



Canadian Food  
Inspection Agency

Agence canadienne  
d'inspection des aliments

# Nova Scotia Hemlock Woolly Adelgid Update Western Woodland Conference, March 3, 2018

Ronald Neville, Plant Health Survey Unit



Canada

# The Canadian Food Inspection Agency aims to mitigate risks to Canada's plant resource base

- The plant protection program within the CFIA aims to prevent the introduction and spread of regulated plant pests, to detect and control or eradicate designated plant pests in Canada.
- Hemlock Woolly Adelgid is regulated under the authority of the Plant Protection Act

# Hemlock Woolly Adelgid (*Adelges tsugae*)



- Introduced invasive species
- Aphid-like pest feeds on the storage cells in hemlock twigs at the base of needles
- Significant pest of eastern hemlock

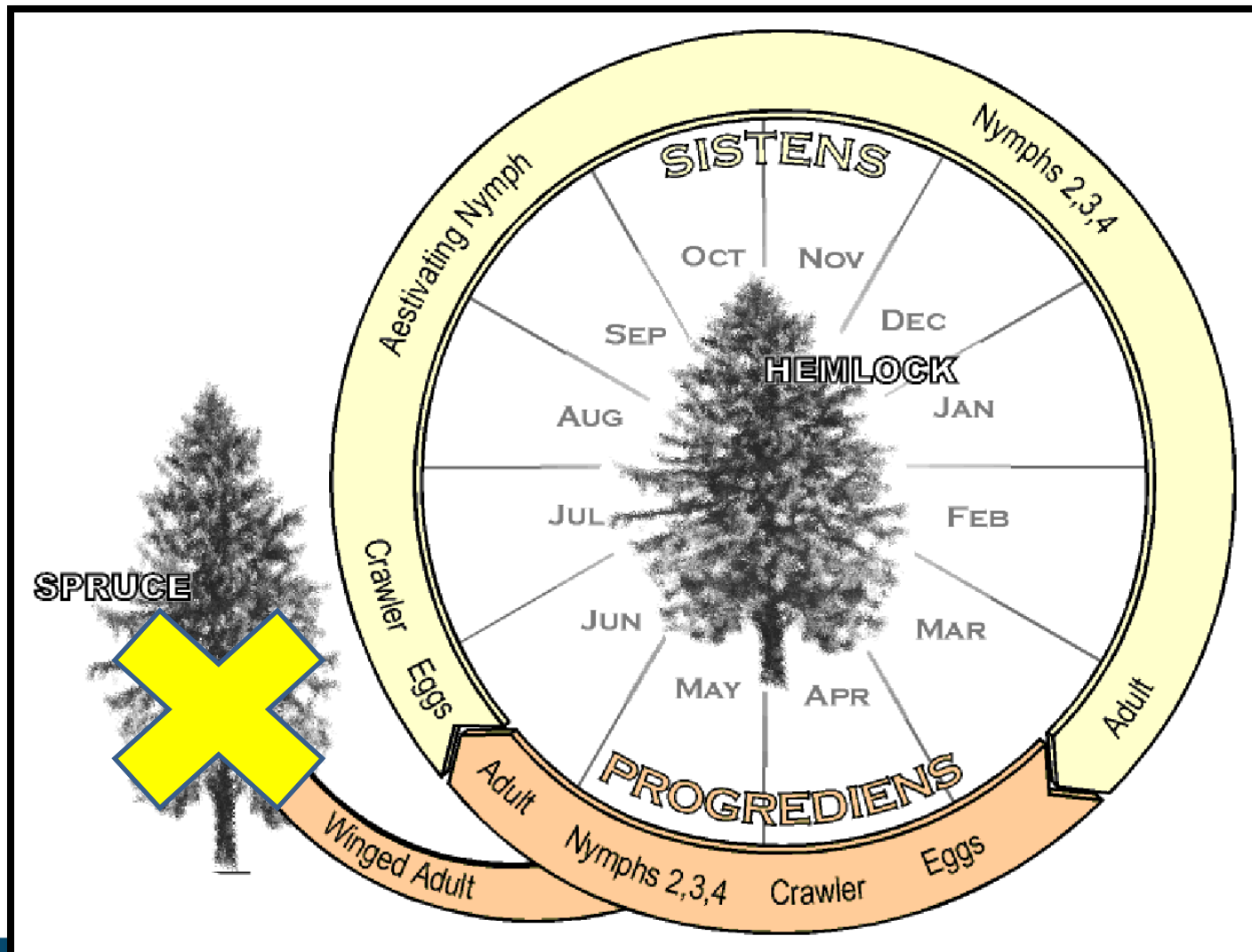
# Hemlock Woolly Adelgid (HWA)



- Asexual reproduction (all female)
  - **1** individual can start a new population
  - **2** generations per year (up to 200 eggs / female in 1<sup>st</sup> and fewer in 2<sup>nd</sup>)
  - **5000** potential progeny from 1 female / year
- Native natural enemies are lacking in Eastern North America
- No documented resistance by Eastern hemlock



