**BEFORE THE STATE WATER
RESOURCES CONTROL BOARD**

In the Matter of the State Water Resources Control Board (State Water Board) Hearing to Determine whether to Adopt a Draft Cease & Desist Order against California American Water Regarding its Diversion of Water from the Carmel River in Monterey County under Order WR 95-10	))))))))	Hearing Date: July 23 - 25, 2008 Carmel River in Monterey County

EXHIBIT MPWMD-TC14

MONTEREY PENINSULA WATER MANAGEMENT DISTRICT

RIPARIAN CORRIDOR MONITORING REPORT
CARMEL RIVER

2001

BY

MPWMD
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I. INTRODUCTION

The mission of the Monterey Peninsula Water Management District (MPWMD) is to manage, augment, and protect water resources for the benefit of the community and the environment. MPWMD is an independent Special District created by an act of the California State legislature in 1977. Its boundaries include the Monterey Peninsula and much of the Carmel River watershed. Although not a water supplier, MPWMD has the power to regulate water production and distribution within its boundaries. The Monterey Peninsula relies entirely on local water resources, primarily surface and groundwater from the Carmel River, to meet its water supply needs.

Since the early 1980's, MPWMD has integrated water supply management with an active program to mitigate for impacts from water extraction and restore degraded resources in the Carmel River. Some of the unique functions of MPWMD include Carmel River mitigation programs in fisheries, riparian restoration, and erosion protection. The 1990 Water Allocation Program EIR documented environmental degradation associated with water extraction. In 1995, the State Water Resources Control Board (SWRCB) found that the California-American Water Company (Cal-Am) has valid rights to 3,376 acre-feet per year, but had been illegally diverting 10,730 acre-feet per year of water from the Carmel River and its alluvial aquifer.

Over the last century, the Carmel River has undergone a transformation from a wide, meandering, shallow watercourse to a moderately incised channel. Major alterations in the hydrologic regime began in 1921 with the construction of the San Clemente Dam and Reservoir (1,425 acre-feet) at River Mile 18.6. The Los Padres Dam and Reservoir (3,030 acre-feet) was built in 1948 at River Mile 25.0. A combination of floodplain development in the 15.5-mile alluvial section, trapping of sediment load behind the dams, and gravel mining in the channel bottom downstream of the dams, led to channel incision. Today, 90 percent of San Clemente Reservoir's original storage capacity and one half of Los Padres Reservoir's capacity has been replaced by sediment.

An absence of major flood damage between the 1911 flood (estimated to be 20,000 cubic feet per second) and the 1958 flood encouraged encroachment of farming and structures into the floodplain. Increased demands on groundwater beginning in the 1960's in conjunction with a severe two-year drought (1976-1977) put an enormous amount of pressure on the limited water resources in Carmel Valley. Groundwater levels declined to unprecedented lows causing widespread mortality to riparian vegetation. Between 1978 and 1983, high flows destabilized the alluvial portion of the river. The degradation of the river corridor and decline in the steelhead population galvanized efforts within the community to find solutions to the environmental problems. Currently the California red-legged frog (*Rana aurora draytonii*) and steelhead (*Oncorhynchus mykiss*) are listed as threatened in the watershed under the Federal Endangered Species Act (ESA). In 1983, MPWMD began a restoration program after 83 percent of river-front property owners approved a benefit assessment zone along the river to help fund projects.

In studies contracted by the MPWMD a close connection has been demonstrated between groundwater pumping and the health of the riparian vegetation and increased channel instability (McNeish 1986, '88, '99, '91a, '91b). It was determined that plant stress was directly related to soil water availability and depth to groundwater and that mitigation was necessary in the form of irrigation if all four of the following criteria were met (McNeish, 1986).

1. Dry river channel
2. Drop in the water table by greater than 2feet/ week or seasonally 8 feet or more below the elevation of the river channel
3. Unacceptable soil moisture levels
4. Unacceptable vegetation stress

To determine these conditions MPWMD's monitoring system currently measures plant stress, soil moisture, depth to groundwater and its associated stream flow. When necessary supplemental irrigation is applied to help mitigate the effects of groundwater pumping. The following report summarizes 2001 monitoring results.

II. SITE DESCRIPTIONS

The 36-mile-long Carmel River drains 255 square miles of the central coast of California. The watershed includes the Santa Lucia Mountains to the south and the Sierra del Salinas to the north. Bedrock in the basin is mainly Sur Series crystalline rock (granite, gneiss, schist) or Monterey Shale with significant outcrops of sandstone and volcanics (Page and

Mathews, 1984). Mean annual rainfall varies from about 14 inches along the northeast perimeter of the basin to over 40 inches in the high peaks (up to approximately 5,000 feet in elevation) of the southern portion (James, 1999). Upper reaches on the Carmel River flow through steep-sided canyons, while the lower 16 miles is a relatively flat alluvial valley to the ocean. The average annual runoff at the San Clemente Dam site is 69,700 acre-feet (James, 1999). Bankfull flow is 2,200 cubic feet per second (cfs) near the mouth. On March 10,1995 the river peaked at 16,000 cfs, which is the largest recorded (gaged) event on the Carmel River. The District has maintained four long-term monitoring sites: San Carlos, Valley Hills, Scarlett and Schulte (Figure 1).

The San Carlos monitoring site is located 3.69 miles (5.94 km) upstream of the Carmel river mouth (based on 1986 aerial photos). This site encompasses one of the largest mature riparian areas remaining in the lower Carmel Valley. It consists of a high terrace with large black cottonwoods and an extensive lower flood plain consisting mostly of red and arroyo willows. Cal-Am has a production well at this site that is capable of pumping 2.45 cubic feet/second (Darby F., Cal-Am 1999). Irrigation at this site began in 1989. The San Carlos site includes two tensiometer gypsum block stations and a monitoring well. Pre-dawn leaf moisture stress samples include a pair of willows and cottonwoods.

The Valley Hills monitoring site is located 5.60 miles (5.2 km) upstream of the Carmel River mouth. This restoration site, encompassing 1500 feet of river channel, was installed in 1992. This site is located adjacent to agricultural lands. The Valley Hills project includes two tensiometer and gypsum block stations. Pre-dawn leaf moisture stress samples include three cottonwoods and three willows.

The Scarlett monitoring site is located off Scarlett Road, 9.1 miles (14.64 km) upstream of the Carmel River mouth. This restoration project was constructed in 1989. It encompasses 1800 lineal feet of riverbank. It was the first project where willows were incorporated into the bank toe. No tensiometers exist at this site. However, a monitoring well is located in the area next to Coyote Creek. Pre-dawn leaf moisture stress samples include two cottonwoods and three willows.

The Schulte river monitoring site is located 6.70 miles (10.78 km) upstream of the Carmel River mouth. This restoration project was completed in January of 1988 and consisted of 3,200 lineal feet of channel realignment and flood plain modification. The Schulte project includes three tensiometer and gypsum block stations and a monitoring well. Pre-dawn leaf moisture stress samples include four willows and three cottonwoods.

