City of Prairie du Chien Urban Forestry Plan & Tree Inventory Summary

November 21, 2011

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This document was funded in part by an urban forestry grant from the
State of Wisconsin Department of Natural Resources Forestry program as authorized under s.23.097 Wis. Stat.

City of Prairie du Chien
Urban Forestry Management Plan & Tree Inventory Analysis

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Cover photo: St. Lo Drive

EXECUTIVE SUMMARY

The City of Prairie du Chien recognizes that trees provide important economic, social and environmental benefits that significantly improve the quality of urban life. Bluestem Forestry Consulting Inc. completed a public street and park tree inventory and prepared this management plan in the summer/fall of 2011. This management plan and tree inventory marks a sincere commitment to Prairie du Chien's urban forestry program. This document reports the findings of the inventory and makes specific, prioritized recommendations for managing the urban forest resource for 2012-2016 based on inventory findings, current staffing, budgets and tree circumstances. A companion document, the 'City of Prairie du Chien Emerald Ash Borer Readiness Plan' was also prepared for the purpose of ash and emerald ash borer (EAB) management. EAB considerations and expenses are included in this management plan, however a more thorough discussion of those circumstances can be found in the companion plan.

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

- A total of 2,994 trees, 53 stumps and 535 planting sites were inventoried.
- 393 trees (13.1%) are green, black or white ash and are susceptible to Emerald Ash Borer.
- 14.9% of all sites suitable for a tree are vacant. If no ash are chemically treated for preservation, another 13.1% of sites will be vacant. This would result in an extremely high tree vacancy rate.
- The recommended contractual budget for 2012 – 2016 varies from $23,310 to $91,939 (including EAB expenses). The forestry budget for 2010 was $0. Staffing requirements average 100 days annually. Recommendations include staffing and budgetary increases.
- There are 238 trees in need of immediate removal for safety reasons. This is 6.6% of total inventoried population. A typical first-time inventory averages removals between 3-10%. The high numbers of removals are due in part to the lack of maintenance in the past and poor tree species.
- 209 trees need to be immediately pruned for safety reasons (5.8% of total inventoried population). A typical inventory averages 3-7% safety prune. This figure is on the high end of the scale due to a high number of trees that have been topped and a high population of Siberian elm, which require extensive pruning.
- The 'City of Prairie du Chien Emerald Ash Borer Readiness Plan' is a companion guide discussing issues and management costs relating to the emerald ash borer.
- 45.1% of the forest is represented by maple and an additional 13.1% by ash. Ideally, the forest should be comprised of not more than 5% of any one species and 10% of any one genus. No species over the recommended limits, including maple, should be planted until this goal has been met.

STATEMENT OF PURPOSE AND SCOPE

The purpose of Prairie du Chien's urban forest management plan is to recommend specific activities and designate responsibilities to properly manage the street & 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 Director of Parks & Recreation, the Public Works Department and City administration will be responsible for implementation of this plan. The benefits of a healthy, properly maintained urban forest are many including reduced energy costs, reduced stormwater runoff, increased property values and decreased carbon dioxide. The benefits of a properly managed an urban forest is far less than the benefits the forest provides. Simply stated, proper forest management is cost effective and wise use of funds and time.

TREE INVENTORY

In the summer of 2011, Bluestem Forestry Consulting Inc. conducted a street & park tree inventory throughout the City of Prairie du Chien. Areas that received an individual tree inventory included maintained areas of street rights-of-ways and the following parks: Washington Street Park, Michigan Street Park, Waterworks Park, Cecil Smith Ballfields, Fort Fun & Pool, O'Brien Park, Hoffman Hall, Lochner Park and St. Feriole Island. LaRiviere Farm Park received a forest health analysis that is a separate document. Wooded or unmaintained areas in all parks excluding LaRiviere Farm Park were not inventoried.

The following data was collected: address, street, species, condition, diameter, prioritized maintenance needs, overhead utility and miscellaneous comments. To further aid in understanding the terminology associated with the inventory findings, a Glossary of Inventory Terminology can be found as attachment 2. The data can be accessed via a web-based internet database maintained by MSA Professional Services, Inc. of Baraboo, WI. Their website containing the data is: http://gis2.msa-ps.com. A discussion of some of the overall inventory findings is below.

Diversity. Sixty-one different species were identified within Prairie du Chien's urban forest. This is a very diverse number of species; however, only two genera represent 58.2% of the total population. These two tree genera are maple (45.1%) and ash (13.1%). 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 genus and includes each different type of maple. Each type of maple such as sugar maple is considered a species. In Prairie du Chien, silver maple is the most heavily

represented of the maples with 698 trees or 23.3% of the total population. Other maples include: sugar maple, red maple, Norway maple (including Crimson King a red-leaved maple), boxelder and amur maple. Limited species distribution could result in a population crash if an insect or disease were to attack any one particular species.

