URBAN FORESTRY MANAGEMENT PLAN

CITY OF WASILLA

OCTOBER 20, 2010

URBAN FORESTRY MANAGEMENT PLAN

FOR

City of Wasilla
290 E. Herning Avenue
Wasilla, Alaska 99654

SUBMITTED BY:

JIM FLOTT
COMMUNITY FORESTRY CONSULTANTS, INC.
2020 E. 36TH AVENUE
SPOKANE, WA 99203
509-954-6454
509-534-2019 (FAX)
E-mail: cfconsults@comcast.net

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ACKNOWLEDGMENTS

CITY OF WASILLA STAFF

Archie Giddings
Keith Jones
Jana Griffin
Ken Langlois
Terry Gregory

ALASKA DEPARTMENT OF NATURAL RESOURCES
DIVISON OF FORESTRY
COMMUNITY FORESTRY PROGRAM STAFF

Patricia Joyner
Stephen Nickel

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EXECUTIVE SUMMARY

An Urban Forest Management Plan (UFMP) is intended to provide a framework for ensuring that the trees and forests of our city are appropriately cared for according to our community goals. It is a guide for city staff, landowners, utility companies, developers, and residents to follow when making decisions about community trees.

Wasilla's UFMP was initiated by a grant from the Alaska Department of Natural Resource Division of Forestry Community Forestry Program with funding from the USDA Forest Service and the Wasilla Public Works Department to facilitate the city's ongoing commitment to maintain, enhance, and preserve Wasilla's tree canopy.

The Wasilla UFMP provides a strategic framework to initiate and expand the city's Urban Forestry program to meet a range of policy, education, and management goals. The plan is intended as a tool to explore community concerns and management conflicts, while offering a series of prioritized implementation actions based on inventory data, arboriculture practices, and community outreach. The plan evaluates staffing needs and addresses program sustainability, funding, and ongoing community support. The plan will serve as a road map to improve the city's urban tree management and stewardship in a coordinated, cooperative approach with city departments, program partners, and private land owners.

The plan was prepared through a systematic and comprehensive review of existing city regulations, standards and other adopted plans, discussions with key staff members, and an analysis of tree inventory data. This is a unique, holistic urban forestry management plan for the city of Wasilla based on local needs and priorities, as determined through these processes.

As a strategic and forward-looking document, this plan should be incorporated into the existing policies and requirements of the Wasilla Municipal Code, the Comprehensive Plan or the Land Development Codes. The UFMP does suggest modifications and expansions to city codes to improve long-term tree stewardship, and any proposed code revisions will be reviewed and considered through future public process.

The objectives of the management plan support the primary vision and mission of improving Wasilla's community through proper management of one of the city's most valuable assets – trees. The UFMP follows the program vision to retain a high quality of life by focusing on actions to increase the benefits and values of trees, and to improve on the responsible management of Wasilla's urban forest.

The program vision is intended to act as a catalyst for sustaining our community trees. Planting new trees combined with maintaining the health and structure of existing trees will increase the tree canopy spreading over our community streets, parking lots, parks, open spaces, and private properties. City administrators, elected officials, city staff, and citizens should have this vision for the future of the Wasilla's urban forest:

City of Wasilla Urban Forestry Vision Statement

The City of Wasilla, recognizing the value of city trees as an important part of the community's infrastructure, intends to enhance, preserve, and manage the community trees using the best management practices to sustain the community forest resource for the benefit of Wasilla's residents, visitors, and ecosystem.

Relying on the UFMP for guidance, the City of Wasilla (CITY) will actively encourage participation in tree planting and stewardship; preserve and protect existing trees; promote public safety, tree health, and structure; implement cost-effective enhancement and proper arboriculture maintenance of the community forest; increase public education and awareness of the value of our community forest; and maximize the social, economic, and environmental benefits of the community forest for current residents and future generations.

City of Wasilla Urban Forestry Mission Statement

The City of Wasilla is dedicated to provide proactive management, maintenance, and preservation of public trees within the city by informing the community, protecting and expanding the public tree resource, utilizing proper arboriculture practices, and increasing community forestry partners to ensure the long term safety, health, viability, and aesthetic quality of the public tree resource.

The UFMP guidelines promote considering city trees as major and important urban infrastructure. It outlines best practices to incorporate trees into the urban framework. The UFMP provides for the development of a progressive long-range urban and community forestry program that will result in a healthier and safer forest in Wasilla. Acknowledging trees' major contribution to Wasilla, the goal of this management plan is to provide a strategic approach to sustaining community trees. The UFMP is a tool to be used for guiding the tree program and garnering support, cooperation, and funding for the tree program.

Lastly, it is understood that woody shrubs and ground cover plant communities are part of, and integral to, the overall health of the urban forest, but the primary scope of this plan is to focus on trees – the largest, longest-lived and most significant member of the landscape community. The implementation of the UFMP will ultimately contribute to the quality of life in Wasilla through enhancements to the tree population.

MANAGEMENT GOALS

The UFMP establishes these management goals for the Wasilla.

- Adopt and implement the Urban Forestry Management Plan.
- Increase urban forestry funding
- Hire an ISA certified arborist or obtain ISA certification for existing staff person.
- Continue to educate staff about current arboriculture work practices.
- Implement a cyclic pruning program for young and mature trees.
- Remove high-risk trees.

- Create a tree planting plan; promote proper planting of new trees and diversification of species; incorporate tree planting into community planning.
- Maintain the inventory of public trees.
- Revise the tree ordinance to incorporate the recommendations and goals of the city's tree management plan, adopt the ordinance into the city code, and implement ordinance enforcement practices.
- Provide education and public awareness of the importance of the trees to the community; educate city staff and the community on proper tree care; and encourage greater participation in tree steward activities.

The recommendations made in this plan are intended to be considered and implemented over a period of five to ten years.

Trees are long-lived organisms. Maintaining existing trees and planting trees today will provide benefits for current and future generations. By having systematic tree planting and maintenance programs in place, and by having adequate funding, staffing, regulations, and public education resources today, the future public tree population and overall urban forest will thrive, expand, and be sustainable.

These goals may change over time, both through completion of specific projects and through the changing nature and composition of the tree program and tree populations over the years.

MANAGEMENT RECOMMENDATIONS

These recommendations are based on program management goals and are preliminary steps to enhancing the urban forestry management program for the city. The following table contains a summary of the management goals contained in the UFMP.

TYPE	RECOMMENDATION	DESCRIPTION	PAGE
Management Information	Tree inventory	Inventory public trees to enhance short and long-term management of public trees.	14
	Management Plan	Utilize management plan to establish a clear set of priorities and objectives related to goal of maintaining a productive and beneficial community forest.	16
Program Planning	Effective administration	Responsibility for administration of community tree program	17
	Five-year management plans	Create five year plans that are first level of operational planning	18
	Annual operating plans	Create annual work plans to direct day-to-day operations	18
	Education, outreach, and stewardship	Create a strategy to capture key stakeholders and broader community input to the vision and goals for the future management plan development	19
	Urban forestry advisory tree committee	Engage tree committee in program development, annual operating plans, and community outreach.	21
Tree Resource Protection	Tree preservation during development and construction	Require developers and contractors to preserve trees and use best arboriculture practices to protect trees in construction areas.	21
Risk Management	Risk tree management	Managing tree risk and reducing city liability	22
	Risk tree abatement	High risk trees should be inspected as soon as possible and removed to reduce risk to residents, visitors, and facilities.	23
	Tree inspections	Establish an inspection routine to inspect trees regularly for risk and maintenance treatments.	23
Maintenance	Tree maintenance	Establish tree maintenance program	24
	Mature tree care	Establish a two to five year cyclic pruning program for mature trees	26

The UFMP initiates an effort by the city to form systematic management strategies for the public tree population of Wasilla. The primary objectives of the plan are listed below and described in detail in the body of the management plan.

- Effective administration
- Inventory and proactive management of public trees
- Annual analysis and removal of risk trees

- Proper tree selection and purchase
- Proper tree planting
- Proper tree maintenance
- Adequate funding
- Community education, participation, and collaboration

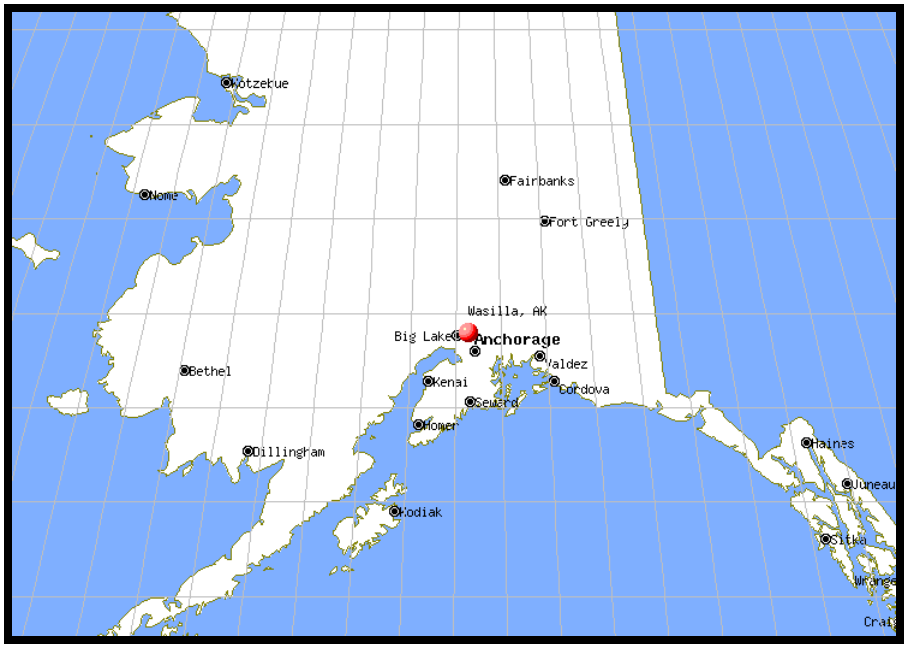
The recommendations and actions will help conserve Wasilla's tree resource and sustain the tree canopy for future generations. Although this commitment will come with costs, the long-term benefits are significantly greater and will result in a sustainable asset for the citizens of Wasilla today and tomorrow.

INTRODUCTION

In 2010 the Alaska Department of Natural Resources Community Forestry Program provided grant funding to assist the City of Wasilla to begin a public tree inventory and develop a management plan to guide the management of the community trees. The city also provided staff and funds to match the grant and support the project.

Wasilla is a city in Matanuska-Susitna Borough and is the fourth-largest city in Alaska. It is located on the northern point of Cook Inlet in the Matanuska-Susitna Valley of the south central part of the state. The city's population was 5,469 at the 2000 census; the Census Bureau estimated that it had risen to 10,256 in 2008. Wasilla is the largest city in the Borough and a part of the Anchorage metropolitan area, which had an estimated population of 364,701 in 2008.

Established at the intersection of the Alaska Railroad and Old Carle Wagon Road, the city prospered at the expense of the nearby mining town of Knik. Historically entrepreneurial, the economic base shifted in the 1970s from small-scale agriculture and recreation to support for workers employed in Anchorage or on Alaska's North Slope oilfields and related infrastructure. The George Parks Highway turned the town into a commuter suburb of Anchorage. Several state and federal agencies have offices in Wasilla, including the Alaska Departments of Environmental Conservation, Labor and Divisions of Public Assistance, Social Services.



Wasilla began as a transportation logistics & trade center serving natural resource extraction (mining, trapping & timber) followed by small-scale agricultural activity circa 1935; around 1975, construction of the Parks Highway substantially reduced travel time to Anchorage, encouraging the transition to a satellite bedroom community where workers commute to Anchorage for employment. Local service employment has increased in recent years.

About 35 percent of the Wasilla workforce commutes to Anchorage. The local economy is diverse, and residents are employed in a variety of city, state, federal, retail, and professional service positions. Tourism, agriculture, wood products, steel, and concrete products are part of the economy.

Program History

The trees, landscapes, and open spaces now enjoyed were preserved or planted by early settlers, individuals, city staff, garden clubs, civic, and youth groups. These people worked to enhance the livability of Wasilla through their donated money and time.

In 2000 the Wasilla Parks & Recreation Commission voted to accept the responsibility of being the Forestry Advisory Committee and to advise the city on program policies and priorities. A formal resolution from the Wasilla Planning Commission supporting the urban and community forestry program and formation of the Wasilla community forestry subcommittee was passed in March 2000. The resolution was adopted by the Wasilla city council in April 2000. A budget for tree maintenance of $14,000.00 was allocated. The existing park maintenance staff was assigned additional tree maintenance duties. Wasilla was named TREE CITY USA in 2000.

Organizational and Functional Overview

The tree program is housed within the Wasilla Public Works Department, which historically responded to tree-related issues and permit issuance. Currently, one full-time employee manages the tree program part time, which serves more than 10,000 residents. Also, a full-time gardener is available for assistance to the urban forestry program.

As the tree program is currently structured and staffed, the range and complexity of responsibilities exceeds the capacity of a single staff person. As such, responsibilities for the management of the urban forest fall towards reactive rather than proactive management; **this reality illustrates a major limitation to the city's overall efficacy in protecting and expanding urban tree resources.**

Vision Statement

The vision statement describes how the community wants its landscapes to look and function in the future. This brief paragraph describes the desired outcomes of the plan. It includes sentiments about the importance of a community's trees and natural resources in terms of attractiveness, sustainability, people's health, safety, economic prosperity, and provisions for future generations.

City of Wasilla Urban Forestry Vision Statement

The City of Wasilla, recognizing the value of city trees as an important part of the community's infrastructure, intends to enhance, preserve, and manage the community trees using the best management practices to sustain the community forest resource for the benefit of Wasilla's residents, visitors, and ecosystem.

Tree Benefits

Few elements of the grey infrastructure of urban places can be said to boost property values, support retail activity, improve municipal health, protect water quality, reduce stormwater runoff, counter climate change, and ensure roadway safety-all at once. Communities looking for these benefits may be surprised to find a solution right in their own backyards, along their streets, and in their parks. The green infrastructure of trees, along with parks and open space, provide a wealth of benefits to Wasilla (Figure 1).

Figure 1 - Wasilla's arterials and main streets lack trees.

Trees have held a prominent role in discussions regarding environmental change, and more directly there have been a growing number of scientific studies in recent years specifically geared toward the role of trees in urban environments. Trees and urban forests provide environmental, ecological, economic and social benefits to people living in urban and suburban areas. Environmental, economic and social urban forest services and values are well documented in scientific and technical journals. A summary of key values and benefits, and some supporting sources, is provided below.

Water Quality & Stormwater Retention. Urban forests absorb rainfall, control surface water run-off, filter ground water and assist in ground water recharge. According to one study, 37,500 tons of sediment per square mile per year comes off of developing and developed landscapes, and urban trees could reduce this value by 95%. Lake Lucille and Lake Wasilla are critical watersheds for the city.

Urban tree canopy reduces stormwater runoff by intercepting and storing rainfall and increasing infiltration into the soil through improved soil structure. The US

Environmental Protection Agency issued a report, *Using Smart Growth Techniques as Stormwater Best Management Practices*, which identified urban tree canopy as an innovative and sustainable means to dramatically reduce stormwater runoff and the costs associated with stormwater management. Trees contribute to water quality and quantity improvement through storm water control, attenuation of peak flows, maintenance of base flow, erosion control and rainfall interception (Bernatzky 1983; Xiao et al 1998; Floyd 2002; American Forests 2007).

Air Quality Improvements. Trees absorb gaseous pollutants such as ozone, nitrogen oxides and sulfur dioxide; and they filter particulate matter such as dust, ash, pollen and smoke. Reductions in these pollutants results in improved public health and reduces the severity of ozone-induced asthmatic responses and other respiratory illnesses. Urban trees absorb carbon dioxide, a major greenhouse gas, at an approximate rate of 230-lbs per year per tree. According to the U.S. Department of Agriculture, "one acre of forest absorbs six tons of carbon dioxide and puts out four tons of oxygen. This is enough to meet the annual needs of 18 people."

Trees improve air quality by producing oxygen, absorbing pollutants and sequestering carbon (Rowntree and Nowak 1991; Nowak 1992; McPherson et al 1999; American Forests 2007). A regional ecosystem analysis specific to Wasilla using tree inventory data can estimate the monetary value of pollution removal services provided by the urban forest.

The Economics of Aesthetics. Improving aesthetics of Wasilla has tangible economic benefits. Networks of natural areas and trails give a community a reputation for being a good place to live and visit. Increased recreational and community activity attracts new businesses, fosters expressions of creativity, and stimulates tourism. Due to the changing nature of business needs and the move toward a service and technology based economy, businesses locate or re-locate based on a community's quality of life, including an abundance of open space, nearby recreation and pedestrian friendly neighborhoods. Nationwide, easy access to parks and open space has become a new measure of community wealth – an important way to attract businesses and residents by guaranteeing both quality of life and economic health.

