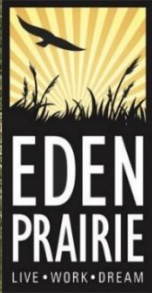




URBAN FORESTRY MANAGEMENT PLAN

City of Eden Prairie

A comprehensive guide to citywide
actions related to the urban forest



Acknowledgements

We would like to thank many people for their continued support of the city's forestry and natural resources program, whom work tirelessly to improve and maintain our treasured landscapes. These people include: Mayor Ron Case, the entire City Council, Parks and Recreation & Natural Resources Commission members, Parks and Recreation Director Jay Lotthammer, Parks & Natural Resources Manager Matt Bourne, and the people of Eden Prairie.

Document prepared by Forestry & Natural Resources Specialist, Lauren Stufft and by Minnesota GreenCorps member, Alexander Law.

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Executive Summary

This document records the current practices utilized by the City of Eden Prairie. These practices are based on current forestry and natural resources research and are recognized as industry best practices. These practices address current issues for our urban forest, such as invasive species and describes strategies to mitigate future issues such as tree planting diversity guidelines for reforestation efforts. The Urban Forestry Management Plan is a living document, flexible as new challenges emerge and as best management practices change.

This document outlines the goals, practices, and reasoning behind our urban forest management. The goals and practices outlined in this document increase the safety and general welfare of the urban forest while also improving the user experience of the park system. Publication of this document is meant to spread awareness to the citizens of Eden Prairie on urban forestry issues our community faces and to highlight what the City of Eden Prairie is doing to address these issues. While the City's Parks and Natural Resources Division will primarily be responsible for implementing this plan, interdepartmental cooperation and collaboration will be essential to ensure management decisions are made in a sustainable and economically responsible manner.



Figure 1: Prairie Plants in Bloom at Round Lake Park

Core Values, Vision, and Mission

City of Eden Prairie Core Values

1. We develop positive relationships inside and outside our organization. We build teams to create cohesive systems. We work toward a common goal and consistently find ways to bridge gaps. We care about people and build meaningful experiences to advance opportunities for all. We share our talents, skills and knowledge for the greater good.
2. We are a learning organization, committed to advancing in a world that is ever-changing. We encourage initiative to challenge the status quo and continue to improve, while honoring what has been done before. We progressively seek out innovative trends and pioneer new ideas to implement the vision of the City. We engage others and utilize feedback to learn, develop and grow.
3. We are honest, ethical and trustworthy. We protect the City's resources, including property, money and time. We take responsibility and follow through on our word. We uphold our values and align them with our goals and priorities.
4. We strive to achieve excellence. We are problem solvers. We seek and implement long-term solutions. We deliver positive and measurable results.

5. We create a welcoming and inclusive atmosphere. We strive to exceed customer expectations with each unique interaction. We focus on listening and understanding the needs of others. We exhibit positive attitudes, even when faced with adversity. We embrace diverse perspectives, experiences, lifestyles and cultures.

City Vision Statement

Eden Prairie is a vibrant city characterized by the thoughtful integration of natural beauty and physical development that creates a highly desirable place for its residents and businesses.

Mission Statements

City Mission:

Eden Prairie city government fosters respect for the past, plans for the future, and delivers high quality public services that contribute to a strong sense of community.

Parks and Recreation Mission:

Parks and Recreation fosters a high quality living environment and provides healthy, safe, enjoyable leisure time opportunities for all segments of the population by...Developing and maintaining the park and open space system with sufficient recreation facilities to meet community needs...Identifying and recommending ways to protect and preserve unique historical and environmental features within Eden Prairie.

Defining the Scope of the Urban Forestry Management Plan

Plan Scope

The Parks and Natural Resources Division is responsible for the care of the City's 44 parks and special use areas, including maintaining more than 1,000 acres of developed parkland, and ensuring a healthy and viable urban forest. This care includes tree plantings, tree inventory updates, crown cleaning, crown raising, structural pruning, tree removals, and routine tree inspections.

The passive areas of the park system include an additional 1,400 acres of property that is unmaintained or involves minimal maintenance work. Management in these natural areas is responsive to current adversities. These areas are also managed for ecological services and wildlife habitat.

Effective management of natural areas is accomplished by utilizing grant funding, engaging volunteers, and creating partnerships to preserve particularly important ecosystems.

This management plan guides management in both the maintained and natural spaces in the City of Eden Prairie.

Plan Limitations

This plan primarily focuses on trees that are on city land or are otherwise the management responsibility of the City of Eden Prairie, as this resource is directly managed by the city. This plan does not mandate management activities on private lands. However, our intent is that private property owners utilize this plan as a guide to maintain and improve their trees and natural spaces. Additionally, some lands in Eden Prairie are excluded from this plan as they are not suitable for tree canopy cover, including:

- Prairies, where increased tree canopy or changes in tree type would decrease prairie plant diversity, pollinator or wildlife habitat, or otherwise compromise the ecological integrity of the prairie
- Wetland areas such as lakes or areas where flooding prevents tree growth and establishment
- Park infrastructure that is desirable or necessary to provide a positive user experience such as sports courts, baseball fields, soccer fields, ice rinks, community gardens, playground, park buildings, above and below ground utilizes, and open spaces for undesignated play



Figure 2: Native prairie at Richard T. Anderson Conservation Area

Relationship to Other Documents

In 2018, the City produced an Emerald Ash Borer (EAB) Management Plan to combat the spread and damage caused by EAB. The EAB Management Plan outlined plans for mitigating the damage caused by this invasive species and acts as a supplemental document to the Urban Forestry Management Plan.