Similar to Dutch elm disease which destroyed American elms in the 1970-1980's, the emerald ash borer is destroying ash. The State of Wisconsin has confirmed multiple infestation sites of Emerald Ash Borer (EAB), which attacks and is fatal to all ash trees. One noteworthy EAB infestation is approximately 30 miles north of Prairie du Chien. Other nearby finds include SE Minnesota and NE Iowa. The City has 393 ash trees (13.1% of its public tree population), all of which are threatened by EAB. Green ash is the most common ash tree within Prairie du Chien's urban forest and it represents 11.5% of the overall population. Black ash and white ash make up the remaining 1.6%. If an insect or disease attacked maple, the City would be threatened with losing nearly half of all of their public trees since maple makes up over 45% of the street and park trees. This is why species diversity is so vital. While losing 5%-10% of a forest is devastating, losing 45% is catastrophic.

Once infested with EAB, ash trees die within a few years. It is not safe for communities to leave dead or dying ash on public property. In all likelihood, Prairie du Chien will be removing many ash trees within the next several years. The "City of Prairie du Chien Emerald Ash Borer Readiness Plan" has been developed that specifically discusses issues relating to EAB including budget projections, chemical treatments, tree removals and replanting strategies.

One specific example of poor species diversity is Lochner Park. Overall the trees in Lochner Park are quite healthy, but only 5 different tree families are represented. These are: ash (41.6% of population), honeylocust (35.8%), maple (18.8%), oak (1.8%) and walnut (1.8%). It isn't that these aren't quality species, but there should simply be more different species. More oak and walnut are appropriate as they grow well on the soils in the park and other non-represented species should be present. Ideally, 15-20 species should be present so that a particular insect or disease would not decimate the park tree population. This illustrates the idea of overall diversity within a community, but also diversity within specific areas, parks and neighborhoods. Bur oak may represent 5% of the total population, but if they are all growing within one park or on one street, it is still not an ideal situation. Species diversity means many different tree species throughout the city without large concentrations of any single tree species. The goal is to minimize the impact of an insect or disease so that large swaths of urban forest are not killed. The global economy continues to introduce invasive species that threaten our native species. From buckthorn, to EAB to Asian carp, it is unlikely that invasive threats will decrease. Properly managing the urban forest thru species diversity is the single greatest tool we have to prevent large scale forest destruction in our urban forests.

The ten most common species and over-represented species are shown in the following tables:

TOP TEN SPECIES SUMMARY TABLE		
Species	Count	Percentage of Total Population
Silver Maple	698	23.3%
Norway Maple	370	12.4%
Green Ash	345	11.5%
Siberian Elm	264	8.8%
Sugar Maple	209	7.0%
Honeylocust	108	3.6%
Blue Spruce	99	3.3%
Crabapple	76	2.5%
River Birch	72	2.4%
Other	753	25.2%

SPECIES/GENUS OVER RECOMMENDED LIMITS 5% of any one species, 10% of any one family		
Species/Family	Count	Percentage of Total Population
Maple Family	1350	45.5%
Silver Maple	698	23.3%
Norway Maple	139	7.7%
Sugar Maple	209	7.0%
Ash Family	393	13.1%
Green Ash	345	11.5%
Siberian Elm	264	8.8%

Street Construction and Impact on Trees. There were areas of recent construction in Prairie du Chien, particularly South Michigan Street along the 500-600 blocks that are worth a brief discussion. Residents commented that the City was actively involved with selecting which trees they felt would survive construction and which trees needed to be removed and replanted. This was an excellent outreach opportunity that the City capitalized upon. Evaluating trees prior to construction is an outstanding opportunity to educate residents and make responsible, cost-conscious management decision at the same time.

It is also advised that reconstructed streets *always* receive tree planting where appropriate and when there is sufficient boulevard space whether a tree was removed or not. This was completed to a degree on Michigan Street. Trees do reside within the reconstructed street right-of-way area and tree planting should be included at the initial stages of any reconstruction project. Trees provide many benefits as do new sewer lines and paved surfaces. Trees are infrastructure and should be treated as such.

Construction creates a great deal of stress on trees as well as direct damage to trees and can adversely impact health. Any tree that is in a construction zone should receive additional tree monitoring for several years to assure that they are stable and healthy enough to remain in the population. Items to watch for during the monitoring phase include dieback, early leaf drop, early leaf color in fall and trees leafing out late. With the round-abouts and additional construction planned in Prairie du Chien, trees will continue to be impacted by street repairs. City staff should be commended on their outreach and are encouraged to continue this service and increase tree planting in these areas.

Tree Growing Conditions. Growing conditions for trees in Prairie du Chien are extremely varied. Soils vary from 'bottomland' soils on St. Feriole Island and along the Mississippi River to very dry soils just a short distance from the river. As a result, particular care needs to be paid to planting within the City.

