City of Des Moines Urban Tree Planting 2023 Initial Project Design Document

Table of Contents

PROTOCOL REQUIREMENTS

Project Operator (Section 1.1)
Identify a Project Operator for the project. A Project requires one Project Operator, which can be an entity organized and licensed under the laws of its jurisdiction or a governmental body. This is the entity who takes legal responsibility for the project and its reporting.

Commit to 26-year Project Duration in the Project Implementation Agreement (Section 1.3, 2.2)
Sign the Project Implementation Agreement. This is the 26-year agreement between the Project Operator and City Forest Credits (the "Registry") for an urban forest carbon project.

Project Location (Section 1.4)
Project must be located in or along the boundary of one of the following:

A. "Urban Area" per Census Bureau maps;
B. The boundary of any incorporated city or town created under the law of its state;
C. The boundary of any unincorporated city, town, or unincorporated urban area created or designated under the law of its state;
D. The boundary of any regional metropolitan planning agency or council established by legislative action or public charter;
E. The boundary of land owned, designated, and used by a municipal or quasi-municipal entity for source water or watershed protection;
F. A transportation, power transmission, or utility right of way, provided the right of way begins, ends, or passes through some portion of above criteria.

Ownership or Eligibility to Receive Potential Credits (Section 1.7)
The Project Operator must demonstrate ownership of property and eligibility to receive potential credits by meeting at least one of the following:

A. Own the land, the trees, and potential credits upon which the Project trees are located; or
B. Own an easement or equivalent property interest for a public right of way within which Project trees are located, own the Project trees and credits within that easement, and accept ownership of those Project trees by assuming responsibility for maintenance and liability for them; or
C. Have a written and signed agreement from the landowner granting ownership to the Project Operator of any credits for carbon storage or other benefits delivered by Project trees on that landowner's land. If Project trees are on private property, this agreement, or notice thereof, must be recorded in the property records of the county in which the land containing Project trees is located.

Defining the Project Area (Section 1.5)
Project Operators may include more than one planting site in a project. The initial planting of trees for all properties in a project must occur within a 36-month period or less. Project Operators may include multiple properties under one project.

Additionality (Section 4)
Project Operators must demonstrate compliance with the following additionality requirements:

- A Legal Requirements Test that declares city trees planted due to an enacted law or ordinance not eligible (Section 1.8);

- Either 1) a project-specific baseline or 2) the current version of the Registry's performance standard baseline developed in adherence with the WRI GHG Protocol (CFC Standard);
- Sign and comply with a Project Implementation Agreement with the Registry that requires a 26-year Project Duration.

Project Operators must also sign an Attestation of Additionality stating that its 26-year Project Duration commitment is additional to and longer than any commitment it makes to non-carbon project tree plantings.

Planting Designs and Quantification for Credits (Section 1.2, 10, Appendix A)
All Projects must use one of three different methods for quantifying CO_2. The quantification method used depends on the planting design. The Registry has developed spreadsheets and methods for Project Operators. The quantification methods include:

- Single Tree Quantification Method: trees planted in a dispersed or scattered design that are planted at least 10 feet apart (i.e. street trees). This method requires tracking of individual trees and tree survival for sampling and quantification.
- Clustered Quantification Method: trees planted at least 10 feet apart but are relatively contiguous and designed to create canopy over an area (i.e. park-like settings). This method requires tracking change in canopy, not individual tree survival.
- Area Reforestation Quantification Method: tree planting areas greater than 5 acres and where many trees are planted closer than 10 feet. Higher tree mortality is expected and the goals are to create canopy and a forest ecosystem. Project Operators have several quantification models to choose from, all of which produce a carbon index on a per-acre basis.

Attestation of No Net Harm and No Double Counting (Section 5)
Project Operators must sign an attestation that no project shall cause net harm and no project shall seek credits on trees, properties, or projects that have already received credits. The Project Operator must submit documentation showing no overlap of Project Trees or Project Area with any other registered urban forest carbon project.

Social Impacts (Section 11)
Project Operators will describe how the Project impacts contribute towards achievement of the global UN Sustainable Development Goals (SDGs). The Registry will supply a template to evaluate how the Project aligns with the SDGs.

Validation and Verification by Third-Party Verifiers (Sections 12)
Project compliance and quantification must be verified by a third-party verifier known as a Validation and Verification Body approved by the Registry. Protocol Appendix B provides more detail.

Issuance of Ex Ante City Forest Carbon Forward Removal Credits to Project Operator (Section 6)
The forecasted amount of CO_2 stored during the project duration is the value from which the Registry issues ex ante City Forest Carbon Forward Removal Credits™. To ensure performance of the credits, the Registry issues credits at five times during the 26-year Project Duration:

- 10% of projected credits after planting
- 30% of projected credits at Year 4

- 30% of projected credits at Year 6
- 10% of projected credits at Year 14
- Remaining credits issued based on quantification of CO_2e at Year 26

Credits for Reversal Pool Account (Section 6.2)
The Registry will issue 95% of Project credits earned and requested and will hold 5% in the Registry's Reversal Pool Account.

Understand Reversals (Section 8)
If the Project Area loses credited carbon stock, the Project Operator must return or compensate for those credits if the tree loss is due to intentional acts or gross negligence of Project Operator. If tree loss is due to fire, pests, or other acts of god (i.e., not due to the Project Operator's intentional acts or gross negligence), the Registry covers the reversed credits from its Reversal Pool Account of credits held back from all projects.

Commit to Monitoring and Reporting (Section 7)
Project Operators must submit an annual monitoring report to the Registry every year for the Project Duration. The reports must be in writing, and the Project Operator must attest to the accuracy of the reports.

Tree Sampling, Measurement, and Imaging Requirements (Appendix A)
To ensure performance of the credits, Project Operators must commit to the following at Years 4, 6, 14, and 26 based on the appropriate quantification method.

Single Tree

1) Initial Credit: Use the carbon quantification tool which contains a worksheet called "Data Collection" for use in tracking each tree. In that file or another tree inventory system, document the GPS coordinates for each tree planted.
2) Years 4 and 6: 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. 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.
    a. Based on this data, the number and species of project trees is adjusted and a new CO2 projected amount by Year 26 is generated.
3) Year 14: Project Operators must follow the same process as stated above for Years 4 and 6, except they must also measure DBH on the sample of trees. The DBH will be used to ensure growth curve consistent with the projected CO2 storage at Year 26.
    a. If the actual growth curves of project trees are less than was projected, the number of credits issued at Year 14 will be adjusted downward.
4) Year 26: Project Operators must generate a random sample of project trees and measure DBH on the sample of trees. The DBH will be used to calculate CO2 storage at that time. Project Operators must also submit geocoded photos of the sampled trees.
    a. Credits may be issued based on the actual CO2 storage at Year 26, minus credits already issued.

INSTRUCTIONS

Project Operators must complete and submit this Initial Credit Project Design Document (PDD) to request credits after the last tree in a project has been planted. 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 amendment to the Project Design Document will need to be submitted for future verification at years 4, 6, 14, and 26.

The Protocol Requirements below are a list of eligibility requirements for informational purposes which are also found in more detail in the CFC Afforestation/Reforestation Protocol Version 11, dated February 24, 2023.

Project Operators should enter data and supporting attachments starting on page 9 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 project:

1. Regional Map
2. Project Area Map
3. Project Area Geospatial Data (shapefile or KML file)
4. Attestation of Land Ownership or Agreement to Transfer Credits
5. Attestation of Planting
6. Attestation of Planting Affirmation
7. Attestation of Additionality
8. Attestation of No Net Harm and Attestation of No Double Counting of Credits
9. No Double Counting Evidence
10. Carbon Quantification Initial Credits Tool
11. Tree Data (list of trees planted with species, date of planting, GPS coordinates, tree ID and site ID)
12. Social Impact Report
13. Project or Performance Standard Baseline (Appendix A)
14. Quantifying Carbon Dioxide Storage and Co-Benefits (Appendix A)

PROJECT OVERVIEW

Project Name: City of Des Moines Urban Tree Planting 2023
Project Number: 051
Project Type: Planting Project (under the Afforestation and Reforestation Protocol – version 11, dated February 24, 2023)
Project Start Date: 11/4/2023
Project Location: Des Moines, IA
Project Operator Name: Trees Forever
Project Operator Contact Information:
Megan Schneider, Director of Programs Des Moines, mschneider@treesforever.org, 515-776-0335

Project Description
Describe overall project goals as summarized in the Project Application (2 paragraphs max). Include how many trees were planted, where trees were planted, and the date range for when trees were planted.

This project includes 1,945 trees that were planted throughout the City of Des Moines from April 1, 2023 to November 30, 2023. Tree planting locations are a mix of street tree plantings on city-owned rights-of -way and city-owned parks, but with the major focus on street tree plantings. The main species planted include flowering crabapple, lilac, tulip tree, redbud and greenspire linden species.

Trees Forever plants trees on behalf of the City of Des Moines and works closely with the City on all aspects of the planting including identifying sites to plant, communication with area citizens, and general promotion of the work The main project goals are to increase tree equity across the city by targeting trees to under-resourced neighborhoods, work with Trees Forever's Growing Futures teen employees and area volunteers to plant trees, and to complete major street corridor plantings.

Throughout 2023, Trees Forever will plant and care for trees through the Growing Futures program, a youth-centered worker program, to address critical social, economic, and environmental needs in Des Moines. Growing Futures uses a thoughtfully designed and hands-on approach to give Iowa's young people needed workplace skills and open doors for them to green careers all while planting trees.

LOCATION (Section 1.4)

Project Location
Describe the city, town, or jurisdiction where the Project is located. State which urban location criteria is met from Protocol Section 1.4.

This project falls within the limits of the City of Des Moines, an incorporated city. Des Moines, IA is also considered an urban area as identified by the Census Bureau Map. The urban cluster code for Des Moines is 23743.

Project Area Maps

Provide three maps of the Project Area that illustrate the location: geospatial location, regional, and detailed. Maps should include project title, relevant urban or town boundaries, and indicate where trees were planted, and a legend. If the number of trees planted is too dense to show as single points, they can be represented as a heat map or graduated colors map. Include numbered filename of attachments (Ex: 1 Regional Map).

- Project Area Map
  Location of planting sites for Single Tree, boundaries of Project Area for Cluster or Area Reforestation, provide as KML, KMZ, or shapefile format
  Attachment: *1 Des Moines 2023 Project Area Map*

- Regional Map
  Attachment: *2 Des Moines 2023 Regional Area Map*

- Shapefiles
  Attachment: *3 Des Moines 2023 Shapefiles*

OWNERSHIP OR ELIGIBILITY TO RECEIVE POTENTIAL CREDITS (Section 1.7)

Project Operator must demonstrate ownership of potential credits or eligibility to receive potential credits. If the Project Operator is not the same as the landowner of the Project Area, provide agreement(s) between Project Operator and landowner authorizing Project Operator to execute this project. Include relevant documentation including numbered filename as an attachment.

Name of landowner of Project Area and explanation:
All tree plantings occurred on City of Des Moines owned property – along city streets and within city parks. A signed Agreement from Owner to Transfer Credits is on file at City Forest Credits. Attachment 4, noted below, runs in duration through 2030.

Attachment: *4 Des Moines 2023 Agreement to Transfer Credits*

PROJECT DURATION (Section 1.3, 2.2)

Project Operator commits to the 26-year project duration requirement through a signed Project Implementation Agreement with City Forest Credits and agrees to the statement below.

Project Operator has committed to the 26-year project duration and signed a Project Implementation Agreement with City Forest Credits on December 14, 2023.

ATTESTATION OF PLANTING AND PLANTING AFFIRMATION (Section 3)

Complete and attach the following attestations: 1) Attestation of Planting, including supporting documentary evidence of how trees were paid for and who planted them such as invoices and event photos, 2) Attestation of Planting Affirmation, signed by a representative of a participating organization that can attest to the tree planting. Provide any additional notes as relevant.

Project Operator has signed the Attestation of Planting and provided supporting documentary evidence of planting. A participating organization in the tree planting, City of Des Moines, has signed the Planting Affirmation.

Attachments:
5 Des Moines 2023 Attestation of Planting
6 Des Moines 2023 Attestation of Planting Affirmation

ADDITIONALITY (Section 4)

Additionality is demonstrated by the Project in several ways, as described in the City Forest Credits Standard Section 4.9.2 and Afforestation and Reforestation Protocol. Complete and attach 1) Attestation of Additionality and 2) Project-specific baseline or Performance Standard Baseline. If Project Operator elects to use it, the Performance Standard Baseline is provided as Attachment 11 to this PDD.

Additionality is demonstrated by Project Operators per the Protocol in the following ways and in the Attestation of Additionality.

- Project trees are not required by law or ordinance to be planted (Protocol Section 1.8). 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 (Protocol Section 1.9)
- Project trees are additional based on a project-specific baseline or the Performance Standard Baseline attached to this PDD.
    - The City of Des Moines Urban Forest Master Plan includes attachment 12.B., the Sustainability Report Card Chart, shows that as of August 1, 2020, the tree canopy is not dropping, but is not on track to achieve the DNR-established goal of 3% canopy increase by 2045. In fact, meeting the 3% goal would require quintupling the planting budget. This document is included as Attachment 7b.
    - Additionally, Des Moines experienced a powerful derecho storm in mid-August, 2020. Though the City does not have quantitative data on tree loss after the storm, the City is aware that many trees were lost throughout Des Moines and surrounding areas. Although city-specific data is lacking, the Iowa Department of Natural Resources estimates that Polk County, where the city of Des Moines is located, lost an estimated 642,348 trees. This document is also included in Attachment 7b.
- Project Operator has signed a Project Implementation Agreement with City Forest Credits for 26 years.
- The 26-year Project Duration commitment is additional to and longer than any commitment our organization makes to non-carbon project tree plantings.
- Project Operator has signed the Attestation of Additionality.
- The revenue from the sale of carbon credits will play a material role in the successful and durable storage of Project Trees' carbon stock by providing funding that will help ensure the establishment and long-term health of Project Trees. Trees Forever will reinvest carbon revenues to plant and care for additional trees in the Des Moines metro area, which include two years of maintenance and care.

Attachment: *7 Des Moines 2023 Planting Attestation of Additionality*

Attachment: *14 Performance Standard Baseline Methodology*

PLANTING DESIGN AND CARBON QUANTIFICATION DOCUMENTATION (1.2, 10, Appendix A)

Describe the planting design and appropriate quantification method for the project – Single Tree, Clustered, or Area Reforestation. Include the project's climate zone and data collection. Outline the estimated total number of credits to be issued to the project over 26 years as well as the amount to be issued upon successful validation and verification in Year 1. Attach the quantification tool and provide the data you have collected for Project Trees.

Total number of trees planted	1,945
Project area (acres), if applicable	N/A
Total number of trees per acre, if applicable	N/A
Credits attributed to the project (tCO2e)	4,592
Credits after mortality deduction (20%)	3,674
Contribution to Registry Reversal Pool Account (5%) (tCO2e)	184
Total credits to be issued to the Project Operator (tCO2e)	3,490
Total credits requested to be issued in Year 1 (10% of above)	349

GHG Assertion:
Project Operator asserts that the Project results in GHG emissions mitigation of 3,490 tons CO_2e over the 26-year Project Duration. Project Operator will provide tree survival and growth data, quantify tons CO_2e, and submit documentation for validation, verification, and credit issuance at Years 4, 6, 14, and 26, per the Afforestation and Reforestation Planting Protocol and Single Tree Planting Design and Quantification Method.

Project Operator asserts that the Project results in GHG emissions mitigation of 349 tons CO_2e after initial tree planting.

Explanation of Planting Design:
The single-tree dispersed planting design was used (spaced 16.5' or more apart, i.e. street trees or linear plantings) to plant 1,945 trees in the City of Des Moines, Iowa, which is within the Midwest climate zone. Tree data was collected on site during each planting and logged into TreeKeeper8, the City of Des Moines' tree planting database and GIS system. Data includes species, date of planting, DBH, warranty date, and all watering events for the first two years post planting.

Attachments:
8 Des Moines 2023 Midwest Single Tree Initial Credit Tool
9 *Des Moines 2023 Tree Planting Data*

CO-BENEFITS QUANTIFICATION DOCUMENTATION (Section 10 and Appendix A)

Summarize co-benefit quantification per year and provide supporting documentation. The Single Tree Initial Credit tool includes a Co-Benefits Quantification calculator for quantifying rainfall interception, reduction of certain air compounds, and energy savings.

Ecosystem Services	***Resource Units***	***Value***
Rainfall Interception (m3/yr)	8,483.43	$60,733.39
Air Quality (t/yr)	0.2713	$1,208.95
Cooling – Electricity (kWh/yr)	282,150.29	$21,415.21
Heating – Natural Gas (kBtu/yr)	4,076,932.66	$39,687.85
Grand Total ($/yr)		$123,045.39

Co-benefits were quantified using CFC's Co-Benefits Quantification Calculator. These ecosystem services represent values in avoided costs of $123,045.39 annually when the trees reach 25 years of age.

Attachment: *8 Des Moines 2023 Midwest Single Tree Initial Credit Tool*

ATTESTATION OF NO DOUBLE COUNTING OF CREDITS AND NO NET HARM (Section 5)

Complete and attach the following attestation: 1) Attestation of No Double Counting of Credits and Attestation of No Net Harm. Provide a map that includes both the Project Area and the closest registered urban forest afforestation or reforestation project based on the registered urban forest planting project database KML/Shapefile provided by CFC to demonstrate that the Project does not overlap with any existing urban forest carbon projects.

Project Operator has completed a check against the registered planting projects database using XY coordinates recorded at the time of planting and determined that there is no overlap of Project Trees with any registered urban forest afforestation or reforestation carbon project.

Project Operator has signed the Attestation of No Double Counting of Credits and No Net Harm on January 11, 2024.

Attachment: *10 Des Moines 2023 Attestation of No Double Counting and No Net Harm*
10a Des Moines 2023 No Double Counting Evidence

SOCIAL IMPACTS (Section 11)

*Project Operators shall use the Carbon Project Social Impacts template to evaluate how their Project aligns with the UN Sustainable Development Goals (SDGs). CFC will provide the template. Summarize the three to five main SDGs attributed to this Project.*Trees Forever plants trees in low canopy areas and open spaces, with a focus on broad leaf species, which have better capacity to sequester air pollutants. Planting trees in open spaces provides shade and protection from UV exposure as well as

helping to reduce urban heat effects. Biodiversity is taken into consideration when selecting species that are best suited for the Des Moines urban environment. Trees are planted around schools and along busy streets to help slow traffic, as buffers along the regional trail system, and near streets to help with stormwater runoff. As part of the planting planning process, Trees Forever identifies areas with high tree inequity, particularly in formerly redlined neighborhoods, and focuses on incorporating these areas into the overall annual plan.

Trees Forever encourages nature experiences through educational tree tags that link individual trees with a City of Des Moines hosted database in order to learn more about benefits of trees and individual species. TreeKeepers, skilled volunteers trained in tree planting and care, are engaged through plantings and community engagement events focused on continuing education.

Trees Forever intends to reduce inequalities through engaging in community partnerships, planting trees in low-income areas (particularly previously redlined areas of the city), and organizing plantings around schools, affordable housing development, and in areas with low tree canopy. Staff engage residents and community leaders with project design when possible. A three-session TreeKeeper course for community volunteers is offered twice a year. Participants learn to plant, prune, and care for trees in the community, and are relied upon as skilled volunteers for subsequent plantings and community engagement events.

The City of Des Moines was awarded $2.5 million in Inflation Reduction Act funding, of which Trees Forever will partner to spend $1.5 million. This funding is restricted to underserved communities, which includes a large portion of the Des Moines metro urban core.

A series of community meetings were held in conjunction with Des Moines neighborhood representatives. Residents were engaged in the creation of a neighborhood planting map, and a plan for tree care that included volunteer watering by community members. Trees Forever prioritizes hiring students from local high schools for the Growing Futures employment program and works with local contractors for additional watering needs.

Attachment: *11 Des Moines 2023 Social Impacts*

MONITORING AND REPORTING (Section 7)

Throughout the Project Duration, the Project Operator must report on tree conditions across the Project Area through annual reports and with more detailed data at Years 4, 6, 14, and 26.

Monitoring Reports

Project Operator is required to submit an annual monitoring report on the anniversary of the date of the first Verification Report. For example, if the verification report is dated January 31, 2023, the first monitoring report will be due by January 31, 2024 and each January 31st thereafter for the duration of

the project. CFC will provide the due dates for future monitoring reports to Project Operators after the first verification report is approved. Project Operators must submit reports in writing and must attest to the accuracy of the reports. The reports must contain any changes in eligibility status of the Project Operator and any significant tree loss. The information includes updates to land ownership, changes to project design, changes in implementation or management and changes in tree or canopy loss.

Future Project Design Documents and Reporting
Project Operator is required to submit an updated Project Design Document at Years 4, 6, 14, and 26, as well as sampling, measurement of trees or canopy coverage, and/or quantification of CO_2e. Project Operators will submit the updated documentation for request of credit issuance in lieu of a monitoring report that year.

Monitoring Plans
Confirm and describe your plans for annual monitoring of this project and specifics on how sampling, measurement, and imaging (see Protocol Requirements and Appendix A) will be conducted based on your project's quantification method.

All trees planted enter into a two-year watering cycle that helps ensure establishment of the young trees and long-term survival. Watering is completed throughout the summer months by Growing Futures teen employees. Trees Forever will submit monitoring reports containing the required information using the template provided by City Forest Credits. Monitoring will take place through imaging and can be easily tracked utilizing the unique tree ID number that the tree inventory system – TreeKeeper – produces. The unique ID number will correspond with the geo-coded image.

PROJECT OPERATOR SIGNATURE

Signed on March 7 in 2024, by Debra Powers, Interim CEO, for Trees Forever.

Debra M. Powers
Signature

Debra M. Powers
Printed Name

563-275-9643
Phone

dpowers@treesforever.org
Email

ATTACHMENTS

Update the attachments list as appropriate for your project.

1. Des Moines 2023 Project Area Map
2. Des Moines 2023 Regional Area Map
3. Des Moines 2023 Shapefile
4. Des Moines 2023 Agreement to Transfer Credits

5. Des Moines 2023 Planting Attestation
6. Des Moines 2023 Attestation of Planting Affirmation
7. Des Moines 2023 Attestation of Additionality
7b. Des Moines Report Card Chart & Derecho Report
8. Des Moines 2023 Midwest Single Tree Initial Credit Tool
9. Des Moines 2023 Tree Planting Data
10. Des Moines 2023 Planting Attestation of No Double Counting and No Net Harm
10a. Des Moines 2023 No Double Counting Evidence
11. Des Moines 2023 Social Impacts

Attachment 13

PERFORMANCE STANDARD BASELINE METHODOLOGY (Section 4)

There is a second additionality methodology set out in the WRI GHG Protocol guidelines – the Performance Standard methodology. This Performance Standard essentially allows the project developer, or in our case, the developers of the protocol, to create a performance standard baseline using the data from similar activities over geographic and temporal ranges.

The common perception, particularly in the United States, is that projects must meet a project specific test. Project-specific additionality is easy to grasp conceptually. The 2014 Climate Action Reserve urban forest protocol essentially uses project-specific requirements and methods.

However, the WRI GHG Protocol clearly states that either a project-specific test or a performance standard baseline is acceptable.[1] One key reason for this is that regional or national data can give a more accurate picture of existing activity than a narrow focus on one project or organization.

Narrowing the lens of additionality to one project or one tree-planting entity can give excellent data on that project or entity, which data can also be compared to other projects or entities (common practice). But plucking one project or entity out of its regional or national context ignores all comparable regional or national data. And that regional or national data may give a more accurate standard than data from one project or entity.

By analogy: one pixel on a screen may be dark. If all you look at is the dark pixel, you see darkness. But the rest of screen may consist of white pixels and be white. Similarly, one active tree-planting organization does not mean its trees are additional on a regional basis. If the region is losing trees, the baseline of activity may be negative regardless of what one active project or entity is doing. Here is the methodology described in the WRI GHG Protocol to determine a Performance Standard baseline, together with the application of each factor to urban forestry:

Table 2.1 Performance Standard Factors

WRI Performance Standard Factor	As Applied to Urban Forestry
Describe the project activity	Increase in urban trees
Identify the types of candidates	Cities and towns, quasi-governmental entities like utilities, watersheds, and educational institutions, and private property owners
Set the geographic scope (a national scope is explicitly approved as the starting point)	Could use national data for urban forestry, or regional data
Set the temporal scope (start with 5-7 years and justify longer or shorter)	Use 4-7 years for urban forestry
Identify a list of multiple baseline candidates	Many urban areas, which could be blended mathematically to produce a performance standard baseline

[1] WRI GHG Protocol, Chapter 2.14 at 16 and Chapter 3.2 at 19.

The Performance Standard methodology approves of the use of data from many different baseline candidates. In the case of urban forestry, those baseline candidates are other urban areas.[2]

As stated above, the project activity defined is obtaining an increase in urban trees. The best data to show the increase in urban trees via urban forest project activities is national or regional data on tree canopy in urban areas. National or regional data will give a more comprehensive picture of the relevant activity (increase in urban trees) than data from one city, in the same way that a satellite photo of a city shows a more accurate picture of tree canopy in a city than an aerial photo of one neighborhood. Tree canopy data measures the tree cover in urban areas, so it includes multiple baseline candidates such as city governments and private property owners. Tree canopy data, over time, would show the increase or decrease in tree cover.

Data on Tree Canopy Change over Time in Urban Areas

The CFC quantitative team determined that there were data on urban tree canopy cover with a temporal range of four to six years available from four geographic regions. The data are set forth below:

Table 2.2 Changes in Urban Tree Canopy (UTC) by Region (from Nowak and Greenfield, 2012, see footnote 7)

City	Abs Change UTC (%)	Relative Change UTC (%)	Ann. Rate (ha UTC/yr)	Ann. Rate (m2 UTC/cap/yr)	Data Years
EAST					
Baltimore, MD	-1.9	-6.3	-100	-1.5	(2001–2005)
Boston, MA	-0.9	-3.2	-20	-0.3	(2003–2008)
New York, NY	-1.2	-5.5	-180	-0.2	(2004–2009)
Pittsburgh, PA	-0.3	-0.8	-10	-0.3	(2004–2008)
Syracuse, NY	1.0	4.0	10	0.7	(2003–2009)
Mean changes	-0.7	-2.4	-60.0	-0.3	
Std Error	0.5	1.9	35.4	0.3	
SOUTH					
Atlanta, GA	-1.8	-3.4	-150	-3.1	(2005–2009)
Houston, TX	-3.0	-9.8	−890	-4.3	(2004–2009)
Miami, FL	-1.7	-7.1	-30	-0.8	(2003–2009)
Nashville, TN	-1.2	-2.4	-300	-5.3	(2003–2008)
New Orleans, LA	-9.6	-29.2	−1120	-24.6	(2005-2009)
Mean changes	-3.5	-10.4	-160.0	-7.6	
Std Error	1.6	4.9	60.5	4.3	
MIDWEST					
Chicago, IL	-0.5	-2.7	-70	-0.2	(2005–2009)
Detroit, MI	-0.7	-3.0	-60	-0.7	(2005–2009)

[2] See Nowak, et al. *"Tree and Impervious Cover Change in U.S. Cities,"* Urban Forestry and Urban Greening, 11 (2012), 21-30

City	Abs Change UTC (%)	Relative Change UTC (%)	Ann. Rate (ha UTC/yr)	Ann. Rate (m2 UTC/cap/yr)	Data Years
Kansas City, MO	-1.2	-4.2	-160	-3.5	(2003–2009)
Minneapolis, MN	-1.1	-3.1	-30	-0.8	(2003–2008)
Mean changes	-0.9	-3.3	-80.0	-1.3	
Std Error	0.2	0.3	28.0	0.7	
WEST					
Albuquerque, NM	-2.7	-6.6	-420	-8.3	(2006–2009)
Denver, CO	-0.3	-3.1	-30	-0.5	(2005–2009)
Los Angeles, CA	-0.9	-4.2	-270	-0.7	(2005–2009)
Portland, OR	-0.6	-1.9	-50	-0.9	(2005–2009)
Spokane, WA	-0.6	-2.5	-20	-1.0	(2002–2007)
Tacoma, WA	-1.4	-5.8	-50	-2.6	(2001–2005)
Mean changes	-1.1	-4.0	-140.0	-2.3	
Std Error	0.4	0.8	67.8	1.2	

These data have been updated by Nowak and Greenfield.[3] The 2012 data show that urban tree canopy is experiencing negative growth in all four regions. The 2018 data document continued loss of urban tree cover.

Table 3 of the 2018 article shows data for all states, with a national loss of urban and community tree cover of 175,000 acres per year during the study years of 2009-2014.

To put this loss in perspective, the total land area of urban and community tree cover loss during the study years totals 1,367 square miles – equal to the combined land area of New York City, Atlanta, Philadelphia, Miami, Boston, Cleveland, Pittsburgh, St. Louis, Portland, OR, San Francisco, Seattle, and Boise.

Even though there may be individual tree planting activities that increase the number of urban trees within small geographic locations, the performance of activities to increase tree cover shows a negative baseline. The Drafting Group did not use negative baselines for the Tree Planting Protocol, but determined to use baselines of zero.

Deployment of the Performance Standard baseline methodology for a City Forest Planting Protocol is supported by conclusions that make sense and are anchored in the real world:

- With the data showing that tree loss exceeds gains from planting, new plantings are justified as additional to that decreasing canopy baseline. In fact, the negative baseline would justify as additional any trees that are protected from removal.
- Because almost no urban trees are planted now with carbon as a decisive factor, urban tree planting done to sequester carbon is additional;
- Almost no urban trees are currently planted with a contractual commitment for monitoring. Maintenance of trees is universally an intention, one that is frequently reached when budgets are cut, as in the Covid-19 era. The 25-year commitment required by this Protocol is entirely

[3] Nowak et al. 2018. "Declining Urban and Community Tree Cover in the United States," *Urban Forestry and Urban Greening,* 32, 32-55

additional to any practice in place in the U.S. and will result in substantial additional trees surviving to maturity;

- Because the urban forest is a public resource, and because public funding falls far short of maintaining tree cover and stocking, carbon revenues will result in additional trees planted or in maintenance that will result in additional trees surviving to maturity;
- Because virtually all new large-scale urban tree planting is conducted by governmental entities or non-profits, or by private property developers complying with governmental regulations (which would not be eligible for carbon credits under our protocol), and because any carbon revenues will defray only a portion of the costs of tree planting, there is little danger of unjust enrichment to developers of city forest carbon projects.

Last, The WRI GHG Protocol recognizes explicitly that the principles underlying carbon protocols need to be adapted to different types of projects. The WRI Protocol further approves of balancing the stringency of requirements with the need to encourage participation in desirable carbon projects:

Setting the stringency of additionality rules involves a balancing act. Additionality criteria that are too lenient and grant recognition for "non-additional" GHG reductions will undermine the GHG program's effectiveness. On the other hand, making the criteria for additionality too stringent could unnecessarily limit the number of recognized GHG reductions, in some cases excluding project activities that are truly additional and highly desirable. In practice, no approach to additionality can completely avoid these kinds of errors. Generally, reducing one type of error will result in an increase of the other. Ultimately, there is no technically correct level of stringency for additionality rules. GHG programs may decide based on their policy objectives that it is better to avoid one type of error than the other.[4]

The policy considerations weigh heavily in favor of "highly desirable" planting projects to reverse tree loss for the public resource of city forests.

[4] WRI GHG Protocol, Chapter 3.1 at 19.

Attachment 14

QUANTIFYING CARBON DIOXIDE STORAGE AND CO-BENEFITS FOR URBAN TREE PLANTING PROJECTS (Appendix A)

Introduction

Ecoservices provided by trees to human beneficiaries are classified according to their spatial scale as global and local (Costanza 2008) (citations for Part Two are listed in References). Removal of carbon dioxide (CO_2) from the atmosphere by urban forests is global because the atmosphere is so well-mixed it does not matter where the trees are located. The effects of urban forests on building energy use is a local-scale service because it depends on the proximity of trees to buildings.

To quantify these and other ecoservices City Forest Credits (CFC) has relied on peer-reviewed research that has combined measurements and modeling of urban tree biomass, and effects of trees on building energy use, rainfall interception, and air quality. CFC has used the most current science available on urban tree growth in its estimates of CO_2 storage (McPherson et al., 2016a). CFC's quantification tools provide estimates of co-benefits after 25 years in Resource Units (i.e., kWh of electricity saved) and dollars per year. Values for co-benefits are first-order approximations extracted from the i-Tree Streets (i-Tree Eco) datasets for each of the 16 U.S. reference cities/climate zones (https://www.itreetools.org/tools/i-tree-eco) (Maco and McPherson, 2003). Modeling approaches and error estimates associated with quantification of CO_2 storage and co-benefits have been documented in numerous publications (see References below) and are summarized here.

Carbon Dioxide Storage

Project Operators must use one of three different methods for quantifying carbon dioxide (CO2) storage in urban forest carbon projects. Selection of the quantification method depends on the planting project design:

- Single Tree Method - trees planted in a dispersed or scattered design and that are planted at least 10 feet apart (i.e. street trees). This method requires tracking of individual trees and tree survival for sampling and quantification.
- Clustered Method - to trees planted at least 10 feet apart but are relatively contiguous and designed to create canopy over an area (i.e park-like settings). This method requires tracking change in canopy, not individual tree survival
- Area Reforestation Method – tree planting areas greater than 5 acres and where many trees are planted closer than 10 feet. Higher tree mortality is expected and the goals are to create canopy and a forest ecosystem. Project Operators have several quantification models to choose from, all of which produce a carbon index on a per-acre basis.

In all cases, the estimated amount of CO2 stored 26-years after planting is calculated. The forecasted amount of CO2 stored during this time is the value from which the Registry issues ex ante Carbon Forward Removal Credits.TM

To ensure performance of the credits, the Registry issues Carbon Forward Removal Credits at five times during the 26-year Project Duration:

- 10% after planting

- 30% in Year 4, after sampling and mortality check or imaging and calculating canopy
- 30% in Year 6, after sampling and mortality check or imaging and calculating canopy
- 10% in Year 14, after measuring sampled trees or imaging and calculating canopy and
- "True-up" credits at the end of the initial Project Duration in Year 26, when CO2e is quantified from tree measurement and final credits are issued for CO2e stored minus credits already issued.

The mortality checks at Years 4 and 6 correspond to nationality mortality data that shows increased survival rates after three years and six years.

The Registry will issue 95% of Project Credits earned and will hold 5% of total credits in the Registry's Reversal Pool Account. This 5% Reversal Pool Account deduction is applied in all three quantification methods before calculation of any crediting, with these funds going into a program-wide pool to insure against unavoidable reversals due to catastrophic loss of trees.

All ex-ante Carbon Forward Removal Credits convert to ex post City Forest Carbon+ Credits at Year 26 and are marked in the registry of credits.

Scientific Basis for Carbon Dioxide Quantification

Estimates of stored (amount accumulated over many years) and sequestered CO_2 (i.e., net amount stored by tree growth over one year) are based on the U.S. Forest Service's recently published technical manual and the extensive Urban Tree Database (UTD), which catalogs urban trees with their projected growth tailored to specific geographic regions (McPherson et al. 2016a, b). The products are a culmination of 14 years of work, analyzing more than 14,000 trees across the United States. Whereas prior growth models typically featured only a few species specific to a given city or region, the newly released database features 171 distinct species across 16 U.S. climate zones. The trees studied also spanned a range of ages with data collected from a consistent set of measurements. Advances in statistical modeling have given the projected growth dimensions a level of accuracy never before seen. Moving beyond just calculating a tree's diameter or age to determine expected growth, the research incorporates 365 sets of tree growth equations to project growth.

Users select their climate zone from the 16 U.S. climate zones (Fig. 1). Calculations of CO_2 stored are for a representative species for each tree-type that was one of the predominant street tree species per reference city (Peper et al., 2001). The "Reference city" refers to the city selected for intensive study within each climate zone (McPherson, 2010). About 20 of the most abundant species were selected for sampling in each reference city. The sample was stratified into nine diameter at breast height (DBH) classes (0 to 7.6, 7.6 to 15.2, 15.2 to 30.5, 30.5 to 45.7, 45.7 to 61.0, 61.0 to 76.2, 76.2 to 91.4, 91.4 to 106.7, and >106.7 cm). Typically 10 to 15 trees per DBH class were randomly chosen. Data were collected for 16 to 74 trees in total from each species. Measurements included: species name, age, DBH [to the nearest 0.1 cm (0.39 in)], tree height [to the nearest 0.5 m (1.64 ft.)], crown height [to the nearest 0.5 m (1.64 ft.)], and crown diameter in two directions [parallel and perpendicular to nearest street to the nearest 0.5 m (1.64 ft.)]. Tree age was determined from local residents, the city's urban forester, street and home construction dates, historical planting records, and aerial and historical photos.

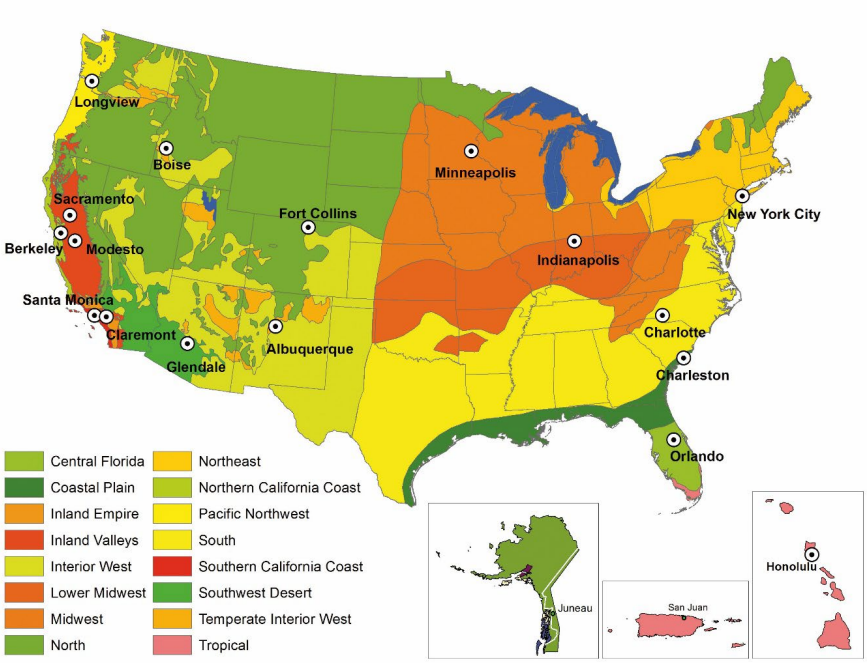

Figure 1. Climate zones of the United States and Puerto Rico were aggregated from 45 Sunset climate zones into 16 zones. Each zone has a reference city where tree data were collected. Sacramento, California was added as a second reference city (with Modesto) to the Inland Valleys zone. Zones for Alaska, Puerto Rico and Hawaii are shown in the insets (map courtesy of Pacific Southwest Research Station).

Species Assignment by Tree-Type

Representative species for each tree-type in the South climate zone (reference city is Charlotte, NC) are shown in Table 1. They were chosen because extensive measurements were taken on them to generate growth equations, and their mature size and form was deemed typical of other trees in that tree-type. Representative species were not available for some tree-types because none were measured. In that case, a species of similar mature size and form from the same climate zone was selected, or one from another climate zone was selected. For example, no Broadleaf Evergreen Large (BEL) species was measured in the South reference city. Because of its large mature size, *Quercus nigra* was selected to represent the BEL tree-type, although it is deciduous for a short time. *Pinus contorta*, which was measured in the PNW climate zone, was selected for the CES tree-type, because no CES species was measured in the South.

Table 1. Nine tree-types and abbreviations. Representative species assigned to each tree-type in the South climate zone are listed. The biomass equations (species, urban general broadleaf [UGB], urban general conifer [UGC]) and dry weight density (kg/m^3) used to calculate biomass are listed for each tree-type.

Tree-Type	Tree-Type Abbreviation	Species Assigned	DW Density	Biomass Equations
Brdlf Decid Large (>50 ft)	BDL	*Quercus phellos*	600	*Quercus macrocarpa* [1.]
Brdlf Decid Med (30-50 ft)	BDM	*Pyrus calleryana*	600	UGB [2.]
Brdlf Decid Small (<30 ft)	BDS	*Cornus florida*	545	UGB [2.]
Brdlf Evgrn Large (>50 ft)	BEL	*Quercus nigra*	797	UGB [2.]

Brdlf Evgrn Med (30-50 ft)	BEM	*Magnolia grandiflora*	523	UGB [2.]
Brdlf Evgrn Small (<30 ft)	BES	*Ilex opaca*	580	UGB [2.]
Conif Evgrn Large (>50 ft)	CEL	*Pinus taeda*	389	UGC [2.]
Conif Evgrn Med (30-50 ft)	CEM	*Juniperus virginiana*	393	UGC [2.]
Conif Evgrn Small (<30 ft)	CES	*Pinus contorta*	397	UGC [2.]
[1.] from Lefsky, M., & McHale, M.,2008. [2] from Aguaron, E., & McPherson, E. G., 2012				

Calculating Biomass and Carbon Dioxide Stored

To estimate CO_2 stored, the biomass for each tree-type was calculated using urban-based allometric equations because open-growing city trees partition carbon differently than forest trees (McPherson et al., 2017a). Input variables included climate zone, species, and DBH. To project tree size at 25-years after planting, we used DBH obtained from UTD growth curves for each representative species.

Biomass equations were compiled for 26 open-grown urban trees species from literature sources (Aguaron and McPherson, 2012). General equations (Urban Gen Broadleaf and Urban Gen Conifer) were developed from the 26 urban-based equations that were species specific (McPherson et al., 2016a). These equations were used if the species of interest could not be matched taxonomically or through wood form to one of the urban species with a biomass equation. Hence, urban general equations were an alternative to applying species-specific equations because many species did not have an equation.

These allometric equations yielded aboveground wood volume. Species-specific dry weight (DW) density factors (Table 1) were used to convert green volume into dry weight (7a). The urban general equations required looking up a dry weight density factor (in Jenkins et al. 2004 first, but if not available then the Global Wood Density Database). The amount of belowground biomass in roots of urban trees is not well researched. This work assumed that root biomass was 28% of total tree biomass (Cairns et al., 1997; Husch et al., 2003; Wenger, 1984). Wood volume (dry weight) was converted to C by multiplying by the constant 0.50 (Leith, 1975), and C was converted to CO_2 by multiplying by 3.667.

Error Estimates and Limitations

The lack of biometric data from the field remains a serious limitation to our ability to calibrate biomass equations and assign error estimates for urban trees. Differences between modeled and actual tree growth adds uncertainty to CO_2 sequestration estimates. Species assignment errors result from matching species planted with the tree-type used for biomass and growth calculations. The magnitude of this error depends on the goodness of fit in terms of matching size and growth rate. In previous urban studies the prediction bias for estimates of CO_2 storage ranged from -9% to +15%, with inaccuracies as much as 51% RMSE (Timilsina et al., 2014). Hence, a conservative estimate of error of ± 20% can be applied to estimates of total CO_2 stored as an indicator of precision.

Co-Benefit: Energy Savings

Trees and forests can offer energy savings in two important ways. In warmer climates or hotter months, trees can reduce air conditioning bills by keeping buildings cooler through reducing regional air temperatures and offering shade. In colder climates or cooler months, trees can confer savings on the fuel needed to heat buildings by reducing the amount of cold winds that can strip away heat.