# Life Cycle





**EGGS**



**NYMPHS**



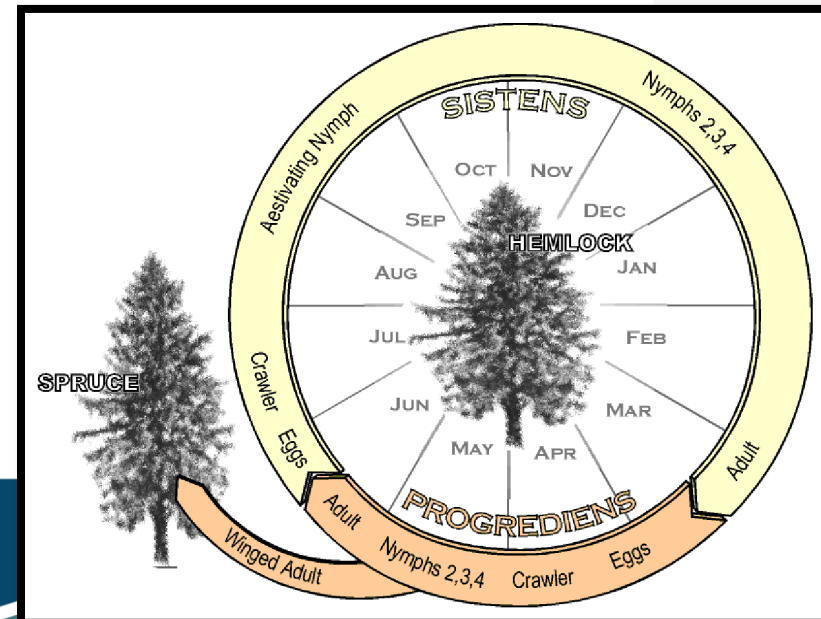
**CRAWLERS**



**ADULT**



**EGGS AND CRAWLERS  
FROM MARCH TO END OF  
JULY**





