City of Des Plaines Emerald Ash Borer Management Plan

Prepared by

Natural Path Urban Forestry Consultants

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Executive Summary

Natural Path Urban Forestry Consultants, an urban forestry consulting firm, was contracted by the City of Des Plaines to conduct an assessment of the City's ash population and provide an Emerald Ash Borer Management Plan. The impetus for the project was the introduction of the Emerald Ash Borer (EAB) insect into northern Illinois in 2006. The Federal government predicts that, if the EAB's infestation continues unchecked, all ash will be lost in infested areas within a few years. The loss would be significant in both economic and environmental terms because the ash genus was heavily planted in the Chicago metro area in response to a previous devastation of American elm due to Dutch elm disease. Des Plaines is no exception among the Chicago metropolitan suburbs: Sixteen percent (n = 3,708 trees) of Des Plaines' street trees are ash. The removal and replacement of such a large portion of the street tree population will stress City fiscal and staff resources. Accompanying the direct economic burden that the City must assume for this tree management issue is the long-term environmental and associated economic losses from canopy reduction. A healthy, sustained and expanding canopy provides residents with a range of tangible and quantifiable environmental cost savings through reduced heating and cooling bills, reduced storm water runoff, captured carbon dioxide, and captured pollutant particulates.

Two assessments were conducted to provide a broad understanding of the City's tree resource in the context of EAB as well as of the entire street tree system. Specifically, an ash inventory and a sample inventory of the entire population were conducted.

Ash Inventory – During the ash inventory, essential data that can inform an effective urban forestry management program was collected for each ash tree that was located on the City's streets. Data fields included: species, diameter, condition, maintenance need, and replacement potential. Each tree was also mapped and incorporated into the City's Geographic Information System (GIS). Three thousand seven hundred and eight trees were inventoried. Three species of ash were represented in the population. Thirty three percent (n = 1,241 trees) were in poor or worse condition. Three hundred and sixty-six trees (9.9%) were marked for removal for a range of reasons, including condition and risk structure.

Sample Inventory – Using the sample inventory methodology developed by the United States Forest Service (USFS), all of the trees on approximately 110 randomly selected block segments within City limits were inventoried. The data collected allowed Natural Path to estimate the City's street population at 24,000 trees. The data was also used to calculate forest canopy benefits using the USFS cost/benefit program *I-Tree Streets.* The residents of Des Plaines realize approximately $269,000 annually in energy savings through the City's street trees.

Based on the data collected and consultation with City staff, *Natural Path* developed recommendations for managing the City's ash population. The overall goal of an effective urban forestry program is to advance the program toward a more diverse tree population, which promotes the benefits of a healthy and expanding canopy and system-wide

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sustainability. The following recommendations are specific to issues of (1) immediate maintenance and (2) Management.

Immediate Maintenance

1. Remove all trees identified as "Removals" in the database. The ash inventory identified 337 trees for removal. The trees were marked for a number of reasons including Emerald Ash Borer indicators, declining health and structurally compromised trees.

2. Achieve a manageable ash population – Implement an ash reduction policy that works toward achieving a manageable ash stocking level of 3% of the total tree population.

3. Broaden the City's planting palette – Emphasize under-used, high-quality, and low-maintenance species in the City's planting program with attention to population targets that align with a managed loss model.

4. Consider chemical treatment of the ash that are in excellent condition. Examine the cost-benefits of prioritizing treating of trees that are in excellent condition. These trees have the most potential to rebound from chemical treatment and may be the most resilient to the EAB infestation.

Management

1. Annual inspection – Appreciate that the ash population will decline quickly once the City becomes heavily infested. Anticipate that condition ratings will decline rapidly and more rigorous tree monitoring will be required. Implement an annual inspection program for the trees, and train staff or subcontract services appropriately.

2. Modify City tree ordinances – Include ash trees in the nuisance ordinance. Codify the Cities response to EAB on private property.

3. Community Outreach – Increase outreach to residents regarding current work, inventory outcomes, and next steps.

4. Tighten planting site specifications – Develop a policy regarding planting space specifications that aligns with current standards, attends to other constraints (e.g., hydrants, stop signs, residential trees), and targets tree canopy optimization by allowing trees to realize their full form.

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An Overview of Emerald Ash Borer

Emerald Ash Borer (EAB), *Agrilus planipennis* is an extremely destructive tree-killing beetle. This insect is an invasive species from China that most probably arrived in the United States as larvae living in shipping pallets. The beetle was first discovered in Michigan, but the pest is now devastating the ash tree (genus *Fraxinus*) population in Illinois. These insects can quickly decimate ash populations in an infested area, which poses a significant loss of tree benefits to communities as well as a high financial burden due to the expense of tree removals for municipalities and land owners.

Illinois communities were initially infested in 2006. The State of Illinois declared the insect a statewide nuisance, which allows municipalities some statutory control over eradication measures. (See Attachment 2 – State of Illinois EAB Nuisance Declaration). At the time of this writing, forty-three of the 102 Illinois counties were included in the State-quarantine. (See Attachment 2 – Quarantine Area – December, 2011)

Emerald Ash Borer Life Cycle

The Emerald Ash Borer has three distinct phases: Pupae, Larvae and Adult. Each phase and the damage the insect does in that phase appears to follow a predictable timeline, as described in Graphic 1 on the next page.

Pupae – The larvae from the previous season develop into pupae that overwinter in small chambers. Pupae develop into adult beetles in late spring.

Adult – The adult EAB emerges in May and takes flight. The adult eventually alights on a new tree and feeds on leaves for a few weeks. During this period, the tree damage is minimal. Although the adult stage seems to have minimal impact, in the later stage of this cycle the female deposits eggs on the bark, which are problematic.

Image 1: Ash with typical EAB galleries

Larvae – The deposited eggs mature, and the larvae produced bore into the phloem of the tree. The larvae feed for the next six to eight week, and they create tightly packed horizontal galleries that are in a zigzag pattern. The most destruction to the tree occurs during this phase. See Image 1 – Ash with typical EAB galleries.

