



WATER EDUCATION FOUNDATION
NORTHERN CALIFORNIA TOUR

Groundwater Conditions in the Northern Sacramento Valley

October 17, 2013



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Overview

- Groundwater Aquifer Review
- Geology and Hydrogeology
- Water Use – Northern Sacramento Valley
- Groundwater Level Monitoring
- Current Hydrogeologic Conditions



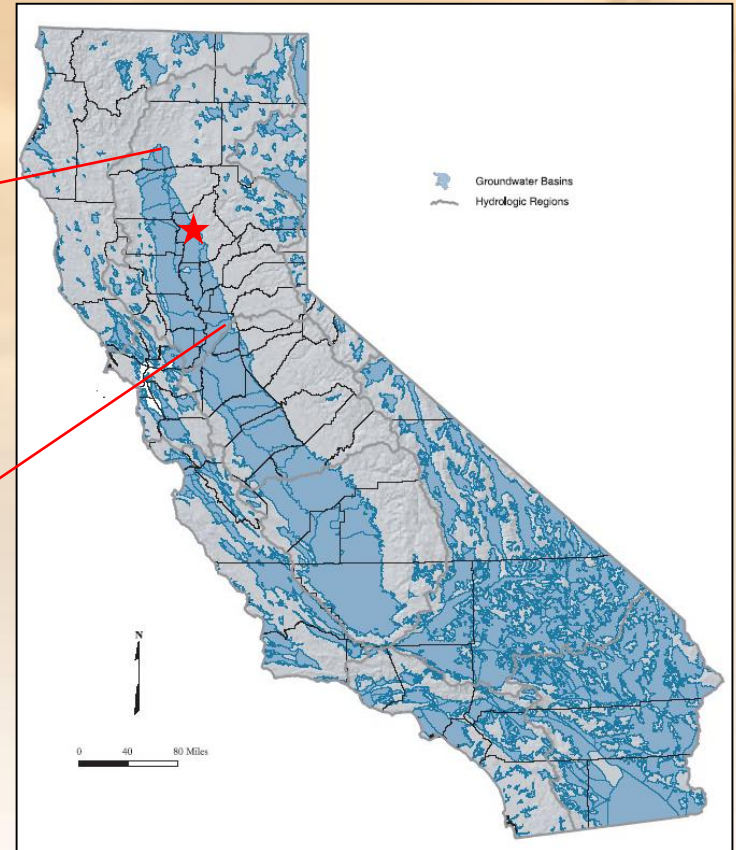
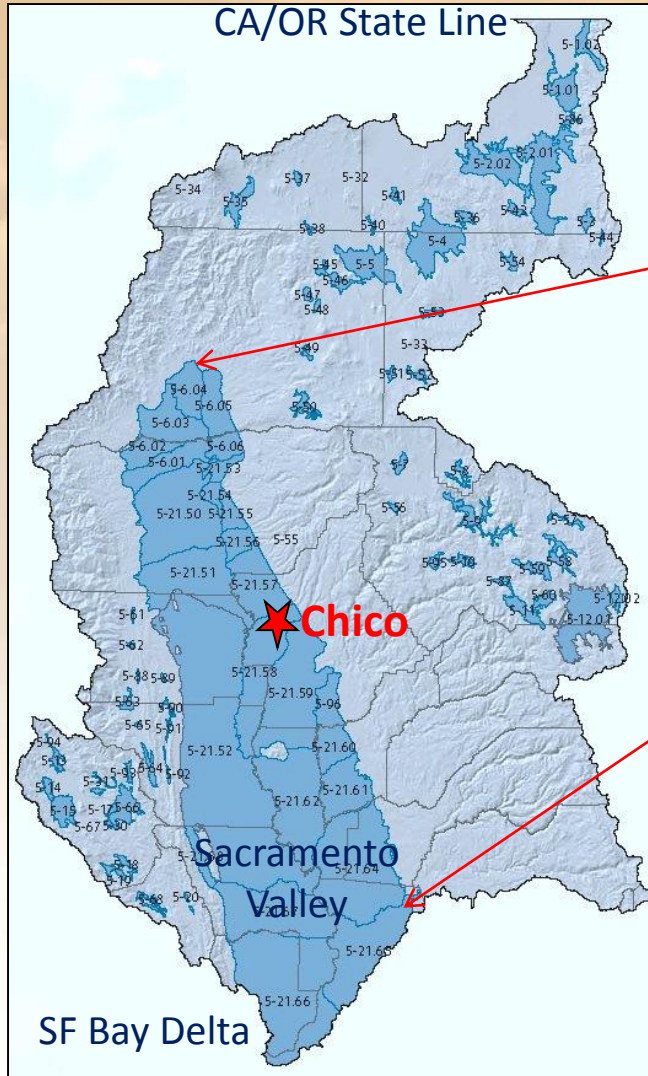
Groundwater Aquifer Review



Sacramento River Hydrologic Region

Groundwater Basins

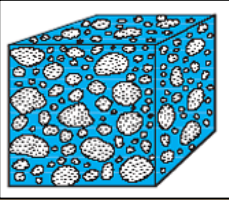
Identified in DWR's Bulletin 118, Update 2003



- 515 alluvial basins and subbasins
- Alluvial Basin Aquifers (blue)
- Fractured Rock Aquifers (lavender-grey)

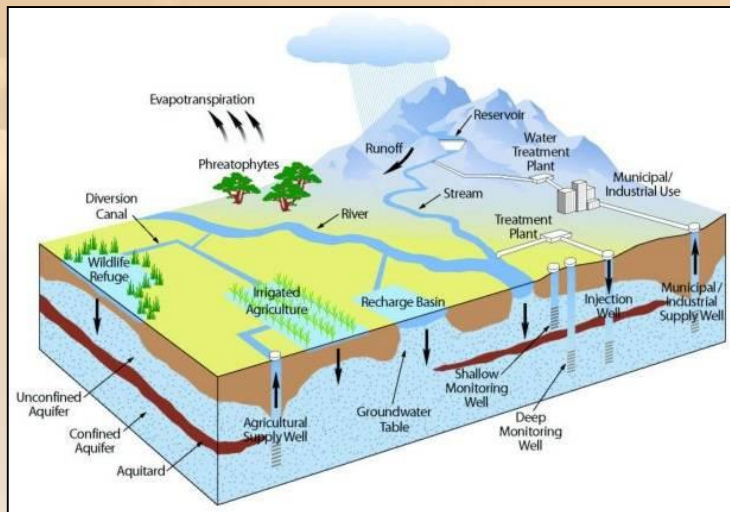


Alluvial Aquifers

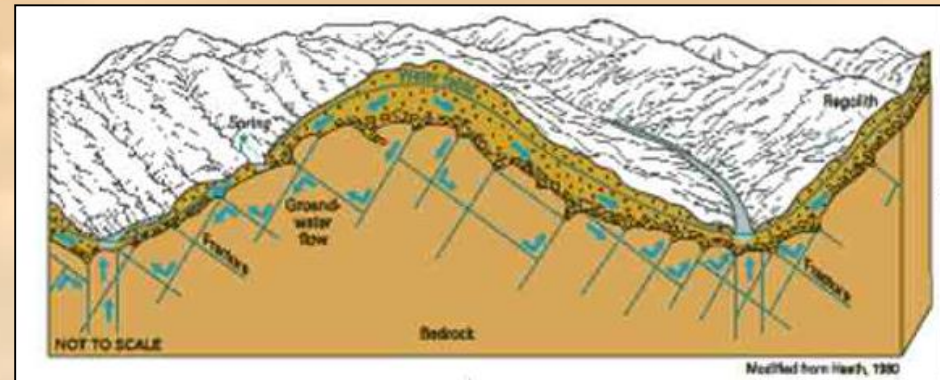


Primary Porosity

Water stored between individual grains of sand & gravel

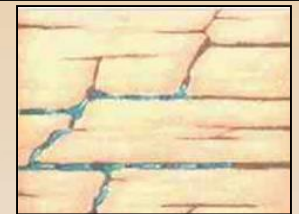


Fractured Rock Aquifers



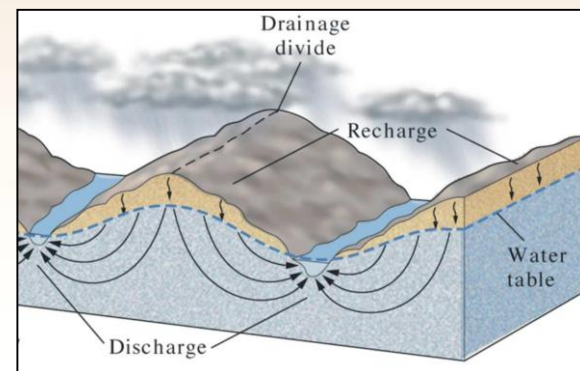
Secondary Porosity

Water stored within the rock fractures and cracks



- **GW Movement is Downhill:**
 - High to Low Elevation
 - Recharge Area to Discharge Area
- **GW movement is typically very slow**
 - clay, silt, fine sand
 - 120 feet/year to 1,000 feet/year
- **GW movement can be rapid**
 - sandy or gravelly aquifer or fractured rock
 - 180 feet/year to 3 miles/year

