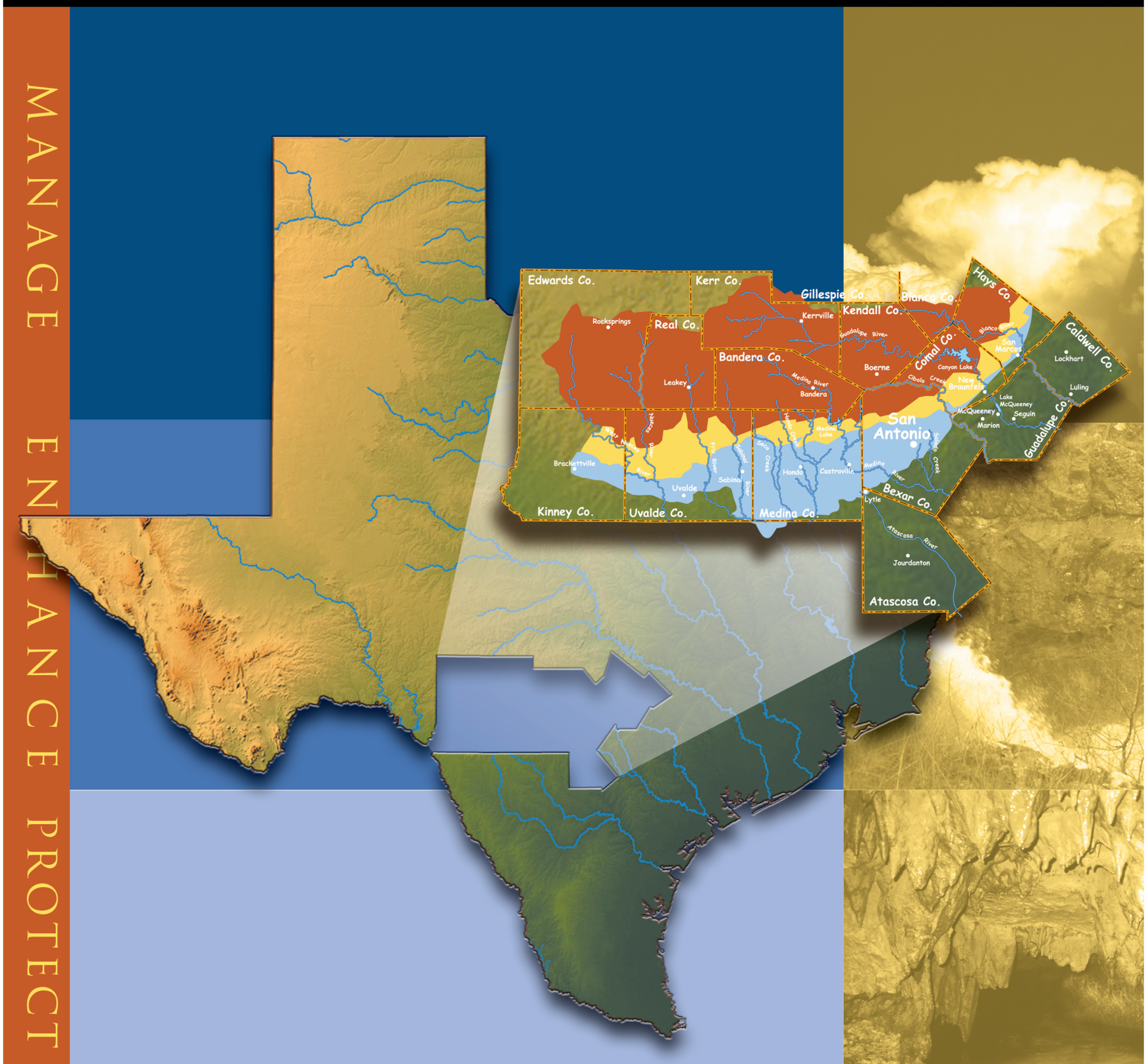
Evaluation of the Option to Designate a Separate San Marcos Pool for Critical Period Management

February 2008

MANAGE ENHANCE PROTECT



Report No. 08-01

EDWARDS AQUIFER AUTHORITY

Evaluation of the Option to Designate a Separate San Marcos Pool for Critical Period Management

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EXECUTIVE SUMMARY

This report presents the findings of the Edwards Aquifer Authority's investigation into the hydrogeology and hydrodynamics of water discharging from San Marcos Springs in Hays County, Texas. The purpose of the report is to determine whether there is sufficient technical justification for distinct aquifer management rules for the designation of a San Marcos Pool in the San Marcos area regarding critical period management.

Statement of Problem

In 2006, discharge at San Marcos Springs declined to less than 100 cubic feet per second (cfs), which required users of the Edwards Aquifer in Medina, Bexar, Comal, Hays, Atascosa, Guadalupe, and Caldwell counties to reduce water use pursuant to Edwards Aquifer Authority (Authority) rules. Although water levels in the Bexar County Index Well (J-17) and discharge at Comal Springs in Comal County also declined in 2006, San Marcos Springs was more severely impacted by the dry conditions and became the trigger for mandated reductions. When rainfall returned to normal or above normal conditions in early 2007, Comal Springs discharge increased, but San Marcos Springs remained below average and did not recover to average conditions until later in 2007.

The apparent difference in response to rainfall by Comal Springs and San Marcos Springs could indicate that these springs represent separate hydrologic subbasins or *pools* within the San Antonio Segment of the Balcones Fault Zone Edwards Aquifer. Whereas J-17 water level changes correlate well with changes in springflow at Comal Springs, they do not correlate well with changes in springflow at San Marcos Springs. However, San Marcos Springs is included within the San Antonio Pool (Medina, Bexar, Comal, Hays, Atascosa, Guadalupe, and Caldwell counties) for critical period purposes.

Scope of Investigation

For this investigation, Authority staff evaluated hydrologic setting, including regional stratigraphic and structural geology; hydrodynamics of Comal, Hueco, and San Marcos springs, the Guadalupe and Blanco rivers, and Cibolo Creek; regional precipitation and groundwater use; water and monitoring well potentiometric surface data; tracer testing; and water quality data within the Edwards Aquifer.

Findings of the Investigation

Edwards Aquifer groundwater flow within Comal and Hays counties occurs predominately within two of four major fault blocks. Major faults and hydraulic head appear to play an important role in controlling discharge at Comal and San Marcos springs. Water contained within the Artesian fault block (southernmost block) is predominately responsible for discharge at Comal Springs and also for recharging the Comal Springs fault block. During high groundwater levels, water from the Comal Springs fault block discharges at Comal Springs, but this fault block also provides groundwater to San Marcos Springs. During low-flow conditions (<100 cfs at Comal Springs), a significant volume of water in the Comal Springs fault block bypasses Comal Springs to discharge at San Marcos Springs. During the 1950s drought of record, Comal Springs ceased to flow, and it is likely that all of the water in the Artesian and Comal Springs fault block bypassed Comal Springs to discharge at San Marcos Springs. Water levels at J-17 correlate poorly with those of San Marcos Springs because J-17 is located in the Artesian fault block and not in the Comal Springs fault block.

Results of this study indicate that

- During low-flow conditions at San Marcos Springs (<100 cfs), more than 90 percent of the discharge at San Marcos Springs is derived from the western portion of the aquifer;
- During normal and high-flow conditions, groundwater from the western portion of the aquifer flows through the Artesian fault block to the Comal Springs fault block then bypasses Comal Springs and discharges at San Marcos Springs;
- At higher discharge rates, San Marcos Springs is also recharged by water infiltrating from Cibolo Creek, the Guadalupe River, Dry Comal Creek, Sink Creek, and other streams. Despite the large volume of water that these streams carry at times, they contribute relatively small amounts to San Marcos springflow;
- Well J-17's water level correlates strongly with discharge at Comal Springs because of the highly transmissive flowpath through the Artesian fault block, but correlates poorly with discharge at San Marcos Springs because of the complex flowpath from the Artesian fault block to the Comal Springs fault block;
- When San Marcos Springs discharge is less than 100 cfs, Cibolo Creek, the Guadalupe River, the Blanco River, and other creeks and streams in Comal and Hays counties contribute a small percentage of water to San Marcos Springs discharge; and
- Because most of the flow at San Marcos Springs is derived from the western portion of the aquifer during low-flow conditions, there is not sufficient technical justification at this time to create a separate San Marcos "Pool."

Recommendations

On the basis of the findings of this report, the following recommendations are made:

- Hays and Comal counties should continue to be included within the San Antonio Pool (Medina, Bexar, Comal, Hays, Atascosa, Guadalupe, and Caldwell counties) for critical period management. Critical period rules for the San Antonio Pool should continue to be based on water levels in the Bexar County Index Well and flows at Comal and San Marcos springs.
- The Authority should establish a "Hays County" Index Well within the Comal Springs fault block near the City of San Marcos. The selected well should have a strong correlation with discharge at San Marcos Springs and should be evaluated for use as a suitable surrogate for triggering critical period levels at San Marcos Springs. The amount of time needed to develop a correlation between a well and San Marcos springs will depend on hydrologic conditions. The well will also aid in dealing with the gauging system uncertainties at San Marcos Springs.
- The Authority will continue to collect hydrogeologic data in Comal and Hays counties to refine its understanding of groundwater flow in the region, as described in the Data Needs section at the end of the report.

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INTRODUCTION

The Edwards Aquifer Authority (Authority) Act aquifer management rules include the term *pool* to indicate areas within the Edwards Aquifer that are hydrologically related to one another. These pools are considered groundwater subbasins within the aquifer. The Authority Act established two pools, the San Antonio Pool and the Uvalde Pool, for aquifer management purposes. The San Antonio Pool primarily includes Medina, Bexar, Comal, and Hays counties, whereas the Uvalde Pool occurs within the boundary of Uvalde County. Both pools are considered subbasins of the San Antonio segment of the Balcones Fault Zone segment of the Edwards Aquifer, which is the Authority's jurisdictional area.

The purpose of this report is to determine whether there is technical justification for delineation of a new San Marcos Pool. The principal study questions are:

- Are there hydrogeologic conditions or geologic features that indicate that a significant part of the groundwater system discharging at San Marcos Springs is isolated from the San Antonio Pool (for example, groundwater divide, barrier fault)?
- What is the distance from San Marcos Springs beyond which Edwards Aquifer groundwater withdrawals do not appreciably affect springflow?

The Authority examined a large volume of existing information and collected additional new data to determine whether a new pool is technically justified. The primary objective is to identify sources of the springflow at San Marcos Springs, which in turn will reveal the nature of the San Marcos Pool and whether it is sufficiently isolated from the San Antonio Pool of the Edwards Aquifer. This report presents findings of an investigation of San Marcos Springs, its hydrologic characteristics, and a recommendation regarding the technical justification for a San Marcos Pool.

Statement of Problem

Between November 2004 and February 2007, the Edwards Aquifer region received only about 44 inches of rain, as recorded in San Antonio (National Weather Service, 2007), which is 63 percent of normal. For comparison, San Antonio received approximately 34 inches of rain between December 1953 and April 1956 (29 months) during the driest part of the 1950s drought. During the 2004–2007 dry period, groundwater elevation at the Bexar County Index Well (J-17) declined 35 feet, Comal Springs discharge decreased 240 cubic feet per second (cfs), and San Marcos Springs discharge decreased almost 260 cfs. In January 2007, rains returned to much of the region, and the Bexar County Index Well (J-17) and Comal Springs surged to above-normal levels, although San Marcos Springs discharge remained below average. Consequently, water use restrictions imposed by the Authority's 2004 Demand Management/Critical Period Management (DM/CPM) regulations in place at the time could not be lifted because discharge at San Marcos Springs was below the DM/CPM threshold.

Although J-17 water levels closely predict springflow at Comal Springs, they do not correlate well with discharge at San Marcos Springs. However, San Marcos Springs is included in what is defined as the San Antonio Pool (Medina, Bexar, Comal, and Hays counties) for Edwards Aquifer critical period management purposes. In the event of a more severe drought in the future, aquifer management rules based on J-17 water levels would protect habitat at Comal Springs, but not necessarily habitat at San Marcos Springs. Consequently, the Edwards Aquifer Authority (Authority) initiated a study to determine whether there is sufficient technical justification to create a separate pool for the San Marcos Springs area.

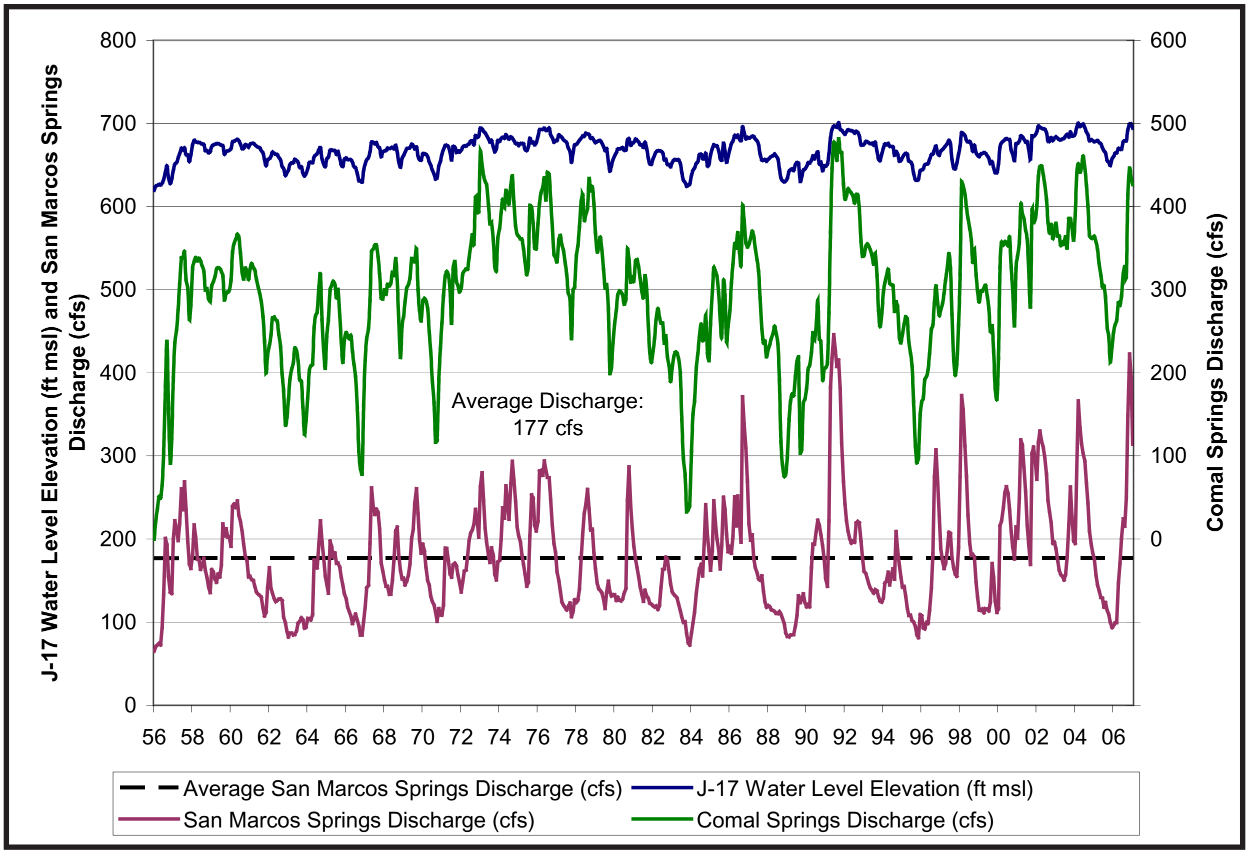


Figure 1. Average Monthly Discharge Hydrographs for San Marcos Springs and Comal Springs and J-17 Water Level Elevations (1956–2006)

Description of the San Marcos Springs Complex

The San Marcos Springs Complex, a group of springs discharging from the Edwards Aquifer, has the second-largest average discharge of all Texas springs. Only Comal Springs discharge is larger. Most of the individual springs are submerged beneath Spring Lake, which was created by a dam constructed in the 1800s to provide water power for a nearby mill system. Most of the water discharges through sediments on the lake bottom. Spring Lake forms the headwaters of the San Marcos River.

San Marcos Springs discharge has been measured by the U.S. Geological Survey (USGS) since 1956 at the Aquarena Springs Drive Bridge near Sessom Drive on the Texas State University (TXU) campus. The USGS gauging station name is “San Marcos Springs at San Marcos, Texas, (08170000)” at latitude 29°53'20" and longitude 97°56'02". The location of the gauge includes measurement of storm flow from Sink Creek and Sessom Creek. The USGS subtracts volume of stormwater runoff to calculate actual spring discharge. For the period of record, 1956–2006, discharge averaged 177 cfs (Hamilton and others, 2007). Figure 1 shows monthly averages for San Marcos Springs discharge, with Comal Springs discharge and J-17 water level elevations shown for comparison.

Description of the Study Area

The study area for the project includes parts of Bexar, Comal, Guadalupe, and Hays counties (Figure 2). Important hydrogeologic features within the study area include Comal Springs, Hueco Springs, Cibolo Creek, Guadalupe River, Blanco River, and stratigraphy of the Edwards Aquifer Recharge Zone (Blome

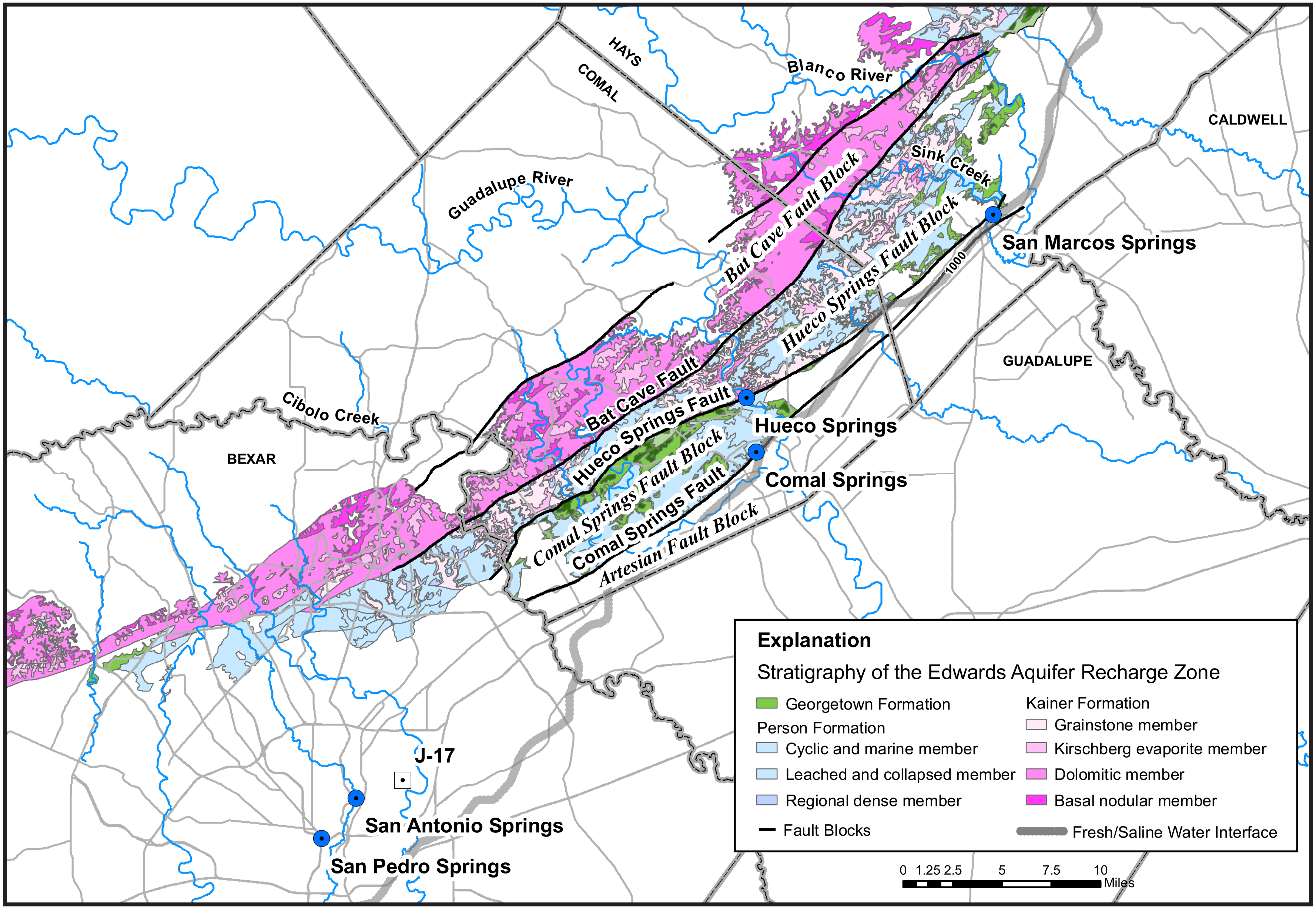


Figure 2. Study Area and Stratigraphy (Blome and others, 2005) of the Edwards Aquifer Recharge Zone

and others, 2005). The recharge zone for San Marcos Springs is divided into three main fault blocks from northwest to southeast: Bat Cave, Hueco Springs, and Comal Springs fault blocks. The Artesian fault block comprises the part of the Edwards Aquifer under confined conditions. Figure 3 shows principal fault blocks of the San Marcos and Comal springs hydrologic system. Bat Cave, Hueco Springs, and Comal Springs faults are the most prominent structural features near San Marco Springs. The Hueco Springs fault is also known as the San Marcos fault in Hays County. These faults divide the Edwards Aquifer in the study area into four fault blocks: Bat Cave, Hueco Springs, Comal Springs, and Artesian fault blocks, which influence groundwater flow and surface water resources in Comal and Hays counties.

The fault blocks are part of the Balcones Fault Zone, which consists of numerous subparallel, normal faults, with some displacements exceeding 1,000 feet. Most of the faults are displaced down to the southeast toward the Gulf of Mexico, although some are reverse faults with displacement down to the northwest. The Balcones Fault Zone marks the front of the Edwards Plateau, which uplifted thick sequences of Cretaceous sediments during Miocene times (LBG-Guyton Associates, 2004). The San Marcos Fault extends from Comal County northeastward and terminates at San Marcos Springs.

Each fault block has geologic characteristics that influence the hydrologic system. Within the Bat Cave fault block, lower members of the Edwards Group crop out, the Dolomitic member and Basal Nodular member, with small outcrops of the Kirschberg member. Most wells within the Bat Cave fault block are probably completed in the underlying Glen Rose Formation of the Trinity Group because the water table is often below Edwards Group members.

Within the Hueco Springs fault block, middle members of the Edwards Group crop out, the Leached and Collapsed, the Regional Dense, and the Grainstone, with the Kirschberg and underlying members exposed along the Guadalupe River and other streams. The Edwards Aquifer yields an adequate quantity of water to wells from the Hueco Springs fault block.

Within the Comal Springs fault block, upper members of the Edwards Group crop out, including the Cyclic and Marine members. The Georgetown, Del Rio Clay, Buda Limestone, Eagle Ford Group, and Austin Group, which overlie the Edwards Group, also crop out within the Comal Springs fault block. The fault displaced the Edwards Group 400 to 600 feet (George and others, 1952). It also produces adequate water to wells.

Within the Artesian fault block, the top of the Edwards Aquifer is approximately 150 feet to more than 600 feet below land surface. The Artesian fault block is recharged by groundwater flowing northeastward from Bexar County, as well as recharge from the Comal Springs fault block, depending on the potentiometric surface. The southeastern limit of the Edwards Aquifer is within the Artesian fault block at a fresh water/saline water interface. The saline zone is defined as the area where total dissolved solids exceed 1,000 milligrams per liter.

Seven Federally listed threatened or endangered species depend directly on habitat maintained by San Marcos Springs. The six endangered species are the Texas blind salamander (*Eurycea rathbuni*), fountain darter (*Etheostoma fonticola*), San Marcos gambusia (*Gambusia georgei*), Texas wild-rice (*Zizania texana*), Comal Springs riffle beetle (*Heterelmis comalensis*), and Comal Springs dryopid beetle (*Stygoparnus comalensis*). The threatened species is the San Marcos salamander (*Eurycea nana*). These species are aquatic and inhabit ecosystems that are constantly replenished by spring water. The San Marcos gambusia is a native of the San Marcos Springs ecosystem, but it has not been observed since 1983 and is thought to be extinct.

Organization of this Report

This report summarizes previous investigations in the following section and describes the hydrologic setting of the springs in the section after that. The Hydrogeological Evaluation of the San Marcos Springs Area section describes sources of water that issue from the springs and presents a hydrogeologic evaluation of the area. The final section contains conclusions and recommendations of this study.

