

# DWR Update: Groundwater Conditions & Considerations for Landowner Volunteer Monitoring Wells Colusa County

Jun 16<sup>th</sup>, 2016



Roy Hull, Engineering Geologist  
CA Department of Water Resources

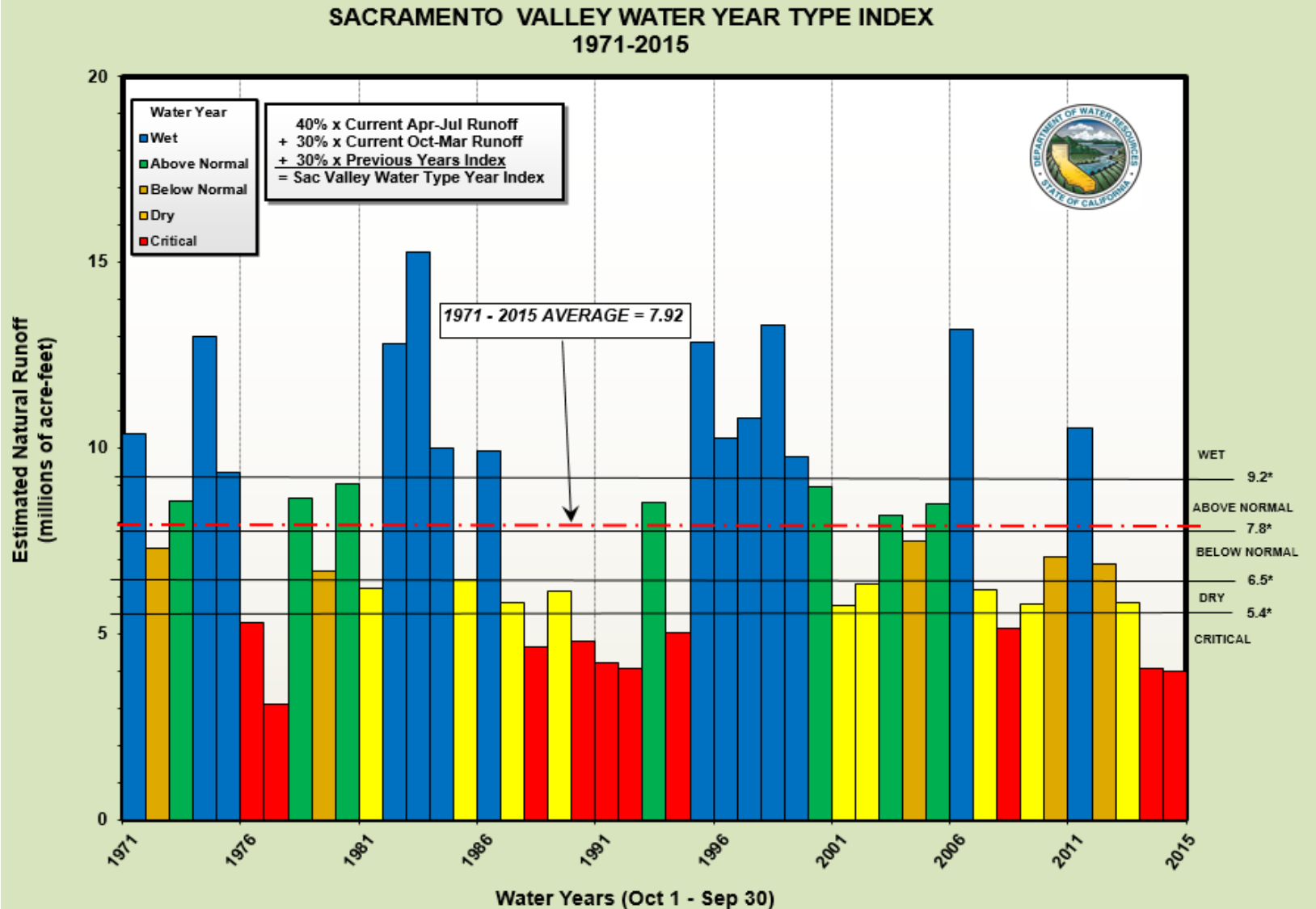
*Groundwater and Geologic Investigations Section  
Northern Region Office, Red Bluff*



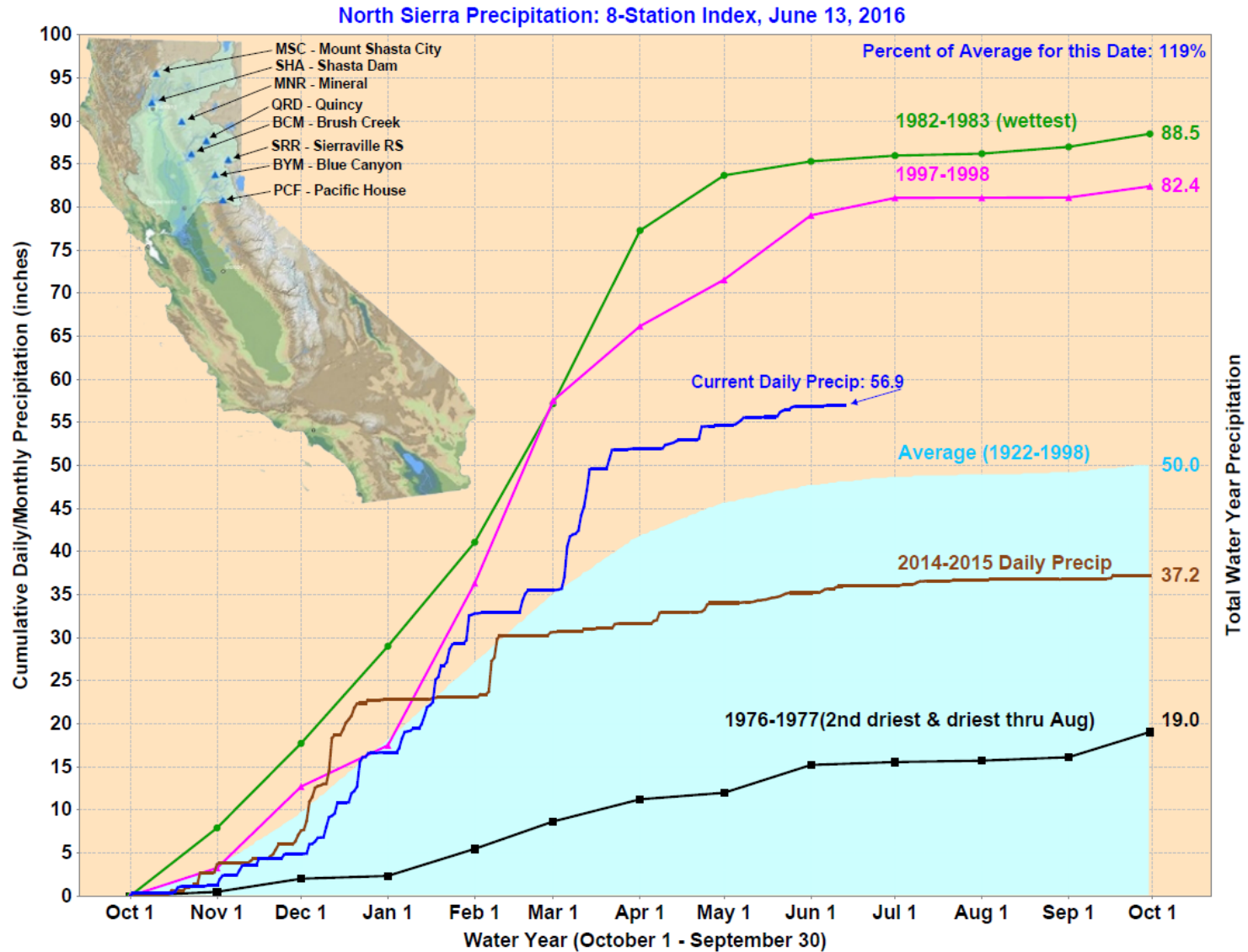
# Agenda

- Water Year to date
- Spring 2016 GW level report
  - Colusa County and Colusa GW Basin with select hydrographs
- Questions
- Considerations for landowner volunteer monitoring wells
- Questions

