Initial Spacing Study - Ponderosa Pine Plantation

Location: NW/4 of the SE/4 Sec. 29, T19N, R7E
Elevation: 2,650 ft.
Precipitation: 68 inches annually
Geology: Metamorphosed basalt
Soil: Aiken Series (clayey, mesic Xeric Haplohumults
Site Quality: 110 ft at 50 years

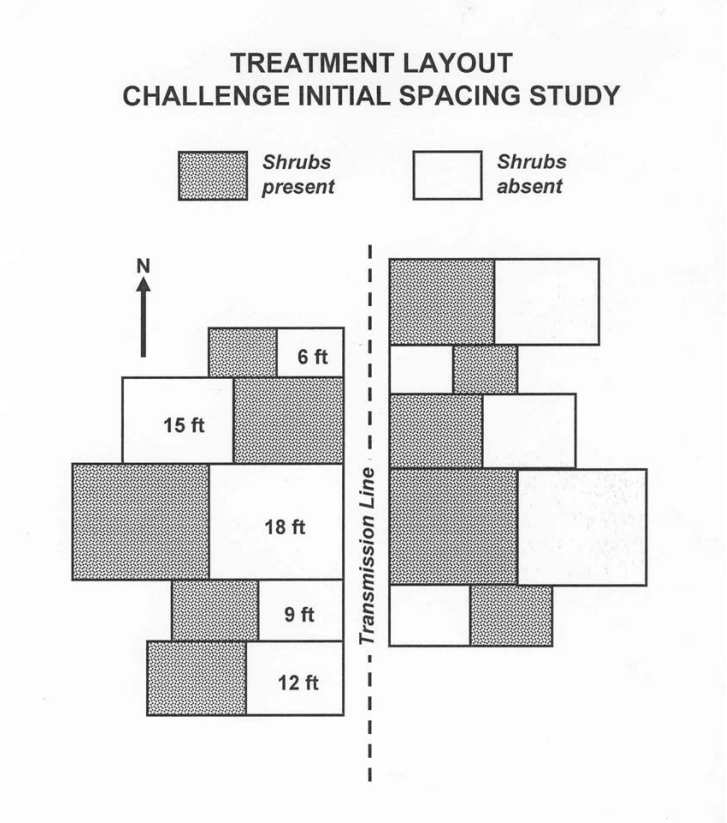
Background:

1965: Young sawtimber ponderosa pine clearcut, slash cleared by tractor

1966: Ponderosa pine planted at 5 different levels of spacing in two blocks (block 1 on left and block 2 on right in the map) in a split plot design with a competition control.

- 6 x 6 ft – 1,210 TPA (but 1,061 TPA survived first year after planting)
- 9 x 9 ft – 538 TPA
- 12 x 12 ft – 302 TPA
- 15 x 15 ft – 194 TPA
- 18 x 18 ft – 134 TPA

There are 12 measurement trees within each subplot by varying plot size; the wider spacing plots are much larger than the narrower spacing plots.



