



A Glimmer of Hope:

Ash Preservation for the future

Presenters: *David Dutkiewicz*, Entomology Technician

Vince La Tassa, Program Development Coordinator

Invasive Species Centre

Northern Ontario First Nations Environmental Conference



Invasive Species Centre

The **Invasive Species Centre** is a not-for-profit organization that mobilizes action against invasive species that harm the environment, economy and society.



Emerald Ash Borer



- Description:
 - Metallic green beetle
 - ~1cm in length
 - Bullet shaped
- Host:
 - Ash trees
 - Green/Red Ash
 - White Ash
 - Black Ash
 - Blue Ash
 - Pumpkin Ash

Commonly Confused



Emerald Ash Borer

INVASIVE



Bronze Birch Borer

NATIVE



Metallic Wood Borer

NATIVE



Six-Spotted Tiger Beetle

NATIVE



Metallic Wood Borer

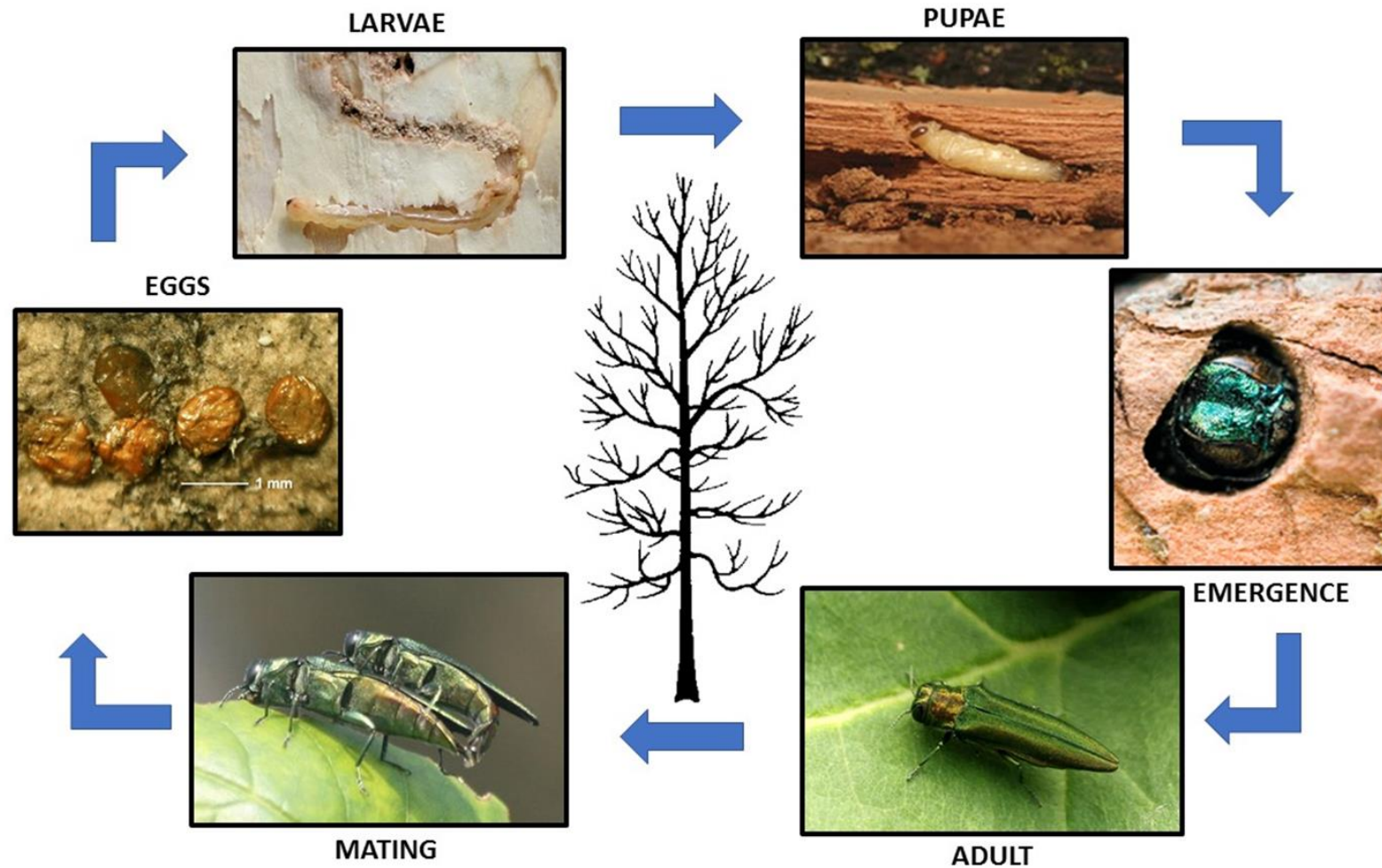
NATIVE



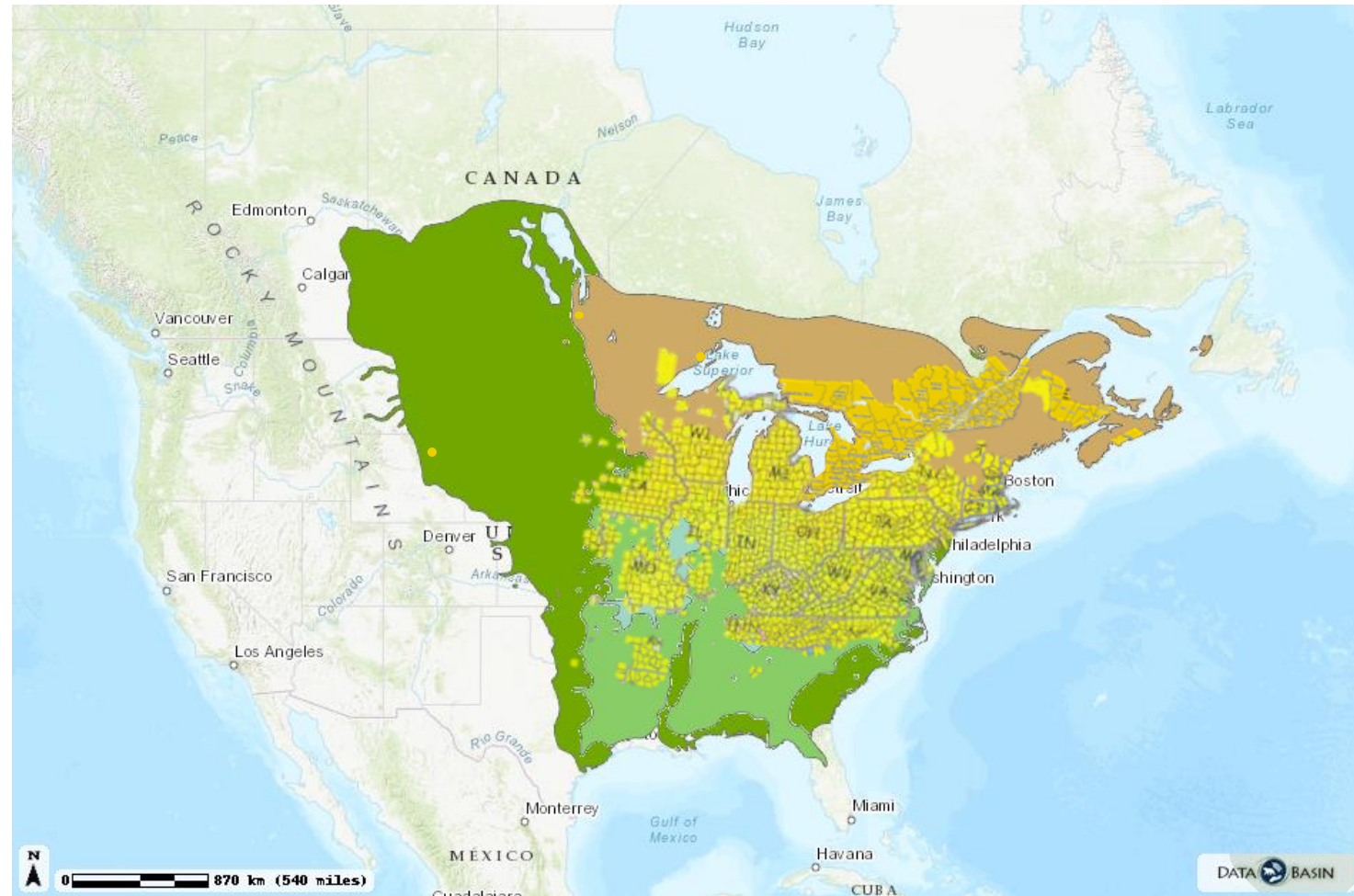
Calosoma Ground Beetle

NATIVE

Life Cycle



Range



Sign's/Symptom's



- Branch Flagging – Crown dieback begins with branches losing leaves

Signs/Symptoms



- Epicormic Shoots
 - New shoot growth from existing branches and/or the trunk of Ash tree
- Bark Cracks and Fissures
 - EAB larvae will cause the bark to detach from the heart wood by feeding on the vascular phloem tissue
 - This cause the bark to dry and crack

Signs/Symptoms



- Woodpecker Feeding

- Usually found on the South side of the tree
- Easiest to see in winter
- Bark flakes off the tree
- Small feeding holes along the trunk
- Woodpecker feeding hole
- EAB exit hole