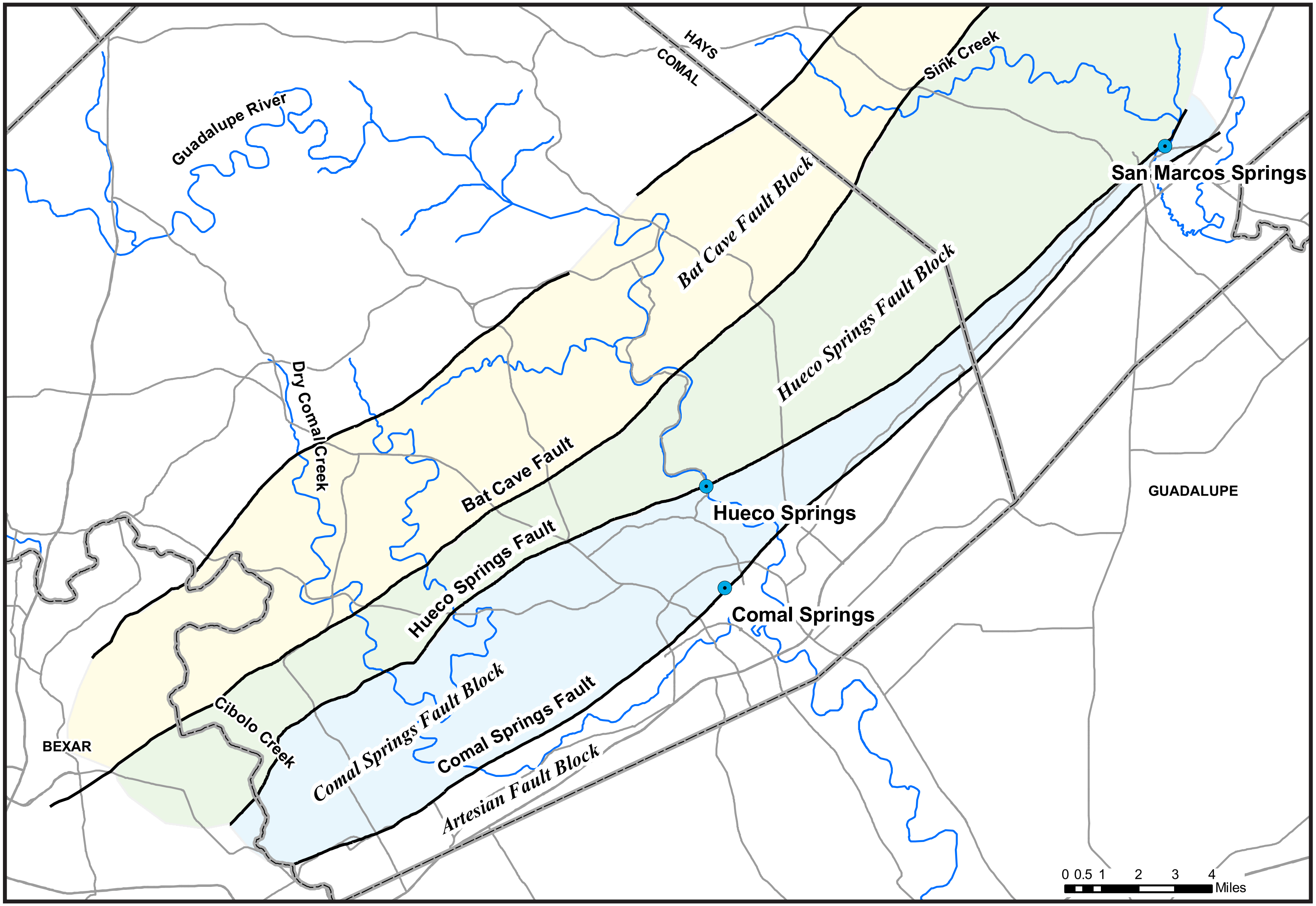


Figure 3. Locations of Fault Blocks

PREVIOUS INVESTIGATIONS

Barnes (1938) prepared a guide for landowners and well drillers consisting of records of wells and springs in Hays County. The purpose of the report was to "determine the distribution and extent of the available ground-water supplies and the relation of the large springs of the county to the ground-water reservoirs." The report contains over 200 analyses and water levels from wells and springs throughout Hays County. It includes records of well locations on a hand-drawn map, well depth, well owners, and analyses of total dissolved solids, calcium, magnesium, bicarbonate, sulfate, chloride, nitrate, and hardness.

George and others (1952) investigated geology and groundwater resources of Comal County, which provided insight into the hydrology of Comal Springs. They described stratigraphy and structure of the Edwards Group, along with groundwater and surface water resources of Comal County, and concluded that faults control groundwater movement in the Edwards Aquifer in that area. They measured more than 20 feet of difference in water level elevations across Hueco Springs fault. George and others (1952) concluded that most of the water discharged by Comal Springs originates from a large reservoir west of the county. Cibolo Creek and Dry Comal Creek basins supply one-third to one-fourth of the discharge. These workers also concluded that the Guadalupe River contributes very little water to Comal Springs.

DeCook (1957) described stratigraphy, geologic structure, and groundwater conditions in the San Marcos Springs quadrangle. Groundwater levels were generally less than five feet higher than Spring Lake, suggesting a low gradient.

DeCook (1963) gathered geologic and hydrologic data in Hays County related to the occurrence of groundwater, especially in the Edwards Group and the associated Comanche Peak Limestone. He estimated on the basis of the period of 1934 through 1947 that 70,000 acre-feet of groundwater flows annually (97 cfs) from Comal County. The report contains information from 519 wells and springs, driller's logs of 49 wells, periodic water-level measurements in about 70 wells, and chemical analyses of water samples from 238 wells and springs in Hays County.

Puente (1976) statistically correlated relationships among springflow, groundwater elevations, and streamflow in Bexar, Comal, and Hays counties. He concluded that most of the discharge at Comal Springs originates from the Artesian fault block of the aquifer flowing at depth from the southwest. He also concluded that Hueco Springs discharges water mainly from local recharge captured by Dry Comal Creek north of the Hueco Springs fault. San Marcos Springs discharges water that has flowed past Comal Springs and from local recharge areas in northern Comal and Hays counties.

Guyton (1979) concluded that regional and local sources supply water to San Marcos Springs. Regional groundwater flows past Comal Springs and discharges from San Marcos Springs and comprises 55 to 60 percent of San Marcos springflow. He cited relatively high tritium levels in 1974 (indicating recently recharged water), close correlation between springflow and local water levels, and close correlation of Hueco and San Marcos springflow as evidence of local sources of recharge. These consist of "(1) the recharge area of the Blanco River basin; (2) the Sink, Purgatory, York, and Alligator Creek basins; (3) the Guadalupe River basin recharge area east of the river and that small portion west of the river which is south of the Hueco Springs Fault; (4) probably part of the upper part of the Dry Comal Creek basin; and (5) possibly part of the upper part of the Cibolo Creek basin recharge area."

Watson (1985) of the Texas Department of Water Resources (TDWR) investigated the rate of infiltration of water from the Blanco River into the Edwards Aquifer in response to a permit to discharge sewage effluent near Wimberley. He measured streamflow at three locations on the recharge zone and compared them with groundwater levels measured in seven nearby wells. Results show a small net gain over the 11 miles downstream of the Wimberley gauge. One of the locations with the greatest loss (1 to 6 cfs) was in a reach from "900 feet downstream of the falls at upper Halifax Ranch to a point about ½ mile downstream of the mouth of Halifax Creek." The recharge zone from 11.1 to 13.3 miles below the Wimberley gauge gains or loses water, depending on groundwater levels. Several rounds of streamflow measurements by the USGS and TDWR indicated 15 cfs as the maximum loss rate for the Blanco River. However, Watson (1985) concluded that rate was appropriate at river stages up to two feet. He increased his estimate to 30 cfs because additional water would flow into Tarbuttons Showerbath Cave at higher river stages.

Ogden and others (1985a, b; 1986) conducted tracer tests, collected water samples from San Marcos Springs and wells, and statistically analyzed the results to determine whether multiple flowpaths are connected to different orifices at the springs. Two tracer tests verified that there are discrete flowpaths to individual orifices in the San Marcos Spring complex. Hydrochemical analyses of six San Marcos spring orifices demonstrated that two chemically different spring groups exist. The southern group of orifices (Deep and Catfish) display higher temperatures and tritium and dissolved oxygen concentrations than those of the northern group (Cabomba, Johnny, Hotel, and Diversion). Also, changes in discharge have a more profound effect on water chemistry for the northern spring orifices.

Kolbe (1988) studied the occurrence of bacterial contamination in the Edwards Aquifer in the San Marcos area. She collected groundwater samples from 22 private wells in the Country Estates subdivision east of San Marcos for one year to characterize frequency and number of fecal coliform. She concluded that intense, short-duration rainfall caused the highest numbers of fecal and total coliform in wells. Low-intensity rainfall caused less contamination. Wells near Sink Creek were the most vulnerable to contamination because runoff readily infiltrated the fractured surface.

Wanakule (1988) concluded that although J-17 water levels correlate well with Comal Springs, correlation to flows at San Marcos Springs is much lower because of the greater distance from San Antonio and the influence of recharge from the Blanco River basin. His conclusions were based on a reservoir model of the Edwards Aquifer.

Kuniansky and Holligan (1994) constructed a finite-element model for simulating two-dimensional, steady-state groundwater flow of the Edwards-Trinity aquifer system and contiguous hydraulically connected units to describe the regional groundwater flow system. The model included approximately 500 cfs (2.5 cfs along the 221-mile boundary simulated by the model) of groundwater moving from the Trinity and Edwards-Trinity aquifers into the Edwards Aquifer. They considered it a "major departure" from previous models. In addition, the model indicated that anisotropy created by the Balcones Fault Zone strongly influences flow in the Edwards Aquifer and was necessary for a satisfactory simulation of the groundwater flow system.

McKinney and Sharp (1995) characterized the San Marcos and Comal springs hydrologic system as part of a feasibility study of methods for augmenting springflow to protect endangered plant and animal species. The report, based largely on existing studies, concluded that both Comal and San Marcos springs receive most of their recharge from regional sources extending as far west as Kinney County. They cited tritium analyses by Pearson and others (1974) and water chemistry from Rothermel and Ogden (1987) as supporting evidence that Comal Springs receives little local recharge. San Marcos Springs is recharged by regional sources that may follow flowpaths different from those that supply Comal Springs, especially along the San Marcos fault. Local sources such as Purgatory Creek, York Creek, and the Blanco River contribute up to 35 percent of San Marcos Springs discharge.

Hansen and Small (1995) concluded that the San Marcos Springs fault and Mustang Branch fault completely, or almost completely, offset the Edwards Aquifer by juxtaposing Edwards Aquifer limestone against nearly impermeable upper confining units in

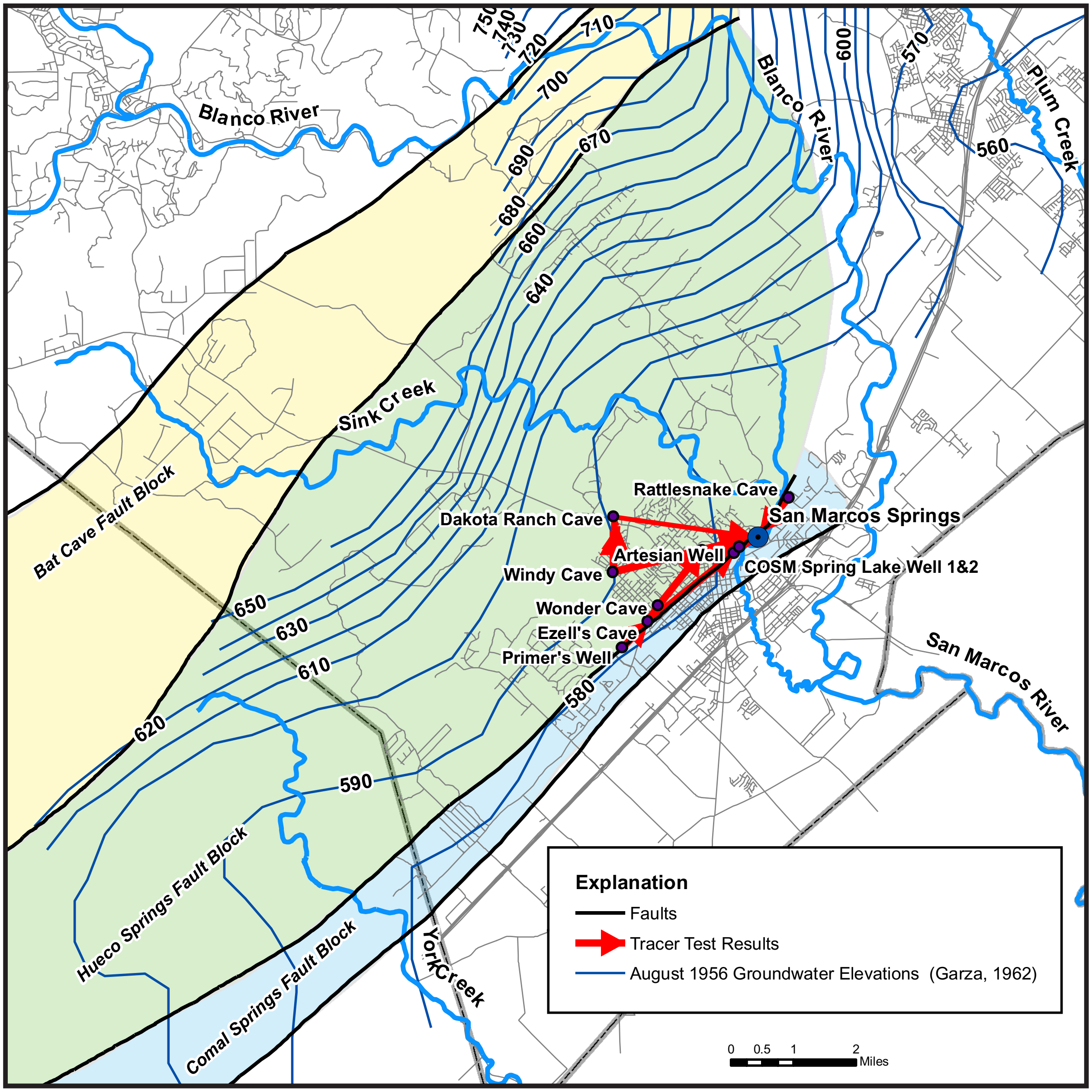


Figure 4. Results of Tracer Tests near San Marcos

Hays County. These faults were thought to be barriers, or partial barriers, to groundwater flow, where all or most of the Edwards Aquifer is displaced. They produced a map of the Edwards Aquifer Recharge Zone in Hays County.

Slattery and Fahlquist (1997) collected water samples at selected sites along the San Marcos Springs riverine system during July and August 1994 to better understand environmental needs of threatened and endangered species. Samples were collected downstream from the springs and at three sites on the San Marcos River. Results showed that concentrations of inorganic analytes did not change significantly downstream from the springs, and no organic compounds were detected.

Beginning in 2002, Authority staff and contractors conducted several tracer tests near San Marcos Springs. Table 1 lists all injections to date, and Figure 4 indicates the results. The purpose of the tests was to measure groundwater velocities and

Table 1. Injections at San Marcos

Date	Injection Location	Dye	Recovery Location
9/16/2002	Primer's Well	Eosin	Ezell's Cave
9/16/2002	Ezell's Cave	Uranine	Artesian Well and COSM Spring Lake wells
1/6/2004	Rattlesnake Cave	Phloxine B	Crater Bottom, Cream of Wheat, Diversion, Salt and Pepper 1 & 2, Weissmuller, Cabomba, and Hotel springs
1/12/2004	Primer's Well	Uranine	Ezell's Cave, Artesian Well, COSM Spring Lake wells, and Jackson wells
1/6/2004	Ezell's Cave	Eosin	Artesian Well, Deep Hole, Catfish Hotel, Cabomba, and Diversion springs and COSM Spring Lake wells
7/2/2004	Ezell's Cave	Uranine	Artesian Well and Deep Hole Spring
7/5/2005	Ezell's Cave	Uranine	Artesian Well and Deep Hole Spring
7/6/2005	Hageman's Well	Eosin	None
8/11/2005	Windy Cave	Eosin	None
8/12/2005	Dakota Ranch Cave	Phloxine B	None
8/20/2005	Windy Cave	Eosin	None
8/19/2005	Dakota Ranch Cave	Phloxine B	None
9/6/2005	Windy Cave	Eosin	None
9/7/2005	Dakota Ranch Cave	Phloxine B	None
10/25/2005	Windy Cave	Eosin	Nearby wells, Deep Hole, Hotel, Weissmuller, Cabomba, Catfish Hotel, Cream of Wheat, and Diversion springs
10/26/2005	Dakota Ranch Cave	Phloxine B	Nearby wells, Crater Bottom, and Cream of Wheat springs

interpret groundwater flowpaths to the springs. Tracer tests revealed a highly transmissive groundwater flowpath parallel to the Hueco Springs fault, which was traced from Primer's Well to Ezell's Cave to Wonder Cave to Spring Lake well field and to San Marcos Springs. Groundwater velocities along the flowpath were calculated at approximately 1,400 feet per day. Groundwater velocities from north of the springs (Rattlesnake Cave) were also calculated at approximately 1,400 feet per day. In contrast, travel times from Windy and Dakota Ranch caves were much longer. Dyes from Windy Cave arrived at the springs in approximately 20 days, for a velocity of approximately 700 feet per day. Dyes from Dakota Ranch Cave arrived at the springs more than 260 days after injection, for a velocity of less than 100 feet per day. Velocities are measured on a straight line from injection points to the springs, although the actual flowpath may be quite complex. Dye from Dakota Ranch Cave was detected in the northern spring orifices, whereas dye from Windy Cave was detected in the southern spring orifices. Tracer tests were performed during the height of the drought and may not reflect groundwater velocities during average conditions. These results indicate that discrete groundwater flowpaths discharge at individual spring orifices at San Marcos Springs.

LBG-Guyton Associates (2004) conducted a comprehensive examination of San Marcos Springs as part of a study to evaluate options for augmenting springflow in the event of a drought. They concluded that the springs receive water from local and regional sources. Local sources consist of the Blanco River and other parts of the Blanco River basin and possibly the Guadalupe River basin. Regional flow travels through the unconfined part of the aquifer, although volume is regulated by Comal Springs orifices in the upthrown block of the aquifer. This study was a follow-up to McKinney and Sharp (1995).

The report (LBG-Guyton Associates, 2004) concluded that lack of correlation between Comal and San Marcos springs could be the basis for a separate pool in the Hays County part of the Edwards Aquifer. Although San Marcos discharge has often been theorized to be a combination of regional and local sources of recharge, LBG-Guyton Associates (2004) cited the discharge hydrograph from 1988–89 as evidence that few local recharge events influence the springs. Most flow must be from regional sources, by way of the Comal Springs fault block and the Artesian fault block, according to the report. However, Comal Springs acts as an overflow spring, intercepting and discharging spikes of recharge as the water flows toward San Marcos Springs. The result is relatively smooth flow, and the difference between low-flow and high-flow conditions in regional baseflow going to San Marcos Springs is only 50 to 100 cfs.

HYDROLOGIC SETTING

South central Texas endured a 27-month-long drought beginning November 2004 and extending to February 2007. During this period, only about 44 inches of rain were recorded at the San Antonio airport, compared with the average amount of approximately 70 inches of rainfall for a 27-month period (National Weather Service, 2007). The drought ended in the eastern region of the Authority's jurisdictional area, with above-normal rainfall beginning in January 2007 that continued through July 2007. From November 2004 through January 2007, the San Antonio segment of the Edwards Aquifer was subjected to a period of extreme dryness, followed by a period of above-normal precipitation.

The drought provided information on how San Marcos Springs relates to the regional hydrologic system. Response of the Edwards Aquifer to extreme meteorological conditions provides more insight into its hydrology than do quiescent conditions. The Edwards Aquifer is a triple porosity and permeability aquifer system, with groundwater occurring in the matrix of the rock, within fractures and bedding plane partings and within larger (>2.0 centimeters) conduits and caves. Groundwater moves quickly within the conduit system and slowly within the matrix system, with the fracture system playing an intermediate role. Generally the Edwards Aquifer is a three-dimensional network of discrete, anisotropic flowpaths in which the predominant volume of water moving through the aquifer is within the conduits and larger fractures and the predominant volume of water in storage is within the matrix. Both types of flow leave a signature that can be used to interpret the sources of water for San Marcos Springs.

The purpose of this section is to describe the regional San Marcos Springs hydrologic system. Within the San Marcos region, San Marcos Springs is one part of the groundwater/surface system that also includes Comal Springs, Hueco Springs, the Guadalupe and Blanco rivers and other ephemeral streams, Cibolo Creek, local and regional precipitation, and withdrawals from wells. The structural geologic setting (that is, the Balcones Fault Zone) of the Edwards Aquifer also influences sources and flowpaths of water for San Marcos Springs. Data for this analysis were collected by the Authority, the USGS, the Texas Water Development Board (TWDB), the San Antonio Water System (SAWS), the Barton Springs Edwards Aquifer Conservation District (BSEACD), TXU, and others. The USGS considers data collected since October 1, 2006, provisional until they are validated and published in 2008.

Geologic Structure

The San Marcos Springs hydrologic system occupies principally three fault blocks in the Edwards Aquifer recharge zone. As shown in Figure 3 and the cross section in Figure 5, fault blocks are separated by Bat Cave, Hueco Springs, and Comal Springs faults. Only lower members (Kirschberg, Dolomitic, and Basal Nodular) of the Edwards Aquifer are present in the Bat Cave fault block. The Authority's synoptic water level program indicates that the Edwards Group in the Bat Cave fault block is largely unsaturated and does not provide significant storage of water for the San Marcos system, except as a source of cross-formational flow from the Trinity Aquifer and recharge to the Trinity and Edwards aquifers.

The Hueco Springs fault block is bounded by the Bat Cave fault to the northwest and the Hueco Springs fault to the southeast. The Hueco Springs fault is a normal fault with approximately 300 feet of displacement. Middle members of the Edwards Aquifer (Grainstone, Regional Dense, and Leached and Collapsed) crop out in this block. The Hueco Springs fault extends northeast to San Marcos Springs, where it is also called the "San Marcos Springs fault."

The Comal Springs fault block is bounded by the Hueco Springs fault (to the northwest) and the

Comal Springs fault (to the southeast). The Comal Springs fault is a normal fault with 200 to 300 feet of displacement near the Bexar-Comal County line to more than 800 feet of displacement at Comal Springs. Upper members of the Edwards Aquifer (Georgetown Formation and Cyclic and Marine of the Person Formation) and overlying units are exposed at the surface in this fault block. The Comal Springs fault block is approximately 4 miles wide near Comal Springs and narrows to approximately one-half mile in width at San Marcos Springs. The Edwards Group in the Comal Springs fault block is covered by upper confining units near San Marcos Springs.

The Comal Springs fault is the northwest boundary of the Artesian fault block. This fault block, which is recharged by groundwater flowing from Bexar County, is located southeast of and adjacent to the Comal Springs fault block. The Artesian fault block is fully saturated and contains both freshwater and saline water. In Comal County, the Artesian fault block provides significant quantities of flow to Comal Springs but contains saline water and does not contribute flow to San Marcos Springs.

Figure 5 is a cross section of the Edwards Aquifer that shows water levels measured during dry conditions in October 2006 and during wetter conditions (higher groundwater elevations) in July 2007. The difference in water levels between wet conditions and dry conditions is approximately 40 feet in the Bat Cave fault block, 17 feet in the Hueco Springs fault block, and 7 feet in the Comal Springs fault block. The cross section indicates that the Bat Cave fault block is unsaturated during dry conditions and that the top of the ground-water surface occurs in the upper Glen Rose Formation of the Trinity Aquifer. Trinity and Edwards aquifers are hydraulically connected in this area.

Comal Springs

Comal Springs is the largest discharge point in the Edwards Aquifer and also the largest spring in Texas (Figure 6). Figure 7 graphically summarizes the water level response of a series of wells and the flow response of Comal, San Marcos, and Hueco springs to wet and dry conditions between June 2006 and October 2007. Figure 7 includes the lowest water levels of the dry period and recovery after precipitation increased in January 2007. After peaking in late 2004, discharge for all three springs declined steadily in response to low rainfall and finally reached their lowest levels in August 2006. During that period, Comal Springs discharge fell from 505 cfs to less than 250 cfs, whereas San Marcos Springs discharge decreased from 360 cfs to less than 100 cfs. Hueco Springs discharge fell from 126 cfs to less than 10 cfs.

As described by Puente (1976), Guyton (1979), and LBG-Guyton Associates (2004), Comal Springs receives most of its flow from the Artesian fault block of the Edwards Aquifer. Water enters the aquifer through the recharge zone in the western counties, migrates to the Artesian fault block, and follows the Balcones Fault Zone northeast to Comal and San Marcos springs. LBG-Guyton Associates (2004) concluded that some of the groundwater flowpaths bifurcate between the Comal Springs fault block and the Artesian fault block approximately four miles southwest of Comal Springs. At that point, there is hydraulic communication between these adjacent fault blocks.

