Western Madera County and Merced County

LAND SUBSIDENCE SOLUTIONS

In Association with Washington Avenue Growers, Red Top Area Growers, Merced and Madera Counties

Chris White
Central California Irrigation District

Chase Hurley
San Luis Canal Company
Subsidence Rates (feet/year)

GPS Stations
- Used only in July 2012 and December 2012 surveys
- Used in all three surveys

July 2012 to December 2012

0 - +0.1
-0.05 - 0
-0.1 - -0.05
-0.2 - -0.1
-0.3 - -0.2
-0.4 - -0.3
-0.5 - -0.4
-0.6 - -0.5
Merced County (approx. 6 miles) & Madera County (approx. 8 miles)
Eastside Bypass
@ Avenue 18 1/2, Madera County

Photo Date: January 2013

Levee Unit #5
Eastside Bypass
2006

Levee Unit #5

Levee Unit #6

El Nido G. S.
Approximate location of maximum subsidence in the United States identified by research efforts of Dr. Joseph F. Poland (pictured). Signs on pole show approximate altitude of land surface in 1925, 1955, and 1977. (28 feet in 50 years, .56 feet/year)

The site is in the San Joaquin Valley southwest of Mendota, California.
Short Term Subsidence Solutions

Reduce deep well (sub-Corcoran) pumping

Existing wells:
- Convert pumping from primarily deep wells to primarily shallow wells on Triangle T – at least 3,000 acre feet
- Substitute 2 deep wells on Vlot Property for 2 shallow wells on Triangle T – 2,000 acre feet

Fallow late year forage crops and purchase feed from an outside source:
- 160 to 300 acres – 1,000 acre feet
- Secure and distribute supplemental water supply from an outside source – 3,000 acre feet

Total 2013 reduction in deep well pumping – 6,000 to 9,000 acre feet
(Due to management practices)

Reduction in deep well pumping due to crop changes.
(Temporary until crop matures) 15,000 + acre feet
Water Level Elevations and Direction of Groundwater Flow in the Upper Aquifer

EXPLANATION

- **42**: Well & Water-Level Elevation Above MSL (feet)
- **40**: Contour of Water-Level Elevation Above MSL (feet)
- **Direction of Groundwater Flow**

Jan.-Feb. 2010
Jan.-Feb. 2013
Water Level Elevations and Direction of Groundwater Flow in the Upper Aquifer
Sack Dam to Eastside Bypass Comparison

EXPLANATION

○ Well & Water-Level Elevation Above MSL (feet)

Contour of Water-Level Elevation Above MSL (feet)

→ Direction of Groundwater Flow

Jan.-Feb. 2010

Jan.-Feb. 2013
Water Level Elevations and Direction of Groundwater Flow in the Lower Aquifer

Jan.-Feb. 2010

Jan.-Feb. 2013

EXPLANATION

42
Well & Water-Level Elevation Above MSL (feet)

40
Contour of Water-Level Elevation Above MSL (feet)

Direction of Groundwater Flow
Alignments for Clayton WD and Sierra WD Irrigation Conveyance

- Existing Well - Upper Aquifer
- Existing Well - Composite of Upper & Lower Aquifers
- Proposed Pipeline for Vlot (by others)
- Proposed Clayton WD/Triangle T Pipeline - 24" (by others)
- Furnish & Install 24" PVC Pipeline to Vlot/Fagundes
  (Pipe lengths are approximate)

Survey Points
Township & Range
District Boundaries

Aerial - National Agricultural Imagery Program (NAIP), June 2012
Western Madera County Subsidence Study
Long Term Solutions

• Continue grower-driven process to revive existing districts, form a new district, and/or annex into Madera Irrigation District.

• Develop Recharge Ponds and Turnouts from the Bypass (existing and proposed).

• The target schedule is to submit applications for permits this fall.

• Replace deep wells with shallow aquifer wells.

• Construct internal conveyance infrastructure improvements.
Subsidence Area District Vicinity

Study Area
Western Madera County Subsidence Area Base-map with Recharge Ponds and Conveyance Facilities
**Western Madera County Subsidence Solution**

**Cost Summary**

<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity</th>
<th>Cost</th>
<th>Capital Cost</th>
<th>Total Annual Cost</th>
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</thead>
<tbody>
<tr>
<td><strong>On-Site Facilities</strong></td>
<td></td>
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<tr>
<td>Recharge Ponds &amp; Turnouts</td>
<td>720 Acres</td>
<td>$3,000</td>
<td>$2,161,000</td>
<td>$141,000</td>
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<tr>
<td>Shallow Water Supply Replacement Wells</td>
<td>30 Wells</td>
<td>$120,000</td>
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<td>Surface Water Distribution System</td>
<td>25,640 Acres</td>
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<td><strong>Subtotal:</strong></td>
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<td>$637,000</td>
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<td><strong>Supplemental Supply Acquisition (1/2 acre-foot/acre)</strong></td>
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<td>Supplemental Water Supply Acquisition**</td>
<td>10,000 ac-ft/year</td>
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<td><strong>Total Program Cost:</strong></td>
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<td>$9,761,000</td>
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<td>$3,637,000</td>
</tr>
</tbody>
</table>

*Capital cost amortized @ 20 years, 3% interest.*

**Assumes Bureau of Reclamation to contribute $9 million under their current cooperative agreement to facilitate start up operation of the Madera County Water Supply Enhancement Project (Madera Water Bank) with capability of delivering 10,000 acre-feet/year to the site.*

Participation in the Madera Water Bank provides guaranteed new supplemental supply that does not compete with existing scarce water supplies south of the Delta.
Subsidence Study
Ongoing Coordination Efforts

- Coordinate with landowners.
- Coordinate solutions with County Boards of Supervisors.
- Coordinate with adjacent water and irrigation districts.
- Work with DWR on determining flood carrying capacity of Bypass and SJR.
- Work with reservoir operators on coordinated releases to minimize flood risk.
- Coordinate efforts with the SJR Restoration Program.
- Continue subsidence monitoring network.
Western Madera County

• Project Question
  • Will the County support the organization of the landowners in the project area into an Irrigation District for the purposes of solving the Red Top subsidence problem?

• Well Construction Question
  • Will the County allow combination (above and below Corcoran Clay) wells?

• Project Participation Question
  • Given the public safety concern with subsidence impacts on the flood control system and to other adjacent facilities, what will be the County’s participation in the project now and in the future?
Contact Information

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