Tree Composition of New York Riparian Forests in Advance of Emerald Ash Borer

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Author at the convergence of the South Branch and the main branch of Cattaraugus Creek.

Introduction

To what degree will emerald ash borer impact New York's riparian forests, river systems and the health of ash dependent biota?

Emerald ash borer (EAB) is a destructive invasive beetle whose fast expanding range is encroaching on New York State. Vulnerability of New York forests and ash component is not well documented. By quantifying the amount of ash in riparian habitats, the impact of EAB on riparian and ash dependent biota can be estimated.

New York's Ash

- There are three native ash trees found in New York
  - White Ash (*Fraxinus americana*)
  - Green Ash (*F. pennsylvanica*)
  - Black Ash (*F. nigra*)
- These ash have not developed defenses against EAB

Emerald Ash Borer

Emerald ash borer (*Agrilus planipennis*)

- Order, Coleoptera:Family, Buprestidae
- 1 to 1½ cm long beetle, native to Asia.
- First discovered in 2002 in southeast Michigan.
- Has killed tens of millions of ash trees in Michigan and Ohio – EAB has been detected in ten states.
- Specialize on ash trees, resulting in 100% mortality.
- Larvae develop under the bark, consuming the phloem, girdling the tree; Adults are herbivorous on ash foliage.

Methods

- Surveyed five waterways geographically distributed through New York State: Cattaraugus Creek, Mohawk River, Oswegatchie River, Saranac River and Susquehanna River.
- Installed five 30x50m (0.15ha) fixed area vegetation plots per river – site selection criteria included the requirement for the occurrence of riparian vegetation.
- Species and diameter of all trees >10cm dbh were measured.

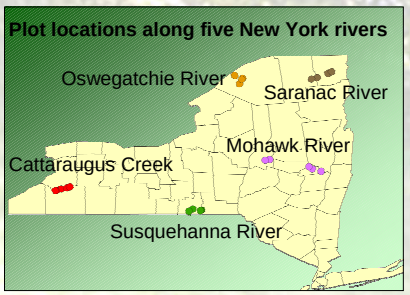
A healthy mature ash tree on the Susquehanna River.

Dead riparian ash in Canada

Areas currently infested with EAB

Adult Emerald Ash Borer

Larval gallery with larvae



Results

- Encountered 42 species among 2293 trees
- 3 white, 110 black and 388 green ash (Table 1).
- Computed relative frequency, relative dominance and importance value (relative frequency + relative dominance) and diversity (Shannon-Weaver)
- Ash comprises 21.8% of riparian tree species in the rivers studied with a range of 6.5% to 47.9% by river
- Highest diversity found on Cattaraugus Creek, Oswegatchie and Saranac Rivers
- Lowest diversity found along the most flow-impacted river – Mohawk River
- Green ash is among the most important along the Oswegatchie (Figure 1) (Importance Value=1), Susquehanna (IV=2) and Mohawk Rivers (IV=3)
- Black ash is a moderately important species along the Oswegatchie (IV=5) and Saranac Rivers (IV=6)

Riparian understory of a plot along the Mohawk River.

Table 1

	# of Trees	# of Species	Total # of Ash	Shannon Diversity Index	Rel. Freq. of Ash	Rel. Dom. of Ash
Cattaraugus Creek	369	22	24	10.756	6.504	8.638
Mohawk River	318	12	85	5.379	26.730	13.854
Oswegatchie River	570	21	42	8.088	47.895	48.193
Saranac River	785	21	75	9.531	9.554	5.687
Susquehanna River	251	16	44	7.271	17.530	13.635

Discussion

Due to the large quantity of ash, the most heavily impacted rivers will likely be the Oswegatchie, Susquehanna and Mohawk Rivers. With 100% mortality of all ash, impacts are expected to be substantial for these unique and essential riparian habitats as well as ash-dependent biota. There is currently no completely effective method of controlling EAB infestations, which means emerald ash borer's invasion into New York is imminent. Determining ash density in different habitats is essential to modeling EAB dispersal, spread, and impact.

Mouth of Saranac River in Plattsburg feeding into Lake Champlain.

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Figure 1. Importance Values for the 10 most important trees per river. Note: Ash species are accented **black**.