In 2020, the city partnered with LHB Corporation to develop the Climate Action Plan. By 2050, Eden Prairie’s predicted carbon dioxide equivalent emissions were expected to total 1,028,901

One strategy that can push the city to a more near-term de-carbonization date are conscious sustained efforts in urban forestry. Trees are one of the cheapest strategies to remove and store carbon from our atmosphere (World Resources Institute, n.d.).

tons. In response to these predictions, the Action Plan was created to identify strategies for greenhouse gas emission reduction, including: energy code enforcement, net-zero energy buildings, behavior change and

fleet electrification, among others. The Carbon Action Plan lays the groundwork for carbon neutrality in the city by 2050. It states, “While it is the goal of the EP CAP to achieve total

communitywide de-carbonization by 2050, efforts that work to achieve this goal ahead of 2050 should be sought out and diligently pursued”.

Current Regulations & Policies Related to Forestry

Current regulations adopted by the City are essential to maintaining a healthy urban forest. Regulations require that trees diseased with highly contagious and fatal disease be removed and disposed of properly in order to prevent tree mortality. Additionally, regulations allow the city to condemn trees on private property when they are hazardous to public property (sidewalks, streets, etc.). These regulations include city codes 9.70, the shade tree pest control, and 11.55, the land alteration, tree preservation and storm water management code.

These city codes are summarized as follows:

9.70 – Shade Tree Pest Control

This code directly deals with the identification and disposal of diseased or infested trees, on both public and private property. The city decided to address these issues by requiring the appointment of a city tree inspector to the Parks and Recreation Department. The code also lays out best management practices for work on potentially infested or diseased trees. This includes implementing a ban on the transport of infested wood to prevent the spread of pests and diseases. Lastly, the code allows the city to take immediate abatement action when a tree on private property is hazardous to public property.



Figure 3: Emerald ash borer larval galleries

11.55 – Land Alteration, Tree Preservation, and Storm water Management Regulations

Code 11.55 lays out tree planting and removal requirements that homeowners and developers must abide by. This code encourages the protection and preservation of Eden Prairie’s natural vegetation and topography. One of the purposes of this code is to minimize tree loss and removal and to prevent wind and water erosion.

11.03 – Landscaping Requirements

Defining the Benefits of Trees

The benefit of trees can be difficult to fully encapsulate, as many of these benefits are not easily measured. iTree, a state of the art, peer reviewed software, was used to estimate the direct economic benefits of Eden Prairie’s trees. iTree was developed by the USDA Forest Service for intended use by homeowners, educators, businesses, researchers and governments. Wider examples of the economic and social benefits of trees come from the cited research papers. Here are just some of the benefits of trees.

Trees reduce storm water.

Urban trees reduce the amount of storm water a city has to deal with through interception, evapotranspiration, and infiltration. This reduces the amount of infrastructure needed by a city to transport and treat storm water as well as aids in the recharging of aquifers and reduces runoff into our lakes and streams. The street trees alone in New York City were found to intercept 890 million gallons of storm water annually, that's 1,525 gallons per tree on average, with a total value of over \$35 million each year (Peper, et al.). iTree estimates that Eden Prairie trees intercept 49 million gallons of storm water per year, with a total value of \$437,249.

Trees reduce utility bills.

Trees can save us a tremendous amount of energy through shading buildings and pavements, along with serving as

The net cooling effect of a well-placed healthy tree is equivalent to 10 air conditioners operating 20 hours a day (Wolf K. , 1998). This natural insulation effect is recognized in city code 11.55.

windbreaks. Evergreens serving as windbreaks in the winter can save 10-50% on heating costs (U.S. Department of Energy). In

Minneapolis, street trees alone save \$6.8 million in energy costs annually (McPherson E. , et al., 2005).

Trees help combat the urban heat island effect.

The urban heat island effect occurs when urban ambient air temperature is hotter than its rural surroundings (Fallmann, Emeis, Wagner, & Ketterer, 2016). This occurs when infrastructure absorbs short-wave radiation from the sun during the day, emitting it later in the evening keeping temperatures high. This infrastructure is comprised of impermeable surfaces, preventing evaporative cooling from reducing temperatures. Cooling is also prevented by infrastructure blocking winds from taking hot air away. The urban heat island effect is most prominent in industrial and marginalized communities. One way to combat it and alleviate this effect is by planting of trees. Trees decrease temperatures through their evaporative cooling effects associated with the photosynthetic process (Fallmann, Emeis, Wagner, & Ketterer, 2016).

Trees extend the life of our streets.

Although trees can cause damage to infrastructure in situations of poor planning, they can also increase the life and decrease maintenance for infrastructure in cases of good planning. One example comes from Modesto, California where they found that paved streets shaded with large-stature trees reduced costs for repaving by 58% or (\$0.66/ft²) compared to unshaded streets over a 30 year period (McPherson & Muchnick, Effects of street tree shade on asphalt concrete pavement performance, 2005).

Trees increase home values.

Properties with or in close proximity to trees are typically worth more money. A study done in east Portland found having one average sized tree for that area in front of a home increased its sale price by \$7,130. The tree's benefits spilled over to homes within a 100-foot radius,

increasing their combined value by \$12,828 (Wells, 2010). A similar study done in the Philadelphia neighborhood of New Kensington showed new tree plantings increased surrounding housing values by approximately 10%, which translated to a \$4 million gain in property value just through tree planting (Wachter, 2004).