Aside from the potential price effect on residential property sales, trees in retail settings increase shoppers' willingness to pay for goods and services by 12%. Shoppers also indicate that they are willing to drive farther and stay longer if a retail district is well-landscaped with trees. Also, respondents consistently reported greater willingness-to-pay values for goods and services in the landscaped mall at an overall rate of 8.8%. Urban forests create an appealing consumer environment in business districts (e.g., Wolf 2003, 2005).

Increases in land values or sale prices as a result of quality landscaping and the presence or retention of trees offers a secondary benefit to the local jurisdiction. The adjustments directly relate to additional revenue from sources such as real estate transfer taxes and property tax assessments (Behe et. al. 2005; Wolf, 2007).

Health & Well-Being. Public spaces with trees receive more visitors, increasing the frequency of casual social interactions and strengthening the sense of community. Trees along transportation corridors narrow a driver's field of vision, reducing traffic speeds and increasing pedestrian safety by providing a natural, physical barrier. Studies

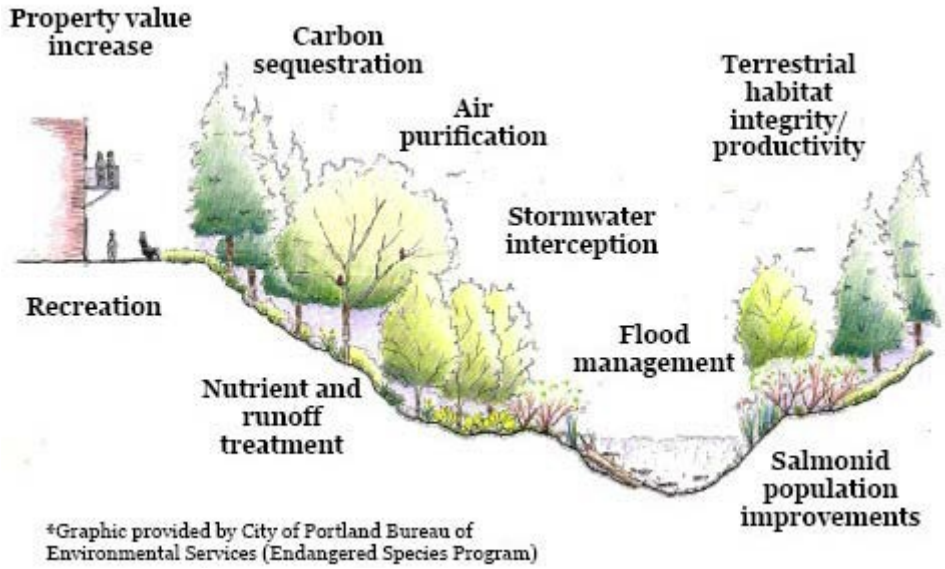
have found that urban highways lined with trees decrease driver stress, resulting in fewer incidents of road rage. Trees foster safer, more sociable neighborhood environments and have been shown to reduce levels of crime, including domestic violence. Views of nature reduce the stress response of both body and mind when stressors of urban conditions are present. Hospital patients with window views of trees recover significantly faster and with fewer complications than comparable patients without access to such views. Overall, the service value of individual urban trees can be quantified as shown in the table below.

Average annual net benefits values per tree by size

Small	Medium	Large
$1 - $8	$19 - $25	$48 - $53

Source: *Society of American Foresters: Western Forester, January 2007*

The graphic below illustrates the various benefits of and the integrated functions provided by the urban forest.



While real costs must be borne by the city of Wasilla and its residents because of the urban forest (e.g., storm damage, removals, planting, care, leaf removal, infrastructure impacts, etc), the protection and expansion of the Wasilla urban forest will yield increased environmental, economic and social benefits. This plan specifies a number of actions the city can take to maximize these benefits and engender community involvement and activism.

Appraised Value. Trees in urban areas are valued differently than their rural counterparts. The Iditapark trees represent a considerable economic, social, recreational, and environmental asset to the community. **The Iditapark trees inventoried in Wasilla have a total appraised value over $274,000.00 (Table 1).** There may be an additional 3,000 street and park trees in Wasilla valued at over one million dollars.

Appraised Value
Iditapark

Total Number of Trees in Report:	**762**
Total Appraised Value:	**$274,120**
Total Mean Appraised Value:	**$360**
Median Appraised Value:	**$270**
Minimum Appraised Value:	**$0**
Maximum Appraised Value:	**$6,500**

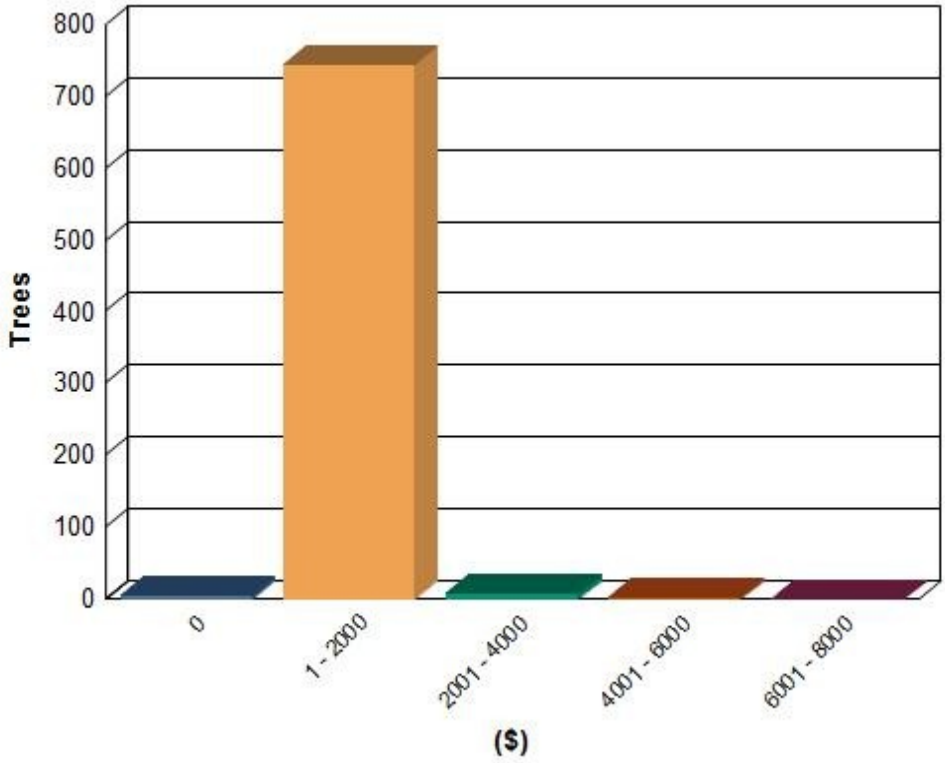


Table 1 – The appraised value of Iditapark trees was determined from the Council of Tree & Landscape Appraisers Guide for Plant Appraisal, 9th Edition.

Trees are of vital importance to Wasilla's environmental, social, and economic well-being. The city's community forest provides numerous benefits that are both tangible and intangible. Trees are the only asset owned by the city that increases in value as they age but only if they receive proper maintenance.

URBAN FOREST MANAGEMENT PLANNING

In natural forests trees in all stages of growth and decay are important to the functioning of the ecosystem, and even when left alone a forest will convey many benefits to humans. The same cannot be said of city and park trees. The term "City Trees"

includes trees subjected to tough urban conditions including street and park trees and those planted along boulevards, in medians, in parking lots, in tree vaults, and other urban open spaces. Their health and vitality are compromised primarily through limited soil volume, compacted soils, restricted root space, and conflicts with other city infrastructure.

Other urban activities such as mowing, leaf collection, vehicle and pedestrian traffic, vandalism, and pollutants submit community trees to additional stresses. Intense citizen use necessitates pruning and prompt removal of high-risk trees to maintain high safety standards. A sustainable urban forest requires careful management in order to maximize the benefits of green infrastructure while addressing the direct and indirect human influences on the trees.

Community trees play an important role in the livability of the city. The community draws a wide range of benefits from the trees. The urban forest has been recognized as a visual amenity and for its environmental benefits for several decades, but has only recently begun to be considered as a vital component of a community's infrastructure, and given the specific label of "green infrastructure" or "natural capital" (e.g., Benedict and McMahon 2002; Wilkie and Roach 2004; Ewing and Kostyack 2005). As a result, in Wasilla as in many municipalities, resource allocation for management of urban trees has been relatively limited, and staff has largely been occupied with responding to emergency situations and service requests rather than having the opportunity to pursue more proactive management practices.

As with any type of infrastructure, the urban forest requires regular maintenance and monitoring to ensure that it continues to function properly and provide benefits to its maximum capacity. Infrastructure such as roads and sewers that are neglected for many years can only be repaired at a great cost to the city and the people who live there. For the urban forest, this neglect typically comes in the form of failing to plant young trees to replace maturing populations, failing to adequately diversify tree species to protect against species-specific diseases, failing to prune trees early on to limit the risks posed by trees as they mature, and failing to maintain mature trees properly.

Fortunately in Wasilla there are many opportunities to improve the urban forest through well-planned active management over time. This is one key area in which green infrastructure differs from built infrastructure; trees in cities, like other infrastructure, require maintenance to remain safe and viable but their value to the community generally increases over time as they mature so that they become less and not more of a liability.

The City of Wasilla, like so many communities, values its trees but has not, until recently, recognized that it should have a proactive, practical plan to ensure that the urban forest is managed to provide maximum benefits to the residents now and in the decades to come.

Management, maintenance and preservation of trees in the urban environment can only be achieved effectively through the development and implementation of a Strategic Urban Forest Management Plan that standardizes the policies and practices surrounding all activities related to trees. This report lays out the framework for and components of such a strategic plan, one that encompasses a long-term vision with short-term goals for

the management of trees in the city. It is up to the city to provide the short and long-term support required to implement it. The goal is to provide specific guidance on managing, maintaining, and preserving trees within the urban and suburban infrastructure.

Employing the best management practices of the arboriculture and urban forestry industries, the following recommendations are for enhancing Wasilla's community forest program. Community Forestry Consultants, Inc. recommends the following management and maintenance recommendations to improve the health, quality, size, and diversity of the working forest of Wasilla. This section outlines the primary objectives of this urban forest management plan.

PROGRAM OBJECTIVES

The overall goal of strategic planning and management of the urban forest is to ensure a healthy, aesthetic, safe, and diversified tree cover that can provide a sustained supply of environmental, economic and social benefit to society. Research shows the average city tree lives only 32 years (Moll and Ebenreck 1989) and the closer to the city's center, the shorter the life of the average tree. To help address issues like these, a long range plan is essential for management of a resource that is by its very nature a long-term matter.

Strategic plans define long-term and short-term goals for the agency's urban forestry program. Management plans define how individual goals are achieved through action plans and timelines. Each goal must have an achievable and discernable outcome. The outcomes are the policy that the agency wishes to have representing their program. Both types of plans can define the overall program management goals of the agency.

The objective of this report is to provide a framework for a Strategic Management Plan that will set the parameters for a standardized approach to urban forest management designed to promote the growth of healthy, functioning trees. The aim is to fulfill this vision over a five-year timeline.

Tree Inventory Benefits

Many communities have public street and park trees, a shade tree commission, and plant trees, but how many actually know what the resource looks like, the condition it is in, the benefits it is providing, and how effective their program has been? Whether you are managing a retail store or natural resources, an inventory is critical. Without an inventory of the resource, you don't know what you have, what condition it is in, and what kind of work is needed to maintain or manage it for the future. An inventory also helps you better document the many benefits that trees are providing the community.

Tree inventories are the foundation of an effective tree management program. Tree inventories help vegetation managers identify current and potential problems and plan for budgets, removals, pruning, planting and other maintenance requirements. A tree inventory is a means by which a vegetation manager can acquire and retain pertinent information about the condition and value of Wasilla's tree resources (Figure 2). The inventory data supplies objective and quantitative information that can be used to document estimates for funding, personnel and equipment. Using and regularly updating the tree inventory moves the urban forestry program into proactive management.

Street and park tree inventories provide information for the planning, design, planting, maintenance, and removal of trees. It provides useful information to justify starting and managing a tree program and funding an existing program. An inventory of a community's public trees and planting spaces is a prerequisite for making sound decisions. A community that operates a tree program without an inventory may question the need for an inventory. Previous decisions may have been based on tradition rather than an accurate assessment.

Figure 2 - Inventory data collection

A tree inventory can quantify the answers to many important questions. For example, an inventory can provide the location of risk trees, the number of trees located within the public right-of-way, the value of street and park trees, and the number of available planting sites. In addition, an inventory can help identify insect or disease problems, pruning needs, and work and budget priorities.

With this information, tree boards and staff can better plan and prioritize tree removals, maintenance work, and plantings. They can also determine the value of public trees, which can help emphasize the program's importance. An inventory can be used to monitor tree conditions and quickly and accurately answer management questions, such as where and how many trees should be planted in a year. Over the years, changes in a community forest can be seen in the number, age, condition, and species of trees. A well-maintained inventory can be used in cases of liability to demonstrate that there was no negligence in the inspection or care of these trees. An inventory will also improve the chances of receiving grants and other assistance by providing documentation of the extent and worth of street and park trees. **The following objective will enhance management of the urban forestry program.**

- Complete the assessment of the tree population to obtain accurate, functional data necessary to manage the urban forestry program.

Completing the tree inventory and using TreeWorks™ to prioritize maintenance establishes a systematic tree maintenance program which actually reduces costs. This is primarily because systematic maintenance in general leads to healthier trees that require less expensive maintenance over the long run than unhealthy, high-risk trees. A computerized tree inventory aids in reducing the subjectivity of tree management decisions and stimulates proactive responses.

Management Plan Benefits

Traditional forestry is the management of trees or stands of trees for timber production and other values including wildlife, water quality, and ecological health. Urban forestry is the management of trees and other forest resources in urban ecosystems for the environmental, economic, social, health, and aesthetic benefits trees provide society.

Municipal tree plans provide policy and standards for implementing and managing tree programs. The principal purpose of a community tree plan is to guide the management and maintenance of a community tree program, including tree removal, pruning, planting, funding, volunteer opportunities, and other important work. Tree plans should be consistent with other municipal planning strategies and usually include a vision statement, goals, objectives, and strategies.

In any given city nationwide, buildings and roads receive careful planning and scheduled maintenance. It is widely recognized that neglect of infrastructure planning and maintenance can result in deterioration leading to numerous potential expenses and risks. Why should trees receive any less planning, attention and care? Tree management plans help cities proactively manage their tree resources to avoid risk, reduce liability, cut maintenance costs, and increase the value of trees. A comprehensive plan helps promote the future health and sustainability of the community's street and park trees, while providing a framework to make difficult decisions about tree removal, preservation, pruning, and planting. Without a proactive approach to tree issues, Wasilla runs the danger of addressing tree issues reactively – and paying a steep price for maintenance, removal and liability associated with tree failures.

The city, in partnership with the State of Alaska Community Forestry program has taken the proactive step of creating a comprehensive UFMP. The UFMP was systematically developed by a review of existing city documents, specifications and standards, tree inventory data; through interviews with key staff and interested citizens, field observations, and by applying national arboriculture standards and best management practices. Field observations of trees along streets, in parks and in the downtown corridor were conducted. This is a customized UFMP for the city based on local conditions, resources, and priorities.

The UFMP is intended to provide strategies, goals, policies, standards, and actions to protect, enhance, expand, and preserve the working forest for the benefit of the community. The UFMP provides program coordination and improves the city's tree management in an equitable, economic, and sustainable manner. Moreover, the UFMP will be a valuable strategic planning tool, serve as a road map to enhance the urban forestry program, and become a part of the city's comprehensive city plan.

The UFMP plan will help the members of the tree board, city staff, and other concerned citizens understand the current condition of the community forest and shape its future. Good tree management involves setting goals and objectives and developing specific management strategies to meet them. Implementations of the UFMP objectives are the foundation of an effective tree management program. It contains goals and objectives that will guide the city in its actions and decisions affecting public trees.

This project follows a trend in urban forestry to move from reactionary management of

individual trees—typically characterized by an emergency-response approach to problems and complaints—to a proactive, systematic, and strategic focus on an urban forest system as a whole. While limited municipal funds for forestry programs often constrain proactive tree care, management planning efforts can increase the efficacy and reach of scarce resources, and have significant impact on the landscape.

Sharing the UFMP could further educational efforts by showing staff, elected officials, and citizens how science informs tree management as well as promoting city pride. Knowledge gained from this UFMP should also be integrated into other city plans that impact trees. Issues discussed in the UFMP can be used to educate the citizens about the value of trees to the community.