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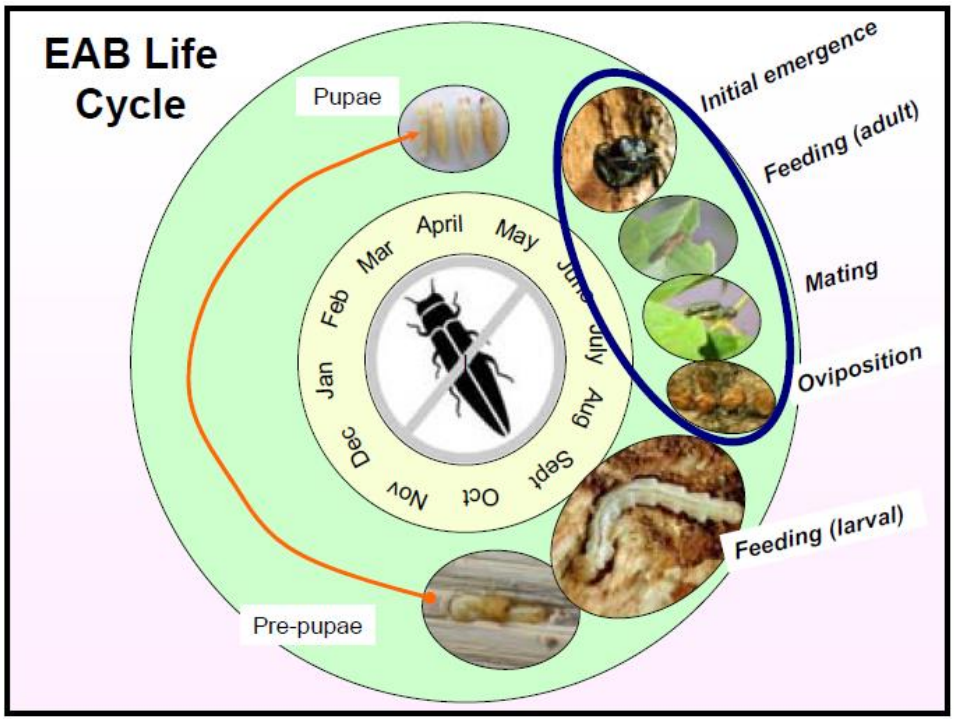
Damage to a tree's phloem and cambium disrupts the vascular system of the tree; this prevents the flow of water and nutrients to parts of the tree. Knowledge of the nature and timing of the various EAB phases is important, as this informs potential mitigation strategies and might optimize the effectiveness of treatments such as chemical injections or aerial spraying. For example, mid-spring treatment may prevent damage from the subsequent larval stage. Additionally, inspections in early fall, prior to leaf drop, will identify trees that have moved into the poor condition class since the early summer.



Graphic 1: Emerald Ash Borer Life Cycle (Purdue University, 2009: http://extension.entm.purdue.edu/EAB/index.php?page=ident/eab_life_cycle)

Visual Indicators of Emerald Ash Borer

There are no early and clear visual indicators of Emerald Ash Borer's presence in a tree. It can be assumed that most trees in the Chicago metropolitan area have some degree of infestation given the breadth of the quarantine areas. The most visually obvious indicators are only observable after extensive damage has already occurred; they include:

Crown Decline – As the phloem becomes damaged, water and nutrient distribution to the crown extremities are reduced. This results in a visually obvious disparity between the upper and lower crown where the latter will have fewer and smaller leaves. This gives the upper crown an anemic look.

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Water Sprouts – As the tree is stressed, dormant buds at the base or lower portion of the trunk actively produce numerous aggressive sprouts that grow from the tree.

Woodpecker Damage – The presence of woodpecker damage provides a strong indicator of a heavily infested tree. The damage appears as patches of lightly colored bark from afar. A closer inspection shows that the patches are made from the chipping off of the older and grayer surface bark, which reveals the lighter exposed sub surface bark. An even closer inspection reveals numerous rough-edged quarter-inch holes (See Image 2).

Image 2: Woodpecker damage

Galleries – The shape and style of the horizontal and zigzag patterned galleries are distinct to EAB. Unless the bark has sloughed off, however, the galleries are only visible once the bark has been physically removed with a draw knife.

D-Shaped Exit Holes – The D-shaped 1/8th-inch exit holes are also a clear indicator of EAB. Again, unfortunately, this indicator is typically not observable unless the bark has been removed with a draw knife.

Emerald ash borer is likely to be the biggest problem in urban forestry since the outbreak of Dutch elm disease. It is critical that municipalities act progressively and responsibly in preparation for the arrival of the pest and create well thought out policies to manage the pest when it does begin to invade the community.

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Ash Inventory Summary

A total of 3,708 ash trees were inventoried and mapped on the City's public streets. The data was collected by a number of Natural Path staff over the course of the summer and fall using a Trimble Pathfinder GPS unit. The following information was collected:

TreeID – A unique Identification number

Species – A range of ash species exist in northern Illinois (Black Ash, Blue Ash, European Ash, Green Ash and White Ash). Each tree that was included in this assessment was identified to the species level.

Diameter – Each tree was measured to the nearest inch at the standard measuring height of four and a half feet (4.5') from the ground.

Condition – One of the following conditions was assigned to each tree based on a visual assessment of the individual tree's overall health and structure: Excellent, Good, Fair, Poor, Very Poor or Dead

Crown Width – The crown spread was recorded to the nearest ten-foot increment.

Overhead Utilities – A Yes/No question. An affirmative response was recorded when any type of over-head transmission, cable, or service lines was identified.

Planting Space – A Yes/No question. An affirmative response was recorded if a vacant planting site could be created upon the removal of the tree being assessed. The primary parameters used to identify a vacant space were (1) appropriate spacing from adjacent trees and (2) distances from street infrastructure (e.g., fire hydrants, street lights, alleys, etc).

Attributes – A number of physical attributes could be assigned to an individual tree. The issues identified should assist in prioritizing future maintenance actions or filter for more immediate care.

- Appressed Fork – A structural defect typified by branches that form a narrow attachment and has included bark present.

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- Canker – A dead area of cambium caused by a disease. Depending on the extent of the canker, the outer shell of the tree can be structurally compromised.

- Cavity/Decay – Decay is the breakdown of wood structure from decay organisms. A natural process in trees, issues arise when the volume of decay exceeds the trees capacity to counter the decay.

- Crack – A structural separation of wood. This presents a significant issue if the crack is a shear crack, but it is minor concern if the crack is of superficial depth.

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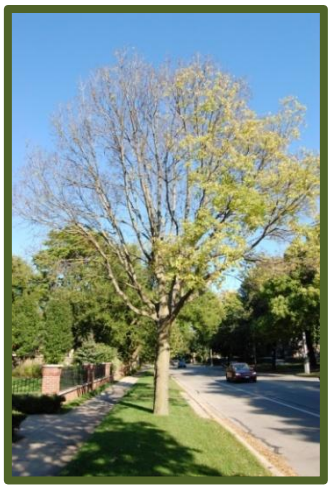

- Decline – Denotes an overall and significant deterioration in tree health.

Action – A choice of four maintenance actions were available. Actions were only assigned if immediate action was necessary.

- Cable – Cabling was only assigned if it would correct a structural defect on a high-quality species in good condition that had a potential for a long life.
- Monitor – Trees that require an annual inspection because of a structural defect or condition were noted.
- Prune – When a tree exhibited a significant amount of dead wood or large dead wood, a prune maintenance action was assigned.
- Remove – Trees were identified for removal if they exhibited at least one of the following qualities: very poor or dead condition. Trees with structural issues that posed a high-risk to residents and staff were also noted for removal.

