BIOLOGICAL ASSESSMENT

FOR ONGOING PROJECT ACTIVITIES WITH DETERMINATIONS OF NO EFFECT OR MAY AFFECT, NOT LIKELY TO ADVERSELY AFFECT

FOR THE NORTHERN LONG-EARED BAT

ON THE

GREEN MOUNTAIN NATIONAL FOREST AND WHITE MOUNTAIN NATIONAL FOREST

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INTRODUCTION

On October 2, 2013, the FWS issued a proposed rule to list the northern long-eared (*Myotis septentrionalis*) bat as Endangered, with a final listing rule proposed for November 1, 2014 and later extended to April 2, 2015. The proposed rule indicated the most severe and immediate threat to NLEB is the disease white-nose syndrome (WNS), and that were it not for the presence of this disease, the drastic population declines seen over the last few years would not be expected. The proposed rule also included brief discussions of other threats, but made clear the predominant threat to the species was from WNS.

The Green Mountain National Forest (GMNF) and White Mountain National Forests (WMNF) conduct many routine actions to manage and improve forest conditions, as well as provide infrastructure to support the millions of visitors that travel to each Forest every year. Disturbance to the northern long-eared bat (hereafter referred to as NLEB) from these activities may occur during times when bats are present and suitable habitat may be indirectly altered during times when bats are not present.

This Biological Assessment (BA) is prepared in accordance with direction provided in the United States Department of Agriculture Forest Service (USDA Forest Service) Manual 2672.42 and Section 7 of the Endangered Species Act. It addresses the potential effects of ongoing routine projects on the NLEB. Projects reviewed in this BA are those in which effects analysis and decision documentation following the National Environmental Policy Act have been completed or are expected prior to September 1, 2015 and in which implementation is expected to occur within the next 3 years (2015-2017).

Information used to inform the determinations documented in this BA include review of relevant literature, survey results from various sources including Forest-specific data, project-specific effects analyses documented in previous Biological Evaluations on both Forests, and informal consultation with U.S. Fish and Wildlife Service personnel.

AFFECTED AREA AND SCOPE OF ANALYSIS

The GMNF (~446,000 acres) and the WMNF (~793,000 acres) together make up approximately two percent of the forested land base in New England. Although not all forested land is presumed to be habitat for NLEB, the majority of it is likely suitable for roosting and foraging. Based on Sasse (1995) and various survey data from both Forests, it is presumed that most NLEB maternity roosts occur lower on the landscape (below 2500 feet elevation) and are less likely in conifer-dominated stands.

CONSULTATION HISTORY

Communication regarding potential effects from National Forest projects on NLEB has been ongoing between the National Forests and Field Offices since the species was proposed for listing. A meeting to specifically discuss forest management effects occurred on February 10, 2014, with both National Forests and the New York and New England Field Offices present. The conferencing process for NLEB was specifically discussed at a meeting between the WMNF and the New England Field Office at a meeting on March 6, 2014. On April 7, 2014, a conference call between the two Forests and the New York, New England, and Maine Field Offices was held to discuss the Albany South project as a specific example of a forest management project currently undergoing NEPA analysis, as well as to discuss a strategy for completing programmatic conferencing on both Forests' management plans. On September

19, 2014, an additional conference call was held to further discuss specific project effects. On November 7, 2014, both Forests met with the New England Field Office to discuss summer survey results and strategize how to complete ongoing project conferencing. On December 17, 2014, and February 11, 2015, the strategy to conference on all ongoing projects was reviewed with all three Field Offices.

A number of other individual contacts have been made between parties since the proposed listing was announced.

SUMMARY OF AVAILABLE INFORMATION

Conclusions about whether NLEB and suitable habitat are known or suspected within individual project areas are based on best available science which includes a review of literature on habitat requirements and known occurrences for each species. During revision of both Forest Plans approximately 10 years ago (prior to WNS), an in-depth analysis was completed for all species with any viability concerns on either National Forest (USDA Forest Service 2005a Appendices F, USDA Forest Service 2005b). This analysis included participation and review by species experts. NLEB was evaluated, but was dropped early in the process because species experts had no concerns over this species' viability under proposed management regimes.

POPULATION STATUS OF THE NORTHERN LONG-EARED BAT

The NLEB is widely but patchily distributed throughout the eastern and north-central United States and adjacent southern Canada (Natureserve 2014). Prior to WNS, the northeast and Canada had been considered to constitute the core of the species' range (USFWS 2014a); however, populations have since declined by 99 percent in much of this region. Since WNS was first documented near Schenectady, New York in 2006, it has spread throughout the eastern US (except Florida), north into Canada, and west to Missouri and Arkansas (L. Heffernan, WNS map dated 1/23/15). As of January 2012, over 5.5 million bats in North America had died as a result of this disease (USFWS news release 1/17/2012), and the death toll has increased considerably since then. Myotid species are among the most affected bats, particularly little brown bats (*Myotis lucifugus*) and NLEB, with many hibernacula having experienced colony declines greater than 90% (Turner et al. 2011).

WNS was first detected in Vermont and New Hampshire during the winter of 2008-2009 and in Maine 2 winters later. Bats with WNS were confirmed on the WMNF in March, 2010. Winter populations in hibernacula across the states are tracked respectively by the Vermont Agency for Natural Resources, New Hampshire Fish and Game Department, and Maine Department of Inland Fisheries and Wildlife. New Hampshire statewide hibernacula surveys show a loss of almost 99% of all hibernating bats and only 30 live bats were found in all hibernacula surveys completed in 2011(NHFG 2012). The GMNF and WMNF have conducted annual acoustic monitoring (driving transects) across both Forests during summer months since 2009. Results from both winter and summer surveys indicate a dramatic decrease in populations (GMNF unpublished data, WMNF unpublished data). Additional driving surveys coordinated by the New Hampshire Audubon Society throughout New Hampshire in 2012 and 2013 show relatively few NLEB detections (Figure 1).

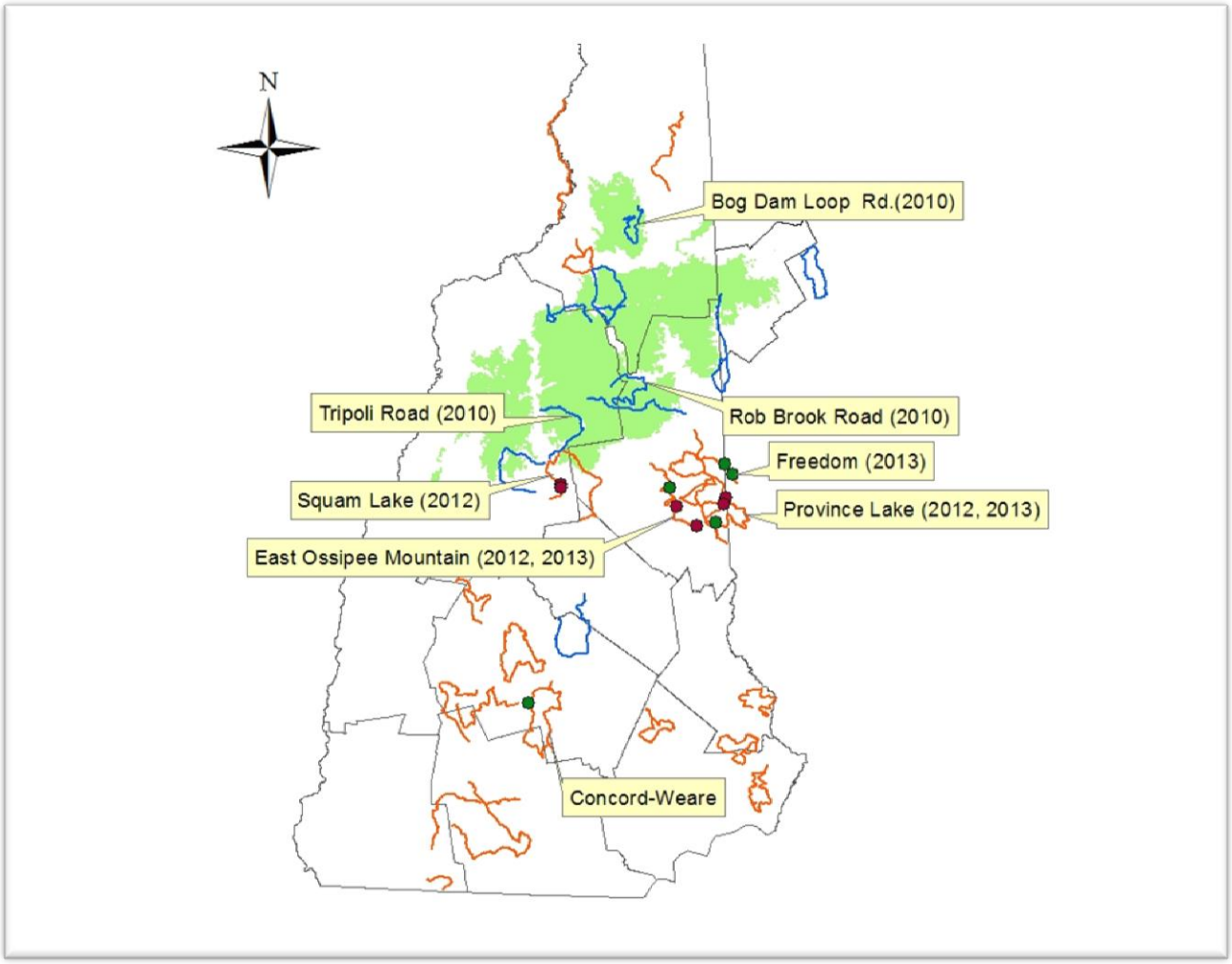


Figure 1. Bat driving survey routes. Blue routes are completed by WMNF staff; orange routes are coordinated by NH Audubon Society. Dates indicate years in which NLEB was detected. Red points are specific NLEB etections in 2012; green points are specific NLEB detections in 2013. WMNF surveys in 2010 did not employ GPS technology so information is generalized to the entire route.

State and federal agencies, universities and other groups are actively engaged in WNS research and monitoring across North America in an attempt to better understand and battle WNS, while also tracking changes in abundance and distribution of bat species as the disease continues to spread. The continued monitoring of summer usage patterns across the GMNF and WMNF is expected to provide further information on the scope and type of effects that WNS has on NLEB and other bats within New England and throughout the range of the species. Meanwhile, we do not believe that the projects discussed in this document will alter the amount or extent of mortality or harm to NLEB resulting directly from WNS.

POPULATION STATUS ON THE GMNF

Although the Forest Service has not collected comparable data on the GMNF from pre- and post-WNS periods, the Vermont Fish and Wildlife Department has compiled state-wide information on the status of bats in Vermont. Darling and Smith (2011) estimated that as a consequence of WNS, northern long-eared bats had declined by 93% to 99% state-wide and little brown bats in Vermont declined by 75% to 99%. Indiana bats, eastern small-footed bats, and tri-colored bats have never been abundant or wide-

spread in Vermont, however, and documenting declines in abundance for these species is difficult. These estimates are based on a wide array of pre- and post-WNS data, including hibernaculum counts, summer trapping data, and summer roost exit counts (Darling and Smith 2011). These estimates for Vermont are consistent with conclusions drawn from hibernaculum counts in New York, Vermont, and Pennsylvania (Turner et al. 2011). As described below, results of mist-net surveys conducted on the GMNF from 1999 through 2006, vehicle-based acoustic surveys conducted from 2009 through 2014, and fixed-site acoustic surveys conducted in 2010, 2012, and 2014 all are consistent with the conclusions of Darling and Smith (2011) that the population of NLEB on and adjecent to the GMNF has declined by as much as 99% since the onset of WNS.

Mist-Net Capture Surveys

The Forest Service conducted mist-net trapping of bats on the GMNF in seven different years from 1999 through 2006 (Toth 1999, Reynolds 2000b, Kiser et al. 2001, Beverly et al. 2002, Kiser and Brack 2003, Burbank and Kiser 2006 [2004 data], Burbank 2006) at numerous sites on the Manchester, Middlebury, and Rochester Ranger Districts of the GMNF (Figure 2). The Forest Service has not conducted any mist-net surveys on the GMNF post-WNS.

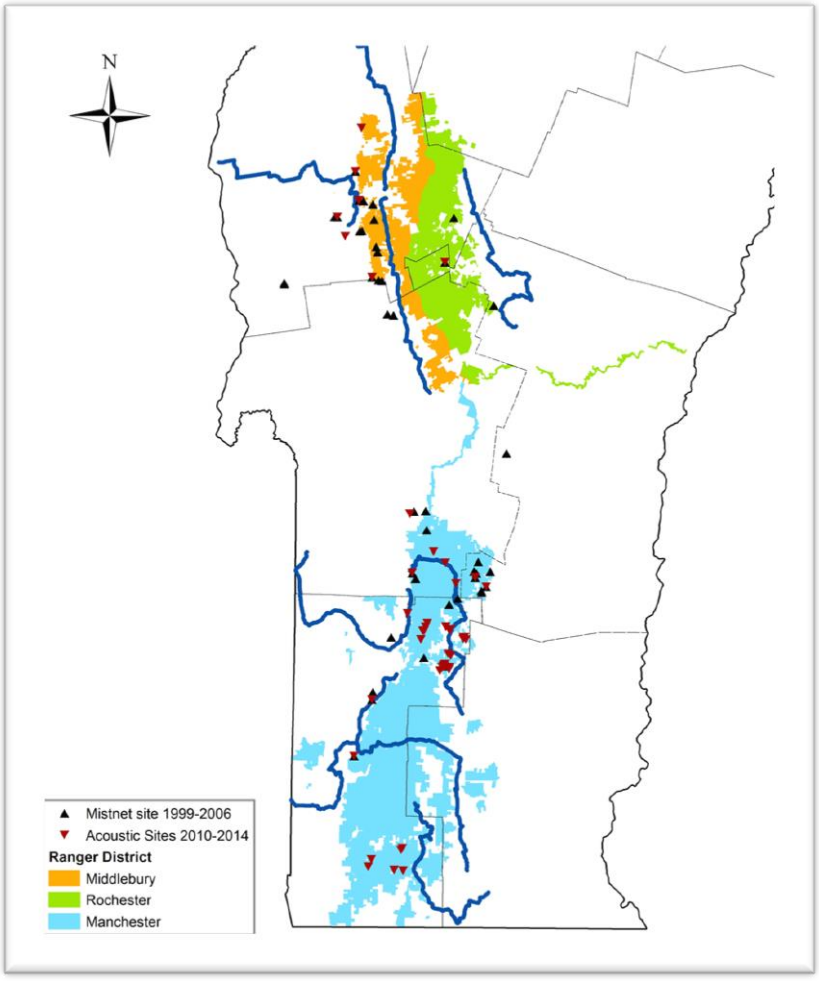


Figure 2. Location of mist-net survey sites, 1999 to 2006, and acoustic survey sites, 2010 to 2014, on the Green Mountain National Forest, Vermont. Nine vehicle-based acoustic surveys are shown in blue for reference.

Mist-net surveys were completed on the GMNF from 1999 through 2006. Mist-net trapping captured a total of 597 bats with 187 net nights of trapping effort during the four trapping seasons, or a rate of 3.19 bats per net night (bats/nn). The number of bats captured per net night varied considerably from a low of 1.43 in 2000 to a high of 7.62 in 2001. Although many net sites were sampled repeatedly, the selection of sampled sites varied considerably each year and no individual site was sampled in each year. Net nights, as presented, are not a precise measure of trapping effort, as they do not standardize for the actual area of mist nets deployed during each survey year. More detailed information is not available for most years; however net nights should provide at least an approximate comparison of effort.

During all seven trapping seasons on the GMNF, NLEB represented 11.4 percent of the captured bats (68 of 597 bats). During individual seasons, the proportion of NLEB ranged widely from about 4 percent (2001 and 2006 to 50 percent (2000) of the captured bats. Certainly, the selection of individual trapping sites and the corresponding habitats that were sampled in any given year would influence the species composition of captured bats. It is likely that number of NLEB captured in any given year was largely a function of net-site selection.

Table 1 provides detailed information about the number and species distribution of bats captured during mist-net surveys on the GMNF from 1999 through 2006.

Table 1. Numbers and species composition of bats captured in mist nets on the Green Mountain National Forest, Vermont, during 1999 through 2006[1], including species composition and trapping effort measured as net nights (nn).

		Species[2]										
Year		MYSE	MYLU	MYSO	MYLE	MYsp	PESU	EPFU	LABO	LACI	Total	nn
1999	n	9	42					9	1		61	13
	%	14.8	68.9					14.8	1.6		100	
	bats/nn	0.692	3.231					0.692	0.077		4.692	
2000	n	20	16			3		1			40	28
	%	50.0	40.0			7.5		2.5			100	
	bats/nn	0.714	0.571			0.107		0.036			1.429	
2001	n	8	135	25			1	26	1	2	198	26
	%	4.0	68.2	12.6			0.5	13.1	0.5	1.0	100	
	bats/nn	0.308	5.192	0.962			0.038	1.000	0.038	0.077	7.615	
2002	n	16	124	1	4			11	6		162	56
	%	9.9	76.5	0.6	2.5			6.8	3.7		100	
	bats/nn	0.286	2.214	0.018	0.071			0.196	0.107		2.893	
2003	n	7	36		1				1		45	16
	%	15.6	80.0		2.2				2.2		100	
	bats/nn	0.438	2.250		0.063				0.063		2.813	
2004	n	7	54		1			6			68	40

		Species[2]										
Year		MYSE	MYLU	MYSO	MYLE	MYsp	PESU	EPFU	LABO	LACI	Total	nn
	%	10.3	79.4		1.5			8.8			100	
	bats/nn	0.175	1.350		0.025			0.150			1.700	
2006		1	7					15			23	8
n												
	%	4.3	30.4					65.2			100	
	bats/nn	0.125	0.875					1.875			2.875	
Total		68	414	26	6	3	1	68	9	2	597	187
% of total		11.4	69.3	4.4	1.0	0.5	0.2	11.4	1.5	0.3	100.0	
bats/nn		0.364	2.214	0.139	0.032	0.016	0.005	0.364	0.048	0.011	3.193	

[1] Sources for trapping data: Toth 1999, Reynolds 2000b, Kiser et al. 2001, Beverly et al. 2002, Kiser and Brack 2003, Burbank and Kiser 2006 (2004 data), Burbank 2006.

[2] Species: MYSE=northern long-eared bat (*Myotis septentrionalis*), MYLU=little brown bat (M. lucifugus), MYSO= Indiana bat (*M. sodalis*) , MYLE=eastern small-footed bat (*M. leibii*), MYsp= unidentified *myotid* bat , PESU=tri-colored bat (*Perimyotis subflavus*), EPFU=big brown bat (*Eptesicus fuscus*), LABO=eastern red bat (*Lasiurus borealis*), LACI=hoary bat (*L. cinereus*).

No comparable data are available for the GMNF post-WNS. The Vermont Fish and Wildlife suspended almost all mist-net surveys in the GMNF vicinity after the WNS-caused population declines in populations of hibernating bats. This suspension was partly intended to eliminate introducing the additional stress of capture and handling on bats already stressed by WNS, but also due to the fact that even extensive hours of trapping effort no longer captured bats.

Vehicle-Based Acoustic Surveys

The Forest Service conducts acoustic bat surveys along eight different routes during June and July beginning in 2009, after WNS already had severely decreased populations of hibernating bats in Vermont. No comparable pre-WNS data are available for the GMNF. Three routes are on the Middlebury and Rochester Ranger Districts (a fourth route was surveyed twice in 2010 only) and five are on the Manchester Ranger District (Figure 3). Survey routes are 26 to 30 miles in length, traversing GMNF lands, as well as lands adjacent to the GMNF. Protocol for these surveys was adapted by the Forest Service from "Using Acoustic Surveys to Monitor Population Trends in Bats," by Eric R. Britzke and Carl Herzog. An acoustic monitoring device (e.g., Anabat SD2) was mounted on the roof of a vehicle which proceeded along the survey route at a speed of approximately 20 miles per hour. Ideally the survey was conducted once in each of three survey periods (June 1 through June 15, June 16 through June 30, and July 1 through July 15), although some routes were surveyed only once or twice during some years. In all, the Forest Service conducted 110 surveys along the nine routes from 2009 through 2014. For all 110 surveys, Echoclass v2 identified 4,004 files with bat calls (excluding files with miscellaneous noise or other sounds that not identifiable as bat calls), and a total of 52,904 individual call pulses. Echoclass v2 calculated maximum likelihood statistics for only four species: big brown bat, hoary bat, eastern red bat, and silver-haired bat. Echoclass v2 identified NLEB calls in only 9 of the 1,669 files (one file each for nine of the 110 surveys), which is insufficient for calculation of maximum likelihood (GMNF, unpublished data). These individual call files have not been visually examined individually by an acoustic identification expert.

Because vehicle-based acoustic surveys did not take place in pre-WNS conditions, no pre- post-WNS comparison is possible. The wide variability in the numbers of high-frequency calls (Figure 4) likely is

a function more of daily variability in weather conditions, moonlight, season, etc.

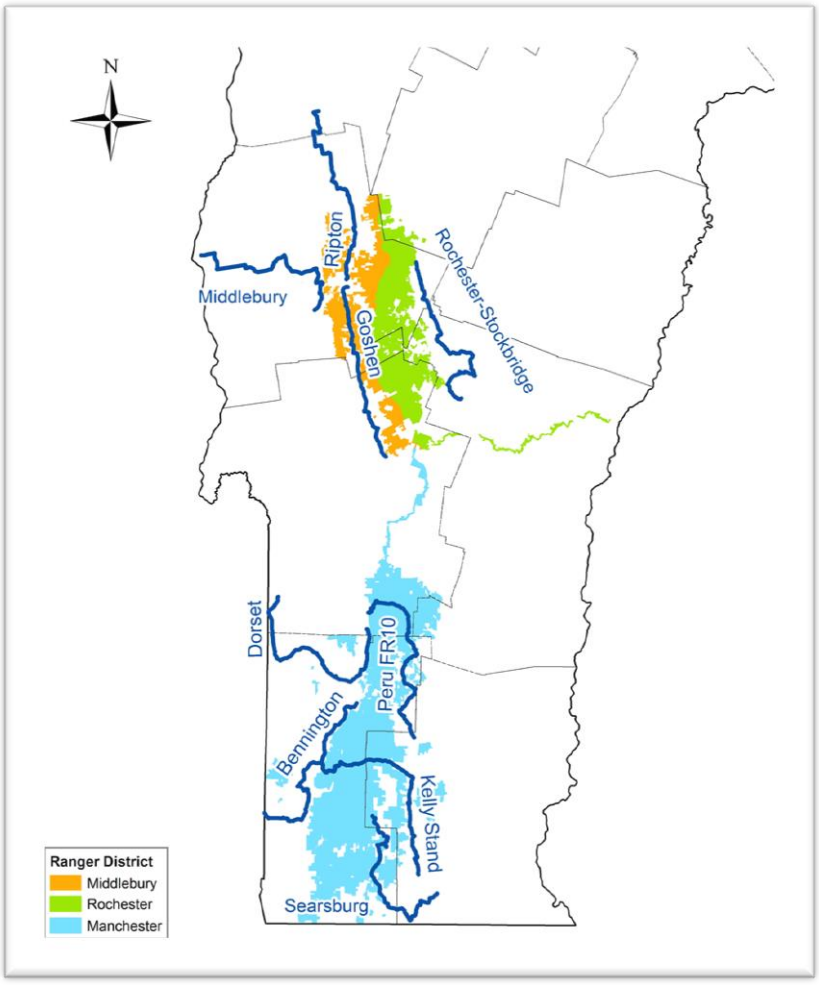


Figure 3. Location of vehicle-based acoustic survey routes on the Green Mountain National Forest, Vermont, 1999 to 2014. The Goshen route on the Middlebury Ranger District was surveyed only in 2010. The Bennington and Searsburg routes on the Manchester Ranger District started in 2009. All other surveys began in 2010, with one to three surveys conducted on each route each year.

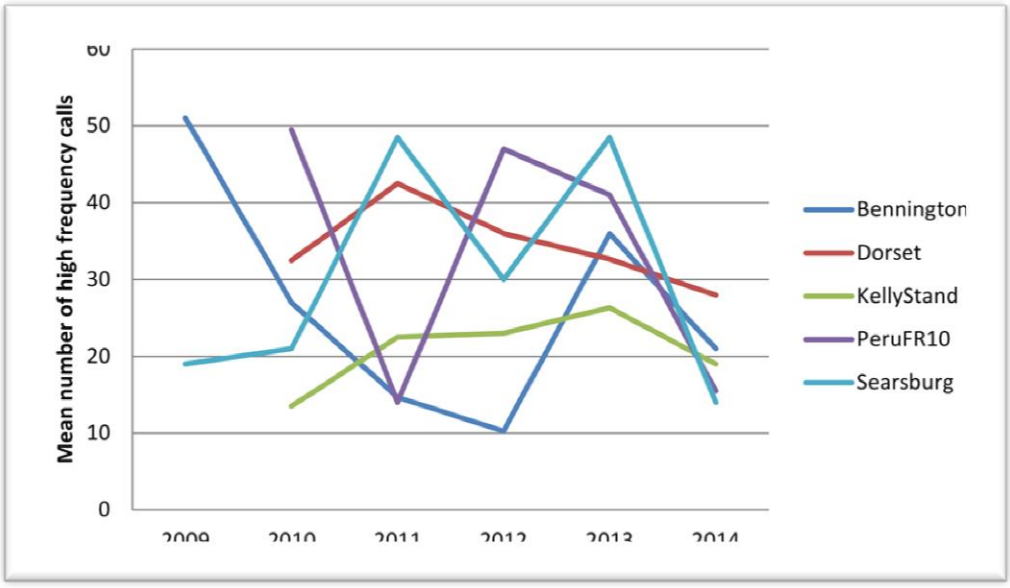


Figure 4. Mean numbers of high-frequency bat calls detected by route and by year on GMNF vehicle-based acoustic survey routes.

Acoustic Surveys

The Forest Service frequently deployed Anabat acoustic recording devices adjacent to and in conjunction with mist-net capture activities from 2004 to 2008 (see Figure 2 above). The Forest Service also conducted several acoustic surveys during 2008 that were not in conjunction with mist-net trapping. The library of acoustic data from these efforts is incomplete, as some files have been lost on old equipment, corrupted in transfer to newer storage media, or are otherwise unavailable. The surviving data files, from 33 site-nights across the GMNF from 2004 through 2008, include a total of 3,225 files and 40,877 call pulses. Echoclass v2 identified NLEB in only two files, one each from two different sites, which is insufficient to calculate maximum likelihood statistics. NLEB were captured at these sites in 2001, 2005, or 2006.

The Forest Service conducted fixed-site acoustic surveys at 23 sites across the GMNF in 2010 and 14 sites on the Manchester District in 2012 (Figure 2, Figure 5, Figure 6). A few sites were surveyed a single night, most were surveyed during different years and/or more than one night in a given year. NLEB were detected with high likelihood at one site on the Middlebury District, with possible detection at three other sites on the Middlebury and Manchester Districts in 2010. On the Manchester District in 2012, NLEB were detected with high likelihood at one site and possible detection at three other sites on the District. No acoustic surveys took place on the Middlebury District in 2012, nor in the Rochester District in 2010 or 2012.

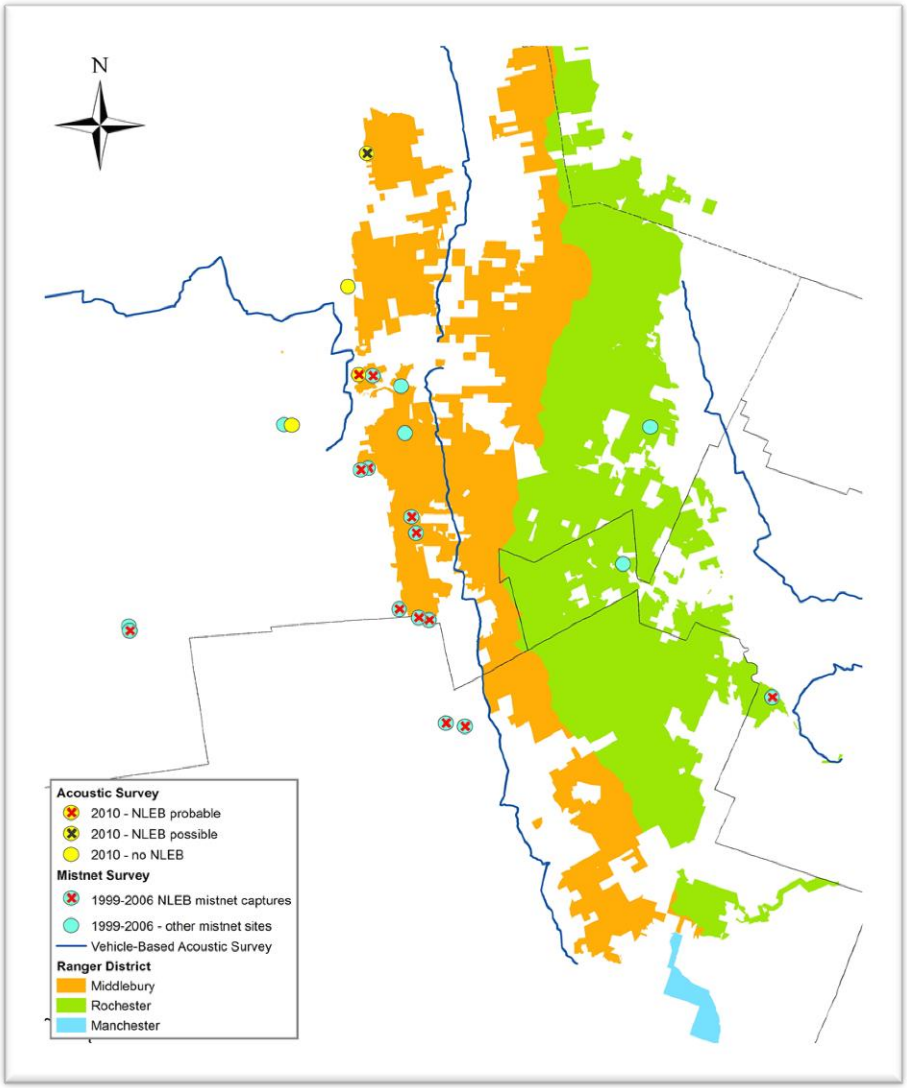


Figure 5. Acoustic survey sites on the Middlebury and Rochester Ranger Districts of the GMNF, 2010, and mist-net survey sites, 1999 to 2006. Crosses indicate sites where NLEB were captured in mist nets or detected acoustically. Vehicle-based acoustic surveys are shown in blue for reference.

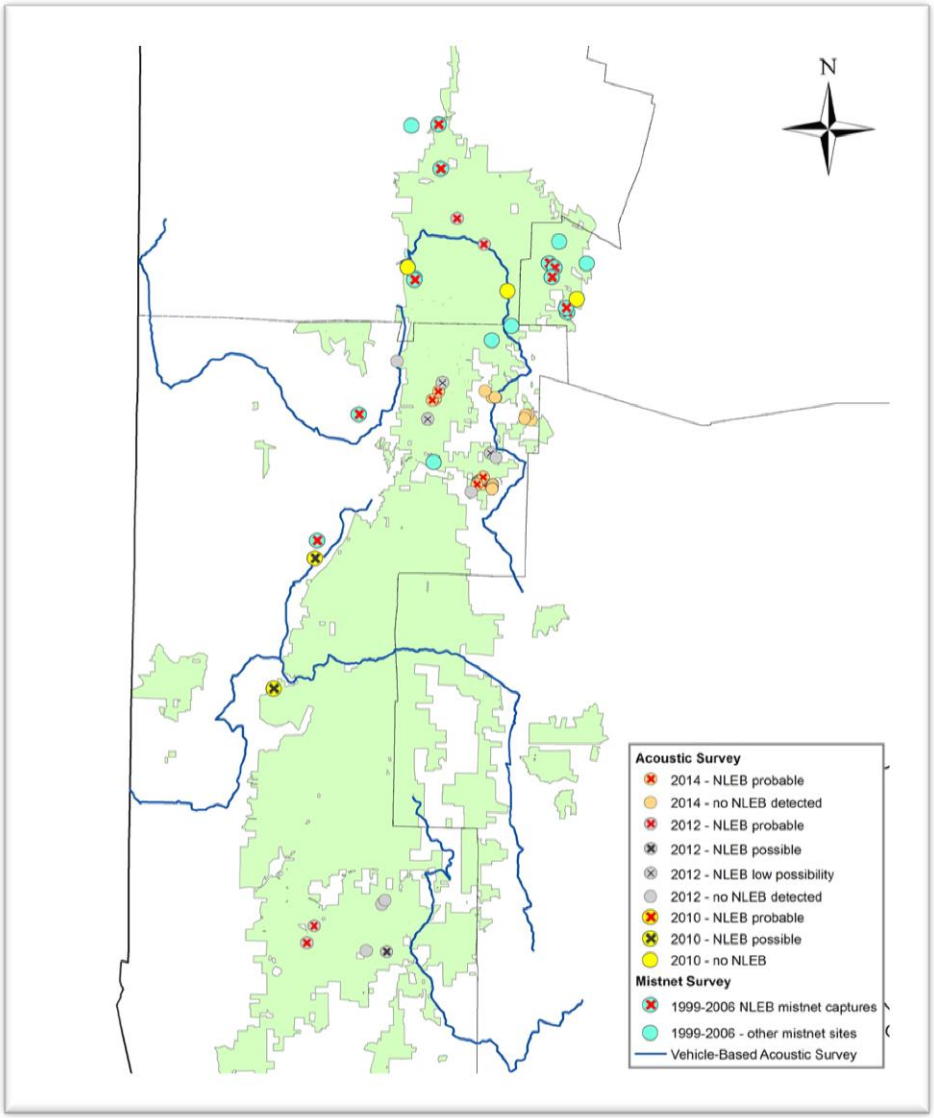


Figure 6. Acoustic survey sites on the Manchester Ranger District of the GMNF, 2010 to 2014, and mist-net survey sites, 1999 to 2006. Crosses indicate sites where NLEB were captured in mist nets or detected acoustically. Vehicle-based acoustic surveys are shown in blue for reference.

Project Acoustic Surveys

The Forest Service conducted fixed-site project-specific acoustic surveys at 22 sites across five different timber project areas on the Manchester District during 2014. Acoustic surveys focused on timber harvest areas where soil conditions are suitable for summer operation; most timber harvests are conducted during winter on frozen-ground conditions. Survey equipment included a mix of zero-crossing (e.g., Anabat SD-2) and multi-spectrum (e.g., Pettersson D500X) recorders. NLEB were positively detected at six survey sites, in two clusters of three sites each, in three timber sale areas. One cluster of three sites were located at elevations of 2,100 to 2,200 feet, the other cluster was at an elevation of about 1,500 feet. One of the lower-elevation sites where NLEB were detected in 2014 was surveyed with mist nets in 2001 without capturing any NLEB. No NLEB were detected in two sale areas, despite extensive detector-night effort.

Figure 7 and Figure 8 show acoustic surveys completed in GMNF timber sales in 2014. The GMNF

will conduct acoustic surveys in the other sale areas beginning in 2015. Acoustic surveys focused on stands determined suitable for summer timber harvest, based on soil conditions, drainage, and other factors.

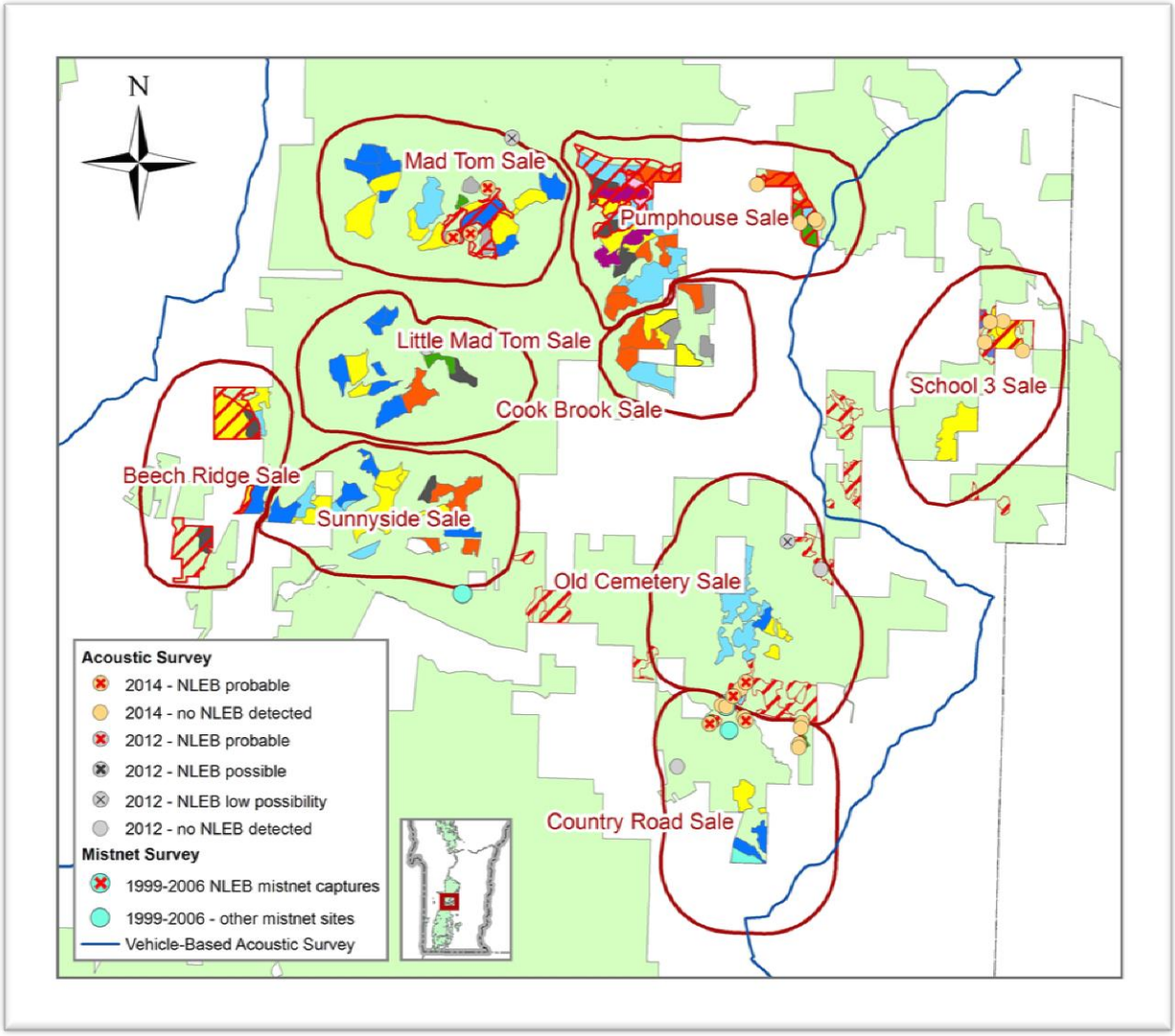


Figure 7. Project-specific acoustic survey sites in the Country Road, Old Cemetery, School 3, Pumphouse, and Mad Tom timber sale areas on the Manchester Ranger District of the GMNF, 2014. Crosses indicate sites where NLEB were detected acoustically. NLEB were not captured at two sites in 2001 and 2004. Vehicle-based acoustic surveys are shown in blue for reference.

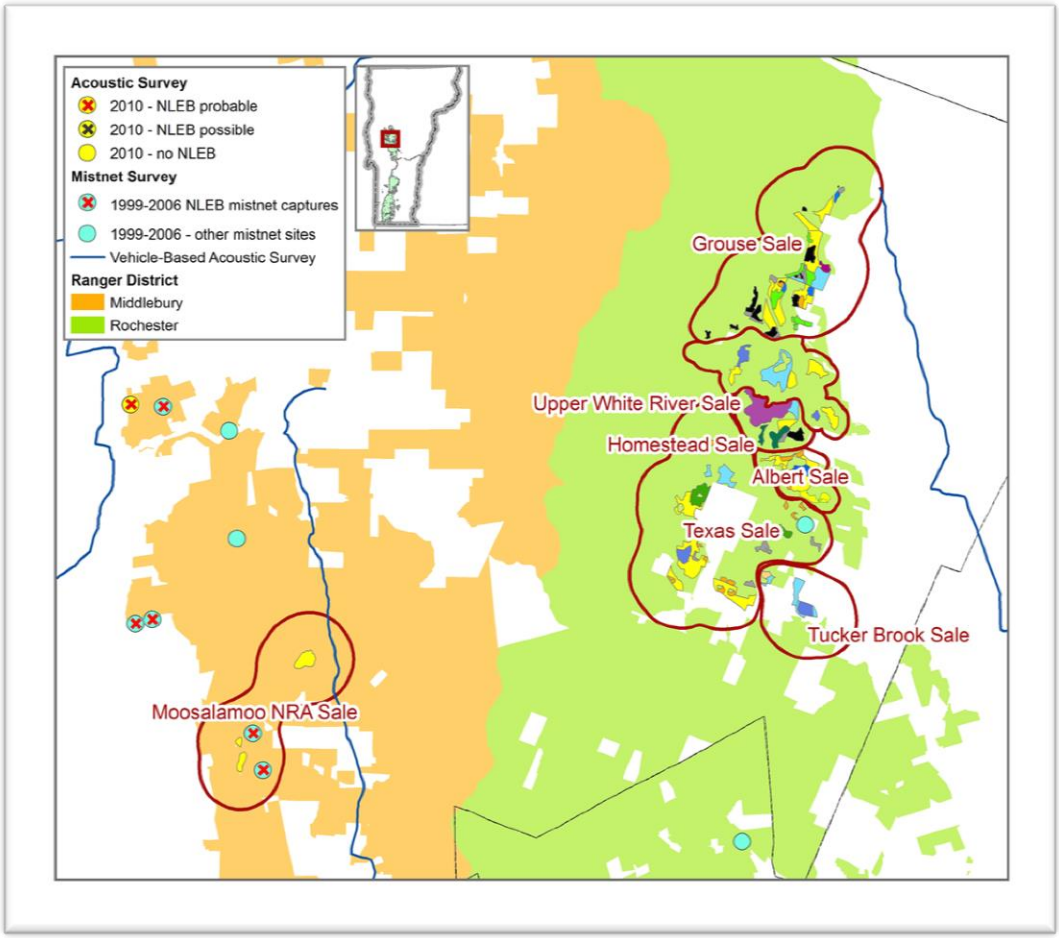


Figure 8. Timber sale areas on the Middlebury and Rochester Districts of the GMNF. Crosses indicate sites where NLEB were captured in and near the Moosalamoo NRA Sale in 2003. Vehicle-based acoustic surveys are shown in blue for reference.

Appendix 2 provides greater detail about project-specific acoustic survey results on the Manchester Ranger District during 2014, as well as the timber operations that are scheduled to be conducted in those sale areas.

POPULATION STATUS ON THE WMNF

Mist Net Surveys

NLEB have been identified in a number of surveys conducted on the WMNF. In 1992 and 1993, Krusic et al. (1996) conducted a general woodland bat survey in a variety of WMNF habitats. NLEB made up 10 of 84 (12%) individuals of all bat species captured in mist nets or harp traps, the second highest proportion after little brown bats (56%). In 1993 and 1994, Sasse (1995) set out to track cavity-roosting bats to their roost sites. He trapped bats in mist nets at 18 WMNF locations (752 net hours over 87 nights) (see Figure 9). Similar to Krusic et al. (1996), Sasse also caught predominantly little brown bats (71%) with NLEB the next highest (27%). Sasse found a skewed sex ratio in his captures, with 84% of little brown bats being male versus only 40% of NLEB. Subsequently, the ratio of juveniles captured was also skewed, with only 4% of little brown bats being juveniles versus 20% of NLEB.

Chenger (2002) conducted general mist net surveys at 10 locations in New Hampshire, including 5 sites (50 net nights) on the WMNF. Throughout New Hampshire, a total of 202 bats were captured. Four species were identified, including the little brown bat (50%) and the NLEB (23%). Totals from WMNF mist net locations were proportional to other survey regions in the study and NLEB was captured at all five WMNF sites. However, when gender was separated, a striking difference became evident. Of the four species captured on the WMNF, only the NLEB had females, all other species captures were males. And of the 10 female NLEB captured on the WMNF, only 1 (10%) showed signs of reproductive activity.

Two years later, Chenger (2004) returned to the WMNF to conduct additional mist net surveys. A total of 57 net nights were completed at 8 sites, resulting in 233 individuals captured. This time, six bat species were netted, although little brown bats still represented the majority of captures (75%). Big brown bats (12%) and NLEB (7%) reported the next highest numbers. NLEBs were captured at seven of the eight sites. When data for all species was combined, females made up a larger proportion (42%) than in 2002, with males and females being captured from five of the six species. However, female NLEB were identified at only three sites. All Chenger mist net locations are shown in Figure 9. All Sasse (1995) and Chenger (2002, 2004) mist net locations where at least one adult female or juvenile of either sex was found is shown in Figure 10.

