Fox River Bluffs Planting Project
Project Design Document – Year 4

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INSTRUCTIONS

Project Operators must complete and submit this Project Design Document (PDD) to request credits after the third anniversary of the Credit Commencement Date. City Forest Credits then reviews this PDD as part of the validation process along with all other required project documents. An approved third-party verifier then does an independent check of all documents and compliance with the Protocol, known as verification. An updated PDD will need to be submitted for future verification at Year 6 and After Year 25.

Project Operators should enter data and supporting attachments starting on page 3 under Project Overview where you find "[Enter text here]" as thoroughly as possible and provide numbered attachments for maps and other documentation (ex: 1 – Regional Map). Keep all instructions in the document.

Below is a list of documents that are needed to complete a successful Year 4 Project Design Document:

For the Single Tree Planting Design:

- Carbon Quantification Year 4 Credit tool
- Tree Sampling Data
- Geocoded photos
- Project geospatial data, if there have been changes (KML file or shapefile)

For the Cluster Planting Design

- Project Area imaging from any telemetry, imaging, or remote sensing service
- i-Tree Canopy report
- i-Tree Canopy source data
- Project geospatial data, if there have been changes (KML file or shapefile)
- Carbon Quantification Year 4 Credit tool

For the Area Reforestation Planting Design (previously Canopy Design):

- Either:
    - Project Area imaging from any telemetry, imaging, or remote sensing service
    - i-Tree Canopy report
    - i-Tree Canopy source data
- Or:
    - Tree plot sampling data
- Project geospatial data, if there have been changes (KML file or shapefile)
- Carbon Quantification Year 4 Credit tool
- Summary of approach to quantifying the local CO_2 index

PROJECT OVERVIEW

Project Name: Fox River Bluffs Planting Project
Project Number: 019
Project Type: Planting Project (under the Planting Protocol – Version 9, February 7, 2021])
Project Start Date: April 8, 2020
Project Location: Yorkville, IL

Project Operator Name: Kendall County Forest Preserve District
Project Operator Contact Information:

David Guritz, Executive Director
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PROJECT AND PLANTING DESIGN UPDATES

Include information on changes to the project including tree survival, ownership, or other relevant updates.

In April 2020, Kendall County Forest Preserve District (District) planted 40-acres of former farmland in Yorkville, IL, as part of a larger, 99-acre woodland and prairie restoration plan. With the help of community volunteers, the District planted 23,917 native trees over the 40-acre carbon Project Area using the area reforestation planting design and carbon quantification methodology. The tree species planted included six species of oak, Shagbark hickory, Black walnut, and American plum. This Year 4 Project Design Document describes the sampling conducted to assess tree growth and establishment at the site after at least three years of growth.

There have been no changes to ownership of the site, which is owned, monitored, and managed by the District.

Based on plot sampling conducted on October 7, 2023, the Project Area meets the minimal required stocking threshold of 400 trees per acre needed to generate full canopy at 25 years.

CARBON QUANTIFICATION DOCUMENTATION (Section 12 and Appendix B)

Describe and summarize the planting design, sampling, and appropriate quantification/measurement method for the project – Single Tree, Clustered, or Area Reforestation. Include the project's climate zone and method of data collection. Outline the estimated total number of credits to be issued to the project over 25 years as well as the amount to be issued upon successful validation and verification in Year 4. Attach the quantification tool and appropriate sampling tool.

List of quantification Tools by planting method (CFC to provide guidance and resources):

1) *Single Tree - single tree quantification tool*
2) *Clustered - cluster quantification tool*

3) *Area Reforestation - quantification with CO_2 calculated per acre*

To ensure performance of the credits, Project Operators must commit to the following at Year 4, with additional requirements at Year 6 and after Year 25 based on the appropriate quantification method.

1) *Single Tree*
    a. *Year 4: Project Operators must generate a random sample of project tree sites using the Single Tree Quantification Tool. Project Operators must visit those sampled tree sites and collect data on whether the sample contains a live tree, standing dead tree, or no tree. Provide geocoded photos or imaging of a minimum sample of 20% of the trees. The tracking file includes a column where each tree is assigned a unique serial number to help with tracking each coordinate and tree picture or image.*
        i. *Based on this data, the number and species of project trees is adjusted and a new CO_2 projected amount by after Year 25 is generated.*

2) *Clustered*
    a. *Year 4: Project Operators provide images of the Project Area from any telemetry, imaging, remote sensing, i-Tree Canopy, or UAV service, such as Google Earth and estimate the area in tree canopy cover (acres). Imaging from Google Earth with leaf-on may be used. Project Operators will calculate the percent of canopy cover from the Google Earth imaging. Projects can use i-Tree Canopy and point sampling to calculate canopy cover. Using i-Tree Canopy, continue adding points until the standard error of the estimate for both the tree and non-tree cover is less than 5%. i-Tree Canopy will supply you with the standard errors. If tree canopy cover is determined using another approach, such as image classification, a short description of the approach should be provided, as well as the QA/QC measures that were used. A tree cover classification accuracy assessment should be conducted, as with randomly placed points, and the percentage tree cover classification accuracy reported.*
        i. *If the canopy coverage equals or exceeds 2.8% (400 trees per acre with an average canopy area of 3.14 square feet per tree (2-foot diameter of canopy) is 2.8% of an acre), then the credits projected in the Clustered Quantification Tool may be issued. If canopy coverage is below 2.8%, then the number of credits issued is reduced by the same percentage as the canopy coverage falls below 2.8%.*

3) *Area Reforestation (formerly Canopy planting design)*
    a. *Year 4: Project Operators must either conduct a physical tree count using plots or use imaging to determine canopy coverage at Year 4.*
        i. *If the canopy coverage equals or exceeds 2.8% (400 trees per acre with an average canopy area of 3.14 square feet per tree (2-foot diameter of canopy) is 2.8% of an acre), then the credits projected in the Quantification Tool may be issued. If canopy coverage is below 2.8%, then the number of credits issued is reduced by the same percentage as the canopy coverage falls below 2.8%.*

Overview

In April 2020, the District planted 23,917 trees over 40 acres under the Area Reforestation method. Trees were planted 8' on center in rows to create a forest ecosystem and generate canopy cover over time. Nine native tree species were planted, as outlined in the table below:

Species	# per Acre	Total over 40-Acres
Bur Oak	135	5,417
Red Oak	135	5,417
Shagbark Hickory	104	4,167
Black Oak	63	2,500
White Oak	42	1,667
Swamp White Oak	42	1,667
Pin Oak	31	1,250
Black Walnut	25	1,000
American Plum	21	832
TOTALS	598 per acre	23,917

Data Collection

Plot sampling was used to assess tree establishment across the 40 acres, over three years after the initial planting. Sixty 452.4 sq. ft.-plots (approximately 1/100 of an acre) were randomly selected within the project area (Attachment 1). Within each plot, all trees belonging to a species planted by the District in 2020 were tallied. To promote youth environmental education, the District engaged 32 students from School District 308 Oswego and Oswego East High Schools to aid in surveying the plot samples. All student volunteers attended mandatory field identification training and were grouped into teams of three, with 11 teams each surveying five to six plots. As described in greater detail in the Student Instruction Sheet (Attachment 2a), each team recorded GPS plot coordinates, tallied the number of trees, and collected leaf samples for each tree observed. All student tree counts and identifications (Attachment 3) were individually reviewed and independently verified by District staff using the collected leaf samples.

GPS plot coordinates were incorrectly recorded on three of the sample plots (Plots #15, 37, and 58). However, samples were collected within the project area as denoted in the plot numbering field notes generated by District staff. See Attachment 1 for more information.

Attachments:

1 – Fox River Bluffs Survey Plot Map
2a - Fox River Bluffs Student Instructions Sheet
2b – Fox River Bluffs Sampling Photos
3 – Fox River Bluffs Survey Data Sheets

Based on the District-verified tree plot counts, 251 trees were observed across the surveyed 60 plots (Attachment 4). The average number of trees per plot was 4.18 trees; given the size of each plot (452.4 sq. ft., or 0.0104 of an acre), the average trees per acre was calculated at 402.8 trees/acre. Per the Area Reforestation guidance document provided by the Registry during Initial Crediting (Attachment 5), the density of trees required to achieve full stocking at Year 25 is 400 trees/acre. Given the current density of 402.8 trees/acre, the Project is on track to achieve full canopy cover by Year 25.

Attachments:

4 – Fox River Bluffs Survey Data
5 – Area Reforestation Project Type and Quantification

Carbon Quantification

Total number of trees planted	23,917
Project area (acres)	40
Total number of trees per acre (Initial Crediting)	598
Total number of trees per acre observed via plot sampling (Year 4)	402.8
Credits attributed to the project (tCO2e)	5,328
Credits after mortality deduction (N/A for area reforestation)	N/A
Contribution to Registry Reversal Pool Account (5%) (tCO2e)	266.4
Total credits to be issued to the Project Operator (tCO2e)	5062
Total credits requested to be issued at Year 4	2,025

GHG Assertion:

Project Operator asserts that the Project results in GHG emissions mitigation of 5,062 tons CO_2e over the 25-year Project Duration. Project Operator asserts that, per Protocol Guidelines, 40% of the Project GHG emissions mitigation is issued at Year 4, or 2,025 tons CO_2e. Because the plot sampling results showed that the project is fully stocked at over 400 trees/acre and on track to achieve the forecasted carbon storage, no revisions to the GHG emissions estimates were made. The CO2 index (tCO2e/acre) was determined during Initial Crediting based on sampling of a 25-year-old reference oak forest in the same metropolitan region (Attachment 9).

Attachment: 6 Fox River Bluffs Carbon and CoBenefit Quantification
7 Fox River Bluffs Shapefiles
9 Fox River Bluffs CO2 Index Determination

CO-BENEFITS QUANTIFICATION DOCUMENTATION (Section 12 and Appendix A)

Summarize co-benefit quantification and provide supporting documentation. If necessary, update the CFC-provided Co-Benefits Quantification spreadsheet to calculate updated rainfall interception, reduction of certain air compounds, and energy savings.

Ecosystem Services	***Resource Units***	***Value***
Rainfall Interception (m3/yr)	10,820.4	$77,472.17
Air Quality (t/yr)	0.4529	$681.87
Cooling – Electricity (kWh/yr)	85,177	$6,464.96

Heating – Natural Gas (kBtu/yr)	1,592,668	$15,504.27
Grand Total ($/yr)		**$100,123.27**

Attachment: 6 Fox River Bluffs Carbon and CoBenefit Quantification Tool

ADDITIONALITY (Section 4)

Complete and attach the Attestation of Additionality.

Additionality is demonstrated by Project Operators per the Protocol in the following ways and in the Attestation of Additionality. The Attestation of Additionality was not required to be signed in the Tree Planting Protocol Version 9; however Project Operator met the requirements and is submitting the Attestation with this Project Design Document update.

- Project trees are not required by law or ordinance to be planted (Protocol Section 4.1). See Attestation of Planting.
- The Project did not plant trees on sites that were forested and then cleared of trees within the prior ten years
- Project trees are additional based on a project specific baseline or the Performance Standard Baseline attached to this PDD.
- Project Operator has signed a Project Implementation Agreement with City Forest Credits for 25 years.
- The 25-year Project Duration commitment is additional to and longer than any commitment the Project Operator makes to non-carbon project tree plantings.
- Project Operator has signed the Attestation of Additionality.

Attachment: 8 Fox River Bluffs Attestation of Additionality

ADDITIONAL INFORMATION

Include additional information on changes to monitoring and reporting plans since the Initial Credit Planting Design Document was submitted.

No changes to monitoring and reporting plans have been made since the Initial Crediting period. During the plot sample inventory, data was also collected on pioneer ("Voluntary/Adventitious") trees species present within the plots. These data were documented in the "Vol (Adv.)" column of Attachment 4. The following Voluntary/Adventitious tree species were observed: American linden (basswood), black cherry, black locust, sycamore, red maple, box elder, white mulberry, red cedar, and Siberian Elm. As the canopy continues to form over the next 5 years, the District will continue to monitor for invasive or exotic species emerging that may present longer term competitive impacts to the growth of the planted species. That said, the increase of diversity of observed species was anticipated.

SIGNATURE

Signed on December 11, 2023, by David Guritz, Executive Advisor for the Kendall County Forest Preserve District, Kendall County, Illinois.

David Guritz

Signature

David Guritz

Printed Name

630-553-4025

Phone

kcforest@kendallcountyil.gov

Email

ATTACHMENTS

1- Survey Plot Map
2- Student Instructions Sheet and Sampling Photos
3- Survey Data Sheets
4- Survey Data
5- Area Reforestation Project Type and Quantification
6- Carbon and Co-benefit Quantification Tool
7- Shapefiles
8- Attestation of Additionality
9- CO2 Index Determination

Attachments

Canopy

Survey Plots Maps

Student Instructions Sheet & Sampling Photos

Survey Data & Survey Sheets

Project Type & Quantification

Carbon & Cobenefit Quantification Year 4 Credit Tool

Attestation of Additionality

CO2 Index Determination

Survey Plots Map

Fox River Bluffs Sampling Plot Maps

Exhibit A: Plot Sample Numbering Plan

Exhibit B: Plot Sample Numbering Field Notes

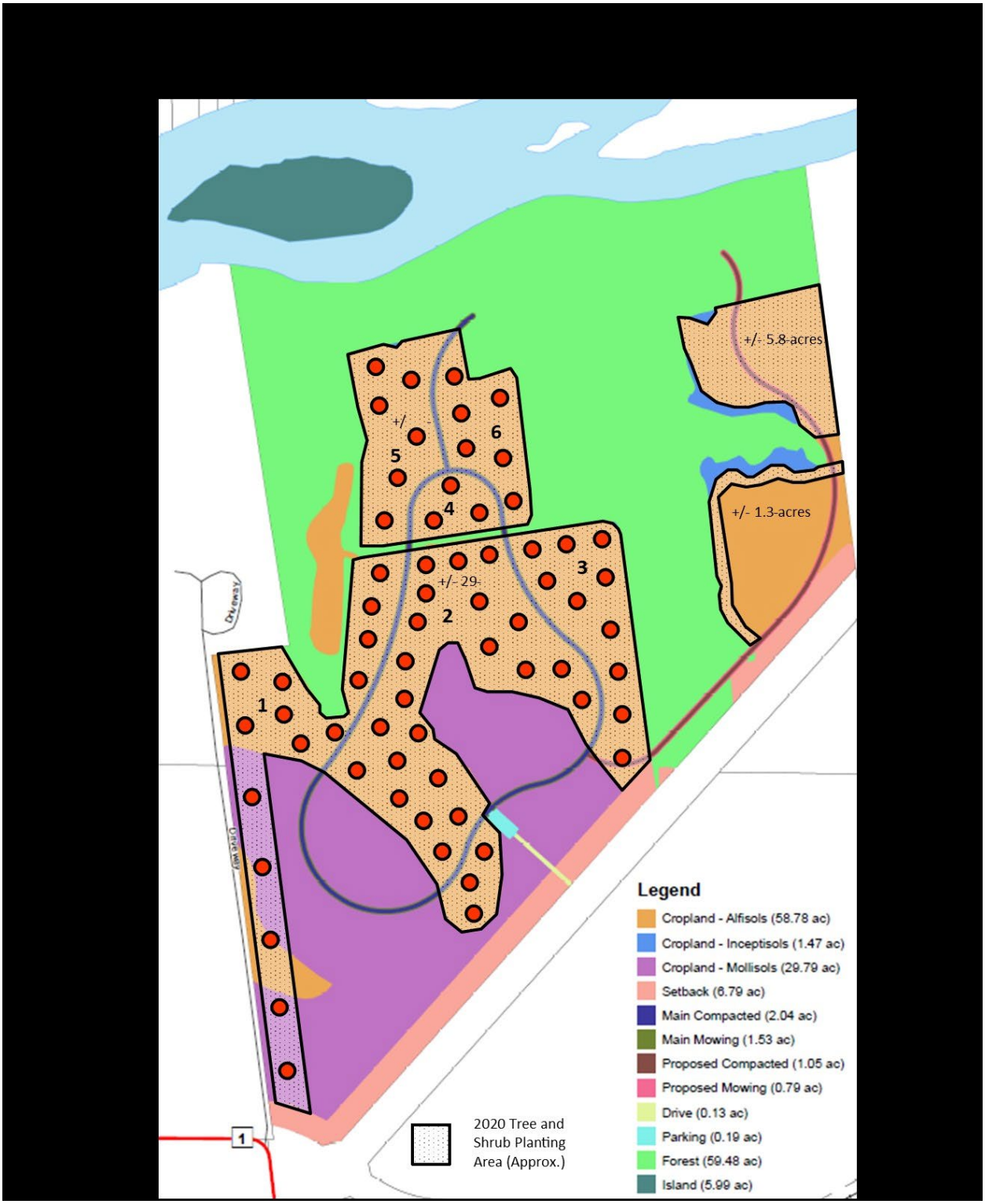
Exhibit C: Plot Sample Map, based on recorded GIS coordinates; plots 15, 37, 58 excluded, as described below

Exhibit D: Plot Sample Map with approximate locations of plots 15, 37, 58

Three plots were recorded with incorrect plot coordinates: plots 15, 37, and 58. The approximate plot locations are identified in Exhibit D, based on field notes depicted in Exhibit B.