Trees fight crime.

A study done of public housing residents in inner-city Chicago found that 25% fewer acts of domestic aggression and violence were reported in areas with nearby trees and natural landscapes than areas without (Kuo & Sullivan, Aggression and Violence in the Inner City, Effects of Environment via Mental Fatigue, 2001). A separate study conducted in the same area found that apartment buildings with high levels of vegetation had 52% fewer total crimes reported than those with low levels of vegetation. Proposed reasons for this reduction of crime is the increase in surveillance due to higher outdoor activity and lowered mental fatigue due to exposure to green space (Kuo & Sullivan, Environment and the Inner City, Does Vegetation Reduce Crime?, 2001). Considering in Minnesota the taxpayer pays on average \$41,366 per inmate annually (Mai & Subramanian, 2017) this reduction in crime could save us a significant amount of money.

Trees keep us healthy.

Increased air quality is another benefit of trees. They clean the air by absorbing carbon dioxide, sulphur dioxide, nitrous oxides and other pollutants (Simpson, et al., 2006). Increased air quality means less health risks.

Researchers from Columbia University found childhood asthma rates were highest in parts of New York City where tree density was lowest. The rate of asthma fell by 24% for every extra 343 trees/km², a pattern that held true even after taking account of differing sources of pollution, levels of affluence and population density (G S Lovasi, 2008). On the same track, patients recovering from surgery in hospital rooms with window views of a natural scene had shorter postoperative hospital stays, received fewer negative evaluations in nurses' notes, and took fewer painkillers than matched patients in similar rooms with windows facing a brick wall (Ulrich, 1984).



Figure 4: Residents taking home a brand new tree to plant in their yard after the 2020 tree sale

Trees are good for business.

Shoppers are willing to travel further to visit a business district with high quality trees and spend more time there once they arrive. They are also willing to spend 9%-12% more for products in well treed business districts than those with no trees. This was found to be true in cities of varying sizes and across the US (Wolf K. L., 2005).

Trees create jobs.

In 2002 the environmental horticultural industry was estimated to employ 1,964,339 people, adding \$95.1 billion in property value, and contributed \$64.3 billion in labor income (Hall & Hodges, 2006).

Trees Sequester Carbon

iTree estimates that the carbon sequestration of Eden Prairie’s trees is equivalent to \$18,445,065.00 or 108,150 Tons of carbon. Each year that sequestration is worth \$413,853.00, for the annual fixation of 2,426.5 tons.

Trees Provide habitat for animals.

Habitat trees are defined as live or dead trees with large dead branches, cracks, cavities and trunk rot, among others. Many of these same features would denote the tree as being hazardous but these natural features are host to many species through their decaying process.



At least 25% of forest species depend upon these types of trees, and many harbor endangered plants and animals (Butler, Lachat, Larrieu, & Paillet, 2016). Their ecological value is precisely why many of these trees are left standing in natural spaces owned by the city. Native plants play key roles in the food webs of pollinators, which then go on to support local agriculture. While annual flowers are promoted as supporting pollinators, trees also play a key

Figure 5: Osprey egg found at Staring Lake during a banding event in 2005

role. Some trees produce their own flowers and many host caterpillars (Tallamy).

Trees provide more benefits than costs.

Do the costs outweigh the benefits? In the early 90’s a study was done in Chicago to determine if benefits from their newly planted trees outweighed planting and maintenance costs over a 30

year period. They determined there was a *net* benefit of \$38 million over the 30 years or \$402 per tree planted. For every \$1 invested in planting and maintenance costs, they received \$2.83 back in benefits (McPherson, et al., 1997). Trees are the only type of infrastructure that increases in value over time.



Figure 6: Rainbow Tree Care treating a mature Green Ash, preserving it from removal

In 1997-1998 the City of Modesto, California set out to find if the annual \$2.6 million municipal budget spent on urban trees was justified. The results of the study found the total annual benefit from Modesto’s urban trees to be \$4.95 million, *netting* \$2.3 million or on average \$54.33/tree annually (McPherson G. , Simpson, Peper, & Xiao, 1999).

In Davis, California a study of 24,000 maintained public street trees showed a *net* annual benefit of \$1.2 million, with every \$1 invested returning \$3.80 in

benefits. The costs factored in included infrastructure damage, price of litter/storm clean up, litigation and settlement expenditures, as well as planting, maintenance, and removal costs (Maco & McPherson, 2003).

Trees in New York City provide \$5.60 in benefits for every \$1 spent on tree planting and care (Peper, et al.). Studies done by a variety of researchers across the nation and world continue to tell us that investing in urban trees has significant returns. These returns can be increased greatly through proper planning (site and species selection) as well as using proper planting techniques and continued maintenance.

Minneapolis receives an annual estimated net benefit of \$15.7 million or \$79/tree from its municipal trees (McPherson E. , et al., 2005).

History of Eden Prairie’s Urban Forest

Tree City USA

Tree City USA is a national recognition program founded in 1976 by the Arbor Day Foundation in partnership with the US Forest Service to bring awareness to communities about the value of trees, and the efforts their local government makes to plant and preserve trees. Participation in the program also gives cities resources for urban forest management. Eden Prairie has been a Tree City USA member since 1981. Participating for over 30 years, we are among the oldest members in Minnesota. In 2021, the city received the Sterling Award for our 10-year participation in their growth program.

Tree City USA Standards

To participate in the Tree City USA program these standards must be followed;

Standard 1: A legal responsibility for public tree care.

