Mobile Irrigation Labs

Irrigation Management on the Farm

Jamie Whiteford, Irrigation Technician
Ventura County Resource Conservation District

Resource Conservation Districts (RCD's)

- RCD's are local organizations with distinct boundaries
  - Usually by county or other distinct geographic feature
  - About 97 in California (CARCD)
  - Management and programs vary to fit needs
- Ventura County RCD (VCRCD) covers Ventura County
  - Non-regulatory, not County government
  - Nonprofit, primarily funded through grants
  - Programs by funding and long-term plan
    - Storm Water Quality Program - Water Quality
    - Programmatic Permit Program - Invasive Plants
    - Mobile Irrigation Lab - Water Conservation

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Mobile Irrigation Labs (MIL's)

MIL's are managed by area Resource Conservation Districts (RCD's).

- VCRCD MIL program began in 2007
- Grant funded, currently California Department of Water Resources
- Free for agricultural producers (acre or more) in Ventura County
- "Fee for service" for non-ag except in Casitas MWD – CMWD pays fee
- VCRCD MIL staff provide irrigation system evaluations

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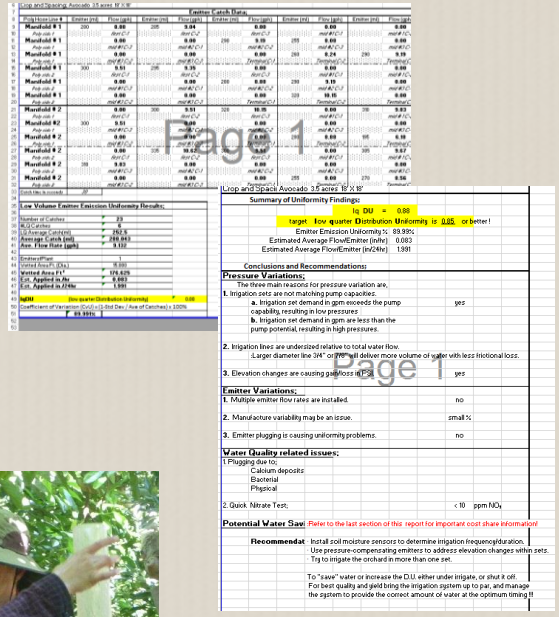
Irrigation System Evaluation

- Collect random sampling of flow and pressure measurements
- Assess system's distribution uniformity (DUlq)
- Determine ways to improve DUlq
- Provide grower report with data and recommendations
- Provide incentives for improvements



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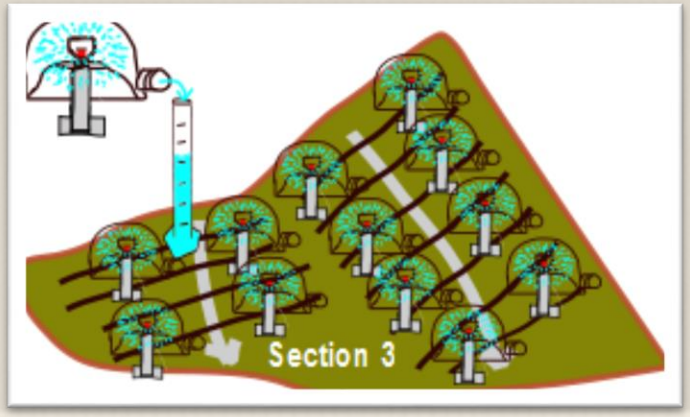
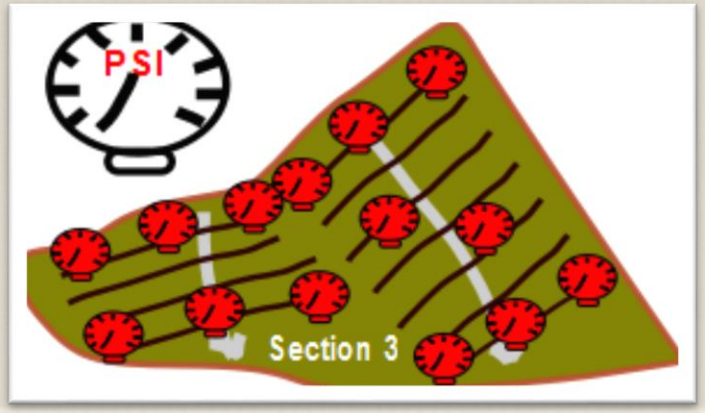
Irrigation System Evaluation