Most soils outside of the bottomland areas are very dry and sandy. Even during seasons of adequate rainfall, the soil is not structured to hold or retain water. Sandy soils are porous and water percolates thru them very quickly leaving little water for trees to access after a rain event as passed. The trees that are thriving in Prairie du Chien along city streets and upland parks are dry-site species. Trees doing poorly are wet-site species. As the names imply, dry-site species are adapted and naturally grow on dry-sites and wet-site species grow well on wet-sites such as river bottoms. Trees doing well on dry sites in Prairie du Chien include Northern red, burr & pin oak, tuliptree, American linden and hackberry. All of these trees have evolved to grow on mesic or dryer sites. Trees doing well in lowland sites include silver maple, sycamore, elm and river birch. These species are adapted to periods of flooding and enjoy having 'wet feet.'

A list of recommended species for each soil type is provided on page 24. Prairie du Chien is encouraged to focus on these species to increase tree longevity and health.

Tree Topping. A significant number of public and private trees in Prairie du Chien have been topped, some recently, within the past few years. Topping is the practice of indiscriminately cutting back branches on a tree at a single height. Often times it is performed to reduce the size of a tree. Topping is devastating to tree health and greatly shortens the lifespan of a tree. Topping creates extensive pockets of decay within the crown of a tree and causes very weakly attached new growth that usually creates a larger risk of branch failure. Topping actually results in increased maintenance costs due to the very quick regrowth that experiences increased branch failure.

It is unusual to see topping performed to the extent it is within Prairie du Chien. While topping was generally accepted at one time, it is scientifically proven to be detrimental to trees and tree health and has not been generally accepted practice for the last 2-3 decades. The City has not been performing topping. It has been completed by homeowners and contractors. It is strongly recommended that the City begin an education campaign aimed at homeowners explaining why this practice is unwise. Likewise, contractors should be individually contacted and to explain that this type of pruning is not to be performed on City trees. The City does have a permitting policy for tree work on streets, but it has not been enforced. Enforcement of this policy is recommended.

Two websites that illustrate the injury topping causes are: http://pubs.ext.vt.edu/430/430-458/430-458.html and http://www.extension.iastate.edu/publications/sul7.pdf.

5.8% of the tree population was identified as in need of safety/priority pruning. This is a high number of trees for an initial inventory. This is due in large part to two reasons. One of these is because of the common practice of topping within Prairie du Chien and the accompanying crown decay. The second is the lack of routine maintenance and pruning in the past.

Training Prunes. Training pruning is the structural pruning of all trees 10 years of age or younger. Training pruning is the single most beneficial pruning a tree can receive and can best be described as preventative maintenance. Pruning a 3 inch diameter tree with a double leader takes only a few minutes by a single staff person, requires only hand tools and has minimal impact on tree health. If that double leader were allowed to grow it would likely take an hour or better to remove with multiple staff and large equipment. If the double leader could be removed at all, tree health would be significantly impacted thru decaying of this large wound. More extensive pruning can be performed because young trees heal quickly from pruning wounds. Structural defects such as double leaders can easily be corrected at this size with minor risk of decay. This type of pruning is also easy for the City to perform. It is quick, taking only 10-15 minutes per tree. It is affordable and can be completed with hand tools from the ground. Training pruning has been scheduled as an annual activity and high priority should be given to this activity. Clearly, pruning risk trees is the first priority, but this pruning should receive second priority.

Poor Species/Siberian Elm (Ulmus pumila). Often erroneously called Chinese or Japanese elm, Siberian elm (*Ulmus pumila*) is a poor-quality species that is common in Prairie du Chien. It is the third most common species, representing 8.8% of the population. Other generally disliked trees such as black locust and mulberry are present, but not to the large extent Siberian elm are. Siberian elms are characterized by their quick growth, weak wood, susceptibility to pests and propensity to self-seed at high rates. They tend to experience large volumes of limb dieback and as a result present a high risk to people and property due to limb failure. There are many Siberian elms on St. Feriole Island and due to the island's extensive use by campers and visitors, all Siberian elms on the Island need pruning. The City is wisely trying to phase this species out of the population. Replanting with long-lived, strong-wooded species such as oak, hackberry and American elm (disease resistant) is strongly recommended.

