

SACRA

# Churchtown

# Dairy

## Grove Restoration Site

Hudson Carbon Research Project

CONNECT WITH US.



**SACRA LLC**

Oneida County, New York State. U.S.A.

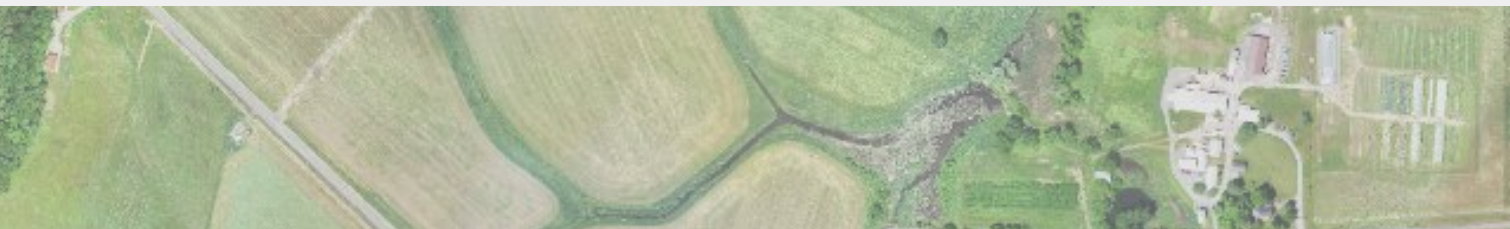
Michael Howard

+1-315-527-7058

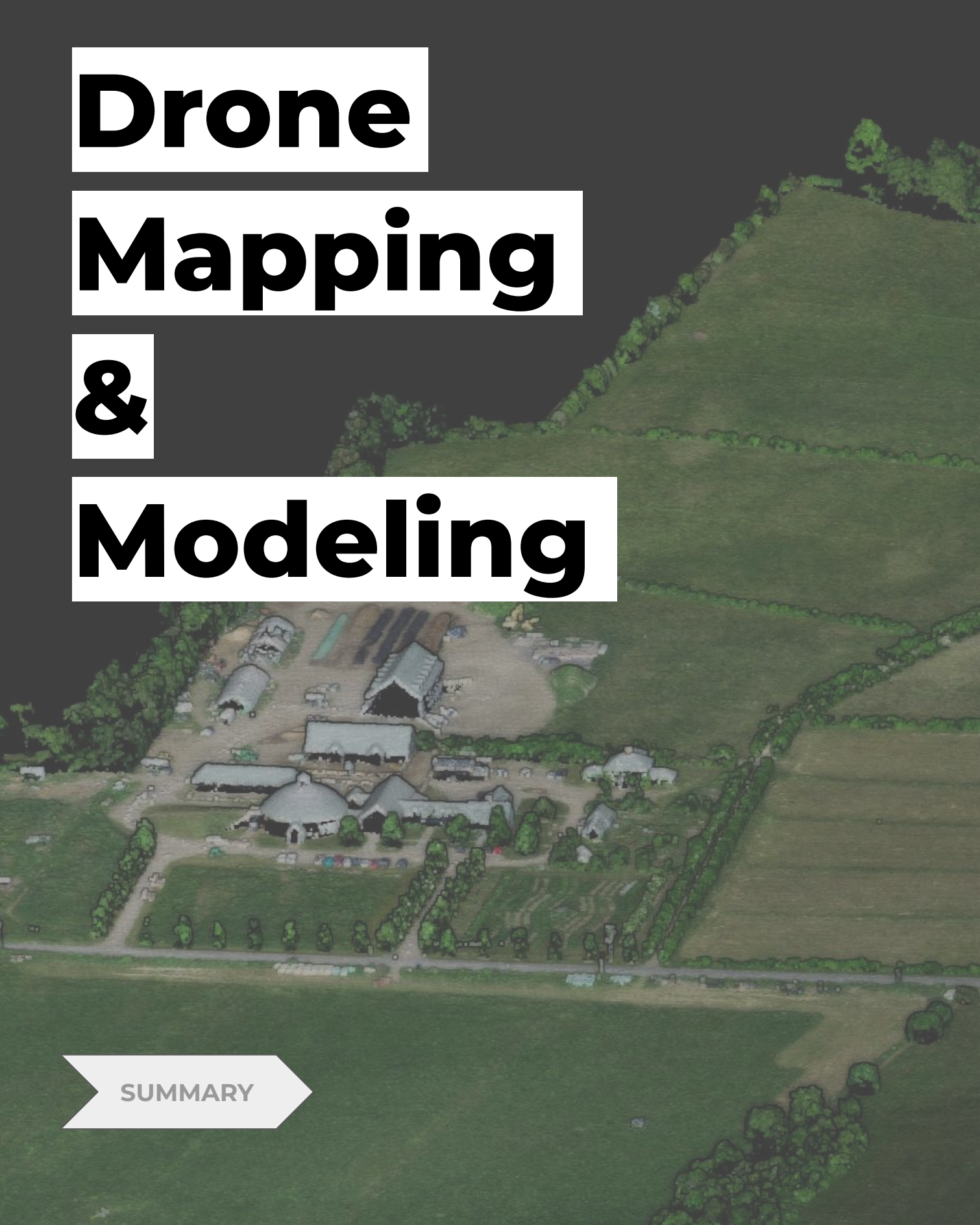
[mike@sacramx.com](mailto:mike@sacramx.com)

# Summary

- ❑ Drone Mapping and Modeling
- ❑ Forest Biomass Carbon Estimate
- ❑ Bird Species Audio Detection
- ❑ Insect Biodiversity Survey
- ❑ Plant Biodiversity Survey
- ❑ Soil Health Analysis (Woods End)
- ❑ Appendices

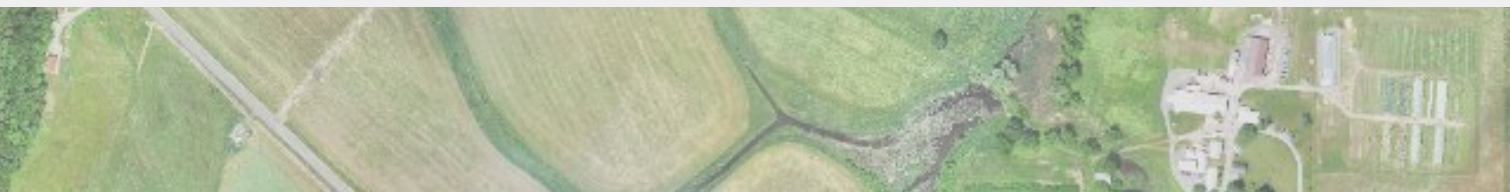
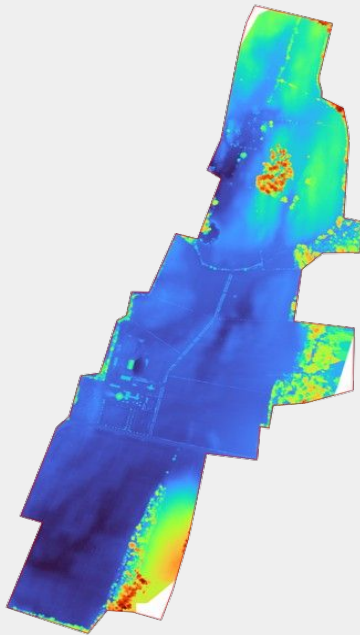
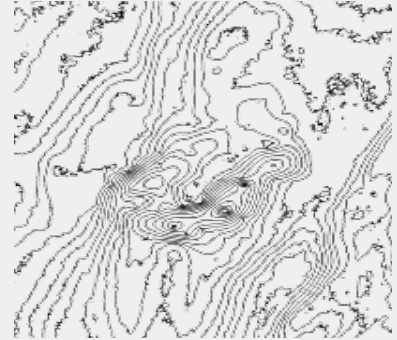
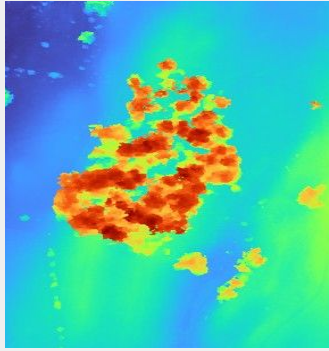