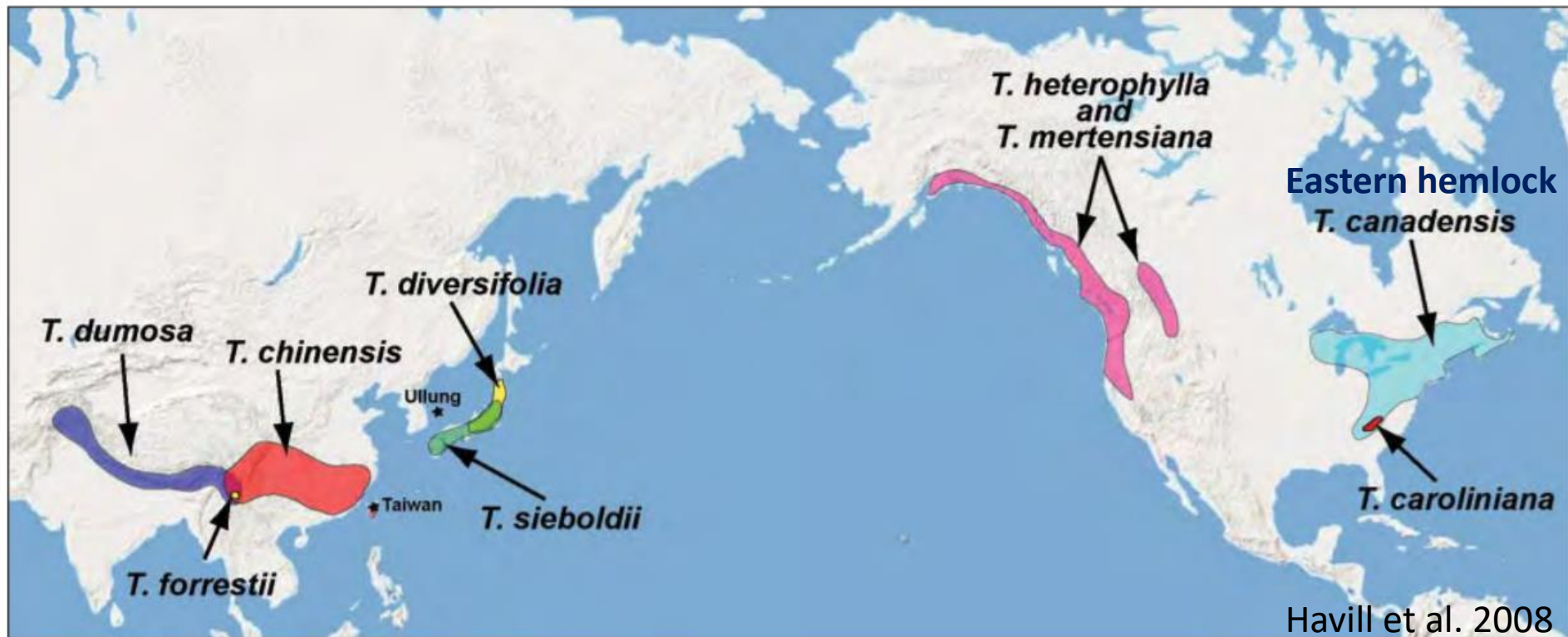
100X 20 kV

0008

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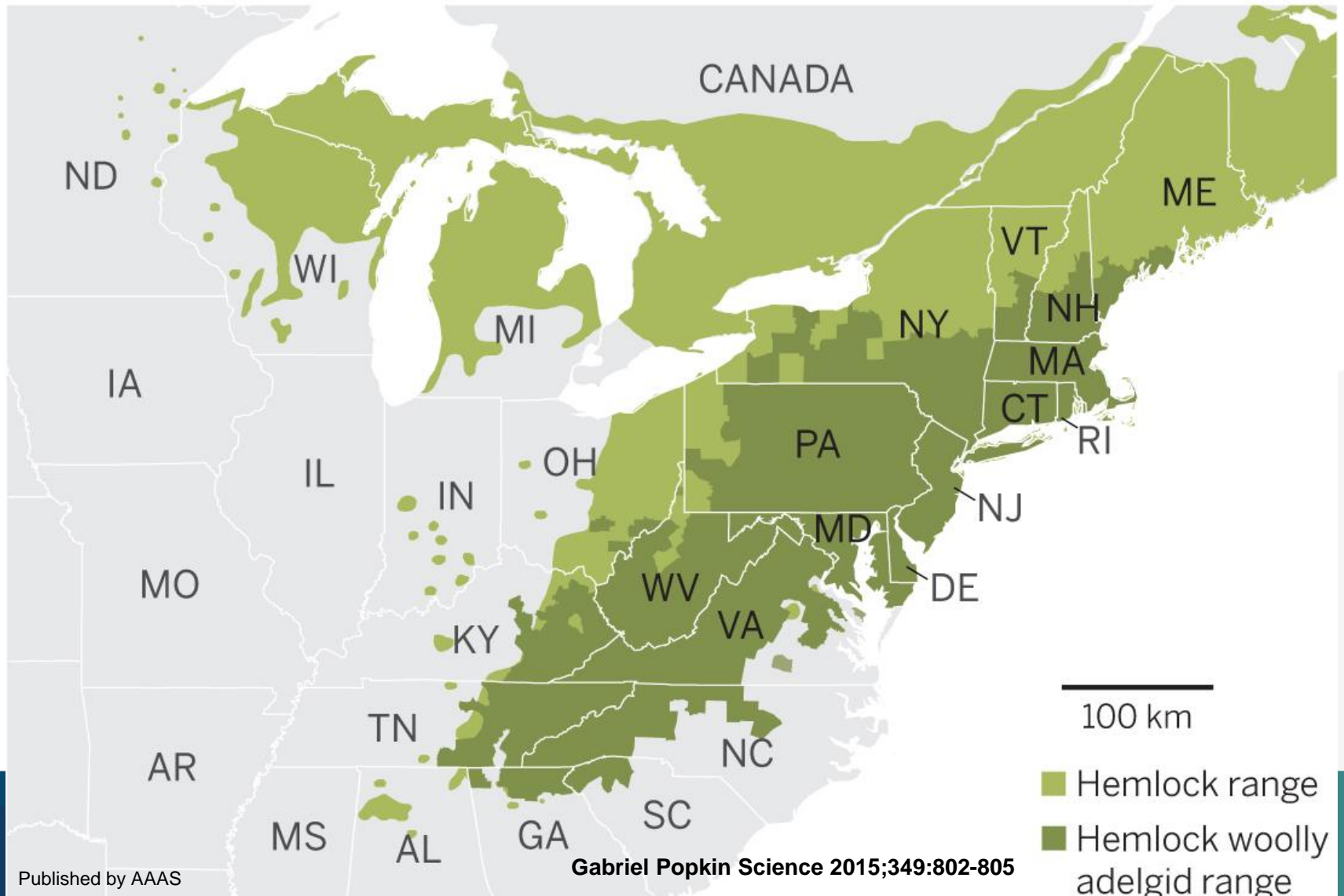
# Map of Hemlock Species Worldwide





