

# *Emerald Ash Borer (EAB)*



## THE THREAT TO THE URBAN FOREST

PAUL HAMBIDGE, URBAN FOREST SPECIALIST MAY 2013



# What is Emerald Ash Borer?



- An invasive species commonly referred to as EAB
- Imported from Asia and discovered in Michigan and Windsor, Ontario in 2002. **No natural predators North America**
- Attacks and kills all species of ash tree
- Millions of ash trees killed in North America since then



# How does it Kill the tree?

- Adult females lay individual eggs distributed over the bark of tree
- Eggs hatch out –larvae bore through the bark and feed on the vascular tissue beneath
- Unchecked numbers obstruct flow of water and nutrients



# Adult EAB

- Adult females emerge leaving characteristic D-shaped emergence hole





# Symptoms on the tree

- Canopy becomes thin with weak, smaller foliage



# Symptoms on the tree

- Epicormic shoots produced on trunk and branches





# Symptoms on the tree

- Tree succumbs and rapidly dies



# Insect build-up & Ash tree death

- One adult female = 1 Trillion insects in year 9
- Losses are exponential once populations build up

**Predicted Ash tree mortality in Peterborough 2014-2023**





# How rapidly is it spreading?

- Natural spread only about 4km/year
- Artificial spread by human actions (any distance)
- Principal cause –movement of wood, especially firewood

# Impact of EAB

- Toledo, Ohio



- 2005



- 2009



# Impact of EAB

- Loss of tree cover



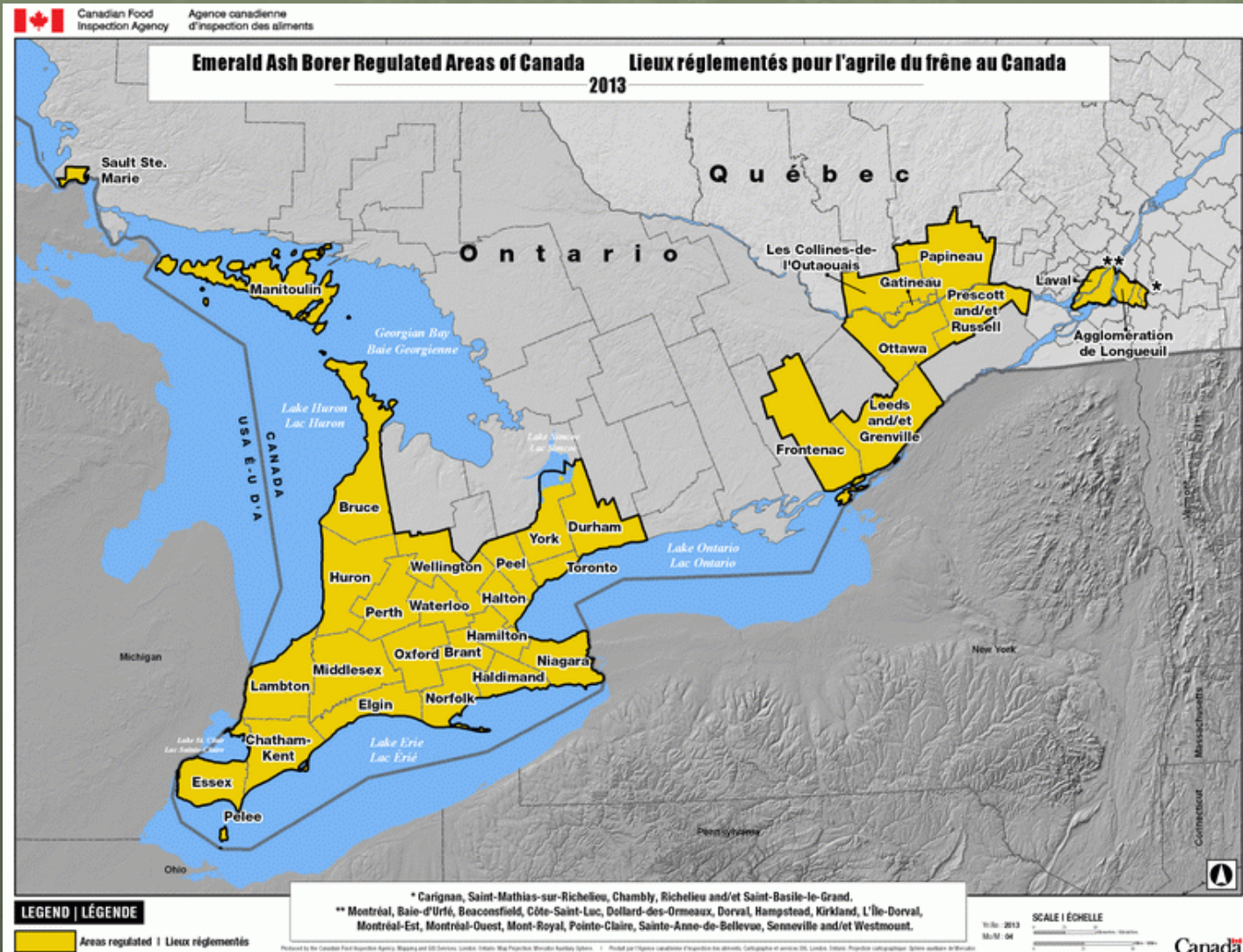
- Aesthetic, environmental, property values