# Drone Mapping & Modeling

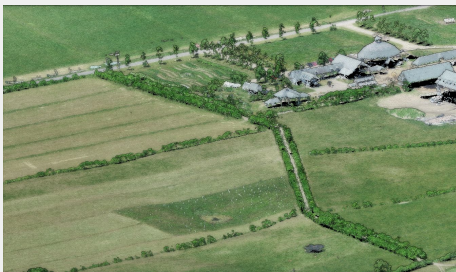
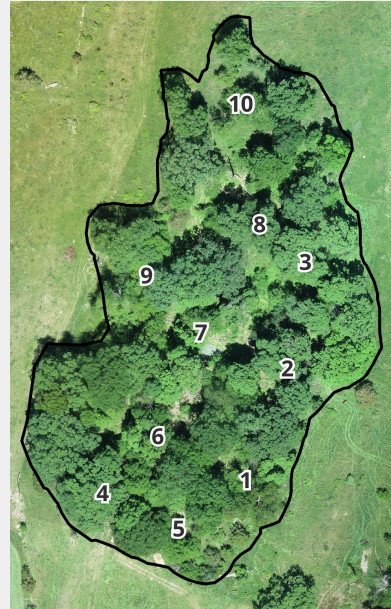
An aerial photograph of a farm complex. The farm features several large, light-colored buildings with dark roofs, including a prominent circular structure. There are numerous smaller outbuildings and a large open area that appears to be a field or parking lot. The farm is surrounded by green fields and a line of trees. A road or path runs along the bottom of the farm area.

SUMMARY

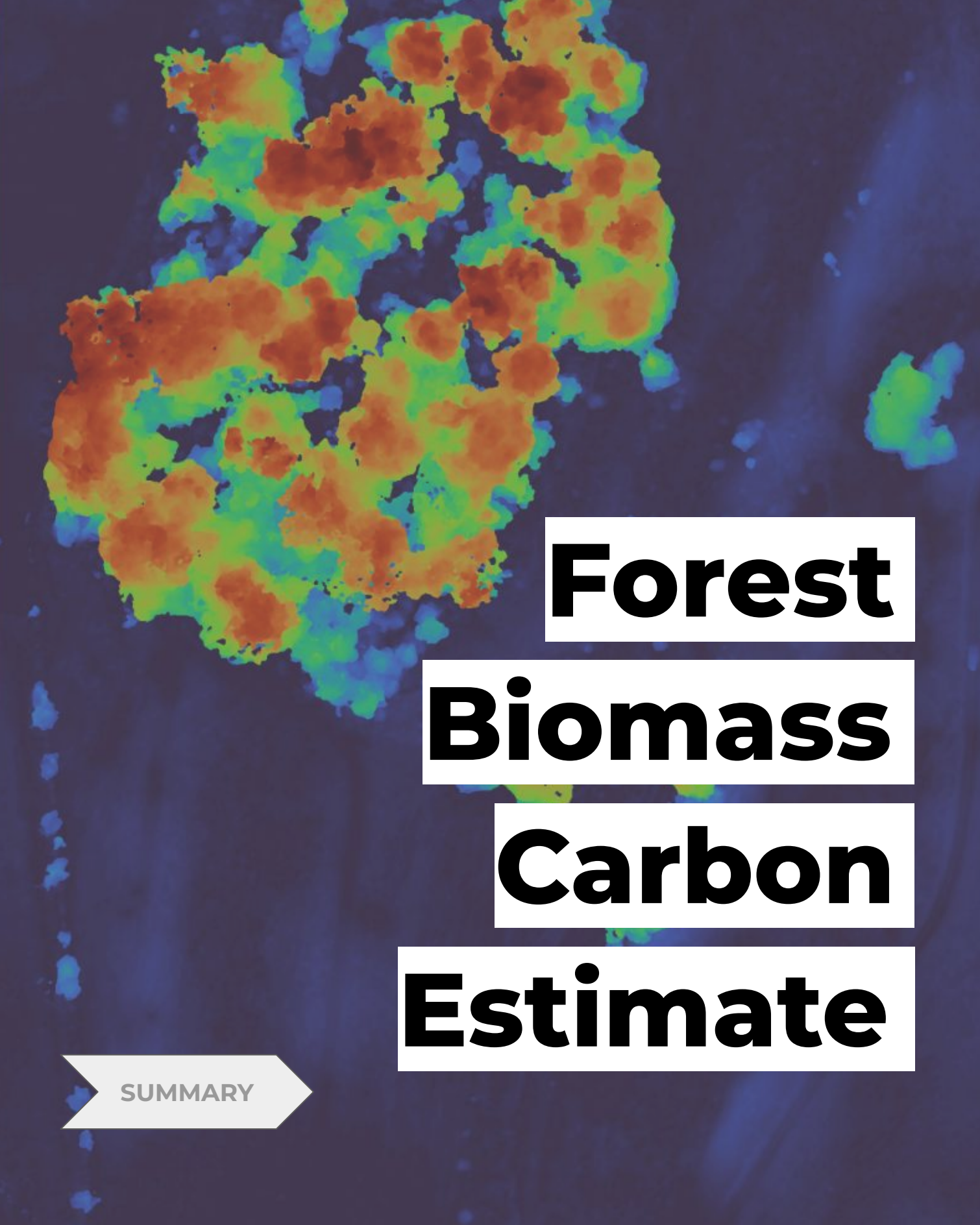
## Drone Mapping & Modeling



## Drone Mapping & Modeling



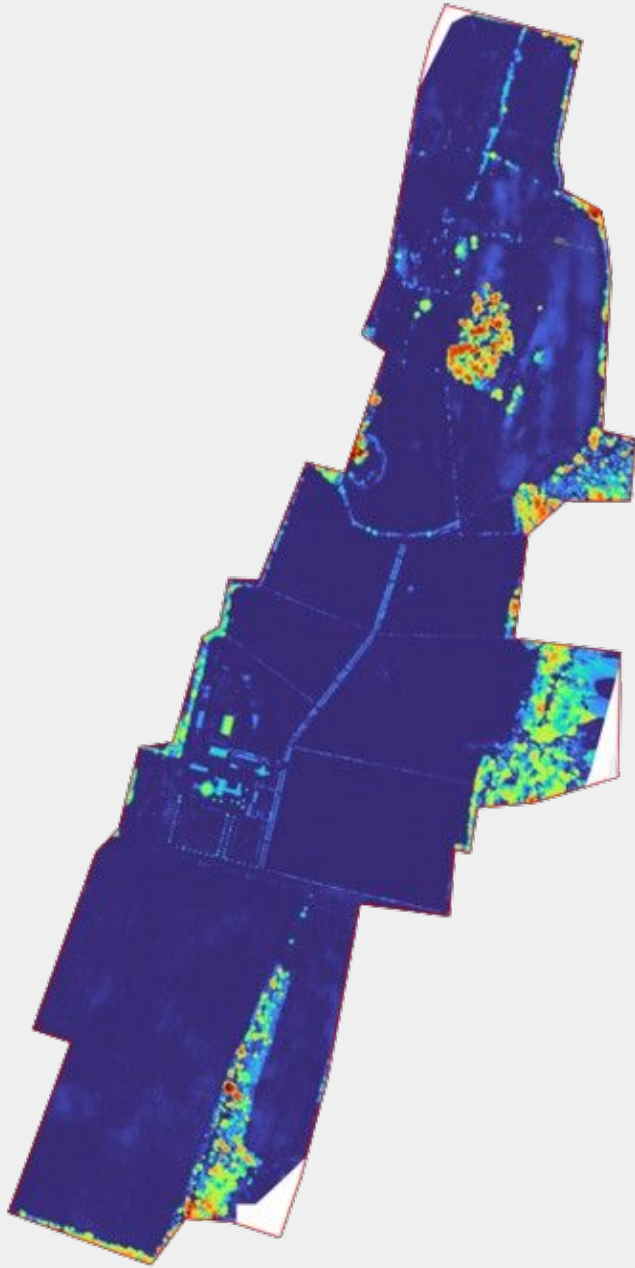
- [Field Guide with Maps](#)
- [3D Interactive Model](#)
- [Download all 2D Maps](#)