Distribution Uniformity (DU)

- Distribution Uniformity Low-Quarter (DUlq)
  - Program developed at Cal Poly's ITRC
  - Measure flows, pressures
  - Ratio of lowest quartile to population average
    - Is water evenly applied?
    - How much extra to apply to water all?

Distribution Uniformity Ratings			
DU%:	100-90%	=	Excellent
DU%:	89-80%	=	Good
DU%:	79-70%	=	Fair
DU%:	69-60%	=	Poor
DU%:	≤59%	=	Unacceptable





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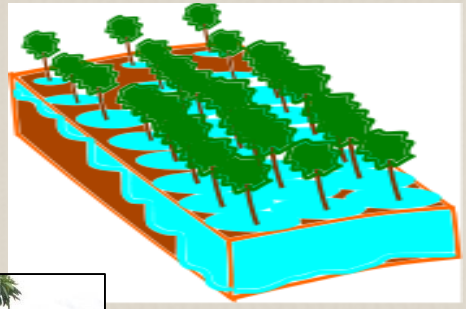
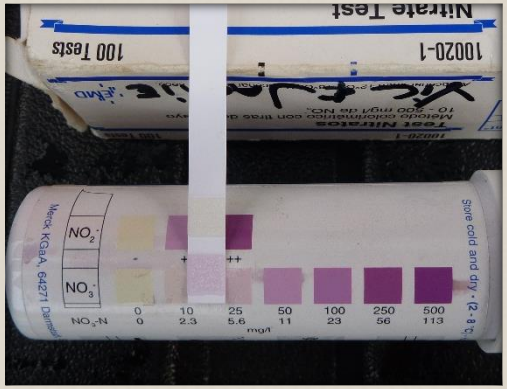
Irrigation System Evaluation

- Irrigation System Evaluations save water and money
  - Low DU means some water wasted
    - More water is needed to properly irrigate all the trees in the grove
    - … more water means more fertilizer
    - … more water means leaching, runoff
    - … more water means phytophthora





