FY 2008 Acres column shows the actual acres of harvest activity awarded in timber sales in FY 2008. These sales were awarded following project-level decisions rendered under 2007 Forest Plan direction. They are displayed here to reflect the amount of progress toward the desired conditions projected by the 2007 Forest Plan.

The sum of all individual treatment activities does not equate to the total acreage of projected timber harvest because more than one type of harvest activity may occur on any given acre. For example, an area may be thinned in one decade, followed by a shelterwood seed cut and removal cut in the following decade.

Table 7. Annual Probable Timber Harvest Management Practices by Management Area Compared with Actual Completed FY 2008 Accomplishment (Forest Plan, p 23)

Management Area	Average Annual Decade One (rounded to nearest 10 acres)	Actual FY 2008 Acres
Intermediate Thinning		
MA 2.2	20	2
MA 3.0	940	583
MA 6.1	40	31
MA 8.6	0	5 ¹
Total Intermediate Thinning	1,000	621
Shelterwood Seed Cut		
MA 1.0	30	0
MA 2.2	40	0
MA 3.0	1,740	418
MA 6.1	30	19
Total Shelterwood Seed Cut	1,840	437
Acres of Even-aged Regeneration Harvest (Shelterwood Removal Cut and/or Clearcut)		
MA 1.0	30	0
MA 2.2	20	0
MA 3.0	1,690	207
MA 6.1	10	24
Total Even-aged Regeneration Harvest	1,750	231
Acres of Uneven-aged Regeneration Harvest		
MA 2.1	50	0
MA 2.2	620	51
Total Uneven-aged Regeneration Harvest	670	51
¹ Five acres of thinning to salvage dead, damaged, or dying trees occurred in MA 8.6 (Kane Experimental Forest), as part of a research study.		

Actual acres sold for various types of timber harvest using different silvicultural methods to move towards Forest Plan desired conditions were substantially less than that projected in the Forest Plan.

In the long term, if acres treated through timber harvest continue to be lower than Forest Plan projections, landscape-level desired vegetative conditions and Forest Plan goals and objectives related to forest vegetation will not be met. It is recommended to continue monitoring outputs and services designed to move the Forest towards desired landscape-level vegetation conditions.

Description of Timber Volume Sold in FY 2008

One key decision of the Forest Plan is the identification of the Allowable Sale Quantity (ASQ) of timber. The ASQ is measured in cubic feet, although conversions are produced for board feet. Table 8 compares the FY 2008 sold accomplishment with the ASQ in the cubic volume measure and the board foot equivalent. Only the cubic volume is the controlling measure for evaluating compliance with the requirement not to exceed the ASQ in the plan period. Since FY 2007 was a transition year, the first full year in Decade 1 was actually FY 2008.

Table 8. Comparison of Average Annual ASQ to FY 2008 Volume Sold

Forest Plan Harvest Volume Unit of Measure	Average Annual ASQ Decade 1	FY 2008 Volume Sold
Million Cubic Feet (MMCF)	8.9	3.2
Million Board Feet Equivalent (MMBF)	54.1	19.8

Timber from the ANF has substantial economic value and contributes to local and regional economies. The volume awarded in 2008 had a total value of \$6.85 million, of which \$6.80 million was sawtimber.

Timber volume awarded in FY 2008 is approximately 35% of that projected to be awarded annually in the 2007 Forest Plan. However, many of the vegetation output levels are developed from the previous three to five years of project-level NEPA decisions. Timber values in 2008 were substantially lower than those in prior years. It will be important to project trend lines for accomplishments over the next few years to make reasonable conclusions and develop meaningful recommendations.

Prescriptions and Effects

Action, effect or resource to be managed	Monitoring Question	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
Prescriptions and effects (36 CFR 219.12(k)(2))	How have prescriptions and effects been measured?	Annual	Annual	A/B

A wide array of management prescriptions are applied each year on the Forest. Each year, prescription monitoring will be performed on a few activities. This year two efforts are reported below:

1. Silviculture marking checks completed for six treatment prescriptions prior to treatment implementation, and
2. An interdisciplinary review team evaluated the implementation of silvicultural prescriptions in two units of the FR 230 Timber Sale on the Marienville Ranger District, following treatment.

Silviculture Marking Checks for Prescription Monitoring *Prior* to Treatment Implementation

Protocol – Timber sale marking checks were conducted in 2008 by gathering new silvicultural examination plot data for four intermediate thinning and two shelterwood seed cuts on the ANF. The plot data was used to generate new SILVAH summaries for each monitored stand to determine whether the marking followed the silvicultural prescription and whether interdisciplinary recommendations were incorporated in the silvicultural prescription. SILVAH is the stand analysis program developed by the Northern Forest Experiment Station in Irvine, PA. The program is used to evaluate vegetation data, to quantify silvicultural characteristics of a stand, and to develop silvicultural prescriptions.

Results - Certified silviculturists prepared or reviewed the prescriptions. Coordination with other resource uses was conducted for all reviewed stands. Less common tree species were retained in all reviewed stands, consistent with silvicultural prescriptions.

Intermediate Thinnings - Timber sale marking checks were completed for two intermediate commercial thinnings on the Bradford Ranger District. Two variable density thinnings designed to Accelerate development of Mature Forest Conditions (AMFC) were also checked. The AMFC thinnings support late structural objectives by developing larger trees within a stand and creating more heterogeneous stand structure. Further description of the AMFC treatment is located in Appendix A of the Forest Plan on page A-26.

- A. Intermediate Commercial Thinnings: The prescriptions were properly implemented in all stands. The thinnings achieved the desired relative density identified in the prescription. In both cases, the prescription desired to restore oak species dominance within stands that had increased levels of mesic species. In those cases, the marked prescriptions redistributed site resources to oak species. All marking checks noted desired spacing of residual trees and an improvement in overall residual growing stock.
- B. AMFC Thinnings: Prescription objectives included maintaining longer lived species, larger sized individual stems, releasing around regeneration, leaving dense areas, and creating gaps. Field checks revealed that the marking met these objectives. The residual stand relative density for one stand was the same as the desired relative density. The second stand's relative density was just slightly higher than the desired relative density. In both cases, marking introduced the desired heterogeneity, restored oak species importance, and retained larger, healthy individual stems.

Shelterwood Seed Cuts - Timber sale marking checks were completed for two shelterwood seed cuts on the Bradford Ranger District. In both of these areas, the prescriptions were properly implemented.

Stand 1: The residual relative density was slightly above the prescription's desired relative density.

Stand 2: The residual relative density was slightly below the prescription's desired relative density.

Both stands will be monitored to determine if seedlings develop or if reforestation work is needed. In the stand where the relative density was reduced below that prescribed, the residual relative density was only one percent lower than the original prescription. Adequate, well distributed seed trees are present in all three stands.

Conclusion – Overall, the monitored silvicultural prescriptions integrated various resource considerations and met objectives to move landscapes towards desired conditions established in the Forest Plan. Both intermediate thinnings and shelterwood seed cuts retained a diversity of tree species. Thinning prescriptions were marked very close to relative densities specified in the prescriptions. The AMFC thinning marking checks identified promising results in implementing this new treatment on the forested landscape of the ANF where late structural objectives were desired. These two stands will be reviewed after harvest to further examine their effectiveness in producing the desired structural characteristics.

Silvicultural Marking Checks for Prescription Monitoring *After* Treatment Implementation

Protocol - On September 24, 2008 a NEPA review was conducted on two timber stands in the Forest Road 230 Timber Sale which is part of the Spring Creek Project. This review was to monitor implementation of the Spring Creek Project. Fourteen resource specialists from the ANF, Marienville District and the Supervisor's Office participated in the review. Expertise in

forestry (silviculture, sale administration, timber marking), wildlife management, soils, hydrology and landscape architecture were present.

The basic concept of prescription monitoring is to assess whether we achieved the stand level stocking and composition objectives specified in the silvicultural prescription marking guidelines. Correctly implementing the stand marking guidelines helps ensure the overall silvicultural prescription objectives are achieved in the long term.

Compartment 709 - Stand 41 – Payment Unit 36

Results – Compartment 709 Stand 41 (Payment Unit 36) was the first unit checked. This 22 acre stand was a 121 year old northern hardwood stand that was 70% stocked and had a basal area of 97 square feet. Beech bark disease was just beginning to affect the stand when the prescription was developed.

The objective was to regenerate the stand to a fully stocked, healthy stand. The prescription called for a shelterwood seed cut, reducing the basal area to between 60 and 70 square feet with a desired stocking level of 50 percent relative density. Marking guidelines called for removing dead/declining trees and all sweet birch first, focusing on retaining healthy black cherry, red maple, and minority species (such as yellow poplar and hemlock) as seed trees.

The stand was correctly marked and the basal area was reduced to about 50% in 2005. Beech bark disease resulted in additional mortality to some overstory beech. The stand was treated with Oust and Accord in 2007. Due to decline observed from beech bark disease complex, District personnel are appropriately considering spot treatment (with Accord) of beech sprouts that are susceptible to beech bark disease complex. One primary skid trail runs down through the middle of the stand.

Conclusion - The payment unit was properly marked and the silvicultural prescription was properly carried out.

Compartment 708 - Stand 10 – Payment Unit 20

Results - Compartment 708 Stand 10 (Payment Unit 20) was a 15 acre 90 year old Allegheny Hardwood stand that was 100 percent stocked and had a basal area of 170 square feet. It was last thinned in 1989.

The silvicultural prescription called for a thinning removing 45 square feet (to a residual basal area of 125 square feet) of primarily suppressed or poor quality black cherry primarily in the pole or small sawtimber size classes and a few medium-sized sawtimber.

The prescription was met. The basal area was reduced to 133 square feet, with a residual relative density of 57 percent. Residual trees are of good quality and have healthy crowns, indicating that the marking focused primarily on removing poor quality trees. Crown spacing is acceptable and all marked trees were removed.

Conclusion - The Unit was properly marked and the prescription was properly carried out. However, intermediate thinning prescriptions should generally remove no more than one third of the trees in a stand in a single harvest entry (Forest Plan Appendix A, p A-22; Marquis et al. 1994, p 252). Implementation of this prescription resulted in 43 percent of the relative density removed in one entry, which is more than one third of the original 100 percent stocking.

Recommendations – Prescriptions to regenerate hardwoods occurring on the Allegheny Plateau focus on using relative density as the appropriate measure for stand level stocking because relative density captures differences in the stocking of various tree species (Marquis, DA, Editor. 1994. Quantitative Silviculture for Hardwood Forests of the Alleghenies. General Technical Report NE-183. USDA Forest Service, p 88-90). It is recommended that silvicultural prescriptions incorporate the use of relative density, along with basal area, particularly in intermediate thinnings.

To maximize total stand growth and yield in thinning prescriptions, as well as quality, it is recommended that no more than one third of the trees in a stand be removed in a single thinning harvest entry.

In the 2007 Monitoring and Evaluation report, it was recommended to increase frequency of marking checks on both Districts to monitor implementation of silvicultural prescriptions in all types of prescriptions. It was also recommended to collect stand level silvicultural examination data prior to the harvest treatment, following layout and marking, so existing and residual figures can be compared from the same data collected at the same time. The additional marking checks in FY 2008 included the AMFC treatment which is a newer adaptive management treatment identified in the 2007 ANF Forest Plan. It is recommended that periodic marking checks occur, prior to harvest activities, particularly when implementing newer prescriptions.

