

Analysis of Site Type on Douglas-fir Allometrics

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Background

Biomass Models support

- Wildfire hazard mitigation
- Bio-energy development
- Carbon sequestration

Tree Level Estimation

- Measure individual trees and components
- Develop individual tree biomass models



Scale to Stand-Level

- Crown biomass per unit area
- Support fuel and fire models
- Carbon allocation and sequestration



Previous Work

- Regional biomass models to estimate crown fuels
- National biomass models for forest inventory

Which model is more accurate?

Objective

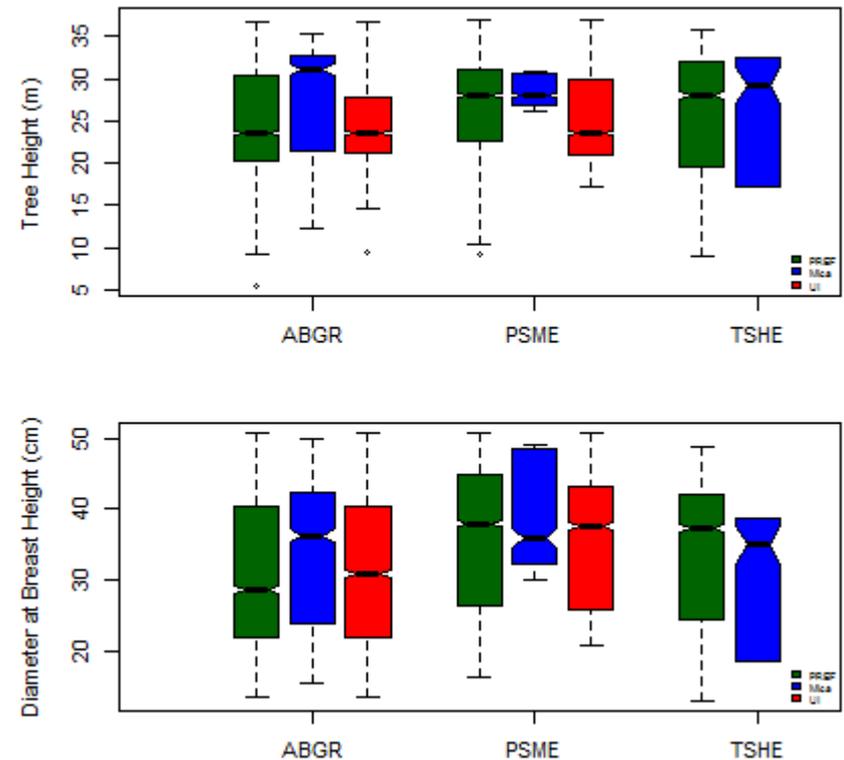
- Can site-specific allometric equations for Douglas-fir improve biomass estimations over existing regional models?

Dataset 1

- 6 sites
- 4 trees per site
 - Determine size class breaks
 - Trees selected within size class quartiles
- Destructively sample selected trees
 - Divide crown into thirds
 - Three branches for each third, evenly spaced
 - One branch from each third for detailed analysis
- Weigh sample branches and bole segments in field