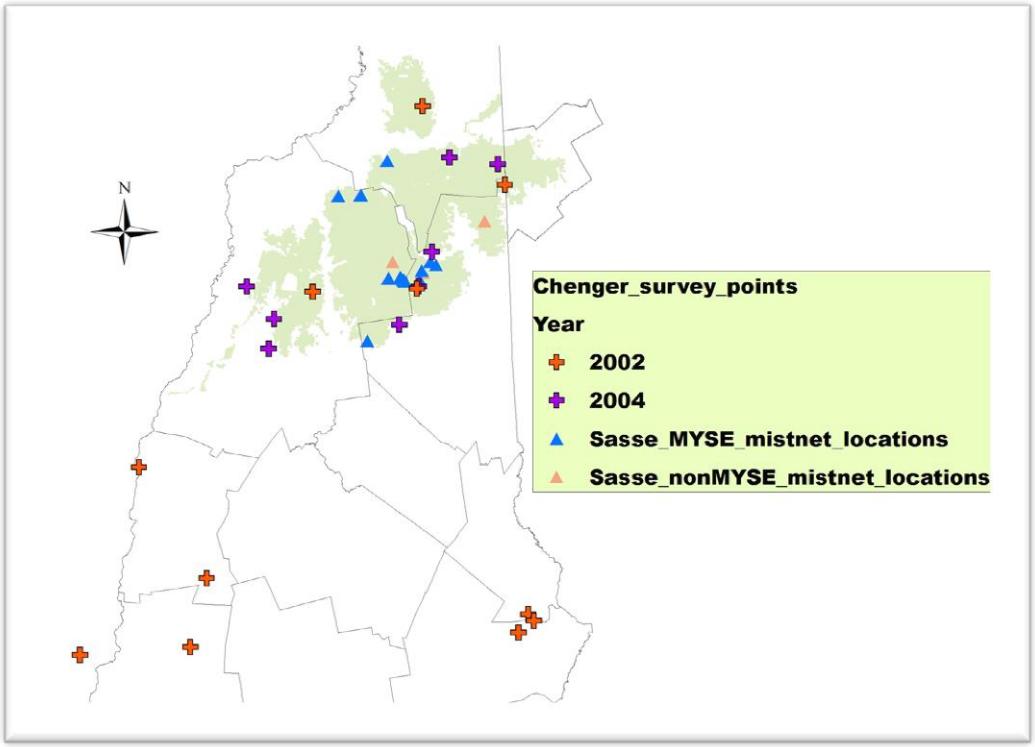


Figure 9. Chenger 2002/2004 and Sasse (1995) mist net locations.

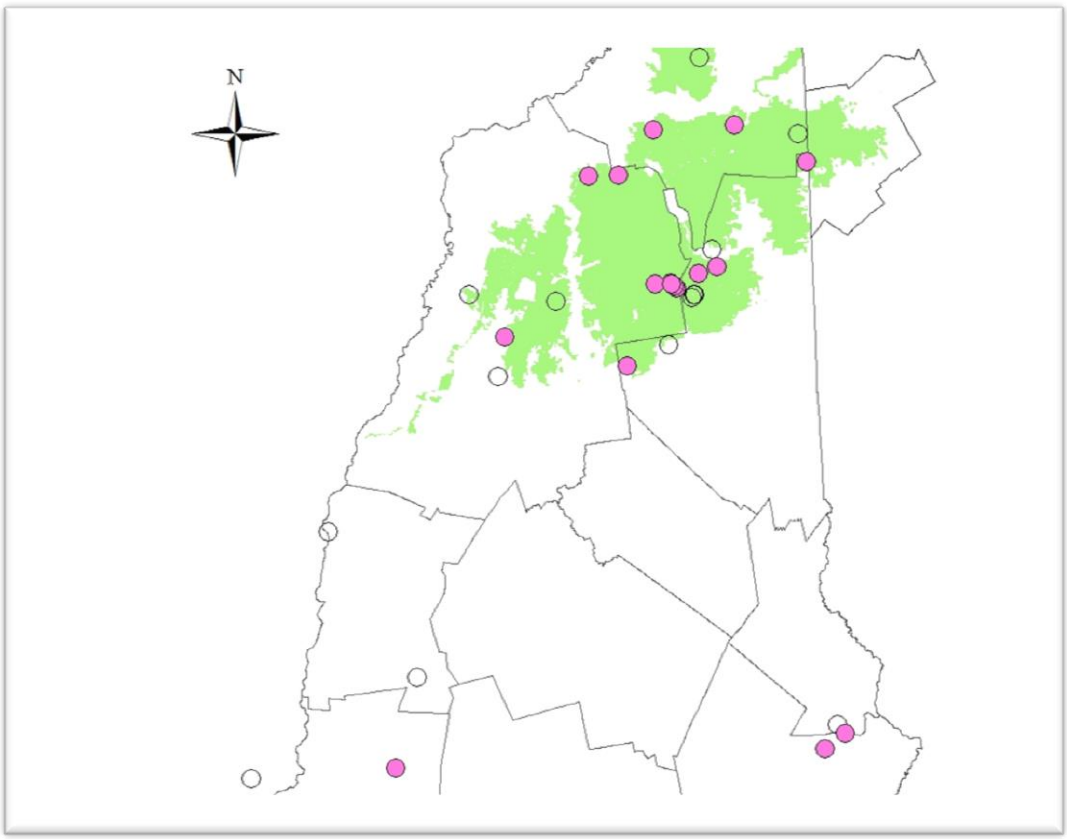


Figure 10. Sasse (1995) and Chenger (2002/2004) mist net locations. Solid pink circles represent where adult females or juveniles were captured. Open circles indicate where only males and non-reproductive females were caught.

Forest Plan Revision Species Viability Evaluation

Prior to WNS, the viability of local NLEB populations was not in doubt. In 2005 (WMNF) and 2006 (GMNF), both Forests completed the required revisions of their Land and Resource Management Plans (Forest Plans). As part of this effort, the GMNF and WMNF jointly completed an extensive Species Viability Evaluation. More than 1,100 plant and animal species were considered for inclusion. The NLEB was dropped early in the process, after species experts concurred that it was common in summer surveys throughout much of the northeast and whose viability was not of concern (unpublished SVE mammal panel notes (2002) and notes from telephone conversation with Al Hicks, NYDEC 2001).

Vehicle-Based and Stationary Acoustic Surveys

In 2009, WMNF staff initiated an annual driving survey as part of a larger regional effort to monitor the trends of various bat species. Five transects were established in the inaugural year, with an additional 4 transects added in 2010, including 2 transects located off-Forest for comparison (Figure 11). Each transect is run three times during the summer in the same manner as the GMNF. Data were not identified to species, but were grouped based on whether the characteristic frequencies of the calls were high, medium, or low. High frequency bats were those whose characteristic call frequencies were approximately 40 kH. Virtually all calls in this category belong to four of the five species affected by WNS on the WMNF: little brown bat, NLEB, eastern small-footed bat, and tri-colored bat. When viewed as a group, this category of bats has declined 93% in the five-year period between 2009 and 2013 (Figure 12, WMNF unpublished data).

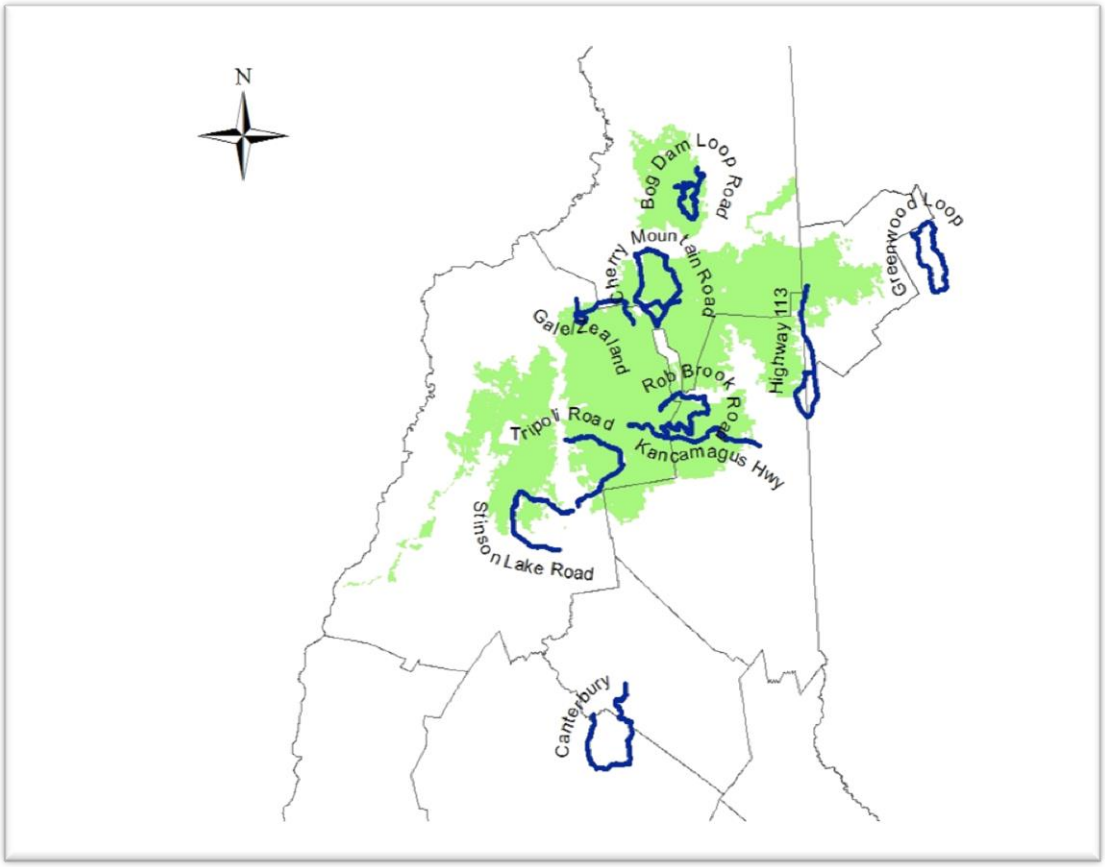


Figure 11. Acoustic driving survey transects performed by WMNF staff. Note two transects occur off-Forest (Canterbury and Greenwood Loop) for comparison purposes.

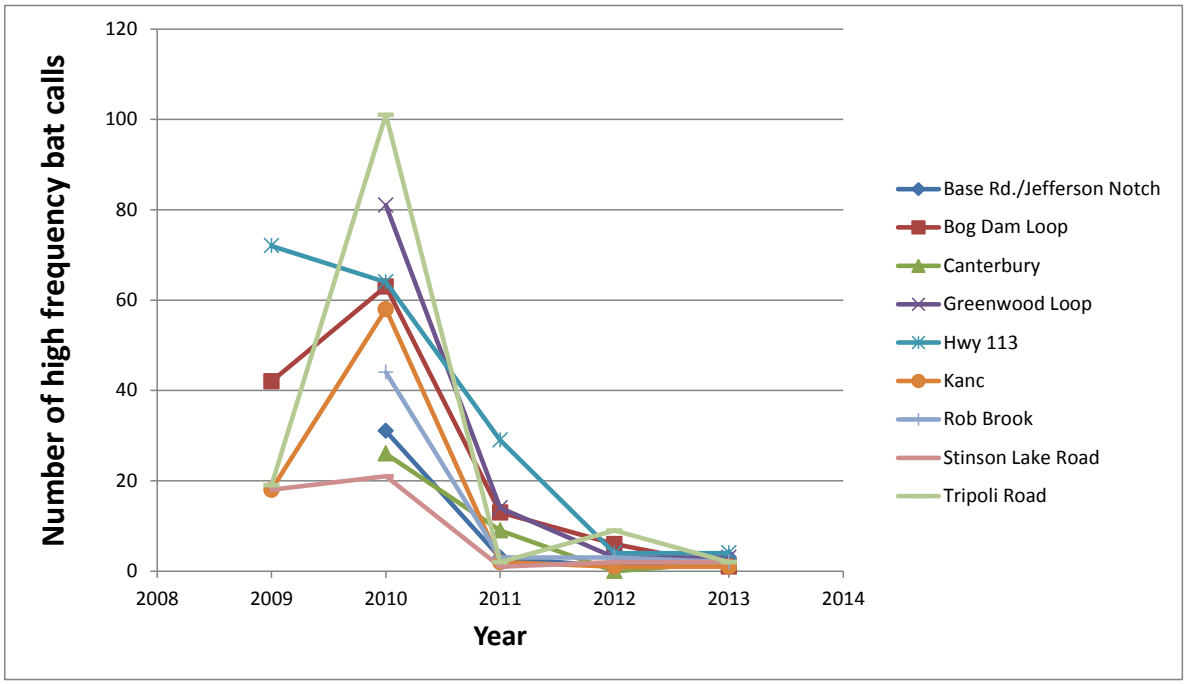


Figure 12. Number of high frequency bat calls by year on WMNF driving survey transects

Similarly, the WMNF conducted a number of stationary bat surveys between 2009 and 2013, where bat detectors were left in the same location from three to nine hours in various locations across the Forest (Figure 13).

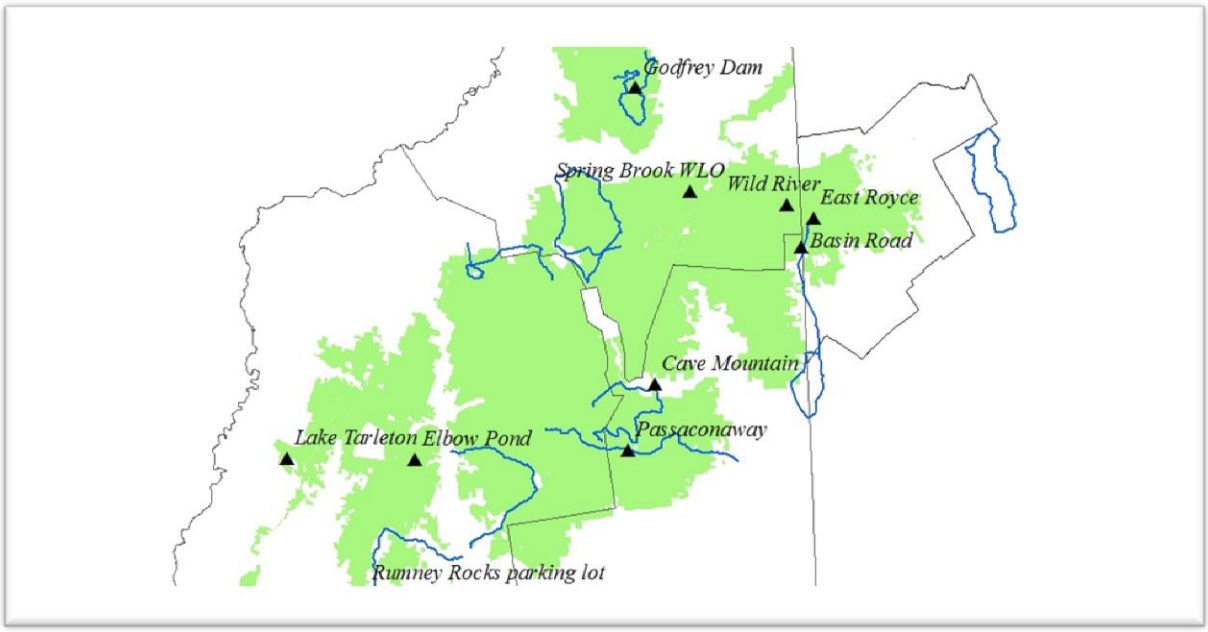


Figure 13. WMNF stationary site locations. Driving transects are shown in blue for reference.

Further analysis was done recently to tease out NLEB calls from both the driving survey and stationary survey data. In total, over 6,000 calls were recorded on driving surveys between 2009 and 2014, and approximately 5,200 calls were recorded at stationary sites between 2009 and 2013. All calls were automatically classified to species using Echoclass (v. 2) and Kaleidoscope Pro (v. 1.1.22). Echoclass classified 23 calls as NLEB (12 driving+11 stationary), Kaleidoscope Pro classified 583 (340 driving+243 stationary). After reviewing each of these calls by hand, a total of 8 independent locations were identified has having NLEB calls, all occurring in 2009 or 2010 (Table 2).

Table 2. NLEB occurrences on WMNF driving (2009-2014) and stationary (2009-2013) surveys

Driving Transect	***District***	***Date***	***Time***
Bog Dam Loop Road	Andro	8/11/10	9:23.36
Rob Brook Road	Saco	8/11/10	9:09.23
Tripoli Road	Pemi	6/21/10	9:58.37
Stationary Site		***Date***	***Time***
Lake Tarleton	Pemi	8/15/09	10:14.28
Basin Road	Saco	7/24/09	9:30.57 9:37.19
Cave Mountain	Saco	7/27/09	9:13.15
Wild River	Andro	7/20/10	9:23.26 9:28.54 9:30.58 9:31.14
Elbow Pond	Pemi	6/21/10	9:58.37
Basin Road	Saco	7/17/10	9:32.48

Mt. Washington Acoustic Surveys

Also in 2010 and continuing into 2011, the WMNF attempted to locate a hibernaculum thought to occur on the western side of Mt. Washington. Until recently, no hibernacula had been identified on the WMNF, although it was assumed that perhaps rock fissures might serve as small hibernacula sites for a few bats. However, in early spring, 2010, unusual bat activity was identified near the Cog Railroad in Bretton Woods, NH. Bat biologists observed typical WNS behavior in a number of bats, and a specimen collected at the site later tested positive for WNS. Because of the large number of bats seen flying downslope, it seemed apparent that a very large hibernaculum must exist nearby, likely high in elevation on Mt. Washington.

Later that fall, WMNF staff and volunteers organized a massive effort to try and locate this suspected hibernaculum. From August 24 to September 17, a series of 13 bat detectors were deployed at various locations on the western slope of Mt. Washington. Initial stations were located in potential bat travel corridors (i.e., along streams, trails, roads, and the railroad). Every 3-4 days, data was downloaded from each detector and briefly evaluated. If a substantial amount of bat activity was detected, the station was relocated to a higher elevation along the same corridor. Stations with little or no activity would be relocated to a new corridor. The expectation was that at this time of year, bats would be moving towards their hibernation sites, where fall swarming activity might help indicate the hibernaculum entrance. The assumption was that the area of highest bat activity at the end of the season would be the most likely area to search for a hibernaculum.

Survey efforts continued in 2011, focusing on the 2 most likely corridors. Unfortunately, Tropical Storm Irene on August 28 cut short the season's work. However, despite the reduced season, bat calls were still recorded at several locations. Surprisingly, when data from both years was evaluated, bat activity (not necessarily NLEB) was prevalent at most sites, with over 40,000 calls recorded at 26 locations (Figure 14). This number of calls over multiple locations was unexpected, as prior consensus among local bat biologists was that bats would be unlikely to occur in higher elevations of the WMNF. The accepted view was that the dense conifer vegetation, cooler temperatures, and less abundant insect prey above 2,500 feet elevation would be less suitable for most bats because survival would require an excessive amount of energy expenditure for little gain. Except for four stations along roads, all survey stations were located above 2,500 feet.

Based on a brief review of the data, the vast majority of recorded calls were from the little brown bat. Although the data has not been extensively evaluated, a coarse analysis was completed to check for NLEB. EchoClass (v2) and Kaleidoscope Pro (v 1.1.22) were used to classify all data. Two locations were identified where NLEB were present according to U.S. Fish and Wildlife Service NLEB analysis parameters (Maximum Likelihood Estimator values < 0.05; see Project Acoustic Surveys below for references). One site (F01) is located at an unusual water feature, a natural waterbody locally called the Gem Pool on the Ammonoosuc Ravine Trail at approximately 3,500 feet. It is unusual in that large water bodies are relatively uncommon at elevations above 2,500 feet; this one likely serves as a foraging location for several bat species. The other location (H01) is adjacent to the Ammonoosuc River at 2,900 feet.

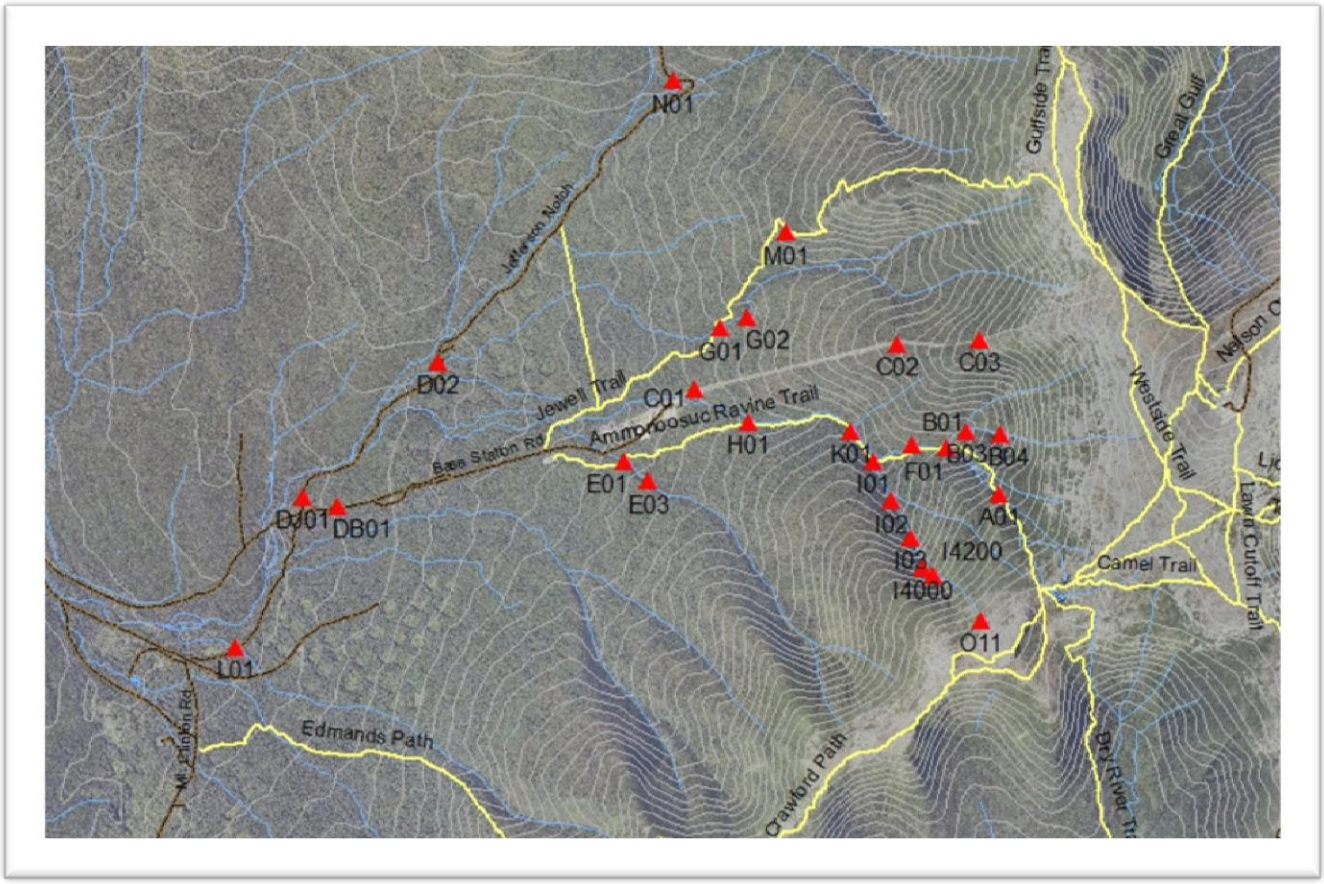


Figure 14. Mt. Washington bat survey locations, 2010-2011

Project Acoustic Surveys

Finally, during the summer of 2014, WMNF staff deployed acoustic bat detectors at 153 separate locations in an effort to determine if NLEB were present at specific projects, primarily timber sales. For projects undergoing NEPA analysis, surveys followed the Northern Long-eared Bat Interim Presence/Absence Survey Guidance for 2014 (Appendix B of the NLEB Interim Conference and Planning Guidance (USFWS 2014a)), which points to using the 2014 Indiana Bat Summer Survey Guidelines (USFWS 2014b) with minor modifications. Based on informal consultation (see Consultation History above), it was agreed that the primary concern from forest management activities is a direct impact (e.g., cutting down a tree with a NLEB roosting in it, especially a maternity roost). With a 93% decline in WMNF summer populations and even more drastic decline in local hibernacula, a more than ample supply of unoccupied roost habitat should exist across the landscape (see Habitat Status section below). Since bats on the WMNF are hibernating underground from approximately November 1 through March 31, cutting trees during this time period would have no direct effects. Instead, acoustic survey work focused on areas where trees might be cut when bats are present (approximately April 1-October 31). And of those areas, places where many trees would be proposed for cutting (e.g., clearcuts) would be a higher priority to survey than those with relatively fewer trees proposed for cutting (e.g., individual tree selection) because the more trees that are cut in a given area, the higher the probability that one might contain a roosting bat.

For projects that already had a decision documented under NEPA, the same protocol was used, except through consultation it was agreed that instead of four detector nights in two locations per survey site,

these projects would suffice with four detector nights in a single location per survey site. All other considerations for detector placement remained the same.

Because of staffing and equipment limitations, as well as a survey window that only spans 3 months, survey areas focused on large projects (timber sales and large prescribed burns). In addition, three sites were planned at two known maternity colonies identified by Sasse (1995). For each project, a habitat assessment was made and locations of planned bat detectors were coarsely identified based on potential foraging habitat (e.g., near known vernal pools or small ponds) or along potential flight paths (e.g., along streams or old roads). An attempt was made to assure surveys would cover all summer harvest units, especially summer clearcuts.

NLEB were confirmed at 14 of the 153 sites (9%), including all three sites from the two historic maternity colonies (Figure 15).

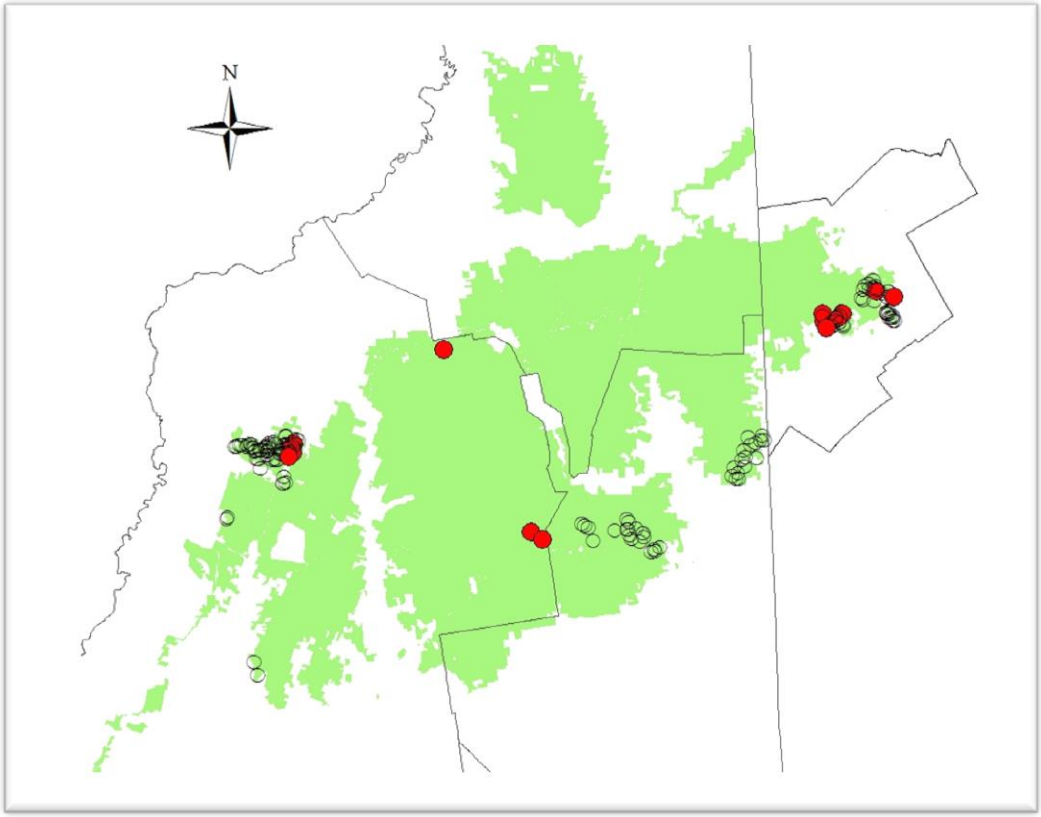


Figure 15. WMNF 2014 acoustic detector locations. Red dots indicate where NLEB calls were confirmed. Black open circles indicate detector locations where NLEB are presumed absent.

Summary

A summary of all known WMNF NLEB detections since 1993 is shown in Figure 16.

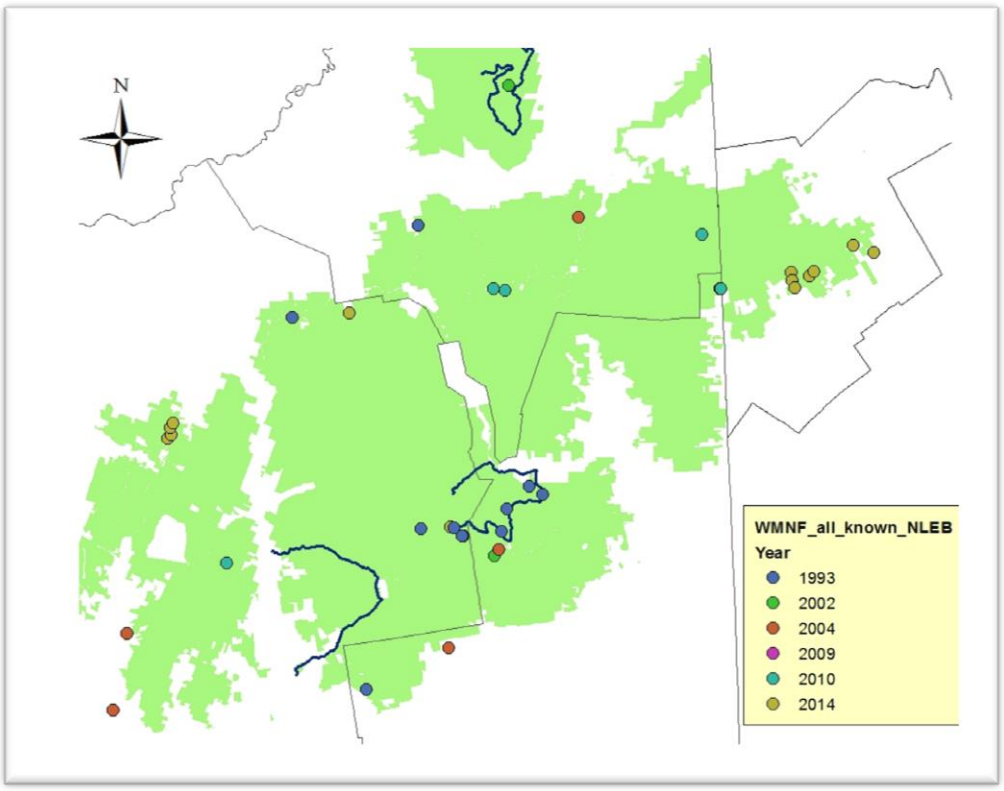


Figure 16. All known NLEB detections on the WMNF since 1993. Note positive identification on driving surveys are not tied to specific coordinates, so the entire transect is shown.

LIFE HISTORY OF THE NLEB

Winter Habitat

The types of hibernacula occupied by NLEB vary geographically (Amelon and Burhans, 2006). NLEB overwinters predominantly in caves and abandoned mines that typically are large, with large passages and entrances, relatively constant, cooler temperatures (32 to 48 °F), and with high humidity and no air currents (Van Zyll de Jong 1985, Raesly and Gates 1987, Caceres and Barclay 2000, Brack 2007, Fitch and Shump 1979). NLEB typically prefers cooler and more humid conditions than little brown bats, rather more similar to the eastern small-footed bat and big brown bat, although the latter two species tolerate lower humidity than northern long-eared bats (Hitchcock 1949, Barbour and Davis 1969). NLEB typically hibernates in small crevices or cracks in cave or mine walls or ceilings, often with only the nose and ears visible, thus are easily overlooked during surveys; less frequently NLEB may hang in the open (Griffin 1940, Barbour and Davis 1969, Caire et al. 1979, Van Zyll de Jong 1985). Hibernation counts for this species rarely exceed 100 individuals (Amelon and Burhans, 2006).

Infrequently, NLEB has been found overwintering in other types of habitat that resemble cave or mine hibernacula, including abandoned railroad tunnels, more frequently in the northeast portion of the range. Individual records exist of NLEB hibernating near the entrance of a storm sewer in central Minnesota and in a hydro-electric dam facility in Michigan (Goehring 1954, Kurta and Teramino1994). In Massachusetts, NLEB has been found hibernating in the Sudbury Aqueduct, a structure created in the late 1800s to transfer water, but that is rarely used for this purpose today (French 2012, unpublished data, cited in 78 FR 61046). Griffin (1945) found NLEB in December in Massachusetts in a dry well,

and commented that these bats may regularly hibernate in ‘‘unsuspected retreats’’ in areas where caves or mines are not present.

Recent observations of NLEB on Long Island, New York (Fishman 2013, 2015) suggest that NLEB may be hibernating locally where there are no known caves or mines. Ongoing research efforts may reveal new information about hibernacula used by NLEB.

Summer Habitat

NLEB typically uses mature, intact interior forest for roosting, though younger, managed forests are also used; roost selection is likely adaptable and variable depending on forest characteristics in an area (Broders et al. 2006, Carter and Feldhamer 2005, Ford et al. 2006, Henderson et al. 2008, Lacki and Schwierjohann 2001, Loeb and O’Keefe 2006, Perry and Thill 2007). Roosting site characteristics and tree species vary by geographic location across the species range. For example, NLEB were captured frequently in uplands, particularly mid-upper slopes and ridgetops, in northern Ohio and Kentucky (Silvis et al. 2012, Krynak 2010, Schultes 2002), while roost trees in Michigan and southern Illinois were all in wetlands or in bottomland and floodplain habitat (Foster and Kurta 1999, Carter and Feldhamer 2005). Silvis et al. (2012) suggested that while upland positions may increase solar radiation at roost sites, such sites also have the highest natural disturbance frequency and severity; thus, increased snag presence rather than increased solar radiation might be the primary influence on NLEB roost selection. This could also potentially explain higher use of trees in wetlands and floodplains, where high water often results in high snag densities. NLEB differ from Indiana bats (*Myotis sodalis*) in that NLEB often use roost trees with relatively lower levels of solar exposure (i.e., greater canopy cover; Carter and Feldhamer 2005, Ford et al. 2006, Johnson et al. 2009, Lacki and Schwierjohann 2001, Sasse and Pekins 1996, Schultes 2002, Silvis et al. 2012). However, while canopy cover at NLEB roost trees may be relatively high in comparison with Indiana bat roosts, it is generally still lower than the surrounding forest canopy cover.

NLEB seems to be able to exploit or at least tolerate some level of forest management activities such as tree cutting and prescribed burning. For example, NLEB exploited alterations to forest structure created by the reintroduction of fire in West Virginia, likely due to enlargement of existing or creation of new canopy gaps (Johnson et al. 2009). Various studies have shown that NLEB will use and return over time to managed forest stands that have been harvested with various techniques, thinned, and/or burned (Cryan et al. 2001, Johnson et al. 2009, Lacki and Schwierjohann 2001, Menzel et al. 2002, O’Keefe 2009, Owen et al. 2003, Perry and Thill 2007, Silvis et al. 2012, Sheets et al. 2013, Timpone et al. 2010, Titchenell et al. 2011, Silvis et al. 2014).

Similar to the variation in landscape characteristics, many studies suggest that NLEB use a variety of tree species for roosts based largely on the tree species’ proportional availability on the local landscape, roosting in trees that offer the necessary structural characteristics in association with other suitable roost trees and near foraging habitat (Foster and Kurta 1999, Krynak 2010, Menzel et al. 2002, Sasse and Pekins 1996, Schultes 2002). In studies of relatively mature forested habitat, female NLEB roosts (particularly maternity roosts) were often in larger, taller trees in mid-late decay class, in localized areas with more open canopy and more abundant snags as compared to other areas (Broders and Forbes, 2004, Garroway and Broders 2008, Lacki and Schwierjohann 2001, Sasse and Pekins 1996). On the WMNF, roost trees averaged 40.9 cm dbh (SE-2.8), were 14.8m tall (SE=1.0), had 78% bark remaining (SE=2.8), with a canopy closure of 83 % (SE=1.4). Live trees in the immediate area surrounding roost trees had larger dbh than did live trees in a 1 km^2 area around the roost tree, although there was no difference in snag dbh between roost sites and surrounding stands. Percent

canopy closure in a 1-km^2 area surrounding roost trees averaged 88% (SE=1.7)(Sasse and Pekins 1996).

Regardless of geographic and topographic location, maternity roost sites must provide warm microclimates that maximize growth rate of the young. In North Carolina (O'Keefe 2009) and West Virginia (Johnson et al. 2009), NLEB were found roosting in trees within canopy gaps. O'Keefe (2009) also found that several microhabitat factors were important for roost site selection by reproductive females (roosts were generally large diameter canopy trees with low canopy closure and in close proximity to other suitable roosts), while males were more flexible, typically selecting a cavity in a small diameter live-damaged understory or mid-story roost tree. Male and non-reproductive female summer roost sites also may be in cooler locations, including caves and mines. Maternity colonies have been reported in a variety of situations, including tree cavities, crevices, under exfoliating bark, in live trees and in bridges as well as buildings and bat boxes (Burke 1999, Foster and Kurta 1999, Menzel et al. 2002, Feldhamer et al. 2003, Henderson and Broders 2008, Krynak 2010).

Like many other tree-roosting bats, NLEB maternity colonies are located in areas with multiple additional suitable roosts available within close proximity, regardless of whether those roosts are located in close proximity to foraging areas. Maternity colonies often are located farther from foraging habitats than are male or non-reproductive female roost trees, likely because stands that support an abundance of potential maternity roosts are not located randomly on the landscape and the availability of such a network of suitable roosts may be more important to females than proximity to foraging habitat (Broders and Forbes 2004, O'Keefe 2009, Silvis et al. 2014). Male NLEB generally roost alone and are less selective in terms of roost tree characteristics. Proximity to foraging sites may be a more important factor for male roost-site selection. Several recent studies have investigated the fission-fusion social structure of female NLEB roost tree networks, within which individuals switch roosts regularly and subsets of individuals maintain preferred associations on both a short- and long-term basis (Garroway and Broders 2007, Patriquin et al. 2010, Johnson et al. 2012, Silvis et al. 2014). General use of space within roosting networks tends to be similar, with all colonies exhibiting a distinct core roosting area surrounded by other, less frequently used roosts. Studies suggest that NLEB may persist following the loss of some of these roosts, which would be consistent with the ephemeral nature of snags as a habitat resource (Silvis et al. 2014, Silvis et al. 2015).

In the WMNF, the mean distance between roosting and foraging areas was 602m (~2,000 ft.), ranging from 60-1719 m (~200 ft.-1 mile) (Sasse and Pekins 1996). Foraging habitat generally consists of mature forested upland habitats, although water and riparian habitats (vernal pools, streams, etc.) are sometimes considered important (Brooks and Ford 2005, Brooks 2009, Schirmacher et al. 2007). Several studies indicate an apparent preference by NLEB for foraging under closed canopy conditions or very near its edge, with little activity occurring into open fields or clearcuts (Henderson and Broders 2008, Jantzen and Fenton 2013, Patriquin and Barclay 2003). However, NLEB may use smaller openings within the forest (Brooks and Ford 2005, Sheets et al 2013, Lookingbill et al. 2010, Loeb and O'Keefe 2006).

Broders et al. (2006) noted that gender may strongly affect bat habitat use and selection. They found the minimum foraging area for females was 46.2 ± 44.4 ha and for males was 13.5 ± 8.3 ha.

HABITAT STATUS ON THE GMNF

Winter Habitat

The Vermont Fish and Wildlife tracks and conducts periodic hibernaculum counts at about 30 caves and mines across Vermont. Of these, 14 are located within about five miles of GMNF lands (Figure 17). Total numbers of bats in these 14 hibernacula range from a few individuals in Williams Mine to thousands in Aeolus (Dorset) Cave (Vermont Fish and Wildlife Department, unpublished data; Trombulak et al. 2001). Only one hibernaculum, The Greely Talc Mine, is located on GMNF lands. The Greely Mine is gated and locked year-round to prevent human access. Prior to WNS, the Greely mine housed up to 200 to 300 NLEB in addition to as many as 700 or 800 bats of other species. The Greely Mine has had few or no bats hibernating in it post-WNS. Winter surveys at most of the other hibernacula historically found fewer than 50 NLEB (Vermont Fish and Wildlife Department, unpublished data). Post-WNS hibernaculum counts are greatly reduced and highly variable (Vermont Fish and Wildlife Department, unpublished data; Darling and Smith 2011).

Approximately 82,000 acres (20%) of GMNF lands lie within 5 miles of the 14 known bat hibernacula (Figure 17).

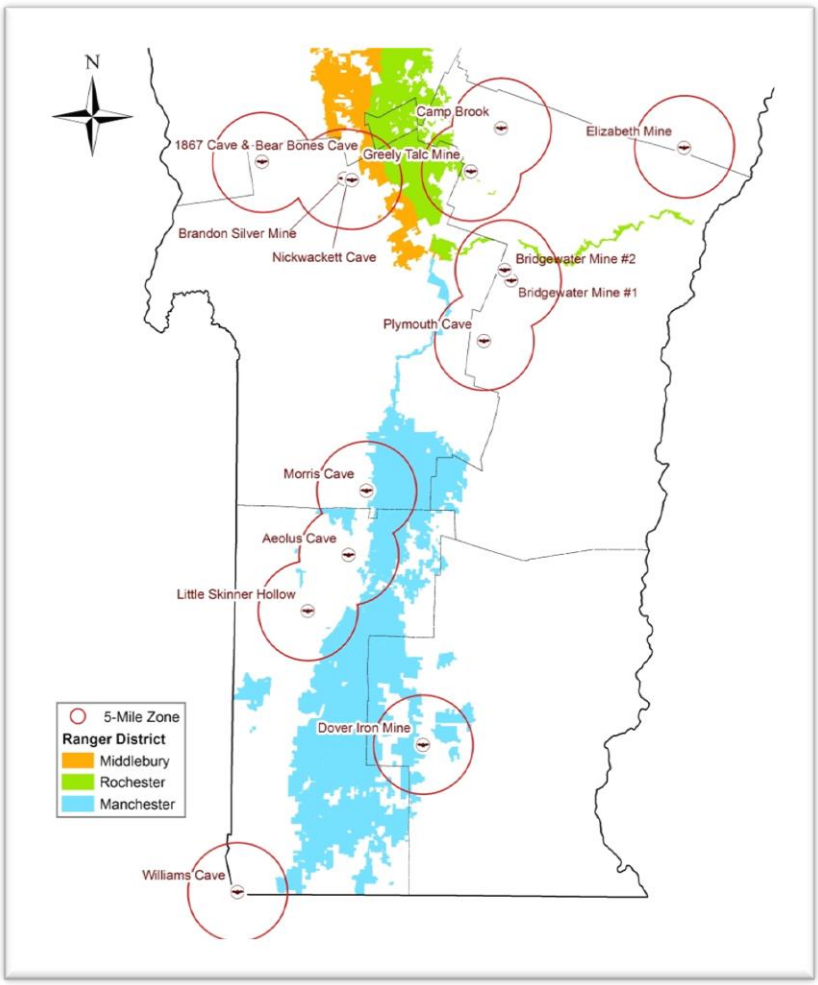


Figure 17. Locations of 14 bat hibernacula relative to the GMNF.

Summer Habitat

No specific information is available about summer habitat use by NLEB on the GMNF. Lacking specific field data for the GMNF, the Forest Service assumes that habitat use on the GMNF is generally

similar to that on the WMNF (e.g., Sasse 1995, Sasse and Pekins 1996). Considering the widespread distribution of NLEB on and around the GMNF prior to WNS, the Forest Service assumes that the habitat conditions on National Forest lands and the management regimes that have been implemented over recent decades provide appropriate habitat conditions for NLEB.

The GMNF includes more than 400,000 acres of National Forest System lands in central and southern Vermont. The area is rural with numerous farms and forest lands intermixed with low-density, rural, residential development, and small historical villages and towns. Forested conditions are found on about 97 percent of the GMNF: approximately 79 percent northern hardwoods, 10 percent mixedwoods, 7 percent softwoods, and 1 percent oak. Open lands, some of which are maintained in early-successional stages of vegetation for provide wildlife habitat, and wetlands each account for about one to two percent of the GMNF. Although only 12 percent or less of the GMNF would be classified as young forest stands (10 to 40 or 60 years old, depending of the tree species, and one percent or less is regeneration (0 to 10 years old), most of the GMNF (about two-thirds) is less than 100 years old due to land use history in the area (GMNF 2006).

The GMNF includes several rivers and many streams and brooks ranging in size and flow, as well as seasonality. The GMNF also includes many small lakes, ponds, and other bodies of open water. Numerous beaver impoundments and marshy areas are scattered across the Forest. Consequently, access to open water for NLEB is not restrictive on almost the entirety of the GMNF.

The GMNF is centered along the spine of the Green Mountains, but also includes some lands within the Taconic Range in southwestern Vermont. Elevations on the GMNF range from about 600 feet to 4,200 feet above sea level.

Although Sasse (1995) concluded that NLEB preferred lower elevations (below 1,500 or 2,000 feet), the Forest Service detected NLEB acoustically at three GMNF sites located at about 2,200 feet. Most NLEB acoustic detections on the GMNF have been at elevations of 1,500 feet or less (Forest Service, unpublished data).

HABITAT STATUS ON THE WMNF

Winter Habitat

There are 15 confirmed hibernacula in New Hampshire, more than half of which are in Grafton County (none located on the WMNF, although one is suspected). Compared to other states, New Hampshire's hibernacula are quite small (the largest had less than 1,800 bats in 2008 prior to WNS). Less than half of the known hibernacula supported more than 100 bats in the 3 years of survey prior to 2008 (New Hampshire Fish and Game Department unpublished data). However, the state's geology lends itself to numerous cracks, crevices, and other rocky openings that could support wintering bats.

