
Vineyard Site Assessment Guide

**A primer for effective interaction with
resource and regulatory agencies in
Sonoma County**



University of California Cooperative Extension



In accordance with applicable State and Federal laws and University policy, the University of California does not discriminate in any of its policies, procedures, or practices on the basis of race, religion, color, national origin, sex, marital status, sexual orientation, age, veteran status, medical condition, or handicap. Inquiries regarding this policy may be addressed to the Affirmative Action Director, University of California, Agriculture and Natural Resources, 111 Franklin – 6th Floor, Oakland, CA 04607-5200. (520) 987-0097.

Electronic Version 8/2002

Vineyard Site Assessment Guide

**A primer for effective interaction with
resource and regulatory agencies in
Sonoma County**

David Lewis, University of California Cooperative Extension,
Sonoma County Project Coordinator and Principal Author

Rhonda J. Smith, University of California Cooperative
Extension, Sonoma County Editor

Authors

Andrew Baker, California Regional Water Quality Control Board

Gail Davis, Sonoma County Agriculture Commissioner's office

Chester Gin, Natural Resource Conservation Service

Carol Mandel, Natural Resource Conservation Service

Bernardo Sajulga, Natural Resource Conservation Service

Charlette Sanders, Natural Resource Conservation Service

Paul Sheffer, Southern Sonoma Resource Conservation District

Rhonda J. Smith, University of California Cooperative
Extension, Sonoma County

Acknowledgements: Funding for original development and printing was made available through the United States Department of Agriculture and the County of Sonoma.

Table of Contents

Introduction	3
Using this Guide	4
Driveway and Road Systems	5
Neighbors	6
Slope	7
Soils	8
Water Access and Rights	9
Existing Erosion	10
Vegetation	11
Streams and Riparian Corridors	12
Wet Areas	14
Summary	16
Agency Directory	17
Notes	20
Tables	
Table 1: Level designation of new vineyard planting and replanting by average percent slope and soil erodability	7
Table 2: Resource and Regulatory agency reference by natural resource and critical concern	21

Introduction

Developing a vineyard is a challenging endeavor, requiring an understanding of many crop production factors such as climate, soil fertility, and water availability. These and other factors will affect vineyard design and, ultimately, crop yield and quality. However, in addition to these production factors, there are now environmental regulatory requirements that directly impact the process of developing a vineyard in Sonoma County.

The Clean Water Act and the Endangered Species Act are just two of the environmental laws that make up the regulatory landscape into which a vineyard is developed. These regulations give federal and state natural resource and regulatory agencies the authority to protect beneficial uses of streams and rivers from adverse land use. In addition, there are county ordinances regulating vineyard development. These regulations require approval of site development plans and permits before installation activities begin.

In the past, developers and owners have proceeded with vineyard installation without knowledge of these regulatory requirements and the ramifications of non-compliance. In such cases, the owner and developer were responsible for compliance and had to reach agreements with respective agencies about remediation. Fines have been assessed for violations, as well.

The Vineyard Site Assessment Guide was written to assist the prospective vineyard owner and developer. It can be used as an initial property survey tool to assess a site and identify which regulations and regulatory agencies have jurisdiction regarding the development of a vineyard. Before actual vineyard development begins, it is your responsibility to contact the appropriate agencies. An Agency Directory is in the back of this document.

Using This Guide

This Vineyard Site Assessment Guide will inform current and perspective landowners, realtors, and vineyard developers of various aspects of your site that will trigger mandatory agency involvement. These include activities such as road development and vegetation conversion. It enables everyone – regardless of experience – to mesh rudimentary vineyard layout ideas with awareness of which agency should be involved from the onset of vineyard development. Each section of the guide represents a specific natural resource or vineyard characteristic with an explanation of the resource’s significance, listing of relevant regulations and agency jurisdiction, potential costs for compliance, and suggestions for future steps.

This guide should be used with the appropriate USGS 7.5-minute quadrangle map or an aerial photograph of the site being assessed. Maps are sold by sporting goods retailers. In addition, the Sonoma County Permits and Resource Management Department has lot line topographic maps and aerial photographs available for a fee.

With a map or photograph in hand, locate the site of interest and its boundaries. Become familiar with the river basin and tributary watersheds in which the site is located. Tour the prospective site using the map or photograph and this guide. Identify significant natural resource features, such as streams and slopes, and make notes about resource and regulatory agencies to contact for clarification.