# **Forest Biomass Carbon Estimate**

SUMMARY

## Forest Biomass Carbon Estimate

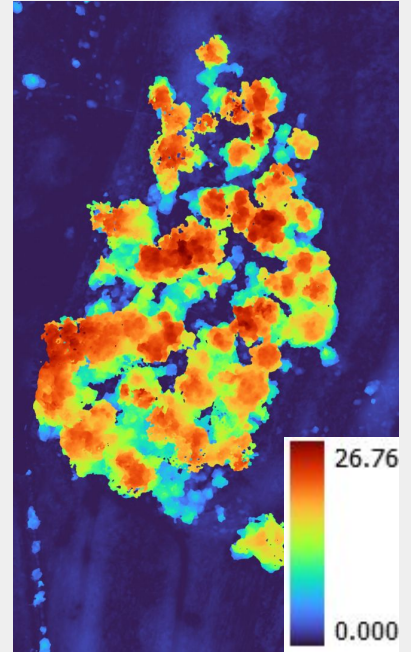
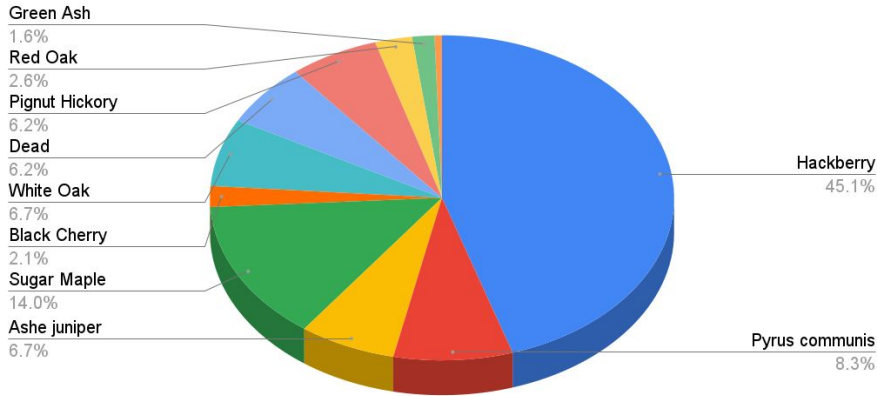


