

## **BASIN MANAGEMENT OBJECTIVES CHICO URBAN AREA**

**Butte County Water Advisory Committee Member – Vacant**

### **Contact Information**

Phone Number:

Email Address:

### **Description of the Chico Urban Area Sub-Inventory Unit –**

The Chico Sub-Inventory Unit (SIU) covers an area of about 15,400 acres in the Greater Chico urban area and is split between the Vina and West Butte inventory units. The SIU boundary corresponds roughly to the municipal water service area for the City of Chico, which is operated by the California Water Service Company. The company supplies groundwater to the Chico area through the operation of about 66 groundwater wells. There are a number of private wells in the SIU that are utilized for domestic and irrigation purposes.

### **Management Objective –**

Basin Management Objectives for the Chico Urban Area reflect groundwater levels adequate to sustain municipal, agricultural and domestic use and the quality of streams and groundwater dependent vegetation. These groundwater levels reflect the natural seasonality of the groundwater systems.

Basin Management Objectives for the Chico Urban Area is based on water quality measurements (temperature, pH, and electrical conductivity,) that represent water quality acceptable for human consumption and agricultural purposes related to saline intrusion.

Basin Management Objectives for the Chico Urban Area reflect measurements that do not demonstrate inelastic land subsidence.

### **Geologic Formations Identified In Sub-Inventory Unit –**

Geologic formations in the Chico Urban Area SIU, from youngest (shallowest) to oldest (deepest), include:

- Basin Deposits
- Modesto Formation
- Tuscan Unit C (Upper Tuscan)
- Tuscan Unit B (Lower Tuscan)

**Fresh Water-bearing Units.** In the Sacramento Valley Region of Butte County, fresh groundwater-bearing units include, from youngest (shallowest) to oldest (deepest), the Modesto, Riverbank, Laguna, Tehama and Tuscan Formations. Those included in the Chico Urban Area SIU are:

- Modesto Formation
- Tuscan Unit C (Upper Tuscan)
- Tuscan Unit B (Lower Tuscan)

## BMO Key Wells Selected for Groundwater Level Monitoring

In the Chico Urban SIU a triple-completion Bureau of Reclamation monitoring well will be used to monitor water levels in the Upper Tuscan and the Lower Tuscan. The e-log for this well shows it to be screened in these aquifers. In addition to monitoring specific aquifers, there are seven California Water Service production wells to monitor for the continued health of the municipal and industrial (M & I) water supply. While these wells will not provide information about the specific aquifers underlying the Chico Urban Area since they are not screened in a single aquifer, the information will help track whether municipal supply is being sustained, as called for in the BMO objectives. One well (CWSCH01) has been closed and sealed. Another well will replace the original CWSCH01. The new well will be given a new designation, CWSCH01b. Analysis will need to be conducted to establish fall and spring alert stages consistent with the BMO Ordinance. Two dedicated monitoring wells measured for the Chico Nitrate Compliance Program provide groundwater level data for the shallow alluvial aquifer but do not have assigned alert stages.

### SPRING

| Well ID       | First Record | Well Type      | Aquifer   | Stage 1 Alerts |            | Stage 2 Alerts |            |
|---------------|--------------|----------------|-----------|----------------|------------|----------------|------------|
|               |              |                |           | Elev. (ft)     | Depth (ft) | Elev. (ft)     | Depth (ft) |
| CWSCH01       | 1988         | M&I Production | Composite | 125            | 79         | 100            | 104        |
| CWSCH02       | 1988         | M&I Production | Composite | 123            | 60         | 91             | 92         |
| CWSCH03       | 1988         | M&I Production | Composite | 128            | 130        | 81             | 177        |
| CWSCH04       | 1988         | M&I Production | Composite | 126            | 86         | 106            | 106        |
| CWSCH05       | 1988         | M&I Production | Composite | 119            | 96         | 95             | 120        |
| CWSCH06       | 1988         | M&I Production | Composite | 116            | 65         | 93             | 88         |
| CWSCH07       | 1991         | M&I Production | Composite | 115            | 155        | 95             | 175        |
| 22N01E28J001M | 1958         | Monitoring     | Tuscan B  | 140.4          | 40         | 135.6          | 45         |
| 22N01E28J003M | 1958         | Monitoring     | Tuscan B  | 136.2          | 41.6       | 130.2          | 47.6       |
| 22N01E28J005M | 1958         | Monitoring     | Tuscan B  | 135.1          | 41.7       | 130.8          | 46.0       |

### FALL

| Well ID       | First Record | Well Type      | Aquifer   | Stage 1 Alerts |            | Stage 2 Alerts |            |
|---------------|--------------|----------------|-----------|----------------|------------|----------------|------------|
|               |              |                |           | Elev. (ft)     | Depth (ft) | Elev. (ft)     | Depth (ft) |
| CWSCH01       | 1988         | M&I Production | Composite | 119            | 85         | 101            | 103        |
| CWSCH02       | 1988         | M&I Production | Composite | 103            | 80         | 63             | 120        |
| CWSCH03       | 1988         | M&I Production | Composite | 116            | 142        | 100            | 158        |
| CWSCH04       | 1988         | M&I Production | Composite | 103            | 109        | 66             | 146        |
| CWSCH05       | 1988         | M&I Production | Composite | 98             | 117        | 61             | 154        |
| CWSCH06       | 1988         | M&I Production | Composite | 115            | 66         | 61             | 154        |
| CWSCH07       | 1991         | M&I Production | Composite | 103            | 167        | 80             | 190        |
| 22N01E28J001M | 1958         | Monitoring     | Tuscan B  | 126.7          | 54         | 120.8          | 60         |
| 22N01E28J003M | 1958         | Monitoring     | Tuscan B  | 129.1          | 48.7       | 123.7          | 54.1       |
| 22N01E28J005M | 1958         | Monitoring     | Tuscan B  | 122.3          | 54.5       | 117.3          | 59.5       |

Wells measured and tracked but no alert stage assigned due to short period of record.

| Well ID       | First Record | Well Type  | Aquifer    |
|---------------|--------------|------------|------------|
| 22N01E35E001M | 2005         | Irrigation | Unassigned |
| 22N02E30C002M | 2002         | Monitoring | Unassigned |

### **BMO Key Wells Selected for Groundwater Quality Monitoring–**

The Chico well selected for monitoring is a private domestic well.

| Water Quality Measurement | Temp. (°C) | pH   | E.C. (µS/cm) |
|---------------------------|------------|------|--------------|
| 2007                      | 18.4       | 6.88 | 280          |
| 2008                      | 20.1       | 6.94 | 291          |
| 2009                      | 18.2       | 6.90 | 260          |
| 2010                      | 18.8       | 6.99 | 249          |
| 2011                      | 19.5       | 7.53 | 250          |
| 2012                      | 21.6       | 7.29 | 248          |
| 2013                      | 18.0       | 7.05 | 217          |
| 2014                      | NM         | NM   | NM           |
| 2015                      | 18.4       | 6.9  | 214          |
| 2016                      | 17.8       | 7.0  | 221          |
| 2017                      | 19.0       | 7.0  | 254          |

**BMO Key Well(s) Selected for Land Subsidence Monitoring–** State Well Number 22N01E35E01M. No inelastic subsidence has been detected. A Sacramento Valley-wide GPS survey was conducted during 2017. Results of the survey will be available in 2018 and will provide additional land subsidence data throughout the county.

### **BMO Alert Stage Methodologies–**

The Chico Urban Area Sub-Inventory Unit utilizes the BMO Alert Stage historic range method specified in Chapter 33A-5 of the Butte County Code.

### **BMOs for Groundwater Level –**

Summary - The Chico Urban Sub-inventory unit utilizes the “Historic Range Method” specified in the BMO Groundwater Elevation Criteria (Chapter 33A-5c1. of the Butte County Code). In the spring of 2017, three wells reached BMO Alert Stage 1. All other measurements met BMOs for groundwater elevation. In the fall of 2017, three wells reached an Alert Stage 1.

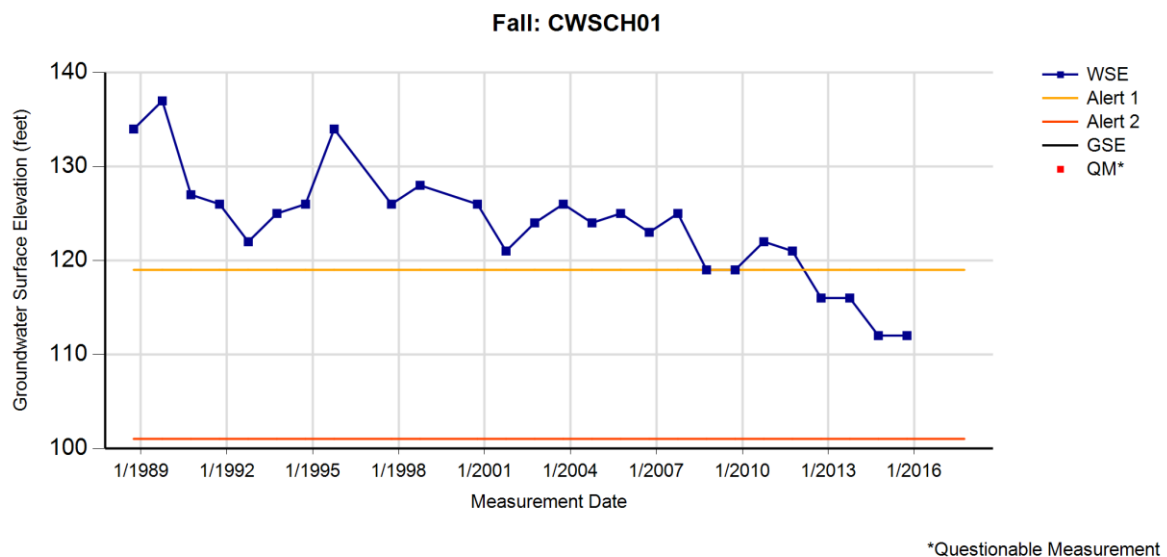
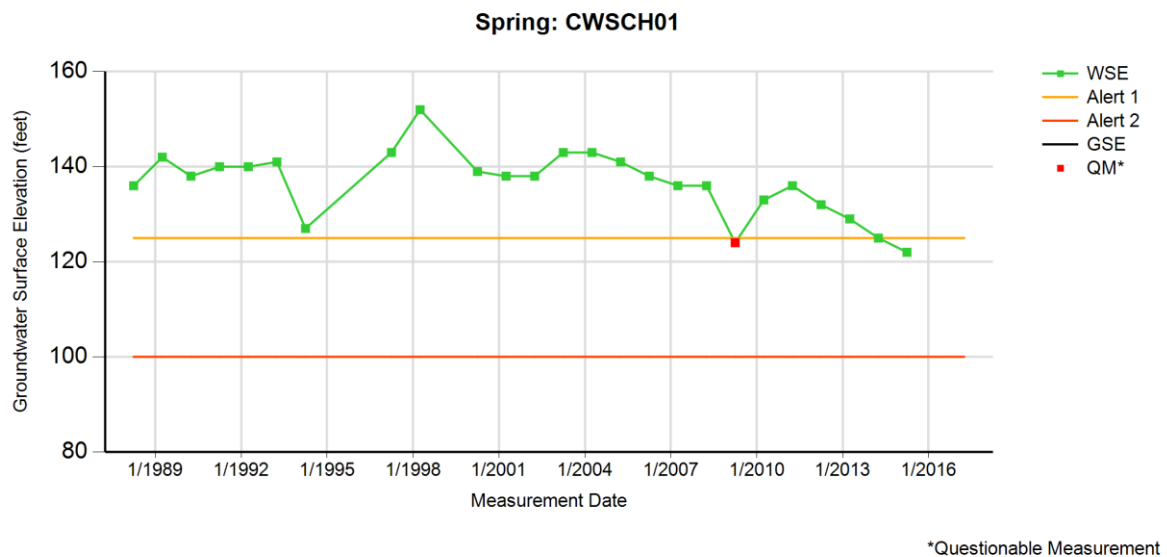
California Water Service Wells - Groundwater levels for the California Water Service (CWS) monitoring wells are measured static (non-pumping) groundwater levels,