Tree Maintenance Priority. This inventory provides a first-ever overall look at Prairie du Chien's urban forest and considerable maintenance needs. EAB significantly increases the amount of necessary tree work 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 and in the accompanying 'City of Prairie du Chien Emerald Ash Borer Readiness Plan.' Based on equipment and staffing, Prairie du Chien has the capability to manage its trees superbly. Administration is strongly encouraged to support the following activities:

Activities to be Completed in 2012* (cost = $91,939, staff time = 89.5 days):

Complete removals 0-15% (147 trees)

Complete priority prune 1 (115trees)

Monitor/training prunes/staff training

Remove/replant **ash** in poor/very poor condition (39 trees)

Chemically treat significant **ash** for preservation (215 trees)

Activities to be Completed in 2013 (cost = $35,920, staff time = 86.5 days):

Complete removals >15% condition (91 trees)

Complete priority prune 2 (94 trees)

Remove/replant **ash** 1-6" diameter (40 trees)

Plant trees (55 plantings)

Monitor/training prunes/staff training/grind stumps

Activities to be Completed in 2014 (cost = $32,770, staff time = 77 days):

Remove/replant **ash** with overhead utilities (22 trees)

Complete routine non-ash removals/prunes

Plant trees (55 plantings)

Monitor/training prunes/staff training

Activities to be Completed in 2015 (cost = $64,976, staff time = 120 days):

Remove/replant non-preservation **ash** (77trees)

Complete routine removals/prunes

Plant trees (55 plantings)

Monitor/training prunes/staff training/chemically treat significant **ash** for preservation

Activities to be Completed in 2016 (cost = $23,310, staff time = 66 days):

Complete routine removals/prunes

Plant trees (55 plantings)

Monitor/training prunes/staff training

**treatment of ash in good/excellent condition will be completed every third year.*

All maintenance activity recommendations are based upon inventory findings. The following graphs provide a visual representation of the inventory:

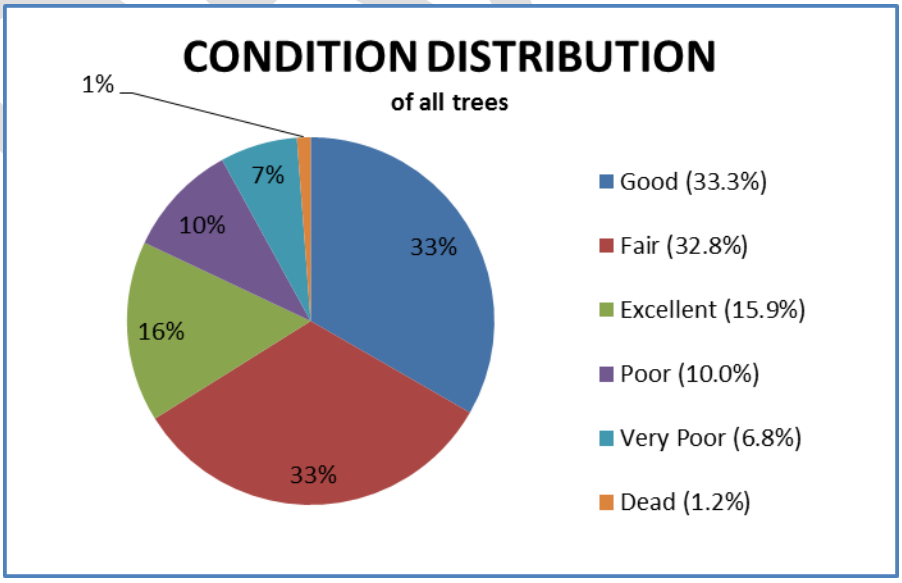
Park Name	# of Trees
St. Feriole Island	822
Fort Fun Park	100
Washington Street Park	57
Lochner Park	53
Cecil Smith Ballfields	25
Hoffman Hall	20
Waterworks Park	11
Michigan Street Park	3
TOTAL PARK TREES	1091

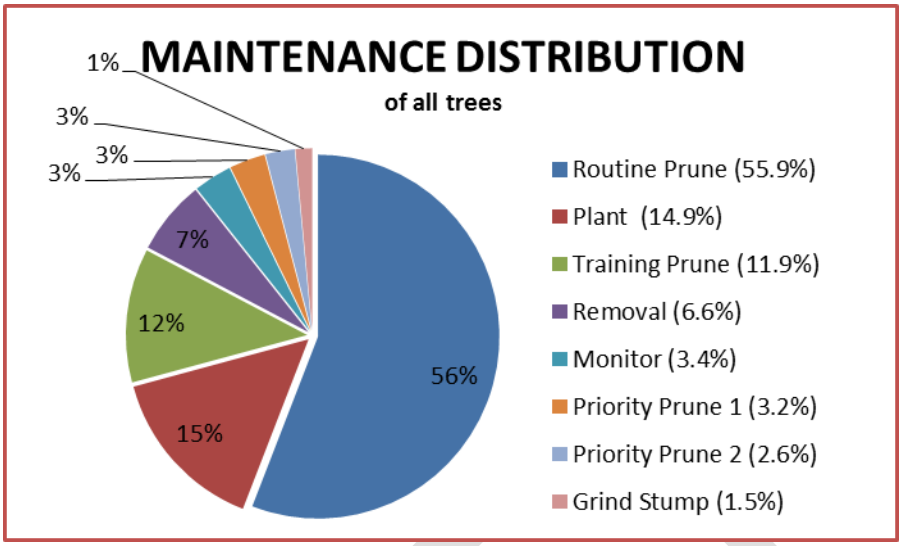
SIZE DISTRIBUTION

Existing	dbh*	Ideal**
36.9%	0-8"	40.0%
30.0%	9-16"	30.0%
17.8%	17-24"	20.0%
15.3%	25+"	10.0%