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Distribution Uniformity

What happens with low DU in Avocados

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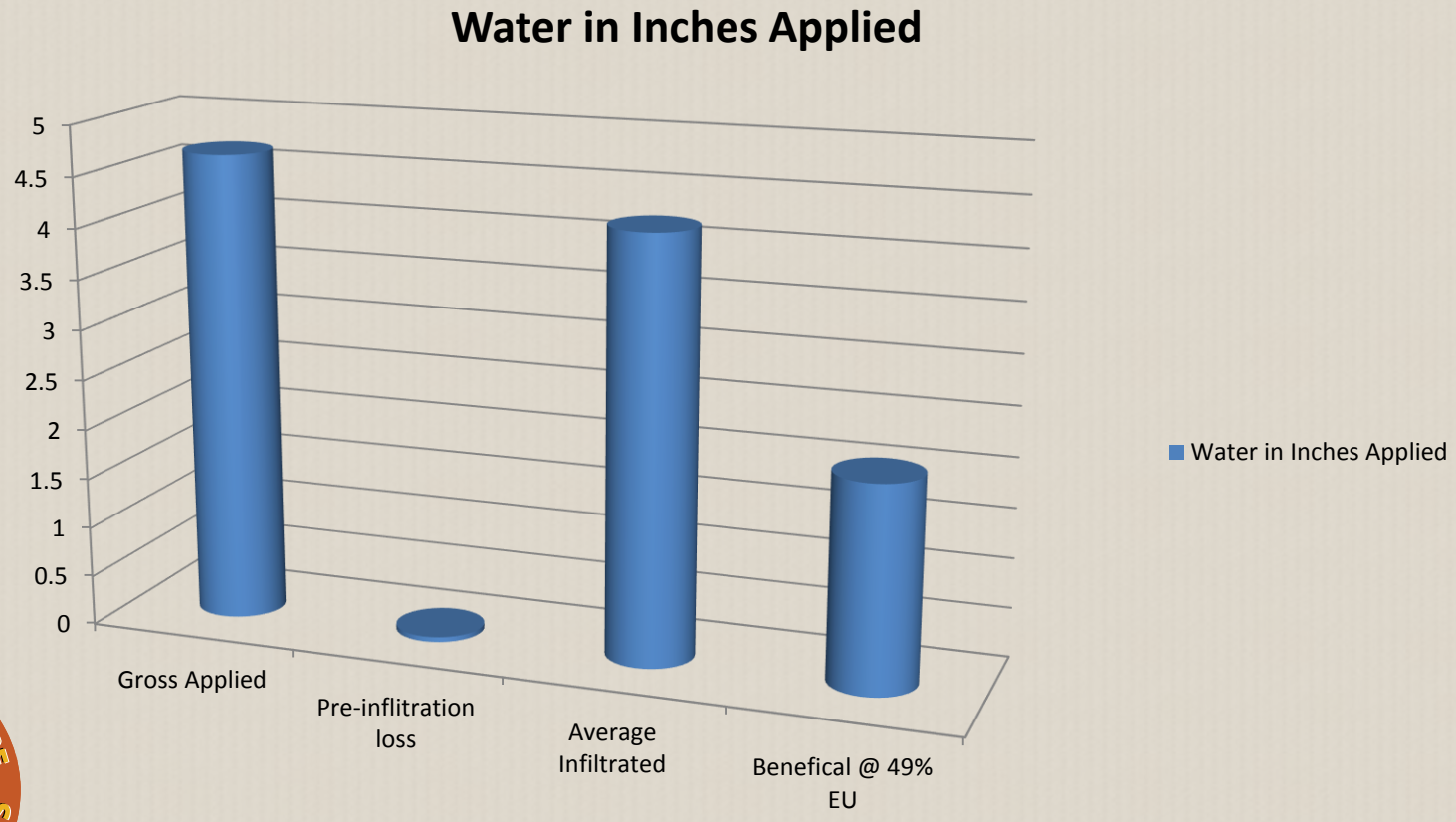
Distribution Uniformity

