

Muskoka Lakes Association

August 2016



Current Impacts on Canada's Forests

- Observed impacts already occurring– Increasing length of growing season 12 days between 1981-1999
 - – Mean Spring thaw date 13 days earlier 1988-2001
 - – Tree lines expanding upward in elevation
 - – 2001-2003 drought event of unprecedented length and extent
 - – Increased fire incidence
 - – Mountain pine beetle infestation in BC interior
 - – Increasing severity of disturbance nation wide

Global Change will have multiple interacting impacts on natural systems

:



Changes in productivity

- CO₂ fertilization
- Higher temperature
- N mineralization
- Longer growing seasons
- Changes in water balance (drought)



Migration of plant species (north and up)

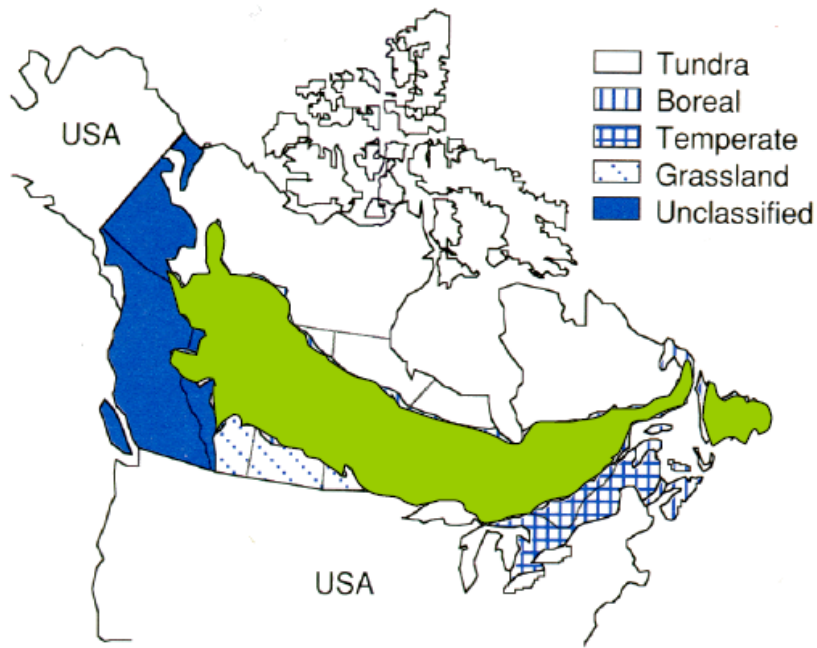
Increased area burned by forest fires



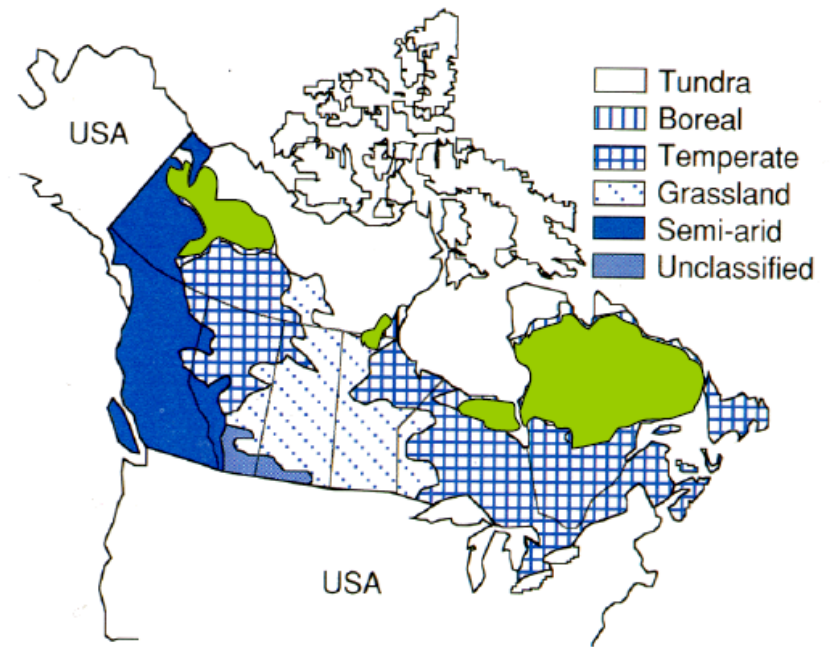
Changes in insect dynamics

- Range expansions
- Life cycle changes
- Invasives

Species 'Climatic Range' Will Change



Present day



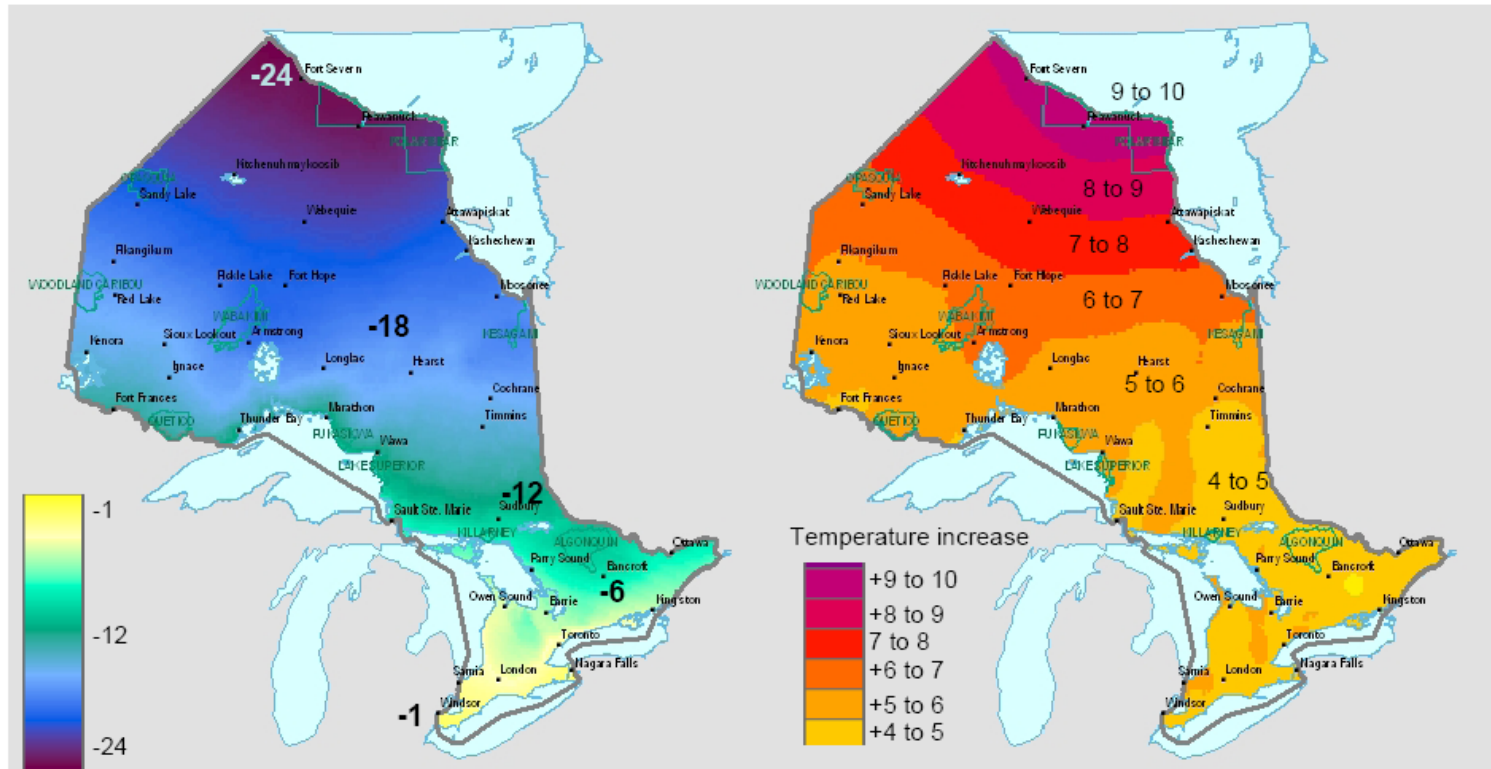
Doubled-CO₂ climate

SOURCE: Rizzo 1990.