Signs/Symptoms – Upland White Ash



Signs/Symptoms – Upland White Ash



Signs/Symptoms – Upland White Ash



ns/Symptoms – Upland ite Ash



Signs/Symptoms – Lowland Black Ash



Signs/Symptoms – Lowland Black Ash

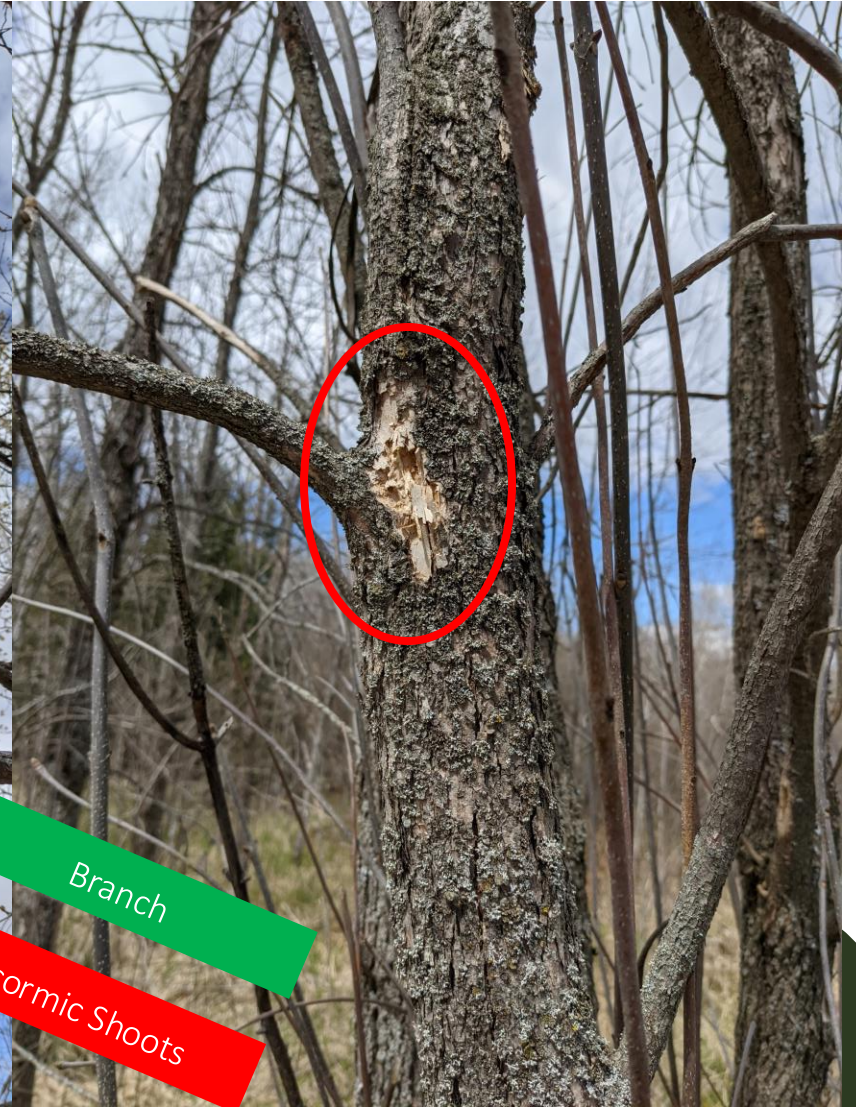


Epicormic Shoots



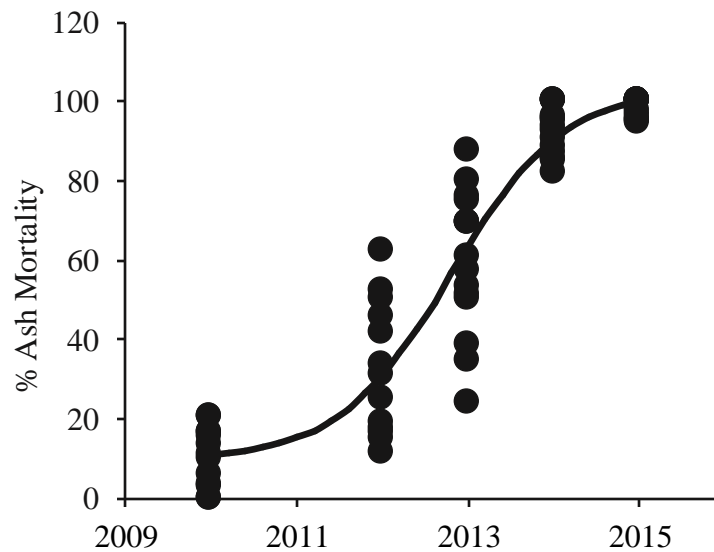
Branch

Epicormic Shoots

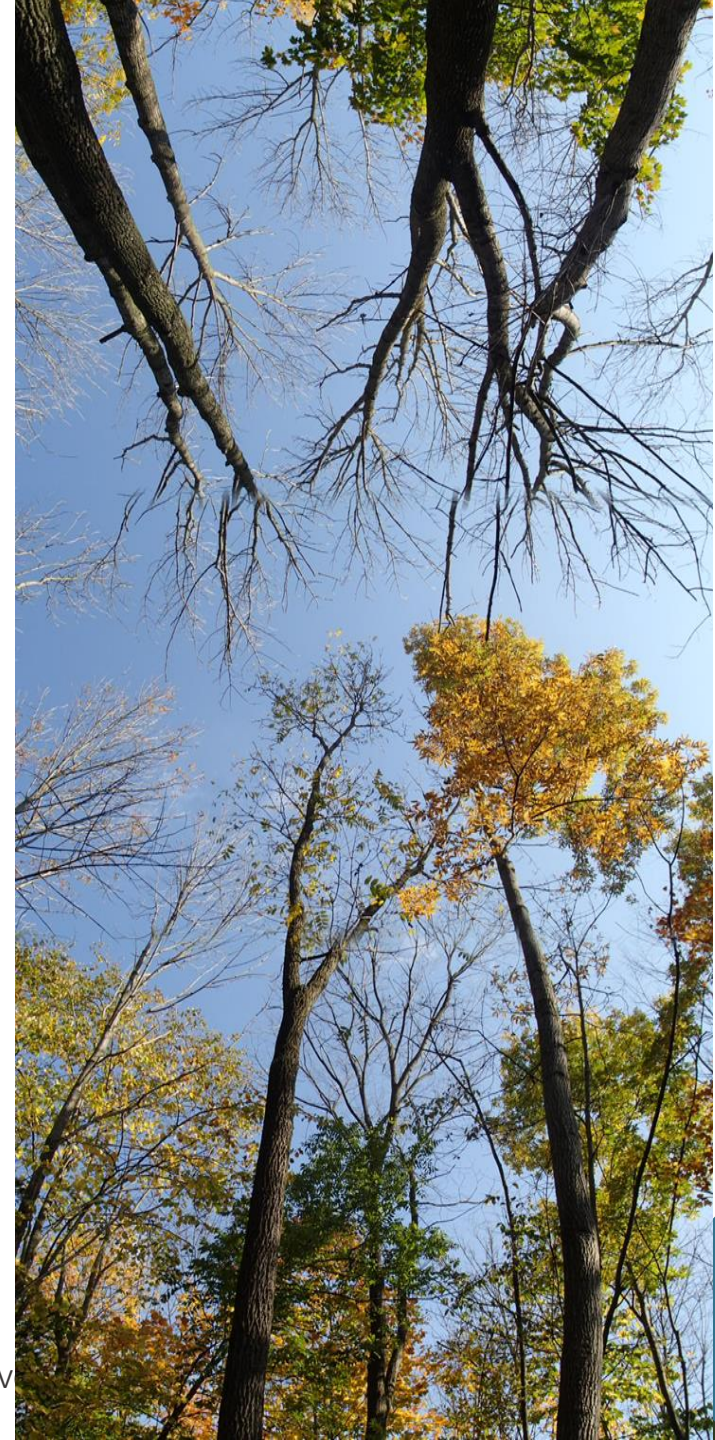


Damage

- EAB kills Ash trees within 3-6 years of infestation
- Falling Ash trees are known to snap off/get snagged in non-ash trees
- Creates large amounts of woody debris



