

PERFORMANCE REPORT

STATE: West Virginia

PROJECT NUMBER: E-1-30

PROJECT TITLE: Endangered Species

PERIOD COVERED: 1 October 2012 through 30 September 2013

1. **STUDY TITLE:** Federally Listed Bats (Indiana bat (*Myotis sodalis*), Virginia big-eared bat (*Corynorhinus townsendii virginianus*), and gray bat (*Myotis griscescens*)).

STUDY OBJECTIVE: To conserve and recover populations of federally listed bats in West Virginia and assist with the range-wide recovery of these species.

STUDY ABSTRACT

Cave surveys for hibernating colonies of endangered bats were conducted in 22 caves in eight counties during winter 2012/2013. Populations of Indiana bats (*Myotis sodalis*) exhibited a decrease of 85.6% over previous survey results; Virginia big-eared bats (*Corynorhinus townsendii virginianus*) exhibited a decrease of 18.8% over previous survey results. Ten summer colonies of Virginia big-eared bats were censused in June 2013. The overall summer population size of the ten caves surveyed (n = 7,934) was 5.4% higher than the 2012 total and the highest recorded since these counts began in 1983; the 2013 total was 24.5% higher than the number of bats in these colonies during the summer before White Nose Syndrome (WNS) appeared in the state, suggesting this species is not experiencing WNS-related declines. An interstate highway bridge used as a significant *M. sodalis* summer roost was discovered in summer 2011. These bats were monitored again in 2013, and in August 2013, little brown bats and Indiana bats using this roost were banded as part of a White-Nose Syndrome survivors study. Acoustic surveys were conducted to gather data on the summer distribution and abundance of bats across the state, especially *M. sodalis*. WVDNR, USFS, and other agencies, organizations, and volunteers conducted a total of approximately 6,996 km of acoustic surveys; Myotisoft, Inc. is currently under contract to analyze the 2009-2012 acoustic data. WNS was not discovered in any new counties this job segment; the karst regions of the state are considered saturated with WNS. Assistance was provided on WNS studies being conducted by other researchers. Cave gates repaired during the previous job segment were inspected and are secure. During this job segment the WVDNR acquired the entrance of [REDACTED] a significant Virginia big-eared bat cave.

a) Activities:

WINTER SURVEYS IN HIBERNACULA

During the current job segment, 22 caves were surveyed for the presence of hibernating endangered bats by WVDNR biologists; three additional surveys were conducted by the caving community and reported to the WVDNR (Table 1-1). Hellhole, the state's most significant endangered bat hibernaculum, was surveyed in 23 Feb 2013 (**Appendix A**). These caves were located in eight West Virginia counties. Most of these caves were known to have contained Virginia big-eared bats (*Corynorhinus townsendii virginianus*) and/or Indiana bats (*Myotis sodalis*) in recent winters. The presence of White Nose Syndrome (WNS) in West Virginia affected our survey efforts in several ways: 1) only one cave was surveyed on any trip, 2) all gear and equipment were cleaned and disinfected between trips, and 3) gear easy to disinfect replaced standard caving gear (i.e., rubber boots, disposable coveralls, etc.). Ten caves contained *M. sodalis* during the current surveys. A total of 2,783 *M. sodalis* were observed (Table 1-1). No new sites for *M. sodalis* were discovered this job segment. The number of *M. sodalis* observed in winter 2012-2013 represents a decrease of 85.6% from the number observed in these same caves during the previous surveys at those sites (Table 1-2). Percent change from the last survey ranged from -100.0% at four sites () to +12.2% at () (Table 1-2). The largest decline was the loss of 16,017 individuals in . Indiana bats were observed in three caves where they were not seen during the previous survey, although Indiana bats had been observed at these sites in the past (). Based on these survey results, the number of *M. sodalis* hibernating in West Virginia caves declined precipitously between winter 2009-2010 and 2012-2013 due to White Nose Syndrome which was first observed in West Virginia in January 2009. The current estimated number of Indiana bats hibernating in WV caves is 4,021, but this is based on the assumption that the number of bats in caves not surveyed this year has remained constant since the previous survey; in light of WNS, this is unlikely.

Ten caves surveyed this winter contained a total of 8,838 *C.t. virginianus*. Despite WNS affecting other species of bats, *C.t. virginianus* does not appear to be affected by WNS. To date no big-eared bats have been found exhibiting the signs of WNS. Although the number of *C.t. virginianus* observed at these hibernacula showed a decline of 18.8% from the previous surveys (Table 1-2), the summer maternity colony counts (see below) indicate that the population of *C.t. virginianus* has increased since WNS arrived in West Virginia. Percent change from the last survey ranged from -23.8% at Hellhole to +61.2% in . The number of *C.t. virginianus* in declined by 2,385 individuals, but this may be the result of bats moving within the cave and not being counted in the 2013 survey. In *C.t. virginianus* hibernate in areas with extensive breakdown and it is possible that there is a hibernation site within the cave that has not been found. The number of *C.t. virginianus* in increased from 5,006 in 2007 to 10,025 in 2010, and then declined to 7,640 in 2013 (still 52.6% higher than the 2007 survey). Summer maternity colony counts suggest that during this time period the population was fairly stable and increasing slowly. Maternity colony counts are probably a better indicator of population trends of Virginia big-eared bats in West Virginia than the hibernacula surveys.

A total of 3,325 non-listed bats of five species were observed during the 2012-2013 surveys. These were: little brown bat (*M. lucifugus*) (n = 2,783), tri-colored bat (= eastern pipistrelle) (*Perimyotis subflavus*) (n = 419), big brown bat (*Eptesicus fuscus*) (n = 107), northern long-eared bat (*M. septentrionalis*) (n = 3), and eastern small-footed bat (*M. leibii*) (n = 13 (Table 1-1).

Table 1-1. Summary of the results of the West Virginia Division of Natural Resources winter 2012-2013 bat surveys. (M. lucif. = *Myotis lucifugus*, M. sept. = *Myotis septentrionalis*, M. sod. = *Myotis sodalis*, M. leib. = *Myotis leibii*, P. subfl. = *Perimyotis subflavus*, E. fuscus = *Eptesicus fuscus*, L. noctiv. = *Lasionycteris noctivagans*, C. town. = *Corynorhinus townsendii virginianus*).