Eden Prairie meets this requirement by the adoption of city code 9.70 as well as the tree health evaluations and decisions made by city staff.

Standard 2: Tree care and preservation as a priority.

Eden Prairie meets this requirement by the adoption of city codes 9.70 and 11.55 and by having full time staff dedicated to tree maintenance.

Standard 3: Community forestry program with an annual budget of at least \$2 per capita.

Eden Prairie has spent anywhere from \$3.88 to \$4.87 per capita in past years.

Standard 4: An Arbor Day observance and proclamation.

Eden Prairie celebrates Arbor Day on an annual basis with an Arbor Day walk and green fair.



Figure 7: Emma Schultz with the MN DNR (left) presents Sterling Award to Jay Lotthammer (middle) and Lauren Stufft with the City of Eden Prairie (right) in 2021.

Historical Urban Forest Management

The City has always marked trees that were dead, diseased, or had obvious structural defects for removal. Removal occurred on an annual basis or at a timeline that was deemed appropriate by City staff. Survey for diseased trees is closely linked to our status as a Tree City USA city. Annual reports confirm that since 1981, our first year with such status, thousands of diseased trees have been marked for removal.

Historically, the City has managed virulent tree diseases and pests such as Dutch elm disease (DED) and oak wilt. DED related tree mortality was at its peak from the 1980's to the early 2000's. Tree loss from virulent tree diseases continues. Before 2009, emerald ash borer (EAB) had not yet reached Minnesota. Since EAB was discovered in Eden Prairie, it has killed thousands of trees. Managing pests and diseases will always be a vital part of urban forest management, but future workloads can be managed proactively by planting a diverse range of tree species and by following other best management practices set forth in this document.

Dutch elm disease (DED) and oak wilt:

Since DED and oak wilt were added to the city ordinance in 1981, the city has completed an annual citywide tree inspection. The inspection identifies and removes trees with DED or oak wilt on public property. Additionally, the city identifies and abates trees with DED or oak wilt on private properties. By doing this, the city decreases the total number of trees killed by these diseases. Without management, the city would have many more dead elms and oaks.

Emerald ash borer (EAB):

In 2018, while writing the EAB plan, it was estimated that Eden Prairie had 3,164 city owned ash trees that needed to be chemically treated or removed. That year, the city treated 369 ash trees on city property, which was the first of a three year treatment cycle. The city also removed over 274 ash trees in 2018. Residents took advantage of the citywide discount in Eden Prairie’s ash tree treatment contract, treating over 1,500 ash trees. The city partners with treatment contractors to educate homeowners on the value of treating ash trees. This includes promotional mailings, featured pieces in local news media, social media campaigns, and the utilization of neighborhood communication applications.

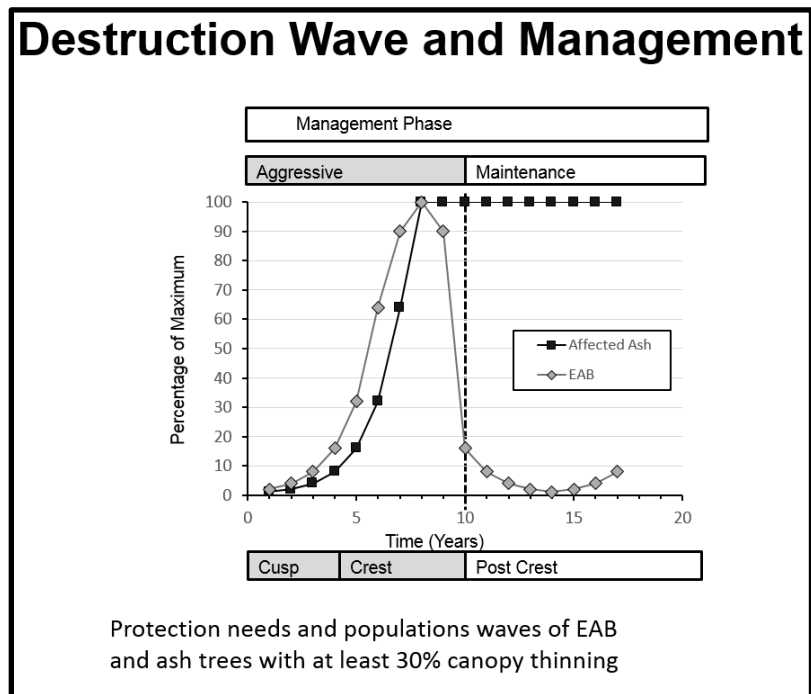


Figure 8: Purdue University emerald ash borer Cost Calculator Destruction Wave predictive graph

The city aimed to treat mature, healthy ash with a 12” diameter or greater, which were planted in desirable locations on public property. These trees were selected due to their value to the community. A total of 963 trees were selected for treatment. In 2018, the city aimed to remove 2,114 trees in the city right-of-way and in city parks. The planting goal was to replace trees in maintained areas at 1.5 times the rate of removal.

City Goals

Planting Practices

Age Diversity

Since 2018, the City of Eden Prairie has tracked the year trees were planted in our tree inventory. The ages of trees planted before 2018 can only be estimated by diameter at breast

height (DBH) measurements. Consistently planting trees on an annual basis to replace trees that are lost will result in a diverse age structure. Age diversity is important because trees are vulnerable to different types of stressors at different ages. For example, seedlings are vulnerable to drought, but not high-speed wind events, and older trees are more vulnerable to high-speed wind events but not drought (Swanston, et al., 2018). Age diversity increases the resiliency of the urban forest by preventing tree loss in the event of natural disaster (e.g. drought or high speed wind event).

