

# working for clean rivers



## Potential Impacts of the Emerald Ash Borer to Johnson Creek

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ENVIRONMENTAL SERVICES  
CITY OF PORTLAND

working for clean rivers

MINGUS MAPPS, COMMISSIONER • MICHAEL JORDAN, DIRECTOR

Johnson Creek Science Symposium

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# Emerald Ash Borer (EAB)

*Agrilus planipennis* (Coleoptera: Buprestidae)



- **Metallic wood boring beetle**
- **Life span:** 1-2 years
- **Host specialist** (Genus-level)
  - *Fraxinus* spp. (Oleaceae)
    - aka "Ash"
- **Origin:** East Asia
  - Infests only stressed *Fraxinus* trees
  - Co-evolved with native biota
- In North America
  - EAB is a major pest
  - Infests healthy AND stressed *Fraxinus* trees





# Distribution and Dispersal in North America



- **First detection**

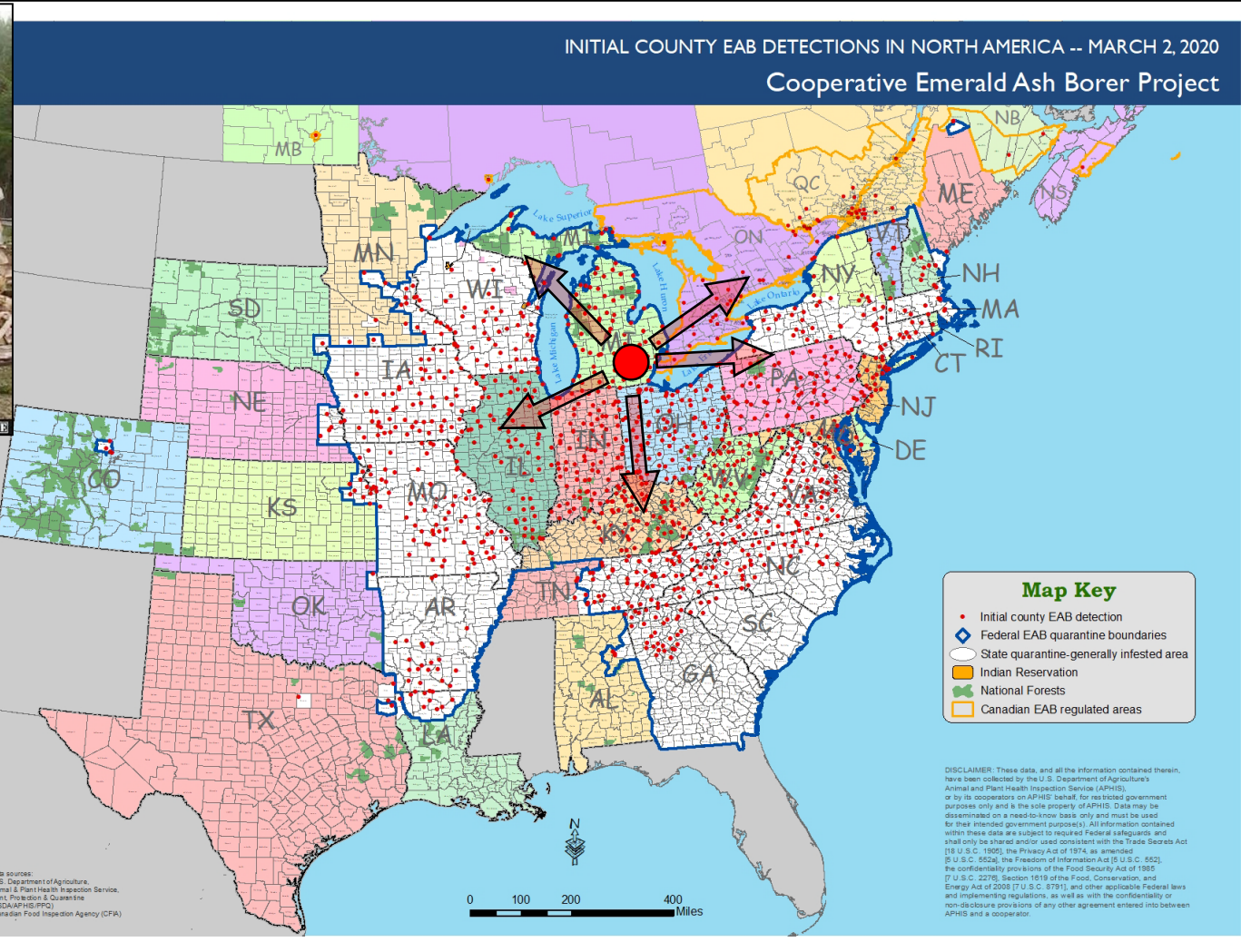
- Michigan (2002)
- Arrived in 1990s

- **Western-most detection**

- Colorado (2013)

- **Stratified dispersal**

- Natural: <10 km
- Human assisted: >>100 km

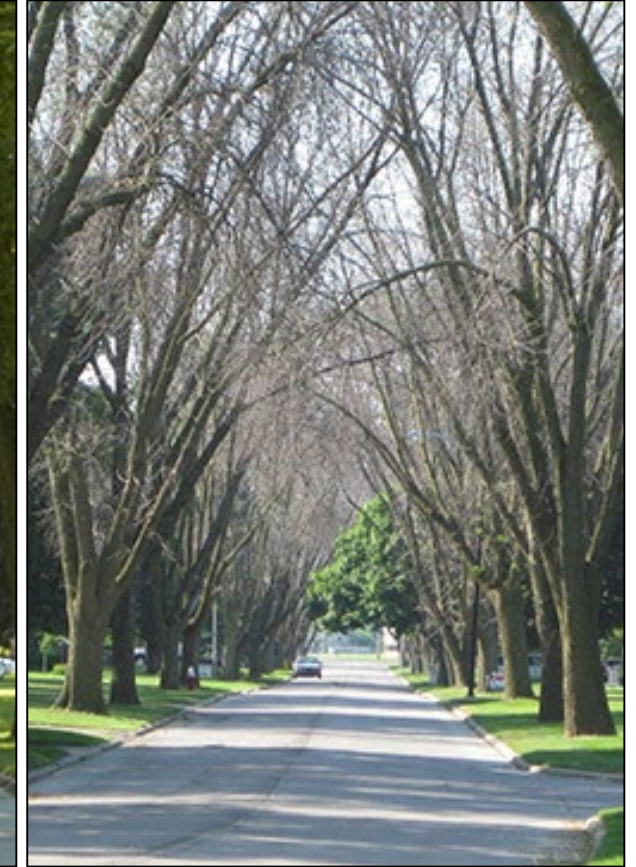


# Impacts

- **Direct:**
  - Hundreds of millions of North American ash trees killed so far (urban and non-urban)
- **Indirect:**
  - Human health and safety
  - Altered ecology/succession
  - Trophic cascade/ecological impacts
  - Water quality – temperature
- **Portland *Fraxinus* inventories**
  - Street trees (4.3%, ~10k)
  - Parks (3.0%, ~500)
  - **Private and natural areas?**



Before...