The Authority's tracer tests in March 2002 further document the complexity of the flowpaths between Artesian and Comal Springs fault blocks. Dye injected into the Landa Park well (6823302) in the Comal Springs fault block was detected in some, but not all, of the springlets in Spring Run 3, which is located parallel to the Comal Springs fault escarpment in Landa Park (Figure 6). The dye followed one of many flowpaths through the Comal Springs fault block. Dye injected into the LCRA well (6823304), which is completed in the Artesian fault block more than 600 feet below the surface, appeared in Spring #7, which is located just below the water level of Landa Lake several hundred feet northeast of Spring Run 3. Dye was also recovered in the New Braunfels Utility well (NBU Well Number 5) located on the east side of Landa Lake and in water diffusing upward through sediments on the bottom of Landa Lake. LBG-Guyton Associates (2004) concluded that 75 percent of the

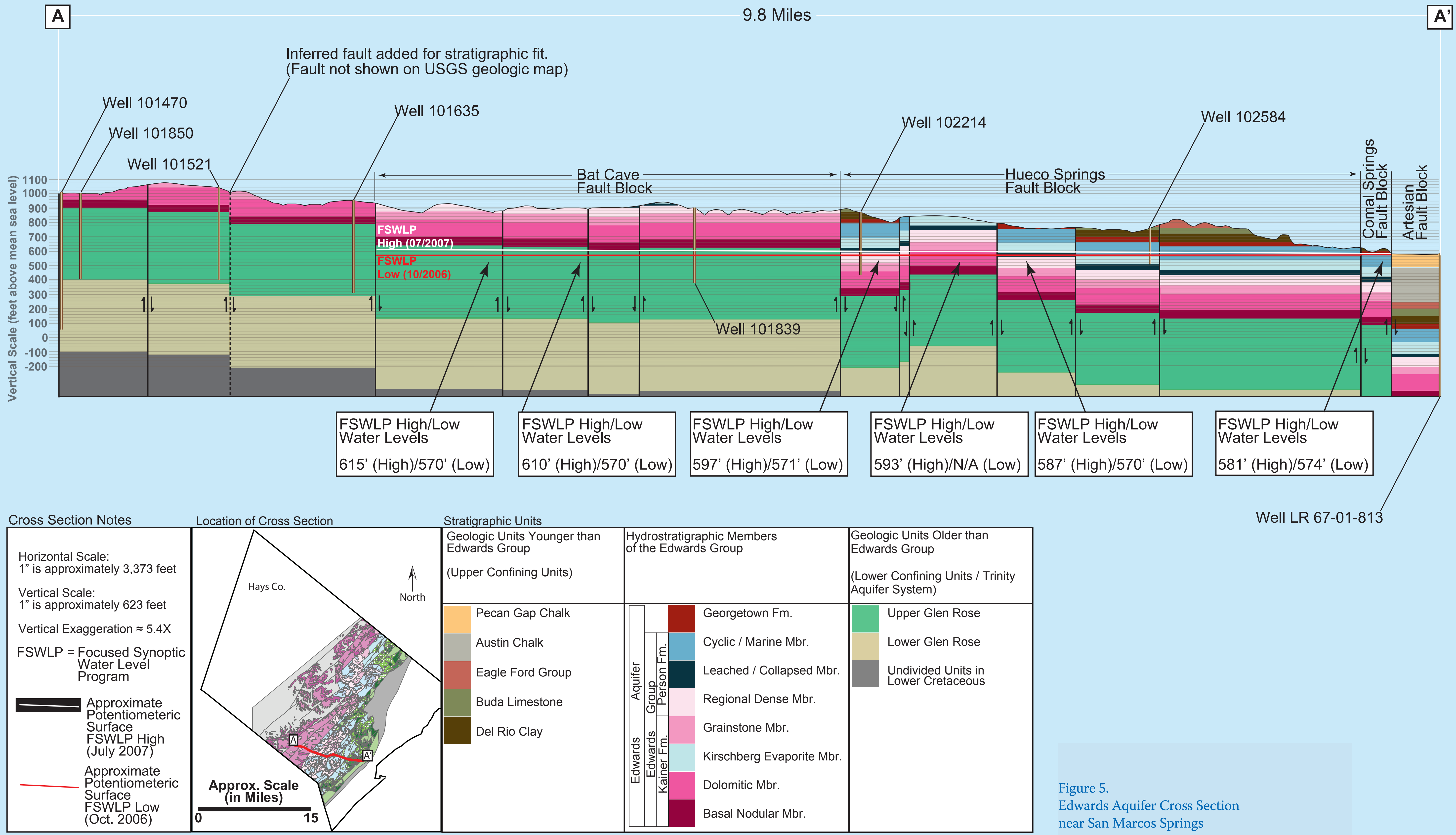


Figure 5.
Edwards Aquifer Cross Section
near San Marcos Springs

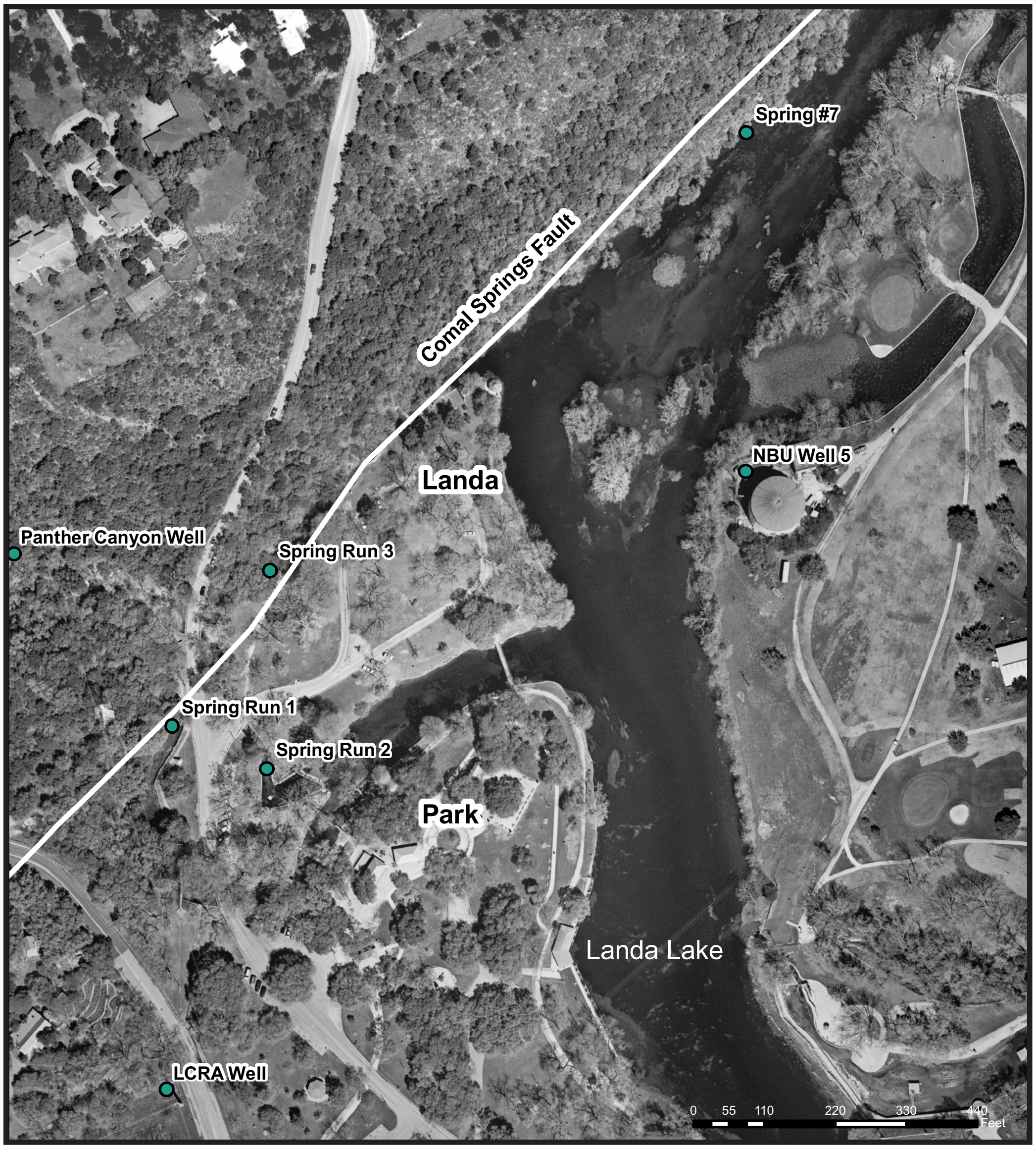


Figure 6. Area of Comal Springs in Landa Park and Tracer Test Locations

discharge from the Comal Springs complex comes from the bottom of Landa Lake, upwelling from the Artesian fault block. Dye was also detected in two springs on Spring Island. Equally important, dye was not detected at Spring Run 1 (the closest spring to the LCRA Well), Spring Run 2, or Spring Run 3. Spring Runs 1, 2, and 3 are much closer to the LCRA Well than Spring #7, the closest location to the well at which dye was detected.

Historical groundwater levels near Comal Springs indicate that the Comal Springs fault block does not contribute to springflow during dry periods. Rather, springflow is maintained by water from the Artesian fault block. Well 6823302 in Landa Park is influenced by water that upwells from the Artesian fault block into the Comal Springs fault block near Comal Springs and along the fault southwest of the springs. At low flows, the hydraulic head indicated by well 6823302 is probably due to water upwelling near Comal Springs because it is higher than the rest of the Comal Springs fault block. As water levels in the Comal Springs fault block rise because of increasing leakage from the Artesian fault block and precipita-

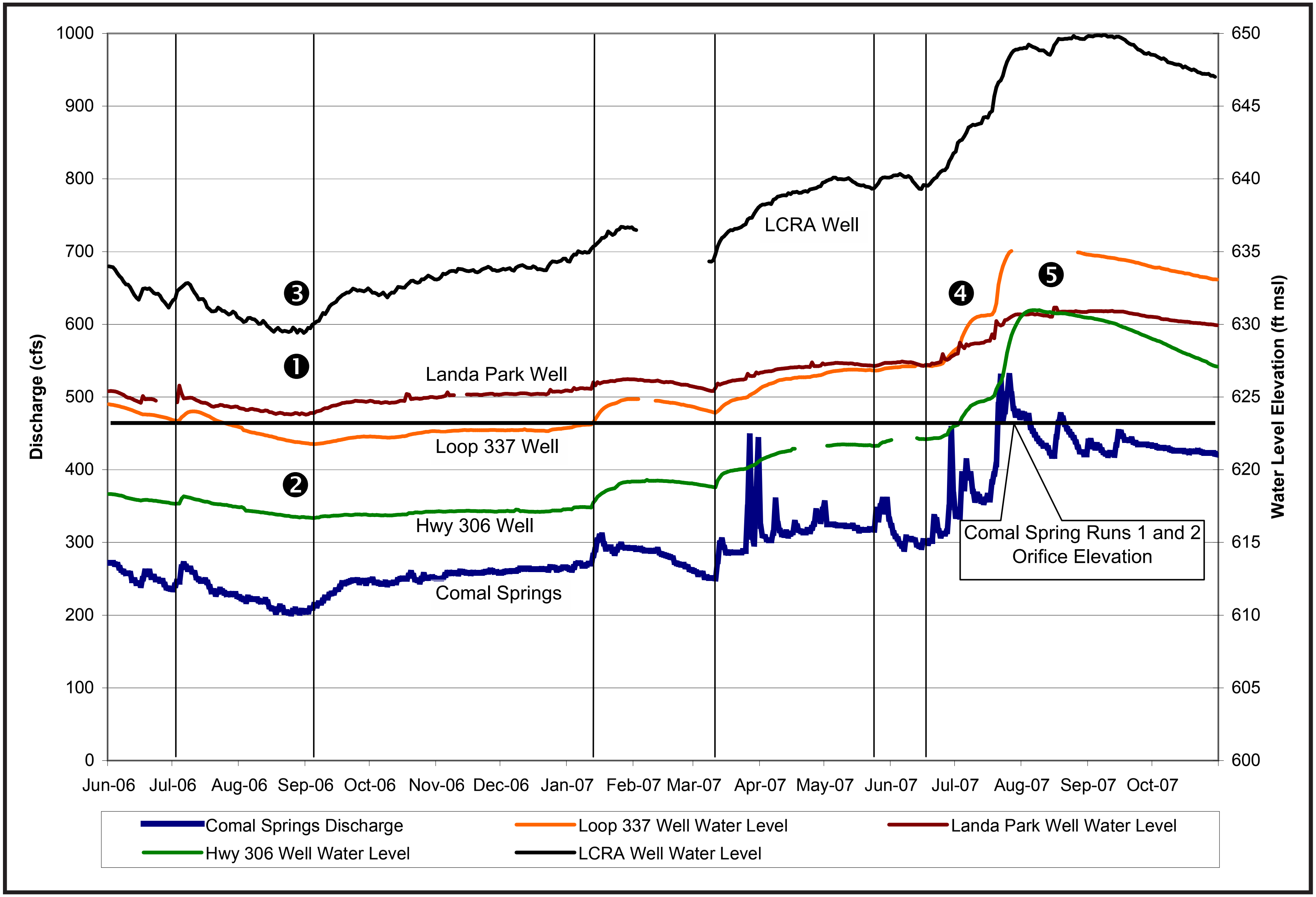


Figure 7. Hydrographs for Comal Springs, Highway 306 Well, Loop 337 Well, Landa Park Well, and LCRA Well

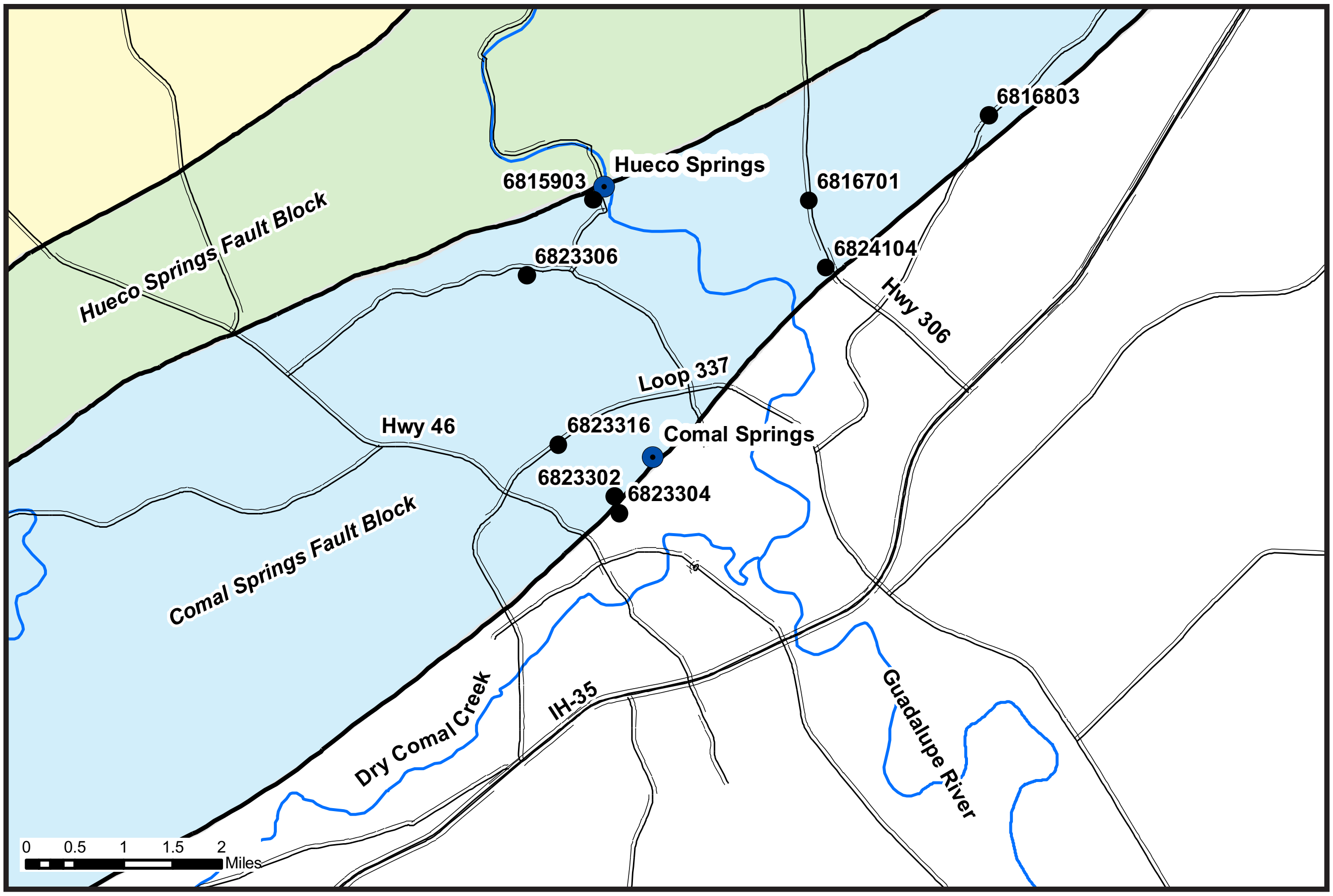


Figure 8. Locations of Wells in Figure 7

tion, well 6823302 water level also rises. Water levels at 6823302 correlate closely with Comal Springs discharge because of this hydraulic relationship. Some water passing through the Comal Springs fault block probably discharges from Spring Runs 1, 2, and 3, and the rest bypasses Comal Springs to discharge at San Marcos Springs. However, the Authority has not identified sources of water for Spring Runs 1 or 2. During periods of normal to above normal aquifer conditions, water enters the Comal Springs fault block from direct precipitation and from interformational flow from adjacent fault blocks and flows to San Marcos Springs. However, during drought years, such as 1956–57, 1964, 1984, 1996, and 2000, groundwater levels in the Comal Springs fault block declined to a level below the orifice elevation at Comal Springs Runs 1 and 2 (elevation 623 feet above mean sea level [msl]). Under these conditions, Comal Springs is fed only by water discharging from the Artesian fault block. For comparison, the Artesian fault block stops flowing when groundwater elevation is 619 ft msl. Water from the Artesian fault block that does not discharge from spring orifices mixes with groundwater in the Comal Springs fault block and flows toward San Marcos Springs.

Figure 7 shows hydrographs for several wells near Comal Springs during the 2006 drought. They include well 6823302 in Landa Park adjacent to Comal Springs and well 6823316 on Loop 337 one mile northwest of Comal Springs, and 6816701 on Hwy 306 approximately three miles northeast of Comal Springs. Locations are shown in Figure 8. All the wells are completed in the Comal Springs fault block. Well 6823304 (LCRA well) adjacent to Comal Springs is completed in the Artesian fault block. In August 2006, upwelling water maintained the water level in 6823302 (Land Park well) above Comal Springs orifices (see ❶ on Figure 7), but the groundwater level in 6823316 on Loop 337 fell below the elevation of the spring orifices (see ❷ on Figure 7). This decline suggests that a trough formed in the Comal Springs fault block at the peak of the drought. The hydraulic gradient between 6823302 and 6823316 sloped away from the springs, indicating that water in the Comal Springs fault block would flow past the springs. At that point, most of the water discharging from Comal Springs originated from the Artesian fault block, represented by the LCRA well (6823304), in which the water level was almost 7 feet above the Comal Springs orifice elevation (see ❸ on Figure 7).

During recovery of water levels in July 2007, the Loop 337 Well water level rose above the Landa Park Well water level (see ❹ on Figure 7), reversing the gradient toward the springs, which would enable water from the Comal Springs fault block to discharge from the springs along with water from the Artesian fault block. Comal Springs discharge increased approximately 100 cfs as the Loop 337 water level increased, probably reflecting additional water from the Comal Springs fault block. Finally, the Hwy 306 Well water level matched or exceeded the Landa Park water level after heavy rains in August 2007 (see ❺ on Figure 7), suggesting that higher water levels resulted in more water being forced out of the Comal Springs fault block and the Artesian fault block to discharge at Comal Springs.

The fate of groundwater in the Comal Springs fault block at Comal Springs is crucial to interpretation of the hydrology of San Marcos Springs. Figure 9 was constructed so that groundwater conditions in the Comal Springs fault block could be investigated at low flows. Sources of information are water levels from Authority synoptic surveys and the TWDB groundwater database. For each well, all water levels corresponding to discharges of less than 100 cfs were averaged, compared with Comal Springs orifice elevation of 623 ft msl, and plotted on Figure 9. Discharge of 100 cfs is for purposes of this study only and carries no regulatory significance. Major faults and the saline water line are also plotted for reference.

Figure 9 shows that groundwater levels in the Comal Springs fault block are typically below Comal Springs orifice elevation (623 feet) when Comal Springs discharges are less than 100 cfs. At these discharges, potentiometric data indicate that water upwells from the Artesian fault block and enters the Comal Springs fault block, crossing the Comal Springs fault, and therefore bypassing Comal Springs. This movement is consistent with spring discharge data during the drought of record. Comal Springs ceased flowing during 1956, but San Marcos Springs continued to flow at reduced levels. Water levels measured by George and others (1952) in January 1951 also display this flowpath past Comal Springs. The potentiometric surface from George and others (1952) in Figure 10 indicates a prominent groundwater flowpath in the Comal Springs fault block oriented toward the northeast. Comal Springs discharge was approximately 230 cfs at that time, which was apparently supplied largely by the Artesian fault block.

The Hueco Springs/San Marcos fault separates the Comal Springs fault block and the Hueco Springs fault block, and it appears to maintain higher heads on the northwest side of the fault. Consequently, there are hydraulic gradients toward the northeast parallel to strike of faults, as well as normal to faults. Both flowpaths ultimately converge at San Marcos Springs, but it is not known how much water, if any, flows across the fault.

For contrast with the low-flow conditions around Comal Springs shown in Figure 9, Figure 11 indicates average water levels in the Comal Springs fault block when Comal Springs discharge is between 200 and 300 cfs. Water levels in the Comal Springs fault block are as much as 8 ft higher than when Comal Springs discharge is less than 100 cfs. They are also generally higher than measurements by George and others (1952) in January 1951. Most water levels in the southwestern Comal Springs fault block are higher than its orifice elevation (623 ft msl), suggesting that the fault block is being recharged by water from sources other than the Artesian fault block. Water levels are also generally higher in the Artesian fault block (for example, 6823808). When Comal Springs