provided by California Water Service Company. Although the groundwater level measurements presented in the CWS hydrographs were collected when the wells were not pumping (static groundwater levels), it should be noted that effects from recent pumping of these production wells could result in groundwater level readings that are deeper than stable static conditions.

Overall hydrographs indicate that groundwater levels in the California Water Service area of the Chico Urban Area Sub-Inventory Unit have generally declined 10-20 feet between 1988 and 2017. Analysis of the seasonal fluctuation of groundwater levels in these California Water Service wells indicates a rather consistent seasonal fluctuation (spring to fall) of 8 to 20 feet during normal years. Analysis of seasonal groundwater levels during drought years shows a wide range of fluctuation depending upon the individual well. Some wells show little or no seasonal change between wet, normal and dry years, while other wells show large differences. The wide range of response to seasonal change in normal versus drought years is likely due to the wide range of operational scenarios that can be imposed upon these municipal wells. Spring levels have generally declined over the course of the 2012-2015 severe drought. However, 2015- 2017 levels in several of the Cal Water wells came up from previous years. The slowing or reversing the downward trend in fall water levels is likely a combined result of additional recharge from the wet winter of 2017 and a reduction in residential water demand from state mandated water conservation measures and voluntary efforts.

## CWSCH01

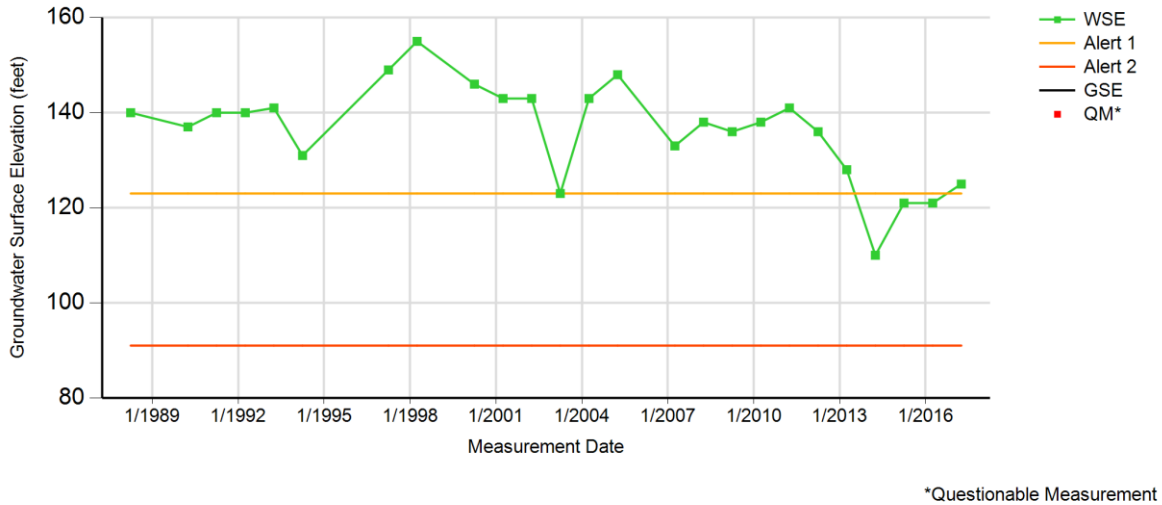
Well CWSCH01 is located just southwest of the center of the California Water Service area. Water elevations have been monitored since 1988 at this location but the well was destroyed in 2016. It was discovered that the measurement recorded in April 2009 was inaccurate due to an equipment error and therefore the graph shows it as a questionable measurement. The record of fall water level measurements shows declining levels with the average of the last five years (2011-2016) almost 14 feet lower than the average of the first 5 years on record (1988-1992). Both of these time periods contain multiple drought years.



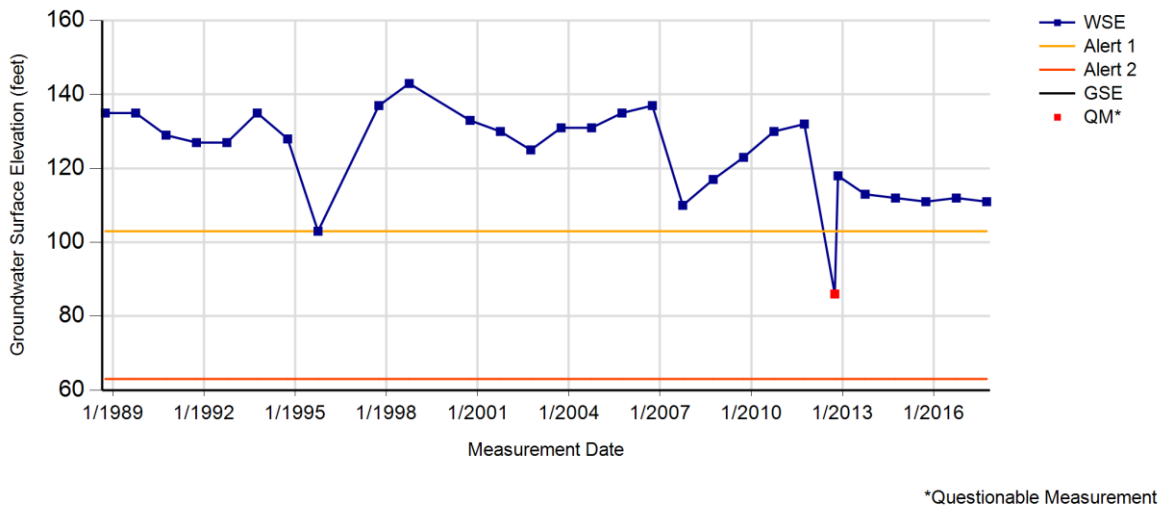
WSE – Water Surface Elevation (feet, above mean sea level)  
 GSE – Ground Surface Elevation (feet, above mean sea level)

## CWSCH02

Spring: CWSCH02



Fall: CWSCH02

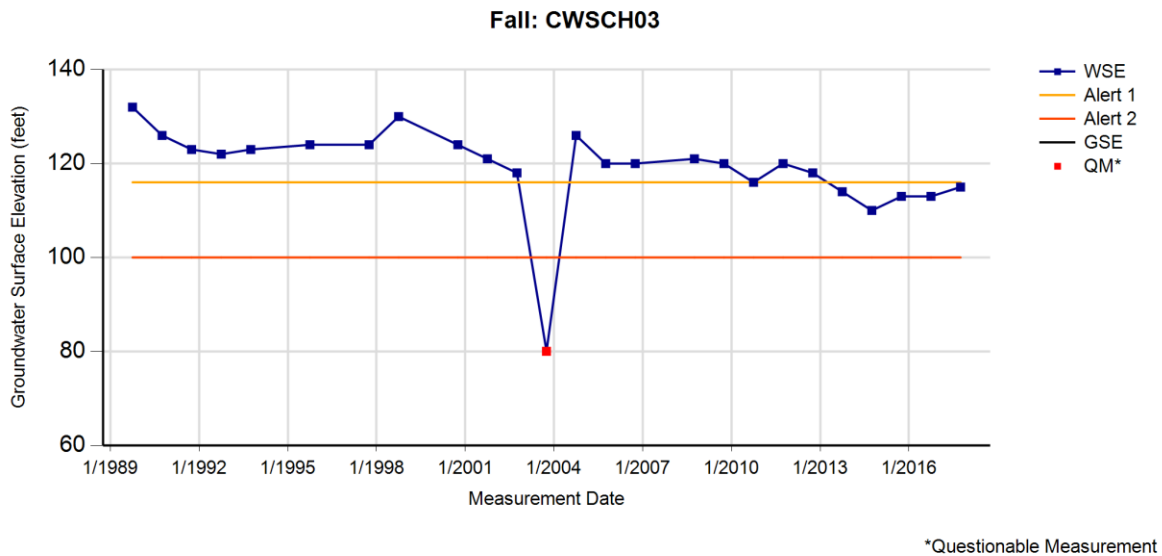
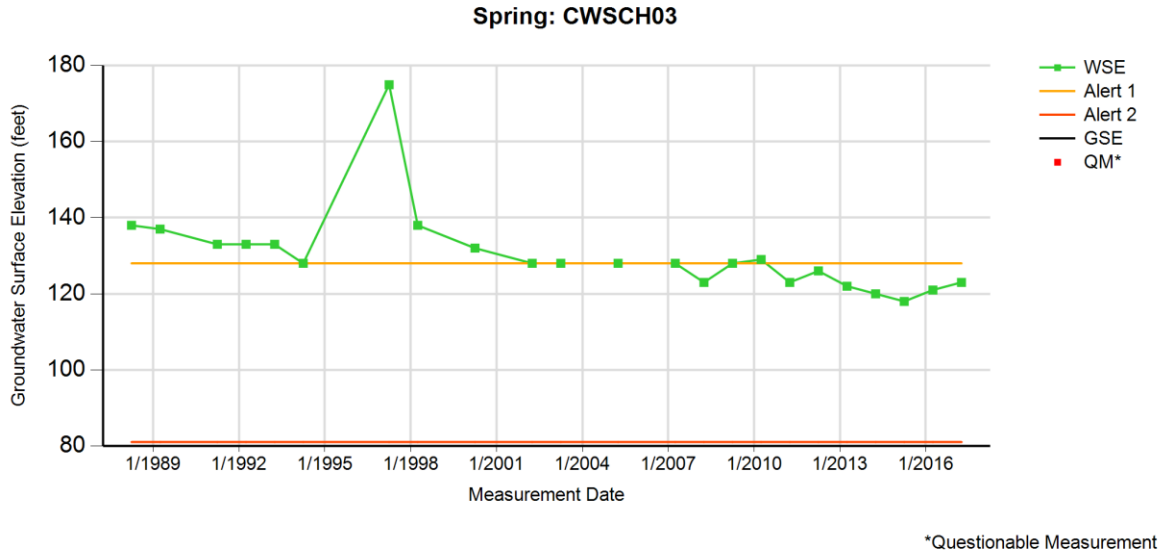


\* Note: Fall 2012 was a questionable measurement, re-checked the depth to water was 65 feet (compared to 97').