The device used to locate plot points was the Bad Elf GNSS Surveyor. As described by the manufacturers on their website, when in use in the field, it can take some time for the device to triangulate satellite data and final GPS coordinates. If it's still settling in on location, it can create a recording error. The other error source would be from incorrect reading and/or transcribing of the final coordinate figures. In reviewing the plot sample data and field notes, the District confirms that the tree data at these three plots is sound.

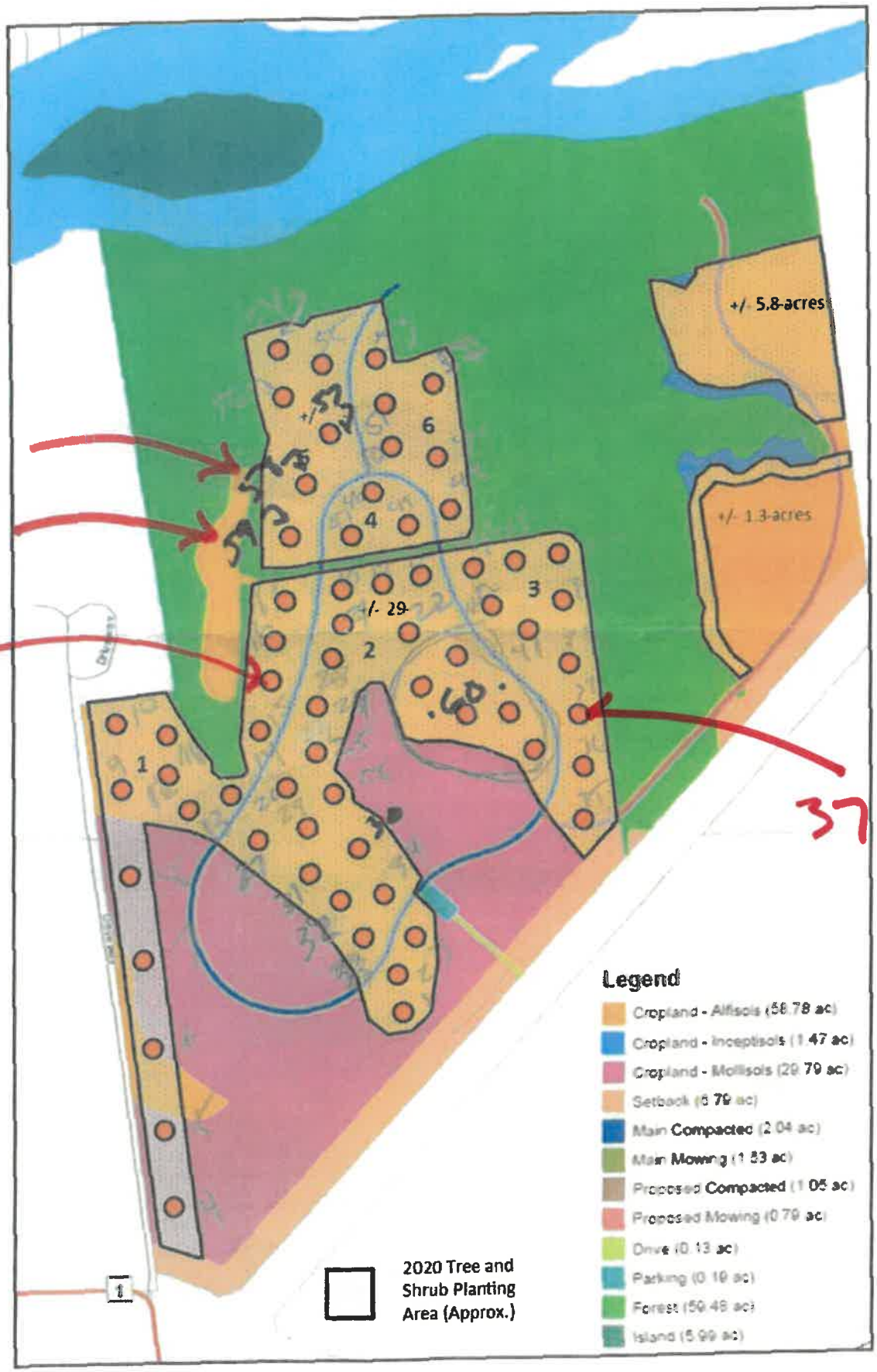
Plot Sample Numbering Plan



Fox River Bluffs—2020 Cropland Conversion Project

Tree and Shrub Planting Footprint and Soil Types Map

Zone #	# Plots
1	15
2	20
3	10
4	3
5	6
6	6

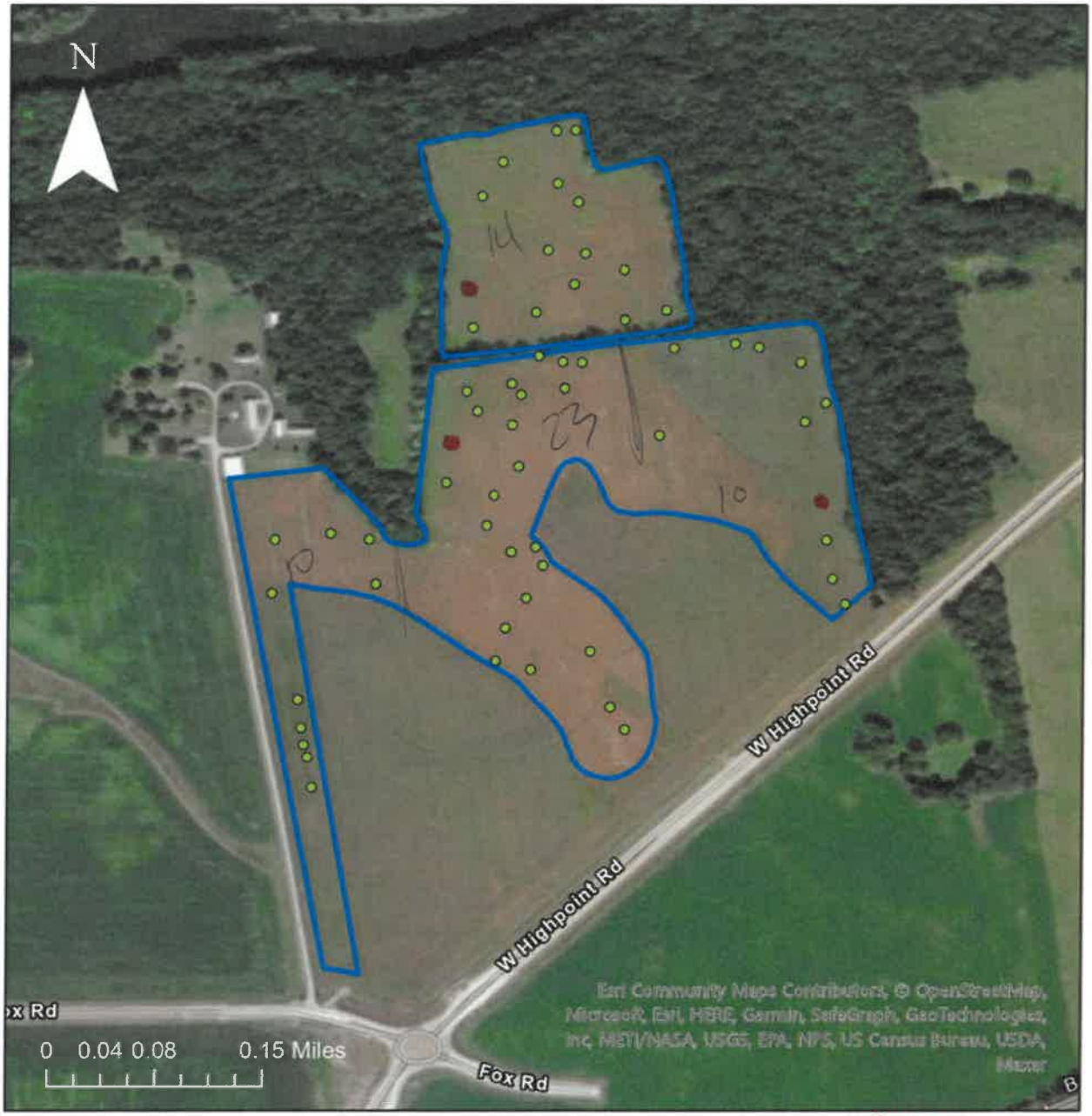


Fox River Bluffs - Year 4 Plot Sample Map

Legend

- Plot Sample Data (GIS coordinates)
- Project Area

Fox River Bluffs - Year 4 Plot Sample Map



Legend

- Plot Sample Data (GIS coordinates)
- Project Area

Path
• Error
15, 37, 58

Student Instructions Sheet & Sampling Photos

Oswego East and Oswego HS – Tree Planting Project Monitoring

Introduction:
In Mar-Apr 2020, the District planted 31,000 trees and shrubs at Fox River Bluffs Forest Preserve. Trees were planted in rows every 6-8 feet. Following planting, the District was awarded over 5,000 voluntary carbon credits (1 credit = 1 ton of sequestered carbon dioxide) through City Forest Credits that can be purchased on a voluntary basis to offset carbon footprints, with the first sale of the first 10% of carbon credits sold at $32 per credit.

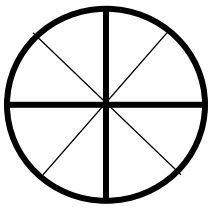
Today, we are monitoring for the success of our planted trees and shrubs:

1. 32 students total
2. 3-students per team / 11 teams
3. 6-plots for each team

Each team will help survey 6 plots each for tree and shrub survivorship. Students will:

1. Fully complete each survey plot data sheet by:
    a. Recording the assigned plot number from the center point flag
    b. Recording the GIS coordinates provided by a District staff member
    c. Tally the number of oak trees; walnut trees; hickory trees; plum trees and shrubs (hazelnut and elderberry) present on the data sheet
    d. Collect a leaf sample from each tree and shrub in a ziplock bag with the assigned plot number using a sharpie marker

Materials per team:
1. Data collection and tree/shrub ID sheets – (1 per survey plot/6 per team); clipboard and pencil
2. Marking flags with assigned survey plot (#1-60 for each center point)
3. One leaf collection Ziplock for each plot / 6 per team
4. One X 12' radius survey string and small Ziplock bag
5. Two marking flags per team
6. One sharpie/permanent marker for each team



Survey and Data Collection Instructions:

1. Record the assigned survey plot number on the data sheet.
2. Record the GIS coordinates once received from District staff.
3. For each team of three – one student holds the survey string over the center point. The second student holds the other end and walks the circle clockwise, stopping at each 45 degree mark (est.) to allow the third student time to collect the data within each of the 8-transect sections per survey plot.
4. Use the two marking flags are used to define each section studied to avoid duplicating counts. The third student searches within each 45 degree transect area, collects 1-leaf from each tree and shrub found, and tallies tree and shrub counts on the data sheet.
5. Teams retrieve all survey plot flags, and proceed to the next station.

IMPORTANT: DO NOT REMOVE CENTER POINT FLAGS, OR LEAVE A SURVEY PLOT AREA BEFORE RECORDING GIS COORDINATES

KENDALL COUNTY
FOREST PRESERVE DISTRICT

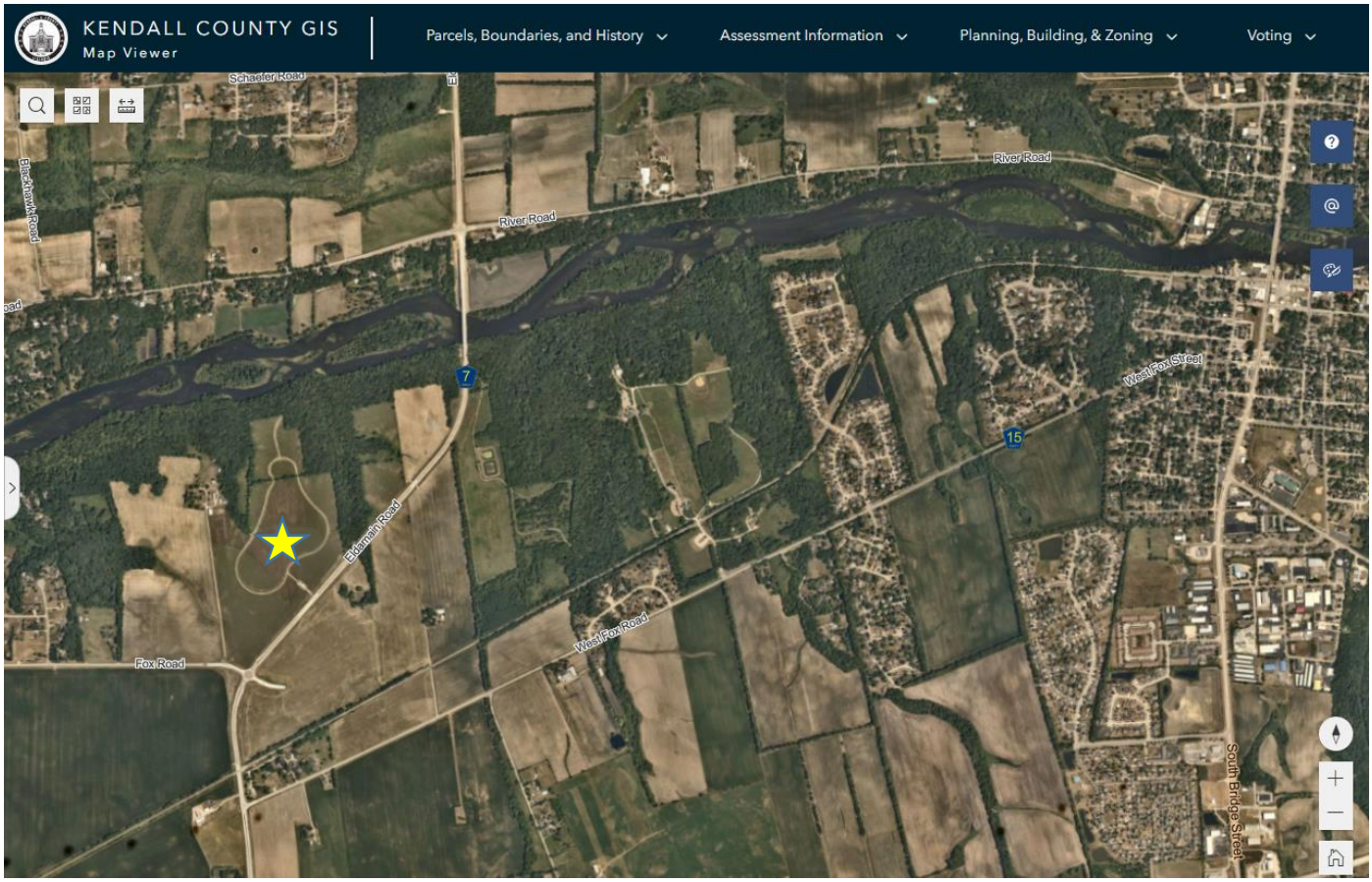
FOX RIVER BLUFFS FOREST PRESERVE – DIRECTIONS

From Route 34

Head west on Route 34 to Eldamain Road – turn left (south) on Eldamain. The entrance to Fox River Bluffs Forest Preserve is located on the south side of the Fox River. The entry drive and parking lot will be on your right.