Low initial DU



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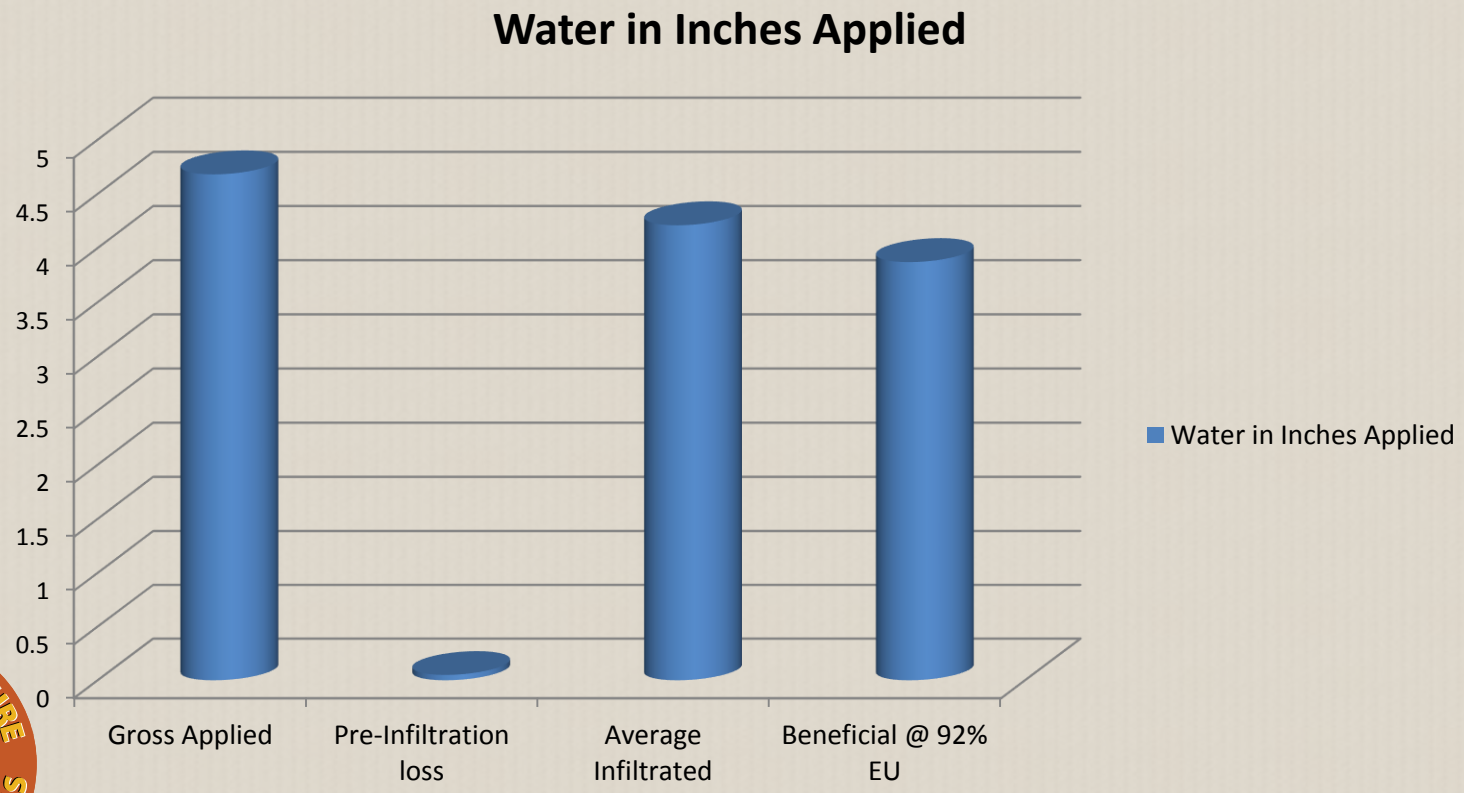
Distribution Uniformity

Improved DU



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Recommendations

Recommendations for Irrigation System Improvement

- Pressure regulation
  - Regulators
  - PC emitters

- Appropriate Sprinkler
  - Correct volume
  - Wind? Avoid Fanjet type…
  - Pattern – canopy, off trunk…

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Recommendations

Recommendations for Irrigation System Improvement

- Main & Sub main layout
  - Pump and pipe size
  - Lateral lengths
  - Poly diameter
  - Get a pro…
- Irrigation Monitoring
  - Timers, Meters…
  - Sensors, Probes…

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Recommendations

Recommendations for Irrigation Scheduling

- Weather-based
  - CIMIS
  - Atmometers
  - Others…anything!
- Soil moisture-based
  - Probe, shovel
  - Soil moisture sensor system
  - Feel method…anything!

Simplified Irrigation Calculations

For summer months (Avocados)

Input Variables	*Enter Here*
Emitter Flow Rate (gph):	16
Emitter Wetted Radius (ft):	8
Emitter Pattern:	Full Circle
Emitters/Plant:	1
Crop Canopy Diameter(ft):	18
Crop Spacing Length(ft):	20
Crop Spacing Width(ft):	20
Average Daily ETo:	0.22
Crop Kc:	0.86
Soil Water Hold Cap. (In/in):	0.16
Soil Rooting Depth (in):	20
Irrigation System Uniformity (%):	85%
Desired Leaching Requirement (%):	10%

