GROUNDWATER STATUS REPORT

Prepared for

BUTTE COUNTY WATER COMMISSION

by

BUTTE BASIN WATER USERS ASSOCIATION

February 2006

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FOREWORD

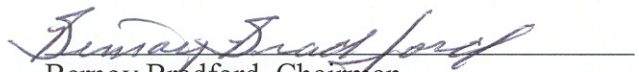
In November 1996, the voters in Butte County voted in "AN ORDINANCE TO PROTECT THE GROUNDWATER RESOURCES IN BUTTE COUNTY". One of the stated purposes of the Ordinance was that "The groundwater underlying Butte County is a significant water resource which must be reasonably and beneficially used and conserved for the benefit of the overlying land by avoiding extractions which harm the Butte Basin aquifer, causing exceedance of the safe yield or a condition of overdraft." The ordinance is now codified as Chapter 33 of the Butte County Code relating to groundwater conservation.

Prior to 2000, Butte County Code, Chapter 33, required that the Groundwater Status Report be delivered to the County by January 15th of each year. During 2000, the Butte County Board of Supervisors amended Chapter 33 to require the Groundwater Status Report be delivered by February 21st of each year.

Section 3.01 – "Groundwater Planning Process" requires that the Butte Basin Water Users Association prepare a groundwater status report based upon the data gathered and analyzed pursuant to Section 3.02 – "Groundwater Monitoring". The Groundwater Status Report is in response to this requirement.

The Department of Water Resources Northern District in Red Bluff supplied monitoring information and hydrographs that are used in this report and we would like to thank them for their cooperation and support in supplying this information.

The purpose of this report is to summarize groundwater level and land subsidence data collected by Butte County and DWR up to and through October 2005. The report presents locations of wells and extensometers, information related to groundwater level trends, and hydrographs depicting groundwater levels over time. It is our intent that this information be used to provide a better basis for understanding groundwater level trends in Butte County.



Bernoy Bradford, Chairman
Butte Basin Water Users Association

SUMMARY

Based upon the water level measurements taken in 2005, the following points can be made relative to the status of groundwater in Butte County:

- It was noted in the previous status report that groundwater levels in many of Butte County's groundwater dependant sub-areas have steadily declined since the late 1990's. Although the groundwater levels have not recovered to the levels recorded in the late 1990's, the decline has generally stabilized and there is some modest reversal. The notable exception continues to be in the Pentz Sub-area where the groundwater level in the key well has continued to decline. The spring 2005 measurement was nearly 10 feet below the previous historic low levels measured during the recent drought periods (1976-77 and early 1990's).

- Previously reports have sighted a general rate of decline in many of Butte County's key wells of between 0.8 and 2.0 feet per year since 1998. These declines seem to have stabilized in the past two to three years. It is believed that these declines are primarily the result of precipitation patterns and not the result of increased groundwater use. An examination of historical trends on the key hydrographs presented in the report suggests that once precipitation returns to a more normal pattern that groundwater levels should recover. However, the situation should be evaluated closely over the next few annual updates.

- The minimum depth to water observed in the California Water Service Sub-area key wells during 2005 was 63 feet (Well 1-04) and the maximum was 130 feet (Well 33-01). The seasonal fluctuations measured in the two key wells were 11 feet in Well 33-01 and 13 feet in Well 1-04. Groundwater level measurements taken throughout 2005 indicate a similar fluctuation pattern as in previous years. The decline noticed since 1998 seems to have stabilized in the three most recent spring measurements.

- No land subsidence was detected in the County from an evaluation of the extensometer records in the Western Canal, M&T, California Water Service, Richvale, and Biggs-West Gridley sub-areas.

INTRODUCTION

This report is a compilation of information related to the monitoring activities in Butte County and includes groundwater hydrographs from "key wells" within each hydrologic sub-area. Groundwater hydrographs for the other wells monitored in the County are available on the DWR website at http://wdl.water.ca.gov.

Most of the material contained in this report was excerpted directly from a draft report titled Butte County Groundwater Analysis, dated December 2000, which was prepared by the Department of Water Resources, Northern District. This was done to achieve a level of consistency between the findings of the BBWUA, and those of the Butte County Inventory Analysis, which was prepared cooperatively by Butte County Department of Water and Resource Conservation, Camp, Dresser and McKee, Inc., and the Department of Water Resources in March 2000.

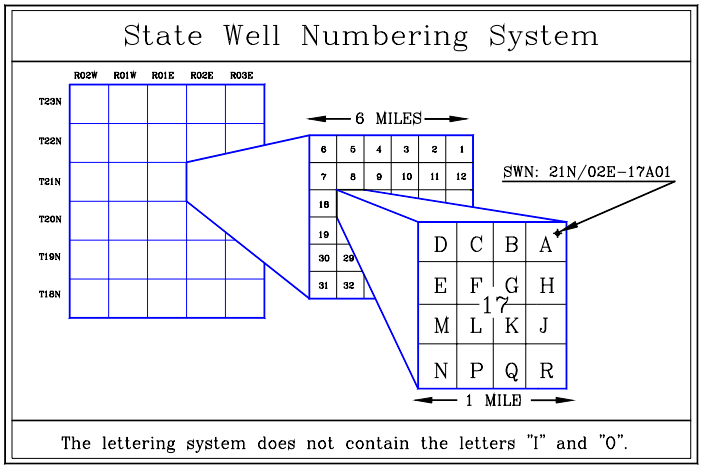
MEASUREMENT FREQUENCY AND PERIOD OF RECORD

Groundwater level monitoring in the Sacramento Valley portion of Butte County is currently being conducted by several private and public agencies. Historically, the Department of Water Resources has maintained the most comprehensive, long-term groundwater level monitoring grid, with approximately 210 different wells monitored over the last 50 years in the Sacramento Valley portion of Butte County. Within this period of time, the annual size of the monitoring grid has fluctuated from as few as 50 wells, to as many as 180 wells, depending upon the activity of special studies in the area. Until 1989, the majority of these wells were measured semi-annually, during the spring and fall. Beginning in 1990, the frequency of groundwater level monitoring was increased to monthly, before returning to a semi-annual measurement in 1995. In 1997, the Butte County Department of Water and Resource Conservation, in cooperation with the Department of Water Resources, began to expand the number and frequency of groundwater level monitoring in the valley portion of Butte County. Currently 104 wells are monitored in Butte County. These wells consist of a mixture of domestic and irrigation wells, along with dedicated observation wells. Two new multi-completion observation wells were installed in the Western Canal sub-area during 2005, and data collection at these wells will begin in 2006. Approximately 35 of the 109 wells are equipped to continuously monitor and record changes in groundwater levels. The remaining wells are measured four times per-year, during March, July, August and October. The locations of wells monitored in Butte County are shown in Appendix A.

In addition to the groundwater level monitoring conducted by Butte County and Department of Water Resources, California Water Service Company currently measures monthly groundwater levels in approximately 60 municipal groundwater supply wells in the Chico Urban area. California Water Service wells are typically deep wells that draw from the lower Tuscan Formation aquifer system. The U. S. Bureau of Reclamation and USGS are not currently measuring groundwater levels in Butte County, but both agencies have monitored wells in the past.

MONITORING WELL LOCATIONS

Locations of Butte County monitoring wells, including continuously monitored wells and extensometers, are shown in Appendix A. The well locations are approximate, but are estimated to be within 500 feet. The monitoring wells are numbered using the State Well Numbering System. The State Well Numbering System identifies each well by its location according to the township, range, section, and tract system. The figure below illustrates how a State Well Number (SWN) is assigned.

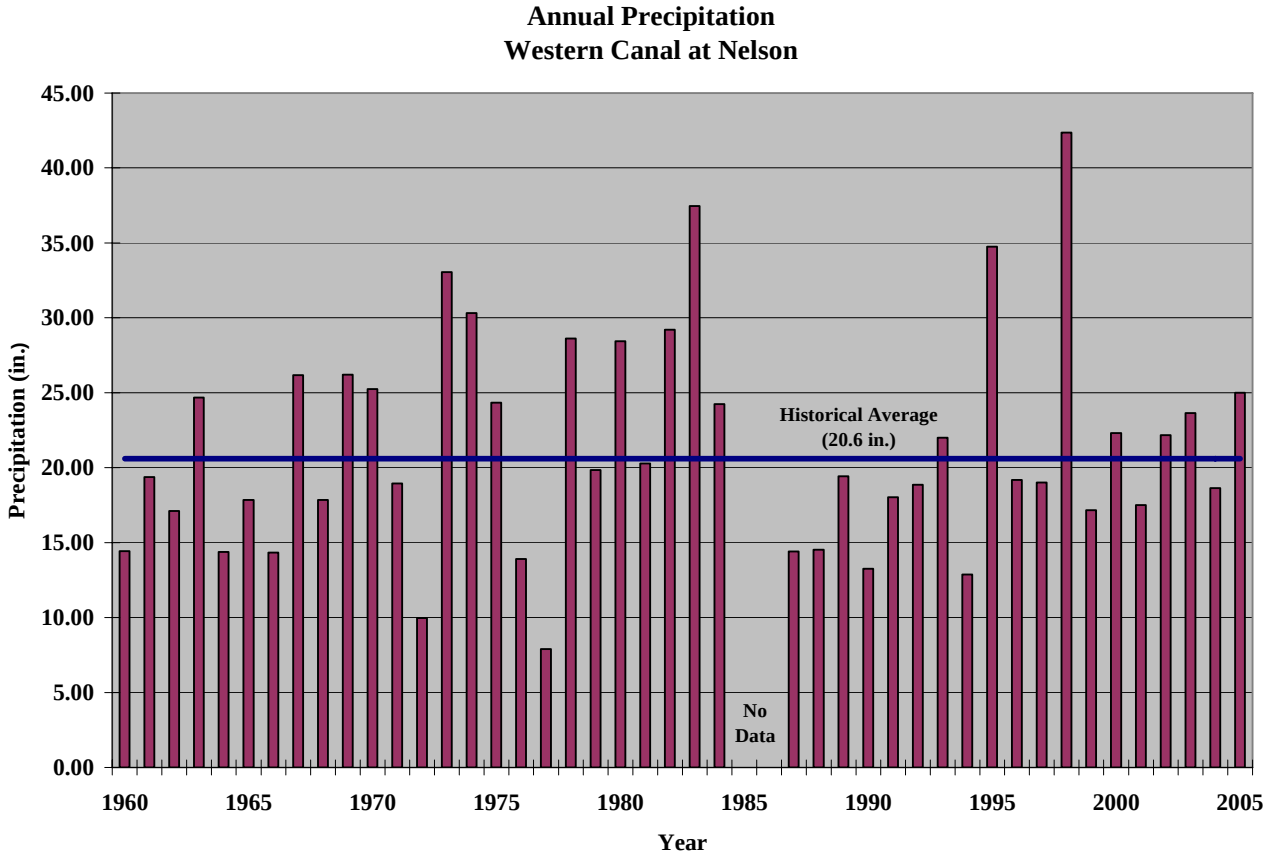


LAND SUBSIDENCE

The locations of the five extensometers that measure land subsidence within the County are shown in Appendix A. These extensometers were installed during 1999 and 2003. Records from these extensometers are available by contacting the Department of Water Resources Northern District or on the Northern District web page (http://www.nd.water.ca.gov/Data/Extensometers/index.cfm). To date, no land subsidence has been recorded in Butte County

PRECIPITATION

Precipitation for the water year ending September 30, 2005 at the Western Canal Nelson Climatological Observation Station was 25.00 inches, which is 4.40 inches above the 45-year average of 20.60 inches. The figure below represents the total annual precipitation at the Western Canal Station for the 45-year period 1960 through 2005.



