BIOLOGICAL ASSESSMENT

on the

PROPOSED ACTIVITIES ON FORT DRUM MILITARY INSTALLATION, FORT DRUM, NEW YORK (2018-2020)

FOR THE INDIANA BAT (*Myotis sodalis*) and NORTHERN LONG-EARED BAT (*Myotis septentrionalis*)

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2018-2020 FORT DRUM BIOLOGICAL ASSESSMENT FOR THE INDIANA AND NORTHERN LONG-EARED BAT

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Executive Summary

Fort Drum is a 108,733 acre (ac) US Army installation in northern New York and is the largest military installation in the northeastern United States, serving as home to the 10th Mountain Division-Light Infantry and one of the primary training facilities for National Guard and Army Reserve units throughout the region. Military training has occurred on Fort Drum lands since 1908.

There is one federally-listed endangered species known to occur on Fort Drum, the Indiana bat (*Myotis sodalis*) and one federally-listed threatened species, the Northern long-eared bat (*Myotis septentrionalis*). This BA identifies and analyzes potential impacts to both these species from activities that are proposed to occur on Fort Drum from January 1, 2018 – December 31, 2020. It is expected to cover approximately 85%+ of activities that may occur on Fort Drum within the next three years. All other activities not included in this BA will be addressed via individual informal consultation or by reinitiating formal consultation with the USFWS. This BA was prepared pursuant to Section 7 of the Endangered Species Act (16 USC 1536 (c)).

Indiana bats were first confirmed on Fort Drum in 2006. The nearest known Indiana bat hibernaculum, Glen Park, is approximately 6.5 mi (10.5 km) from Fort Drum's Cantonment Area. Approximately 230 Indiana bats now hibernate there annually. Mist-netting and radio-tracking efforts have identified one maternity colony focused within the Cantonment Area of Fort Drum.

Northern long-eared bats were first confirmed on Fort Drum in 1999 when a small survey effort documented four bats in the Training Area. Subsequently, approximately 380 northern long-eared bats have been captured throughout the installation while performing mist net surveys during 2007-2017. Suspected acoustic detections of the species have also been recorded throughout the installation. Where all evidence for Indiana bat suggests most use is still concentrated within the Cantonment Area and the southern Training Areas, evidence for northern long-eared bat suggests there is no concentrated use, and that they could be found throughout most of installation (albeit in extremely low numbers) in appropriate habitat. It is unknown where northern long-eared bats may be hibernating; however, there are dozens of potential hibernacula within range of Fort Drum.

Historically, Fort Drum likely contained relatively robust numbers of Indiana bats within the known maternity colony, and high numbers of individuals and maternity colonies of northern long-eared bats. However, impacts from white-nose syndrome (WNS) to Indiana and northern long-eared bats have been severe in New York and on Fort Drum, and the disease has caused drastic declines in their populations. Although acoustic detections of probable Indiana and northern long-eared bats are still being detected on the installation, only 2 Indiana bats have been captured since 2011. No northern long-eared bats have been captured since 2011. Where it was once relatively easy to capture these species through traditional mistnet efforts, it is now a difficult task. Given this development, the likelihood of finding new maternity colonies of either of these species is unlikely.

Section 1 provides consultation history, abbreviated relevant information on Fort Drum (see previous Fort Drum BAs and BOs regarding Indiana or northern long-eared bat for additional information), and the status of the Indiana and northern long-eared bat.

Section 2 describes and assesses the potential effects of the following activities on the Indiana and northern long-eared bat: construction; military training; forest management; mechanical

vegetation management; land conversion; use of pesticides; wildlife management/vertebrate pest control; and outdoor recreation. Conservation measures are also outlined to reduce or eliminate adverse impacts of the proposed activities.

Section 3 describes and assesses the potential effects of proposed conservation activities on the Indiana and northern long-eared bat, including: the establishment of a 2,202 ac (891 ha) Bat Conservation Area (BCA) to protect known Indiana and northern long-eared bat roosting and foraging areas from permanent development and habitat loss; research and monitoring efforts to provide information for future management actions; outreach efforts; and the Army Compatible Use Buffer (ACUB) program.

Section 4 describes potential cumulative effects, and Section 5 provides an overall conclusion. Previous Fort Drum Biological Assessment and Opinions are referenced throughout this document and be found in the Appendices. The 2009-2011, 2012-2014, and 2015-2017 Fort Drum Biological Assessments can be found in Appendix A, B, and C, respectively and the 2009-2011, 2012-2014, 2015-2017 Biological Opinions can be found in Appendix D, E, and F, respectively. Much information will be referenced from these documents to reduce extraneous verbiage within this BA. All conservation measures and beneficial actions mentioned throughout the document are included in Appendix R.

After reviewing all of the proposed activities, Fort Drum has determined that by following the project descriptions and the conservation measures proposed, there should be no activities within the next three years that are likely to adversely affect Indiana bats on Fort Drum.

Fort Drum has also determined that in season clearing for small scale range construction projects and the use of smoke/obscurants is likely to adversely affect northern long-eared bats on Fort Drum. However, all other proposed activities on Fort Drum will not affect, or may affect, but should not adversely affect northern long-eared bats.

1.0 Background

This section provides abbreviated background information on Fort Drum and Indiana and northern long-eared bat life history as it relates to this Biological Assessment (BA). More detailed information can be found in Appendix A, B, C, D, E, and F.

1.1 Purpose

The purpose of this BA is to identify and analyze potential impacts to the federally-listed endangered Indiana bat (*Myotis sodalis*) and the federally-listed threatened northern long-eared bat (*Myotis septentrionalis*) that may arise from activities that are likely to occur on Fort Drum Military Installation from January 1, 2018 – December 31, 2020. This BA will provide Fort Drum flexibility temporally, spatially, and functionally in planning and implementation of activities without delays resulting from sudden changes in plans, priorities, and/or funding. This BA will address activities for the next three years reducing the requirement to initiate or re-initiate Section 7 consultations for most individual projects or activities. However, individual Section 7 consultations will still occur for activities not specifically identified in this BA or for other unforeseen activities.

This document was prepared in accordance with Section 7 of the Endangered Species Act (16 USC 1536 (c)). The Indiana bat and the northern long-eared bat are the two known federally listed species that occur on Fort Drum or within the action area. The action area is defined in Section 1.4. No critical habitat has been proposed or designated for the northern long-eared bat. There is no designated Critical Habitat for the Indiana bat within the action area.

All federal agencies and tenant organizations that operate on Fort Drum were considered in the effects analysis of activities and are subject to the conservation measures prescribed in this BA. These federal agencies include the US Army; US Army Corps. of Engineers (Engineering – New York District); US Army Corps. of Engineers (Clean Water Act Section 404 Permits); US Air Force (Range 48); and all other military and law enforcement agencies training at Fort Drum. Fort Drum Mountain Community Homes (FDMCH), the Development Authority of the North County (DANC), Verizon, ReEnergy, AT&T and ACTUS Lend Lease are currently the private tenant organizations that actively lease Fort Drum property or have other partnership arrangements that could have potential impacts to the Indiana or northern long-eared bat. The US Army Garrison Fort Drum is the lead federal agency for all ESA consultation on Fort Drum.

1.2 Consultation History

The following are highlights of the consultation history between Fort Drum Military Installation (Fort Drum) and the U.S. Fish & Wildlife Service-New York Field Office in Cortland, New York (USFWS) since the 2014-2017 BA was provided to the USFWS.

On **September 22, 2014**, the USFWS received Fort Drum's September 22, 2014 request for initiation of formal consultation for 2015-2017 activities on Fort.

On **October 15, 2014**, the USFWS sent the Army a letter confirming that adequate information was provided to initiate formal consultation.

On **February 9, 2015**, the Army submitted the 2014 annual report of LTAA activities in accordance with the 2012 BO.

On **February 18, 2015**, the USFWS sent the Army a letter concurring that several categories of activities were not likely to adversely affect the Indiana bat.

On **March 5, 2015**, the Army submitted the 2014 annual report of NLTAA activities in accordance with the 2012 BO (final submittal for 2012 BO).

On **April 28, 2015**, the USFWS issued a Biological Opinion (BO) to Fort Drum.

On **October 20, 2015**, the Army reported a failure to implement certain conservation measures.

On **March 3, 2016**, Fort Drum submitted the 2015 annual report.

On **April 21, 2016**, the USFWS sent a letter to the Army acknowledging the submittal.

On **March 1, 2017**, Fort Drum submitted the 2016 annual report activities.

On **March 22, 2017**, the USFWS sent a letter to the Army acknowledging the submittal and requested a meeting for the ACUB program.

On **June 6, 2017** Fort Drum and USFWS met to discuss development of the 2018-20 BA.

On **June 6, 2017** Fort Drum, USFWS, and partners met to discuss the ACUB program.

1.3 Fort Drum Military Installation

Much of the information in this document will be incorporated by reference. As such, please see the 2009-2011 BA (Fort Drum 2009 or Appendix A); the 2012-2014 BA (Fort Drum 2011b or Appendix B); the 2015-2017 BA (Fort Drum 2014 or Appendix C); the 2009-2011 BO (USFWS 2009 or Appendix D); the 2012-2014 BO (USFWS 2012 or Appendix E); the 2015-2017 BO (USFWS 2015 or Appendix F); the proposed rule for the northern long-eared bat (USFWS 2013a or Appendix G); the USFWS conference guidance for the northern long-eared bat (USFWS 2014 or Appendix H); Fort Drum Integrated Natural Resources Management Plan (Fort Drum 2011a or Appendix I); ESI 2008a (Appendix J); ESI 2008b (Appendix K); Copperhead 2009 (Appendix L); ESI 2010 (Appendix M); ESI 2011 (Appendix N); JECS 2012 (Appendix O); Copperhead 2016 (Appendix P) and USFS 2011 (Appendix Q). Each one of these documents will be referenced throughout or can be referred to for additional information.

1.3.1 Regional Description of Fort Drum

Please see Appendix A, Section 1.3.1 for the Regional Description of Fort Drum.

1.3.2 Military Mission & History

Please see Appendix A, Section 1.3.2 for Fort Drum's Military Mission and History.

1.3.3 General Description of Fort Drum

Please see Appendix A, Section 1.3.3 for the General Description of Fort Drum. See Figure 1.1 for a map of Fort Drum showing the Cantonment Area/Wheeler-Sack Army Airfield (WSAAF), Training Area, Bat Conservation Area, and Main Impact Area

1.3.4 General Habitat Information on Fort Drum

Please see Appendix A, Section 1.3.4 for the General Habitat Information on Fort Drum.

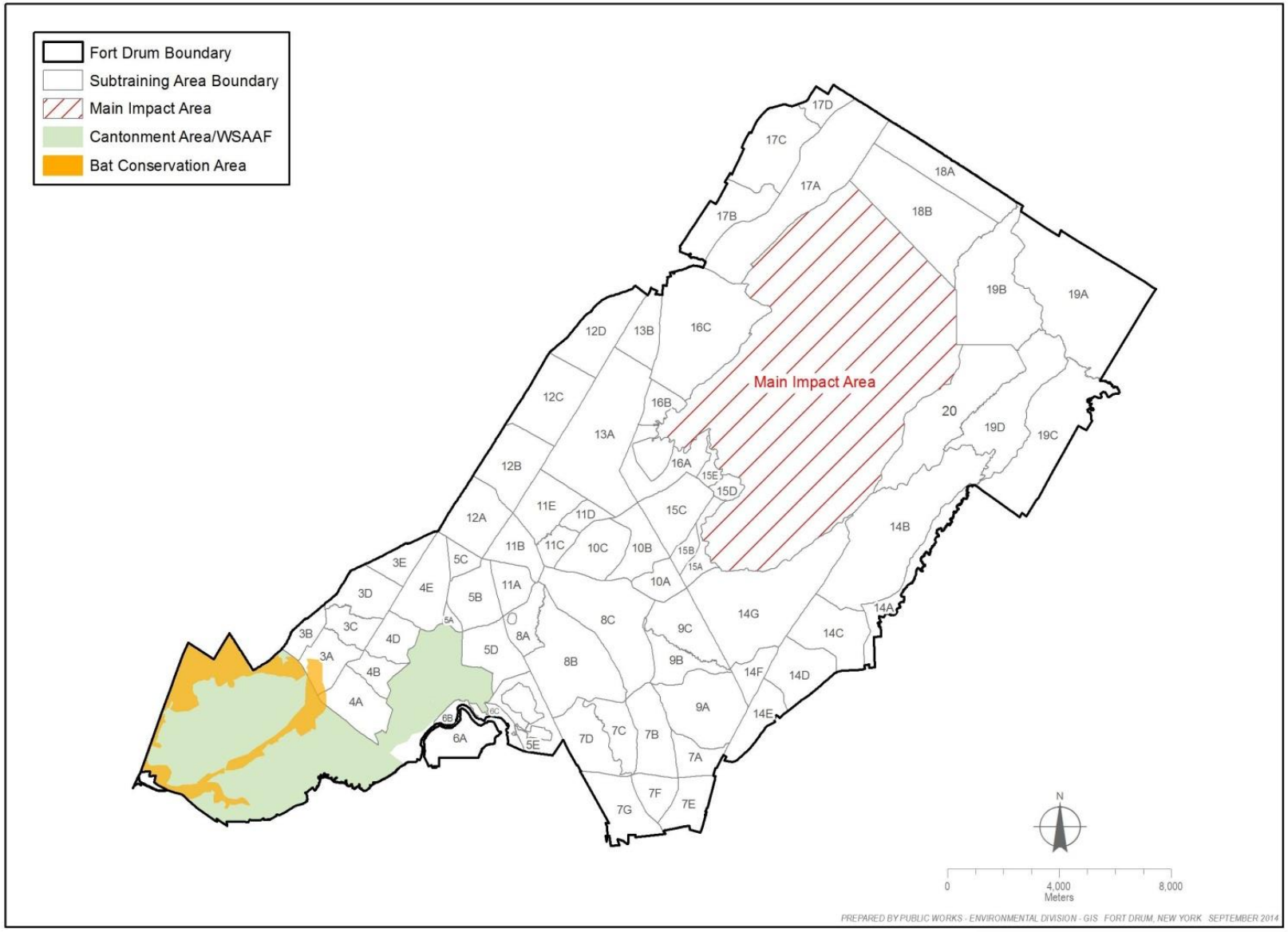


Figure 1.1. Fort Drum Military Installation.

1.4 Action Area

The action area is defined by regulation as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR §402.02). Hence, this analysis is not limited to the "footprint" of the action nor is it limited by the Federal agency's authority; it is a biological determination of the reach of the proposed action on listed species.

For this BA, the “action area” is the area where all direct and indirect effects of implementing and sustaining the mission of Fort Drum may impact the Indiana and northern long-eared bat.

Therefore, for the purposes of this analysis, the Fort Drum action area includes all of Fort Drum (with some exceptions related to the Main Impact Area as identified below) and private lands as part of the Army Compatible Use Buffer (ACUB) program (i.e., those areas Fort Drum has third party interest in; Figure 1.2).

The Main Impact Area is an approximately 20,200 ac (8175 ha) portion of Fort Drum’s Training Area where no human access is allowed (outside of specific training mission requirements). The Main Impact Area potentially has suitable habitat for both species of bats. However, as all evidence for the last 10 years has suggested that Indiana bats are found primarily in the approximately 11,500 ac (4654 ha) Cantonment Area, and the TAs south of US Military Highway, it is not expected that this species would be found utilizing the Main Impact Area. Conversely, given that northern long-eared bats have historically been captured throughout the installation (except the Main Impact Area), the possibility exists that the species could be utilizing this area to some degree. Unfortunately, as stated above, there is typically no access into the area and no way to adequately or appropriately assess any potential impacts to bats. No surveys have been conducted to date within the Main Impact Area, nor could they be in the foreseeable future. While Fort Drum has a general idea of where ordnance is impacting within this area, the amount, duration, and locations vary temporally and spatially, depending on which ranges and ammunition is being utilized. Subsequently, since we have no way to know utilization areas of the northern long-eared bats within this location, and we cannot predict exact locations of ordnance/ammunition impacts, there is no way to know where these impacts may intersect and affect bats. Additionally, given that this area has been utilized for decades, with ongoing fires, noise, explosions, impacts, etc, if bats are exploiting the area to any degree, we would assume that this would continue to occur. If they are avoiding the area, we would assume that would continue to occur as well. Given these considerations, we have excluded the Main Impact Area from analysis for this BA.

At this time, it is unknown where northern long-eared bats that utilize Fort Drum may be hibernating. There are dozens of potential hibernation sites around Fort Drum that northern long-eared bats could be coming from. Therefore it is difficult to determine the extent of use surrounding Fort Drum, or even the direction of travel Fort Drum northern long-eared bats may take coming to and from hibernacula.

Figure 1.2 shows the known Indiana and northern long-eared bat use within and adjacent to the action area. These areas will most likely continue to be used by Indiana and northern long-eared bats after emergence from hibernation, during the reproductive season, and during fall swarming. Fall swarming activity is expected to occur within 10 miles (and up to 20 miles) from hibernation sites during the late summer and fall months. There are no known hibernacula on Fort Drum, therefore no winter use is expected to occur on the installation.

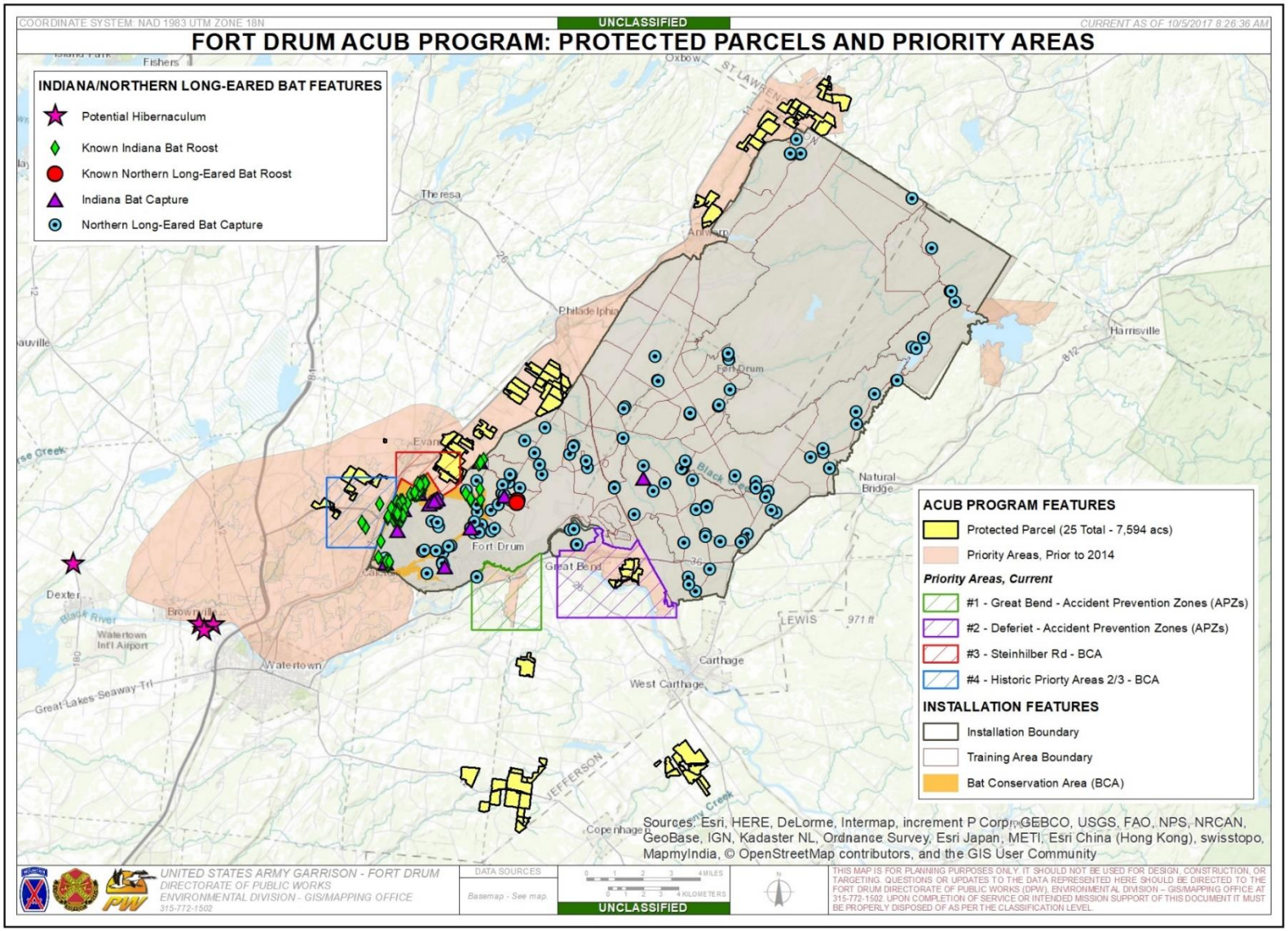


Figure 1.2 Known Indiana and northern long-eared bat use within and adjacent to the Action Area at Fort Drum Military Installation.

The Indiana bat and northern long-eared bat are closely related species in the Genus *Myotis* (Chiroptera: Vespertilionidae). Information on these species has been extensively described in previous documents and can be found in Appendices A, J-Q. Little new information has been collected on these species on Fort Drum since 2014.

1.5 Indiana Bat

1.5.1 General Description

For additional information on life history, ecology, and threats, see the Indiana Bat Draft Revised Recovery Plan (USFWS 2007).

1.5.2 Distribution and Status

For additional information on the range wide distribution and status of the Indiana bat, please see the Indiana Bat Draft Revised Recovery Plan and (https://www.fws.gov/midwest/Endangered/mammals/inba/pdf/2017IBatPopEstimate5July2017.pdf)

According to hibernacula surveys conducted by the NYSDEC, there were approximately 52,000 Indiana bats that overwintered in New York using 12 hibernacula prior to WNS (NYSDEC, unpublished data). During the winter of 2016-2017, approximately 12,688 individuals were found in nine hibernaculum sites, with over 85% of the population found in Barton Mine (NYSDEC, unpublished data). In Jefferson County, New York, there is a single known Indiana bat hibernaculum at Glen Park that is classified as a Priority II hibernacula. The site is located approximately 6.5 mi (10.5 km) from Fort Drum, and while it historically provided wintering habitat for over 2,000 Indiana bats, only approximately 230 bats now reside in the cave.

1.5.2.1 Fort Drum

Information regarding the temporal and spatial use of Fort Drum has been extensively documented for Indiana bats. Please refer to Appendices A-C for this information. Little new information has been collected for this species on Fort Drum. The last capture and tracking of this species was in 2014 and previously described in the 2015-2017 BA. Despite fairly extensive mist net efforts in 2015 (Copperhead 2016; Appendix P) and smaller efforts by Fort Drum staff during 2015-2017, no new captures of this species have occurred. Probable acoustic detections of the species are still being collected; however, no new information is being gleaned from this monitoring, other than confirming continued reduced use of the installation since the onset of WNS (also previously extensively described). Detections are still be collected throughout the Cantonment Area and in the Training Areas south of US Military Highway. All information still suggests that suspected Indiana bat use within the Training Area is most likely periodic foraging or exploratory movements from the known colony in the Cantonment Area. There has been no new down range captures or other evidence to suggest otherwise.

