



TREASURE VALLEY MUNICIPAL PARKS PLANTING PROJECT
Initial Credit Project Design Document

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INSTRUCTIONS

Project Operators complete and submit this Initial Credit Project Design Document (PDD) after planting has been completed. City Forest Credits then reviews this PDD for validation with all other required project documents. An approved third-party verifier then conducts verification. A separate amendment to the Project Design Document will need to be submitted for future verification at years 4, 6, and after year 25.

Please complete sections starting on page 5 where you find “[Enter text here]” as thoroughly as possible.

PROTOCOL REQUIREMENTS

Below are a list of the eligibility requirements in the City Forest Credits (CFC) Tree Planting Protocol Version 9, dated February 7, 2021. Begin your responses on page 4 under PROJECT OVERVIEW.

Project Operator (Section 1.1)

Identify a Project Operator for the project. This is the person or entity who takes responsibility for the project for the 25-year duration.

Commit to 25-year Project Duration in the Project Implementation Agreement (Section 1.2 and Section 5)

Sign the Project Implementation Agreement – this is the 25-year agreement between the Project Operator and CFC for an urban forest carbon project.

Location Eligibility (Section 1.3)

Project Areas must be located in parcels within or along the boundary of at least one of the following criteria.

- A. The Urban Area boundary (“Urban Area”), defined by the most recent publication of the United States Census Bureau
- 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. Examples include the Metropolitan Area Planning Council in Boston and the Chicago Metropolitan Planning Agency;
- E. The boundary of land owned, designated, and used by a municipal or quasi-municipal entity such as a utility 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 A through E above.

Ownership Eligibility (Section 2)

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 must be recorded in the property records of the county in which the land containing Project trees is located.

Additionality (Section 4.1 and Appendix D)

Legally Required Trees NOT Eligible - Project trees cannot be required by law or ordinance to be planted.

Performance Standard Baseline (Appendix D)

Project trees must be additional based on the performance standard baseline attached.

Multiple planting sites may be aggregated into one project (Section 8)

Planting sites can be on public and private land, in different cities, and aggregated into one project, provided that planting on all properties occurs within a 36-month period and that all properties comply with protocol requirements.

Carbon Quantification (Section 12 and Appendix B)

CFC has developed spreadsheets and methods for quantifying carbon stored and credited. The project design including tree spacing and goals will determine the quantification and monitoring requirements. Project Operators will quantify CO₂ using the method appropriate for the project type. CFC supplies all quantification tools. The three main project designs are:

- Single Tree - trees are scattered and spaced apart more than 10 feet, as in streets, yards, some parks, and schools, individual trees are tracked and randomly sampled
- Clustered Parks - trees are relatively contiguous in park-like settings and change in canopy is tracked
- Canopy - trees are planted very close together, often but not required to be in riparian areas, significant mortality is expected, and change in canopy is tracked. The two main goals are to create a forest ecosystem and generate canopy

Verification by third-party verifiers (Section 13)

All projects must be verified before receiving credits.

Imaging Requirements (based on planting method)

In order to receive credits, additional information is required at Years 4, 6, and 26. Below are the imaging requirements by planting method:

- 1) Single Tree (spaced 10' or more apart, i.e. street trees or linear plantings)
 - a. Initial Credit: The carbon quantification tool for your project contains a worksheet called "Data Collection" for use in tracking each tree. In that file, document the GPS coordinates for each tree planted.
 - b. Years 4, 6, and 26: Geocoded photos or imaging of a minimum sample of 20% of the trees is required at Years 4, 6, and 26. 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.
- 2) Clustered Parks (spaced 10' apart but continuously so to generate canopy over time, i.e. natural areas)

- a. Initial Credit: Projects must document the planting through photos or imaging. Select points and take geo-coded photos that when taken together capture the newly planted trees in the project area. If site is rectilinear, take a photo at each of the corners. If the site is large, take photos at points along the perimeter looking into the project area. If necessary to capture the trees, take photos facing each of the cardinal directions while standing in the middle of the project area. If site is nonrectilinear, identify critical points along property boundaries and take photographs at each point facing in towards the middle of the site. Next, take photographs from the middle of the project area facing out at each cardinal direction.
 - b. At Years 4, 6, and 26: Project provides images of the Project Area from any telemetry, imaging, remote sensing, i-Tree Canopy, or UAV service, such as Google Earth and estimate the area in tree canopy cover (acres). Imaging from Google Earth with leaf-on may be used. Project operators will calculate the percent of canopy cover from the Google Earth imaging. Projects can use i-Tree Canopy and point sampling to calculate canopy cover. Using i-Tree Canopy, continue adding points until the standard error of the estimate for both the tree and non-tree cover is less than 5%. i-Tree Canopy will supply you with the standard errors. If tree canopy cover is determined using another approach, such as image classification, a short description of the approach should be provided, as well as the QA/QC measures that were used. A tree cover classification accuracy assessment should be conducted, as with randomly placed points, and the percentage tree cover classification accuracy reported.
- 3) Canopy (closely planted with spacing less than 10' apart so to generate canopy and forest ecosystem, high tree mortality expected, i.e. riparian areas)
- a. Initial Credit: Projects must document the planting through photos or imaging. Select points and take geo-coded photos that when taken together capture the newly planted trees in the project area. If site is rectilinear, take a photo at each of the corners. If the site is large, take photos at points along the perimeter looking into the project area. If necessary to capture the trees, take photos facing each of the cardinal directions while standing in the middle of the project area. If site is nonrectilinear, identify critical points along property boundaries and take photographs at each point facing in towards the middle of the site. Next, take photographs from the middle of the project area facing out at each cardinal direction.
 - b. At Years 4, 6, and 26: Project provides images of the Project Area from any telemetry, imaging, remote sensing, i-Tree Canopy, or UAV service, such as Google Earth and estimate the area in tree canopy cover (acres). Imaging from Google Earth with leaf-on may be used. Project operators will calculate the percent of canopy cover from the Google Earth imaging. Projects can use i-Tree Canopy and point sampling to calculate canopy cover. Using i-Tree Canopy, continue adding points until the standard error of the estimate for both the tree and non-tree cover is less than 5%. i-Tree Canopy will supply you with the standard errors. If tree canopy cover is determined using another approach, such as image classification, a short description of the approach should be provided, as well as the QA/QC measures that were used. A tree cover classification accuracy assessment should be conducted, as with randomly placed points, and the percentage tree cover classification accuracy reported.

PROJECT OVERVIEW

Basic Project Details

Project Name: Treasure Valley Municipal Parks Planting

Project Number (CFC to provide): 004

Project Type: Planting Project (under the Planting Protocol – version 9, dated February 7, 2021)

Project Start Date: June 9, 2021

Project Location (city, town, or jurisdiction): Boise, ID

Project Operator Name: Treasure Valley Canopy Network

Project Operator Contact Information:

Lance Davisson – 208-994-1135, ldavisson@thekeystoneconcept.com

Project Description

Describe overall project goals, where the project will take place, what method of planting (per Protocol), partners, time period of when the trees have been or will be planted, and any other relevant information. (minimum of 2 paragraphs)

The Treasure Valley Municipal Parks Planting Project is a partnership between the City of Boise and the Treasure Valley Canopy Network (Network). This project will plant approximately 454 trees in 9 municipal parks throughout the Treasure Valley (see vicinity map). Over the course of the next 25 years, these trees will produce over \$535,000 in ecosystem services that will benefit our region's environment and its citizens.

The City of Boise is at the heart of Idaho's Treasure Valley, one of the fastest growing metropolitan areas in the United States. As our region grows, its city is committed to building healthy and vibrant public spaces for all citizens to enjoy. The trees planted in these parks will provide residents of various socioeconomic categories with recreational opportunities resulting in healthier environments and people.

This project is the first pilot in the Treasure Valley City Forest Credits Program, administered by the Treasure Valley Canopy Network. As the Network continues to build collaborative partners and planting projects, we anticipate many more opportunities for financial support of our regional City Forest Credits Program. Ultimately, this program will generate funding to significantly increase tree planting efforts throughout the region and raise awareness about the social, environmental, and economic benefits that these trees are providing to our region.

Trees will be planted as scattered single trees throughout the parks as outlined in each municipal park planting plan and planting list.

The Treasure Valley City Forest Credits Program is supported by the diverse public and private member partners of the Treasure Valley Canopy Network (<http://www.tvcanopy.net/partners/>).

LOCATION AND OWNERSHIP OF PROJECT AREA (Section 1.3 and Section 2)

Project Area Location

Describe where the Project Area is located and how it meets the location criteria.

The plantings are located in the following urban areas:

- Boise, ID (Urban Area Code: 08785 – Boise City, ID)
 - Franklin Park, 310 S Hilton St, Boise, ID 83705
 - Magnolia Park, 7136 N Bogart Ln, Boise, ID 83714
 - Pine Grove Park, 750 S Maple Grove Rd, Boise, ID 83709
 - Hyatt Hidden Lakes, 5301 N Maple Grove Rd, Boise, ID 83704
 - Sterling Park Pond (Mariposa Park), 9851 W Irving St, Boise, ID 83704
 - Harrison Hollow (Hillside Hollow Reserve), 2455 Harrison Hollow Lane, Boise, ID 83702
 - Bernadine Quinn Riverside Park, 3150 W. Pleasanton Ave, Boise, ID 83702
 - Westside Downtown (Cherie Buckner-Webb) Park, 1100 W Bannock St, Boise, ID 83702
 - Bowler Park, 4403 S Surprise Way, Boise, ID 83706

Project Area Ownership and Right to Receive Credits

Describe the property ownership and include relevant documentation including numbered title/filename as an attachment (Ex: 1 - Attestation of Land Ownership, or 1 - Agreement from Owner to Transfer Credits).

Park property ownership, by city:

- Boise, ID
 - Franklin Park – owned by City of Boise
 - Magnolia – owned by City of Boise
 - Pine Grove Park – owned by City of Boise
 - Hyatt Hidden Lakes – owned by City of Boise
 - Mariposa Park (formerly Sterling Park) – owned by City of Boise
 - Harrison Hollow – owned by City of Boise
 - Bernadine Quinn Riverside Park – owned by City of Boise
 - Cherie Buckner-Webb (formerly Westside Downtown) Park – owned by City of Boise
 - Bowler Park – owned by City of Boise

Prior to credit issuance, the property owner and Treasure Valley Canopy Network will sign an agreement outlining the Treasure Valley Canopy Network's right to receive credits from the property owner. Copies will be provided to CFC. – *Refer to attached Agreement to Transfer Credits between TV Canopy Network and City of Boise*

Maps

Provide a detailed map of the Project Area. Also provide a regional-scale map that shows the Project Area within the context of relevant urban/town boundaries. Include numbered title/filename of attachments (Ex: 2 - Regional Scale Map)

1) Map of Project Area

Title/filename of relevant attachment(s):

- 01 Bernadine Quinn Park.pdf
- 02 Bowler Park.pdf
- 03 Cherie Buckner-Webb (Westside Downtown) Park.pdf
- 04 Franklin Park.pdf
- 05 Harrison Hollow Park.pdf
- 06 Hyatt Hidden Lakes Park.pdf
- 07 Magnolia Park.pdf
- 08 Mariposa Park.pdf
- 09 Pine Grove Park.pdf

2) Regional-scale map of Project Area

Title/filename of relevant attachment(s):

- Treasure Valley Municipal Parks Project Maps.pdf

Additional Notes

PROJECT DURATION

Project Operator commits to the 25-year project duration requirement through a signed Project Implementation Agreement with City Forest Credits.

ATTESTATIONS

Complete and attach the following attestations: Attestation of No Double Counting of Credits, Attestation of No Net Harm, Attestation of Planting, and Attestation of Planting Affirmation. Provide any additional notes as relevant.

All completed and signed attestations are attached.

ADDITIONALITY

Legally required trees NOT eligible - Project trees are not required by law or ordinance to be planted. See Attestation of Planting.

PERFORMANCE STANDARD BASELINE

Project trees are additional based on the performance standard baseline attached.

PLANTING DESIGN

Describe detailed planting design, including spacing between trees. Will the trees be planted as scattered individual trees, clustered in groups like in natural areas, or tightly clustered to restore a forest ecosystem?

- *Single Tree - trees are scattered and spaced apart more than 10 feet, as in streets, yards, some parks, and schools, individual trees are tracked and randomly sampled*
- *Clustered Parks - trees are relatively contiguous in park-like settings and change in canopy is tracked*
- *Canopy - trees are planted very close together, often but not required to be in riparian areas, significant mortality is expected, and change in canopy is tracked. The two main goals are to create a forest ecosystem and generate canopy*

Describe your data collection on Project Trees and show it in the quantification section below. For example, Project Operator can use the data collection sheet contained in the CFC quantification tool or your own approved method.

This project will plant 454 trees using the single tree method in nine parks in Boise, ID. All trees in all parks will be irrigated and maintained by city parks staff, including pruning and replacement as needed. The expected survival rate for this project is 90%. This is based on a regional average for trees planted in

new parks. Any tree that dies will be replaced that year over the course of the next 25 years while the project is included in the registry.

All project trees were planted within 2016 - 2021.

CARBON QUANTIFICATION DOCUMENTATION (Section 12 and Appendix B)

Describe which quantification approach you anticipate using, list the project’s climate zone, and outline the estimated total number of credits to be issued to the project as well as the amount to be issued upon successful verification. When requesting credits after planting, attach one of the three quantification tool documents below and provide the data you have collected for Project Trees.

- *Single Tree - trees are scattered and spaced apart more than 10 feet, as in streets, yards, some parks, and schools, individual trees are tracked and randomly sampled*
- *Clustered Parks - trees are relatively contiguous in park-like settings and change in canopy is tracked*
- *Canopy – trees are planted very close together, often but not required to be in riparian areas, significant mortality is expected, and change in canopy is tracked. The two main goals are to create a forest ecosystem and generate canopy*

Total number of trees planted	454
Project area (acres), if applicable	N/A
Total number of trees per acre, if applicable	N/A
Credits attributed to the project (tCO2e)	663.9
Credits after mortality deduction (10%)	597.51
Contribution to Registry Reversal Pool (5%) (tCO2e)	29.88
Total credits to be issued to the Project Operator (tCO2e)	567.7
Total credits requested to be issued in Year 1 (10% of above)	57

The single tree quantification approach was used to calculate the estimated carbon credits to be issued and co-benefit information. Each park has its own tool and copies are included in CFC records. Below is a summary of the number of trees, total credits, and co-benefits for all parks. The total number of credits being requested at this first issuance is: **57**.

Attachment 8 - 02 Temperate Interior West Single Tree Initial Credit Tool_20211202
Attachment 10 - 01 Tree Inventory from City of Boise

Row Labels	Sum of Quantity
American hornbeam	1
Austrian pine	32
black spruce	3
blue spruce	28
bur oak	2
Callery pear	2
common chokecherry	30
crabapple	54
downy serviceberry	3
eastern redbud	1
elm	2
European hornbeam	6
giant sequoia	10
hawthorn	5
honeylocust	54
Japanese pagoda tree	9
Kentucky coffeetree	4
littleleaf linden	35
London planetree	10
maple	21
northern hackberry	3
northern red oak	21
Norway maple	3
Norway spruce	3
pine	5
red maple	2
river birch	13
Scotch pine	13
spruce	1
sugar maple	3
swamp white oak	5
sweetgum	7
tulip tree	24
Vanderwolf Pine	3
white ash	5
white spruce	23
willow	8
Grand Total	454

CARBON CO-BENEFITS QUANTIFICATION DOCUMENTATION (Section 12 and Appendix B)

Summarize co-benefit results based on the project's planting method and provide supporting documentation. CFC can provide co-benefits quantification for Project Operator for rainfall interception, air quality improvements, and energy savings.

- *Single Tree* - trees are scattered and spaced apart more than 10 feet, as in streets, yards, some parks, and schools, individual trees are tracked and randomly sampled
- *Clustered Parks* - trees are relatively contiguous in park-like settings and change in canopy is tracked
- *Canopy* - trees are planted very close together, often but not required to be in riparian areas, significant mortality is expected, and change in canopy is tracked. The two main goals are to create a forest ecosystem and generate canopy

<i>Ecosystem Services</i>	<i>Resource Units</i>	<i>Value</i>
Rainfall Interception (m3/yr)	2,523.31	\$5,199.38
Air Quality (t/yr)	0.0600	\$1,445.61
CO2 Avoided from Energy Savings	2.43	\$48.57
Cooling – Electricity (kWh/yr)	84,571.85	\$9,861.08
Heating – Natural Gas (kBtu/yr)	390,109.87	\$4,854.67
Grand Total (\$/yr)		\$21,409.31

Attachment 9 - 02 Temperate Interior West Single Tree Initial Credit Tool_20211202

MONITORING AND REPORTING PLANS (Appendix A)

Project Operator is required to submit an annual monitoring report by the anniversary of the first approved verification report. For example, if the verification report is dated January 1, 2021, the first monitoring report will be due by January 1, 2022 and each January 1st thereafter for the duration of the project.