WSE – Water Surface Elevation (feet, above mean sea level)  
GSE – Ground Surface Elevation (feet, above mean sea level)

### CWSCH03

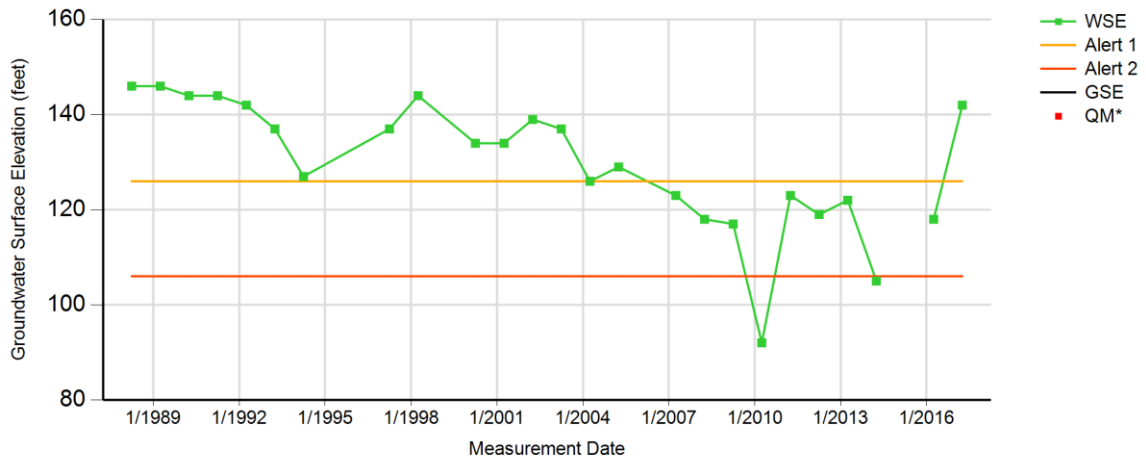
Well CWSCH03 is located in the northeastern portion of the California Water Service area. Water elevations have been monitored since 1988 at this location and the historical depth to water averages (from static one-time measurements), including 2017 data, are 128.3 feet in the spring and 139.1 feet in the fall. Spring water levels recorded in the last five years represent a decline of approximately fourteen feet from average spring water levels recorded 1988-1992.



WSE – Water Surface Elevation (feet, above mean sea level)  
 GSE – Ground Surface Elevation (feet, above mean sea level)

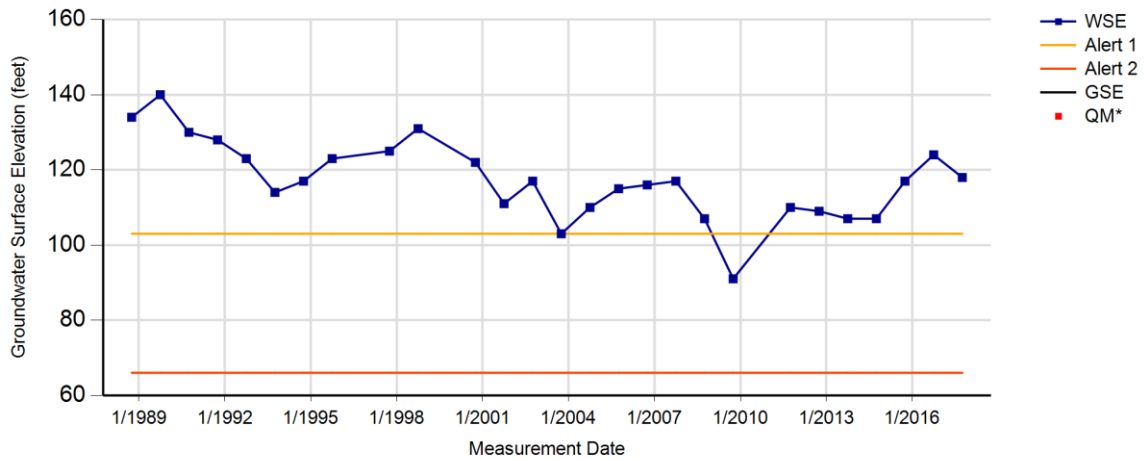
## CWSCH04

Spring: CWSCH04



\*Questionable Measurement

Fall: CWSCH04



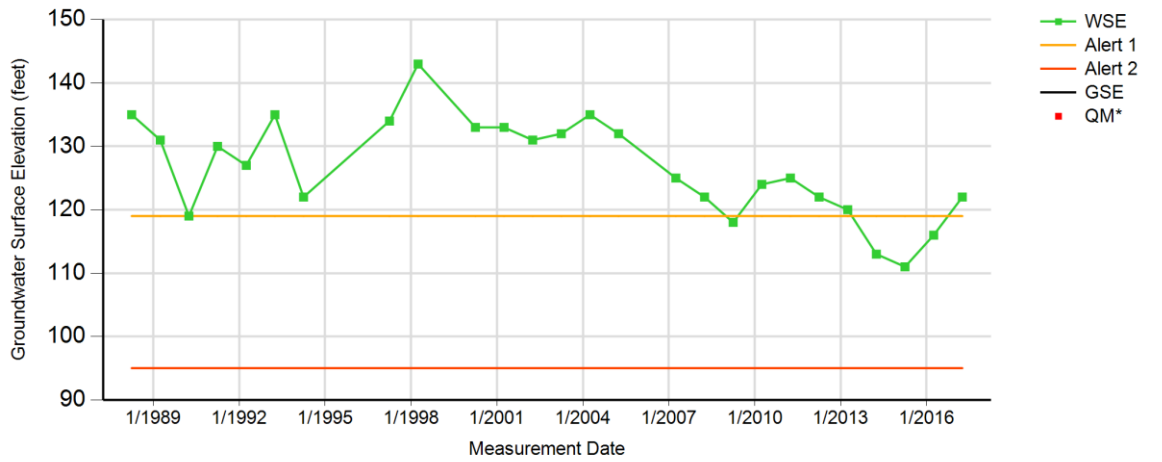
\*Questionable Measurement

WSE – Water Surface Elevation (feet, above mean sea level)  
GSE – Ground Surface Elevation (feet, above mean sea level)



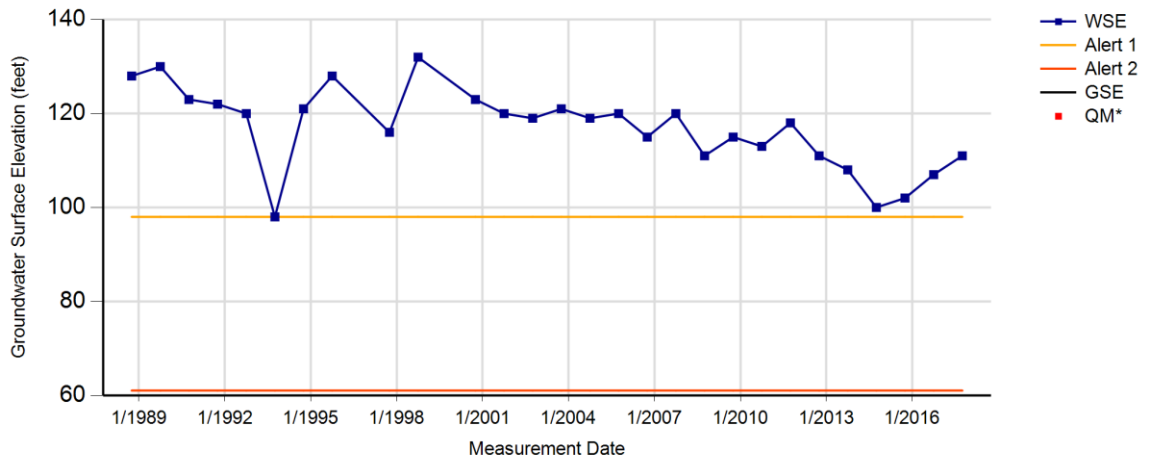
## CWSCH05

Spring: CWSCH05



\*Questionable Measurement

Fall: CWSCH05

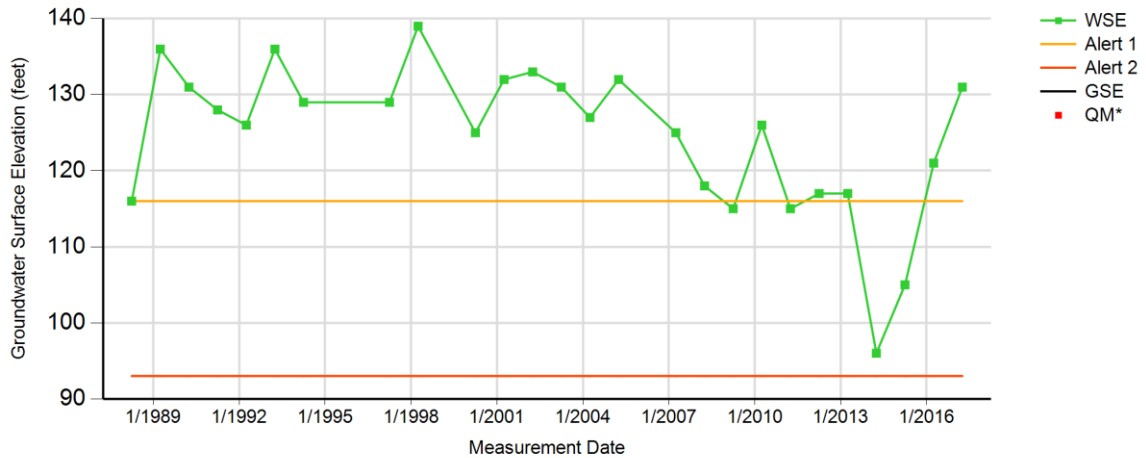


\*Questionable Measurement

WSE – Water Surface Elevation (feet, above mean sea level)  
GSE – Ground Surface Elevation (feet, above mean sea level)

