

## Wildlife Resources

### Introduction

The Monongahela National Forest (MNF) works with the West Virginia Division of Natural Resources (WVDNR) to accomplish wildlife management objectives, including habitat restoration and enhancements, through a cooperative agreement between the U.S. Forest Service and the WVDNR. The Forest conducts inventory and monitoring of federally threatened and endangered species, Management Indicator Species (MIS), RFSS, and other species groups (e.g., breeding birds, bats). The WVDNR tracks populations of most of the game species on the Forest. The MNF also cooperates with other Federal and State agencies and Universities, through several ongoing agreements as well as formal and informal consultations, in developing monitoring plans and developing and implementing conservation strategies for threatened, endangered and proposed species.

### 2007 Accomplishments

The Wildlife Program accomplishments for FY 2007 included:

- Budget and work planning, including out-year planning.
- Wildlife surveying for proposed projects that may affect habitat conditions.
- Coordination and consultation with WVDNR, US Fish and Wildlife Service (USFWS), and other wildlife organizations regarding TES species and other wildlife concerns.
- Coordination and cooperation with agencies, non-government organizations, and universities on Forest wildlife studies.
- Quarterly coordination meetings for Forest wildlife group.
- Monitoring and evaluation efforts TES, MIS and other species and habitats of interest as described below.

### Monitoring and Evaluation

#### FOREST PLAN MONITORING FOR WILDLIFE RESOURCES

The Monongahela National Forest Land and Resource Plan (2006) outlines monitoring to address wildlife concerns and population objectives for Management Indicator Species (MIS), Threatened, Endangered, and Proposed (TEP) species, Regional Forester Sensitive Species (RFSS), and other wildlife and habitats of concern or interest. In addition to addressing the goals and objectives associated with management and conservation of these species, the Forest Plan sets forth specific monitoring questions developed to ensure that monitoring and evaluation address information essential to measuring the Forest Plan. This report will focus primarily on MIS, RFSS, and Threatened and Endangered Species.

**FEDERALLY THREATENED OR ENDANGERED SPECIES****Monitoring Question 31. To what extent is Forest management contributing to the protection and recovery of threatened and endangered species?**

Four federally endangered or threatened vertebrate species make their homes on the Monongahela: the WV northern flying squirrel (*Glaucomys sabrinus fuscus*), Indiana bat (*Myotis sodalis*), Virginia big-eared bat (*Corynorhinus townsendii virginianus*), and Cheat Mountain salamander (*Plethodon nettingi*). The Forest Plan direction for TEP species is to provide habitat capable of contributing to the survival and recovery of species listed under the ESA, and to provide habitat that may help preclude Proposed species from becoming listed. Toward that end, the Forest has been actively monitoring the four species noted above, while concurrently participating in studies designed to better understand the ecology of these species, and developing management plans to restore and enhance TEP habitats.

**Northern Flying Squirrel (*Glaucomys sabrinus fuscus*)**

**Monitoring.** The northern flying squirrel (NFS) was listed as a federally endangered species in 1985. Since that time, thousands of flying squirrel nest boxes have been placed and monitored on the MNF, and live trapping surveys have been conducted in proposed project areas. In December 2006, following a review of the squirrel's status, the USFWS formally proposed removing federal protection for the flying squirrel.

In 2007, the Forest and WVDNR continued to monitor historic nest boxes across the Forest. In addition, the Forest conducted a more intensive nest box check and trapping effort in portions of NFS habitat on the Forest as part of a pilot monitoring study being conducted to determine the most effective long-term monitoring protocol for this species, while gathering site-specific demographic and habitat information for the squirrel. Ten 100-hectare blocks included in the pilot study were sampled using four "treatments", or sampling techniques, to assess different monitoring protocols. A total of 750 nest boxes were constructed and placed in these sampling areas, and nest box checks and trapping associated with the study was conducted across all areas from 2005-07. All adults captured were measured and pit-tagged (if not recaptures); other demographic and habitat information also was collected for all captures and sampling units. During FY 2007, 25 NFS captures were made as part of this study, including one recapture.

The results of this study will allow us to determine the most practicable sampling strategy for monitoring this endangered species on the Forest. A long-term monitoring plan will then be established to gather population information (primarily in the form of spatial and temporal occupancy patterns) across the Forest, as well as to continue to collect critical information regarding the species' life history and habitat requirements. The WVDNR reported that a total of 38 northern flying squirrel captures were made at fifteen sites across the WV species' range in 2006-07 (Endangered Species Federal Assistance Performance Report, WVDNR, 2006-2007), including the 25 captures made by Monongahela NF biologists as noted above.

Other studies continue on the Forest and surrounding lands to gain additional information regarding NFS life history and habitat requirements. In addition, the Forest is actively involved

in planning site-specific spruce restoration and enhancement areas in support of the Forest Plan long-term objective of increasing mid-late and late-successional spruce forest acreage to provide optimum habitat for the NFS and other high-elevation spruce and spruce-hardwood species.



**Figure WL-1. Northern Flying Squirrel after Capture, Processing, and Release**

The Forest also entered into a Red Spruce Memorandum of Understanding (MOU) with the USFWS, WVNDR, WV Division of Forestry (WVDOF), Northern Research Station (NRS), and The Nature Conservancy (TNC). This MOU is meant to encourage active participation and cooperation in the conservation and management of red spruce forests in West Virginia. Cooperative monitoring of both the red spruce ecosystem and those species characteristic of this unique habitat, such as the northern flying squirrel and Cheat Mountain salamander, will also be implemented as part of this MOU.

