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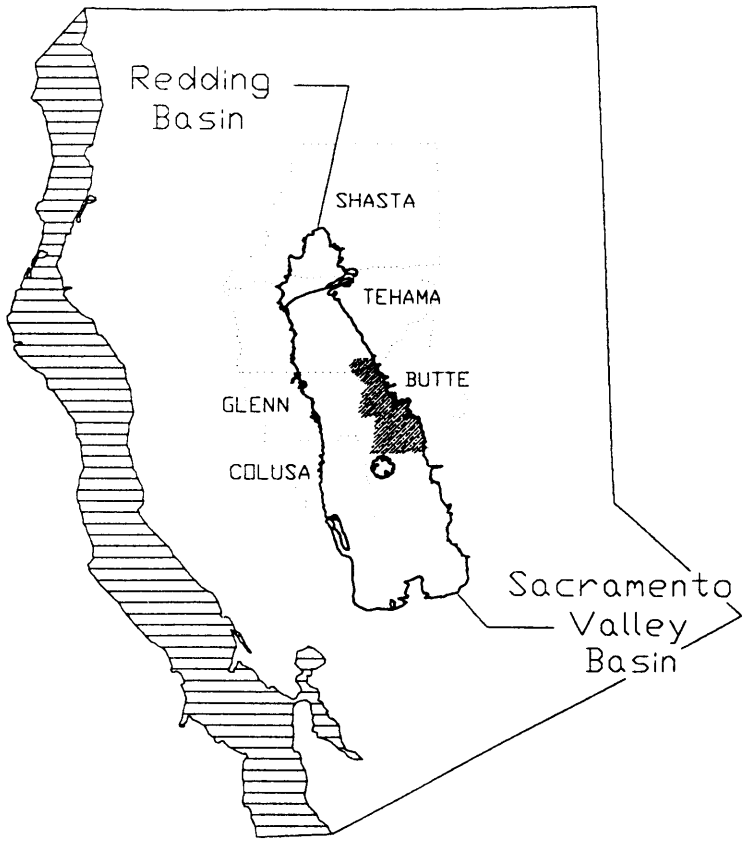
The Resources Agency
DEPARTMENT OF WATER RESOURCES
Northern District

# SACRAMENTO VALLEY BASIN GROUND WATER LEVELS

# BUTTE COUNTY




**Department of Water Resources**
**Northern District**

**February 1993**

| | | |
|---|---|---|
| Douglas P. Wheeler<br>Secretary for Resources<br>The Resources Agency | Pete Wilson<br>Governor<br>State of California | David N. Kennedy<br>Director<br>Department of Water Resources |

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**For electronic copies of the data for Butte County contact:**

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Ground Water Section
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Red Bluff, CA 96080

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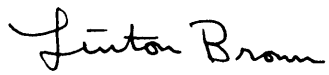
**Department of Water Resources**

# Foreword

Ground water is an important source of water for Butte County. The Northern District of the Department of Water Resources has collected data on ground water levels from more than 70 wells in the county.

This report summarizes ground water level data collected by the Department through April 1992. The report presents locations of wells, information related to the monitoring program, and hydrographs depicting ground water levels over time. This information will provide the basis for a better understanding of ground water level trends in Butte County. Understanding these trends will aid in management of this important resource.



Linton Brown, Chief
Northern District

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Ralph G. Scott . . . . . Chief, Resources Assessment Branch

*This report was prepared by:*

Patricia S. Huckabay . . . . . Associate Engineer, Water Resources

*With assistance from:*

Noel Eaves . . . . . Associate Engineering Geologist
Shawn Pike . . . . . Associate Engineer, WR
Sandra H. Gregg . . . . . Water Resources Technician I
Douglas Blankenship . . . . . Water Resources Technician I
Sid B. Clarkson . . . . . Graduate Student Assistant
Michael L. Serna . . . . . Senior Delineator
Sharon Helfrich . . . . . Office Technician

Under the direction of:

Glen S. Pearson . . . . . Chief, Ground Water Section

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# Introduction

Since the 1940s, DWR has measured ground water levels in more than 70 Butte County wells. Currently, 51 wells are monitored semiannually. In addition, DWR measures 6 wells on a monthly basis.

This report is a compilation of information related to the monitoring program in Butte County and includes ground water hydrographs for the monitored wells.

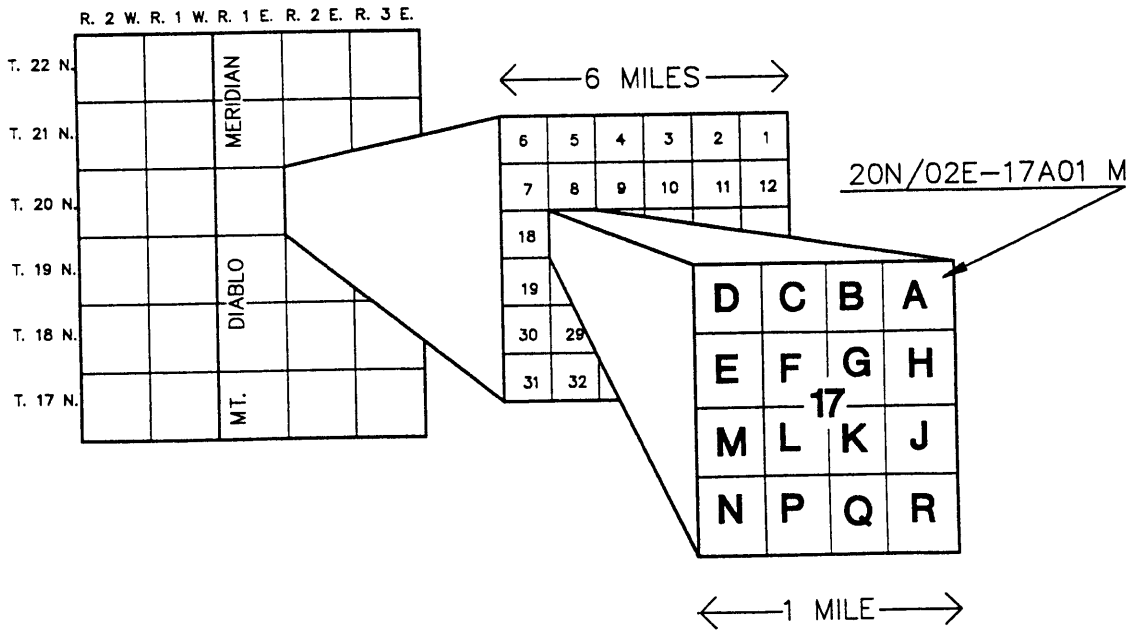
# State Well Numbering System

Each well in the monitoring program is assigned an official State Well Number. DWR has sole responsibility for assigning State Well Numbers to water wells in California, and each number uniquely identifies a well based on its location.

Each State Well Number includes township, range and section number, and each section is further subdivided into sixteen 40-acre tracts, which are assigned a letter designation as shown below. Within each 40-acre tract, wells are numbered sequentially in the order they are inventoried. The final letter of the identification signifies the base line and meridian to which the well location refers. In Butte County, all wells are referenced to the Mount Diablo base line and meridian. The example below is for State Well Number 20N/02E-17A01 M.

**Figure 1**

## State Well Numbering System




The lettering system does not contain the letters "I" and "O".

# Measurement Frequency and Period of Record

Table I shows the period of record and frequency of measurement for Butte County wells monitored historically by the Ground Water Section of the Northern District. The wells currently measured are labeled as ACTIVE.

Most wells are measured semiannually: once in spring, usually during March, and once in fall, during October. Dates of the measurements are timed to obtain the approximate highest static water level in the spring and approximate lowest static water level in the fall. Currently, six wells are measured monthly to provide a record of how levels change throughout the year. Over time, the measurement frequency for many wells in the monitoring program has alternated between semiannually and monthly. The "Measurement Frequency" column in Table 1 reflects only the most recent measurement frequency for the wells.

**Table 1**
**Measurement Frequency and Period of Record for Ground Water Monitoring Wells in Butte County**

| State Well Number | Measurement Frequency | No. of Meas. | Record Begins | Record Ends |
|---|---|---|---|---|
| 17N/01E-10A01M | SEMI-ANNUAL | 88 | 03/10/53 | ACTIVE |
| 17N/02E-14A01M | SEMI-ANNUAL | 95 | 04/07/47 | ACTIVE |
| 17N/02E-16C01M | SEMI-ANNUAL | 92 | 08/22/47 | ACTIVE |
| 17N/03E-03D01M | SEMI-ANNUAL | 96 | 04/10/47 | ACTIVE |
| 17N/03E-05C01M | SEMI-ANNUAL | 97 | 04/10/47 | ACTIVE |
| 17N/03E-08G01M | SEMI-ANNUAL | 83 | 03/12/53 | ACTIVE |
| 17N/03E-13N01M | SEMI-ANNUAL | 64 | 01/21/76 | 10/08/90 |
| 17N/03E-16N01M | SEMI-ANNUAL | 83 | 03/12/53 | ACTIVE |
| 17N/04E-08A01M | SEMI-ANNUAL | 68 | 05/02/61 | ACTIVE |
| 17N/04E-22B01M | SEMI-ANNUAL | 39 | 03/08/76 | ACTIVE |
| 18N/01E-13M01M | SEMI-ANNUAL | 95 | 04/26/48 | ACTIVE |
| 18N/01E-15D02M | SEMI-ANNUAL | 39 | 03/08/76 | ACTIVE |
| 18N/02E-11D01M | SEMI-ANNUAL | 52 | 10/02/59 | 10/08/82 |
| 18N/02E-16F01M | SEMI-ANNUAL | 119 | 04/09/47 | ACTIVE |
| 18N/02E-25M01M | SEMI-ANNUAL | 73 | 08/19/59 | ACTIVE |
| 18N/02E-32Q01M | MONTHLY | 34 | 02/05/47 | 10/07/63 |
| 18N/02E-32Q02M | SEMI-ANNUAL | 245 | 02/05/47 | ACTIVE |
| 18N/03E-05K01M | SEMI-ANNUAL | 93 | 03/29/47 | ACTIVE |
| 18N/03E-18F01M | SEMI-ANNUAL | 102 | 03/23/47 | ACTIVE |
| 18N/03E-21G01M | SEMI-ANNUAL | 87 | 03/12/53 | ACTIVE |
| 18N/03E-25N01M | SEMI-ANNUAL | 39 | 03/09/76 | ACTIVE |
| 18N/04E-08M01M | SEMI-ANNUAL | 69 | 05/02/61 | ACTIVE |
| 18N/04E-16C01M | SEMI-ANNUAL | 91 | 10/20/47 | ACTIVE |
| 18N/04E-28L01M | SEMI-ANNUAL | 93 | 10/20/47 | ACTIVE |
| 19N/01E-09Q01M | SEMI-ANNUAL | 7 | 08/15/91 | ACTIVE |
| 19N/01E-09R01M | SEMI-ANNUAL | 38 | 03/08/76 | 08/27/91 |
| 19N/01E-27Q01M | SEMI-ANNUAL | 75 | 04/19/78 | ACTIVE |
| 19N/01E-28R01M | SEMI-ANNUAL | 256 | 08/19/59 | ACTIVE |
| 19N/02E-17A01M | SEMI-ANNUAL | 74 | 08/11/59 | ACTIVE |
| 19N/02E-34J01M | SEMI-ANNUAL | 38 | 10/02/59 | 03/21/78 |
| 19N/03E-05N01M | SEMI-ANNUAL | 16 | 11/08/58 | 03/10/67 |
| 19N/03E-05N02M | SEMI-ANNUAL | 46 | 03/10/67 | ACTIVE |
| 19N/03E-21C01M | SEMI-ANNUAL | 93 | 10/30/47 | ACTIVE |
| 19N/03E-22A01M | SEMI-ANNUAL | 68 | 11/10/58 | 03/16/82 |
| 19N/04E-32P01M | SEMI-ANNUAL | 73 | 08/29/59 | ACTIVE |
| 20N/01E-10C02M | SEMI-ANNUAL | 98 | 03/31/47 | ACTIVE |
| 20N/01E-35C01M | SEMI-ANNUAL | 100 | 02/04/47 | ACTIVE |
| 20N/01W-26H01M | SEMI-ANNUAL | 89 | 08/05/48 | ACTIVE |
| 20N/01W-26H02M | SEMI-ANNUAL | 123 | 11/24/41 | ACTIVE |
| 20N/02E-06Q01M | SEMI-ANNUAL | 86 | 10/17/47 | ACTIVE |
| 20N/02E-09L01M | SEMI-ANNUAL | 84 | 07/30/53 | ACTIVE |
| 20N/02E-28N01M | MONTHLY | 392 | 06/06/47 | ACTIVE |
| 20N/03E-06M01M | SEMI-ANNUAL | 22 | 03/11/76 | 10/09/86 |
| 21N/01E-05G01M | MONTHLY | 185 | 05/11/61 | 03/11/81 |
| 21N/01E-12K01M | SEMI-ANNUAL | 73 | 08/12/59 | ACTIVE |
| 21N/01E-27D01M | SEMI-ANNUAL | 142 | 10/09/46 | ACTIVE |
| 21N/01W-23J01M | SEMI-ANNUAL | 173 | 12/08/41 | ACTIVE |
| 21N/01W-26K01M | MONTHLY | 170 | 12/05/29 | 03/11/76 |
| 21N/02E-07C01M | SEMI-ANNUAL | 57 | 02/28/67 | ACTIVE |
| 21N/02E-26E02M | SEMI-ANNUAL | 278 | 08/26/47 | ACTIVE |
| 21N/02E-26F01M | SEMI-ANNUAL | 57 | 02/23/67 | ACTIVE |
| 22N/01E-02R01M | SEMI-ANNUAL | 81 | 08/17/48 | 10/10/89 |
| 22N/01E-09J02M | SEMI-ANNUAL | 96 | 01/14/48 | ACTIVE |
| 22N/01E-20K01M | MONTHLY | 249 | 05/10/61 | ACTIVE |
| 22N/01E-28J01M | MONTHLY | 253 | 01/16/58 | ACTIVE |
| 22N/01E-28J02M | MONTHLY | 242 | 01/16/58 | 10/09/86 |
| 22N/01E-28J03M | MONTHLY | 263 | 01/06/58 | ACTIVE |
| 22N/01E-28J05M | MONTHLY | 265 | 01/03/58 | ACTIVE |
| 22N/01E-29R01M | SEMI-ANNUAL | 105 | 01/27/47 | ACTIVE |
| 22N/01W-05M01M | SEMI-ANNUAL | 103 | 04/01/47 | ACTIVE |
| 22N/02E-17E01M | SEMI-ANNUAL | 151 | 09/20/47 | ACTIVE |
| 22N/02E-18H01M | SEMI-ANNUAL | 6 | 09/26/91 | ACTIVE |
| 23N/01E-18A01M | SEMI-ANNUAL | 39 | 10/13/47 | ACTIVE |
| 23N/01E-29P01M | SEMI-ANNUAL | 213 | 10/08/56 | 04/20/90 |
| 23N/01E-29P02M | SEMI-ANNUAL | 10 | 10/09/90 | ACTIVE |
| 23N/01W-09E01M | MONTHLY | 253 | 02/07/47 | ACTIVE |
| 23N/01W-14R01M | SEMI-ANNUAL | 227 | 01/21/48 | 05/30/86 |
| 23N/01W-14R02M | SEMI-ANNUAL | 21 | 11/13/85 | ACTIVE |
| 23N/01W-27L01M | SEMI-ANNUAL | 39 | 03/10/76 | ACTIVE |
| 23N/01W-36P01M | SEMI-ANNUAL | 73 | 08/20/59 | ACTIVE |
| 23N/02W-25C01M | SEMI-ANNUAL | 57 | 02/28/67 | ACTIVE |

# Well Locations

Locations of Butte County monitoring wells are shown in Appendix B. They are monitored by DWR. Butte County and the U.S. Bureau of Reclamation are not currently measuring water levels in Butte County, but have historically. Approximate latitude, longitude, and Zone 10 UTM *(Universal Transverse Mercator)* coordinates, in meters, for each well are given in Table 2.

The coordinates were determined by plotting the location of each well on USGS 7.5-minute quadrangles, using information on file with DWR. The UTM coordinates of the plotted locations were digitized from these quadrangles. Latitude and longitude coordinates for each well were calculated from the digitized UTM coordinate data using software developed by the U.S. Geological Survey.

Locations shown in Table 2 and on Appendix B are approximate, but are estimated to be within 500 feet. If you detect an error in location, please notify the Department of Water Resources, Northern District, Ground Water Section, 2440 Main Street, Red Bluff, California 96080.

**Table 2**
**Locations for Ground Water Level Monitoring Wells in Butte County**

| State Well Number | UTM Coordinates East | UTM Coordinates North | Latitude (Decimal Degrees) | Longitude (Decimal Degrees) | Latitude (Degrees Minutes Seconds) | | | Longitude (Degrees Minutes Seconds) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 17N/01E-10A01M | 600268 | 4355579 | 39.3457 | 121.8364 | 39 | 20 | 44 | 121 | 50 | 11 |
| 17N/02E-14A01M | 611306 | 4354387 | 39.3336 | 121.7086 | 39 | 20 | 1 | 121 | 42 | 31 |
| 17N/02E-16C01M | 607264 | 4354257 | 39.3329 | 121.7555 | 39 | 19 | 59 | 121 | 45 | 20 |
| 17N/03E-03D01M | 617827 | 4357845 | 39.3639 | 121.6323 | 39 | 21 | 50 | 121 | 37 | 56 |
| 17N/03E-05C01M | 615387 | 4357609 | 39.3621 | 121.6607 | 39 | 21 | 44 | 121 | 39 | 38 |
| 17N/03E-08G01M | 615628 | 4354998 | 39.3385 | 121.6583 | 39 | 20 | 19 | 121 | 39 | 30 |
| 17N/03E-13N01M | 621530 | 4353155 | 39.3211 | 121.5902 | 39 | 19 | 16 | 121 | 35 | 25 |
| 17N/03E-16N01M | 616665 | 4353170 | 39.3219 | 121.6466 | 39 | 19 | 19 | 121 | 38 | 48 |
| 17N/04E-08A01M | 625801 | 4356393 | 39.3497 | 121.5400 | 39 | 20 | 59 | 121 | 32 | 24 |
| 17N/04E-22B01M | 628683 | 4353117 | 39.3197 | 121.5072 | 39 | 19 | 11 | 121 | 30 | 26 |
| 18N/01E-13M01M | 602138 | 4362958 | 39.4119 | 121.8136 | 39 | 24 | 43 | 121 | 48 | 49 |
| 18N/01E-15D02M | 598811 | 4363817 | 39.4201 | 121.8521 | 39 | 25 | 12 | 121 | 51 | 8 |
| 18N/02E-11D01M | 609826 | 4364040 | 39.4207 | 121.7241 | 39 | 25 | 15 | 121 | 43 | 27 |
| 18N/02E-16F01M | 607136 | 4363270 | 39.4142 | 121.7555 | 39 | 24 | 51 | 121 | 45 | 20 |
| 18N/02E-25M01M | 611685 | 4359785 | 39.3822 | 121.7033 | 39 | 22 | 56 | 121 | 42 | 12 |
| 18N/02E-32Q01M | 606094 | 4357756 | 39.3646 | 121.7685 | 39 | 21 | 53 | 121 | 46 | 7 |
| 18N/02E-32Q02M | 606075 | 4357629 | 39.3635 | 121.7687 | 39 | 21 | 48 | 121 | 46 | 7 |
| 18N/03E-05K01M | 615703 | 4366537 | 39.4425 | 121.6555 | 39 | 26 | 33 | 121 | 39 | 20 |
| 18N/03E-18F01M | 613718 | 4363710 | 39.4173 | 121.6790 | 39 | 25 | 2 | 121 | 40 | 44 |
| 18N/03E-21G01M | 617214 | 4362051 | 39.4019 | 121.6387 | 39 | 24 | 7 | 121 | 38 | 19 |
| 18N/03E-25N01M | 621440 | 4359873 | 39.3817 | 121.5900 | 39 | 22 | 54 | 121 | 35 | 24 |
| 18N/04E-08M01M | 624479 | 4365134 | 39.4286 | 121.5538 | 39 | 25 | 43 | 121 | 33 | 14 |
| 18N/04E-16C01M | 626517 | 4364546 | 39.4230 | 121.5302 | 39 | 25 | 23 | 121 | 31 | 49 |
| 18N/04E-28L01M | 626409 | 4360271 | 39.3845 | 121.5323 | 39 | 23 | 4 | 121 | 31 | 56 |
| 19N/01E-09Q01M | 597787 | 4373993 | 39.5119 | 121.8625 | 39 | 30 | 43 | 121 | 51 | 45 |
| 19N/01E-09R01M | 598253 | 4373862 | 39.5106 | 121.8571 | 39 | 30 | 38 | 121 | 51 | 26 |
| 19N/01E-27Q01M | 599602 | 4368779 | 39.4647 | 121.8422 | 39 | 27 | 53 | 121 | 50 | 32 |
| 19N/01E-28R01M | 598343 | 4368852 | 39.4655 | 121.8568 | 39 | 27 | 56 | 121 | 51 | 25 |
| 19N/02E-17A01M | 606288 | 4373518 | 39.5066 | 121.7637 | 39 | 30 | 24 | 121 | 45 | 49 |
| 19N/02E-34J01M | 609681 | 4368081 | 39.4572 | 121.7252 | 39 | 27 | 26 | 121 | 43 | 31 |
| 19N/03E-05N01M | 614738 | 4375581 | 39.5241 | 121.6651 | 39 | 31 | 27 | 121 | 39 | 54 |
| 19N/03E-05N02M | 614738 | 4375581 | 39.5241 | 121.6651 | 39 | 31 | 27 | 121 | 39 | 54 |
| 19N/03E-21C01M | 616686 | 4372363 | 39.4948 | 121.6430 | 39 | 29 | 41 | 121 | 38 | 35 |
| 19N/03E-22A01M | 619274 | 4372358 | 39.4944 | 121.6129 | 39 | 29 | 40 | 121 | 36 | 47 |
| 19N/04E-32P01M | 624850 | 4368048 | 39.4548 | 121.5489 | 39 | 27 | 17 | 121 | 32 | 56 |
| 20N/01E-10C02M | 598801 | 4384841 | 39.6095 | 121.8491 | 39 | 36 | 34 | 121 | 50 | 57 |
| 20N/01E-35C01M | 600392 | 4378376 | 39.5510 | 121.8316 | 39 | 33 | 4 | 121 | 49 | 54 |
| 20N/01W-26H01M | 591763 | 4379306 | 39.5604 | 121.9318 | 39 | 33 | 37 | 121 | 55 | 55 |
| 20N/01W-26H02M | 591762 | 4379398 | 39.5612 | 121.9318 | 39 | 33 | 40 | 121 | 55 | 55 |
| 20N/02E-06Q01M | 604134 | 4385249 | 39.6125 | 121.7869 | 39 | 36 | 45 | 121 | 47 | 13 |
| 20N/02E-09L01M | 606852 | 4384094 | 39.6018 | 121.7555 | 39 | 36 | 6 | 121 | 45 | 20 |
| 20N/02E-28N01M | 606454 | 4378775 | 39.5539 | 121.7610 | 39 | 33 | 14 | 121 | 45 | 39 |
| 20N/03E-06M01M | 612714 | 4385902 | 39.6173 | 121.6869 | 39 | 37 | 2 | 121 | 41 | 13 |
| 21N/01E-05G01M | 595331 | 4395452 | 39.7055 | 121.8880 | 39 | 42 | 20 | 121 | 53 | 17 |
| 21N/01E-12K01M | 601929 | 4393725 | 39.6891 | 121.8113 | 39 | 41 | 21 | 121 | 48 | 41 |
| 21N/01E-27D01M | 597842 | 4389476 | 39.6513 | 121.8596 | 39 | 39 | 5 | 121 | 51 | 35 |
| 21N/01W-23J01M | 591205 | 4390253 | 39.6591 | 121.9368 | 39 | 39 | 33 | 121 | 56 | 13 |
| 21N/01W-26K01M | 590698 | 4388592 | 39.6442 | 121.9430 | 39 | 39 | 39 | 121 | 56 | 35 |
| 21N/02E-07C01M | 603045 | 4394317 | 39.6943 | 121.7982 | 39 | 41 | 40 | 121 | 47 | 54 |
| 21N/02E-26E02M | 609380 | 4389211 | 39.6476 | 121.7252 | 39 | 38 | 51 | 121 | 43 | 31 |
| 21N/02E-26F01M | 609448 | 4389147 | 39.6470 | 121.7244 | 39 | 38 | 49 | 121 | 43 | 28 |
| 22N/01E-02R01M | 600360 | 4404225 | 39.7839 | 121.8280 | 39 | 47 | 2 | 121 | 49 | 41 |
| 22N/01E-09J02M | 597539 | 4403247 | 39.7754 | 121.8611 | 39 | 46 | 32 | 121 | 51 | 40 |
| 22N/01E-20K01M | 595178 | 4399803 | 39.7447 | 121.8891 | 39 | 44 | 41 | 121 | 53 | 21 |
| 22N/01E-28J01M | 597348 | 4398365 | 39.7315 | 121.8640 | 39 | 43 | 53 | 121 | 51 | 51 |
| 22N/01E-28J02M | 597348 | 4398365 | 39.7315 | 121.8640 | 39 | 43 | 53 | 121 | 51 | 51 |
| 22N/01E-28J03M | 597348 | 4398365 | 39.7315 | 121.8640 | 39 | 43 | 53 | 121 | 51 | 51 |
| 22N/01E-28J05M | 597348 | 4398365 | 39.7315 | 121.8640 | 39 | 43 | 53 | 121 | 51 | 51 |
| 22N/01E-29R01M | 595883 | 4397921 | 39.7276 | 121.8812 | 39 | 43 | 40 | 121 | 52 | 52 |
| 22N/01W-05M01M | 584887 | 4404403 | 39.7872 | 122.0086 | 39 | 47 | 14 | 122 | 0 | 31 |
| 22N/02E-17E01M | 603938 | 4402138 | 39.7647 | 121.7866 | 39 | 45 | 53 | 121 | 47 | 12 |
| 22N/02E-18H01M | 603831 | 4402124 | 39.7646 | 121.7878 | 39 | 45 | 52 | 121 | 47 | 16 |
| 23N/01E-18A01M | 593958 | 4411958 | 39.8543 | 121.9016 | 39 | 51 | 16 | 121 | 54 | 6 |
| 23N/01E-29P01M | 594986 | 4407417 | 39.8133 | 121.8903 | 39 | 48 | 48 | 121 | 53 | 25 |
| 23N/01E-29P02M | 594986 | 4407417 | 39.8133 | 121.8903 | 39 | 48 | 48 | 121 | 53 | 25 |
| 23N/01W-09E01M | 586186 | 4413059 | 39.8651 | 121.9923 | 39 | 51 | 54 | 121 | 59 | 32 |
| 23N/01W-14R01M | 590783 | 4410399 | 39.8406 | 121.9390 | 39 | 50 | 26 | 121 | 56 | 20 |
| 23N/01W-14R02M | 590894 | 4410508 | 39.8416 | 121.9377 | 39 | 50 | 30 | 121 | 56 | 16 |
| 23N/01W-27L01M | 588492 | 4407913 | 39.8185 | 121.9661 | 39 | 49 | 6 | 121 | 57 | 58 |
| 23N/01W-36P01M | 591916 | 4405679 | 39.7980 | 121.9264 | 39 | 47 | 53 | 121 | 55 | 35 |
| 23N/02W-25C01M | 582323 | 4408371 | 39.8232 | 122.0381 | 39 | 49 | 24 | 122 | 2 | 17 |

# Ground Water Level Data Management

The data presented in this report are maintained on IBM-compatible personal computer systems using a collection of data processing applications developed by DWR's Central and Northern District Ground Water Sections. The data management application, known as "eX-terra," consists of five main data tables that contain:

- Ground water level data
- Generalized geographic data
- Well construction data
- Well qualification data
- Coordinate data

Ex-terra is configured to produce both printed reports and ASCII *(American Standard Code for Information Interchange)* files for use in other computer programs. Among the printed reports are:

- Ground water levels for single wells or groups of wells, based on State Well Number, ground water basin, or county
- Well construction and monitoring history
- Well coordinate and geographic data

The ASCII output files are formatted for direct input to several widely available graphics programs to create ground water level contour maps or hydrographs, such as those presented in Appendix A.

The ground water level and coordinate data presented in this report can be purchased in electronic form (see inside front cover for details). The files are provided in ASCII delimited format. An ASCII documentation file explaining the contents of the data files is included with each response to a data request. Information about the IBM-compatible applications that comprise the eX-terra ground water level data management system and their implementation is also available.

# Ground Water Level Measurements

Water levels in all wells are measured using a steel tape or electric probe. All measurements of water levels should be accurate to the nearest tenth of a foot. The water surface elevations presented in this report are calculated using the water level measurements and ground surface elevations at each well. Most of the ground surface elevations were estimated from USGS 7.5 quadrangles. Accuracy of these elevations is dependent on the contour intervals of the maps, which range from 5 to 40 feet.

Ground water level data for each well are depicted on the hydrographs in Appendix A. The hydrographs represent water level data through April 1992 and are organized by township from south to north and by range from east to west.

On the hydrographs, solid circles (dots) depict actual measured ground water elevations. When an individual measurement is identified by a hollow circle enclosing a smaller solid circle, the measurement is questionable. Solid lines connecting individual measurements are interpolations of the change in ground water elevation between measurements. Discontinuities on the graphs indicate an expected measurement is missing. Ground surface elevations at the wells are represented as long, solid horizontal lines.

Hydrographs representing monthly monitoring wells have a higher concentration of data points compared to hydrographs representing semi-annual measurement wells.

Data points that appear "unusual" were checked against field records and retained, to preserve the objectivity of the ground water level records.

# Ground Water Level Trends

Butte County can be divided into two general ground water resource areas: the Sacramento Valley, which is the major ground water basin, and the foothills and mountains to the east-northeast, which have limited ground water resources. The Department's monitoring program focused on wells located only in the Sacramento Valley basin.

Ground water levels fluctuate annually in response to pumpage, recharge from precipitation, stream percolation, infiltration of applied irrigation water, and subsurface inflow and outflow. Levels are usually highest in the spring and lowest in the fall. Longer term fluctuations occur when discharge exceeds or is less than recharge over several seasons. Changes in ground water levels are determined from well measurements. Hydrographs are graphical plots of the measurements and illustrate annual spring to fall changes, long-term changes linked to increased or decreased ground water extraction, or variations associated with wet or dry climatic conditions.

Ground water in Butte County is recharged by precipitation, applied water, local creeks, and the Thermalito Afterbay. The major creeks are Big Chico, Little Chico, and Butte Creeks. Ground water generally flows from northeast to southwest and discharges at the Sacramento and Feather Rivers.