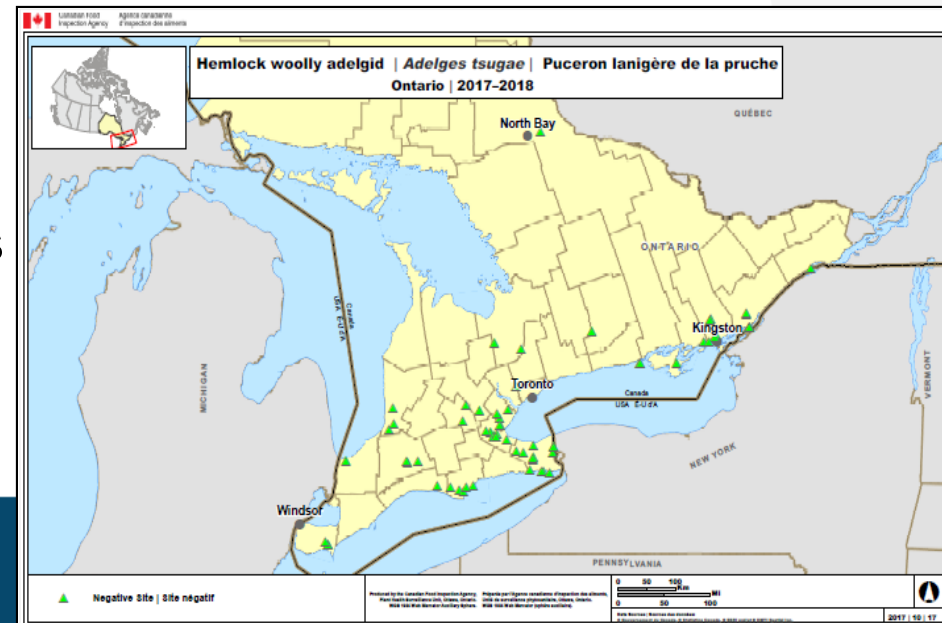
# A creeping conflict

The hemlock woolly adelgid now infests about half of the eastern hemlock's range, and has been spreading by about 15 kilometers per year.



# HWA Detections in Ontario

- Small localized populations detected in ON
  - Etobicoke residence in 2012 [referral from Arborist]
  - Niagara gorge population detected via CFIA regulatory survey in 2013-2015
- Prohibition of Movement
- Delimitation
- Infested trees removed through collaborative effort at both locations and follow-up surveys ongoing
- No further evidence detected since 2015

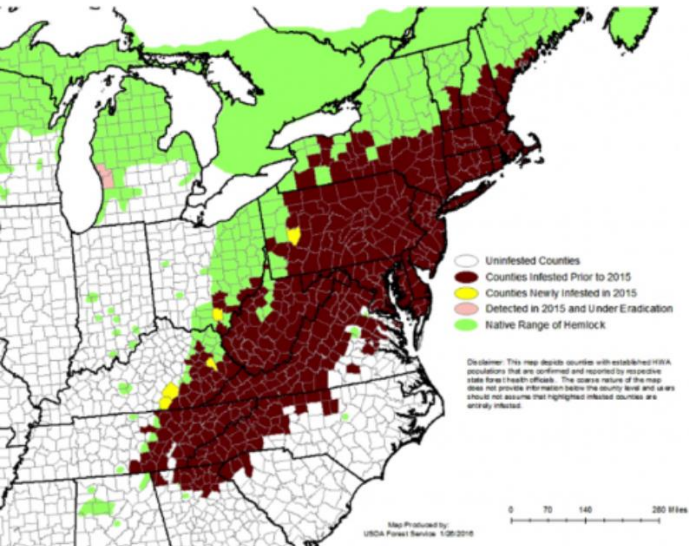


# HWA Detections in Nova Scotia

- Mid-July had referral from an arborist that trees in the Weymouth area were infested with HWA
- Followed up with samples and many survey sites
- Detections in five counties, Digby, Yarmouth, Shelburne, Annapolis and Queens
- Created a working group with CFIA, NSDNR, MTRI, CFS, Parks Canada, and a number of researchers



# How Did It Get Here??



- Wind ?
- Birds ?
- Humans ?