Species Diversity

Invasive species are responsible for nearly 75% of all known species extinctions (Guyot, et al., 2015), causing major losses in biodiversity in many different ecosystems. Susceptibility to invasion increases with a decrease in biodiversity. The city is committed to planting a diverse range of species in order to mitigate potential damages from current and future invasive species.

Trees of the same genus (genera plural) have the same basic flower structure and may resemble other genus members in outward appearance. An example of a tree genus is maple. However, a red maple is a species of maple within that genus.

The EAB Management Plan set in motion a diversity-based guideline, namely that the city would not plant more than 10% of any one genus and that all maple, apple, and spruce should be avoided due to high existing populations. While it is rare for any of these three genera to be planted by the city, there may be some situations where these genera are desirable. For example, apple trees may still be considered when planting a community orchard.

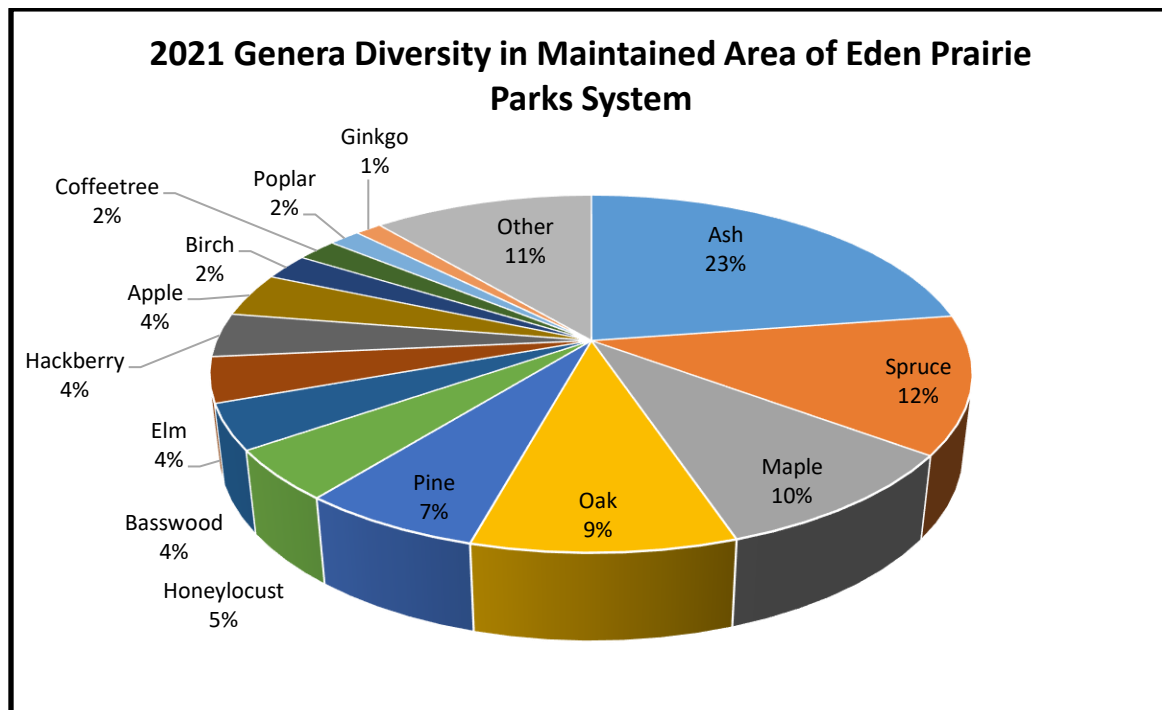


Figure 9: Genera diversity for trees in the maintained area of Eden Prairie parks in 2021.

Experts recommend that communities not plant more than 5% of any one genus. They suggest avoiding trees from species rich genera, where there is a high disease susceptibility, and instead maximizing the planting of monotypic trees (Ball, 2017). Monotypic trees are those that only have one species in their genus. Examples of monotypic trees include ginkgo, Kentucky coffee tree, Osage-orange, hardy rubber tree and katsura tree. Monotypic trees may only have one or two pests, while genera with many species can have hundreds. As an example, maple has 128 species in its genera and 208 pests (Sinclair & Lyon, 1987) (Johnson & Lyon, 1976) (Krussmann, 1984). Ginkgo, on the other hand, a monotypic tree, meaning it has only one species in its genera, has no known pests.

There are limitations on a 5% genus goal. The limitations that should be considered include that certain genera do not survive in certain environments. You must plant with proven success and the right tree in the right spot is the first priority before species diversity. You would not plant a native Amazonian tree to Minnesota to improve diversity standards, as the long-term success of this tree is very low due to it not being cold hardy or appropriate for our local climate. Plant trees that you know will thrive in our climate.

Another limitation is the availability and/or cost of tree stock. Having a clear budget gives flexibility to the department and gives the ability to order trees far in advance, which reduces the cost of tree stock. Ordering trees in advance will also give options for more diversity. Ordering two months out from a planting due to budget would restrict planting options to the most common trees, which are typically those that are over planted in our community.

Invasive species become destructive when they are introduced into a new landscape. Another dynamic of diversity is to avoid planting genera with species that grow in many parts of the world. Invasive species from one part of the genera are more likely to cross continents leads to an increased likelihood of pests and increased likelihood of the spread and establishment of those pests (Ball, 2017).