The UFMP will help raise citizen awareness of the benefits of a healthy, diverse and well-managed urban forest. A strong management plan will serve as a tool to be used for garnering public support, cooperation, funds, and help the community sustain its trees for future generations. **The objectives of the municipal tree plan include:**

- Effective administration
- Annual analysis and removal of risk trees
- Proper tree selection and purchase
- Proper tree planting
- Proper tree maintenance
- Adequate funding and staffing
- Community education, participation, and collaboration

Effective Administration

Like the gray infrastructure of streets and utilities, trees are an essential part of a community's green infrastructure and should be administered effectively. The responsibility for administering a community tree program must be clearly defined and carried out on a regular basis. These responsibilities often are divided among elected officials, a tree commission, and municipal employees in various departments.

The size and complexity of a municipality will determine how to organize the tree program. In a small community similar to Wasilla, a tree board may have the entire responsibility. A large community may employ a city arborist or consulting arborist to coordinate work among a tree commission, municipal departments, and the public. Many variations of these organizational structures are possible. To ensure good program administration, the community should develop strategies that clearly assign responsibilities and define procedures.

Community tree plans provide overall guidance to the long-term administration of public trees, which then must be translated into effective actions. Annual work plans for tree removal, tree maintenance, tree planting, periodic inspections, task scheduling, securing funding, and public education and involvement should be used to schedule the work required to meet plan's objectives and goals. By using an annual work plan and a budget based on this plan to prioritize and schedule tasks for the upcoming year, a tree program can become more efficient and avoid crisis management.

Framework for the 5-year Strategic Management Plan (2010 – 2015)

The plan is intended to primarily provide guidance to the Public Works Department using a tree information database, in conjunction with a management cycle approach which

will monitor short to long term trends and serve as a tool for proactive management of the various issues and factors affecting city trees.

This plan is also intended to provide guidance for the ongoing education of and coordination with the various stakeholders with whom urban forestry staff must work for effective protection of the urban forest. This is intended to be an adaptive and "living" plan, creating a clear critical path for planning and activity, while still accommodating changes in priorities related to economic and/or environmental conditions.

Annual Operating Plans

Annual operating plans (AOP) will direct the day-to-day operations and can be used to project budget requirements for all aspects of maintaining the urban forest. The annual plan will include plans for planting, pruning, removals, inspections, plant health care and maintenance of the inventory. Initially, the annual plan will need to address priorities derived from the inventory, but eventually will be focused on proactive management objectives. The preparation of AOPs is the responsibility of the city. An example is provided in Table 2.

PROGRAM ACTIVITY	J	F	M	A	M	J	J	A	S	O	N	D
PLANNING												
Work priorities												
Organize activities												
Modification												
TREE REMOVALS												
Review inventories												
Field inspections												
Conduct removals												
Permit inspections												
TREE PRUNING												
Review inventories												
Field inspections												
Conduct tree pruning												
Permit inspections												
TREE PLANTING												
Review inventories												
Survey neighborhoods												
Purchase trees												
Install trees												
Water trees												
Permit inspections												
COMMUNITY EDUCATION AND OUTREACH												
Education programs												
Arbor Day Festival												
Tree Board												
STAFF TRAINING												
Professional development												
Safety training												

Table 2 – Example of an Annual Work Plan

Education, Outreach and Stewardship

Effective implementation of this UFMP will require the "buy-in" and support from as broad a base as possible. This will include, but is not limited to: City staff (particularly those departments who need to work with, or around, trees), Assembly, Alaska DNR Community Forestry, local arborists, individuals, and groups involved in the protection and restoration of Wasilla's trees, private landowners, local green industries, and local institutions with trees on their properties or properties where trees could be planted.

Education, public outreach, and stewardship are some of the best tools available to keep staff, citizens, and elected officials of Wasilla informed of the benefits of trees and the

proper care of trees. Education and personal involvement of as many community members as possible is critical to the success of a sustainable community forest. Education about proper tree care and participation in the community tree program can translate into more tree benefits for the city and a willingness to support the tree program in the future.

There are many opportunities to involve the community in the management of Wasilla's trees. Through a range of projects from increasing the potential for passive awareness (signs), to active recruitment for tree care through stewardship programs, the CITY can continue to focus on bringing street and park trees, the benefits they provide and the maintenance needed to the attention of residents and patrons. **Objectives of education, outreach, and stewardship initiatives include the following:**

- Promote proper tree care to increase tree health and longevity, reduce hazard potential, and minimize storm damage.
- Provide education about the benefits of native plants, the negative effects of invasive species and promote the concept of "Right Plant, Right Place" (e.g., site appropriate planting).
- Design, maintain and update promotional and technical information, in multiple media, about urban forestry using staff contributions or program partner materials.
- Elevate the prominence of and expand content of the CITY's web page regarding urban forestry content; develop internet address mailing lists to enhance communication and marketing efforts with the public.
- Expand community-based volunteer and stewardship opportunities, such as volunteer planting or pruning programs, as a way to inform and engage residents about urban forestry issues, such as tree planting, tree care and management and expanding the CITY's tree inventory database.
- Host events and festivals to promote the benefits of trees, such as Arbor Day and Earth Day celebrations, and recognize forestry community advocates and volunteers.
- Maintain the Arbor Day Foundation's "Tree City USA" status.
- Coordinate with schools and other organizations to develop and/or promote youth education and outreach materials related to urban forestry.
- Coordinate with Alaska DNR urban forestry program and local schools, community colleges, and universities in support of the development of urban forestry training programs for mentorship, internship and research opportunities for students.

- Increase communication with city decision-makers, including City Council and commissions, about the benefits of trees and the urban forestry program's objectives and performance.

- Promote professional development opportunities to strengthen the core skills and engender greater retention of and commitment from volunteers, tree board members, commissioners and staff.

The purpose of these objectives will be to capture key stakeholder and broader community input to the vision and goals for the UFMP, and provide an opportunity to create or re-establish relationships with individuals and groups interested in being involved with ongoing implementation and review of the community tree program.

Urban Forestry Advisory Committee

The UFAC was established by resolution of the Park & Recreation Planning commission in March 2000. The tree committee purpose and duties are not defined in the resolution or city code.

The tree committee can be a very useful resource for busy city staff working to develop and implement a management plan since it provides additional opinions from individuals who are interested in, and typically knowledgeable about, the subject at hand, and also helps maintain relationships with groups and individuals that may be able to assist with implementation.

The primary role behind an advisory committee for the city's UFMP, and the related *5-year Management Plans* would be to periodically (e.g., once a year) review the plans, and to track the status of the various recommendations. **Objectives for a tree committee can gain support for a tree program by involving the public in various important endeavors:**

- Developing a community tree plan.
- Developing an annual work plan and budget for tree care.
- Designing tree plantings.
- Holding public hearings and reviewing permit requests.
- Soliciting funds, including grants and donations.
- Developing or reviewing a street tree ordinance.
- Organizing and coordinating Arbor Day celebrations, other events, and education programs.

The tree committee should report to and be overseen by the staff member responsible for directing and overseeing the implementation of the UFMP.

Tree Resource Protection

The primary goal of tree protection is the long-term survival and stability of a tree or group of trees. It is not about trying to save every tree during development and construction because some trees are not salvageable due to structural problems or poor quality species. It is about preserving and protecting trees that add value to the property or because the community demands trees be preserved and protected.

Arboriculture practices cannot repair construction damage or vandalism to a tree or reverse degradation of its growing environment. Our industry has a limited ability to cure these injuries or accumulated stresses to trees. The focus to reach our goal of tree protection is to prevent injury to trees. **Implementing the following objectives can prevent canopy loss and sustain the tree population in Wasilla**.

- Develop approaches to protect larger tracts of privately held forest lands via conservation easements and acquisition, property tax reduction or other means.
- Develop and promote a nomination-based, voluntary Memorial/Heritage Tree program to recognize and protect unique, landmark or notable private trees.
- Promote tree-friendly development and land use practices by reviewing and reinforcing policies to preserve mature, significant trees and planning for appropriate replanting.
- Promote stewardship of native plant communities on private and public property.
- Prevent unnecessary tree removal on single-family residential lots through property owner education.

Tree Risk Management

The trees inventoried in Iditapark are small and pose little liability concerns currently. Most public trees in Wasilla are small stature or have not reached their large mature size yet. Ultimately a municipality has the responsibility for maintaining a safe public right-of-way once it has created one.

These responsibilities include high risk trees or limbs that could damage property and cause injuries or even death, trees that block required traffic sight lines, or tree roots that raise sidewalks or invade segmented pipes. The human and financial impact of these problems can far outweigh the costs that a municipality would have incurred in providing proper, proactive care.

The liability associated with trees can best be avoided by clearly assigning the responsibilities for tree inspection and care and then documenting that this responsibility is regularly met. Cities and other property owners are expected to conduct annual work, including yearly tree inspections, removal, pruning, and other maintenance.

The following objectives written into the tree plan or tree risk management plan creates proactive tree management and reduces exposure to liability:

- A tree inventory will be completed and maintained. Dates of inspection, condition of inventoried trees, and pruning and other maintenance needs will be recorded.
- Annual inspections of community trees should be completed and accurate inspection records should be kept.
- Hazardous tree branches should be removed as they become known.
- Only trained, ISA certified, and insured tree care professionals who follow arboriculture industry practices should be hired for any tree maintenance work on public trees.
- City personnel will be trained in safe arboriculture procedures, first aid, and safe equipment use.

- Visual clearance for intersections, traffic signs, and signals shall be maintained.
- Requests by city departments, property owners, and others should be responded to promptly.
- Implement a risk tree removal action plan based on levels of risk.
- Provide tree risk training for staff.
- Implement a cyclic pruning program.

Tree risk assessment can also be used as an educational tool to demonstrate the necessity for urban forest planning. With proper planting and aftercare combined with regular pruning and periodic inspections, there is less chance for weaknesses or defects to become hazardous. Proper management will lead to permanent reductions in liability.

Public safety is the major concern for urban forest managers. The city government has a legal duty to exercise reasonable care to protect the public from foreseeable risks. City managers, administrators, staff, and elected officials must demonstrate reasonable care to minimize the risk associated with trees in public areas. It is imperative for all city departments to follow established risk management policies.

Risk Tree Abatement

The city has collected information on trees in Iditapark. The remainder of the public trees along streets and in parks should be inventoried to determine maintenance requirements and risk issues.

Once the inventory is completed, there will also be a need for the continued assessment of risk trees. Assuming that all trees with some risk factor will not be immediately removed, trees that are retained should be inspected on a scheduled basis. The determination of which trees should be inspected and how often should be part of the development of a tree risk program once the tree inventory is completed. Dedicated and qualified staff or consulting arborists will be required for tree inspections. Tree risk inspections should be performed by a PNW certified tree risk assessor.

With the initiation of cyclic pruning program, at a minimum, each tree will be re-inspected once every five years. Pruning crews will systematically work through the community and when they are assessing pruning needs they can also evaluate risks. Any new risks can be added to the database and then further inspections can be requested if required. Simple risk abatement through pruning can be addressed as part of the cyclic pruning program.

Tree Inspections

Currently the assessment of risk is the responsibility of city staff. The public works staff inspects trees drawn to their attention, reported by the public, or identified through operational activities. There is no systematic inspection process or trained staff available to identify trees at risk largely due to the current lack of staff training and resources.

Tree inspection is a systematic process of assessing the tree or parts for potential to fail and injure or for potential maintenance needs. Inspections are the first line of defense in proactive risk management and maintenance programs. The city can prioritize tree inspections and corrective actions needed based on a process that divides the city into

zones; establish inspection methods and schedules according to the zones; and implement corrective actions in a reasonable and timely manner. The evaluation cycle or inspection interval may be annually or two per year, one during the summer to include leaves and one during the dormant season. Mature trees and species with known failure histories may need to be inspected more frequently. Occurrence of tree or branch failures between inspections will indicate the adequacy of the interval between inspections. Additional inspections should be made following storm events.

The city will benefit and reduce the possibility of structural defects being missed by using a certified tree risk assessor for tree inspections. Inspections should follow consistent protocol established by the arboriculture industry and described in this management plan; the problems should be documented and appropriate arboriculture recommendations made or future monitoring as necessary.

Completing a city-wide tree inventory and implementing an urban forest management strategy creates an opportunity to develop a more comprehensive risk tree program to address the city's responsibilities with respect to "duty of care". **Until a city staff person becomes a certified tree risk assessor we recommend the following objectives for city staff engaged in the tree risk evaluation:**

	A	B	C	D
	HIGH	**MODERATE**	**LOW**	**REMOVE**
	Trees whose retention is most desirable	Trees whose retention is desirable	Trees which could be retained	Trees which should be removed
1	Vigorous healthy trees, of good form, and in harmony with proposed space and structures;	Trees that might be included with the high category, but because of their numbers or slightly impaired condition, are downgraded in favor of the best individuals	Trees in adequate condition, or which can be retained with minimal tree surgery, but are not worthy for inclusion in the high or moderate categories	Dead, or structurally dangerous trees.
2	Healthy young trees of good form, potentially in harmony with the proposed development	Immature trees with potential to develop into the high category	Immature trees or trees of no particular merit.	Unstable trees
3	Trees for screening or softening the effect of existing structures in the near vicinity, or of particular visual importance to the locality			Trees with significant fungal decay at the base or on the main bole.
4	Trees of particular historical, commemorative or other value, or good specimens of rare or unusual species			Trees with a cavities or cavities of significance to safety.
5				Trees that will become dangerous after removal of other trees for reasons given in 1-4

For a more comprehensive approach the city should refer to a recent publication by the USDA Forest Service titled "Urban Tree Risk Management: A Community Guide to Program Design and Implementation". This publication is available at: http://www.na.fs.fed.us/spfo/pubs/uf/utrmm/.

Tree Maintenance and Care

Pruning plans are essential, not only to ensure healthy, aesthetically pleasing trees but also to increase public safety and to decrease public or private liability. A variety of requirements can inform pruning plans, some more desirable than others. Common factors that determine pruning priorities are residential or business requests and emergency pruning. This kind of "reactive management" is most common in jurisdictions where no planning exists. Scheduling pruning based on these factors may actually increase liability for damages because many hazards remain unidentified until a failure occurs.

Healthy trees confer numerous benefits, yet poorly maintained trees can pose a considerable risk to the surrounding community. Broken branches and even entire trees can fall down, especially during inclement weather. In paved areas roots can cause cracks and buckles in pavement which may be tripping hazards. Leaves can clog gutters and fruits can rot and smell. While the benefits of trees far outweigh the costs, careful maintenance is needed to manage risks that are often predictable, detectable, and preventable. Excluding immediate, acute problems (blow downs, pest outbreaks, and extreme vandalism) tree maintenance should be performed following a two to five year pruning cycle based on a management plan developed by city staff or consulting arborist.

Figure 3 - Co-dominant stems are easily fixed on a young tree but often fail if not pruned correctly early in the life of the tree.

Tree health can be greatly increased by regular pruning, especially when the tree is young. Immature trees that are not pruned can develop many structural problems such as weak branch structure, crossing branches, and co-dominant leaders (International Society of Arboriculture 2005) (Figure 3). If corrected early, the tree can develop a

strong support structure with a healthy canopy. This in turn will reduce the necessity of more expensive and often intrusive corrective pruning during the normal life of the tree. If tree condition is improved at a young age and maintained during the tree's life, there will be less need for a reactive approach to pruning.

Most communities try to implement a two to five year pruning cycle. The ability to implement a cyclic pruning program is limited by the staff and financial resources of the city and most cities and towns cannot afford to contract services for all trees. There are options available to deal with budget constraints. For example, contract pruning of trees with diameters larger than 16 inches near high use areas may be an initial management recommendation while small tree pruning is performed by city staff or trained volunteers. The objective is to start and maintain a cyclic pruning program within the fiscal and personnel resource constraints of the city.

Industry standards such as ANSI 300, 133.1, or 60.1 define the standards and terms of arboriculture; specifications and best management practices determine how the agency applies the standards to manage its trees. The standards and specifications are applied universally to all public trees regardless of who is doing the work – staff or contractor. The standards and specifications guarantee that, if invoked, a healthy, structural sound urban forest will be perpetuated. The standards and specifications also demonstrate the agency is implementing currently accepted practices by the urban forestry and arboriculture professions. The arboriculture specifications should, at a minimum, include specifications for removal, pruning, planting, species, tree preservation, risk rating system and inventory methodology. **The following objective for tree care maintenance should be applied for city staff and contractors.**

- Pruning treatments should follow the best management practices established by the ISA, ANSI Z133.1 and ANSI A300 standards and employ ISA certified arborists or certified tree workers to perform tree maintenance. In addition to ANSI standards, the city should develop pruning specifications that serve to define treatments for different species, ages of trees, pruning techniques and other pruning issues.

Proper pruning adds value to the landscape and is one of the few active management techniques that helps a landscape appreciate in value while minimizing liability concerns. Proper pruning, with an understanding of tree biology, can maintain good tree health and structure while enhancing the aesthetic and economic value the community forest creates for Wasilla.

