Acoustic Bat Monitoring

Steep Rock Association

Summer 2016

Introduction

One of Steep Rock Association's stewardship initiatives is to inventory and monitor fauna populations on its properties, and apply this information to protect and enhance biodiversity through sound management practices.

Bat populations throughout the northeast have experienced declines in the past few decades, but most notable has been the collapse of cave-roosting bats in response to white-nose syndrome (WNS). WNS results from an infection by a cold-loving fungus that causes bats to cluster near hibernacula entrances, wake up from torpor, and even fly outside during the winter. These activities result in a premature expenditure of energy and depletion of fat reserves needed to survive winter. Cave-roosting species affected by WNS include the big brown, little brown, eastern small-footed, northern long-eared, tri-colored, and Indiana bats. Tree-roosting species like silver-haired, hoary, and eastern red bats migrate rather than overwinter in mines and caves and thus are not affected by WNS.

The purpose of this study is to document the presence or absence of species inhabiting the preserves as well as to identify areas of high foraging activity. Results may be used to guide land management practices and perform additional surveys targeted at focal species.

Methods

An Anabat Express detector was deployed at nine locations on six preserves (Figure 1). Locations were selected based on likely forage corridors such as edges in order to record foraging echolocation calls rather than less-discerning social and navigation signals. Close proximity to a water source was also a selection parameter.

An extendable ladder was used to mount the detector and its protective casing to a vertical tree trunk 15-20 feet high. The detector was programmed to turn on 30 minutes before sunset, record bat calls through the night, and turn off 30 minutes after sunrise. Data was stored on a SD card in the detector. A total of two consecutive nights were sampled at each site over a period beginning on April 27, 2016 and ending August 18, 2016. After two nights of recording, the detector was collected and data was transferred from the SD card to a computer.

AnalookW software was used for zero-crossing data analysis. Zero-crossing extracts the basic time-frequency content of a signal, retaining the dominant frequency at any time, and requires the manual identification of species from the produced sonograms.

Results

This sampling effort documented a suite of species occurrence on Steep Rock lands. The big brown bat (not listed in CT) and the silver-haired bat (special concern in CT) were the dominant species detected. Big brown bat was found at every site except Neilson, while silver-haired bats were present at

all sites sampled. The two other tree-roosting, CT special concern bats (hoary and eastern red) were well represented across the Washington landscape and seemed to prefer foraging early (shortly after sunset) and late (shortly before sunrise). Hoary bats were found at Logan, Macricostas, Hidden Valley (Quartz Field), and Steep Rock (SR1 Field and Middle Field) Preserves. Their apparent activity level and number of distinguishable recordings were less than that of eastern red bats, whose presence was confirmed through multiple sonograms at Logan, White, Hidden Valley (Nye Field and Quartz Field), and Steep Rock (SR1 Field, Middle Field, and Clamshell Tail) Preserves.

Little brown bats, listed as endangered in CT, were detected at six of nine sites (Table 1). Other CT endangered species (tri-colored, eastern small-footed, northern long-eared, and Indiana) have similar calls with a minimum frequency around 40kHz. Diagnostic features were absent in several sonograms identified as potentially produced by these species. After analysis, CT DEEP biologist Kate Moran confirmed the lack of confidence in reporting presence of these species.

Discussion

Steep Rock Association lands clearly provide quality habitat for a variety of bat species. As mentioned in DEEP's report, species presence and relative activity levels may vary based on weather and time of year. Cooler night temperatures may explain the relatively low number of bat passes in the first half of the sample period. Field/forest edges and the Shepaug River corridor in Hidden Valley and Steep Rock Preserves were heavily used as foraging areas in June, July, and August.

Further investigation into the occurrence of CT endangered species is recommended through a more focused effort in recording these bats. Open water, ledge/talus slopes, and old-growth forest openings are known habitat types that were not extensively sampled in this survey whose goal was to document the whole bat community rather than a few species. The use of full-spectrum analysis software such as SonoBat, although expensive, would likely result in greater efficiency and confidence of call analysis. This could be a potential collaboration with the White Memorial Foundation who plans to purchase this software as they investigate their bat community.

Other recommendations concerning management of preserves can be found on the last page of DEEP's Acoustic Bat Monitoring Report. Related activities planned for 2017 include a winter roost survey of the tunnel and additional acoustic monitoring at Hidden Valley (DEEP), bat box building/installment, and an active bat monitoring program at Macricostas Preserve.