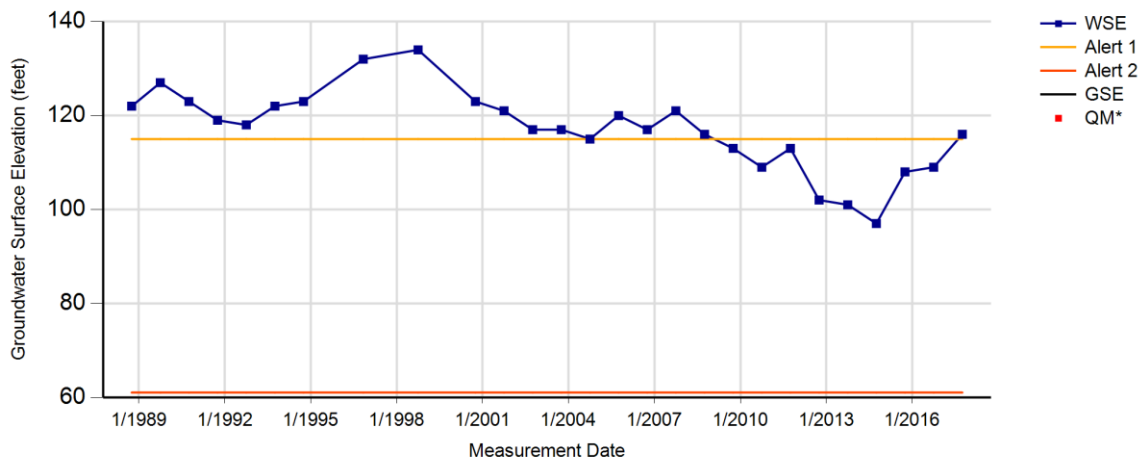
## CWSCH06

Spring: CWSCH06



\*Questionable Measurement

Fall: CWSCH06

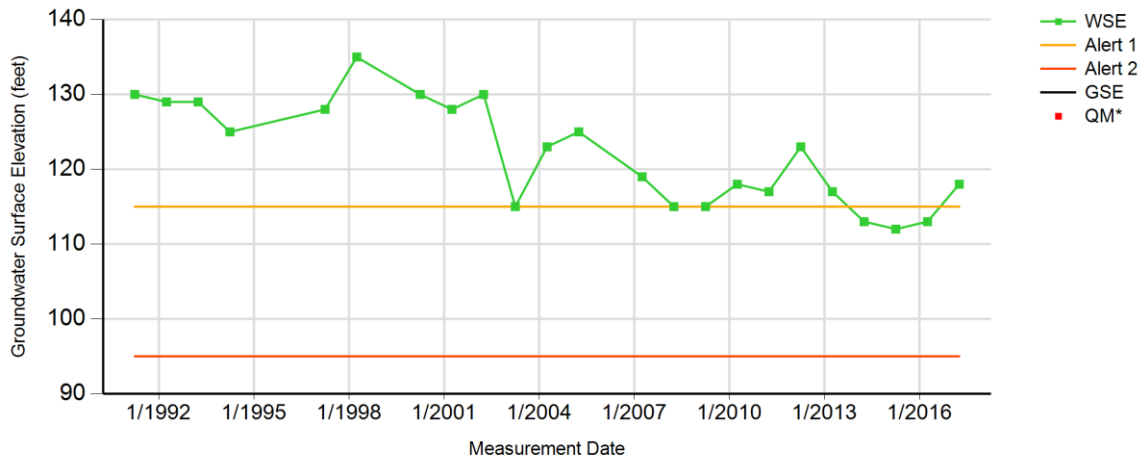


\*Questionable Measurement

WSE – Water Surface Elevation (feet, above mean sea level)  
 GSE – Ground Surface Elevation (feet, above mean sea level)

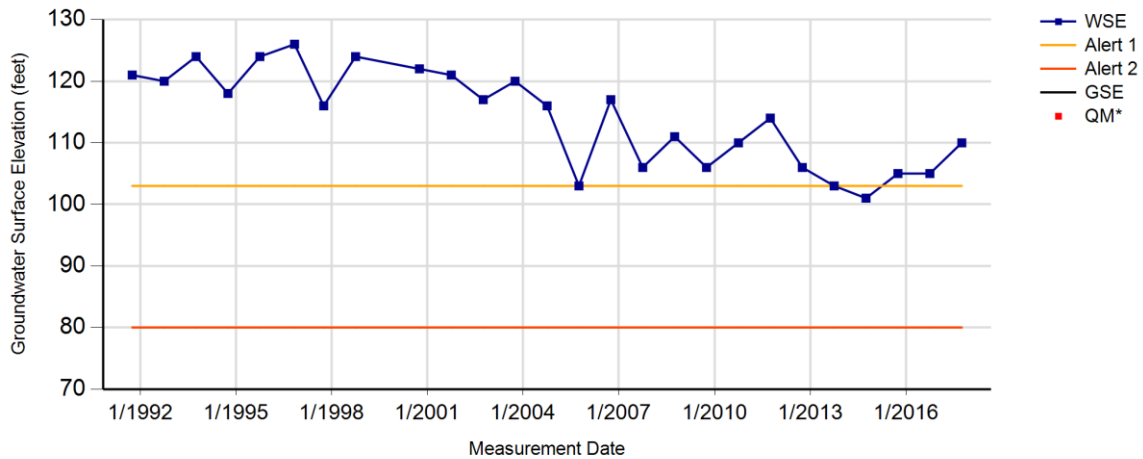
## CWSCH07

Spring: CWSCH07



\*Questionable Measurement

Fall: CWSCH07



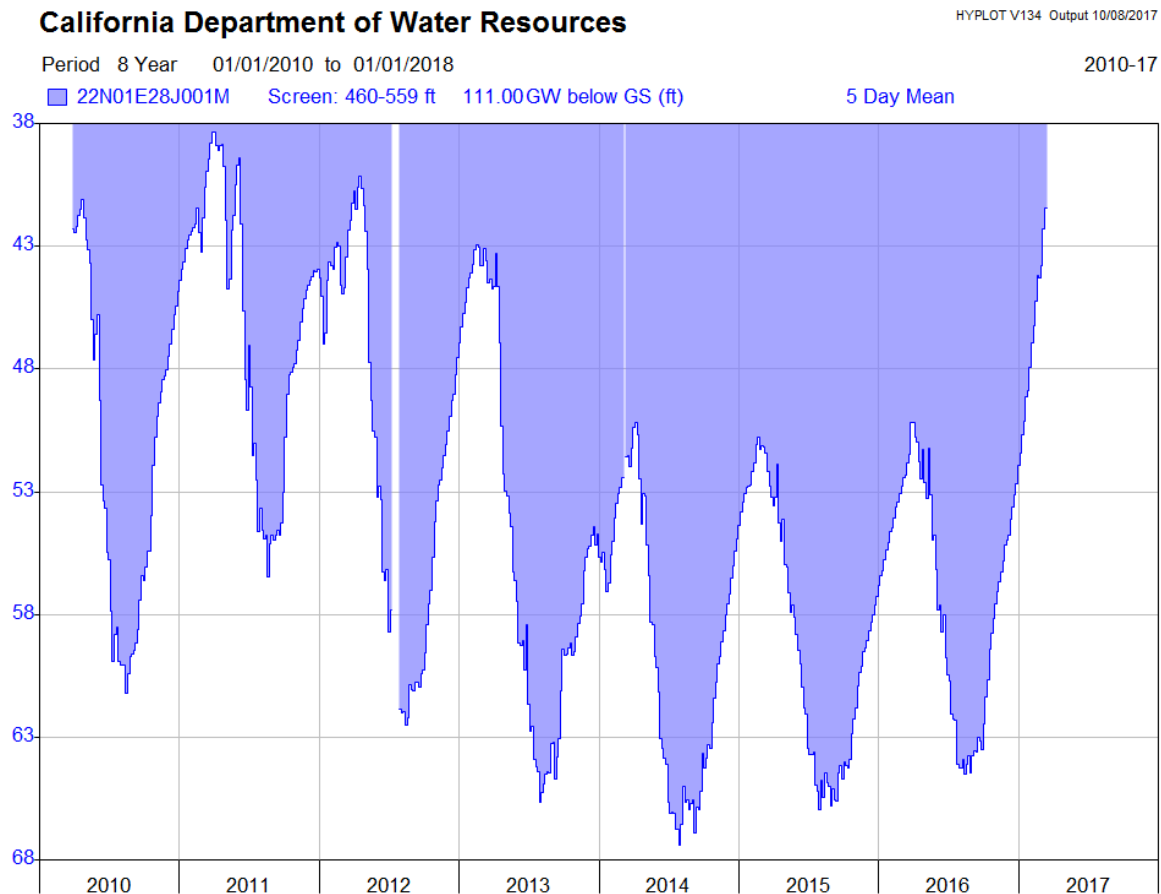
\*Questionable Measurement

WSE – Water Surface Elevation (feet, above mean sea level)  
 GSE – Ground Surface Elevation (feet, above mean sea level)

## 22N01E28J001-5M

Well 22N01E28J001-5M is part of a dedicated multi-completion monitoring well set that was installed by the United States Bureau of Reclamation in 1955. The well is located in west Chico, north of West Sacramento Avenue and west of Nord Avenue. Water elevations have been monitored since 1958 at this location, in all three wells.

Continuous data is available online for 28J001 with data since January 2010. The hydrograph of groundwater elevation is below.