Graphic 2 on the following page denotes the relative location of most of the inventoried ash trees. A number of high concentrations of ash are visibly apparent.

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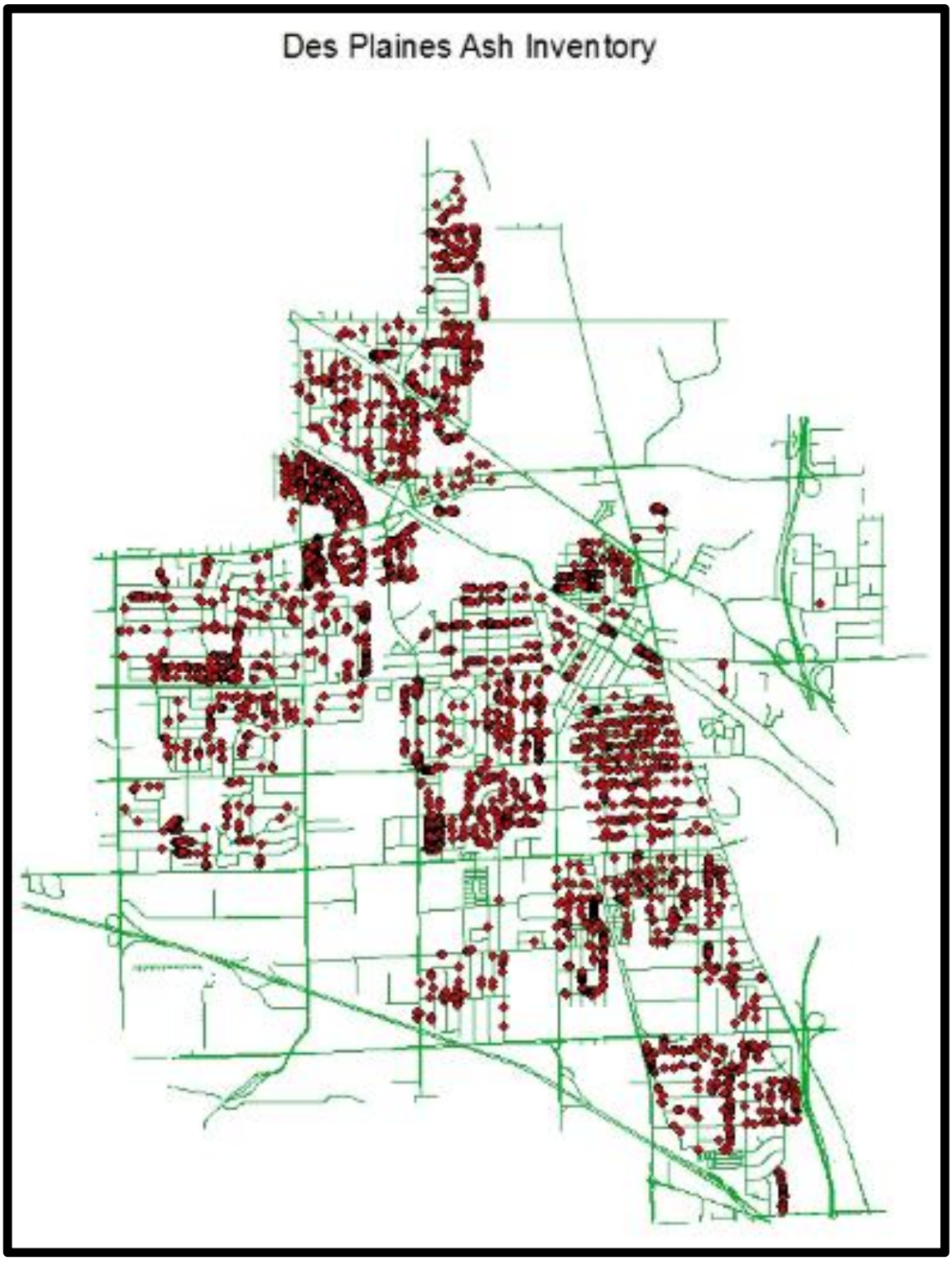

Graphic 2: Des Plaines Street Tree Ash Population:

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A number of important characteristics of the City's ash population were identified during this project. There are approximately six species of ash found in urban settings in the Chicago area. Three of these were identified in Des Plaines. They were black ash (*Fraxinus nigra*), green ash (*Fraxinus pennsylvanica*) and white ash (*Fraxinus americana*). Green ash dominates the ash population with 3,029 trees. **Table 1** shows the condition distribution for the individual species. The green ash were primarily found to be in the fair to poor condition classes. While the white ash appeared to be in slightly better condition classes, such as fair to good, a significant percentage of white ash (18%) were in excellent condition. This contrasts with the population of green ash, which has less than 1% in the excellent condition class.

The value of the condition distribution information is that it allows communities to identify immediate removals: trees in very poor or worse condition, trees to be removed in the short term, are trees in poor condition. In this context, short-term implies within the next three years. Finally, the condition data permits decisions regarding the trees that might be considered for enhanced treatment –trees in good or better condition.

Table 1 – Condition Distribution by Ash Species

Species	Condition Class						Total
	Excellent	Good	Fair	Poor	Very Poor	Dead	
Ash, Black	-	5	1	2	-	-	**8**
Ash, Green	20	361	1,508	1,095	40	5	**3,029**
Ash, White	124	282	170	92	1	2	**671**
Total	**144**	**644**	**1,679**	**1,193**	**41**	**7**	**3,708**

Table 2 summarizes the diameter distribution of the ash population in six-inch size classes. The largest number of trees in this population is in the nineteen to twenty-four inch size class. Based on age studies in the Chicago area, ash trees of this size are approximately forty years old. The reduced number of ash trees in the smaller size classes is attributable to the reduction of ash plantings in the last ten years. The table also provides a summary of the total number of inches that can be found within each size class. There is a total of 70,000 inches of ash in Des Plaines. The significance of this information is that it provides a basis for projecting present and future costs of arboricultural services.

Additionally, Table 2 provides diameter distribution summaries for the 366 trees identified for removal. Using the data specific to quantity and size, the City can determine the maximum size that in-house crews can manage regarding removals and which removals may need to be contracted to an outside party. If contracted, bid specifications should use the numbers provided in Table 2 to achieve the best prices.

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Table 2 - Ash Diameter Distribution										
		Diameter Class								
		6”	12”	18”	24”	30”	36”	42”	43”+	Total
Ash	Quantity	132	483	938	1,321	660	90	13	4	3,708
	Total Inches	624	4,696	14,874	28,275	17,731	2,942	496	204	69,842
Removals	Quantity	2	21	99	167	56	10	4	1	366
	Total Inches	6	195	1,579	3,565	1,504	330	158	46	6,747
	Percentage	1.5%	4.3%	10.6%	12.6%	8.5%	11.1%	30.8%	25.0%	9.9%

Table 3 provides data summaries within a condition/diameter matrix. It is expected that most of the trees in good or better condition can be found in the smaller size classes, as there is an inverse relationship between diameter and condition ratings. Essentially, as diameters increase, the conditions naturally decrease. Because chemical treatment and arboricultural costs are closely tied to diameter, the information in Table 3 can provide guidance regarding the prioritization of enhanced care for the City’s trees. Specifically, trees that are in good or better condition and of a size that allows the maximum number of trees to be managed within the City’s limited fiscal resources should be one short-term focus.