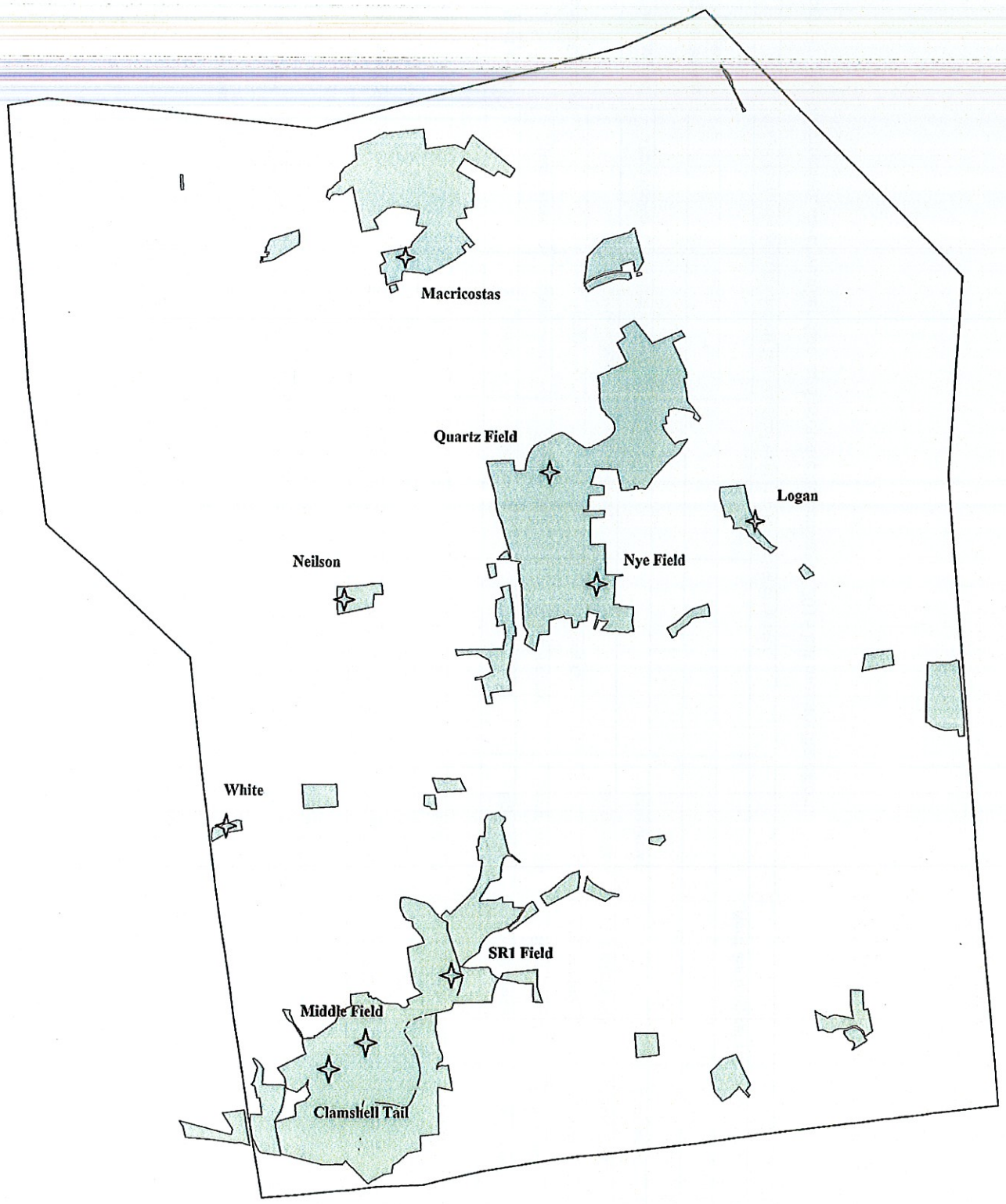
