Agricultural Water Offset Program
County Planning Department contacted the RCD to design a water use offset program for agriculture users in Paso Basin.

- developed in response to the urgency ordinance which requires NEW irrigated Ag to offset their total projected water use.
1. Most Basic Reason for ordinance: **Severe Decline**

2. What is considered “new irrigated Ag?” *
   - Crop conversions
   - Increased crop density
   - New installations on previously un-irrigated lands

*Per urgency ordinance language*
Phase I – Technical Analysis

RCD assembled a multidisciplinary project team (March)
  • Hydrogeologist
  • Hydrologic engineer
  • UC Cooperative Extension staff
  • Cal Poly ITRC department faculty
  • NRCS Conservationist
  • GIS specialist
  • Agricultural manager
  • Biological Expertise
  • **Analysis** of potential for offset credits within regional areas
  • **GIS mapping** and verification of crop layer data
  • Data and methodology **review of water use by crop type**
    • Master Water Report
    • UC Extension input
Phase II – Public Outreach

• RCD collaborating with YOU!
  • Paso Robles Wine Alliance
  • Ag Liaison Committee
    • Farm Bureau
  • Cattlemans Association
    • Vineyard Team
  • Olive Growers Association
    • Pro Water Equity
  • Other Stakeholder Groups TBD

• Town Hall meetings (Later Phase)
  • Open to the public for general discussion and questions
Draft program Standards

• Framework Provisions
  • Crop Conversions
  • New irrigated acreage
  • Increased crop density
  • Rootstock conversions (still under analysis)
• Rural GW uses not included in urban domestic program thru County
Program Feasibility Analysis

Ag Water Conservation Offset Program

Paso Robles Groundwater Basin
Irrigated Crops by Sub Area

Category
- Vineyard = 31277 Acres
- Vegetables = 9453 Acres
- Deciduous = 665 Acres
- Nursery = 77 Acres
- Citrus = 405 Acres
- Pasture = 1385 Acres
- Alfalfa = 1837 Acres
- SLO County Boundary
- PRGWB Sub Areas

San Luis Obispo County

Disclaimer: GIS data are to be considered a generalized spatial representation that is subject to revisions. This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. The US-LTRCD, US-MCRCD, GVC, or GSI assume no responsibility associated with its misuse.
Flow of Program

Determine amount of Water Credit
(current crop acreage x water use factor)

Determine Potential Acres of New Crop
(water credit amount / water use factor)

- Same Property, Same Well
- Same Property, Different Well
- Contiguous Parcel
- Non-contiguous Parcel
Proximity Analysis

Meets Standard

Same Property, Same Well

Same Property, Different Well

Contiguous Parcel

Non-contiguous Parcel

Proximity Analysis

Meets Standard

Neighboring Well Impact analysis

Deed Restriction Recorded & Well Meter Installed

Annual Verification (3rd Party reporting)
Master Water Report
http://www.slocountywater.org
Crop Water Calculations

Annual Crop Specific Applied Water

\[
(AF/\text{Ac/Yr}) = \frac{ET_c - ER}{(1 - LR) \times IE} + FP
\]

where:

\(ET_c = \text{crop evapotranspiration} = ETo \times Kc\)
\(ETo = \text{reference evapotranspiration}\)
\(Kc = \text{crop coefficient}\)
\(ER = \text{effective rainfall}\)
\(FP = \text{frost protection}\)
\(LR = \text{leaching requirement}\)
\(IE = \text{irrigation efficiency}\)
# Crop Groups MWR/Offsets

## Table 1. Crop Group and Commodities Used for the Agricultural Demand Analysis

<table>
<thead>
<tr>
<th>Crop Group</th>
<th>Primary Commodities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alfalfa</td>
<td>Alfalfa</td>
</tr>
<tr>
<td>Nursery</td>
<td>Christmas trees, miscellaneous nursery plants, flowers</td>
</tr>
<tr>
<td>Pasture</td>
<td>Miscellaneous grasses, mixed pastures, sod/turf, sudangrass</td>
</tr>
<tr>
<td>Small Grains</td>
<td>Oats, barley, wheat</td>
</tr>
<tr>
<td>Citrus</td>
<td>Avocados, grapefruits, lemons, oranges, olives, kiwis, pomegranates (nondeciduous)</td>
</tr>
<tr>
<td>Deciduous</td>
<td>Apples, apricots, berries, peaches, nectarines, plums, figs, pistachios, persimmons, pears, quinces, strawberries</td>
</tr>
<tr>
<td>Strawberries</td>
<td>Strawberries</td>
</tr>
<tr>
<td>Vegetables</td>
<td>Artichokes, beans, miscellaneous vegetables, mushrooms, onions, peas, peppers, tomatoes</td>
</tr>
<tr>
<td>Vineyard</td>
<td>Wine grapes, table grapes</td>
</tr>
</tbody>
</table>
Crop Water Average #’s

