Potential Impact of Emerald Ash Borer on Stream Shading in Willamette Valley Forested Wetlands

Vance Kimball Water Resources Specialist Clean Water Services



Ecological Importance of Riparian Shade

- Stream shade provided by vegetation helps keep water temperatures lower.
- Many freshwater and anadromous species native to the PNW are temperature-sensitive.
- Lack of riparian shading can affect reproduction, mortality rates, body morphology, and disease resistance.



A Chinook salmon in Oregon's McKenzie River. *Photo: Morgan Bond*

Oregon ash (*Fraxinus* latifolia) is somewhat unique among trees native to the Willamette Valley in its ability to tolerate wet, clay-rich soils, as well as seasonal drought conditions.



Impact of Emerald Ash Borer on Forested Wetlands

From this...



Forested Wetland

to this.



Scrub-Shrub

Research Question

How will the loss of ash trees from riparian wetlands affect stream shading in the Tualatin River basin?



Data Collected

- 10 sites, 50 data collection points
- Measurements of canopy cover at the thalweg (deepest point in the stream profile)
- Stream channel wetted width and near-stream disturbance zone (equivalent to bankfull) width





Vermont Agency of Transportation

Results

For small streams, wetland plant communities with canopy heights of 20 ft, or even less, can provide comparable levels of shade to mature forested wetlands.



Stream Wetted Width	
Min	1.1 ft
Max	21.9 ft
Mean	8.6 ft

Regression Statistics		
p value	0.00012	
Adjusted R ²	0.27	
Standard Error	21	
Observations	50	

Case Study: Bronson Creek Greenway

Contains:

- Scrub-shrub (≈13 ft canopy)
- Forested wetland (≈55 ft canopy)



Bronson Creek Greenway: Forested Wetland vs. Scrub-Shrub

- Densiometer data indicated a 4% difference in canopy cover.
- Shade-a-lator modeling predicted an 8% difference in effective shade.

	Average Measured Canopy Cover	Average Modeled Effective Shade	Predicted Thermal Load Blocked (kcal/d)*	
FW	94%	79%	189587	
SS	90%	71%	170591	
*per 100 ft stream segment				

Conclusion

Ash-dominated riparian wetlands surrounding small streams may continue to provide significant shading as ash trees are lost due to emerald ash borer.



Proactive Measures for EAB

Ash-dominated riparian wetlands should be planted with taller shrub species prior to ash loss to:

- Help ensure continuity of adequate stream shading.
- Reduce hydrologic impacts.
- Prevent the proliferation of invasive plant species.



Thank you for listening and please feel free to reach out with questions, comments, or future research ideas!

> Vance Kimball Clean Water Services kimballv@cleanwaterservices.org



Photo: Guenevere DiGioia