# Roles and Responsibilities

- All levels of government have a role in dealing with EAB
- All costs of EAB management must be borne by local Municipalities and private property owners



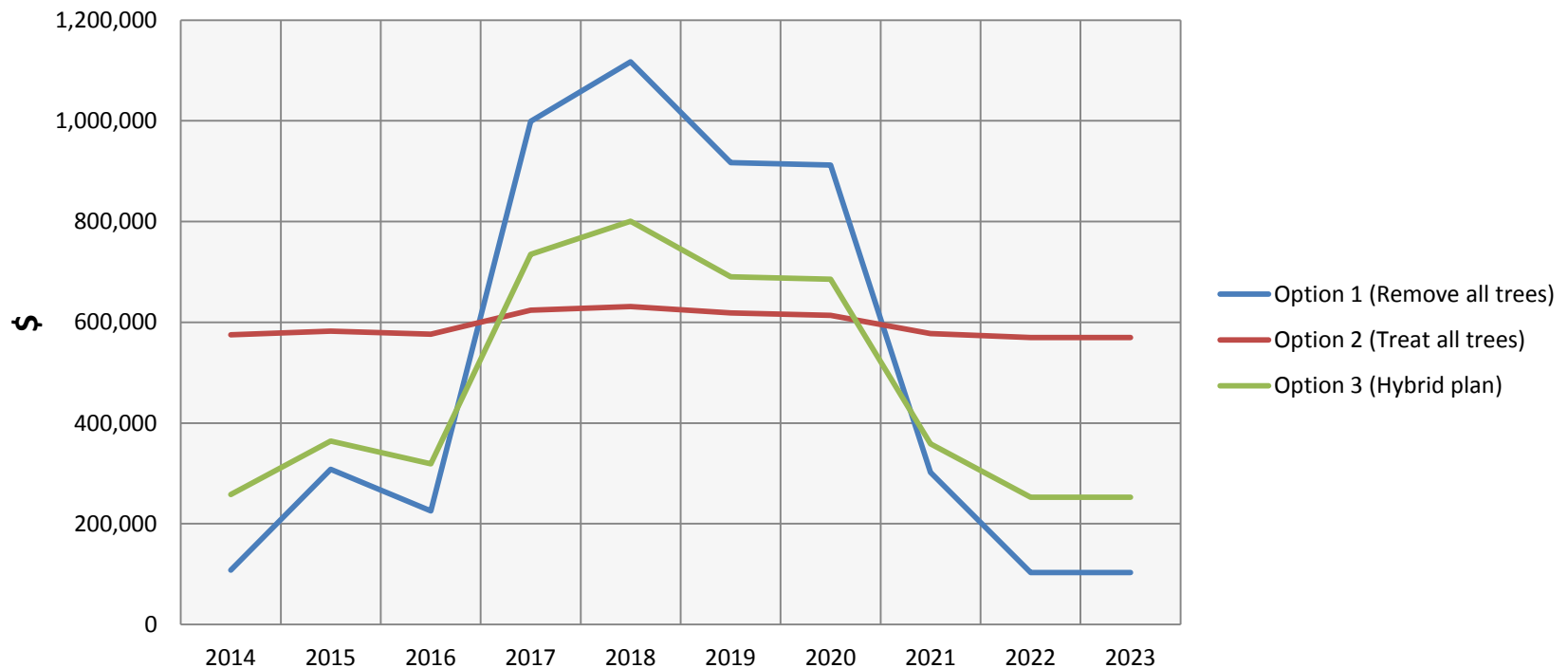
# Where is it now ?