**Evaluation, Conclusions, and Recommendations.** The pilot study will be completed in FY 2008, followed by set-up and implementation of the long-term monitoring program for this species. To date, the pilot monitoring program has been very successful, with 77 captures over 2 ½ years, including several recaptures. Data will be analyzed in the coming year to examine habitat relationships and demographic data collected, as well as monitoring protocols.

The monitoring of NFS (through next box checks, capture sites, and telemetry tracking) will continue to help the Forest determine population occupancy patterns and refine our understanding of suitable habitat, thus allowing us to manage for the protection and recovery of this species. In addition to the landscape-level monitoring for the NFS, both the species and habitat will be monitored in areas managed for spruce restoration and enhancement (i.e., using adaptive management to ensure that habitat modifications are beneficial to the NFS and associated wildlife species). The 4.1 management prescription in the Forest Plan emphasizes spruce and spruce-hardwood ecosystem restoration, and is designed to aid in the recovery of the NFS and other TES species associated with these habitat types. Within suitable squirrel habitat, spruce and spruce-hardwood stands would generally be allowed to grow older and develop

uneven-aged structure over time. However, areas within MP 4.1 (and other appropriate areas) may be managed to encourage spruce regeneration and promote desired habitat characteristics, while minimizing ground disturbance.

### **Cheat Mountain Salamander (*Plethodon nettingi*)**

**Monitoring.** The Cheat Mountain salamander is a federally threatened species, whose current range lies primarily within the proclamation boundary of the MNF. Dr. Thomas Pauley of Marshall University has delineated known and potential habitat for the Cheat Mountain salamander (CMS) and has conducted surveys across much of the Forest since the species was listed, in addition to conducting independent research associated with the salamander. Dr. Pauley conducted surveys at the Timberline Four-Season Resort on Forest Service land in Tucker County, continuing a 21-year study to examine effects of the Salamander Run ski trail on a population of CMS.

In addition to Dr. Pauley's work, the MNF was involved in a Participating Agreement with the Northern Research Station and University of Wisconsin at Stevens Point to develop landscape- and local-level models to identify potential CMS habitat across the Forest and the overall range of the species. These efforts were meant to allow the Forest to better manage potential habitat for the species, target survey needs, and develop Forest-wide conservation plans.

**Evaluation, Conclusions, and Recommendations.** Data gathered by Dr. Pauley regarding CMS populations on the Forest have been used in management decisions and for planning purposes. For example, results of the study at Timberline have played an important part in our assessment of the renewal of a special use permit at that site. However, because most of the CMS surveys on Forest have been associated with project clearance or research studies, there remains a need to conduct more systematic surveying for this species across potential habitats on the Forest to ensure that our management is contributing to the protection and recovery of the species.

### **Endangered Bat Species**

The MNF conducts Forest-wide inventory and monitoring of forest bats on an annual basis. The purpose of this program is to inventory watershed areas for all species of forest bats and to clear project areas as part of Sec. 7 consultation, as well as to monitor long-term sites across the Forest. Long-term monitoring will allow us to detect any unusual changes in bat populations over time that may or may not be associated with management activities, so that we can act appropriately to ensure continued species viability on the Forest.

As part of the Forest's bat monitoring program, Sanders Environmental, Inc. conducted mist-netting at 50 sites on the MNF during 2007, including 30 watershed-specific sites and 20 long-term monitoring sites. Bats were captured using mist nests, which were set in accordance with the USFWS protocol and the project technical specifications found in the MNF bat monitoring plan and 2007 contract. A total of 1,154 bats were captured as part of this effort. Ten bat species were encountered during mist-netting, including three male Indiana bats (E), 16 small-footed bats (*Myotis leibii*, RFSS), and an evening bat (*Nycticeius humeralis*), a new species recorded on the Forest.

**Indiana Bat** (*Myotis sodalists*)

**Monitoring.** Historical Indiana bat capture locations are included as sites in our long-term monitoring program. As part of that ongoing mist-netting effort, transmitters are attached to selected bats, and radio-telemetry is used to gather information about habitat use by Indiana bats on the Forest. In addition, the Forest cooperates with the WVDNR and USFWS to conduct additional surveys that may be used to track the status of the species. In 2004, a lactating Indiana bat was captured at one of our long-term mist-net sites, fitted with a radio-transmitter, and tracked to roosting locations nightly through the life of the transmitter. As a result of this work, an Indiana bat maternity colony of approximately 30 bats was located within the Forest Proclamation Boundary. Additional netting sites were located in the vicinity of the site where that female had been captured and the identified roost site locations during 2005 and 2006. No female Indiana bats were found during this effort, although male Indiana bats were captured and tracked to roost trees in the surrounding area. While no mist-netting occurred at this location during 2007, this location remains a long-term monitoring site for us, which will be surveyed on a regular basis. Meanwhile, the Forest will continue to coordinate with the USFWS and WVDNR to maintain a protective zone centered on the maternity site, and to search for additional maternity colonies in the area and elsewhere on the Forest.