In general, the hydrographs in Appendix A show:

- Ground water levels have not changed significantly since the 1950s.
- The seasonal fluctuation (spring to fall change) is about 10 to 20 feet in the north and east portion of the county and less than five feet in the southwest portion of the county.
- Ground water level declines in most wells are associated with the 1976 - 77 and 1986 - current drought.
- All ground water levels recovered from the 1976 - 77 to pre-drought levels during the wet period in the early 1980s.
- The decline is not just "in the wells." Water levels in the wells indicate an apparent decline in general ground water levels in the Chico area. Near Chico, an apparent water level decline began about 1982.

# Well Qualification

Well qualification is a standardized process to identify the aquifer(s) associated with individual monitoring wells (Table 3).

A ground water basin is often stratified with several layers of pervious, impervious and semi-impervious material. These layers form an upper unconfined and one or more lower confined to semi-confined zones (described as ground water bodies or aquifers). Water wells may draw from two or more different aquifers.

In order to compare and understand the water level data from various monitoring wells, one must identify which aquifer(s) each well is drawing from by qualifying the wells.

There are four components in well qualification. They are:

I. The ground water body classification of the well's ground water aquifer(s).

1. Unconfined ground water body.
2. Semi-confined ground water body.
3. Confined ground water body.
4. Previously named zone either confined or unconfined, i.e., "A" zone confined, "Silverado."
5. Composite, consisting of both free and confined ground water bodies.

II. The degree of certainty associated with the ground water body classification.

1. Definite: Evidence is conclusive.
2. Probable: Evidence is not conclusive, but includes fairly convincing evidence in support.
3. Possible: Evidence is not conclusive and not as firm as probable, but evidence indicates that it could be or that it is possible.

III. The geologic unit as the water bearing material associated with the ground water body. (i.e. Qal - Alluvium, Qfl - Floodplain deposits, Ttu - Tuscan Formation etc.)

IV. The date of qualification and the licensed professional who qualified the well.

Information used to qualify a well may be found from the following sources.

- Well Completion Reports (Driller's Well Logs) may contain the log of geologic formation by depth of the bore hole, well construction information, and well test information such as draw down and yield. When no well completion report is available, a report of a nearby well is substituted and the degree of certainty is reduced to probable or possible in qualifying the well.
- Geologic maps.
- Water level records are analyzed for patterns of water level fluctuation.
- Electric logs - chart the resistivity vs. depth of a well. They are used to locate the vertical boundaries of water-bearing materials.
- Pump test records.
- Water quality and temperature records.

The amount of information available for a well affects the degree of certainty of the ground water body classification.

**Table 3**
**Well Qualification for Butte County Monitoring Wells**

| WELL NUMBER | LOG * | USE | GW BODY | GEOLOGIC UNITS | CONFIDENCE |
|---|---|---|---|---|---|
| 17N/01E-10A01M | USGS | DOM | Composite | Qob | Probable |
| 17N/02E-14A01M | | IRR | Composite | Qob | Possible |
| 17N/02E-16C01M | | DOM | Composite | Qob | Possible |
| 17N/03E-03D01M | SVD | IRR | Composite | Qal+TQL | Possible |
| 17N/03E-05C01M | | IRR | Composite | Qal+TQL | Possible |
| 17N/03E-08G01M | | DOM | Composite | Qoal+TQL? | Possible |
| 17N/03E-13N01M | 91784 | IRR | Composite | TQL | Probable |
| 17N/03E-16N01M | USGS | DOM | Confined | TQL | Probable |
| 17N/04E-08A01M | | IRR | Composite | TQl | Possible |
| 17N/04E-22B01M | 152538 | DOM | Confined | TQg | Probable |
| 18N/01E-13M01M | USBR | DOM | Composite | TQL? | Probable |
| 18N/01E-15D02M | 49155 | DOM | Composite | Qob+TQL? | Probable |
| 18N/02E-11D01M | | IRR | Composite | Qob+TQL | Possible |
| 18N/02E-16F01M | USBR | IRR | Composite | Qob+TQL | Probable |
| 18N/02E-25M01M | USGS | IRR | Composite | Qob?+TQL | Probable |
| 18N/02E-32Q01M | | ABAND | Unconfined | Qoal+Qob | Possible |
| 18N/02E-32Q02M | | DOM | Composite | Qoal+Qob+TQL | Possible |
| 18N/03E-05K01M | | IRR | Confined | TQL | Possible |
| 18N/03E-18F01M | | IRR | Confined | TQL | Possible |
| 18N/03E-21G01M | | IRR | Composite | Qal+TQL | Possible |
| 18N/03E-25N01M | 21096 | IRR | Confined | TQl | Probable |
| 18N/04E-08M01M | DWR | IRR | Confined | TQl | Probable |
| 18N/04E-16C01M | | IRR | Confined | TQl | Possible |
| 18N/04E-28L01M | DWR | IRR | Confined | TQl | Possible |
| 19N/01E-09Q01M | 48541 | IRR | Confined | Qoal+Ttu | Probable |
| 19N/01E-09R01M | 32329 | IRR | Confined | Qoal+Ttu | Probable |
| 19N/01E-27Q01M | DWR | OBS | Confined | Ttu | Definite |
| 19N/01E-28R01M | | DOM | Unconfined | Qob | Probable |
| 19N/02E-17A01M | | DOM | Unconfined | Qob | Possible |
| 19N/02E-34J01M | | DOM | Unconfined | Qob | Possible |
| 19N/03E-05N01M | | ABAND | Composite | TQl | Possible |
| 19N/03E-05N02M | | DOM | Composite | TQl | Probable |
| 19N/03E-21C01M | | DOM | Unconfined | TQl | Possible |
| 19N/03E-22A01M | USGS | IND | Confined | TQl | Possible |
| 19N/04E-32P01M | | MUNI | Confined | TQl | Possible |
| 20N/01E-10C02M | USBR | IRR | Composite | Qoal+Ttu? | Probable |
| 20N/01E-35C01M | | DOM | Confined | Ttu | Probable |
| 20N/01W-26H01M | USGS | IRR | Confined | Qoal+Ttu | Possible |
| 20N/01W-26H02M | USGS | ABAND | Unconfined | Qal | Probable |
| 20N/02E-06Q01M | USGS | IRR | Composite | Qal+Ttus | Definite |
| 20N/02E-09L01M | | IRR | Composite | Qob+Qoal+Ttu | Probable |
| 20N/02E-28N01M | USBR | ABAND | Unconfined | Qob+Ttus | Possible |
| 20N/03E-06M01M | 129880 | IRR | Composite | Ttu | Probable |
| 21N/01E-05G01M | USBR | DOM | Confined | Qoal+Ttu | Probable |
| 21N/01E-12K01M | 48510 | IRR | Confined | Qoal+Ttu | Probable |
| 21N/01E-27D01M | | DOM | Confined | Qoal | Possible |
| 21N/01W-23J01M | | ABAND | Unconfined | Qal | Probable |
| 21N/01W-26K01M | DWR | DOM | Unconfined | Qal | Probable |
| 21N/02E-07C01M | 76297 | IRR | Confined | Ttus | Probable |
| 21N/02E-26E02M | USBR | ABAND | Confined | Ttus | Probable |
| 21N/02E-26F01M | | IRR | Confined | Ttus | Probable |
| 22N/01E-02R01M | | ABAND | Confined | Ttus | Possible |
| 22N/01E-09J02M | | DOM | Unconfined | Qal | Possible |
| 22N/01E-20K01M | | DOM | Composite | Qal+Qoal | Possible |
| 22N/01E-28J01M | USBR | OBS | Confined | Ttus | Definite |
| 22N/01E-28J02M | USBR | OBS | Composite | Qal+Qoal | Probable |
| 22N/01E-28J03M | USBR | OBS | Confined | Qoal | Probable |
| 22N/01E-28J05M | USBR | OBS | Confined | Ttus | Definite |
| 22N/01E-29R01M | USGS | IRR | Confined | Qoal+Ttus | Probable |
| 22N/01W-05M01M | | IRR | Composite | Qfl | Possible |
| 22N/02E-17E01M | USBR | DOM | Confined | Ttus | Probable |
| 22N/02E-18H01M | 265114 | DOM | Composite | Ttus | Probable |
| 23N/01E-18A01M | 57344 | DOM | Confined | Ttus | Probable |
| 23N/01E-29P01M | USGS | ABAND | Composite | Qoal | Probable |
| 23N/01E-29P02M | 265103 | DOM | Composite | Qoal+Ttus? | Possible |
| 23N/01W-09E01M | | IRR | Confined | TQfg | Possible |
| 23N/01W-14R01M | | STOC | Composite | TQfg+Ttu | Possible |
| 23N/01W-14R02M | 215535 | STOC | Composite | Ttus | Probable |
| 23N/01W-27L01M | 57350 | DOM | Confined | Qoal | Probable |
| 23N/01W-36P01M | | DOM | Composite | Qal+Qoal | Possible |
| 23N/02W-25C01M | | IRR | Composite | Qfl+Qoal | Possible |

**GEOLOGIC UNITS**

Qal - Alluvium
Qfl - Floodplain deposits
Qoal - Older alluvium
Qob - Older basin deposits
TQfg - Fanglomerate
TQg - Older gravels
TQL - Laguna Formation
Ttu - Undifferentiated Tuscan Formation
Ttus - Tuscan Formation sediments

**GROUND WATER BODY**

Unconfined - Represents the free ground water level in the uppermost zone of saturation.
Confined - Represents the piezometric surface of an aquifer under pressure.
Composite - Represents a water level that includes two or more confined levels and the free ground water level.

**CONFIDENCE RATING**

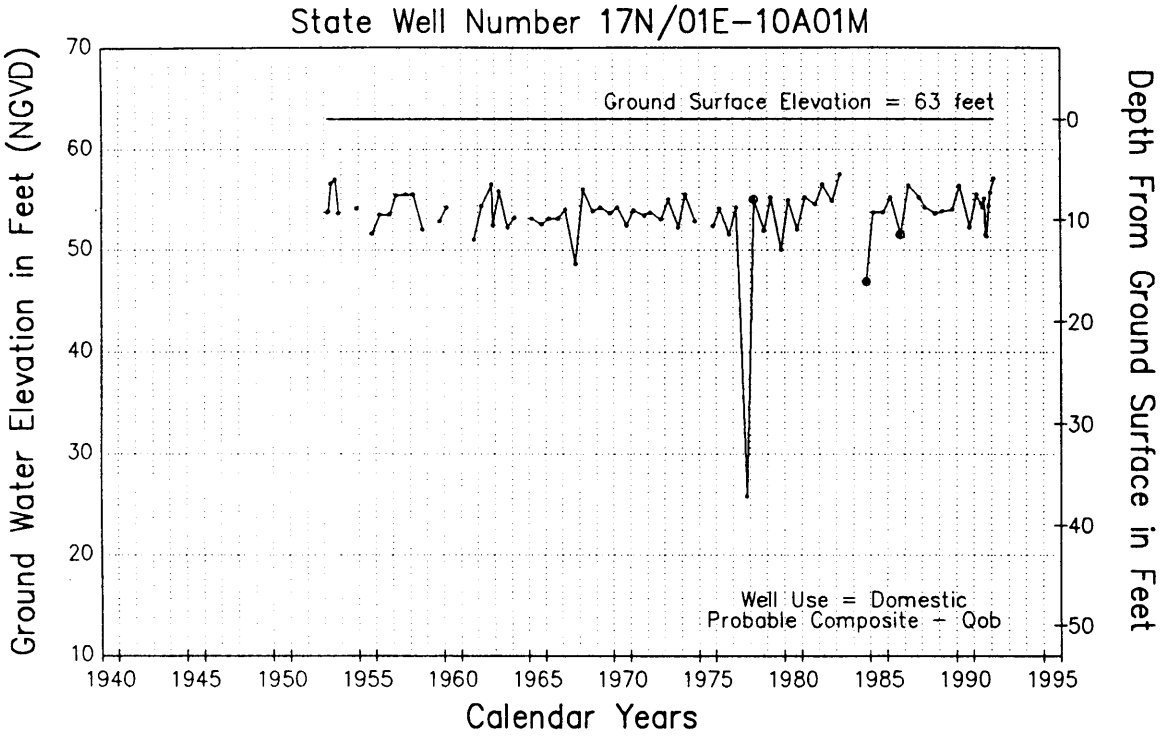
Definite - Know well depth & perforated interval, have complete drillers report & good local geology.
Probable - Know well depth, have partial well drillers report & good local geology.
Possible - Know well depth, have poor local geology and/or uncertain well data.

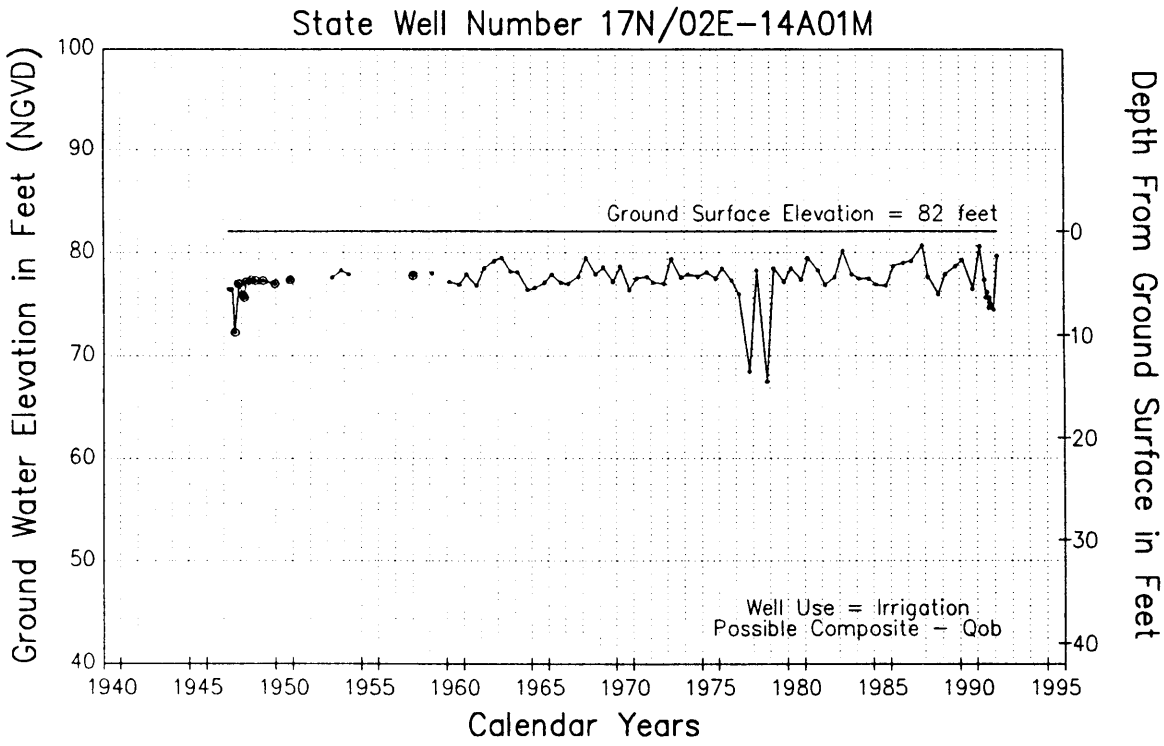
* A well log in file is identified by its DWR log number or by the agency that prepared the log. Likewise, a blank entry indicates that a log is not on file.

# Appendix A
# Hydrographs


| State Well Number | Page | State Well Number | Page |
|---|---|---|---|
| 17N/01E-10A01M | 15 | 20N/01E-35C01M | 33 |
| 17N/02E-14A01M | 15 | 20N/01W-26H01M | 33 |
| 17N/02E-16C01M | 16 | 20N/01W-26H02M | 34 |
| 17N/03E-03D01M | 16 | 20N/02E-06Q01M | 34 |
| 17N/03E-05C01M | 17 | 20N/02E-09L01M | 35 |
| 17N/03E-08G01M | 17 | 20N/02E-28N01M | 35 |
| 17N/03E-13N01M | 18 | 20N/03E-06M01M | 36 |
| 17N/03E-16N01M | 18 | 21N/01E-05G01M | 36 |
| 17N/04E-08A01M | 19 | 21N/01E-12K01M | 37 |
| 17N/04E-22B01M | 19 | 21N/01E-27D01M | 37 |
| 18N/01E-13M01M | 20 | 21N/01W-23J01M | 38 |
| 18N/01E-15D02M | 20 | 21N/01W-26K01M | 38 |
| 18N/02E-11D01M | 21 | 21N/02E-07C01M | 39 |
| 18N/02E-16F01M | 21 | 21N/02E-26E02M | 39 |
| 18N/02E-25M01M | 22 | 21N/02E-26F01M | 40 |
| 18N/02E-32Q01M | 22 | 22N/01E-02R01M | 40 |
| 18N/02E-32Q02M | 23 | 22N/01E-09J02M | 41 |
| 18N/03E-05K01M | 23 | 22N/01E-20K01M | 41 |
| 18N/03E-18F01M | 24 | 22N/01E-28J01M | 42 |
| 18N/03E-21G01M | 24 | 22N/01E-28J02M | 42 |
| 18N/03E-25N01M | 25 | 22N/01E-28J03M | 43 |
| 18N/04E-08M01M | 25 | 22N/01E-28J05M | 43 |
| 18N/04E-16C01M | 26 | 22N/01E-29R01M | 44 |
| 18N/04E-28L01M | 26 | 22N/01W-05M01M | 44 |
| 19N/01E-09Q01M | 27 | 22N/02E-17E01M | 45 |
| 19N/01E-09R01M | 27 | 22N/02E-18H01M | 45 |
| 19N/01E-27Q01M | 28 | 23N/01E-18A01M | 46 |
| 19N/01E-28R01M | 28 | 23N/01E-29P01M | 46 |
| 19N/02E-17A01M | 29 | 23N/01E-29P02M | 47 |
| 19N/02E-34J01M | 29 | 23N/01W-09E01M | 47 |
| 19N/03E-05N01M | 30 | 23N/01W-14R01M | 48 |
| 19N/03E-05N02M | 30 | 23N/01W-14R02M | 48 |
| 19N/03E-21C01M | 31 | 23N/01W-27L01M | 49 |
| 19N/03E-22A01M | 31 | 23N/01W-36P01M | 49 |
| 19N/04E-32P01M | 32 | 23N/02W-25C01M | 50 |
| 20N/01E-10C02M | 32 | | |

# Sacramento Valley Basin – Butte County




·····Water surface elevation in well ••••• Questionable measurement

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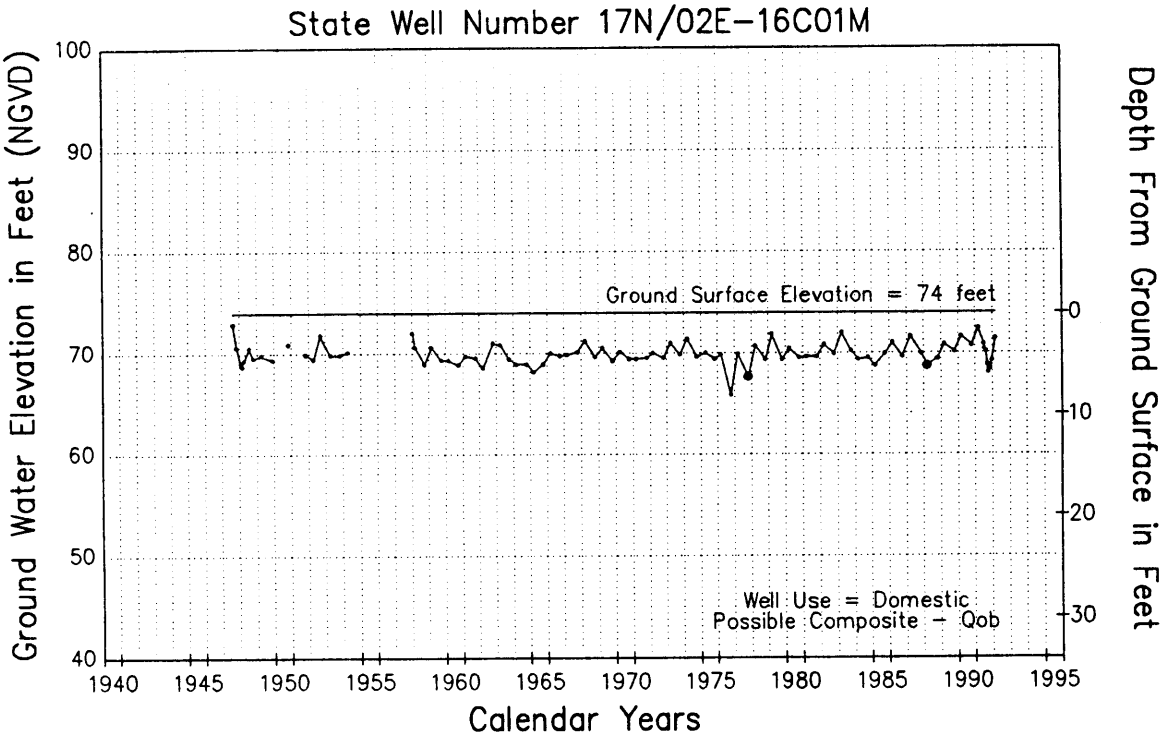
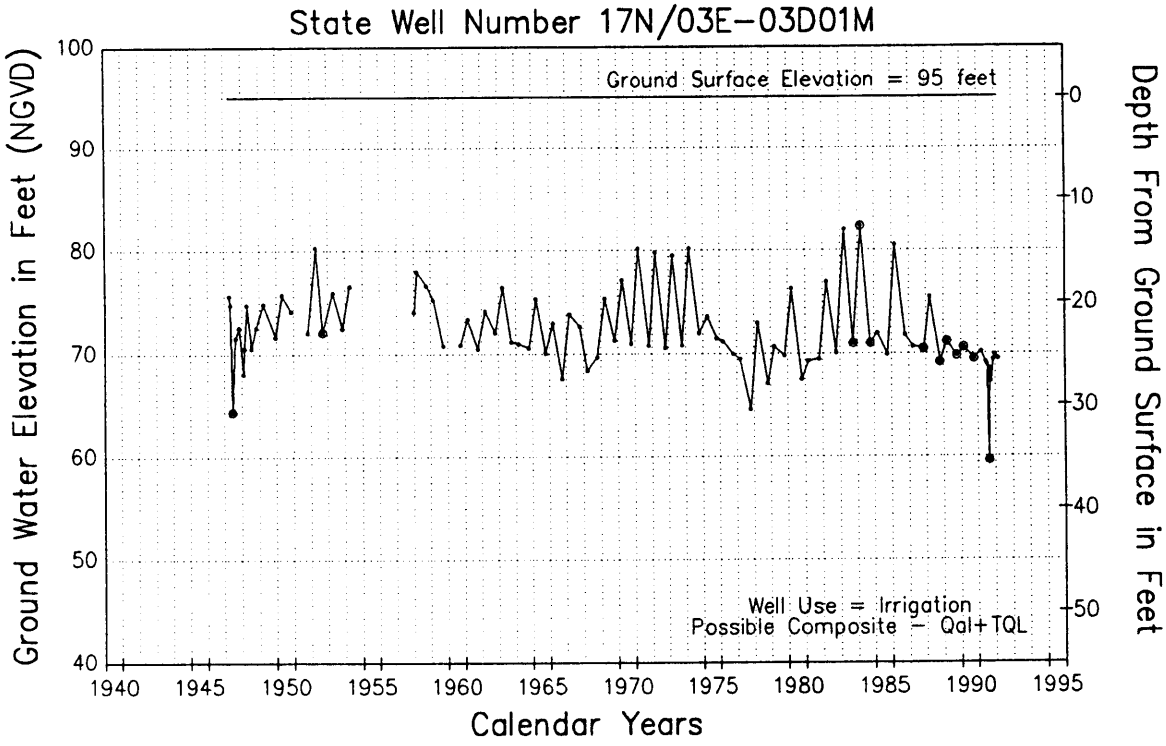
# Sacramento Valley Basin – Butte County

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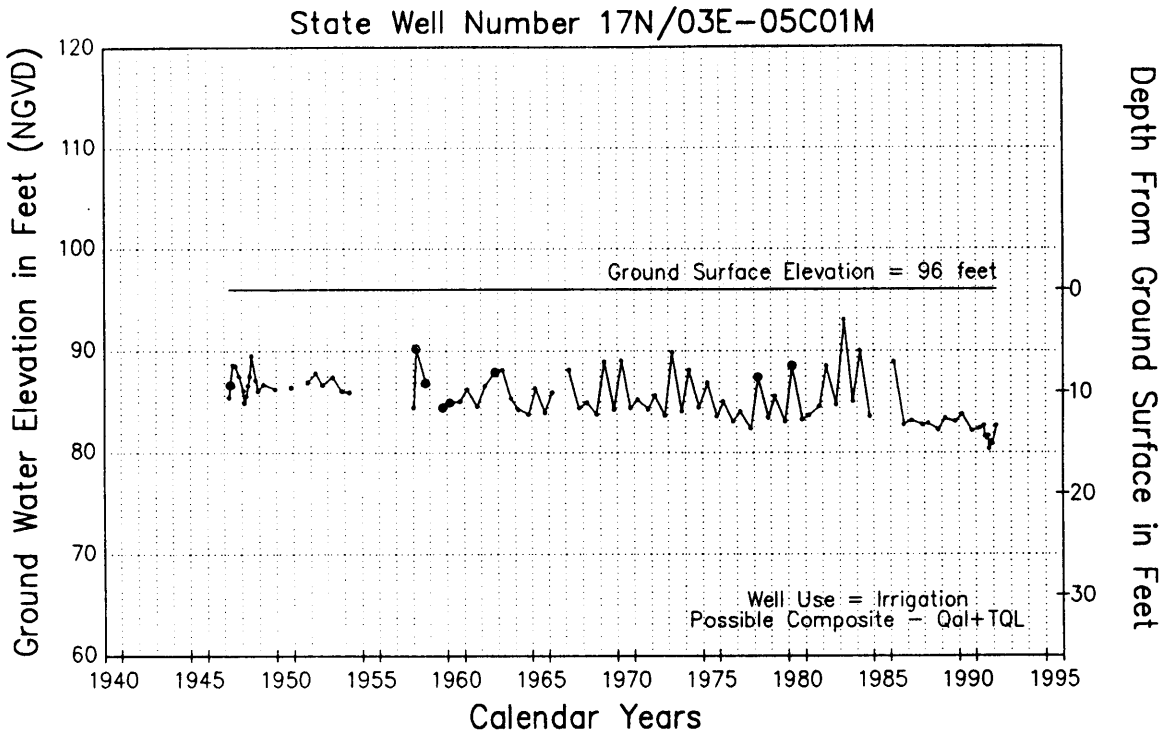
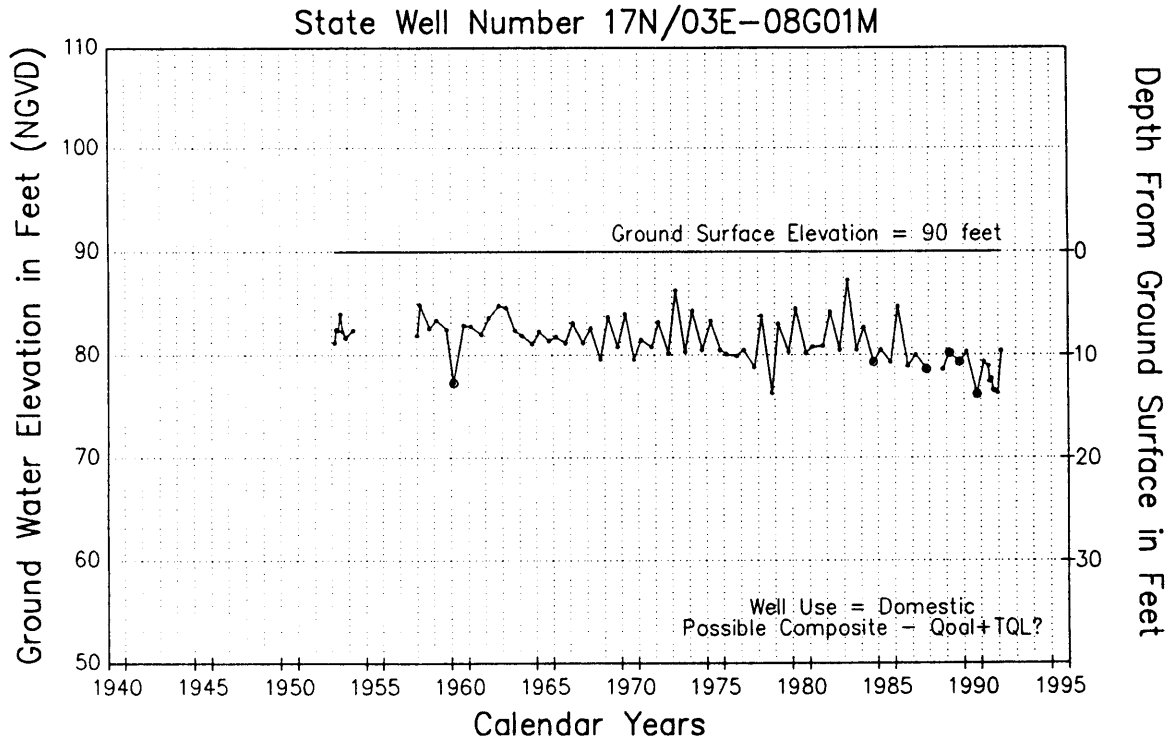
# Sacramento Valley Basin – Butte County