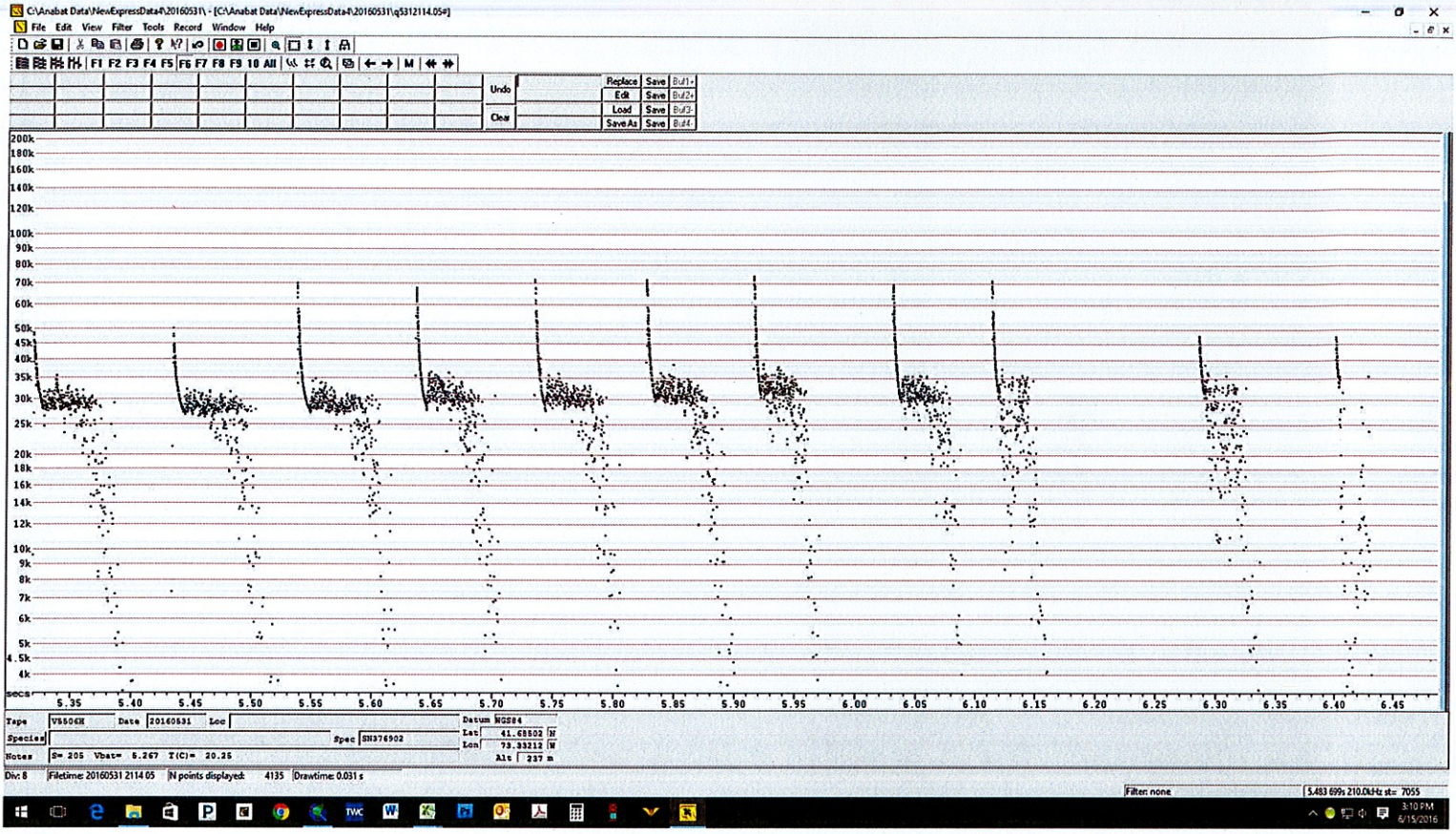