(Note: In this guide the term “developer” means both vineyard developer and owner.)

Driveway and Road System

Significance – Access to a site and its facilities is integral to doing business. Where and how a driveway and road system is constructed or exists can affect water runoff, volume, and quality from road drainage, including flows in sideboard ditches and culverts.

Regulations and Jurisdiction – The Sonoma County Permit and Resource Management Department has principle jurisdiction for site surveying and land development, including access and driveway construction. This work usually requires grading and encroachment permits granted through the Department. In addition, the California Regional Water Quality Control Board stipulates control of sediment from roads through recommended management practices. If a site is located within a watershed scheduled for development of a sediment total maximum daily load, a road inventory and maintenance plans may be required. The National Marine Fisheries Service and California Department of Fish and Game have established culvert and stream crossing standards. A permit from the California Department of Forestry and Fire Protection may also be required if road construction through timberland involves tree removal. Lastly, United States Army Corps of Engineers permits may be required for roads crossing streams or wetlands.

Costs – Costs include fees for associated permits and the development and implementation of erosion and sediment control plans, as well as road inventory and maintenance plans.

Next Steps – Identify existing driveways and roads and carefully survey their drainage system for potential maintenance needs. If no driveway exists or an alteration to existing access is needed, determine where a potential driveway would be constructed considering slope and stream channel crossings. Check with Permit and Resource Management Department for grading and encroachment permit requirements. In addition, the California Regional Water Quality Control Board can inform you about road inventory requirements and the listing of a

watershed for a total maximum daily load on the California 303 (d) List and Total Maximum Daily Load Priority Schedule.

Neighbors

Significance – Both the United States Environmental Protection Agency and the State Water Resources Control Board are implementing water quality regulations through watershed management initiatives. The goal is to protect water resources from point source and non-point source pollutants within a topographically defined watershed or basin. This approach to water resource management places collective responsibility for water quality on all landowners within a watershed. Knowing who potential neighbors are and learning of their past, current, and future land use plans is beneficial within the context of understanding the water quality issues for a specific site and its watershed. This includes immediately adjacent properties, as well as neighbors positioned throughout the watershed.

Regulations and Jurisdiction – No specific regulations pertain to this characteristic. The California Regional Water Quality Control Board or the United States Environmental Protection Agency has the lead in directing Watershed Management Initiatives. In some cases, public comment is required prior to site development.

Costs – Fees will include those associated with doing a title search.

Next Steps – When surveying the site, identify where streams and surface waters come on to the site and the land use activities these waters drain prior to entering the property. Likewise, identify where streams and surface waters exit the site and the land use activities those waters drain before exiting the property. Identify the entire watershed in which the site is located and be aware of any local land use activities that may significantly impact water quality. Public information about site ownership is available through the County Assessor's Office.

Slope

Significance – The risk of erosion and sediment delivery is greater on hillsides than on valley floors. As slope increases, the rate of water runoff increases. Successful grading and earth movement activities on hill slopes require experience and careful planning to minimize soil movement related to precipitation. Percent slope on the prospective site is the ratio of vertical distance to horizontal distance multiplied by 100. For example, a 10 % slope indicates that for every 1000 feet horizontally there is a 100-foot rise or fall vertically.

Regulations and Jurisdiction – In Sonoma County, the Vineyard Erosion and Sediment Control Ordinance requires that an erosion and sediment control plan be approved prior to planting or replanting a vineyard site in slope levels II and III (Table 1). Documentation is required to determine Level I status. With minor exceptions, new plantings are not allowed on sites with 50% average slope or greater. Approved methods to calculate average percent slopes are established in the ordinance. Grading activities may also require a Sonoma County grading permit. In addition to the ordinance requirements, grading and construction on hill slopes that impact water quality is subject to review and punitive action by the Regional Water Quality Control Board under the Clean Water Act.

Table 1: Level designation of new vineyard planting and replanting by average percent slope and soil erodibility.

Level	Average % Slope on Highly Erodible Soils	Average % Slope on Less Erodible Soils
Level I	<10	<15
Level II	10-<15	15-<30
Level III	15-<50	30-<50

Costs – Costs can include the development of an erosion and sedimentation control plan and implementation of such a plan. At minimum, costs may be incurred if outside expertise is necessary to determine average slope.