As noted above, three male Indiana bats were captured as part of our 2007 Forest-wide bat monitoring effort. These bats were fitted with radio-transmitters, and tracked to roosting locations nightly through the life of the transmitters. Roost trees were identified and located with GPS, and habitat measurements were taken for each. In addition to these surveying efforts, habitat for the Indiana bat on the MNF is also being assessed and modeled using GIS to inform management recommendations and strategies for habitat enhancement.



**Figure WL-2. Indiana Bat fitted with a Radio-telemetry Transmitter**

Surveys of West Virginia bat hibernacula were conducted by WVDNR personnel in 22 caves and during the winter of 2006-07, including 17 caves known to have had Virginia big-eared bats or Indiana bats in previous winters. Nine caves contained *M. sodalists* during these surveys, with a total of 13,669 individuals observed—a 9.1 percent increase over a previous survey of the same

caves. Assuming stable populations in the caves not checked during this survey, the number of *M. sodalis* hibernating in WV caves is estimated at 15,750 individuals (Endangered Species Federal Assistance Performance Report, WVDNR, 2006-2007). The greatest increase in number of individuals (+ 968) was observed in Hellhole Cave, where 12,858 *M. sodalis* were estimated during this survey. Hellhole is the largest hibernaculum for these bats in West Virginia, and one of the most important Indiana bat caves in the East. This critical cave is located within the MNF Proclamation Boundary, but on private land about 1 mile from National Forest land.

Eleven Indiana bat hibernacula are located within the MNF Proclamation Boundary, but only three (Big Springs Cave, Cave Hollow/Arbogast Cave, and Two-Lick Run Cave) have all or most of their entrances on Forest land. Both Big Springs and Cave Hollow/Arbogast have showed a general increase in *M. sodalis* counts from the early 1980's to the present, while Two-Lick Cave has fluctuated from a high of 12 in 1995, to zero Indiana bats detected in 2003 (one was observed in the 2005-06 survey).

Mist-net sites were set to further investigate an area identified as a possible bachelor colony roost site in 2004. That year, several male Indiana bats were captured near this site and fitted with radio-transmitters. These bats were tracked to roosting locations nightly through the life of the transmitters. Biologists from the MNF and Sanders Environmental, Inc. conducted initial emergence counts documenting approximately 30 bats from a single roost tree. In a cooperative effort including personnel from Sanders Environmental Inc. and MNF, USFWS and WVDNR biologists, this site was mist-netted in 2005-2007 using a triangle set around the roost tree. In 2007, eleven adult male Indiana bats were captured as part of that effort, out of a total of 17 bats counted emerging; another emergence count at the same tree a week earlier yielded 28 bats.

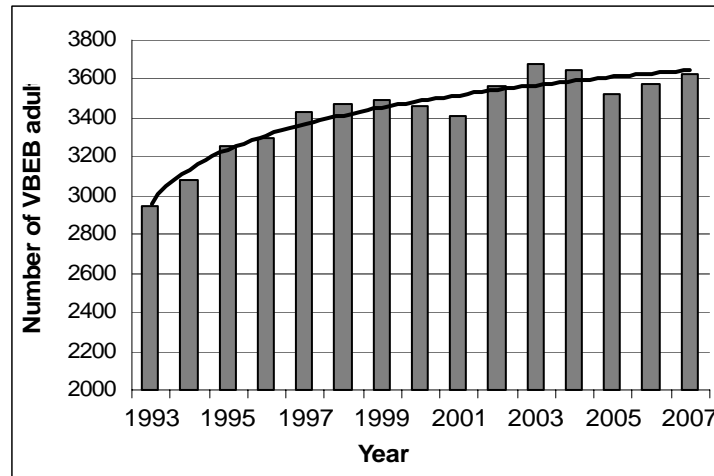
### **Virginia Big-eared Bat (*Corynorhinus townsendii virginianus*)**

**Monitoring.** Virginia big-eared bat (VBEB) populations are surveyed in cooperation with WVDNR to track the status of the species, and the MNF has an ongoing program of mist-netting and telemetry work to gather information about habitat use by bats on the Forest (see above). The VBEB is a cave obligate species, with its largest populations located in West Virginia. A 2007 census of ten summer VBEB colonies by the WVDNR across the state resulted in an estimate of 6,264 adults; a 0.7% decrease from the 2006 count (Endangered Species Federal Assistance Performance Report, WVDNR, 2006-2007).

Changes in summer colony population size at individual caves ranged from -23.4 percent at Cave Mountain to +35.9 percent at Mill Run Cave. Six of the ten colonies have entrances located within the Forest Proclamation Boundary, including the two caves noted above. The change in VBEB estimates from 2006 to 2007 associated with the other four caves within the Proclamation Boundary are: Arbogast /Cave Hollow (+0.6%), Mystic (-1.2), Peacock (+0.6%), and Schoolhouse Cave (+12.7%; Table 1; Endangered Species Federal Assistance Performance Report, WVDNR, 2006-2007).

The WVDNR's winter hibernacula survey included all known significant hibernacula for *C. t. virginianus* and most minor hibernacula in 2006-07. A total of 7,314 individuals were counted in 17 caves, including a new hibernaculum with a single *C. t. virginianus* individual in Spring

Run Saltpeter Cave that was discovered by a Bat Conservation International biologist (Endangered Species Federal Assistance Performance Report, WVDNR, 2006-2007).



