City Wide Public Tree Inventory
Delta, Utah
2014

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Introduction

The inventory results are to be used as a source of information about Delta's community forest resource. Data collected reveals information about the current species, size, health, distribution and value of trees on the public right-of-ways and parks, within the city. Analysis of the data provides information that will direct future management decisions. Management activities such as tree removals and pruning can be determined for specific streets and addresses. Furthermore, a complete and up-to-date inventory allows proactive management activities to be scheduled rather than waiting for emergency needs to arise. The data provides information about the needs of each street tree as determined by the data collectors.

Data Collection

Data collection took place summer 2014 by Randy Morris, Delta City with assistance from the State of Utah Division of Forestry, Fire and State Lands (FFSL) Southwest Area Urban and Community Forester, Danon Hulet. The inventory areas included trees in the city park and the soccer field.

Delta's Urban Tree Inventory Map

Figure 1. Map of areas inventoried during the 2014 Delta's public tree inventory.

Methods

Data was collected using an app called collector. A tree inventory app designed by FFSL GIS specialist Buck Ehler was used to record tree attribute information. Using this combination of aerial imagery, GIS software, and the inventory app, the tree locations were mapped on site and specific information was recorded for each tree.

Data analysis was completed utilizing i-Tree—a state-of-the-art, peer-reviewed software suite from the USDA Forest Service that provides urban forestry analysis and benefits assessment tools including quantifying forest structure and assessing the environmental services they provide. More information on i-Tree can be found at http://www.itreetools.org/.

The following attribute information was recorded for each tree:

Species Identification
Each street tree was identified by common name. Cultivar names were also listed where appropriate. If the species name was not known, data recorders had the option of identifying the genus only. (For example, "maple", "spruce", "oak", etc.) If the species could not be determined in field, it was recorded as "unknown" and later identified utilizing a variety of resources including tree identification books and online tree identification guides.

Diameter Class
The diameter of each tree was estimated and placed in one of nine diameter classes. Diameter was measured at 4.5 feet from the ground (Diameter at Breast High - DBH) and recorded in inches. The nine diameter classes are as follows:

1 = 0-3	2 = 4-6	3 = 7-12
4 = 13-18	5 = 19-24	6 = 25-30
7 = 31-60	8 = 61-100	9 = 100+

Height Class (feet)
The approximate height of each tree was visually estimated and recorded in one of three height classes. The three height classes are as follows:

Small = 0-15′ Medium = 15-30′ Large = 30′+

Canopy Spread (feet)
Each tree was assigned an approximate canopy spread value. Canopy spread is measured along the dripline of a tree. The drip line is the outline on the ground of the outermost leaves of the crown. Canopy spread estimates require measurement from two positions at right angles to each other so that an average can be obtained. Once data collectors were comfortable with determining the canopy spread class, the measurement was visually estimated. Canopy spread

was classified in one of three classes:

Small = 0-15′ Medium = 15-30′ Large = 30′+

Condition Factor
Each tree was assigned a "condition factor" which served to provide a quantitative assessment of the tree's overall form, vigor, and quality. Condition rating was based on the data collector's visual inspection. The numerical rating ranges from zero (dead tree) to 100 (the perfect tree). A description of the guidelines used to determine condition factor are as follows:

Excellent = (80-99) This rating is reserved for trees that are outstanding in form and health. Characteristics for an excellent tree vary with species but may include a combination of: strong central leader, vigorous crown development, wound free trunk and base, balanced root flares and solid/wound free roots. No tree is "perfect"; therefore, no trees are rated a 100.

Good = (60-79) Trees rated "good" have few defects, little to no dead material in the canopy and require minimal maintenance. Often a data collector will start assessing a tree as a 70 and add points for more excellent qualities and deduct points for defects. Good trees are never hazardous, they have never been topped and they are free of major insect, disease and stress problems.

Fair = (40-59) Fair trees may have poor form, defects, signs of insect/disease/stress, previous neglect or declining canopy. These trees typically need some level of maintenance but with some care can be improved.

Poor = < 40 Poor trees do not contribute too much to the overall landscape. These trees have a combination of defects and a high level of maintenance needs. Topped trees with rot and decay, storm damaged trees and highly borer infested trees are examples of potentially poor trees. Live hazardous trees are always considered poor.

Dead = 0 Dead trees are almost always considered hazardous.

Location Factor
A location value for each tree was noted during the inventory. This location value was used to determine the monetary value of specific trees and to determine the overall worth, in dollar terms, of the urban forest in the sampled area.

Several factors influence location value including the **site** of the property or landscape; a plant's unique functional and aesthetic **contributions**; and the **placement** of the individual tree in the landscape.

Ideal Average Less desirable Poor

Most trees in city parks are estimated at Ideal. If the tree was located in a park strip or near a property line, the location was reduced to Average. If a tree was located under a utility line it

was assigned a less desirable location value. Other special circumstances may have warranted a different location value, if so this was noted and justified during the inventory.

Ownership
Each tree was assigned an ownership classification to distinguish between trees that are owned and managed by the city and trees that are privately owned and managed. Two classification classes were used: Private or Public. All city owned trees were classified as "Public". If ownership information was unknown during the time of inspection, ownership information was determined and recorded at a later date.

