

# **City of Soldotna, Alaska Urban Forest Management Plan**



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Soldotna, AK 99669**

*March 2012*

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# CHAPTER 1 | EXECUTIVE SUMMARY

## OVERVIEW

Soldotna is a community that values a high quality of life and respect for the natural environment. Over the past several years, the City has placed a higher priority on maintaining and planting new community trees. The purpose of this planning document is to evaluate the City's current community forestry program and make recommendations and goals that will help decision-makers and City staff continues to provide a healthy, safe, and pleasant environment for the visitors and residents of our community.

A Community Forest Management Plan (CFMP) is intended to provide a framework for ensuring that the public trees – those trees on land owned and managed by the City of Soldotna - are appropriately cared for according to community goals over the next five years. This includes 'street trees' in the City's rights-of-way, green spaces in parks and the memorial park, and other public lands such as City Hall, the library, and the Police Department. The Soldotna CFMP provides a strategic framework to initiate and expand the City's forestry program to meet a range of policy, education, and management goals.

This project was funded through a grant from the Alaska Department of Natural Resources Division of Forestry Community Forestry Program with funding from the USDA Forest Service, to facilitate the city's ongoing commitment to maintain, enhance, and preserve Soldotna's tree canopy. It is a guide for city staff, landowners, utility companies, developers, and residents to follow when making decisions about community trees. The plan was prepared through a systematic and comprehensive review of existing city regulations, standards and other adopted plans, discussions with key staff members, an assessment of urban forestry financial resources, and an analysis of tree inventory data.

## TREE INVENTORY

The week of July 18-22, 2011, city staff, Alaska Department of Natural Resources (ADNR) staff, and the project consultant inventoried approximately 500 trees on the city hall grounds, Parker, Sunrise, Farnsworth, and Soldotna Creek parks, and the police and fire station grounds. The team was trained to identify species, collect data such as the size (trunk diameter, approximate height, etc.), identify structural defects and/or hazards (such as encroachment into power lines), and to rate overall tree health.

One notable finding was the relative lack of species diversity in Soldotna and opportunities to plant much larger tree species than are currently used. Other notable issues identified include: cases of trunk damage from lawn mowers and weed eaters; the need for improved/additional maintenance for existing trees; instances of improper tree planting and siting of plants; and the need for additional training and education for city staff, contractors, and the community.

## VISION AND GOALS

A vision statement is a written summary of what the community wants their city to be like now and in the future. After reviewing various city planning documents, interviewing City staff and officials, and meeting with members of the public, the following vision statement was established:

**City of Soldotna Urban Forestry Vision Statement**  
**Soldotna values and will create a thriving, sustainable community forest that improves the quality of life and sense of community for residents, while maximizing environmental, economic, social, and aesthetic benefits.**

In addition to the vision statement above, the plan establishes management goals for the City. These recommendations are preliminary steps to enhancing the community forestry management program for the city. The recommendations and actions will help conserve Soldotna’s trees and ensure a healthy tree canopy for future generations. Although this commitment will come with costs, the long-term benefits are significant and will result in a sustainable asset for the citizens of Soldotna today and tomorrow. The list of program objectives is in Chapter 3.

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



# CHAPTER 2 | BACKGROUND

## PROJECT BACKGROUND

In 2011, the Alaska Department of Natural Resources Community Forestry Program provided grant funding to the City of Soldotna to begin a public tree inventory and develop a management plan to guide the management of community trees. The city provided staff for inventory data collection and funds to match the grant and support the project.

## SOLDOTNA'S DEVELOPMENT HISTORY

The City of Soldotna's growth was shaped by both man-made and natural features. The most densely developed region of the City is in the western half, bordered by the Kenai River and two major highways. Commercial development has primarily occurred along the Sterling and Kenai Spur Highways, and on major collector roads off them. The City is relatively young with the majority of development occurring in the 70's and 80's following the discovery of oil in the Swanson River area. At the time, large swaths of private land were cleared and developed without zoning or other land use controls in place to require retention of natural vegetation.