CAVE NAME	COUNTY	DATE	M. lucif.	M. sept.	M. sod.	M. leib.	P. subfl.	E. fuscus	C. town.	TOTAL
██████████	Randolph	17 Jan 13	8	1			3	2	1	15
██████████	Tucker	22 Mar 13	6		79		6			91
██████████	Greenbrier	20 Jan 13	29				5			34
██████████	Randolph	17 Jan 13	5				25	1		31
██████████	Pendleton	7 Feb 13	7			1	15	9	2	34
██████████	Pendleton	20 Feb 13	3				11	7	146	167
██████████	Pocahontas	23 Jan 13	20		1		33	1		55
██████████	Greenbrier	12 Feb 13	13				45	6		64
██████████	Pendleton	2 Mar 13	1				4			5
██████████	Pendleton	23 Feb 13	2,461		2,540	4	24	4	7,640	12,673
██████████	Pendleton	20 Mar 13	1				4		20	25
██████████	Mercer	3 Feb 13	0					5		5
██████████	Randolph	5 Feb 13	5		29		12			46
██████████	Pocahontas	23 Jan 13	4				1	1		6
██████████	Pocahontas	23 Jan 13					1			1
██████████	Grant	6 Feb 13	2	2			22	5	2	33
██████████	Monroe	14 Mar 13					20	3		23

██████	Pendleton	15 Mar 13	7				9			16
██████████	Pendleton	21 Feb 13	2		8		8	1	136	155
██████ ¹	Pendleton	2 Mar 13	16		6		6	1	1	30
██████	Greenbrier	12 Feb 13	142		21	7	34	35		239
██████	Monroe	13 Feb 13	9		2		3	5		19
██████	Greenbrier	13 Feb 13	37		18		89	4		148
██████████	Pendleton	28 Feb 13	2				2	7	885	896
██████	Pendleton	26 Feb 13	3		79	1	37	10	5	135
TOTAL			2,783	3	2,783	13	419	107	8,838	14,946

¹ Data provided by cavers.

Table 1-2. Summary of endangered bat (*Myotis sodalis* and *Corynorhinus townsendii virginianus*) populations encountered during the West Virginia Division of Natural Resources winter 2012-2013 bat surveys and comparisons with the results of previous surveys.

Cave Name	Date Of Previous Survey	<i>Myotis sodalis</i>			<i>Corynorhinus t. virginianus</i>		
		Number Observed		% Change	Number Observed		% Change
		Previous Survey	Present Survey		Previous Survey	Present Survey	
██████████	23 Jan 2009				1	1	0.0
██████████	29 Mar 2011	412	79	-80.8			
██████████	10 Jan 2011	3	0	-100.0			
██████████	15 Feb 2011				2	2	0.0
██████████	4 Mar 2009	43	0	-100.0	138	146	+5.8
██████████	29 Jan 2008	0	1	--			
██████████	7 Feb 2008	1	0	-100.0			
██████████	20 Feb 2010	18,557	2,540	-86.3	10,025	7,640	-23.8
██████████	13 Jan 2011				0	20	--
██████████	24 Feb 2009	42	0	-100.0			
██████████	25 Feb 2008	115	29	-74.8			
██████████	25 Feb 2011				2	2	0.0
██████████	9 Mar 2009	33	8	-75.8	163	136	-16.6
██████████	3 Mar 2012	0	6	--	0	1	--
██████████	23 Feb 2011	19	21	-10.5			
██████████	7 Mar 2011	0	2	--			
██████████	7 Feb 2008	34	18	-47.1			
██████████	4 Mar 2011				549	885	+61.2
██████████	28 Feb 2011	90	79	-12.2	0	5	--
Total		19,349	2,783	-85.6	10,880	8,838	-18.8

In addition to the cave surveys, a large culvert (approximately 427 m (1,400 ft) in length) was inspected for hibernating bats. The culvert was built during the construction of the Corridor H highway project in Grant County. A section of the North Fork of Patterson Creek flows through the culvert. On 18 Jan 13, one tricolored bat was found hibernating in the culvert. The temperature at the hibernation site was 3.9° C (39.1° F).

VIRGINIA BIG-EARED BAT SUMMER COLONY CENSUSES

Ten summer colonies of *C.t. virginianus* in West Virginia were censused between 3 June and 19 June 2013 (Table 1-3). Two documented bachelor colonies, [REDACTED] and [REDACTED] caves, were not visited this job segment. Counts were conducted during the bats' nightly emergence from the caves to forage, and night vision equipment and infra-red lights were used to observe the bats exiting the caves. The emergences at [REDACTED] were videotaped and counted later to provide a more accurate count of the number of bats leaving the caves. Bat emergences at other caves were also videotaped, but the counts were conducted in real time, and the tape served as a back-up if problems were encountered (i.e., equipment failure, etc.). Two caves ([REDACTED]) were counted twice because the first count at the site was more the 10% below the 2012 count.

Good counts were obtained at all ten summer colonies (Table 1-3). Results of the June 2013 censuses are presented in Table 1-4. The total number of adult *C.t. virginianus* in the ten West Virginia summer maternity colonies was tallied at 7,934 bats (Table 1-4) or 5.4% (403 individuals) more than in June 2012. This is the highest total since the counts began in 1983. Changes in summer colony populations ranged from -9.3% at [REDACTED] to +30.2% at the [REDACTED] (Table 1-4). Six of the ten colonies increased between 2012 and 2013. The number of Virginia big-eared bats in these maternity colonies has increased 24.5% since June 2008, the last count before White Nose Syndrome was observed in West Virginia. This, in addition to the fact that no *C.t. virginianus* have been observed exhibiting signs of WNS during winter surveys, suggests that this species has not been negatively impacted by WNS.

Table 1-3. Chronology and results of West Virginia Division of Natural Resources' Virginia big-eared bat (*Corynorhinus townsendii virginianus*) summer colony censuses, June 2013.

Cave	County	Date	Personnel	Comments
██████████	Pendleton	3 Jun	RD	Good count. Total = 905.
██████	Pendleton	3 Jun	CS	Good count. Total = 841.
██████	Pendleton	3 Jun	JW	Low count. Total = 454.
██████████	Pendleton	4 Jun	CS, JW	Good count. Upper = 195; Lower = 1000. Total = 1,195.
██████	Pendleton	4 Jun	RD	Low count. Total = 400.
██████████	Pendleton	5 Jun	CS, RD	Good count. Lower = 171; Small Upper = 24; Large Upper = 164. Total = 560. Light went out at Small Upper near end of count, but count was within 10% of 2012 at that time.
██████	Pendleton	5 Jun	JW, TM	Good count. Total = 297.
██████	Grant	11 Jun	JW, CSa, RU	Good count. Total = 1,246.
██████████	Tucker	11 Jun	CS, RD	Good count. Arbogast = 817; Cave Hollow = 116. Total = 933.
██████	Pendleton	14 Jun	JW	Recount. Equipment problems.
██████	Pendleton	15 Jun	CS, KE	Recount. Good Count. Total = 447.
████	Pendleton	17 Jun	CS, JW, RD	Good Count. North Ent. = 785; South Ent. = 380. Total = 1,165.
██████	Pendleton	19 Jun	JW	Recount. Good count. Total = 537.

Personnel: CS=Craig Stihler, CSa=Cindy Sandeno, JW=Jack Wallace, KE=Kevin Eliason, RD=Rick Doyle, RU=Rebecca Urbanczyk, and TM=Tara Mallow,

Table 1-4. Results of West Virginia Division of Natural Resources Virginia big-eared bat (*Corynorhinus townsendii virginianus*) summer colony censuses in West Virginia, 1983-2013 and percent change in number of bats 2012 to 2013.