2005 Update

Precipitation for the 2005 water year was approximately 4.4 inches above the 45-year average. Since 1987 there have only been two years that are classified as wet. These occurred in 1995 and 1998. Excluding these two years, the 1987 to 2005 time period would be considered slightly dryer than average.

SURFACE WATER DELIVERIES

Surface water is an important component to aquifer recharge in the Butte Basin. During the 2005 water year 1,028,912 acre-feet of water were delivered to Western Canal Water District and the Joint Water District Board. The 2005 water deliveries were nearly 140,000 acre-feet more than what was delivered in 2004, and approximately 500,000 acre-feet higher than what was delivered in 1991. The increase in water demand since 1991 is primarily the result of late season water needs for rice straw decomposition and for waterfowl habitat. Summarized below are the deliveries to Western Canal Water District and the Joint Water District Board for the years 1991 to 2005 in acre-feet.

Water Year	Western Canal Water District	Joint Water District Board	Total
1991	185,273	344,768	529,915
1992	198,797	349,036	547,631
1993	216,521	515,292	729,827
1994	224,768	586,622	811,377
1995	210,110	568,481	778,598
1996	257,195	615,004	872,187
1997	272,003	658,540	934,214
1998	229,528	590,727	820,248
1999	293,364	690,847	984,248
2000	314,737	707,018	1,032,392
2001	302,784	718,489	1,021,562
2002	305,460	597,529	902,989
2003	271,867	682,403	954,270
2004	329,700	790,663	1,120,363
2005	284,188	750,128	1,034,316

GROUNDWATER LEVEL TRENDS

Groundwater levels fluctuate seasonally in response to recharge and extraction. Precipitation, applied irrigation water, local creeks and rivers, and Thermalito Afterbay all recharge groundwater in Butte County. Levels are usually highest in the spring and lowest during the irrigation season in the summer months. Groundwater in the valley portion of Butte County generally flows from northeast to southwest.

Long-term fluctuations occur when there is an imbalance between aquifer recharge and discharge. If long-term recharge exceeds the long-term discharge then groundwater levels will increase. Conversely, if long-term discharge exceeds long-term recharge then groundwater levels will decline. These long-term changes are linked to increased or decreased groundwater extraction or variations in recharge associated with wet or dry climatic cycles.

The seasonal and long-term changes in groundwater levels are determined using water level measurements in wells. This data is typically depicted on hydrographs, which are graphical plots of the water level measurement history. Prior to 1997, data points for each of the hydrographs in Butte County generally consisted of two annual measurements. Since 1997, four measurements are recorded each year. The addition of these summer measurements gives the hydrographs the appearance of greater fluctuation.

Described below, by sub-area, are groundwater level assessments for key wells. Each sub-area assessment includes a discussion of the land use, the historical trend in groundwater levels, and a 2005 update describing recent trends and pertinent findings. The key wells were chosen as being representative of groundwater level conditions within each sub-area. It should be noted that the sub-areas are consistent with the sub-inventory units used in Butte County's Water Inventory Analysis.

When reviewing the hydrographs for the key wells, it is important to note that the solid circles (dots) indicate a static groundwater level measurement while other symbols indicate a measurement that has been qualified as questionable. The Department of Water Resources assigns a numerical code to all questionable groundwater level measurements in an effort to help increase the accuracy of data analysis. Questionable measurement codes are used to differentiate between static versus pumping groundwater level measurements, identify if nearby wells are in operation during the measurement, or note that other conditions were present that could impact the accuracy of the measurement. A questionable measurement code key is show on each hydrograph.

The accuracy of the groundwater levels shown on these graphs is 0.1 feet on the depth scale and within 1 USGS topographic map contour interval on the elevation scale. Typically in Butte Basin the contour interval is 5 feet.

When interpreting short-term changes in groundwater levels, care should be used to compare only those measurements taken during similar times of the year. When using a hydrograph to evaluate long-term groundwater level data, comparison of the spring measurements is usually recommended. Discontinuities or breaks in a hydrograph represent missing measurements. Following is the list of the key wells presented in this report:

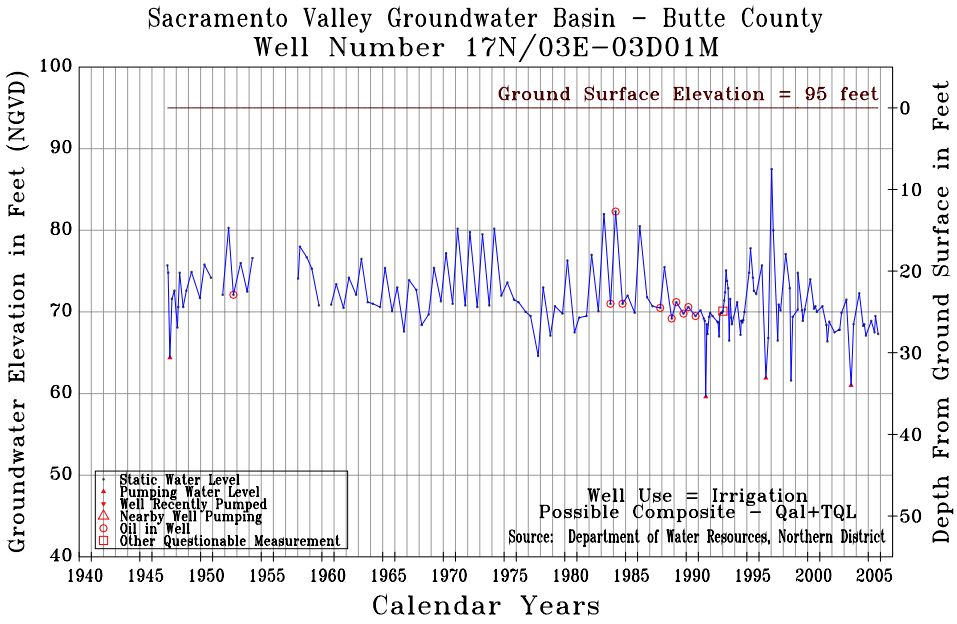
- North Yuba Sub-Area (Well Number 17N/03E-03D01M)
- Thermalito Sub-Area (Well Number 18N/03E-21G01M)
- Western Canal Sub-Area (Well Number 20N/01E-35C01M)
- Richvale Sub-Area (Well Numbers 19N/01E-28R01M & 19N/01E-35B01M)
- Pentz Sub-Area (Well Number 21N/02E-26F01M)
- Esquon Sub-Area (Well Number 20N/02E-09L01M)
- Butte Sink Sub-Area (Well Number 17N/01E-17F01M)
- Butte Sub-Area (Well Number 17N/03E-16N01M)
- Biggs-West Gridley Sub-Area (Well Number 18N/02E-16F01M)
- M & T Sub-Area (Well Number 22N/01E-29R01M)
- Durham-Dayton Sub-Area (Well Number 20N/02E-06Q01M)
- Vina Sub-Area (Well Number 23N/01W-09E01M)
- Cherokee Sub-Area (Well Numbers 20N/02E-13E02M & 20N/02E-24C02M)
- Llano Seco Sub-Area (Well Numbers 20N/01W-26H02 & 20N/01E-18L02M)
- California Water Service (Chico) Sub-Area (Well Numbers 1-04 and 33-01)

North Yuba Sub-Area (Well Number 17N/03E-03D01M):

The figure below is a hydrograph for well 17N/03E-03D01M, located in the western portion of the North Yuba Sub-area. The area surrounding the well is characterized by rural, agricultural land use supported by the application of both surface and groundwater. The well is an active irrigation well drawing water from the upper and middle portions of the aquifer system, with a groundwater level measurement record dating back to the late 1940s. The groundwater level in this well was monitored on a semi-annual basis until 1991, on a monthly basis from 1991 to approximately 1995, and is currently being measured four times per year, March, July, August and October.

Historical Trend

The figure shows that the seasonal fluctuation in groundwater levels is about 5 to 10 feet during years of average precipitation and 10 to 15 feet during years of drought. Long-term comparison of spring-to-spring groundwater levels shows about a 10-foot decline in groundwater levels associated with 1976-77 and 1986-94 droughts, followed by recovery to pre-drought levels. Overall comparison of spring-to-spring groundwater levels indicates that the upper to middle aquifer system in this area has changed little since the 1940s.



Hydrograph for Well 17N/03E-03D01M

2005 Update

The spring 2005 groundwater level elevation is slightly lower than the levels from the preceding two years, and consistent with the trend of lower than average measurements observed over the past five to six years. The one noticeably low measurement during that period was measured during the summer of 2003, and was noted as a questionable measurement which probably indicates it does not represent static conditions. The unusually high spring 1998 groundwater level is likely the result of an exceptionally wet winter and likely indicates that when precipitation patterns return to a more normal trend that groundwater levels should recover. An examination of the overall record reveals that long-term depletion of groundwater in storage is probably not occurring at this time.

Thermalito Sub-Area (Well Number 18N/03E-21G01M):

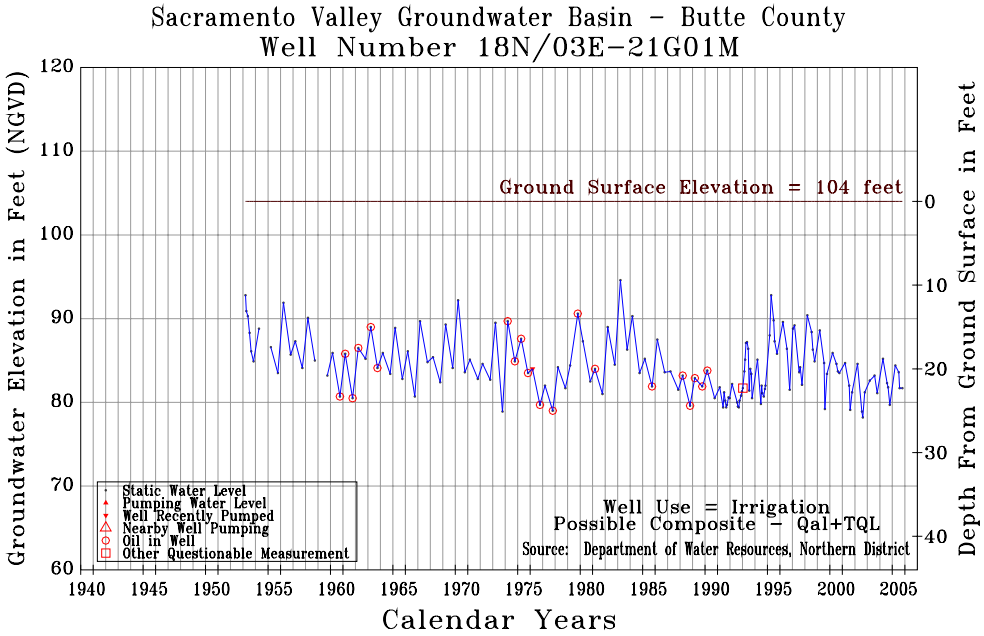
The figure below is a hydrograph for well 18N/03E-21G01M, located in the southern portion of the Thermalito Sub-area, approximately one-mile west of the Feather River. The area surrounding this well is characterized as rural agricultural. Agricultural cultivation in this area consists of orchard crops supported primarily by groundwater extraction. This well is an active irrigation well producing groundwater from the shallow to intermediate portion of the aquifer system. The groundwater level measurement record dates back to the late 1940s. Groundwater levels in this well were monitored on a

semi-annual basis until 1991, on a monthly basis from 1991 to about 1994, and are currently being monitored four times a year during March, July, August and October.