Anticipated Reporting Schedule

Monitoring Report – Year 2	2022	Monitoring Report – Year 15	2035
Monitoring Report – Year 3	2023	Monitoring Report – Year 16	2036
Monitoring Report – Year 4*	2024	Monitoring Report – Year 17	2037
Monitoring Report – Year 5	2025	Monitoring Report – Year 18	2038
Monitoring Report – Year 6*	2026	Monitoring Report – Year 19	2039
Monitoring Report – Year 7	2027	Monitoring Report – Year 20	2040
Monitoring Report – Year 8	2028	Monitoring Report – Year 21	2041
Monitoring Report – Year 9	2029	Monitoring Report – Year 22	2042
Monitoring Report – Year 10	2030	Monitoring Report – Year 23	2043
Monitoring Report – Year 11	2031	Monitoring Report – Year 24	2044
Monitoring Report – Year 12	2032	Monitoring Report – Year 25	2045
Monitoring Report – Year 13	2033	Monitoring Report – Year 26*	2046
Monitoring Report – Year 14	2034		

* Denotes a year where additional information is required in order to receive credits

Monitoring Reports

The report must contain any changes in eligibility status of the Project Operator and any significant tree loss. Monitoring report questions are listed below. The following are questions contained in CFC's annual monitoring report template:

1. Has the contact information for the Project Operator changed? If so, provide new information.
2. Have there been changes in land ownership of the Project Area?
3. Have there been any changes in the Project Design?
4. Have there been any changes in the implementation of management of the Project?
5. Have there been any significant changes to the site (such as flooding or human changes)?
6. Have there been any significant tree or canopy losses?
7. Any other significant elements to report?

Confirm and describe your plans for annual monitoring of this project and specifics on how imaging (see Imaging Requirements in the Protocol Requirements section above) will be conducted based on your project's planting method.

Treasure Valley Canopy Network and City of Boise Parks and Recreation Staff will conduct annual on-site monitoring of the condition of the trees, in addition to the monitoring requirements of the CFC protocols. Monitoring will include photos and condition inspections by an ISA Certified Arborist.

ADDITIONAL INFORMATION

Include additional noteworthy aspects of the project. Examples include collaborative partnerships, community engagement, or project funders.

This is a highly collaborative project, led by Treasure Valley Canopy Network and City of Boise Parks and Recreation. To learn more about this project, its history and background, visit <https://www.tvcanopy.net/city-forest-credits>.

PROJECT OPERATOR SIGNATURE

Signed by Lance Davisson, Executive Director for Treasure Valley Canopy Network.

Lance Davisson

Signature

(208) 994-1135

Phone

coordinator@tvcanopy.net

Email

ATTACHMENTS

- 1 - Agreement to Transfer Credits and/or Attestation of Land Ownership
- 2 - Regional Area Map (in PDD)
- 3 - Project Area Map (in PDD)
- 4 - Attestation of No Double Counting of Credits
- 5 - Attestation of No Net Harm
- 6 - Attestation of Planting
- 7 - Attestation of Planting Affirmation
- 8 - Carbon Quantification Initial Credits Tool (02 Temperate Interior West Single Tree Initial Credit Tool_20211202)
- 9 - Co-Benefit Quantification Initial Credits Tool (02 Temperate Interior West Single Tree Initial Credit Tool_20211202)
- 10 - Tree Data (01 Tree Inventory from City of Boise)

PERFORMANCE STANDARD BASELINE METHODOLOGY (Appendix D)

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 this case, the developers of the protocol, to create a performance standard baseline using the data from similar activities over geographic and temporal ranges.

A common perception, particularly in the U.S., 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:

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

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

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:

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

Table 2.2 Changes in Urban Tree Canopy (UTC) by region (Nowak and Greenfield, 2012)

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)
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 (Oregon), 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 Tree 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 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.

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

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.

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

Introduction

Ecoservices provided by trees to human beneficiaries are classified according to their spatial scale as global and local (Costanza 2008) (citations in Part 1 are listed in References at page 16). Removal of carbon dioxide (CO₂) 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 CO₂ 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 CO₂ storage and co-benefits have been documented in numerous publications (see References below) and are summarized here.

Carbon Dioxide Storage

There are three different methods for quantifying carbon dioxide (CO₂) storage in urban forest carbon projects:

- Single Tree Method - planted trees are scattered among many existing trees, as in street, yard, some parks, and school plantings, individual trees are tracked and randomly sampled
- Clustered Parks Planting Method - planted trees are relatively contiguous in park-like settings and change in canopy is tracked
- Canopy Method – trees are planted very close together, often but not required to be in riparian areas, significant mortality is expected, and change in canopy is tracked. The two main goals are to create a forest ecosystem and generate canopy
- Area Reforestation Method – large areas are planted to generate a forest ecosystem, for example converting from agriculture and in upland areas. This quantification method is under development

In all cases, the estimated amount of CO₂ stored 25-years after planting is calculated. The forecasted amount of CO₂ stored during this time is the value from which the Registry issues credits in the amounts of 10%, 40% and 30% at Years 1, 4, and 6 after planting, respectively. A 20% mortality deduction is applied before calculation of Year 1 Credits in the Single Tree and Clustered Parks Planting Methods. A 5% buffer pool deduction is applied in all three methods before calculation of any crediting, with these funds going into a program-wide pool to insure against catastrophic loss of trees. At the end of the project, in year 25, Operators will receive credits for all CO₂ stored, minus credits already issued.

In the Single Tree Method, the amount of CO₂ stored in project trees 25-years after planting is calculated as the product of tree numbers and the 25-year CO₂ index (kg/tree) for each tree-type (e.g., Broadleaf Deciduous Large = BDL). The Registry requires the user to apply a 20% tree mortality deduction before

calculation of Year 1 Credits. Year 4 and Year 6 Credits depend on sampling and mortality data. A 5% buffer pool deduction is applied as well before calculation at any stage.

In the Clustered Parks Planting Method, the amount of CO₂ stored after 25-years by planted project trees is based on the anticipated amount of tree canopy area (TC). Because different tree-types store different amounts of CO₂ based on their size and wood density, TC is weighted based on species mix. The estimated amount of TC area occupied by each tree-type is the product of the total TC and each tree-type's percentage TC. This calculation distributes the TC area among tree-types based on the percentage of trees planted and each tree-type's crown projection area. Subsequent calculations reduce the amount of CO₂ estimated to be stored after 25 years based on the 20% anticipated mortality rate and the 5% buffer pool deduction.

In the Canopy Method, the forecasted amount of CO₂ stored at 25-years is the product of the amount of TC and the CO₂ Index (CI, t CO₂ per acre). This approach recognizes that forest dynamics for riparian projects are different than for park projects. In many cases, native species are planted close together and early competition results in high mortality and rapid canopy closure. Unlike urban park plantings, substantial amounts of carbon can be stored in the riparian understory vegetation and forest floor. To provide an accurate and complete accounting, we use the USDA Forest Service General Technical Report NE-343, with biometric data for 51 forest ecosystems derived from U.S. Forest Inventory and Assessment plots (Smith et al., 2006). The tables provide carbon stored per hectare for each of six carbon pools as a function of stand age. We use values for 25-year old stands that account for carbon in down dead wood and forest floor material, as well as the understory vegetation and soil. If local plot data are provided, values for live wood, dead standing and dead down wood are adjusted following guidance in GTR NE-343. More information on methods used to prepare the tables and make adjustments can be found in Smith et al., 2006. See Attachment A at the end of this Appendix for more information on the Canopy Method.

Source Materials for Single Tree Method and Clustered Parks Planting Methods

Estimates of stored (amount accumulated over many years) and sequestered CO₂ (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 CO₂ 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.

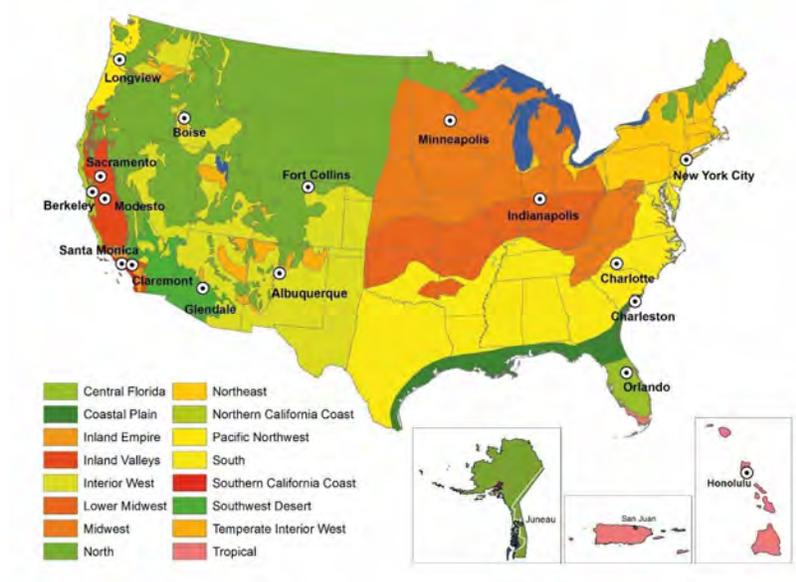


Fig. 1. Climate zones of the United States and Puerto Rico were aggregated from 45 Sunset climate zones into 16 zones. Each zone has a reference city where tree data were collected. Sacramento, California was added as a second reference city (with Modesto) to the Inland Valleys zone. Zones for Alaska, 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/m³) 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	<i>Quercus phellos</i>	600	<i>Quercus macrocarpa</i> ^{1.}
Brdlf Decid Med (30-50 ft)	BDM	<i>Pyrus calleryana</i>	600	UGB ^{2.}
Brdlf Decid Small (<30 ft)	BDS	<i>Cornus florida</i>	545	UGB ^{2.}
Brdlf Evgrn Large (>50 ft)	BEL	<i>Quercus nigra</i>	797	UGB ^{2.}
Brdlf Evgrn Med (30-50 ft)	BEM	<i>Magnolia grandiflora</i>	523	UGB ^{2.}
Brdlf Evgrn Small (<30 ft)	BES	<i>Ilex opaca</i>	580	UGB ^{2.}
Conif Evgrn Large (>50 ft)	CEL	<i>Pinus taeda</i>	389	UGC ^{2.}
Conif Evgrn Med (30-50 ft)	CEM	<i>Juniperus virginiana</i>	393	UGC ^{2.}
Conif Evgrn Small (<30 ft)	CES	<i>Pinus contorta</i>	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 CO₂ 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 CO₂ 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 CO₂ 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 CO₂ storage ranged from -9% to +15%, with inaccuracies as much as 51% RMSE (Timilsina et al., 2014). Hence, a conservative estimate of error of $\pm 20\%$ can be applied to estimates of total CO₂ stored as an indicator of precision.

It should be noted that estimates of CO₂ stored using the Tree Canopy Approach have several limitations that may reduce their accuracy. They rely on allometric relationships for open-growing trees, so storage estimates may not be as accurate when trees are closely spaced. Also, they assume that the distribution of tree canopy cover among tree-types remains constant, when in fact mortality may afflict certain species more than others. For these reasons, periodic “truing-up” of estimates by field sampling is suggested.

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 CO₂ 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 ft² (929 m²), 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: CO₂ Avoided

Energy savings result in reduced emissions of CO₂ and criteria air pollutants (volatile organic hydrocarbons [VOCs], NO₂, SO₂, PM₁₀) from power plants and space-heating equipment. Cooling savings reduce emissions from power plants that produce electricity, the amount depending on the fuel mix. Electricity emissions reductions were based on the fuel mixes and emission factors for each utility in the 16 reference cities/climate zones across the U.S. The dollar values of electrical energy and natural gas were based on retail residential electricity and natural gas prices obtained from each utility. Utility-specific emission factors, fuel prices and other data are available in the Community Tree Guides for each region (https://www.fs.fed.us/psw/topics/urban_forestry/products/tree_guides.shtml). To convert the amount of CO₂ avoided to a dollar amount in the spreadsheet tools, City Forest Credits uses the price of \$20 per metric ton of CO₂.

Error Estimates and Limitations

Estimates of avoided CO₂ emissions have the same uncertainties that are associated with modeling effects of trees on building energy use. Also, utility-specific emission factors are changing as many utilities incorporate renewable fuels sources into their portfolios. Values reported in CFC tools may overestimate actual benefits in areas where emission factors have become lower.

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 foliage 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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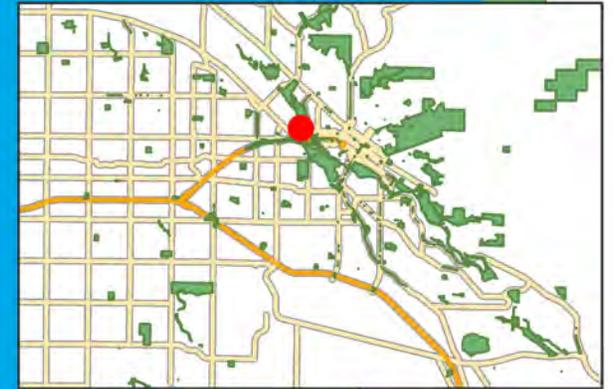
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Bernardine Quinn Riverside Park



-  Parks Tree Plantings
-  BPR Managed Properties
-  Major Water Features

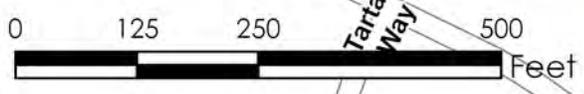
0 75 150 300 Feet



Bowler Park



-  Parks Tree Plantings
-  BPR Managed Properties



Cherie Buckner-Webb Park



W Bannock St

N 11th St

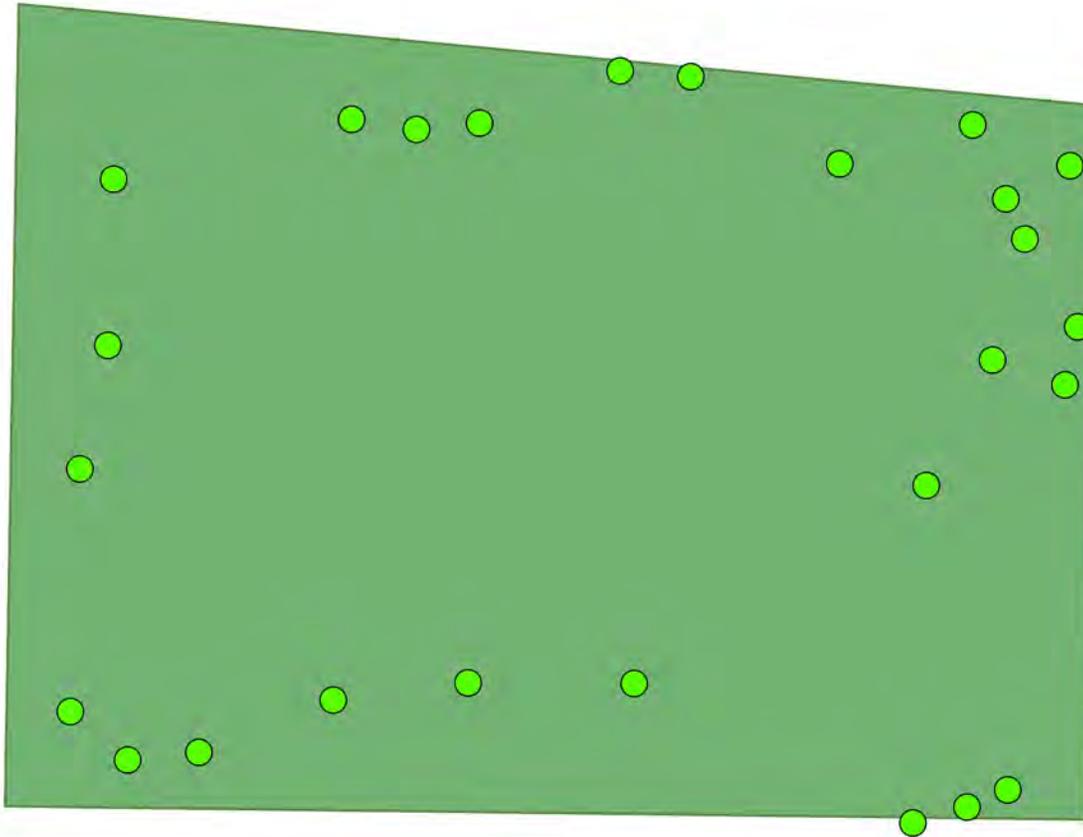
-  Parks Tree Plantings
-  BPR Managed Properties



