

# Combating Alien Invaders with Geographic Information Science



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# Alien Invaders

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- Why this is relevant at NY GeoCon
- Past nature of invasions
- Advances in invasive management
- Case studies – monitoring invasives and managing invasives

# The problem with invasive species

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- Invasives are a major threat to global biodiversity
- Invasive species are second only to habitat fragmentation
- Invasions are facilitated by globalization
- A critical concern in conservation and land management
- Can have significant impacts on cultural landscapes

# The problem with invasive species

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“Introduced species of animals, plants and microbes cost the U.S. \$123 billion a year”

(U.S. Department of the Interior, 2000)

“Invasives cost the U.S. more than \$120 billion in **damages** every year”

(Pimental et al. 2005. Ecological Economics 52:273-288)

# Who pays?

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- We do!
- Federal, state, local taxes
- Local tax payers hit twice -
  - Tax dollars diverted for invasive remediation
  - Pay to treat, remove, replace trees on property

# Forest invasives:

Impact natural and cultural landscapes

## That old chestnut?



# Forest invasives:

Impact natural and cultural landscapes

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## A Nightmare on Elm Street



# Example: Cultural landscapes

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## Ashes to ashes



# Current management approach

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## **ED/RR**

- **Early Detection**
  - Monitor for visual signs and symptoms
- **Rapid Response**
  - Treat or destroy infestation centers



# Current management approach

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## Recent advances in ED/RR:

- **The Crowd & The Cloud!**
  - Geospatial technology
  - Mobile devices
  - Web/cloud technology

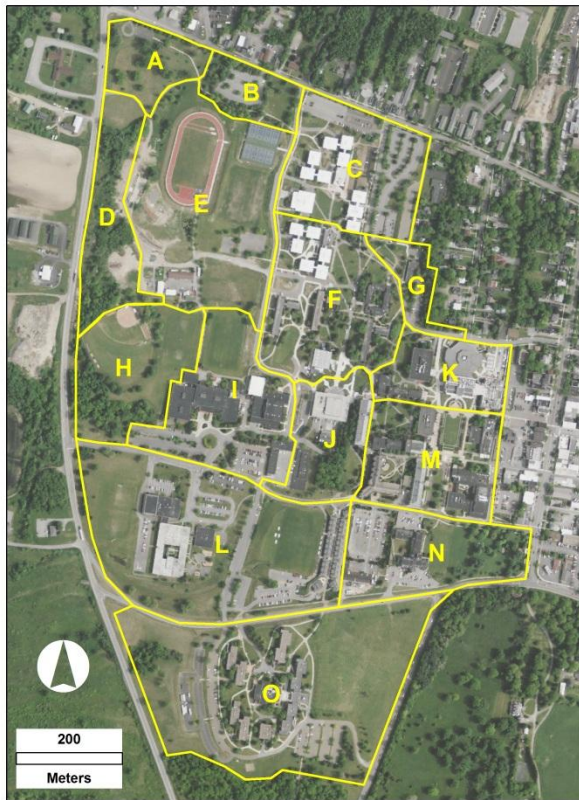
# Case Study 1 – EAB in Livingston County

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- EAB arrived in Livingston in 2010
- Livingston County Planning (LCP) begins a county-wide ash inventory on public recreation space
- Interns from Biology and Geography
- Funding from SUNY Geneseo Grounds and internal research grants