Maintenance Needs
During the inspection of each tree, a basic assessment of its maintenance needs was recorded. Given the time and scope of this inventory these determinations of maintenance needs cannot be considered all inclusive. The inventory was performed during the winter making detailed assessments of tree health or structure less complete given the lack of foliage on any deciduous trees. However, adequate information should be obtained to reveal basic needs for service.

Eleven maintenance categories were established for data recorders to select from. For each tree, a maximum of two maintenance needs could be recorded. For example, a tree may need a hazard limb removed and may also need to have its low limbs raised to provide clearance for an adjacent sidewalk. Thus, two maintenance needs categories would be identified. The higher priority maintenance need is listed in the "Maintenance 1" column and the second maintenance need in the "Maintenance 2" column.

Of the eleven maintenance needs categories available, five are specific to pruning and are in accordance with the American National Standards Institute (ANSI) A300 Guideline for Tree, Shrub, and Other Woody Plant Management – Standard Practices (2008).

Each maintenance need category is defined below:

Prune-Crown Raising
This type of pruning removes the lower branches of a tree in order to provide clearance for buildings, signs, vehicles, pedestrians and vistas. Excessive removal of lower branches should be avoided so that development of trunk taper is not affected and structural safety is maintained.

Prune-low
This type of pruning is typically low to the ground not requiring aerial equipment to prune.

Prune-high
This type of pruning is typically high in the canopy of the tree and would require aerial equipment to conduct the pruning.

Prune-Structural
This type of pruning is typically required for young trees that have multiple leaders or a forked

main stem. Removing one of the forked stems now removes the potential for future structural defects. This designation is also used for more mature trees that may need to have a limb subordinated to help establish a central leader. Structural pruning helps a tree develop a healthy form. Nearly all structural pruning can be performed from the ground without the use of bucket trucks or climbers.

Prune-Restoration
Restoration pruning will restore the canopy of trees that have been damaged by storms, topping or other neglect. It typically involves the removal of broken limbs or poorly developing new growth.

Hazard Tree and/or Hazard Limb
Trees in the "Hazard Tree" category have serious defects that were readily visible during the inspection. Removal should be planned to take place as budgets allow. These are priority removals. Typically, the "Hazard Limb" designation was given to trees with large dead branches or branches with obvious rot and decay.

Trees and limbs were only considered potentially hazardous if they had a likely target (playground, pedestrian, etc.) Delta's City Parks Department may consider re-inspecting these trees and establishing a "hazard rating" to prioritize the risk factor for each tree and better schedule removals.

Disclaimer: Any tree or tree limb could be a potential hazard and fail. Data collectors identify hazard trees based on visual inspection from the ground. Due to the limited scope of this project, the Division of Forestry, Fire and State Lands does not assume any liability for not identifying all potential hazards within the city of Delta.

Safety Prune-Other
Trees that interfere with stop sign visibility or vehicle sight lines could be safety pruned (though in most cases these trees would need to be removed).

Tree Ring
Mulched tree rings protect the roots and base of trees growing in turf. The International Society for Arboriculture and American National Standards Institute (ANSI) A300 Guideline for Tree, Shrub, and Other Woody Plant Management – Standard Practices (2008), among others recommend the establishment of a mulched tree rings around the root zone for multiple beneficial reasons. Mulch rings specifications can be found at the ISA website (http://www.treesaregood.com/treecare/mulching.aspx). The recommendation to establish a "Tree Ring" is given if the tree does not have an adequate buffer between the turf grass and the base. Often these trees will also have a "Mower Damage" comment associated with them.

Recommend Removal
Non-hazardous trees in very poor condition or undesirable species that provide little value should be removed.

Re-inspect
These are boarder-line trees that could be removed or treated. The city should make the final decision on whether to spend the time and resources need to save the tree.

Stake Removal
This designation indicates that the tree is currently staked but the stake is not necessary or is inflicting damage to the tree and therefore should be removed. It is important to mention that staking of newly planted trees is not always necessary. In fact, staking can have detrimental effects on the development of a tree. Note that support stakes or guying should be removed after one growing season. If the support system is left in place for more than two years, the tree's ability to stand alone may be reduced, and chances of girdling are increased.

Treat Insect/Disease
This designation should be used for trees that exhibit evidence (signs and or symptoms) of a specific insect or disease. However, many symptoms observed in declining trees are nonspecific. Therefore, nonspecific symptoms must be analyzed in combination with specific information about the tree and the site in forming a diagnosis.

Maintenance Priority Level
Once specific maintenance needs were identified for each tree, the data collector would then assign a "Maintenance Priority Level" classification. Priority level was determined based on the size of the tree (small or large) and the maintenance needs identified. The objective of this classification is to help with prioritizing, planning, and budgeting for tree maintenance. Each maintenance priority level is defined below:

- Routine (Small Tree)
- Routine (Large Tree)
- Immediate (Small Tree)
- Immediate (Large Tree)
- Critical – Public Safety

Any "hazard" or "safety" designations (i.e., hazard tree, hazard limb, safety prune) were placed in the "Critical – Public Safety" category. Routine maintenance includes any maintenance needs that do not present an urgent risk to the trees health. Immediate classifications represent trees with urgent maintenance needs that have the potential to affect the trees health.