Table 3 - Ash Condition/Diameter Distribution									
	Diameter Class								
	6”	12”	18”	24”	30”	36”	42”	43”+	Total
Excellent	70	56	17	1	0	0	0	0	142
Good	39	190	150	157	99	8	1	0	644
Fair	19	128	427	678	379	43	3	2	1,679
Poor	4	104	357	492	185	39	9	2	1,193
Very Poor	0	0	9	21	11	0	0	0	47
Dead	0	5	2	0	0	0	0	0	7
Total	132	483	938	1,321	660	90	13	4	3,708

The final table in this section (**Table 4**) summarizes the condition distribution of the trees that had a maintenance action assigned to them. Actions were assigned to trees if relatively immediate issues were identified. All of the ash trees in very poor or worse condition have some mitigation assigned to them. Most of the removals are derived from the poor or worse condition classes. Taking actions on these trees is evidence of a developing program that identifies and mitigates the trees that pose with the greatest risk potential to the residents of Des Plaines.

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Table 4 – Ash Condition Distribution by Action							
Action	Condition Class						Total
	Excellent	Good	Fair	Poor	Very Poor	Dead	
Monitor	0	2	11	**60**	4	0	76
Prune	0	11	21	**9**	1	0	42
Remove	0	0	4	**319**	36	7	366

Sample Tree Inventory Summary

The sample inventory was an independent assessment from the ash inventory. Unlike the ash inventory, the sample inventory assessed the entire street tree population. Through this an understanding of the whole population could be achieved and long-term policies that inform not only the current Emerald Ash Borer issue but urban forestry management as a system could be developed.

The assessment methodology and application used for this component of the project was the United States Forest Service ***Streets*** software. ***Streets*** is a shareware application that is part of the larger *iTREE* suite of urban forestry analysis programs. ***Streets*** is a user-friendly software tool that is intended for municipal street trees. It enables a community to inventory and assess the benefits that its urban forest is providing. The analysis provides baseline data from which one can improve the management of the urban forest. The application assesses the following aspects of a street tree population:

Structure: Defines the species composition, age distribution, species importance values, and canopy cover of the urban forest, helping managers anticipate future planting needs and the potential impact of pest threats.

Function: The core of ***Streets*** is its capacity to analyze the ecosystem services, i.e., the function that the urban forest is providing. These services include energy conservation, air quality improvement, stormwater management, and carbon dioxide reduction. Increased property values due to aesthetic and other benefits are also calculated.

Value: ***Streets*** quantifies the environmental and other benefits that the urban forest is providing, this is both in unit terms (e.g., kilowatt hours of electricity conserved) and in dollars. Management costs can be included in the analysis to determine the return on investment the trees are providing.

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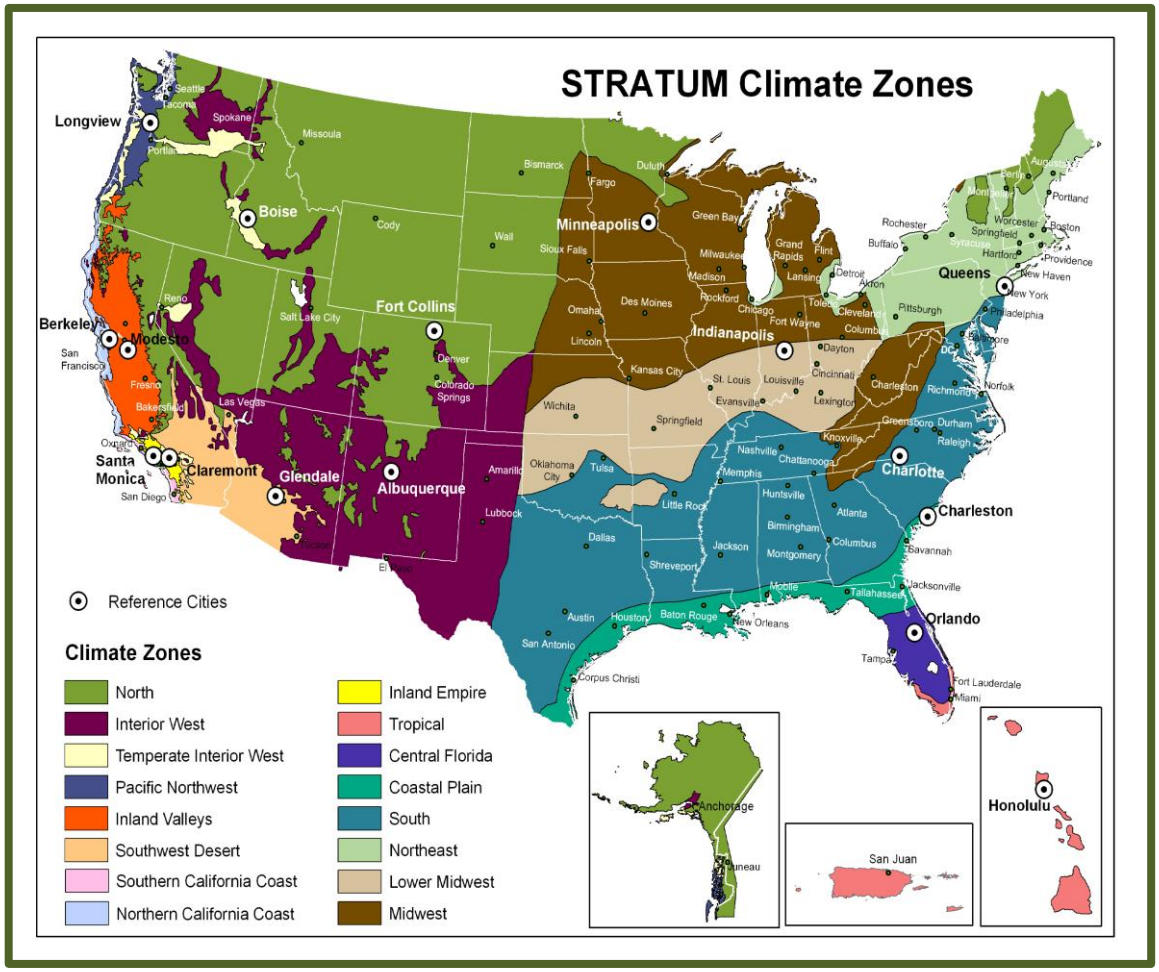
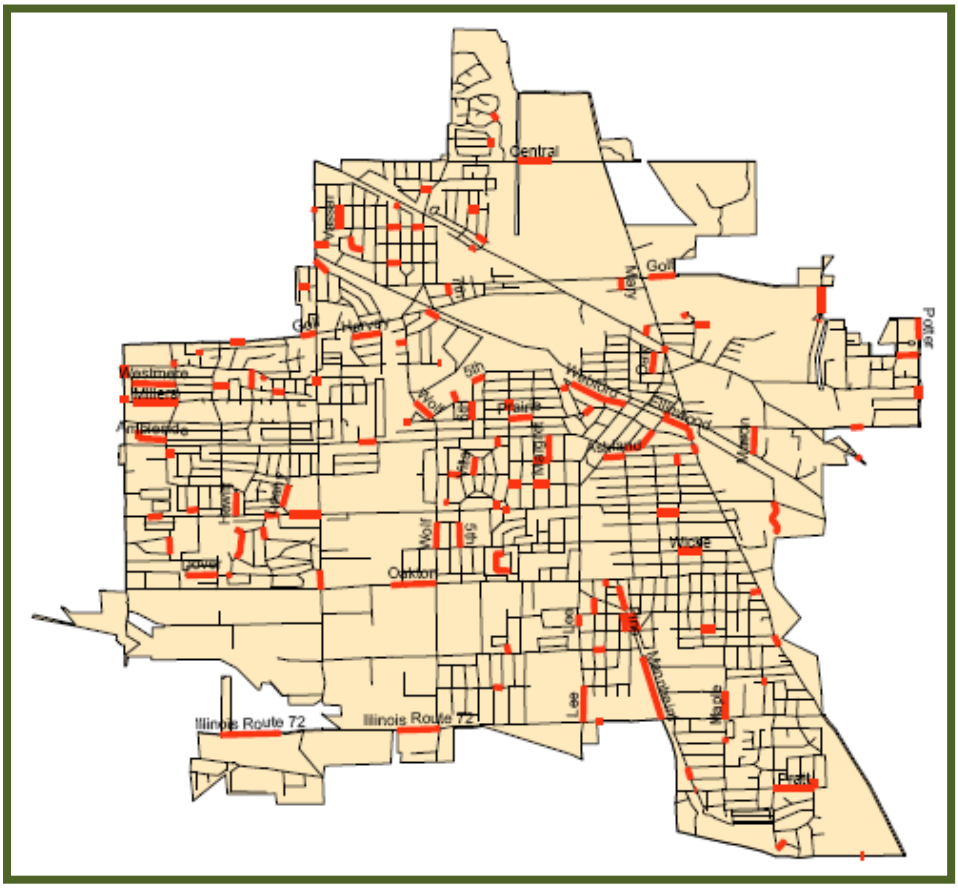