1.5.3 Background Ecology

Information regarding the life history (e.g., hibernation, spring emergence, summer roosting and reproductive behavior, home range and fall swarming) of this species has been previously extensively described. Please refer to Appendices A-C, and J-Q. Also please see Jachowski (2016) and (2017) for consolidated information regarding Indiana bat roost-site selection on Fort Drum.

1.6 Northern long-eared Bat

1.6.1 General Description

For additional information on life history, ecology, and threats, see proposed rule for the northern long-eared bat (USFWS 2013a or Appendix G) and the interim conference and planning guidance for the northern long-eared bat (USFWS 2014 or Appendix H).

1.6.2 Distribution and Status

For information on the range wide distribution and status of the northern long-eared bat, please see the proposed rule for the northern long-eared bat (USFWS 2013a or Appendix G) and the interim conference and planning guidance for the northern long-eared bat (USFWS 2014 or Appendix H).

There are approximately 89 known northern long-eared hibernation sites in New York. The NYSDEC completed surveys at 13 of those sites during the winter of 2016-2017 and documented only one northern long-eared bat. Historically, up to approximately 1151 northern long-eared bats were observed during winter counts focused on Indiana bats. This represents an approximate 99% decline in the species at these locations, and it is thought that of all bats in New York, this bat is at the greatest risk of imminent extinction (NYSDEC, unpublished data).

1.6.2.1 Fort Drum

Information regarding the temporal and spatial use of Fort Drum has been previously documented for northern long-eared bats. Please refer to Appendix C for this information. Little new information has been collected for this species on Fort Drum. The last capture of this species was in 2011 and previously described in the 2015-2017 BA. Despite fairly extensive mist net efforts in 2015 (Copperhead 2016) and smaller efforts by Fort Drum staff during 2015-2017, no new captures of this species have occurred. Probable acoustic detections of the species are still being collected; however, no new information is being gleaned from this monitoring, other than confirming continued reduced use of the installation since the onset of White-nose Syndrome (also previously extensively described). All information still suggests that while numbers of northern long-eared bats were historically high and the installation was used quite extensively for foraging and rearing young, the onset of WNS has decimated this species. Although current acoustic survey work is still picking up small numbers of suspected northern long-eared calls in some areas of Fort Drum, it is obvious the population is a small fraction of what it was.

1.6.3 Background Ecology

Information regarding the life history (e.g., hibernation, spring emergence, summer roosting and reproductive behavior, home range and fall swarming) has been previously described. Please refer to Appendix C.

1.7 Threats to Indiana and Northern Long-eared Bats

While there are a number of documented and suspected reasons for the decline of these species, currently the number one reason is WNS. This has not changed since the 2015-2017 BA. No new information on WNS or other threats has become available since that time. First detected in Howe's Cave in Schoharie County, New York in 2006 (Blehert et al. 2009), WNS has since spread through 31 states and 5 Canadian provinces (USGS 2017 and USFWS 2017; Figure 1.3). Additionally, evidence of the causative agent of the disease, the novel psychrophilic fungus *Pseudogymnoascus destructans* (Blehert et al. 2009, Gargas et al. 2009, and Minnis and Linder 2013), has been detected on bats as far south and west as Mississippi and Washington, respectively (USGS 2017). This disease poses one of the most serious threats to the continued existence and recovery of both the Indiana and northern long-eared bat. Prior to WNS, the Recovery Priority of the Indiana bat was 8 meaning the species had a moderate degree of threat and high recovery potential; due to WNS, the Recovery Priority is now a 5, meaning the species has a high degree of threat and a low potential for recovery.

Prior to WNS, the northern long-eared bat was one of the most abundant bats in the summer landscape. Whereas previously, northern long-eared bats were one of the most readily captured bats during mistnetting efforts (Owen et al. 2004), population declines associated with WNS have now made it extremely difficult to capture individuals on the landscape in many places (Copperhead 2016, Francl et al. 2012, Fort Drum, unpublished data).

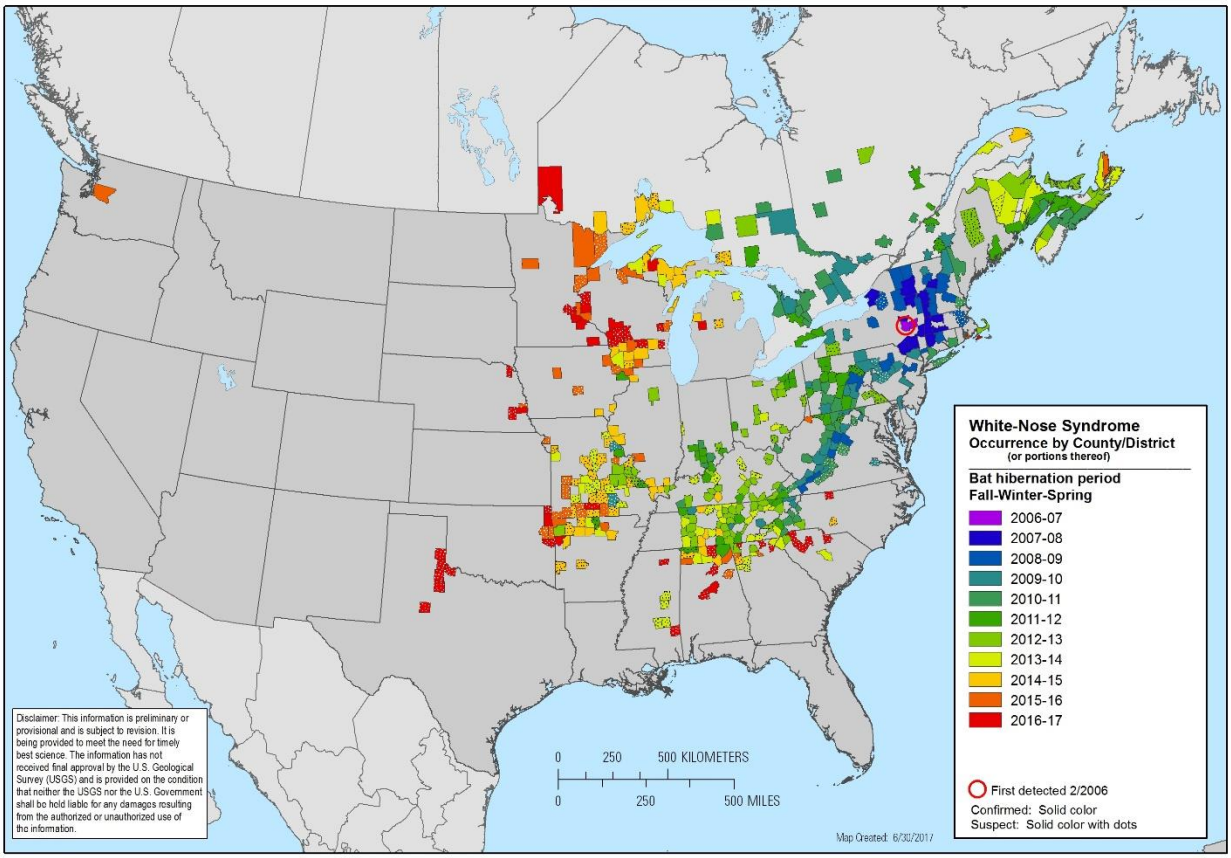
Given the drastic declines in numbers of both species on the Fort Drum landscape and the difficulty in accurately monitoring these bats through currently available methodology, it will be unlikely that much new information will be gathered on either one of these species in the near term.

There are also a number of other documented and suspected reasons for the historic decline of bat populations which include disturbance during hibernation, habitat loss, pesticide contamination, persecution, and disease.

Both bats are highly susceptible to injury or death during hibernation. This can be from humans entering hibernacula and disturbing bats thus causing them to expend crucial fat reserves, which can lead to starvation if forced to arouse from sleep too often. Vandalism of hibernacula and the direct killing of hibernating Indiana bats have also contributed to population declines. Natural catastrophes, such as flooding or extreme temperatures, have resulted in the death of hibernating bats. Due to its importance to the survival of the species, the protection of Indiana bat hibernacula had been in the forefront of Indiana bat recovery plans (USFWS 2007). Likely this will become an important consideration for northern long-eared bat hibernacula as well.

The loss of summer habitat is another important factor that could affect both these species. Historically, changing land use practices including urban and agricultural development, as well as fire suppression have reduced available roosting and foraging habitat in some portions of the range for both these species (USFWS 2007 and USFWS 2013a). Timber harvests have the potential to remove important roosting/foraging sites for both bats, but proper forest

management can retain and even improve roosting and foraging habitat for these bats by providing or maintaining forest structural features, such as snags, openings in canopy cover, and edge habitats. It is unlikely with the overall reduction in populations due to WNS that summer habitat would now be a limiting factor for either of these species. There are now likely large areas of unoccupied suitable summer habitat. Due to the strong site fidelity exhibited by both species, the larger threat related to this issue would be if specific areas of forest were removed that contained important roosting networks for known or unknown maternity colonies.



Citation: White-nose syndrome occurrence map - by year (2017). Data Last Updated: 6/30/2017. Available at: https://www.whitenosesyndrome.org/resources/map.

Figure 1.3. **Distribution of white-nose syndrome (WNS) affected areas as of June 30, 2017 (https://whitenosesyndrome.org/resources/map).**

Bioaccumulation of environmental contaminants has also been identified as a suspected cause for the decline of Indiana bats (USFWS 2007) and could be a concern for northern long-eared bats as well. Organochlorine insecticides which became widely used after World War II are neurotoxic, synthetic chemicals of which many are resistant to metabolism in mammals (O'Shea and Clark 2002). Organochlorine insecticides may have resulted in chronic mortality of bats (O'Shea and Clark 2002). For example, guano collected from an Indiana bat roost in Indiana, in the 1970s, had concentrations of dieldrin in their guano comparable to the levels found in colonies of gray bats that suffered mortality from dieldrin poisoning (O'Shea and Clark 2002). Schmidt et al. (2002) measured levels of Polycyclic Aromatic Hydrocarbons (PAH) and organochlorine pesticides in surrogate bat species to ascertain potential affects to the Indiana bat. At low concentrations, these chemicals cause cancer and cellular mutations in mammals, and may affect reproductive success by reducing viability of gametes or offspring.

Another relatively recent threat to bats in the last decade has been wind power facilities (Kunz et al. 2007). Numerous wind power facilities have been recently constructed in northern New York, with more planned (Figure 1.4). A Bats and Wind Energy Cooperative (www.batsandwind.org) has been launched to conduct research on mortality causes and to develop solutions to prevent or minimize fatalities at wind farms. Monitoring at large wind facilities has documented multiple Indiana and northern long-eared bat mortalities to date (Robyn Niver, USFWS, personal communication, https://www.fws.gov/midwest/wind/wildlifeimpacts/inbafatalities.html), but the possibility exists that additional mortalities have gone undiscovered.

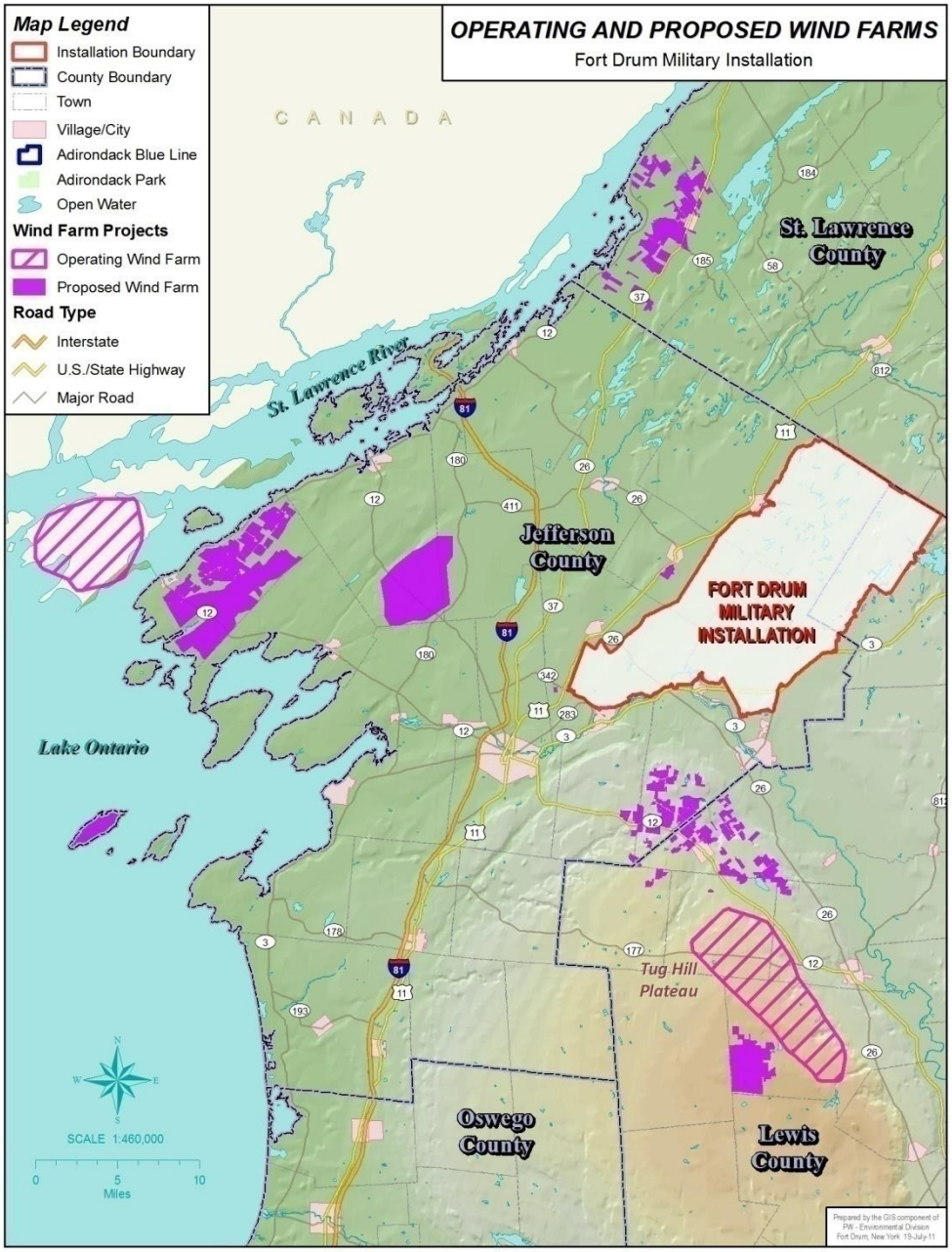


Figure 1.4. Operating and proposed wind farms within Fort Drum's operational airspace.

2.0 Proposed Activities

This section assesses activities on Fort Drum that have the potential to affect the Indiana and northern long-eared bat. These activities include: construction; military training; forest management; mechanical vegetation management; land conversion; use of pesticides; wildlife management/vertebrate pest control; outdoor recreation; and the ACUB program.

2.1 Construction

There are approximately 125 (mainly small scale) projects over approximately 750 acres proposed for construction during January 2018 -December 2020 on Fort Drum that may result in the loss of roosting or foraging habitat. Approximately 100 projects covering 300 acres will be concentrated in the Cantonment Area and the area surrounding Wheeler-Sack Army Airfield (WSAAF), and the remaining 25 are in the Training Area covering approximately 450 acres. All projects are subject to funding, mission priorities, and other factors, and although 125 are proposed, it is unknown how many will actually be constructed. As long as the scope is not greater than discussed here, no further coordination is needed beyond annual reporting.

Given the total proposed impact, Fort Drum considers that the Conservation Measures presented in the previous versions of the BAs (2009-2017) for construction are still appropriate.

2.1.1 Construction Activities

2.1.1.1 Cantonment Area/WSAAF Construction

Between 2009-2017, Fort Drum anticipated constructing on approximately 3600 ac (1457 ha; Table 2.1) of land in and around the Cantonment Area and WSAAF. During these nine years, approximately only 661 ac (267 ha; 18%) were actually cleared for construction as of September 2017. This included the loss of approximately 404 ac (163 ha; 11%) of natural vegetation. The remaining approximately 256 ac (104 ha) were on already disturbed and/or developed land. There may be some additional acreage cleared for construction by the end of the calendar year; however, we do not anticipate that being a large amount. This will be reported through the end of the year reporting requirements.

For January 2018-December 2020, we anticipate construction of approximately 100 new projects on up to 300 ac (121 ha) in the Cantonment Area (Table 2.2).

Table 2.1. Amount of landcover by type (buffered by 25 ac/vegetation type, excluding wetlands) proposed for removal during 2009-2017 construction activities in the Cantonment Area and WSAAF, and actual landcover impacts from construction activities on Fort Drum Military Installation.

Landcover Type	Proposed Acres					Actual Acres			
	2009-2011	2012-2014	2015-2017	Total		2009-2011	2012-2014	2015-2017	Total
Conifer Forest	283	45	25	353		11.75	1.01	4.17	16.93
Deciduous Forest	619	110	50	779		55.19	71.54	20.41	147.14
Disturbed/Developed	658	85	90	833		127.29	83.21	45.48	255.98
Grassland/Rangeland	518	30	35	583		59.06	44.84	15.96	119.86
Mixed Forest	509	75	35	619		0.50	11.62	6.20	18.32
Sand Dunes/Flats	116	25	25	166		11.35	6.92	0.00	18.27
Shrublands	169	30	35	234		66.28	6.61	5.13	78.02
Water/Wetlands*	8	10	5	23		5.00	0.49	0.05	5.54
Total	2880	410	300	3590		336.42	226.24	97.40	660.06

Table 2.2. Amount of landcover by type (buffered by 25 ac/vegetation type, excluding water/wetlands) proposed for removal during 2018-2020 construction activities in the Cantonment Area and WSAAF, on Fort Drum Military Installation.

Landcover Type	Proposed Acres
Conifer Forest	25
Deciduous Forest	45
Disturbed/Developed	65
Grassland/Rangeland	50
Mixed Forest	40
Sand Dunes/Flats	30
Shrublands	40
Water/Wetlands*	5
Total	300

2.1.1.2 Training Area Construction

Between 2009-2017, Fort Drum anticipated constructing on approximately 4695 ac (1900 ha; Table 2.3) of land in the Training Area. During these nine years, approximately only 372 ac (151 ha; 8%) were actually cleared for construction as of September 2017. This included the loss of approximately 318 ac (129 ha; 7%) of natural vegetation. The remaining approximately 54 ac (22 ha) were on already disturbed and/or developed land. There may be some additional acreage cleared for construction by the end of the calendar year; however, we do not anticipate that being a large amount. This will be reported through the end of the year reporting requirements.

We anticipate construction of approximately 25 new projects on up to 450 ac (182 ha) in the Training Area during January 2018 -December 2020 (Table 2.4).

Table 2.3. Amount of landcover by type (buffered by 25 ac/vegetation type) proposed for removal during 2009-2017 construction activities in the Training Area, and actual landcover impacts from construction activities on Fort Drum Military Installation.

Landcover Type	Proposed Acres					Actual Acres			
	2009-2011	2012-2014	2015-2017	Total		2009-2011	2012-2014	2015-2017	Total
Conifer Forest	172	100	25	297		0.00	0.00	0.00	0.00
Deciduous Forest	1449	75	45	1569		26.04	24.53	4.83	55.40
Disturbed/Developed	182	50	65	297		17.12	36.65	0.00	53.77
Grassland/Rangeland	791	30	50	871		94.91	27.69	2.93	125.53
Mixed Forest	595	150	40	785		91.13	2.45	2.86	96.44
Sand Dunes/Flats	0	25	30	55		0.00	0.13	0.00	0.13
Shrublands	432	50	40	522		23.85	9.81	2.22	35.88
Water/Wetlands*	259	35	5	299		3.00	1.25	0.64	4.89
Total	3880	515	300	4695		256.05	102.51	13.48	372.04

Table 2.4. Amount of landcover by type (buffered by 25 ac/vegetation type, excluding water/wetlands) proposed for removal during 2018-2020 construction activities in the Training Area on Fort Drum Military Installation.

Landcover Type	Proposed Acres
Conifer Forest	75
Deciduous Forest	75
Disturbed/Developed	75
Grassland/Rangeland	75
Mixed Forest	75
Sand Dunes/Flats	20
Shrublands	50
Water/Wetlands*	5
Total	450

2.1.1.3 Active Season Clearing

As discussed in Fort Drum's previous BAs, in order to facilitate small, unanticipated training-related projects, Fort Drum may need to clear trees in the Training Area during the time of year bats may be present on the property.

While Fort Drum will wait until after maternity colony activity has decreased (after August 15), we may need to clear trees prior to when bats have left the installation for hibernation.

As part of the previous BAs, it was determined the boundary for clearing trees after August 15 would only occur north and east of US Military Highway (Figure 2.1). This area is adjacent to most of the range facilities, and is most likely where small projects covered under this scenario would be sited. While this area is outside the area of known maternity colony use by the Indiana bat, it is within the known use area of the northern long-eared bat. Therefore, the following only applies to the northern long-eared bat.

During 2015-2017, up to 10 ac (4 ha) per year were anticipated to be cut during the active season; however, only approximately 0.3 ac was actually cut during this time. Please see email correspondence from 10/12/2017 for more information. No other actions were required. Fort Drum may still have this requirement in the next three years. Therefore, we still consider there will be up to10 ac per year (with no more than 5 ac total in one contiguous location) that would be removed for an immediate construction need during 2018-2020. There may be many combinations of forested habitat removal as part of this requirement (e.g., 2 projects that could remove up to 5 ac (2 ha) each, 5 projects that could remove 2 ac (0.8 ha) each, etc.). Although projects are subject to change, typical projects tend to be adjacent to existing trails or roads and are roughly 2 ac (0.8 ha) in size. Additionally, these projects would be anticipated to occur near existing ranges.

Before construction begins, each project will be evaluated for potential northern long-eared bat habitat. If the project site has no suitable roosting habitat (i.e., all trees are less than 3 in DBH, there are no dead/dying large diameter trees), roosting is unlikely, and there are no potential impacts to roosting bats.

If suitable roosting habitat is present and the project cannot be delayed until after October 15, there is the potential that a small number of northern long-eared bats to be present during tree removal activities. All northern long-eared bats will be volant and most would be anticipated to fly away unharmed. However, some bats may be trapped within a cavity or crevice and subsequently crushed and killed.

No land clearing for construction projects will occur between 16 April and 15 August anywhere on Fort Drum, and no construction projects will occur south/west of US Military Highway between August 16 - October 15. If an action is required south/west of US Military Highway, then additional consultation is needed with the USFWS. If Indiana bats are captured north/east of US Military Highway, then additional consultation is needed with the USFWS. Further consultation is also needed if a project exceeds 5 ac (2.02 ha) per site or if the cumulative acreage exceeds 10 forested ac (4 ha) per year.