# EAB Monitoring in Livingston County, NY

## *Short-term Objectives – Mapping Ash Trees*



# EAB Research in Livingston County, NY

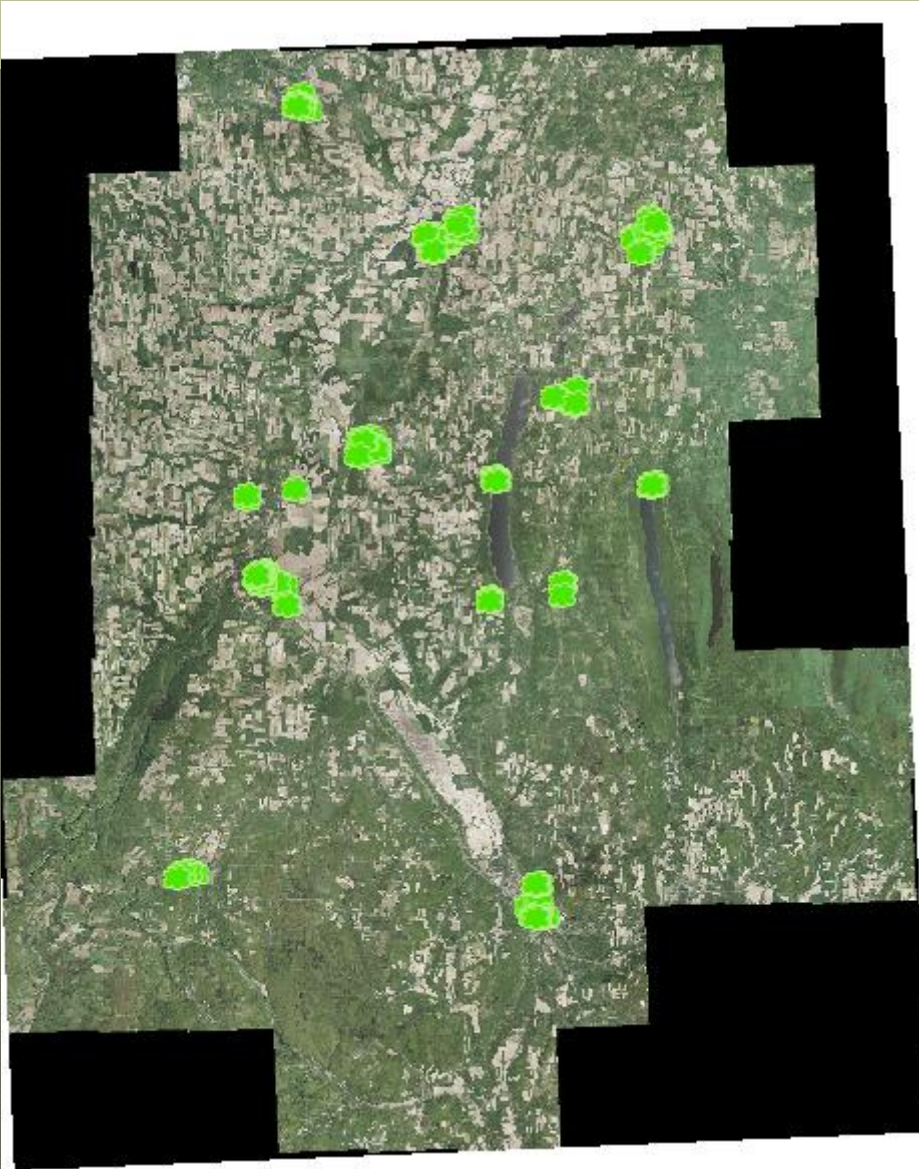
## *Short-term Objectives – Data Collection*

[illegible]

Zone	Name	Street	Name	Species	Code
A	Date:	North Main		Apple	ORNA
B		South Main		Ash, black	FRNI
C		Ward		Ash, green	FRPE
D		Chestnut		Ash, white	FRAM2
E		North 2nd		Black walnut	JUNI
F		South 2nd		Boxelder (ash maple)	ACNE2
G		North		Cherry	ORNA
H		Oak		Cottonwood	PODE3
I		Center		Hickory	CAOV2
J		South (20A)		Honeylocust	GLTR
K		Elm		Horsechestnut	AEHI
L		Prospect		Maple, Norway	ACPL
M		South Highland		Maple, red	ACRU
N		North Highland		Maple, silver	ACSA2
O				Maple, sugar	ACSA3
				Pear	ORNA
				Pine, red	PIRE
				Pine, white	PIST
				Oak, bur	QUMA2
				Oak, red	QURU
				Oak, swamp white	QUBI
				Oak, white	QUAL
Sidewalk Buckling					
1 - No buckling					
2 - Roots encroaching on walk					
3 - Sidewalk buckling evident					
Proximity to Powerlines					
1 - No powerline threat					
2 - Powerlines within one meter					
3 - Powerlines pass through crown					

# EAB Research in Livingston County, NY

## *Short-term Objectives*



- Continue and extend the inventory
- Community outreach
- Monitor inventoried trees

# EAB Research in Livingston County, NY

## *Short-term Objectives*

- Continue and extend the inventory

*Island Preserve – Genesee Valley Conservancy*



# EAB Research in Livingston County, NY

## *Short-term Objectives*

- Community outreach & seed collection

*Mt. Morris Dam – U.S. Army Corps of Engineers*



# EAB Research in Livingston County, NY

## *Risk/Cost Model – Data Preparation*

### Inventory converted to a GIS database

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# **Case Study 2 - Quinn Oak Opening**