Figure 1. Anabat acoustic monitoring sites on fee-owned preserves.

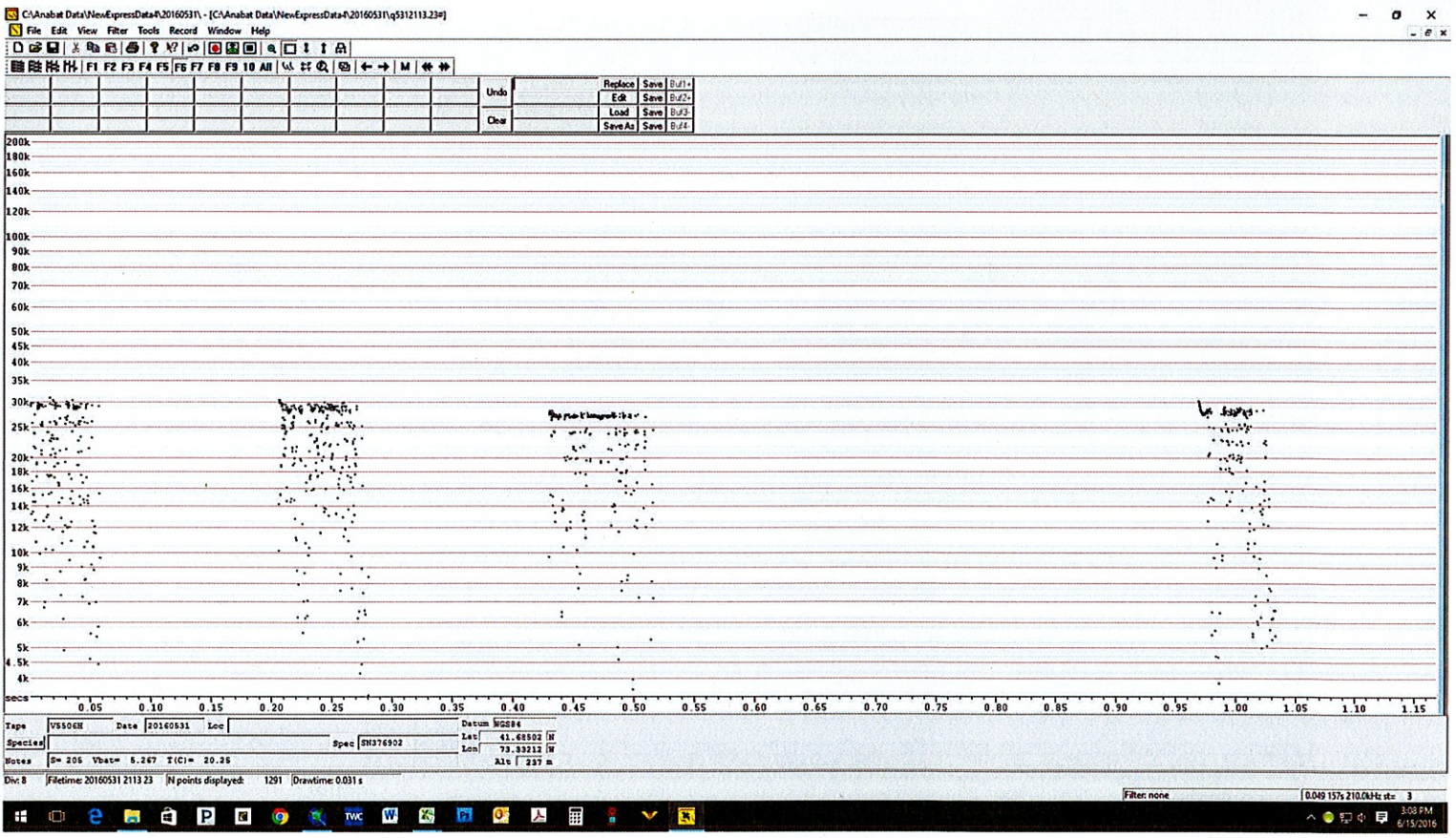
	Sites								
	Neilson	Logan	White	Macricostas	HV (Nye Field)	HV (Quartz Field)	SR (SR1 Field)	SR (Middle Field)	SR (Clamshell Tail)
GPS Coordinates	N 41.65236	N 41.65921	N 41.63035	N 41.63035	N 41.65370	N 41.66461	N 41.61575	N 41.60932	N 41.60746
	W 73.33917	W 73.28672	W 73.35496	W 73.35496	W 73.30714	W 73.31221	W 73.32459	W 73.33711	W 73.33987
Habitat Type	Field/Forest Edge	Swamp/Forest Edge	Field/Forest Edge	Fen	Field/Forest Edge	Field/Forest Edge	Field/Forest Edge	Field/Forest Edge	Open Water
Waterbody	Wetland	Cranberry Swamp	Walker Brook Trib	Bee Brook, Meeker Swamp	Vernal Pool	Shepaug River	Shepaug River	Shepaug River	Shepaug River, Shinar Brook
Dates Sampled	27-Apr-28	11-May-12	17-May-18	31-May/June-01	14-Jun-15	29-Jun-30	5-Jul-06	19-Jul-20	17-Aug-18
Avg. Temp (F)	49	54	54	64	67	67	72	69	73
# Recordings	22	28	63	154	950	1011	1103	792	2094*
Not Listed		Big Brown	Big Brown	Big Brown	Big Brown	Big Brown	Big Brown	Big Brown	Big Brown
Special Concern	Silver-haired	Silver-haired	Silver-haired	Silver-haired	Silver-haired	Silver-haired	Silver-haired	Silver-haired	Silver-haired
		Hoary		Hoary		Hoary	Hoary	Hoary	
		Eastern Red	Eastern Red		Eastern Red	Eastern Red	Eastern Red	Eastern Red	Eastern Red
Endangered	Little Brown	Little Brown			Little Brown		Little Brown	Little Brown	Little Brown
Other Myotis Potential								Eastern Pipistrelle	Eastern Pipistrelle
									Eastern Small-footed
						Northern Long-eared	Northern Long-eared		
	* high # recordings at Clamshell Tail result of light rain reflecting off water								

Table 1. Site information, date/weather data, and acoustic detections of 2016 bat monitoring effort.