Comment Categories
In addition to the Maintenance Needs and Priority Level, comment categories were available for data collectors to make comments about each tree. While the comments do not specifically indicate a particular need for a tree, they do provide information that makes management decisions easier. The comments will indicate such things as the presence of overhead wires,

trunk wounds, evidence of past topping, sidewalk damage, etc. Each tree could be assigned two comments and no priority ranking difference between Comment 1 and Comment 2 categories. A data collector may add other comments, when necessary; to better describe the tree's situation. Most of the comments are self explanatory, see explanations below:

• Co-dominant Stems	• Mower Damage	• Insect/Disease/Stress
• Staked	• Topped	• Power Lines
• Trunk Wound	• Sucker	• Included Bark
• Girdling Roots	• Watersprouts	• Sidewalk Damage
• Stump	• Ladder Fuels	• Storm Damage
• Chlorosis	• Wildlife Damage	• Vandalism
• Canopy Die-Back	• Multi-Stemmed	

Codominant stems
Forked branches of nearly the same size in diameter and lacking a normal branch union. In young trees, it is best to remove one of the codominant stems.

Mower Damage
Maybe an indicator of poor tree health resulting from trunk damage.

Insect/Disease/Stress
While treatment may or may not be advisable, this does provide additional information about the tree. Trees suffering from chlorosis, scale, borers, confined root zones, compaction, construction damage, poor planting quality or neglect may designated in this category. Specific problems may be further identified in the "Notes" section.

Staked
Stakes used for newly planted trees should be removed the next season.

Multi/Forked Trunk
Multi-trunk and forked trees are often weaker than single trunk trees. The structural stability of these trees may be jeopardized do to this type of grown form.

Trunk Wound
A trunk wound may indicate current or future health problems.

Topped
Also called "heading cut", "hat racked", "tipped back", topping is the indiscriminate cutting of branches in a canopy to stubs or lateral branches that are not large enough to assume the terminal role. This comment often requires "Prune-Restoration" or "Recommended Removal" as maintenance.

Canopy Die-Back

Dead or diseased branches in the canopy can be an indication of stress from construction damage, insect/disease problems, over watering, under watering and more.

Storm Damage
This includes damage to a tree due to lightning and/or wind and may need crown restoration.

Chlorosis
An abnormally yellow color of plant tissues, resulting from partial failure to develop chlorophyll, caused by a nutrient deficiency or the activities of a pathogen.

Wildlife Damage
Damage caused by wildlife that is affecting the function of the tree.

Vandilism
Damage caused by someone doing harm to the tree.

Included Bark
A tree that is multi-stemmed or forked and has included bark will be less stable and more likely to push apart.

Girdling Root
A girdling root wraps around part of the tree's base and can cause a significant decline in health.

Sucker
A shoot or shoots arising from the roots of a tree.

Watersprout
An upright, adventitious shoot arising from the trunk or branches of a tree. Sometimes called a "sucker", although this term is incorrect.

Data Analysis—Results

The detailed results of the data analysis for the Delta Tree Inventory are contained in the following sections of this report. A brief description of the information found in each section is provided below. Each Specific Park, streetscape, or area inventoried will be referred to as a "zone".

Species Composition and Diversity

This section provides the complete listing by species of the street trees and their percentage of the total. A total of 128 public trees were identified and inventoried, with 17 different tree species represented. The ten most common species and their percent distribution within the city are listed below in Table 1.

Table 1. Ten most common publicly owned tree species in Delta, Utah including the total number of trees identified and respective percent distribution.

Species	Total	Percent (%) of Total
Ash-Green	48	37.50%
Elm-Siberian	36	28.12%
Hackberry-Common	10	7.81%
Pine-Austrian	7	5.46%
Poplar-sp	5	3.90%
Poplar-Lombardy	4	3.12%
Redbud	4	3.12%
Hackberry-Netleaf	3	2.34%
Spruce-Blue	2	1.56%
Birch	2	1.56%

Ideally, no one species should make up more than 10% of a community's tree population, no one genus should comprise more than 20%, and no family more than 30% (Clark et al. 1997). These ratios are used to provide a simple guideline to provide for a diverse population in order to minimize the chance of catastrophic losses from insects or disease. At 37.5%, Green ash (*Fraxinus pennsylvanica*) surpasses this recommended level along with Siberian elm at 28.12% *(Ulmus pumila*) in Delta. Another specie that has a high percentage value, close to the recommended limit include Common Hackberry (*Celtis reticulata*) at 7.81%.

Of the 17 genus represented in Delta's community forest, ash *(Fraxinus*) and elm (Ulmus) were the only genus that surpassed the recommended threshold of 20% maximum with a value of 37.5% and 28.12%. Correspondingly, the *Oleaceae* family which includes Green ash is also higher than recommended value at 37.5% as well as the Ulmaceae family at 38.27%. Figure 2. displays the total tree diversity by plant family for Delta, Utah.