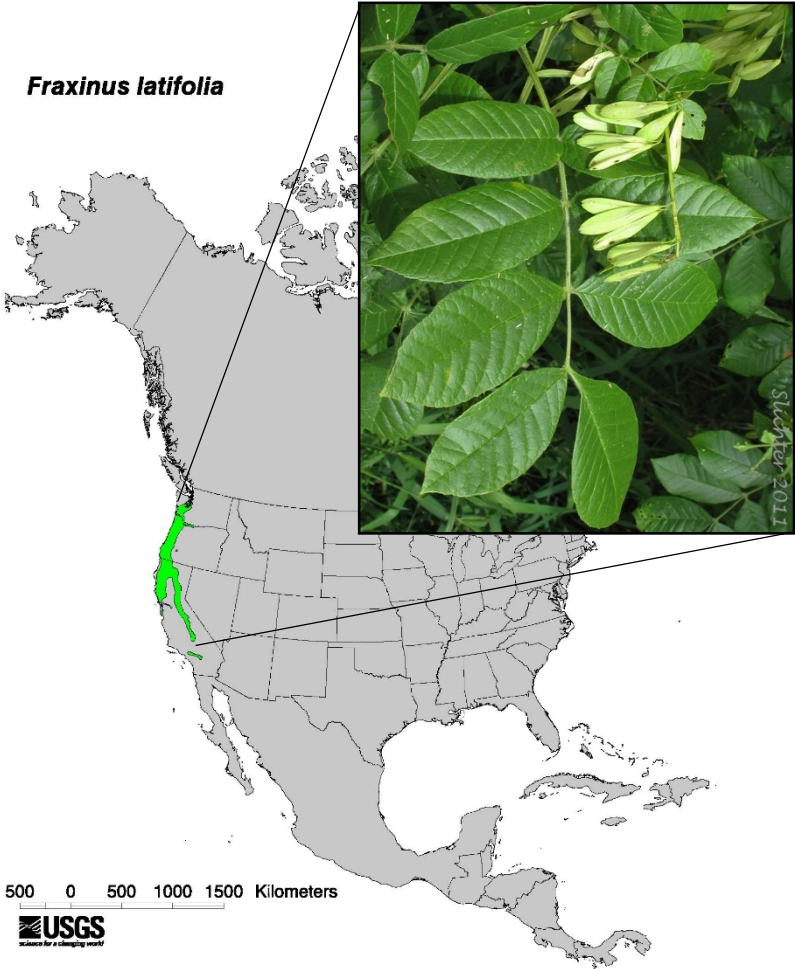
...After

Photos by Daniel Herms





# Oregon ash *Fraxinus latifolia* (Oleaceae)



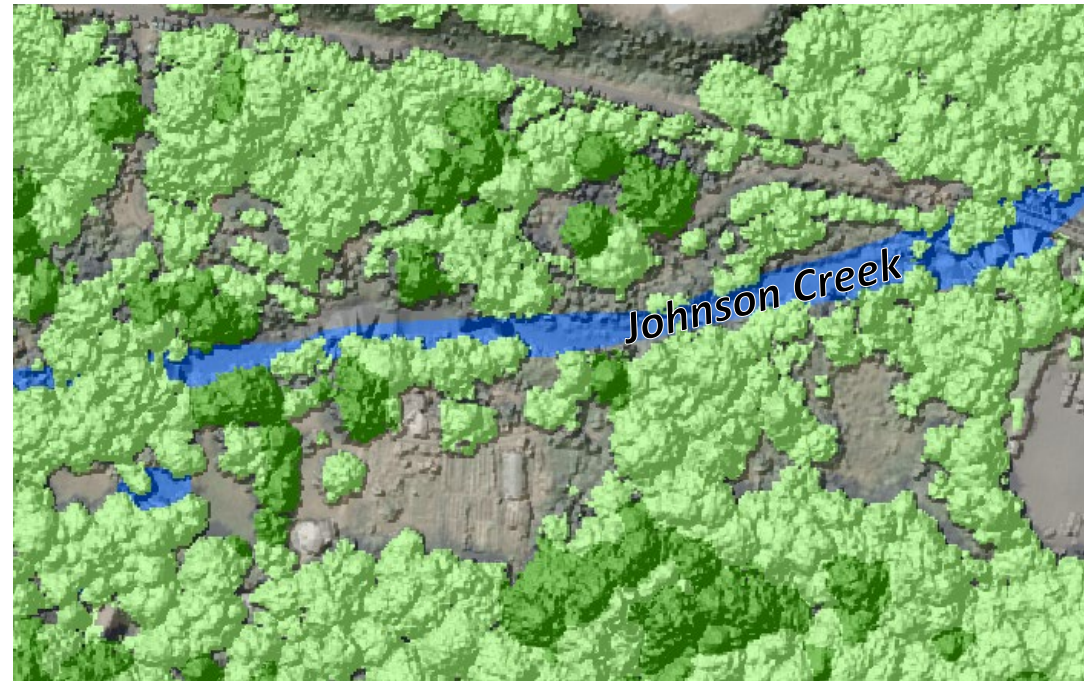
<http://science.halleyhosting.com/nature/plants/trees/deciduous/oleaster/fraxinus/latifolia.html>