Winter temperature

Temperature 1971-2000

Change by 2071-2100



Average winter temperature, CGCM2, A2 scenario

The rate of change is unprecedented

- species may not be able to adapt or migrate rapidly enough to keep pace with the change
- loss of wetlands and lower stream/lake levels
- threatened wildlife/fish habitat
- potential species extinctions
- increased invasive/alien species
- insect and disease outbreaks
- cumulative effect will be that ecosystems and biodiversity are stressed and threatened



Extreme weather

- climate change is projected to cause an increase in the frequency of extreme events



1-2 million hectares of forest storm damage in last 10-years, AFFM

Forests and woodlots help fight climate change

...at many levels

- Forests sequester carbon - Ontario's forests are projected to be a significant carbon sink in the 21st century (live trees, downed woody debris, soils)
- Forest products store carbon, and provide material to substitute for high-emission products (steel, concrete, plastics).
- Forest biomass provides renewable “bio-energy” – widely used already in forest industry, reduces emissions by offsetting the use of fossil fuel
- Adaptation and Resiliency - Increasing forest cover on the landscape of southern Ontario will help restore ecosystem function and health making our environment more resilient to the effects of Climate Change

“Sustainably” managed forests contribute to mitigating climate change

In the long term, a sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks, while producing an annual sustained yield of timber, fibre, or energy from the forest, **sustained generate the **largest** mitigation benefit.**

(IPCC 2007. Climate Change 2007: Mitigation)



Top 7 actions woodlot owners can do

1 Keep the forest you have and enhance it if possible

Maintain existing forests on the landscape and identify opportunities for afforestation to increase forest cover. Take advantage of opportunities to restore and/or enhance connectivity between natural areas to allow trees and wildlife to migrate more easily as future conditions change.

2 Practice sustainable forestry

Practice sustainable forest management to maximize forest health and the carbon storage potential of your woodlot. Always use a Registered Professional Forester and Certified Ontario Tree Marker when harvesting to ensure sound stewardship of forest resources.

3 Plant diverse tree species

Before harvest activities, plan for the regeneration and establishment of a diversity of native species by considering both current climate conditions and projected changes over the next 50 to 100 years. Monitor post-harvest growth and be prepared to adjust cutting cycle according to how the stand responds rather than to a pre-set time interval.

4 Improve forest health

Regularly remove unhealthy trees and reduce overcrowding in your woodlot. Diversify age and structure through stand improvement, thinning, harvesting, and planting. Consider stand edges— keeping out drying winds, conserving snow cover for spring moisture, and reducing the vulnerability of interior stems to wind throw. These actions will increase stand resilience and maintain the health of the remaining trees.

5 Consider new species

Consider adjusting species composition to match current and future site conditions. Establish and maintain more drought resistant species (e.g., oaks, hickories, and pines) when planting or harvesting in areas prone to drought. Additionally, species currently found at the southern edge of their range may persist better in cooler and moister microhabitats, for example on north-facing slopes or near water.

6 Manage pests and disease

Understand which insects, diseases and invasive species might be expected in your woodlot and be on the lookout for them with regular monitoring to enable early intervention and easier management. Monitor deer populations and take steps to control browsing pressure if regeneration is inhibited by high populations.

7 Stay informed and exercise your civil responsibility (vote!)

It is important to stay informed and attuned to developments in science and research and incentive programs that may affect you and your woodlot.



L. Wirth



MWH

Cavity Trees



Steve Munro - 21 August 2016 - Westwind Forest Stewardship Inc.