Graphic 3: iTree Streets Climate Zones

The regional values used in the ***Streets*** application were based on research data from a range of communities within climate zones of the country. Northern Illinois is within the Midwest climate zone. See Graphic 3 above. The USFS Midwest Tree Guide accompanies this report and provides the details on the local parameters used in determining Des Plaines' values.

A total of 110 street block segments were assessed to comprise a 6% sample of the City's total block segments. See Graphic 4 on the following page. Based on this sample inventory, we estimate that the City of Des Plaines has a total street tree population of 24,000.



Graphic 4: iTree Streets Sample Plots

As previously stated, ***Streets*** calculates the environmental and financial benefits provided by the urban forest. The data summaries provided here are divided into Benefit Analysis and Resource Structure Analysis

<u>Benefit Analysis</u>

Calculations are provided as annual benefits and are presented in terms of resource units and dollars. The seven benefits are:

Energy: The Energy report presents the energy conservation contributions of the urban forest in terms of reduced natural gas use in winter (measured in therms or gigajoules) and reduced electricity use for air conditioning in summer (measured in kilowatt-hours or gigajoules).

Stormwater: The Stormwater report presents the reductions in annual stormwater runoff due to rainfall interception by trees (measured in gallons or cubic meters).

Air quality: The Air Quality report quantifies the air pollutants (i.e., O3, NO2, SO2, PM10) deposited on tree surfaces and reduced emissions from power plants (i.e., NO2, PM10,

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VOCs, SO2) due to reduced electricity use (measured in pounds or kilograms). Also reported are the potential negative effects of trees on air quality due to BVOC emissions.

Carbon dioxide: The Carbon Dioxide report presents annual reductions in atmospheric CO_2 due to sequestration by trees and reduced emissions from power plants due to reduced energy use (in pounds or kilograms). The model accounts for CO_2 released as trees die and decompose as well as CO_2 released during the care and maintenance of trees.

Carbon stored: Whereas the above report quantifies *annual* CO_2 reductions, the Carbon Stored report tallies all of the carbon dioxide stored in the urban forest *over the life of the trees* as a result of sequestration (in pounds or kilograms).

Aesthetic/other: The Aesthetic/Other report presents the tangible and intangible benefits of trees reflected in increases in property values (in dollars).

The total annual benefits that the residents of Des Plaines derive from their street trees is $4,463,474. As outlined above, these benefits are in energy conservation, carbon dioxide uptake, pollutant particulate uptake, stormwater retention, and aesthetic value.

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Resource Structural Analysis

The Resource Structural reports present a snapshot in time of the urban forest and provide information that is necessary for management planning. The following are a summary of the more relevant structural analysis

Species Distribution: The Species Distribution reports present data on species composition in the form of pie charts and tables for the 10 most common species; the latter is displayed in percentage of total numbers. These reports are helpful for understanding species dominance. Table 5 provides the species distribution for the City of Des Plaines.

Table 5 – iTree Streets Analysis Species Distribution

Species	Number	Percent
Maple, Norway	5,279	22.0
Maple, Silver	5,196	21.7
Ash, Green	2,673	11.1
Honeylocust	1,909	8.0
Linden, Littleleaf	1,311	5.5
Pear, Callerya	963	4.0
Ash, White	930	3.9
Maple, Sugar	847	3.5
Maple, Boxelder	614	2.6
Elm, Siberian	531	2.2
Balance of Species	3,747	15.6
Total	24,000	100.0

Diameter Distribution: The Diameter Distribution report offers tree age data that is presented in terms of diameter size class. This is important for determining current management needs as well as anticipating how needs will change given total numbers and aging of individual species. The distribution of ages within a tree population influences present and future costs as well as the flow of benefits. A staggered or unevenly-aged population allows managers to allocate annual maintenance costs uniformly over many years and assure continuity in overall tree canopy cover. Table 6 provides diameter class frequency and proportion data for the City of Des Plaines' urban forest.

