



Ventura County

2015-2016 Annual Report

 **University of California**
Agriculture and Natural Resources

UC Partnering in Ventura County

The University of California Division of Agriculture and Natural Resources serves Ventura County in two ways:
the Cooperative Extension and
the Hansen Agricultural Research and Extension Center



For over a century, UC Cooperative Extension (UCCE) has taken pride in bringing practical, trusted, science-based solutions in agriculture, natural resource management and youth development for the citizens of Ventura County.



University of California
Agriculture and Natural Resources
Research and Extension Center System

The Hansen Agricultural Research and Extension Center (HAREC), located in Santa Paula, provides land, labor, and equipment to conduct state-of-the-art research projects and serves as a venue for education and outreach to a wide variety of audiences.

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UC Cooperative Extension and HAREC Benefiting Ventura County

Sharing Expertise and Supporting Agriculture—UCCE-Ventura County maintains academic staff that collaborates with researchers from the UC system and other institutions to address both agricultural and environmental issues within the County. UCCE supports the 2 billion dollar agricultural industry through innovative research on pest issues, waste management, new crop evaluations, cultural practices, soils, fertilizers and amendments, and water management including water quality and irrigation. Research programs and grant funding helps bring solutions to Ventura County growers and our natural and urban environments. Targeted research aims to protect agricultural viability, keep agricultural products globally competitive and improve environmental quality of production in one of the County’s main industries.

Integrated Pest Management—Farm advisors develop integrated pest management strategies and provide UC research-based pest information to growers, gardeners, farmers and others to help control pests effectively while minimizing pesticide applications and use of non-toxic biological controls. Advisors and Master Gardener volunteers educate Ventura County residents about invasive and threatening pests such as Asian Citrus Psyllid and Polyphagous Shot Hole Borer.



Saving Soil—Advisors place emphasis on soil resources and conservation with targeted research on protection of topsoil and optimization of soil minerals as well as effective irrigation via drip, mulching and fighting soil borne fungi that are pathogenic to crops.

Optimizing Water Resources—Advisors help growers optimize water and fertilizer application that enables growth of the highest quality produce possible while conserving resources. In 2016, Master Gardener volunteers made water conservation education a top priority. Outreach was achieved through irrigation lectures and drought tolerant demonstration gardens and plant sales.



Teaching Sustainability and Creating Leaders—It is a major goal of UCCE-Ventura County to teach sustainability of gardens, farms, agriculture and our extensive natural resources. Ventura County Master Gardener volunteers are the “go-to” gardening experts in the community. Their efforts enhance approved sites with appealing demonstration gardens and educate the home gardener. The 4-H Youth Development Program volunteers which include those in community clubs and youth enrichment programs at the HAREC play a key role in extending agricultural literacy to Ventura County youth and in developing tomorrows leaders through hands-on, STEM (Science, Technology, Engineering, Math) activities and leadership opportunities.



The following pages provide a summary of the impacts that the University of California Cooperative Extension-Ventura County and the Hansen Agricultural Research and Extension Center have on the community. The County of Ventura plays a key role in our efforts by providing in-kind and direct financial assistance. We are grateful for the continued support from the County Board of Supervisors and Staff. We hope you enjoy reviewing our highlights for 2015-16.

Submitted by Dr. Jim Downer, Interim County Director, Advisor-Ventura County



Dr. Jim Downer oversees installation of *Climate ready Urban Trees of California Central Coast Cities* research project at HAREC

Natural Resources Management

Ventura County supports a wide range of natural resources and native habitats, from beautiful beaches and islands to large and small rivers and streams, from chaparral and oak dotted hillsides to rugged mountains. The Natural Resources Management Program conducts research and education to support the sound management of these resources, providing information and training on the conservation and management of wildlands and watersheds to a wide variety of Ventura County residents. Topics we address include invasive species and pests and restoration of aquatic ecosystems. In addition, Ventura County hosts the Southern California Director of the Statewide California Naturalist program, a program that works with partner organizations to train and certify volunteer interpreters, scientists, and stewards.