Energy conservation by trees is important because building energy use is a major contributor to greenhouse gas emissions. Oil or gas furnaces and most forms of electricity generation produce CO_2 and other pollutants as by-products. Reducing the amount of energy consumed by buildings in urban areas is one of the most effective methods of combatting climate change. Energy consumption is also a costly burden on many low-income families, especially during mid-summer or mid-winter. Furthermore, electricity consumption during mid-summer can sometimes over-extend local power grids leading to rolling brownouts and other problems.

Energy savings are calculated through numerical models and simulations built from observational data on proximity of trees to buildings, tree shapes, tree sizes, building age classes, and meteorological data from McPherson et al. (2017) and McPherson and Simpson (2003). The main parameters affecting the overall amount of energy savings are crown shape, building proximity, azimuth, local climate, and season. Shading effects are based on the distribution of street trees with respect to buildings recorded from aerial photographs for each reference city (McPherson and Simpson, 2003). If a sampled tree was located within 18 m of a conditioned building, information on its distance and compass bearing relative to a building, building age class (which influences energy use) and types of heating and cooling equipment were collected and used as inputs to calculate effects of shade on annual heating and cooling energy effects. Because these distributions were unique to each city, energy values are considered first-order approximations.

In addition to localized shade effects, which were assumed to accrue only to trees within 18 m of a building, lowered air temperatures and windspeeds from increased neighborhood tree cover (referred to as climate effects) can produce a net decrease in demand for winter heating and summer cooling (reduced wind speeds by themselves may increase or decrease cooling demand, depending on the circumstances). Climate effects on energy use, air temperature, and wind speed, as a function of neighborhood canopy cover, were estimated from published values for each reference city. The percentages of canopy cover increase were calculated for 20-year-old large, medium, and small trees, based on their crown projection areas and effective lot size (actual lot size plus a portion of adjacent street and other rights-of-way) of 10,000 ft^2 (929 m^2), and one tree on average was assumed per lot. Climate effects were estimated by simulating effects of wind and air-temperature reductions on building energy use.

In the case of urban Tree Preservation Projects, trees may not be close enough to buildings to provide shading effects, but they may influence neighborhood climate. Because these effects are highly site-specific, we conservatively apply an 80% reduction to the energy effects of trees for Preservation Projects.

Energy savings are calculated as a real-dollar amount. This is calculated by applying overall reductions in oil and gas usage or electricity usage to the regional cost of oil and gas or electricity for residential customers. Colder regions tend to see larger savings in heating and warmer regions tend to see larger savings in cooling.

Error Estimates and Limitations

Formulaic errors occur in modeling of energy effects. For example, relations between different levels of tree canopy cover and summertime air temperatures are not well-researched. Another source of error stems from differences between the airport climate data (i.e., Los Angeles International Airport) used to model energy effects and the actual climate of the study area (i.e., Los Angeles urban area). Because of

the uncertainty associated with modeling effects of trees on building energy use, energy estimates may be accurate within ± 25 percent (Hildebrandt & Sarkovich, 1998).

Co-Benefit: Rainfall Interception

Forest canopies normally intercept 10-40% of rainfall before it hits the ground, thereby reducing stormwater runoff. The large amount of water that a tree crown can capture during a rainfall event makes tree planting a best management practice for urban stormwater control.

City Forest Credits uses a numerical interception model to calculate the amount of annual rainfall intercepted by trees, as well as throughfall and stem flow (Xiao et al., 2000). This model uses species-specific leaf surface areas and other parameters from the Urban Tree Database. For example, deciduous trees in climate zones with longer "in-leaf" seasons will tend to intercept more rainfall than similar species in colder areas shorter foliation periods. Model results were compared to observed patterns of rainfall interception and found to be accurate. This method quantifies only the amount of rainfall intercepted by the tree crown, and does not incorporate surface and subsurface effects on overland flow.

The rainfall interception benefit was priced by estimating costs of controlling stormwater runoff. Water quality and/or flood control costs were calculated per unit volume of runoff controlled and this price was multiplied by the amount of rainfall intercepted annually.

Error Estimates and Limitations

Estimates of rainfall interception are sensitive to uncertainties regarding rainfall patterns, tree leaf area and surface storage capacities. Rainfall amount, intensity and duration can vary considerably within a climate zone, a factor not considered by the model. Although tree leaf area estimates were derived from extensive measurements on over 14,000 street trees across the U.S. (McPherson et al., 2016a), actual leaf area may differ because of differences in tree health and management. Leaf surface storage capacity, the depth of water that foliage can capture, was recently found to vary threefold among 20 tree species (Xiao & McPherson, 2016). A shortcoming is that this model used the same value (1 mm) for all species. Given these limitations, interception estimates may have uncertainty as great as ± 20 percent.

Co-Benefit: Air Quality

The uptake of air pollutants by urban forests can lower concentrations and affect human health (Derkzen et al., 2015; Nowak et al., 2014). However, pollutant concentrations can be increased if the tree canopy restricts polluted air from mixing with the surrounding atmosphere (Vos et al., 2013). Urban forests are capable of improving air quality by lowering pollutant concentrations enough to significantly affect human health. Generally, trees are able to reduce ozone, nitric oxides, and particulate matter. Some trees can reduce net volatile organic compounds (VOCs), but others can increase them through natural processes. Regardless of the net VOC production, urban forests usually confer a net positive benefit to air quality. Urban forests reduce pollutants through dry deposition on surfaces and uptake of pollutants into leaf stomata.

A numerical model calculated hourly pollutant dry deposition per tree at the regional scale using deposition velocities, hourly meteorological data and pollutant concentrations from local monitoring stations (Scott et al., 1998). The monetary value of tree effects on air quality reflects the value that society places on clean air, as indicated by willingness to pay for pollutant reductions. The monetary value of air quality effects were derived from models that calculated the marginal damage control costs

of different pollutants to meet air quality standards (Wang and Santini 1995). Higher costs were associated with higher pollutant concentrations and larger populations exposed to these contaminants.

Error Estimates and Limitations

Pollutant deposition estimates are sensitive to uncertainties associated with canopy resistance, resuspension rates and the spatial distribution of air pollutants and trees. For example, deposition to urban forests during warm periods may be underestimated if the stomata of well-watered trees remain open. In the model, hourly meteorological data from a single station for each climate zone may not be spatially representative of conditions in local atmospheric surface layers. Estimates of air pollutant uptake may be accurate within ± 25 percent.

Conclusions

Our estimates of carbon dioxide storage and co-benefits reflect an incomplete understanding of the processes by which ecoservices are generated and valued (Schulp et al., 2014). Our choice of co-benefits to quantify was limited to those for which numerical models were available. There are many important benefits produced by trees that are not quantified and monetized. These include effects of urban forests on local economies, wildlife, biodiversity and human health and well-being. For instance, effects of urban trees on increased property values have proven to be substantial (Anderson & Cordell, 1988). Previous analyses modeled these "other" benefits of trees by applying the contribution to residential sales prices of a large front yard tree (0.88%) (McPherson et al., 2005). We have not incorporated this benefit because property values are highly variable. It is likely that co-benefits reported here are conservative estimates of the actual ecoservices resulting from local tree planting projects.

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Attachments

Agreement to Transfer Credits

Project Area Map

Regional Area Map

Attestation of Planting

Attestation of Planting Affirmation

Attestation of No Double Counting and No Net Harm & Evidence

Attestation of Additionality & Supporting Documentation

Carbon Quantification Initial Credit Tool

Tree Planting Data

Social Impacts

Agreement to Transfer Credits

Roll Call Number 23-0169

Agenda Item Number 31

Date February 6, 2023

APPROVAL OF FIRST AMENDMENT TO AGREEMENT TO TRANSFER AND DEVELOP POTENTIAL CARBON AND ENVIRONMENTAL CREDITS WITH TREES FOREVER, INC.

WHEREAS, on November 23, 2021, the City Manager approved an Agreement to Transfer and Develop Potential Carbon and Environmental Credits ("Agreement") between the City of Des Moines and Trees Forever, Inc., an Iowa non-profit corporation ("Project Operator"), pursuant to which the Project Operator develops potential carbon and environmental credits (Carbon+ Credits) through the Growing Futures tree-planting project on public right of way and parks with the City, with title and rights to all Carbon+ Credits granted by City to Project Operator, for the 25-year duration of the Agreement and a potential 25-year renewal period; and

WHEREAS, the Carbon+ Credit provider, City Forest Credits, is requiring an amendment to the Agreement in order to provide said Credits to the Project Operator for 2022 and for better compliance with its Carbon+ Credit program; and

WHEREAS, the City Forester and the Project Operator have negotiated a First Amendment to the Agreement, in form on file in the City Clerk's office, which First Amendment specifies the transfer of Carbon+ Credits from the Growing Futures project or any similar project involving trees approved by both City and Project Operator through 2030, and extending the term of the Agreement to the set date of November 1, 2056, with a potential 25-year renewal option.

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Des Moines, Iowa:

1. That approval of the Agreement to Transfer and Develop Potential Carbon and Environmental Credits by the Mayor is hereby ratified, and the First Amendment to the Agreement is hereby approved.
2. That the Mayor is hereby authorized and directed to execute the First Amendment to the Agreement on behalf of the City, and the City Manager is authorized and directed to approve and execute any additional minor amendments to said Agreement and to submit any substantive amendments to said Agreement to City Council for consideration and approval.
3. That the City Forester is hereby authorized and directed to administer the Agreement, as amended, on behalf of the City.

(Council Communication No. 23-071) Moved by Gatto to adopt.

APPROVED AS TO FORM: Second by Boesen.

/s/ *Glenna K. Frank*
Glenna K. Frank, Assistant City Attorney

COUNCIL ACTION	YEAS	NAYS	PASS	ABSENT
COWNIE	✓			
BOESEN	✓			
GATTO	✓			
MANDELBAUM	✓			
SHEUMAKER	✓			
VOSS	✓			
WESTERGAARD	✓			
TOTAL	7			

MOTION CARRIED APPROVED

J. W. Cownie
Mayor

I, LAURA BAUMGARTNER, City Clerk of said City hereby certify that at a meeting of the City Council of said City of Des Moines, held on the above date, among other proceedings the above was adopted.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal the day and year first above written.

Laura Baumgartner
Laura Baumgartner, City Clerk

FIRST AMENDMENT TO AGREEMENT TO TRANSFER AND
DEVELOP POTENTIAL CARBON AND ENVIRONMENTAL CREDITS
BY AND BETWEEN
THE CITY OF DES MOINES, IOWA AND
TREES FOREVER, INC.

This FIRST AMENDMENT TO AGREEMENT TO TRANSFER AND DEVELOP POTENTIAL CARBON AND ENVIRONMENTAL CREDITS is made and entered into and is effective on this 6th day of February 2023 by and between the City of Des Moines ("CITY") and Trees Forever, Inc., an Iowa non-profit organization ("Project Operator"), to said Agreement, by and between the CITY and Project Operator dated November 23, 2021 ("the Agreement").

WHEREAS, on November 23, 2021, the City Manager approved the Agreement pursuant to which the Project Operator develops potential carbon and environmental credits ("Carbon+ Credits"), with title and rights to all Carbon+ Credits granted by CITY to Project Operator for the duration of the Agreement; and

WHEREAS, the CITY and the CORPORATION have negotiated this First Amendment to the Agreement to explicitly list 2022 as a credit year and to extend the Agreement term to 2047, with retention of all other existing terms of the Agreement.

NOW, THEREFORE, for and in consideration of the mutual undertakings of the parties hereto, it is agreed as follows:

1. Section 2, "Rights Granted", is hereby amended by deleting the first sentence thereof and replacing it with the following, with all other text of said Section remaining as originally stated:

> City grants Project Operator the title and rights to any and all Carbon+ Credits developed from the Tree Project or any similar project involving trees approved by both City and Project Operator through 2030, and during the term of this agreement, including rights to register with CFC, and develop and sell the Carbon+ Credits, subject to the termination requirements in section 8 herein.

2. Section 9, "Term of Agreement and Option to Renew", is hereby deleted in its entirety and replaced with the following text:

> 9. Term of Agreement and Option to Renew
> This Agreement shall remain in force from the Effective Date of this Agreement until November 1, 2056. Project Operator may, at the City's sole discretion, renew this Agreement for a renewal term of 25 years if it delivers written notice of renewal to City at least 90 days prior to expiration of this Agreement. Said notice shall be completed in accordance with paragraph 11 herein.

3. Except as modified above, all other terms of the Agreement shall remain in effect.

IN WITNESS WHEREOF, the parties to this FIRST AMENDMENT have hereunto set their hands on this day and year as first above written.

City of Des Moines, Iowa

By: T. M. Franklin Cownie
Its: Mayor

Trees Forever, Inc.

By: Kiley A. Miller
Its: Pres. & CEO

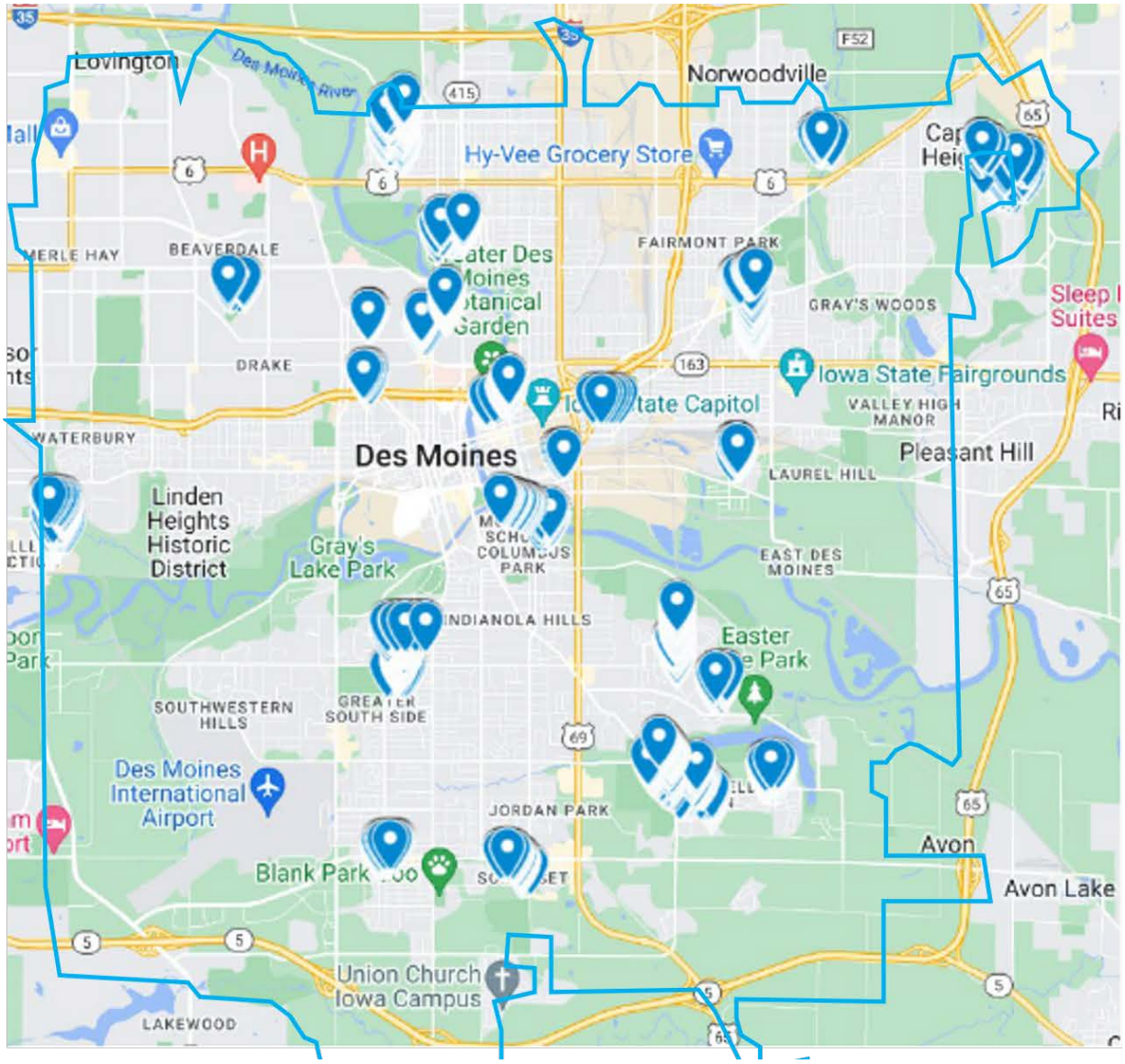
Approved As To Form:

/s/ Glenna K. Frank
Glenna K. Frank, Assistant City Attorney

Project Area Map

Des Moines 2023 Project Area Map

Project Name: City of Des Moines Urban Tree Planting 2023



LEGEND:

● Denotes individual tree planted in 2023

Regional Area Map

Des Moines 2023 Regional Area Map

Des Moines, Iowa

Des Moines City Boundary

Attestation of Planting

City of Des Moines Urban Tree Planting 2023
Project Operator Attestation of Planting

I, the undersigned Project Operator for the Planting Project named City of Des Moines Urban Tree Planting 2023, located in Des Moines, IA and submitted to City Forest Credits by application dated December 14, 2023, attest to the following in order to confirm the planting of trees under this Project:

- Trees planted were not required by any law or ordinance to be planted;
- Trees were planted under this project on the following date (s): April 1 – November 30, 2023
- The organizations or groups that participated in the planting event(s) are listed in the attached documents;
- Planting events are shown in photos attached, which can include photos of tree stock and planting activities;
- The number of trees planted by species are, to a reasonable certainty, 1945 trees planted.

These planting numbers are confirmed by one or more of the following supporting and attached documents:

1. Invoices for trees planted, or
2. Invoices or a statement from the party who funded the tree purchase or supplied the trees attesting to the number of trees purchased, or
3. Any reporting to the owner or public body regarding the planting, invoices, costs, or other data regarding the planting, or
4. Any other reliable estimate of trees planted that is approved by the Registry

Signed on January 11 in 2024, by Debra Powers, Interim CEO, for Trees Forever.

Debra M. Powers
_____
Signature
Debra Powers_____
Printed Name
563-275-9643_____
Phone
Dpowers@treesforever.org_____
Email

Exhibit A

Invoices:
Filename: Invoices for Trees Planted_Trees Forever 2023

Organizations/Groups that participated in the planting events:

Accenture
National Honor Society
Girl Scouts
Drake University Outdoor Leadership Club
City of Des Moines Parks & Recreation
Southeast Polk High School Key Club
Tippie College of Business
Coca Cola
Andersen Windows & Doors
Dot Dash Meredith
West Des Moines Rotary
Principal Financial
Wells Fargo
Kemin
MidAmerican Energy
Microsoft
North High School
Hubbell Realty
Big Brothers Big Sisters
City of Des Moines Public Works / Engineering
IMT Insurance
Big Grove Brewery
Drake University Women in STEM
Ted Lare Landscaping
Morris Elementary
Voss Distributing
American Equity Investment Life Insurance
Lightedge

Photos of planting events:

Growing Futures employees providing a tree planting demonstration for volunteers from Microsoft.

City Forester Dan Just and City Councilperson Carl Voss planting a tree in the Columbus Park Neighborhood of Des Moines.

Volunteers from Wells Fargo planting trees along Indianola Avenue on the south side of Des Moines in HOT weather.

Volunteers from Kemin planting trees on Des Moines’ east side neighborhoods.

Tree identification tags at Edmunds Elementary, planted in conjunction with Big Grove Brewery.

Volunteers from ‘Dads on a Mission’ planting trees in Evelyn K. Davis park.

Volunteers from MidAmerican planting trees alongside Green Iowa AmeriCorps members in the Highland Park neighborhood of Des Moines.

The following documents represent the majority of invoices for trees planted as part of this project. All invoices are on file with Trees Forever.

Iowa Native Trees LLC 2023

56645 170th St
Ames, IA 50010 US
(515) 664-8633
iowanativetrees@gmail.com

Estimate

ADDRESS	SHIP TO		
Megan Schneider	Megan Schneider	ESTIMATE	1166
Trees Forever Des Moines	Trees Forever Des Moines	DATE	08/28/2023

DATE	SERVICE	DESCRIPTION	QTY	RATE	AMOUNT
		Des Moines Chesterfield Park Planting Fall 23			
	Amelanchier	Serviceberry, #7	18	90.00	1,620.00
	Populus tremoloides	Quaking aspen, #10	19	125.00	2,375.00
	Celtis	Hackberry, #10	8	110.00	880.00
	Quercus alba	White oak, 1.25" 12" mesh	2	175.00	350.00
	Quercus bicolor	Swamp white oak, 1.5" 12" mesh	3	175.00	525.00
	Quercus macrocarpa	Bur oak, 1.5" 12" mesh	4	165.00	660.00
	Tilia americana	American linden, 1" 12" mesh	7	150.00	1,050.00
	Viburnum dentatum	Arrowwood viburnum, #3	6	40.00	240.00
	Alnus rugosa	Speckled alder, #7 4-5'	12	90.00	1,080.00
	Pinus strobis	White Pine, #7	8	110.00	880.00
	Delivery charge	Deliver Charge - 50 miles at $3.50/mile	1	175.00	175.00

TOTAL **$9,835.00**

Accepted By

Accepted Date

Sandridge Nursery, LLC

INV_TREEFODSM01
3/6/2023

INVOICE

FROM:

Sandridge Nursery, LLC
c/o Eric Goodhue
7530 SE 52nd St.
Carlisle, IA 50047
(515) 724-9599

TO:

Trees Forever
c/o Kacie Ballard/Leslie Berckes
1515 Linden Street
Des Moines, IA 50309
(515) 661-8334

#	Item Description	Size	Qty	Unit Cost	Total
	****Deposit for 2023 Growing Season****				
1	2,226 Trees Guarantees for delivery in 2022; 50% Deposit	1.5" BR	2226	$95.00	$105,735.00
	1,113 Spring Delivery; 1,113 Fall Delivery				

	Tax Rate (if applicable)	0%	$0.00

	TOTAL	**2226**	**$105,735.00**

Terms: NET 10

THANK YOU FOR THE BUSINESS!

Sandridge Nursery, LLC

INV_TREEFODSM03
8/2/2023

INVOICE

FROM:

Sandridge Nursery, LLC
c/o Eric Goodhue
7530 SE 52nd St.
Carlisle, IA 50047
(515) 724-9599

TO:

Trees Forever
c/o Lexy Nelson
1515 Linden Street
Des Moines, IA 50309
(515) 661-8334

#	Item Description	Size	Qty	Unit Cost	Total
	****Delivered to West Des Moines on 5/13/2023****				
1	Amelanchier x grandiflora 'Autumn Brilliance' - Autumn Brilliance Serviceberry	1.5" BR	5	$95.00	$475.00
2	Carpinus caroliniana - American Hornbem	1.5" BR	4	$95.00	$380.00
3	Celtis Occidentalis - Hackberry	1.5" BR	7	$95.00	$665.00
4	Crataegus virdis 'Winter King' - Winter King Hawthorn	1.5" BR	3	$95.00	$285.00
5	Gleditsia triacanthos 'Skycole' - Skyline Honeylocust	1.5" BR	4	$95.00	$380.00
6	Liridendron tulipifera - Tulip Tree	1.5" BR	7	$95.00	$665.00
7	Malus assorted species - Crabapple	1.5" BR	9	$95.00	$855.00
8	Ostrya virginiana - American Hophornbeam	1.5" BR	3	$95.00	$285.00
9	Quercus bicolor - Swamp White Oak	1.5" BR	3	$95.00	$285.00
10	Quercus macrocarpa - Bur Oak	1.5" BR	3	$95.00	$285.00
11	Quercus rubra - Red Oak	1.5" BR	4	$95.00	$380.00
12	Syringa reticulata 'Ivory Silk' - Ivory Silk Japanese Lilac	1.5" BR	11	$95.00	$1,045.00
13	Tilia cordata 'Glenleven' - Glenleven Linden	1.5" BR	8	$95.00	$760.00
14	Ulmus americana 'New Harmony' - New Harmony Elm	1.5" BR	6	$95.00	$570.00

	Tax Rate (if applicable)			0%	$0.00

TOTAL		**77**	**$7,315.00**

Terms: NET 10

THANK YOU FOR THE BUSINESS!

Sandridge Nursery, LLC

INV_TREEFODSM04
9/23/2023

INVOICE

FROM:

Sandridge Nursery, LLC
c/o Eric Goodhue
7530 SE 52nd St.
Carlisle, IA 50047
(515) 724-9599

TO:

Trees Forever
c/o Lexy Nelson
1515 Linden Street
Des Moines, IA 50309
(515) 661-8334

#	Item Description	Size	Qty	Unit Cost	Total
	****Delivered on Wednesday, 9/20****				
	Betula nigra - River Birch	1.5" BR	5	$95.00	$475.00
	Celtis occidentalis - Hackberry	1.5" BR	7	$95.00	$665.00
	Gleditsia triacanthos 'Skycole' - Skyline Honeylocust	1.5" BR	5	$95.00	$475.00
	Tilia cordata 'Glenleven' - Glenleven Linden	1.5" BR	3	$95.00	$285.00
	Ulmus parvifolia - Frontier Elm	1.5" BR	10	$95.00	$950.00
	****Delivered on Thursday, 9/21****				
	Celtis occidentalis - Hackberry	1.5" BR	5	$95.00	$475.00
	Cercis canadensis - Eastern Redbud	1.5" BR	11	$95.00	$1,045.00
	Crataegus virdis 'Winter King' - Winter King Hawthorn	1.25" BR	9	$80.00	$720.00
	Gleditsia triacanthos 'Skycole' - Skyline Honeylocust	1.5" BR	4	$95.00	$380.00
	Malus 'Cardinal' - Cardinal Crabapple	1.5" BR	9	$95.00	$855.00
	Malus 'Jewelcole' - Red Jewel Crabapple	1.5" BR	2	$95.00	$190.00
	Malus 'Spring Snow' - Spring Snow Crabapple	1.5" BR	6	$95.00	$570.00
	Platanus occidentalis 'Bloodgood' - London Planetree	1.5" BR	3	$95.00	$285.00
	Quercus macrocarpa - Bur Oak	1.5" BR	4	$95.00	$380.00
	Syringa reticulata 'Ivory Silk' - Ivory Silk Japanese Lilac	1.5" BR	7	$95.00	$665.00
	Tilia cordata 'Greenspire' - Greenspire Linden	1.5" BR	3	$95.00	$285.00
	Ulmus americana 'New Harmony' - New Harmony Elm	1.5" BR	3	$95.00	$285.00
	Ulmus parvifolia - Frontier Elm	1.5" BR	3	$95.00	$285.00
	Viburnum lentago - Nannyberry Viburnum	1.5" BR	6	$95.00	$570.00
	****Delivered on Saturday, 9/23****				
	Celtis occidentalis - Hackberry	1.5" BR	1	$95.00	$95.00
	Cercis canadensis - Eastern Redbud	1.5" BR	3	$95.00	$285.00
	Gleditsia triacanthos 'Skycole' - Skyline Honeylocust	1.5" BR	1	$95.00	$95.00
	Liridendron tulipifera - Tulip Tree	1.5" BR	1	$95.00	$95.00
	Malus 'Cardinal' - Cardinal Crabapple	1.5" BR	4	$95.00	$380.00
	Malus 'Spring Snow' - Spring Snow Crabapple	1.5" BR	2	$95.00	$190.00
	Syringa reticulata 'Ivory Silk' - Ivory Silk Japanese Lilac	1.5" BR	8	$95.00	$760.00
	Tilia cordata 'Glenleven' - Glenleven Linden	1.5" BR	2	$95.00	$190.00
	Ulmus americana 'New Harmony' - New Harmony Elm	1.5" BR	3	$95.00	$285.00
	Viburnum lentago - Nannyberry Viburnum	1.5" BR	1	$95.00	$95.00

	Tax Rate (if applicable)		0%	$0.00

TOTAL		**131**	**$12,310.00**

Terms: NET 10

THANK YOU FOR THE BUSINESS!

Sandridge Nursery, LLC

INV_TREEFODSM05
9/29/2023

INVOICE

FROM:

Sandridge Nursery, LLC
c/o Eric Goodhue
7530 SE 52nd St.
Carlisle, IA 50047
(515) 724-9599

TO:

Trees Forever
c/o Lexy Nelson
1515 Linden Street
Des Moines, IA 50309
(515) 661-8334

#	Item Description	Size	Qty	Unit Cost	Total
	****Delivered on Wednesday, 9/27****				
	Celtis occidentalis - Hackberry	1.5" BR	3	$95.00	$285.00
	Cercis canadensis - Eastern Redbud	1.5" BR	3	$95.00	$285.00
	Liridendron tulipifera - Tulip Tree	1.5" BR	2	$95.00	$190.00
	Platanus occidentalis 'Bloodgood' - London Planetree	1.5" BR	4	$95.00	$380.00
	Quercus bicolor - Swamp White Oak	1.5" BR	4	$95.00	$380.00
	Quercus coccinea - Scarlet Oak	1.5" BR	2	$95.00	$190.00
	Quercus macrocarpa - Bur Oak	1.5" BR	2	$95.00	$190.00
	Quercus rubra - Red Oak	1.5" BR	8	$95.00	$760.00
	Tilia cordata 'Greenspire' - Greenspire Linden	1.5" BR	1	$95.00	$95.00
	Ulmus parvifolia - Frontier Elm	1.5" BR	1	$95.00	$95.00
	****Delivered on Friday, 9/29****				
	Celtis occidentalis - Hackberry	1.5" BR	1	$95.00	$95.00
	Crataegus virdis 'Winter King' - Winter King Hawthorn	1.25" BR	1	$80.00	$80.00
	Malus 'Cardinal' - Cardinal Crabapple	1.5" BR	3	$95.00	$285.00
	Quercus macrocarpa - Bur Oak	1.5" BR	4	$95.00	$380.00
	Syringa reticulata 'Ivory Silk' - Ivory Silk Japanese Lilac	1.5" BR	2	$95.00	$190.00
	Ulmus americana 'New Harmony' - New Harmony Elm	1.5" BR	1	$95.00	$95.00

	Tax Rate (if applicable)		0%	$0.00

TOTAL		**42**	**$3,975.00**

Terms: NET 10

THANK YOU FOR THE BUSINESS!

Sandridge Nursery, LLC

INV_TREEFODSM06
10/6/2023

INVOICE

FROM:

Sandridge Nursery, LLC
c/o Eric Goodhue
7530 SE 52nd St.
Carlisle, IA 50047
(515) 724-9599

TO:

Trees Forever
c/o Lexy Nelson
1515 Linden Street
Des Moines, IA 50309
(515) 661-8334

#	Item Description	Size	Qty	Unit Cost	Total
	****Delivered on Thursday, 10/5****				
	Cercis canadensis - Eastern Redbud	1.5" BR	4	$95.00	$380.00
	Gelditsia triacanthos 'Skycole' - Skyline Honeylocust	1.5" BR	6	$95.00	$570.00
	Liridendron tulipifera - Tulip Tree	1.5" BR	7	$95.00	$665.00
	Malus 'Cardinal' - Cardinal Crabapple	1.5" BR	3	$95.00	$285.00
	Platanus occidentalis 'Bloodgood' - London Planetree	1.5" BR	5	$95.00	$475.00
	Quercus coccinea - Scarlet Oak	1.5" BR	7	$95.00	$665.00
	Quercus macrocarpa - Bur Oak	1.5" BR	7	$95.00	$665.00
	Syringa reticulata 'Ivory Silk' - Ivory Silk Japanese Lilac	1.5" BR	6	$95.00	$570.00
	Tilia cordata 'Greenspire' - Greenspire Linden	1.5" BR	5	$95.00	$475.00
	Ulmus americana 'New Harmony' - New Harmony Elm	1.5" BR	6	$95.00	$570.00
	Viburnum lentago - Nannyberry Viburnum	1.5" BR	4	$95.00	$380.00
	****Delivered on Friday, 10/6****				
	Celtis occidentalis - Hackberry	1.5" BR	6	$95.00	$570.00
	Cercis canadensis - Eastern Redbud	1.5" BR	9	$95.00	$855.00
	Crataegus virdis 'Winter King' - Winter King Hawthorn	1.25" BR	5	$80.00	$400.00
	Liridendron tulipifera - Tulip Tree	1.5" BR	5	$95.00	$475.00
	Malus 'Cardinal' - Cardinal Crabapple	1.5" BR	10	$95.00	$950.00
	Malus 'Donald Wyman' - Donald Wyman Crabapple	1.5" BR	2	$95.00	$190.00
	Malus 'Prairiefire' - Prairiefire Crabapple	1.5" BR	3	$95.00	$285.00
	Malus 'Prairiefire' - Prairiefire Crabapple	1.25" BR	2	$80.00	$160.00
	Malus 'Spring Snow' - Spring Snow Crabapple	1.5" BR	5	$95.00	$475.00
	Platanus occidentalis 'Bloodgood' - London Planetree	1.5" BR	3	$95.00	$285.00
	Quercus macrocarpa - Bur Oak	1.5" BR	5	$95.00	$475.00
	Syringa reticulata 'Ivory Silk' - Ivory Silk Japanese Lilac	1.5" BR	14	$95.00	$1,330.00
	Tilia cordata 'Greenspire' - Greenspire Linden	1.5" BR	4	$95.00	$380.00
	Ulmus americana 'New Harmony' - New Harmony Elm	1.5" BR	3	$95.00	$285.00
	Ulmus parvifolia - Frontier Elm	1.5" BR	1	$95.00	$95.00
	Viburnum lentago - Nannyberry Viburnum	1.5" BR	9	$95.00	$855.00

	Tax Rate (if applicable)	0%	$0.00

TOTAL		**146**	**$13,765.00**

Terms: NET 10

THANK YOU FOR THE BUSINESS!

Sandridge Nursery, LLC

INV_TREEFODSM07
10/14/2023

INVOICE

FROM:

Sandridge Nursery, LLC
c/o Eric Goodhue
7530 SE 52nd St.
Carlisle, IA 50047
(515) 724-9599

TO:

Trees Forever
c/o Lexy Nelson
1515 Linden Street
Des Moines, IA 50309
(515) 661-8334

#	Item Description	Size	Qty	Unit Cost	Total
	****Delivered on Thursday, 10/12****				
	Cercis canadensis - Eastern Redbud	1.25" BR	5	$80.00	$400.00
	Crataegus virdis 'Winter King' - Winter King Hawthorn	1.25" BR	4	$80.00	$320.00
	Liridendron tulipifera - Tulip Tree	1.5" BR	4	$95.00	$380.00
	Malus 'Cardinal' - Cardinal Crabapple	1.5" BR	6	$95.00	$570.00
	Malus 'Prairiefire' - Prairiefire Crabapple	1.5" BR	1	$95.00	$95.00
	Malus 'Prairiefire' - Prairiefire Crabapple	1.25" BR	2	$80.00	$160.00
	Platanus occidentalis 'Bloodgood' - London Planetree	1.5" BR	2	$95.00	$190.00
	Syringa reticulata 'Ivory Silk' - Ivory Silk Japanese Lilac	1.5" BR	21	$95.00	$1,995.00
	Tilia cordata 'Greenspire' - Greenspire Linden	1.5" BR	3	$95.00	$285.00
	Ulmus americana 'New Harmony' - New Harmony Elm	1.5" BR	3	$95.00	$285.00
	Viburnum lentago - Nannyberry Viburnum	1.5" BR	1	$95.00	$95.00
	****Delivered on Saturday, 10/14****				
	Betula nigra - River Birch	1.5" BR	3	$95.00	$285.00
	Celtis occidentalis - Hackberry	1.5" BR	4	$95.00	$380.00
	Cercis canadensis - Eastern Redbud	1.5" BR	3	$95.00	$285.00
	Gleditsia tracanthos 'Skycole' - Skyline Honeylocust	1.5" BR	2	$95.00	$190.00
	Liridendron tulipifera - Tulip Tree	1.5" BR	3	$95.00	$285.00
	Malus 'Cardinal' - Cardinal Crabapple	1.5" BR	6	$95.00	$570.00
	Malus 'Prairiefire' - Prairiefire Crabapple	1.5" BR	2	$95.00	$190.00
	Malus 'Prairiefire' - Prairiefire Crabapple	1.25" BR	3	$80.00	$240.00
	Quercus macrocarpa - Bur Oak	1.5" BR	5	$95.00	$475.00
	Syringa reticulata 'Ivory Silk' - Ivory Silk Japanese Lilac	1.5" BR	15	$95.00	$1,425.00
	Ulmus americana 'New Harmony' - New Harmony Elm	1.5" BR	3	$95.00	$285.00

	Tax Rate (if applicable)	0%	$0.00

TOTAL	**101**	**$9,385.00**

Terms: NET 10

THANK YOU FOR THE BUSINESS!

Sandridge Nursery, LLC

INV_TREEFODSM08
10/21/2023

INVOICE

FROM:

Sandridge Nursery, LLC
c/o Eric Goodhue
7530 SE 52nd St.
Carlisle, IA 50047
(515) 724-9599

TO:

Trees Forever
c/o Lexy Nelson
1515 Linden Street
Des Moines, IA 50309
(515) 661-8334

#	Item Description	Size	Qty	Unit Cost	Total
	****Delivered on Wednesday, 10/18****				
	Betula nigra - River Birch	1.5" BR	3	$95.00	$285.00
	Celtis occidentalis - Hackberry	1.5" BR	1	$95.00	$95.00
	Cercis canadensis - Eastern Redbud	1.25" BR	4	$80.00	$320.00
	Liridendron tulipifera - Tulip Tree	1.5" BR	1	$95.00	$95.00
	Platanus occidentalis 'Bloodgood' - London Planetree	1.5" BR	10	$95.00	$950.00
	Quercus macrocarpa - Bur Oak	1.5" BR	4	$95.00	$380.00
	Quercus rubra - Red Oak	1.5" BR	2	$95.00	$190.00
	****Delivered on Thursday, 10/19****				
	Celtis occidentalis - Hackberry	1.5" BR	5	$95.00	$475.00
	Cercis canadensis - Eastern Redbud	1.25" BR	1	$80.00	$80.00
	Cercis canadensis - Eastern Redbud	1.5" BR	3	$95.00	$285.00
	Crataegus virdis 'Winter King' - Winter King Hawthorn	1.25" BR	3	$80.00	$240.00
	Gleditsia tracanthos 'Skycole' - Skyline Honeylocust	1.5" BR	5	$95.00	$475.00
	Malus 'Cardinal' - Cardinal Crabapple	1.5" BR	7	$95.00	$665.00
	Malus 'Prairiefire' - Prairiefire Crabapple	1.5" BR	3	$95.00	$285.00
	Platanus occidentalis 'Bloodgood' - London Planetree	1.5" BR	4	$95.00	$380.00
	Quercus rubra - Red Oak	1.5" BR	4	$95.00	$380.00
	Syringa reticulata 'Ivory Silk' - Ivory Silk Japanese Lilac	1.5" BR	18	$95.00	$1,710.00
	Tilia cordata 'Greenspire' - Greenspire Linden	1.5" BR	4	$95.00	$380.00
	Ulmus americana 'New Harmony' - New Harmony Elm	1.5" BR	5	$95.00	$475.00
	****Delivered on Saturday, 10/21****				
	Betula nigra - River Birch	1.5" BR	3	$95.00	$285.00
	Cercis canadensis - Eastern Redbud	1.5" BR	2	$95.00	$190.00
	Crataegus virdis 'Winter King' - Winter King Hawthorn	1.25" BR	3	$80.00	$240.00
	Liridendron tulipifera - Tulip Tree	1.5" BR	3	$95.00	$285.00
	Malus 'Coralcole' - Coralburst Crabapple	1.25" BR	1	$80.00	$80.00
	Malus 'Prairiefire' - Prairiefire Crabapple	1.25" BR	2	$80.00	$160.00
	Malus 'Spring Snow' - Spring Snow Crabapple	1.5" BR	2	$95.00	$190.00
	Quercus bicolor - Swamp White Oak	1.5" BR	2	$95.00	$190.00
	Quercus rubra - Red Oak	1.5" BR	2	$95.00	$190.00
	Syringa reticulata 'Ivory Silk' - Ivory Silk Japanese Lilac	1.5" BR	12	$95.00	$1,140.00
	Tilia cordata 'Greenspire' - Greenspire Linden	1.5" BR	2	$95.00	$190.00
	Ulmus americana 'New Harmony' - New Harmony Elm	1.5" BR	2	$95.00	$190.00

	Tax Rate (if applicable)		0%	$0.00

TOTAL DELIVERED TO DATE	**420**	
TOTAL THIS INVOICE	**123**	**$11,475.00**

Terms: NET 10

THANK YOU FOR THE BUSINESS!

Sandridge Nursery, LLC

INV_TREEFODSM09
10/28/2023

INVOICE

FROM:

Sandridge Nursery, LLC
c/o Eric Goodhue
7530 SE 52nd St.
Carlisle, IA 50047
(515) 724-9599

TO:

Trees Forever
c/o Lexy Nelson
1515 Linden Street
Des Moines, IA 50309
(515) 661-8334

#	Item Description	Size	Qty	Unit Cost	Total
	****Delivered on Thursday, 10/26****				
	Cercis canadensis - Eastern Redbud	1.25" BR	9	$80.00	$720.00
	Crataegus virdis 'Winter King' - Winter King Hawthorn	1.25" BR	7	$80.00	$560.00
	Liridendron tulipifera - Tulip Tree	1.5" BR	6	$95.00	$570.00
	Malus 'Cardinal' - Cardinal Crabapple	1.5" BR	2	$95.00	$190.00
	Malus 'Coralcole' - Coralburst Crabapple	1.25" BR	7	$80.00	$560.00
	Malus 'Prairiefire' - Prairiefire Crabapple	1.25" BR	7	$80.00	$560.00
	Platanus occidentalis 'Bloodgood' - London Planetree	1.5" BR	6	$95.00	$570.00
	Quercus bicolor - Swamp White Oak	1.5" BR	4	$95.00	$380.00
	Quercus rubra - Red Oak	1.5" BR	6	$95.00	$570.00
	Syringa reticulata 'Ivory Silk' - Ivory Silk Japanese Lilac	1.5" BR	19	$95.00	$1,805.00
	Tilia cordata 'Greenspire' - Greenspire Linden	1.5" BR	4	$95.00	$380.00
	Ulmus americana 'New Harmony' - New Harmony Elm	1.5" BR	5	$95.00	$475.00
	****Delivered on Saturday, 10/28****				
	Betula nigra - River Birch	1.5" BR	2	$95.00	$190.00
	Celtis occidentalis - Hackberry	1.5" BR	2	$95.00	$190.00
	Cercis canadensis - Eastern Redbud	1.25" BR	3	$80.00	$240.00
	Crataegus virdis 'Winter King' - Winter King Hawthorn	1.25" BR	3	$80.00	$240.00
	Liridendron tulipifera - Tulip Tree	1.5" BR	2	$95.00	$190.00
	Malus 'Cardinal' - Cardinal Crabapple	1.5" BR	6	$95.00	$570.00
	Malus 'Donald Wyman' - Donald Wyman Crabapple	1.5" BR	2	$95.00	$190.00
	Malus 'Spring Snow' - Spring Snow Crabapple	1.25" BR	2	$80.00	$160.00
	Ostrya virginiana - American Hophornbeam	1.5" BR	3	$95.00	$285.00
	Quercus macrocarpa - Bur Oak	1.5" BR	2	$95.00	$190.00
	Quercus rubra - Red Oak	1.5" BR	4	$95.00	$380.00
	Syringa reticulata 'Ivory Silk' - Ivory Silk Japanese Lilac	1.5" BR	12	$95.00	$1,140.00
	Tilia cordata 'Glenleven' - Glenleven Linden	1.5" BR	2	$95.00	$190.00
	Ulmus americana 'New Harmony' - New Harmony Elm	1.5" BR	2	$95.00	$190.00

	Tax Rate (if applicable)	0%	$0.00

TOTAL DELIVERED TO DATE	**549**	
TOTAL THIS INVOICE	**129**	**$11,685.00**

Terms: NET 10

THANK YOU FOR THE BUSINESS!