**Figure WL-3. Total Number of Adult *C. t. virginianus* in the Six Maternity Colonies with Entrances within the MNF Proclamation Boundary**

***Evaluation, Conclusions, and Recommendations.*** Monitoring results over the recent past indicate that numbers of both Indiana bats in hibernacula and Virginia big-eared bats in maternity colonies and hibernacula on or near the Forest are stable or increasing. These results would seem to indicate that Forest management practices are not having any large-scale detrimental impacts to these species or their habitats at present. Additional monitoring is needed and planned to ensure that populations continue to be viable, particularly in the face of threats to bats from outside the Forest (e.g., white-nose syndrome) and to confirm that Forest management continues to contribute to the protection and recovery of these species.

#### MANAGEMENT INDICATOR SPECIES (MIS)

**Monitoring Question 10. To what extent is Forest management moving toward desired habitat conditions for MIS and species associated with MIS habitats?**

Forest Plan direction is to monitor MIS and their relationships to habitat affected by management to determine whether Forest management is moving toward providing desired habitat conditions for MIS and other species associated with MIS habitats. This item is addressed through the monitoring of MIS and their habitats, and planning for projects that will create or enhance desired conditions for these species. Under the 2006 Forest Plan, MIS species for the Forest include the northern flying squirrel, wild turkey (*Meleagris gallopavo*), cerulean warbler (*Dendroica cerulean*), and wild brook trout (*Salvelinus fontinalis*). Monitoring for the squirrel, an endangered species, is addressed above, and the brook trout is addressed in the Aquatic Resources portion of this report. Game species, such as wild turkey, as well as deer, bear and other harvested species, are monitored by the WV Department of Natural Resources (WVDNR)

via both the collection and analysis of harvest data and ongoing DNR research projects, providing a forest-wide population index. The Forest and WVDNR cooperate in ongoing songbird point count monitoring and breeding bird surveys that are expected to provide Forest-wide data on this species. In addition, the Forest is involved in a participating agreement specific to the cerulean warbler.

### **Wild Turkey (*Meleagris gallopavo*)**

**Monitoring.** WVDNR data indicated a fall 2006 turkey harvest of 5 percent greater than the previous year; this increase followed a consistent decline over the previous five years. Hunters in West Virginia harvested 9,976 turkeys during the 2007 spring gobbler season, about 15 percent lower than the 2006 harvest. The reduced gobbling activity and lower harvest rate were the result of poor wild turkey brood production in 2005. Even though the state's population is generally higher due to last year's good brood production, the low numbers of 2-year-old birds in the population (from poor brood production in 2005) affected the 2007 spring harvest.

The 2007 mast survey included 326 locations, covering all regions of West Virginia. Compared to the 2006 survey, the majority of mast species declined considerably, with the most noticeable decline in soft mast species (e.g., apple, blackberry, and crabapple). This year marks the second year of decline for several mast species, including scrub, red, black, and scarlet oak; ten of the 18 species monitored declined 20 percent or more. Although the decline in oak species was considerable from 2006, the index of all oaks combined remained above the 37-year average. Because of the irregular patterns of abundance, we should be cautious when comparing these indices; however, good acorn production is important because oak are the most valuable mast species in West Virginia. Current mast conditions affect over-winter survival and reproductive success of many wildlife species, including the wild turkey.

**Evaluation, Conclusions, and Recommendations.** Many factors affect harvest success (e.g., hunting season variations, changes in hunting regulations, weather, hunter participation, access) that have little to do with the overall populations of game animals. Also, although harvest data is a fairly good indicator of hunter success rates, the harvests only complicate the Forest's ability to determine what effects Forest activities or management may be having on game populations. In fact, good harvest is often an indicator of poor habitat conditions, in terms of mast production, because turkeys are then clustered in the fewer good habitat patches in higher densities, allowing for easier hunting. The mast survey data collected by the DNR is perhaps a better barometer for how Forest management is meeting the needs of the wild turkey and similar species, and this data appears to indicate generally favorable conditions for the species.

### **Cerulean Warbler (*Dendroica cerulean*)**

Breeding Bird Survey data from 1966-2000 indicate a decline of about 3 percent per year throughout the Cerulean Warbler's breeding range. West Virginia is in the species' core breeding range, with relatively high densities, though numbers have been steadily declining in the state's breeding populations as well. Partners In Flight plans for the three physiographic areas in West Virginia (Ohio Hills, Mid-Atlantic Ridge and Valley, Northern Cumberland Plateau) all identify cerulean warblers as the species of highest conservation concern within



mature deciduous forest habitats. This species was a candidate for listing as a threatened/ endangered species in 2002. However, in December 2006, the USFWS announced that while populations of the warbler were declining, listing the species as threatened under the Endangered Species Act was not warranted. The Service will pursue cooperative conservation initiatives designed to reverse population declines and to prevent the need to list this migratory songbird.

**Monitoring.** The Forest conducts annual breeding bird point count surveys across the Forest. This data, along with Breeding Bird Survey data, provide us with general information regarding the distribution of breeding birds, including the cerulean warbler (CEWA), across the Forest. In addition, the MNF partnered with the USGS (West Virginia Cooperative Fish and Wildlife Research Unit) and West Virginia University, through a participating agreement, to assess the responses (e.g., densities and nesting success) of CEWA populations and other forest bird species to silvicultural treatments and differing levels of timber harvesting intensity. This ongoing study is part of a larger effort involving researchers, land managers and non-government organizations in states throughout the species' breeding range.