Maine has few caves or mines suitable for hibernacula. In 2009, 2 mines were surveyed (Zircon Mine in Litchfield and Whitecap Mine near Rumford). Neither showed any evidence of WNS. Maine's first confirmed cases of WNS occurred in 2010 in Oxford County. Like New Hampshire, Maine's hibernacula are fairly small in terms of bat numbers. Biologists in Maine also believe there are many unknown rock crevices or other natural geologic formations that provide additional suitable hibernacula sites (J. DePue, MDIFW, personal communication).

On the WMNF, the only potential hibernaculum that is known is on Mt. Washington, although

occurrences of NLEB using that location has not been confirmed. The site is well protected from human disturbance, being located some distance from any hiking trails and on a steep, talus slope just below treeline.

Summer Habitat

Sasse (1995) found northern long-eared bats and little brown bats seem to prefer lower elevations. Despite 40% of mist net effort at elevations greater than 440m (1,444 ft.), only 7% of female NLEB were captured above this elevation. Similarly, out of 40,000+ calls at 26 sites on Mt. Washington, presence according to U.S. Fish and Wildlife Service survey protocol was only confirmed at two locations. This may be partly because typically hardwoods provide more snags with larger diameters than softwoods and therefore may offer more opportunities for roosting. On the WMNF, snag data shows only 9 percent of softwood snags are at least 9 inches dbh in size, while hardwoods and other deciduous species snags make up 21 percent of their total (Forest Inventory and Analysis Database, 2013). High elevation spruce-fir trees are also often spaced very close together, with perhaps fewer opportunities for solar radiation on a potential maternity roost. Work by Sasse and Pekins (1996) reinforces the idea that NLEB seem to prefer individual roost trees that are not softwood species. Twenty-six NLEB were followed to 46 roost trees, made up almost exclusively of northern hardwood or other deciduous species (14 beech, 13 sugar maple, 8 yellow birch, 6 red maple, 2 bigtooth aspen, and 1 each of black cherry, paper birch, white ash, and hemlock).

Potential roost trees are not considered a limiting factor on the WMNF, as evidenced by Table 3. In this table, snag trees are defined as standing dead trees. Rough culls are live trees that do not contain at least one eight-foot section of the merchantable bole that is reasonably free from defect. Examples of rough culls are trees with splits, large cracks, lightning strikes and other defects. Rotten culls are live trees where more than 2/3 of the merchantable bole is defective and at least half of this is due to the tree being rotten. Rotten culls are usually trees with large hollow sections.

Table 3. Potential roost trees on the WMNF (Forest Inventory and Analysis Database 2013)

National Forest	snags ≥ 5" dbh[1]	rough culls > 3" dbh	rotten culls > 3" dbh	potential roost trees	potential roost trees/acre	snags/ acre
White Mountain	46,823,772	47,725,742	4,900,072	99,449,568	125	59

In total, there are 567 trees per acre (not counting nonforested lands) that are at least three inches dbh, so on average, potential roost trees make up approximately 22 percent of the forested landbase on the WMNF.

Anecdotal evidence also suggests that ponds or wetlands, especially beaver flooded wetlands, are attractive to NLEB. All of the known maternity roosts on the WMNF lie within 1 mile of these features, as do all but one of the NLEB mist net or acoustic detections recorded over the last 20+ years. Size of the wetland may not be critical, as one of the two historic maternity colonies on the WMNF is relatively small, estimated as five acres at the time of Sasse and Pekins'(1996) study. The other is significantly larger, at least 200 acres in size. Over 600 wetlands at least five acres in size occur on or adjacent to the WMNF, making up over 13,000 acres.

[1] Dbh = diameter at breast height

POTENTIAL EFFECTS OF MANAGEMENT ACTIVITIES

For the purposes of this document, "direct effects" are those resulting in the death, injury, disturbance, or other "take" of an individual bat or bats. "Indirect effects" are those that affect bats indirectly through alteration of habitat, removal of known maternity roost trees, etc., particularly when bats are not present. Management activities that could result in direct take of NLEB include cutting trees larger than 3-inch diameter breast height (dbh) that could be occupied by a roosting NLEB, prescribed fire that kills or injures bats in roost trees or chases bats from roost trees due to heat or smoke, dismantling buildings or other structures that might be occupied by roosting bats, or disturbing bats while in their winter hibernacula. Management activities that could result in indirect effects (but not necessarily rise to the level of take under the Endangered Species Act) would include those that remove unoccupied roost trees or otherwise alter habitat conditions for roosting, foraging, or hibernating bats. Based on recent research by Silvis et al. (2014, 2015), it appears NLEB can tolerate some loss of maternity roosts, perhaps as high as 20 percent in a single colony. Given their strategy of utilizing such ephemeral resources as snags and declining trees for roosts, some acceptable level of disturbance makes sense from an evolutionary standpoint. On the GMNF and WMNF, indirect effects sufficiently adverse to be considered take would include such situations as cutting down so many unoccupied maternity roost trees in a single colony that the habitat becomes effectively unsuitable for bats returning from hibernation or substantial modification to or destruction of hibernacula conditions that occur when bats are not present.

A handful of projects are presented here to demonstrate the types of activities that are expected to have No Effect on the NLEB. These are projects that cut trees less than three inches in diameter or do not occur during the summer when bats are present.

Forest	**Project**	**Description**
GMNF and WMNF	Christmas tree permits	Approximately 850 permits are issued annually to cut individual Christmas trees in November and December. These are individual conifers without defects. No measurable change in stand level canopy closure.
GMNF and WMNF	Non-native invasive plant treatment	Approximately 160 acres total. Includes cutting or hand pulling herbaceous plants. Also directed herbicide treatment on specific stems. No broadcast spraying. Standard application practice is to avoid/minimize spray on insects or other organisms (potential NLEB prey). Herbicides used are on the less toxic end of the spectrum.
GMNF	Maple tapping	Maple trees are tapped January through March/early April across <500 acres. No trees are cut.
GMNF	Redfield Brook Trail bridge replacement	No trees cut. Bridge is too small for roosting.

GMNF	AT/LT Lottery Road trail improvement	Correct drainage problems; no trees cut
GMNF	SR 73 Bridge Staging	No trees cut. Use of existing cleared FS land as staging area to store materials for bridge construction work occurring on non-Forest Service land.
GMNF	Robert Frost trail improvements	1,200 feet of trail improvement; no trees cut. Construction of boardwalk and other trail improvements in existing trail tread.
GMNF	Chittenden Brook System Trail Improvements	Replacement of footbridge and other trail improvements in existing trail tread.
GMNF	FR71 Winter Sports Cabin decommissioning	Structure removal, some burning of materials. Work accomplished during winter.
GMNF	Emerald Lake Connector Trail	New hiking trail construction through an open meadow. No trees cut.
WMNF	High Street Snowmobile Trail relocation	All trees are smaller than 3" dbh; work will be completed during the fall.

Evaluation of the remaining ongoing projects resulted in determinatinos of *May Affect, but are Not Likely to Adversely Affect NLEB*. Projects were grouped into categories of activity to facilitate evaluation. Activities are listed below in a very coarse order of increasing intensity and risk to NLEB.

1. Building Modification or Decommission
2. Culvert or Bridge Replacement
3. Opening Maintenance
4. Miscellaneous Individual Tree Cutting
5. Miscellaneous Forestry Projects
6. Construct Small Utility Lines
7. Hiking Trail Construction or Reconstruction
8. Campsite Construction or Reconstruction
9. Aquatic Habitat Improvement
10. Parking Lot Construction
11. Road Reconstruction or Maintenance
12. Hazard Tree Removal
13. Ski Area Projects
14. Prescribed Fire
15. Commercial Timber Harvest

Each type of activity is presented separately, with specific projects listed for each activity. GMNF

projects and WMNF projects are indicated with a "G" and "W", respectively, before the project number. Districts are indicated by a letter following the number, using the following abbreviations:
Manchester = M
Middlebury or Rochester = R
Androscoggin = A
Pemigewasset = P
Saco = S

As an example, project number 16 on the Androscoggin District of the WMNF would be labeled in a table as W16A. Projects that are not district-specific and may occur across either Forest do not have a letter following the project number, e.g., W16. All known projects that may be implemented over the next three years (2015-2017) are included. A distinction is made between projects that may occur annually (2015, 2016, 2017) and those in which implementation will occur based sometime within the 3-year time period (2015-2017). Estimated tree counts included in each project are generally overestimated to be conservative.

Conservation measures may be employed to reduce the risk of impacts to NLEB. Conservation measures already being planned as part of implementation are listed below each table. All WMNF site-specific project locations are shown on maps found in Appendix 1 and can be made available by request for GMNF projects. A determination and rationale for all projects combined is summarized at the end of this section.

1. Building Modification or Decommission
Over the next 5 years, only routine maintenance such as painting is planned at large buildings such as administrative offices. A total of six smaller buildings are planned to be decommissioned (removed) and one will have a new roof installed. These projects generally occur during the summer maternity season. Minor amounts of tree cutting are also included in some projects to facilitate equipment access or to prevent building damage.

Project #	State	Project	Extent of Activity	Season of Implementation	Comments
W18A	NH	Glen Ellis - decommision restroom building and pumphouse building. (Other parts of this project included in Hiking Trail Construction or Reconstruction and Parking Lot Construction)	3 bldgs	June-Nov. 2015-2017	
W92A	NH	Cabot Cabin decomission	2 bldgs.	June-Sept. 2015-2017	Well above 2,500' elev.
W104A	NH	South Pond bath house reroofing	1 bldg.	June-Nov. 2015-2016	
W93A	NH/ME	Admin facility maintenance (painting, staining, minor tree removal)	6 sites, 30 trees total	June-Sept. 2015-2017	

W94A	NH/ME	Recreation facility site painting and staining	4 sites (multiple small bldgs); 15 trees total	June-Sept. 2015-2017	
W22S	NH	Dugway picnic area decomission restroom building	1 bldg; 5 trees	Summer 2015	
W66S	NH	Jigger Johnson Campground building removal	1 bldg.	Summer 2015	

Conservation measures

During the summer maternity season, prior to any work that could cause disturbance to a roosting bat, the buildings will be investigated for evidence of bat roosting both inside and out (e.g., checking around rough siding for cracks that could hold a bat or near ceilings of interior spaces, looking for evidence of bat guano on the floors, etc.). If evidence of bat roosting is found, work will not begin until the structure has been appropriately searched or an exit count performed with negative results. If bats are found, work will be postponed until after August 1 unless it can be determined by a biologist that the bat(s) in question are not a federally listed species.

Rationale for Determination

NLEB has never been found roosting in any building on the GMNF or WMNF. Given the amount of human disturbance at these sites and the abundance of available unoccupied roost trees likely present in the surrounding area, the likelihood of a NLEB being found in one of these project areas is considered discountable.

2. Culvert or Bridge Replacement

Road and trail culverts and bridges are replaced periodically as part of routine maintenance. In some cases, these structures are removed as part of road or trail decommissioning or in favor of crossings that better meet resource objectives. These projects may occur during the summer maternity season but involve fairly small structures. Minor amounts of tree cutting are also included to facilitate equipment access.

Project #	State	Project	Extent of Activity	Season of Implementation	Comments
W73A	NH	Tuckerman Ravine trail bridge replacements	~20 trees at each of 4 sites (80 trees total)	Spring 2015-2017	
W89A	ME	Hwy 113 snowmobile bridge removal	20 trees	May-Nov. 2015	
W95A	NH	Moriah Brook Trail decommission suspension bridge	20 trees	June-Sept. 2015-2017	
W103A	NH	Bog Dam Loop Road replace culverts w/bridges (4)	32 trees	Summer/fall 2015-2016	
W97P	NH	Red Brook Road culvert replacement	2 trees	Summer/fall 2015	

Project #	State	Project	Extent of Activity	Season of Implementation	Comments
W99P	NH	Beaver Brook Road repair and replace culvert	4 trees	Summer/fall 2015	
W101S	NH	Champney Falls Trail remove bridge abutments	2 trees	Summer/fall 2015	
W70	NH/ME	Other unspecified culvert replacement	Estimate up to 20 culverts/ year.	June – Oct. 2015, 2016, 2017	Most are small (0-3 trees cut/ culvert). Approx. 3-7 would be replaced by larger culverts or bridges and would remove up to 10 trees/site.

Conservation measures

During the summer maternity season, prior to any work that could cause disturbance to a roosting bat, all structures will be investigated for evidence of bat roosting by visually inspecting as much of the structure as is reasonably possible (e.g. looking into both ends of a culvert and on the underside of bridges). If evidence of bat roosting is found, work will not begin until the structure has been thoroughly searched or an exit count performed with negative results. If bats are found, work will be postponed until after August 1 unless it can be determined by a biologist that the bat(s) in question are not NLEB.

Rationale for Determination

NLEB has never been found roosting in any culvert or bridge on the GMNF or WMNF. Most of these structures are very small and unlikely to provide optimal roosting substrates. Given the abundance of available unoccupied roost trees likely present in the surrounding area, the likelihood of a NLEB being found in one of these project sites is considered discountable.

3. Opening Maintenance

The GMNF and WMNF maintain a number of openings to provide wildlife habitat diversity, scenic vistas, and in the case of some old apple orchards, to showcase period landscapes at historic sites. These sites make up less than 1% of the Forests' landbase. Mainenance activities may include mowing, brushing, or prescribed fire. Over uneven terrain or high elevation areas, work is generally done by hand using chainsaws. Many of these areas are maintained on a 3- to 5-year cycle, so trees that are cut or burned are generally very young and small, with the vast majority less than 3 inches in diameter.

Project #	State	Project	Extent of Activity	Season of Implementation	Comments
W80	NH/ME	AMC huts (5), Randolph Mountain Club cabins (2) vista maintenance	100 trees/ year total	Spring/Fall 2015-2017	High elevation sites, where NLEB less likely to occur.

W49	NH/ME	WMNF vista maintenance	300 trees/ year	Spring/ Fall 2015, 2016, 2017	
W35	NH	Public Service powerline maintenance	10 trees/ year	Spring/Summer/ Fall 2015, 2016, 2017	
W26P	NH	North South Road orchard reclamation	5 acres	April-Oct. 2015-2017	This orchard has not been treated in some time, so larger diameter trees may be present.
W24	NH/ME	Orchard maintenance	25 acres	April-Oct.	
W25	NH/ME	Wildlife opening maintenance	200 acres/ year	Apr-May for prescribed burning; July-Dec for mowing	Mowing = No Effect (just forbs and trees <3”dbh)

Conservation measures
None.

Rationale for Determination
The NLEB is considered an interior forest species and unlikely to use large openings, although some of the openings in the list above may be small enough to be considered suitable for foraging (see Life History section above), especially along the edges. In any case, roosting would not occur within the openings as closed canopy conditions would not be sufficiently high. It is possible the areas are used for foraging, but all mechanical treatments would occur during the daytime when bats are roosting in other locations. Effects from these actions may indirectly benefit NLEB in the long term by providing improved habitat for insect prey but are not expected to result in negative effects.

NLEB could be roosting within forested interiors adjacent to these openings and could potentially be affected by smoke from prescribed fires, However, opening burns are low in intensity and smoke tends to rise rather than penetrating deep into adjacent stands. An occupied NLEB maternity roost occurring near an opening and be affected by smoke from a prescribed fire is unlikely.

4. Miscellaneous Individual Tree Cutting
These are individually small projects where a minimal amount of tree cutting may occur.

Project #	State	Project	Extent of Activity	Season of Implementation	Comments
W91A	NH	Hermit Lake site maintenance	40 trees	June-Sept 2015-2017	
W96A	NH	Gregg Tract access and parking	2 trees	Summer/ Fall 2015	
W23S	NH	Sabbaday Falls replace railings	20 trees	Summer/Fall 2015	

Project #	State	Project	Extent of Activity	Season of Implementation	Comments
W15S	NH	Black alder (non-native invasive species) cutting	50 trees total	July-Sept 2015-2017	Current location along the Kancamagus Highway, very open area. Most trees are very small in diameter (<3")
W14	NH	Black locust (non-native invasive species) cutting (>3" dbh)	200 trees total in multiple locations	July-Sept. 2015-2017	Trees generally scattered across the Forest, often in disturbed sites (e.g., edges of roads and parking lots).
W29	NH	Girdle emerald ash borer (non-native invasive species) trap trees	20 trees/ year	Oct-Nov 2015, 2016, 2017	Trees are girdled in spring and felled in the fall.
W30	NH/ ME	Special forest products permits (e.g., birch canoes, maple tapping, etc.)	1-2 permits /year	Spring/Summer/ Fall 2015, 2016, 2017	The details of each permit request differ each year. Permits are generally for individual trees or are non-destructive (e.g. maple tapping)
W47	NH/ ME	Chainsaw/crosscut saw training	110 trees/ year usually over 1-3 sessions	May-June 2015, 2016, 2017	Training must occur during this window when new seasonal employees come on board.
W90	NH/ME	Special uses permit site mtnce	5-20 trees/ site	May-Oct. 2015-2017	
W105	NH/ME	Forestry program sampling to estimate volume and defect	15 trees/ year	May-Nov. 2015, 2016, 2017	

Conservation measures
None.

Rationale for Determination
Some implementation could occur during the summer maternity season, but all of these projects are extremely small in scope compared to the overall availability of potential roost trees in surrounding stands. The likelihood of a NLEB occurring in one of the few trees being cut in one of these projects is

discountable. Removing the minor amount of trees involved in these projects would have no measurable effect on NLEB habitat suitability.

5. Miscellaneous Forestry Projects

These are projects that are larger in scale than the Miscellaneous Individual Tree Cutting projects but are not as large as timber sales. Because of access issues to many of these areas, implementation could occur during the summer maternity season.

Project #	State	Project	Extent of Activity	Season of Implementation	Comments
G52R	VT	Root wad removal of Norway spruce (Trees to be removed with rootwads intact to be used later in aquatic habitat improvement projects).	58 trees	Summer 2015	NLEB less likely to be roosting in softwoods (Sasse and Pekins 1996)
G51; W114	VT/ NH/ME	Site preparation for natural regeneration (use chainsaws, brushsaws, or brushhog to remove competing seedling/sapling trees following clearcut, patch cut, or group selection harvests)	400 acres/ year (GMNF); 190 acres/ year (WMNF)	May-Oct 2015, 2016, 2017	See footnote below[2]
W115	NH/ME	Tree release and weed[3] Activity is similar to site prep for natural regen except focus is on individual stems of particular species, typically oak or softwoods.	100 acres/year	~half in May-July; other half Aug-Oct.	
W27S	NH	Moat Area fuels reduction (using chainsaws and brushsaws to create a fuelbreak strip between forest and subdivisions)	25 acres	June-Sept. 2015	Trees are smaller diameter in pitch-pine; NLEB less likely to occur.
W79	NH	Radio Improvement Project (install new radio repeaters at 4 locations. Will require 2 75'-diam helicopter landing zones and minor tree clearing at 1 site)	0.5 acre total	Winter 2015-2017	Above 2000' elevation; NLEB less likely to occur

Conservation measures

The Radio Improvement Project is being cut during the winter which will avoid any possible direct

[2] Although acreage is high, work involves primarily hand-cutting residual trees <5" that are left after a clearcut, patch cut, or group selection harvest (typically 1-2 years after harvest). Very few of these small trees would have defects suitable to be potential NLEB roosts. Even with suitable defects, the likelihood of a NLEB roosting in such an open area seems discountable.

[3] Activity is similar to site preparation for natural regeneration except focus is to release trees from around individual stems of regenerating species, e.g. oaks or softwoods.

effects to bats. Other work is split between May-July and August-October time periods, but including the entire amount of work in the fall is not feasible given current staffing levels.

Rationale for Determination
These projects are relatively large in terms of acreage, but they occur in habitats where NLEB is unlikely to occur (e.g. clearcuts, high elevation, adjacent to a residential area) and the trees being removed are almost all small diameter or cut during winter when bats aren't present. The likelihood of a NLEB occurring in a tree being cut in one of these projects is considered discountable. Since the habitat is not considered very suitable for roosting, indirect effects to roosting habitat would be minor and cutting selective sapling trees would not measurably change these areas for foraging.

6. Construct Small Utility Lines
These are small projects to create new campsites in dispersed locations (i.e., not in developed campgrounds). Because of access issues to these areas, implementation could occur during the summer maternity season.

Project #	State	Project	Extent of Activity	Season of Implementation	Comments
W66S	NH	Jigger Johnson Campground waterline replacement	2 acres	Summer 2015	
W107P	NH	Zealand/Sugarloaf Campground install electric line	1 acre	Summer 2016	Trees cut in a line adjacent to established road

Conservation measures
None.

Rationale for Determination
Some implementation could occur during the summer maternity season, but these projects are small in scope compared to the overall availability of potential roost trees in surrounding stands. The likelihood of a NLEB occurring in a tree being cut in one of these projects is considered discountable. The small scale of these linear projects would have no measurable indirect effects to future suitability of the area for roosting or foraging, as utility corridors would be narrow (i.e., not a barrier to movement) and canopy closure over the surrounding areas would remain high.

7. Hiking Trail Construction or Reconstruction
These are also relatively small projects which occur as a linear feature. Trees removed are in a line, rather than a group. Hiking trails are narrow, so effects would be primarily limited to the chance of direct take from a roost tree cut during the summer.

Project #	State	Project	Extent of Activity	Season of Implementation	Comments
G37M	VT	Old Job Trail relocation	Reconstruct 0.7 mile	Spring/Summer 2015-2016	

Project #	State	Project	Extent of Activity	Season of Implementation	Comments
G53M	VT	East Dorset Trail repair, enhancement, relocation	25 trees over 3.1 miles improvement + 0.5 mile of new trail reroute	Spring/Summer 2015-2016	
G55M	VT	Dorset Peak mountain bike and foot trails	25 trees (3 miles new trail; 3 miles rehab)	Spring/Summer 2015-2016	
G32R	VT	AT/LT Clement Shelter Connector	600 ft. temporary trail construction	Spring/Summer 2015-2016	
G33R	VT	Catamount Trail Brewers Corner relocation	0.5 mi	Spring/Summer 2015-2016	
G57R	VT	Relocate portion of Catamount Trail		Spring/Summer 2015-2016	Don’t anticipate any trees >3” dbh being cut
G35R	VT	AT Pomfret relocation	750 ft relocation	Spring/Summer 2015-2016	
G26; W88	VT/ NH/ ME	Non-specific trail maintenance	100 trees (GMNF); 300 trees over 1500 miles (WMNF)	May – Nov 2015, 2016, 2017	Trees widely scattered over large area, much of which is above 2000' elevation; NLEB unlikely to occur
W18A	NH	Glen Ellis -- 0.3 mile new trail construction + 0.2 mile accessible trail reconstruction	100 trees	June-Nov. 2015-2017	
W37A	NH	19 Mile Brook Trail bridge installation and trail relocations	25 trees	May-November 2015	
W38A	NH	Andro education / wellness trail construction	100 trees along 1 mile	Summer 2015	
W39A	NH	Bunnell Notch Trail repair 1 bog bridge, 1 short relocation	12 trees	June-Sept. 2015	

Project #	State	Project	Extent of Activity	Season of Implementation	Comments
W41A	NH	Ellis River Trail reroute #2	cut 16' wide ROW (0.5 acre total)	Fall 2015	Fall work, roosts not likely in conifer stands
W42A	NH	Highwater Trail relocation	6 trees	June-Sept 2015	
W43A	NH	Mill Brook Trail -- replace several bog bridges	15 trees	June-Sept 2015	
W44A	NH	Pond of Safety Accessible Trail construction	40 trees	June to Oct 2015-2016	
W110A	NH	AMC trail maintenance (Pine Link (3 miles), Parapet Trail, Valley Way (3.5 miles), Osgood (3.2 miles, 1.2 above treeline)	Mostly repairing rock cairns but a few trees may be cut at each trail	June-Oct 2015	High elevation; NLEB not likely to occur
W51P	NH	Appalachian Trail maintenance (Mt. Mist section)	5 trees	Summer 2015	
W53P	NH	Campton Day Use Area footpath construction	40 trees	Spring/ Summer 2015	
W54P	NH	Cedar Brook trail relocation	20 trees	Summer 2015	
W55P	NH	Falling Waters Trail check dam installation	5 trees	Summer 2015	
W56P	NH	Fishin Jimmy Trail bog bridge replacement	10 trees	Summer 2015	
W58P	NH	Hale Brook Trail (waterbar replacement)	5 trees	Summer 2015	
W61P	NH	Mt. Osceola Trail (soil retainer and wood waterbar installation)	30 trees	Summer 2015	

Project #	State	Project	Extent of Activity	Season of Implementation	Comments
W63P	NH	Three Ponds/Mt. Kineo Trail (turnpike installation, heavy brushing)	15 trees	Summer 2015	
W64S	NH	Blueberry Ledge Cutoff trail maintenance	10 trees	June-Sept 2015	
W67S	NH	Oliverian Brook Trail maintenance	10 trees	June-Sept 2015	
W117S	NH	Rocky Branch Trail relocation	100 smaller trees in 3-4 locations along a 2-mile stretch.	June-Sept 2015	
W109P	NH	Rumney Rocks Access Trails	30 trees	Summer 2015	
W111S	NH	Davis Path Reconstruction	10 trees	Summer/Fall 2015	
W112S	NH	Bennett Street Trail Reconstruction	25 trees	Summer/Fall 2015	
W113S	NH	Champney Falls trail reconstruction	10 trees	Summer/Fall 2015	

Conservation Measures

For hiking trails, efforts are made to minimize the amount of trees cut. Some of this work will be done after August 1, but it is not feasible for all of it to occur then due to staffing limitations and access restrictions.

Rationale for Determination

Some implementation could occur during the summer maternity season, but all of these projects are extremely small in scope compared to the overall availability of potential roost trees in surrounding stands. Most of these projects occur in higher elevations outside where NLEB maternity colonies have been found on the WMNF. The likelihood of a NLEB occurring in a tree being cut in one of these projects is considered discountable. The linear nature of these features also makes it unlikely that the overall character of the surrounding habitat would be measurably changed if NLEB were to occur. NLEB may use trails as travel corridors in general, but these projects are too small to have any effect on bats' continued use as such.

8. Campsite Construction or Reconstruction
These are small projects to create new campsites in dispersed locations (i.e., not in developed campgrounds).

Project #	State	Project	Extent of Activity	Season of Implementation	Comments
W16A	ME	Broken Bridge Pond, Patte Marsh Pond dispersed site relocation and construction	30 trees at 2 sites	Summer 2015	Includes 50' spur road
W106P	NH	Tripoli Road campsite redesign	3 acres	Summer 2016	Project is spread out over a large area; dispersed sites are small individually
W83S	NH	Rocky Branch Tent Pad construction	50 trees	Summer/fall 2015	

Conservation measures
None.

Rationale for Determination
Some implementation could occur during the summer maternity season, but all of these projects are extremely small in scope compared to the overall availability of potential roost trees in surrounding stands. The likelihood of a NLEB occurring in a tree being cut in one of these projects is considered discountable. Openings created as a result of these projects would not be so large as to make the surrounding habitat unsuitable.

9. Aquatic Habitat Improvement

These are projects designed to improve instream habitat conditions through the addition of wood material. Trees generally within 75 feet of the stream edge are felled to provide cover for brook trout and other aquatic organisms, to aid in formation of pool habitat, and/or to correct erosion and stream sedimentation issues. Trees of different diameter class may be felled, although generally larger diameter trees are needed as the size of the stream channel increases. Trees are felled in scattered locations, not as a clump, so canopy closure is maintained. Trees being cut for these projects are as sound as possible, since any decay will shorten the usable time for the piece in the water.

Project #	State	Project	Extent of Activity	Season of Implementation	Comments
G23R	VT	Aquatic habitat restoration	≤ 600 trees cut total of 3.9 miles	June-Sept 2015-2016	8 project areas ranging from 0.1 to 1.1 miles each.
W69A	ME	Harriman Brook backwater pools	20 trees total at 2 sites	June-Aug. 2015	

W116A	ME	Miles Brook wood addition	~700 trees along 2.5 miles	Aug-Nov 2015	Project occurs after Aug. 1
W71P	NH	Basin stewardship wood addition	12 trees	June-Oct. 2015-2017	
W72S	NH	Meserve Brook wood addition	22 trees	June-Sept. 2015-2017	

Conservation measures

The GMNF Land and Resource Management Plan (Forest Plan) includes the following pertinent standards and guidelines:

Soil, Water, and Riparian Area Protection and Restoration

S-2 -- A protective strip of predominantly undisturbed soil (having plant and/or organic matter cover) shall separate soil-disturbing activities from all water sources (streams, lakes, ponds, wetlands, and vernal or seasonal pools).

G-1 -- To maintain bank stability and provide for long-term recruitment of large woody debris (LWD) to streams and ponds, tree cutting and/or harvesting should not occur within 25 feet of a perennial stream or high water mark of a pond. Maintain a minimum basal area of 50 square feet per acre including the retention of large diameter trees within 25 feet of the bank of intermittent streams. Exceptions to these guidelines include: tree removal for public safety; prescriptions to benefit hydrological and/or ecological function of associated stream, pond, or riparian area; and tree removal needed to construct and maintain existing roads, bridges, and other infrastructure. Trees cut or moved in this zone should be used to benefit riparian and aquatic habitat.

G-9 -- In the 25 to 50 foot distance zones of all streams, consider leaving large diameter trees (12 inches or greater), especially conifers to enhance achievement of riparian vegetation composition goals.

G-10 -- Within 100 feet of wetlands and seasonal pools, activities should be limited to those that protect, manage, and improve the condition of these resources. Acceptable activities should be approved on a case-by-case basis.

G-13 An average canopy closure of at least 70 percent should be maintained over a stream's length to ensure that stream temperatures are appropriate for native fish species. Permanent upland openings may be maintained and established to the water's edge in accordance with FSM 2526.03.2 and .5. Trees cut or moved in this zone should be used to benefit riparian and aquatic habitats when possible.

The WMNF Forest Plan (pp. 2-24 to 2-25) includes the following pertinent guidelines:

Riparian and Aquatic Habitats

G-1 -- Tree cutting and harvest should not occur within 25 feet of the bank of mapped perennial streams, the high water mark of a pond, or a identified natural vernal pool, unless prescribed to benefit hydrological or ecological function of the associated stream, pond, or riparian area. Exceptions to this include tree removals needed to clear a designated stream crossing, maintaining an existing road or previously cleared skid road that cannot be relocated, or protecting human safety or infrastructure. Trees (greater than 4 inch DBH) cut or moved in this zone should be placed in a fashion that benefits riparian functions or aquatic habitats when possible.

G-2 -- Uneven-aged silvicultural practices should be used within the Riparian Management Zone (RMZ) along all perennial streams, lakes, ponds, and vernal pools. Cuts should be should be designed to maintain a relatively continuous forest canopy for the protection and maintenance of water quality, dead wood recruitment, hydrologic function, wildlife habitat, and scenic values. Regeneration group cuts should be limited to less than one acre in size. Exceptions may apply in areas deemed important for maintaining beaver colonies. In the absence of on-the-ground riparian mapping, width of RMZs should be defined as in Table 2-01.

Table 2-01 Width of RMZ for Specific Aquatic Features

Aquatic Feature	*Width of RMZ* (feet)*
1st and 2nd order streams	*75′*
3rd order streams	*275′*
4th and larger order streams	*575′*
Lakes, ponds, and vernal pools	*75′*

**These widths may vary on the ground and may be modified at the project level if a hydrologist or biologist maps the actual riparian zone.*

Rationale for Determination

Conservation measures assure that most riparian areas do not have much tree cutting so outside of these projects, habitat is mature and provides abundant suitable roosting habitat. Some implementation could occur during the summer maternity season, but all of these projects are extremely small in scope compared to the overall availability of potential roost trees in riparian habitats and adjacent stands. Trees being cut are visually examined for defect prior to cutting, since the most sound trees will last the longest once felled. The likelihood of a NLEB occurring in a tree being cut in one of these projects is considered discountable.

10. Parking Lot Construction

Three projects involve removal of trees to create a more open area. This is similar to the Campsite Construction or Reconstruction activity, just at a slightly larger scale.

Project #	State	Project	Extent of Activity	Season of Implementation	Comments
W18A	NH	Glen Ellis parking lot relocation	500 trees	Aug-Nov 2015-2017	Same size parking lot being moved adjacent to current location. Trees cut after Aug. 1
W98P	NH	The Eddy parking area reconstruction (includes replacement of 5 culverts)	15 trees	Summer/Fall 2015	
W65S	NH	Champney Trailhead parking lot relocation	2 acres	Spring/Fall 2016-2017	

Conservation measures

Trees for the Glen Ellis parking lot will be cut after August 1, which will avoid any impacts to pregnant or non-volant young.

Rationale for Determination

Some implementation could occur during the summer maternity season, but all of these projects are extremely small in scope compared to the overall availability of potential roost trees in surrounding stands. The likelihood of a NLEB occurring in a tree being cut in one of these projects is considered discountable. Openings created as a result of these projects would not be so large as to make the surrounding habitat unsuitable.

11. Road or Snowmobile Trail Reconstruction and Maintenance

These projects are similar to those in the Hiking Trail Construction or Reconstruction category, but at a slightly larger scale. Like hiking trails, roads and snowmobile trails are linear features but are wider to accommodate vehicle traffic expected and may also include shoulders or ditches.

Project #	State	Project	Extent of Activity	Season of Implementation	Comments
G50M	VT	Green Mountain Power powerline relocation – West Hill Road	10 trees	Spring/Summer 2015-2016	A few trees cut to replace 280 feet of powerline, 3 poles, and 1 pole anchor immediately adjacent to road.
G28M	VT	Snow Valley Corridor 7 relocation	0.6 mi. new trail on FS 1.2 mi. on private	Summer 2015-2016	
G26R	VT	Tunnel Brook Trail Relocation	0.8 mile	Spring/Summer 2015-2016	
G49R	VT	Forest Road 55 and West Hill Road corner widening	20?	Spring/Summer 2015	A few trees along the road will be cut
G56R	VT	FT258 snowmobile trail reroute (3.1 miles rerouted using 2.5 miles existing skid trail and 0.6 mile new construction)	25 trees	Spring/Summer 2015-2016	
W40A	ME	Crocker Pond Snowmobile Trail relocation (2 sections along ¼ mile of trail)	25 trees	Summer 2015-2017	
W87A	ME	Dan Early special use road permit (brushing road)	¼ mile (expect 15 trees ≥3")	May-Nov. 2015-2018	
W2P	NH	Tunnel Brook Road reconstruction	100 trees over 0.7 mile	Summer 2015	

W21P	NH	Russell Pond Road reconstruction	20 trees	Summer 2015	
W102P	NH	Eastside Road construction and bridge installation	40 trees	Summer/Fall 2015	
W52P	NH	Bog Pond Snowmobile Trail bridge installation	25 trees	Summer 2015	
W60P	NH	Mill Brook Snowmobile Connector Trail relocation	¾ mile	Summer 2015	
W108P	NH	Corridor 11 ByPass – 7 Dwarfs reroute	1 acre	Fall 2015	No direct effects
W68S	NH	Rob Brook Snowmobile Trail relocation	30 trees (2-8" hardwoods), 70 ft. of trail	Fall 2015	No direct effects
W100S	NH	Sawyer River Road stabilize falling slope	10 trees	Summer/Fall 2015	
G46; W20	VT/ NH/M E	Roadside mowing and maintenance	50 miles (GMNF); 50 miles (WMNF) (3’ cutback on each side)	Summer 2015, 2016, 2017	Most vegetation being cut is <3”, although occasionally larger trees occur.

Conservation Measures

The Rob Brook Snowmobile Trail relocation will occur in the fall to avoid take near one of the WMNF historic NLEB maternity colonies (2+ miles away from closest known roost tree). Some other projects will be done after August 1, but it is not feasible for all work to occur then due to staffing limitations.

Rationale for Determination

Some implementation could occur during the summer maternity season, but all of these projects are small in scope compared to the overall availability of potential roost trees in surrounding stands. The likelihood of a NLEB occurring in a tree being cut in one of these projects is considered discountable. The linear nature of these features also makes it unlikely that the overall character of the surrounding habitat would be measurably changed. NLEB may use roads as travel corridors in general, but these projects are probably too small to have any effect on bats’ continued use as such.

12. Hazard Tree Removal

The Forest Service is committed to providing a reasonably safe environment for the visiting public and employees. Trees are an ephemeral resource and at any given time, large numbers of standing trees are

dead or dying (see Habitat Status section above). When these occur near expected areas of visitor use (e.g., at recreation sites or along roads and trails), they must be removed for safety. The relatively long winter and late spring in the northeast limits access to many of these sites until the snow melts and road surfaces allow vehicle use, generally at least May.

Project #	State	Project	Extent of Activity	Season of Implementation	Comments
G27; W46	VT/ NH/ME	Campground/Day use areas/ Trailheads	<200 trees/ year (GMNF) 575 trees/ year at 171 sites (WMNF)	Spring/Fall 2015, 2016, 2017	These are often heavily used areas, with smoke from campfires and cooking often present. The probability of a NLEB roosting in a tree in one of these areas seems unlikely.
G45; W19	VT/ NH/ME	Forest-wide Roads	200 trees/ year (GMNF) 200 trees/ year over 160 miles (1.25 trees/ mile) (WMNF)	Spring/Summer 2015, 2016, 2017	Scattered individual trees. NLEB unlikely to roost on road edge.
W32A	NH	AMC Camp Dodge	5 trees/ year	Spring/Summer/ Fall 2015, 2016, 2017	
W33A	NH	AMC Pinkham Notch Visitor Center	5 trees/year	Spring/Summer/ Fall 2015, 2016, 2017	
W34A	NH	Harvard Mountain Club Cabin	10 trees/ year	Summer 2015, 2016, 2017	
W81	NH/ME	AMC Shelters (13), Randolph Mountain Club Shelters (2), Dartmouth Outing Club Shelters (8)	100 trees/ year	Spring/Fall 2015-2017	High elevation sites; NLEB less likely to occur here
W45	NH/ME	Backcountry facilities	200 trees/ year	Spring/Summer/ Fall 2015, 2016, 2017	Few trees per site
W48	NH/ME	Snowmobile trails	100 trees/ year	Fall 2015, 2016, 2017	Few trees/mile
W50	NH	Ski areas	20 trees/ year at 8 ski areas	Summer/Fall 2015, 2016, 2017	

Conservation measures
None.

Rationale for Determination
Most implementation would occur during the summer maternity season, but only a few trees would be cut at any single location. The nature of hazard trees (which are often dead or dying trees) makes them more suitable as roost trees compared to trees being cut in other projects. However, these projects are small in scope compared to the overall availability of potential roost trees in surrounding stands. The total number of hazard trees to be removed in these projects is approximately 3/1000th of one percent of the total potential roost trees available on the WMNF. The likelihood of a NLEB occurring in a tree being cut in one of these projects is considered discountable and no measurable effects to continued habitat suitability would be expected.

13. Ski Area Projects
Ski areas are highly developed locations managed under special use permits. They offer year-round recreation opportunities and require much supportive infrastructure. Projects in this category are sometimes similar to other Forest projects but are included as a separate section (except for hazard tree removal) to account for possible differences in implementation.

Project #	State	Project	Extent of Activity	Season of Implementation	Comments
G42M	VT	Prospect Mtn. homologated racecourse (widen 750' of trail)	3 trees	Spring/Summer 2015-2016	
G41R	VT	Sugarbush Valley house lift replacement (in existing corridor)	A few trees	Spring/Summer 2015-2016	
G40R	VT	Mt. Snow Mountain Bike Trail relocation	3,600 ft; will require some tree cutting	Spring/Summer 2015-2016	Within 1 mile of small hibernaculum (Dover Iron Mine)
W62P	NH	Nancy Barton Trail relocation	16' strip (1 acre total)	Summer 2015	
W59P	NH	Loon Mountain Tower Guns on Lower Bear Claw Trail	50 trees	Summer 2015	
W12P	NH	Loon Mountain Beginner Area new trail and lift construction	10 acre clearcut	Aug-April 2015-2016	All cutting done after August 1

Project #	State	Project	Extent of Activity	Season of Implementation	Comments
W57P	NH	Green Peak new ski trail/lift corridor	44 acres clearcut (new lift corridor) + 12 acres shelterwood for glade skiing	Summer 2015-2017	Large project, but predominantly small diameter softwoods above 2000' elevation; NLEB unlikely to occur. Only scattered larger trees will be cut

Conservation Measures
The Loon Mountain Beginner Area will be cut after August 1 to avoid any impacts to bats possibly roosting in the area.

Rationale for Determination
Project implementation would occur during the summer maternity season, but all of these projects are small in scope compared to the overall availability of potential roost trees in surrounding stands. The trail relocation projects on the list are similar to other hiking and snowmobile trail projects. The Loon Mountain Beginner Area project is a series of new trails within the footprint of an already active ski area with summer use. Green Peak covers a greater area, but the majority of the trees being cut are small diameter softwoods and not in lowland habitat; the closest mapped wetland feature is more than one mile away. The likelihood of a NLEB occurring in a tree being cut in one of these projects is considered discountable.

14. Prescribed Fire
Projects listed in this category are underburns rather than opening burns (which are included under Opening Maintenance). Underburns are are prescribed burns that remove the seedlings and herbaceous material that make up the understory of an area and leave the canopy level intact. The objective is to retain mature trees and promote regeneration of specific forest communities (generally oak, pine, or some combination). Of greatest concern to NLEB would be direct effects from flames or smoke.

Project #	State	Project	Extent of Activity	Season of Implementation	Comments
W74P	NH	Stevens Brook prescribed burn	29 acres in 3 units	April/May or Sept-Nov. 2015-2017	Acoustic survey conducted, no NLEB found, but one unit (12 acres) not covered and within 0.5 mile from wetland. Relatively small project. Closest post-WNS occurrence (2010) is 11 miles away.

Conservation Measures
None. Although the season of implentation dates imply that this project could be done in the fall, the

correct weather and ground conditions to meet the burn prescription rarely occur in the fall and are much more likely in the spring.

Rationale for Determination
Project implementation would most likely occur during the summer maternity season. However, this is a small project and the likelihood that a reproductive female would be roosting in this stand is very small. Two of the three burn units were included in a 2014 acoustic survey and no NLEB were found.

15. Commercial Timber Harvest
Timber harvests described below include timber sales that already have successfully been awarded to a contractor and are underway, as well as timber sales implementing projects for which a final NEPA decision is completed and signed. Projects not yet under contract are in the final stages of layout and or timber marking, or are being prepared to offer for bids. Only those sales determined to have **No Effect** or ***Not*** **Likely to Adversely Affect** NLEB are addressed in this BA; timber sales that **May Adversely Affect** NLEB are addressed in a separate document provided to the US Fish and Wildlife Service for formal conferencing. Detailed maps for each project are provided in Appendix 2. Definitions of common forest management terms is provided in the Glossary.

Project #	State	Project	Extent of Activity	Season of Implementation	Comments
G3M	VT	School No. 3 (Nordic IRP)	118 acres (51 in summer)	Summer/Winter 2015-2016	Acoustic survey completed; no NLEB detected; ≤ 51 acres of shelterwood and single tree-group selection harvest could be during summer, including non-volant season.
G4M	VT	Cook Brook Sale (Dorset-Peru IRP)	222 acres	Winter 2015-2016	No summer harvest; harvest ranges from clearcut to single-tree selection
G5M	VT	Pumphouse East Sale (Dorset-Peru IRP)	77 acres (75 in summer)	Summer/Winter 2015-2016	Acoustic survey completed; no NLEB detected; ≤ 75 acres of shelterwood and single tree-group selection harvest could be during summer, including non-volant season.
G8M	VT	Little Mad Tom Sale (Dorset-Peru IRP)	200 acres	Winter 2015-2017	No summer harvest; harvest ranges from clearcut to single-tree selection,
G9M	VT	Sunnyside Sale (Dorset-Peru IRP)	341 acres	Winter 2015-2017	No summer harvest; timber harvest ranging from clearcut to single-tree selection.
G13R	VT	Texas Sale (UWR IRP)	461 acres	Winter 2015-2017	No summer harvest; timber harvest ranging from clearcut to single-tree selection.
G15R	VT	Albert Sale (UWR IRP)	193 acres	Winter 2015-2017	No summer harvest; timber harvest ranging from clearcut to single-tree selection.

G16R	VT	Homestead Sale (UWR IRP)	254 acres	Winter 2015-2017	No summer harvest; timber harvest ranging from clearcut to single-tree selection.
G17	VT	Moosalamoo NRA Sale	73 acres	Winter 2015-2017	No summer harvest; thinning treatments entirely during winter.
W6A	ME	Bell Mountain (Holt) Timber Sale	318 acres	Fall/Winter 2015-2017	A single NLEB call recorded during 2014 acoustic surveys. All units will be harvested after July 31. All units will leave relatively high residual basal area except a single clearcut (<3 acres) in a white pine stand (unlikely for NLEB to occur). A detector in this stand recorded no NLEB calls.
W7A	ME	Brown's Ledge Timber Sale	120 acres	Fall/ Winter 2015-2017	One survey site (just to south of proposed units); no NLEB detected there. Remainder of project area not surveyed. All units will be harvested after July 31. Most of the project area is relatively young, with smaller dbh and basal area compared to a mature stand. Some small (1-6 acres) patch cuts in young forest (not likely suitable NLEB habitat). One mixed wood unit in northeast proposed for shelterwood prep cut, but will be done lightly in very small groups and leave 80-90 square feet basal area. One unit adjacent to a road in the southeast is also a shelterwood prep cut in a mature pine stand, with approx. 50% basal area removed. NLEB may be less likely to have a maternity roost in a pine stand.
W31P	NH	Indigo Timber Sale	814 acres	Winter 2015-2017	Acoustic survey conducted across part of project; no NLEB found. All winter units; limited wetland features.
W10P	NH	Sebosis Timber Sale	1,021 acres	Summer/Fall/ Winter 2015-2017	Only 1 2-acre summer unit left to be harvested. Winter clearcuts are scattered and located away from wetlands
W31S	NH	Ledge Brook Timber Sale	83 acres	Winter 2015-2017	Only group or individual tree selection in winter. Sasse mist-netted just east and west of this project and no NLEB roost trees were located in the project vicinity.