Next Steps – Determine the average percent slope of the prospective site following approved guidelines. Identify changes in slope with respect to potential vineyard planting sites. Compare slopes to county ordinance directives (Table 1).

Soils

Significance – Physical and chemical soil properties lend distinguishing characteristics to a site that will influence potential vineyard yields and fruit quality. In the same way these properties present varying risks and benefits for water quality. The Natural Resource Conservation Service assesses soils for erodibility and use suitability. The suitability and erodibility of a soil is important when considering grading and earth moving activities or setting achievable production goals.

Regulations and Jurisdiction - County regulations make requirements based on identification of erodible and less erodible soils. The Sonoma County Vineyard Erosion and Sediment Control Ordinance requires submittal and approval of an erosion and sediment control plan prior to vineyard development for a site with average slopes of 10 % or greater on any of the following highly erodible soils: Diablo, Los Osos, Goldridge, Dibble, Suther, Steinbeck, and Laughlin.

Costs – Costs can include the fees for the development of an erosion and sediment control plan, and implementation of such a plan. At a minimum, costs may be incurred if outside expertise is necessary to determine soil type.

Next Steps – Using the identified changes in vegetation and slope, consult your local Resource Conservation District or Natural Resource Conservation Service office to identify the soils on your site using a soil survey. The survey will identify soils as erodible, as well as provide information about soil fertility, permeability, and water holding capacity. Compare the list of identified soils on the site to that listed in the Sonoma County ordinance.

Water Access and Rights

Significance – Crop water requirements and irrigation strategy will determine water needs for a vineyard. Water access and rights are essential components to meet these needs. Using both surface and groundwater to meet crop water needs without impacting beneficial uses of these water resources is the primary concern.

Regulations and Jurisdiction – Water use in California is governed by appropriative, riparian, and overlying water rights. Appropriative rights are defined as physical control of water and, since 1914, require a permit or license for water use. Riparian rights are granted by the ownership of property that touches a river, stream, pond, or lake, as well as lands that regularly receive floodwaters. Overlying rights to groundwater are afforded to property above a common aquifer. In general, riparian and overlying rights are senior to appropriative rights. Appropriative right prioritization is made in accordance to seniority in use. However, these rights are correlative, preventing the unlimited removal of water without regard to others' needs. This is established by the Water Commission Act of 1913 and Article X, Section 2, amendment of the California Constitution requiring “beneficial and reasonable” use of all water. In some cases, the correlative use of water forces adjudication of water rights. Adjudication calls upon the courts to settle disputes over the quantity of water that can be rightfully extracted. In other cases, a water body or stream section can have “fully appropriated” rights restricting any further water allocation. The State Water Resources Control Board Division of Water Rights has jurisdiction over appropriative and riparian surface rights, including the approval and permitting of water diversion and storage projects. The California Department of Water Resources Planning and Local Assistance Department administers policy to Sonoma County Permit and Resource Management Department for groundwater use. This includes approval of water well permits. An environmental impact report may be required to comply with the California Environmental Quality Act. Any water from fish bearing streams diversion requires screens in accordance with criteria developed by the National Marine Fisheries Service and the California Department of Fish and Game.

Lastly, reservoir construction requires a grading permit from Sonoma County Permit and Resource Management Department.

Costs – In addition to the material and installation costs of wells and storage structures, there will be a \$100.00 application fee for small domestic registration or water diversion permits and a subsequent water right fee based on the quantity of water diverted. Both fees are assessed by the State Water Resources Control Board - Division of Water Rights. The Sonoma County Permit and Resource Management Department will also assess water well fees. Other costs will include an \$850.00 California Department of Fish and Game filing fee and, if an environmental impact report is necessary, up to \$1,250.00 for the California Environmental Quality Act filing fee, as well as costs for the preparation of the report. This process can require posting for public comment, as well.

Next Steps – Assess site’s existing water access including streams, rivers, and storage structures. Conduct a title search to identify existing water rights and permits, carefully checking that rights have not been deeded to other parties. Generate an annual sum of water available to the site through existing rights. Contact the County Superior Court for any existing or impending adjudication of water rights on the site or in the watershed of question. The California Regional Water Quality Control Board can identify the beneficial uses of the creeks and rivers, which will be important to determine the priority of water rights and use in times of shortage. Consult the State Water Resources Control Board Division of Water Rights to determine if the creeks and rivers in question are fully appropriated and to establish what permits would be needed for water diversion and storage projects. Contact the Sonoma County Permit and Resource Management Department as well as the California Department of Water Resources Planning and Local Assistance for details on well permits, standards, and groundwater availability.

