Sugar Maple (*Acer saccharum*) Health Management Plan

Rick Morrill

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FES 557

Outline

- Background on Sugar Maple characteristics
- Abiotic complex: Maple Winter Decline
- Biotic complex: Sugar Maple Borer (*Glycobius 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

Veneer (per MBF)	Avg	Min	Max
Red Oak	$536	$50	$1,010
Sugar Maple	$529	$186	$1,200
Yellow Birch	$499	$202	$960

http://www.global-gold.com/products/photos/photo-[illegible]gs_and_Lumber/Hard_Maple_Logs/tn/Red_Oak_and_Hard_Maple_Rotary_logs.gif


http://northernwoodlands.org/images/uploads/Lumbra_2.jpg

Maine Stumpage Prices 2006

Sawlogs (per MBF)	Avg	Min	Max
Sugar Maple	$263	$35	$725
Red Oak	$227	$10	$650
Yellow Birch	$169	$25	$533

Management Objective

- Natural regeneration

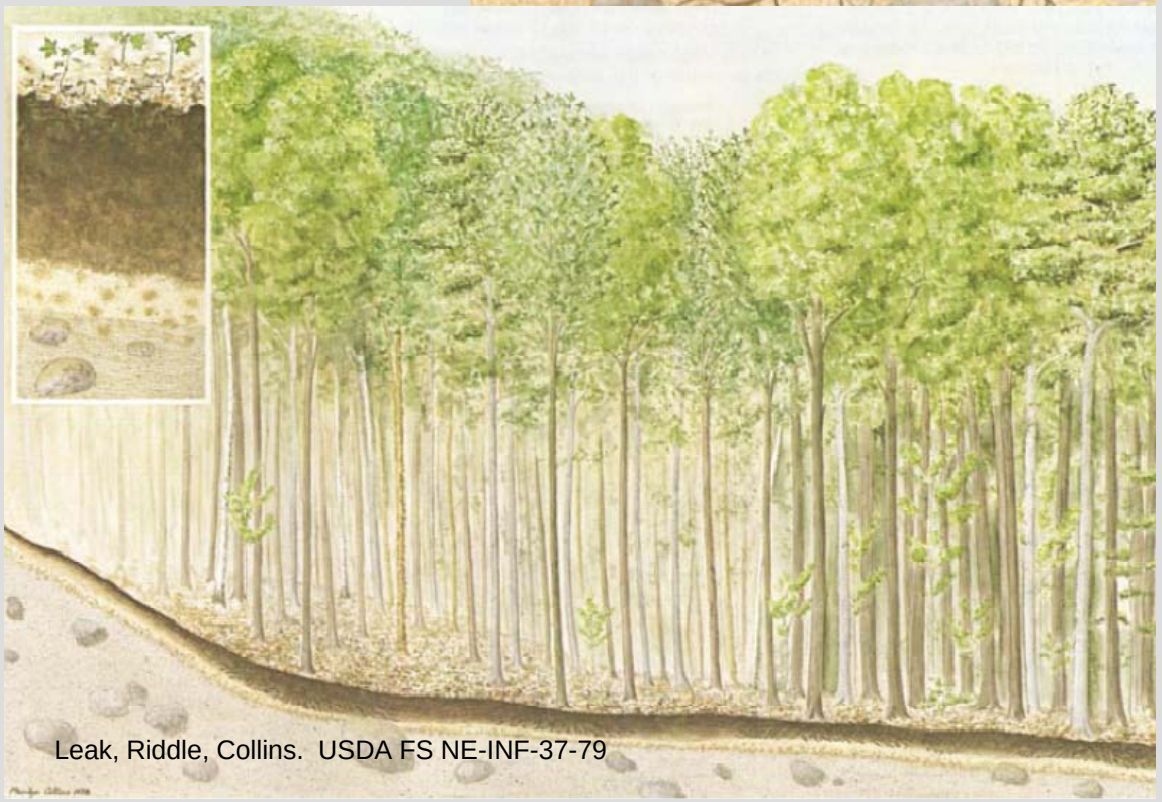
http://www.hubbardbrook.org/w6_tour/tree-stop/sugar-maple/maple-lvs-400.jpg