While we want to maximize the use of native species in our forests, it is important to supplement with introduced species to improve diversity. Use of male or fruitless varieties is best as this prevents uncontrolled propagation and the creation of new invasive species.



Figure 10: Students at Prairie View Elementary planting an urban orchard in partnership with Hennepin County

The Parks & Recreation Department’s genetic diversity goal is to have no more than 5% of any given genera in the maintained portion of its parks. However, the limitations will not be ignored to meet this goal.

These diversity goals will also be promoted on private property types, such as residential, commercial and industrial. Future integration of a diversity guideline with commercial landscaping plans will be one way to accomplish this goal. Efforts towards public outreach to accomplish this goal on residential properties will need to be made.

Quality of Planting Stock

When writing contracts with vendors, the most current ANSI Z60.1 standards of nursery stock will be used. These standards, set forth by the American Horticulture Industry Association, establish common techniques and terminology for the industry. Also described are forms and measurements for diameter, height, and root depth based upon different species.

- ANSI Z60.1 is used to facilitate nursery stock transactions, ensuring the consumer receives the healthiest tree possible at the time of planting (AmericanHort, 2014).
- Vegetative cuttings are a form of asexual reproduction used to create nursery stock. Each cutting, which then grows into a tree, is essentially a clone of the original.
- When possible, one should avoid vegetative cuttings and cloning in order to maximize individual genetic variation. Maximization of individual genetic variation will increase resilience to pests and stress.

Proper Planting Practices

Proper planting techniques following the International Society of Arboriculture’s “Best Planting Practices” will minimize losses in both the long and short term (AmericanHort, 2014). The city should continue to follow these practices so that trees planted do not become hazardous or die.

An example of proper planting practices would be the removal of encircling roots at the time of planting. This will significantly decrease the chance of stem girdling roots in the future. Stem girdling roots is a common cause of tree death near or at maturity. Proper watering at the time of planting minimizes tree losses in the short term by allowing new roots to become properly established. City crews and volunteer groups should be trained and closely supervised during a



Figure 11: Volunteers with Tree Trust planting a tree at Cedar Hills Park

planting event to ensure proper practices are followed.

The primary cause of post-planting stress is too little or too much water. Following recommended amounts and frequency of watering is needed to ensure establishment. Other establishment care includes mulching, trunk protection, and structural pruning.

Planting Locations

The city should continue to take into consideration the physical characteristics of trees to minimize conflicts with infrastructure. These characteristics include height, crown spread and form.

Some basic planting instructions include:

- Plant short trees under utility lines
- Tree locations should be moved a minimum of 10 feet away from any underground utility (e.g. gas, water, sewer and electric lines)
- Do not block windows of buildings, this may promote vandalism and disrupt views
- Do not plant short trees at the edge of streets where they may block signage or impede traffic
- Space trees based on tree crown size to prevent overcrowding
- Sites that are not appropriate for tree planting (small cutouts, areas with standing water, areas that impede park use, etc.) should not be planted

Planting in Best Use Ways

The City should continue to plant in the highest and best use ways, planting consciously. As noted in the benefits of trees section, trees can save citizens on utility bills. This is not a universal trait, trees must be planted strategically to block winter winds and summer sun. The Arbor Day Foundation recommends planting deciduous trees to shade east and west windows, but pruning as to not block the view. They recommend planting evergreens on the north and northwest sides of buildings, where they will act as a windbreak. In the winter, the deciduous trees will drop their leaves and let the sun in, warming the building (U.S. Department of Energy). Similar strategies can be implemented in parks. Trees can be planted in ways to shade park benches from the summer sun.

Some trees can be considered a nuisance due to messy fruits or a natural tendency to drop branches frequently. While it would not be appropriate to plant these trees in high use areas, for example along paths or near an area designated for a specific recreational activity, it may be appropriate to plant these tree types near natural areas or low-use areas where they can act to support animals and pollinators, without disturbing park users.

Planting to Anticipate Climate Change

The City should plant proactively to anticipate the effects of climate change and urban development. Researchers with the U.S. Forest Service Northern Research Station study adapting urban forests to climate change models, also providing the public with climate change

adaption strategies. These strategies attempt to sustain current ecological functions, reduce impacts of biological stressors, maintain and create ecological refuges, enhance diversity, and facilitate community adjustments through species transitions. Up to this point, all of these goals, except the last, have been addressed in this document. To address species transitions the researchers use climate change models to anticipate tree migration and changes in tree stress over time.

The US Forest Service Northern Research Station lays out the following recommendations for future planting:

- Species on the southern edge of their geographic range are vulnerable in the future. Plant native species at the northern limit of their range as these are most likely to provide future habitat.
- Manage for species with wide moisture and temperature tolerances; drought and heat tolerance will become increasingly valuable (Swanston, et al., 2018).

Pruning and Maintenance

The City of Eden Prairie is committed to crown cleaning, crown raising and structural pruning. The city prunes trees to manage street and trail clearance and site lines. Guidelines for this pruning can be found in the vegetation management policy. The City follows all best management practices set forth in the International Society of Arboriculture’s “Pruning Best Management Practices”.

Crown cleaning involves the removal of dead, dying, diseased, weakly attached or low vigor branches. This pruning specification essentially removes non-beneficial parts of a tree to manage health and risk. This type of pruning is used to mitigate risk in high use areas such as tree shaded picnic areas and beaches.

