City of Bayfield
Urban Forestry Plan & Tree
Inventory Summary

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Cover photo: American Chestnut on South 10th Street

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Urban Forestry Management Plan & Tree Inventory Analysis

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EXECUTIVE SUMMARY

The City of Bayfield recognizes that trees provide important economic, social and environmental benefits that significantly improve the quality of urban life. Bluestem Forestry Consulting Inc. was contracted to complete a street and park tree inventory and prepare a management plan in the spring of 2011. This management plan and tree inventory marks a sincere commitment to Bayfield's urban forestry program. This document reports the findings of the inventory and makes specific, prioritized recommendations for managing the urban forest resource for 2011-2015 based on inventory findings, current staffing, budgets and tree circumstances. Additionally, EAB considerations and expenses are included in this management plan.

Important points of the inventory and current tree management program include:

- A total of 686 trees, 10 stumps and 61 planting sites were inventoried. 99 (14.4%) trees can be found in Bayfield parks.

- 10 trees (1.5%) are green or white ash and are susceptible to Emerald Ash Borer.

- The recommended contractual budget for 2011 – 2015 varies from $9,881 to $14,103. This includes EAB related activities. The forestry budget for 2011 is $20,000(50% funded by grant).

- There are 31 trees in need of removal due to a high risk condition such as trunk cavity or severe dieback. This is 4.1% of total inventoried population. A typical inventory averages removals between 4-10%. This is a low percentage and can be attributed to the good care trees in Bayfield receive and the relatively small average size (see below)

- 26 trees need to be pruned for safety reasons (3.4% of total inventoried population). A typical inventory averages 3-7% safety prune.

- 17.5% of sites have overhead utility lines present.

- The average dbh (diameter at breast height, approximately 4.5' above ground) is 12.3". This is partially due to the small growing trees that are common in Bayfield. Small growing trees are utilized frequently so as to retain views of Lake Superior.

- 28.4% of the forest is represented by maple. Ideally, the forest should be comprised of not more than 5% of any one species and 10% of any one genus.

STATEMENT OF PURPOSE AND SCOPE

The purpose of Bayfield's urban forest management plan is to recommend specific activities and designate responsibilities to properly manage the street and park tree urban forest. This plan includes specific, prioritized, inventory-based recommendations for managing the urban forest. It includes a multi-year budget outline and a directive for responsibilities and support needs. The Public Works Director and City Forester will be responsible for implementation of this plan.

TREE INVENTORY

In the summer of 2011, Bluestem Forestry Consulting Inc. conducted a street and park tree inventory throughout the City of Bayfield. Areas that received an individual tree inventory included maintained (mowed) areas of parks and street rights-of-ways. Parks that were inventoried include: Fountain Park, East Dock Park, Memorial Park, Cooper Hill Park, the beach area and the unnamed park at 6th Street South and Old Military Road. Dairymarple Park received an abbreviated inventory. It is a municipal owned campground and trees with obvious hazards near camping areas were marked with paint indicating they need removal. Dairymarple Park trees do not appear on the inventory database. Wooded areas were not inventoried.

The following data was collected: address, street/park, species, condition, DBH, maintenance needs, overhead utility, priority rating and miscellaneous comments. The inventory did not include hazard tree inspections, but did note general health condition. To further aid in understanding the terminology associated with the inventory findings, a Glossary of Inventory Terminology can be found as attachment 2. A discussion of some of the overall inventory findings is below.

Diversity. Sixty-two different species were inventoried within Bayfield's urban forest. This is a very diverse number of species and is largely attributed to the efforts of the city forester and tree board as well as Bayfield's unique growing conditions. The only severely over-represented genera are maple. Maple represents 28.4% of the forest. Ideally, the forest should be comprised of not more than 5% of any one species and 10% of any one genus. For illustration, maple is considered a family/genus and includes every different type of maple. Each type of maple such as sugar maple is considered a species. In Bayfield, sugar maple is the most heavily represented of the maples with 73 trees or 10.5% of the total population. As communities have learned from Dutch elm disease in the past and emerald ash borer at present, limited species distribution could result

in a population crash if an insect or disease were to attack any one particular species.

While most areas near Bayfield in Northwest Wisconsin have a plant hardiness rating of 3, Bayfield has its own unique growing conditions. Bayfield is located on the Bayfield Peninsula of Lake Superior and the lake has a warming effect during the winter on Bayfield. This has allowed the establishment of many orchards and nurseries in the area that are able to grow plants that may only be hardy to zone 4. The same is true of trees within Bayfield. These slightly altered growing conditions allow for a wider range of trees to thrive such as gingko, Ohio buckeye and shagbark hickory. This phenomenon coupled with a city forester who is extremely knowledgeable of trees and their growing conditions has resulted in a wide array of interesting trees in Bayfield.

Similar to Dutch elm disease which decimated the American elm population in the 1970-1980's, the emerald ash borer is destroying ash trees. The State of Wisconsin and the upper peninsula of Michigan has confirmed multiple infestation sites of Emerald Ash Borer (EAB), which attacks and is fatal to ash trees. Fortunately, Bayfield had only 10 public ash trees most of which are less than 12" in diameter. There will be privately owned ash that will be impacted, but as far as municipal trees, only 1.5% of the population is ash. Most communities have a much more substantial population and Bayfield is fortunate to have so few ash trees.

Tree Condition. Inventoried trees were classified as excellent, good, fair, poor, very poor and dead. Bayfield has 31 trees that need to be removed immediately for safety reasons (4.1%), the majority of which are in dead, very poor or poor condition. Ideally, no street or park tree should be in a condition of less than fair. However, Bayfield has a large population of small growing trees and it is acceptable that some of the small, poor condition trees stay in the population due to their low risk of injury to people and/or property. Typically, when an inventory is completed a municipality can expect a removal rate of 3-10%. Most of the trees identified as removals are experiencing safety issues such as trunk cavity, trunk decay or major dieback. By state statute, each municipality must provide a safe environment for people. This means providing fire and police protection, but it also means removing trees that are obvious risks. It is unsafe and unjustifiable for a municipality to leave high-risk trees in the City.

While Bayfield does have tree removal needs, an amazing 33.8% of the population is in excellent condition. Another 28.9% is in good condition and 25.9% is in fair condition. This is outstanding. With small improvements in maintenance, Bayfield can even improve upon these numbers.

Recent Successes. Bayfield has several recent achievements that are noteworthy. Some large trees, willows in East Dock Park in particular, were pruned in 2010. These trees were chosen for pruning because of their size, visibility and importance to their local environment. The pruning performed was excellent and these trees will grace the environment for a longer time due to the care and attention they received. The City is encouraged to prune the remaining large trees early in the routine pruning cycle to increase longevity. Of particular note are the large sugar maples on North 2nd Street. These trees are in fairly good health, but can likely be improved with a thorough pruning. Proper pruning results in healthier, safer trees.

As mentioned earlier, the City Forester and tree board have made excellent species selections over the last several years. Diversity is increasing which means overall forest vitality is improving. Some outstanding recent selections include juneberry, hybrid elm, swamp white oak and birch.

The control of invasives in the park system is quite good. There are small amounts of invasives, for instance, buckthorn is present in Fountain Park, but overall, the presence of invasive species within the parks is limited.

Bayfield is situated on a steep hill overlooking Lake Superior. Many residents have homes that highlight the view of the lake. The City Forester and tree board have worked diligently with residents to be sure that while trees are planted, they do not detract from the views and the right tree is planted in the right place.