*diameter at breast height (4.5' above ground)

** based on recommendations from 2011 Minnesota Shade Tree Short Course





STAFFING & EQUIPMENT

The Public Works Department is responsible for all tree maintenance activities. The Director of Parks & Recreation (DP&R) with assistance from the co-Public Works Director (PWD) are responsible for all tree decisions. These two entities work together to manage the urban forest. Staffing for public works includes seven full-time and two seasonal employees. The City also accesses inmates at the penitentiary to assist when needed. Equipment includes an aerial lift truck, chipper truck, end loader, skid steers, dump trucks, chainsaws, pole pruner, safety equipment and hand tools. The biggest limiting equipment factor is the reach on the aerial lift truck. To safely complete very large removals a 50' or 60' reach is required. Because Prairie du Chien's lift truck is not this length, tree removals (and prunings) ≥21 inches dbh should be contracted to a qualified tree maintenance firm. The public works crew, prison laborers and DP&R have been successfully planting trees in-house and as noted in the budgets above, this tree planting should continue as is.

Staff is currently completing work on an emergency basis only and do not have sufficient time to complete routine maintenance such as pruning let alone risk removal/prunings and ash activities. Staffing requirements developed by Bluestem estimate that forestry duties average 100 days annually. Factoring in EAB duties causes this number to jump to well over 120 days annually. The city is understaffed to manage its forest or EAB. It is highly recommended that the City hire an additional staff member to assist with these activities. This new hire should have forestry related experience in addition to large equipment experience. It is imperative that the recommendations in this plan be started immediately. Recommendations are to remove tree risks (removals and prunings) and then begin EAB related work. In all likelihood, if EAB is 30 miles away, it is in Prairie du Chien and simply hasn't been confirmed yet. Time is of the essence. Begin removing/pruning risk trees now so that when EAB is confirmed, ash related work can proceed quickly

As with most communities, Prairie du Chien is underfunded to manage its forest. The forestry budget in 2011 was $0. Not only is Prairie du Chine underfunded for forestry work, it is not funded

at all. Specific budget recommendations are found as Attachment 1: Schedule of Activities. The funding to properly manage the forest and EAB varies from $23,310 annually to $91,939. This will significantly reduce risk to residents, visitors and property. It will also manage ash/EAB. It is critical that Prairie du Chien budget adequate funds to properly and safely manage their urban forest.

The Wisconsin Department of Natural Resources has an excellent opportunity designed for tree managers with limited forestry background. The Community Tree Management Institute (CTMI) course encompasses 6 days of training (over 3 sessions) from forestry experts and experienced city foresters in a wide variety of fields. This course provides a solid knowledge of forestry basics. It is highly recommended that the DP&R and/or the co-DPW attend this course. As always, the DP&R should be allowed the liberty to consult with a credentialed urban forester if he feels necessary as complex or issues beyond his scope of knowledge arise.

URBAN FORESTRY GOALS

This inventory was the first step towards establishing a defined, efficient forestry program to maximize benefits and minimize costs for the City of Prairie du Chien. 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, defensible, consistent 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 reasonable care in maintaining these trees. Political pressure, inadequate time, untrained staff and inadequate funding are not valid reasons 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 238 trees should be immediately removed from the existing tree population. Once this initial group of trees is removed, the City's removal program should stabilize at approximately 41 removals per year (1.5% of the total population).

Each tree was given a condition rating when it was inventoried (see chart, page 11). 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%. The schedule of activities (Attachment 1) has broken the removals into two categories.

Category one includes trees with a rating of 0-15%. These are the highest priority trees and need to be removed in 2012. These are large trees with very significant targets and serious defects such as cavities and decay. Category two are removals greater than or equal to 20% and these need to be removed no later than 2013.

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.

Large canker on Norway maple Crack
Photos courtesy: http://www.na.fs.fed.us/spfo/pubs/howtos/ht_haz/ht_haz.htm

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 Fort Fun Park or anywhere in Prairie du Chien, 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 Prairie du Chien 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 238 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). Can be purchased at: http://www.treecareindustry.org/public/gov_standards_z133.htm

~ American National Standard for Tree Care Operations - Tree, Shrub and Other Woody Plant Maintenance - Standard Practices, ANSI A300 (current revision). Can be purchased at: http://www.tcia.org/standards/A300.htm

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 be "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. Ordinances are currently undergoing revisions and will likely include a notification procedure.

Objective B: Prune high-risk branches.

A total of 209 trees are in need of priority pruning. Trees in need of priority pruning 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. One hundred fifteen trees were identified as Prune Priority 1. These should be pruned in conjunction with the initial high-risk removals in 2012.