W76S	NH	Douglas Brook Timber Sale	178 acres	Summer/Fall/ Winter 2015-2017	Acoustic survey conducted, no NLEB found, but not all of project area surveyed. The remainder that hasn't been surveyed is group selection or thinning in winter.
W77S	NH	Province Project (3 Timber Sales)	1690 acres	Summer/Fall/ Winter 2015-2017	Acoustic survey conducted, no NLEB found, but not all of project area surveyed. The remainder that hasn't been surveyed is a lot of fall or winter units, units near wetlands are uneven-aged treatments.

Conservation Measures

The GMNF Forest Plan contains standards and guidelines that apply to all stands and all harvest operations, including the requirement that at least five den, nest, roost, and snag trees (combined) be retained per acre during these management activities. Forest Plan standards and guidelines also require inclusion of uncut patches of trees totaling five percent of the harvested area during even-aged management (when harvest reduces the basal area of a stand below thirty square feet per acre). Retained patches should be at least one-quarter acre in size, encompassing as many den, nest, roost, and snag trees as possible.

Both Forest Plans include similar standards and guidelines that would contribute to reducing the risk of negative impacts to NLEB. Riparian and Aquatic Habitats standards and guidelines (which also includes protection of vernal pools that may be used as foraging habitat) are already listed in the Aquatic Habitat Improvement project category above. Other standards and guidelines for wildlife reserve trees are presented here:

GMNF Wildlife Reserve Trees

S-1 -- Uncut patches totaling five percent of the harvested area shall be retained during forest management activities of five acres or greater where harvest reduces the basal area of a stand below 30 square feet per acre.

S-2 -- At least five wildlife trees shall be retained per acre harvested during forest management activities outside potential Indiana bat maternity roosting habitat (as defined below) where harvest will leave basal area above 30 square feet per acre.

S-3 -- Wildlife reserve trees shall include two cavity or snag trees of the largest available dbh [diameter breast height], live trees with exfoliating bark, den trees, nest trees, or yellow birch and red maple >26 inch dbh considered "cull" or unacceptable growing stock. In areas lacking such cavity trees and snags, retain at least two trees of the largest available dbh with defects likely to lead to cavity formation.

S-4 -- All hard snags and den trees and two mast trees per acre shall be retained within 300 feet of ponds, lakes, beaver ponds, wetlands, permanent upland openings greater than five acres, and within riparian zones of all streams as shown on USDA Forest Service 1:24,000 topographic maps. If hard snags, mast trees, and den trees are not available in these areas, retain at least six replacement trees per acre.

S-5 -- All shagbark hickory trees shall be retained unless they pose a safety hazard.

G-1 -- Patches of retained trees should be at least one-quarter acre in size and located to encompass as many wildlife trees as possible, including nest or den tees; trees with

exfoliating bark; snags greater than or equal to eight inches dbh; other trees with cavities or broken tops; and mast trees such as oaks, bear-clawed beech, hop hornbeam, hickories, apple, and black cherry.

G-2 -- Patches of retained trees should be located along the edge of openings or riparian corridors where possible.

GMNF Snags

G-1 -- All soft snags should be retained unless they pose a safety hazard.

G-2 -- Evidence of wildlife use for feeding, roosting, nesting, or denning should be used to prioritize snags for retention.

GMNF Den & Nest Trees

G-1 -- Den trees with cavities or openings that are not prone to collecting water should be retained whenever possible.

WMNF Wildlife Reserve Trees

S-1 When harvest reduces the basal area of a stand below thirty square feet per acre, uncut patches totaling five percent of the harvested area must be retained, with each at least one quarter acre in size.

S-2 When timber harvest will leave basal area above thirty square feet per acre, at least six cavity and/or snag trees per acre must be retained. These leave trees should include at least one wildlife tree and three trees exceeding twelve inches DBH per acre when feasible. In areas lacking such cavity trees and snags, trees of the largest available diameters with defects likely to lead to cavity formation should be retained.

G-1 Uncut patches retained under S-1 should be located to encompass as many wildlife trees, snags greater than or equal to nine inches DBH, other trees with cavities or broken tops, and bear-clawed beech as possible. A wildlife tree or snag greater than eighteen inch DBH may be used as a nucleus. In areas lacking suitable cavity trees and snags, trees of the largest available diameters with defects likely to lead to cavity formation should be retained.

G-2 When possible, uncut patches retained under S-1 and leave trees retained under S-2 should be placed within three hundred feet of open wetlands, ponds, riparian areas, or wildlife openings greater than five acres in size.

G-3 Existing standing dead, and dead-and-down woody material, should be retained and not damaged during Forest management activities unless they are considered a safety hazard or the area is being permanently removed from a forest condition (for example, parking lot construction). This applies especially to large (greater than or equal to eighteen inches DBH) hollow or rotten logs and rotten stumps

Scheduling harvest between August 1 and March 31 minimizes the chance of take of pregnant females and non-volant young.

Rationale for Determination

Past management activities are presumed to have had no negative impacts to species viability. The rationale for proposing to list the NLEB identifies white-nose syndrome as the primary threat (Federal Register 78 FR 61045:61045-61080 2014) and continued management over the last several decades (at harvest levels considerably higher than current) on both Forests did not apparently pose a threat according to local species experts. As described in the Life History section above, NLEB are able to tolerate timber harvest (including even-aged harvests such as shelterwoods) in many parts of their

range. On the WMNF, there is some anecdotal evidence that typical forest management can also maintain habitat suitability. Sasse and Pekins (1996) identified two maternity colonies on the WMNF in 1993-1994. At the time, NLEB had no special status and several years later, a typical timber sale was implemented in the area of one colony on the Pemigewasset Ranger District. Clearcuts and group selection cuts are evident from more current (2009) aerial imagery (Figure 18). Sasse's roost trees were not originally mapped with GPS technology, but they were marked with aluminum tags. In 2010, he returned to the WMNF to attempt relocating the roost trees from his study 17+ years ago. As would be expected with snags and trees with defects, many (43%) had fallen to the ground or were otherwise unusable. Some (33%) could not be relocated, but five were found within the timber sale area. WMNF acoustic surveys in 2014 confirmed NLEB still using the area, so presumably the amount of harvest in this timber sale was not so intense as to make the habitat unsuitable.

Figure 18. Haystack Road maternity colony area

The majority of harvest units presented in these projects are scheduled for fall or winter, when the bats are most likely gone from the area. Summer units were either surveyed for NLEB with negative results or are very small (e.g., 2 acres). Many of the prescriptions are relatively light, uneven-aged prescriptions, so canopy closure will be maintained. Winter clearcuts are scattered and not located near

wetlands. Standards and guidelines in both Forest Plans will assure that potential roost trees remain in all harvested stands. Although timber harvest may remove some potential roost trees, it is expected that plenty will still remain (see Habitat Status section above). Also see Appendix 1 for additional information and rationale for each timber sale.

SUMMARY OF PROJECT DETERMINATIONS AND RATIONALE

The majority of the projects being considered in this analysis are very small. Both Forests have documented a decline of at least 93 percent in summer NLEB populations. The probability of a NLEB being found through summer stationary acoustic surveys in suitable habitat in 2014 was only 9 percent on the WMNF, lower if driving surveys are also included. Analysis of forest inventory data on the WMNF shows approximately 125 potential roost trees per acre across the Forest. Past surveys in and around both Forests, as well as consensus from species experts, is that viability was not a concern for the NLEB prior to WNS, even though the amount of timber harvest was substantially higher in earlier decades compared to current levels.

One way to evaluate the magnitude of project effects is to consider the acreage over which projects occur in an average year. If work on both Forests is combined (and includes the Finger Lakes National Forest as well), the estimated total area over which projects occur is 13,360 acres or approximately one percent of the total forested landbase. This is a substantial overestimate of the total area actually impacted since, as is explained in the projects listed above, not every acre of land within a project area is affected by a prescribed activity.

An alternate way of evaluating potential impacts to NLEB would be to measure the number of roost trees to be removed. On the WMNF, a generous estimate of the number of trees at least three inches dbh that will be removed over the next three years is 300,000 trees. That includes not only the projects listed in this document, but all projects with determinations of May Effect, Likely to Adversely Affect being addressed separately, as well as a number of projects whose NEPA decisions have yet to occur but that will likely be implemented in the next three years. That total makes up only 7/100ths of one percent (0.07%) of the total number of trees (>3” dbh) on the landscape). The total estimate of potential roost trees on the WMNF alone is almost 100 million trees. With so few bats on the landscape and seemingly abundant potential roosting habitat, the likelihood that a tree containing a roosting bat will be cut down during the summer maternity season, causing take, is discountable.

Take could also occur indirectly if an unknown maternity colony site is modified to such an extent that suitable roost trees are not available to pregnant bats as they return after hibernation. Pregnant females are probably at their lowest energy reserves of the year at this point and cannot afford to expend much extra energy searching for a new colony site. Projects that propose many trees being removed from the same area, especially close to forested wetlands, would be the most likely to cause negative impacts, even if the trees were removed during the winter. However, as is explained in the tables above and in more detail in Appendix 2, the likelihood of that occurring in any of these projects is discountable because they occur too far from optimal foraging habitat and/or the intensity of the project work is too insignificant to rise to the level of take.

REQUEST FOR CONCURRENCE

Given the limited spatial and temporal scope of the projects included in this document, the extensive availability of roost trees and foraging habitat across the GMNFand WMNF, the broad range of the species and limited number of individuals that could be affected by these projects, we have determined that all these activities are **not likely to jeopardize the continued existence of the northern long-eared bat**. We request concurrence on that determination as well as for those projects that we have determined "May Affect, but are Not Likely to Adversely Affect" the northern long-eared bat.

GLOSSARY OF FOREST MANAGEMENT TERMS

DBH -Diameter at breast height (4.5 feet).

Even-aged Silviculture -Timber management which produces a forest or stand composed of trees having relatively small differences in age. Regeneration cutting methods in this system include clearcutting, shelterwood, and seed-tree (seed cut). Thinnings are intermediate even-aged harvests as opposed to the previous harvests which tend to regenerate the entire stand at once.

Uneven-aged Silviculture. Timber management which produces a stand or forest composed of a variety of ages and sizes. Regeneration cutting methods in this system include group selection and.single tree selection. Improvement cuts are intermediate harvests to remove undesirable trees and focus growth on the remaining trees.

Even-Aged Silviculture Prescriptions

1. **Thinning** - The objective of thinning is to maximize future volume yield by removing lower quality trees and by salvaging trees that would otherwise die; to concentrate growth on higher quality trees; and to improve growing conditions for remaining trees. This is accomplished by reducing the number of trees in stands that are above 80 percent relative density (which equates to canopy closures above 71 percent) to approximately 60 percent relative density (54 percent canopy closure). Most thinnings occur in stands that are over 90 percent relative density (79 percent canopy closure). Trees to be removed are concentrated in the smaller diameter classes, leaving the larger, healthier trees on site. More open canopy conditions may persist for 15-20 years following the thinning.
2. **Shelterwood** - The objective of shelterwood is to establish seedling regeneration through the application of 1 or 2 preparation or seed cuts, followed by the almost complete removal of overstory trees in a removal harvest. Relative density is reduced from above 80 percent to 30-40 percent in the shelterwood seed cut. It may take from 3 to10 years for adequate seedlings to germinate and become established. Once adequate numbers of seedlings are in place, a shelterwood (overstory) removal can be completed to permit the seedlings to grow in full sunlight.
3. **Seed Tree Cut** - The seed tree cut is similar to the shelterwood, in that it removes most of the mature overstory, leaving a portion standing. Generally, the seed tree cut leaves only a few residual trees as a seed source only. Residual trees are selected based on their growth rate, form, seeding ability, wind resistance and future marketability. As viewed on the ground after completion, a seed tree cut usually appears intermediate, removing more trees and canopy cover than a shelterwood harvest, but not as much as a clearcut. However, some seed tree prescriptions may be quite light and retain a high level of remaining trees, depending on the tree species being regenerated and conditions in a particular stand.
3. **Clearcut** - The objective of clearcut harvest is to remove trees in stands where adequate numbers of seedlings exist in the understory, or to remove trees by cutting the existing stand which allows seedling regeneration to develop after the cut occurs. This treatment is used to regenerate aspen and northern hardwoods, regenerate growth of healthy trees in diseased or damaged stands, convert non-native softwood plantations to native hardwood forests, or create permanent openings that will be maintained for wildlife and other uses.

Uneven-Aged Silviculture Prescriptions

1. **Improvement Cut** - The objective of improvement cut is to modify the age- and size-class distribution of an even-aged stand to that of an uneven-aged stand by removing designated

trees through commercial harvest. By reducing the overstory to 60 percent of full stocking, and concentrating these removals in specific age and size classes, residual stand structure will become more like that of an uneven-aged stand. Some seedling regeneration may become established in this kind of harvest; however more emphasis would be placed on seedling establishment in subsequent entries.

2. **Individual Tree Selection** - The objective of individual tree selection is to maximize volume yield by removing lower quality trees and by salvaging trees that would otherwise die; to concentrate growth on the better trees; and to open the canopy enough to foster the development of a new age class after every cut. This is accomplished by reducing the number of trees in stands that are above 80 percent relative density (which equates to canopy closures above 71 percent) to approximately 60 percent relative density (54 percent canopy closure). Most selection harvests occur in stands that are over 90 percent relative density (79 percent canopy closure).
3. **Group Selection** - This treatment is similar to individual tree selection, but varies by the removal of small clumps of trees (usually less than 0.25-0.5 acre on the GMNF but up to 2 acres in size on the WMNF) in conjunction with removals similar to the individual tree selection. Post-harvest density will average slightly lower than in individual tree selection to as low as 50 percent relative density (45 percent canopy closure).

Timber Stand Improvement

Timber Stand Improvement (TSI) includes a variety of activities or treatments that improve the composition, structure, condition, health and growth of **even-age** or **uneven-age** stands. Such activities may include mechanical or chemical[4] treatment of vegetation that competes with desirable trees; removing diseased or dying trees; thinning; pruning; and post-harvest treatments on natural regenerating stands. Timber stand improvement has three primary objectives: increase the value of the stand, improve the growth and form of crop trees, or manipulate stand composition.

[4] Chemical treatment for Timber Stand Improvement is not permitted on the WMNF.

LITERATURE CITED

Amelon, S. and D. Burhans. 2006. Conservation Assessment: *Myotis septentrionalis* (Northern longeared bat) in the Eastern United States. In USDA Forest Service General Technical Report NC-260: Conservation Assessments for Five Forest Bat Species in the Eastern United States.

Barbour, R.W. and W.H. Davis. 1969. Bats of America. University Press of Kentucky, Lexington. 286 pp.

Beverly, J., J.D. Kiser, V. Brack. 2002. A survey for eastern forest bats in two areas on Green Mountain National Forest, with emphasis on the federally endangered Indiana bat (Myotis sodalis). Environmental Solutions and Inovations, LLC. Neon, Kentucky. 59 pp.

Brack, V. 2007. Temperatures and locations used by hibernating bats, including the endangered Indiana bat (*Myotis sodalis*), in a limestone mine. Environ. Manage. 40:739-746.

Broders, H.G. and G.J. Forbes. 2004. Interspecific and intersexual variation in roost-site selection of northern long-eared and little brown bats in the Greater Fundy National Park ecosystem. J.Wildl. Mgmt. 68(3):602-610.

Broders, H.G., G.J. Forbes, S. Woodley, and I.D. Thompson. 2006. Range-extent and stand selection for forest-dwelling northern long-eared and little brown bats in New Brunswick. Journal of Wildlife Management 70:1174-1184.

Brooks, R.T. and W. M. Ford. 2005. Bat activity in a forest landscape of central Massachusetts. Northeastern Naturalist 12:447-462.

Brooks, R.T. 2009. Habitat-associated and temporal patterns of bat activity in a diverse forest landscape of southern New England, USA. Biodiversity and Conservation 18:529-545.Chenger, J. 2002. Summer survey of New Hampshire woodland bats – June 27 – July 19, 2002. Bat Conservation and Management, Carlisle, PA 49pp.

Burbank, M.B. 2006. Green Mountain National Forest eastern forest bat survey, summer 2005. Green Mountain National Forest, Middlebury, Vermont. 11 pp.

Burbank, M.B. and J.D. Kiser. 2006. A survey for eastern forest bats in two areas on Green Mountain National Forest, with emphasis on the federally endangered Indiana bat (Myotis sodalis). Green Mountain National Forest, Rutland, Vermont. 22 pp.

Burke, H.S.J. 1999. Maternity colony formation in Myotis septentrionalis using artificial roosts: the rocket box, a habitat enhancement for woodland bats. Bat Research News 40:77-78.

Caceres, M.C. and R.M.R. Barclay. 2000. *Myotis septentrionalis*. Mammalian Species No. 634:1-4.

Caire, W., R.K. LaVal, M.L. LaVal, and R. Clawson. 1979. Note on the ecology of *Myotis keenii* in Eastern Missouri. American Midland Naturalist 102:404-407.

Carter, T.C. and G.A. Feldhamer. 2005. Roost tree use by maternity colonies of Indiana bats and northern long-eared bats in southern Illinois. Forest Ecology and Management 219:259-268.

Chenger, J. 2002. Summer survey for New Hampshire woodland bats. Bat Conservation and Management, Inc. Carlisle, PA 47pp.

Chenger, J. 2004. 2004 woodland bat survey in the White Mountain National Forest – August 8 – 18, 2004. Bat Conservation and Management, Inc. Carlisle, PA 38pp.

Darling, S. and R. Smith. 2011. Assessment of Vermont cave bat populations and proposal to list bat species. Vermont Fish and Wildlife Department. Vermont Fish and Wildlife Department, February 2011. 19 pp.

Feldhamer, G.A., T C. Carter, E H. Nicholson, and A.T. Morzillo. 2003. Use of bridges as day roosts by bats in southern Illinois. Transactions Illinois State Academy Science 96(2):107-112.

Fishman, M. 2013. Bats of Long Island. Presentation at the 2013 Annual Meeting of the Northeast Bat Working Group. Albany, New York, January 9-11, 2013.

Fishman, M. 2015. Remnant Populations of Northern Long-eared Bat in Northeastern Coastal Communities. Presentation at the 2015 Annual Meeting of the Northeast Bat Working Group. Portland, Maine, January 21-23, 2015.

Fitch, J.H. and K.A. Shump. 1979. *Myotis keenii*. Mammalian Species 121:1–3.

Ford, W.M., S.F. Owen, J W. Edwards, and J L. Rodrigue. 2006. Robinia pseudoacacia (black locust) as day roosts of male Myotis septentrionalis (Northern bats) on the Fernow Experimental Forest, West Virginia. Northeastern Naturalist 13:15-24.

Foster, R.W. and A. Kurta. 1999. Roosting ecology of the northern bat (Myotis septentrionalis) and comparisons with the endangered Indiana bat (Myotis sodalis). Journal of Mammalogy 80:659-672.

Garroway, C.J. and H G. Broders. 2007. Nonrandom association patterns at northern long-eared bat maternity roosts. Canadian Journal of Zoology 85(9):956-964.

Goehring, A.B. 1954. Pipistrellus subflavus, Myotis keenii, and Eptesicus fuscus hibernating in a storm sewer in central Minnesota. Journal of Mammalogy 35:434-435.

Griffin, D.R. 1940. Notes on the life-histories of New England cave bats. Journal of Mammalogy 21:181-187.

Griffin, D.R. 1945. Travels of banded cave bats. Journal of Mammalogy 26:15-23.

Henderson, L.E. and H.G. Broders. 2008. Movement and resource selection of the Northern long-eared Myotis (Myotis septentrionalis) in a forest-agriculture landscape. Journal of Mammalogy 89:952-963.

Henderson, L.E., L.J. Farrow, and H.G. Broders. 2008. Intra-specific effects of forest loss on the distribution of the forest-dependent northern long-eared bat (Myotis septentrionalis). Biological Conservation 141:1810-1828.

Hitchcock, H.B. 1949. Hibernation of bats in southeastern Ontario and adjacent Quebec. Canadian Field-Naturalist 63:47-59.

Jantzen, M. K. and M. B. Fenton. 2013. The depth of edge influence among insectivorous bats at forest-field interfaces. Canadian Journal of Zoology 91:287-292.

Johnson, J.B., J.W. Edwards, W.M. Ford, and J.E. Gates. 2009. Roost tree selection by northern myotis (Myotis septentrionalis) maternity colonies following a prescribed fire in a Central Appalachian Mountains hardwood forest. Forest Ecology and Management 258:233-242.

Johnson, J.B., Ford, W.M., and J.W. Edwards. 2012. Roost networks of northern Myotis (*Myotis septentrionalis*) in a managed landscape. Forest Ecology and Management 266 :223-231.

Kiser, J.D., R.R. Kiser, V. Brack, R.R. Britzke. 2001. A survey for eastern forest bats on Green Mountain and Finger Lakes National Forests, with emphasis on the federally endangered Indiana bat (Myotis sodalis). Environmental Solutions and Inovations, LLC. Neon, Kentucky. 71 pp.

Kiser, J.D. and V. Brack. 2003. A survey for eastern forest bats in Dutton Brook area on Green Mountain National Forest, with emphasis on the federally endangered Indiana bat (Myotis sodalis). Environmental Solutions and Inovations, LLC. Neon, Kentucky. 43 pp.

Krusic, R. A., M. Yamasaki, C. D. Neefus, and P. J. Pekins. 1996. Bat habitat use in White Mountain National Forest. J. Wildl. Manage. 60(3):625-631

Krynak, T.J. 2010. Bat habitat use and roost tree selection for northern long-eared myotis (Myotis septentrionalis) in North-Central Ohio. Unpublished M.S. thesis, John Carroll University, University Heights, Ohio.

Kurta, A. and J.A. Teramino. 1994. A novel hibernaculum and noteworthy records of the Indianabat and eastern pipistrelle (Chiroptera:*Vespertilionidae*). American Midland Naturalist 132:410-413.

Lacki, M. J. and J. H. Schwierjohann. 2001. Day-roost characteristics of northern bats in mixed mesophytic forest. Journal of Wildlife Management 65:482-488.NatureServe. 2014. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available http://explorer.natureserve.org. (Accessed: February 6, 2015).

Loeb, S. C. and J. M. O'Keefe. 2006. Habitat use by forest bats in South Carolina in relation to local, stand, and landscape characteristics. Journal of Wildlife Management 70:1210–1218.

Lookingbill, T.R., Elmore, A.J., Engelhardt, K.A.M., Churchill, J.B., Gates, J.E., and J.B. Johnson. 2010. Influence of wetland networks on bat activity in mixed-use landscapes. Biological Conservation 143:974-983.

Menzel, M.A., S.F. Owen, W.M. Ford, J.W. Edwards, P.B. Wood, B.R. Chapman, and K.V. Miller. 2002. Roost tree selection by northern long-eared bat (Myotis septentrionalis) maternity colonies in an industrial forest of the central Appalachian mountains. Forest Ecology Management 155:107-114.

NatureServe. 2014. Myotis septentrionalis. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available http://explorer.natureserve.org. (Accessed: February 6, 2015).

New Hampshire Fish and Game Department. 2010. White-nose-syndrome a new threat to NH bats. Available at: http://www.wildnh.com/Wildlife/Nongame/bats/wns.html. Accessed February 6, 2015.

New Hampshire Fish and Game Department. 2012. White-nose syndrome: a new threat to New Hampshire bats. Available: http://www.wildlife.state.nh.us/Wildlife/Nongame/bats/wns.html

O'Keefe, J.M. 2009. Roosting and foraging ecology of forest bats in the Southern Appalachian Mountains. PhD Dissertation, Clemson University, Clemson, South Carolina.

Patriquin, K. J., and R. M. R. Barclay. 2003. Foraging by bats in cleared, thinned and unharvested boreal forest. Journal of Applied Ecology 40:646–657.

Patriquin, K.J., M.L. Leonard, H G. Broders, and C.J. Garroway. 2010. Do social networks of female northern long-eared bats vary with reproductive period and age? Behavioral Ecology and Sociobiology 64:899-913.

Perry, R.W. and R.E. Thill. 2007. Roost selection by male and female northern long-eared bats in a pine-dominated landscape. Forest Ecology and Management 247:220-226.

Raesly, R.L. and J.E. Gates. 1987. Winter habitat selection by north temperate cave bats. The American Midland Naturalist 118:15-31.

Reynolds, D.S. 2006. Woodland bat survey, Green Mountain National Forest, July 03-12, 2000. North East Ecological Services. West Boylston, MA. 29 pp.

Sasse, D. B. 1995. Summer roosting ecology of cavity-dwelling bats in the White Mountain National Forest. Unpublished M.S. thesis, University of New Hampshire, Durham. 65 pp.

Sasse, D. B. and P. J. Pekins. 1996. Summer roosting ecology of northern long-eared bats (Myotis septentrionalis) in the White Mountain National Forest. Pages 91-101 in Bats and Forests symposium (R. M. R. Barclay and R. M. Brigham, editors). British Columbia Ministry of Forests Working Paper 23/1996, Victoria, Canada.U.S.

Schultes, K. L. 2002. Characteristics of roost trees used by Indiana bats (Myotis sodalis) and northern bats (M. septentrionalis) on the Wayne National Forest, Ohio. Unpublished M.S. thesis, Eastern Kentucky University, Richmond.

Schirmacher, M. R., S. B. Castleberry, W. M. Ford, and K. V. Miller. 2007. Habitat associations of bats in South-central West Virginia. Proceedings of the Annual Conference of Southeastern Association of Fish and Wildlife Agencies 61:46-52.

Sheets, J. S., J. E. Duchamp, M. K. Caylor, L. D'Acunto, J. O. Whitaker Jr., V. Brack Jr., and D. W. Sparks. 2013. Habitat use by bats in two Indiana forests prior to silvicultural treatments for oak regeneration. Pp. 203-217 in The Hardwood Ecosystem Experiment: a framework for studying responses to forest management (R. K. Swihart, M. R. Saunders, R. A. Kalb, G. S. Haulton, and C. H. Michler, eds.) Gen. Tech. Rep. NRS-P-108. U.S. Department of Agriculture, Forest Service, Northern Research Station, Newtown Square, PA. U.S. Fish and Wildlife Service. 2014b. 2014 Range-wide Indiana bat summer survey guidelines; January 2014. 41pp. Available: http://www.fws.gov/midwest/endangered/mammals/inba/ surveys/pdf/2014IBatSummerSurveyGuidelines13Jan2014.pdf

Silvis, A., W.M. Ford, E.R. Britzke, N.R. Beane, and J B. Johnson. 2012. Forest succession and maternity roost selection by Myotis septentrionalis in a mesophytic hardwood forest. International Journal of Forestry Research, Volume 2012, Article ID 148106, 8 pp.

Silvis, A, W.M. Ford, E.R. Britzke, and J.B. Johnson. 2014. Association, roost use and simulated disruption of Myotis septentrionalis maternity colonies. Behavioural Processes 103:283– 290.

Silvis, A., Ford, W.M., and E.R. Britzke. 2015. Effects of hierarchical roost removal on northern long-eared bat (*Myotis septentrionalis*) maternity colonies. PLoS ONE 10(1):e0116356. doi:10.1371/journal.pone.D116356

Timpone, J.C., Boyles, J.G., Murray, K.L., Aubrey, D.P., and L.W. Robbins. 2010. Overlap in roosting habits of Indiana bats (*Myotis sodalis*) and Northern bats (*Myotis septentrionalis*). Am. Midl. Nat. 163:115-123.

Titchenell, M.A., R.A. Williams, and S.D. Gehrt. 2011. Bat response to shelterwood harvests and forest structure in oak-hickory forests. Forest Ecology and Management 262:980-988

Toth, E. 1999. Woodland bat survey and core monitoring team training: August 3-11, 1999. Green Mountain National Forest, Manchester Center, Vermont. 33 pp.

Trombulak, S.C., P.E. Higuera, and M. Desmeules. 2001. Population trends of wintering bats in Vermont. Northeastern Naturalist 8(1):51-62.

Turner, G.G., Reeder, D.M., and J.T.H. Coleman. 2011. A five-year assessment of mortality and geographic spread of white-nose syndrome in North American bats and a look to the future. Bat Research News 52(2):12-27.

USDA Forest Service. 2005a. Final Environmental Impact Statement for White Mountain National Forest Land and Resource Management Plan and Appendices. Laconia, NH.

USDA Forest Service. 2005b. White Mountain National Forest Species of Viability Concern. Evaluation of Status, Habitat Needs, and Limiting Factors. Laconia, NH. 126 pp.

USDA Forest Service. 2006. Final Environmental Impact Statement to accompany the Land and Resource Management Plan. Green Mountain National Forest, Rutland, Vermont.

USDA Forest Service. 2013. Forest Inventory and Analysis Database. Available: http://apps.fs.fed.us/fia/fido/index.html. Accessed February 3, 2015.

USDI Fish and Wildlife Service. 2014a. Northern long-eared bat interim conference and planning guidance. 67 pp. *www.fws.gov/midwest/endangered/mammals/nlba/index.html.*

USDI Fish and Wildlife Service. 2014b. 2014 range-wide Indiana bat summer survey guidelines. 41 pp.

Van Zyll de Jong, C.G. 1985. Handbook of Canadian Mammals. 2. Bats. National Museum of Natural Sciences, National Museums of Canada, Ottawa, ON, Canada. 212 pp.

APPENDIX 1. Project Locations

GMNF Project Locations

Timber sales on the GMNF are shown in detail in Appendix 2. Other site-specific project locations can be made available up on request.

WMNF Project Locations

Site-specific WMNF district projects are shown below first on overview maps by district and then on smaller scale maps, along with all known NLEB occurrences. All projects are listed in the table below based on project number along with coordinating map numbers for reference. Note some map points refer to projects whose determinations are May Affect, Likely to Adversely Affect and are not addressed in this BA.

Project #	Project name	District	Map #
2	Tunnel Brook Road reconstruction	Pemi	14
12	Loon Mountain Beginner Area new trails and lifts	Pemi	19
14	Black locust cutting >3" (non-native invasive species)	Forest-wide	
15	Black alder cutting (non-native invasive species)	Saco	21
16	Broken Bridge Pond, Patte Marsh Pond, Dispersed site relocation and construction	Andro	1
18	Glen Ellis – decommission restroom buildings, pumphouse building,0.3mi new trail construction,0.2 mi accessible trail reconstruction	Andro	5
19	Road hazard tree removal	Forest-wide	
20	Roadside Mowing/Maintenance	Forest-wide	
21	Russell Pond Road reconstruction	Pemi	18
22	Dugway picnic area decommission (includes restroom building)	Saco	22
23	Sabbaday Falls	Saco	21
24	Orchard maintenance	Forest-wide	14
25	Wildlife opening maintenance (mowing and prescribed burning)	Forest-wide	
26	North South Road Orchards reclamation	Pemi	14
27	Moat Area Fuels Reduction (Dandiview-Birchhill WUI)	Saco	22
28	Christmas trees (Forest-wide)	Forest-wide	
29	Girdle emerald ash borer trap trees	Forest-wide	
30	Special forest product permits (1-2/year)	Forest-wide	
31	Ledge Brook Timber Sale	Saco	21
32	AMC Camp Dodge hazard tree removal	Andro	6

Project #	Project name	District	Map #
33	AMC Pinkham Notch Visitor Center hazard tree removal	Andro	5
34	Harvard Mountain Club – Harvard Cabin hazard tree removal	Andro	5
35	Public Service powerline maintenance	Forest-wide	
36	Road use permit hazard tree removal	Forest-wide	
37	19 Mile Brook Trail bridge installation and trail relocations	Andro	6
38	Andro education / wellness trail construction	Andro	7
39	Bunnell Notch Trail repair 1 bog bridge, 1 short relocation	Andro	9
40	Crocker Pond Snowmobile Trail relocation	Andro	1
41	Ellis River Trail reroute #2	Andro	4
42	Highwater Trail relocation	Andro	3
43	Mill Brook Trail – replace several bog bridges	Andro	9
44	Pond of Safety Accessible Trail construction	Andro	8
45	Backcountry facilities hazard tree removal	Forest-wide	
46	Campground/Day use area/trailheads hazard tree removal	Forest-wide	
47	Chainsaw/crosscut training	Forest-wide	
48	Hazard tree removal along snowmobile trails	Forest-wide	
49	WMNF vistas	Forest-wide	
50	Ski area hazard/operational tree removal	Forest-wide	
51	Appalachian Trail (Mt. Mist section)	Pemi	15
52	Bog Pond Snowmo Trail bridge installation	Pemi	13
53	Campton Day Use Area footpath construction	Pemi	17
54	Cedar Brook trail relocation	Pemi	19
55	Falling Waters Trail check dam installation	Pemi	13
56	Fishin Jimmy Trail bog bridge replacement	Pemi	13
57	Green Peak new ski trail/lift corridor	Pemi	18
58	Hale Brook Trail (waterbar replacement)	Pemi	12
59	Loon Tower Guns on Lower Bear Claw	Pemi	19
60	Mill Brook snowmobile connector trail relocation	Pemi	11
61	Mt. Osceola Trail (soil retainer and wood waterbar installation)	Pemi	18
62	Nancy Barton Trail relocation	Pemi	12
63	Three Ponds/Mt. Kineo Trail (turnpike installation, heavy brushing)	Pemi	16
64	Blueberry Ledge Cutoff trail maintenance	Saco	20

Project #	Project name	District	Map #
65	Champney Trailhead parking lot relocation	Saco	21
66	Jigger Johnson campground waterline replacement, building removal	Saco	21
67	Oliverian Brook Trail maintenance	Saco	21
68	Rob Brook Snowmobile Trail relocation	Saco	21
69	Harriman Brook backwater pools	Andro	1
70	Culvert replacement	Forest-wide	
71	Basin stewardship wood addition	Pemi	14
72	Meserve Brook wood addition	Saco	25
73	Tuckerman Ravine trail bridge replacements	Andro	5
74	Stevens Brook prescribed burn	Pemi	16
75	Indigo Timber Sale	Pemi	14
76	Douglas Brook Timber Sale	Saco	21
77	Northeast Swift Timber Sale	Saco	22
79	Radio Improvement Project (install new radio repeaters and helicopter landing zones)	Forest-wide	
80	AMC hut viewshed maintenance	Forest-wide	
81	AMC Shelters, Randolph Mountain Club Shelters	Forest-wide	
82	High Street Snowmobile Trail relocation	Saco	22
83	Rocky Branch Tent Pad Construction	Saco	24
84	Post-harvest crop tree release and weed	Forest-wide	
85	Dolly Copp campground	Andro	6
87	Dan Early special use permit on Forest Road 18C	Andro	1
88	Trail maint	Forest-wide	
89	RT 113 Snowmoile bridge removal	Andro	2
90	Special uses permit maintenance multiple sites Forest wide	Forest-wide	
91	Hermit Lake site maintenance, elev. Over 2,000 '	Andro	5
92	Cabot Cabin decomission	Andro	9
93	Administrative Facility Maintenance. Painting , Staining , Clearing Trees	Andro	2, 5, 6, 7
94	Recreation Facility Maintenance. Painting , Staining , Clearing Trees at 3 sites (Gilead picnic area, South Pond rec area, Dolly Copp Pavilion, Hermit Lake >2000').	Andro	2, 6, 10
95	Moriah Brook Trail suspension bridge , (decommission , removal)	Andro	3

Project #	Project name	District	Map #
96	Gregg Tract Access and parking	Andro	8
97	Red Brook Road NFSR 6153 replace culvert	Pemi	11
98	Eddy Parking Area reconstruction and replace 5 culverts	Pemi	17
99	Beaver Brook Roads NFSR 774 repair and replace culvert	Pemi	12
100	Sawyer River Road stabilize falling slope	Saco	23
101	Champney Falls remove old bridge abutments	Saco	21
102	Eastside road construction and bridge installation	Pemi	19
103	Bog Dam Loop Road replace culverts with bridges (4)	Andro	8
104	South Pond bath house reroofing	Andro	10
105	Forestry destructive sampling to estimate volume and defect	Forest-wide	
106	Tripoli Road Campsite Redesign	Pemi	18
107	Zealand/Sugarloaf install electric line	Pemi	12
108	Corridor 11 By-Pass – 7 Dwarfs	Pemi	12
109	Rumney Rocks Access Trails	Pemi	
110	AMC trails (Pine Link, Parapet Trail, Valley Way, Osgood Trail	Andro	6
111	Davis Path Reconstruction	Saco	23
112	Bennett Street Trail reconstruction	Saco	20
113	Champney Falls Trail reconstruction	Saco	21
116	Miles Brook	Andro	1
117	Rocky Branch Trail relocation	Saco	24

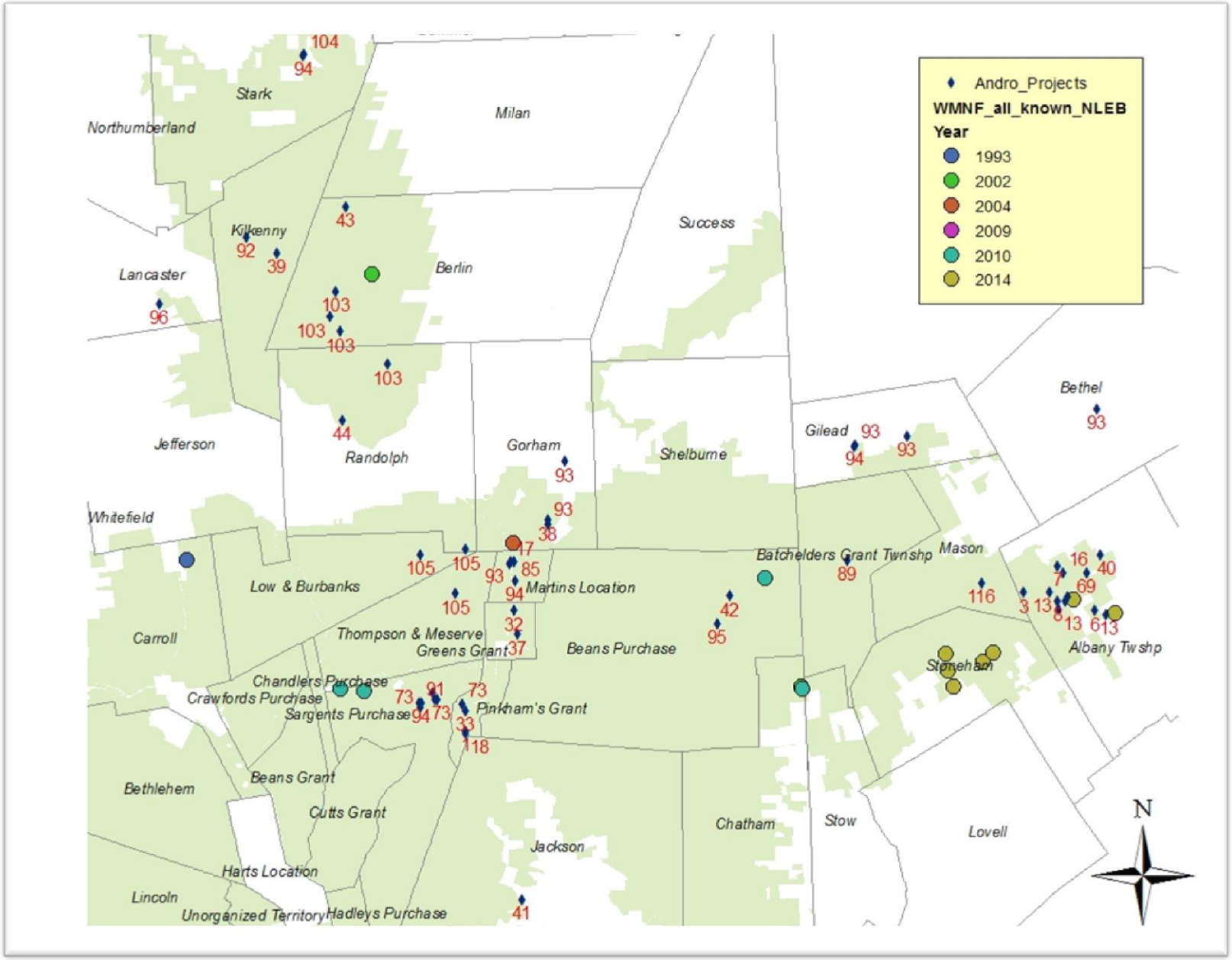


Figure 19. Androscoggin Ranger District projects

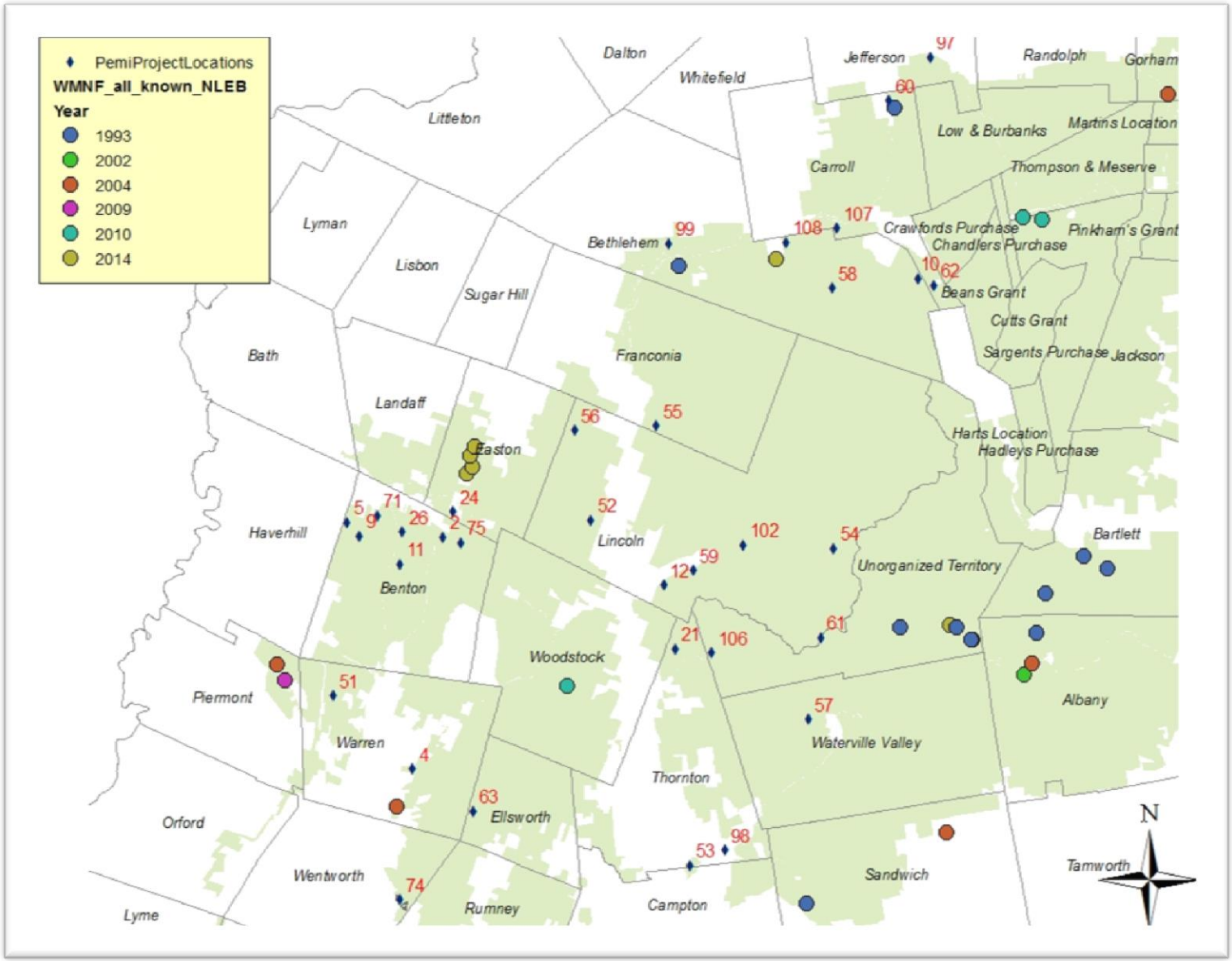


Figure 20. Pemigewasset Ranger District projects.