Franklin Park



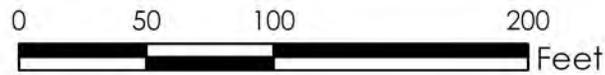
S Hilton St



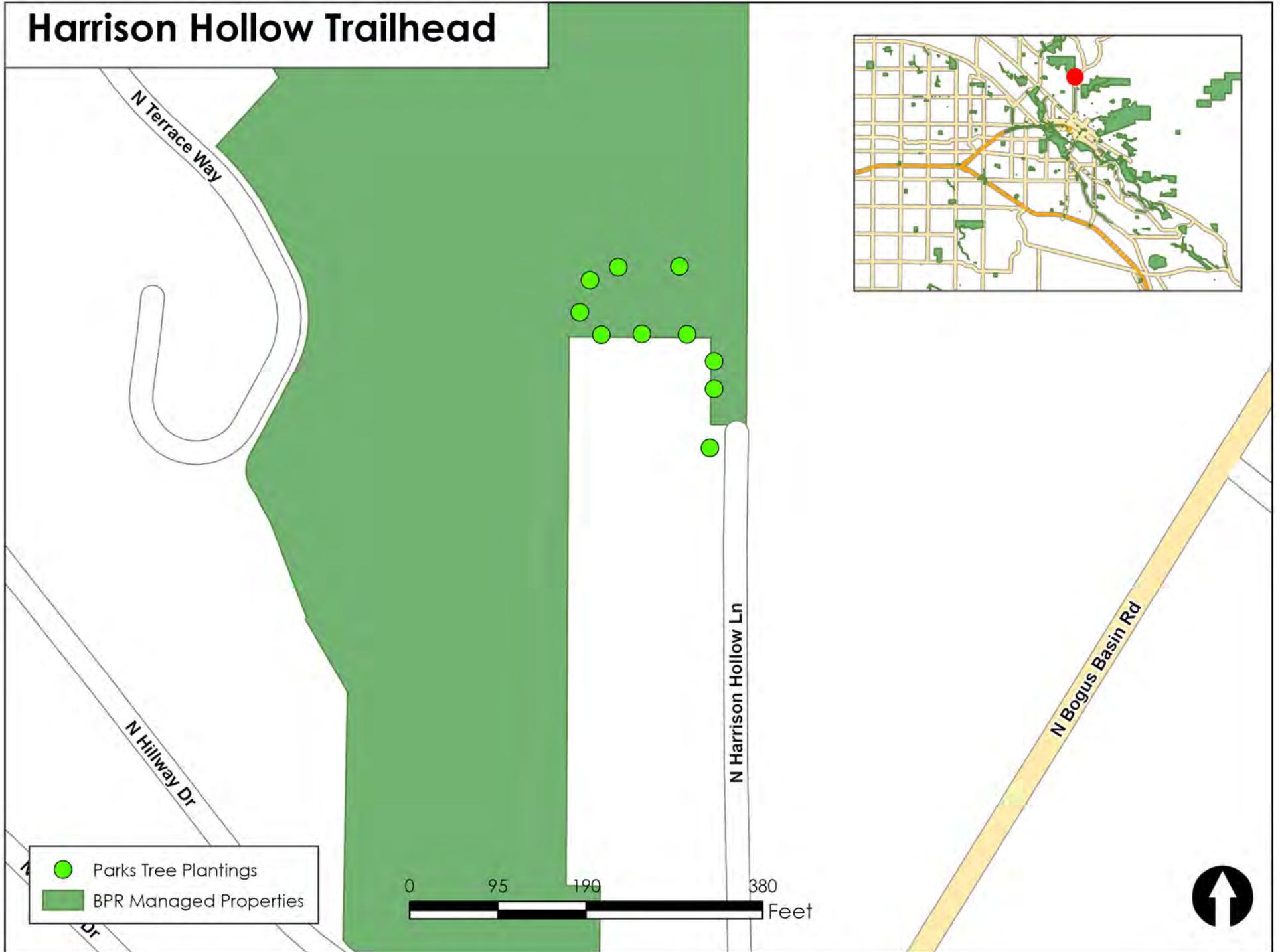
S Orchard St

W Peg St

-  Parks Tree Plantings
-  BPR Managed Properties



Harrison Hollow Trailhead

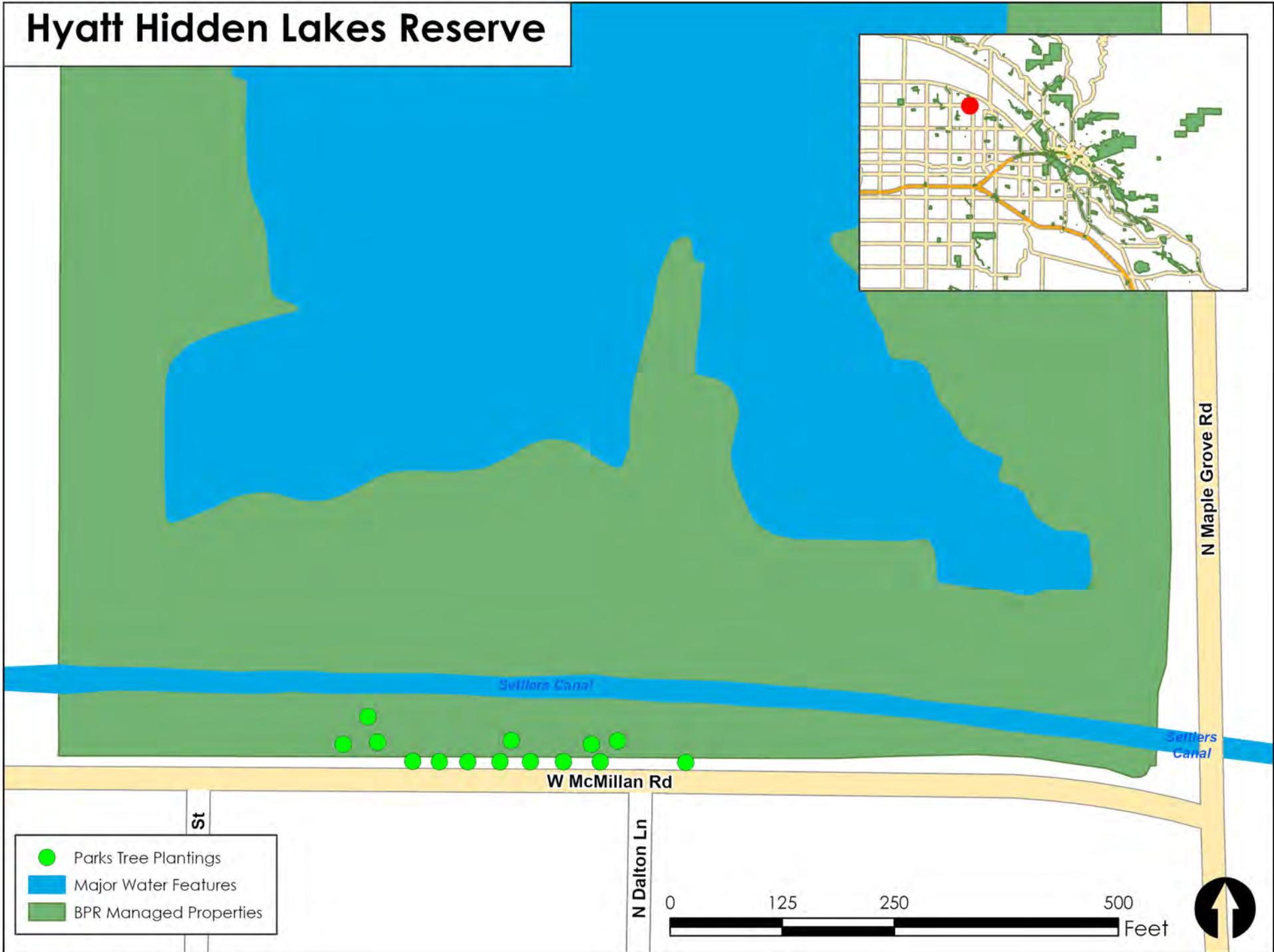


-  Parks Tree Plantings
-  BPR Managed Properties

0 95 190 380 Feet



Hyatt Hidden Lakes Reserve



-  Parks Tree Plantings
-  Major Water Features
-  BPR Managed Properties

St

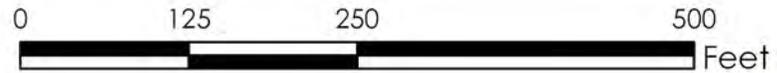
W McMillan Rd

N Dalton Ln

N Maple Grove Rd

Swillers Canal

Swillers Canal



Magnolia Park

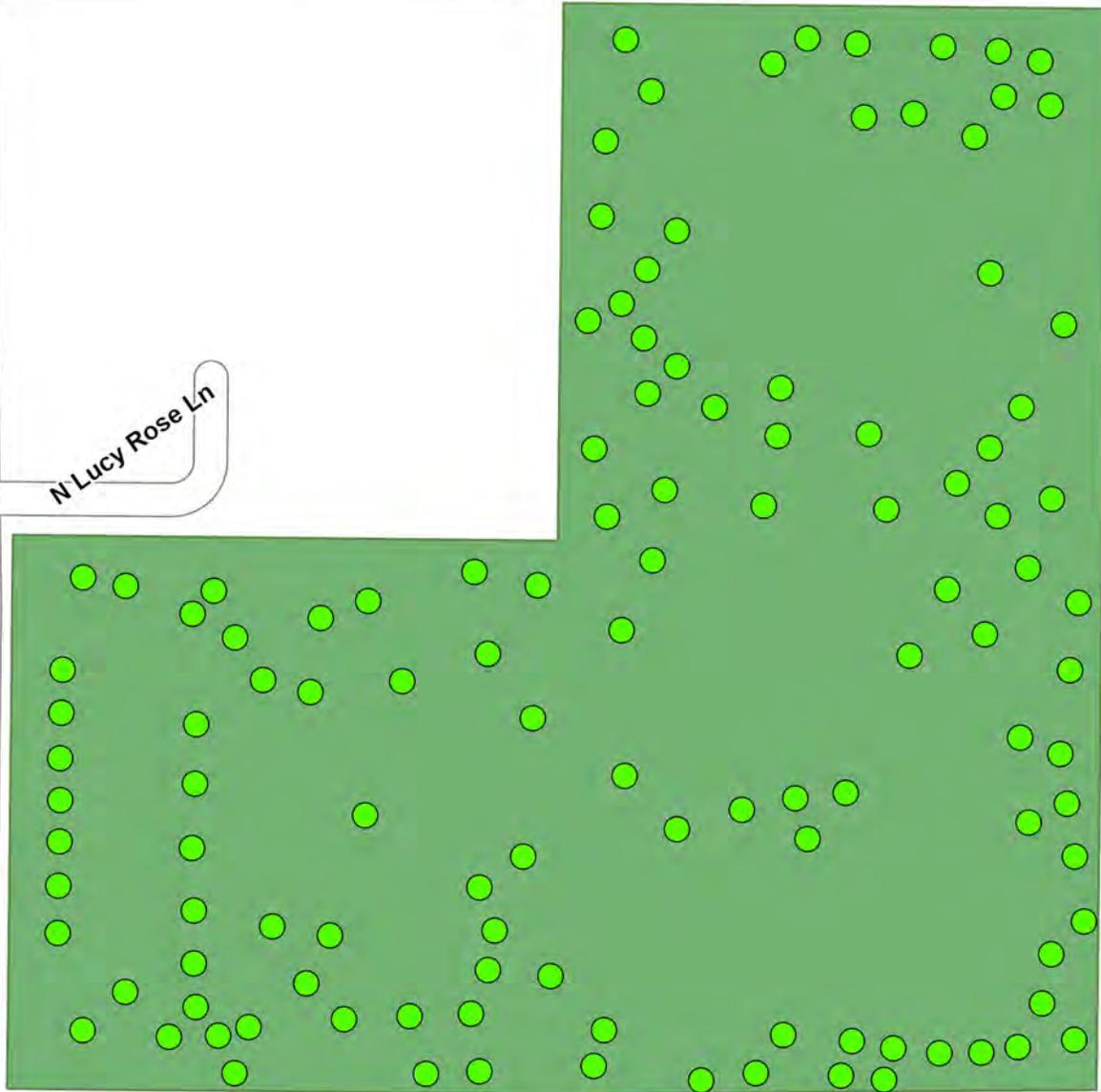


N Sunflow Ave

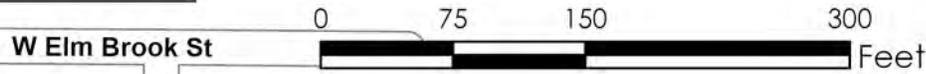
W Sloan St

N Bogart Ln

N Lucy Rose Ln

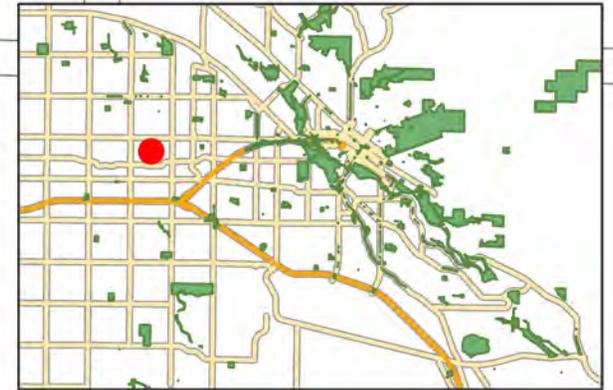
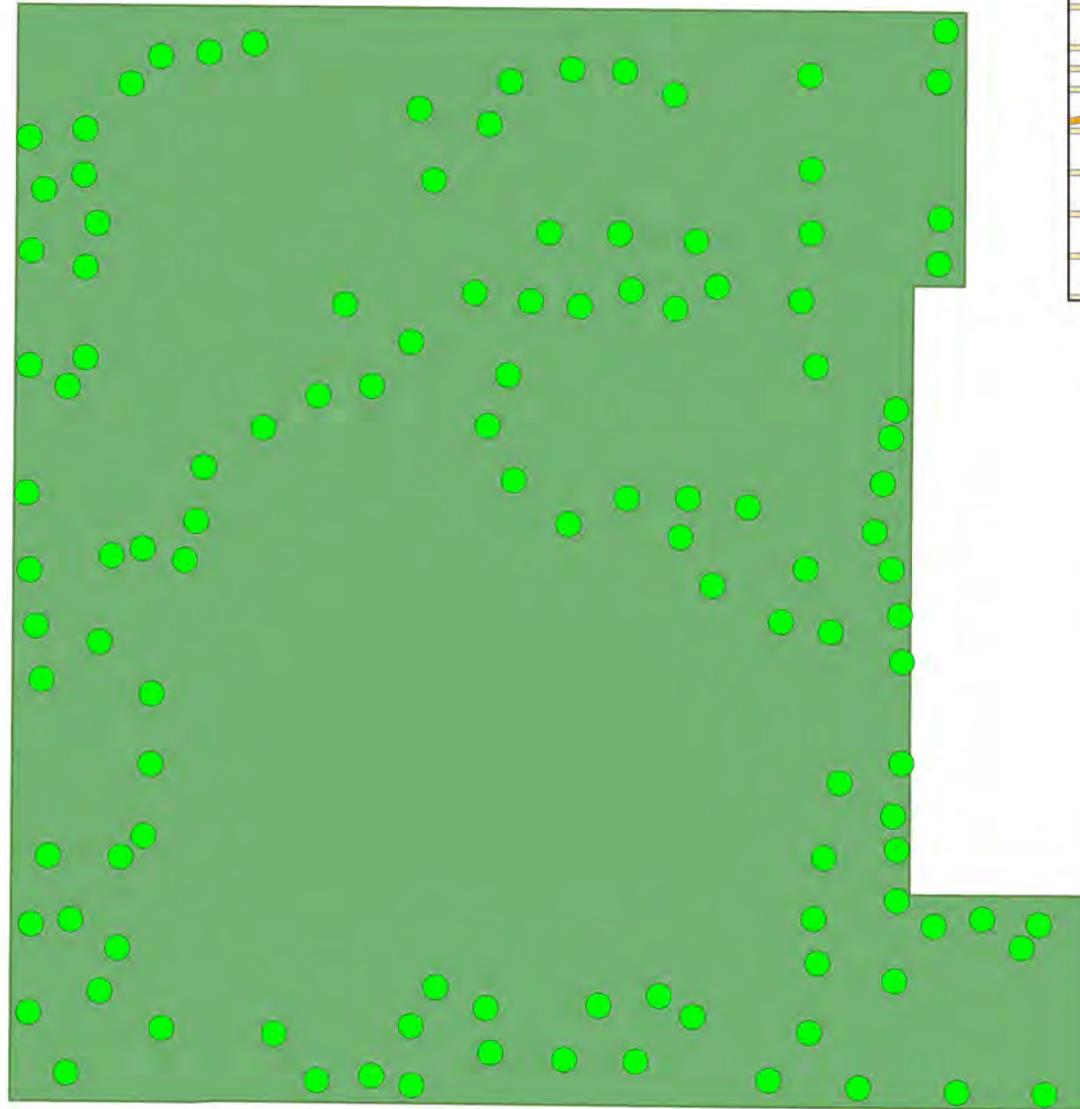