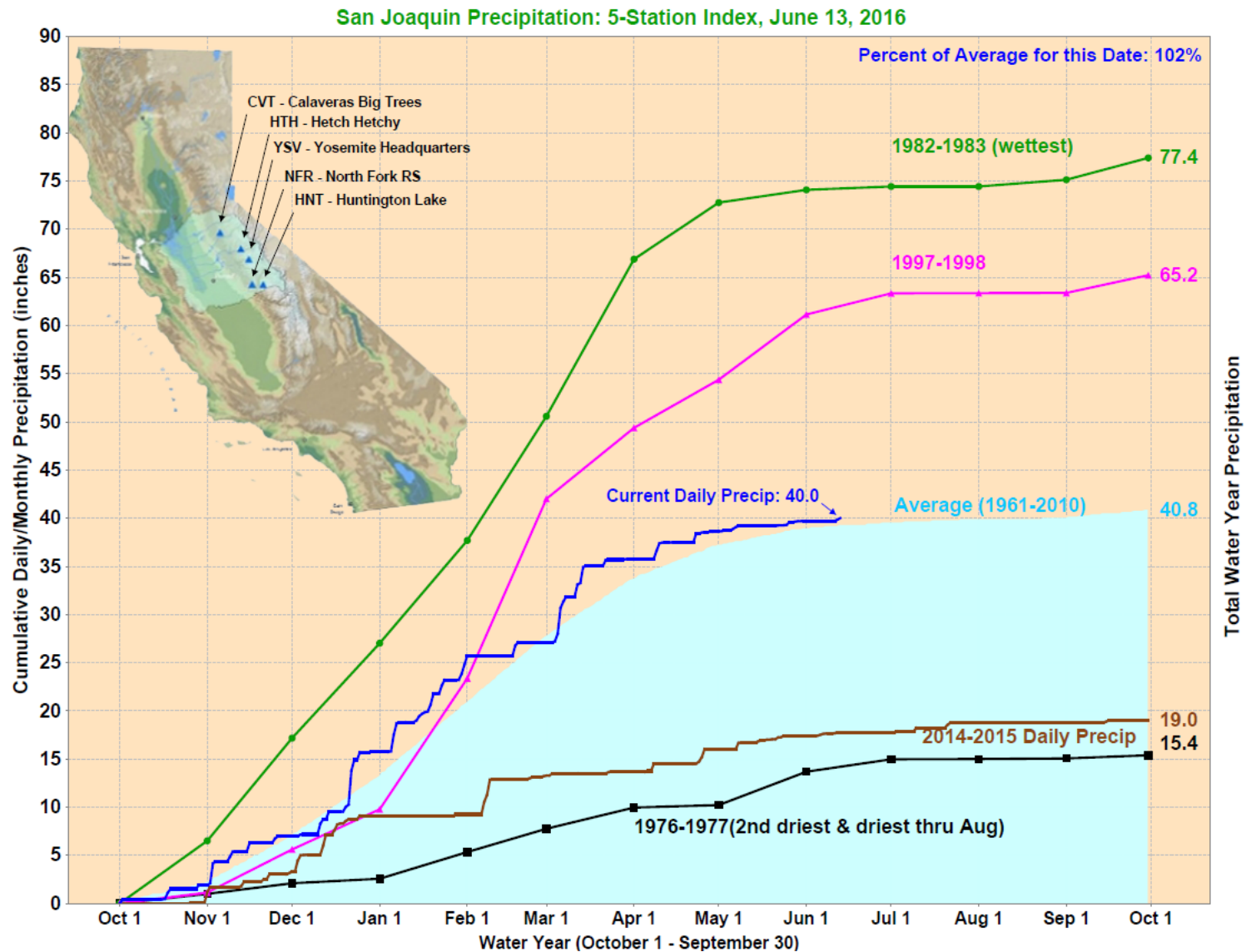
# Water Year Index 1971-2014



# Sacramento Valley Precipitation

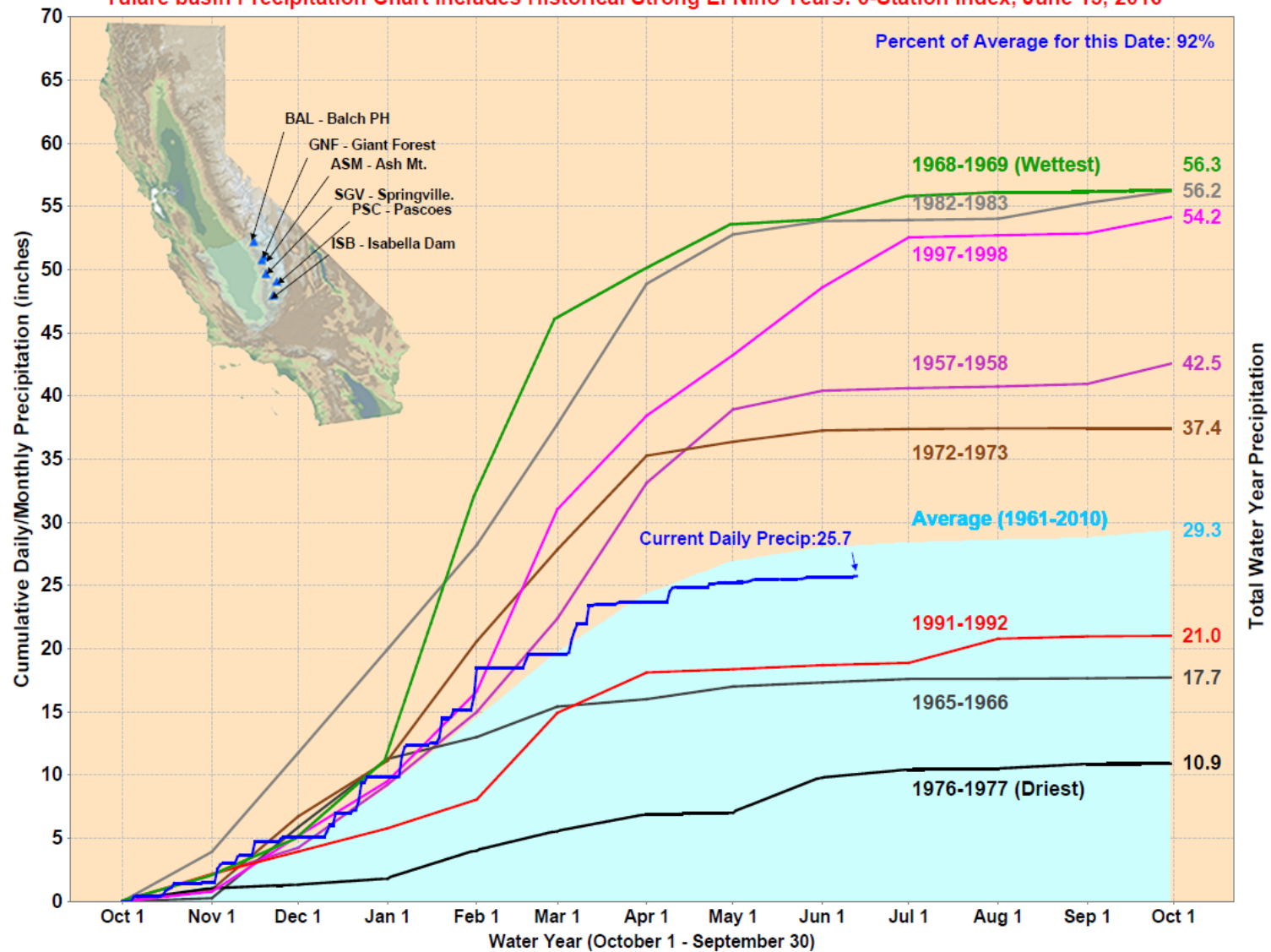


# San Joaquin Precipitation

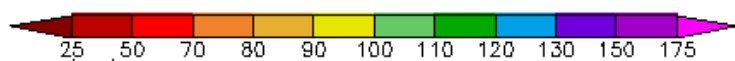
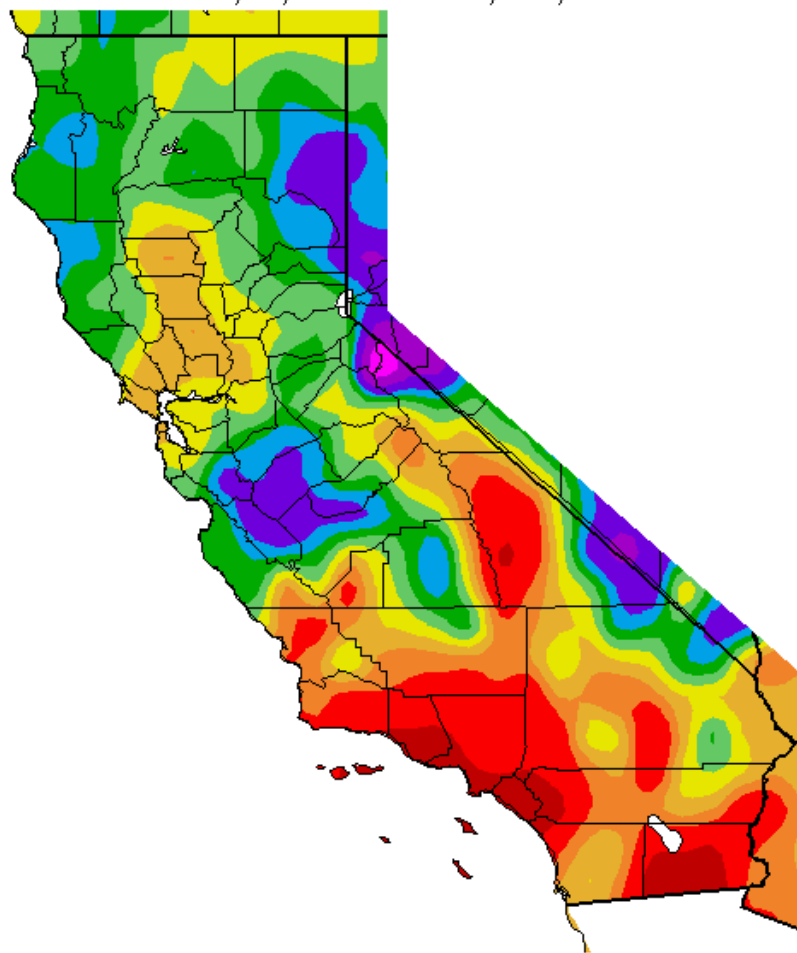


# Sacramento Valley Precipitation

Tulare basin Precipitation Chart Includes Historical Strong El Nino Years: 6-Station Index, June 13, 2016

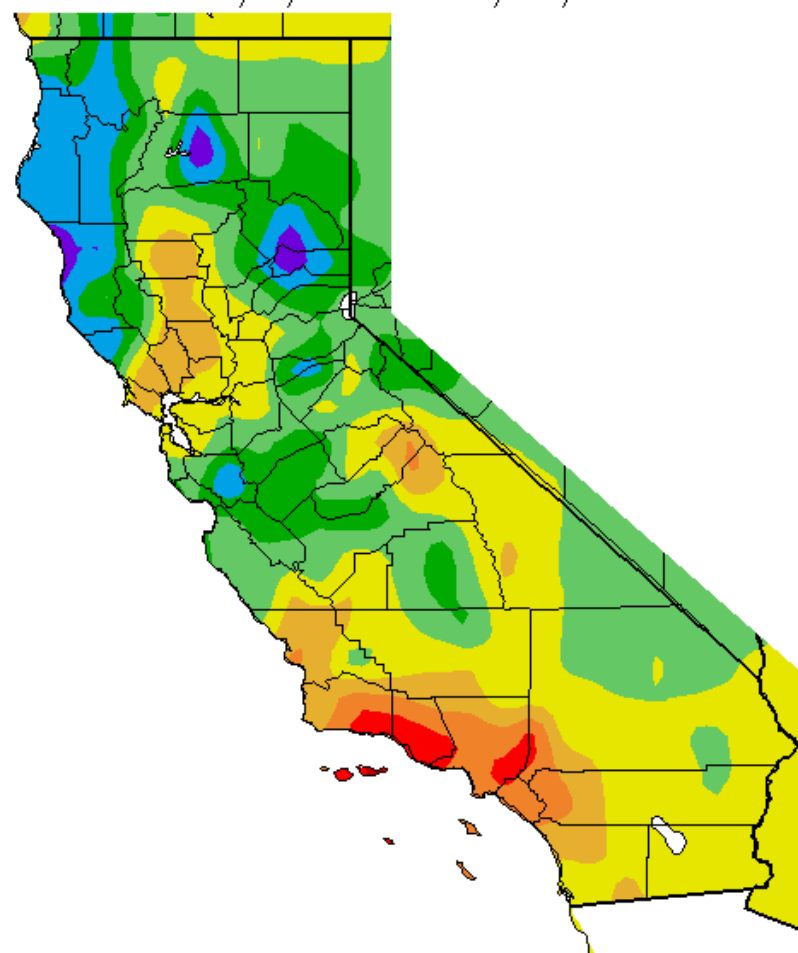


Percent of Average Precipitation (%)  
10/1/2015 – 6/11/2016



Generated 6/12/2016 at WRCC using provisional data.  
NOAA Regional Climate Centers

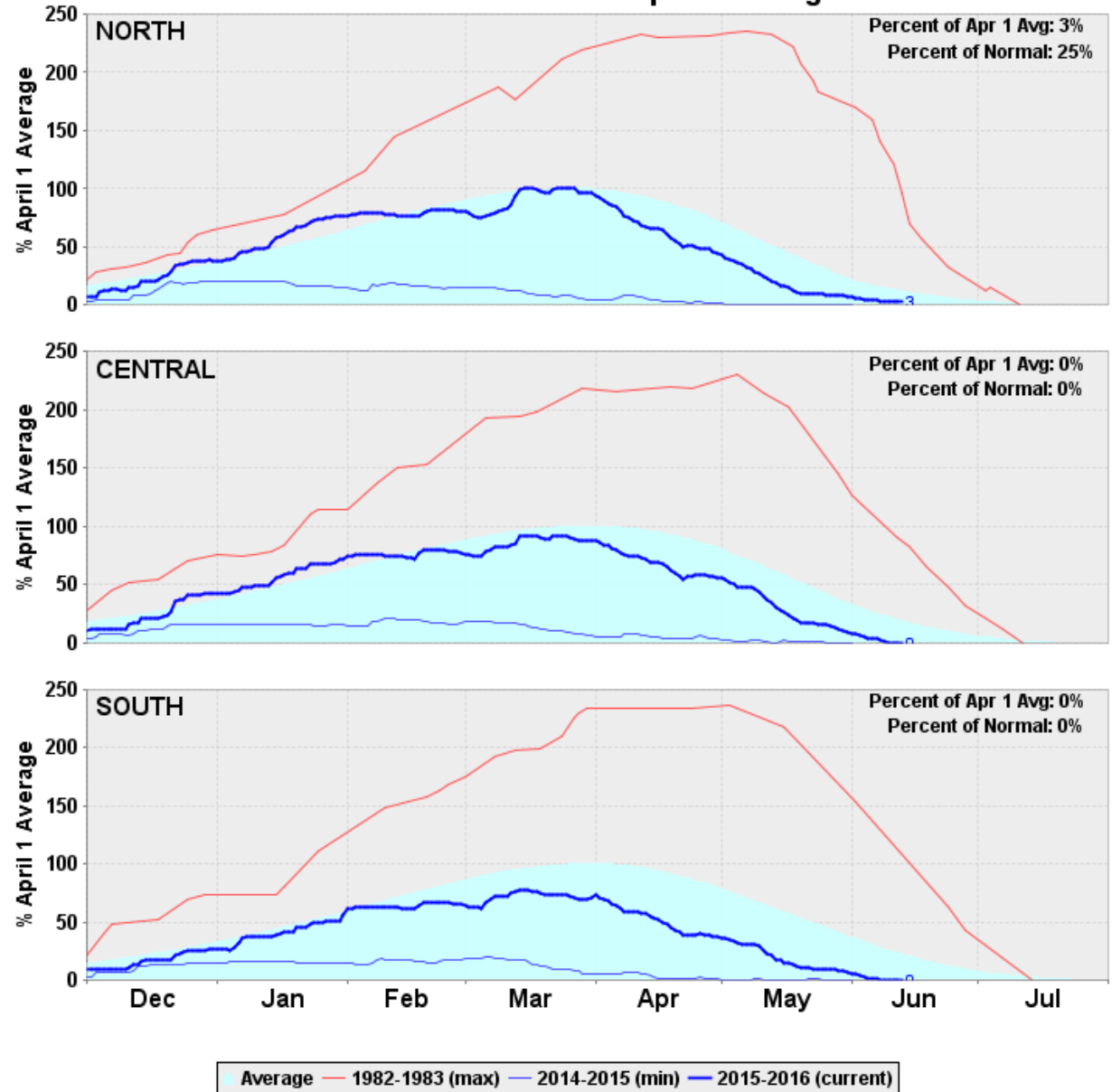
Precipitation Departure from Average (in.)  
10/1/2015 – 6/11/2016