www.hkconserve.com/hardwoodmgmt.php

- Sawlog and veneer grade products

Tree Adaptations

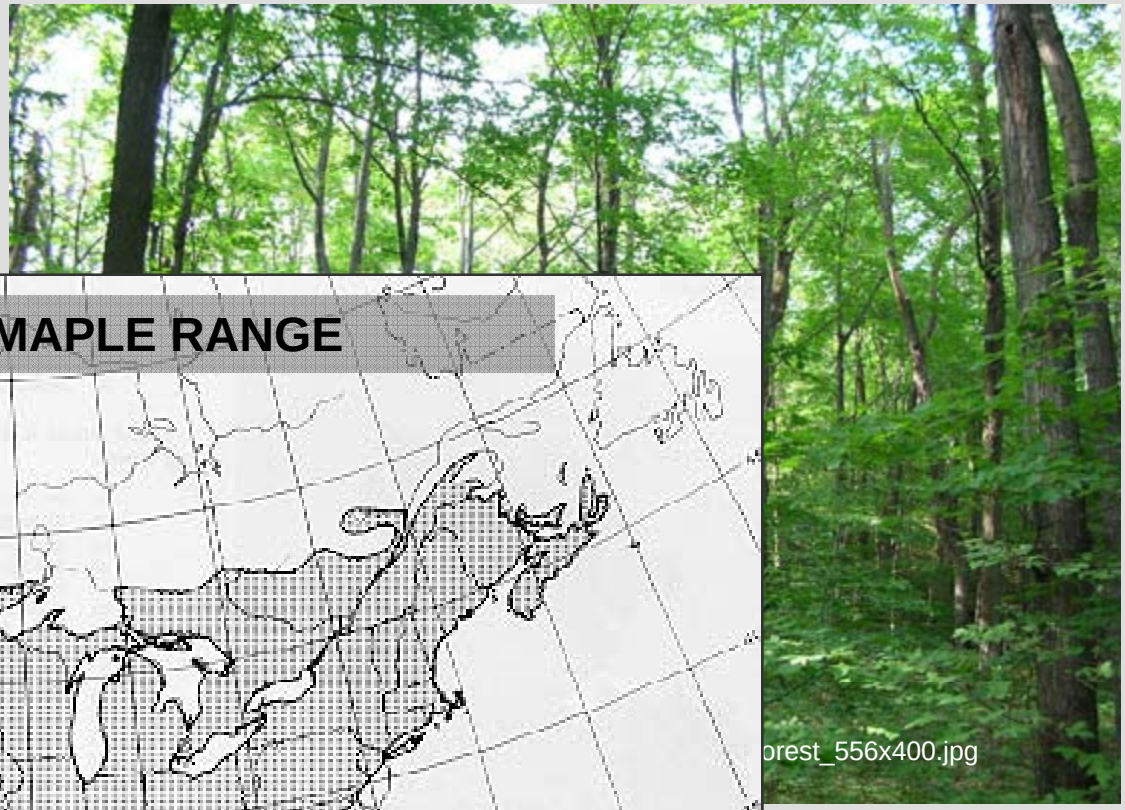
- Soils
  - Deep loams
  - Moist but well drained
  - pH = 5.5-7.3
- Sites
  - “Goldie Lox sites”