Effects of Management Practices

Action, effect or resource to be managed	Monitoring Question	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
Effects of Management Practices (36 CFR 219.11(d))	To what extent have standards and guidelines been applied?	Annual	Annual	A/B

A wide array of management practices are applied each year on the Forest. Each year, effectiveness monitoring will be performed on a few activities. This year an interdisciplinary review team evaluated two units of the FR 230 Timber Sale on the Marienville Ranger District.

Results of Project-Level Effectiveness Monitoring Review

Protocol - On September 24, 2008 a NEPA review was conducted on two timber stands in the Forest Road 230 Timber Sale which is part of the Spring Creek Project. Fourteen resource specialists from the ANF, Marienville District and the Supervisor's Office, participated in the review. Expertise in forestry (silviculture, sale administration, timber marking), wildlife management, soils, hydrology and landscape architecture were present.

The basic concept of effectiveness monitoring is to evaluate whether the applicable Forest Plan standards and guidelines were utilized and whether project-level mitigations achieved the desired outcomes.

Compartment 709 - Stand 41 – Payment Unit 36

Results – To protect water quality, mitigation measures require that wet areas be buffered from harvest activities with a minimum 25 foot buffer. This mitigation measure was properly applied to one small wet area on the eastern side of the stand. Herbicide treatments also protected the wet area by maintaining at least a 25 foot buffer. No additional wet areas were present.

Soil mitigation included proper layout of skid trails and no skid trails on grades greater than 15 percent. Both of these measures were properly applied. No excessive damage to soils was observed and no skidding occurred through seeps or springs. Approximately 2.6 % of the stand had soil disturbance associated with skid trails and landings (Table 9), less than the 15% maximum level.

Table 9. Post-Harvest Soil Monitoring of Payment Unit 36 FR 230 Timber Sale

Payment Unit	Acres	Acres in skid trails	Acres in landings	Acres in ruts	Total acres disturbed	Percent disturbed
36	22	0.56	0.03	0.01	0.60	2.6

Visual mitigation measures included pulling the slash back 25 feet from the road and felling striped maple and beech along the road after applying herbicide. Both of these measures were completed as prescribed.

Wildlife mitigations center around leaving snags, den trees, and conifers. The number of wildlife reserve trees is provided in Table 10.

Table 10. Wildlife Reserve Trees in Compartment 709 Stand 41

	Snags	Den trees	Potential Den trees	Hemlock	Cavity Trees	Boundary reserve Trees	Reserve Trees
Total Trees	161	27	30	138	36	67	8
Trees/Acre	7.3	1.2	1.3	6.2	1.6	3.0	0.4

The measure that requires 5-10 snags per acre has been met. Retention of 16 live trees per acre has been met (since this is a partial harvest). However, substantial beech mortality occurred after the unit was marked and a few reserve trees were cut because of safety concerns. Retention of three live den trees is met if potential den trees are included.

Conclusion - The mitigation measures were properly applied and were effective in avoiding/minimizing substantial resource damage.

Compartment 708 - Stand 10 – Payment Unit 20

Results - Mitigations for soils and water included buffering wet areas and using existing skid trails. One existing skid trail ran through a small wet area. This skid trail was used and care was taken to avoid rutting and excessive soil damage. The unit was relatively flat and no skid trails exceeded a 15% grade. The main skid trails disturbed less than 15% of the unit acreage (see Table 11).

Table 11. Post Harvest Soil Monitoring of Payment Unit 20 FR 230 Timber Sale

Payment Unit	Acres	Acres in skid trails	Acres in landings	Acres in ruts	Total acres disturbed	Percent disturbed
20	15	1.02	0.20	none	1.22	8.1

No visual or recreation concerns were raised and no mitigations were applied for these resources. Some horse riding use is occurring in this unit.

For the wildlife mitigation, 67 snags and 21 den trees (4.4 snags per acre and 1.4 den trees per acre) were left. The wildlife retention measure for a green partial harvest was:

Retain all snags >9" dbh. Retain at least 16 live trees per acre ≥ 9 " dbh. Mark and retain 3 live den trees per acre. Retain 1 live tree in the vicinity of about 1/3 of all large diameter (>12") snags with exfoliating bark.

Since this treatment was a thinning there are many more live trees retained than the minimum of 16 per acre. There are also many opportunities for additional den trees to develop over time.

Conclusion - The mitigation measures were properly applied and were effective in avoiding/minimizing resource damage.

Recommendations – There are no findings to recommend changes to standards and guidelines in the Forest Plan at this time.

Annual Evaluation Items for 2008
Achievement of Forest Plan Objectives

Evaluate ANF Road System Suitable for Snowmobile Use

Forest Plan Objective	Monitoring Question	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
2350 Trails				
Evaluate ANF road systems to identify which roads are suitable for snowmobile use utilizing the Travel Management Process.	Are roads and trails designated for snowmobile use marked and signed?	Annual	Annual	B

Protocol - New regulations governing motor vehicle use on national forests and grasslands have been established under the 2005 Travel Management Rule (*36 CFR Parts 212, 251, 261, and 295 Travel Management; Designated Routes and Areas for Motor Vehicle Use; Final Rule*).

The CFRs make a distinction between ‘motor vehicles’ and ‘over the snow vehicles’. Travel management planning is required by each national forest for motor vehicles but is optional for over the snow vehicles. The final rule prohibits the use of motor vehicles off a designated system, as well as use of motor vehicles on routes and in areas that is not consistent with the designations.

The clear identification of roads, trails, and areas for motor vehicle use on each national forest will enhance management of National Forest System (NFS) lands; sustain natural resource values through more effective management of motor vehicle use; enhance opportunities for motorized recreation experiences on NFS lands; address needs for access to NFS lands; and preserve areas of opportunity on each national forest for non-motorized travel and experiences. The final rule is consistent with provisions of Executive Order 11644 and Executive Order 11989 regarding off-road use of motor vehicles on Federal lands.

Even though ‘over the snow’ vehicles are exempt from mandatory designation, the responsible official may propose restrictions or prohibitions. Included within the body of 36 CFR 212, subpart B, are procedures that describe the restriction or prohibition of ‘over the snow’ vehicles including public involvement, coordination with governmental agencies, revision of designations, and application of criteria in 36 CFR 212.55. It is the intent of the ANF to use the

procedures outlined in 36 CFR 212.55 to evaluate future additions to the snowmobile trail system.

Results – Roads and trails designated for snowmobiles are found on the Snowmobile Trails map (2008). This map meets a requirement of 36 CFR 212.55 to publish an ‘over the snow’ map. The map includes a 1,000 foot segment of snowmobile trail that was rerouted in the Salmon Creek area during FY 2008. Also, see [Facilitate Regular Grooming of Designated Snowmobile Trail System](#).

Conclusion and Recommendations – The Forest is required by law, in the Travel Management Rule, to evaluate and update a motor vehicle use map on an annual basis. The Forest will also adhere to any changes and/or new directives regarding travel management planning for off-highway vehicles including over the snow vehicles. Specific to over the snow vehicles, the Forest will continue to maintain a snow vehicle map to show where it is legal for the public to ride.

Facilitate Regular Grooming of Designated Snowmobile Trail System

Forest Plan Objective	Monitoring Question	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
2350 Trails				
Facilitate regular grooming of the designated snowmobile trail system if Commonwealth funding is available.	To what degree has the ANF contributed to snowmobile grooming?	Annual	Annual	B

Protocol - Recreation personnel keep track of how much time is spent grooming trails in order to help determine over-all accomplishment and program of work in the recreation program. Monitoring of snowmobile trail grooming is based on accomplishment and does not involve detailed data collection; therefore, there is no protocol. An annual accomplishment report details what trails were groomed and what efforts were made to facilitate regular grooming.

Results - In FY 2008 two Forest Service snow grooming machines were used for approximately 259 hours grooming trails across the entire Forest. This occurred over a combined five week period, one week in December and the entire month of February. The equipment was operational the entire season; however, warm temperatures and a lack of snow made for unfavorable snow conditions for portions of the winter. The Challenge Cost Share agreement continued with the Forest County Snowmobile Club to groom connector trails on the forest. Work under the agreement resulted in 300+ hours of grooming.

Utilizing the Forest Service Construction and Maintenance (C&M) Crew and volunteers from the PA Snowseekers, several projects on the snowmobile trail were completed to provide a stable trail foundation to facilitate trail grooming. The C&M crew completed the relocation of a hill climb in Salmon Creek to correct safety issues. The crew also assisted the volunteers in improvements to Connector #24 with bulldozer work, brushing, rock removal and signing. The PA Snowseekers worked a total of 32 hours.

Grooming started Dec 22, 2007 for one week, and continued February 1st to March 1st, 2008, for five days/week, Wednesday thru Sunday, 10-1/2 hrs/day. All grooming was on Trail 1, the Allegheny Snowmobile Loop.

Conclusion – The amount of grooming will vary from year to year depending on amount of snow, available staff, and equipment. For FY 2008, the Forest met the objective of regular trail grooming.

Recommendations – Seeking deferred maintenance projects with volunteers to provide quality grooming results should continue.

Provide Snowmobile System Connectors

	Monitoring Question	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
2350 Trails				
Utilize partnerships with snowmobile clubs, local communities, State agencies, and private landowners to provide snowmobile system connectors across private lands to Tionesta, Ridgway, Sheffield, and Bradford.	What connectors have been developed?	Annual	Annual	A

Protocol – The same protocol governing travel planning and the Travel Management Rule (as described above for [*Evaluate ANF Road System Suitable for Snowmobile Use*](#)) applies to this objective.

Results – None, no connectors were built.

Conclusion and Recommendations – Pursue potential opportunities as they are presented.

***Maintain or Create Age Class Diversity on Lands Suitable for
Timber Management***

Forest Plan Objective	Monitoring Question	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
Maintain or create age class diversity on lands suitable for timber management to provide for sustainable forest ecosystems and high quality hardwood timber products by treating an estimated 1,400 to 1,800 acres using even-aged regeneration methods and treating 300 to 700 acres using uneven-aged methods, annually.	How many acres of even-aged regeneration harvest and uneven-aged harvest have occurred?	Annual	Annual	A/B

Protocol and Results – Vegetation harvests sold for even and uneven-aged regeneration were compiled from vegetation databases, including TIM and FACTS databases. In total, 239 acres were sold for even-aged regeneration (includes areas regenerated to one or two age classes) in 2008. This figure includes eight acres of aspen regeneration harvests specifically designed to create early successional habitat for wildlife and regenerate aspen. Twenty-nine acres were sold to be regenerated using a two-aged method, in order to sustain greater within-stand structural diversity and maintain two age classes on the site in the long term. In total, 51 acres were sold for uneven-aged regeneration using both the single tree (15 acres) and group selection (36 acres) methods. Additionally, seven acres of timber were sold to create permanent herbaceous openings for wildlife. See the [Comparison of Projected and Actual Outputs and Services](#) section for more detail.