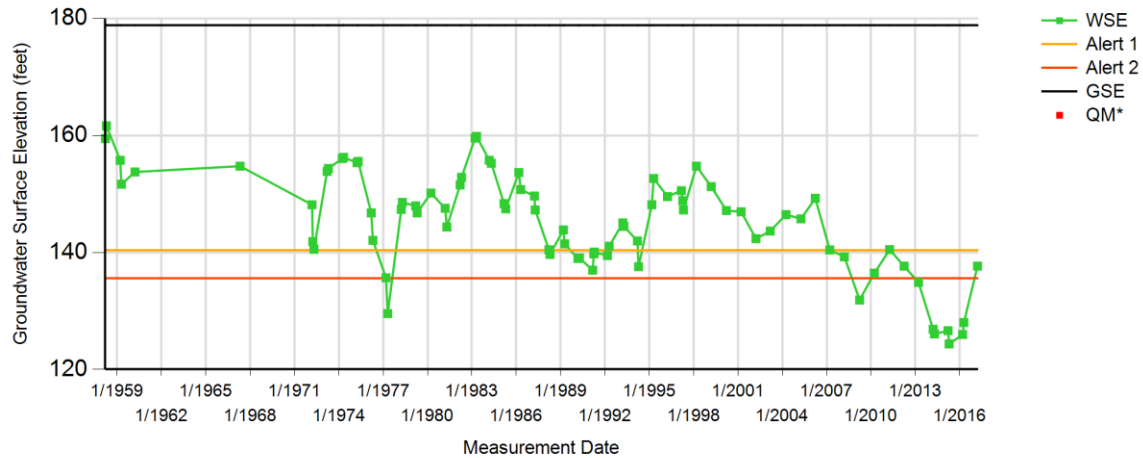


<http://www.water.ca.gov/waterdatalibrary/docs/Hydstra/index.cfm?site=22N01E28J001M>

## 22N01E28J001

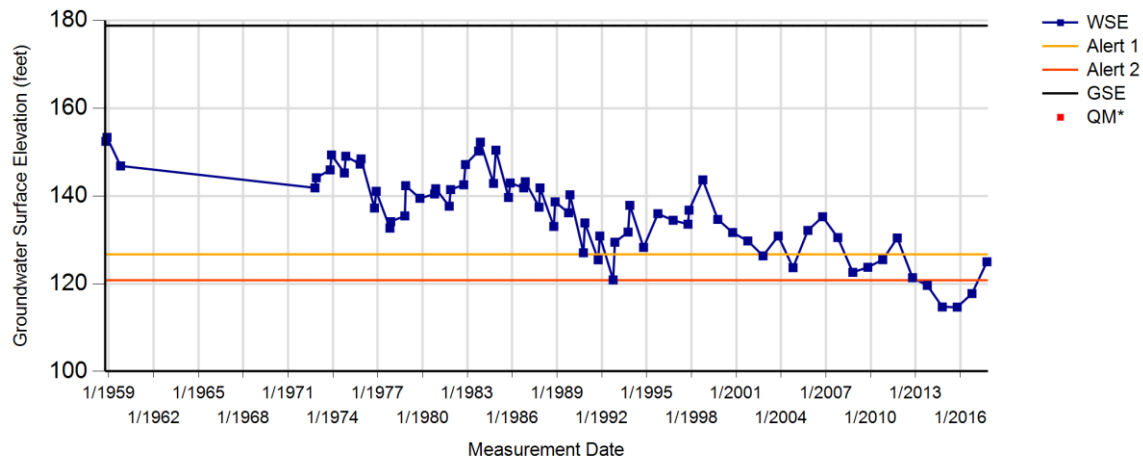
This monitoring well is screened from 460-559 feet below ground surface.

Spring: 22N01E28J001M



\*Questionable Measurement

Fall: 22N01E28J001M



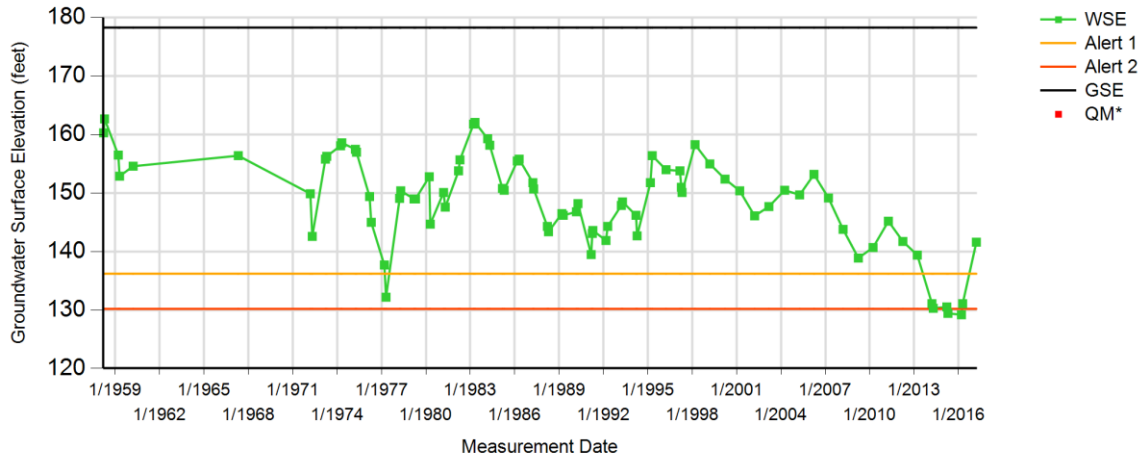
\*Questionable Measurement

WSE – Water Surface Elevation (feet, above mean sea level)  
GSE – Ground Surface Elevation (feet, above mean sea level)

## 22N01E28J003

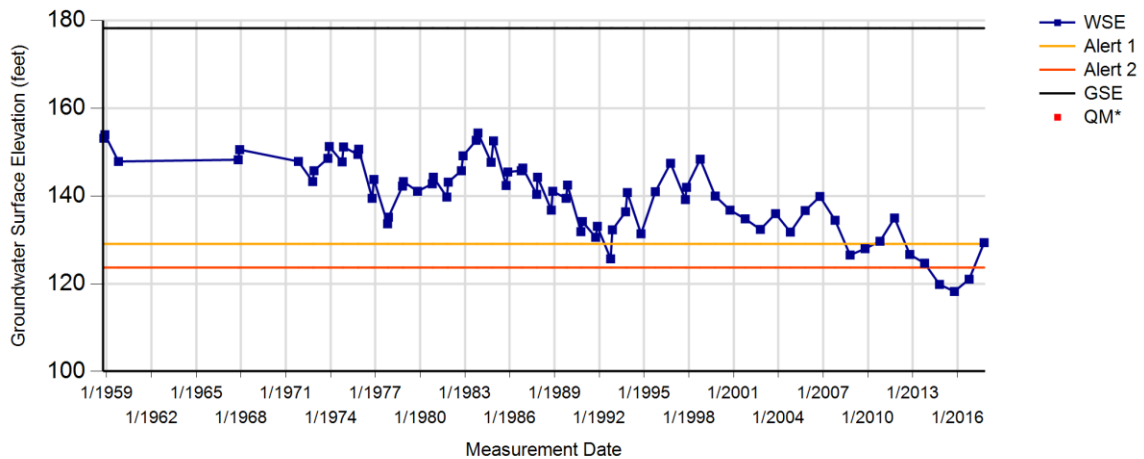
This monitoring well is screened from 200-279 feet below ground surface.

Spring: 22N01E28J003M



\*Questionable Measurement

Fall: 22N01E28J003M

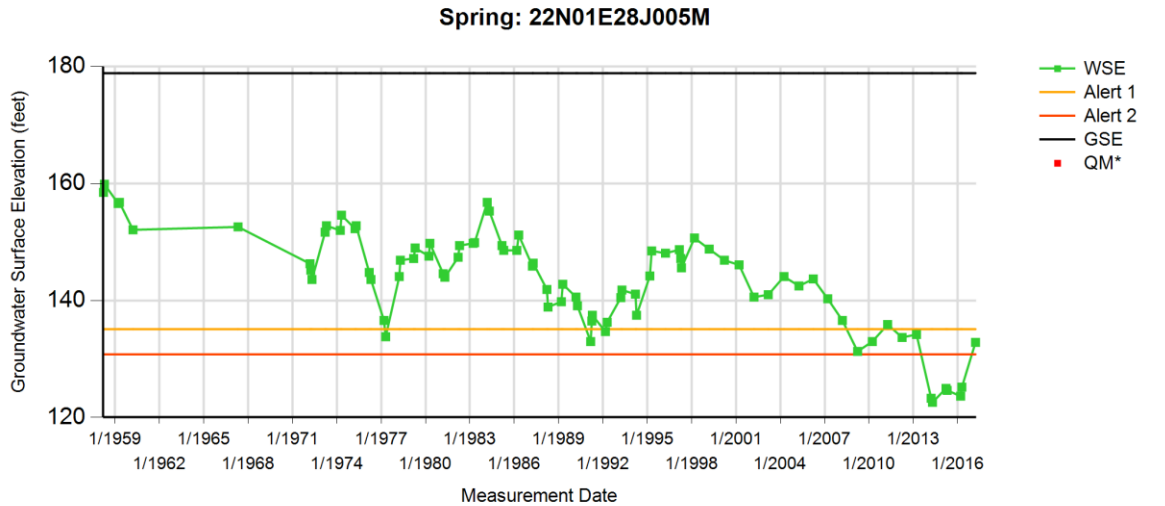


\*Questionable Measurement

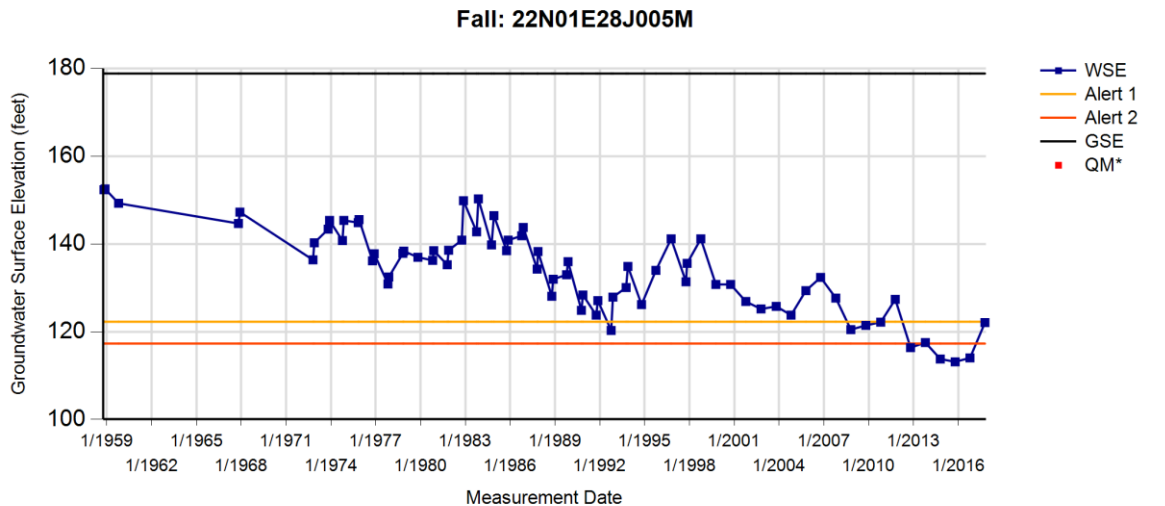
WSE – Water Surface Elevation (feet, above mean sea level)  
GSE – Ground Surface Elevation (feet, above mean sea level)

## 22N01E28J005

Measurements from 22N01E28J005M represent groundwater conditions within the confined portion of the Tuscan Formation aquifer system between 740 to 800 feet in depth below ground surface.