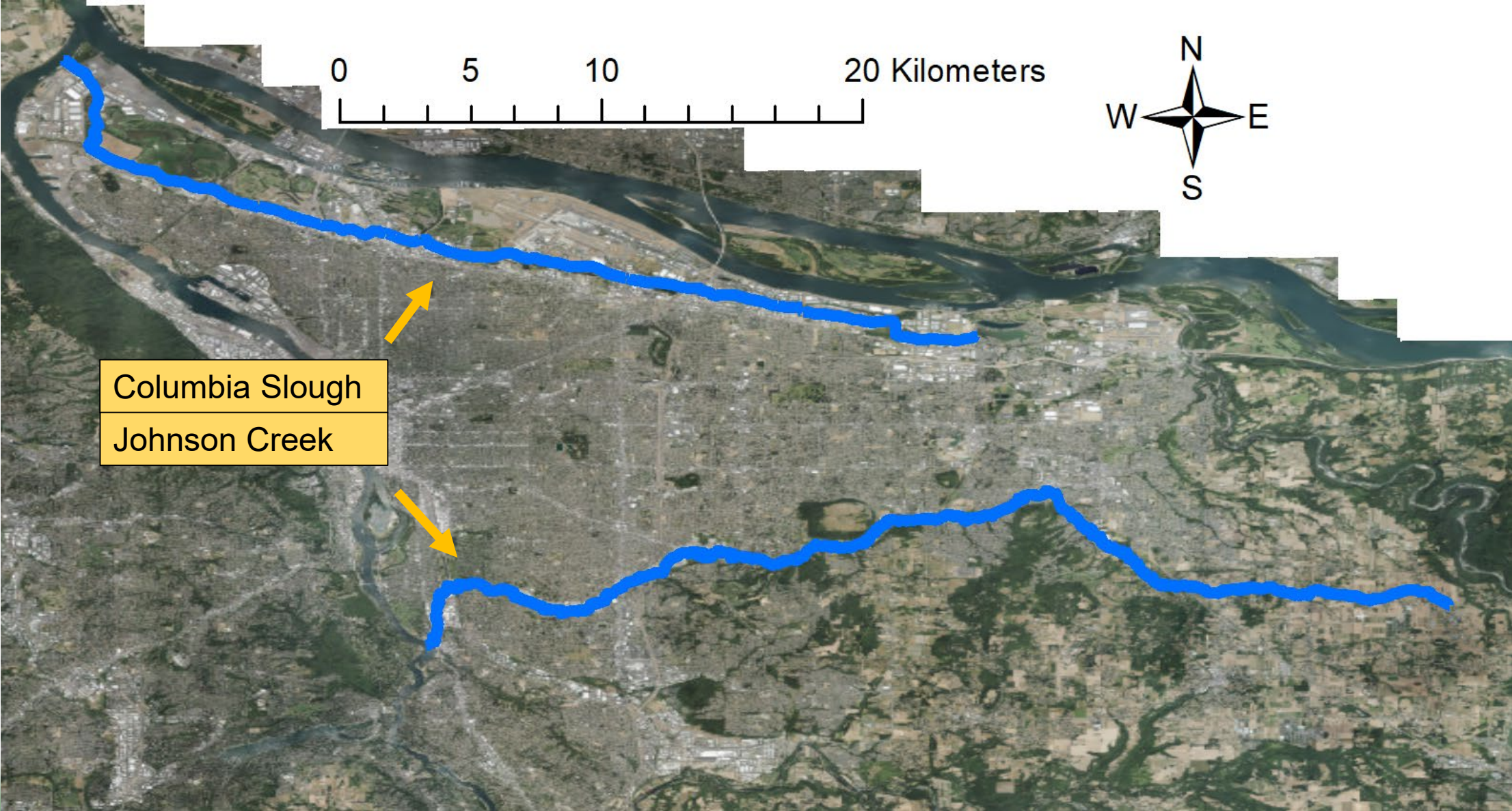
# Research Questions

- Where is Oregon ash in Portland's natural areas? Public and private
- What is the contribution of Oregon ash to the riparian canopy?
- What may happen to that canopy and water quality after EAB arrives?