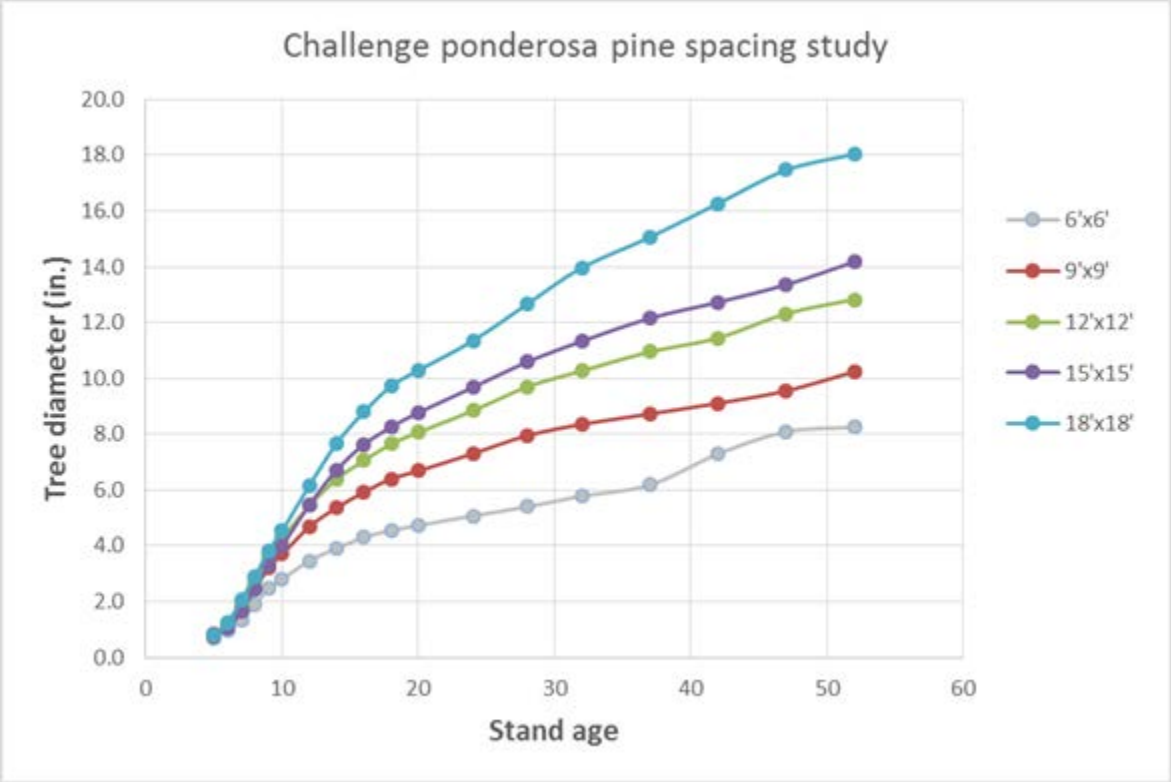
1968-2017: Height and diameter were measured every year until 1975, then measured every two years from 1975 to 1985, every four years from 1985 to 1997, and every five years since 1997.

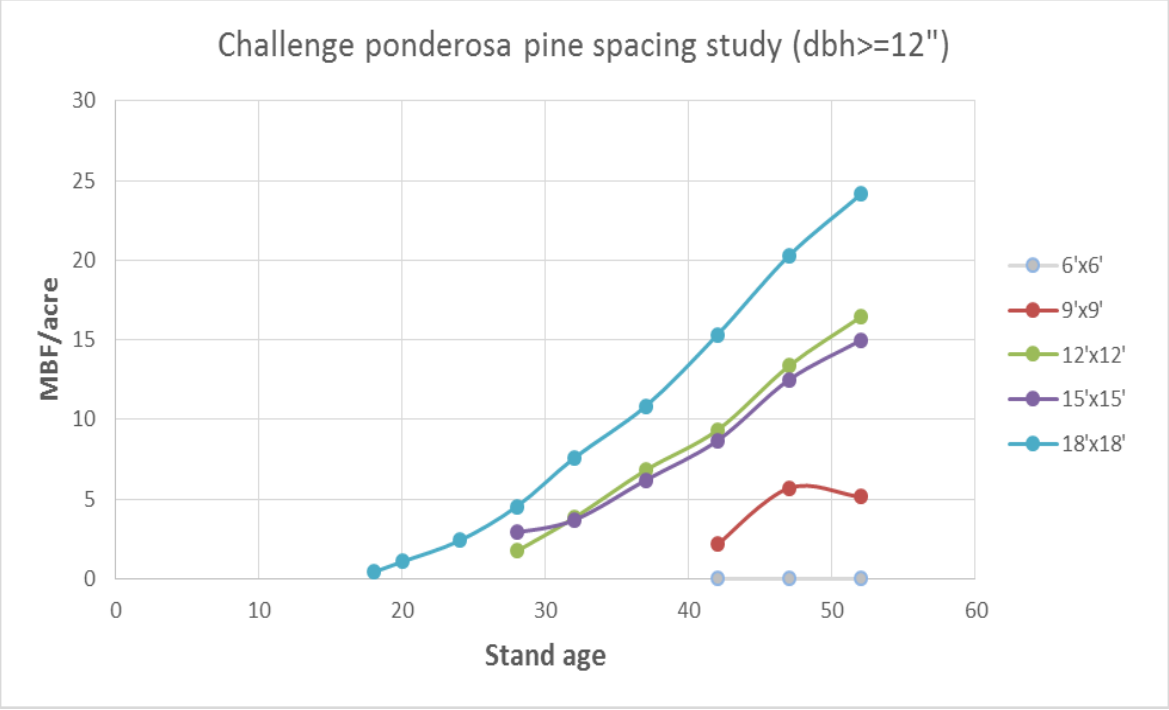
1994: Three trees per treatment plot felled in buffer for biomass. Understory sampled destructively for biomass and nutrient analysis. Same were for forest floor and soil to 20 cm depth.