Generated 6/12/2016 at WRCC using provisional data.  
NOAA Regional Climate Centers

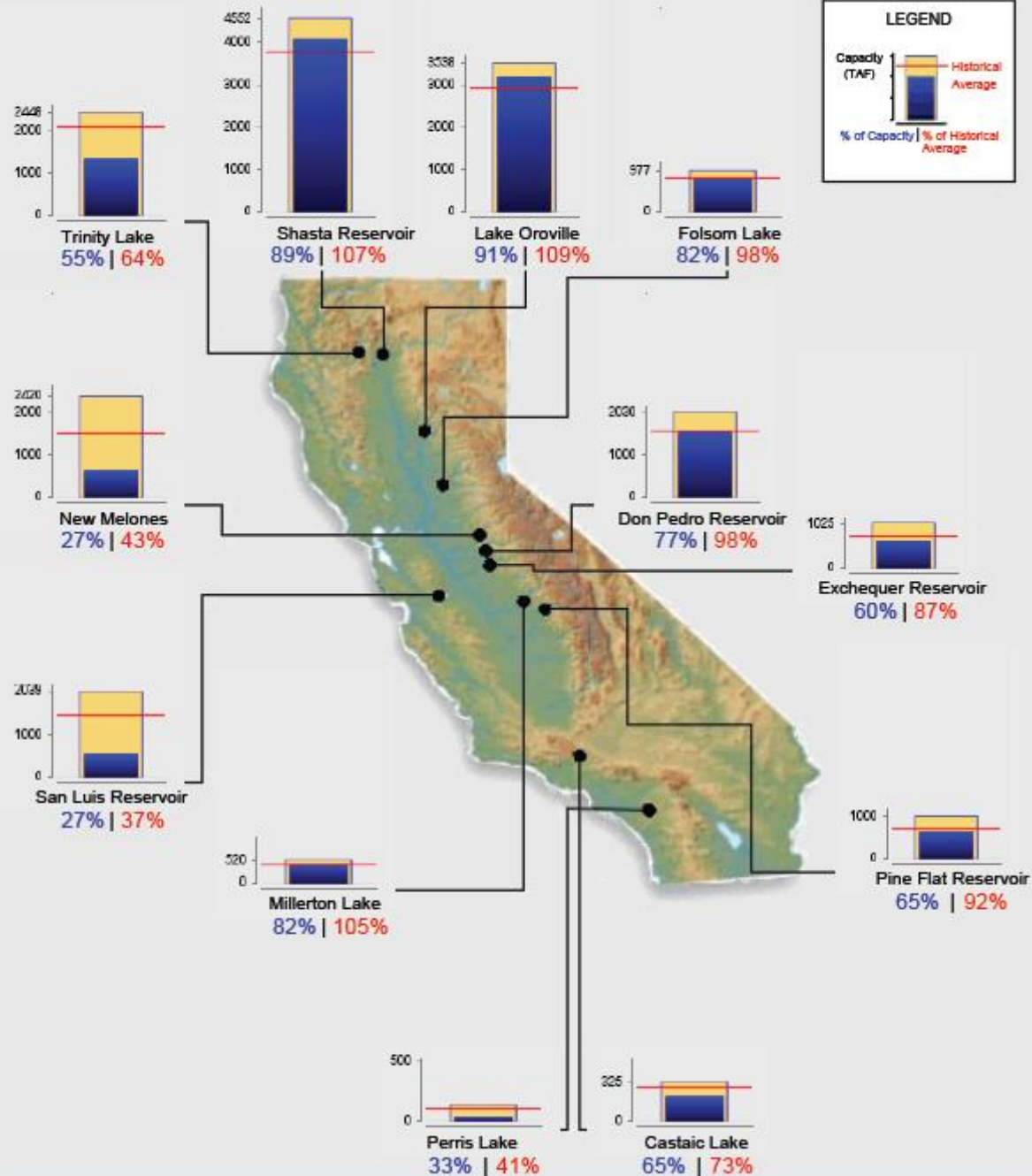
# Snow Pack

California Snow Water Content - Percent of April 1 Average For: 13-Jun-2016



# Reservoirs

## CURRENT RESERVOIR CONDITIONS



# Groundwater Change in Elevation Maps

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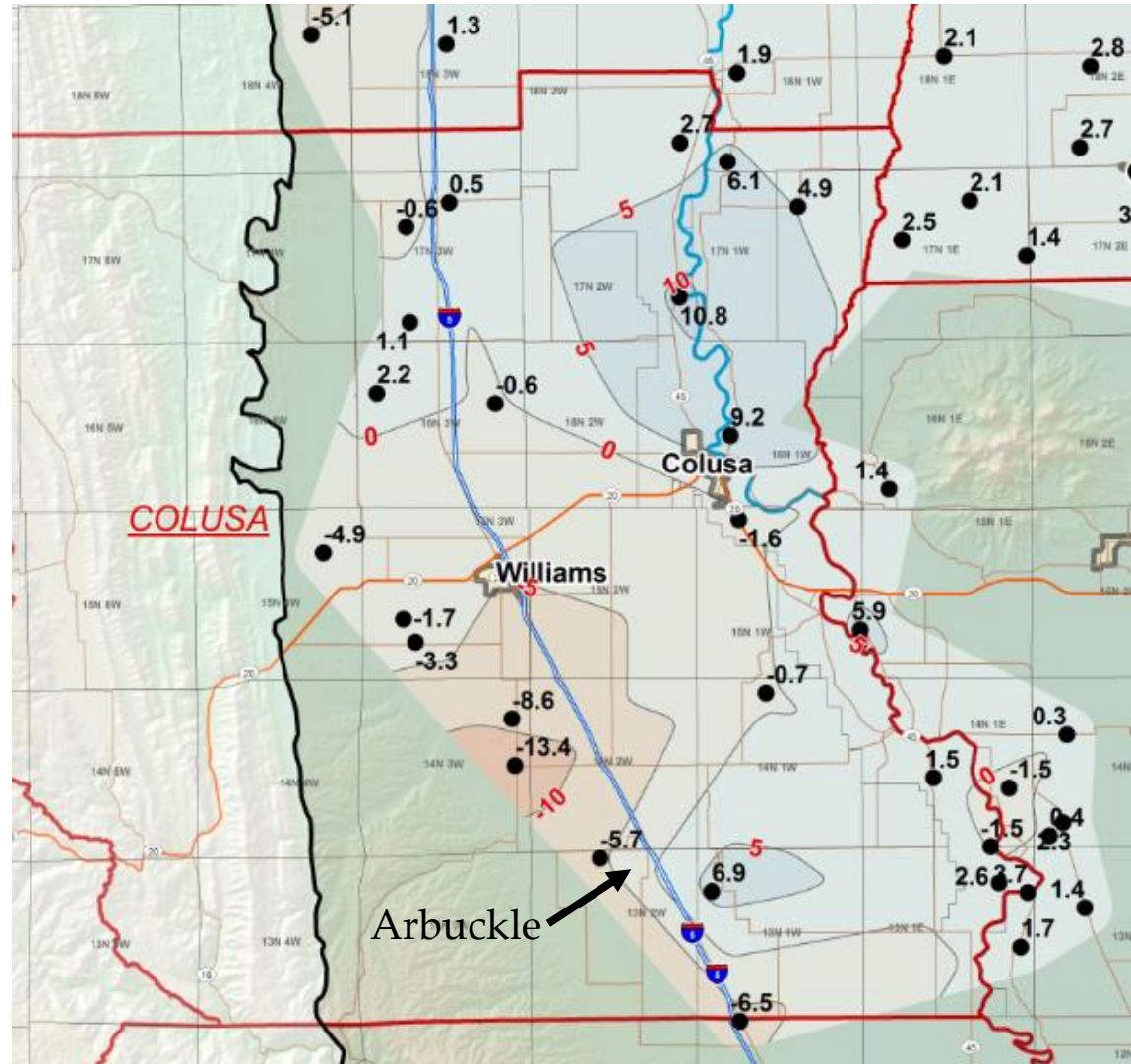
Spring 2016

# Groundwater Elevation Change Map Colusa County

## Spring 2015 to 2016

Shallow:  
Less than 200 feet  
below ground surface

|                                                   |       |
|---------------------------------------------------|-------|
| <b>Colusa County - Sacramento Valley GW Basin</b> |       |
| Maximum Increase GWL(ft)                          | 10.8  |
| Maximum Decrease GWE (ft)                         | -13.4 |
| Average Change GWE (ft)                           | 0.3   |
| Average Well Depth (ft)                           | 129   |
| Number of Wells Monitored                         | 22    |



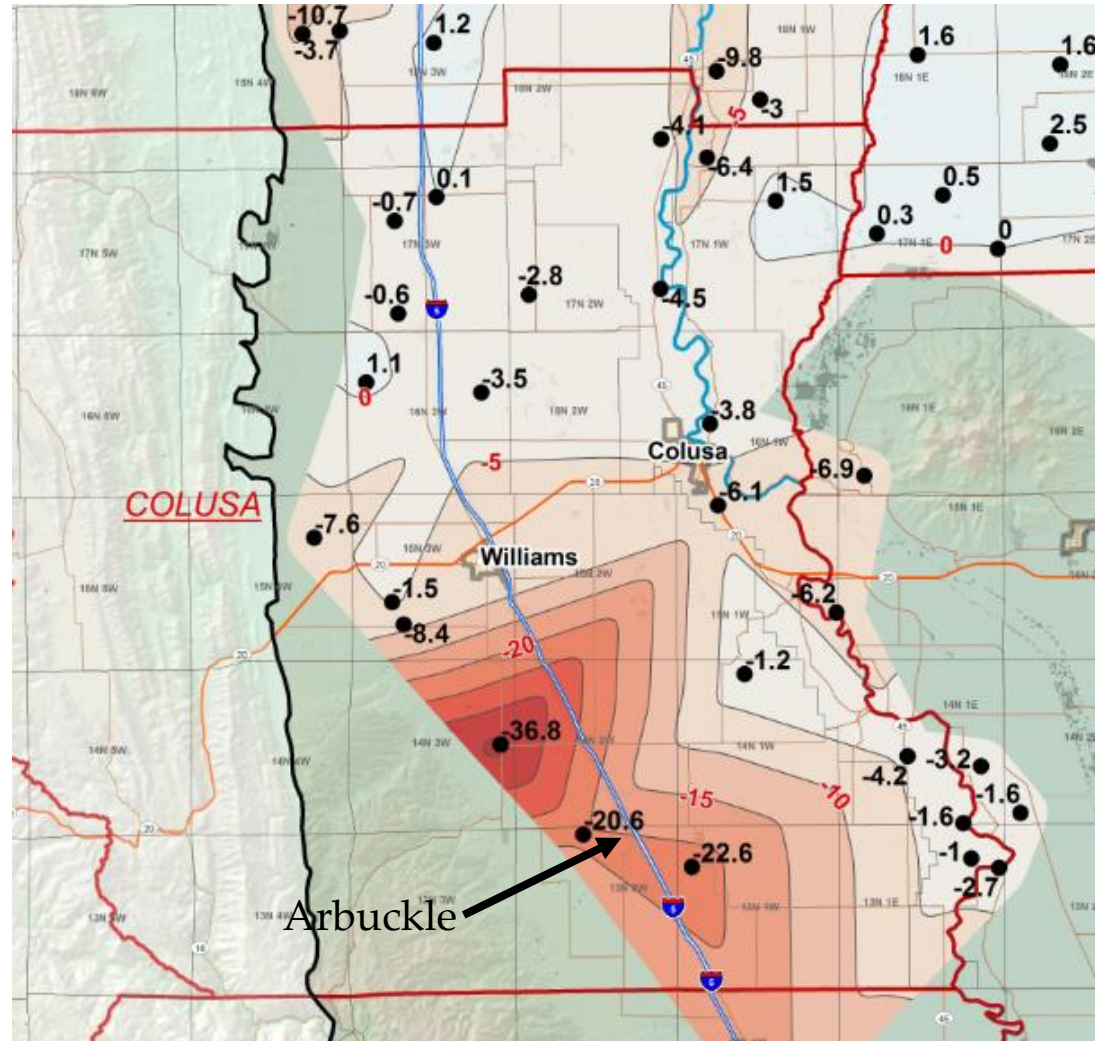
# Groundwater Elevation Change Map Colusa County