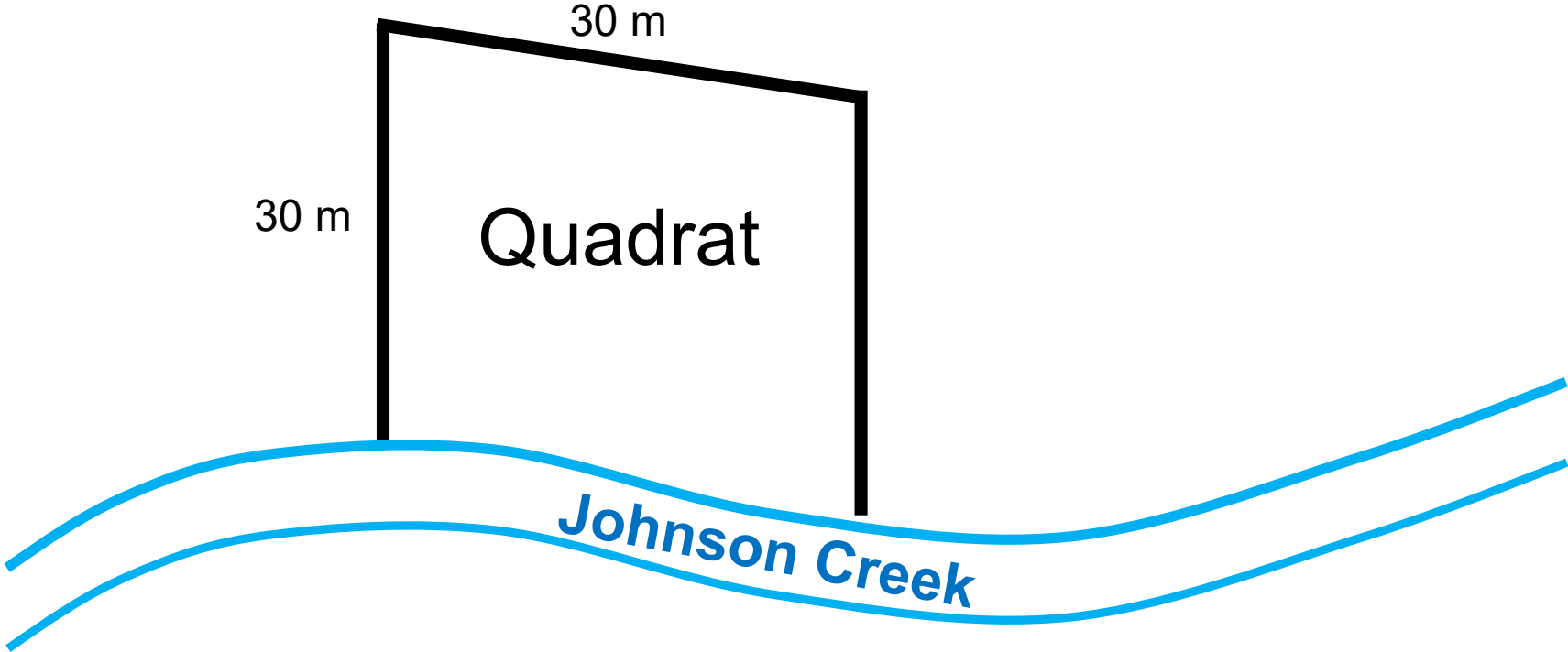




# Johnson Creek and Columbia Slough

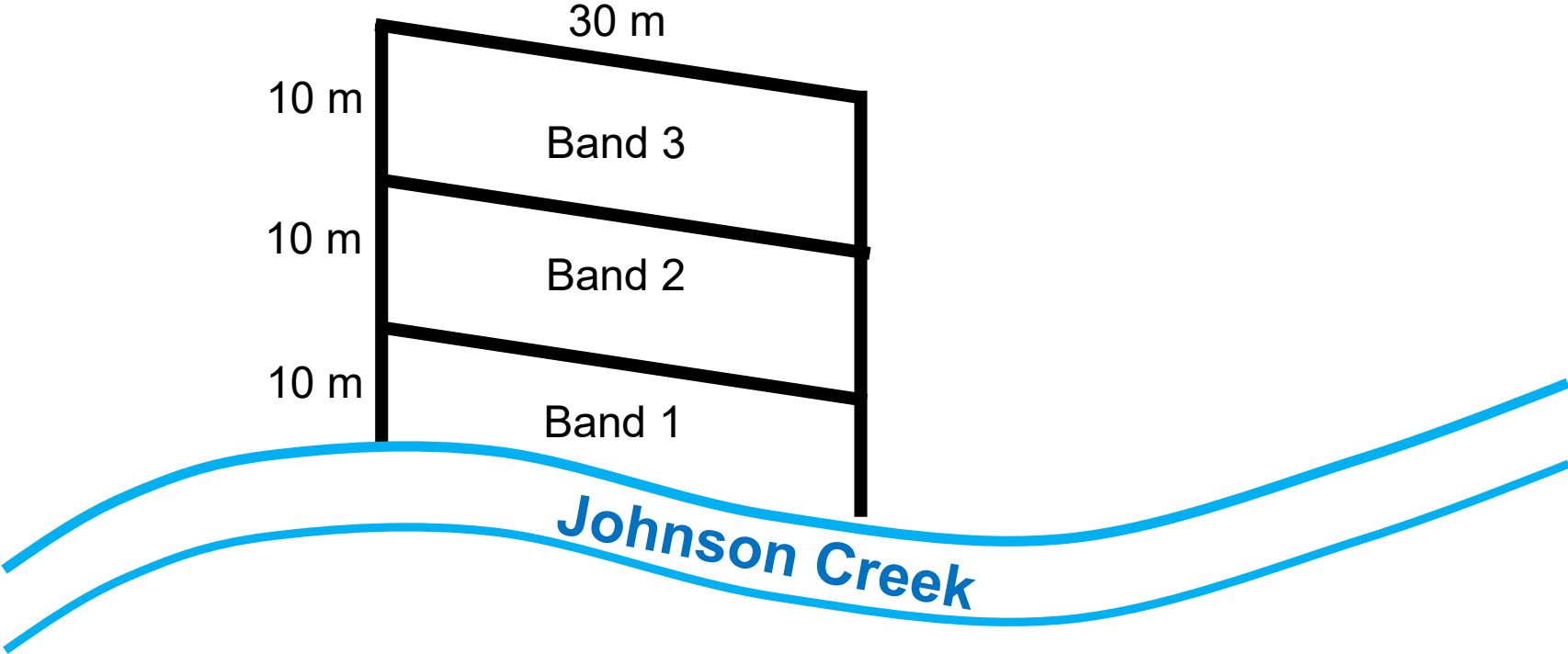


# Methods

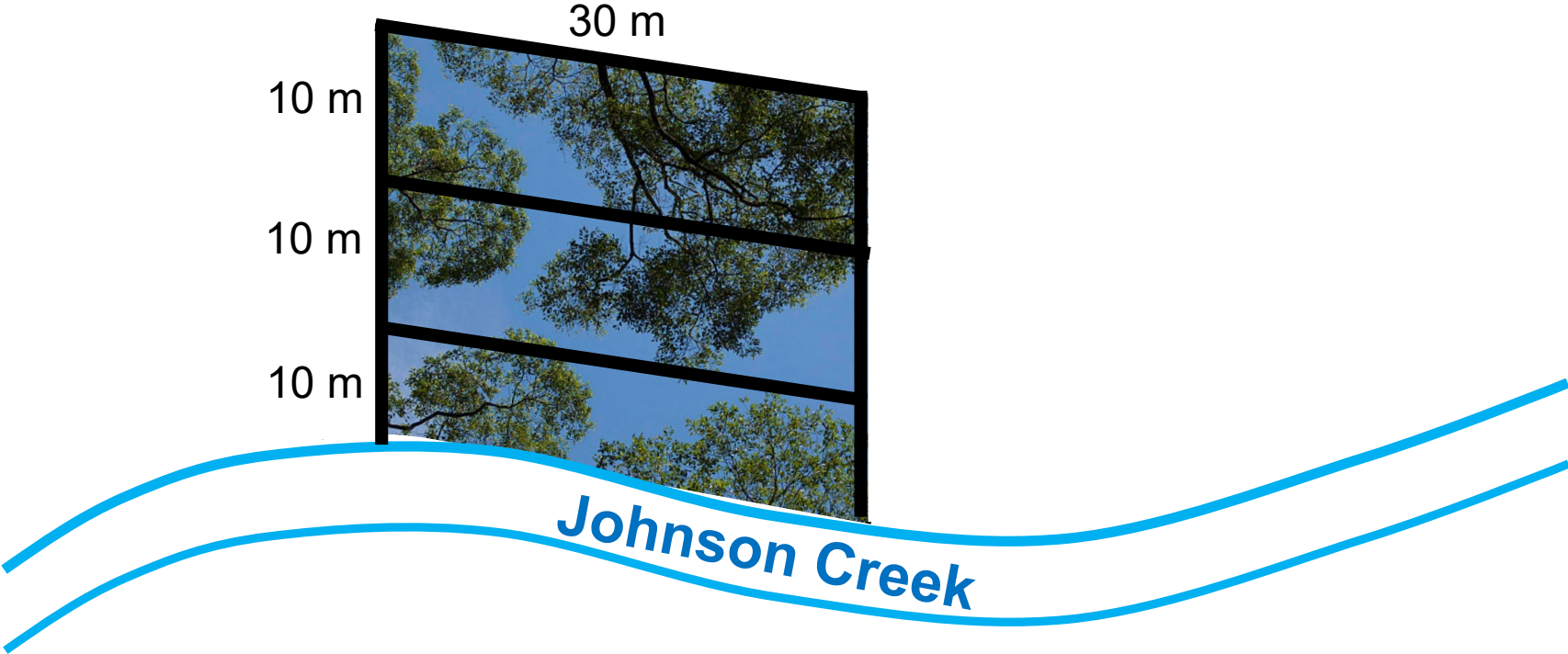