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- **NY DEC Adopt-A-Natural-Resource (AANR) stewardship program**

# **Quinn Oak Opening Management Efforts**

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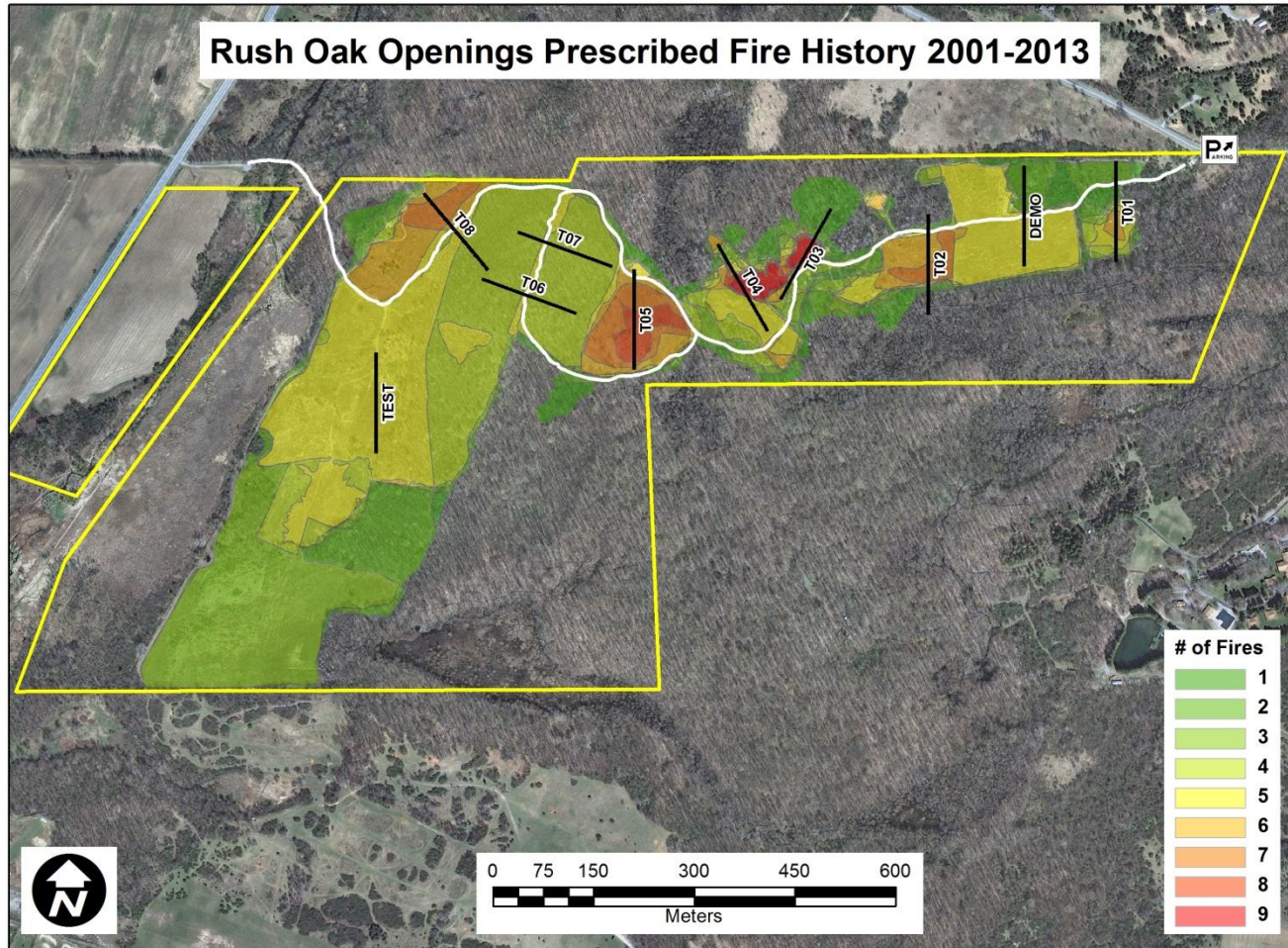
- **NY DEC used mechanical removal in the 90's**
- **Used prescribed fire since 2000**
  - **Prevent woody encroachment (invasives and adventitious natives)**
  - **Favor native prairie graminoids and forbs**
  - **Favor the oak/hickory woodlands (aspen and maple)**
- **Never quantitatively evaluated success**