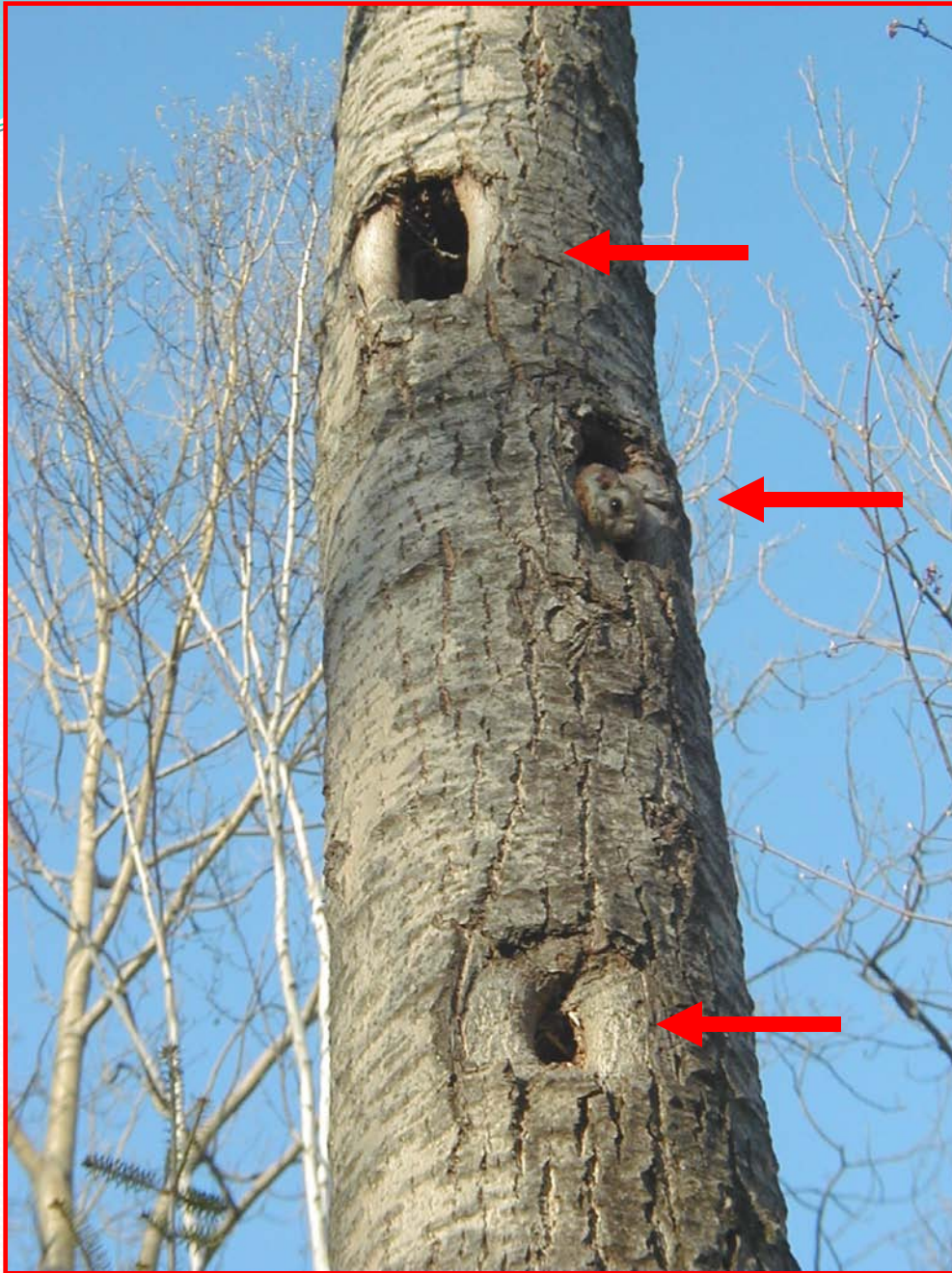


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Cavity Trees

**Good Crowns
8 per ha**

**Roost / nesting
Feeding
Escape**



Leaf nests

**fine twigs and
leaves/needles**





Stick Nests

Stick nest builders

Eagles, ospreys, herons

**Broad-winged, Cooper's,
goshawk, red-shouldered,
red-tailed, sharp-shinned
hawks**

Crows, ravens

Stick nest users

**Barred, great grey, great
horned, long-eared owls**

Merlin





**Red shouldered
hawk**

Cooper's hawk



Goshawk



Mast Trees

- 8 mast trees/ha
- 25+ cm dbh
- oak, beech, cherry, hickory, basswood, butternut, walnut, ironwood

Winter Cover

- blocks wind
- traps heat
- alters snow depth and density



- Browse plots
- Food source

Supercanopy Trees



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Vernal Pools



Ontario government's 50 Million Tree Program

Announced by Ontario government to fund majority of landowners' tree planting costs – up to \$1.35/tree

MNR is partnering with Trees Ontario to plant trees on rural private and public land

Landowners Requirements:

- Minimum: 1 hectare (2.5 acres) land size
- Landowner agrees to protect forest for 15 years
- Employ good forestry practices



What can you expect after applying for the program?



1. A call from a local partner
2. Site visit to determine local conditions, soil type, moisture regime in order to select the best **native** trees to plant
3. A 15 year afforestation plan and agreement for your property
4. Fall or spring site preparation
 - tilling, competition spray, planting of groundcover
5. Spring tree planting (machine and/ or hand planting)

Landowner Requirements

- **Minimum 1 hectare (2.5 acres)**
- **Landowner agrees to protect forest for 15 years**
- **Employ good forestry practises**
- **Apply for site visit online**
- **Contact a local plant partner- Westwind!**

Assessing the Site!