Current Projects and 2015-2016 Impacts:

- **Emerging tree pests**—Several new tree pests are affecting Ventura County. These include Foamy Bark Canker, a disease vectored by the Western Oak Bark Beetle that primarily affects oaks; and Polyphagous/Kuroshio Shot Hole Borers (P/KSHB), invasive ambrosia beetles that spread Fusarium Dieback to a wide variety of native, landscape, and agricultural tree species including avocado. Additionally, the Goldspotted Oak Borer has expanded its range to northern Los Angeles County, posing an imminent threat.
 - ◇ 5 workshops—285 growers, land managers, arborists, pest control professionals, and master gardeners trained to recognize and manage infestation. Participants in our workshops report over 40% increases in advanced knowledge of several of these pests, and over 40% increases in their intent to take management actions such as managing infested wood
 - ◇ Participation in County committee investigating ways to protect Ventura County from pests in imported wood waste
 - ◇ Coordination of multiagency effort to surveil and manage P/KSHB in wildland and urban settings
 - ◇ Development and maintenance of regional website www.pshb.org that includes real time pest distribution map



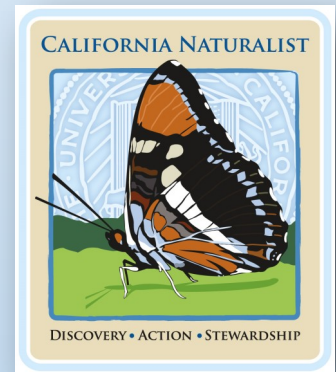
Polyphagous Shot Hole Borer galleries. Photo by A. Eskalen, copyright UC Regents (left) Upper Piru Creek. Photo by S. Drill (right)

Management of aquatic ecosystems—Efforts focus on restoration of the three major watersheds in Ventura County: Calleguas Creek and the Ventura and Santa Clara Rivers to support species of concern, including the endangered southern steelhead trout. Another research area is detection and management of aquatic invasive species, such as the New Zealand Mudsail, that pose a threat to these habitats.

- ◇ Development of www.CalAIS.ucanr.edu, and information and volunteer monitoring website
 - ◇ Regional training—presented on aquatic invasive species for 66 pest management professionals
 - ◇ Technical review of efforts to restore habitat by removing Matilija and Rindge Dams
- **Increasing science and environmental literacy for community members**
 - ◇ Ventura County’s California Naturalist Program first graduating class with the Ojai Valley Land Conservancy—20 Naturalists certified who contributed over 1000 volunteer hours and made over 2000 environmental interpretation contacts in the community



Invasive New Zealand Mudsails, Upper Piru Creek, Photo by S. Drill, copyright UC Regents (above). Naturalists noting observations, Photo by Marti Reid, OVLC (right)



Row Crops

According to the 2015 Ventura County Agricultural Commission Crop Report, the strawberry industry leads with revenues of \$618 million. Raspberries follow in third place with annual values of \$228 million. The Cooperative Extension plays a vital role in these industries by conducting research and outreach programs with emphasis on sustainable production and pest and pathogen management.

Current Research, Outreach & 2015-2016 Impacts:

- Anaerobic Soil disinfection (ASD)—a biologically-based method that improves yields and uses less water than synthetic fumigant application. Ventura County leads the way in optimizing this technology for Southern California growers. As a result of collaborative projects, adoption of ASD increased from 120 acres in 2013 to over 1200 acres in 2016. Working with identified carbon sources recycled from the waste products of other local industries makes ASD very economical. ASD is accepted by the California Certified Organic Program thus accelerating adoption among organic farmers
- Improving Irrigation and Fumigation Efficiency With Additional Drip Lines—this multi-year multi-site field study shows improved distribution of water and fumigant efficiency resulting in at least 20% water savings and 5-15% yield increase in strawberry production. Increasing the number of drip lines per bed and reducing the use of high-impact overhead sprinklers is now a wide-spread practice essential in sustaining production during limited water availability caused by severe drought
- Integrated Pest Management (IPM)—the first UC IPM Guideline for cilantro and parsley was produced in 2016. When combined, these rank in the top 10 revenue producing crops
- North American Strawberry Symposium and Growers Association (NASGA)—UCCE-Ventura played a key role in organizing and providing the site for the most successful joint event in the history of this society. The event brought together researchers and growers from over 20 countries
- Outreach efforts:
 - ◇ 78 professional presentations (46 to clientele, 17 to peers, 15 to public)
 - ◇ 97 publications



Strawberry plants established without sprinkler irrigation using increased number of drip lines used 20% less water and had similar yield to plants established with standard high impact sprinklers .