- Forest Carbon Data

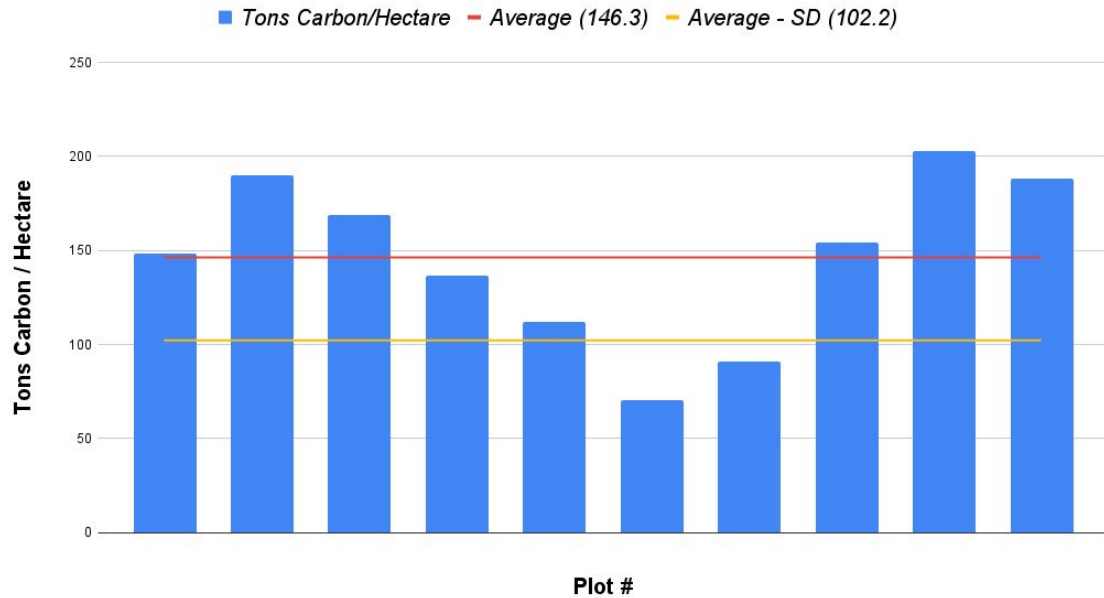


# Forest Biomass Carbon Estimate

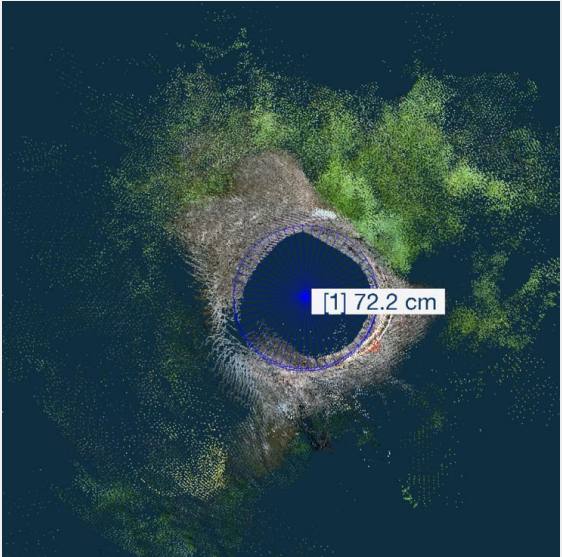
## Tree Species Percentage



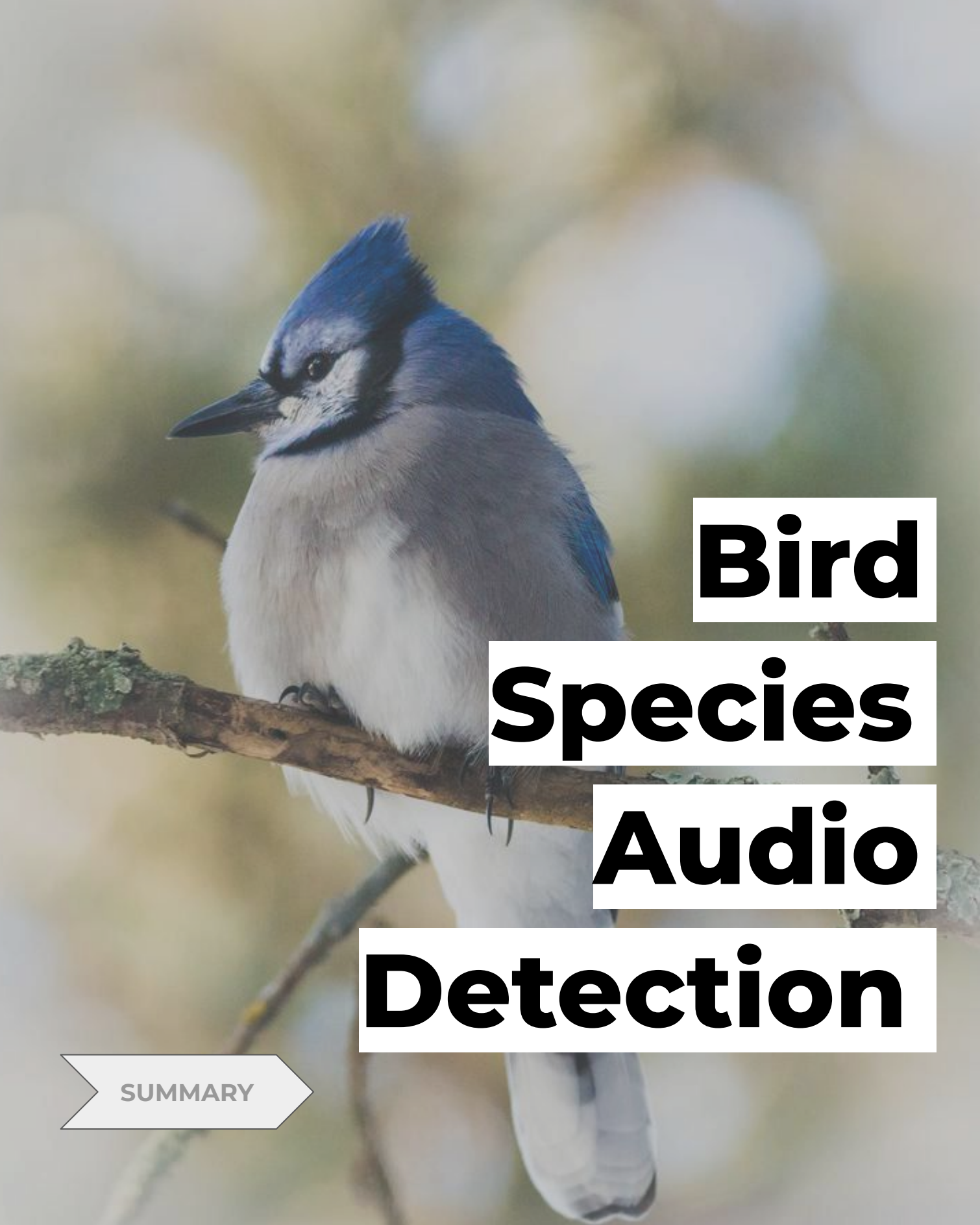
## Tons Carbon / Hectare Across Plots



Forest Biomass Carbon Estimate



|                                     |       |
|-------------------------------------|-------|
| Average (Tons C/ha)                 | 146.3 |
| SD (Tons C/ha)                      | 44.1  |
| Total Forest Area (ha)              | 1.425 |
| Total Forest Carbon Tons            | 208   |
| Total CO2e Tons (Avg * Area)        | 765   |
| Total CO2e Tons ((Avg - SD) * Area) | 534   |
| People/year USA                     | 48    |
| People/year India                   | 334   |

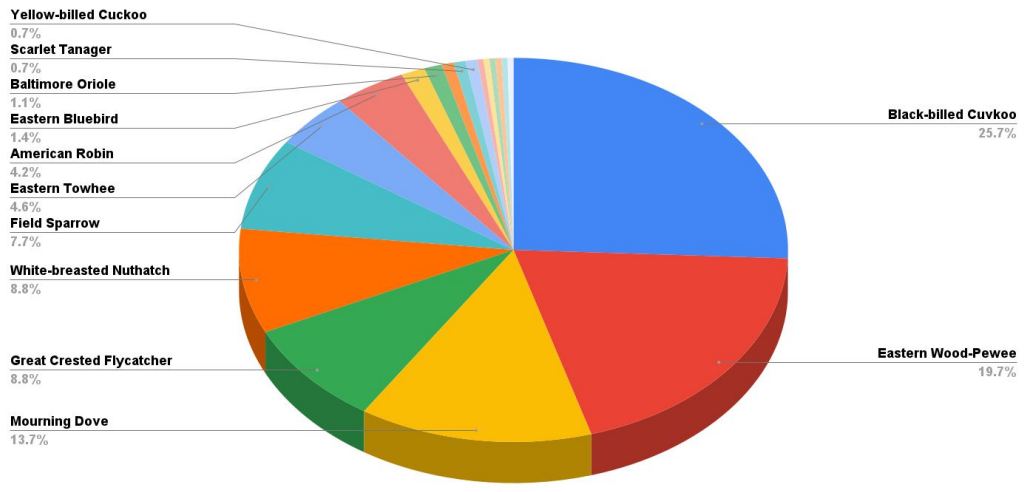


# **Bird Species Audio Detection**

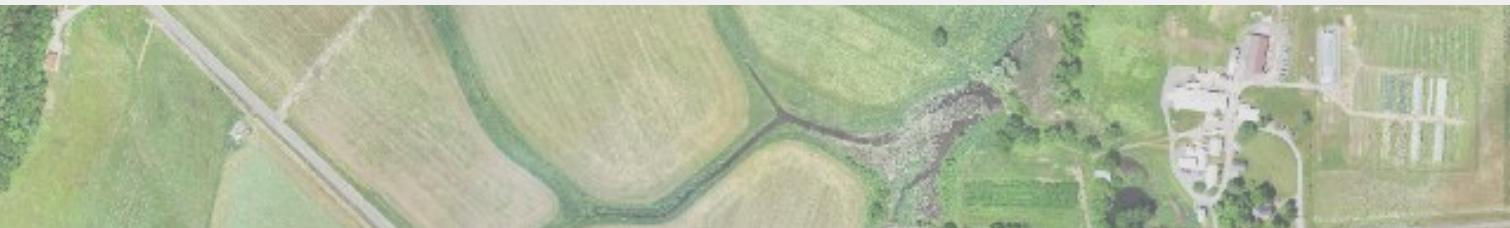
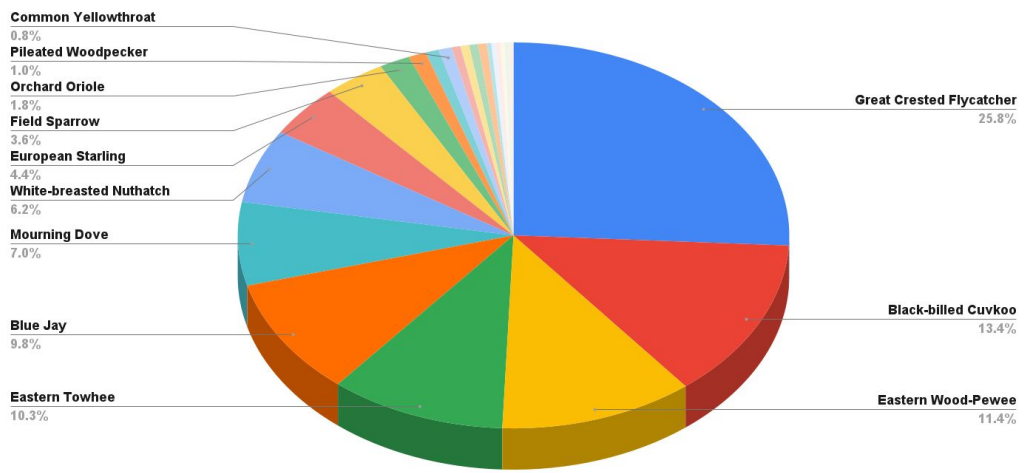
SUMMARY

## - Bird Calls 30 Bird Species Observed

**Bird Calls Observed % [South] >75% Condifence**



**Bird Calls Observed % [North] >75% Condifence**



## Bird Species Audio Detection



**American Robin**  
*Turdus migratorius*



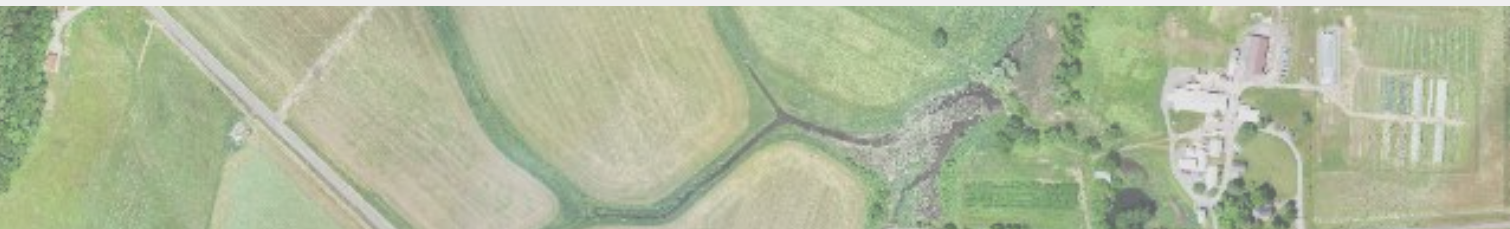
**Black-billed Cuckoo**  
*Coccyzus erythrophthalmus*



**Cooper's Hawk**  
*Accipiter cooperii*



\* Bird photos from [iNaturalist](https://www.inaturalist.org/)



## Bird Species Audio Detection



**Eastern Kingbird**  
*Tyrannus tyrannus*



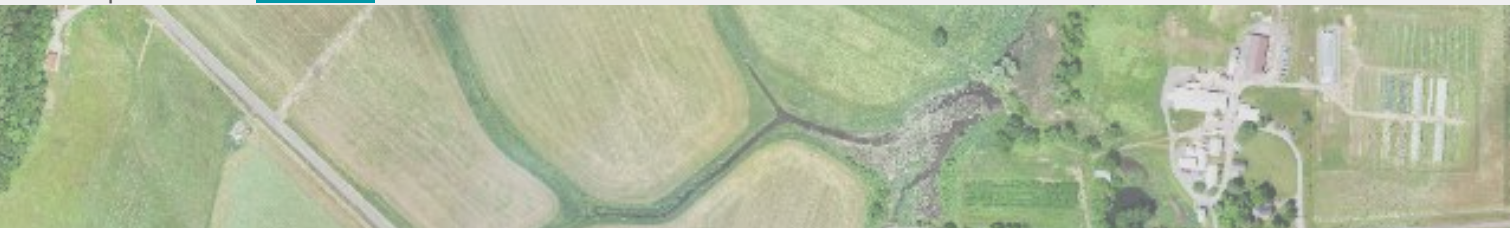
**Eastern Meadowlark**  
*Sturnella magna*