# **Hemlock Woolly Adelgid** **Puceron lanigère de la pruche**

**New Brunswick | Nouveau-Brunswick  
 and | et  
 Nova Scotia | Nouvelle-Écosse**

Survey results as of  
 November 30, 2017

Résultats de l'enquête  
 en date du 30 novembre 2017

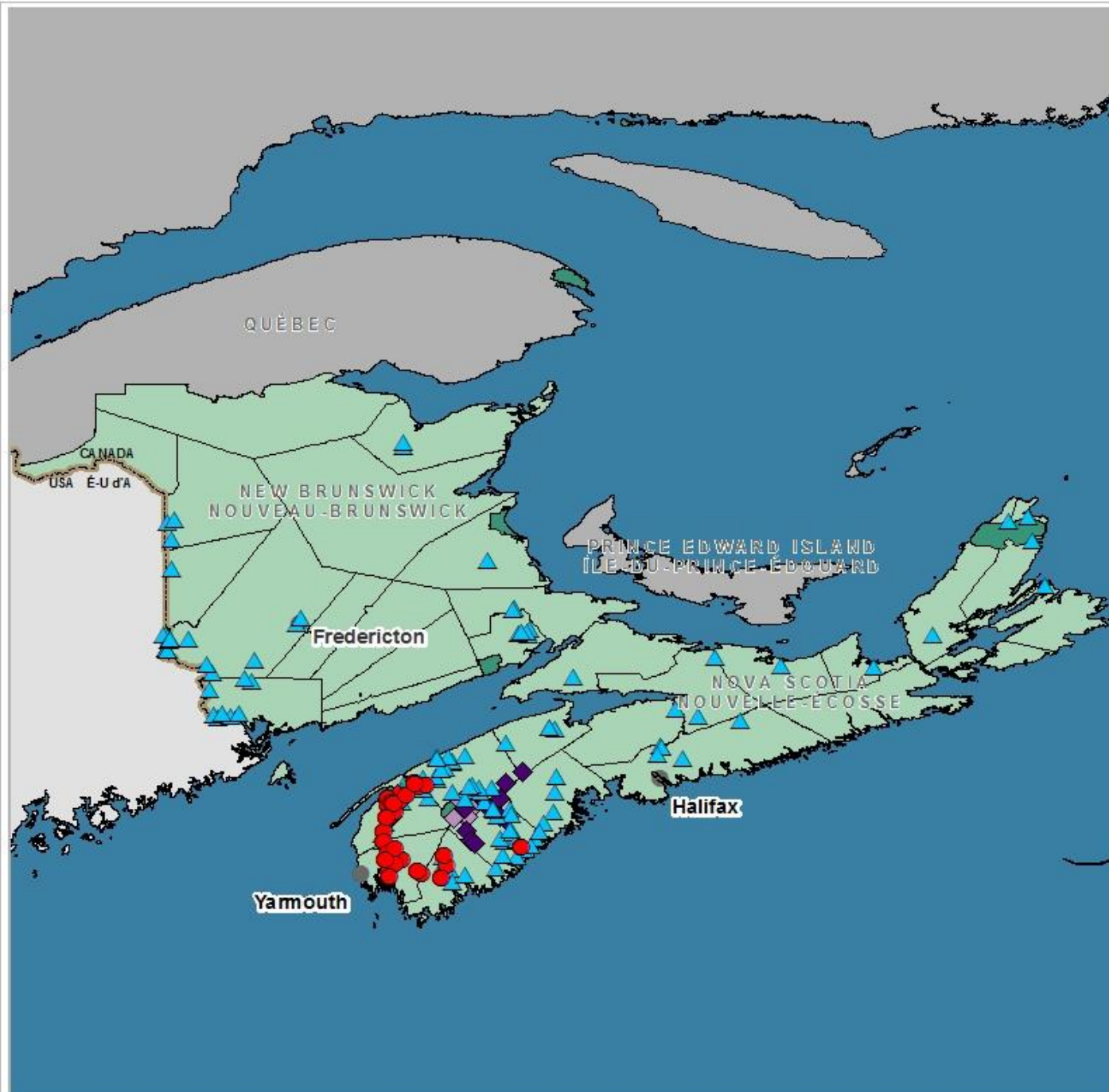
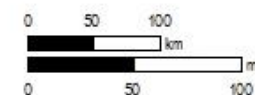
- Positive Site | CFIA-A CIA | Site positif
- ▲ Negative Site | CFIA-ACIA | Site négatif
- ◆ Positive Site | NSDNR-MRNNÉ | Site positif
- ◆ Negative Site | NSDNR-MRNNÉ | Site négatif
- ◆ Negative Site | Parks Canada-Parcs Canada | Site négatif
- National Parks of Canada | Parcs nationaux du Canada