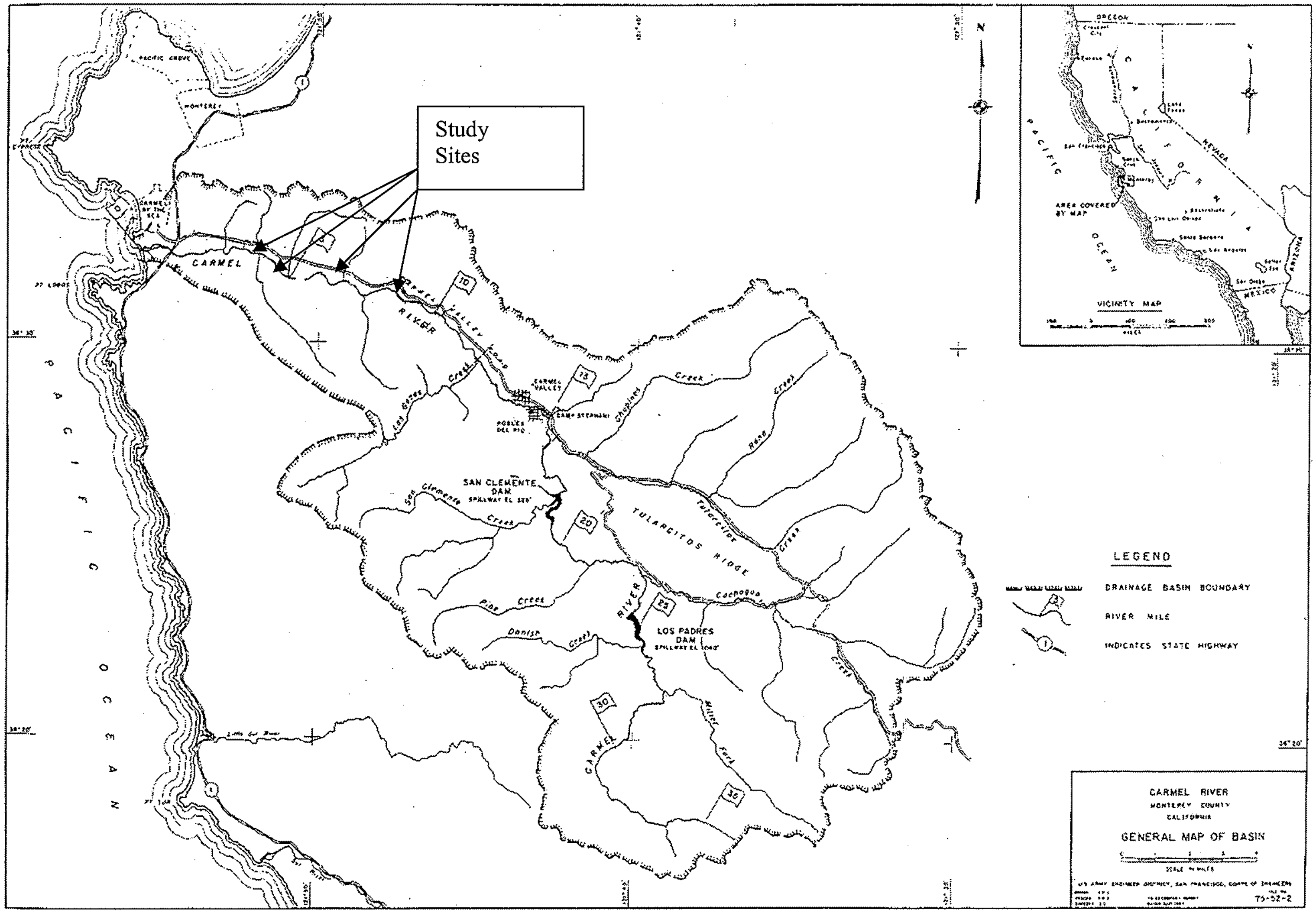

Figure 1. Carmel River Watershed

III. METHODS

Groundwater Monitoring

Six wells are monitored for depth to groundwater (Table 1). Three monitoring sites are used to characterize the depth to groundwater within the lower reaches of the Carmel River. The most downstream monitoring well was the State Parks/Highway 1 monitoring well followed by the Rubin well and the San Carlos 2 well. Three upstream monitoring wells are used to monitor depth to groundwater values described from downstream to upstream, include Reimers, Coyote and deDampierre monitoring wells.

An Olympic Well Probe model 150 was used to determine the actual water depth from the top of the well casing to the water surface. The monitoring period for these three monitoring well sites began on May 18, 2001 and concluded on January 18, 2002.

Soil Moisture Measurement

Tensiometers are used at three sites (San Carlos, Valley Hills, and Schulte) to determine soil moisture and are placed at 18 inches and 36 inches at different elevations above the river. A vacuum gage measures the attractive forces of the surrounding soil on a water filled column and a porous ceramic tip. Tensiometers work on the principle that as the soil dries it will pull harder on the water filled in the column until it has reached equilibrium with the surrounding soil thus giving an indication on how much moisture is available for plant growth.

Table 1. Depth to Ground Water Values 2001 and Baseline Monitoring well information

Name	Well #	Date	Max. Depth to Groundwater (feet)	Depth of Well (feet)	Perforated Intervals (feet)	Casing (inches)	Elevation	Date Drilled
NEARCOD(E)Hwy1	T16S/R1W-13Lb	10/04/02	8.0	65	55-64	2	15.00	1989
Rubin	T16S/R1E-17Jd	11/30/02	28.17	95	5-95	2	48.59	1984
San Carlos 2	T16S/R1E-17Jc	11/30/02	31.04	68	48-68	2	51.32	1983
Reimers	T16S/R1E-23La	8/02/02	18.45	122	50-122	2	102.10	1988
Coyote (Scarlett 1)	T16S/R2E-19Nx	8/30/02	21.48	47	20-41	14	142.32	Pre-1973
de Dampierre	T17S/R2E-03La	8/30/02	7.60	50	30-50	2	251.00	1988

Source: MPWMD Fox database and U:FieldData\excel\gwater\depthgw2001.xls

Pre-dawn Leaf Water Potential Testing

Four sites (San Carlos, Valley Hills, Schulte, and Scarlett) are monitored bi-monthly for pre-dawn leaf water potential values (moisture stress). Monitoring continues through the dry season, which typically extends from May through October. A total of 14 willows and 13 cottonwoods are sampled at these four monitoring sites. Leaves are collected from black cottonwoods (*Populas tricocarpa balsamifera*) and red willows (*Salix laevigata).* The data collected from trees shows the water stress of specific sample trees, giving an indication of moisture stress in the surrounding area. Leaves are collected in the pre-dawn hours beginning at 4:00 am when stomata are closed and water in the leaf is a function of available soil moisture (McNeish, 1988). A clean cross sectional slice is made across the petiole. The leaf petiole is fit tightly, cut side up, into a rubber stopper with putty. The leaf is then placed within a nitrogen pressure chamber. As pressure increases, the free water is forced out of the vascular tissue to determine the exact moment when water is released from the vascular bundles. The chamber is immediately turned off and the pressure gauge is read (bars). The greater the pressure to force moisture from the tree leaf, the more stress the tree is experiencing. The amount of pressure it takes to force the free water from the petiole is a measure of the amount of water available within the plant for life processes. The established laboratory stress index stated in the Woodhouse study 1983 indicated that "severe" stress is recognized when the results for willows rise above 7.5 bars and when readings for cottonwoods rise above10 bars (Woodhouse, 1983). Woodhouse states, "Irrigation should begin when pre-dawn water potential falls to within two bars of these critical values."

IV. RESULTS

Historic Depth to Groundwater:

Historic depths to groundwater values from 1988 through 2001 were plotted for six monitor well sites, including de Dampierre, Coyote, Reimers, San Carlos, Rubin, and Highway 1. These plots provide baseline data for each monitoring site, indicating minimum and maximum groundwater depths from 1988 through 2001 (See Appendix A for historic depth to groundwater plots). The annual variation in depth to groundwater is mostly a function of annual precipitation, stream flow, and municipal pumping regimes. Extreme groundwater levels that exceed historic maximum depth may trigger irrigation to mitigate stress on riparian vegetation.

2001 Depth to Groundwater Monitoring:

Depth to groundwater monitoring began on May 18, 2001. The monitoring alternated bi-monthly between downstream well stations (San Carlos #2, Rubin, Highway 1) and well stations further upstream (de Dampierre, Coyote, and Reimers).

The monitoring wells at DeDampierre, Coyote, and Reimers show little overall change in depth to groundwater values (Figure 2. de Dampierre Depth to Groundwater). The consistent values at these upstream monitoring sites are a function of perennial flow, and reduced pumping of the Manor production well. In contrast to these up stream monitoring wells, the downstream wells at San Carlos and Rubin show an increase in depth to groundwater over time especially as the river dried up on July 13, 2001 (Figure 3). Within a period of seven months, May through November, the aquifer level dropped 17.75 feet at the Rubin well and 22.69 feet at the San Carlos well. Reasons for this steady drop in groundwater values are attributed to constant pumping of Cal-Am's San Carlos and Canada production wells, and the lack of recharging river flow within this reach. The streambed remained dry until December, 2001 when the river began flowing and depth to groundwater began to rebound.

2001 Pumping Regime

A drop in depth to groundwater in relation to the pumping of municipal production wells is demonstrated by the plot of Cal-Am's Rancho Canada production well verses the depth to groundwater values at the adjacent Rubin monitoring well (Figure 4. Rancho Canada's 2001 production vs. depth to groundwater at the Rubin monitoring well). As Rancho Canada well production ceased for two weeks beginning mid-May through mid-June, the depth to groundwater values rebounded. The general trend shows as production remained consistent during the heavy demand period of June through September, the depth to groundwater continuously dropped.