Sandridge Nursery, LLC

INV_TREEFODSM10
11/4/2023

INVOICE

FROM:

Sandridge Nursery, LLC
c/o Eric Goodhue
7530 SE 52nd St.
Carlisle, IA 50047
(515) 724-9599

TO:

Trees Forever
c/o Lexy Nelson
1515 Linden Street
Des Moines, IA 50309
(515) 661-8334

#	Item Description	Size	Qty	Unit Cost	Total
	****Delivered on Thursday, 11/2****				
	Betula nigra - River Birch	1.5" BR	4	$95.00	$380.00
	Cercis canadensis - Eastern Redbud	1.25" BR	8	$80.00	$640.00
	Crataegus virdis 'Winter King' - Winter King Hawthorn	1.25" BR	5	$80.00	$400.00
	Gleditsia triacanthos 'Skycole' - Skyline Honeylocust	1.5" BR	2	$95.00	$190.00
	Liridendron tulipifera - Tulip Tree	1.5" BR	6	$95.00	$570.00
	Malus 'Cardinal' - Cardinal Crabapple	1.5" BR	2	$95.00	$190.00
	Malus 'Coralcole' - Coralburst Crabapple	1.25" BR	4	$80.00	$320.00
	Malus 'Spring Snow' - Spring Snow Crabapple	1.25" BR	2	$80.00	$160.00
	Platanus occidentalis 'Bloodgood' - London Planetree	1.5" BR	5	$95.00	$475.00
	Quercus rubra - Red Oak	1.5" BR	7	$95.00	$665.00
	Syringa reticulata 'Ivory Silk' - Ivory Silk Japanese Lilac	1.5" BR	19	$95.00	$1,805.00
	Tilia cordata 'Greenspire' - Greenspire Linden	1.5" BR	4	$95.00	$380.00
	Ulmus americana 'New Harmony' - New Harmony Elm	1.5" BR	6	$95.00	$570.00
	****Delivered on Saturday, 11/4****				
	Gleditsia triacanthos 'Skycole' - Skyline Honeylocust	1.5" BR	7	$95.00	$665.00
	Platanus occidentalis 'Bloodgood' - London Planetree	1.5" BR	2	$95.00	$190.00
	Quercus rubra - Red Oak	1.5" BR	3	$95.00	$285.00
	Tilia cordata 'Glenleven' - Glenleven Linden	1.5" BR	4	$95.00	$380.00
	****Delivered on Saturday, 11/4****				
	Betula nigra - River Birch	1.5" BR	5	$95.00	$475.00
	Celtis occidentalis - Hackberry	1.5" BR	3	$95.00	$285.00
	Cercis canadensis - Eastern Redbud	1.25" BR	2	$80.00	$160.00
	Crataegus virdis 'Winter King' - Winter King Hawthorn	1.25" BR	3	$80.00	$240.00
	Gleditsia triacanthos 'Skycole' - Skyline Honeylocust	1.5" BR	6	$95.00	$570.00
	Ulmus americana 'New Harmony' - New Harmony Elm	1.5" BR	3	$95.00	$285.00

	Tax Rate (if applicable)	0%	$0.00

TOTAL DELIVERED TO DATE	**661**	
TOTAL THIS INVOICE	**112**	**$10,280.00**

Terms: NET 10

THANK YOU FOR THE BUSINESS!

Sandridge Nursery, LLC

INV_TREEFODSM11
11/12/2023

INVOICE

FROM:

Sandridge Nursery, LLC
c/o Eric Goodhue
7530 SE 52nd St.
Carlisle, IA 50047
(515) 724-9599

TO:

Trees Forever
c/o Megan Schneider
1515 Linden Street
Des Moines, IA 50309
(515) 661-8334

#	Item Description	Size	Qty	Unit Cost	Total
	Balance of 2023 Contractual Trees				
	1,606 Contract - 784 Delivered = 822 Residual	1.5" BR	822	$95.00	$78,090.00
	Tax Rate (if applicable)			0%	$0.00
	TOTAL THIS INVOICE		**822**		**$78,090.00**

Terms: NET 10

THANK YOU FOR THE BUSINESS!

Iowa Native Trees LLC 2023

56645 170th St
Ames, IA 50010 US
(515) 664-8633
iowanativetrees@gmail.com

INVOICE

BILL TO
Megan Schneider
Trees Forever Des Moines

SHIP TO
Megan Schneider
Trees Forever Des Moines

INVOICE	2195
DATE	09/29/2023
TERMS	Net 30
DUE DATE	10/29/2023

DATE	SERVICE	DESCRIPTION	QTY	RATE	AMOUNT
		Des Moines Chesterfield Park Planting Fall 23			
	Amelanchier	Serviceberry, #7	18	90.00	1,620.00
	Populus tremoloides	Quaking aspen, #10	19	125.00	2,375.00
	Celtis	Hackberry, #10	8	110.00	880.00
	Quercus alba	White oak, 1.25" 12" mesh	2	175.00	350.00
	Quercus bicolor	Swamp white oak, 1.5" 12" mesh	3	175.00	525.00
	Quercus macrocarpa	Bur oak, 1.5" 12" mesh	4	165.00	660.00
	Tilia americana	American linden, 1" 12" mesh	7	150.00	1,050.00
	Viburnum dentatum	Arrowwood viburnum, #3	6	40.00	240.00
	Alnus rugosa	Speckled alder, #7 4-5'	12	90.00	1,080.00
	Pinus strobis	White Pine, #7	8	110.00	880.00
	Delivery charge	Deliver Charge - 50 miles at $3.50/mile	1	175.00	175.00

SUBTOTAL	9,835.00
TAX	0.00
TOTAL	9,835.00
BALANCE DUE	**$9,835.00**

Pay invoice

Attestation of Planting Affirmation

CITY FOREST
CREDITS

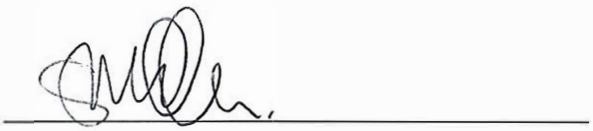
City of Des Moines Urban Tree Planting 2023
Attestation of Planting Affirmation

I, the undersigned working on behalf of Public Works Department at the City of Des Moines, attest and confirm that tree planting(s) occurred on the following dates under the project named in the City Forest Credits Registry City of Des Moines Urban Tree Planting 2023 by the Project Operator, Trees Forever.

Trees were planted under this project on the following date(s): April 1 –November 30, 2023.

The approximate number of trees planted is: 1945

Signed on January 11 in 2024, by Shane McQuillan, City Forester, for City of Des Moines.



Signature
Shane McQuillan
Printed Name
(515) 283-4105
Phone
Sdmcquillan@dmgov.org
Email

Attestation of No Double Counting and No Net Harm

City of Des Moines Urban Tree Planting 2023
Attestation of No Double Counting of Credits and No Net Harm

I am the Interim CEO of Trees Forever and make this attestation regarding no double counting of credits and no net harm from this tree planting project, City of Des Moines Urban Tree Planting 2023.

1. 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.

2. No Double Counting by Applying for Credits from another Registry

Trees Forever has not and will not seek credits for CO_2 for the project trees or for this project from any other organization or registry issuing credits for CO_2 storage.

3. No Double Counting by Seeking Credits for the Same Trees or Same CO_2 Storage

Trees Forever has not and will not apply for a project including the same trees as this project nor will it seek credits for CO_2 storage for the project trees or for this project in any other project or more than once. Trees Forever has checked the location of the Project Area against registered urban forest carbon afforestation and reforestation projects. Project Operator has determined that there is no overlap of Project Area or Project Trees with any registered urban forest carbon afforestation and reforestation project.

4. No Net Harm

The trees planted in this project will produce many benefits, as described in our Application and PDD. Like almost all urban trees, the project trees are planted not for harvest but for the benefits they deliver to people, communities, and the environment as living trees in a metropolitan area.

The project trees will produce many benefits and will not cause net harm. Specifically, they will not:

- Displace native or indigenous populations
- Deprive any communities of food sources
- Degrade a landscape or cause environmental damage

Signed on January 11 in 2024, by Debra Powers, Interim CEO, for Trees Forever.

Debra M. Powers
_____
Signature

563-275-9643_____
Phone

Dpowers@treesforever.org_____
Email

INSTRUCTIONS

1. Refresh the data by going to the "Data" tab, and clicking "Refresh All" under the "Queries & Connections" section
2. Under the "No Double Counting Within Project" check, filter for your project name by:
   Click the dropdown next to "All"
   Check the box for "Select multiple items"
   Expand the "All" option and select only the name of your project

CHECK: No Double Counting Within Project

Project Name	Des Moines 2023

Number of Trees	Number of Unique Lat & Long Combos
1945	1945

TRUE	Number of trees planted is equal to the number of unique latitude & longitude combos. **No double counting within project**

CHECK: No Double Counting Across Projects

Number of Unique Lat & Long Combos	Distinct Count of Project Category
6174	6174

TRUE	Each tree is classified as being part of a past or current project. Since each unique lat and long combo is sorted uniquely into a past OR a current project, then the current planting sites are not part of any past projects. **No double counting in current project vs past projects**

Attestation of Additionality

City of Des Moines Urban Tree Planting 2023
Attestation of Additionality

I am the Interim CEO of Trees Forever and make this attestation regarding additionality from this tree planting project, City of Des Moines Urban Tree Planting 2023.

- 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 1.8)
    - 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 1.9)
- 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
    - Trees Forever has signed a Project Implementation Agreement with City Forest Credits for 26 years.
- The 26-year Project Duration commitment is additional to and longer than any commitment Trees Forever makes to non-carbon project tree plantings.
- The revenue from the sale of carbon credits will play a material role in the successful and durable storage of Project Trees' carbon stock by providing funding that will help ensure the establishment and long-term health of Project Trees. Trees forever will reinvest carbon revenues to plant and care for additional trees in the Des Moines metro area, which include two years of maintenance and care.
- Previous Director of Programs Leslie Berckes was introduced to Mark McPherson in 2018 when Microsoft was looking to fund projects. Trees Forever launched the Des Moines Growing Futures program in the spring of 2019 with funding from Microsoft. The City of Des Moines was and remains supportive of Trees Forever submitting all trees planted through the program for carbon crediting and reinvesting the proceeds back into the program. The first project submitted for credits was in 2019.

Signed on January 11 in 2024, by Debra Powers, Interim CEO, for Trees Forever.

Debra M. Powers
_____

Signature

Debra Powers_____
Printed Name

563-275-9643_____
Phone

Dpowers@treesforever.org_____
Email

Sustainability Report Card

INDICATORS OF A SUSTAINABLE URBAN FOREST IN DES MOINES	OVERALL OBJECTIVE OR INDUSTRY STANDARD	PERFORMANCE LEVELS AND CRITERIA			DES MOINES 08/01/2020
		LOW	MODERATE	GOOD	
URBAN TREE CANOPY	Achieve the desired tree canopy cover according to goals set for the entire City and neighborhoods. Alternatively, achieve 75% of the total canopy possible for the entire City and in each neighborhood.	Canopy is decreasing and/or no canopy goals have been set.	Canopy is not dropping, but not on a trajectory to achieve the DNR-established goal of 3% canopy increase by 2045.	Canopy goal is achieved, or well on the way to achievement.	Des Moines canopy cover is 29%. Meeting the current DNR canopy increase goal of 3% will require quintupling the planting budget.
LOCATION OF CANOPY (EQUITABLE DISTRIBUTION)	Achieve low variation between tree canopy and equity factors citywide by neighborhood. Ensure that the benefits of tree canopy are available to all, especially for those most affected by these benefits.	Tree planting and public outreach and education is not determined by tree canopy cover or benefits.	Tree planting and public outreach and education is focused on neighborhoods with low tree canopy	Tree planting and public outreach and education is focused in neighborhoods with low tree canopy and a high need for tree benefits.	The City is committed to planting in underserved areas needing a high degree of tree benefits until equity is reached.
AGE OF TREES (SIZE AND AGE DISTRIBUTION)	Establish a diverse-aged population of public trees across the entire city and for each neighborhood. Ideal standard: • 0-8" DBH: 40% • 9-17" DBH: 30% • 18-24" DBH: 20% • over 24" DBH: 10%	Age distribution is not proportionately distributed across size classes at the city level.	Age distribution is evenly distributed at city level, though unevenly distributed at the neighborhood level.	Age distribution is generally aligned with the ideal standard diameter classes at the neighborhood level.	Generally aligned with ideal age distribution: 37% 0-8"; 28% 9-17"; 15% 18-24"; 20% 24"+.
INDICATORS	OVERALL OBJECTIVE OR INDUSTRY STANDARD	PERFORMANCE LEVELS AND CRITERIA			DES MOINES 08/01/2020
		LOW	MODERATE	GOOD	
CONDITION OF PUBLICLY OWNED NATURAL AREAS (TREES MANAGED EXTENSIVELY)	Possess a detailed understanding of the ecological structure and function of all publicly-owned natural areas (such as woodlands, ravines, stream corridors, etc.), As well as usage patterns.	No current information is available on tree condition or risk.	Publicly-owned natural areas are identified in a sample-based "natural areas survey" or similar data.	Information from a current, GIS-based, 100% complete natural areas survey is utilized to document ecological structure and function, as well as usage patterns.	Possess GLO survey (1930's) plus a natural resources inventory (2012), plus a sample DNR stewardship plan upon which plans and activities are based. Able to account for crop trees, burns, snags and dens.
TREES ON PRIVATE PROPERTY	Possess a solid understanding of the extent, location and general condition of trees on private lands	No data are available on private trees.	Current tree canopy assessment reflects basic information (location) of both public and private canopy combined.	Detailed information available on private trees. Ex. Bottom-up sample-based assessment of trees.	The City knows where there are pockets of oak. The City took sampling data on private ash ownership.
DIVERSITY	Establish a genetically diverse population of publicly-owned trees across the entire city and for each neighborhood. Tree populations should be comprised of no more than 30% of any family, 20% of any genus, or 10% of any species.	Fewer than five species dominate the entire tree population citywide	No species represents more than 20% of the entire tree population citywide.	No species represents more than 10% of the entire tree population citywide.	2 Species over 10%. Maple 17%; Oak 13%
SUITABILITY	Establish a tree population suited to the urban environment and adapted to the overall region. Suitable species are gauged by exposure to imminent threats, considering the "right tree for the right place" concept and invasive species.	Less than 50% of trees are considered suitable for the site.	50% To 75% of trees are considered suitable for the site.	More than 75% of trees are considered suitable for the site.	Right Tree, Right Place is the standard used. More than 75% of trees are suitable for their site.
NEIGHBORHOOD ACTION	Residents understand, cooperate, and participate in urban forest management at the neighborhood level. Urban forestry is a neighborhood-scale issue.	Little or no resident involvement or neighborhood action.	Some active groups are engaged in advancing urban forestry activity, but with no unified set of goals or priorities.	The majority of all neighborhoods are organized, connected, and working towards a unified set of goals and priorities.	Some neighborhoods have trees included in their official neighborhood plans. Each has unique goals but all steer toward a common goal.
LARGE PRIVATE & INSTITUTIONAL LANDHOLDER INVOLVEMENT	Large, private, and institutional landholders embrace citywide goals and objectives through targeted resource management plans.	Large private landholders are unaware of issues and potential influence in the urban forest. No large private land management plans are currently in place.	Aware of issues and potential influence in the urban forest. No large private land management plans are currently in place. Education materials and advice is available to large private landholders. Few large private landholders or institutions have management plans in place.	Clear and concise goals are established for large private landholders through direct education and assistance programs. Key landholders and institutions have management plans in place.	Key landowners have or are making tree canopy plans. Drake University is a Tree Campus USA.
GREEN INDUSTRY INVOLVEMENT	The green industry works together to advance citywide urban forest goals and objectives. The City and its partners capitalize on local green industry expertise and innovation.	Little or no involvement from green industry leaders to advance local urban forest goals.	Some partnerships are in place to advance local urban forest goals, but more often for the short-term.	Long-term committed partnerships are working to advance local urban forest goals.	Typically, it is contract work that brings the City and green industry together for the short-term.
CITY DEPARTMENTS AND AGENCIES	All City departments and agencies cooperate to advance citywide urban forest goals and objectives.	Conflicting goals and/ or actions among City departments and agencies.	Informal teams among departments and agencies are communicating and implementing common goals on a project-specific basis.	Common goals and collaboration occur across all departments and agencies. City policy and actions are implemented by formal interdepartmental and interagency working teams on all City projects.	Public Works Forestry works with Engineering, Community Development, and Parks and Recreation to align urban tree canopy goals of tree protection and increased planting. Committed to alignment with the tomorrow plan.
FUNDER ENGAGEMENT	Local funders are engaged and invested in urban forest initiatives. Funding is adequate to implement citywide urban forest management plan.	Little or no funders are engaged in urban forest initiatives.	Funders are engaged in urban forest initiatives at minimal levels for short-term projects.	Multiple funders are fully engaged and active in urban forest initiatives for short-term projects and long-term goals.	Tree Des Moines raised money to complete the tree inventory. Trees Forever is a long-term partner engaged in promotion, planting, and fundraising.
UTILITY ENGAGEMENT	All utilities are aware of and vested in the urban forest and cooperate to advance citywide urban forest goals and objectives.	Utilities and City agencies act independently of urban forest efforts. No coordination exists.	Utilities and City agencies have engaged in dialogues about urban forestry efforts with respect to capital improvement and infrastructure projects.	Utilities, City agencies, and other stakeholders integrate and collaborate on all urban forestry efforts, including planning, site work, and outreach/ education.	MidAmerican Energy, Des Moines Water Works, and cellular/cable providers collaborate on planning and site work. MidAmerican Energy and Des Moines Water Works represent City messaging to their clients.
DEVELOPER ENGAGEMENT	The development community is aware of and vested in the urban forest and cooperates to advance citywide urban forest goals and objectives.	Little or no cooperation from developers in (or awareness of) municipality-wide urban forest goals and objectives.	Some cooperation from developers and general awareness and acceptance of municipality-wide goals and objectives.	Specific collaborative arrangements across developer community in support of municipality-wide goals and objectives.	Whether by effect of ordinance or by developer initiative, the developer community accomplishes the tree protection and tree planting goals of the City.
PUBLIC AWARENESS	The general public understands the benefits of trees and advocates for the role and importance of the urban forest.	Trees are generally seen as a nuisance, and thus, a drain on City budgets and personal paychecks.	Trees are generally recognized as important and beneficial.	Trees are seen as valuable infrastructure and vital to the community's well-being. The urban forest is recognized for the unique environmental, economic, and social services it provides to the community.	The benefits of trees are expressed routinely and the public has embraced both the need for, and the desire to have, a healthy urban tree canopy.
REGIONAL COLLABORATION	Neighboring communities and regional groups are actively cooperating and interacting to advance the region's stake in the City's urban forest.	Little or no interaction between neighboring communities and regional groups.	Neighboring communities and regional groups share similar goals and policy vehicles related to trees and the urban forest.	Communities and regional groups share similar goals and policy vehicles related to trees and the urban forest. Regional urban forest planning, coordination, and management is widespread.	The Tomorrow Plan and the Capital Crossroads documents promote shared urban tree canopy goals. Metro municipal forestry leaders meet regularly to discuss and plan urban forest strategies.
TREE INVENTORY	Comprehensive, GIS-based, current inventory of all intensively-managed public trees to guide management, with mechanisms in place to keep data current and available for use. Data allow for analysis of age distribution, condition, risk, diversity, and suitability.	No inventory or out-of-date inventory of publicly-owned trees.	Partial or sample-based inventory of publicly-owned trees, inconsistently updated.	Complete, GIS-based inventory of publicly-owned trees, updated on a regular, systematic basis.	Completed in 2017 by Davey Resource Group. Management actions are updated daily. Plans to update entire inventory 1/5th at a time on 5-year cycle.
CANOPY ASSESSMENT	Accurate, high-resolution, and recent assessment of existing and potential citywide tree canopy cover that is regularly updated and available for use across various departments, agencies, and/ or disciplines.	No tree canopy assessment.	Sample-based canopy cover assessment, or dated (over 10 years old) high-resolution canopy assessment.	High-resolution tree canopy assessment using aerial photographs or satellite imagery.	Urban tree canopy (UTC) assessment completed in 2009 and updated in 2014 (US Forest Service and University of Vermont)
MANAGEMENT PLAN	Existence and buy-in of a comprehensive urban forest management plan to achieve citywide goals. Re-evaluation is conducted every 5 to 10 years.	No urban forest management plan exists.	A plan for the publicly-owned forest resource exists but is limited in scope, acceptance, and implementation.	A comprehensive plan for the publicly owned forest resource exists and is accepted and implemented.	Urban Forest Master Plan completed in 2020, including a management plan with benchmarks for accomplishment.
RISK MANAGEMENT PROGRAM	All publicly-owned trees are managed for maximum public safety by way of maintaining a citywide inventory, conducting proactive annual inspections, and eliminating hazards within a set timeframe based on risk level. Risk management program is outlined in the management plan.	Request-based, reactive system. The condition of publicly-owned trees is unknown.	There is some degree of risk abatement for publicly-owned trees, but risk is still managed on a request-based reactive system.	There is a complete tree inventory with risk assessment data and a risk abatement program in effect. Hazards are eliminated within a set time period depending on the level of risk.	The TK8 inventory includes a risk assessment. Forestry Division works proactively to eliminate or mitigate hazards.
MAINTENANCE PROGRAM OF PUBLICLY-OWNED TREES (TREES MANAGED INTENSIVELY)	All intensively-managed, publicly-owned trees are well maintained for optimal health and condition in order to extend longevity and maximize benefits. A reasonable cyclical pruning program is in place, generally targeting 5-7 year cycles. The maintenance program is outlined in the management plan.	Request-based, reactive system. Little-to-no systematic pruning program is in place for publicly-owned trees.	All publicly-owned trees are systematically maintained, but pruning cycle is inadequate.	All publicly-owned trees are proactively and systematically maintained and adequately pruned on a cyclical basis.	Hiring first of three two-person pruning crews in 2020 to initiate a 7-year cyclical pruning rotation.
TREE PROTECTION POLICY	Comprehensive and regularly updated tree protection ordinance with enforcement ability is based on community goals. The benefits derived from trees on public and private property are ensured by the enforcement of existing policies.	No tree protection policy.	Policies are in place to protect trees, but the policies are not well-enforced or ineffective.	Protection policies ensure the safety of trees on public and private land. The policies are enforced and supported by significant deterrents and shared ownership of City goals.	City Forester and Engineering Department co-designed robust tree protection standards. Enforced.
CITY STAFFING AND EQUIPMENT	Adequate staff and access to the equipment and vehicles needed to implement the management plan. A high-level urban forester or planning professional, strong operations staff, and solid ISA Certified Arborist technicians.	Insufficient staffing levels, insufficiently-trained staff, and/ or inadequate equipment and vehicle availability	ISA Certified Arborists and professional urban foresters on staff have some professional development but are lacking adequate staff levels or adequate equipment.	Multi-disciplinary team within the urban forestry unit, including an urban forest professional, operations manager, and Arborist technicians. Vehicles and equipment are sufficient to complete required work.	The City Forester, Urban Forestry Project Manager, and Forestry Section Chief are all ISA Certified and Tree Risk Assessment Qualified (TRAQ). 8 of 11 Arborists are ISA-Certified. The hiring standard for Arborists is they must have ISA certification. All vehicles will be current within two years.
FUNDING	Appropriate funding in place to fully implement both proactive and reactive needs based on a comprehensive Urban Forest Management Plan.	Funding comes from the public sector only and covers only reactive work.	Funding levels (public and private) generally cover mostly reactive work. Low levels of risk management and planting in place.	Dynamic, active funding from engaged private partners and adequate public funding are used to proactively manage and expand the urban forest.	Adequate funding in place for perpetual maintenance as well as hazard mitigation. Seek to boost planting by budget increase and nonprofit fundraising.
DISASTER PREPAREDNESS & RESPONSE	A disaster management plan is in place related to the City's urban forest. The plan includes staff roles, contracts, response priorities, debris management, and a crisis communication plan. Staff are regularly trained and/or updated.	No disaster response plan is in place.	A disaster plan is in place, but pieces are missing and/or staff are not regularly trained or updated.	A robust disaster management plan is in place, regularly updated and staff is fully trained on roles and processes.	Forestry Division has a local disaster management plan. They will also adhere to the County disaster plan as needed for wide-scale events.
COMMUNICATION	Effective avenues of two-way communication exist between the City departments and between the City and its residents. Messaging is consistent and coordinated, when feasible	No avenues are in place. City departments and public determine on an ad-hoc basis the best messages and avenues to communicate.	Avenues are in place but used sporadically and without coordination or only on a one-way basis.	Avenues are in place for two-way communication, are well-used with targeted, coordinated messages.	Communications are excellent. Public Works has dedicated expertise from the Communications Office to design and launch media, as well as effectively respond to major issues. Tiny Trees (dsm.city/tinytrees) is an example.

DNR Derecho Report

Assessment of urban tree canopy damage in incorporated communities resulting from the August 2020 Midwest Derecho

Nick McGrath; Iowa Department of Natural Resources and Trees Forever

Summary of urban forest damage in incorporated communities resulting from a single derecho wind event.

INTRODUCTION

Derechos are commonplace in the eastern half of the contiguous United States with some locations experiencing up to two per year (Figure 1). In order to be classified as a derecho a storm must have consistent straight-line winds at speeds of 58 mph or greater, and wind damage which extends for at least 250 miles. Downbursts, or stronger winds within the storm path, can be clocked at upwards of 90 mph. The destructive potential of derechos is also due to the high speeds of the parent system. Often these storm systems move at speeds upwards of 50 mph, offering little to no warning for those in its path (Corfidi et. al. 2018).

Figure 1. Odds of the occurrence of derechos in the U.S. Data source: National Weather Service

"On August 10th and 11th, 2020 a derecho - a widespread, long-lived, straight-line windstorm - struck the State of Iowa and surrounding states delivering catastrophic damage to structures, crops, and trees" (Goff et. al. 2021). Sustained winds of 70 miles per hour (mph) lasted nearly an hour over a large swath of central and eastern Iowa, and wind gusts of 110 to 140 mph impacted portions of five Iowa counties (Figure 2).

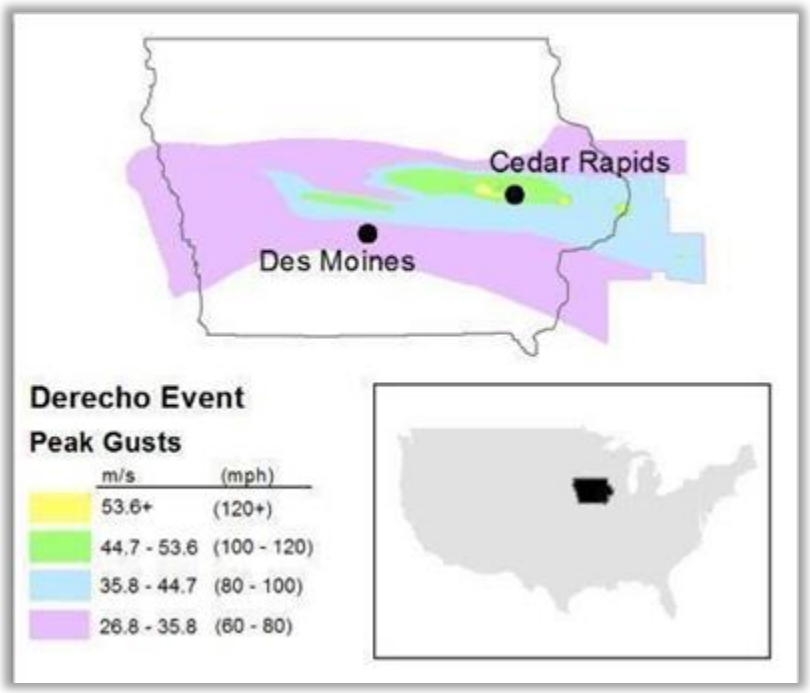


Figure 2. Estimated peak wind gusts of the Midwest Derecho, August 10-11, 2020. Iowa, USA. Data source: NOAA Storm Prediction Center (Goff et al.2021).

The swath of damage resulting from this line of storms extended over 770 miles over several state lines. This system also spawned twenty five tornados across Iowa, Illinois and Indiana (Figure 3).

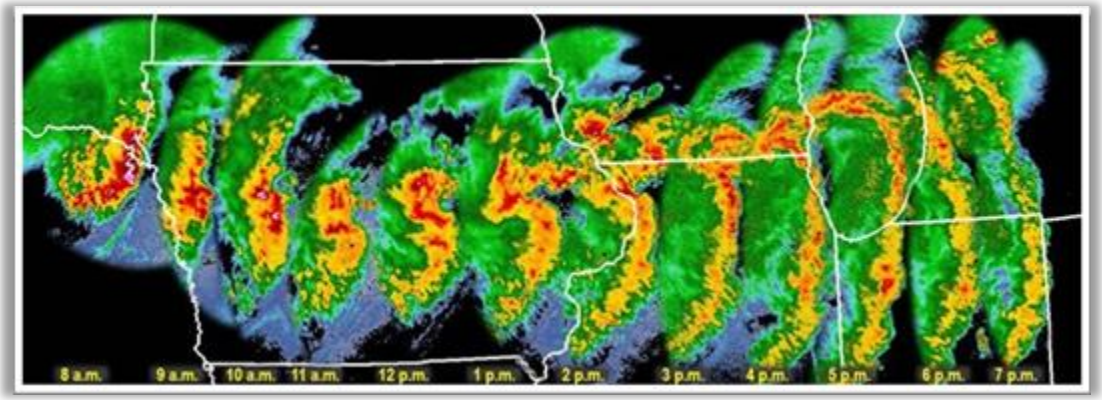


Figure 3. August 10, 2020 Derecho: Lowest Angle NWS Radar Reflectivity at One Hour Time Steps. Data Source: National Weather Service Chicago.

"The strongest estimated wind speeds in the vicinity of Cedar Rapids, Iowa, were among the highest wind speeds ever recorded during a derecho event, peaking at about 140 mph. Estimates indicate that this is the costliest thunderstorm event in recorded history in the United States" (NOAA). The severity and scope of damage crippled the Iowa communities within the storm path and necessitated a significant response from government at all levels.

DEFINITIONS

"Urban tree canopy, defined as the layer of tree leaves, branches and stems in a community that cover the ground when viewed from above, is a simple way for a community to get an overall picture of both private and public trees" (Iowa DNR). This definition does not include grassland. All estimates reported here are for canopy of any type within incorporated communities.

For the purposes of this report "damaged" is defined as injured but able to survive either on its own or with pruning. "Destroyed" is defined as having sustained extensive canopy and/or stem damage necessitating removal or already on

the ground.

METHODS

Acquiring the data in this report was made possible by a request to the USFS who assisted with an aerial flight of the impacted area. Iowa Derecho Damage Survey (IDDS) data, collected by Iowa DNR with the assistance of the Maryland Department of Agriculture, was collected September 21-24 with assistance from the USFS (Figure 4 through Figure 6). The percentage of acres damaged was assessed with Iowa Derecho Damage Survey (IDDS) data based on visible damage and destruction from the air along the designated flight path. In instances where multiple severity categories of damage were recorded, an averaged midpoint was applied when estimating damage and loss totals for that community. The damage estimates for communities evaluated through aerial inspection were compiled for each county to establish a baseline county average damage percentage.

The aerial flight of the Iowa Derecho Damage Survey was able to directly assess damage in 74 incorporated communities. Due to restrictions in the aerial flight of the Iowa Derecho Damage Survey it was not possible to survey all communities impacted by the derecho wind event. When possible, a baseline average damage percentage was established for each county using data collected from surveyed communities. That average, respectively, was applied to all communities within the county which were not directly surveyed. In counties where no communities were directly surveyed no baseline county average was established and no damage estimates were suggested.

The Iowa Derecho Damage Survey damage was applied to canopy cover data for total acres of damage. Urban canopy cover for Iowa communities was assessed using a high-resolution land cover dataset, target year 2009, (2009 High Resolution Land Cover Web Service) in conjunction with the incorporated boundaries from the 2010 census data (U.S. Census Bureau). An average of 135 trees per acre was assumed, using the nearest studied Midwest City, Chicago (Nowak & Greenfield 2018, US Urban Forest Statistics, Values, and Projections; Journal of Forestry, 171-172).

RESULTS

It is estimated that the derecho wind event damaged 32,773 acres of urban canopy across Iowa based on the methods listed above. The number of individual trees damaged or destroyed is estimated to be 4,424,426. This estimate was obtained using Chicago averages of i-Tree data of 135 trees per acre and tree cover averaging 35.8% (Nowak & Greenfield, 2018).

An estimate of some benefits lost due to the August 10, 2020 derecho wind event was calculated based on statewide data regarding urban forest structural characteristics (Nowak & Greenfield, 2018. 173-176). Assuming an urban canopy of 34,300,000 trees statewide, a total damaged estimate of 4,424,426 trees equates to 12.9% of the total canopy. This percentage was applied to all known structural characteristics and values to determine the annual loss of benefits as well as the immediate loss of long-term carbon storage. It is estimated the total impact for both sequestration and storage is $20,238,846.62 per year (Table 1). The standard error of these calculations is unknown.

Table 1. Estimated structural value and benefit loss in Iowa due to the derecho wind event on August 10, 2020. Data source: Nowack & Greenfield, 2018.

Structural Loss

Trees		Leaf Area	Leaf Biomass	Carbon Storage	
# of trees	Trees Per Capita	Acres	Tons	Tons	$
4,424,426	17.60	103,193	35,343.81	735,254.47	90,294,408.12

Annual Benefit Loss

Carbon Sequestration		Avoided Emissions		Air Pollution Removal	Avoided Energy Use	Total
Tons/Year	$/Year	Tons/Year	$/Year	$/Year	$/Year	$/Year
22,870.28	2,966,816.12	335.38	2,708,832.24	7,713,722.29	6,849,475.82	20,238,846.62

DISCUSSION

Although it would be feasible to rely on city data (e.g. inventories, FEMA reporting, etc.) to produce a smaller scale damage report on public trees, this report presents a statewide assessment of the swath of damage that occurred within Iowa urban areas as a result of the August 10, 2020, derecho wind event. Midpoints and averages were used for the best estimates.

The lowest estimated percentage of urban canopy damage in a community was 7%. No communities were assessed greater than 50% due to limitations in data collection. The flight path was structured to document the most severely damaged locations therefore county averages may not be a reflective sample (Figure 3).

With the understanding that not all incorporated communities within a given county were affected to the same degree and that unincorporated communities were not surveyed, the damage in estimated tree losses is grouped by county (Table 2). This report is a snapshot of trees exhibiting signs of damage or mortality at the time of the aerial survey. It does not account for future mortality due to tree injury, increases in pests and disease, or dieback exhibited after the Spring of 2021. Those factors were not included in the interest of producing this report as expediently as possible.

CITATIONS

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APPENDIX

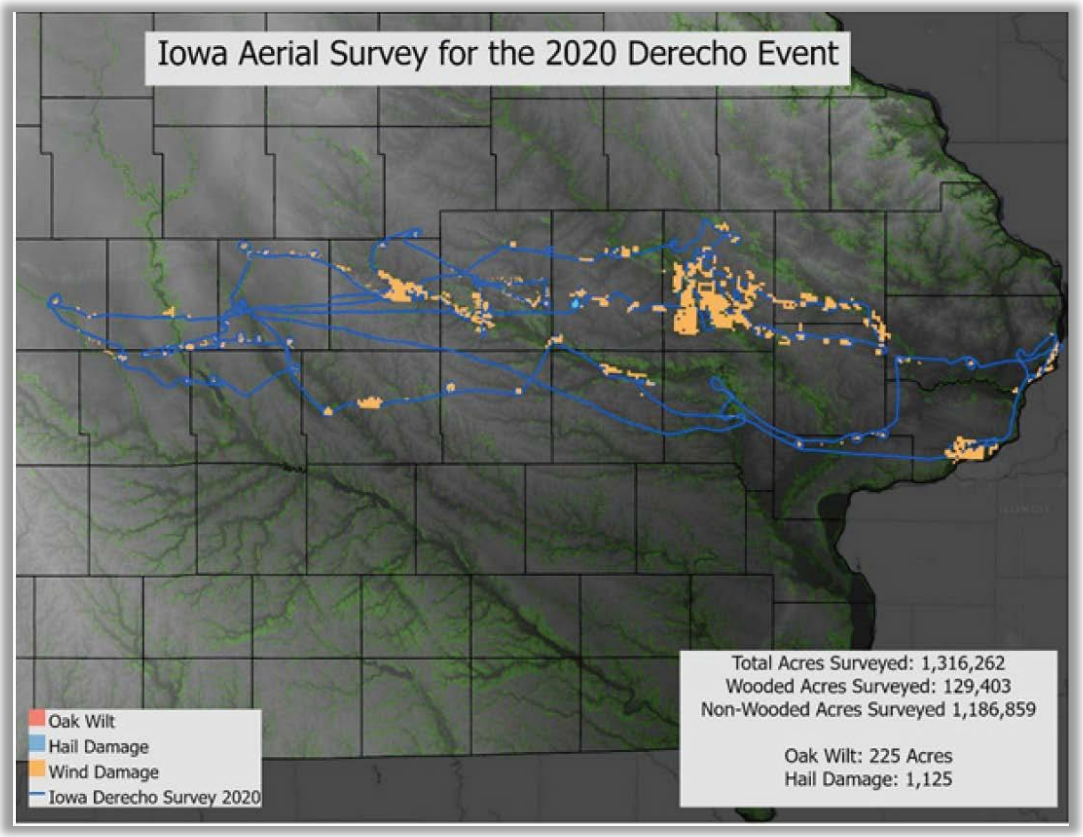


Figure 4. Iowa DNR Aerial Survey Map, 2020 Derecho Forest Health Monitoring.

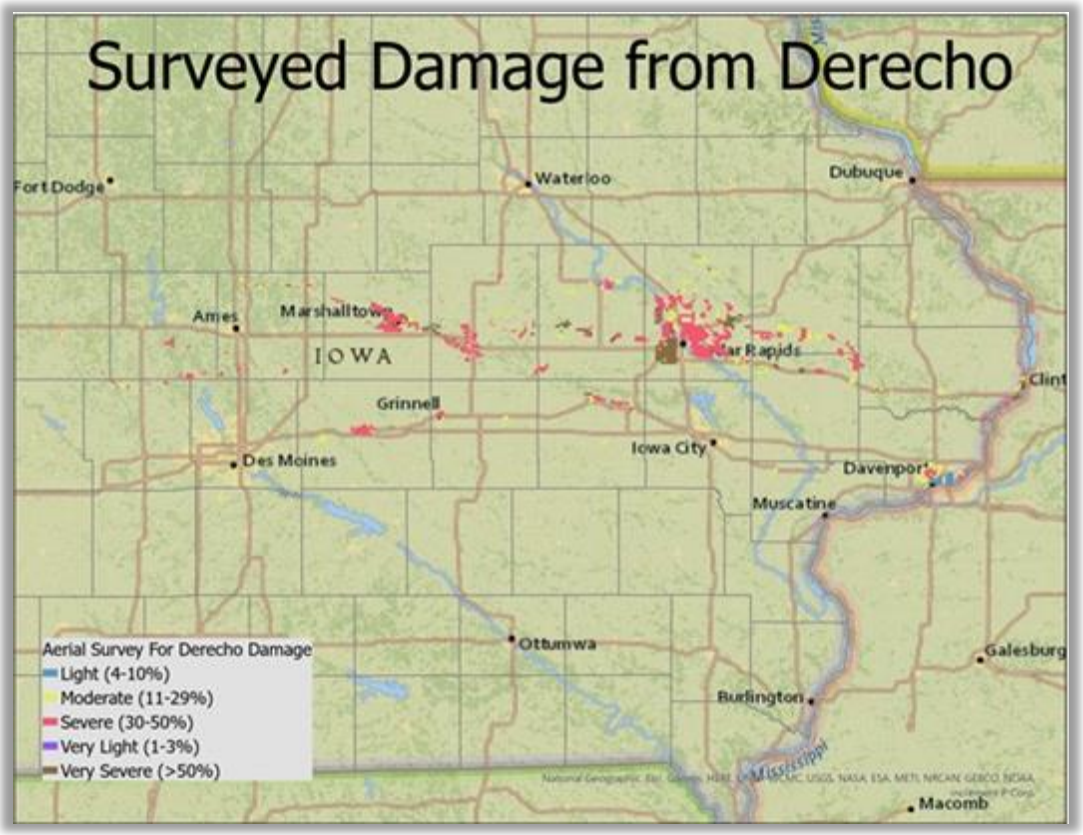


Figure 5. Damage assessment along the USFS flight path of derecho impacted areas of Iowa, collected September 21-24, 2020.

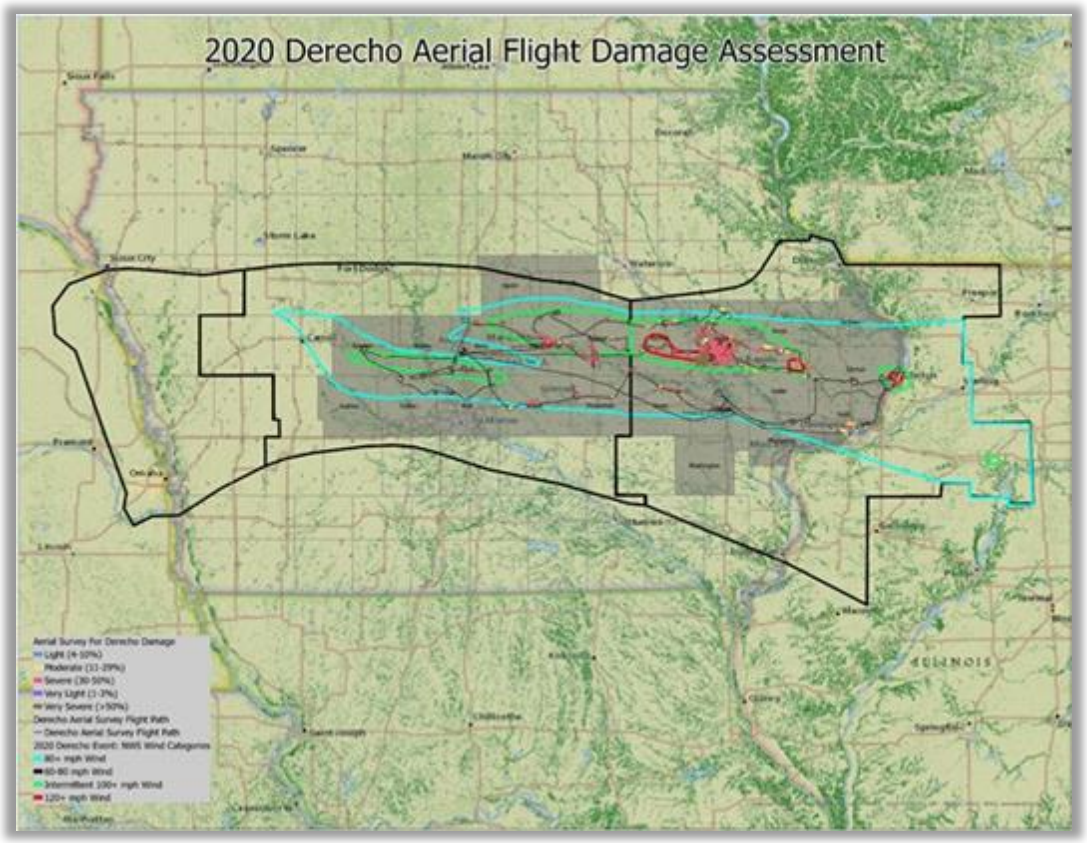


Figure 6. Summary of the USFS flight path over the derecho impacted areas of Iowa, collected September 21-24, 2020.