\*Questionable Measurement



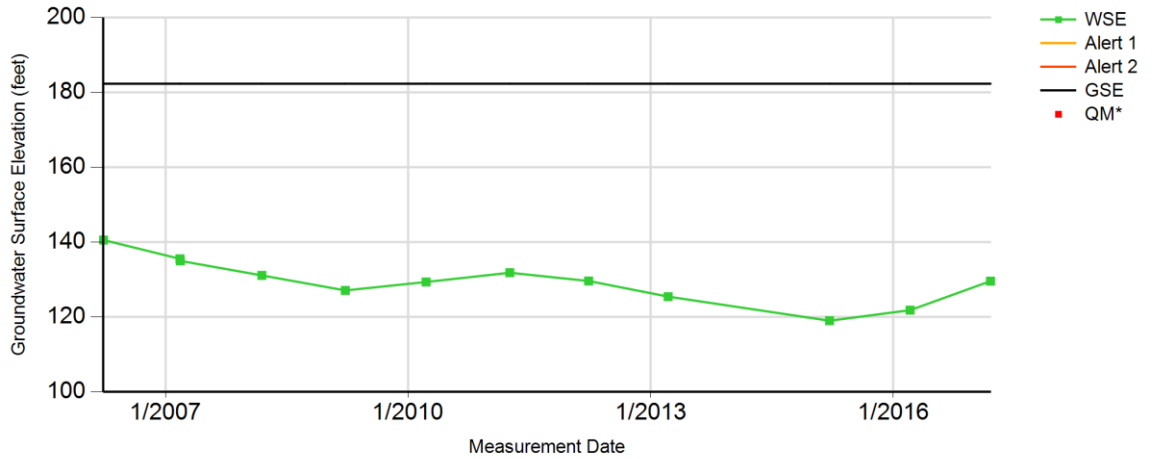
\*Questionable Measurement

WSE – Water Surface Elevation (feet, above mean sea level)  
 GSE – Ground Surface Elevation (feet, above mean sea level)

