

#### Municipal and Conservation Authority Invasive Species Investment Understanding Costs to Ontario Communities

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> Colin Cassin\* & David Nisbet Invasive Species Centre





## **INVASIVE SPECIES CENTRE**

The Invasive Species Centre (ISC) was founded by the Governments of Canada and Ontario to act as a hub for collaboration and knowledge sharing between stakeholders.

Incorporated as a not-for-profit in 2011, the ISC has grown into a respected collaborator, knowledge broker, partner and leader in invasive species research and action in Ontario and beyond.



**MISSION** The Invasive Species Centre connects stakeholders, knowledge and technology to prevent and reduce the spread of invasive species that harm Canada's environment, economy and society.



## **Economic Impacts Project**

# **Question:** What are invasive species costing Ontario's communities?



Street trees removed due to emerald ash borer; Photo: CBC news.



#### **Impacts of Invasive Species**



Neighbourhood before and after Emerald Ash Borer Photo Credit: Rob Gordon



## **Impacts of Invasive Species**



Phragmites in St. Thomas, Ontario (before eradication)

Photo Credit: David Collins





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## **Impacts of Invasive Species**



# Zebra Mussels clogging water intake pipe

Photo Credit: Marrone Bio Invasions





#### **Economic Impacts of Invasive Species**

#### **ECONOMIC IMPACT LITERATURE (EXAMPLES)**

- Estimates of environmental damages from a variety of species in the U.S. indicate costs of almost **\$120 billion** a year (Pimental et al., 2005)
- **Treatment and removal of EAB killed ash trees** in Canadian urban areas over a 30 year time frame could range from **\$451 million to \$2 billion** (McKenney et al., 2012)
- Treatment and removal of EAB killed ash trees in 25 U.S. states over a 10 year time frame estimated over \$10.7 billion (Kovacs et al., 2010)
- Annual economic impact in Canada estimated at \$16.6 billion for 16 prominent "nuisance" species in the fisheries, agriculture, and forestry industries (Colautti et al., 2006)
- **Key Gap:** lack of data from a digestible level; community scoped information lacking



#### Economic Impacts Analysis: Ontario Municipalities

#### **GOAL**:

To quantify Municipal **EXPENDITURES** associated with invasive species, not total **COSTS** in Ontario





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### 2019 Survey

#### What are Invasive Species Costing You?

Calling all Ontario Municipalities and Conservation Authorities - we need your numbers!

#### Inventories

Complete your inventory here- select only one that pertains best to your department

#### Municipal Department Specific

By-laws/Public Works/Roads/Infrastructure

Forestry, Parks & Recreation, Natural Areas and Natural Heritage Department

Aquatic, Wastewater Management, Streams & River, Sewer, Water Department

#### Conservation Authority Department Specific

By-laws/Public Works/Roads/Infrastructure

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## 2019 Survey Response

#### 2019 Conservation Authority Survey Results:

• 16 unique CA's represented (44.4% of 36 Ontario CA's)

## 2019 Municipal Survey Results:

 88 unique municipalities (19.8% of 444 Ontario municipalities) represented



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## **Data Extrapolation**

Summary of per capita extrapolation results for estimated total expenditure on invasive species by all municipalities and conservation authorities in Ontario

Survey Data	Extrapolation Level	Municipalities (\$ millions)	CAs (\$ millions)	Total (\$ millions)
2019	Provincial	\$40.2	\$9.3	\$49.5
	Regional	\$41.2	\$10.9	\$52.1
	Municipal Category	\$44.0	\$9.3	\$53.3
2017-2019	Provincial	\$42.3	\$8.4	\$50.8
	Regional	\$43.1	\$8.8	\$52.0
	Municipal Category	\$42.3	\$8.4	\$50.7



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Per capita extrapolation results show total invasive species expenditures ranging from \$49.5 to \$53.3 Million. This small range enhances confidence in these estimates.



## Let's Dig Deeper

- 1. How is the money being invested?
  - Is investment primarily in staff? Contractors? Equipment?
- 2. At what stage is the money being invested?
  - Is investment reactionary (i.e. control) or preventative (i.e. detection)?
- 3. What species are we investing in?
  - Is investment dispersed across many species? Squeaky wheels?