Preparing the site



Species to Plant!



Red Pine



White Pine



White Spruce

After the Plant!



the trees



Property Signs



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What is an Invasive Species?

A non-native organism that has negative effects on the environment, economy and our health

Outcompetes or directly attacks native species, affects the natural balance

Often has no native predators



Photo Credit: vanderbeektree.com

Asian Long Horned Beetle



**Asian Long-horned Beetle found in
Mississauga, Ontario**

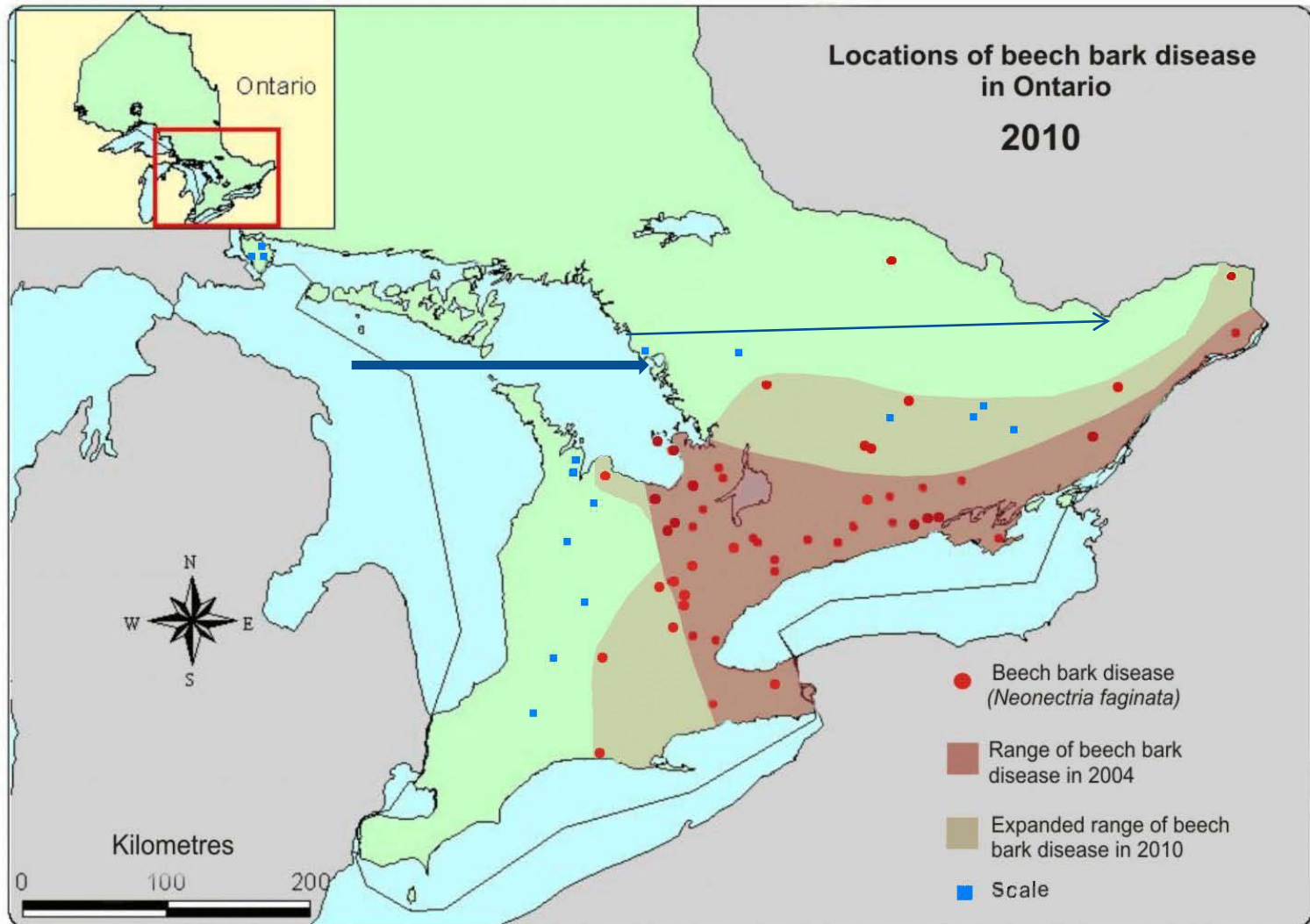
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Beech Bark Disease