Mature Tree Care

The benefits and values of trees are maximized when trees reach maturity and become established in their growing location. To maintain this high level of benefits for a longer period, the city should commit to providing regular scheduled maintenance to its mature trees and prepare for other, non-routine arboricultural treatments as needed. A comprehensive mature tree care program primarily centers on routine or preventive pruning, and the ability to provide fertilization, irrigation, insect and disease control, and cabling and bracing when necessary.

If regular pruning is planned in a systematic manner, crews and equipment can work much more efficiently than if pruning is only done by request. The cost difference can be dramatic. The ISA has compared efficiencies of both methods and found planned

pruning to be at least twice as productive. When crews examine the urban forest regularly for possible risks and tree health problems, there is a reduction in citizen calls for emergency pruning (Luley et al. 2002). Additionally, the crews often find problems that would not have been reported by residents. Regular pruning cycles can also focus on certain species that may require more attention; this is common when a pest needs to be controlled, for example. Regular, cyclic pruning maintains a greater safety level in the urban forest and can decrease liability for the municipality (McGauley et al 2000).

A regular pruning cycle is a critical component of an effective community forestry program (Table 3). Over 60% of the trees inventoried require pruning. Regular pruning of the city's trees will improve the condition rating of a large number of trees, reduce the potential for storm damage to trees, reduce the risk associated with community trees, and demonstrates proactive management of the city's tree resources (Table 4).

Young Tree Pruning Program

There are hundreds of newly planted or young trees in Wasilla. More new trees will be added as trees are removed and to diversify the existing tree population. It is critical then to understand the proper maintenance techniques required to ensure the longest and safest service life of these trees. The major components of a young tree care program are pruning, mulching, and watering.

Training pruning is used to develop a strong structural architecture of branches so that future growth will lead to a dominant central leader, strong branch attachment and proper branch spacing along the trunk. It also consists of the removal of dead, dying, diseased, interfering, conflicting, and/or weak branches.

Many young trees may have branch structure that can lead to potential problems as they grow, such as double leaders, many limbs attaching at the same point on the trunk, or crossing/interfering limbs. When trees are small, these problems can be remedied easily and inexpensively.

If structural problems are not corrected while trees are young, they can lead to poor branch attachment. Trees with poor branch attachment can become safety risks as they grow larger and could create potential liability for Wasilla in the near future.

All newly planted trees should receive their first training pruning the third year following planting. Training pruning should not be done when a tree is planted, because it is already under stress from transplanting and needs as much of its leaf canopy as possible in order to manufacture food and increase root growth for proper establishment in its new site. Only dead or broken branches should be removed at the time of planting, and in the next two years.

The training pruning program would also be accomplished on a cyclical basis, but the work would be scheduled during a three year cycle rather than the two to five year cycle for the routine pruning of larger established trees. As mentioned above, newly planted trees should receive their first training pruning three years after planting. This work can be accomplished throughout the year.

Proper training in young tree structural pruning would be required for Wasilla staff or volunteers responsible for this task. Additionally, these workers would require an

understanding of the growth-habits of the various species being planted, as well as an understanding of tree biology, anatomy and physiology.

This type of work is also highly suitable for properly trained summer interns, part-time employees, and/or volunteers. Since no bucket truck is required, city staff or volunteers can perform this work at any time. Training pruning can be accomplished from the ground with a minimum amount of equipment. The city should develop an organized, documented approach to cyclical tree maintenance that can be easily managed by city staff and properly trained volunteers, if budgetary issues are a concern.

An optimum time to perform this pruning is late winter–early spring prior to bud break. The leaves are gone allowing clear visibility of the branches and trees will react positively to pruning at this time of year. Also it is usually a time of the year when city work loads are less demanding.

The following objectives will promote stewardship, longevity, structural integrity, and health of the community forest.

- Complete the GIS-based inventory to better understand the composition, character and distribution of the urban forest.

- Establish a long-term tree care and management program for public trees to enhance urban forest and ecosystem health and function, that includes structural pruning of young trees, cyclical pruning and crown cleaning of older trees, line-of-sight and height clearance pruning of street trees, removal and replanting efforts, risk identification for street and park trees.

- Coordinate with City Planning and Public Works to identify and address serious and persistent tree-related infrastructure conflicts, to include street, sidewalk and utility impacts along with maintenance and installation impacts within utility easements.

- Consider opportunities to expand the use and marketing of wood waste bi-products from various Urban Forestry programs and activities.

- Maintain industry-appropriate storm and risk tree response protocols.

- Maintain, promote, and apply industry-appropriate pruning and planting standards through staff and volunteer training and reference in city codes and outreach materials.

- Review and update the Urban Forestry Management Plan on a 5-year cycle, or as needed, to adjust to changing circumstances.

Maintenance requirements and condition of trees found during inventory data collection are summarized in the following charts.

Planned Maintenance

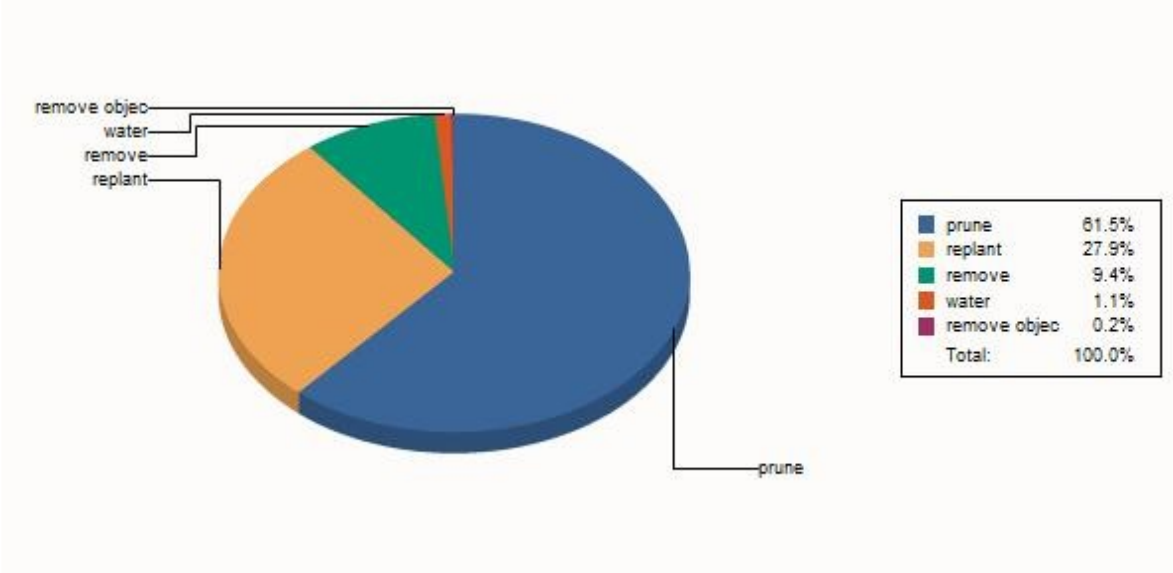
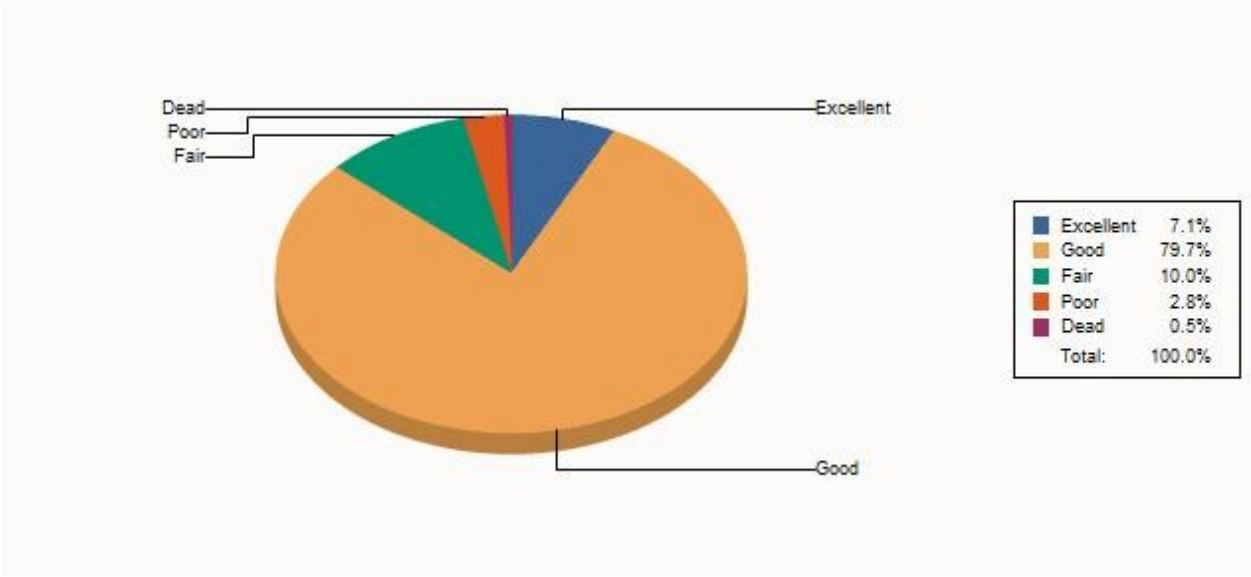


Table 3 – Tree maintenance tasks and task frequency determined during inventory data collection.

Condition Distribution



Top 20 Species

Condition	Percent	Count
Excellent (81 -100)	7.1%	54
Good (61 - 80)	79.7%	607
Fair (41 - 60)	10.0%	76
Poor (21 - 40)	2.8%	21
Dead (0)	0.5%	4
Total		**762**

Table 4 – Condition ratings for inventoried trees.

Tree Resource Expansion

There is a clear need for a tree planting plan to guide the arboriculture future of Wasilla's community trees. Such plans will minimize the unintended but gradual degradation of the urban forest over time, as well as maximize the potential for a sustainable and diversified tree canopy and the associated benefits. The trees in Wasilla—a relatively young, even-aged, limited, and undiversified population—are not only significant design elements but also represent the future canopy cover at this stage in their growth.

A challenge for the city is to plant enough new and replacement trees each year to increase the canopy cover. Without a clear plan to guide tree plantings, the city may gain trees but not achieve a net increase in tree canopy.

Tree planting plans include input from local citizens, state agencies, organizations, businesses, city staff, affiliated green industry professionals, and elected officials. They

are integrated with other comprehensive agency plans and create a blueprint for administration and management of the street and park tree planting program.

The goal is to provide specific guidelines on locating, planting, and caring for trees within the urban and urban/rural interface. Removing, pruning, planting, and preserving trees; educating stakeholders; and improving coordination and communication among citizens, tree committee, city staff, and elected officials are critical components in the development of the tree planting plan. A tree planting plan will help department managers quickly determine how best to apply funding that often becomes available in small and unpredictable amounts. A plan should not only specify what (species) and where (location) but when (timeframe) and why (underlying goals).

The community tree plan should address some important questions about landscape design, including the kinds of neighborhood and other landscapes that are present, their function, and their attractiveness; how the landscapes should look and function in the future; and how the landscapes should be protected or modified to create the desired result. **Design objectives can include the following:**

- Increase tree and shrub planting on city-owned property, including parks, natural areas, and riparian corridors.
- Promote additional street tree plantings to maximize future tree canopy coverage, while considering infrastructure (i.e., utility) limitations.
- Review new site development proposals to maximize tree planting and preservation opportunities.
- Encourage tree planting and preservation on private property; partner with property owners on project design and implementation.
- Develop guidelines for reviewing tree selection and/or location with regard to the aesthetics of specific architectural and development projects in community core.
- Consider the development of a Master Street Tree Plan as a means to express unified visions and themes for street trees across the city.
- Explore options for protecting existing canopy through the review and modification of development and management policies in the urban fringe area, in partnership with other agencies, to manage the interface between rural and urban lands.
- Important landscapes, such as business districts, neighborhoods, and main entrances and exits, will be identified and considered in tree and flower planting.
- Traditional landscapes, such as neighborhoods with large trees, will be preserved through tree planting. An overall image of the city will be developed through the coherent planting of trees along streets.
- The final selection of trees and their placement for a landscape shall be made in the field while considering the many elements of that landscape.
- The tree species chosen for planting, besides meeting design criteria, must be biologically adapted to site conditions and well suited for the level of care it will receive.

Implementing a tree planting plan and using inventory data to prioritize planting and maintenance establishes a systematic program which actually reduces costs. This is primarily because systematic maintenance in general leads to healthier trees that require less expensive maintenance over the long run than unhealthy, high risk trees. A healthy

and well maintained forest does not come about by accident. The health and stability of Wasilla's trees can only be achieved through careful planning and systematic maintenance of the tree population. Maintenance practices and standards for new tree plantings should be a component of the tree landscaping plan as well as strategies for funding maintenance programs. Developers should be encouraged and expected to use creative design strategies to achieve the intent of the tree planting plan.

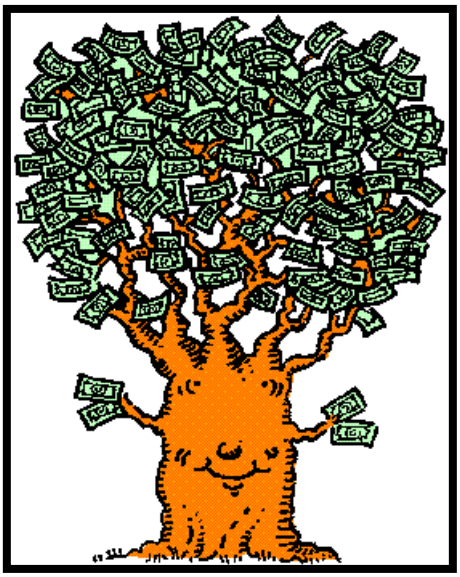


Figure 4 - For every dollar spent on tree planting and establishment, a 250% return on investment is provided back to the city in terms of the total services provided at tree maturity.

Tree planting in a city can significantly impact that community's landscape for years to come. Yet planting decisions, including the selection of species and location, are often made without the benefit of a long-term strategy or plan (Figure 4). Tree planting might occur as part of a larger capital construction project, or be driven by a donor request or the need for a volunteer project. Each of these common scenarios can occur in Wasilla—as it has in many cities and towns—over the years.

As the inventory of existing trees continues, places where trees could be planted should also be noted. These sites are potential spots where the urban forest can be enhanced and where the first possibilities lie for increasing the number of trees in the community. Knowing the number of available planting sites can also help when the community is budgeting for, and ordering new trees.

The opportunity to plant trees exists in every park and on every street. Each year communities are transformed by planting tens of thousands of trees in parks, landscapes and along city streets. It is a common activity promoted by cities, local and national trade, and professional and citizen organizations. These new trees are the future environmental, economic and social workhorses for our communities.

The key to maintaining a healthy, sustainable community forest is the implementation of regular, annual tree plantings, regardless of grant money or catastrophic events. A large number of trees do not need be planted, but a consistent annual addition of trees to the community forest is critical to maintain a perpetual canopy. **The following objective will guide the tree planting program.**

- The annual quantity of trees to plant is directly dependent on the quantity of trees the city can maintain.

Tree Planting Practices

Across the country we are striving to restore our community forests but the road from nursery to working forest is arduous. The sight of new trees struggling rather than thriving in the landscape is common whether the site is residential or commercial, public or private.

The current installation practices used in Wasilla are planting trees too deeply. Root collars are buried and trees are dying or declining rather than thriving. Installation practices need to change to reduce mortality and increase longevity at the outset (Figure 5).

Figure 5 - Root collar below grade. Note the presence of a stem girdling root, often associated with planting too deeply.

In general, the tree-planting holes should be relatively shallow (typically slightly less deep than the measurement between the root collar and the bottom of the root plate) and quite wide (three to five times the diameter of the root system). Care should be taken so that the root collars of the new trees are at the same level or slightly higher than the surrounding soil grade (Figure 6).

In most situations, it is not recommended to add soil amendments to the planting holes, as this can lead to differences between texture and structure of soils inside the planting holes and the surrounding soil. Such differences can lead to either water being wicked away from or accumulating in the planting holes.

Tree staking or guying should be the exception and not the rule. Tree staking hardware should only be installed when necessary to keep trees from leaning (*e.g.,* windy sites) or to prevent damage from pedestrians and/or vandals. Stakes should only be attached to trees with a loose, flexible material, and all staking material must be removed as soon as the root system anchors the tree.