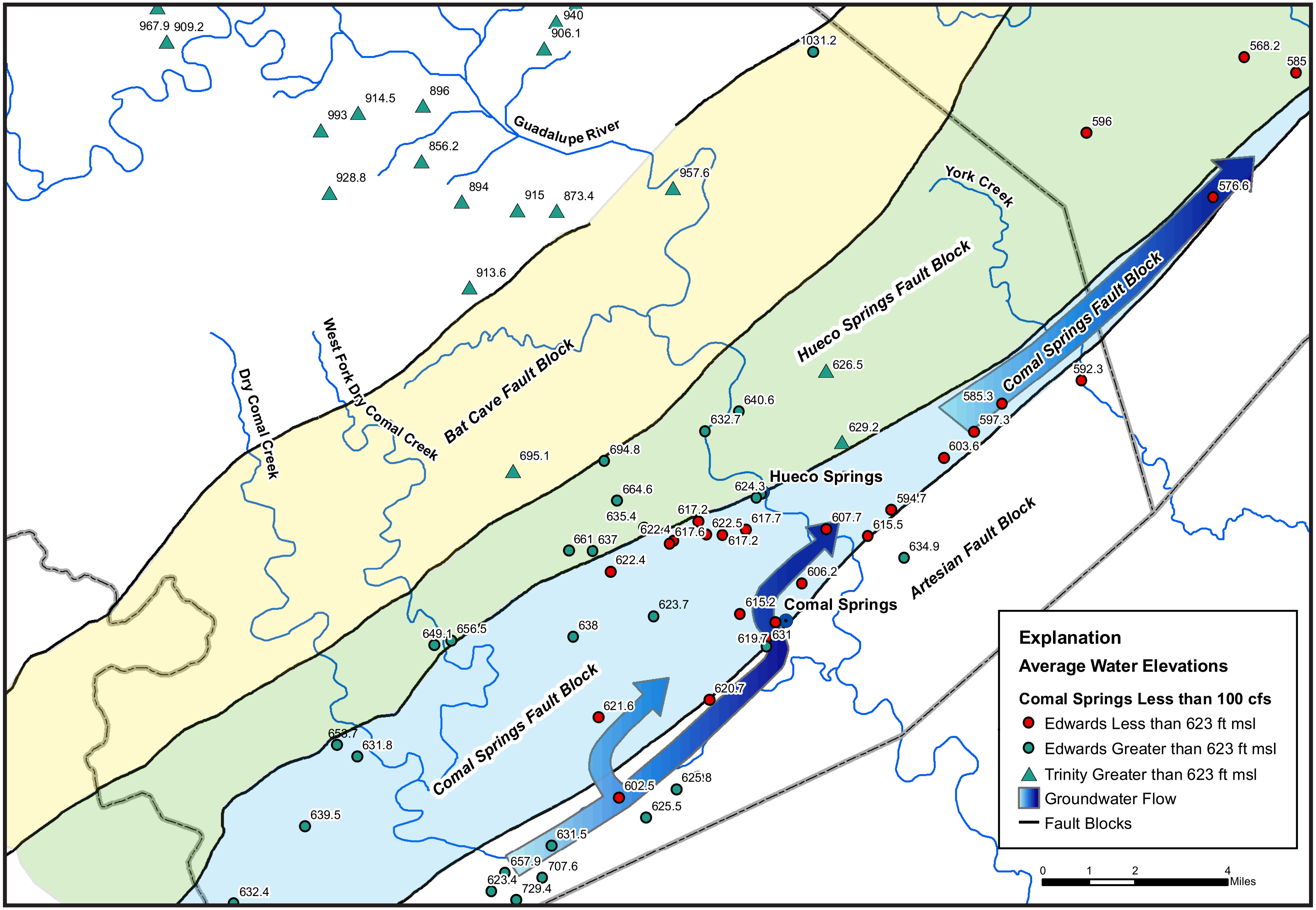


Figure 9. Average Water Levels when Comal Springs Discharge is Less than 100 cfs

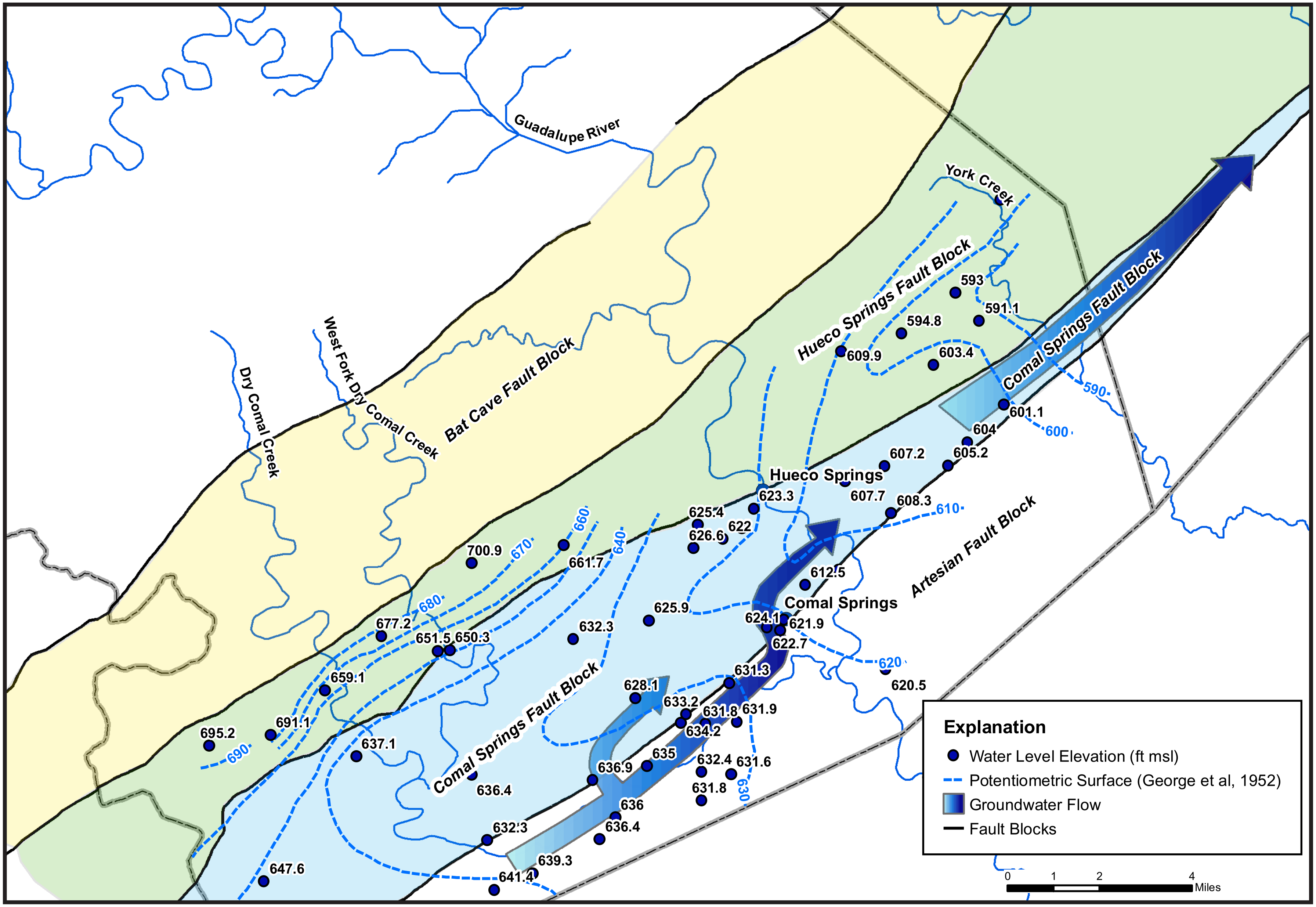


Figure 10. Potentiometric Surface Map from January 1951

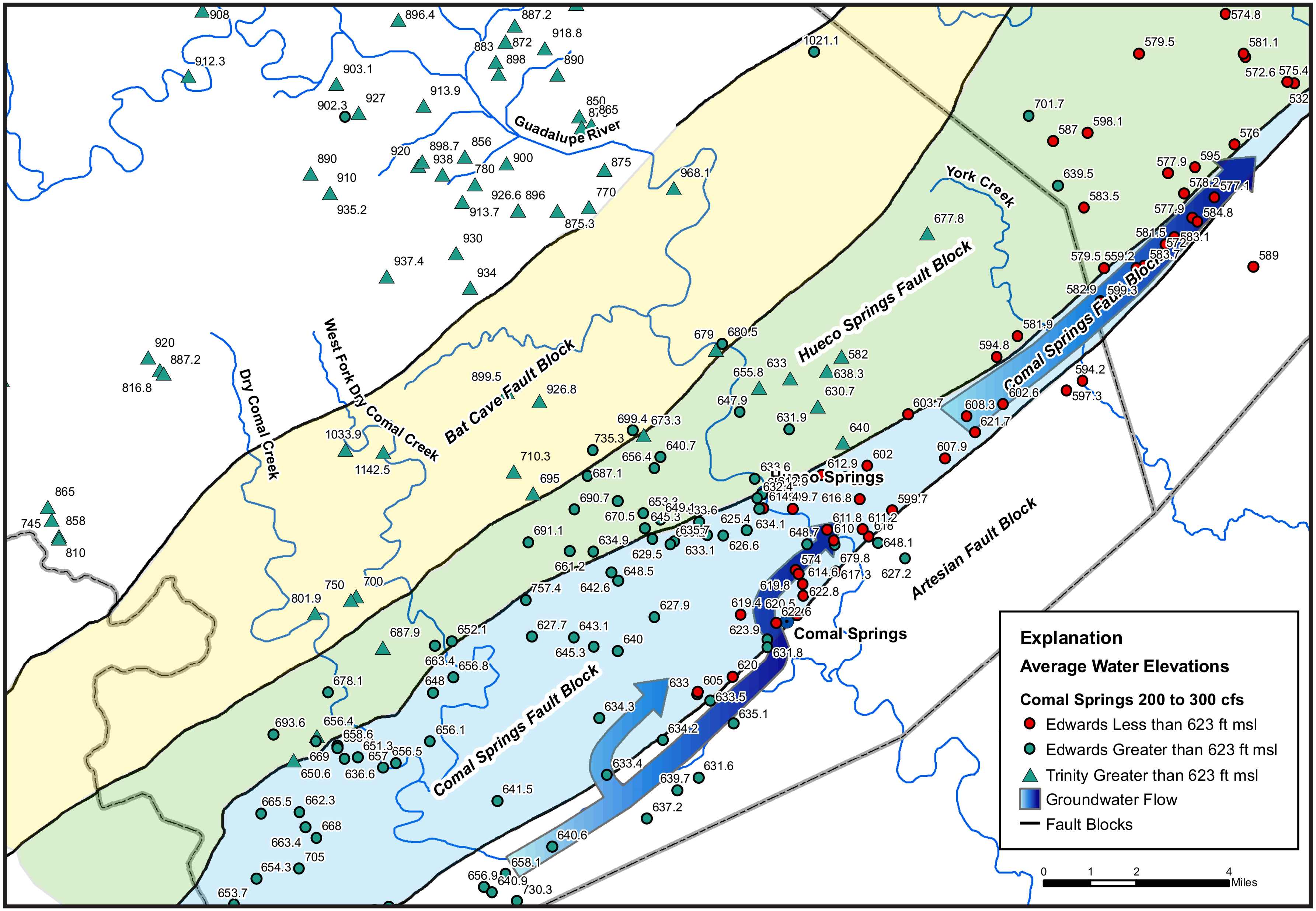


Figure 11. Average Water Levels when Comal Springs Discharge is 200 to 300 cfs

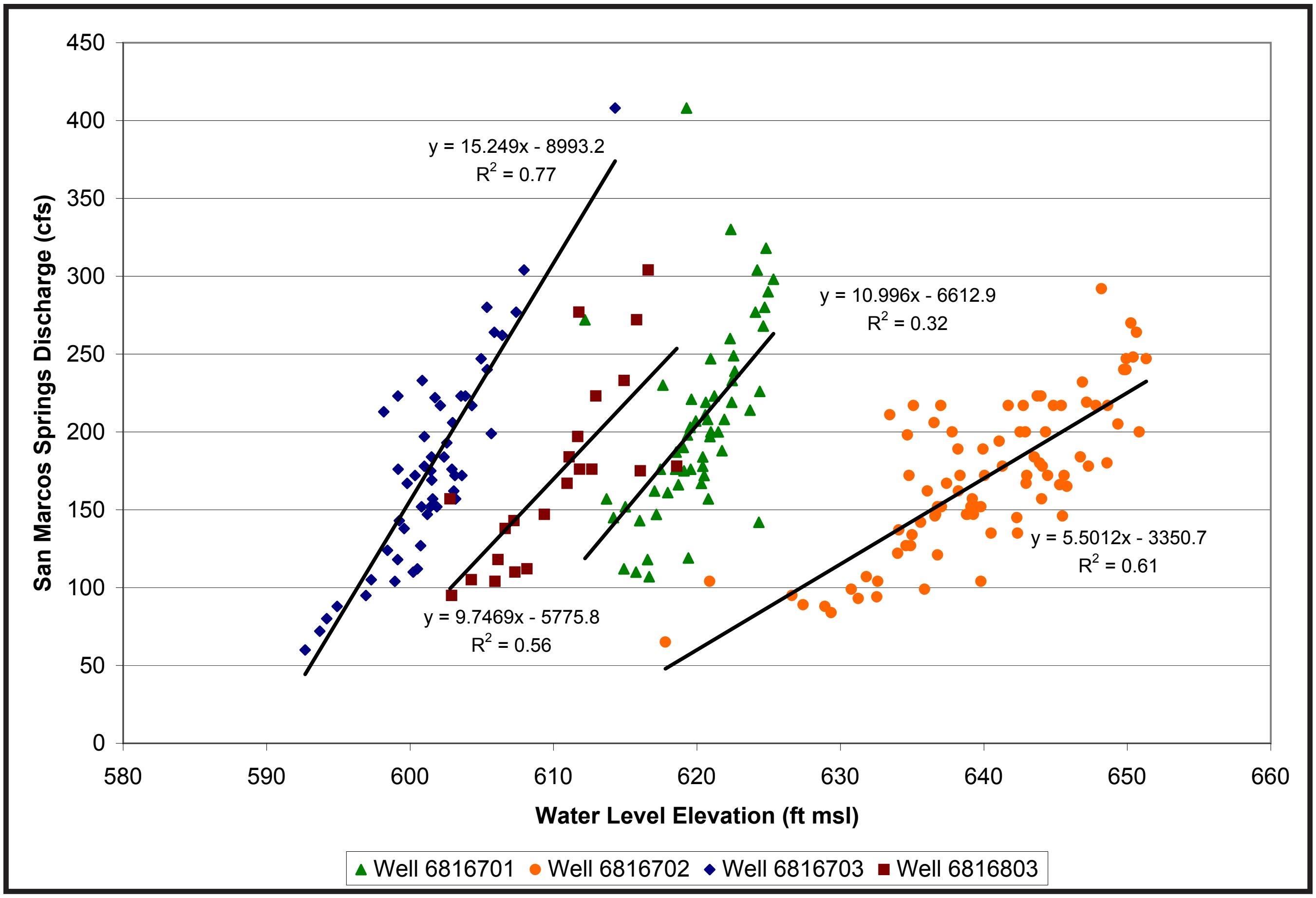


Figure 12. Correlation of Wells near Well 6816701 with San Marcos Springs Discharge

discharges are less than 100 cfs, average water level at 6823808 is 625.5 feet above msl, compared with 637.2 feet above msl at 200 to 300 cfs. The hydraulic gradient toward San Marcos Springs is shown by water levels northeast of Comal Springs.

Approximately one mile northeast of the Guadalupe River in the Comal Springs fault block, the Edwards Group lies beneath the Del Rio Clay and Buda Limestone. Water level measurements in wells completed in the Edwards Aquifer in that area (for example, 6816701) are generally well correlated with San Marcos discharge, as shown in Figure 12. Water levels in the Comal Springs fault block represented by wells 6816701, 6816703, and 6816803 display similar slopes in their correlation with San Marcos Springs discharge. Water levels at well 6816702 form a shallower slope, probably because it is located in the Hueco Springs fault block, and the hydraulic connection to the Comal Springs fault block is not well established. Figure 10 shows a consistent hydraulic gradient toward the northeast to San Marcos Springs, even at low flow.

Even at higher discharges, water levels in the Hueco Springs fault block are higher than in the Comal Springs fault block, especially northeast of Comal Springs. At higher discharges, therefore, the flowpath to San Marcos Springs is also through the Comal Springs fault block. Because of the hydraulic gradient, groundwater in the Hueco Springs fault block may be recharging the Comal Springs fault block.

Figure 13 shows hydrographs from two wells near Hueco Springs, along with discharge hydrographs for Comal and San Marcos springs. Well 6815903 is in the Hueco Springs fault block, and 6823306 is in the Comal Springs fault block. Figure 13 indicates

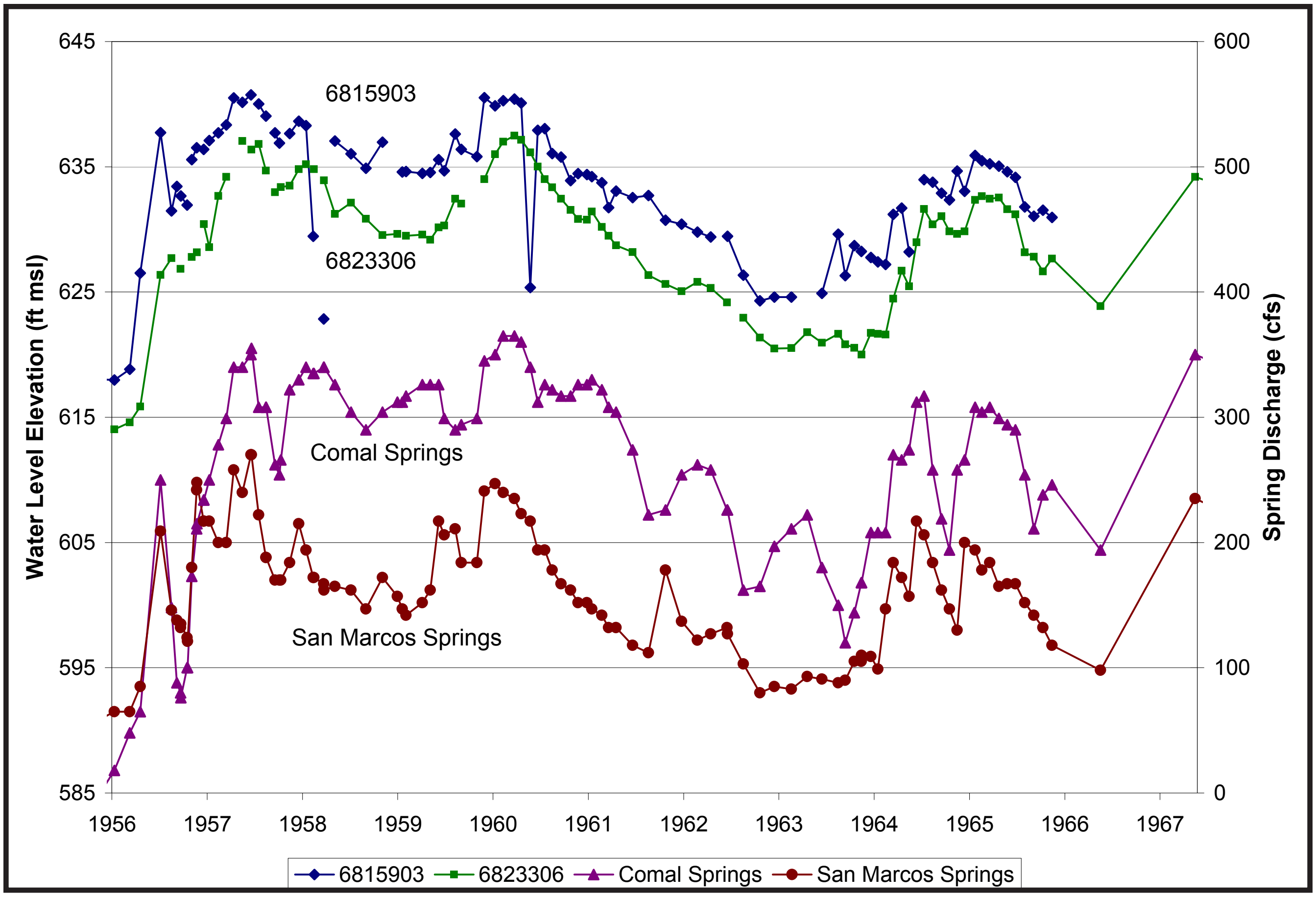


Figure 13. Hydrographs for Comal Springs, San Marcos Springs, Well 6815903, and Well 6823306

that groundwater levels may be consistently higher in the Hueco Springs fault block than in the Comal Springs fault block. The two blocks are separated by a graben that extends from approximately Cibolo Creek to Hueco Springs. This graben may restrict flow between the two blocks and maintain the head difference. However, existing data do not allow a quantitative estimate of groundwater flow, if any, between Hueco Springs and Comal Springs fault blocks.

Hueco Springs

Hueco Springs consists of two spring orifices adjacent to the Guadalupe River on River Road, just a few miles north of Highway 46 (Figure 3). Average discharge for Hueco Springs is approximately 60 cfs, according to the period of record from November 2002 through October 2007. The USGS measures Hueco Springs discharge through a joint funding agreement with the Authority. Figure 14 shows the discharge hydrograph for Hueco Springs, which flows into the Guadalupe River. Elevation of the lowest orifice is 652 feet msl. Hueco Springs is on the Hueco Springs fault block, which is separated from the Comal Springs fault block by the Hueco Springs fault, a normal fault with approximately 400 feet of displacement down toward the south. Hueco Springs is located on the upthrown side of the fault, where the lower units of the Edwards Group are exposed as shown in Figure 15. Upper members of the Edwards Group are exposed in the neighboring fault block to the south.

Hueco Springs discharge correlates well with San Marcos discharge, with significant hysteresis and scatter at high discharges, as shown in Figure 16. Hysteresis occurs when the relationship between water levels and discharge changes according to

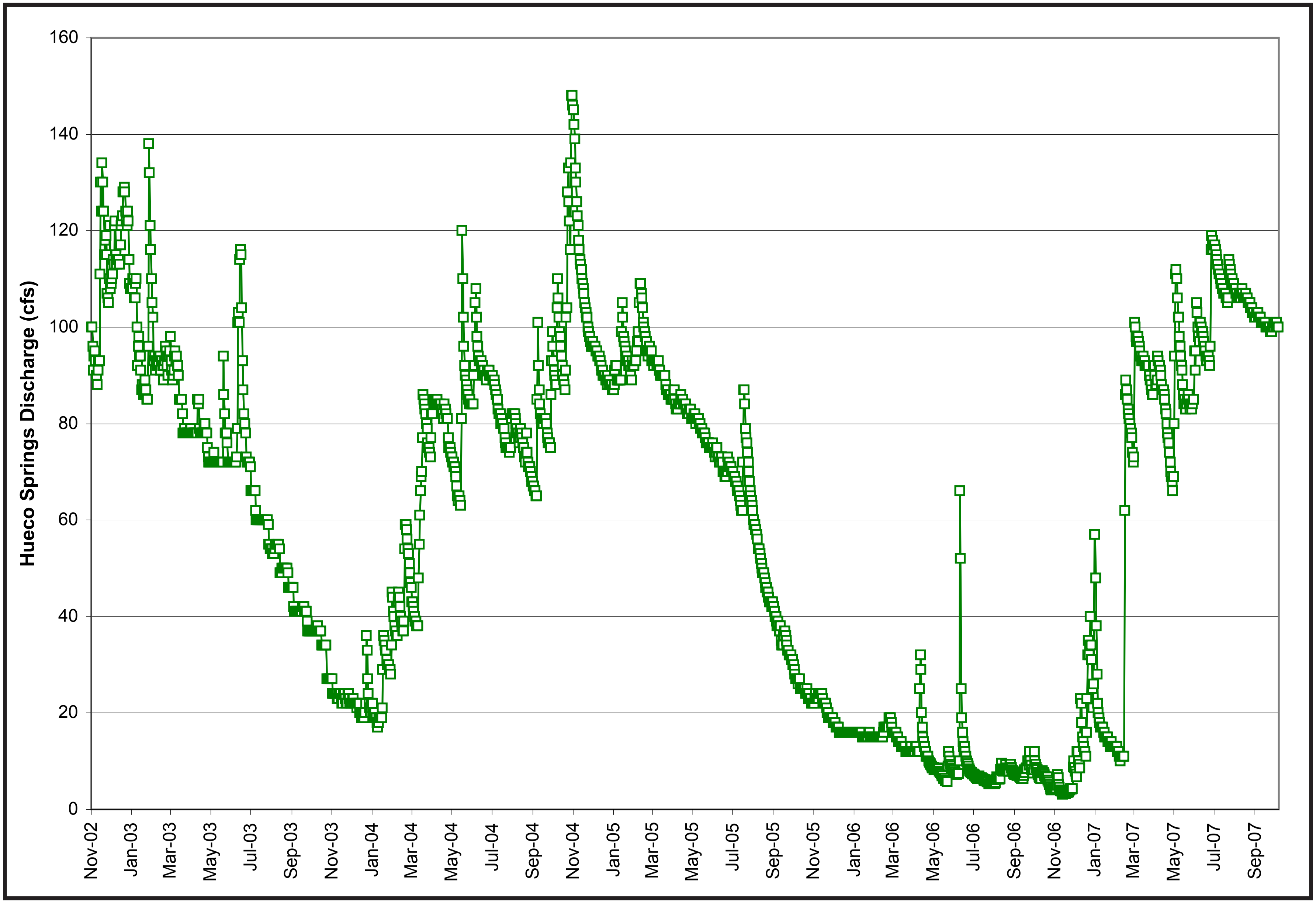


Figure 14. Hydrograph for Hueco Springs Period of Record

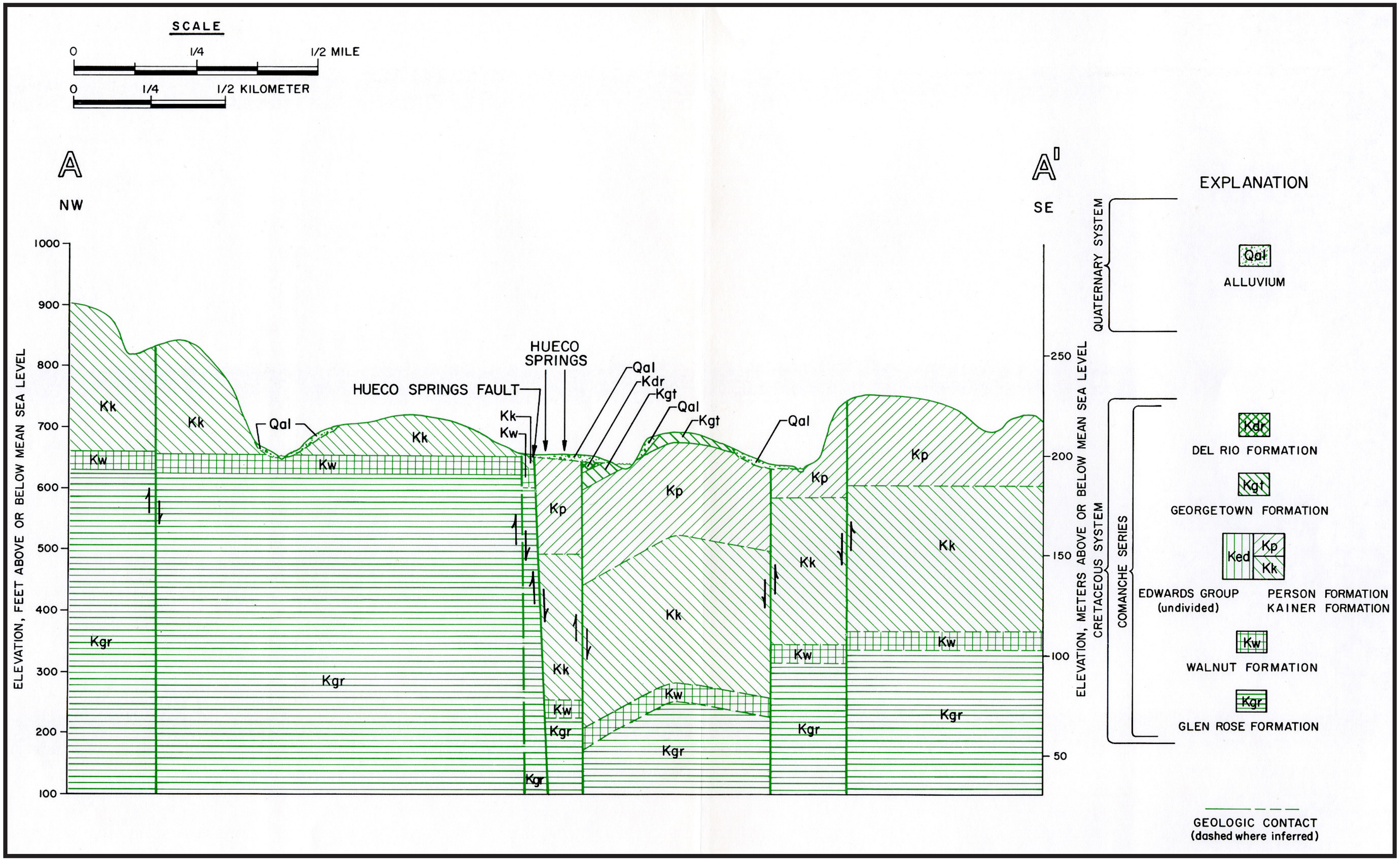


Figure 15. Cross Section of Hueco Springs (Guyton, 1979)