2003: Plots instrumented with TDR for soil moisture measurement. Decomposition study began.

Jianwei Zhang, PhD, Research Forester, Forest Service Pacific Southwest Research Station

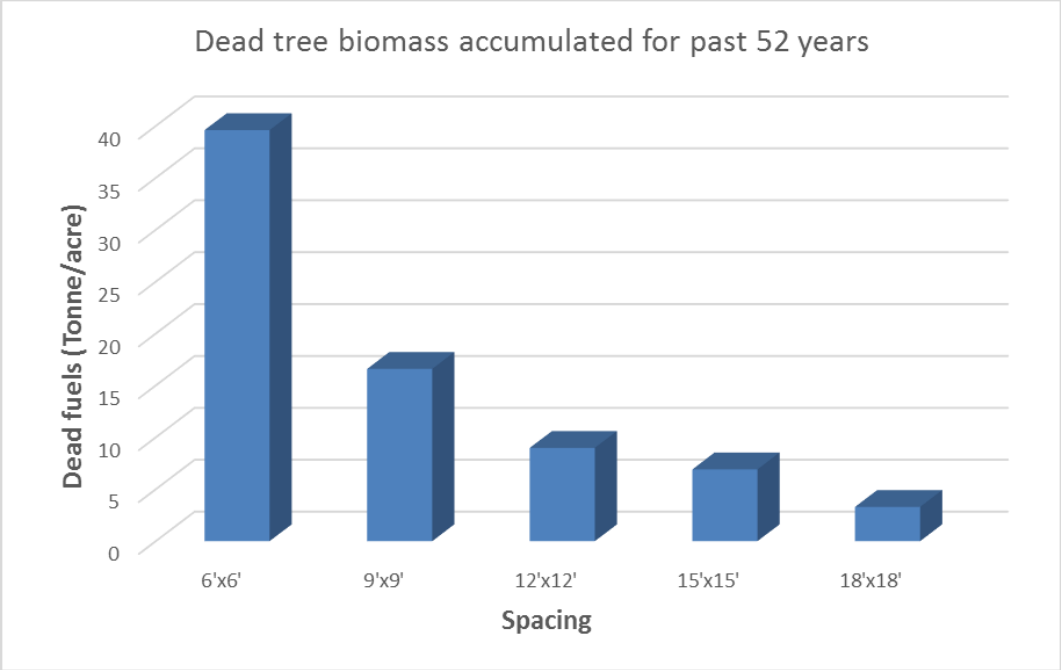
Results - 52 years after planting (Competing vegetation control plots only):