Tree Maintenance Priority. This inventory provides a first-ever overall look at Bayfield's urban forest and many items are recommended for completion. EAB adds additional layers of activities and deciding what to do first can be difficult. To simplify the pecking order of activities, the following summary has been provided by year. A further description of activities and their associated costs can be located in Attachment 1: Schedule of Activities.

Activities to be Completed in 2011-2012*:
Complete recommended removals (31 trees)
Complete recommended prune priority 1 (15 trees)
Monitor recommended trees
Perform training prunes (74 trees)
Continue utilizing City Forester
Begin purchase of laptop/computer for City Forester/Tree Board

Activities to be Completed in 2012-2013:
Complete recommended priority prune 2 (11 trees)
Complete recommended removals in Dairymarple Park Campground
Monitor recommended trees
Perform training prunes (74 trees)
Grind existing stumps (10 stumps)
Plant trees (15 plantings)
Continue utilizing City Forester
Purchase of laptop/computer for City Forester or small equipment

Routine Activities to be Completed Beginning in 2014:
Monitor trees
Complete routine removals
Complete routine prunes
Perform training prunes

Plant trees
Training/small equipment/supplies
Continue utilizing City Forester
Remove 10 ash on public property (when EAB confirmed in Bayfield
Co.)

Park Trees. Bayfield had six parks and a portion of Dairymarple Park Campground that were inventoried. There are 99 trees in maintained areas of parks. A breakdown of trees per park is:

Park Name	# of Trees
Fountain Park	35
East Dock Park	25
Jameson Park	25
Memorial Park	12
Beach Area	17
6th St/Old Military	5
Cooper Hill Park	5

Some specific park comments include:

~In addition to the recent pruning in East Dock Park, several trees have been planted. Prior to these plantings, the park was largely single –aged. The addition of these new trees will increase size and age diversity. A more diverse forest in every way is a healthy forest.

~Fountain Park has the highest number of trees. It is home to a small amount of buckthorn that can be controlled. It is important to recognize that there is extensive buckthorn on private property throughout Bayfield and while control in parks is admirable, until the issue of private property buckthorn control is addressed, park control is temporary.

~The park at 6th Street and Old Military Road would benefit from additional tree plantings. This park is populated by mature, large trees. Additional species and sizes would be beneficial.

Park maps can be found as Attachment 5.

The Benefit of Trees. The benefits of trees are wide ranging and impressive. In recent years, much research has been conducted on the contribution of trees to ourselves and our environment. A few of the many benefits of urban forests include:

"The net cooling effect of a young, healthy tree is equivalent to ten room-size air conditioners operating 20 hours a day."—*U.S. Department of Agriculture*

Trees in Davis, California, parking lots reduced asphalt temperatures by as much as 36 degrees Fahrenheit, and car interior temperatures by over 47 degrees Fahrenheit – I Scott, James Simpson, G. McPherson

"Landscaping can reduce air conditioning costs by up to 50 percent, by shading the windows and walls of a home." —*American Public Power Association*

"A mature tree can often have an appraised value of between $1,000 and $10,000." —*Council of Tree and Landscape Appraisers*

"In one study, 83% of realtors believe that mature trees have a "strong or moderate impact" on the salability of homes listed for under $150,000; on homes over $250,000, this perception increases to 98%." —*Arbor National Mortgage & American Forests*

"Landscaping, especially with trees, can increase property values as much as 20 percent."—*Management Information Services/ICMA*

Amenity and comfort ratings were about 80% higher for a tree-lined sidewalk compared with those for a nonshaded street. – K. Wolf, National Urban Forest Conference

Fifty million shade trees planted in strategic, energy-saving locations could eliminate the need for seven 100-megawatt power plants – G. McPerson

"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."—*U.S. Department of Agriculture*

"Trees properly placed around buildings can reduce air conditioning needs by 30 percent and can save 20 - 50 percent in energy used for heating."—*USDA Forest Service*

"Trees can be a stimulus to economic development, attracting new business and tourism. Commercial retail areas are more attractive to shoppers, apartments rent more quickly, tenants stay longer, and space in a wooded setting is more valuable to sell or rent."—*The National Arbor Day Foundation*

"Healthy, mature trees add an average of 10 percent to a property's value."—*USDA Forest Service*

"The planting of trees means improved water quality, resulting in less runoff and erosion. This allows more recharging of the ground water supply. Wooded areas help prevent the transport of sediment and chemicals into streams."—*USDA Forest Service*

The following graphs provide a visual representation of the inventory results:

SIZE DISTRIBUTION

Existing	dbh*	Ideal
49.3%	0-8"	40.0%
24.1%	9-16"	30.0%
12.9%	17-24"	20.0%
13.7%	25+"	10.0%

*diameter at breast height (4.5' above ground)

CONDITION DISTRIBUTION

- Excellent (231 trees) — 34%
- Good (198 trees) — 29%
- Fair (178 trees) — 26%
- Poor (44 trees) — 6%
- Very Poor (30 trees) — 4%
- Dead (5 trees) — 1%
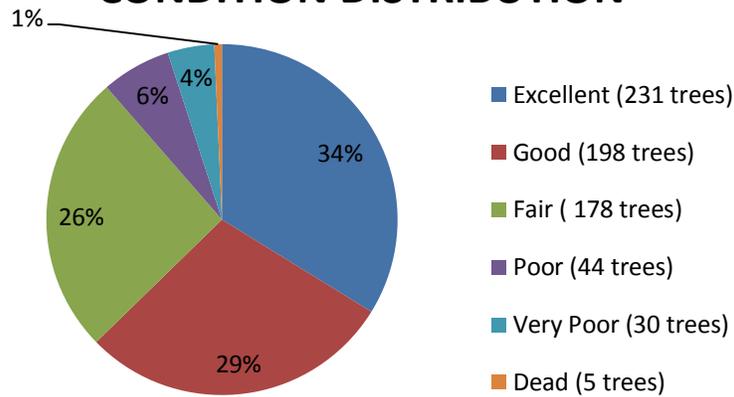
MAINTENANCE DISTRIBUTION

- Routine Prune (451 trees) — 60%
- Training Prune (147 trees) — 20%
- Plant (61 sites) — 8%
- Removal (31 trees) — 4%
- Monitor (30 trees) — 4%
- Priority Prune 1 (15 trees) — 2%
- Priority Prune 2 (11 trees) — 1%
- Grind Stump (10 stumps) — 1%
- Special Action (1 tree) — 0%
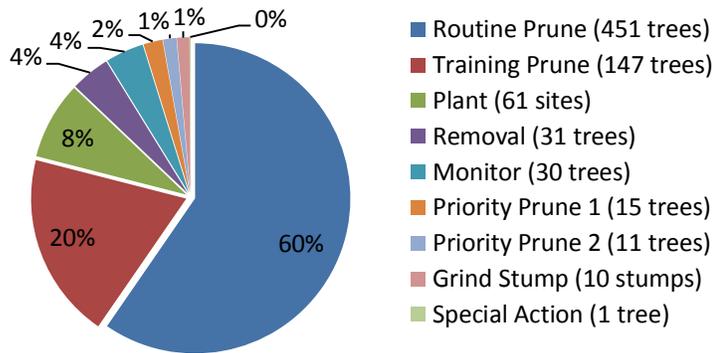
TOP TEN SPECIES SUMMARY TABLE		
Species	Count	Percentage of Total Population
Crabapple	77	11.0%
Sugar Maple	73	10.5%
Northern Red Oak	45	6.5%
Colorado Blue Spruce	41	5.9%
Red Maple	37	5.3%
Crimson King Maple	32	4.6%
Eastern White Pine	28	4.0%
Mountain Ash	26	3.7%
Balsam Fir	25	3.6%
Other	312	44.9%

STAFFING & EQUIPMENT

The Public Works Department, with assistance from the City Forester and the tree board is responsible for all tree maintenance. Staffing includes the Public Works Director (PWD) and two full time employees. The forestry budget in 2011 was $20,000 (including grant funds from the WI DNR). Equipment includes small hand tools, chainsaws, chaps, hard hats, Genie lift, trucks and loaders. The Public Works Department has traditionally contracted out larger tree removals and prunings and completed small tree removals, trimming and tree plantings in-house. Equipment is adequate to continue this working arrangement. The tree board completes training prunes, watering and fertilizing of new trees and also updates the tree inventory/maintenance records.