## Wells without Assigned Alert Stages

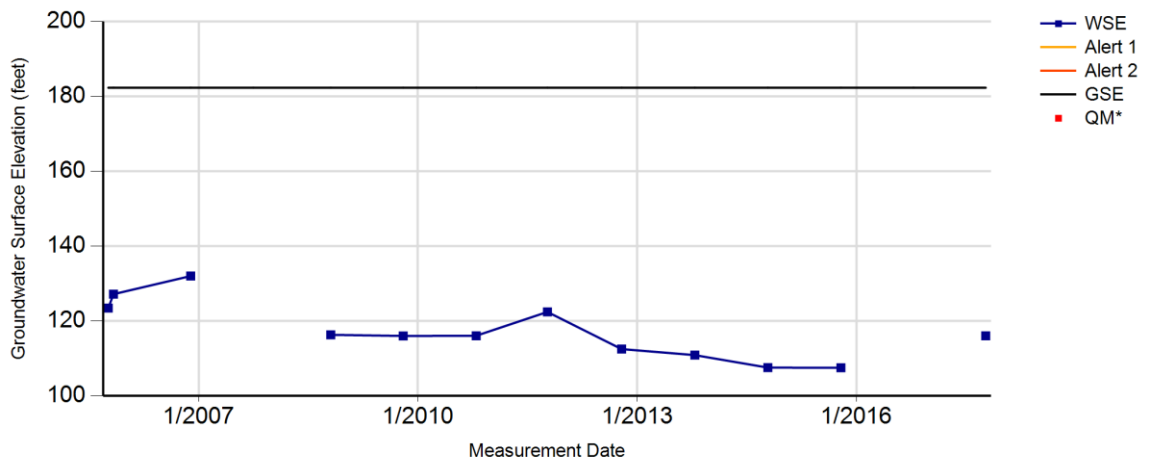
### 22N01E35E001M

#### Spring: 22N01E35E001M



\*Questionable Measurement

#### Fall: 22N01E35E001M

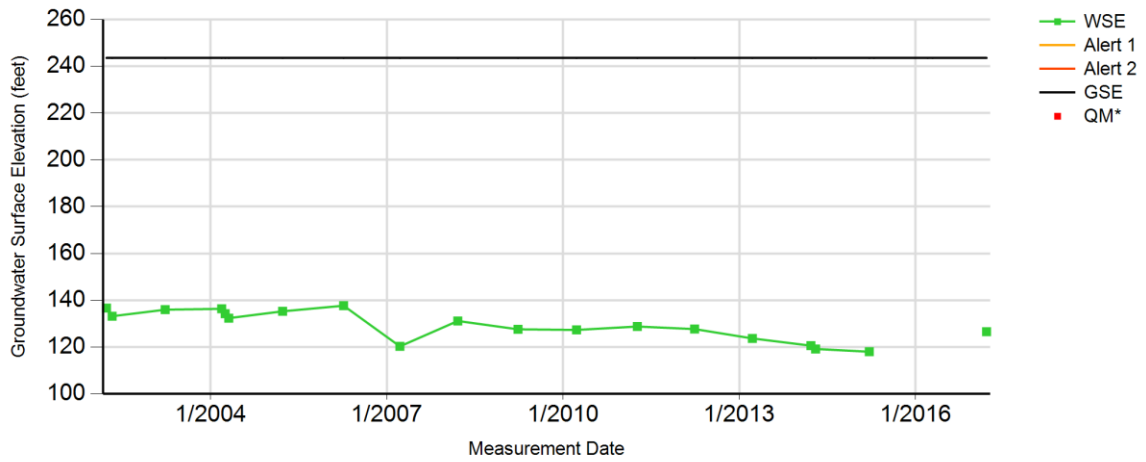


\*Questionable Measurement



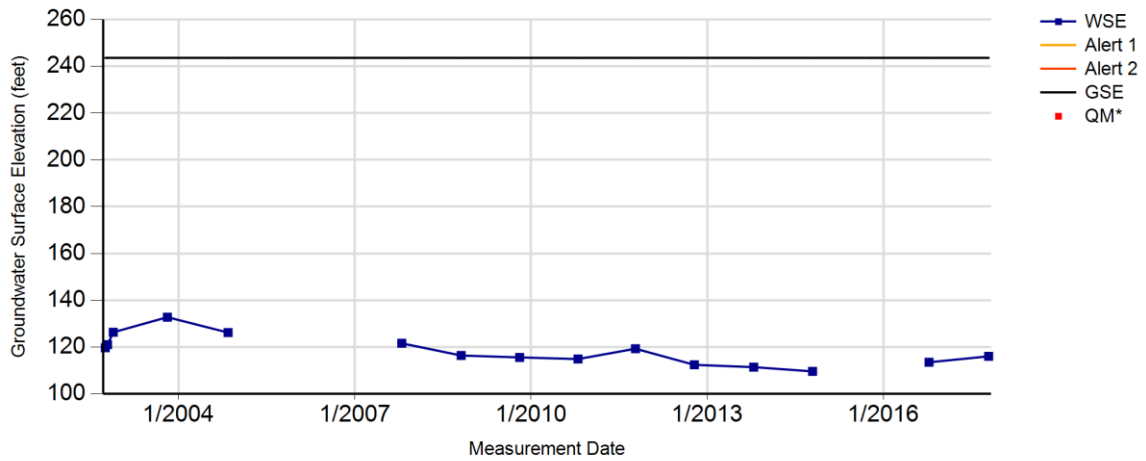
## 22N02E30C002M

### Spring: 22N02E30C002M



\*Questionable Measurement

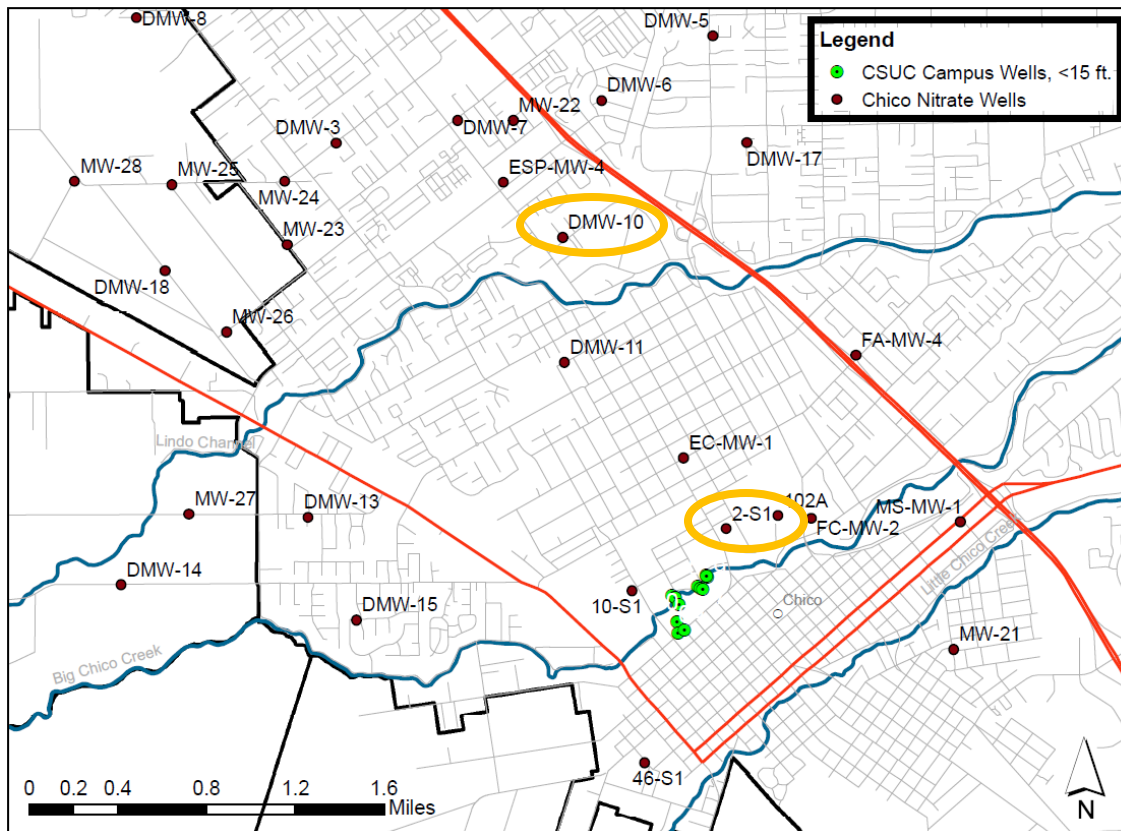
### Fall: 22N02E30C002M



\*Questionable Measurement

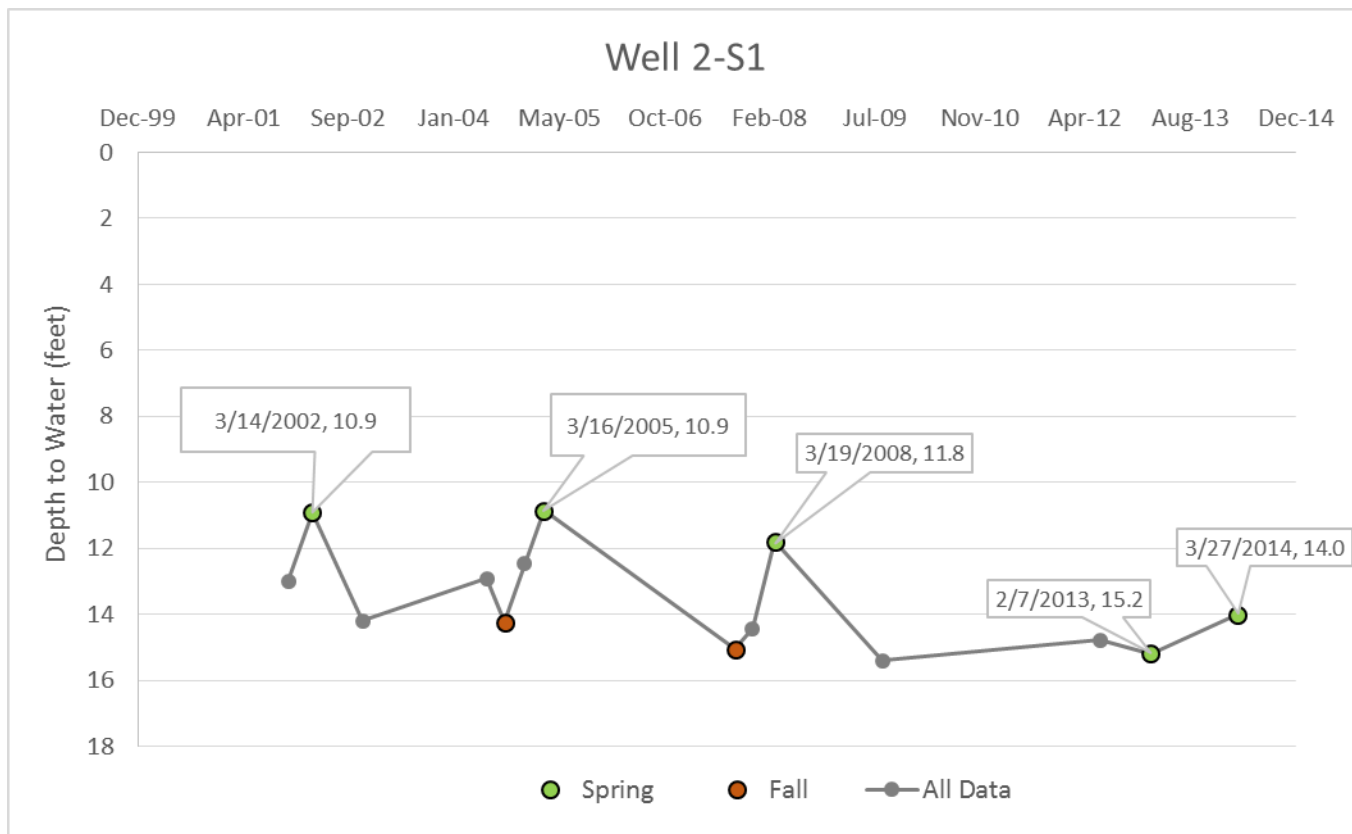
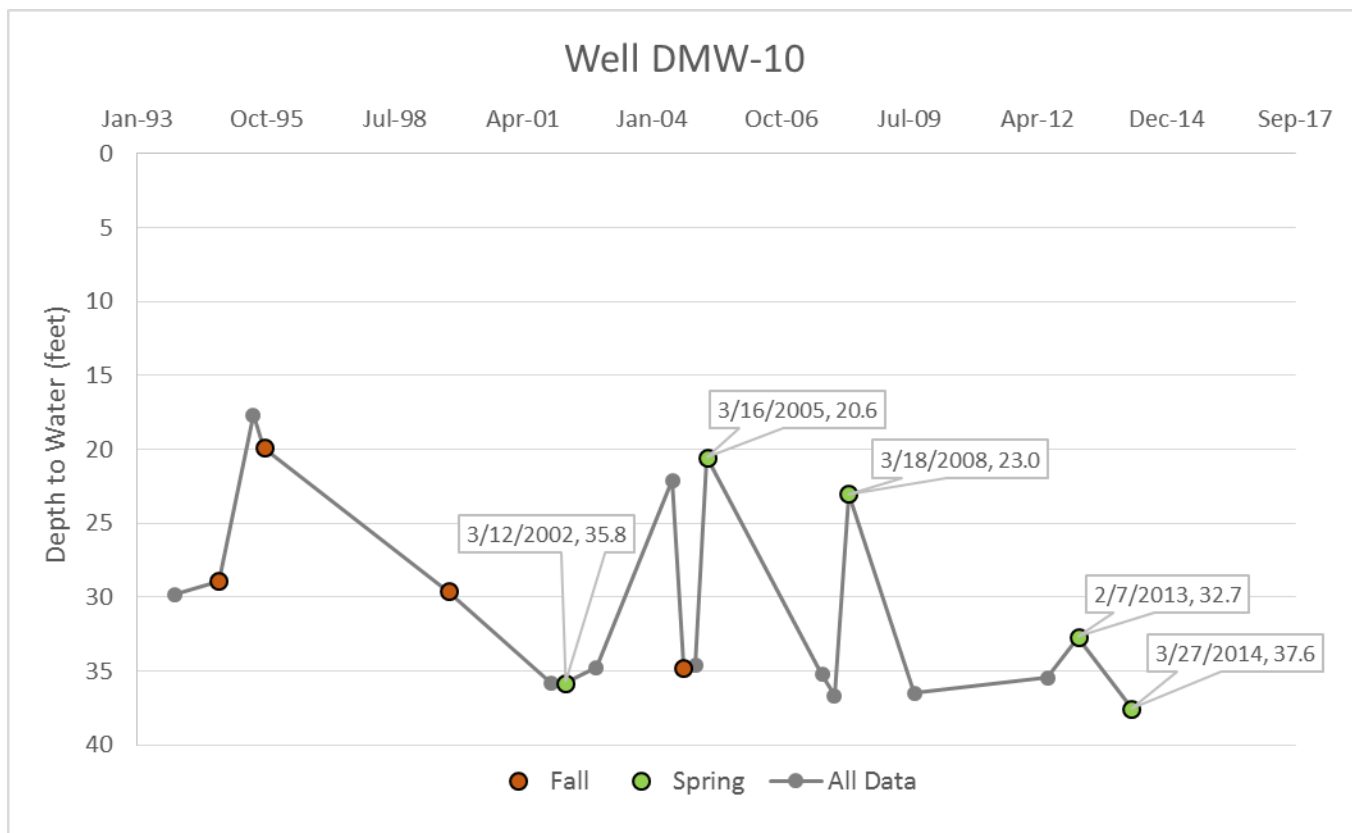
WSE – Water Surface Elevation (feet, above mean sea level)  
GSE – Ground Surface Elevation (feet, above mean sea level)

## Chico Nitrate Wells Selected to Monitor the Shallow Alluvial Aquifer



Two dedicated monitoring wells measured for the Chico Nitrate Compliance Program are selected based on location and length of historical data record to provide groundwater level data for the shallow alluvial aquifer. DMW-10 is north of Lindo Channel and has a well depth of 39 feet. 2-S1 is north of Big Chico Creek and has a well depth of 25 feet. Well data is obtained from the Chico Nitrate Compliance Program.

Stakeholders recommend that a monitoring well near Little Chico Creek also be included.



## Chico Urban SIU Stakeholder Issues and Recommendations

1. Land Use Changes – County service areas formerly with onsite sanitary septic systems are now connected to the City of Chico sanitary sewer system which conveys wastewater to the Chico Water Pollution Control Plant on the far west side of Chico. This change removed any appreciable recharge that occurred from the septic systems.

Local stakeholders recommend that Butte County and the City of Chico land use office improve coordination and communication on water resource issues and data.

2. Monitoring the Alluvial Aquifer - Local stakeholders strongly recommend that the monitoring network include wells to monitor groundwater conditions in the shallow (alluvial) aquifer. A suggestion was made that several domestic wells could be added to the existing monitoring well network within the sub-inventory unit to allow development of management objectives for the alluvial aquifer system. Butte County staff is partnering with CSU Chico and the SIU representative to survey existing compliance monitoring wells by other entities to identify if any may be appropriate to add to the BMO monitoring network. In 2015, two nitrate compliance monitoring wells were added to the report. Additional existing monitoring wells could be added in the future.
3. Water Conservation Efforts - On April 1, 2015, by Executive Order, the Governor required a statewide 25% reduction in potable urban water usage through February 28, 2016. Each urban area was given a target percent reduction by the State Board compared to the amount used in 2013. Chico's target percent is 32%. Residents have responded with water saving actions and have reduced their per capita use to 140.4 gallons per day with a cumulative reduction since June 1 of 39.5% (as of September).

In 2009, the California Legislature passed a law ("20 by 2020") requiring water purveyors to reach a 20 percent reduction in per-person water use by the year 2020. The law included an interim required reduction of 10 percent by 2015. To encourage its customers to conserve, the California Public Utilities Commission approved Cal Water's request for a tiered rate structure, which means when one uses above a certain threshold they pay more per unit of water. In addition, Cal Water's many drought related education and outreach efforts have focused on water conservation. Cal Water's demonstration conservation garden with drought-tolerant plants has been located at the southeast corner of Sheridan and East First Avenues since 1993. Cal Water's single-family residential customers can get a free conservation kit featuring a range of water saving plumbing retrofit fixtures including a high efficiency showerhead, hose nozzle, faucet aerators and toilet leak tablets. Commercial and residential Cal Water customers can also access conservation rebates and programs including

free irrigation sprinkler nozzles, and rebates on a smart irrigation controller, on a high efficiency clothes washer and on high efficiency toilets. CalWater conducted a Turf Rebate program that was highly successful. The public responded overwhelmingly. As a result, customers within the CalWater Chico service area have already exceeded water conservation targets: The per capita water demand of 224 gallons per capita per day (gpcd) in 2013 was 21.7 percent less compared to the baseline of 286 gpcd. Information about the rebates and programs for CalWater customers is accessible at [www.calwater.com/conservation](http://www.calwater.com/conservation)

4. Urban Water Management Plan - The California Water Code requires all urban water suppliers that provide water for municipal purposes either directly or indirectly to more than 3,000 customers (or supply more than 3,000 acre feet of water annually) to prepare Urban Water Management Plans (UWMP) at least every five years. On June 24, 2011 the California Water Service Company submitted to California Department of Water Resources the final version of its UWMP. The UWMP is a foundation document and source of information for a Water Supply Assessment and Written Verification of Water Supply. The UWMP also serves as: a long-range planning document for water supply; source of data for development of a regional water plan; source document for cities and counties as they prepare their General Plans; and key component to Integrated Regional Water Management Plans. The UWMP for the Chico District of California Water Service Company is available for review online at: [www.calwater.com/conservation/uwmp/ch](http://www.calwater.com/conservation/uwmp/ch). The 2015 UWMP was finalized in June 2016.
5. Water Quality - Although not specifically a component of the BMO program, the Chico Urban Area Sub-inventory Unit stakeholders have expressed an interest in groundwater contamination from toxins. Significant groundwater quality monitoring by multiple agencies is ongoing within the Chico Urban Area to track nitrate contamination and toxic plumes, including the Butte County Nitrate Compliance Program and the Department of Toxic Substances Control program for monitoring toxic chlorinated solvent plumes. California Water Service Company monitors water quality constituents important for drinking water supply for all of its water supply wells.