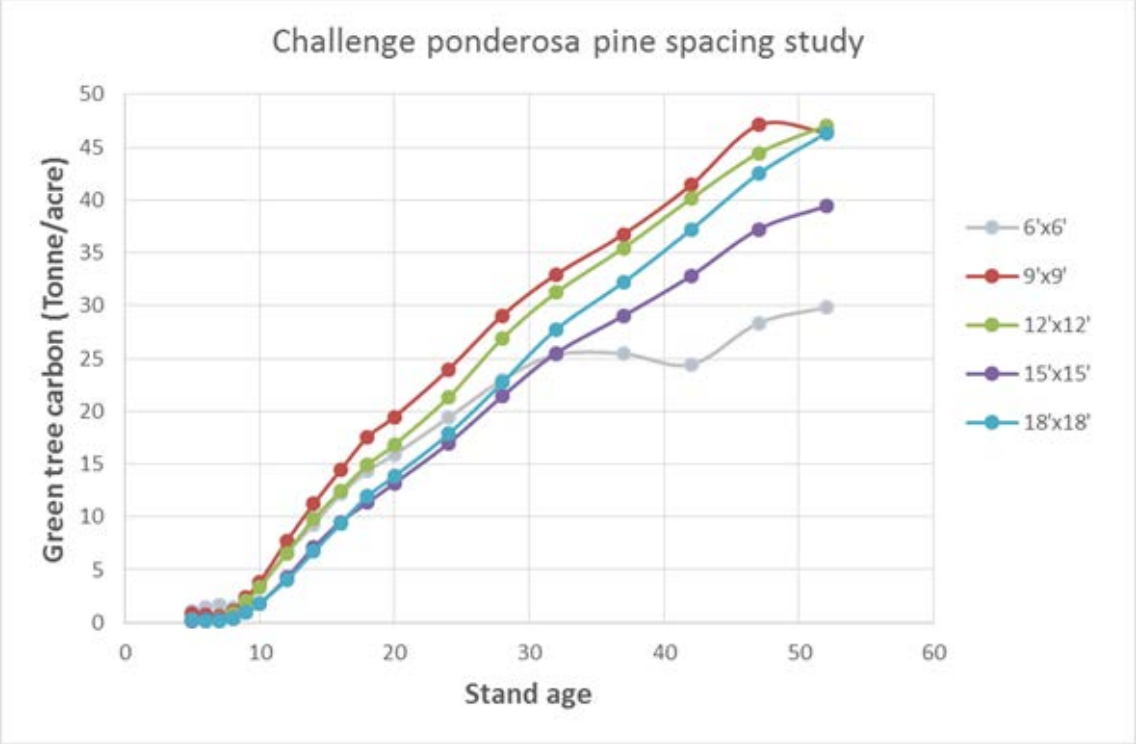
Spacing & dead fuel loading

(Dead fuel loading impacts risk of loss from wildfire & feasibility of safe Rx burning)