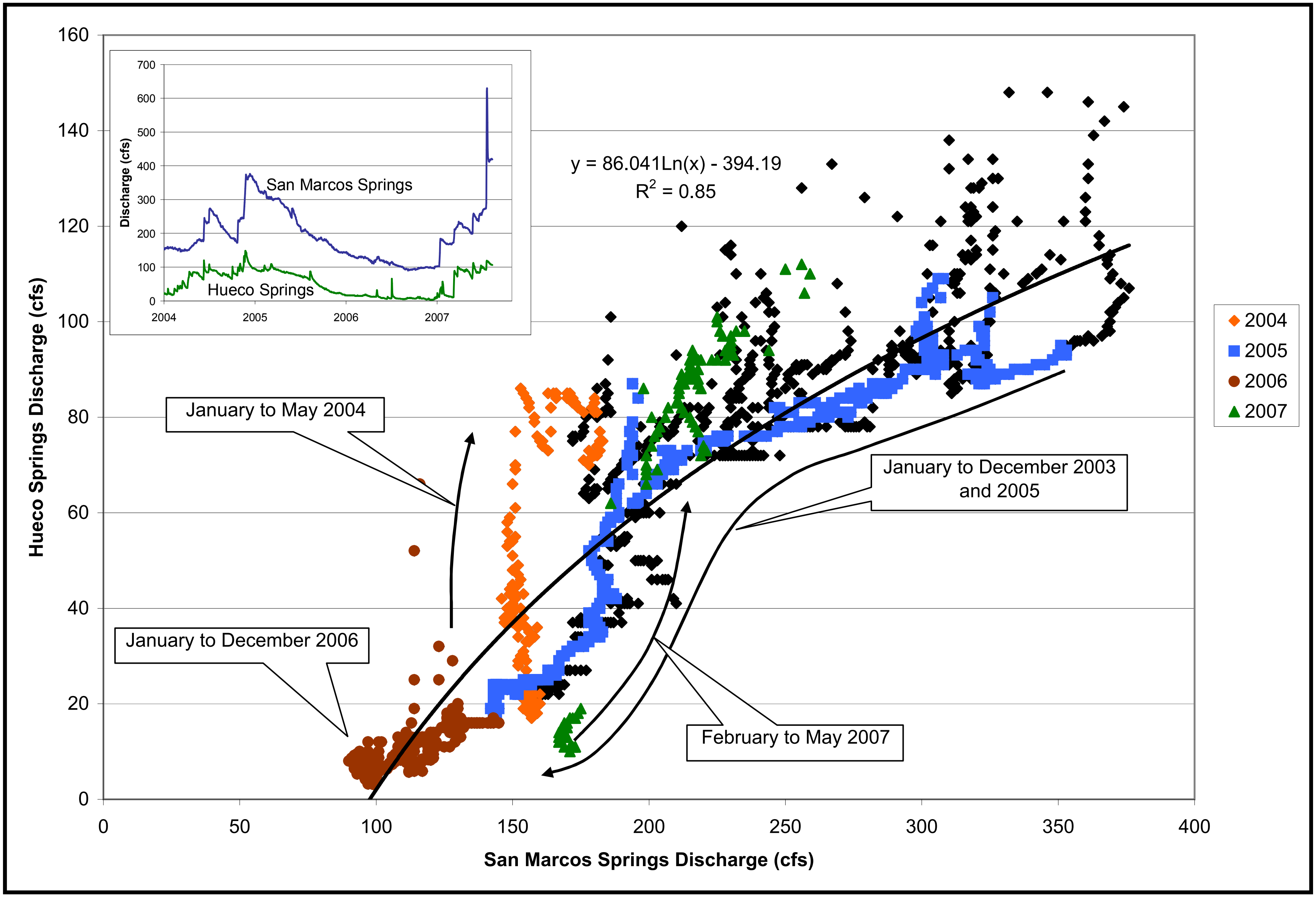


Figure 16. Correlation of Hueco and San Marcos Springflows

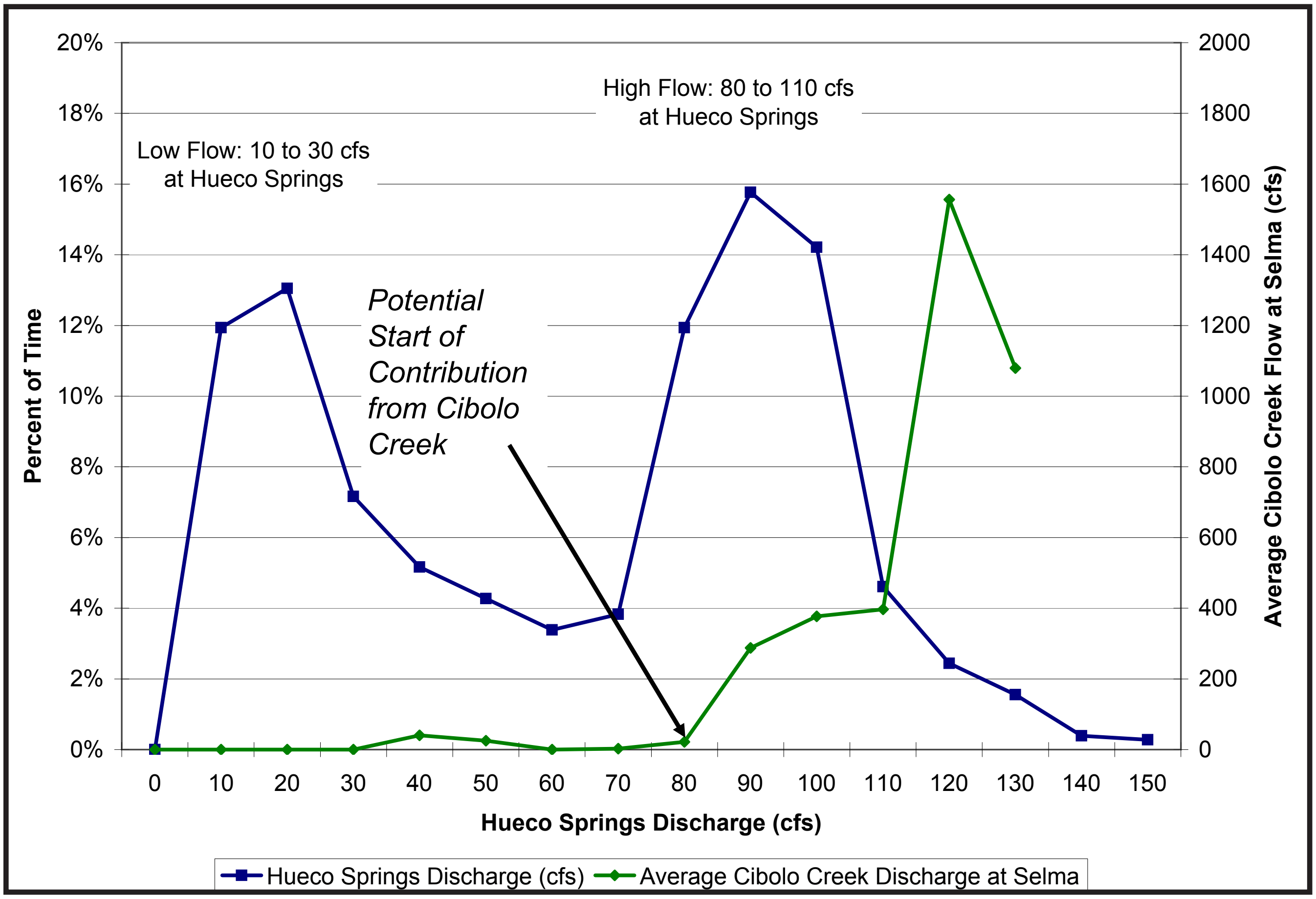


Figure 17. Relationships between Springflow at Hueco Springs and Cibolo Creek Streamflow at Selma

whether water levels are rising or decreasing. In this context, hydraulic behavior of fault blocks ranges between filling (rising) and draining (falling) spring discharges. Hueco Springs discharge rose steeply in early 2004, and San Marcos Springs discharge remained at approximately 150 cfs. In early 2007, San Marcos and Hueco springs discharge increased in tandem. In 2004, Hueco Springs discharge increased at a San Marcos Springs discharge different from that in 2007. One difference between the two years is amount of precipitation; 2007 recorded four to five times as much precipitation as 2004. These data reflect the anisotropic nature of the hydrologic system. Hueco Springs discharge declined steadily throughout 2005, remained as flat as that of San Marcos Springs in 2006, and peaked at 120 cfs in 2007. Hysteresis is indicated by the different curves that Hueco Springs discharge follows as it increases and decreases. Scatter in the data consists of measurements taken during storm events. In addition, Ogden and others (1986) noted similarities of water temperature and tritium concentration between Hueco Springs and San Marcos Springs.

Figure 16 shows a transition in Hueco Springs discharge between approximately 40 and 70 cfs. Although Hueco Springs discharge is increasing, San Marcos Springs discharge is relatively uniform, suggesting that a source of water is reaching Hueco Springs that is not simultaneously affecting San Marcos Springs. Potential sources of recharge for Hueco Springs include Cibolo Creek, Dry Comal Creek, and the Trinity Aquifer.

Figure 17 was constructed to investigate the relationship between Hueco Springs and Cibolo Creek. It shows how Hueco Springs discharge varies along with the Cibolo Creek stage at Selma. Cibolo Creek at Selma is generally dry, which means that the entire Cibolo Creek flow is being captured upstream by the Edwards or Trinity aquifer. Extremely wet weather is required before water passes the Selma gauge. Figure 17 shows the frequency of daily mean Hueco Springs discharges for the period of record from 2002 through 2007. It shows that most of the time Hueco Springs discharges either 10 to 30 cfs or 80 to 110 cfs. Discharges between 40 and 70 cfs or more than 110 cfs occur less frequently. Because there are fewer measurements between 40 and 70 cfs, discharges must pass relatively quickly between high and low flows (Figure 16). Average Cibolo Creek flows at Selma were calculated for each Hueco Springs discharge to see whether Cibolo Creek recharges the springs. When no water passes Selma, Hueco Springs discharges an average of approximately 54 cfs. Little or no flow occurs at Selma until Hueco Springs is discharging approximately 85 cfs. When Hueco Springs is discharging an average of 100 cfs, Cibolo Creek flow is approximately 400 cfs. Average Hueco Springs discharge was approximately 104 cfs when Cibolo Creek was flowing at Selma during the period of record. These data suggest that Hueco Springs is recharged by Cibolo Creek only during high-flow conditions, but it is not a major contributor to Hueco Springs under quiescent conditions. However, the flowpath between Cibolo Creek and Hueco Springs is not known because water could travel through the Edwards or Trinity aquifer to the springs under any conditions. It is also not known where Cibolo Creek loses water, although the Cibolo Creek section describes channel losses in the Hueco Springs fault block. Recharge could also originate from some other ungauged stream.

In any case, Figure 16 indicates that another flowpath that causes Hueco Springs discharge to increase steeply is activated when additional water is available to the system. Water that does not issue from Hueco Springs continues moving through the fault block toward San Marcos Springs.

Hueco Springs discharge correlates complexly with Comal Springs discharge, as shown in Figure 18. The correlation is relatively good when Comal Springs is discharging less than approximately 360 fs and Hueco Springs is discharging less than approximately 20 cfs. As discharges increase or decrease between 20 and 80 cfs at Hueco Springs, flow in Comal Springs does not change. Above approximately 80 cfs at Hueco Springs, the two discharges are again correlated. Up to approximately 20 cfs, Hueco Springs receives water independently of Comal Springs. Water probably originates in the Hueco Springs fault block bounded by Bat Cave and Hueco Springs faults. As stated earlier, the source of Hueco Springs is the Edwards Aquifer, with perhaps some contribution from the Trinity Aquifer. A correlation chart suggests that Hueco Springs received two different sources of recharge in 2004 and 2007 because the rising limbs of the curves follow two different paths. In addition, water infiltration from Dry Comal Creek may discharge from Hueco Springs, rather than crossing the Hueco Springs Fault to sink and discharge at Comal Springs. Indeed, Hueco Springs probably would not exist if large volumes of water flowed across the fault.

A comparison of discharge hydrographs of Hueco Springs and Comal Springs is additional evidence that the Hueco Springs fault restricts groundwater flow. Although average water levels shown in Figure 9 are lower in the Comal Springs fault block than in the Hueco Springs fault block, any water that crosses the Hueco Springs fault probably flows northeast toward San Marcos Springs. In addition, correlation between Hueco Springs and San Marcos Springs would be less if a large amount of water flowed across the fault and discharged at Comal Springs rather than at San Marcos Springs.

Guadalupe River

The Authority and the USGS, through a joint funding agreement, maintain gauges on the Guadalupe River at Sattler (upstream) and above the Comal River (downstream) of the recharge zone. LBG-Guyton Associates (2004) reported some correlation between Guadalupe River flow and San Marcos Springs

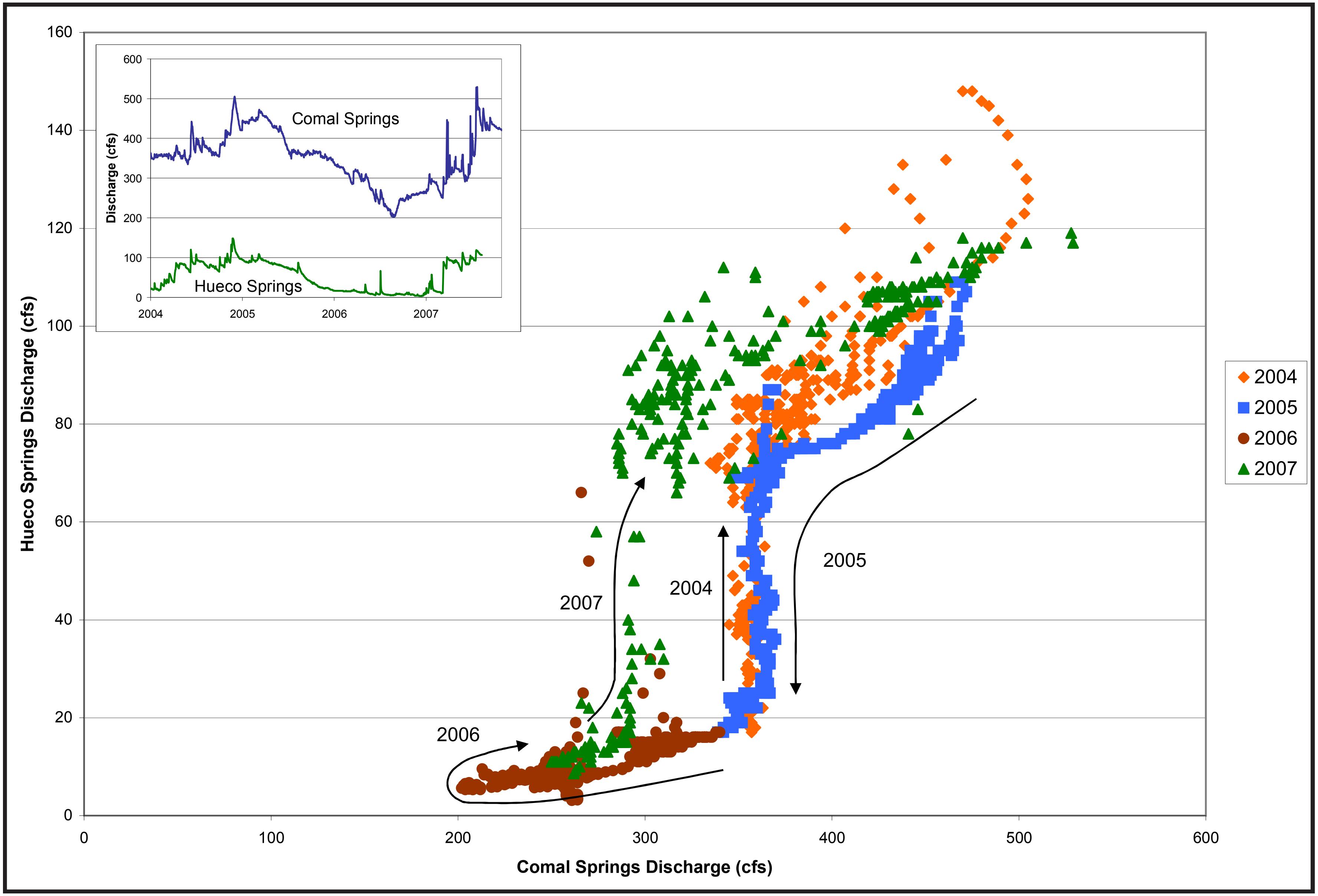


Figure 18. Relationship between Comal and Hueco Springflows

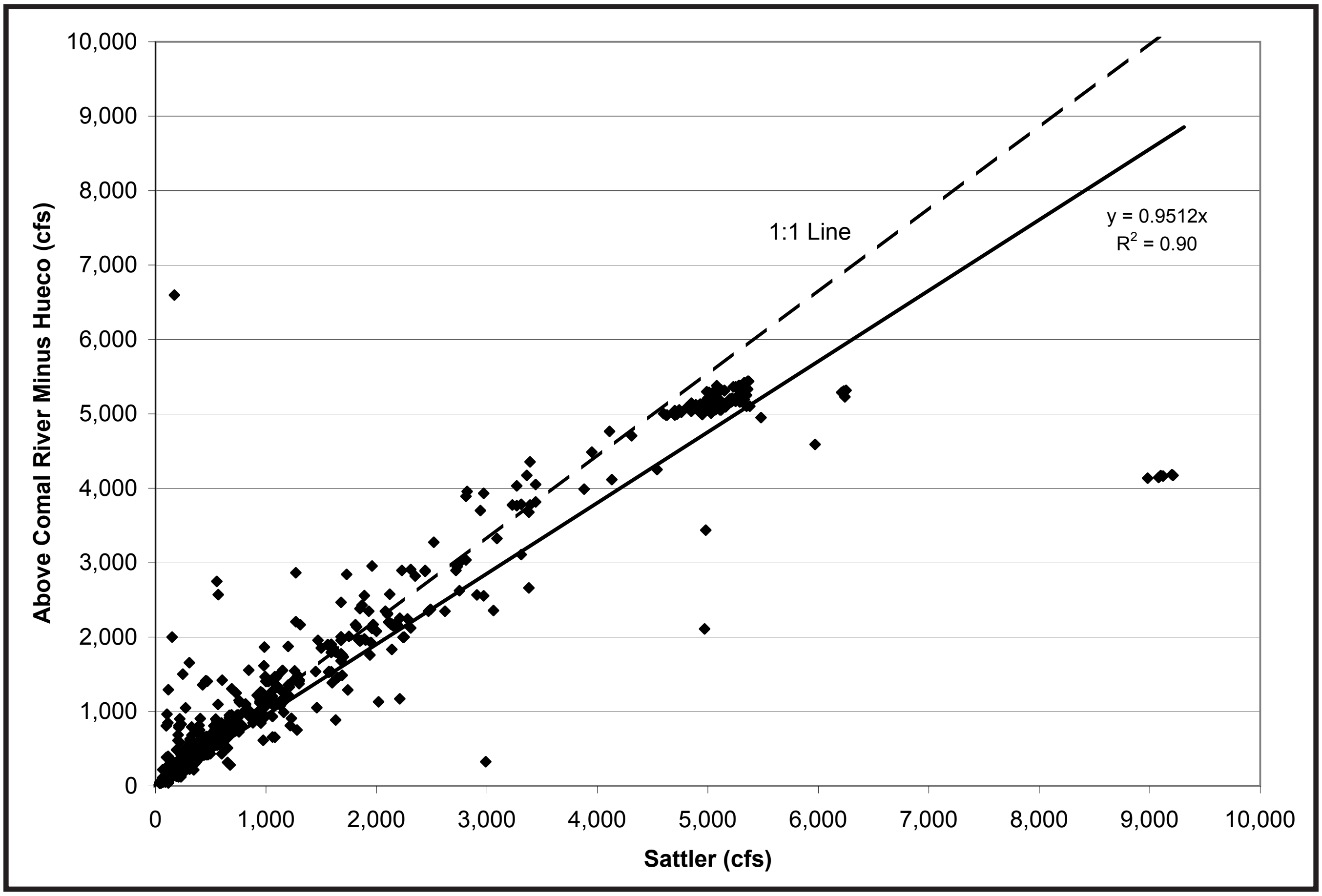


Figure 19. Correlation of Guadalupe Gauges

discharge from 1956 until 1964, when Canyon Dam began controlling the river flow. However, their report concludes that the correlation may be coincidental responses to similar hydrologic conditions rather than causal. George and others (1952) and Woodruff and Abbott (1986) also reported that the Guadalupe River contributes little or no water to the San Marcos hydrologic system.

The Guadalupe River crosses Comal Springs, San Marcos Springs, and Bat Cave fault blocks, as shown in Figure 3. The major fault blocks are separated by Hueco Springs and Bat Cave faults. The Guadalupe River has incised the Edwards Group such that it flows on the Trinity Group limestones in the Bat Cave fault block and on lower members of the Edwards Group (Dolomitic and Basal Nodular members) in the Hueco Springs fault block. It flows over upper members (Cyclic and Marine and Leached and Collapsed) and Georgetown Formation outcrops in the Comal Springs fault block.

Although the Guadalupe River carries large volumes of water, it is a minor contributor to the Edwards Aquifer. A comparison of discharges at the two gauges reveals that there is a slight loss of water after subtracting the contribution of Hueco Springs. Slade and others (2002) showed channel losses of less than five cfs in that reach of the river. Figure 19 shows the correlation between the two gauges after subtracting Hueco Springs discharge along a 1:1 line. Gauge measurements fall on a line just below the 1:1 line, indicating that there is slightly less flow at the gauge above the Comal River than at Sattler. Difference in slopes of the 1:1 line and the gauges suggests that approximately 10 percent of the flow is lost between gauges, although there is a large amount of variation.

Groundwater within the Edwards Aquifer flows beneath the Guadalupe River from recharge areas in the west toward San Marcos Springs. The greatest saturated thickness to transmit water is available in the Comal Springs fault block, which is the principal flowpath for San Marcos Springs, especially at low (up to 100 cfs) discharge rates. Limited saturated thickness in the Hueco Springs fault block may restrict flow toward San Marcos Springs.

Water levels in wells may show the effects of water infiltrating from the Guadalupe River. Figure 20 shows the Guadalupe River and hydrographs of five wells adjacent to the river: 6815606, 6815905, 6816702, 6815903, and 6815907. Water levels are from the TWDB groundwater database, and river discharges are from the USGS gauge above the Comal River. The relationship between the Guadalupe River and adjacent groundwater is best evaluated by the 6815903 hydrograph, which has the largest number of measurements, although the other wells respond similarly. Groundwater levels rise proportionately with the river discharge at discharges under approximately 500 cfs. Higher flows fall on an almost vertical line, suggesting that the river has reached its maximum infiltration rate, and groundwater levels stop rising. The maximum recharge amount from the Guadalupe River is estimated at 10 percent of flow below 500 cfs, for a maximum recharge rate of 50 cfs. However, this estimate may be high because these wells may also intercept recharge from other sources, such as the Dry Comal Creek or the Trinity Aquifer.

Blanco River

The Blanco River crosses Edwards and Trinity aquifers in Hays County north of the City of San Marcos. The Authority and the USGS, through a cooperative agreement, maintain two gauges to calculate recharge at Wimberley (08171000; upstream) and at Kyle (08171300; downstream). The Blanco River also carries large volumes of water through the San Marcos springshed, as shown in Figure 21, which compares discharge of the Blanco River at Wimberley with that of San Marcos Springs. Both are flashy, responding quickly to storm events. There is some degree of correlation at peak discharges, which suggests that the Blanco River may contribute to San Marcos Springs.

Statistically, correlation of discharges (approximately 60 percent) is relatively low, as shown in Figure 22. A large amount of scatter is due to the wide range of Blanco River discharges for any given San Marcos Springs discharge. However, they both respond to precipitation events in the area, so their discharges are generally proportional.

Previous estimates of the amount of recharge that the Blanco River provides to San Marcos Springs are mixed. In their GWSIM IV model of the Edwards Balcones Fault Zone Aquifer, Klemt and others (1979) attributed 47 percent of the Blanco River flow directly to San Marcos Springs discharge. Consequently, the model produced a relatively low degree of correlation between actual and measured spring discharge. In contrast, Texas Board of Water Engineers (1960), Watson (1985), and Slade and others (2002) measured channel losses in the Blanco River over the recharge zone at less than 20 cfs (Figure 23). Watson (1985) reported that reaches over the Trinity Aquifer gained water when groundwater levels were high. This rate is generally a few percent of the Blanco River flow. The principal infiltration area is near Halifax Creek, approximately five miles upstream of Kyle. Watson (1985) concluded that river water also flows into Tarbuttons Showerbath Cave at high stages.

There is other evidence that channel losses from the Blanco River are relatively small. A comparison of flow at USGS gauges at Wimberley and Kyle (see Figure 23 for gauge locations) suggests that the channel has a limited capacity for infiltration. When there is no flow at the Kyle gauge, all flow passing Wimberley is infiltrating into the Edwards Aquifer and may potentially recharge San Marcos Springs. In Figure 24, vertical gray lines indicate periods when no flow was recorded at the Kyle gauge. During these