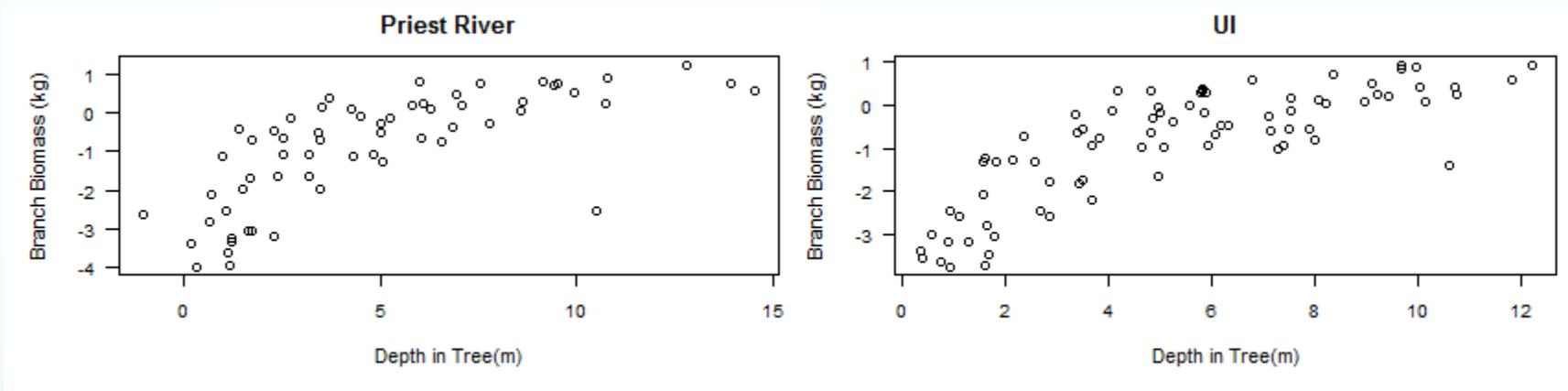
Dataset 2

- Sites randomly located in two areas
 - Sites chosen for species mix
- 2 trees per species per site
- Destructively sample selected trees
 - Divide crown into quarters
 - Two branches for each quarter, randomly selected
 - Eight branches for detailed analysis
- Weigh sample branches



Methods

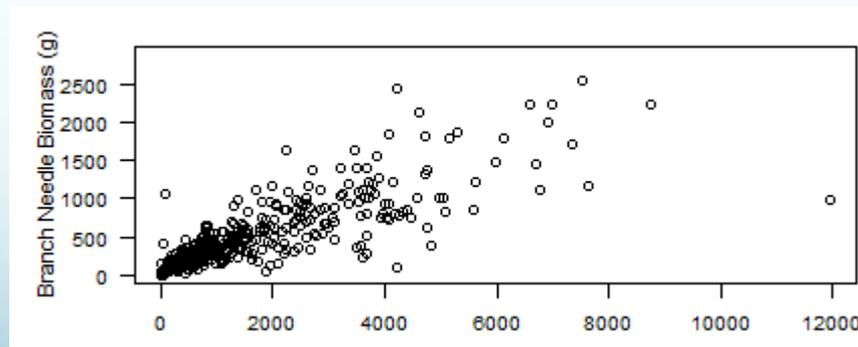
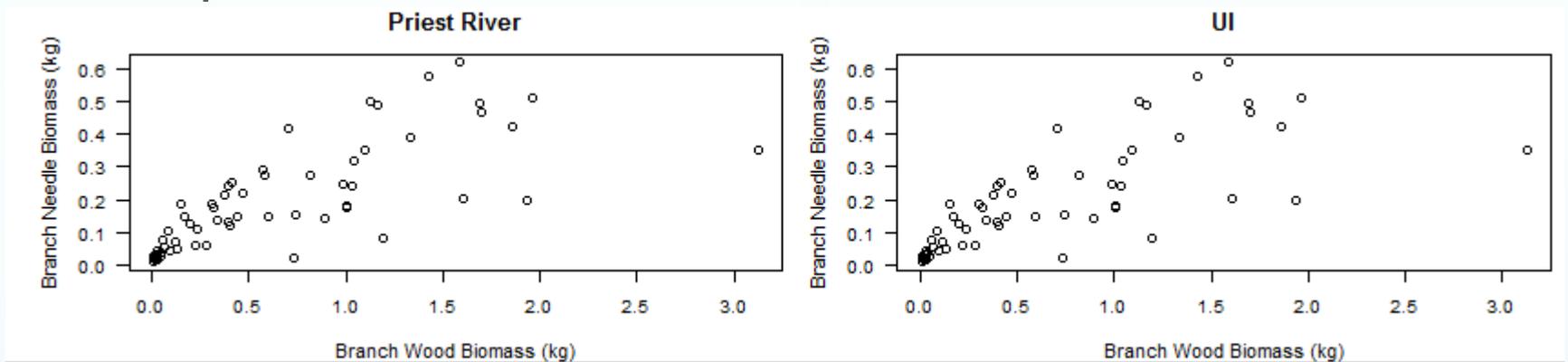
- Begin at branch level to compare models for individual branch biomass (dataset 2)



