Forest Health Management
Assessment of Urban Forest Parkway Trees

Assess Progress ------ Indicators
- Inventory
  - Species Diversity, Size Distribution, Stocking Level
- Canopy Cover

Long Range Planning to set Goals:
- Planting Numbers
- Adjust Species Mix-----Set Diversity Guidelines
- Prohibit/Reduce Plantings of certain trees
- Potential Impacts on Trimming and Removals
19% Canopy Cover
3.5 million Trees
566,000 Street Trees
4,000 miles of streets
140,000 acres

900 - \( \frac{1}{4} \) mile grids
Each Grid has 32, 5 Acre Blocks
1 City Block

1 sample plot in Survey
Forest Health Management
Indicator # 1: How Many?

- 1990 100% Tree Census 440,000
- 1994 Random Sample* 450,000
- 2003 100% Tree Census 528,000
- 2003 Random Sample* 538,000
- 2013 Random Sample* 586,811

## Forest Health Management

### Indicator # 2: Canopy Cover

<table>
<thead>
<tr>
<th>Year</th>
<th>Citywide</th>
<th>Roadway</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td>11%*</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>14-16%**</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>17%***</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>19%****</td>
<td>29% (street trees)</td>
</tr>
<tr>
<td>2020</td>
<td>20% Goal</td>
<td></td>
</tr>
</tbody>
</table>

**American Forests:** 40% Goal

* McPherson, Nowak Study using 213 sample plots /Leaf Area Index
** 2003 Iconos Satellite Image, City staff vs. Grad student, Arizona State looking closer at this
***UFORE UTC 2008 by RFP Mapping, LLC
**** Hi Res Lidar 2010, CRTI
2003 Data Analysis

- Environmental baseline data-collection & analysis:
  - Tree Canopy Cover
Forest Health Management
Tree Planting

Target:
Heat Island
Low Canopy Cover
Plant 2,000 to 5,000 annually

EAB Treatment years - lower number

Remove 10,000-20,000
-limited by resources
Forest Health Management
Indicator # 3: Stocking Level

- 1994 Parkway Stocking Level 64%
- 2003 Parkway Stocking Level 75%
- 2013 Parkway Stocking Level 72%*
  * preliminary
Residential Street

90% of Street Trees are located on residential streets
Greatest Opportunity to increase Diversity, Canopy Cover Etc.
Typical Streetscape Development

-- Increase Tree Pit size from 5’ x 5’ to 5’ x10’
-- Increase center opening from 16” to 24”
Forest Health Management
Indicator # 4: Species Diversity
<table>
<thead>
<tr>
<th>Species</th>
<th>Quantity</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Norway maple</td>
<td>126,000</td>
<td>28%</td>
</tr>
<tr>
<td>Silver maple</td>
<td>76,000</td>
<td>17%</td>
</tr>
<tr>
<td>Honeylocust</td>
<td>63,000</td>
<td>14%</td>
</tr>
<tr>
<td>Green ash</td>
<td>60,000</td>
<td>14%</td>
</tr>
<tr>
<td>American elm</td>
<td>13,470</td>
<td>3%</td>
</tr>
<tr>
<td>Sugar maple</td>
<td>8,700</td>
<td>2%</td>
</tr>
<tr>
<td>Basswood</td>
<td>7,900</td>
<td>2%</td>
</tr>
</tbody>
</table>
Tree Species Diversity Goals

Informed by Random Sample Survey Info

- No Species > 15% of total population
- Systematic Diversity
  - Alternating Groupings (4-6) of Trees
- No tree >25% of block segment

ISA: 10% Family (Fagacae), 5% Species (Red oak)

Santamore: 30% Family, 20% Genus, 10% Species
<table>
<thead>
<tr>
<th>Species</th>
<th>Count</th>
<th>Percentage</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Norway maple</td>
<td>114,876</td>
<td>22%</td>
<td>-6%</td>
</tr>
<tr>
<td>Silver maple</td>
<td>88,889</td>
<td>17%</td>
<td></td>
</tr>
<tr>
<td>Honeylocust</td>
<td>80,970</td>
<td>15%</td>
<td>+1%</td>
</tr>
<tr>
<td>Green ash</td>
<td>76,157</td>
<td>14%</td>
<td></td>
</tr>
<tr>
<td>White ash</td>
<td>14,848</td>
<td>3%</td>
<td>+2%</td>
</tr>
<tr>
<td>Basswood</td>
<td>10,187</td>
<td>2%</td>
<td></td>
</tr>
<tr>
<td>Littleleaf linden</td>
<td>10,498</td>
<td>2%</td>
<td>+2%</td>
</tr>
<tr>
<td>Tree Type</td>
<td>Count</td>
<td>Percentage</td>
<td>Change</td>
</tr>
<tr>
<td>--------------------</td>
<td>--------</td>
<td>------------</td>
<td>--------</td>
</tr>
<tr>
<td>Norway maple</td>
<td>104,734</td>
<td>18%</td>
<td>-4%</td>
</tr>
<tr>
<td>Green ash</td>
<td>87,179</td>
<td>15%</td>
<td>+1%</td>
</tr>
<tr>
<td>Honeylocust</td>
<td>85,122</td>
<td>14%</td>
<td>-1%</td>
</tr>
<tr>
<td>Silver maple</td>
<td>72,092</td>
<td>12%</td>
<td>-5%</td>
</tr>
<tr>
<td>Hybrid elm</td>
<td>18,049</td>
<td>3%</td>
<td>+2%</td>
</tr>
<tr>
<td>Littleleaf linden</td>
<td>15,528</td>
<td>3%</td>
<td>+1%</td>
</tr>
<tr>
<td>White ash</td>
<td>14,982</td>
<td>3%</td>
<td></td>
</tr>
</tbody>
</table>
Forest Health Management
Indicator # 5: Size Distribution
2013 vs “Ideal” Size Distribution

Ideal: 40% 30% 20% 10%

Scott Maco and Greg McPherson
Assessing Canopy Cover over Streets and Sidewalks in Street Tree Populations.