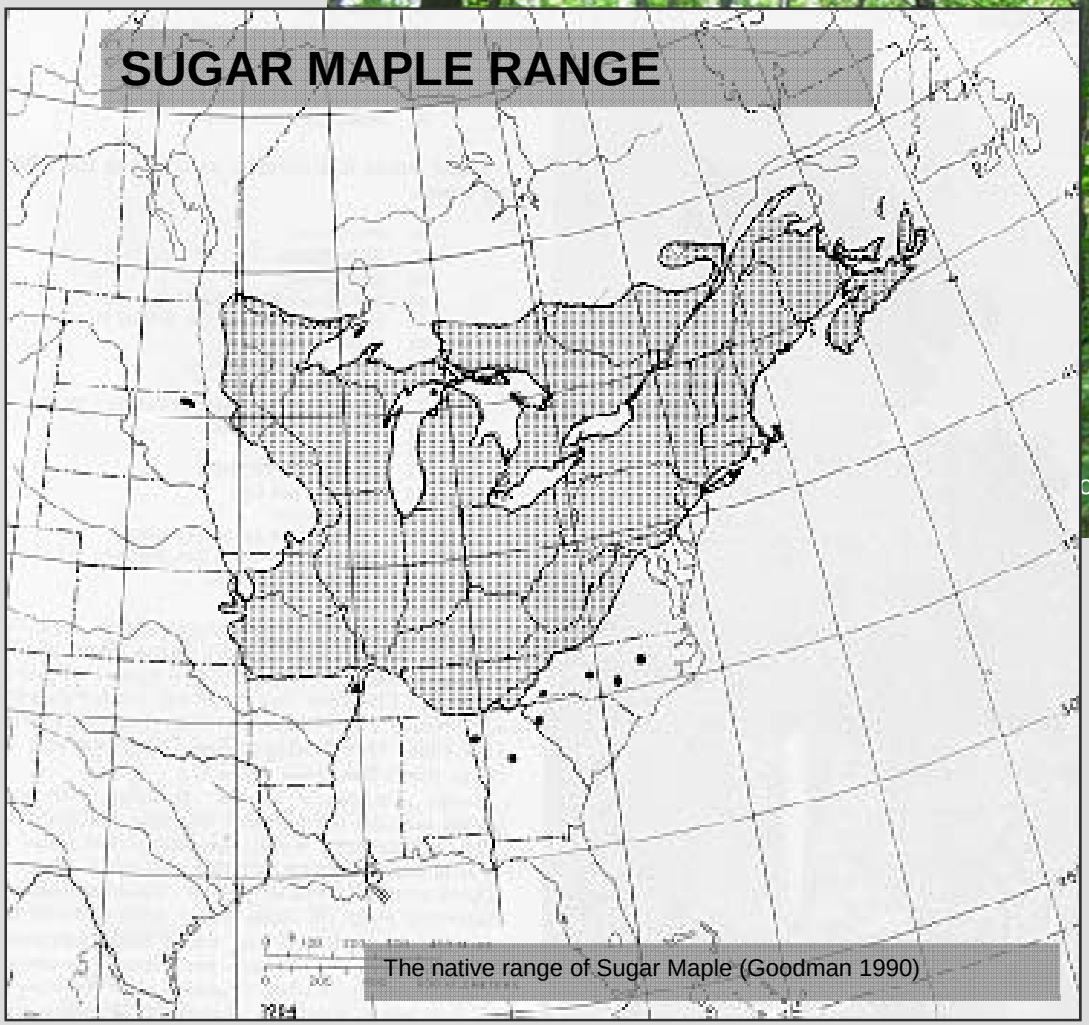


Leak, Riddle, Collins. USDA FS NE-INF-37-79

Tree Adaptations

- Climate
  - Cool and moist
- Tolerant





Abiotic Complex: Maple Winter Decline

- Symptoms
  - –Crown transparency

://www.hubbardbrook.org/w6_tour/tree-stop/sugar-maple/maple-lvs-400.jpg

  - –Crown dieback

www.hubbardbrook.org/w6_tour/tree-stop/sugar-maple/maple-lvs-400.jpg

  - –Reduced radial growth

://www.hubbardbrook.org/w6_tour/tree-stop/sugar-maple/maple-lvs-400.jpg

Abiotic Complex: Maple Winter Decline

- Signs
  - Extreme winter thaw/freeze events
  - Below freezing temps

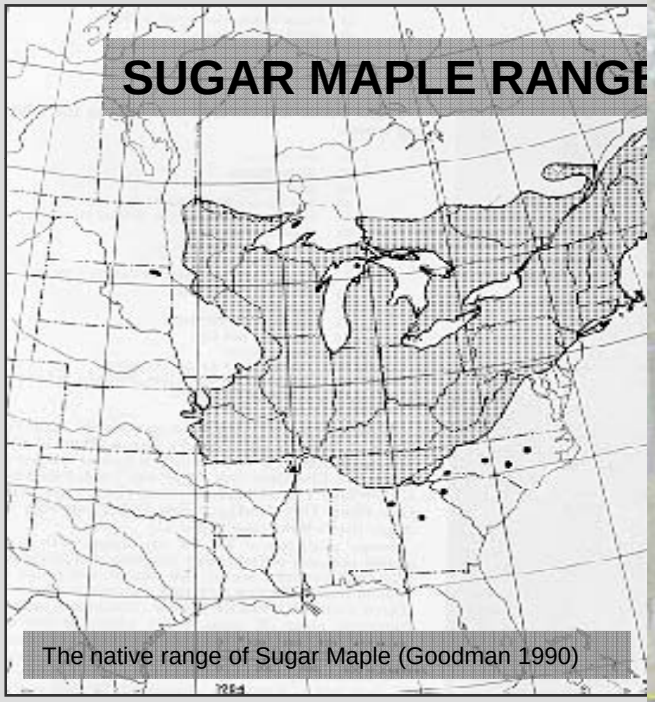
http://www.bigfoto.com/themes/nature/winter/winter_icicle-i1.jpg