- \$1 million in competitive grant funding secured for projects that focus on optimizing environmental impacts of Ventura County agriculture. Examples of projects include:
 - ◇ A \$218,000 CDFA funded project in collaboration with Ventura County Resource Conservation District to develop Best Management Practices (BMP) for soil and water conservation in plasticiculture tunnels
 - ◇ Evaluation of management options on the increasingly popular primocane blackberry and raspberry crops for Ventura County growers



Barley cover crop is among five BMP that can help minimize sediment and nutrient losses in macro-tunnel system, while also providing weed control (above)

Primocane blackberry can be managed to maximize production during the most desirable parts of the year (right)

Field day displayed irrigation treatments to growers and other stakeholders (below)



Irrigation and Water Resources

Water conservation is high priority for governments, grower and environmental agencies. Agriculture uses approximately 55% of Ventura County water where most crops have low tolerance to water stress and require frequent irrigation. Berries, vegetables and nursery crops make up the greater part of Ventura County's \$2.1 billion agricultural economy and use large quantities of mineral fertilizers, applied primarily through irrigation water. These characteristics, associated with recurring drought, limited water availability and potential for off-site movement of nutrients emphasize the importance of and need for efficient production systems.

The Irrigation and Water Resources Program aims to improve water and fertilizer use efficiency to support the sustainability of County agriculture and natural resources, while maintaining or increasing agricultural productivity and economic viability. To address these issues, current research projects precisely quantify water use and nutrient uptake of berry and vegetable crops to help growers with proper amount and timing of water and fertilizer applications. Summary of project findings are developed into management guidelines, production tools, local workshops and field days.

Program goals are achieved through collaborations with other UC researchers, local growers, farming companies, Ventura County Farm Bureau, California Department of Food and Agriculture, California Celery Board, Driscoll Strawberry Associates, Dole Fresh Vegetables, Resources and Conservation District, and California Strawberry Commission.



Staff Research Associate Kamille Garcia downloads flow meter data of irrigation scheduling study.



a.



b.

Root depth and canopy development were measured weekly for modeling plant growth and aid growers with irrigation and nutrient management (above a. and b.)

Current Projects:

- Improve irrigation and nutrient management of strawberries, raspberries and celery
- Assessing CropManage, an online tool for water and nitrogen recommendations of strawberry and celery production
- Improving salinity management of strawberry cultivars in California
- Assessing best management practices for improving water and fertilizer use efficiency in celery production
- Ventura County agricultural water use efficiency program
- Assessment of in-season phosphorus and potassium fertigation of strawberries
- Assessing soil water tension thresholds for optimum irrigation scheduling, yield and quality of celery



Irrigation and Nutrient Management Field Day: experiment results are shared with Ventura County growers .

Environmental Horticulture and Plant Pathology

Environmental horticulture is comprised of producers of ornamental plants (nurseries) and users of those products such as landscape contractors and maintenance personnel, arborists, landscape architects and other related industries. Environmental horticulture industries face new pests, water limitations and drought effects as well as waste and nutrient management issues. Research and education is provided to address these issues particularly on ornamental plant diseases and shade tree management.

Current projects:

- Effect of tillage on reduction of soil-borne pathogens
- Long term effects of compost on pathogen reduction
- Climate Ready Trees for Southern California
- Effects of urban environments on mycorrhizae of urban trees
- Interactions of turfgrass and trees in landscapes
- Effect of fertilizers on landscape roses
- Drought effects on landscape trees in Ventura County



Effects of compost (above) and no compost (below)



Boring insects cause damage to many landscape trees. New pests such as Polyphagous shot hole borer and Goldspotted Oak Borer pose a multi-million dollar threat to Ventura County. Through education and research on pest invasions we are limiting the destruction caused by invasive Shot Hole Borer.



Shade trees add millions of dollars of value to Ventura County landscapes. However, they are often mismanaged. We hold county-wide shade tree management classes for the general public and are conducting research on climate ready trees for drought and high temperature tolerance. Our research also investigates the effects of urbanization on carbon capture and sequestration in soil.



Master Gardener volunteers help with Rose research. (above). New research is planned on landscape rose fertility requirements.