From Route 71

Head west on Route 71 to Eldamain Road – turn right (north) on Eldamain. The entrance to Fox River Bluffs is located on the south side of the Fox River – about half mile north east of the roundabout. The entry drive and parking lot will be on your left.




Legend


PIC•COLLAGE

Survey Data & Survey Sheets

Species						Oak	Hickory	Walnut	Plum	Vol. (Adv.)	Shrub
Survery Plot	Latitude	Longitude	Total Tree Count	Total Shrub Count	**Verified Total Tree Count**						
1	41.63075	-88.495762	5	0	4	2		2		1	
2	41.6305139	-88.4956084	6	1	5	4		1			
3	41.631334	-88.4959766	2	0	2			2			
4	41.629911	-88.498877	7	0	5	4			1		
5	41.6302252	-88.498924	4	1	4	4					
6	41.6303532	-88.4989633	6	0	5	5					
7	41.6305306	-88.4989905	3	2	3	3					1
8	41.630827	-88.4990243	5	1	5	5					1
9	41.631941	-88.4993003	5	1	5	5					1
10	41.6325031	-88.4992699	4	0	4	4					
11	41.6325666	-88.4986926	10	0	6	6				3	
12	41.632039	-88.498222	3	0	3	3					
13	41.6325056	-88.4982929	6	0	3	3				2	1
14	41.6331	-88.497493	3	0	2	2					
15	unrecorded; see PDD		6	0	4	3			1	2	1
16	41.6338489	-88.4971713	0	1	0						1
17	41.6340537	-88.497284	10	0	2	2				7	
18	41.634425	-88.4965291	7	1	7	6	1			1	
19	41.634365	-88.4962799	6	0	6	6					
20	41.634358	-88.4960779	4	0	4	4					
21	41.6341348	-88.4968134	4	0	4	4					
22	41.6340879	-88.4962567	9	2	5	1	2		2	2	2
23	41.6340192	-88.4967156	7	0	7	6	1				
24	41.6337043	-88.4968043	8	1	0					1	4
25	41.63327	-88.4967373	6	1	6	6				2	
26	41.6329663	-88.4969909	4	1	5	5					1
27	41.6326521	-88.4970662	1	3	2	1			1	1	1
28	41.6323748	-88.4968088	4	0	3	2		1		1	
29	41.6324249	-88.496555	5	0	4	4					
30	41.632232	-88.4964758	3	0	3	2		1			
31	41.6318898	-88.4966502	1	1	1	1				1	
32	41.6315785	-88.4968665	7	3	3	2			1		
33	41.631235	-88.4969656	7	1	7	7				1	
34	41.6311428	-88.4965984	4	0	4	4					
35	41.6318289	-88.4933178	4	0	5	5					
36	41.6320935	-88.4934526	1	1	2	1	1				
37	unrecorded; see PDD		4	0	4	3			1		
38	41.6324987	-88.4935198	7	0	10	10				1	
39	41.6339339	-88.4935337	9	0	9	9					
40	41.634357	-88.4938	3	3	3	3					3
41	41.6337358	-88.4937511	4	2	3	2	1				1
42	41.6345177	-88.4942362	5	1	5	5					1
43	41.634554	-88.4944803	5	0	2	2				2	1
44	41.6345077	-88.4951152	5	3	3	3				2	1
45	41.634804	-88.4956326	6	1	6	6					1
46	41.6351761	-88.4961633	3	0	3	3					
47	41.6348816	-88.4965634	4	1	5	4	1				
48	41.6349037	-88.4951986	10	1	7		7			3	1
49	41.6353272	-88.4956405	10	1	8	8				3	1
50	41.6354971	-88.4960499	12	2	6	6				9	1
51	41.6362296	-88.4963452	5	0	4	4				1	
52	41.636036	-88.4961274	9	2	7	6			1	2	1
53	41.636788	-88.4961628	4	1	5	5					1
54	41.6364558	-88.4969172	5	0	4	4					
55	41.6367818	-88.4963602	4	1	4	4				1	
56	41.6360983	-88.497134	1	0	1	1					
57	41.6355325	-88.49644	1	4	1	1				1	4
58	unrecorded; see PDD		6	11	2	2				15	1
59	41.634722	-88.497222	4	2	4	4				2	
60	41.6335949	-88.495265	5	0	5	5					
					251	222	14	7	8	67	32

Verified Total Tree Count	251	43,560.00	sq. ft. / acre
Average Trees per Plot	4.18	452.39	sq. ft. / plot
Avg. Trees per Acre (X96.29 plots per acre)	402.81	27,143.40	60-plots
Monitoring Ratio: Trees per Acre / 400	1.01	96.29	plots per acre

TREES	LEAF SHAPE	Tally
Bur Oak		1
White Oak		
Swamp White Oak		6 1
Red Oak		
Black Oak		
Pin Oak		1
Shagbark Hickory		
Black Walnut		
American Plum		11
SHRUBS		
Hazelnut		
Elderberry		1

SURVEY PLOT #

48

GIS COORDINATES

Latitude

41.6349037

Longitude

88.4951986

TOTALS

Trees

10

Shrubs

1

TREES	LEAF SHAPE	Tally
Bur Oak		III
White Oak		I
Swamp White Oak		II
Red Oak		I
Black Oak		
Pin Oak		
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		I
Elderberry		

Elm I water Ash I Boxelder I

SURVEY PLOT #

49

GIS COORDINATES

Latitude

41.6353272

Longitude

88.4956405

TOTALS

Trees

10

Shrubs

1

TREES	LEAF SHAPE	Tally
Bur Oak		II
White Oak		II
Swamp White Oak		II
Red Oak		
Black Oak		I
Pin Oak		
Shagbark Hickory		II
Black Walnut		III
American Plum		
SHRUBS		
Hazelnut		II
Elderberry		

SURVEY PLOT #

50

GIS COORDINATES

Latitude
41.6354971

Longitude
88.4960499

TOTALS

Trees
12

Shrubs
2

+2 pines??) → unknown: 2

TREES	LEAF SHAPE	Tally
Bur Oak		||
White Oak		||
Swamp White Oak		
Red Oak		|
Black Oak		
Pin Oak		
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		
Elderberry		

SURVEY PLOT #

51

GIS COORDINATES

Latitude

41.6362296

Longitude

88.4963452

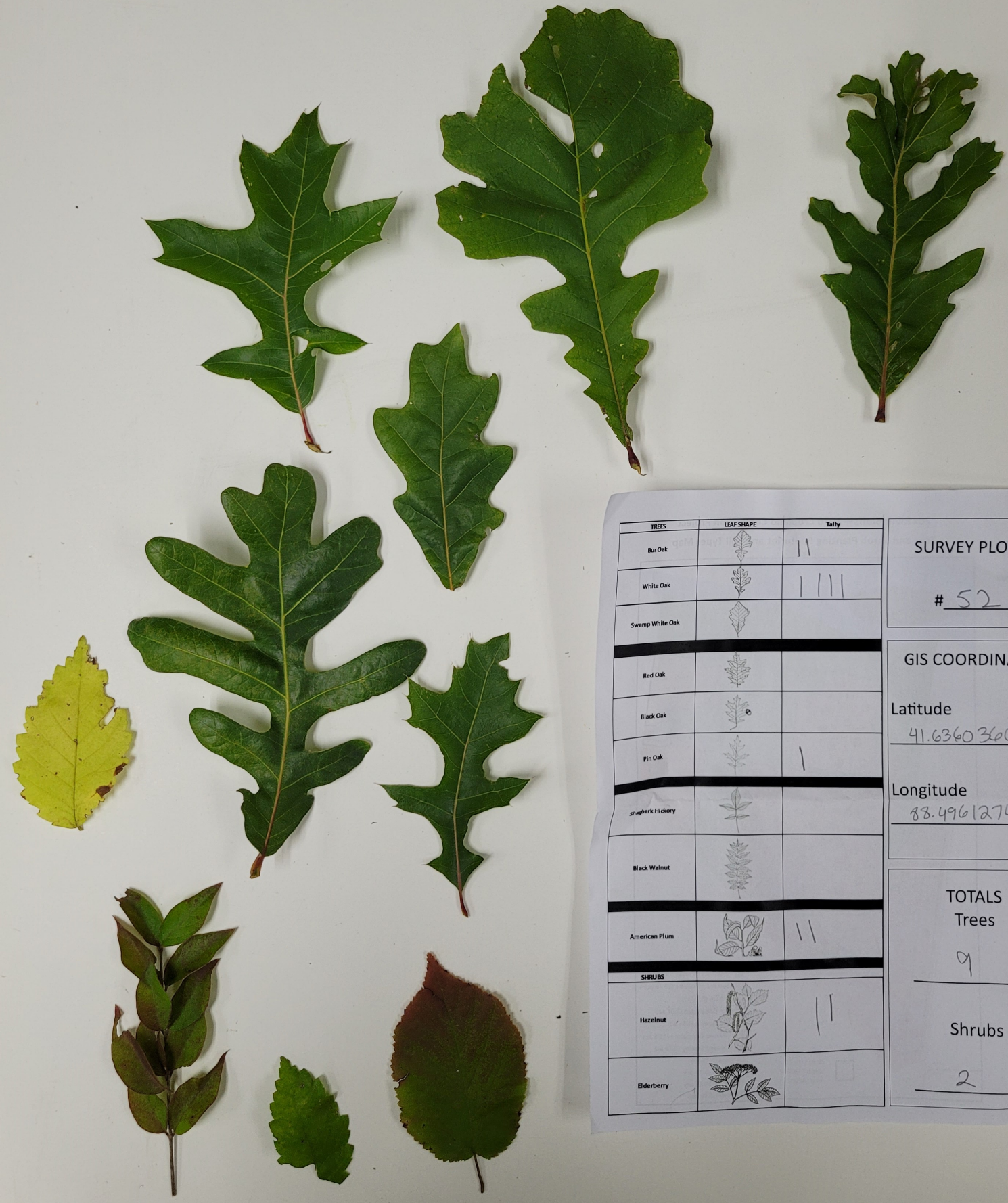
TOTALS

Trees

5

Shrubs

0



TREES	LEAF SHAPE	Tally
Bur Oak		11
White Oak		1111
Swamp White Oak		
Red Oak		
Black Oak		
Pin Oak		1
Shagbark Hickory		
Black Walnut		
American Plum		11
SHRUBS		
Hazelnut		11
Elderberry		

SURVEY PLOT #

52

GIS COORDINATES

Latitude

41.6360360

Longitude

88.4961274

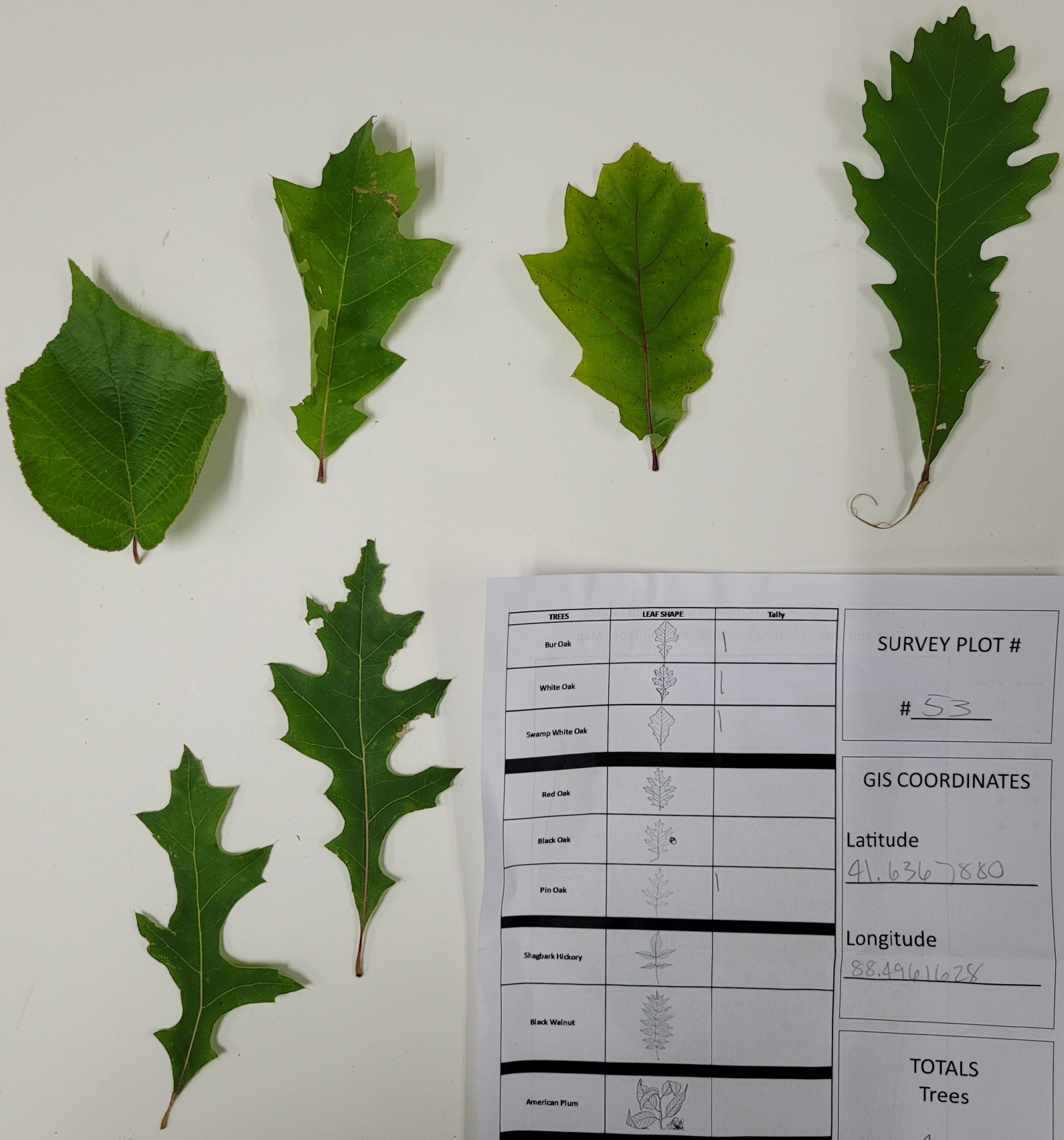
TOTALS

Trees

9

Shrubs

2



TREES	LEAF SHAPE	Tally
Bur Oak		1
White Oak		1
Swamp White Oak		1
Red Oak		
Black Oak		
Pin Oak		1
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		1
Elderberry		

SURVEY PLOT #

#53

GIS COORDINATES

Latitude

41.63677880

Longitude

88.49616628

TOTALS

Trees

4

Shrubs

1

TREES	LEAF SHAPE	Tally
Bur Oak		
White Oak		
Swamp White Oak		1
Red Oak		
Black Oak		
Pin Oak		
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		
Elderberry		

SURVEY PLOT #

64

GIS COORDINATES

Latitude

41.63104598

Longitude

88.4916917

TOTALS

Trees

Shrubs

TREES	LEAF SHAPE	Tally
Bur Oak		I
White Oak		II
Swamp White Oak		I
Red Oak		
Black Oak		
Pin Oak		
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		I
Elderberry		

SURVEY PLOT #

55

GIS COORDINATES

Latitude

41.6367818

Longitude

88.4963692

TOTALS

Trees

4

Shrubs

1

TREES	LEAF SHAPE	Tally
Bur Oak		
White Oak		I
Swamp White Oak		
Red Oak		
Black Oak		
Pin Oak		
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		
Elderberry		

SURVEY PLOT #

56

GIS COORDINATES

Latitude

41.6360983

Longitude

88.4971340

TOTALS

Trees

1

Shrubs

0

TREES	LEAF SHAPE	Tally
Bur Oak		
White Oak		1
Swamp White Oak		
Red Oak		
Black Oak		
Pin Oak		
Shagbark Hickory		
Black Walnut		
American Plum		X
SHRUBS		
Hazelnut		1111
Elderberry		