**Eastern Towhee**  
*Pipilo erythrophthalmus*



\* Bird photos from [iNaturalist](#)



## Bird Species Audio Detection



**European Starling**  
*Sturnus vulgaris*



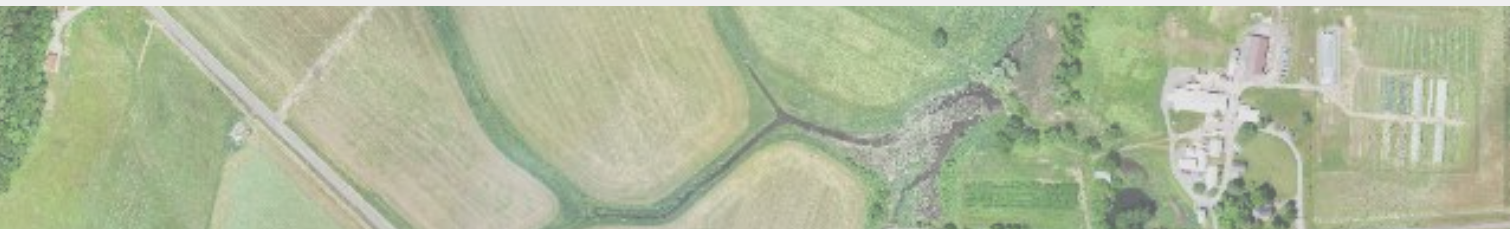
**Field Sparrow**  
*Spizella pusilla*



**Great Crested Flycatcher**  
*Myiarchus crinitus*



\* Bird photos from [iNaturalist](https://www.iNaturalist.org/)



## Bird Species Audio Detection



**Mourning Dove**  
*Zenaida macroura*



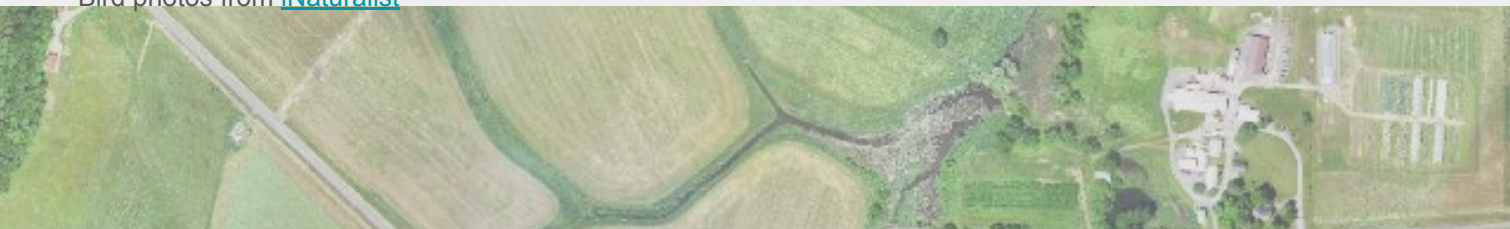
**Orchard Oriole**  
*Icterus spurius*



**Pileated Woodpecker**  
*Dryocopus pileatus*



\* Bird photos from [iNaturalist](#)



## Bird Species Audio Detection



**Scarlet Tanager**  
*Piranga olivacea*



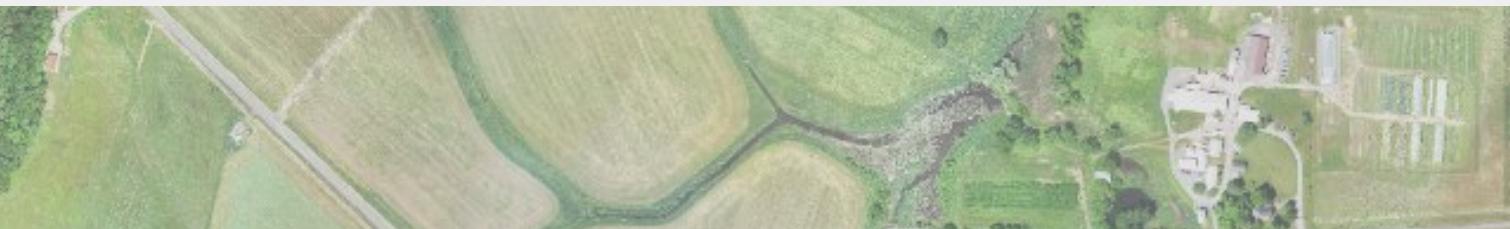
**White-breasted Nuthatch**  
*Sitta carolinensis*



**Yellow-billed Cuckoo**  
*Coccyzus americanus*



\* Bird photos from [iNaturalist](#)





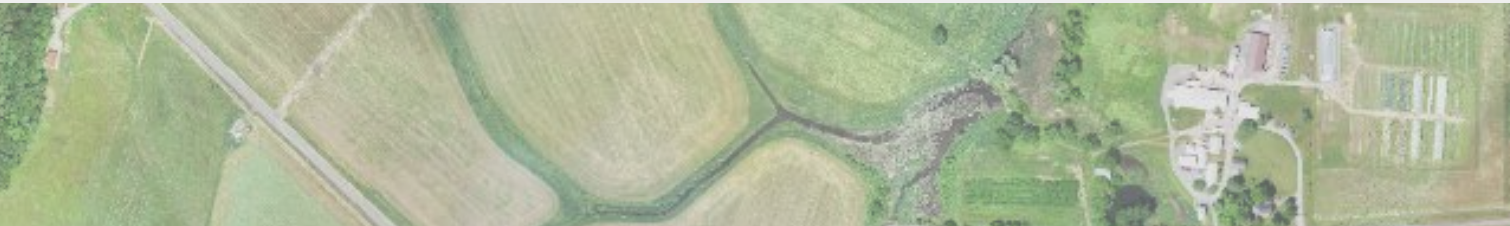
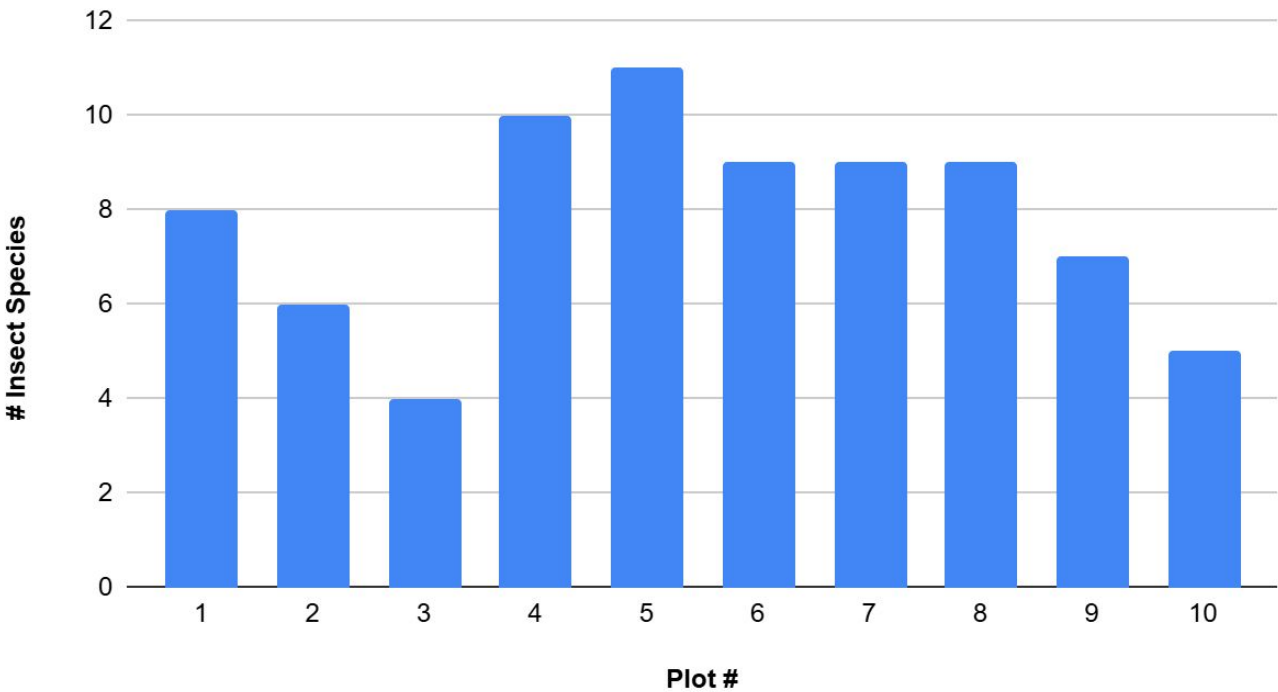
# **Insects Diversity Survey**

