Sugar Maple (Acer saccharum) Health Management Plan

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April 28th 2008
FES 557
Outline

• Background on Sugar Maple characteristics
• Abiotic complex: Maple Winter Decline
• Biotic complex: Sugar Maple Borer (*Glycobioides speciosus*)
• Sugar Maple Health Management Plan (HMP)
• Conclusions
Why is Sugar Maple Important

• Aesthetic value
  – Fall foliage season

• Maple Syrup
  – $7 million produced during 2006 season in Maine
Why is Sugar Maple Important

- High value wood products

### Maine Stumpage Prices 2006

<table>
<thead>
<tr>
<th>Veneer (per MBF)</th>
<th>Avg</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Oak</td>
<td>$536</td>
<td>$50</td>
<td>$1,010</td>
</tr>
<tr>
<td>Sugar Maple</td>
<td>$529</td>
<td>$186</td>
<td>$1,200</td>
</tr>
<tr>
<td>Yellow Birch</td>
<td>$499</td>
<td>$202</td>
<td>$960</td>
</tr>
</tbody>
</table>

### Maine Stumpage Prices 2006

<table>
<thead>
<tr>
<th>Sawlogs (per MBF)</th>
<th>Avg</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sugar Maple</td>
<td>$263</td>
<td>$35</td>
<td>$725</td>
</tr>
<tr>
<td>Red Oak</td>
<td>$227</td>
<td>$10</td>
<td>$650</td>
</tr>
<tr>
<td>Yellow Birch</td>
<td>$169</td>
<td>$25</td>
<td>$533</td>
</tr>
</tbody>
</table>
Management Objective

• Natural regeneration

• Sawlog and veneer grade products
Tree Adaptations

• Soils
  – Deep loams
  – Moist but well drained
  – pH = 5.5-7.3

• Sites
  – “Goldie Lox sites”
Tree Adaptations

- Climate
  - Cool and moist
- Tolerant

The native range of Sugar Maple (Goodman 1990)
Abiotic Complex: Maple Winter Decline

• Symptoms

– Crown transparency

– Crown dieback

– Reduced radial growth
Abiotic Complex: Maple Winter Decline

- **Signs**
  - Extreme winter thaw/freeze events
  - Below freezing temps
  - Open winters

http://www.bigfoto.com/themes/nature/winter/winter-icicle-1.jpg

http://www.ecostudies.org/people_sci_groffman_snow_summary.html
Abiotic Complex: Maple Winter Decline

• Environment
  – Range Maps

The native range of Sugar Maple (Goodman 1990)

USFS Tree Atlas
Google Earth Map
Abiotic Complex: Maple Winter Decline

- Predisposing
  - Overtapping
  - Stand age
  - Off site
  - Stand density
  - Previous stress events
Abiotic Complex: Maple Winter Decline

• Inciting
  – Freezing temps and no snow
  – Can serve as inciting stress

• Contributing
  – Drought
  – Defoliation
Abiotic Complex: Maple Winter Decline

• Control Options
  – Cultural
    • Favor on best sites
    • Silvicultural thinning
    • Uneven age silviculture

Leak, Riddle, Collins. USDA FS NE-INF-37-79
www.forestguild.org
http://www.nrs.fs.fed.us/ef/locations/nh/bartlett/
Biotic complex: Sugar Maple Borer (*Glycobius speciosus*)

- **Symptoms**
  - Horizontal crack
  - Branch death
  - Crown dieback
Biotic complex: Sugar Maple Borer (*Glycobius speciosus*)

- **Signs**
  - Wet spot on bark
  - Frass
  - Initial bark cracks
  - Galleries
  - Insect

Claude Monnier, Natural Resources Canada, Canadian Forest Service, Laurentian Forestry Centre

http://bugguide.net/node/wvl/114226jourge
Biotic complex: Sugar Maple Borer 
(*Glycobius speciosus*)

- **Environment**
  - Throughout Sugar Maple range

- **Predisposing**
  - Lifecycle
    - 4 stages
    - 2 year lifecycle
Sugar Maple Borer Life Cycle

Eggs laid in June-July

Summer #1 Larvae bores horizontal chamber

Overwinter #1

Pupate Stage

Overwinter #2

Summer #2 Larvae bores vertical chamber


Hoffard and Marshall 1978 NA-GR-1
Biotic complex: Sugar Maple Borer (

\textit{Glycobiue speciosus})

• Inciting
  – Borer is NOT an inciting agent
  – Agents that weaken trees

• Contributing
  – Acts as a contributing agent
  – Associated agents
Biotic complex: Sugar Maple Borer
(*Glycobius speciosus*)

- **Control options**
  - Cultural
    - Favor on best sites
    - Silvicultural thinning
    - Cull damaged stems in harvest
  - Mechanical
    - The wire approach
Sugar Maple
Health Management Plan

• Pre-emptive
  – Favor on best sites
  – Silvicultural thinning
    • Target low vigor trees
Sugar Maple Health Management Plan

• Monitoring
  – Initial symptoms are hidden
  – Some symptoms develop later
  – Monitor for susceptible trees/stands
  – Integrate with normal forest inventory
Sugar Maple
Health Management Plan

• Reactive
  – Remove damaged stems
  – Avoid premature salvage
  – Combat future agents

• Feasibility and Rationale
  – Preemptive silvicultural actions
  – Reactive on case by case basis
Conclusions

- Maintain stand vigor
- Culture on appropriate sites
- Monitor
- Use control measures with care
References