SURVEY PLOT #

57

GIS COORDINATES

Latitude

41.6355325

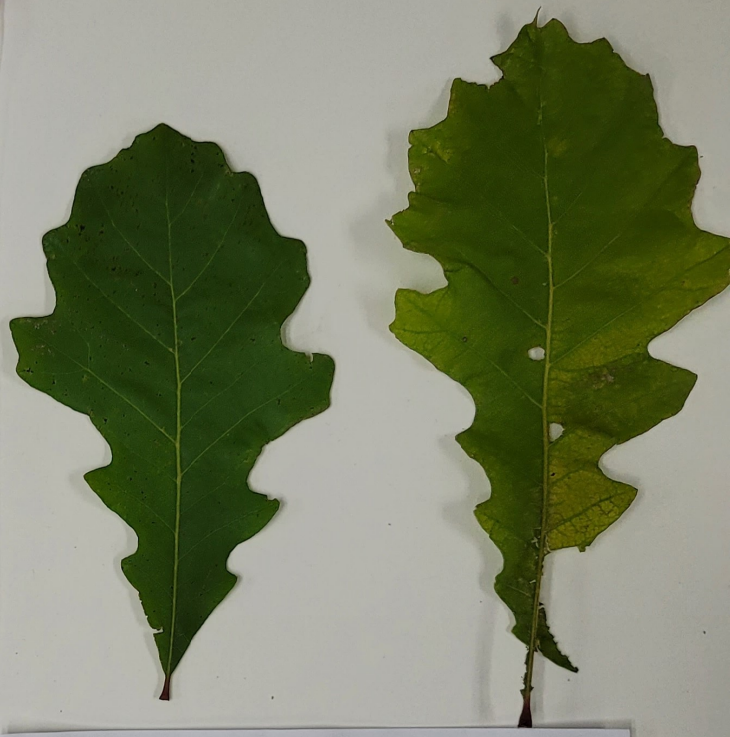
Longitude

88.49640

1 tree

4 Shrubs

Elm: 1



TREES	LEAF SHAPE	Tally
Bur Oak		
White Oak		
Swamp White Oak		II
Red Oak		
Black Oak		
Pin Oak		
Shagbark Hickory		
Black Walnut		II
American Plum		
SHRUBS		
Hazelnut		𝍸 II
Elderberry		
Amur Honeysuckle		III

SURVEY PLOT #

58

GIS COORDINATES

Latitude

41°38'5"

Longitude

88° 29'50"

TOTALS

Trees

6

Shrubs

II

Fr | II | Unknown | I

TREES	LEAF SHAPE	Tally
Bur Oak		
White Oak		1
Swamp White Oak		
Red Oak		11
Black Oak		
Pin Oak		1
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		11
Elderberry		

SURVEY PLOT #

59

GIS COORDINATES

Latitude

41° 38' 5

Longitude

88° 29' 50

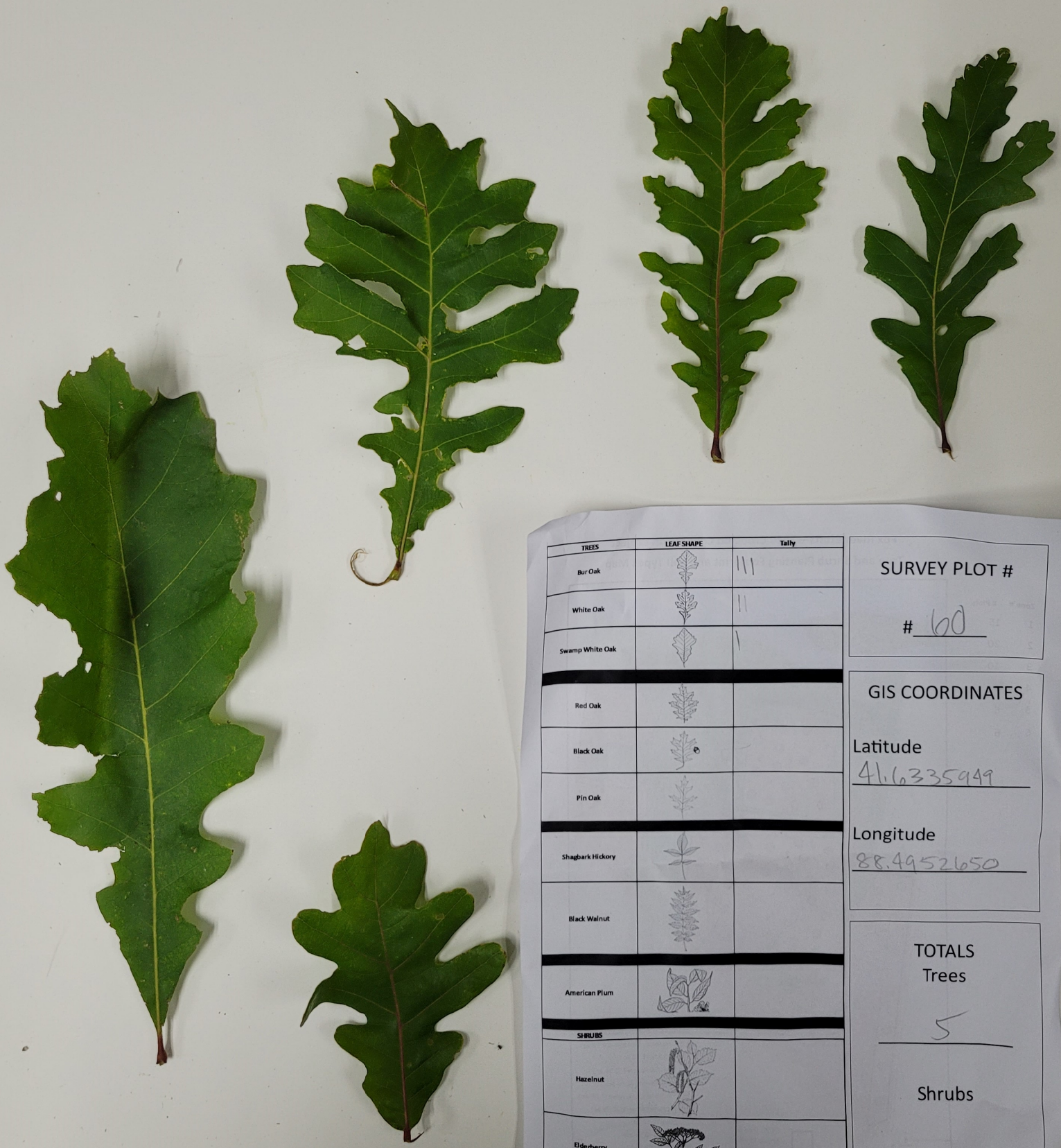
TOTALS

Trees

4

Shrubs

2



TREES	LEAF SHAPE	Tally
Bur Oak		III
White Oak		II
Swamp White Oak		I
Red Oak		
Black Oak		
Pin Oak		
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		
Elderberry		

SURVEY PLOT #

60

GIS COORDINATES

Latitude

41.6335949

Longitude

88.4952650

TOTALS

Trees

5

Shrubs

TREES	LEAF SHAPE	Tally
Bur Oak		
White Oak		1
Swamp White Oak		1
Red Oak		
Black Oak		
Pin Oak		
Shagbark Hickory		
Black Walnut		11
American Plum		1
SHRUBS		
Hazelnut		
Elderberry		

SURVEY PLOT #

1

GIS COORDINATES

Latitude

41.630 75

Longitude

88.495762

TOTALS

Trees

5

Shrubs

TREES	LEAF SHAPE	Tally
Bur Oak		I
White Oak		I
Swamp White Oak		II
Red Oak		
Black Oak		
Pin Oak		
Shagbark Hickory		
Black Walnut		II
American Plum		
SHRUBS		
Hazelnut		
Elderberry		I

unknown.

SURVEY PLOT #

2

GIS COORDINATES

Latitude

41.63051390

Longitude

88.4956084

TOTALS

Trees

6

Shrubs

1

TREES	LEAF SHAPE	Tally
Bur Oak		
White Oak		
Swamp White Oak		
Red Oak		
Black Oak		
Pin Oak		
Shagbark Hickory		
Black Walnut		11
American Plum		
SHRUBS		
Hazelnut		
Elderberry		

SURVEY PLOT #

3

GIS COORDINATES

Latitude

41.6303134

Longitude

88.4959766

TOTALS

Trees

2

Shrubs

TREES	LEAF SHAPE	Tally
Bur Oak		
White Oak		I
Swamp White Oak		III
Red Oak		
Black Oak		
Pin Oak		
Shagbark Hickory		
Black Walnut		
American Plum		II
SHRUBS		
Hazelnut		
Elderberry		

SURVEY PLOT #

4

GIS COORDINATES

Latitude

41.6299111

Longitude

88.4988877

TOTALS

Trees

7

Shrubs

TREES	LEAF SHAPE	Tally
Bur Oak		
White Oak		
Swamp White Oak		11
Red Oak		1
Black Oak		1
Pin Oak		
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		1
Elderberry		

SURVEY PLOT #

5

GIS COORDINATES

Latitude 41.6302252

Longitude 88.498924

TOTALS

Trees

4

Shrubs

1

TREES	LEAF SHAPE	Tally
Bur Oak		11
White Oak		1
Swamp White Oak		11
Red Oak		
Black Oak		
Pin Oak		1
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		
Elderberry		

SURVEY PLOT #

6

GIS COORDINATES

Latitude

41.630353 2

Longitude

88.4929633

TOTALS

Trees

Shrubs

TREES	LEAF SHAPE	Tally
Bur Oak		
White Oak		11
Swamp White Oak		
Red Oak		
Black Oak		
Pin Oak		1
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		11
Elderberry		

SURVEY PLOT #

7

GIS COORDINATES

Latitude

41.630 5306

Longitude

-88.49 89905

TOTALS

Trees

3

Shrubs

2

TREES	LEAF SHAPE	Tally
Bur Oak		11
White Oak		11
Swamp White Oak		
Red Oak		
Black Oak		
Pin Oak		1
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		1
Elderberry		

SURVEY PLOT #

8

GIS COORDINATES

Latitude

41.6306270

Longitude

86.4990243

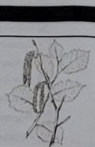
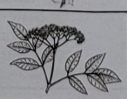
TOTALS

Trees

5

Shrubs

1

TREES	LEAF SHAPE	Tally
Bur Oak		II
White Oak		I
Swamp White Oak		II
Red Oak		
Black Oak		
Pin Oak		
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		I
Elderberry		

SURVEY PLOT #

#9

GIS COORDINATES

Latitude
41.6319410

Longitude
88.1993003

TOTALS

Trees
5

Shrubs

TREES	LEAF SHAPE	Tally
Bur Oak		1
White Oak		1
Swamp White Oak		1
Red Oak		
Black Oak		1
Pin Oak		
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		
Elderberry		

SURVEY PLOT #

10

GIS COORDINATES

Latitude

41.6325031

Longitude

88.4992699

TOTALS

Trees

4

Shrubs

TREES	LEAF SHAPE	Tally
Bur Oak		11
White Oak		
Swamp White Oak		11
Red Oak		11
Black Oak		
Pin Oak		
Shagbark Hickory		
Black Walnut		
American Plum		1
SHRUBS		
Hazelnut		
Elderberry		

Boxelder 11

SURVEY PLOT #

11

GIS COORDINATES

Latitude

41.63256666

Longitude

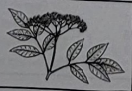
88.49869260

TOTALS

Trees

10

Shrubs

TREES	LEAF SHAPE	Tally
Bur Oak		I
White Oak		II
Swamp White Oak		
Red Oak		
Black Oak		
Pin Oak		
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		
Elderberry		

SURVEY PLOT #

12

GIS COORDINATES

Latitude 88.498222

Longitude 41.632039

TOTALS

Trees 3

Shrubs 0

TREES	LEAF SHAPE	Tally
Bur Oak		
White Oak		11
Swamp White Oak		11
Red Oak		11
Black Oak		
Pin Oak		
Shagbark Hickory		1
Black Walnut		
American Plum		1
SHRUBS		
Hazelnut		
Elderberry		

SURVEY PLOT #

13

GIS COORDINATES

Latitude

41.6325056

Longitude

88.4982929

TOTALS

Trees

6

Shrubs

0

TREES	LEAF SHAPE	Tally
Bur Oak		
White Oak		
Swamp White Oak		
Red Oak		11
Black Oak		
Pin Oak		
Shagbark Hickory		
Black Walnut		
American Plum		1
SHRUBS		
Hazelnut		
Elderberry		

SURVEY PLOT #

14

GIS COORDINATES

Latitude

41.6331000

Longitude

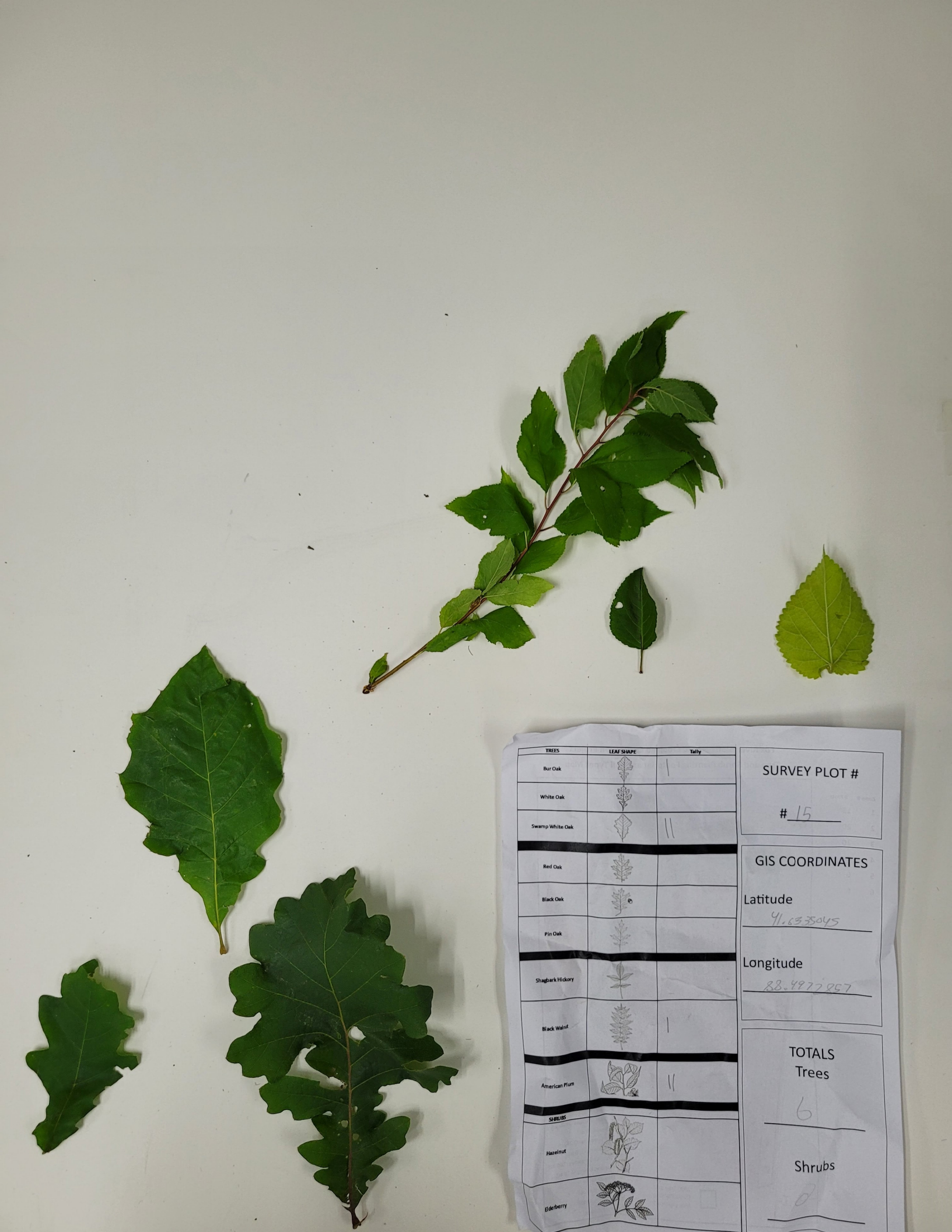
88.4974930

TOTALS

Trees

3

Shrubs



TREES	LEAF SHAPE	Tally
Bur Oak		I
White Oak		
Swamp White Oak		II
Red Oak		
Black Oak		
Pin Oak		
Shagbark Hickory		
Black Walnut		I
American Plum		II
SHRUBS		
Hazelnut		
Elderberry		