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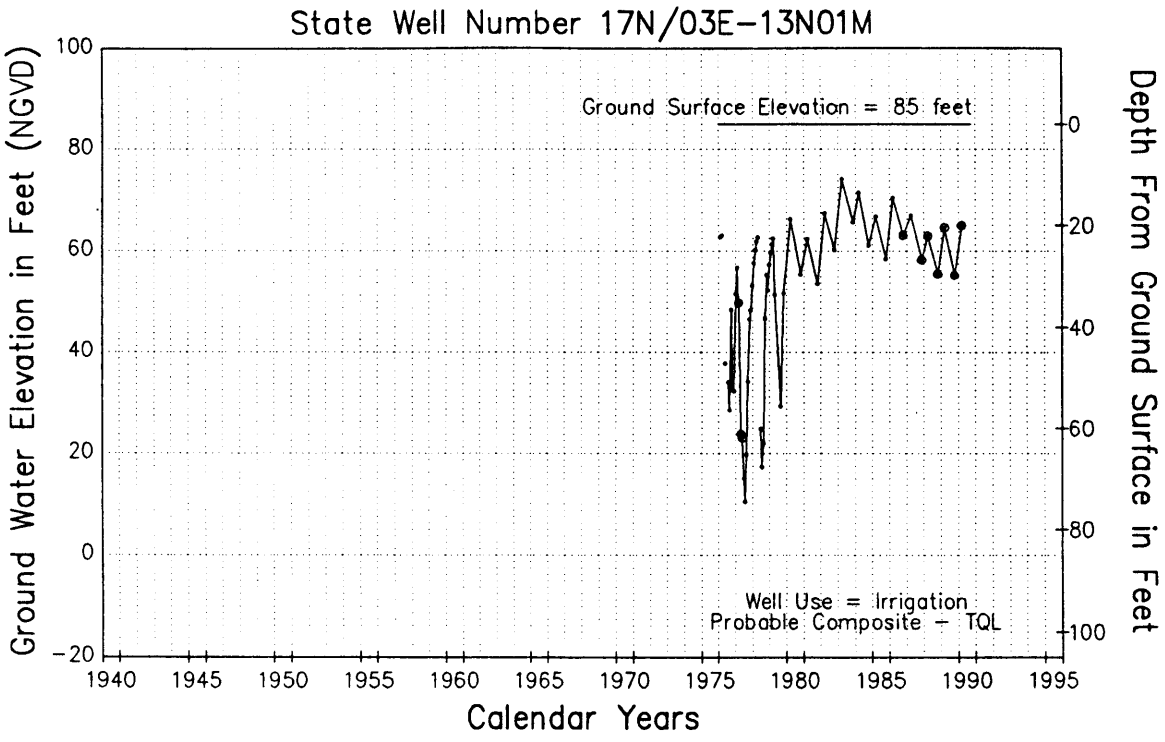
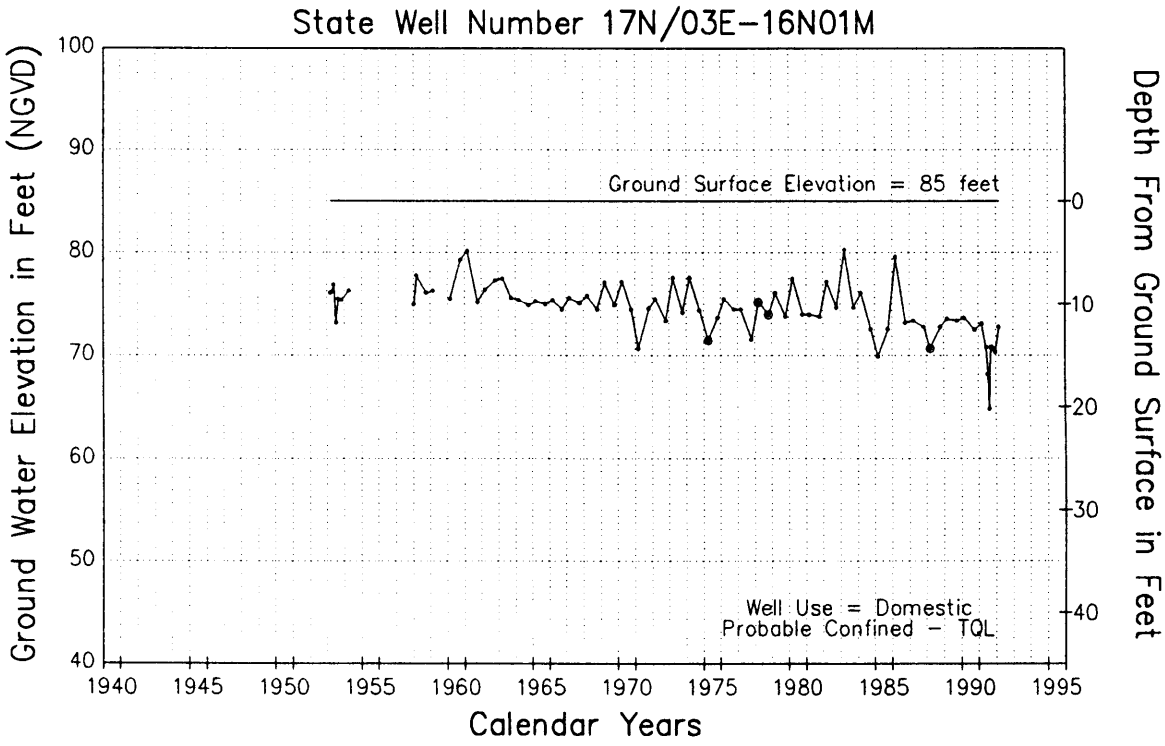
# Sacramento Valley Basin – Butte County

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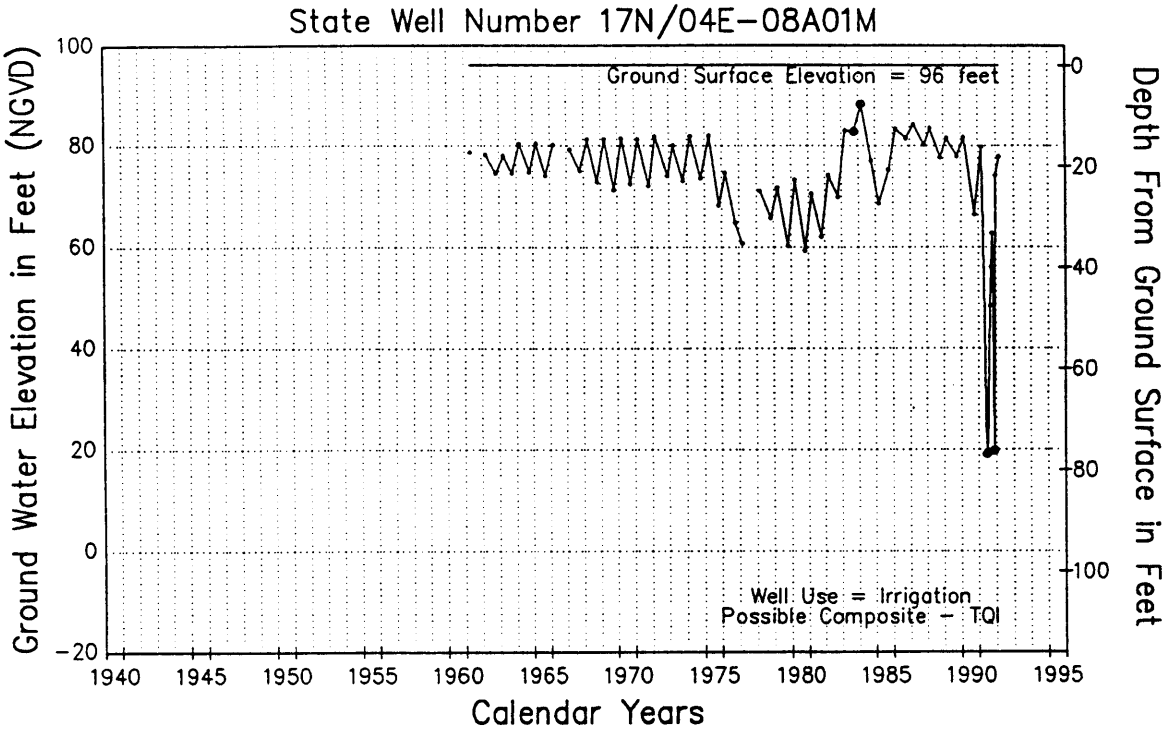


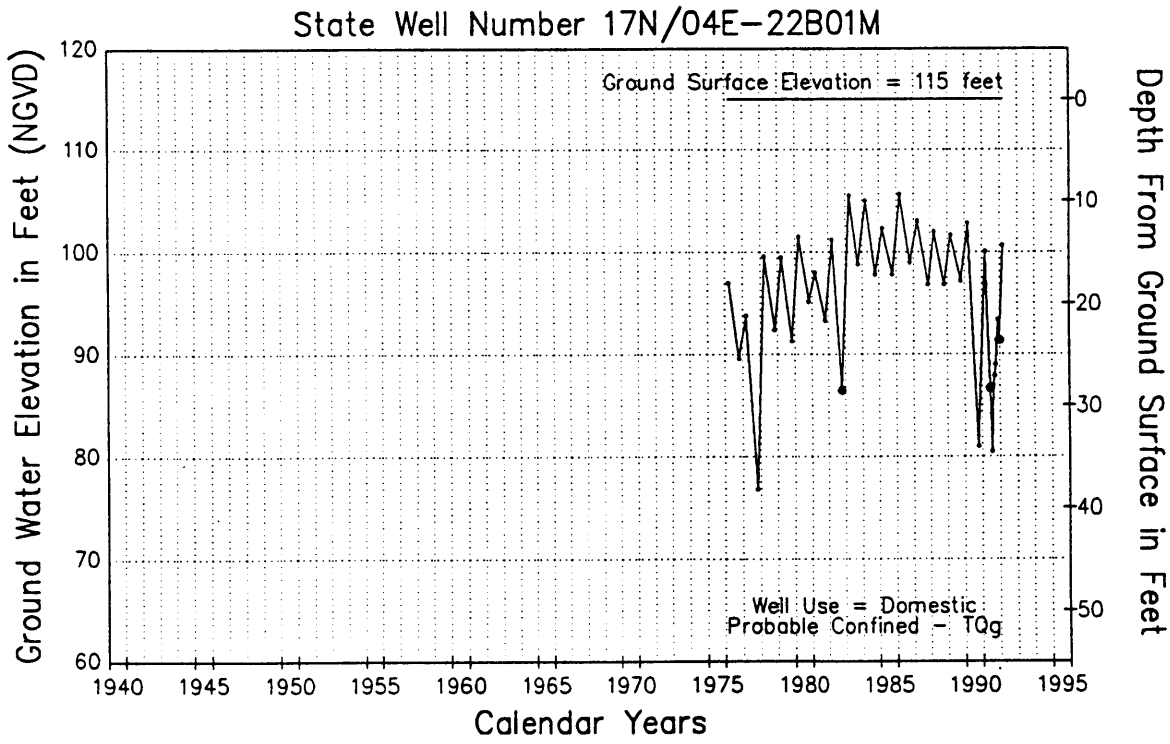


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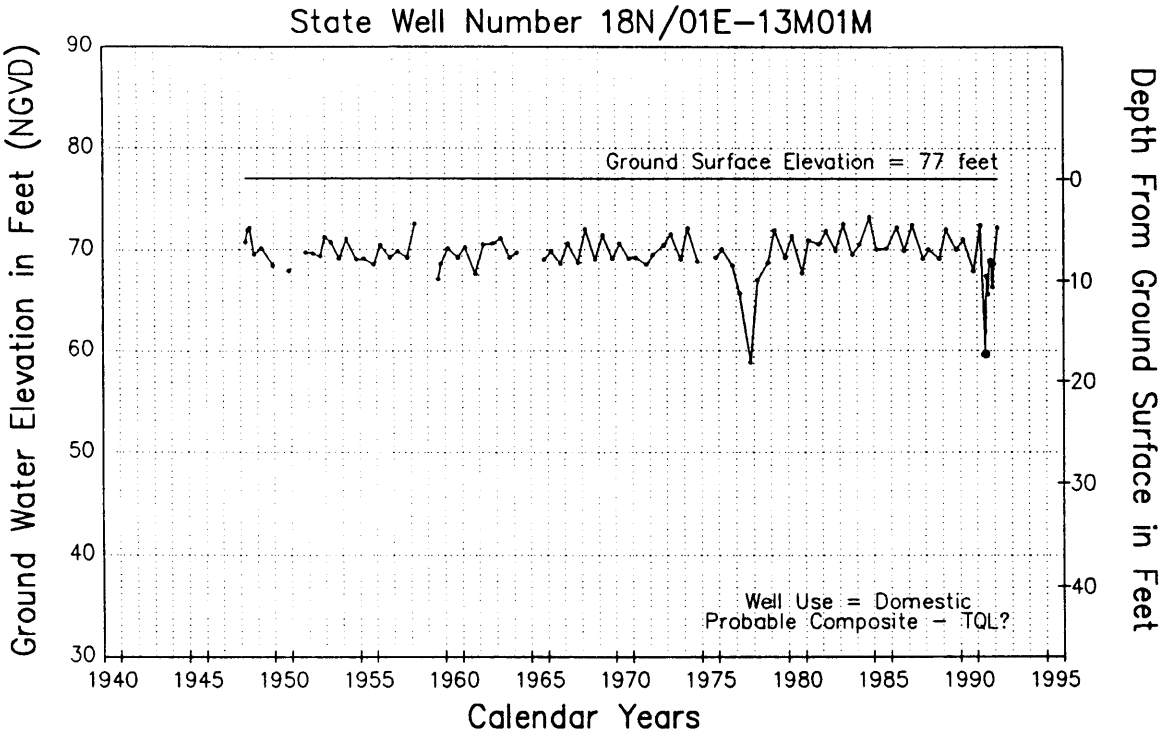


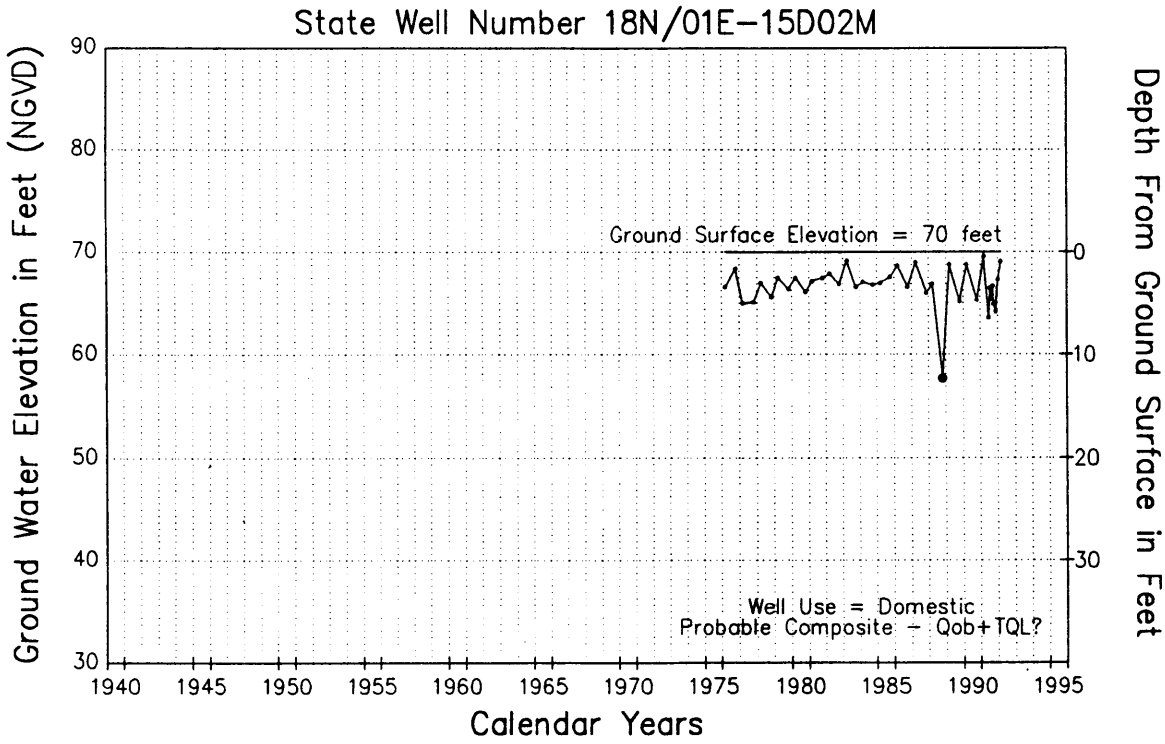


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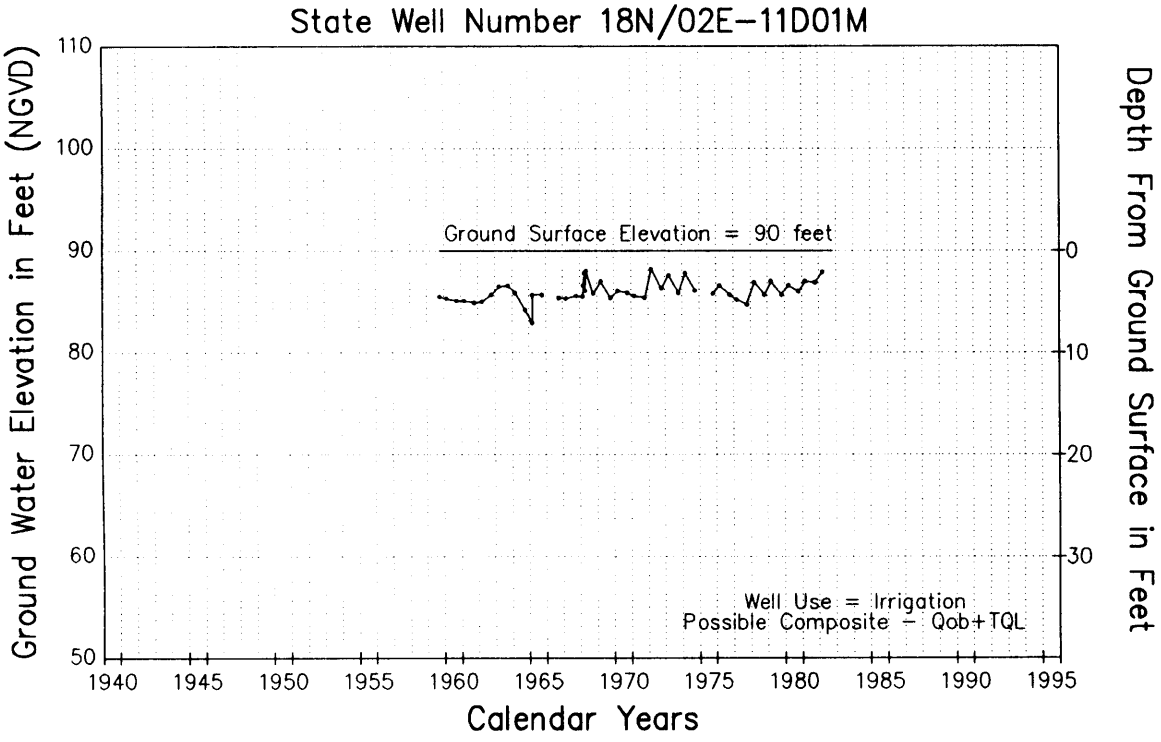
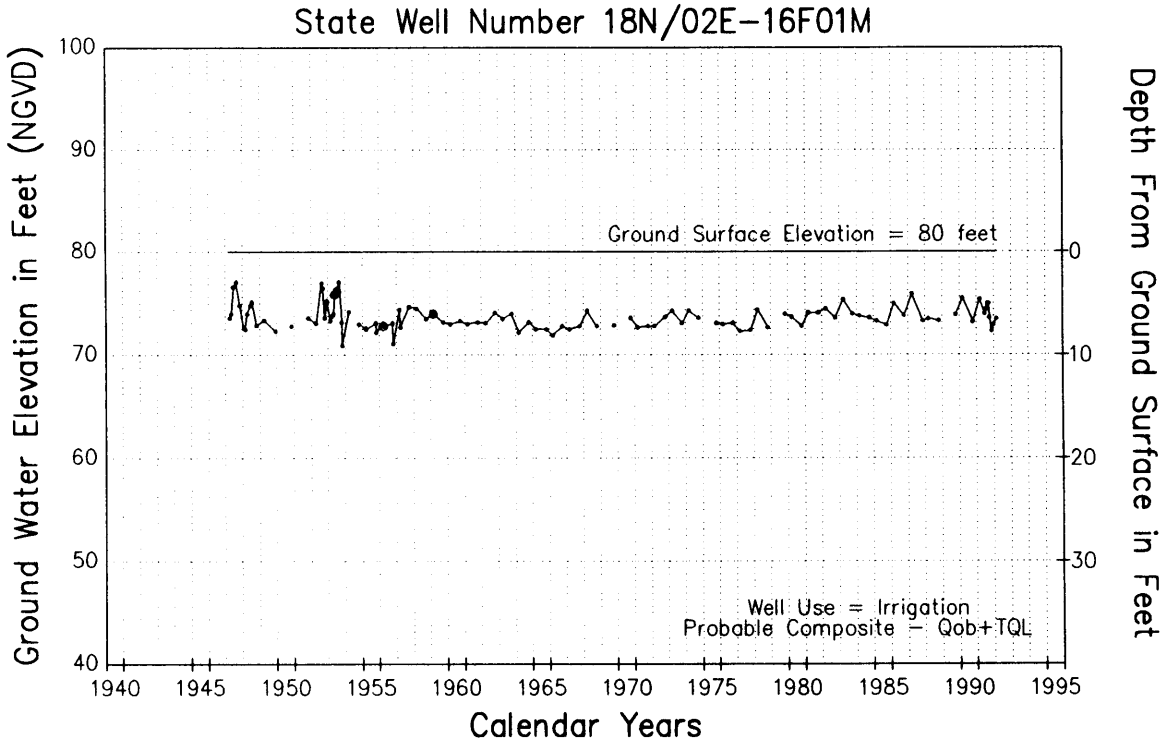
# Sacramento Valley Basin – Butte County

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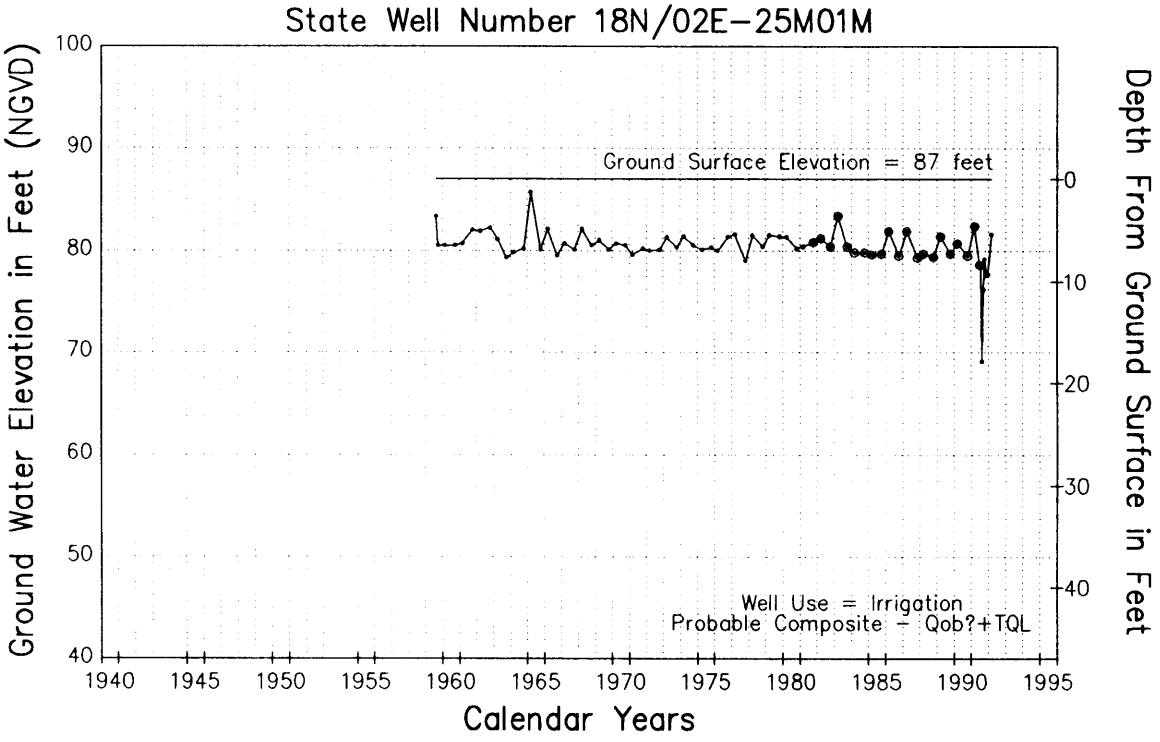


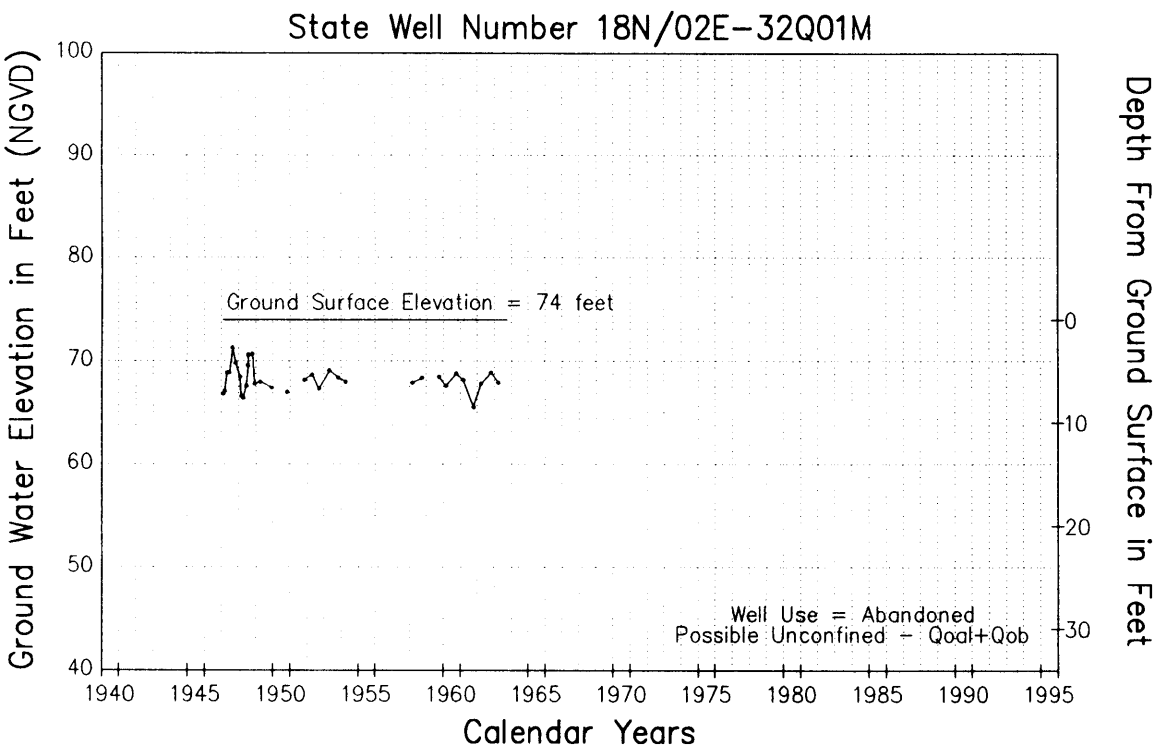


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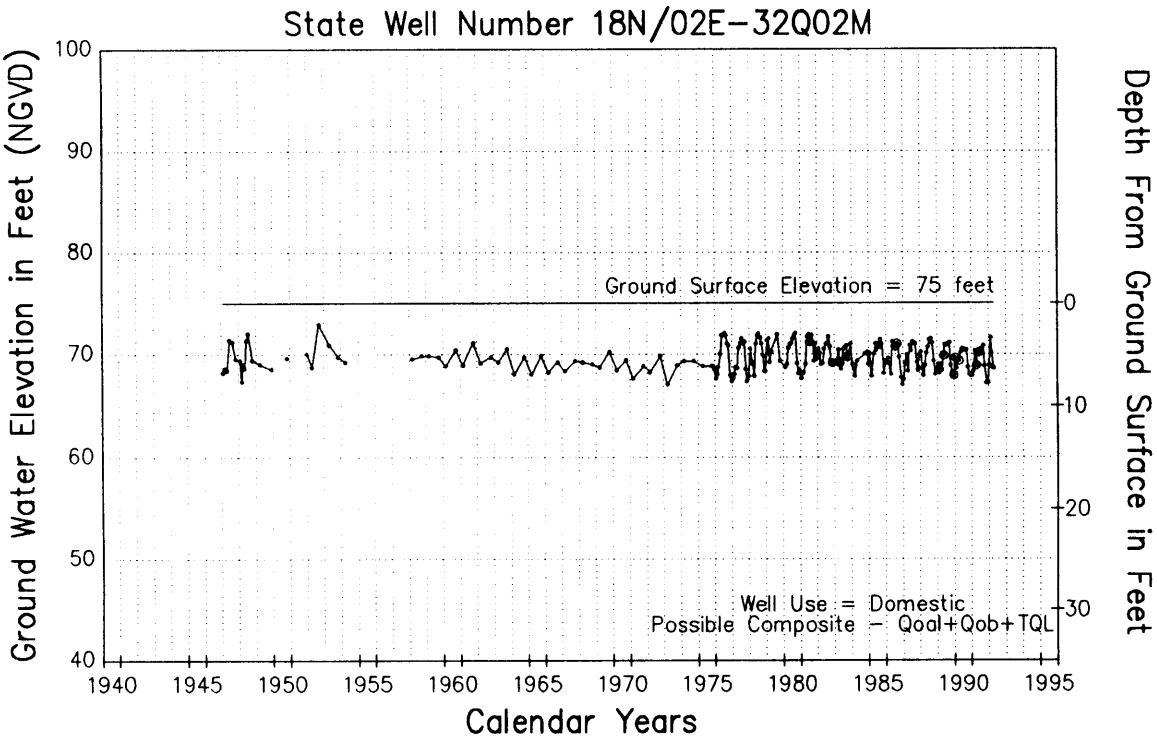
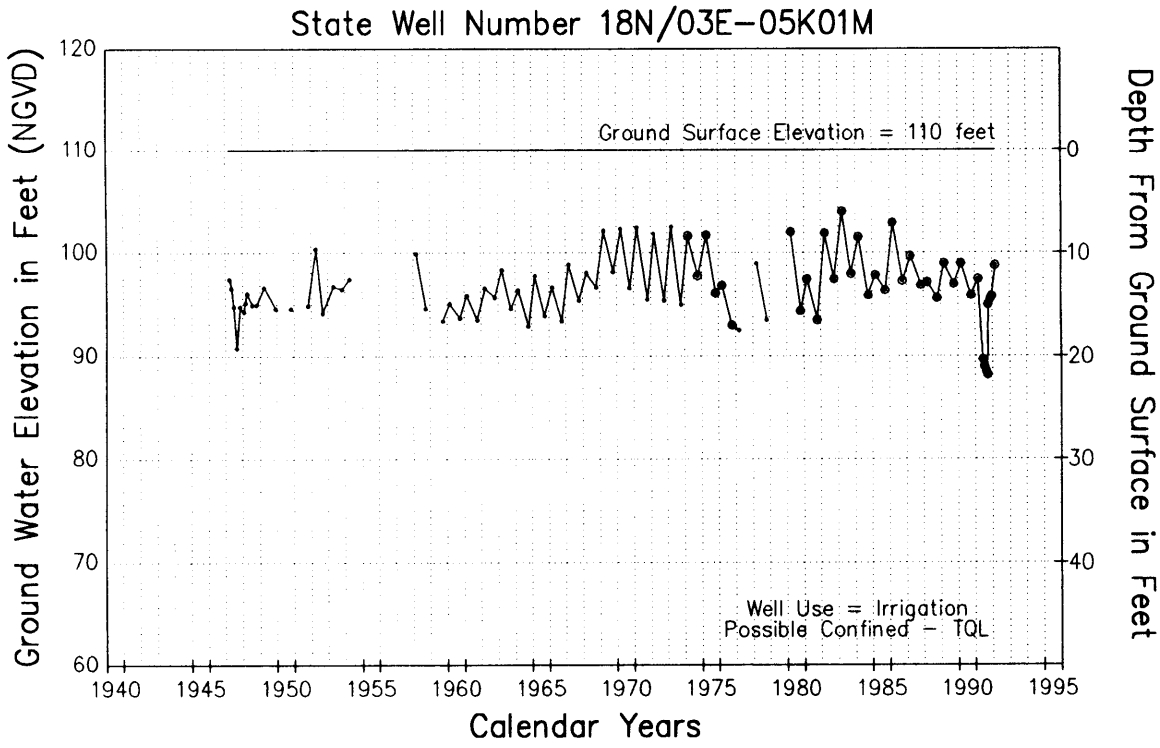
# Sacramento Valley Basin – Butte County