On average, staff and volunteers complete 10 routine prunings (large), 4 removals, 15 tree plantings and 30 training prunes per year. With the exception of the plantings, all of these will increase both initially and long-term. The 'Schedule of Activities' details each item recommended for completion (Attachment 1).

Many communities contract out most of their forestry work, but it is still critical that a forester be available to make decisions regarding tree issues. To assist the PWD, Bluestem recommends that the City continue to utilize the existing City Forester. The current City Forester has a lengthy background in horticulture and forestry. Ideally, the City Forester will become an ISA Certified Arborist over the course of the next year to add even more credentials to his background.

Based on staffing and equipment, maintenance of trees 1-12" dbh will be completed in-house and trees greater than or equal to 13" will be contracted out. Tree planting will be completed in-house. As always, each tree should be individually evaluated for its suitability and safety for removal in-house. ANSI standards for forestry/tree work should always be followed. These activities can be completed using existing equipment and staff.

Any employee that will be completing forestry work should receive consistent training on proper procedures. As well as equipment training these employees should receive training on: removals, proper pruning procedures, construction damage and proper tree planting techniques so that they can supervise contracted tree planting and construction crews. Sources of training include: contracted PWD/City Forester, WAA (Wisconsin Arborist Association) seminars (held annually in fall), WAA/DNR urban forestry conference (held annually in late January), WI DNR annual workshops (as available) or thru private instruction by an experienced consulting forester.

URBAN FORESTRY GOALS

This inventory was the first step towards establishing a defined, efficient forestry program for the City of Bayfield. The next step is to identify goals and begin the process of implementation. The primary goals and objectives that Bluestem has identified to establish a management program in order of priority are:

GOAL 1:   ELIMINATE HIGH RISK SITUATIONS.

          Objective A: Remove high-risk trees.
          Objective B: Prune high risk branches.
          Objective C: Remove and manage EAB/ash trees

GOAL 2:   ESTABLISH A ROUTINE, COMPREHENSIVE URBAN FORESTRY
            PROGRAM FOR A HEALTHY FOREST

          Objective A: Perform yearly tree inspections/Evaluate Risk Management
                       Program.
          Objective B: Perform training prunes.
          Objective C: Perform routine pruning and removals.
          Objective D: Plant high quality trees with low maintenance requirements.
          Objective E: Ensure an adequate budget.
          Objective F: Inventory updating.
          Objective G: Community Education
          Objective H: Wood Residue

GOAL 1: Eliminate high-risk situations.

The first and foremost objective of any municipality entrusted with the responsibility of an urban forest is the safety of its residents and visitors. Until a safe environment has been attained, no other objectives can be tackled. The following is a prioritized list of actions that need to be taken to eliminate the high-risk situations identified during the inventory:

1. Remove trees identified as Removals.
2. Prune trees identified as Prune Priority 1.
3. Prune trees identified as Prune Priority 2.

4. Complete ash removals.

A complete listing of activities and their costs can be found as Attachment 1: Schedule of Activities.

Objective A: Remove High Risk Trees.

Tree removals are an integral part of a good forest management program. Removals are as necessary to the urban forest's life cycle as are tree plantings and maintenance. Removals do, at times, stimulate a public reaction because people grow attached to the trees in the vicinity of their homes. Nevertheless, a successful urban forestry program demands that a removal policy be adopted and applied uniformly throughout the City. A clear policy provides coherent guidelines to enable City officials and crews to make informed removal decisions. Furthermore, such a policy can help allay public concerns about tree removals. The City's potential losses from liability claims are also reduced due to healthier and lower risk trees.

The goal of a removal plan is to develop a comprehensive risk reduction program that will guarantee the timely removal of high risk or potentially high risk trees as well as to heighten staff awareness of hazard abatement procedures.

There are three important reasons for establishing a strong removal policy. The first is to maintain safe public areas by reducing potentially high-risk trees and the liability associated with them. Secondly, the removal of dead and declining trees allows the urban forest manager to make room for new diverse planting which in turn increases the overall health of the community forest. Thirdly, it is more cost effective to maintain healthy trees rather than decadent, senescing, over mature trees.

In Wisconsin, municipal governments have a legal duty to exercise reasonable care to protect the general public from foreseeable hazards. To minimize the liability associated with trees in high use areas, such as urban streets and parks, land managers must demonstrate that they are exhibiting reasonable care in maintaining these trees. Political pressure is not a valid reason for inaction and may potentially leave the City liable should there be no designated risk tree removal program showing the effort to reduce the number of these trees.

Based on the inventory data, Bluestem estimates that 31 trees should be removed from the existing tree population. Once this initial group of trees is removed, the City's removal program should stabilize at approximately 7 removals per year (1.5% of the total population).

Each tree was given a condition rating when it was inventoried. This number is used to calculate the appraised dollar value of each tree, but is also used to prioritize removals. Ratings range from a low of 0% to a high of 100%. For example, a specimen tree in perfect condition received a 100%. A dead standing tree received a 0%. Most removals fall between 0-30% condition class. Trees ranging between 0-15% are typically large trees with very significant targets and serious defects such as cavities and decay. Removals greater than or equal to 20% present a less severe

risk, but need to be removed nevertheless.

Several factors can assist with prioritizing tree removals and management:

1. Utilize the Risk Management Guide (attachment 3). This guide is a step-by-step system for evaluating risk within the population. This guide was utilized during the inventory fieldwork and is a good guide for the City to use for day-to-day duties. For example, several steps are listed for tree evaluation. One step is to 'Identify Problematic Conditions'. The inventory identified a condition rating for each tree inventoried. A tree was assigned one of six ratings: excellent, good, fair, poor, very poor or dead. Very poor and dead trees need to be prioritized for removal. Other steps include identifying problematic species, diameters and defects. Some problematic species include willow and boxelder. These trees are typically weak wooded and tend to fail more often than other species such as oak. Problematic diameters include larger diameter trees. A 2" dbh dead tree poses minimal risk, while a 30" dead or very poor condition tree poses a very high risk. Additionally, certain defects should be red-flagged for action. Cavities, decay and excessive dieback are some of the more severe defects noted during the inventory. All of this data can be found within the inventory database. Target and location are also important factors to consider when prioritizing removals. Playgrounds and busy streets where pedestrians and vehicles frequent should receive higher priority than streets with wooded/naturalized rights-of-way. The combination of these factors should be used to determine the order in which trees need to be removed.

2. Prioritizing Staff Duties and Time. The safety risk of failing trees cannot be over-stressed. Staff time needs to be prioritized to maximize public safety and reduce tree-related liability. The frequency of other non-safety tasks should be reduced so that staff can dedicate more time to pruning and removals? Will a reduced mowing schedule endanger residents? Will a 32" silver maple with a trunk cavity endanger residents?

One of the primary purposes of the inventory was to identify risks. The City can reduce these risks and increase safety for its residents through prompt implementation of the inventory-based pruning and removal recommendations in this plan.