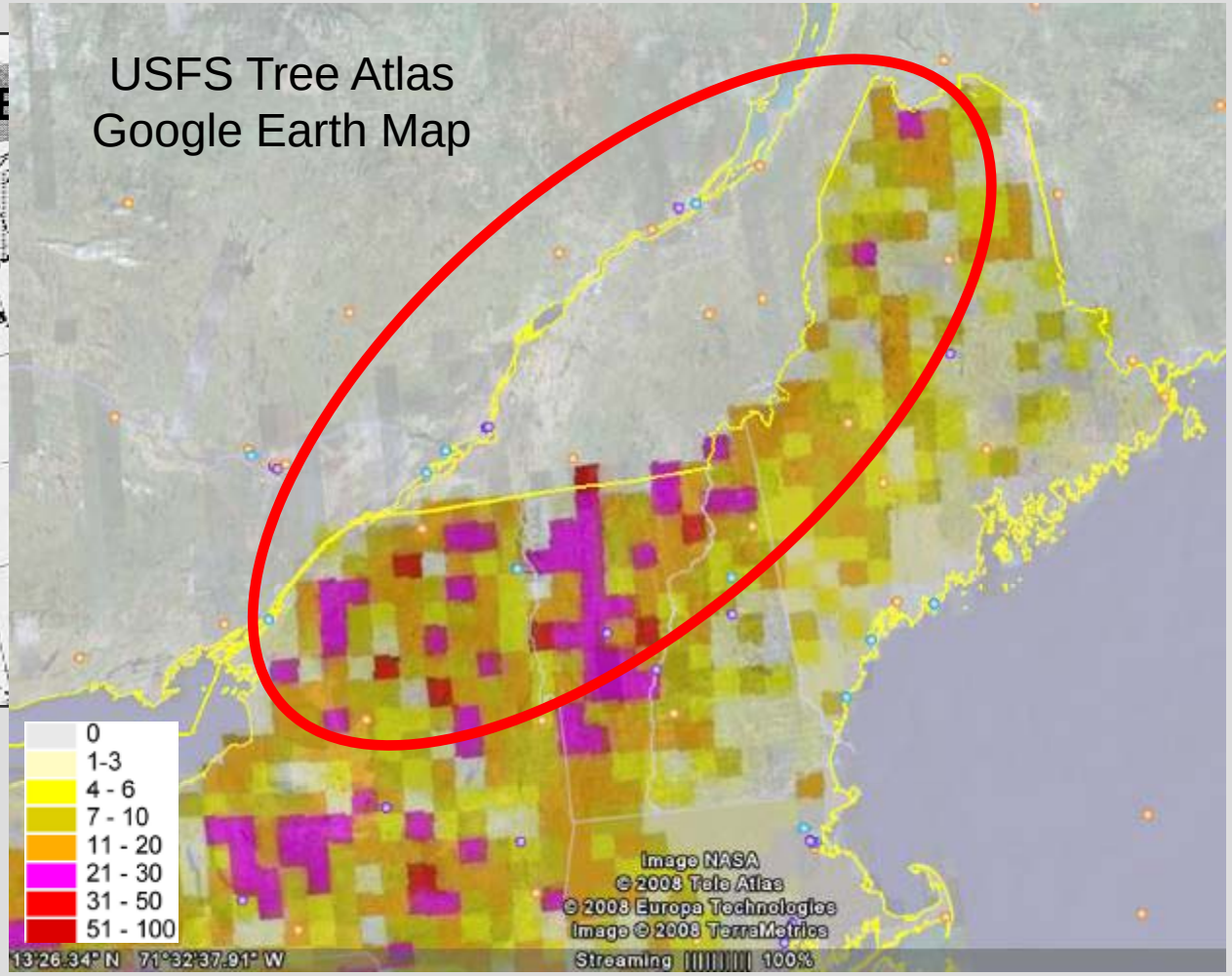
  - Open winters

http://www.ecostudies.org/people_sci_groffman_snow_summary.html

Abiotic Complex: Maple Winter Decline

- Environment
  - Range Maps





Abiotic Complex: Maple Winter Decline

- Predisposing
  - Overtapping
  - Stand age
  - Off site
  - Stand density
  - Previous stress events

http://www.soe.uoguelph.ca/webfiles/wjames/homepage/Me%20(personal)/BThike99.htm

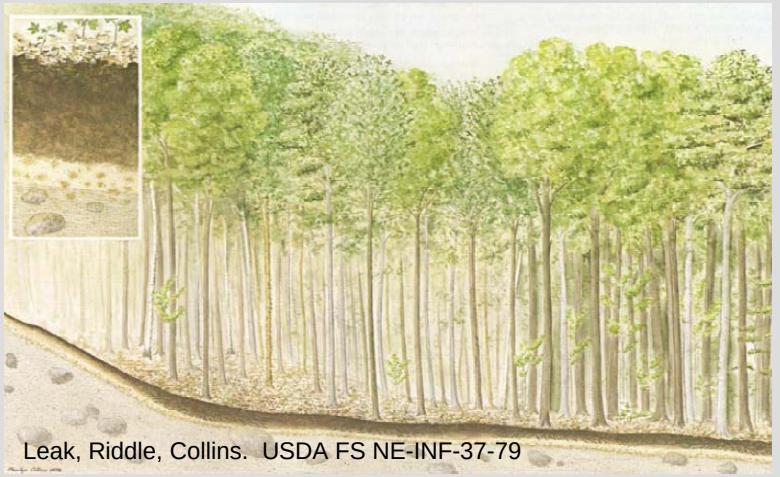
http://www.naturalnewscapes.com/Quickstart/ImageLib/Insect-Emerald_defoliation.jpg

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


http://www.nrs.fs.fed.us/ef/locations/nh/bartlett/


www.forestguild.org

Biotic complex: Sugar Maple Borer (*Glycobius speciosus*)

- **Symptoms**
  - **Horizontal crack**
  - **Branch death**
  - **Crown dieback**

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

Biotic complex: Sugar Maple Borer (*Glycobius speciosus*)

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

Biotic complex: Sugar Maple Borer (*Glycobius speciosus*)

- **Environment**
  - **Throughout Sugar Maple range**

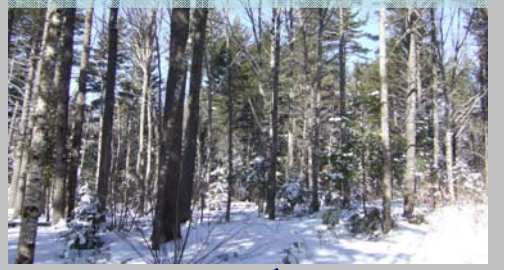
- **Predisposing**
  - **Lifecycle**
    - **4 stages**
    - **2 year lifecycle**