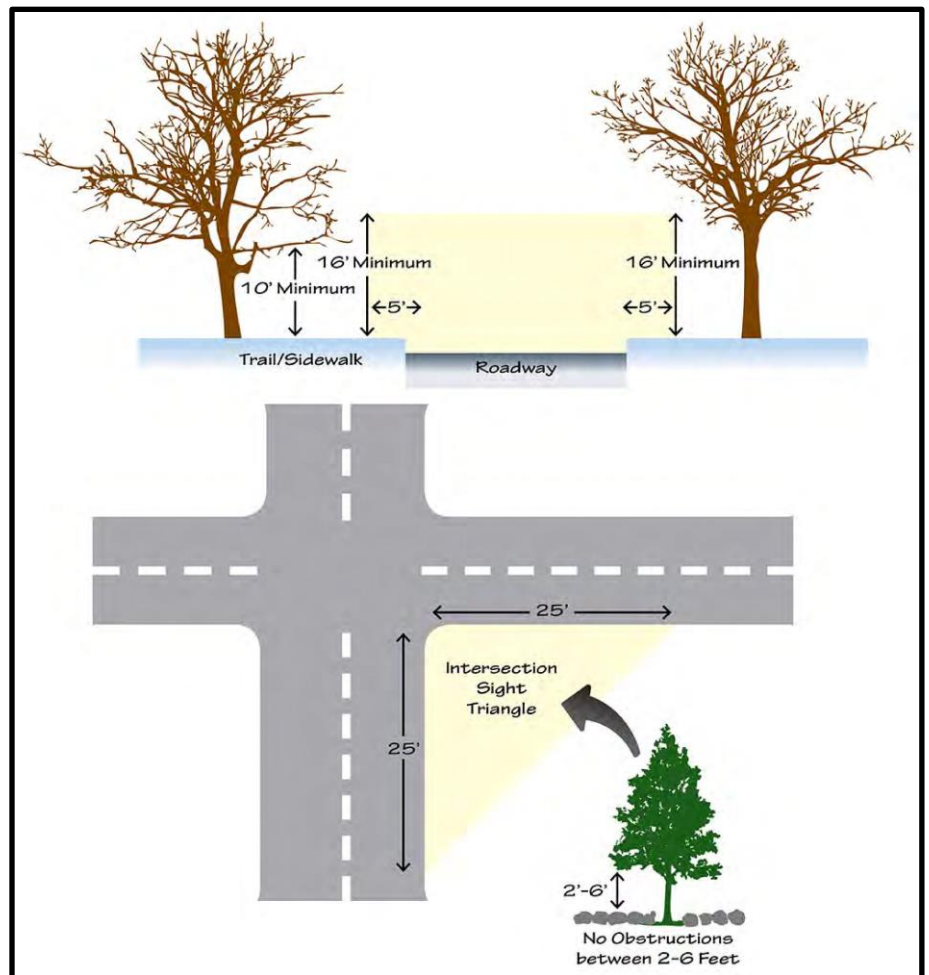


Figure 12: Tree Pruning Diagram for streets and trails

Crown raising involves the removal of the lower branches of a tree in order to provide clearance for buildings, vehicles, park lighting, and park users.

Structural pruning is pruning that influences the tree structure, the strength of branch attachment, the growth rate, and the size of branches and stems. It is best conducted at intervals when the tree is young (Association, Tree, Shrub, and Other Woody Plant Management - Standard Practices (Pruning), 2017).

There are many benefits to structural pruning. The improved tree structure decreases the chance of structural failures, which means on average trees live longer and need to be replanted less often. It is also more cost effective to prune smaller trees instead of waiting until these trees are mature. When trees are mature, branches are more difficult to remove, making the pruning much slower, more costly, and less effective as larger wounds are left on the tree. Recommended structural pruning cycles are at; planting, 2-3 years, 5-6 years, 8-10 years and 13-15 years. Following proper cycles can help prevent more costly maintenance in the future.

Tree Removals

The city has always removed trees when necessary. Necessary removals are defined as:

- A tree is dead in a maintained portion of a park or will fall into a maintained portion of a park
- A tree is infected with a disease which cannot be treated successfully and/or there is a strong potential that the pathogen could spread to other trees in the immediate vicinity
- A tree has been determined by the City to be high or extreme risk and other risk mitigation efforts won't sufficiently reduce the risk associated with the tree
- The tree needs to be removed for park construction or infrastructure improvements



Figure 13: City crews remove a diseased tree

Risk Assessment

Trees in Eden Prairie that are along trails and in maintained areas of parks are assessed for potential risk following the most current ANSI A300 guidelines, specifically a level one limited visual assessment. Level 1 Risk Assessments are conducted by trained tree inspectors. Trees along trails and in maintained areas of parks that are determined to be high or extreme risk within a years' timeframe are marked for removal. When possible, if a tree or tree part(s) are determined to be high or extreme risk within a years' time, mitigation efforts such as pruning, cabling, or other efforts may be appropriate. If tree removal is determined to be the appropriate risk mitigation effort, then the timeline of the removal is determined by the City as a result of the specific level of risk for that tree.

Trees in non-maintained areas of parks that are not designated for recreational use are not assessed for risk. As the ISA Best Management Practices Guide states that it is impossible to maintain trees free of all risk, some level of risk must be accepted in order to benefit from trees.

When a private property owner reaches out to the city with concerns regarding the structure or condition of a park tree, the City has a representative, who is Tree Risk Assessment Qualified by the International Society of Arboriculture, assess the tree by performing a Level 2 Basic Assessment. This includes filling out the International Society of Arboriculture's Basic Tree Risk Assessment Form which is kept on record. If mitigation efforts or tree removal is required, the City will determine that, as well as the appropriate timeframe for the work to occur.