Spring 2011 to 2016

Shallow:  
Less than 200 feet  
below ground surface

## Colusa County - Sacramento Valley GW Basin

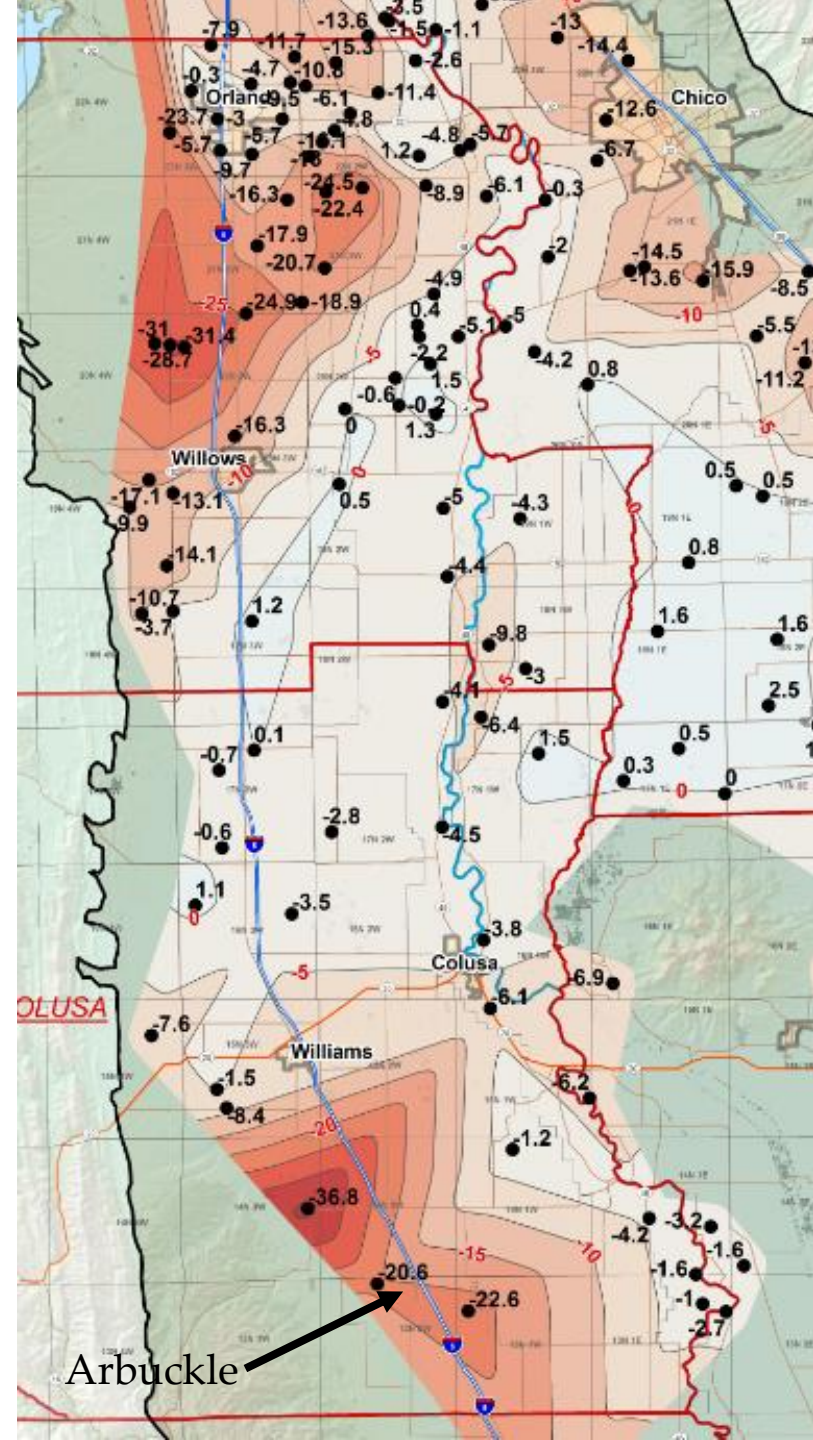
|                           |       |
|---------------------------|-------|
| Maximum Increase GWL(ft)  | 1.5   |
| Maximum Decrease GWE (ft) | -36.8 |
| Average Change GWE (ft)   | 6.1   |
| Average Well Depth (ft)   | 132   |
| Number of Wells Monitored | 22    |



# Groundwater Elevation Change Map Colusa Basin

Spring 2011 to 2016

Shallow:  
Less than 200 feet  
below ground surface



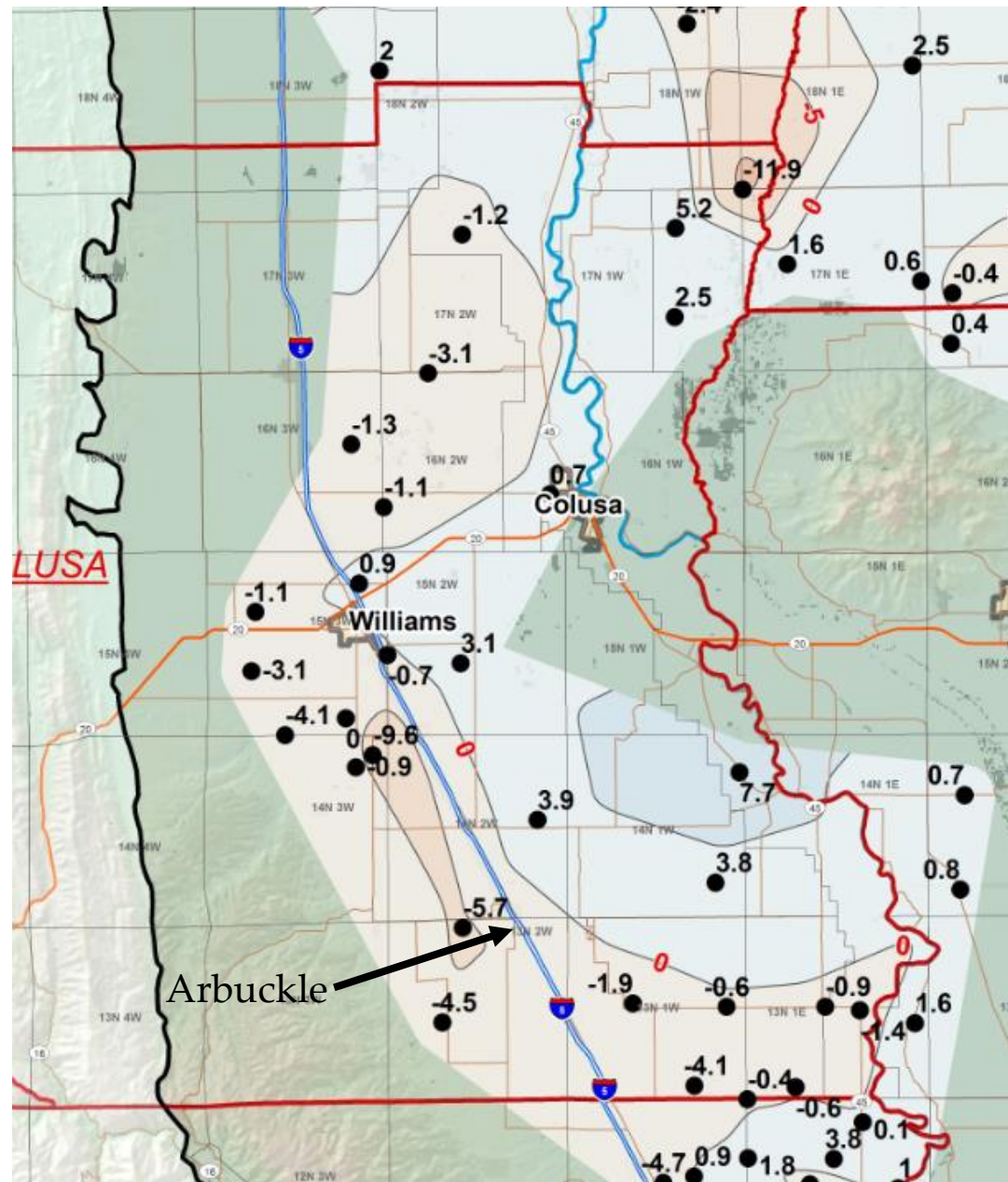
# Groundwater Elevation Change Map Colusa County

Spring 2015 to 2016

Intermediate:  
Between 200 and 600 feet  
below ground surface

## Colusa County - Sacramento Valley GW Basin

|                           |       |
|---------------------------|-------|
| Maximum Increase GWE(ft)  | 7.7   |
| Maximum Decrease GWE (ft) | -11.9 |
| Average Change GWE (ft)   | -7.1  |
| Average Well Depth (ft)   | 406   |
| Number of Wells Monitored | 28    |



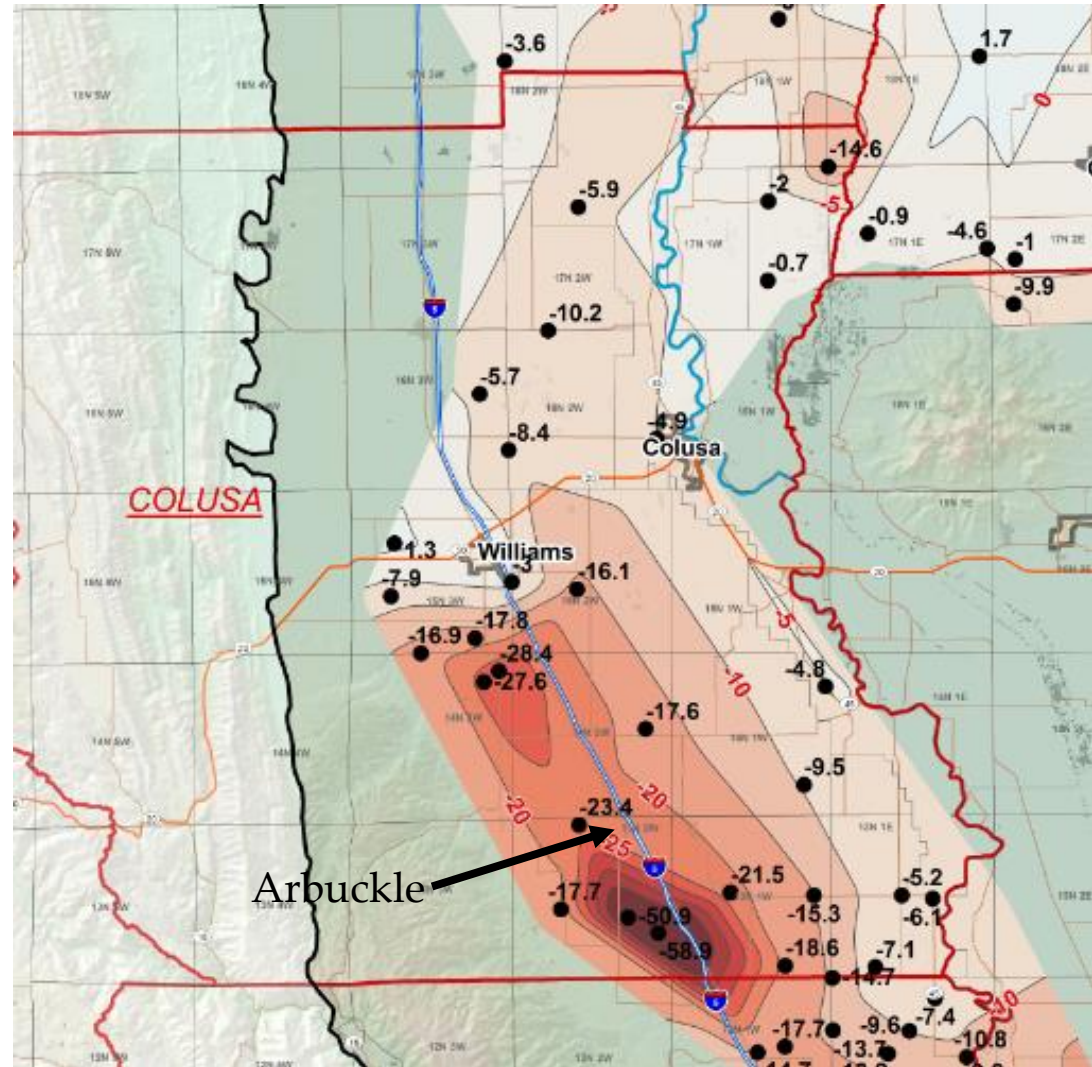
# Groundwater Elevation Change Map Colusa County

