

Western Ecological Research Center

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VTM Plots and Historical Vegetation Change

Between 1929 and 1935, the California Vegetation Type Map (VTM) project collected data from more than 18,000 plots throughout the state. In recent years, numerous studies have made use of these VTM plots to reconstruct historical changes in vegetation distribution in forests, woodlands, and shrublands. In the October issue of the journal *Madroño*, USGS scientist Dr. Jon E. Keeley demonstrates some critically important flaws in some of these published studies and suggests approaches for increasing the credibility of studies using these historical VTM data.

One of the major limitations to the use of VTM plots for historical reconstructions is that they cannot be precisely relocated. Previous studies assumed that errors resulting from this problem were inconsequential or could be eliminated by comparison with a composite of multiple contemporary plots. Keeley's study examined that assumption for southern California shrubland landscapes. He compared shrub species density in 90 pairs of VTM-size (400-m²) plots separated by 10 m, and found that all species exhibited considerable differences in density over this short distance. It is concluded that this patchiness in shrub distribution could lead to major errors in historical reconstructions from VTM plot data. These differences, however, were greatly reduced when samples were averaged over many plots.

Two methods are proposed for future historical studies using VTM plots. One is to collect multiple contemporary samples from the original VTM plot area and use the observed spatial variation to set bounds on the temporal changes required to represent significant historical change. The other approach is to look at broad landscape changes reflected in the averages observed in a large sampling of sites.

Management Implications:

- Historical vegetation sample plots set up by the VTM project over 70 years ago are potentially important as baselines for understanding vegetation change in many California plant communities.
- VTM plots cannot be precisely relocated; therefore, some of the differences observed between these plots and contemporary re-sampling are due to spatial rather than temporal differences, and this problem can be substantial.
- Legitimate use of these plots for historical reconstruction requires either a measure of the current spatial variation in community structure or large sample sizes that focus on landscape average changes rather than site-specific conclusions or historical evidence such as photographs to more precisely determine plot locations.

These results suggest that the broad generalizations about historical changes using VTM plots are likely valid. However, they raise serious questions about many of the published accounts that report very specific changes based on a single or just a few plots.

Keeley, J. E. 2004. VTM plots as evidence of historical change: Goldmine or landmine? Madroño 51:372–378.