Existing Erosion

Significance – Existing erosion or evidence of past naturally-occurring soil movement can offer clues and indications of site

conditions including soil types, surface water pathways, and past and current land use activities.

Regulations and Jurisdiction – Under California law, assumption of ownership for property includes acceptance and responsibility for any conditions of negative environmental impact. This includes sites of existing soil erosion and sediment delivery that are impacting water quality and that are subject to the Clean Water Act and the jurisdiction of the California Regional Water Quality Control Board.

Costs – All costs to mitigate soil erosion and sediment delivery from the site fall to the owner. There are cost-share programs administered by Natural Resource Conservation Service and local Resource Conservation District for such projects.

Next Steps – Survey site for erosional features including gullies, stream bank cutting, slide scarps and hummocky terrain. Gather history about these features through aerial photograph review or oral account. Look for indications that previous land use activities were or were not associated with the soil erosion and sediment delivery at these features. Consider how site development will influence surface runoff and erosion processes at these locations.

Vegetation

Significance – Existing vegetation can indicate soil types and wet areas on the site. Some vegetation types and specific species are protected either as endangered or threatened. Vegetation conversion can require submittal and approval of relevant plans and issuance of permits.

Regulations and Jurisdiction – The California Department of Forestry and Fire Protection regulates the conversion of commercial timberland to vineyards through the approval and oversight of Timberland Conversion Applications. A Timberland Conversion Permit and a Timber Harvest Plan are required for sites of commercial timberland larger than three acres. For smaller sites a Less than 3-acres Conversion Application can be submitted. The

services and signature of a registered professional forester is needed for each of these timberland conversion documents. Timberland conversion may also require that a site be rezoned by Sonoma County if it is in a “timberland production zone.” In addition, there are four Sonoma County tree protection ordinances that regulate timberland conversion and oak tree removal from a site. Lastly, there may be concerns for sensitive plant habitats such as native grasslands and oak woodlands. These may contain threatened or endangered plant and animal species requiring submittal of an Environmental Impact Report to California Department of Fish and Game under the California Environmental Quality Act).

Costs – Fees include \$600.00 for California Department of Forestry and Fire Protection review and processing, as well as \$1,250.00 for California Department of Fish and Game review of submitted plans or to obtain permits. Additional costs may include the services of a registered professional forester for plan preparation.

Next Steps – Assess the site for historical and current presence of commercial timber species, such as Douglas fir, sugar and ponderosa pine, and redwood species. Contact the Field Forester at the California Department of Forestry and Fire Protection to help with this determination and for guidance on the appropriate timberland conversion documents that will be required. The Field Forester can also provide a list of locally available registered professional foresters. Information can be found through the California Department of Fish and Game United States Fish and Wildlife Service Natural Resource Conservation Service and local Resource Conservation District regarding threatened and endangered species. Contact Sonoma County Permit and Resource Management Department about timberland conversion and tree protection ordinances.

Streams and Riparian Corridors

Significance – Ephemeral, seasonal, and perennial streams each provide important hydrologic and habitat functions within a

watershed. An ephemeral stream flows intermittently in response to precipitation and in some years may not flow at all. Seasonal streams also flow intermittently in response to precipitation but flow every year on a seasonal basis. Perennial streams flow all year in response to both precipitation and groundwater inputs. Identifying which types of streams exist on a site is important to understanding the hydrology of the watershed and, hence, the factors that will affect drainage of a new vineyard. Re-directing or channeling a natural drainage that is ephemeral, seasonal, or perennial may affect plant and wildlife habitat downstream through changes in hydrology and channel morphology.