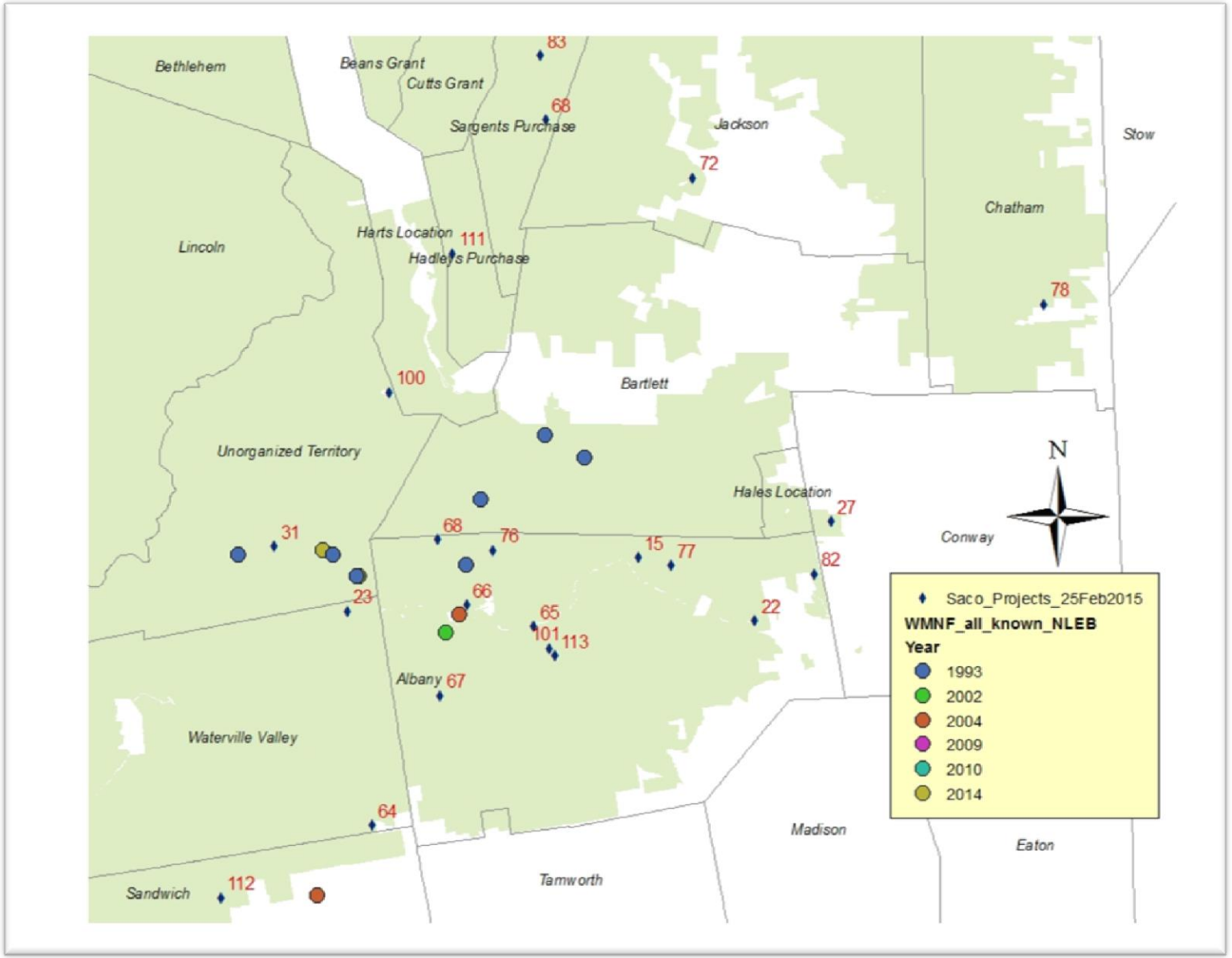
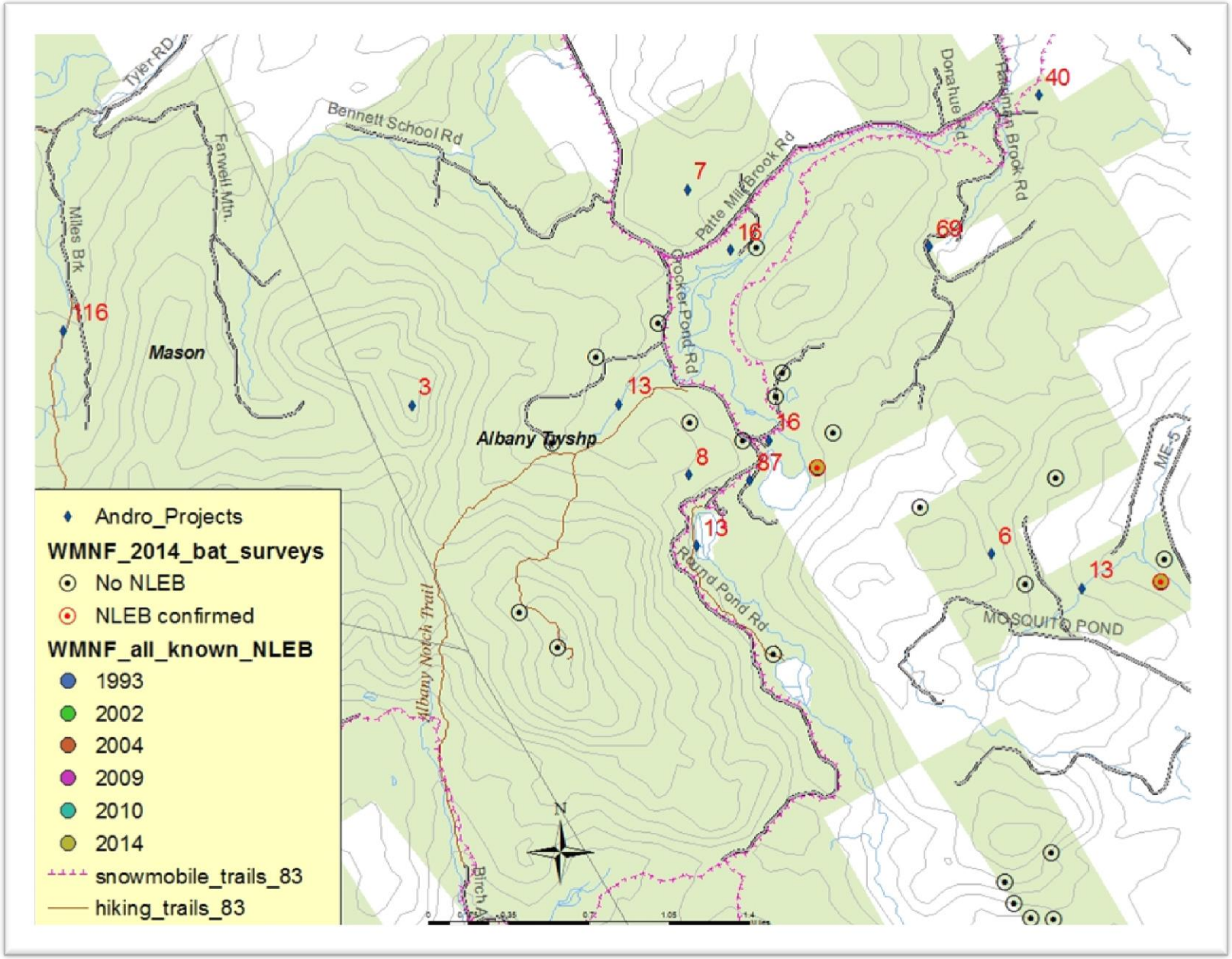
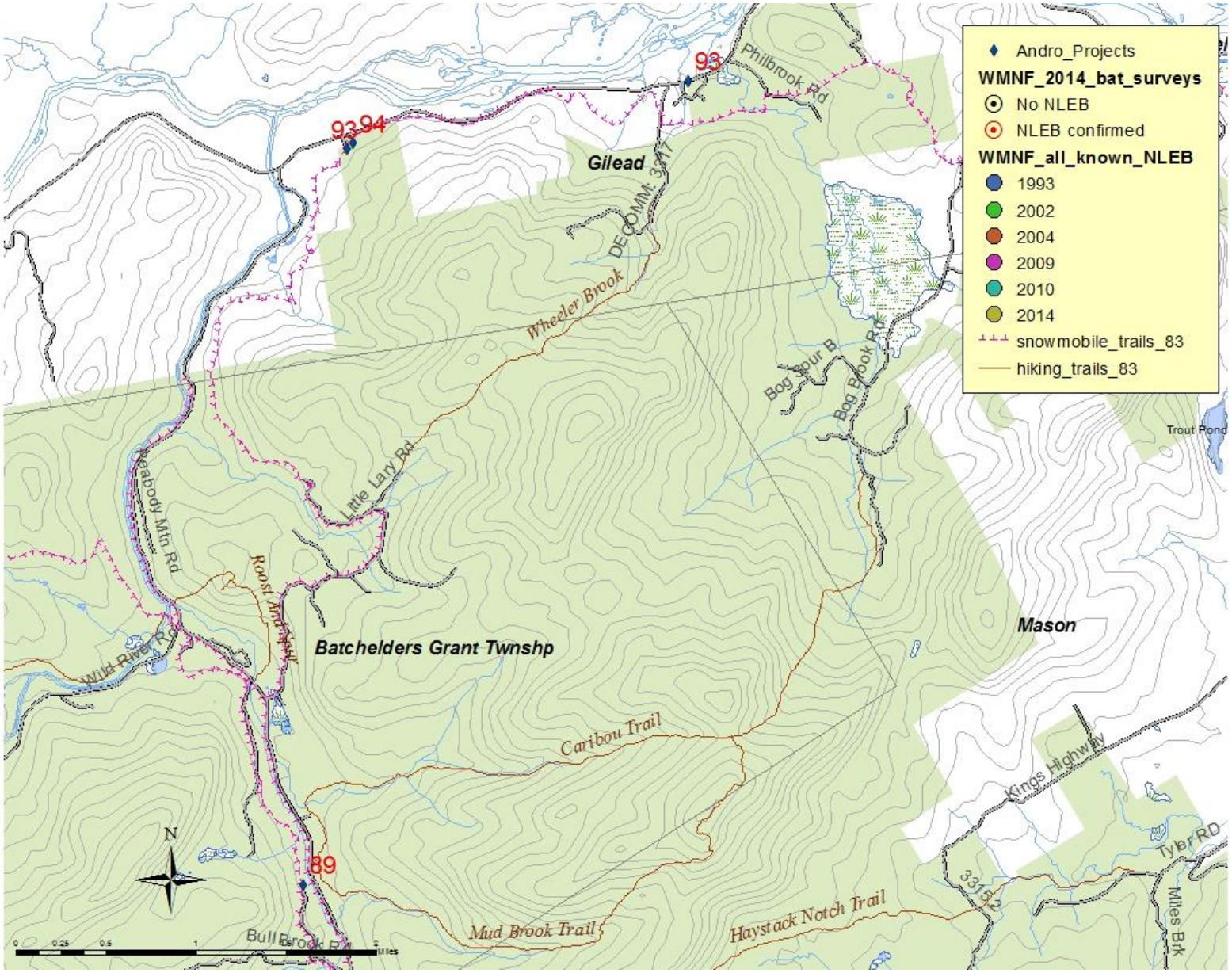


Figure 21. Saco Ranger District projects.


Tyler RD
Bennett School Rd
Farwell Mtn.
Miles Brk
Mason
Albany Twshp
Albany Notch Trail
Birch
Palte Mill Brook Rd
Crocker Pond Rd
Round Pond Rd
Donahue Rd
Hannah Brook Rd
ME-5
MOSQUITO POND
N
Andro_Projects
WMNF_2014_bat_surveys
No NLEB
NLEB confirmed
WMNF_all_known_NLEB
1993
2002
2004
2009
2010
2014
snowmobile_trails_83
hiking_trails_83

Map WMNF 1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No NLEB
NLEB confirmed
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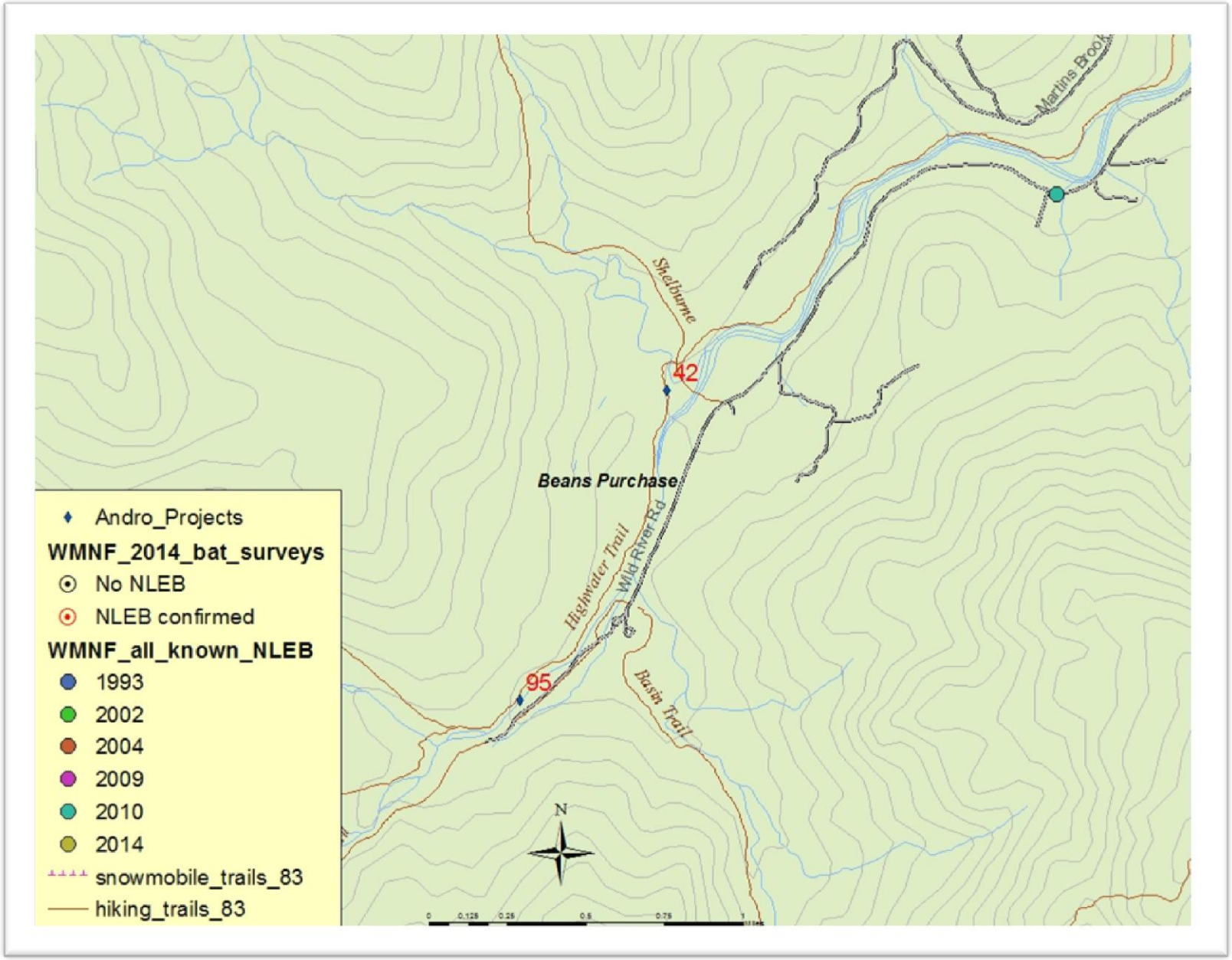
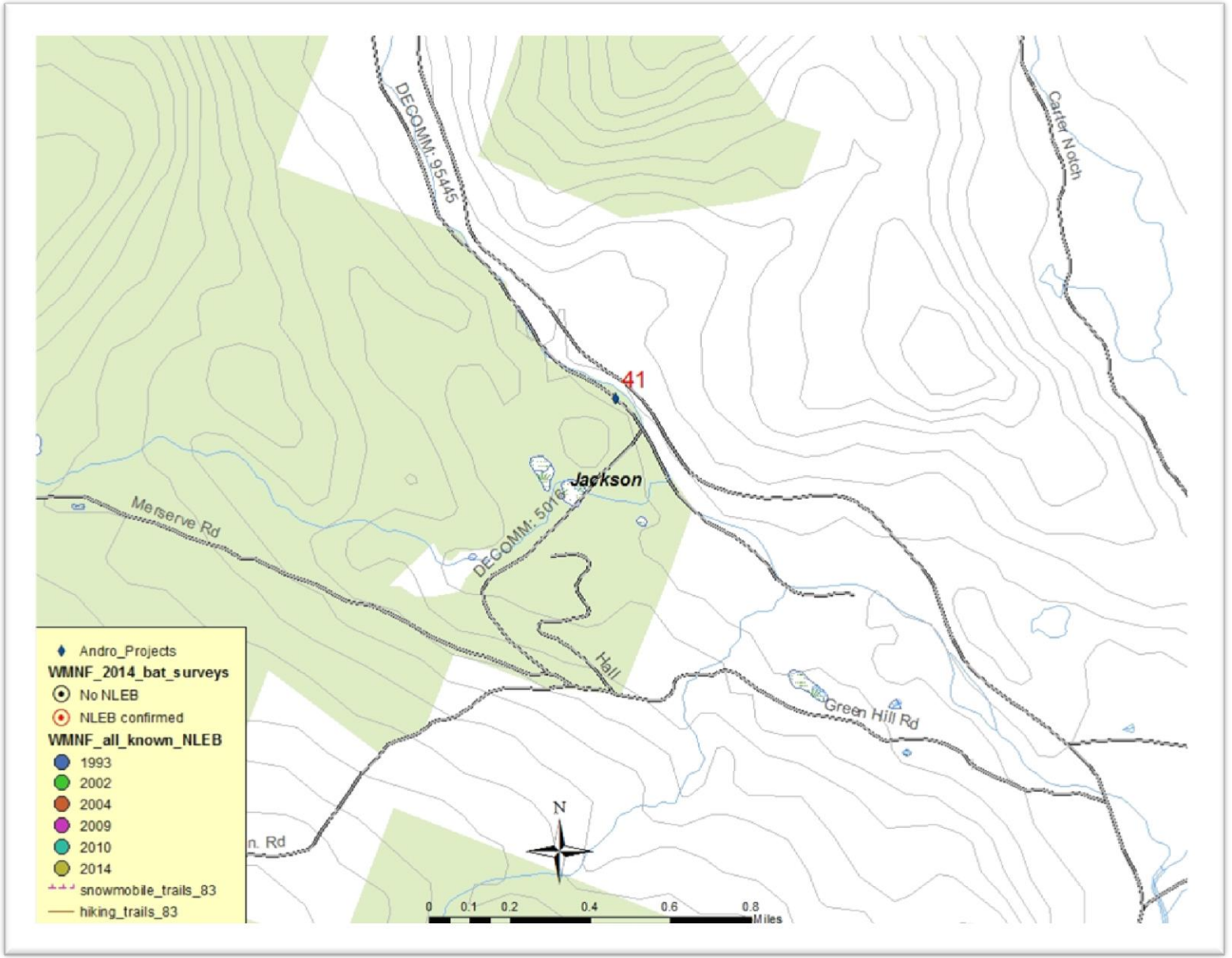
1993
2002
2004
2009
2010
2014
snowmobile_trails_83
hiking_trails_83
93
9394
89
Gilead
Batchelders Grant Twnshp
Mason
Wheeler Brook
Caribou Trail
Mud Brook Trail
Haystack Notch Trail
Kings Highway
Tyler RD
Miles Brk
Trout Pond
Bog Spur B
Bog Brook Rd
Philbrook Rd
Peabody Mtn Rd
Wild River Rd
Roost Mtn Trail
Bull Brook Rd
N

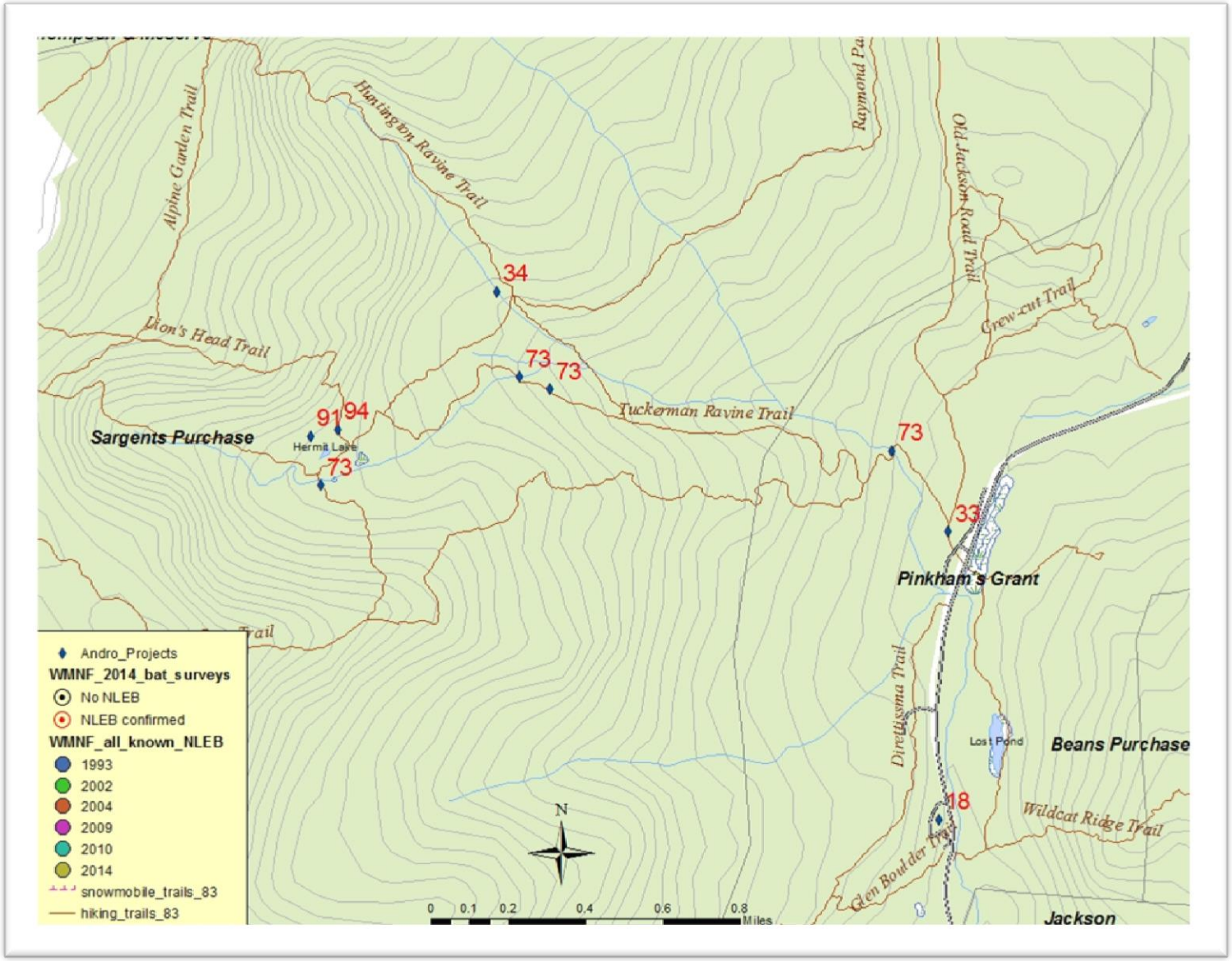
Map WMNF 2


Martins Brook
Shelburne
42
Beans Purchase
Highwater Trail
Wild River Rd
95
Basin Trail
N
Andro_Projects
WMNF_2014_bat_surveys
No NLEB
NLEB confirmed
WMNF_all_known_NLEB
1993
2002
2004
2009
2010
2014
snowmobile_trails_83
hiking_trails_83

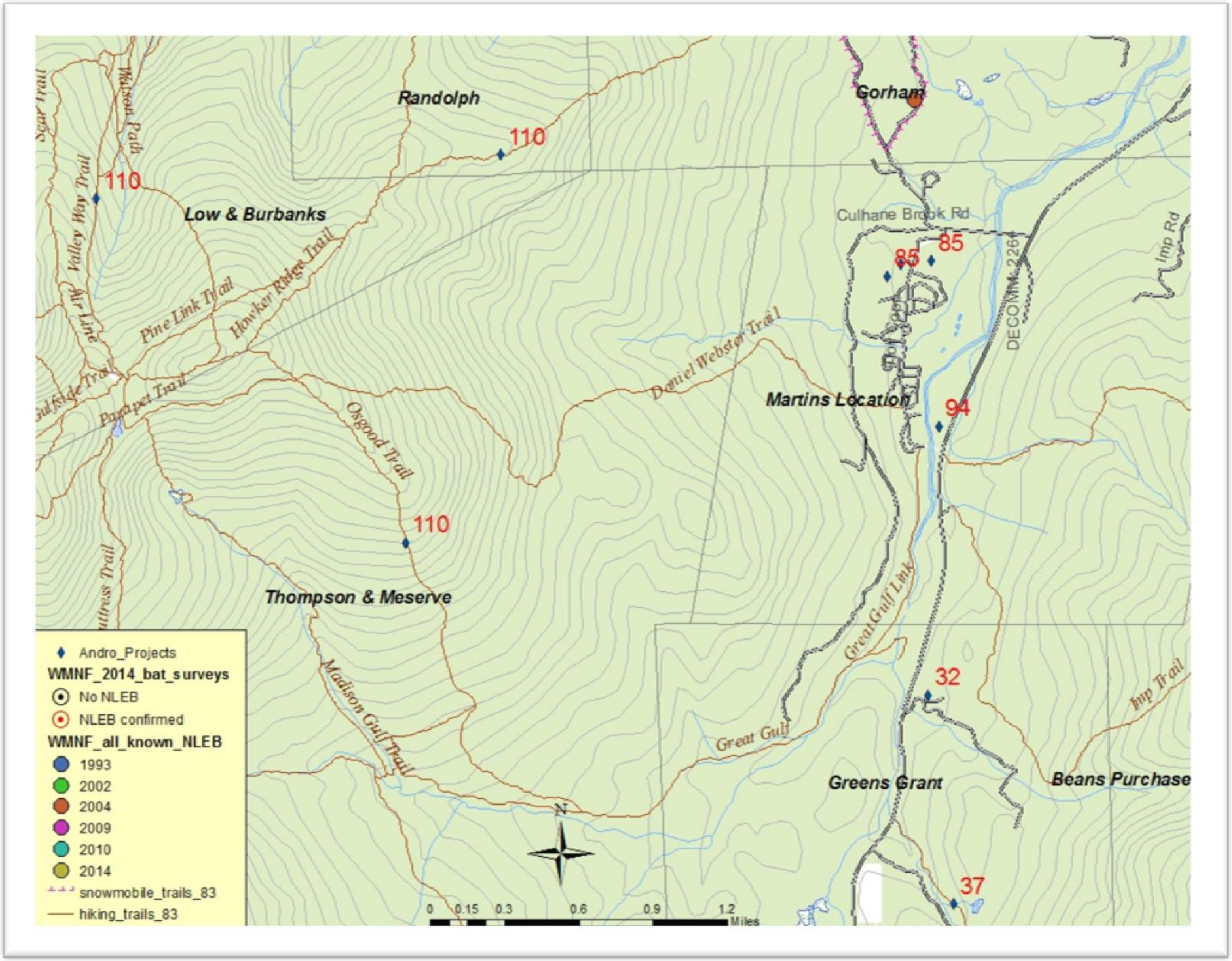
Map WMNF 3


DEGOMM: 95445
Carter Notch
41
Jackson
DEGOMM: 5016
Merserve Rd
Hall
Green Hill Rd
n. Rd
N
0 0.1 0.2 0.4 0.6 0.8
Miles
Andro_Projects
WMNF_2014_bat_surveys
No NLEB
NLEB confirmed
WMNF_all_known_NLEB
1993
2002
2004
2009
2010
2014
snowmobile_trails_83
hiking_trails_83

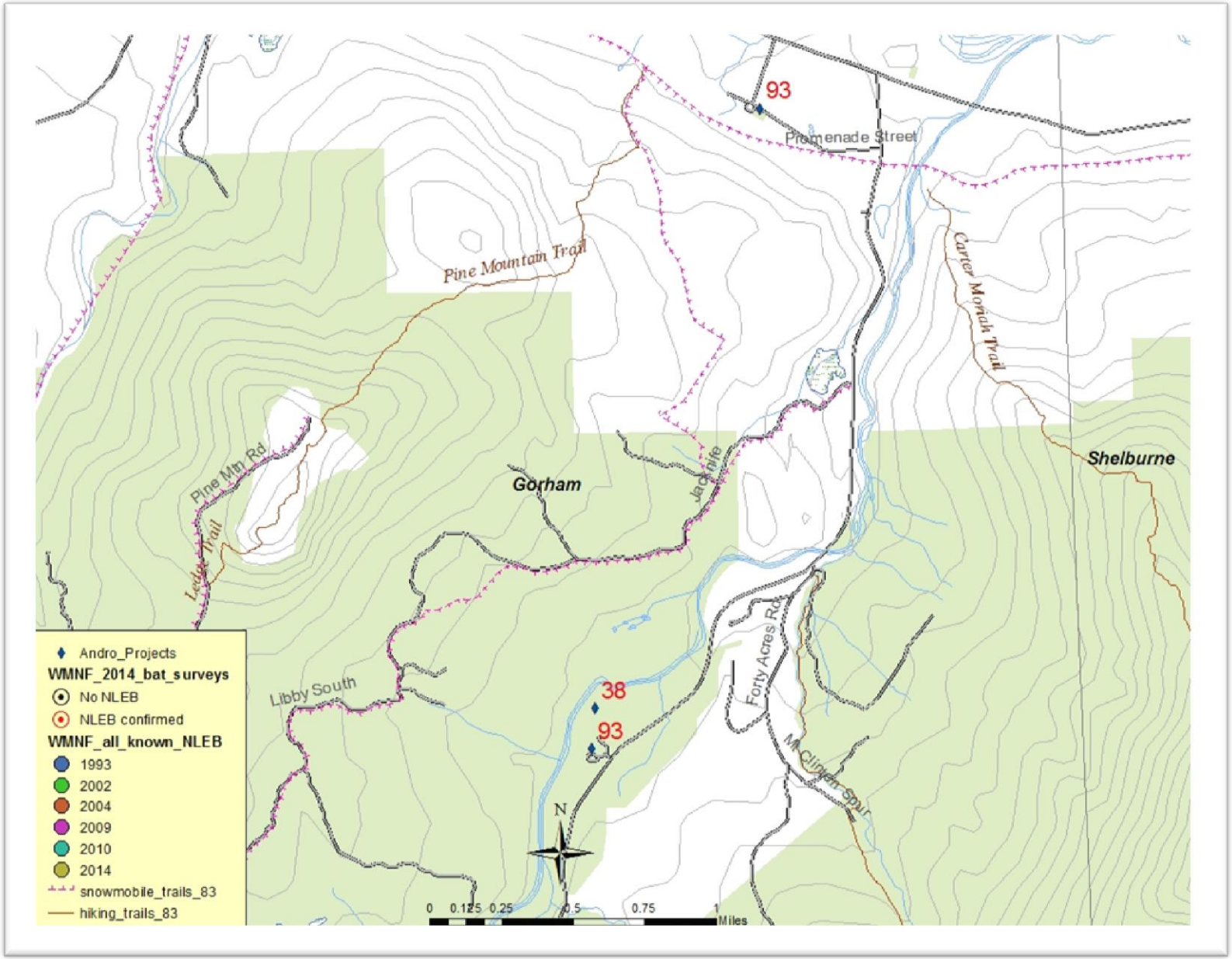
Map WMNF 4


Alpine Garden Trail
Huntington Ravine Trail
Raymond Pa
Old Jackson Road Trail
Crew-cut Trail
Lion's Head Trail
Tuckerman Ravine Trail
Sargents Purchase
Hermit Lake
Pinkham's Grant
Beans Purchase
Lost Pond
Wildcat Ridge Trail
Glen Boulder Trail
Jackson
34
73
73
91
94
73
73
33
18
Andro_Projects
WMNF_2014_bat_surveys
No NLEB
NLEB confirmed
WMNF_all_known_NLEB
1993
2002
2004
2009
2010
2014
snowmobile_trails_83
hiking_trails_83
N
0 0.1 0.2 0.4 0.6 0.8
Miles

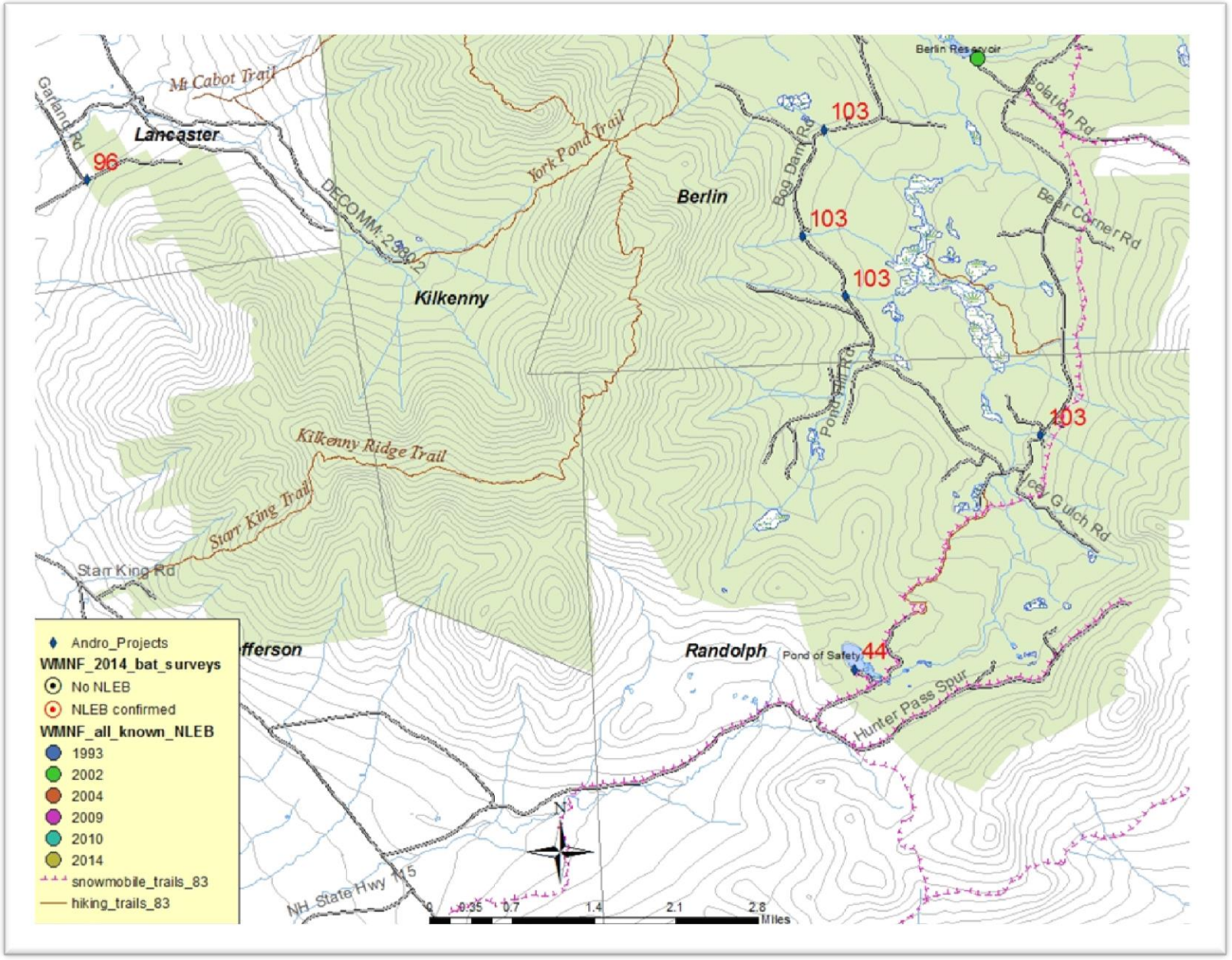
Map WMNF 5


Randolph
110
Gorham
110
Low & Burbanks
Culhane Brook Rd
85
85
Pine Link Trail
Howker Ridge Trail
Daniel Webster Trail
Martins Location
94
Osgood Trail
110
Thompson & Meserve
Great Gulf Link
32
Madison Gulf Trail
Great Gulf
Greens Grant
Beans Purchase
Imp Trail
37
Imp Rd
Andro_Projects
WMNF_2014_bat_surveys
No NLEB
NLEB confirmed
WMNF_all_known_NLEB
1993
2002
2004
2009
2010
2014
snowmobile_trails_83
hiking_trails_83
0 0.15 0.3 0.6 0.9 1.2 Miles
N

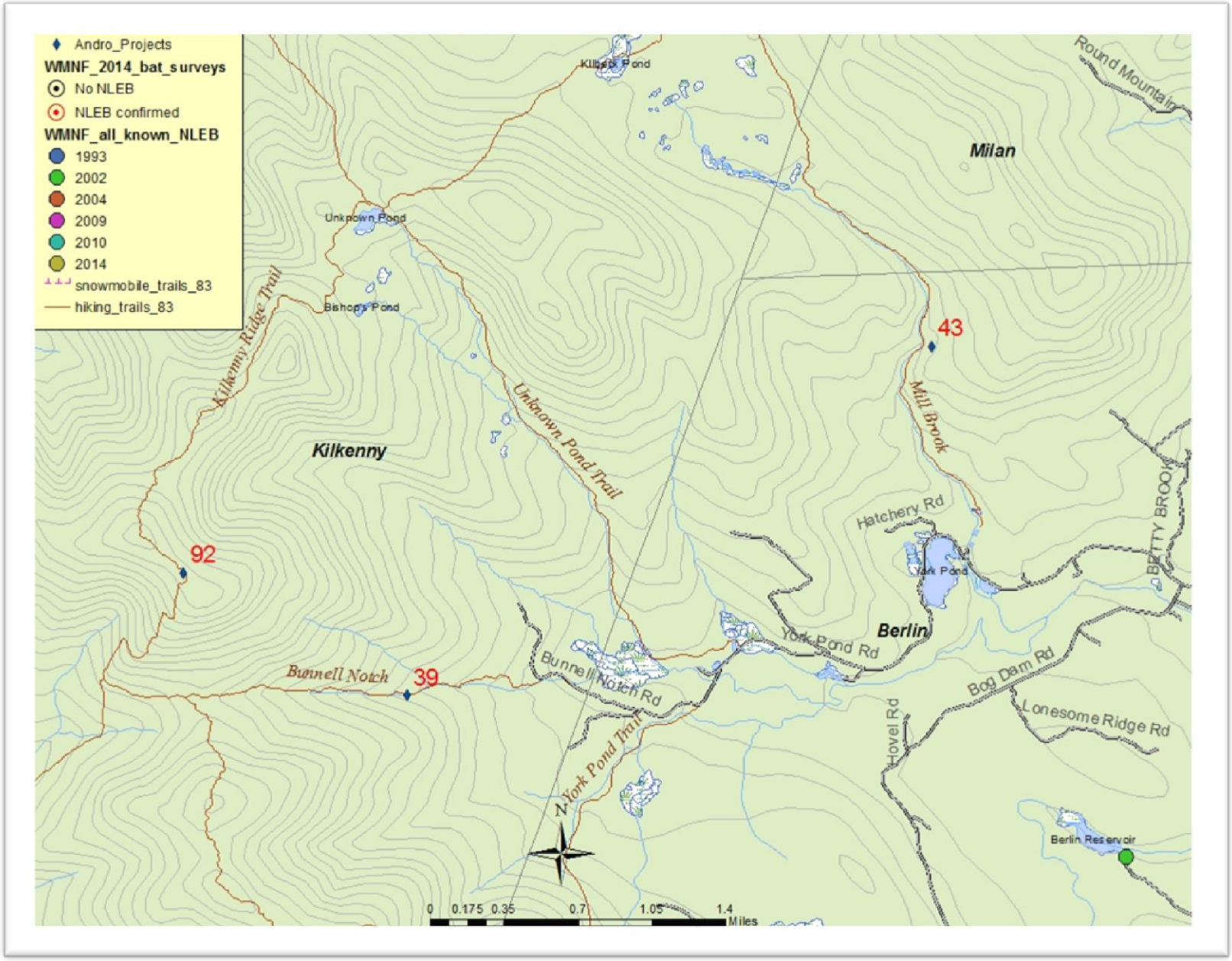
Map WMNF 6


93
Promenade Street
Pine Mountain Trail
Carter Moriah Trail
Pine Mtn Rd
Ledge Trail
Gorham
Jackrabbit
Shelburne
Libby South
38
93
Forty Acres Rd
Mt Cleveland Spur
Andro_Projects
WMNF_2014_bat_surveys
No NLEB
NLEB confirmed
WMNF_all_known_NLEB
1993
2002
2004
2009
2010
2014
snowmobile_trails_83
hiking_trails_83
N
0 0.125 0.25 0.5 0.75 1
Miles

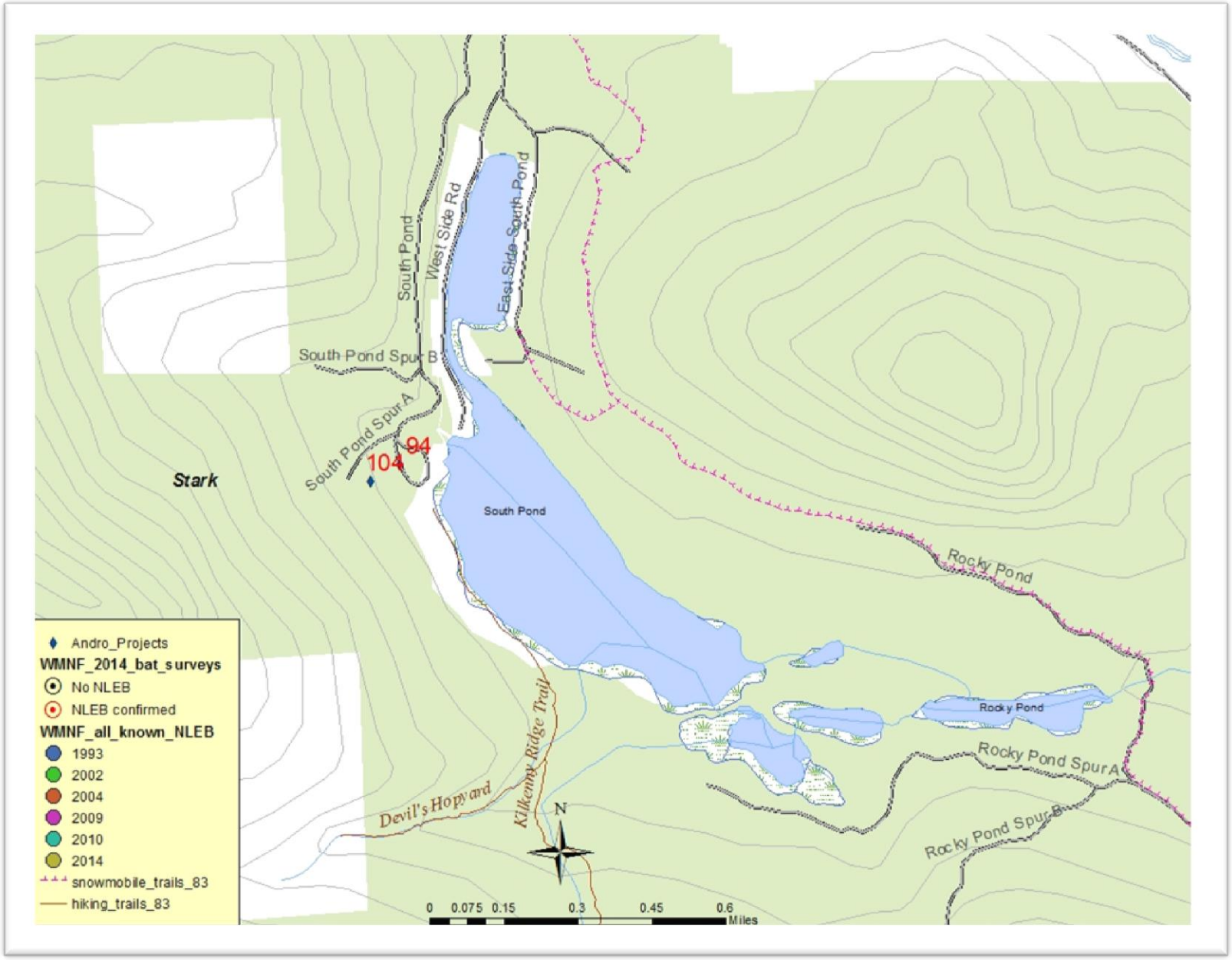
Map WMNF 7


Berlin Reservoir
Mt Cabot Trail
Garland Rd
Lancaster
96
DECOMM-23802
York Pond Trail
Berlin
Bog Dam Rd
103
103
103
Bear Corner Rd
Isolation Rd
Kilkenny
Kilkenny Ridge Trail
Starr King Trail
Starr King Rd
Pond Dam Rd
Jacy Gulch Rd
Randolph
Pond of Safety
44
Hunter Pass Spur
NH State Hwy 115
Andro_Projects
WMNF_2014_bat_surveys
No NLEB
NLEB confirmed
WMNF_all_known_NLEB
1993
2002
2004
2009
2010
2014
snowmobile_trails_83
hiking_trails_83
N
0
0.35
0.7
1.4
2.1
2.8
Miles