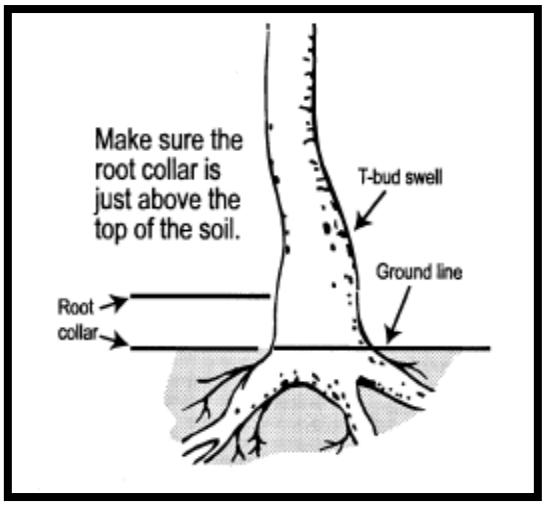


Figure 6 – Root collar at grade level

Mulching

Mulch should be applied to the surface of the soil around each newly planted tree. Mulch should never be piled up around the root collar (creating mulch volcanoes), but rather should be pulled away from the root collar (Figure 7). Mulch that buries the root collar provides

shelter for insects, fungi, and mammals that could damage the tree. Mulch should be applied to an area three times the diameter of the root system to a depth of two to four inches. Mulch not only suppresses competition from grass and weeds, but also provides a zone where turf maintenance is not needed, thereby keeping lawn mowers and string trimmers safely away and thus preventing mechanical damage. Mulch also helps to hold moisture in the surface of the soil where most of the feeder roots are to be established.

Figure 7 - Incorrect mulch applications can degrade trunk tissue causing tree mortality.

Diversification

The 2010 inventory of Iditapark included over 700 trees. There are more than 20 different species found in Iditapark tree population (Table 5). This appears to be a diverse population but species distribution figures indicate the population is dominated by a few species. Over 70 percent of the trees are represented by five species. The five species are western larch, paper birch, mountain ash, European bird cherry, and Canada red chokecherry.

Species diversity in new plantings should be a primary concern. The dangers (*e.g.*, disease and insects) of planting monocultures have proven to be devastating throughout the United States. The goal should be to maintain species diversity throughout the city. A common guideline for maintaining species diversity in urban settings is the 10-20-30 rule. That is, no one species should make up more than 10 percent of the trees in a population, no more than 20 percent of any one genus, and no more than 30 percent of one family in the total tree population (Santamour, 1990).

Diversity is an important measure of a forest's resilience. A more diverse forest, both in total number of species represented and in their relative abundance, is better able to adapt to environmental changes as well as disease and insect infestations. When just a few species dominate the composition of a tree population, these changes or infestations will significantly impact the entire population. **The following objectives will increase species diversity.**

- The city should adopt a more aggressive diversity guide that states that no more than 10% of any one genus as a guiding principle.

- The city should emphasize a diversity of species in the planting program. Many species should be avoided that have high maintenance costs, invasive characteristics, high storm damage potential or a history of failure.

Species Distribution

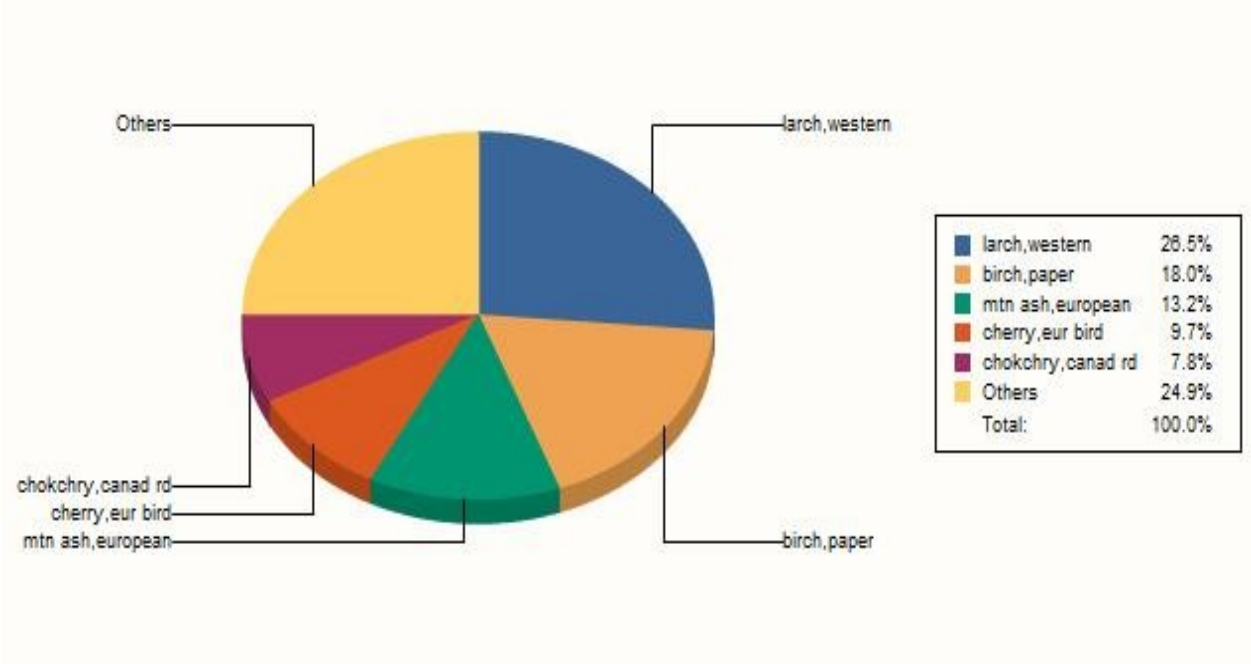


Table 5 – Species distribution. Over 70% of the public tree population is represented by five species.

Diameter Distribution

The graph (Table 6) below depicts the diameter distribution for the Iditapark trees inventoried. A population exhibiting the diameter distribution characteristics would indicate the city has planted trees many trees recently.

A well distributed age-class helps maintain a stable canopy cover. If all the trees within a particular area or neighborhood are approximately the same age they will mature and decline more or less at the same time, leaving that area with a deficient urban forest canopy. In many parts of the city, young trees of similar age class dominate the landscape. To mitigate the impacts of an even age canopy maturing at the same time, the city should take steps to increase the age class and species distribution where possible.

For example, western cities established the following standard for desired age structure:

- 40% young (< 6 inch DBH)
- 30% maturing (6 – 12 inch DBH)
- 20% mature (12 – 24 inch DBH)
- 10% old (> 24 inch DBH)

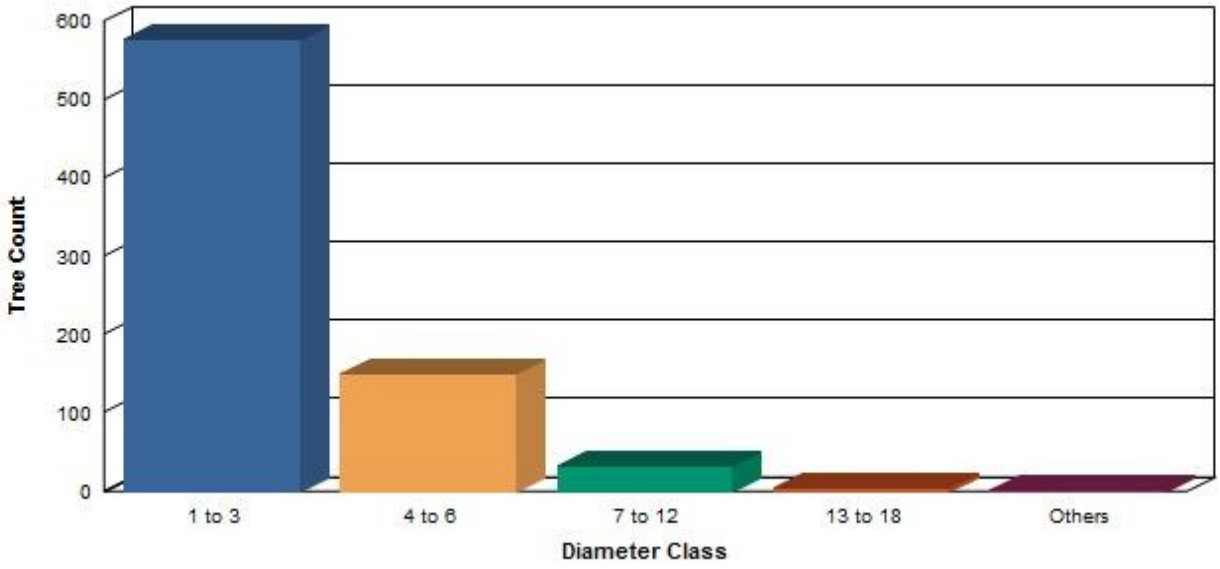
Wasilla's tree population ranges for the same categories of desired age structure are:

- 95% young (< 6 inch DBH)

- 4% maturing (6 – 12 inch DBH)
- 1% mature (12 – 24 inch DBH)
- 0% old (> 24 inch DBH)

Management activities should strive to improve Wasilla's population distribution to reflect current industry standards.

Diameter Distribution



Diameter Class	Percent	Count
1 to 3	75.7%	577
4 to 6	19.6%	149
7 to 12	4.2%	32
13 to 18	0.4%	3
Others	0.1%	1
Total		**762**

Table 6 – Diameter distribution of inventoried trees (Diameter breast height – 54 inches above grade level).

Tree Protection - Vandalism

It is impossible to constantly police every street and park tree. It is possible, however, to raise awareness in the community about tree health and to increase people's respect for the trees in the community. Educating residents, park patrons, and school children about street trees or trees in the parks may reduce incidents of tree vandalism (such as girdling and peeling bark, and harvesting bark) and encourage reporting of observed tree damage.

Accidental tree damage is also primarily a matter of education. Most people do not realize that slamming a car door (or fender) into a tree, urinating on a tree, hammering a nail into a trunk, or dumping hot coals at the base of a tree may all cause irreparable

damage that can eventually lead to hazardous conditions and tree mortality. Even walking on a tree's roots, when done by hundreds of people a day, can seriously injure a tree.

Programs that raise the public's awareness of the trees in the community through emphasizing their benefits they provide can help influence resident and visitor behavior. See the education and outreach sections of this UFMP for more information on this topic.

Young Tree Protection

As more young trees are planted along streets or in the parks, the need for a young tree maintenance program will rise. Young trees require more frequent care than older trees. Depending on conditions they may need to be watered, mulched, pruned, and/or protected with temporary fencing, as they are more susceptible to vandalism and adverse environmental conditions.

Trunk protectors and fence used during the winter season will reduce damage from large animals. It is worth the investment, as a year's worth of new tree planting losses from animals can quickly exceed the cost of fencing, trunk protectors, maintenance, and upkeep. Planting larger caliper trees from the onset may alleviate some problems with animals or vandalism.

Encourage volunteers to adopt young trees in the parks and their neighborhood. Volunteers trained in basic tree maintenance, and watering techniques, provided with tools (a hose, trowels, garbage bags, gloves, etc.) and are given the responsibility for the care of the adopted tree. This program promotes citizen involvement in tree care and awareness of the urban forest. This program could be implemented in Wasilla for street or park trees – individuals, families, or school groups could adopt newly planted trees. The city should attempt to organize a 'Tree Stewards' program and utilize the opportunity this group provides for more volunteer hours.

WASILLA MUNICIPAL CODE REVIEW

Enacting laws and policies that make public prohibitions and direct action in a certain way is not a popular way of influencing behavior. However, sometimes an issue is so important and complex that legislation and official policies are appropriate tools for local governments to use to protect its citizens and property. Managing urban forests is an important complex issue.

In recognition of the many benefits conferred by trees, hundreds of local governments are adopting street and park tree ordinances. Street and park tree ordinances apply mostly to publicly owned trees, as well as nuisance trees on private property.

Tree ordinances reflect the values of a community and the worth of a community's trees. A tree ordinance encourages tree maintenance to secure the beautification, air purification, noise and dust abatement, stormwater management, water quality, property value enhancements, public health and safety benefits trees provide.

A review of Wasilla municipal code provides no clear definitive language or tree ordinance that addresses the urban forest. The city code lacks provisions recommended and found in other city tree ordinances. The city has no over-arching

administrative or regulatory policy for managing public trees. There is no ordinance detailing the city's responsibilities for public trees, protection of public trees, enforcement and penalties for violations, or planting guidelines and processes. Without an ordinance or formal policy authorized by the CITY or without an administrative policy from the city, there is only limited coordination, inefficiencies, and marginal urban forestry management.

The key benefits to developing and adopting a tree ordinance are:

- Helps establish the tree management program;
- Provides reference to permanent procedures and legal authority;
- Legalizes a tree program through authorization of a tree commission;
- Establishes a permit review, approval, and appeal process for tree removal, planting, and pruning;
- Establishes the nature and degree of public responsibilities to community's trees according to specific standards and specifications;
- Establishes an official tree policy for the community;
- Specifies and ordinates arboriculture standards for tree planting, pruning, and other tree work;
- Identifies standards and regulations for arboriculture practices;
- Ensures that the people who perform work on the trees are well qualified.

Street and park tree ordinances must resolve two key issues. First, the ordinance should identify local government (and private property owner, if desired) responsibilities for planting, pruning, removing, and maintaining trees. Second, the ordinance should establish a tree committee and provide the committee with authority to guide the management of public street and park trees.

Municipalities should understand and plan for their own particular needs and abilities and not rely only on model ordinances from other places. Although ordinances may vary widely in form, content, and complexity, an effective tree ordinance should contain the following elements. The comments and examples are intended to help in developing the city tree ordinance. Appendix A contains resources for writing tree ordinances.

Table 7 - COMMON ELEMENTS FOR ORDINANCE EVALUATION

Element	Explanation
Location	Defines section in municipal code where ordinance should be placed (public works, parks and recreation, zoning, or planning departments)
Purpose	The goals and objectives of the ordinance. These are crucial to implementation, enforcement, and defense of the ordinance if challenged.
Authority	The source of the local government's authority to regulate – usually its own police powers and relevant state statutes (enabling legislation).
Definitions	Terms and phrases with special meaning within the body of the ordinance. Clear, concise definitions are important to ordinance comprehension.
Designation of Administrative Responsibility	The specification of a position, department, or committee responsible for enforcing the ordinance and carrying out specified duties. Ideally, limits of authority and responsibilities are clearly defined.
Permits and Plan Review Process	Establishes actions that will require permits such as tree planting, pruning, and removing. Explanation of how a new/proposed development or other action will be reviewed. Should detail information to be submitted with permit or platting requests, such as site survey of trees and proposed building locations.
Incentives	The methods that can be used to achieve conservation & compliance with ordinance (e.g. preserved trees credited to required project landscaping).
Preservation	What is to be preserved and how it is to be accomplished. There are many approaches to this, such as retaining ≥30% of existing tree canopy.
Construction Protection Measures	Specific measures required to protect trees during construction activities. Usually involves providing a protective zone for trunk and root structures.
Nuisance Trees	Provides authority to remove trees on private property that are diseased or threaten public safety.
Maintenance After Development	Specification of required maintenance of trees and vegetation after project has been completed, often including replacement for damage-killed trees.
Appeals	Provides for possible flexibility with a process for appealing decisions, which serves as a check on authority, but can potentially undermine management.
Enforcement	Provision for enforcement, and penalties for ordinance violations. May include fines, imprisonment, withholding of permits, work stoppage, etc.

Tree ordinances are among the tools used by communities striving to attain a healthy, vigorous, and well-managed community forest. Tree ordinances cannot assure that the trees in and around Wasilla will be improved or even maintained. Tree ordinances simply provide the city an opportunity to set policy and back it with the force of law when necessary. It provides the city clear authorization for public tree management activities (planting, pruning, removing, and other maintenance). If these activities are not integrated into an overall management strategy, problems are likely to arise. Without an overall strategy, management is haphazard, reactive, inefficient, and ineffective, and the community trees will suffer. **The following objectives provide for developing and adopting a city tree ordinance.**

- Determine the goals and scope of the ordinance
- Write a draft ordinance that reflects community goals and arboriculture standards
- Include relevant ordinance elements from Table 7

There are many existing tree ordinances and tree ordinance-writing resources. For a detailed listing of provisions for tree ordinances, see *How to Write a Municipal Tree Ordinance* by the National Arbor Day Foundation or contact your Alaska Community Forestry Coordinator for other resources.

OPERATIONAL REVIEW

Wasilla's goal is to have a larger, healthy, diverse, and functional urban forest and thriving residential and business communities. The dynamics of balancing urban forest management and other infrastructure needs, responsibilities, and assets are diverse and complex and suggest a dedicated, interdisciplinary, flexible approach and organization. However, the current constraints for comprehensive and effective urban forest management city can be considered formidable.

Budget

The lack of dedicated and adequate financial resources for tree management and maintenance precludes making significant improvements to the community trees. Currently, there is no line item or designated regular funding for tree planting, preventive tree maintenance, tree removals, increased staff and support personnel, or equipment.