As the community matures and more of the basic needs for residents are met, the attitude has shifted towards improving on Soldotna's already high quality of life by focusing on improvements to the City's trail network, beautifications of our rights-of-ways and highway corridors, and finding more environmentally-conscious ways of developing infrastructure.

## ORGANIZATIONAL AND FUNCTIONAL OVERVIEW

Tree maintenance in the City of Soldotna has traditionally been the responsibility of the Parks and Recreation Department, which responds to tree-related issues on an as-needed basis. The City does not have an urban forester or International Society of Arboriculture (ISA) Certified Arborist on staff, and program resources are limited and must be balanced with other important city services. New trees are incorporated into capital projects on City property (such as the recent development of Soldotna Creek Park), however the City's typical street section standards do not provide for nor require trees in City rights-of-way when sections of City streets are developed or re-developed.

As the tree program is currently structured and staffed, the range and complexity of arboriculture responsibilities exceeds the capacity of resources and staff. As such, management responses tend to be reactive rather than proactive and preventative; this reality illustrates a major limitation to the city's overall efficacy in protecting and expanding urban tree resources, and is a common issue found in small communities.

While real costs must be borne by the city of Soldotna 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 Soldotna 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 generate community involvement and activism.

## TREE BENEFITS

Trees have held a prominent role in discussions regarding environmental change, and we now have a better understanding of the benefits trees provide in an urban environment. Trees are essential to the health and sustainability of a community, protecting the overall Kenai River Watershed resources and salmon spawning grounds, improving air quality, increasing property values, and providing critical habitat for wildlife. A summary of key values and benefits and some supporting sources is provided below.



**FIGURE 1. THE PHOTOS ABOVE SHOW A NEWER SUBDIVISION IN SOLDOTNA WHERE MUCH OF THE VEGETATION WAS REMOVED DURING CONSTRUCTION (LEFT), AND AN OLDER ESTABLISHED NEIGHBORHOOD WITH MANY MATURE TREES (RIGHT). PHOTOS COURTESY GOOGLE EARTH 2011.**

**WATER QUALITY & STORM WATER RETENTION.** The Kenai River watershed is one of the most productive systems in the United States. The City of Soldotna has implemented a variety of measures to improve water quality, reduce storm water runoff and wastewater infiltration into the Kenai River watershed. Urban forests absorb rainfall, control surface water run-off, filter ground water and assist in ground water recharge.

Increasing on-site water retention and treatment can reduce the demand on the City's stormwater infrastructure. The City of Soldotna has approximately 5.7 miles of storm water collection system, which leads to several sedimentation basins. This infrastructure, aside from the initial capital cost to install, requires annual maintenance to ensure the system is working properly. Adding trees where there currently are none, and keeping Soldotna's community trees healthy, will be a part of the solution and reduce the total amount of runoff to treat.

**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.

**THE ECONOMICS OF AESTHETICS.** Soldotna is a center for trade and services, education, retail, local government and health care for the central peninsula. It is important to the community and fiscal revenues to remain competitive and attractive to businesses and customers and residents.

Improving aesthetics of Soldotna 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 tourism 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.

**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. Parks, campgrounds, green space, and trails are important assets for Soldotna residents and visitors. Use of these resources by the community promotes the health and well-being of the individuals as well as the sense of community.

## ENVISION SOLDOTNA 2030

In the spring of 2011, the City adopted a new comprehensive plan, Envision Soldotna 2030. The plan directs land use and guides development policies for the city over the next 20 years. It also establishes specific policies related to economic development, neighborhoods, natural resources and the environment, parks trails and recreation, arts education and culture, public infrastructure and services, highways and transportation, regional growth and development, and general land use. Fostering a healthy community trees program furthers several goals of Envision Soldotna 2030, such as working to beautify our highway commercial corridors, improve water quality and protect the Kenai River, and making the City more accessible and enjoyable for pedestrians.