# Expenditures by Department & Category of Expenditure (Municipalities)



Private consultation and services Other

\*Figures based on 2018 report\*

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# Expenditure Allocation on Invasion Cycle (Municipalities)





\*Figures based on 2018 report\*

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#### 2019 Species Specific Expenditures

Invasive Species	Municipal	ities	<b>Conservation Authorities</b>		Combin	ed	% of Non-EAB
-	\$	%	\$	%	\$	%	Expenditure
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-							
-							
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Total	\$18,737,842	100.0%	\$2,490,166	100.0%	\$21,228,008	100.0%	100.0%



### 2019 Species Specific Expenditures





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#### 2019 Species Specific Expenditures

Invasive Species	Municipalities		Conservation Authorities		Combined		% of Non-EAB
	\$	%	\$	%	\$	%	Expenditure
Emerald Ash Borer (EAB)	\$9,923,875	53.0%	\$2,159,520	86.7%	\$12,083,395	56.9%	
Zebra Mussels	\$1,985,398	10.6%	\$0	0.0%	\$1,998,179	9.4%	21.7%
Gypsy Moth	\$1,980,000	10.6%	\$0	0.0%	\$1,985,563	9.3%	21.7%
Quagga Mussels	\$1,972,782	10.5%	\$0	0.0%	\$1,980,000	9.3%	21.6%
Phragmites	\$1,241,733	6.6%	\$103,263	4.1%	\$1,344,996	6.3%	14.7%
Wild Parsnip	\$478,425	2.6%	\$1,401	0.1%	\$479,826	2.3%	5.2%
European Buckthorn	\$368,302	2.0%	\$61,101	2.5%	\$429,403	2.0%	4.7%
Dutch Elm Disease	\$260,000	1.4%	\$0	0.0%	\$260,000	1.2%	2.8%
Dog Strangling Vine	\$39,300	0.2%	\$69,500	2.8%	\$108,800	0.5%	1.2%
Asian Longhorned Beetle	\$100,792	0.5%	\$0	0.0%	\$100,792	0.5%	1.1%
Giant Hogweed	\$92,667	0.5%	\$6,500	0.3%	\$99,167	0.5%	1.1%
Autumn Olive	\$91,000	0.5%	\$2,000	0.1%	\$93,000	0.4%	1.0%
Japanese Knotweed	\$72,505	0.4%	\$5,501	0.2%	\$78,005	0.4%	0.9%
Garlic Mustard	\$24,508	0.1%	\$11,581	0.5%	\$36,089	0.2%	0.4%
Sea Lamprey	\$0	0.0%	\$32,000	1.3%	\$32,000	0.2%	0.3%
Linden Bark Borer	\$27,300	0.1%	\$0	0.0%	\$27,300	0.1%	0.3%
Oak Wilt	\$22,512	0.1%	\$1,000	0.0%	\$23,512	0.1%	0.3%
Asian Carp	\$0	0.0%	\$20,000	0.8%	\$20,000	0.1%	0.2%
Beech Bark Disease	\$10,492	0.1%	\$8,300	0.3%	\$18,792	0.1%	0.2%
Brown Spruce Longhorned Beetle	\$13,500	0.1%	\$0	0.0%	\$13,500	0.1%	0.1%
Hemlock Woolly Adelgid	\$4,792	0.0%	\$8,500	0.3%	\$13,292	0.1%	0.1%
Glossy Buckthorn	\$13,000	0.1%	\$0	0.0%	\$13,000	0.1%	0.1%
Manitoba Maple	\$5,000	0.0%	\$0	0.0%	\$5,000	0.0%	0.1%
European Chafer	\$5,000	0.0%	\$0	0.0%	\$5,000	0.0%	0.1%
Scots Pine	\$4,960	0.0%	\$0	0.0%	\$4,960	0.0%	0.1%
Total	\$18,737,842	100.0%	\$2,490,166	100.0%	\$21,228,008	100.0%	100.0%



- These values are extrapolations and would be expected to change with shifting respondents
- Voluntary survey design creates potential sample bias
- Method assumes accurate and full data provided by survey respondents, encompassing all expenses and departments. Introduces opportunity for under estimation
- No easy way to quantify loss of ecosystem services





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#### **Data Limitations**

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\$50.8 million/year province wide \$218,148/year average per municipality \$314,724/year average per CA \$1.98/year per capita

LIKELY AN UNDERESTIMATE!



#### www.invasivespeciescentre.ca/cost







#### **Special Thanks To**

- 88 municipalities
- 16 Conservation Authorities
- Will Cox
- Mackenzie Di Gasparro
- Paul Giroux
- Dayna Laxton
- David Nisbet
- Ayushi Shah
- Richard Vyn

**More Questions?** 

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