A "high risk" is any tree or tree part that demonstrates a high risk of failure or fractures which would result in damage or injury to people or property. Usually, high-risk trees demonstrate visible defects.

There are two distinct aspects to the definition of a high risk tree: 1) a physical defect within a tree that increases its potential for failure, and 2) the proximity of the tree to people or property that increases the likelihood of personal injury or property damage. A decaying tree in the middle of the Chequamegon National Forest may have a potential for failure, but the chance that tree will cause personal injury is remote. However, that same tree located in East Dock Park or anywhere in Bayfield, should be considered a high risk because of its urban location.

One task of the urban forest manager is to anticipate tree failures before they occur. There are no absolutes in determining risks - only sound judgment based on experience at recognizing

structurally unsound trees.

The number of trees marked for removal within a given year further describes a forest system's health, although in some instances trees need to be removed for reasons unrelated to health. The objective is to eventually have no City trees with a condition rating lower than fair.

The risk assessment that Bayfield should use to evaluate trees was created by the International Society of Arboriculture. It is titled A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas, 2nd Edition by Nelda Matheny and James R. Clark. This can be purchased for $45.00 at 1-888-472-8733. Additional resources include the US Forest Service's "Urban Tree Risk Management" guide. This is available at no charge from the WI DNR regional urban forester.

Again, during the inventory 31 trees were identified as a 'removal' (found in the inventory database). These trees have large areas of decay in the trunk, extensive splitting, root damage, extensive dieback or other such problems.

When a tree has been identified for removal or priority pruning, it may indicate an underlying deficiency. For this reason, all trees scheduled for removal along with trees in need of priority pruning need to receive a thorough inspection twice a year (once with the leaves on and once without the leaves) until the tree has been removed or the hazard has been eliminated. Likewise, all trees identified as in need of monitoring, poor or very poor or dead should also receive a similar inspection.

Trees that need to be regularly and frequently inspected were identified as 'Monitors.' These trees may have a problem developing such as dieback or may have old storm damage that warrants attention. A list of these trees can be found in the inventory database.

City policy should require tree pruning and removal in accordance with national industry standards. Standards-based specification are commonly used when municipalities hire a contractor or purchases materials, but should also be applied to all work completed by staff. Industry standards and specifications include current editions of:

~ American National Standard for Safety in Tree Care Operations, ANSI Z133 (current revision)

~ American National Standard for Tree Care Operations - Tree, Shrub and Other Woody Plant Maintenance - Standard Practices, ANSI A300 (current revision)

A notification procedure should be enacted to alert nearby residents of the impending removal. Not only does this alert them to the high risk situation, it helps residents feel involved in the decision and gives them time to adjust to the loss of the adjacent tree. The tree can "marked" and give the nearby homeowner written notification explaining why the tree is being removed, how the removal will be performed, when the removal will begin and if replanting will occur. Include a phone number to be contacted for any additional questions or concerns.

Objective B: Prune high-risk branches.

A total of 26 trees were identified as in need of priority pruning, some of which are ash. Trees in need of priority pruning were trees were broken into two categories, Prune Priority 1 and Prune Priority 2.

Prune Priority 1 are trees with obvious risks such as branch cavities, hangers or significantly sized deadwood. These trees should be pruned immediately as they present the greatest danger. Fifteen trees were identified as Prune Priority 1. These should be pruned in conjunction with the initial removals in 2012-2013.

Prune Priority 2 are trees with structural deficiencies or with a potentially dangerous situation developing. For example, a tree with crossed or congested limbs or a tree in the initial stages of dieback would be classified as a Prune Priority 2. Eleven trees were identified as Prune Priority 2. These prunings should be performed with the second batch of removals in 2013-2014 or sooner.

The tree inventory was a ground visual only survey and was not intended to substitute for a thorough hazard tree survey and as such the trees have not been aerially inspected. Additional defects may be noted from an aerial inspection. It is important that while trees are being pruned from an aerial bucket truck that their condition be re-evaluated. If the pruner feels they would not benefit from being pruned, they should be removed.

Objective C: Remove and Manage Ash Trees for EAB

Ten publicly owned trees in Bayfield are ash. Without chemical treatment, these trees will die from EAB. Because this number comprises such a small component of Bayfield's forest and the trees are generally smaller, it is logical to simply remove these trees when EAB is confirmed in Bayfield or Ashland County. Specifically, 9 of the ash trees are 8" dbh and under. One ash is 17" in diameter. Additional data is housed on the tree inventory database.

GOAL 2: Establish a routine, comprehensive urban forestry program for a healthy forest.

Systematic maintenance of existing trees is important for three reasons: safety, cost savings and aesthetics. Maintained trees have a greater lifespan and provide greater canopy benefits than trees that are not maintained. Proper maintenance can also reduce removal and replanting costs. On a limited budget, it is necessary to prioritize actions. High-risk tree situations should always be eliminated first (Goal 1) and then routine maintenance should proceed. The following routine objectives are listed from highest to lowest priority.

Objective A: Perform Yearly Tree Inspections & Evaluate the Risk Management Program.

It is important that *all* of the street and park trees in the City get a yearly inspection. Trees that have been identified during the inventory as needing priority pruning, monitoring or removal need a hazard inspection *twice* yearly. Complete this inspection once with leaf cover and once without until the hazard has been eliminated or the situation resolved. Additionally, all large diameter trees need an extra inspection after storms. If any hazards are identified, the situations need to be corrected immediately, and then continue with the list of routine maintenance.

It is important that an ISA Certified Arborist complete the larger tree inspections (greater than 6" in diameter). The City Forester is well qualified to become ISA Certified and should do so as soon as possible. When certification is obtained, he can complete this activity. Otherwise a qualified individual with certification should be contracted for completion of inspections.

Seven factors should be considered when evaluating trees:

1. Crown development
    - ~ characteristic of species and well balanced
    - ~ branching throughout entire upper 2/3 of trunk area
    - ~ lacking full crown
2. Trunk
    - ~ one central leader is desired
    - ~ no defects
    - ~ missing sections of bark
    - ~ extensive decay or hollow
3. Major branch structure
    - ~ evenly distributed branches
    - ~ structurally important branches not dead or broken
4. Twig growth rate
    - ~ typical for species and age
    - ~ growth rate reduced
5. Foliage
    - ~ normal size and color
    - ~ small leaves with deficiencies

6. Insects and disease
   ~ no apparent problems
   ~ severe infestation
7. Roots
   ~ extensive root loss
   ~ stem girdling roots present
   ~trunk flare present indicating proper planting depth
   ~ground mounded opposite trunk lean

To eliminate high-risk situations within Bayfield, the PWD/City Forester should evaluate the risk management program annually. The evaluation can be accomplished by following the Risk Management Guide (Attachment 3). This inventory and management plan represents the first comprehensive inventory but is not a substitute for a hazard tree evaluation. This management plan is the first phase of the risk management program.

Objective B: Perform Training Prunes.

Training pruning is the structural pruning of all trees 10 years of age or younger (see Attachment 2: Glossary of Terms for additional information). Some benefits of training pruning include:

- *Pruning 2-3 times in the first ten years of a tree's life will reduce 90% of the structural problems the tree will ever have.*

- *This is the easiest pruning to perform due to the small size of the trees.*

- *Training pruning is the most cost effective pruning because it reduces long-term routine pruning costs.*

- *It is the most economical pruning because an in-house crew can complete it quickly and efficiently.*

Trees that are structurally pruned at this stage require much less care as they mature. It is not necessary that they be pruned every year but an every other year pruning is a good objective. This results in cost savings and still adequately prunes the tree. This equates to 74 training prunes per year. The tree board/City Forester can continue completing this task. The inventory revealed that training prunes performed by this group in the past have been quite good. All of the training prunes can be completed in-house until they are unable to be reached from the ground or are older than 10 years planted, and then they will be scheduled for routine pruning.