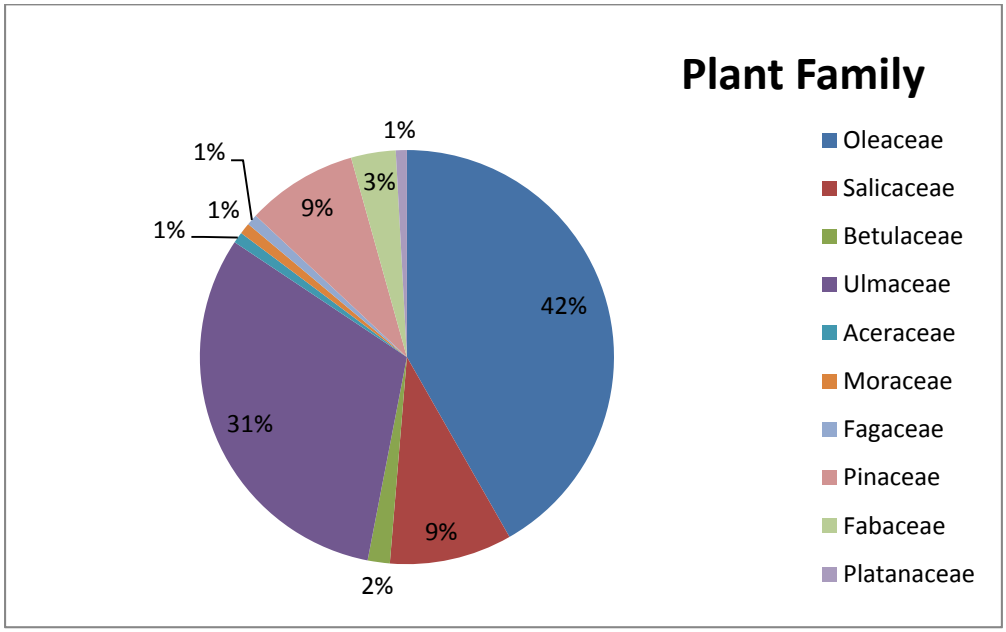

Figure 2. Tree diversity by plant family for Delta, Utah.

Relative Age

Age, relative to dbh size class, is important in determining current management needs as well as how the needs will change depending on total numbers and aging of individual species. Ideal community tree populations contain the largest percentage of trees in the smallest diameter class with decreasing percentages in the larger classes. Table 2 and Figure 4 display the citywide size and relative age distribution of Delta's community forest. Overall, the relative age of Delta's community forest is an evenly age class.

As Figure 5 displays, Cottonwood and Siberian elm are represented by having an aged population with few young trees to replace their aging predecessors. Conversely, many species are represented by only small size classes and while abundant, small trees are relatively unimportant when considering the functionality of the forest (McPherson et al. 1997).
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Table 2. Citywide diameter (inches) and relative age distribution of Delta's community forest.

Diameter Class	Frequency	% of Total
0--3	16	12.50%
4--6	11	8.59%
7--12	12	9.37%
13--18	16	12.50%
19--24	27	21.09%
25--30	24	18.75%
31--60"	19	14.84%
61--100"	3	2.34%

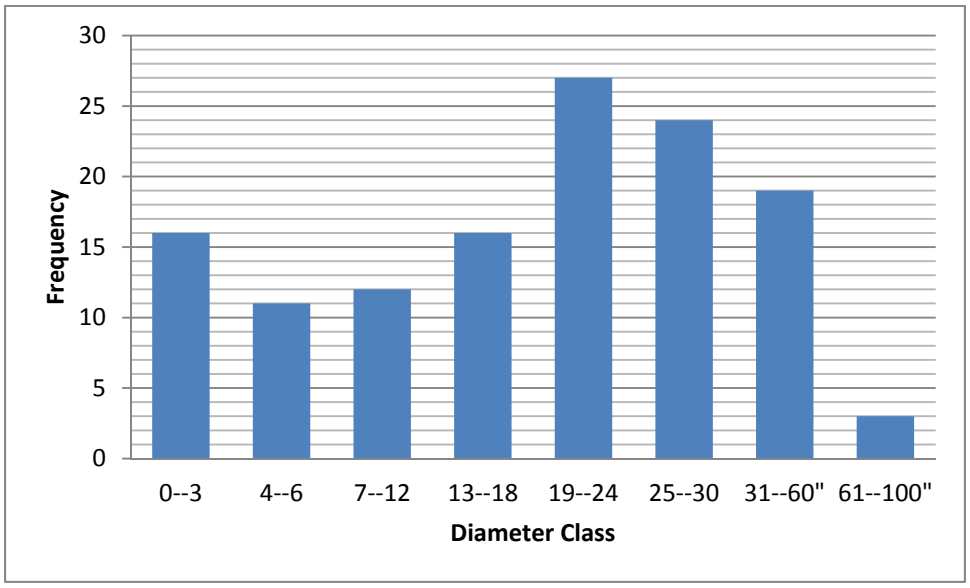
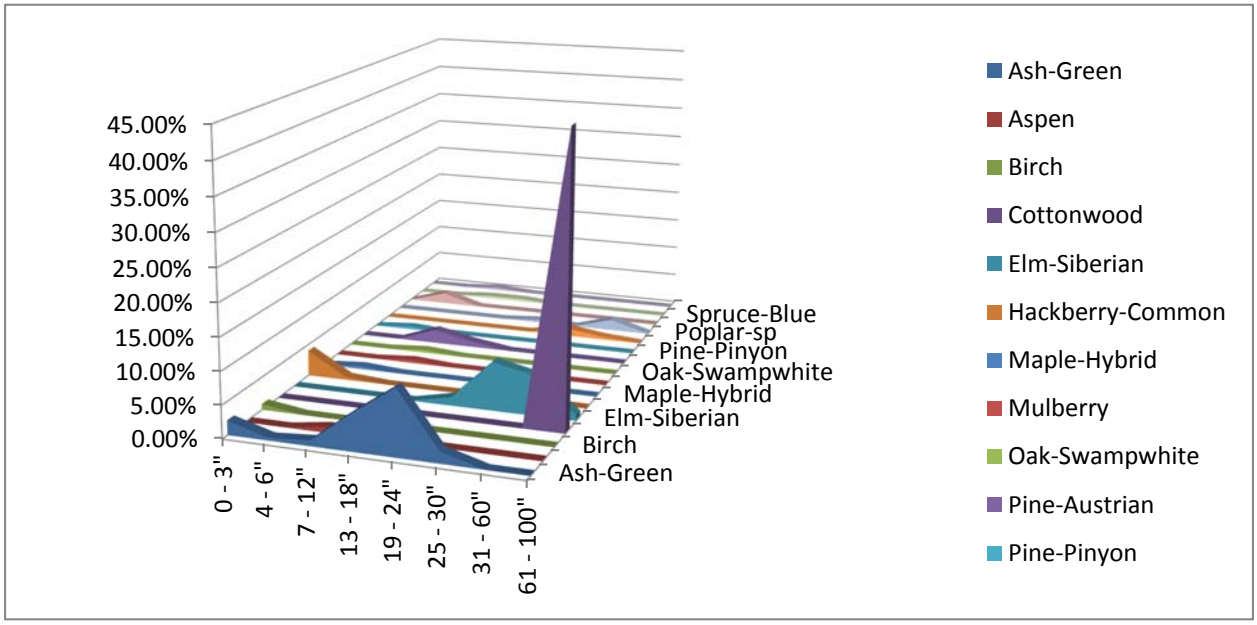