Historical Trend

This figure shows an interesting spring to summer fluctuation in groundwater levels between normal and drought years. The range of spring to summer fluctuation in groundwater levels is about 5 to 8 feet during years of normal precipitation, but then decreases during years of drought to about 2 to 5 feet. A closer examination of the hydrograph shows that the decrease in spring to summer fluctuation is the result of a drop in spring groundwater levels, while the summer levels remain constant. The drop in spring groundwater levels indicates that the aquifer system in this area does not fully recharge during years of drought. The quick drop, then relatively constant summer water level during drought years, indicates that the aquifer system in this area is likely being recharged from a steady source of surface water; in this case the Feather River. During drought years, groundwater levels drop relatively quickly until they reach the point where the aquifer is interconnected with the Feather River. The hydrograph indicates that, in this area, the surface water - groundwater interconnection takes place at about 23 feet below ground surface, or at an elevation of about 80 feet above mean sea level.

Long-term comparison of spring-to-spring groundwater levels show an overall decline of 5 to 8 feet during the 1976-77 and 1986-94 droughts, followed by recovery to pre-drought levels. Further long-term comparison of spring-to-spring groundwater levels during normal years indicates very little change since the late 1950s.



Hydrograph for Well 18N/03E-21G01M

2005 Update

It was noted in the previous report that successive spring groundwater levels had declined steadily in this well by about 1.5 feet per year since 1998, and that the trend was less evident in the spring 2004 measurement. The spring 2005 measurement is slightly lower than the spring 2004 measurement, but it is higher than levels measured for several years prior to 2004. Although the below average trend is

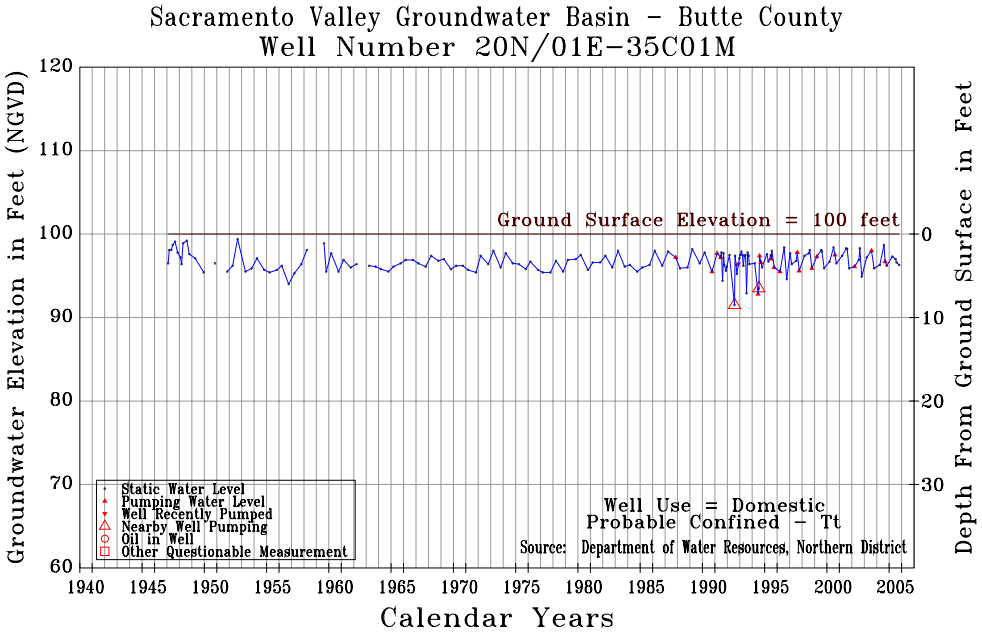
worth noting, it is likely climate related and not the result of over utilization of the groundwater resource. An examination of the overall record reveals that long-term depletion of groundwater in storage is probably not occurring at this time. It is anticipated that when annual precipitation returns to a more average pattern that groundwater levels will fully recover.

Western Canal Sub-Area (Well Number 20N/01E-35C01M):

The figure below is a hydrograph for an active domestic well 20N/01E-35C01M, in the central portion of the Western Canal Sub-area. The area surrounding this well is characterized as rural agricultural. Agricultural cultivation in this area consists of rice production supported by surface water in normal years and a combination of surface and groundwater in drought years. The well is constructed in the uppermost aquifer system. The groundwater level measurement for this well record dates back to the mid-1960s. Groundwater levels in this well were monitored on a semi-annual basis until 1991, and on a monthly basis from 1991 to about 1994, and are currently being monitored four times a year during March, July, August and October.

Historical Trend

The figure shows that the spring to summer fluctuation in groundwater levels averages only 2 to 3 feet during years of normal precipitation and 4 to 8 feet during years of drought. Summer groundwater level monitoring indicates that the upper aquifer recharges during summer months due to flood irrigation for rice production. In areas of flood irrigation, it is important that domestic wells have an adequate annular seal in order to restrict potential contamination from surface sources and maintain a high quality source of domestic groundwater. Long-term comparisons of spring-to-spring groundwater levels show almost no change associated with the 1976-77 drought and only a small decline associated with the 1986-94 drought. Further long-term analysis of spring-to-spring groundwater levels indicates very little change since the late 1940s.



Hydrograph for Well 20N/01E-35C01M

2005 Update

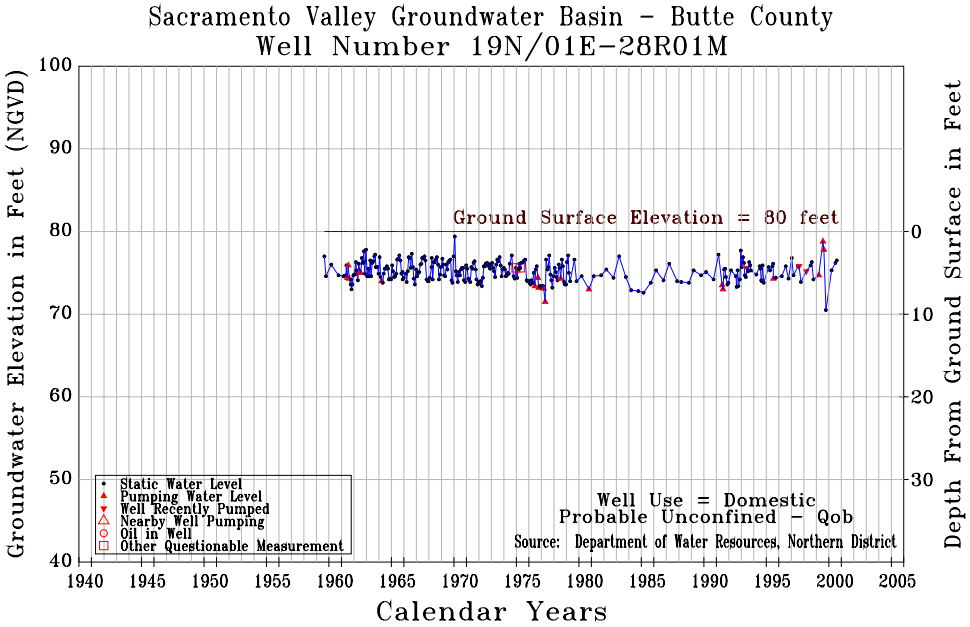
No recent trends or points of concern were observed. At this time groundwater is not being depleted from storage in this sub-area.

Richvale Sub-Area (Well Number 19N/01E-28R01M & 19N/01E-35B01M):

The figure below is a hydrograph for well 19N/01E-28R01M, located in the western portion of the Richvale Sub-area. The area surrounding this well is characterized as rural agricultural. Agricultural cultivation in this area consists of rice production supported by surface water in normal years and a combination of surface and groundwater in drought years. The well is an active domestic well constructed in the upper portion of the aquifer, with a groundwater level measurement record dating back to the late-1950s. Groundwater levels in this well were monitored on a monthly basis from 1959 to 1979, on a semi-annual basis (spring and fall) from 1979 to 1991 and on a monthly basis again from 1991 to about 1994, and on a semi-annual basis until measurements were discontinued in 2000.