Objective C: Perform routine pruning & removals.

One of the most beneficial and noticeable activities performed in the urban forest is routine pruning. Routine pruning is the cycle of pruning all trees on a rotating basis (see Attachment 2: Glossary of Terms for additional information). Once all of the safety issues have been addressed,

all trees 10 years of age or over (approximately 6" or over) need to be placed on a routine pruning cycle. Some benefits of routine pruning include:

- Increased health and viability of trees.
- Fewer tree mortalities and fewer structural deficiencies.
- Reduced liability from potential tree-related injuries or damages to property.
- Increased property values.
- Enhanced aesthetic value.
- Fewer complaints/requests.
- Increased longevity of tree.
- Reduced future costs associated with hazardous limbs and decay.
- Improved cost effectiveness of tree maintenance reducing the need for on-demand pruning and henceforth staff overtime.

A feasible routine pruning cycle needs to be established. Industry guidelines are to prune each tree over 6" dbh once every 5-7 years. To save cost and time, a seven year cycle is recommended. Essentially, the City can be broken into seven zones and a different zone has work completed in a particular year. For example, routine pruning in 2012 will occur in zone 1, zone 2 in 2013, etc.

Completing one cycle, combined with increased emphasis on training prunes, should greatly reduce the cost and time associated with future routine pruning. If a tree is pruned properly and is on a routine pruning cycle, no limb over 4" in diameter should need to be removed. The best time of year to prune is when the leaves are off the trees. If pruning does occur while the trees have their leaves on, it should be after the leaves have fully expanded and not when they are in the process of forming. Pruning should also be avoided when the leaves are turning colors in the fall and in the process of dropping. All American elms and oaks should be pruned during dormancy.

Oak wilt is an increasing problem throughout the state. Oaks occur frequently both in the street tree population and in private yards. *Do not cut, prune or otherwise wound oaks in the spring and early summer, generally from April 1-August 30.* To be very cautious, avoid wounding oaks from March 1st - October 1st.

Taking into consideration Bayfield's current level of stocking, the above mentioned routine pruning cycle of seven years is feasible. This cycle will result in approximately 72 trees pruned annually.

Another facet of routine maintenance includes 'routine' tree removals. Any given City can expect approximately 1-2% of trees will need to be removed per year due to high-risk situations. This is in addition to the initial safety removals. In Bayfield this calculates into a total of 7 removals per year. This has also been figured into the schedule of activities that can be found as attachment 1.

A non-risk tree removal policy similar to the one listed below is in place in the event a resident requests that a terrace tree be removed. This policy should be applied equally to all residents. The purpose of the tree management program is to maintain trees on public property as long as

they are healthy and safe. If an individual would like to remove a tree on public property, he or she should provide the following information to the PWD/City Forester:

1. Name of person requesting removal.

2. Description and location of tree.

3. Reason for wanting removal.

Upon receiving such request, the PWD/City Forester will take these steps:

1. Evaluate the tree and make a recommendation.

2. Notify the person requesting removal of the decision.

The person requesting removal may hire, at his or her own expense, a forester or arborist to evaluate the tree and submit a report. The PWD/City Forester needs to acknowledge and approve the qualifications of this forester or arborist hired by the homeowner. The forester/ISA certified arborist should assess the health and safety of the tree and appraise its monetary value.

The final decision rests with the PWD/City Forester. If permission is granted to remove a tree that is not diseased, high risk or dead, the property owner pays the full cost of contracting out the removal, including stump grinding, and makes a contribution to the City tree program equal to the appraised value of the tree. The City may wish to plant a tree in a nearby vacant space according to the planting program.

Objective D: Mulching.

There are trees within the City that are becoming over-mature and declining. The large sugar maples on North 2nd Street are a good example of this. Mulching and regular fertilizing may help increase the longevity and maintain the health of these older trees. A foliar and soil analysis should be completed prior to fertilizing so that the exact type and amount of fertilizer needed can be determined.

Mulching is currently used on trees planted in Bayfield. This is an excellent policy and should continue. Mulching may be the single best advantage a young tree can have. Some benefits of mulching include:

> ~ Eliminates lawnmower and weed-whip damage.
> ~ Discourages weed growth.
> ~ Helps to retain moisture in soil.
> ~ Adds nutrients to soil as the mulch decomposes.
> ~ Facilitates increased root growth due to less compacted soil.

Oftentimes mulch is described as "messy." Lawnmowers scatter it around. Slowing down while mowing around mulch will eliminate this situation. Adding mulch as necessary to maintain a 2-4"

depth and spread as widely as possible aids the tree itself and helps the mulch retain a "fresh" color. Mulch should be kept 6" from the trunk to help fungal problems within the trunk flare region.

Objective E: Plant high quality trees with low maintenance needs.

There were 61 planting sites identified on street rights-of-way during the inventory. Of these 49 are suitable for larger to medium trees and 12 are suitable for small trees under utility lines. Certain planting policies can be applied to any community. As always, no planting should take place until all of the high risk safety situations identified have been alleviated. Then, the order of priority for tree planting should be:

1. Trees lost within the past year.

2. Trees lost within the past three years.

3. Specific high priority sites (see discussion below)

4. Homeowner requests.

5. Appropriate sites within the current work zone.

It is very important to replant as trees are being removed. Not only is this standard procedure for most urban forests, but it is also good public relation policy for the City. Bayfield is a highly visited summer recreation area. Economically, tourism is extremely important to Bayfield and the surrounding area. Any activity that can be completed to increase the aesthetic appearance of Bayfield will assist with tourism and this includes tree planting. To this end, planting trees along highly traveled corridors and downtown retail areas should be prioritized. Also, it is important to keep in mind that trees with large canopies provide the most overall benefit to residents and visitors and it would be beneficial to plant sites that will accommodate large growing trees in coordination with or immediately following high traffic areas. The list of tree planting sites provided on the database and the printout of inventory data specifies where each planting site is located and what size of tree is suitable for each site.

To determine the number of trees to be planted on a routine basis each year, the following equation was used:

100% stocking in 14 years (2 rotations) + replacements = 15 trees/year
(61 planting sites + 31 removals)/14 years + 7 routine removals/year = 15 plantings annually

This equation includes the current number of sites and removals and factors in future tree mortality. The only variable is the number of years to full stocking. Fourteen years was selected because it represents two zone rotations. Due to the long time frame involved, the actual number of years may vary depending on maintenance, insect and disease factors.

Beginning in Year 2012-2013, these 15 plantings have been included in the budget (see Attachment 1: Schedule of Activities). The city currently plants 15 gallon trees and have been

successful with this size. Continue utilizing this size of tree unless a problem develops. The following is a suggested guideline concerning homeowner requests.

The City will select and plant a tree at no cost to the adjacent property owner according to the above priority order, the homeowner request replacement policy and funds available. The following is a sample guideline concerning homeowner planting requests.

HOMEOWNER REQUEST PLANTING POLICY

To request a replacement tree, individuals should provide the following information to the PWD/City Forester:

1. Name, address and phone number of person requesting tree planting.

2. If the tree was removed in the past, the location of tree that was removed and the year it was removed.

3. If not due to a removal, the reason for requesting a tree.

Upon receiving such a request, the PWD/City Forester should take these steps:

1. Evaluate the site for suitability.

2. If the site is to be planted, make a recommendation about species and location.

3. Notify the person requesting planting of the decision.

The final decision about tree planting on public property lies with the PWD/City Forester. If the homeowner's site wasn't chosen for planting within the next few years, he or she may, at their own cost hire a City approved contractor to plant a tree or they may plant their own tree with City approval. The City must approve the site and species.