Figure 4. Citywide size (diameter class measured in inches) and relative age distribution of Delta's community forest.

Figure 5. Age distribution by species for Delta's species.



Condition

Tree condition indicates both how well trees are managed and their relative performance given site specific conditions. Table 3 displays the citywide totals per condition class for Delta. The majority of trees inventoried in Delta are in fair condition, 30% respectively. A total of twenty two trees were identified as being in poor condition during the inventory. As mentioned above, numerous factors can influence a trees condition, including past management practices and site conditions.

Table 3. Number of trees per condition class (frequency) and respective percent of total trees inventoried per condition class for Delta.

Condition Class	Frequency	% of Total
Excellent (80-99%)	34	26.56%
Good (60-79%)	33	25.78%
Fair (40-59%)	39	30.46%
Poor (<40%)	22	17.18%

Resource Management Needs

Optimizing management of Delta's community forest resource, within a limited budget, is contingent upon effective allocation of funds. To that end, this approach allows managers to compare relative management needs among zones and allocate funds accordingly.

Pruning needs
Understanding species distribution, age structure, and tree condition may aid in determining proper pruning cycle length, but it is important to understand the actual pruning needs of city trees. Not only will this knowledge provide clues to whether or not the pruning cycle is adequate, but it will also identify what level of risk and liability is associated with the city's tree population. Table 5 displays the maintenance tasks needed including pruning needs and other general maintenance needs. Overall, 100% (128) of all Delta's trees needed some form of pruning, and 1.56% (2) was categorized as immediate priority. The greatest pruning needs are trees needing "High Pruning".

Other Maintenance
In addition to pruning, several other significant maintenance needs were identified during the inventory. For example, fifteen "hazard trees/limbs" were identified and in need of structural pruning or removal. By far the greatest maintenance need identified during the inventory was pruning. In total, ten trees were recommended for removal.

Table 6 shows the number of trees in separate "comment" categories. While not necessarily always requiring maintenance or some type of follow up activity, the comments provide relevant information that may be useful for management. The majority of the problems associated with the various comments categories can be remedied through the application of better management practices. For example, the two most notable comments include 12 trees recorded as having "canopy dieback" and 9 trees interfering with "power lines". Both issues can be easily addressed through simple management practices.

Table 5. Maintenance tasks needed

Maintenance Task		
Pruning		
	Crown Cleaning	
	Crown Reduction	
	Cleaning	
	Structural	4
	Restoration	
	Safety Prune-Utility	
	Safety Prune-Other	7
	Prune High	85
	Prune Low	32
Other		
	Hazard Tree	10
	Hazard Limb	5
	Tree Ring	
	Recommend Removal	10
	Re-Inspect	
	Stake Removal	
	Treat Insect/Disease	

Table 6. Comments recorded for trees inventoried

Comments	
Co-Dominate Stems	2
Staked	
Trunk Wound	7
Girdling Roots	
Canopy Die-Back	12
Mower Damage	2
Topped	1
Sucker/Watersprouts	1
Multi-Stemmed	2
Insect/Disease/Stress	3
Power Lines	9
Included Bark	1
Sidewalk Damage	6
Chlorosis	5
Root damage	3
Vandalism	1

Resource Replacement Value

Replacement Values
Understanding the value of street trees is important when it comes time to determine staffing and budget levels. The replacement value utilizes factors such as species, size, condition and location to determine a street tree's dollar value. The total replacement value of Delta's community trees is estimated at $777,472. The average value of a street tree in this area is $6,074. The Siberian elms provide the highest dollar contribution to the citywide total at $444,962. By and large the greatest contribution to dollar value comes from trees in the larger diameter classes. Figure 6 displays the estimated replacement value of Delta's community forest per diameter class.