# Quinn Oak Opening

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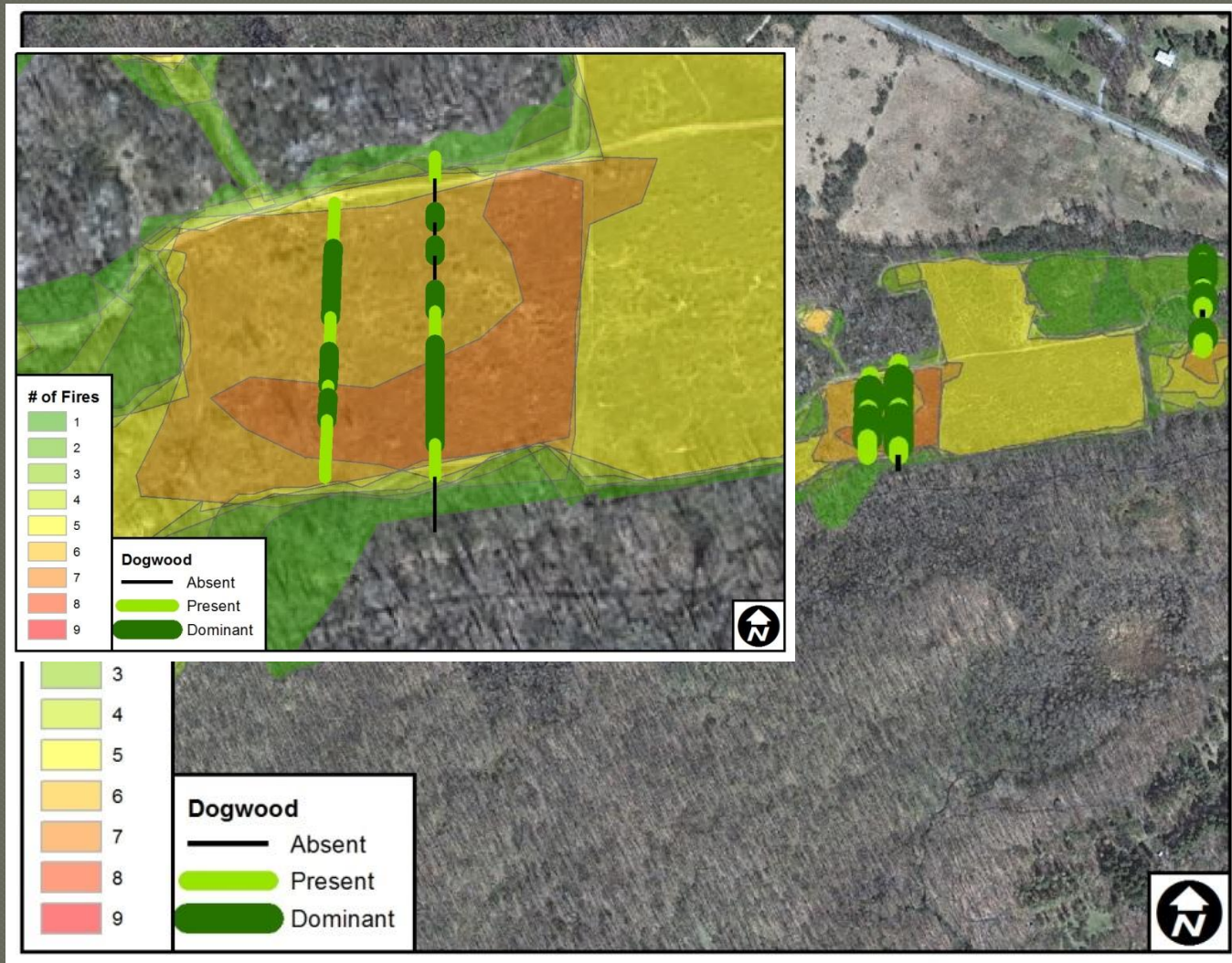
# Quinn Oak Opening



# Quinn Oak Opening

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# Quinn Oak Opening



# **Morals of the story....**

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- **Invasive species are an economic, environmental, and quality of life issue that effects us all**
- **Crowd-cloud solutions may help us tackle geographically unwieldy problems**
- **Partnerships, partnerships, partnerships**
- **Look to your local university!**

# Acknowledgments

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- City of Rochester Division of Forestry
- Arborjet

# Contact

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