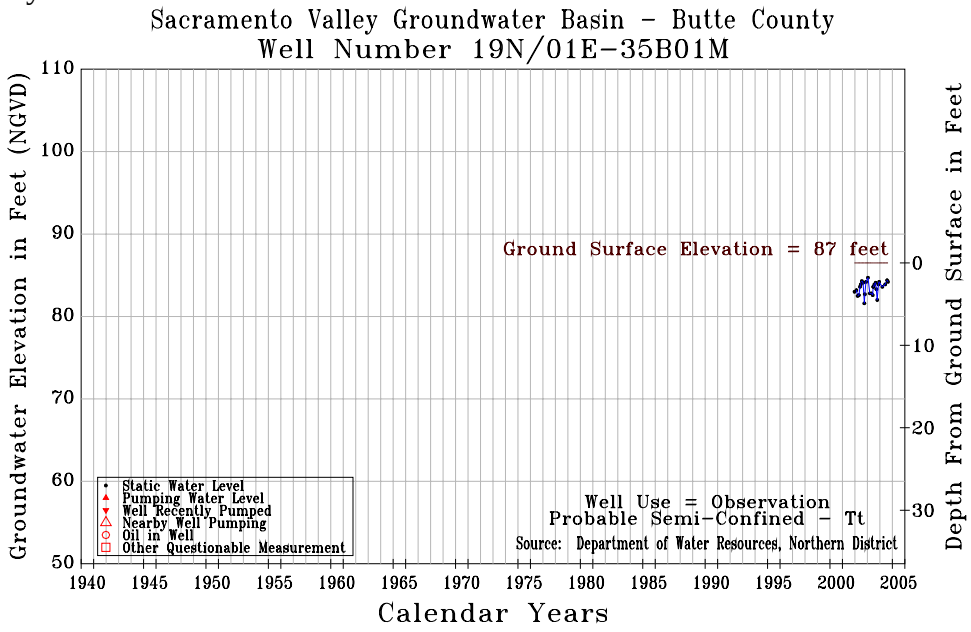
Historical Trend

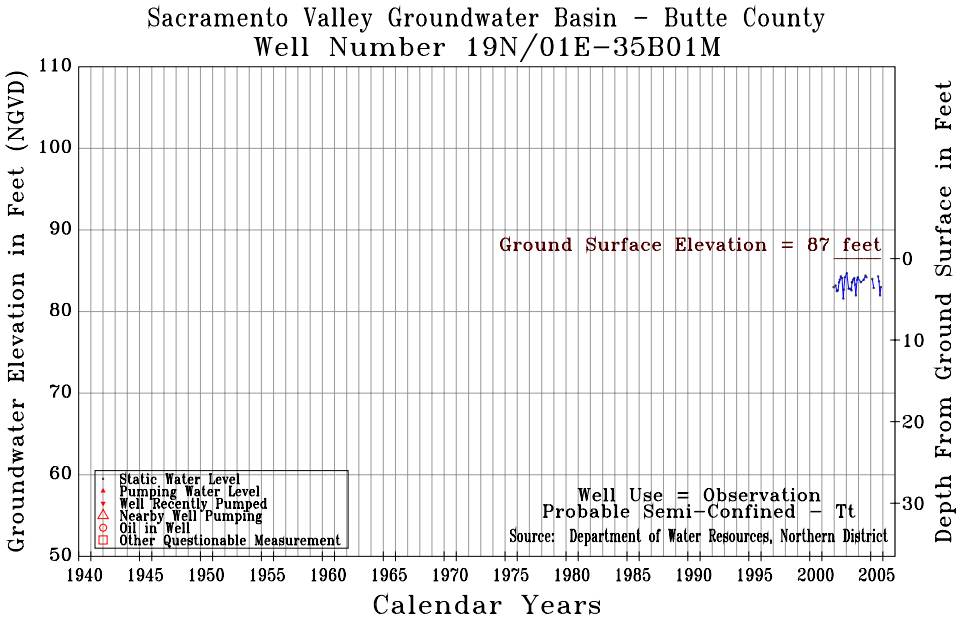
The figure shows that the spring to summer fluctuation of groundwater levels in the unconfined portion of the aquifer system averages only 3 to 4 feet during years of normal precipitation and 4 to 5 feet during years of drought. Close examination of the spring to summer fluctuations indicates that the upper aquifer recharges during summer months due to flood irrigation for rice production. In areas of flood irrigation, it is important that domestic wells have an adequate annular seal in order to restrict potential contamination from surface sources and maintain a high quality source of domestic groundwater. Long-term comparison of spring-to-spring groundwater levels show almost no change in groundwater levels associated with either the 1976-77 and or the 1986-94 droughts. Further long-term analysis of spring-to-spring groundwater levels indicates very little change in groundwater levels since the late 1950s.



Hydrograph for Well 19N/01E-28R01M

Well 19N/01E-35B01 was chosen to replace 19N/01E-28R01M as a key well in the Richvale Sub-area. This is a new dedicated monitoring well that was installed by Butte County during 2001. This well is in the west central portion of the sub-area east of the original key well. Measurements in this well represent groundwater conditions at a depth of 95-200 feet, in the semi-confined portion of the Upper Tuscan aquifer system.





Hydrograph for Well 19N/01E-35B01M

2005 Update

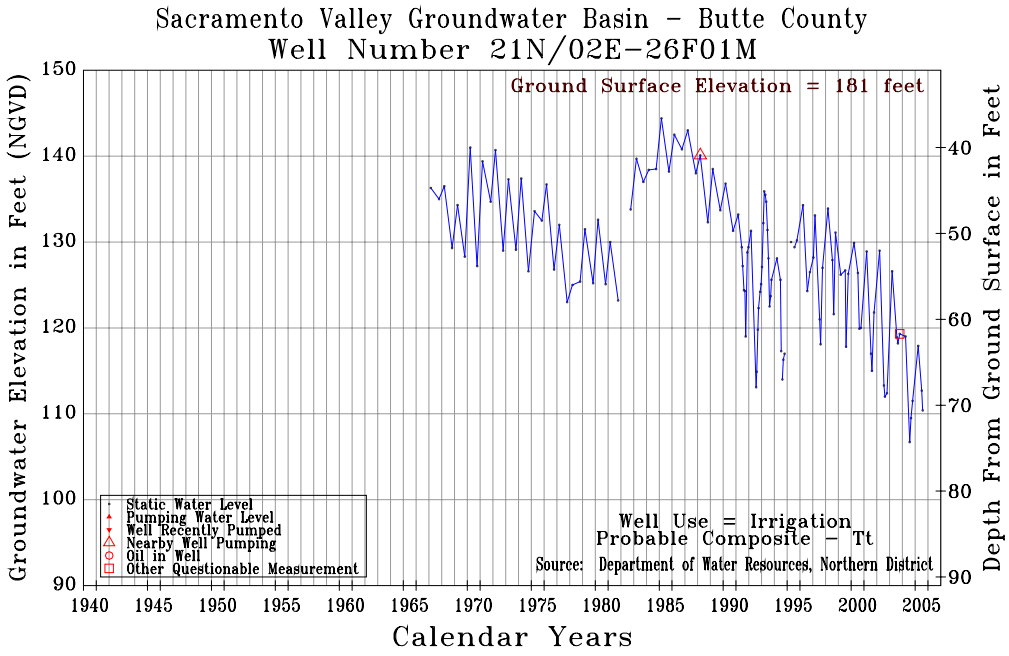
An evaluation of data from both key wells reveals that groundwater levels have changed very little since about 1960, and that groundwater in storage is not currently being depleted in this sub-area.

Pentz Sub-Area (Well Number 21N/02E-26F01M):

The figure below is a hydrograph for an active irrigation well 21N/02E-26F01M, just west of Highway 99E, near the intersection of Durham-Pentz Road and Oro-Chico Highway. Within a two-mile radius of the well, groundwater is used to support agricultural production of orchard and row crops, and small-scale industrial uses associated with a beverage distribution plant. The well is a deep irrigation well with shallow casing, and a groundwater level measurement record dating back to the mid-1960s. Groundwater levels in this well represent a mixture of the unconfined and confined portions of the aquifer system. The groundwater levels in this well were monitored on a semi-annual basis (spring and fall) until 1991, on a monthly basis from 1991 to about 1994, and are currently being monitored four times a year during March, July, August and October.

Historical Trend

The figure shows that the average seasonal fluctuation in groundwater levels averages about 5 to 10 feet during years of normal precipitation and up to 20 feet during years of drought. Long-term comparison of spring-to-spring groundwater levels shows a small decline in groundwater levels associated with the 1976-77 drought, followed by a larger decline associated with the 1986-94 drought. Groundwater levels in this well appear to recover from the 1986-94 drought to groundwater levels similar to those of the early 1980s. However, further long-term analysis of spring-to-spring groundwater levels indicates a 5 to 10 foot decline in groundwater levels since the late 1960s.



Hydrograph for Well 21N/02E-26F01M

2005 Update

Since 1996, spring, summer, and fall groundwater levels in this well have declined approximately 15 feet. Currently the groundwater levels are lower than those measured during the drought of the early 1990's. The reason for the decline is not fully known; however, it is probably related to a combination of factors, including climate patterns and changes in groundwater usage in the area. Hopefully, when

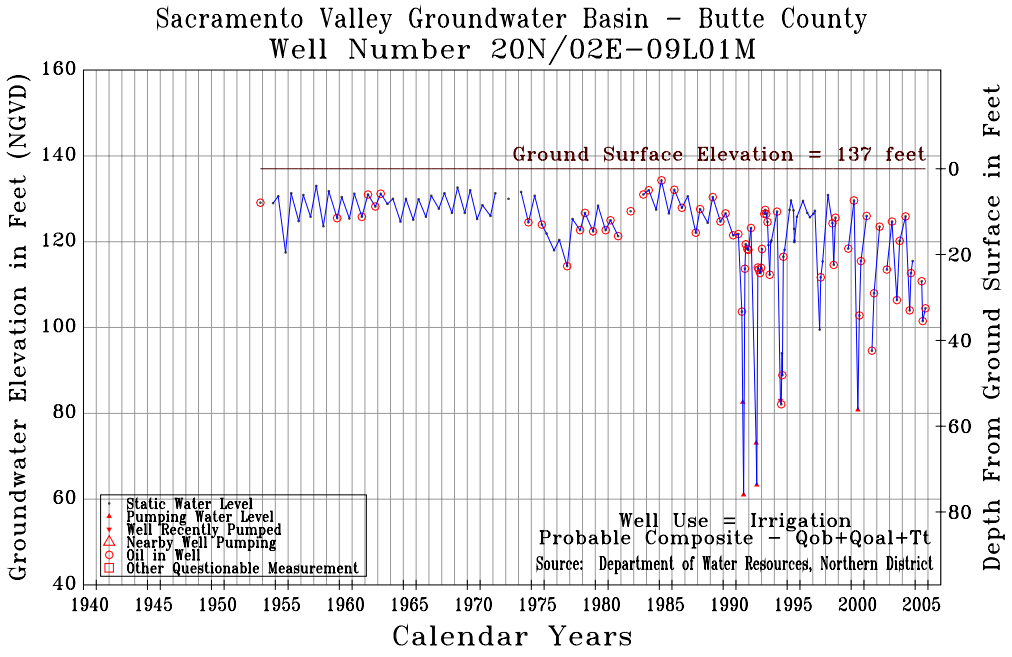
precipitation returns to a more normal pattern, the downward trend will reverse itself. This sub-area needs to be watched closely in the future.

Esquon Sub-Area (Well Number 20N/02E-09L01M):

The figure below is a hydrograph for an active irrigation well 20N/02E-09L01M, in the southern portion of the Esquon Sub-area. The area surrounding the well consists primarily of rice production using both surface and groundwater. The well is a deep irrigation well with shallow casing, and a groundwater level measurement record dating back to the 1950s. Groundwater levels in this well represent a mixture of the unconfined and confined portions of the aquifer system. The groundwater levels in this well were monitored on a semi-annual basis until 1991, on a monthly basis from 1991 to about 1994, and are currently being monitored four times a year during March, July, August and October.

Historical Trend

The figure shows that the spring to summer fluctuation in groundwater levels averages 10 to 20 feet during years of normal precipitation, and up to 40 feet during the 1994 drought. Long-term comparison of spring-to-spring groundwater levels shows a small decline in groundwater levels associated with the 1976-77 drought, followed by a similar decline associated with the 1986-94 drought. Groundwater levels in this well appear to recover from the 1986-94 drought to groundwater levels similar to those of the early 1980s. However, further long-term analysis of spring-to-spring groundwater levels indicates about a 5-foot decline in groundwater levels since the late 1950s.



Hydrograph for Well 20N/02E-09L01M

2005 Update

It was noted in the previous report that between 2000 and 2003 spring and fall groundwater levels have declined in this area at an annual rate of about one foot per year. It was also noted that this trend was less evident in the spring 2003 and 2004 groundwater level measurements. No spring 2005 groundwater

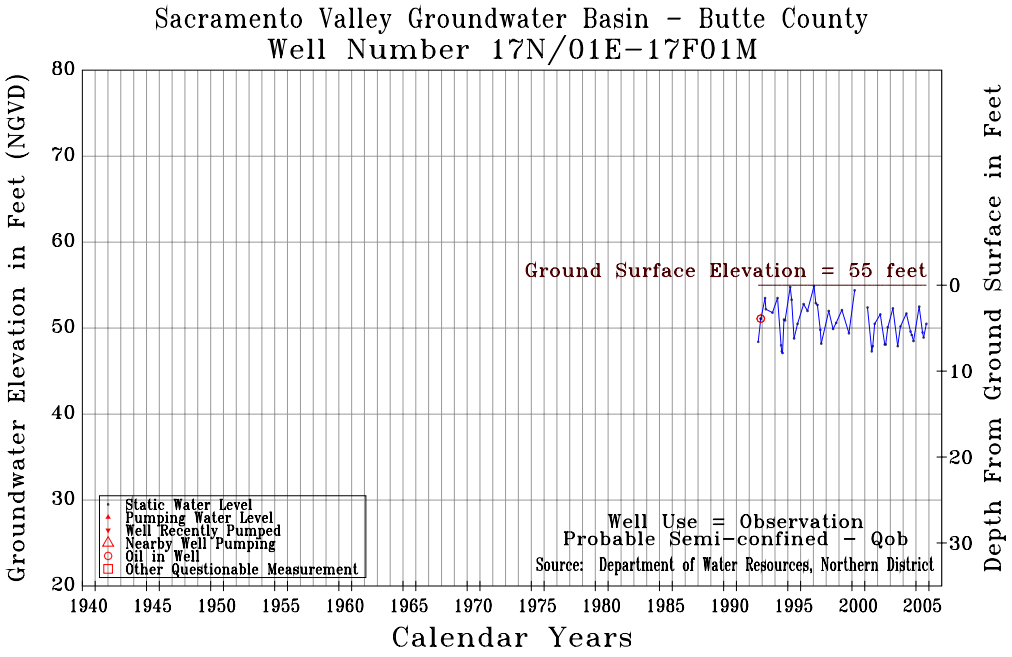
level measurement was taken, but the summer 2005 measurements are consistent with those for summer of 2003 and 2004. The noted decline is probably climate related and not from over utilization of the groundwater resource. The large downward spikes on the hydrograph that appear after 1990 are summer measurements that reflect the pumping and not static groundwater levels. Summer groundwater levels were not measured prior to 1990. The sub-area will probably fully recover when precipitation returns to a more average pattern, but this sub-area should be closely watched in the future.