Sugar Maple Borer Life Cycle

Summer #1 Larvae bores horizontal chamber

http://cfs.nrcan.gc.ca/subsite/glfc-sugarbush/glycobius-speciosus-images/

Overwinter #1

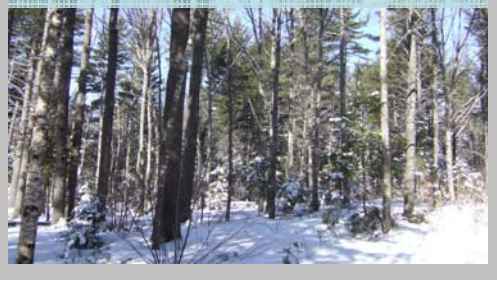


Summer #2 Larvae bores vertical chamber

Hoffard and Marshall 1978 NA-GR-1

http://cfs.nrcan.gc.ca/subsite/glfc-sugarbush/glycobius-speciosus-images/2

Overwinter #2



Pupate Stage

Eggs laid in June-July

Hoffard and Marshall 1978 NA-GR-1

Biotic complex: Sugar Maple Borer (*Glycobius 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*)

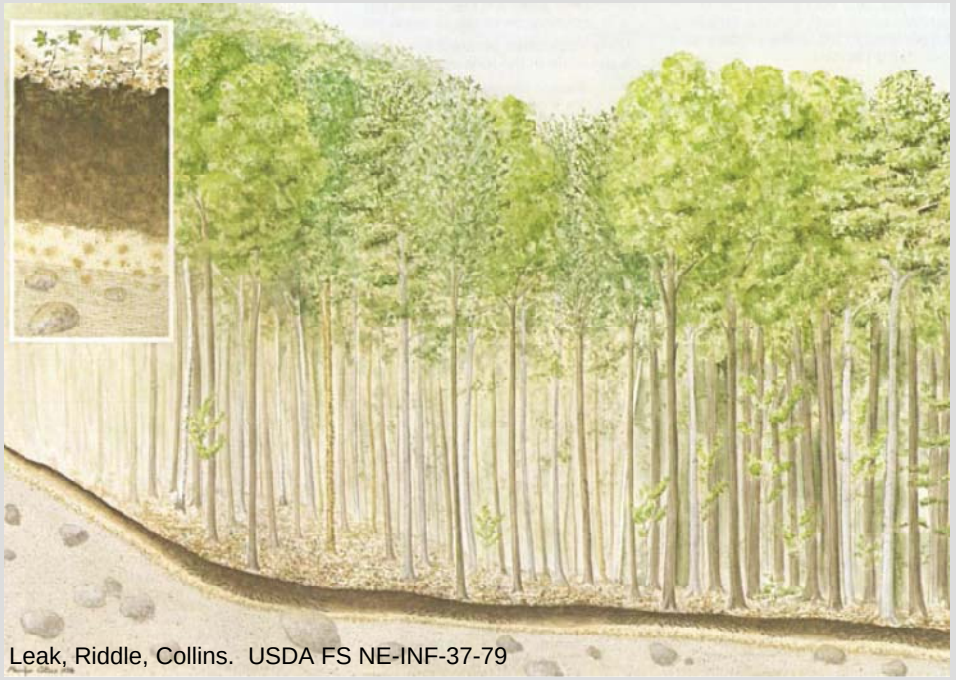
- **Control options**
  - Cultural
    - Favor on best sites
    - Silvicultural thinning
    - Cull damaged stems in harvest
  - Mechanical
    - The wire approach

http://www.suttontrees.com/shade/jerryimg/sugarmaple.jpg

Sugar Maple
Health Management Plan

- **Pre-emptive**
  - Favor on best sites
  - Silvicultural thinning
    - Target low vigor trees