Table 2. Existing Crop-Specific Applied Water (AF/Ac/Yr) by Crop for the Salinas/Estrella WPA

<table>
<thead>
<tr>
<th>Crop Group</th>
<th>Applied Water (AF/Ac/Yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alfalfa</td>
<td>4.5</td>
</tr>
<tr>
<td>Citrus</td>
<td>2.3</td>
</tr>
<tr>
<td>Deciduous</td>
<td>3.5</td>
</tr>
<tr>
<td>Strawberries</td>
<td>2.3*</td>
</tr>
<tr>
<td>Nursery</td>
<td>2.5</td>
</tr>
<tr>
<td>Pasture</td>
<td>4.8</td>
</tr>
<tr>
<td>Small Grain</td>
<td>1.7*</td>
</tr>
<tr>
<td>Vegetables</td>
<td>1.9</td>
</tr>
<tr>
<td>Vineyard</td>
<td>1.7</td>
</tr>
</tbody>
</table>

*Information obtained from Current Cost and Return Studies, UCCE, UC Davis (Small grains 2013 data, Strawberries 2011 data)
Determine amount of Water Credit  
(current crop acreage x water use factor)
Ag Water Conservation Offset Program
Paso Robles Groundwater Basin

Irrigated Crops by Sub Area

Category
- Vineyard = 31277 Acres
- Vegetables = 9463 Acres
- Deciduous = 865 Acres
- Nursery = 77 Acres
- Citrus = 405 Acres
- Pasture = 1305 Acres
- Alfalfa = 1857 Acres
- SLO County Boundary
- PRWCB Sub Areas

San Luis Obispo County

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Crop Water Savings Analysis

Crop conversions for higher water use crops such as Alfalfa *could yield* potential new irrigated acreage for lower water use crops as follows.

<table>
<thead>
<tr>
<th>Sub Area</th>
<th>Citrus</th>
<th>Deciduous</th>
<th>Nursery</th>
<th>Pasture</th>
<th>Vegetables</th>
<th>Vineyard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estrella</td>
<td>531</td>
<td>271</td>
<td>489</td>
<td>204</td>
<td>643</td>
<td>582</td>
</tr>
<tr>
<td>Creston</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Shandon</td>
<td>601</td>
<td>307</td>
<td>553</td>
<td>230</td>
<td>727</td>
<td>658</td>
</tr>
<tr>
<td>Atascadero</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>San Juan</td>
<td>650</td>
<td>332</td>
<td>598</td>
<td>249</td>
<td>786</td>
<td>711</td>
</tr>
<tr>
<td>South Gabilan</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Total potential acreage conversions

|              | 1782   | 910     | 1640    | 683     | 2156      | 1951     |

*basin sub-area boundaries used for analysis purposes*
### Steps, Simplified

<table>
<thead>
<tr>
<th>Project Type</th>
<th>Type of Credit</th>
<th>Offset Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crop Conversion</td>
<td>Crop Conversion</td>
<td>Same Property</td>
</tr>
<tr>
<td>New Irrigation Ag</td>
<td>Fallowed Land/Create Credit</td>
<td>Adjacent or Different Property</td>
</tr>
</tbody>
</table>
Steps, Simplified

Step 1 – Determine Water Use
Determine water credit for existing crop

Step 2 – Determine New Crop Acreage
Determine acreage and water use for the new crop

Step 3 – Assess Impacts to Wells
Evaluate drawdown impacts on neighboring irrigation and domestic wells

Step 4 – Check Proximity
Determine that credit well location is within cone of depression of new well location
Well Pumping Impacts: *Proximity*