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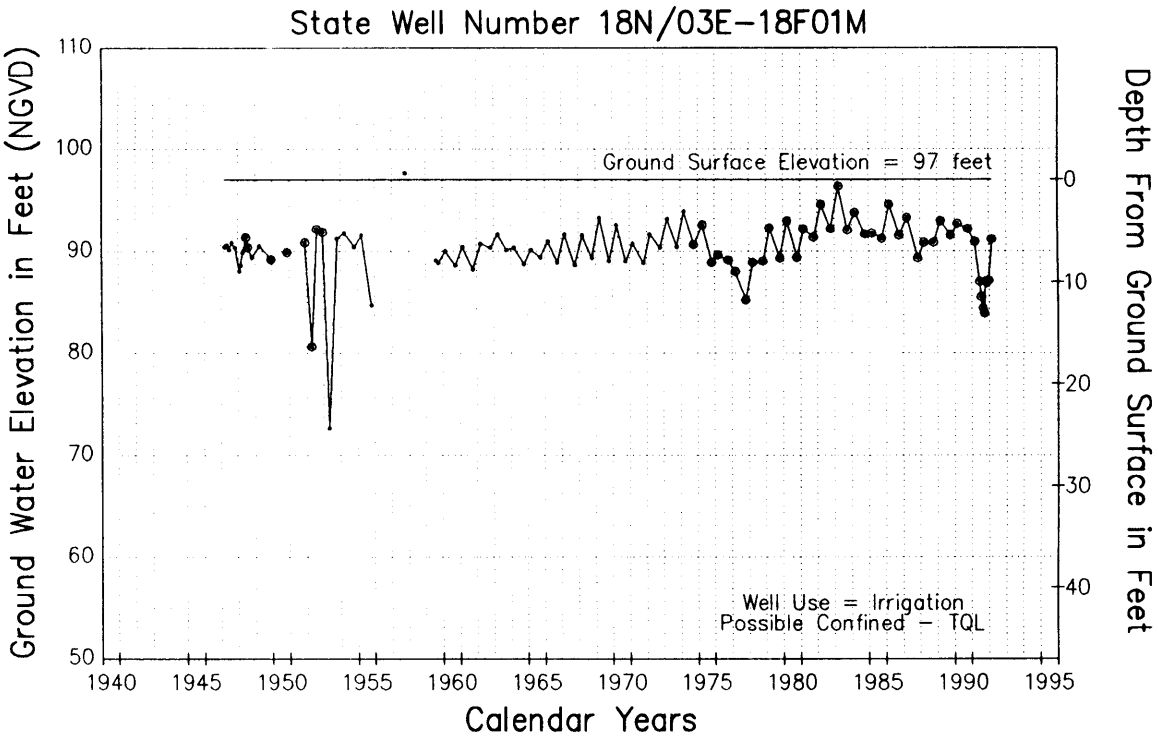
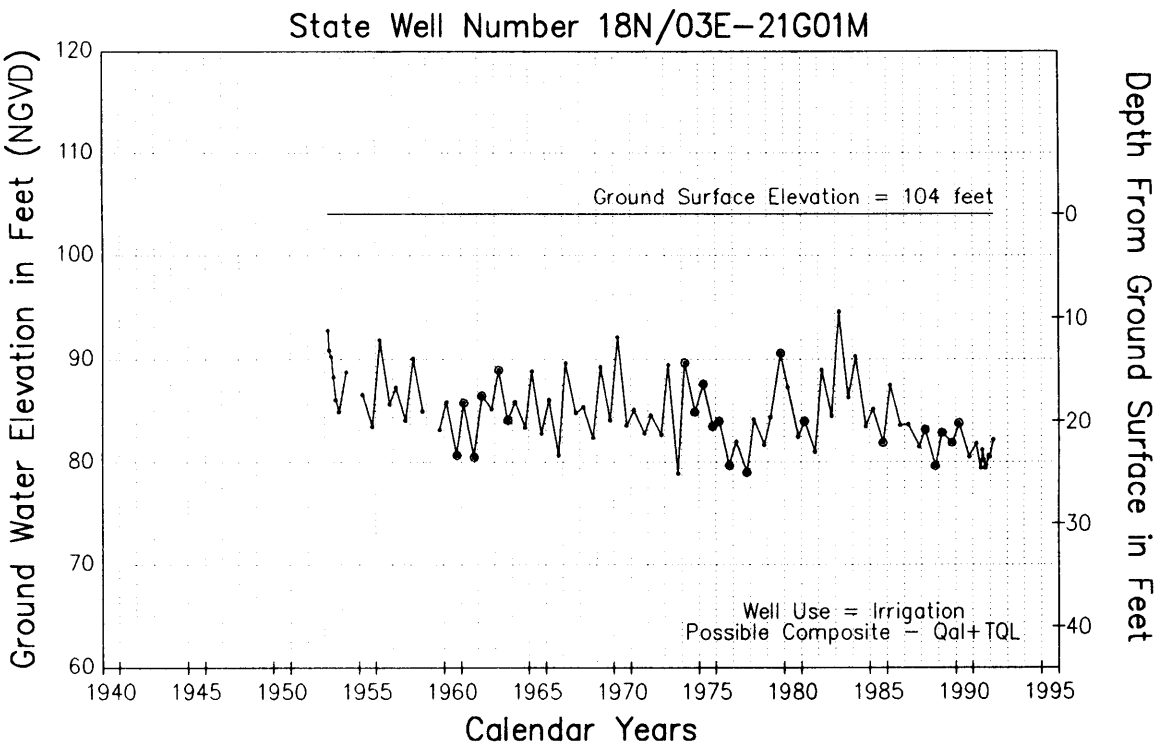
# Sacramento Valley Basin – Butte County

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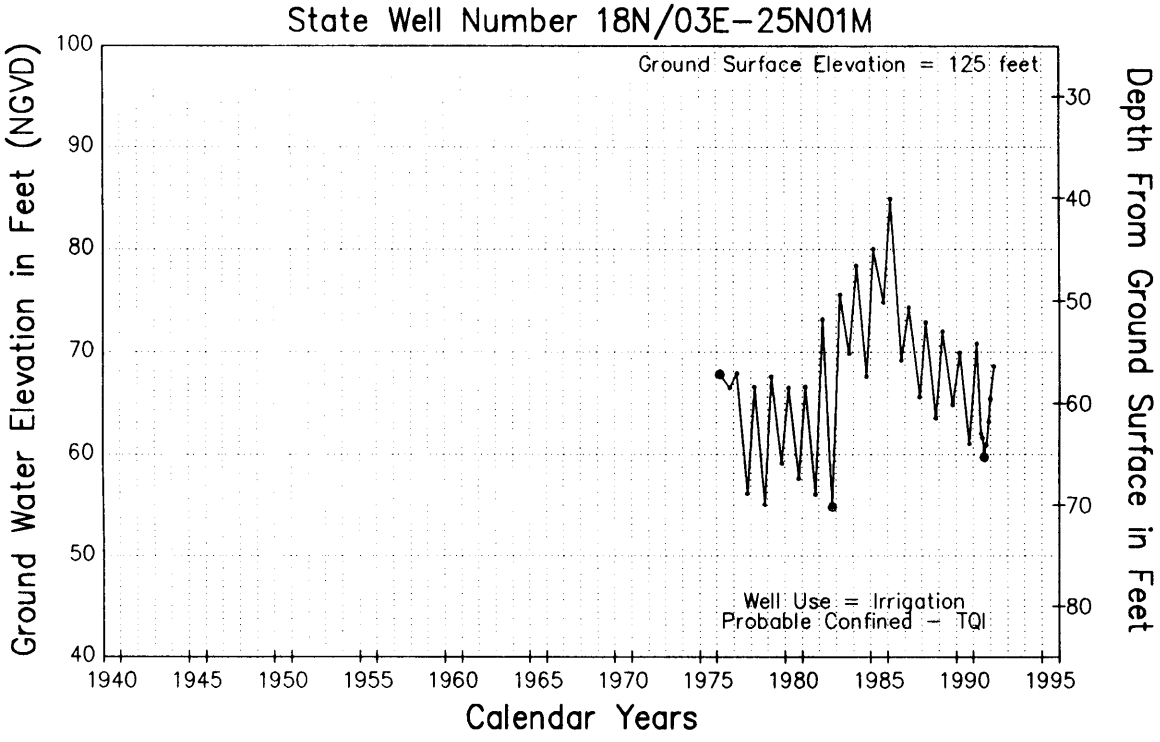
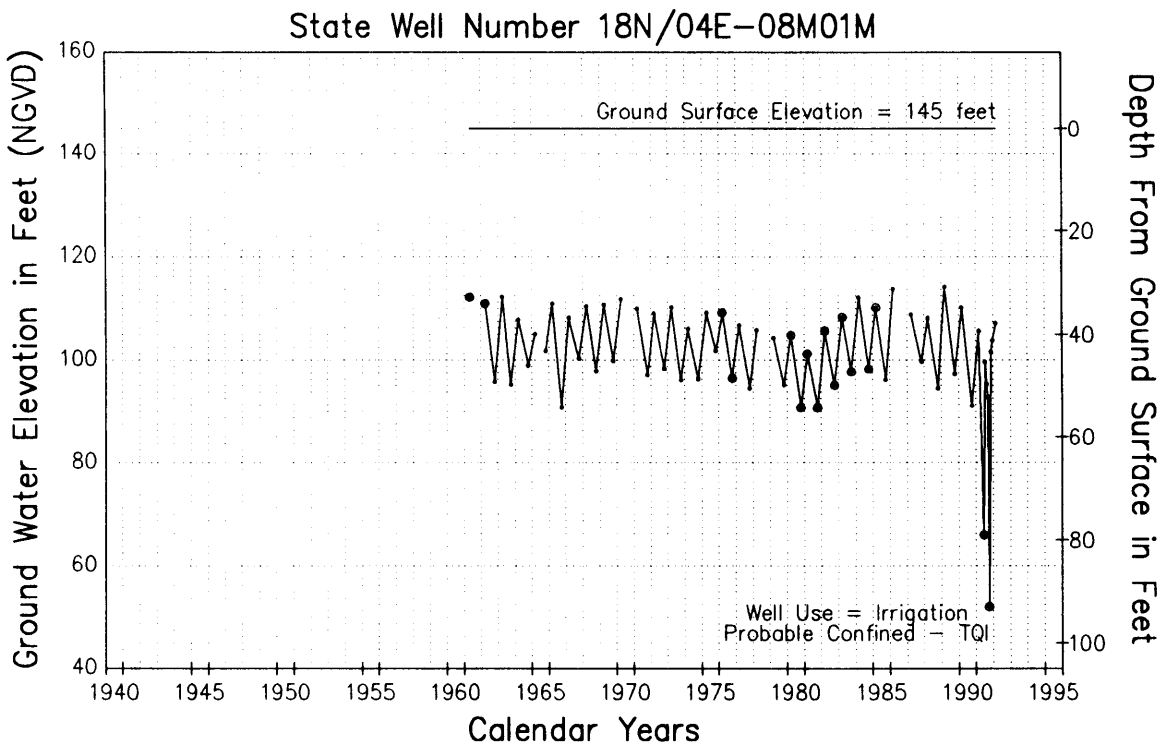
# Sacramento Valley Basin – Butte County