Lost ground

0 - 8
9 - 16
17 - 24
25 +
EAB Management Program

- Manage Loss of Ash (Non-catastrophic)
  - Project based Ash reduction- Capital Projects
    - Small replaceable ash targeted
  - Late to game Treatment
    - Treating imperfect trees
  - At what point is Ash tree Condemned
    - Imperfect implementation

- Prolong benefits of Ash Tree Canopy
<table>
<thead>
<tr>
<th>Year</th>
<th>Pop.</th>
<th>Removed</th>
<th>%Total Removals</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>86501</td>
<td>872</td>
<td>13%</td>
</tr>
<tr>
<td>2012</td>
<td>85258</td>
<td>1243</td>
<td>18%</td>
</tr>
<tr>
<td>2013</td>
<td>82234</td>
<td>3024</td>
<td>31%</td>
</tr>
<tr>
<td>2014</td>
<td>75232</td>
<td>7007</td>
<td>46%</td>
</tr>
<tr>
<td>2015</td>
<td>65,606</td>
<td>9926</td>
<td>55%</td>
</tr>
</tbody>
</table>
Tree Removal
Street Trees

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ash</td>
<td>928</td>
<td>1018</td>
<td>768</td>
<td>872</td>
<td>1243</td>
<td>3024</td>
<td>7002</td>
<td>9626</td>
</tr>
<tr>
<td>Total</td>
<td>9347</td>
<td>7168</td>
<td>6304</td>
<td>6630</td>
<td>6485</td>
<td>9730</td>
<td>15286</td>
<td>17428</td>
</tr>
</tbody>
</table>

- **Ash**
- **Total**
Street Tree Population Trend

Street Tree Population
sample adjustment at +4755/year
## Emerald Ash Borer Management

**Tree-Age Injections (2008 discovery)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>1,512 (hot spots only)</td>
</tr>
<tr>
<td>2012</td>
<td>1,300</td>
</tr>
<tr>
<td>2013</td>
<td>37,829 (2 year cycle)</td>
</tr>
<tr>
<td>2014</td>
<td>23,658</td>
</tr>
<tr>
<td>2015</td>
<td>off year</td>
</tr>
<tr>
<td>2016</td>
<td>~25,000</td>
</tr>
</tbody>
</table>
Storm Water Benefits 2003

- Total Street Trees: 540,000
  - Ash Tree Population: 89,000 (16% of total)

- Storm Water Interception: 1.22 Billion Gal/year
  - SWI

- Ash Tree SWI: 174 Million Gal/year
  (14% of Total Street Tree SWI)
Storm Water Benefits 2013

- Total Street Trees: 586,811
  - Ash Tree Population: 82,000 (14% of total)

- Storm Water Interception: 1.5 Billion Gal/year
  - SWI

- Ash Tree SWI: 150 – 174 million Gallons*
  * Guestimate Calculation In Progress
Spend to: Preserve Canopy or Plant More Trees

- Existing Ash
  - SWI = 150 – 174 million Gallons

- Remove Remaining Ash

- Plant 82,000 new trees
  - SWI = 13 million Gallons  8.5%
  - 91.5% capacity lost
The Good News

- **>146,000** increase in Street Trees
- **~72%** Stocking, 8% Gain over 19 yrs
- **~19%** Canopy cover, 8% Gain over 19 yrs
- **25”+ Size Class** has almost doubled in last 10yrs

Co-operative Effort  Public/Private

- Creating New Spaces, Preserving Spaces, Planting Existing Spaces
- Landscape Ordinance Contributed
- **~90,000+** Street Trees
Continuing Goals

- Strive to Increase Planting to reach Sustainability
  - Maximize Planting in non-treatment years

- Continue Tree Preservation Efforts
  - Canopy Preservation——Large Tree Benefit

- Continue Promotion of Larger Planting Spaces
  - More Soil Volume
  - CREATE RIGHT SPACE FOR RIGHT TREE
The Struggle

- Street Tree Population in Decline

- ~ 2 year Removal Backlog
  - Even with Treatments, Removals are a challenge

- Ideal Size Distribution falling behind
  - Reduced tree planting
Partners

- **Chicago Region Trees Initiative (CRTI)**
  - Comprised of Municipalities, Non-Profits, Community Groups, Nursery Growers, Trade Groups (ISA, IAA), Openlands, Morton Arboretum and Chicago Botanic Garden.

- **Openlands**
  - **Treekeepers** - Volunteer Tree Care
  - **TreePlanters Grant** - Volunteer Tree Planting
  - Green Infrastructure Mapping