Conclusion and Recommendations – Desired ecosystem conditions for the Forest include sustaining a diversity of vegetative structural stages and age classes across the landscape, within the context of multiple use management. Early structural stages created by timber harvest or natural disturbance will comprise 8 to 10 percent of the forested landscape (Forest Plan, pp 11 and 19). To provide desired ecosystem conditions, Forest Plan objectives include maintaining or creating age class diversity of lands suitable for timber management by annually treating 1,400 to 1,800 acres using even-aged regeneration methods, and 300 to 700 acres using uneven-aged methods (Forest Plan, p 19).

In the longer term, if even-aged and uneven-aged regeneration harvests continue to be lower than the stated objectives, landscape-level desired vegetative structural stages and age classes will not be sustained at levels sufficient to meet desired Forest Plan ecosystem conditions. It is recommended to increase treatments to 1,400+ acres using even-aged methods and 300+ acres

using uneven-aged methods to meet objectives annually, and continue monitoring progress towards achievement of desired vegetation conditions.

Enhance Terrestrial Wildlife Habitat

Forest Plan Objective	Monitoring Question	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
Enhance terrestrial wildlife habitat to provide desired cover and forage conditions on 1,200 to 1,600 acres, annually.	How many and what type of terrestrial habitat enhancements have been implemented?	Annual	Annual	A

Protocol – Acres of habitat enhancements are completed by District wildlife staff and recorded in the Wildlife Work Plans by the Forest Wildlife Biologist.

Results – In FY 2008 a total of 1,542 acres of habitat enhancement were completed.

Conclusion – The amount of habitat enhancements completed in 2008 is within the Forest Plan Objective of 1,200 to 1,600 acres each year. Partnerships are a significant component of the wildlife habitat enhancement program.

Recommendations – Continue to work with partners to complete habitat enhancements.

Prevent Introduction of Zebra Mussels

Forest Plan Objective	Monitoring Question	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
2600 Wildlife, Fish and Sensitive Plant Habitat				
Prevent the introduction of zebra mussels into the Allegheny Reservoir and the Allegheny River from Forest Service boat launch sites.	Are zebra mussels in the Allegheny Reservoir? What is the risk of zebra mussel introduction from Forest Service boat launches?	Annual	Annual	B

Protocol – To assess whether zebra mussels are present in the Allegheny Reservoir, the shoreline on each side of Forest Service boat launches are walked a minimum ¼-mile to visually determine if any are present. This assessment is normally done after the reservoir drops to at least a pool elevation of 1,318’ mean sea level (msl) (or a drop of at least 10’ from summer pool elevation of 1,328’ msl) in the fall. If a dock is present at the launch, it is also inspected for zebra mussels. The assessments are conducted by Forest Service employees.

To determine the risk for introduction of zebra mussels into the Allegheny Reservoir, a series of predetermined questions are asked boaters before they launch their watercraft. Forest Service employees conduct the survey. The objective is to screen (through personal interviews) at least 500 boats for the risk assessment. A sample of boaters is surveyed. Launch sites that typically receive the highest use are targeted first. The assessment is primarily conducted during the recreational boating season from Memorial Day to Labor Day. In addition to the questionnaire, boat trailers parked at launch sites are visually inspected for the presence of aquatic vegetation and/or zebra mussels. The objective is to visually inspect at least 1,000 trailers. The overall goal is to keep the risk low over the life of the Forest Plan.

This particular monitoring item addresses two of the many conservation measures agreed to by the U.S. Fish and Wildlife Service and the ANF for two endangered mussels. These two mussels, clubshell and northern riffleshell, are present in the Allegheny River and could be affected by zebra mussels moving downstream out of the reservoir should they become established. Other conservation measures associated with these two mussels are discussed under [*Conservation Measures for Clubshell and Northern Riffleshell Mussels.*](#)

Results

Risk Assessment

The following two tables summarize 1) the risk for introduction of zebra mussels into the Allegheny Reservoir based on personal interviews with boaters and, 2) the number of parked trailers with aquatic vegetation and/or zebra mussels.

Table 12. Watercraft at Risk Based on Personal Interviews of Boaters in 2008

Launch	Risk		
	Low	Medium	High
Elijah	151	2	0
Kiasutha	11	0	0
Willow Bay	287	3	0
Wolf Run Marina	84	1	0
Total	533	6	0

Table 13. Trailer Counts at Forest Service Boat Launches in 2008

Launch	# Trailers Screened	# with Vegetation	# with Zebra Mussels
Dewdrop	24	0	0
Elijah	353	0	0
Kiasutha	221	0	0
Roper Hollow	1	0	0
Sugar Bay	1	0	0
Webbs Ferry	8	0	0
Willow Bay	377	0	0
Wolf Run Marina	154	0	0
Total	1139	0	0

Of the 539 watercraft that were screened at the launch site, 6 were at medium risk for zebra mussel introduction into the reservoir, and none were at high risk. Of the 1,139 trailers inspected in the parking lots, none were found with vegetation or adult zebra mussels.

Conclusion - The number of screenings and trailer counts met the objective in this first full season of implementation of the 2007 Forest Plan. In 2007-2008 1.9% of watercrafts were determined to be at moderate-high risk for introducing zebra mussels. Similarly, in 2007-2008, 0.4% of trailers inspected had vegetation on them that could harbor zebra mussels, a decrease from those earlier years. The 2008 results show only a slight risk of zebra mussel introduction to the reservoir based on the six watercrafts determined to be medium risk. No watercraft was determined to be a high risk.

Through educational efforts conducted by Forest personnel including personal contact and signs at launches, and recreational boaters becoming more conscientious about invasive species, the introduction of zebra mussels has thus far not occurred to our knowledge from watercraft users launching at Forest Service sites on the reservoir. In addition, the drawdown of the reservoir each year could desiccate any zebra mussels that might get introduced.

Recommendations - Continue with annual inspections of the shoreline and any associated docks at Forest Service boat launches. Also continue with boat screenings and trailer counts at Forest Service boat launches to determine the risk of zebra mussel introduction.

Evaluate Productivity of Bald Eagles

Forest Plan Objective	Monitoring Question	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
Maintain or increase productivity of bald eagles on the ANF.	What is the status of known bald eagle nests on the ANF? How many young are produced?	Annual	Annual	A/B

Protocol – Known nests are observed in the field each year. Reports of new nests are field verified. Some searches for new nests are conducted annually in high potential nesting habitat by driving established routes adjacent to rivers and large stream corridors. .

Results – Of the 10 known eagle territories within the proclamation boundary, five were documented as active in 2008. Of the five active nests, a total of eight young were fledged (1.6 young per active nest or 0.8 young per territory).

Conclusion – An annual productivity of 1.6 young per active nest is above the National recovery objective of 1.0 young per occupied nest. Annual productivity on the Forest over the past 12 years remains above the National recovery objective (Biological Assessment for Forest Plan Revision (2006 p 33)).

Recommendations - Continue to monitor nest success.

Acres Treated to Increase Plant Species Diversity

Forest Plan Objective	Monitoring Question	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
Improve the overall health and sustainability of ANF forest ecosystems by reducing understory dominance of native species, such as beech brush, ferns, grass and striped maple, and non-native invasive species (NNIS) to encourage greater species diversity of herbaceous, shrub, or tree seedlings on 3,000 to 6,200 acres annually (through direct treatment such as site preparation, herbicide application, scarification, and fencing).	How many acres have been treated to increase plant species diversity (with site preparation, herbicide application, and fencing)?	Annual	Annual	A

Protocol and Results – Acres of site preparation, herbicide application, fencing and non-native invasive plant treatment were compiled from the FACTS database. In total, 2,166 acres were treated with site preparation or herbicide (excluding re-treatment acreage) to reduce dominance by interfering plants that prevent a diversity of herbaceous and tree species from becoming established, or fenced to reduce deer browsing impacts. Eighteen acres were treated via manual or mechanical (weed eater) control to remove non-native invasive plants. Forest Plan objectives include reducing the understory dominance of native invasive species such as beech brush, ferns, grass, and striped maple, and NNIS by treating 3,000 to 6,200 acres annually (Forest Plan, p 21).

Herbicide application, site preparation and area fencing acres were below Forest Plan projections and objectives (see [Comparison of Projected and Actual Outputs and Services](#)). Herbicide application and site preparation levels were below that projected, primarily due to fewer acres receiving shelterwood seed cuts and regeneration harvests (using either even-aged or uneven-aged methods) than projected in the Forest Plan. Deer browsing impacts have dropped in recent years because overall deer populations are reduced. As a result, the need to fence areas has declined markedly. No herbicide treatment for non-native invasive plants or wildlife habitat enhancements occurred in FY 2008 because the project-level analysis for such treatments was not approved until FY 2009 (November–December). Project-level planning for herbicide treatment was completed for three projects, and treatment is anticipated to occur over the next few years.

Conclusion and Recommendations – Desired ecosystem conditions include restoration of understory vegetation and vertical diversity, including multiple vegetative layers to enhance the resiliency of Forest ecosystems (Forest Plan, p 11). Site preparation, herbicide application, and area fencing are some tools available to help reduce dominant understory vegetation that prevents a diversity of plants and tree seedlings from becoming established and contributing to compositional and structural diversity. An abundance and diversity of forest plants and trees will improve the overall health, resiliency, and sustainability of forest ecosystems.

In the longer term, if treatments to reduce interfering, invasive vegetation continue to be lower than Forest Plan objectives, understory vegetation conditions will not be improved enough to meet desired Forest Plan ecosystem conditions. Continue monitoring progress towards achievement of desired understory vegetation conditions, and the overall health and sustainability of forest ecosystems.

Annual Evaluation Items for 2008

Strategic Monitoring Information

Bald Eagle Conservation Measures

Resource Area	Monitoring Question	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
Wildlife, Fish and Sensitive Plants	Are bald eagle conservation measures being implemented? What management activities are occurring within suitable nesting, foraging and roosting habitat?	Annual	Annual	A/B

Protocols and Results – Bald eagle conservation measures protocols and results are listed in Table 14. Conservation measures are described in detail in the U.S. Fish and Wildlife Service concurrence letter (1/31/2007, pp 4 and 5).