Cave	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
██████████	650 ¹	800 ¹	739 ¹	1080	1015	1137	286	325	420	423
██████████	808	728	812	703	861	773	931	881	826	805
████	--	--	--	--	--	--	--	--	--	1350 ²
██████████	755	755	771	739	780	930	753	711	777	906
██████	--	209 ³	230	277	96	58	49	65	116	112
██████	--	--	--	--	--	--	--	--	--	--
██████████	95	171	147	161	206	151	132	133	287	194
██████	254	250	209	239	267	283	274	287	253	338
██████	160	183	207	239	254	326	396	466	497	573
██████████	338	378	368	547	548	515	537	449	719	612
██████████	153	216	238	338	426	454	560 ⁵	538 ⁵	560 ⁵	466
TOTAL	3213	3690	3721	4323	4453	4627	3918	3855	4455	5779

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¹ Does not include ██████████

² Colony estimated by entering cave, 2 May 1992

³ Colony discovered in 1984 and censused 28 August 1984

⁴ Average of two counts on 10 June 1993 and 16 June 1993

⁵ Thorn Mountain not censused

⁶ Estimated cluster size inside cave; not an emergence count

⁷ The 1996 count is the most accurate to date; the population was probably overestimated in previous counts

⁸ Emergence videotaped to increase accuracy

Table 1-4 (cont.)

Cave	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
██████████	454	491	559	513	454	538	620	618	614	596	691
██████████	762	796	742	768	736	637	568	471	529	622	532
████	1292	1350 ⁶	1350 ⁶	1243 ⁷	1004	1179 ⁸	1,250 ⁸	1250 ⁹	1250 ⁹	1002	933
██████████	942	857	849	980	970	828	850	890	910	902	931
██████	134	132	122	126	123	131	106	29	177	225	252
██████	114	153	204	167	231	293	335	312	136	165	181
██████████	356 ⁴	504	398	377	412	482	534	434	271	-- ¹¹	-- ¹¹
██████	357	319	367	377	397	406	488	485 ¹⁰	465	479	510
██████	635	652	730	772	800	862	827	858	900	1004	959
██████████	629	673	649	701	815	732	655 ⁸	718	762	700	808
██████████	168	304	418	344	279	187	183	245	167	202	148
TOTAL	5943	6231	6388	6368	6221	6275	6416	6310	5910¹²	5897¹²	5945¹²

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¹ Does not include ██████████² Colony estimated by entering cave, 2 May 1992³ Colony discovered in 1984 and censused 28 August 1984⁴ Average of two counts on 10 June 1993 and 16 June 1993⁵ Thorn Mountain not censused⁶ Estimated cluster size inside cave; not an emergence count⁷ The 1996 count is the most accurate to date; the population was probably overestimated in previous counts⁸ Emergence videotaped to increase accuracy⁹ Cave not counted in 2000 or 2001 and population assumed to be the same as in 1999.¹⁰ Average of two counts.¹¹ Trapping at cave entrance suggests this is not a maternity colony and should not be included. Not counted.¹² Does not include numbers for Minor Rexrode.

Table 1-4 (cont.)

Cave	2004	2005	2006	2007	2008	2009	2010	2011	2012
██████████	664	648	698	756	728	850	615	836	935
██████████	512	510	564	432	424	357	307	365	371
████	1027	976	910	880	880 ¹³	1151	1154	1045	1124
██████████	1050	928	1175	1029	1077	1208	1186	1231	1098
██████	202	267	288	295	305	430	468	473	493
██████	154	125	131	178	203	235	272	275	278
██████████	-- ¹¹	-- ¹¹	-- ¹¹	-- ¹¹	-- ¹¹	-- ¹¹	-- ¹¹	-- ¹¹	-- ¹¹
██████	552	536	576	569	598	618	578	633	566
██████	982	1038	979	985	1013	1119	1229	1199	1228
██████████	782	665	630	710	726	795	834	775	792
██████████	313	297	361	430	419	482	529	629	646
TOTAL	6238¹²	5990¹²	6312¹²	6264¹²	6373¹²	7245¹²	7172¹²	7461¹²	7531

¹ Does not include ██████████² Colony estimated by entering cave, 2 May 1992³ Colony discovered in 1984 and censused 28 August 1984⁴ Average of two counts on 10 June 1993 and 16 June 1993⁵ Thorn Mountain not censused⁶ Estimated cluster size inside cave; not an emergence count⁷ The 1996 count is the most accurate to date; the population was probably overestimated in previous counts⁸ Emergence videotaped to increase accuracy⁹ Cave not counted in 2000 or 2001 and population assumed to be the same as in 1999.¹⁰ Average of two counts.¹¹ Trapping at cave entrance suggests this is not a maternity colony and should not be included. Not counted.¹² Does not include numbers for Minor Rexrode.¹³ Land slide made it dangerous to approach South Entrance of Cliff Cave, so we couldn't get a count; 2007 number used.

Cave	2013	% Change								
██████████	933	-0.2								
██████████	368	-0.8								
████	1165	+3.5								
██████████	1195	+8.8								
██████	447	-9.3								
██████	297	+6.8								
██████████	-- ¹¹	--								
██████	537	-5.1								
██████	1246	+1.5								
██████████	905	+14.3								
██████████	841	+30.2								
TOTAL	7934¹²	+5.4								

¹ Does not include ██████████

² Colony estimated by entering cave, 2 May 1992

³ Colony discovered in 1984 and censused 28 August 1984

⁴ Average of two counts on 10 June 1993 and 16 June 1993

⁵ Thorn Mountain not censused

⁶ Estimated cluster size inside cave; not an emergence count

⁷ The 1996 count is the most accurate to date; the population was probably overestimated in previous counts

⁸ Emergence videotaped to increase accuracy

⁹ Cave not counted in 2000 or 2001 and population assumed to be the same as in 1999.

¹⁰ Average of two counts.

¹¹ Trapping at cave entrance suggests this is not a maternity colony and should not be included. Not counted.

¹² Does not include numbers for Minor Rexrode.

¹³ Land slide made it dangerous to approach South Entrance of Cliff Cave, so we couldn't get a count; 2007 number used.

OTHER SUMMER RECORDS OF LISTED BATS

During the current job segment, the WVDNR did not conduct any mist net surveys for Indiana bats. Listed bats were netted or trapped by other researchers/consultants working in West Virginia during this job segment. Below is a summary of the endangered bat captures during fall 2012 and summer/fall 2013:

- 17 Oct 2012 Two male Indiana bats were captured by Joel Beverly's crew at the [REDACTED] portal in Raleigh County approximately 4.5 km northeast of Dry Creek.
- 14 Jun 2013 An adult male Indiana bat was captured at the [REDACTED] site, Pendleton County, by Chris Sanders' crew while conducting surveys for the Monongahela National Forest (MNF).
- 15 Jun 2013 Two adult male and one non-reproductive female Virginia big-eared bats were captured at the [REDACTED] site, Pendleton County, by Chris Sanders' crew while conducting surveys for the MNF.
- 15 Jun 2013 An adult male Indiana bat was captured at the [REDACTED] site, Pendleton County, by Chris Sanders' crew while conducting surveys for the MNF.
- 15 Jun 2013 A pregnant Virginia big-eared bat was captured at the [REDACTED] site, Pendleton County, by Chris Sanders' crew while conducting surveys for the MNF.
- 15 Jun 2013 Three Virginia big-eared bats (1 adult male, 1 lactating, and 1 non-reproductive female) were captured at the [REDACTED] site, Pendleton County, by Chris Sanders' crew while conducting surveys for the MNF.
- 16 Jun 2013 Four Virginia big-eared bats (2 lactating, 1 pregnant, and 1 non-reproductive female) were captured at the [REDACTED] site, Pendleton County, by Chris Sanders' crew while conducting surveys for the MNF.
- 28 Jun 2013 An adult male Indiana bat was captured at the [REDACTED] site by Joel Beverly's crew. Bat was subsequently tracked to a shagbark hickory (*Carya ovata*) on 29 Jun and a tulip popular (*Liriodendron tulipifera*) on 30 Jun.
- 14 Jul 2013 An adult male Indiana bat was captured at the [REDACTED] site by Joel Beverly's crew.
- 5 Sep 2013 A female and a male Virginia big-eared bat were captured at the [REDACTED] tunnel, New River Gorge Fayette County, by Mark Graham, National Park Service.
- 26 Sep 2013 Twenty-four male Indiana bats were capture at the [REDACTED], New River Gorge, Fayette County, by Mark Graham, National Park Service.

MONONGAHELA NATIONAL FOREST

The Monongahela National Forest (MNF) has monitored bats, including two endangered species, on the Forest for several summers. Listed bats captured during these efforts during the current job segment are included in the listing above. Below is a summary of the MNF's bat monitoring efforts prepared by Catherine Johnson, MNF:

"Since 1997, the Monongahela National Forest (MNF) has conducted annual mist-netting to inventory the Forest for the endangered Indiana and Virginia big-eared bats as well as other bat species. Forest-wide mist-netting includes watershed or potential project sites as well as long-term sites that are revisited on a rotating basis. These data are used to track changes in summer bat species distribution and population demographics that may occur in response to local habitat changes and/or broader issues (e.g., White-nose Syndrome, WNS). Captured Indiana bats that meet certain criteria are fitted with radio-telemetry transmitters and tracked to roosting locations. Individual roost trees are identified and metrics taken for the trees and surrounding habitats; emergence counts also are conducted to assess the potential for maternity colonies on the Forest. These data provide important information regarding bat habitat use and can inform our forest management practices to conserve and enhance habitat for threatened, endangered and sensitive (TES) bat species.

During 2013 mist-netting efforts, 250 bats of 10 species were captured, including three Indiana bats (E); ten Virginia big-eared bats (E); 88 northern long-eared bats (S), and six small-footed bats (S). The majority of captures (92) were red bats, with northern long-eared bats (S) and big brown bats also fairly common (though the proportion of northern bats has declined dramatically compared to previous years). Only one little brown bat (S) was captured; prior to WNS, this species was common across the Forest. Mist-net data is analyzed to assess potential changes in community and demographic parameters at long-term sites, with a particular emphasis on changes that may have occurred since the onset of WNS in the region. 2013 represents the fifth year since WNS was first confirmed in WV and, as expected, we have observed a significant decline in capture rates for several species at long-term sites. Data from 2010-2013 showed highly significant declines in northern long-eared bats, little brown bats, and tri-colored bats as compared to pre-WNS data (pre-2009); other post-WNS changes also were observed for some species (e.g., changes in body condition and reproductive timing).

All three Indiana bats captured were mist-netted in the northeastern part of the MNF (); they were all males and radio-transmitters were attached to each. One of the bats dropped its transmitter within the first two days of capture (approx. 1.7 miles from its capture location). A second bat caught at the same mist-net location was tracked to several roost trees in the same general area as the first (all trees were within ~ 0.2 mi of one another and ~ 1.7 miles from the capture location); despite extensive tracking efforts this bat could not be found on some days, indicating that it may have traveled considerably farther to alternate roost sites as well. The third bat was captured at a neighboring mist-net site (~2.4 miles away) and used three roost trees within 0.6 miles of the capture site; the third tree was used from the third day through the remainder of the monitoring period. Data from the MNF's telemetry efforts over the last ten years show Indiana bat

use of roost trees in a variety of habitats, including range allotments and active timber sale areas as well as upland and riparian forested habitats, helping to refine our understanding of the species' habitat needs.

The MNF provided information from its long-term bat monitoring efforts to the US Fish and Wildlife Service to assist in their response to a status review request for the little brown bat and petitions to add the Eastern small-footed and northern long-eared bats to the list of federally threatened and endangered species. In addition, MNF personnel provided data and analyses to other federal and state agencies to assist in efforts to better understand and contain the spread of WNS, and presented findings from the Forest's bat survey work at regional and national meetings. The Forest also is working with Eastern Michigan University to model species distributions (spatial and temporal) across the MNF using the Forest's long-term mist-netting database."

ACOUSTIC SURVEYS

During this job segment, WVDNR biologists focused on conducting acoustical route surveys to obtain data on bat populations over a large geographic area and to minimize the handling of bats and the potential for spreading White Nose Syndrome from bat to bat or from bat to equipment to bat. Data gathered from the acoustic routes can be used to target areas where *M. sodalis* were detected for future mist net surveys. This will allow biologists to focus resources on areas likely to yield *M. sodalis* captures while minimizing the handling of bats.

The Acoustic routes consist of segments of highway routes driven in a vehicle traveling at approximately 33 kilometers per hour (20 miles per hour) while recording ultrasonic bat echolocation calls. The routes are typically 33 km to 49 km (20 to 30 mi) long and begun 30 min after sunset. The full spectrum ultrasound detectors employed were purchased from Binary Acoustic Technology LLC (<http://binaryacoustictech.com/>). The detector (model AR125) was mounted on the roof of the vehicle using a magnetic mount constructed by the WVDNR's shop personnel. A USB cable connected the detector to a laptop computer in the vehicle. The software package SPECT'R was used to record the calls onto the computer's hard drive. Simultaneously, a GPS unit or antenna (Garmin, model GPSmap 76Cx or USGLOBALSAT BU-353 Waterproof WAAS Enabled USB GPS Receiver) gathered GPS readings and recorded them to another file on the computer's hard drive. In 2012 an additional piece of software (GPS Time and Test v. 1.05, BrigSoft), which synchronizes the computer time with the time on the GPS unit, was incorporated into this setup.

In 2009, routes were established to cover the state, but with a higher concentration of routes in the eastern portion of the state near known White-Nose Syndrome positive counties in West Virginia and Virginia; this effort was coordinated with the USFS, Monongahela National Forest (MNF), and MNF personnel established and ran several routes on or near the Forest. In 2010, additional detectors were purchased and the 2009 routes were run again and additional routes were established. The 2010 surveys were conducted by WVDNR, MNF, Ohio River Islands National Wildlife Refuge, Canaan Valley National Wildlife Refuge, Freshwater Institute, WV Division of Highways, and Oglebay Institute personnel and volunteers. A total of 85 routes were run, most multiple times, for a total of approximately 8,731 km (5,425 mi) of survey effort in 2010.