Spring 2011 to 2016

Intermediate:  
Between 200 and 600 feet  
below ground surface

## Colusa County - Sacramento Valley GW Basin

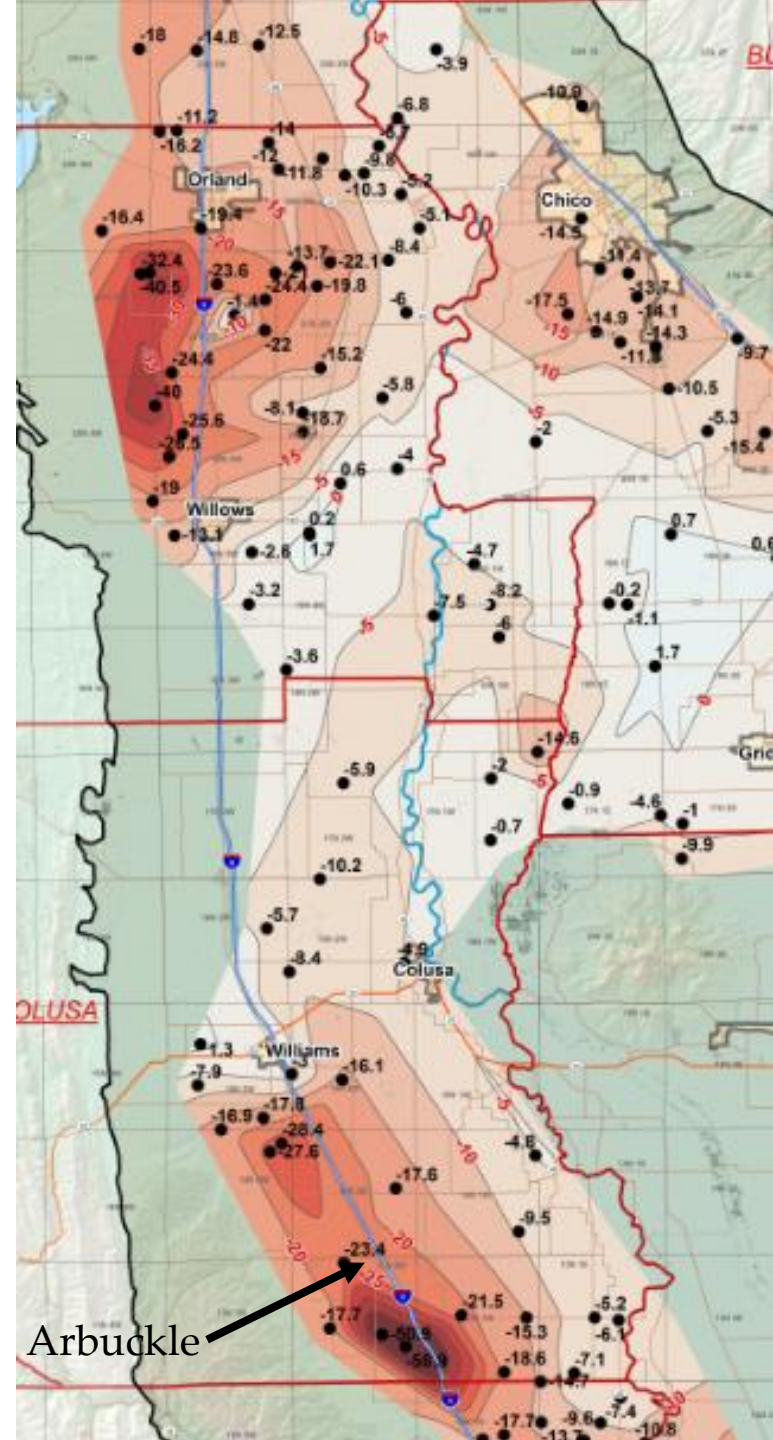
|                           |       |
|---------------------------|-------|
| Maximum Increase GWE(ft)  | 1.3   |
| Maximum Decrease GWE (ft) | -58.9 |
| Average Change GWE (ft)   | -14.7 |
| Average Well Depth (ft)   | 408   |
| Number of Wells Monitored | 29    |



# Groundwater Elevation Change Map Colusa Basin

Spring 2011 to 2016

Intermediate:  
Between 200 and 600 feet  
below ground surface



# Groundwater Hydrographs

...

Spring 2016

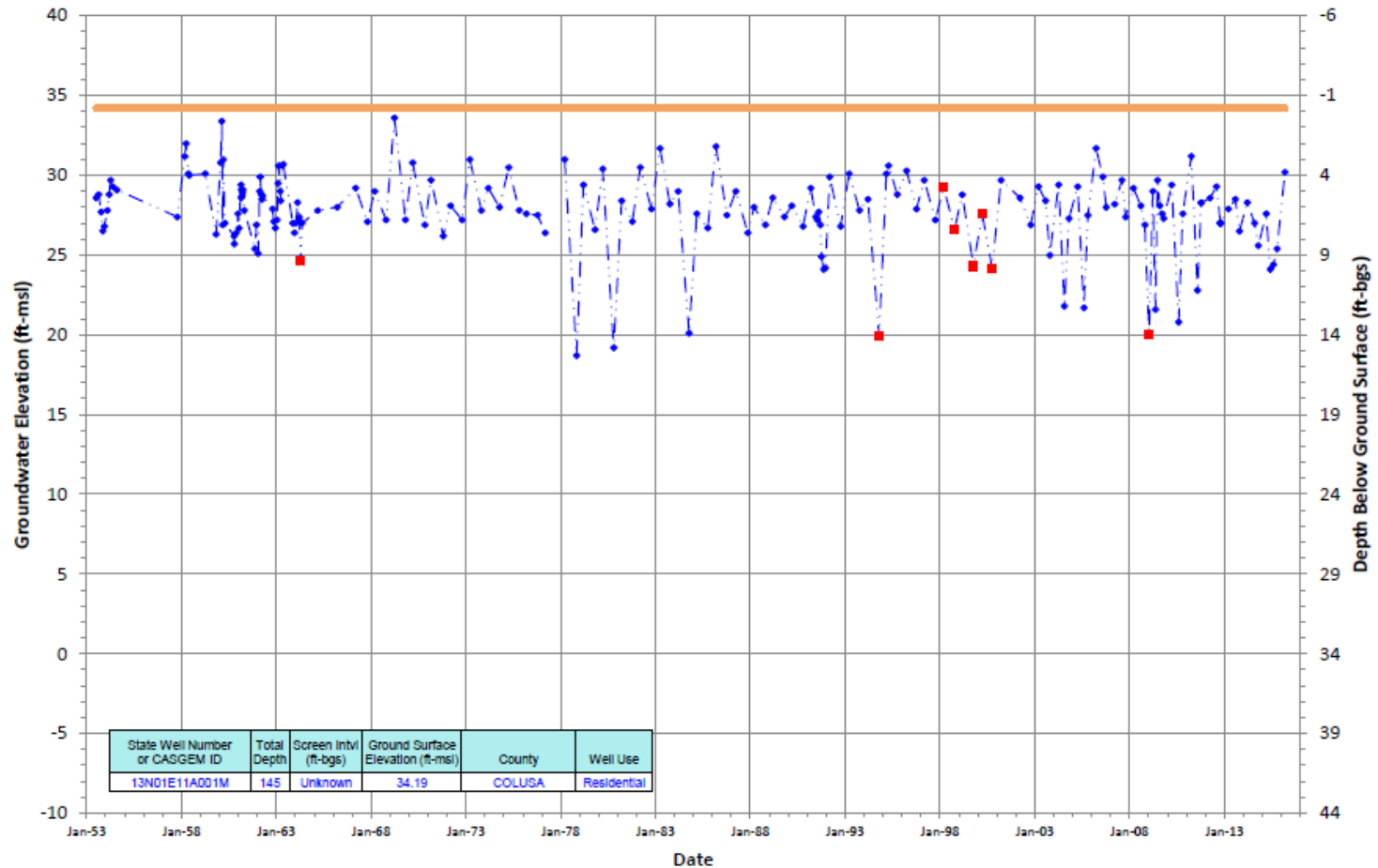
# 13N01E11A001M

13N01E11A001M|

Period Of Record: 07/01/1953 to 03/14/2016

Hydrograph Criteria

Field Book Name is 'Colusa County-Book 1'



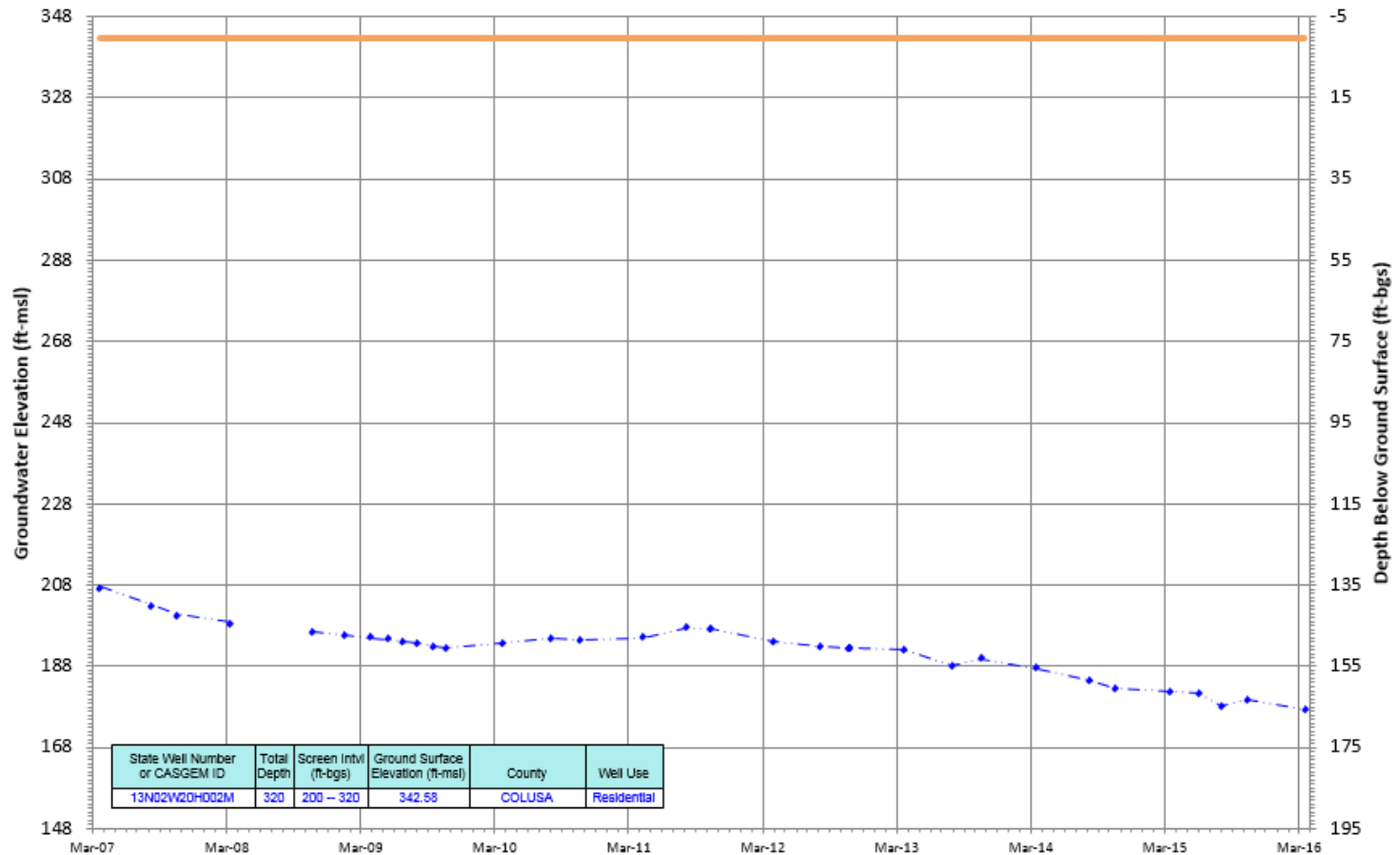
# 13N02W20H002M

13N02W20H002M

Period Of Record: 03/22/2007 to 03/15/2016

Hydrograph Criteria

Field Book Name is 'Colusa County-Book 1'