Table 14. Bald Eagle Conservation Measures

Protocols	Results
Activities within 660 feet of nest – review of approved National Environmental Policy Act (NEPA) documents and Plans of Operation (minerals).	We received a Plan of Operation from one mineral owner that proposed the drilling of 3 wells within 660 feet of an active bald eagle nest near Sugar Bay. The mineral owner was unaware of the eagle nest. After discussions between the mineral owner and the ANF, the mineral owner agreed not to drill the 3 wells.
Restrict recreational activities with 660 feet of nest – on-the-ground monitoring of recreational activities near nests.	The Cornplanter nest is vulnerable to boating and camping traffic. Signs were placed along the shoreline in past years to warn people not to camp there. In 2008, this nesting pair successfully fledged 2 young. Since nesting begins long before the boating season is in full swing,

Protocols	Results
	this pair of eagles seems to tolerate the boat traffic.
Restrict road and trail construction, timber harvest, and OGM activities within 1,320 feet of nest during the nesting season – on-the-ground monitoring of these activities during the nesting season.	Mineral activity did not occur near the Sugar Bay nest. This nesting pair was successful in fledging one young.
Road/trail closures near nests – on-the-ground observations indicate changes in eagle behavior.	Although the non-system road near the Grove Run nest was closed, the nest tree blew over and no eagles used this nest site in 2008. The trail near the Kiasutha nest remained closed during 2008. The Kiasutha nest successfully fledged two young.
Maintenance of scattered white pines within 300 feet of major drainages and Allegheny Reservoir – on-the-ground observations, review of NEPA documents, and Plans of Operation for projects along major drainages and reservoir.	No white pines were harvested on NFS lands within 300 feet of the major drainages and Allegheny Reservoir.
Smoke considerations in burn plans for prescribed burning near eagle nests – review of burn plans.	A burn plan was completed for fields near the Hall Barn. Smoke considerations were included to reduce potential impacts to the nearby eagle nest. The field was burned in 2008. A wildlife biologist monitored the Trunkeyville nest during the burn. No visible smoke reached the nest site and the eagles remained on the nest. No signs of stress to the eagles were observed.
Notify U.S. Fish and Wildlife Service of OGD activities within 1,320 feet of nest - review of Plans of Operation and review of correspondence.	The USFWS was notified of the proposed oil and gas activities near the sugar Bay nest. Since no wells were drilled near the nest, no action by the USFWS was needed.
Site specific eagle hazard reduction plan for new power lines - review of new power line proposals (special use permits).	No new power lines were approved in 2008.

Protocols	Results
Monitor potential impacts and report to U.S. Fish and Wildlife Service – on-the-ground observations.	Known nest sites are monitored each year. As previously described, potential smoke impacts were monitored at the Trunkeyville nest and potential mineral development impacts were monitored at the Sugar Bay nest.
Clean-up of discarded fishing line and lures – Volunteers organized to perform clean-up and report to Bradford Ranger District.	As Forest Service personnel and campground workers came across fishing line during their normal duties, it was picked-up and disposed of properly. No reports of eagle entanglement in fishing line were received.
Erect signs or issue news releases to educate public about eagles - review record of news releases and new signs.	The ANF published a news release on May 21, 2008, advising forest visitors not to disturb eagles and asking them to pick up discarded fishing line.

Conclusion – Despite wide-spread human activity associated with multiple resource management on the ANF, the integrity of active eagle nest sites is being maintained and reproduction is continuing at a steady rate. New eagle nests are being discovered on a regular basis indicating that the population is expanding and suitable habitat is available.

Recommendations – Continue to monitor the implementation of eagle conservation measures.

Indiana Bat Conservation Measures

Resource Area	Monitoring Question	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
Wildlife, Fish and Sensitive Plants	Are conservation measures for the Indiana bat being implemented?	Annual	Annual	A/B

Introduction – The Indiana bat is a federally endangered bat that is known to roost under the bark of live and dead trees often in Forests with canopy closures ranging from 50 to 80 percent. A brief summary of habitat requirements for this rare bat is included in the 2007 ANF Land and Resource Management Plan FEIS (p 3-209, Appendix E, p E-24).

Protocol – Indiana bat conservation measures and protocols are listed below. These conservation measures were developed in consultation with the U.S. Fish and Wildlife Service and are described in detail in the U.S. Fish and Wildlife Service concurrence letter (1/31/2007, pp 9 and 10) and Appendix C of the Forest Biological Assessment (BA):

1. **Conservation Measure:** In timber harvest units retain ¼ acre reserve areas, snags, large live trees, and all shagbark hickories. In partial harvests, retain a canopy closure >50%. **Protocol:** conduct compliance checks and snag longevity monitoring.
2. **Conservation Measure:** Protect all known roost trees and all maternity roosts. **Protocol:** conduct on-the-ground monitoring of known roosting sites.
3. **Conservation Measure:** Notify U.S. Fish and Wildlife Service if known Indiana bat occurrences are located in the vicinity of proposed mineral developments. **Protocol:** conduct a review of Plans of Operation and correspondence.
4. **Conservation Measure:** Conduct prescribed burns within any maternity colony area only during the hibernating season. **Protocol:** conduct a review of burn plans.
5. **Conservation Measure:** Do not demolish buildings that harbor bats between April 15 and August 15; install bat boxes. **Protocol:** conduct a review of plans to demolish buildings.
6. **Conservation Measure:** Survey for bats. Consult with U.S. Fish and Wildlife Service if an Indiana bat is captured. **Protocol:** complete 20 to 30 bat mist net surveys every third year. Periodically monitor bats in caves in cooperation with the Pennsylvania Game Commission.

Results

1. Compliance checks were completed on five final harvest units in 2008 (Table 15). The number and size of live and dead trees that were reserved in final harvest units is the focus of the information presented in Table 15. These units were selected from a group of units that were harvested in 2007.

Table 15. Final Harvest Units' Compliance Checks for 2008.

Sale-Payment Unit #	9 snags/ac>10''*	3 live trees/ac>20''*	6 live trees/ac>10''*
Forest Renewal-10	2.0	2.5	11.5
Forest Renewal-8	0.3	2.7	8.3
Forest Renewal-14	2.6	2.2	10.1
Forest Renewal-7	0.9	1.6	8.3
Nansen Salvage-21	3.4	0.3	7.7

*Guideline in Forest Plan which was not in place when timber harvest occurred.

Total number of live and dead trees marked for reservation before treatment and remaining after treatment is displayed in Table 16.

Table 16. Live and Dead Tree Summary in Final Harvest Monitoring Stands

Sale	Comp/Stand	Payment Unit	Ac	Pre-Treatment		Post-Treatment ¹	
				No. Trees (Trees/ac)		No. Trees (Trees/ac)	
				Live	Dead	Live	Dead
Stonehill	213/27	2	14	7.1	3.6	6.3 ²	2.3 ²
West Sheffield Removal	272/05	1	10	6.9	4.9	4.6 ²	4.7 ²
West Sheffield Removal	272/10	2	13	9.8	3.8	7.5 ²	2.0 ²
Eastside #1	440/19	1	10	15.9	18.5	12.4 ²	5.4 ²
East Kinzua	472/01	1	15	5.3	5.4	8.6 ²	3.8 ²

¹ - Post-treatment data collected with 100% tally of live and dead trees ≥ 9 " dbh

² - Numbers include only residual trees

³ - Numbers include residuals trees and clumps

Table 17 summarizes documented damaged/blowdown trees for the five final harvest stands selected for monitoring and provides some rationale for variation between the pre- and post-treatment data displayed in Table 17.

Table 17. Timber Sale Monitoring Summary of Blowdown/Damaged Trees

Sale	Payment Unit	Documented Damaged/ Blowdown Trees		Comments
		Live	Dead	
Stonehill	2	0	0	No comments
West Sheffield Removal	1	0	0	No comments
West Sheffield Removal	2	2	0	2 live trees damaged during skidding
Eastside #1	1	2	0	2 live trees damaged by natural causes
East Kinzua	1	0	3	3 punky beech fell over due to natural causes

Table 18 summarizes the post-treatment crown closure conditions and live and dead tree data for the five partial harvest units. Crown closure is based on over-story plot data. Pre-treatment live and dead tree numbers are not displayed, since a pre-treatment tally of live and dead trees was not completed in partial harvest units.

Table 18. Live Tree and Crown Closure Summary in Partial Harvest Monitoring Stands

Treatment	Sale	Comp/Stand	Ac	Post Treatment		
				Live Trees/Ac	Dead Trees/Ac	Crown Closure
Thinning	East Lewis	469/11	18	not tallied	6.6	>54%
Thinning	Sheriff East RE-AD	298/28	24	not tallied	5.7	>54%
Thinning	North Kavanaugh	439/46	24	not tallied	7.1	>54%
Thinning	North Kavanaugh	438/34	21	not tallied	8.9	>54%
Thinning	Little Hammer	345/04	21	not tallied	0.8	>54%

Results of the six monitoring items on p 45, continued:

2. No roost trees or maternity roosts are known to occur on the ANF.
3. No Indiana bats were discovered on the ANF in 2008.
4. No prescribed burns were planned near maternity colonies in 2008.

5. No buildings containing bats were demolished in 2008.
6. No mist net surveys were conducted in 2008.

Conclusion – The compliance checks were compared to the guidelines in the 2007 Forest Plan although the timber harvest occurred under the guidelines in the 1986 Forest Plan, as amended.

Dead trees (snags)

None of the five final harvest payment units met the guideline for retaining nine snags per acre greater than 10 inches dbh, or 3 live trees per acre greater than 20 inches. Under the 1986 Forest Plan, the guideline was 5–10 snags per acre greater than 9 inches dbh. This old guideline was not met in any of the five units measured. The likely reason for not meeting this guideline is most of these units were salvage of blown down trees and standing snags were just not present in these units.

Live trees

The third guideline calls for the retention of an additional six live trees per acre greater than 10 inches dbh. This guideline was met in all five units measured. The guideline in the 1986 Forest Plan called for the retention of 8–15 live trees per acre greater than 9 inches dbh. This guideline was met in four out of five units measured.

Canopy closure

For partial harvests in healthy stands the guidelines call for retaining canopy closure at more than 50 percent. This guideline was met in all five stands.

Recommendations - These results indicate that more emphasis needs to be placed on retaining snags. Retaining snags and trees that may become snags during the first entry (partial harvest) may result in more snags available for retention in the final harvest.

Conservation Measures for Clubshell and Northern Riffleshell Mussels

Resource Area	Monitoring Question	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
2600 Wildlife, Fish and Sensitive Plant Habitat				
Wildlife, Fish and Sensitive Plant Habitat	Are conservation measures for the clubshell and northern riffleshell mussels being implemented?	Annual	Annual	B

Two “sets” of conservation measures were developed for the 2007 Forest Plan. The first “set” is included in Appendix C of the Forest Biological Assessment (BA) that was completed during Forest Plan revision and submitted to the U.S. Fish and Wildlife Service. There are seven measures included in Appendix C. The second “set” was issued by the U.S. Fish and Wildlife Service and was a restating of numerous standards and guidelines from the Forest Plan and which were included in the 2007 Forest BA (pp 66 to 70) as conservation measures to implement to reach a “May affect, not likely to adversely affect” determination in their concurrence letter (1/30/2007). There are 20 measures included in this second “set”.

All conservation measures pertain to activities within the 13% Area, which is the area of the ANF that drains directly into the Allegheny River. The protocols for the measures are varied and, likewise, the methods used to determine their implementation vary.

Appendix C Conservation Measures (from the Forest BA)

Table 19 summarizes the seven measures in Appendix C of the Forest BA, with the protocols to follow.

Table 19. Conservation Measures Outlined in Appendix C of Forest BA

Conservation Measures in Appendix C of the Forest BA
1-3. Educational material will be provided on preventing the spread of zebra mussels.
4. Agency coordination will occur in the event of zebra mussel presence.
5. Report occurrence of dead endangered mussels to USFWS.
6. Determine zebra mussel presence in Allegheny Reservoir.
7. Water quality monitoring, standards and guidelines effectiveness monitoring, and activities addressed with runoff concerns will occur.