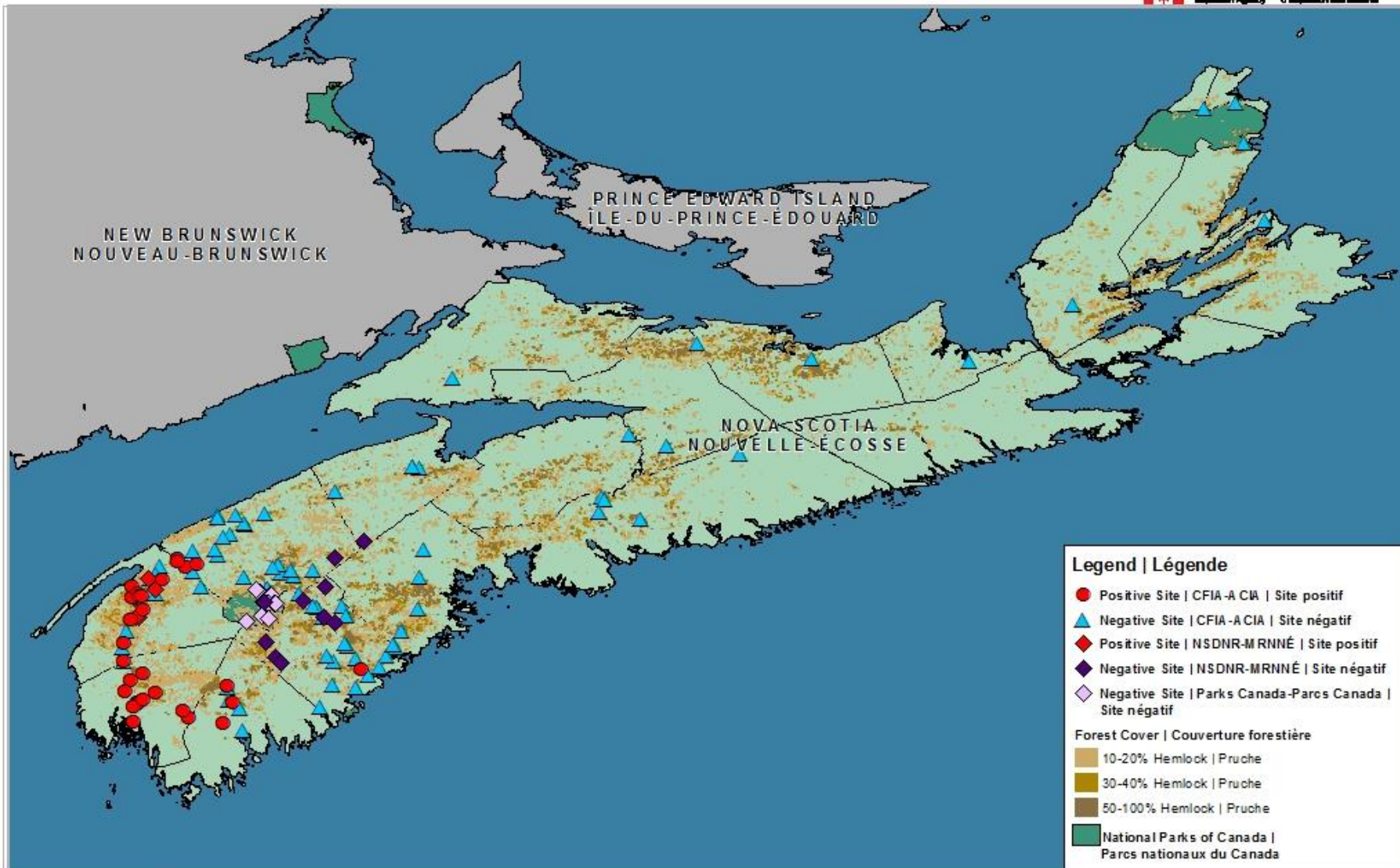


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 Plant Health Surveillance Unit, Ottawa, Ontario  
 WGS 1984 Web Mercator Auxiliary Sphere

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 Unité de surveillance phytosanitaire, Ottawa, Ontario  
 WGS 1984 Web Mercator (sphère auxiliaire)

Data Sources / Sources des données:  
 Plant Health Surveillance Unit, Ottawa, Ontario  
 NSDNR and NS DNR





Hemlock woolly adelgid | *Adelges tsugae* | Puceron lanigère de la pruche

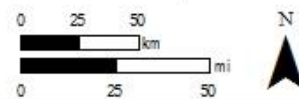
Nova Scotia | Nouvelle-Écosse

2017

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Régie canadienne d'inspection des aliments  
WGS 1984 Web Mercator auxiliary sphere

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Unité de surveillance phytosanitaire, Ottawa, Ontario  
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# **Hemlock Woolly Adelgid** **Puceron lanigère de la pruche**

## **Nova Scotia** **Nouvelle-Écosse**

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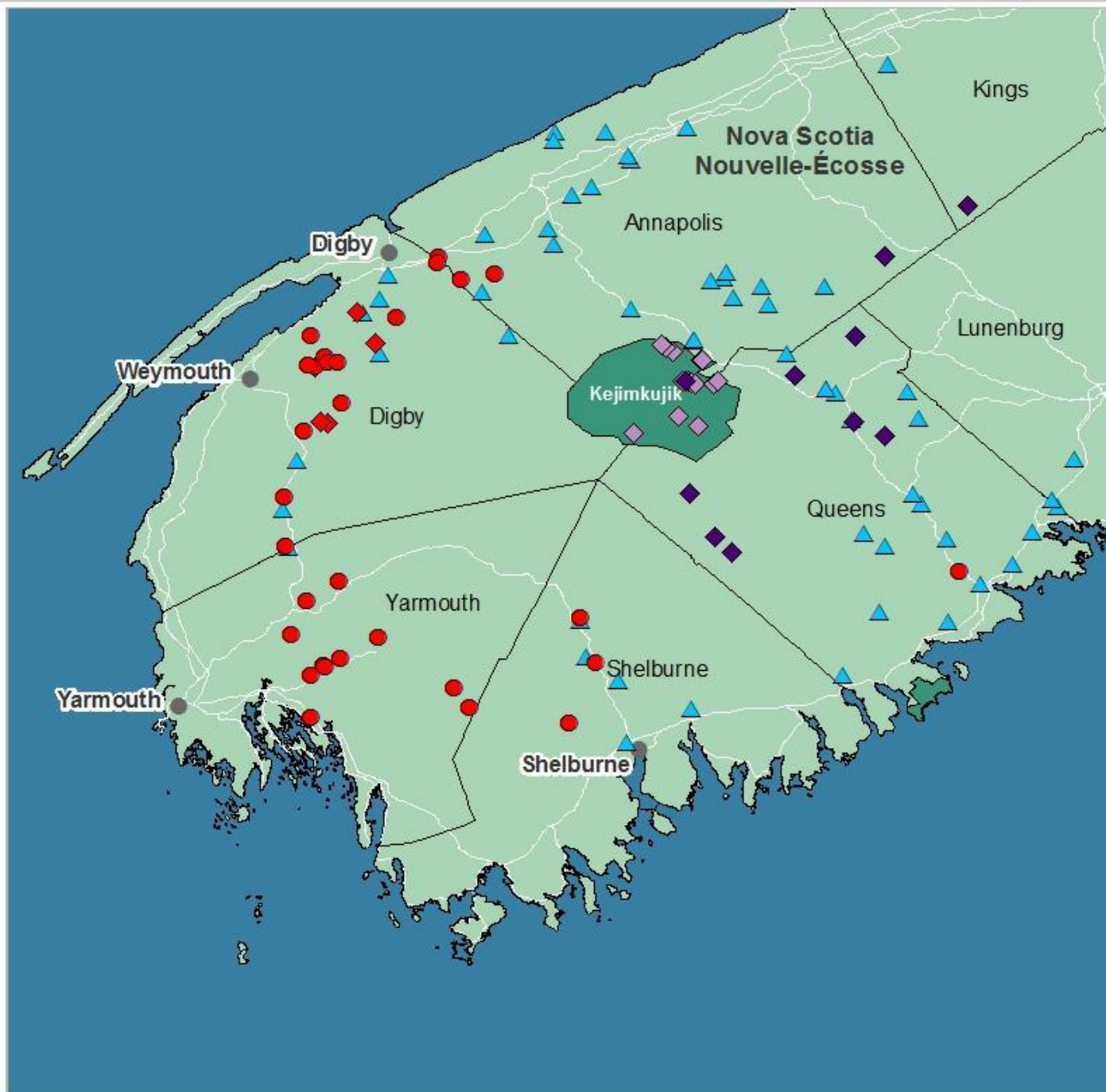
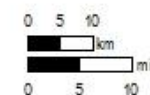
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Data Sources / Sources des données:  
 P. Gosselin et al. (2016), P. Gosselin et al. (2017),  
 P. Gosselin et al. (2018) and P. Gosselin et al. (2019)