## COMPLETE STREETS

“Complete streets” is a term used to describe streets designed to enable safe, attractive, and comfortable access for all users. Complete Streets contribute to Soldotna by providing public open space that integrates amenities including street trees and landscaping, street and sidewalk lighting, transit facilities, street furniture, water features, and public art work. The policies also promote the planting of street trees and other vegetation, the construction and maintenance of non-motorized transportation facilities, general support for transit, and streetscape improvements. The concept of the complete streets design guidelines supports tree planting and tree maintenance and provides additional information supporting the goals and objectives of the community forest master plan.

Public streets and sidewalks constitute a large percentage of the City’s impervious surface, generating runoff and pollutants. Reducing the amount of pavement and increasing vegetation planted within City rights-of-way can assist in creating greener business districts and neighborhoods in Soldotna. Techniques to accomplish this include reducing the travel width of roadways, utilizing pervious pavement, installing rain gardens, and installing traffic circles and medians that can be planted with vegetation. These techniques can also help to achieve traffic calming goals and a better balance between vehicles, pedestrians and bicycles, and are part of a “complete streets” approach.

## TREE CITY USA DESIGNATION

TREE CITY USA status demonstrates a community’s commitment to managing urban tree resources, and creates opportunities for grants for the community. Four standards must be met before a community can achieve this recognition, including:

1. Designating a tree board or responsible department;
2. Adopting a tree care ordinance;
3. Implementing a community forestry program with an annual budget of at least \$2 per capita; and
4. Observing Arbor Day and issuing a proclamation.

These requirements are achievable to the City and Soldotna would see many benefits from participation in this program.

## TREE INVENTORY

Tree inventories are the foundation of an effective tree management program. Tree inventories help municipalities 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 municipality can acquire and retain pertinent information about the condition of their tree resources. The inventory data supplies objective and quantitative information that can be used to document estimates for funding, personnel and equipment needs. Using and regularly updating the tree inventory moves the urban forestry program into proactive management and can save the city time and money through program efficiencies.

With this information, staff can better plan and prioritize tree removals, maintenance work, and plantings. An inventory will also improve the chances of receiving grants and other program assistance by providing documentation of the community's commitment to healthy street and park trees.

## MAINTENANCE TASKS IDENTIFIED

The tree inventory identified the following maintenance tasks:

**Removal:** Of the 479 trees inventoried, 162 (>35%) are recommended for removal. Trees recommended for removal in Soldotna are primarily due to structural defects or previous maintenance damage caused by lawnmowers and weed eaters inflicting wounds to the trunk.

**Prune:** 210 inventoried trees are recommended for some type of pruning treatment. The most common defect is co-dominant stems which can be corrected by subordination pruning treatments. This contributes to a strong structure, longer life and safer tree.

**Replant:** There are 50 trees recommended for replanting due to improper installation (planted too deeply). In addition, the burlap, polyethylene rope, and wire basket were left on the root ball. The root systems of container trees were not treated at installation leaving many with stem girdling roots. This increases the potential for the tree to become unsafe or to fail, leading to costly removal and replacement.



**FIGURE 2. TREE AT PUBLIC LIBRARY HIT RECENTLY BY A MOWER. FREQUENT WOUNDING BY MOWERS AND WEED EATERS ALLOWS DECAY TO ENTER THE TREE.**

## CONDITION DISTRIBUTION

The team visually inspected each tree in the survey and assigned a 'condition' rating: 0% (dead) 30% (very poor) 50% (poor) 70% (fair) 80% (good) 90% (excellent). Trees in the Soldotna inventory were rated as follows:

| <b>Condition</b> | <b>Count</b> | <b>Percent</b> |
|------------------|--------------|----------------|
| Excellent        | 0            | 0              |
| Good             | 19           | 4              |
| Fair             | 310          | 64.7           |
| Poor             | 100          | 20.9           |
| Very poor        | 45           | 9.4            |
| Dead             | 5            | 1.0            |

## SPECIES DISTRIBUTION

Over 65% of the public tree population is represented by five species.