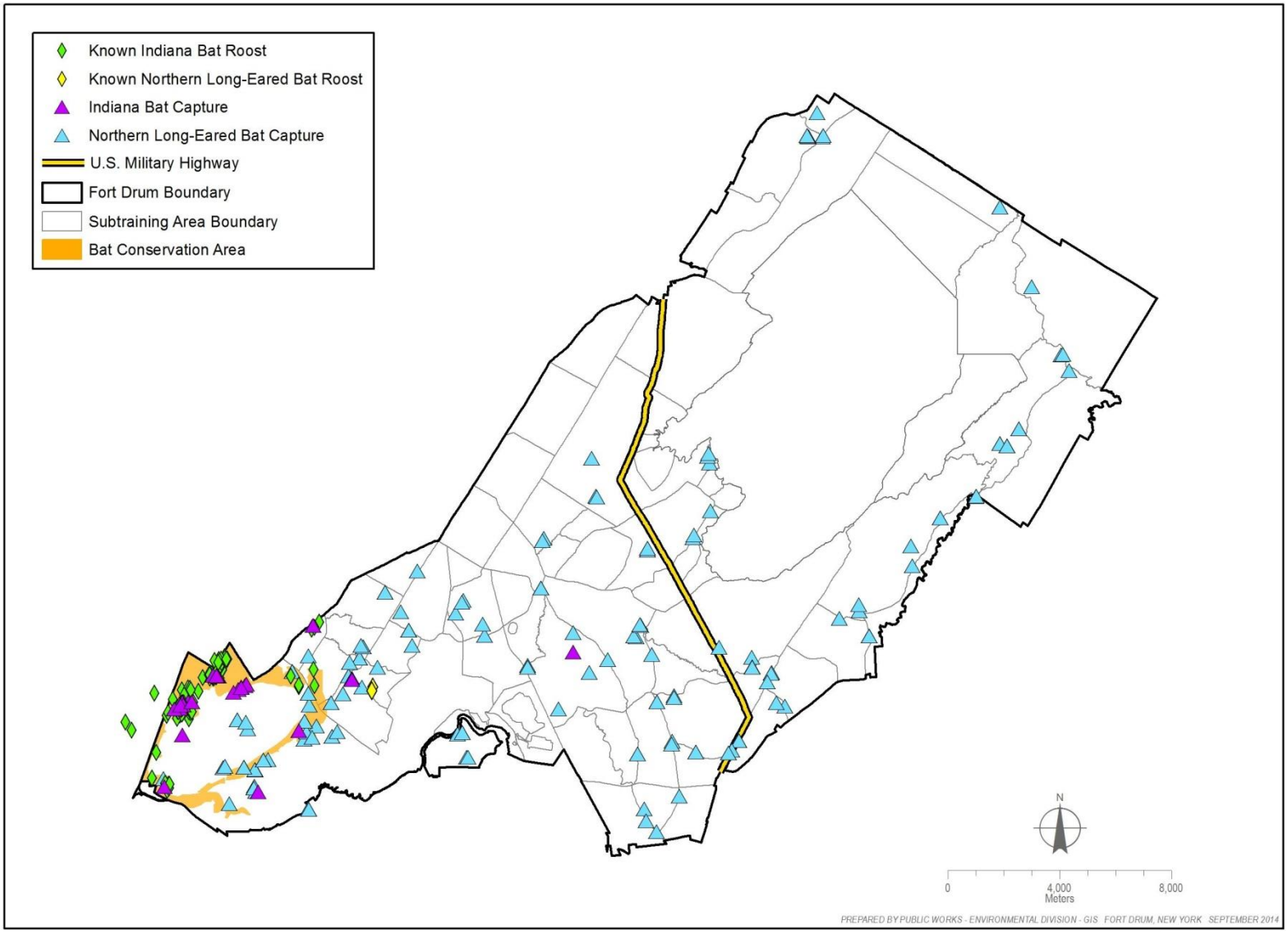


Figure 2.1. Location of US Military Highway boundary for active season clearing for construction projects on Fort Drum Military Installation.

2.1.1.4 Demolition

We anticipate up to approximately 225 buildings on the installation may be demolished between 2018-- 2020. The majority of buildings scheduled for demolition were built in the 1940s and are in the Cantonment Area. Demolition will occur any time of the year as long as no bats are documented in the structure. The LeRay Mansion is the only building on Fort Drum known to have (had) permanent, resident bats—a maternity colony of little brown bats. If bats of any species are discovered prior to, or during the course of demolition, then all work must cease and Fort Drum's Fish and Wildlife Management Program must be immediately contacted. If bats are identified as Indiana or northern long-eared bats, then additional steps will be taken to try and minimize impacts to the species and additional consultation with the USFWS is required. If the structure is safe to leave as is, then it will be left until after the bats have stopped using the structure. If the structure is unsafe and poses a risk to human health and safety, Fort Drum will attempt to exclude the bats immediately. If this is not possible, or bats are found to be using a structure during the maternity season when pups are not volant, the Fort Drum Fish and Wildlife Management Program will contact USFWS to discuss the most appropriate course of action.

2.1.1.5 Wetland Mitigation

Fort Drum has established a wetland mitigation bank to offset permanent impacts to wetlands (where appropriate). This mitigation bank was developed in accordance with US Army Corps of Engineers Mitigation Guidelines (33 CFR Parts 325 and 332; 40 CFR Part 230) and currently contains three sites (North Corner, Antwerp, and Range 37 Borrow Pit; Figure 2.2). Other than some minor vegetation management (e.g., invasive species control), there was no maintenance or management required at these sites during 2015-2017. There is no other management anticipated at these sites during 2018-2020.

Although no new wetland mitigation projects were constructed, Fort Drum's mitigation bank was utilized/debited for wetland impacts exceeding established thresholds during 2015-2017. There are no current plans for wetland construction during 2018-2020; however, small onsite wetland creation could occur to offset impacts, and/or the wetland bank will continue to be utilized when appropriate.

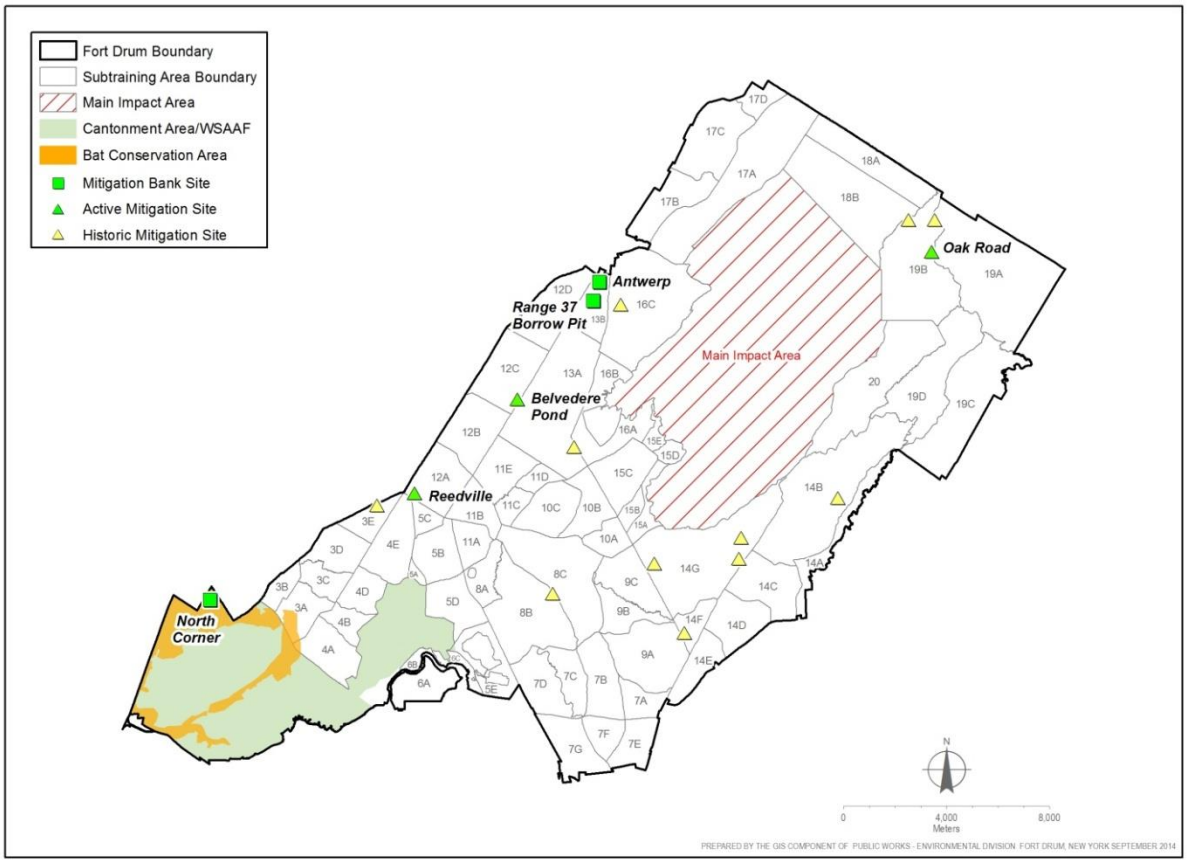


Figure 2.2. Constructed wetland mitigation sites and wetland bank sites on Fort Drum Military Installation.

2.1.2 Conservation Measures for Construction Activities

1. Bat Conservation Area. A 2,200+ ac (890 ha) Bat Conservation Area (BCA) was established in 2008 to protect known Indiana bat roosting and foraging areas from permanent development within the Cantonment Area. The BCA attempts to provide connectivity of existing habitat in the Cantonment Area along the West Creek and Pleasant Creek corridors and the relatively undeveloped northern portion of the Cantonment Area where most of the known primary and maternity roosts are known. The BCA accounts for more than 20% of the total land area in the Cantonment Area. See *Section 3.1* for more information about the BCA. The BCA will also provide protection for northern long-eared bats within the Cantonment Area.

2. Roost Tree Protection. All female roosts, including roosts identified in the future, will be protected from construction for the lifespan of the roost tree. Additionally, a buffer will be placed around all female roosts to protect the roost from disturbance and to maintain a semblance of a natural environment for Indiana and northern long-eared bats. The size and shape of a buffer will be determined on a case by case basis by Fort Drum's Fish and Wildlife Management Program in consultation with the USFWS. Factors that will be considered will include surrounding landscape, habitat connectivity, distance to other roosts, distance to known foraging areas, and any other issue important to target species.

3. Time of Year Restriction for Tree Felling. A time of year restriction for clearing trees (> 3 in DBH) has been established to protect roosting Indiana and northern long-eared bats during non-hibernation seasons. For the majority of construction activities, felling of trees must take place between October 16 - April 15 while most bats are at the hibernaculum. This will greatly reduce the risk of accidentally harming bats that may potentially be present in trees scheduled to be removed. Specifically, maternity colonies and their associated non-volant young will be protected from disturbance.

4. Flagging or signs will be used to demarcate areas to be cleared vs. not cleared prior to any construction activities for a given project. Flagging will be removed upon completion of the project.

5. Via Environmental Protection Plans, Scope of Works, Contracts, etc., all personnel responsible for construction activities will be informed about the need to follow design plans, stay within flagging, minimize impacts to wildlife and other environmental concerns.

6. Outdoor Lighting Minimization. For all future projects, Fort Drum will evaluate the use of outdoor lighting and seek to minimize light pollution by angling lights downward or via other light minimization measures following Appendix P. High light levels may deter bats from areas as their nocturnal behavior may have evolved in response to predation risks (Speakman 1995, Sparks et al. 2005). By angling the light away from potential foraging and roosting areas, the area will be darker thus providing bats more protection from predators.

7. Demolition. If the building has pre-existing known bat colonies, then Fort Drum's Fish and Wildlife Management must be contacted before demolition is to occur. If during the course of demolition, bats of any species are discovered, then all work must cease and Fort Drum's Fish and Wildlife Management Program must be immediately contacted. If bats are identified as Indiana or northern long-eared bats, then additional steps will be taken to try and minimize impacts to the species and additional consultation with the USFWS is required. If the structure is safe to leave as is, then it will be left until after October 15, or until bats have stopped using the structure. If the structure is unsafe and poses a risk to human health and safety, Fort Drum will attempt to exclude the bats immediately. If this is not possible, or bats are found to be using the structure during the maternity season when pups are not volant, the Fort Drum Fish and Wildlife Management Program will contact USFWS to discuss the most appropriate next course of action.

8. Water Quality. All construction activities with ground disturbance greater than one acre or that meets another requirement of the New York State Department of Environmental Conservation, are required to follow standards in New York State Pollutant Discharge Elimination System: Storm water General Permit for Storm water Discharges (Permit No. GP-0-08-001 Issued Pursuant to Article 17, Titles 7, 8 and Article 70 of the Environmental Conservation Law). All construction projects over an acre are required to prepare a sediment and erosion control plan or a storm water pollution prevention plan (SWPPP), which details all erosion and sediment control practices and, when necessary, post-construction storm water management practices. Practices mentioned within the SWPPP will be in accordance with the New York State Stormwater Management Design Manual ("Design Manual") dated August 2003, or the most current version or its successor. Erosion and sediment controls vary, depending on individual impacts from

each project. Some temporary examples of erosion and sediment controls include silt fences, check dams, and sediment traps. Permanent controls may include retention ponds, detention ponds, and grass lined swales. With water quality control measures in place, it is expected that declines in water quality will be minimal and thus will continue to provide adequate habitat for Indiana bat prey and drinking water for Indiana bats. In fact, water quality may actually improve during the construction of future projects due to new stormwater practices that mitigate for old water quality issues when no conservation measures were required or implemented.

9. Record-keeping and Reporting. For annual reporting purposes, all entities responsible for construction activities on Fort Drum will submit electronic shapefiles of clearing limits to Fort Drum's Fish and Wildlife Management Program. This information will be used to describe vegetative cover types and habitat loss on Fort Drum and reported annually to the USFWS.

2.1.3 Effects to Indiana and northern long-eared bats

Fort Drum does not anticipate that there will be any significant change from the amount, type, and/or duration of construction that was previously analyzed in the previous BAs and that will occur on Fort Drum over the next 3 years. During 2009-2017, Fort Drum had anticipated that construction could occur on up to 8285 ac (3353 ha) of which approximately 7155 ac (2896 ha) could impact natural habitat. Construction actually occurred on only approximately 1032 ac (418 ha) of which 722 ac (292 ha) occurred within natural habitat. There may be some additional construction after the completion of this document and prior to the end of the calendar year, and that will be identified through the end of year reporting requirements.

While construction type and/or location may vary annually, we do not anticipate any activity that would cause any additional or unaddressed impacts not previously covered under the previous BAs. Given that only a small portion of previously anticipated habitat has been lost, there are currently no large scale construction projects scheduled for the next 3 years (only approximately 600 acres (worst case scenario total are scheduled for removal), and projects are spread out across the Cantonment and Training Areas, Fort Drum anticipates limited potential impacts from construction activities to either species of bats.

After reviewing the project description and effects analysis for this section in the previous BAs, we feel that it is suitable in scope to address any potential impacts to both Indiana and northern long-eared bats. Additionally, no new information has been collected through monitoring efforts for these species over the past 3 years. Therefore, we affirm that the conservation measures and effects analysis is appropriate from the previous BAs and suitable to address both Indiana and northern long-eared bat. Please see Appendices A-C, Section 2.1 for a more detailed description and background of these activities as well as maps of the previous locations for construction activities.

2.1.4 Conclusion

All covered construction activities in 2018-2020 may affect, but are not likely to adversely affect Indiana bats.

Most construction activities in 2018-2020 may affect, but are not likely to adversely affect northern long-eared bats.

Although there will be a cumulative, permanent loss of some potential foraging and roosting habitat within the Cantonment and Training Area, conservation measures are in place that will minimize potential direct and indirect impacts to these species. The BCA will continue to protect 2200 acres that encompasses the known maternity colony of Indiana bats, with all associated known primary maternity roosts, approximately 93% of all known roosts, and the majority of known foraging habitat on Fort Drum. As northern long-eared bats have historically been captured throughout the Cantonment Area, the BCA will provide protection for that species as well. Additionally, a tree cutting restriction between April 15–October 15 will protect the majority of Indiana and northern long-eared bats on the property outside of the BCA.

Normal construction activities in the Training Area are likely to have minimal effects on the known maternity colony of Indiana bats. Indiana bats have used the same general areas on Fort Drum since 2007, and it is expected that they will continue to utilize these areas as long as suitable roosting and foraging areas remain available. Given the declines of Indiana bats due to WNS, it is unlikely that the remaining population would abandon a historic roosting and foraging area to exploit new areas.

Normal construction activities in the Training Area are also likely to have minimal effects on northern long-eared bats. Given the limited loss of suitable habitat, the vast amount of natural habitat available and the amount expected to remain in the Training Areas, and the WNS induced reductions of northern long-eared bats on Fort Drum, there should be ample roosting and foraging area available for the remaining population of northern long-eared bats.

Although normal construction activities should pose minimal impacts, active season clearing for immediate need range construction projects may lead to unavoidable impacts to northern long-eared bats. These activities may clear up to 10 acres/year during the time of year bats are present on Fort Drum. Little is known about northern long-eared bat roosting on Fort Drum, and there is potential for these bats to be found in the range construction project areas. No tree clearing will occur before 16 August to avoid impacts to non-volant pups, and all bats should be able to leave the project footprint once disturbance starts; however, the potential exists that a small number of individual northern long-eared bats may not be able to exit a roost quickly enough during tree clearing activities at the project location and will subsequently be crushed and killed.

2.2 Military Training

Fort Drum has been used as a military training site since 1908, and military training continues to be the primary purpose of the installation. Training is somewhat dictated by weather and climate; however, training occurs on Fort Drum year-round at all times of the day and night. The majority of training is conducted in the Training Area. The Training Area comprises approximately 97,737 ac (39,533 ha)—over 90% of the entire installation—and can be roughly divided into three components: maneuver area, ranges, and the Main Impact Area. Additional training activities also occur in the Local Training Areas (LTAs) within the Cantonment Area.

2.2.1 Military Training Activities

Fort Drum does not anticipate that there will be any significant change from the amount, type, and/or duration of military training that was previously analyzed in the 2009-2011, 2012-2014, or 2015-2017 BAs and that will occur on Fort Drum over the next 3 years. While training type and/or intensity may vary annually as differing numbers of soldiers utilize the facilities, we do not anticipate any activity that would cause any additional or unaddressed impacts not previously

covered under the previous BA for sustainment operations, engineering operations, air operations, water operations, field training operations, live munitions training, demolition, and smoke/obscurants. Please see Appendices A-C, Section 2.2 for a more detailed description and background of these activities as well as maps of the Training Area, LTAs, and range facilities.

Smoke/Obscurants

Smoke/obscurants are used to conceal military movements and help protect troops and equipment. They can be used throughout the Training Area as part of another military operation, or as part of an independent training scenario. Although they would be primarily used during the day, smoke/obscurants may be deployed at night.

For the purposes of this BA smoke/obscurants are classified into three categories: (1) smoke operations-operations that utilize fog oil to produce large amounts and sustained smoke; (2) colored smoke, smoke grenades, and smoke pots (aka pyrotechnics) -items that typically utilize terephthalic acid (TPA) to produce smoke; and (3) smoke munitions-those items that typically utilize white phosphorous (WP) for signaling, screening and incendiary purposes.

Category 1

Although Category 1 smoke operations have not been utilized on Fort Drum in the past 8+ years, this type of training could occur on approximately 30,000 ac (12,140 ha) of the Training Area. Smoke training would be rotated regularly among multiple areas to minimize impacts to any one area of the installation. A typical training exercise that uses smoke/obscurants and smoke generators would normally last from 1 to 4 hours. Smoke generators may generate smoke from fixed locations or during mobile operations covering up to several hundred acres or more. Smoke dispersion is variable depending on means of dispersing smoke (i.e., fixed or static) and weather conditions (i.e., wind). Refer to Appendix A for representative examples of fog oil dispersion from static and mobile smoke training areas in Pasquill atmospheric stability category E (3D/International 1997). Fog oil (i.e., Standard Grade Fuel #2) would be generated the majority of the time, while graphite could also be generated about 25% of the training time (ENSR 2006). Graphite smoke is currently not approved for large scale use on the installation, therefore it will be excluded from analysis. If a graphite smoke operation is planned, further consultation with the USFWS will be required.

Potentially up to 200 days of training could be conducted using fog oil smoke each year. In those 200 days, approximately 270 generator-hours (number of hours each generator would operate annually x number of generators used on installation) would produce fog oil smoke per year. Approximately 22,120 gallons of fog oil per year could be used on Fort Drum to produce fog oil smoke.

Category 2

TPA is used in Category 2 floating or ground smoke pots, and in smoke grenades (aka pyrotechnics). TPA is ignited and burned to produce smoke. The primary combustion products of TPA are carbon monoxide, carbon dioxide, sulfur dioxide, benzene, toluene, and formaldehyde. It is used alone, or in combination with fog oil to fill in incomplete fog oil screens. Smoke grenades would typically generate 30 seconds to 2 minutes of smoke and smoke pots would typically generate up to 5 minutes of smoke. Refer to Appendix A-C for past usage of smoke/obscurants for concentrations of TPA at varying distances (Pasquil Category B).

Category 3

Category 3 WP is used for signaling, screening, and incendiary purposes, and is usually dispersed by explosive munitions. WP is used only on the Range facilities and in the Main Impact Area. WP flame produces a hot, dense white smoke composed of particles of phosphorus pentoxide, which are converted by moist air into phosphoric acid. WP ignites when it is exposed to air and may cause burns. Smoke typically lasts up to 15 min.

2.2.2 Conservation Measures for Military Training

1. a) No Category 1 smoke operation will be conducted within 1,000 m of the installation boundary, public roads, Cantonment Area, ammunition supply point or WSAAF in accordance with *Fort Drum Regulation 350-4 Range Regulation* and *Fort Drum Regulation 350-6 Assignment and Operational Use of Local Training Areas (LTAs)*. This restriction currently protects all known Indiana roosts and the majority of the known maternity use area (i.e., roosting and core foraging area) from close proximity smoke exposure.

   b) In the Training Area, Category 1 smoke and obscurants must be used >100 m from any known Indiana or northern long-eared bat maternity roost areas between April 16 – October 15. This will help to protect Indiana and northern long-eared bat roosts into the future. The 100 m buffer serves to minimize the effects of smoke and obscurants by providing distance between the roost and the densest amount of the smoke/obscurants. Training missions will be aware of maternity areas via the NEPA process and will be directed to avoid these areas.

   c) Category 1 smoke operations must also be rotated among training areas to minimize impacts to any one area.

   d) The use of Category 2 smoke (aka pyrotechnics) may be used in the Training Areas at any time within 1,000 m of the installation boundary, but will not be used within 100 m of any known Indiana or northern long-eared bat roost areas between April 16 - October 15.

   e) Category 2 smoke may not be used within 100 m of any forested areas within the LTAs between April 15 - October 15, (with the exception of use at the mobile MOUTs as identified in f) below). Approval from Range Control and NEPA review is required prior to any use of Category 2 smoke, and these reviews will help ensure that Category 2 smoke use is in accordance with this conservation measure.

   f) Category 2 smoke may be periodically used at three mobile MOUTs within the LTAs during April 15- October 15. All mobile MOUTs are currently outside of the BCA, but are in relatively close proximity (approximately 25, 35, 140m, respectively). Only infrequent use of colored smoke is expected to be used in around the mobile MOUTs. The closest known roost tree to the Mobile MOUTs is approximately 270m away. With the exception of the Category 2 colored smoke used at the mobile MOUTS, no other smoke or obscurant may be used in the BCA. Currently, all known Indiana bat maternity roosts are found within the BCA or within a 1,000 m from the installation boundary.