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Table 6 - iTree Streets Analysis Diameter Distribution		
Diameter Class	**Quantity**	**Percent**
1 – 6”	2,058	8.6%
7 -12”	3,831	16.0%
13 – 18”	5,478	22.8%
19 – 24”	6,673	27.8%
25 – 30”	3,868	16.1%
31 – 36”	1,311	5.5%
37 – 42”	448	1.9%
43”+	183	0.8%
Total	**24,000**	**100.0%**

Condition: The Condition report affords a snapshot of the overall forest condition. Condition of the trees is presented in **Table 7**. Tree condition can be an indicator of how well trees are managed and their relative performance given site-specific conditions.

Table 7 – iTree Streets Analysis Condition Distribution		
Condition	**Number**	**Percent**
Excellent	61	22.0
Good	620	21.7
Fair	529	11.1
Poor	163	8.0
Very Poor	9	5.5
Dead	17	4.0
Total	**24,000**	**100.0**

Replacement Values: The Replacement Values report estimates the appraised value of trees in their current condition, should they be removed. Replacement values are based on the Council of Tree and Landscape Appraisers (CTLA) Guide for Plant Appraisal, which uses a trunk formula methodology. The CTLA is a widely accepted methodology used by arborists for determining landscape tree replacement value based on regional species ratings, condition, location in the landscape, cross-sectional area of the trunk and regional replacement costs. The appraised value of this urban forest is $38,906,850.

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Management Discussion

Urban forestry is the term associated with the management of a natural resource that provides important environmental, aesthetic, and economic benefits to the community over decades. Additionally, an individual tree, and thus the collective forest, increases in value and community contributions as it ages. It is only at the end of a tree's biological life does its contribution and value decline. It is this contribution over generations and increasing value with time that differentiates trees from all other public assets.

Urban forestry as a management practice in the United is very much in its infancy. Our understanding of the important role that trees play in mediating the urban environment in which we live has only recently been quantified. Prior to this, our understanding focused on qualitative interpretations. As the urban forest becomes more relevant, the long-term consequences of our choices become magnified.

Given that about 20 percent of the urban tree population consists of ash trees, which are susceptible to this pest, it is essential that the spread of this beetle is minimized. The first step in a proactive program is the development of a comprehensive and thoughtful management plan that is positioned to deal with the inevitable onslaught of EAB as it continues to spread.

One option in the fight against EAB is the preventative treatment of ash trees with insecticides, such as imidicloprid. Various sources have suggested that if a given ash tree has at least 50 to 75 percent of its canopy intact it may be a candidate for insecticide use. With an estimated cost of $3/diameter inch of tree/year however, treating a large portion of ash trees will be cost prohibitive. Insecticide use could be a worthwhile EAB strategy for large trees that contribute a significant amount to the community. Of the various ash species planted in Northeast Illinois, green ash, *Fraxinus pennsylvanica* is the most common and also presents the largest maintenance costs of the ashes due to frequent hangers and poor structure. Because of this, we recommend focusing insecticide treatments only on a select few green ash. Blue, White, and Manchurian ash make up only a small percentage of trees and are generally higher quality which may warrant greater usage of insecticides. Overall, insecticide use is generally not recommended for municipal trees due to the expense.

The ash population is a significant part of Des Plaines's urban forest; it comprises 16% of the total street tree population. Green ash was one of three or four species that were heavily emphasized by Midwest communities as the replacement species for the American elms lost to DED. The concept of species diversity, as a means to manage the unanticipated, was minimally understood at that time. Hindsight has proven that, the planting of a few species to replace the monoculture elm population was not good practice. Given the current treatment methods

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available, both the United States Department of Agriculture and the Illinois Department of Agriculture anticipate the eventual loss of all ash trees within infested areas.

At the community level, the infestation severity determines most of the options available to any one community. A heavily infested community will need to conduct a large number of removals in a short time period. Infestation patterns are not homogenous. Communities as geographically wide ranging as Elburn, Algonquin Wilmette, Oak Park and Homewood have seen significant losses from EAB already. On the other hand, communities adjacent to the above communities have yet to experience the same level of losses.

To complicate the issue, we have no strong visual indicators through which we can to determine the extent of internal damage to ash. This point is an important factor if trying to establish a chemical treatment regimen. To determine some baseline cost estimates, Natural Path obtained bid quote information from a number of recent bid requests by communities in the west and northwest suburbs. **Table 8** provides per inch tree removal cost estimates for six size classes. Mean pricing details were compiled from eight bids. In addition to the average of the eight bids, the lowest and highest quotes are also provided.

Table 8 – Removal Cost Comparisons

Diameter Class	Per Inch Cost Comparison (Eight Bidders)		
	Low	High	Average
1 -12”	$7.00	$20.00	$12.62
13 – 18”	$7.50	$23.00	$15.03
19 – 24”	$11.50	$27.00	$18.93
25 – 30”	$13.50	$34.00	$22.25
31 – 36”	$15.72	$42.00	$25.12
37”+	$15.72	$60.00	$29.12

Table 9 provides the anticipated cost to remove the 366 trees identified for removal during the ash inventory project.

Table 9 Cost Estimates for Removing Current List of Removal Trees

Diameter Class	Calculations			
	Quantity	Total Inches	Average Per Inch Price	Total
1 -12	23	201	$12.62	$2,537
13 – 18	99	1,579	$15.03	$23,732
19 – 24	167	3,565	$18.93	$67,485
25 - 30	56	1,504	$22.25	$33,464
31 – 36	10	330	$25.12	$8,290
37”+	5	204	$29.12	$5,940
Total	**366**	**7,383**		**$141,448**

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Table 10 provides the anticipated cost to remove all of the remaining trees in fair or worse condition as a subset of the entire population.

Table 10 Cost Estimates for Remaining Trees in Fair or Worse Condition				
Diameter Class	Calculations			
	Quantity	Total Inches	Average Per Inch Price	Total
1 -12	232	2,215	$12.62	$27,953
13 – 18	631	10,130	$15.03	$152,254
19 – 24	1,010	21,163	$18.93	$400,616
25 - 30	538	13,998	$22.25	$311,456
31 – 36	96	2,931	$25.12	$73,627
37”+	23	847	$29.12	$24,665
Total	**2,530**	**51,464**		**$990,571**

Table 11 provides the anticipated cost to remove all of the remaining trees in poor or worse condition.

Table 11 Cost Estimates for Remaining Trees in Poor or Worse Condition				
Diameter Class	Calculations			
	Quantity	Total Inches	Average Per Inch Price	Total
1 -12	91	900	$12.62	$11,358
13 – 18	262	4,176	$15.03	$62,765
19 – 24	339	7,261	$18.93	$137,451
25 - 30	138	3,715	$22.25	$82,659
31 – 36	26	850	$25.12	$21,352
37”+	5	185	$29.12	$5,387
Total	**861**	**17,087**		**$321,972**

Table 12 provides the per inch chemical treatment cost estimates per year unless otherwise specified. The data was compiled from eight bids and on the three primary treatments that are currently available. In addition to the average of the eight bids, the lowest and highest quotes are also provided.

