CARLTON COUNTY LAND DEPARTMENT
FOREST BAT SURVEY REPORT
CARLTON COUNTY, MINNESOTA

August 9-10, 2018

Prepared for:

Carlton County Land Department
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REPORT REFERENCE

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INTRODUCTION

Carlton County Land Department (CCLD) contracted Western EcoSystems Technology, Inc. (WEST) to conduct mist-net surveys for bats within Carlton County, Minnesota. The main objective of summer bat surveys was to evaluate the presence, distribution, and habitat use by federally listed northern long-eared bats *(Myotis septentrionalis;* NLEB) and little brown bats (*M. lucifugus*), within CCLD land during the maternity season (May 15 to August 15). The area surveyed is a pine plantation stand selected by CCLD as an area of high interest for NLEB and general bat activity (Appendix A).

The pine plantation stand is located in Carlton County in east-central Minnesota within the Northern Lakes and Forests Level III Ecoregion (Appendix A). The Northern Lakes and Forests Ecoregion is a rolling landscape of woods, wetlands, pasture, and crops that extends into northern Minnesota, northern Wisconsin, and northern Michigan (Omernik et al. 2000). Land cover in the Ecoregion is characterized by nutrient poor glacial soils and coniferous and northern hardwood forests, with lakes distributed throughout the region.

The following report summarizes the results of mist-net and radio-telemetry surveys conducted during the summer 2018.

Overview of Bat Diversity

There are seven species of bats are found in Minnesota. Those species include: the big brown bat (*Eptesicus fuscus*), silver-haired bat (*Lasionycteris noctivagans*), eastern red bat (*Lasiurus borealis*), hoary bat (*L. cinereus*), little brown bat, NLEB, and tri-colored bat (*Perimyotis subflavus*). Of the seven species with the potential to occur in Minnesota, one (NLEB) is federally listed as threatened under the Endangered Species Act [ESA]. The NLEB, big brown bat, little brown bat and tri-colored bat are all considered Minnesota species of special concern (MN-DNR 2013).

METHODS

Mist-Net Surveys

Mist-net surveys were conducted following guidance in the *2018 Range-wide Indiana Bat Summer Survey Guidelines* (USFWS 2018), which is also used for NLEB presence/probable absence surveys and the *Northern Long-Eared Bat Interim Conference and Planning Guidance* (USFWS 2014). WEST conducted mist-net surveys August 9 – 10, at site CC-M1. Standard two-ply, 75 denier, monofilament mist-nets with a mesh size of 38 millimeters (1.30 inches) were used at all mist-net sites. WEST began mist-netting at sunset and continued for at least five hours; nets were checked every 10 minutes. Net locations were typically established at least 30 m (98.4 ft) apart within each mist-net site whenever possible. Disturbance in the form of noise and movement were minimized at all net locations. WEST surveyed two mist-net locations for two nights for a total of four net nights. Specific mist-net sites were determined on-site by

permitted bat biologists with NLEB research experience. If weather conditions, such as persistent rain (more than 30 minutes), strong winds (greater than nine mph for more than 30 minutes), or cold temperature (below 10 °C for more than 30 minutes) occurred during the netting period, then those net nights were re-surveyed. All mist-net surveys were performed by staff permitted by USFWS (Permit # TE234121-9) and Minnesota Department of Natural Resources: #19614) to capture and handle NLEB.

For each mist-net night the date, start and end time, site description, site coordinates, mist-net specifics, and weather data (temperature, cloud cover, wind speed, precipitation, and moon phase) were recorded. WEST identified all captured bats to species. WEST also recorded the sex, age, reproductive condition, body mass (grams), forearm length (millimeters), and capture status (recapture/new) of each captured bat. To assess exposure to White-Nose Syndrome (WNS), a Reichard Index score (0-3) was recorded for all captured bats. To prevent cross contamination of captured bats with *Pseudogymnoascus destructans*, the fungus that causes WNS, WEST followed the USFWS WNS decontamination protocols for all mist-netting efforts (see White-Nose Syndrome.org; USFWS 2016). Captured bats were measured and processed immediately and were usually released within 30 minutes. Species of bats captured were photo-documented. If any NLEB or little brown bats were captured, WEST took voucher photographs of species-specific identifiable features (e.g. head, body, calcar, foot, toe hairs etc.). Numbered metal forearm bands were attached to any captured NLEB.

RESULTS

Mist-Net Surveys

The mist-nest survey was completed August 9 – 10, 2018 for a total of 4 net nights at site CC-M1 (Table 1). Maps and pictures of mist-nets are included in Appendices A and B, respectively. One silver-hair bat was captured (Table 2). The captured bat exhibited no signs of damage on the wings from WNS. Photos of the captured bat are included in Appendix C, and capture details can be found in Appendix D.