Invasiv



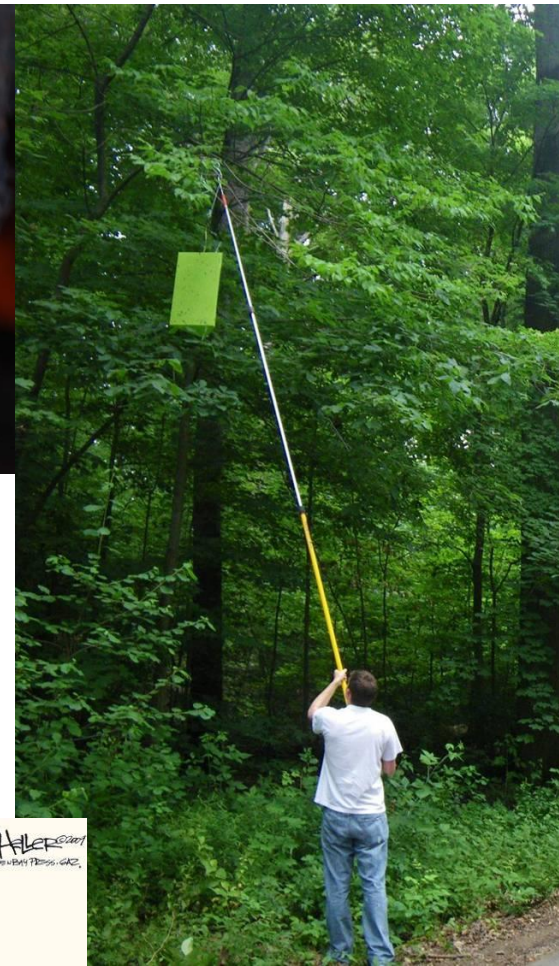
Damage



- Allows light to penetrate the forest canopy promoting a proliferation of ground vegetation
 - Vector for introduction of invasive species
 - European Buckthorn
 - Garlic mustard
 - Phragmites
- Can kill off Native shade loving plants

Management

- Early Detection
 - Trapping
 - Green prism traps, host and sex pheromones
 - <https://semiochemical.com/prism-others/>
 - Branch Sampling
 - Sampling for EAB larvae
- Spread
 - EAB Quarantine Zone
 - CFIA
 - Don't Move Firewood!