In 2011, additional equipment was purchased; this reduced the time associated with sharing equipment and allowed additional surveys to be run. All agencies and organizations

which conducted surveys in 2010 also conducted surveys in 2011. Once again, two detectors were loaned to the MNF for the entire summer. Three new biologists hired to work half-time for WVDNR and half time for National Resources Conservation Service (stationed in Huntington, Moorefield, and Wheeling) were also provided equipment and ran acoustic routes in 2011. A total of 81 routes were run, most three times, for a total of approximately 9,640 km (5,990 mi).

In 2012 most of the 2011 routes were run again and efforts were made to run each route three times at about the same time they had been run in the previous year. The FenwickEnon route was scheduled to be run only once because the amount traffic on this route makes it difficult to run. Because it is the only route in that portion of the state we will continue to run it once a year. Assistance in running the 2012 acoustic routes was provided by USFWS-Canaan Valley National Wildlife Refuge, USFWS-Ohio River Island National Wildlife Refuge, USFWS-WV Field Office, WV Division of Highways, Oglebay Institute, The Freshwater Institute, National Park Service-New River Gorge National River, and several volunteers. In 2012, 77 routes were run, most three times, for a total of approximately 9,402 km (5,842 mi) miles of survey effort. In addition, acoustic surveys were run at 12 stationary sites.

In 2103, acoustic survey routes were run following protocols used the previous year. No additional software was added, but a "fix" to the GPS/time sync program was installed on all computers. This corrected a glitch that sometimes recorded the date in the GPS files one day later than the survey was actually conducted; this error is easily correcting when processing the data, but the fix eliminated this problem. Beginning in 2013, many of the routes were placed on an every-other-year schedule. This will continue to provide good geographical coverage of the state each year, while requiring less effort each year. Some agencies, i.e., the US Forest Service, conducted all their routes in 2013. In 2013, 57 routes were run, most three times, for a total of approximately 6,995 km (4,347 mi) miles of survey effort. In addition, acoustic surveys were run at 8 stationary sites.

In early 2013, Myotissoft, LLC was contracted to analyze the West Virginia 2009-2012 acoustic data. Data files, survey logs (metadata for each survey), and GPS logs were provided to Myotissoft, LLC personnel on four external hard drives. Data are currently being analyzed. Each bat call will be classified using two software programs: Sonobat and Kaleidoscope. The resulting classification data will be merged with the GPS data (if GPS data were collected). Once this is done, an Excel spreadsheet will be populated with these data and an ArcMap shapefile will be created showing the location of each call tagged with the associated data. Deliverables associated with the Myotissoft, LLC contract are:

- Geospatial database containing all classified calls and the associated data from the survey log and the analysis programs.

- A summary geospatial database of each survey plotted on the centroid of the survey route consisting of statistics and metrics and associated data from the survey log.

- A series of maps showing the location of all survey routes recorded per year.

- Excel worksheet/s (Excel2007 or later format) containing all the data in the geospatial database/s.

- Documentation on methods and data processing procedures.

- Supporting custom software and scripts produced to support WVDNR acoustic data processing effort.

BRIDGE ROOSTS

Although small numbers of bats have been observed day roosting on bridges (mainly in expansion joints above the roadbed) and night roosting under bridges in West Virginia, no bridge roost of any significance had been found in the state until summer 2011. On 20 Jul 11, Jonathan Hootman (working for Joel Beverly) called the WVDNR to report that they had tracked a radio-tagged *M. sodalis* from the [REDACTED] mine project to a bridge on [REDACTED] not far from where the bat had been captured in a mist net. Hootman reported that when the bridge was visited, over 200 bats, including several *M. sodalis*, were found roosting under the bridge. On 21 Jul 11, Hootman sent photos of some of the bats, and indeed, many appeared to be *M. sodalis*. WVDNR biologists met Hootman on 26 Jul 11 and conducted a count of the bats under the bridge. A total of 195 bats were tallied: 106 *M. lucifugus*, 88 *M. sodalis*, and 1 *E. fuscus*. WVDOH personnel have continued to monitor this site, and there were at least a few bats present during every inspection during winter 2011-2012. Dead bats collected under the bridge during that winter were sent to SCWDS and tested positive for White Nose Syndrome. During summer 2012 a maximum of 58 *M. lucifugus* and 50 *M. sodalis* were observed roosting under the bridge (8 Aug 12). Forty-six of the *M. lucifugus* were banded on 8 Aug 12. The bat banded EEE 0882 was recaptured by Joel Beverly's crew on Paint Creek on 12 Aug 2012.

WVDOH personnel continued to monitor bat use under the bridge in 2013. A summary of bat observed roosting under the bridge in 2013 is provided in Table 1-5. On 9 Aug 2013, the bridge was again visited and bats were captured by hand and placed in holding cages. Three little brown bats, forty-nine Indiana bats, and two small-footed bats were captured. One of the little brown bats was a recapture of a bat banded at the bridge in August 2012 (band CCC0591). One captured Indiana bat was also previously banded; this was an adult male that was captured upstream of the [REDACTED] bridge and banded by Joel Beverly's crew on 2 Aug 2012. The two un-banded little brown bats were banded using green anodized bands provided by the US Fish and Wildlife Service; unfortunately, one of these bands fell off shortly after banding and was recovered under the bridge. The 48 un-banded Indiana bats were banded using standard aluminum bands. The Indiana bats were all males except for a single non-reproductive female. Both small-footed bats, both non-reproductive females, were also banded using standard aluminum bands. All bats were released at the capture site.

Maintenance work was scheduled for the [REDACTED] bridge in early 2013. At a meeting of personnel from the West Turnpike Commission, WV Division of Highways, US Fish and Wildlife Service, and WV Division of Natural Resources, held on 4 Mar 2013, a plan was developed to complete the work while the bats were present. Because warm temperatures (50° F or higher) were needed to complete the work, waiting until most bats left during cold weather was not feasible. The plan called for the construction of a "containment area" that would exclude bats from the work area at the base of the bridge abutment, minimize light, and to a lesser extent, sound from construction activities disturbing the bats at their roost site outside the containment area, and provide sufficient room for workers to complete their repairs (Containment Area plans are provided in **Appendix B**). In addition, work would only be conducted at night (beginning one hour after sunset and ending one hour before daylight) when the bats should spend most of their time away from the bridge to forage. Previous surveys from 2012 had shown that few bats roosted in the area that would be within the containment area. The containment area was constructed (Figures 1 and 2) and monitored to be sure no bats had found their way inside the area. When temperatures warmed sufficiently, work began. An email dated 10 Jun 13 noted that all repairs had been completed and that the containment area had been removed. The bats continued to use the bridge roost both during and following the time when repairs were done.