# Methods

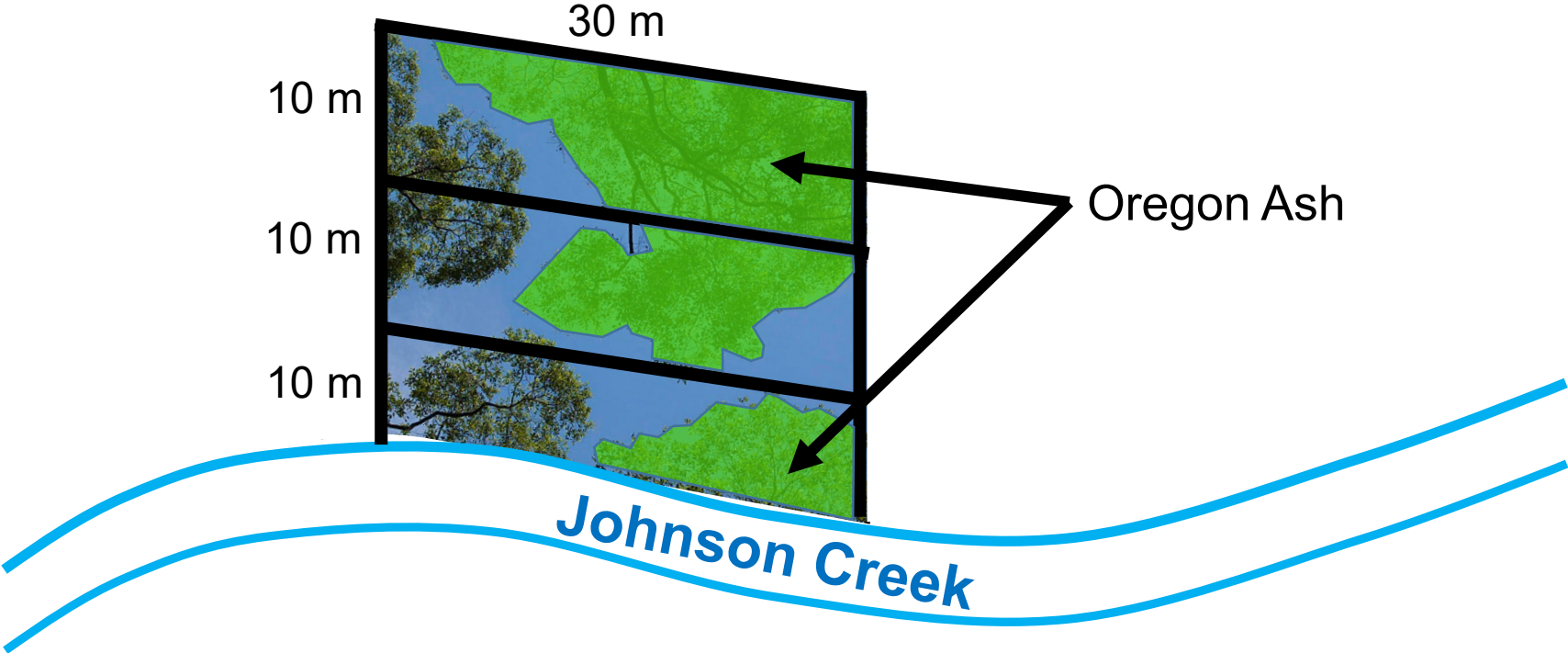


# Methods



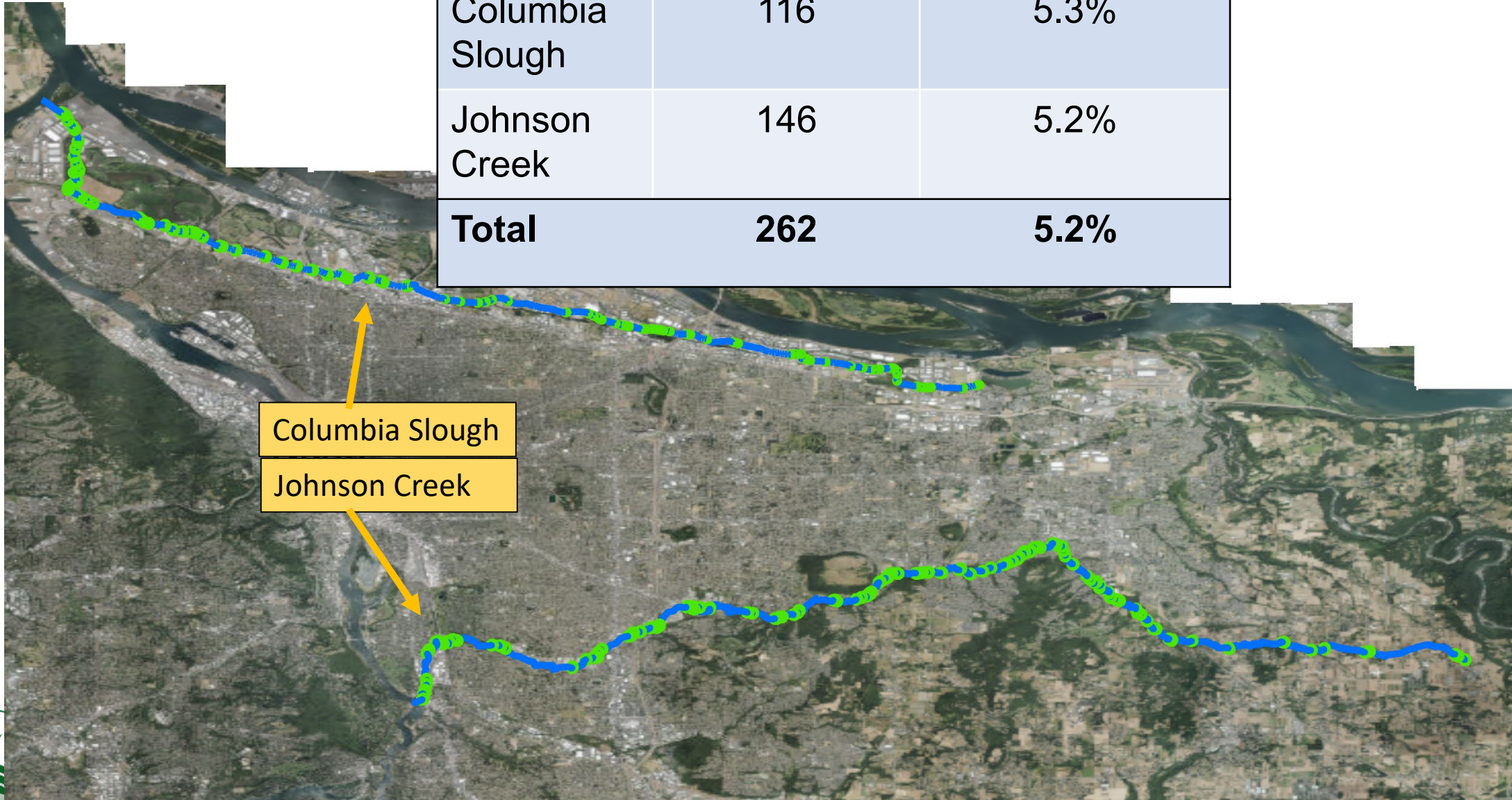


# Methods



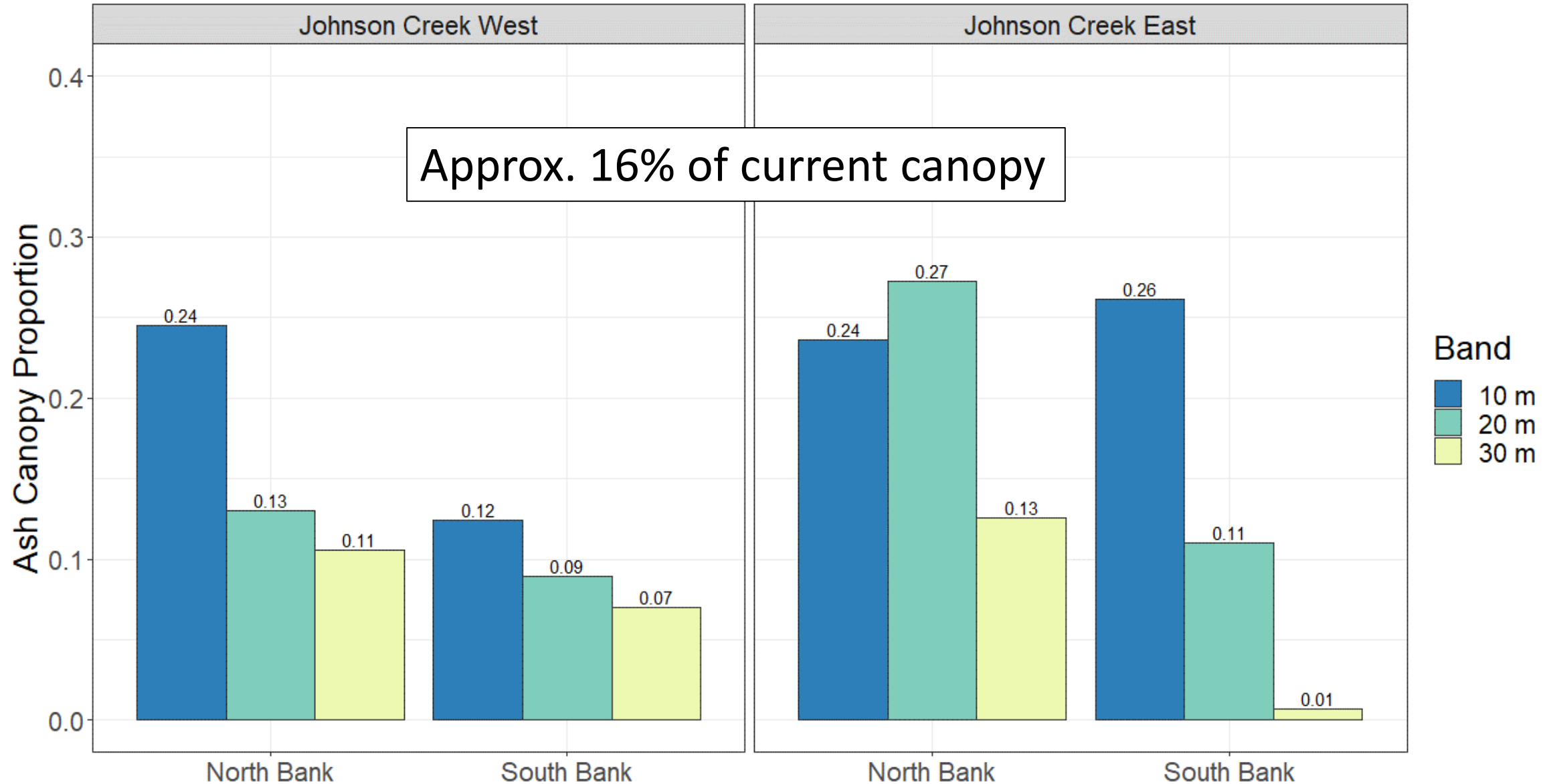
# Results

Stream	# Quadrats sampled	% Total Riparian Area
Columbia Slough	116	5.3%
Johnson Creek	146	5.2%
<b>Total</b>	<b>262</b>	<b>5.2%</b>