Protocols

Measures 1-3

These relate to educational materials and signs posted at boat launches to keep the public aware of how to prevent the spread of zebra mussels. Before the beginning of the boating season (Memorial Day weekend), educational materials are made available to various venues, such as concessionaires that manage campgrounds and boat launches, Forest offices, bait shops, and sporting goods stores, marinas, and visitor centers. Enough material is left for the public to take

a personal copy. The materials are replenished during the boating season as needed. Larger signs posted at the marina and boat launches about the prohibition of launching watercraft that may contain zebra mussels and the methods to be used to decontaminate a watercraft are inspected and replaced with new ones if needed.

Measure 4

To accomplish measure 4, contact is made with Pa. Department of Environmental Protection (DEP) about any latest documented occurrences in the river, and whether there are any plans to address their presence. We have since been informed that Pa. Sea Grant is now monitoring the presences of zebra mussels within the state.

Measure 5

This measure requires the ANF to report to the U.S. Fish and Wildlife Service any dead endangered mussels that are collected, and is accomplished primarily by word of mouth from boaters and anglers, other agencies, or others that are on the river.

Measure 6

The protocol for this measure is described in the protocol for [Prevent Introduction of Zebra Mussels](#).

Measure 7

The seventh measure in Appendix C of the Forest BA actually contains six items related to water quality. The first five items are addressed through visual monitoring conducted by Forest personnel during their normal work in the field and with scheduled visits to areas where the potential for water quality concerns could occur. A field visit or a discussion with the Contracting Officer Representative upon completion of any road or trail surfacing work is done to determine if the work meets the surfacing guidelines that have been prescribed to address runoff concerns. The sixth item under this measure is accomplished by Forest personnel; water samples are generally collected during runoff events in order to assess the amount of fine sediment being transported by the streams. Two streams, Hedgehog Run and Grunder Run, are currently being monitored.

Concurrence Letter Conservation Measures

The conservation measures are not numbered in the concurrence letter from the U.S. Fish and Wildlife Service, but will be numbered here in the order they are stated in the letter. The letter outlines 20 measures, some of which are the same as that in Appendix C of the Forest BA. Table 20 summarizes these measures.

Table 20. Conservation Measures for the Protection of Endangered Mussels

Conservation Measures from the U.S. Fish and Wildlife Service Concurrence Letter
1-3. Land disturbing activities will be planned, evaluated, and implemented to protect endangered mussel habitat, including the implementation of riparian corridor guidelines, conservation measures, and water quality protection guidelines in DEP field guides and manuals.
4-5. Wood removal from streams is only done according to the guideline in the Forest Plan and firewood permit language.
6. Existing aquatic uses are protected when water is drafted from a stream.
7. Buffers will be implemented to protect water quality when using herbicides within the 13% Area.
8-9. Roads and motorized trails constructed or reconstructed on NFS lands within 300' of a stream within the 13% Area will be surfaced with a high quality stone to minimize sedimentation. In the event this cannot be achieved, the U.S. Fish and Wildlife Service will be notified.
10-14. Stream crossings are outlined in these five measures, and include guidelines for surfacing, revegetation, providing for passage of aquatic species, sizing a culvert to accommodate a minimum 50-year flow, and accommodating a bank-full flow when using a temporary crossing structure.
15-17. These three measures address private oil and gas activity on the ANF. ANF staff work with private oil and gas operators in application of mitigation measures to be used in the 13% Area.
18. This measure is the same as <i>Measure 7</i> in Table 19.
19. Timber harvesting, vegetation management, and road management within the Allegheny Wild and Scenic River corridor are addressed in this measure. Timber harvesting and vegetation management will only be carried out to address: recreation and scenery management activities; user safety; wildlife concerns; forest health; catastrophic events; improvement of habitat for species of concern; restoration of ecosystems; maintenance of existing unique or important wildlife features or plant communities; maintenance or expansion of existing facilities or trails; conservation, research, or education around heritage sites; and timber salvage and associated reforestation. Existing roads or aerial harvest will be used for salvage harvests. Roads will not be constructed on islands. Roads will be limited to those needed for public access, service, or maintenance. New road construction will be limited to that required for designated special uses or by law. Roads will be decommissioned if they are causing environmental damage, degrading outstandingly remarkable values, or to manage visitor use and access.

Conservation Measures from the U.S. Fish and Wildlife Service Concurrence Letter

20. The last measure states that further consultation with the U.S. Fish and Wildlife Service is required if:
- a. new access sites to the Allegheny River are authorized, funded, or constructed by the Forest Service;
 - b. any activities do not follow any of the above 19 measures within the 13% Area;
 - c. any activities are anticipated to contribute large amounts of sediment beyond what was analyzed in the Forest BA or;
 - d. any activity increases the risk of zebra mussel introduction to the Allegheny Reservoir.

Protocols

Measures 1-3

These measures are evaluated in the field during or soon after completion of land-disturbing activities. Areas where buffers, including riparian corridors, are established will be assessed on a random basis to determine if they were implemented according to Forest Plan guidance.

Measures 4-5

The removal of any wood would likely be to protect bridges and culverts on the forest, as well as for the protection of private property. This is assessed by discussing with engineers on the forest on whether this action occurred. For firewood collection, people cutting firewood are periodically checked by Forest personnel to insure they are in compliance with language in the permit; a permit requirement is that firewood cannot be taken from streams.

Measure 6

The drafting of water is not monitored continuously, but when Forest personnel see a concern with maintaining existing uses, DEP is notified.

Measure 7

To evaluate the application of this buffer when using herbicides near water, a field review will be conducted on a sample of sites where this buffer was, or should have been, used.

Measures 8-9

This measure is addressed through project design or through negotiations with the private oil and gas operator. It is evaluated through field review.

Measures 10-14

To assess if these measures were completed as planned, field visits will be conducted and/or discussions will take place with Contracting Officer Representatives to ascertain their implementation. This will occur on constructed and reconstructed crossings.

Measures 15-17

The Forest Service works with developers during the planning and layout phases to negotiate design features for roads.

When a known federally listed species is within the area of proposed development, the FS will notify the operator and U.S. Fish and Wildlife Service.

Measure 18

See Appendix C Protocols – *Measure 7*. These two measures are similar.

Measure 19

An evaluation by a Forest Biologist will be made of any proposed activities within the Wild and Scenic River corridor to insure they comply with this measure.

Measure 20

The four items listed under this measure, as they become known, will be presented to the U.S. Fish and Wildlife Service.

Results

Results from implementing the Conservation Measures contained in Appendix C of the Forest BA are summarized in Table 21.

Table 21. Results from Conservation Measures Outlined in Appendix C of Forest BA

Conservation Measures in Appendix C of the Forest BA	Results from Applying Conservations Measures
1-3. Educational material on preventing spread of zebra mussels.	Measures 1-3 were accomplished in 2008.
4. Agency coordination when zebra mussel presence.	A contingency plan was not discussed or developed by other agencies in 2008. No zebra mussels were detected in the Allegheny River in the vicinity of the Forest during 2008. DEP was consulted on both these points, and we were notified that they no longer track the occurrences. We were directed to the Pennsylvania Sea Grant who is now overseeing these efforts. Their website was checked for recent occurrences, and none were noted.
5. Report dead endangered	The ANF was not notified or aware of any reports of unnatural deaths of

Conservation Measures in Appendix C of the Forest BA	Results from Applying Conservations Measures
mussels to USFWS.	endangered mussels in 2008.
6. Determine zebra mussel presence in Allegheny Reservoir.	There were no reports of zebra mussels being in the Allegheny Reservoir in 2008.
7. Water quality and S&Gs effectiveness monitoring; activities addressed with runoff concerns.	<ol style="list-style-type: none"> 1. The recently approved Meads Mill project identified 0.64 miles of limestone surfacing on three sections of road. The roads include FR254 (0.15 miles), FR254C (0.45 miles), and FR524 (0.04 miles). This is planned to occur in the near future. 2. Two streams, Dutchman Run and Anders Run, are currently being evaluated to address runoff and sedimentation reaching these streams from roads. For timber activities within the 13% Area, one stand originally harvested as a shelterwood seed cut in 1997 had a final harvest done in 2008, thus completing the prescription for this stand. The stand is numbered 210-6, is 28 acres, and was part of the Stonehill Removal. This unit is located high on the plateau with no water concerns. The Little Hammer timber sale, located partially in the 13% Area, had two units harvested. However payment units 03A and 05 are both outside the 13% Area. 3. Guidelines for the operation of oil and gas developments were monitored by Forest oil and gas administrators. The one thing observed was the lack of maintenance of silt fences. Silt fences are placed according to the Soil Erosion and Sediment Control Plan, but were not being maintained. 4. Oil and gas administrators continue to randomly monitor private oil and gas leases located on the Forest. In 2008, no cases were noted where oil, gas, or brine were being improperly stored. However, some containment pits appear too small to capture the fluids from the largest tank at a tank battery should it drain completely. Sediment from roads continues to be identified as a concern on some private leases within the 13% Area. Several locations are known to be contributing sediment to nearby streams. 5. Some of the areas where sedimentation was identified as a concern were

Conservation Measures in Appendix C of the Forest BA	Results from Applying Conservations Measures
<p>7.Continued</p>	<p>addressed in 2008 in cooperation with private lease holders. In the Grunder Run watershed, two stream crossings and adjoining roads were decommissioned and will reduce sediment input to a tributary to Grunder Run. In all, 13 sections of private lease roads totaling 5007' were decommissioned and will prevent further sedimentation. Also in the Grunder Run watershed, one stream crossing was corrected by replacing the existing pipes with a correctly sized pipe that will allow the passage of fish, and the approaches to the crossing were surfaced with limestone to reduce sedimentation (this section of road is also part of the Rocky Gap ATV trail and is located in Lot 444). Ott Run, the watershed located to the east of Grunder Run also had work completed to address sedimentation. This included the removal of a stream crossing that consisted of three culverts, and 300' of road was decommissioned that had been contributing runoff to the stream at this same crossing.</p> <p>6. The sixth point under this measure has no results to report for 2008, but is updated with results from 2007. Water samples were collected from the two streams being monitored for sediment in 2008, but results are not yet available. To provide a basis for comparison as the Forest begins implementing the 2007 Forest Plan, Figure 3 depicts results from water samples collected from 2000-2007.</p>
	<p>The first stream, Grunder Run, is located in a 3,171 acre watershed that is dominated by intensive oil and gas activities, dirt and gravel roads, and off-highway vehicle trails. Approximately 84% of the drainage (2,657 acres) is managed by the Forest Service. There are 5.4 miles of mapped stream, one stone pit, and 455 recorded oil and gas wells in the drainage. There has been no timber harvest activity on NFS land since 2000 in this drainage. The road density for all jurisdictions increased to 10.59 mi/mi², with a slight increase in the road density to 1.05 mi/mi² within 300 feet of a mapped stream. Timber harvesting is currently being proposed in this watershed. Many of the non-system roads in the Grunder Run watershed used by private oil and gas developers were constructed in the early 1980's by private lease holders. See Table 22.</p> <p>Hedgehog Run, the second stream, is primarily located in the Allegheny National Recreation Area and has almost no land-disturbing activity where NFS land is located in the 2,758 acre watershed. This watershed has 6.8 miles of perennial and intermittent streams. The road density for all</p>

Conservation Measures in Appendix C of the Forest BA	Results from Applying Conservations Measures
	jurisdictions is currently 2.0 mi/mi ² , with a decrease in road density to 0.02 mi/mi ² within 300 feet of a mapped stream. See Table 22.