Output Variables	
Soil Total AWHC (in):	3.2
30% Soil AWHC (in):	0.96
Emitter Wetted Area (sq-ft):	200.96
Emitter Soil Reservoir (gals):	402
30% Soil Reservoir (gals):	121
Emitter Precip Rate (in/hr):	0.13
Canopy Area (sq-ft):	254
Emitter:Canopy Area (%):	79%
Canopy:Emitter Area (%):	127%
Weekly Water Req. (in/plant):	1.3
Weekly Water Req. (gals):	211
Daily Water Req. (gals):	30
30% Soil Refill Runtime (hrs):	**9.9**
***30% Soil Refill Freq. (days):**	**4.0**

Weekly Soil Refill Runtime (hrs):	**17.2**
****Relative Weekly SMD (%):**	**52%**

* UCCE recommended soil moisture depletion
** SMD= soil moisture depletion

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Irrigation Scheduling

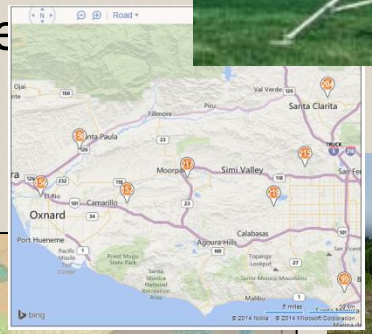
Weather-based

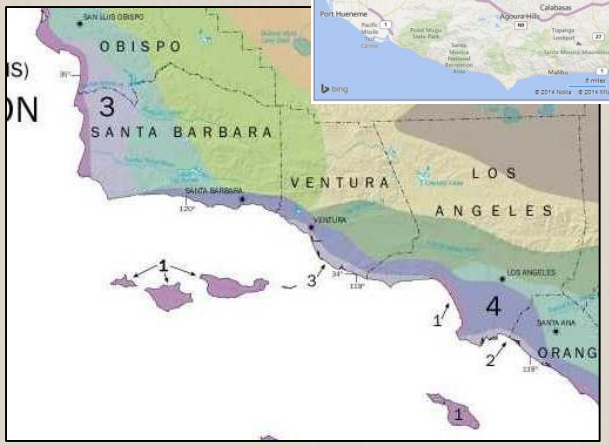
CIMIS

- Standardized weather stations
- Stations provide data for ETo zone
- ETo data requires crop coefficie
- Needs active management
  - Soil texture
  - Aspect
  - BMP's

Atmometers

- On-site
- Evaporation





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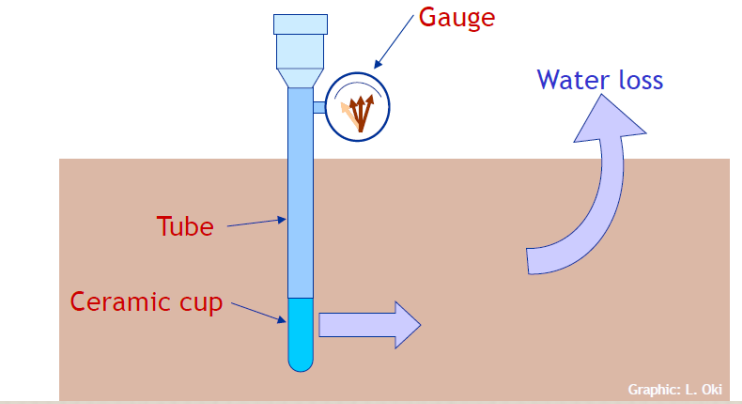
Irrigation Scheduling



Soil moisture-based

Soil Moisture Sensor Types

- Tensiometers - Tension
- Granular matrix - Tension (conductivity)
- Dielectric - Volummetric

- Trends and Responses
- How many?
  - Above and below root zone
  - Soil texture zones
  - Productivity zones