The study calls for pre-treatment, immediate post-treatment, and longer term post-treatment monitoring of CEWA population responses to differing harvest activities. The pre-treatment phase included background GIS work, site selection, and the collection and analysis of baseline, pre-harvest vegetation and bird survey data. The harvest treatments, implemented in the fall of 2006, included: 1) reference stand, undisturbed by harvesting, 2) single-tree selection harvest, 3) shelterwood harvest, and 4) regeneration (clearcut) harvest (Figure WL-4).

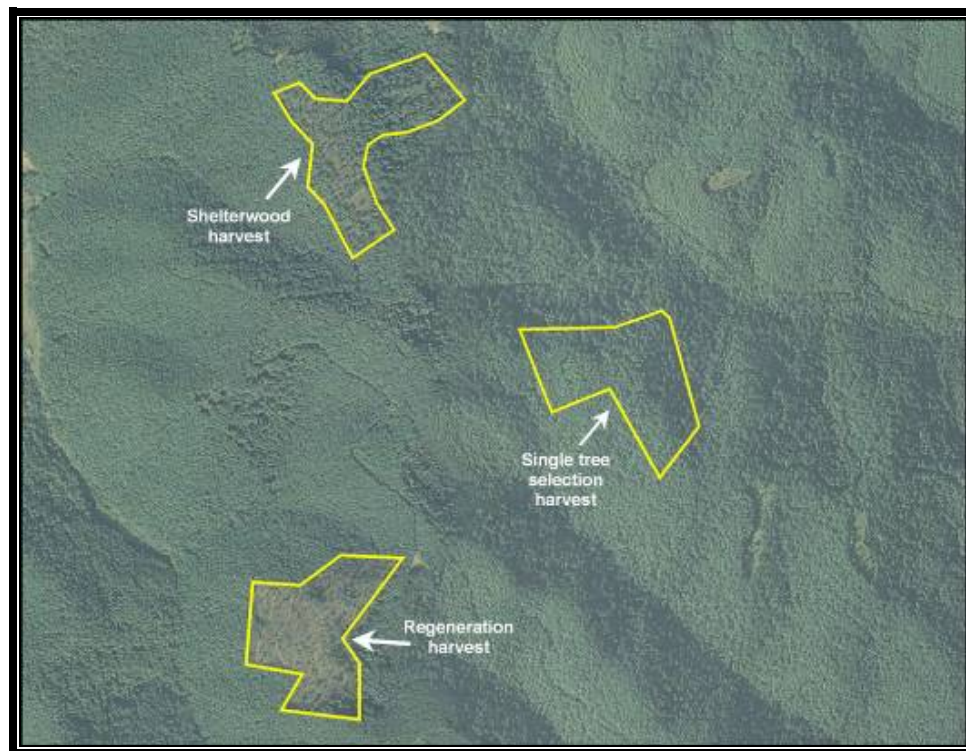


Figure WL-4. Cerulean Warbler Study Silvicultural Treatments, Pheasant Mountain, WV

Initial post-treatment monitoring began in spring 2007 with the collection of territory mapping data, nest monitoring, and the collection of habitat metrics. Two additional years of post-harvest data will be collected in 2008-2009. Data analysis and the production of a Final Report will follow, providing important information regarding CEWA populations and habitat use on the MNF, which should enhance the ability of the Forest and other National, State and Private forest managers to better provide for the species' long-term viability.

**Evaluation, Conclusions, and Recommendations.** Data from Forest-wide bird surveys indicate a continued presence of cerulean warblers across the Forest, in both managed and unmanaged areas. The ongoing study with WVU will be completed at the end of FY 2008, at which point the data from the Monongahela and the other sites included in the regional study will be analyzed and should provide valuable information regarding the effects of management on these and other forest bird species. This information will be used by the Forest in management planning to maximize desired habitat conditions for this and associated species in suitable areas. Meanwhile, the Cerulean Warbler Working Group is developing draft voluntary forest management guidelines for the species.

#### REGIONAL FORESTER SENSITIVE SPECIES (RFSS)

**Monitoring Question 26. To what extent is Forest management contributing to the conservation of sensitive species and maintaining or restoring their habitat conditions?**

<i>Scientific Name</i>	<i>Common Name</i>
<b>Mammals</b>	
<i>Myotis leibii</i>	Eastern small-footed bat
<i>Microtus chrotorrhinus caroliniensis</i>	Southern rock vole
<i>Neotoma magister</i>	Allegheny woodrat
<i>Sorex palustris punctulatus</i>	Southern water shrew
<i>Spilogale putorius</i>	Eastern spotted skunk
<b>Birds</b>	
<i>Accipiter gentilis</i>	Northern goshawk
<i>Falco peregrinus anatum</i>	American peregrine falcon
<i>Ammodramus henslowii</i>	Henslow's sparrow
<i>Pooecetes gramineus</i>	Vesper sparrow
<i>Contopus cooperi</i>	Olive-sided flycatcher
<i>Lanius ludovicianus migrans</i>	Migrant loggerhead shrike
<i>Melanerpes erythrocephalus</i>	Red-headed woodpecker
<i>Vermivora chrysoptera</i>	Golden-winged warbler
<b>Amphibians</b>	
<i>Aneides aeneus</i>	Green salamander
<i>Cryptobranchus alleghensiensis</i>	Hellbender
<b>Reptiles</b>	
<i>Glyptemys (Clemmys) insculpta</i>	Wood turtle
<i>Crotalus horridus</i>	Timber rattlesnake

**Table WL-1. RFSS Wildlife Species for the Monongahela NF (vertebrates, excluding fish)**

The Forest Plan directs us to provide habitat diversity to support viable populations of native and desired non-native wildlife and fish species, including MIS, game species, and furbearers, and to keep RFSS from a trend toward federal listing. Toward that end, RFSS species monitoring should provide information that will lead to a better understanding of the viability of current RFSS populations and how Forest management is contributing to the conservation of these species and their habitats.