2. In the Training Area and LTAs, the cutting of trees and tree removal is prohibited without approval by Fort Drum's Forest Management Program in accordance with current

Environmental Guidelines. If approved, actions will be in accordance with all conservation measures in *Section 2.3 Forest Management*. In general, this is a relatively rare military training action. No female roosts, including roosts identified in the future, will be felled for training for the lifespan of the roost. No tree felling will occur in the BCA for training purposes.

3. In the LTAs, vehicular traffic is restricted to open grassy areas within easy access of the road in accordance with *Fort Drum Regulation 350-6 Assignment and Operational Use of Local Training Areas*. Vehicles are not permitted to cross streams, ditches, wetlands, or dense vegetation in order to reach grassy areas without prior NEPA review, thus minimizing impacts to natural habitats.

4. In the LTAs, POL operations are prohibited in accordance with *Fort Drum Regulation 350-6 Assignment and Operational Use of Local Training Areas.* This helps to minimize the risk of accidental water/ground contamination.

5. Fort Drum will abide by the Fort Drum Integrated Wildland Fire Management Plan (Fort Drum 2013) which includes fire danger ratings, unless under special circumstances that are approved by the commander. Military activities that may spark fires will not be conducted during moderate to high danger ratings in order to prevent unintentional wildfires. Although unintentional fires will still ignite and burn, this conservation measure will help protect Indiana and northern long-eared bats from smoke exposure and from roost destruction. Burn bans are most likely implemented during the summer months when reproductive bats are present on Fort Drum.

2.2.3 Effects to Indiana and Northern Long-eared Bats

After reviewing the project description and effects analysis for this section in the previous BAs, Fort Drum has determined they are suitable in scope to include any potential impacts to both Indiana and northern long-eared bats. We have also determined that the conservation measures are suitable for both species. Subsequently, we have reaffirmed that those activities may affect, but are not likely to adversely affect Indiana bats, as they should have no different impacts in the next three years as they had in the previous nine covered under the 2009-2011 and 2012-2014 and 2015-2017 BAs. Additionally, we have determined those activities (except smoke/obscurants) may also affect, but are not likely to adversely affect northern long-eared bats for the same reasons identified through the previous analysis. However, the use of smoke/obscurants is likely to adversely affect northern long-eared bat. Please see Appendix C for the detailed effects analysis for all operations and activities.

2.2.4 Conclusion

Considering their presence on Fort Drum and the length of time Fort Drum has been an active military installation, it is assumed that Indiana and northern long-eared bats have adapted to military noise, training, and other subsequent military related activities. However, given the impacts of WNS, small adverse impacts to the species that previously could have been benign, can now exacerbate the disease impacts. No type of military training is expected to do that, except the use of smoke/obscurants. While the use of smoke and obscurants is not anticipated to adversely affect Indiana or northern long-eared bats within the Indiana bat core roosting and foraging area, northern long-eared bats using unknown areas in the Training Area for roosting

and foraging are likely to experience direct adverse effects primarily through smoke inhalation and indirect effects through reduced fitness.

2.3 Forest Management

2.3.1 Forest Management Activities

Please see Appendix A, Section 2.3 for more detailed information about the Forest Management Program on Fort Drum

In the 2015-2017 BA, it was anticipated that up to 2500 ac (1012 ha) of forests would be harvested (Table 2.5). However, actual harvest during that time was approximately 1500 ac (607 ha; Table 2.6) at the time of this document. An additional approximate 550 ac (223 ha) could be harvested in the fall of 2017; however, the total acreage (~2050) would still be below the anticipated harvest amount. The Forest Management Program anticipates cutting approximately the same amount during the next 3 years. This acreage will also include all potential standing firewood sales that remove trees greater than 3" DBH.

In addition to timber harvesting, up to 300 ac (121 ha) within forested stands will be managed between August 16 - April 15 to support tree regeneration and control unwanted vegetation. This site preparation will remove vegetation less than 3 in DBH to prepare the area for seed drop and subsequent regeneration. Site preparation within a stand will typically occur via mechanical or herbicide application the year following a timber harvest. If site preparation is required at other sites, then further consultation will be needed.

Forest management on Fort Drum utilizes both even-aged (e.g., clearcutting or shelterwood) and uneven-aged (e.g., thinning or group selection) harvest methods to manage forests to support military training, timber production/health, and wildlife habitat creation/enhancement. Environmental conditions (e.g., wet or rocky soils), training requirements, and stand characteristics dictate harvest methods. It is anticipated that approximately one quarter (up to 625 ac) of the harvesting would be completed for military training, one half (up to 1250 ac) completed for uneven-aged management, and one quarter (up to 625 ac) completed for even-aged management. It is also anticipated that even aged management will typically occur on sites no larger than 50 ac in one contiguous location, and no more than 208 ac per year.

Table 2.5. Approximate acreage of forests that were proposed for harvest between January 2015 -December 2017, and acreages actually harvested on Fort Drum Military Installation.

Forest Type	Proposed Acres	Actual Acres
Conifer	400	432
Deciduous	300	454
Mixed	800	585
Unknown	1000	0
Total	2500	1471 (2050)

Table 2.6. Approximate acreage of forests (buffered by 1000 ac) that are proposed to be harvested for all Forest Management actions between January 2018 -December 2020 on Fort Drum Military Installation.

Forest Type	Proposed Acres
Conifer	400
Deciduous	300
Mixed	800
Buffer	1000
Total	2500

Most timber harvesting is expected to occur within the Training Area, and no treatments are currently scheduled within the Cantonment Area. Other actions (e.g., tree clearing for construction, maintenance activities, invasive species management, or other goals) may require the removal of trees in the Cantonment Area, however, these are not sustainable forestry actions and are addressed in *Section 2.1 Construction* and *Section 2.4 Vegetation Management*, respectively.

Military Training Support

Fort Drum does not anticipate that there will be any significant change from the amount, type, and/or duration of military training support actions that was previously analyzed in the 2009-2011, 2012-2014, or 2015-2017 BAs and that will occur on Fort Drum over the next 3 years.

While these support actions may vary annually, we do not anticipate any activity that would cause any additional or unaddressed impacts not previously covered under the previous BAs. Please see Appendix A, Section 2.2 for a more detailed description and background of these activities. Please also see Appendix A, Section 2.3 for more information regarding forest management for military training support.

Timber Production/Forest Health

Actions carried out to support timber production/forest health in the next three years are expected to be similar to those covered under the 2009-2011and 2012-2014 and 2015-2017 BAs. While actions may vary annually, we do not anticipate any activity that would cause any additional or unaddressed impacts not previously covered under the previous BAs. Please see Appendix A, Section 2.3 for more information regarding forest for timber production/forest health.

Wildlife Habitat Management

Actions carried out to support wildlife habitat management in the next three years are expected to be similar to those covered under the 2009-2011 and 2012-2014 and 2015-2017 BAs. While amount, type, and/or duration may vary annually, we do not anticipate any activity that would cause any additional or unaddressed impacts not previously covered under the previous BAs. Please see Appendix A, Section 2.3 for more information regarding forest management for wildlife habitat management.

Water Quality Protection

Fort Drum's Forest Management Program and Wetlands Management Program developed several measures to minimize the risks of impacting water quality from soil disturbance, which also provide a benefit to a variety of wildlife.

1. If possible, new log landings will be constructed at least 200 ft (61 m) from water bodies and wetlands.

2. Spill kits and oil absorbent mats will be present on log landings in case of fuel, lubricant or hydraulic fluid spills or leaks.

3. If necessary, soil will be stabilized by seeding and mulching at the end of the operation.

4. Where possible, skid trail grade will be maintained at less than 15%. Where higher grade is unavoidable, the grade will be broken, drainage structures will be installed, and soil stabilization practices will be used where needed to minimize runoff and erosion.

5. Debarking and other damage to residual trees will be minimized wherever possible.

6. Stream crossings will be used only when absolutely necessary. If necessary, bridges will be deployed to minimize damage to bed and bank of the stream.

7. Streams will be crossed by the most direct route.

8. Ruts will be filled in, and water bars and erosion barriers will be installed to prevent or minimize erosion and sedimentation from roads, skid trails and log landings.

9. Erosion control measures will be inspected within 24 hours after a rain event and checked once per week. Erosion controls will be maintained or removed as needed.

10. No machinery will be operated in streams protected under Article 15 of the New York State Environmental Conservation Law without first obtaining a permit from NYSDEC.

Firewood Cutting

The Forest Management Program issues approximately 300 firewood permits annually, which results in the removal of about 400 cords of firewood per year. Firewood is collected only from trees that are dead AND downed (i.e., laying on the ground) throughout the installation. This is different from the standing firewood sales as identified above. The Main Impact Area, active construction sites, and environmental or archeological sensitive areas marked with "Off-Limits by Order of the Commander" signs or Seibert Stakes are off-limits to firewood collection. Firewood may be removed via tractors, four wheelers, bobcats, or other mechanical means. Historically, soil disturbances and water quality concerns from these activities have been minimal.

2.3.2 Conservation Measures for Forest Management Activities

To minimize the risks of impacting Indiana and northern long-eared bats during forest management activities, while benefiting bat habitat, several conservation measures have been implemented.

1. Bat Conservation Area. Approximately 2,200 ac (890 ha) have been set aside for Indiana bats. This BCA will also provide the same protections to northern long-eared bats. Timber harvests will not occur within the BCA until an appropriate management plan is developed and the plan has been consulted on. If timber harvesting is needed within the BCA, then consultation with the USFWS is needed.

2. Roost Tree Protection. No female roost trees, including roosts identified in the future, will be felled for the lifespan of the roost, unless there is a human health and safety concern. This includes roost trees in and outside of the BCA.

3. Roost Tree Avoidance. Clearcutting and overstory roost tree removal will not occur within 0.75 mi (1.2 km) of known maternity roost trees located outside the BCA without further consultation with the USFWS. An exception to this requirement is a small number of small forested patches (ranging from ~5-15 acres) that will be clearcut at or near WSAAF to meet federal regulations for air safety. The majority of these patches contain trees primarily less than 4 in dbh. They will be maintained as forest, but will be clearcut approximately every 5-10 years to keep them at the appropriate height. Selective thinning will not occur within one tree height of the known roost tree to minimize the risk of accidentally felling a known maternity roost during the non-hibernation season. Tree height is based on the average height of the stand (~80 ft (24 m)) surrounding the roost tree. For selective thinning harvests within 0.75 mi of a known maternity roost, all snags will be retained, and live trees > 16 in DBH that have noticeable cracks, crevices, or exfoliating bark will be favored as residuals. Further consultation will be needed with the USFWS for timber harvests that do not follow this conservation measure.

4. Firewood Cutting Restriction. The known primary Indiana bat roosting areas (those areas behind Guthrie Clinic and Cool Road) have been made off limits to firewood cutting during April 16- October 15. Although firewood harvest only removes trees that are lying on the ground, this restriction will help avoid any associated noise or disturbance in the roosting areas from chainsaws and/or tractors used in the harvest of the wood.

5. Time of Year Restriction. A time of year restriction for clearing trees (> 3 in DBH) has been established to protect roosting bats during non-hibernation seasons. Felling of trees must take place between October 16 - April 15 while most Indiana or northern long-eared bats are at the hibernaculum.

6. Snag Retention. Indiana and northern long-eared bats typically select areas that have high snag densities for establishment of maternity colonies, so snag retention will benefit roosting bats by providing areas to rear young. All snags will be left in silvicultural treatments unless there is a safety concern for the contractor or the military units training in the stands (e.g., maneuver corridors), or unless the treatment is a salvage harvest or clearcut. Snags should be distributed and retained throughout the landscape.

7. No cutting of trees will occur within or along the bed or bank of streams protected under Article 15 of the New York State Environmental Conservation Law unless required to meet specific management goals and only after obtaining a permit from NYSDEC.

8. A minimum of 70 sq ft of residual basal area, all snags, and all live trees > 16 in DBH that have noticeable cracks, crevices, or exfoliating bark will be retained around all perennial streams and open waterbodies (2 ac or greater in size) on Fort Drum. A perennial stream is defined as having flowing water year-round during a typical year. The water table is located above the stream bed for most of the year. Groundwater is the primary source of water for stream flow. Runoff from rainfall is a supplemental source of water for stream flow. If silvicultural treatments are needed that do not meet this conservation measure and that do not have a "no effect" determination, then individual consultation will be required with the USFWS. This buffer protects water quality and provides foraging habitat for Indiana bats. Indiana bats are known to utilize riparian corridors that have suitable vegetative cover for foraging and for roosting in nearby trees (Jachowski et al. 2014a, Garner & Gardner 1992).

9. For annual reporting purposes, the Forest Management Program will provide shapefiles of harvested areas, vegetative cover types pre- and post-harvest (within a scaled map), and the harvesting method used to Fort Drum's Fish and Wildlife Management Program. This information will be used to describe the vegetative cover types and habitat modification on Fort Drum and will be reported annually to the USFWS.

2.3.3 Effects to Indiana and Northern Long-eared Bats

Unlike construction, forest management actions are not designed to result in the permanent loss of habitat. In fact, forest management has the potential to provide long-term beneficial effects for Indiana and northern long-eared bats with only short-term negative effects in many cases.

Fort Drum does not anticipate that there will be any significant change from the amount, type, and/or duration of forest management that was analyzed in the previous BAs and that will occur on Fort Drum over the next 3 years. During 2015-2017, Fort Drum had anticipated that forest management could occur on up to 2500 ac (1012 ha); however, management actually occurred on only approximately 1500 ac (607ha), with the possibility of a total of approximately 2050 ac (830 ha). Although multiple forest management actions are scheduled for completion during 2018-2020, those projects will remove limited potential roosting and foraging habitat for Indiana or northern long-eared bats, and extensive areas of habitat will remain.

While forest management type and/or location may vary annually, we do not anticipate any activity that would cause any additional or unaddressed impacts not previously covered under the prior BAs. Fort Drum anticipates limited potential impacts from forest management activities to either species of bats.

After reviewing the project description and effects analysis for this section in the previous BAs, we feel that it is suitable in scope to address any potential impacts to both Indiana and northern long-eared bats. Additionally, no new information has been collected through monitoring efforts for these species over the past 3 years. Therefore, we affirm that the conservation measures and effects analysis is appropriate from the previous BAs and suitable to address both Indiana and northern long-eared bat. Please see Appendix A, Section 2.3 for a more detailed description and background of these activities as well as maps of the previous locations for forest management activities.

2.3.4 Conclusion

Suitable habitat has never been considered a limiting factor for viable Indiana bat colonies on Fort Drum given that the core maternity colony habitat has been protected within the BCA. In addition, suitable habitat has not been considered a limiting factor for northern long-eared bats. Given the reduced populations of these bat species due to WNS impacts, and ample suitable forested habitat for roosting and foraging remaining, this is even less of a concern for the remaining bats. Further, forest management on Fort Drum is expected to benefit the remaining Indiana and northern long-eared bats in the long-term by manipulating the structure, species composition, and ages of forests. Although some tree harvesting may temporarily reduce optimal roosting and foraging habitat, based on the type of silvilcultural treatment, the area may actually become more suitable for foraging or roosting over a longer period of time. Conservation measures such as time of year restrictions, snag retention and recruitment, and avoidance of known bat roosting and foraging locations, as well as the vast size of Fort Drum and available forests, reduces potential impacts to Indiana and northern long-eared bats when performing forest management actions. Given this information and conservation measures that will be employed, potential impacts to Indiana and northern long-eared bats from forest management actions should be minimal. These actions may affect, but should not adversely affect Indiana or northern long-eared bats, and should have beneficial effects in the long-term.

2.4 Mechanical Vegetation Management

2.4.1 Mechanical Vegetation Activities

Fort Drum anticipates the following changes over the next 3 years to the amount, type, and/or completion of mechanical vegetation management actions that was previously analyzed in the 2009-2011 or 2012-2014, or 2015-2017 BAs:

1) Up to 4500 ac (1821 ha) of management for specific vegetation (e.g., shrubs, < 3 in dbh trees, or invasive plants), may occur over the next three years within the Training Area or the Cantonment Area. This is slightly different to the previous BAs, where it was determined that up to 3500 ac (1416 ha) of mechanical vegetation would occur and be primarily within the Training Area. This increase is primarily to target invasive species. Most of the recent invasive species vegetation management has been handled through herbicide application (see Section 2.6); however, Fort Drum has been able to get more funding, manpower, and mechanical equipment to deal with invasive vegetation as well. The original 2009-2011 BA briefly mentioned this as a possible action for the future, but not much was completed with this management until the last couple of years, and even then it was not a large amount of acreage. The anticipated acreage provided is likely liberal as the entire areas/habitats targeted may not always be cut. Primarily the patches of invasive shrubs and plants will be targeted, although other small trees and shrubs may need to be removed to facilitate overall management of the area for invasives.

   While the 2009-2011 BA indicated that there were no plans for vegetation management within the Local Training Areas that are part of the BCA, this is now no longer the case. In targeting invasives, overall management may occur within the BCA. To minimize any potential impacts in the BCA, no more than to 50 ac per year (no more than 25 ac in a contiguous block- this Conservation Measure has been added) will be cut, and mowing/ vegetation removal will not occur within 100 ft of known roost trees to avoid disturbing roosting bats and maintaining cover around the roosts. Primarily the patches of invasive

shrubs and plants will be targeted, although other small trees and shrubs may need to be removed to facilitate overall management of the area for invasives.

We believe that the changes to the acreage does not change the previous impacts analysis from the prior documents. While targeting specific vegetation patches may remove a small amount of potential foraging area, the impacts should be minor. Removal of these invasive species should help in long-term management of the BCA as well, for long term sustainability. Therefore, we affirm that the effects analysis is appropriate from the previous BAs, and the conservation measures are suitable to address both Indiana and northern long-eared bat. Please see Appendix A-C for more information.

2.4.2 Conservation Measures for Mechanical Vegetation Management Activities

1. Time of Year Restriction for Tree Felling. A time of year restriction for clearing trees (> 3 in DBH) and removing low- to medium-risk hazard trees has been established to protect roosting bats during non-hibernation seasons. Felling of trees must take place between October 16 - April 15 while most Indiana and northern long-eared bats are at hibernation sites. This will greatly reduce the risk of accidentally harming bats that may potentially be present in trees scheduled to be removed. Specifically, maternity colonies and their associated non-volant young will be protected from this disturbance.

2. Roost Tree Protection. No female roost trees, including roosts identified in the future, will be removed unless determined to be high risk hazard trees (see #4 below). Hazard trees that are not considered high risk, will be removed during the winter. Roost trees may not be removed for any other reason (e.g., aesthetically unappealing).

3. Mowing/ vegetation removal will not occur within 100 ft of known roost trees to avoid disturbing roosting bats and maintaining cover around the roosts.

4. No more than 50 ac per year (and no more than 25 ac in a contiguous block) will be mechanically removed within the BCA annually.

5. High Risk Hazard Trees. For hazard trees that are determined to be high or critical classified between April 16 – October 15, Fort Drum's Fish and Wildlife Management Program personnel will be notified in advance, so they may assess the hazard tree. If appropriate, an emergence survey will be conducted and if no bats are observed, then the roost tree will be promptly removed. This will reduce the risk of removing an undiscovered roost tree. If bats are observed, then further consultation with the USFWS is needed.

6. Reporting. Personnel responsible for each vegetation management action must provide a scaled map of the treated area, specify the type of management action that occurred, report the total acreage of impacted habitat, and the vegetative cover types that were managed (i.e., number of hazard trees removed, amount of shrubland habitat cleared) to Fort Drum's Fish and Wildlife Management Program for annual reporting requirements to the USFWS. Mowing of landscaped grass in the Cantonment Area does not need to be documented.

2.4.3 Effects to Indiana and Northern long-eared bats

After reviewing the project description and effects analysis for this section in the previous BAs, Fort Drum has determined they are suitable in scope to include any potential impacts to both Indiana and northern long-eared bats. We have also determined that the conservation measures (as amended) are suitable for both species. Subsequently, we have reaffirmed that vegetation management activities may affect, but are not likely to adversely affect Indiana or northern long-eared bats, as they should have no different impacts in the next three years as they had in the previous nine years covered under the 2009-2011 and 2012-2014 and 2015-2017 BAs.

Please see Appendices A-C, section 2.4 for the detailed effects analysis for Mechanical Vegetation Management.

2.4.4 Conclusion

Vegetation management of grass, shrubs, and trees < 3 in DBH has the potential to alter insect diversity and possible abundance, potentially altering roosting habitat and behavior for these bat species. Hazard tree removal could remove potential roosts for these species, and in season removal could cause harm or adverse effects to non-volant young. However, in general, given the size of Fort Drum and the vast amount of natural areas remaining, management or removal of vegetation through this activity is unlikely to have any discernible effects to Indiana or northern long-eared bats. With the time-of-year restriction for clearing of most trees, and the other conservation measures and screening criteria in place to deal with hazard tree removal, and vegetation removal within the BCA, any negative effects should adequately be minimized. Therefore, mechanical vegetation management may affect but is unlikely to adversely affect Indiana and northern long-eared bats.

2.5 Land Conversion

2.5.1 Land Conversion Activities

The land conversion category was a new activity identified for 2015-2017. This activity was performed primarily for military training requirements or to modify habitat for wildlife goals.

Fort Drum anticipates the following changes over the next 3 years to the amount, type, and/or completion of land conversion actions that was previously analyzed in the 2015-2017 BA:

1) Up to 300 ac in a single year may be removed at WSAAF to convert forested areas to grassland. In the previous BA it was identified that only 100 ac/ yr would be converted; however, no actions were able to be performed in the past three years. This area is growing rapidly and causing increasing safety concerns for airfield operations. Therefore, Fort Drum is going to attempt to remove all of the woody vegetation through a timber sale and then follow up with additional actions to convert the area to grass. If the timber sale doesn't occur as planned, it is likely given time and manpower constraints that 100 ac/ yr would still be likely.

Given the type of young forest habitat that is present, and the time of year that it will be cut, we don't anticipate that there would be any substantial differences to our analysis whether we converted 100 ac/ yr or all of the acreage at once. Therefore, we affirm that the effects analysis

is appropriate from the previous BA, and the conservation measures are suitable to address both Indiana and northern long-eared bat. Fort Drum does not anticipate that there will be any other change from the amount, type, and/or duration of land conversion activities that was previously analyzed in the 2015-2017 BA and that will occur on Fort Drum over the next 3 years. Please see Appendix C, Section 2.5 for more information.

2.5.2 Conservation Measures for Land Conversion Activities

To minimize the risks of impacting Indiana and northern long-eared bats during land conversion activities, several conservation measures have been implemented.

1. Bat Conservation Area. Approximately 2,200 ac (890 ha) have been set aside for Indiana bats. This BCA will also provide the same protections to northern long-eared bats. Land conversion will not occur within the BCA without additional consultation with the USFWS.

2. Roost Tree Protection. No female roost trees, including roosts identified in the future, will be felled for the lifespan of the roost, unless there is a human health and safety concern. This includes roost trees in and outside of the BCA.

3. Roost Tree Avoidance. Land conversion activities will not occur within 0.75 mi (1.2 km) of known maternity roost trees located outside the BCA without further consultation with the USFWS. An exception to this requirement would be the forested areas at WSAAF. In order to meet federal regulations for air safety, some of these areas may be converted from forest to grassland for ease of maintenance. These areas were originally clearcut in 2005 and contain trees primarily less than 4 in dbh. They have now regrown to heights that are once again becoming a safety concern. Some areas will be maintained as forest, but will be clearcut approximately every 5-10 years to keep them at the appropriate height (as described in Section 2.3). Other areas will be completely converted to grass.