Groundwater Movement



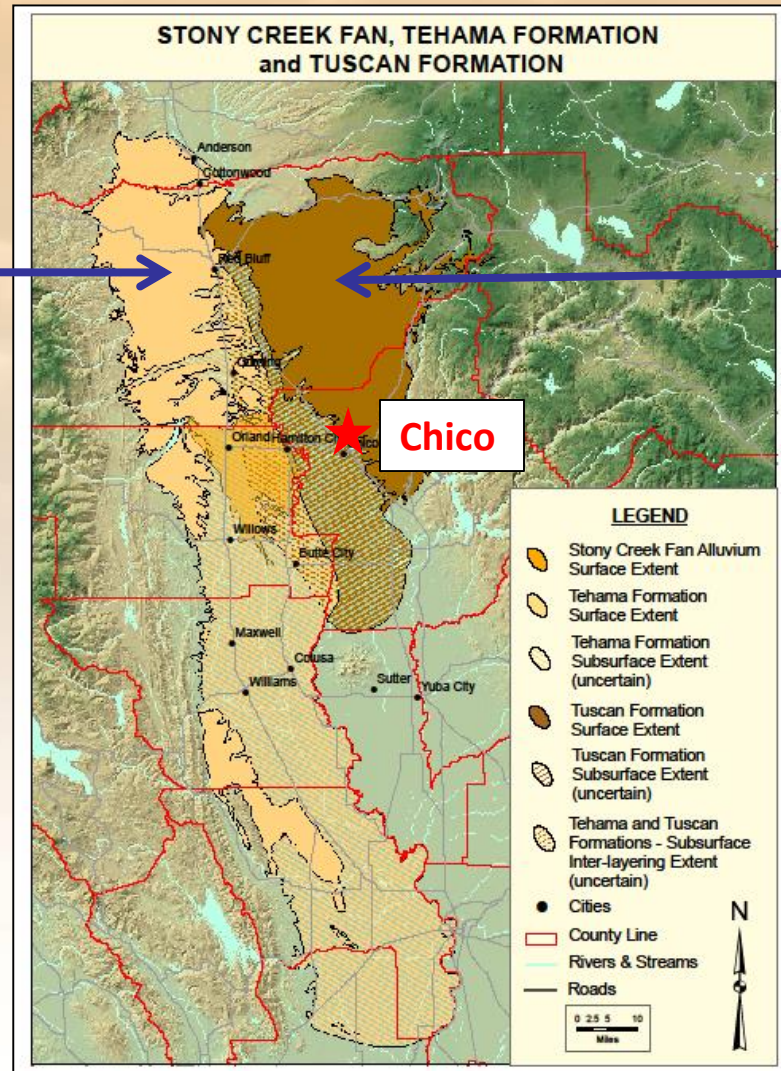
Geology and Hydrogeology in the Northern Sacramento Valley



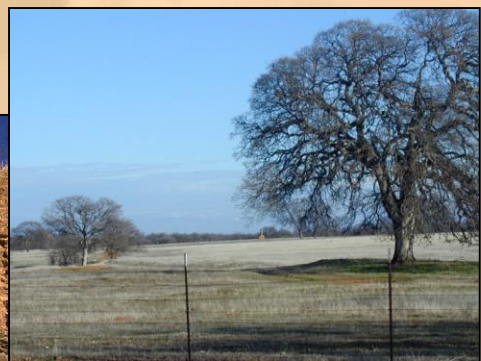
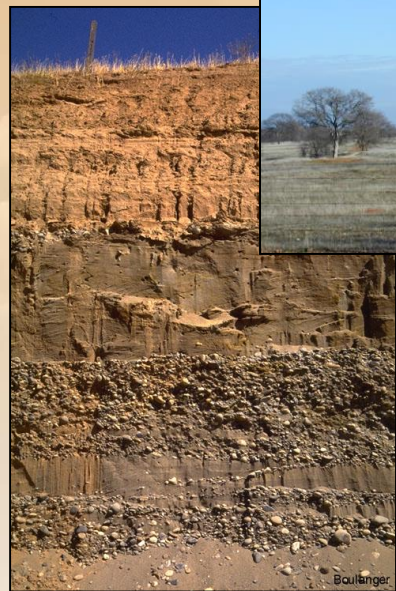
Major Water-producing Aquifers

Tehama
Formation

Tuscan
Formation



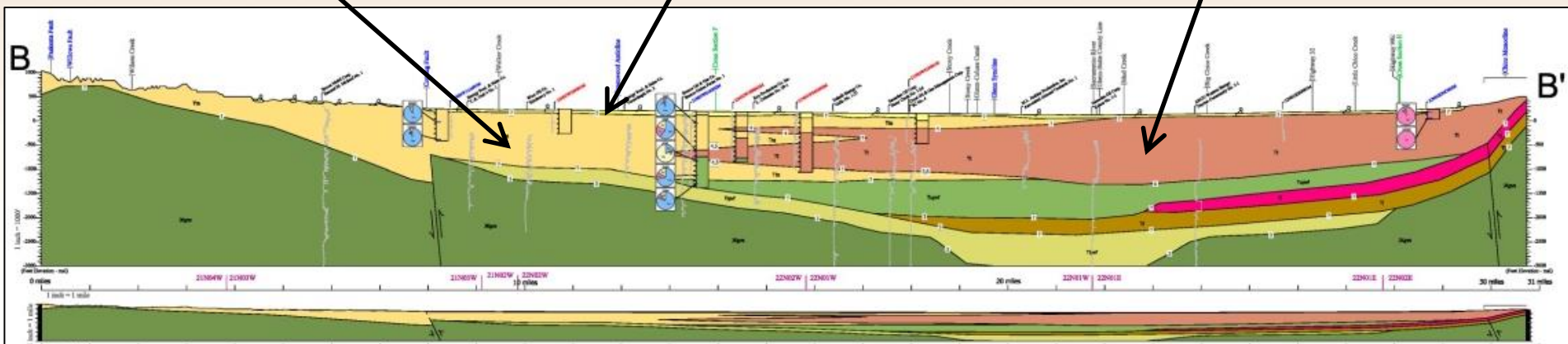
Northern Sacramento Valley Alluvial Aquifer Systems



- Shallow Aquifers:
- Modesto Formation
 - Riverbank Formation
 - Shallow Alluvium
 - Basin Deposits