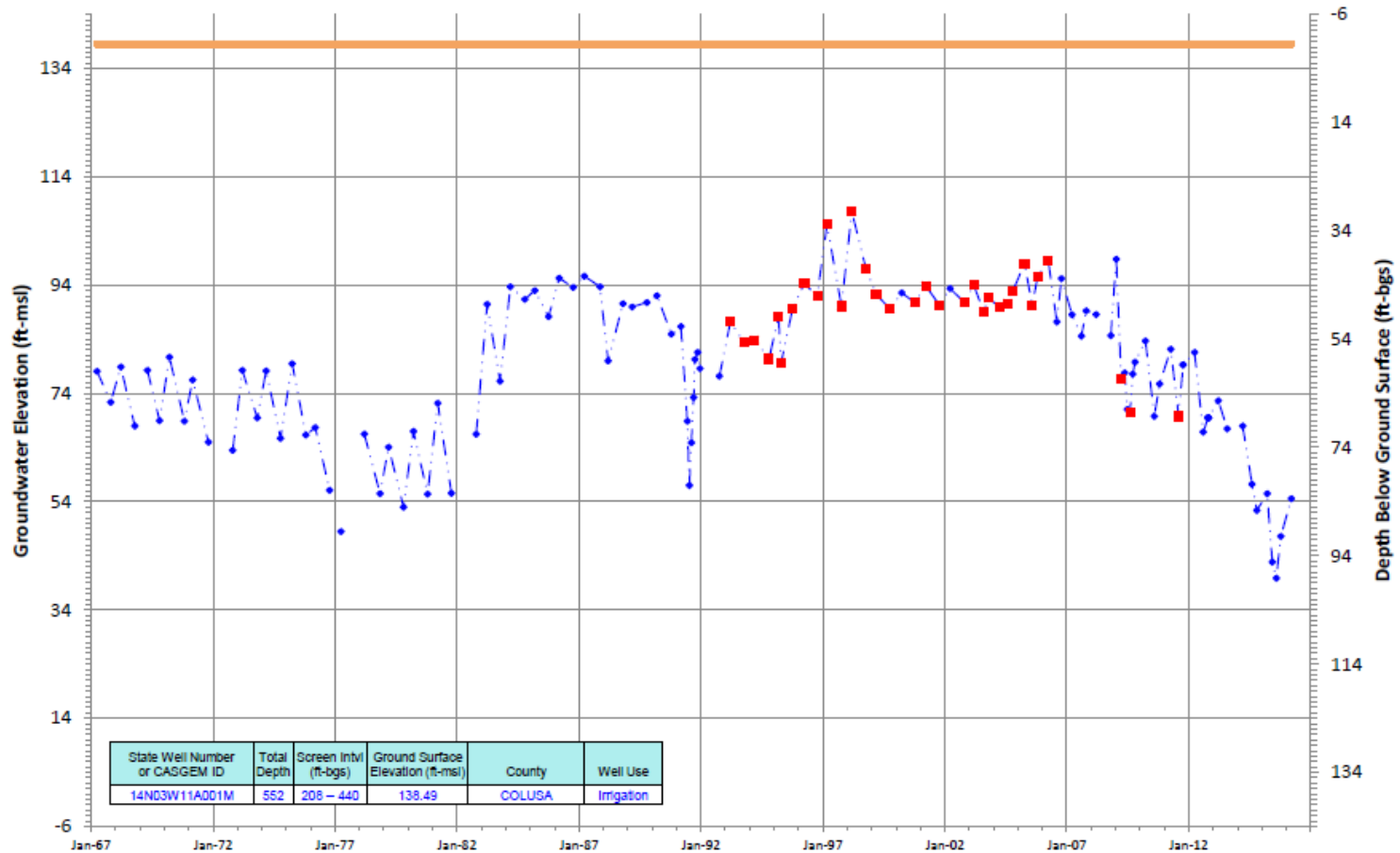
# 14N03W11A001M

14N03W11A001M

Period Of Record: 03/29/1967 to 03/15/2016

Hydrograph Criteria

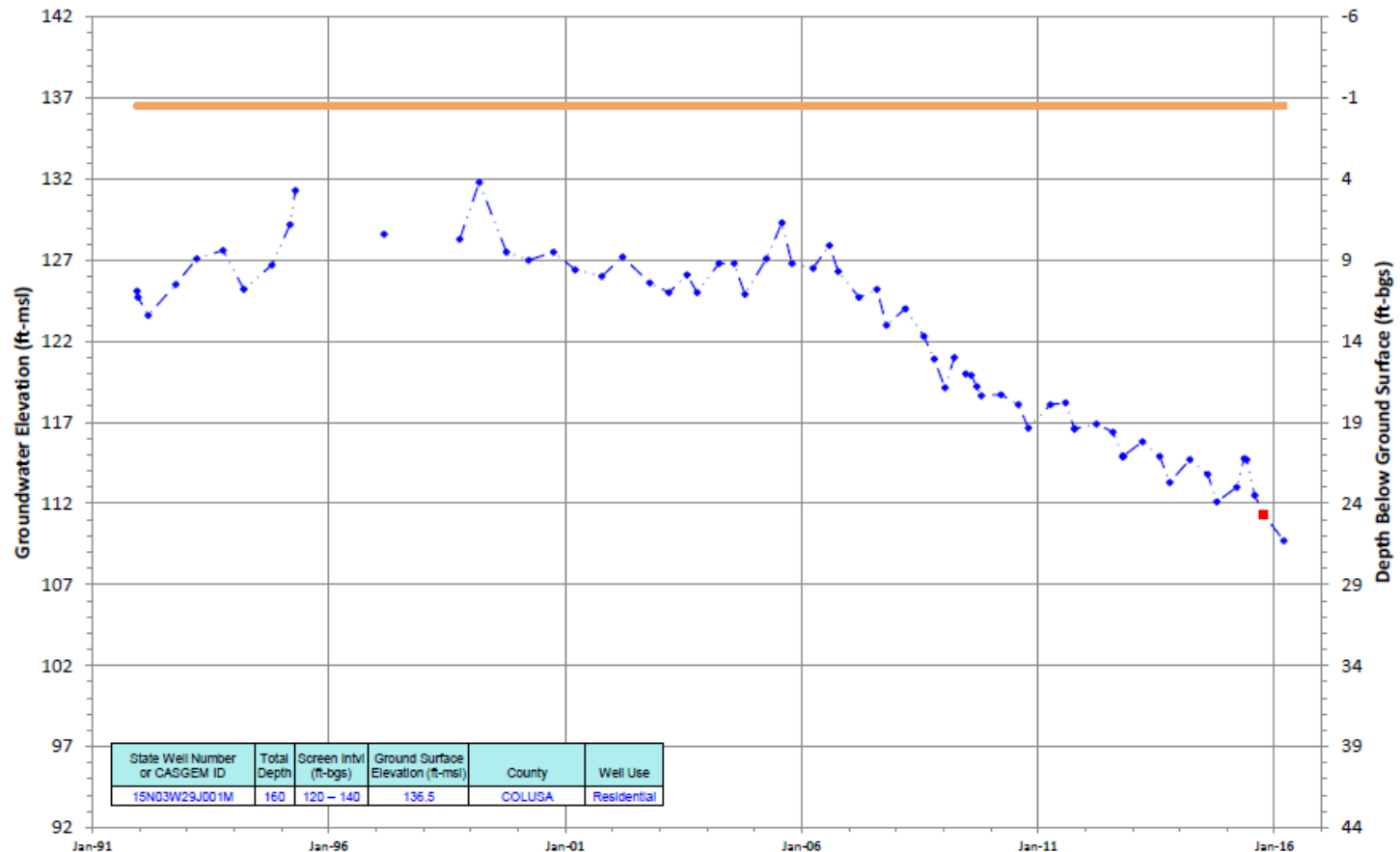
Field Book Name is 'Colusa County-Book 1'



# 15N03W29J001M

15N03W29J001M|  
Period Of Record: 12/10/1991 to 03/15/2016

Hydrograph Criteria  
Field Book Name is 'Colusa County-Book 1'



# 17N01W10A002M

17N01W10A002M

Period Of Record: 05/13/2010 to 03/17/2016

Hydrograph Cntena

Field Book Name is 'Colusa County-Book 1'



# Small break for a few questions?



Photo Credit: Sue Graue

<http://water.ca.gov/groundwater/>

General Discussion:  
Considerations for  
Landowner Volunteer  
Monitoring Wells

• • •

Spring 2016

# You want your well monitored?

- General Checklist:
  - Well Construction Information (**a must**)
    - i.e. Driller's Well Logs, E-Logs, coordinates, elevation

# Well Completion Log

ORIGINAL

File with DWR

Page 1 of 1

Owner's Well No. 254895

Date Work Began 08/03/92 **D.W.R.** 08/04/92

Local Permit Agency Colusa County Health Dept.

Permit No. 0323

Permit Date \_\_\_\_\_

**RECEIVED**

STATE OF CALIFORNIA

**WELL COMPLETION REPORT**

Refer to Instruction Pamphlet

No. 423344

DWR USE ONLY - DO NOT FILL IN

13N02W20H

STATE WELL NO./STATION NO.