Cal-Am's Manor production well illustrates a variable pumping regime (Figure 5 Manor 2001 production verses Reimer monitoring well depth to groundwater values). The plot shows a slight fluctuation in depth to groundwater which could be attributed to pumping Manor and evapotranspiration. The fluctuation in values shows a connection between Cal-Am's pumping regime and the groundwater levels. The delay in response of depth to

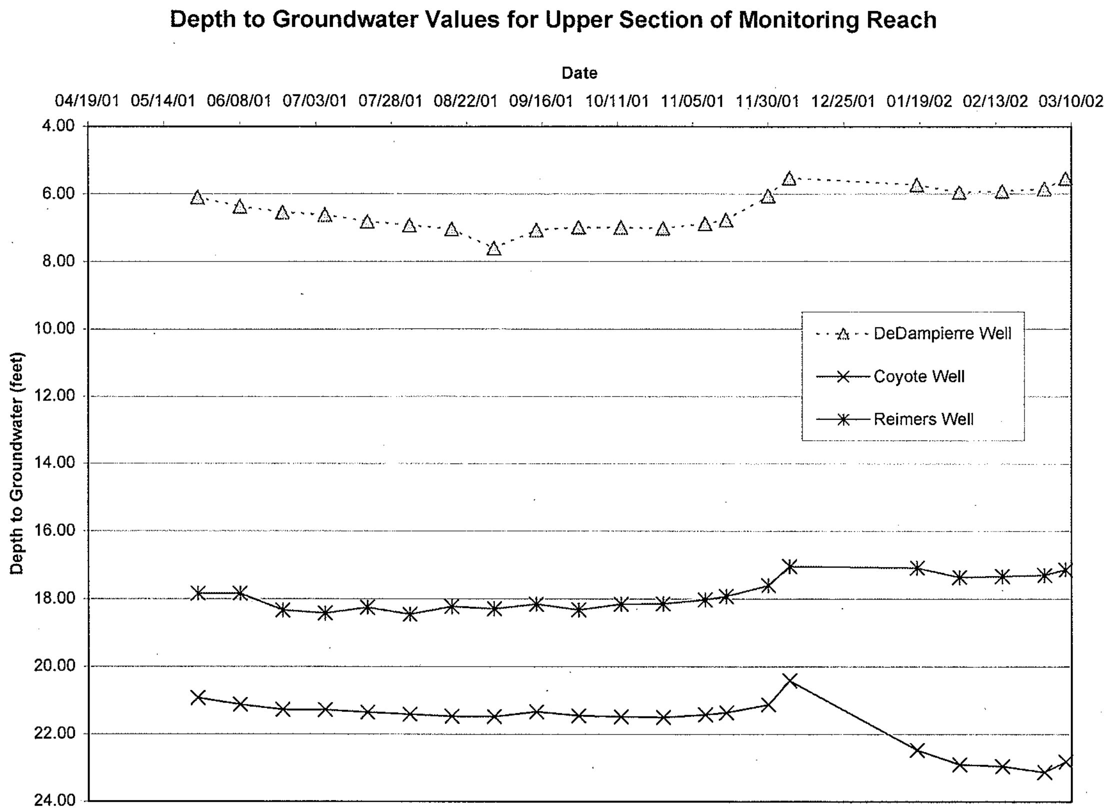

Figure 2. Depth to Groundwater Values for deDampierre, Scarlett and Schulte Monitoring Wells

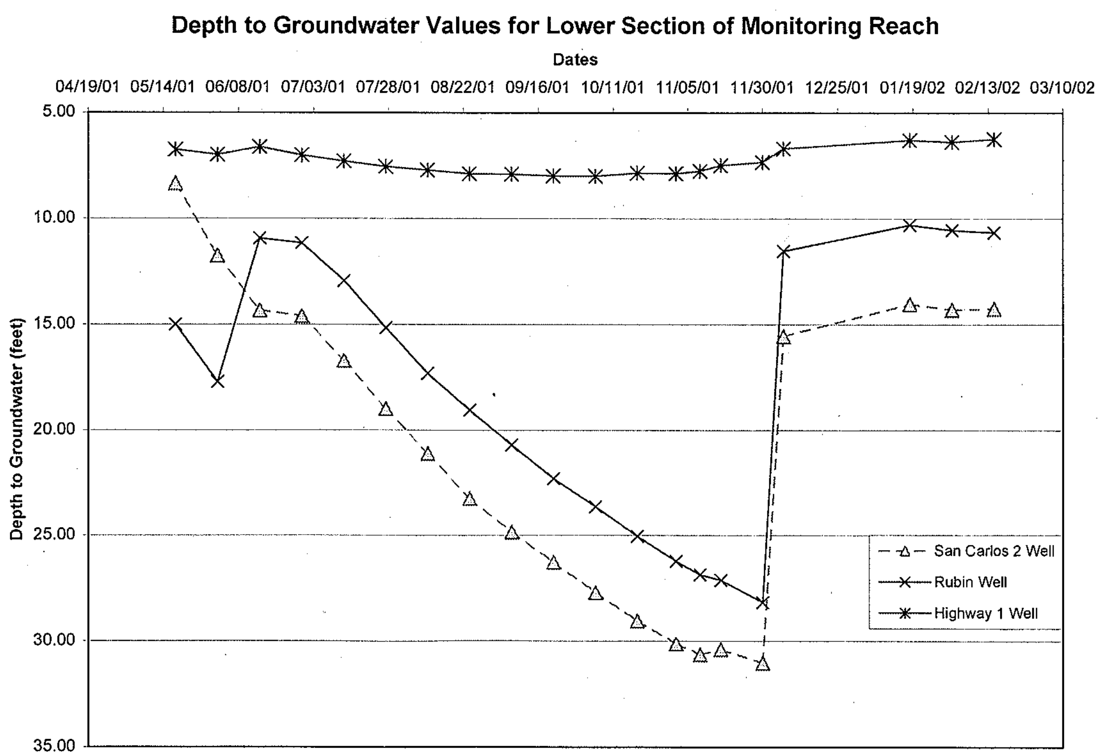

Figure 3. Depth to Groundwater Values for San Carlos, Rubin, and Highway 1 Monitoring Well

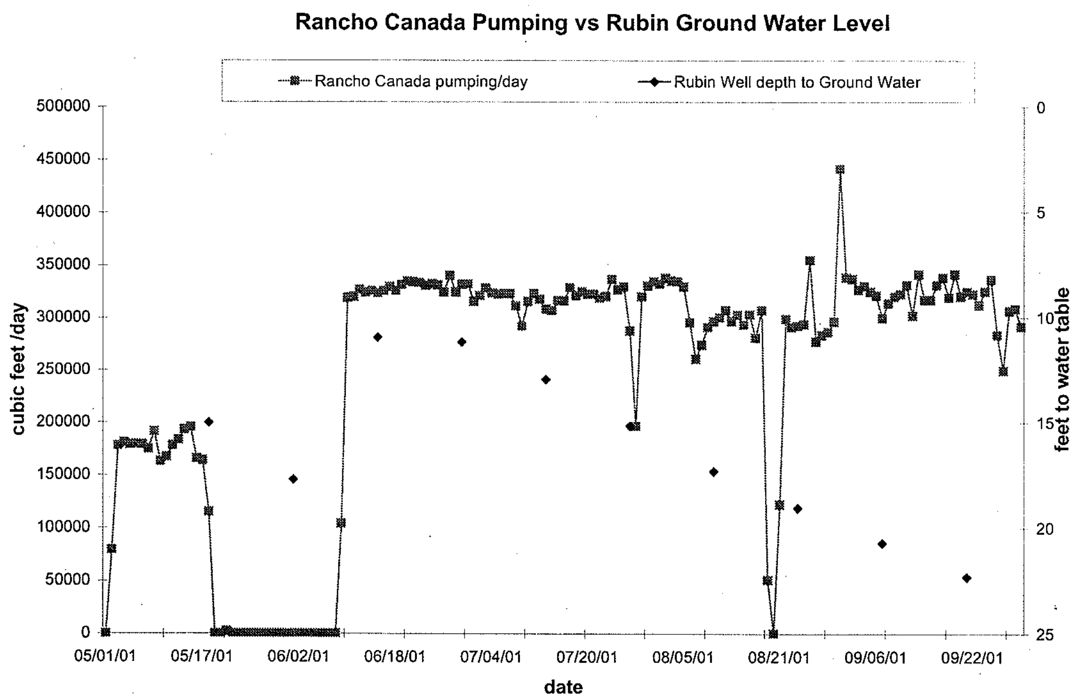

Figure 4. Rancho Canada's 2001 pumping volumes vs. Rubin monitoring well depth to ground water values