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Table 12 - Chemical Treatment Cost Comparisons for Northeast Illinois			
Treatment	Cost Comparisons (Eight Bidders)		
	Low	High	Average
Imidacloprid	$1.29	$8.00	$2.96
TreeAge	$3.90	$12.50	$7.61
Xytect	$1.65	$7.75	$3.29

Table 13 provides the anticipated cost to treat all of the trees in fair or better condition. The imidacloprid and Xytect are annual injections. TreeAge is a biannual treatment.

Table 13 - Cost Estimates of Chemical Treatment of all Ash in Fair or Better Condition				
Treatment	Calculations			
	Quantity	Total Inches	Average Price per Inch	Total
Imidacloprid	2,465	45,324	$2.96	$ 134,159
TreeAge	2,465	45,324	$7.61	$ 344,916
Xytect	2,465	45,324	$3.29	$ 149,116

Table 14 provides the anticipated cost to treat all of the trees in good or better condition. The imidacloprid and Xytect are annual injections. TreeAge is a biannual treatment.

Table 14 - Cost Estimates of Chemical Treatment of all Ash in Good or Better Condition				
Treatment	Calculations			
	Quantity	Total Inches	Average Price per Inch	Total
Imidacloprid	791	11,761	$2.96	$ 34,813
TreeAge	791	11,761	$7.61	$ 89,501
Xytect	791	11,761	$3.29	$ 38,694

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Recommendations

Based on the data collected, a review of current operational policies and resources, and current thinking regarding EAB management, the following recommendations should be implemented to guide a long-term, sustained approach to managing Des Plaines' urban forest. The main thread that links all of the recommendations is a focus on developing a long-term, healthy urban forest.

1. Remove trees that are identified for removal by May of 2012. The two assessment projects, which inform this report, noted 337 trees for removal. Trees that exhibited high visual indicators of EAB infestation or that had significant structural issues were earmarked for removal. The following activities should be prioritized:

    - Develop an In-house/Contractor strategy to maximize the number of trees removed while minimizing budget pressures.
    - Generate a replacement list based on vacant spaces created by the removals.
    - Replant during the fall 2012 and spring 2013 planting season.

2. Reduce the ash population to a manageable size (3% of the total tree population). Based on an estimated population of 24,000 streets, this would equate to a target goal of 720 ash trees. A reduction of 2,780 ash trees over the next ten years would be required to achieve this target. Reducing the ash population to a manageable size is a long-term and proactive management policy. This can be achieved through the following management practices:

    - Active removal of all ash in poor or worse condition
    - Removal and replacement of all ash trees within capital projects
    - Permit private development projects to remove parkway ash trees through a policy that compensates the City for the appraised values of the tree. Use these funds to replace and support the reduction of the ash population.

3. Conduct an annual inspection. Appreciate that the ash population will decline quickly once the City becomes heavily infested. Anticipate that condition ratings will decline rapidly and that more rigorous tree monitoring will be required. Implement an annual inspection program for the trees, and train staff or subcontract services appropriately. Attend to the following recommendations:

    - Train staff on assessment procedures
    - Generate list of all poor conditioned trees
    - Inspect all ash trees in poor condition every June.

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- Produce a list of all fair and good trees
- Plan for and schedule an inspection all ash trees in fair or good condition in early September

4. Modify City tree ordinances. Include ash trees in the nuisance ordinance. Codify the City's response to EAB on private property.

5. Engage the community through active outreach. Maintain a multi-leveled program of outreach to residents regarding the current status of EAB in Des Plaines as well as policies and community involvement. Keep residents informed of the status of the program via the community access channel and public notices.

6. Broaden the City's planting palette. Emphasize under-used, high-quality, and low-maintenance species in the City's planting program with attention to population targets that align with a managed loss model. Some species that should receive increased presence in Des Plaines are Bur Oak, Swamp White Oak, Kentucky Coffeetree, Black Gum, Silver Linden and Hackberry. Additional management activities should include:

   - Define high value species
   - Establish long-term percentage and quantity targets given a street tree population of 24,000 trees
   - Develop an annual planting scheme that emphasizes the planting of high-quality species at moderate levels to assure a balanced versus skewed distribution over time

7. Tighten planting site specifications. Develop a policy regarding planting space specifications that aligns with current standards and also targets tree canopy optimization by allowing trees to realize their full form.

8. Consider chemical treatment of the ash in good or better condition. Acknowledge the cost-benefits of treating trees in excellent condition, which have the most potential to rebound from chemical treatment and may be resilient to the EAB infestation.

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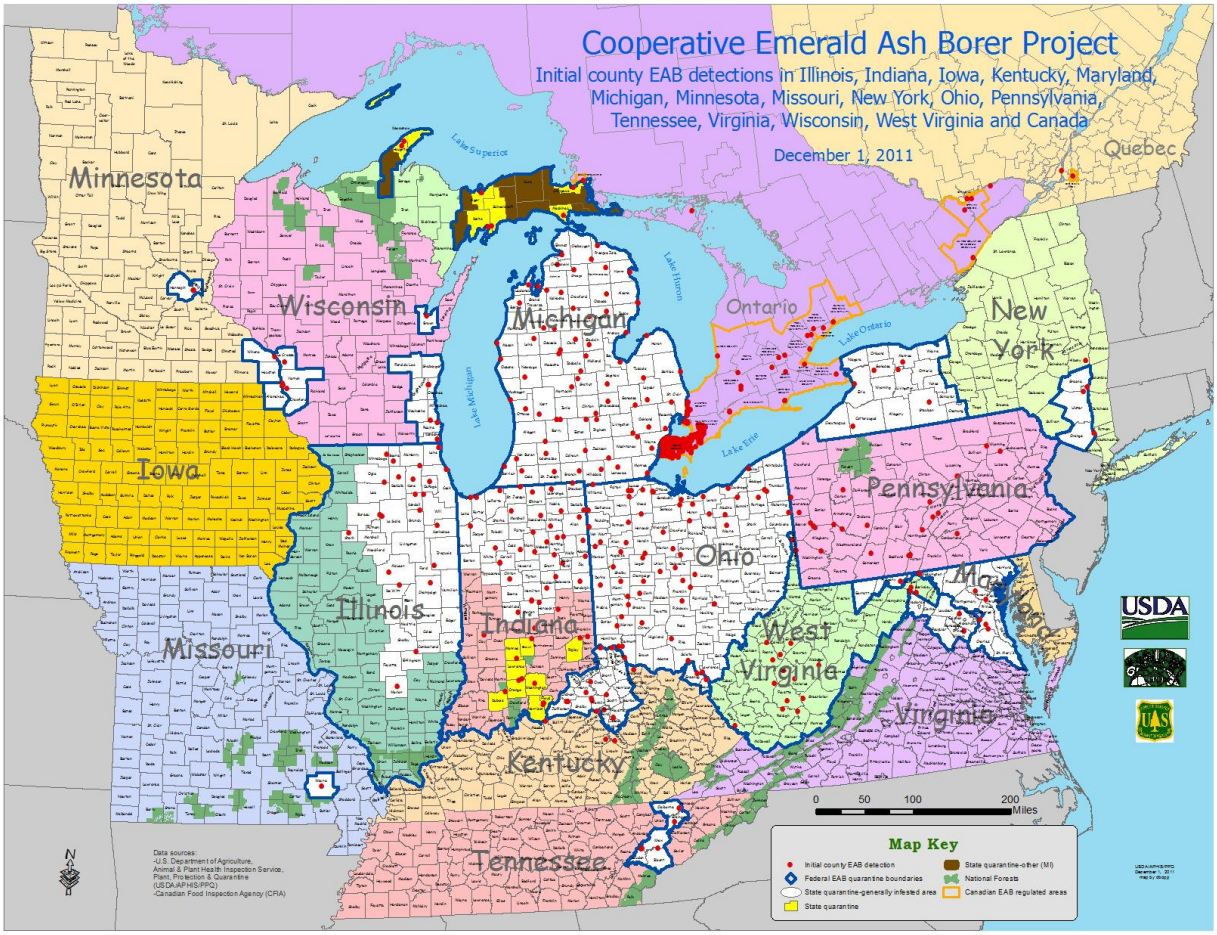
Attachment 1 – Extent of EAB in Canada and the Unites States as of December, 2011