# Three Management Strategies

- Option 1: Remove all the Ash trees as they die
- Option 2: Treat all structurally sound ash trees
- Option 3: Combined treatment and removals program

**Annual EAB Management Option Costs**

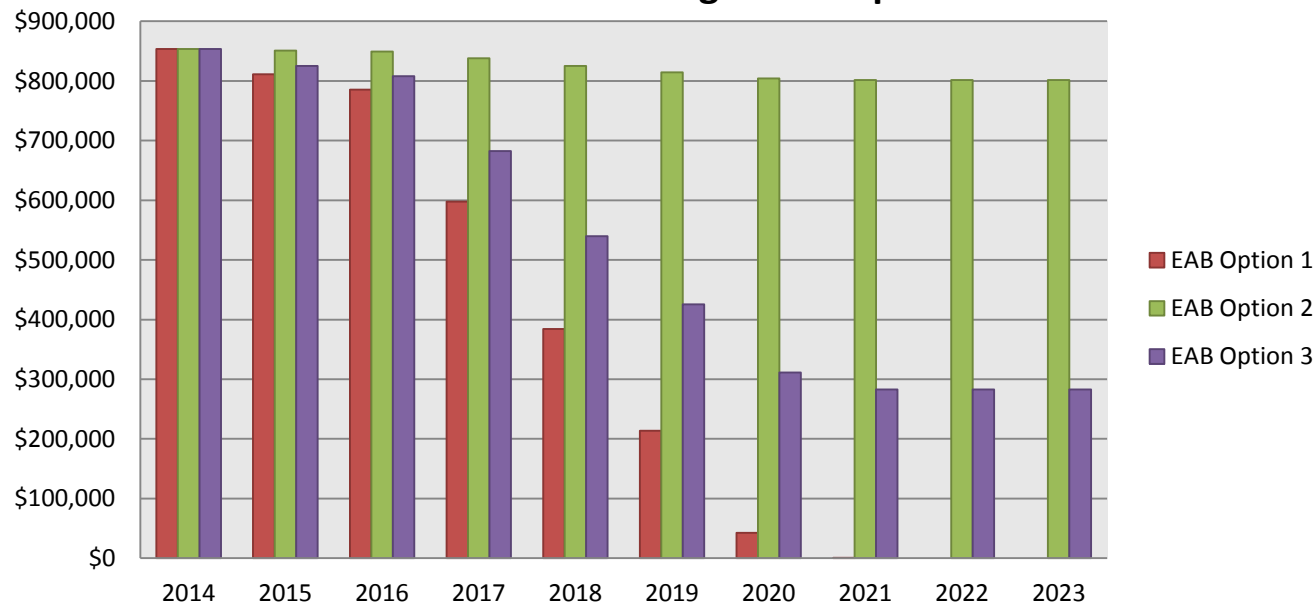




# Tree Benefits

- Option 1: Remove all the Ash trees as they die
- Option 2: Treat all structurally sound ash trees
- Option 3: Combined treatment and removals program

**Chart 4: Annual Ash Tree Benefits to the Community  
Versus EAB Management Options**



# Costs

## Option 1 – Let all trees die

Year	Number of Trees Removed <sup>(1)</sup>	Inventory, Monitoring & Assessment (\$)	Waste Disposal <sup>(2)</sup> (\$)	Treatment Cost <sup>(3)</sup> (\$)	Removal Cost <sup>(4)</sup> (\$)	Replanting Cost <sup>(5)</sup> (\$)	Public Education & Communications (\$)	Yearly Totals (\$)
2013	0	148,000	0	0	0	0	25,000	173,000
2014	0	98,000	0	0	0	0	10,000	108,000
2015	243	98,000	-3,000	0	153,090	52,000	10,000	310,090
2016	145	98,000	-1,800	0	91,350	31,200	10,000	228,750
2017	1067	98,000	-13,300	0	672,210	228,800	10,000	995,710
2018	1213	98,000	-15,200	0	764,190	260,000	10,000	1,116,990
2019	970	98,000	-12,100	0	611,100	208,000	10,000	915,000
2020	970	98,000	-12,100	0	611,100	208,000	5,000	910,000
2021	242	98,000	-3,000	0	152,460	52,000	5,000	304,460
2022	0	98,000	0	0	0	0	5,000	103,000
2023	0	98,000	0	0	0	0	5,000	103,000
<b>Totals</b>	<b>4,850</b>	<b>\$1,128,000</b>	<b>-\$60,500</b>	<b>\$0</b>	<b>\$3,055,500</b>	<b>\$1,040,000</b>	<b>\$105,000</b>	<b>\$5,268,000</b>



# Costs

Option 1 – Let all trees die (\$5,268,000)