Management

- Branch Sampling

- <https://cfs.nrcan.gc.ca/pubwarehouse/pdfs/32127.pdf>

- Best time to sample is in the winter season



Detection of emerald ash borer in urban environments using branch sampling

K. L. Ryall, J. G. Fidge, J.J. Turgeon

The emerald ash borer (EAB), *Agrylus planipennis* Fairmaire (Fig. 1), a non-native insect pest of Asian origin, presently infests large numbers of ash (*Fraxinus* spp.) trees in Ontario and Quebec and could soon spread to other provinces.



Fig. 1. Adult emerald ash borer.

One of the many requirements for effective management of EAB is early detection of infestations, when densities are still low and before signs and symptoms are obvious. Visual surveys rely on external signs and symptoms (e.g., exit holes, larval tunnels seen through cracks in the bark, feeding by woodpeckers or squirrels) that may not be noticeable for 2 to 3 or more years after the arrival of the population, particularly if the infestation begins in the upper part of the tree. Sticky traps baited with an attractant have the potential to detect EAB adults in an area before signs or symptoms become visible, but may not necessarily provide information on the infestation status of individual trees.

Ryall et al. (2010) sampled many ash trees with no obvious sign or symptom of EAB attack (Fig. 2) and showed that branch sampling was an effective method of detecting EAB-infested trees; indeed, 74% of the infested trees would have been discovered if the method described below had been used. The purpose of this note is to describe this basic sampling technique.



Fig. 2. Healthy-looking ash trees with no visible sign or symptom, but determined to be infested with EAB using branch sampling.

DESCRIPTION OF THE BRANCH SAMPLING METHOD

This method is suitable for sampling open-grown ash in any landscape, but it is of particular value in urban areas with high-value ash trees (Fig. 2). Branch sampling can be performed at any time between September and May; however, because larvae continue to feed and grow in size in early fall, their galleries are easiest to see if branches are sampled after October. This technique can be performed using the following steps:

1. Select an open grown black, red, green, European or white ash, 6-18 m tall and 15-50 cm DBH (diameter at breast height) with large open crowns;
2. Identify two live branches in the mid-crown preferably 5-7 cm in diameter at the base (minimum 3 cm; maximum 10 cm) ideally from the south side of the tree. NOTE: Be sure to follow appropriate safety procedures and to cut branches using proper tree pruning methods.

3. Cut each branch at its base using a pole, chain or pruning saw (see Fig. 3a);
4. Measure off 75 cm from the base and cut the branch again at this point. Remove any lateral branches from this piece (Fig. 3b);
5. Secure the 75 cm piece in a vise (Fig. 3c);
6. Peel (whittle) the bark in thin strips (1-2 mm thickness) from the basal 50 cm of the branch using a good quality draw- or paring-knife (Fig. 3d);
7. Examine the branch carefully, looking for EAB galleries and/or larvae. Remember that gallery length varies from a few millimetres to (Fig. 4a) several centimetres (Fig. 4b).

If the objective is only to detect EAB, then sampling can stop when the first gallery is found. If the objective is to assess densities, then it is important to count all EAB galleries and living larvae on the sample. Counts take 2-3 times longer to carry out than presence/absence sampling.

The branch sampling technique can be done concurrently with other tree management activities, such as pruning. Samples from ash trees could be returned to a centre where whittling is performed. Because ash tree material can contain live EAB, it must not be moved outside of regulated areas established by the Canadian Food Inspection Agency (CFIA). In non-regulated areas, discovery of EAB galleries or of a live specimen must be reported to the CFIA. Procedures for movement and disposal of ash wood are available at: <http://www.inspection.gc.ca/english/plants/pestrava/agpla/registre.shtml>.



Fig. 3. Cutting (a), measuring and trimming (b) ash branches. Branches, cut to a length of 75 cm, are placed in a vise and bark is whittled off the basal 50 cm (c) (1.5 m piece shown here). Whittling removes bark in thin 1-2 mm strips (d).



Fig. 4. Early (a) and late (b) stage serpentine galleries made by EAB larvae, found by branch sampling.

CAVEATS

This technique was developed using open-grown urban trees. Its efficacy for use in woodlots has not been tested. Similarly, sampling of much larger or smaller branches and trees than those recommended herein may result in lower detectability of EAB infestations.

CONCLUSIONS

Branch sampling is a highly effective tool for detection of incipient EAB populations, before outward signs or symptoms become apparent. Early detection of EAB populations can provide managers with additional time to identify and implement management options before unacceptable ash mortality occurs. This technique can be used for early detection of incipient EAB populations to provide estimates of EAB density on infested trees and to delimit the extent of outbreaks. Ongoing research is developing area-wide detection and delimitation

survey protocols, relating EAB density to severity of visual signs and symptoms, and is calibrating effectiveness of baited traps as another early detection tool.

CONTACT INFORMATION

Krista Ryall
Great Lakes Forestry Centre
1219 Queen Street East
Sault Ste. Marie, Ontario, Canada
P6A 2E5
Phone: 705-949-9461
Fax: 705-541-5700
<http://cfs.nrcan.gc.ca/regions/glc>
E-mail: GLFCWeb@nrcan.gc.ca

ACKNOWLEDGEMENTS

Developed by Natural Resources Canada, Canadian Forest Service, in collaboration with Canadian Food Inspection Agency and Ontario Ministry of Natural Resources. We are grateful to the cities of Toronto, Pickering and Sault Ste Marie for permission to sample trees.

ADDITIONAL READING

de Groot, P.; Biggs, W.D.; Lyons, D.B.; Scarr, T.; Czerwinski, E.; Evans, H.J.; Ingram, W.; Marchant, K. 2006. A visual guide to detecting emerald ash borer damage. Natural Resources Canada, Canadian Forest Service, Great Lakes Forestry Centre. 16 pages.

Lyons, D.B.; Caister, C.; de Groot, P.; Hamilton, B.; Marchant, K.; Scarr, T.; Turgeon, J.J. 2007. Survey guide for detection of emerald ash borer. Natural Resources Canada – Canadian Forest Service and Canadian Food Inspection Agency, Sault Ste. Marie, Ontario, Canada.

Ryall, K.L.; Fidge, J.G.; Turgeon, J.J. 2010. Development of a sampling unit for early detection of the emerald ash borer, *Agrylus planipennis*, in individual urban trees. Unpublished.