Butte Sink Sub-Area (Well Number 17N/01E-17F01M):

The figure below is a hydrograph for well 17N/01E-17F01M, in the northwestern portion of the Butte Sink Sub-area. The land use surrounding this well is characterized as native riparian and agricultural. Agricultural cultivation in this area consists of rice production supported primarily by surface water. Surface water is also used as the primary source for flooding of native riparian land for waterfowl habitat. This well is a dedicated monitoring well constructed in the upper to middle portions of the aquifer, with a groundwater level measurement record dating back to 1992. The groundwater levels in this well were monitored on a monthly basis from 1992 to 1995, and are currently monitored four times a year during March, July, August and October.

Historical Trend

The figure shows that the spring to summer fluctuation of groundwater levels in the unconfined portion of the aquifer system averages only 3 to 5 feet during years of normal precipitation and 5 to 8 feet during years of drought. Long-term comparison of spring-to-spring groundwater levels shows little change in spring groundwater levels from 1986-94 drought. Further long-term analysis of spring-to-spring groundwater levels is not possible due to the short monitoring history.



Hydrograph for Well 17N/01E-17F01M

2005 Update

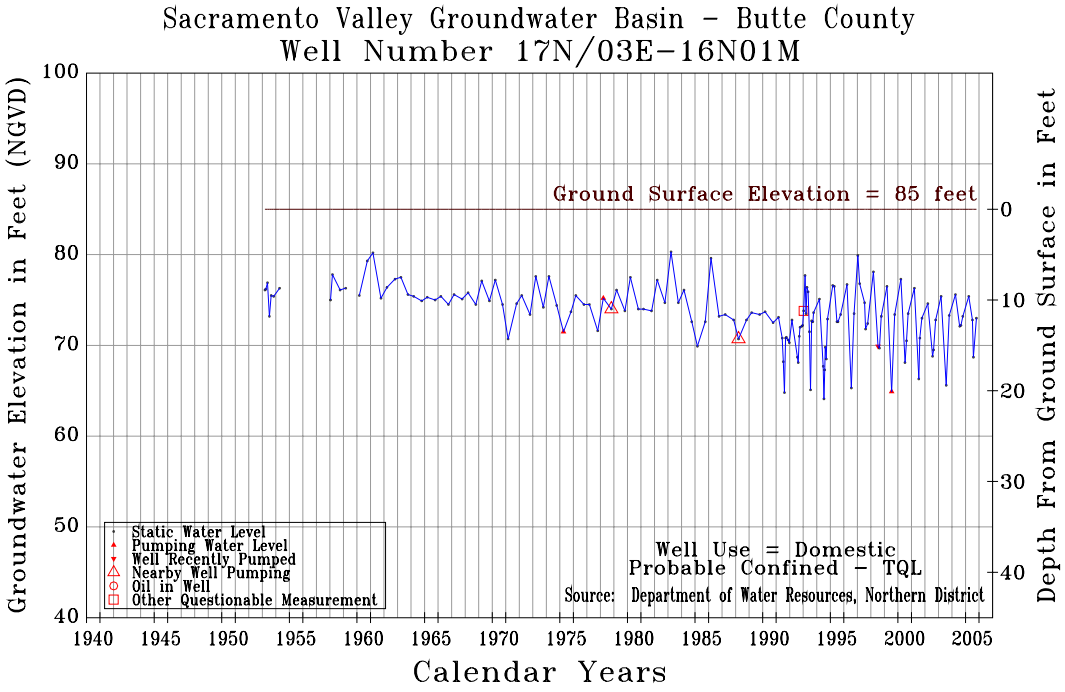
Examination of this record reveals that following 1997, groundwater levels declined about three feet. Since that time groundwater levels have remained relatively stable at that level. It is unknown why the level dropped, and it is not considered significant at this time. Groundwater in storage is not being depleted in the sub-area at this time.

Butte Sub-Area (Well Number 17N/03E-16N01M):

The figure below is a hydrograph for well 17N/03E-16N01M, in the southeastern portion of the Butte Sub-area. The area surrounding this well is characterized as rural agricultural. Agricultural cultivation in this area consists primarily of orchard crops supported by groundwater. The well is an active domestic well constructed over the upper and middle portions of the aquifer, with a groundwater level measurement record dating back to the mid-1950s. The groundwater levels in this well were monitored on a semi-annual basis until approximately 1991, on a monthly basis from approximately 1991 to 1995, and are currently monitored four times a year during March, July, August and October.

Historical Trend

The figure shows that the spring to summer fluctuation of groundwater levels in the unconfined portion of the aquifer system averages only 3 to 6 feet during years of normal precipitation and 5 to 10 feet during years of drought. Long-term comparisons of spring-to-spring groundwater levels shows a small decline in spring groundwater levels associated with the 1976-77 and the 1986-94 droughts, followed by recovery to normal levels. Further long-term analysis of spring-to-spring groundwater levels indicates very little change in groundwater levels since the 1950s.



Hydrograph for Well 17N/03E-16N01M

2005 Update

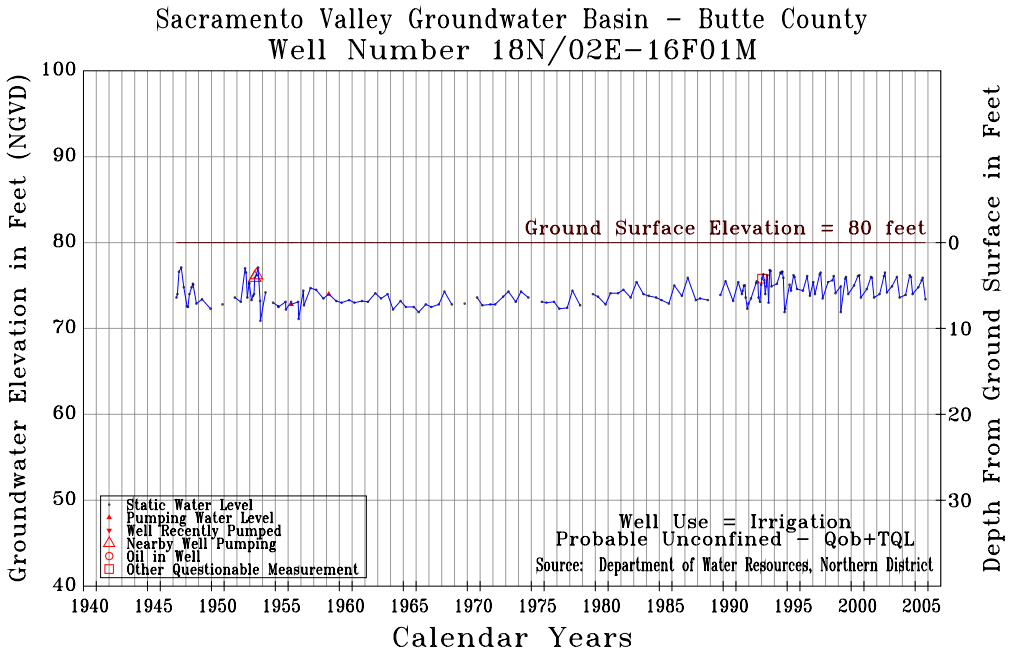
Although previous reports had indicated that since 1998 the spring groundwater elevation had experienced a small, but steady decline, data for 2003-2005 has shown it remaining at a consistent elevation. The previously noted decline in the spring groundwater levels is probably climate related and not the result of over utilization of the groundwater resource. An examination of the overall record reveals that long-term depletion of groundwater in storage is probably not occurring at this time. It is anticipated that when annual precipitation returns to a more normal pattern that groundwater levels will fully recover.

Biggs-West Gridley Sub-Area (Well Number 18N/02E-16F01M):

The figure below is a hydrograph for well 18N/02E-16F01M, in the north-central portion of the Biggs-West Gridley Sub-area. The area surrounding this well is characterized as rural agricultural. Agricultural cultivation in this area consists primarily of rice production supported by a combination of surface and groundwater. The well is an active irrigation well constructed in the upper portion of the aquifer, with a groundwater level measurement record dating back to the late 1940s. Groundwater levels in this well were monitored on a semi-annual basis until 1991, on a monthly basis from 1991 to about 1994 and are currently being monitored four times a year in March, July, August and October.

Historical Trend

The figure shows that the spring to summer fluctuation of groundwater levels in the unconfined portion of the aquifer system averages only 1 to 2 feet during years of normal precipitation and 2 to 4 feet during years of drought. Close examination of the spring to summer fluctuations indicate that groundwater levels rise during the summer months as the upper aquifer recharges due to flood irrigation for rice production. Long-term comparison of spring-to-spring groundwater levels shows almost no change in groundwater levels associated with either the 1976-77 and or the 1986-94 droughts. Further long-term analysis of spring-to-spring groundwater levels indicates very little change in groundwater levels since the late 1940s.



Hydrograph for Well 18N/02E-16F01M

2005 Update

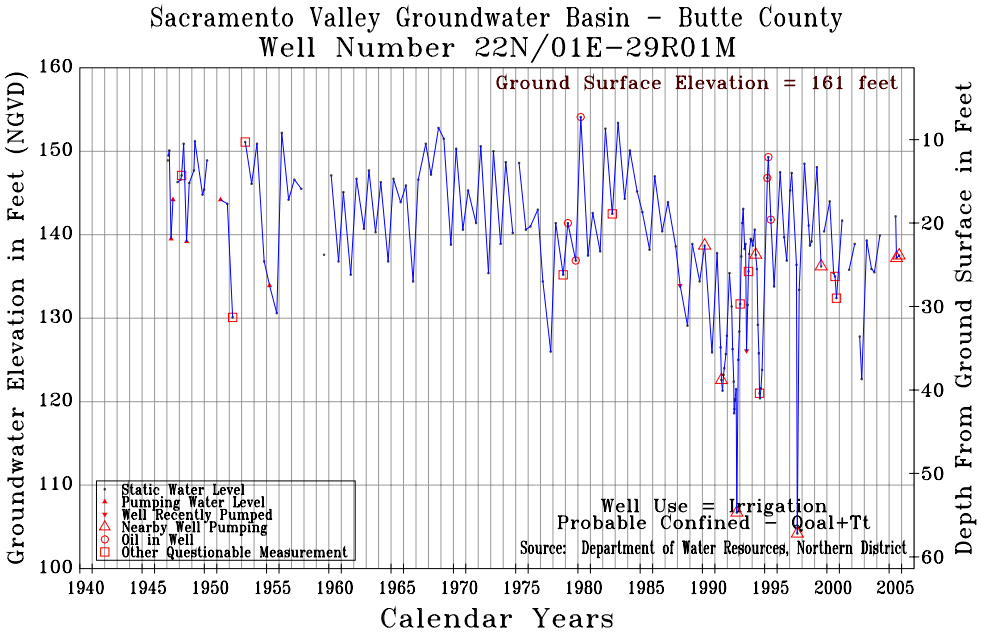
Groundwater levels have remained constant at normal historic levels since about 1950. Groundwater in storage is not being depleted in the sub-area at this time.

