

BOOK REVIEW

A manual of California vegetation. Second Edition.

John O. Sawyer, Todd Keeler-Wolf, and Julie M. Evens. 2009. California Native Plant Society, Sacramento, California, USA. 1,300 pages. \$82.00 paperback. ISBN 978-0-943460-49-9

Available from: California Native Plant Society, 2707 K Street, Suite 1, Sacramento, CA 95816-5113 (www.cnps.org)

In 1995 the California Native Plant Society (CNPS) published *A Manual of California Vegetation* (Sawyer and Keeler-Wolf 1995) (hereafter, the MCV 1st Edition) with the goals of developing common language and clear definitions to further the inventory and understanding of all plant communities within California and developing quantitative, defensible definitions of rare and threatened communities. After 14 years of rigorous surveys, analyses, descriptions, and mapping of vegetation, original authors John Sawyer of Humboldt State University and Todd Keeler-Wolf of the California Department of Fish and Game (California Department of Fish and Wildlife [CDFW] as of 2013) were joined by Julie Evens, California Native Plant Society Vegetation Program Director, to produce the second edition of the manual.

This updated publication contains >450 vegetation descriptions that include a brief summary of the vegetation type, its habitats, rarity ranking, the names applied to similar types in other classifications, quantitative membership rules, detailed life histories, fire characteristics, regional variation, management considerations, and a list of all associations for the type found in supporting literature. Distribution maps are included for 352 vegetation types, and >2,400 references were consulted.

The book's initial chapters provide an introduction to vegetation classification and mapping necessary for readers to fully understand the detailed chapters that follow: How to Read the Alliance Descriptions and the Key and Descriptions for California Vegetation. The key and the descriptions are arranged by vegetation strata — i.e., types dominated by trees, by shrubs, or by herbs. Five very useful appendices are presented in the MCV 2nd Edition: (1) Comprehensive Life History of Species Table; (2) Comprehensive Fire Regime Table; (3) National Classification Hierarchy of Vegetation Types; (4) List of Unranked Vegetation Types; and (5) Reclassified Vegetation Types.

What is the significance of this volume? Recognizing the growing utility of vegetation maps for land use planning and natural resource conservation, the California Legislature codified state standards for classification and mapping of vegetation in 2007. Map products that meet the California Vegetation Classification and Mapping Standards (CVCMS) integrate two principal standardized datasets: (1) classified field samples representing the full array of vegetation types in an area, and (2) a map layer displaying the classified vegetation types along with other information, among which are cover, structural data, and site quality information. The state standards were developed and endorsed by a committee comprised of representatives from several federal and state agencies. An expanded discussion of the process by which the standards were developed from the California Department of Fish

and Wildlife's perspective is available at <<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=54411&inline=1>>.

The endorsed California Vegetation Classification is presented in MCV 2nd Edition, and this classification meets United States National Vegetation Classification (USNVC) standards. These standards, developed by the Federal Geographic Data Committee and peer-reviewed by the Ecological Society of America's Vegetation Panel, facilitate the analysis of biological and geographical data and the management of lands across different agencies on a nation-wide basis. All federal agencies are encouraged to meet the standards, as are institutions that receive federal funding; at a minimum, classifications must crosswalk to the USNVC. Therefore, map classifications adhering to the standards presented in the MCV 2nd Edition may be crosswalked with any recently produced map, or map under production for federal lands or using federal funds; nearly 48% of the land in California is owned by federal agencies (Gorte et al. 2012).

Approximately one third of the state's vegetation has been mapped using the classification set forth in this volume through integrated classification and mapping projects. The use of the standards will help these maps to be unified into a seamless statewide map. When incorporated with other data layers in geographic information systems, a detailed, accurate vegetation map will allow planners to avoid or reduce unnecessary habitat destruction and costly litigation when siting developments or large infrastructure projects. Planning at the local scale can take place with a statewide or regional vision of the cumulative impacts of a given project on an important habitat, or with an eye toward connecting wildlife corridors to other regions. Required compensatory mitigation can be directed to valuable habitat adjacent to existing conservation lands to help create large reserves and maximize benefits to plants and wildlife.