4. No more than a total of 50 ac/year in each category (100 ac total for military training and wildlife habitat benefits) of land conversion will occur in forested areas with > 3 in dbh trees. This will help to ensure large areas within a contiguous area will not be removed, minimizing the potential to remove a large percentage of unknown roost trees.

5. Time of Year Restriction. A time of year restriction for clearing trees (> 3 in DBH) has been established to protect roosting bats during non-hibernation seasons. Felling of trees must take place between October 16 - April 15 while most Indiana or northern long-eared bats are not on Fort Drum.

6. No cutting of trees will occur within or along the bed or bank of streams protected under Article 15 of the New York State Environmental Conservation Law unless required to meet specific management goals and only after obtaining a permit from NYSDEC.

7. A minimum of 70 sq ft of residual basal area, all snags, and all live trees > 16 in DBH that have noticeable cracks, crevices, or exfoliating bark will be retained around all perennial streams and open waterbodies (2 ac or greater in size) on Fort Drum. A perennial stream is defined as having flowing water year-round during a typical year. The water table is located above the stream bed for most of the year. Groundwater is the primary source of water for stream flow. Runoff from rainfall is a supplemental

source of water for stream flow. If land conversion treatments are needed that do not meet this conservation measure and that do not have a “no effect” determination, then individual consultation will be required with the USFWS. This buffer protects water quality and provides foraging habitat for Indiana and northern long-eared bats. Indiana bats are known to utilize riparian corridors that have suitable vegetative cover for foraging and for roosting in nearby trees (Jachowski et al. 2014a, Garner & Gardner 1992).

8. For annual reporting purposes, the proponent of the land conversion activities will provide shapefiles of converted areas and vegetative cover types pre- and post-conversion (within a scaled map to Fort Drum's Fish and Wildlife Management Program. This information will be used to describe the vegetative cover types and habitat modification on Fort Drum and will be reported annually to the USFWS.

2.5.3 Effects to Indiana and Northern Long-eared Bats

Outside of the potential change to the conversion activity within WSAAF, Fort Drum does not anticipate that there will be any significant change from the amount, type, and/or duration of land conversion activities that was analyzed in the 2015-2017 BA and that will occur on Fort Drum over the next 3 years.

While land conversion locations may vary annually, we do not anticipate any activity that would cause any additional or unaddressed impacts not previously covered under the prior BA. Fort Drum anticipates limited potential impacts from land conversion to either species of bats.

After reviewing the project description and effects analysis for this section in the 2015-2017 BA, we feel that it is suitable in scope to address any potential impacts to both Indiana and northern long-eared bats. Additionally, no new information has been collected through monitoring efforts for these species over the past 3 years. Therefore, we affirm that the conservation measures and effects analysis is appropriate from the previous BA and suitable to address both Indiana and northern long-eared bat. Please see Appendix C, Section 2.5 for a more detailed description and background of these activities.

2.5.4 Conclusion

Suitable habitat has never been considered a limiting factor for viable Indiana bat colonies on Fort Drum given that the core maternity colony habitat has been protected within the BCA. In addition, suitable habitat has not been considered a limiting factor for northern long-eared bats. Given the reduced populations of these bat species due to WNS impacts, and ample suitable forested habitat for roosting and foraging habitat remaining, this is even less of a concern for the remaining bats. Regardless, land conversion activities could have negative impacts if they removed important roosting networks or foraging locations. However, they are scheduled to occur on a very small proportion of the available habitat on Fort Drum, and are not scheduled to occur within the core roosting and foraging area of Indiana bats. Conservation measures such as time of year restrictions, avoidance of known bat roosting and foraging locations, as well as the vast size of Fort Drum and available forests, reduces potential impacts to Indiana and northern long-eared bats when performing these conversion actions. Given this information potential impacts to Indiana and northern long-eared bats from land conversion actions at the scale they are proposed should be minimal. These actions may affect, but should not adversely affect Indiana or northern long-eared bats.

2.6 Pesticides

In this section, pesticides used on Fort Drum to control vegetation and invertebrates are assessed. For the purposes of this BA, a pesticide would be considered any substance or mixture of substances intended for: preventing, destroying, repelling, or mitigating any pest. It would also include herbicides, fungicides, and various other substances (including biological control agents) used to control pests or vegetation.

All pesticide application is subject to funding, mission priorities, and other factors. No aerial applications will occur over the Cantonment Area or Bat Conservation Area without further consultation with the USFWS.

2.6.1 Pesticide Activities

Fort Drum anticipates the following changes over the next 3 years to the amount, type, and/or application of pesticide that was previously analyzed in the 2009-2011 or 2012-2014, or 2015-2017:

2) Up to 5500 acres of ground application for specific vegetation (e.g., shrubs, < 3 in dbh trees, or invasive plants), 6000 acres of aerial application (primarily for target line of sight on ranges and within the MIA), and 6000 acres of biological control may occur over the next three years. It is likely that approximately 1500-1700 acres will be treated for ground, 2000 acres through aerial application, and 2000 acres of biological control annually.

   This is slightly different to the previous BAs, where it was determined that up to 4000 acres of ground (to include biological control) and 12000 acres (6000 within the MIA and 6000 outside of the MIA) of aerial herbicide would be treated. While there is an increase in the amount of ground application, there is a decrease in the amount of aerial application, for a net decrease in the total amount of chemical herbicide anticipated to be applied. While there is an increase in the amount of biological control, these actions are targeted specifically at leafy spurge, purple loosestrife, and spotted knapweed and will not remove any other habitat. The anticipated acreages provided are very liberal as the entire areas/habitats will not typically be treated, only the patches of these invasive plants. Furthermore, because chemical herbicides may also be selectively/spottily applied in many of the locations, these anticipated acreages are likely a fairly liberal estimate as well. It is likely that the actual area where herbicide is applied will be less than anticipated here. Some of the ground application areas will be mechanically cut on any given year, sometimes they will be treated by both methods, and many areas will not be treated at all. Additionally, the majority of the ground type treatment will be in the grassland/shrubland areas on the western side of Fort Drum or specific to invasive species where we would not expect high utilization by bats.

3) We have modified three conservation measures -- see #7,10 and 11 below. Conservation measure #7 has been changed to require additional measures to reduce drift. Measure #10 was changed to allow more targeted pesticide application to occur at higher wind speeds, but alternately to require additional measures to reduce drift. Measure #11 has been added to provide additional protection to open water habitat.

We believe that the changes to the acreages and the modification/addition of these conservation measures does not change the previous impacts analysis from the prior

documents. Therefore, we affirm that the effects analysis is appropriate from the previous BAs, and the conservation measures are suitable to address both Indiana and northern long-eared bat. Please see Appendices A-C, Section 2.7 for more information.

2.6.2 Conservation Measures for Pesticide Application Activities

1. Only pesticides registered by the EPA and State of New York may be applied and only in accordance with their label.

2. Aerial applications will occur between the hours of sunrise and one hour before sunset. This will protect foraging bats in undiscovered foraging areas from direct exposure.

3. Aerial application of pesticides in the BCA will not occur without further consultation with the USFWS.

4. Other pesticide application within the BCA will be limited to 50 ac per year (no more than 25 ac in a contiguous block) for tow behind power blowers and 25 ac per year for spot/ground application.

5. Tow behind power blowers will not be utilized until after August 15 in all forested areas to allow pups to reach volancy and exit an area if disturbed by this activity. Deviations from this conservation measure will require further consultation with the USFWS.

6. Whenever possible, herbicides that have low toxicity to mammals will be utilized with the tow behind power blowers. Herbicides that may be somewhat toxic to mammals will be mixed and applied at a rate that should minimize any potential exposure concerns.

7. Application of pesticides from ground mounted vehicles (i.e., ATVs, tractors) that spray chemicals directly onto the ground and do not result in broad dispersal will be conducted at least 100 ft (30 m) from known roost trees (including roosts identified in the future) and 250 ft (76 m) from known primary roosts. Pesticides applied from ground mounted vehicles will use drift control additives and droplet sizes appropriate for reducing drift.

8. Application of pesticides that result in broad dispersal (e.g., tow behind power blowers) will be conducted at least 250 ft (76 m) away from known roost trees (including roosts identified in the future) and 500 ft (152 m) from known primary roosts. Pesticides will be applied between sunrise and one hour before sunset. Location-specific applications (i.e. hatchet or stem injections of trees, individual application to specific plants) may be used within 500 ft (30-76 m) of known roosts. This measure minimizes the risk of exposure to bats and potential effects from pesticides.

9. Pesticides applied from tow behind power blowers will use drift control additives and will be applied using low pressure to reduce drift and potential swirling motion from the blower. All efforts will be made to only spray 10 feet from ground level or below.

10. Pesticides will not be applied outdoors when the wind speed exceeds 10 mi/hr for all ground applications except power mist blowers. Pesticides applied via power mist blower will only be applied with wind speeds 8 mi/hr or less. Pesticides applied aerially will only be applied with wind speed 8 mi/hr or less. This is to reduce the risk of pesticide drift, which could impact water quality or non-target areas. Care will be taken to make sure that any spray drift is kept away from non-target areas and individuals.

Additionally, aerial application will utilize helicopters and employ large droplet technology through special nozzles on drop tubes to ensure the herbicide stays on target.

11. Pesticides will not be applied to any protected wetlands, streams, or other waters of NY State without obtaining the appropriate permits.

12. If a bat colony is found roosting in a building, then insecticides will be used sparingly and no foggers will be used. This will minimize impacts to roosting Indiana bats if they are found within a building. Currently, only one colony of bats has been located on Fort Drum. The LeRay Mansion houses several hundred little brown bats according to a survey conducted in 2007. No Indiana bats were identified in the survey.

13. For each pesticide application, all entities will report the total amount of PAI used for each pesticide, the size of the treated area (within a scaled map), and the vegetative cover types that were treated to Fort Drum's Fish and Wildlife Management Program for annual reporting purposes to the USFWS. For pesticides applied indoors or immediately along the exterior of the building, only the PAI needs to be reported—no map is required or vegetation types need to be reported.

2.6.3 Effects to Indiana and Northern Long-eared Bats

Fort Drum does not anticipate that there will be any significant change from the amount, type, and/or duration of pesticide application activities that was analyzed in the 2015-2017 BA and that will occur on Fort Drum over the next 3 years.

While pesticide application locations may vary annually, we do not anticipate any activity that would cause any additional or unaddressed impacts not previously covered under the prior BA. Fort Drum anticipates limited potential impacts from pesticide application to either species of bats.

After reviewing the project description and effects analysis for this section in the 2015-2017 BA, we feel that it is suitable in scope to address any potential impacts to both Indiana and northern long-eared bats. Additionally, no new information has been collected through monitoring efforts for these species over the past 3 years. Therefore, we affirm that the conservation measures and effects analysis is appropriate from the previous BA and suitable to address both Indiana and northern long-eared bat. Please see Appendices A-C, Section 2.7 for a more detailed description and background of these activities.

2.6.4 Conclusion

There is limited suitable roosting habitat on the range areas where aerial herbicide application is occurring. These herbicides are sprayed only a few times a year, and will not be sprayed at night. These aerial applications are typically greater than 7.5 mi (12 km), from known roosting locations for Indiana bats, and outside the known Indiana maternity colony core area within the BCA, Cantonment Area, and southern Training Areas. Given the declines of Indiana bats due to WNS, it is unlikely that the remaining population would abandon a historic roosting and foraging area to exploit new areas.

Northern long-eared bats have historically been found throughout all of Fort Drum, including near areas where aerial application of herbicide is expected to occur over the next three years. However, the majority of the acreage scheduled for aerial herbicide application is mostly in

areas that have been previously and continually disturbed and consist primarily of grass and shrubs (on the range propers). While there could be some potential roost trees that are covered with herbicide, the likelihood that there would be northern long-eared bats in the few remaining trees on ranges and that a non-volant young was within a tree that could not escape is low. Because of the lack of suitable habitat within the range areas, and measures to control pesticide drift, northern long-eared bats are unlikely to be directly affected by pesticides.

While herbicide application via power sprayers will be applied within the BCA near the core area for Indiana bats and in other areas near northern long-eared bat use, whenever possible, herbicides will be utilized that have low toxicity to mammals (bats). If this is not possible, herbicides will be mixed and applied at a rate low enough to ensure minimal exposure impacts to bats. Additionally, this type of application will only occur on a very limited acreage per year within the BCA and in the Training Area. Due to population declines in both Indiana and northern long-eared bats, the likelihood that spraying would occur near individuals or colonies is low. While it could be sprayed unknowingly near undiscovered Indiana and northern long-eared roosts, application will only occur after August 15 to allow any bat (to include volant young) to fly away if irritated by the activity. Given the small amount of acreage that herbicide would be applied to in this manner, bats would not have to go far or expend energy to deal with this issue. We would not expect in shifts in home range or roosting or foraging behavior due to this activity. Therefore, although herbicide application via tow behind power blowers may affect Indiana and northern long-eared bats, it is unlikely to indirectly adversely affect these bats.

Pesticide application is not anticipated to reduce any prey within known or unknown foraging areas, and it is not expected to reduce or adversely modify foraging habitat. Additionally, there are adequate foraging locations throughout Fort Drum.

Given these considerations and the proposed conservation measures, the use of pesticides may affect, but is not likely to adversely affect Indiana or northern long-eared bats on Fort Drum.

2.7 Wildlife Management/Vertebrate Pest Control

2.7.1 Wildlife Management/ Vertebrate Pest Control Activities

Fort Drum does not anticipate that there will be any significant change from the amount, type, and/or duration of wildlife management/vertebrate pest control management that was previously analyzed in the 2009-2011, 2012-2014, or 2015-2017 BAs that will occur on Fort Drum over the next 3 years. After reviewing the project description and effects analysis for this section in the previous BAs, we believe that it is suitable in scope to include any potential impacts to northern long-eared bats. Additionally, we feel that the conservation measures should be suitable for both species. Therefore, we affirm that the effects analysis is appropriate from the previous BAs, and the conservation measures are suitable to address both Indiana and northern long-eared bat. Please see Appendix A-C, Section 2.8 for more information.

2.7.2 Conservation Measures for Wildlife Management/Vertebrate Pest Control Activities

1. No Lethal Control. No lethal control methods are permitted for bats unless there is a suspected human health risk for exposure to rabies or other disease. If individual bats are in buildings and there is no evidence of maternity use, then all efforts will be made to safely capture and release individual bats. Or, the bats will be excluded by establishing one-way valves over the roost's exit (if feasible).

2. Time of Year Restriction for Exclusion. The exclusion will only be done during times of the year when pups are not present or when they are volant (i.e., August - early May). The time of year restriction will minimize the risk of separating mothers from non-volant young, so it will prevent potential pup mortality during exclusion activities. Sealing cracks and crevices in buildings will also be done during the late fall or early spring. This is based on the assumption that no bats hibernate in buildings on Fort Drum, which is a valid assumption given the narrow temperature requirements necessary for hibernating bats and the heating of buildings (Tuttle & Kennedy 2002) and the fact that no bats have been found hibernating in buildings to date. Sealing cracks and crevices prevents bats from entering a building and reduces human/bat conflicts.

3. Adhesive Trap Restrictions. No adhesive traps used for rodents or insects will be placed in such a manner that they could capture bats—glue traps will not be placed in any crawl space or attic compartment within buildings or in areas where bats are known to occur.

2.7.3 Effects to Indiana and Northern Long-eared Bats

Please see Appendices A-C for the detailed effects analysis that was performed for the 2009-2011, 2012-2014, and 2015-2017 BAs. Fort Drum does not anticipate any change in activities that would require any new analysis. After reviewing the project description and effects analysis for this section in the previous BAs, we believe that it is suitable in scope to include any potential impacts to northern long-eared bats. Additionally, we feel that the conservation measures should be suitable for both species. Therefore, we affirm that the effects analysis is appropriate from the previous BAs, and the conservation measures are suitable to address both Indiana and northern long-eared bat.

2.7.4 Conclusion

With conservation measures in place, wildlife management/vertebrate pest control activities may affect, but are not likely to adversely affect Indiana or northern long-eared bats.

2.8 Outdoor Recreation

2.8.1 Outdoor Recreation Activities

Fort Drum does not anticipate that there will be any significant change from the amount, type, and/or duration of outdoor recreation that was previously analyzed in the 2009-2011, 2012-2014, and 2015-2007 BAs that will occur on Fort Drum over the next 3 years. After reviewing the project description and effects analysis for this section in the previous BAs, we believe that it is suitable in scope to include any potential impacts to Indiana and northern long-eared bats. Additionally, we feel that the conservation measures should be suitable for both species. Therefore, we affirm that the effects analysis is appropriate from the previous BAs, and the conservation measures are suitable to address both Indiana and northern long-eared bat. Therefore, we affirm that the previous BA analysis is appropriate. Please see Appendix A-C, Section 2.9 for more information.

2.8.2 Conservation Measures for Outdoor Recreation Activities

1. Skeet Range. Skeet shooting at the current skeet range is located adjacent to the BCA and fires over a known fall, summer, and assumed spring foraging location of Indiana bats. From April 15 - October 15, the skeet range's hours of operation will be no earlier

than 30 minutes after sunrise and no later than one hour before sunset. This measure will prevent the accidental shooting of an Indiana bat during the non-hibernation seasons.

2.8.3 Effects to Indiana and Northern Long-eared Bats

Please see Appendix A for the detailed effects analysis that was performed for the 2009-2011, 2012-2014, and 2015-2017 BAs. Fort Drum does not anticipate any change in activities that would require any change to the analysis. After reviewing the project description and effects analysis for this section in the previous BAs, we believe that it is suitable in scope to include any potential impacts to Indiana and northern long-eared bats. Additionally, we feel that the conservation measures should be suitable for both species. Therefore, we affirm that the effects analysis is appropriate from the previous BAs, and the conservation measures are suitable to address both Indiana and northern long-eared bat.

2.8.4 Conclusion

Only ATV use, hunting, and skeet shooting are expected to have any potential impacts to Indiana or northern long-eared bats. However, because of the current restrictions for ATV use, the timing and nature of hunting, and the conservation measure for skeet shooting, these recreational activities may affect but are not likely to adversely affect Indiana bats. Please see Appendix A-C, Section 2.9 for additional information.

3.0 Conservation Activities

Conservation measures for each action are in the appropriate section throughout *Section 2.0*. (A complete list of conservation measures and other beneficial actions from *Section 2.0* can be found in Appendix O) This section elaborates on the Bat Conservation Area, outlines future monitoring and research efforts, and notes outreach activities and the Army Compatible Use Buffer program.

3.1 Bat Conservation Area

A 2,202 ac (891 ha) Bat Conservation Area (BCA) has been established on Fort Drum for the benefit of Indiana bats (Figure 3.1). This BCA will also benefit northern long-eared bats in many of the same way.

The majority of the BCA occurs in undeveloped portions of the Cantonment Area (2,051 ac (830 ha)) and follows Pleasant Creek northward into Training Areas 4A and 3A (151 ac (61 ha)). These areas were selected for the BCA in order to provide protection for the majority of known Indiana bat roosting and foraging areas based on mist-netting and radio-tracking efforts (ESI 2008a, 2008b) and past acoustical surveys. The BCA contains 90% (110 out of 122) of all roosts identified on Fort Drum in the past 11 years (2007-2017). Four of the roosts not found in the BCA are located within 25 m of the boundary of the BCA, four are located in Training Area 3B, and four of the roosts are located off Fort Drum, within approximately 1,000 m of the BCA.

Historically, the BCA has been an important area for Indiana bats on Fort Drum and in the adjacent Town of LeRay. Indiana bats that have been captured off-post (Fort Drum-I-81 connector project – USFWS 2008, Eagle Ridge housing project – ESI 2006) were noted to roost on Fort Drum for multiple days. In addition, Indiana bats captured and roosting on Fort Drum regularly went off-post into the Town of LeRay to forage (ESI 2008b, USFS 2011). While no Indiana bats have been captured since 2014, acoustic detections are still indicating Indiana bat use in the area.

Although the BCA was initially established for the benefit of Indiana bats, northern long-eared bats have historically been captured throughout the Cantonment Area and within the BCA. This protected area will likely provide similar benefits to this species of bat as well.

The BCA includes a variety of habitat types and water bodies, including Pleasant and West Creeks. The BCA was configured to allow for continued development approximately 150 m along existing roads and around the Guthrie Ambulatory Health Care Clinic.

Permitted & Restricted Activities in BCA

The intention of the BCA is to not prohibit all actions in the identified areas, but to protect known roosting and foraging habitat from permanent loss to the greatest extent possible. Many activities that currently occur will continue to be conducted within the BCA. The following discusses in detail permitted and restricted activities within the BCA.

1. Roost Tree Protection. No viable roost trees identified within the boundaries of the BCA will be felled. This includes roost trees identified in the future.

2. Construction. The primary activity not allowed in the BCA is construction activities resulting in the permanent loss of natural habitat. No permanent facility will be constructed within the BCA with the exception of some additional facilities (e.g., cabins, picnic shelters, parking lots, a campground, etc.) that may impact up to 7 ac (3 ha) in and around Remington Park. Remington Park is located along the Pleasant Creek corridor of the BCA. The construction of park facilities is included in *Section 2.1 Construction* of this BA. Conservation measures in *Section 2.1 Construction* will also apply. Construction of temporary facilities, primarily for training purposes, may be constructed within the BCA if the impacts to habitats are minimal. Temporary structures are defined as structures that are easy to assemble and disassemble, and easy to move.

   If construction of other permanent structures must occur within the BCA in the future, further consultation with the USFWS is required. This has only happened in a few instances since 2009.

   Although currently not expected to occur within the next three years, the potential exists for the Installation Restoration Program (IRP) to remove trees in order to access contaminated ground water sites in response to a contamination episode. Individual consultation will occur with the USFWS and trees would only be removed during the October 16 - April 15 tree clearing window if in a non-emergency situation.

   By restricting construction within the BCA, habitat connectivity, water sources, and suitable roost and foraging sites are maintained for the known Indiana bat maternity colony in the spring and summer and for individuals associated with the maternity colony in the fall. The BCA provides habitat for all sexes and ages of Indiana and northern long-eared bats.