M & T Sub-Area (Well Number 22N/01E-29R01M):

The figure below is a hydrograph for well 22N/01E-29R01M, located just south of Big Chico Creek in the northern portion of the M&T Sub-area. The well is surrounded by agricultural orchard production, supported by groundwater extraction. This well is an active irrigation well of intermediate depth, with a groundwater level measurement record dating back to the late-1940s. Groundwater levels in this well represent the confined portion of the aquifer. The groundwater levels in this well were monitored on a semi-annual basis until 1991, on a monthly basis from 1991 to about 1994, and are currently being monitored four times a year during March, July, August and October.

Historical Trends

The figure shows that the average seasonal fluctuation in groundwater levels is about 10 feet during years of normal precipitation and up to 20 feet during years of drought. Long-term comparison of spring-to-spring groundwater levels shows a small decline in groundwater levels associated with the 1976-77 drought, followed by a larger decline associated with the 1986-94 drought. Overall comparison of spring to spring groundwater levels associated with this confined portion of the aquifer system, during years of normal precipitation, have changed little since the early 1960s.



Hydrograph for Well 22N/01E-29R01M

2005 Update

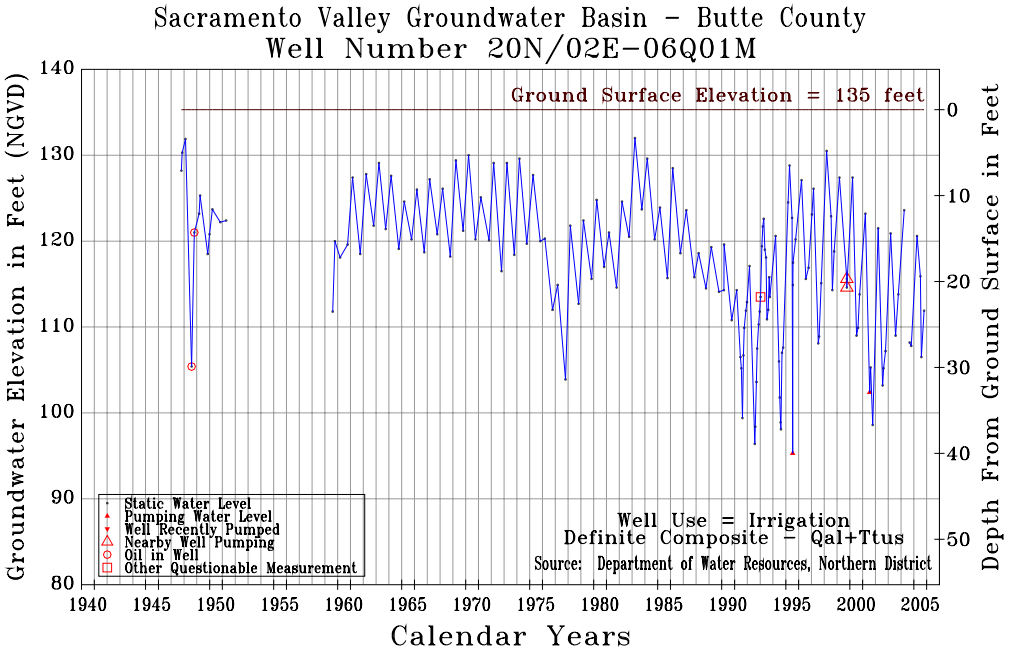
It was noted in the previous report that groundwater levels in this well had declined on average about two feet per year between 1999 and 2002. The data for 2003-2005 indicates that spring groundwater levels have steadily increased since 2002. The overall record would suggest that when precipitation returns to a more normal pattern, that groundwater levels should recover somewhat. An examination of the overall record reveals that long-term depletion of groundwater in storage is probably not occurring at this time. This is a sub-area that needs to be watched carefully in the future.

Durham-Dayton Sub-Area (Well Number 20N/02E-06Q01M):

The figure below is a hydrograph for well 20N/02E-06Q01M, located about two miles south of Durham. This area marks a change in agricultural water uses from groundwater to the north and surface water use to the south. The well is a deep irrigation well with shallow casing, and a groundwater level measurement record dating back to the late-1940s. Groundwater levels in this well represent a mixture of the unconfined and confined portions of the aquifer system. The groundwater levels in this well were monitored on a semi-annual basis until 1991, on a monthly basis from 1991 to about 1994, and are currently being monitored four times a year during March, July, August and October.

Historical Trend

The figure shows a seasonal fluctuation in groundwater levels of about 10 to 15 feet during years of normal precipitation and up to 20 feet during years of drought. Long-term comparison of spring-to-spring groundwater levels shows a decline and recovery of groundwater levels associated with the 1976-77 and 1986-94 droughts. Overall, comparison of spring-to-spring groundwater levels associated with this composite portion of the aquifer system, during years of normal precipitation, has changed little since the early 1970s.



Hydrograph for Well 20N/02E-06Q01M

2005 Update

It was noted in the previous report that groundwater levels in this well had declined on average about two feet per year since 1998. Although this trend is less evident in the spring 2004 groundwater level measurement, the spring 2005 measurement shows continued decline from the 2003 level. The reason for the noted decline is probably two fold. First climate is probably partly responsible for the groundwater level decline. Secondly, the well is in proximity to the City of Chico so there may be an influence from the municipal groundwater extraction occurring in the California Water Service area. The relative impact by these two factors is currently unknown. The overall record suggests that when precipitation returns to a more normal pattern, that groundwater levels should recover. An examination of the overall record reveals that long-term depletion of groundwater in storage is probably not occurring at this time. This is an area that needs to be watched carefully in the future.

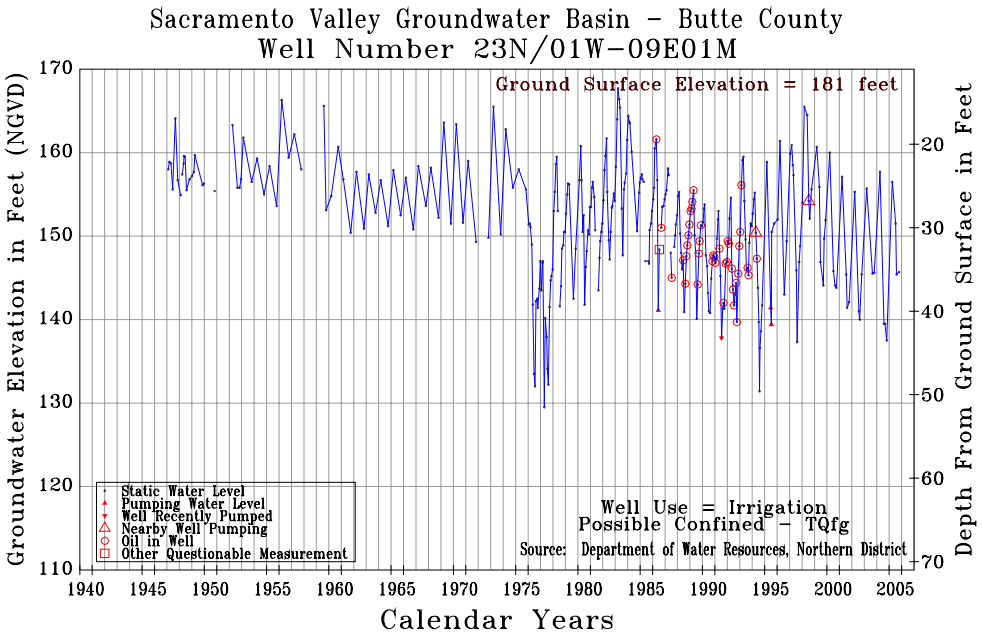
Vina Sub-Area (Well Number 23N/01W-09E01M):

The figure below is a hydrograph for well 23N/01W-09E01M, in the northern Vina Sub-area. The area surrounding this well is characterized by rural, agricultural land use supported by groundwater. This well is an irrigation well constructed in the confined portion of the aquifer system, with a groundwater level measurement record dating back to the mid-1940s. The groundwater levels in this well were monitored on a semi-annual basis until the mid-1970s, on a monthly basis from the mid-1970s to 1996, and are currently monitored four times a year during March, July, August and October.

Historical Trend

The figure shows the seasonal and long-term changes in groundwater levels over time. At first glance it appears that the annual fluctuation in groundwater levels has increased since 1976. However, prior to

1976, summer groundwater level data were not collected. Comparison of the seasonal fluctuation of groundwater levels using spring-fall data indicates little change since the 1960s.



Hydrograph for Well 23N/01W-09E01M

2005 Update

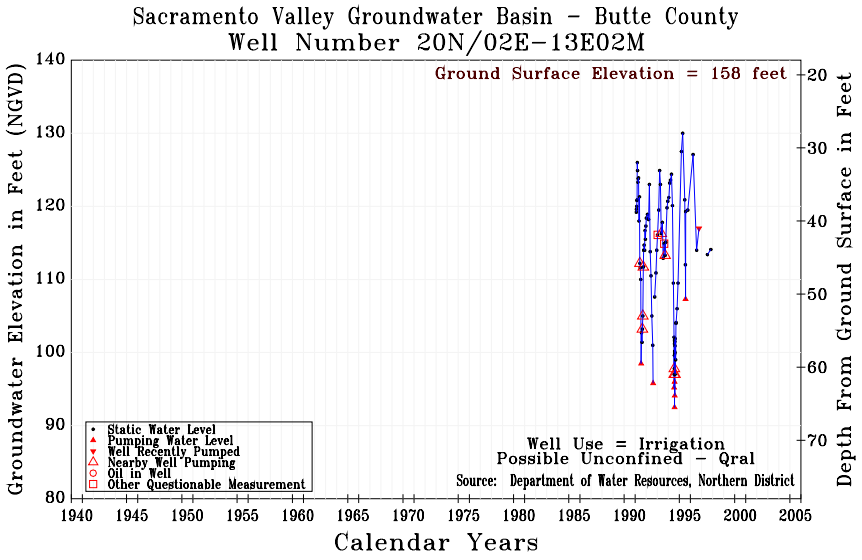
The hydrograph for this well is very similar to the key wells in the M&T and Durham Dayton Sub-areas. The previously noted decline has leveled off in the past three years. The reason for the noted decline is probably climate related. The overall record would suggest that when precipitation returns to a more normal pattern the groundwater levels should recover. Currently, groundwater levels are near those recorded during the drought of the early 1990's. They are, however, higher than they were during the drought of 1976-77. An examination of the overall record reveals that long-term depletion of groundwater in storage is probably not occurring at this time. This sub-area needs to be watched carefully in the future.