Based on Forest monitoring data, consultation with experts, and a review of the literature, the Forest's sensitive species list was revised in September 2006; vertebrate wildlife (not fish) species currently on the list are shown in Table WL-1. Sensitive species' surveys, project mitigation, and data collection are done on an ongoing basis as part of Manual/Handbook and Regional direction. In addition to some of our Forest-wide monitoring that tracks a number of RFSS (e.g., breeding bird surveys and point counts, goshawk surveys, and stream surveys), our project-specific clearance efforts are focused on unique habitats (e.g., rock outcrops) that support many of the Forest's sensitive species.

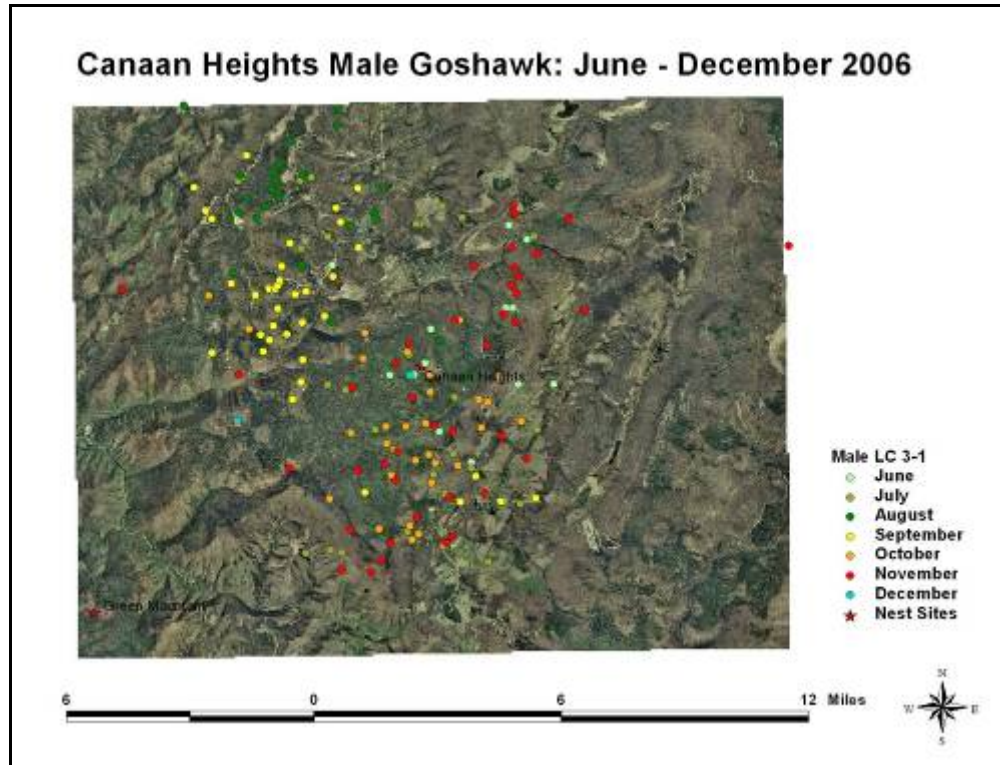
### **Northern Goshawk (*Accipter gentilis*)**

**Monitoring.** The northern goshawk is also a species of concern for the State and the Fish and Wildlife Service as an indicator of healthy forested habitats. Forest personnel survey for northern goshawks to determine if and where the species occurs, in order to protect and manage for the species and its habitat when making land management decisions. The Forest also entered into a Challenge Cost-Share Agreement with the Maryland Department of Natural Resources to develop a better understanding of the movement patterns of northern goshawks on the MNF. As part of that agreement, satellite radio transmitters (PTTs) were acquired for use on birds found during annual inventory and monitoring surveys. Adult goshawks are fitted with PTTs and the subsequent satellite data is retrieved to monitor breeding and non-breeding habitat use and home range size. This information will provide insight into a variety of basic biological questions that have not been addressed in an eastern population of northern goshawks.

As reported in the 2006 MNF Wildlife Monitoring Report, surveys that year revealed a new nest on the Cheat District of the Forest with a breeding pair and four chicks. In the summer of 2006, the adults were banded and fitted with satellite transmitters (as part of the cost-share agreement noted above). The female of the pair did not survive through the summer; the transmitter was found along with goshawk feathers at the same location. The male did survive and his movements were tracked via satellite information received through December 2006; this information indicated that the male remained in the area, within roughly 9 miles of the nest site, at least through this time period.