SUMMARY

Insects Diversity Survey

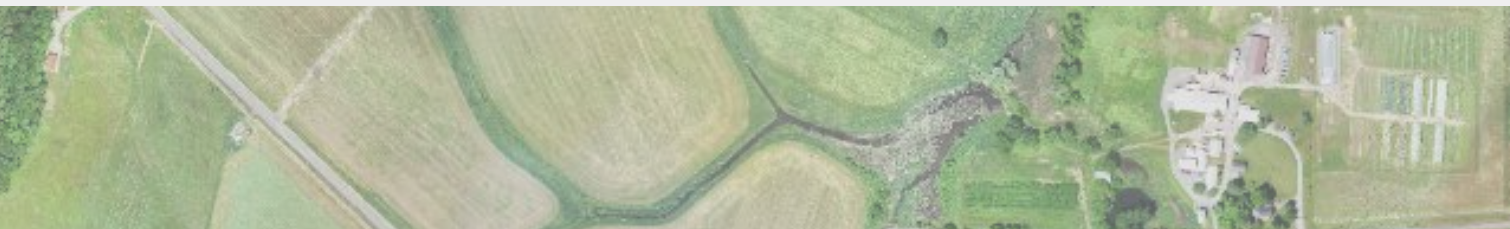
| Plot # | # Insect Species | 1st                           | 2nd                               | 3rd                            |
|--------|------------------|-------------------------------|-----------------------------------|--------------------------------|
| 1      | 8                | <i>Stenotus binotatus</i>     | <i>Musca domestica</i>            | <i>Meconema thalassinum</i>    |
| 2      | 6                | <i>Meconema thalassinum</i>   | <i>Rhamphomyia longicauda</i>     | <i>Scathophaga stercoraria</i> |
| 3      | 4                | <i>Rhamphomyia longicauda</i> | <i>Philaenus spumarius</i>        | <i>Pholcus phalangioides</i>   |
| 4      | 10               | <i>Stenotus binotatus</i>     | <i>Leptopterna dolabrata</i>      | <i>Meconema thalassinum</i>    |
| 5      | 11               | <i>Leptopterna dolabrata</i>  | <i>Philaenus spumarius</i>        | <i>Stenotus binotatus</i>      |
| 6      | 9                | <i>Philaenus spumarius</i>    | <i>Rhamphomyia longicauda</i>     | <i>Musca domestica</i>         |
| 7      | 9                | <i>Stenotus binotatus</i>     | <i>Leptopterna dolabrata</i>      | <i>Deraeocoris ruber</i>       |
| 8      | 9                | <i>Stenotus binotatus</i>     | <i>Leptopterna dolabrata</i>      | <i>Deraeocoris ruber</i>       |
| 9      | 7                | <i>Stenotus binotatus</i>     | <i>Megaloceroea relicticornis</i> | <i>Rhamphomyia longicauda</i>  |
| 10     | 5                | <i>Stenotus binotatus</i>     | <i>Philaenus spumarius</i>        | <i>Rhagio tringarius</i>       |

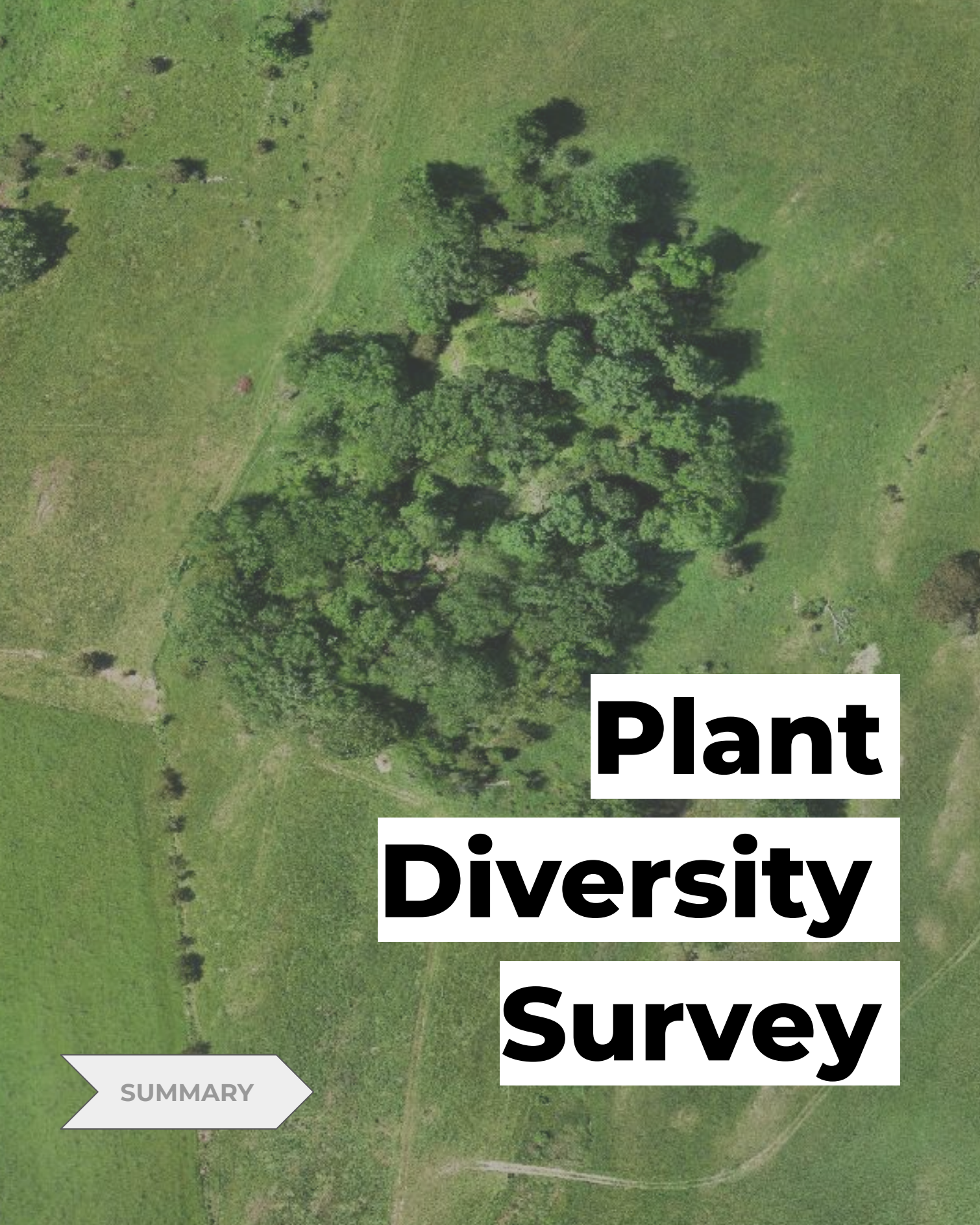
# Insect Species / Plot



## Insects Diversity Survey

- [Photos of Insects & Species List](#)
- [Insect Species List & Plot Data](#)
- [Video compilation of Insects](#)