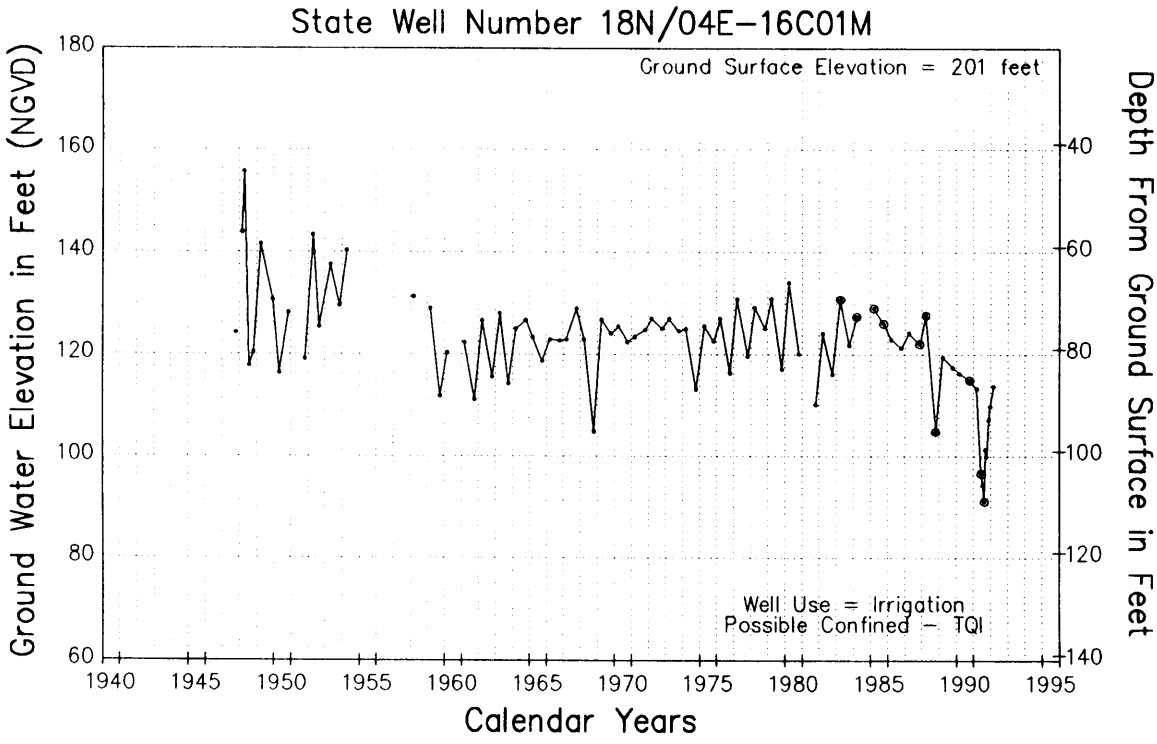


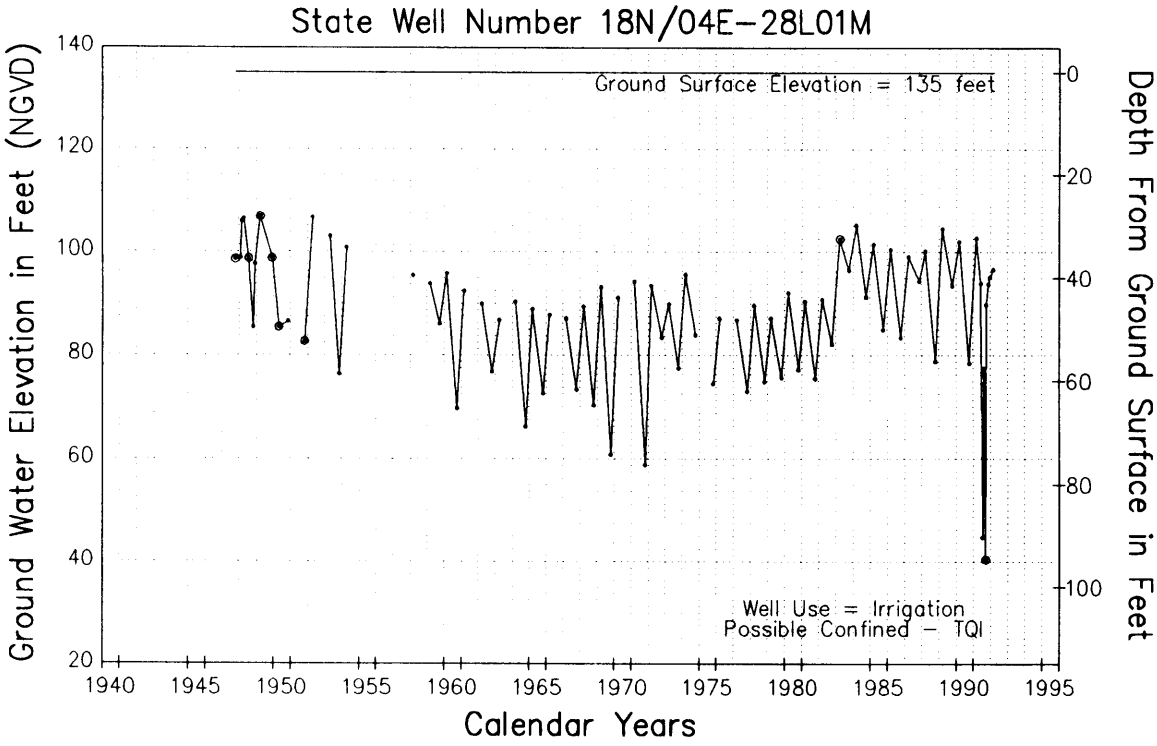




·····Water surface elevation in well ••••• Questionable measurement

Department of Water Resources, Northern District

# Sacramento Valley Basin – Butte County

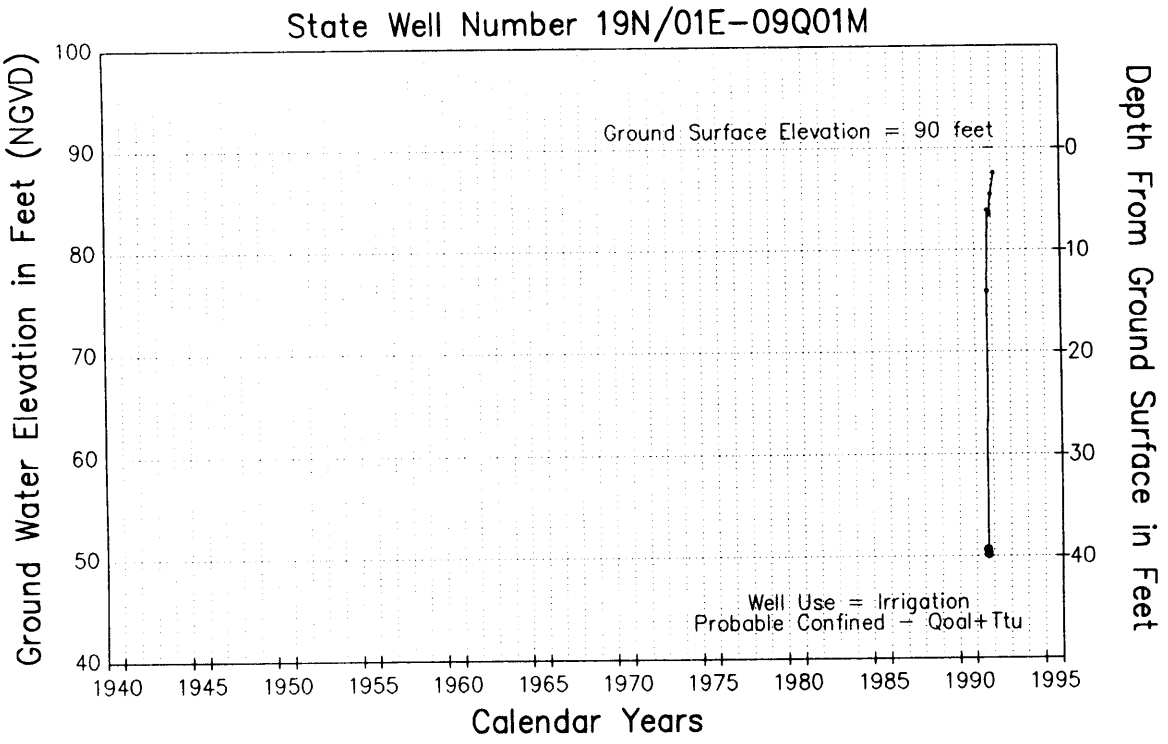


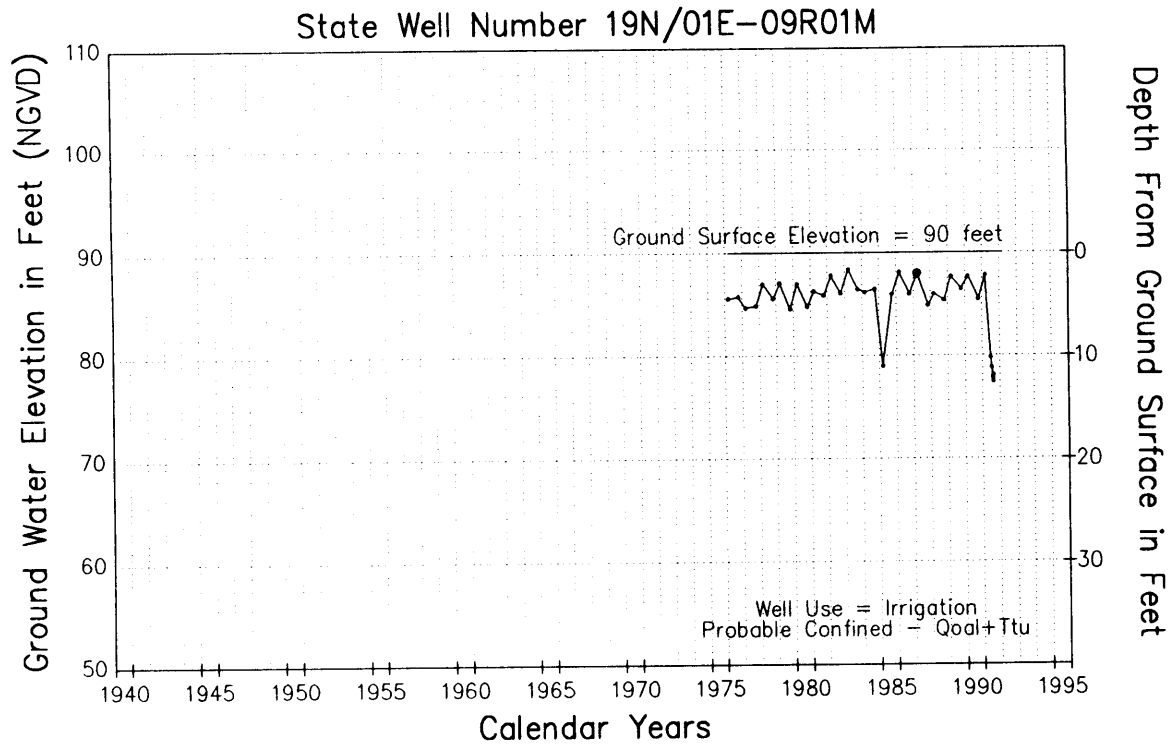




·····Water surface elevation in well  ••••• Questionable measurement

Department of Water Resources, Northern District

# Sacramento Valley Basin – Butte County

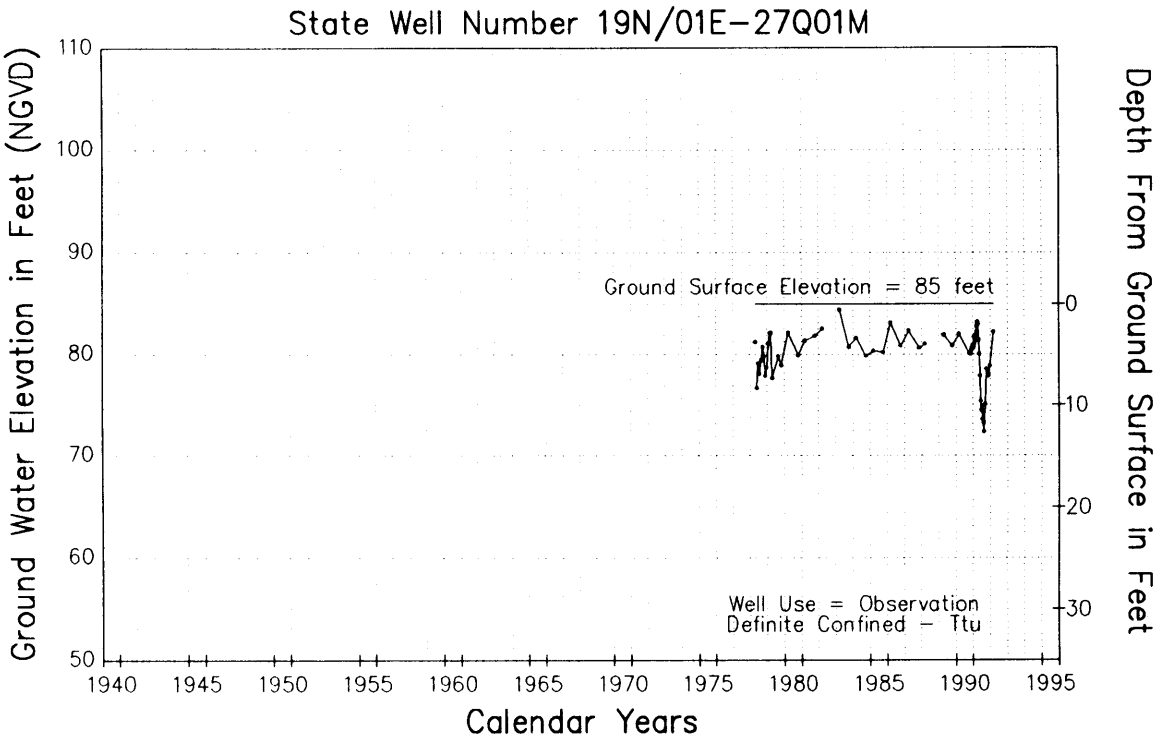


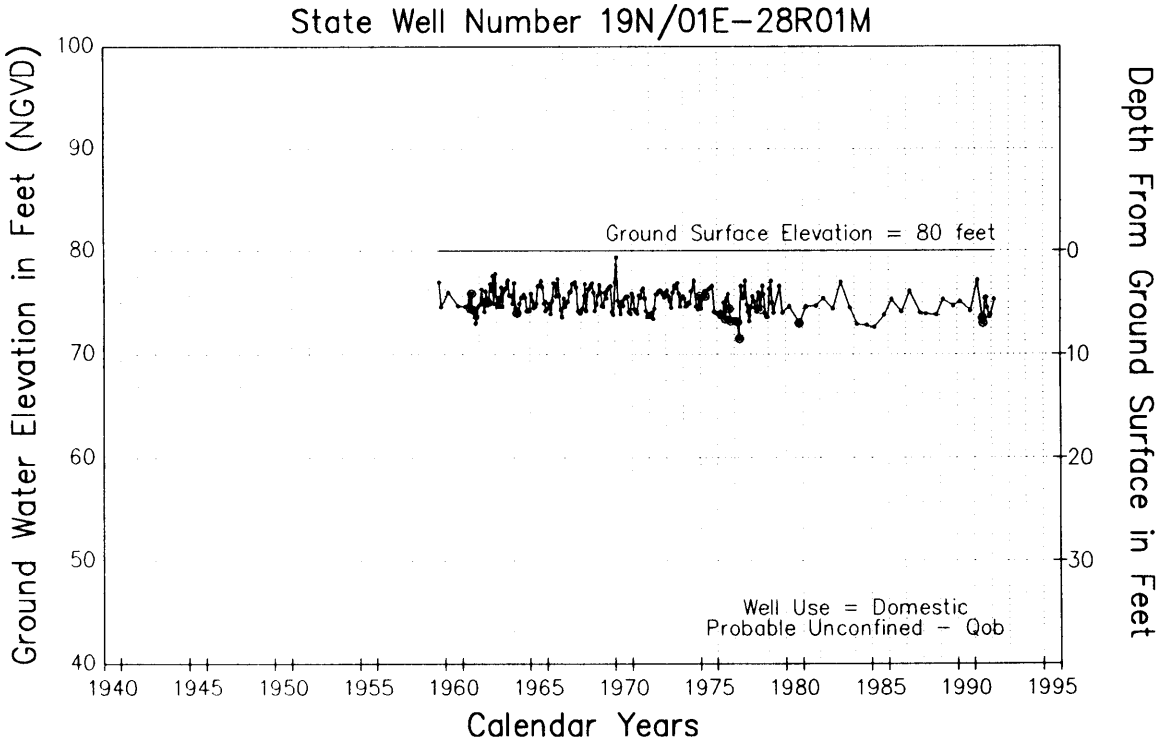




.....Water surface elevation in well ••••• Questionable measurement

Department of Water Resources, Northern District

# Sacramento Valley Basin – Butte County

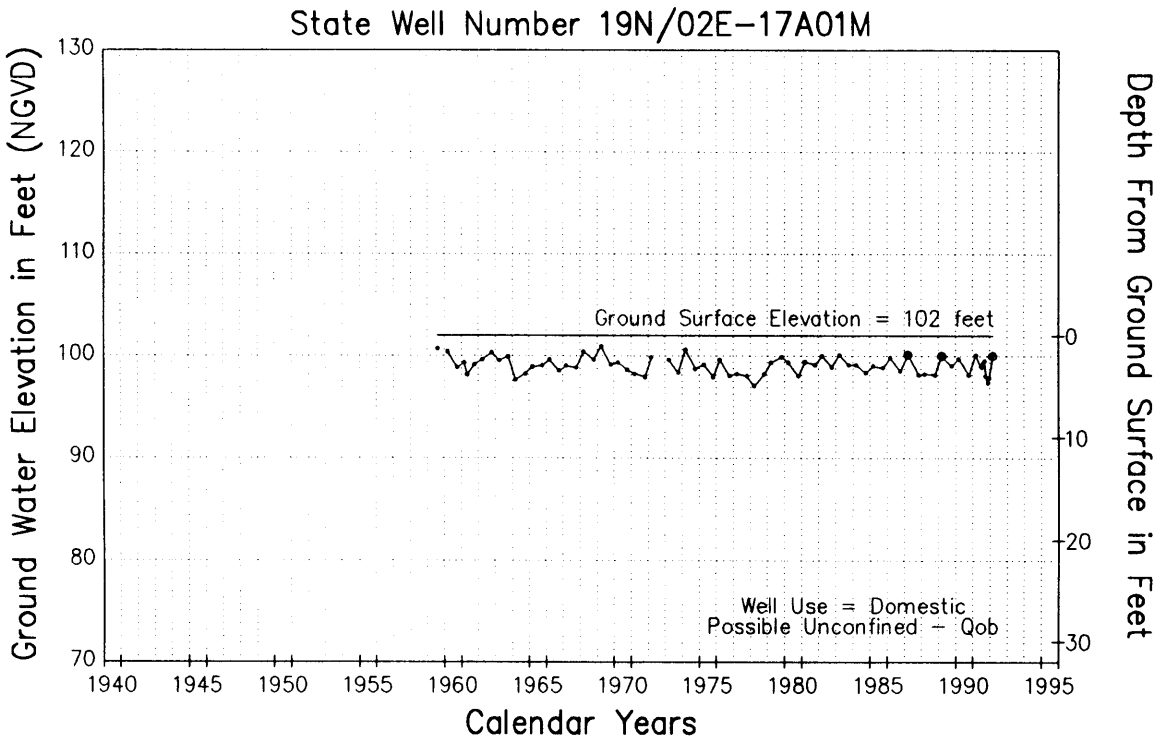


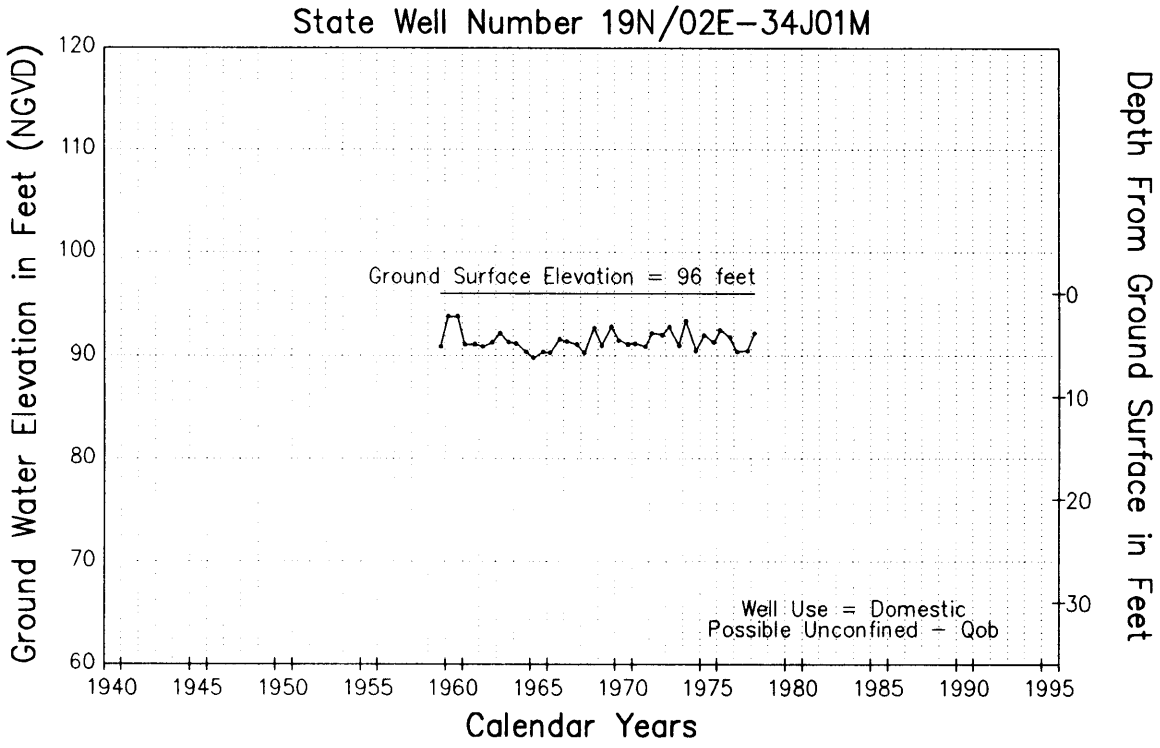




·····Water surface elevation in well  ••••• Questionable measurement

Department of Water Resources, Northern District

# Sacramento Valley Basin – Butte County

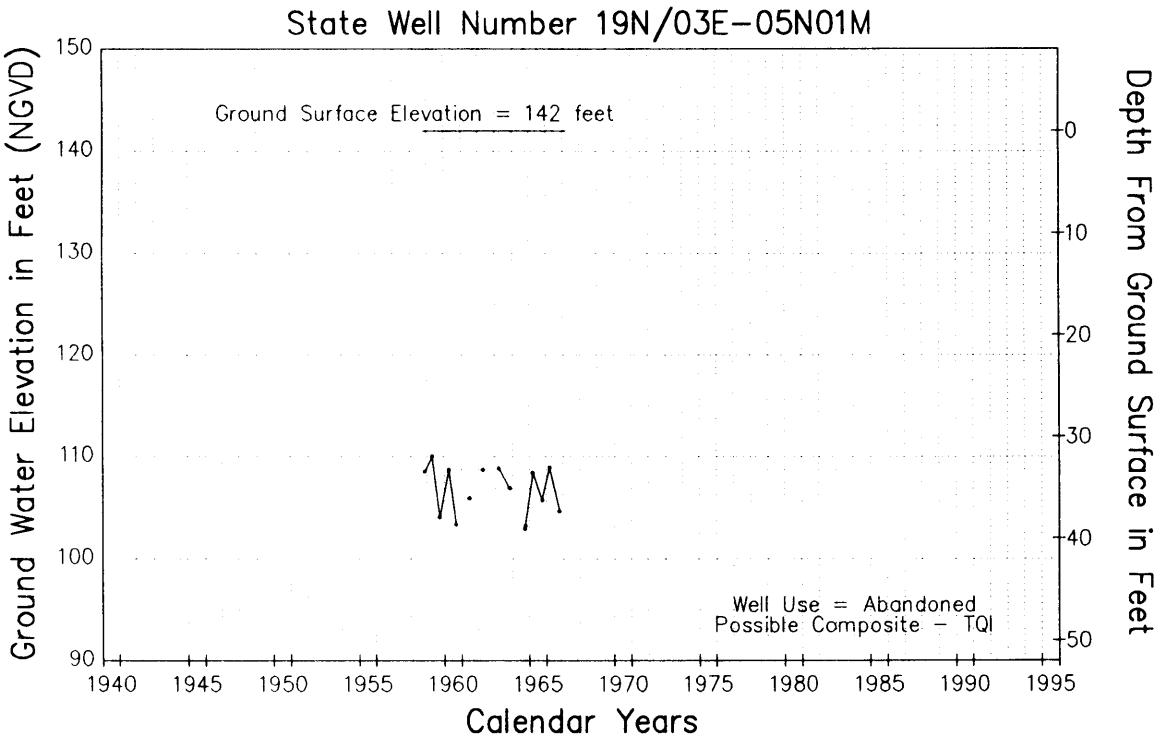


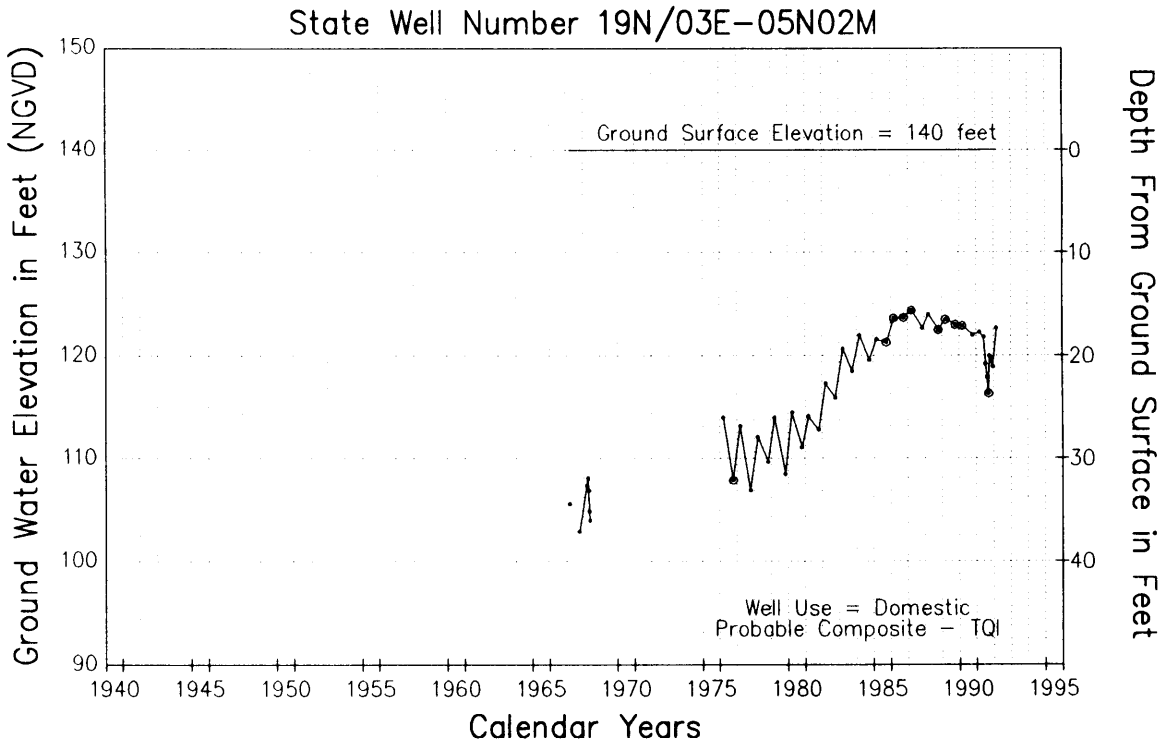




·····Water surface elevation in well  ••••• Questionable measurement

Department of Water Resources, Northern District

# Sacramento Valley Basin – Butte County

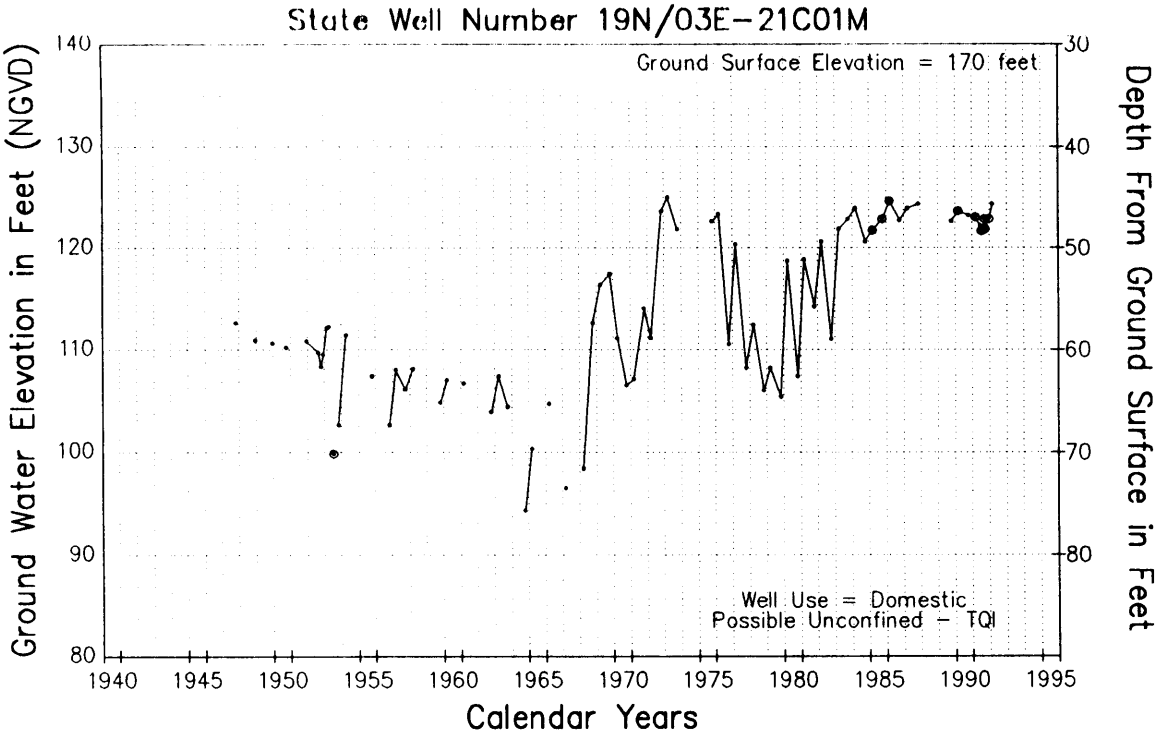


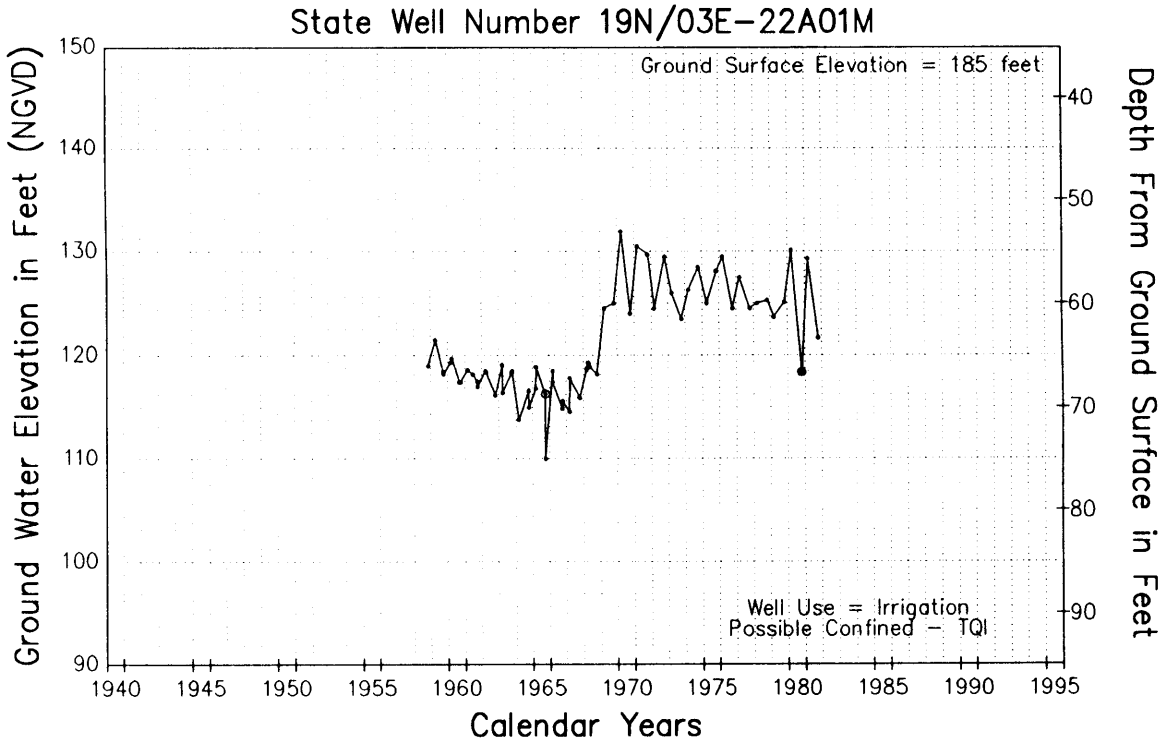




·····Water surface elevation in well  ••••• Questionable measurement

Department of Water Resources, Northern District

# Sacramento Valley Basin – Butte County

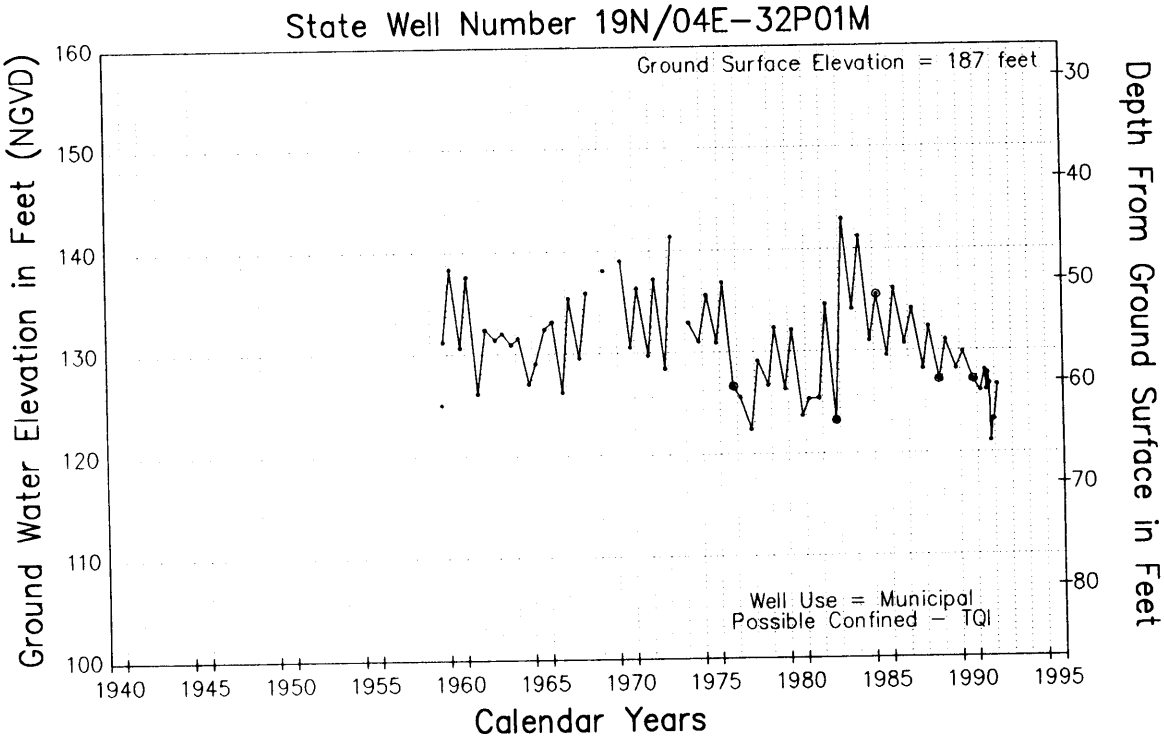


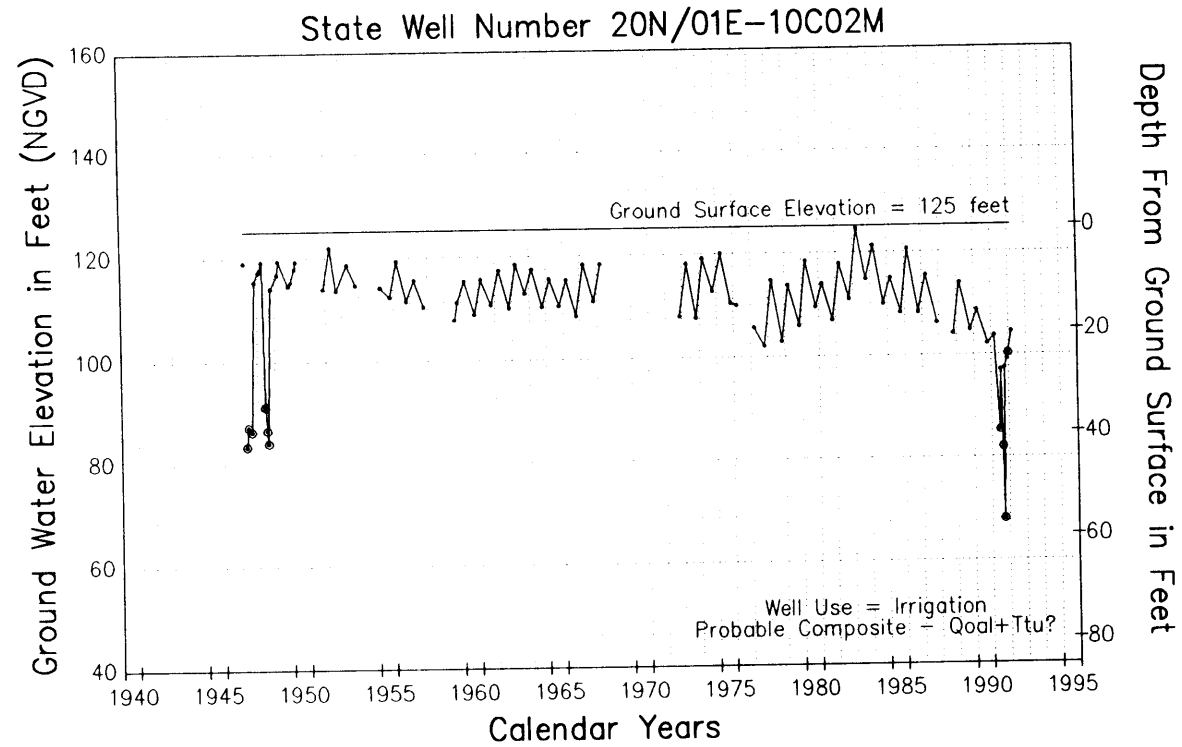




·····Water surface elevation in well  ••••• Questionable measurement

Department of Water Resources, Northern District

# Sacramento Valley Basin – Butte County

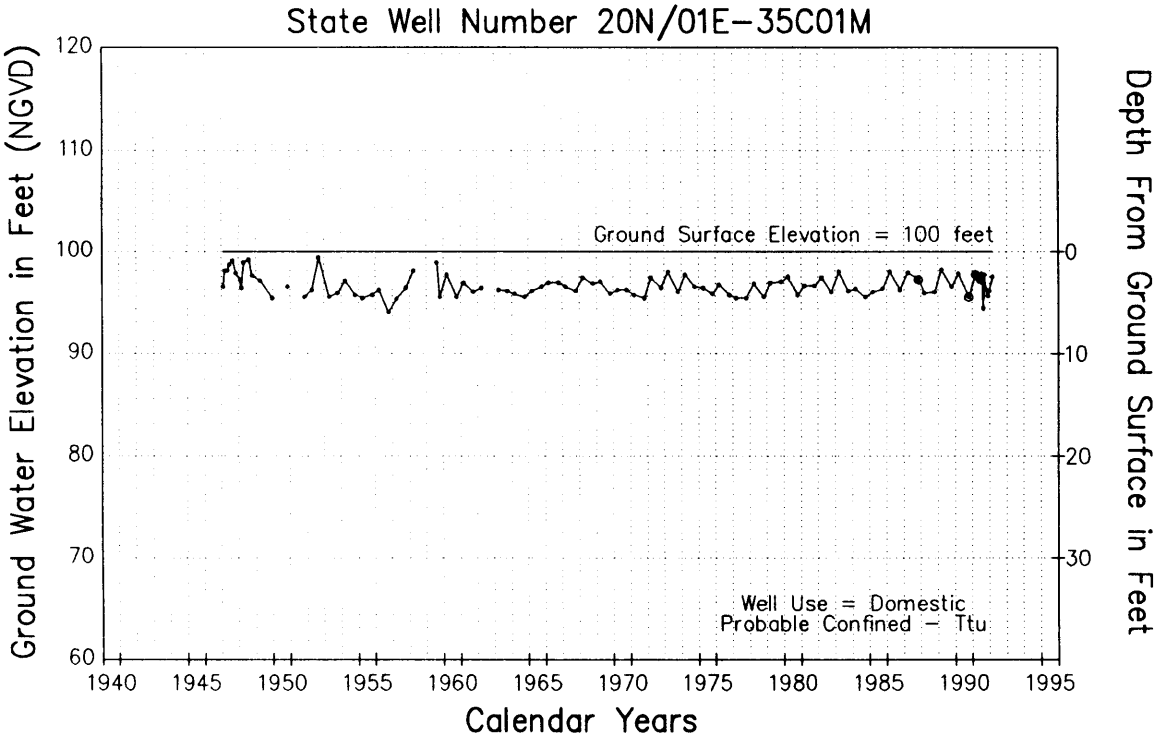


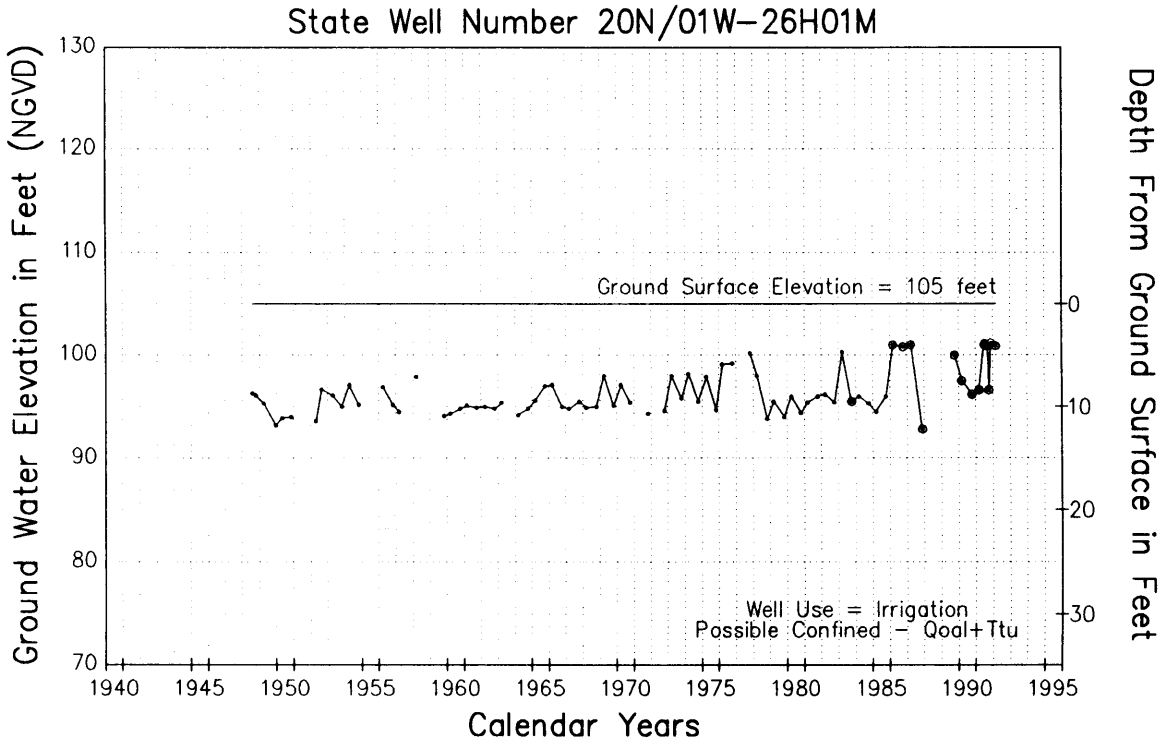