LATITUDE LONGITUDE

APN/TRS/OTHER

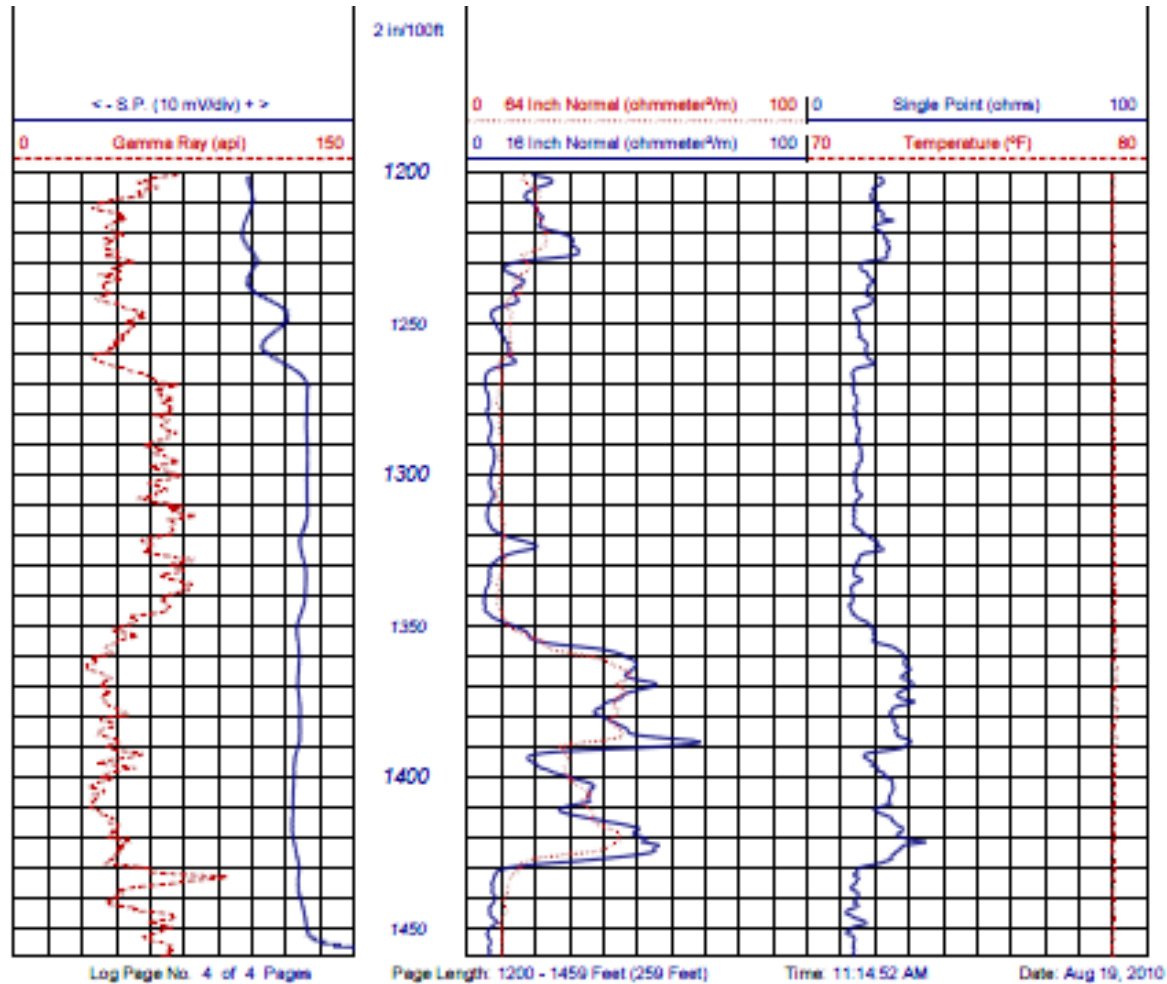
| GEOLOGIC LOG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |             |                             | WELL OWNER                                                                                                                                                                                                                                                                                                                                                                   |             |            |  |   |   |      |   |    |        |    |    |      |    |     |                             |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                                                                                                                                          |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------|--|---|---|------|---|----|--------|----|----|------|----|-----|-----------------------------|-----|-----|------|-----|-----|---------------|-----|-----|------|-----|-----|---------------|-----|-----|------|-----|-----|---------------|-----|-----|------|-----|-----|---------------|-----|-----|------|-----|-----|---------------|-----|-----|------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| ORIENTATION ( ) <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> HORIZONTAL <input type="checkbox"/> ANGLE _____ (SPECIFY)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                             | Name _____                                                                                                                                                                                                                                                                                                                                                                   |             |            |  |   |   |      |   |    |        |    |    |      |    |     |                             |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                                                                                                                                          |  |
| DEPTH TO FIRST WATER _____ (Ft) BELOW SURFACE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                             | Mailing Address <u>P. O. Box</u>                                                                                                                                                                                                                                                                                                                                             |             |            |  |   |   |      |   |    |        |    |    |      |    |     |                             |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                                                                                                                                          |  |
| DESCRIPTION<br><i>Describe material, grain size, color, etc.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |             |                             | <u>Dunnigan</u> <u>CA</u> <u>95937</u><br>CITY STATE ZIP                                                                                                                                                                                                                                                                                                                     |             |            |  |   |   |      |   |    |        |    |    |      |    |     |                             |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                                                                                                                                          |  |
| <table border="1"> <thead> <tr> <th>DEPTH FROM SURFACE</th> <th>DESCRIPTION</th> </tr> <tr> <th>Ft. to Ft.</th> <th></th> </tr> </thead> <tbody> <tr><td>0</td><td>3</td><td>Soil</td></tr> <tr><td>3</td><td>16</td><td>Gravel</td></tr> <tr><td>16</td><td>30</td><td>Clay</td></tr> <tr><td>30</td><td>100</td><td>Clay with Streaks of Gravel</td></tr> <tr><td>100</td><td>125</td><td>Clay</td></tr> <tr><td>125</td><td>140</td><td>Sand &amp; Gravel</td></tr> <tr><td>140</td><td>185</td><td>Clay</td></tr> <tr><td>185</td><td>196</td><td>Gravel &amp; Sand</td></tr> <tr><td>196</td><td>210</td><td>Clay</td></tr> <tr><td>210</td><td>225</td><td>Gravel &amp; Sand</td></tr> <tr><td>225</td><td>240</td><td>Clay</td></tr> <tr><td>240</td><td>252</td><td>Gravel &amp; Sand</td></tr> <tr><td>252</td><td>300</td><td>Clay</td></tr> <tr><td>300</td><td>315</td><td>Gravel &amp; Sand</td></tr> <tr><td>315</td><td>320</td><td>Clay</td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table> |             |                             | DEPTH FROM SURFACE                                                                                                                                                                                                                                                                                                                                                           | DESCRIPTION | Ft. to Ft. |  | 0 | 3 | Soil | 3 | 16 | Gravel | 16 | 30 | Clay | 30 | 100 | Clay with Streaks of Gravel | 100 | 125 | Clay | 125 | 140 | Sand & Gravel | 140 | 185 | Clay | 185 | 196 | Gravel & Sand | 196 | 210 | Clay | 210 | 225 | Gravel & Sand | 225 | 240 | Clay | 240 | 252 | Gravel & Sand | 252 | 300 | Clay | 300 | 315 | Gravel & Sand | 315 | 320 | Clay |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | WELL LOCATION<br>Address <u>1550 Ft. North of Marine Ave.</u><br>City <u>750 Ft. West of Wyr Road</u><br>County <u>Colusa</u><br>APN Book <u>21</u> Page <u>130</u> Parcel <u>92</u><br>Township <u>13 N</u> Range <u>2 W</u> Section <u>20</u> <b>++</b><br>Latitude _____ NORTH Longitude _____ WEST<br>DEG. MIN. SEC. |  |
| DEPTH FROM SURFACE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | DESCRIPTION |                             |                                                                                                                                                                                                                                                                                                                                                                              |             |            |  |   |   |      |   |    |        |    |    |      |    |     |                             |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                                                                                                                                          |  |
| Ft. to Ft.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |                             |                                                                                                                                                                                                                                                                                                                                                                              |             |            |  |   |   |      |   |    |        |    |    |      |    |     |                             |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                                                                                                                                          |  |
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| 16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 30          | Clay                        |                                                                                                                                                                                                                                                                                                                                                                              |             |            |  |   |   |      |   |    |        |    |    |      |    |     |                             |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                                                                                                                                          |  |
| 30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 100         | Clay with Streaks of Gravel |                                                                                                                                                                                                                                                                                                                                                                              |             |            |  |   |   |      |   |    |        |    |    |      |    |     |                             |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                                                                                                                                          |  |
| 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 125         | Clay                        |                                                                                                                                                                                                                                                                                                                                                                              |             |            |  |   |   |      |   |    |        |    |    |      |    |     |                             |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                                                                                                                                          |  |
| 125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 140         | Sand & Gravel               |                                                                                                                                                                                                                                                                                                                                                                              |             |            |  |   |   |      |   |    |        |    |    |      |    |     |                             |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                                                                                                                                          |  |
| 140                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 185         | Clay                        |                                                                                                                                                                                                                                                                                                                                                                              |             |            |  |   |   |      |   |    |        |    |    |      |    |     |                             |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                                                                                                                                          |  |
| 185                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 196         | Gravel & Sand               |                                                                                                                                                                                                                                                                                                                                                                              |             |            |  |   |   |      |   |    |        |    |    |      |    |     |                             |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                                                                                                                                          |  |
| 196                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 210         | Clay                        |                                                                                                                                                                                                                                                                                                                                                                              |             |            |  |   |   |      |   |    |        |    |    |      |    |     |                             |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                                                                                                                                          |  |
| 210                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 225         | Gravel & Sand               |                                                                                                                                                                                                                                                                                                                                                                              |             |            |  |   |   |      |   |    |        |    |    |      |    |     |                             |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                                                                                                                                          |  |
| 225                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 240         | Clay                        |                                                                                                                                                                                                                                                                                                                                                                              |             |            |  |   |   |      |   |    |        |    |    |      |    |     |                             |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                                                                                                                                          |  |
| 240                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 252         | Gravel & Sand               |                                                                                                                                                                                                                                                                                                                                                                              |             |            |  |   |   |      |   |    |        |    |    |      |    |     |                             |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                                                                                                                                          |  |
| 252                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 300         | Clay                        |                                                                                                                                                                                                                                                                                                                                                                              |             |            |  |   |   |      |   |    |        |    |    |      |    |     |                             |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                                                                                                                                          |  |
| 300                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 315         | Gravel & Sand               |                                                                                                                                                                                                                                                                                                                                                                              |             |            |  |   |   |      |   |    |        |    |    |      |    |     |                             |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                                                                                                                                          |  |
| 315                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 320         | Clay                        |                                                                                                                                                                                                                                                                                                                                                                              |             |            |  |   |   |      |   |    |        |    |    |      |    |     |                             |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                                                                                                                                          |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                             |                                                                                                                                                                                                                                                                                                                                                                              |             |            |  |   |   |      |   |    |        |    |    |      |    |     |                             |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                                                                                                                                          |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                             |                                                                                                                                                                                                                                                                                                                                                                              |             |            |  |   |   |      |   |    |        |    |    |      |    |     |                             |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                                                                                                                                          |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                             |                                                                                                                                                                                                                                                                                                                                                                              |             |            |  |   |   |      |   |    |        |    |    |      |    |     |                             |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                                                                                                                                          |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                             |                                                                                                                                                                                                                                                                                                                                                                              |             |            |  |   |   |      |   |    |        |    |    |      |    |     |                             |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                                                                                                                                          |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                             |                                                                                                                                                                                                                                                                                                                                                                              |             |            |  |   |   |      |   |    |        |    |    |      |    |     |                             |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                                                                                                                                          |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                             |                                                                                                                                                                                                                                                                                                                                                                              |             |            |  |   |   |      |   |    |        |    |    |      |    |     |                             |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                                                                                                                                          |  |
| LOCATION SKETCH<br>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |             |                             | ACTIVITY ( )<br><input checked="" type="checkbox"/> NEW WELL<br>MODIFICATION/REPAIR<br><input type="checkbox"/> Deepen<br><input type="checkbox"/> Other (Specify) _____<br>DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")<br>PLANNED USE(S)<br>( )<br><input type="checkbox"/> MONITORING<br>WATER SUPPLY<br><input checked="" type="checkbox"/> Domestic |             |            |  |   |   |      |   |    |        |    |    |      |    |     |                             |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |     |     |               |     |     |      |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |                                                                                                                                                                                                                                                                                                                          |  |

# Well Completion Log

|                               |     |                                                                                                                                         |                     |
|-------------------------------|-----|-----------------------------------------------------------------------------------------------------------------------------------------|---------------------|
|                               |     | MILLERS AVE.                                                                                                                            | Public              |
|                               |     |                                                                                                                                         | Irrigation          |
|                               |     |                                                                                                                                         | Industrial          |
|                               |     |                                                                                                                                         | "TEST WELL"         |
|                               |     | SOUTH                                                                                                                                   | CATHODIC PROTECTION |
|                               |     | Illustrate or Describe Distance of Well from Landmarks such as Roads, Buildings, Fences, Rivers, etc.<br>PLEASE BE ACCURATE & COMPLETE. | OTHER (Specify)     |
|                               |     | DRILLING METHOD Rotary FLUID Mud                                                                                                        |                     |
|                               |     | WATER LEVEL & YIELD OF COMPLETED WELL                                                                                                   |                     |
|                               |     | DEPTH OF STATIC WATER LEVEL (Ft.) & DATE MEASURED                                                                                       |                     |
|                               |     | ESTIMATED YIELD* (GPM) & TEST TYPE                                                                                                      |                     |
|                               |     | TEST LENGTH (Hrs.) TOTAL DRAWDOWN (Ft.)                                                                                                 |                     |
|                               |     | * May not be representative of a well's long-term yield.                                                                                |                     |
| TOTAL DEPTH OF BORING         | 320 | (Feet)                                                                                                                                  |                     |
| TOTAL DEPTH OF COMPLETED WELL | 320 | (Feet)                                                                                                                                  |                     |

| DEPTH<br>FROM SURFACE |    |     | BORE-<br>HOLE<br>DIA.<br>(Inches) | CASING(S) |                |           |  |                     |                                  | DEPTH<br>FROM SURFACE | ANNULAR MATERIAL              |                                 |      |     |     |    |     |                                    |
|-----------------------|----|-----|-----------------------------------|-----------|----------------|-----------|--|---------------------|----------------------------------|-----------------------|-------------------------------|---------------------------------|------|-----|-----|----|-----|------------------------------------|
|                       |    |     |                                   | TYPE (✓)  |                |           |  | MATERIAL /<br>GRADE | INTERNAL<br>DIAMETER<br>(Inches) |                       | GAUGE<br>OR WALL<br>THICKNESS | SLOT SIZE<br>IF ANY<br>(Inches) | TYPE |     |     |    |     |                                    |
| Ft.                   | to | Ft. | BLANK                             | SCREEN    | CON-<br>DUCTOR | FILL PIPE |  |                     |                                  |                       |                               |                                 |      |     | Ft. | to | Ft. | CE-<br>MENT<br>(≤)                 |
| 0                     |    | 200 | 9"                                | XX        |                |           |  | F-480               | 5"                               | $\frac{1}{4}$ "       |                               | 0                               |      | 25  | X   |    |     |                                    |
| 200                   |    | 260 | 9"                                |           | XX             |           |  | F-480               | 5"                               | $\frac{1}{4}$ "       | .032                          | 25                              |      | 340 |     |    |     | Pea Gravel                         |
| 260                   |    | 300 | 9"                                | XX        |                |           |  | F-480               | 5"                               | $\frac{1}{4}$ "       |                               |                                 |      |     |     |    |     | $\frac{1"}{4} \times \frac{1"}{2}$ |
| 300                   |    | 320 | 9"                                |           | XX             |           |  | F-480               | 5"                               | $\frac{1}{4}$ "       | .032                          |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |
|                       |    |     |                                   |           |                |           |  |                     |                                  |                       |                               |                                 |      |     |     |    |     |                                    |

