

The Palo Alto Avenue Oak

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On the night of November 7 of last year, during a heavy storm, a large coast live oak fell near Palo Alto Ave., in Palo Alto. The tree had been growing on the southwest levee of San Francisquito Creek, near where the Bike Bridge crosses the creek. One of the massive branches of the tree damaged a car when it fell, but fortunately the thick main trunk of the tree, measuring nearly one meter in diameter, fell on the levee and did no other damage.

We decided to study this tree, to determine its age, and see what it could tell us about its history. With the cooperation of the City of Palo Alto Department of Public Works, we obtained two cross sections, or "rounds", of the tree for study. The two rounds are displayed on the table near this poster. The larger round, cut from the trunk about 40 cm above the ground level (when the tree was standing), is missing its center. The tree had "heart rot", and the main roots that were supporting it were also mostly rotten. The tree fell during the storm because it had little support left, and the strong gusts were able to knock it down. We cut another round from further up in the tree, about 3.8 meters



The fallen coast live oak (*Quercus agrifolia*), near the bike bridge that crosses the San Francisquito Creek, on Palo Alto Ave, between Poe and Bryant Streets.



Erik Krebs, of the Palo Alto Department of Public Works, about to finish cutting the first, lower "round" with his chainsaw. The tree had heart rot, and the center was missing.

The rings indicated that the tree is about 130 years old, quite a bit younger than we had anticipated based on the diameter of its trunk and its size.

The tree sprouted in about 1872 (our ring count goes back to 1834; subtracting an additional estimated 12 years, we obtain a date of ~1872). The tree was growing before Palo Alto became settled in 1887, the year the first five families purchased lots in the new town and moved in, and well before the town became incorporated in 1894.



Moving the lower, larger round to load in the van.



Upper round, cut from about 3.8 m level above ground as measured on the tree. The cut reveals at least four sets of fire scars of different ages.

The value of a record such as the one preserved in this oak tree is that it not only allows us to determine the age of the tree, but also makes it possible to see the effects of the environment and past environmental changes on its growth. Much of this information can be derived from studying the relative widths and other characteristics of the rings. For example, in our part of California, wet years are expressed by relatively thick rings, dry years by thin rings. Years with high summer temperatures may be expressed not only by narrower rings, but also by higher wood density (see display table). Once we learn how to interpret the ring characteristic by correlating them to observed environmental effects, we can then extend the history of environmental change back in time, by looking at rings that were formed before weather and other environmental data were systematically collected, and even further back into prehistoric time. Among the effects that we can observe are past patterns of wet years and drought, periodic decadal oscillations in weather, such as "El Nino" and "La Nina", longer warm or cold periods such as the Little Ice age (~1400 to ~1600 yrs AD), histories of forest fires, as well as effects induced solely by human activity, such as the industrial revolution, pollution, and global warming (see display table).



Lead slug from bullet lodged inside the tree. The slug is about 1 cm long. The saw cut easily through the softer lead. A zone of discoloration has migrated outward from the slug's clearance in case of lead poisoning.



Photos by Tara Kneeshaw, U.S.G.S, except for photo above, Dec. 4, 2002.