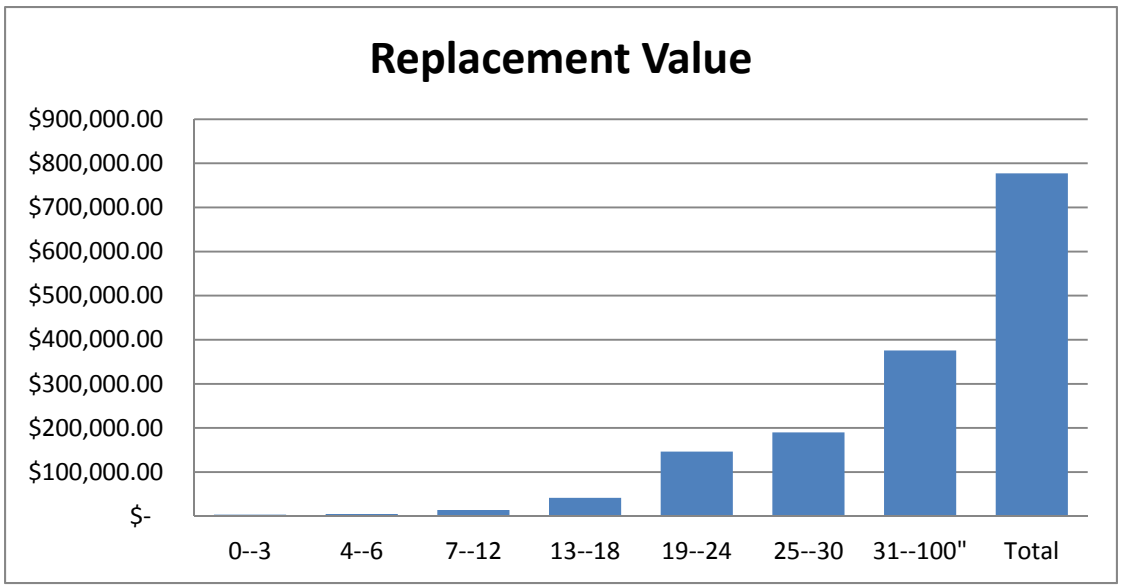


Figure 6. Estimated replacement value of Delta's community forest per diameter class.

Ecosystem Service Benefits
The environmental benefits associated with the urban forest, such as carbon sequestration and air quality improvement, have a value to society. As trees often provide benefits that reduce external costs to society (e.g., air pollution), estimates of these external costs (externality costs) are applied to the trees. For example, if a forest removes two tons of air pollution per year, and the external cost (e.g., estimated health impact) of a ton of pollution is $5,000, then forest air pollution removal value is estimated at $10,000 per year.
During 2014, Delta's publicly maintained trees will produce $30,172 in tangible benefits for the residents of Delta. This amounts to an average of $235.71 per publicly maintained tree, or approximately $8.68 per resident. Of this amount, stored CO2 and stormwater management—benefits that are locally realized—were the majority of this value at $9,103 and $5,172 annually, respectively. Though functionality of lesser proportion, improved energy savings and air quality were substantial with the values of $2,844 and $525 respectively. Annual increases in aesthetic

value to property were the largest benefits produced by trees in Delta, accounting for an annual value of $11,949 (Figure 7).

While species varied in their ability to produce benefits, common characteristics of trees within tree type classes (e.g., deciduous versus conifer) aided in identifying the most beneficial street trees in Delta. Comparatively, large trees produced the most benefits, but the average large deciduous tree produced more than a conifer.

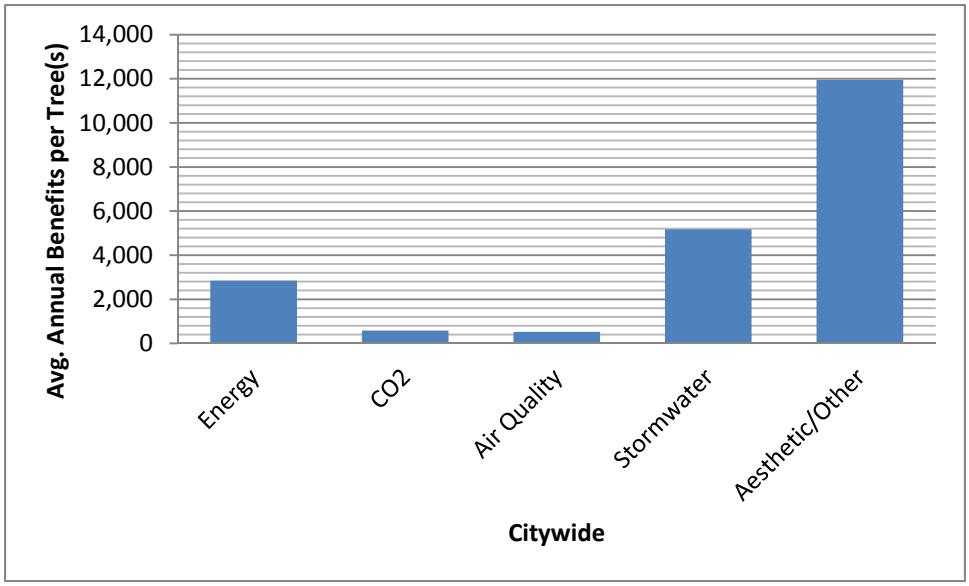


Figure 7. Approximate annual benefit values for Delta's publicly managed trees.