Regulations and Jurisdiction – The United States Army Corps of Engineers regulates all jurisdictional waters of the U.S. per the Rivers and Harbors Act, Clean Water Act and the Marine Protection, Research, and Sanctuaries Act. Jurisdictional waters include springs, grassy swales, seasonal wetlands, vernal pools, ephemeral, seasonal and perennial creeks, rivers, lakes, ponds, and marshes. The California Regional Water Quality Control Board has jurisdiction to enforce water quality standards through the Clean Water Act and the Porter Cologne Act and requires submittal and approval of a Water Quality Certification for any stream channel work. This includes compliance with the California Environmental Quality Act. The National Marine Fisheries Service will be solicited for technical review, per the Endangered Species Act, of any stream or riparian corridor project that has Natural Resource Conservation Service oversight or United States Army Corps of Engineers approval. The California Department of Fish and Game through its mandate to protect state fish, wildlife, and native plants, requires notification for any project that will impact a river, stream, or lake. The Sonoma County Vineyard Erosion and Sediment Control ordinance requires riparian setbacks from 25 feet and 50 feet from the top of the bank for sites in Level I, and Levels II and III, respectively (see Table 1.). The Sonoma County General Plan also requires these setbacks.

Costs – Costs can include a Lake and Streambed Alteration Agreement fee from the California Department of Fish and Game that is a minimum \$132.00 (non-refundable) with additional fees

levied on the basis of the project's cost up to a total of \$1,059.00. Water Quality Certification from the California Regional Water Quality Control Board has a \$500.00 fee. The United States Army Corps of Engineers permit application fees are a maximum \$100.00. Costs may also be incurred for site data collection and documentation required by those agencies. Negatively impacting aquatic habitat may require in-kind replacement and revegetation.

Next Steps – Identify where potential vineyard installation would take place in proximity to the creeks flowing through the site. Assess these creeks and drainages to determine if they are ephemeral, seasonal, or perennial. Questions about the flow patterns of the creeks may help with this determination. Refer to the United States Geologic Survey 7.5-minute quadrangle topographic map to identify creeks designated by solid or dashed blue lines. These represent important aquatic habitat and potential fish bearing streams. The United States Army Corps of Engineers, National Marine Fisheries Service, and California Department of Fish and Game will provide pre-project consultations to determine permit needs. In addition, the Natural Resource Conservation Service and local Resource Conservation District can provide technical service for vineyard development near streams and riparian corridors. Questions concerning a pest and disease risk assessment of the site can be directed to the University of California Cooperative Extension office.

Wet Areas

Significance – Areas that are seasonally or perennially saturated can represent unique aquatic and plant habitat such as wetlands and vernal pools. In addition, these areas include springs that can present problems regarding soil erosion and sediment delivery during and after vineyard installation.

Regulations and Jurisdiction – Wet areas are jurisdictional waters of the United States and their development for vineyards requires a permit from the United States Army Corps of Engineers. In addition, vernal pools and wetlands represent habitat and species

composition that may be subject to the Endangered Species Act with oversight by the California Department of Fish and Game National Marine Fisheries Service and United States Fisheries and Wildlife Service.

Costs – Maximum fee for a United States Army Corps of Engineers permit is \$100.00. Filling in or negatively impacting aquatic habitat may require in-kind replacement and revegetation.

Next Steps – Assess the site for wetlands, vernal pools, and springs. This may not be easy in dry periods during the year. Green vegetation that contrasts with surrounding dry grasses may indicate such areas. In general identify basins, swales, and any areas with the potential to trap and hold precipitation. Contact the regional United States Army Corps of Engineers office for further consultation in identifying lands that would require permitting for vineyard development. In addition, the Natural Resource Conservation Service and respective Resource Conservation District can provide assistance in identifying wet areas and discussing approaches to developing vineyards on such areas. Contact the California Department of Fish and Game as well as the United States Fisheries and Wildlife Service for information about endangered and threatened species in a given watershed.

Summary

Resource agencies, such as the Natural Resource Conservation Service local Resource Conservation District and UC Cooperative Extension are often able to tell you what the most critical areas of concern are for local regulatory agencies regarding vineyard development. Resource agencies educate, they do not regulate, and by contacting them early in the process you may be able to avoid common mistakes that could put the natural resources on your property at risk and possibly diminish the site's economic and aesthetic value.

This guide is part of that educational role. In addition, there are opportunities for vineyard owners and developers who wish to develop management plans for ongoing vineyard development. These include the Southern Sonoma Resource Conservation District's "Vineyard Conservation Planning" course, Sotoyome Resource Conservation District's "Fish Friendly Farming" workshop, and the University of California Cooperative Extension's "Farm Water Quality" short course. Management plans are not currently required by any agency, however, any level of participation will only enhance your ability to identify and mitigate potentially negative impacts on your property's natural resources.