The following are general design guidelines for selecting species for planting:

1. Plant trees to define spaces and select species appropriate for the purposes served by each space. For example, trees might function as a wind break near a park ball field or the function of a boulevard tree near a home is for shade.

2. Select trees for the community with desirable forms, colors and textures.

3. Use plantings to emphasize major community pattern elements, particularly major streets. An example would be to plant a specific pattern of trees on a street where uniformity is desired. This creates a structured pattern of trees, but still allows for diversity.

4. Evaluate soil conditions to determine the best species choice.

5. Match tree size to street width and the available space in the terrace.

6. Space trees an appropriate distance apart:

Small trees (up to 30' tall)   planted at 25' offcenters   planting width min. 5'
Medium trees (30 - 45' tall)   planted at 35 - 40' offcenters   planting width min. 5-8'
Large trees (>45' tall)   planted at 45' - 50' offcenters   planting width min. >8'

7. Complement existing vegetation.

8. Match planting concept, tree size and spacing with the adjacent land use.

9. Do not plant coniferous (spruce, cedar, pine, etc.) trees within terrace areas, regardless if there are sidewalks and curbs or not.

Partial Source: <u>Urban and Community Forestry, A Guide for the Interior Western United States,</u> USDA Forest Service, 1990

Bayfield is a Zone 3 climate and types allow for some good street and park tree planting selections. Sound choices for **larger** trees include:

swamp white oak (Quercus bicolor)
hackberry (Celtis occidentalis)
bur oak (Quercus macrocarpa)
American linden (Tilia americana) 'Redmond', 'Fastigiata'
elm (Ulmus spp.) 'Accolade', 'New Horizon', 'Discovery'
American Liberty elm (Ulmus americana 'Liberty')
Kentucky coffeetree (Gymnocladus dioica)
ginkgo (Ginkgo biloba)
honeylocust (Gleditsia triacanthos)

Good **medium** selections include:
Amur cork tree (Phellodendron amurense 'macho')
river birch (Betula nigra)
amur chokecherry (Prunus maackii)
horsechestnuts (Aesculus spp.)

Smaller sites can be filled with:
Japanese tree lilac (Syringa reticulata)
serviceberry (Amelanchier arborea) 'Autumn Brilliance', 'Princess Diana'
hophornbeam (Ostrya virginiana)
American hornbeam (Carpinus caroliniana)

crabapple (Malus spp.)
        white cultivars: 'Spring Snow', 'Snowdrift'
        red/pink cultivars: 'Prairiefire', 'Red Jade', Red Barron'
Hawthorn (Crateagus spp.)

Small trees only should be planted under power lines. Do not plant wide trees, such as the hawthorn on narrow terraces. They will grow out into the street. Additionally, do not plant trees too close to traffic signs and intersections. They will eventually grow and block these areas. Try to stay at least 40' away from these areas. Lastly, be sure not to plant trees too closely together.

A complete evaluation of the site needs to be completed before selecting a species. Additionally, "Choosing the Right Landscape Plants" (publication number A3864) by Laura Jull is an excellent publication to assist with selecting species. It is available online at no cost online.

It is important to diversify the urban forest as much as possible. Every effort should be made to continue diversification. Planting many different species and varieties keeps the urban forest healthy and attractive.

Ideally, no more than 5% of any one species and 10% of any one family should comprise the City's trees. Again, maples are over represented. These should be planted in moderation. No ash should be planted due to the emerald ash borer.

Bayfield should create a suggested list of trees not to be planted anywhere in the City (public and private property). Some examples of poor species selection include black locust (Pseudoacacia robinia), boxelder (Acer negundo) and Siberian elm (Ulmus pumila) and any coniferous trees (spruce, fir, cedar, pine, etc) on the street. These deciduous trees are weak wooded causing limbs to "break out" often, are "messy", dropping leaves and twigs continuously and are not particularly attractive. The conifers obstruct the view of pedestrians and vehicles and will grow to block off sidewalks and encroach onto the road.

Planting Techniques. Many excellent tree planting resources can be found online. A newer publication developed by the WI DNR division of forestry can be found at dnr.wi.gov/forestry/publications/newtreeplanting.pdf. Some planting techniques to utilize include:

~ Remove all burlap and the entire wire basket from balled and burlapped trees.

~ Do not use tree wrap. If it is used, remove all tree wrap after one season. Wrap left on attracts insects and may cause fungal problems due to increased moisture from wrap left on during the growing season. Plastic tubing should be avoided. It has been used often by developers and is now girdling some trees.

~ Remove stakes, or don't stake trees at all. Wire braces attached to stakes left on the tree will eventually begin to girdle the tree, thus weakening the trunk, predisposing it to wind throw or breakage.

~ Do not plant large trees under power lines. They will grow into the lines and need to be removed or trimmed in an unnatural way and become unsightly and unsafe.

~ Do not plant wide growing trees in narrow terraces. The trees will grow into streets and over sidewalks and the available resources simply will not support long-term large tree growth.

~ Inspect and reject poor form trees prior to planting. Most trees should have a main leader and be well balanced.

~ Trees are often planted too deeply. Frequently, balled & burlapped (B&B) trees are dug at the field and an additional 1-3" of soil is thrown on top. And then, they are planted too deeply.

~ Monitor trees for mortality during the warranty period so they can quickly be replaced.

All plant quality should follow the <u>American National Standard for Nursery Stock; ANSI Z60</u> (current revision) should be used when purchasing plant material.

Objective F: Ensure adequate funding for routine activities.

Routine expenses will start in 2014 after all of the initial safety removals and priority prunings have occurred. This does not include EAB related activities. The following items can be completed annually at a contracted cost of $10,644 and a full-time staff time commitment of 216 hours:

1. 7 routine removals = $4,000
2. 74 training prunes (performed by Tree Board and City Forester)
3. 72 routine prunes = $6,994
4. 15 tree plantings = $2,250
5. Training and small equipment purchases (workshops/chainsaw/etc.) = $250
6. Tree monitors (performed by City Forester)
7. City Forester = $500

A list of these with their associated cost can be found as 'Schedule of Activities' (Attachment 1).

This plan and inventory was completed with a grant from the WI DNR. The purpose of these grants is to help new programs become self-sufficient. Applying for a grant annually is strongly encouraged. However, the grant program is intended as 'start up' help only and funding of the grants at state level is always questionable. The goal of the program is that the City has initial funds for operations while it builds its own partnerships and backing within the community and City structure.

Objective G: Inventory Maintenance and Updating.

The inventory database is managed on MS Excel. Whoever completes tree work should complete

work orders (Attachment 4). One specifically designated person should input the completed work on a continuing basis. Without continual updating in this way, the inventory quickly becomes obsolete. Annually, the PWD/City Forester and staff should evaluate this management plan and inventory based work/goals as they are implemented to assure the goals are being met and new goals are being developed.

This management plan contains provisions for five years, beginning in 2011. Typically, a complete re-inventory should be completed every 5 years. When the inventory expires in 2015, a qualified, experienced forester should thoroughly evaluate all of the trees on an individual basis again. It is beneficial for an experienced eye outside the City perform an inventory due to changing tree conditions and factors.

Objective H: Community Education.

Community Education: Community education will allow for residents to know and understand what proper tree care looks like, how and when to perform it on their own trees and when to anticipate it on City-maintained trees. Some recommendations include:
~ Develop a tree planting recommendations flyer focusing on tree planting under power lines to distribute. It seems logical to distribute these with utility bills in the spring when most people plant trees.