WHITE NOSE SYNDROME

White Nose Syndrome (WNS) was first noted in New York caves in 2007, (and was identified in a photograph taken in a nearby cave in 2006), however, its potential impacts to bat populations in the Northeast was not apparent until early 2008. In January 2008, WNS reappeared in New York, and subsequent surveys in the caves affected in 2007 showed mortalities of approximately 90% of the bats in these sites. In addition, in 2008, WNS showed up at additional sites in New York as well as surrounding states. WNS was first observed in West Virginia in January 2009. That winter, it was found in four caves, all in Pendleton County. By the end of winter 2009-2010, WNS was known from caves in six West Virginia counties: Greenbrier, Hardy, Mercer, Monroe, Pendleton, and Pocahontas. In addition, a WNS-positive bat was collected at a non-cave site in Jefferson County. During winter 2010-2011, WNS was also confirmed in [REDACTED] (mine portal), [REDACTED] (cave), [REDACTED] (cave), and [REDACTED] (caves) counties. WNS was observed in three additional counties during winter 2011-2012: Mineral, Table 1-5.

Number of bats roosting under the [REDACTED] bridge near Exit [REDACTED] Fayette County West Virginia, 4 Jan 13 through 17 Oct 13. (MYSO=*Myotis sodalis*, MYLU=*M. lucifugus*, MYLE=*M. leibii*, PESU=*Perimyotis subflavus*, EPFU=*Eptesicus fuscus*, UNK=Unknown species). Dead bats observed are not included in this table.

DATE	MYSO	MYLU	MYLE	PESU	EPFU	UNK	TOTAL
4 Jan 13	1	3			4		9
8 Feb 13		3			4		7
8 Mar 13		7	2		3		12
19 Mar 13	1	3		1	1		6
15 Apr 13		3					3
30 Apr 13	2	1					3
20 May 13	30	3	5				38
30 May 13	21	9	3				33
17 Jun 13	1	63	5		1		70
9 Aug 13	52	3	3		1		59
18 Aug 13	10		2		1		14
19 Sep 13	2	10	2		2		16
17 Oct 13		15	1		2		18

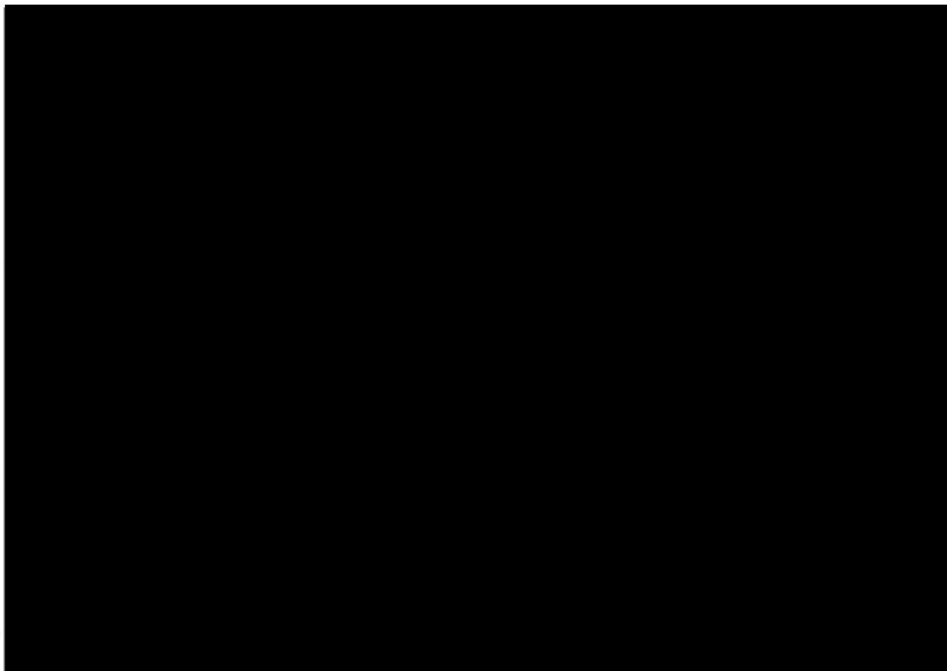


Figure 1. [REDACTED] bridge repair containment area to minimize disturbance to Indiana bats roosting under the bridge, looking south, 19 Mar 2013.

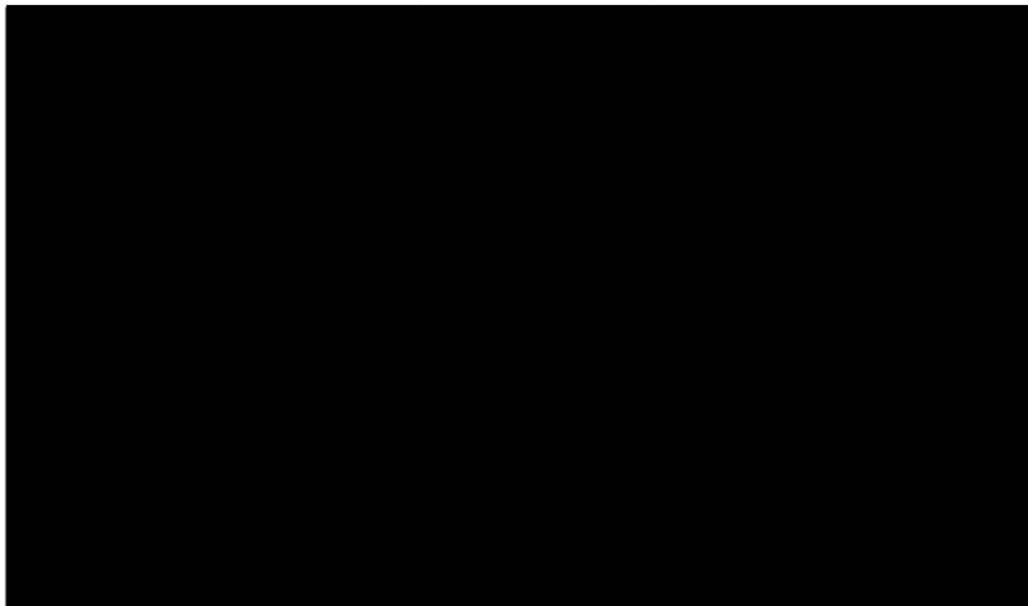


Figure 2. [REDACTED] bridge repair containment area to minimize disturbance to Indiana bats roosting under the bridge, looking east, 19 Mar 2013.

Monongalia, and Preston. No additional counties were added in winter 2012-2013, but all hibernacula visited by the WVDNR that winter were WNS positive (except possibly the one tricolored bat in [REDACTED] which may have been “clean”), and the significant karst areas of WV are considered saturated with WNS. A list of confirmed and suspect WNS sites in West Virginia is presented as Table 1-7, however, it is likely that all hibernacula in the state are now WNS positive.

Unfortunately, bat mortalities associated with WNS in West Virginia appear to be as severe as those observed farther north. During winter surveys the bat species which appear to be most affected by WNS are little brown bats and tri-colored bats. The number of little brown bats in [REDACTED] the state’s most important hibernacula for this bat, declined 97% due to WNS.

Indiana bats in [REDACTED] (also the state's most important hibernacula for this species) declined 86%. To date, no Virginia big-eared bats have been seen exhibiting signs of WNS even though nearly all of these bats in West Virginia hibernate in known WNS-positive caves. As mentioned above, Virginia big-eared bats do not seem to be affected by WNS, and summer maternity counts indicate that since June 2008, the summer before WNS was discovered in West Virginia, the number of Virginia big-eared bats in the ten summer colonies has increased 24.5% from 6,373 individuals to 7,934 individuals.