Tehama Formation

Tuscan Formation

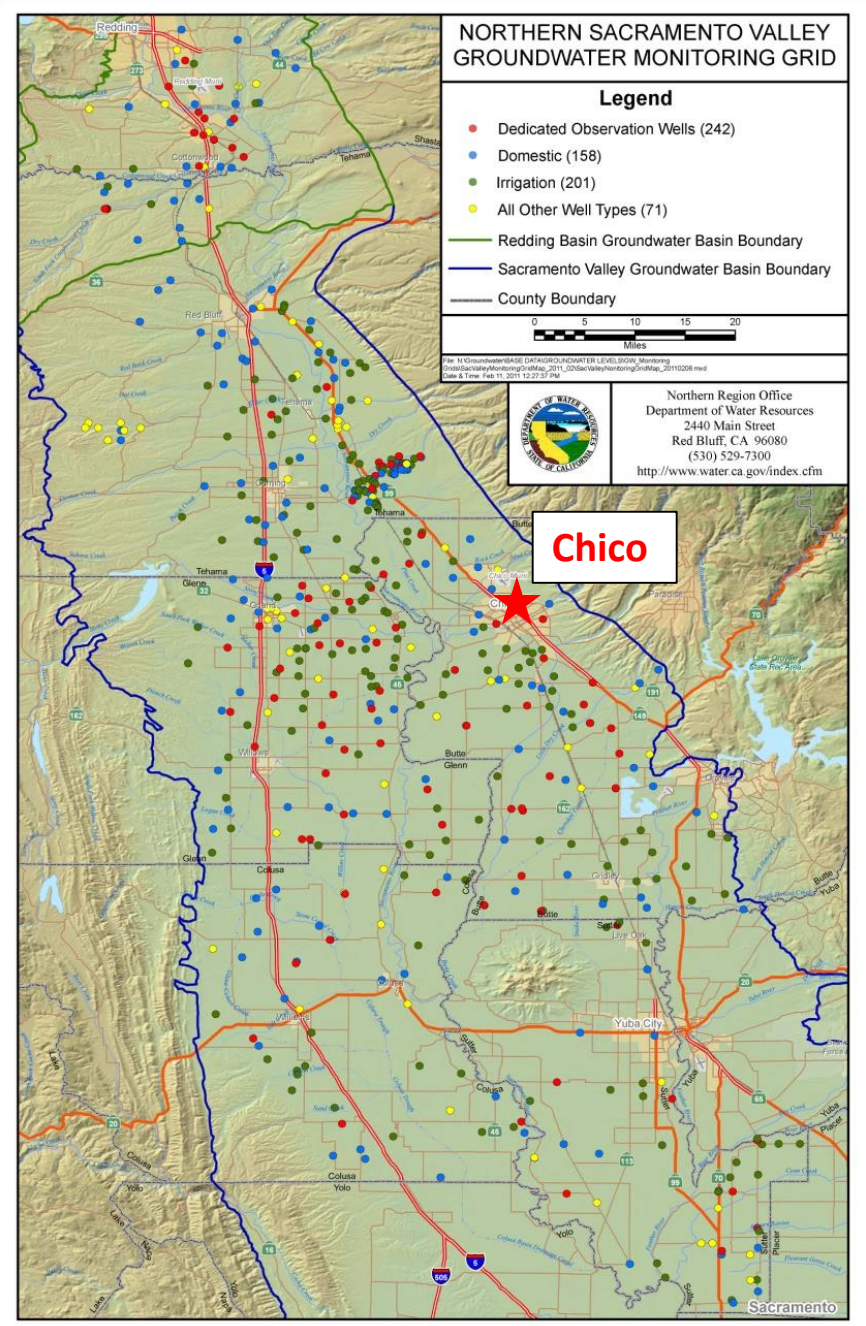


Groundwater Level Monitoring



Groundwater Measurement Grid

Sacramento Valley and Redding Basin



- +/- 700 wells are measured in the Spring, Summer, and Fall in the Northern Sacramento Valley
- About 200 of the 700 wells are dedicated observation wells that have data loggers which record hourly measurements



Groundwater Measurement Grid

All Basins



- +/- 1,300 wells measured in the Spring and Fall in all of Northern Region

Groundwater Level Data

Water Data Library Transitions to CASGEM

DEPARTMENT OF WATER RESOURCES

Home Newsroom Flood & Safety Planning State Water Project Funding Environment Supply & Use Data

CDEC CIMIS WDL IEP IWRIS All Data Topics...

Water Data Library Home
 Groundwater Level Data
 Water Quality Data
 Continuous Data
 Contact Information

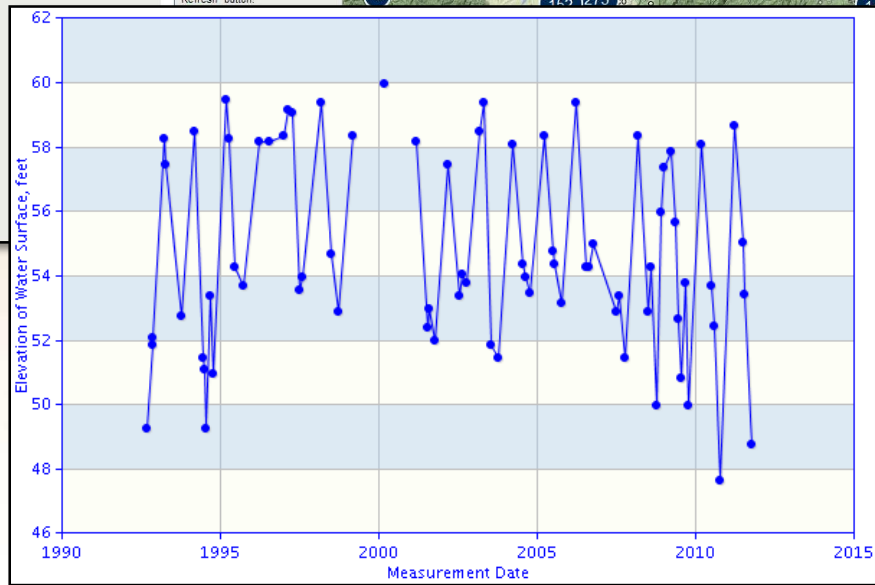
Water Data Library

Use the map below to locate monitoring stations. You can find an area of interest if you zoom and pan the map. Quickly find an area searching for named features on a map such as the name of a city, park, landmark, lake, water feature, or zip code within California. Once at the area of interest, select the desired Site Type and click the "Refresh Map" button to show monitoring stations in the area. Additional searches by data type are possible by clicking the links on the left. For help on these and other ways to find your data [click here](#).

WDL STATION MAP

Location Search
 To find monitoring stations for a specific area, enter the placename or zip code into the text box below then, click the "Search" button.

Site Type
 Select the desired site type using the checkboxes, then click the "Refresh" button.



CASGEM Online System

Welcome: Deborah Spangler for Department of Water Resources as Reviewer

Home Notifications Manage Wells View Map Reports Public View Sign Out

Welcome to the California Statewide Groundwater Elevation Monitoring (CASGEM) Online System

The CASGEM Online System now allows you to:

- Register as an "Administrator" for a Monitoring Entity to maintain the Monitoring Entity's profile and create and maintain user accounts for yourself and collaborating agencies.
- Submit a Notification that your organization intends to assume the role of Monitoring Entity for a California groundwater basin, sub-basin, or portion of a sub-basin, including:
 - Organization details and contact information.

Well Search Results

Local Well Number	State Well Number	CASGEM Station ID	Monitoring Entity	Basin Name/Num	Well Use	CASGEM Well	Total Well
BMO 17N01E17F003M	17N01E17F003M	393257H121883	Department of V	East Butte-5-21	Observation	Yes	556
BMO 17N01E17F003M	17N01E17F003M	393257H121883	Butte County De	East Butte-5-21	Observation	Yes	556

Hydrograph

CASGEM Well Information Summary

Groundwater Elevation, NAVD88 (ft)