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. Ninety-four trees were identified as Prune Priority 2. These prunings should be performed with the second batch of removals in 2013 or sooner if possible.

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.

Prune ash *only* if they will receive chemical treatment or have been identified as a priority prune. It is not necessary to perform routine prunes on ash trees as they will likely die within the next several years due to EAB.

Objective C: Remove and Manage Ash Trees for EAB

Three hundred ninety-three trees in Prairie du Chien are ash. Without chemical treatment, these trees will die from EAB. The 'City of Prairie du Chien Emerald Ash Borer Readiness Plan' prioritizes ash removals in advance of EAB and identifies 215 trees that are significant enough to receive chemical treatment for preservation. EAB costs are included in Attachment 1: Schedule of Activities. Further detailed recommendations are found in the companion EAB Readiness Plan.

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 a qualified forester complete the larger tree inspections (greater than 6" in diameter).

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

An excellent resource guide is "How to Recognize Hazardous Defects in Trees" published by the USDA Forest Service (Guide # NA-FR-01-96). This can be found at: http://www.na.fs.fed.us/spfo/pubs/howtos/ht_haz/ht_haz.htm

To eliminate high-risk situations within Prairie du Chien, the DP&R should evaluate the risk management program annually, see discussion on page 14. 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 212 training prunes per year. The crew and PWD/City Forester can complete this task. 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.

Prune ash *only* if they will receive chemical treatment.

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 associated staff overtime.

Once risk issues have been resolved and ash management is under way, a feasible routine pruning cycle needs to be established. It is likely that routine pruning will not begin for several years. 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 2014 will occur in zone 1, zone 2 in 2015, etc. Taking into consideration Prairie du Chien's current level of stocking, the above mentioned routine pruning cycle of seven years will result in approximately 333 trees pruned annually.

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 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. For more information on oak wilt see: http://dnr.wi.gov/forestry/fh/oakwilt/ or http://na.fs.fed.us/pubs/detail.cfm?id=921

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 that

develop naturally as the tree population matures. This is in addition to the initial safety removals. In Prairie du Chien this calculates into a total of 41 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 boulevard 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. Removing trees for reasons such as leaf litter is unacceptable. The good generated by the tree to the community as a whole far outweighs the minor inconvenience of leaf little for a few weeks annually.

If an individual would like to remove a tree on public property, he or she should provide the following information to the DP&R:

1. Name of person requesting removal.
2. Description and location of tree.
3. Reason for wanting removal.

Upon receiving such request, the DP&R 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 DP&R 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 DP&R. 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. This policy is likely to be made in the ordinance revision currently underway.

Objective D: Mulching.

There are trees within the City that are becoming over-mature and declining. 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. A discussion of fertilization needs can be found at: http://www.extension.umn.edu/distribution/horticulture/dg7410.html.

Mulching is currently used on trees planted in Prairie du Chien. 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 535 planting sites identified on street rights-of-way during the inventory. Most recent plantings have been in park areas. Trees provide huge benefits and planting needs to occur on an annual basis to assure that trees are growing for future generations.

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. McPherson

"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*

To continue enjoying and increase the varied benefits of trees, trees must be planted. In Prairie du Chien, 421 planting sites are suitable for larger growing trees, 23 are suitable for medium sized trees and 91 are suitable for small trees under power lines ('City of Prairie du Chien Emerald Ash Borer Readiness Plan' for a full list of recommended species). 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. Appropriate sites within the current work zone.
4. Homeowner requests.

A cycle of planting should be initiated. The easiest and most logical method of planting is to use the same zones identified for routine pruning. 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 (3 rotations) + replacements = 55 trees/year
(535 planting sites + 238 removals)/14 years + 41 routine removals/year = 55 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 is reasonable. 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 2013, these 55 plantings have been included in the budget (see Attachment 1: Schedule of Activities). They should be 1.5-2.0" dbh and planted by the in-house crew. Whips are frequently planted in the parks, particularly St. Feriole Island and Washington Street Park. Many of these trees failed in both parks and the remaining trees have basal scars from campers, traffic and lawn maintenance. This type of injury limits growth and health. Planting larger stock helps

increase survival. Be sure to mulch all new trees to help keep lawn maintenance equipment from damaging trunks.

The City should 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 suggested guideline concerning homeowner requests.

HOMEOWNER REQUEST PLANTING POLICY

To request a replacement tree, individuals should provide the following information to the DP&R:

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 DP&R 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 DP&R. 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.

GENERAL DESIGN GUIDELINES FOR SPECIES SELECTION:

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. Increase tree canopy. Plant the largest-growing tree appropriate for each planting site to encourage high canopy coverage.