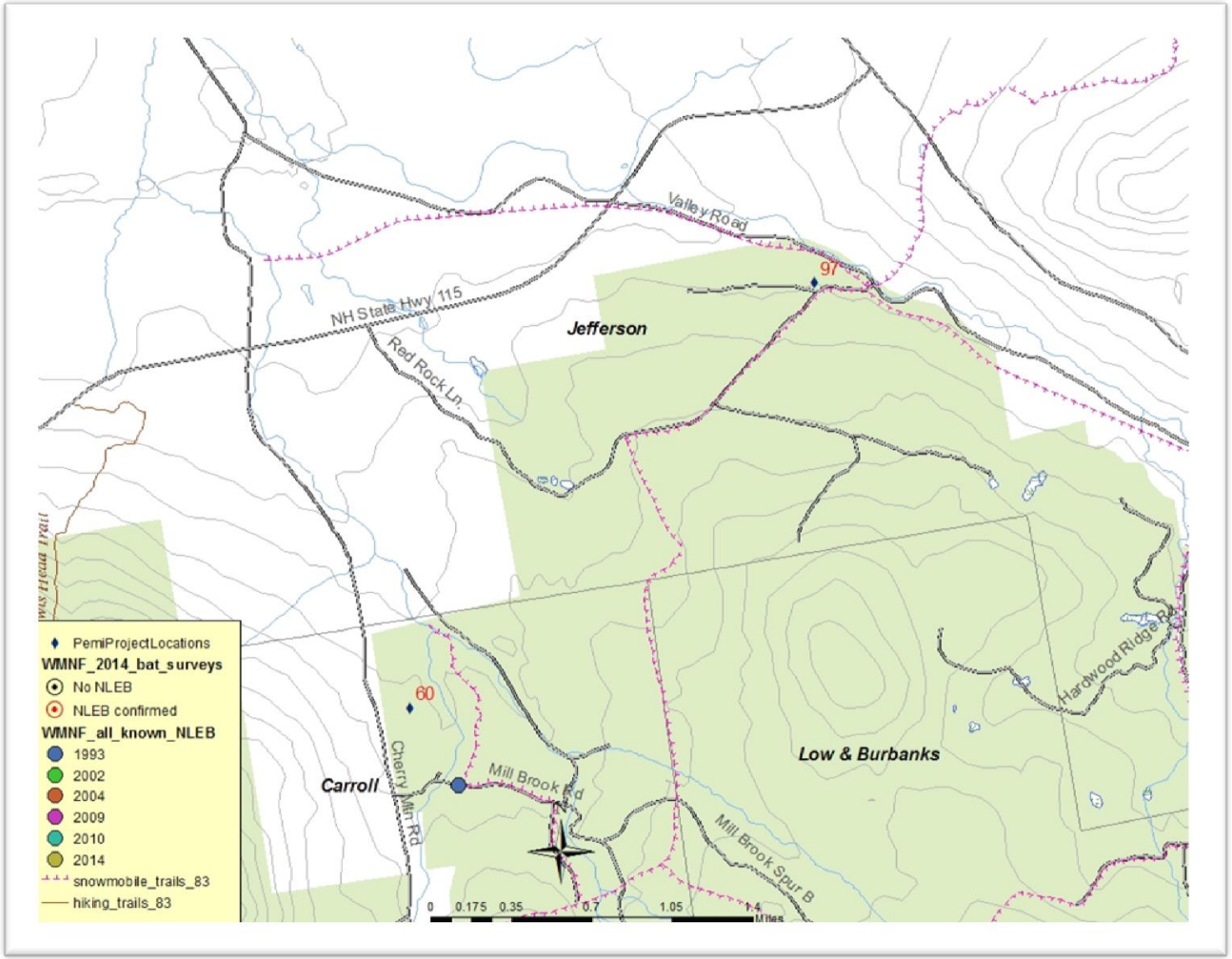
Map WMNF 8


Andro_Projects
WMNF_2014_bat_surveys
No NLEB
NLEB confirmed
WMNF_all_known_NLEB
1993
2002
2004
2009
2010
2014
snowmobile_trails_83
hiking_trails_83
Milan
Kilkenny
Berlin
Unknown Pond
Bishops Pond
Round Mountain
43
92
39
Kilkenny Ridge Trail
Unknown Pond Trail
Mill Brook
Hatchery Rd
York Pond
York Pond Rd
Bunnell Notch
Bunnell Notch Rd
Bog Dam Rd
Lonesome Ridge Rd
Hovel Rd
North York Pond Trail
Berlin Reservoir
BETTY BROOK
0 0.175 0.35 0.7 1.05 1.4
Miles

Map WMNF 9


South Pond
West Side Rd
East Side South Pond
South Pond Spur B
South Pond Spur A
94
104
Stark
South Pond
Rocky Pond
Rocky Pond
Rocky Pond Spur A
Rocky Pond Spur B
Devil's Hopyard
Kilkenny Ridge Trail
N
0 0.075 0.15 0.3 0.45 0.6
Miles
Andro_Projects
WMNF_2014_bat_surveys
No NLEB
NLEB confirmed
WMNF_all_known_NLEB
1993
2002
2004
2009
2010
2014
snowmobile_trails_83
hiking_trails_83

Map WMNF 10


Valley Road
NH State Hwy 115
Red Rock Ln
Jefferson
97
60
Carroll
Cherry Mtn Rd
Mill Brook Rd
Mill Brook Spur B
Hardwood Ridge R
Low & Burbanks
PemiProjectLocations
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1993
2002
2004
2009
2010
2014
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hiking_trails_83
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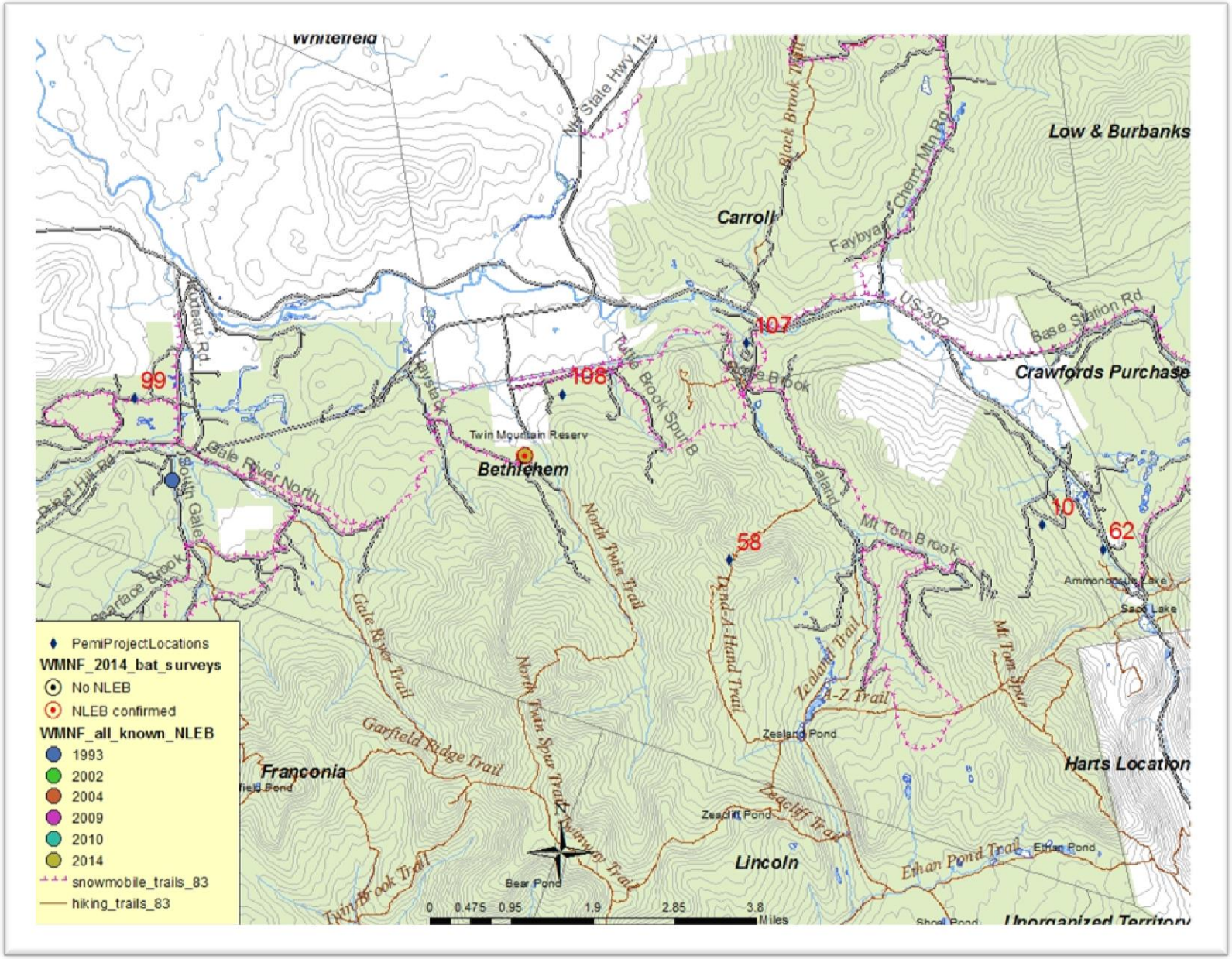
Miles

Map WMNF 11


Whitefield
Carroll
Low & Burbanks
Crawfords Purchase
Bethlehem
Twin Mountain Reserv
Franconia
Lincoln
Harts Location
Unorganized Territory
Zealand Pond
Zeacliff Pond
Ethan Pond
Bear Pond
Ammonoosuc Lake
Sand Lake
Base Station Rd
US 302
Cherry Mtn Rd
Black Brook Trail
Faybya
Mt Tom Brook
Zealand
Tuttle Brook Spur B
Gale River North
South Gale
Forest Hill Rd
Mcindeau Rd
Haystack
North Twin Trail
Trend-A-Hand Trail
Zealand Trail
A-Z Trail
Mt Tom Spur
Gale River Trail
Garfield Ridge Trail
North Twin Spur Trail
Twinway Trail
Twin Brook Trail
Zeacliff Trail
Ethan Pond Trail
99
106
107
58
10
62
PemiProjectLocations
WMNF_2014_bat_surveys
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NLEB confirmed
WMNF_all_known_NLEB
1993
2002
2004
2009
2010
2014
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hiking_trails_83
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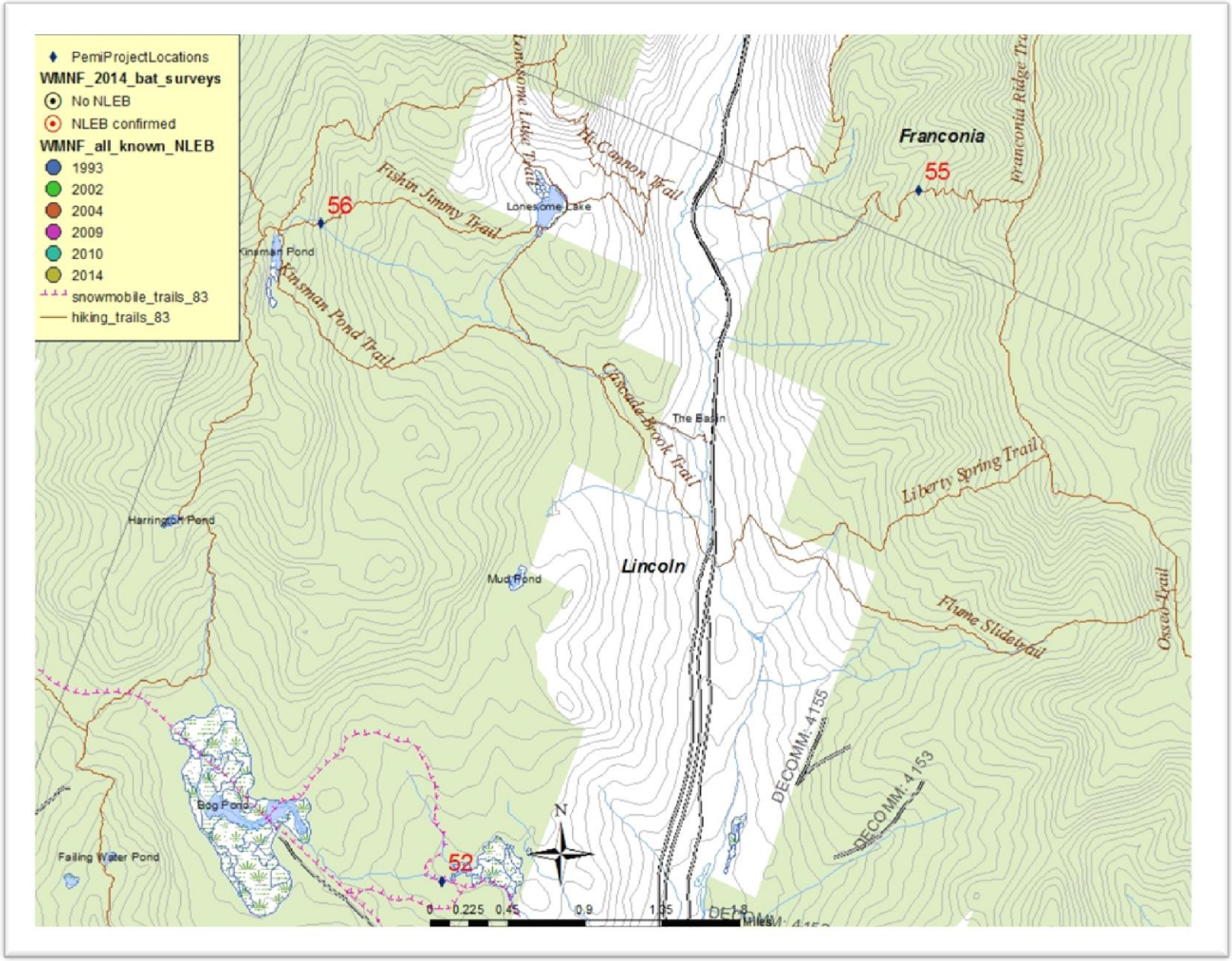
Miles

Map WMNF 12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NLEB confirmed
WMNF_all_known_NLEB
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2002
2004
2009
2010
2014
snowmobile_trails_83
hiking_trails_83
Franconia
55
56
52
Lonesome Lake
Kinsman Pond
Fishin Jimmy Trail
Kinsman Pond Trail
Mt. Common Trail
Franconia Ridge Tra
Cascade Brook Trail
The Basin
Liberty Spring Trail
Lincoln
Harrington Pond
Mud Pond
Flume Slidetrail
Osseo Trail
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DECOMM: 4153
Bog Pond
Failing Water Pond
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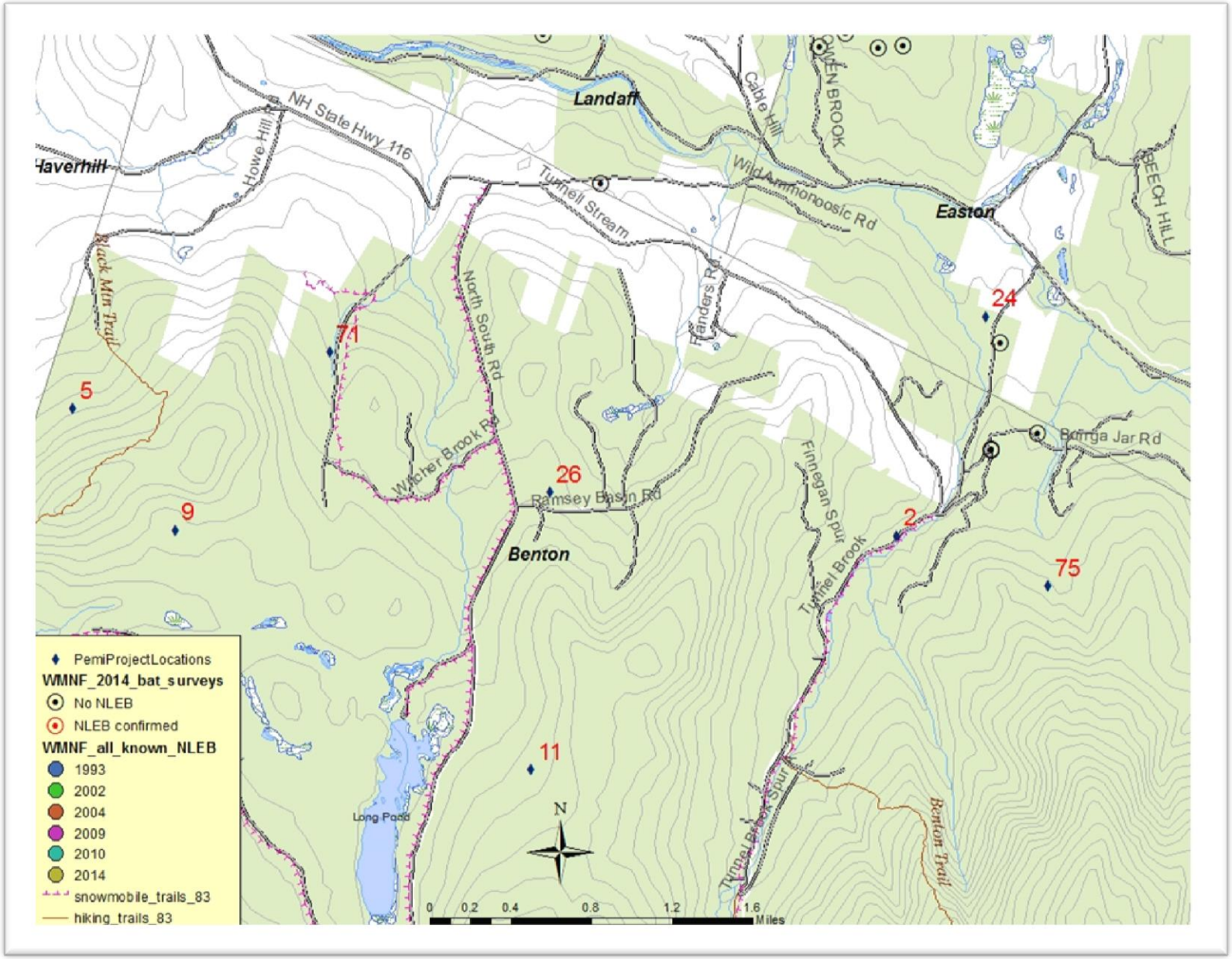
0 0.225 0.45 0.9 1.35 1.8

Map WMNF 13


Landaff
Haverhill
NH State Hwy 116
Howe Hill
Tunnell Stream
Cable Hill
CHEN BROOK
Wild Ammonoosic Rd
Easton
BEECH HILL
Black Mtn Trail
North South Rd
Randers R
71
24
5
Borga Jar Rd
Wicher Brook Rd
26
Ramsey Basin Rd
Finnegan Spur
9
Benton
2
Tunnel Brook
75
PemiProjectLocations
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No NLEB
NLEB confirmed
WMNF_all_known_NLEB
1993
2002
2004
2009
2010
2014
snowmobile_trails_83
hiking_trails_83
11
N
Long Pond
Tunnel Brook Spur
Benton Trail
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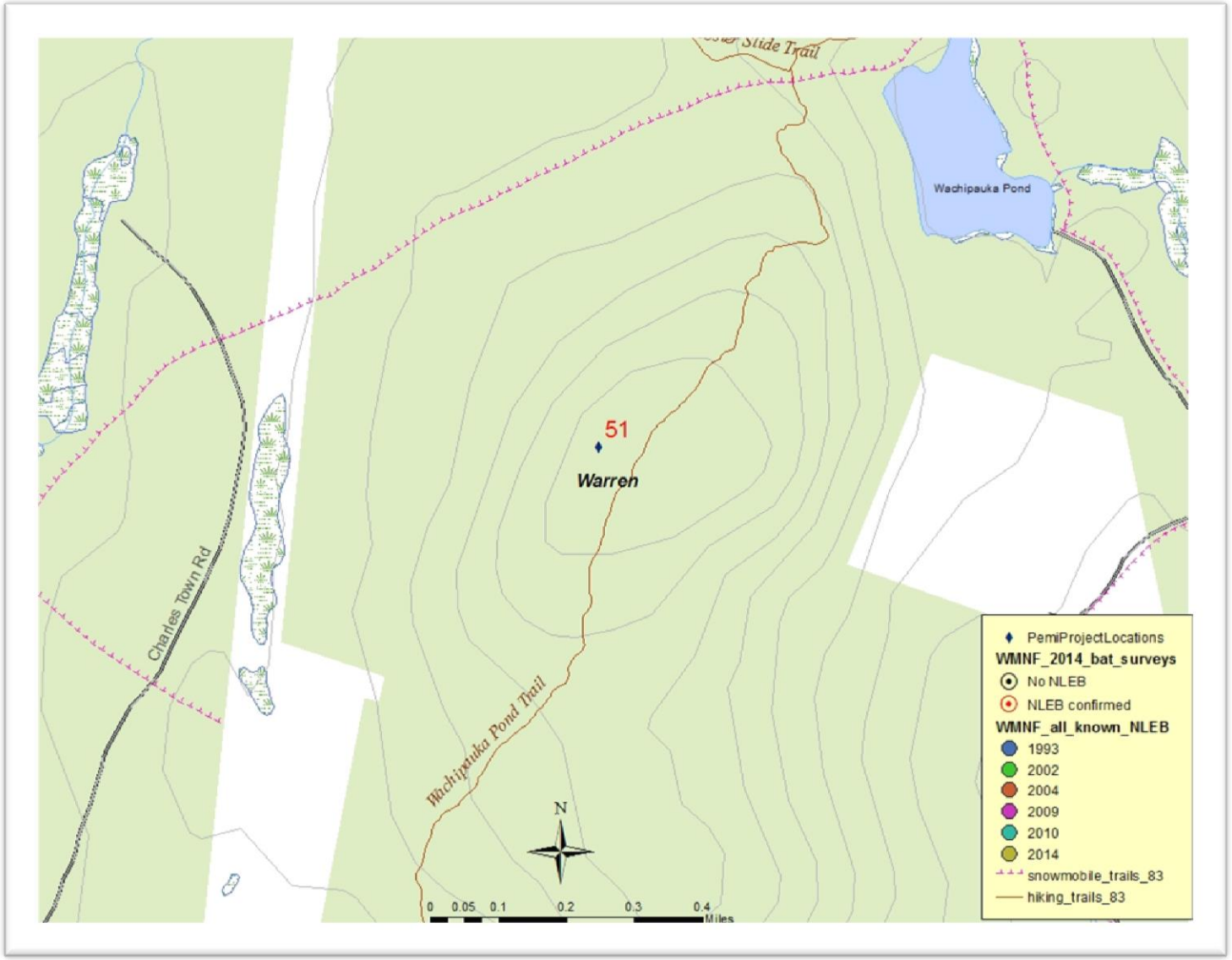
Miles

Map WMNF 14


Wachipauka Pond
51
Warren
Charles Town Rd
Wachipauka Pond Trail
N
0 0.05 0.1 0.2 0.3 0.4
Miles
PemiProjectLocations
WMNF_2014_bat_surveys
No NLEB
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WMNF_all_known_NLEB
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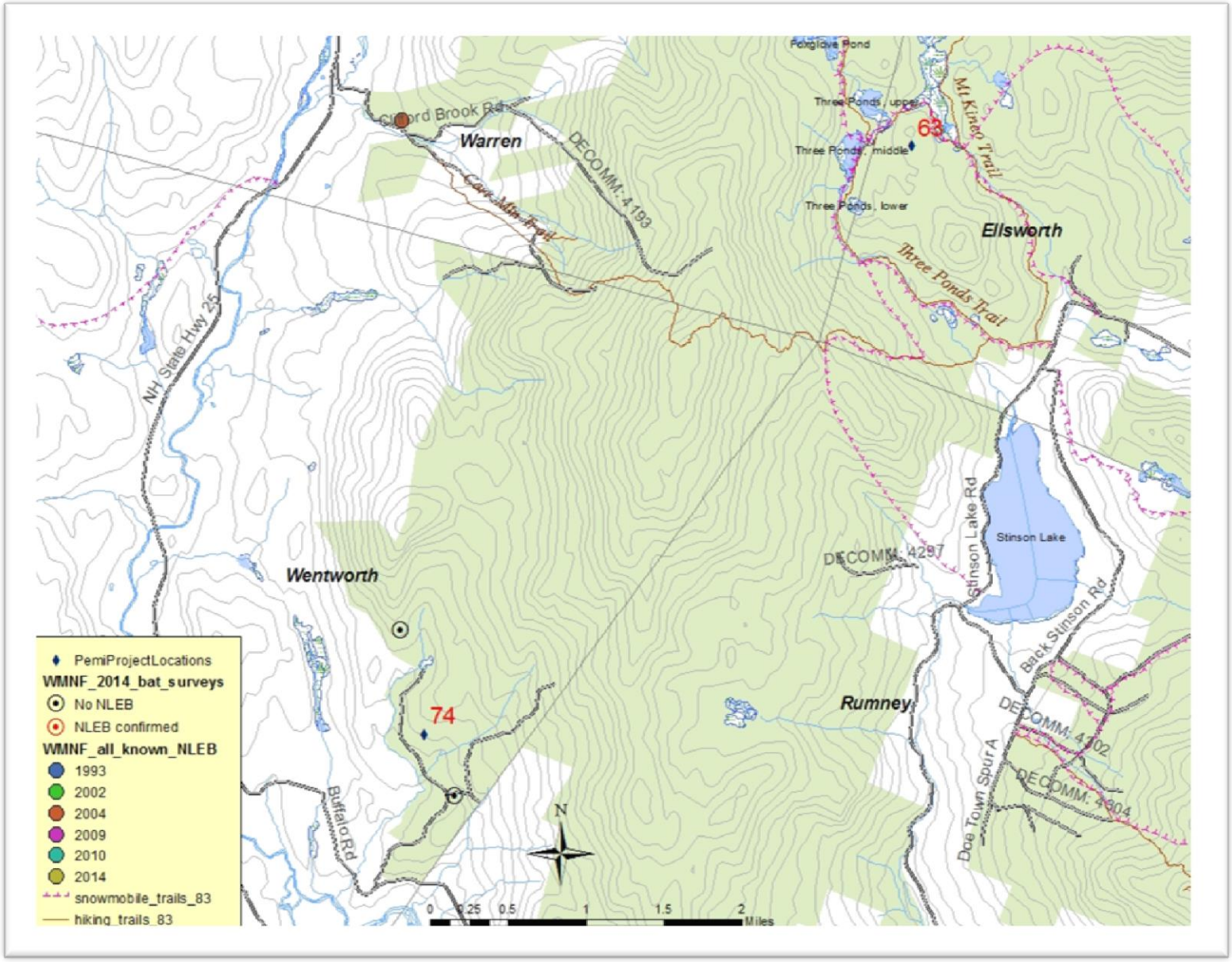
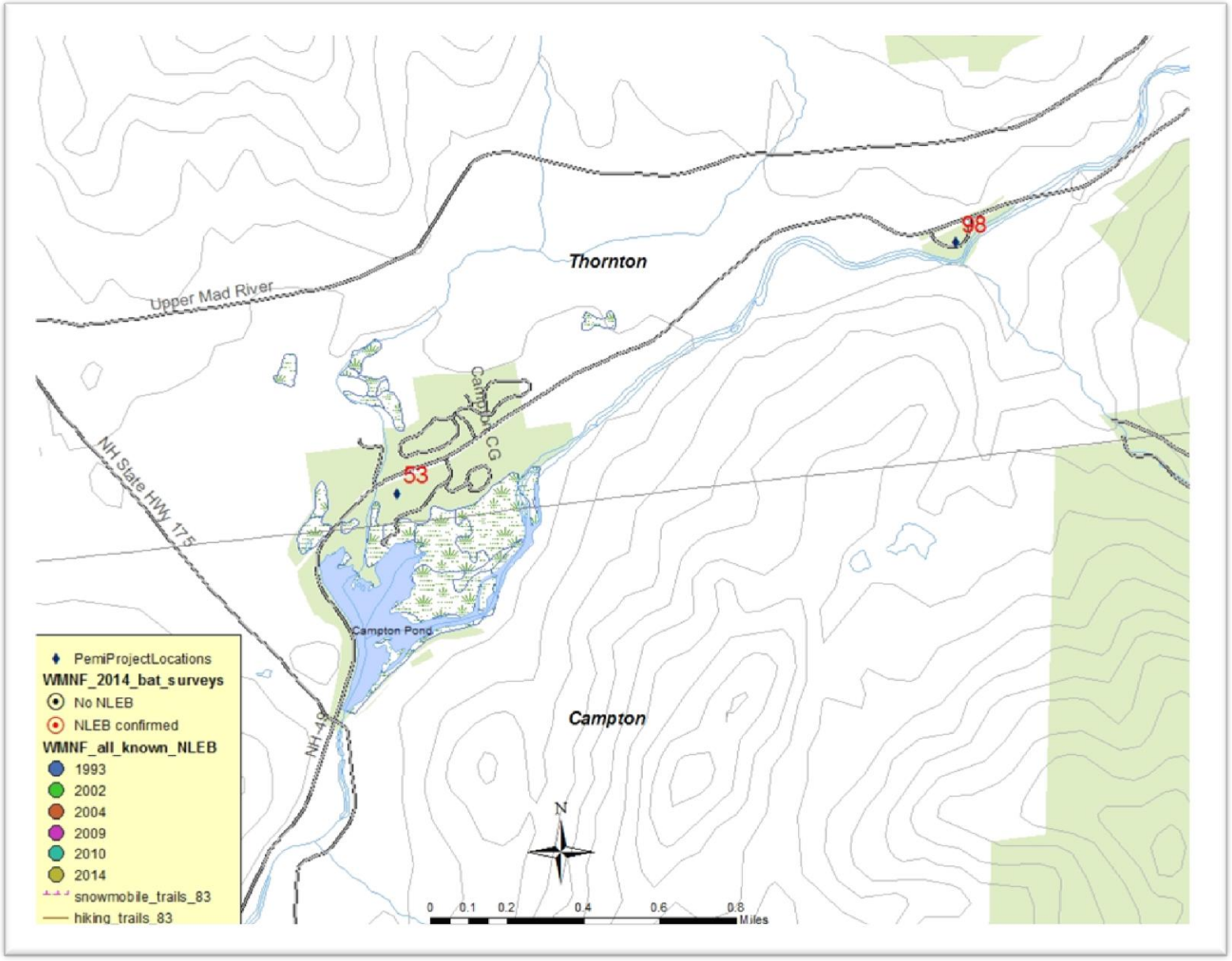
2002
2004
2009
2010
2014
snowmobile_trails_83
hiking_trails_83

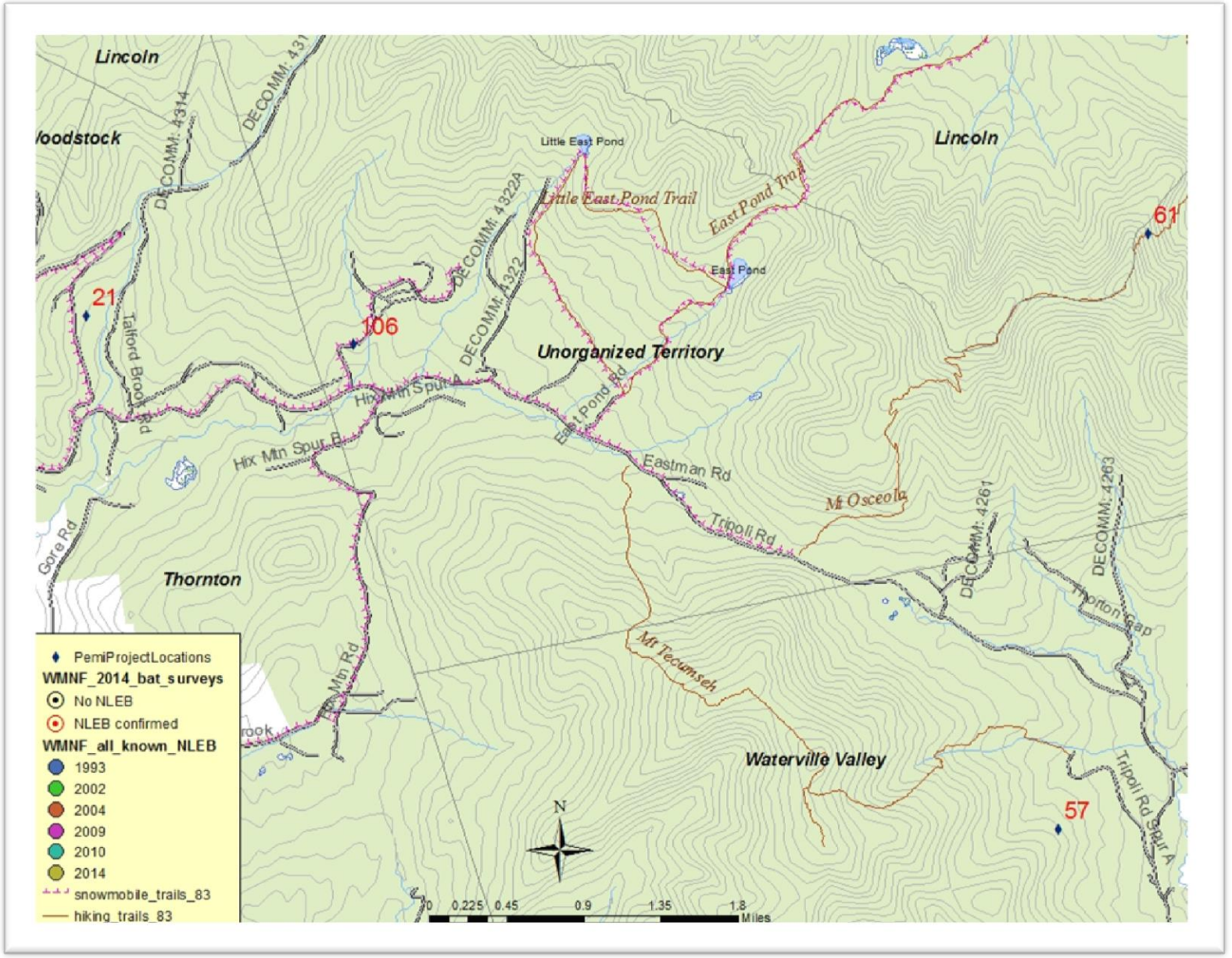
Map WMNF 15


Polyglove Pond
Three Ponds, upper
Three Ponds, middle
Three Ponds, lower
63
Mt Kineo Trail
Three Ponds Trail
Ellsworth
Clifford Brook Rd
Warren
DECOMM: 4193
Cave Mtn Trail
NH State Hwy 25
Wentworth
DECOMM: 4297
Stinson Lake Rd
Stinson Lake
Back Stinson Rd
Rumney
DECOMM: 4202
DECOMM: 4304
Doe Town Spur A
74
Buffalo Rd
N
0 0.25 0.5 1 1.5 2 Miles
PemiProjectLocations
WMNF_2014_bat_surveys
No NLEB
NLEB confirmed
WMNF_all_known_NLEB
1993
2002
2004
2009
2010
2014
snowmobile_trails_83
hiking_trails_83

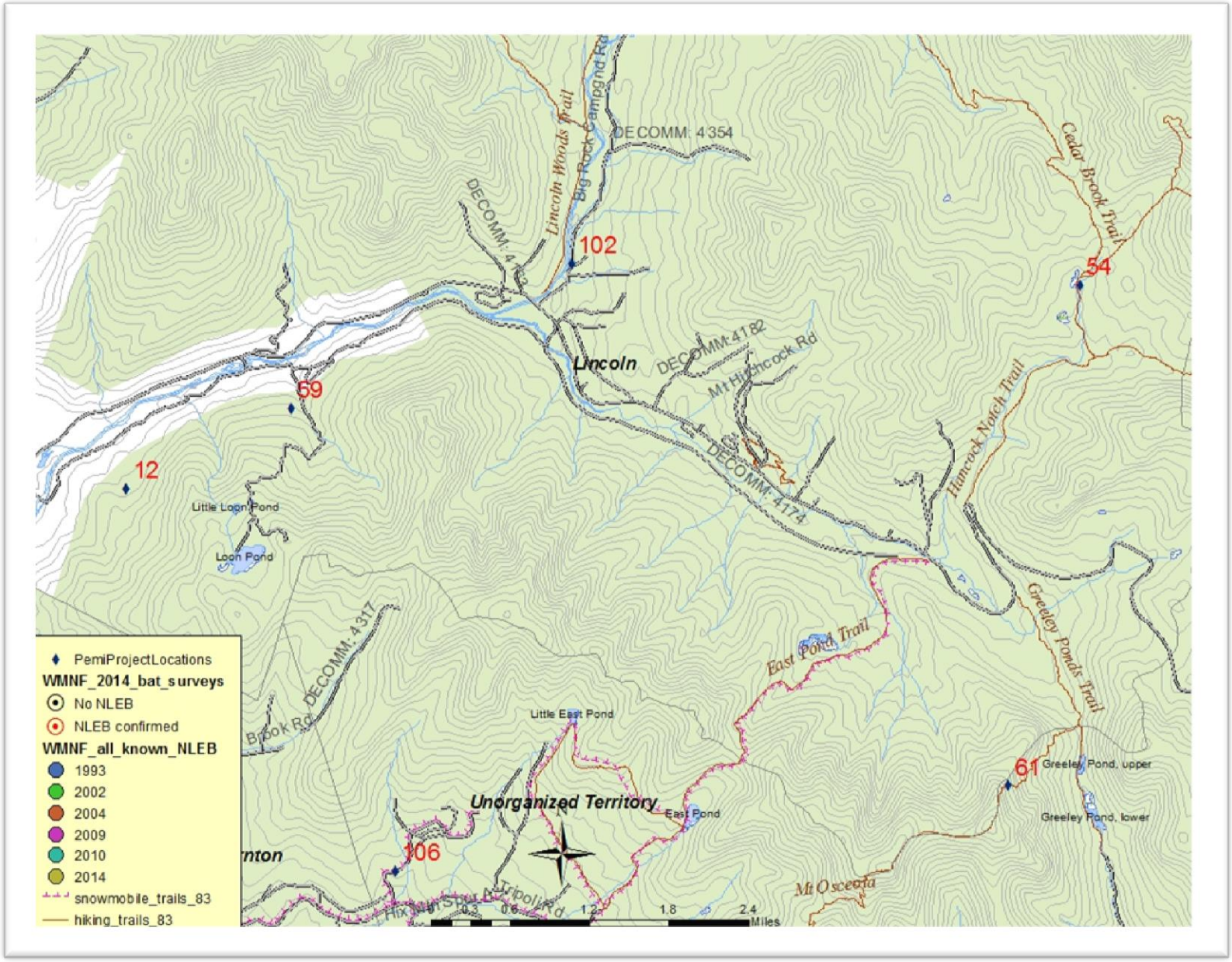
Map WMNF 16


Thornton
Upper Mad River
98
53
Campton CG
NH State HWY 175
Campton Pond
Campton
NH 49
PemiProjectLocations
WMNF_2014_bat_surveys
No NLEB
NLEB confirmed
WMNF_all_known_NLEB
1993
2002
2004
2009
2010
2014
snowmobile_trails_83
hiking_trails_83
N
0 0.1 0.2 0.4 0.6 0.8
Miles

Map WMNF 17


Lincoln
Woodstock
Lincoln
Little East Pond
Little East Pond Trail
East Pond Trail
East Pond
61
21
106
Unorganized Territory
Talford Brook Rd
Hix Mtn Spur A
Hix Mtn Spur B
East Pond Rd
Eastman Rd
Tripoli Rd
Mt Osceola
Gore Rd
Thornton
Mt Tecumseh
Waterville Valley
57
Tripoli Rd Spur A
Thorton Gap
DECOMM: 4314
DECOMM: 4322A
DECOMM: 4322
DECOMM: 4261
DECOMM: 4263
PemiProjectLocations
WMNF_2014_bat_surveys
No NLEB
NLEB confirmed
WMNF_all_known_NLEB
1993
2002
2004
2009
2010
2014
snowmobile_trails_83
hiking_trails_83
N
0 0.225 0.45 0.9 1.35 1.8
Miles

Map WMNF 18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No NLEB
NLEB confirmed
WMNF_all_known_NLEB
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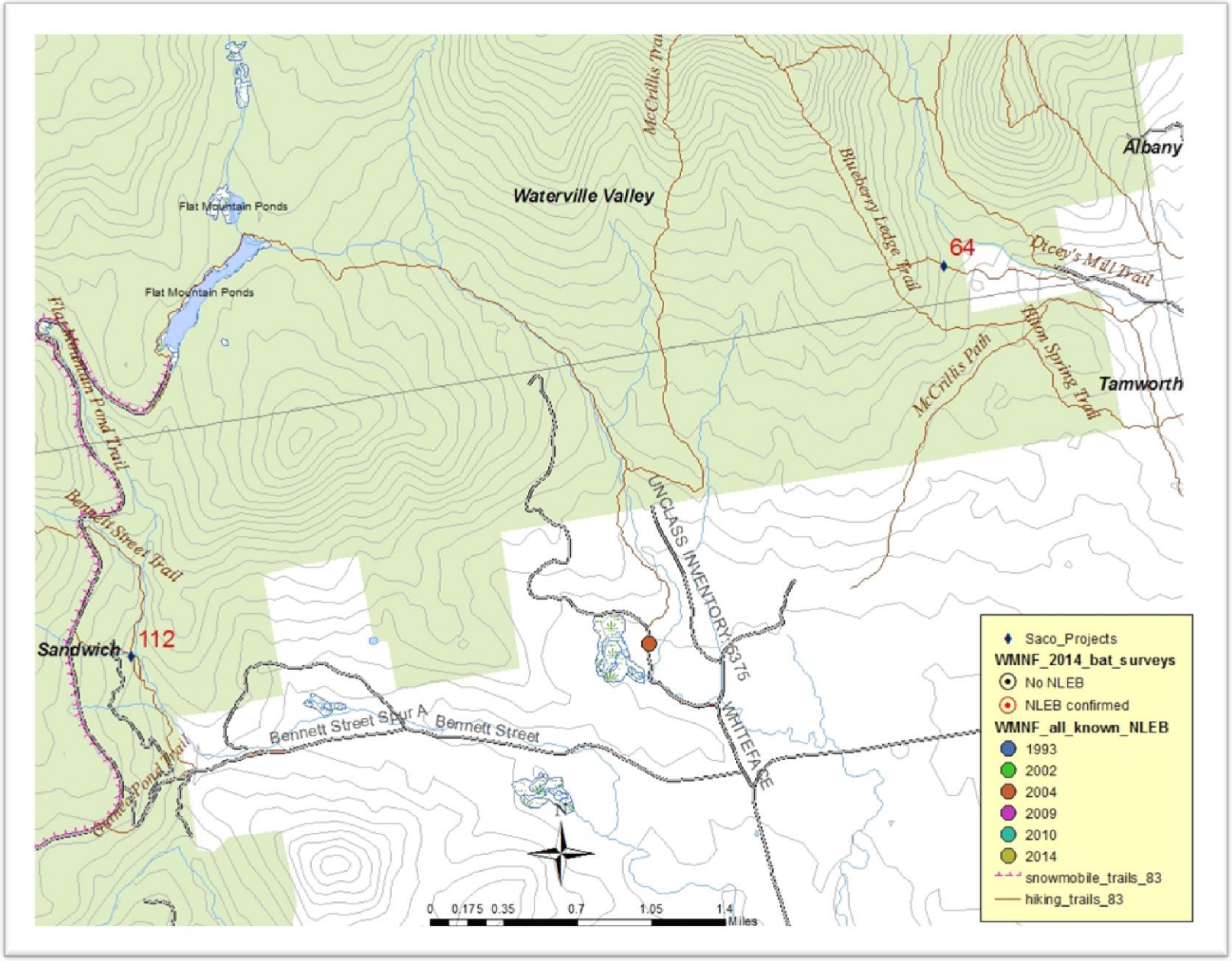
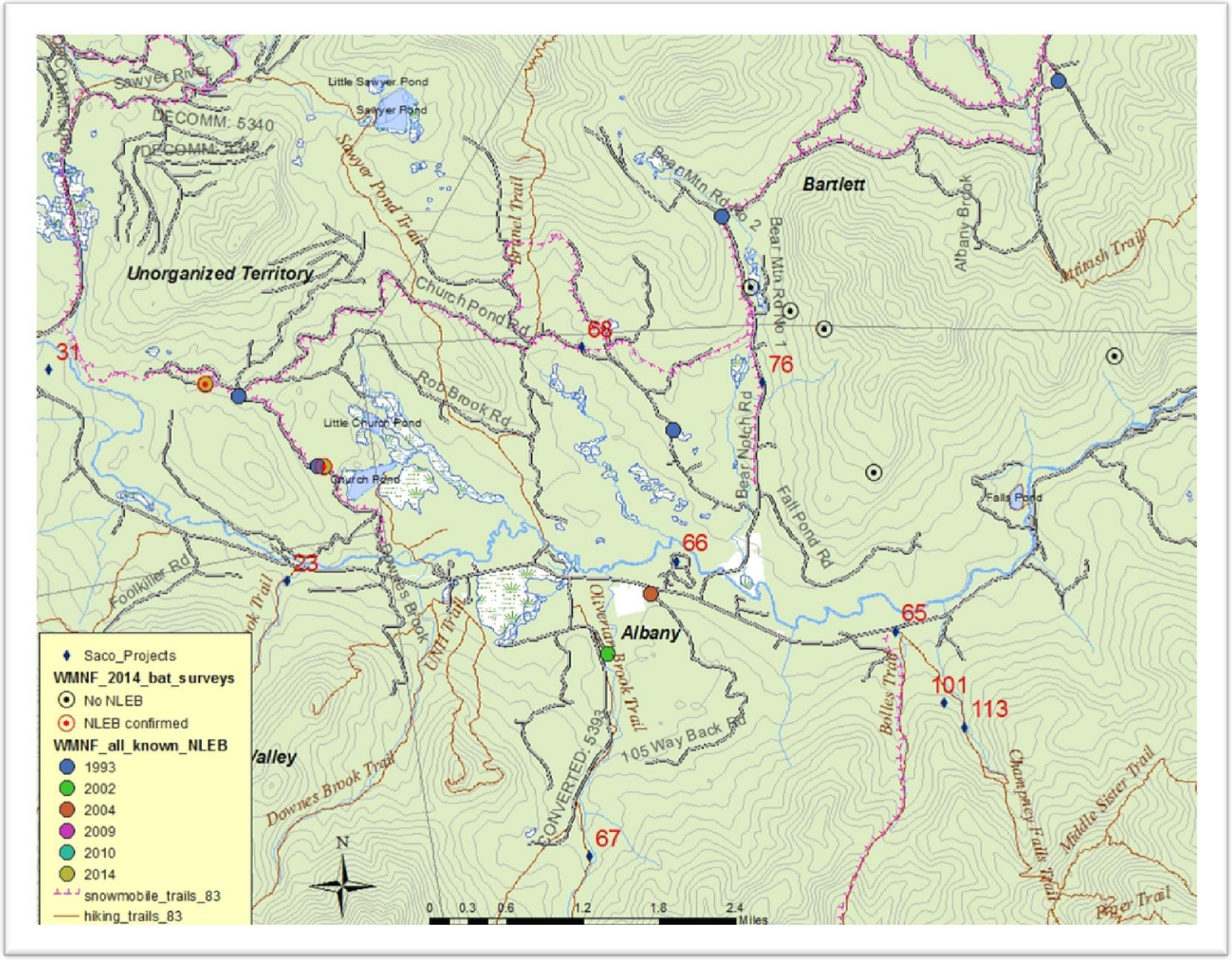
2002
2004
2009
2010
2014
snowmobile_trails_83
hiking_trails_83
Lincoln Woods Trail
Big Rock Campgnd Rd
DECOMM: 4354
DECOMM: 4182
Mt Hitchcock Rd
DECOMM: 4174
Hancock Notch Trail
Cedar Brook Trail
Greeley Ponds Trail
East Pond Trail
DECOMM: 4317
Brook Rd
Lincoln
Little Loon Pond
Loon Pond
Little East Pond
East Pond
Greeley Pond, upper
Greeley Pond, lower
Unorganized Territory
Mt Osceola
Tripoli Rd
102
54
59
12
61
106
0.3
0.6
1.2
1.8
2.4
Miles