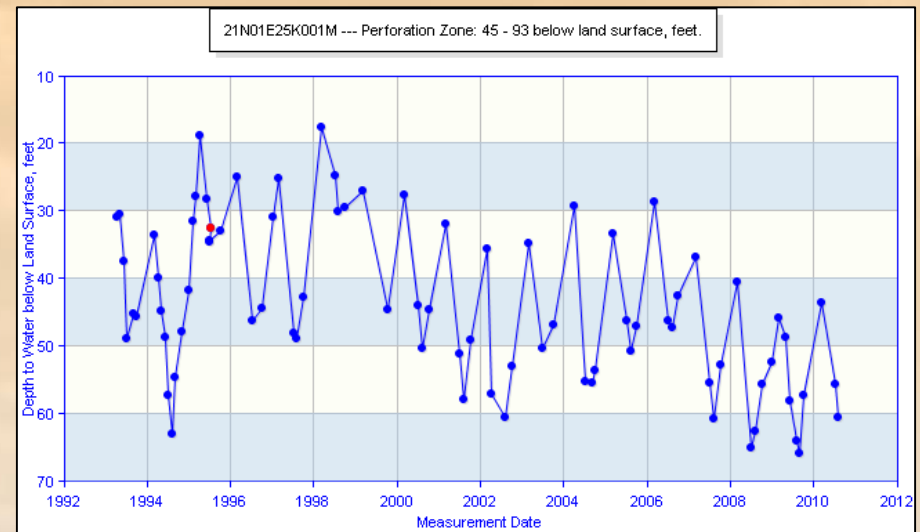
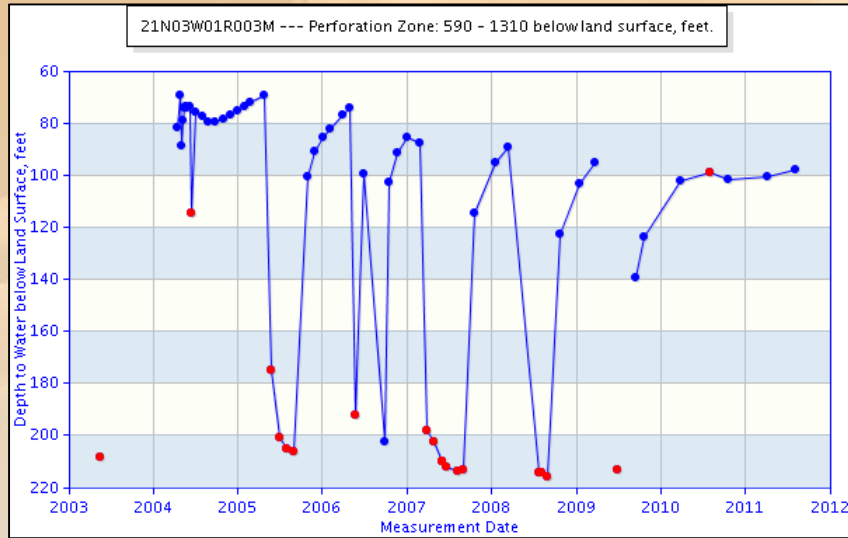
Year

Ground Surface Elevation Questionable Measurement 393257H121883W063

Groundwater Hydrographs

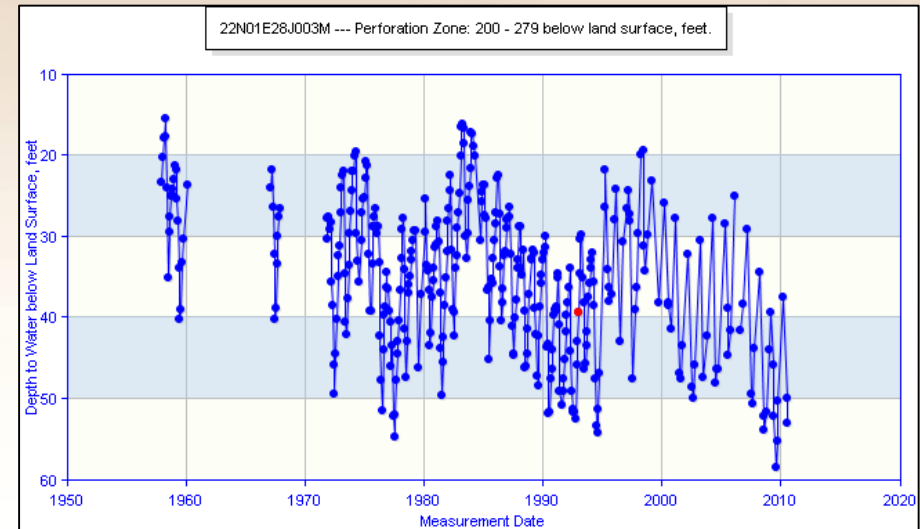
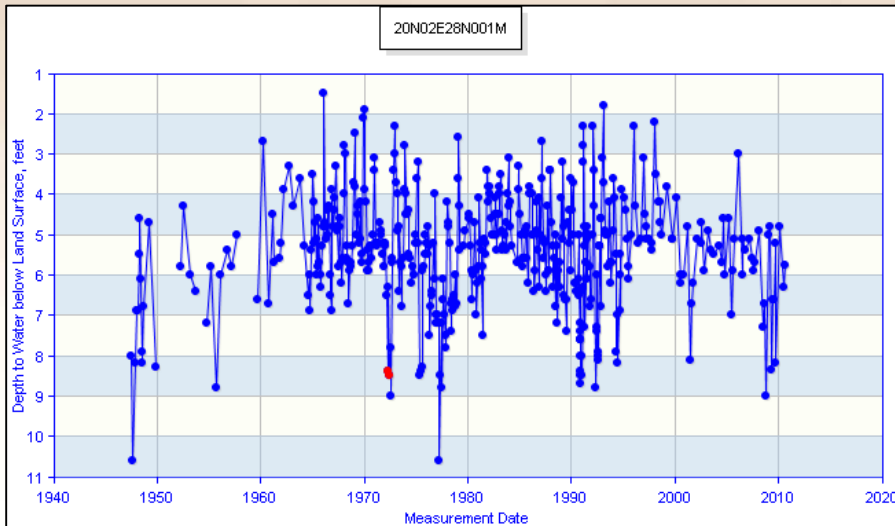
Irrigation Well

Domestic Well



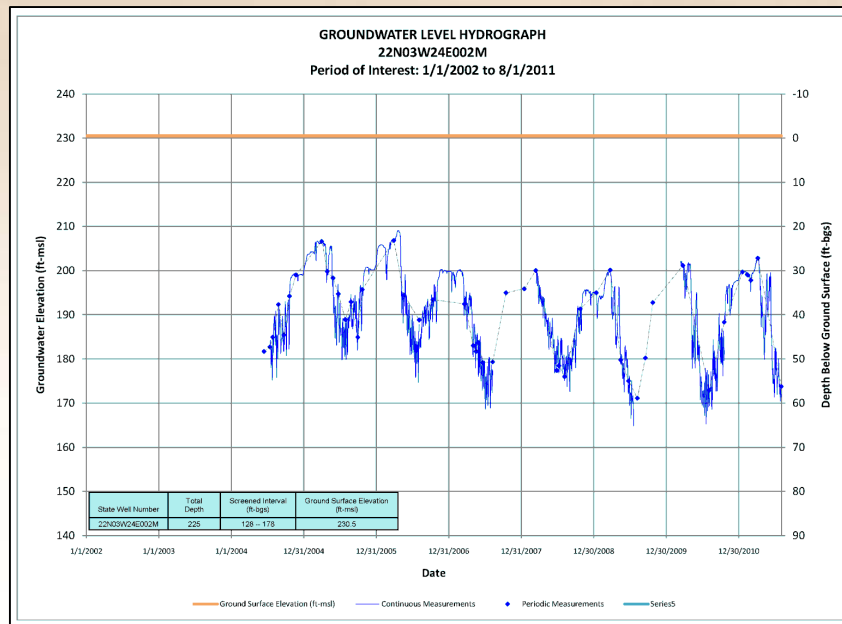
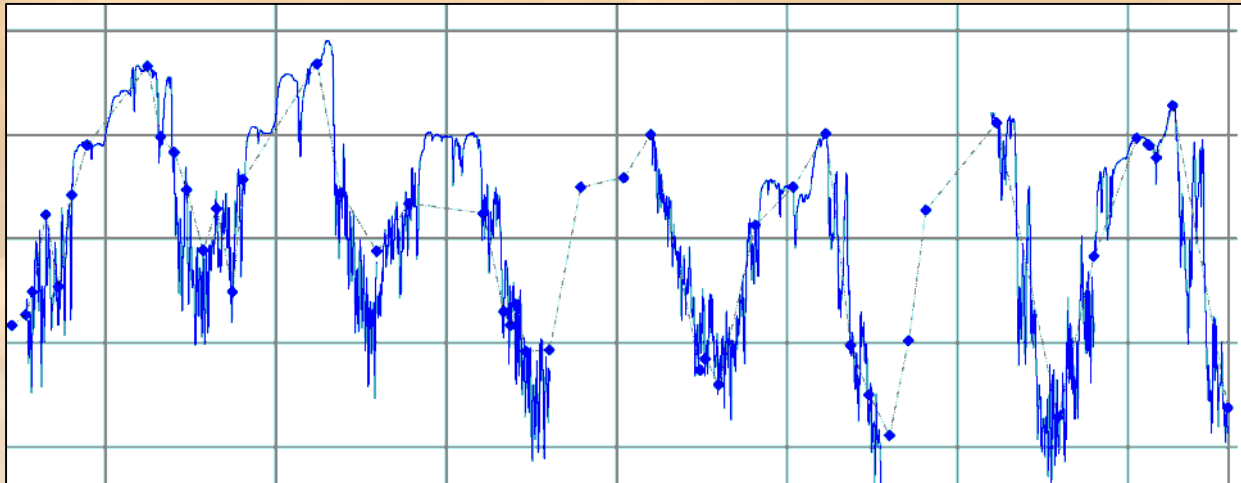
Irrigation Well