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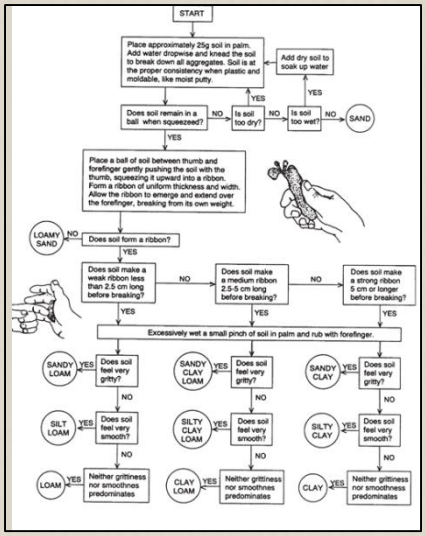
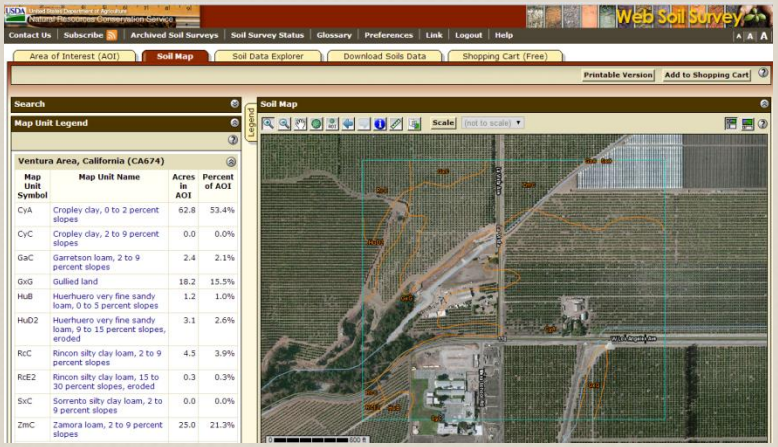
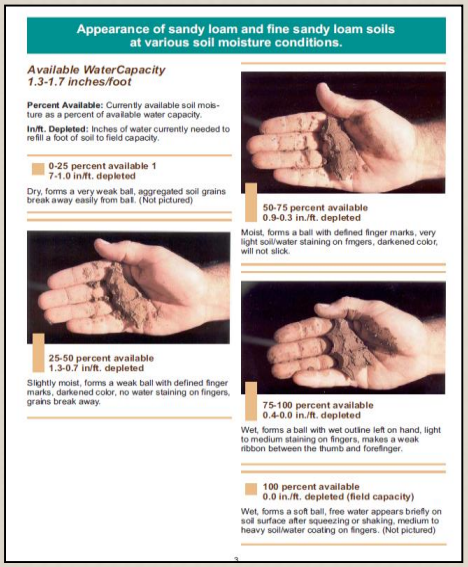
Irrigation Scheduling

Soil moisture-based

- Penetration, look, color
- Feel method - soil texture
- Practice and persistence
- NRCS web soil survey







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Irrigation Improvement - Finances

VCRCD Irrigation Improvement Incentives Program

- DWR AWUE MIL Cost Share
  - Implement improvements
  - Maintain water-use records
  - Submit receipts
    - Only covers hardware
    - 60% of reimbursable costs
    - $20,000 reimbursable cap
    - One time fee

    Reimbursement > $7500, $995 fee

    Reimbursement ≤ $7500, greater of 10% or $375

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Irrigation Improvement - Finances

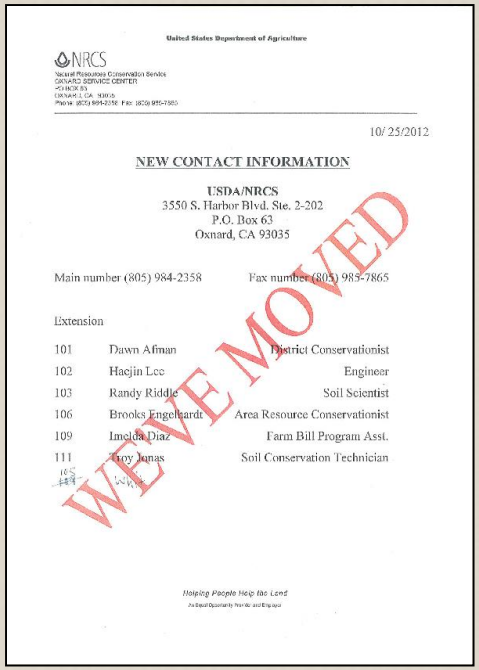
Natural Resource Conservation Service (NRCS)