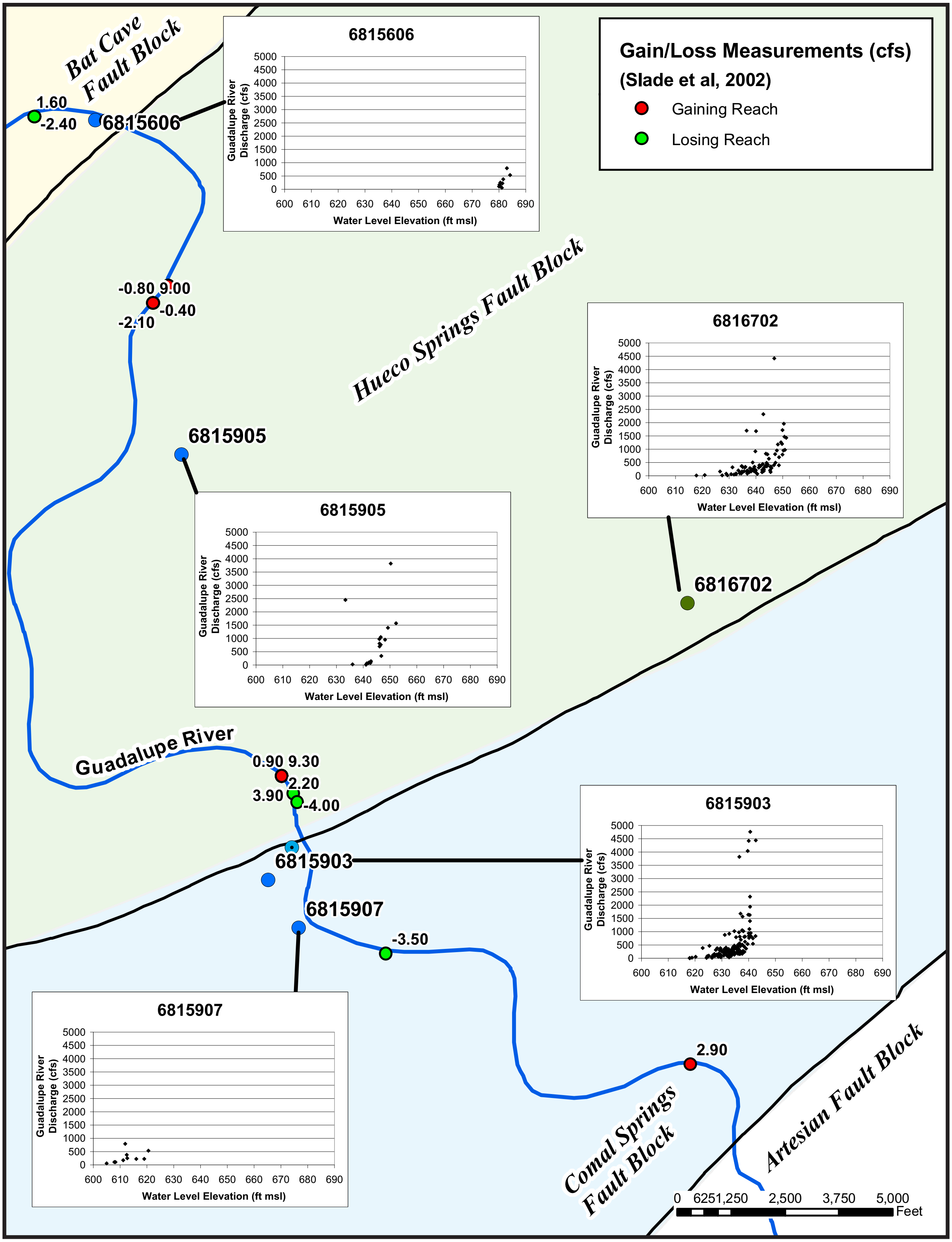


Figure 20. Hydrographs of Wells near the Guadalupe River

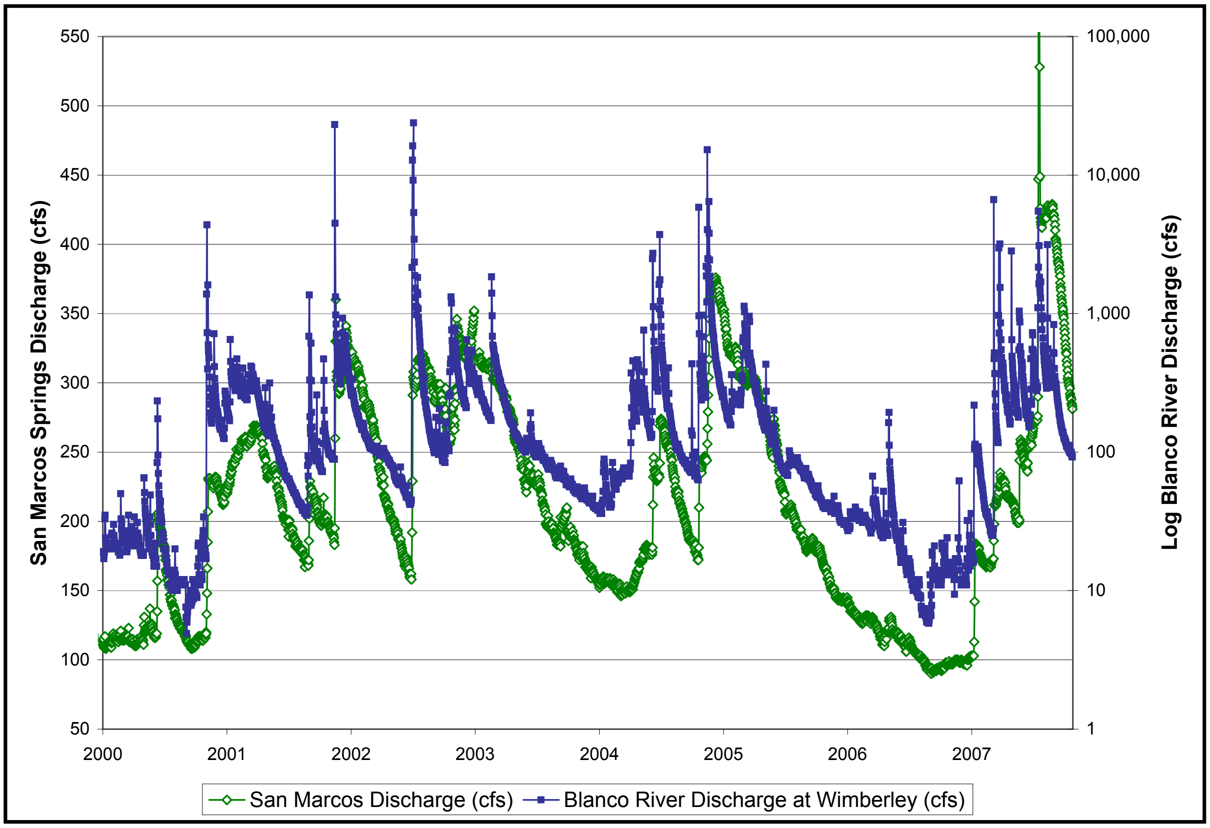


Figure 21. Comparison of Blanco River and San Marcos Springs Discharge

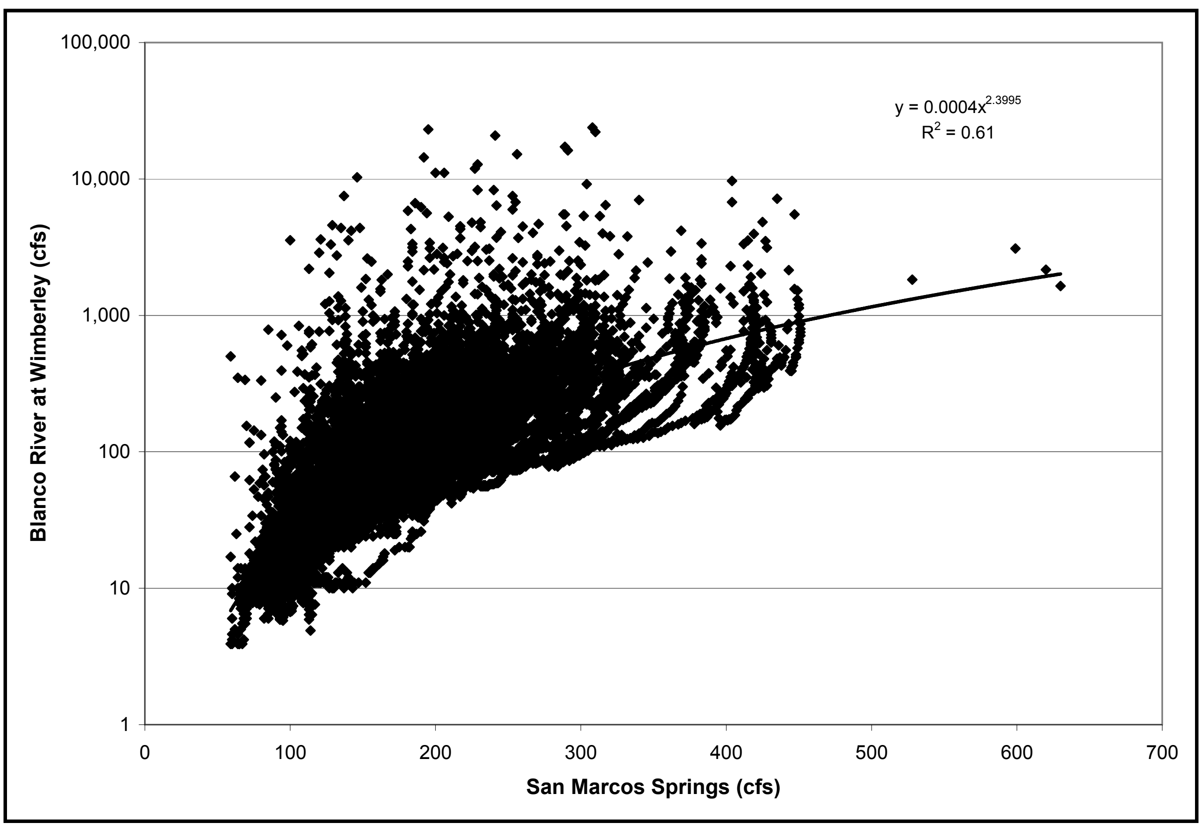


Figure 22. Correlation of Blanco River and San Marcos Springs Discharge

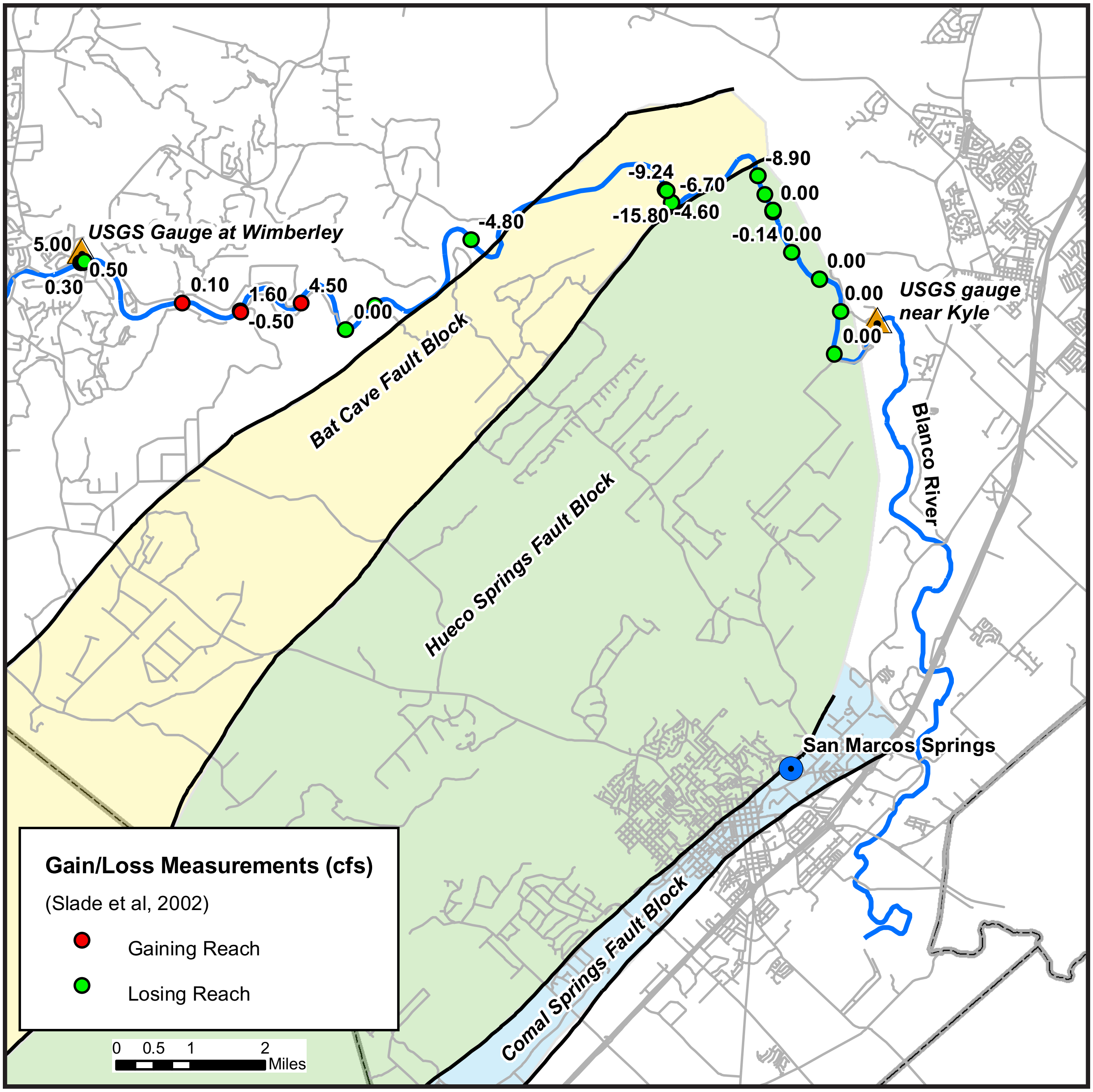


Figure 23. Gain/Loss Measurements (Slade and others, 2002) on the Blanco River

periods, mean flow at Wimberley was approximately 15 cfs. Figure 25 shows frequency (number of days) since 1956 of daily average discharges measured at Wimberley when there is no flow at the Kyle gauge. Discharges at Wimberley ranged from 3.9 to 600 cfs, with an average of approximately 15 cfs, which corroborates the low channel losses measured by Slade and others (2002). Only 24 measurements were above 45 cfs. During the same periods, San Marcos Springs discharge ranged from 59 to 184 cfs, with an average of approximately 96 cfs. If all flow from the Blanco River recharged San Marcos Springs during periods of no flow at Kyle, its contribution would range from approximately 8 to 25 percent of springflow.

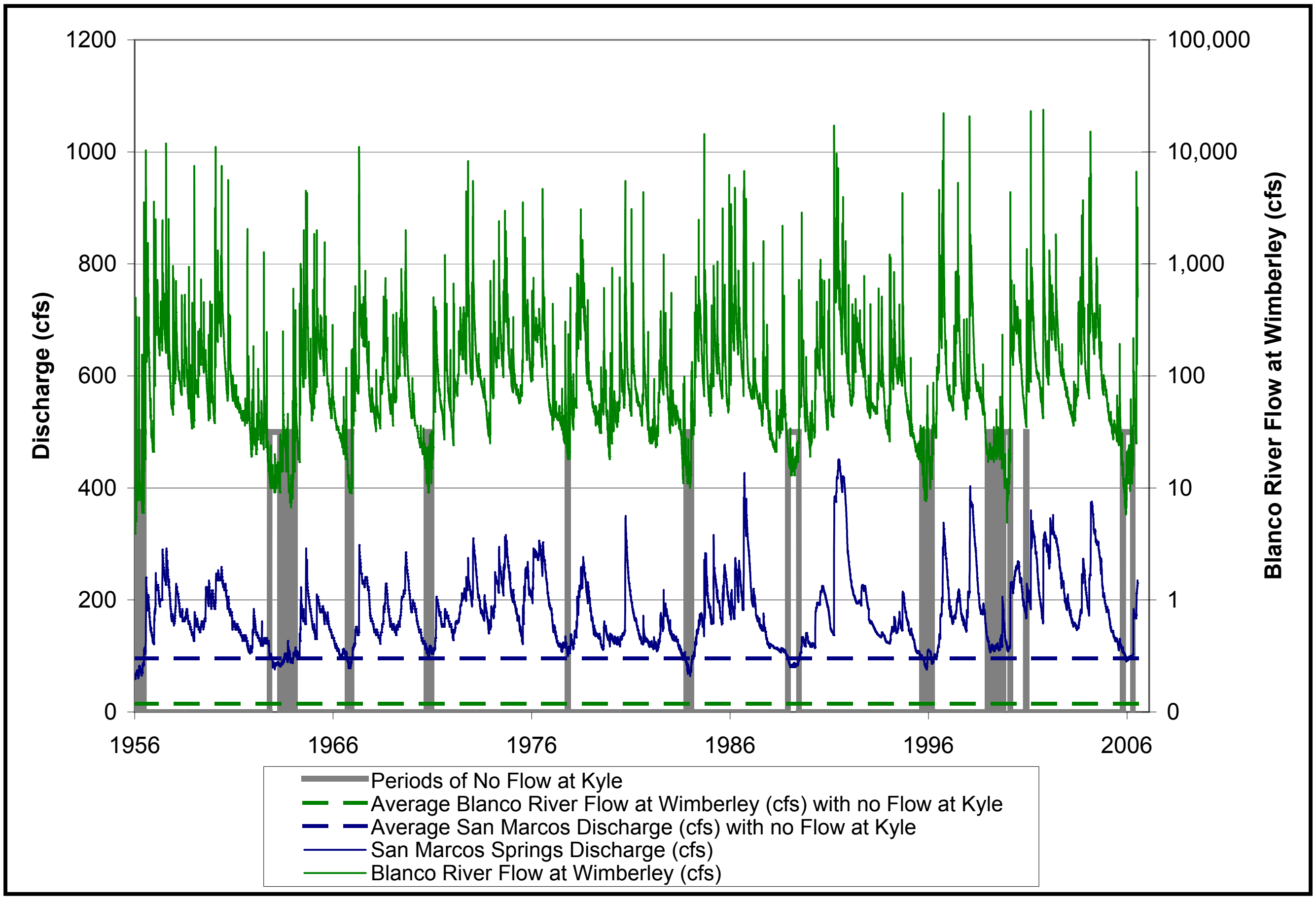
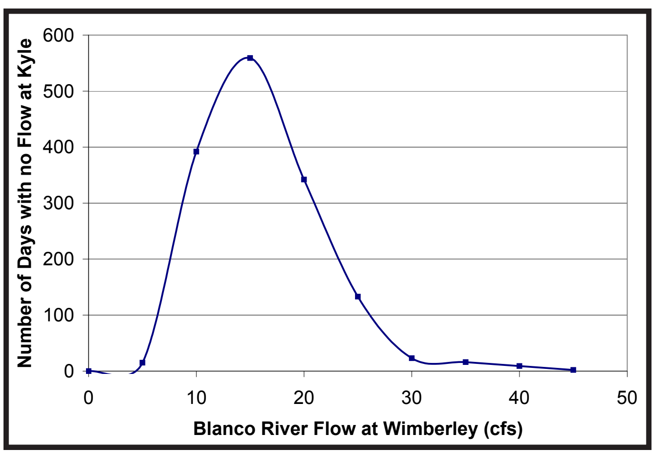


Figure 24. Periods of No Flow at the USGS Gauge at Kyle since 1956



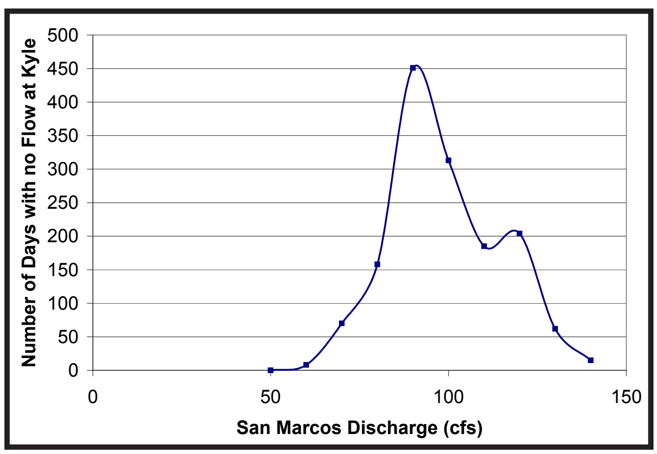


Figure 25. Blanco River Flow at Wimberley (left) and San Marcos Springs Discharge (right) when the Blanco River is Not Flowing at Kyle

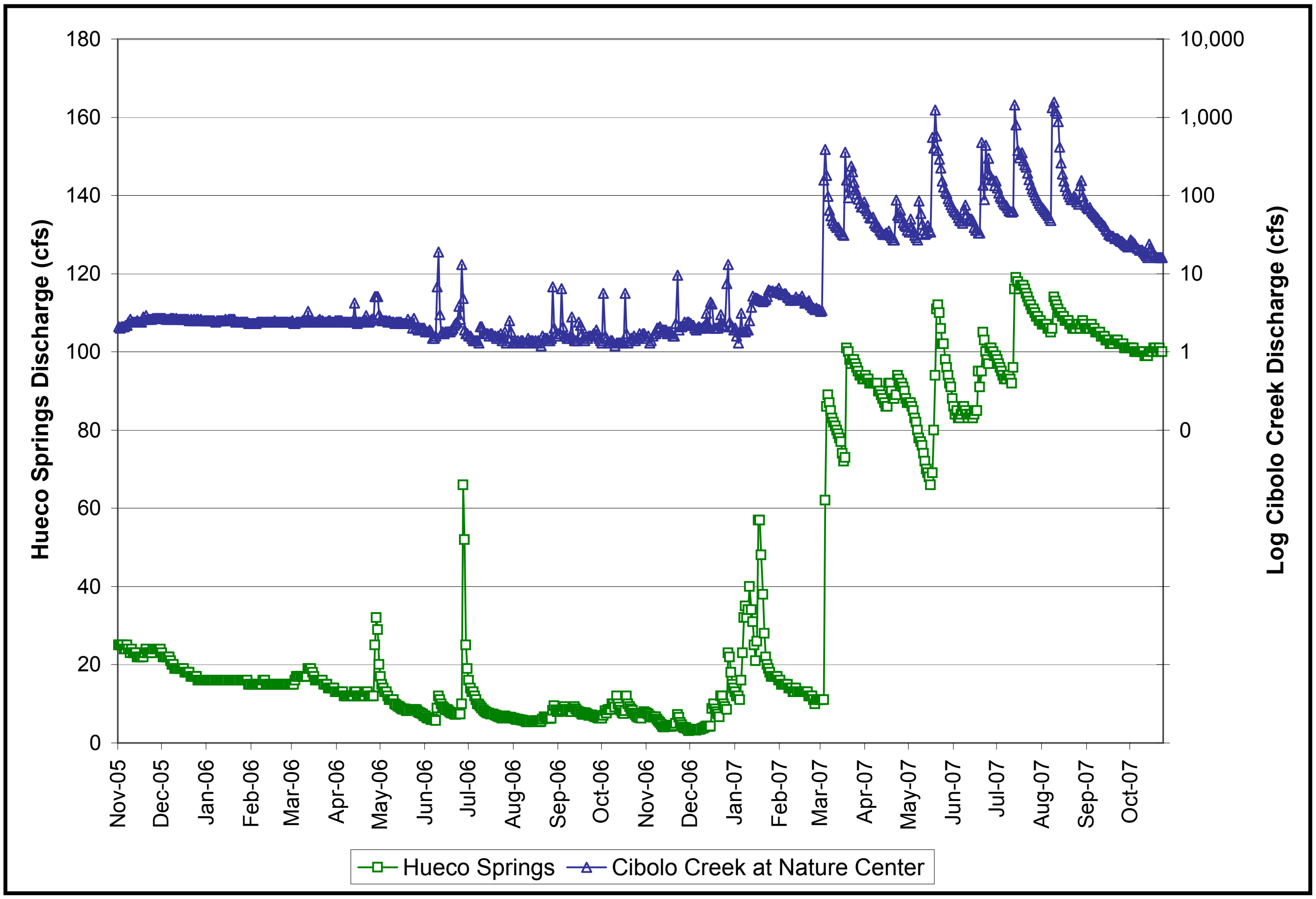


Figure 26. Comparison of Hueco Springs Discharge and Cibolo Creek Flow

Cibolo Creek

Cibolo Creek forms the boundary between Bexar and Comal counties, flowing across Trinity and Edwards Group limestones from north to south, as shown in Figure 2. Although several stream gauges are on Cibolo Creek, most flow measurements were collected during different periods of time. Gauges that provide the most information for this analysis are at the Cibolo Nature Center near Boerne (08183890; since 11/9/2005), Boerne (08183900: 1962–97), and at Selma (08185000; since 4/1/1946) near Interstate 35.

Figure 26 shows discharge hydrographs of Cibolo Creek at the Cibolo Nature Center and Hueco Springs from November 2005 through October 2007. Although the Nature Center gauge does not quantify exactly the flow of water over the recharge zone, it is more representative than the Selma gauge because the creek is generally dry at the Selma gauge. The hydrograph indicates that spring and creek discharges generally respond simultaneously to the same precipitation events. The pattern for both gauges is a short-lived peak followed by a steep recession curve.

Correlation between Hueco Springs and Cibolo Creek discharge is shown in Figure 27. Although discharge extremes generally matched, Figure 27 indicates that degree of correlation varies with discharge rates. Correlation is also biased by precipitation during the period of record from November 2005 through October 2007. Throughout 2005 and 2006, Hueco Springs discharged less than 20 cfs, and flow in

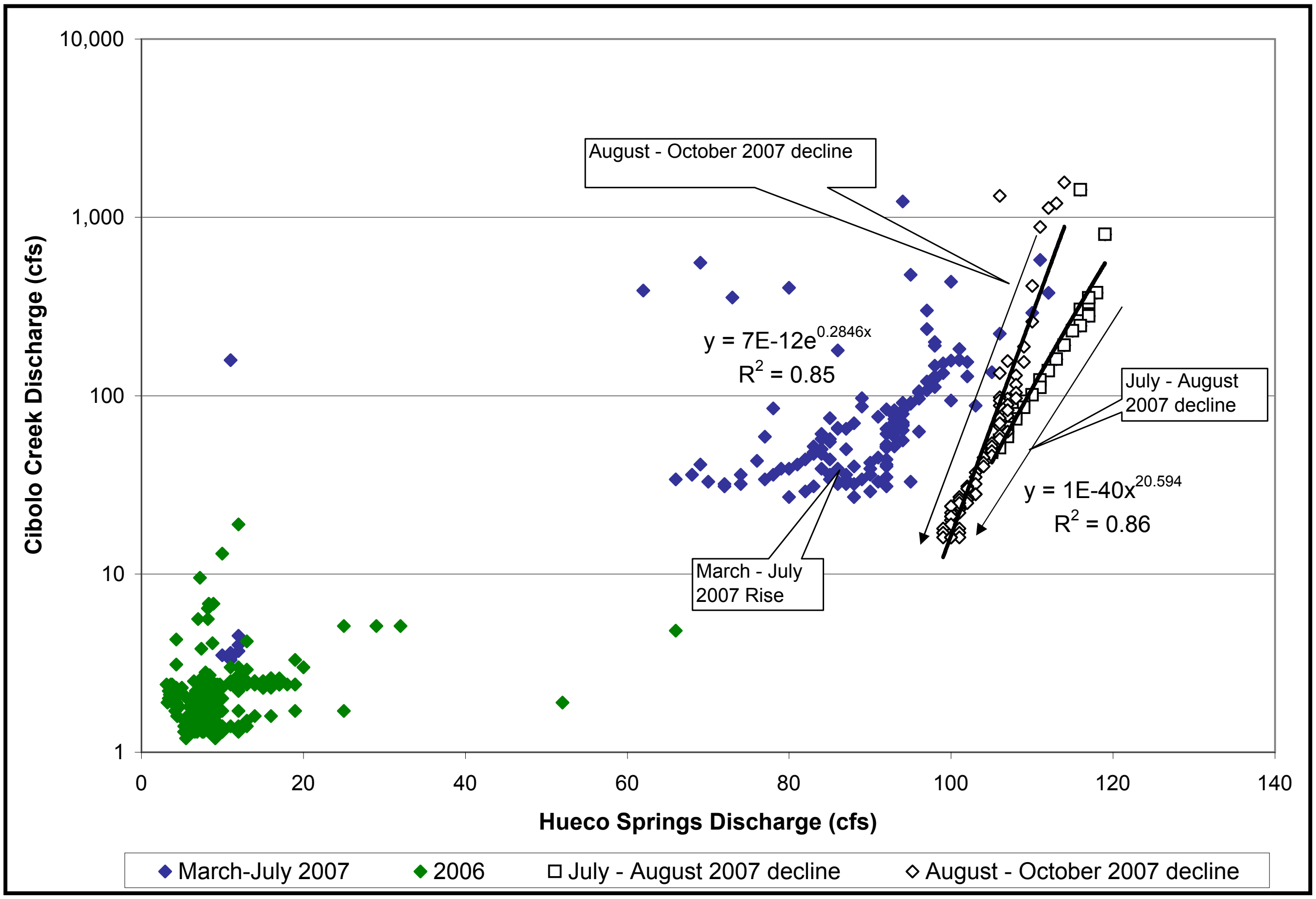


Figure 27. Correlation of Hueco Springs Discharge and Cibolo Creek Flow

Cibolo Creek was less than 10 cfs except for storm events in May and July 2006. These points plot in the lower left corner of the chart near the origin. Gaps occur in Hueco Springs discharges between approximately 30 and 70 cfs, reflecting the transition between baseflow and storm flow, at least for this period of record. At higher discharges, measurements from rising or declining curves of storm events form roughly linear sets of points. For example, points measured between August and October 2007 form a line as Hueco Springs discharge declined from approximately 120 cfs to 100 cfs, whereas Cibolo Creek discharge declined from 400 cfs to less than 20 cfs. Other lines are less clear because they consist of one or more storm events superimposed on one another.