Observation Well



Observation Wells

Continuous Datalogger and Hand Measurements

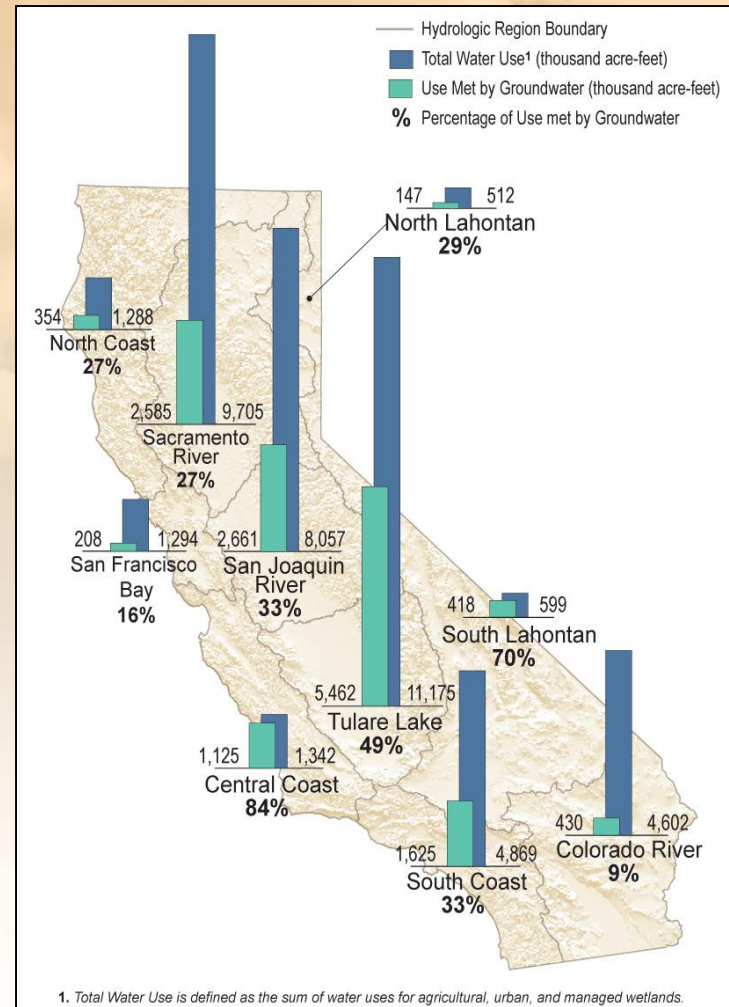


Water Use in the Northern Sacramento Valley



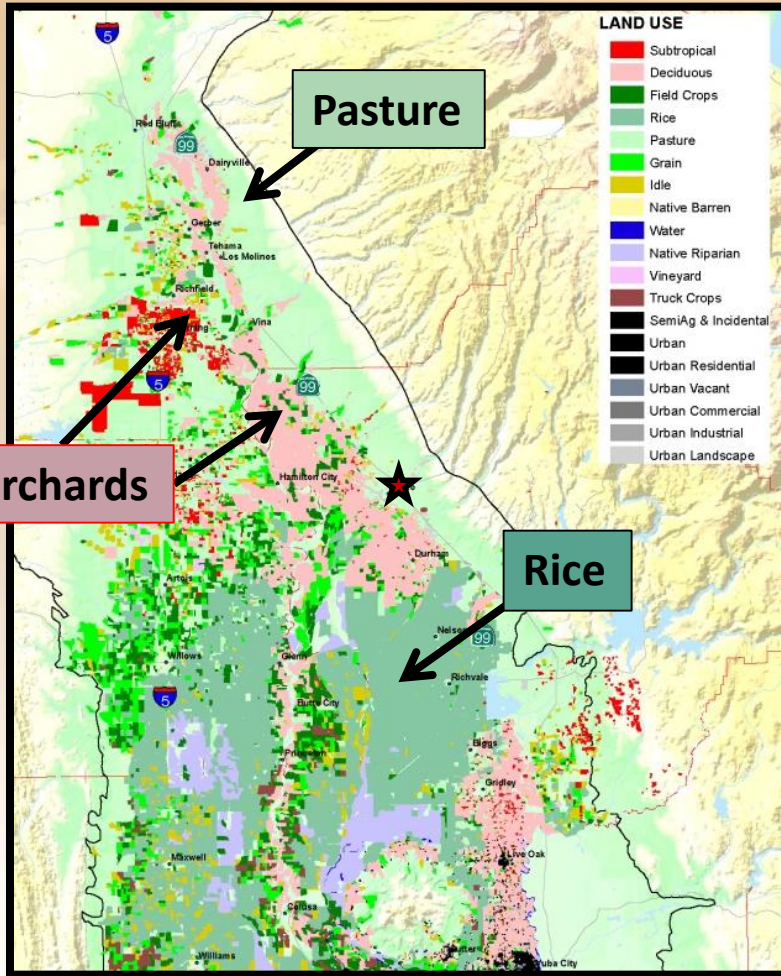
Groundwater Use

- 30% of total water use is provided by GW, on average
- Up to 40% or more provided by GW in dry years
- 43% of Californians obtain drinking water from GW
- California single largest user of GW in the nation
- Estimated 14.5 MAF of GW extracted in CA in 1995, represents nearly 20% of all GW extracted in the U.S.
- Some cities and coastal basins are entirely dependent on groundwater
- 1995 population - 32 million
2020 population - 46 million