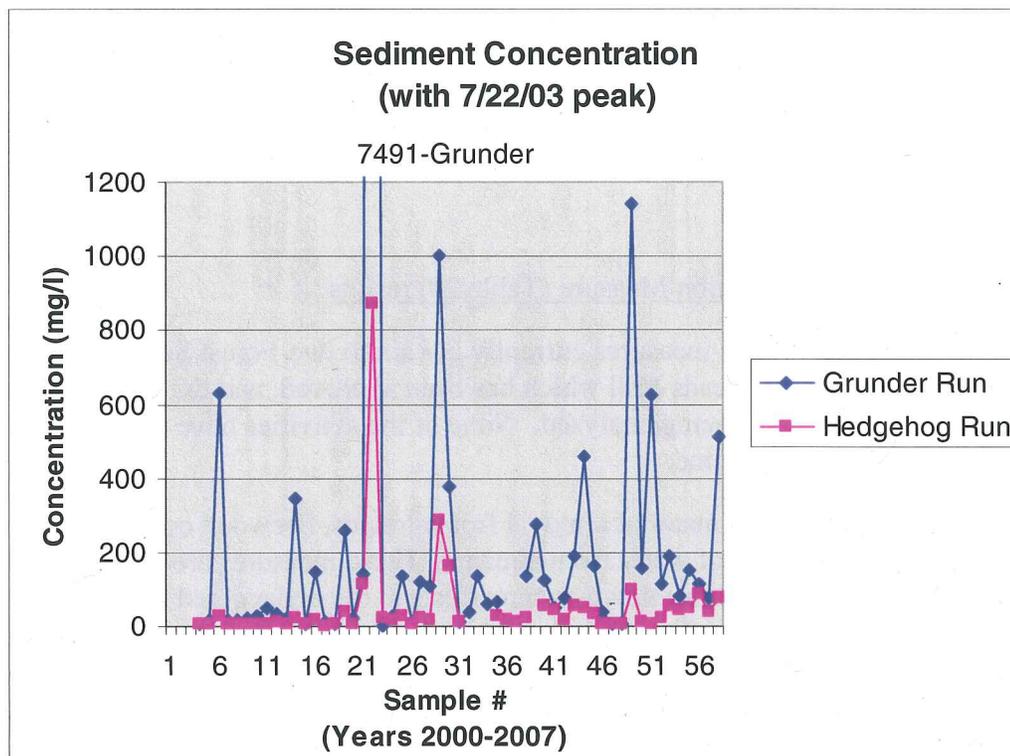


Figure 3. Sediment concentration of water samples from Grunder Run and Hedgehog Run, 2000 - 2007.

Table 22. Comparison of Road Densities within the Grunder Run and Hedgehog Run Drainages (Based on GIS).

Drainage	Year	Acres	All jurisdiction on all ownerships		All jurisdiction within 300' of a stream on all ownerships		Forest Service roads on all ownership	Forest Service roads within 300' of a
			Total	Road density	Total	Road density		

			Miles	(miles/mile ²)	Miles	(miles/mile ²)	(miles)	stream (miles)
Grunder Run	Oct. 2006	3,171	44.03	8.89	4.52	0.91	0.90	0.00
	April 2009		52.4	10.59	5.2	1.05	4.2*	0.00
Hedgehog Run	Oct. 2006	2,758	9.00	2.09	0.21	0.05	1.03	0.00
	April 2009		8.6	2.00	0.1	0.02	1.0	0.00

* This is not a result of new road construction. The figure is a result of a recalculation of miles in GIS.

Concurrence Letter Conservation Measure (Table 20) results

Measures 1-3 - The first three measures currently pertain to two Forest Service projects within the 13% Area. The first is Meads Mill which has been approved, and the second is Southwest Reservoir which is currently being analyzed. None of the activities have occurred yet and, thus, cannot be reported on at this time.

Measures 4-6 address woody material removal from streams, firewood collection from various water resources, and drafting of water from streams. These measures are intended to protect headwater sources that could have downstream affects to the endangered mussels in the Allegheny River. Specifically, firewood permits issued by the Forest Service were updated after the Forest Plan was signed in March 2007 and now contain language prohibiting the removal of wood from streams and other water sources. No specific incident of wood removal was noted during 2008.

Measure 7 outlines buffers to be used when using herbicide near water. In 2008, no herbicide was applied within the 13% Area by the ANF.

Measures 8-9 include language to surface dirt and gravel roads, and motorized trails, within 300' of a stream with a high quality surfacing stone. Limestone surfacing is normally what is used in these instances when a road or trail is reconstructed or constructed. One section of the Rocky Gap ATV trail was surfaced with limestone on each side of a replaced stream crossing within the 13% Area on an unnamed tributary to Grunder Run. See Table 21 results, specifically under Measure 7, where this is also discussed.

Measure 10 deals with minimizing the number of road and trail crossings of streams, and erosion associated with these crossings. In 2008, no new Forest Service road or trail crossings were constructed within the 13% Area.

Measure 11 is associated with measure 10. Since no crossings were constructed or reconstructed, this measure was not required in 2008.

Measure 12 relates to providing the appropriate crossing to allow fish and aquatic passage. Within the 13% Area, one crossing in Lot 444 was replaced with a more appropriately sized crossing that will allow passage. This crossing is on a private lease road in the Grunder Run watershed but is also part of the Rocky Gap ATV trail (mentioned previously in Table 21, Measure 7). The stream is an unnamed tributary to Grunder Run.

Measure 13 - One private lease crossing (same crossing as discussed in Measure 12 located in Lot 444) was replaced with a properly sized pipe to handle a minimum 50-year flow in the Grunder Run watershed.

Measure 14 addresses temporary crossings. No temporary crossings were constructed in 2008.

Measure 15 pertains to roads built by private oil and gas developers. Eight well packages for the drilling of 90 wells in the 13% Area were received by the Forest in 2008. Seven have received Notices-To-Proceed. The construction of roads is associated with each of the eight well packages.

Each well package is in various stages of completion, with some not started and others completed. Some only have the roads built, but no wells drilled. One new crossing was constructed in the Sill Run watershed in Lot 453 by a private lease holder (Case #209). The crossing was constructed with a squashed culvert that will handle a 25-50 year flow. Discussions with the lease-holder are currently occurring to surface this crossing with a high-quality stone. The eight well packages include the following (Table 23):

Table 23. Private OGD proposals within the 13% Area

Case #	Notice-To-Proceed	# Wells
209	3/17/2008	11
275	2/28/2008	17
276	Pending	20
277	8/12/2008	6
B-002	3/18/2008	15
B-003	3/17/2008	14

B-004	5/2/2008	6
B-012	7/30/2008	1 deep well

Measure 16 pertains to notification of the private oil and gas developer if federally listed or candidate species are located within the vicinity of a proposed development. Notifications were made.

Measure 17 pertains to adherence to the Soil and Erosion and Sedimentation Control plan by the private oil and gas operator. This requirement is monitored as developments occur. Discussions with operators occur as situations warrant.

Measure 18 - See Measure 7 results in Table 21.

Measure 19 includes direction for the Wild and Scenic River Corridor of the Allegheny River. Four points are outlined, none of which occurred in 2008.

Measure 20 outlines four points that require further consultation with the U.S. Fish and Wildlife Service, should they occur. No additional consultation is required as a result of monitoring completed in 2008.

Conclusion - Where applicable, conservation measures were implemented in 2008. Educational material was distributed and updated; sediment from private oil and gas roads, and lack of silt fence maintenance were noted as concerns within the 13% Area.

The objective of screening 500 boats and conducting 1,000 trailer counts was met. Based on the information collected from the numbers that were accomplished, the risk of zebra mussel introduction to the Allegheny Reservoir was just slightly higher than the average over a three-year period when more extensive surveys occurred, but still very low.

Many measures did not need implementing simply because the activities they address did not occur within the 13% Area, or weren't yet applicable.

Recommendations - Continue with implementation of the conservation measures outlined in Appendix C of the Forest BA and with the conservation measures outlined in the U.S. Fish and Wildlife Service concurrence letter (1/30/2007).

Have Federally-Listed Plants been Identified?

Resource Area	Monitoring Question	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
Wildlife, Fish and Sensitive Plant Habitat	If federally listed plants have been identified, what conservation measures are being implemented?	Annual	Annual	A/B

Protocol – NRIS (Natural Resource Information System) TESP (Threatened, Endangered, Sensitive Plants) and invasive species (all taxa) is the corporate database for inventory and mapping data for Federally Threatened or Endangered, or Regional Forester Sensitive plant species. The protocol for collecting data is contained in: USDA-FS 2005. Threatened, Endangered, Sensitive Plants Element Occurrence Field Guide. Washington D.C., 39 pp

Results – Project-level surveys for federally listed small whorled pogonia (*Isotria medeoloides*) and northeastern bulrush (*Scripus ancistrochaetus*) were conducted in areas proposed for management activities such as, but not limited to, timber harvest, road construction, and wildlife opening construction in FY 2008. No federally listed plants were documented.

Conclusion - If federally listed plants are documented, follow Forest Plan direction in the 2600 Section (p 84). Conservation measures found in the biological evaluation completed for the 2007 Forest Plan would also apply.

Recommendations – Project-level surveys for federally listed small-whorled pogonia have been conducted for 22 years on the ANF with no documented occurrences. It is recommended to work with the USFWS to modify our surveying techniques and protocols due to this lack of finding over a long period of time.

Evaluation of Other Annually Monitored Items

Three additional items of interest were selected to report on in FY 2008. These were maximum opening size from even-aged management, population trends of management indicator species, and deer densities. These items are collected annually, but normally evaluated on a five year cycle.

Maximum Opening Size from Even-aged Management

Action, effect or resource to be managed	Monitoring Question	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
Maximum opening size from even-aged management and the need for change (36 CFR 219.12(k)5(iii) and 36 CFR 219.27(d)(2))	What is the maximum size opening from even-aged management? Is there a need to change the standard?	Annual	5 years	A/B

Protocol – Vegetation harvests sold for even-aged regeneration harvests were compiled from vegetation databases, including TIM and FACTS databases. Timber sale maps were reviewed for final harvest areas to review adjacent shelterwood removal, clearcut, or two-aged harvest prescriptions to determine the maximum and minimum size of temporary openings by MA.

Results

Table 24. Size of Final Harvests by Management Area in Acres

Management Area	FY 2008 Accomplishments				
	Minimum Size	Maximum Size - scheduled, "Green" Treatments	Maximum Size - unscheduled, Salvage Treatments	Average Size	Forest Plan Maximum Size specified for Management Area
3.0	11	39	41	25.9	40
6.1	6	n/a	11	8	40

A temporary opening can be created through a final harvest silvicultural treatment and is intended to be re-occupied by young trees. Temporary openings are dominated by trees and saplings less than 15 feet tall that, with time, will grow into a mature forest. Table 24 displays the minimum, maximum, and average size of areas sold for final harvest, which will result in temporary openings.

