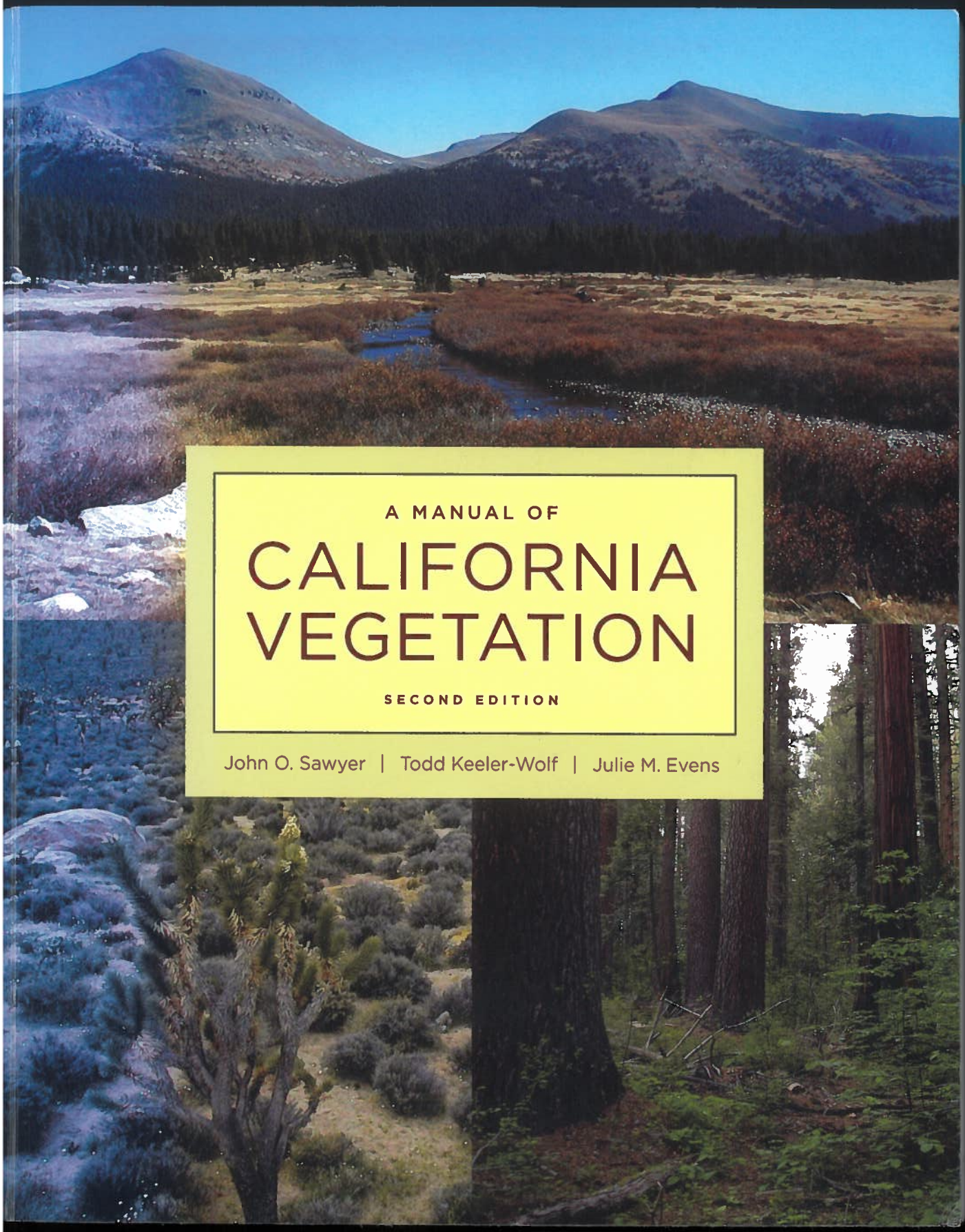

A MANUAL OF

CALIFORNIA VEGETATION

SECOND EDITION

John O. Sawyer | Todd Keeler-Wolf | Julie M. Evens

A Manual of California Vegetation

Second Edition

John O. Sawyer, Humboldt State University
Todd Keeler-Wolf, Department of Fish and Game
Julie M. Evens, California Native Plant Society

California Native Plant Society
In collaboration with
California Department of Fish and Game
Sacramento, California