.....Water surface elevation in well  •••••Questionable measurement

Department of Water Resources, Northern District

# Sacramento Valley Basin – Butte County

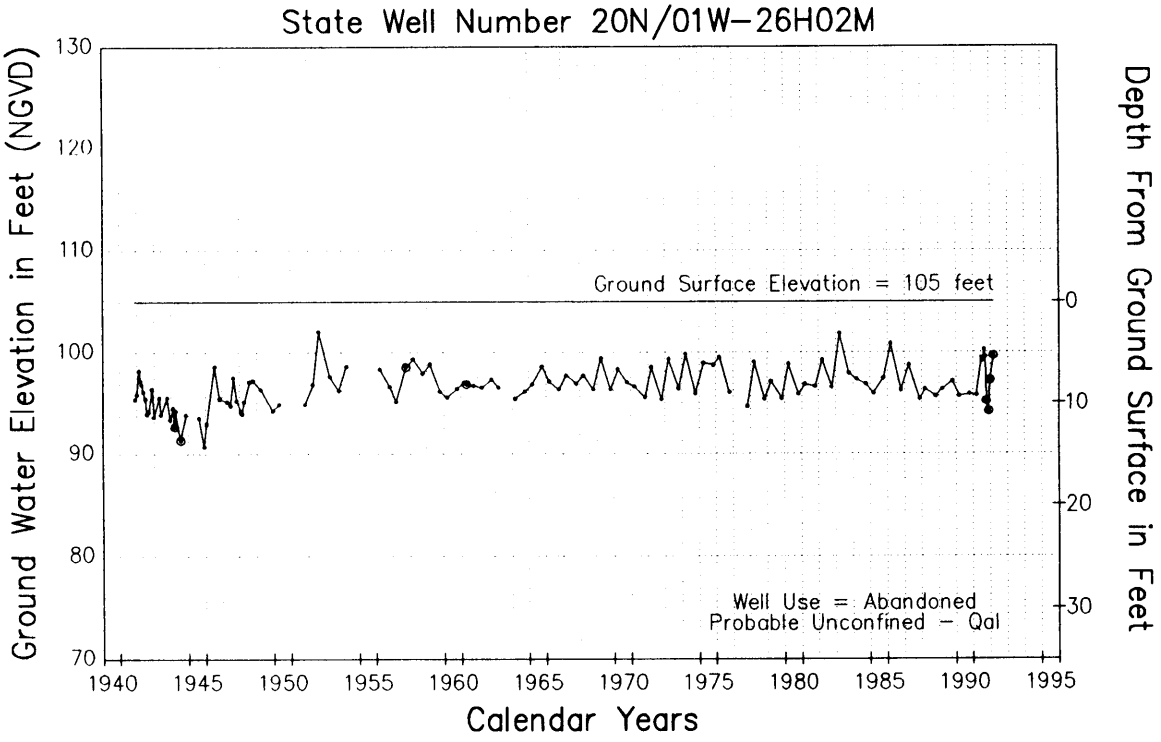


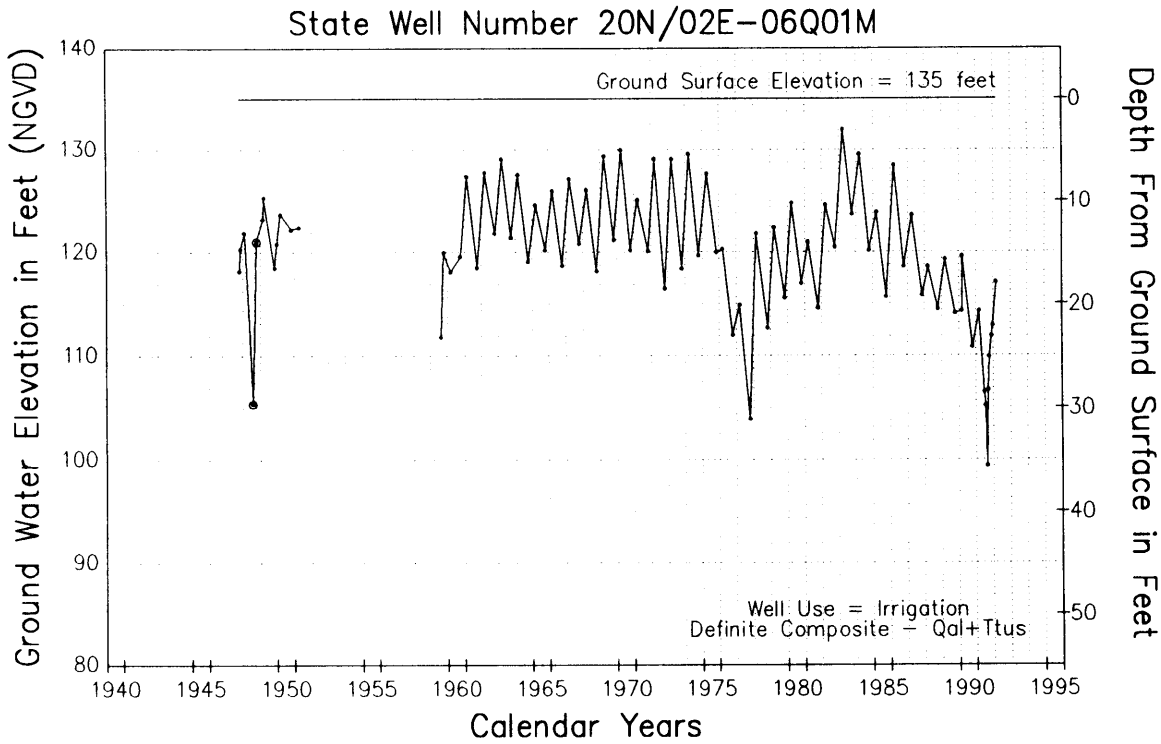




·····Water surface elevation in well  ••••• Questionable measurement

Department of Water Resources, Northern District

# Sacramento Valley Basin – Butte County

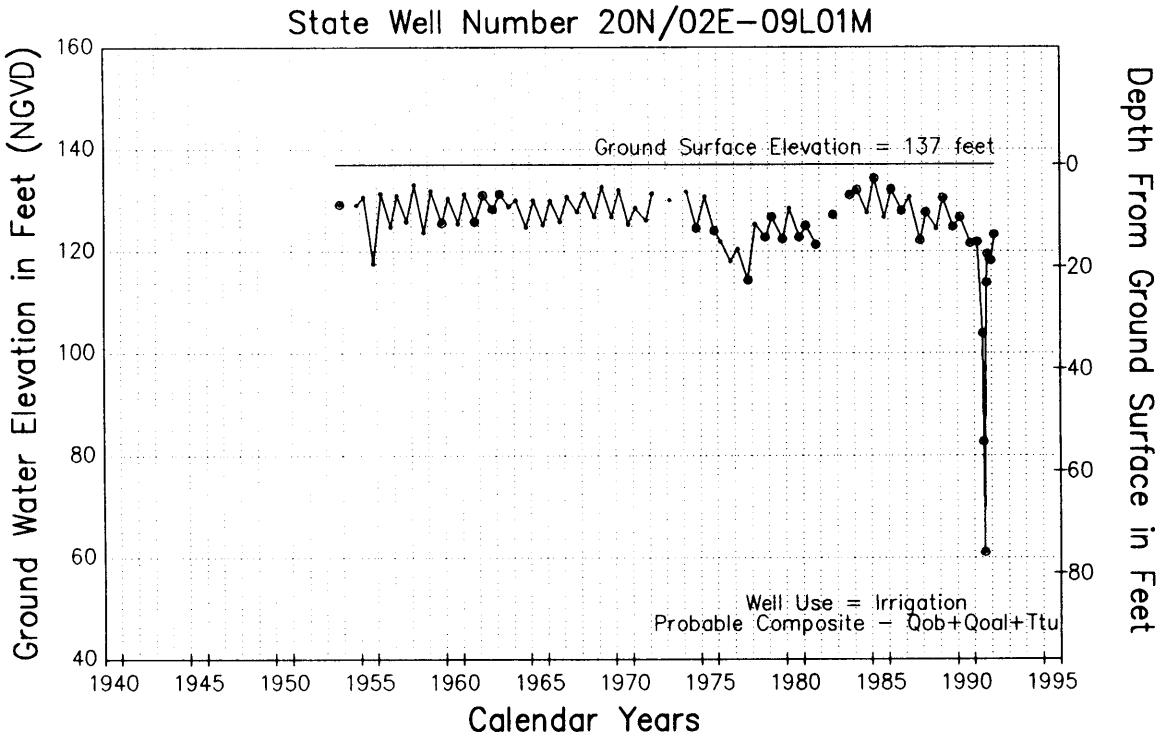


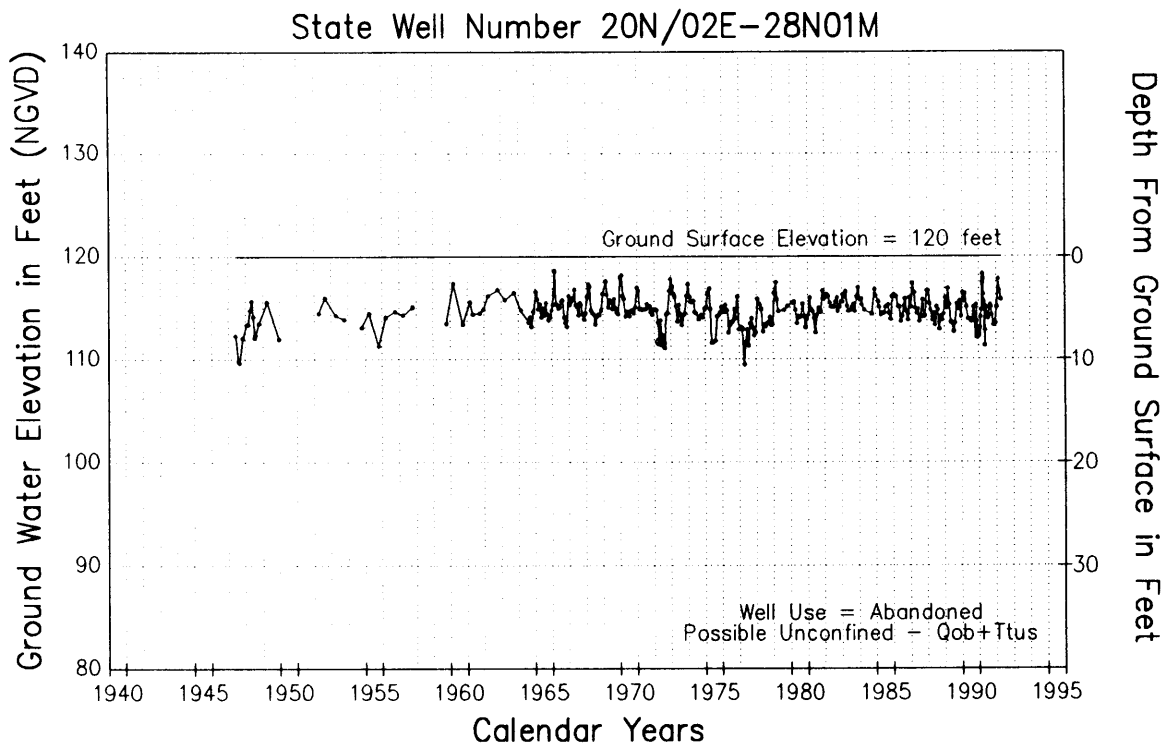




·····Water surface elevation in well  ••••• Questionable measurement

Department of Water Resources, Northern District

# Sacramento Valley Basin – Butte County

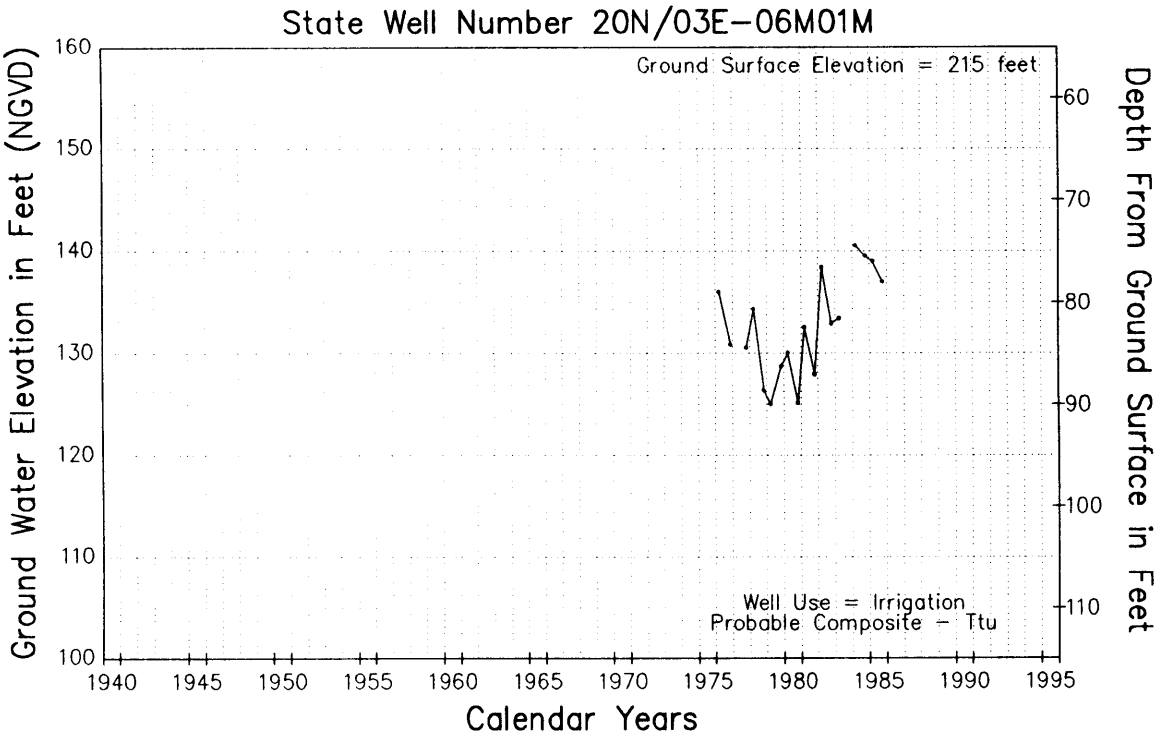


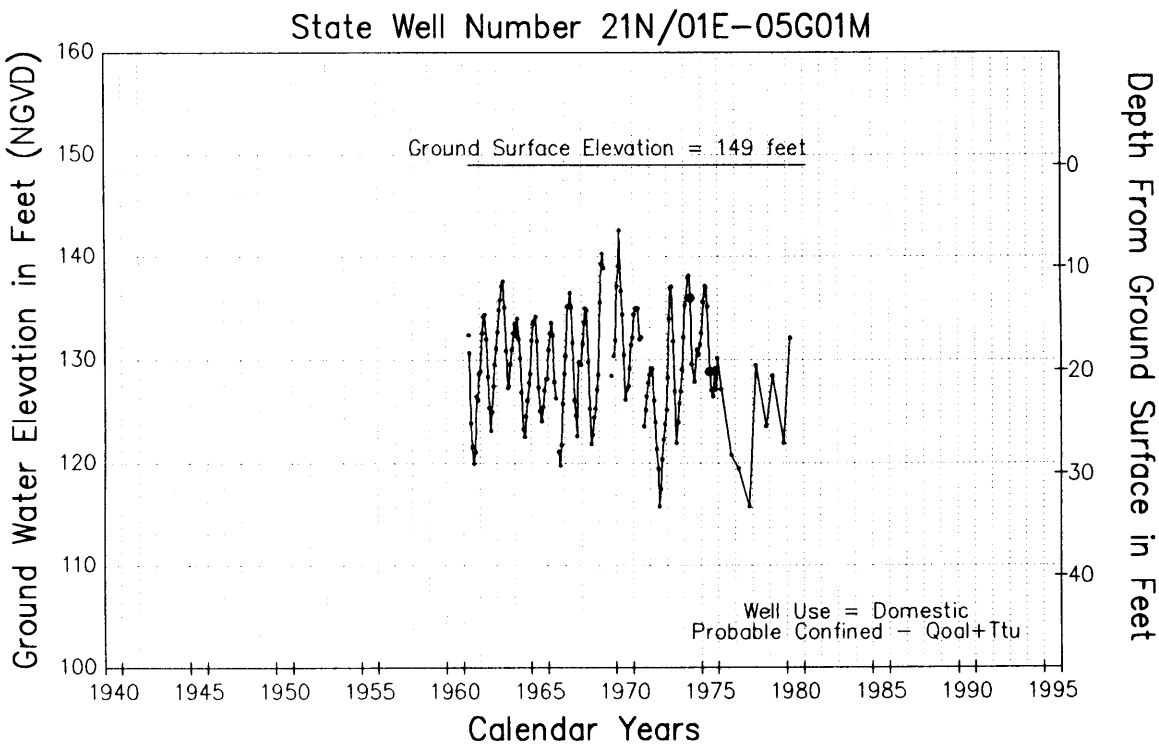




·····Water surface elevation in well ••••• Questionable measurement

Department of Water Resources, Northern District

# Sacramento Valley Basin – Butte County

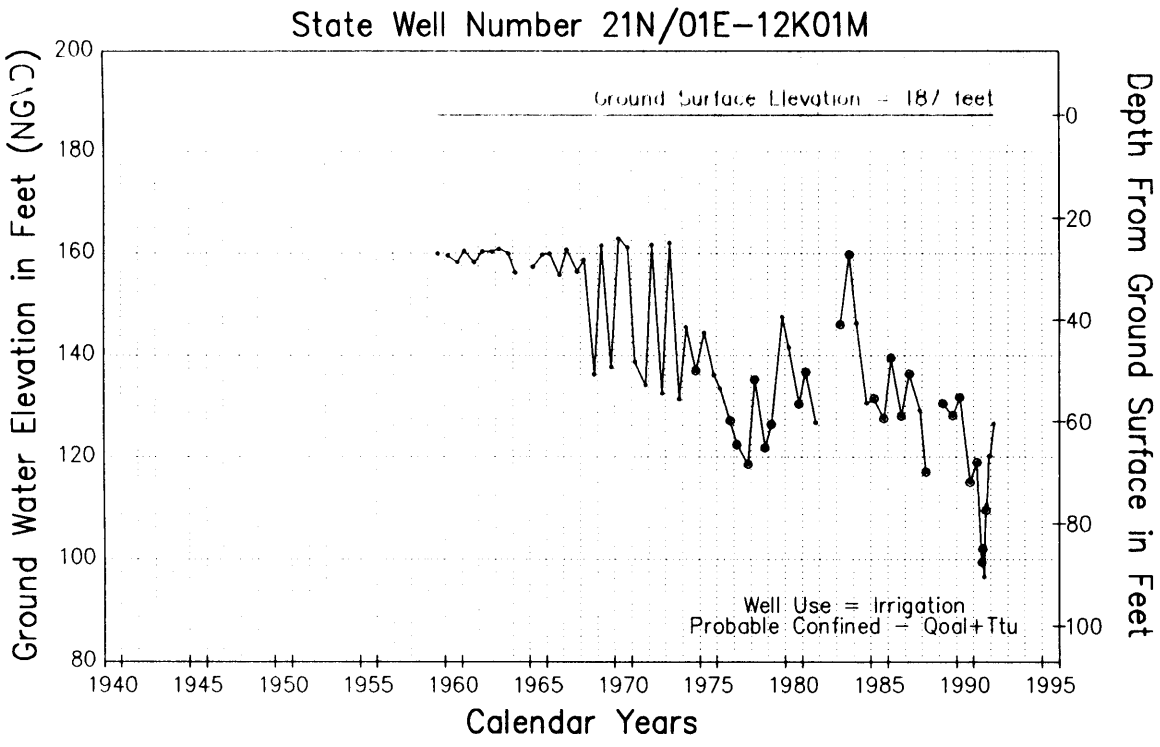


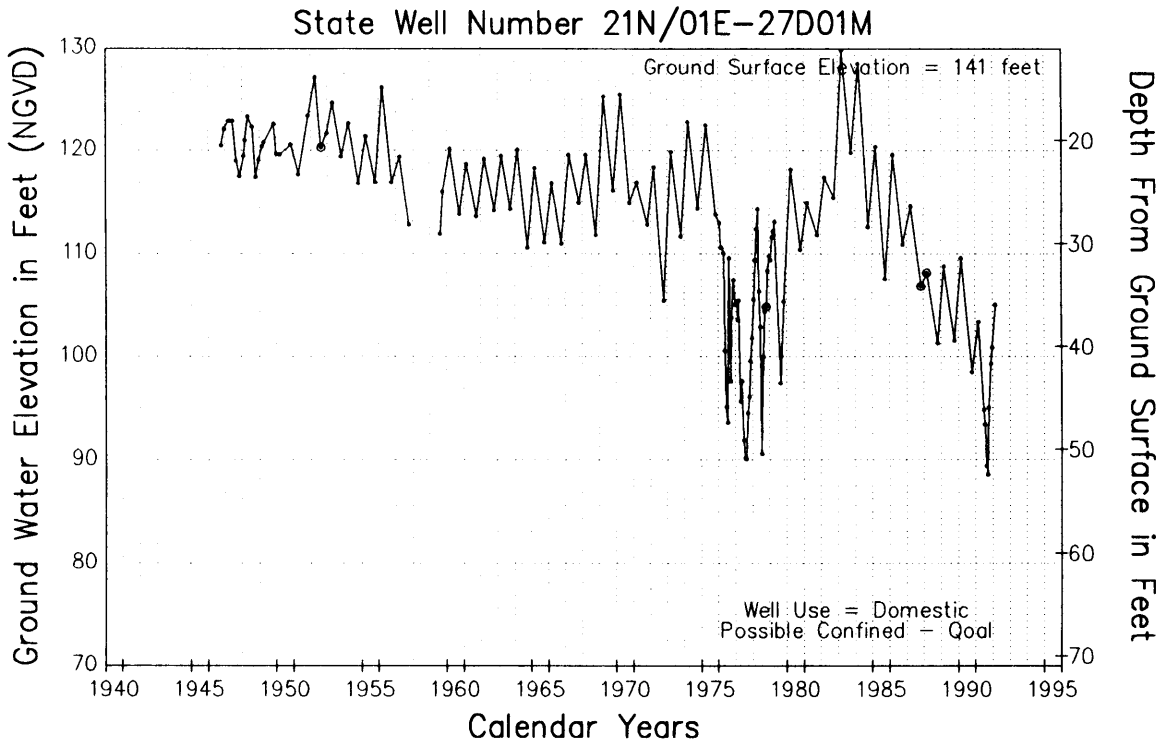




·····Water surface elevation in well ••••• Questionable measurement

Department of Water Resources, Northern District

# Sacramento Valley Basin – Butte County

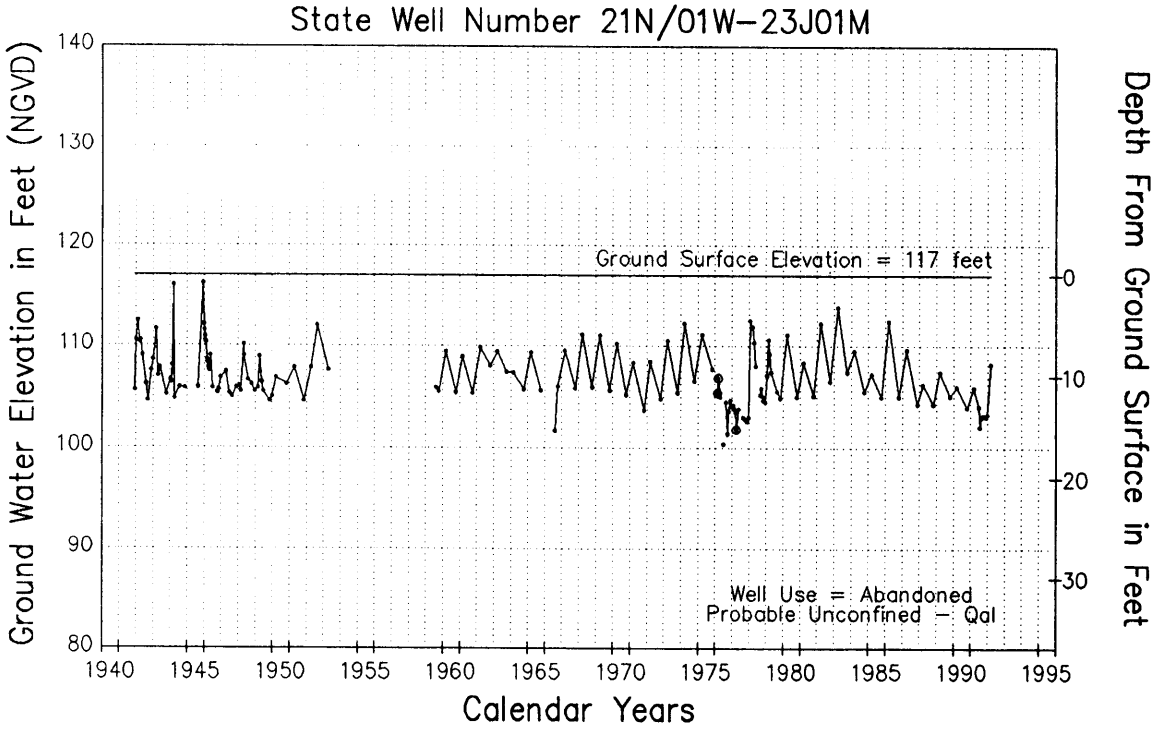


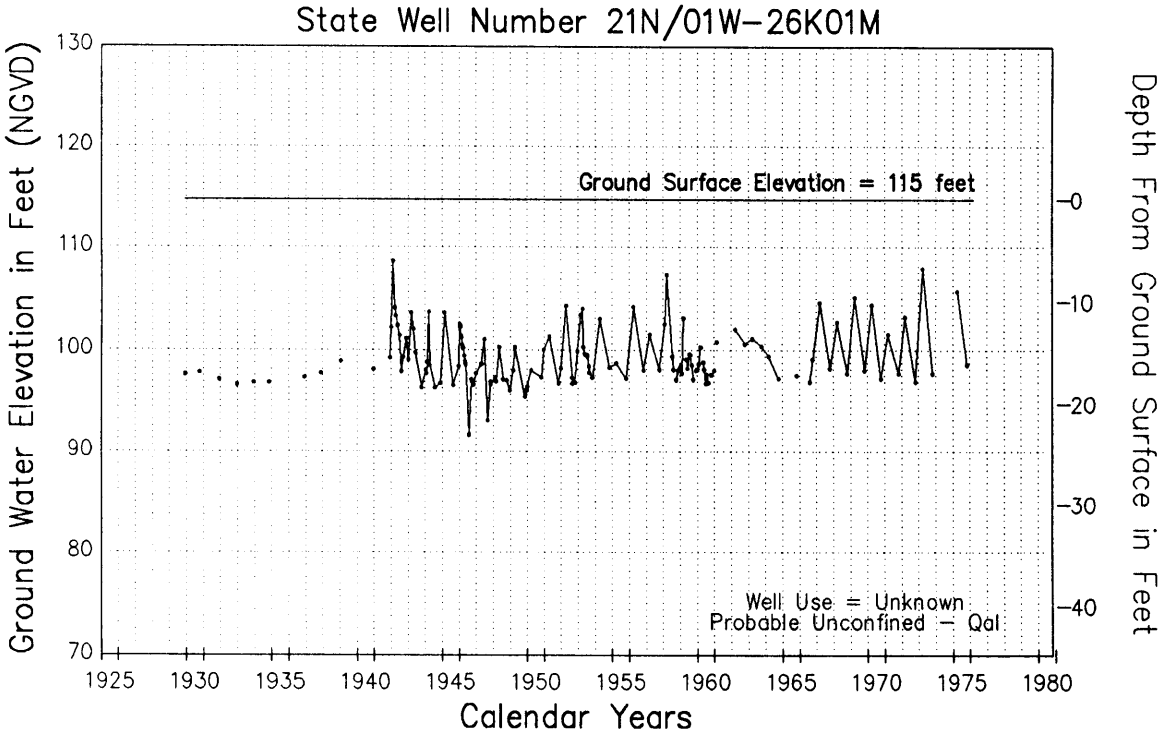




·····Water surface elevation in well ••••• Questionable measurement

Department of Water Resources, Northern District

# Sacramento Valley Basin – Butte County

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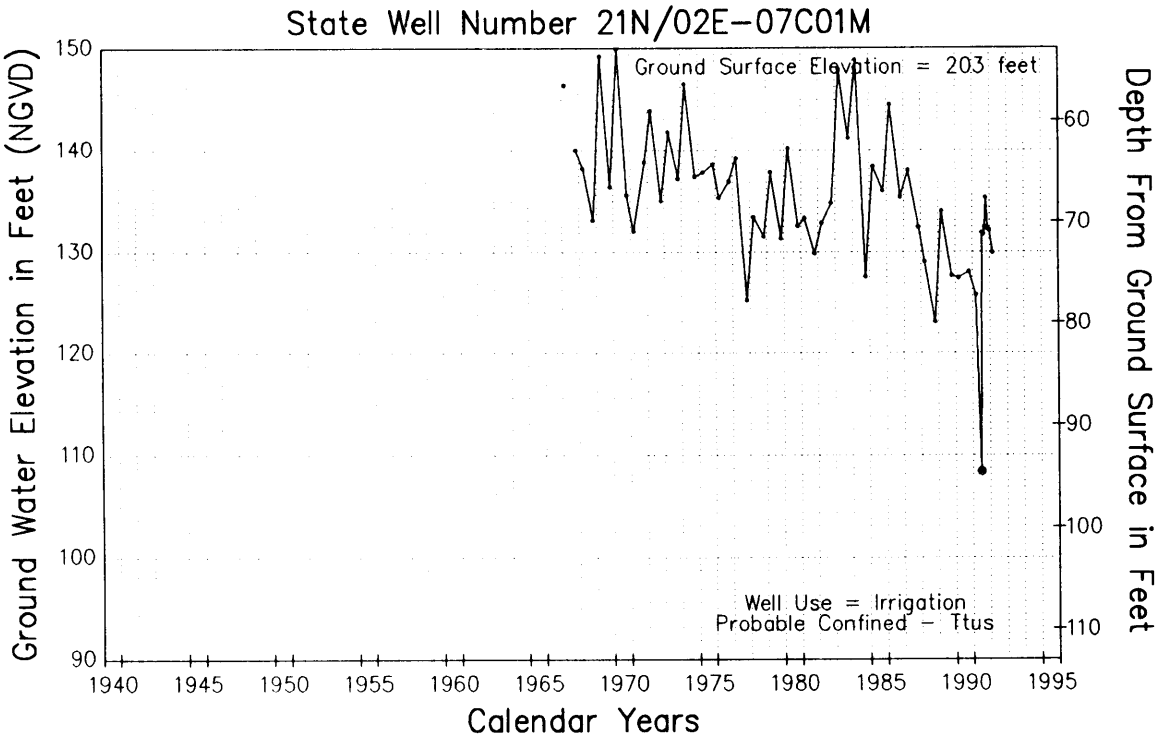
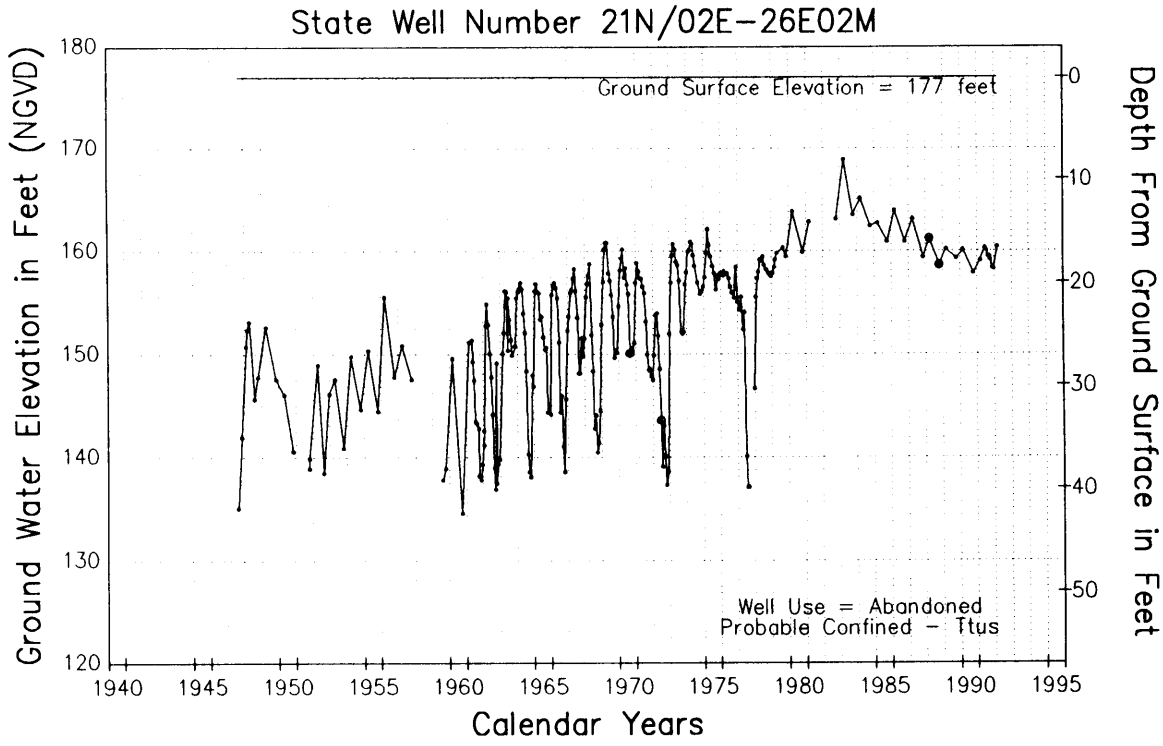
Department of Water Resources, Northern District

# Sacramento Valley Basin – Butte County




•••••Water surface elevation in well  •••••Questionable measurement

Department of Water Resources, Northern District

# Sacramento Valley Basin – Butte County

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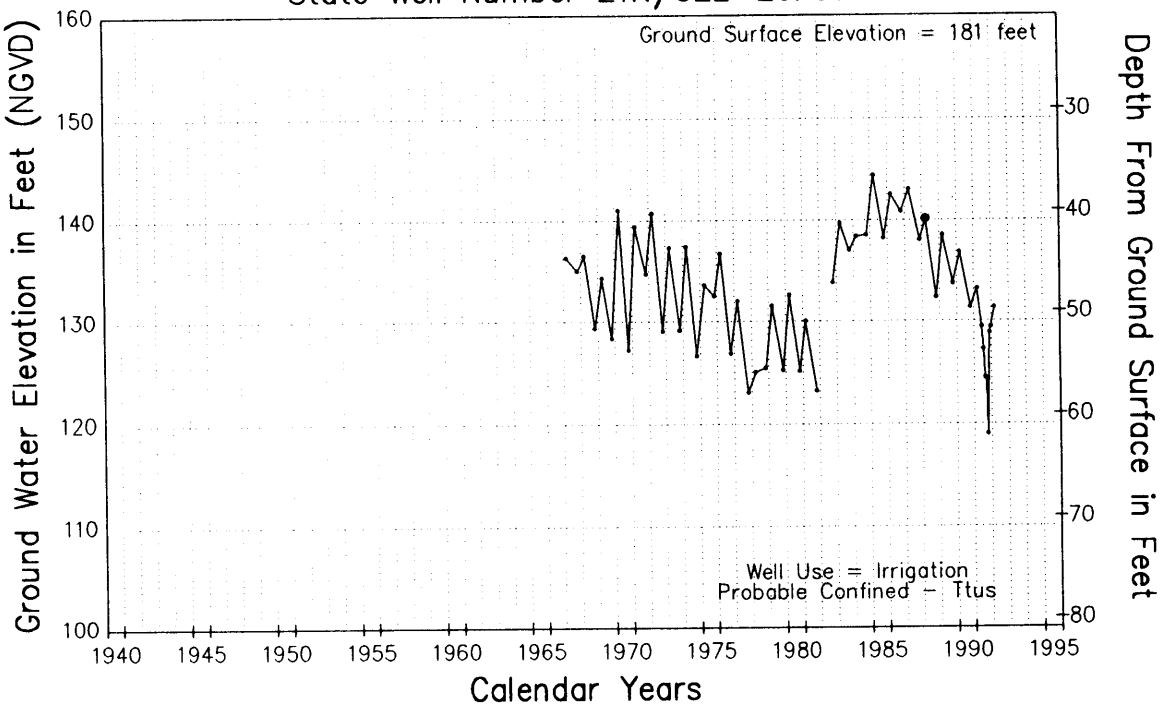