Option 2 - Treat all trees

Year	Number of Trees Removed <sup>(1)</sup>	Inventory, Monitoring & Assessment (\$)	Waste Disposal <sup>(2)</sup> (\$)	Treatment Cost <sup>(3)</sup> (\$)	Removal Cost <sup>(4)</sup> (\$)	Replanting Cost <sup>(5)</sup> (\$)	Public Education & Communications (\$)	Yearly Totals (\$)
2013	0	148,000	0	0	0	0	25,000	173,000
2014	0	98,000	0	467,000	0	0	10,000	575,000
2015	15	98,000	-200	467,000	9,450	3,200	10,000	587,450
2016	8	98,000	-100	467,000	5,040	1,600	10,000	581,540
2017	64	98,000	-800	467,000	40,320	14,000	10,000	628,520
2018	73	98,000	-900	467,000	45,990	15,600	10,000	635,690
2019	58	98,000	-700	467,000	36,540	12,400	10,000	623,240
2020	58	98,000	-700	467,000	36,540	12,400	5,000	618,240
2021	15	98,000	-200	467,000	9,450	3,200	5,000	582,450
2022	0	98,000	0	467,000	0	0	5,000	570,000
2023	0	98,000	0	467,000	0	0	5,000	570,000
<b>Totals</b>	<b>291</b>	<b>\$1,128,000</b>	<b>-\$3,600</b>	<b>\$4,670,000</b>	<b>\$183,330</b>	<b>\$62,400</b>	<b>\$105,000</b>	<b>\$6,145,100</b>

# Costs

Option 1 – Let all trees die (\$5,268,000)

Option 2 - Treat all trees (\$6,145,000)

Option 3 – Hybrid plan (\$4,909,450)

Year	Number of Trees Removed <sup>(1)</sup>	Inventory, Monitoring & Assessment (\$)	Waste Disposal <sup>(2)</sup> (\$)	Treatment Cost <sup>(3)</sup> (\$)	Removal Cost <sup>(4)</sup> (\$)	Replanting Cost <sup>(5)</sup> (\$)	Public Education & Communications (\$)	Yearly Totals (\$)
2013	0	148,000	0	0	0	0	25,000	173,000
2014	0	98,000	0	150,000	0	0	10,000	258,000
2015	147	98,000	-1,800	150,000	92,610	18,400	10,000	367,210
2016	88	98,000	-1,100	150,000	55,440	10,800	10,000	323,140
2017	646	98,000	-8,100	150,000	406,980	80,000	10,000	736,880
2018	733	98,000	-9,200	150,000	461,790	91,200	10,000	801,790
2019	587	98,000	-7,300	150,000	369,810	72,800	10,000	693,310
2020	587	98,000	-7,300	150,000	369,810	72,800	5,000	688,310
2021	147	98,000	-1,800	150,000	92,610	18,000	5,000	361,810
2022	0	98,000	0	150,000	0	0	5,000	253,000
2023	0	98,000	0	150,000	0	0	5,000	253,000
<b>Totals</b>	<b>2,935</b>	<b>\$1,128,000</b>	<b>-\$36,600</b>	<b>\$1,500,000</b>	<b>\$1,849,050</b>	<b>\$364,000</b>	<b>\$105,000</b>	<b>\$4,909,450</b>