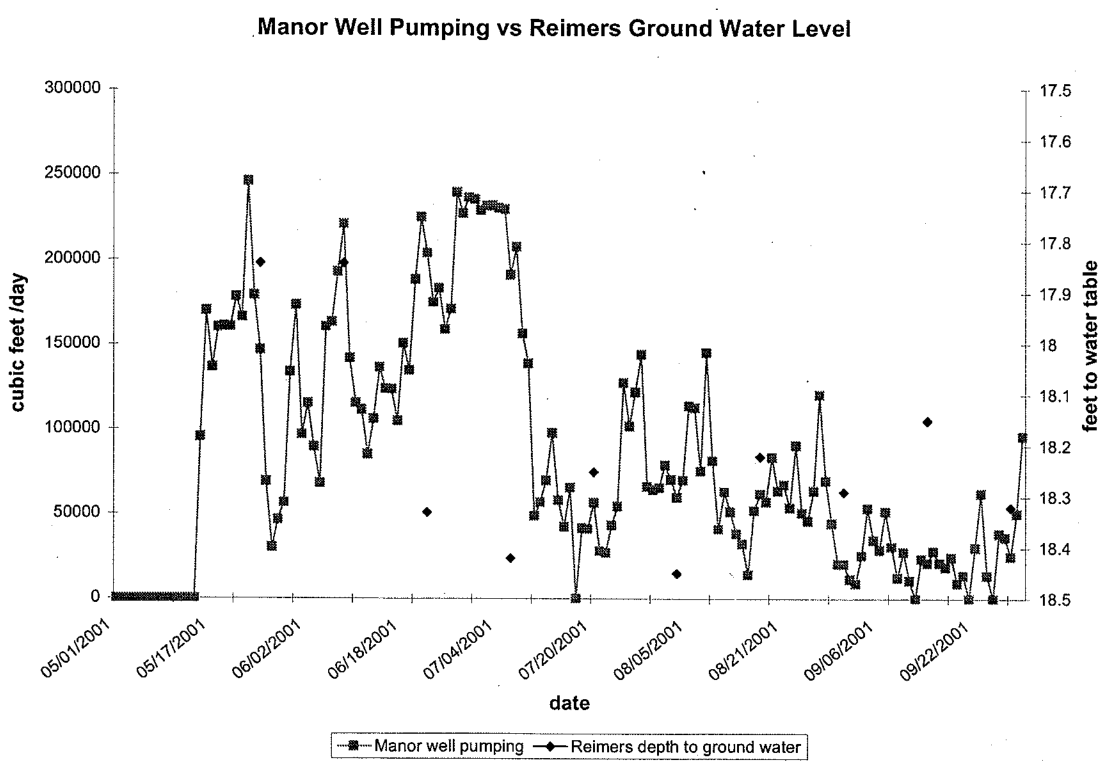

Figure 5. Manor 2001 pumping volumes verses Reimer monitoring well depth to ground water values

groundwater values from Manor well pumping is a function of hydraulic conductivity, stream flow, and the extent of the cone of depression created by the municipal pumping in this region. Reimer's slight fluctuations in depth to groundwater contrast that of San Carlos which shows a steady draw down as a result of a dry stream and little recharge.

Soil Moisture:

Tensiometer values (36 inches deep) were collected bi-monthly from three project locations including Schulte, Valley Hills, and San Carlos. Tensiometers give a relative indication of when soils begin to dry. Values at San Carlos begin at approximately 0.25 bars in April and rise steeply to 0.75 bars by June (Figure 6 San Carlos 2001 Tensiometer Values). This two-month period shows rapid drying of the soils. Analysis of the graphs are useful in determining the duration of specific moisture conditions. For example at San Carlos the tensiometer readings remain below 0.5 bars from late November through May. In comparison soil moisture at the Valley Hills site persist below 0.5 bars from December through July (Figure 7 Valley Hills 2001 Tensiometer Values). The vegetation at San Carlos had a shorter duration of moist soil, readings below 0.5 bars, than that of the Valley Hills project during the 2001 monitoring season.

Pre-dawn Leaf Water Potential:

Table 2 is a summary of pre-dawn moisture potential readings for all four sites. The average annual reading for willows and cottonwoods as well as the highest reading for each tree at each site is given.

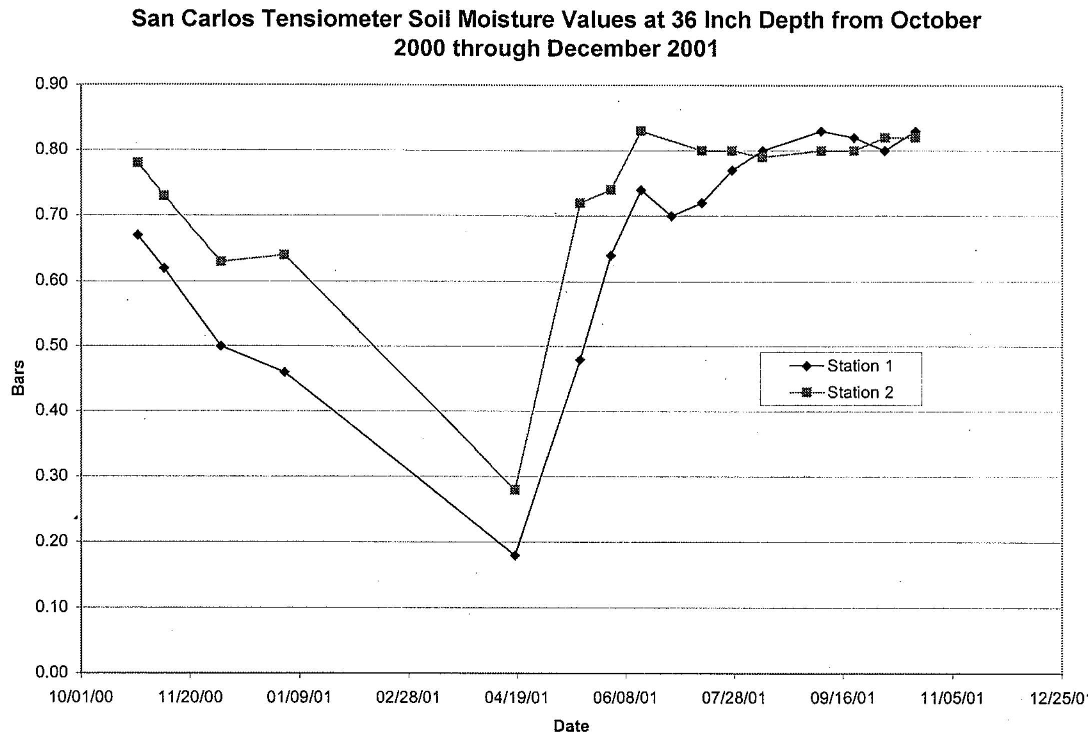

Figure 6. San Carlos 2001 Tensiometer Soil Moisture Values

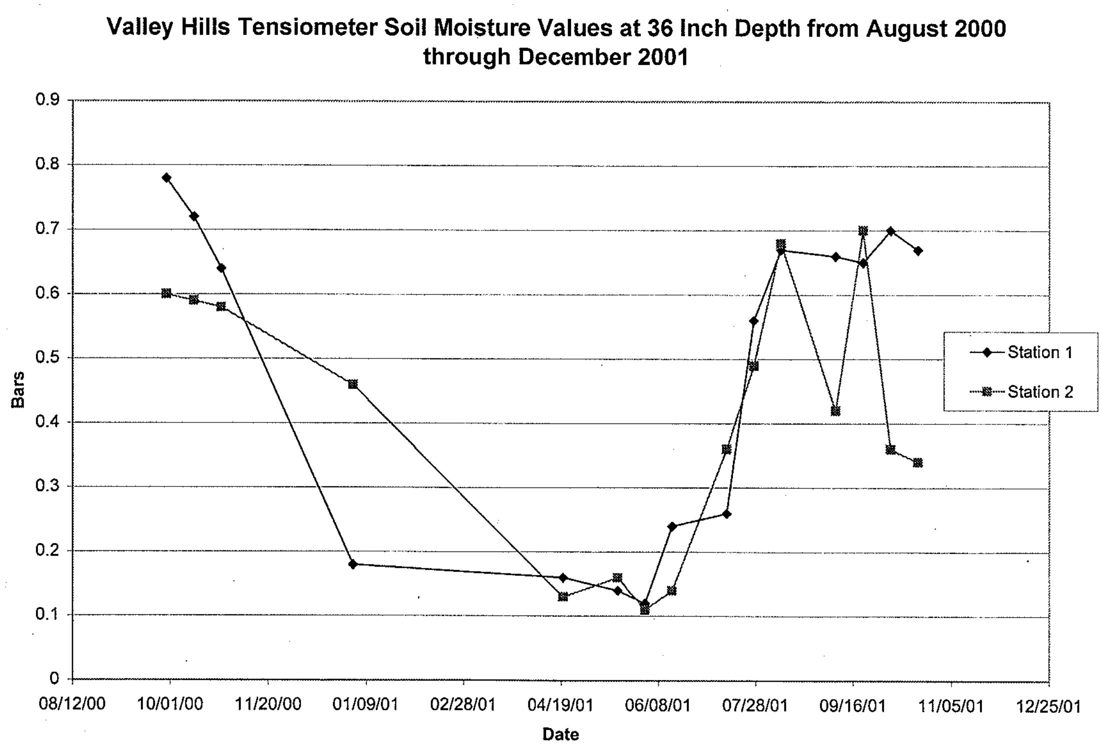

Figure 7. Valley Hills 2001 Tensiometer Soil Moisture Values

Table 2. Pre-dawn Leaf Water Potential Summary 2001

Site	Willow		Cottonwood	
	High (bars)	Average (bars)	High (bars)	Average (bars)
SanCarlos	7.50	3.04	8.75	3.66
Scarlett	6.00	3.37	6.25	3.62
Schulte	4.50	2.22	5.00	2.34
Valley Hills	12.00	4.50	11.75	3.82