Existing public funds for urban forest management are provided from public works funds for various maintenance tasks, are usually expended on park trees, and are often expended only on an emergency basis, by limited citizen requests, for individual capital projects, or for limited aspects of public tree management, such as park tree maintenance. There is no management authority over dedicated funds for comprehensive urban forest management activities, nor control and input on the expenditures made by other departments.

A community tree program will be in competition for funding with other important municipal projects and services. To compete successfully, a proposed budget should accurately estimate the program's annual costs. It should also clearly justify the need for annual and long-term funding for the program. Obtaining funds from municipal leaders can be difficult. Here are some points to remember:

- Budgeting happens every day of the year. Communicate the good things you do to elected officials regularly and include them in tree planting and other positive opportunities. Key decision makers and the public should be kept well informed about the program's accomplishments and needs.
- Citizens are reluctant to support new programs or increased taxes. Without an increase in revenues, municipal managers cannot provide new services unless they cut others. To obtain funding, the officials must be persuaded that a community tree program is a wise investment. Most municipal officials are not familiar with the benefits or technical details of community forestry, so the budgeting process should be educational as well.
- Sound information is crucial in developing good budgets. Annual work plans should be used to calculate the program's costs. You must understand the financial reality of your request as it fits the constraints of the municipal budget.
- A cost-effective community tree program will better compete for scarce budget dollars. The program's costs can be reduced through sound administrative practices such as employee training, accurate record keeping, preventive maintenance, and selection of well-adapted trees for planting. Contracting out services can also be cost effective. For instance, a consulting arborist or community forester can be hired part time, on a retainer, or on a cost-sharing basis with surrounding municipalities. These costs could be lower than paying a full-time salary.
- Remember to include the public in your program. Grassroots public support can help generate funding. Clearly document the value of the community forestry program by developing good relations with the press and service organizations.
- Accurate records of work and expenditures can provide convincing information on the need for funding. The budget for a tree program should adapt to the changing needs of a program as work is accomplished and the program becomes established. New programs may need larger proportions of a budget dedicated to tree maintenance, tree removal, and public education. Established programs may dedicate more funding for tree planting as progress is made in the removal and maintenance of trees neglected in the past.

The following suggestions can be used when developing annual budget plans. The percentages, which are samples from established programs, should be modified for the particular needs of Wasilla's street and park trees.

- About 20 percent of the budget should be allocated for tree removal. If there are trees that need to be removed, this should be made a budget priority.
- About 40 percent should be allocated for tree maintenance activities such as pruning, watering young trees, mulching, or controlling insects and diseases.
- Public safety and caring for existing trees should take priority over planting new trees. Too many communities make the mistake of planting new trees while neglecting older, more valuable trees. Only about 20 percent of the annual budget of an established program should be allocated for new tree plantings.

- Administrative activities are an integral part of every tree program and should receive about 20 percent of the budget. When starting a program, much more of the budget should be dedicated to obtaining authorization, gaining legislative and public support, and educating the public.

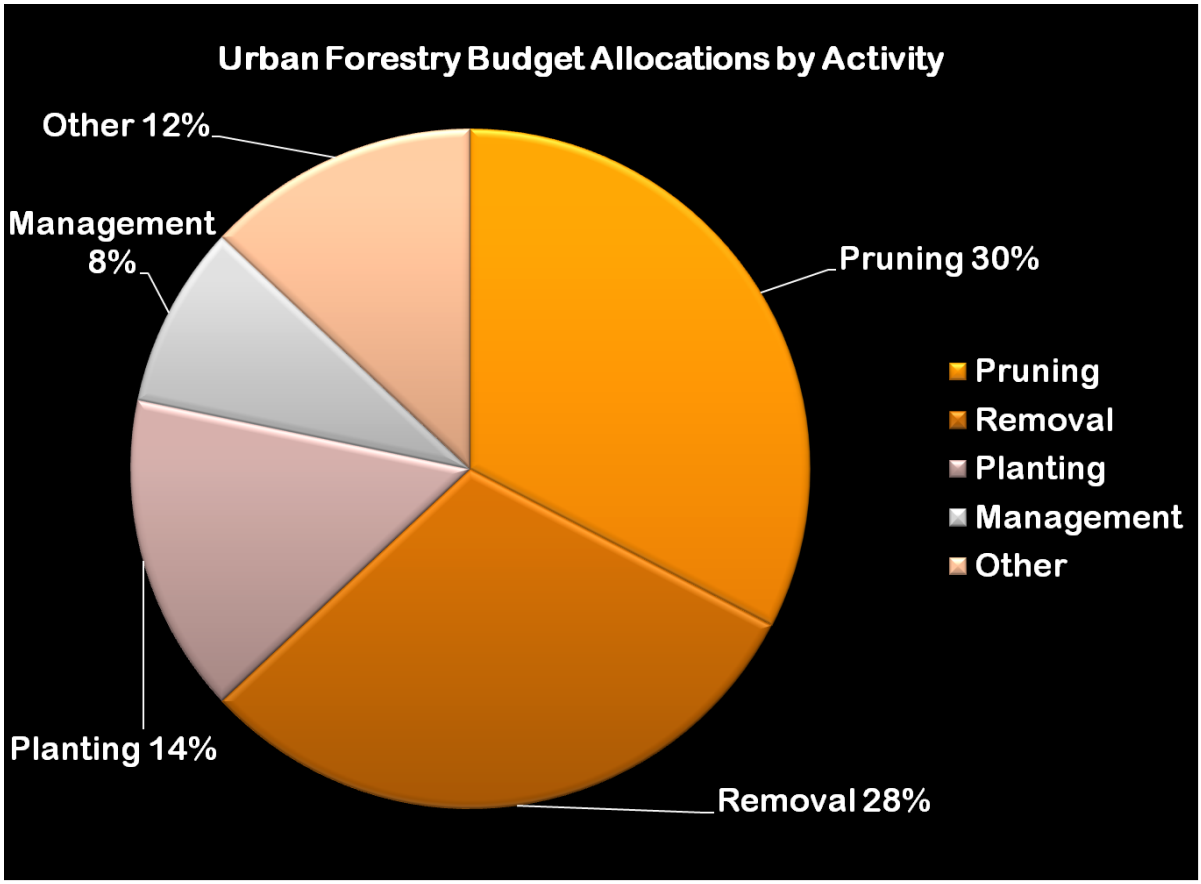


Figure 8 – Typical fund use in urban forestry tree budget allocations

Projected Multi-Year Maintenance Budgets

Typical tree budget allocations found in urban forestry programs across the United States allocate funding in these areas (Figure 8). These are approximations but provide an accurate representation of fund allocations. The priority should be to take care of what you have before substantially adding to the street tree population.

The National Arbor Day Foundation (NADF) suggests $2.00 per capita for urban forestry funding criteria to meet minimum TREE CITY USA standards. The funding criterion includes many activities that do not involve tree maintenance. Wasilla has a population of approximately 10,000 residents. The urban forestry budget based on TREE CITY USA standards should be approximately $20,000.00. Currently Wasilla spends $14,000.00 on part time staff, tree equipment, and tree maintenance. This figure has not changed since the original resolution in 2000 that initiated the program.

One thing many municipalities have in common is a limited budget. Traditionally, the budgets for public trees and parks are the first to be cut when money becomes tight. Many municipalities simply cannot afford a community tree program. As a result,

creativity and energy are needed to find funds to support public trees and landscapes. **Below are some objectives to ensure funding for urban forestry programs:**

- An annual report, work plan, and budget will be used to inform elected officials of the tree board's work and funding needs (Table 8).
- An annual meeting will be held to discuss the tree board's work and funding needs.
- News articles and releases will be used to explain worthy activities, including planting, tree removals, pruning, and funding needs.
- A "memorial or heritage tree" program will be used to raise money for tree planting on streets and in parks.
- Local civic organizations and businesses will be contacted annually to discuss their participation and support of commission activities.
- Community, family, and corporate foundations will be identified and considered for support of commission activities.
- State and other government grants will be identified and considered for support of commission activities.
- Emphasize the solutions to community problems that trees offer such as stormwater abatement.

Annual Community Tree Budget Worksheet

_____
MUNICIPALITY AND YEAR

Materials		
Trees (Multiply number of trees _____ by the average cost per tree $_____.)	$_____	
Stakes, soil, mulch, fertilizer	$_____	
Pesticides/herbicides	$_____	
Computer inventory software	$_____	
Administrative and public education materials (paper, copies, brochures, educational books)	$_____	
Other	$_____	
Materials subtotal		$_____
Equipment and buildings use		
(Divide total cost by years of service life and add maintenance, utilities, and fuel costs.)		
Office space	$_____	
Equipment storage/building	$_____	
Climbing gear	$_____	
Pruning tools, chain saws, handsaws	$_____	
Trucks/aerial lifts, backhoe/front-end loader, leaf collection equipment, chipper, stump grinder	$_____	
Spray equipment	$_____	
Equipment rental (types _____)	$_____	
Other	$_____	
Equipment and building subtotal		$_____
Services (municipal, volunteer, and contracted)		
Salaries and fringe benefits (based on % of employees' time spent working with trees)	$_____	
Tree board volunteer time	$_____	
Labor (paid or volunteer) or total cost of services		
(When using volunteer labor, estimate the wage based on task.)		
Planting (Multiply hours_____ by average wage $_____.)	$_____	
Pruning (Multiply hours_____ by average wage $_____.)	$_____	
Removal of trees and stumps (Multiply hours_____ by average wage $_____.)	$_____	
Tree inventory (Multiply hours_____ by average wage $_____.)	$_____	
Emergency storm damage cleanup (Multiply hours_____ by average wage $_____.)	$_____	
Mulching, watering, fertilizing (Multiply hours_____ by average wage $_____.)	$_____	
Leaf and branch cleanup (Multiply hours_____ by average wage $_____.)	$_____	
Leaf composting (Multiply hours_____ by average wage $_____.)	$_____	
Insect control (Multiply hours_____ by average wage $_____.)	$_____	
Utility pruning and other services (Obtain estimate from company and pro-rate per year.)	$_____	
Consultant services	$_____	
Educational programs	$_____	
Delivery/transportation charges	$_____	
Administration: (permit review, grant writing, Arbor Day planning, site inspection, etc.)	$_____	
Memberships in tree organizations (state council, ISA, etc.)	$_____	
Other	$_____	
Services subtotal		$_____
Other		
Unpaid insurance claims for damaged trees	$_____	
Grant funds expended, if not included above	$_____	
Total expenditures (Use this amount in Tree City USA formula.):		$_____

Table 8 – An annual budget, no matter how small, should be presented to the Wasilla assembly by the tree committee.

There is no magic formula for determining how much funding is needed for a proactive, sustainable urban forestry program. Every urban forest is different, and urban forestry programs may be at differing stages of development. The simple answer is that there should be sufficient funding for staff or hired contractors to carry out preventive tree maintenance, perform emergency response, as well as support management, staff, equipment, staff training, and community education and outreach.

PROGRAM ACTIONS

Actions and recommendations required to work toward the management goals that are prioritized and undertaken by the city staff working in concert with the tree committee, contractors, and citizens of Wasilla.

Short-Term Action Items

There are five program management elements that must be addressed on an annual basis: Community Forestry Management Plan Adoption and Implementation, Tree Inventory, Proper Tree Maintenance, Tree Planting, and Program Administration. Although each of these programs is essential to the maintenance of the community forest, an annual operating plan should be established to determine where budget dollars will be spent. City staff and the tree committee have established public safety, responsible management of existing trees and tree planting as highest priorities.

Priority 1: Adoption and Implementation of the Urban Forestry Management Plan.

The UFMP is straightforward and comprehensive, and contains appropriate goals and activities for this community. The objectives of the UFMP are clear and far-sighted. The goal is to change the forest as it is today into one that reflects the goals of the management plan. The five year plan should be reviewed annually to determine progress, review the activities accomplished, aid in the development of annual operating plans, and plan for future activities to complete the UFMP recommendations. This ensures important components of the UFMP are accomplished and progress is made towards achieving a sustainable tree program. Long-range planning time horizons can be several years or a decade, but five years is most commonly used and is a realistic time frame for implementation of the goals and recommendations of the UFMP.

Priority 2: Tree Inventory Completion

A significant component of an urban forest program is a professional analysis of the tree population. Using the TreeWorks software, the inventory of all public trees should be completed to provide an accurate accounting of public trees. Using accurate, consistent inventory data and professional interpretation and planning, leads to healthier, safer, trees with lower maintenance costs and increased benefits to the community provided by public trees.

Priority 3: Proper Tree Maintenance

After planting an appropriate species at a site that can support adequate growth, maintenance practices such as mulching, watering, and pruning should be employed for three to five years. If trees are pruned properly three or four times during the first twenty years, they will need less frequent and less costly pruning in later years. Pruning promotes sound structural development of a tree's trunk and branches. The most important period for pruning occurs when the tree is young. Pruning large trees is costly and usually consumes a large part of any tree program's budget. By prioritizing the proper planting and pruning of young trees, a substantial savings can be realized by the entire tree program.

Early pruning performed properly will lead to long-lived healthy and safe mature trees. Pruning young trees properly produces substantial cost savings to the city. Training

young trees can provide a strong branching structure that requires less frequent pruning as the tree matures. Improved stewardship to increase the health and survival of recently planted trees is one strategy for increasing cost-effectiveness.

Proper training in young tree structural pruning would be required for Wasilla staff responsible for this task. Additionally, these workers would be required to understand the growth-habits of the various species being planted, as well as tree biology, anatomy, and physiology. This training can be received through several sources, including urban forestry consultants, the state's Community Forestry Program, and the regional chapter of the International Society of Arboriculture. The tremendous aesthetic and financial benefits to be gained in the years to come from proper pruning of young trees are a strong incentive for educating tree crew personnel concerning proper pruning techniques. The added knowledge gained by the individuals could augment the sense of professionalism in their jobs.

Large trees are the most significant component of the city's community forest. They form a canopy over streets, parks, and private properties. A mature tree is a costly management element, but it is important element because of safety and tree health issues. The consequences of lack of care for large trees are the creation of more risk trees and poor tree health.

Enforcing standards for pruning and other tree care is crucial in providing correct and consistent plant health care. The International Society of Arboriculture has developed pruning standards for trees. The standards are divided into four categories: crown cleaning, crown thinning, crown raising, and crown reduction.

Crown restoration, pruning for views, and other pruning are considered specialty pruning. Other helpful sets of standards to consider and include are the ANSI Standards for Arboricultural Operations—Pruning, Trimming, Repairing, Maintaining, and Cutting Brush—Safety Requirements (ANSI Z133.1, 2000) and the ANSI Standards for Tree Care Operations—Tree, Shrub, and Other Woody Plant Maintenance–Standard Practices, Pruning (ANSI A300(Part 1), 2001, Pruning). These safety and pruning standards are designed specifically for tree care operations and should be incorporated into your standards for tree care.

Systematic pruning of large trees reduces maintenance costs, increases the value of the trees, sustains the benefits of trees, and is a clear demonstration the city is exhibiting reasonable care in maintaining its trees. Cyclic pruning shifts tree management from reactive to proactive. The overall condition of Wasilla's trees will be increased by improving the quality of pruning, storm damage will be greatly reduced, and the cost to prune trees will decrease as problems are addressed before they become costly. The city should establish a pruning cycle of two to five years.

Priority 4: Tree Planting

New tree planting is an essential part of the community tree management. The health and stability of the city's future forest depends in large part on judicious tree selection, location, and tree planting today, as well as regular maintenance of young public trees.

The key for successful tree planting is to plant quantities the city has the ability to maintain. If you cannot maintain 100 new trees, don't plant 100 new trees. Increase

new plantings each year, but in quantities that match the maintenance abilities of staff and city resources.

To ensure the health of newly planted trees and that planted trees thrive, standards should be provided in the tree plan for planting techniques. These can best be expressed as general guidelines with references to technical publications. A great deal of information about the size of planting pits, staking, and other planting practices has been developed by International Society of Arboriculture. The Alaska Community Forestry Program can provide other resources and training programs to ensure successful tree planting programs.

Priority 5: Program Support and Administration

The city's concern for and level of dedication to urban forestry is exemplified by the recent tree inventory and management plan project and the existence of some park tree maintenance.

However, the elected officials are keys to the growth and success of the Wasilla's urban forestry program. As the ultimate policy-making group and representatives of the citizens, the mayor, assembly, and commissions can have direct influence over the current and future management of the urban forest. They can approve new and improved tree ordinances, support increases in program funding, support additional staffing levels, and generally make urban forestry issues a priority for the city.

Support from elected officials and the citizens are critical to implement and maintain an effective comprehensive urban forest management program. The citizens own both the public and private urban forests, and without greater political support and increased citizen understanding and commitment, urban forest management in Wasilla may not reach its full potential.

Program administration refers to the supervision, scheduling, coordination, planning, and education for the city's tree program. These tasks are varied and numerous and should be addressed through the coordinated effort of city administration, staff and an advisory tree committee. Much of the field work will be performed through contractual agreements with consultants and commercial tree care firms. It is the responsibility of the city administration, city staff, tree committee, and residents to ensure that the best management practices are used for treatments to the city's trees.