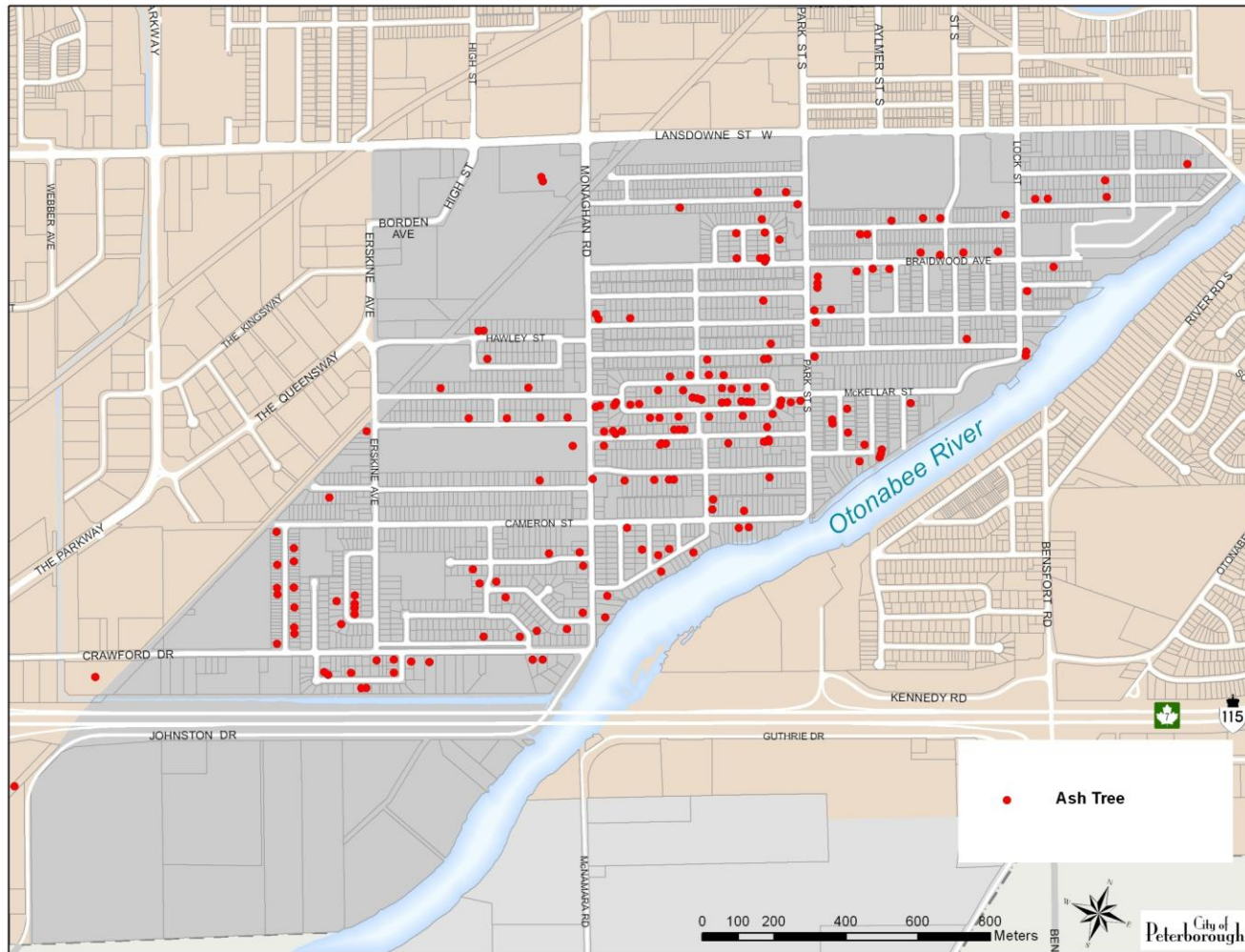


# EAB Strategic Management

- Conduct City-wide tree inventory
- Monitor for EAB through trapping & branch sampling
- Conduct Public education & outreach