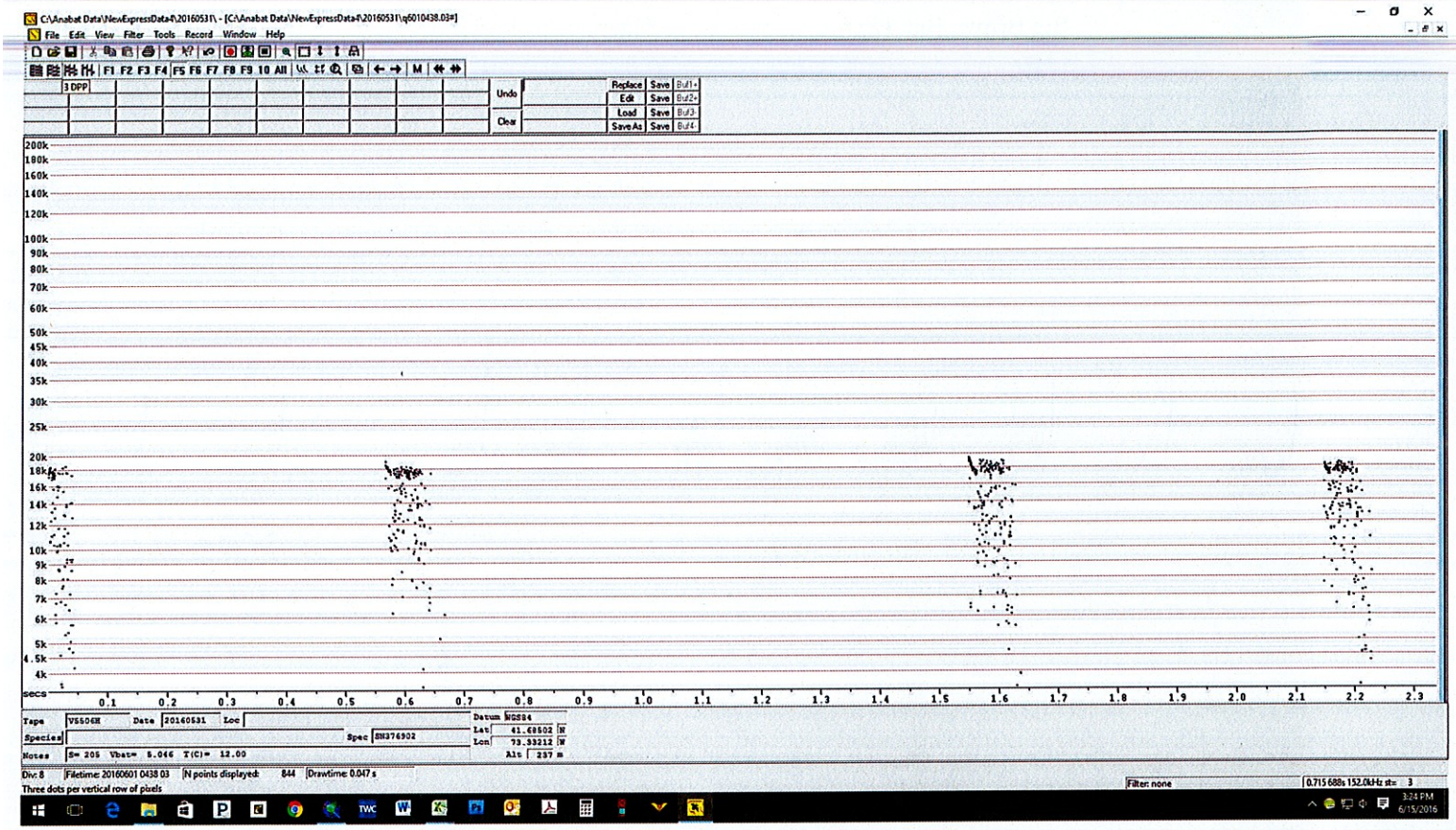
Big Brown Bat (*Eptesicus* fuscus) - Macricostas Preserve