Cherokee Sub-Area (Well Number 20N/02E-13E02M & 20N/02E-24C02M):

The figure below is a hydrograph for well 20N/02E-13E02M, located in the western portion of the Cherokee Sub-area. The area surrounding this well is characterized by agricultural production of orchard, rice and row crops supported by both groundwater and surface water. This well is a shallow irrigation well constructed in the unconfined portion of the aquifer system. The groundwater levels in this well were monitored on a monthly basis from 1991 to 1995 and on a semi-annual basis from 1995 to 1996.

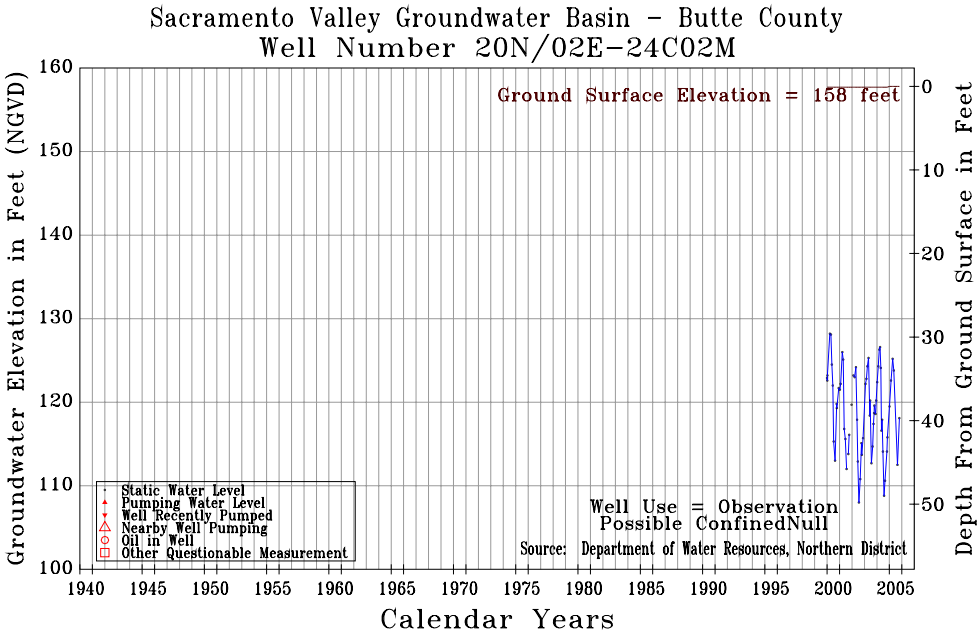
Historical Trend

Due to active pumping within the monitoring well and nearby pumping of surrounding wells, the true seasonal fluctuation of static groundwater levels is difficult to accurately determine. In general, this figure shows that the spring-to-summer fluctuation in groundwater levels averages about 10 to 12 feet during years of normal precipitation (1993 and 1995) and up to 25 feet during years of drought.



Hydrograph for Well 20N/02E-13E02M

Groundwater level monitoring was discontinued in this well. Well 20N/02E-24C02M was chosen to replace this key well in the Cherokee Sub-area. The new key well is part of a dedicated, multi-completion monitoring well set that was installed during 1999. The well is in the west central portion of the sub-area south of the initial key well. Measurements in this well represent groundwater conditions between 336 to 377 feet in the semi-confined portion of the Lower Tuscan aquifer system.



Hydrograph for Well 20N/02E-24C02M

2005 Update

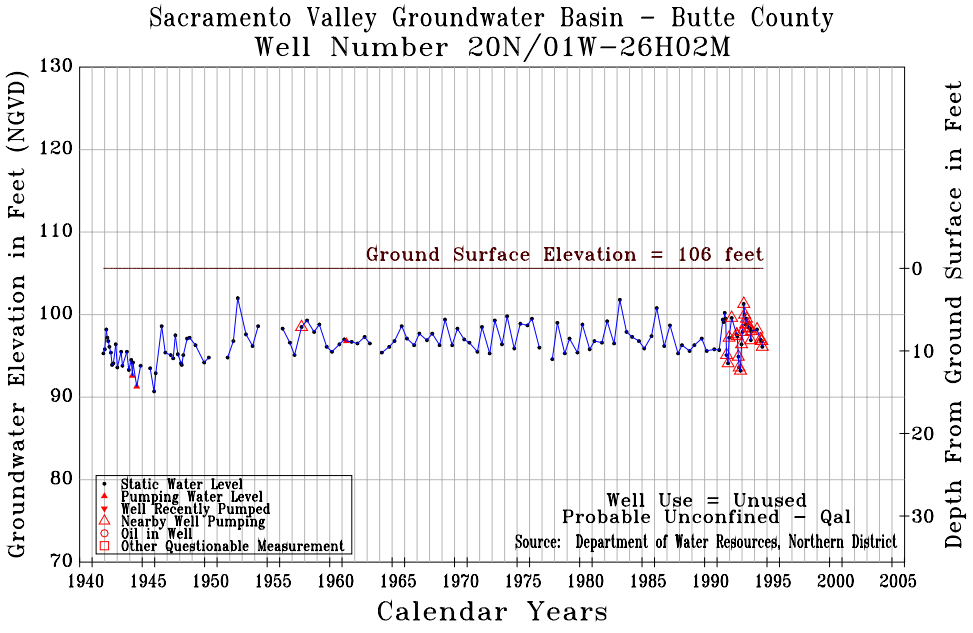
Although the record for this well is short, it appears that the aquifer system recovers by spring of each year. In general, the spring groundwater levels are relatively unchanged over the past five years. There are not sufficient groundwater level measurements taken in either well and to make a meaningful long-term evaluation of change of groundwater in storage for the sub-area.

Llano Seco Sub-Area (Well Number 20N/01W-26H02M & 20N/01E-18L02M):

The figure below is a hydrograph for well 20N/01W-26H02M, located in the southern portion of the Llano Seco Sub-area. The area surrounding this well is characterized by rural agricultural land use, supported primarily by the application of surface water. This well is an unused irrigation well constructed in the unconfined portion of the aquifer system, with a groundwater level measurement record dating back to the early 1940s. The groundwater levels in this well were monitored on a semi-annual basis until 1991 and on a monthly basis from 1991 to about 1994, when monitoring of this well was discontinued.

Historical Trend

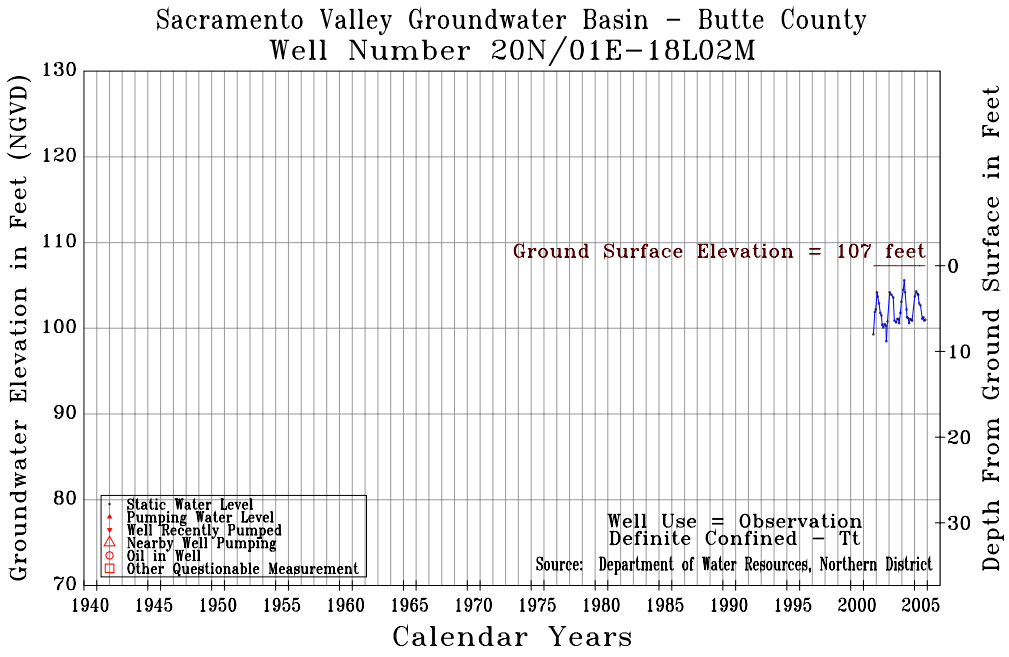
The figure shows that the average seasonal fluctuation in groundwater levels is about 3 to 5 feet during normal and drought years. Long-term comparison of spring-to-spring groundwater levels show little, if any, decline in groundwater levels associated with the 1976-77 and 1986-94 droughts. Overall comparison of spring-to-spring groundwater levels show that there has been very little change in the unconfined aquifer system within this portion of the Llano Seco Sub-area since the early 1940s.



Hydrograph for Well 20N/01W-26H02M

Groundwater level monitoring was discontinued in this well. Well 20N/01E-18L02M was chosen to replace the original key well in the Llano Seco Sub-area. This new well is part of a dedicated, multi-completion monitoring well set that was installed during 2001. The well is along the eastern margin of

the sub-area, due east from the original key well. Measurements in this well represent groundwater conditions between 510-560 feet in the confined portion of the Upper Tuscan aquifer system.



Hydrograph for Well 20N/01E-18L02M

2005 Update

An evaluation of the record from both index wells in the Llano Seco Sub-area reveals that groundwater levels have changed little over time and that no depletion of groundwater in storage is occurring at this time.

California Water Service (Chico) Sub-Area (Well Numbers 1-04 and 33-01):