Depth to Groundwater Values vs. Average Dawn Leaf Water Potential Values

Leaf water potential monitoring is a valuable tool in monitoring vegetation stress within the riparian corridor. Pre-dawn leaf water potential readings of 7.5 bars or greater indicate water stress in willows and values of 10.0 bars or greater indicate water stress in cottonwoods (McNeish 1988). The San Carlos graph illustrates that pre-dawn leaf water potential values rise as depth to groundwater values drop (Figure 8 San Carlos depth to groundwater 2001 values compared with leaf water potential values). By July 13, 2001 river flow ceased within the San Carlos reach, concurrently the graph shows a steady rise in leaf water potential values (bars) starting from mid-July and continuing through October. Leaf water potential values are generally higher at San Carlos with 54.2 % of the readings above 3 bars and only 20.8 % of the readings were above 3 bars at Schulte. The maximum average value for willow and cottonwood readings occurred in October and was 6.375 bars at San Carlos and 3.41 bars at Schulte. (Figure 9 Schulte depth to

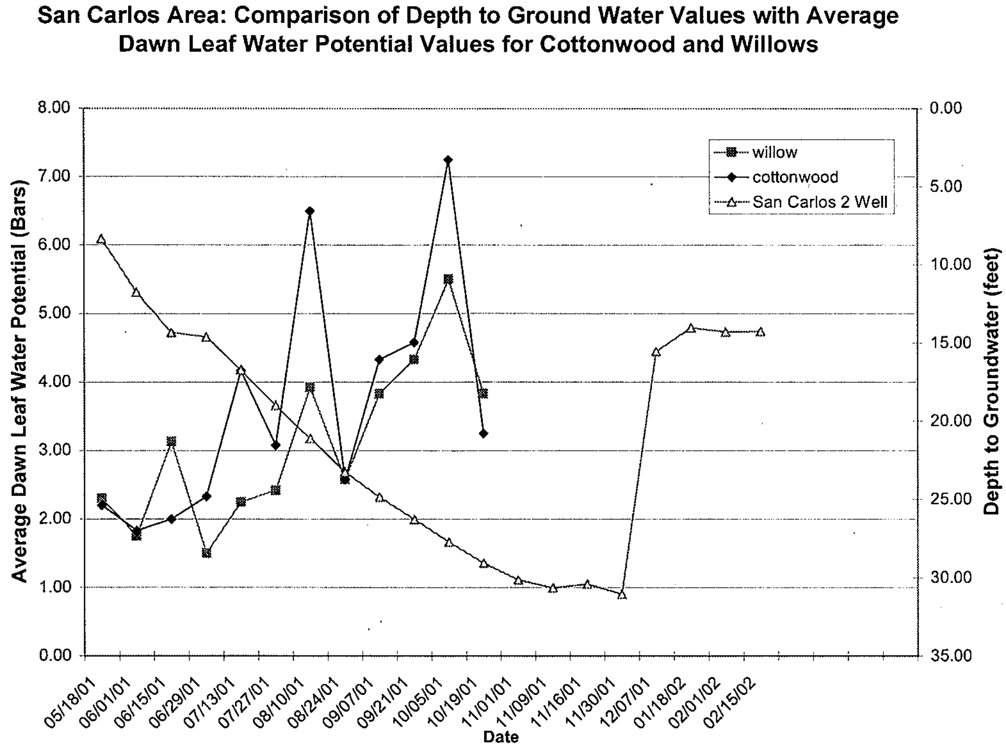

Figure 8. San Carlos comparison of dgw values with average dawn leaf water potential 2001values

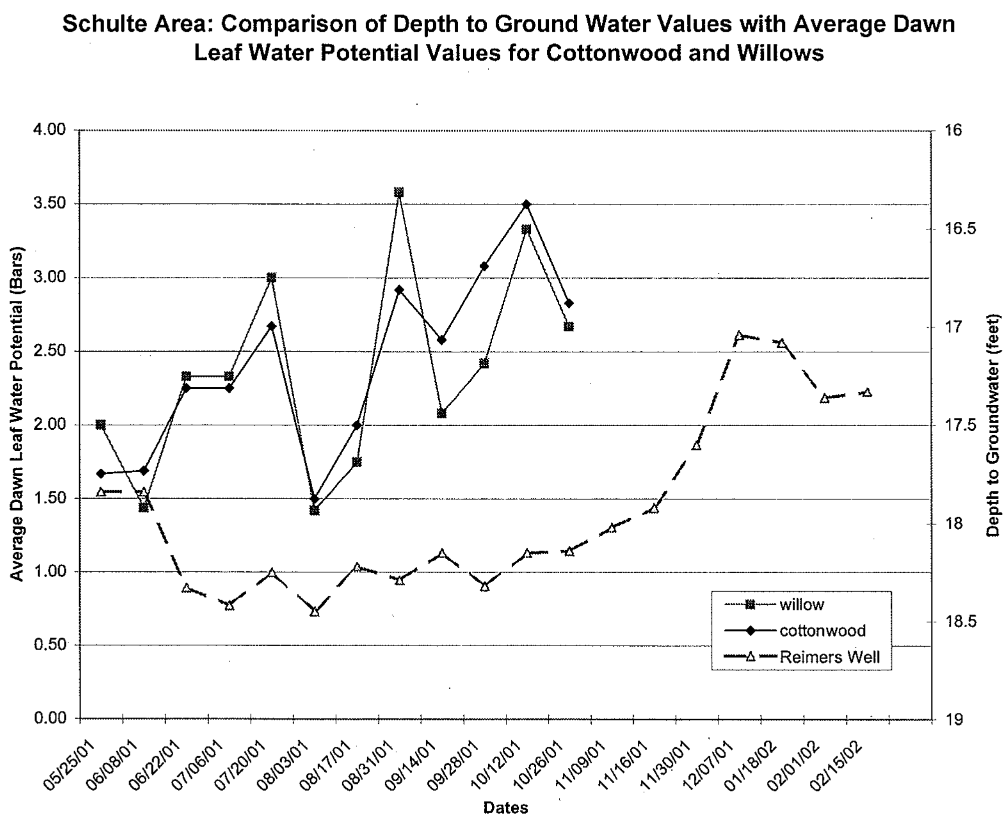

Figure 9. Schulte comparison of dgw values with average dawn leaf water potential 2001values

groundwater 2001 values compared with leaf water potential values). The higher readings at San Carlos may be a function of the dry channel duration and the cone of depression in the alluvial aquifer caused by the pumping of the San Carlos and Cañada wells within this reach verses perennial flow within the upstream section.

V. DISSCUSSION

Many complex interacting factors influence the moisture stress experienced by riparian vegetation. Factors that impact riparian monitoring results include depth to groundwater, which is influenced by weather, precipitation, river flow, and Cal-Am's groundwater pumping. This in turn impacts soil moisture. To complicate things further different soils have different water holding capacities. Finer textured soils (clay) hold more water than coarse textured soils (sand). Therefore, directly measuring plant stress helps integrate the various driving forces. However, it is important to note that there is a lag time associated with a change in depth to groundwater and moisture stress in individual plants. Plant available moisture is a function of **matric** potential (capillary and surface binding forces), osmotic potential produced by solutes in the soil water, gravitational forces, and external pressure (Kramer and Boyer 1995). As the water table drops residual moisture in the soil still provides water for a limited time to plants.