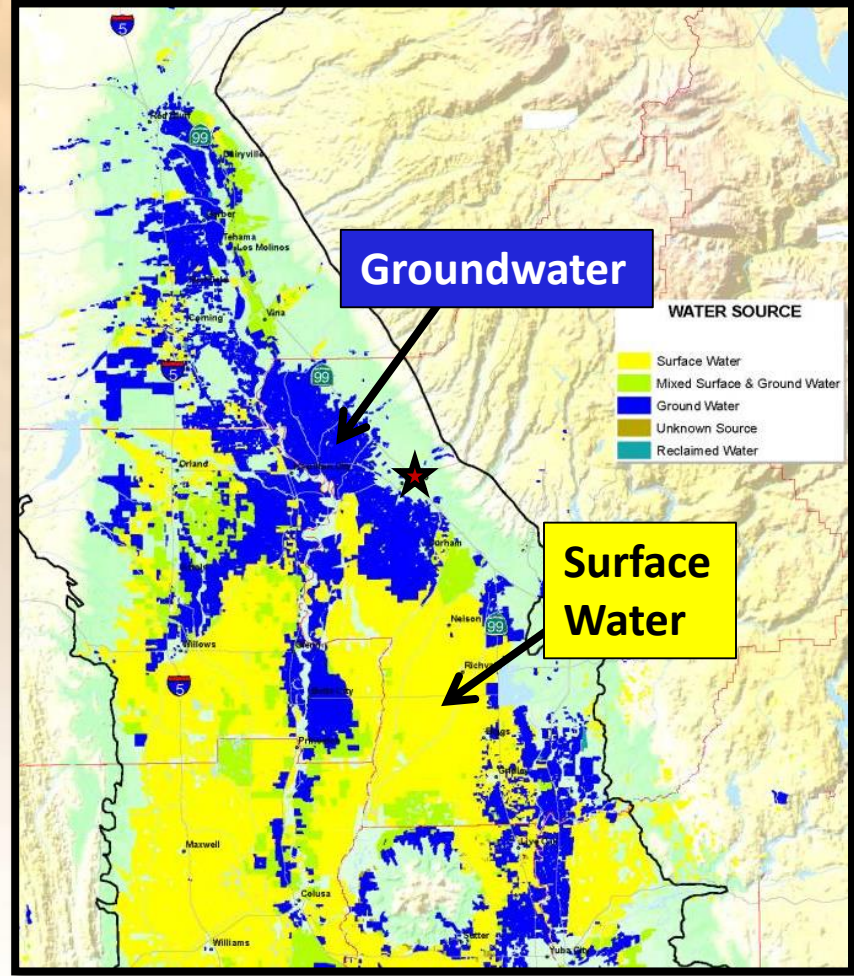


Sacramento Valley Water Source and Land Use

Land Use



Water Source

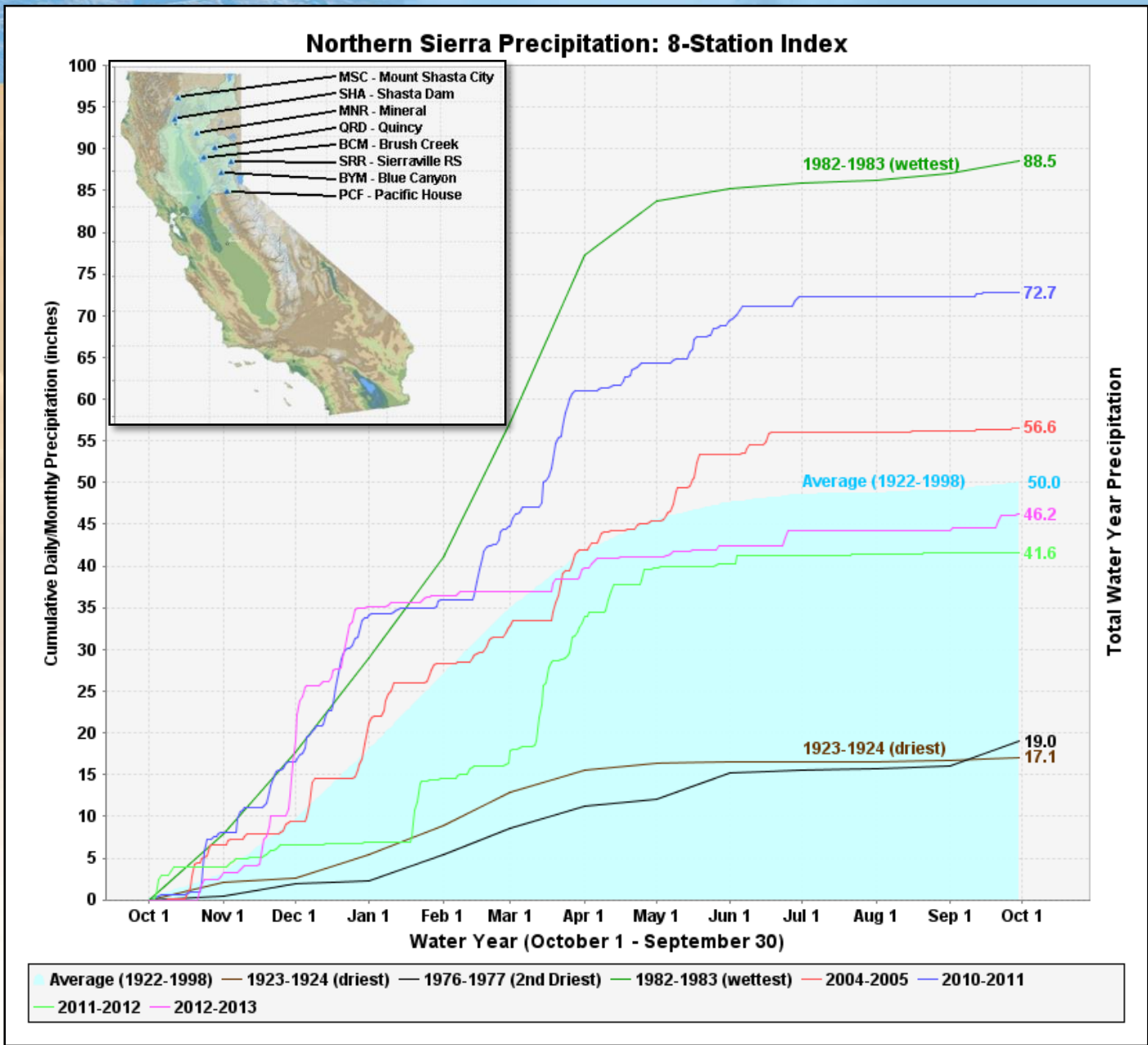


Data Source: DWR ND Land & Water Use Section



Hydrogeologic Conditions

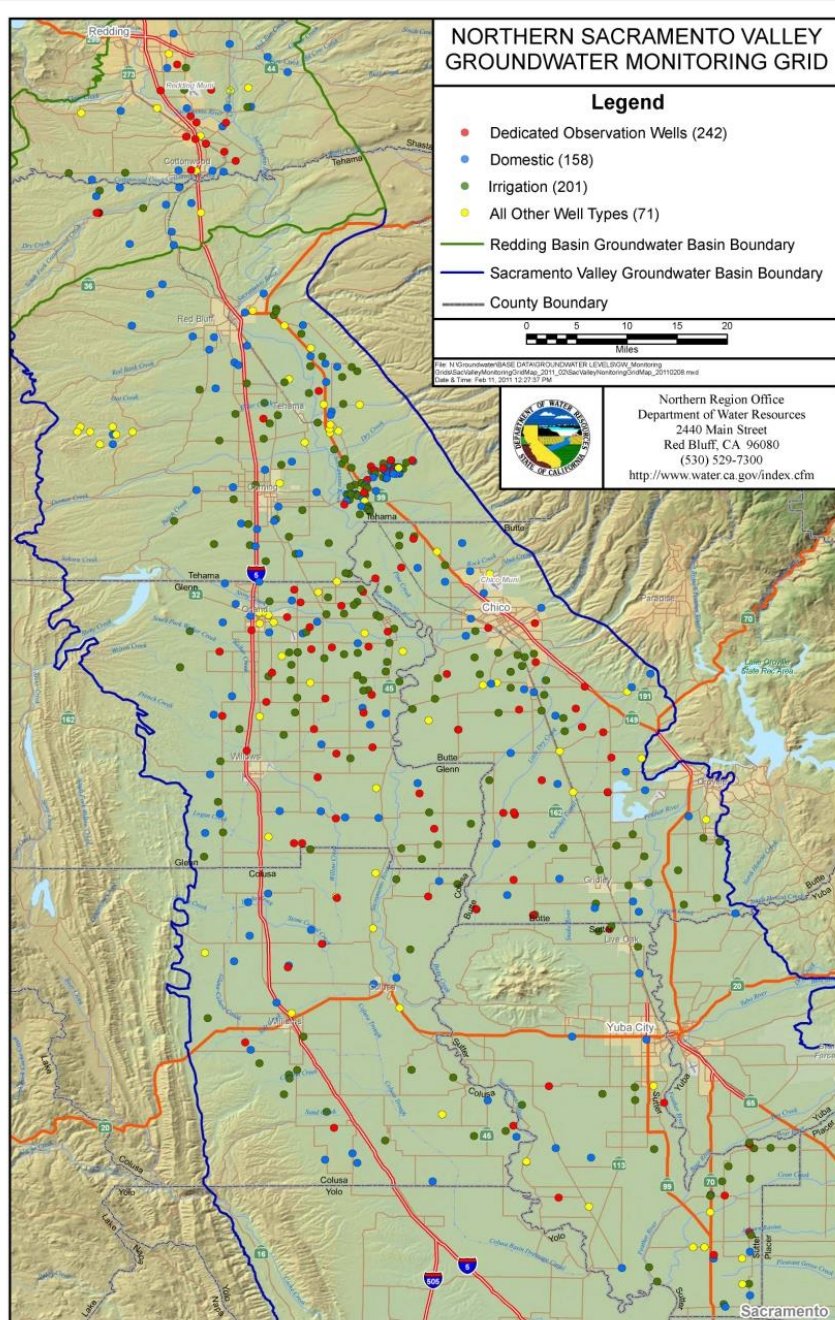




Source: DWR's California Data Exchange Center <http://cdec.water.ca.gov>



GROUNDWATER LEVEL STATUS REPORT



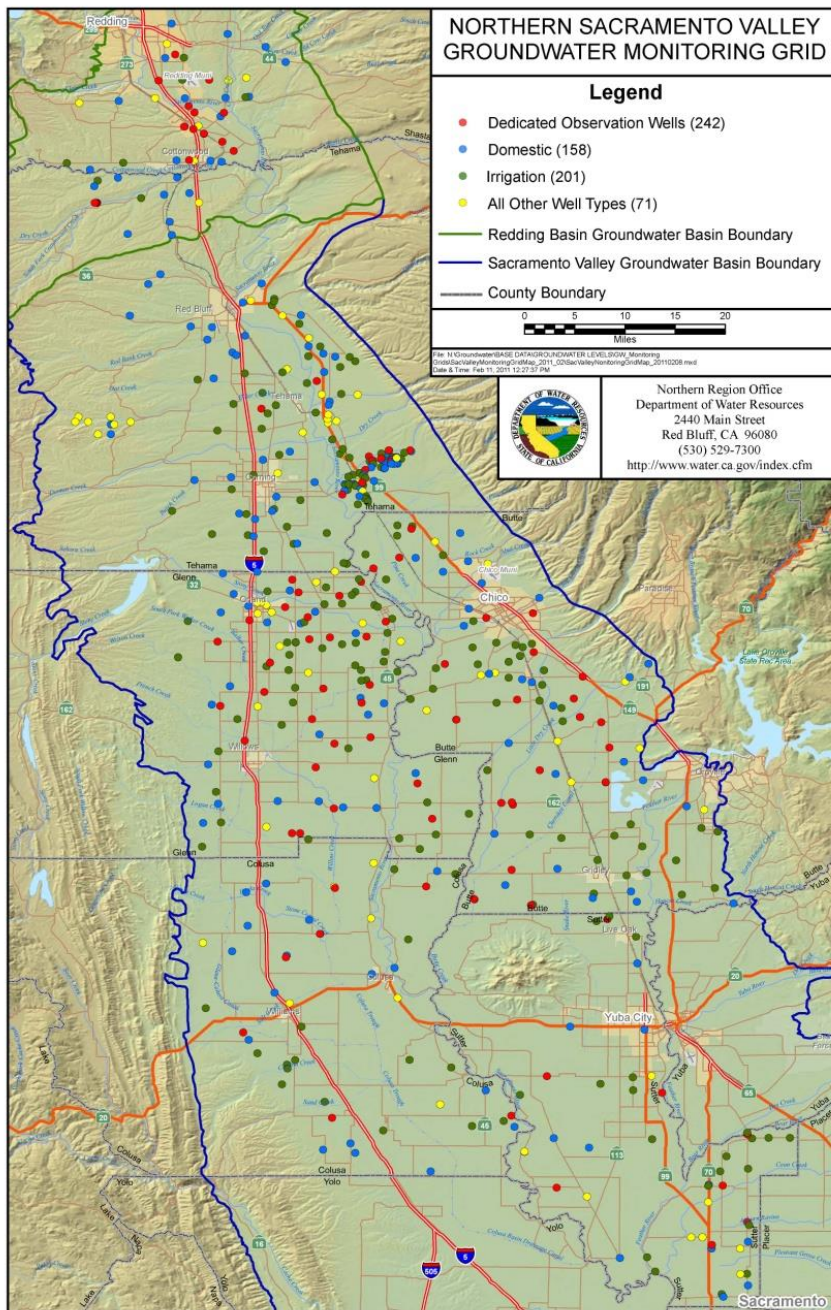
SPRING 2004 - SPRING 2012 GROUNDWATER LEVEL CHANGE

Sacramento Valley and Redding Groundwater Basins

- 428 wells w/ 2004 and 2012 Spring Measurements
- 374 wells were lower in 2012