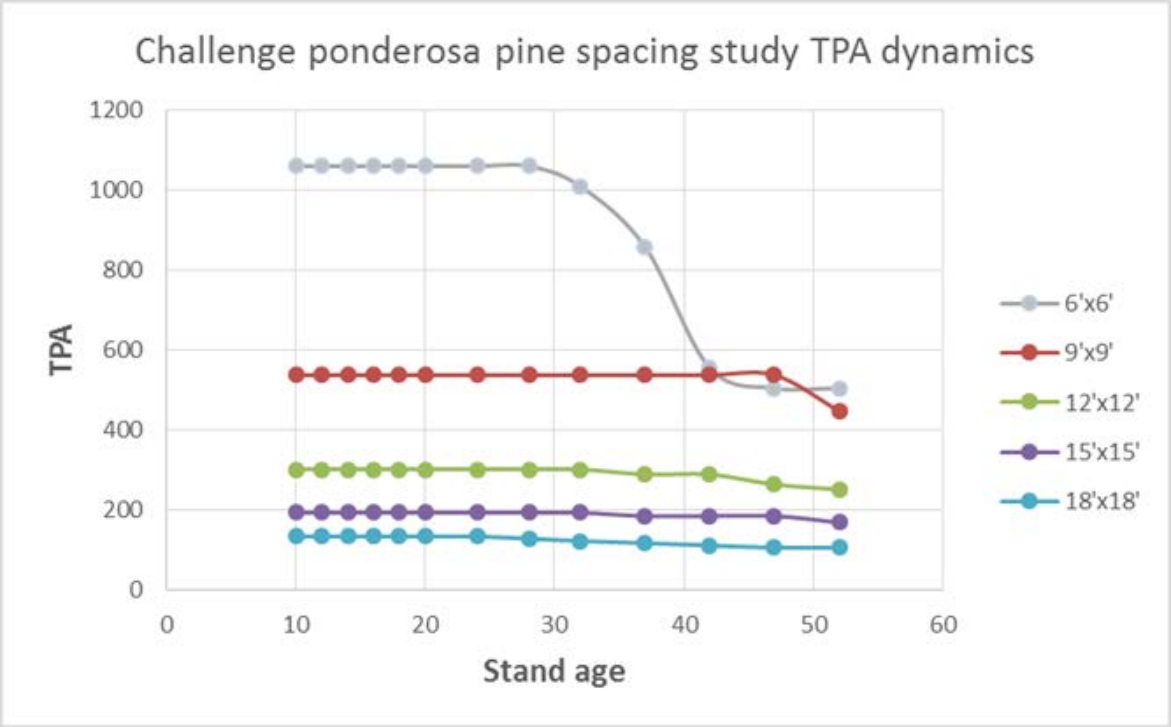


Spacing & Carbon Sequestration

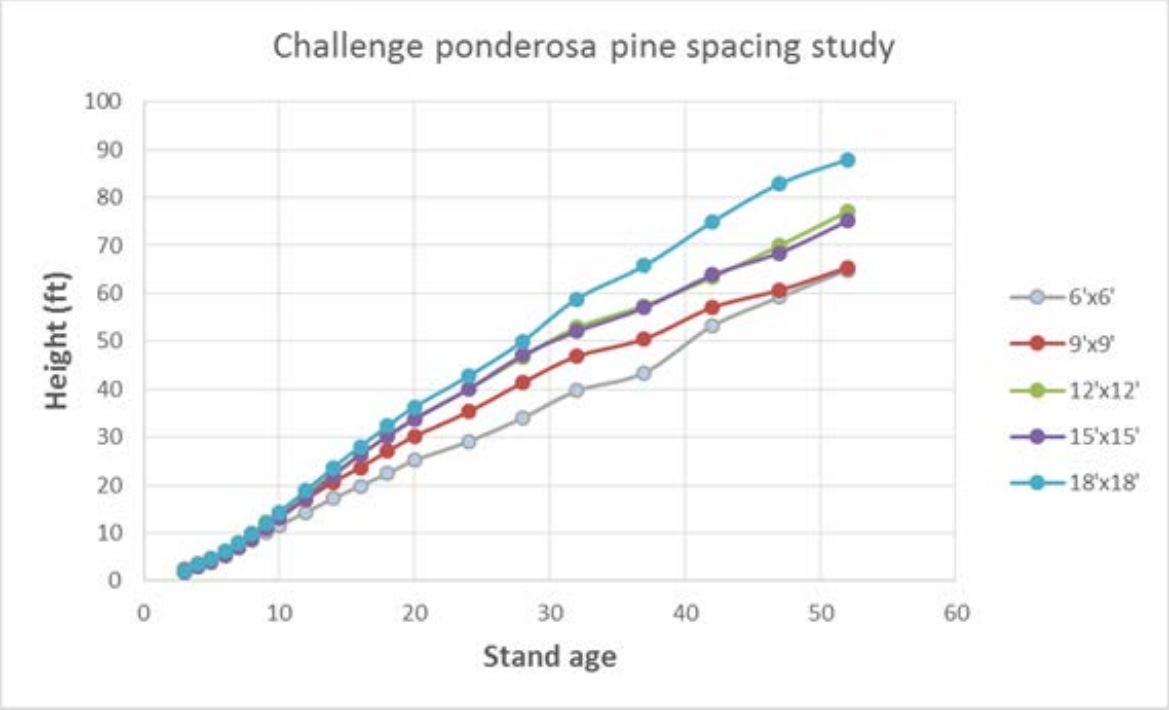
(note that carbon stored in larger trees, i.e. wider spacing, is much more stable)



Note: initial TPA for 12' x 12' plot was 302 & due to mortality it was 252 TPA at age 52. The initial 18' x 18' plot was 134 TPA and at age 52, it was 106 TPA.



Effect of Spacing on Height Growth



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