- Implement a proactive removals, treatments and replacement planting program

# Inventory

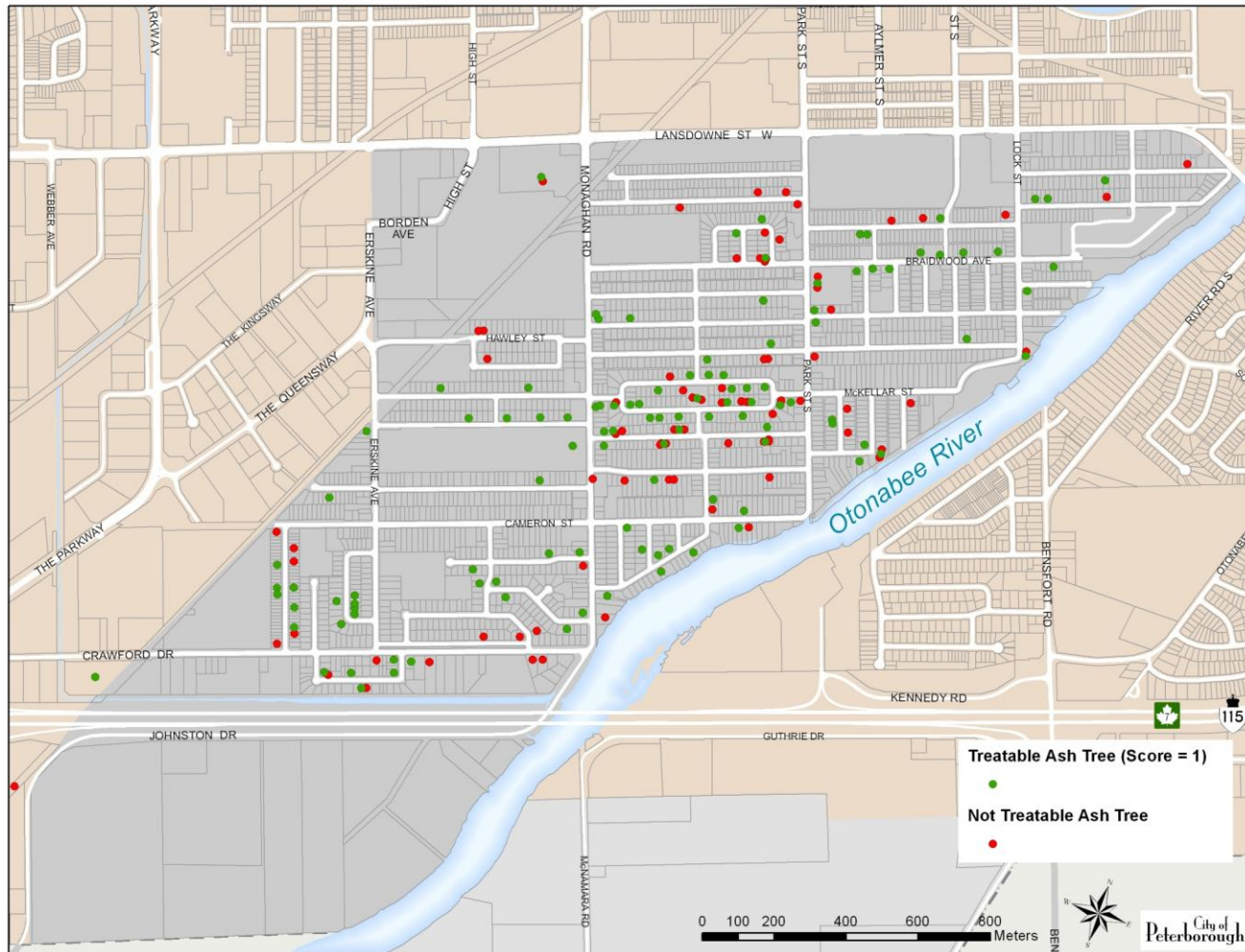
## Ash tree sampling in the right of way