~ Host annual tree care seminars. Having a professional or consultant host these seminars is an excellent example of a potentially fundable grant project component.

~ Maintain a supply of educational material for distribution to the public. ISA brochures are available at a reasonable cost. A link to these materials can be found at: http://www.isa-arbor.com/.

~ Use the local newspaper and/or the City of Bayfield website to promote the tree program by periodically preparing a news release on tree topics such as: tree pruning, how to enter the poster contest, and how to winterize trees.

~ Distribute flyers when working in neighborhoods. Residents will not be surprised when they hear the buzz of chainsaws and will be more aware of the value of the urban forest.

~ Initiate a "Champion Tree Contest". Enlist school children to find Bayfield's biggest trees and award the participation and largest trees. This is an excellent task for the tree board as they are very active with the City's Arbor Day program.

Objective I: Wood Residue Utilization.

Bayfield current wood residue policy is to make boles/trunks available for firewood. This is an excellent policy and should continue. The contractor utilized for large tree pruning and removal will be responsible for disposal of his/her debris.

ATTACHMENT 1:
2011-2015 Schedule of Activities

Schedule of Activities (Year 2011-2012) one time only activities

Activity	Responsible	# of Trees	# of Inches	Avg dbh	Cost	Work Time
Complete removals 1-12" dbh	in-house	3	24	8.0"	n/a	1 day 2-3 person crew
Complete removals with overhead utilities (Excel Energy)	utility co. bole-inhouse/stump-contract	4	63"	15.75"	n/a $95	1 day 2 person crew
Complete removals w/o overhead utlities	contract	24	661"	27.5"	$8,999	3 days coordination
Complete prune priority 1	contract	15	501"	33.4"	$4,259	2 days coordination
Monitor trees (twice annually)	forester	varies	n/a	n/a	n/a	2 days
Training prune trees that are 1-6" dbh, once/2 years	in-house/ forester/tree board	74	n/a	2.3"	n/a	7 days
Training & laptop/small equipment	n/a	n/a	n/a	n/a	$250	varies
Volunteer Forester	in-house	n/a	n/a	n/a	$500	n/a

CONTRACTED COST = $14,103
STAFF TIME INVESTMENT = 96 hours
Staff cost - does not include equipment cost-(based on $48.65/hour, includes benefits) = $4,670

Schedule of Activities (Year 2012-2013) one time only activities

Activity	Responsible	# of Trees	# of Inches	Avg dbh	Cost	Work Time
Complete prune priority 2 1-12" dbh	**in-house**	1	8	8"	n/a	1 hour
Complete prune priority 2 13"+" dbh	**contract**	10	215	21.5"	$1,827	1 day coordination
Campground Work (begin as soon as possible)	**in-house/ contract**	n/a	n/a	n/a	n/a $5,000	4 days 3 person crew
Monitor trees (twice annually)	**forester**	varies	n/a	n/a	n/a	2 days
Training prune trees that are 1-6" dbh, once/2 years	**in-house/ forester/tree board**	74	n/a	2.3"	n/a	7 days
Grind existing stumps	**contract**	10	203	20.3"	$304	1 day coordination
Plant trees full stocking in 2 rotations (14 years)	**in-house**	15	n/a	15 gallon	$2,250 apx $150/ea	3 days 2 person crew
Training & laptop/small equipment	**n/a**	n/a	n/a	n/a	$250	varies
Volunteer Forester	**in-house**	n/a	n/a	n/a	$500	n/a

CONTRACTED COST = $9,881
STAFF TIME INVESTMENT = 160 hours

Staff cost - does not include equipment cost-(based on $48.65/hour, includes benefits) = $7,784

ROUTINE Schedule of Activities (Beginning in 2014 and completed annually)
and EAB Related Costs

Activity	Responsible	# of Trees	# of Inches	Avg dbh	Cost	Work Time
Monitor trees (twice annually)	**forester**	**varies**	**n/a**	**n/a**	**n/a**	**2 days**
Compete routine removals	**in-house/contract**	**5**	**n/a**	**12.3"**	**$600**	**2 days**
	utility	**2**	**n/a**	**12.3"**	**stump=$50**	3 person crew
Complete routine prune*						
(trees over 12" dbh) w/o overhead utlities	**contract**	**44**	**n/a**	**18.7"**	**$6,994**	**2 days**
(trees over 6-12" dbh) w/o overhead utlities	**in-house**	**16**	**n/a**	**18.7"**	**n/a**	**3 days**
(trees over 6" dbh) with overhead utilities	**utility**	**12**	**n/a**	**18.7"**	**n/a**	3 person crew
Training prune **trees that are 1-6" dbh, once/2 years**	**in-house/** **forester/tree board**	**74**	**n/a**	**2.3"**	**n/a**	**7 days**
Plant trees **full stocking in 2 rotations (14 years)**	**in-house**	**15**	**n/a**	**15 gallon**	**$2,250** apx $150/ea	**3 days** 2 person crew
Training & **laptop/small equipment**	**n/a**	**n/a**	**n/a**	**n/a**	**$250**	**varies**
Volunteer Forester	**in-house**	**n/a**	**n/a**	**n/a**	**$500**	**n/a**

EAB Removals when EAB in Co.						
(trees over 12" dbh) w/o overhead utlities	contract	1	17	17"	$231	1 hour
(trees1-12" dbh) w/o overhead utlities	in-house	8	44	5.5"	n/a	2 days
trees with overhead utilities	utility	1	8	8"	n/a	2 hours

CONTRACTED ROUTINE COST = $10,644 (w/o EAB costs) $231 EAB COSTS
STAFF TIME INVESTMENT: Routine = 216 hours; EAB = 19 hours
Staff cost - does not include equipment cost-(based on $48.65/hour, includes benefits) = $11,432

All maintenance lists such as removals and prune priority can be found on the tree management database

Estimated costs derived from Jay's Tree Care, Ashland and are in 2011 dollars.

stump grinding = $1.50/diam inch

removal (includes stump) = $13.60/diam inch   prune = $7.50/diam inch

planting based on 15 gallon potted tree @ $150/each

TREE CONDITION

A condition rating helps to assess overall forest health and to evaluate a species performance. Bluestem Forestry Consulting Inc. uses criteria adapted from the International Society of Arboriculture <u>Valuation of Landscape Trees, Shrubs and Other Plants: A Guide to the Methods and Procedures for Appraising Amenity Plants</u> (Ninth Edition) as the basis for the field condition rating.

At least seven factors were examined and rated to determine the condition of a tree. These factors are crown development, trunk, major branch structure, twig growth rate, foliage health, insects/diseases and roots. General descriptions of the criteria used to categorize each condition are as follows:

Excellent - A tree in excellent condition has no visible defects and appears to be in perfect health. The tree will exhibit all of the characteristics typical of its species. An excellent tree can be expected to live well into the future.

Good - A tree in good condition has a sound trunk and a full canopy and has only minor mechanical injuries such as minor trunk scarring that will eventually heal. The tree will exhibit most of the characteristics associated with its species and can be expected to live for many years.

Fair - A tree in fair condition will be exhibiting minor to moderate defects. Some situations that would warrant a fair rating include: a thinning canopy, twigs growth may only be 1/2 the expected rate, significant mechanical injury such as scarring on the trunk, insects or disease may be present but are controllable and the crown may be lacking the natural or desired symmetry characteristic to the species. If given routine maintenance such as pruning and mulching a tree that is graded fair will contribute to the forest for many years.