-  Parks Tree Plantings
-  BPR Managed Properties



Mariposa Park

W Irving St

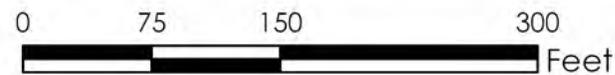


N Mitchell St

W Lincroft Dr

W Preece St

-  Parks Tree Plantings
-  BPR Managed Properties



Pine Grove Park

S Grey Pine Ln

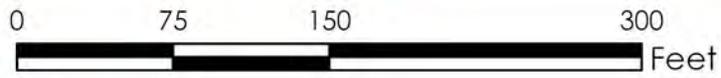
Blue Pine Ln

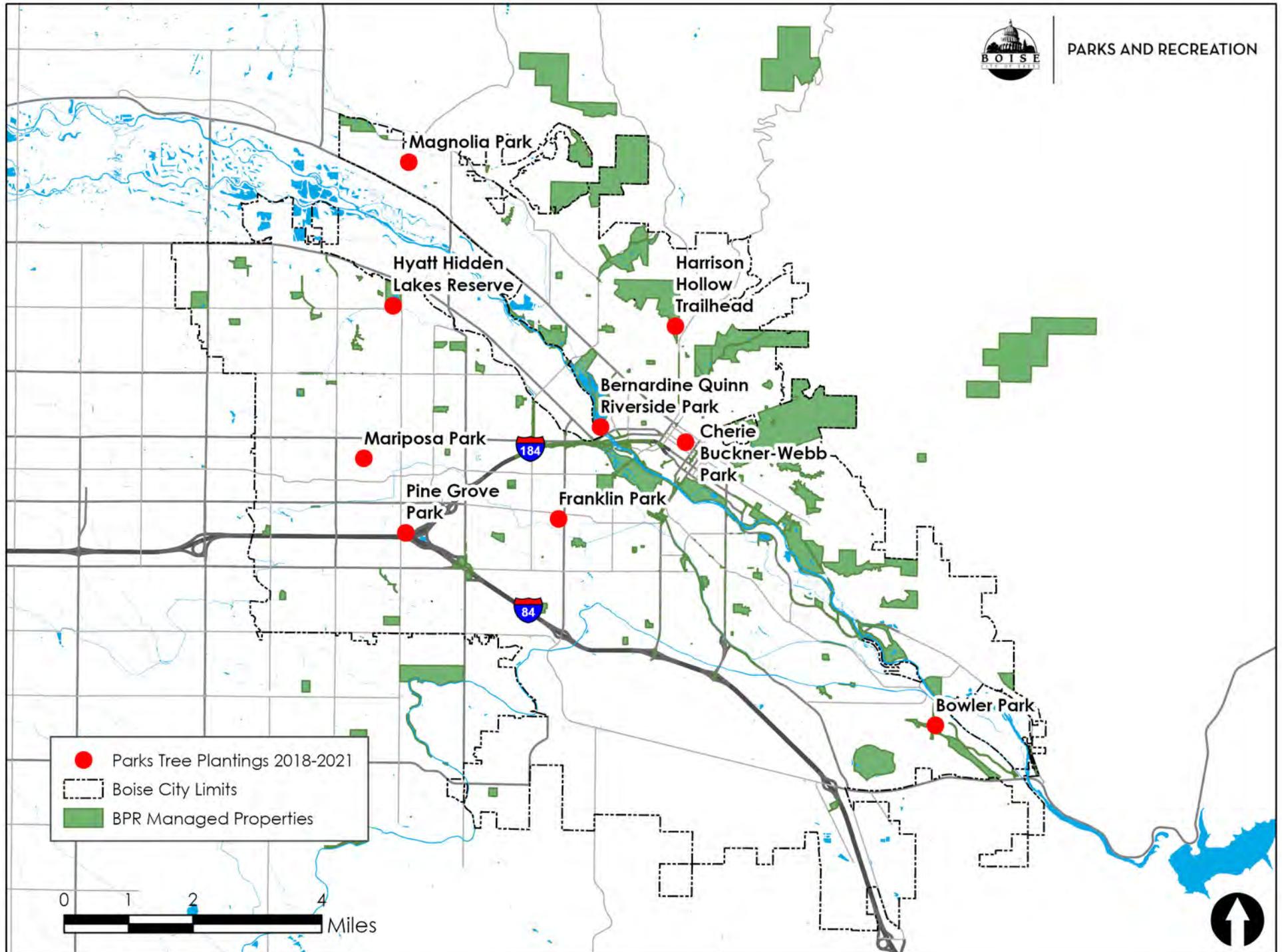
S Pine Tree Ln

W Shoup Dr

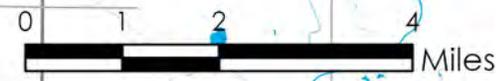


-  Parks Tree Plantings
-  Major Water Features
-  BPR Managed Properties

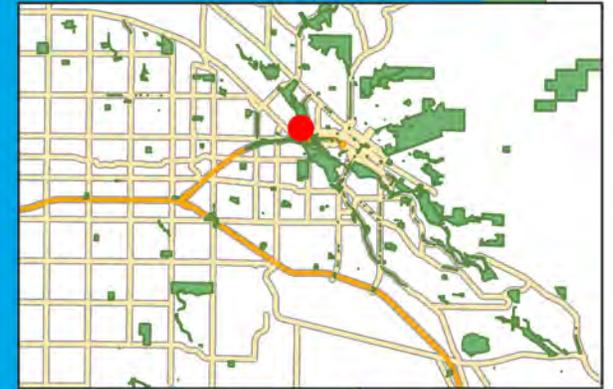




- Parks Tree Plantings 2018-2021
- Boise City Limits
- BPR Managed Properties



Bernardine Quinn Riverside Park



-  Parks Tree Plantings
-  BPR Managed Properties
-  Major Water Features

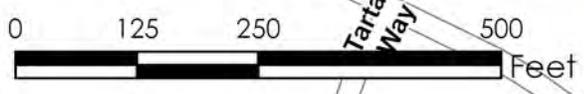
0 75 150 300 Feet



Bowler Park



-  Parks Tree Plantings
-  BPR Managed Properties



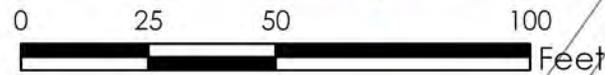
Cherie Buckner-Webb Park



W Bannock St

N 11th St

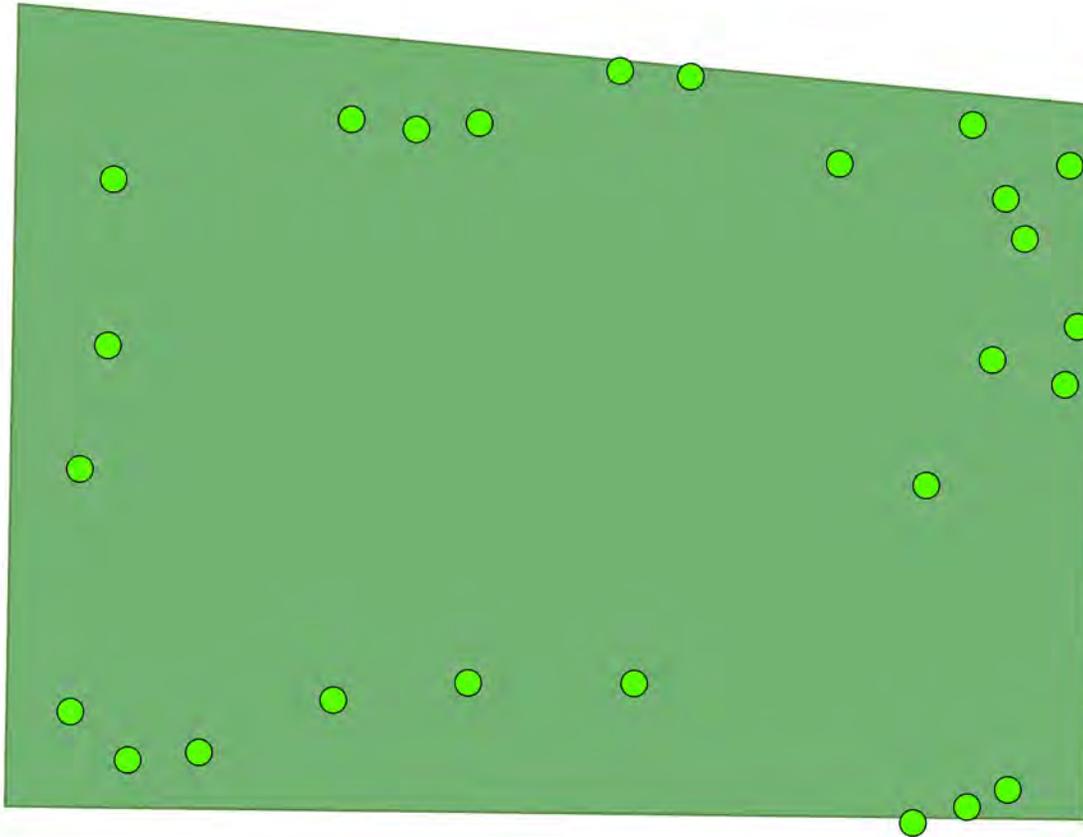
-  Parks Tree Plantings
-  BPR Managed Properties



Franklin Park



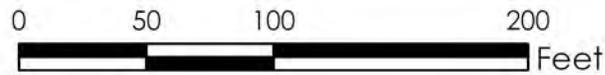
S Hilton St



S Orchard St

W Peg St

-  Parks Tree Plantings
-  BPR Managed Properties



Harrison Hollow Trailhead



-  Parks Tree Plantings
-  BPR Managed Properties

0 95 190 380 Feet



Hyatt Hidden Lakes Reserve



Magnolia Park

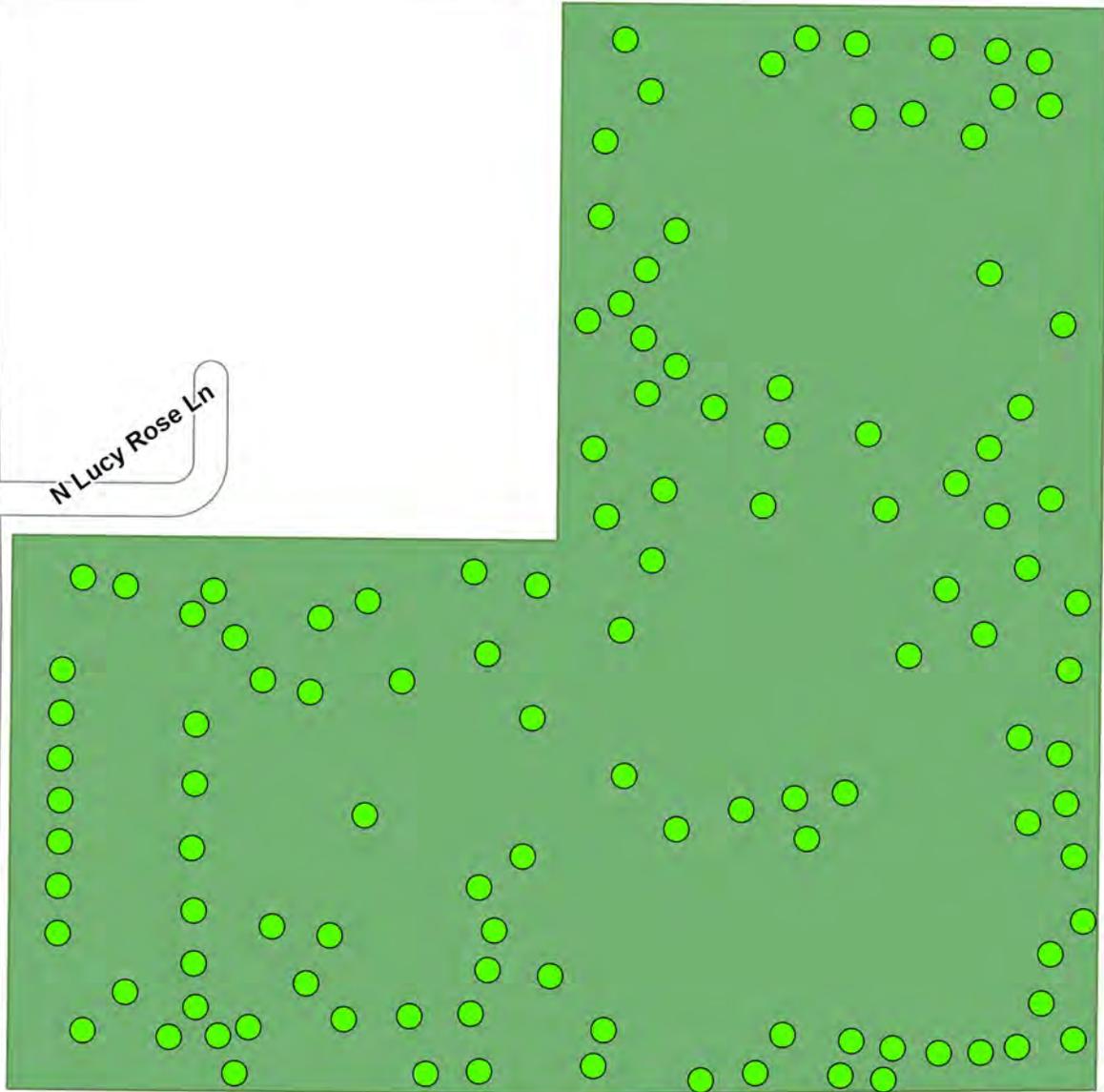


N Sunflow Ave

W Sloan St

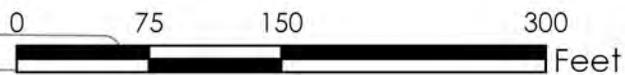
N Bogart Ln

N Lucy Rose Ln



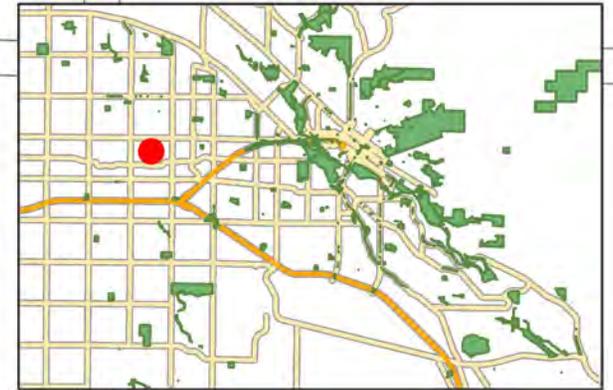
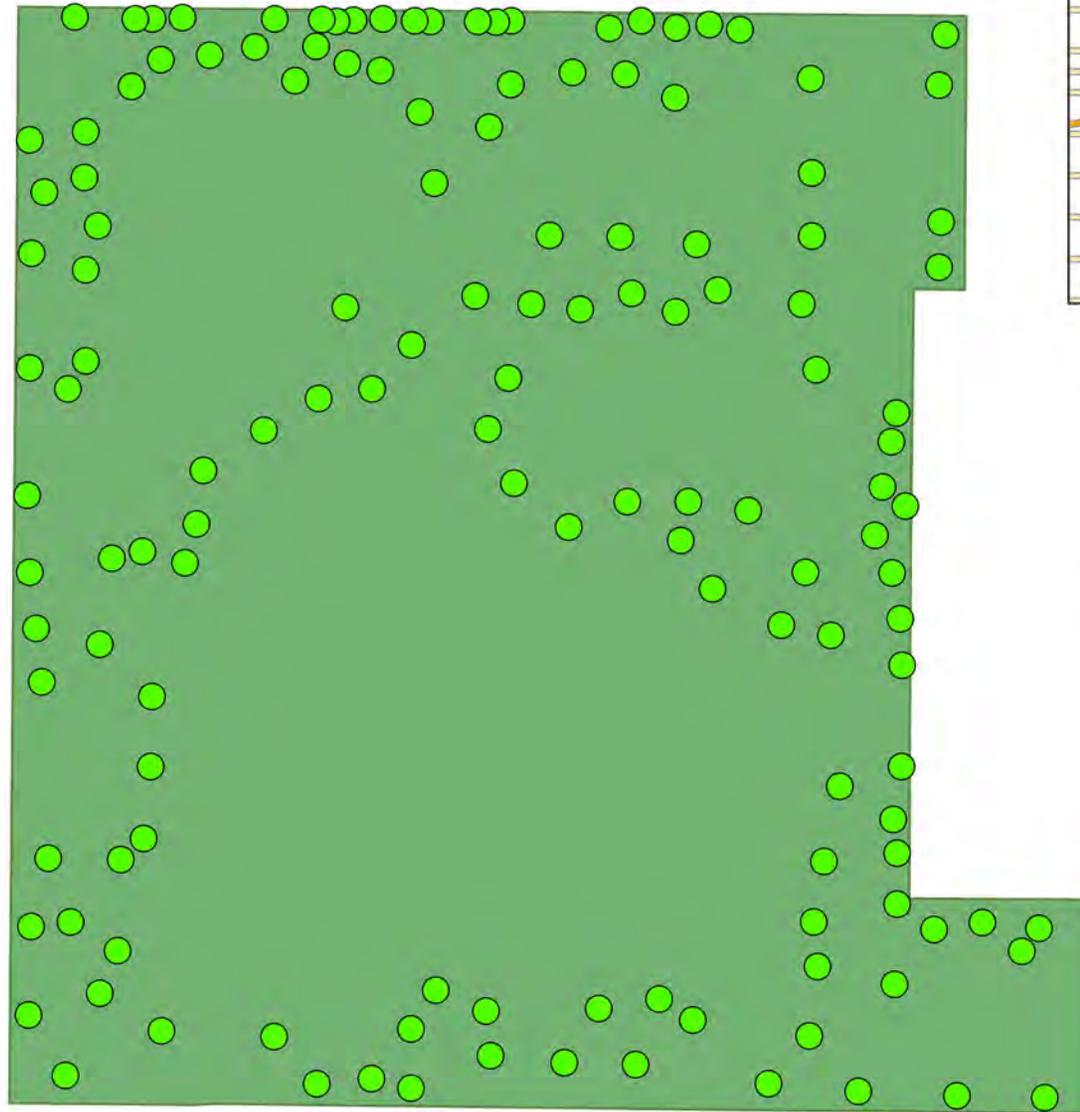
-  Parks Tree Plantings
-  BPR Managed Properties