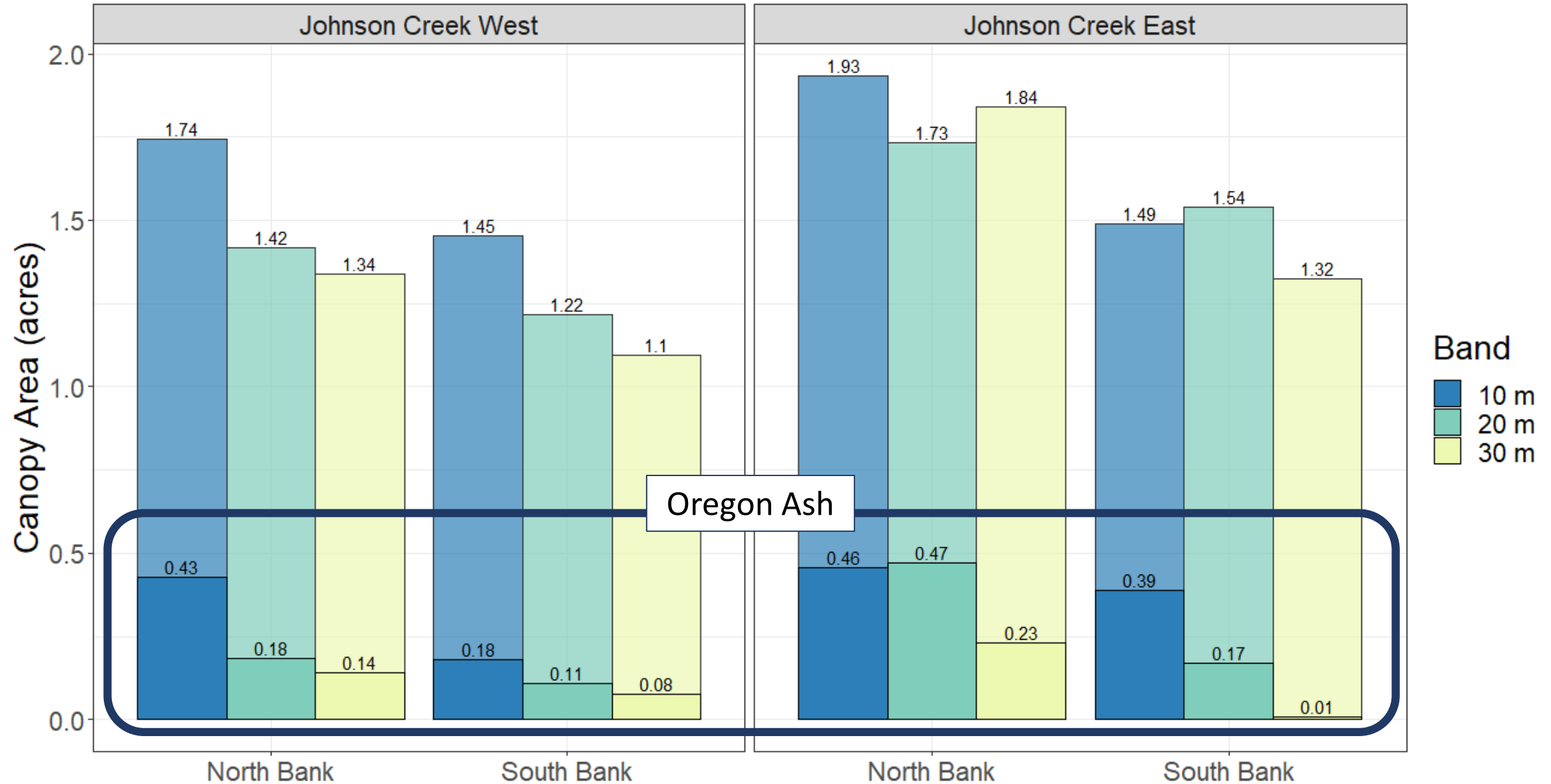




# Oregon Ash Canopy Abundance



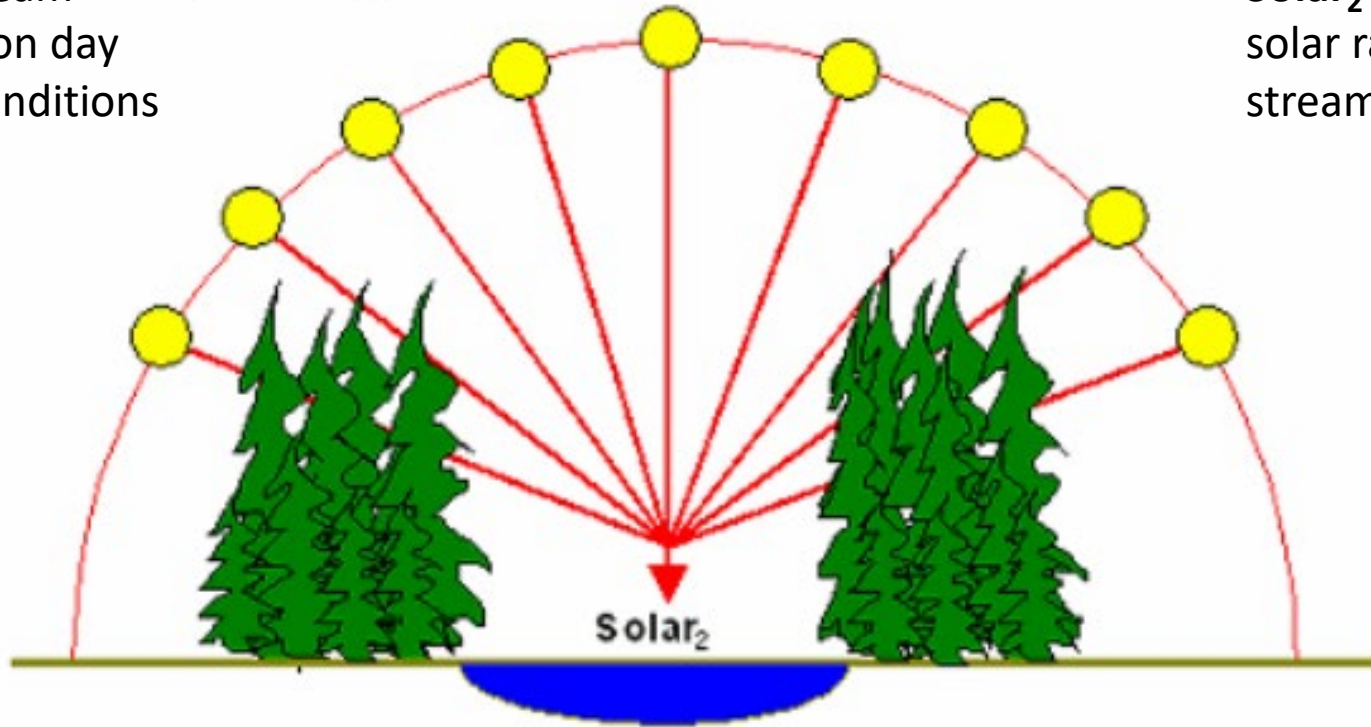
# Total Canopy Area





# Impact to Effective Shade

**Solar<sub>1</sub>** = Daily direct beam solar radiation based on day of the year and site conditions



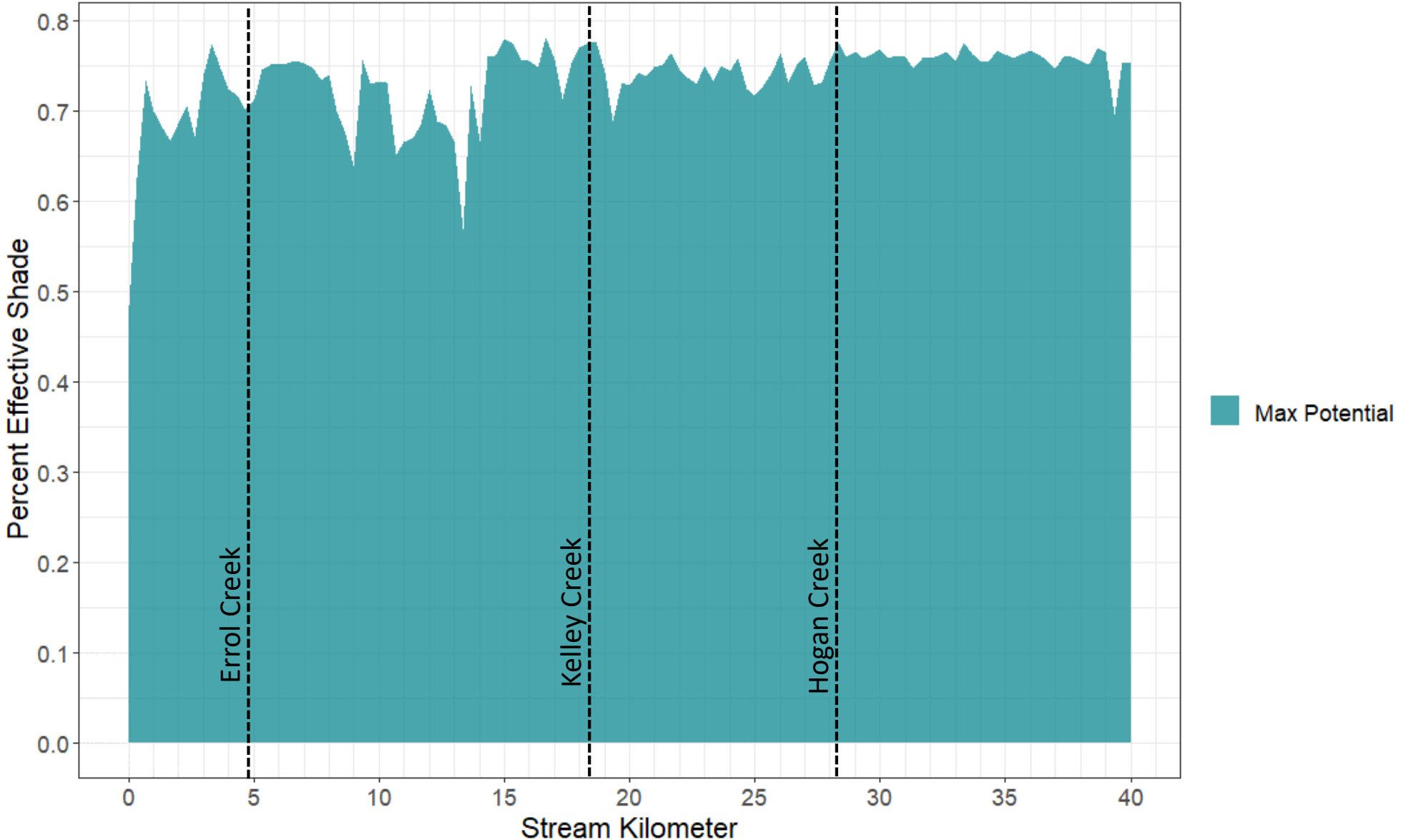
**Solar<sub>2</sub>** = Daily direct beam solar radiation received at the stream surface

$$\text{Effective Shade} = \frac{(\text{Solar}_1 - \text{Solar}_2)}{\text{Solar}_1}$$

Effective shade is the surrogate parameter used by Oregon DEQ in the Johnson Creek Temperature TMDL