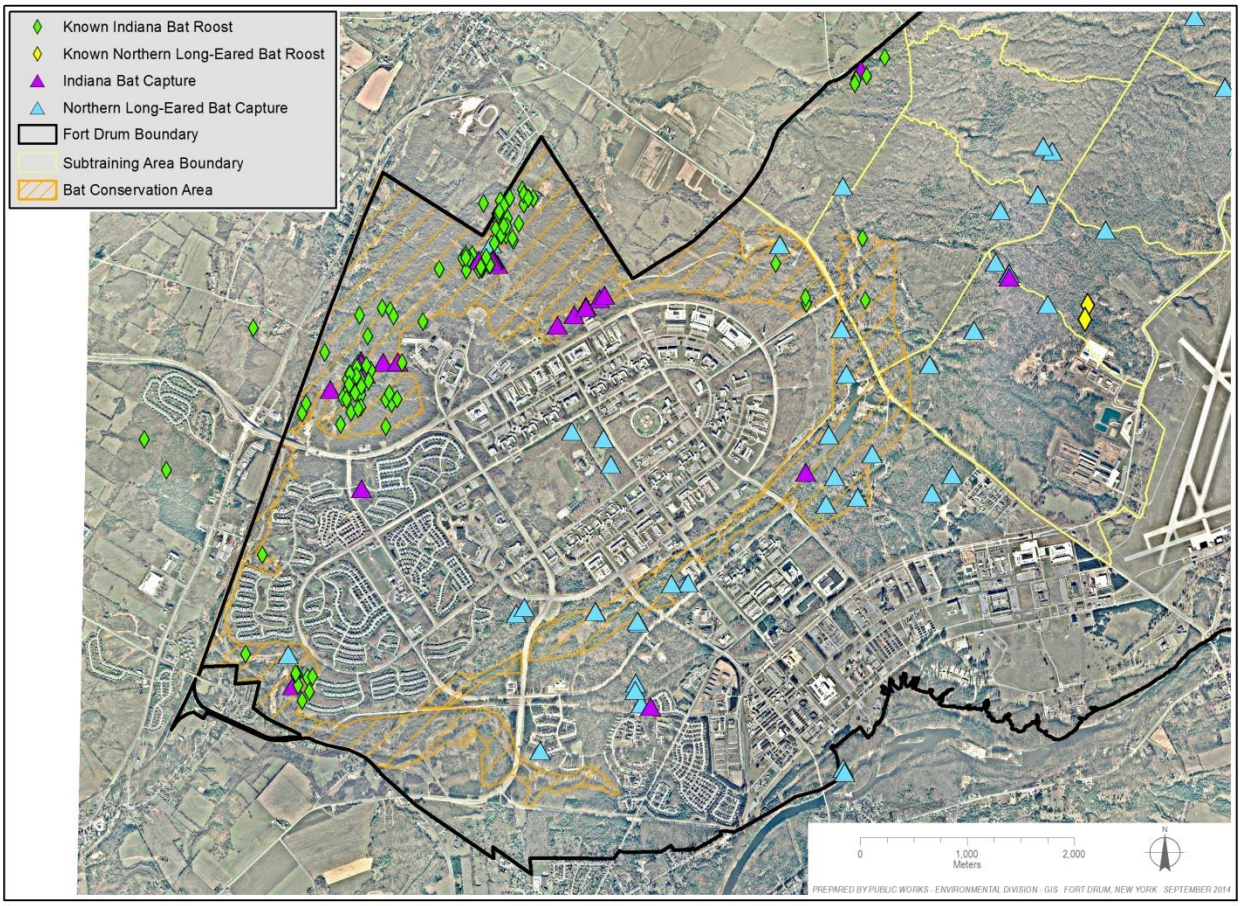


Figure 3.1 Bat Conservation Area on Fort Drum Military Installation

3. Military Training. Relatively low impact military training (e.g., land navigation and small unit tactics) is conducted in the northern portion of the BCA within Local Training Areas (LTAs). No live fire is allowed, however, weapons that fire the equivalent of blanks or paintball rounds are used. Occasionally artillery (with blanks) and other simulated explosives are also used. Current training allowed in the Cantonment Area will continue which may include the construction of small temporary buildings (e.g., mock villages for urban warfare training) as long as no trees or large areas of natural habitat are removed.

   Category 2 smoke may not be used within 100 m of any forested areas within the LTAs between April 16 - October 15 to minimize impacts to roosting bats (with the exception of the MOUT sites as identified below). Approval from Range Control and NEPA review is required prior to any use of Category 2 smoke in the LTAs, and these reviews will help ensure that Category 2 smoke use is in line with this conservation measure. See *Section 2.2 Military Training* for more information on impacts.

   Category 2 smoke may be periodically used at three mobile MOUTs within the LTAs during April 15- October 15. All mobile MOUTs are currently outside of the BCA, but are in relatively close proximity (approximately 25, 35, 140m, respectively). Only infrequent use of colored smoke is expected to be used in around the mobile MOUTs. The closest known roost tree to the Mobile MOUTs is approximately 270m away. With

the exception of the Category 2 colored smoke used at the mobile MOUTS, no other smoke or obscurant may be used in the BCA. Currently, all known Indiana bat maternity roosts are found within the BCA or within a 1,000 m from the installation boundary.

4. Vegetation Management. Limited tree removal is expected as part of required maintenance activities for the perimeter fence and/or utilities (Refer to *Section 2.4 Vegetation Management*). This is expected to be no more than 20 ac (8 ha). Hazard trees may also be removed for safety concerns along roadways, trails, or parking areas. Conservation measures in *Section 2.4 Vegetation Management* will apply.

   Invasive species management is expected to occur over approximately 150 acres over the next three years. This will be limited to 50 acres annually and will not occur within 100ft of known roost trees. Isolated shrub/plant patches may be targeted as well as larger patches of invasives within forested areas. Some targeted trees may have to be removed to support this type of management.

   Spraying of herbicides will conducted along the perimeter fence, utility line corridors, and within forested areas to manage vegetation. Conservation measures in *Section 2.6 Pesticides* will apply.

5. Recreation. Most of the BCA is currently used for recreational purposes. The primary recreational use is Physical Training (PT) by Soldiers, hiking and cross-country skiing throughout an extensive trail system, and archery hunting during the big game season.

   There are currently plans to improve the trail system—both in quantity and quality. Any new trails will avoid trees and wetlands if at all possible—if trees >3 in DBH must be removed, only the minimum required will be removed during the October 16 - April 15 tree clearing window.

6. Natural Resources Management. The management of natural resources is expected to continue throughout the BCA including the control/eradication of invasive species via mechanical, chemical (see also Section 2.6), biocontrol and physical removal. Only small areas (no more than 50 acres per year, with 25 acres in one contiguous block) will be mechanically cut or treated with herbicide. All appropriate conservation measures will be followed regarding the respective treatments. Natural resources surveys, inventories, and research will also continue in these areas. In the future, there may be potential to create or enhance wetland and/or stream mitigation sites (one wetland mitigation site is already located within the BCA) and future forest management activities may occur. Mitigation and forest management activities will be addressed in future consultations, biological assessments, and/or management plans.

3.2 Monitoring & Research

Past and Ongoing Efforts

Please see Appendices J-Q for more detailed information about Fort Drum survey efforts and results for bats.

Small scale mist net efforts by Fort Drum staff were completed during 2015-2017 and one large scale contracted effort was completed in 2015. No Indiana or northern long-eared bats were captured during these survey efforts. Also, no other new information was collected during these

efforts to suggest there has been any substantive changes in the temporal or spatial information for these listed species.

Acoustical surveys using Anabat echolocation detectors were also completed during 2015-2017 and have elucidated no new information, other than to suggest that use of the installation by Indiana and northern long-eared bats has declined even further due to WNS. Indiana bat use is still focused in the Cantonment Area and the southern portion of the Training Areas (primarily south of US Military Highway), and northern long-eared bats are still found throughout the installation in isolated pockets of activity.

Fort Drum may perform additional mist net and acoustic surveys during 2018-2020 in an attempt to gain additional information on the spatial and temporal use by these bats in the post-WNS landscape; however, given the drastic declines, the likelihood of gaining additional information on this species is low, and attempts will aborted if it determined that efforts are futile.

Conservation Recommendations

Fort Drum recognizes that Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out discretionary conservation programs for the benefit of endangered and threatened species. Within the previous 2015-2017 BO, the USFWS identified the following actions that, if performed, would further the conservation and assist in the recovery of the Indiana bat and assist in collecting information on other potentially imperiled bat species. The following is the progress Fort Drum has achieved to date:

1. Assist with WNS investigations (to include, but not limited to): (a.) Monitoring the status/health of the little brown bat colony at the LeRay mansion/bat houses; (b.) Collecting samples for ongoing or future studies; (c.) Providing funding for off-post WNS research activities; and (d.) Allowing staff to participate in off-post research projects.

Fort Drum has examined the effects of WNS on the little brown myotis (*Myotis lucifugus*) maternity colony found in Fort Drum's Historic LeRay area during 2009-2017. These efforts focused on the health of the individuals within the colony, the potential ability for bats to survive and heal during the summer months, and the potential persistence and subsequent transmission of WNS within the colony during the summer. Fort Drum published a manuscript in the December 2011 issue of the Journal of Fish and Wildlife Management (Dobony et al. 2011) presenting the results on initial monitoring the little brown myotis' ability to survive, heal and reproduce. Another follow on paper is currently in preparation that further provides insights into these parameters nine years post WNS infection, as well as models of survival during that time. This effort has been ongoing, and we will continue to analyze results to determine the potential persistence and transmission of *Pseudogymnoascus destructans* and WNS at the colony.

Acoustical surveys using Anabat echolocation detectors have been conducted since 2003, providing good baseline information about temporal and spatial use of various species of bats on Fort Drum. In 2009, Fort Drum started re-surveying sites that were previously surveyed in to attempt to establish trends and impacts to bat species from WNS. Results from some of these efforts have also been published in the December 2011 issue of the Journal of Fish and Wildlife Management (Ford et al. 2011). In 2011, Fort Drum initiated a project using acoustic methodology to establish monitoring protocols to replace mist-netting as this methodology becomes less effective due to WNS. A Masters graduate student graduated in May of 2013

from Virginia Tech University, and multiple publications are now available outlining the outcome of those efforts (Coleman et al. 2014a, Coleman et al. 2014b, Coleman et al. 2014c). An additional follow on project was initiated in May of 2015 and will be completed in 2018 that will provide additional information.

2. Pursue additional acquisition of parcels or easements to protect Indiana bat roosting, foraging, and commuting habitat through the ACUB program.

Although parcels being protected within the ACUB program have not been used to directly support Indiana bat protection to date, these parcels now likely offer a measure of protection for northern long-eared bats and other bat species and wildlife in general. We are still exploring the possibility of acquiring parcels or easements into the ACUB program to specifically benefit bats, although the future potential of that is unknown. One group of parcels has the potential to benefit Indiana bat and the USFWS was updated on the inclusion of some of that group of parcels in the latest ACUB meeting in the summer of 2017.

3. Conduct research on smoke/obscurant impacts to the Indiana bat.

Fort Drum did not conduct any research in regards to smoke/obscurant impacts to the Indiana bat.

4. Conduct research on the summer habitat requirements and distribution of Indiana bats.

Fort Drum has been involved with this type of activity since 2003 with information collected via Anabat detectors. Additional information has been gathered in subsequent years via Anabat and mistnet surveys. As identified in the Monitoring and Research section above, general bat use has been examined via mistnet survey in the Training Area of Fort Drum from 2009 - 2017 with specific goals of determining temporal and spatial use of Fort Drum by the known Indiana bat colony. Additional information has been collected on other species of bats as part of these efforts leading to information about northern long-eared bats on the property. Efforts have documented foraging and roosting areas of the Indiana bat colony within the Cantonment Area, BCA, and adjacent Training Areas (USFS 2011, Jachowski et al. 2014a, Jachowski et al. 2014c, and Jachowski et al. 2016). They have documented captures of northern long-eared bats throughout the installation. They have also documented the declines of multiple species of bats due to WNS, and the subsequent change in bat behavior and habitat use (Ford et al. 2011, Jachowski et al. 2014b)
Fort Drum will continue to examine summer habitat requirements and distribution of Indiana and northern long-eared bats as resources allow.

5. Evaluate potential to correlate USFS foraging data with training activities to glean any information on Indiana bat response to night training exercises.

Fort Drum has not performed any actions specific to this recommendation.

Future Planned Efforts

Fort Drum will continue to monitor the Indiana bat maternity colony as resources allow. This will primarily be accomplished through monitoring areas around the known maternity colony with Anabat detectors and mist net efforts.

Fort Drum will continue to assist with WNS related research when able and other projects and funding opportunities will be explored with NYSDEC, other military installations, universities, etc.

3.3 Outreach Efforts

Fort Drum has participated in and facilitated several outreach efforts including publishing articles in local outlets, cooperating with local media, participating in community and school events publishing in peer-reviewed journals, and presenting at professional wildlife workshops, meetings, and conferences. Below are some of the highlights:

Local Publications and Presentations

- March 2009: Spring 2009 Fort Drum Fish & Wildlife Management Program *Blaze Orange* newsletter featured a short article entitled *Bat White-nose Syndrome Update* [The Blaze Orange newsletter is a semi-annual newsletter published by Fort Drum's Fish & Wildlife Management Program and sent to all residents on Fort Drum and all recreation permit holders.

- 16 April 2009: Article in *The Mountaineer* [Fort Drum weekly newspaper] titled: *US Fish, Wildlife Service issues opinion on treatment of Indiana bat* [re: issuance of Biological Opinion]

- 30 April 2009: Article in *The Mountaineer* titled: *Accommodations will expand near LeRay Mansion* [re: installation of new bat hotel].

- 13 May 2009: Featured presentation at the meeting of the North Country Bird Club in Watertown, NY re: bats and bat management at Fort Drum.

- 04 June 2009: Article in *The Mountaineer* titled: *White-Nose Syndrome threatens bat populations: Fort Drum joins research project* [re: NYSDEC project at LeRay bat house]
- August 2009: Fall 2009 Fort Drum Fish & Wildlife Management Program *Blaze Orange* newsletter featured three articles related to bats on Fort Drum titled: *New Bat House at LeRay*, *Year 3 for Indiana Bat Surveys*, and *Activities of the Fort Drum Fish & Wildlife Management Program: Bat Management & White-nose Syndrome*.

- March 2010: Spring 2010 Blaze Orange newsletter featured an article entitled *Bats & White-nose Syndrome on Fort Drum Update* [The newsletter is a semi-annual newsletter published by Fort Drum's Fish & Wildlife Management Program and sent to all housing residents on Fort Drum and all recreation permit holders.]

- April 2010: A Town Hall Meeting for the public was conducted by Fort Drum's Fish & Wildlife Management Program—information about bat management and white-nose syndrome was presented.

- August 2010: Fall 2010 Outdoor News newsletter had a short article entitled: White-nose Syndrome Update [Formerly known as the Blaze Orange, the newsletter is a semi-annual newsletter published by Fort Drum's Fish & Wildlife Management Program and sent to all housing residents on Fort Drum and all recreation permit holders.]

- October 2010: A presentation was given to a group at the Fort Drum Library entitled *Bats and Fort Drum*

- November 2010: Fort Drum helped to coordinate (with Bat Conservation International) a meeting addressing white-nose syndrome concerns on Military Installations.

- July 2011: Fort Drum worked with the local Watertown Channel 7 News, the Watertown Daily Times, the Fort Drum Mountaineer, and North Country Public Radio to distribute information about WNS and some of the results of studies ongoing at the little brown maternity colony at LeRay.

- August 2011: Fort Drum helped to coordinate (with Bat Conservation International) a meeting addressing white-nose syndrome concerns on Military Installations.

- August 2012: Fort Drum presented at the the Sackets Harbor Summer Youth Program. Presentation title: *Going Batty*

- March 2013: Fort Drum Presented at a National Wildlife Week event at Fort Drum's McEwen Library

- March 2013 Fort Drum Established educational signage at two stops along Fort Drum's Maple Days Nature Trail regarding artificial and natural bat roosts.

- October 2015: Fort Drum presented to 5th and 6th graders at Wiley Intermediate School in Watertown, NY about bat biology and radio telemetry.

Professional Publications and Presentations

Publications- Peer Reviewed

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- Jachowski, D.S., C.T. Rota, C.A. Dobony, W.M. Ford, and J.W. Edward. 2017. Correction: Seeing the forest through the trees: considering roost-site selection at multiple spatial scales. PLoS ONE 12(1): e0169815. doi:10.1371/journal.pone.0169815

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- Coleman, L.S., W.M. Ford, C.A. Dobony, and E.R. Britzke. 2014. Comparison of radio-telemetric home-range analysis and acoustic detection for little brown bat habitat evaluation. Northeastern Naturalist 21: 431-445.

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- Ford, W. M., E. R. Britzke, C.A. Dobony, J.L. Rodrigue, and J.B. Johnson. 2011. Patterns of acoustical activity of bats prior to and following white-nose syndrome occurrence. Journal of Fish and Wildlife Management 2:125-134.

Publications – Un-refereed Articles

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- Dobony, C.A., E. Britzke, M. Ford, R. Rainbolt. 2009. Impacts of white-nose syndrome to bat populations and management. Natural Selections [DoD Legacy Resource Management Program newsletter] 5(10):1, 7-8.

- Rainbolt, R. & C. Dobony. 2009. Fort Drum Fish & Wildlife and Cultural Resources: Bats & LeRay Mansion. Natural Selections [DoD Legacy Resource Management Program newsletter] 5(6): 1, 7-8.

Presentations

- Ford, W.M., A. Silvis, E.R. Britzke, M. St. Germane, and C.A. Dobony. 2017. Military lands lead bat conservation and research in the East. 2017 National Military Fish and Wildlife Association Annual Meeting and Training Workshop. Spokane, VA, March 6-10.

- Dobony, C.A., D. Jachowski, E.R. Britzke, J.W. Edwards, J.B. Johnson, L. Coleman, W.M. Ford and J.L. Rodrigue. 2015. Thoughts on bat research at Fort Drum, New York. National Military Fish and Wildlife Association Conference. Omaha, Nebraska. March 9-13.

- Dobony, C.A. 2014. Observed resiliency in little brown bats at Fort Drum Military Installation? White-nose Syndrome Workshop. St. Louis, Missouri. September 8-12.

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- Jachowski, D.S, C. A. Dobony, L. S. Coleman, W.M. Ford, E.R. Britzke, and J.L. Rodrigue. 2014. Disease and community assemblage: white-nose syndrome alters spatial and temporal niche partitioning in sympatric bat species. 2014 Northeast Bat Working Group, Port Clinton, NJ.

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- Coleman, L.S., C.A. Dobony, W.M. Ford and E.R. Britzke. 2013. An overview of little brown bat habitat preferences at the Fort Drum Military Installation. 2013 Colloquium on the Conservation of Mammals in the South. Pikeville, Tennessee. February 14-15.

- Coleman, L.S., W.M. Ford, C.A. Dobony, and E.R. Britzke. 2013. A comparison of mist netting and acoustic sampling for detecting bat species in the post-white nose syndrome world. Virginia Chapter of the Wildlife Society Annual Meeting. Smith Mountain Lake, Virginia. February 12-13.

- Coleman, L.S., C.A. Dobony, W.M. Ford and E.R. Britzke. 2013. Uncertainty in home range estimates of little brown bats at Fort Drum Military Installation. 2013 Northeast Bat Working Group Meeting. Albany, New York. January 9-11.

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- Dobony, C.A. 2011. Impacts of white-nose syndrome at Fort Drum Military Installation, NY. DoD Legacy White-nose Syndrome Meeting. Tucson, Arizona, August 30- September 1.

- Dobony, C.A. 2010. Impacts of white-nose syndrome at Fort Drum Military Installation, NY. DoD Legacy White-nose Syndrome Meeting. Nashville, Tennessee, November 2-4.

- Cunningham, K. A., J. B. Johnson, C. A. Dobony, J. W. Edwards, W. M. Ford and J. L. Rodrigue. 2009. Roost tree selection by Indiana bats (Myotis sodalis) on Fort Drum Military Installation, New York. Abstracts of the 19th Colloquium on Conservation of Mammals in the Southeastern United States. 18:8.

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3.4 Army Compatible Use Buffer (ACUB) Program

Please see Appendices A-C for more detailed information about the Army Compatible Use Buffer (ACUB) program.

For the purposes of this BA, the ACUB program has been reviewed to: (1) ensure that the inclusion of easements primarily acquired to establish buffer areas around Fort Drum to limit effects of encroachment and maximize land inside the installation that can be used to support the mission do not adversely affect the Indiana and northern long-eared bat; and (2) ensure that the inclusion of easements primarily acquired to sustain natural habitats for the benefit of the Indiana or northern long-eared bat will beneficially affect these species and assist Fort Drum to meet its environmental regulatory requirements for endangered species conservation.

As of this writing in fall 2017, 25 partnerships have been developed through the program encompassing approximately 7,594 ac (3073 ha; Figure 3.2). Fort Drum's Public Works Directorate-Natural Resources Branch has taken over all responsibility for the ACUB program, and will ensure that all ESA Section 7 requirements are met. Active ACUB partners at Fort Drum currently include Ducks Unlimited Great Lakes/ Atlantic Regional Office and Tug Hill Tomorrow Land Trust.

As Fort Drum determines potential new parcels for inclusion in the program or if priority areas change, we will coordinate with the USFWS to ensure that the latest information about the distribution of the Indiana and northern long-eared bat is utilized to make the best decisions to avoid adverse affects to the species. The "Agricultural" model easement (Appendix T) previously developed will be utilized for the foreseeable future. As long as this model easement is utilized, "Agricultural" ACUB parcels may affect, but will not adversely affect the Indiana or northern long-eared bat. If a different type of easement is developed, the USFWS will be consulted.

As opportunities arise, Fort Drum will work with the partners and the USFWS to incorporate parcels into the ACUB program for the specific benefit of the Indiana and northern long-eared bat. This will be done in such a way to help ensure that these easements will be wholly beneficial for the Indiana and northern long-eared bat.

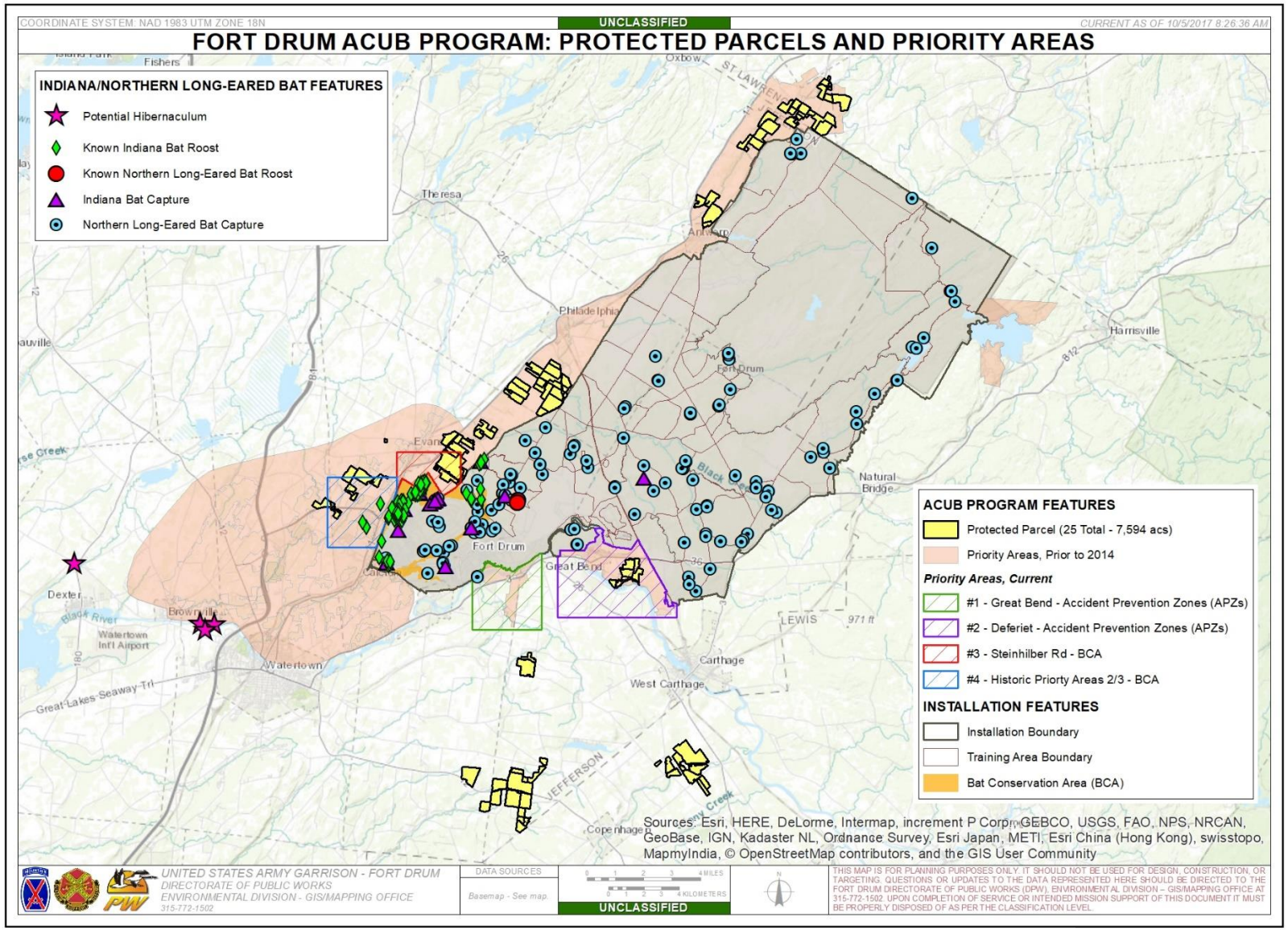

Figure 3.2. Protected Parcels and Priority Areas currently within the Army Compatible Use Buffer Program at Fort Drum Military Installation.