Table 2. Summary of damage for derecho affected counties in Iowa derived from USFS aerial flight assessment.

County	Estimated acres of canopy damaged	Estimated number of trees damaged
Total	32,773	4,424,426
Benton	548	74,125
Boone	805	108,702
Cedar	272	36,664
Clinton	2,580	348,344
Dallas	3,204	432,488
Greene	271	36,649
Grundy	185	24,973
Guthrie	247	33,369
Hardin	656	88,573
Iowa	113	15,255
Jackson	82	11,045
Japser	1,004	135,519
Johnson	1,738	234,567
Jones	640	86,432
Linn	7,061	953,224
Marshall	1,037	140,039
Muscatine	550	74,192
Polk	4,758	642,348
Poweshiek	413	55,752
Scott	3,809	514,163
Story	1,869	252,292
Tama	675	91,173
Washington	256	34,538

Carbon Quantification Initial Credit Tool

Directions
1) In Table 1 record the number of sites planted for each tree species.
2) If species are not listed, add them to the bottom of Table 1.

Table 1. Planting List

Scientific Name	Common Name	Tree-Type Abbreviation	No. Sites Planted
Malus spp.	crabapple, flowering	BDS	**255**
Syringa species	lilac	BDS	**183**
Liriodendron tulipifera	tulip tree	BDL	**118**
Cercis canadensis	eastern redbud	BDS	**105**
Tilia cordata 'Greenspire'	linden, greenspire	BDM	**102**
Celtis occidentalis	common hackberry	BDL	**95**
Crataegus spp.	hawthorn, spp.	BDS	**90**
Ulmus spp.	spp elm	BDL	**89**
Gleditsia triacanthos	honeylocust	BDM	**82**
Quercus rubra	northern red oak	BDL	**73**
Quercus bicolor	swamp white oak	BDL	**63**
Quercus macrocarpa	bur oak	BDL	**57**
Amelanchier spp.	serviceberry, spp.	BDS	**44**
Platanus x acerifolia	planetree, London	BDL	**42**
Quercus coccinea	scarlet oak	BDL	**41**
Populus tremuloides	quaking aspen	BDL	38
Cladrastis kentukea	yellowwood	BDM	37
Ostrya virginiana	American hophornbeam	BDM	**35**
acuminata	nannyberry	BDS	**34**
Syringa reticulata	Japanese tree lilac	BDS	**27**
Quercus species	oak	BDL	26
Carpinus caroliniana	American hornbeam	BDM	**25**
Betula nigra	river birch	BDM	**24**
Taxodium distichum	common baldcypress	BDL	**22**
Ulmus 'Frontier'	elm, frontier	BDM	**22**
Gleditsia triacanthos inermis	honeylocust, thornless	BDL	**19**
Quercus phellos	oak, willow	BDL	**18**
Pinus strobus	eastern white pine	CEL	17
Tilia americana	American linden	BDL	**14**
Liquidambar styraciflua	sweetgum	BDL	**13**
Nyssa sylvatica	blackgum	BDM	**11**
Eucommia ulmoides	hardy rubber	BDL	**10**
Ginkgo biloba	ginkgo	BDM	10
Alnus species	alder	BDM	9
Tilia cordata	littleleaf linden	BDM	**9**
Prunus serrulata 'Kwanzan'	cherry, Japanese flowering	BDS	**7**
Viburnum spp.	Viburnum spp.	BDS	**7**
Gymnocladus dioicus	Kentucky coffeetree	BDL	**6**
Quercus lyrata	oak, overcup	BDL	**6**
Quercus shumardii	shumard oak	BDL	**5**
Prunus x yedoensis	cherry, Yoshino	BDS	**5**
Chionanthus retusus	Fringtree, Chinese	BDS	**5**
Syringa vulgaris	lilack, common	BDS	**5**
acuminata	Magnolia, cucumber	BDM	**5**
Quercus alba	white oak	BDL	**4**
Quercus velutina	oak, black	BDL	**4**
Platanus occidentalis	American sycamore	BDL	**3**
Ulmus 'Morton Glossy'	elm, Morton Glossy	BDL	**3**
Crataegus crusgalli	hawthorn, cockspur	BDS	**2**
Crataegus viridis	hawthorn, green	BDM	**2**
Juglans nigra	black walnut	BDL	2
Abies concolor	fir, white	CEL	**2**
Aesculus glabra	Ohio buckeye	BDL	1
Amelanchier arborea	serviceberry, downy	BDS	**1**
Carya ovata	shagbark hickory	BDL	**1**
Carya species	hickory	BDL	1
Catalpa speciosa	northern catalpa	BDL	1
Cornus florida	flowering dogwood	BDS	1
Pyrus calleryana	Callery pear	BDM	1
Ulmus x	elm, hybrid	BDL	**1**
Fagus grandifolia	beech, american	BDL	**1**
euonymus, spp.	euonymus, spp.	BDS	**1**
Crataegus phaenopyrum	Hawthorn, Washington	BDS	**1**
Lonicera spp.	honeysuckle spp	BDS	**1**
Asimina triloba	paw paw, common	BDS	**1**
Acer ginnala	Amur maple	BDS	
Acer negundo	boxelder	BDM	
Acer nigrum	black maple	BDL	
Acer palmatum	Japanese maple	BDS	
Acer platanoides	Norway maple	BDL	
Acer rubrum	red maple	BDL	
Acer saccharinum	silver maple	BDL	
Acer saccharum	sugar maple	BDL	
Acer species	maple	BDL	
Albizia julibrissin	mimosa	BDS	
Amelanchier canadensis	serviceberry, shadblow	BDS	
Amelanchier laevis	serviceberry, Allegheny	BDM	
Betula papyrifera	paper birch	BDL	
Betula species	birch	BDM	
Broadleaf Deciduous Large	broadleaf deciduous large	BDL	

Table 2. Summary of Planting Sites

Tree-Type	Tree-Type Abbreviation	No. Sites Planted
Brdlf Decid Large (>50 ft)	**BDL**	777
Brdlf Decid Med (30-50 ft)	**BDM**	374
Brdlf Decid Small (<30 ft)	**BDS**	775
Brdlf Evgrn Large (>50 ft)	**BEL**	0
Brdlf Evgrn Med (30-50 ft)	**BEM**	0
Brdlf Evgrn Small (<30 ft)	**BES**	0
Conif Evgrn Large (>50 ft)	**CEL**	19
Conif Evgrn Med (30-50 ft)	**CEM**	0
Conif Evgrn Small (<30 ft)	**CES**	0
	Total Sites Planted	1945

Broadleaf Deciduous Medium	broadleaf deciduous medium	BDM	
Broadleaf Deciduous Small	broadleaf deciduous small	BDS	
Broadleaf Evergreen Large	broadleaf evergreen large	BEL	
Broadleaf Evergreen Medium	broadleaf evergreen medium	BEM	
Broadleaf Evergreen Small	broadleaf evergreen small	BES	
Castanea dentata	American chestnut	BDL	
Catalpa species	catalpa	BDL	
Celtis occidentalis	northern hackberry	BDL	
Cercidiphyllum japonicum	katsuratree	BDM	
Conifer Evergreen Large	conifer evergreen large	CEL	
Conifer Evergreen Medium	conifer evergreen medium	CEM	
Conifer Evergreen Small	conifer evergreen small	CES	
Cornus species	dogwood	BDS	
Diospyros virginiana	common persimmon	BDM	
Fraxinus americana	white ash	BDL	
Fraxinus nigra	black ash	BDM	
Fraxinus pennsylvanica	green ash	BDL	
Fraxinus species	ash	BDM	
Hibiscus syriacus	rose-of-sharon	BDS	
Ilex opaca	American holly	BES	
Ilex species	holly	BES	
Juniperus species	juniper	CEM	
Juniperus virginiana	eastern red cedar	CEM	
Maackia amurensis	amur maackia	BDS	
Magnolia grandiflora	southern magnolia	BEM	
Magnolia virginiana	sweetbay	BEM	
Malus species	apple	BDS	
Morus alba	white mulberry	BDM	
Morus species	mulberry	BDM	
Ostrya virginiana	eastern hophornbeam	BDM	
Parrotia persica	persian ironwood	BDS	
Phellodendron amurense	Amur corktree	BDM	
Picea abies	Norway spruce	CEL	
Picea mariana	black spruce	CEM	
Picea pungens	blue spruce	CEM	
Picea species	spruce	CEL	
Pinus contorta	Bolander beach pine	CES	
Pinus nigra	Austrian pine	CEM	
Pinus ponderosa	ponderosa pine	CEL	
Pinus resinosa	red pine	CEL	
Pinus sylvestris	Scotch pine	CEM	
Pinus virginiana	Virginia pine	CEM	
Populus deltoides	eastern cottonwood	BDL	
Populus nigra	black poplar	BDL	
Populus species	cottonwood	BDL	
Prunus cerasifera	cherry plum	BDS	
Prunus serotina	black cherry	BDL	
Prunus serrulata	Kwanzan cherry	BDS	
Prunus species	plum	BDS	
Prunus virginiana	common chokecherry	BDS	
Pyrus species	pear	BDM	
Quercus acutissima	sawtooth oak	BDL	
Quercus ellipsoidalis	northern pin oak	BDL	
Quercus muehlenbergii	chinkapin oak	BDL	
Quercus nigra	water oak	BEL	
Quercus palustris	pin oak	BDL	
Quercus x	hybrid oak	BDL	
Rhamnus species	buckthorn	BDS	
Rhus species	sumac	BDS	
Robinia pseudoacacia	black locust	BDL	
Salix discolor	pussy willow	BDS	
Salix species	willow	BDL	
Sorbus species	mountain ash	BDS	
Thuja occidentalis	northern white cedar	CEL	
Tilia americana	American basswood	BDL	
Tilia species	basswood	BDL	
Staphylea Trifolia	American bladdernut	BDS	
Tsuga canadensis	eastern hemlock	CEL	
Ulmus americana	American elm	BDL	
Ulmus parvifolia	Chinese elm	BDL	
Ulmus pumila	Siberian elm	BDM	
Ulmus rubra	slippery elm	BDM	
Ulmus species	elm	BDL	
Ulmus thomasi	elm, rock	BDL	

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	This copy assigned to INSERT ORGANIZATION NAME. Proprietary and confidential CFC information. Do not forward to third parties without CFC permission.												
2													
3		**Directions**											
4		Using the information you provide and background data, the tool calculates the amount of Credits that could be issued after planting (10%), at Year 4 (30%), at Year 6 (30%), at Year 14 (10%), and at Year 26 (20%). A mortality deduction (% loss) is applied to account for anticipated tree losses (Cell D6). A 5% Reversal Pool Account deduction is applied that will go into a program-wide pool to insure against catastrophic loss of trees. This tool is used to determine credits issued after planting (Intial Crediting). A different tool is used for credit issuance in Years 4, 6, 14, and 26. The tool in those years requires calculation of a sample and collection of data on tree status in the sample sites.										
5													
6		Mortality Deduction (%):		20%									
7		**Table 3. Projected CO_2 stored by live trees 25 years after planting, issued at five times over the Project Duration. These values account for anticipated tree losses and the 5% Reversal Pool Account deduction.**											
8													
9								10%	30%	30%	10%	20%	
10			**No. Sites Planted**	**No. Live Trees**	**Mortality Deduction (%)**	**25-yr CO_2 stored (kg/tree)**	**Total 25-yr CO_2 stored, includes Mortality and Reversal Pool Account Deduction (t)**	**Year 0 10% CO_2 (t)**	**Year 4 30% CO_2 (t)**	**Year 6 30% CO_2 (t)**	**Year 14 10% CO_2 (t)**	**Year 26 20% CO_2 (t)**	
11		**BDL**	777	622	0.20	3,978.85	2349.6	234.96	704.88	704.88	234.96	469.92	
12		**BDM**	374	299	0.20	2,451.33	696.8	69.68	209.03	209.03	69.68	139.35	
13		**BDS**	775	620	0.20	700.27	412.5	41.25	123.74	123.74	41.25	82.49	
14		**BEL**	0	0	0.20	0.00	0.0	0.00	0.00	0.00	0.00	0.00	
15		**BEM**	0	0	0.20	0.00	0.0	0.00	0.00	0.00	0.00	0.00	
16		**BES**	0	0	0.20	0.00	0.0	0.00	0.00	0.00	0.00	0.00	
17		**CEL**	19	15	0.20	2,144.53	31.0	3.10	9.29	9.29	3.10	6.19	
18		**CEM**	0	0	0.20	0.00	0.0	0.00	0.00	0.00	0.00	0.00	
19		**CES**	0	0	0.20	0.00	0.0	0.00	0.00	0.00	0.00	0.00	
20			1945	1556	0.20	9,275.0	3489.8	348.98	1046.94	1046.94	348.98	697.96	
21													sumcheck
22						**Credits issued**	3490	349	1047	1047	349	698	3490
23						**Buffer Credits**	184	18	55	55	18	38	184

In Table 4 the tool infers the amount of CO_2 stored after 25 years from the sample to the population of live trees. Values in column H account for anticipated tree losses and the 5% Reversal Pool Account deduction.

Table 4. Grand Total CO_2 Stored after 25 years (all live trees, includes anticipated tree loss and Reversal Pool Account deduction)

Tree-Type	No. Sites Planted	Mortality Deduction (%)	Total Live Trees After Mortality	25-yr CO_2 stored (kg/tree)	CO_2 Total - No Deductions (t)	Grand Total CO_2 with Deductions (t)
Brdlf Decid Large (>50 ft)	777	0.20	622	3,978.85	3,091.6	2,349.6
Brdlf Decid Med (30-50 ft)	374	0.20	299	2,451.33	916.8	696.8
Brdlf Decid Small (<30 ft)	775	0.20	620	700.27	542.7	412.5
Brdlf Evgrn Large (>50 ft)	0	0.20	0	0.00	0.0	0.0
Brdlf Evgrn Med (30-50 ft)	0	0.20	0	0.00	0.0	0.0
Brdlf Evgrn Small (<30 ft)	0	0.20	0	0.00	0.0	0.0
Conif Evgrn Large (>50 ft)	19	0.20	15	2,144.53	40.7	31.0
Conif Evgrn Med (30-50 ft)	0	0.20	0	0.00	0.0	0.0
Conif Evgrn Small (<30 ft)	0	0.20	0	0.00	0.0	0.0
	1945		1556	9275	4,591.8	3,489.8

	A	B	C	D	E	F	G	H	I	J
1	**This copy assigned to INSERT ORGANIZATION NAME. Proprietary and confidential CFC information. Do not forward to third parties without CFC permission.**									
2										
3		Using the information you provide and background data, the tool provides estimates of co-benefits per year after 25 years.								
4										
5		**Table 5. Co-Benefits <u>per year</u> after 25 years (all live trees, includes tree mortality)**								
6		**Ecosystem Services**	**Resource Units Totals**	**Total $**						
7		**Rainfall Interception (m3/yr)**	8,483.43	$60,733.39						
8		**Air Quality (t/yr)**								
9		**O3**	0.1198	$400.06						
10		**NOx**	0.0197	$65.65						
11		**PM10**	0.0639	$181.53						
12		**Net VOCs**	0.0679	$561.71						
13		**Air Quality Total**	0.2713	$1,208.95						
14		**Energy (kWh/yr & kBtu/yr)**								
15		**Cooling - Electricity**	282,150.29	$21,415.21						
16		**Heating - Natural Gas**	4,076,932.66	$39,687.85						
17		**Energy Total ($/yr)**		$61,103.05						
18		**Grand Total ($/yr)**		$123,045.39						
19										
20				$3,199,180.10						

Tree Planting Data

Date Entered into TreeKeeper Platform	(Botanical) Species	(Common) Species	Cultivar	DBH	Latitude	Longitude	To Check
2023-12-13	Cladrastis kentukea	yellowwood		1.5	41.52063746	-93.60827669	
2023-12-13	Quercus rubra	oak, northern red		1.5	41.52067260	-93.60738083	
2023-12-13	Betula nigra	birch, river		1.5	41.52068565	-93.60814928	
2023-12-13	Quercus rubra	oak, northern red		1.5	41.52074992	-93.60796823	
2023-12-13	Prunus serrulata 'Kwanzan'	cherry, Japanese flowering		1.5	41.52076397	-93.60810905	
2023-12-13	Quercus rubra	oak, northern red		1.5	41.52077401	-93.60754847	
2023-12-13	Cladrastis kentukea	yellowwood		1.5	41.52080012	-93.60806345	
2023-12-13	Taxodium distichum	baldcypress, common		1.5	41.52081217	-93.60840677	
2023-12-13	Liquidambar styraciflua	sweetgum, American		1.5	41.52093467	-93.60667139	
2023-12-13	Quercus phellos	Oak, willow		1.5	41.52099893	-93.60828339	
2023-12-13	Taxodium distichum	baldcypress, common		1.5	41.52103207	-93.60816806	
2023-12-13	Liriodendron tulipifera	tuliptree		1.5	41.52105014	-93.60831156	
2023-12-13	Liriodendron tulipifera	tuliptree		1.5	41.52113549	-93.60822036	
2023-12-13	Quercus phellos	Oak, willow		1.5	41.52114352	-93.60835313	
2023-12-13	Taxodium distichum	baldcypress, common		1.5	41.52133731	-93.60824450	
2023-12-13	Cladrastis kentukea	yellowwood		1.5	41.52165360	-93.60837727	
	Taxodium distichum	baldcypress, common		1.5	41.52173494	-93.60825389	
	Eucommia ulmoides	Rubber-tree, Hardy		1.5	41.52190965	-93.60839470	
2023-12-13	Liquidambar styraciflua	sweetgum, American		1.5	41.52200002	-93.60843091	
2023-12-13	Liquidambar styraciflua	sweetgum, American		1.5	41.52204821	-93.60832094	
2023-12-13	Quercus rubra	oak, northern red		1.5	41.52206528	-93.60849126	
2023-12-13	Prunus serrulata 'Kwanzan'	cherry, Japanese flowering		1.5	41.52211046	-93.60854893	
2023-12-13	Cladrastis kentukea	yellowwood		1.5	41.52216167	-93.60865756	
2023-12-13	Liriodendron tulipifera	tuliptree		1.5	41.52218477	-93.60846847	
2023-12-13	Quercus rubra	oak, northern red		1.5	41.52219180	-93.60883727	
2023-12-13	Prunus serrulata 'Kwanzan'	cherry, Japanese flowering		1.5	41.52223999	-93.60915109	
2023-12-13	Liriodendron tulipifera	tuliptree		1.5	41.52225505	-93.60861196	
2023-12-13	Cladrastis kentukea	yellowwood		1.5	41.52229120	-93.60879301	
2023-12-13	Quercus rubra	oak, northern red		1.5	41.52229321	-93.60886007	
2023-12-13	Quercus lyrata	Oak, Overcup		1.5	41.52229823	-93.60893785	
2023-12-13	Betula nigra	birch, river		1.5	41.52231630	-93.60934421	
2023-12-13	Taxodium distichum	baldcypress, common		1.5	41.52234442	-93.60963389	
2023-12-13	Taxodium distichum	baldcypress, common		1.5	41.52241470	-93.60945820	
2023-12-13	Cladrastis kentukea	yellowwood		1.5	41.52241571	-93.60929459	
2023-12-13	Quercus phellos	Oak, willow		1.5	41.52250808	-93.60939785	
2023-12-13	Prunus serrulata 'Kwanzan'	cherry, Japanese flowering		1.5	41.52262656	-93.60947027	
2023-12-13	Quercus phellos	Oak, willow		1.5	41.52265668	-93.60960840	
2023-12-13	Cercis canadensis	redbud, eastern	Forest pansy	1.5	41.52269183	-93.60949441	
2023-12-13	Quercus phellos	Oak, willow		1.5	41.52279324	-93.60964327	
2023-12-13	Prunus serrulata 'Kwanzan'	cherry, Japanese flowering		1.5	41.52288662	-93.60970362	
2023-12-13	Eucommia ulmoides	Rubber-tree, Hardy		1.5	41.52297698	-93.60981762	
2023-09-29	Malus spp.	crabapple, flowering		1.5	41.52303285	-93.63670028	
2023-12-13	Liquidambar styraciflua	sweetgum, American		1.5	41.52304928	-93.61002281	
2023-12-13	Cercis canadensis	redbud, eastern	Fringe tree	1.5	41.52305329	-93.61055254	
2023-12-13	Cladrastis kentukea	yellowwood		1.5	41.52305530	-93.61046537	
2023-12-13	Cercis canadensis	redbud, eastern	Forest pansy	1.5	41.52305631	-93.61204519	
2023-12-13	Malus spp.	crabapple, flowering		1.5	41.52305631	-93.61188292	
2023-12-13	Prunus serrulata 'Kwanzan'	cherry, Japanese flowering		1.5	41.52305731	-93.61179575	
2023-12-13	Quercus rubra	oak, northern red		1.5	41.52305731	-93.61150875	
2023-12-13	Cladrastis kentukea	yellowwood		1.5	41.52305831	-93.61114531	
2023-12-13	Taxodium distichum	baldcypress, common		1.5	41.52305932	-93.61256688	
2023-12-13	Cercis canadensis	redbud, eastern	Fringe tree	1.5	41.52305932	-93.61236035	
2023-12-13	Cercis canadensis	redbud, eastern	Forest pansy	1.5	41.52306133	-93.61158653	
2023-12-13	Liquidambar styraciflua	sweetgum, American		1.5	41.52306133	-93.61103266	
2023-12-13	Cladrastis kentukea	yellowwood		1.5	41.52306133	-93.61075505	
2023-12-13	Cladrastis kentukea	yellowwood		1.5	41.52306133	-93.61023336	
2023-12-13	Quercus phellos	Oak, willow		1.5	41.52306333	-93.61266344	
2023-12-13	Cladrastis kentukea	yellowwood		1.5	41.52306333	-93.60975190	
2023-09-29	Quercus coccinea	oak, scarlet		1.5	41.52307703	-93.63526530	
2023-12-13	Cercis canadensis	redbud, eastern	Forest pansy	1.5	41.52308944	-93.60980957	
2023-09-29	Platanus x acerifolia	planetree, London		1.5	41.52309310	-93.63669224	
2023-09-29	Viburnum lentago	nannyberry		1.5	41.52310414	-93.63656885	
2023-12-13	Cladrastis kentukea	yellowwood		1.5	41.52314868	-93.61240193	
2023-12-13	Quercus phellos	Oak, willow		1.5	41.52315470	-93.61250653	
2023-12-13	Betula nigra	birch, river		1.5	41.52315470	-93.61012339	
2023-12-13	Cercis canadensis	redbud, eastern	Forest pansy	1.5	41.52315671	-93.61163481	
2023-12-13	Cercis canadensis	redbud, eastern	forest pansy	1.5	41.52315671	-93.61184134	
2023-12-13	Prunus serrulata 'Kwanzan'	cherry, Japanese flowering		1.5	41.52315671	-93.61043989	
2023-12-13	Pyrus calleryana	pear, callery		1.5	41.52315772	-93.61203446	
2023-12-13	Cercis canadensis	redbud, eastern	Forest pansy	1.5	41.52315772	-93.61020788	
2023-09-29	Ulmus spp.	elm, spp.		1.5	41.52315937	-93.63526932	
2023-12-13	Cladrastis kentukea	yellowwood		1.5	41.52315973	-93.61212163	
2023-12-13	Quercus phellos	Oak, willow		1.5	41.52316073	-93.61267685	
2023-12-13	Cladrastis kentukea	yellowwood		1.5	41.52316173	-93.61263394	
2023-09-29	Ulmus spp.	elm, spp.		1.5	41.52322363	-93.63538064	
2023-09-29	Liriodendron tulipifera	tuliptree		1.5	41.52323568	-93.63670162	
2023-09-29	Syringa spp.	lilac		1.5	41.52323969	-93.63656885	
2023-09-29	Gleditsia triacanthos	honeylocust		1.5	41.52324170	-93.63526664	
2023-09-29	Quercus macrocarpa	oak, bur		1.5	41.52326279	-93.63537929	
2023-09-29	Cercis canadensis	redbud, eastern		1.5	41.52329893	-93.63656751	
2023-09-29	Liriodendron tulipifera	tuliptree		1.5	41.52337022	-93.63538466	
2023-09-29	Tilia cordata	linden, littleleaf		1.5	41.52340034	-93.63656617	
2023-09-29	Ulmus spp.	elm, spp.		1.5	41.52340034	-93.63669760	
2023-09-29	Viburnum lentago	nannyberry		1.5	41.52343147	-93.63537795	
2023-12-13	Taxodium distichum	baldcypress, common		1.5	41.52343785	-93.61138403	
2023-09-29	Quercus macrocarpa	oak, bur		1.5	41.52345255	-93.63526396	

2023-09-29	Gleditsia triacanthos	honeylocust	1.5	41.52345456	-93.63669626
2023-12-13	Quercus rubra	oak, northern red	1.5	41.52350211	-93.61139073
2023-09-29	Platanus x acerifolia	planetree, London	1.5	41.52354493	-93.63537125
2023-09-29	Liriodendron tulipifera	tuliptree	1.5	41.52355196	-93.63527067
2023-09-29	Platanus x acerifolia	planetree, London	1.5	41.52356300	-93.63656617
2023-09-29	Ulmus spp.	elm, spp.	1.5	41.52363128	-93.63656215
2023-09-29	Quercus macrocarpa	oak, bur	1.5	41.52365337	-93.63527469
2023-09-29	Quercus coccinea	oak, scarlet	1.5	41.52368750	-93.63537929
2023-09-29	Quercus coccinea	oak, scarlet	1.5	41.52373871	-93.63669894
2023-09-29	Liriodendron tulipifera	tuliptree	1.5	41.52375980	-93.63657824
2023-09-29	Ulmus spp.	elm, spp.	1.5	41.52378891	-93.63670967
2023-09-29	Quercus macrocarpa	oak, bur	1.5	41.52384715	-93.63537929
2023-09-29	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.52391141	-93.63670833
2023-09-29	Gleditsia triacanthos	honeylocust	1.5	41.52391543	-93.63658361
2023-09-29	Liriodendron tulipifera	tuliptree	1.5	41.52397065	-93.63670699
2023-09-29	Gleditsia triacanthos inermis	honeylocust, thornless	1.5	41.52399977	-93.63538064
2023-09-29	Quercus coccinea	oak, scarlet	1.5	41.52407507	-93.63658227
2023-09-29	Ulmus spp.	elm, spp.	1.5	41.52408411	-93.63670565
2023-09-29	Ulmus spp.	elm, spp.	1.5	41.52411624	-93.63528005
2023-09-29	Quercus rubra	oak, northern red	1.5	41.52418853	-93.63527335
2023-09-29	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.52421965	-93.63538064
2023-09-29	Quercus macrocarpa	oak, bur	1.5	41.52423572	-93.63659299
2023-09-29	Liriodendron tulipifera	tuliptree	1.5	41.52429395	-93.63528274
2023-09-29	Platanus x acerifolia	planetree, London	1.5	41.52439335	-93.63539002
2023-09-30	Syringa spp.	lilac	1.5	41.52444909	-93.63527614
2023-09-29	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.52445259	-93.63670296
2023-09-29	Cercis canadensis	redbud, eastern	1.5	41.52452087	-93.63538868
2023-09-29	Syringa spp.	lilac	1.5	41.52452187	-93.63527067
2023-09-29	Syringa spp.	lilac	1.5	41.52460320	-93.63331533
2023-09-29	Syringa spp.	lilac	1.5	41.52460420	-93.63293312
2023-09-29	Malus spp.	crabapple, flowering	1.5	41.52460923	-93.63313697
2023-09-29	Syringa spp.	lilac	1.5	41.52461023	-93.63378472
2023-09-29	Malus spp.	crabapple, flowering	1.5	41.52461224	-93.63350845
2023-09-29	Viburnum lentago	nannyberry	1.5	41.52461224	-93.63405965
2023-09-29	Quercus macrocarpa	oak, bur	1.5	41.52461224	-93.63635428
2023-09-29	Platanus x acerifolia	planetree, London	1.5	41.52461324	-93.63565422
2023-09-29	Cercis canadensis	redbud, eastern	1.5	41.52461625	-93.63549865
2023-09-29	Quercus macrocarpa	oak, bur	1.5	41.52461726	-93.63558582
2023-09-29	Cercis canadensis	redbud, eastern	1.5	41.52461826	-93.63371096
2023-09-29	Viburnum lentago	nannyberry	1.5	41.52462429	-93.63491393
2023-09-29	Quercus rubra	oak, northern red	1.5	41.52462730	-93.63574810
2023-09-29	Syringa spp.	lilac	1.5	41.52462931	-93.63453976
2023-04-22	Amelanchier spp.	serviceberry, spp.	1.5	41.53022707	-93.57058493
2023-04-22	Cladrastis kentukea	yellowwood	1.5	41.53063990	-93.57071368
2023-04-22	Quercus coccinea	oak, scarlet	1.5	41.53064351	-93.57058922
2023-04-22	Celtis occidentalis	hackberry, common	1.5	41.53072544	-93.57071797
2023-04-22	Amelanchier spp.	serviceberry, spp.	1.5	41.53079652	-93.57059781
2023-04-22	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.53085956	-93.57059781
2023-04-22	Malus spp.	crabapple, flowering	1.5	41.53121898	-93.57065091
2023-04-22	Quercus coccinea	oak, scarlet	1.5	41.53128584	-93.57065521
2023-04-22	Cladrastis kentukea	yellowwood	1.5	41.53144868	-93.57079683
2023-04-22	Crataegus spp.	hawthorn, spp.	1.5	41.53155510	-93.57067237
2023-04-22	Amelanchier spp.	serviceberry, spp.	1.5	41.53163802	-93.57067023
2023-04-22	Celtis occidentalis	hackberry, common	1.5	41.53179805	-93.57065306
2023-04-22	Amelanchier spp.	serviceberry, spp.	1.5	41.53184965	-93.57076249
2023-04-22	Ulmus spp.	elm, spp.	1.5	41.53187134	-93.57064018
2023-04-22	Quercus coccinea	oak, scarlet	1.5	41.53193498	-93.57062087
2023-04-22	Amelanchier spp.	serviceberry, spp.	1.5	41.53215304	-93.57027326
2023-04-22	Crataegus spp.	hawthorn, spp.	1.5	41.53215364	-93.57037840
2023-04-22	Ulmus spp.	elm, spp.	1.5	41.53215404	-93.57018743
2023-04-22	Ulmus spp.	elm, spp.	1.5	41.53215424	-93.57045565
2023-04-22	Quercus velutina	oak, black	1.5	41.53215525	-93.57085758
2023-04-22	Cladrastis kentukea	yellowwood	1.5	41.53215625	-93.57093268
2023-04-22	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.53215886	-93.57110649
2023-04-22	Malus spp.	crabapple, flowering	1.5	41.53216328	-93.57172233
2023-04-22	Gleditsia triacanthos	honeylocust	1.5	41.53216589	-93.57232958
2023-04-22	Quercus spp.	oak	1.5	41.53217391	-93.57472630
2023-04-22	Liriodendron tulipifera	tuliptree	1.5	41.53217812	-93.57483145
2023-04-22	Ulmus spp.	elm, spp.	1.5	41.53221507	-93.57523056
2023-04-22	Gleditsia triacanthos	honeylocust	1.5	41.53222732	-93.57531210
2023-04-22	Quercus coccinea	oak, scarlet	1.5	41.53223153	-93.57659098
2023-04-22	Ulmus spp.	elm, spp.	1.5	41.53223254	-93.57688065
2023-04-22	Liriodendron tulipifera	tuliptree	1.5	41.53223354	-93.57697936
2023-04-22	Celtis occidentalis	hackberry, common	1.5	41.53223454	-93.57706519
2023-04-22	Gleditsia triacanthos	honeylocust	1.5	41.53223474	-93.57538505
2023-04-22	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.53224017	-93.57645794
2023-04-22	Gleditsia triacanthos	honeylocust	1.5	41.53224318	-93.57557817
2023-04-22	Amelanchier spp.	serviceberry, spp.	1.5	41.53224339	-93.57008658
2023-04-22	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.53224378	-93.57546659
2023-04-22	Celtis occidentalis	hackberry, common	1.5	41.53224418	-93.57570692
2023-04-22	Gleditsia triacanthos	honeylocust	1.5	41.53224559	-93.57634636
2023-04-22	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.53224600	-93.57032690
2023-04-22	Malus spp.	crabapple, flowering	1.5	41.53224660	-93.57095414
2023-04-22	Crataegus spp.	hawthorn, spp.	1.5	41.53224780	-93.57624980
2023-04-22	Ulmus spp.	elm, spp.	1.5	41.53224840	-93.57612534
2023-04-22	Liriodendron tulipifera	tuliptree	1.5	41.53224900	-93.57604595
2023-04-22	Malus spp.	crabapple, flowering	1.5	41.53224921	-93.57118588

2023-04-22	Ostrya virginiana	hophornbeam, American	1.5	41.53224962	-93.57158714
2023-04-22	Quercus macrocarpa	oak, bur	1.5	41.53225062	-93.57187253
2023-04-22	Amelanchier spp.	serviceberry, spp.	1.5	41.53225343	-93.57125455
2023-04-22	Ulmus spp.	elm, spp.	1.5	41.53225684	-93.57269865
2023-04-22	Ulmus spp.	elm, spp.	1.5	41.53227069	-93.57478424
2023-04-22	Cladrastis kentukea	yellowwood	1.5	41.53230381	-93.57519194
2023-04-22	Quercus macrocarpa	oak, bur	1.5	41.53231606	-93.57527133
2023-04-22	Quercus velutina	oak, black	1.5	41.53232831	-93.57536574
2023-04-22	Quercus coccinea	oak, scarlet	1.5	41.53233192	-93.57603093
2023-04-22	Gleditsia triacanthos	honeylocust	1.5	41.53233192	-93.57558032
2023-04-22	Celtis occidentalis	hackberry, common	1.5	41.53233253	-93.57547089
2023-04-22	Malus spp.	crabapple, flowering	1.5	41.53233293	-93.57567688
2023-04-22	Quercus velutina	oak, black	1.5	41.53233775	-93.57610389
2023-04-22	Amelanchier spp.	serviceberry, spp.	1.5	41.53233875	-93.57618972
2023-04-22	Gleditsia triacanthos	honeylocust	1.5	41.53234136	-93.57630344
2023-04-22	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.53234237	-93.57637640
2023-04-22	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.53234337	-93.57648798
2023-04-22	Ostrya virginiana	hophornbeam, American	1.5	41.53235240	-93.57657381
2023-04-22	Celtis occidentalis	hackberry, common	1.5	41.53235281	-93.57687636
2023-04-22	Quercus velutina	oak, black	1.5	41.53235381	-93.57695790
2023-04-22	Malus spp.	crabapple, flowering	1.5	41.53236064	-93.57717033
2023-04-22	Amelanchier spp.	serviceberry, spp.	1.5	41.53236124	-93.57705446
2023-04-22	Ostrya virginiana	hophornbeam, American	1.5	41.53240603	-93.57057367
2023-04-22	Liriodendron tulipifera	tuliptree	1.5	41.53246486	-93.57054362
2023-04-22	Quercus macrocarpa	oak, bur	1.5	41.53251726	-93.57051573
2023-04-28	Crataegus spp.	hawthorn, spp.	1.5	41.53337458	-93.57822919
2023-04-28	Crataegus spp.	hawthorn, spp.	1.5	41.53339647	-93.57830858
2023-04-28	Crataegus spp.	hawthorn, spp.	1.5	41.53342157	-93.57840729
2023-04-28	Crataegus spp.	hawthorn, spp.	1.5	41.53343522	-93.57810474
2023-04-28	Crataegus spp.	hawthorn, spp.	1.5	41.53344265	-93.57817984
2023-04-28	Liriodendron tulipifera	tuliptree	1.5	41.53345530	-93.57796312
2023-04-28	Ulmus spp.	elm, spp.	1.5	41.53345791	-93.57853174
2023-04-28	Ulmus spp.	elm, spp.	1.5	41.53348461	-93.57861543
2023-04-28	Ulmus spp.	elm, spp.	1.5	41.53351774	-93.57869697
2023-04-28	Liriodendron tulipifera	tuliptree	1.5	41.53353180	-93.57790518
2023-04-28	Liriodendron tulipifera	tuliptree	1.5	41.53359223	-93.57786226
2023-04-28	Quercus bicolor	oak, swamp white	1.5	41.53360548	-93.57864976
2023-04-28	Quercus macrocarpa	oak, bur	1.5	41.53363058	-93.57873988
2023-04-28	Pinus strobus	pine, eastern white	1.5	41.53375045	-93.57925487
2023-05-04	Celtis occidentalis	hackberry, common	1.5	41.53380368	-93.57243961
2023-05-04	Quercus rubra	oak, northern red	1.5	41.53380750	-93.57213839
2023-04-28	Pinus strobus	pine, eastern white	1.5	41.53380767	-93.57934499
2023-05-04	Liriodendron tulipifera	tuliptree	1.5	41.53380790	-93.57260993
2023-05-04	Liriodendron tulipifera	tuliptree	1.5	41.53382818	-93.57290899
2023-05-04	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.53389484	-93.57241010
2023-05-04	Quercus rubra	oak, northern red	1.5	41.53389926	-93.57266169
2023-05-04	Quercus bicolor	oak, swamp white	1.5	41.53390187	-93.57258740
2023-05-04	Quercus bicolor	oak, swamp white	1.5	41.53392235	-93.57291624
2023-05-04	Celtis occidentalis	hackberry, common	1.5	41.53396953	-93.57315790
2023-05-04	Ulmus spp.	elm, spp.	1.5	41.53401832	-93.57335880
2023-05-04	Liriodendron tulipifera	tuliptree	1.5	41.53404462	-93.57343310
2023-04-28	Quercus macrocarpa	oak, bur	1.5	41.53405463	-93.58013678
2023-05-04	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.53407494	-93.57375308
2023-04-28	Pinus strobus	pine, eastern white	1.5	41.53408635	-93.57984924
2023-05-04	Ulmus spp.	elm, spp.	1.5	41.53410807	-93.57385259
2023-05-04	Quercus rubra	oak, northern red	1.5	41.53411911	-93.57361683
2023-04-28	Quercus macrocarpa	oak, bur	1.5	41.53412952	-93.58014751
2023-04-28	Pinus strobus	pine, eastern white	1.5	41.53416887	-93.57943082
2023-04-28	Pinus strobus	pine, eastern white	1.5	41.53417108	-93.57950378
2023-05-04	Gleditsia triacanthos	honeylocust	1.5	41.53418396	-93.57378339
2023-04-28	Quercus bicolor	oak, swamp white	1.5	41.53420281	-93.58016038
2023-05-04	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.53421348	-93.57387057
2023-04-28	Pinus strobus	pine, eastern white	1.5	41.53422790	-93.57945871
2023-04-28	Quercus macrocarpa	oak, bur	1.5	41.53430500	-93.58007884
2023-05-04	Ostrya virginiana	hophornbeam, American	1.5	41.53446545	-93.57449096
2023-05-04	Celtis occidentalis	hackberry, common	1.5	41.53447268	-93.57436758
2023-04-28	Malus spp.	crabapple, flowering	1.5	41.53454011	-93.57794810
2023-04-28	Liriodendron tulipifera	tuliptree	1.5	41.53455906	-93.55782646
2023-04-28	Liriodendron tulipifera	tuliptree	1.5	41.53456268	-93.55806625
2023-04-28	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.53456328	-93.55796459
2023-04-28	Ulmus spp.	elm, spp.	1.5	41.53456689	-93.55817863
2023-04-28	Quercus bicolor	oak, swamp white	1.5	41.53457051	-93.55841628
2023-04-28	Ostrya virginiana	hophornbeam, American	1.5	41.53457111	-93.55830389
2023-04-28	Liriodendron tulipifera	tuliptree	1.5	41.53457472	-93.55853081
2023-05-04	Quercus rubra	oak, northern red	1.5	41.53458090	-93.57434317
2023-04-28	Malus spp.	crabapple, flowering	1.5	41.53458317	-93.55962266
2023-04-28	Liriodendron tulipifera	tuliptree	1.5	41.53458699	-93.55932789
2023-04-28	Malus spp.	crabapple, flowering	1.5	41.53458900	-93.55979513
2023-05-04	Malus spp.	crabapple, flowering	1.5	41.53459777	-93.57446441
2023-04-28	Quercus coccinea	oak, scarlet	1.5	41.53463849	-93.58021188
2023-05-04	Ostrya virginiana	hophornbeam, American	1.5	41.53464816	-93.57445073
2023-04-28	Gleditsia triacanthos	honeylocust	1.5	41.53465162	-93.55812123
2023-04-28	Quercus bicolor	oak, swamp white	1.5	41.53465443	-93.55792436
2023-04-28	Quercus bicolor	oak, swamp white	1.5	41.53465744	-93.55818856
2023-04-28	Ulmus spp.	elm, spp.	1.5	41.53465865	-93.55801958
2023-04-28	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.53466166	-93.55830523
2023-04-28	Cercis canadensis	redbud, eastern	1.5	41.53466307	-93.55860376