W Elm Brook St



Mariposa Park

W Irving St

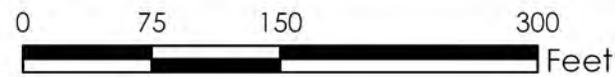


N Mitchell St

W Lincroft Dr

W Preece St

● Parks Tree Plantings
■ BPR Managed Properties



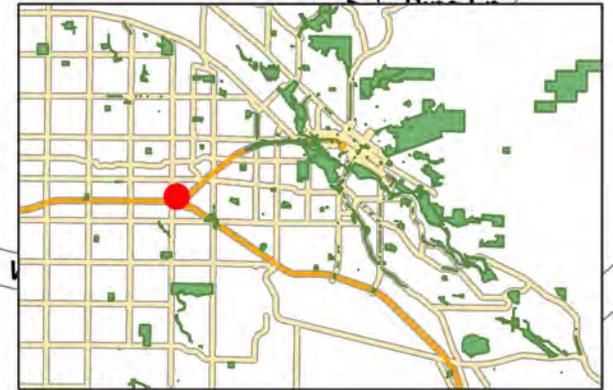
Pine Grove Park

Blue Pine Ln

S Pine Tree Ln

W Shoup Dr

S Grey



84

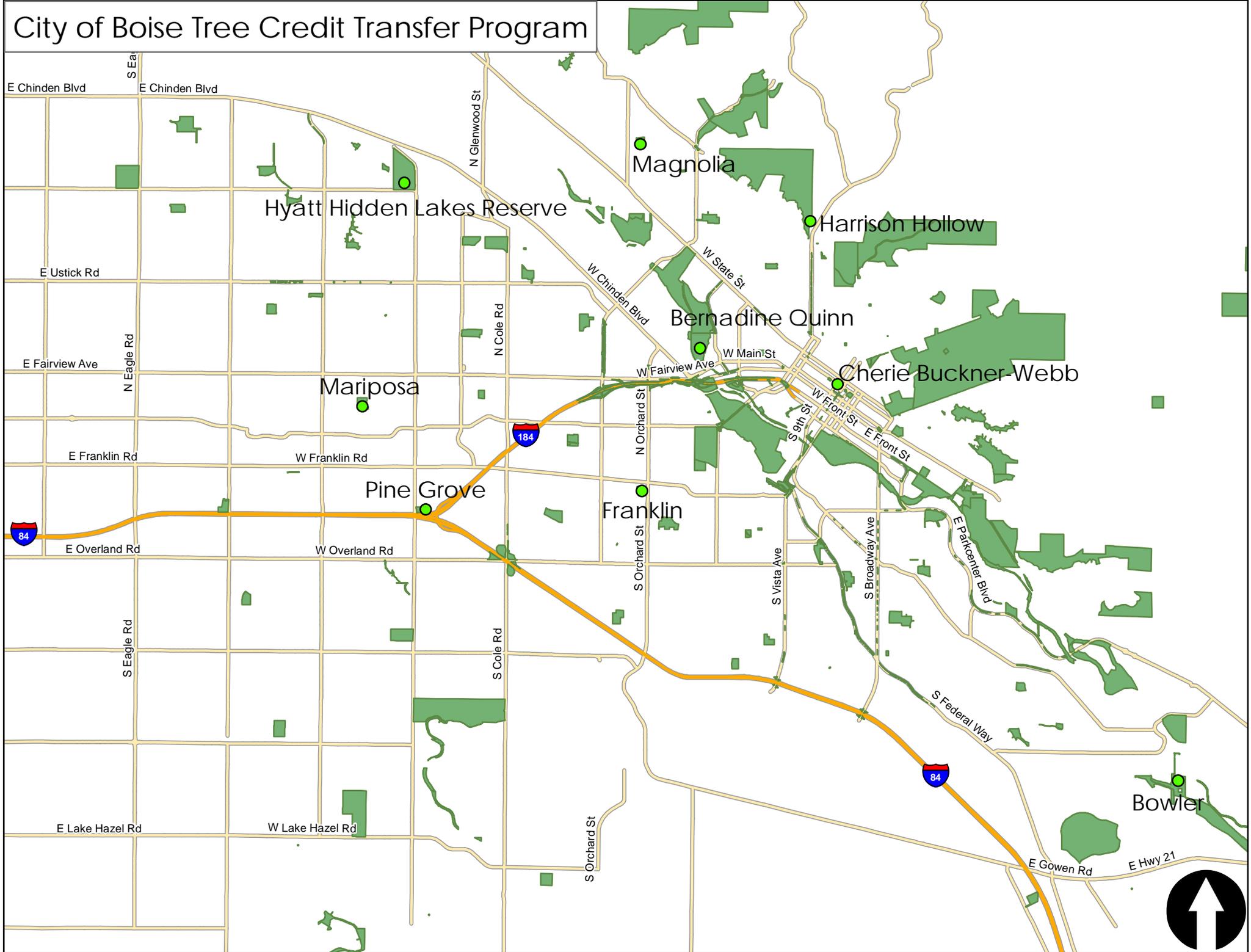
184

84

-  Parks Tree Plantings
-  BPR Managed Properties



City of Boise Tree Credit Transfer Program



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The Single Tree Initial Credit Tool for the Temperate Interior West Climate Zone

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The analyst can use this method to forecast the amount of CO₂ (in metric tonnes, t) estimated to be stored by live project trees after 25 years for crediting. Credits based on the estimated CO₂ storage can be issued at three points in time – 10% within one year after planting, 40% after year 3, and 30% after year 5, minus 5% that will go into a program-wide pool to insure against catastrophic loss of trees. At the end of the project, in year 25, Operators will receive credits for all CO₂ stored, minus Credits already issued.

Project Operators will follow the Steps listed below to obtain an initial forecast. Basic tree planting data on all trees planted needs to be collected at the time of planting. When a user wishes to seek Credits at one of the first points in time after planting, they will use this tool to calculate credit amounts and to supply verification data to the Registry. Users will submit this spreadsheet to the Registry with other documentation so the Registry can verify the planting. Sampled data will be used to obtain Credits at subsequent points in time.

Steps

- 1) Plant project trees and collect the following data on each planted tree using the data collection table included in this workbook: species, site id#, tree id# and location (latitude and longitude). We use the term “site” instead of “tree” because some planted trees may no longer be present in the sites where they were planted.
- 2) Compile data on the numbers of trees planted by species to fill in the Planting List (Table 1).
- 3) Enter data on the anticipated mortality rate (% of planted sites without trees in 25 years) into row 6 on the Credits sheet.
- 4) Credits will be automatically calculated in Table 6, incorporating tree losses and the 5% buffer pool deduction.
- 5) Table 4 automatically infers the amount of CO₂ stored after 25 years from the sample to the population of live trees.
- 6) For planning purposes only, users can enter a low and high price of CO₂ (\$ per t) in Table 5. Table 6 incorporates error estimates of ±15% to calculate low and high amounts of CO₂ stored.
- 7) Table 7 automatically provides estimates of co-benefits for live trees after 25 years in Resource Units (e.g., kWh) per year and \$ per year.

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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
<i>Tilia americana</i>	American basswood	BDL	
<i>Tilia americana</i>	American basswood	BDL	
<i>Castanea dentata</i>	American chestnut	BDL	
<i>Ulmus americana</i>	American elm	BDL	
<i>Ulmus americana</i>	American elm	BDL	
<i>Ilex opaca</i>	American holly	BES	
<i>Carpinus caroliniana</i>	American hornbeam	BDM	1
<i>Sorbus americana</i>	American mountain ash	BDS	
<i>Cotinus obovatus</i>	American smoketree	BDS	
<i>Platanus occidentalis</i>	American sycamore	BDL	
<i>Phellodendron amurense</i>	Amur corktree	BDM	
<i>Maackia amurensis</i>	Amur maackia	BDM	
<i>Acer ginnala</i>	Amur maple	BDS	
<i>Prunus armeniaca</i>	apricot	BDS	
<i>Fraxinus species</i>	ash	BDL	
<i>Cedrus atlantica</i>	Atlas cedar	CEL	
<i>Pinus nigra</i>	Austrian pine	CEL	32
<i>Taxodium distichum</i>	bald cypress	BDL	
<i>Taxodium distichum</i>	bald cypress	BDL	
<i>Populus balsamifera</i>	balsam poplar	BDL	
<i>Rosa banksiae</i>	banksian rose; Lady Bank's rose	BDS	
<i>Tilia species</i>	basswood	BDL	
<i>Fagus species</i>	beech	BDL	
<i>Populus grandidentata</i>	bigtooth aspen	BDL	
<i>Acer grandidentatum</i>	bigtooth maple	BDM	
<i>Betula species</i>	birch	BDM	
<i>Fraxinus nigra</i>	black ash	BDL	
<i>Populus trichocarpa</i>	black cottonwood	BDL	
<i>Robinia pseudoacacia</i>	black locust	BDL	
<i>Robinia pseudoacacia</i>	black locust	BDL	
<i>Acer nigrum</i>	black maple	BDL	
<i>Quercus velutina</i>	black oak	BDL	
<i>Quercus velutina</i>	black oak	BDL	
<i>Populus nigra</i>	black poplar	BDL	
<i>Picea mariana</i>	black spruce	CEL	3
<i>Juglans nigra</i>	black walnut	BDL	
<i>Salix nigra</i>	black willow	BDM	
<i>Salix nigra</i>	black willow	BDM	
<i>Viburnum prunifolium</i>	blackhaw	BDS	
<i>Quercus marilandica</i>	blackjack oak	BDM	
<i>Prunus bireiana</i>	Blerana plum	BDS	
<i>Fraxinus quadrangulata</i>	blue ash	BDL	
<i>Picea pungens</i>	blue spruce	CEL	28
<i>Acer negundo</i>	boxelder	BDL	
<i>Broadleaf Deciduous Large Other</i>	broadleaf deciduous large	BDL	
<i>Broadleaf Deciduous Medium Other</i>	broadleaf deciduous medium	BDM	
<i>Broadleaf Deciduous Small Other</i>	broadleaf deciduous small	BDS	
<i>Rhamnus species</i>	buckthorn	BDS	
<i>Quercus macrocarpa</i>	bur oak	BDL	2
<i>Quercus macrocarpa</i>	bur oak	BDL	
<i>Sabal palmetto</i>	cabbage palmetto	PEM	
<i>Quercus kelloggii</i>	California black oak	BDL	
<i>Washingtonia filifera</i>	California palm	PES	
<i>Pyrus calleryana</i>	Callery pear	BDM	2
<i>Populus x canadensis</i>	Carolina poplar	BDL	
<i>Gleditsia caspica</i>	Caspian locust	BDM	
<i>Fraxinus oxycarpa</i>	Caucasian ash	BDM	
<i>Cedrus species</i>	cedar	CEL	
<i>Vitex agnus-castus</i>	chaste tree	BDS	
<i>Prunus cerasifera</i>	cherry plum	BDS	
<i>Ulmus parvifolia</i>	Chinese elm	BDL	
<i>Ulmus parvifolia</i>	Chinese elm	BDL	
<i>Picea asperata</i>	Chinese spruce	CEL	
<i>Quercus muehlenbergii</i>	chinkapin oak	BDL	
<i>Quercus muehlenbergii</i>	chinkapin oak	BDL	
<i>Prunus virginiana</i>	common chokecherry	BDS	30
<i>Ptelea trifoliata</i>	common hoptree	BDS	
<i>Pyrus communis</i>	common pear	BDM	
<i>Diospyros virginiana</i>	common persimmon	BDM	
<i>Conifer Evergreen Large Other</i>	conifer evergreen large other	CEL	
<i>Conifer Evergreen Medium Other</i>	conifer evergreen medium other	CEM	
<i>Conifer Evergreen Small Other</i>	conifer evergreen small other	CES	
<i>Salix matsudana</i>	corkscrew willow	BDS	
<i>Salix matsudana</i>	corkscrew willow	BDS	
<i>Populus species</i>	cottonwood	BDL	
<i>Pinus coulteri</i>	Coulter pine	CEL	
<i>Malus species</i>	crabapple	BDS	54
<i>Magnolia acuminata</i>	cucumber tree	BDL	
<i>Cupressus species</i>	cypress	CEL	
<i>Cedrus deodara</i>	deodar cedar	CEL	
<i>Cornus species</i>	dogwood	BDS	
<i>Pseudotsuga menziesii</i>	Douglas fir	CEL	
<i>Amelanchier arborea</i>	downy serviceberry	BDM	3
<i>Populus deltoides</i>	eastern cottonwood	BDL	
<i>Tsuga canadensis</i>	eastern hemlock	CEL	
<i>Tsuga canadensis</i>	eastern hemlock	CEL	
<i>Juniperus virginiana</i>	eastern red cedar	CEM	
<i>Cercis canadensis</i>	eastern redbud	BDS	1
<i>Pinus strobus</i>	eastern white pine	CEL	
<i>Ulmus species</i>	elm	BDL	2
<i>Ulmus species</i>	elm	BDL	
<i>Picea engelmannii</i>	Engelmann spruce	CEL	
<i>Ulmus procera</i>	English elm	BDL	
<i>Quercus robur</i>	English oak	BDL	

Table 2. Summary of Planting Sites

Tree-Type	Tree-Type Abbreviation	No. Sites Planted
Brdlf Decid Large (>50 ft)	BDL	184
Brdlf Decid Med (30-50 ft)	BDM	59
Brdlf Decid Small (<30 ft)	BDS	90
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	105
Conif Evgrn Med (30-50 ft)	CEM	16
Conif Evgrn Small (<30 ft)	CES	0
Total Sites Planted		454

For black hills-densata spruce

For common chokecherry and common-canada red chokecherry

For crabapple, tschonokii crabapple, and crabapple-spring snow

For serviceberry

For elm-prospector

<i>Quercus robur</i>	English oak	BDL	
<i>Juglans regia</i>	English walnut	BDL	
<i>Alnus glutinosa</i>	European alder	BDL	
<i>Fraxinus excelsior</i>	European ash	BDL	
<i>Fagus sylvatica</i>	European beech	BDL	
<i>Carpinus betulus</i>	European hornbeam	BDM	6
<i>Larix decidua</i>	European larch	BDL	
<i>Sorbus aucuparia</i>	European mountain ash	BDM	
<i>Sorbus aucuparia</i>	European mountain ash	BDM	
<i>Betula pendula</i>	European white birch	BDM	
<i>Abies species</i>	fir	CEL	
<i>Torreya taxifolia</i>	Florida torreya	CES	
<i>Fraxinus ornus</i>	flowering ash	BDM	
<i>Cornus florida</i>	flowering dogwood	BDS	
<i>Prunus triloba</i>	flowering plum	BDS	
<i>Sequoiadendron giganteum</i>	giant sequoia	CEL	10
<i>Ginkgo biloba</i>	ginkgo	BDL	
<i>Laburnum x watereri</i>	golden chain tree	BDS	
<i>Koelreuteria paniculata</i>	goldenrain tree	BDM	
<i>Fraxinus pennsylvanica</i>	green ash	BDL	
<i>Crataegus viridis</i>	green hawthorn	BDM	
<i>Eucommia ulmoides</i>	hardy rubber tree	BDL	
<i>Crataegus species</i>	hawthorn	BDS	5
<i>Corylus species</i>	hazelnut	BDS	
<i>Acer campestre</i>	hedge maple	BDM	
<i>Carya species</i>	hickory	BDL	
<i>Pinus wallichiana</i>	Himalayan pine	CEM	
<i>Gleditsia triacanthos</i>	honeylocust	BDL	54
<i>Aesculus hippocastanum</i>	horsechestnut	BDL	
<i>Alnus cordata</i>	Italian alder	BDM	
<i>Abies homolepis</i>	Japanese fir	CEL	
<i>Sophora japonica</i>	Japanese pagoda tree	BDM	9
<i>Sophora japonica</i>	Japanese pagoda tree	BDM	
<i>Styrax japonicus</i>	Japanese snowbell	BDS	
<i>Syringa reticulata</i>	Japanese tree lilac	BDM	
<i>Syringa reticulata</i>	Japanese tree lilac	BDS	
<i>Zelkova serrata</i>	Japanese zelkova	BDL	
<i>Juniperus species</i>	juniper	CEM	
<i>Cercidiphyllum japonicum</i>	katsura tree	BDM	
<i>Gymnocladus dioica</i>	Kentucky coffeetree	BDL	4
<i>Pinus attenuata</i>	knobcone pine	CEL	
<i>Quercus glandulifera</i>	Konara oak	BDM	
<i>Pyrus fauriei</i>	Korean sun pear	BDS	
<i>Prunus serrulata</i>	Kwanzan cherry	BDS	
<i>Quercus laurifolia</i>	laurel oak	BDL	
<i>x Cupressocyparis leylandii</i>	Leyland cypress	CEL	
<i>Syringa species</i>	lilac	BDS	
<i>Pterostyrax corymbosa</i>	little Epaulette tree	BDS	
<i>Tilia cordata</i>	littleleaf linden	BDM	35
<i>Tilia cordata</i>	littleleaf linden	BDM	
<i>Quercus virginiana</i>	live oak	BDL	
<i>Quercus virginiana</i>	live oak	BEL	
<i>Platanus acerifolia</i>	London planetree	BDL	10
<i>Magnolia species</i>	magnolia	BDM	
<i>Fraxinus mandchurica</i>	Manchurian ash	BDL	
<i>Abies holophylla</i>	Manchurian fir	CEL	
<i>Acer species</i>	maple	BDL	21
<i>Washingtonia robusta</i>	Mexican fan palm	PEM	
<i>Albizia julibrissin</i>	mimosa	BDM	
<i>Catalpa speciosa</i>	northern catalpa	BDL	
<i>Celtis occidentalis</i>	northern hackberry	BDL	3
<i>Quercus rubra</i>	northern red oak	BDL	
<i>Quercus rubra</i>	northern red oak	BDL	21
<i>Thuja occidentalis</i>	northern white cedar	CEL	
<i>Thuja occidentalis</i>	northern white cedar	CEL	
<i>Acer platanoides</i>	Norway maple	BDM	3
<i>Picea abies</i>	Norway spruce	CEL	3
<i>Quercus species</i>	oak	BDL	
<i>Aesculus glabra</i>	Ohio buckeye	BDL	
<i>Crataegus monogyna</i>	oneseed hawthorn	BDS	
<i>Picea orientalis</i>	Oriental spruce	CEL	
<i>Quercus aliena</i>	Oriental white oak	BDL	
<i>Other species</i>	other species	BDM	
<i>Betula papyrifera</i>	paper birch	BDL	
<i>Acer griseum</i>	paperbark maple	BDS	
<i>Malus pumila</i>	paradise apple	BDM	
<i>Prunus persica</i>	peach	BDS	
<i>Quercus palustris</i>	pin oak	BDL	
<i>Quercus palustris</i>	pin oak	BDL	
<i>Pinus species</i>	pine	CEL	5
<i>Pinus edulis</i>	pinyon pine	CES	
<i>Prunus species</i>	plum	BDS	
<i>Pinus serotina</i>	pond pine	CEL	
<i>Pinus ponderosa</i>	ponderosa pine	CEL	
<i>Quercus stellata</i>	post oak	BDL	
<i>Malus ioensis</i>	prairie crabapple	BDS	
<i>Acer truncatum</i>	purpleblow maple	BDS	
<i>Populus tremuloides</i>	quaking aspen	BDL	
<i>Acer rubrum</i>	red maple	BDL	2
<i>Morus rubra</i>	red mulberry	BDL	
<i>Betula nigra</i>	river birch	BDL	13
<i>Juniperus scopulorum</i>	Rocky Mountain juniper	CEM	
<i>Salix gracilistyla</i>	rosegold pussy willow	BDS	
<i>Elaeagnus angustifolia</i>	Russian olive	BDS	
<i>Prunus sargentii</i>	Sargent cherry	BDM	
<i>Sassafras albidum</i>	sassafras	BDL	
<i>Serenoa repens</i>	saw palmetto	PES	
<i>Quercus acutissima</i>	sawtooth oak	BDM	
<i>Quercus coccinea</i>	scarlet oak	BDL	
<i>Pinus sylvestris</i>	Scotch pine	CEM	13
<i>Picea omorika</i>	Serbian spruce	CEM	
<i>Quercus shumardii</i>	Shumard oak	BDL	
<i>Ulmus pumila</i>	Siberian elm	BDL	
<i>Ulmus pumila</i>	Siberian elm	BDL	
<i>Abies alba</i>	silver fir	CEL	