# Inventory

## Ash tree sampling in the right of way



# Monitoring

- Traps
- Branch sampling





# Detection

- Observation, woodpecker damage, symptoms etc. (too late!)





# Treatments

- TreeAzin, Confidor 200 SL, IMA-Jet
- TreeAzin used most in Ontario municipalities (class 4 pesticide)
- Bio-pesticide derived from Neem Oils
- Treatments 98% effective
- Needed every 2 (possibly 3) years
- Alternatives will emerge over coming years



# Application





# EAB Summary

- EAB will eventually come to the Greater Peterborough Area
- EAB will kill all untreated ash trees
- The impact of EAB can be managed with advanced planning
- A proactive program of removals, treatments and replacement planting (with a different species!) is the most sustainable option for the urban forest



# Questions ?



## EAB - THE THREAT TO THE URBAN FOREST

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# Resource Slides

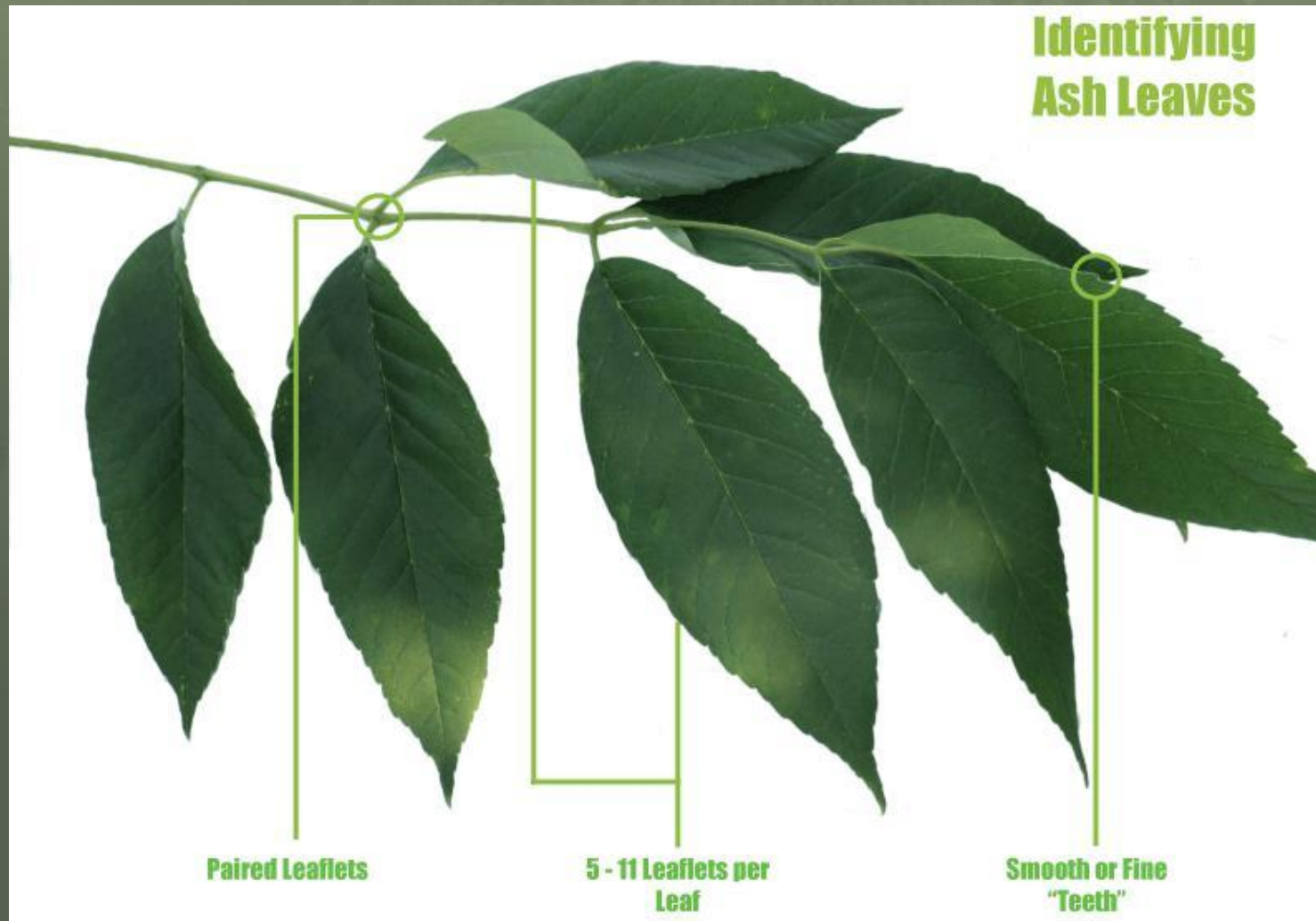


# Ash Tree Identification - Leaf





# Ash Tree Identification - Leaf



# Ash Tree Identification – Fruit (seed)





# Ash Tree Identification - Bark





# Ash Tree Identification - Bark

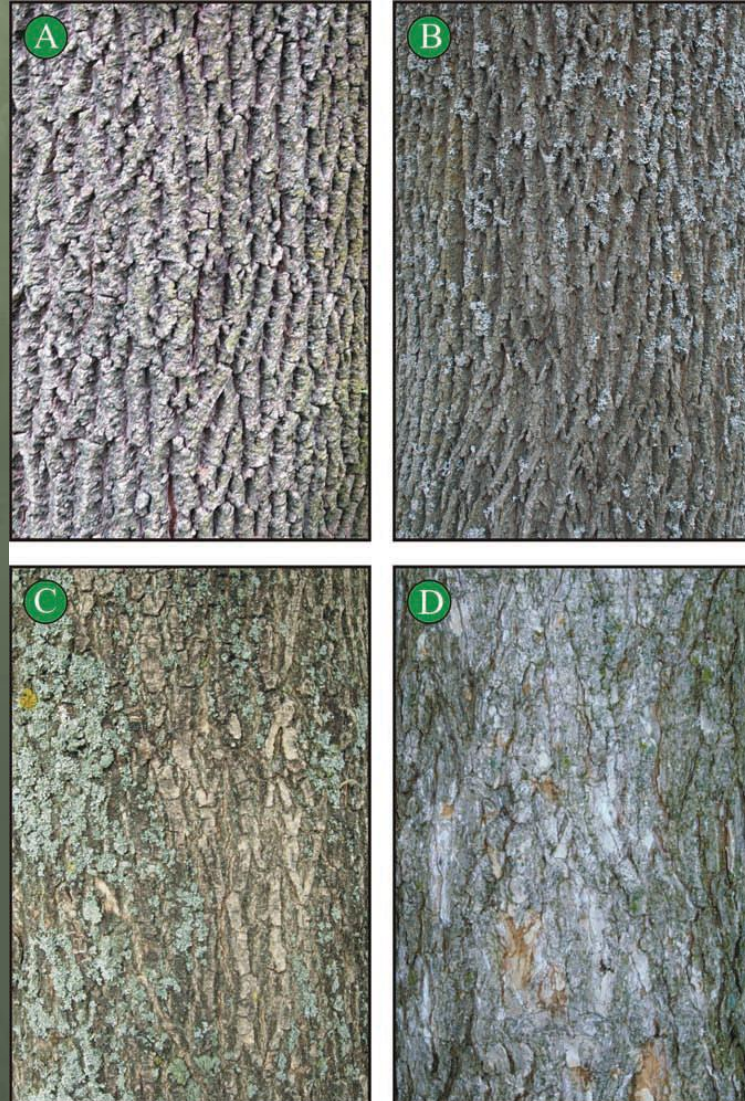
Mature bark of :

A green/red ash,

B white ash,

C black ash,

D blue ash.