Carbon sequestration (annual removal from the air) and total cumulative storage (in woody stems and roots) by urban vegetation is important because the source of the carbon is carbon dioxide (CO_2). Delta's publicly maintained trees are currently storing 1,213,674 lbs of CO_2.

Urban vegetation removes a number of air pollutants including nitrogen dioxide, sulfur dioxide, carbon monoxide, ozone, and particulate matter. Gaseous pollutants (e.g., ozone) tend to be removed within the stomates of the leaves, while particles are mostly captured on the plant surface. Air pollution effects human health and poor air quality increases health care costs for individuals and society. Reduction in air pollutants has a value in terms of lower medical and hospitalization costs as well as health insurance premiums. Delta's publicly owned trees are currently helping to remove 262.6 lbs of pollutants from the air. More specifically, 82.9 lbs ozone (O_3), 49.5 lbs nitrogen dioxide (NO_2), and 20.9 lbs of particulate matter.

In addition to reducing air pollution and sequestering carbon, Delta's public trees also help reduce stormwater runoff and improve water quality. As communities grow, trees are removed

to make way for impervious surfaces such as parking lots, roads and buildings. Studies show that impervious surfaces have increased by 20% over the past two decades in urban areas nationally. Constructed stormwater facilities are created to compensate for the tree loss. These facilities are expensive to build and maintain. The cost has been calculated to be in excess of $100 billion nationally. Delta's publicly maintained trees intercept approximately 478,887 gallons of rainwater each year. This interception results in an annual savings of $5,172 in stormwater treatment for the city and residents of Delta.

Observations and Recommendations

1) A total of 128 trees were inspected. In total, two zones were inventoried including city park and soccer field.

2) The total replacement value of Delta's public tree resource is $777,359. Each tree has an average value of $6,074. By in large, the greatest contribution to dollar value comes from trees in the largest size classes (i.e., diameter class); most notably, Siberian elm (*Ulmus pumila*).

3) Delta's public tree resource provides ecosystem service and aesthetic benefits to the community valued at over $30,000 annually. Of this amount, stored CO2 and stormwater management—benefits that are locally realized—were the majority of this value at $9,103 and $5,172 annually, respectively. Though functionality of lesser proportion, improved energy savings and air quality were substantial with the values of $2,844 and $525 respectively. Annual increases in aesthetic value to property were the largest benefits produced by trees in Delta, accounting for an annual value of $11,949

4) Ten species account for over 90% of the total public tree resource. Diversity is one sign of a healthy and resilient community forest. Ideally, no one species should make up more than 10% of a community's tree population, no one genus should comprise more than 20%, and no family more than 30% (Clark et al. 1997). These ratios are used to provide a simple guideline to provide for a diverse population in order to minimize the chance of catastrophic losses from insects or disease. The inventory of Delta's public tree resource shows an need for species diversification at the citywide scale.

5) 100% of the public tree resource was noted to be in need of pruning. As budgets allow, trees noted to be in need of "cleaning" and marked with an "immediate" priority level should be prioritized first. Furthermore, consideration should be made to develop and implement a pruning schedule. For more information on methods and recommendations regarding how to develop a pruning schedule, consult "An Illustrated Guide to Pruning" (Gilman, 2002, p.84). Equally as important, special attention should be made toward recognizing species attributes that contribute toward increased pruning needs prior to species

selection and planting. For example, canopy size, growth form, site restrictions, etc. Lastly, it is strongly recommended that only arborists certified by the International Society for Arboriculture are used to perform pruning work. It is risky to allow unqualified individuals work on this valuable resource.

6) Planning for succession. Trees, just as all living organisms, reach a stage of maturity and die. Planning for this natural succession is a critical step in community planning. Delta's current age distribution displays a somewhat of an even age class. Although, efforts should be made to start focusing on planting a variety of long-lived medium to large-stature trees in order to maximize canopy cover and associated benefits.

7) Keep inventory up-to-date and identify available planting spaces. Now that a comprehensive inventory of Delta's publicly managed trees has been conducted, one of the critical steps is to keep the inventory relevant by updating the information on a consistent basis including new plantings, removals, and monitoring condition. Furthermore, an inventory of available planting sites and the respective size of tree the space can accommodate will help managers prioritize and plan.

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Current Species List

Common Name	Scientific Name	Total	Percent (%) of Total	Genus	Percent (%) of Total	Family	Percent (%) of Total
Ash-Green	Fraxinus pennsylvanica	48	37.50%	Malus	37.50%	Oleaceae	37.50%
Aspen	Populus tremuloides	1	0.78%	Populus		Salicaceae	
Cottonwood	Populus fremontii	1	0.78%	Populus		Salicaceae	
Poplar-Lombardy	Populus nigra	4	3.12%	Populus		Salicaceae	
Poplar-sp	Populus	5	3.90%	Populus	8.59%	Salicaceae	8.59%
Birch	Betula occidentalis	2	1.56%	Betula	1.56%	Betulaceae	1.56%
Elm-Siberian	Ulmus pumila	36	28.12%	Ulmus	28.12%	Ulmaceae	
Hackberry-Common	Celtis occidentalis	10	7.81%	Celtis		Ulmaceae	
Hackberry-Netleaf	Celtis reticulata	3	2.34%	Celtis	10.15%	Ulmaceae	38.27%
Maple-Hybrid	Acer	1	0.78%	Acer	0.78%	Aceraceae	0.78%
Mulberry	Morus alba	1	0.78%	Morus	0.78%	Moraceae	0.78%
Oak-Swampwhite	Quercus bicolor	1	0.78%	Quercus	0.78%	Fagaceae	0.78%
Pine-Austrian	Pinus nigra	7	5.46%	Pinus		Pinaceae	
Pine-Pinyon	Pinus edulis	1	0.78%	Pinus	6.25%	Pinaceae	
Spruce-Blue	Picea pungens	2	1.56%	Picea	1.56%	Pinaceae	7.81%
Redbud	Cercis canadensis	4	3.12%	Cercis	3.12%	Fabaceae	3.12%
Sycamore	Platanus	1	0.78%	Platanus	0.78%	Platanaceae	0.78%

