Assessing avifauna at West Nile virus surveillance sites

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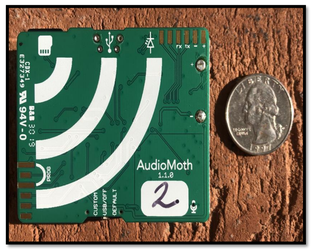
Is there a correlation between avian populations and West Nile virus in Lowndes County, Georgia?

Do certain species of birds cause high levels of WNV? Or do areas with more acoustic biodiversity have higher levels of WNV?

Collecting Audio Recordings

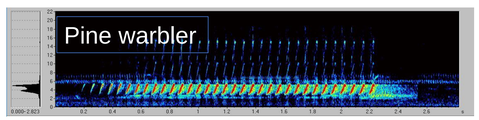
Experimental Design:

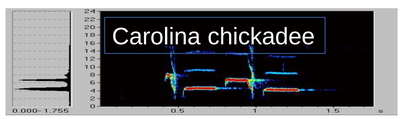
- We are collecting audio recordings at 13 long-term WNV surveillance sites in Lowndes County.
- Recordings are taken at 0600, 0700, and 0800 EST.
- For analysis, we are listening to the first 5-min of every hour for each site.

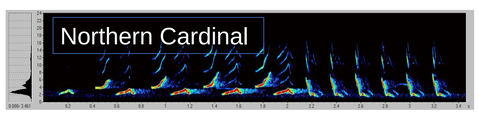


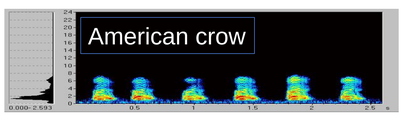
We are collecting acoustic recordings on three AudioMoth units (pictured above) and visualize sounds with the program Koe Bioacoustics software.

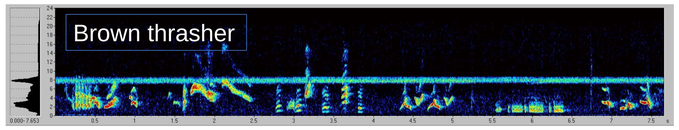
Analyzing Audio Recordings





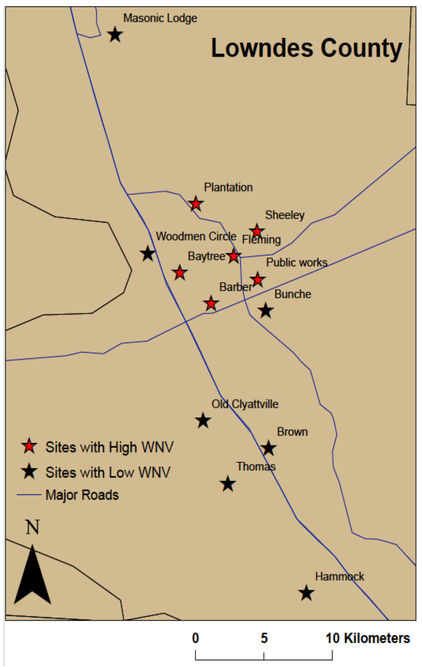






To visualize sound, we generated spectrograms which plot the song frequency (kHz) as a function of time (s). We compared sections of sound that were found to be of avian origin to known audio specimens to verify species. We measured avian biodiversity as the presence or absence of species-specific songs at each of the surveillance sites.

Linking patterns of bird diversity to WNV in Lowndes County



Map image showing each of our 13 recording sites. Six sites (red stars) have high levels of WNV and seven sites have low levels (black stars) of WNV.

Table 1: presence or absence of bird songs and calls from analyzed recordings.

Site	AMCR	AMRO	BLJA	BHNU	BRTH	CACH	CAWR	FICR	NOMO	NOPA	NOCA	MODO	PIWA	RSHA
Barber*														
Baytree*														
Brown														
Bunche														
Fleming*														
Hammock														
Masonic Lodge														
Old Clyattville														
Plantation*														
Public Works*														
Sheeley*														
Thomas														
Woodman Circle														

Absent
Present
Incomplete

Sites with an * following their name are areas of high WNV. The following bird species were analyzed on recordings and are shown in the table: American crow (AMCR, *Corvus brachyrhynchos*), American robin (AMRO, *Turdus migratorius*), Blue jay (BLJA, *Cyanocitta cristata*), Brown-headed nuthatch (BHNU, *Sitta pusilla*), Brown thrasher (BRTH, *Toxostoma rufum*), Carolina chickadee (CACH, *Poecile carolinensis)*, Carolina wren (CAWR, *Thryothorus ludovicianus*), Fish Crow (FICR, *Corvus ossifragus*), Northern Mockingbird (NOMO, *Mimus polyglottos*), Northern parula (NOPA, *Setophaga americana)*, Northern Cardinal (NOCA, *Cardinalis cardinalis*), Mourning dove (MODO, *Zenaida macroura*), Pine warbler (PIWA, *Setophaga pinus*), Red-Shouldered Hawk (RSHA, *Buteo lineatus*).

Preliminary conclusions

1. Sites with lower levels of WNV have more acoustic biodiversity.

2. The Carolina Wren species is more prevalent in majority of the sites.

3. We predict that acoustic biodiversity in sites with high levels of WNV will differ from those with low levels of WNV.

Next steps: What bird species are the most common in areas with high WNV prevalence?

Are migrants or residents more common in areas with high WNV?

How does bird acoustic biodiversity change with season in Lowndes county?

As a research team, we would like to express our appreciation for the people that helped us get this project up and running. First and foremost, we would like to thank the families and businesses that have allowed us to record our data on their properties. The utmost thanks to Dr. Blackmore for his hard work and dedication to WNV research in Lowndes County for so many years. The main player of Dr. Blackmore's WNV research studies, Adam Slaton, who took the time to show us each and every site—thank you. We would like to Dr. Blackmore's lab group for sharing their WNV mosquito data with us so we could include that information on our poster.