- 54 wells were higher in 2012
- Largest decline = -70.6 feet
- Largest increase = +18.0 feet
- Average change = -6.6 feet



GROUNDWATER LEVEL STATUS REPORT



SPRING 2011 - SPRING 2012 GROUNDWATER LEVEL CHANGE

Sacramento Valley and Redding Groundwater Basins

- 585 wells w/ 2011 and 2012 Spring Measurements
- 536 wells were lower in 2012
- 49 wells were higher in 2012
- Largest decline = -39.6 feet
- Largest increase = +15.3 feet
- Average change = -3.1 feet



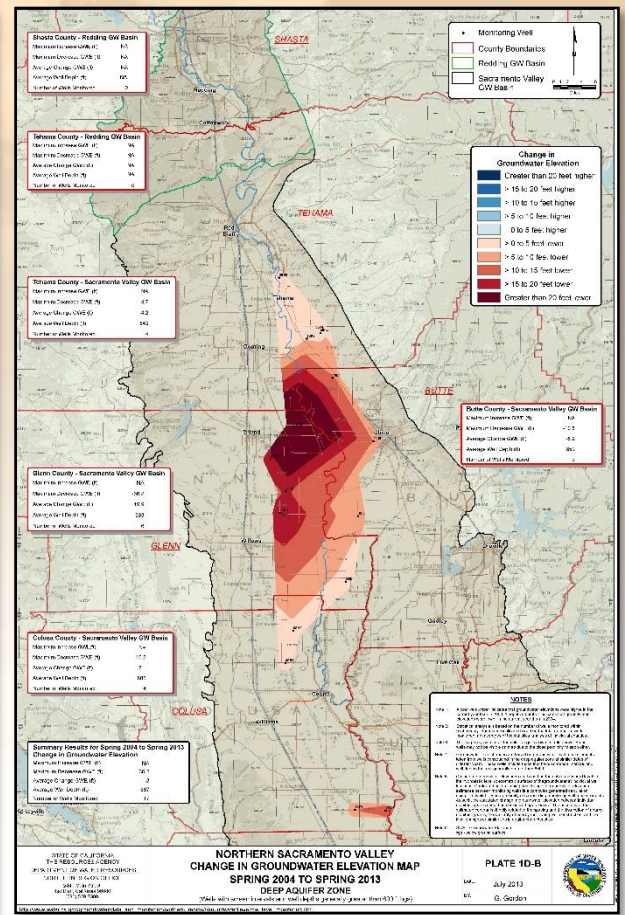
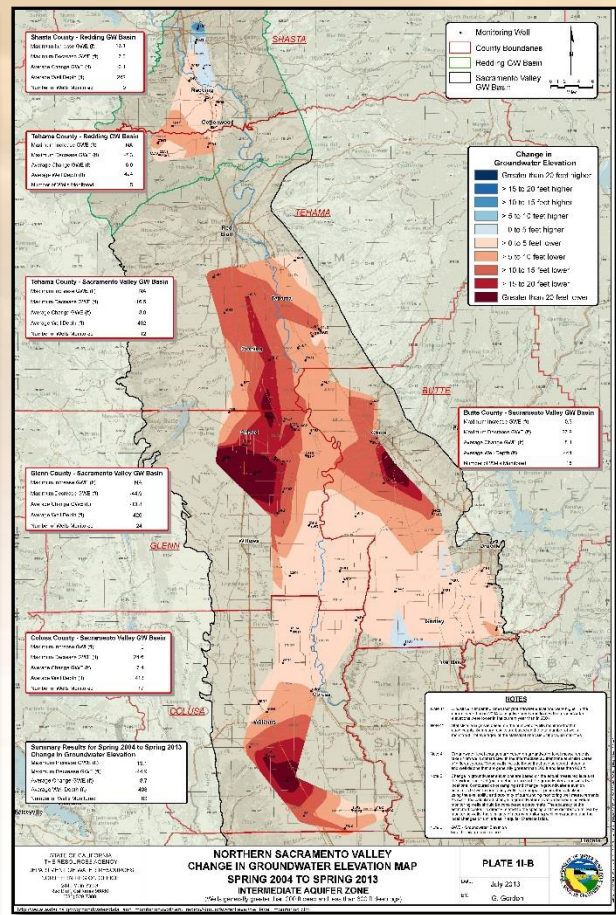
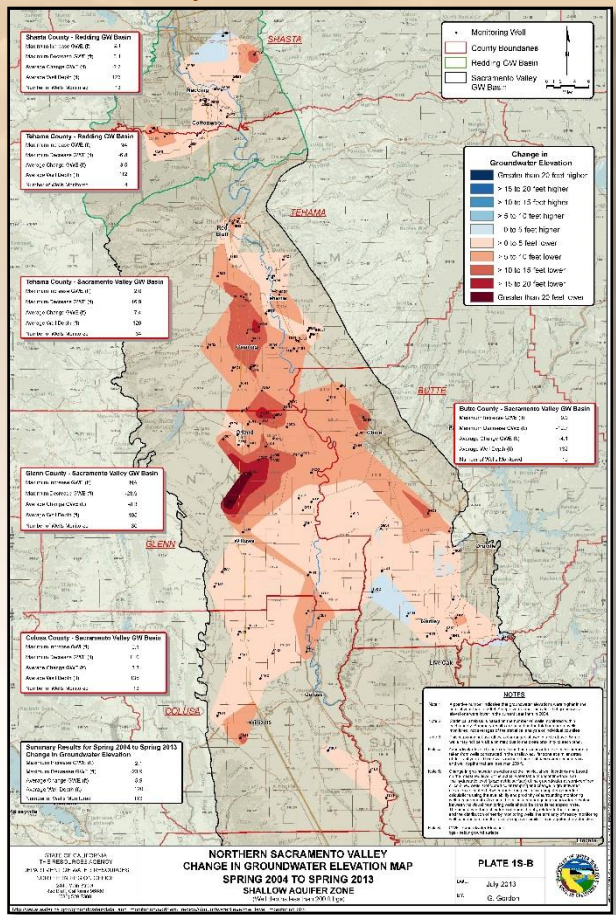
Groundwater Level Change Maps