Canadian Forest Service, Great Lakes Forestry Centre
1219 Queen St. East
Sault Ste. Marie, Ontario, P6A 2E5
(705) 949-9461

© Her Majesty the Queen in Right of Canada, 2011
Catalogue No. Fo123-1/111E
ISBN 978-1-100-17111-1

For information regarding reproduction rights, please contact Public Works and Government Services Canada at: 613-996-6886 or at: david.aurout.copyright@pwgsc.gc.ca

Management

- Parasitic Wasps
 - Native Parasites
 - ~7 found attacking EAB
 - Parasitism rate 3.6%
 - Non-Native Parasites
 - 30-60%
 - *Tetrastichus planipennisi*
 - *Oobius agrili*
 - *Spathius galinae*
 - *Spathius agrili*



Management

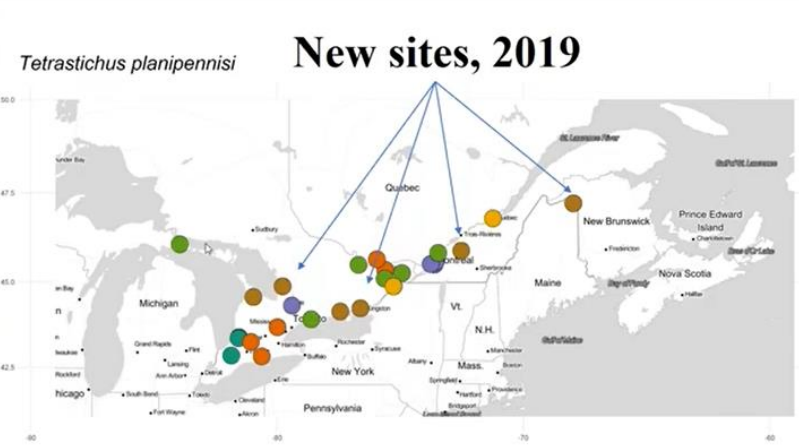
- <https://www.youtube.com/watch?v=sq6S4deKoXw>

YouTube CA

Search

Tetrastichus planipennisi

New sites, 2019



year of 1st release: 2013 2014 2015 2016 2017 2018 2019

year	released
2013	15,130
2014	14,750
2015	21,483
2016	12,347
2017	36,690
2018	26,905
2019	47,465

Natural Resources Canada / Ressources naturelles Canada

Canada

Present Status and Update on the Management of Emerald Ash Borer in Canada

163 views • 9 Dec 2020

3 0 SHARE SAVE ...

Management

- Pesticides
 - TreeAzin[®] - Azadirachtin
 - Systemic injection
 - Is used every 2-3 years to prevent the development of the larvae
 - Not Host specific
 - Expensive for forestry applications



Quarantine Zone





So...why should we care?

Ash trees provide essential services in the following ways:

Ecological

- Provide food & shelter for many species of insects, birds & mammals
- Contribute to biodiversity, increasing forest resiliency to stressors (pathogens, pests, drought)
- Essential for maintaining & promoting forest soil health through nitrogen cycling (leaf litter decomposition)
- Play a significant role in atmospheric carbon sequestration, contributing to climate change mitigation efforts

Economic

- Ash wood is sought after for strength, flexibility, & shock absorbance, used as lumber, furniture, sports equipment (baseball bats, canoe paddles), & tool handles
- In urban environments, increase property value, pollution abatement, runoff prevention

Social/Cultural

- Commonly used in urban green spaces such as parks, along streets, adding aesthetic & recreational value
- Black ash – used traditionally by many First Nations groups, used widely in basketmaking





Black ash

Fraxinus nigra

- Relatively long lived (200-300 yrs), slow growing species
- Foundational wetland tree species in swamp forests and riparian ecosystems
 - Plays important role in regulating hydrology
 - Canopy provides shade & habitat for other species
- Approximately 25% of global range occurs within province of Ontario, with ~51% of species total range in Canada
- Its loss would negatively impact wetland and riparian forest ecosystems

Key Black Ash Characteristics



← Compound leaves composed of smaller leaflets

Bark is thin & scaly, → orange underside



Gap between → terminal bud & first pair of lateral buds



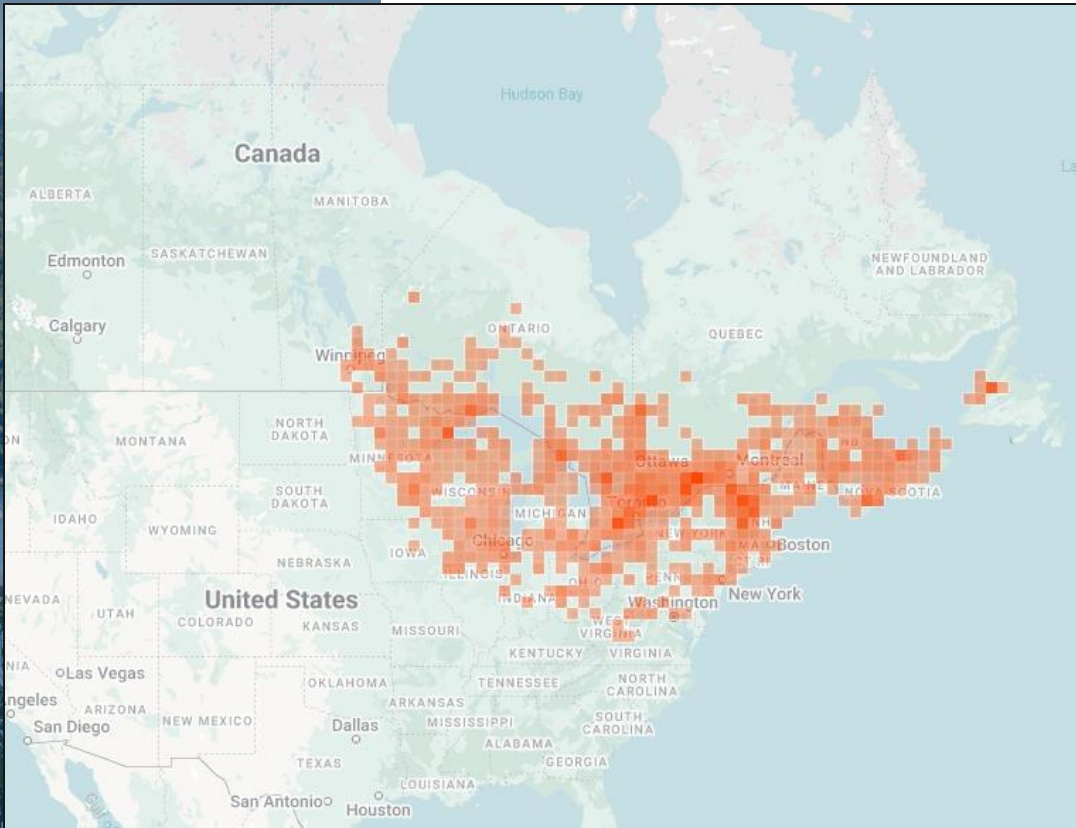
← Leaflets lack petiolule, attached directly to leaf's central stalk