# Ash Tree Identification – Whole Tree

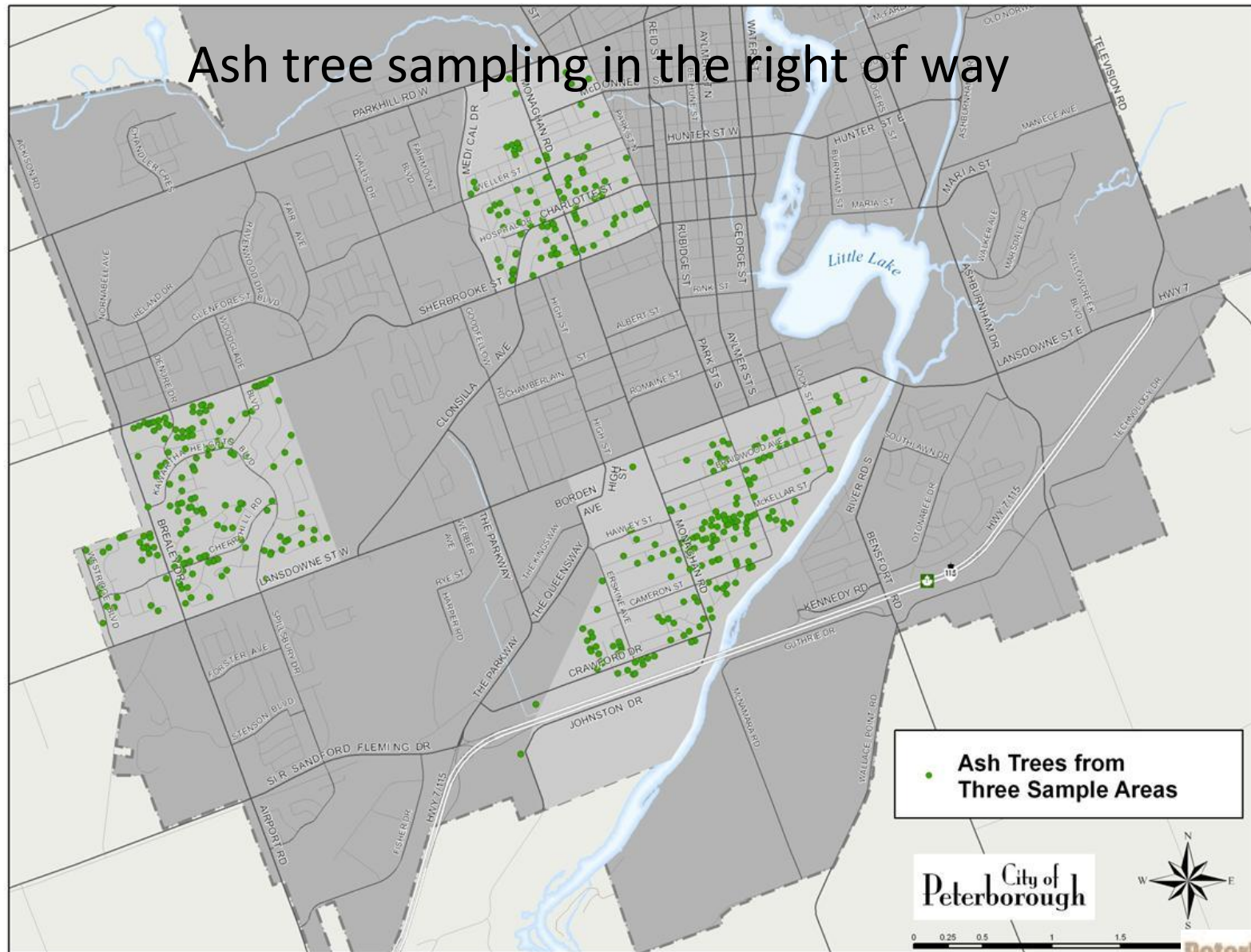


McKellar Street Peterborough



# Inventory

## Ash tree sampling in the right of way





# Ward 1 - Ash Trees



Park Street South – Risk to St John CES

# Otonabee Ward 1 - Ash Trees



McKellar Street – many mature ash



# Monaghan Ward 2 - Ash Trees



Cherryhill Road –most of the trees in this view will be lost

# Monaghan Ward 2 - Ash Trees



Sherbrook Street – most trees on the right would be lost/require removal



# Town Ward 3 - Ash Trees



Downtown – Ash is a survivor in the harshest of environments

# Town Ward 3 - Ash Trees



Charlotte Street



# Ashburnham Ward 4 - Ash Trees



Maria Street

# Ashburnham Ward 4 - Ash Trees



Maria Street – Ash canopy



# Northcrest Ward 5 - Ash Trees



Cumberland Avenue – All the yellow fall colour are ash

# Northcrest Ward 5 - Ash Trees



Herbert Street



# Northcrest Ward 5 - Ash Trees



Franklin / Hilliard – group of 5 Autumn Purple ash