3.5 Conclusion

The establishment of the Bat Conservation Area, monitoring and research efforts, and outreach efforts will all have discountable or wholly beneficial impacts to the Indiana bat and other forest bat species. The establishment of ACUB areas for noise buffer or encroachment concerns (aka "Agricultural easements") may affect, but should not adversely affect the Indiana or northern long-eared bats as long as the easement language is followed and the landowners contact the NYSDEC or USFWS prior to completing any type of forest clearing or land management action. The establishment of ACUB areas between the Glen Park hibernaculum and Fort Drum will have wholly beneficial impacts to the Indiana bat and other forest bat species as the forested areas will be conserved as part of the easement agreement.

4.0 Cumulative Effects

All future actions on Fort Drum are subject to federal agency involvement, and federal involvement is anticipated in all or most future actions within the Action Area (see *Section1.*4).

Besides those activities occurring on Fort Drum addressed in this BA, there are numerous activities that occur in the action area off-post that affect the Indiana and northern long-eared bat. These activities include residential and commercial development associated with the expansion at Fort Drum, agriculture, timber harvesting, and outdoor recreation. Although many of these are private actions, some involve permitting through the US Army Corps of Engineers due to impacts to waters of the United States. Because of the permitting requirements, the USFWS is engaged in consultation with many of these off-post projects. The USFWS is also engaged with the Town of LeRay in ongoing development in the area, and is actively involved with reviewing most, if not all, development projects within the Town (regardless of USACE involvement). The USFWS are working with the Town and developers to conserve and connect suitable Indiana bat habitat whenever possible and hope to work with other towns in the area in a similar fashion.

Because of the active Federal agency involvement in the immediate area, no detailed cumulative effects analysis is presented here. However, off-post activities in the action area are likely to have direct, indirect, and cumulative effects to Indiana and northern long-eared bats known to utilize Fort Drum.

5.0 Overall Conclusion

Over the past 11 years (2007-2017), Fort Drum has conducted mist net surveys at more than 300 sites throughout the installation and captured more than 4,000 bats, of which, 44 were Indiana bats, and over 375 were northern long-eared bats.

All evidence now suggests that suspected Indiana bat use within the Training Area is most likely periodic foraging or exploratory movement activity by bats from the known colony in the Cantonment Area. Acoustic detections continue to document activity in these same areas. Due to the extensive declines of Indiana bats in the Glen Park Hibernaculum and on Fort Drum, we expect no changes to this historic use. It is unlikely that the Indiana bats utilizing the Cantonment Area and BCA will leave this historic core range as long as suitable roosting and foraging habitat remains available. Utilizing all available information and the revised assumptions, Fort Drum contends that as long as all conservation measures and project descriptions are followed, no proposed activity will have any adverse effect to Indiana bats on Fort Drum Military Installation during 2018-2020.

Historically, Fort Drum likely contained relatively high numbers of individuals and maternity colonies of northern long-eared bats. All evidence suggests that there is no concentrated use for this species, and that they could be found throughout most of installation in appropriate habitat in small pockets of activity. As with Indiana bats, impacts from WNS have been severe to this species in New York and on Fort Drum, and the disease has caused drastic declines in their populations.

Where it was once relatively easy to capture these species through traditional mistnet efforts, it is now a difficult task, and no northern long-eared bats have been captured since 2011. However, acoustic detections of probable northern long-eared bats are still being detected on the installation. Thus it is likely the installation is still being utilized to some degree by this species.

Subsequently, Fort Drum has determined that in season clearing for small scale range construction projects and the use of smoke/obscurants is likely to adversely affect northern long-eared bats on Fort Drum. However, all other proposed activities on Fort Drum will not affect, or may affect, but should not adversely affect northern long-eared bats. Table 5.1 summarizes the effects analysis of each activity in this BA for Indiana and northern long-eared bat.

Table. 5.1 Overall Effects Summary. (0 = No effect; 1 = may affect, but not likely to adversely affect; 2 = may affect, likely to adversely affect; + = beneficial effect). IBAT=Indiana bat; NLEB= northern long-eared bat.

ACTIVITY	ATTRIBUTE	DIRECT EFFECT		INDIRECT EFFECT	
		IBAT	NLEB	IBAT	NLEB
Construction	Hibernation	0	0	0	0
	Roosting	1	2	1	1
	Foraging	1	1	1	1
Military Training – All Except Smoke/Obscurants	Hibernation	0	0	0	0
	Roosting	1	1	1	1
	Foraging	1	1	1	1
Military Training – Smoke/Obscurants	Hibernation	0	0	0	0
	Roosting	1	2	1	2
	Foraging	1	1	1	1
Forest Management	Hibernation	0	0	0	0
	Roosting	1	1	1	1
	Foraging	1	1	1	1
Mechanical Vegetation Management	Hibernation	0	0	0	0
	Roosting	1	1	1	1
	Foraging	0	0	1	1
Land Conversion	Hibernation	0	0	0	0
	Roosting	1	1	1	1
	Foraging	1	1	1	1
Pesticide Application	Hibernation	0	0	0	0
	Roosting	1	1	1	1
	Foraging	1	1	1	1
Wildlife Management/ Vertebrate Pest Control	Hibernation	0	0	0	0
	Roosting	1	1	1	1
	Foraging	0	0	1	1
Outdoor Recreation	Hibernation	0	0	0	0
	Roosting	1	1	1	1
	Foraging	1	1	1	1
ACUB – Non Indiana Bat Easements	Hibernation	0	0	0	0
	Roosting	1	1	1	1
	Foraging	1	1	1	1
ACUB – Bat Easements	Hibernation	0	0	0	0
	Roosting	+	+	+	+
	Foraging	+	+	+	+

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7.0 Appendices

Appendix A. Fort Drum, New York Biological Assessment for the Indiana Bat (*Myotis sodalis*) 2009-2011. Can be viewed at: http://fortdrum.isportsman.net/publications

Appendix B. Biological Assessment on the Proposed Activities on the Fort Drum Military Installation, Fort Drum, New York (2012-2014) for the Federally-Endangered Indiana bat (*Myotis sodalis*). Can be viewed at: http://fortdrum.isportsman.net/publications

Appendix C. Biological Assessment on the Proposed Activities on Fort Drum Military Installation, Fort Drum, New York (2015-2017) for the Indiana bat (*Myotis sodalis*) and Northern Long-eared bat (*Myotis septentrionalis*). Prepared by: US Army Garrison Fort Drum, Fish and Wildlife Management Program, Environmental Division, Directorate of Public Works, Fort Drum, New York.

Appendix D. Biological Opinion on the Proposed Activities on the Fort Drum Military Installation (2009-2011) for the Federally-Endangered Indiana Bat (*Myotis sodalis*) in the towns of Antwerp, Champion, LeRay, Philadelphia, and Wilna, Jefferson County and the Town of Diane, Lewis County, New York. Can be viewed at: http://www.fws.gov/midwest/Endangered/mammals/inba/bos/09_NY_Fort Drum.pdf**.**

Appendix E. Biological Opinion on the Proposed Activities on the Fort Drum Military Installation (2012-2014) for the Federally-Endangered Indiana Bat (*Myotis sodalis*) in the towns of Antwerp, Champion, LeRay, Philadelphia, and Wilna, Jefferson County and the Town of Diane, Lewis County, New York. Can be viewed at: http://www.fws.gov/midwest/Endangered/mammals/inba/bos/12_NY_Fort Drum.pdf

Appendix F. Biological Opinion on the Effect of Proposed Activities on the Fort Drum Military Installation (2015-2017)) in the towns of Antwerp, Champion, LeRay, Philadelphia, and Wilna, Jefferson County and the Town of Diana, Lewis County, New York on the Northern Long-eared bat (*Myotis Septentrionalis*).

Appendix G. 50 CFR Part 17: Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition To List the Eastern Small-Footed Bat and the Northern Long-Eared Bat as Endangered or Threatened Species; Listing the Northern Long-Eared Bat as an Endangered Species; Proposed Rule. Can be viewed at:

http://www.fws.gov/midwest/endangered/mammals/nlba/pdf/FRpropListNLBA2Oct2013.pdf

Appendix H. USFWS Northern Long-Eared Bat Interim Conference and Planning Guidance. Can be viewed at: http://www.fws.gov/midwest/endangered/mammals/nlba/pdf/NLEBinterimGuidance6Jan2014.pdf

Appendix I. Fort Drum, New York Integrated Natural Resources Management Plan 2011. Can be viewed at: http://fortdrum.isportsman.net/publications

Appendix J. Summer Mist Net and Radio-Telemetry Surveys for the Indiana Bat (*Myotis sodalis*) on Fort Drum, Jefferson and Lewis Counties, New York – 2007. Prepared by Environmental Solutions & Innovations, Inc. Previously Provided to USFWS.

Appendix K. Fall Mist Net and Radio-Telemetry Surveys for the Indiana Bat (*Myotis sodalis*) on Fort Drum, Jefferson and Lewis Counties, New York – 2007. Prepared by Environmental Solutions & Innovations, Inc. Previously Provided to USFWS.

Appendix L. Summer 2008 Bat Survey and Radiotelemetry Study Conducted at Fort Drum, Jefferson and Lewis Counties, New York. Prepared by Copperhead Environmental Consulting. Previously Provided to USFWS.

Appendix M. Summer Mist Net and Radio-Telemetry Surveys for the Indiana Bat (*Myotis sodalis*) on Fort Drum, Jefferson and Lewis Counties, New York – 2009. Prepared by Environmental Solutions & Innovations, Inc. Previously Provided to USFWS.

Appendix N. Summer Mist Net and Radio-Telemetry Surveys for the Indiana Bat (*Myotis sodalis*) on Fort Drum, Jefferson and Lewis Counties, New York – 2010. Prepared by Environmental Solutions & Innovations, Inc. Previously Provided to USFWS.

Appendix O. Bat Species Inventory of the Ft. Drum Military Installation, Jefferson and Lewis Counties, New York – 2012. Prepared by Jackson Environmental Consulting Services, LLC. Previously Provided to USFWS.

Appendix P. Summer 2015 bat survey and radiotelemetery study conducted at the Fort Drum Military Reservation, Jefferson and Lewis Counties, New York. Prepared by Copperhead Environmental Consulting, Inc.

Appendix Q. Fort Drum Military Installation Cantonment Area Indiana Myotis Survey. 2008 and 2009. Prepared by West Virginia University Under US Forest Service Agreement # 09-PA-11092000-106. Previously Provided to USFWS.

Appendix R. Conservation Measures and Beneficial Actions for Indiana and Northern Long-Eared Bats on Fort Drum.

This appendix includes all conservation measures and other beneficial actions that are implemented on Fort Drum which directly or indirectly benefit the Indiana and northern long-eared bat. These measures and actions are consolidated from Section 2. *Proposed Actions* and are in addition to those outlined in Section 3 *Conservation Measures*.

Conservation Measures for Construction Activities

1. Bat Conservation Area. A 2,200+ ac (890 ha) Bat Conservation Area (BCA) was established in 2008 to protect known Indiana bat roosting and foraging areas from permanent development within the Cantonment Area. The BCA attempts to provide connectivity of existing habitat in the Cantonment Area along the West Creek and Pleasant Creek corridors and the relatively undeveloped northern portion of the Cantonment Area where most of the known primary and maternity roosts are known. The BCA accounts for more than 20% of the total land area in the Cantonment Area. See *Section 3.1* for more information about the BCA. The BCA will also provide protection for northern long-eared bats within the Cantonment Area.

2. Roost Tree Protection. All female roosts, including roosts identified in the future, will be protected from construction for the lifespan of the roost tree. Additionally, a buffer will be placed around all female roosts to protect the roost from disturbance and to maintain a semblance of a natural environment for Indiana and northern long-eared bats. The size and shape of a buffer will be determined on a case by case basis by Fort Drum's Fish and Wildlife Management Program in consultation with the USFWS. Factors that will be considered will include surrounding landscape, habitat connectivity, distance to other roosts, distance to known foraging areas, and any other issue important to target species.

3. Time of Year Restriction for Tree Felling. A time of year restriction for clearing trees (> 3 in DBH) has been established to protect roosting Indiana and northern long-eared bats during non-hibernation seasons. For the majority of construction activities, felling of trees must take place between October 16 - April 15 while most bats are at the hibernaculum. This will greatly reduce the risk of accidentally harming bats that may potentially be present in trees scheduled to be removed. Specifically, maternity colonies and their associated non-volant young will be protected from disturbance.

4. Flagging or signs will be used to demarcate areas to be cleared vs. not cleared prior to any construction activities for a given project. Flagging will be removed upon completion of the project.

5. Via Environmental Protection Plans, Scope of Works, Contracts, etc., all personnel responsible for construction activities will be informed about the need to follow design plans, stay within flagging, minimize impacts to wildlife and other environmental concerns.

6. Outdoor Lighting Minimization. For all future projects, Fort Drum will evaluate the use of outdoor lighting and seek to minimize light pollution by angling lights downward or via other light minimization measures following Appendix P. High light levels may deter bats from areas as their nocturnal behavior may have evolved in response to predation risks (Speakman 1995, Sparks et al. 2005). By angling the light away from potential foraging and roosting areas, the area will be darker thus providing bats more protection from predators.

7. Demolition. If the building has pre-existing known bat colonies, then Fort Drum's Fish and Wildlife Management must be contacted before demolition is to occur. If during the course of demolition, bats of any species are discovered, then all work must cease and Fort Drum's Fish and Wildlife Management Program must be immediately contacted. If bats are identified as Indiana or northern long-eared bats, then additional steps will be taken to try and minimize impacts to the species and additional consultation with the USFWS is required. If the structure is safe to leave as is, then it will be left until after October 15, or until bats have stopped using the structure. If the structure is unsafe and poses a risk to human health and safety, Fort Drum will attempt to exclude the bats immediately. If this is not possible, or bats are found to be using the structure during the maternity season when pups are not volant, the Fort Drum Fish and Wildlife Management Program will contact USFWS to discuss the most appropriate next course of action.

8. Water Quality. All construction activities with ground disturbance greater than one acre or that meets another requirement of the New York State Department of Environmental Conservation, are required to follow standards in New York State Pollutant Discharge Elimination System: Storm water General Permit for Storm water Discharges (Permit No. GP-0-08-001 Issued Pursuant to Article 17, Titles 7, 8 and Article 70 of the Environmental Conservation Law). All construction projects over an acre are required to prepare a sediment and erosion control plan or a storm water pollution prevention plan (SWPPP), which details all erosion and sediment control practices and, when necessary, post-construction storm water management practices. Practices mentioned within the SWPPP will be in accordance with the New York State Stormwater Management Design Manual ("Design Manual") dated August 2003, or the most current version or its successor. Erosion and sediment controls vary, depending on individual impacts from each project. Some temporary examples of erosion and sediment controls include silt fences, check dams, and sediment traps. Permanent controls may include retention ponds, detention ponds, and grass lined swales. With water quality control measures in place, it is expected that declines in water quality will be minimal and thus will continue to provide adequate habitat for Indiana bat prey and drinking water for Indiana bats. In fact, water quality may actually improve during the construction of future projects due to new stormwater practices that mitigate for old water quality issues when no conservation measures were required or implemented.

9. Record-keeping and Reporting. For annual reporting purposes, all entities responsible for construction activities on Fort Drum will submit electronic shapefiles of clearing limits to Fort Drum's Fish and Wildlife Management Program. This information will be used to

describe vegetative cover types and habitat loss on Fort Drum and reported annually to the USFWS.

Beneficial Actions for Construction Activities

1. Time of Year Restriction for Land Clearing. For all construction activities, a time of year restriction for clearing natural vegetation (i.e. shrubs, grasses and trees-excluding trees 3 4 in DBH) has been established. Vegetation is typically not removed between April 15 - August 1. This time of year restriction was established in order to minimize take of migratory birds and their young in accordance with the Migratory Bird Treaty Act.

2. Minimizing Building Footprints. To minimize environmental impacts, construction activities attempt to minimize building footprints by combining infrastructure (i.e. roads, utility lines, etc.) for multiple buildings or by constructing multi-story versus multiple or expanded single story buildings whenever possible

3. Bat Roost Minimization in Buildings. Buildings will be appropriately designed and constructed so cracks and crevices are not created, vents are screened, etc. Properly constructed buildings will discourage bats from roosting in buildings, thus minimizing human/bat conflicts in occupied dwellings.

4. Stormwater Management. Fort Drum anticipates reviewing stormwater management plans with the objective of moving towards integrated infrastructure to reduce the number or completely eliminate the need for stormwater retention ponds and the excessive land use required.

Conservation Measures for Military Training

1. a) No Category 1 smoke operation will be conducted within 1,000 m of the installation boundary, public roads, Cantonment Area, ammunition supply point or WSAAF in accordance with *Fort Drum Regulation 350-4 Range Regulation* and *Fort Drum Regulation 350-6 Assignment and Operational Use of Local Training Areas (LTAs)*. This restriction currently protects all known Indiana roosts and the majority of the known maternity use area (i.e., roosting and core foraging area) from close proximity smoke exposure.

   b) In the Training Area, Category 1 smoke and obscurants must be used >100 m from any known Indiana or northern long-eared bat maternity roost areas between April 16 – October 15. This will help to protect Indiana and northern long-eared bat roosts into the future. The 100 m buffer serves to minimize the effects of smoke and obscurants by providing distance between the roost and the densest amount of the smoke/obscurants. Training missions will be aware of maternity areas via the NEPA process and will be directed to avoid these areas.

   c) Category 1 smoke operations must also be rotated among training areas to minimize impacts to any one area.

   d) The use of Category 2 smoke (aka pyrotechnics) may be used in the Training Areas at any time within 1,000 m of the installation boundary, but will not be used within 100 m

of any known Indiana or northern long-eared bat roost areas between April 16 - October 15.

e) Category 2 smoke may not be used within 100 m of any forested areas within the LTAs between April 15 - October 15 (with the exception of use at the mobile MOUTs as identified in f) below). Approval from Range Control and NEPA review is required prior to any use of Category 2 smoke, and these reviews will help ensure that Category 2 smoke use is in accordance with this conservation measure.

f) Category 2 smoke may be periodically used at three mobile MOUTs within the LTAs during April 15- October 15. All mobile MOUTs are currently outside of the BCA, but are in relatively close proximity (approximately 25, 35, 140m, respectively). Only infrequent use of colored smoke is expected to be used in around the mobile MOUTs. The closest known roost tree to the Mobile MOUTs is approximately 270m away. With the exception of the Category 2 colored smoke used at the mobile MOUTS, no other smoke or obscurant may be used in the BCA. Currently, all known Indiana bat maternity roosts are found within the BCA or within a 1,000 m from the installation boundary.

2. In the Training Area and LTAs, the cutting of trees and tree removal is prohibited without approval by Fort Drum's Forest Management Program in accordance with current Environmental Guidelines. If approved, actions will be in accordance with all conservation measures in *Section 2.3 Forest Management*. In general, this is a relatively rare military training action. No female roosts, including roosts identified in the future, will be felled for training for the lifespan of the roost. No tree felling will occur in the BCA for training purposes.

3. In the LTAs, vehicular traffic is restricted to open grassy areas within easy access of the road in accordance with *Fort Drum Regulation 350-6 Assignment and Operational Use of Local Training Areas*. Vehicles are not permitted to cross streams, ditches, wetlands, or dense vegetation in order to reach grassy areas without prior NEPA review, thus minimizing impacts to natural habitats.

4. In the LTAs, POL operations are prohibited in accordance with *Fort Drum Regulation 350-6 Assignment and Operational Use of Local Training Areas.* This helps to minimize the risk of accidental water/ground contamination.

5. Fort Drum will abide by the Fort Drum Integrated Wildland Fire Management Plan (Fort Drum 2013) which includes fire danger ratings, unless under special circumstances that are approved by the commander. Military activities that may spark fires will not be conducted during moderate to high danger ratings in order to prevent unintentional wildfires. Although unintentional fires will still ignite and burn, this conservation measure will help protect Indiana and northern long-eared bats from smoke exposure and from roost destruction. Burn bans are most likely implemented during the summer months when reproductive bats are present on Fort Drum.

Conservation Measures for Forest Management Activities

1. Bat Conservation Area. Approximately 2,200 ac (890 ha) have been set aside for Indiana bats. This BCA will also provide the same protections to northern long-eared

bats. Timber harvests will not occur within the BCA until an appropriate management plan is developed and the plan has been consulted on. If timber harvesting is needed within the BCA, then consultation with the USFWS is needed.

2. Roost Tree Protection. No female roost trees, including roosts identified in the future, will be felled for the lifespan of the roost, unless there is a human health and safety concern. This includes roost trees in and outside of the BCA.

3. Roost Tree Avoidance. Clearcutting and overstory roost tree removal will not occur within 0.75 mi (1.2 km) of known maternity roost trees located outside the BCA without further consultation with the USFWS. An exception to this requirement is a small number of small forested patches (ranging from ~5-15 acres) that will be clearcut at or near WSAAF to meet federal regulations for air safety. The majority of these patches contain trees primarily less than 4 in dbh. They will be maintained as forest, but will be clearcut approximately every 5-10 years to keep them at the appropriate height. Selective thinning will not occur within one tree height of the known roost tree to minimize the risk of accidentally felling a known maternity roost during the non-hibernation season. Tree height is based on the average height of the stand (~80 ft (24 m)) surrounding the roost tree. For selective thinning harvests within 0.75 mi of a known maternity roost, all snags will be retained, and live trees > 16 in DBH that have noticeable cracks, crevices, or exfoliating bark will be favored as residuals. Further consultation will be needed with the USFWS for timber harvests that do not follow this conservation measure.