CONCLUSION

The results of the 2018 Carlton County summer bat surveys were relatively similar to the survey results of summer bat surveys taken place in Aitkin County in 2018. In 2015, 21 bats were captured on Carlton County property, with nine bats captured at CC-M1. In 2016, 23 bats were captured at two sites on Carlton County property with 15 bats being captured at site CC-M1. At CC-M1 five NLEB and four little brown bats were captured in 2015, while in 2016 only one NLEB was captured, but 12 little brown bats were captured. In 2017, there were nine bat captures and five species. The single capture at both the Aitkin and Carlton 2018 mist-net surveys were much lower than previous years. Lower capture rates may be due to WNS becoming established within the state or natural movement of bats within the study area.

LITERATURE CITED

Allen, L.A.W., U.K. Bernal, and R.J. Moulton. 1996. Pine Plantations and Wildlife in the Southeastern United States: An Assessment of Impacts and Opportunities. Information and Technology Report 3, U.S. Department of the Interior National Biological Service.

Chapman, S.S., J.M. Omernik, J.A. Feeouf, D.G. Huggins, J.R. McCauley, C.C. Freeman, G. Steinauer, R.T. Angelo, and R.L. Schlepp. 2001. Ecoregions of Nebraska and Kansas (map poster). U.S. Geological Survey, Reston, Virginia. Scale 1:1,950,000.

Endangered Species Act (ESA). 1973. 16 United States Code (USC) §§ 1531-1544, Public Law (PL) 93-205, December 28, 1973, as amended, PL 100-478 [16 USC 1531 et seq.]; 50 Code of Federal Regulations (CFR) 402.

ESRI. 2015. Geographic Information System (GIS) Online Topographic Base Map. ESRI, producers of ArcGIS software. Redlands, California.

Frick, W. F., J. F. Pollock, A. C. Hicks, K. E. Langwig, D. S. Reynolds, G. G. Turner, C. M. Butchkoski, and T. H. Kunz. 2010. An Emerging Disease Causes Regional Population Collapse of a Common North American Bat Species. Science 329: 679-682.

North American Datum (NAD). 1983. NAD83 Geodetic Datum.

Omernik, J.M., S.S. Chapman, R.A. Lillie, and R.T. Dumke. 2000. Ecoregions of Wisconsin. Transactions of the Wisconsin Acadamy of Sciences, Arts, and Letters 88:77-103.

White-Nose Syndrome.org. 2012. National White-Nose Syndrome Decontamination Protocol - Version 06.25.2012. June 25, 2012. White-Nose Syndrome.org homepage at: http://whitenosesyndrome.org/; Decontamination protocols available online at: https://www.whitenosesyndrome.org/sites/default/files/resource/national_wns_revise_final_6.25.12.pdf

US Department of Agriculture (USDA). 2014. Imagery Programs - National Agriculture Imagery Program (NAIP). USDA - Farm Service Agency (FSA). Aerial Photography Field Office (APFO), Salt Lake City, Utah. Last updated September 2015. Information available online at: http://www.fsa.usda.gov/programs-and-services/aerial-photography/imagery-programs/index

US Fish and Wildlife Service (USFWS). 2013. 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. Docket No. FWS-R5-ES-2011-0024. 78 Federal Register (FR) 191: 61046-61080. October 2, 2013. Available online at: http://www.fws.gov/midwest/endangered/mammals/nlba/pdf/FRpropListNLBA2Oct2013.pdf

US Fish and Wildlife Service (USFWS). 2014. Northern Long-Eared Bat Interim Conference and Planning Guidance. January 6, 2014. USFWS Regions 2, 3, 4, 5, & 6. Available online at: http://www.fws.gov/northeast/virginiafield/pdf/NLEBinterimGuidance6Jan2014.pdf

US Fish and Wildlife Service (USFWS). 2016. National White-Nose Decontamination Protocol- Version 04.12.2016. Updated April 12, 2016. Available online at: https://www.whitenosesyndrome.org/resource/national-white-nose-syndrome-decontamination-protocol-april-2016

US Fish and Wildlife Service (USFWS). 2018. Range-Wide Indiana Bat Survey Guidelines. USFWS, Midwest Region, Bloomington, Minnesota. April 2018. Available online: https://www.fws.gov/midwest/endangered/mammals/inba/surveys/pdf/2018RangewideIBatSurveyGuidelines.pdf

US Geological Survey (USGS). 2015. The National Map/US Topo. Last updated January 2015. Homepage available at: http://nationalmap.gov/ustopo/index.html

US Geological Survey (USGS) National Land Cover Data (NLCD). 2011. National Land Cover Database NLCD, Muti-Resolution Land Characteristics Consortium (MRLC). USGS Earth Resources Observation and Science (EROS) Center, Sioux Falls, South Dakota. Information available online at: http://www.mrlc.gov/nlcd11_leg.php