# **Hemlock Woolly Adelgid** **Puceron lanigère de la pruche**

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**Nouvelle-Écosse**

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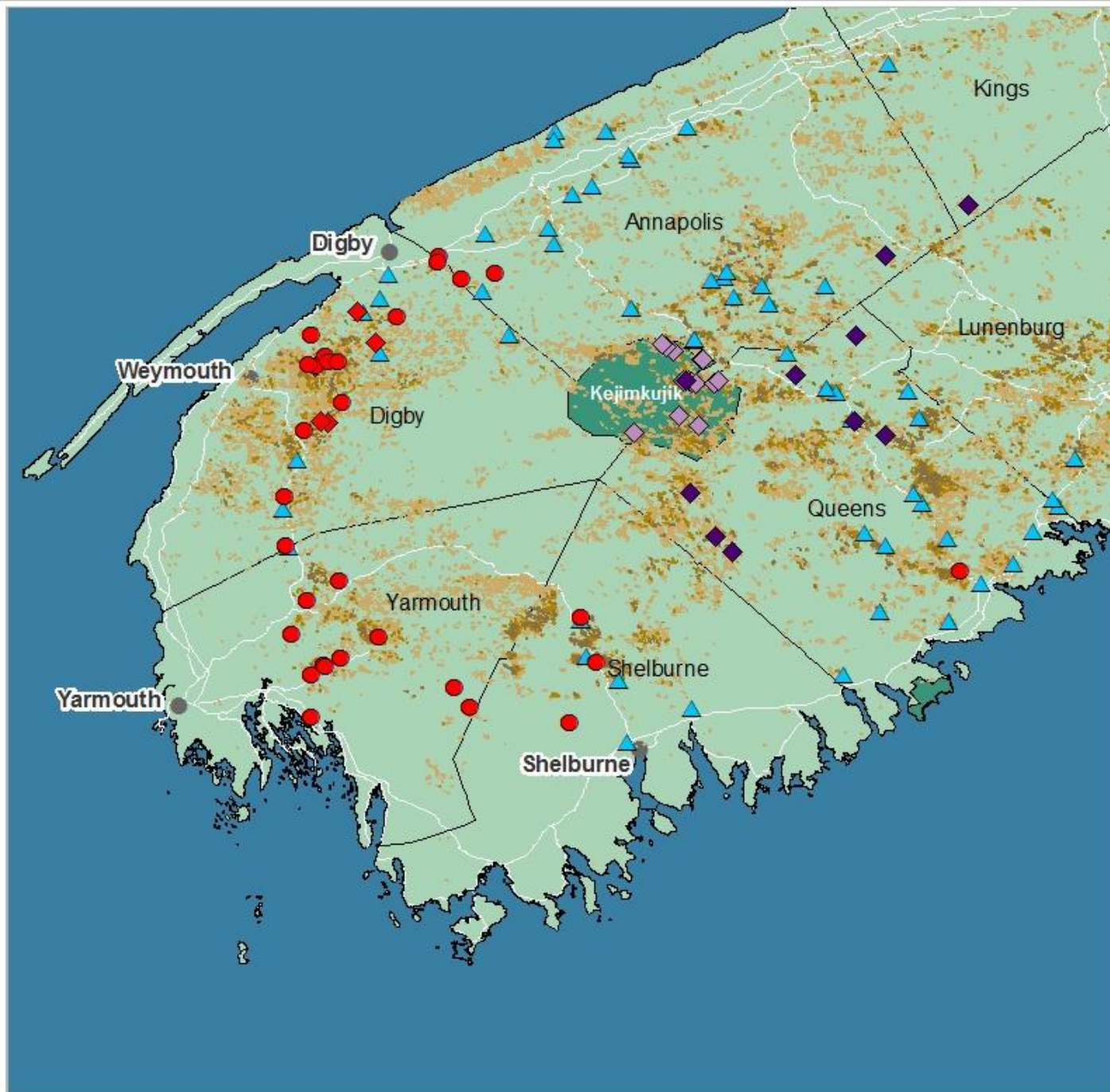
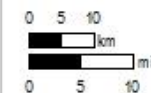
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- ◆ Negative Site | Parks Canada - Parcs Canada | Site négatif
- Forest Cover | Couverture forestière
  - 10-20% Hemlock | Pruche
  - 30-40% Hemlock | Pruche
  - 50-100% Hemlock | Pruche
  - National Parks of Canada | Parcs nationaux du Canada