2023-04-28	Gleditsia triacanthos	honeylocust	1.5	41.53466427	-93.55841118
2023-04-28	Ulmus spp.	elm, spp.	1.5	41.53466527	-93.55850425
2023-05-04	Celtis occidentalis	hackberry, common	1.5	41.53466824	-93.57430803
2023-04-28	Cercis canadensis	redbud, eastern	1.5	41.53467453	-93.55929463
2023-04-28	Ulmus spp.	elm, spp.	1.5	41.53467553	-93.55939628
2023-04-28	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.53467654	-93.55950008
2023-04-28	Ulmus spp.	elm, spp.	1.5	41.53468075	-93.55971761
2023-04-28	Quercus coccinea	oak, scarlet	1.5	41.53469250	-93.58025050
2023-04-28	Malus spp.	crabapple, flowering	1.5	41.53471419	-93.57808542
2023-04-28	Carpinus caroliniana	hornbeam, American	1.5	41.53473956	-93.55767760
2023-05-04	Ulmus spp.	elm, spp.	1.5	41.53474112	-93.57427290
2023-04-28	Quercus coccinea	oak, scarlet	1.5	41.53474491	-93.58028698
2023-04-28	Gleditsia triacanthos	honeylocust	1.5	41.53474880	-93.55755368
2023-04-28	Ulmus spp.	elm, spp.	1.5	41.53476347	-93.55980666
2023-04-28	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.53477773	-93.55992709
2023-05-04	Quercus rubra	oak, northern red	1.5	41.53478208	-93.57437911
2023-04-28	Ulmus spp.	elm, spp.	1.5	41.53479089	-93.58031488
2023-04-28	Malus spp.	crabapple, flowering	1.5	41.53481566	-93.55767679
2023-04-28	Gleditsia triacanthos	honeylocust	1.5	41.53483033	-93.55980746
2023-04-28	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.53483292	-93.55754858
2023-04-28	Ulmus spp.	elm, spp.	1.5	41.53484329	-93.58035994
2023-04-28	Quercus coccinea	oak, scarlet	1.5	41.53488927	-93.58039641
2023-04-28	Quercus bicolor	oak, swamp white	1.5	41.53491223	-93.55754992
2023-04-28	Quercus bicolor	oak, swamp white	1.5	41.53492450	-93.55980827
2023-04-28	Quercus coccinea	oak, scarlet	1.5	41.53494006	-93.58044577
2023-05-04	Celtis occidentalis	hackberry, common	1.5	41.53497382	-93.57425385
2023-04-28	Malus spp.	crabapple, flowering	1.5	41.53499066	-93.57834292
2023-04-28	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.53499314	-93.55755126
2023-04-28	Quercus shumardii	oak, Shumard	1.5	41.53500050	-93.58050585
2023-04-28	Malus spp.	crabapple, flowering	1.5	41.53505210	-93.57828284
2023-04-28	Malus spp.	crabapple, flowering	1.5	41.53505230	-93.57839442
2023-04-28	Quercus shumardii	oak, Shumard	1.5	41.53505290	-93.58060455
2023-04-28	Gleditsia triacanthos	honeylocust	1.5	41.53509516	-93.55981417
2023-04-28	Malus spp.	crabapple, flowering	1.5	41.53509948	-93.57843733
2023-04-28	Malus spp.	crabapple, flowering	1.5	41.53511374	-93.57832790
2023-05-04	Gleditsia triacanthos	honeylocust	1.5	41.53512842	-93.57411116
2023-04-28	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.53513150	-93.55993514
2023-04-28	Liriodendron tulipifera	tuliptree	1.5	41.53519675	-93.55994023
2023-04-28	Malus spp.	crabapple, flowering	1.5	41.53520509	-93.57864547
2023-04-28	Malus spp.	crabapple, flowering	1.5	41.53521894	-93.57858539
2023-04-28	Malus spp.	crabapple, flowering	1.5	41.53524966	-93.57871413
2023-04-28	Malus spp.	crabapple, flowering	1.5	41.53525870	-93.57865191
2023-05-04	Gleditsia triacanthos	honeylocust	1.5	41.53527117	-93.57379868
2023-04-28	Gleditsia triacanthos	honeylocust	1.5	41.53527323	-93.55767062
2023-04-28	Malus spp.	crabapple, flowering	1.5	41.53530648	-93.57870126
2023-05-04	Quercus rubra	oak, northern red	1.5	41.53530751	-93.57390678
2023-04-28	Ostrya virginiana	hophornbeam, American	1.5	41.53533487	-93.55754966
2023-04-28	Ulmus spp.	elm, spp.	1.5	41.53534302	-93.58133411
2023-04-28	Quercus coccinea	oak, scarlet	1.5	41.53537334	-93.58169675
2023-04-28	Ulmus spp.	elm, spp.	1.5	41.53539542	-93.58147359
2023-04-28	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.53540014	-93.55997966
2023-04-28	Quercus coccinea	oak, scarlet	1.5	41.53541610	-93.58179331
2023-04-28	Ulmus spp.	elm, spp.	1.5	41.53543819	-93.58159590
2023-04-28	Ostrya virginiana	hophornbeam, American	1.5	41.53544129	-93.55987532
2023-05-04	Quercus bicolor	oak, swamp white	1.5	41.53544806	-93.57368576
2023-04-28	Quercus coccinea	oak, scarlet	1.5	41.53546690	-93.58186197
2023-05-04	Ostrya virginiana	hophornbeam, American	1.5	41.53551652	-93.57365545
2023-04-28	Malus spp.	crabapple, flowering	1.5	41.53552713	-93.57878065
2023-04-28	Quercus bicolor	oak, swamp white	1.5	41.53553706	-93.56002633
2023-05-04	Gleditsia triacanthos	honeylocust	1.5	41.53558137	-93.57375550
2023-04-28	Liriodendron tulipifera	tuliptree	1.5	41.53558304	-93.56004001
2023-04-28	Ulmus spp.	elm, spp.	1.5	41.53558405	-93.55991851
2023-04-28	Malus spp.	crabapple, flowering	1.5	41.53559198	-93.57877422
2023-04-28	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.53560531	-93.55755100
2023-04-28	Cercis canadensis	redbud, eastern	1.5	41.53563324	-93.55992575
2023-04-28	Quercus coccinea	oak, scarlet	1.5	41.53564780	-93.58214521
2023-04-28	Malus spp.	crabapple, flowering	1.5	41.53565041	-93.57875705
2023-04-28	Malus spp.	crabapple, flowering	1.5	41.53569907	-93.55754590
2023-04-28	Quercus macrocarpa	oak, bur	1.5	41.53570823	-93.58220744
2023-04-28	Quercus macrocarpa	oak, bur	1.5	41.53572309	-93.58204651
2023-04-28	Malus spp.	crabapple, flowering	1.5	41.53574667	-93.56006818
2023-05-04	Quercus rubra	oak, northern red	1.5	41.53576829	-93.57373538
2023-04-28	Gleditsia triacanthos	honeylocust	1.5	41.53579926	-93.55754724
2023-04-28	Quercus bicolor	oak, swamp white	1.5	41.53581243	-93.58214951
2023-04-28	Quercus bicolor	oak, swamp white	1.5	41.53582488	-93.58231688
2023-05-04	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.53585242	-93.57373672
2023-04-28	Quercus macrocarpa	oak, bur	1.5	41.53586805	-93.58219886
2023-04-28	Quercus bicolor	oak, swamp white	1.5	41.53589705	-93.56007327
2023-04-28	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.53589945	-93.55754644
2023-04-28	Quercus macrocarpa	oak, bur	1.5	41.53593812	-93.58224821
2023-04-28	Liriodendron tulipifera	tuliptree	1.5	41.53596552	-93.56007193
2023-04-28	Quercus bicolor	oak, swamp white	1.5	41.53597875	-93.55754563
2023-04-28	Malus spp.	crabapple, flowering	1.5	41.53598098	-93.55995686
2023-04-28	Malus spp.	crabapple, flowering	1.5	41.53599855	-93.57869482
2023-04-28	Quercus macrocarpa	oak, bur	1.5	41.53600337	-93.58230829
2023-04-28	Malus spp.	crabapple, flowering	1.5	41.53602535	-93.55995552
2023-04-28	Malus spp.	crabapple, flowering	1.5	41.53602807	-93.57870770

2023-04-28	Malus spp.	crabapple, flowering	1.5	41.53606722	-93.57871843
2023-05-04	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.53606826	-93.57373055
2023-04-28	Quercus bicolor	oak, swamp white	1.5	41.53606862	-93.57867551
2023-04-28	Ulmus spp.	elm, spp.	1.5	41.53607412	-93.55754483
2023-04-28	Quercus bicolor	oak, swamp white	1.5	41.53608308	-93.58236194
2023-04-28	Malus spp.	crabapple, flowering	1.5	41.53610476	-93.57873988
2023-04-28	Malus spp.	crabapple, flowering	1.5	41.53612946	-93.57870770
2023-04-28	Gleditsia triacanthos	honeylocust	1.5	41.53614401	-93.56007595
2023-04-28	Quercus bicolor	oak, swamp white	1.5	41.53614512	-93.58240914
2023-04-28	Ostrya virginiana	hophornbeam, American	1.5	41.53615645	-93.55995418
2023-04-28	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.53615664	-93.55754831
2023-04-28	Quercus bicolor	oak, swamp white	1.5	41.53620234	-93.58244777
2023-04-28	Liriodendron tulipifera	tuliptree	1.5	41.53621689	-93.55995069
2023-04-28	Quercus bicolor	oak, swamp white	1.5	41.53625318	-93.58262587
2023-04-28	Quercus bicolor	oak, swamp white	1.5	41.53627506	-93.58274174
2023-04-28	Ostrya virginiana	hophornbeam, American	1.5	41.53628556	-93.55921510
2023-04-28	Carpinus caroliniana	hornbeam, American	1.5	41.53629138	-93.55910432
2023-05-04	Ulmus x	elm, hybrid	1.5	41.53629412	-93.57361093
2023-04-28	Gleditsia triacanthos	honeylocust	1.5	41.53637631	-93.56007662
2023-04-28	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.53637671	-93.55981430
2023-04-28	Ulmus spp.	elm, spp.	1.5	41.53637752	-93.55909869
2023-04-28	Gleditsia triacanthos	honeylocust	1.5	41.53637772	-93.55956191
2023-04-28	Carpinus caroliniana	hornbeam, American	1.5	41.53637892	-93.56001091
2023-04-28	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.53644956	-93.55754751
2023-05-04	Quercus bicolor	oak, swamp white	1.5	41.53646497	-93.57374262
2023-04-28	Quercus bicolor	oak, swamp white	1.5	41.53649577	-93.55894285
2023-04-28	Quercus bicolor	oak, swamp white	1.5	41.53649933	-93.58287263
2023-04-28	Liriodendron tulipifera	tuliptree	1.5	41.53652726	-93.55754671
2023-04-28	Quercus shumardii	oak, Shumard	1.5	41.53658867	-93.58267951
2023-04-28	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.53665636	-93.55754161
2023-04-28	Quercus shumardii	oak, Shumard	1.5	41.53667480	-93.58273315
2023-05-04	Celtis occidentalis	hackberry, common	1.5	41.53667619	-93.57374451
2023-04-28	Quercus bicolor	oak, swamp white	1.5	41.53672924	-93.55754510
2023-04-28	Quercus shumardii	oak, Shumard	1.5	41.53674535	-93.58277984
2023-04-28	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.53676762	-93.55882001
2023-04-28	Ulmus spp.	elm, spp.	1.5	41.53679935	-93.58281632
2023-04-28	Ulmus spp.	elm, spp.	1.5	41.53686460	-93.58285494
2023-04-28	Malus spp.	crabapple, flowering	1.5	41.53689942	-93.57875490
2023-04-28	Malus spp.	crabapple, flowering	1.5	41.53690223	-93.57879353
2023-04-28	Malus spp.	crabapple, flowering	1.5	41.53691929	-93.57870770
2023-04-28	Malus spp.	crabapple, flowering	1.5	41.53692532	-93.57875491
2023-04-28	Ulmus spp.	elm, spp.	1.5	41.53693949	-93.58289571
2023-04-28	Malus spp.	crabapple, flowering	1.5	41.53695383	-93.57872004
2023-04-28	Quercus coccinea	oak, scarlet	1.5	41.53700796	-93.58294292
2023-04-28	Quercus coccinea	oak, scarlet	1.5	41.53706357	-93.58297082
2023-04-28	Quercus coccinea	oak, scarlet	1.5	41.53713846	-93.58300515
2023-04-28	Quercus bicolor	oak, swamp white	1.5	41.53720852	-93.58304377
2023-04-28	Quercus bicolor	oak, swamp white	1.5	41.53728020	-93.58308883
2023-04-28	Quercus macrocarpa	oak, bur	1.5	41.53735027	-93.58312531
2023-05-04	Quercus spp.	oak	1.5	41.53744877	-93.57843685
2023-05-04	Quercus spp.	oak	1.5	41.53753651	-93.57849264
2023-05-04	Platanus occidentalis	sycamore, American	1.5	41.53760979	-93.57853985
2023-05-04	Quercus spp.	oak	1.5	41.53767825	-93.57859349
2023-05-04	Quercus spp.	oak	1.5	41.53775956	-93.57865572
2023-05-04	Celtis occidentalis	hackberry, common	1.5	41.53782802	-93.57870722
2023-05-04	Quercus spp.	oak	1.5	41.53789488	-93.57876515
2023-05-04	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.53806292	-93.57889819
2023-05-04	Quercus spp.	oak	1.5	41.53815547	-93.57897544
2023-05-04	Syringa spp.	lilac	1.5	41.53819342	-93.57901406
2023-05-04	Quercus spp.	oak	1.5	41.53824421	-93.57906556
2023-05-04	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.53829661	-93.57911491
2023-05-04	Quercus spp.	oak	1.5	41.53835383	-93.57916856
2023-05-04	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.53840141	-93.57921362
2023-05-04	Gleditsia triacanthos	honeylocust	1.5	41.53846345	-93.57928228
2023-05-04	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.53852228	-93.57933378
2023-05-04	Syringa spp.	lilac	1.5	41.53858110	-93.57941103
2023-05-04	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.53863350	-93.57946682
2023-05-04	Quercus spp.	oak	1.5	41.53869393	-93.57952905
2023-05-04	Platanus occidentalis	sycamore, American	1.5	41.53875597	-93.57959127
2023-05-04	Ulmus spp.	elm, spp.	1.5	41.53879552	-93.57963633
2023-05-04	Quercus spp.	oak	1.5	41.53883667	-93.57967496
2023-05-04	Malus spp.	crabapple, flowering	1.5	41.53887944	-93.57972431
2023-05-04	Ulmus spp.	elm, spp.	1.5	41.53892220	-93.57977152
2023-05-04	Malus spp.	crabapple, flowering	1.5	41.53900672	-93.57985949
2023-05-04	Ulmus spp.	elm, spp.	1.5	41.53910407	-93.57996222
2023-05-04	Amelanchier spp.	serviceberry, spp.	1.5	41.53914955	-93.58001479
2023-05-04	Gleditsia triacanthos	honeylocust	1.5	41.53919422	-93.58006521
2023-05-04	Quercus macrocarpa	oak, bur	1.5	41.53924049	-93.58011028
2023-05-04	Malus spp.	crabapple, flowering	1.5	41.53928034	-93.58015641
2023-05-04	Carpinus caroliniana	hornbeam, American	1.5	41.53933385	-93.58021220
2023-05-04	Ulmus spp.	elm, spp.	1.5	41.53938093	-93.58026584
2023-05-04	Malus spp.	crabapple, flowering	1.5	41.53946816	-93.58035167
2023-05-04	Malus spp.	crabapple, flowering	1.5	41.53952166	-93.58041068
2023-05-04	Liriodendron tulipifera	tuliptree	1.5	41.53956232	-93.58045574
2023-05-04	Malus spp.	crabapple, flowering	1.5	41.53960377	-93.58050188
2023-05-04	Ulmus spp.	elm, spp.	1.5	41.53964041	-93.58053728
2023-05-04	Malus spp.	crabapple, flowering	1.5	41.53967747	-93.58058290

2023-05-04	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.53977915	-93.58069126
2023-05-04	Liriodendron tulipifera	tuliptree	1.5	41.53982382	-93.58074276
2023-05-04	Cladrastis kentukea	yellowwood	1.5	41.53991266	-93.58083181
2023-05-04	Liriodendron tulipifera	tuliptree	1.5	41.53995894	-93.58087901
2023-05-04	Malus spp.	crabapple, flowering	1.5	41.54002689	-93.58095304
2023-05-04	Malus spp.	crabapple, flowering	1.5	41.54007718	-93.58100776
2023-05-04	Liriodendron tulipifera	tuliptree	1.5	41.54010981	-93.58104531
2023-05-18	Crataegus spp.	hawthorn, spp.	1.5	41.54799776	-93.56862292
2023-05-18	Cercis canadensis	redbud, eastern	1.5	41.54799837	-93.56853414
2023-05-18	Syringa spp.	lilac	1.5	41.54801021	-93.56832305
2023-05-18	Ulmus spp.	elm, spp.	1.5	41.54810693	-93.57033214
2023-05-18	Celtis occidentalis	hackberry, common	1.5	41.54816856	-93.57033348
2023-05-18	Liriodendron tulipifera	tuliptree	1.5	41.54821894	-93.57047859
2023-05-18	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.54834962	-93.57046706
2023-05-18	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.54839037	-93.57032678
2023-05-18	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.54852951	-93.56819993
2023-05-18	Ulmus spp.	elm, spp.	1.5	41.54855477	-93.57032383
2023-05-18	Ulmus spp.	elm, spp.	1.5	41.54867127	-93.57047108
2023-05-18	Ulmus spp.	elm, spp.	1.5	41.54868267	-93.56819913
2023-05-18	Liriodendron tulipifera	tuliptree	1.5	41.54872968	-93.56933756
2023-05-18	Celtis occidentalis	hackberry, common	1.5	41.54876357	-93.56820262
2023-05-18	Cercis canadensis	redbud, eastern	1.5	41.54882603	-93.57047028
2023-05-18	Liriodendron tulipifera	tuliptree	1.5	41.54884125	-93.56820610
2023-05-18	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.54887220	-93.57032919
2023-05-18	Malus spp.	crabapple, flowering	1.5	41.54894868	-93.57046089
2023-05-18	Quercus rubra	oak, northern red	1.5	41.54895427	-93.56819886
2023-05-18	Celtis occidentalis	hackberry, common	1.5	41.54901268	-93.56819591
2023-05-18	Syringa spp.	lilac	1.5	41.54901894	-93.57031337
2023-05-18	Celtis occidentalis	hackberry, common	1.5	41.54908715	-93.56820369
2023-05-18	Liriodendron tulipifera	tuliptree	1.5	41.54916865	-93.56805402
2023-05-18	Syringa spp.	lilac	1.5	41.54920016	-93.56819645
2023-05-18	Liriodendron tulipifera	tuliptree	1.5	41.54934131	-93.57032678
2023-05-18	Ulmus spp.	elm, spp.	1.5	41.54943827	-93.57031739
2023-05-18	Cercis canadensis	redbud, eastern	1.5	41.54944208	-93.56918387
2023-05-18	Gleditsia triacanthos	honeylocust	1.5	41.54953774	-93.56805751
2023-05-18	Malus spp.	crabapple, flowering	1.5	41.54954798	-93.56818760
2023-05-18	Syringa spp.	lilac	1.5	41.54955429	-93.57046277
2023-05-18	Cercis canadensis	redbud, eastern	1.5	41.54957055	-93.57031444
2023-05-18	Malus spp.	crabapple, flowering	1.5	41.54963217	-93.57031793
2023-05-18	Malus spp.	crabapple, flowering	1.5	41.54966469	-93.56934131
2023-05-18	Crataegus spp.	hawthorn, spp.	1.5	41.54968026	-93.56819537
2023-05-18	Quercus rubra	oak, northern red	1.5	41.54974671	-93.56819886
2023-05-18	Syringa spp.	lilac	1.5	41.54985780	-93.56932146
2023-05-18	Quercus rubra	oak, northern red	1.5	41.54992736	-93.56759483
2023-05-18	Malus spp.	crabapple, flowering	1.5	41.54994110	-93.56978068
2023-05-18	Syringa spp.	lilac	1.5	41.55003375	-93.56781745
2023-05-18	Crataegus spp.	hawthorn, spp.	1.5	41.55003475	-93.56791482
2023-05-18	Celtis occidentalis	hackberry, common	1.5	41.55004720	-93.56763426
2023-05-18	Crataegus spp.	hawthorn, spp.	1.5	41.55005150	-93.56962243
2023-05-18	Syringa spp.	lilac	1.5	41.55005251	-93.56976056
2023-09-23	Syringa reticulata	lilac, Japanese tree	1.5	41.55050241	-93.63085843
2023-09-23	Viburnum lentago	nannyberry	1.5	41.55050943	-93.63358087
2023-09-23	Syringa reticulata	lilac, Japanese tree	1.5	41.55050943	-93.63097511
2023-09-23	Syringa reticulata	lilac, Japanese tree	1.5	41.55051345	-93.63364122
2023-09-23	Malus spp.	crabapple, flowering	1.5	41.55051545	-93.63456793
2023-09-23	Crataegus spp.	hawthorn, spp.	1.5	41.55051746	-93.63326035
2023-09-23	Syringa reticulata	lilac, Japanese tree	1.5	41.55051847	-93.63475434
2023-09-23	Syringa reticulata	lilac, Japanese tree	1.5	41.55051847	-93.63448746
2023-09-23	Cercis canadensis	redbud, eastern	1.5	41.55051947	-93.63497294
2023-09-23	Malus spp.	crabapple, flowering	1.5	41.55052148	-93.63484285
2023-09-23	Syringa reticulata	lilac, Japanese tree	1.5	41.55052148	-93.63408245
2023-09-23	Ulmus 'Frontier'	elm, Frontier	1.5	41.55052348	-93.63276682
2023-09-23	Malus spp.	crabapple, flowering	1.5	41.55052449	-93.63346017
2023-09-23	Malus spp.	crabapple, flowering	1.5	41.55052549	-93.63490052
2023-09-23	Cercis canadensis	redbud, eastern	1.5	41.55052549	-93.63399259
2023-09-23	Syringa reticulata	lilac, Japanese tree	1.5	41.55052850	-93.63501317
2023-09-23	Malus spp.	crabapple, flowering	1.5	41.55057316	-93.63135665
2023-09-23	Liriodendron tulipifera	tuliptree	1.5	41.55057567	-93.63102071
2023-09-23	Cercis canadensis	redbud, eastern	1.5	41.55057668	-93.63147400
2023-09-23	Syringa reticulata	lilac, Japanese tree	1.5	41.55058069	-93.63268367
2023-09-23	Malus spp.	crabapple, flowering	1.5	41.55058872	-93.63280437
2023-09-23	Gleditsia triacanthos inermis	honeylocust, thornless	1.5	41.55059073	-93.63428495
2023-09-23	Ulmus 'Frontier'	elm, Frontier	1.5	41.55059073	-93.63469801
2023-09-23	Syringa reticulata	lilac, Japanese tree	1.5	41.55059876	-93.63232694
2023-09-23	Ulmus 'Frontier'	elm, Frontier	1.5	41.55059876	-93.63512448
2023-09-21	Gleditsia triacanthos inermis	honeylocust, thornless	1.5	41.55069611	-93.63288417
2023-09-21	Crataegus crusgalli	hawthorn, cockspur	1.5	41.55070013	-93.63303974
2023-09-21	Malus spp.	crabapple, flowering	1.5	41.55086874	-93.63301292
2023-09-21	Viburnum lentago	nannyberry	1.5	41.55087476	-93.63290831
2023-09-21	Quercus macrocarpa	oak, bur	1.5	41.55098315	-93.63288685
2023-09-21	Malus spp.	crabapple, flowering	1.5	41.55098917	-93.63299414
2023-09-21	Cercis canadensis	redbud, eastern	1.5	41.55108351	-93.63301292
2023-09-21	Malus spp.	crabapple, flowering	1.5	41.55117183	-93.63287076
2023-09-21	Platanus x acerifolia	planetree, London	1.5	41.55124610	-93.63289758
2023-09-21	Syringa reticulata	lilac, Japanese tree	1.5	41.55126417	-93.63299950
2023-09-21	Syringa reticulata	lilac, Japanese tree	1.5	41.55137457	-93.63299950
2023-09-21	Malus spp.	crabapple, flowering	1.5	41.55146289	-93.63300487

2023-09-21	Platanus x acerifolia	planetree, London	1.5	41.55147292	-93.63288417
2023-09-21	Cercis canadensis	redbud, eastern	1.5	41.55154519	-93.63299950
2023-09-21	Tilia cordata	linden, littleleaf	1.5	41.55155321	-93.63287344
2023-09-21	Viburnum lentago	nannyberry	1.5	41.55166562	-93.63301023
2023-09-21	Syringa reticulata	lilac, Japanese tree	1.5	41.55169974	-93.63289758
2023-09-21	Crataegus spp.	hawthorn, spp.	1.5	41.55178405	-93.63301560
2023-04-29	Ostrya virginiana	hophornbeam, American	1.5	41.55185949	-93.57736788
2023-09-21	Ulmus 'Frontier'	elm, Frontier	1.5	41.55193459	-93.63287881
2023-04-29	Carpinus caroliniana	hornbeam, American	1.5	41.55194399	-93.57737727
2023-09-21	Syringa reticulata	lilac, Japanese tree	1.5	41.55197674	-93.63298878
2023-10-19	Gleditsia triacanthos	honeylocust	1.5	41.55198377	-93.63169997
2023-04-29	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.55200762	-93.57737378
2023-09-21	Tilia americana	linden, American	1.5	41.55202693	-93.63288149
2023-09-21	Malus spp.	crabapple, flowering	1.5	41.55207510	-93.63298878
2023-10-19	Celtis occidentalis	hackberry, common	1.5	41.55208012	-93.63169595
2023-09-21	Viburnum lentago	nannyberry	1.5	41.55214736	-93.63301292
2023-09-21	Quercus macrocarpa	oak, bur	1.5	41.55220155	-93.63288953
2023-09-21	Cercis canadensis	redbud, eastern	1.5	41.55226579	-93.63299146
2023-04-29	Taxodium distichum	baldcypress, common	1.5	41.55231854	-93.57737673
2023-10-19	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.55233002	-93.63169863
2023-10-12	Ulmus spp.	elm, spp.	1.5	41.55237368	-93.63169059
2023-10-19	Malus spp.	crabapple, flowering	1.5	41.55237919	-93.63180056
2023-04-29	Quercus spp.	oak	1.5	41.55238378	-93.57737968
	Malus spp.	crabapple, flowering	11	41.55240415	-93.63299693
2023-09-21	Crataegus spp.	hawthorn, spp.	1.5	41.55241231	-93.63286808
2023-04-29	Quercus spp.	oak	1.5	41.55244741	-93.57737834
2023-10-12	Quercus rubra	oak, northern red	1.5	41.55248407	-93.63169461
	Malus spp.	crabapple, flowering	11	41.55250490	-93.63299571
2023-10-19	Crataegus spp.	hawthorn, spp.	1.5	41.55250766	-93.63180592
2023-09-21	Cercis canadensis	redbud, eastern	1.5	41.55253676	-93.63287881
2023-04-29	Platanus x acerifolia	planetree, London	1.5	41.55255279	-93.57738773
2023-10-12	Syringa spp.	lilac	1.5	41.55259347	-93.63169595
2023-04-29	Malus spp.	crabapple, flowering	1.5	41.55260839	-93.57738639
2023-09-21	Cercis canadensis	redbud, eastern	1.5	41.55261906	-93.63299414
2023-04-29	Liriodendron tulipifera	tuliptree	1.5	41.55266880	-93.57737861
2023-09-21	Malus spp.	crabapple, flowering	1.5	41.55276559	-93.63288953
2023-10-19	Syringa spp.	lilac	1.5	41.55276860	-93.63181129
2023-10-19	Malus spp.	crabapple, flowering	1.5	41.55288501	-93.63180056
2023-09-21	Gleditsia triacanthos inermis	honeylocust, thornless	1.5	41.55291412	-93.63288685
2023-10-19	Malus spp.	crabapple, flowering	1.5	41.55292616	-93.63180324
2023-10-12	Platanus x acerifolia	planetree, London	1.5	41.55293570	-93.63168388
2023-09-21	Malus spp.	crabapple, flowering	1.5	41.55306667	-93.63287881
2023-09-21	Viburnum lentago	nannyberry	1.5	41.55313291	-93.63299950
2023-10-12	Quercus rubra	oak, northern red	1.5	41.55315147	-93.63168388
2023-10-19	Syringa spp.	lilac	1.5	41.55317807	-93.63180190
2023-09-21	Malus spp.	crabapple, flowering	1.5	41.55323126	-93.63285735
2023-10-12	Malus spp.	crabapple, flowering	1.5	41.55327993	-93.63167718
2023-04-29	Liquidambar styraciflua	sweetgum, American	1.5	41.55333299	-93.57739443
2023-09-21	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.55335169	-93.63286003
2023-10-12	Platanus x acerifolia	planetree, London	1.5	41.55335420	-93.63169863
2023-10-12	Gleditsia triacanthos	honeylocust	1.5	41.55342345	-93.63169059
2023-10-12	Quercus rubra	oak, northern red	1.5	41.55350273	-93.63169193
2023-09-21	Syringa reticulata	lilac, Japanese tree	1.5	41.55351829	-93.63298878
2023-04-29	Gymnocladus dioicus	Kentucky coffeetree	1.5	41.55359894	-93.57738880
2023-04-29	Gleditsia triacanthos	honeylocust	1.5	41.55366900	-93.57739175
	Celtis occidentalis	hackberry, common	17	41.55373403	-93.63287786
2023-10-12	Celtis occidentalis	hackberry, common	1.5	41.55375263	-93.63168254
2023-04-29	Ostrya virginiana	hophornbeam, American	1.5	41.55375932	-93.57739336
2023-09-21	Cercis canadensis	redbud, eastern	1.5	41.55377320	-93.63300219
2023-10-19	Malus spp.	crabapple, flowering	1.5	41.55378424	-93.63179653
2023-10-19	Malus spp.	crabapple, flowering	1.5	41.55384145	-93.63178715
2023-04-29	Carpinus caroliniana	hornbeam, American	1.5	41.55385346	-93.57738773
2023-10-19	Syringa spp.	lilac	1.5	41.55389363	-93.63180190
2023-04-29	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.55396204	-93.57739711
2023-10-12	Ulmus spp.	elm, spp.	1.5	41.55399148	-93.63167986
2023-10-12	Celtis occidentalis	hackberry, common	1.5	41.55402862	-93.63169461
2023-10-19	Cercis canadensis	redbud, eastern	1.5	41.55403112	-93.63180324
2023-10-19	Syringa spp.	lilac	1.5	41.55412647	-93.63179653
2023-09-21	Syringa reticulata	lilac, Japanese tree	1.5	41.55416661	-93.63284930
2023-09-21	Viburnum lentago	nannyberry	1.5	41.55418467	-93.63299414
2023-04-29	Taxodium distichum	baldcypress, common	1.5	41.55420391	-93.57739577
2023-04-29	Quercus spp.	oak	1.5	41.55428841	-93.57739872
2023-09-21	Malus spp.	crabapple, flowering	1.5	41.55430109	-93.63297536
2023-09-21	Gleditsia triacanthos inermis	honeylocust, thornless	1.5	41.55434324	-93.63283857
2023-11-04	Gleditsia triacanthos	honeylocust	1.5	41.55438238	-93.57889197
2023-04-29	Quercus spp.	oak	1.5	41.55439218	-93.57739309
2023-11-04	Taxodium distichum	baldcypress, common	1.5	41.55442854	-93.57796661
2023-09-21	Celtis occidentalis	hackberry, common	1.5	41.55443356	-93.63286003
2023-11-04	Taxodium distichum	baldcypress, common	1.5	41.55443457	-93.57803635
2023-09-21	Cercis canadensis	redbud, eastern	1.5	41.55443557	-93.63299414
2023-11-04	Pinus strobus	pine, eastern white	1.5	41.55445464	-93.57851915
2023-11-04	Pinus strobus	pine, eastern white	1.5	41.55446066	-93.57843063
2023-04-29	Platanus x acerifolia	planetree, London	1.5	41.55447347	-93.57740033
2023-11-04	Gleditsia triacanthos inermis	honeylocust, thornless	1.5	41.55448274	-93.57818655
2023-09-21	Viburnum lentago	nannyberry	1.5	41.55450783	-93.63287612
2023-11-04	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.55454496	-93.57762061
2023-09-21	Viburnum lentago	nannyberry	1.5	41.55454596	-93.63284394

2023-09-21	Crataegus spp.	hawthorn, spp.	1.5	41.55458209	-93.63299682	
2023-11-04	Quercus rubra	oak, northern red	1.5	41.55459514	-93.57883296	
2023-11-04	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.55463729	-93.57763133	
2023-11-04	Quercus rubra	oak, northern red	1.5	41.55464733	-93.57883296	
2023-10-12	Platanus x acerifolia	planetree, London	1.5	41.55466790	-93.63167718	
2023-10-19	Syringa spp.	lilac	1.5	41.55467743	-93.63179519	
2023-09-21	Cercis canadensis	redbud, eastern	1.5	41.55470854	-93.63285735	
2023-04-29	Malus spp.	crabapple, flowering	1.5	41.55472818	-93.57739899	
2023-09-21	Syringa reticulata	lilac, Japanese tree	1.5	41.55474267	-93.63298878	
2023-11-04	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.55475370	-93.57763133	
2023-11-04	Platanus x acerifolia	planetree, London	1.5	41.55480188	-93.57881151	
2023-04-29	Liriodendron tulipifera	tuliptree	1.5	41.55480626	-93.57740409	
2023-10-19	Syringa spp.	lilac	1.5	41.55482396	-93.63179117	
2023-10-12	Ulmus spp.	elm, spp.	1.5	41.55482546	-93.63167449	
2023-09-21	Tilia americana	linden, American	1.5	41.55484102	-93.63285467	
2023-11-04	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.55485406	-93.57763402	
2023-04-29	Liquidambar styraciflua	sweetgum, American	1.5	41.55489558	-93.57739202	
2023-10-12	Syringa spp.	lilac	1.5	41.55497499	-93.63167583	1
2023-11-04	Gleditsia triacanthos inermis	honeylocust, thornless	1.5	41.55497650	-93.57813827	
2023-04-29	Gymnocladus dioicus	Kentucky coffeetree	1.5	41.55498329	-93.57739711	
2023-11-04	Quercus rubra	oak, northern red	1.5	41.55498653	-93.57862107	
2023-11-04	Quercus rubra	oak, northern red	1.5	41.55498854	-93.57852719	
2023-11-04	Quercus rubra	oak, northern red	1.5	41.55499256	-93.57843332	
2023-10-12	Malus spp.	crabapple, flowering	1.5	41.55502417	-93.63168522	
2023-11-04	Gleditsia triacanthos inermis	honeylocust, thornless	1.5	41.55502668	-93.57838504	
2023-11-04	Gleditsia triacanthos inermis	honeylocust, thornless	1.5	41.55503671	-93.57782177	
2023-11-04	Gleditsia triacanthos inermis	honeylocust, thornless	1.5	41.55504675	-93.57815973	
2023-11-04	Gleditsia triacanthos inermis	honeylocust, thornless	1.5	41.55507686	-93.57838504	
2023-09-21	Crataegus spp.	hawthorn, spp.	1.5	41.55512402	-93.63300219	
2023-10-19	Syringa spp.	lilac	1.5	41.55515313	-93.63179251	
2023-09-21	Crataegus spp.	hawthorn, spp.	1.5	41.55523642	-93.63297268	
2023-10-19	Syringa spp.	lilac	1.5	41.55524646	-93.63179117	
2023-10-19	Syringa spp.	lilac	1.5	41.55529162	-93.63179519	
2023-09-21	Malus spp.	crabapple, flowering	1.5	41.55529664	-93.63297000	
2023-04-29	Gleditsia triacanthos	honeylocust	1.5	41.55533755	-93.57740006	
2023-04-29	Quercus spp.	oak	1.5	41.55556656	-93.57741374	
2023-10-12	Ulmus spp.	elm, spp.	1.5	41.55557412	-93.63168388	
2023-10-19	Malus spp.	crabapple, flowering	1.5	41.55558868	-93.63180592	
2023-09-21	Ulmus 'Frontier'	elm, Frontier	1.5	41.55559771	-93.63287881	
2023-09-21	Cercis canadensis	redbud, eastern	1.5	41.55561577	-93.63298609	
2023-04-29	Carpinus caroliniana	hornbeam, American	1.5	41.55566230	-93.57740382	
2023-10-19	Malus spp.	crabapple, flowering	1.5	41.55566394	-93.63178715	
2023-10-12	Celtis occidentalis	hackberry, common	1.5	41.55569355	-93.63166779	
2023-09-21	Quercus macrocarpa	oak, bur	1.5	41.55569806	-93.63287344	
2023-04-29	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.55575162	-93.57740677	
2023-09-21	Celtis occidentalis	hackberry, common	1.5	41.55577233	-93.63285735	
2023-10-19	Syringa spp.	lilac	1.5	41.55577735	-93.63178849	
2023-09-21	Ulmus spp.	elm, spp.	1.5	41.55578061	-93.63527838	
2023-09-21	Malus spp.	crabapple, flowering	1.5	41.55579641	-93.63300219	
2023-10-12	Gleditsia triacanthos	honeylocust	1.5	41.55580896	-93.63168120	
2023-04-29	Taxodium distichum	baldcypress, common	1.5	41.55585218	-93.57740757	
2023-09-21	Syringa reticulata	lilac, Japanese tree	1.5	41.55587469	-93.63299682	
2023-09-21	Cercis canadensis	redbud, eastern	1.5	41.55588272	-93.63285735	
2023-10-19	Cercis canadensis	redbud, eastern	1.5	41.55589577	-93.63179922	
2023-10-12	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.55593340	-93.63168522	
2023-04-29	Liriodendron tulipifera	tuliptree	1.5	41.55594471	-93.57741482	
2023-09-21	Malus spp.	crabapple, flowering	1.5	41.55596301	-93.63301292	
2023-09-21	Ulmus spp.	elm, spp.	1.5	41.55598533	-93.63528508	
2023-09-21	Platanus x acerifolia	planetree, London	1.5	41.55599512	-93.63288417	
2023-04-29	Quercus spp.	oak	1.5	41.55603402	-93.57741133	
2023-10-12	Viburnum lentago	nannyberry	1.5	41.55606888	-93.63168656	
2023-09-21	Malus spp.	crabapple, flowering	1.5	41.55612357	-93.63299414	
2023-04-29	Gymnocladus dioicus	Kentucky coffeetree	1.5	41.55615867	-93.57740570	
2023-12-14	Celtis occidentalis	hackberry, common	1.5	41.55617479	-93.63168120	
2023-10-19	Malus spp.	crabapple, flowering	1.5	41.55617676	-93.63180458	
2023-09-21	Ulmus 'Frontier'	elm, Frontier	1.5	41.55621992	-93.63286808	
2023-10-12	Celtis occidentalis	hackberry, common	1.5	41.55627260	-93.63166645	
2023-09-21	Quercus macrocarpa	oak, bur	1.5	41.55628414	-93.63286271	
2023-09-21	Crataegus spp.	hawthorn, spp.	1.5	41.55629619	-93.63298609	
2023-04-29	Liriodendron tulipifera	tuliptree	1.5	41.55630097	-93.57740650	
2023-10-12	Gleditsia triacanthos	honeylocust	1.5	41.55634285	-93.63168120	
2023-09-21	Malus spp.	crabapple, flowering	1.5	41.55636443	-93.63298878	
2023-10-12	Viburnum lentago	nannyberry	1.5	41.55639805	-93.63167718	
2023-09-21	Ulmus 'Frontier'	elm, Frontier	1.5	41.55643267	-93.63287076	
2023-10-19	Syringa spp.	lilac	1.5	41.55645776	-93.63179653	
2023-09-21	Platanus x acerifolia	planetree, London	1.5	41.55647482	-93.63287344	
2023-09-21	Crataegus spp.	hawthorn, spp.	1.5	41.55648084	-93.63299950	
2023-10-19	Syringa spp.	lilac	1.5	41.55650191	-93.63180592	
2023-04-29	Platanus x acerifolia	planetree, London	1.5	41.55653480	-93.57740945	
2023-10-19	Crataegus spp.	hawthorn, spp.	1.5	41.55657116	-93.63180190	
2023-09-21	Gleditsia triacanthos inermis	honeylocust, thornless	1.5	41.55657517	-93.63287344	
2023-09-21	Gleditsia triacanthos inermis	honeylocust, thornless	1.5	41.55657944	-93.63530118	
2023-04-29	Quercus spp.	oak	1.5	41.55667389	-93.57740811	
2023-10-12	Cercis canadensis	redbud, eastern	1.5	41.55670614	-93.63168254	
2023-09-21	Liriodendron tulipifera	tuliptree	1.5	41.55674603	-93.63530654	
2023-10-12	Syringa spp.	lilac	1.5	41.55675732	-93.63168790	
2023-10-19	Syringa spp.	lilac	1.5	41.55677789	-93.63180726	

2023-09-21	Crataegus spp.	hawthorn, spp.	1.5	41.55679997	-93.63300755
2023-10-12	Platanus x acerifolia	planetree, London	1.5	41.55686670	-93.63169729
2023-09-21	Tilia americana	linden, American	1.5	41.55690434	-93.63287881
2023-10-12	Quercus coccinea	oak, scarlet	1.5	41.55693093	-93.63168522
2023-09-21	Malus spp.	crabapple, flowering	1.5	41.55695853	-93.63300487
2023-09-21	Celtis occidentalis	hackberry, common	1.5	41.55699265	-93.63290563
2023-10-12	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.55700218	-93.63170132
2023-04-29	Quercus spp.	oak	1.5	41.55701208	-93.57740892
2023-10-12	Ulmus spp.	elm, spp.	1.5	41.55706240	-93.63169595
2023-09-21	Celtis occidentalis	hackberry, common	1.5	41.55712512	-93.63291367
2023-09-21	Liriodendron tulipifera	tuliptree	1.5	41.55720665	-93.63491762
2023-09-21	Ulmus spp.	elm, spp.	1.5	41.55720665	-93.63433826
2023-09-21	Quercus rubra	oak, northern red	1.5	41.55720966	-93.63447774
2023-09-21	Liriodendron tulipifera	tuliptree	1.5	41.55721167	-93.63265786
2023-09-21	Ulmus spp.	elm, spp.	1.5	41.55721268	-93.63335792
2023-09-21	Lonicera spp.	honeysuckle, spp.	1.5	41.55721268	-93.63251570
2023-09-21	Betula nigra	birch, river	1.5	41.55721368	-93.63213617
2023-09-21	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.55721468	-93.63403383
2023-09-21	Quercus rubra	oak, northern red	1.5	41.55721468	-93.63279599
2023-09-21	Quercus rubra	oak, northern red	1.5	41.55721468	-93.63205570
2023-09-21	Ulmus spp.	elm, spp.	1.5	41.55721468	-93.63192293
2023-09-21	Platanus x acerifolia	planetree, London	1.5	41.55721569	-93.63233197
2023-09-21	Platanus x acerifolia	planetree, London	1.5	41.55721669	-93.63157425
2023-09-21	Quercus rubra	oak, northern red	1.5	41.55721769	-93.63364893
2023-09-21	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.55721769	-93.63348130
2023-09-21	Malus spp.	crabapple, flowering	1.5	41.55721870	-93.62988445
2023-09-21	Cercis canadensis	redbud, eastern	1.5	41.55721970	-93.63031629
2023-09-21	Malus spp.	crabapple, flowering	1.5	41.55722070	-93.63374549
2023-09-21	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.55722070	-93.63123092
2023-09-21	Ulmus spp.	elm, spp.	1.5	41.55722472	-93.62920451
2023-09-21	Quercus rubra	oak, northern red	1.5	41.55722472	-93.62893093
2023-09-21	Syringa spp.	lilac	1.5	41.55722572	-93.63000784
2023-09-21	Liriodendron tulipifera	tuliptree	1.5	41.55722572	-93.62928632
2023-09-21	Platanus x acerifolia	planetree, London	1.5	41.55722672	-93.62882364
2023-09-21	Betula nigra	birch, river	1.5	41.55722773	-93.62909857
2023-09-21	Liriodendron tulipifera	tuliptree	1.5	41.55722873	-93.62861175
2023-09-21	Betula nigra	birch, river	1.5	41.55722974	-93.62848836
2023-09-21	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.55722974	-93.62826574
2023-09-21	Platanus x acerifolia	planetree, London	1.5	41.55723174	-93.62757507
2023-04-29	Platanus x acerifolia	planetree, London	1.5	41.55726357	-93.57740543
2023-09-21	Cercis canadensis	redbud, eastern	1.5	41.55730299	-93.63378170
2023-09-21	Liriodendron tulipifera	tuliptree	1.5	41.55730299	-93.63503161
2023-09-21	Viburnum lentago	nannyberry	1.5	41.55730400	-93.63257337
2023-09-21	Syringa spp.	lilac	1.5	41.55730500	-93.63521803
2023-09-21	Syringa spp.	lilac	1.5	41.55730600	-93.63006953
2023-09-21	Crataegus spp.	hawthorn, spp.	1.5	41.55730600	-93.63194841
2023-09-21	Syringa spp.	lilac	1.5	41.55730600	-93.63217908
2023-09-21	Syringa spp.	lilac	1.5	41.55730600	-93.63343302
2023-09-21	Viburnum lentago	nannyberry	1.5	41.55730701	-93.63077629
2023-09-21	Malus spp.	crabapple, flowering	1.5	41.55730701	-93.63204631
2023-09-21	Crataegus spp.	hawthorn, spp.	1.5	41.55730701	-93.63225553
2023-09-21	Crataegus spp.	hawthorn, spp.	1.5	41.55730801	-93.63283220
2023-09-21	Syringa spp.	lilac	1.5	41.55730902	-93.63269407
2023-09-21	Cercis canadensis	redbud, eastern	1.5	41.55731002	-93.62969134
2023-09-21	Syringa spp.	lilac	1.5	41.55731102	-93.62849507
2023-09-21	Syringa spp.	lilac	1.5	41.55731102	-93.63085944
2023-09-21	Cercis canadensis	redbud, eastern	1.5	41.55731102	-93.63291133
2023-09-21	Malus spp.	crabapple, flowering	1.5	41.55731203	-93.62793583
2023-09-21	Crataegus spp.	hawthorn, spp.	1.5	41.55731203	-93.62864393
2023-09-21	Viburnum lentago	nannyberry	1.5	41.55731203	-93.62891081
2023-09-21	Malus spp.	crabapple, flowering	1.5	41.55731203	-93.62986568
2023-09-21	Cercis canadensis	redbud, eastern	1.5	41.55731203	-93.63111425
2023-09-21	Syringa spp.	lilac	1.5	41.55731203	-93.63185722
2023-09-21	Viburnum lentago	nannyberry	1.5	41.55731203	-93.63332841
2023-09-21	Syringa spp.	lilac	1.5	41.55731303	-93.62908650
2023-09-21	Malus spp.	crabapple, flowering	1.5	41.55731303	-93.62915623
2023-09-21	Cercis canadensis	redbud, eastern	1.5	41.55731303	-93.63169763
2023-09-21	Viburnum lentago	nannyberry	1.5	41.55731403	-93.62769711
2023-09-21	Crataegus spp.	hawthorn, spp.	1.5	41.55731403	-93.62811017
2023-09-21	Cercis canadensis	redbud, eastern	1.5	41.55731403	-93.62829793
2023-09-21	Syringa spp.	lilac	1.5	41.55731403	-93.62937483
2023-09-21	Syringa spp.	lilac	1.5	41.55731403	-93.62954918
2023-09-21	Malus spp.	crabapple, flowering	1.5	41.55731403	-93.62961489
2023-09-21	Cercis canadensis	redbud, eastern	1.5	41.55731504	-93.62949151
2023-09-21	Syringa spp.	lilac	1.5	41.55731504	-93.63163325
2023-09-21	Syringa spp.	lilac	1.5	41.55731604	-93.62739402
2023-09-21	Malus spp.	crabapple, flowering	1.5	41.55731805	-93.62756837
2023-04-29	Cladrastis kentukea	yellowwood	1.5	41.55739865	-93.57740677
2023-04-29	Liriodendron tulipifera	tuliptree	1.5	41.55756523	-93.57740784
2023-04-29	Liquidambar styraciflua	sweetgum, American	1.5	41.55787452	-93.57740650
2023-04-29	Cladrastis kentukea	yellowwood	1.5	41.55798471	-93.57741160
2023-04-29	Gleditsia triacanthos	honeylocust	1.5	41.55814467	-93.57740811
2023-04-29	Ostrya virginiana	hophornbeam, American	1.5	41.55827734	-93.57742179
2023-04-29	Carpinus caroliniana	hornbeam, American	1.5	41.55841803	-93.57741401
2023-04-29	Quercus spp.	oak	1.5	41.55866470	-93.57740838
2023-04-29	Quercus spp.	oak	1.5	41.55877810	-93.57740489
2023-04-29	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.55904563	-93.57740784