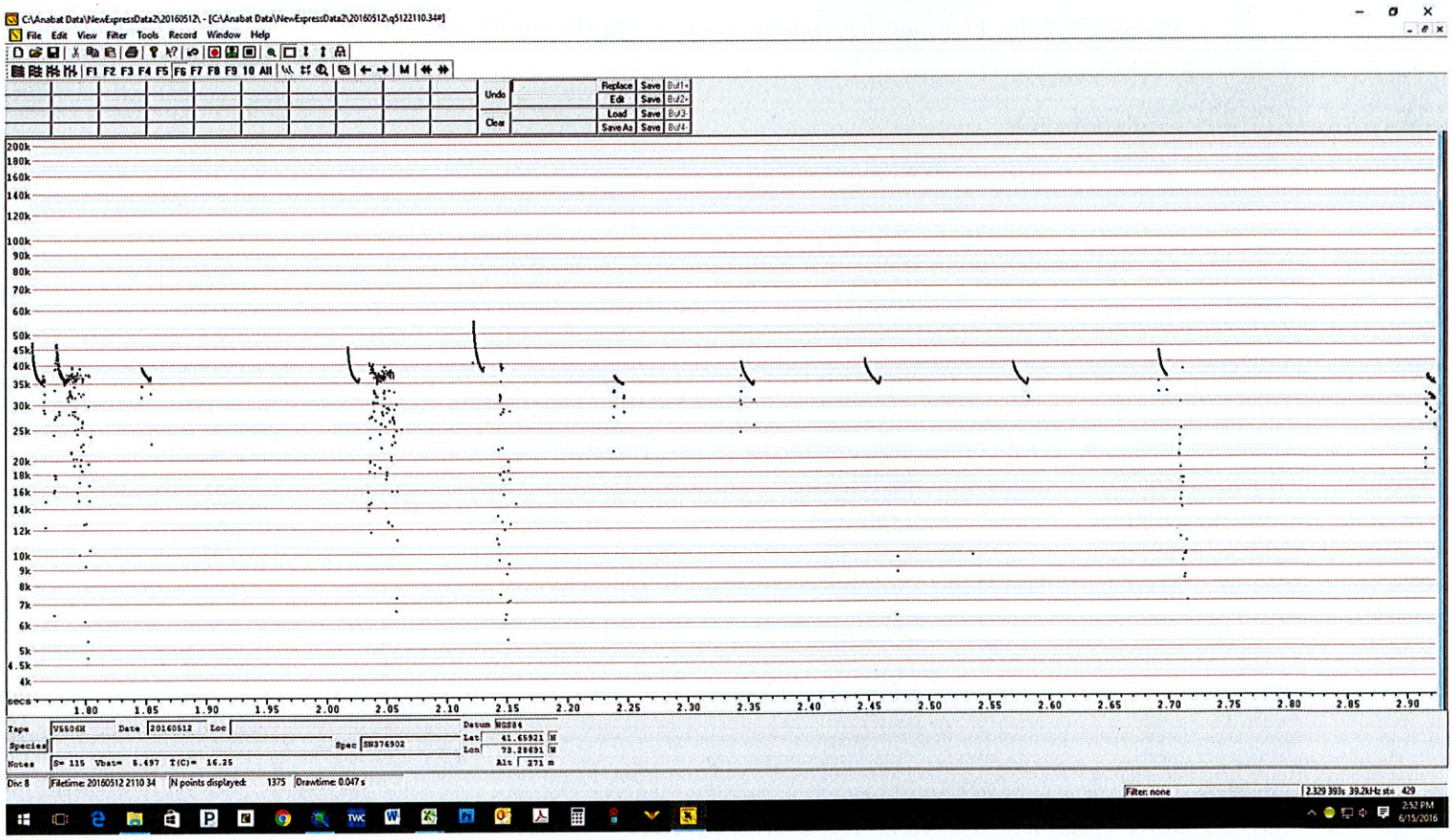
Silver-haired Bat (*Lasionycteris noctivagens*) - Macricostas Preserve



Hoary Bat (*Lasiurus cinereus*) - Macricostas Preserve



Eastern Red Bat (*Lasiurus borealis*) - Logan Preserve



Little Brown Bat (*Myotis lucifugus*) - Hidden Valley Preserve (Nye Field)