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: Urban and Community Forestry, A Guide for the Interior Western United States, USDA Forest Service, 1990

Prairie du Chien is a Zone 4 climate and types allow for some good street and park tree planting selections. A comprehensive list of tree plantings including varieties can be found as an Attachment in the companion EAB Readiness Plan. The list below is a quick general list for review. This list is suited for dry-sites unless noted. Some **larger** trees include:

Tuliptree (Lirodendron tulipifera)
Sycamore (Platanus occidentalis) (wet site)
hackberry (Celtis occidentalis)
burr oak (Quercus macrocarpa)
swamp white oak (Quercus bicolor) (wet site)
American linden (Tilia americana) 'Redmond', 'Fastigiata'
elm (Ulmus spp.) 'Accolade', 'New Horizon', 'Discovery' (wet or dry site)
American elm (Ulmus americana 'Valley Forge') (wet or dry site)
Kentucky coffeetree (Gymnocladus dioica)
ginkgo (Ginkgo biloba)
honeylocust (Gleditsia triacanthos)

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

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.)

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 http://learningstore.uwex.edu/Choosing-the-Right-Landscape-Plants-Factors-to-Consider-P1371.aspx

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 only in extremely special circumstances. No ash should be planted due to the emerald ash borer.

Prairie du Chien should create a suggested list of trees not to be planted on public property. Some examples of poor species selection include black locust (Pseudoacacia robinia), blue spruce (Picea pungens), 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:

All plant quality should follow the American National Standard for Nursery Stock; ANSI Z60 (current revision) should be used when purchasing plant material. Can be found at: http://www.isa-arbor.com/education/onlineResources/cad/resources/educ_CAD_DevelopingPlantingSpecifications.pdf

Objective F: Ensure adequate funding for routine activities.

Initial costs to implement this plan are highest the first two years due to a large backlog of safety-related tree removal and maintenance work as well as preparation for emerald ash borer. Costs total $91,939 and $35,920 for 2012 and 2013, respectively. 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 will be completed annually at a cost of $23,310

1. 41 routine removals = $3,130
2. 212 training prunes = n/a
3. 333 routine prunes = $7,055
4. 55 tree plantings = $9,625
5. Staff training and small equipment purchases (workshops/chainsaw/etc.) = $500
6. 122 tree monitors twice annually (contracted forester)

Again, time commitments by staff must be increased. Routine activities will require approximately 66 staff days of time to properly complete.

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

This plan and inventory was completed with an Urban Forestry grant from the WI DNR. The purpose of these grants is to help new programs become self-sufficient or established programs undertake special projects. Applying for a grant annually is strongly encouraged. However, the grant program is not intended to replace local funding and continued availability of the grants is not guaranteed. To ensure a sustainable forestry program, the city must build its own partnerships and backing within the community and City structure.

Objective G: Inventory Maintenance and Updating.

The inventory database is a software program designed and maintained by MSA Professional Associates (http://gis2.msa-ps.com). Whomever completes tree work should complete work orders (see database). 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 Parks & Recreation Director 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 2012. Typically, a complete re-inventory should be completed every 5 years. When the inventory expires in 2016, 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:

~ A brochure on the harm of topping.

~ 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 Prairie du Chien website to promote the tree program by periodically preparing a news release on tree topics such as: tree pruning, EAB and its impacts, 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 Prairie du Chien's biggest trees and award the participation and largest trees. This is an excellent activity for an Arbor Day program.

Objective I: Wood Residue Utilization.

Prairie du Chien current wood residue policy is to:

- Chip suitable branches for landscaping activities
- Make boles/trunks available for firewood

This is an excellent policy and should continue. Prairie du Chien is in a quarantined county and this will impact wood use and disposal. An in depth discussion of wood utilization options can be found in the 'City of Prairie du Chien Emerald Ash Borer Readiness Plan.'

ATTACHMENT 1:
2012-2016 Schedule of Activities

Schedule of Activities (Year 2012)

(one time only activities)

Activity	Responsible	# of Trees	# of Inches	Avg dbh	Cost	Work Time
Complete removals 0-15% condition 1-20" dbh	**in-house**	**52**	**789**	**15.1"**	**$2,248** stump grinding	**13 days** 3 person crew
Complete removals 0-15% condition ≥21" dbh	**contract**	**95**	**3024**	**31.8"**	**$31,660**	**4 days** coordination
Complete prune priority 1 with overhead utilities	**utility**	**9**	**276**	**30.7"**	**n/a**	**1/2 day** coordination
Complete prune priority 1 without overhead utilities, 1-20" dbh	**in-house**	**25**	**436**	**17.4"**	**n/a**	**3 days** 2 person crew
Complete prune priority 1 without overhead utilities, ≥21" dbh	**contract**	**81**	**2453**	**30.3"**	**$12,265**	**4 days** coordination
Monitor trees (twice in 2012)	**contracted forester**	**122**	**2768**	**22.7"**	**$3,000**	**n/a**
Training prune trees that are 1-6" dbh, once/2 years	**in-house**	**212**	**n/a**	**3.0"**	**n/a**	**9 days**
Training & small equipment	**n/a**	**n/a**	**n/a**	**n/a**	**$500**	**varies**
EAB Related Costs	**chemical treatment**	**215**	**n/a**	**n/a**	**$21,133**	**5 days**
(see EAB plan for further details)	**remove and replant ash poor, very poor, dead**	**39**	**n/a**	**n/a**	**$12,578**	**22 days**