- Tiered Approach – heightened standards for offset credits located at greater distances (Category 1-4)
- Analysis of impacts to neighboring wells
- Vertical and Horizontal qualifying factors
- Well Metering for all participants in the program
  - Verification of compliance by 3rd party
Proximity Analysis

Meets Standard

Same Property, Same Well

Same Property, Different Well

Contiguous Parcel

Non-contiguous Parcel

Proximity Analysis

Meets Standard

Neighboring Well Impact analysis

Meets Standard

Deed Restriction Recorded & Well Meter Installed

Annual Verification (3rd Party reporting)
Proximity Categories

**Category 1 Offset Credit**
- Same Land
- Same Well

**Category 2 Offset Credit**
- Same Land
- Different Well

**Category 3 Offset Credit**
- Adjacent Property
- Different Well

**Category 4 Offset Credit**
- Different Property
- Different Well
Category 4 applications

1. Cone of Depression model
   a. Based on well drawdown, hydrogeology, and transmissivity characteristics
   b. Crediting well must be within identified cone of depression parameter radius to qualify
Proximity Analysis Example
Paso Robles Basin

CONE OF DEPRESSION
WHERE DRAWDOWN IS AT LEAST TWO FEET

NEIGHBORING WELL
WELL SERVING NEW USE
OFFSET CREDIT WELL

Calculated Drawdown
< 15' if Domestic Well
< 30' if Irrigation Well

Offset Distance Drawdown >2'

Silt and Clay
Sand and Gravel

Image from Google Earth Pro
P:\Portland\514-US-LT RCD\002-RCD Offset Program Support\Figures
Proximity Analysis

Meets Standard

Same Property, Same Well

Same Property, Different Well

Contiguous Parcel

Non-contiguous Parcel

Proximity Analysis

Meets Standard

Neighboring Well Impact analysis

Deed Restriction Recorded & Well Meter Installed

Annual Verification (3rd Party reporting)
Increased pumping cannot impact neighboring irrigation and domestic wells

- **Domestic wells** – 15 feet additional drawdown
- **Irrigation wells** – 30 feet additional drawdown

- Well providing credit must be within the cone of depression of well serving the new use (category 4)
  - Where there is at least 2 feet of drawdown
Area of Severe Decline Criteria

Credit cannot be used to increase pumping within severe groundwater level decline area as defined by SLO County

• Proposed 50’ water level decline
• Reviewed annually
• Annual map of decline published
Decline Map Sample – Paso Basin
Flow of Program

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(current crop acreage x water use factor)

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- Contiguous Parcel
- Non-contiguous Parcel

Meets Standard

Deed Restriction Recorded & Well Meter Installed

Annual Verification (3rd Party reporting)
Next Steps

- RCD is refining program framework and defining associated language to support the transactions to come and finalize the draft report for the County.

- Education and Outreach (June – September)
  - Peer Review
  - County Staff Interface
  - Key stakeholders – Ag Community
  - Focus Group, Case Study Development
  - Public at large

- Final program presented for adoption – estimated for October 2014
Conclusion

• Program designed to be flexibly tiered, simplified, and user-friendly.

• Issue is complex in nature, and program tries to encompass multiple layers of operational complexity.

• Groundwater basin(s) are natural features that change over time and the program is designed with flexibility and adaptation in mind.
Questions?

<table>
<thead>
<tr>
<th>Contact</th>
<th>Email</th>
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<tbody>
<tr>
<td>Laura Edwards, Program Mgr</td>
<td><a href="mailto:laura@us-ltrcd.org">laura@us-ltrcd.org</a></td>
</tr>
<tr>
<td>Jeff Barry, Hydrogeologist</td>
<td><a href="mailto:JBarry@gsiws.com">JBarry@gsiws.com</a></td>
</tr>
<tr>
<td>Ben Burgoa, Ag Engineer</td>
<td><a href="mailto:Ben.Burgoa@rcdmonterey.org">Ben.Burgoa@rcdmonterey.org</a></td>
</tr>
<tr>
<td>Kelly Gleason, Policy Specialist</td>
<td><a href="mailto:kelly@us-ltrcd.org">kelly@us-ltrcd.org</a></td>
</tr>
<tr>
<td>Devin Best, Biology Specialist</td>
<td><a href="mailto:Devin@us-ltrcd.org">Devin@us-ltrcd.org</a></td>
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Thank You