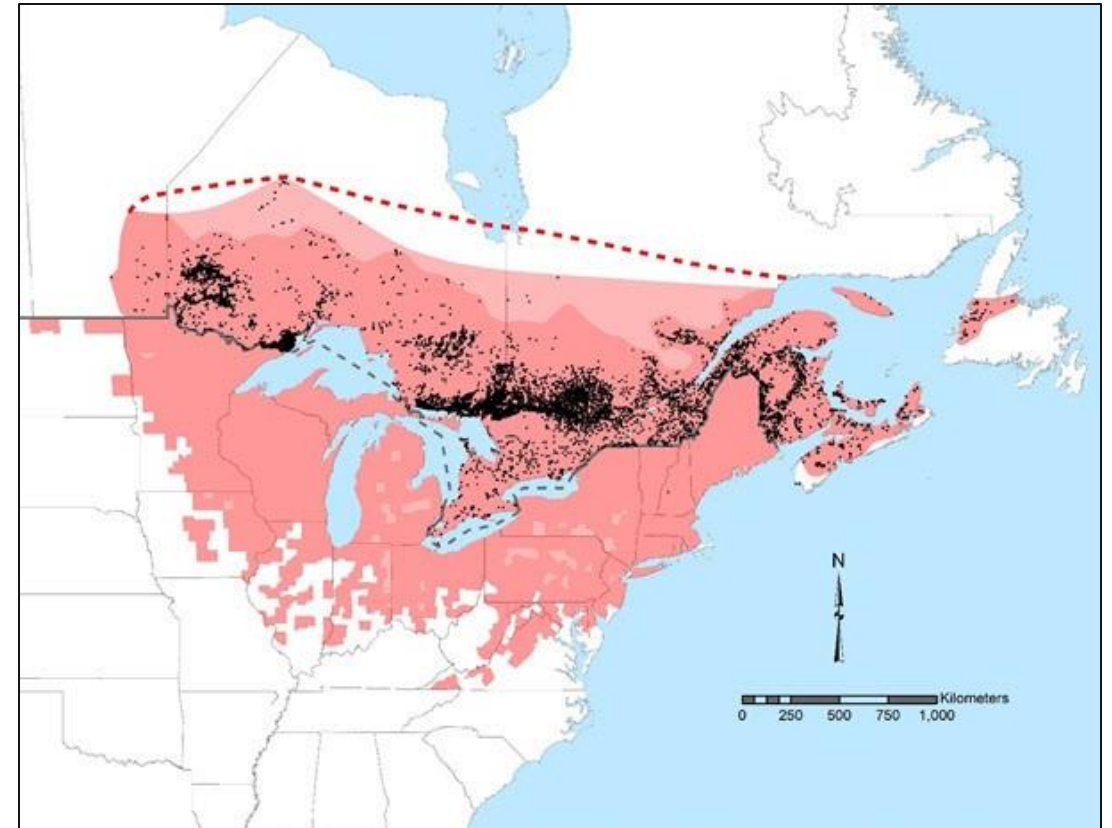
← Opposite branch arrangement



Distribution



Source: iNaturalist.org, 2024



Source: COSEWIC Assessment and Status Report on the Black Ash (*Fraxinus nigra*) in Canada 2018



Invasive Species & Species at Risk

- UN ranks **invasive species** as a top-5 driver of species decline
- Invasive species change species composition & diversity, altering how ecosystems function
- Reduce critical habitat that species at risk need to survive
 - Species at risk are vulnerable to habitat change, especially endemic species
- Reduce biodiversity by outcompeting desirable native species
- Infect, wound, parasitize, or kill species at risk



Black ash as a SAR

- Black ash is most susceptible and severely affected ash species by emerald ash borer
- EAB currently greatest threat to black ash survival → >70% decline in next 100 yrs
- Added to the Species at Risk (SAR) in Ontario list (*O. Reg. 230/08*) in 2022
- Current status in Ontario is **Endangered** under the *Endangered Species Act, 2007*, where it receives protection through prohibitions
- Black ash habitat defined as '*radial distance of 30-metres from the stem of every black ash...*'
- Prohibition exemptions:
 - If located in municipality/territorial district (*Schedule 1, O. Reg. 6/24*)
 - Stem height < 1.37m, OR < 8cm DBH
 - If black ash assessed as unhealthy

What does this mean?

- Invasive species and species at risk two sides of same coin
- ISC collaborates extensively with all levels of government, municipalities, Indigenous communities, and environmental organizations
- Proven public outreach track record, including training workshops and presence at major events
- Proven capacity to mobilize resources
 - Access to funding
 - Volunteer networks





New Project:

Title: *Mitigating Emerald Ash Borer Impacts and Supporting Long-term Ash Viability*

- **Three-year project** with goal of mitigating impacts of emerald ash borer (EAB) on existing populations of ash
- Project aims to increase public awareness of risks and impacts of EAB in Ontario, research, and importance of strong genetic & seed diversity for ash species, including species at risk like black ash
- Achieved through combination of education & outreach with research, seed preservation, genomics research, & enhancing understanding of ash preservation & resistance against EAB
- Increase understanding of the current state and importance of bio-control, and identify knowledge gaps
- ISC to connect with Indigenous Communities across Ontario to broaden perspectives and integrate them into our outreach work



Over the next 3 years...