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## Hemlock woolly adelgid | *Adelges tsugae* | Puceron lanigère de la pruche

### Infested Places | Lieux infestés



**Infested Places | Lieux infestés**

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2017 | 09 | 20

Canada

Prohibits or restricts the movement of the pest or regulated articles out of the infested place unless authorised beforehand under a movement certificate.



# Regulated Articles

- Propagative and non-propagative commodities of *Tsuga* spp. (hemlock), *Picea jezoensis* (Yeddo spruce), and *Picea polita* (Tiger-tail spruce) as follows:
- **Propagative Material:** Plants for planting.
- **Non-propagative Material:** Christmas trees; fresh decorative wreaths, foliage and branches; forest products with bark attached such as logs and lumber with bark; bark chips; wood mulch with bark; and dried branches.
- **Firewood of all species**



# Impact on Trees

- HWA can cause defoliation, twig dieback and mortality in as few as 4 years (4-10 years), sometimes up to 20 years.
- All sizes and ages of trees can be attacked.
- Feeding kills the buds first then the needles
- Drought and other factors can significantly hasten impacts of HWA

# Most Affected Trees Appear Healthy



From Aug 25

Photo: Matt Smith, Parks Canada







# Springhaven, NS - Aug 9, 2017







# What to Look For



**Egg  
Sacs**



# What to Look For



## Nymphs

# What to Look For



**Twig  
Dieback  
Yellow  
Needles**

# What to Look For



**Fallen  
Branches**



# What to Look For



**Egg sacs  
on tree  
trunks**

# HWA Look-alikes



Photo credit: D. Ouellette, Maine Forest Service



Photo credit: D. Ouellette, Maine Forest Service



Photo credit: D. Ouellette, Maine Forest Service



Photo credit: Eric R. Day, Virginia Polytechnic Institute and State University, [www.forestryimages.org](http://www.forestryimages.org)



Photo credit: S. Costa, University of Vermont



Photo credit: D. Ouellette, Maine Forest Service

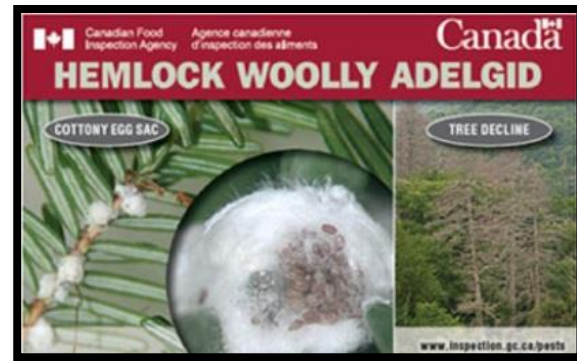
## HWA





# HWA Outreach

- Signage
- Credit Cards
- Citizen Science iNaturalist – 2018
- Media / CFIA Website
- Social Media
- Partnerships
- Collaborative training



iNaturalist

« Projects



Healthy Hemlock Forests of the Maritimes

Stats

Invasive Species Centre  
March 21, 2017 · 🌐

The answer is all of the above! #TriviaTuesday

FEMALE HWA PRODUCE WOOL-LIKE WAX FILAMENTS TO:

- PROTECT ITSELF AND ITS EGGS FROM ENEMIES
- PREVENT EGGS FROM DRYING OUT



👍 Like    💬 Comment



# Managing HWA

- Integrated Pest Management Program in the USA
  - Chemical – using chemical insecticides for short term protection
  - Biological – key in the USA strategy
  - Silvicultural – thinning stands to allow increased light

**These methods need to be assessed for feasibility for use in Canada.**

# Survey Reports and Pest Info

- <http://www.inspection.gc.ca/plantsurvey>

 [https://twitter.com/CFIA\\_Canada](https://twitter.com/CFIA_Canada)

## Contact Info

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- (902) 536-1022