SURVEY PLOT #

15

GIS COORDINATES

Latitude

41.633045

Longitude

88.4972857

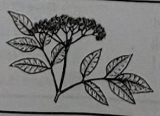
TOTALS

Trees

6

Shrubs

0

TREES	LEAF SHAPE	Tally
Bur Oak		
White Oak		
Swamp White Oak		
Red Oak		
Black Oak		
Pin Oak		
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		1
Elderberry		

SURVEY PLOT #

16

GIS COORDINATES

Latitude

41.6338489

Longitude

88.4971713

TOTALS

Trees

0

Shrubs

1

TREES	LEAF SHAPE	Tally
Bur Oak		1
White Oak		
Swamp White Oak		
Red Oak		1
Black Oak		
Pin Oak		
Shagbark Hickory		
Black Walnut		
American Plum		1
SHRUBS		
Hazelnut		
Elderberry		

SURVEY PLOT #

#17

GIS COORDINATES

Latitude

41.6340537

Longitude

88.4972840

TOTALS

Trees

10

Shrubs

Black cherry III Elm IIII

TREES	LEAF SHAPE	Tally
Bur Oak		III
White Oak		I
Swamp White Oak		I
Red Oak		
Black Oak		
Pin Oak		I
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		I
Elderberry		

SURVEY PLOT #

18

GIS COORDINATES

Latitude
41.6344250

Longitude
88.4965291

TOTALS

Trees
7

Shrubs
1

TREES	LEAF SHAPE	Tally
Bur Oak		I
White Oak		I
Swamp White Oak		I
Red Oak		
Black Oak		
Pin Oak		III
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		
Elderberry		

SURVEY PLOT #

19

GIS COORDINATES

Latitude

41.6343650

Longitude

88.4962799

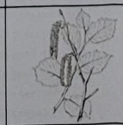
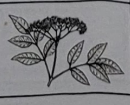
TOTALS

Trees

6

Shrubs

0

TREES	LEAF SHAPE	Tally
Bur Oak		11
White Oak		1
Swamp White Oak		1
Red Oak		
Black Oak		
Pin Oak		1
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		
Elderberry		

SURVEY PLOT #

201

GIS COORDINATES

Latitude

41.6343580

Longitude

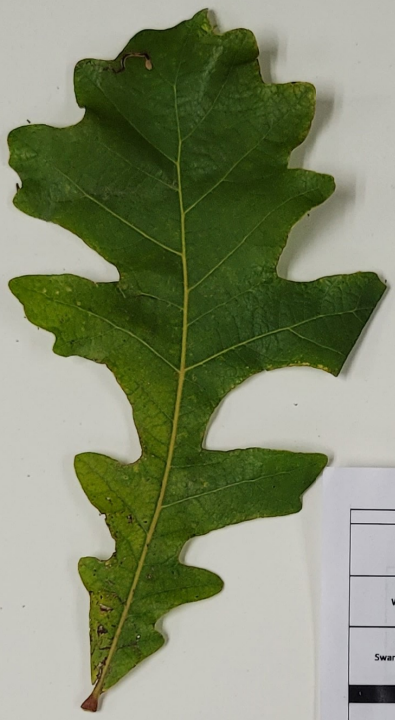
88.4960779

TOTALS

Trees

4

Shrubs



TREES	LEAF SHAPE	Tally
Bur Oak		
White Oak		III
Swamp White Oak		I
Red Oak		
Black Oak		
Pin Oak		
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		
Elderberry		

SURVEY PLOT #

21

GIS COORDINATES

Latitude

41.6341348

Longitude

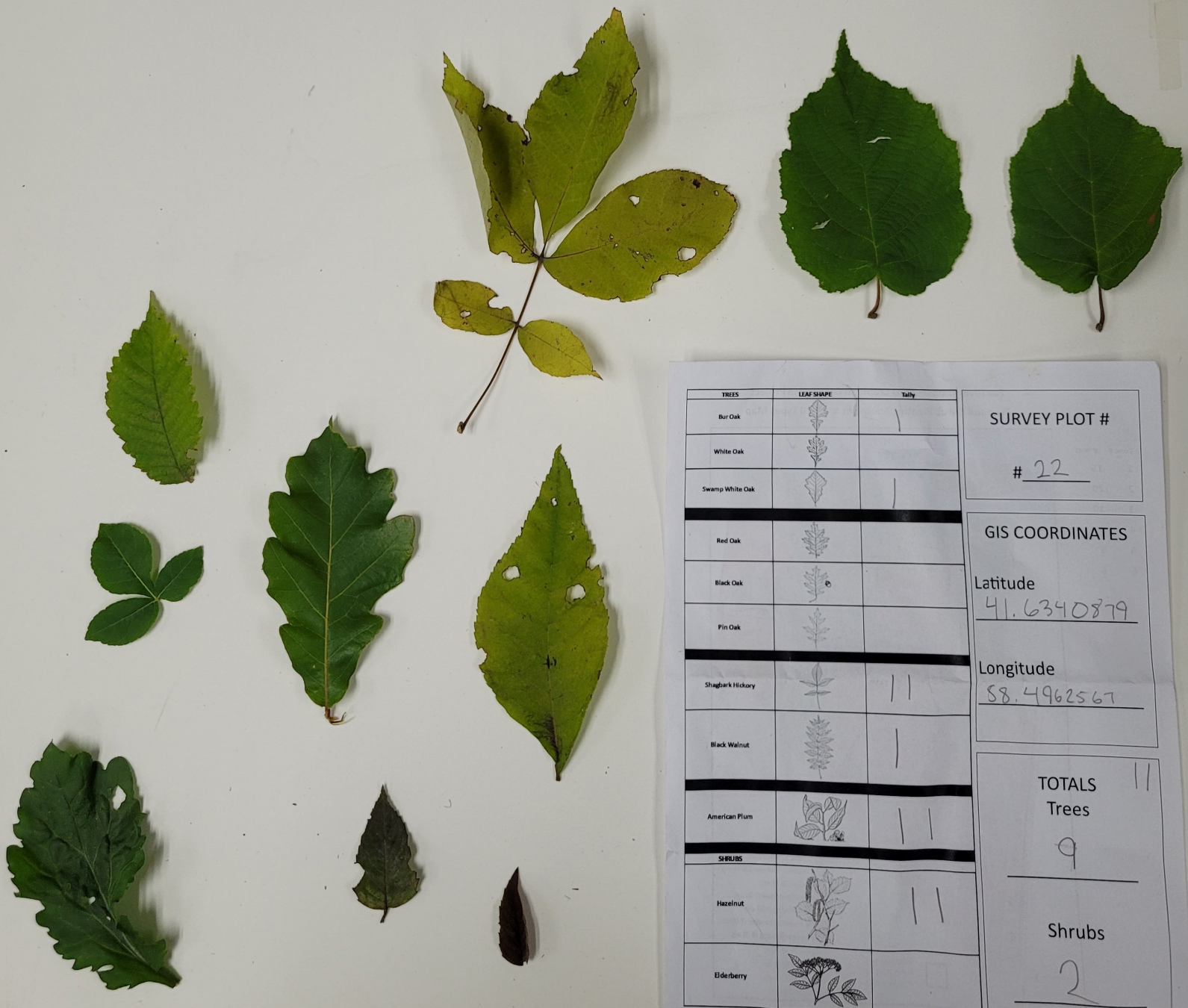
88.4968134

TOTALS

Trees

4

Shrubs



TREES	LEAF SHAPE	Tally
Bur Oak		1
White Oak		
Swamp White Oak		1
Red Oak		
Black Oak		
Pin Oak		
Shagbark Hickory		11
Black Walnut		1
American Plum		11
SHRUBS		
Hazelnut		11
Elderberry		

SURVEY PLOT #

22

GIS COORDINATES

Latitude

41.6340879

Longitude

-88.4962567

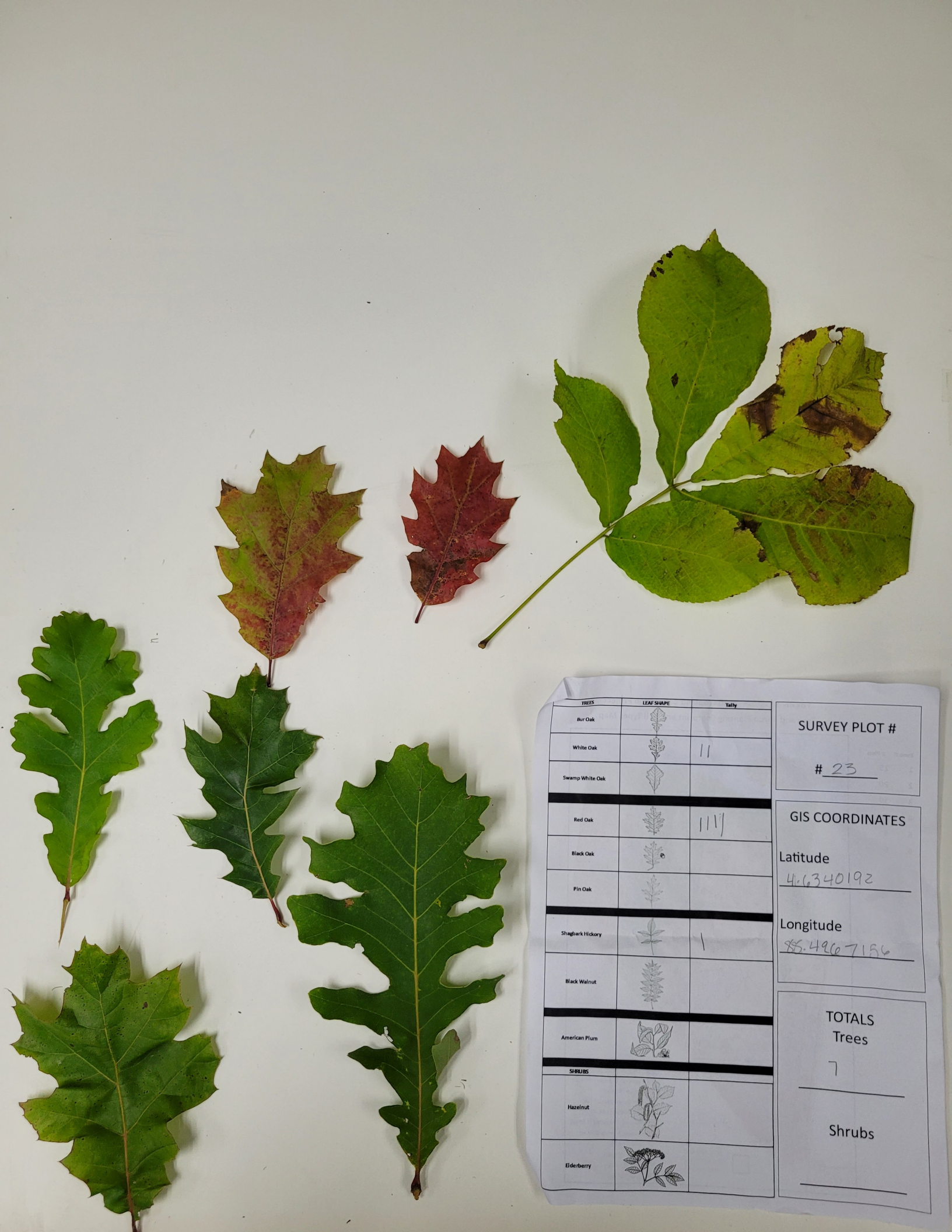
TOTALS 11

Trees

9

Shrubs

2



TREES	LEAF SHAPE	Tally
Bur Oak		
White Oak		II
Swamp White Oak		
Red Oak		III
Black Oak		
Pin Oak		
Shagbark Hickory		I
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		
Elderberry		

SURVEY PLOT #

23

GIS COORDINATES

Latitude

41.634019?

Longitude

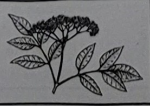
85.4967156

TOTALS

Trees

7

Shrubs

TREES	LEAF SHAPE	Tally
Bur Oak		1
White Oak		
Swamp White Oak		1
Red Oak		1
Black Oak		
Pin Oak		
Shagbark Hickory		11
Black Walnut		1
American Plum		1
SHRUBS		
Hazelnut		1
Elderberry		

SURVEY PLOT #

24

GIS COORDINATES

Latitude

41.633703

Longitude

88.468043

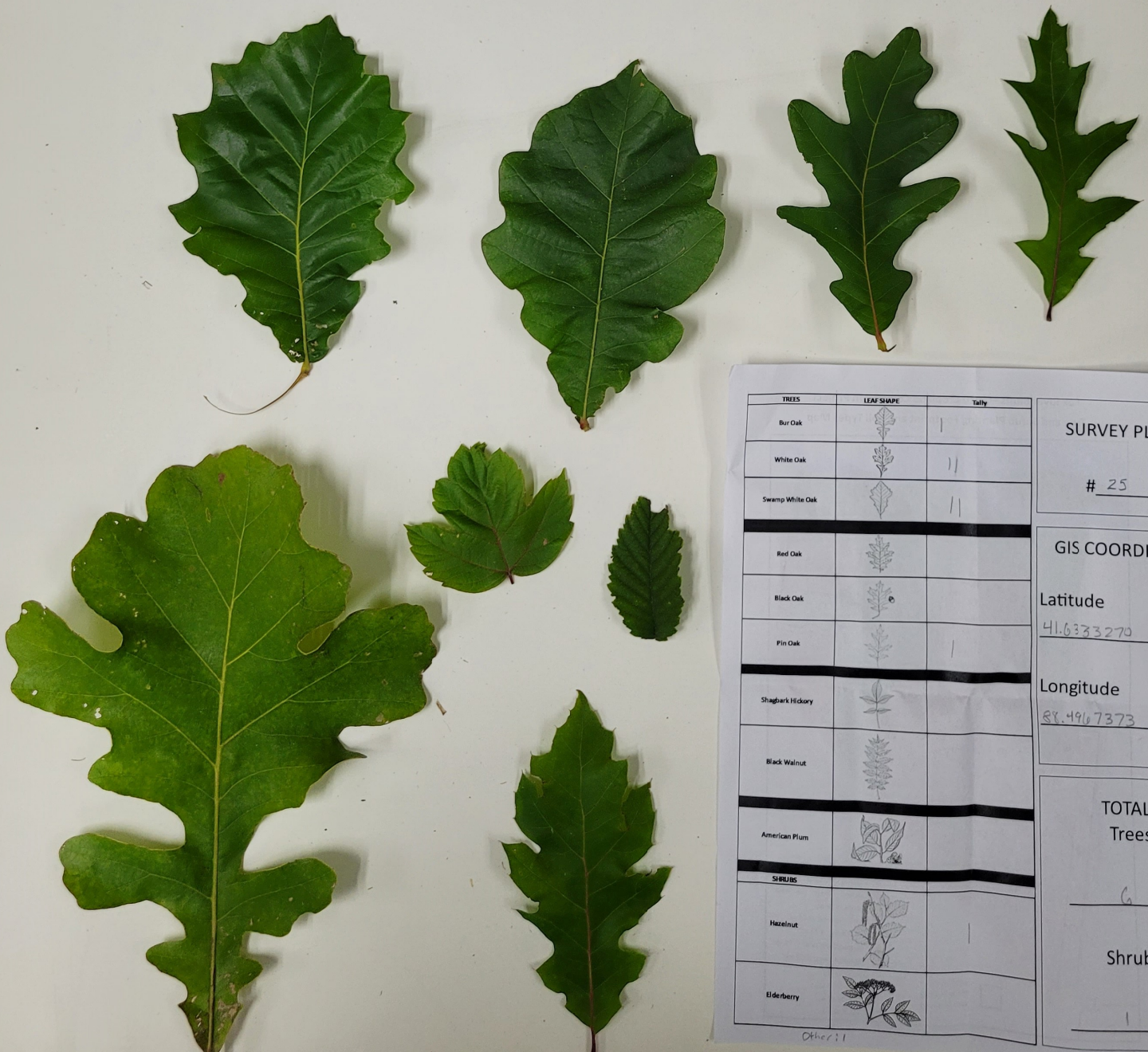
TOTALS

Trees

8

Shrubs

1



TREES	LEAF SHAPE	Tally
Bur Oak		I
White Oak		II
Swamp White Oak		II
Red Oak		
Black Oak		
Pin Oak		I
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		I
Elderberry		