Map WMNF 19


Waterville Valley
Albany
Tamworth
Flat Mountain Ponds
Flat Mountain Ponds
64
112
Sandwich
Bennett Street Spur A
Bennett Street
UNCLASS INVENTORY 6375
WHITEFACE
Saco_Projects
WMNF_2014_bat_surveys
No NLEB
NLEB confirmed
WMNF_all_known_NLEB
1993
2002
2004
2009
2010
2014
snowmobile_trails_83
hiking_trails_83
0 0.175 0.35 0.7 1.05 1.4
Miles

Map WMNF 20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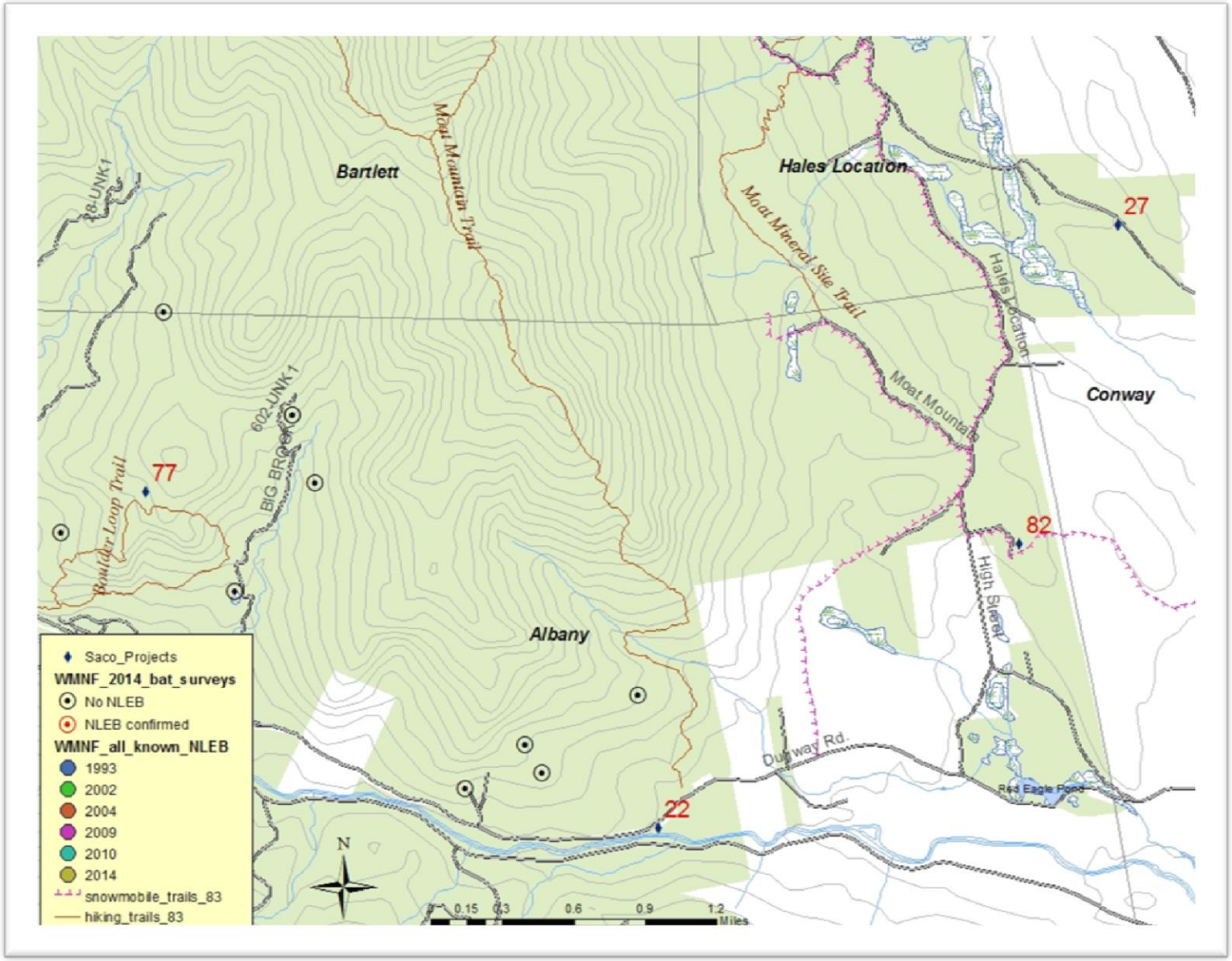
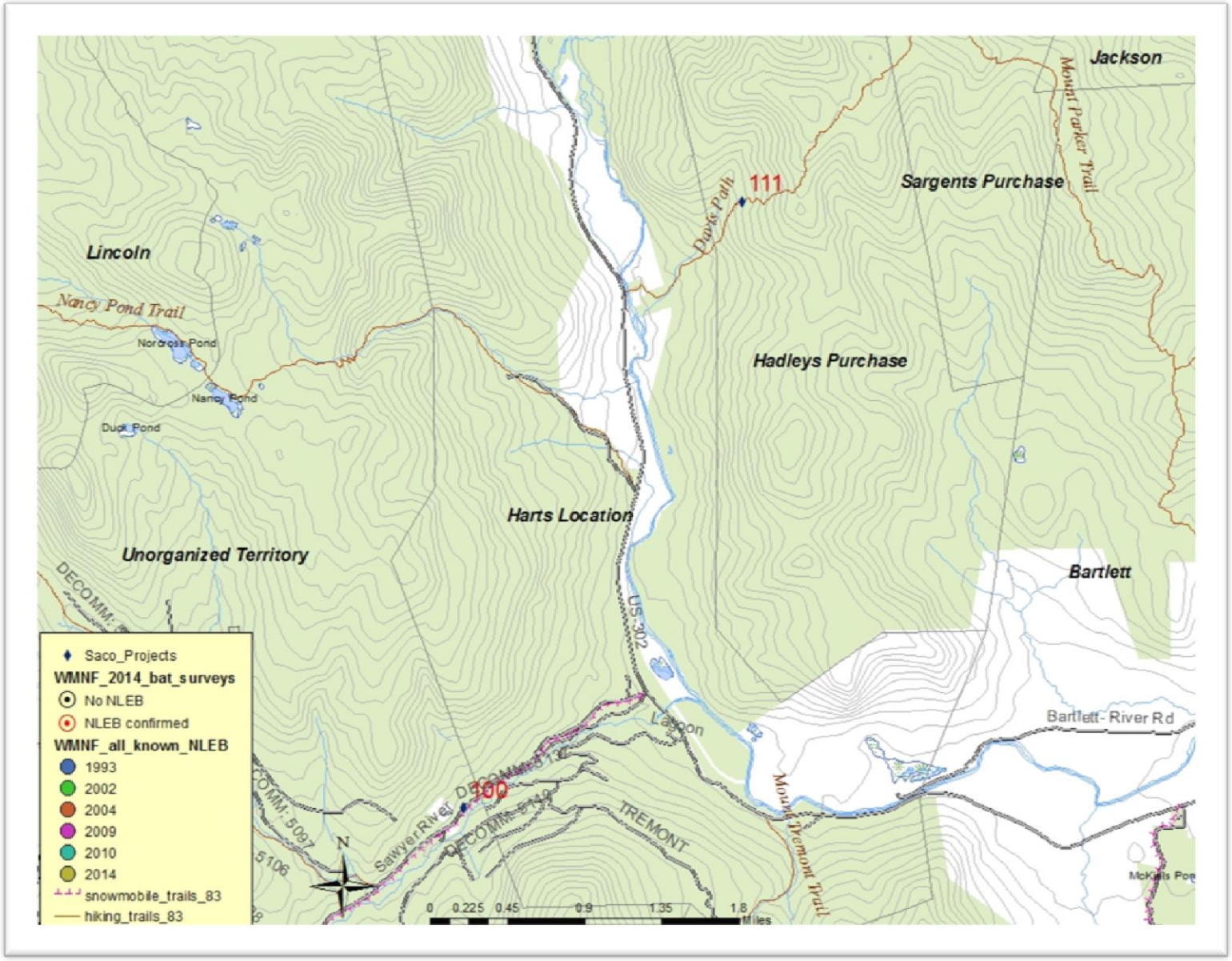
Little Sawyer Pond
Sawyer Pond
DECOMM: 5340
Sawyer Pond Trail
Brunel Trail
Bear Mtn Rd No 2
Bartlett
Albany Brook
Unorganized Territory
Church Pond Rd
Bear Mtn Rd No 1
Rob Brook Rd
Little Church Pond
Church Pond
Bear Notch Rd
Fall Pond Rd
Falls Pond
Foolkiller Rd
Albany
Oliverian Brook Trail
105 Way Back Rd
Bolles Trail
Champney Falls Trail
Middle Sister Trail
Pigeon Trail
Downes Brook Trail
UNH Trail
CONVERTED: 5393
31
23
68
76
66
65
101
113
67
Saco_Projects
WMNF_2014_bat_surveys
No NLEB
NLEB confirmed
WMNF_all_known_NLEB
1993
2002
2004
2009
2010
2014
snowmobile_trails_83
hiking_trails_83
N
0 0.3 0.6 1.2 1.8 2.4
Miles

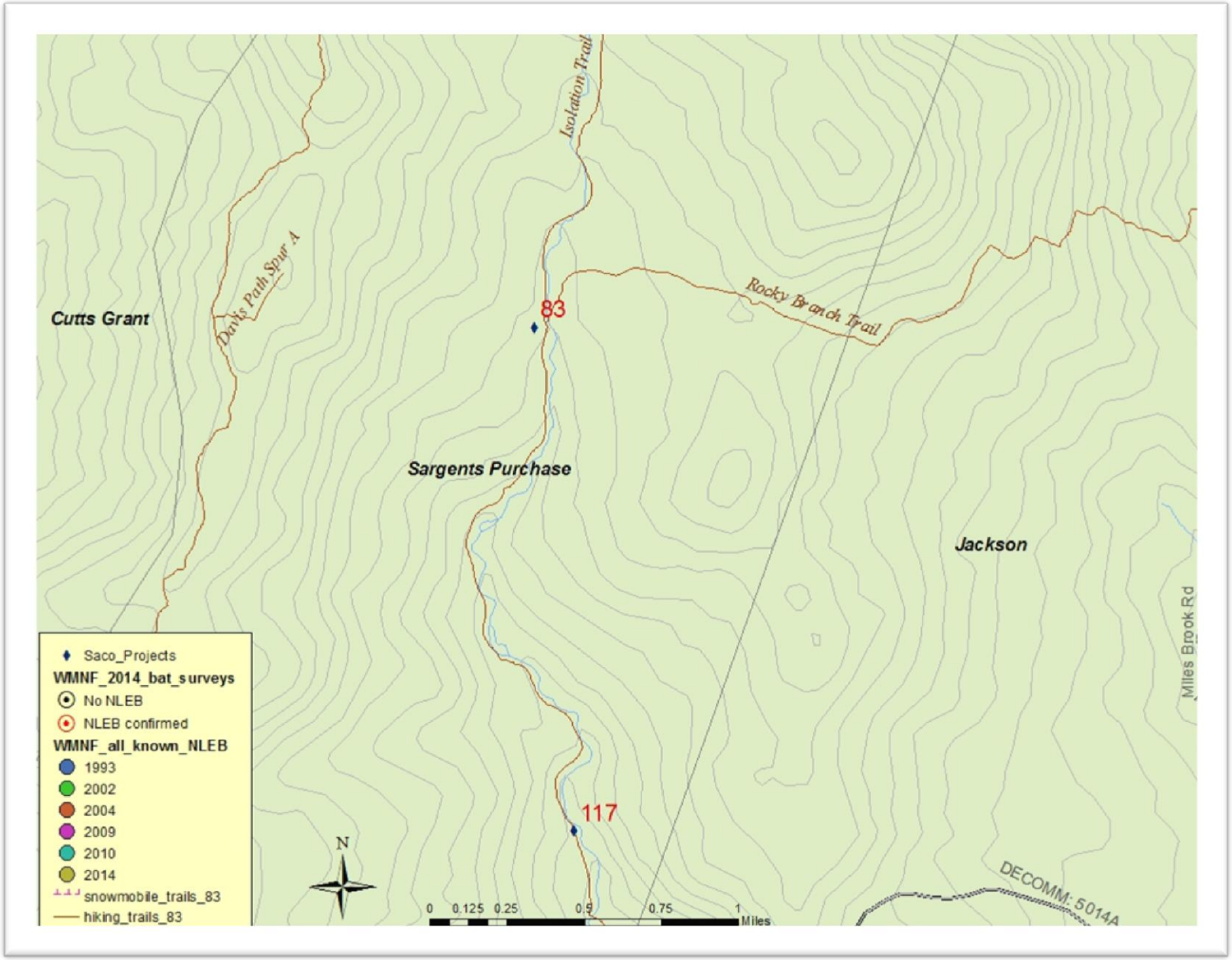
Map WMNF 21


Bartlett
Hales Location
Conway
Albany
Moat Mountain Trail
Moat Mineral Site Trail
Hales Location
Moat Mountain
High Street
Dugway Rd.
Red Eagle Pond
Boulder Loop Trail
BIG BROOK
602-UNK1
28-UNK1
77
27
82
22
N
0 0.15 0.3 0.6 0.9 1.2
Miles
Saco_Projects
WMNF_2014_bat_surveys
No NLEB
NLEB confirmed
WMNF_all_known_NLEB
1993
2002
2004
2009
2010
2014
snowmobile_trails_83
hiking_trails_83

Map WMNF 22


Jackson
Mount Parker Trail
Sargents Purchase
111
Davis Path
Lincoln
Nancy Pond Trail
Nordrose Pond
Nancy Pond
Duck Pond
Hadleys Purchase
Harts Location
Unorganized Territory
Bartlett
US-302
Saco_Projects
WMNF_2014_bat_surveys
No NLEB
NLEB confirmed
WMNF_all_known_NLEB
1993
2002
2004
2009
2010
2014
snowmobile_trails_83
hiking_trails_83
Lagoon
Bartlett- River Rd
100
TREMONT
Mount Tremont Trail
Sawyer River
N
0 0.225 0.45 0.9 1.35 1.8
Miles

Map WMNF 23


Isolation Trail
Davis Path Spur A
Cutts Grant
83
Rocky Branch Trail
Sargents Purchase
Jackson
Miles Brook Rd
117
DECOMM: 5014A
Saco_Projects
WMNF_2014_bat_surveys
No NLEB
NLEB confirmed
WMNF_all_known_NLEB
1993
2002
2004
2009
2010
2014
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hiking_trails_83
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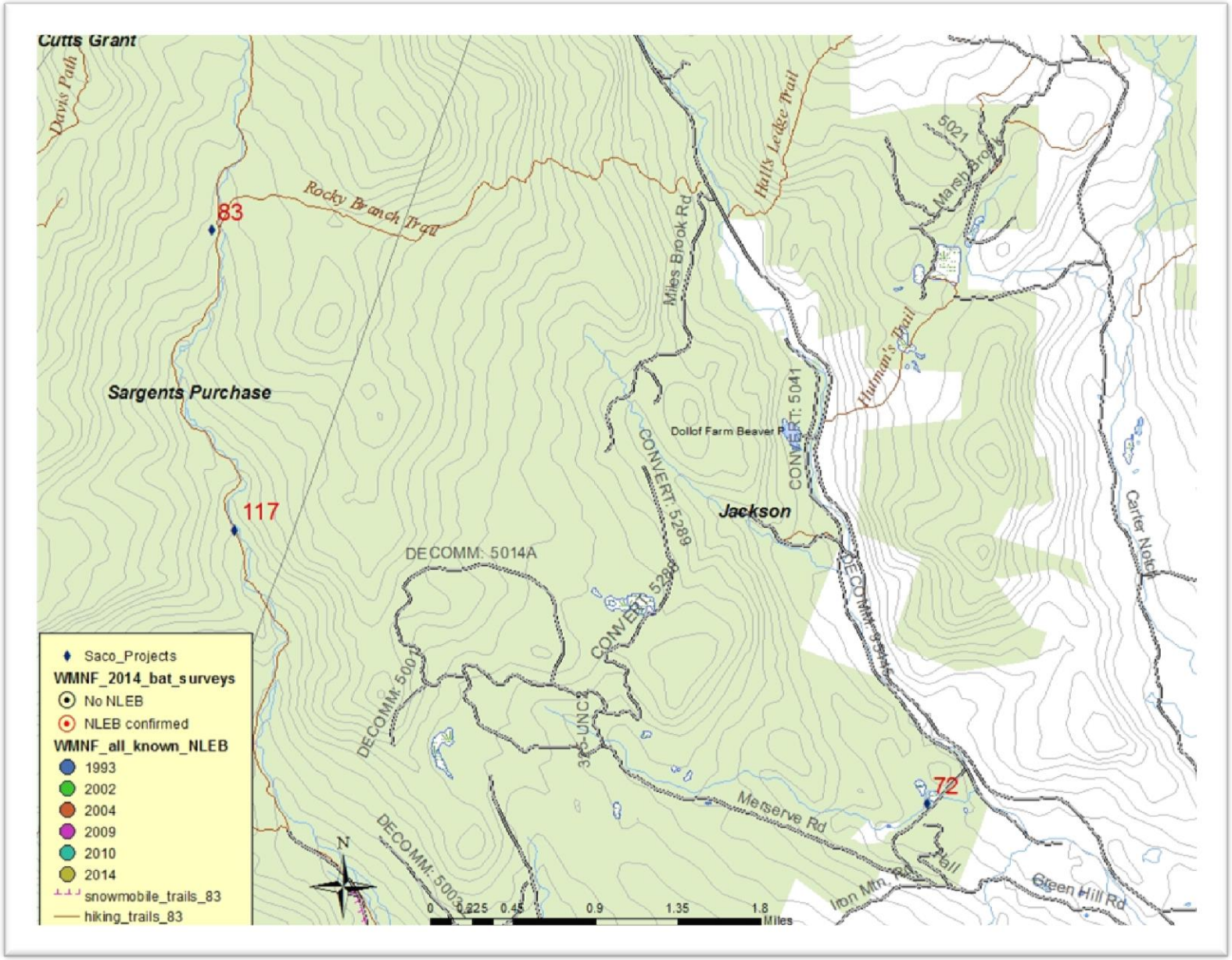
Miles

Map WMNF 24


Cutts Grant
Davis Path
Rocky Branch Trail
83
Sargents Purchase
117
Miles Brook Rd
Halls Ledge Trail
5021
Marsh Brook
Hutman's Trail
CONVERT: 5041
Dollof Farm Beaver P
Jackson
CONVERT: 5289
DECOMM: 5014A
Carter Notch
DECOMM: 5001
DECOMM: 5003
35 UNC
Metserve Rd
72
Iron Mtn. Rd
Green Hill Rd
Saco_Projects
WMNF_2014_bat_surveys
No NLEB
NLEB confirmed
WMNF_all_known_NLEB
1993
2002
2004
2009
2010
2014
snowmobile_trails_83
hiking_trails_83
N
0 0.225 0.45 0.9 1.35 1.8
Miles

Map WMNF 25

APPENDIX 2. Timber Sale Project Maps and Harvest Prescriptions

Timber harvests described below include timber sales that already have successfully been awarded to a contractor and are underway, as well as timber sales implementing projects for which a final NEPA decision is completed and signed. These projects typically are in the final stages of layout and or timber marking, or are being prepared to offer for bids. Of the 17 timber sales and one Forest-wide management project (Timber Stand Improvement or "TSI") on the GMNF, the Forest Service determined that two timber sales will have **"No Effect"** on NLEB and seven timber sales **"May Affect, *Not* Likely to Adversely Affect"** NLEB. The Forest Service further determined that eight timber sales and Forest-wide TSI **"May Affect, Likely to Adversely Affect"** NLEB. Only those sales determined to have **No Effect** or ***Not*** **Likely to Adversely Affect** NLEB are addressed in this BA; Sales that **May Adversely Affect** NLEB are addressed in a separate document provided to the US Fish and Wildlife Service for formal conferencing.

GMNF – Rochester Ranger District

Timber sale areas on the Rochester Ranger District are shown in Figures GMNF A-1 through A-2.

Upper White River Integrated Resource Project

Homestead Sale Harvest Treatments	Acres
Reclaim Existing Opening	25.5
Clearcut Convert To Opening	8.3
Clearcut Regeneration	47.2
Thinning	23.3
Individual Tree/Group Selection	21.5
Timber Stand Improvement	154.1
Total	279.9

No mist net or acoustic surveys for bats within the Homestead Sale Area. All 254 acres will be harvested predominantly under frozen-ground conditions during winter. The Homestead Sale contract should be awarded and operations commence during winter FY15. The sale should be completed by FY16.

Albert Sale Harvest Treatments	Acres
Clearcut Convert to Aspen	22.7
Shelterwood	29.6
Individual Tree/Group Selection	140.9
Total	193.3

No mist net or acoustic surveys for bats within the Albert Sale Area. All 193 acres will be harvested predominantly under frozen-ground conditions during winter. The Albert Sale contract should be awarded and operations commence during winter FY15. The sale should be completed by FY16.

Texas Sale Harvest Treatments	Acres
Clearcut Convert To Opening	42.7
Clearcut Convert to Aspen	36.7
Clearcut Regeneration	44.2
Shelterwood	29.5
Thinning	51.6
Individual Tree/Group Selection	256.6
Total	461.3

No mist net or acoustic surveys for bats within the Texas Sale Area. All 461 acres will be harvested predominantly under frozen-ground conditions during winter. The Texas Sale began operations in FY14 and should be completed by FY16.

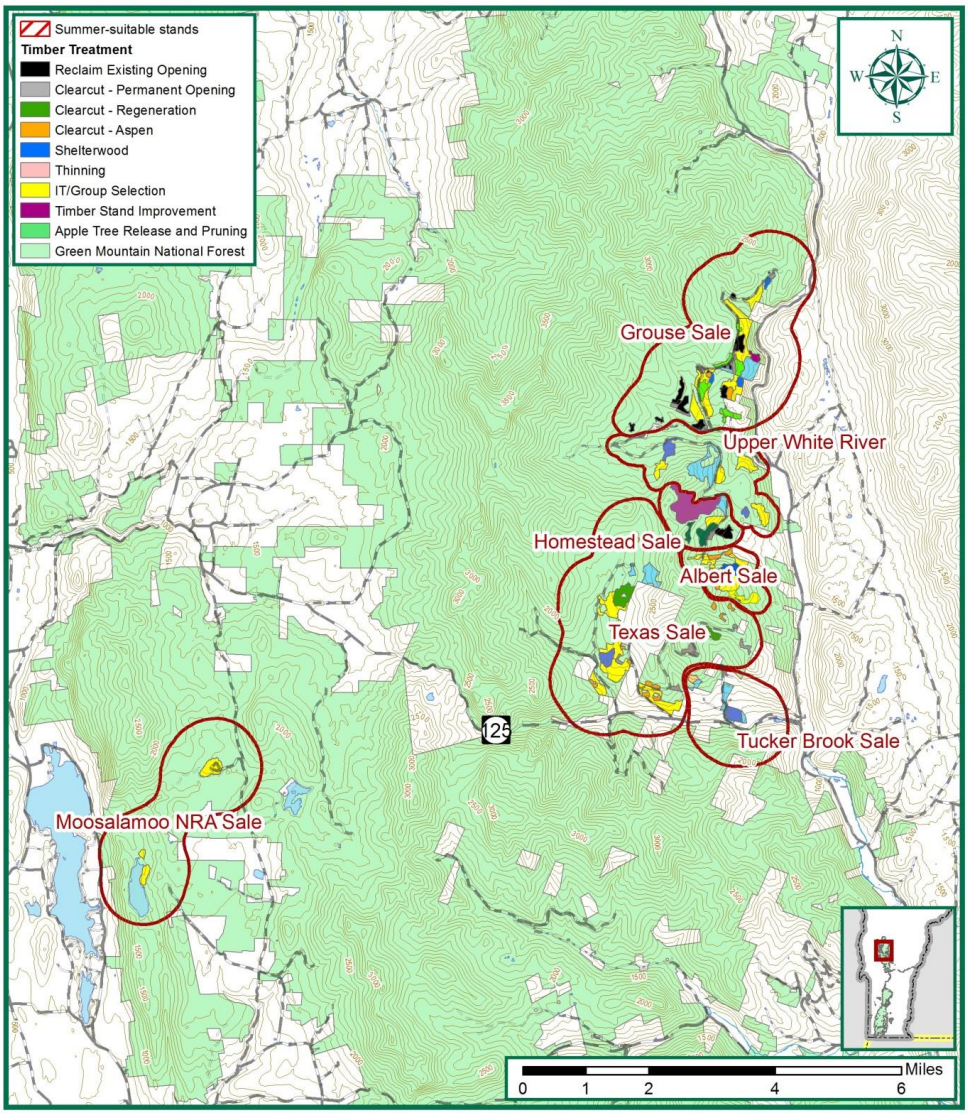


Figure GMNF A-1. Timber sales located on the Rochester and Middlebury Ranger Districts, Green Mountain National Forest, Vermont. The Forest Service determined that the Homestead, Albert, Texas, and Moosalamoo Sales **"May Affect, *Not* Likely to Adversely Affect"** NLEB. The Grouse, Upper White River, and Tucker Brook sales **"May Affect, Likely to Adversely Affect"** NLEB, and are addressed in a separate BA.

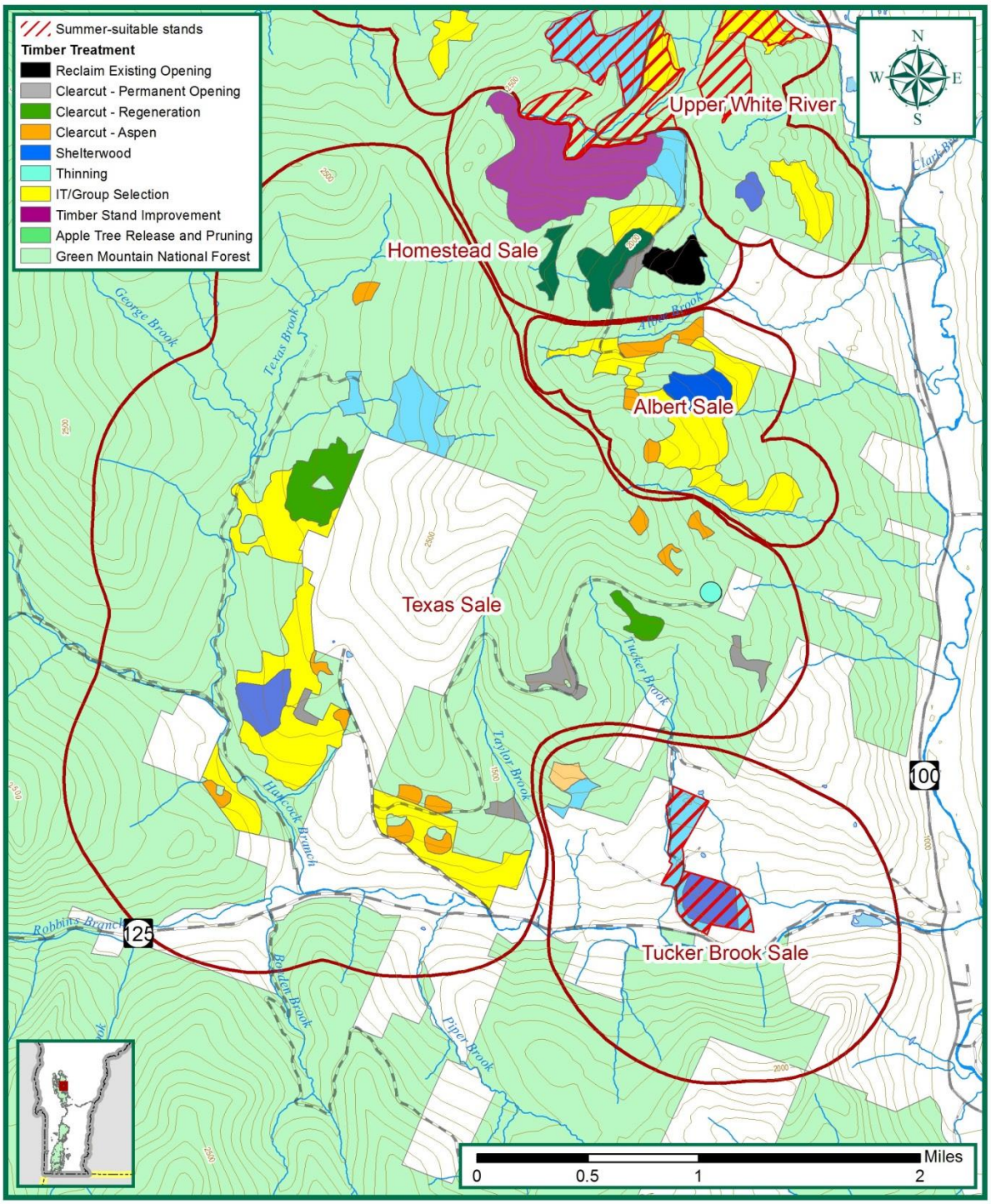


Figure GMNF A-2. The location of the Homestead, Albert, and Texas Sales that **"May Affect, ***Not*** Likely to Adversely Affect No Effect"** NLEB. The Forest Service determined that the Tucker Brook Sale **"May Affect, Likely to Adversely Affect"** NLEB, and it will be addressed in a separate BA..

Middlebury Ranger District – The Moosalamoo Stewardship Sale, the only current sale areas on the Middlebury Ranger District, is shown in Figure GMNF A-3.

Moosalamoo Stewardship Sale Harvest Treatments	Acres
Individual Tree/Group Selection	72.6
Total	72.6

Five NLEB were captured 2003 in the Moosalamoo Sale Area during a mist net survey (Figure GMNF A-3). No acoustic surveys for bats within the Moosalamoo Sale Area. All 73 acres will be harvested predominantly under frozen-ground conditions during winter. The Moosalamoo Sale began operations in FY14 and should be completed during FY15.

Manchester Ranger District – Sale areas on the Manchester Ranger District are shown in Figures GMNF A-4 to A-7.

Dorset Peru Integrated Resource Project

Pumphouse East Sale Harvest Treatments	Acres
Restore Existing Opening	3.0
Clearcut Convert To Opening	5.3
Clearcut Regeneration	24.8
Improvement Cut	37.1
Thinning	7.3
Total	77.4

No mist net surveys in the Pumphouse Sale Area, but 9 detector nights of acoustic monitoring in 2014 did not detect any NLEB in the eastern portion of the sale area (Figure GMNF A-5). Almost all the harvest in the eastern portion of the sale area (75 of 77 acres) is in summer suitable stands, including regeneration clearcut and improvement cut, with lesser acreages of thinning and clearcut conversion to permanent upland opening for wildlife. The Pumphouse Sale will be offered and a contract awarded during FY15. Operations may take place during FY15 through FY17. The Forest Service determined that the Pumphouse East Sale will have **"May Effect, *Not* Likely to Adversely Affect"** determination on NLEB.

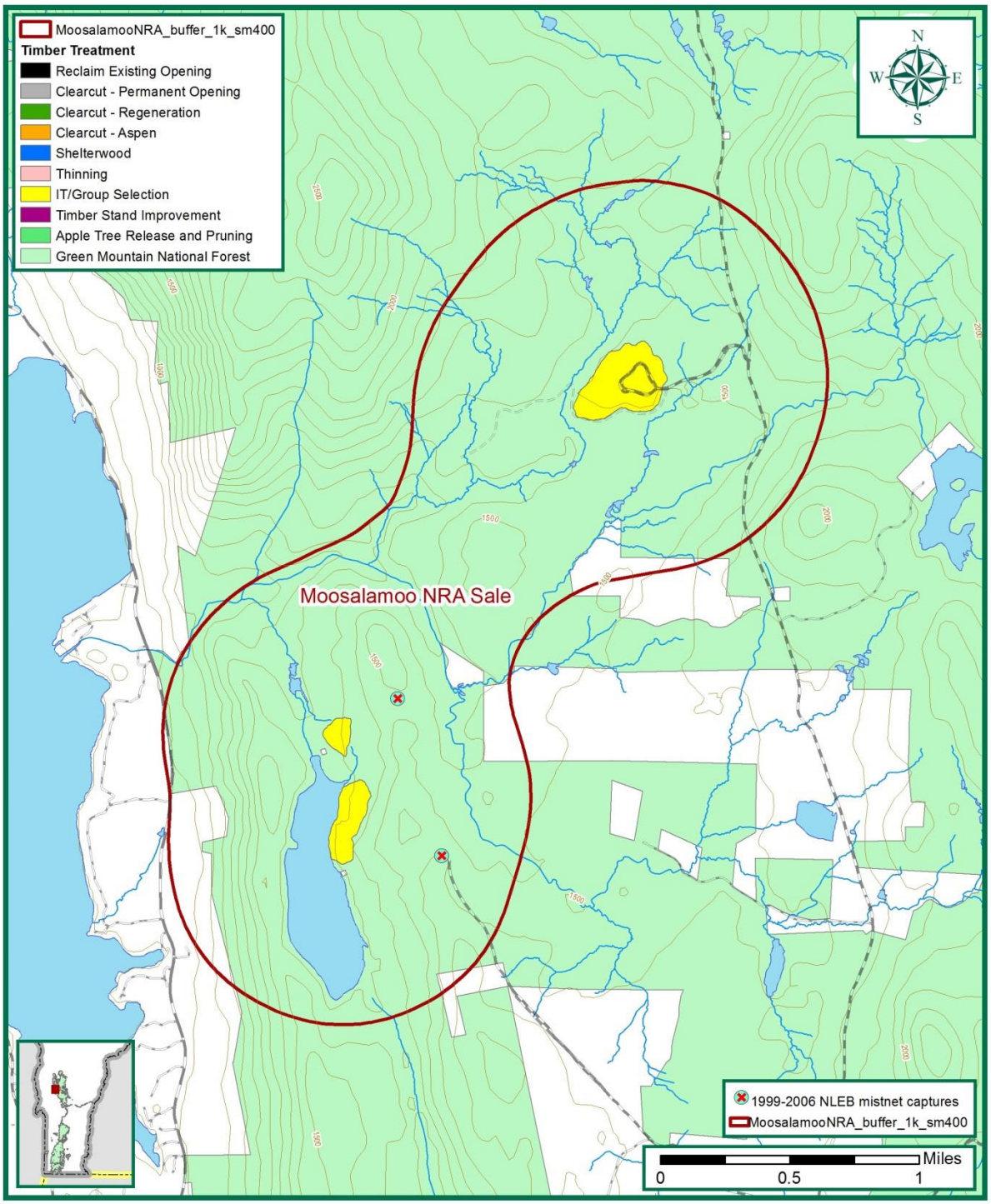


Figure GMNF A-3. The Moosalamoo Stewardship Sale Area, Middlebury Ranger District, Green Mountain National Forest. The Forest Service determined that the The Moosalamoo Stewardship Sale **"May Affect, *Not* Likely to Adversely Affect"** NLEB. Five NLEB were captured in mist nets in 2003, at the two capture sites indicated on the map.

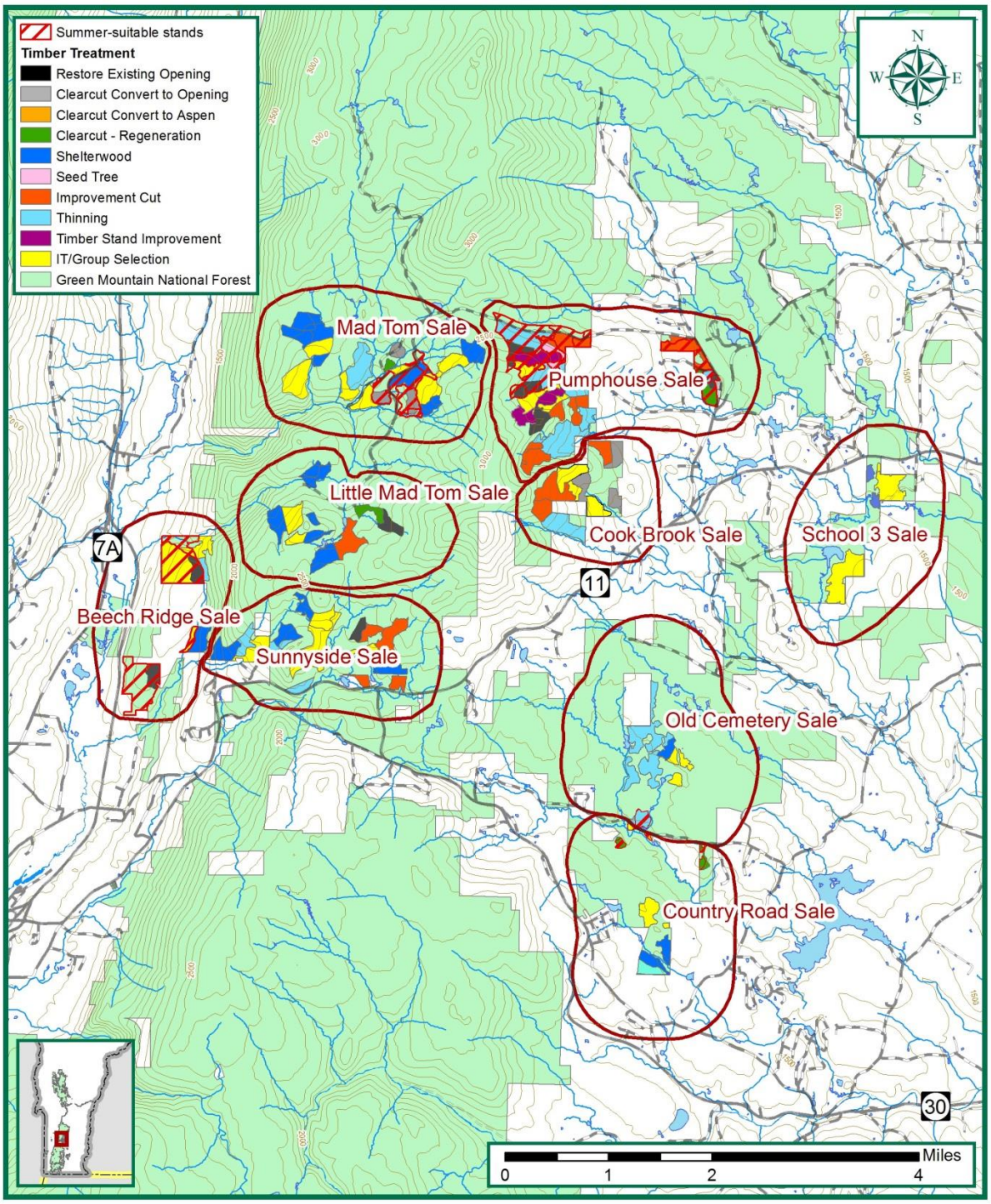


Figure GMNF A-4. Location of timber sales located on the Manchester Ranger District, Green Mountain National Forest, Vermont. The Forest Service determined that the Pumphouse East, Cook Brook, Little Mad Tom, Sunnyside, and School 3 sales **"May Affect, *Not* Likely to Adversely Affect"** NLEB. The Pumphouse West, Mad Tom, Beech Ridge, Old Cemetery, and Country Road sales **"May Affect, Likely to Adversely Affect"** NLEB and will be addressed in a separate BA.

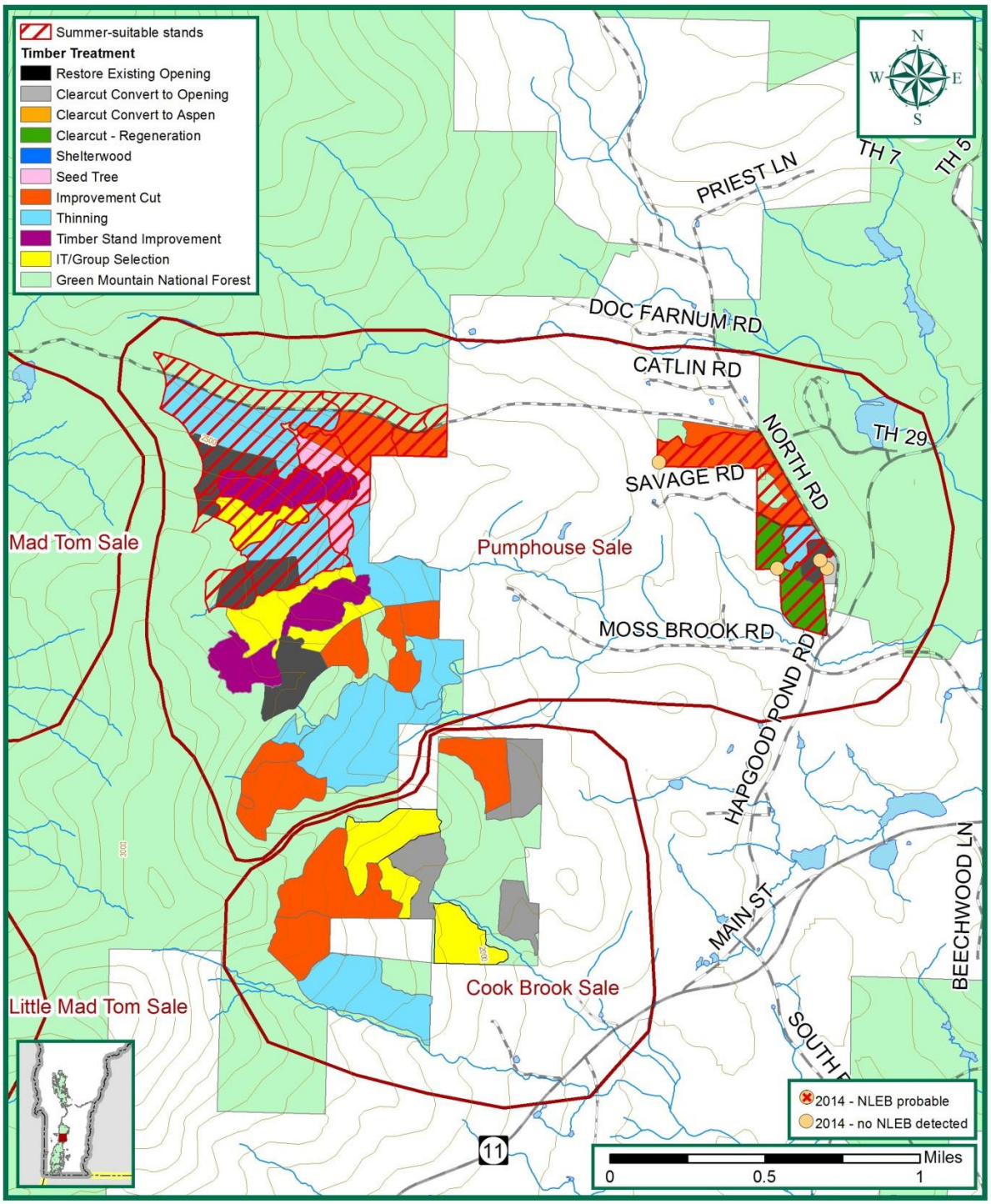


Figure GMNF A-5. Locations of the Pumphouse East sale and the Cook Brook Sale that **"May Affect, ***Not*** Likely to Adversely Affect"** NLEB**.** Acoustic surveys in 2014 failed to detect NLEB in the Pumphouse East Sale area at the four sites indicated on the map. The Pumphouse West Sale **"May Affect, Likely to Adversely Affect"** NLEB.

Manchester Ranger District, Dorset Peru Integrated Resource Project, continued.

Cook Brook Sale Harvest Treatments	Acres
Clearcut Convert To Opening	49.4
Improvement Cut	77.5
Thinning	40.2
Individual Tree/Group Selection	54.5
Total	221.6

No mist net or acoustic surveys for bats in the in the Cook Brook Sale Area (Figure GMNF A-5). All 222 acres will be harvested predominantly under frozen-ground conditions during winter. A contract for the Cook Brook Sale has been awarded, and operations should begin during FY15, with completion by FY17.

Little Mad Tom Sale Harvest Treatments	Acres
Clearcut Convert To Opening	16.7
Clearcut Regeneration	15.3
Shelterwood	96.0
Improvement Cut	35.5
Individual Tree/Group Selection	36.1
Total	199.6

No mist net or acoustic surveys for bats in the in the Little Mad Tom Sale Area (Figure GMNF A-6). All 200 acres will be harvested predominantly under frozen-ground conditions during winter. The Little Mad Tom Sale will be offered and a contract awarded during FY15, with operations during FY15 through FY17.