2023-04-29	Liriodendron tulipifera	tuliptree	1.5	41.55921041	-93.57740436
2023-04-29	Quercus spp.	oak	1.5	41.55935431	-93.57741374
2023-04-29	Platanus x acerifolia	planetree, London	1.5	41.55946931	-93.57740597
2023-04-29	Liriodendron tulipifera	tuliptree	1.5	41.55965336	-93.57741321
2023-04-29	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.55978281	-93.57741187
2023-04-29	Gleditsia triacanthos	honeylocust	1.5	41.55988978	-93.57741053
2023-04-29	Platanus x acerifolia	planetree, London	1.5	41.56019103	-93.57741348
2023-04-29	Liriodendron tulipifera	tuliptree	1.5	41.56031245	-93.57741213
2023-04-29	Quercus spp.	oak	1.5	41.56041621	-93.57741079
2023-10-12	Malus spp.	crabapple, flowering	1.5	41.56967268	-93.70209857
2023-10-12	Syringa spp.	lilac	1.5	41.56968773	-93.70195239
2023-10-12	Malus spp.	crabapple, flowering	1.5	41.56975696	-93.70194703
2023-10-12	Syringa spp.	lilac	1.5	41.56977302	-93.70209857
2023-10-12	Malus spp.	crabapple, flowering	1.5	41.56988940	-93.70210260
2023-10-12	Quercus macrocarpa	oak, bur	1.5	41.56989241	-93.70194435
2023-10-12	Syringa spp.	lilac	1.5	41.56995964	-93.70209857
2023-10-12	Malus spp.	crabapple, flowering	1.5	41.57005195	-93.70210260
2023-10-12	Liriodendron tulipifera	tuliptree	1.5	41.57005997	-93.70194569
2023-10-12	Viburnum lentago	nannyberry	1.5	41.57013924	-93.70209991
2023-10-12	Cercis canadensis	redbud, eastern	1.5	41.57018037	-93.70210260
2023-10-12	Syringa spp.	lilac	1.5	41.57023355	-93.70209857
2023-10-12	Platanus x acerifolia	planetree, London	1.5	41.57028271	-93.70194837
2023-10-12	Malus spp.	crabapple, flowering	1.5	41.57030980	-93.70210394
2023-10-12	Viburnum lentago	nannyberry	1.5	41.57059876	-93.70210528
2023-10-12	Viburnum lentago	nannyberry	1.5	41.57068405	-93.70193362
2023-10-12	Syringa spp.	lilac	1.5	41.57075328	-93.70210260
2023-10-12	Syringa spp.	lilac	1.5	41.57084257	-93.70209187
2023-10-12	Betula nigra	birch, river	1.5	41.57087669	-93.70194032
2023-10-12	Syringa spp.	lilac	1.5	41.57090980	-93.70210126
2023-10-12	Quercus macrocarpa	oak, bur	1.5	41.57118772	-93.70194435
2023-10-12	Liriodendron tulipifera	tuliptree	1.5	41.57125996	-93.70194301
2023-10-12	Gleditsia triacanthos	honeylocust	1.5	41.57136029	-93.70210662
2023-10-12	Malus spp.	crabapple, flowering	1.5	41.57141146	-93.70194301
2023-10-12	Celtis occidentalis	hackberry, common	1.5	41.57146363	-93.70210528
2023-10-12	Syringa spp.	lilac	1.5	41.57147868	-93.70195239
2023-10-12	Malus spp.	crabapple, flowering	1.5	41.57155293	-93.70194837
2023-10-12	Syringa spp.	lilac	1.5	41.57167734	-93.70193898
2023-10-12	Malus spp.	crabapple, flowering	1.5	41.57171647	-93.70209857
2023-10-12	Ulmus spp.	elm, spp.	1.5	41.57176362	-93.70210260
2023-10-12	Quercus macrocarpa	oak, bur	1.5	41.57184389	-93.70209991
2023-10-12	Malus spp.	crabapple, flowering	1.5	41.57202850	-93.70194166
2023-10-12	Cercis canadensis	redbud, eastern	1.5	41.57209572	-93.70194301
2023-10-12	Viburnum lentago	nannyberry	1.5	41.57214287	-93.70210796
2023-10-12	Syringa spp.	lilac	1.5	41.57216796	-93.69885377
2023-10-12	Crataegus spp.	hawthorn, spp.	1.5	41.57217297	-93.69959808
2023-10-12	Malus spp.	crabapple, flowering	1.5	41.57217598	-93.70049931
2023-10-12	Syringa spp.	lilac	1.5	41.57217699	-93.69892887
2023-10-12	Syringa spp.	lilac	1.5	41.57217899	-93.69998566
2023-10-12	Syringa spp.	lilac	1.5	41.57218802	-93.70173715
2023-10-12	Malus spp.	crabapple, flowering	1.5	41.57218802	-93.70129056
2023-10-12	Syringa spp.	lilac	1.5	41.57218903	-93.70136432
2023-10-12	Malus spp.	crabapple, flowering	1.5	41.57219003	-93.70068036
2023-10-12	Cercis canadensis	redbud, eastern	1.5	41.57219103	-93.70112560
2023-10-12	Syringa spp.	lilac	1.5	41.57219103	-93.70085872
2023-10-12	Cercis canadensis	redbud, eastern	1.5	41.57219204	-93.70185114
2023-10-12	Malus spp.	crabapple, flowering	1.5	41.57219204	-93.70164327
2023-10-12	Malus spp.	crabapple, flowering	1.5	41.57219605	-93.70261155
2023-10-12	Crataegus spp.	hawthorn, spp.	1.5	41.57219605	-93.70242111
2023-10-12	Betula nigra	birch, river	1.5	41.57228534	-93.69950152
2023-10-12	Liriodendron tulipifera	tuliptree	1.5	41.57228534	-93.70228968
2023-10-12	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.57228635	-93.70018817
2023-10-12	Quercus rubra	oak, northern red	1.5	41.57228735	-93.70076082
2023-10-12	Quercus bicolor	oak, swamp white	1.5	41.57228835	-93.69939155
2023-10-12	Betula nigra	birch, river	1.5	41.57228835	-93.70026595
2023-10-12	Betula nigra	birch, river	1.5	41.57228936	-93.70094992
2023-10-12	Liriodendron tulipifera	tuliptree	1.5	41.57229036	-93.70002724
2023-10-12	Liriodendron tulipifera	tuliptree	1.5	41.57229036	-93.70051272
2023-10-12	Ulmus spp.	elm, spp.	1.5	41.57229036	-93.70106659
2023-10-12	Ulmus spp.	elm, spp.	1.5	41.57229136	-93.70185785
2023-10-12	Syringa spp.	lilac	1.5	41.57229237	-93.70164863
2023-10-12	Crataegus spp.	hawthorn, spp.	1.5	41.57229337	-93.70243184
2023-10-12	Betula nigra	birch, river	1.5	41.57229437	-93.70263434
2023-10-12	Quercus rubra	oak, northern red	1.5	41.57229738	-93.70276980
2023-10-12	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.57229839	-93.70174787
2023-04-20	Ostrya virginiana	hophornbeam, American	1.5	41.57230868	-93.60425072
2023-04-20	Carpinus caroliniana	hornbeam, American	1.5	41.57230948	-93.60329263
2023-04-20	Ostrya virginiana	hophornbeam, American	1.5	41.57231009	-93.60336907
2023-04-20	Syringa vulgaris	lilac, common	1.5	41.57231129	-93.60414423
2023-04-20	Syringa vulgaris	lilac, common	1.5	41.57231309	-93.60446154
2023-04-20	Syringa vulgaris	lilac, common	1.5	41.57231390	-93.60364937
2023-04-20	Malus spp.	crabapple, flowering	1.5	41.57231490	-93.60490115
2023-04-20	Syringa vulgaris	lilac, common	1.5	41.57231550	-93.60508059
2023-04-20	Malus spp.	crabapple, flowering	1.5	41.57231570	-93.60439797
2023-04-20	Carpinus caroliniana	hornbeam, American	1.5	41.57231751	-93.60469382
2023-04-20	Malus spp.	crabapple, flowering	1.5	41.57232012	-93.60453584
2023-10-12	Viburnum lentago	nannyberry	1.5	41.57236962	-93.70194569
2023-04-20	Gleditsia triacanthos	honeylocust	1.5	41.57240199	-93.60300805

2023-04-20	Malus spp.	crabapple, flowering	1.5	41.57240219	-93.60423945
2023-04-20	Gleditsia triacanthos	honeylocust	1.5	41.57240239	-93.60343023
2023-04-20	Quercus rubra	oak, northern red	1.5	41.57240460	-93.60313545
2023-04-20	Quercus rubra	oak, northern red	1.5	41.57240500	-93.60352330
2023-04-20	Celtis occidentalis	hackberry, common	1.5	41.57240640	-93.60438402
2023-04-20	Liriodendron tulipifera	tuliptree	1.5	41.57240713	-93.60457789
2023-04-20	Liriodendron tulipifera	tuliptree	1.5	41.57240761	-93.60374727
2023-04-20	Gleditsia triacanthos	honeylocust	1.5	41.57240813	-93.60476109
2023-04-20	Quercus rubra	oak, northern red	1.5	41.57240914	-93.60484129
2023-10-12	Malus spp.	crabapple, flowering	1.5	41.57243283	-93.70194971
2023-04-20	Quercus rubra	oak, northern red	1.5	41.57248691	-93.60281791
2023-10-12	Cercis canadensis	redbud, eastern	1.5	41.57252614	-93.70194301
2023-04-20	Celtis occidentalis	hackberry, common	1.5	41.57256497	-93.60282086
2023-10-12	Ulmus spp.	elm, spp.	1.5	41.57262245	-93.70210126
2023-04-20	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.57263981	-93.60281523
2023-10-12	Malus spp.	crabapple, flowering	1.5	41.57266158	-93.70195105
2023-10-12	Viburnum lentago	nannyberry	1.5	41.57267964	-93.70209857
2023-04-20	Quercus coccinea	oak, scarlet	1.5	41.57270663	-93.60281604
2023-10-12	Celtis occidentalis	hackberry, common	1.5	41.57282010	-93.70210260
2023-10-12	Quercus macrocarpa	oak, bur	1.5	41.57286425	-93.70210528
2023-04-20	Quercus rubra	oak, northern red	1.5	41.57286997	-93.60293459
2023-10-12	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.57290789	-93.70093651
2023-04-20	Liriodendron tulipifera	tuliptree	1.5	41.57291311	-93.60281684
2023-04-20	Liriodendron tulipifera	tuliptree	1.5	41.57294923	-93.60293164
2023-10-12	Malus spp.	crabapple, flowering	1.5	41.57295705	-93.70091907
2023-10-12	Gleditsia triacanthos	honeylocust	1.5	41.57297662	-93.70209455
2023-04-20	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.57299277	-93.60281121
2023-10-12	Ulmus spp.	elm, spp.	1.5	41.57302929	-93.69978316
2023-04-20	Quercus rubra	oak, northern red	1.5	41.57306060	-93.60292869
2023-10-12	Malus spp.	crabapple, flowering	1.5	41.57306842	-93.70091639
2023-10-12	Cercis canadensis	redbud, eastern	1.5	41.57307243	-93.69966380
2023-04-20	Quercus coccinea	oak, scarlet	1.5	41.57308207	-93.60281201
2023-10-12	Betula nigra	birch, river	1.5	41.57310203	-93.70209723
2023-10-12	Malus spp.	crabapple, flowering	1.5	41.57312159	-93.70092175
2023-05-20	Cercis canadensis	redbud, eastern	1.5	41.57315088	-93.60230188
2023-05-20	Syringa spp.	lilac	1.5	41.57315128	-93.60271547
2023-05-20	Malus spp.	crabapple, flowering	1.5	41.57315148	-93.60212512
2023-05-20	Malus spp.	crabapple, flowering	1.5	41.57315349	-93.60356439
2023-05-20	Malus spp.	crabapple, flowering	1.5	41.57315509	-93.60249151
2023-05-20	Crataegus spp.	hawthorn, spp.	1.5	41.57315569	-93.60338978
2023-05-20	Gleditsia triacanthos	honeylocust	1.5	41.57315589	-93.60418130
2023-05-20	Liriodendron tulipifera	tuliptree	1.5	41.57315690	-93.60313068
2023-05-20	Malus spp.	crabapple, flowering	1.5	41.57315770	-93.60365317
2023-05-20	Gleditsia triacanthos	honeylocust	1.5	41.57315790	-93.60322804
2023-05-20	Malus spp.	crabapple, flowering	1.5	41.57316292	-93.60403029
2023-05-20	Malus spp.	crabapple, flowering	1.5	41.57316310	-93.60505233
2023-05-20	Cercis canadensis	redbud, eastern	1.5	41.57316370	-93.60497213
2023-05-20	Cercis canadensis	redbud, eastern	1.5	41.57316673	-93.60392434
2023-10-12	Cercis canadensis	redbud, eastern	1.5	41.57322293	-93.70092310
2023-10-12	Liriodendron tulipifera	tuliptree	1.5	41.57323547	-93.70209857
2023-10-12	Syringa spp.	lilac	1.5	41.57324299	-93.69966514
2023-10-12	Malus spp.	crabapple, flowering	1.5	41.57324299	-93.69978852
2023-05-20	Malus spp.	crabapple, flowering	1.5	41.57324840	-93.60221229
2023-05-20	Syringa spp.	lilac	1.5	41.57325181	-93.60253174
2023-05-20	Malus spp.	crabapple, flowering	1.5	41.57325221	-93.60232306
2023-05-20	Syringa spp.	lilac	1.5	41.57325602	-93.60317413
2023-05-20	Malus spp.	crabapple, flowering	1.5	41.57325662	-93.60310466
2023-05-20	Cercis canadensis	redbud, eastern	1.5	41.57325723	-93.60272191
2023-05-20	Crataegus spp.	hawthorn, spp.	1.5	41.57325763	-93.60242955
2023-05-20	Cercis canadensis	redbud, eastern	1.5	41.57325861	-93.60485814
2023-05-20	Malus spp.	crabapple, flowering	1.5	41.57325863	-93.60324574
2023-05-20	Syringa spp.	lilac	1.5	41.57325963	-93.60400400
2023-05-20	Malus spp.	crabapple, flowering	1.5	41.57326062	-93.60508505
2023-05-20	Syringa spp.	lilac	1.5	41.57326443	-93.60497267
2023-10-12	Syringa spp.	lilac	1.5	41.57328914	-93.70092041
2023-05-20	Malus spp.	crabapple, flowering	1.5	41.57333649	-93.60293139
2023-10-12	Cercis canadensis	redbud, eastern	1.5	41.57339449	-93.69978450
2023-10-12	Malus spp.	crabapple, flowering	1.5	41.57340352	-93.70092175
2023-10-12	Viburnum lentago	nannyberry	1.5	41.57343562	-93.69966380
2023-05-20	Malus spp.	crabapple, flowering	1.5	41.57347514	-93.60292629
2023-10-21	Syringa spp.	lilac	1.5	41.57348830	-93.69964100
2023-05-20	Syringa spp.	lilac	1.5	41.57354156	-93.60292763
2023-10-12	Malus spp.	crabapple, flowering	1.5	41.57354498	-93.70172508
2023-10-12	Liriodendron tulipifera	tuliptree	1.5	41.57354699	-93.70110414
2023-10-12	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.57354899	-93.70133884
2023-10-12	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.57355000	-93.70102368
2023-10-12	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.57355401	-93.69930438
2023-10-12	Liriodendron tulipifera	tuliptree	1.5	41.57355602	-93.69949884
2023-10-12	Crataegus spp.	hawthorn, spp.	1.5	41.57355702	-93.69991056
2023-10-12	Liriodendron tulipifera	tuliptree	1.5	41.57355802	-93.70012648
2023-10-12	Liriodendron tulipifera	tuliptree	1.5	41.57355802	-93.70068974
2023-10-12	Platanus x acerifolia	planetree, London	1.5	41.57355903	-93.70021767
2023-10-12	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.57356003	-93.70001249
2023-10-12	Syringa spp.	lilac	1.5	41.57356204	-93.70219849
2023-10-12	Crataegus spp.	hawthorn, spp.	1.5	41.57356304	-93.70233930
2023-10-12	Ulmus spp.	elm, spp.	1.5	41.57356605	-93.70049662
2023-05-20	Malus spp.	crabapple, flowering	1.5	41.57359513	-93.60292898

2023-10-12	Malus spp.	crabapple, flowering	1.5	41.57366136	-93.69984351
2023-10-12	Syringa spp.	lilac	1.5	41.57366136	-93.70260886
2023-10-12	Syringa spp.	lilac	1.5	41.57366237	-93.69965441
2023-10-12	Syringa spp.	lilac	1.5	41.57366337	-93.70075009
2023-10-12	Syringa spp.	lilac	1.5	41.57366538	-93.70207108
2023-10-12	Syringa spp.	lilac	1.5	41.57366638	-93.70063744
2023-10-12	Malus spp.	crabapple, flowering	1.5	41.57366738	-93.70048053
2023-10-12	Viburnum lentago	nannyberry	1.5	41.57366839	-93.70055966
2023-10-12	Crataegus spp.	hawthorn, spp.	1.5	41.57366839	-93.70018549
2023-10-12	Malus spp.	crabapple, flowering	1.5	41.57366839	-93.69977109
2023-10-12	Syringa spp.	lilac	1.5	41.57366939	-93.70272018
2023-10-12	Malus spp.	crabapple, flowering	1.5	41.57367039	-93.70025523
2023-10-12	Crataegus phaenopyrum	hawthorn, Washington	1.5	41.57367140	-93.70034910
2023-10-12	Cercis canadensis	redbud, eastern	1.5	41.57367140	-93.69991593
2023-10-12	Syringa spp.	lilac	1.5	41.57367240	-93.70226956
2023-09-30	Syringa spp.	lilac	1.5	41.57367257	-93.70219456
2023-10-12	Syringa spp.	lilac	1.5	41.57367340	-93.70279796
2023-10-12	Syringa spp.	lilac	1.5	41.57367641	-93.70136834
2023-10-12	Syringa spp.	lilac	1.5	41.57367641	-93.70189808
2023-10-12	Syringa spp.	lilac	1.5	41.57367641	-93.70149038
2023-10-12	Syringa spp.	lilac	1.5	41.57367842	-93.70249085
2023-10-12	Syringa spp.	lilac	1.5	41.57367942	-93.70043493
2023-10-12	Syringa spp.	lilac	1.5	41.57368043	-93.70241440
2023-10-12	Syringa spp.	lilac	1.5	41.57368143	-93.70011709
2023-10-12	Cercis canadensis	redbud, eastern	1.5	41.57368343	-93.70169691
2023-05-20	Quercus macrocarpa	oak, bur	1.5	41.57371533	-93.60281337
2023-05-20	Syringa spp.	lilac	1.5	41.57372255	-93.60292603
2023-10-28	Crataegus spp.	hawthorn, spp.	1.5	41.57373159	-93.69942307
2023-05-20	Liriodendron tulipifera	tuliptree	1.5	41.57381626	-93.60292737
2023-10-28	Syringa spp.	lilac	1.5	41.57384597	-93.69942843
2023-05-20	Crataegus spp.	hawthorn, spp.	1.5	41.57390354	-93.60292656
2023-05-20	Gleditsia triacanthos	honeylocust	1.5	41.57391498	-93.60281042
2023-10-28	Quercus rubra	oak, northern red	1.5	41.57391820	-93.69955182
2023-10-28	Malus spp.	crabapple, flowering	1.5	41.57392222	-93.69942575
2023-05-20	Malus spp.	crabapple, flowering	1.5	41.57395712	-93.60292790
2023-05-20	Malus spp.	crabapple, flowering	1.5	41.57396113	-93.60280023
2023-05-20	Syringa spp.	lilac	1.5	41.57402133	-93.60261248
2023-05-20	Amelanchier spp.	serviceberry, spp.	1.5	41.57402333	-93.60270850
2023-05-20	Syringa spp.	lilac	1.5	41.57402374	-93.60445462
2023-05-20	Syringa spp.	lilac	1.5	41.57402574	-93.60431890
2023-05-20	Syringa spp.	lilac	1.5	41.57402976	-93.60313765
2023-05-20	Malus spp.	crabapple, flowering	1.5	41.57403016	-93.60236893
2023-05-20	Malus spp.	crabapple, flowering	1.5	41.57403096	-93.60380123
2023-05-20	Syringa spp.	lilac	1.5	41.57403176	-93.60302339
2023-05-20	Syringa spp.	lilac	1.5	41.57403257	-93.60484622
2023-05-20	Malus spp.	crabapple, flowering	1.5	41.57403457	-93.60461179
2023-05-20	Syringa spp.	lilac	1.5	41.57403858	-93.60250358
2023-10-28	Syringa spp.	lilac	1.5	41.57409077	-93.69941771
2023-05-20	Crataegus spp.	hawthorn, spp.	1.5	41.57413329	-93.60412363
2023-05-20	Malus spp.	crabapple, flowering	1.5	41.57413370	-93.60461662
2023-05-20	Syringa spp.	lilac	1.5	41.57413771	-93.60423789
2023-05-20	Malus spp.	crabapple, flowering	1.5	41.57413931	-93.60509835
2023-05-20	Crataegus spp.	hawthorn, spp.	1.5	41.57414132	-93.60487250
2023-10-28	Malus spp.	crabapple, flowering	1.5	41.57414494	-93.69942039
2023-05-20	Malus spp.	crabapple, flowering	1.5	41.57414854	-93.60435645
2023-05-20	Carpinus caroliniana	hornbeam, American	1.5	41.57418225	-93.60279647
2023-10-28	Syringa spp.	lilac	1.5	41.57424928	-93.69940966
2023-05-20	Syringa spp.	lilac	1.5	41.57427014	-93.60279487
2023-05-20	Malus spp.	crabapple, flowering	1.5	41.57434519	-93.60279755
2023-10-28	Cercis canadensis	redbud, eastern	1.5	41.57442385	-93.69941234
2023-10-28	Betula nigra	birch, river	1.5	41.57443991	-93.69954377
2023-10-28	Malus spp.	crabapple, flowering	1.5	41.57450612	-93.69954913
2023-10-28	Malus spp.	crabapple, flowering	1.5	41.57461247	-93.69943648
2023-10-28	Quercus rubra	oak, northern red	1.5	41.57462959	-93.69953112
2023-10-28	Celtis occidentalis	hackberry, common	19	41.57479506	-93.69953036
2023-10-28	Crataegus spp.	hawthorn, spp.	1.5	41.57490342	-93.69938820
2023-10-28	Quercus macrocarpa	oak, bur	19	41.57494756	-93.69953572
2023-10-28	Syringa spp.	lilac	1.5	41.57496562	-93.69940698
2023-05-06	Malus spp.	crabapple, flowering	1.5	41.57497325	-93.60672247
2023-05-06	Malus spp.	crabapple, flowering	1.5	41.57506053	-93.60710362
2023-05-06	Amelanchier spp.	serviceberry, spp.	1.5	41.57508361	-93.60719937
2023-05-06	Malus spp.	crabapple, flowering	1.5	41.57510989	-93.60736808
2023-05-06	Syringa spp.	lilac	1.5	41.57521206	-93.60789570
2023-05-06	Malus spp.	crabapple, flowering	1.5	41.57523353	-93.60798502
2023-10-28	Cercis canadensis	redbud, eastern	1.5	41.57523650	-93.69940698
2023-05-06	Cercis canadensis	redbud, eastern	1.5	41.57524698	-93.60805503
2023-05-06	Crataegus spp.	hawthorn, spp.	1.5	41.57527868	-93.60778949
2023-10-28	Tilia cordata 'Greenspire'	linden, greenspire	19	41.57528322	-93.69952664
2023-05-06	Malus spp.	crabapple, flowering	1.5	41.57528891	-93.60785735
2023-05-06	Syringa spp.	lilac	1.5	41.57531359	-93.60795310
2023-05-06	Amelanchier spp.	serviceberry, spp.	1.5	41.57533025	-93.60802311
2023-05-06	Crataegus spp.	hawthorn, spp.	1.5	41.57533105	-93.60845763
2023-05-06	Ostrya virginiana	hophornbeam, American	1.5	41.57545686	-93.60859630
2023-10-28	Liriodendron tulipifera	tuliptree	1.5	41.57545922	-93.69952499
2023-05-06	Crataegus spp.	hawthorn, spp.	1.5	41.57549278	-93.60877788
2023-05-06	Cercis canadensis	redbud, eastern	1.5	41.57553030	-93.60892943
2023-05-06	Amelanchier spp.	serviceberry, spp.	1.5	41.57558227	-93.60950798

2023-05-06	Carpinus caroliniana	hornbeam, American	1.5	41.57570165	-93.60965309
2023-05-06	Celtis occidentalis	hackberry, common	1.5	41.57573597	-93.60977030
2023-05-06	Ostrya virginiana	hophornbeam, American	1.5	41.57583047	-93.61059883
2023-05-06	Quercus bicolor	oak, swamp white	1.5	41.57583770	-93.61015144
2023-05-06	Ostrya virginiana	hophornbeam, American	1.5	41.57585515	-93.61069459
2023-05-06	Celtis occidentalis	hackberry, common	1.5	41.57585756	-93.61023218
2023-05-06	Quercus bicolor	oak, swamp white	1.5	41.57588224	-93.61033866
2023-10-28	Quercus rubra	oak, northern red	1.5	41.57588260	-93.69966447
2023-05-06	Syringa spp.	lilac	1.5	41.57589107	-93.61083970
2023-05-06	Ostrya virginiana	hophornbeam, American	1.5	41.57593020	-93.61099339
2023-05-06	Crataegus spp.	hawthorn, spp.	1.5	41.57594524	-93.61105695
2023-05-06	Quercus bicolor	oak, swamp white	1.5	41.57594705	-93.61056745
2023-10-28	Syringa spp.	lilac	1.5	41.57595684	-93.69970202
2023-10-28	Malus spp.	crabapple, flowering	1.5	41.57597289	-93.69975566
2023-10-28	Malus spp.	crabapple, flowering	1.5	41.57597891	-93.70019018
2023-05-06	Carpinus caroliniana	hornbeam, American	1.5	41.57598116	-93.61119777
2023-05-06	Syringa spp.	lilac	1.5	41.57600424	-93.61129353
2023-05-06	Amelanchier spp.	serviceberry, spp.	1.5	41.57609112	-93.61163658
2023-05-06	Amelanchier spp.	serviceberry, spp.	1.5	41.57610115	-93.61122406
2023-05-06	Crataegus spp.	hawthorn, spp.	1.5	41.57616756	-93.61149576
2023-05-06	Amelanchier spp.	serviceberry, spp.	1.5	41.57620147	-93.61212206
2023-10-28	Betula nigra	birch, river	1.5	41.57623173	-93.70297163
2023-10-28	Liriodendron tulipifera	tuliptree	1.5	41.57624577	-93.70278924
2023-10-28	Quercus macrocarpa	oak, bur	1.5	41.57625380	-93.70262563
2023-10-28	Quercus rubra	oak, northern red	1.5	41.57625982	-93.70172977
2023-10-28	Celtis occidentalis	hackberry, common	1.5	41.57626383	-93.70244324
2023-05-06	Malus spp.	crabapple, flowering	1.5	41.57627010	-93.61235005
2023-05-06	Carpinus caroliniana	hornbeam, American	1.5	41.57628755	-93.61195335
2023-05-06	Ostrya virginiana	hophornbeam, American	1.5	41.57630441	-93.61249516
2023-05-06	Cercis canadensis	redbud, eastern	1.5	41.57632246	-93.61214271
2023-10-28	Malus spp.	crabapple, flowering	1.5	41.57633406	-93.70134890
2023-10-28	Cercis canadensis	redbud, eastern	1.5	41.57633406	-93.70154738
2023-10-28	Syringa reticulata	lilac, Japanese tree	1.5	41.57633807	-93.70149642
2023-10-28	Syringa reticulata	lilac, Japanese tree	1.5	41.57634008	-93.70114773
2023-10-28	Syringa spp.	lilac	1.5	41.57635212	-93.70167344
2023-10-28	Syringa spp.	lilac	1.5	41.57635613	-93.70242446
2023-05-06	Syringa spp.	lilac	1.5	41.57639971	-93.61245144
2023-05-06	Ostrya virginiana	hophornbeam, American	1.5	41.57642439	-93.61253861
2023-09-27	Quercus bicolor	oak, swamp white	1.5	41.58258212	-93.56516818
2023-09-27	Quercus macrocarpa	oak, bur	1.5	41.58258814	-93.56531570
2023-09-27	Quercus bicolor	oak, swamp white	1.5	41.58263829	-93.56544713
2023-09-27	Populus tremuloides	aspen, quaking	1.5	41.58268444	-93.56589774
2023-09-27	Pinus strobus	pine, eastern white	1.5	41.58269246	-93.56577704
2023-09-27	Populus tremuloides	aspen, quaking	1.5	41.58269848	-93.56602381
2023-09-30	Quercus macrocarpa	oak, bur	1.5	41.58270086	-93.56511648
2023-09-27	Pinus strobus	pine, eastern white	1.5	41.58271253	-93.56569926
2023-09-27	Populus tremuloides	aspen, quaking	1.5	41.58272055	-93.56613110
2023-09-27	Pinus strobus	pine, eastern white	1.5	41.58274061	-93.56560270
2023-09-27	Populus tremuloides	aspen, quaking	1.5	41.58274463	-93.56624107
2023-09-27	Amelanchier spp.	serviceberry, spp.	1.5	41.58278074	-93.56634836
2023-09-27	Quercus bicolor	oak, swamp white	1.5	41.58279478	-93.56521110
2023-09-30	Tilia americana	linden, American	1.5	41.58280719	-93.56551345
2023-09-27	Amelanchier spp.	serviceberry, spp.	1.5	41.58280883	-93.56644223
2023-09-27	Alnus glutinosa	alder, common	1.5	41.58284093	-93.56655220
2023-09-30	Tilia americana	linden, American	1.5	41.58284531	-93.56543567
2023-11-04	Celtis occidentalis	hackberry, common	1.5	41.58287939	-93.60090285
2023-11-04	Ulmus spp.	elm, spp.	1.5	41.58289142	-93.60114961
2023-11-04	Gleditsia triacanthos inermis	honeylocust, thornless	1.5	41.58293456	-93.60124886
2023-09-29	Abies concolor	fir, white	1.5	41.58295566	-93.56508161
2023-11-04	Betula nigra	birch, river	1.5	41.58296064	-93.60107183
2023-11-04	Gleditsia triacanthos inermis	honeylocust, thornless	1.5	41.58296265	-93.60083580
2023-11-04	Gleditsia triacanthos inermis	honeylocust, thornless	1.5	41.58297468	-93.60076740
2023-11-04	Betula nigra	birch, river	1.5	41.58297769	-93.60110938
2023-11-04	Betula nigra	birch, river	1.5	41.58299374	-93.60116034
2023-11-04	Betula nigra	birch, river	1.5	41.58300177	-93.60120594
2023-11-04	Betula nigra	birch, river	1.5	41.58300779	-93.60124886
2023-09-27	Pinus strobus	pine, eastern white	1.5	41.58300845	-93.56505151
2023-09-27	Pinus strobus	pine, eastern white	1.5	41.58302751	-93.56513868
2023-09-27	Pinus strobus	pine, eastern white	1.5	41.58305560	-93.56503005
2023-11-04	Celtis occidentalis	hackberry, common	1.5	41.58305794	-93.60027521
2023-11-04	Ulmus spp.	elm, spp.	1.5	41.58306597	-93.60049918
2023-09-30	Abies concolor	fir, white	1.5	41.58308406	-93.56511648
2023-09-27	Pinus strobus	pine, eastern white	1.5	41.58308570	-93.56510381
2023-11-04	Celtis occidentalis	hackberry, common	1.5	41.58308603	-93.60034495
2023-11-04	Gleditsia triacanthos inermis	honeylocust, thornless	1.5	41.58308804	-93.60003918
2023-11-04	Gleditsia triacanthos inermis	honeylocust, thornless	1.5	41.58309305	-93.59999761
2023-11-04	Crataegus spp.	hawthorn, spp.	1.5	41.58311011	-93.60008075
2023-11-04	Crataegus spp.	hawthorn, spp.	1.5	41.58311011	-93.60011965
2023-11-04	Ulmus spp.	elm, spp.	1.5	41.58311613	-93.60045492
2023-09-27	Amelanchier spp.	serviceberry, spp.	1.5	41.58311660	-93.56500532
2023-09-27	Amelanchier spp.	serviceberry, spp.	1.5	41.58314168	-93.56499996
2023-11-04	Crataegus spp.	hawthorn, spp.	1.5	41.58314221	-93.60009819
2023-09-27	Pinus strobus	pine, eastern white	1.5	41.58315190	-93.56508503
2023-09-27	Amelanchier spp.	serviceberry, spp.	1.5	41.58316124	-93.56500197
2023-11-04	Cercis canadensis	redbud, eastern	1.5	41.58316227	-93.60004454
2023-11-04	Cercis canadensis	redbud, eastern	1.5	41.58319738	-93.60006198
2023-09-27	Amelanchier spp.	serviceberry, spp.	1.5	41.58319936	-93.56499929

2023-11-04	Gleditsia triacanthos inermis	honeylocust, thornless	1.5	41.58320240	-93.60011160
2023-09-27	Quercus macrocarpa	oak, bur	1.5	41.58320607	-93.56563757
2023-09-27	Tilia americana	linden, American	1.5	41.58321410	-93.56541495
2023-09-27	Amelanchier spp.	serviceberry, spp.	1.5	41.58323347	-93.56499929
2023-09-27	Populus tremuloides	aspen, quaking	1.5	41.58324820	-93.56507431
2023-09-27	Amelanchier spp.	serviceberry, spp.	1.5	41.58328833	-93.56500591
2023-09-27	Quercus alba	oak, white	1.5	41.58329034	-93.56577168
2023-09-30	Quercus alba	oak, white	1.5	41.58329070	-93.56576826
2023-09-27	Populus tremuloides	aspen, quaking	1.5	41.58330237	-93.56507967
2023-09-27	Quercus macrocarpa	oak, bur	1.5	41.58331441	-93.56527547
2023-09-27	Viburnum spp.	viburnum, spp.	1.5	41.58331842	-93.56500591
2023-09-27	Viburnum spp.	viburnum, spp.	1.5	41.58335855	-93.56500725
2023-09-27	Populus tremuloides	aspen, quaking	1.5	41.58336256	-93.56510113
2023-09-27	Viburnum spp.	viburnum, spp.	1.5	41.58339165	-93.56500457
2023-09-27	Quercus alba	oak, white	1.5	41.58340269	-93.56580387
2023-09-27	Celtis occidentalis	hackberry, common	1.5	41.58340269	-93.56529157
2023-09-27	Populus tremuloides	aspen, quaking	1.5	41.58341272	-93.56511722
2023-09-27	Viburnum spp.	viburnum, spp.	1.5	41.58342877	-93.56501262
2023-09-27	Populus tremuloides	aspen, quaking	1.5	41.58345886	-93.56501530
2023-09-27	Tilia americana	linden, American	1.5	41.58348896	-93.56561879
2023-09-27	Amelanchier spp.	serviceberry, spp.	1.5	41.58348996	-93.56501798
2023-09-27	Amelanchier spp.	serviceberry, spp.	1.5	41.58351504	-93.56501932
2023-09-27	Tilia americana	linden, American	1.5	41.58353309	-93.56549005
2023-09-27	Alnus glutinosa	alder, common	1.5	41.58354312	-93.56502200
2023-09-27	Populus tremuloides	aspen, quaking	1.5	41.58357021	-93.56502469
2023-09-27	Alnus glutinosa	alder, common	1.5	41.58359027	-93.56501798
2023-09-27	Amelanchier spp.	serviceberry, spp.	1.5	41.58361334	-93.56502200
2023-09-27	Tilia americana	linden, American	1.5	41.58362137	-93.56563221
2023-09-27	Amelanchier spp.	serviceberry, spp.	1.5	41.58364143	-93.56502200
2023-09-27	Populus tremuloides	aspen, quaking	1.5	41.58367855	-93.56502334
2023-09-27	Viburnum spp.	viburnum, spp.	1.5	41.58369761	-93.56502200
2023-09-27	Tilia americana	linden, American	1.5	41.58370563	-93.56536398
2023-09-27	Viburnum spp.	viburnum, spp.	1.5	41.58371867	-93.56502469
2023-09-27	Viburnum spp.	viburnum, spp.	1.5	41.58373874	-93.56502334
2023-09-27	Populus tremuloides	aspen, quaking	1.5	41.58376181	-93.56502469
2023-09-27	Amelanchier spp.	serviceberry, spp.	1.5	41.58378488	-93.56502066
2023-09-27	Amelanchier spp.	serviceberry, spp.	1.5	41.58381096	-93.56502200
2023-09-27	Amelanchier spp.	serviceberry, spp.	1.5	41.58384206	-93.56502737
2023-09-27	Populus tremuloides	aspen, quaking	1.5	41.58386312	-93.56502871
2023-09-27	Alnus glutinosa	alder, common	1.5	41.58388419	-93.56502871
2023-09-27	Tilia americana	linden, American	1.5	41.58390224	-93.56540690
2023-09-27	Alnus glutinosa	alder, common	1.5	41.58391027	-93.56502871
2023-09-27	Alnus glutinosa	alder, common	1.5	41.58393735	-93.56503273
2023-09-27	Populus tremuloides	aspen, quaking	1.5	41.58396143	-93.56503541
2023-09-27	Alnus glutinosa	alder, common	1.5	41.58398550	-93.56503676
2023-09-27	Alnus glutinosa	alder, common	1.5	41.58401359	-93.56503810
2023-09-27	Populus tremuloides	aspen, quaking	1.5	41.58403867	-93.56648515
2023-09-27	Populus tremuloides	aspen, quaking	1.5	41.58404268	-93.56631885
2023-09-27	Alnus glutinosa	alder, common	1.5	41.58404268	-93.56503944
2023-09-27	Populus tremuloides	aspen, quaking	1.5	41.58404268	-93.56571804
2023-09-27	Populus tremuloides	aspen, quaking	1.5	41.58404469	-93.56617938
2023-09-27	Populus tremuloides	aspen, quaking	1.5	41.58404469	-93.56556515
2023-09-30	Ginkgo biloba	ginkgo	1.5	41.58404506	-93.56558587
2023-09-27	Populus tremuloides	aspen, quaking	1.5	41.58404669	-93.56587629
2023-09-30	Ginkgo biloba	ginkgo	1.5	41.58404907	-93.56543567
2023-09-30	Ginkgo biloba	ginkgo	1.5	41.58406512	-93.56529351
2023-04-01	Ulmus spp.	elm, spp.	1.5	41.59085721	-93.61556305
2023-04-01	Quercus macrocarpa	oak, bur	1.5	41.59090549	-93.61541527
2023-04-01	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.59096433	-93.61503788
2023-04-01	Celtis occidentalis	hackberry, common	1.5	41.59103789	-93.61474043
2023-04-01	Platanus x acerifolia	planetree, London	1.5	41.59108162	-93.61451459
2023-04-01	Quercus bicolor	oak, swamp white	1.5	41.59110930	-93.61437887
2023-04-01	Quercus bicolor	oak, swamp white	1.5	41.59115504	-93.61538631
2023-04-01	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.59116162	-93.61412624
2023-04-01	Quercus rubra	oak, northern red	1.5	41.59120639	-93.61393577
2023-04-01	Cladrastis kentukea	yellowwood	1.5	41.59125333	-93.61374426
2023-04-01	Platanus x acerifolia	planetree, London	1.5	41.59127500	-93.61541903
2023-04-01	Quercus bicolor	oak, swamp white	1.5	41.59128744	-93.61360854
2023-06-07	Tilia cordata	linden, littleleaf	1.5	41.59129400	-93.58909801
2023-06-07	Tilia cordata	linden, littleleaf	1.5	41.59129521	-93.58930668
2023-06-07	Gleditsia triacanthos	honeylocust	1.5	41.59129621	-93.58921307
2023-06-07	Gleditsia triacanthos	honeylocust	1.5	41.59129661	-93.58895934
2023-06-07	Gleditsia triacanthos	honeylocust	1.5	41.59129741	-93.58940887
2023-06-07	Gleditsia triacanthos	honeylocust	1.5	41.59129761	-93.58886573
2023-06-07	Ulmus spp.	elm, spp.	1.5	41.59130283	-93.58958831
2023-06-07	Gleditsia triacanthos	honeylocust	1.5	41.59130664	-93.58967334
2023-06-07	Ulmus spp.	elm, spp.	1.5	41.59131386	-93.59021515
2023-06-07	Ulmus spp.	elm, spp.	1.5	41.59131577	-93.59418012
2023-06-07	Gleditsia triacanthos	honeylocust	1.5	41.59132088	-93.59033450
2023-06-07	Ulmus spp.	elm, spp.	1.5	41.59132229	-93.59101927
2023-06-07	Ulmus spp.	elm, spp.	1.5	41.59132309	-93.59053540
2023-06-07	Ulmus spp.	elm, spp.	1.5	41.59132329	-93.59074971
2023-06-07	Gleditsia triacanthos	honeylocust	1.5	41.59132369	-93.59064832
2023-06-07	Gleditsia triacanthos	honeylocust	1.5	41.59132369	-93.59173193
2023-06-07	Tilia cordata	linden, littleleaf	1.5	41.59132449	-93.59117940
2023-06-07	Gleditsia triacanthos	honeylocust	1.5	41.59132670	-93.59131378
2023-06-07	Tilia cordata	linden, littleleaf	1.5	41.59132911	-93.59187061