All of Cal-Am's on line production wells in Carmel Valley impact overall flow in the Carmel River. However, the most notable impacts to riparian vegetation occur between Cal- Am's four well system (Canada, San Carlos, Cypress, and Pearce). The results show that riparian vegetation experiences an increase in moisture stress in relation to a reduction in stream flow and a drop in the water table elevation. Initial studies on the Carmel River done by McNeish state that severe water stress is defined by a draw down rate of two or more feet per seven days; mild water stress is defined by a draw down rate of one to two feet per seven days or a total draw down of eight feet below the elevation of the adjacent river channel; and no effect is defined as draw down of less than one foot per week throughout summer and autumn and a total draw down of less than four feet below the adjacent river channel (McNeish, 1986). Draw down on the Carmel River peaked at San Carlos with a 1.29 ft draw down for a one week period starting June 1, 2001. Other studies show that on coarse substrates in dry regions, early establishment and growth of Populus spp. seedlings may require water tables within 3.3-6.6 feet (1-2 m) of the established surface (McBride and Strahan 1984, Mahoney and Rood 1992, Seqelquist and others 1993, Stromberg and others 1996). Root growth of established trees allow survival during gradual water table decline. Mature trees are more suited to withstand channel incision and flood plain isolation (Everitt 1968, Hereford 1986). Cottonwoods typically grow where the depth to the water table is 3.5m (Busch and others 1992, Scott and others 1997, Stromberg and others 1997), although cottonwoods have been observed to exist in areas where the water table is 7 to 9 m deep (Robinson 1958). The San Carlos results show that the depth to groundwater dropped to 8.85 feet (2.7 m) below the river bed in August and continued to drop to a maximum low of 18.78 feet (5.7 m) below the river bed on November 30, 2001. Mature black cottonwoods were also found 31.04 feet (9.46 m) above the water table on a historic floodplain in the San Carlos area. These values appear to be close to the limit of what black cottonwoods on the Carmel River can withstand. Mortality may have been avoided simply because these are mature black cottonwoods, with extensive root structures, growing in a soil with higher organic content than some of the sandy areas with riparian vegetation. Fine textured soils have a greater holding capacity for moisture and buffer some groundwater-dependent plants against rapid water table declines (Sorenson and others 1991). The higher organic content in the San Carlos soil would enable a greater degree of water retention and capillary rise from the root zone toward the soil surface.

Obtaining an accurate characterization of soil moisture can be difficult in alluvial areas. In the past MPWMD used a neutron probe to test soil moisture in riparian areas. This system was complicated because it depended on radioactive equipment and a special license. Currently MPWMD uses tensiometers and gypsum blocks which include some limitations. One limitation with tensiometers is that they are difficult to install deeper than 3 feet and are designed for homogenous agricultural soils. Working with tensiometers in gravel and sandy areas give a relative indication of soil drying and wetting. The ideal tensiometer range is 0.0 to 0.5 bars with a peak of 0.8 bars. Highly stressed vegetation exceeds the potential of this tool. Laboratory results indicate that the vegetation wilting point is reached at 15 bars and 0.3 bars indicates field capacity or total soil saturation. This range varies according to soil type. (Kramer & Boyer 1995)* As a result this equipment can provide a limited set of information concerning riparian vegetation stress. Gypsum blocks seem to have an ideal range between 0.1 and 15.0 bars but recent plots show fluctuations in values that do not correspond to tensiometer readings. Ideally soil moisture measuring devices would be installed 5 to 8 feet down where the roots would be interacting with more available moisture.

Visual signs of water stress such as yellowing and pre-mature defoliation were evident as early as June during the 2001 monitoring season. Pre-dawn water potential testing was used on July 27, 2001, to help determine moisture stress at the toe of the riverbank along the San Carlos reach. One willow had a pre-dawn moisture stress value of 8.5 bars. These observations resulted in the installation of 1,770 feet of irrigation pipe from San Carlos Bridge downstream beyond San Carlos well to mitigate for groundwater extraction and the loss of soil moisture in the root zone. The irrigation was installed at San Carlos on August 8, 2001 and continued through November 13, 2001 until significant rainfall caused groundwater levels to rebound.

VI. CONCLUSION

During the 2001 water year the total annual rainfall was 20.99 inches at the San Clemente Dam. Precipitation for this season was ninety eight percent of normal (21.41 inches is the average annual rainfall at San Clemente from 1922 to the 2001). Monitoring stream flow, depth to groundwater, soil moisture, and leaf water potential help determine when supplemental irrigation should be applied to riparian vegetation. During the 2001 monitoring season an overall trend towards higher stress during the summer was observed. In addition, monitoring results show that Cal-Am's pumping does impact depth to groundwater at specific sites thus impacting soil moisture and riparian vegetation. In 2001 MPWMD irrigated eight project areas (San Carlos, Valley Hills, All Saints, Schulte Bridge, Schulte, Pryor, Scarlett, and de Dampierre) with a total of 7.61 acre-feet of supplemental water to offset stress associated with water diversions from the Carmel River. Mitigation in the form of irrigation can be used to prevent plant mortality along the riparian corridor thus contributing to stable river banks and habitat for wildlife.

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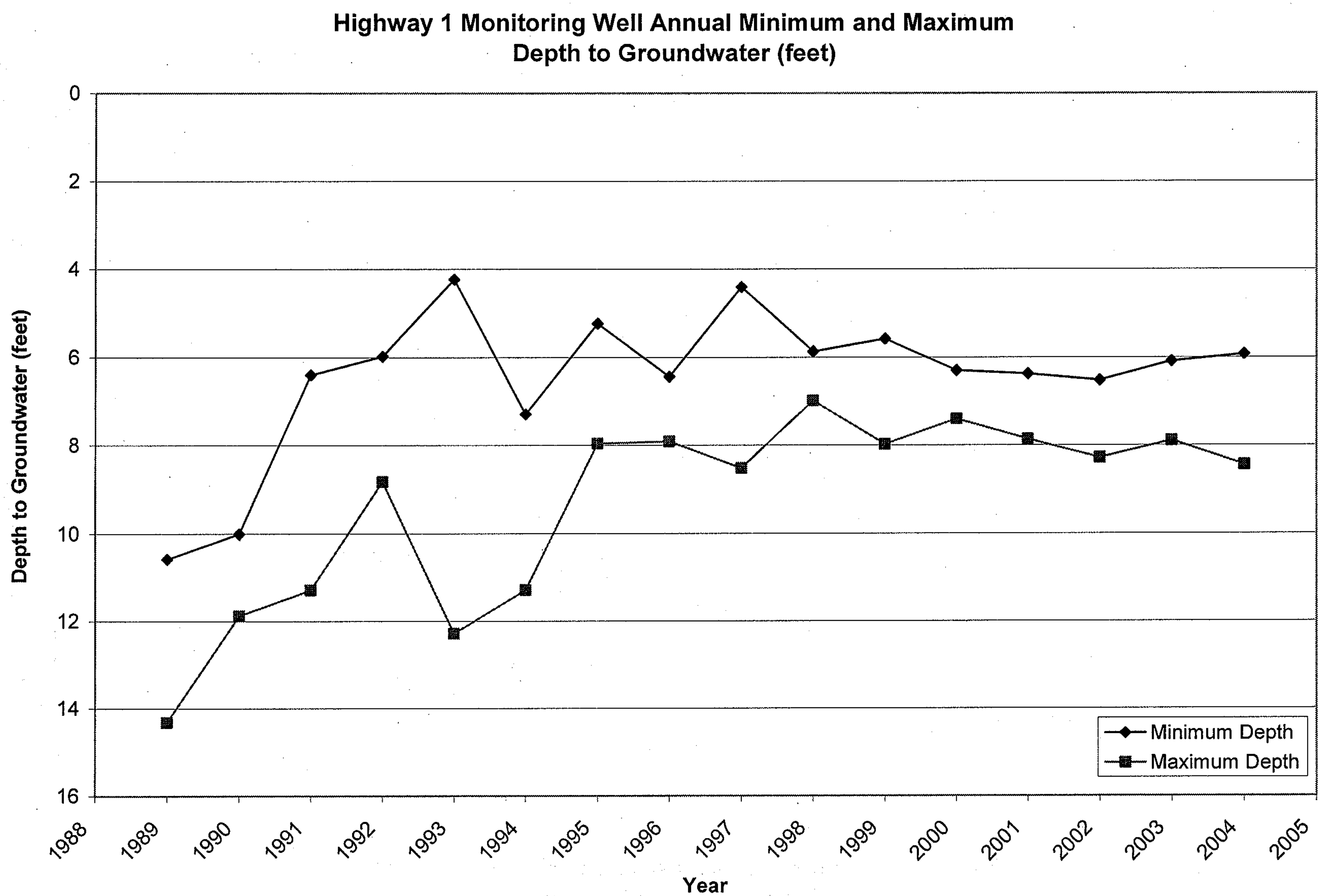
APPENDIX A: Historical Depth to Groundwater for Selected Monitoring Wells