WVDNR biologists have assisted several researchers with White Nose Syndrome-related research projects. During winter 2012-2013 most of the samples collected were for the Frick *et al.* continental WNS project. Swab samples were collected from hibernating bats and cave substrate in eight WNS-positive caves. Additional samples from *Corynorhinus townsendii virginianus*, a species that does not appear to be affected by WNS, were collected for Hazel Barton's lab. WVDNR biologists also participated in a regional banding effort to mark *Myotis lucifugus* with colored wing bands in an attempt to determine if there are WNS survivors. A small number of bats were located in hibernacula and banded. In addition, *M. lucifugus* at a summer bachelor colony using a bridge roost were banded in August 2012 and again in August 2013 using the bands provided by the USFWS. In August 2013, the *M. sodalis* using this bridge roost were banded using standard aluminum bands. This is one of the few sites where it is easy to observe *M. sodalis* in a summer roost to determine the number of banded bats returning. A list of specific research efforts is provided below:

17 Jan 2013	Samples for Frick study collected in [REDACTED] Cave, Randolph County. Samples were: 10 PESU, 2 MYLU, and 11 substrate.
23 Jan 2013	Samples for Frick study collected in [REDACTED] Cave, Pocahontas County. Samples were: 11 PESU, 11 MYLU, 1 MYSO, and 10 substrate.
5 Feb 2013	Samples for Frick study collected in [REDACTED] Cave, Randolph County. 10 MYSO, 10 PESU, 5 MYLU, and 10 substrate.
6 Feb 2013	Samples for Frick study collected in [REDACTED] Cave, Grant County. Samples were: 1 MYSE, 4 EPFU, 2 COTO, 10 PESU, and 11 substrate.
12 Feb 2013	Samples for Frick study collected in [REDACTED] Cave, Greenbrier County. Samples were 5 PESU, 3 MYLE, 6 MYLU, 12 EPFU, and 11 substrate.
20 Feb 2013	Samples for Frick study collected in [REDACTED] Cave, Pendleton County. Samples were: 10 COTO, 1 MYLU, 1 EPFU, 2 PESU, and 10 substrate.
21 Feb 2013	Samples collected for Hazel Barton Lab. Hair samples were collected and placed in both glass and plastic vials. Bats were swabbed and agar plates inoculated. Samples were taken from 3 male MYSO and 3 male and 3 female COTO.
28 Feb 2013	Samples for Frick study collected in [REDACTED] Cave, Pendleton County. Samples were: 10 COTO, 1 MYLU, and 6 substrate.
28 Feb 2013	Samples collected for Hazel Barton Lab. Swab samples using acid

washed glass wool taken from 6 COTO. Six additional COTO were swabbed and agar plates inoculated; hair samples were also collected from these bats and stored in both glass and plastic vials.

- 14 Mar 2013 Samples for Frick study collected in [REDACTED] Cave, Monroe County. Samples were: 10 PESU, 2 EPFU, and 10 substrate.
- 19 Mar 2013 All samples for Frick study mailed to the lab in AZ.
- 20 Mar 2013 Went to [REDACTED] Cave in Pendleton County to band MYLU (red bands) for the survivor study. Found one MYLU and banded it.
- 22 Mar 2013 Banded 6 MYLU with red bands for the WNS survivors study at [REDACTED] Cave, Tucker County.
- 9 Aug 2013 Banded 2 little brown bats (green bands), 48 Indiana bats (standard aluminum bands), and 2 small-footed bats (standard aluminum bands) at [REDACTED] bridge as part of the WNS survivors study.

Although not funded with Section 6 funds, WVDNR staff participated in WNS oversight activities in the state. To assist with the dissemination of information and coordination among agencies, the USFWS hosts bi-weekly conference calls for federal and state agencies and tribal partners; WVDNR personnel participated in these calls whenever possible. Three biologists attended the Northeast Bat Working Group meeting in January 2013, and one biologist attended the WNS Symposium and Workshop in Boise, ID in September 2013. Outreach was another component of WNS oversight. Wildlife Diversity staff send WNS updates to other sections of the WVDNR, biologists in other state agencies, and federal partners in West Virginia. Information on WNS is provided to the general public through news releases, magazine articles, radio "spots." Specific outreach activities are listed below:

- 4 Oct 2012 Assisted with a bat educational event at Mountain State Forest Festival, Elkins.
- 10 Oct 2012 White Nose Syndrome update presented at the WVDNR/National Forest stamp meeting in Canaan Valley.
- 13 Nov 2012 Summer 2012 Virginia big-eared bat summary submitted for publication in Night-wing News.
- 27 Jun 2013 Telephone interview with Cecelia Mason, Public Radio, regarding WNS and the recent WNS grants.
- 22 Jul 2013 Bats and White Nose Syndrome presentation at Forest Industries Camp, Randolph County.
- 28 Aug 2013 Bats and WNS presentation given at the WV Association of Foresters meeting, Summersville, WV.
- 4 Sep 2013 Poster with Catherine Johnson discussing bat population trends on the Monongahela National Forest, WV presented at the 2013 White Nose Syndrome Workshop in Boise, ID.

Table 1-7. West Virginia caves/mines positive or suspect for White-Nose Syndrome prior to 1 Oct 2013.

Cave Name	County	WNS Confirmed by Lab	WNS Seen in Cave –No Lab Sample	Suspicious Bat Sightings	Year First Observed	Comments
[REDACTED]	Randolph			Y	2011	
[REDACTED]	Tucker			Y	2011	
[REDACTED]	Mercer			Y	2011	
[REDACTED]	Mercer			Y	2011	
[REDACTED]	Hardy			Y	2011	
[REDACTED]	Tucker		Y		2011	Number of bats down and many remaining bats showed signs of WNS. WNS was confirmed in the county earlier in the winter.
[REDACTED]	Tucker	Y			2011	One dead tricolored bat was collected and sent to the lab and came back WNS positive. SCWDS.
[REDACTED]	Greenbrier			Y	2011	
[REDACTED]	Greenbrier			Y	2011	One tricolored bat noted in entrance.
[REDACTED]	Randolph			Y	2011	
[REDACTED]	Randolph	Y			2011	Bats appeared clean in early January 2011. Later, a bat was reported flying out of cave and a dead bat was collected outside cave and tested WNS positive. SCWDS.
[REDACTED]	Randolph			Y	2011	
[REDACTED]	Fayette	Y			2011	Bats captured as they flew out of portal in March tested WNS positive. SCWDS.
[REDACTED]	Greenbrier			Y	2011	In addition, several dead bats were noted early 2012.
[REDACTED]	Mercer	Y			2010	Bats flying out in 2011. One bat roosting outside cave. SCWDS.