The relationship between Cibolo Creek and adjacent groundwater may indicate how much water it contributes to the San Marcos hydrologic system. Like the Guadalupe River, Cibolo Creek crosses all three fault blocks in the recharge zone. A comparison of Cibolo Creek discharge with water levels in nearby wells may provide some evidence of the volume of water that infiltrates into the aquifer. Unfortunately, few water level measurements taken on days that Cibolo Creek was flowing exist because Cibolo Creek is generally dry at the Selma gauge. Available data from the TWDB groundwater database and USGS discharge measurements from the downstream gauge at Selma and an upstream gauge at Boerne were used to construct Figure 28. This figure shows charts for four wells comparing water levels and discharge at either

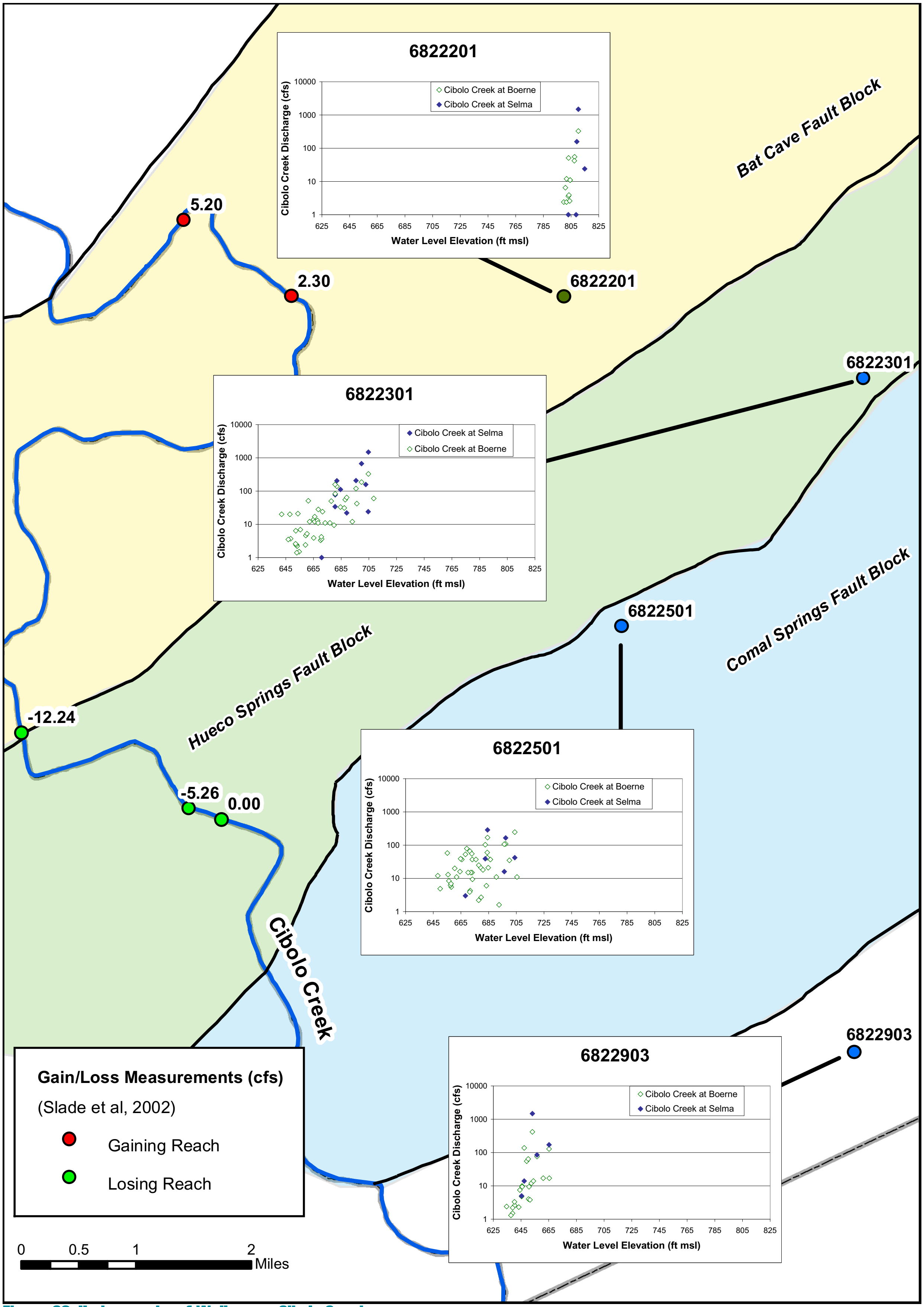


Figure 28. Hydrographs of Wells near Cibolo Creek

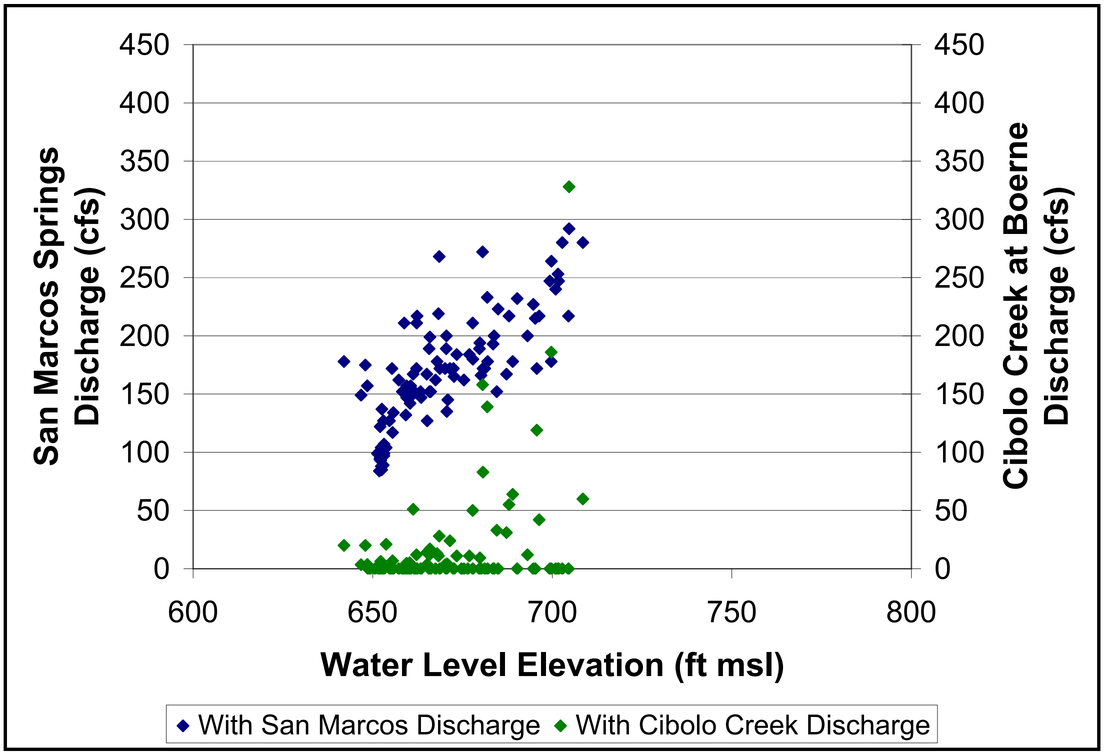


Figure 29. Correlation of Well 6822301 with San Marcos Springs and Cibolo Creek Discharge

Selma or Boerne. The Selma gauge has been measured since 1946, but it is dry more than 90 percent of the time. Although storm flows may exceed 30,000 cfs (October 1998), they are short lived. In order for additional discharge data to be generated, measurements from the Boerne gauge were included in the charts.

Of the four charts, only well 6822301 data, which were completed in the Hueco Springs fault block, suggest some correlation with Cibolo Creek discharge, although there is a lot of scatter. Well 6822201, in the Bat Cave fault block, displays a nearly vertical line, which indicates no hydraulic relationship with Cibolo Creek. It is completed in the Trinity Aquifer. At well 6822501, the top of the Edwards Limestone is 90 feet below the surface, and water level measurements show no relationship to Cibolo Creek discharges. The well is completed in a graben and may communicate better with the Comal Springs fault block. Well 6822903 is completed in the Artesian fault block and would not be expected to correlate with Cibolo Creek.

Figure 28 also shows locations of channel loss measurements on Cibolo Creek by Slade and others (2002). Two reaches gain water on the Bat Cave fault block, and three reaches lose water on the Hueco Springs block. These results corroborate evidence from well 6822301 that water from Cibolo Creek infiltrates into the Hueco Springs fault block. The maximum loss rate was approximately 12 cfs.

As an attempt to quantify the contribution from Cibolo Creek, Figure 29 was constructed to examine the hydrologic relationship between 6822301 water levels, discharge of Cibolo Creek (at Boerne), and San Marcos Springs. However, the discharge scale on this chart masks the correlation shown in Figure 28. This analysis is based on the assumption that 6823301 represents water levels in the Hueco Springs fault block. It shows that although San Marcos Springs discharges range from less than 100 cfs to 300 cfs, Cibolo Creek discharges are generally less than 100 cfs. San Marcos discharge increases independently of the 6823301 water levels between 100 and 150 cfs. At higher discharges, there is considerable scatter. The lack of a compelling relationship with Cibolo Creek suggests that it is not a major contributor to the San Marcos system. On the basis of only a small number of data, it appears that Cibolo Creek contributes a relatively small fraction of San Marcos flow below 150 cfs and a larger fraction above 150 cfs. George and others (1952) also concluded that Cibolo Creek is not a large contributor to the hydrologic system in Comal County.

Precipitation

Response of the Edwards Aquifer to selected precipitation events between 2005 and 2007 provides clues about the hydrologic system in the Comal and San Marcos springs area. Because this period was unusually dry, storms that occurred in the region left a readily recognizable record in the hydrologic system. Each one is analyzed according to its location and relevance to the two springs, and springs and wells cited in the analysis are shown in Figure 30. Figure 31 describes a storm in September 2006, and Figure 32 describes a storm in January 2007, along with hydrographs for each spring and well.

On September 5, 2006, rain fell near San Marcos Springs, but discharge did not increase. Most of the rain appears to have fallen on units overlying the Edwards Aquifer, or it was lost to evapotranspiration. However, Comal Springs discharge and water levels at Loop 337 and Landa Park wells started to rise, even though precipitation was light in Comal County. In contrast, water levels in wells 6816701 and 6709110, which represent the Comal Springs fault block in the San Marcos area, did not rise, indicating that none of the stormwater reached San Marcos Springs.

On January 13, 2007, heavy rain fell on the recharge zone in Hays County, and San Marcos Springs discharge abruptly increased almost 100 cfs. Water levels at 6709110 responded less than would be expected, suggesting that water from a source other than the Comal Springs fault block may have recharged the springs. Water that recharged the aquifer probably flowed directly to San Marcos Springs and discharged from the northern orifices, which will be discussed in the Hydrogeologic Evaluation section, rather than from the southern orifices, which are supplied by the Comal Springs fault block. This incident is probably a good example of local recharge at San Marcos Springs.

Water Quality

Many samples of spring water, groundwater, and surface water have been collected over the years near San Marcos Springs. Barnes (1938), DeCook (1963), Wells (1985), and Ogden and others (1986) published compilations of water quality data, and in the past the Authority (for example, Hamilton and others, 2007) and the USGS routinely analyzed water samples. This section will examine historical water quality data that help define sources of San Marcos water.

Ogden and others (1986) were the first to collect samples for the express purpose of identifying sources of water to San Marcos Springs. Their study included measuring water levels in 75 wells, sampling 90 wells, conducting tracer tests, collecting water quality samples from six orifices every two weeks at San Marcos Springs, and completing other tasks between 1982 and 1985. San Marcos Springs discharge dropped to 60 cfs in 1984 during the study, so these workers were able to study low-flow conditions. They concluded that the southern orifices (Deep and Catfish springs) are recharged by a source of water different from that of the northern orifices (Cabomba, Hotel, Johnny, and Divergent springs; Johnny is also known as Weissmuller, and Divergent is commonly referred to as Diversion) on the basis of water quality contrasts (Figure 33). They hypothesized that orifices were separated by faults or that a “pressure boundary” exists between the orifices that shifts in response to changing flow conditions. Table 2 summarizes their comparison of the orifices.

Results presented in Table 2 support the Ogden and others (1986) hypothesis that the source of

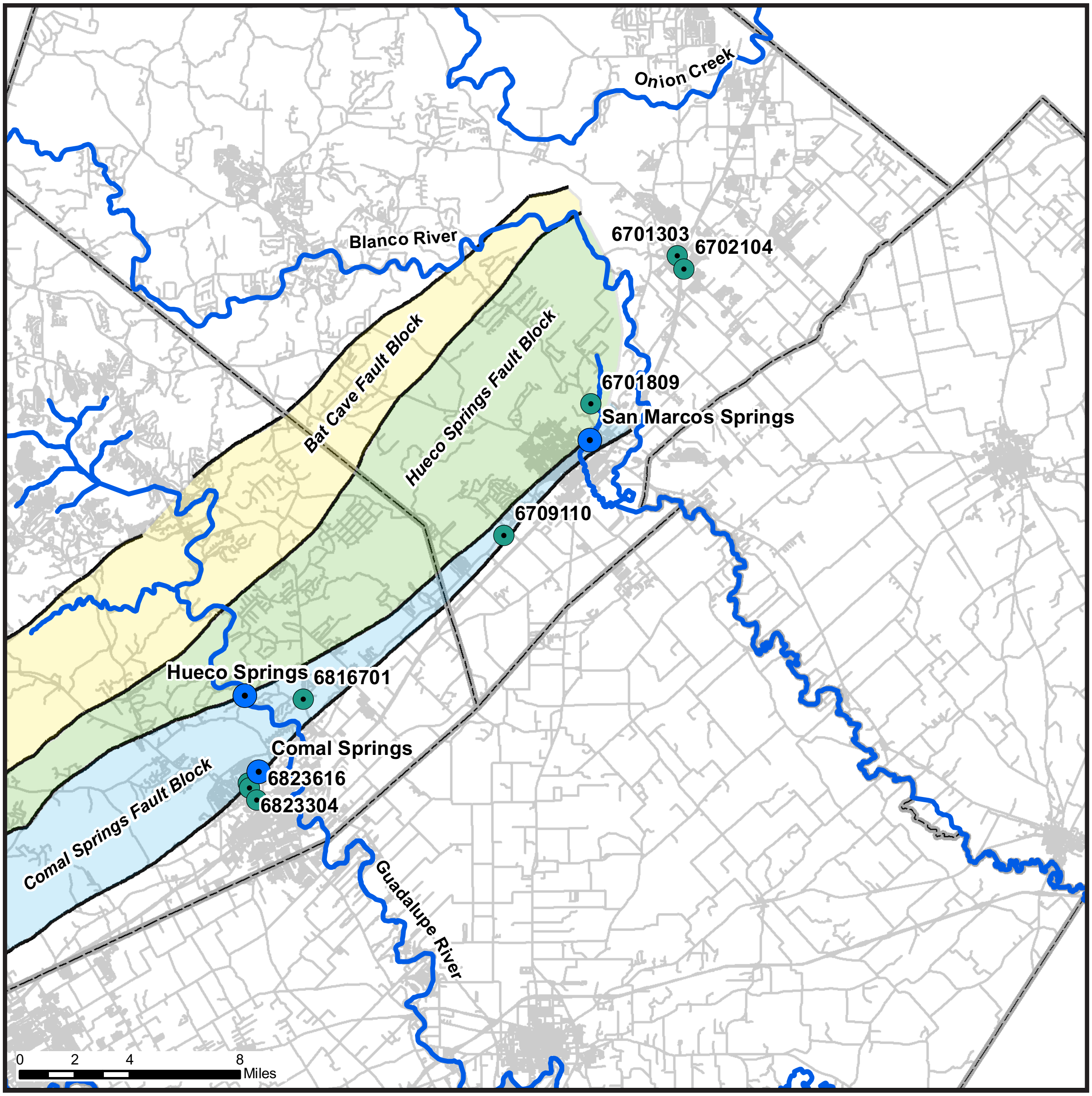


Figure 30. Springs and Wells Used in the Precipitation Analysis

water for the southern springs is the Comal Springs fault block, which is recharged by the Artesian fault block, which also contributes water to Comal Springs. The northern springs receive water from the Blanco River and Sink Creek and areas down-gradient of the northern groundwater divide located near Onion Creek in northern Hays County. The depth of circulation and residence time for the source of water for the northern springs are thought to be shallower and shorter.

A comparison of water quality parameters from the Ogden study clearly shows two different flowpaths for water feeding San Marcos Springs. A slightly

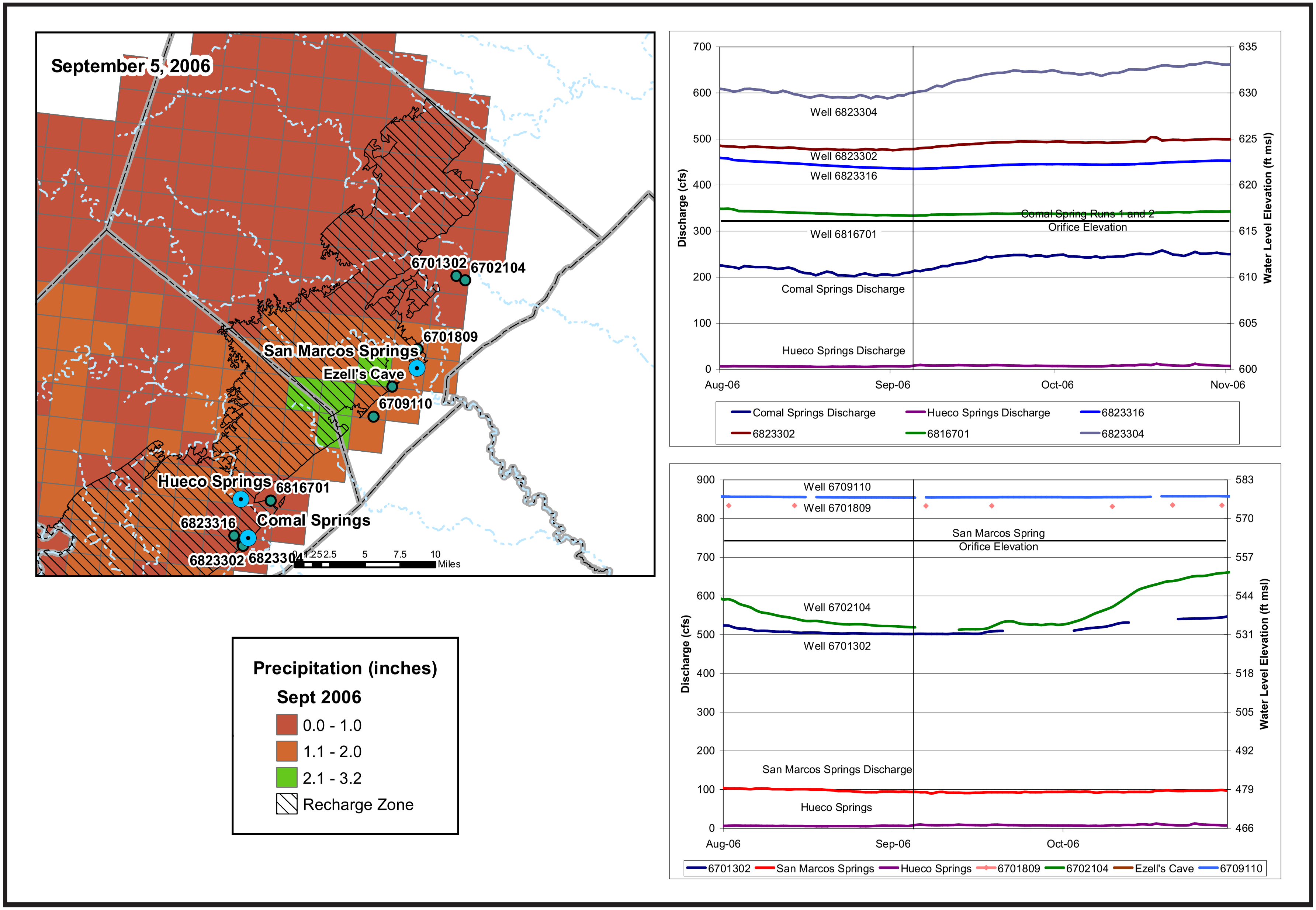


Figure 31. Impact of September 5, 2006, Precipitation on Springflow and Water Levels

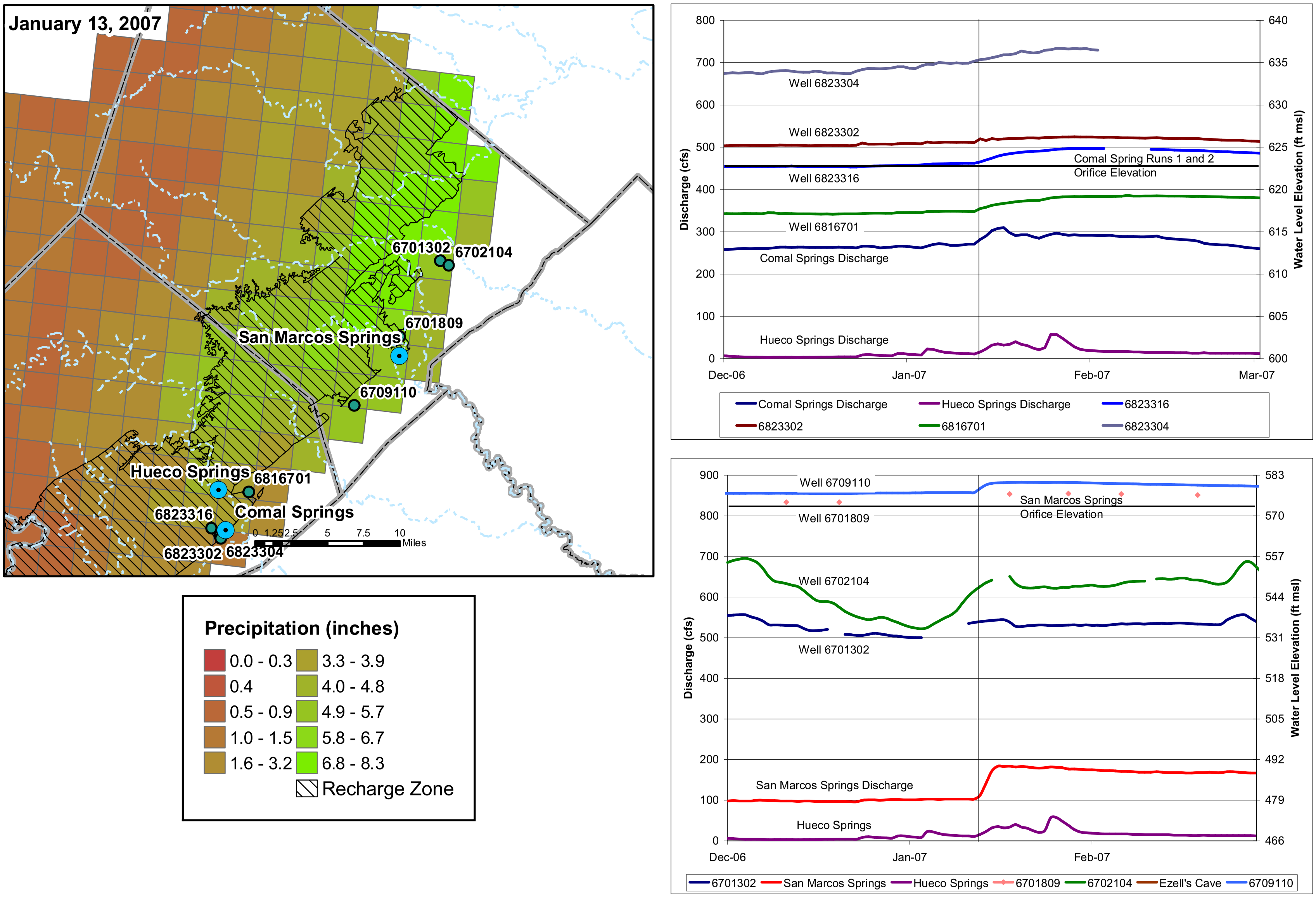


Figure 32. Impact of January 13, 2007, Precipitation on Springflow and Water Levels

Figure 33. Locations of San Marcos Springs Orifices

warmer temperature is characteristic of deeper flowpaths, as temperature increases with depth. Higher alkalinity, conductivity, and hardness results suggest that water recharging the southern springs has greater residence time, meaning a longer, more regional flowpath in the aquifer, compared with that of the northern springs.

Sulfate and chloride concentrations for the northern springs are slightly elevated when compared with those of the southern springs. It is unclear what these results indicate—perhaps a slight mixing of water from the saline zone of the aquifer or a local contribution of water from the Upper Glen Rose limestone.

Tritium is a form of hydrogen that is created in limited quantities by natural conditions in the atmosphere. However, there are other anthropogenic sources such as nuclear power plants. Large concentrations of tritium were also created during atmospheric testing of

Table 2. Comparison of Water Quality Parameters in the Six San Marcos Springs Orifices

Parameter	**Southern Springs:** Deep and Catfish springs	**Northern Springs:** Cabomba, Johnny, and Divergent springs
Temperature	Warmer. Deep Spring averaged 22.3º.	Cooler. Johnny Spring averaged 21.5º.
Dissolved oxygen	Higher. Deep Spring averaged 5.7 mg/L.	Lower. Johnny Spring averaged 4.1 mg/L.
Sulfate	Lower. Deep Spring averaged 15.9 mg/L.	Higher. Johnny Spring averaged 17.4 mg/L.
Alkalinity	Higher. Deep Spring averaged 255 mg/L.	Lower. Johnny Spring averaged 244 mg/L.
Chloride	Lower. Deep Spring averaged 19.4 mg/L.	Higher. Johnny Spring averaged 20.6 mg/L.
Conductivity	Higher. Deep Spring averaged 501 ppm.	Lower. Johnny Spring averaged 485 ppm.
Hardness	Higher. Deep Spring averaged 275 mg/L.	Lower. Johnny Spring averaged 267 mg/L.
Calcium as $CaCO_3$	Higher. Deep Spring averaged 196 mg/L.	Lower. Johnny Spring averaged 182 mg/L.
Magnesium as $CaCO_3$	Higher. Deep Spring averaged 86 mg/L.	Lower. Johnny Spring averaged 80 mg/L.
Tritium	Lower. Deep Spring measured 7.1±0.5 tritium units.	Higher. Johnny Spring measured 9.5±0.5 tritium units.

nuclear weapons, which began in 1952 and peaked in 1963. This "bomb" tritium was removed from the atmosphere in rainfall and recharged groundwater throughout the world. Tritium can be used to gain insight into flowpaths, relative ages of groundwater, and degree of mixing and dilution in the Edwards Aquifer.