CONTRACTED COST = $91,939

STAFF TIME INVESTMENT = 89.5 days

Staff cost - does not include equipment cost-(based on $22.75/hour, w/o benefits) = $16,289

(one time only activities)

Schedule of Activities (Year 2013)

Activity	Responsible	# of Trees	# of Inches	Avg dbh	Cost	Work Time
Complete removals ≥20% condition 1-20" dbh	**in-house**	**65**	**485**	**7.5"**	**$1,234** stump grinding	**16 days** 3 person crew
Complete removals ≥20% condition ≥21" dbh	**contract**	**26**	**769**	**29.5"**	**$8,036**	**3 days** coordination
Complete prune priority 2 with overhead utilities	**utility**	**13**	**260**	**20.0"**	**n/a**	**1 day** coordination
Complete prune priority 2 without overhead utilities, 1-20" dbh	**in-house**	**52**	**821**	**15.8"**	**n/a**	**4 days** 2 person crew
Complete prune priority 2 without overhead utilities, ≥21" dbh	**contract**	**29**	**775**	**26.7"**	**$3,875**	**2 days** coordination
Monitor trees (twice in 2012)	**contracted forester**	**122**	**2768**	**22.7"**	**$3,000**	**n/a**
Training prune trees that are 1-6" dbh, once/2 years	**in-house**	**212**	**n/a**	**3.0"**	**n/a**	**9 days**
Grind existing stumps	**contract**	**53**	**930**	**17.5"**	**$2,650**	**1/2 day** coordination
EAB Related Costs (see EAB plan for further details)	**removals/replanting ash 1-6" dbh**	**40**	**n/a**	**n/a**	**$7,000**	**2.5 days** 2 person crew
Plant trees full stocking in 2 rotations (14 years)	**in-house**	**55**	**n/a**	**1.75"**	**$9,625** apx $175/ea	**5 days** 2 person crew

Training & small equipment	**n/a**	**n/a**	**n/a**	**n/a**	**$500**	**varies**

CONTRACTED COST = $35,920 (including EAB costs)
STAFF TIME INVESTMENT = 86.5 days
Staff cost - does not include equipment cost-(based on $22.75/hr) for in-house work = $15,743

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 in 2012)	**contracted forester**	**122**	**2768**	**22.7"**	**$3,000**	**n/a**
Compete routine removals	**in-house/contract utility**	**41**	**n/a**	**n /a**	**$3,130**	**7 days** 3 person crew
Complete routine prune*						
(trees 1-20" dbh) w/o overhead utilities	**in-house**	**221**	**n/a**	**n/a**	**n/a**	**11 days** (2 person)
(trees ≥21" dbh) w/o overhead utilities	**contract**	**83**	**n/a**	**n/a**	**$7,055**	**3 days**
trees with overhead utilities	**utility**	**29**	**n/a**	**n/a**	**n/a**	**1 day**

Training prune **trees that are 1-6" dbh, once/2 years**	**in-house**	**212**	**n/a**	**3.0"**	**n/a**	**9 days**
Plant trees **full stocking in 2 rotations (14 years)**	**in-house**	**55**	**n/a**	**1.75"**	**$9,625** apx $175/ea	**5 days** 2 person crew
Training & **small equipment**	**n/a**	**n/a**	**n/a**	**n/a**	**$500**	**varies**
EAB Related Costs in 2014 (see EAB plan for further details)	**removals/replanting** **trees w/utilities**	**22**	**n/a**	**n/a**	**$9,460**	**11 days**
EAB Related Costs in 2015 (see EAB plan for further details)	**removals/replanting** **Chemical treatment**	**77** **215**	**n/a** **n/a**	**n/a** **n/a**	**$20,533** **$21,133**	**49 days** **5 days**

CONTRACTED ROUTINE COST = $23,310 (w/o EAB costs) $51,126 EAB COSTS
STAFF TIME INVESTMENT: Routine = 66 days; EAB = 65 days

Staff cost - does not include equipment cost-(based on $22.75/hr) for in-house work: Routine = $12,012; EAB = $11,830

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

Estimated costs obtained from Riverland Tree Service:
removal (includes stump) = $10.45/diam inch prune = $5.00/diam inch stump grinding = $2.85/daim inch

planting based on 1.75" caliper b&b tree @ $175/each

ATTACHMENT 2:
Glossary of Inventory Terminology

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 Valuation of Landscape Trees, Shrubs and Other Plants: A Guide to the Methods and Procedures for Appraising Amenity Plants (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 were 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.

ATTACHMENT 3:
Risk Management Guide

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.