Ponderosa Pine in the Inland Northwest
Observed vs. Projected Response to Pre-Commercial Thinning

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Response of Ponderosa Pine Stands to Pre-Commercial Thinning on Nez Perce and Spokane Tribal Forests in the Inland Northwest, USA

Dennis E. Ferguson, John C. Byrne, William R. Wykoff, Brian Kummet, and Ted Hensold

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Inland Empire (IE) Variant Overview
Forest Vegetation Simulator

Jewel Basin, Flathead National Forest
(Chad Keyser, FS-WOD-FMSC)
Forest Vegetation Simulator (Inland Empire variant)

Small-tree growth logic (DBH < 3”):
- Height
  - Height Growth
  - DBH
  - BAL
  - CCF

Large-tree growth logic (DBH ≥ 3”):
- DBH
  - DBH Growth
  - Height growth
  - BAL
  - CCF
  - Crown ratio
Forest Vegetation Simulator (Inland Empire variant)

Small-tree growth logic (DBH < 3”):

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Large-tree growth logic (DBH ≥ 3”):

- DBH
- DBH Growth
- Height growth
- Height
- BAL
- CCF
- Crown ratio
Forest Vegetation Simulator (Inland Empire variant)

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- Height
  - Height Growth
  - BAL
  - CCF
  - Crown ratio

Large-tree growth logic (DBH ≥ 3”):

- DBH
  - DBH Growth
  - BAL
  - CCF
  - Crown ratio
    - BAL
    - CCF
    - Mean Height
    - BA
    - MAI
    - PCT
Experimental design: 7 installations

- 1997/1998: +0
- 1998/1999: +1
- 2000/2001: +3
- 2002/2003: +5
- 2011: +14/13
Initial size

<table>
<thead>
<tr>
<th>Reubens</th>
<th>West Talmaks</th>
<th>East Castle Rock</th>
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</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Graph 1" /></td>
<td><img src="image2.png" alt="Graph 2" /></td>
<td><img src="image3.png" alt="Graph 3" /></td>
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![Graph 4](image4.png)  

![Graph 5](image5.png)
Stand basal area

- At 5 years
- In 2011

Basal area in trees >2.3 inches DBH (ft²/ac)

Initial spacing (ft)
DBH in 2011
Heights in 2011

<table>
<thead>
<tr>
<th>FVS/IE projection</th>
<th>Measured</th>
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<tr>
<th>Height (ft) in 2011</th>
<th>Initial spacing (ft)</th>
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<tbody>
<tr>
<td></td>
<td>5</td>
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<tr>
<td>10</td>
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<td>50</td>
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<td>60</td>
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</tbody>
</table>

The graph shows the relationship between initial spacing and height in 2011, comparing FVS/IE projection with measured data.
Heights to crown base in 2011
Summary & Implications

1. FVS projections of aggregate basal area exceeded observed levels except at widest spacings
   - mortality projections need scrutiny

2. FVS projections of DBH distributions were high but consistent with observed distributions

3. FVS projections of tree height and height-to-crown-base distributions increased with spacing
   - FVS does not allow DBH-height allometries to vary
   - effects are expected to amplify over time
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