Highway 1 Monitoring Well Annual Minimum and Maximum
Depth to Groundwater (feet)
Depth to Groundwater (feet)
0
2
4
6
8
10
12
14
16
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
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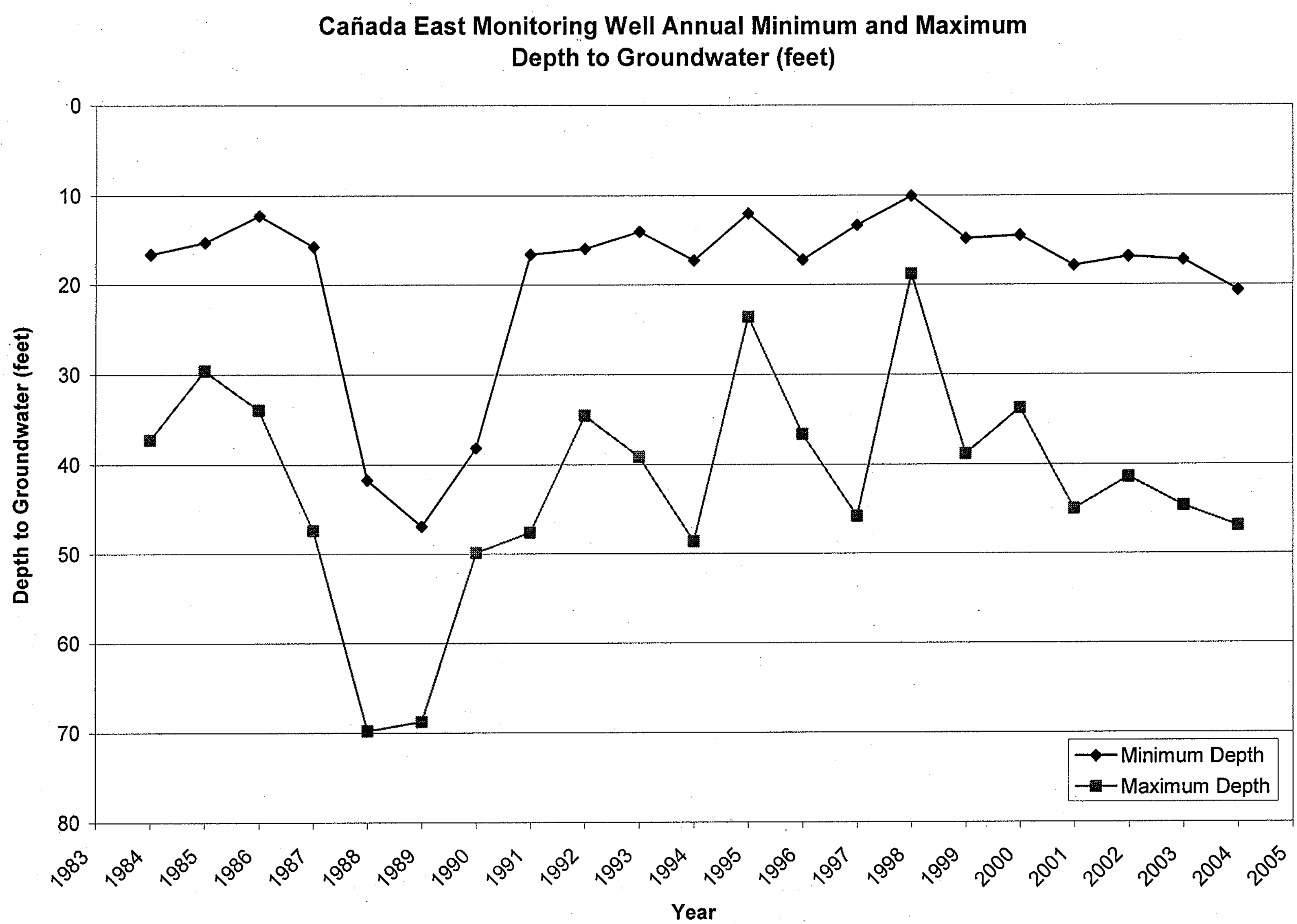
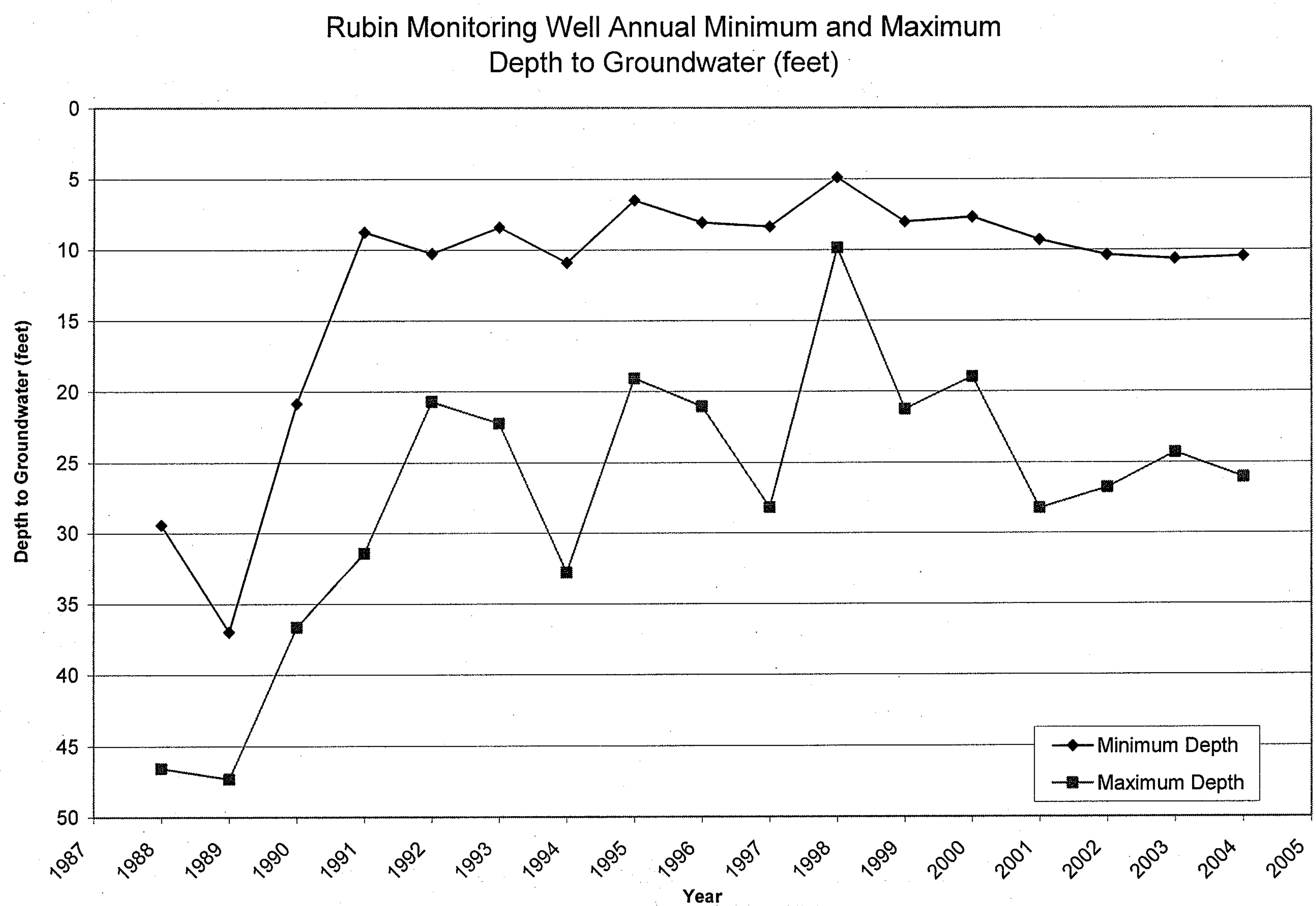
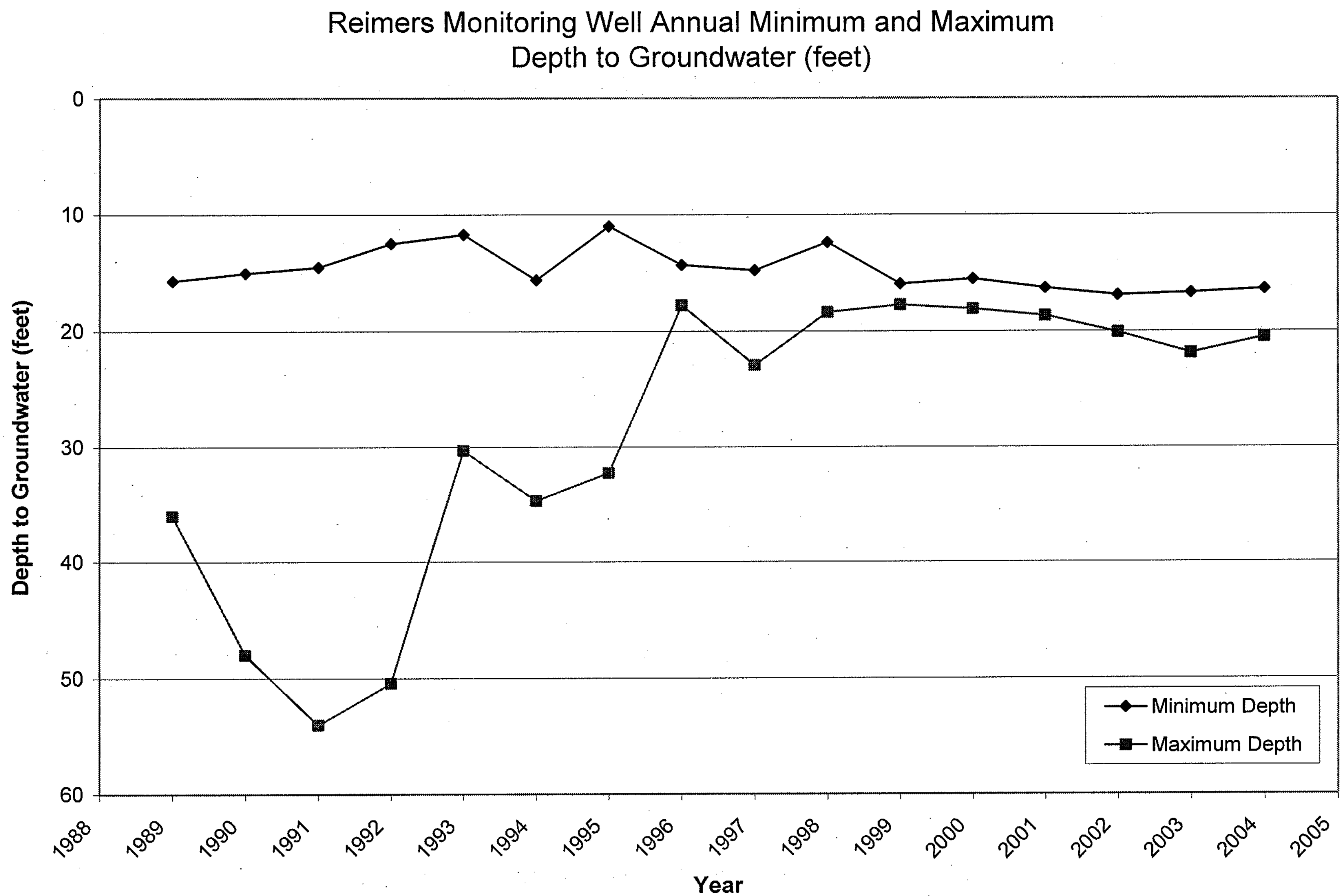
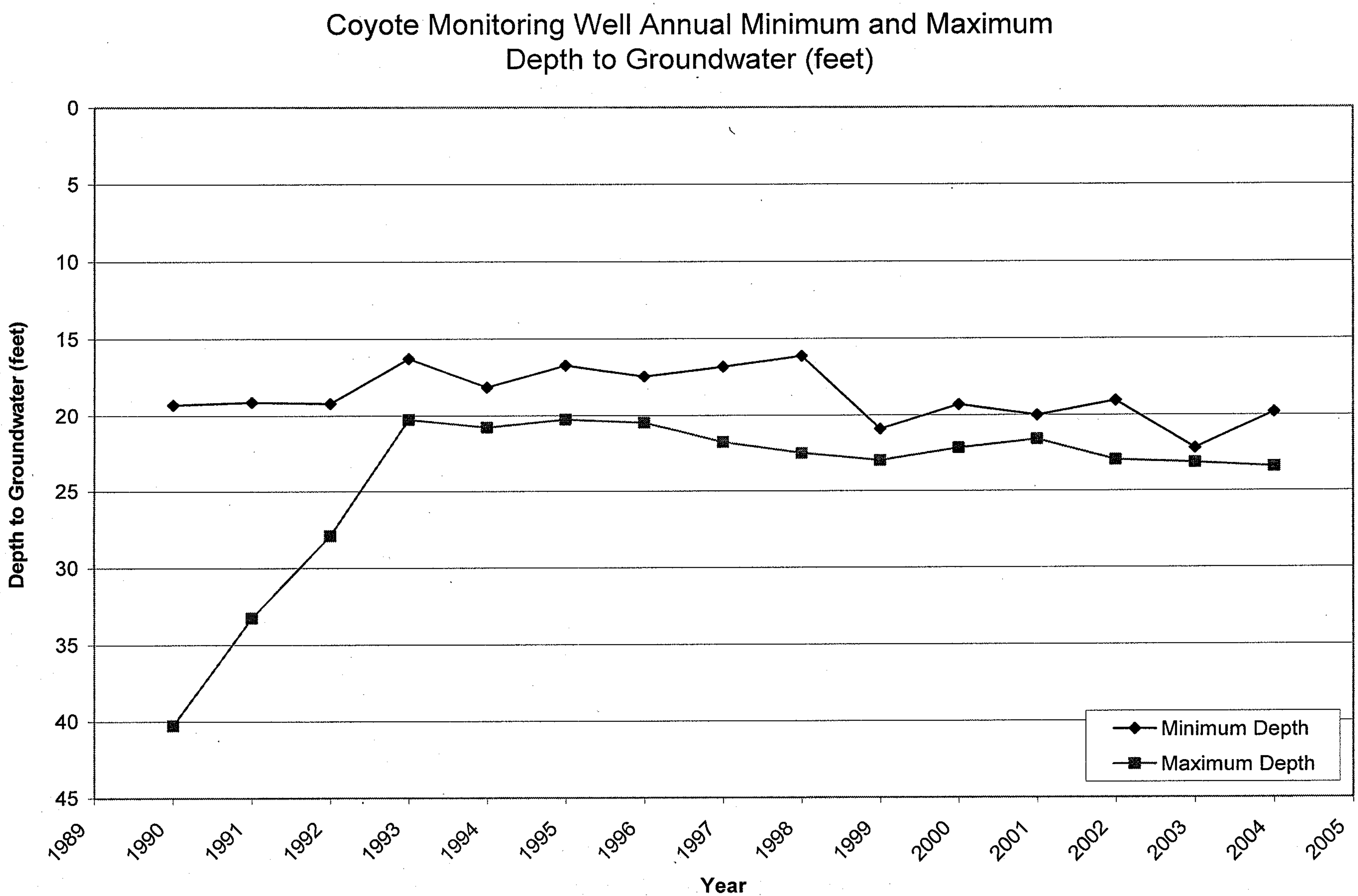
2002
2003
2004
2005
Year
Minimum Depth
Maximum Depth


Cañada East Monitoring Well Annual Minimum and Maximum
Depth to Groundwater (feet)
Depth to Groundwater (feet)
0
10
20
30
40
50
60
70
80
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
Year
Minimum Depth
Maximum Depth


Rubin Monitoring Well Annual Minimum and Maximum
Depth to Groundwater (feet)
Depth to Groundwater (feet)
0
5
10
15
20
25
30
35
40
45
50
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
Year
Minimum Depth
Maximum Depth


Reimers Monitoring Well Annual Minimum and Maximum
Depth to Groundwater (feet)
Depth to Groundwater (feet)
0
10
20
30
40
50
60
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
Year
Minimum Depth
Maximum Depth


Coyote Monitoring Well Annual Minimum and Maximum
Depth to Groundwater (feet)
Depth to Groundwater (feet)
0
5
10
15
20
25
30
35
40
45
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
Year
Minimum Depth
Maximum Depth

DeDampierre Monitoring Well Annual Minimum and Maximum Depth to Groundwater (feet)