California Native Plant Society Press
Sacramento, California

Board of Directors, 2008
Susan Britting, President and Vice President
Steve Hartman, Treasurer
Lynn Houser, Secretary
Brett Hall, Director, Chapter Council Representative
Brian LeNeve, Director, Chapter Council Representative
Arvind Kumar, Director
Vince Scheidt, Director
Alison Shilling, Director
Carol Witham, Director

CNPS Publications Committee, 2008
Dore Brown
Holly Forbes

© 2009 California Native Plant Society. All rights reserved. No part of this book may be reproduced in any form or by any electronic or mechanical means without permission of the publisher. Requests should be made to CNPS, 2707 K Street, Suite 1, Sacramento, CA 95816.

Library of Congress Cataloging-in-Publication Data

Sawyer, John O., 1939–
A manual of California vegetation / John O. Sawyer, Todd Keeler-Wolf, Julie M. Evens. — 2nd ed.
p. cm.
Includes bibliographical references and index.
ISBN 978-0-943460-49-9
1. Plant communities—California. 2. Vegetation classification—California. I. Keeler-Wolf, Todd. II. Evens, Julie M. III. Title.

QK149.S39 2009
581.9794—dc22

2009001198

Manufactured in the United States of America

Contents

The Vegetation Committee vii
Acknowledgments ix

Overview **1**
Introduction 3
What Is Vegetation? 8
The History of Vegetation Classification in California 12
The Difference between Vegetation Classification and Vegetation Mapping 17
The CNPS Approach to Classification 18
Conservation and Management in the Present and Future 22
Changes Since the First Edition 26
Vernal Pools
Semi-Natural Stands
Annual Grassland Vegetation
Maritime Chaparral and Associated Habitats
Montane Mixed Conifer Types
Fens
Mojave and Sonoran Desert Vegetation
Species Life History Traits and Fire Regime Information 43
How to Read the Alliance and Other Descriptions 44

Keys and Descriptions for California Vegetation **51**
Key to Forests and Woodlands in California 53
Descriptions of Forests and Woodlands 58
Key to Shrubland Vegetation in California 304
Descriptions of Shrubland Vegetation 313
Key to Herbaceous Vegetation in California 735
Descriptions of Herbaceous Vegetation 743

Literature Cited 1073
Appendices 1195
1. Species Life History and Botanical Characteristics 1195
2. Alliance Fire Regime Characteristics: Terms and Definitions 1210
3. The National Vegetation Classification Hierarchy as Applied to California Vegetation 1227
4. Vegetation Types, Recognized by Other Authors, Undescribed in This Edition 1241
5. Reclassified Vegetation Types 1243
6. Glossary of Commonly Used Terms 1245

Indices 1249
Alliances/Stands Index 1249
Index to Calveg Types by General Habitat 1260
Index to Wildlife Habitat Relationships (WHR) Types 1263
Species Index 1265

The Vegetation Committee

Committee Chairperson
Todd Keeler-Wolf, California Department of Fish and Game

Ex-Officio Committee Chairperson
Michael G. Barbour, University of California, Davis

Committee Members
Barbara Allen-Diaz, University of California, Berkeley
Susan Bainbridge, University of California, Berkeley
Jennifer Buck, CNPS
David Chipping, California Polytechnic State University and CNPS
Julie M. Evens, CNPS
Hazel Gordon, U.S. Forest Service
J. Robert Haller, University of California, Santa Barbara
Steve Hartman, CNPS
Diana Hickson, California Department of Fish and Game and CNPS
Deborah Hillyard, California Department of Fish and Game
Marc Hoshovsky, California Department of Water Resources
Jeff Kennedy, University of California, Information Center for the Environment
Anne Klein, California Department of Fish and Game
David Magney, DM Environmental Consulting and CNPS
Sally J. Manning, Inyo County Water Department
Erin McDermott, Nomad Ecology
Bruce Orr, Stillwater Sciences
Andrea Pickart, U.S. Fish and Wildlife Service
Cynthia Roye, California Department of Parks and Recreation
Connie Rutherford, U.S. Fish and Wildlife Service
John O. Sawyer, Humboldt State University
Ayzik Solomeshch, University of California, Davis
Joan Stewart, CNPS
Carol Witham, CNPS