TABLES

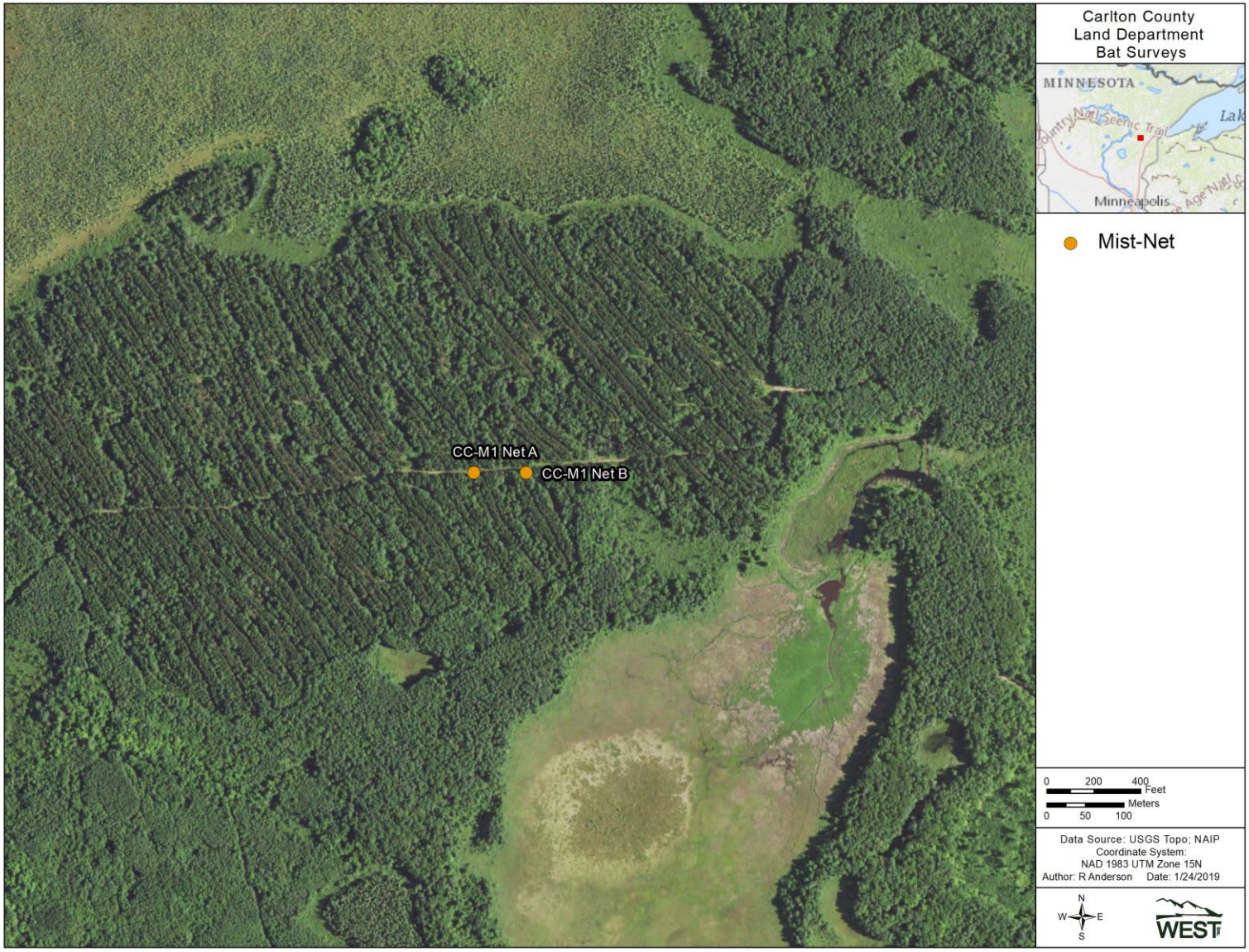
Table 1. Location and site description of mist-net sites for the 2018 bat mist net surveys within Carlton County, Minnesota.

Site ID	Net	UTM Zone	Easting	Northing	Site Description
CC-M1	A	15	503791	5165476	forest corridor
	B	15	503859	5165476	forest corridor

Table 2. Summary of bat captures at mist-net sites for 2018 bat surveys within Carlton County, Minnesota.