Agency Directory

California Department of Forestry & Fire Protection (CDF)
Sonoma-Lake-Napa Headquarters
1199 Big Tree Rd.
Saint Helena, CA 94574
707-963-3601

California Department of Fish and Game (CDFG)
Region Headquarters
7329 Silverado Trail
Napa, CA 94558
707-944-5500

California Department of Water Resources (CDWR)
3251 S Street
Sacramento, CA 95816
916-227-7561

California Regional Water Quality Control Board (CRWQCB)
North Coast Region
5550 Skylane Boulevard, Suite A
Santa Rosa, CA 95403
707-576-2220

Goldridge Resource Conservation District (RCD)
2020 Barlow Lane
Sebastopol, CA 95472
707-823-4662

National Marine Fisheries Service (NMFS)
Habitat Conservation Division
777 Sonoma Ave.
Santa Rosa, CA 95404
707-575-6050

Natural Resource Conservation Service (NRCS)
1301 Redwood Way, Ste. 170
Petaluma, CA 94954-1136
707-794-1242 x3

Sonoma County Agricultural Commissioner (SCAC)
2604 Ventura Ave., Ste. 101
Santa Rosa, CA 95403
707-565-2371

Sonoma County Assessor (Assessor)
585 Fiscal Drive, 104F
Santa Rosa, CA 95403
707-565-1888

Sonoma County Permit and Resource Management Department (PRMD)
2550 Ventura Ave.
Santa Rosa, CA 95403
707-565-1900

Sonoma County Public Works Department (SCPW)
2300 County Center Drive, B 100
Santa Rosa, CA 95403
707-565-2231

Sonoma County Superior Court (Superior Court)
600 Administrative Drive
Santa Rosa, CA 95403
707-565-1160

Sonoma County Water Agency (SCWA)
2150 West College Ave.
Santa Rosa, CA 95401
707-526-5370

Sotoyome Resource Conservation District (RCD)
970 Piner Rd
Santa Rosa, CA 95403
707-569-1448

Southern Sonoma County Resource Conservation District (RCD)
1301 Redwood Way, Ste. 170
Petaluma, CA 95954-1136
707-794-1242

State Water Resources Control Board (SWRCB-DWR)
Division of Water Rights
1001 I Street, 14th Floor
Sacramento, CA 95814
916-341-5300

United States Army Corps of Engineers (USACOE) -Regulatory Branch
North Section Chief
333 Market Street, 8th Floor
San Francisco, CA 94105-2197
415-977-8439

United States Environmental Protection Agency (USEPA)
Region 9
75 Hawthorne Street,
San Francisco, CA 94105
415-947-8021

United States Fish and Wildlife Service (USFWS)
2800 Cottage Way, Rm. W2605
Sacramento, CA 95825-1846
916-414-6600

University of California Cooperative Extension (UCCE)
2604 Ventura Ave., Rm 100
Santa Rosa, CA 95403-2810
707-565-2621

Notes

Table 2: Resource and regulatory agency reference by natural resource and critical concern.

Agency	Driveway & Road System	Neighbor	Slope	Soils	Water Rights	Existing Erosion	Vegetation	Stream & Riparian Corridor	Wet Areas
CDF	✓						✓	✓	
CDFG	✓						✓	✓	✓
CDWR					✓				
CRWQCB	✓		✓	✓		✓		✓	✓
RCD	✓		✓	✓		✓	✓		✓
NMFS	✓								
NRCS	✓					✓	✓	✓	✓
SCAC			✓	✓			✓	✓	
Assessor		✓			✓				
PRMD	✓	✓	✓	✓	✓			✓	
SCPW	✓					✓			
Superior Court					✓				
SWRCB-DWR					✓				
USACOE								✓	✓
USEPA								✓	
USFWS							✓	✓	✓
UCCE				✓		✓	✓	✓	



University of California
 Agriculture & Natural Resources
 Cooperative Extension Sonoma County
 2604 Ventura Avenue, Rm. 100
 Santa Rosa, CA 95403-2810
 Tel. (707) 565-2621 Fax (707) 565-2623
<http://cesonoma.ucdavis.edu>