Suggested Species List

SUGGESTED TREE LIST FOR
HARDINESS ZONES 4-6

UNDERUTILIZED SPECIES THAT SHOULD BE PLANTED MORE

Giant Sequoia (*Sequioadendron giganteum*)	Conifer	
Ginko (*Ginko biloba*)	Conifer	
Lacebark Pine (*Pinus bungeana*)	Conifer	
European Larch *(Larix decidua*)	Conifer	
Baldcypress (*Taxodium distichum*)	Conifer	
Incense-cedar (*Calocedrus (Libocedrus) decurrens*)	Conifer	
Amur Corktree (*Phellodendron amurense*)	Deciduous	
Bigtooth Maple (*Acer grandidentatum*)	Deciduous	**Utah Native*
Bur Oak (*Quercus macrocarpa*)	Deciduous	
Common Hackberry (*Celtis occidentalis*)	Deciduous	
Goldenraintree (*Koelreuteria paniculata*)	Deciduous	
Turkish Filbert (*Corylus columa*)	Deciduous	
Paperbark Maple (*Acer girseum*)	Deciduous	
Japanese Zelkova (*Zelkova serrata*)	Deciduous	
Japanese Tree Lilac (*Syringa reticulata*)	Deciduous	
Kentucky Coffeetree (*Gymnocladus dioicus*)	Deciduous	
Gambel Oak (*Quercus gambelii*)	Deciduous	**Utah Native*
Lacebark Elm (*Ulmus parvifolia*)	Deciduous	
Fringetree (*Chionanthus virginicus*)	Deciduous	
Yellowwood (*Cladrastis kentuckea*)	Deciduous	
European Beech (*Fagus sylvatica*)	Deciduous	
Persian Parrottia (*Parrottia persica*)	Deciduous	
Downy Serviceberry (*Amelanchier arborea*)	Deciduous	
Smoketree (*Cotinus spp.*)	Deciduous	

GOOD SPECIES THAT HAVE PROVEN THEIR WORTH

Austrian Pine (*Pinus nigra*)	Conifer	
Ponderosa Pine (*Pinus ponderosa*)	Conifer	**Utah Native*
Pinyon Pine (*Pinus edulis*)	Conifer	**Utah Native*
Douglas-Fir (*Pseudotsuga menziesii*)	Conifer	**Utah Native*
Hawthorns (*Crataegus spp.*)	Deciduous	
London Planetree (*Platanus x acerifolia*)	Deciduous	
Canada Chokecherry (*Prunus virginiana*)	Deciduous	

Northern Catalpa (*Catalpa speciosa*)	Deciduous	
Eastern Redbud (*Cercis canadensis*)	Deciduous	
American Linden (*Tilia americana*)	Deciduous	
Littleleaf Linden (*Tilia cordata*)	Deciduous	
American Elm (*Ulmus americana*)	Deciduous	

OVER-PLANTED OR TREES THAT ARE PRONE TO PROBLEMS & SHOULD RARELY BE PLANTED

Red Maple cultivars (*Acer rubrum*)	Deciduous	**Overplanted/suffers in high pH*
Norway Maple (*Acer platanoides*)	Deciduous	**Overplanted/suffers in high pH*
Ornamental Pear (*Pyrus calleryana*)	Deciduous	**Overplanted/weak wood*
Poplars (*Populus spp.*)	Deciduous	**Overplanted; however certain situations warrant use (e.g., wind-break)*
Honeylocust (*Gleditsia triacanthos*)	Deciduous	**Overplanted*
Green Ash (*Fraxinus pennsylvanica*)	Deciduous	**Overplanted*
Aspen (*Populus tremuloides*)	Deciduous	**Planting should be limited to moist mountain sites*
Willows (*Salix spp.*)	Deciduous	**Native willow shrubs excluded*
Siberian Elm (*Ulmus pumila*)	Deciduous	
Russian Olive (*Elaeagnus angustifolia*)	Deciduous	**Invasive*
Tamarisk or Salt Cedar (*Tamarix ramosissima*)	Deciduous	**Invasive*
Tree of Heaven (*Ailanthus altissima*)	Deciduous	**Invasive*

PHOTOS AND SPECIFIC SPECIES INFORMATION AVAILABLE ONLINE AT:

www.treebrowser.org

OTHER USEFUL RESOURCES:

Utah Forest Fact Sheets -
NR/FF/014 "16 Less Common Trees for Utah Landscapes"
NR/FF/015 "Conifers for Utah"
Available at:
http://extension.usu.edu/forestry/Reading/FFIndex.htm