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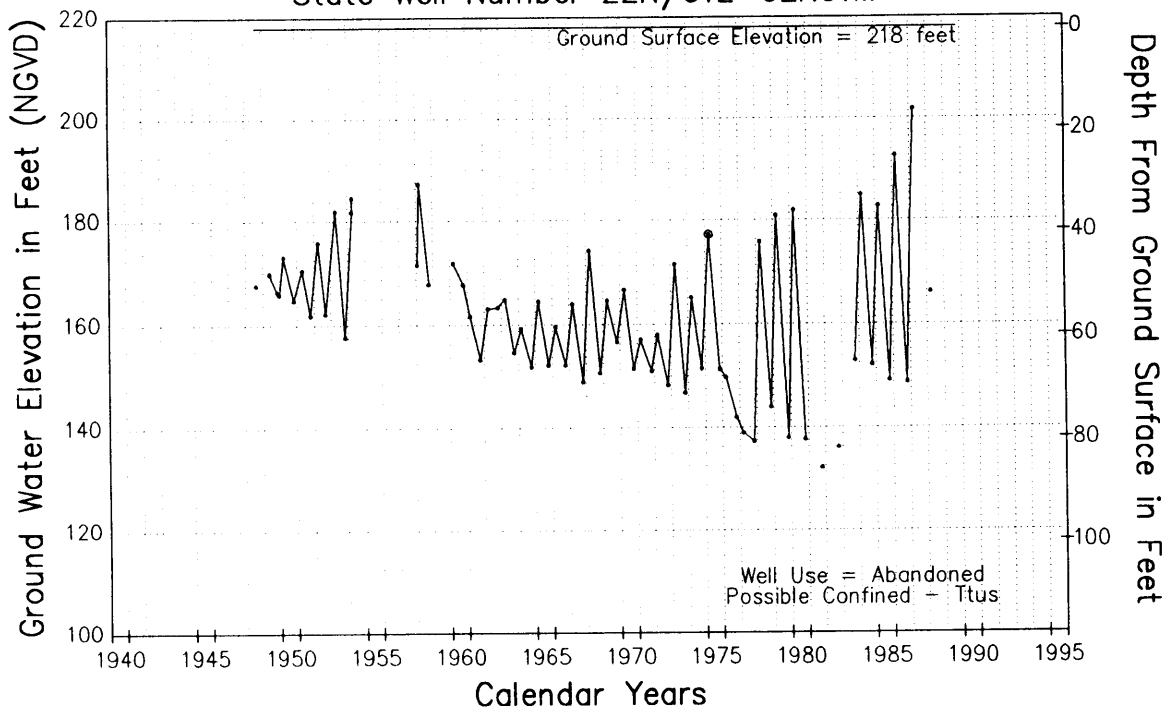
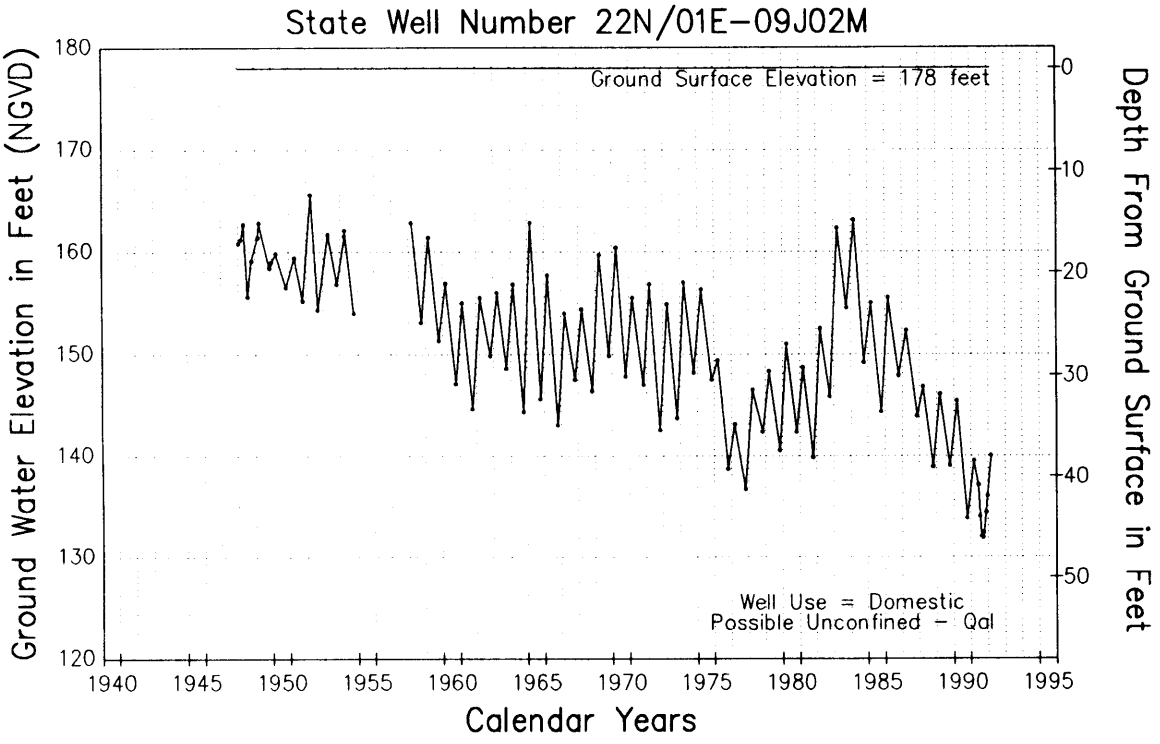
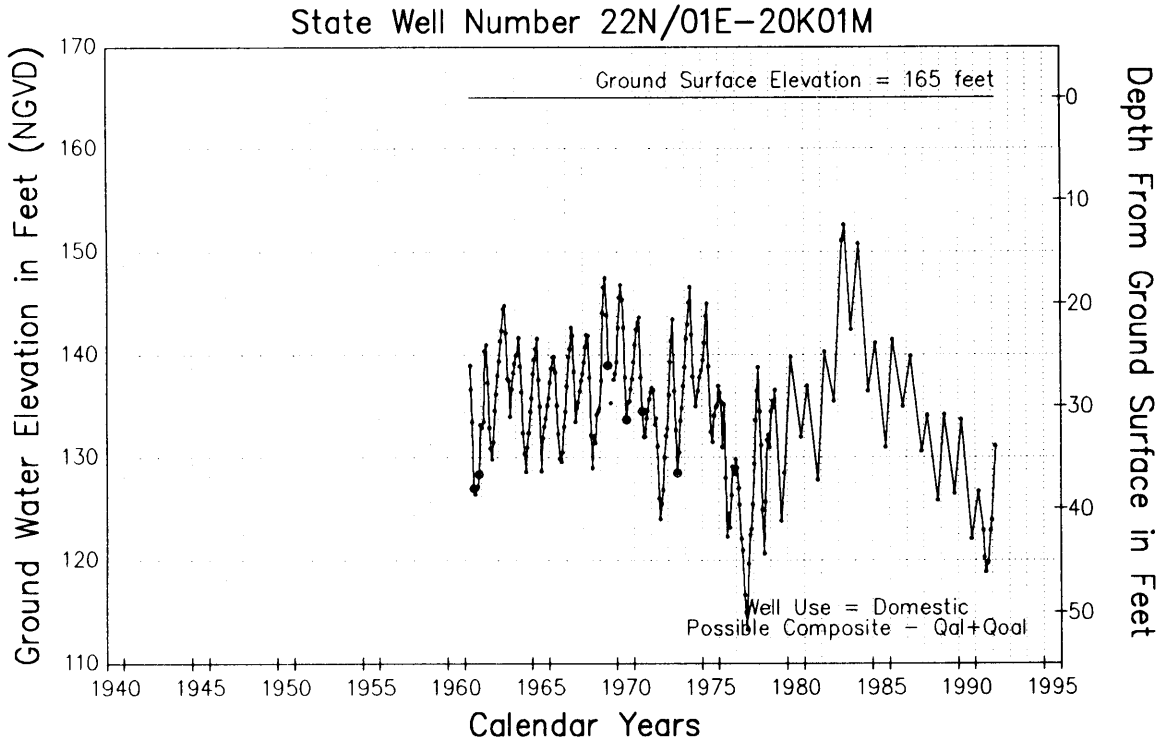