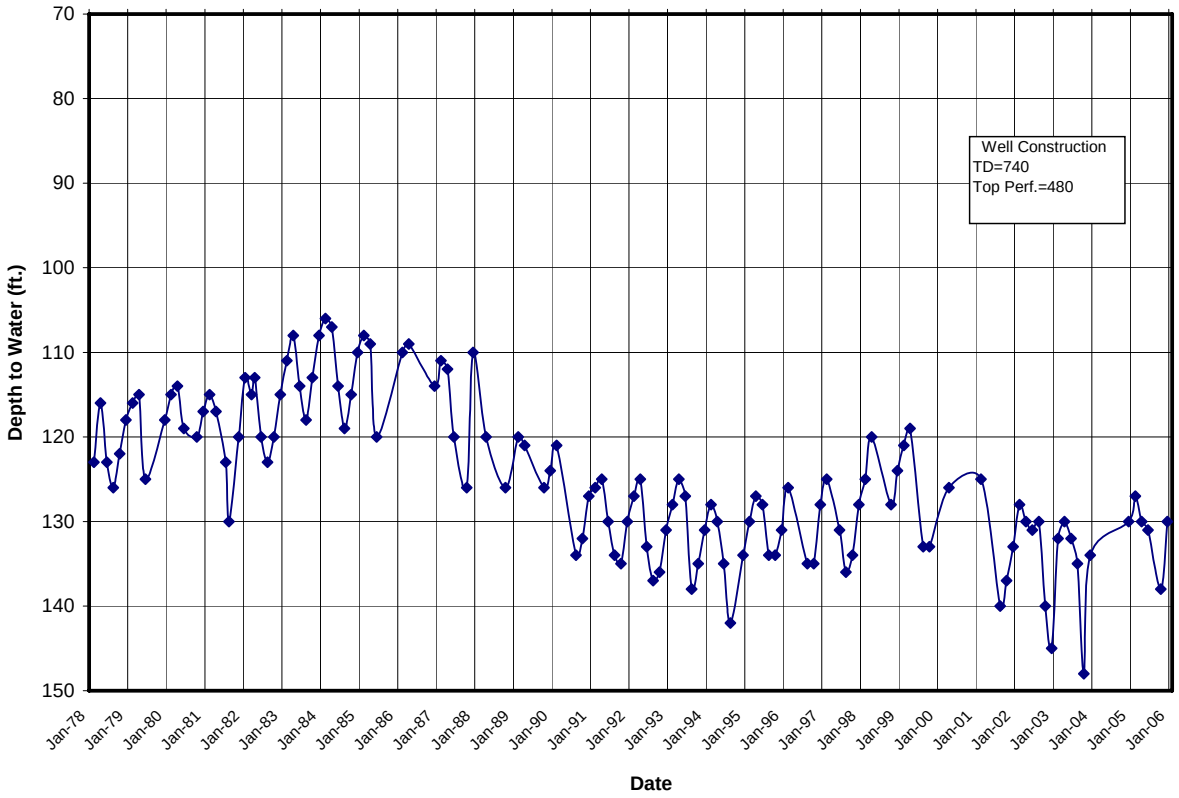
Groundwater hydrographs for the California Water Service monitoring wells were developed using static groundwater level data, provided by California Water Service Company. Although the groundwater level measurements presented in the California Water Service hydrographs were collected when the wells were not pumping (static groundwater levels), it should be noted that the effects from the recent pumping of these production wells could result in groundwater level readings that are deeper than stable static conditions. Hydrographs from two representative wells in the California Water Service Sub-area are shown below.

Historical Trend

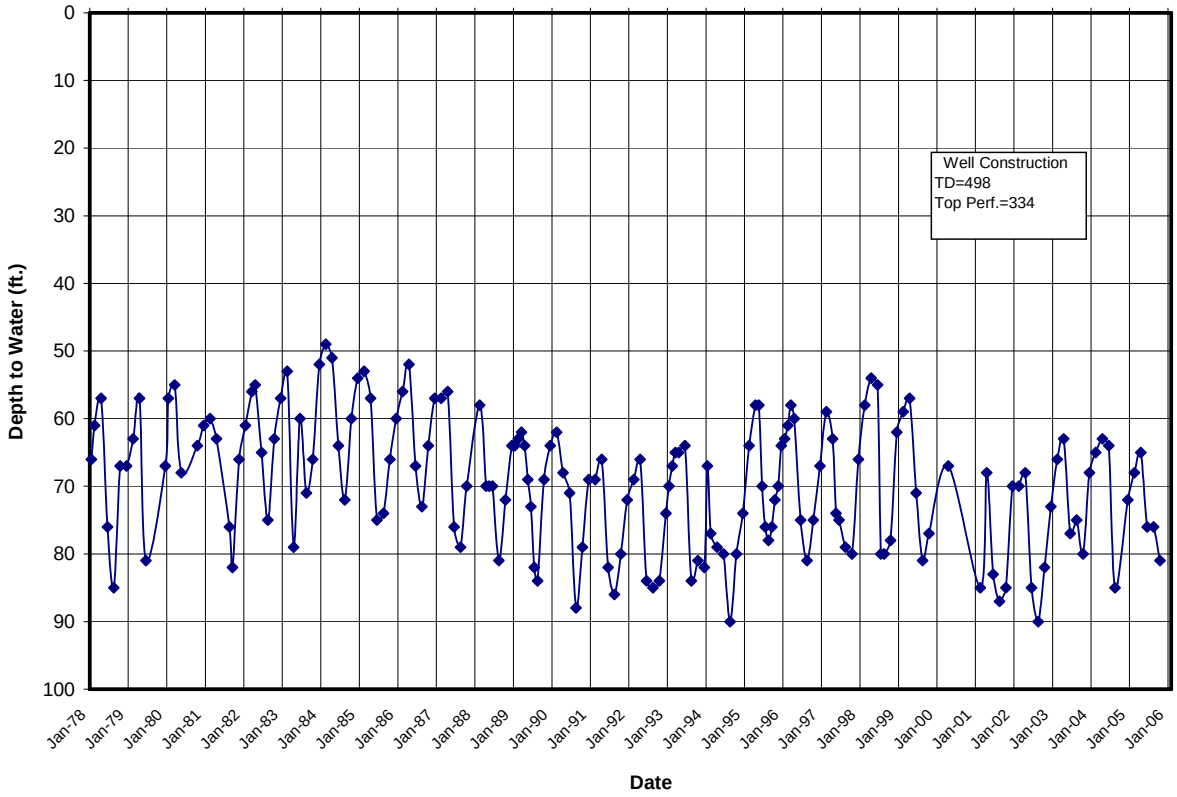
Overall analysis of the seasonal fluctuation of groundwater levels in all of the California Water Service wells with available data indicates a rather consistent seasonal fluctuation of 15 to 20 feet during normal years. Analysis of seasonal groundwater levels during drought years shows a wide range of fluctuation depending upon the individual well. Many 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.

Overall analysis of these hydrographs indicate that groundwater levels in the California Water Sub-area have declined an average of 12 feet between 1978 and 2000, with most of the decline occurring during the 1987-1994 drought. Analysis of the hydrographs also indicates that groundwater levels in the California Water Service wells have generally stabilized since the drought in 1995.

Although the long-term trend of groundwater levels shows a decline in the California Water Sub-area, it does not necessarily mean that groundwater levels will continue to decline into the future. In municipal service areas it is typical for groundwater levels to experience an initial drop as the demand increases or drought conditions occur. After the initial decline, groundwater levels will commonly reach a new equilibrium with the existing production demand, thereby limiting further declines in groundwater levels.



Hydrograph for California Water Service Well 33-01



Hydrograph for California Water Service Well 1-04

2005 Update

In the previous status report it was noted that groundwater levels in Well 33-1 have been declining at a rate of about 3.5 feet per year since 1999. It was also noted that groundwater levels were at a historic low. The spring 2005 groundwater level indicates that this downward trend has leveled off over the past several years. Spring groundwater levels remain near a historical low.

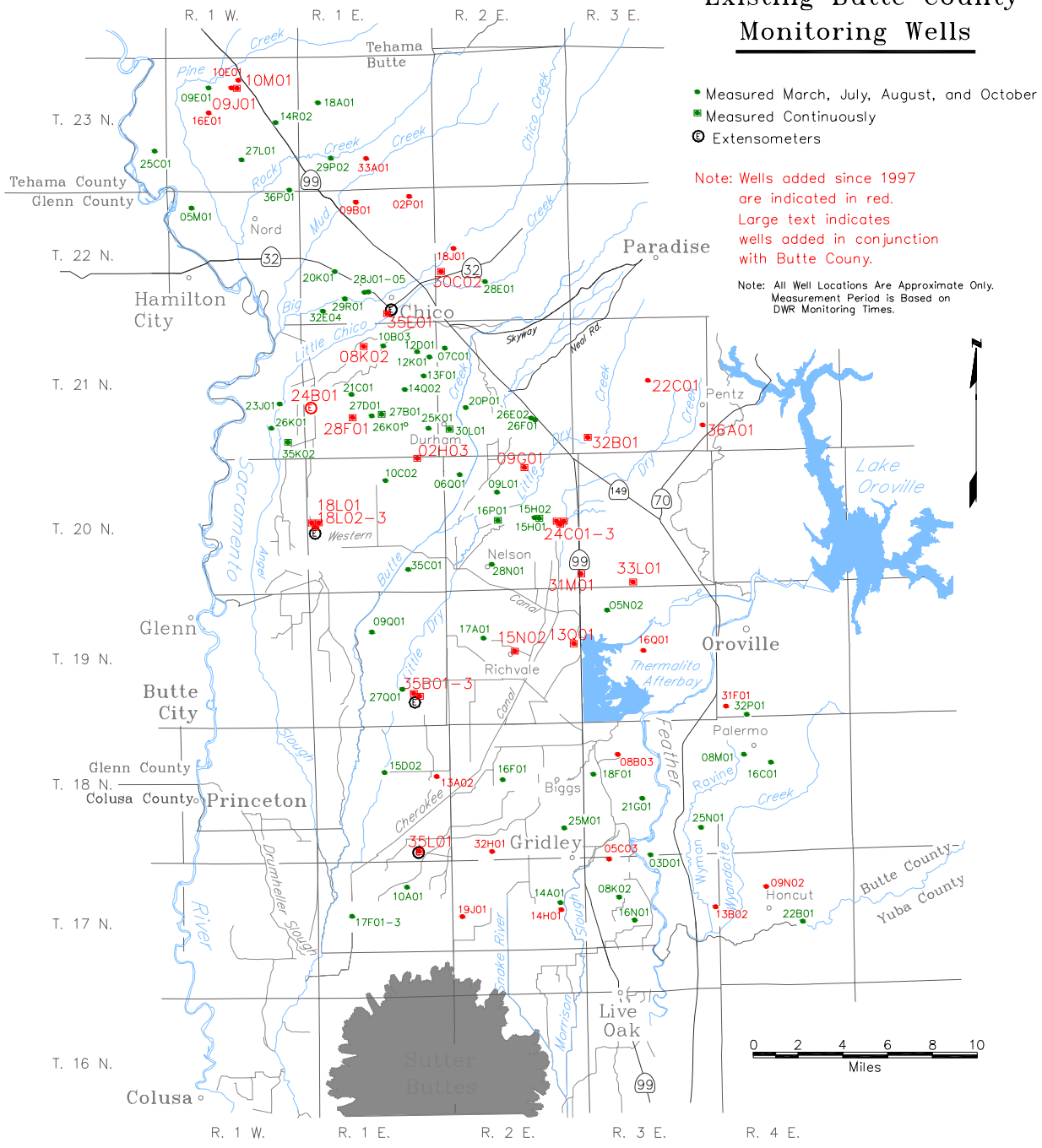
The reason for the previously noted decline was probably two fold. First, climate is probably partly responsible for the groundwater level decline. Secondly, the well is also influenced by other municipal groundwater extraction that is occurring in the California Water Service area and that water demand has been increasing annually.

Groundwater levels in Well 1-04 have dropped about 12 feet following the spring of 1999. Since that time groundwater levels have remained relatively stable with a slight increase in the three most recent spring measurements. The spring 2005 measurement is slightly lower than spring 2004, but the 2005 summer measurement is slightly higher than summer 2004.

Comparison of the two key wells in California Water Service Area (Chico) Sub-area shows that spring groundwater levels have been fairly consistent over the past three years. The 2005 annual groundwater level fluctuation in Well 33-01 was approximately 11 feet, while the fluctuation in Well 1-04 was about 13 feet. The minimum depth to water observed in the California Water Service Sub-area key wells during 2005 was 65 feet (Well 1-04) and the maximum was 138 feet (Well 33-01).

The overall review of both records would suggest that when precipitation returns to a more normal pattern, that groundwater levels should recover somewhat. The degree to which they will recover is currently unknown. Groundwater levels in these two wells are near those recorded during the drought of the early 1990's. This area needs to be watched carefully in the future, like many of the sub-areas in the northern portion of the county.

Butte County Monitoring Grid
Appendix A



Butte County

Revised: December, 2004