For dawn redwood

For crusader-cruzam hawthorn and suksdorf's hawthorn

For honeylocust and shademaster honeylocust

For american linden, american-redmond linden, littleleaf linden, and littleleaf-greenspire linden

For london planetree and london-bloodgood planetree

For maple, crimson sunset maple, and pacific sunset maple

For hackberry

For Norway-crimson king maple and norwegian sunset maple

For bosnian pine and limber pine

For heritage river-cully birch clump

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Directions

Using the information you provide and background data, the tool calculates the amount of Credits that could be issued at years 1 (10%), 3 (40%), and 5 (30%) after planting. A mortality deductions (% loss) is applied to account for anticipated tree losses (Cell D6). A 5% buffer pool 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 (Initial Crediting). A different tool is used for credit issuance in Years 4 and 6. The tool in those years requires calculation of a sample and collection of data on tree status in the sample sites.

Mortality Deduction (%): 10%

Table 3. Credits are based on 10%, 40%, and 30% at Years 1, 3, and 5 after planting, respectively, of the projected CO₂ stored by live trees 25-years after planting. These values account for anticipated tree losses and the 5% buffer pool deduction.

						10%	40%	30%	20%
	No. Sites Planted	No. Live Trees	Mortality Deduction (%)	25-yr CO ₂ stored (kg/tree)	Tot. 25-yr CO ₂ stored w/ losses and 5% deduction (t)	10% CO ₂ (t)	40% CO ₂ (t)	30% CO ₂ (t)	20% CO ₂ (t)
BDL	184	166	0.10	2,587.18	407.0	40.70	162.81	122.10	81.40
BDM	59	53	0.10	1,224.19	61.8	6.18	24.70	18.53	12.35
BDS	90	81	0.10	658.91	50.7	5.07	20.28	15.21	10.14
BEL	0	0	0.10	0.00	0.0	0.00	0.00	0.00	0.00
BEM	0	0	0.10	0.00	0.0	0.00	0.00	0.00	0.00
BES	0	0	0.10	0.00	0.0	0.00	0.00	0.00	0.00
CEL	105	95	0.10	472.49	42.4	4.24	16.97	12.73	8.48
CEM	16	14	0.10	421.75	5.8	0.58	2.31	1.73	1.15
CES	0	0	0.10	0.00	0.0	0.00	0.00	0.00	0.00
	454	409	0.10		567.7	56.77	227.06	170.30	113.53

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In Table 4 the tool infers the amount of CO₂ 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% buffer pool deduction.

Table 4. Grand Total CO₂ Stored after 25 years (all live trees, includes tree losses and buffer pool deduction)

Tree-Type	No. Sites Planted	Mortality Deduction (%)	Total Live Trees After Mortality	25-yr CO ₂ stored (kg/tree)	CO ₂ Tot. - No Deductions (t)	Grand Total CO ₂ w/ Deductions (t)
Brdlf Decid Large (>50 ft)	184	0.10	166	2,587.18	476.0	407.0
Brdlf Decid Med (30-50 ft)	59	0.10	53	1,224.19	72.2	61.8
Brdlf Decid Small (<30 ft)	90	0.10	81	658.91	59.3	50.7
Brdlf Evgrn Large (>50 ft)	0	0.10	0	0.00	0.0	0.0
Brdlf Evgrn Med (30-50 ft)	0	0.10	0	0.00	0.0	0.0
Brdlf Evgrn Small (<30 ft)	0	0.10	0	0.00	0.0	0.0
Conif Evgrn Large (>50 ft)	105	0.10	95	472.49	49.6	42.4
Conif Evgrn Med (30-50 ft)	16	0.10	14	421.75	6.7	5.8
Conif Evgrn Small (<30 ft)	0	0.10	0	0.00	0.0	0.0
	454		409		663.9	567.7

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Directions

In Table 5, enter the low and high price of CO₂ in \$ per tonne (t).

This table incorporates error estimates of ±15% to the high and low estimates of the total CO₂ (t) stored by the live tree population after 25 years. For planning purposes only, it calculates dollar values.

Table 5. CO₂ value

	CO ₂ \$ per tonne
Low	\$19.00
High	\$34.00

Table 6. Summary of CO₂ stored after 25 years (all live trees, includes tree losses)

Tree-Type	Total CO ₂ (t) at 25 years	Low \$ value	High \$ value
Brdlf Decid	519.5	\$9,870.00	\$17,662.10
Brdlf Evgrn	0.0	\$0.00	\$0.00
Conif Evgrn	48.2	\$915.56	\$1,638.37
Total	567.7	\$10,785.55	\$19,300.47
	CO₂ (t)	Total \$	Total \$
Grand Total CO₂ (t) at 25 years:	567.7	\$10,785.55	\$19,300.47
High Est. with Error:	652.8	\$12,403.39	\$22,195.54
Low Est. with Error:	482.5	\$9,167.72	\$9,167.72
± 15% error = ± 10% formulaic ± 3% sampling ± 2% measurement			

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Using the information you provide and background data, the tool provides estimates of co-benefits after 25 years in Resource Units per year and \$ per year.

Table 7. Co-Benefits PER YEAR after 25 years (all live trees, includes tree losses)

Ecosystem Services	Resource Units Totals	Resource Unit/site	Total \$	\$/site
Rainfall Interception (m3/yr)	2,523.31	5.56	\$5,199.38	\$11.452
CO ₂ Avoided (t, \$20/t/yr)	2.43	0.01	\$48.57	\$0.107
Air Quality (t/yr)				
O ₃	0.1172	0.0003	\$1,293.28	\$2.849
NO _x	0.0126	0.0000	\$353.95	\$0.780
PM ₁₀	0.0500	0.0001	\$1,037.52	\$2.285
Net VOCs	-0.1198	-0.0003	-\$1,239.13	-\$2.729
Air Quality Total	0.0600	0.0001	\$1,445.61	\$3.18
Energy (kWh/yr & kBtu/yr)				
Cooling - Electricity	84,571.85	186.28	\$9,861.08	\$21.72
Heating - Natural Gas	390,109.87	859.27	\$4,854.67	\$10.69
Energy Total (\$/yr)			\$14,715.75	\$32.41
Grand Total (\$/yr)			\$21,409.31	\$47.16

\$535,232.87

OBJECTID	Department ID	Installation Date	Status	Park Number	Street	Tree Cell	Tree Condition	Tree Diameter	Tree District	Tree Site Ty	Comment	Count	Common Name	Genus	Species	Pruning Code	Last Verified	Verified By	Pruned_Verify Date	Latitude	Longitude
359	MARR-TR-P-83025	2016-10-15	Active		Marlousa Park	Good	3	3	Park		ma - added to planting list	1	Ash White	FRAXINUS	AMERICANA		2021-05-24 17:26	Cranning		43.61510831	-116.3049476
178	MAGN-TR-P-82272	2016-10-15	Active		MAGNOLIA	Good	2	2	Park			1	White-Autumn Purple	FRAXINUS	AMERICANA		2021-03-17 15:01	Cranning		43.61291478	-116.2920688
230	MAGN-TR-P-82236	2016-10-15	Active		MAGNOLIA	Good	4	4	Park			2	Ash White-Autumn Purple	FRAXINUS	AMERICANA		2021-03-17 15:01	Cranning		43.62024483	-116.2920688
244	MAGN-TR-P-82260	2016-10-15	Active		MAGNOLIA	Good	3	2	Park			2	Ash White-Autumn Purple	FRAXINUS	AMERICANA		2021-03-17 15:01	Cranning		43.62027197	-116.2920738
265	MAGN-TR-P-82216	2016-10-15	Active		MAGNOLIA	Good	3	2	Park			2	Ash White-Autumn Purple	FRAXINUS	AMERICANA		2021-03-17 15:01	Cranning		43.61945658	-116.2920688
144	BEQU-TR-P-82146	2020-07-01	Active		Bernardine Quinn Riverside Park	Good	4	4			10 I dump	1	Birch Clump, Heritage River-Cully	BETULA	NIGRA		2021-11-05	srisrokh		43.62257971	-116.2329662
145	BEQU-TR-P-82147	2020-07-01	Active		Bernardine Quinn Riverside Park	Good	4	4			10 I dump	1	Birch Clump, Heritage River-Cully	BETULA	NIGRA		2021-11-05	srisrokh		43.62260194	-116.2331139
146	BEQU-TR-P-82148	2020-07-01	Active		Bernardine Quinn Riverside Park	Good	4	4			10 I dump	1	Birch Clump, Heritage River-Cully	BETULA	NIGRA		2021-11-05	srisrokh		43.62262572	-116.2332852
147	BEQU-TR-P-82149	2020-07-01	Active		Bernardine Quinn Riverside Park	Good	4	4			10 I dump	1	Birch Clump, Heritage River-Cully	BETULA	NIGRA		2021-11-05	srisrokh		43.62264949	-116.2333583
148	BEQU-TR-P-82150	2020-07-01	Active		Bernardine Quinn Riverside Park	Good	4	4			10 I dump	1	Birch Clump, Heritage River-Cully	BETULA	NIGRA		2021-11-05	srisrokh		43.62267169	-116.2334777
200	MAGN-TR-P-82281	2016-10-15	Active		MAGNOLIA	Good	3	2	Unknown			1	Birch Clump, Heritage River-Cully	BETULA	NIGRA		2021-03-12 19:34	Cranning		43.61024028	-116.2921289
204	MAGN-TR-P-82298	2016-10-15	Active		MAGNOLIA	Good	3	2	Unknown			1	Birch Clump, Heritage River-Cully	BETULA	NIGRA		2021-03-12 19:34	Cranning		43.61024028	-116.2921289
207	MAGN-TR-P-82301	2016-10-15	Active		MAGNOLIA	Good	2	2	Unknown			1	Birch Clump, Heritage River-Cully	BETULA	NIGRA		2021-03-12 19:34	Cranning		43.61024028	-116.2921289
419	MARR-TR-P-83116	2018-10-16	Active		Marlousa Park	Good	2	3			ma - added to planting list	1	Birch Clump, Heritage River-Cully	BETULA	NIGRA		2021-05-28 18:40	Cranning		43.61402626	-116.3067116
420	MARR-TR-P-83117	2018-10-16	Active		Marlousa Park	Good	2	3			ma - added to planting list	1	Birch Clump, Heritage River-Cully	BETULA	NIGRA		2021-05-28 18:40	Cranning		43.61402626	-116.3067116
421	MARR-TR-P-83118	2018-10-16	Active		Marlousa Park	Good	2	3			ma - added to planting list	1	Birch Clump, Heritage River-Cully	BETULA	NIGRA		2021-05-28 18:40	Cranning		43.61402626	-116.3067116
442	MARR-TR-P-83138	2018-10-16	Active		Marlousa Park	Good	2	3			ma - added to planting list	1	Birch Clump, Heritage River-Cully	BETULA	NIGRA		2021-05-28 18:40	Cranning		43.61402626	-116.3067116
441	MARR-TR-P-83139	2018-10-16	Active		Marlousa Park	Good	2	3			ma - added to planting list	1	Birch Clump, Heritage River-Cully	BETULA	NIGRA		2021-05-28 18:40	Cranning		43.61402626	-116.3067116
19	FRAN-TR-P-80137	2018-06-18	Active		FRANKLIN PARK	Good	2	6				1	Birch Clump, Heritage River-Cully	BETULA	NIGRA		2021-05-28 19:12	Cranning		43.61544399	-116.3064681
20	FRAN-TR-P-80138	2018-06-18	Active		FRANKLIN PARK	Good	2	6				1	Birch Clump, Heritage River-Cully	BETULA	NIGRA		2021-05-28 19:12	Cranning		43.61544399	-116.3064681
22	FRAN-TR-P-80139	2018-06-18	Active		FRANKLIN PARK	Good	2	6				1	Birch Clump, Heritage River-Cully	BETULA	NIGRA		2021-05-28 19:12	Cranning		43.61544399	-116.3064681
23	FRAN-TR-P-80140	2018-06-18	Active		FRANKLIN PARK	Good	2	6				1	Birch Clump, Heritage River-Cully	BETULA	NIGRA		2021-05-28 19:12	Cranning		43.61544399	-116.3064681
30	FRAN-TR-P-80147	2018-06-18	Active		FRANKLIN PARK	Good	2	6				1	Birch Clump, Heritage River-Cully	BETULA	NIGRA		2021-05-28 19:12	Cranning		43.61544399	-116.3064681
32	FRAN-TR-P-80149	2018-06-18	Active		FRANKLIN PARK	Good	2	6				1	Birch Clump, Heritage River-Cully	BETULA	NIGRA		2021-05-28 19:12	Cranning		43.61544399	-116.3064681
517	BOWL-TR-P-83020	2021-06-09	Active		Bowler Park	Good	2	7	Park			1	Crabapple	TRICHODIA	TCHONSKII		2021-10-13 16:58	Cranning		43.61073999	-116.2449322
516	BOWL-TR-P-83019	2021-06-09	Active		Bowler Park	Good	2	7	Park			1	Crabapple	TRICHODIA	TCHONSKII		2021-10-13 16:58	Cranning		43.61073999	-116.2449322
515	BOWL-TR-P-83018	2021-06-09	Active		Bowler Park	Good	2	7	Park			1	Crabapple	TRICHODIA	TCHONSKII		2021-10-13 16:58	Cranning		43.61073999	-116.2449322
518	BOWL-TR-P-83021	2021-06-09	Active		Bowler Park	Good	2	7	Park			1	Crabapple	TRICHODIA	TCHONSKII		2021-10-13 16:58	Cranning		43.61073999	-116.2449322
220	MAGN-TR-P-82296	2016-10-15	Active		MAGNOLIA	Good	2	2	Unknown			1	Crabapple	TRICHODIA	TCHONSKII		2021-03-12 19:34	Cranning		43.61027797	-116.2921777
203	MAGN-TR-P-82304	2016-10-15	Active		MAGNOLIA	Good	2	2	Unknown			1	Crabapple	TRICHODIA	TCHONSKII		2021-03-12 19:34	Cranning		43.61027797	-116.2921777
222	MAGN-TR-P-82316	2016-10-15	Active		MAGNOLIA	Good	2	2	Unknown			1	Crabapple	TRICHODIA	TCHONSKII		2021-03-12 19:34	Cranning		43.61027797	-116.2921777
221	MAGN-TR-P-82317	2016-10-15	Active		MAGNOLIA	Good	2	2	Unknown			1	Crabapple	TRICHODIA	TCHONSKII		2021-03-12 19:34	Cranning		43.61027797	-116.2921777
222	MAGN-TR-P-82321	2016-10-15	Active		MAGNOLIA	Good	2	2	Unknown			1	Crabapple	TRICHODIA	TCHONSKII		2021-03-12 19:34	Cranning		43.61027797	-116.2921777
224	MAGN-TR-P-82330	2016-10-15	Active		MAGNOLIA	Good	2	2	Unknown			1	Crabapple	TRICHODIA	TCHONSKII		2021-03-12 19:34	Cranning		43.61027797	-116.2921777
235	MAGN-TR-P-82331	2016-10-15	Active		MAGNOLIA	Good	2	2	Unknown			1	Crabapple	TRICHODIA	TCHONSKII		2021-03-12 19:34	Cranning		43.61027797	-116.2921777
236	MAGN-TR-P-82332	2016-10-15	Active		MAGNOLIA	Good	2	2	Unknown			1	Crabapple	TRICHODIA	TCHONSKII		2021-03-12 19:34	Cranning		43.61027797	-116.2921777
391	MARR-TR-P-83057	2018-10-16	Active		Marlousa Park	Good	3	3			ma - added to planting list	1	Crabapple	TRICHODIA	TCHONSKII		2021-05-28 17:34	Cranning		43.61557759	-116.3058422
427	MARR-TR-P-83116	2018-10-16	Active		Marlousa Park	Fair	1	3			ma - added to planting list	1	Crabapple	TRICHODIA	TCHONSKII		2021-05-28 17:34	Cranning		43.61557759	-116.3058422
428	MARR-TR-P-83125	2018-10-16	Active		Marlousa Park	Fair	1	3			ma - added to planting list	1	Crabapple	TRICHODIA	TCHONSKII		2021-05-28 17:34	Cranning		43.61557759	-116.3058422
436	MARR-TR-P-83133	2018-10-16	Active		Marlousa Park	Good	1	3			ma - added to planting list	1	Crabapple	TRICHODIA	TCHONSKII		2021-05-28 17:34	Cranning		43.61557759	-116.3058422
440	MARR-TR-P-83137	2018-10-16	Active		Marlousa Park	Good	1	3			ma - added to planting list	1	Crabapple	TRICHODIA	TCHONSKII		2021-05-28 17:34	Cranning		43.61557759	-116.3058422
78	PIGR-TR-P-82078	2017-11-29	Active		PINE GROVE PARK	Good	1	3	Unknown			1	Crabapple	TRICHODIA	TCHONSKII		2020-10-29 19:03	Cranning		43.59840637	-116.2955858
79	PIGR-TR-P-82079	2017-11-29	Active		PINE GROVE PARK	Good	1	3	Unknown			1	Crabapple	TRICHODIA	TCHONSKII		2020-10-29 19:03	Cranning		43.59838739	-116.295931
80	PIGR-TR-P-82080	2017-11-29	Active		PINE GROVE PARK	Good	1	3	Unknown			1	Crabapple	TRICHODIA	TCHONSKII		2020-10-29 19:03	Cranning		43.59829789	-116.295931
92	PIGR-TR-P-82092	2017-11-29	Active		PINE GROVE PARK	Good	1	3	Unknown			1	Crabapple	TRICHODIA	TCHONSKII		2020-10-29 19:03	Cranning		43.59777558	-116.2934422
93	PIGR-TR-P-82093	2017-11-29	Active		PINE GROVE PARK	Good	2	3	Unknown			1	Crabapple	TRICHODIA	TCHONSKII		2020-10-29 19:03	Cranning		43.59770725	-116.2932037
94	PIGR-TR-P-82094	2017-11-29	Active		PINE GROVE PARK	Good	2	3	Unknown			1	Crabapple	TRICHODIA	TCHONSKII		2020-10-29 19:03	Cranning		43.59761918	-116.2931918
97	PIGR-TR-P-82097	2017-11-29	Active		PINE GROVE PARK	Good	2	3	Unknown			1	Crabapple	TRICHODIA	TCHONSKII		2020-10-29 19:03	Cranning		43.59728233	-116.2929561
102	MAGN-TR-P-82246	2016-10-15	Active		MAGNOLIA	Good	2	2	Strip			1	Crabapple	MALUS	SPECIES		2021-03-12 19:34	Cranning		43.61073999	-116.2928815
103	MAGN-TR-P-82247	2016-10-15	Active		MAGNOLIA	Good	2	2	Strip			1	Crabapple	MALUS	SPECIES		2021-03-12 19:34	Cranning		43.61073999	-116.2928815
154	MAGN-TR-P-82248	2016-10-15	Active		MAGNOLIA	Fair	2	2	Strip			1	Crabapple	MALUS	SPECIES		2021-03-12 19:34	Cranning		43.61073999	-116.2928815
155	MAGN-TR-P-82249	2016-10-15	Active		MAGNOLIA	Fair	2	2	Strip			1	Crabapple	MALUS	SPECIES		2021-03-12 19:34	Cranning		43.61073999	-116.2928815
156	MAGN-TR-P-82250	2016-10-15	Active		MAGNOLIA	Good	2	2	Strip			1	Crabapple	MALUS	SPECIES		2021-03-12 19:34	Cranning		43.61073999	-116.2928815
157	MAGN-TR-P-82251	2016-10-15	Active		MAGNOLIA	Good	2	2	Strip			1	Crabapple	MALUS	SPECIES		2021-03-12 19:34	Cranning		43.61073999	-116.2928815
158	MAGN-TR-P-82252	2016-10-15	Active		MAGNOLIA	Good	2	2	Strip			1	Crabapple	MALUS	SPECIES		2021-03-12 19:34	Cranning		43.61073999	-116.2928815
225																					

