Long Term Recovery
Lessons from Ohio: Restoration Intervention vs. Natural Selection

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Original design plans

102 years
18 Reservations
~24,000 acres
Stressors

- Invasive species
- Fragmentation
- Stormwater
- Urban wildlife
- New pests / pathogens

Years:
- 2011
- 2016
Restoration Intervention: determined by data

- Plant Community Assessment Program
  - 405 total vegetation plots
    - 2010 (2015)
    - 2011 (2016)
    - 2012 (2017)
    - 2013 (2018)
Forests

77% of our acreage covered by forests

- Beech Maple Forest: 19%
- Mixed Forest: 30%
- Floodplain Forest: 19%
- Other: 7%
- Other: 4%
- Other: 7%
- Other: 3%
- Other: 12%
- Other: 4%
- Other: 19%
- Other: 1%
- Other: 1%
- Other: 1%
- Other: 1%
- Other: 1%
- Other: 1%
Beech ALB – Asian longhorned beetle (maples, willows, elm)
GM – Gypsy moth (oaks, poplars, willows, beech)
EAB – Emerald ash borer (all ashes)
DED – Dutch elm disease (American elm)

Forest and Tree Threats (iTree)

<table>
<thead>
<tr>
<th>Population</th>
<th>Percent</th>
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</thead>
<tbody>
<tr>
<td>Maple species</td>
<td>38 %</td>
</tr>
<tr>
<td>Oak species</td>
<td>8 %</td>
</tr>
<tr>
<td>American Beech</td>
<td>7 %</td>
</tr>
<tr>
<td>Ash species</td>
<td>7 %</td>
</tr>
<tr>
<td>Tulip tree</td>
<td>4 %</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Leaf area</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>28 %</td>
<td></td>
</tr>
<tr>
<td>6 %</td>
<td></td>
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<tr>
<td>21 %</td>
<td></td>
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<tr>
<td>6 %</td>
<td></td>
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<tr>
<td>8 %</td>
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</tbody>
</table>
Spatial distribution of ash
Mapping Ash in High Public Use Areas – A Citizen Science Approach

Cleveland Metroparks Technical Report 2012/NR
1) Size of ash trees (3 DBH categories)
   Ruler: 4-12”
   Hugger: 13-20”
   Tower: >20”
2) # of ash trees
3) Damage/EAB activity
Bar length = # trees

Bar color = damage
(light, med, dark)
All 3 size classes
West Side: Mill Stream Run
East Side: South Chagrin
US Forest Service State and Private Forestry
Great Lakes Restoration Initiative
(Emerald Ash Borer Mitigation)

• **Priorities**
  • Public Areas
  • Natural Habitats
    - invasive species control
    - plant light gaps
    - create young forest
    - expand forested buffers
    - stabilize stream corridors
• Large caliper (UTC)
• Small caliper (young forest establishment)
• Volunteer vs. Contractor
Stream restoration using dead ash logs as grade control structures

Stream Bank Stabilization: Live stake installation
Forest Rehabilitation: invasive shrub control
Reforestation: tree plantings

“Planted” dead ash snags: raptor/bird perch
Impacts of the emerald ash borer (EAB) eradication and tree mortality: potential for a secondary spread of invasive plant species

Constance E. Hausman · John F. Jaeger · Karen S. Menard · Timothy A. Schetter · Oscar J. Rocha

Fourteen years of swamp forest change from the onset, during, and after invasion of emerald ash borer

Scott R. Abella · Constance E. Hausman · John F. Jaeger · Karen S. Menard · Timothy A. Schetter · Oscar J. Rocha

Data sources (as of 7/7/2004):
http://www.michigan.gov/images/MDA_EAB_outlier_map_temp_84565_7.jpg
http://www.ceris.purdue.edu/napis/pests/barkb/map/eabmd.html
http://www.inspection.gc.ca/english/plaveg/for/pestrava/agrpla/infest2e.jpg
Light gaps

Downed ash

Native understory
EAB Eradication Cut Zones – Vegetation Response

Cut Plot 2005

Cut Plot 2009