Poor - A poor tree will be expressing low vigor and significant decline as evidenced by branch dieback, abnormal leaf size, early fall coloration, trunk decay due to injury or canker or the production of new branches on the main stem. A tree in poor condition will most likely require removal, but may be improved with priority pruning.

Very Poor - A tree in very poor condition is on the verge of dying. Dieback will be severe or it may be lacking a full crown. Trunk/crown cavities or decay, severe cracks and seams or severe root problems may also be present. Removal for safety will be required.

Dead - A tree in dead condition is simply a dead standing tree. These will most likely occur in wooded or unmaintained areas, but may also occur with smaller new plantings that have failed. These trees will require removal.

TREE MAINTENANCE NEEDS

Each tree inventoried was assigned a maintenance category. Field judgments were made from the ground based on observation and hazard estimation. Criteria was adapted from two sources: A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas (Second Edition) by Nelda Matheny & James Clark and from a Minnesota Department of Natural Resources Publication How to Detect, Assess and Correct Hazard Trees in Recreational Areas.

The following are the definitions of the maintenance categories:

Removal - Trees designated as a removal are either dead or have one or more defects that cannot be remedied. These trees will most likely have a severe trunk defect such as a cavity or extensive decay, have severe cracks associated with weak unions or have a large percentage of crown death and are potential safety hazards. Most of the trees in this category will rate a very poor or dead condition rating.

Special Action - Trees that should be removed, but that pose minimal liability to persons or property will be listed in this category. Examples include new tree planting failures or undesirable species that are beginning to decline and cannot be improved with pruning. The majority of these trees will rate a poor condition.

Prune Priority 1 - These trees have severe deadwood, hangers or broken branches that need to be remedied as soon as possible. Trees with unattached hanging branches or dead attached branches that are over 2 inches in diameter will be listed in this maintenance category. Overall re-evaluation of the tree while pruning may result in removal of the tree if more extensive problems are noted.

Prune Priority 2 - These trees need pruning more quickly than a routine pruning cycle will allow and have dead, dying or weakened branches that are over less than 2 inches in diameter. The majority of these defects can be corrected with pruning and the tree can be expected to live for many years.

Routine Prune - All trees need to be placed on a cycle of trimming to correct small structural problems or growth patterns that will eventually affect the tree adversely. Routine pruning will result in a healthier, more vigorous tree and will extend the life of most trees. A routine pruning cycle of once every 5-8 years is idea.

Training Prune - Training pruning is the structural pruning of all trees 10 years of age or younger. Removing poorly attached co-dominant, crossing and competing limbs while the tree is young, resulting in small cuts and wounds will produce a well-balanced mature crown. This is the most cost-effective form of all maintenance.

GROWSPACE DESCRIPTIONS

The size and type of terrace is noted during the inventory. The following are the categories used to classify the terraces:

0-4' - This is a terrace framed by a sidewalk and curb/street and is 0-4' in width. These sites are typically not suited for tree planting or growing due to the limited resources available to the tree.

4-6' - This describes a terrace that is framed by a sidewalk and street or curb and is at least 4.5' and up to 6' in width. These terraces are typically ideal for medium sized trees.

6'+ - These terraces are framed by a sidewalk and street or curb and are over 6' in width. Larger trees are typically planted here.

Unrestricted - These are terraces that do not have a sidewalk present. These terraces occur most frequently in "yard" type settings where there is a right-of-way, but there is no sidewalk. They can also occur in wooded or park settings.

Attached sidewalk – The sidewalk is attached to the curb with a tree on the right-of-way growing behind the sidewalk.

Cutout - A tree growing in a concrete cut-out has a terrace listed a 'well'. These growing situations usually occur in downtown areas.

Median - Medians occur when a growing strip occurs between opposite directions of traffic on a single street.

Park – Trees growing in or along parks will be given this designation

Behind Walk – This describes a formal terrace, but with the right-of-way extending beyond the sidewalk area.

Island – An island can often be found in cul de sacs and describes the circular area at the end of the street.

RISK MANAGEMENT

Risk: is the potential for suffering harm or loss

Risk Management: is the ability to minimize the potential for harm or loss from occurring by implementing a sound risk reduction strategy.

Types of Risk
- Financial
- Physical harm

A Risk-Reduction Strategy for Trees
- Evaluate the natural resource being managed
- Evaluate the resources available to you (fiscal, staff, equipment, etc.)
- Develop a policy statement
- Develop an action plan
- Periodic review of all four components

EVALUATE THE NATURAL RESOURCES BEING MANAGED

Evaluate the Entire Population
An understanding of the entire population allows you to identify the key problem areas within the population.
- Species distribution
- Diameter distribution
- Condition distribution
- Defects
- Locations and targets

Identify Problematic Species
Identify the species that, based on your knowledge and experience, pose the greatest physical threat.
- High history of failure
- High storm damage potential
- Prone to high-risk structural defects

Identify Problematic Diameters
Identify the diameters that, based on your knowledge and experience, pose the greatest problem in your population.
- Large diameter trees

Identify Problematic Conditions

Identify the conditions that, based on your knowledge and experience, pose the greatest problem in your population.

- Very poor trees
- Poor trees

Identify Problematic Defects

Identify the defects that, based on your knowledge and experience, pose the greatest problem in your population.

- Basal decay and cavities
- Major dieback
- Poor branch attachments

Identify Locations and Targets

Identify the locations and targets that, based on your knowledge and experience, pose the greatest physical threat in your population.

- Busy streets
- Playground areas

EVALUATE THE RESOURCES AVAILABLE TO MANAGE

Staffing

- Number
- Training
- Work load

Equipment

- Diagnostic
- Capabilities/limitations
- Availability

Fiscal

CREATE A TREE RISK MANAGEMENT POLICY STATEMENT

Components of a Policy Statement

- State your agency's understanding of its responsibility to maintain a safe public area.
- Identify the manager of the risk reduction program.
- List any general constraints on managing hazard trees such as financial or personnel.

The following is an example of a Hazard Tree Policy Statement:

The City of Metropolis has an active policy to maintain the safety of public lands from potentially hazardous trees. The City will strive to eliminate, in a timely fashion, any tree deemed hazardous. When available fiscal and human resources limit the ability of the City to remove high-risk trees,

priority shall be placed on trees deemed to carry the highest risk. The standard for rating the potential risk of a tree will be the International Society of Arboriculture's twelve point hazard evaluation system. The Director of Parks, Recreation and Forestry will administer this program and have final judgment in all matters concerning the mitigation measures taken for any tree deemed hazardous.

Benefits of a Policy Statement

- It defines for staff the overall mission of the company or agency as it relates to high-risk trees.
- Minimizes political influence
- Allows staff to do their job

DEVELOP AND IMPLEMENT AN ACTION PLAN

Goal

After evaluating your resources, define problem areas and broad solutions to those problems. View this as a wish list.

Objectives

Define clear objectives that address the general goals you have established. The details should be more specific. A good objective defines what is going to be done and in what timeline.

Actions

A series of actions should be identified that address each objective defined

PERIODIC REVIEW OF ALL FOUR COMPONENTS

Review all four components of your risk management plan frequently.

ATTACHMENT 4:
Sample Work Order

Date Work Requested:_____

Date Work Completed:_____

Work Completed By:_____

Address:_____ **ID#:**_____

Type of Work Performed:_____

Additional Work Needed:_____

End Condition of Tree: **Excellent** **Good** **Fair** **Poor** **Very Poor** **Dead**

End Rating of Tree:_____ **Comments:**_____

_____

*Recorded by:*_____

*Date:*_____

ATTACHMENT 5:
Park Maps