Sunnyside Sale Harvest Treatments	Acres
Clearcut Convert To Opening	12.0
Shelterwood	85.2
Improvement Cut	72.8
Thinning	42.4
Individual Tree/Group Selection	128.6
Total	341.0

No mist net or acoustic surveys for bats in the in the Sunnyside Sale Area (Figure GMNF A-6). All 341 acres will be harvested predominantly under frozen-ground conditions during winter. The Sunnyside Sale will be offered and a contract awarded during FY15. Operations may take place during FY15 through FY17.

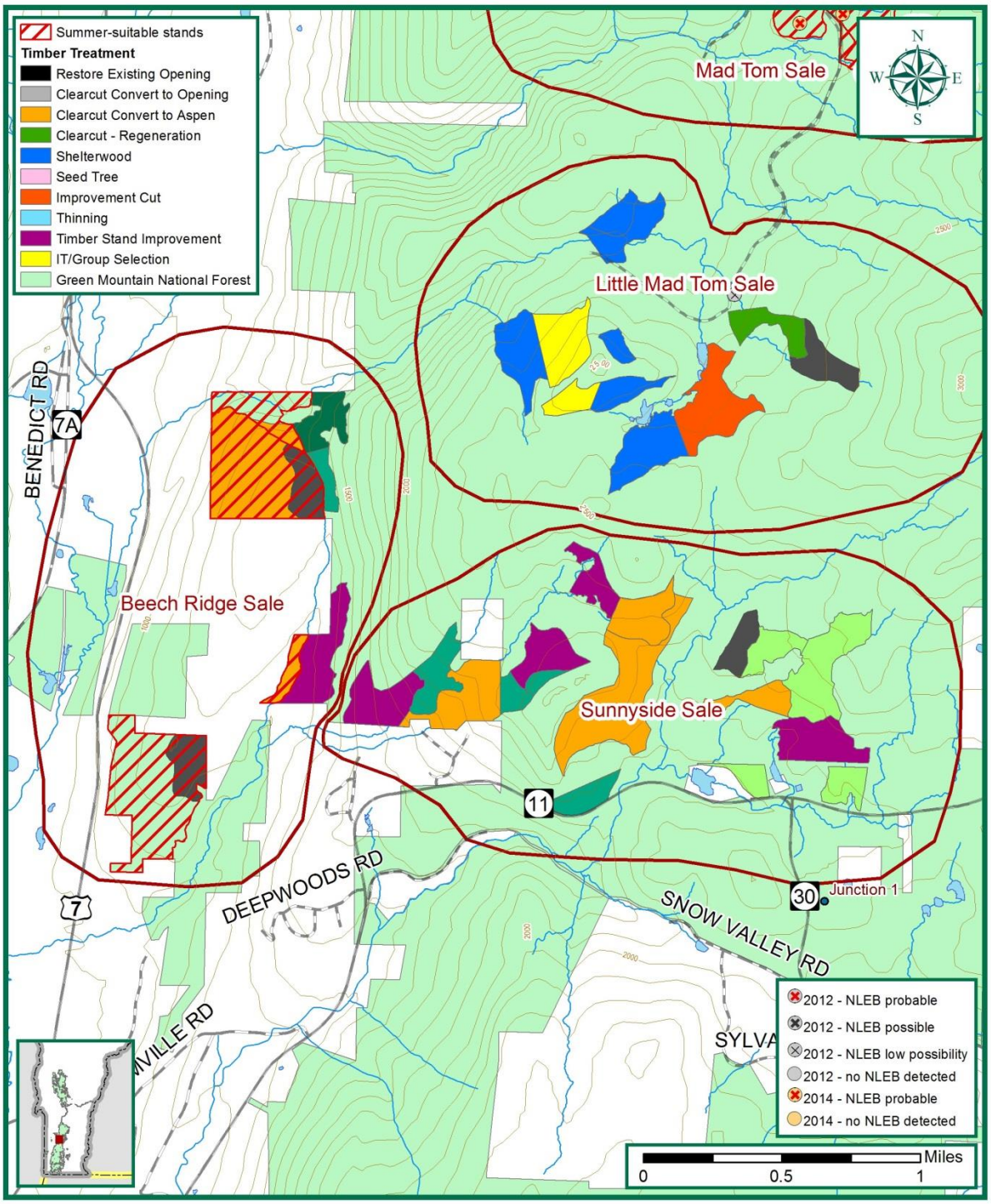


Figure GMNF A-6. Location of the Little Mad Tom and Sunnyside sales that **"May Affect, *Not* Likely to Adversely Affect"** NLEB. The Forest Service determined that the Beech Ridge Sale **"May Affect, Likely to Adversely Affect"** NLEB. NLEB were likely present at one acoustic survey site in the Little Mad Tom Sale area in 2012. No other bat surveys have taken place in these areas to date.

Manchester Ranger District, Nordic Integrated Resource Project

School 3 Sale Harvest Treatments	Acres
Sheleterwood	12.6
Single Tree/Group Selection	104.9
Total	117.5

No mist net surveys in the School 3 Sale Area, but acoustic monitoring in 2014 did not detect any NLEB in the sale area (Figure GMNF A-7). Approximately 51 acres are suitable for summer harvest, primarily in single tree/group selection harvest, with smaller acreage in shelterwood harvest. The School 3 Sale began operations in FY14 and should be completed by FY16. The Forest Service determined that the School 3 Sale will have **"No Effect"** on NLEB.

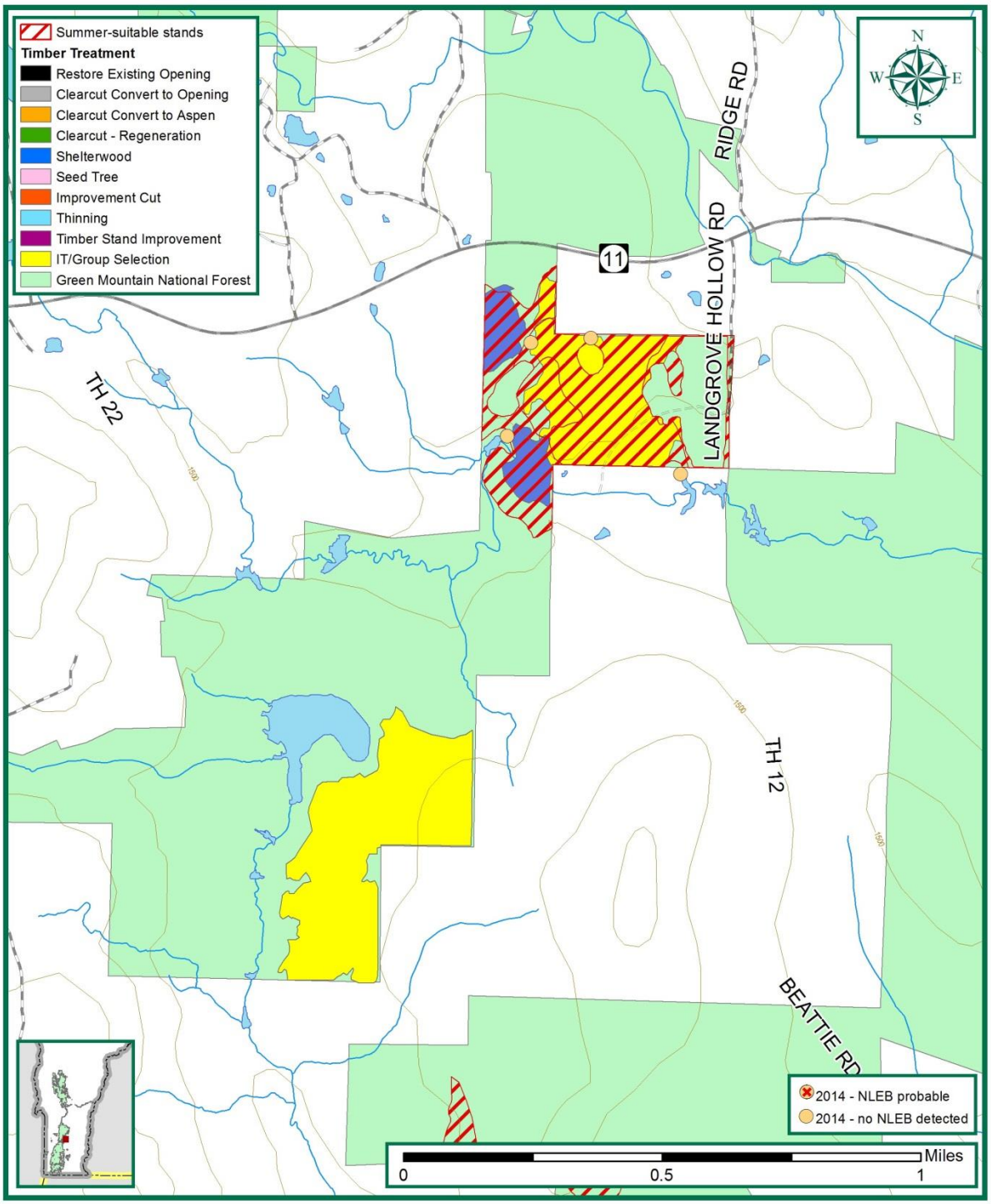


Figure GMNF A-7. Location of the School 3 Sale area. The Forest Service determined that the School 3 Sale "**May Affect, but are *Not* Likely to Adversely Affect**" NLEB. NLEB were not detected at four acoustic survey sites in the northern portion of the sale area during in 2014.

WMNF

Androscoggin Ranger District -- Bell Mountain (Holt) Timber Sale, Brown's Ledge Timber Sale

Bell Mountain (Holt) Timber Sale

Harvest Treatments	Acres
Clearcut	2
Shelterwood	29
Shelterwood/Group Selection	32
Overstory Removal	8
Group Selection	176
Total	318

Figure 22 shows the Holt Timber Sale along with the adjacent Four Ponds Timber Sale and Brown's Ledge Timber Sale further north. The determination of effects for the Four Ponds Timber Sale is ***May Affect, Likely to Adversely Affect NLEB*** and will be addressed in a separate BA. Acoustic surveys were conducted within the Holt Timber Sale area in 2014. A single NLEB call was confirmed, within a half mile of a wetland. However, the detector was left running for a total of 6 nights (5 of which met survey protocol parameters for weather), but only a single call was recorded, so it seems more likely that this was a male bat and not that there is a maternity colony within the project area. Surveys in the remainder of the project area found no other NLEB calls.

However, a series of NLEB calls was recorded at a single location within the Four Ponds Timber Sale area (see Figure 22). Because calls were recorded over several nights (7/2, 7/5, 7/7), the assumption was that this persistent activity was more likely to represent a maternity colony, although it is possible that this is simply a good foraging site (a feeding buzz was recorded in one call). This detector location is approximately ½ - ¾ mile from the closest stands being harvested in the Holt Timber Sale.

There would be no chance for direct effects from the Holt Timber Sale on the Four Ponds bat(s) since all of the units will be operated outside of the summer maternity season. The majority of the units in this timber sale are group selection, which would still leave high canopy closure and available roost trees throughout the area. A single 2-acre clearcut and some shelterwood cuts would leave larger openings, but make up less than 7 percent of the total project area. This small amount would not make the overall project area unsuitable for any NLEB in the future.

Brown's Ledge Timber Sale

Harvest Treatments	Acres
Clearcut	22
Shelterwood	19
Group Selection	79
Total	120

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The Brown's Ledge Timber Sale is shown on Figure 22. The 2014 survey season ended before the Brown's Ledge Timber Sale could be fully surveyed, although one detector point intended to cover part of this sale was located just to the south in the Four Ponds Timber Sale area. (In the field, site-specific decisions to place detectors in the most suitable NLEB habitat sometimes resulted in survey points that appear outside of harvest units). At least one NLEB was confirmed over multiple nights at a single location in the southern part of the adjacent Four Ponds Timber Sale area. It is possible that a maternity colony exists near this location. However, it seems unlikely that maternity roosts would occur in the Brown's Ledge Timber Sale area. This project is more than 2 miles away from the confirmed NLEB at Four Ponds. None of the detectors closest to the Brown's Ledge Timber Sale collected any NLEB calls. Although there is a large wetland (Patte Brook Pond) adjacent to the timber sale, there is a dam at the end of the pond closest to the project area that keeps the water level fairly steady and open (like a pond, not a wetland). The upper (southern) end of the pond further from the project area has more of the forested wetland characteristics similar to the two known WMNF maternity colonies.

In any case, all of the harvest units in the Brown's Ledge Timber Sale will be operated outside of the summer maternity season, so the chance of any incidental take would be avoided. The majority of the units in this timber sale are group selection, which would still leave high canopy closure throughout the area. The northernmost shelterwood cut is designed to leave 80-90 square feet per acre so will still have fairly high canopy closure. The other shelterwood adjacent to Patte Mill Brook Road is a white pine stand and is considered less suitable for NLEB given that Sasse (1995) did not find NLEB roosting in any pine. Clearcuts would leave larger openings, but total only 22 acres (~9% of the project area) and would not make the overall project area unsuitable for any NLEB in the future.

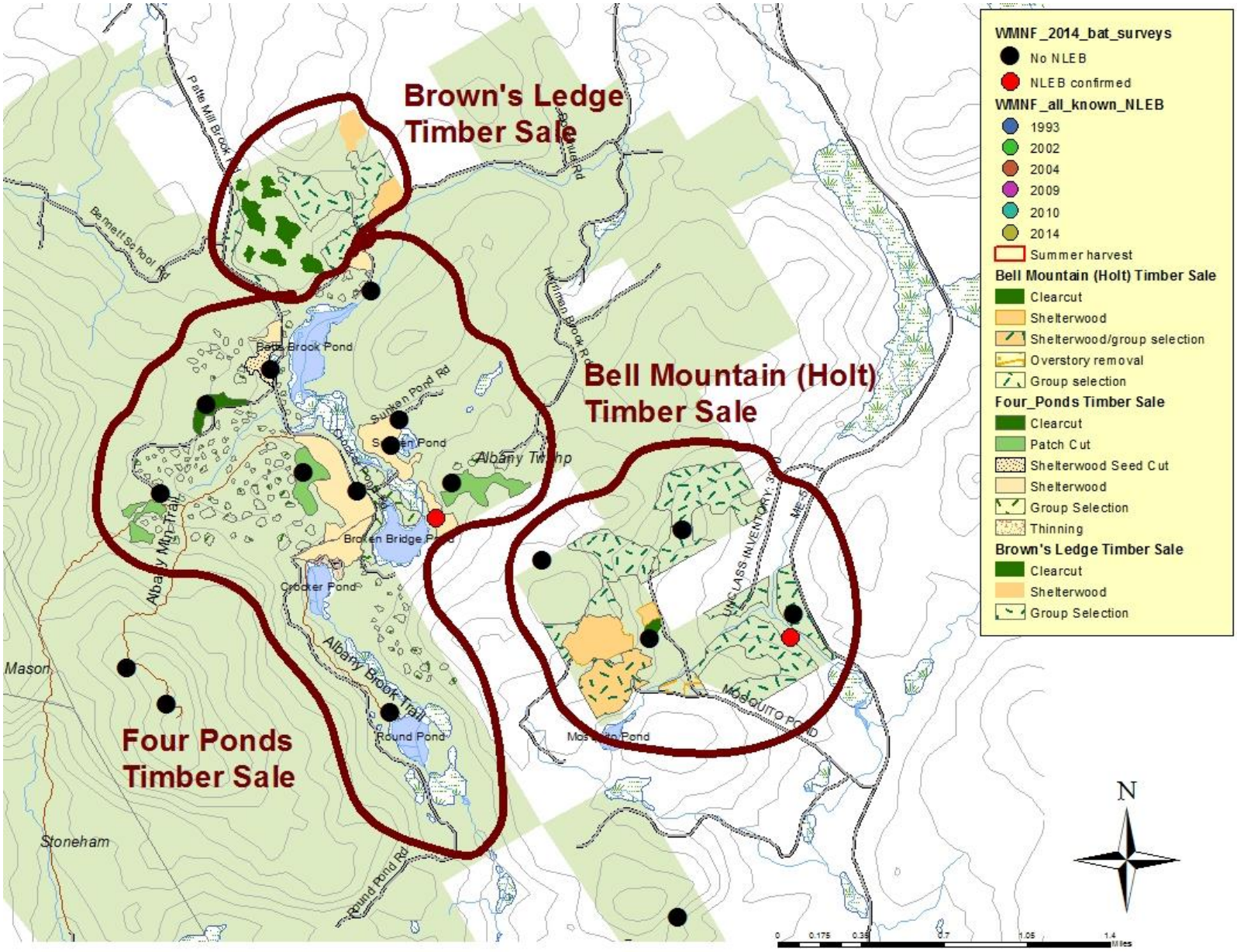

Figure 22. Androscoggin Ranger District timber sales. Note the determination of effects for the Four Ponds Timber Sale is May Affect, Likely to Adversely Affect NLEB and is addressed in a separate BA.

Pemigewasset Ranger District – Indigo Timber Sale, Sebosis Timber Sale

Indigo Timber Sale

Harvest Treatments	Acres
Clearcut	109
Clearcut w/Reserves	6
Shelterwood	13
Overstory Removal	85
Thinning	10
Group/Single Tree Selection	105
Group Selection	7
Single Tree Selection	414
Improvement Cut	65
Total	814

The 2014 survey season ended before the Indigo Timber Sale could be completely surveyed. Detectors placed in the northwest corner of the timber sale collected no NLEB calls (see Figure 23). The closest post-WNS NLEB occurrence is just over 2 miles away to the north.

Most of the units in this sale will be harvested in the winter. Two summer units were surveyed with no NLEB found. The remaining units include mostly single tree selection, where canopy closure and potential roost trees will remain at high levels, and overstory removal, where the mature trees left after a shelterwood will be removed. A stand prescribed for overstory removal would not generally be considered good roost habitat for NLEB because it would have a fairly low canopy closure level until the regenerating stand underneath could mature. There is one 7-acre clearcut unit prescribed for summer harvest. The other clearcuts would be cut in fall or winter.

The closest wetland feature to this timber sale is a series of small wetlands on private land just to the north of the project area. All of the unsurveyed summer harvest units are more than a mile away from these wetlands, so the likelihood of direct take in a maternity roost in any of these stands is considered very low.

The remaining units will be harvested during the winter when bats are not present, so there would be no direct effects. Canopy closure would remain high following harvest and potential roost trees would be expected to be retained in these units since individual and group selection would still leave many mature and decadent trees. There are many acres of interior, closed canopy forest within the overall area that will not be harvested.

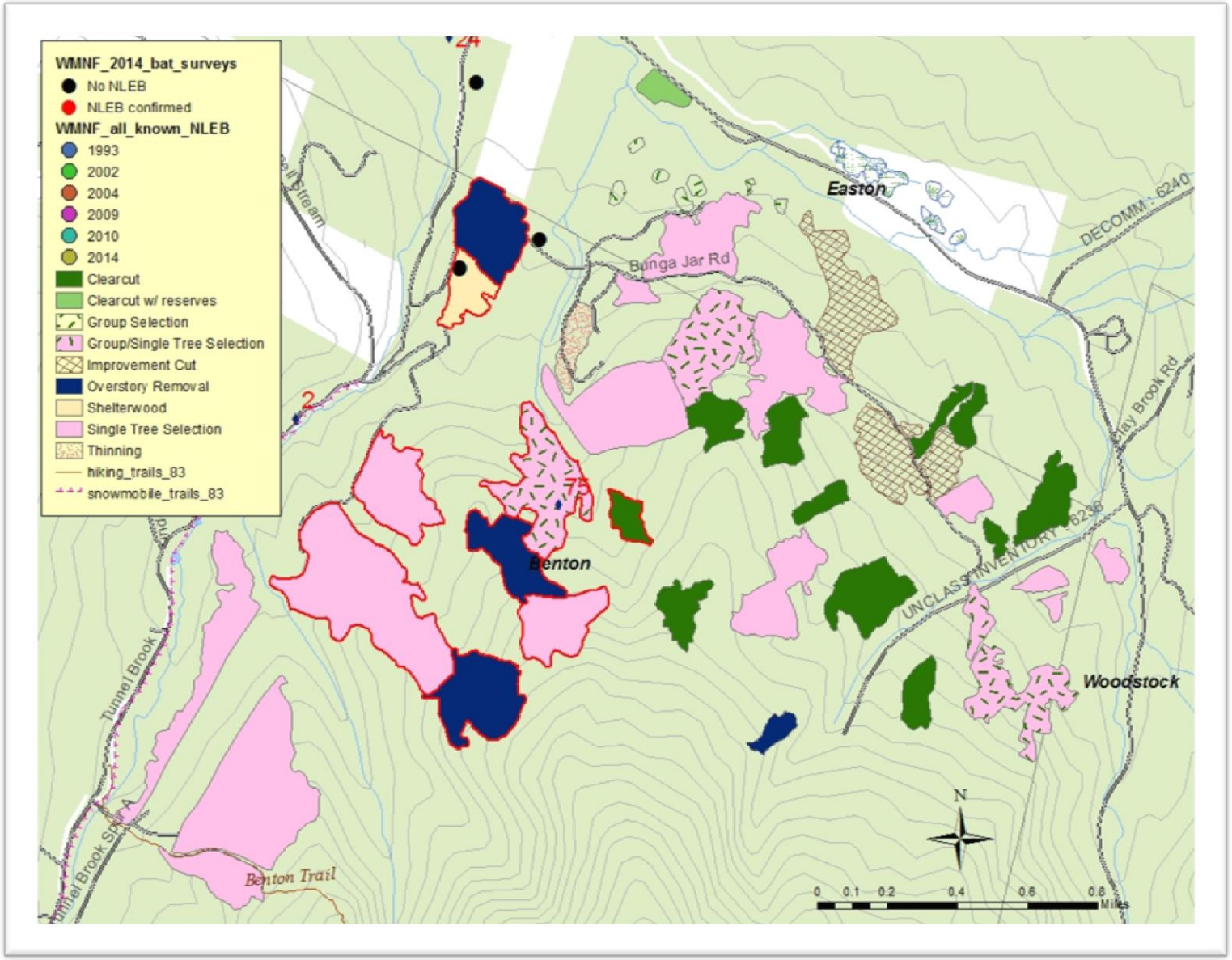

Figure 23. Indigo Timber Sale

Sebosis Timber Sale

Harvest Treatments	Acres
Patch Cut	7
Thinning	69
Group Selection	597
Improvement Cut	348
Total	1,021

The 2014 survey season ended before the Sebosis Timber Sale could be surveyed. The closest post-WNS NLEB occurrence is just over 2.5 miles to the northeast at Mt. Washington. One of Sasse's (1995) maternity colonies is approximately 8 miles to the west.

A number of wetlands occur within this timber sale area and could potentially support a NLEB maternity colony. However, no direct effects would be expected. All but one of the units in this sale will be harvested in the winter. At the southern end of the timber sale, the easternmost improvement cut may be harvested earlier in the fall, but not until after August 1. Although bats may be foraging in the area, all young would be volant by this time and could escape disturbance from equipment.

Indirectly, there is only one 7-acre patch cut unit that would result in low canopy closure levels. Thinnings and improvement cuts will reduce canopy closure but to a lesser extent. Canopy closure levels in group selection cuts would should still provide suitable habitat throughout the stand. Many areas within the Sebosis Timber Sale area will not be harvested, especially within a 0.3-mile radius around the wetlands, which is where most of the NLEB would be expected to roost if there was a maternity colony.

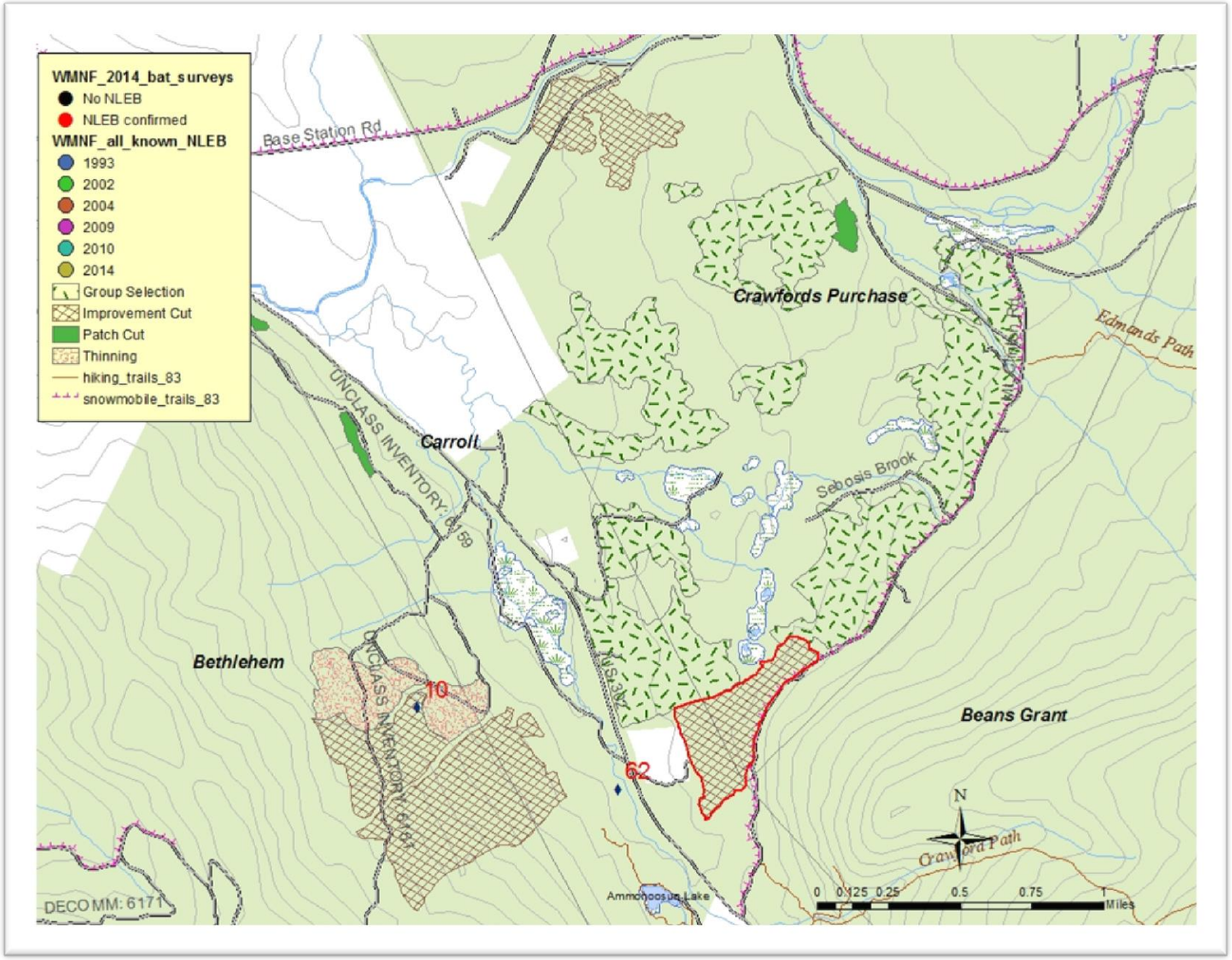

Figure 24. Sebosis Timber Sale

Saco Ranger District – Ledge Brook Timber Sale, Douglas Brook Timber Sale, Northeast Swift Timber Sale, Province Integrated Project (3 separate Timber Sales)

Ledge Brook Timber Sale

Harvest Treatments	Acres
Individual Tree/Group Selection	83
Total	83

No mist net or acoustic surveys were conducted within the Ledge Brook Timber Sale area. Sasse (1995) identified a maternity colony (Rob Brook) approximately one mile to the northeast from these units, as well as captured two adult female NLEB in a mist net near Lily Pond approximately 0.75 mile to the west. Sasse's Lily Pond captures were not radiotagged, so it is unknown where they roosted. Presumably somewhere other than Rob Brook (approximately 2 miles away), as Sasse concluded the mean distance between roosting and foraging habitat was 602 m (0.37 mile), with the greatest distance being only 1,710 m (1 mile). Figure 25 shows the Ledge Brook Timber Sale in relation to Sasse's mist net capture sites, as well as known maternity roosts (from 1993-1994) relocated in 2010.

The Ledge Brook Timber Sale is anticipated to be complete in 2016. Both remaining units will be harvested during the winter when bats are not present, so there would be no direct effects. Canopy closure would remain high following harvest and potential roost trees would be expected to be retained since individual and group selection would still leave many mature and decadent trees. Sasse mist netted extensively in this area and no bats were tracked to the Ledge Brook Timber Sale area. Harvest units are also bounded by the Swift River and the Kancamagus Highway, neither of which are probably barriers to NLEB, but may be places they might avoid given the abundance of mature, interior forest closer to foraging areas.

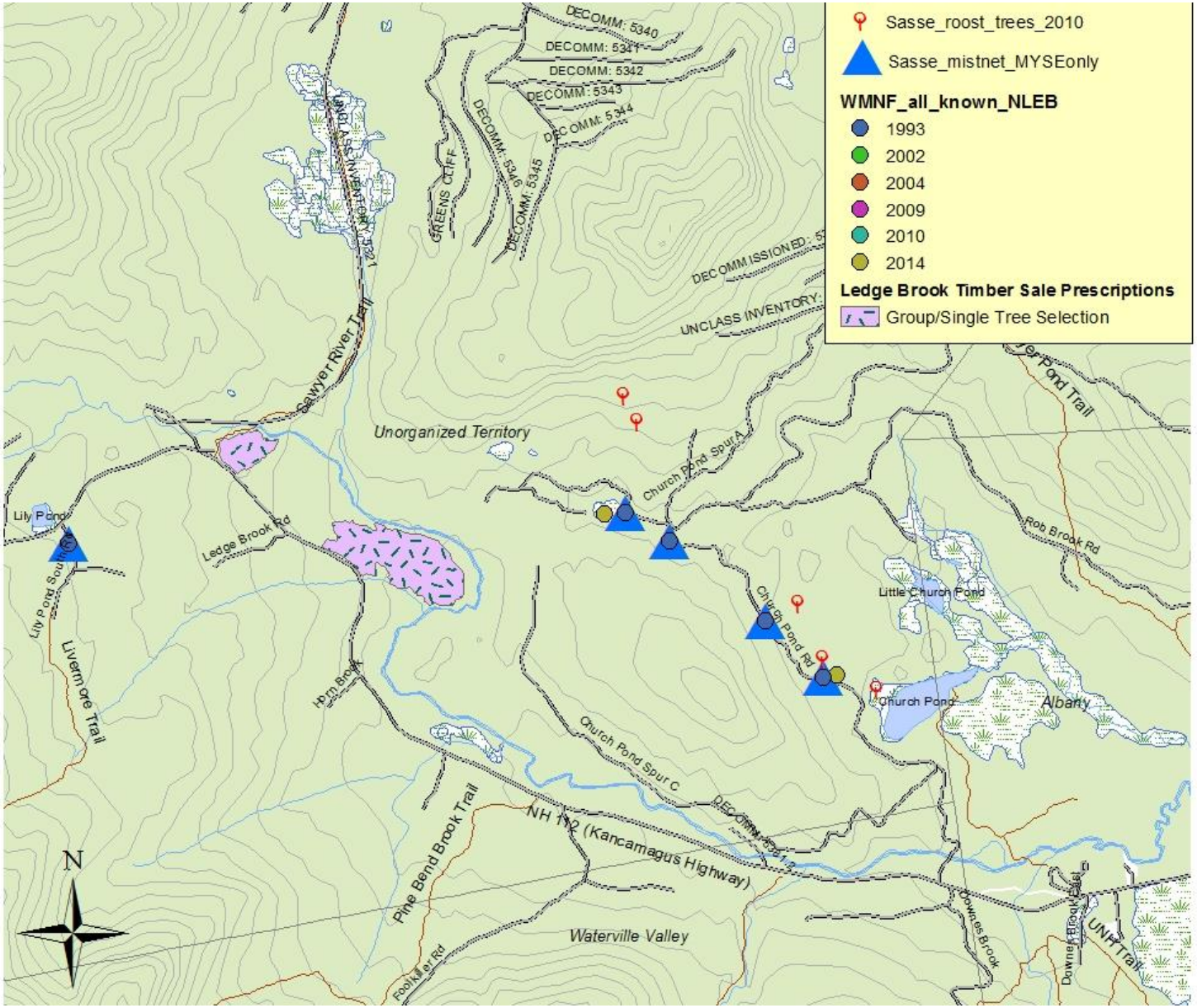

Figure 25. Ledge Brook Timber Sale. "Sasse roost trees 2010" indicate known NLEB maternity roosts in 1993-1994, which were relocated and confirmed still standing in 2010.

Douglas Brook Timber Sale

Harvest Treatments	Acres
Clearcut	12
Patch Cut	13
Thinning	17
Group Selection	136
Total	178

Acoustic surveys were conducted at 4 locations during 2014, including what was considered the most optimal wetland in the project area. No NLEB were identified, although the survey season ended before the entire project area could be completed. Sasse (1995) caught two males (an adult and a juvenile) near the thinning unit. The Rob Brook maternity colony is approximately 3.5 miles to the west from this unit.

Figure 26 shows the harvest units in the Douglas Brook and adjacent Northeast Swift timber sales. The Douglas Brook Sale is expected to be complete in 2016. Most of the remaining acres will be harvested in fall or winter, when bats are not present so no direct effects would occur. The 25 acres of clearcut and patch cuts will be harvested into the fall but not until August 1. Although bats may still be present, reproductive activity should be complete by this date, with all young having been volant for at least a month. However, the likelihood of bats using these stands seems unlikely, as the patch cut unit was surveyed in 2014 with negative results and a detector located adjacent to the clearcut unit in good foraging habitat did not detect any NLEB.

In the remaining units, canopy closure would remain high following harvest and potential roost trees would be expected to be retained since individual and group selection, as well as thinning, would still leave many mature and/or decadent trees. Units already harvested are primarily uneven-aged treatments (there are 7 units total of clearcuts or patch cuts), so canopy closure and potential roost habitat would still remain across the project area.

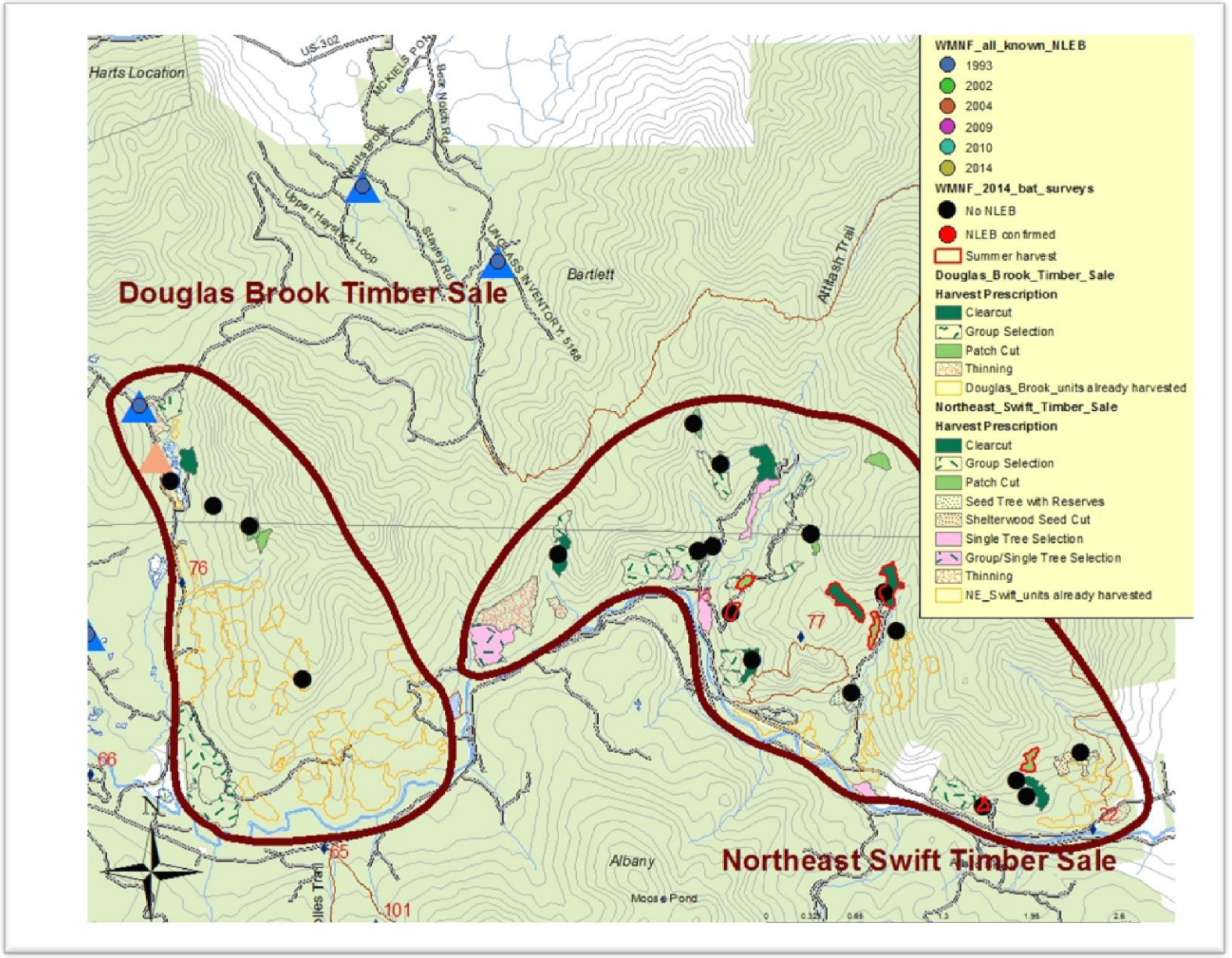

Figure 26. Douglas Brook and Northeast Swift Timber Sales. Note summer units are depicted by bold red borders. Units that have already been harvested are depicted by gold borders

Northeast Swift Timber Sale

Harvest Treatments	Acres
Clearcut	99
Patch Cut	62
Shelterwood Seed Cut	19
Seed Tree with Reserves	10
Thinning	82
Group Selection	196
Group and Single Tree Selection	46
Single Tree Selection	44
Total	558

Acoustic surveys were conducted at 15 locations within this project area during 2014. Of the seven summer units, detectors were placed directly in three of them, and detectors were placed in adjacent units (within the specified 123-acre area prescribed by the FWS survey protocol) in all but one unit. No NLEB were identified, although the survey season ended before the entire project area could be completed. The closest previously known NLEB location is approximately 2.3 miles to the north (Sasse 1995). The Rob Brook maternity colony is approximately 5 miles to the west.

Figure 26 above shows the harvest units in the Northeast Swift Timber Sale. Most of the remaining acres will be harvested in fall or winter, when bats are not present so no direct effects would occur. There are 7 units that could be harvested in the summer (65 acres). Although bats are potentially present on the Forest during this time, it seems unlikely they would be present in these few units. No NLEB were detected anywhere in this project area during 2014, nor have NLEB been detected on driving surveys following the Kancamagus Highway, which parallels the southern boundary of this project area for over six miles. In addition, this project is somewhat unusual in that it has almost no mapped wetland features. The only identified wetland in this project area is less than an acre, so the likelihood of a maternity colony occurring seems very small.

Indirectly, canopy closure would remain high following harvest and potential roost trees would be expected to be retained since individual and group selection, as well as thinning, would still leave many mature and/or decadent trees. Units already harvested are primarily uneven-aged treatments (there are two patch cut units), so canopy closure and potential roost habitat would still remain across the project area. And overall, much of the project area was not proposed for any harvest and will remain mature, interior forest.

Province Integrated Resource Project (3 timber sales)

Harvest Treatments	Acres
Clearcut	297
Patch Cut	66
Shelterwood Seed Cut	24
Group Selection	840
Group and Single Tree Selection	156
Single Tree Selection	241
Timber Stand Improvement	66
Total	1,690

Acoustic surveys were conducted at 16 locations within the Province Integrated Resource Project during 2014 (See Figure 27). No NLEB were identified, although the survey season ended before the entire project area could be completed. Of the 17 summer units, nine had detectors placed directly in them or in adjacent units (within the specified 123-acre area prescribed by the FWS survey protocol). Eight units in whole or in part (5 clearcuts, 2 group selection cuts) totalling approximately 180 acres were not surveyed. The closest previously known NLEB location is approximately 2.3 miles to the north (Sasse 1995). The Rob Brook maternity colony is approximately 5 miles to the west.

Most of the remaining acres will be harvested in fall or winter, when bats are not present. Although there are summer units that were not surveyed, they are all close to one mile or more from the closest mapped wetland. Seemingly the most suitable wetlands near the project area are the large complexes to the north and south of Upper Kimball Pond (on private land). The closest unsurveyed harvest units (at the far southern end of the project area) are at least 2.7 miles away. On the other side of the project area are Shingle Pond and Province Pond, significantly smaller than the Upper Kimball Pond wetlands but closer to the remaining units that weren't surveyed. However, they are still quite a distance away (0.9 and 1.2 miles, respectively).

Although bats are potentially present on the Forest during the time this project will be harvested, it seems unlikely they would be present here. Given the distance of the wetlands to the proposed harvest, the fact that much of the project area was surveyed with no NLEB found, and in fact, no NLEB found on the entire Saco district other than at the Rob Brook maternity colony, it seems unlikely bats would be roosting in the few stands not surveyed.

Indirectly, canopy closure would generally remain high following harvest and potential roost trees would be expected to be retained since individual and group selection, as well as thinning, would still leave many mature and/or decadent trees. Many harvest units are relatively small in comparison to the surrounding uncut acreage, which would continue to provide mature, interior forest habitat. Within a mile of the Upper Kimball Pond wetlands, all harvest is uneven-aged except for one 13-acre clearcut and one 10-acre shelterwood seed cut. Canopy

closure and an abundance of potential roost trees would be maintained.

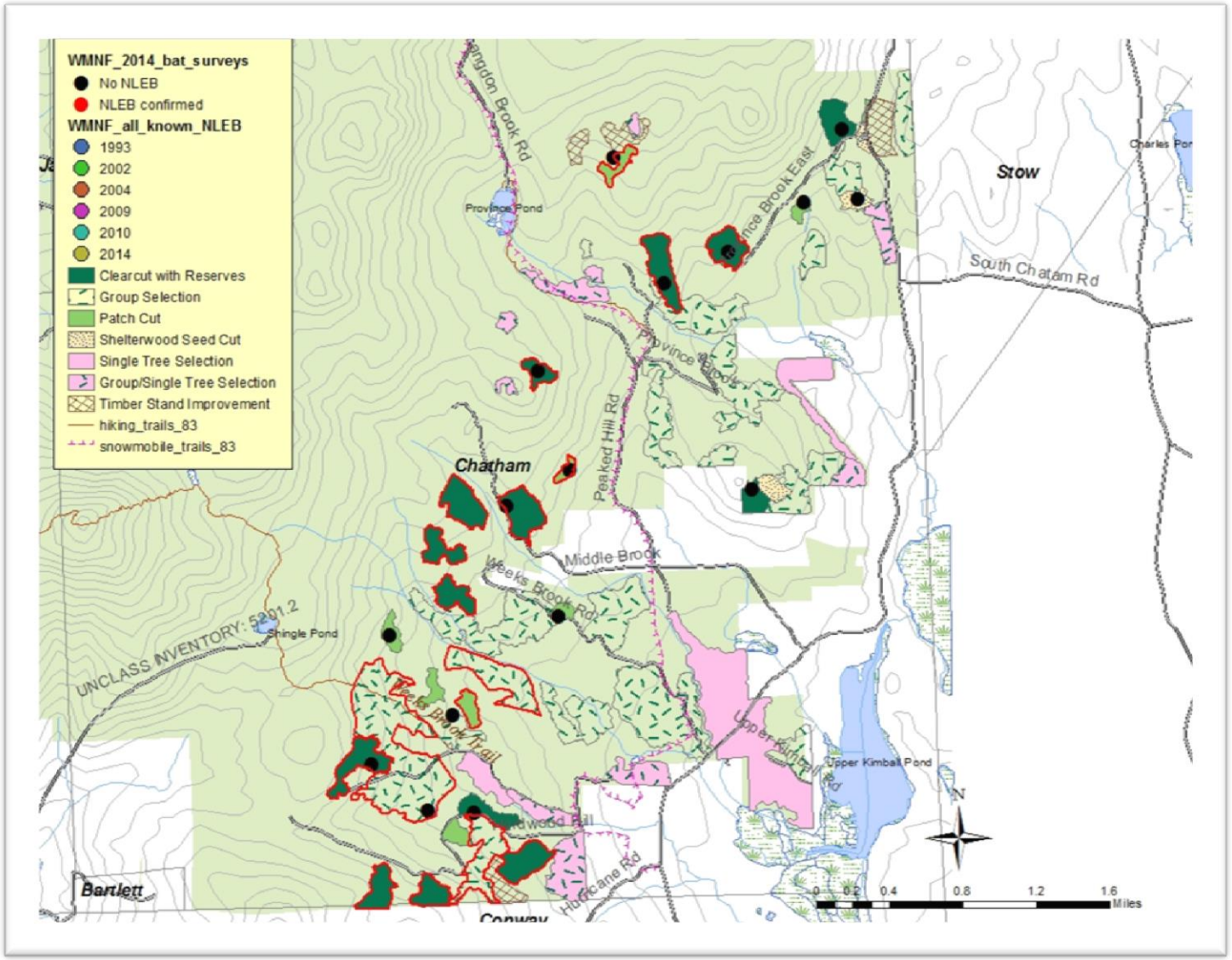

Figure 27. Province timber sales. Open circles around survey points represent the 123 acres of coverage prescribed by the U.S. Fish and Wildlife Service 2014 survey protocol.