4. Firewood Cutting Restriction. The known primary Indiana bat roosting areas (those areas behind Guthrie Clinic and Cool Road) have been made off limits to firewood cutting during April 16- October 15. Although firewood harvest only removes trees that are lying on the ground, this restriction will help avoid any associated noise or disturbance in the roosting areas from chainsaws and/or tractors used in the harvest of the wood.

5. Time of Year Restriction. A time of year restriction for clearing trees (> 3 in DBH) has been established to protect roosting bats during non-hibernation seasons. Felling of trees must take place between October 16 - April 15 while most Indiana or northern long-eared bats are at the hibernaculum.

6. Snag Retention. Indiana and northern long-eared bats typically select areas that have high snag densities for establishment of maternity colonies, so snag retention will benefit roosting bats by providing areas to rear young. All snags will be left in silvicultural treatments unless there is a safety concern for the contractor or the military units training in the stands (e.g., maneuver corridors), or unless the treatment is a salvage harvest or clearcut. Snags should be distributed and retained throughout the landscape.

7. No cutting of trees will occur within or along the bed or bank of streams protected under Article 15 of the New York State Environmental Conservation Law unless required to meet specific management goals and only after obtaining a permit from NYSDEC.

8. A minimum of 70 sq ft of residual basal area, all snags, and all live trees > 16 in DBH that have noticeable cracks, crevices, or exfoliating bark will be retained around all perennial streams and open waterbodies (2 ac or greater in size) on Fort Drum. A perennial stream is defined as having flowing water year-round during a typical year.

The water table is located above the stream bed for most of the year. Groundwater is the primary source of water for stream flow. Runoff from rainfall is a supplemental source of water for stream flow. If silvicultural treatments are needed that do not meet this conservation measure and that do not have a “no effect” determination, then individual consultation will be required with the USFWS. This buffer protects water quality and provides foraging habitat for Indiana bats. Indiana bats are known to utilize riparian corridors that have suitable vegetative cover for foraging and for roosting in nearby trees (Jachowski et al. 2014a, Garner & Gardner 1992).

9. For annual reporting purposes, the Forest Management Program will provide shapefiles of harvested areas, vegetative cover types pre- and post-harvest (within a scaled map), and the harvesting method used to Fort Drum's Fish and Wildlife Management Program. This information will be used to describe the vegetative cover types and habitat modification on Fort Drum and will be reported annually to the USFWS.

Beneficial Actions for Forest Management Activities

1. If possible, new log landings will be constructed at least 200 ft (61 m) from water bodies and wetlands.

2. Spill kits and oil absorbent mats will be present on log landings in case of fuel, lubricant or hydraulic fluid spills or leaks.

3. If necessary, soil will be stabilized by seeding and mulching at the end of the operation.

4. Where possible, skid trail grade will be maintained at less than 15%. Where higher grade is unavoidable, the grade will be broken, drainage structures will be installed, and soil stabilization practices will be used where needed to minimize runoff and erosion.

5. Debarking and other damage to residual trees will be minimized wherever possible.

6. Stream crossings will be used only when absolutely necessary.

7. Streams will be crossed by the most direct route.

8. Ruts will be filled in, and water bars and erosion barriers will be installed to prevent or minimize erosion and sedimentation from roads, skid trails and log landings.

9. Erosion control measures will be inspected within 24 hours after a rain event and checked once per week. Erosion controls will be maintained or removed as needed.

10. No machinery will be operated in streams protected under Article 15 of the NYS Environmental Conservation Law without first obtaining a permit from NYSDEC.

11. Oak Tree Retention. During hardwood removals, dead or dying oak trees that may have been typically removed from the stand will be left in the targeted units. This would be limited to areas that receive large amounts of sunlight during the day (e.g. the edge of the stand, near an opening within the stand, etc.) to provide roost trees for Indiana bats and other wildlife.

12. Live Tree Retention near Wetlands. Whenever possible, a percentage of suitable live trees (i.e., trees that look as if they have the potential to develop into future snags) will be retained, so cavities appropriate for wildlife may develop and for future snag recruitment. Suitable trees will be long lived hardwoods >15 in DBH and have the greatest potential to develop cavities. In wetland areas 10 ac (4 ha) or larger with open water and shorelines greater than 30 m apart, 20 suitable trees will be left for every 50 ac (20 ha) harvested within 0.5 mi (0.8 km) of wetlands. Although this measure was originally developed to benefit cavity nesting waterfowl species (e.g., wood ducks and hooded mergansers), it can also benefit Indiana bats. By retaining trees near wetlands that have the potential to develop into snags, future potential Indiana bat roosts will be located near water sources and potential foraging areas.

13. Forest Openings. When possible, unique forest openings (e.g. patch cuts of aspen varying from 1-10 ac in size removed from the stand) will be provided. This action will create openings in wooded habitat that can provide foraging opportunities for Indiana bats (Brack 2006).

Conservation Measures for Mechanical Vegetation Management Activities

1. Time of Year Restriction for Tree Felling. A time of year restriction for clearing trees (> 3 in DBH) and removing low- to medium-risk hazard trees has been established to protect roosting bats during non-hibernation seasons. Felling of trees must take place between October 16 - April 15 while most Indiana and northern long-eared bats are at hibernation sites. This will greatly reduce the risk of accidentally harming bats that may potentially be present in trees scheduled to be removed. Specifically, maternity colonies and their associated non-volant young will be protected from this disturbance.

2. Roost Tree Protection. No female roost trees, including roosts identified in the future, will be removed unless determined to be high risk hazard trees (see #4 below). Hazard trees that are not considered high risk, will be removed during the winter. Roost trees may not be removed for any other reason (e.g., aesthetically unappealing).

3. Mowing/ vegetation removal will not occur within 100 ft of known roost trees to avoid disturbing roosting bats and maintaining cover around the roosts.

4. No more than 50 ac per year (and no more than 25 ac in a contiguous block) will be mechanically removed within the BCA annually.

5. High Risk Hazard Trees. For hazard trees that are determined to be high or critical classified between April 16 – October 15, Fort Drum's Fish and Wildlife Management Program personnel will be notified in advance, so they may assess the hazard tree. If appropriate, an emergence survey will be conducted and if no bats are observed, then the roost tree will be promptly removed. This will reduce the risk of removing an undiscovered roost tree. If bats are observed, then further consultation with the USFWS is needed.

6. Reporting. Personnel responsible for each vegetation management action must provide a scaled map of the treated area, specify the type of management action that occurred, report the total acreage of impacted habitat, and the vegetative cover types that were managed (i.e., number of hazard trees removed, amount of shrubland habitat cleared) to

Fort Drum's Fish and Wildlife Management Program for annual reporting requirements to the USFWS. Mowing of landscaped grass in the Cantonment Area does not need to be documented.

Beneficial Actions for Mechanical Vegetation Management Activities

1. Typically, for all mechanical vegetation management not exempted for military readiness activities, a time of year restriction for clearing natural vegetation (i.e. shrubs, grasses and trees-excluding trees > 3 in DBH) has been established. Vegetation is typically not removed between April 15 - August 1. This time of year restriction was established in order to minimize take of migratory birds and their young in accordance with the Migratory Bird Treaty Act.

2. Vegetation management for military readiness may be conducted year-round although it is recommended that shrubs, grassess and small trees (< 3 in DBH) not be removed between April 15 - August 1 in order to minimize impacts to migratory birds and to maintain foraging areas for bats.

3. If soils are impacted by vegetation clearing, degraded areas will be repaired via actions that may include grading, compacting, seeding, and application of fertilizer, lime, and mulch. In the past, vegetation management activities typically have not disturbed soils to such an extent that repair work was necessary. This minimizes erosion run-off into waterways, and thus protects water quality and associated invertebrate abundance, including possible prey for Indiana bats.

4. Vegetation management activities typically avoid delineated water bodies/wetlands. Although there is no formal buffer requirement around wetlands, a 20-30 ft (6-9 m) buffer is typically maintained around identified wetlands. By retaining shrubs and small trees around wetlands, it passively directs military activities (i.e. vehicle maneuvers) from these areas to more upland, drier sites. This leads to less military impacts to water quality and protects water sources for bats.

Conservation Measures for Land Conversion Activities

To minimize the risks of impacting Indiana and northern long-eared bats during land conversion activities, several conservation measures have been implemented.

1. Bat Conservation Area. Approximately 2,200 ac (890 ha) have been set aside for Indiana bats. This BCA will also provide the same protections to northern long-eared bats. Land conversion will not occur within the BCA without additional consultation with the USFWS.

2. Roost Tree Protection. No female roost trees, including roosts identified in the future, will be felled for the lifespan of the roost, unless there is a human health and safety concern. This includes roost trees in and outside of the BCA.

3. Roost Tree Avoidance. Land conversion activities will not occur within 0.75 mi (1.2 km) of known maternity roost trees located outside the BCA without further consultation with the USFWS. An exception to this requirement would be the forested areas at WSAAF. In order to meet federal regulations for air safety, some of these areas may be converted

from forest to grassland for ease of maintenance. These areas were originally clearcut in 2005 and contain trees primarily less than 4 in dbh. They have now regrown to heights that are once again becoming a safety concern. Some areas will be maintained as forest, but will be clearcut approximately every 5-10 years to keep them at the appropriate height (as described in Section 2.3). Other areas will be completely converted to grass.

4. No more than a total of 50 ac/year in each category (100 ac total for military training and wildlife habitat benefits) of land conversion will occur in forested areas with > 3 in dbh trees. This will help to ensure large areas within a contiguous area will not be removed, minimizing the potential to remove a large percentage of unknown roost trees.

5. Time of Year Restriction. A time of year restriction for clearing trees (> 3 in DBH) has been established to protect roosting bats during non-hibernation seasons. Felling of trees must take place between October 16 - April 15 while most Indiana or northern long-eared bats are not on Fort Drum.

6. No cutting of trees will occur within or along the bed or bank of streams protected under Article 15 of the New York State Environmental Conservation Law unless required to meet specific management goals and only after obtaining a permit from NYSDEC.

7. A minimum of 70 sq ft of residual basal area, all snags, and all live trees > 16 in DBH that have noticeable cracks, crevices, or exfoliating bark will be retained around all perennial streams and open waterbodies (2 ac or greater in size) on Fort Drum. A perennial stream is defined as having flowing water year-round during a typical year. The water table is located above the stream bed for most of the year. Groundwater is the primary source of water for stream flow. Runoff from rainfall is a supplemental source of water for stream flow. If land conversion treatments are needed that do not meet this conservation measure and that do not have a “no effect” determination, then individual consultation will be required with the USFWS. This buffer protects water quality and provides foraging habitat for Indiana and northern long-eared bats. Indiana bats are known to utilize riparian corridors that have suitable vegetative cover for foraging and for roosting in nearby trees (Jachowski et al. 2014a, Garner & Gardner 1992).

8. For annual reporting purposes, the proponent of the land conversion activities will provide shapefiles of converted areas and vegetative cover types pre- and post-conversion (within a scaled map to Fort Drum's Fish and Wildlife Management Program. This information will be used to describe the vegetative cover types and habitat modification on Fort Drum and will be reported annually to the USFWS.

Beneficial Actions for Land Conversion Activities

1. Typically, for all land conversion activities, a time of year restriction for clearing natural vegetation (i.e. shrubs, grasses and trees-excluding trees > 3 in DBH) will be established. Vegetation will not be removed between April 15 - August 1. This time of year restriction is primarily to minimize take of migratory birds and their young in accordance with the Migratory Bird Treaty Act. However, it can also benefit foraging bats, if they are using the area.

2. If soils are impacted by vegetation clearing, degraded areas will be repaired via actions that may include grading, compacting, seeding, and application of fertilizer, lime, and mulch. In the past, vegetation management activities typically have not disturbed soils to such an extent that repair work was necessary. This minimizes erosion run-off into waterways, and thus protects water quality and associated invertebrate abundance, including possible prey for bats.

Conservation Measures for Pesticide Application Activities

1. Only pesticides registered by the EPA and State of New York may be applied and only in accordance with their label.

2. Aerial applications will occur between the hours of sunrise and one hour before sunset. This will protect foraging bats in undiscovered foraging areas from direct exposure.

3. Aerial application of pesticides in the BCA will not occur without further consultation with the USFWS.

4. Other pesticide application within the BCA will be limited to 50 ac per year (no more than 25 ac in a contiguous block) for tow behind power blowers and 25 ac per year for spot/ground application.

5. Tow behind power blowers will not be utilized until after August 15 in all forested areas to allow pups to reach volancy and exit an area if disturbed by this activity. Deviations from this conservation measure will require further consultation with the USFWS.

6. Whenever possible, herbicides that have low toxicity to mammals will be utilized with the tow behind power blowers. Herbicides that may be somewhat toxic to mammals will be mixed and applied at a rate that should minimize any potential exposure concerns.

7. Application of pesticides from ground mounted vehicles (i.e., ATVs, tractors) that spray chemicals directly onto the ground and do not result in broad dispersal will be conducted at least 100 ft (30 m) from known roost trees (including roosts identified in the future) and 250 ft (76 m) from known primary roosts. Pesticides applied from ground mounted vehicles will use drift control additives and droplet sizes appropriate for reducing drift.

8. Application of pesticides that result in broad dispersal (e.g., tow behind power blowers) will be conducted at least 250 ft (76 m) away from known roost trees (including roosts identified in the future) and 500 ft (152 m) from known primary roosts. Pesticides will not be applied between sunrise and one hour before sunset. Location-specific applications (i.e. hatchet or stem injections of trees, individual application to specific plants) may be used within 500 ft (30-76 m) of known roosts. This measure minimizes the risk of exposure to bats and potential effects from pesticides.

9. Pesticides applied from tow behind power blowers will use appropriate nozzles and drift control additives, and will be applied using low pressure to reduce drift and potential swirling motion from the blower. All efforts will be made to only spray 10 feet from ground level or below.

10. Pesticides will not be applied outdoors when the wind speed exceeds 10 mi/hr for all applications except power mist blowers. Pesticides applied via power mist blower will only be applied with wind speeds 8 mi/hr or less. Pesticides applied aerially will only be applied with wind speed 8 mi/hr or less. This is to reduce the risk of pesticide drift, which could impact water quality or non-target areas. Care will be taken to make sure that any spray drift is kept away from non-target areas and individuals. Additionally, aerial application will utilize helicopters and employ large droplet technology through special nozzles on drop tubes to ensure the herbicide stays on target.

11. Pesticides will not be applied to any protected wetlands, streams, or other waters of NY State without obtaining the appropriate permits.

12. If a bat colony is found roosting in a building, then insecticides will be used sparingly and no foggers will be used. This will minimize impacts to roosting Indiana bats if they are found within a building. Currently, only one colony of bats has been located on Fort Drum. The LeRay Mansion houses several hundred little brown bats according to a survey conducted in 2007. No Indiana bats were identified in the survey.

13. For each pesticide application, Pest Control will report the total amount of PAI used for each pesticide, the size of the treated area (within a scaled map), and the vegetative cover types that were treated to Fort Drum's Fish and Wildlife Management Program for annual reporting purposes to the USFWS. For pesticides applied indoors or immediately along the exterior of the building, only the PAI needs to be reported—no map is required or vegetation types need to be reported.

Conservation Measures for Wildlife Management/Vertebrate Pest Control Activities

1. No Lethal Control. No lethal control methods are permitted for bats unless there is a suspected human health risk for exposure to rabies or other disease. If individual bats are in buildings and there is no evidence of maternity use, then all efforts will be made to safely capture and release individual bats. Or, the bats will be excluded by establishing one-way valves over the roost's exit (if feasible).

2. Time of Year Restriction for Exclusion. The exclusion will only be done during times of the year when pups are not present or when they are volant (i.e., August - early May). The time of year restriction will minimize the risk of separating mothers from non-volant young, so it will prevent potential pup mortality during exclusion activities. Sealing cracks and crevices in buildings will also be done during the late fall or early spring. This is based on the assumption that no bats hibernate in buildings on Fort Drum, which is a valid assumption given the narrow temperature requirements necessary for hibernating bats and the heating of buildings (Tuttle & Kennedy 2002) and the fact that no bats have been found hibernating in buildings to date. Sealing cracks and crevices prevents bats from entering a building and reduces human/bat conflicts.

3. Adhesive Trap Restrictions. No adhesive traps used for rodents or insects will be placed in such a manner that they could capture bats—glue traps will not be placed in any crawl space or attic compartment within buildings or in areas where bats are known to occur.

Beneficial Actions for Wildlife Management/Vertebrate Pest Control Activities

1. Bat Houses. Two large bat structures have been successfully installed and utilized near LeRay Mansion. Additional bat houses may be erected throughout the Installation to provide alternate roosting opportunities for bats.

2. Systematic Planning & Exclusion. Any future exclusion of colonies of bats (such as the LeRay Mansion colony) will only be done through a systematic process. Exit counts will be performed to determine approximate numbers of bats utilizing the structure and alternate roosting structures with enough capacity for the colony will be provided in the area (when practicable) prior to any exclusions or sealing of exit holes. The exclusion will only be done during times of the year when pups are not present or when they are volant (i.e. August - early May) to avoid potentially trapping and killing any non-volant pups.

Conservation Measures for Outdoor Recreation Activities

1. Skeet Range. Skeet shooting at the current skeet range is located adjacent to the BCA and fires over a known fall, summer, and assumed spring foraging location of Indiana bats. From April 15 - October 15, the skeet range's hours of operation will be no earlier than 30 minutes after sunrise and no later than 1 hour before sunset. This measure will prevent the accidental shooting of an Indiana bat during the non-hibernation seasons.

Appendix S. Outdoor Lighting Minimization Measures.

Purpose

The purpose of the Fort Drum Outdoor Lighting Guidelines is to regulate outdoor lighting in order to reduce or prevent light pollution. This means to the extent reasonably possible the reduction or prevention of glare and light trespass, the conservation of energy, and promotion of safety and security. These Guidelines will ensure appropriate outdoor lighting in compliance with the Endangered Species Act and in accordance with the Fort Drum's Army Strategic Plan for Sustainability.

Definitions

a. Fixture Height: height of the fixture shall be the vertical distance from the ground directly below the centerline of the fixture to the lowest direct light emitting part of the fixture.

b. Foot-candles: a unit of illumination of a surface that is equal to one lumen per square foot. For the purposes of these regulations, foot-candles shall be measured at a height of 3 ft. above finished grade.

c. Fully Shielded Light: light fixtures shielded or constructed so that no light rays are directly emitted by the installed fixture at angles above the horizontal plane as certified by a photometric test report. The fixture must also be properly installed to effectively down direct light in order to conform with the definition.

d. Light Trespass: the shining of light produced by a light fixture beyond the boundaries of the property on which it is located.

e. Lumen: the unit of luminous flux, the total amount of light falling uniformly on or passing through an area of 1 square foot, each of which is 1 foot from a 1-candela source, yielding an illuminance of 1 foot candle at that distance (the output of lamps and bulbs is customarily measured in lumens, a common 100 watt incandescent light bulb, for example, having an output less than 1,800 lumens).

f. Point Light Source: the exact place from which illumination is produced (i.e., a light bulb filament or discharge capsule).

g. Sag-lens or Drop-lens: A clear or prismatic refracting lens that extends below the lowest opaque portion of a light fixture.

Applicability

All outdoor lighting fixtures installed, retro-fitted, or replaced on Fort Drum property shall comply with these regulations. These regulations do not apply to interior lighting.

Exemptions

The following are exempt from the provisions of these guidelines:

a. Traffic control signals and devices.

b. Temporary emergency lighting (i.e., fire, police, repair workers).

c. Moving vehicle lights.

d. Navigation lights (i.e., airports, heliports, radio/television towers).

e. Seasonal decorations with individual lights in place no longer than 60 days.

f. Lighting for flags. Efforts should be made in these areas to minimize sky glow and light trespass whenever feasible.

g. Sports field outdoor lighting (i.e. ball fields, football, soccer, ice rink, etc.). Sports outdoor lighting is to be turned off when a sporting event is not occurring.

h. Other special situations for temporary or periodic events (i.e. fairs, festivals, carnivals, night-time construction).

i. Security lights of any wattage that are controlled by a motion-sensor switch and which do not remain on longer than 10 minutes after activation.

j. Access points, Army Supply points, or other high security areas subject to AR 190-11 or TM-8-583-2. Efforts should be made in these areas to minimize sky glow and light trespass whenever feasible.

Additional exemptions may be provided after coordination with Fort Drum's Fish and Wildlife Management Program.

General Standards

All building exterior lighting and site lighting shall be at a minimum in accordance with these requirements and/or the most recent Fort Drum Utility Design Standards. A Professional Engineer must review any lighting plan in and ensure it is sound and meets minimization requirements. The following general standards shall apply to all outdoor lighting installed, retrofitted, or replaced on Fort Drum, which is not exempted above :

a. Outdoor lighting must be hooded, fully shielded (i.e. full cutoff fixtures), and/or aimed downward. Outdoor lighting used to illuminate parking spaces, driveways, maneuvering areas, or buildings shall conform to the definition for "fully shielded light fixtures" and be designed, arranged and screened so that the point light source shall not be visible from adjoining lots (i.e. woodlands) or streets.

b. The intensity of light within a site shall not exceed two (2) footcandles at any property line, edge of pavement, or road. There shall be no or minimal measureable light output behind the light pole.

c. The hood or shield must mask the direct horizontal surface of the light source. The light must be aimed to insure that the illumination is only pointing downward onto the ground surface, with no escaping light permitted to contribute to sky glow by shining upward into the sky.

d. Any bright light shining onto adjacent properties (i.e. woodlands) or streets which would result in a nuisance glare or a disabling glare shall not be permitted. Light trespass beyond property boundaries or above the horizontal plane shall be considered non-compliant.

e. Existing fixtures may be adapted to comply with these guidelines by adding a properly designed hood or shield, or by pointing any upward-mounted, shielded fixture downward onto the ground surface.

f. All outdoor lighting fixtures shall be designed, installed, located and maintained such that nuisance glare onto adjacent properties (i.e. woodlands) or streets shall be minimized and all direct illumination kept within the boundaries of a building's property.

g. Accent lighting shall be directed downward onto the building or object and not toward the sky or onto adjacent properties (i.e. woodlands). Direct light emissions shall not be visible above the roof line or beyond the building edge.

h. Spotlighting on landscaping and foliage shall be limited to 150 watts (2220 lumens output) and lighting is to be angled downwards. The lamp shall be fully shielded and not create disabling or nuisance glare.

i. No sag-lens or drop-lens are to be used.

j. LED light fixtures will be utilized to the maximum extent practicable. These fixtures shall be long life, coupled with high efficient drivers. LED lights shall incorporate measures to reduce blue-rich white light output. These measures will be coordinated with Fort Drum's electric shop and Natural Resources Branch prior to implementation, but could include things such as targeting wavelengths between 550-650 nm, and/or reducing the correlated color temperature of the fixture to 3000K or lower. A map is available that designates areas in which utilizing lower correlated color temperatures is required. This can be viewed through Fort Drum's Fish and Wildlife Management Program and/or the electric shop. (**This map can be provided to the USFWS upon request**)

Appendix T. Example Army Compatible Use Buffer Program "Agricultural Easement". Previously Provided to USFWS.