Night	Big Brown Bat	Eastern Red Bat	Silver-Haired Bat	Little Brown Bat	Hoary Bat	Northern Long-Eared Bat	Tri-colored Bat	Total
1	0	0	1	0	0	0	0	1
2	0	0	0	0	0	0	0	0
Total	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**

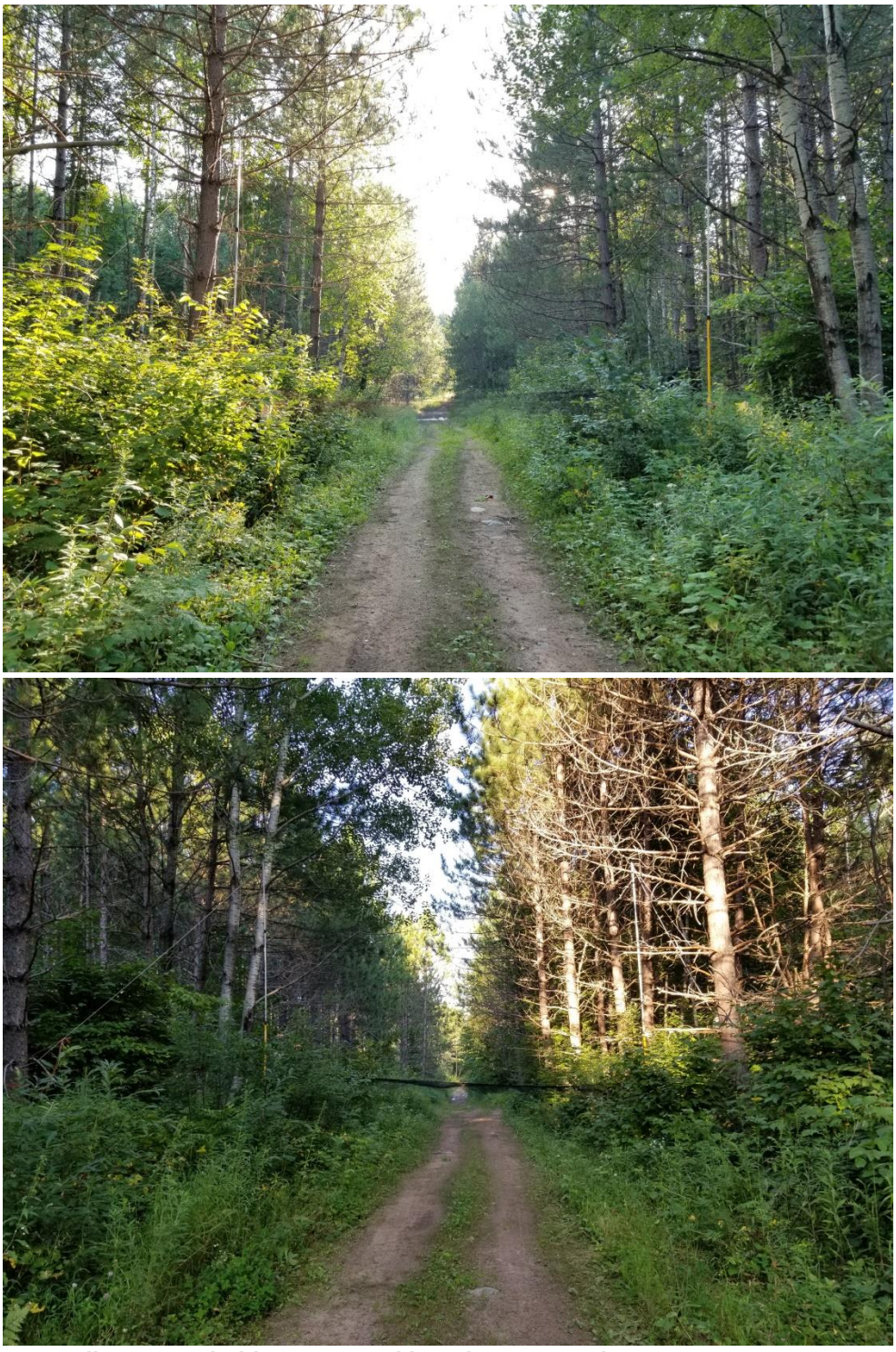
Appendix A. Carlton County Land Department Project Map and Locations of Bat Surveys



Appendix A2. Aerial view of mist-net sites used for bat surveys at site CC-M1 at the Carlton County Land Department managed forest.

Appendix B. Photographs of Mist-Net Survey Site

Appendix B1. Bat habitat surveyed by mist-nets at site CC-M1 net A.



Appendix B2. Bat habitat surveyed by mist-nets at site CC-M1 net B.

Appendix C. Photographs of Captured Bats

Appendix C1. Photos of silver-haired bat captured at CC-M1.

Appendix D. Summary of Mist-Net Captures

Appendix D1. Details of bats captured at mist-net site CC-M1; August 9 – 10, 2018.

Species	Sex	Age	Reproductive Status	Reichard Score	Weight (g)	Forearm Length (mm)
August 9						
Silver-haired bat	Female	Juvenile	Non-reproductive	0	11.75	42
August 10						
None						