In some situations, when there is not enough information to make an appropriate assessment of a tree's risk, the City may perform a Level 3 Advanced Tree Risk Assessment. However, this generally occurs only when the City needs more information than provided in the Level 1 and 2 assessments to accurately evaluate the risk of a tree. The City of Eden Prairie strives to take a balanced and proportionate approach to tree safety management by following best management practices and ANSI standards.

Tree Inventory

The need for an inventory of the trees maintained on City property was identified in the 2018 EAB Management Plan. This inventory is among the best practices used by the City and allows the city to make data driven decisions about tree management by allowing for a better understanding of the urban forest (tree sizes, species diversity, etc.).

A consistently accurate inventory is needed to accomplish the goals of the city and of this document. Beyond the listed department uses, it also allows for (Bond, 2013);

- Increased efficiency
- Appropriate budgets
- Documented actions

Without an accurate inventory, management decisions regarding the urban forest are generally estimates or based on experience and observation. Tree inventories allow for data-based decision making.



Figure 14: Tree inventory interface

The tree inventory includes information about the location of individual trees, trails, property lines, easements and right of ways. Point data on the trees gives user information on each tree including its species, cultivar, maintenance needed, management decisions, size and tree health information. Point data taken from our GIS database is used to assign work requests to third-party contractors or to internal crews.

The City of Eden Prairie is committed to maintaining our geographic information systems (GIS) tree inventory. In order to accurately maintain an inventory, forestry staff and seasonal workers must have remote devices for GIS data collection, along with accompanying GIS specific staff support.

Safety & Training

The City of Eden Prairie is committed to training staff on proper safety practices when performing tree work. Staff follow all ANSI Z133 safety standards and undergo continual training to ensure that best practices for planting, pruning, and removals are followed. Parks staff attend continuing education conferences and obtain professional certifications in the field of arboriculture.

Public Outreach & Education

Urban forest management cannot be properly implemented without public engagement and education. Much of Eden Prairie's urban forest falls on private property. In order to maximize

the benefits from this resource, private property owners must be educated on how to best manage their trees. The City of Eden Prairie is committed to public outreach and education and will serve as a connection to the natural environment by:

- Making information regarding all aspects of urban forest management available online (how to manage invasive species, how to hire a tree care professional, etc.)
- Utilizing local volunteers to aid in restoration projects

Volunteer groups act as a form of educational outreach. At the same time, they are a cost effective way to accomplish our ongoing projects such as:

- Tree plantings & demonstrations
- Prairie Seed Harvest
- Buckthorn Removal

- and in tree plantings. These activities are not only fiscally responsible, but also allow volunteers to learn about trees and local environments
- Seeking out opportunities to educate the public on invasive species, such as emerald ash borer, in order to decrease tree losses and ensure that the public is aware of management options and timelines
- Maintaining a list of local community members and organizations who have expressed interest in tree planting or other volunteer opportunities and reaching out to these groups when these opportunities arise
- Partnering with local organizations and agencies to improve the natural environment and apply for grant funding in order to improve outreach capabilities and educational opportunities for the public

Funding Sources

Funding for forestry initiatives come from a variety of sources. In recent years, the City has been able to partner with many other organizations to help fund these initiatives. Funding sources include:

- General Budget – The City of Eden Prairie annually budgets for forestry supplies, seasonal tree inspectors and other forestry related expenditures in the City’s annual budget.
- Tree Preservation Fund – In 2015, the Tree Preservation Ordinance was revised and included a payment option to meet tree replacement requirements for development projects. These funds are used to purchase trees to be planted throughout the city.
- Hennepin County Grants – The Healthy Tree Canopy Grant through Hennepin County provides funds to assist with EAB management projects. The Best of the Rest grant program provides funds to assist with restoration projects the City has completed at Richard T. Anderson Conservation Area and the Prairie Bluff Conservation Area.
- MN DNR Grants – Provides funds to assist with our EAB management and reforestation efforts.
- RPBCWD Grants – Currently provides funds to assist with the annual tree sale.

- Nine Mile Creek WD Grants – Currently provides funds to assist with the annual tree sale.

Partners

Partnerships are a vital part of urban forest management as they increase resources available to manage the urban forest and increase the scope and depth of urban forest management by engaging professionals across multiple agencies. City of Eden Prairie has partnered with Hennepin County, the U.S. Fish and Wildlife Service, Minnesota DNR, Nine Mile Creek Watershed District, Riley Purgatory Bluff Creek Watershed District, Eden Prairie School District, Minnesota Conservation Corps, Minnesota Green Corps, Minnesota Valley National Wildlife Refuge, Tree Trust, and local businesses to improve the urban forest through grants, volunteer opportunities, and partnerships. Responsible urban forest management includes maintaining and fostering these relationships as well as continually searching for new partners and ways to expand the capacities of urban forest management.

Conclusion

The City of Eden Prairie acknowledges that trees are an instrumental resource to our community. Managing trees in a way that maximizes their benefits is an integral part of our governmental role to best serve our community and stay true to our core values, vision, and mission. Trees provide our community with a myriad of benefits and this document will serve as a guiding management plan that will be utilized by all departments when making decisions regarding the urban forest. This document represents the City of Eden Prairie's commitment to our urban forest and community and outlines the ways in which we will manage this resource to best serve our community for today and tomorrow.

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