The size of temporary openings created through scheduled, or “green” harvests cannot exceed 40 acres, or 20 acres in MA 2.2, as specified in Forest Plan MA direction (Forest Plan, p 68 and 111). Regional Forester approval is required to exceed these scheduled “green” temporary opening sizes. As can be seen from Table 24, the size of “green” final harvests in timber sales conformed to MA direction.

Unscheduled salvage treatments occur in response to catastrophic forest damage from wind, insects, or disease. Salvage regeneration treatments are designed to regenerate heavily damaged or declining stands in order to restore fully stocked forested stands to these sites. In these cases, the size of the damaged area was determined by the disturbance event which, in turn, determined the size of the subsequent silvicultural treatment. Salvage temporary openings created in response to catastrophic damage are not constrained in size (Forest Plan, p 68). As can be seen in the table, the maximum size of salvage final harvests sold in response to damaging agents was 41 acres, and occurred in MA 3.0. All 24 acres of final harvest sold in MA 6.1 are salvage treatments designed to regenerate poorly stocked stands to young, well stocked forest stands. All salvage treatments were prescribed to recover economic value of damaged timber and restore healthy, fully stocked, forested conditions to treated areas.

Conclusion and Recommendations – The size of final harvest units in timber sales awarded in FY 2008 conformed to MA direction. There is no need identified to change these items. Continue monitoring the size of temporary openings created through shelterwood removals, clearcuts, or two-aged harvests to ensure Forest Plan standards and guidelines are met.

Populations Trends of Management Indicator Species – Northern Goshawk

Action, effect or resource to be managed	Monitoring Questions	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
Population trends of the five Management Indicator Species (36 CFR 219.19(a)(6))	How many northern goshawk nesting territories exist on the ANF and of these, how many are occupied? How many young were produced?	Annual	5 years	B
	What management activities have occurred within known goshawk territories and how have these altered habitat	Annual	5 years	B

Action, effect or resource to be managed	Monitoring Questions	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
	conditions? What is the relationship between trends in habitat and populations?			

Background - The Northern Goshawk is listed as a Management Indicator Species (MIS) and Regional Forester Sensitive Species (RFSS) in the 2007 Land and Resource Management Plan (Forest Plan). As a MIS, the goshawk represents the group of wildlife species that utilize diverse forest landscapes with a predominance of mid to late structural forests. The long term cumulative viability outcome for the goshawk is:

The combination of environmental and population conditions restrict the potential distribution of the species, which is characterized by patchiness and /or areas of low abundance. Gaps where the likelihood of population occurrence is low or zero is large enough that some subpopulations are isolated, limiting opportunity for species interaction... (Forest Plan FEIS p E-29).

Design criteria were included in the 2007 Forest Plan to maintain the integrity of known nest sites (2007 ANF Forest Plan p 84-85).

Between 1974 and 1993 Kimmel and Yahner (1994) documented 100 active goshawk nests in Pennsylvania. This included 6 active nest located on the ANF in 1990 and an additional 26 nests located in the 4 county area that contains the ANF (Kimmel and Yahner 1994).

In 2007 ANF biologists documented 34 goshawk nests on the ANF that had been active within the past 5 years.

Protocol - In 2001 the ANF initiated a partnership with David Brinker of the Central Appalachian Goshawk Project located in Catonsville, Maryland. Since then, efforts have focused on surveying known goshawk territories and banding both adults and young at each active nest.

Slippery Rock University tested the National Northern Goshawk monitoring protocol on the ANF in 2008 (Woodbridge and Hargis 2006). Using a sub-sample of the area surveyed by Tim Kimmel in 1990, the National protocol which used tape playback calls was tested. Although results have not yet been published, preliminary findings indicate that no new goshawk territories were documented.

A general habitat analysis was completed on 34 goshawk nests using our Geographic Information System (GIS). Three buffer zones were delineated around each nest location: 0 to 660 feet; 660 to 1320 feet; and 1320 to 2640 feet. The acreage within each buffer totals 31 acres,

94 acres, and 377 acres respectively. Each buffer zone was analyzed for miles of road, miles of ATV/Motorized Bike trail, miles of snowmobile trail, acres of 3 age classes (0-30, 31-90, and 90+ years), acres of non-forest habitat, acres of high quality remote habitat, and acres in five Management Areas (2.2, 3.0, 5.2, 6.1, and 7.2).

Results - In 2008 twelve goshawk territories on the ANF were known to have had recent activity. Of these twelve, nine were checked and three were active with one territory producing one young. This is down from seven active territories in 2007 that successfully fledged 7 young. Of the 24 territories monitored since 2001, the annual success rate has averaged 45 percent (proportion of monitored territories that fledged at least one young).

A summary of the habitat analysis for 34 goshawk nests on the ANF is provided in Table 25.

Table 25. Roads, Trails, Age Class, Habitat, and Management Areas within 3 Buffer Distances Around 34 Northern Goshawk Nests Active within the Past 5 Years on ANF

	Units	Buffer 660 ft.	Buffer 660-1320 ft.	Buffer 1320-2640 ft.
Roads	Miles (# of nests)	5.4 (25)	16.8 (30)	60.4 (32)
ATV/Bike trails	Miles (# of nests)	0.8 (4)	1.9 (5)	5.7 (6)
Snowmobile trails	Miles (# of nests)	0 (0)	1.6 (7)	8.6 (10)
Age classes				
0-30 yrs	Acres (# of nests)	43 (12)	223 (22)	1091 (31)
31-90 yrs	Acres (# of nests)	550 (32)	1271 (33)	4446 (33)
91+ yrs	Acres (# of nests)	345 (26)	927 (29)	3343 (33)
Habitat				
Non-forest	Acres (# of nests)	41 (27)	114 (33)	572 (33)
HQ Remote	Acres (# of nests)	31 (1)	94 (1)	376 (1)

	Units	Buffer 660 ft.	Buffer 660-1320 ft.	Buffer 1320-2640 ft.
Habitat*				
Mgmt. Area				
2.2	Acres (# of nests)	253 (10)	579 (12)	2037 (15)
3.0	Acres (# of nests)	611 (27)	1626 (29)	5977 (30)
5.2	Acres (# of nests)	0 (0)	0 (0)	27 (1)
6.1	Acres (# of nests)	0 (0)	0 (0)	45 (2)
7.2	Acres (# of nests)	31 (1)	94 (1)	328 (1)

* High Quality Remote Habitat (see 2007 Forest plan FEIS p 3-194)

Conclusion and Recommendations - Reasons for the low number of active goshawk territories and low nesting success are not clearly known. Evidence of West Nile Virus in goshawks has been documented in the Northeast, and evidence of fisher predation on goshawk nests has been observed on the ANF. Human disturbances associated with falconry, banding, roads and trails, and mineral development may be contributing to nest failures.

Analysis of habitat data needs to continue in order to determine what habitat criteria are critical to nesting success. Data presented in Table 25 needs to be correlated with known nesting success and monitored for several years. Some observations from the existing analysis that need further exploration include:

- 74% of nests have roads within the 660 foot buffer but only 12% of the nests are within 660 feet of an ATV trail. Further analysis is needed to determine what impact roads and trails are having on nest success.
- 36% on nests have a small amount of 0-30 year old vegetation within the 660 foot buffer zone while 94% of nests have some 0-30 year old vegetation within the ½ mile buffer.
- Only one nest has been found in the high quality remote habitat areas, no nests have been found in the wilderness study areas (MA 5.2) and only one nest is found in the remote recreation areas (MA 7.2). This raises the question of whether these areas have received the same degree of nest search surveys as other areas where more activities are planned.

Working in cooperation with David Brinker, ANF biologists should increase efforts to check all known goshawk territories during the spring of 2009 and increase efforts to locate new territories especially in areas where survey effort has been minimal in the past.

Habitat analysis should continue in an effort to correlate habitat quality with nesting success.

Proposed oil and gas developments, timber harvest projects, and other activities that change forest conditions should be inventoried for goshawks prior to project initiation. Forest Plan design criteria should continue to be applied to forest activities.

Although the results of the national goshawk protocol tested by Slippery Rock University on the ANF during the summer of 2008 are not yet available, preliminary observations are that this protocol is too labor intensive for most ANF applications. More conclusions and recommendations may be forthcoming once the final report is complete.

Population Trends of Management Indicator Species – Timber Rattlesnake

Action, effect or resource to be managed	Monitoring Questions	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
Population trends of the five Management Indicator Species (36 CFR 219.19(a)(6))	How many rattlesnake dens are known to occur on the ANF?	Annual	5 years	B
	How many dens are active, and what are the number, size, and sex of snakes in occupied dens?	Annual	5 years	B

Background - The timber rattlesnake is identified in the 2007 Forest Plan as a Management Indicator Species (MIS) and a Regional Forester Sensitive Species (RFSS). As a MIS, timber rattlesnakes represent the group of wildlife species that utilize remote habitats that have little human disturbance and relatively few roads. The long term cumulative viability outcome for the selected Forest Plan alternative (Alternative Cm) is:

...suitable habitat is frequently isolated with large habitat gaps. Most subpopulations are isolated with limited opportunity for most subpopulations to interact (Forest Plan FEIS, p E-33).

In 2008, the ANF and Pennsylvania Fish and Boat Commission entered into a cooperative agreement to monitor timber rattlesnakes in an attempt to identify new den locations. Prior to this agreement, the PFBC had reviewed all historic records of rattlesnake dens on the ANF and visited these sites to document current rattlesnake activity. Survey data indicated that many den sites were no longer active and rattlesnake populations were declining on the ANF.

Protocol - During 2008, ANF and PFBC personnel captured timber rattlesnakes in areas where no dens were known. PFBC personnel surgically implanted a radio transmitter in each captured snake, and both agencies tracked the movement of tagged snakes on a weekly basis.

Five male rattlesnakes were implanted with radio transmitters between mid-June and early July. One of the five snakes was illegally killed within 48 hours of release. However, law enforcement officials were able to recover the transmitter and issue a citation.

The remaining four snakes were tracked at least once a week throughout the remainder of the summer. Each time the snakes were located, a GPS location was recorded. The snakes were tracked until it was obvious they were no longer migrating, around the second week of October.

Results - From the four snakes tracked, two new den sites have been located. At least six young-of-the-year were seen in October at one of the two new den sites, and other adult rattlesnakes were seen at the other newly-identified den. Preliminary calculations show the male snakes traveled from 1 to 1.5 miles away from the den sites (based on GPS points plotted on a map) resulting in 3 miles of traveling out and back to their den.

In the process of tracking snakes this year, several prospective dens were identified. During the 2009 field season, attempts will be made to capture snakes near these prospective dens in hopes of documenting new den sites.

In an effort to educate the public about timber rattlesnakes, biologists on the Marienville Ranger District developed a rattlesnake brochure. This brochure has been distributed to various user groups and is available free of charge at all ANF offices.

Conclusion and Recommendations - Maintaining a viable population of rattlesnakes on the ANF will require:

1. Continuing efforts to identify den sites (the most important component of their habitat).
2. Maintaining the integrity of den sites by reducing or removing human activities that have a high risk of causing rattlesnake mortality.
3. Continuing public education efforts to reduce fears and increase appreciation for this sensitive species.