In 2007, MNF biologists inventoried over 10,000 acres for northern goshawks using standard survey protocol along transects in potential habitat. Surveys were conducted within potential habitat in proposed project areas or watersheds, within high quality habitat elsewhere on the Forest, and in the vicinity of reported sightings. In addition, all known historic nest sites were surveyed to determine if those nests were currently active. No goshawks were observed by sight or sound along pre-planned survey transects. Only one of the previously known nest sites revealed an active nesting attempt in 2007, the nest site that was discovered in the Cheat District

last year. A pair was observed again at the same nest site in 2007, though no reproduction was confirmed. Survey transects at other locations on the Forest during the breeding season resulted in two additional confirmed goshawk sightings, but additional active nest sites were not found; these sites will be revisited in 2008, with a more intensive search for nests.



**Figure WL -4. Satellite Transmitter Locations for Male Northern Goshawk, June-Dec 2006**

Posters were placed near trails and campgrounds early in the season, asking the public to report any sightings of northern goshawks. These posters appeared to be quite effective this year, with several credible sightings reported. Detailed information was collected regarding the location of these sightings, and survey transects will be run in these areas in FY 2008.

***Evaluation, Conclusions, and Recommendations.*** The results of the satellite transmitter study work are being analyzed and will be useful, along with future data collected as part of these efforts, in informing our conservation and management efforts for this species. At present, most of the documented habitat-association information for this species comes from populations in the western U.S. and Great Lakes. Because available habitats may be quite different in the eastern U.S., it is critical that we continue to develop both demographic and habitat data for the northern goshawk in this part of the species range. That data can then be used to ensure that appropriate Forest management is occurring, including maintenance or restoration of suitable habitat that will contribute to the conservation of this species.

The posters and requests for public assistance in identifying potential goshawk nesting sites has been very productive and will be continued, particularly given the difficulty in conducting

standard protocol surveys for the northern goshawk throughout potential habitat on the Forest. This effort will be continued in future years, and additional methods of detecting potential sites (e.g., acoustic monitoring) will be explored as well.

## **Breeding Birds**

***Monitoring.*** The Forest currently has eight bird species on the list of RFSS, more than any other vertebrate group. While annual surveys are conducted for the northern goshawk, most of our information for other bird species comes from breeding bird surveys (point counts and breeding bird survey routes). Point count surveys are conducted, among other reasons, to document species habitat use, gather information regarding TES and other species' trends, and assess population responses to habitat management across the Forest. Point count transect routes were surveyed across the Forest by biologists from the MNF, WVDNR, and several contracted ornithologists. These surveys were conducted using standard protocol and data sheets were sent to the WVDNR for inclusion in a statewide database.

Twenty-five point count transect routes were run by the MNF during the spring; the WVDNR conducted additional surveys along routes within the Forest proclamation boundary. Two of the routes, begun in 2006, traverse proposed harvest areas; one was harvested in 2007 and the other is proposed for harvest in the near future. These and others pre- and post-management survey sites run in the future should provide important data for adaptive management on the Forest, particularly in reference to bird species of concern. Of the eight birds on the RFSS list, three were historically detected in point count routes on the Forest: the olive-sided flycatcher, red-headed woodpecker, and golden-winged warbler. Because of the placement of the vast majority of our point count routes in forested habitats, it is not surprising that the other species were not detected as the other passerines are generally associated with grasslands and other open habitats.

In addition to the point count surveys detailed above, the MNF, WVDNR, and private groups (e.g., the Brooks Bird Club) and individuals have conducted Breeding Bird Survey routes and Christmas bird counts on or near Forest land. Mist-netting and bird-banding also are conducted at the Allegheny Front Migration Observatory at Dolly Sods on the Cheat-Potomac District.

***Evaluation, Conclusions, and Recommendations.*** Current bird survey efforts are, and will continue to be, useful in providing baseline data for development of long-term trend information on the Forest. In addition, the addition of routes within proposed management areas that will result in both pre- and post-management survey data will provide important information regarding the effects of different types of Forest management on bird communities. Because several of the birds on the Forest's sensitive species list are associated with more open habitats (e.g., golden-winged warbler, Henslow's sparrow, and vesper sparrow), more effort should be directed toward surveys in these habitats in addition to the forested habitats. Additional surveys also should be focused on historical routes associated with RFSS to determine whether breeding pairs, previously detected in routes on the Forest, are still using these habitats and, if not, assess potential management actions to ensure viable populations.

## **Project-related Surveys**

Many of the non-avian sensitive species on the Forest are associated with rocky outcrop and ledge habitats. The small-footed bat is addressed as part of the Forest-wide bat survey effort described above; however, the green salamander, timber rattlesnake, Allegheny woodrat, and southern rock vole also use these rocky/ledge habitats and are not currently part of a Forest-wide effort. As a result, a special attempt is made to locate and survey these discrete habitats in association with planned management activities or other proposed projects. In FY 2007, survey efforts were focused primarily in the Gauley and Marlinton/White Sulphur Ranger Districts, in the vicinity of proposed timber sales and prescribed burn projects.

**Gauley District Project Monitoring.** Clearance surveys were conducted for the Nicholas County portion of the Big Rock timber sale from late July through September 2007. With 930 acres covered, Forest personnel documented five green salamanders, one Allegheny woodrat midden, and one timber rattlesnake. Also, approximately 40 acres of wildlife openings throughout the district were monitored for success throughout the fiscal year. The discovery of running buffalo clover (*Trifolium stoloniferum*) along Forest Road 425 in July 2007 prompted additional visits to estimate the coverage of that endangered plant species.