Other: I

SURVEY PLOT #

25

GIS COORDINATES

Latitude

41.6333270

Longitude

88.4916373

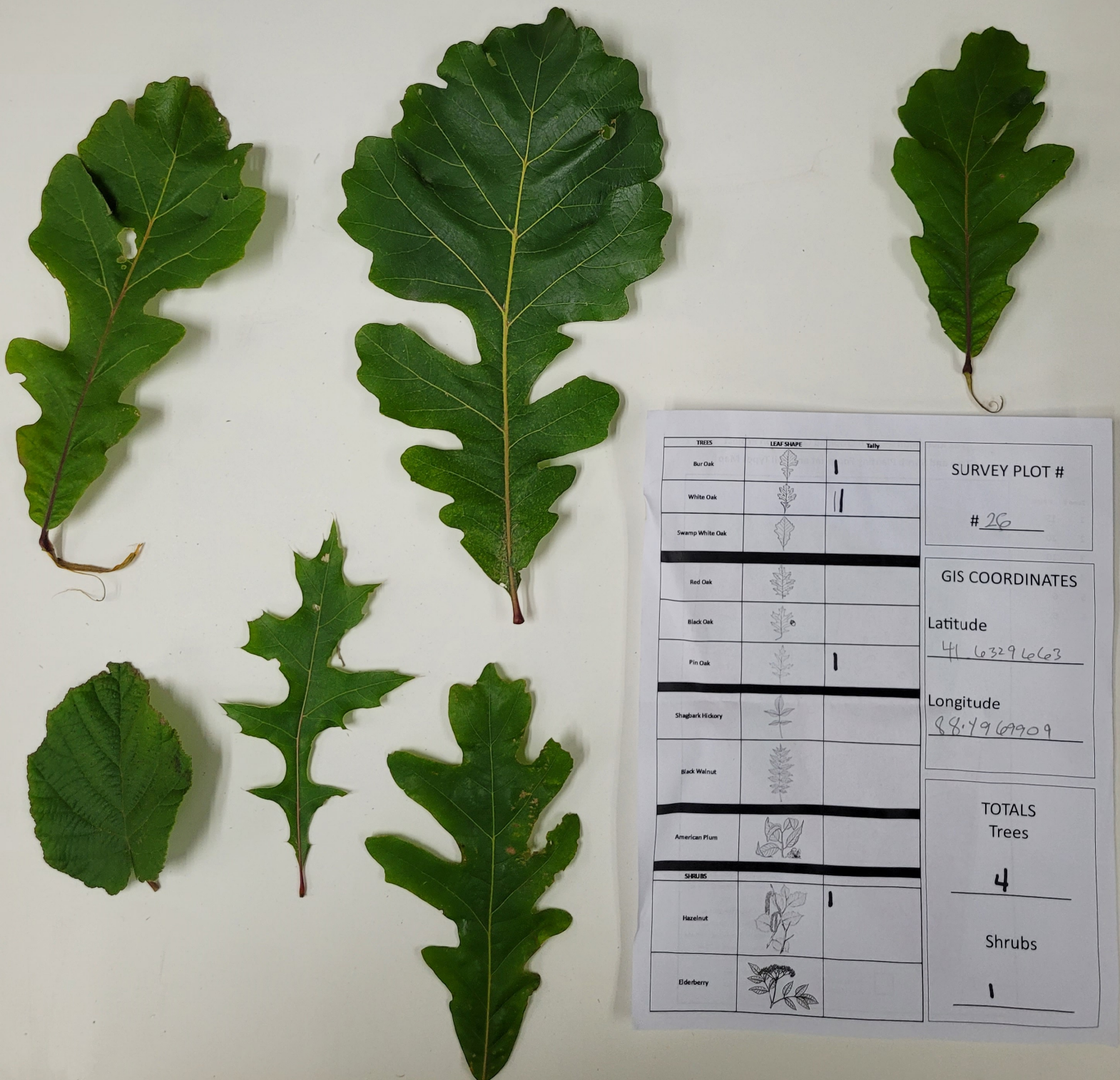
TOTALS

Trees

6

Shrubs

1



TREES	LEAF SHAPE	Tally
Bur Oak		I
White Oak		II
Swamp White Oak		
Red Oak		
Black Oak		
Pin Oak		I
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		I
Elderberry		

SURVEY PLOT #

26

GIS COORDINATES

Latitude

41 63296663

Longitude

88.49669909

TOTALS

Trees

4

Shrubs

1

TREES	LEAF SHAPE	Tally
Bur Oak		
White Oak		
Swamp White Oak		1
Red Oak		
Black Oak		
Pin Oak		
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		11
Elderberry		1

SURVEY PLOT #

27

GIS COORDINATES

Latitude

41.632052N

Longitude

88.4970662

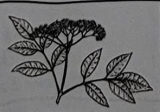
TOTALS

Trees

1

Shrubs

3

TREES	LEAF SHAPE	Tally
Bur Oak		
White Oak		
Swamp White Oak		\
Red Oak		
Black Oak		
Pin Oak		\
Shagbark Hickory		
Black Walnut		\
American Plum		
SHRUBS		
Hazelnut		
Elderberry		

SURVEY PLOT #

28

GIS COORDINATES

Latitude

41.6323748

Longitude

88.49608088

TOTALS

Trees

4

Shrubs

TREES	LEAF SHAPE	Tally
Bur Oak		
White Oak		1
Swamp White Oak		1
Red Oak		11
Black Oak		
Pin Oak		
Shagbark Hickory		1
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		
Elderberry		

SURVEY PLOT #

29

GIS COORDINATES

Latitude

41.6324249

Longitude

88.496555

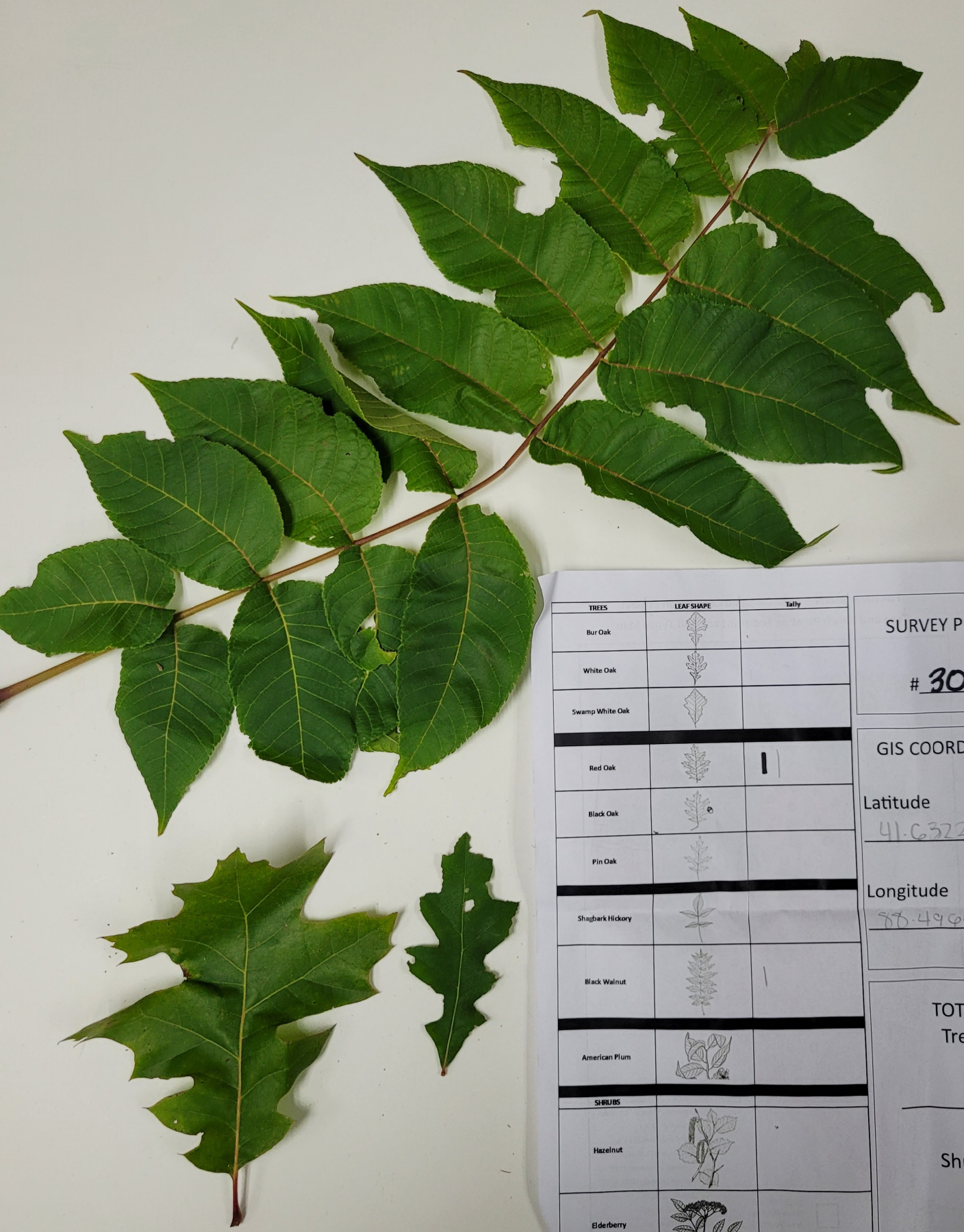
TOTALS

Trees

5

Shrubs

0



TREES	LEAF SHAPE	Tally
Bur Oak		
White Oak		
Swamp White Oak		
Red Oak		1
Black Oak		
Pin Oak		
Shagbark Hickory		
Black Walnut		1
American Plum		
SHRUBS		
Hazelnut		
Elderberry		

SURVEY PLOT #

30

GIS COORDINATES

Latitude

41.6322320

Longitude

88.4904756

TOTALS

Trees

Shrubs

TREES	LEAF SHAPE	Tally
Bur Oak		
White Oak		
Swamp White Oak		
Red Oak		1
Black Oak		
Pin Oak		
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		1
Elderberry		

SURVEY PLOT #

31

GIS COORDINATES

Latitude

41.6318898

Longitude

88.4966502

TOTALS

Trees

1

Shrubs

1

TREES	LEAF SHAPE	Tally
Bur Oak		1
White Oak		
Swamp White Oak		
Red Oak		1
Black Oak		
Pin Oak		
Shagbark Hickory		1 1 1
Black Walnut		
American Plum		1
SHRUBS		
Hazelnut		1
Elderberry		1 1

SURVEY PLOT #

32

GIS COORDINATES

Latitude

41.6315785

Longitude

88.4968665

TOTALS

Trees

7

Shrubs

3

TREES	LEAF SHAPE	Tally
Bur Oak		1
White Oak		1111
Swamp White Oak		11
Red Oak		
Black Oak		
Pin Oak		
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		1
Elderberry		

SURVEY PLOT #

#33

GIS COORDINATES

Latitude

41.6312350

Longitude

88.49691656

TOTALS

Trees

7

Shrubs

1

TREES	LEAF SHAPE	Tally
Bur Oak		1
White Oak		1
Swamp White Oak		
Red Oak		
Black Oak		1
Pin Oak		1
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		
Elderberry		

SURVEY PLOT #

34

GIS COORDINATES

Latitude

41.6311428

Longitude

88.4965984

TOTALS

Trees

4

Shrubs

TREES	LEAF SHAPE	Tally
Bur Oak		
White Oak		
Swamp White Oak		111
Red Oak		1
Black Oak		
Pin Oak		
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		
Elderberry		

SURVEY PLOT #

35

GIS COORDINATES

Latitude

41.63182289

Longitude

-88.49331778

TOTALS

Trees

4

Shrubs

0

TREES	LEAF SHAPE	Tally
Bur Oak		
White Oak		1
Swamp White Oak		
Red Oak		
Black Oak		
Pin Oak		
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		1
Elderberry		

SURVEY PLOT #

36

GIS COORDINATES

Latitude

41.6320935

Longitude

88.4934526

TOTALS

Trees

1

Shrubs

1

TREES	LEAF SHAPE	Tally
Bur Oak		
White Oak		
Swamp White Oak		1
Red Oak		11
Black Oak		
Pin Oak		
Shagbark Hickory		
Black Walnut		
American Plum		1
SHRUBS		
Hazelnut		
Elderberry		

SURVEY PLOT #

37

GIS COORDINATES

Latitude

41.6232276

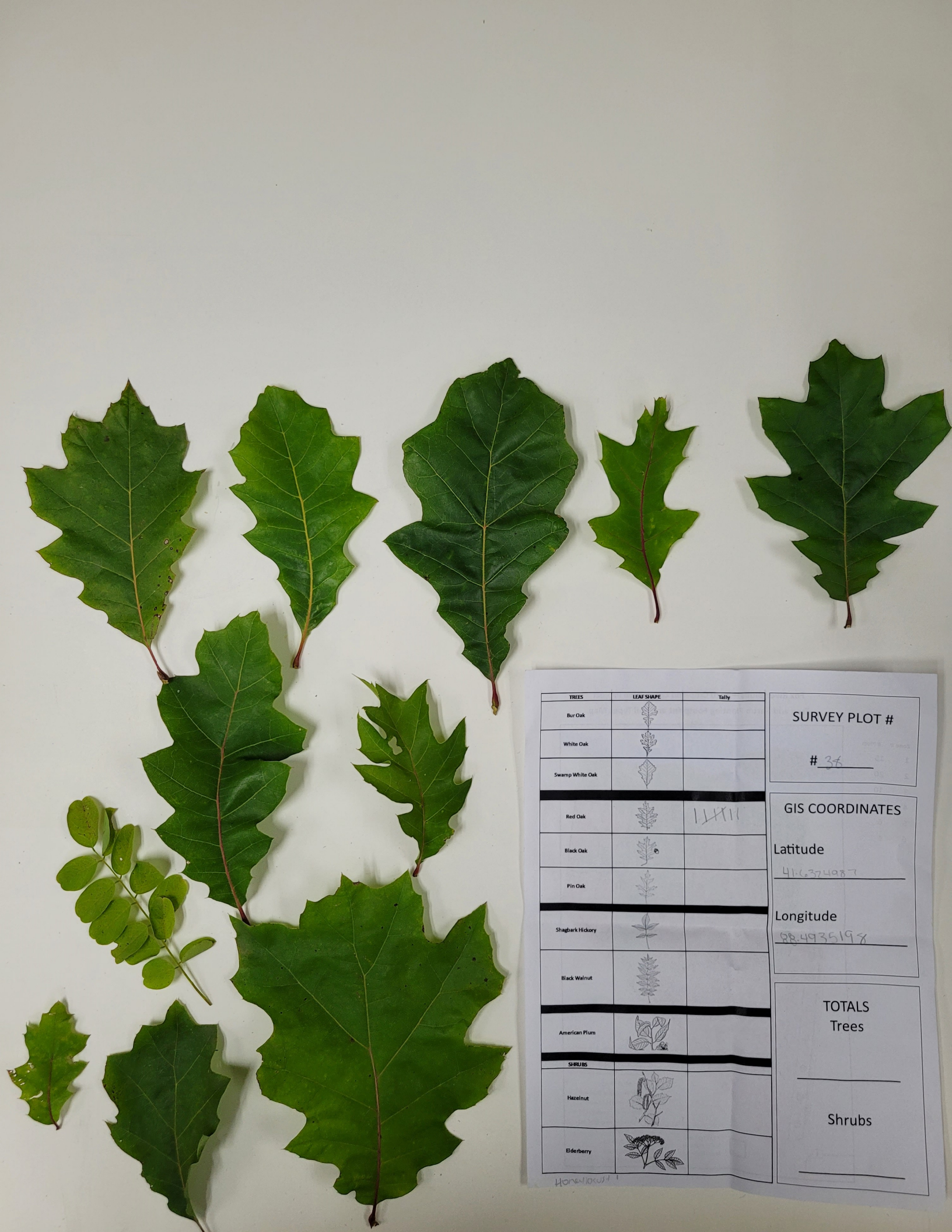
Longitude

88.4933856

TOTALS

Trees

Shrubs



TREES	LEAF SHAPE	Tally
Bur Oak		
White Oak		
Swamp White Oak		
Red Oak		IIII
Black Oak		
Pin Oak		
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		
Elderberry		

Honeylocust

SURVEY PLOT #

38

GIS COORDINATES

Latitude

41.637403?