Spring 2004 to Spring 2013

Well Depths Less than 200 ft

Well Depths: 200 to 600 ft

Well Depths: Greater than 600 ft

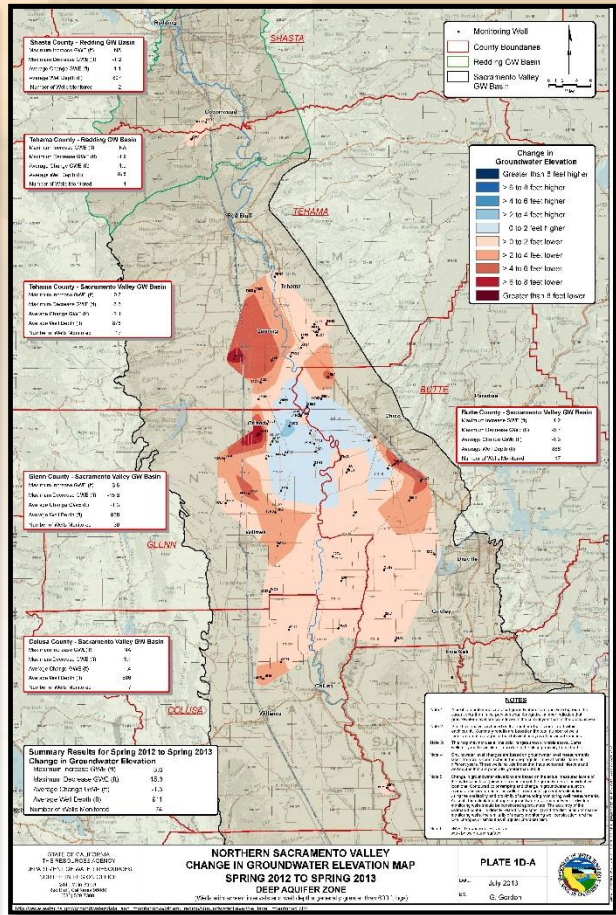
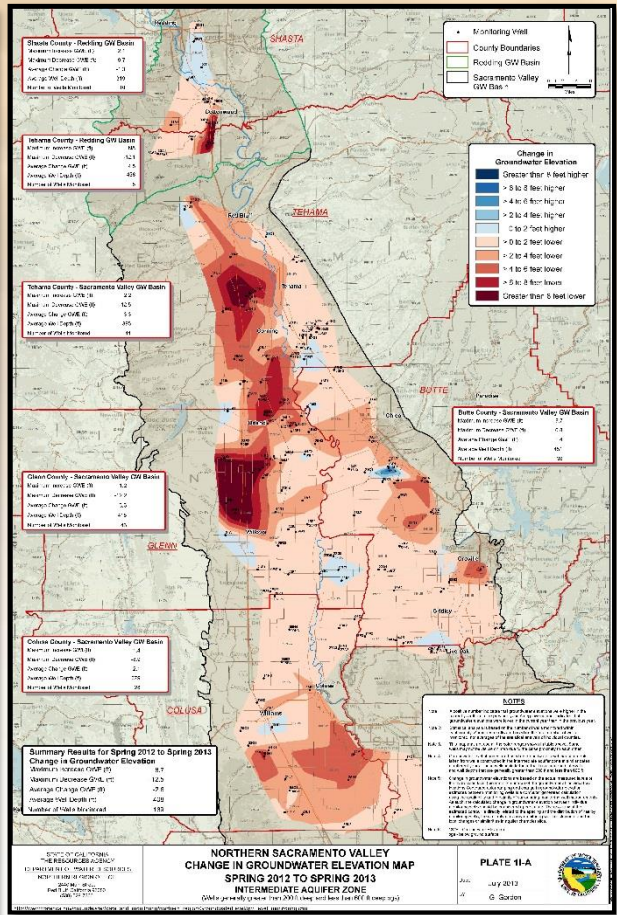
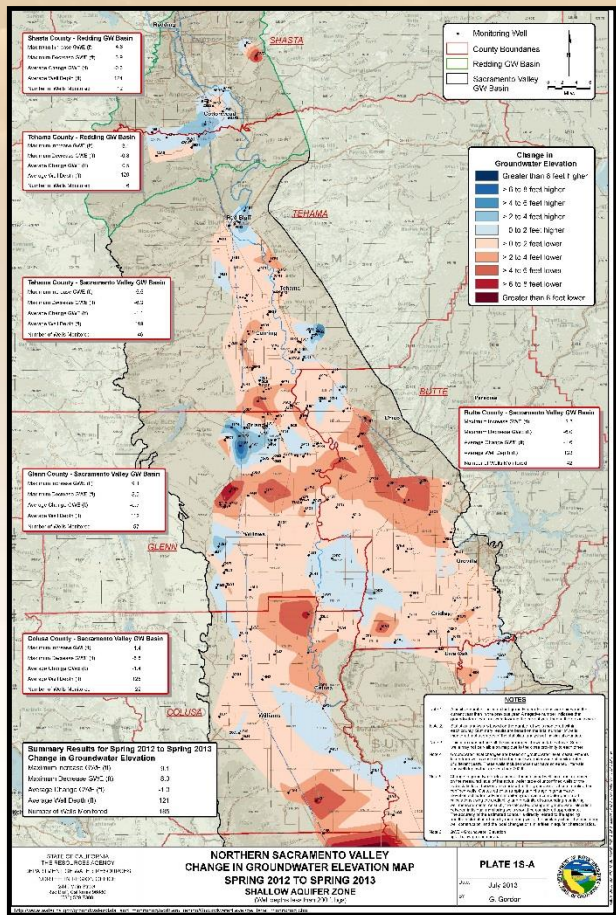


Groundwater Level Change Maps Spring 2012 to Spring 2013

Well Depths Less than 200 ft

Well Depths: 200 to 600 ft

Well Depths: Greater than 600 ft



GROUNDWATER LEVEL STATUS REPORT

SUMMARY OF GROUNDWATER LEVELS Sacramento Valley and Redding Groundwater Basins (All Well Depths)

- Since 2004 the trend had been generally downward as a result of precipitation patterns and some use changes.
- Average decline of approximately 6.5 feet between 2004 and 2012.
- The strong precipitation year 2011 temporarily stopped the declining trend.
- Low precipitation year 2012 gave back the modest gains of 2011 and reinstated the declining trend.



**DEPARTMENT OF
WATER RESOURCES**
Northern Region Office



Thank you

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Groundwater Level Change Maps:

http://www.water.ca.gov/groundwater/data_and_monitoring/northern_region/GroundwaterLevel/gw_level_monitoring.cfm