Subtropical, Water & Soil

UCCE-Ventura Advisors collaborate on a variety of subtropical, water, and soil projects with researchers from other counties, universities and related agricultural industries. Communication with growers is vital and achieved with farm visits and through the *Topics in Subtropics Newsletter* and Blog which are two of the most widely read sources of grower information by California Tree Fruit Growers.

Current projects:

- Developing methods to improve management of strawberry and raspberry runoff to reduce sediment, nutrient and pesticide flows into water channels.
- Evaluating techniques of herbicide management in citrus orchards. Assessing how much water lemons and avocados use with and without a crop load to better understand water conservation.
- Assessing best avocado rootstocks for salinity and root rot tolerance.
- Best practices in rearing large numbers of parasitic wasps to control Asian Citrus Psyllid. A collaboration with Associates Insectary of Santa Paula.
- Resolving the problem of damage caused by broad mite in citrus, reducing the fruit value to growers. A collaboration with University of Arkansas.
- Understanding the destructive nature of a similar pest/disease complex as experienced with shot borer and a fungal infections.
- Evaluating the best nutritional regime for pomegranates, a California Polytechnic State University, San Luis Obispo collaboration.



Boron toxicity is a common problem in Ventura County and made worse by the drought (above). Sodium toxicity also made worse by drought (right). Adding more water helps leach out these two naturally occurring salts.



UC Statewide IPM Program
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Youth, Family & Community

Education and Outreach

The 4-H youth development programs at the Hansen Agricultural Research and Extension Center (HAREC) are offered County-wide Spring, Summer and Fall. School enrichment offerings consist of farm field trips and classroom outreach for grades Kindergarten to High School. In collaborations with school districts and the City of Ventura, the Center offers afterschool Student Farm and Summer Camp opportunities. The programs utilize approved UC curriculum with focus on STEM (Science, Technology, Engineering and Math) education and emphasis on:

- Agricultural literacy
- Local food systems
- Nutrition
- Sustainability
- Ventura County agriculture

Curriculum supports Common Core State Standards and Next Generation Science Standards.

Additionally, HAREC participates in various community outreach events and activities for youth and offers workshops for local teachers and community educators. All programs are delivered by trained volunteers and staff.

2015-2016 Impacts:

- 7943 youth reached
- 1379 adults reached
- 64% participating schools are Title 1
- Ethnicity of youth participants:
51% Hispanic, 40% White, 7% Asian, 2% Black
- Over 1000 lbs. of food produced by the Student Farm project is donated to school cafeterias, Food Share, and Food Forward
- 3045 volunteer hours to extend and support programming, a value of \$83,920
- Collaborations with the City of Ventura, Ventura Unified School District, Rio School District, Briggs School District provided 264 hours of in-kind donation to extend and support youth programs



Student Farm middle school youth plant radish seeds (above). Sustainable You! Summer Camp helps youth understand what it means to be sustainable through fun, interactive activities which focus on the five major areas of sustainability: land, water, energy, air, and food. The program is a collaboration with the City of Ventura and Rio School District (left).

4-H Youth Development



The 4-H Club Program, a nation-wide program, is designed to develop citizenship, leadership, responsibility and life skills of youth through experiential learning programs and a positive youth development approach. 4-H aims to create leaders through hands-on learning. 4-H members gain tangible life skills through projects in public speaking, nutrition and health, animal sciences, recordkeeping, and much more. Club and project meetings incorporate practical ways to apply STEM (Science, Technology, Engineering, Math). Field days, fairs, competitions and demonstrations promote independence and provide opportunities to showcase mastery of skills. Service learning projects connect youth to needs in the community.

4-H Community Club 2015-2016 Impacts:

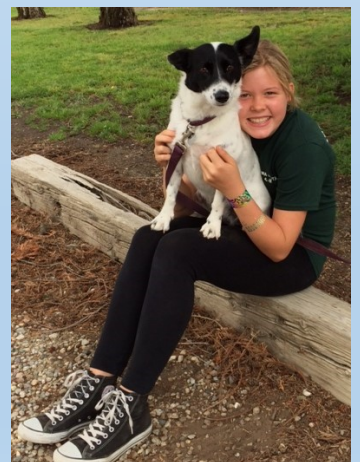
- 14 clubs, 2 registered military clubs
- 691 youth participants ages 5-19
- 198 adult volunteers
- 4-H members collected approximately 4,000 pounds of food provided to Food Share through a program called Trick or Treat So Others Can Eat, enough to feed 500 people for a week.
- Over thirty 4-H members built and flew drones on National Youth Science Day as part of the nation-wide experiment *Drone Discovery*
- Thirty-six 4-H Record Books were submitted for County judging. Of these, 6 advanced to the State Record Book competition
- 403 different STEM related projects offered county-wide



Above and below—Super Field Day is an opportunity for 4-H members to demonstrate skills learned through projects.