Wildland managers should find the fire regime information particularly valuable. The fire information was developed in consultation with members of the Association of Fire Ecologists and other scientists, and comprises an extensive literature and decades of experience. Fire characteristics are discussed for each alliance and also presented in tabular form in Appendix 2.

Federal and state agency staff charged with planning the conservation and wise use of, or preventing the extinction of, natural communities under the California Environmental Quality Act, the National Environmental Policy Act, and enabling legislation or operating policies of a variety of agencies should find that the objective analysis behind each defined alliance or association, description, and rarity ranking strengthens the definition of the vegetation community, thereby making it easier to discern, describe, and defend.

How has the second edition rectified criticisms of the MCV 1st Edition? (1) The classification presented earlier was criticized for over-emphasis of dominance in the tallest vegetation stratum. Schwartz (1997) stated this approach would not satisfy phytosociologists who base their classifications on detailed samples of all vegetation layers. MCV 2nd Edition advocates data-driven vegetation classification. Vegetation classifications are often more detailed than vegetation map units because of differences in scale and the use of remotely sensed imagery, and therefore only layers that are visible, for mapping. This is explained in the chapter entitled *The Difference between Vegetation Classification and Vegetation Mapping*. (2) Keil (1997) advocated inclusion of more associations based on samples. In response, the authors of MCV 2nd Edition were able to include many more associations based on the published results of sampling in the numerous studies that followed publication of MCV 1st

Edition. Each of the associations listed in the second edition is based on a full complement of published independent samples, typically 10 or more. (3) Lacey (1996) expressed a need for more discussion of regional variation to help horticulturists plan successful native gardens. MCV 2nd Edition includes regional variation, extensive life history notes, and habitats in which vegetation types have been documented. This information should be of use to horticulturists and restoration ecologists.

The MCV 2nd Edition has been in circulation long enough for users' comments to be based on practical experience, not on first impressions. Some users find the book too complicated; they want to quickly learn which vegetation types occur in an area, and conversely, in which areas particular vegetation types occur. Some have complained that all types are not included. The book only includes types that had been defined in works published prior to the publication of MCV 2nd Edition.

Although the MCV 2nd Edition is large, it is not truly a "stand-alone" volume, as it does not explain the California Mapping Standard it discusses — these standards are state standards, not CNPS standards, and may be found at <<http://biodiversity.ca.gov/vegmou.html>>. MCV 2nd Edition does not include the protocols (repeatable methods) necessary to achieve the sampling standards it advocates. Those protocols have been developed and refined cooperatively by CNPS and CDFW over the past 15 years. Minor revisions are made as field work reveals omissions, and may be found at <<http://www.cnps.org/cnps/vegetation/pdf/protocol-combined.pdf>>.

Even with these limitations, the comprehensive MCV 2nd Edition presents an enormous body of information in an organized way and, as a result, readers can develop a better understanding of California vegetation. The print volume does not provide color photographs of the vegetation types and is not intended to serve as a general overview of California vegetation for a casual audience. It will be of interest to students of vegetation, botanists, ecologists, environmental scientists, and natural history enthusiasts, and is a must-have for land-use managers and conservation planners.

Is *A Manual of California Vegetation* 2nd Edition the definitive work on California vegetation? No; it is a step in the process of developing an understanding of the complete variation and distribution of California vegetation. This understanding will evolve as more data are collected.

The California Native Plant Society is working diligently on a searchable, online version of MCV 2nd Edition, which currently is being beta tested. When it becomes available, many of the criticisms listed above will be resolved by using the "search" feature of the online version. CNPS also plans to include new vegetation types identified in studies published since the publication of MCV 2nd Edition, and photographs of many vegetation types in the online version.

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