- In Oxnard, moved from Somis end of 2012
- Dawn Afman, District Conservationist

  Phone (805) 984-2358 ext. 101

  Email: dawn.afman@ca.usda.gov

  - EQIP
  - Storage
  - Conservation Planning



United States Department of Agriculture

NRCS
Natural Resources Conservation Service
OXNARD SERVICE CENTER
[illegible]
Oxnard, CA 93035
Phone (805) 984-2358 Fax: (805) 985-7865

10/ 25/2012

NEW CONTACT INFORMATION

USDA/NRCS
3550 S. Harbor Blvd. Ste. 2-202
P.O. Box 63
Oxnard, CA 93035

Main number (805) 984-2358 Fax number (805) 985-7865

Extension		
101	Dawn Afman	District Conservationist
102	Haejin Lee	Engineer
103	Randy Riddle	Soil Scientist
106	Brooks Engelhardt	Area Resource Conservationist
109	Imelda Diaz	Farm Bill Program Asst.
111	Troy Junas	Soil Conservation Technician

WE'VE MOVED

Helping People Help the Land
An Equal Opportunity Provider and Employer

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Irrigation Improvement - Finances

- Casitas Municipal Water District
  - Ag Producer
  - Hobby Farm
  - Cinnamon McIntosh
  - 805-649-2251 x110
- Metropolitan Water District
  - Be Water Wise
- Others? Check your water district…

Irrigation Improvement – Finances?

Potential additional VCRCD funding

- IRWMP - Regional Partnership
  - California Drought Money
  - Watershed Protection District, GMA, etc.
    - Water use records critical
    - Put in flow meter NOW!
- Climate Ready
  - Coastal Conservancy
  - Water and energy
    - Reduce water use
    - Reduce energy - VFD pumps

Emergency Drought Relief Funding
SB 103/104 & AB 79/80

Infrastructure investments to improve water supply
- $472 million (Proposition 84) to Deparment of Water Resources (DWR) for Integrated Regional Water Management Program grants. $200 million of these funds expedited for drought preparedness/response projects.
- $77 million (Propositiong 1E) to DWR for Central Valley flood protection projects that provide additional public benefits, including water supply and water quality improvements.

Emergency Drinking Water, Water Supply and Water Quality
- $15 million (General Fund) to the Department of Public Health (DPH) for alternative water supplies and public water system improvements
- $4 million (special funds) to the State Water Resources Control Board (Board) to secure emergency drinking water supplies for disadvantaged communities.
- $7 million (special funds) to the Board for grants to small and severely disadvantaged communities for wastewater treatment projects that protect water quality in rivers and groundwater basins.
- $2.5 million (General Fund) to the Board for drought-related water rights and conservation actions.

Housing, Employment and Emergency Services for Drought-stricken Communities
- $10 million (special funds) to the Department of Housing and Community Development for housing or utility subsidies for people who become un- or underemployed due to drought conditions
- $2 million (General Fund) to the Employment Training Panel for job training related to drought related job losses
- $1.8 million (General Fund) to the Office of Emergency Services for disaster recovery assistance to communities

Water and Energy Efficiency for Urban and Agricultural Communities
- $20 million (AB 32 auction revenues) to DWR to improve water use efficiency, save energy and reduce greenhouse gas emissions from local water management.
- $10 million (AB 32 auction revenues) to DWR for water/energy improvements to the state water system.
- $10 million (AB 32 auction revenues) to California Department of Food and Agriculture (CDFA) for incentives to reduce water and energy use, augment supply, and increase water and energy efficiency in the agricultural sector.