45	Franklin Park	FRAN-TR-P-80161	2018-06-18	Active	FRANKLIN PARK	Good	3	6	1	Pear, Calirey or Flowering	PYRUS	CALLEERYANA	2018-10-03	ripe/kins	43.60124644	-116.2454642
161	Magnolia Park	MAGN-TR-P-82255	2016-10-15	Active	MAGNOLIA	Good	5	2		Pinus, Austrian	PNUS	NIGRA	2021-03-12 19:34	Cbranning	43.68180637	-116.2936367
162	Magnolia Park	MAGN-TR-P-82256	2016-10-15	Active	MAGNOLIA	Good	4	2		Pinus, Austrian	PNUS	NIGRA	2021-03-12 19:34	Cbranning	43.68180634	-116.2936368
183	Magnolia Park	MAGN-TR-P-82277	2016-10-15	Active	MAGNOLIA	Good	5	2		Pinus, Austrian	PNUS	NIGRA	2021-03-12 19:57	Cbranning	43.68182138	-116.2929155
206	Magnolia Park	MAGN-TR-P-82300	2016-10-15	Active	MAGNOLIA	Good	5	2		Pinus, Austrian	PNUS	NIGRA	2021-03-12 19:34	Cbranning	43.68180809	-116.2936369
209	Magnolia Park	MAGN-TR-P-82303	2016-10-15	Active	MAGNOLIA	Good	4	2		Pinus, Austrian	PNUS	NIGRA	2021-03-12 19:34	Cbranning	43.68180835	-116.291812
210	Magnolia Park	MAGN-TR-P-82306	2016-10-15	Active	MAGNOLIA	Fair	5	2		Pinus, Austrian	PNUS	NIGRA	2021-03-15 16:41	Cbranning	43.681807339	-116.2917299
211	Magnolia Park	MAGN-TR-P-82322	2016-10-15	Active	MAGNOLIA	Good	4	2		Pinus, Austrian	PNUS	NIGRA	2021-03-15 17:01	Cbranning	43.681808572	-116.2926265
226	Magnolia Park	MAGN-TR-P-82327	2016-10-15	Active	MAGNOLIA	Fair	4	2		Pinus, Austrian	PNUS	NIGRA	2021-03-15 17:01	Cbranning	43.68179088	-116.2926265
231	Magnolia Park	MAGN-TR-P-82330	2016-10-15	Active	MAGNOLIA	Good	5	2		Pinus, Austrian	PNUS	NIGRA	2021-03-15 17:01	Cbranning	43.682213554	-116.2926265
232	Magnolia Park	MAGN-TR-P-82350	2016-10-15	Active	MAGNOLIA	Good	4	2		Pinus, Austrian	PNUS	NIGRA	2021-03-15 17:01	Cbranning	43.68222575	-116.2925805
254	Magnolia Park	MAGN-TR-P-82350	2016-10-15	Active	MAGNOLIA	Good	4	2		Pinus, Austrian	PNUS	NIGRA	2021-03-15 17:01	Cbranning	43.68222575	-116.2925805
255	Magnolia Park	MAGN-TR-P-82351	2016-10-15	Active	MAGNOLIA	Good	4	2		Pinus, Austrian	PNUS	NIGRA	2021-03-15 17:01	Cbranning	43.68226177	-116.2916630
256	Magnolia Park	MAGN-TR-P-82352	2016-10-15	Active	MAGNOLIA	Good	6	2		Pinus, Austrian	PNUS	NIGRA	2021-03-15 17:16	Cbranning	43.68269027	-116.2916709
319	Mariposa Park	MARI-TR-P-82986	2018-10-16	Active	Mariposa Park	Good	3	3	ma - added to planting list	Pinus, Austrian	PNUS	NIGRA	2021-05-24 17:08	Cbranning	43.615294447	-116.3047778
320	Mariposa Park	MARI-TR-P-82986	2018-10-16	Active	Mariposa Park	Good	3	3	ma - added to planting list	Pinus, Austrian	PNUS	NIGRA	2021-05-24 17:08	Cbranning	43.6149841	-116.3047778
322	Mariposa Park	MARI-TR-P-82988	2018-10-16	Active	Mariposa Park	Good	3	3	ma - added to planting list	Pinus, Austrian	PNUS	NIGRA	2021-05-24 17:08	Cbranning	43.6148444	-116.3047778
323	Mariposa Park	MARI-TR-P-82996	2018-10-16	Active	Mariposa Park	Good	3	3	ma - added to planting list	Pinus, Austrian	PNUS	NIGRA	2021-05-24 17:08	Cbranning	43.61477077	-116.3047778
324	Mariposa Park	MARI-TR-P-82996	2018-10-16	Active	Mariposa Park	Good	2	3	ma - added to planting list	Pinus, Austrian	PNUS	NIGRA	2021-05-24 17:08	Cbranning	43.61469705	-116.3047544
329	Mariposa Park	MARI-TR-P-82996	2018-10-16	Active	Mariposa Park	Good	2	3	ma - added to planting list	Pinus, Austrian	PNUS	NIGRA	2021-05-24 17:08	Cbranning	43.61427486	-116.3047677
332	Mariposa Park	MARI-TR-P-82998	2018-10-16	Active	Mariposa Park	Good	3	3	ma - added to planting list	Pinus, Austrian	PNUS	NIGRA	2021-05-24 17:08	Cbranning	43.61428703	-116.3044849
333	Mariposa Park	MARI-TR-P-83009	2018-10-16	Active	Mariposa Park	Good	2	3	ma - added to planting list	Pinus, Austrian	PNUS	NIGRA	2021-05-24 17:26	Cbranning	43.61449459	-116.3049116
344	Mariposa Park	MARI-TR-P-83010	2018-10-16	Active	Mariposa Park	Good	2	3	ma - added to planting list	Pinus, Austrian	PNUS	NIGRA	2021-05-24 17:26	Cbranning	43.61484459	-116.3052045
353	Mariposa Park	MARI-TR-P-83019	2018-10-16	Active	Mariposa Park	Good	2	3	ma - added to planting list	Pinus, Austrian	PNUS	NIGRA	2021-05-24 17:26	Cbranning	43.61505694	-116.3059689
354	Mariposa Park	MARI-TR-P-83020	2018-10-16	Active	Mariposa Park	Good	2	3	ma - added to planting list	Pinus, Austrian	PNUS	NIGRA	2021-05-27 17:34	Cbranning	43.61528942	-116.3057596
355	Mariposa Park	MARI-TR-P-83061	2018-10-16	Active	Mariposa Park	Good	2	3	ma - added to planting list	Pinus, Austrian	PNUS	NIGRA	2021-05-27 17:34	Cbranning	43.61563784	-116.3053723
356	Mariposa Park	MARI-TR-P-83062	2018-10-16	Active	Mariposa Park	Good	3	3	ma - added to planting list	Pinus, Austrian	PNUS	NIGRA	2021-05-27 17:34	Cbranning	43.61564091	-116.3054885
357	Mariposa Park	MARI-TR-P-83063	2018-10-16	Active	Mariposa Park	Good	3	3	ma - added to planting list	Pinus, Austrian	PNUS	NIGRA	2021-05-27 17:34	Cbranning	43.61562015	-116.3054885
405	Mariposa Park	MARI-TR-P-83102	2018-10-16	Active	Mariposa Park	Fair	2	3	ma - added to planting list	Pinus, Austrian	PNUS	NIGRA	2021-05-28 18:40	Cbranning	43.61416109	-116.3052842
406	Mariposa Park	MARI-TR-P-83103	2018-10-16	Active	Mariposa Park	Good	2	3	ma - added to planting list	Pinus, Austrian	PNUS	NIGRA	2021-05-28 18:40	Cbranning	43.61414539	-116.3054183
160	Magnolia Park	MAGN-TR-P-82283	2016-10-15	Active	MAGNOLIA	Good	3	3	ma - added to planting list	Pinus, Austrian	PNUS	NIGRA	2021-03-12 19:34	Cbranning	43.61200211	-116.2935723
404	Mariposa Park	MARI-TR-P-83101	2018-10-16	Active	Mariposa Park	Good	2	3	ma - added to planting list	Pinus, Limber	PNUS	FLEXILIS	2021-05-28 18:40	Cbranning	43.61405665	-116.305335
415	Mariposa Park	MARI-TR-P-83112	2018-10-16	Active	Mariposa Park	Good	2	3	ma - added to planting list	Pinus, Limber	PNUS	FLEXILIS	2021-05-28 18:40	Cbranning	43.61404073	-116.30613
416	Mariposa Park	MARI-TR-P-83113	2018-10-16	Active	Mariposa Park	Good	2	3	ma - added to planting list	Pinus, Limber	PNUS	FLEXILIS	2021-05-28 18:40	Cbranning	43.61403078	-116.30613
426	Mariposa Park	MARI-TR-P-83123	2018-10-16	Active	Mariposa Park	Good	2	3	ma - added to planting list	Pinus, Limber	PNUS	FLEXILIS	2021-05-28 19:12	Cbranning	43.61515276	-116.309294
428	Franklin Park	FRAN-TR-P-80145	2018-06-18	Active	FRANKLIN PARK	Good	3	6		Pinus, Limber-Vanderwards Pyramid	PNUS	FLEXILIS	2018-10-03	ripe/kins	43.60156067	-116.2444432
35	Franklin Park	FRAN-TR-P-80151	2018-06-18	Active	FRANKLIN PARK	Good	3	6		Pinus, Limber-Vanderwards Pyramid	PNUS	FLEXILIS	2018-10-03	ripe/kins	43.60176818	-116.2444432
43	Franklin Park	FRAN-TR-P-80159	2018-06-18	Active	FRANKLIN PARK	Good	3	6		Pinus, Limber-Vanderwards Pyramid	PNUS	FLEXILIS	2018-10-03	ripe/kins	43.60120688	-116.2452643
507	Bowler	BOWL-TR-P-83610	2021-06-09	Active	Bowler Park	Good	4	7		Pinus, Scotch or Scots	PNUS	SYLVESTRIS	2021-10-13 16:58	Cbranning	43.65562011	-116.3052041
508	Bowler	BOWL-TR-P-83611	2021-06-09	Active	Bowler Park	Good	2	7		Pinus, Scotch or Scots	PNUS	SYLVESTRIS	2021-10-13 16:58	Cbranning	43.65562029	-116.3052041
509	Bowler	BOWL-TR-P-83612	2021-06-09	Active	Bowler Park	Good	2	7		Pinus, Scotch or Scots	PNUS	SYLVESTRIS	2021-10-13 16:58	Cbranning	43.65561951	-116.3052041
168	Magnolia Park	MAGN-TR-P-82284	2016-10-15	Active	MAGNOLIA	Good	3	2		Pinus, Scotch or Scots	PNUS	SYLVESTRIS	2021-03-12 19:34	Cbranning	43.61528942	-116.3057596
190	Magnolia Park	MAGN-TR-P-82284	2016-10-15	Active	MAGNOLIA	Good	4	2		Pinus, Scotch or Scots	PNUS	SYLVESTRIS	2021-03-12 19:34	Cbranning	43.681184	-116.2927802
192	Magnolia Park	MAGN-TR-P-82288	2016-10-15	Active	MAGNOLIA	Good	4	2	Unknown	Pinus, Scotch or Scots	PNUS	SYLVESTRIS	2021-03-12 19:34	Cbranning	43.68102774	-116.2929391
205	Magnolia Park	MAGN-TR-P-82293	2016-10-15	Active	MAGNOLIA	Good	4	2	Unknown	Pinus, Scotch or Scots	PNUS	SYLVESTRIS	2021-03-12 19:34	Cbranning	43.61581814	-116.3051155
384	Mariposa Park	MARI-TR-P-83050	2018-10-16	Active	Mariposa Park	Good	3	3	ma - added to planting list	Pinus, Scotch or Scots	PNUS	SYLVESTRIS	2021-05-25 17:34	Cbranning	43.61565701	-116.3063935
385	Mariposa Park	MARI-TR-P-83051	2018-10-16	Active	Mariposa Park	Good	3	3	ma - added to planting list	Pinus, Scotch or Scots	PNUS	SYLVESTRIS	2021-05-25 17:34	Cbranning	43.61566133	-116.3062892
407	Mariposa Park	MARI-TR-P-83101	2018-10-16	Active	Mariposa Park	Good	3	3	ma - added to planting list	Pinus, Scotch or Scots	PNUS	SYLVESTRIS	2021-05-25 17:34	Cbranning	43.61566296	-116.3062892
437	Mariposa Park	MARI-TR-P-83134	2018-10-16	Active	Mariposa Park	Good	2	3	ma - added to planting list	Pinus, Scotch or Scots	PNUS	SYLVESTRIS	2021-05-28 19:12	Cbranning	43.61562639	-116.3067766
438	Mariposa Park	MARI-TR-P-83135	2018-10-16	Active	Mariposa Park	Good	2	3	ma - added to planting list	Pinus, Scotch or Scots	PNUS	SYLVESTRIS	2021-05-28 19:12	Cbranning	43.61562675	-116.3067766
443	Mariposa Park	MARI-TR-P-83140	2018-10-16	Active	Mariposa Park	Good	2	3	ma - added to planting list	Pinus, Scotch or Scots	PNUS	SYLVESTRIS	2021-05-28 19:12	Cbranning	43.61562962	-116.3067766
477	Magnolia Park	MAGN-TR-P-82271	2016-10-15	Active	MAGNOLIA	Good	3	2	Unknown	Platanus, London	PLATANUS	XACERIFOLIA	2021-03-12 19:57	Cbranning	43.68176543	-116.2933189
421	Mariposa Park	MARI-TR-P-83118	2018-10-16	Active	Mariposa Park	Good	3	2	Unknown	Platanus, London	PLATANUS	XACERIFOLIA	2021-05-28 18:40	Cbranning	43.61579796	-116.3064067
447	Mariposa Park	MARI-TR-P-83144	2018-10-16	Active	Mariposa Park	Good	4	3	ma - added to planting list	Platanus, London	PLATANUS	XACERIFOLIA	2021-05-28 19:36	Cbranning	43.61452704	-116.3064067
77	Pine Grove Park	PIGR-TR-P-82077	2017-11-29	Active	PINE GROVE PARK	Good	4	3	Unknown	Platanus, London	PLATANUS	XACERIFOLIA	2020-10-29 19:30	Cbranning	43.59847739	-116.2934773
102	Pine Grove Park	PIGR-TR-P-82078	2017-11-29	Active	PINE GROVE PARK	Good	3	3	Unknown	Platanus, London	PLATANUS	XACERIFOLIA	2020-10-29 19:54	Cbranning	43.61191102	-116.2934773
103	Pine Grove Park	PIGR-TR-P-82103	2017-11-29	Active	PINE GROVE PARK	Good	3	3	Unknown	Platanus, London	PLATANUS	XACERIFOLIA	2020-10-29 19:54	Cbranning	43.59819409	-116.2920959
118	Bernardine Quinn Riverside Park	BEQU-TR-P-82120	2020-07-01	Active	Bernardine Quinn Riverside	Good	2	4		Platanus, London-Bloodgood	PLATANUS	XACERIFOLIA	2020-11-05	sirotnak	43.62189489	-116.2323094
208	Magnolia Park	MAGN-TR-P-82302	2016-10-15	Active	MAGNOLIA	Good	3	2	Unknown	Platanus, London-Bloodgood	PLATANUS	XACERIFOLIA	2021-03-12 19:34	Cbranning	43.68102625	-116.2919002
208	Magnolia Park	MAGN-TR-P-82304	2016-10-15	Active	MAGNOLIA	Good	3	2	Unknown	Platanus, London-Bloodgood	PLATANUS	XACERIFOLIA	2021-03-12 19:34	Cbranning	43.61565346	-116.2923098
287	Magnolia Park	MAGN-TR-P-82363	2016-10-15	Active	MAGNOLIA	Good	1	2	Unknown	Rehdb. Eastern	CERCIS	CANADENSIS	2021-03-15 17:51	Cbranning	43.68181879	-116.2918568
181	Magnolia Park	MAGN-TR-P-82275	2016-10-15	Active	MAGNOLIA	Good	2	2	Unknown	Redwood, Dawn	METASEQUOIA	GLYPTOSTROBODES	2021-03-12 19:57	Cbranning	43.68917913	-116.2931981
242	Magnolia Park	MAGN-TR-P-82338	2016-10-15	Active	MAGNOLIA	Good	3	2	Unknown	Redwood						