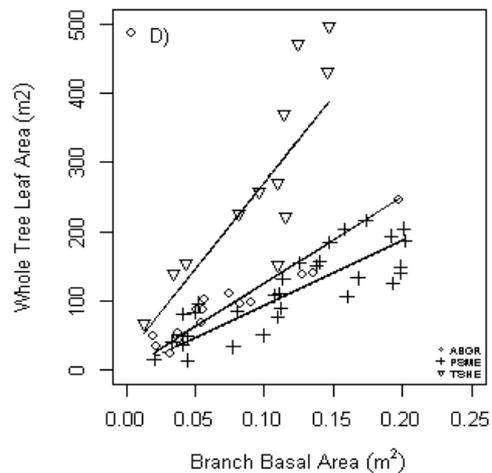
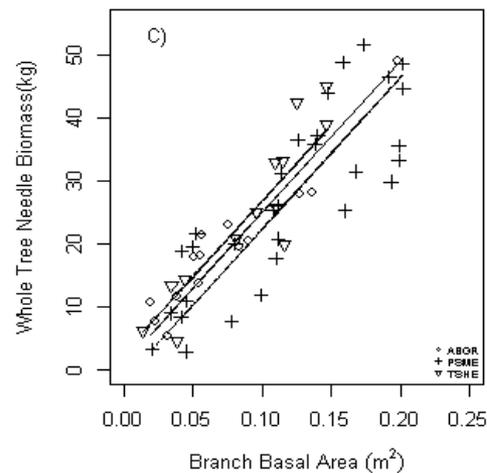
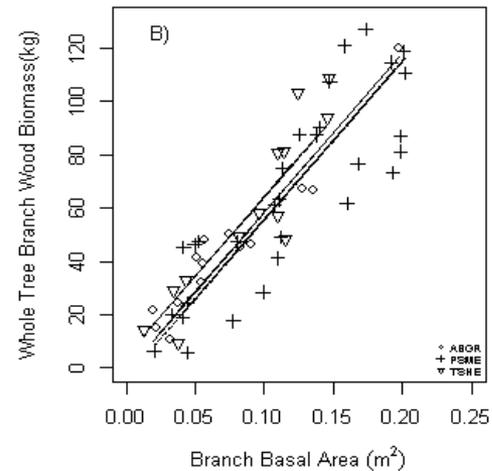
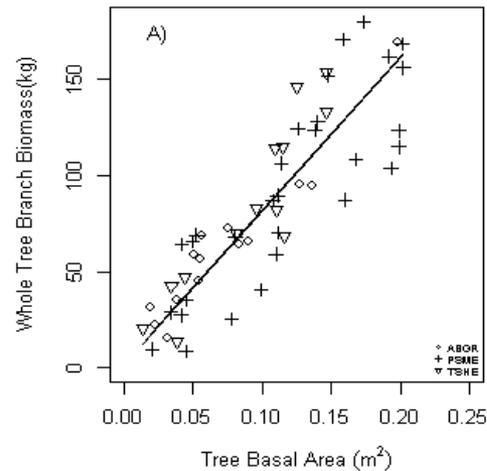
- Estimate depth in tree for dataset 1

Analysis

- Relate dry needle biomass to dry wood biomass for sample trees



Validate branch biomass equations with existing Douglas-fir equations



- Branch basal area is best predictor of individual branch biomass
- Insertion height nearly as good
- Similar variability is explained to previous work (Jenkins et al 2003, Monserud and Marshall 1999).
- Differences in individual branch biomass models does not appear to be different *yet*

Further work

- Are there differences in size class by site type ?
- Are there differences in location within the crown by site type?
- Add site type specificity to Dataset 2 and re-examine biomass equations
- Include weight of bole in analyses, re-examine biomass equations