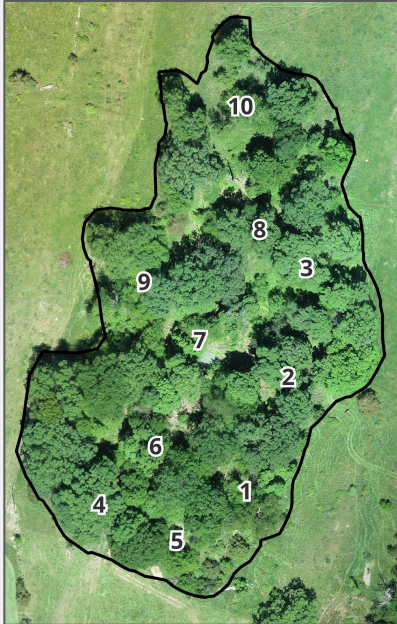




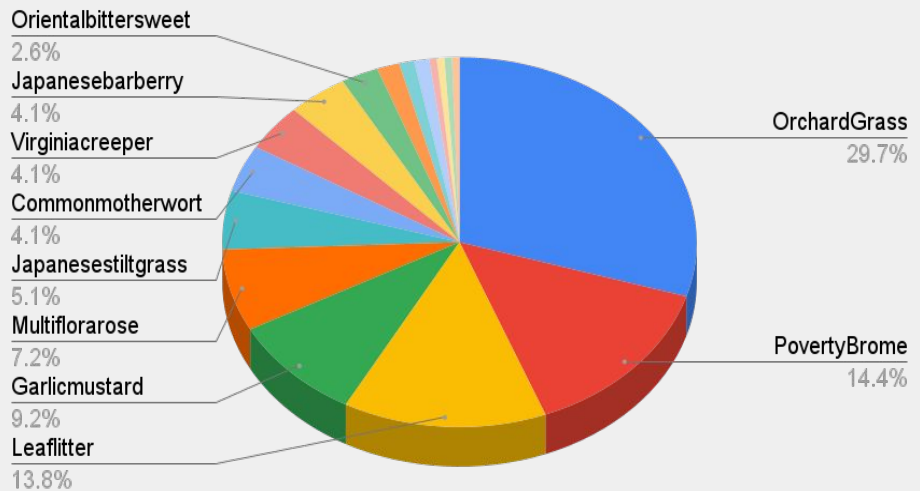
# **Plant Diversity Survey**

SUMMARY

## Plant Diversity Survey

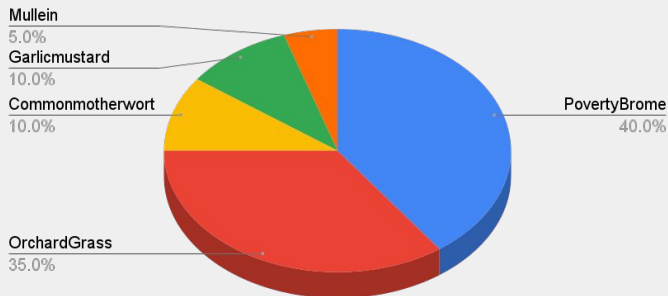
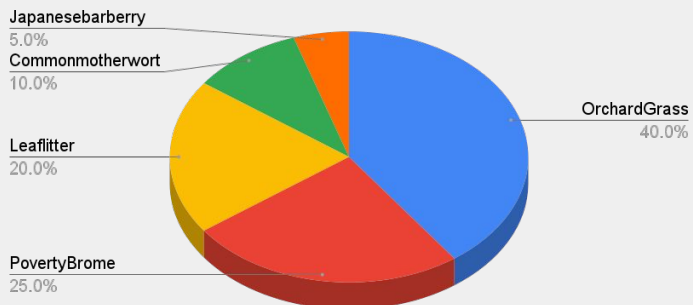
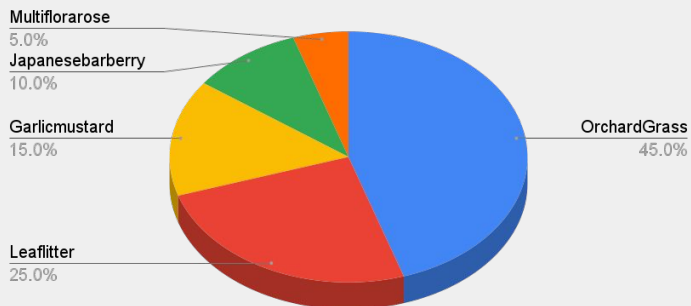
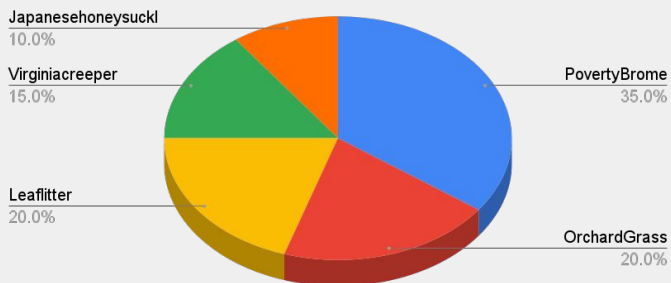
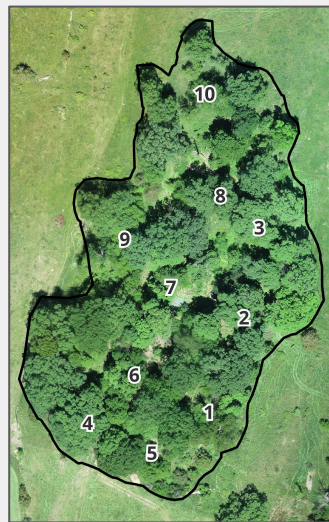
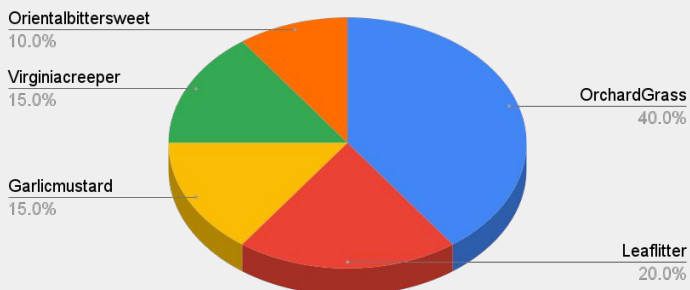


### Most Common Plants



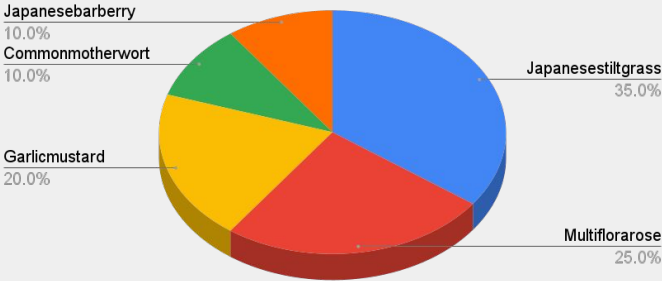
- [North South Transects Videos and Data](#)
  - [Plant Survey Data Sheet](#)
  - [Plot Video Uploads](#)

# Plant Diversity Survey

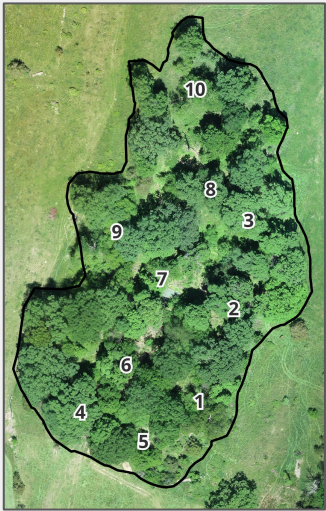
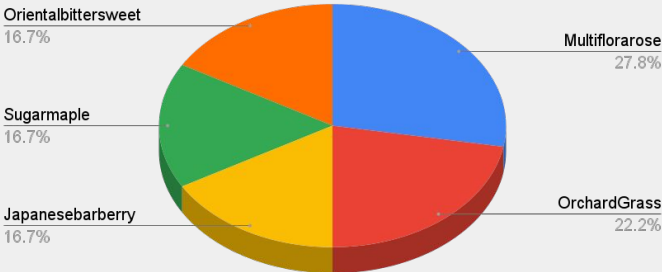
**Plot 1****Plot 2****Plot 3****Plot 4****Plot 5**