Year One

- Connecting with partners to collaborate (i.e. FGCA, OFRI and National Tree Seed Centre)
- Listening and learning about impacts of EAB to forests in Ontario
- Hosting workshops & training sessions
- Development of new resources (factsheets/protocols/webpage)
- Black ash scouting & mapping

Year Two

- Hosting workshops & training sessions
- Digital media (promoting on social media, developing a how-to-video, hosting webinars, website & new webpage updates)
- Seed & branch sample collection by volunteers & ISC, send to NTSC

Year Three

- Continue hosting workshops, training sessions, webinars
- Continue seed & branch sample collection
- Sharing program success and progress via social media

Attending Anishinabek Nation Lands and Resources Forum each year

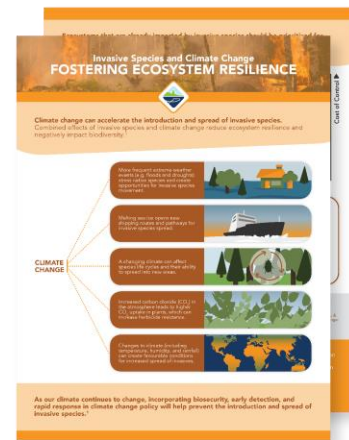
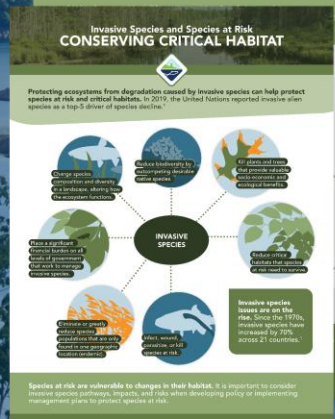




Community Action Network Coordination

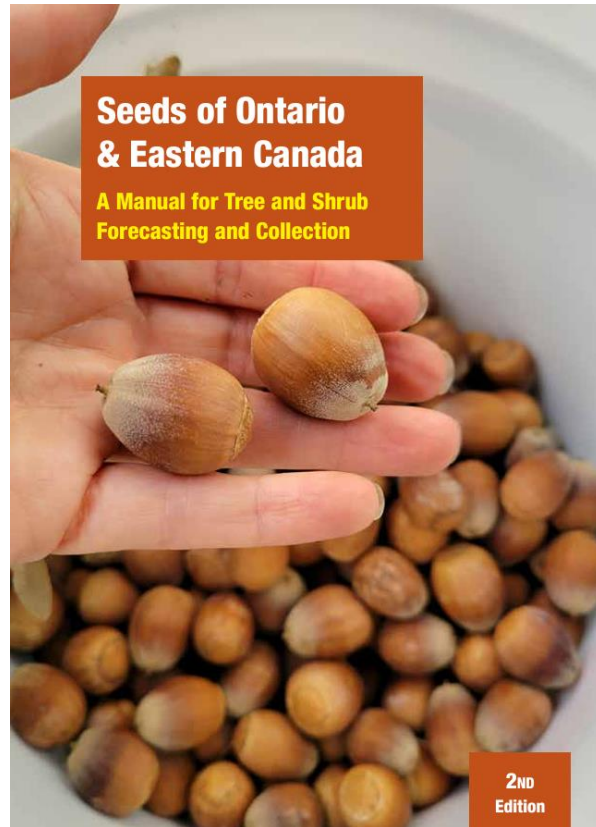
- Key aspect involves coordinating network of volunteers
- Partnership with the National Tree Seed Centre (NTSC) to lead black ash seed collection and branch sampling
- ISC to mobilize and train Ontarians to effectively collect ash seeds and branch samples through series of in-person & online workshops
- Once collected, materials to be sent to ISC for further processing and shipment to NTSC
- Volunteers also encouraged to document tree locations

New EAB Factsheet Development



- New available resource for events
- Comprehensive summary of EAB including latest available information
- How it impacts ash species, specifically black ash, including I.D.
- How to recognize signs and symptoms of EAB
- Will be available both online through our website and hardcopy for send out

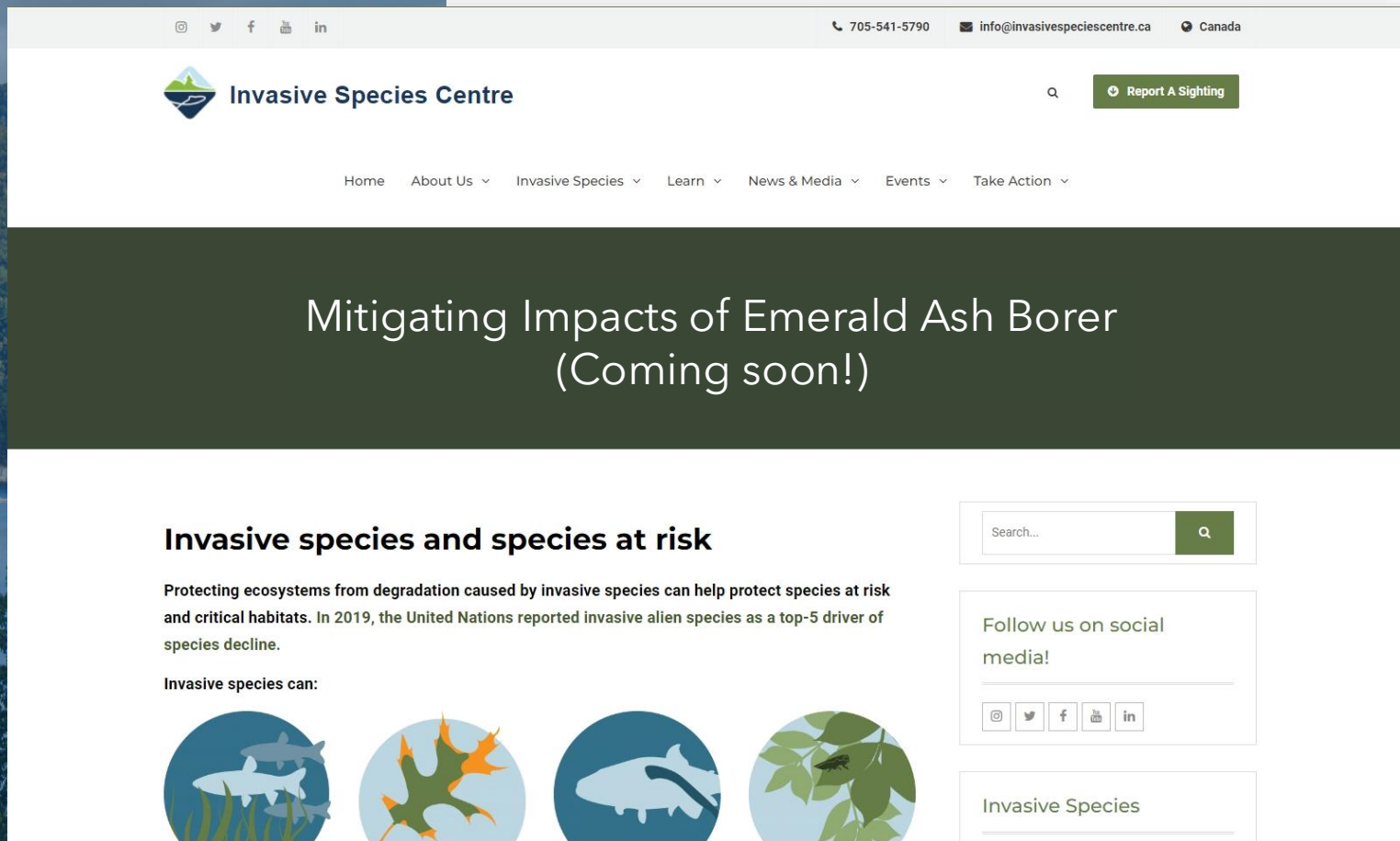
New Seed Collection Protocol for Volunteers: Quick Reference Sheet



