

TO CORE OR NOT TO CORE? THAT IS THE QUESTION.

Collecting cores from trees is a standard method for measuring ages and growth in seasonal environments where annual tree rings are formed (van Mantgem and Stephenson 2004). Tree coring is also widely used for studying fire histories on landscape scales. For example, in the San Juan National Forest in Colorado, researchers are studying how fire regimes and forest structure have varied across space and time in response to regional climate variability and land-use change. The project status (8 July 2005) indicates that researchers have sampled cores (or cross sections) from approximately 3,700 trees (Brown and Wu 2005). Taking tree cores also occurs in national park areas. For example, in 1995 *Park Science* reported that researchers collected cores from pure stands of aspen (*Populus termuloides*) adjacent to mixed

conifer sites at Bandelier National Monument in New Mexico in order to determine post-fire establishment dates (Allen et al.). This standard research practice enables a variety of management and research questions to be addressed. But does it contribute to tree mortality? As highlighted in van Mantgem and Stephenson, this question has not been answered satisfactorily.

The authors used 21 years of annual-resolution data from two cored and two un-cored permanent plots in the Sierra Nevada of California. The objective was to detect change in mortality rates 12 years following coring for two coniferous species: white fir (*Abies concolor*) and red fir (*Abies magnifica*). Analysis of data from these sites supports the idea that coniferous trees sustain little serious damage from tree coring. However, several caveats apply to these results. First, a post-coring interval of 12 years is short compared to the more than 300-year potential life-span of these species. Second, the cored trees may have sustained internal and unobservable damage, resulting in fungal infections, which could cause future elevated mortality rates. Third, under more challenging conditions (e.g., drought, windstorms, or pathogen outbreaks) coring damage could become a contributing factor of tree death. Fourth, other species, in particular hardwoods, are likely to show greater susceptibility to fungal attacks following coring, possibly leading to mortality.

If coring has a measurable effect on tree mortality, it may be important to consider how it shapes subsequent forest dynamics and limit its use to situations where destructive sampling is considered acceptable (van Mantgem and Stephenson 2004). Hence, this study recommends more research to conclude categorically that coring does not cause significant harm. The article suggests that a promising avenue for future research would be to exploit information from historical and ongoing projects (of which plenty seem to be available).

References

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