| <b>Species</b>            | <b>Count</b> | <b>Percent</b> |
|---------------------------|--------------|----------------|
| Colorado spruce           | 116          | 24.2           |
| Crabapple species         | 59           | 12.3           |
| European mountain ash     | 53           | 11.1           |
| 'Canada Red' chokecherry, | 51           | 10.6           |
| Amur chokecherry          | 48           | 10.0           |
| Birch                     | 42           | 8.8            |
| Others                    | 110          | 23.0           |
| <b>Total</b>              | <b>479</b>   | <b>100.0</b>   |

## DIAMETER DISTRIBUTION

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:

| <b><u>Standard Tree Class Distribution</u></b> | <b><u>Present Soldotna Distribution</u></b> |
|--|---|
| 40% young (< 6 inch DBH)                       | 62% young (< 6 inch DBH)                    |
| 30% maturing (6 – 12 inch DBH)                 | 33% maturing (6 – 12 inch DBH)              |
| 20% mature (12 – 24 inch DBH)                  | 3% mature (12 – 24 inch DBH)                |
| 10% old (> 24 inch DBH)                        | 2% old (> 24 inch DBH)                      |

The comparison indicates trees may not be surviving to reach maturity or many small ornamental trees have been planted in recent years that never will reach large diameter trees. Management activities should strive to improve Soldotna's population distribution to reflect current industry standards and plant large trees when possible.

The following table lists the diameter distribution of inventoried trees. Diameter was taken at breast height, approximately 54 inches above grade.

| <b>Diameter Class (inches)</b> | <b>Count</b> | <b>Percent</b> |
|--------------------------------|--------------|----------------|
| 1 to 3                         | 141          | 29.4           |
| 4 to 6                         | 158          | 33.0           |
| 7 to 12                        | 157          | 32.8           |
| 13 to 18                       | 15           | 3.1            |
| 19 to 24                       | 1            | 0.2            |
| 25 to 30                       | 3            | 0.6            |
| 31 to 36                       | 3            | 0.6            |
| 43+                            | 1            | 0.2            |
| <b>Total</b>                   | <b>479</b>   | <b>100.0</b>   |

## CHAPTER 3 | URBAN FOREST MANAGEMENT PLANNING

Community trees play an important role in the quality of life of the city. As previously noted, the community draws a wide range of benefits from the trees. In Soldotna, 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, trees require regular maintenance and monitoring to ensure that they continue to function properly and provide benefits to their maximum capacity. For the urban forest, this neglect typically comes in the form of failure to plant young trees to replace maturing populations, to adequately diversify tree species to protect against species-specific diseases, to prune trees early on to limit the risks posed by trees as they mature, and failing to maintain mature trees properly.

This report lays out a long-term vision with short-term goals for the management of trees in the city. It provides 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, this plan recommends the following management and maintenance actions to improve the health, quality, size, and diversity of the working forest of Soldotna. This section outlines the primary objectives of this urban forest management plan.

### VISION STATEMENT

A vision statement is a community's aspirations for itself put in writing. It describes the community Soldotna residents want to live in now and the community they want to pass on for future generations.

**City of Soldotna Urban Forestry Vision Statement**  
**Soldotna values and will create a thriving, sustainable community forest that improves the quality of life and sense of community for residents, while maximizing environmental, economic, social, and aesthetic benefits.**

### GOALS AND 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. 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.

### ADMINISTRATION

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 city board or commission, and municipal employees in various departments.

The size and complexity of a municipality will determine how to organize the tree program. In Soldotna, an option is to hire a part-time city arborist or share a city arborist position(s) with neighboring communities. As Soldotna continues to grow a full time urban forester or city arborist may be required to manage the tree program and coordinate work among a tree commission, municipal departments, and the public. The city may contract with arborists as needed. 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 on the long-term administration of public trees, but in order to be effective they must then be translated into 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 the 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.