Source: Forest Gene Conservation Association, 2024

- Based on: Seeds of Ontario & Eastern Canada A Manual for Tree and Shrub Crop Forecasting and Collection (2nd ed. 2024).
- Summarized version focusing specifically on ash in a handy factsheet format
- Resource available as digital version and hard copy
- Instructions on how to properly collect seeds & branch samples
- List of required tools and materials
- Includes photos of black ash I.D. features, and signs of EAB
- Links to new Mitigating Impacts of EAB webpage

New Webpage Development



- New webpage as a hub for volunteers
 - What is EAB? Impacts & I.D.
 - Black ash I.D.
 - SAR classification
 - Other ash I.D. tips
 - Seed & branch sample guidelines
 - EAB factsheet
 - Links to partner resources (NTSC, FGCA)
 - 'How to' video resources (black ash I.D., seed & branch sample collection)



A Glimmer of Hope?

Call to Action:

- We need **YOUR** help to safeguard black ash genetic diversity
- Calling on municipalities, organizations, environmental committees, naturalists' groups, Indigenous communities, woodlot owners to contribute volunteers for seed & branch sample collection
- ISC is here to provide training, resources & support and listen and learn

How you can help!

- Contribute to community science!
- Help us map locations of Black Ash

Ontario Black Ash Inventory
AUG 1, 2024

About

This iNaturalist project is part of a larger project to mitigate the impacts of the invasive emerald ash borer (EAB) on the at-risk species of black ash in Ontario. This work will combine education and outreach with research, seed preservation, genomics research, and gaining a better understanding of ash preservation and

[Read More >](#)

[Join](#) [3](#)

[Project Journal](#)

Overview 5 OBSERVATIONS 1 SPECIES 1 IDENTIFIER 5 OBSERVERS

Recent Observations ➔

Black Ash
Fraxinus nigra
1 2mo

Black Ash
Fraxinus nigra
1 2mo

Black Ash
Fraxinus nigra
1 2mo

Most Observations
1st smariner123 1

stuley 1
jleader 1
data_nerd 1
rossddickson 1

[View All](#) [View Yours](#)

Most Species
1st rossddickson 1

data_nerd 1
jleader 1
stuley 1
smariner123 1

[View All](#) [View Yours](#)

Most Observed Species
Black Ash 5

[View All](#) [View Yours](#)

Project Requirements ➔

Observations in this project must meet the following criteria:

Taxa	Black Ash (<i>Fraxinus nigra</i>)
Location	Ontario, CA
Users	Any
Projects	Any
Quality Grade	Research Grade, Needs ID
Media Type	Any
Date	August 1
Establishment	Any

Stats ➔

5 Observations

● Research Grade
● Needs ID
● Casual

Journal ➔

No journal posts yet



Visit - <https://www.inaturalist.org/projects/ontario-black-ash-inventory>



Upcoming Workshop

- Saturday, November 2nd at Science North, Sudbury
- Learn about the latest on EAB, ongoing black ash projects
- Training on seed & branch sample collection, including in-field demonstration
- Lunch & refreshments will be provided
- Stay tuned for official invite and registration!



Ash Preservation for the Future...

- Trees are unique, we can preserve seed for many years
- Preserving ash seeds from many location across Ontario allows communities to replant their collected seeds back in their community
- Collecting black ash seeds today may help preserve the species, offering the potential for future restoration efforts
- The seeds collected now are for your grandchildren to grow

Supporting Indigenous Action



Lucia Laford and planning team at
ISC Land Acknowledgment Unveiling

See land acknowledgement
and Ojibwe translation



Great Lakes Forestry Centre Day of Truth and
Reconciliation with special guest Elder Barb Nolan



Elder Joe Jones
of GRFN sharing
a smudge at
Himalayan
balsam kick-off



By the Rapids Community Event
with Batchewana First Nations
and Parks Canada

- Partnership ongoing with Anishinabek Nation and their 39 communities since 2020
- Supporting Grand Council Treaty #3 with invasive species monitoring and management
- Great Lakes Forestry Centre's Indigenous Community of Practice
- Relationship building and support to communities:
 - Batchewana First Nation
 - Atikameksheng Anishnawbek FN
 - Garden River First Nation
 - Missanabie Cree First Nation
- Work with Woodland artist Lucia Laford
- ISC's Forum session on Indigenous communities working on invasive species
- Invasive Species Municipal Community of Practice
- Inviting Indigenous perspectives and integrating two-eyed seeing into our work



Funding Opportunities

- The Invasive Species Action Fund (ISAF)
 - Three streams of funding
 - Microgrants
 - Smaller scale projects with an emphasis on community action and stewardship. All invasive species are eligible to be managed under this stream.
 - Accelerated Impact and Transformative Action
 - Larger scale projects taking place in priority geographies and addressing priority species such as those regulated under Ontario's Invasive Species Act.
- The Invasive Phragmites Control Fund (IPCF)
 - One stream of funding with a singular focus on invasive Phragmites
 - The fund supports local on-the-ground action on Phragmites to help amplify and expand control activities at a provincial scale

Thanks to the Ministry of Natural Resources for their continued, and ongoing financial support that allows us to make these funds possible.

Next call for proposals for both programs: Late Fall 2024



ISAF and IPCF – Indigenous Support

2023

- 9 Indigenous Groups or Communities applied for funding through ISAF and IPCF
- 6 Indigenous projects were funded
- 93 Indigenous communities were involved in the various projects

2024

- 17 Indigenous Groups or Communities applied for funding through ISAF and IPCF
- 13 Indigenous projects were funded
- 150 Indigenous communities will be involved in the various projects*

*This number is a projected number self-reported by the recipients and is subject to change



Vince La Tassa
David Dutkiewicz

vlatassa@invasivespeciescentre.ca

705-541-5748

www.invasivespeciescentre.ca