Long-Term Action Items

Long-range planning mainly concerns program enhancement and involves the completion of recommendations in the management plan. There are three program management elements that must be addressed to sustain the community's tree program and trees: Increase Funds Spent on Community Trees, Community Outreach and Education, and Tree Ordinance Revision Development.

Priority 1: Increase Staff and Funds Spent On Community Trees

Community trees are a local responsibility. Federal assistance, state assistance, donations and special grants provide important help for community tree activities. However, no source of funds should be considered a substitute for including trees in the city's budget. Abundant, healthy trees are of value to the entire city. A tree program is

as much a city responsibility as streets, water and fire protection. Incorporating trees into the mainstream of the city's fiscal responsibility should be a goal in Wasilla's strategic planning for the future.

The lack of dedicated and adequate financial resources for the community trees precludes making significant improvements to the tree population. Currently, there is no designated regular funding for tree planting, preventive tree maintenance, risk management, cyclical pruning, staff training and support personnel, or equipment.

The resources for urban forest management should be increased. A truly proactive and comprehensive urban forest management program requires trained and dedicated staff to oversee management and operational activities. The important duties of tree planting, tree maintenance, risk assessment, site inspections, project management, contract administration, citizen education, and public outreach require a competent staff, equipment, and other program resources.

An adequate complement of professionals who, individually or collectively, understand the technical, operational and administrative factors in urban forest management is needed to prescribe and monitor the city's urban forestry activities, enforce policies and regulations, apply technical standards and practices, and review plans that affect the forest resource. Without this professional component in sufficient numbers, urban forest management decisions and actions often default to inadequately prepared decision-makers, which can have long-term, negative consequences for the forest resource.

Wasilla's urban forestry needs have reached a point where the future management of the city trees requires tree maintenance positions, support staff, and funds for contractors or consultants with the ability to augment the services provided by the public works staff. A job analysis could be performed to determine if new or existing job classifications should be created, whether existing staff could be trained and reassigned or if new hiring is needed, and what level of funding is needed to support the positions.

An operational review of urban forestry activities could be performed to document work processes, work quantities, personnel, use or absence of arboricultural standards, and to inventory existing equipment, tools, and office equipment. The findings and recommendation of both the job analysis and operational review are critical sources of decision-making information and baseline data for judging whether to retain the services of a consulting arborist.

Priority 2: Community Outreach and Education

Collaboration is necessary for a tree program to serve the physical, social and ecological needs of the city's infrastructure and contribute to the community. The citizens of Wasilla will need to be informed and educated to ensure the success of a tree program and to carry out and accomplish the recommendations of the management plan. Education is one of the best investments to garner support for the tree program. Workshops, stewardship programs and collaboration with volunteers, schools, and other civic groups can serve as a conduit for support of the program.

Methods of educating the public and encouraging participation by volunteers are important parts of a community tree plan. Examples of strategies for public education and participation for a tree plan include the following:

- Residents, civic organizations, and environmental groups will be offered opportunities to participate in tree planting and maintaining public flower beds.
- Educational materials concerning trees and other natural resources will be provided to schools, particularly grades three through ten.
- Arbor Day and Earth Day will be celebrated—with the involvement of public officials and school children—as reminders of the importance of the community forest.
- Workshops on tree planting and care and other educational programs will be provided for community residents.
- Contacts with commercial arborists and the utility company will inform them of community expectations for the quality of work on public and private trees.

Identify and involve local movers and shakers, decision makers, and other people in your community. The number one reason people volunteer is because they are personally asked.

Identify community and nonprofit groups, churches, and schools that could provide support in the form of people and meeting space. Seek and publicly acknowledge support from local banks, utility companies, and other organizations for special projects.

Identify and contact assembly members, state legislators, and city departments using the city's resources as leverage to attract additional funds, influence, skills, and other resources.

Priority 3: Tree Ordinance Development

A review of the city's documents exposed several issues not addressed in city code regulations. Tree ordinances to be effective must provide three functions: provide authority, define responsibility and establish minimum standards for management and maintenance. The tree ordinance suited to Wasilla, and most likely to be approved in Wasilla, is written with a thorough understanding of the natural resource, ethnic tradition, political-economic climate, legal framework of the community, and the need to manage with an ecological perspective the supports the green infrastructure.

Most forestry programs exist as a reflection of community interest in trees and operate as specified in the tree ordinance. Passage or revision of an ordinance can be a complex issue. There are many diverse groups that have a stake in tree ordinances. I recommend a broad base of community support be developed prior to attempting to develop the ordinance. The tree inventory and UFMP can provide the basis for support and the need to develop the current ordinance.

CONCLUSION

Community Forestry Consultants, Inc. has completed its assignment of evaluating and making recommendations regarding the community forest of Wasilla. This management plan provides the city with the framework to implement the best management practices for the community forest. The management and maintenance needs for a successful urban forestry program have been developed from the best management practices available in the urban forestry and arboriculture industry.

The urban forest management plan should be considered a “living,” working document. The work objectives recommended in it should be reviewed annually and adjustments made appropriately for the following year. The entire document should be reviewed on a five or ten year basis to determine if management and urban forest conditions have changed significantly.

Timely action needs to be taken to prevent tree failures, preserve tree resources, and maintain the trees of Wasilla. Trees are valuable assets to the community. The healthier the trees are in the community the more the city’s livability is improved. To realize these benefits, tree planting, pruning and removing; increased education, preservation and volunteerism is needed. The focus goes beyond the individual tree to trees throughout the city…..to the working community forest.

The recommendations will help conserve Wasilla’s tree resource and sustain the tree canopy for future generations. Although this commitment will come with costs, the long-term benefits are significantly greater and will result in a sustainable asset for the citizens of Wasilla today and tomorrow.

APPENDIX A – Tree Ordinance Writing Resources

Guidelines for Developing and Evaluating Tree Ordinances: Bernhardt, E.A. and Swiecki, T.J.;California Dept. of Forestry and Fire Protection;(http://www.isa-arbor.com/tree-ord/ordintro.htm).
Tree City USA Bulletin #9: How to Write a Municipal Tree Ordinance: National Arbor Day Foundation; (http://www.arborday.org/programs/treecitybulletinsbrowse.cfm).
Tree City USA Bulletin # 31: Tree Protection Ordinances: National Arbor Day Foundation; (http://www.arborday.org/programs/treecitybulletinsbrowse.cfm).
U.S. Landscape Ordinances: An Annotated Reference Handbook; by Buck Abbey, D. Gail Abbey; This comprehensive reference brings together and explains the planning ordinances which govern the landscapes of 300 U.S. cities.
Tree Ordinance Development Guidebook; Georgia Forestry Commission; (http://www.gfc.state.ga.us/CommunityForests/documents/2005TreeOrdinance-100.pdf).
Landscape Ordinances Research Project; A resource home page for urban design, city planning, urban forestry, site design, landscape architecture, architecture, site engineering, land use law and land development--highlighting legal standards and technical requirements for site development plan; (http://www.greenlaws.lsu.edu/sitemanager.htm).
Guide to Developing a Community Tree Preservation Ordinance; Presented by the Community Tree Preservation Task Force of the Minnesota Shade Tree Advisory Committee, this guide describes the planning process, typical ordinance elements, and resources available for the task; (http://www.mnstac.org/RFC/preservationordguide.htm).
Guide to Writing a City Tree Ordinance – Model Tree Ordinances for Louisiana Communities; (http://www.greenlaws.lsu.edu/modeltree.htm).
Research Article – Kathleen Wolf; (http://www.cfr.washington.edu/research.envmind/Roadside/Trees_Parking.pdf).
Developing a Successful Urban Tree Ordinance; Charles C. Weber, Alabama Forestry Commission.
Guidelines for Developing Urban Forest Practice Ordinances; Bell, P.C., Piamondon, S., and Rupp, M.; Oregon Department of Forestry, Forest Practices Program; Urban and Community Forestry Program. This guide is designed to assist cities and counties in the development of urban forest practice regulations; (http://www.oregon.gov/ODF/URBAN_FORESTS/docs/Other_Publications/UrbanFP.pdf).

Urban and Community Forestry: A Guide for the Northeast and Midwest United States; Ascerno, M. et al., U.S. Forest Service, Northeastern Area State and Private Forestry; This manual updates a 1990 edition which focused on the interior western region of the U.S. and includes chapters on history, benefits (aesthetic, social, recreational, wildlife, economic, and physical), programs, inventories, planning, ordinances and policy, site evaluation, tree selection and planting, soils, and maintenance; 210 pp; Undated; probable publication date, 1992.

Municipal Tree Manual; Hoefer, P.J., Himelick, E.B., and DeVoto, D.F., Urbana, IL, International Society of Arboriculture. 42 pp; Prepared in cooperation with the Municipal Arborists and Urban Foresters Society; The purpose of this manual is to be a guide for preparing new, or revising old, municipal tree ordinances.

Practice Tree Preservation; Zoning Practice, July 2006, From APA, Issue #7.

Tree Conservation Ordinances; APA Report #446 with Scenic America, Copyrighted 1993, Christopher J. Duerksen, Suzanne Richman; (http:www.amazon.com/Tree-Conservation-Ordinances-Duerksen/dp/9994880802).

Community Trees: Tree Ordinances for Iowa Communities; Wray, P., Iowa State University, Cooperative Extension Service (http://www.extension.iastate.edu/Publications/PM1429b.pdf).

General Code Publishers (on-line ordinance clearinghouse); (www.generalcode.com/webcode2.html).

LexisNexis Municipal Codes (on-line ordinance clearinghouse); (http://municipalcodes.lexisnexis.com).

American Legal Publishing Corporation (on-line ordinance clearinghouse); (http://www.amlegal.com/library).

Municipal Code Corporation (on-line ordinance clearinghouse); (www.municode.com);(http://www.municode.com/resources/code_list.asp?stateID=49).

TreeOrd software; Unique software for cities is available to help them develop ordinances that will ensure the future of their community forests. TreeOrd, an interactive CD-ROM, was developed by the Tree Trust with a grant from the USDA Forest Service. The cost is $60 plus shipping and handling; (http://www.mnstac.org/RFC/tree_order_form.PDF).

APPENDIX B – Potential Landscape Plant List

The plant list below is composed of many species not in the tree population of Wasilla. These trees may be hardy to the Wasilla, and are not natives but will adapt to the area. Diversification and willingness to try new species are the keys to a successful planting program.

Small Trees – Less than 25' mature height for narrow parking strips and under utility lines

Hedge Maple
Acer campestre

Height: 25-35'
Spread: 20-30'
Hardiness: -25
Tree with a dense, round canopy. Leaves are deep green with a yellowish fall color. Extremely adaptable, tolerant of dry soils and compaction. Excellent street tree in residential areas and for use under power lines. Noted for its corky, ridged and furrowed bark.

Amur Maple (treeform)
Acer ginnala

Height: 20'
Spread: 20'
Hardiness: -50
A small, hardy tree with rounded outline, glossy green leaves changing to shades or yellow and red in fall. Fragrant, but not showy flower. Very adaptable to a wide range of soils and tolerant of some shade.

Miyabe Maple
Acer miyabei

Height: 25-30'
Spread: 20-30'
Hardiness: -30
An upright oval to rounded tree. The leaves are 3 to 5 lobed, dark green with a pale yellow fall color. Tolerates some dryness and prefers full sun. No serious pests and a good choice for a small shading tree.

Pacific Sunset Shantung Maple
Acer truncatum x A. platanoides 'Warrenred'

Height: 25'
Spread: 25'
Hardiness: -30
An upright, spreading, rounded crown tree with a regular branching pattern having dark green, glossy leaves and an outstanding yellow-orange to bright red fall color. A hardy tree that has great potential for urban areas.Red

Autumn Brilliance Serviceberry
Amelanchier x grandiflora 'Autumn Brilliance' (treeform)

Height: 20'
Spread: 15'
Hardiness: -30
Tree form of serviceberry with an upright spreading crown, white flowers and a reliable, bright red fall color. The fruit is edible. Tolerates some drought.

Cumulus Allegheny Serviceberry
Amelanchier laevis 'Cumulus' (treeform)

Height: 25'
Spread: 20'
Hardiness: -30
A serviceberry with a distinct upright and oval tree habit, fleecy white flowers in spring and a yellowish to orange-scarlet fall color. Smooth gray bark.

American Hornbeam
Carpinus caroliniana

Height: 25'
Spread: 25'
Hardiness: -40
A small tree with an irregular spreading habit, with a rounded outline. Dark green leaves change to yellow, orange and scarlet in the fall. Smooth, gray, irregular twisting bark adds interest in winter. Will grow in heavy shade and wet soils.

Lavalle Hawthorn
Crataegus x lavallei

Height: 25'
Spread: 20'
Hardiness: -40
A small, dense oval canopy tree with shiny dark green foliage turning to bronzy copper-red in the fall. Usually thornless or with small one inch thorns. Quite free of rust and very adaptable.

European Euonymus
Euonymus europaeus

Height: 15-30'
Spread: 10-20'
Hardiness: -30
A narrowly upright tree in youth broadening as it ages with a rounded outline when mature. Early leaf out with a flat dark green color turning from yellow to reddish purple in fall. Fruits ripen pink to red in September and are quite attractive.

Amur Maackia
Maackia amurensis

Height: 25'
Spread: 25'
Hardiness: -25
A small round headed tree. Leaves emerge a silvery gray and gradually become dark green. Fragrant pale white flowers light the tree in July and August. Bark peels with maturity exposing a shiny amber to brown color, becoming curly in texture. Prefers moist, well drained soil, but is quite adaptable to environmental conditions.

Merril Loebner Magnolia
Magnolia x loebneri 'Merrill'

Height: 30'
Spread: 30'
Hardiness: -30
An upright habit becoming round with age. Leaves are thick and rigid, dark green and turn yellow in fall. Flowering peaks in April, where the tree resembles a white cloud covered with fragrant snowy blossoms. A vigorous grower and cherished landscape tree.

Yulan magnolia
Magnolia denudata

Height: 35'
Spread: 30'
Hardiness: -30
Tree with spreading branches somewhat irregular, producing an informal outline. Leaves are thick and resilient turning yellow in fall. Flowers are fragrant, white and 4-6 inches wide, blooming in spring. New nursery stock.

Galaxy Magnolia
Magnolia x 'Galaxy'

Height: 20 - 25'
Spread: 15'
Hardiness: -20
A tree form magnolia with a strong central leader and pyramidal to oval shape. The foliage is lustrous green and flowers are large, 8 to 10 inches wide, blooming in spring on bare stems, pink outside and white inside. Good selection for a landscape or street where space is limited or confined.

Royal Star Magnolia
Magnollia stellata 'Royal Star'

Height: 20'
Spread: 15'
Hardiness: -30
A hardy, compact, rounded tree with deep green foliage and yellow fall color. The large fragrant flowers bloom in early spring, before the leaves break. An excellent ornamental tree for small sites in urban landscapes.

Flowering Crabapples
Malus sp. (Red Flowers)
Hardiness: -20 (-30)

'Adams'
Height: 20'
Spread: 20'
Dense and rounded symmetrical habit. Pink flowers, red persistent fruit.

'Amazam' American Masterpiece
Height: 25'
Spread: 18 - 20'
Pyramidal habit. Bright red leaves emerge and mature to dark maroon. Brilliant red flowers change to unique pumpkin orange fruits in fall that persist through winter.

'Bechtel' Klehm's Improved Crab
Height: 15 - 20'
Spread: 15 - 20'
Rounded form, dense dark green foliage, turning orange to orange red in fall. Large double pink flowers cover the tree in spring. Improved strain for disease resistance. Seldom fruits, very tidy tree.

'Centzam' Centurion Crabapple
Height: 20'
Spread: 15'
Narrow upright habit, spreading slightly with maturity. Purple emerging leaves changing to bronze-green. Rose-red flowers ripen to bright red fruits persisting through the winter.

'Prairifire' Prairifire Crabapple
Height: 20'
Spread: 20'
Upright spreading habit becoming rounded. Reddish stems with foliage changing from purple to red hued green. Excellent color change from crimson buds to dark pink flowers to deep red fruits which persist through winter.

Flowering Crabapples
Malus sp. (White Flowers)
Hardiness: -20 (-30)

'Adirondack'
Height: 18'
Spread: 10'
Densely upright inverted cone shape. The cut of this cultivar combined with an overabundant white flowers in spring makes this a "standard" to which other flowering crabs are compared. Bright red fruits carry interest through winter.

'Hargozam' Harvest Gold Crab
Height: 25'
Spread: 15'
Upright, moderately columnar habit. White flowers in spring are but a precursor to the golden fruits which adorn this tree through winter making it a show stopper in the landscape.

