

## **Ninety-Two Years of Tree Growth and Death in a Second-Growth Coast Redwood Forest**

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Mature second-growth coast redwood (*Sequoia sempervirens*) forests are an important and uncommon resource in the redwood region. Development of second-growth redwood forests beyond rotation age is not well understood. Continuous long-term data are especially lacking, considering that the maximum possible age of second-growth stands is now over 150 years. Two observation plots established in 1923 in the Arcata Community Forest provide a unique opportunity to examine the long-term development of second-growth redwood forest.

Dr. Woodbridge Metcalf of UC Berkeley established two one-acre plots on land that was logged in approximately the 1880s. Metcalf and associates tagged and measured all trees every ten years from 1923 to 1963. Dr. Rudolf Becking of Humboldt State University spearheaded another remeasurement in 1990, but no publication ever resulted from Metcalf or Becking's work. We surveyed the plots using modern methods (precise stem mapping confirmed with LiDAR data, height measurements with laser rangefinders and LiDAR data, crown volume measurements, multiple diameter measurements of buttressed tree bases, etc.) and assembled a complete dataset from 1923 to 2015. Analysis is ongoing at the time of this writing. Fritz's "Wonder Plot" in Mendocino County is the only similar dataset for *S. sempervirens* (Allen et al. 1996, Fritz 1945, Gerhart 2006) and will provide an interesting comparison to these mixed-species stands located in Humboldt County. We will present results as an example of a post-logging trajectory of redwood forest development in terms of species composition, biomass, wood production, and carbon sequestration.

Allen G, Lindquist J, Melo J, Stuart J (1996) Seventy-two years' growth on a redwood sample plot: the wonder plot revisited. Proceedings of the conference on coast redwood forest ecology and management: 61-2.

Fritz E (1945) Twenty Years' Growth on a Redwood Sample Plot. Journal of Forestry 43:30-6.

Gerhart M (2006) Expanding the legacy of research at the Fritz Wonder Plot, Big River, California: A report to Save-the-Redwoods League. Mendocino, CA: Mendocino Land Trust.