# E-Logs will be a plus

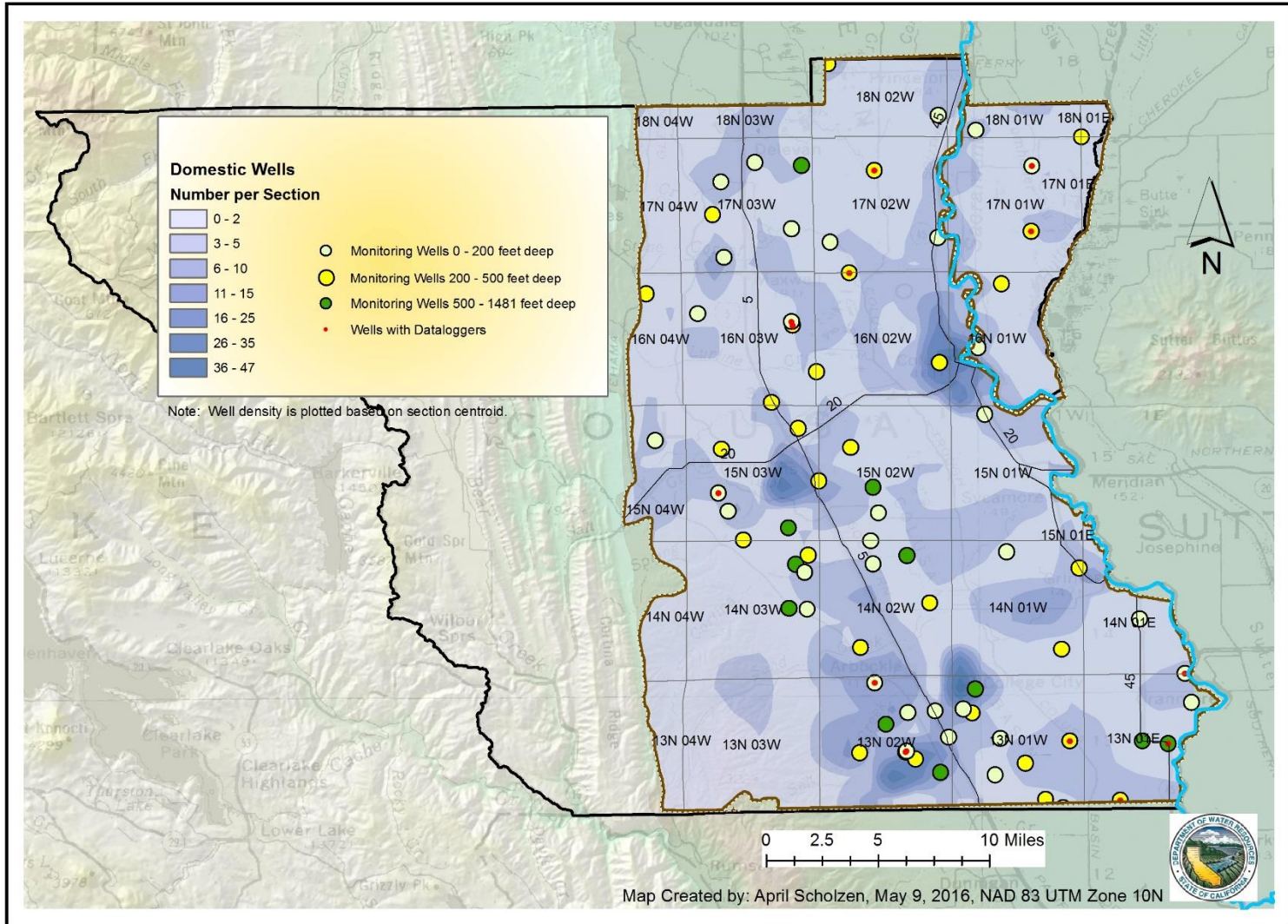


# So you want to offer your well to be monitored

- General Checklist:
  - Well Construction Information
    - i.e. Driller's Well Logs, E-Logs
  - Access to well at least 3 times a year
  - Fills a gap in current monitoring needs
  - Fills a special project need,
    - i.e. transfers, pump tests, etc.

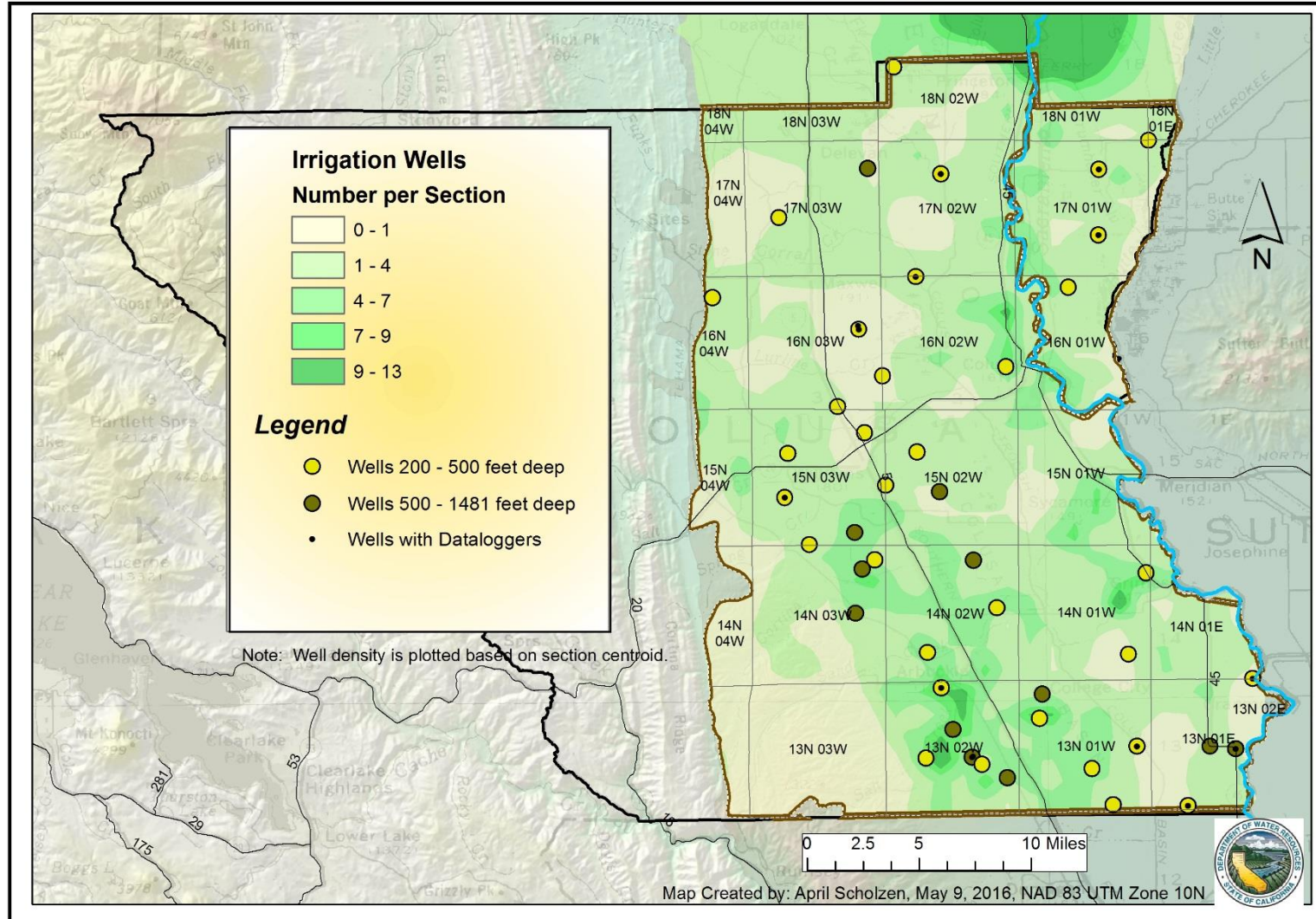
# Data gap - Domestic

## COLUSA COUNTY DOMESTIC WELL DENSITY COMPARED TO CURRENT MONITORING GRID



# Data gap - Irrigation

## COLUSA COUNTY IRRIGATION WELL DENSITY COMPARED TO CURRENT MONITORING GRID



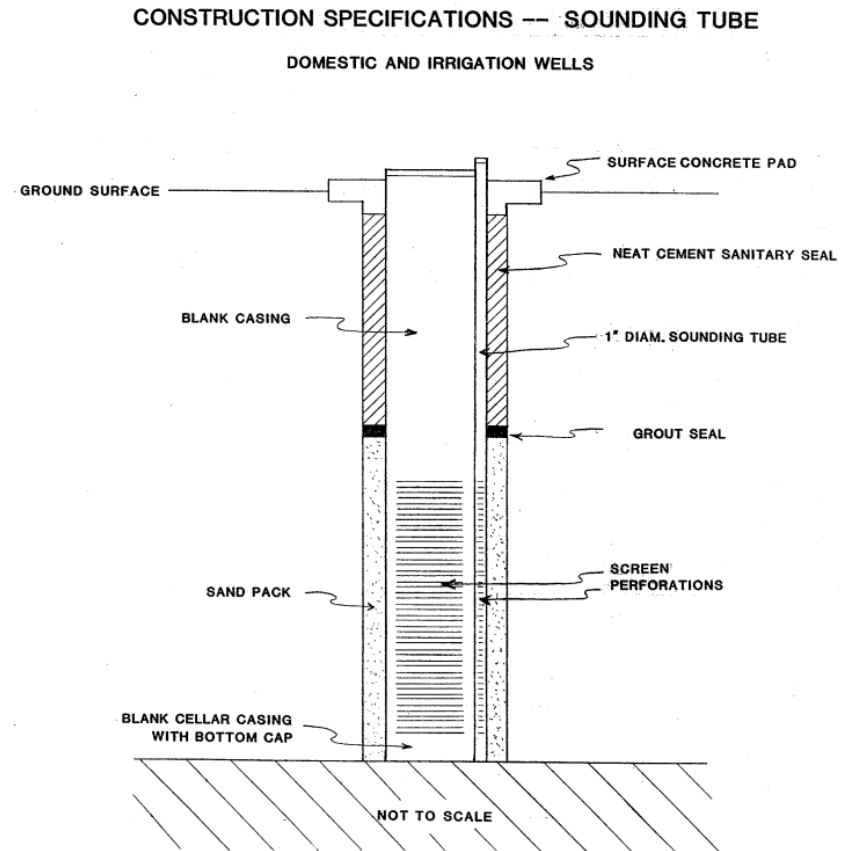
# What makes a good monitoring well?

- Limited cross-aquifer design
- Clear access to well
  - Safe
  - Clear of debris, pests, and vegetation
- Access to casing
  - Minimum  $\frac{3}{4}$ "
  - No special tools
- 
- 
- 



# What makes a good monitoring well?

- Limited cross-aquifer design
- Clear access to well
  - Safe
  - Clear of debris, pests, and vegetation
- Access to casing
  - Minimum  $\frac{3}{4}$ "
  - No special tools
- Use
  - Limited or no pumping
    - Nearby too



# What are the options for real time, continuous GWL data loggers?

- In-Situ, Inc.
  - Level TROLL 700\*
  - Water level, pressure, and temp
- Solinst
  - Levellogger
  - Water level, pressure, and temp
- Other brands too.
- Type of readers
- Device: Estimates range \$600 – \$1,300



\* DWR currently uses Level TROLL 700 devices

# What are the options for real time, continuous GWL data loggers?

## Considerations when installing GWL readers

- Costs
  - Device, Reader Cables, etc.
- Depth to water, range of change
- Who is going to monitor?
- Functionality, accuracy, compatibility of the device
- Data storage and management
- Are the reasons right? Data gaps?

# Thank-you! Questions?



Photo Credit: Sue Graue

<http://water.ca.gov/groundwater/>