Professor Sprenger'
Height: 20'
Spread: 20'
Stark upright habit makes for a larger more stately looking tree than other crabs. Red buds bloom white with pink tones ripening to orange-red fruits and endure on the noble frame through winter.

'Sentinel'
Height: 20'
Spread: 12'
Vase shaped, an unusual form for a crab makes its mark as an excellent street tree under power lines. Flowers are white with a touch of pink , fragrant,

with bright red fruits that carry through the winter.

like drops of rain from this elegant tree.

Persian Parrotia
Parrotia persica

Height: 20 - 30'
Spread: 15 - 25'
Hardiness: -20
Small single stemmed tree with upright to wide spreading branches, oval outline. Pink to purple emerging leaves blend to glossy green and turn a beautiful succession of yellow to orange to red in fall. An excellent selection for streets and landscapes, given size, color display and remarkable resistance to pests and disease.

Columnar Sargent Cherry
Prunus sargentii
'Columnaris'

Height: 35'
Spread: 15'
Hardiness: -30
Upright, columnar to narrowly vase shaped at maturity. Flowers, foliage and bark with the same attractive qualities as the species. The narrow habit lends itself for street tree use.

Prairie Gem Pear
Pyrus ussuriensis
'Mordak'

Height: 25'
Spread: 20'
Hardiness: -30
Densely branched and compact tree with a round canopy. Leaves are bright green, thick and leathery turning golden yellow in fall. White flowers blanket the tree in early spring. Excellent pear for urban Plantings.

Ivory Silk Lilac
Syringa reticulata
'Ivory Silk'

Height: 25'
Spread: 15'
Hardiness: -20
Tree form lilac, oval and compact with upward curving branches. Foliage is dark green, flowering when young. Displays large white flower clusters in early July.

Medium Trees – 25 to 50' mature height

Fairview Maple
Acer Plantanoides
'Fairview'

Height: 45'
Spread: 35'
Hardiness: -30
Upright oval form, slightly tapered. An improved 'Schwedler' (red-leaf) type, more narrow and upright. Leaves emerging garnet purple and mature to bronze-green. Care should be taken not to encourage diseases and pests by overuse of Maple cultivars.

Parkway Maple
Acer Plantanoides
'Columnarbroad'

Height: 40'
Spread: 25'
Hardiness: -40
Narrow oval form with a good central leader. Leaves are dark green and turn yellow in fall. Very hardy Norway cultivar and an excellent maple for city u se due to it's narrow shape and well behaved branching. A healthy tree performs well along wide streets and corridors of green. Be cautious about overuse.

Emerald Queen Maple
Acer Plantanoides
'Emerald Queen'

Height: 50'
Spread: 40'
Hardiness: -30
Forms a well shaped, dense, oval habit with upright spreading branches. A excellent green-leafed cultivar for Urban Planting. Can tolerate environmental extremes and has consistent yellow fall color.

Superform Maple
Acer Plantanoides
'Superform'

Height: 45'
Spread: 40'
Hardiness: -30
Broadly oval to rounded form. As the name suggests this tree was selected for its symmetrical and uniform growth. Leaves are green with yellow fall color. The trunk is straight and develops an excellent branch structure, very formal and solid looking maple.

Sycamore Maple
Acer pseudoplatanus

Height: 40'
Spread: 30'
Hardiness: -30
Upright spreading branches and a slightly irregular rounded crown. Leaves are dark green with no discoloration on the lower surface. Adaptable to a variety of environmental conditions, poor soils and exposed sites. Makes an excellent, informal street tree.

Armstrong Maple
Acer rubrum
'Armstrong'

Height: 45 - 55'
Spread: 15'
Hardiness: -30
Rapidly growing columnar tree. Leaves light green turning orange in fall. The bark becomes a beautiful silver-gray as the tree matures. Widely utilized in urban Plantings where space is limited for spreading types.

Bowhall Maple
Acer rubrum 'Bowhall'

Height: 40'
Spread: 15'
Hardiness: -30
Tightly formed columnar cultivar. An excellent selection for street Plantings. Nice contrast to broader species with medium green foliage. Smaller and slower to mature than 'Armstrong' with better fall color.

Northwood Maple
Acer rubrum

Height: 40'
Spread: 35'
Hardiness: -40
Broadly oval to rounded shape. Foliage is medium green. The tree can tolerate harsher winters than most, but fall color is not as reliable as other Red Maples. The trunk is rectilinear with strong branch connections. Selected from the University of Minnesota.

Red Sunset Maple
Acer rubrum
'Franksred'

Height: 45'
Spread: 35'
Hardiness: -30
Hailed as one of the best Red Maple cultivars. Trees have vigorous and symmetrical growth, developing into pyramidal to oval forms Good branch angles display dark green leaves transforming to brilliant shades of red and orange in Fall.

Black Alder
Alnus glutinosa

Height: 40 - 50'
Spread: 30 - 35'
Hardiness: -30
Fast growing tree with a broadly pyramidal habit, somewhat irregular. Dark green leaves change to yellow in the fall. These trees thrive near water and perform well in poor soils. Good tree for an alternative to willows and other poplars. The 'Pyramidalis' cultivar has an excellent narrow form and recommended for confined space areas.

European Hornbeam
Carpinus betulus

Height: 25 - 40'
Spread: 25 - 35'
Hardiness: -20
Pyramidal shape, quite dense with dark green leaves. Fall color is usually yellow but

during cold winters can turn dark red. Heat and drought resistant.
'Fastigiata', a columnar cultivar, is taller, but only spreads 15', making it preferable for confined urban spaces.

European Beech
Fagus sylvatica

Height: 40 - 50'
Spread: 15 - 40'
Hardiness: -20
Stately tree, narrowly compact to densely pyramidal to broadly oval, branching close to the ground. Leaf color varies dramatically between cultivars. It is said that the right cultivar of this tree can enhance any landscape. Care should be used with Planting lower branching trees to avoid creating a traffic nuisance.

'Fastigiata'
Fastigate Beech
Trees deep green, tight form makes it one of the most striking columnar trees.

'Riversii' Rivers Purple Beech
Broadly oval habit, foliage has striking purple shades, spring through summer.

'Zlatia'
Golden Beech
Upright pyramidal habit, young leaves are yellow maturing to golden green.

White Ash
Fraxinus americana

Height: 45 - 55'
Spread: 30 - 40'
Hardiness: -25
A variety of forms usually oval. Bark is ash-gray to grayish-brown aging with diamond furrows with slender ridges. Leaves are pinnately compound with a range of green and a variety of fall colors. Most cultivars have been selected or breed with disease and pest resistant characteristics. The trees are widely used and make good selections for urban Plantings.

'Autumn Purple'
Rounded habit, purple fall color. Signature purple ash.

'Champaign County'
Dense oval habit, yellow fall color. Thick trunk and strong branches.

'Rosehill'
Upright oval habit, bronze red fall color.
Strong central leader.

Green Ash
Fraxinus pennsylvanica

Height: 45 - 50'
Spread: 25 - 35'
Hardiness: -30
A variety of forms usually oval. Bark is ash-gray to grayish-brown aging with diamond furrows with slender ridges. Leaves have a range of green and yellow fall color. Cultivars have been selected or breed with disease and pest resistant characteristics, the tendency towards irregular growth has been reduced as well. The trees are widely used and make good selections for urban Plantings. Care should be taken not to encourage diseases and pests by overuse of any tree species.

'Bergeson'
Strong, upright growth, oval. Tends to be smaller in size.

'Cimmaron'
Narrow oval habit, Glossy green foliage, brick red fall color

'Patmore'
Symmetrical branching, oval canopy. Yellow in fall.

'Summit'
Uniform branching, narrowly oval with a good leader. Yellow fall color.

Maidenhair Tree
Ginkgo Biloba

Height: 40 - 55'
Spread: 15 - 35'
Hardiness: -25
Young trees are irregularly shaped, but finish broadly symmetrical. Usually all marketed trees are male due to the offensive smell of the female trees in fruit. The leaves are uniquely lobed and bright green on both sides, changing to bright to golden yellow in fall. Having outlived most of its enemies Ginkgo is a fine specimen for urban Planting.

'Autumn Gold'
Very uniform and balanced pyramidal tree. Spreading at maturity.

'Magyar'
Narrow pyramidal form with a strong central leader. Well spaced branches.

'Princeton Sentry'
Narrow tapering growth almost columnar. Tallest of the three.

Honeylocust
Gleditsia

Height: 35 - 45'
Spread: 35 - 40'
Hardiness: -20
Usually a tree with a squat trunk and open spreading branches. Cultivars are thornless, or have very few thorns. Often overused in landscapes which can promote pest and disease problems.

'Halka'
Heavy caliper and full even crown with an oval form. Yellow in fall.

'Moraine'
Rapid growth with a vase shape and rounded outline. Golden fall color.

'Shademaster'
Irregular vase with rectangular outline. Good form for street use. Yellow in fall.

'Skyline'
Broadly pyramidal, good branch angles. Form lends itself to urban design.

American Hophornbeam
Ostrya viginiana

Height: 30 - 45'
Spread: 25'
Hardiness: -30
Rounded oval shape made up of slender branches, sometimes arching up or down. Leaves are bright green turning yellow to brown in fall often persisting adding winter interest along with the hop like fruits. Tolerates dry conditions and free of major disease and insect problems.

Amur Corktree
Phellodendron amurense

Height: 30 - 45'
Spread: 40 - 50'
Hardiness: -30
Broadly spreading tree, leaves deep to lustrous green with a brief display of yellow or bronze in fall. The bark of mature trees is unusual and quite striking. Remarkably free of pests, pH adaptable, tolerant to drought and pollution making it a great urban tree if given enough space to fill out.

'His Majesty'
Male, free of seed litter. Thick leathery leaves on stout branches.

Korean Mountainash
Sorbus alnifolia

Height: 40 - 50'
Spread: 20 - 30'
Hardiness: -30
Form changing from pyramidal to rounded outline at maturity. Leaves differing from other mountain ashes, look more beech like, as does the trunk. Striking tree with an excellent combination of form, foliage, flowers, fruit and bark. Considered the best of the Mountain Ashes.

American Linden
Tilia americana

Height: 35 - 50'
Spread: 20 - 35'
Hardiness: -40
Tall stately trees, cultivars generally smaller in size especially when used in urban areas. Leaves are generally 4 to 8 inches long and about as wide in a range of green shades. Bark is gray to brown with narrow lateral furrows. The wood is soft and easily prunes, but is elastic enough to handle most weather extremes. These trees will entirely block the sun in their shadow so place them appropriately.

'Boulevard'
Dense, narrow pyramidal habit with ascending branches. Yellow in fall.

'Legend'
Rounded pyramidal habit, yellow fall color.

'Lincoln'
Slender, upright and compact form with light green leaves, 25' by 15' in 25 years.

'Redmond'
Full pyramidal form, uniform with large leaves and red branches, winter interest.

Littleleaf Linden
Tilia cordata

Height: 40 - 45'
Spread: 45'
Hardiness: -30
Trees are pyramidal, rounding with maturity. Leaves are generally smaller, 2 to 3 inches long and wide, (except Glenleven) finely serrated and turn yellow in fall. Trunks are usually straight and bark smooth. Likes well drained alkali soils, but pH adaptable and tolerates pollution well. Makes an excellent selection for any urban Planting.

'Chancellor'
Fastigiate in youth, becoming pyramidal with age. Good branch development.

'Corzam' Corinthian Linden
Narrowly pyramidal, 15' spread. Yellow in fall. Excellent tree for limited space.

'Glenleven' Glenleven Linden
Fast growing with a straight trunk, leaves twice the size of 'Greenspire'

'Greenspire'
Single straight leader, good branch angle. Tolerates difficult conditions.

'Olympic'
Very symmetrical pyramid form, better branching than some other cultivars.

Kentucky Coffeetree
Gymnocladus dioicus

Height: 50 - 65'
Spread: 40 - 50'
Hardiness: -30
Sharply ascending branches, rising to form a narrow oval crown. The bark is unique, developing on young stems. Spring leaves are late to emerge, their pinks and purples are a nice contrast to greening trees. Seldom bothered by pests or disease, pollution tolerant and strong, upright growth make this an excellent street tree.

'Stately Manor'
Male selection, no seed pods.

Butternut
Juglans cinerea

Height: 40 - 60'
Spread: 30 - 50'
Hardiness: -30
Round topped tree with wide spreading crown of large horizontal branches and stout laterals. Leaves are dark green and woolly, white ridges and gray furrows make up the mature bark. Fruit debris may be a nuisance. Performs well in the rocky, dry and limestone based soils, a prevalent soil type in Spokane. Usable as Boulevard and Park tree.

LARGE TREES – 50' OR LARGER AT MATURE HEIGHT

Black Maple
Acer nigrum

Height: 60 - 75'
Spread: 40 - 55'
Hardiness: -25
Extremely similar to Sugar Maple with darker green leaves which have a tendency to look droopy. The fall color is more consistently in yellow or shades of yellow and some say the Black Maple can survive harsher conditions than Sugar Maple.

'Green Column'
Upright narrow oval, 20' spread. Tolerates heat. Great fall color.

Sugar Maple
Acer saccharum

Height: 60 - 75'
Spread: 40 - 55'
Hardiness: -25
Trees branch upright developing into a large oval to rounded canopy. Foliage is medium green turning bright yellow and burnt orange with red tones in fall. Urban uses in larger lawns, parks and islands of green, recommended against confined or pollution prone sites.

'Green Mountain'
Broadly oval. Very cold tolerant. Reliable fall color.

'Commemoration'
Oval to rounded. Thick, dark green leaves, reduces leaf tatter.

'Endowment'
Columnar form, well suited for confined urban sites.

'Legacy'
Very symmetrical form. Thick stem and branches. Drought tolerant.

Hackberry
Celtis occidentalis

Height: 50 - 75' (100')
Spread: 40 - 50'
Hardiness: -50
Cold tolerant tree will uncommonly obtain heights of 100 feet, but in urban settings usually does not exceed 60'. Rounded or vase shaped crown with graceful splaying of the branches. No spectacular foliage or flower display, more the trees unique character and ability to tolerate adverse conditions that make it an excellent choice for a Park or Boulevard.

Tulip Tree
Liriodendron tulipifera

Height: 70 - 90'
Spread: 35 - 50'
Hardiness: -20
Tree develops quickly with a tall straight trunk , several large sinuous branches develop a narrow oval frame. The leaves actually appear tulip like medium green changing to yellow and golden in autumn.

Cucumbertree Magnolia
Magnolia acuminata

Height: 50 - 80'
Spread: 40 - 80'
Hardiness: -25
Pyramidal growth habit when young aging to a broad-rounded outline with massive spreading branches often arching towards the ground. Foliage is dark green, flowers are smaller than some magnolias, but in abundance. Makes a great tree for parks, golf courses and other open areas, where it can have room to spread.

Black Walnut
Juglans nigra

Height: 50 - 75' (100')
Spread: 50 - 75'
Hardiness: -20
Develops a rounded well formed crown that is devoid of branches a third to two thirds the way up the tree. Leaves are finer than Bitternut and less furry. Bark is brown to grayish black and roughly diamond shaped. May inhibit the growth of other plants near the site. Tolerates dry conditions and can be used for streets where ground clearance is needed, but performs best when used for Parks and Boulevards, due to dropping fruit.

Dawn Redwood
Metasequoia Glyptostroboides

Height: 60 - 100'
Spread: 25 - 40'
Hardiness: -20
Deciduous conifer, tall pyramidal or conical form. Large basal spread. Bright green foliage, renewed every year. Grows rapidly and tolerate wet sites if drainage is not restricted. In winter the skeletal frame of larger trees is starkly majestic. Definitely a tree for large areas so select sites appropriately.

Bloodgood London Planetree
Platanus x acerifolia 'Bloodgood'

Height: 50 - 80'
Spread: 40 - 60'
Hardiness: -15
Broadly pyramidal, rounding with thick spreading branches at maturity. Large basal spread. Large maple like leaves turn yellow in fall. Bark is peeling creating a brown/cream mottling with year round interest. Better resistance to anthracnose disease than other sycamores but still can be a problem if trees are over used.

White Oak
Quercus alba

Height: 60 - 80'
Spread: 50 - 70'
Hardiness: -30
Juvenile shape is pyramidal maturing with a broad and majestic crown. Leaves are bluntly lobed, dark green to blue-green. Autumn color varies from brown to red. A challenge to transplant and establish, but worth the effort.

Bur Oak
Quercus macrocarpa

Height: 55 - 80'
Spread: 50 - 70'
Hardiness: -40
Weakly pyramidal or oval to start, developing into a large broad-rounded tree with a massive trunk. Foliage is partially lobed, dark green above and grayish below, turning yellow-brown to purplish in fall. Corky bark on smaller branches adds interest. Adapts to a wide range of soil types, drought and pollution tolerant, makes an excellent tree for urban areas where acorn debris can be managed.

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