During the timber rattlesnake spring emergence period lasting through June, ANF biologists should increase efforts to locate new dens and visit all known dens to ensure that habitat integrity is being maintained. Efforts should continue to work closely with PFBC and implant additional transmitters in adult snakes with a goal of locating new dens.

Deer Densities

Forest Plan Objective	Monitoring Question	Monitoring Frequency	Evaluation Frequency	Precision/Reliability
Manage white-tailed deer populations at 10 to 20 deer per square mile to sustain herbaceous and woody species diversity across the landscape.	What is the deer density across the landscape?	Annual	5 years	B

Protocol – Deer density is estimated using the spring pellet group transect methodology developed by Dr. deCalesta. Basically, the protocol includes five, one-mile transects per site. The biologist records the number of pellet groups within a six foot radius plot taken at 100 foot intervals along the five miles of transect. Browsing intensity is recorded at 200 foot intervals (every other plot).

Results – The deer density on the Kinzua Quality Deer Cooperative (KQDC) is provided in Tables 26 and 27. The deer density on the portion of the Forest outside of the KQDC is provided in Table 28.

Table 26. Deer density on the KQDC from years 2002-2008.

	2002	2003	2004	2005	2006	2007	2008
Deer density (deer/sq. mile)	27.3	28.7	24.7	14.4	11.6	12.7	14.9
DMAP coupons on KQDC	0	2,960	2,960	700	300	300	500
DMAP coupons on remaining portion of ANF	0	9,290	9,290	6,300	5,000	0	0
Total DMAP coupons	0	12,250	12,250	7,000	5,300	300	500

The opening day of the fall 2007 deer rifle season (FY 2008) was rainy and foggy. The result was a poor deer harvest on the day that accounts for at least half of the total deer harvest. Spring deer density showed a slight increase based on pellet group counts.

Average over-winter deer density varied considerably among the 26 sites (Table 27), ranging from a low of 3.0 deer per square mile to a high of 29.3 deer per square mile.

Table 27. Deer/square mile per site on the KQDC in 2008.

Site	2008 Deer/square mile
A	10.1
B	3.8
C	16.5
D	20.2
E	5.4
F	17.0
G	4.3
H	6.7
I	25.9
J	28.2
K	29.3
L	14.8
M	10.1
N	11.7
O	11.9
P	27.6
Q	5.3
R	6.8
S	5.6
T	3.0
U	24.6
V	21.1
W	17.9
X	29.2
Y	12.5

Z	18.2
Mean*	14.9±1.3

*Confidence interval is mean plus or minus interval with 95% confidence of containing true mean value.

Table 28. Deer Density on NFS Lands Outside of the KQDC in 2008

Location (Forest road)	Deer per square mile
150B/279	7.4
161	17.7
186/490	12.1
184/228/582	27.8
243	14.6
180/525	14.6
Laurel Mill	3.91
214/217/218	17.2
Average	14.4

On NFS lands not included in the KQDC, 8 pellet group transects were conducted in 2008 resulting in an average deer density estimate of 14.4 deer per square mile. In 2005, the average deer density was estimated to be 26.6 deer per square mile. In 2006, the average density dropped to 15.4 deer per square mile. In 2007, the density declined to 12.2 deer per square mile. These less intensive samples over most of the Forest correspond closely with the intensive sampling occurring on the KQDC. However, not all sample sites are in the same location each year.

Conclusion – Deer densities are within the range specified in the Forest Plan (10 to 20 deer per square mile). Continue to monitor deer populations and implement DMAP when necessary. Once spring pellet group transects have been completed, and deer density has been calculated a decision on DMAP license allocations will be made.

Summary of Results and Recommendations

The ANF has completed its first full year of monitoring and evaluation under implementation of the 2007 Forest Plan. Evaluation of information for all monitoring elements indicates no changes to Forest Plan management direction are needed at this time.

Several more years of monitoring are needed before trends can be established. Recommendations for improvements (methodology, frequency, etc.) are summarized below in Table 29.

Table 29. FY 2008 Monitoring Results and Recommendations Summary

Description	Results	Recommendation
Stocking within 5 years of regeneration harvests	Reforestation success rate for 2003 harvests was 91% for green, even-aged regeneration harvests and 100% for green, two-aged regeneration harvests.	Use an adaptive management approach to implement new Forest Plan uneven-aged treatments. Evaluation of effectiveness of new treatments may take 5 to 10 years.
Destructive insects and diseases	831 acres of conifer mortality from overstocking and beetle infestations in pine plantations. Beech bark disease complex decline and mortality continues to spread across ANF.	Continue insect and disease detection monitoring. Continue to collect and use FIA/FHM intensified forest health monitoring data to assess the health of individual tree species. Monitor for presence of future threats from emerald ash borer, hemlock wooly adelgid, and siren woodwasp. Maintain health of conifer stands by maintaining adequate growing space and site resources through thinning. Develop strategies with state-of-the-art pest control techniques. Continue to assess the need for public education, control and monitor the movement of forest products (including firewood), and monitor effectiveness of education and outreach efforts.
Actual outputs and services	Resource areas made varying levels of progress on moving current conditions	Vegetation outputs are developed from previous 3 to 5 years of project-level NEPA decisions. Several years are needed to build trend lines, make reasonable conclusions, and develop meaningful conclusions.

Description	Results	Recommendation
	toward the desired conditions described in Forest Plan. Timber volume awarded was 35% of ASQ.	
Prescriptions and effects	Overall, prescriptions were marked and implemented appropriately; however, a limited number of stands were monitored.	<ol style="list-style-type: none"> 1) Use both relative density and basal area in silvicultural prescriptions, particularly in intermediate thinning. 2) Thinning should remove no more than one third of the trees in a single entry. 3) Stand silvicultural data should be collected prior to harvest treatment, following layout and marking, so existing and residual figures can be compared from the same data collected at the same time. 4) Increase marking check frequency, prior to harvest activities, particularly on newer prescriptions.
Effects of management practices	Mitigation measures were properly applied and effective in avoiding/minimizing resource damage in the two vegetation treatments reviewed.	No findings to recommend changes to vegetation treatment standards and guidelines in Forest Plan at this time.
Evaluate ANF road system for suitable snowmobile use	No changes; used 2007 Winter Use Map in 2008.	Continue snow vehicle map to show where legal for the public to ride.
Snowmobile grooming	Met objective of regular trail grooming during favorable	Continue deferred maintenance projects with volunteers to enhance grooming opportunities.

Description	Results	Recommendation
Snowmobile connectors	conditions. No new connectors built.	Pursue potential opportunities as they are presented.
Maintain or create age class diversity	239 acres of even-aged treatments (Forest Plan Objective = 1,400-1,800 acres annually) and 51 acres of uneven-aged treatments (Forest Plan Objective = 300-700 acres annually) were sold.	Increase treatments to 1,400+ acres using even-aged methods and 300+ acres using uneven-aged methods to meet objectives annually, and continue monitoring progress towards achievement of desired vegetation conditions.
Enhance terrestrial wildlife habitat	1,542 acres of wildlife habitat enhancements (Forest Plan Objective = 1,200-1,600 acres annually) were completed.	Continue to work with partners to complete habitat enhancements.
Prevent introduction of zebra mussels	Number of watercraft screenings and trailer counts met. 1.1% of watercraft screened were found to be at medium risk for zebra mussel introduction. None of the 1,139 trailers inspected had vegetation on them. No zebra mussels	Continue boat screenings, trailer counts, and shoreline and dock inspections at Forest Service boat launches. Continue with boat screenings and trailer counts at Forest Service boat launches to determine the risk of zebra mussel introduction.

Description	Results	Recommendation
	found.	
Bald eagle productivity	50% of documented territories active. 1.6 young per active nest (National Recovery Objective = 1.0 young per nest).	Continue to monitor nest success.
Acres treated to increase understory diversity	2,166 acres treated with site preparation and herbicide to reduce dominance of interfering plants and 18 acres of manual/mechanical treatment for NNIP (Forest Plan Objective = 3,000-6,000 acres annually).	If treatments to reduce interfering, invasive vegetation continue to be lower than Forest Plan objectives, understory vegetation condition will not reach desired Forest Plan condition. Continue monitoring progress towards achievement of desired understory vegetation condition, and the overall health and sustainability of forest ecosystems.
Bald eagle conservation measures	Integrity of active nest sites is being maintained. Location of new sites indicate population is expanding and suitable habitat is available.	Continue to monitor implementation of conservation measures.
Indiana bat conservation measures	Actual snag retention is below snag retention guideline in conservation measure, but likely due to	More emphasis needed on retaining snags.

Description	Results	Recommendation
	salvage conditions. The live tree and canopy closure conservation measures were met.	
Clubshell and Northern Riffshell conservation measures	Conservation measures have been implemented. Sediment from private OGM roads with lack of silt fence maintenance was noted in 13% area.	Continue to monitor implementation of conservation measures.
Identify federally-listed plants	Surveys conducted in proposed timber harvest, road and wildlife opening construction areas found no federally-listed plants.	Develop new strategy for monitoring small-whorled pogonia.
Maximum opening size from even-aged management	Final harvest units in timber sales awarded in FY 2008 conformed to MA direction with average size of 25.9 acres in MA 3.0 and 8.0 acres in MA 6.1.	Continue to monitor the size of temporary openings created through shelterwood removals, clearcuts, and two-aged harvests.
Population trend of northern goshawk	33% of monitored territories active with	Continue surveys and analyze data to determine what habitat criteria are critical to nesting success. Evaluate areas with less disturbance (MA 5.2 and 7.2), as most surveys were conducted in proposed treatment areas. Review Slippery Rock University Final Report

Description	Results	Recommendation
	one young produced.	on 2008 tested protocol for future ANF application.
Population trend of timber rattlesnake	Located two new den sites. Observed six young and several adults at new sites.	Continue work with PFBC to implant additional transmitters in adult snakes to locate new dens. Minimize human activities around known dens and continue public education to increase appreciation for this sensitive species.
Deer densities	KQDC density averaged 14.9 deer per square mile (3.0-29.3 = range) and density outside of KQDC on NFS lands averaged 14.4 deer per square mile (3.91-27.8 = range). Averages fell within the Forest Plan Objective of 10 to 20 deer per square mile.	Continue to monitor deer populations and use spring pellet group transects to inform DMAP permit request.

List of Abbreviations

ANF	Allegheny National Forest
ASQ	allowable sale quantity
BA	Biological Assessment
BOF	Bureau of Forestry
CUA	concentrated use area
dbh	diameter at breast height
DCNR	Department of Conservation and Natural Resources
DEP	Department of Environmental Protection
EAB	emerald ash borer
FACTS	Forest Service Activity Tracking Summary
FEIS	Final Environmental Impact Statement
FHM	Forest Health Monitoring
FHP	Forest Health Protection
FIA	Forest Inventory Analysis
FS	Forest Service
FY	fiscal year
HWA	hemlock woolly adelgid
K-V	Knutsen-Vandenberg
MA	Management Area
msl	mean sea level
NF	National Forest
NFS	National Forest System
NNIS	non-native invasive species
NRS	Northern Research Station
OGD	oil and gas development
OGM	oil and gas management
p	page
pp	pages
PA	Pennsylvania
PDA	Pennsylvania Department of Agriculture
TIM	Timber Information Manager

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