Plant Diversity Survey

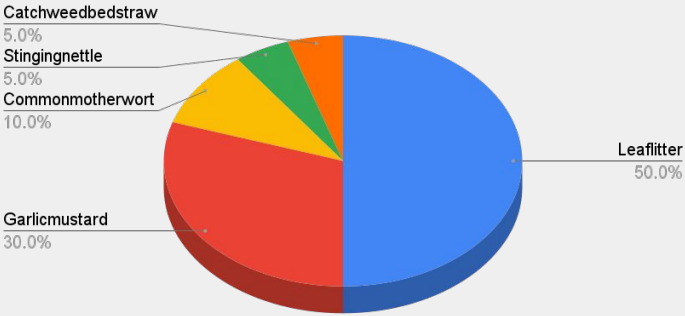
Plot 7



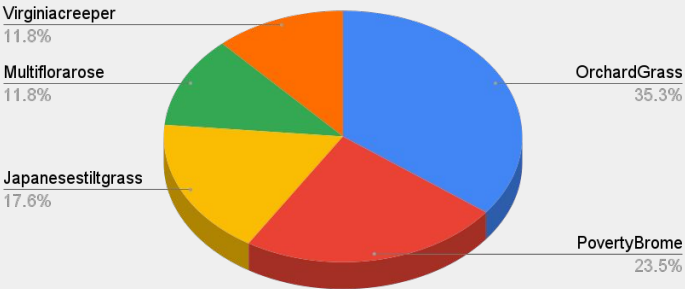
Plot 9



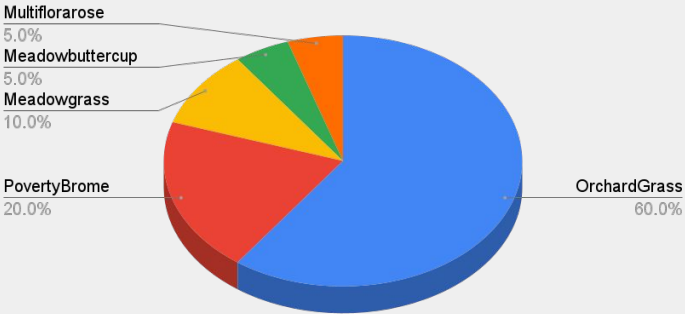
Plot 6



Plot 8



Plot 10

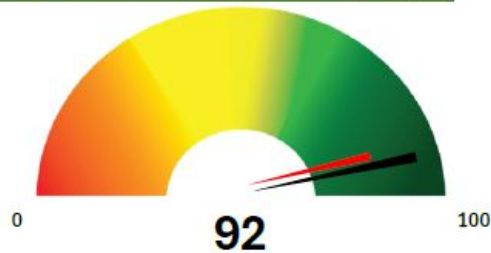


# Soil Health Analysis

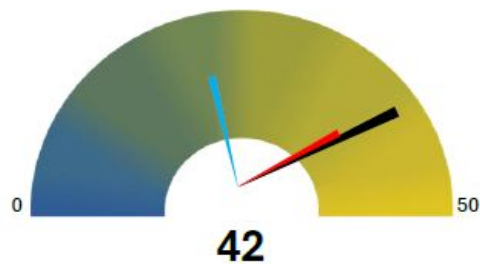
Conducted by Woods End Laboratory

| Soil Health Panel  | Units     |       | RANKING: |
|--------------------|-----------|-------|----------|
| Microbial Rate     | ppm       | 202.9 | High     |
| Solvita Response   | ( 0 - 5 ) | 4.62  | High     |
| Soil Amino-N       | ppm       | 585   | VHigh    |
| Crumb Aggregates   | Vol %     | 32    | Medium   |
| Scoop Bulk Density | g/cc      | 0.58  | Loose    |
| Total Carbon       | %         | 7.680 | High     |

| Nutrients as: lb/a | Interpretative Guidelines |        |        | Est Carbon:  |
|--------------------|---------------------------|--------|--------|--------------|
|                    | N                         | P205   | K2O    | lb/a         |
| Soil Supply:       | 293                       | 295    | 430    | 88,576       |
| Crop Use:          | 120                       | 60     | 75     |              |
| Difference:        | 0                         | 0      | 0      |              |
| Suggested Need     | 25                        | 0      | 0      | Est CEC, meq |
| Other Notations    | OK                        | Normal | Normal | 28.9         |



**OVERALL FERTILITY SCORE**  
YOUR VALUE IS BLACK. RED LINE IS REGION-EXPECTED TARGET



**SOIL HEALTH SCORE**

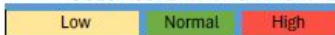
YOUR VALUE IS BLACK POINTER.  
BLUE is Minimum and RED is Optimal Target  
Color range based on Solvita Color Scale

Green Manure/Cover Crop Recommendations

Types of Inter-planting Blends Suggested:

100% Grass/Non-Legume

Lime Suggestion 2.8 Lime tons/acre  
COLOR SCALE KEY FOR TEST VALUES



( warning may be either too high or too low )

## NUTRIENT PANEL

| Analysis                                | Units  | RESULT |
|-----------------------------------------|--------|--------|
| Climate Zone at this Location           | ZONE   | 5      |
| Nitrogen as readily soluble NO3-N       | ppm    | 33     |
| Est. Seasonal Biological N-Release      | lb/a   | 233    |
| PMN (Avail. + N-Min) Nitrogen Potential | lb/a   | 293    |
| Likelihood of N-Response based on Org-N | Rating | Low    |

### Extractable Nutrients

|                              |       |      |
|------------------------------|-------|------|
| Phosphorus , Extractable P   | mg kg | 111  |
| Phosphorus - Carbonate Ext-P | mg kg | NT   |
| Potassium - Extractable K    | mg kg | 310  |
| Calcium - Extractable Ca     | mg kg | 2917 |
| Magnesium - Extractable Mg   | mg kg | 290  |
| Sodium - Extractable Na      | mg kg | 21   |

### Rating Factors

|                                              |         |      |
|----------------------------------------------|---------|------|
| Nutrient Index, Scale 0 - 100                | Rating  | 100% |
| Most Limiting Factor                         |         | None |
| Cation Balance (Molar Ratio: K ÷ [Ca + Mg] ) | Optimal | 4.7% |

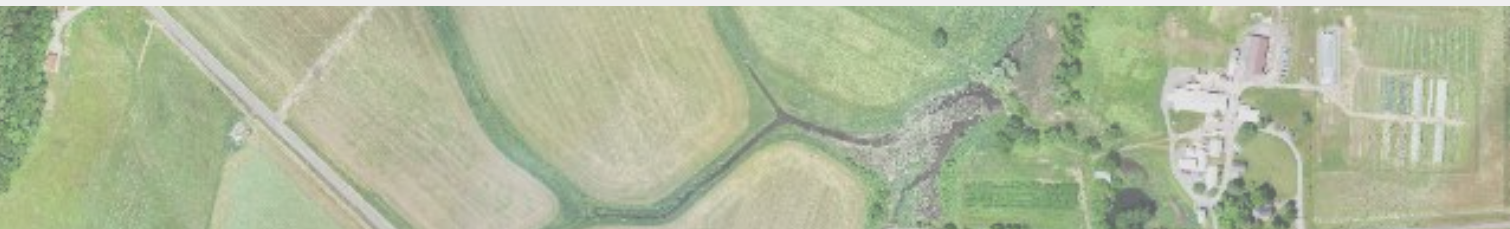
### Other Factors

|                                     |       |        |
|-------------------------------------|-------|--------|
| pH in water 1:1                     | Unit  | 5.524  |
| Optional test (buffer pH)           | Unit  | 5.896  |
| Water Soluble Carbon                | mg kg | 952    |
| Water Soluble C:N (WSOC:NO3-N)      | Unit  | 29     |
| Aluminum, Extractable               | mg kg | 742    |
| Est. Limestone Content              | dry % | NT     |
| Additional: Organic Matter % by LOI | dry % | 16.340 |

Soil Test Form 201-a Copyright ©2021 Woods End Laboratories Inc.

Generated by user ID: nh

- [Link to Entire Report for all 10 Sample Sites](#)



# Appendices

SUMMARY

## Appendices

*To access more information about the farm go to these links to download it*

- [Drone Mapping and Modeling](#)
- [Forest Biomass Carbon Estimate](#)
- [Bird Species Audio Detection](#)
- [Insect Biodiversity Survey](#)
- [Plant Biodiversity Survey](#)
- [Soil Health Analysis](#)