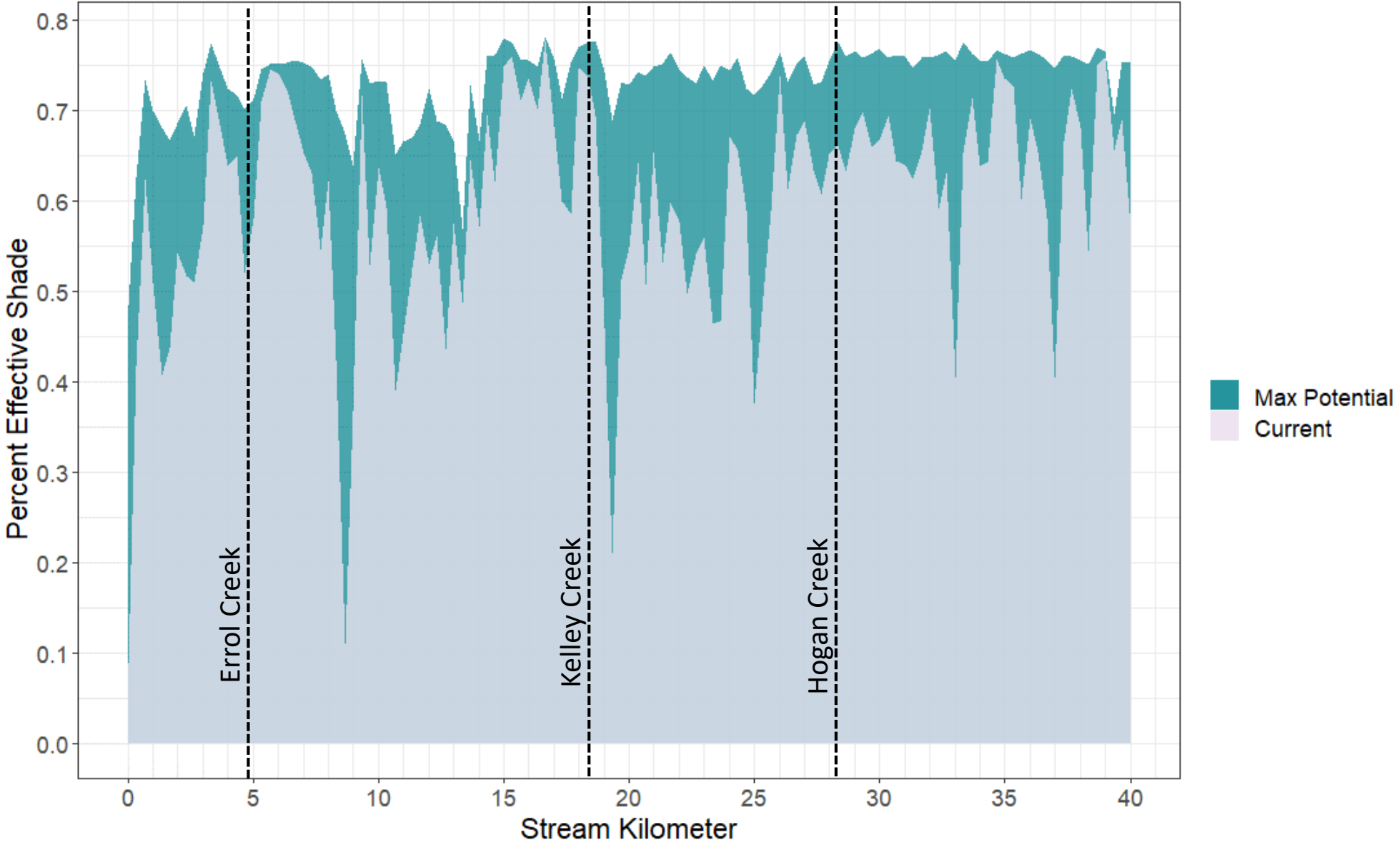


Johnson Creek Effective Shade Scenarios



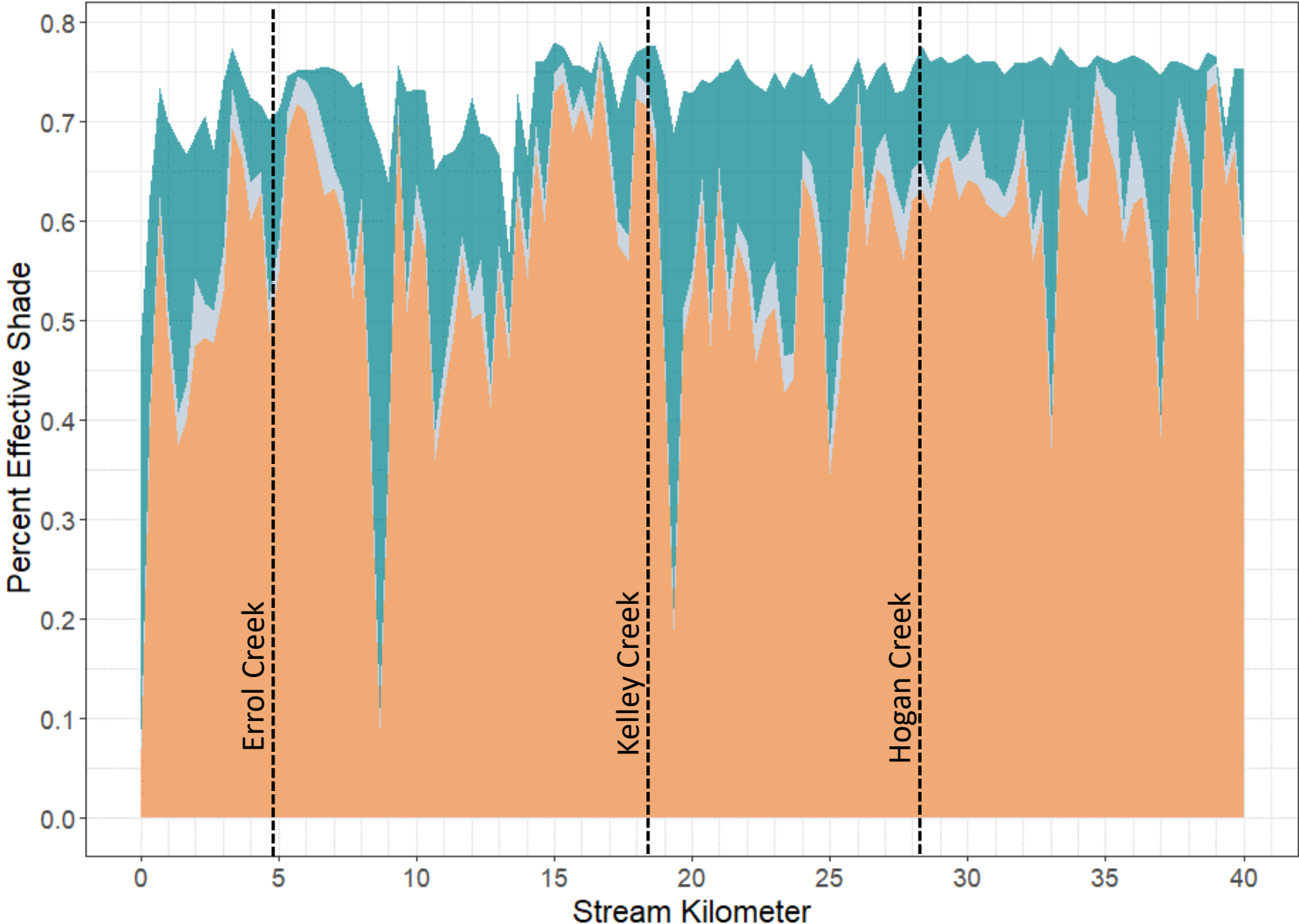


Johnson Creek Effective Shade Scenarios



# Preliminary Results

## Johnson Creek Effective Shade Scenarios



5-10% increase  
in solar loading

- Max Potential
- Current
- Ash Loss



# Summary

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- Oregon Ash represents a substantial component of Johnson Creek's riparian canopy
  - Approx. 16% of the existing riparian canopy is composed of Oregon ash
  - Represents 3 of the 18 mainstem riparian acres
  - Results in 5-10% increase in solar loading
- Key remaining question: what can we plant instead?
  - Potential species replacement



# Thank You!



**4-COUNTY**  
Cooperative Weed  
Management Area



CITY OF  
**GRESHAM**  
OREGON



**Johnson Creek**  
Watershed Council



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Healthy Parks, Healthy Portland



**Rockwood Water**  
People's Utility District