Longitude

88.493519?

TOTALS

Trees

Shrubs

TREES	LEAF SHAPE	Tally
Bur Oak		III
White Oak		II
Swamp White Oak		III
Red Oak		I
Black Oak		
Pin Oak		
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		
Elderberry		

SURVEY PLOT #

39

GIS COORDINATES

Latitude

41.6359339

Longitude

88.4935337

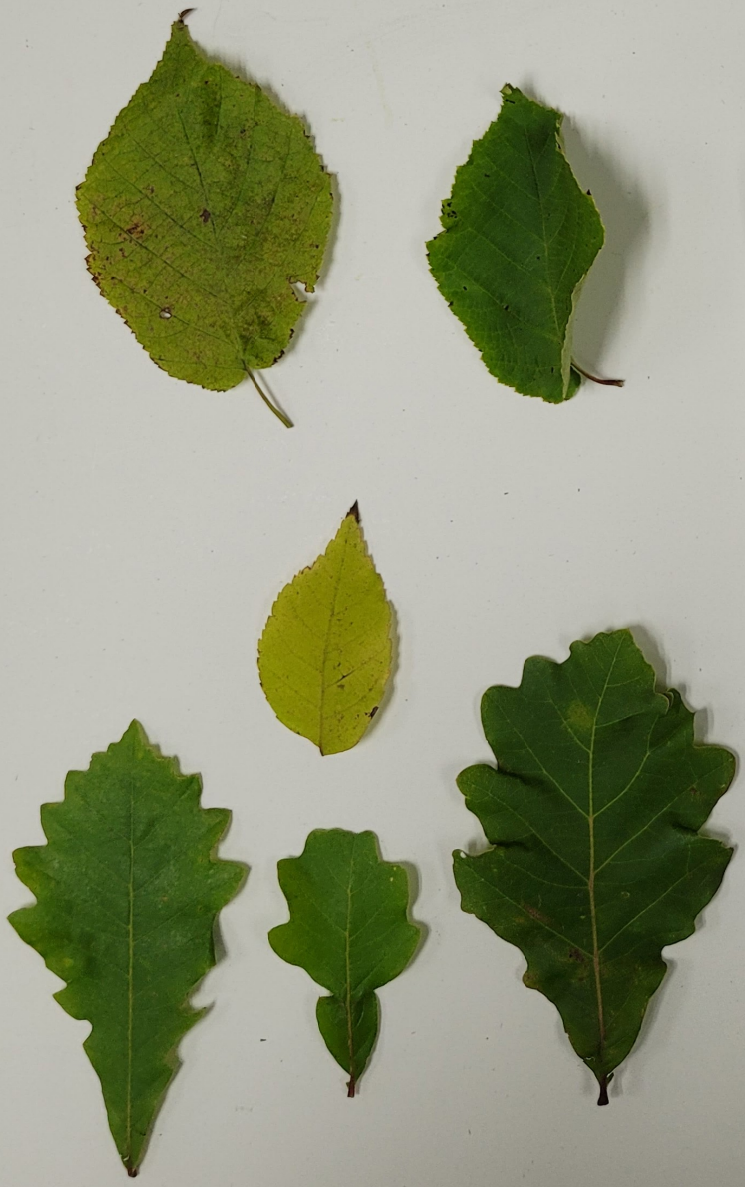
TOTALS

Trees

9

Shrubs

6



TREES	LEAF SHAPE	Tally
Bur Oak		II
White Oak		
Swamp White Oak		
Red Oak		I
Black Oak		
Pin Oak		
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		III
Elderberry		

SURVEY PLOT #

40

GIS COORDINATES

Latitude

41.6343570

Longitude

88.4938000

TOTALS

Trees

3

Shrubs

3

TREES	LEAF SHAPE	Tally
Bur Oak		
White Oak		
Swamp White Oak		I
Red Oak		
Black Oak		
Pin Oak		
Shagbark Hickory		III
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		II
Elderberry		

SURVEY PLOT #

41

GIS COORDINATES

Latitude

41.623 7358

Longitude

88.493 7511

TOTALS

Trees

4

Shrubs

2

TREES	LEAF SHAPE	Tally
Bur Oak		I
White Oak		II
Swamp White Oak		II
Red Oak		
Black Oak		
Pin Oak		
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		I
Elderberry		

SURVEY PLOT #

42

GIS COORDINATES

Latitude

41.624517?

Longitude

89.4042362

TOTALS

Trees

5

Shrubs

1

TREES	LEAF SHAPE	Tally
Bur Oak		
White Oak		1
Swamp White Oak		1
Red Oak		11
Black Oak		1
Pin Oak		
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		
Elderberry		

SURVEY PLOT #

~~45~~ 43

GIS COORDINATES

Latitude

41.6345540

Longitude

88.4944803

TOTALS

Trees

5

Shrubs

0

TREES	LEAF SHAPE	Tally
Bur Oak		
White Oak		
Swamp White Oak		11
Red Oak		1
Black Oak		
Pin Oak		
Shagbark Hickory		11
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		111
Elderberry		

SURVEY PLOT #

44

GIS COORDINATES

Latitude

41.6345077

Longitude

88.4951152

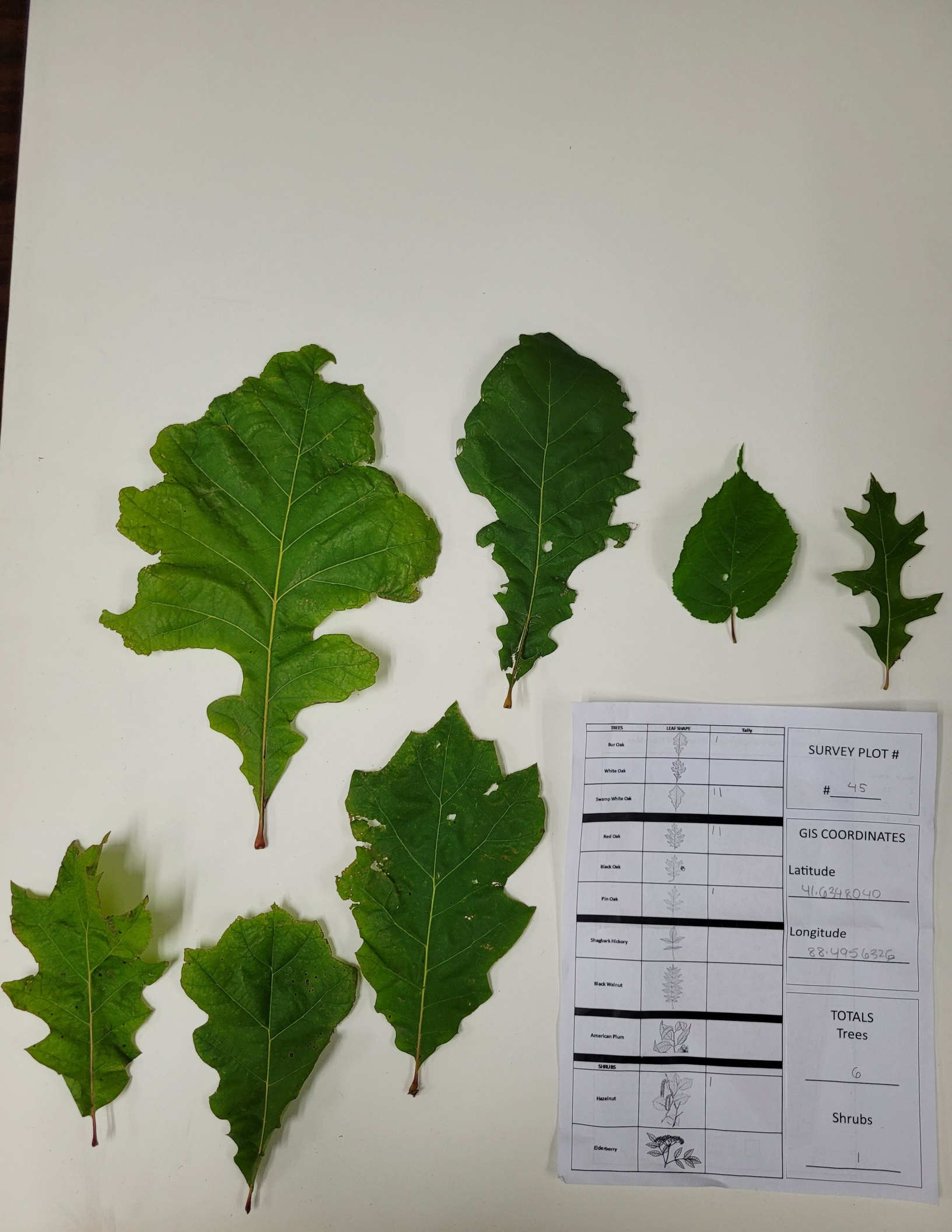
TOTALS

Trees

5

Shrubs

3



TREES	LEAF SHAPE	Tally
Bur Oak		1
White Oak		
Swamp White Oak		11
Red Oak		11
Black Oak		
Pin Oak		1
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		1
Elderberry		

SURVEY PLOT #

45

GIS COORDINATES

Latitude

41.6348040

Longitude

88.4956326

TOTALS

Trees

6

Shrubs

1

TREES	LEAF SHAPE	Tally
Bur Oak		
White Oak		
Swamp White Oak		11
Red Oak		
Black Oak		1
Pin Oak		
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		
Elderberry		

SURVEY PLOT #

46

GIS COORDINATES

Latitude

41.6351761

Longitude

88.4961633

TOTALS

Trees

3

Shrubs

TREES	LEAF SHAPE	Tally
Bur Oak		1
White Oak		1
Swamp White Oak		1
Red Oak		1
Black Oak		
Pin Oak		
Shagbark Hickory		
Black Walnut		
American Plum		
SHRUBS		
Hazelnut		1
Elderberry		

SURVEY PLOT #

47

GIS COORDINATES

Latitude

41. 6348816

Longitude

88. 4965634

TOTALS

Trees

4

Shrubs

1

Project Type & Quantification

Area Reforestation Project Type and Quantification

October 25, 2020

Area Reforestation seeks two main goals – create a dynamic forest ecosystem and generate canopy over parcels or properties greater than 5 acres and some cases over dozens or hundreds of acres. Examples are projects to convert agricultural land to forest or reforestation of natural areas. To accomplish these goals, area reforestation plants trees closely together, using a diverse palette of species and size, with relatively high expected mortality. Mortality is not the central measure of success of area reforestation, because certain species and trees are expected to out-compete others. Recruitment often occurs that results in mature trees that were not planted by the project operator.

The amount of CO_2 stored after 25-years by planted project trees is based on the anticipated amount of tree canopy area (TC). The forecasted amount of CO_2 stored at 25-years is the product of the amount of tree canopy (TC) and the CO_2 Index (CI, t CO_2 per acre). This approach recognizes that forest dynamics for area reforestation projects are different than for street trees or parks projects. In many cases, native species are planted close together and early competition results in high mortality and rapid canopy closure. The Single Tree Method and the Canopy Method for Parks-like plantings, which are based on the biometrics of open-growing urban trees, do not adequately describe biomass distribution among closely-spaced trees and the dynamic changes in CO_2 stored in dead wood and understory vegetation as a forest stand matures.

City Forest Credits (referred to as the Registry) issues credits at four times during a 25-year area reforestation project. Assuming compliance with all protocol requirements and third-party verification, the Registry issues credits based on projected CO_2 storage over the 25-year project duration. It issues 10% of projected credits after planting, 40% of projected credits at Year 4, and 30% of projected credits at Year 6 after planting. At the end of the project, in year 25, the Operator will receive credits for all CO_2 stored, minus credits already issued. A 5% buffer pool deduction is applied at each issuance of credits, with these funds going into a program-wide pool to insure against catastrophic loss of trees (unavoidable reversals).

To quantify the CO_2 for these kinds of area reforestation projects, Project Operators may choose one of two methods – local data or a forest ecosystem approach using the USDA Forest Service General Technical Report (GTR), with its biometric data and allometrics for 51 forest ecosystems in regions of the U.S. (Smith et al., 2006). In this GTR method, the forecasted amount of CO_2 stored at 25-years is the product of the amount of TC and the CO_2 Index (CI, t CO_2 per acre).

Local Data

Project Operators may apply to the Registry to quantify the projected CO_2 storage from local data for tree growth that more accurately reflects CO_2 storage than the GTR tables. If a Project Operator has

local data for 25-year-old stands like those planted, it can submit that data to the Registry. The Registry retains sole discretion to determine the applicability of that data to the planting project of the Project Operator.

Use of GTR Tables

A Project Operator may alternatively choose to use the USDA Forest Service General Technical Report (GTR), with its biometric data and allometrics for 51 forest ecosystems in regions of the U.S. (Smith et al., 2006). The GTR tables provide carbon stored per hectare for each of six pools as a function of stand age. We used values for 25-year old stands for afforestation projects, because the sites contain little carbon in down dead wood and forest floor material at the time of planting. Data used to derive the 51 forest ecosystem tables came from U.S. Forest Inventory and Assessment plots. More information on methods used to prepare the tables can be found in Smith et al. (2006). The value from the applicable table, for total non-soil carbon stock for age 25 (or other source approved by the registry) is the CO_2 Index (CI).

Project Operators determine their forest type and select the type from their region in the GTR tables. Project Operators then utilize the carbon totals for year 25 from the tables. If a project is planted on an area that has been tilled to grow crops for at least three of ten years before tree planting, then soil carbon may be claimed.

SOIL CARBON SEQUESTRATION

- If a project converts land from tillage, the project may receive credit for increasing soil carbon sequestration. If a project does not convert land from tillage, the project shall not receive credit for soil carbon sequestration. To receive soil carbon credits, the project must document a history of cropping in at least three of the 10 years preceding initiation of the project. Options for documenting tillage include cropping records, crop subsidy payment receipts, and historical aerial photos showing cropping.
- Following the United Nations Framework Convention on Climate Change, Intergovernmental Panel on Climate Change (IPCC) afforestation/reforestation methodological tool "Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities, Version 01," projects that are on sites that are productive enough to grow trees and that stop tillage are assumed to gain more than the IPCC's maximum creditable amount of soil carbon of 16 tC/ha, which is 23.7 tCO_2e/acre over the 25 year life of the sequestration project.
- When a project converts agricultural land to forest and makes no change in the demand for agricultural products, the project creates pressure to bring other lands into agriculture. Economists call the rate that other resources are increased to serve a supply the "price elasticity of supply." The average price elasticity of supply of agricultural land in the U.S. is calculated by Barr et al. (2010) to be 0.018, which is 1.8%. To account for this expected conversion of some other land to agriculture, and assuming that land brought into agriculture loses the same amount of carbon that soil taken out of agriculture regains, the Registry deducts 1.8% of the IPCC creditable amount of carbon gain. As a result, projects that convert land from tillage to trees may count

23.3 tCO_2e per acre of soil carbon gain as a result of the project over the 25 year life of the project.

After conversions from Carbon to CO_2, **the CO_2 Index (CI) is tons CO_2 per acre of tree canopy (TC) and the forecasted amount of CO_2 stored after 25-years is the CI x TC.** This is the value from which the Registry will issue credits.

If a Project operator feels that the GTR table applicable to its project does not reflect accurate CO_2 storage for that project, he or she may apply to the Registry for use of a different GTR table in a more accurate way. Here is a non-exhaustive list of factors the Registry will consider in any requests to deviate from the GTR values:

- Soils
- Precipitation
- Climate information for the area
- Site productivity
- Local measurements of growth
- Proximity to the border of another region

Guidance on Numbers of Trees per Acre to Plant for Crediting under this Area Reforestation Quantification Method

To determine how many trees to plant, the project must estimate what mortality of planted seedlings it will have. With professional tree planters, quality planting stock, growing conditions conducive to growth, and little animal damage, planting at 10' by 10' spacing (436 trees per acre) often results in more than 400 trees per acre surviving at Year 6.