·····Water surface elevation in well  ••••• Questionable measurement

Department of Water Resources, Northern District

# Sacramento Valley Basin – Butte County

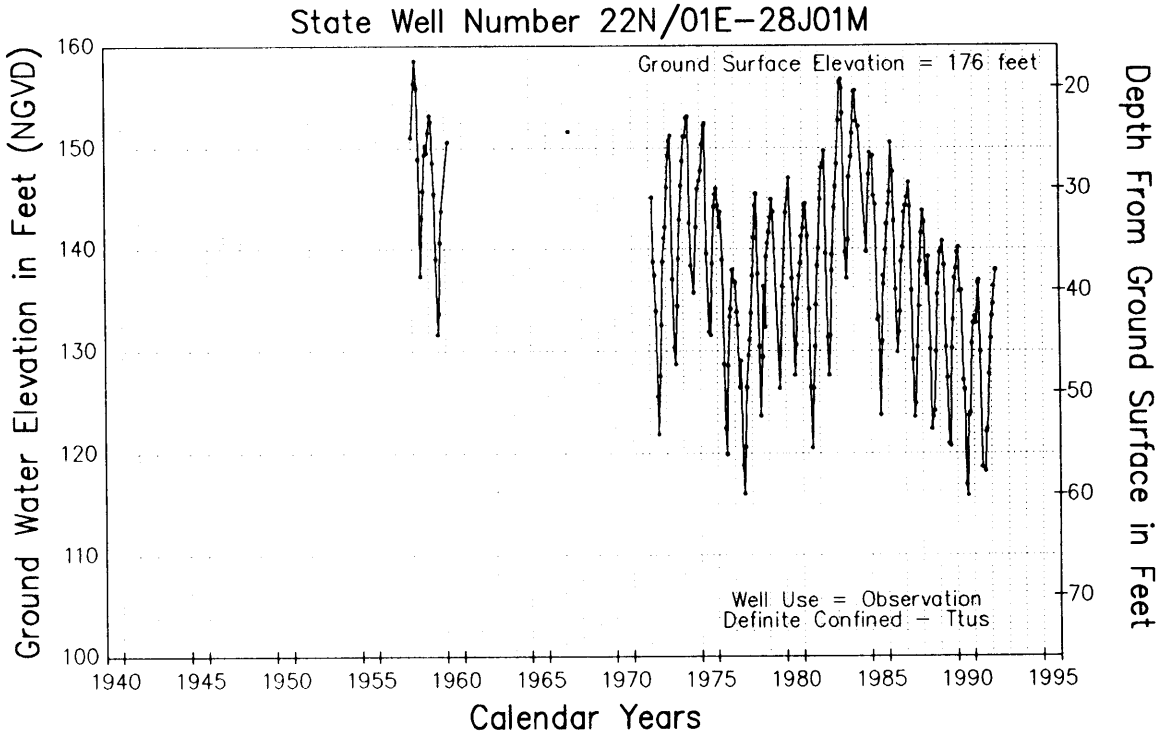


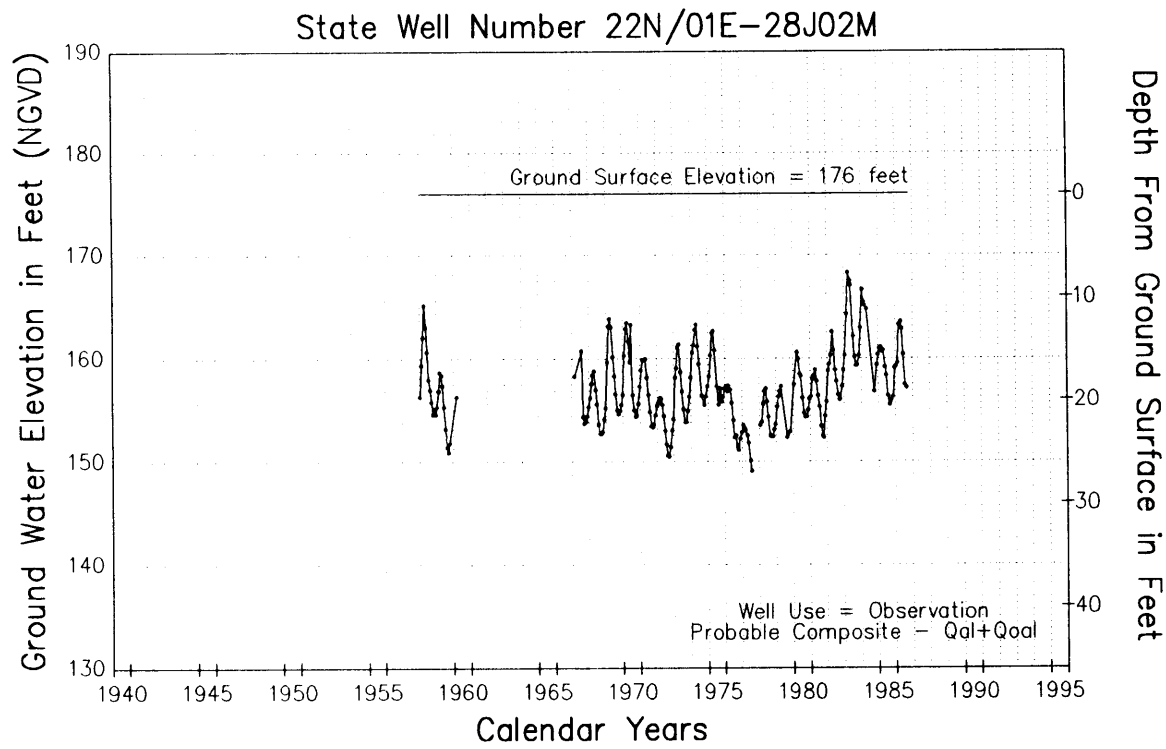




·····Water surface elevation in well ••••• Questionable measurement

Department of Water Resources, Northern District

# Sacramento Valley Basin – Butte County

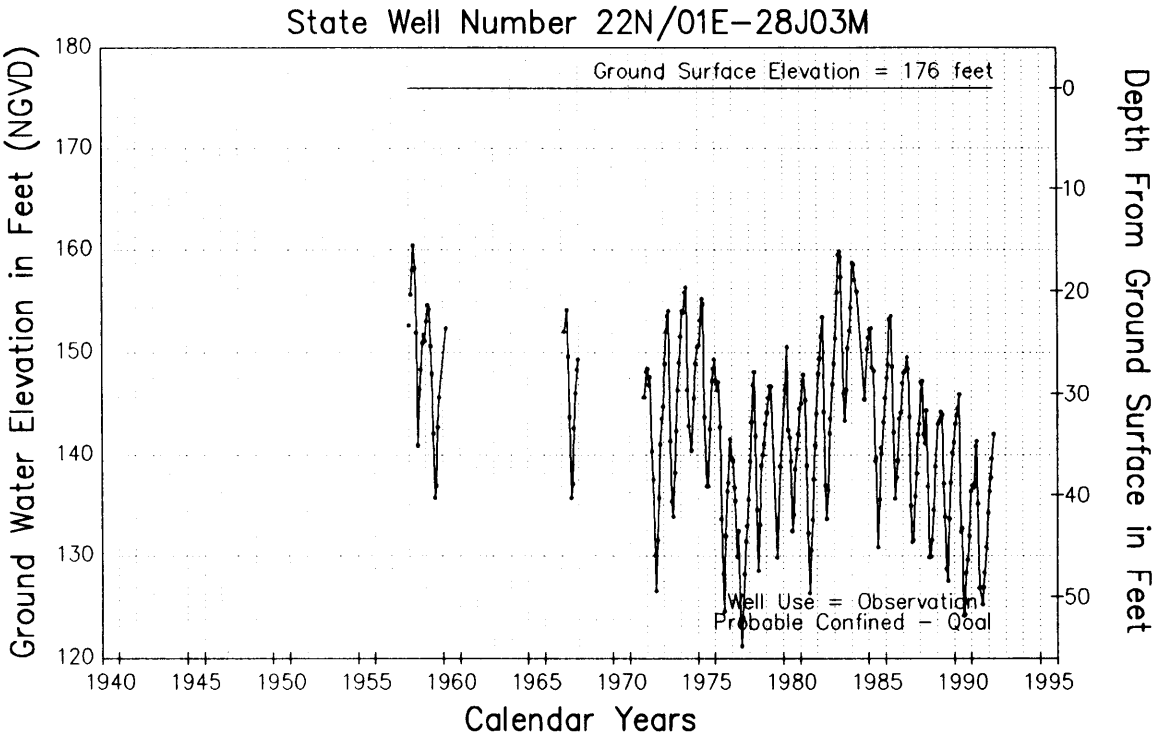


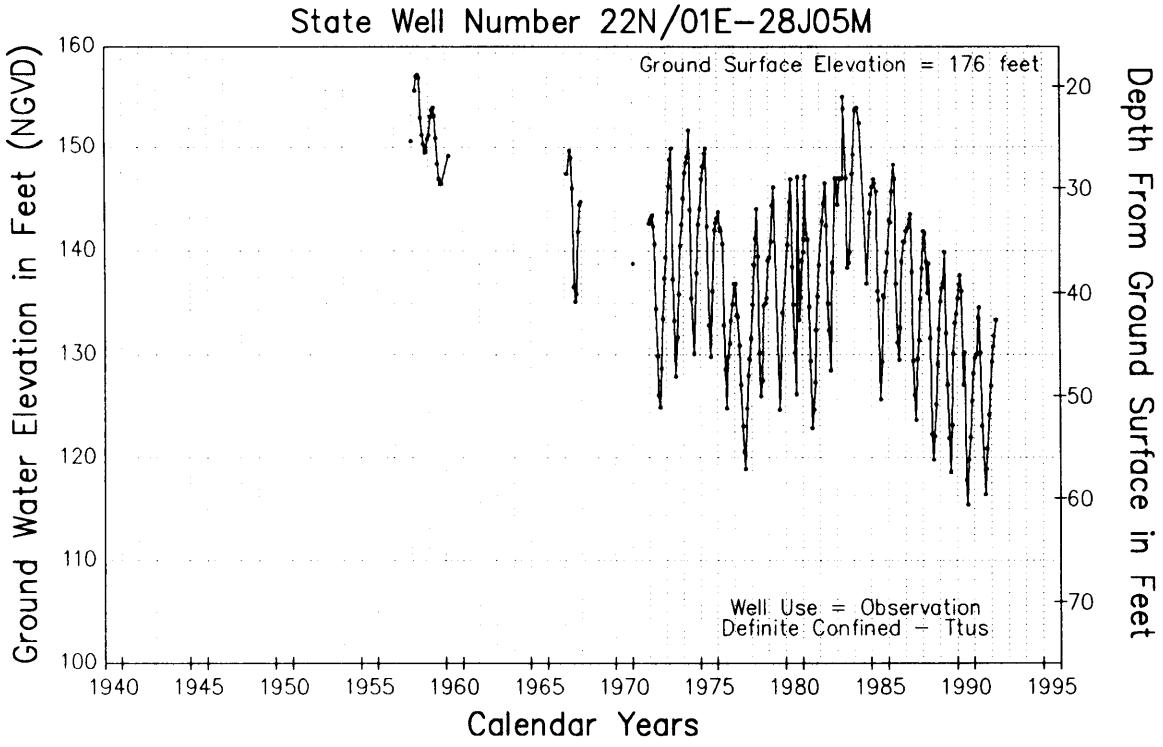




·····Water surface elevation in well  ••••• Questionable measurement

Department of Water Resources, Northern District

# Sacramento Valley Basin – Butte County

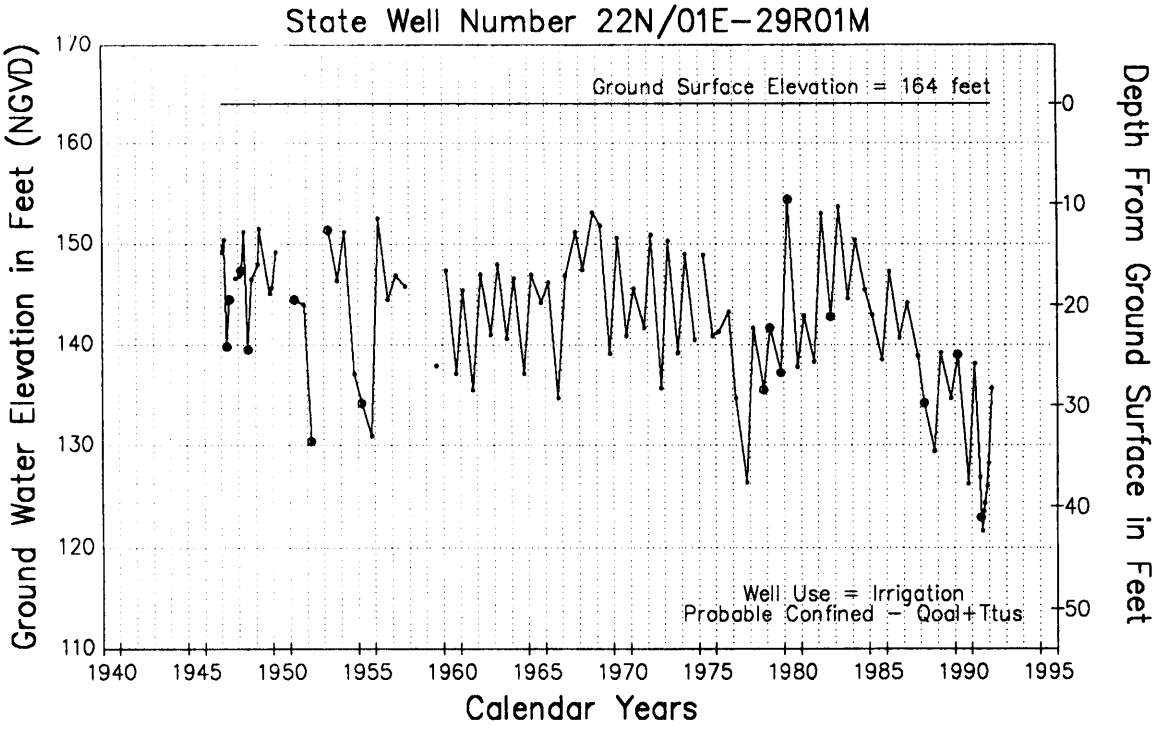


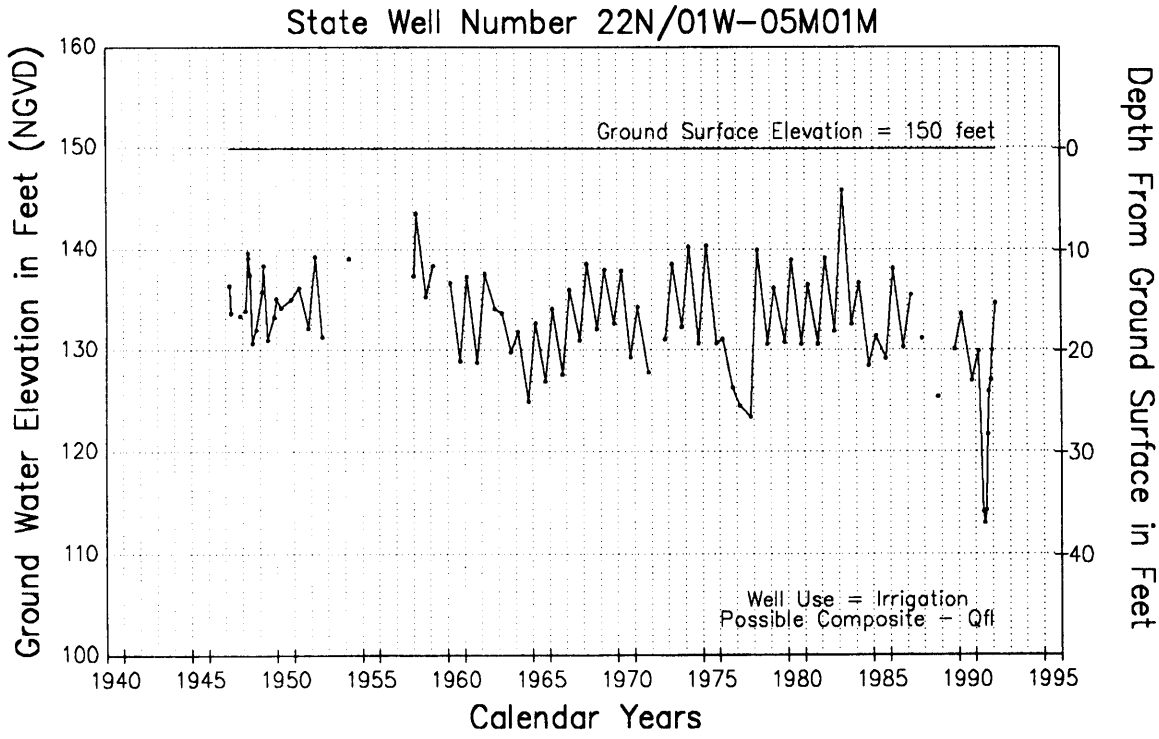




·····Water surface elevation in well ●●●●● Questionable measurement

Department of Water Resources, Northern District

# Sacramento Valley Basin – Butte County

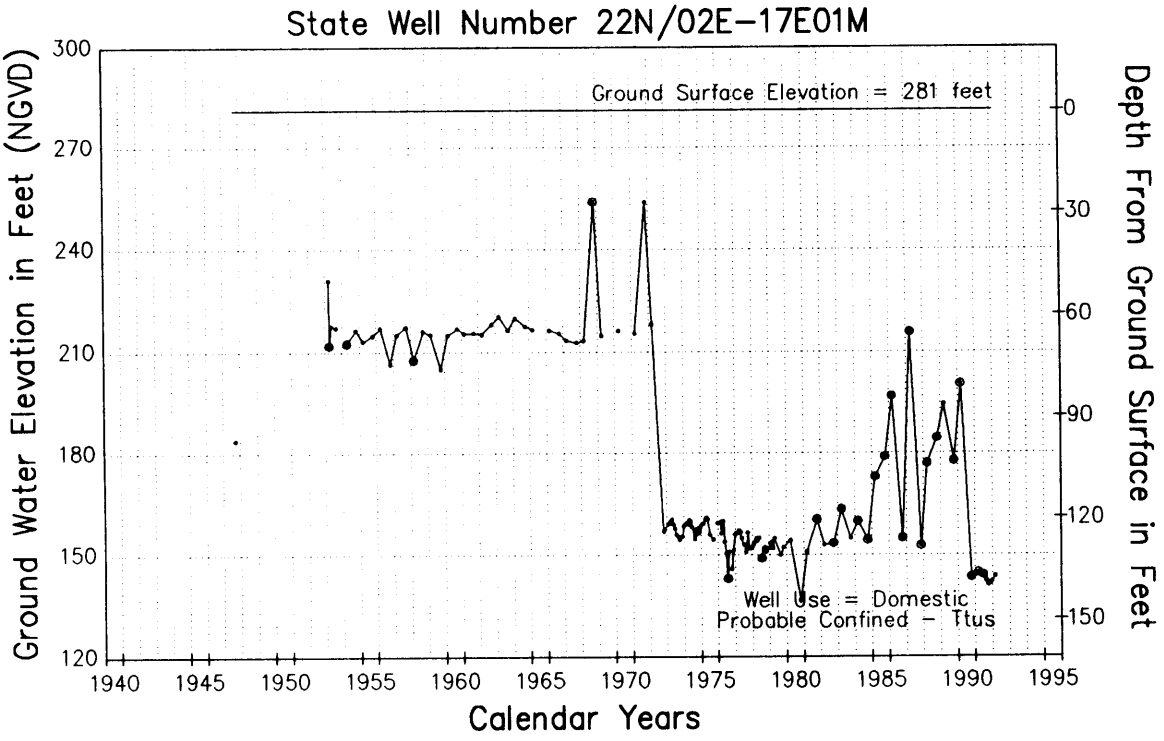


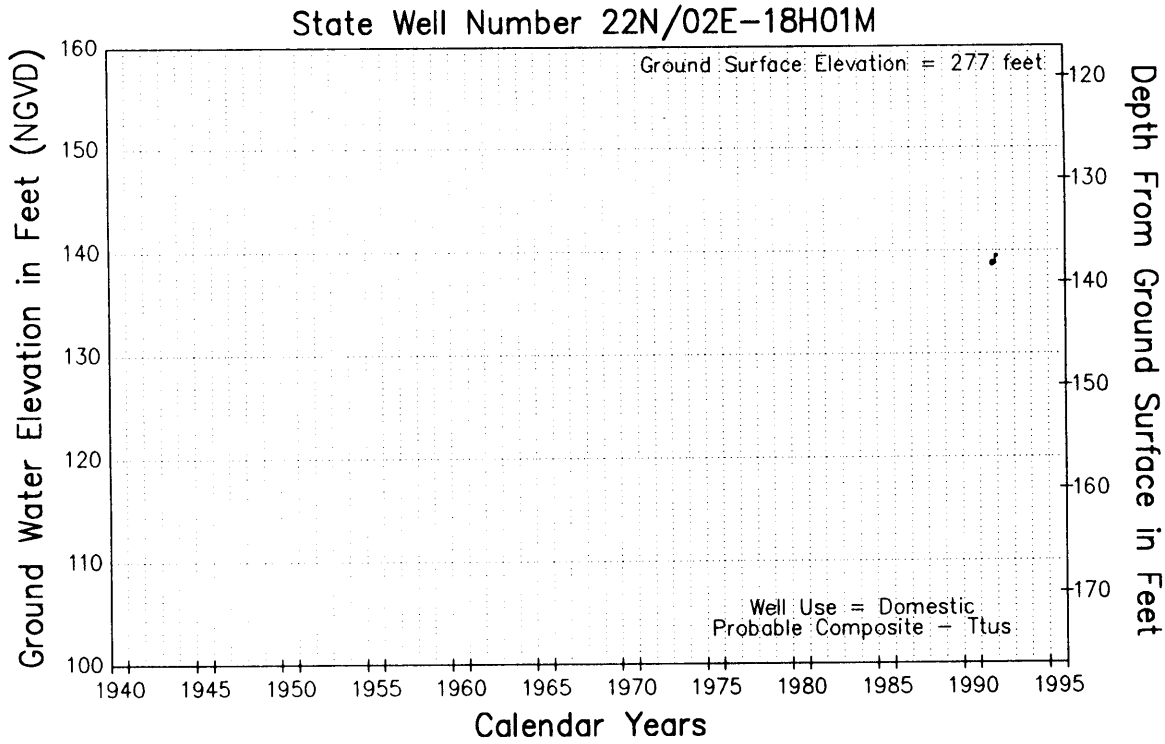




·····Water surface elevation in well  ••••• Questionable measurement

Department of Water Resources, Northern District

# Sacramento Valley Basin – Butte County

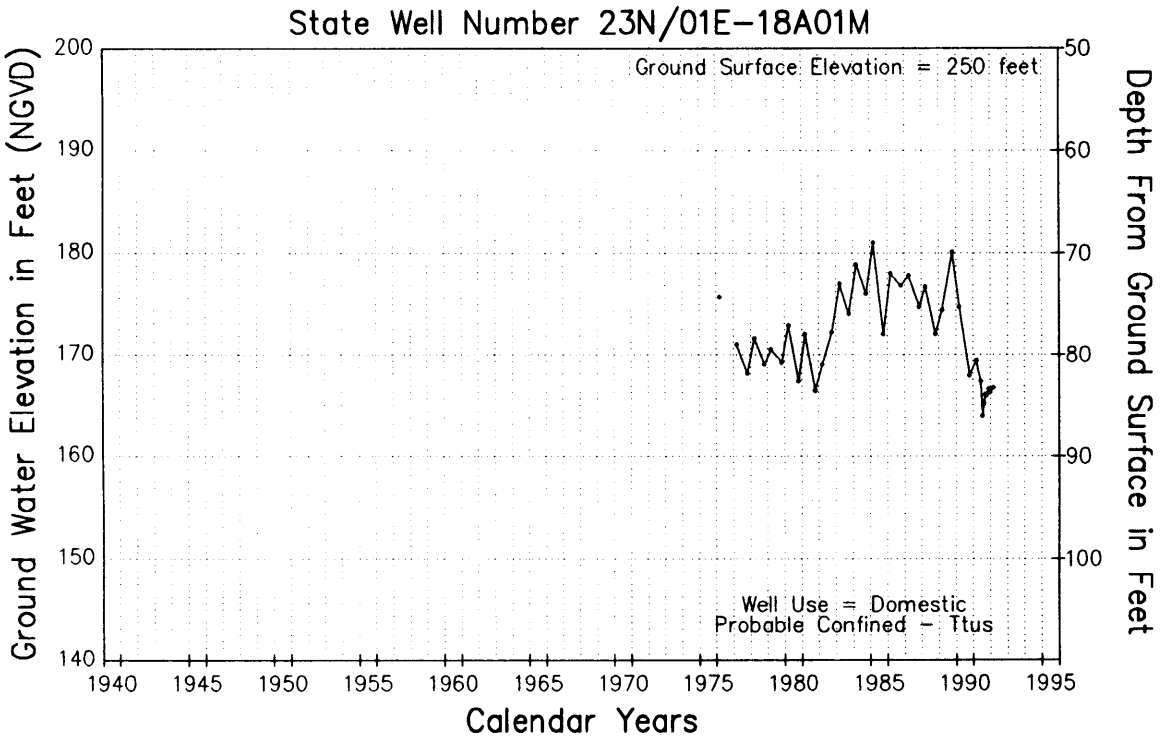


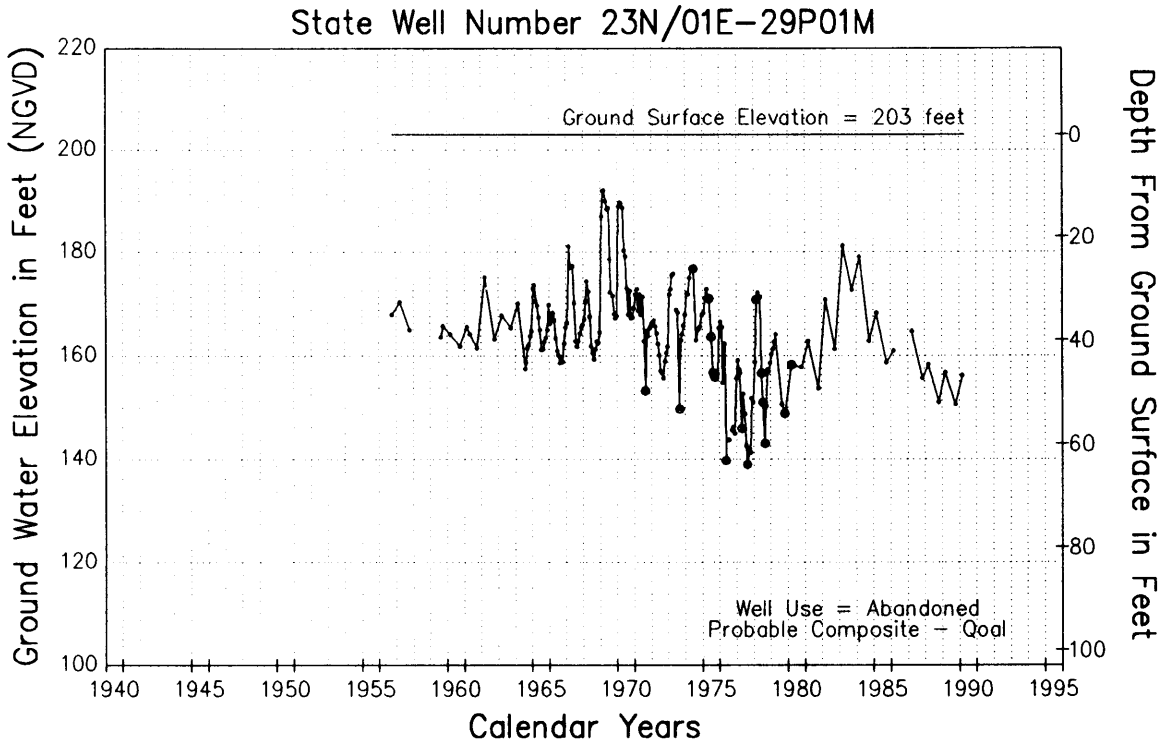




•••••Water surface elevation in well  ••••• Questionable measurement

Department of Water Resources, Northern District

# Sacramento Valley Basin – Butte County

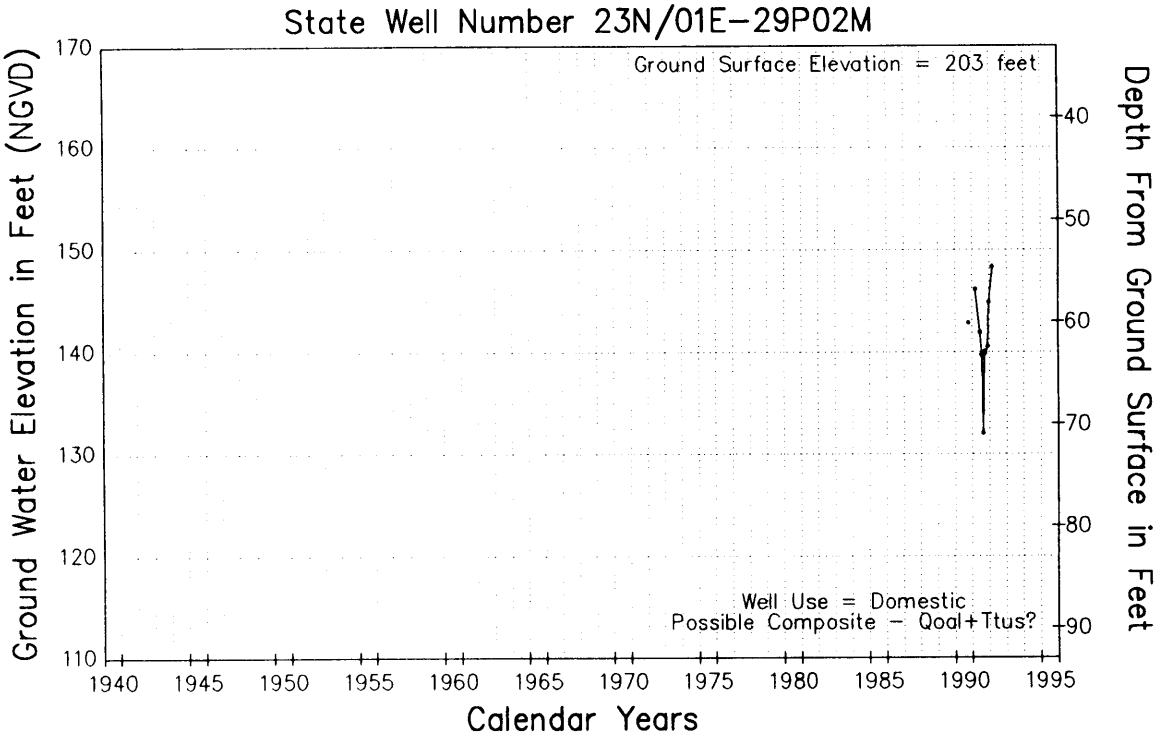


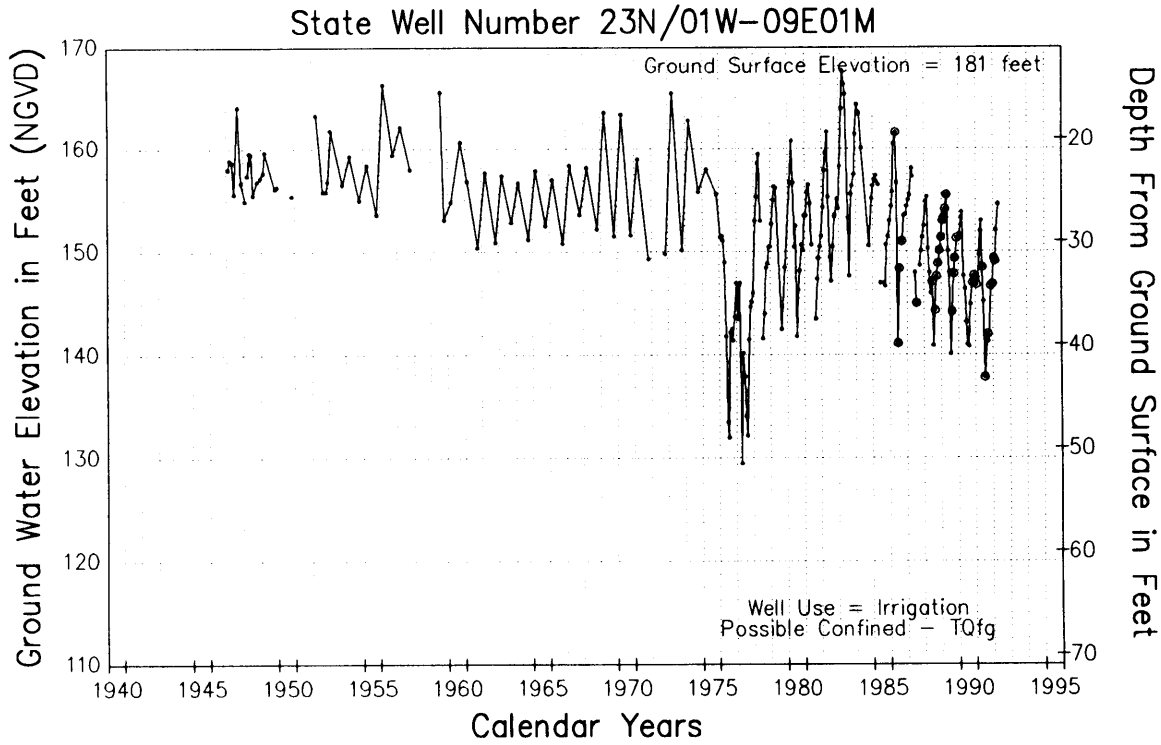




·····Water surface elevation in well  ••••• Questionable measurement

Department of Water Resources, Northern District

# Sacramento Valley Basin – Butte County

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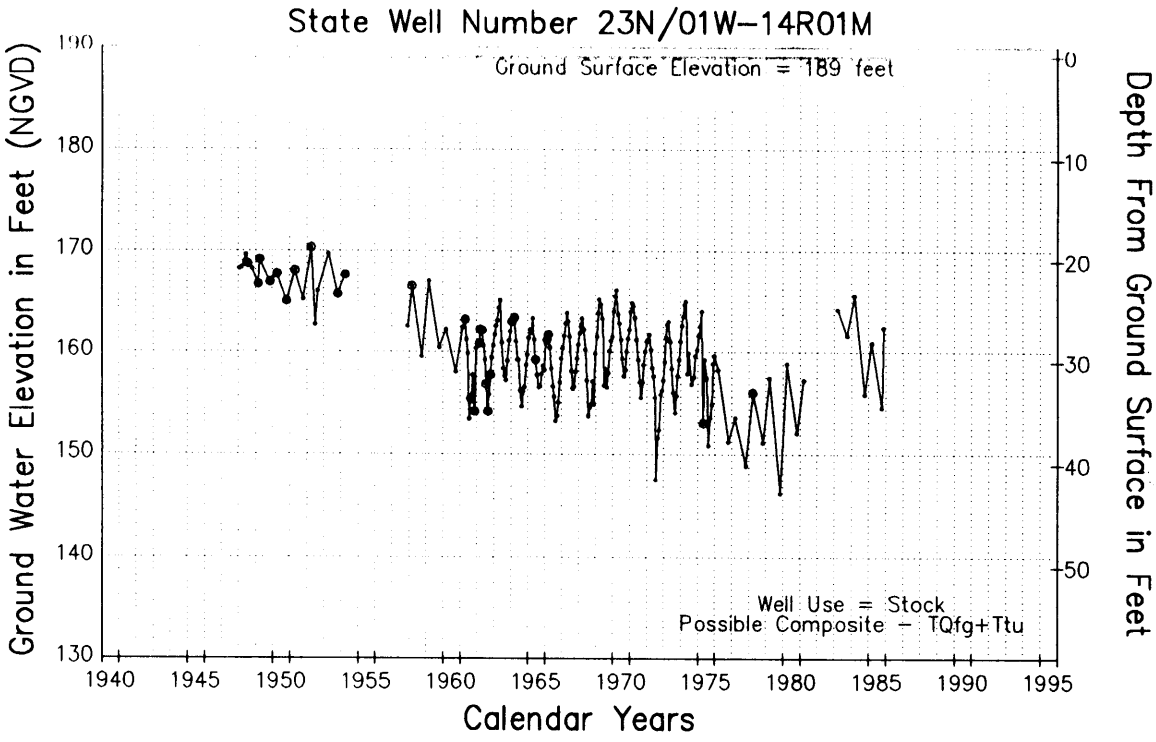
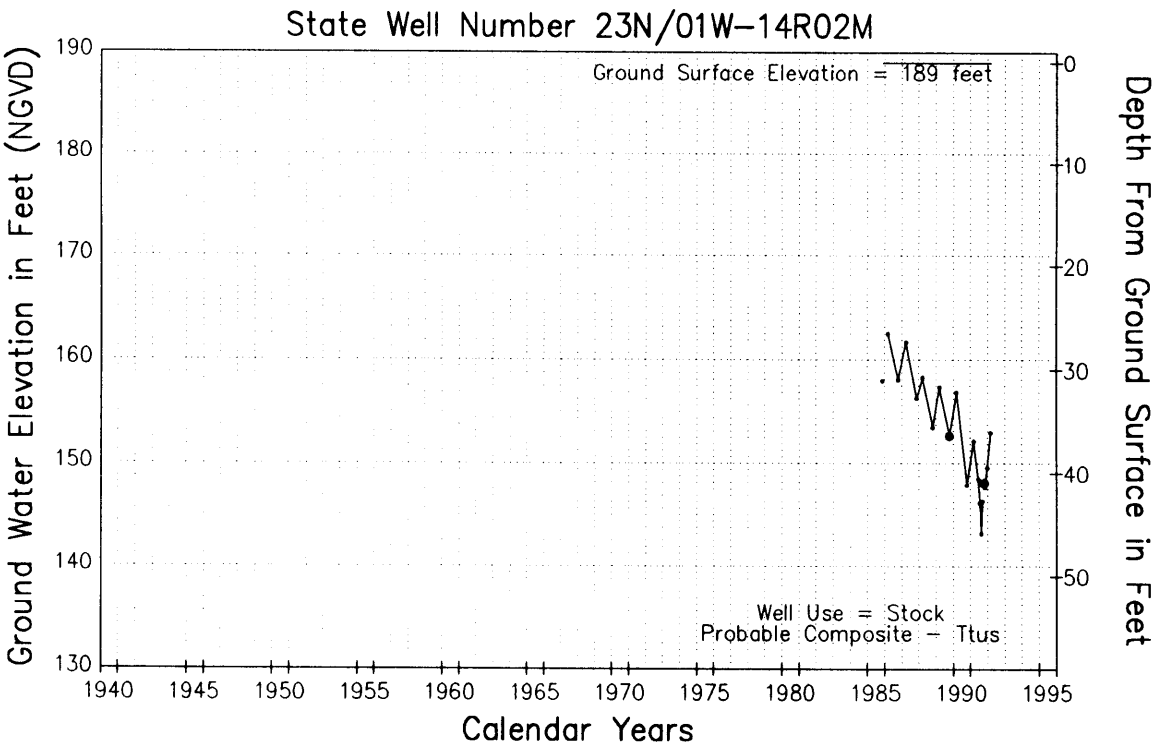
Department of Water Resources, Northern District

# Sacramento Valley Basin – Butte County

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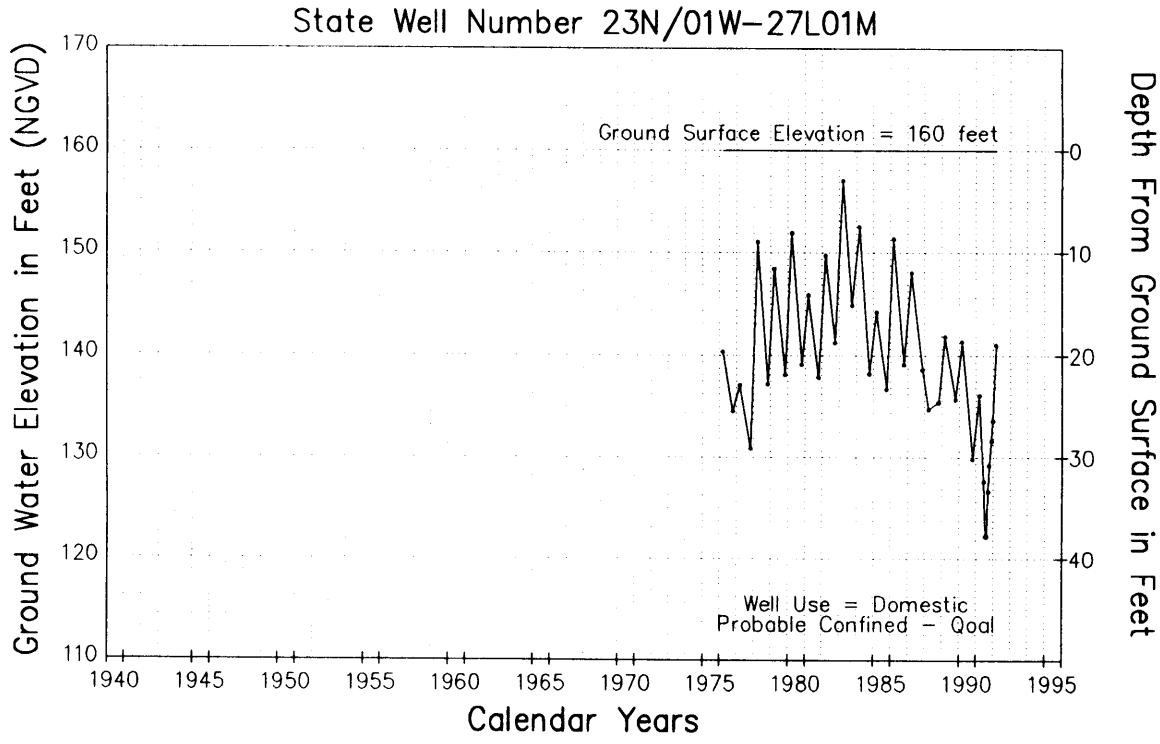
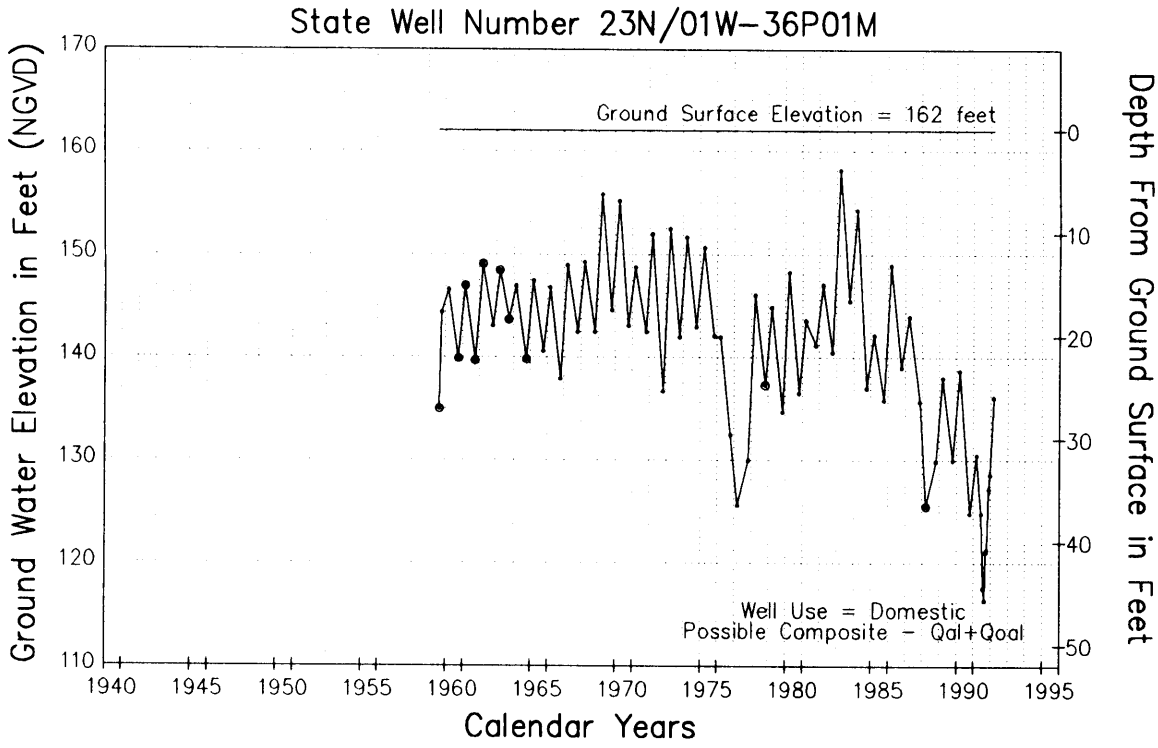
Department of Water Resources, Northern District

# Sacramento Valley Basin – Butte County

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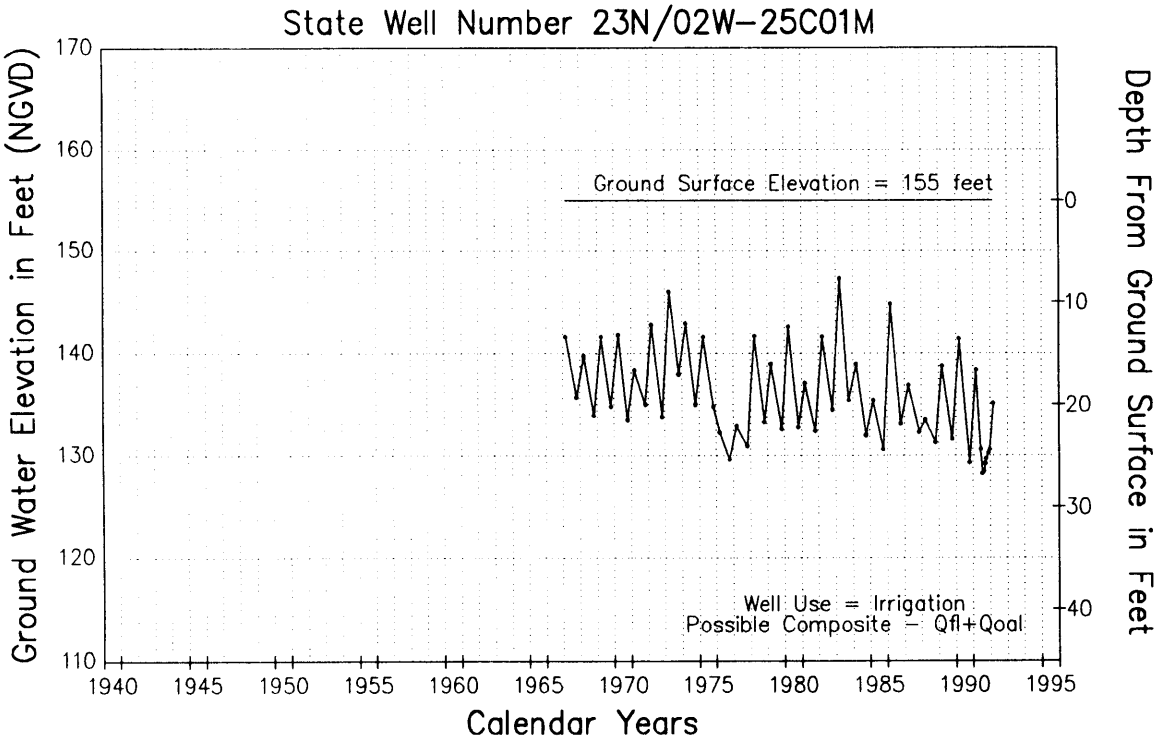
Department of Water Resources, Northern District

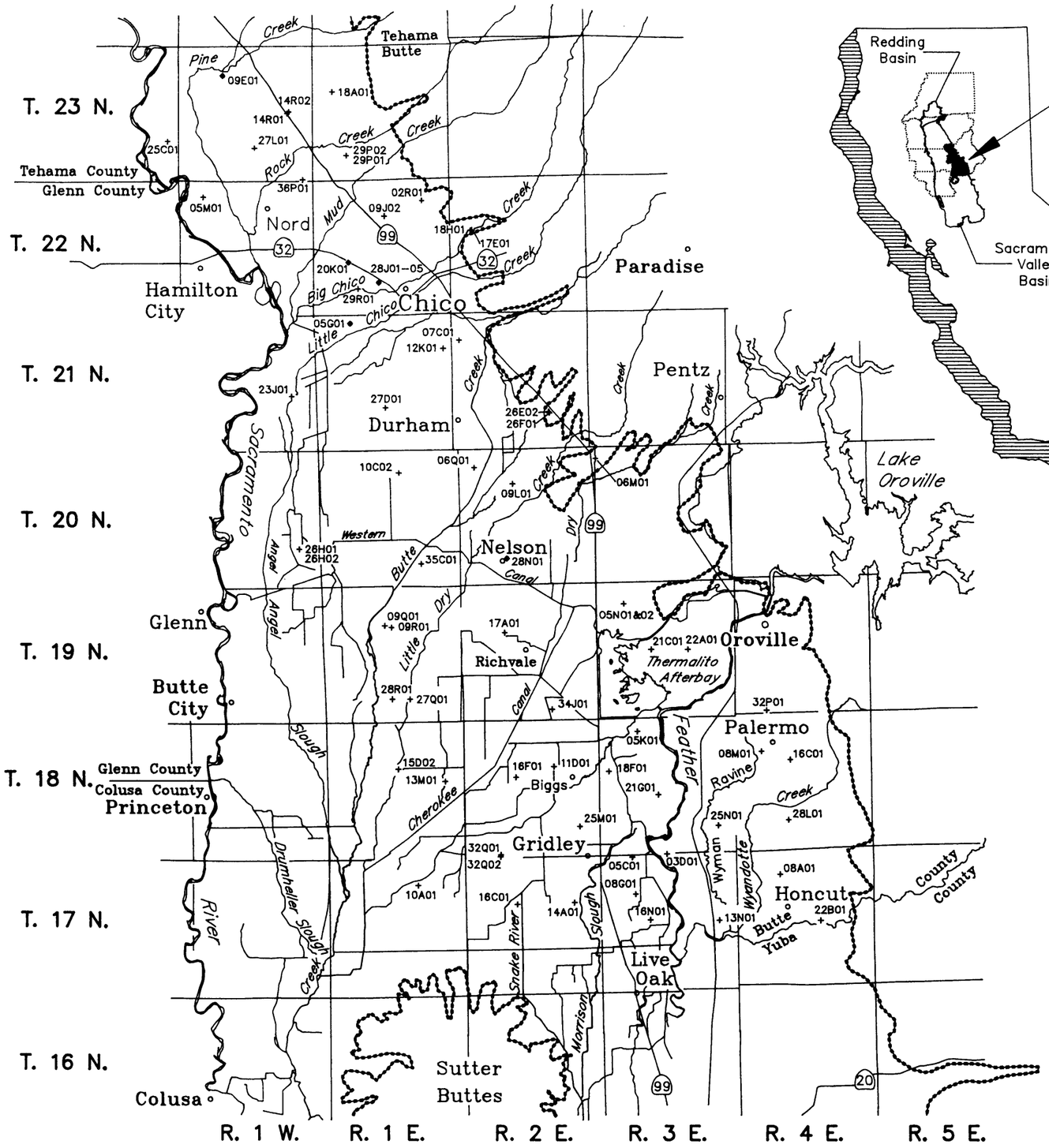
# Sacramento Valley Basin – Butte County




·····Water surface elevation in well ••••• Questionable measurement

Department of Water Resources, Northern District

# Appendix B
# Location of Ground Water Level Monitoring Wells in Butte County




STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
NORTHERN DISTRICT

**Ground Water Levels in Sacramento Valley Basin**
**Butte County**

# LOCATION OF GROUND WATER LEVEL MONITORING WELLS FEBRUARY 1993