Cryptococcus fagisuga & *Nectria faginata*

Range of BBD in Ontario



Beech Bark Disease

Causes death of American Beech trees

Result from a combination of an insect-created wound and fungal infection

Recently detected outbreak in Ontario

Future beech will be stunted and deformed



Photo Credit: forestryimages.org

The Insect

Beech scale insect

Forms in colonies on the bark of the tree

Woolly white tufts

Larva hatch on bark and crawl

Find a suitable place on the bark and feed

Secrete woolly wax cover for protection



Photo Credit: D.K.B. Cheung



Symptoms



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Effect on ecosystem

- Potential changes in food availability for wildlife
- Loss of habitat for cavity-nesting
- Beech may be eliminated
- Heavy root sprouting can occur around dead and dying trees, ensuring that beech remains in the stand, but these stems become infected and highly defective.

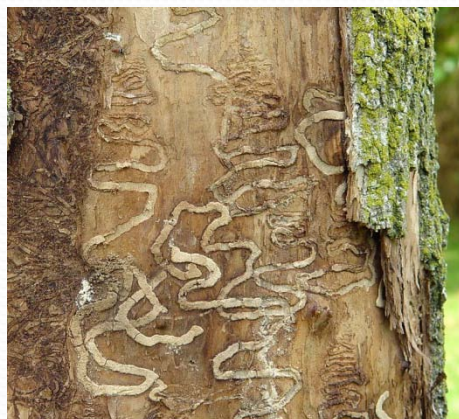


Resistance



Landowners

- Make keeping beech in your forest a priority
- Take note of any resistant tolerant trees
- Remove heavily infested canker trees
- **Do not move wood**
- Urban tree owners- removal of hazard trees
- Power wash off the scale insect
- Application of a dormant oil

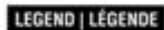


Emerald Ash Borer

Agrilus planipennis

Lieux réglementés pour l'agrile du frêne au Canada

Q u é b e c



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SCALE / ÉCHELLE

Canada

Appearance

Adults:

- Dark metallic green
- Elongated bullet-shaped bodies
- 8.5mm long and 1.6mm wide
- Flat head with black eyes

Larvae:

- Creamy-white
- 10 bell-shaped abdominal segments
- Four instars (stages of larvae)
- Fully-mature larvae are 26-32mm long



Photo Credit: yourleaf.org

Impacts & Damage

Larvae bore holes and tunnels and feed on new sapwood

Distinctive D shaped holes when adults emerge

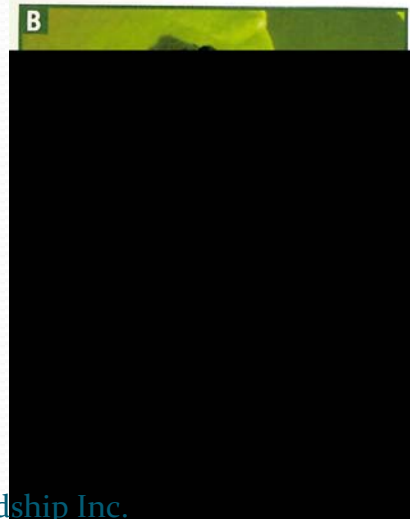
Tree is girdled and will die

Adult beetles feed on ash leaves



Photo Credit: extension.iastate.edu

Signs and Symptoms of EAB



More Symptoms



Candace Karandiuk

Managing ash forests enhancing tree species diversity

- Thin stands to remove ash component
- Remove defective or diseased trees
- Follow basal area guidelines (stocking)
- Promote regeneration of non-ash tree species
- Retain non-ash species
- Retain trees with significant wildlife value (e.g., cavity trees)

Hemlock Woolly Adelgid



- a native of Asia,
- 1/32 inch long reddish purple insect that lives within its own protective coating.
- White, woolly masses that shelter these sap-feeding insects are at the bases of hemlock needles along infested branches.
- The presence of these white sacs, which resemble tiny cotton balls, indicate that a tree is infested.

Invasive species, pests and disease



As winters get warmer with climate change, the number of pests and diseases that survive the winter may increase, leading to greater outbreaks and infestations. Invasive species take advantage of disturbance regardless of its cause.



Eastward march of
Mountain Pine Beetle