250	Magnolia Park	MAGN-TR-P-82346	2016-10-15	Active	MAGNOLIA	Good	2	2	Park										
434	Mariposa Park	MARI-TR-P-83131	2018-10-16	Active	Mariposa Park	Good	2	3	Park	ma - added to planting list	1	Sweetgum	LIQUIDAMBAR	STYRACIFLUA	2021-03-15 17:16	Crabapple	43.68259653	-116.2919767	
435	Mariposa Park	MARI-TR-P-83132	2018-10-16	Active	Mariposa Park	Fair	1	3	Park	ma - added to planting list	1	Sweetgum	LIQUIDAMBAR	STYRACIFLUA	2021-05-28 19:12	Crabapple	43.61512995	-116.3065896	
136	Bernardine Quinn Riverside Park	BEQU-TR-P-82138	2020-07-01	Active	Bernardine Quinn Riverside	Good	2	4			1	Tuliptree	LIRIODENDRON	TULIPIFERA	2020-11-05	sirohnak	43.62246337	-116.2327747	
137	Bernardine Quinn Riverside Park	BEQU-TR-P-82139	2020-07-01	Active	Bernardine Quinn Riverside	Good	2	4			1	Tuliptree	LIRIODENDRON	TULIPIFERA	2020-11-05	sirohnak	43.62252562	-116.232848	
138	Bernardine Quinn Riverside Park	BEQU-TR-P-82140	2020-07-01	Active	Bernardine Quinn Riverside	Good	2	4			1	Tuliptree	LIRIODENDRON	TULIPIFERA	2020-11-05	sirohnak	43.62267937	-116.2327837	
139	Bernardine Quinn Riverside Park	BEQU-TR-P-82141	2020-07-01	Active	Bernardine Quinn Riverside	Good	2	4			1	Tuliptree	LIRIODENDRON	TULIPIFERA	2020-11-05	sirohnak	43.62263258	-116.2326264	
140	Bernardine Quinn Riverside Park	BEQU-TR-P-82142	2020-07-01	Active	Bernardine Quinn Riverside	Good	2	4			1	Tuliptree	LIRIODENDRON	TULIPIFERA	2020-11-05	sirohnak	43.62252713	-116.2325627	
499	Bowler	BOWL-TR-P-83992	2021-06-09	Active	Bowler Park	Good	2	7	Park		1	Tuliptree	LIRIODENDRON	TULIPIFERA	2021-10-13 19:47	Crabapple	43.55618935	-116.1275921	
521	Bowler	BOWL-TR-P-83624	2021-06-09	Active	Bowler Park	Good	2	7	Park		1	Tuliptree	LIRIODENDRON	TULIPIFERA	2021-10-13 16:42	Crabapple	43.55648456	-116.1285472	
522	Bowler	BOWL-TR-P-83625	2021-06-09	Active	Bowler Park	Good	2	7	Park		1	Tuliptree	LIRIODENDRON	TULIPIFERA	2021-10-13 16:42	Crabapple	43.55644443	-116.1284137	
527	Bowler	BOWL-TR-P-83630	2021-06-09	Active	Bowler Park	Good	2	7	Park		1	Tuliptree	LIRIODENDRON	TULIPIFERA	2021-10-13 16:42	Crabapple	43.55650121	-116.1274206	
474	Cherie Buckner Webb Park	CHBW-TR-P-83577	2021-06-01	Active	Cherie Buckner-Webb Park	Good	2	4	Park		1	Tuliptree	LIRIODENDRON	TULIPIFERA	2021-10-12 16:44	Crabapple	43.61877552	-116.2060009	
475	Cherie Buckner Webb Park	CHBW-TR-P-83578	2021-06-01	Active	Cherie Buckner-Webb Park	Good	2	4	Park		1	Tuliptree	LIRIODENDRON	TULIPIFERA	2021-10-12 16:44	Crabapple	43.61878395	-116.2060778	
476	Cherie Buckner Webb Park	CHBW-TR-P-83579	2021-06-01	Active	Cherie Buckner-Webb Park	Good	2	4	Park		1	Tuliptree	LIRIODENDRON	TULIPIFERA	2021-10-12 16:44	Crabapple	43.61878955	-116.2061537	
477	Cherie Buckner Webb Park	CHBW-TR-P-83580	2021-06-01	Active	Cherie Buckner-Webb Park	Good	2	4	Park		1	Tuliptree	LIRIODENDRON	TULIPIFERA	2021-10-12 16:44	Crabapple	43.61879688	-116.2062282	
478	Cherie Buckner Webb Park	CHBW-TR-P-83581	2021-06-01	Active	Cherie Buckner-Webb Park	Good	2	4	Park		1	Tuliptree	LIRIODENDRON	TULIPIFERA	2021-10-12 16:44	Crabapple	43.61880786	-116.2063048	
479	Cherie Buckner Webb Park	CHBW-TR-P-83582	2021-06-01	Active	Cherie Buckner-Webb Park	Good	2	4	Park		1	Tuliptree	LIRIODENDRON	TULIPIFERA	2021-10-12 16:44	Crabapple	43.61876592	-116.2062523	
480	Cherie Buckner Webb Park	CHBW-TR-P-83583	2021-06-01	Active	Cherie Buckner-Webb Park	Good	2	4	Park		1	Tuliptree	LIRIODENDRON	TULIPIFERA	2021-10-12 16:44	Crabapple	43.61878731	-116.2061781	
481	Cherie Buckner Webb Park	CHBW-TR-P-83584	2021-06-01	Active	Cherie Buckner-Webb Park	Good	2	4	Park		1	Tuliptree	LIRIODENDRON	TULIPIFERA	2021-10-12 16:44	Crabapple	43.61878381	-116.2061056	
482	Cherie Buckner Webb Park	CHBW-TR-P-83585	2021-06-01	Active	Cherie Buckner-Webb Park	Good	2	4	Park		1	Tuliptree	LIRIODENDRON	TULIPIFERA	2021-10-12 16:44	Crabapple	43.61874989	-116.206033	
483	Cherie Buckner Webb Park	CHBW-TR-P-83586	2021-06-01	Active	Cherie Buckner-Webb Park	Good	2	4	Park		1	Tuliptree	LIRIODENDRON	TULIPIFERA	2021-10-12 16:44	Crabapple	43.61872114	-116.2060611	
484	Cherie Buckner Webb Park	CHBW-TR-P-83587	2021-06-01	Active	Cherie Buckner-Webb Park	Good	2	4	Park		1	Tuliptree	LIRIODENDRON	TULIPIFERA	2021-10-12 16:44	Crabapple	43.61872387	-116.2061343	
229	Magnolia Park	MAGN-TR-P-82325	2016-10-15	Active	MAGNOLIA	Good	4	2	Park		1	Tuliptree	LIRIODENDRON	TULIPIFERA	2021-03-15 17:01	Crabapple	43.68197885	-116.2925318	
398	Mariposa Park	MARI-TR-P-83064	2018-10-16	Active	Mariposa Park	Good	3	3	Park	ma - added to planting list	1	Tuliptree	LIRIODENDRON	TULIPIFERA	2021-05-25 17:34	Crabapple	43.61555181	-116.305567	
406	Mariposa Park	MARI-TR-P-83105	2018-10-16	Active	Mariposa Park	Fair	2	3	Park	ma - added to planting list	1	Tuliptree	LIRIODENDRON	TULIPIFERA	2021-05-25 18:40	Crabapple	43.61490933	-116.3059391	
433	Mariposa Park	MARI-TR-P-83130	2018-10-16	Active	Mariposa Park	Fair	2	3	Park	ma - added to planting list	1	Tuliptree	LIRIODENDRON	TULIPIFERA	2021-05-25 19:12	Crabapple	43.61485899	-116.3064941	
212	Magnolia Park	MAGN-TR-P-82308	2016-10-15	Active	MAGNOLIA	Good	3	2	Park		1	Willow	SALIX	NIGRA	2021-03-15 16:41	Crabapple	43.6811449	-116.2916762	
199	Magnolia Park	MAGN-TR-P-82293	2016-10-15	Active	MAGNOLIA	Fair	4	2	Unknown		1	Willow, Weeping	SALIX	BABYLONICA	2021-03-12 19:34	Crabapple	43.68108609	-116.2926599	
223	Magnolia Park	MAGN-TR-P-82319	2016-10-15	Active	MAGNOLIA	Good	5	2	Park		1	Willow, Weeping	SALIX	BABYLONICA	2021-03-15 16:41	Crabapple	43.68141032	-116.292205	
383	Mariposa Park	MARI-TR-P-83049	2018-10-16	Active	Mariposa Park	Good	6	3	Park	ma - added to planting list	1	Willow, Weeping	SALIX	BABYLONICA	2021-05-25 17:34	Crabapple	43.61561376	-116.3064579	
392	Mariposa Park	MARI-TR-P-83058	2018-10-16	Active	Mariposa Park	Good	5	3	Park	ma - added to planting list	1	Willow, Weeping	SALIX	BABYLONICA	2021-05-25 17:34	Crabapple	43.61546219	-116.3057898	
429	Mariposa Park	MARI-TR-P-83128	2018-10-16	Active	Mariposa Park	Good	6	3	Park	ma - added to planting list	1	Willow, Weeping	SALIX	BABYLONICA	2021-05-25 19:12	Crabapple	43.61500131	-116.3062937	
444	Mariposa Park	MARI-TR-P-83141	2018-10-16	Active	Mariposa Park	Good	4	3	Park	ma - added to planting list	1	Willow, Weeping	SALIX	BABYLONICA	2021-05-25 19:12	Crabapple	43.61554046	-116.3065989	
117	Bernardine Quinn Riverside Park	BEQU-TR-P-82119	2020-07-01	Active	Bernardine Quinn Riverside	Good	2	4			1	Willow, Weeping or Pekin-Pendula	SALIX	BABYLONICA PEKINENSIS	2020-11-05	sirohnak	43.62227834	-116.2322715	

From: [Lance Davisson](#)
To: [Christine Cole](#)
Cc: [Mark McPherson](#)
Subject: Request for Early Action Status for Treasure Valley Canopy Network's City Forest Credits application for credit verification -- Treasure Valley Parks Project
Date: Monday, November 1, 2021 4:53:14 AM

Dear Ms. Cole and Mr. McPherson --

The Treasure Valley Canopy Network, as Project Operator for the Treasure Valley Municipal Parks Project, would like to request Early Action Status for our project, as outlined in City Forest Credits Tree Planting Protocol Version 9, dated 2/7/2021.

Our application for credit verification includes 504 trees planted within nine City of Boise parks between October 2016 and June 2021. This application is the product of discussions with City Forest Credits, City of Boise, and Treasure Valley Canopy Network that began since the inception of City Forest Credits Registry. All trees planted within these parks are part of a well-planned effort to pilot the efficacy of a Treasure Valley Program. The Treasure Valley Parks Project (TV Parks Project) represents a purposeful deliverable of the Treasure Valley Forest Carbon Assessment developed with The Nature Conservancy in Idaho and other regional partners. The TV Parks Project represents a key building block for a larger self-sustaining climate action program that will serve the mission of the Treasure Valley Canopy Network and the City of Boise's progressive Climate Action Plan. We appreciate the consideration of the Registry in granting this Early Action status to help us realize and grow our carbon mitigation and climate resilience strategies across the Treasure Valley.

Sincerely, Lance Davisson

--

Lance Davisson
President & Director, Treasure Valley Canopy Network

Phone: (208) 994-1135
E-mail: coordinator@tvcanopy.net

Signature: *Lance Davisson*
Lance Davisson (Dec 6, 2021 13:10 MST)

Email: coordinator@tvcanopy.net

CFC Planting Initial Credit PDD_TVCN_FINAL 20211206

Final Audit Report

2021-12-06

Created:	2021-12-06
By:	Christine Cole (christine@cityforestcredits.org)
Status:	Signed
Transaction ID:	CBJCHBCAABAA1-PTmjgt68nA1blsv5dlH6rIFBrES240

"CFC Planting Initial Credit PDD_TVCN_FINAL 20211206" History

-  Document created by Christine Cole (christine@cityforestcredits.org)
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