Public event Card Making Station for military men and women—community service projects encourage youth to create solutions for genuine needs in the community.



Master Gardener

“Growing with Our Community”



Ventura County supports one of the most active and emulated Master Gardener (MG) programs in the state. Using UC science-based resources, these skilled volunteers educate thousands of home gardeners through classes, events and answer one-on-one garden related questions at the Helpline Desk. Additionally, MG extend garden knowledge at public events throughout the County and boast over 30 years of winning exhibits at the Ventura County Fair .

MG maintain eight teaching gardens utilized as education venues for home gardeners and volunteers:

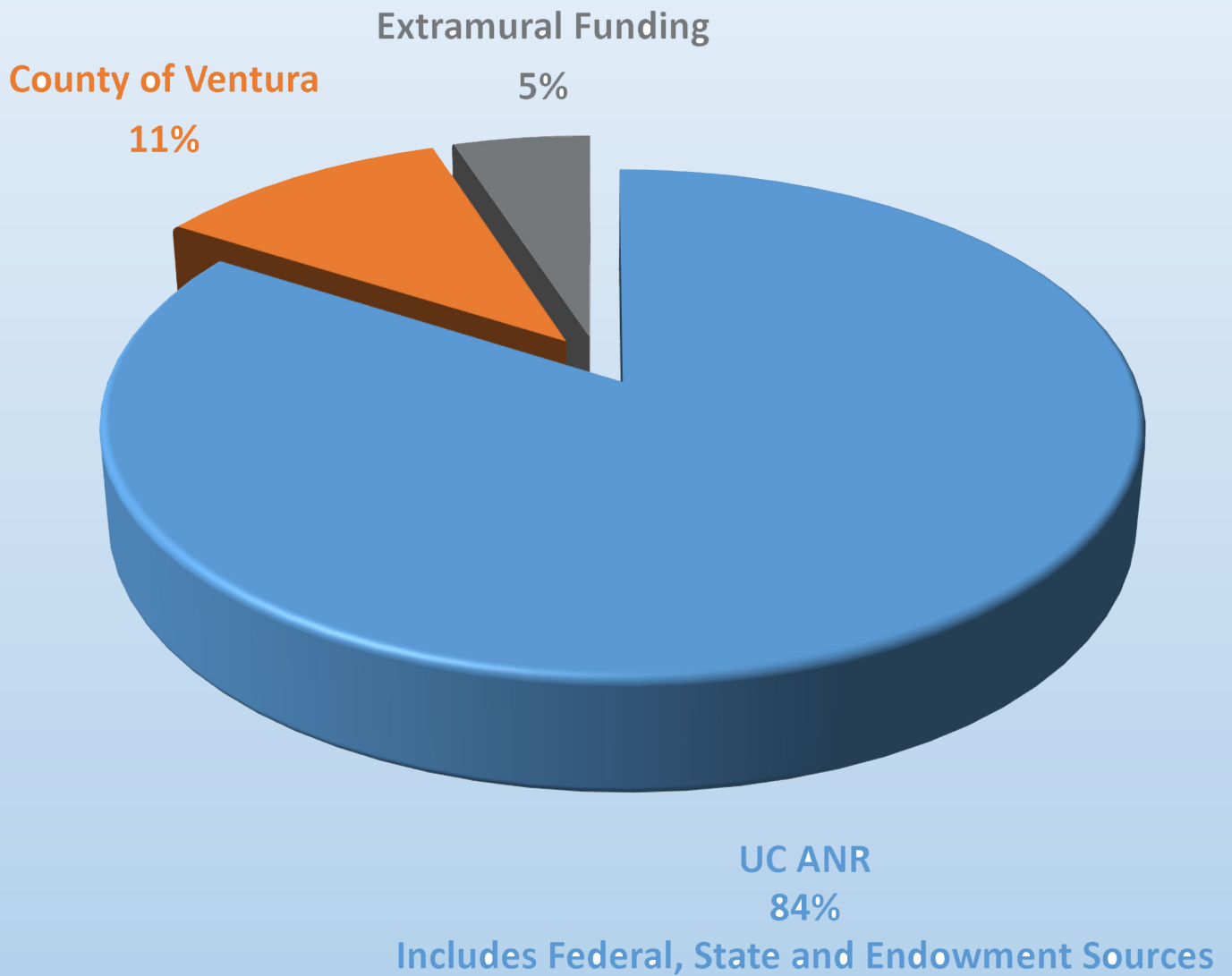
- Santa Paula—Hansen Agricultural Research and Extension Center
- Oxnard Historical Farm Park
- Thousand Oaks—Conejo Botanical Gardens and True Colors Garden and Learning Center
- Ventura—California Veterans Home and U.S. Park Services Marine Center and Native Garden
- Ojai—ARC Enrichment Center
- Camarillo Ranch House