2023-06-07	Syringa spp.	lilac	1.5	41.59133452	-93.59210154
2023-06-07	Malus spp.	crabapple, flowering	1.5	41.59133834	-93.59216940
2023-06-07	Ulmus spp.	elm, spp.	1.5	41.59134054	-93.59234670
2023-06-07	Tilia cordata	linden, littleleaf	1.5	41.59134114	-93.59244674
2023-06-07	Tilia cordata	linden, littleleaf	1.5	41.59134415	-93.59265086
2023-06-07	Gleditsia triacanthos	honeylocust	1.5	41.59134636	-93.59280670
2023-06-07	Malus spp.	crabapple, flowering	1.5	41.59135398	-93.59405178
2023-06-07	Tilia cordata	linden, littleleaf	1.5	41.59135659	-93.59309986
2023-06-07	Ulmus spp.	elm, spp.	1.5	41.59136201	-93.59321278
2023-06-07	Gleditsia triacanthos	honeylocust	1.5	41.59136261	-93.59333643
2023-06-07	Malus spp.	crabapple, flowering	1.5	41.59136321	-93.59351158
2023-06-07	Malus spp.	crabapple, flowering	1.5	41.59139912	-93.59394422
2023-06-07	Malus spp.	crabapple, flowering	1.5	41.59140744	-93.59406613
2023-06-07	Gleditsia triacanthos	honeylocust	1.5	41.59140835	-93.59422049
2023-06-07	Syringa spp.	lilac	1.5	41.59142540	-93.58880645
2023-06-07	Syringa spp.	lilac	1.5	41.59143723	-93.58986780
2023-06-07	Syringa spp.	lilac	1.5	41.59144165	-93.59015158
2023-06-07	Syringa spp.	lilac	1.5	41.59144425	-93.58998072
2023-06-07	Syringa spp.	lilac	1.5	41.59144626	-93.59074193
2023-06-07	Syringa spp.	lilac	1.5	41.59146110	-93.59178424
2023-06-07	Syringa spp.	lilac	1.5	41.59146532	-93.59210691
2023-06-07	Syringa spp.	lilac	1.5	41.59146692	-93.59169492
2023-06-07	Syringa spp.	lilac	1.5	41.59147133	-93.59252587
2023-06-07	Syringa spp.	lilac	1.5	41.59147675	-93.59272677
2023-04-01	Crataegus spp.	hawthorn, spp.	1.5	41.59153016	-93.61306083
2023-04-01	Celtis occidentalis	hackberry, common	1.5	41.59160198	-93.61362302
2023-04-01	Quercus macrocarpa	oak, bur	1.5	41.59165735	-93.61244017
2023-04-01	Cladrastis kentukea	yellowwood	1.5	41.59173919	-93.61368847
2023-04-01	Ulmus 'Morton Glossy'	elm, Morton Glossy	1.5	41.59189686	-93.61192679
2023-04-01	Quercus rubra	oak, northern red	1.5	41.59198111	-93.61197293
2023-04-01	Cercis canadensis	redbud, eastern	1.5	41.59215644	-93.61202603
2023-04-01	Crataegus spp.	hawthorn, spp.	1.5	41.59218252	-93.61080241
2023-04-01	Ostrya virginiana	hophornbeam, American	1.5	41.59224831	-93.61205768
2023-04-01	Ostrya virginiana	hophornbeam, American	1.5	41.59231652	-93.61061895
2023-04-01	Crataegus spp.	hawthorn, spp.	1.5	41.59239555	-93.61065489
2023-04-01	Cercis canadensis	redbud, eastern	1.5	41.59239956	-93.61088556
2023-04-01	Crataegus spp.	hawthorn, spp.	1.5	41.59247820	-93.61214083
2023-04-01	Ulmus 'Frontier'	elm, Frontier	1.5	41.59269805	-93.61208719
2023-04-01	Cercis canadensis	redbud, eastern	1.5	41.59274098	-93.61195254
2023-04-01	Cercis canadensis	redbud, eastern	1.5	41.59274700	-93.61076861
2023-04-01	Quercus rubra	oak, northern red	1.5	41.59279956	-93.61163390
2023-04-01	Celtis occidentalis	hackberry, common	1.5	41.59282403	-93.61148101
2023-04-01	Quercus macrocarpa	oak, bur	1.5	41.59283887	-93.61214352
2023-04-01	Cercis canadensis	redbud, eastern	1.5	41.59285813	-93.61134100
2023-04-01	Celtis occidentalis	hackberry, common	1.5	41.59286656	-93.61201638
2023-04-01	Ostrya virginiana	hophornbeam, American	1.5	41.59287017	-93.61081850
2023-04-01	Quercus macrocarpa	oak, bur	1.5	41.59288581	-93.61121815
2023-04-01	Platanus x acerifolia	planetree, London	1.5	41.59289424	-93.61184203
2023-04-01	Crataegus spp.	hawthorn, spp.	1.5	41.59292513	-93.61168057
2023-04-01	Cladrastis kentukea	yellowwood	1.5	41.59298732	-93.61140859
2023-04-01	Quercus bicolor	oak, swamp white	1.5	41.59300537	-93.61127287
2023-04-01	Celtis occidentalis	hackberry, common	1.5	41.59315822	-93.61115002
2023-04-01	Quercus bicolor	oak, swamp white	1.5	41.59319774	-93.61097917
2023-04-01	Ulmus 'Morton Glossy'	elm, Morton Glossy	1.5	41.59321981	-93.61116853
2023-04-01	Cladrastis kentukea	yellowwood	1.5	41.59328219	-93.61101001
2023-04-01	Platanus x acerifolia	planetree, London	1.5	41.59329583	-93.61119562
2023-04-01	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.59337879	-93.61103436
2023-04-01	Quercus bicolor	oak, swamp white	1.5	41.59342963	-93.61121198
2023-04-01	Quercus rubra	oak, northern red	1.5	41.59344528	-93.61104086
2023-04-01	Celtis occidentalis	hackberry, common	1.5	41.59353936	-93.61123478
2023-09-27	Quercus rubra	oak, northern red	1.5	41.59358244	-93.63875268
2023-09-27	Quercus rubra	oak, northern red	1.5	41.59361654	-93.63886801
2023-09-27	Quercus rubra	oak, northern red	1.5	41.59362958	-93.63927973
2023-09-27	Quercus rubra	oak, northern red	1.5	41.59362958	-93.63896591
2023-04-01	Platanus x acerifolia	planetree, London	1.5	41.59363564	-93.61105883
2023-04-01	Quercus macrocarpa	oak, bur	1.5	41.59363945	-93.61123398
2023-09-27	Quercus rubra	oak, northern red	1.5	41.59364061	-93.63906113
2023-09-27	Quercus rubra	oak, northern red	1.5	41.59364663	-93.63917781
2023-04-01	Platanus x acerifolia	planetree, London	1.5	41.59373795	-93.61123103
2023-04-01	Cladrastis kentukea	yellowwood	1.5	41.59379231	-93.61105749
2023-04-01	Quercus rubra	oak, northern red	1.5	41.59380595	-93.61122593
2023-04-01	Ulmus 'Morton Glossy'	elm, Morton Glossy	1.5	41.59388799	-93.61104756
2023-09-27	Liriodendron tulipifera	tuliptree	1.5	41.59399867	-93.63942591
2023-04-01	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.59400052	-93.61119535
2023-09-27	Celtis occidentalis	hackberry, common	1.5	41.59401171	-93.63929851
2023-09-27	Liriodendron tulipifera	tuliptree	1.5	41.59405684	-93.63940713
2023-04-01	Quercus macrocarpa	oak, bur	1.5	41.59408638	-93.61099687
2023-04-01	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.59409580	-93.61116880
2023-09-27	Quercus rubra	oak, northern red	1.5	41.59414410	-93.63870171
2023-09-27	Quercus bicolor	oak, swamp white	1.5	41.59415814	-93.63962439
2023-09-27	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.59418723	-93.63942055
2023-04-01	Cladrastis kentukea	yellowwood	1.5	41.59419008	-93.61095476
	Cercis canadensis	redbud, eastern	1.5	41.59421238	-93.61112743
2023-09-27	Celtis occidentalis	hackberry, common	1.5	41.59424440	-93.63939104
2023-04-01	Cercis canadensis	redbud, eastern	1.5	41.59424525	-93.61111703
2023-09-27	Quercus bicolor	oak, swamp white	1.5	41.59426546	-93.63852737
2023-09-27	Celtis occidentalis	hackberry, common	1.5	41.59426646	-93.63948894

2023-09-27	Quercus bicolor	oak, swamp white	1.5	41.59426746	-93.63844020
2023-04-01	Crataegus spp.	hawthorn, spp.	1.5	41.59427132	-93.61091909
2023-09-27	Quercus bicolor	oak, swamp white	1.5	41.59432463	-93.63845629
2023-09-27	Ulmus 'Frontier'	elm, Frontier	1.5	41.59448611	-93.63973168
2023-09-27	Cercis canadensis	redbud, eastern	1.5	41.59458540	-93.63977862
2023-09-27	Cercis canadensis	redbud, eastern	1.5	41.59464157	-93.63981483
2023-09-27	Cercis canadensis	redbud, eastern	1.5	41.59469172	-93.63984433
2023-09-27	Liriodendron tulipifera	tuliptree	1.5	41.59491337	-93.63980947
2023-09-27	Liriodendron tulipifera	tuliptree	1.5	41.59502670	-93.63981349
2023-09-27	Liriodendron tulipifera	tuliptree	1.5	41.59511296	-93.63981349
2023-09-27	Quercus coccinea	oak, scarlet	1.5	41.59515308	-93.63887069
2023-09-27	Quercus rubra	oak, northern red	1.5	41.59515709	-93.63850859
2023-09-27	Quercus macrocarpa	oak, bur	1.5	41.59515909	-93.63958952
2023-09-27	Quercus macrocarpa	oak, bur	1.5	41.59516010	-93.63905174
2023-09-27	Quercus coccinea	oak, scarlet	1.5	41.59516210	-93.63925023
2023-09-27	Liriodendron tulipifera	tuliptree	1.5	41.59516511	-93.63982019
2023-05-11	Syringa spp.	lilac	1.5	41.60106417	-93.56241899
2023-05-11	Liriodendron tulipifera	tuliptree	1.5	41.60115984	-93.56257215
2023-05-11	Celtis occidentalis	hackberry, common	1.5	41.60129402	-93.56256222
2023-05-11	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.60144906	-93.56255445
2023-05-11	Quercus bicolor	oak, swamp white	1.5	41.60163619	-93.56255954
2023-05-11	Liriodendron tulipifera	tuliptree	1.5	41.60172705	-93.56256249
2023-04-13	Gleditsia triacanthos	honeylocust	1.5	41.60181866	-93.62852809
2023-04-13	Liriodendron tulipifera	tuliptree	1.5	41.60182307	-93.62728784
2023-04-13	Celtis occidentalis	hackberry, common	1.5	41.60182387	-93.62712047
2023-04-13	Gleditsia triacanthos	honeylocust	1.5	41.60182468	-93.62798736
2023-04-13	Quercus rubra	oak, northern red	1.5	41.60182588	-93.62815044
2023-04-13	Liriodendron tulipifera	tuliptree	1.5	41.60182708	-93.62836072
2023-04-13	Quercus bicolor	oak, swamp white	1.5	41.60182748	-93.62745521
2023-04-13	Celtis occidentalis	hackberry, common	1.5	41.60182949	-93.62869546
2023-04-13	Celtis occidentalis	hackberry, common	1.5	41.60182989	-93.62781141
2023-04-13	Gleditsia triacanthos	honeylocust	1.5	41.60183150	-93.62720630
2023-04-13	Liriodendron tulipifera	tuliptree	1.5	41.60183511	-93.62761829
2023-04-13	Ostrya virginiana	hophornbeam, American	1.5	41.60191453	-93.62888429
2023-04-13	Syringa reticulata	lilac, Japanese tree	1.5	41.60191734	-93.62839506
2023-04-13	Amelanchier spp.	serviceberry, spp.	1.5	41.60192496	-93.62853239
2023-04-13	Crataegus spp.	hawthorn, spp.	1.5	41.60192616	-93.62868688
2023-05-11	Celtis occidentalis	hackberry, common	1.5	41.60193986	-93.56255901
2023-05-11	Syringa spp.	lilac	1.5	41.60196212	-93.56242194
2023-05-11	Amelanchier spp.	serviceberry, spp.	1.5	41.60202249	-93.56243133
2023-05-11	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.60202269	-93.56255981
2023-04-13	Quercus bicolor	oak, swamp white	1.5	41.60209123	-93.62822983
2023-05-11	Malus spp.	crabapple, flowering	1.5	41.60210071	-93.56256062
2023-05-11	Malus spp.	crabapple, flowering	1.5	41.60211977	-93.56242355
2023-04-13	Liriodendron tulipifera	tuliptree	1.5	41.60216604	-93.62823627
2023-05-11	Crataegus spp.	hawthorn, spp.	1.5	41.60224753	-93.56242865
2023-04-13	Gleditsia triacanthos	honeylocust	1.5	41.60228739	-93.62823627
2023-05-11	Carpinus caroliniana	hornbeam, American	1.5	41.60230148	-93.56242731
2023-04-13	Celtis occidentalis	hackberry, common	1.5	41.60236862	-93.62823627
2023-05-11	Malus spp.	crabapple, flowering	1.5	41.60239013	-93.56256625
2023-04-13	Quercus bicolor	oak, swamp white	1.5	41.60241455	-93.62823198
2023-04-13	Ostrya virginiana	hophornbeam, American	1.5	41.60241876	-93.62811181
2023-05-11	Syringa spp.	lilac	1.5	41.60249022	-93.56243026
2023-04-13	Amelanchier spp.	serviceberry, spp.	1.5	41.60249518	-93.62810967
2023-05-11	Quercus bicolor	oak, swamp white	1.5	41.60252592	-93.56256276
2023-04-13	Quercus rubra	oak, northern red	1.5	41.60254692	-93.62823841
2023-04-13	Crataegus spp.	hawthorn, spp.	1.5	41.60255394	-93.62811181
2023-04-13	Liriodendron tulipifera	tuliptree	1.5	41.60262494	-93.62823841
2023-05-11	Ostrya virginiana	hophornbeam, American	1.5	41.60263101	-93.56242650
2023-04-13	Syringa reticulata	lilac, Japanese tree	1.5	41.60269013	-93.62810538
2023-05-11	Liriodendron tulipifera	tuliptree	1.5	41.60270823	-93.56257000
2023-04-13	Gleditsia triacanthos	honeylocust	1.5	41.60271038	-93.62823841
2023-05-11	Malus spp.	crabapple, flowering	1.5	41.60271866	-93.56243375
2023-04-13	Ostrya virginiana	hophornbeam, American	1.5	41.60276474	-93.62810752
2023-05-11	Crataegus spp.	hawthorn, spp.	1.5	41.60278385	-93.56242597
2023-04-13	Quercus bicolor	oak, swamp white	1.5	41.60280285	-93.62824271
2023-04-13	Amelanchier spp.	serviceberry, spp.	1.5	41.60282832	-93.62811181
2023-04-13	Celtis occidentalis	hackberry, common	1.5	41.60287766	-93.62823627
2023-05-11	Celtis occidentalis	hackberry, common	1.5	41.60290178	-93.56257081
2023-04-13	Liriodendron tulipifera	tuliptree	1.5	41.60295247	-93.62822983
2023-05-11	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.60297819	-93.56257161
2023-04-13	Crataegus spp.	hawthorn, spp.	1.5	41.60298496	-93.62810752
2023-04-13	Gleditsia triacanthos	honeylocust	1.5	41.60301885	-93.62823412
2023-04-13	Syringa reticulata	lilac, Japanese tree	1.5	41.60313197	-93.62810538
2023-04-13	Quercus rubra	oak, northern red	1.5	41.60317028	-93.62822983
2023-05-11	Quercus macrocarpa	oak, bur	1.5	41.60323893	-93.56256839
2023-04-13	Celtis occidentalis	hackberry, common	1.5	41.60324309	-93.62823198
2023-05-11	Malus spp.	crabapple, flowering	1.5	41.60325919	-93.56242758
2023-04-13	Quercus bicolor	oak, swamp white	1.5	41.60340093	-93.62822554
2023-04-13	Ostrya virginiana	hophornbeam, American	1.5	41.60341377	-93.62811611
2023-05-11	Celtis occidentalis	hackberry, common	1.5	41.60341743	-93.56256357
2023-05-11	Malus spp.	crabapple, flowering	1.5	41.60351631	-93.56242919
2023-04-13	Amelanchier spp.	serviceberry, spp.	1.5	41.60352869	-93.62812040
2023-10-06	Nyssa sylvatica	blackgum	1.5	41.60355620	-93.63868679
2023-10-06	Nyssa sylvatica	blackgum	1.5	41.60355721	-93.63874446
2023-10-06	Nyssa sylvatica	blackgum	1.5	41.60355821	-93.63883565
2023-10-06	Nyssa sylvatica	blackgum	1.5	41.60356322	-93.63862912

2023-10-06	Nyssa sylvatica	blackgum	1.5	41.60356322	-93.63857950
2023-10-06	Populus tremuloides	aspen, quaking	1.5	41.60358027	-93.63891210
2023-04-13	Liriodendron tulipifera	tuliptree	1.5	41.60358124	-93.62822554
2023-10-06	Populus tremuloides	aspen, quaking	1.5	41.60358228	-93.63887589
2023-10-06	Populus tremuloides	aspen, quaking	1.5	41.60358428	-93.63883431
2023-10-06	Populus tremuloides	aspen, quaking	1.5	41.60358529	-93.63847356
2023-10-06	Populus tremuloides	aspen, quaking	1.5	41.60358629	-93.63855000
2023-10-06	Populus tremuloides	aspen, quaking	1.5	41.60358629	-93.63850842
2023-04-13	Crataegus spp.	hawthorn, spp.	1.5	41.60364040	-93.62811611
2023-10-06	Ginkgo biloba	ginkgo	1.5	41.60366050	-93.63892148
2023-10-06	Ginkgo biloba	ginkgo	1.5	41.60367855	-93.63843198
2023-04-13	Syringa reticulata	lilac, Japanese tree	1.5	41.60370238	-93.62811181
2023-10-06	Ginkgo biloba	ginkgo	1.5	41.60374173	-93.63892148
2023-10-06	Ginkgo biloba	ginkgo	1.5	41.60376880	-93.63843064
2023-04-13	Ostrya virginiana	hophornbeam, American	1.5	41.60379003	-93.62811611
2023-04-13	Gleditsia triacanthos	honeylocust	1.5	41.60379684	-93.62823627
2023-05-11	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.60380933	-93.56258019
2023-10-06	Ginkgo biloba	ginkgo	1.5	41.60381293	-93.63892283
2023-10-06	Ginkgo biloba	ginkgo	1.5	41.60382496	-93.63843332
2023-10-06	Populus tremuloides	aspen, quaking	1.5	41.60386307	-93.63884907
2023-04-13	Celtis occidentalis	hackberry, common	1.5	41.60387286	-93.62823627
2023-10-06	Populus tremuloides	aspen, quaking	1.5	41.60387510	-93.63879408
2023-10-06	Populus tremuloides	aspen, quaking	1.5	41.60388212	-93.63887991
2023-10-06	Populus tremuloides	aspen, quaking	1.5	41.60388713	-93.63851379
2023-10-06	Populus tremuloides	aspen, quaking	1.5	41.60388814	-93.63855000
2023-10-06	Populus tremuloides	aspen, quaking	1.5	41.60389616	-93.63846417
2023-10-06	Populus tremuloides	aspen, quaking	1.5	41.60389716	-93.63882224
2023-10-06	Populus tremuloides	aspen, quaking	1.5	41.60390218	-93.63890941
2023-10-06	Nyssa sylvatica	blackgum	1.5	41.60391421	-93.63860901
2023-10-06	Populus tremuloides	aspen, quaking	1.5	41.60391521	-93.63885175
2023-10-06	Nyssa sylvatica	blackgum	1.5	41.60391521	-93.63853927
2023-10-06	Nyssa sylvatica	blackgum	1.5	41.60391622	-93.63874982
2023-10-06	Nyssa sylvatica	blackgum	1.5	41.60391822	-93.63880883
2023-10-06	Populus tremuloides	aspen, quaking	1.5	41.60392223	-93.63893624
2023-10-06	Populus tremuloides	aspen, quaking	1.5	41.60393427	-93.63888393
2023-10-06	Populus tremuloides	aspen, quaking	1.5	41.60395131	-93.63891478
2023-05-11	Quercus spp.	oak	1.5	41.60396597	-93.56257027
2023-05-11	Liriodendron tulipifera	tuliptree	1.5	41.60404239	-93.56257751
2023-05-11	Quercus spp.	oak	1.5	41.60427765	-93.56257403
2023-05-11	Celtis occidentalis	hackberry, common	1.5	41.60436208	-93.56257268
2023-05-11	Malus spp.	crabapple, flowering	1.5	41.60436248	-93.56243482
2023-05-11	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.60445133	-93.56257564
2023-04-15	Malus spp.	crabapple, flowering	1.5	41.60451852	-93.62346532
2023-04-15	Malus spp.	crabapple, flowering	1.5	41.60451912	-93.62334828
2023-04-15	Liriodendron tulipifera	tuliptree	1.5	41.60460737	-93.62347391
2023-04-15	Quercus coccinea	oak, scarlet	1.5	41.60463404	-93.62335042
2023-04-15	Malus spp.	crabapple, flowering	1.5	41.60467376	-93.62347176
2023-04-15	Ulmus spp.	elm, spp.	1.5	41.60471847	-93.62334828
2023-04-15	Carpinus caroliniana	hornbeam, American	1.5	41.60474014	-93.62346962
2023-04-15	Quercus coccinea	oak, scarlet	1.5	41.60480933	-93.62335042
2023-04-15	Malus spp.	crabapple, flowering	1.5	41.60481134	-93.62347605
2023-05-11	Liriodendron tulipifera	tuliptree	1.5	41.60483842	-93.56256866
2023-04-15	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.60487130	-93.62335471
2023-04-15	Celtis occidentalis	hackberry, common	1.5	41.60490661	-93.62346962
2023-04-15	Quercus rubra	oak, northern red	1.5	41.60493488	-93.62335686
2023-04-15	Quercus rubra	oak, northern red	1.5	41.60499064	-93.62346962
2023-04-15	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.60506986	-93.62347391
2023-05-11	Carpinus caroliniana	hornbeam, American	1.5	41.60510897	-93.56243214
2023-04-15	Gleditsia triacanthos	honeylocust	1.5	41.60512842	-93.62335471
2023-04-15	Quercus rubra	oak, northern red	1.5	41.60516673	-93.62347176
2023-04-15	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.60521927	-93.62335686
2023-04-15	Liriodendron tulipifera	tuliptree	1.5	41.60522670	-93.62346747
2023-05-11	Celtis occidentalis	hackberry, common	1.5	41.60528747	-93.56257537
2023-04-15	Ulmus spp.	elm, spp.	1.5	41.60529889	-93.62335686
2023-04-15	Quercus coccinea	oak, scarlet	1.5	41.60530432	-93.62347820
2023-05-11	Malus spp.	crabapple, flowering	1.5	41.60530732	-93.56244796
2023-05-11	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.60533660	-93.56257832
2023-04-15	Quercus coccinea	oak, scarlet	1.5	41.60538814	-93.62336115
2023-04-15	Ulmus spp.	elm, spp.	1.5	41.60542205	-93.62347820
2023-04-15	Malus spp.	crabapple, flowering	1.5	41.60548862	-93.62335257
2023-05-11	Crataegus spp.	hawthorn, spp.	1.5	41.60553957	-93.56243777
2023-05-11	Liriodendron tulipifera	tuliptree	1.5	41.60554137	-93.56257268
2023-04-15	Gleditsia triacanthos	honeylocust	1.5	41.60556664	-93.62335471
2023-04-15	Quercus coccinea	oak, scarlet	1.5	41.60557507	-93.62348678
2023-05-11	Quercus spp.	oak	1.5	41.60560816	-93.56257134
2023-04-15	Quercus coccinea	oak, scarlet	1.5	41.60562540	-93.62336330
2023-05-11	Malus spp.	crabapple, flowering	1.5	41.60564647	-93.56244287
2023-04-15	Amelanchier spp.	serviceberry, spp.	1.5	41.60568095	-93.62336544
2023-05-11	Celtis occidentalis	hackberry, common	1.5	41.60571506	-93.56257215
2023-04-15	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.60574453	-93.62335686
2023-04-15	Malus spp.	crabapple, flowering	1.5	41.60574575	-93.62348464
2023-05-11	Carpinus caroliniana	hornbeam, American	1.5	41.60599564	-93.56245011
2023-04-15	Quercus coccinea	oak, scarlet	1.5	41.60600546	-93.62336115
2023-04-15	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.60602392	-93.62348893
2023-05-11	Syringa spp.	lilac	1.5	41.60606563	-93.56245306
2023-04-15	Celtis occidentalis	hackberry, common	1.5	41.60608026	-93.62336330
2023-05-11	Malus spp.	crabapple, flowering	1.5	41.60618376	-93.56245815

2023-04-15	Quercus rubra	oak, northern red	1.5	41.60619358	-93.62336330
2023-04-15	Malus spp.	crabapple, flowering	1.5	41.60632133	-93.62336544
2023-05-11	Gleditsia triacanthos	honeylocust	1.5	41.60639334	-93.56258556
2023-05-11	Crataegus spp.	hawthorn, spp.	1.5	41.60639956	-93.56244850
2023-04-15	Celtis occidentalis	hackberry, common	1.5	41.60641218	-93.62335901
2023-05-11	Malus spp.	crabapple, flowering	1.5	41.60645190	-93.56245145
2023-05-11	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.60647296	-93.56258207
2023-04-15	Platanus x acerifolia	planetree, London	1.5	41.60649180	-93.62336115
2023-05-11	Malus spp.	crabapple, flowering	1.5	41.60650745	-93.56244796
2023-05-11	Liriodendron tulipifera	tuliptree	1.5	41.60654777	-93.56258502
2023-05-11	Syringa spp.	lilac	1.5	41.60655980	-93.56245306
2023-04-15	Liriodendron tulipifera	tuliptree	1.5	41.60663239	-93.62336759
2023-04-15	Gleditsia triacanthos	honeylocust	1.5	41.60669597	-93.62337403
2023-04-15	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.60679965	-93.62337403
2023-04-15	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.60688088	-93.62336973
2023-05-11	Celtis occidentalis	hackberry, common	1.5	41.60704694	-93.56244313
2023-04-15	Quercus rubra	oak, northern red	1.5	41.60715303	-93.62337188
2023-04-15	Quercus coccinea	oak, scarlet	1.5	41.60728720	-93.62337617
2023-04-15	Gleditsia triacanthos	honeylocust	1.5	41.60736201	-93.62338261
2023-04-15	Ulmus spp.	elm, spp.	1.5	41.60746569	-93.62338905
2023-04-15	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.60756617	-93.62338046
2023-04-15	Syringa reticulata	lilac, Japanese tree	1.5	41.60757038	-93.62350277
2023-05-11	Gleditsia triacanthos	honeylocust	1.5	41.60761431	-93.56258556
2023-05-11	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.60769232	-93.56259066
2023-05-11	Syringa spp.	lilac	1.5	41.60777756	-93.56245091
2023-05-11	Quercus alba	oak, white	1.5	41.60777836	-93.56259146
2023-05-11	Liriodendron tulipifera	tuliptree	1.5	41.60784835	-93.56258583
2023-05-11	Malus spp.	crabapple, flowering	1.5	41.60785717	-93.56245601
2023-10-06	Liriodendron tulipifera	tuliptree	1.5	41.60801041	-93.66614543
2023-10-06	Cornus alternifolia	dogwood, pagoda	1.5	41.60801141	-93.66604887
2023-10-06	Nyssa sylvatica	blackgum	1.5	41.60801342	-93.66595634
2023-10-06	Fagus grandifolia	beech, American	1.5	41.60802244	-93.66385482
2023-10-06	Asimina triloba	pawpaw, common	1.5	41.60806757	-93.66460450
2023-05-11	Gleditsia triacanthos	honeylocust	1.5	41.60810766	-93.56258449
2023-05-11	Crataegus spp.	hawthorn, spp.	1.5	41.60815178	-93.56245681
2023-10-06	Platanus occidentalis	sycamore, American	1.5	41.60819993	-93.66678514
2023-10-06	Pinus strobus	pine, eastern white	1.5	41.60822099	-93.66341897
2023-10-06	Aesculus glabra	buckeye, Ohio	1.5	41.60826410	-93.66566532
2023-10-06	Gymnocladus dioicus	Kentucky coffeetree	1.5	41.60827614	-93.66342165
2023-10-06	Ginkgo biloba	ginkgo	1.5	41.60830221	-93.66678648
2023-05-11	Celtis occidentalis	hackberry, common	1.5	41.60832044	-93.56258958
2023-10-06	Carya cordiformis	hickory, bitternut	1.5	41.60833630	-93.66342031
2023-10-06	Juglans nigra	walnut, black	1.5	41.60840148	-93.66342031
2023-10-06	Gymnocladus dioicus	Kentucky coffeetree	1.5	41.60840449	-93.66679318
2023-10-06	Gymnocladus dioicus	Kentucky coffeetree	1.5	41.60847267	-93.66342433
2023-10-06	Catalpa speciosa	catalpa, northern	1.5	41.60863512	-93.66671540
2023-10-06	Carya ovata	hickory, shagbark	1.5	41.60871434	-93.66345652
2023-05-11	Cercis canadensis	redbud, eastern	1.5	41.60892322	-93.56591618
2023-05-11	Syringa spp.	lilac	1.5	41.60899281	-93.56572226
2023-10-06	Viburnum lentago	nannyberry	1.5	41.60899811	-93.66362684
2023-10-06	Amelanchier arborea	serviceberry, downy	1.5	41.60900112	-93.66357990
2023-05-11	Carpinus caroliniana	hornbeam, American	1.5	41.60901266	-93.56565708
2023-09-30	Euonymus spp.	euonymus, spp.	1.5	41.60903558	-93.66361702
2023-05-11	Malus spp.	crabapple, flowering	1.5	41.60906942	-93.56550178
2023-10-06	Juglans nigra	walnut, black	1.5	41.60912746	-93.66654240
2023-05-11	Syringa spp.	lilac	1.5	41.60918232	-93.56513405
2023-05-11	Cercis canadensis	redbud, eastern	1.5	41.60922624	-93.56501737
2023-05-11	Malus spp.	crabapple, flowering	1.5	41.60926535	-93.56489640
2023-10-06	Nyssa sylvatica	blackgum	1.5	41.60938115	-93.66682269
2023-05-11	Malus spp.	crabapple, flowering	1.5	41.60981620	-93.56317781
2023-05-11	Crataegus spp.	hawthorn, spp.	1.5	41.60984888	-93.56308689
2023-05-11	Malus spp.	crabapple, flowering	1.5	41.60990243	-93.56291871
2023-05-11	Cercis canadensis	redbud, eastern	1.5	41.60995277	-93.56274624
2023-05-11	Amelanchier spp.	serviceberry, spp.	1.5	41.60999027	-93.56265103
2023-05-11	Carpinus caroliniana	hornbeam, American	1.5	41.61004060	-93.56249358
2023-05-11	Syringa spp.	lilac	1.5	41.61006688	-93.56242411
2023-05-11	Malus spp.	crabapple, flowering	1.5	41.61010438	-93.56229027
2023-05-11	Cercis canadensis	redbud, eastern	1.5	41.61015953	-93.56210707
2023-05-11	Amelanchier spp.	serviceberry, spp.	1.5	41.61020986	-93.56196894
2023-05-11	Malus spp.	crabapple, flowering	1.5	41.61027464	-93.56176643
2023-05-11	Ostrya virginiana	hophornbeam, American	1.5	41.61030412	-93.56170769
2023-05-17	Quercus rubra	oak, northern red	1.5	41.61529733	-93.62504652
2023-05-17	Gleditsia triacanthos	honeylocust	1.5	41.61534164	-93.62510740
2023-05-17	Quercus rubra	oak, northern red	1.5	41.61538756	-93.62501809
2023-05-17	Liriodendron tulipifera	tuliptree	1.5	41.61545594	-93.62499958
2023-05-17	Liriodendron tulipifera	tuliptree	1.5	41.61549064	-93.62507763
2023-05-17	Ulmus spp.	elm, spp.	1.5	41.61553174	-93.62500119
2023-05-17	Celtis occidentalis	hackberry, common	1.5	41.61558187	-93.62506503
2023-05-17	Quercus rubra	oak, northern red	1.5	41.61560654	-93.62499556
2023-05-17	Crataegus spp.	hawthorn, spp.	1.5	41.61625446	-93.62027196
2023-05-17	Crataegus spp.	hawthorn, spp.	1.5	41.61625486	-93.62098597
2023-05-17	Syringa spp.	lilac	1.5	41.61625586	-93.62091596
2023-05-17	Amelanchier spp.	serviceberry, spp.	1.5	41.61625847	-93.62081377
2023-05-17	Syringa spp.	lilac	1.5	41.61625867	-93.62104739
2023-05-17	Syringa spp.	lilac	1.5	41.61625887	-93.62063514
2023-05-17	Malus spp.	crabapple, flowering	1.5	41.61626107	-93.62072874
2023-05-17	Carpinus caroliniana	hornbeam, American	1.5	41.61626248	-93.62111740

2023-05-17	Syringa spp.	lilac	1.5	41.61626468	-93.62053723
2023-05-17	Ostrya virginiana	hophornbeam, American	1.5	41.61626629	-93.62126036
2023-05-17	Crataegus spp.	hawthorn, spp.	1.5	41.61629737	-93.62172733
2023-05-17	Carpinus caroliniana	hornbeam, American	1.5	41.61630930	-93.62182519
2023-05-17	Amelanchier spp.	serviceberry, spp.	1.5	41.61632274	-93.62192094
2023-05-17	Carpinus caroliniana	hornbeam, American	1.5	41.61636184	-93.62217977
2023-05-17	Ostrya virginiana	hophornbeam, American	1.5	41.61637528	-93.62226909
2023-05-17	Carpinus caroliniana	hornbeam, American	1.5	41.61640315	-93.62246570
2023-05-17	Malus spp.	crabapple, flowering	1.5	41.61641659	-93.62253785
2023-05-17	Syringa spp.	lilac	1.5	41.61643002	-93.62262073
2023-05-17	Amelanchier spp.	serviceberry, spp.	1.5	41.61650281	-93.62301045
2023-05-17	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.61650571	-93.61999811
2023-05-17	Crataegus spp.	hawthorn, spp.	1.5	41.61651464	-93.62309977
2023-05-17	Syringa spp.	lilac	1.5	41.61653610	-93.62319767
2023-05-17	Syringa spp.	lilac	1.5	41.61654312	-93.62328914
2023-05-17	Crataegus spp.	hawthorn, spp.	1.5	41.61655805	-93.62000106
2023-05-17	Malus spp.	crabapple, flowering	1.5	41.61656457	-93.62345785
2023-05-17	Malus spp.	crabapple, flowering	1.5	41.61657159	-93.62356433
2023-05-17	Malus spp.	crabapple, flowering	1.5	41.61658021	-93.62366867
2023-05-17	Malus spp.	crabapple, flowering	1.5	41.61660548	-93.62402969
2023-05-17	Syringa spp.	lilac	1.5	41.61660809	-93.62391677
2023-05-17	Syringa spp.	lilac	1.5	41.61661370	-93.62454655
2023-05-17	Ostrya virginiana	hophornbeam, American	1.5	41.61661470	-93.62443793
2023-05-17	Syringa spp.	lilac	1.5	41.61661571	-93.62430355
2023-05-17	Syringa spp.	lilac	1.5	41.61662803	-93.62000616
2023-05-17	Crataegus spp.	hawthorn, spp.	1.5	41.61668358	-93.62000696
2023-05-17	Liriodendron tulipifera	tuliptree	1.5	41.61675118	-93.62528135
2023-05-17	Celtis occidentalis	hackberry, common	1.5	41.61675178	-93.62518613
2023-05-17	Liriodendron tulipifera	tuliptree	1.5	41.61675238	-93.62508877
2023-05-17	Syringa spp.	lilac	1.5	41.61677602	-93.62000133
2023-05-17	Syringa spp.	lilac	1.5	41.61687330	-93.62543343
2023-05-17	Syringa spp.	lilac	1.5	41.61687450	-93.62528591
2023-05-17	Syringa spp.	lilac	1.5	41.61687570	-93.62513410
2023-05-17	Syringa spp.	lilac	1.5	41.61687671	-93.62521859
2023-05-17	Syringa spp.	lilac	1.5	41.61687711	-93.62535538
2023-05-17	Malus spp.	crabapple, flowering	1.5	41.61688771	-93.62000857
2023-05-17	Syringa spp.	lilac	1.5	41.61698817	-93.62001152
2023-05-17	Malus spp.	crabapple, flowering	1.5	41.61710949	-93.62000589
2023-05-17	Malus spp.	crabapple, flowering	1.5	41.61720995	-93.62001528
2023-05-17	Cercis canadensis	redbud, eastern	1.5	41.61729597	-93.62001394
2023-05-17	Syringa spp.	lilac	1.5	41.61736435	-93.62001474
2023-05-17	Carpinus caroliniana	hornbeam, American	1.5	41.61745679	-93.62001340
2023-05-17	Malus spp.	crabapple, flowering	1.5	41.61759254	-93.62001635
2023-05-17	Syringa spp.	lilac	1.5	41.61761245	-93.62452201
2023-05-17	Celtis occidentalis	hackberry, common	1.5	41.61761526	-93.62441955
2023-05-17	Celtis occidentalis	hackberry, common	1.5	41.61762057	-93.62431025
2023-05-17	Syringa spp.	lilac	1.5	41.61764042	-93.62424936
2023-05-17	Malus spp.	crabapple, flowering	1.5	41.61764243	-93.62436899
2023-05-17	Malus spp.	crabapple, flowering	1.5	41.61764393	-93.62455715
2023-05-17	Malus spp.	crabapple, flowering	1.5	41.61764835	-93.62446971
2023-05-17	Crataegus spp.	hawthorn, spp.	1.5	41.61768980	-93.62001930
2023-05-17	Syringa spp.	lilac	1.5	41.61770359	-93.62425500
2023-05-17	Malus spp.	crabapple, flowering	1.5	41.61770800	-93.62436711
2023-05-17	Malus spp.	crabapple, flowering	1.5	41.61771141	-93.62454494
2023-05-17	Syringa spp.	lilac	1.5	41.61771402	-93.62446636
2023-05-17	Celtis occidentalis	hackberry, common	1.5	41.61774068	-93.62441781
2023-05-17	Celtis occidentalis	hackberry, common	1.5	41.61774109	-93.62431427
2023-05-17	Syringa spp.	lilac	1.5	41.61777261	-93.62001581
2023-05-17	Crataegus spp.	hawthorn, spp.	1.5	41.61785543	-93.62002306
2023-05-17	Malus spp.	crabapple, flowering	1.5	41.61787403	-93.62447333
2023-05-17	Malus spp.	crabapple, flowering	1.5	41.61798532	-93.62445965
2023-05-17	Cercis canadensis	redbud, eastern	1.5	41.61817726	-93.62002171
2023-05-17	Amelanchier spp.	serviceberry, spp.	1.5	41.61856807	-93.62003325
2023-12-13	Cercis canadensis	redbud, eastern	Forest Pansy	1.5	41.62290575	-93.51031325
2023-12-13	Liriodendron tulipifera	tuliptree		1.5	41.62291276	-93.51144515
2023-12-13	acuminata	Magnolia, Cucumber		1.5	41.62295988	-93.51114206
2023-12-13	Taxodium distichum	baldcypress, common		1.5	41.62298896	-93.51136870
2023-12-13	Cladrastis kentukea	yellowwood		1.5	41.62305612	-93.51163558
2023-12-13	Eucommia ulmoides	Rubber-tree, Hardy		1.5	41.62320951	-93.51199097
2023-12-13	Eucommia ulmoides	Rubber-tree, Hardy		1.5	41.62327467	-93.51357616
2023-12-13	Cercis canadensis	redbud, eastern	Forest pansy	1.5	41.62334084	-93.51358287
2023-12-13	Cladrastis kentukea	yellowwood		1.5	41.62338495	-93.51301558
2023-12-13	Liquidambar styraciflua	sweetgum, American		1.5	41.62338896	-93.51244695
2023-12-13	Taxodium distichum	baldcypress, common		1.5	41.62341603	-93.51258911
2023-12-13	Quercus lyrata	Oak, Overcup		1.5	41.62345613	-93.51276345
2023-12-13	Taxodium distichum	baldcypress, common		1.5	41.62361152	-93.51358555
2023-12-13	Prunus x yedoensis	Cherry, Yoshino		1.5	41.62369071	-93.51101733
2023-12-13	Liquidambar styraciflua	sweetgum, American		1.5	41.62377994	-93.51106561
2023-12-13	acuminata	Magnolia, Cucumber		1.5	41.62377994	-93.51094089
2023-12-13	Taxodium distichum	baldcypress, common		1.5	41.62378194	-93.51083628
2023-12-13	Eucommia ulmoides	Rubber-tree, Hardy		1.5	41.62386615	-93.51147733
2023-12-13	Prunus x yedoensis	Cherry, Yoshino		1.5	41.62393432	-93.51336427
2023-12-13	Liriodendron tulipifera	tuliptree		1.5	41.62404360	-93.51213581
2023-12-13	Quercus phellos	Oak, willow		1.5	41.62413182	-93.51337231
2023-12-13	acuminata	Magnolia, Cucumber		1.5	41.62415287	-93.51320736
2023-12-13	Quercus phellos	Oak, willow		1.5	41.62416991	-93.51217068
2023-12-13	Cercis canadensis	redbud, eastern	forest pansy	1.5	41.62420199	-93.51250462