[REDACTED]	Hardy			Y	2011	
[REDACTED]	Pocahontas	Y			2010	SCWDS.
[REDACTED]	Pocahontas		Y		2010	
[REDACTED]	Tucker			Y	2011	
[REDACTED]	Pendleton		Y		2009	
[REDACTED]	Greenbrier			Y	2011	One tricolored bat was observed roosting inside the cave near the entrance.
[REDACTED]	Pocahontas		Y		2013	WNS observed on MYLU, PESU, and EPFU. Bat numbers down from pre-WNS surveys. WVDNR survey.
[REDACTED]	Hardy		Y		2010	WNS confirmed in a bat collected at a non-cave site in Hardy County in 2010. WNS seen in cave in 2010. Several bats with visible fungus in 2011.
[REDACTED]	Pendleton			Y	2011	
[REDACTED]	Randolph	Y			2011	Bat found on tree near cave entrance in February tested WNS positive. SCWDS.
[REDACTED]	Randolph		Y		2012	Several bats seen with fungus on muzzle, wings, etc. Several dead tricolored bats hanging on cave walls.
[REDACTED]	Greenbrier		Y		2013	PESU and MYLU with fungus.
[REDACTED]	Monroe			Y	2011	
[REDACTED]	Pendleton	Y			2009	Significant mortality observed in 2009. By 2011, most of the bats were gone from this site. NWHC.
[REDACTED]	Pendleton	Y			2010	Over 400 bats/hour leaving cave in afternoon on 17 Feb 2011. SCWDS.
[REDACTED]	Greenbrier			Y	2011	
[REDACTED]	Greenbrier			Y	2011	One bat, possibly dead, in cave entrance areas. Appeared to have white on forearms.

██████████	Pendleton		Y		2011	
██████████	Mercer		Y		2011	Approximately 60% of little brown bats showed signs of WNS.
██████████	Mercer			Y	2011	Bats (tricolored?) flying out. Owner reported seeing bats flying the last two weeks of February.
██████████	Fayette	Y			2012	Bat roost under bridge near Fayette/Kanawha Co. line. Two dead bats collected and tested WNS positive. SCWDS.
██████████ alton	Randolph			Y	2012	Report from Mark Tracy. He was at cave entrance on 8 Mar 12 and saw two dead bats on outcrop outside cave and 6 dead bats just inside the entrance.
██████████	Pocahontas		Y		2013	WNS seen on MYLU, WVDNR survey
██████████	Minera		Y		2011	Report of bats with fungus in cave in early winter 2011-2012. Report from Greg Trainer and Frank O'Hara about trip on 16 Dec 11.
██████████	Grant	Y			2011	SCWDS.
██████████	Monroe			Y	2011	Three tricolored bats roosting in entrance area. Bats were alive and showed no signs of fungus.
██████████	Pocahontas			Y	2011	Cavers reported dead bats and live bats showing signs for WNS in the cave.
██████████	Monongalia		Y		2012	Dave Riggs reported MYLU with fungus.
██████████	Pocahontas		Y		2011	
██████████	Pendleton		Y		2013	WNS on MYLU and PESU. Number of bats greatly reduced.
██████████	Pendleton		Y		2011	
██████████	Randolph	Y			2011	Three dead bats found on trees near the ██████████ in March tested WNS positive. Bat with fungus seen in ██████████ in Feb 2012. SCWDS.

██████	Greenbrier	Y			2010	
██████	Greenbrier		Y		2011	
██████	Monroe	Y			2010	Bats observed flying out in 2011. SCWDS.
██████	Greenbrier			Y	2011	Bats observed flying out of cave on two visits in March. Dead bat found outside cave.
██████	Pocahontas			Y	2013	No WNS positive bats observed, but number of bats less than 5% of the pre-WNS number. Report from Dave Riggs.
██████	Pendleton		Y		2009	
████████	Pendleton		Y		2011	Dead bat sent to the lab in 2010 was too overgrown with other fungi to confirm WNS.
██████ low	Monroe		y		2010	Report from cavers.
██████	Pendleton		Y		2010	
██████	Pendleton		Y		2010	
████████	Pocahontas	Y			2010	SCWDS.
██████	Monroe			Y	2011	One bat observed flying out of Main Entrance in February.
████████	Pocahontas			Y	2011	Bats seen flying out of the cave as early as January 2011.
██████	Pendleton	Y			2009	NWHC.
████████	Randolph			Y	2012	Many bats near entrance of cave. One showed signs of fungus. One dead bat. 3 Feb 2012.
████████	Pocahontas		Y		2011	
████████	Preston		Y		2012	Bats showing WNS and dead tricolored bats reported by Dave Riggs. Dead bats were collected and will be sent for testing.
████████ to	Greenbrier			Y	2011	Five dead bats found outside cave in February.

CAVE PROTECTION

During this job segment, the entrance to [REDACTED] Cave was purchased by the WVDNR. This cave houses a summer maternity colony and a hibernating concentration of Virginia big-eared bats. It also has had occasional use by Indiana bats in the winter. The WVDNR purchased the fence around the cave entrance and the land within the fence.

Attempts had been made to dig under the two angle iron gates at [REDACTED] Cave, Pendleton County, but neither effort was successful. To discourage further digging at these gates, on 25 Jul 2012 WVDNR and USFWS personnel dug out areas that could potentially be enlarged enough to allow people to crawl under the gate and filled the voids with steel (lengths of 1.25 in angle iron) and concrete. These gates were inspected in summer 2013 and appear to be secure.

Vandalism at the gate on the [REDACTED] entrance of [REDACTED] cave system was repaired on 8 Mar 2012. The gate was inspected in September 2013 and was secure.

The fence around the [REDACTED] Entrance of the [REDACTED] system was damaged by trees that came down during Storm Sandy in October 2012. Repairs to the fence, as well as cutting trees to clear the road leading to the cave, were begun by the Monongahela National Forest and will be completed during the next job segment. The locking mechanism on the [REDACTED] Cave gate will also be upgraded to make it more secure.

The [REDACTED] entrance to the [REDACTED] system re-opened and should be gated in the future. No progress in gating this entrance was made during this job segment.

Greer's limestone quarry permit requires the company to monitor cave microclimates at bat hibernation sites in [REDACTED] Cave and [REDACTED]. In September 2004 data logging systems were installed by Extreme Endeavors, Philippi, WV. On 23 Apr 13 we met with personnel from Greer, Extreme Endeavors, and the USFWS to review the past year of monitoring and to revise the monitoring plan based on the past year's data. The triggers for flags signaling unusual changes in cave conditions were left as they had been in the previous year.

MISCELLANEOUS ACTIVITIES

Presentations on bats were given to various groups and two "Bat Trunks" containing educational materials for use in grades 1-6 were made available to educators. The brochure "Bats of West Virginia" is available to the public. Bat mortalities at wind power facilities are a growing concern, and WVDNR biologists are working with project proponents and their consultants to try to minimize wildlife impacts.

(b) Target date for achievement: Continuous

(c) Date of accomplishment: Continuous

(d) Significant deviations: None

(e) Remarks:

(f) Recommendations: The study should be continued.

(g) Cost: Cost figures not available at this time.



Tricolored bat in [REDACTED], 7 Feb 2013.