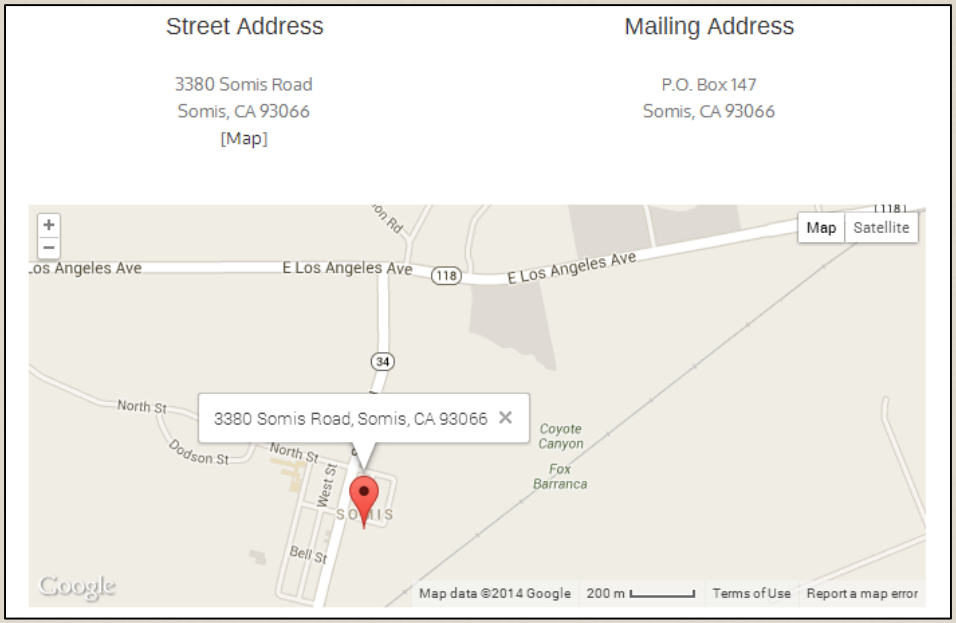
Coastal Conservancy
Climate Ready
Helping California communities meet the challenge of a changing climate

California State Coastal Conservancy's
Climate Ready
Grant Announcement
Round 2
May 23, 2014

The California State Coastal Conservancy (Conservancy) announces the availability of funding for three specific types of projects through its Climate Ready program. This second round of Climate Ready grants is intended to encourage local governments and non-governmental organizations to act now to prepare for a changing climate by the implementation of on-the-ground multiple-benefit actions that provide public benefits while lessening the impacts of climate change on California's coastal communities and natural resources. Grant applications are due **August 22, 2014**.

Ventura County Resource Conservation District

Jamie Whiteford, Irrigation Technician
805-764-5132
jamie.k.whiteford@gmail.com
www.vcrcd.org



Financial Assistance

For Financial assistance from NRCS:

- Go to www.nrcs.usda.gov/getstarted

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Financial Assistance

WSIP Website

www.bewaterwise.com/water-savingsincentive-program.html

Summary

Contact Information

Jamie Whiteford, Irrigation Technician
Ventura County Resource Conservation District
3380 Somis Road, Somis, CA 93066
Phone: (805)764-5132
Email: jamie.k.whiteford@gmail.com

Lance Andersen, Program Director
Agriculture Water Management Program
Mission Resource Conservation District
1588 S. Mission Road Suite 100, Fallbrook, CA 92028
Phone: (760)728-1332
Email: lance@missionrcd.org

Contact Information

G.W. Bates, PE, CPESC, District Engineer
Coastal San Luis Resource Conservation District
645 Main St. Suite F, Morro Bay, CA 93442
Office: (805)772-4391 Cell: (805) 776-3658
Email: gbates@CoastalRCD.org

Ben Faber, Ph.D., Farm Advisor
UC Cooperative Extension, Ventura and Santa Barbara Counties
669 County Square Drive #100, Ventura, CA 93003
Phone: (805) 645-1462
Email: bafaber@ucanr.edu