## EDUCATION, OUTREACH AND STEWARDSHIP

Effective implementation of this CFMP 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), city council, Alaska DNR Community Forestry, local arborists, interested individuals, and groups involved in the protection and restoration of Soldotna'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 Soldotna 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 Soldotna'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).
- 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 community forestry advocates and volunteers.
- Obtain the National 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, and Alaska Dept. of Transportation officials 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 CFMP, 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

Soldotna does not have a city board or committee specifically tasked with implementing goals and programs related to the city's urban forest, although the City's Parks and Recreation Board, or Planning and Zoning Commission would both be good candidates to take on elements of this responsibility. Designating a tree committee can fulfill one of the criteria to become Tree City USA. A 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. Optimally, the tree committee would consist of parks advisory board members, planning commission members as well as ad hoc State Forestry and/or Urban Forestry participation.

The primary role behind an advisory committee for the city's CFMP, and the related 5-year Management Plan 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 managing the implementation of the CFMP.

## 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. Arborists have a limited ability to cure these injuries or accumulated stresses to trees. Because of this limited corrective capacity, the focus to reach our goal of tree protection is to prevent injury to trees.



**FIGURE 3. CO-DOMINANT STEMS ARE EASILY FIXED ON A YOUNG TREE BUT THEY OFTEN FAIL IF NOT PRUNED CORRECTLY EARLY IN THE LIFE OF THE TREE.**

Implementing the following objectives can prevent canopy loss and sustain the tree population in Soldotna.

- Consider development of 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.

## INSPECTIONS AND MAINTENANCE

Currently the assessment of risk is the responsibility of city staff. The parks and recreation staff inspects trees drawn to their attention, reported by the public, or identified through operational activities.

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". This plan recommends the following objectives for city staff engaged in the tree risk evaluation:

### TREE MAINTENANCE AND CARE

Pruning is a necessary maintenance step, not only to ensure healthy, aesthetically pleasing trees but also to reduce the risk of tree failure possibly causing damage or injury. 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, and trees can block sight lines at intersections if not appropriately pruned and maintained.

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 a consulting arborist.

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).

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.

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.*



**FIGURE 4. IF CORRECTED EARLY A TREE CAN DEVELOP A STRONG STRUCTURE WITH A HEALTHY CANOPY. THIS WILL REDUCE THE NEED FOR MORE EXPENSIVE AND OFTEN INTRUSIVE CORRECTIVE PRUNING DURING THE LIFE OF THE TREE.**

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 Soldotna.

## TREE RISK MANAGEMENT

Most public trees in Soldotna are small stature or have not reached their large mature size yet, therefore pose little liability concern. However, it is still prudent for a community to be proactive in managing risk. High risk trees or limbs have the potential to damage property, cause injuries, or even death, and block required traffic sight lines. By providing proactive care the City can reduce the human and financial impact of potential hazardous tree.

The following objectives create proactive tree management for risk trees:

- Hazardous tree branches should be removed as they become known.
- City personnel should be trained in safe arboriculture procedures, first aid, and safe equipment use.
- Visual clearance for intersections, traffic signs, and signals should be maintained.
- Requests by city departments, property owners, and others should be responded to promptly.
- Implement a cyclic pruning program.

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., in 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.

## YOUNG TREE PRUNING

There are hundreds of newly planted or young trees in Soldotna. 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 Soldotna in the near future.

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 Soldotna 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 to 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 workloads are less demanding.

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

- Educate mower and weed eater operators about equipment operation around tree trunks.
- Complete the GIS-based inventory to better understand the composition, character, and distribution of the City's trees.
- 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, Public Works, and Alaska Department of Transportation 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.
- 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.

## 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 may be trained in basic tree maintenance and watering techniques, provided with tools (a hose, trowels, garbage bags, gloves, etc.) and 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 Soldotna 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.

## TREE RESOURCE EXPANSION

There is a clear need for a tree planting plan to guide the future of Soldotna'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 Soldotna—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.
- Encourage tree planting and preservation on private property; 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.

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 Soldotna'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.

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. 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 Soldotna—as it has in many cities and towns—over the years.

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.

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 to 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.