Attachment 2 – State of Illinois 2006 Declaration of Nuisance

State of Illinois

Department of Agriculture

Bureau of Environmental Programs

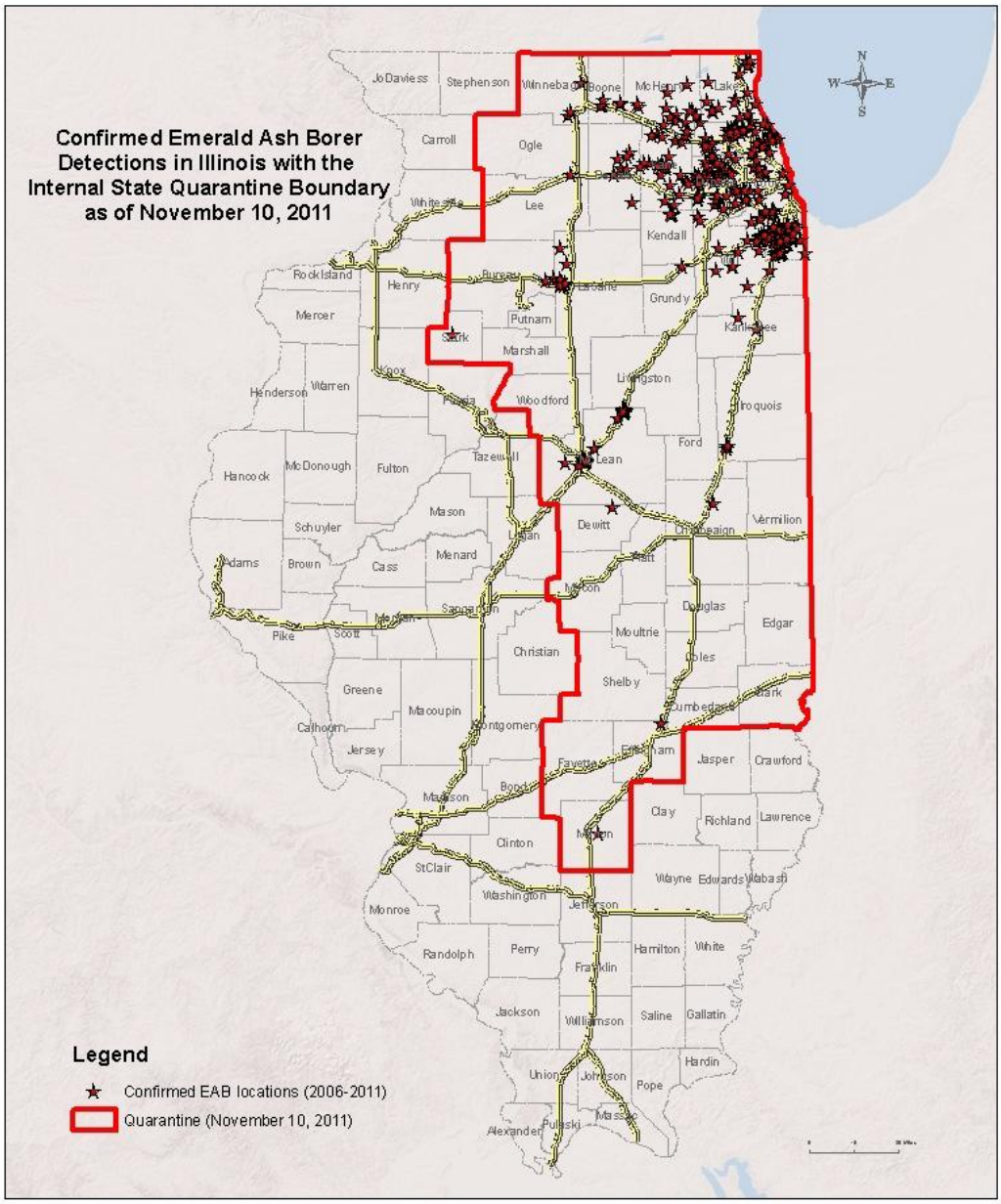
DECLARATION OF NUISANCE

NOTICE IS HEREBY GIVEN by the Illinois Department of Agriculture, Bureau of Environmental Programs, pursuant to the Insect Pest and Plant Disease Act (505 ILCS 90/14) that the Illinois Department of Agriculture is declaring all plants and plant products thereof infested with the Emerald Ash Borer (*Agrilus planipennis* Fairmaire), specifically but not limited to Green ash (*Fraxinus pennsylvanica*), White ash (*Fraxinus Americana*), Black ash (*Fraxinus nigra*), as well as several horticultural varieties of ash, to be a nuisance in the State of Illinois and should be eradicated. The beetle is currently confined to portions of Kane and Cook Counties. There is currently no known treatment to control Emerald Ash Borer. Therefore, in accordance with 505 ILCS 90/15, eradication of infested trees according to Department guidelines will be required by the owner, or other persons in possession or control of the infested trees. The responsible party must remove all infested trees by the deadline and method specified by the Department. Failure of the property owner, or person in possession or control of the property to remove the infested trees will result in the tree removal by the State of Illinois and the expenses incurred by the State of Illinois shall be collected in a civil action against the person liable.

This declaration shall be effective this **19th** day of **July 2006**.

Charles Hartke, Director

Attachment 3 – Illinois EAB Quarantine Area as of December, 2011



Confirmed Emerald Ash Borer Detections in Illinois and Internal State Quarantine Boundary as of November 10, 2011