2015-2016 Impacts:

- 225 Certified Master Gardeners
- Over 25,000 direct contacts annually
- Over 20,000 home gardeners reached through workshops, events and speaking engagements
- Over 15,000 Asian Citrus Psyllid brochures distributed to County residents to increase awareness
- In response to diminishing California water resources, MG joined the Calleguas Municipal Water District, numerous cities and county agencies to create a comprehensive Water Wise Landscape education program.
- 1,000 volunteers hours to assist farm advisors with research projects involving blackberries and strawberries
- Master Gardeners donate over 33,474 volunteer hours annually, a value of \$922,543



University of California Agriculture and Natural Resources—Ventura County Funding Sources



Dedicated to Serving Ventura County Staff

UC Cooperative Extension Staff

Advisors	Research & Field Assistants	Education Specialists
Andre Biscaro	Nathan Bradford	Valerie Grant
Oleg Daugovich	Anna Howell	Leah Haynes
A. James Downer	Bill Rutan	Gwyn Vanoni
Sabrina Drill		
Ben Faber		

Hansen Agricultural Research & Extension Staff

Field & Facility	Education & Outreach
Jose Hernandez	Susana Bruzzone-Miller
Leon Preciado	Jose De Soto
Santos Ramirez	Annabel Faris

UCCE/HAREC Support Staff

Brandy Allee	Patricia Rodriguez
Louise Rangel	Patti Verdugo Johnson

Volunteers & Collaborators

We wish to thank our Master Gardener and 4-H volunteers, Hansen Advisory Board as well as the many community collaborators for their dedicated service and support that helps enrich the lives of Ventura County residents.

Acorn Newspaper
ARC Ojai Enrichment Center
Baron Brothers Nursery
California Celery Research Advisory Board
California Department of Fish and Wildlife
California Department of Food and Agriculture
California Strawberry Commission
Calleguas Municipal Water District
Camarillo Public Library
Camarillo Ranch Foundation
Casitas Municipal Water District
Channel Island National Park
City of Camarillo
City of Moorpark
City of Ojai
City of Oxnard
City of Simi Valley
City of Thousand Oaks
City of Ventura
Conejo Recreation and Park District
Conejo Valley Botanical Gardens

County of Ventura
County of Ventura Agricultural Commissioner
Farm Bureau of Ventura County
Green Thumb of Ventura
Institute of the Environment and Sustainability at UCLA
Moorpark City Library
Ojai Valley Land Conservancy
Oxnard Historical Farm Park Foundation
Resource Conservation District of the Santa Monica Mountains
Santa Monica Mountains National Recreation Area
Rio School District
Thousand Oaks Goebel Center
Thousand Oaks Library
UCSB Riparian Invasion Research Laboratory
USDA Forest Service Forest Health Protection
Ventura County Watershed Protection District
Ventura Unified School District
Veterans Home of California, Ventura
Walmart Foundation





Blog: Hansen News—Center Updates and information
<http://ucanr.edu/blogs/Hansen/>



UC Cooperative Extension—Ventura County
669 County Square Drive, Suite 100
Ventura, CA 93003
<http://ceventura.ucanr.edu/>
805-645-1434

UC Hansen Agricultural Research & Extension Center
14292 W. Telegraph Rd.
Santa Paula, CA 93060
<http://harec.ucanr.edu/>
805-525-9293

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