## DIVERSIFICATION

The 2011 tree inventory included more than 470 trees. There are more than 20 different species found in Soldotna's tree population (page 7). This appears to be a diverse population but species distribution figures indicate the population is dominated by a few species. Over 65 percent of the trees are represented by five species: Colorado spruce, flowering crabapple, European mountain ash, 'Canada Red' chokecherry, and Amur 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 single 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).

The following objectives will increase species diversity:

- The city should adopt a more aggressive diversity guide that states that no more than 10% of the tree population is comprised of any one genus.
- 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.

## CHAPTER 4 | SOLDOTNA MUNICIPAL CODE REVIEW

Soldotna has established a progressive landscape review and retention policy for development in section 17.10.335 – Landscaping of the municipal code. It is the only section in the municipal code that mentions trees but only in the context of preservation and planting requirements.

The following additions or revisions are suggested for section 17.10.335 - Landscaping:

- Include references to the ANSI 60.1 American Nursery Stock Standards for nursery stock standards such as hardiness and caliper.
- Include specific planting specifications to insure trees are planted per established standards.
- Revise distance interval criteria between planting spaces

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.

## CHAPTER 5 | OPERATIONAL REVIEW

Soldotna's goal is to have a larger, healthy, diverse, and functional urban forest and thriving residential and business communities.

### BUDGET

The city currently lacks dedicated financial resources specifically for tree management and maintenance. Instead, these activities are performed under the Parks and Recreation Department's general operations funding. Not having a specific line item for tree planting, preventive tree maintenance, tree removals, increased staff and support personnel, or equipment, makes it difficult to advance a tree management program. The city does have equipment such as a bucket truck within the City's Road Maintenance department that can be made available for tree maintenance.

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 Soldotna's street and park trees. An annual urban forestry budget of approximately \$8,000 is recommended based on inventory results, maintenance requirements, equipment, and program management needs. Because no formal program has been in place within the City of Soldotna, the aforementioned budgeting level is viewed as the minimum necessary to begin working toward a healthier class of trees present on City properties.

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.

### PROJECTED MULTI-YEAR MAINTENANCE BUDGETS

Typical tree budget allocations found in urban forestry programs across the United States allocate funding in these areas. 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 Arbor Day Foundation suggests \$2.00 per capita for urban forestry funding criteria to meet minimum TREE CITY USA standards. Soldotna has a population of approximately 4,000 residents. To qualify for TREE CITY USA standards the city should spend approximately \$8,000 on various tree activities included in TREE CITY USA criteria.

TREE CITY USA standards do not focus on the major urban forestry program tasks of removal, pruning, and planting. Actual program budgets and program funding should be based on maintenance requirements determined in the tree inventory and recommendations in the UFMP.

## CHAPTER 6 | PRIORITIES AND PROGRAM ACTIONS

Following are 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 Soldotna.

### SHORT-TERM ACTION ITEMS

There are five program management elements (priorities) that must be addressed on an annual basis. Although each of these is essential to the maintenance of the community forest, an annual operating plan should be established to determine where budget dollars will be spent.

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

Priority 2: Tree Inventory Completion and Maintenance

Priority 3: Proper Tree Maintenance

Priority 4: Tree Planting

Priority 5: Program Support and Administration

### 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:

#### **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 Soldotna'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.

Soldotna's urban forestry needs have reached a point where the future management of city trees requires tree maintenance positions, support staff, and funds for contractors or consultants with the ability to augment the services provided by the city 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 Soldotna 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.

### **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 Soldotna, and most likely to be approved in Soldotna, 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.

# CHAPTER 7 | CONCLUSION

This management plan provides the city with the framework to implement and maintain the community forest Soldotna desires. 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 periodically and adjustments made as goals are accomplished or circumstances change. It is recommended that the entire document 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 Soldotna. 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 and to the working community forest.

The recommendations will help conserve Soldotna’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 Soldotna today and tomorrow.

## CITY OF SOLDOTNA URBAN FORESTRY MANAGEMENT PLAN WORK ACTIVITY SCHEDULE

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