**Figure WL-5. Green Salamander and Timber Rattler observed during Clearance Surveys**

**Marlinton/White Sulphur District Project Monitoring.** Clearance surveys were conducted for several prescribed burn projects on the district, totaling > 3,000 acres. General transect lines were pre-established (via GIS and GPS) through different habitat types, including all general types, but focused on riparian and potential rock outcrop areas, to ensure adequate coverage. Additional areas were covered, particularly if rock outcrop/talus areas or other special habitats were noted in the field. During these surveys, several timber rattlesnakes were noted as well as potential outcrop habitat for Allegheny woodrats and green salamanders (though none were observed); natural vernal pools also were observed in these areas, with several amphibian species recorded. In addition to project clearance surveys, ten acres of mowing was completed in association with roads leading into several grazing allotments that were developed in FY 2007.

**Evaluation, Conclusions, and Recommendations.** The project clearance surveys were successful in identifying potential RFSS habitats. Information regarding species locations and additional potential habitat will be used in the planning process to ensure that appropriate protective measures are in place for these habitats. In addition, these habitats will be monitored through project planning, implementation and beyond to track species populations and ensure

that management actions do not adversely affect these populations. Monitoring will also indicate where management actions result in restoration or enhancement habitat conditions; that knowledge will be carried forward to inform the planning and design of future management actions to better contribute to the conservation of RFSS on the Forest.

## OTHER WILDLIFE RESOURE MONITORING EFFORTS

### Northern Saw-whet Owl (*Aegolius acadicus*)

Saw-whet owls were monitored on the Forest during fall/winter as part of a long-term mist-netting effort on the Forest. This monitoring station, part of a network of five stations in WV and MD coordinated by the Maryland Department of Natural Resources, is located on the outskirts of the Otter Creek Wilderness Area and has been in place since 1997. As part of this network, nest boxes were installed in suitable habitat on the Forest. Nest boxes also have been placed throughout the MNF by the WVDNR and volunteers. All saw-whet owl nest boxes are monitored annually to gain data regarding the distribution, abundance, and reproductive success of this species. In 2007, one nesting pair located in a box on Briery Knob in the Gauley District produced five fledgling, the third successful year at this site. Because of the similarity in habitat use between this species and the endangered WV northern flying squirrel, these boxes also have provided habitat for that species, with several NFS captures recorded.

### Bird and Bat Migration Study

The MNF entered into an inter-agency agreement with the USGS and USFWS to provide a framework for cooperative activities necessary to monitor migratory birds and bats on the Forest in order to better understand their spatial and temporal distribution patterns during migration through the region, and the potential effects of management or other actions, including wind power development, on these populations.



**Figure WL-6. Acoustic Bird Migration Monitoring Units and Graphic Results of Radar Monitoring at Sharp Knob, Monongahela NF**

MNF biologists assisted USGS and FWS personnel with the installation and maintenance of several monitoring sites in high-elevation areas of the Forest. Acoustic monitoring equipment was placed in twelve locations to monitor bird migration over the Forest during the spring and fall migration. Data was collected from April-June and August-October in 2007; recordings from last year and this spring are currently being evaluated. One of the acoustic monitoring locations is located in close proximity to where portable radar sampling also was conducted in 2006, which allowed concurrent tracking of bird migration patterns for three day periods at several intervals through the spring and fall. Analysis of that radar data is nearly complete.

Information gained as a result of this study will increase the knowledge base available to help assess of how activities on or near the MNF may affect migratory bird populations. Data from the MNF will be combined with that from other regional study sites, contributing to a more comprehensive understanding of nocturnal bird and bat migration through the Appalachians. This information will also be used to develop a summary map of areas where the risk of migrant interactions with potential wind power projects is expected to be low, moderate, or high.

### **Gauley District Red Spruce Habitat Projects**

The Gauley District spruce habitat enhancement project area consists of 400 acres in Pocohantas County that have been monitored on a regular basis to determine the success of the young spruce community. Review of this monitoring in 2006 indicated that the density of these sapling and pole-sized trees is too high, restricting wildlife movement through the unit, and failing to provide suitable habitat for species dependent on mature red spruce conditions. This situation can persist for decades as the co-dominate trees slowly mature and compete for resources.

As a result, the District proposed to manually enhance red spruce habitat in the area by reducing the basal area of sapling and pole sized red spruce (< 5 DBH) in 60 acres of the 18-20 year old regeneration units to encourage the growth of co-dominant red spruce. Additionally, snags will be created on 340 acres (up to 15 snags per acre) in stands adjacent to the young stands. Basal area reduction of co-dominate spruce should increase the growth of the remaining trees through reduction of resource competition. This boost in growth and the associated snag creation will greatly reduce the time in which the project area will become suitable habitat for many of the species associated with mature red spruce habitat including the WV northern flying squirrel.

The District also partnered with the USDA Plant Material Center in Alderson, WV, in planting 10 acres of red spruce seedlings at a mine reclamation site to expand existing spruce habitat. This area will be monitored in future years to ensure adequate establishment of the seedlings.

### **SUMMARY**

The Monongahela Wildlife Group will continue to monitor wildlife species and their habitats on the Forest. Most of the monitoring projects noted above will continue, and we expect to both expand on existing efforts and add new monitoring activities and studies as needed to gain information regarding species habitats and life histories and the potential effects that Forest management activities may have on them.