**Nitrate Compliance Monitoring** – The Butte County Environmental Health Division of the Public Health Department contracts to perform groundwater monitoring for the Chico Urban Area Nitrate Compliance Program. The nitrate compliance monitoring program has been prepared in response to the contamination of groundwater in the Chico Urban Area by nitrate, a form of nitrogen. The discharge from individual septic systems has been cited by the Central Valley Regional Water Quality Control Board as the primary source of groundwater nitrate contamination that exceeds drinking water standards set by the US EPA and the State Water Resources Control Board. Nitrate levels that exceed the standard have been established as a threat to public health and is subject to regulation. All monitoring reports associated with the Nitrate

Compliance Program are available for public review at the Chico Branch of the Butte County Public Library and from the County's website, <http://www.buttebusinessresources.com/chico-urban-area-nitrate-compliance-program>.

**Volatile Organic Chemical Monitoring** - The California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) is continuing its efforts to protect public health and oversee characterization and remediation of chlorinated solvents contamination in Chico Groundwater. The Chico Branch of the Butte County Library is the local information repository for investigation reports, monitoring reports and related documents.

There are eight toxic chlorinated solvent plumes in the Chico area with the northernmost plume near the Chico airport and the southernmost plume near Hegan Lane and the Midway. DTSC is responsible for oversight of remediation activities at all eight plumes in the Chico area.

One DTSC oversight program involves the Skyway Subdivision Groundwater Plume. Chlorinated solvents contamination of groundwater in the Skyway Homes Subdivision area of south Chico was discovered in November 2003. DTSC has determined that the most likely source of the contamination was the former CE Building Products operation on Speedway Avenue. ABB Inc., which purchased the parent company of CE Building Products in 1990, has been identified as a Responsible Party for investigating and cleaning up the Skyway Plume. ABB is cooperating fully with DTSC in investigating the contamination, and has agreed to fund connection of homes and other buildings within the affected area to the California Water Service Company public water system. Extension of the water main was completed by January 2009. Fact Sheets and other documents for the Skyway Subdivision Groundwater Plume are available at [http://www.envirostor.dtsc.ca.gov/public/profile\\_report.asp?global\\_id=04880002](http://www.envirostor.dtsc.ca.gov/public/profile_report.asp?global_id=04880002)

Another DTSC oversight program involves remediation of contamination in intermediate and deep zone aquifers in the central Chico area known as the Central Plume. Since July 1995 more than 1300 pounds of VOCs have been removed from the aquifers. A Remedial Action Plan (RAP) for the Central Plume was finalized in June 2007, to address a "hot spot" of contamination discovered in early 2005. The RAP provided for installation of three additional shallow zone aquifer (SZA) extraction wells and one monitoring well which have been installed. Source area in-situ chemical oxidation by injection of potassium permanganate has recently been implemented. The most recent fact sheets and reports for the Chico Groundwater Central Plume are available at [http://www.envirostor.dtsc.ca.gov/public/profile\\_report.asp?global\\_id=04990003&cmd=community\\_involvement](http://www.envirostor.dtsc.ca.gov/public/profile_report.asp?global_id=04990003&cmd=community_involvement)  
Additional documents related to the Central Plume are available at [http://www.envirostor.dtsc.ca.gov/public/profile\\_report.asp?global\\_id=04990003](http://www.envirostor.dtsc.ca.gov/public/profile_report.asp?global_id=04990003)

6. Monitoring of Stream and Vegetation - Chico Urban Area stakeholders expressed an interest to maintain groundwater levels adequate to sustain the quality of the area streams and the groundwater dependent vegetation. There is not, however, adequate research available to determine what those adequate levels are. The current BMO provides information about the quantity of groundwater as compared to previous years, but does not assess the status of the streams or of the groundwater dependent vegetation.

There are some data available to measure stream quantity. DWR maintains streamflow information on both Big and Little Chico Creek.

(<http://cdec.water.ca.gov/>) California Urban Stream Alliance Stream Team Project collects stream flow and stream quality data for Big Chico Creek. These data have not, however, been correlated to the groundwater measurements developed for the BMO. There is no assessment of the relation of the two sets. The relationship between streamflow and groundwater needs much study. Although surface water and groundwater appear to be two distinct sources of water, they are not. Surface water and groundwater are basically one singular source of water connected physically in the hydrologic cycle ([http://www.water.ca.gov/groundwater/groundwater\\_basics/gw\\_sw\\_interaction.cfm](http://www.water.ca.gov/groundwater/groundwater_basics/gw_sw_interaction.cfm)).

Stakeholders suggest that piezometers could be used to measure depth to groundwater. Piezometers are inexpensive to purchase, use, and maintain and could be installed along all Chico Urban Area creeks. In fact, many piezometers have been installed at various locations bordering Big Chico Creek on the CSU, Chico campus center. Data have been recorded for many years. There should be an effort to correlate existing groundwater level data to existing piezometer data. Such an undertaking to correlate with BMOs and its cost effectiveness will need to be evaluated by the Technical Advisory Committee.

Butte County has developed an Environmental Monitoring Plan as a component of the Integrated Water and Resources Plan. The funding to implement the Environmental Monitoring Plan has not been secured. The links to these documents are available on the department's [website](#).

Of further interest is the health of the flora and fauna dependent on stream flow and groundwater, particularly *Quercus Lobata* or Valley Oak. The methodology used to measure the health of orchard trees could be used to assess oak and sycamores. Tensiometers could be used to measure the soil moisture around oaks. Sycamore twig die off in August can be measured. The quality of the oak crowns can be observed. The pre-dawn xylem sap tension can be measured during the dry season using a pressure chamber device. Trees near flowing streams are measured to identify a healthy xylem sap tension. Trees distant from streams are measured to monitor connectivity with groundwater. All of these observations and data can be correlated to the BMO measurements. If further

study is made of the relationship of groundwater quantity and quality to the health of the BMO Area environment, the objective of maintaining the health of the Chico Urban Area streams and their dependent flora and fauna can be met. These goals can be met if outreach is made to other resources in the Chico Urban Area. The City of Chico Urban Forester and the CSU, Chico Biology Department could be particularly helpful. It is the intention of the stakeholders of the Chico Urban Area SIU that all possible resources be used to further the study of the relationship of groundwater to our environment.

7. Monitoring of Conjunctive Use Projects - Stakeholders expressed an interest in the need to monitor conjunctive water management projects that might have the potential to affect Chico urban area groundwater levels.
8. Fracking of Gas and Petroleum Wells - Stakeholders expressed interest in being updated about whether hydraulic fracturing ('Fracking') of natural gas and petroleum wells is occurring in the region and the potential impact to Butte County groundwater resources.
9. Upper Watershed Health – The upper watershed is an important component of the source of water for the Chico Urban SIU and Butte County in general. As Butte County implements the Sustainable Groundwater Management Act, efforts should be made to assure the protection of the health and storage of the upper watershed.



## **APPENDED DOCUMENTS FOR THE CHICO URBAN AREA BMO**

### **Some Key Dates in the Butte County Nitrate Compliance Plan:**

1979 - High groundwater nitrate concentrations discovered in area wells in the Chico Urban Area (see Chapter 1 & Chapter 2, Nitrate Compliance Plan)

1985/86 - Original scoping of nitrate problems by DWR and development of initial monitoring report

1988 - County Service Area 114 (CSA 114) formed by the Butte County Board of Supervisors to fund technical studies and groundwater evaluations

1990 - Prohibition Order No. 90-126 adopted by the Regional Water Quality Control Board (Redding)

1992 - Initial characterization of 119 wells

1993 - Nitrate study team assembled, representatives from: Butte County Admin Office (BCAO), Butte County Environmental Health, RWQCB, independent hydro-geologists, Dames & Moore (BCAO's consultant), and professors from UC Davis and CSU-Chico for peer review

1994 - Groundwater Nitrate Study - Chico Urban Area Final Report (Dames & Moore)

1996 - Technical Memorandum - Hydrologic and Soils Conditions (Dames & Moore)

1997/2000 - Preparation of Chico Urban Area Nitrate Compliance Plan by Butte County and the Citizens Nitrate Advisory Committee

2000 - Chico Urban Area Nitrate Compliance Plan adopted by the Butte County Board of Supervisors. Presented to the City of Chico, to the RWQCB-Redding, and the Central Valley RWQCB (Sacramento) as the County's official response to Prohibition Order 90-126. Butte County continues to be on the list for State Revolving Fund (SRF) Loan application funding through the State Water Resources Control Board

2001 - East Lassen Avenue sewer installed. Casa de Flores Mobile Home Park (300 units) and other high-density developments started connecting to sewer.

2001 - Draft and Final EIR for the Chico Urban Area Nitrate Compliance Plan

2001 - Butte County receives Small Communities Grant from the SWRCB to do initial sewer feasibility study for connecting low income mobile home parks (located north of Eaton Rd) to sewer

2004/05 - Oversight monitoring program initiated by Butte County Environmental Health for units within CSA 114 that are proposed to remain on septic systems. New groundwater nitrate monitoring wells installed to replace lost/destroyed monitoring sites. Most recent sampling event conducted by Hanover Environmental.

2005 - Butte County and City of Chico Redevelopment Agency execute the Chico Urban Area Joint Powers Financing Authority (JPFA) to facilitate the financing for sewer construction

2006/07 - JPFA develops financial loan application for sewer construction.

Several of the reports mentioned above are located in the public reserve section of the Chico Public Library, or the Meriam Library, Special Collections Section at CSU-Chico. Also, view the Chico Urban Area Nitrate Compliance Plan at [www.buttecounty.net](http://www.buttecounty.net). Select "Administration" from the drop-down menu and then "Chico Nitrate Compliance Program" from the menu on the left.