2023-12-13	Taxodium distichum	baldcypress, common		1.5	41.62420600	-93.51317383	
2023-12-13	Liquidambar styraciflua	sweetgum, American		1.5	41.62425613	-93.51312957	
2023-12-13	Cercis canadensis	redbud, eastern	Forest pansy	1.5	41.62428520	-93.51325161	
2023-12-13	Quercus lyrata	Oak, Overcup		1.5	41.62429823	-93.51247377	
2023-12-13	Chionanthus retusus	Fringetree, Chinese		1.5	41.62433131	-93.51307593	
2023-12-13	Quercus lyrata	Oak, Overcup		1.5	41.62437743	-93.51290427	
2023-12-13	Chionanthus retusus	Fringetree, Chinese	Forest Pansy	1.5	41.62451377	-93.50786842	
2023-12-13	Quercus phellos	Oak, willow	Forest Pansy	1.5	41.62451577	-93.50765518	
2023-12-13	Taxodium distichum	baldcypress, common	Forest Pansy	1.5	41.62451577	-93.50772090	
2023-12-13	Eucommia ulmoides	Rubber-tree, Hardy	Forest Pansy	1.5	41.62451978	-93.50777722	
2023-12-13	Liquidambar styraciflua	sweetgum, American	Forest Pansy	1.5	41.62452580	-93.50845046	
2023-12-13	Cladrastis kentukea	yellowwood	Forest Pansy	1.5	41.62452780	-93.50856982	
2023-12-13	Quercus phellos	Oak, willow		1.5	41.62452880	-93.50991092	
2023-12-13	Cladrastis kentukea	yellowwood		1.5	41.62452880	-93.51002760	
2023-12-13	Quercus lyrata	Oak, Overcup		1.5	41.62453081	-93.51098783	
2023-12-13	Prunus x yedoensis	Cherry, Yoshino		1.5	41.62461602	-93.50843973	
2023-12-13	Quercus phellos	Oak, willow		1.5	41.62461602	-93.50916661	
2023-12-13	acuminata	Magnolia, Cucumber		1.5	41.62461702	-93.50887827	
2023-12-13	Cercis canadensis	redbud, eastern	Forest Pansy	1.5	41.62461702	-93.50896142	
2023-12-13	Chionanthus retusus	Fringetree, Chinese		1.5	41.62461903	-93.51093284	
2023-12-13	Chionanthus retusus	Fringetree, Chinese		1.5	41.62463507	-93.50945360	
2023-12-13	Cercis canadensis	redbud, eastern	Forest Pansy	1.5	41.62475136	-93.51274602	
2023-12-13	Quercus phellos	Oak, willow	Forest Pansy	1.5	41.62500298	-93.50854702	
2023-12-13	Quercus phellos	Oak, willow		1.5	41.62510223	-93.51229272	
2023-12-13	Eucommia ulmoides	Rubber-tree, Hardy	Forest Pansy	1.5	41.62513130	-93.50853897	
2023-12-13	Quercus phellos	Oak, willow	Forest Pansy	1.5	41.62526964	-93.50854299	
2023-12-13	Eucommia ulmoides	Rubber-tree, Hardy		1.5	41.62538092	-93.51227261	
2023-12-13	Taxodium distichum	baldcypress, common		1.5	41.62549609	-93.51693764	
2023-12-13	Cladrastis kentukea	yellowwood		1.5	41.62551625	-93.51231016	
2023-12-13	Eucommia ulmoides	Rubber-tree, Hardy		1.5	41.62571062	-93.51666942	
2023-12-13	Cladrastis kentukea	yellowwood		1.5	41.62574471	-93.51655676	
2023-12-13	Liriodendron tulipifera	tuliptree		1.5	41.62577790	-93.51196549	
2023-12-13	Prunus x yedoensis	Cherry, Yoshino		1.5	41.62579895	-93.51208888	
2023-12-13	Taxodium distichum	baldcypress, common		1.5	41.62618992	-93.51179383	
2023-12-13	Cladrastis kentukea	yellowwood	Forest Pansy	1.5	41.62680443	-93.50741781	
2023-12-13	Quercus lyrata	Oak, Overcup	Forest Pansy	1.5	41.62685555	-93.50715495	
2023-12-12	Cladrastis kentukea	yellowwood		1	41.62686272	-93.50913948	2
2023-12-13	Prunus x yedoensis	Cherry, Yoshino		1.5	41.62686558	-93.50775443	
2023-12-13	Eucommia ulmoides	Rubber-tree, Hardy		1.5	41.62686658	-93.50810579	
2023-12-12	Cercis canadensis	redbud, eastern	Forest Pansy	1	41.62686940	-93.50885913	
2023-12-13	Chionanthus retusus	Fringetree, Chinese		1.5	41.62687460	-93.50840486	
2023-12-13	Quercus phellos	Oak, willow		1.5	41.62687560	-93.50823722	
2023-12-12	Taxodium distichum	baldcypress, common		1	41.62695559	-93.50886832	3
2023-12-13	Cladrastis kentukea	yellowwood		1.5	41.62696983	-93.50838072	
2023-12-13	Cercis canadensis	redbud, eastern	Forest Pansy	1.5	41.62697184	-93.50797705	
2023-12-13	Liquidambar styraciflua	sweetgum, American	Forest Pansy	1.5	41.62697184	-93.50774906	
2023-12-13	acuminata	Magnolia, Cucumber	Forest Pansy	1.5	41.62697384	-93.50789256	
2023-12-13	Liriodendron tulipifera	tuliptree	Forest Pansy	1.5	41.62697484	-93.50780673	
2023-12-12	Quercus phellos	Oak, willow	Forest pansy	1	41.62722828	-93.50982741	4
2023-12-12	Cercis canadensis	redbud, eastern	Forest pansy	1	41.62741859	-93.50991196	
2023-12-12	Cladrastis kentukea	yellowwood		1	41.62752744	-93.50995567	5
2023-09-21	Celtis occidentalis	hackberry, common		1.5	41.62844560	-93.51667354	
2023-09-21	Gleditsia triacanthos	honeylocust		1.5	41.62845863	-93.51684520	
2023-09-21	Betula nigra	birch, river		1.5	41.62847367	-93.51708525	
2023-09-21	Gleditsia triacanthos	honeylocust		1.5	41.62847467	-93.51696992	
2023-09-21	Gleditsia triacanthos	honeylocust		1.5	41.62847568	-93.51704368	
2023-09-21	Betula nigra	birch, river		1.5	41.62848169	-93.51713085	
2023-09-21	Betula nigra	birch, river		1.5	41.62848470	-93.51717377	
2023-09-21	Betula nigra	birch, river		1.5	41.62848570	-93.51722473	
2023-09-21	Betula nigra	birch, river		1.5	41.62849071	-93.51727703	
2023-09-21	Celtis occidentalis	hackberry, common		1.5	41.62849372	-93.51734141	
2023-09-21	Ulmus 'Frontier'	elm, Frontier		1.5	41.62852680	-93.51660916	
2023-09-21	Gleditsia triacanthos	honeylocust		1.5	41.62856990	-93.51652870	
2023-09-21	Ulmus 'Frontier'	elm, Frontier		1.5	41.62863105	-93.51664135	
2023-10-26	Malus spp.	crabapple, flowering		1.5	41.62869916	-93.63194406	
2023-10-26	Crataegus viridis	hawthorn, green		1.5	41.62870517	-93.63206744	
2023-09-29	Cercis canadensis	redbud, eastern		1.5	41.62877183	-93.63438084	
2023-10-26	Malus spp.	crabapple, flowering		1.5	41.62877334	-93.63195210	
2023-09-29	Cercis canadensis	redbud, eastern		1.5	41.62881293	-93.63437280	
2023-10-06	Platanus x acerifolia	planetree, London		1.5	41.62881494	-93.63450087	
2023-09-21	Ulmus 'Frontier'	elm, Frontier		1.5	41.62881650	-93.51509237	
2023-10-26	Malus spp.	crabapple, flowering		1.5	41.62883950	-93.63194674	
2023-09-29	Crataegus spp.	hawthorn, spp.		1.5	41.62885002	-93.63437145	
2023-09-21	Ulmus 'Frontier'	elm, Frontier		1.5	41.62885058	-93.51519161	
2023-10-26	Malus spp.	crabapple, flowering		1.5	41.62887157	-93.63207012	
2023-09-21	Ulmus 'Frontier'	elm, Frontier		1.5	41.62887564	-93.51529354	
2023-09-21	Ulmus 'Frontier'	elm, Frontier		1.5	41.62890672	-93.51539680	
2023-10-06	Quercus macrocarpa	oak, bur		1.5	41.62892119	-93.63449282	
2023-09-21	Ulmus 'Frontier'	elm, Frontier		1.5	41.62892577	-93.51546520	
2023-09-29	Ulmus spp.	elm, spp.		1.5	41.62893623	-93.63437414	
2023-09-21	Celtis occidentalis	hackberry, common		1.5	41.62896386	-93.51678619	
2023-09-21	Celtis occidentalis	hackberry, common		1.5	41.62909618	-93.51686665	
2023-10-26	Tilia cordata 'Greenspire'	linden, greenspire		1.5	41.62913220	-93.63208085	
2023-09-29	Tilia cordata 'Greenspire'	linden, greenspire		1.5	41.62916679	-93.63437950	
2023-10-26	Cercis canadensis	redbud, eastern		1.5	41.62917832	-93.63194674	
2023-10-06	Malus spp.	crabapple, flowering		1.5	41.62919385	-93.63448210	
2023-09-21	Celtis occidentalis	hackberry, common		1.5	41.62922148	-93.51694042	

2023-09-29	Celtis occidentalis	hackberry, common	1.5	41.62923495	-93.63437145
2023-10-26	Crataegus spp.	hawthorn, spp.	1.5	41.62924848	-93.63191992
2023-09-21	Celtis occidentalis	hackberry, common	1.5	41.62928564	-93.51694042
2023-09-29	Celtis occidentalis	hackberry, common	1.5	41.62930512	-93.63437950
2023-10-26	Crataegus spp.	hawthorn, spp.	1.5	41.62932667	-93.63207280
2023-09-21	Celtis occidentalis	hackberry, common	1.5	41.62934277	-93.51693907
2023-10-26	Syringa spp.	lilac	1.5	41.62936677	-93.63195210
2023-09-29	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.62939033	-93.63437950
2023-09-21	Tilia americana	linden, American	1.5	41.62939390	-93.51690018
2023-09-21	Tilia americana	linden, American	1.5	41.62944302	-93.51685324
2023-09-21	Ulmus 'Frontier'	elm, Frontier	1.5	41.62945404	-93.51709196
2023-09-21	Gleditsia triacanthos	honeylocust	1.5	41.62945404	-93.51734006
2023-09-21	Ulmus 'Frontier'	elm, Frontier	1.5	41.62945605	-93.51718047
2023-09-21	Ulmus 'Frontier'	elm, Frontier	1.5	41.62946006	-93.51700345
2023-09-21	Tilia americana	linden, American	1.5	41.62946306	-93.51691091
2023-10-06	Crataegus spp.	hawthorn, spp.	1.5	41.62963692	-93.63448210
2023-04-21	Gleditsia triacanthos	honeylocust	1.5	41.62968391	-93.54689978
2023-04-21	Gleditsia triacanthos	honeylocust	1.5	41.62969453	-93.54703711
2023-04-21	Gleditsia triacanthos	honeylocust	1.5	41.62970035	-93.54715512
2023-04-21	Gleditsia triacanthos	honeylocust	1.5	41.62971739	-93.54727100
2023-10-06	Malus spp.	crabapple, flowering	1.5	41.62971761	-93.63555900
2023-10-26	Malus spp.	crabapple, flowering	1.5	41.62972163	-93.63193869
2023-04-21	Crataegus spp.	hawthorn, spp.	1.5	41.62972875	-93.54865919
2023-04-21	Quercus coccinea	oak, scarlet	1.5	41.62974940	-93.54851971
2023-09-29	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.62977626	-93.63437481
2023-10-06	Malus spp.	crabapple, flowering	1.5	41.62978327	-93.63450355
2023-10-26	Syringa vulgaris	lilac, common	1.5	41.62978578	-93.63194137
2023-04-21	Crataegus spp.	hawthorn, spp.	1.5	41.62979000	-93.54922544
2023-09-29	Liriodendron tulipifera	tuliptree	1.5	41.62983540	-93.63438151
2023-04-21	Quercus coccinea	oak, scarlet	1.5	41.62983862	-93.54852615
2023-04-21	Crataegus spp.	hawthorn, spp.	1.5	41.62985476	-93.54923402
2023-04-21	Crataegus spp.	hawthorn, spp.	1.5	41.62986414	-93.54728387
2023-10-06	Syringa spp.	lilac	1.5	41.62987549	-93.63449551
2023-10-06	Malus spp.	crabapple, flowering	1.5	41.62989103	-93.63558314
2023-10-26	Quercus rubra	oak, northern red	1.5	41.62990206	-93.63208889
2023-04-21	Quercus coccinea	oak, scarlet	1.5	41.62990805	-93.54719589
2023-04-21	Liriodendron tulipifera	tuliptree	1.5	41.62991466	-93.54683326
2023-10-06	Crataegus spp.	hawthorn, spp.	1.5	41.62992361	-93.63449551
2023-04-21	Quercus coccinea	oak, scarlet	1.5	41.62994066	-93.54853473
2023-04-21	Crataegus spp.	hawthorn, spp.	1.5	41.62994197	-93.54924689
2023-10-06	Malus spp.	crabapple, flowering	1.5	41.62994516	-93.63557510
2023-10-06	Cercis canadensis	redbud, eastern	1.5	41.63001383	-93.63449014
2023-04-21	Quercus coccinea	oak, scarlet	1.5	41.63001705	-93.54853473
2023-04-21	Liriodendron tulipifera	tuliptree	1.5	41.63002152	-93.54683111
2023-04-21	Celtis occidentalis	hackberry, common	1.5	41.63002607	-93.54863558
2023-10-06	Crataegus crusgalli	hawthorn, cockspur	1.5	41.63006796	-93.63449551
2023-04-21	Quercus macrocarpa	oak, bur	1.5	41.63008331	-93.54934345
2023-04-21	Quercus macrocarpa	oak, bur	1.5	41.63010135	-93.54952370
2023-04-21	Quercus macrocarpa	oak, bur	1.5	41.63010195	-93.54942499
2023-04-21	Quercus bicolor	oak, swamp white	1.5	41.63010236	-93.54961811
2023-04-21	Liriodendron tulipifera	tuliptree	1.5	41.63010753	-93.54682253
2023-04-21	Celtis occidentalis	hackberry, common	1.5	41.63011418	-93.54982840
2023-04-21	Ulmus 'Frontier'	elm, Frontier	1.5	41.63012080	-93.54897653
2023-04-21	Quercus macrocarpa	oak, bur	1.5	41.63013062	-93.54970823
2023-04-21	Ulmus 'Frontier'	elm, Frontier	1.5	41.63014065	-93.54902803
2023-04-21	Celtis occidentalis	hackberry, common	1.5	41.63015167	-93.54990564
2023-10-06	Viburnum lentago	nannyberry	1.5	41.63016369	-93.63557510
2023-10-06	Malus spp.	crabapple, flowering	1.5	41.63016419	-93.63448478
2023-04-21	Quercus bicolor	oak, swamp white	1.5	41.63016691	-93.54981123
2023-04-21	Ulmus 'Frontier'	elm, Frontier	1.5	41.63016851	-93.54908382
2023-04-21	Celtis occidentalis	hackberry, common	1.5	41.63019237	-93.54997860
2023-04-21	Quercus bicolor	oak, swamp white	1.5	41.63021442	-93.54989277
2023-04-21	Gleditsia triacanthos	honeylocust	1.5	41.63022044	-93.54912673
2023-04-21	Quercus bicolor	oak, swamp white	1.5	41.63025873	-93.54997002
2023-10-06	Malus spp.	crabapple, flowering	1.5	41.63027504	-93.63569814
2023-04-21	Gleditsia triacanthos	honeylocust	1.5	41.63027878	-93.54912458
2023-10-26	Syringa spp.	lilac	1.5	41.63028698	-93.63194942
2023-10-06	Malus spp.	crabapple, flowering	1.5	41.63041028	-93.63558314
2023-04-21	Quercus bicolor	oak, swamp white	1.5	41.63045149	-93.54878579
2023-10-06	Quercus macrocarpa	oak, bur	1.5	41.63047853	-93.63570082
2023-10-06	Malus spp.	crabapple, flowering	1.5	41.63050050	-93.63558314
2023-10-06	Malus spp.	crabapple, flowering	1.5	41.63054360	-93.63559387
2023-04-21	Quercus bicolor	oak, swamp white	1.5	41.63054391	-93.54883085
2023-04-21	Quercus coccinea	oak, scarlet	1.5	41.63056737	-93.54874073
2023-04-21	Quercus bicolor	oak, swamp white	1.5	41.63064214	-93.54876004
2023-10-26	Malus spp.	crabapple, flowering	1.5	41.63064384	-93.63193601
2023-10-06	Celtis occidentalis	hackberry, common	1.5	41.63065094	-93.63570619
2023-10-06	Syringa reticulata	lilac, Japanese tree	1.5	41.63069396	-93.63558448
2023-04-21	Quercus bicolor	oak, swamp white	1.5	41.63071372	-93.54876648
2023-10-06	Syringa reticulata	lilac, Japanese tree	1.5	41.63073305	-93.63558314
2023-04-21	Quercus bicolor	oak, swamp white	1.5	41.63079170	-93.54877506
2023-09-29	Liriodendron tulipifera	tuliptree	1.5	41.63090897	-93.63436542
2023-09-29	Celtis occidentalis	hackberry, common	1.5	41.63096912	-93.63437615
2023-10-06	Crataegus spp.	hawthorn, spp.	1.5	41.63097613	-93.63451696
2023-10-26	Syringa spp.	lilac	1.5	41.63103477	-93.63194674
2023-10-06	Viburnum lentago	nannyberry	1.5	41.63106083	-93.63558180
2023-10-26	Liriodendron tulipifera	tuliptree	1.5	41.63108489	-93.63209962

2023-10-06	Cercis canadensis	redbud, eastern	1.5	41.63112048	-93.63449282
2023-10-06	Malus spp.	crabapple, flowering	1.5	41.63113000	-93.63560326
2023-10-26	Quercus rubra	oak, northern red	1.5	41.63116508	-93.63211840
2023-09-29	Platanus x acerifolia	planetree, London	1.5	41.63117761	-93.63438688
2023-10-06	Syringa reticulata	lilac, Japanese tree	1.5	41.63133699	-93.63450892
2023-10-26	Liriodendron tulipifera	tuliptree	1.5	41.63141769	-93.63191723
2023-09-29	Celtis occidentalis	hackberry, common	1.5	41.63149036	-93.63438420
2023-10-26	Crataegus spp.	hawthorn, spp.	1.5	41.63149387	-93.63194674
2023-10-06	Malus spp.	crabapple, flowering	1.5	41.63154148	-93.63451428
2023-10-26	Syringa spp.	lilac	1.5	41.63156003	-93.63210499
2023-10-06	Syringa spp.	lilac	1.5	41.63160513	-93.63557778
2023-10-26	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.63161215	-93.63191723
2023-10-06	Syringa spp.	lilac	1.5	41.63164022	-93.63558180
2023-10-06	Cercis canadensis	redbud, eastern	1.5	41.63167179	-93.63453038
2023-10-06	Syringa spp.	lilac	1.5	41.63169234	-93.63557644
2023-10-26	Quercus bicolor	oak, swamp white	1.5	41.63173645	-93.63191992
2023-10-06	Viburnum lentago	nannyberry	1.5	41.63176251	-93.63558851
2023-10-06	Syringa spp.	lilac	1.5	41.63176760	-93.63570887
2023-10-26	Malus spp.	crabapple, flowering	1.5	41.63179057	-93.63211303
2023-09-29	Liriodendron tulipifera	tuliptree	1.5	41.63180210	-93.63440297
2023-09-29	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.63186024	-93.63440163
2023-10-06	Syringa spp.	lilac	1.5	41.63187277	-93.63558180
2023-10-26	Cercis canadensis	redbud, eastern	1.5	41.63192890	-93.63211572
2023-10-06	Viburnum lentago	nannyberry	1.5	41.63205670	-93.63449014
2023-09-30	Viburnum lentago	nannyberry	1.5	41.63209558	-93.63558566
2023-10-06	Malus spp.	crabapple, flowering	1.5	41.63222661	-93.63558180
2023-10-06	Syringa spp.	lilac	1.5	41.63223872	-93.63571424
2023-10-06	Cercis canadensis	redbud, eastern	1.5	41.63223914	-93.63451160
2023-09-29	Platanus x acerifolia	planetree, London	1.5	41.63233336	-93.63440431
2023-10-26	Quercus bicolor	oak, swamp white	1.5	41.63237596	-93.63193333
2023-09-29	Liriodendron tulipifera	tuliptree	1.5	41.63239450	-93.63440431
2023-10-26	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.63239529	-93.63195226
	Syringa spp.	lilac	0	41.63254236	-93.63193869
2023-09-29	Ulmus spp.	elm, spp.	1.5	41.63255188	-93.63440029
2023-10-06	Malus spp.	crabapple, flowering	1.5	41.63261102	-93.63452233
	Cercis canadensis	redbud, eastern	0	41.63261854	-93.63194674
2023-10-26	Syringa spp.	lilac	1.5	41.63262655	-93.63210499
2023-10-06	Malus spp.	crabapple, flowering	1.5	41.63264560	-93.63557241
2023-09-29	Celtis occidentalis	hackberry, common	1.5	41.63269622	-93.63440297
2023-10-26	Syringa spp.	lilac	1.5	41.63270474	-93.63210499
2023-10-06	Syringa spp.	lilac	1.5	41.63272779	-93.63559387
2023-10-06	Syringa spp.	lilac	1.5	41.63274433	-93.63451696
	Platanus x acerifolia	planetree, London	0	41.63276288	-93.63196015
2023-09-29	Quercus macrocarpa	oak, bur	1.5	41.63286963	-93.63441102
2023-10-26	Malus spp.	crabapple, flowering	1.5	41.63288516	-93.63211035
	Quercus macrocarpa	oak, bur	0	41.63292125	-93.63196820
2023-10-06	Syringa spp.	lilac	1.5	41.63293478	-93.63451965
2023-10-06	Celtis occidentalis	hackberry, common	1.5	41.63294380	-93.63440968
2023-10-26	Crataegus spp.	hawthorn, spp.	1.5	41.63295733	-93.63211840
	Tilia cordata 'Greenspire'	linden, greenspire	0	41.63301347	-93.63197624
2023-10-26	Syringa spp.	lilac	1.5	41.63302550	-93.63212376
	Liriodendron tulipifera	tuliptree	0	41.63326606	-93.63196015
2023-09-30	Cercis canadensis	redbud, eastern	1.5	41.63328828	-93.63452417
	Quercus rubra	oak, northern red	0	41.63335226	-93.63196283
2023-10-26	Syringa spp.	lilac	1.5	41.63341040	-93.63209426
	Platanus x acerifolia	planetree, London	0	41.63342298	-93.63195575
2023-10-06	Cercis canadensis	redbud, eastern	1.5	41.63342995	-93.63451696
2023-10-26	Malus spp.	crabapple, flowering	1.5	41.63350863	-93.63209694
	Ulmus spp.	elm, spp.	0	41.63352467	-93.63197088
2023-10-06	Syringa spp.	lilac	1.5	41.63356125	-93.63451965
2023-09-29	Celtis occidentalis	hackberry, common	1.5	41.63356176	-93.63559991
2023-10-26	Syringa spp.	lilac	1.5	41.63357078	-93.63212376
	Platanus x acerifolia	planetree, London	0	41.63359283	-93.63197088
2023-10-26	Crataegus viridis	hawthorn, green	1.5	41.63366099	-93.63211572
	Quercus rubra	oak, northern red	0	41.63368304	-93.63196015
2023-10-06	Liriodendron tulipifera	tuliptree	1.5	41.63369256	-93.63441772
2023-10-06	Malus spp.	crabapple, flowering	1.5	41.63369256	-93.63453172
2023-10-26	Syringa spp.	lilac	1.5	41.63371512	-93.63211035
2023-10-06	Crataegus spp.	hawthorn, spp.	1.5	41.63381485	-93.63440431
2023-10-06	Cercis canadensis	redbud, eastern	1.5	41.63384492	-93.63452367
2023-10-06	Syringa spp.	lilac	1.5	41.63393313	-93.63438554
	Malus spp.	crabapple, flowering	0	41.63393563	-93.63197356
2023-10-06	Malus spp.	crabapple, flowering	1.5	41.63394215	-93.63451965
2023-09-29	Malus spp.	crabapple, flowering	1.5	41.63394666	-93.63560527
2023-10-06	Malus spp.	crabapple, flowering	1.5	41.63397021	-93.63452367
2023-10-26	Crataegus spp.	hawthorn, spp.	1.5	41.63397974	-93.63211572
	Liriodendron tulipifera	tuliptree	0	41.63398575	-93.63196283
2023-10-06	Cercis canadensis	redbud, eastern	1.5	41.63400630	-93.63439895
2023-10-26	Malus spp.	crabapple, flowering	1.5	41.63420025	-93.63211303
2023-10-06	Viburnum lentago	nannyberry	1.5	41.63421880	-93.63452635
2023-10-06	Ulmus spp.	elm, spp.	1.5	41.63423884	-93.63440431
2023-09-29	Ulmus spp.	elm, spp.	New harmony	1.5	41.63424335	-93.63553553
	Tilia cordata 'Greenspire'	linden, greenspire	0	41.63426023	-93.63196454
2023-10-26	Syringa spp.	lilac	1.5	41.63426641	-93.63211572
2023-09-29	Malus spp.	crabapple, flowering	New harmony	1.5	41.63426941	-93.63552749
2023-10-06	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.63428595	-93.63441236
2023-10-06	Quercus macrocarpa	oak, bur	1.5	41.63436514	-93.63440163

2023-10-06	Malus spp.	crabapple, flowering	1.5	41.63436714	-93.63453440
2023-09-29	Quercus macrocarpa	oak, bur	1.5	41.63441375	-93.63551408
2023-10-26	Malus spp.	crabapple, flowering	1.5	41.63446287	-93.63213986
2023-10-06	Ulmus spp.	elm, spp.	1.5	41.63447690	-93.63196820
2023-09-30	Quercus macrocarpa	oak, bur	1.5	41.63449311	-93.63440884
2023-09-30	Malus spp.	crabapple, flowering	1.5	41.63449511	-93.63452954
2023-09-29	Syringa spp.	lilac	1.5	41.63457613	-93.63547921
2023-10-06	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.63459518	-93.63197624
2023-10-06	Celtis occidentalis	hackberry, common	1.5	41.63460570	-93.63440968
2023-10-26	Crataegus spp.	hawthorn, spp.	1.5	41.63462525	-93.63211303
2023-10-06	Malus spp.	crabapple, flowering	1.5	41.63466484	-93.63441772
2023-10-06	Malus spp.	crabapple, flowering	1.5	41.63466584	-93.63453440
2023-10-06	Quercus coccinea	oak, scarlet	1.5	41.63467737	-93.63196820
2023-09-29	Malus spp.	crabapple, flowering	1.5	41.63471498	-93.63553520
2023-10-06	Platanus x acerifolia	planetree, London	1.5	41.63477961	-93.63197356
2023-10-26	Syringa spp.	lilac	1.5	41.63481168	-93.63210499
2023-09-29	Syringa spp.	lilac	1.5	41.63482725	-93.63553252
2023-10-26	Malus spp.	crabapple, flowering	1.5	41.63493597	-93.63211035
2023-10-06	Platanus x acerifolia	planetree, London	1.5	41.63503720	-93.63196618
2023-10-26	Crataegus spp.	hawthorn, spp.	1.5	41.63520259	-93.63209694
2023-10-06	Quercus macrocarpa	oak, bur	1.5	41.63533389	-93.63199032
2023-10-26	Malus spp.	crabapple, flowering	1.5	41.63536096	-93.63212913
2023-10-26	Quercus bicolor	oak, swamp white	1.5	41.63547099	-93.63198697
2023-10-06	Syringa spp.	lilac	1.5	41.63563259	-93.63212443
2023-10-06	Liriodendron tulipifera	tuliptree	1.5	41.63563259	-93.63196618
2023-10-06	Platanus x acerifolia	planetree, London	1.5	41.63576890	-93.63198764
2023-10-06	Liriodendron tulipifera	tuliptree	1.5	41.63603151	-93.63198496
2023-10-06	Malus spp.	crabapple, flowering	1.5	41.63603552	-93.63211773
2023-10-06	Ulmus spp.	elm, spp.	1.5	41.63616381	-93.63197423
2023-10-26	Tilia cordata 'Greenspire'	linden, greenspire	1.5	41.63632296	-93.63197892
2023-10-06	Malus spp.	crabapple, flowering	1.5	41.63634022	-93.63212980
2023-10-06	Syringa spp.	lilac	1.5	41.63647754	-93.63198496

Social Impacts

City Forest Carbon Project
Social Impacts

UN Sustainable Development Goals

The 17 United Nations Sustainable Development Goals (SDGs) are an urgent call for action and global partnership among all countries, representing key benchmarks for creating a better world and environment for everyone. Well-designed and managed urban forests make significant contributions to the environmental sustainability, economic viability and livability of cities. They help mitigate climate change and natural disasters, reduce energy costs, poverty and malnutrition, and provide ecosystem services and public benefits. See more details in the CFC Carbon Project Social Impact Reference Guide.

Instructions

This template sets out all relevant SDGs and lists various urban forest project activities that fall within each SDG. Evaluate the SDGs to determine how your carbon project provides social impacts that may contribute towards achievement of the global goals. Check the box(es) that contain one of your project activities and describe in no fewer than two sentences how your project activities align with the corresponding SDG. On page 12, select the icon for three to five of the most relevant SDGs to your project and provide any additional information.

SDG 3 - Good Health and Well Being

Goal: Ensure healthy lives and promote well-being for all at all ages.

Examples of project activities include, but are not limited to:

- ☒ Plant or protect trees to reduce or remove air pollutants
- ☐ If planting trees, select trees for reduced pollen counts and irritant production
- ☒ Plant or protect trees to create shade, provide UV exposure protection, reduce extreme heat negative effects, and/or reduce temperatures to relieve urban heat effects
- ☐ Design project to buffer sounds, optimize biodiversity, or create nature experiences
- ☒ Locate project near vulnerable populations, such as children or elderly
- ☐ Locate project near high volume roads to screen pollutants
- ☒ Locate project near people to encourage recreation, provide new parks or green space, or otherwise promote an active lifestyle
- ☐ Locate project near schools, elderly facilities, or mental health services to promote nature-based wellness, attention restoration, or other mental well-being
- ☒ Locate project in area with conditions of project-defined high inequity to trees, such as at schools, affordable or subsidized housing, formerly redlined neighborhoods, areas with high property vacancy rates, or area with high proportion of renters
- ☒ Reduce stormwater runoff or improve infiltration rates
- ☐ Design project to reduce human exposure to specific pollutants or toxins
- ☐ Other

Trees Forever plants trees in low canopy areas and open spaces, with a focus on broad leaf species, which have better capacity to sequester air pollutants. Planting trees in open spaces provides shade and protection from UV exposure as well as helping to reduce urban heat effects. Biodiversity is taken into consideration when selecting species that are best suited for the Des Moines urban environment. Trees are planted around schools and along busy streets to help slow traffic, as buffers along the regional trail system, and near streets to help with stormwater runoff. As part of the planting planning process, Trees Forever identifies areas with high tree inequity, particularly in formerly redlined neighborhoods, and focuses on incorporating these areas into the overall annual plan.

Trees Forever encourages nature experiences through educational tree tags that link individual trees with a City of Des Moines hosted database in order to learn more about benefits of trees and individual species.

SDG 6 - Clean Water and Sanitation

Goal: Ensure availability and sustainable management of water and sanitation for all

Examples of project activities include, but are not limited to:

- ☐ Research and assess environmental injustices related to water in project area
- ☐ Locate project near high-traffic roads or to otherwise improve, mitigate, or remediate toxic landscapes near water
- ☒ Protect or plant trees to improve historically or culturally important sites related to water that have been degraded and/or neglected
- ☒ Reduce stormwater by planting or protecting trees
- ☐ Plant forested buffers adjacent to streams, rivers, wetlands, or floodplains
- ☒ Prevent soil erosion by protect steep slopes
- ☐ Improve infiltration rates
- ☐ Improve, mitigate, or remediate toxic landscapes and human exposure to risk
- ☒ Drought resistance, such as selecting appropriate water-efficient trees for project climate zone
- ☐ Other

A focus is placed on appropriate tree selection, particularly as it relates to drought tolerance. Trees also reduce stormwater runoff.

SDG 8 - Decent Work and Economic Growth

Goal: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

Examples of project activities include, but are not limited to:

- ☒ Community participation in project implementation, including such things as providing access to financial resources for ongoing community-based care
- ☒ Emphasize local hiring and support small businesses
- ☒ Promote local economic opportunities through workforce training, career pathway development, or other employment
- ☐ Other

A series of community meetings were held in conjunction with Des Moines neighborhood representatives. Residents were engaged in the creation of a neighborhood planting map, and a plan for tree care that included volunteer watering by community members. Trees Forever prioritizes hiring students from local high schools for the Growing Futures employment program and works with local contractors for additional watering needs.

SDG 10 - Reduced Inequalities

Goal: Reduce inequalities within and among countries

Examples of project activities include, but are not limited to:

- ☒ Provide connections and cohesion for social health, such as create or reinforce places that promote informal interactions, engage local residents and users in tree management, include symbolic or cultural elements, or other events
- ☒ Research, understand, and design to address understand historic and current sociocultural inequities, community health conditions, environmental injustices, or prior local greening efforts in community
- ☒ Locate project near vulnerable populations, such as children or elderly, to provide air quality improvements or buffer against extreme heat effects
- ☒ Locate project in high-density residential areas or where there is a lack of trees to improve access and promote an active lifestyle
- ☒ Locate project near schools, elderly facilities, or mental health services to promote nature-based wellness, attention restoration, or other mental well-being
- ☒ Locate project in area with conditions of project-defined high inequity to trees, such as at schools, affordable or subsidized housing, formerly redlined neighborhoods, areas with high property vacancy rates, or area with high proportion of renters
- ☐ Locate project near high-traffic roads or to otherwise improve, mitigate, or remediate toxic landscapes
- ☒ Protect or plant trees to improve historically or culturally important sites that have been degraded and/or neglected
- ☒ Community engagement in project design, including such things as engaging and respecting existing relationships and social networks, community cultural traditions, and public participation methods that are empowering and inclusive
- ☒ Community participation in project implementation, including such things as addressing and removing barriers to participation, promote ongoing community-based care and access to financial resources
- ☒ Emphasize local hiring and support small businesses
- ☒ Research and consider potential for gentrification and displacements
- ☒ Promote local economic opportunities through workforce training, career pathway development, or other employment
- ☐ Other

Trees Forever intends to reduce inequalities through engaging in community partnerships, planting trees in low-income areas (particularly previously redlined areas of the city), and organizing plantings around schools, affordable housing development, and in areas with low tree canopy. Staff engage residents and community leaders with project design when possible. A three-session TreeKeeper course for community volunteers is offered twice a year. Participants learn to plant, prune, and care for trees in the community, and are relied upon as skilled volunteers for subsequent plantings and community engagement events.

The City of Des Moines was awarded $2.5 million in Inflation Reduction Act funding, of which Trees Forever will partner to spend $1.5 million. This funding is restricted to underserved communities, which includes a large portion of the Des Moines metro urban core.

SDG 11 - Sustainable Cities and Communities

Overall: Make cities inclusive, safe, resilient, and sustainable.

Examples of project activities include, but are not limited to:

- ☒ Plant or protect trees to reduce or remove air pollutants
- ☐ If planting trees, select trees for reduced pollen counts and irritant production
- ☐ Locate project near high volume roads to screen pollutants
- ☒ Locate project near vulnerable populations, such as children or elderly
- ☒ Plant or protect trees to create shade, provide UV exposure protection, reduce extreme heat negative effects, and/or reduce temperatures to relieve urban heat effects
- ☒ Locate project near people to encourage recreation, provide new parks or green space, or otherwise promote an active lifestyle
- ☒ Design project to improve wellness and mental health, such as planting trees to buffer sounds, optimize biodiversity, optimize views from buildings, or create nature experiences
- ☒ Locate project near schools, elderly facilities, or mental health services to promote nature-based wellness, attention restoration, or other mental well-being
- ☒ Provide connections and cohesion for social health, such as create or reinforce places that promote informal interactions, engage local residents and users in tree management, include symbolic or cultural elements, or other events
- ☒ Research, understand, and design to address understand historic and current sociocultural inequities, community health conditions, environmental injustices, or prior local greening efforts in community
- ☒ Locate project in area with conditions of project-defined high inequity to trees, such as at schools, affordable or subsidized housing, formerly redlined neighborhoods, areas with high property vacancy rates, or area with high proportion of renters
- ☒ Community engagement in project design, including such things as engaging and respecting existing relationships and social networks, community cultural traditions, and public participation methods that are empowering and inclusive
- ☒ Community participation in project implementation, including such things as addressing and removing barriers to participation, promote ongoing community-based care and access to financial resources
- ☐ Other

Trees Forever plants trees in low canopy areas and open spaces, with a focus on broad leaf species, which have better capacity to sequester air pollutants. Planting trees in open spaces provides shade and protection from UV exposure as well as helping to reduce urban heat effects. Biodiversity is taken into consideration when selecting species that are best suited for the Des Moines urban environment. Trees are planted around schools and along busy streets to help slow traffic, as buffers along the regional trail system, and near streets to help with stormwater runoff. As part of the planting planning process, Trees Forever identifies areas with high tree inequity, particularly in formerly redlined neighborhoods, and focuses on incorporating these areas into the overall annual plan.

Trees Forever encourages nature experiences through educational tree tags that link individual trees with a City of Des Moines hosted database in order to learn more about benefits of trees and individual

species. TreeKeepers, skilled volunteers trained in tree planting and care, are engaged through plantings and community engagement events focused on continuing education.

SDG 12 - Responsible Production and Consumption

Goal: Ensure sustainable consumption and production patterns

Examples of project activities include, but are not limited to:

- ☒ Plant or protect trees to create shade or reduce temperatures to relieve urban heat effects
- ☒ Provide cooling benefits and energy savings by shading impervious surfaces such as streets or parking lots, or planting trees on south and west sides of buildings
- ☐ Other

Trees are planted in areas with low canopy and along streets to create shade and address urban heat effects. Understory and overstory trees are planting in specific places in order to provide the most shade and cooling benefits possible.

SDG 13 - Climate Action

Goal: Take urgent action to combat climate change and its impacts.

Examples of project activities include, but are not limited to:

- ☐ Plant or protect trees to reduce or remove air pollutants
- ☒ Plant or protect trees to create shade or reduce temperatures to relieve urban heat effects
- ☒ Promote community capacity for social and climate resilience by engaging local residents or users in tree management, or other events to connect people to the project
- ☐ Reflect cultural traditions and inclusive engagement for climate resilience
- ☒ Design project to improve soil health
- ☒ Provide cooling benefits and energy savings by shading impervious surfaces such as streets or parking lots, or planting trees on south and west sides of buildings
- ☒ Plant or protect trees to reduce stormwater runoff
- ☒ Select water-efficient trees for climate zone and drought resistance
- ☐ Create and/or enhance wildlife habitat
- ☐ Other

Trees Forever prioritizes planting native species that are appropriate for the climate zone and adding mulch and soil amendments to improve soil health. Planting trees in the right of way helps to reduce stormwater runoff. TreeKeepers, volunteers trained in tree planting and care, are engaged through plantings and community engagement events focused on continuing education. Trees Forever plants trees in low canopy areas and open spaces, with a focus on broad leaf species, which have better capacity to sequester air pollutants. Planting trees in open spaces provides shade and protection from UV exposure as well as helping to reduce urban heat effects.

SDG 14 - Life Below Water

Goal: Conserve and sustainably use the oceans, seas and marine resources for sustainable development.

Examples of project activities located in areas with marine ecosystems include, but are not limited to:

- ☐ Locate project near high-traffic roads or to otherwise improve, mitigate, or remediate toxic landscapes near water
- ☐ Plant or protect trees in project areas to reduce stormwater runoff
- ☐ Plant forested buffers adjacent to streams, rivers, wetlands, or floodplains
- ☐ Prevent soil erosion into by protecting steep slopes
- ☐ Improve infiltration rates
- ☐ Improve, mitigate, or remediate toxic landscapes and human exposure to risk
- ☒ Drought resistance, such as selecting appropriate water-efficient trees for project climate zone
- ☐ Enhance wildlife habitat, such as riparian habitat for fish, birds, and other animals
- ☐ Other

A focus is placed on appropriate tree selection, particularly as it relates to drought tolerance. Trees also reduce stormwater runoff.

SDG 15 - Life on Land

Goal: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

Examples of project activities include, but are not limited to the following with increased functionality of green infrastructure:

- ☒ Plant or protect trees to reduce stormwater runoff
- ☒ Select water-efficient trees for climate zone and drought resistance
- ☒ Create and/or enhance wildlife habitat to improve local biodiversity
- ☐ Plant forested buffers adjacent to streams, rivers, wetlands, or floodplains
- ☒ Prevent soil erosion by protect steep slopes
- ☐ Improve infiltration rates
- ☐ Other

A focus is placed on appropriate tree selection, particularly as it relates to drought tolerance. Trees also reduce stormwater runoff.

Trees Forever focuses on planting a diversity of species, which includes considerations for local wildlife habitat. The organization also engages in education and advocacy work surrounding green infrastructure, protecting biodiversity, and supporting policy that respectfully combats climate change.

SDG 17 - Partnerships for the Goals

Overall: Strengthen the means of implementation and revitalize the global partnership for sustainable development.

Examples of project activities include, but are not limited to:

- ☒ Promote community connections and capacity for social resilience by engaging local residents or users in tree management, or other events to connect people to the project
- ☒ Community engagement in project design, including such things as engaging and respecting existing relationships and social networks, community cultural traditions, and public participation methods that are empowering and inclusive
- ☒ Community participation in project implementation, including such things as addressing and removing barriers to participation, promote ongoing community-based care and access to financial resources
- ☐ Other

The Trees Forever team in the Des Moines metro area has engaged in a renewed focus on community engagement at all levels. The intent of the TreeKeepers education program is to train skilled volunteers that can supplement full-time staff in the community as tree advocates, connect to community stakeholders, and create partnerships. One of the goals of Trees Forever in the Des Moines metro area is to tap into existing partnerships, honor organizational expertise, and engage community members, government officials, local non-profits, and area businesses in meaningful ways. Education of all communities—especially historically redlined areas—on the benefits of trees is essential to success.

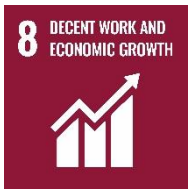
Summary of Project Social Impacts

Trees Forever plants trees in low canopy areas and open spaces, with a focus on broad leaf species, which have better capacity to sequester air pollutants. Planting trees in open spaces provides shade and protection from UV exposure as well as helping to reduce urban heat effects. Biodiversity is taken into consideration when selecting species that are best suited for the Des Moines urban environment. Trees are planted around schools and along busy streets to help slow traffic, as buffers along the regional trail system, and near streets to help with stormwater runoff. As part of the planting planning process, Trees Forever identifies areas with high tree inequity, particularly in formerly redlined neighborhoods, and focuses on incorporating these areas into the overall annual plan.

Trees Forever encourages nature experiences through educational tree tags that link individual trees with a City of Des Moines hosted database in order to learn more about benefits of trees and individual species. TreeKeepers, skilled volunteers trained in tree planting and care, are engaged through plantings and community engagement events focused on continuing education.

Trees Forever intends to reduce inequalities through engaging in community partnerships, planting trees in low-income areas (particularly previously redlined areas of the city), and organizing plantings around schools, affordable housing development, and in areas with low tree canopy. Staff engage residents and community leaders with project design when possible. A three-session TreeKeeper course for community volunteers is offered twice a year. Participants learn to plant, prune, and care for trees in the community, and are relied upon as skilled volunteers for subsequent plantings and community engagement events.

The City of Des Moines was awarded $2.5 million in Inflation Reduction Act funding, of which Trees Forever will partner to spend $1.5 million. This funding is restricted to underserved communities, which includes a large portion of the Des Moines metro urban core.



A series of community meetings were held in conjunction with Des Moines neighborhood representatives. Residents were engaged in the creation of a neighborhood planting map, and a plan for tree care that included volunteer watering by community members. Trees Forever prioritizes hiring students from local high schools for the Growing Futures employment program and works with local contractors for additional watering needs.