In harsh site conditions, or planting at the wrong time of year, or not keeping seedlings cool and moist, or not planting with good contact between roots and soil, mortality of 30-50% is common. Planting by volunteer planters, or in sites with high animal browsing, can result in mortality greater than 80-90%. CFC recommends having someone with tree planting expertise manage the acquisition of planting stock and manage the planting process.

Methods for Determining Canopy Cover Growth or Tree Survival, and Progress Standards for Issuance of Credits at Years 4 and 6

Projects can choose one of two methods for determining canopy or tree survival – the Canopy Cover Growth Method or the Trees Per Acre Method

CANOPY COVER GROWTH METHOD

- Project provides images of the Project Area from any telemetry, imaging, remote sensing, i-Tree Canopy, or UAV service, such as Google Earth and estimate the area in tree canopy cover (acres).
    - Imaging from Google Earth with leaf-on may be used. Project operators will calculate the percent of canopy cover from the Google Earth imaging
    - Projects can use i-Tree Canopy and point sampling to calculate canopy cover. Using i-Tree Canopy, continue adding points until the standard error of the estimate for both the tree and non-tree cover is less than 5%. i-Tree Canopy will supply you with the standard errors.
    - If tree canopy cover is determined using another approach, such as image classification, a short description of the approach should be provided, as well as the QA/QC measures that were used. A tree cover classification accuracy assessment should be conducted, as with randomly placed points, and the percentage tree cover classification accuracy reported.

- Progress Requirements for Issuance of Credits in Years 4 and 6:

    - At Year 4, projects must show canopy coverage of at least 2.8% of the Project Area (400 trees per acre with an average canopy area of 3.14 square feet per tree (2-foot diameter of canopy) is 2.8% of an acre)
    - At Year 6, projects must show canopy coverage of at least 26% of the Project Area (400 trees with an average canopy area of 28.26 square feet per tree (6-foot diameter of canopy) is 26% of an acre)

Note: if projects exceed these Progress Requirements, they will not receive credits early or out of schedule. If projects fail to meet the Progress Requirements, they will not be eligible to request credits until they meet the Progress Requirements.

TREES PER ACRE METHOD

- Select 60 plots within the project area. This can be done using i-Tree Canopy and downloading plot center coordinates, or by travelling to the project area, choosing a random starting point, and walk a grid that locates at least 60 plots within the project area, well distributed across the project area. If locating the plots in the field, record the coordinates of each plot center. The Registry can provide examples of methods for determining the grid spacing and doing a random start.
- Mark each plot center with flagging, with the plot number written on the flagging. For a circular plot with 11.78’ radius measured horizontally from plot center (not slope distance). This 11.78’ radius makes a 1/100 acre plot.
- Count the number of live trees on the plot, counting only tree species that typically will reach 6” DBH by age 25 under the conditions present within the project area.

- Calculate the average number of trees per plot. Multiply the average number of trees per plot by 100. This is the average number of trees per acre present on the project.
- Divide the number of trees per acre on the project area by 400. This is the fraction canopy cover expected to be achieved by age 25.
- Multiply the fraction canopy cover expected to be achieved by age 25 by the live tree carbon stock (in metric tons of carbon per acre) at age 25 from the appropriate afforestation table in US Forest Service GTR NE-343. This is the carbon stock expected to be present at age 25. Multiply this expected carbon stock by 3.67 to calculate the expected carbon stock in metric tons CO_2e per acre.
- Report to the Registry:
    - The method used to locate plot centers.
    - Plot center coordinates.
    - Plot data, specifically the number of trees on each plot, by plot.
    - The average number of trees per acre calculated from plot data.

To count as fully stocked, at Year 6 (after five years of growth since planting) the project must have 400 surviving trees per acre of species that typically will reach 6" DBH by age 25 under the conditions present within the project area.

If 200-400 trees per acre are surviving at Year 6, predicted carbon sequestration is adjusted by multiplying the predicted carbon stock for full stocking at age 25 times the fraction (live trees per acre divided by 400). If the project has fewer than 200 trees per acre at Year 6, the CFC "single tree" quantification tool should be used.

QUANTIFICATION AT END OF YEAR 25

- Project may calculate Trees Per Acre as described above, or
- Project provides images of the Project Area from any telemetry, imaging, remote sensing, i-Tree Canopy, or UAV service, such as Google Earth and estimate the area in tree canopy cover (acres).
    - Projects can use i-Tree Canopy and point sampling to calculate canopy cover. Using i-Tree Canopy, continue adding points until the standard error of the estimate for both the tree and non-tree cover is less than 5%. I-Tree Canopy will supply you with the standard errors.
    - If tree canopy cover is determined using another approach, such as image classification, a short description of the approach should be provided, as well as the QA/QC measures that were used. A tree cover classification accuracy assessment should be conducted, as with randomly placed points, and the percentage tree cover classification accuracy reported.
    - Project calculates total CO_2 storage at end of Year 25 as follows:
        - Multiply the CI (carbon index times the acres of TC (tree canopy) in the Project Area.

References

Barr, Kanlaya J., Bruce A. Babcock, Miguel Carriquiry, Andre Nasser, and Leila Harfuch. 2010. "Agricultural Land Elasticities in the United States and Brazil." CARD Working Papers. 519. http://lib.dr.iastate.edu/card_workingpapers/519

Smith, James E.; Heath, Linda S.; Skog, Kenneth E.; Birdsey, Richard A. 2006. Methods for calculating forest ecosystem and harvested carbon with standard estimates for forest types of the United States. Gen. Tech. Rep. NE-343. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northeastern Research Station. 216 p.

Carbon & Cobenefit Quantification Year 4 Credit Tool

GHG Emissions

						10%	40%	30%	20%
	Acres	**CO2 index (tCO2e/acre)**	**GHG Emissions (tCO2e)**	**5% Buffer Pool Deduction**	**Grand Total CO2 w/ Deductions (t)**	**Year 0 10% CO_2 (t)**	**Year 4 40% CO_2 (t)**	**Year 6 30% CO_2 (t)**	**After Year 25 20% CO_2 (t)**
Total GHG Reductions	40.00	133.2	5,328	266.4	5,062	506	2,025	1,519	1,012
				Credits issued	5062	506	2025	1519	1012
				Buffer Calc	266	26.6	106.6	79.9	53.3
				Buffer Credits Issued	266	27	107	80	52

Light pink background denotes an input cell ->

Directions
1) Use i-Tree Canopy, or another tool, to estimate the amount of deciduous and coniferous tree cover area (acres) (Cell C18 and D18).
2) Use i-Tree Canopy, or another tool, to estimate the amount of non-tree cover area (acres) (Cell F18) in the project area.
3) In Cell G18 the total area of the project is calculated (acres). Prompt i-Tree Canopy to provide an estimate of the project area by clicking on the gear icon next to the upper right portion of the image and selecting ”Report By Area.”
4) Total Project Area, cell G15 should equal 100%.

Table 1. Tree Cover

	Deciduous Tree Cover	Coniferous Tree Cover	Total Tree Cover	Non-Tree (	Total Project Area
Percent (%)	100%	0%	100%	0%	100%
Area (sq miles)	0.063	0.000	0.063	0.000	0.06
Area (m2)	161,873	0	161,873	0	161,873
Area (acres)	40	0.00	40.00	0.00	40.00

Using the information you provide on tree canopy cover, the tool provides estimates of co-benefits in Resource Units and $ per year.

Table 2. Co-Benefits per year with current tree canopy cover.

Ecosystem Services	Resource Units Totals	Res Unit/Acre Tree Canopy	Total $
Rain Interception (m3/yr)	10,820.4	270.5	$77,472.17
Air Quality (t/yr)			
O3	0.2065	0.0052	$312.81
NOx	0.0345	0.0009	$52.20
PM10	0.1056	0.0026	$136.10
Net VOCs	0.1063	0.0027	$180.76
Air Quality Total	0.4529	0.0113	$681.87
Energy (kWh/yr & kBtu/yr)			
Cooling - Elec.	85,177	2,129	$6,464.96
Heating - Nat. Gas	1,592,668	39,817	$15,504.27
Energy Total ($/yr)			$21,969.23
Grand Total ($/yr)			$100,123.27

Attestation of Additionality

CITY FOREST CREDITS

Fox River Bluffs Planting Project
Attestation of Additionality

I am the Executive Advisor of the Kendall County Forest Preserve District and make this attestation regarding additionality from this tree planting project, Fox River Bluffs Planting Project.

- Project Description
  - The Project that is the subject of this attestation is described more fully in both our Application and our Project Design Document (PDD), both of which are incorporated into this attestation.
- Legal Requirements Test (Protocol Section 4.1)
  - Project trees are not required by law or ordinance to be planted.
- The Project did not plant trees on sites that were converted out of a forest use or that were cleared of healthy trees and then planted with project trees (Protocol Section 4.2)
- Project-Specific Baseline or Performance Standard Baseline
  - Project trees are additional based on a project specific baseline. See PDD; or
  - Project trees are additional based on the Performance Standard baseline; see attached baseline to the PDD.
- Project Implementation Agreement for Project Duration
  - Kendall County Forest Preserve District has signed a Project Implementation Agreement with City Forest Credits for 25 years.
- The 25-year Project Duration commitment is additional to and longer than any commitment Kendall County Forest Preserve District makes to non-carbon project tree plantings.

Signed on December 11, 2023, by David Guritz, Executive Advisor, for Kendall County Forest Preserve District.

David Guritz

Signature

David Guritz

Printed Name

630 553 4025

Phone

kcforest@kendallcountyil.gov

Email

CO2 Index Determination

Fox River Bluffs Carbon Quantification Process, Data, and Calculations[1]

In compliance with the Area Reforestation method approved by CFC, the District obtained approval from CFC to sample a 25-year planting of the same oak forest as the project trees. This sampling of 25-year trees of the same species in the same metropolitan region would constitute the most accurate projection of CO_2 storage for the project trees.

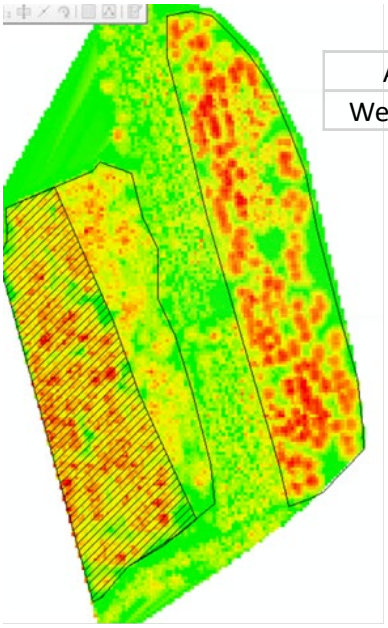
In fall 2020, KCFPD conducted sampling and measurement of DBH at Hoover Forest Preserve, Kendall Township, of a 25-year old grove of row-planted oak trees planted approximately 8' – 10' on center to extrapolate growth projections and CO_2 storage for the first 25-years for the trees planted at Fox River Bluffs Forest Preserve.

The planted grove of trees sampled and measured at Hoover Forest Preserve were planted in 1995 by the Boy Scouts of America under supervision of Tom Gargrave, Illinois Department of Natural Resources State Forester. Student EcoClub volunteers sponsored by Scott Johnson, Environmental Science Teacher from Oswego East High School SD 308, Oswego, Illinois collected DBH measures for the trees planted at Hoover Forest Preserve. The EcoClub students were trained and supervised by David Guritz, Executive Director of the Kendall County Forest Preserve District, and Stefanie Wiencke, Natural Beginnings Early Learning Program and Special Projects Manager. Students were instructed to capture DBH (diameter at breast-height) measures for each of the trees in each of the planted rows, identify the tree species as Oak sp., Pine, or other, and measure distances between planted trees, denoting suspected tree mortality as evidenced by gaps within the planted tree rows, and documented missing individual trees on the data sheets provided. Students completed the field work using the data collection form templates, with the final Excel data compilation spreadsheet completed under the supervision of Scott Johnson, Environmental Science Teacher and EcoClub Sponsor at Oswego East High School.

Field data was entered into the Excel workbook for analysis. The field data records and final spreadsheet was examined for accuracy, with the original data records maintained by the Kendall County Forest Preserve District. We refer to this as the Quantification Workbook because it contains the data and calculations for quantification of CO_2. Based on site conditions, it was determined that the first 20-rows (west to east) of oak trees planted at Hoover Forest Preserve would serve as the comparable grove size in order to extrapolate growth projections at Fox River Bluffs Forest Preserve.

Lindsay Darling, GIS Administrator for The Morton Arboretum's Chicago Region Trees Initiative provided a GIS calculated average height of 26.59 feet for the tree canopy for rows 1-20 (shaded) on January 15, 2021.

[1] Text adapted from Fox River Bluffs Initial Crediting Project Design Document, submitted 12/7/2021 and verified 12/10/2021.



Area	MaxHeight_ft	AverageHeight_ft	PatchArea_sqft
WestWest	60.552368	26.590263	93479.31347

Based on the GIS height study, the height for trees in the westernmost polygon (shaded - all planted Oak sp.) averages 26.59 ft., with a height maximum of 60.55 ft. Within the west polygon, field observations confirm the GIS analysis- that oak tree heights within the study area generally decreases within the rows as the observer travels from west to east.

For the purposes of comparison to the Fox River Bluffs tree planting project, and based on the collected data for the first 20-rows (hatched area in left figure) of oaks located within the west polygon, the average DBH is 8.6".

Average spacing between planted trees within the first 20-rows was 15' 8", with an estimated original planted-stock tree estimate (which includes presumed mortality) of 843, with 594 standing trees remaining after 25-years (mortality =30%).

In short, the resulting figures presented above are consistent with our field observations. Limiting comparative data to only include the first 20-rows within the west polygon factors out the stunted Oak sp. growth from the planted pine rows' shade impacts within the eastern section of the polygon.

Final data collected for the first 20-rows of the 25-year grove at Hoover Forest Preserve was sent to CFC scientists to review the sampling and complete sequestered carbon calculations for the 93,478.3 sq. ft. (+/- 3.27 acres) planted area (Planted Rows 1-20) at Hoover Forest Preserve. The sample data described above was based on student collected data and GIS-average height data provided by Lindsay Darling, PhD student - Purdue University and GIS Administrator - Chicago Region Trees Initiative and Center for Tree Science Fellow at The Morton Arboretum.

Based on the CFC scientist's calculations, the planted oak trees at Hoover Forest Preserve yield 109.9 tCO_2e total biomass sequestration through age 25 above ground and below.

A brief summary of calculation methodology is provided below:

The DBH measures for each tree were used to calculate above ground biomass, dry weight, in kg.

Equations for estimating tree biomass from tree size are from Jenkins, Jennifer C.; Chojnacky, David C.; Heath, Linda S.; Birdsey, Richard A. 2004. Comprehensive database of diameter-based biomass regressions for North American tree species. Gen. Tech. Rep. NE-319. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northeastern Research Station. 45 p.

The above-ground biomass was converted to above-ground carbon and then to CO_2 e. The District, with approval from CFC, applied a 0.20 factor to above-ground carbon to obtain below-ground live carbon (non-soil). The sum of the above-ground CO_2 and the below-ground CO_2 was calculated at 109.9tCO_2/acre

Per the Area Reforestation methodology, soil carbon can be credited if the site has been in active tillage for at least three of the ten years prior to planting. The Area Reforestation methodology gives a standard soil carbon index of 23.3 metric tons CO_2(e). In order to calculate total CO_2e sequestration for

the project, the standard soil carbon index of 23.3 per acre is added to the total above ground and below ground measures, for a total per acre of 133.2.

From this figure, a deduction of 5% of the total project credits is taken for the reversal pool, so credit issuance to the project for the Fox River Bluffs Planting Project is 126.54 tCO_2e per acre through age 25.

With 40 acres planted for crediting, the total GHG emissions removals projected for this project is 5,328. After the deduction for the reversal pool maintained by CFC, the credits issuable to the District are 5,062 tCO2e.