www.hkconserve.com/hardwoodmgmt.php



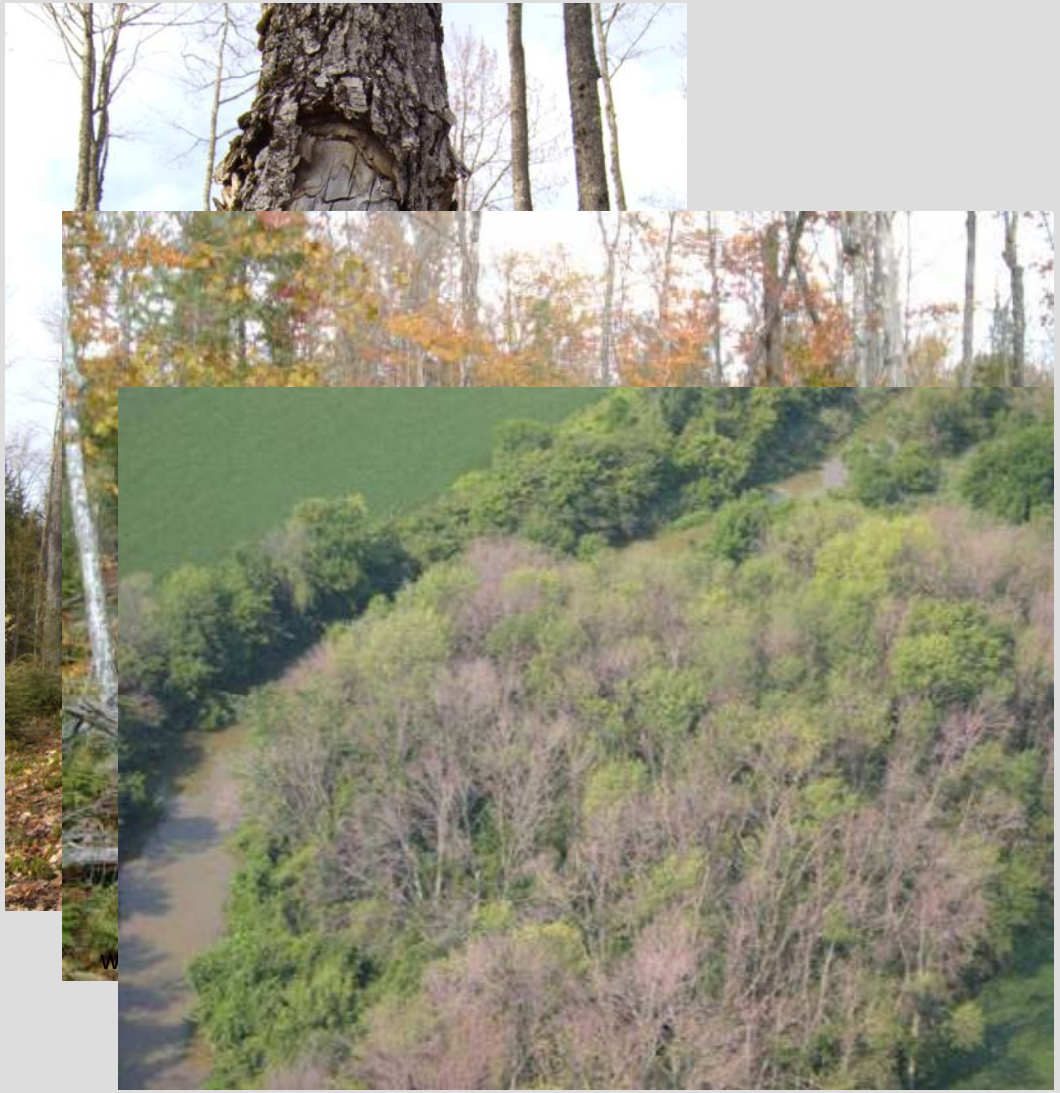
Leak, Riddle, Collins. USDA FS NE-INF-37-79

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

Leak, William B.; Riddle, Jane R. 1979. Why trees grow where they do in New Hampshire Forests NE-INF-37-79. Broomall, Pennsylvania: U.S. Department of Agriculture, Forest Service, Northeastern Research Station. 26p..

Hoffard, William H.; Marshall, Philip T. 1978. HOW to Identify and Control Sugar Maple Borer NA-GR-1. [Broomall, PA]: U.S. Dept. of Agriculture, Forest Service, Northern Area State & Private Forestry.