Figure 34 is a graph indicating tritium concentrations in samples collected by the Authority, USGS, and TWDB from San Marcos, Comal, and Hueco springs.

Figure 34 also includes historical measurements of tritium in precipitation collected by the International Atomic Energy Agency (IAEA/WMO, 2004) from a tritium monitoring station in Waco, Texas (sample collection ended in March 1986). Tritium analyses are listed in Table 3. Groundwater with less than 5 tritium units (TU) is considered "prebomb" recharge (entering the aquifer before 1953) or a mixture of prebomb and younger waters. In contrast, precipitation falling on the recharge zone and entering the aquifer since 1953 carries a much higher tritium signal, although it has declined since atmospheric testing ended.

Table 3 includes data that were collected from selected wells in the Edwards Aquifer. Data for two wells in the Hueco Springs fault block show a high concentration of tritium, which indicates a short residence time, limited mixing and dilution, and short flowpath. Data from wells in the Comal Springs fault block show a moderate residence time, with possibly more mixing of water and longer flowpath. Tritium data from the Artesian fault block indicate a greater residence time, more mixing and dilution, and longer flowpath. These data are consistent with our understanding of flowpaths in the Edwards Aquifer.

The tritium concentration in Deep Spring at San Marcos Springs, located in the south part of Spring Lake, was slightly less than in Johnny Spring, located in the north part of Spring Lake, suggesting that the mixture of water discharging from Deep Spring is older and followed a longer flowpath. A sample of Comal Springs water yielded 5.0±0.5 tritium units (TU), which indicates average groundwater older than water discharging from the northern San Marcos Springs. All three samples were collected in October 1984.

Hueco and San Marcos springs tritium levels are higher than Comal Springs levels, which reflects the ages and sources of discharge waters. San

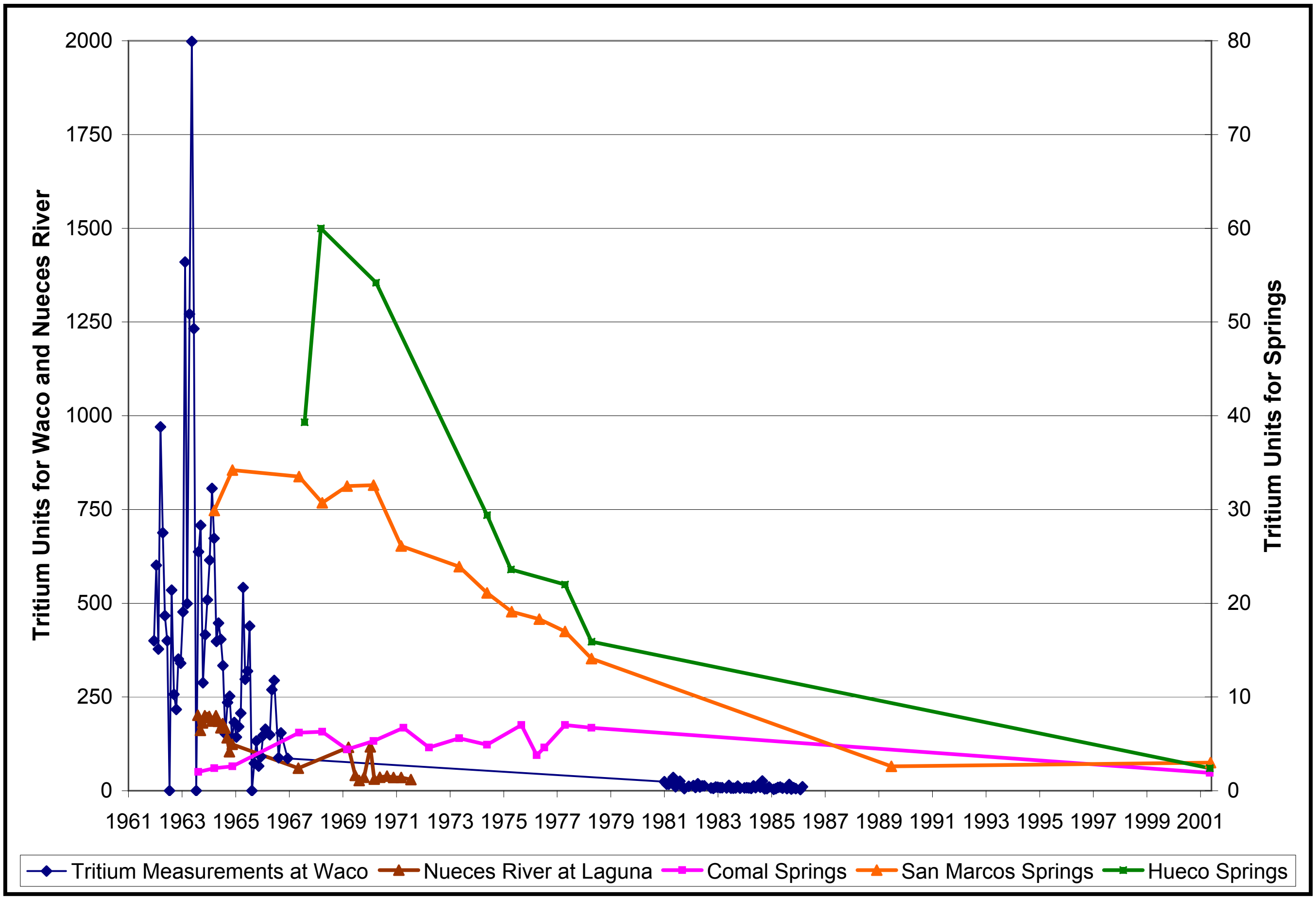


Figure 34. Comparison of Tritium Levels

Marcos tritium samples were collected from Hotel Springs (a northern spring) because it is the only discharge point that discharges above the level of Spring Lake and would preclude mixing with water discharging from other springs in the lake. Water that recharges the northern springs originates relatively near the springs (with shorter flowpaths), so tritium levels would be expected to be relatively high. Water sources of Comal Springs are thought to be much older and more isolated from the atmosphere than water sources of Hueco and San Marcos springs. Tritium levels in water discharging from Hueco and San Marcos springs declined since the 1960s, coincident with the decline in concentration of tritium in precipitation. Comal Springs water is a mixture of predominantly prebomb water. Currently (2007), tritium levels in Comal Springs samples contain less than 2 TU, and less than 3 TU in San Marcos Springs samples.

Tritium levels in groundwater samples corroborate flowpaths to San Marcos Springs. Table 4 lists wells that are completed in either deep or shallow flowpaths to San Marcos Springs (Figure 35). Well 6701203 is in the Hueco Springs fault block, a few miles north of the springs, and the high tritium level indicates recent recharge. In contrast, well 6823303 is in the Comal Springs fault block in Comal County, which leads to San Marcos Springs, and its low tritium levels indicate that it is mostly prebomb water. Water levels at well 6816701 correlate highly with San Marcos Springs discharge, and the tritium level is between Comal Springs and San Marcos Springs (in 1976). It represents a mixture of Artesian fault block water and recently recharged water in the Comal Springs fault block. As groundwater flows past 6816701 toward San Marcos Springs, older water is diluted with more local recharge, and the tritium level increases to the level of the springs.

Table 3. Summary of Tritium Levels in Springs

Spring	Date Collected	Concentration (TU)	Source
Comal Springs #1	8/12/1963	2.0	TWDB
Comal Springs #1	3/19/1964	2.4	TWDB
Comal Springs #1	11/20/1964	2.6	TWDB
Comal Springs #1	5/19/1967	6.2	TWDB
Comal Springs #1	4/1/1968	6.3	TWDB
Comal Springs #1	3/17/1969	4.4	TWDB
Comal Springs #1	3/3/1970	5.3	TWDB
Comal Springs #1	4/15/1971	6.7	TWDB
Comal Springs #1	3/30/1972	4.6	TWDB
Comal Springs #1	5/15/1973	5.6	TWDB
Comal Springs #1	5/30/1974	4.9	TWDB
Comal Springs #1	9/11/1975	7.0	TWDB
Comal Springs #1	4/7/1976	3.8	TWDB
Comal Springs #1	7/22/1976	4.6	TWDB
Comal Springs #1	4/29/1977	7.0	TWDB
Comal Springs #1	4/25/1978	6.7	TWDB
Comal Springs #1	7/14/1989	2.6	USGS
Hueco Springs A	8/4/1967	39.3	TWDB
Hueco Springs A	3/13/1968	60.0	TWDB
Hueco Springs A	4/6/1970	54.2	TWDB
Hueco Springs A	4/29/1977	22.0	TWDB
Hueco Springs A	4/25/1978	15.9	TWDB
Hueco Springs A	6/3/1980	47	USGS
Hueco Springs A	4/16/1985	33	USGS
LR-67-01-801 (Hotel Springs)	3/18/1964	29.9	TWDB
LR-67-01-801 (Hotel Springs)	11/20/1964	34.2	TWDB
LR-67-01-801 (Hotel Springs)	5/19/1967	33.5	TWDB
LR-67-01-801 (Hotel Springs)	4/1/1968	30.7	TWDB
LR-67-01-801 (Hotel Springs)	3/7/1969	32.5	TWDB
LR-67-01-801 (Hotel Springs)	3/3/1970	32.6	TWDB
LR-67-01-801 (Hotel Springs)	3/16/1971	26.1	TWDB
LR-67-01-801 (Hotel Springs)	5/15/1973	23.9	TWDB
LR-67-01-801 (Hotel Springs)	5/30/1974	21.1	TWDB
LR-67-01-801 (Hotel Springs)	5/1/1975	19.1	TWDB
LR-67-01-801 (Hotel Springs)	5/14/1976	18.3	TWDB
LR-67-01-801 (Hotel Springs)	4/29/1977	17.0	TWDB
LR-67-01-801 (Hotel Springs)	4/25/1978	14.1	TWDB
LR-67-01-801 (Hotel Springs)	11/26/1984	23	USGS
LR-67-01-801 (Hotel Springs)	3/7/1985	41	USGS
LR-67-01-801 (Hotel Springs)	6/14/1988	29	USGS
LR-67-01-801 (Hotel Springs)	7/13/1989	2.6	USGS
LR-67-01-819 (Deep Spring)	8/28/1997	12	USGS

Table 4. Tritium Levels in Selected Wells Compared with Tritium Levels in San Marcos Springs

Well/Spring	Date	Fault Block	Source	Tritium Units
Deep Spring	10/1984	Comal Springs	Ogden and others (1986)	7.1 ± 0.5
Johnny Spring	10/1984	Comal Springs	Ogden and others (1986)	9.5 ± 0.6
6701203	8/6/1975	Hueco Springs	TWDB	21.8
6701701	8/6/1975	Hueco Springs	TWDB	16.4
6816603	8/14/1975	Comal Springs	TWDB	13.1
6816701	4/13/1976	Comal Springs	TWDB	9.5
6701806	7/13/1989	Comal Springs	USGS	3.2
6823304	4/26/1976	Artesian	TWDB	6.3
6823304	4/29/1977	Artesian	TWDB	5.6
6823501	7/13/1989	Artesian	USGS	2.6
6823303	7/18/1989	Artesian	USGS	2.6
6823620	6/20/1996	Artesian	USGS	1.0
6823303	6/11/1997	Artesian	USGS	1.3

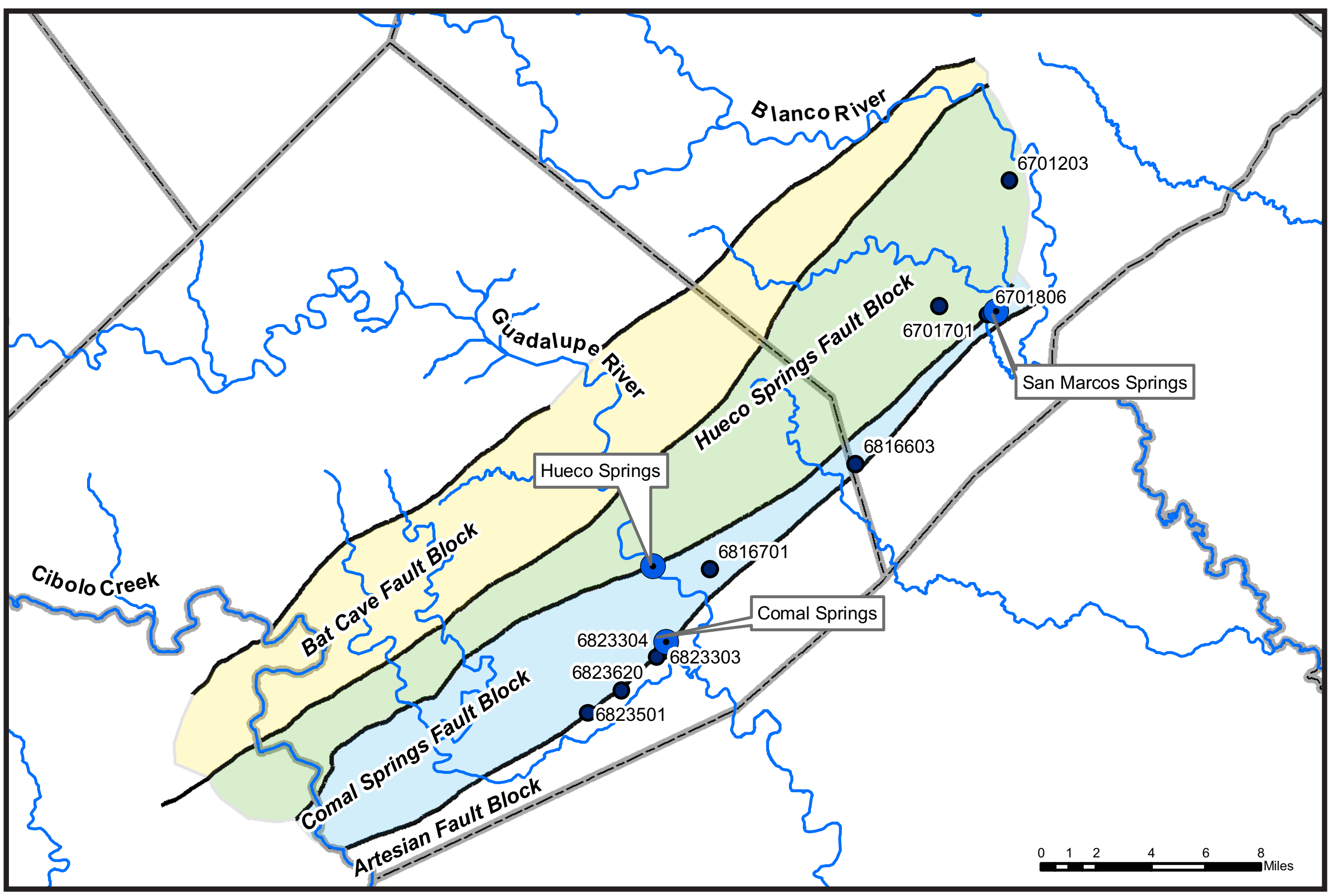


Figure 35. Tritium Sampling Locations

HYDROGEOLOGIC EVALUATION OF THE SAN MARCOS SPRINGS AREA

This section describes sources of water for San Marcos Springs that are based on discussion of the hydrologic system in the previous section.

Sources of Water for San Marcos Springs

To summarize the previous section, San Marcos Springs is part of a multicomponent surface water and groundwater hydrologic system that has developed in the Balcones Fault Zone Edwards Aquifer. Groundwater generally flows (southwest to northeast) from Bexar County toward Comal and San Marcos springs through Bat Cave, Hueco Springs, Comal Springs, and Artesian fault blocks. Additional water recharges the fault blocks from principal perennial streams: Cibolo Creek, the Guadalupe River, and the Blanco River. Ephemeral streams (for example, Dry Comal Creek, Blieders Creek, and Sink Creek) also recharge water, but little information exists regarding the volume that recharges the aquifer from the streams. Groundwater in the Artesian fault block in Bexar County flows northeast to enter Comal County. Water in the Artesian fault block either follows a flowpath upward into the Comal Springs fault block approximately four miles southwest of Comal Springs (LBG-Guyton Associates, 2004) or continues in the Artesian fault block to discharge at Comal Springs. The water level in the Artesian fault block is almost always higher than in the Comal Springs fault block. Groundwater in the Artesian fault block discharges from Comal Springs by ascending the Comal Springs fault and/or recharging the Comal Springs fault block. LBG-Guyton Associates (2004) concluded that low TDS groundwater flow in the Artesian fault block ends just northeast of Comal Springs.

In the recharge zone, groundwater moves through the Comal Springs fault block to discharge at Comal Springs or bypasses Comal Springs to discharge at San Marcos Springs. Water entering the Hueco Springs fault block from northern Bexar County and the recharge zone in Comal County also flows northeast to discharge at either Hueco Springs or San Marcos Springs, especially during wet conditions.

Figures 36 and 37 were constructed to investigate water levels near San Marcos Springs during low flows (that is, less than 100 cfs, which is an arbitrary threshold rather than a regulatory limit). Figure 36 shows average water levels in wells from the Authority's synoptic surveys and the TWDB groundwater database when San Marcos springflows are less than 100 cfs. Wells in which average water level elevations are greater than the San Marcos Springs elevation (573 ft msl) are shown as green dots, and water levels below that elevation are shown as red dots. San Marcos Springs elevation (573 ft msl) corresponds to Spring Lake elevation because most orifices are submerged, and that is the effective head. At low flows, water levels in the Hueco Springs fault block near San Marcos Springs are lower than San Marcos Springs elevation, and that area therefore does not contribute water to San Marcos Springs. Water levels in the Comal Springs fault block are higher than San Marcos Springs elevation, which indicates that the Comal Springs fault block is the main source of water for San Marcos Springs during low flows.

Because of the limited saturated thickness within the Edwards Aquifer in the Bat Cave fault block, the amount of water contributed to springflow at San Marcos is limited. The Bat Cave fault block probably transmits water from the underlying Trinity Aquifer and from direct recharge. However, the Bat Cave fault block would not be expected to store a large volume of water.

Figure 37 shows average water levels when San Marcos discharge is between 200 and 300 cfs. Water

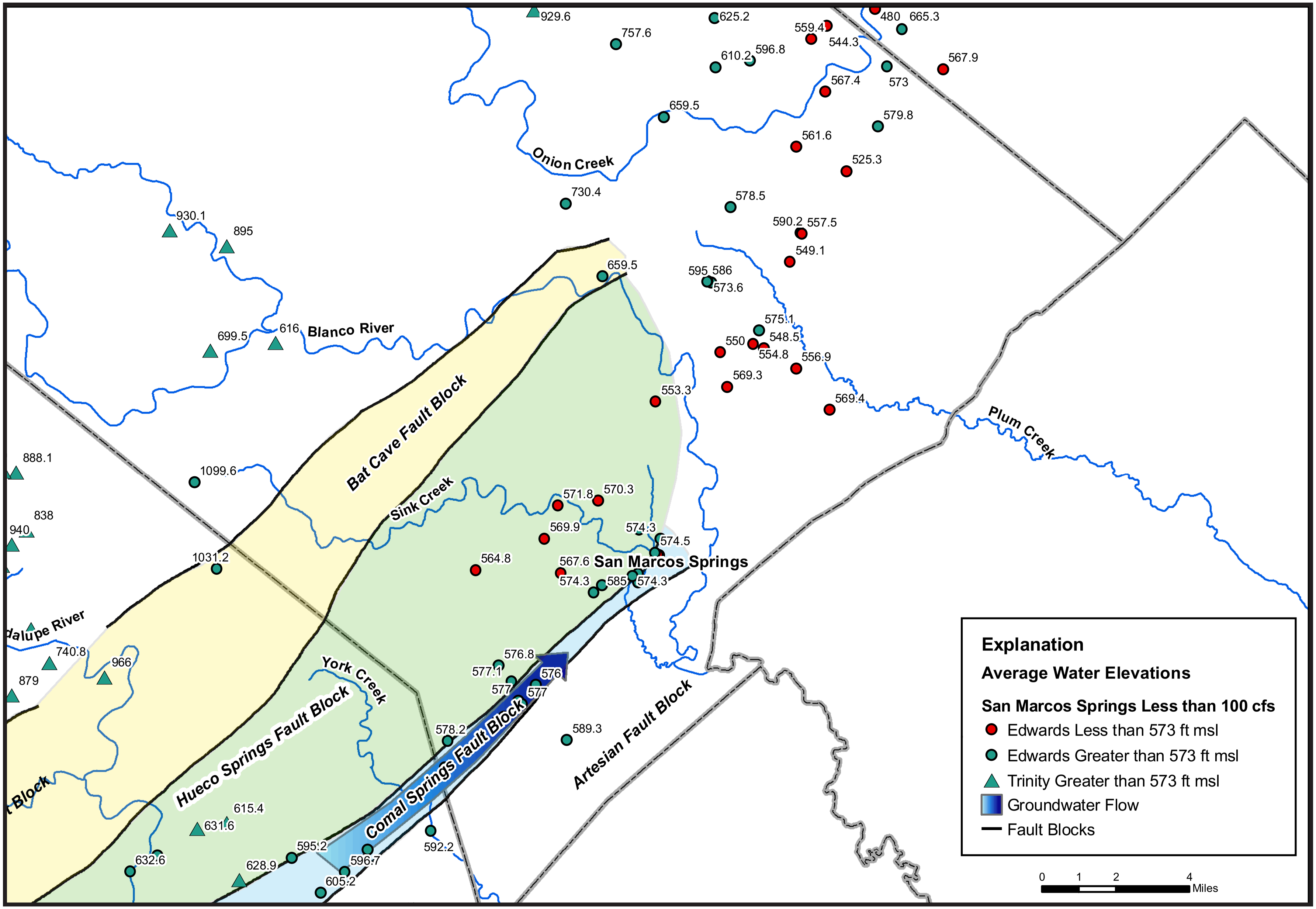


Figure 36. Average Water Levels when San Marcos Springs Discharge is Less than 100 cfs

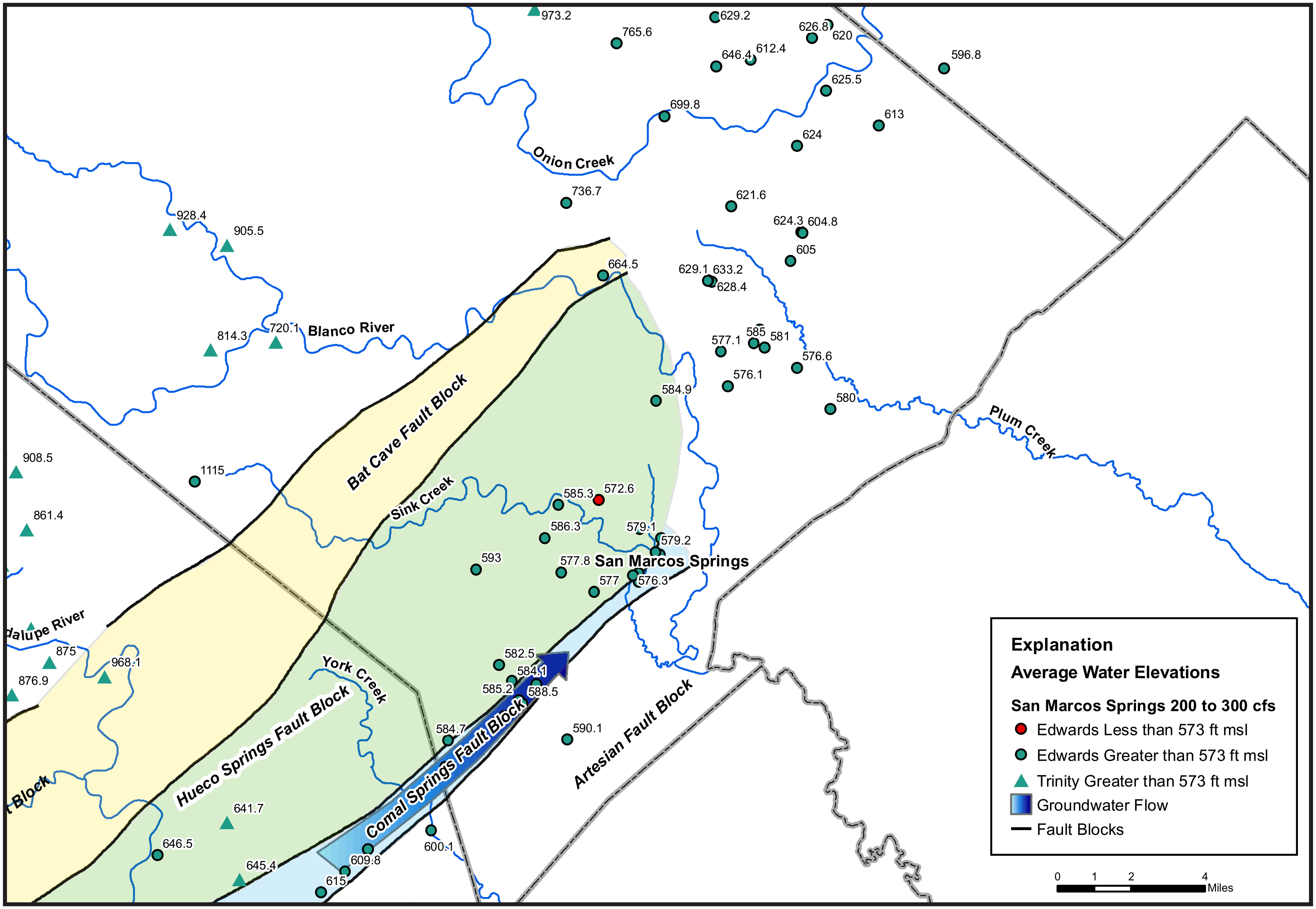


Figure 37. Average Water Levels when San Marcos Springs Discharge is 200 to 300 cfs

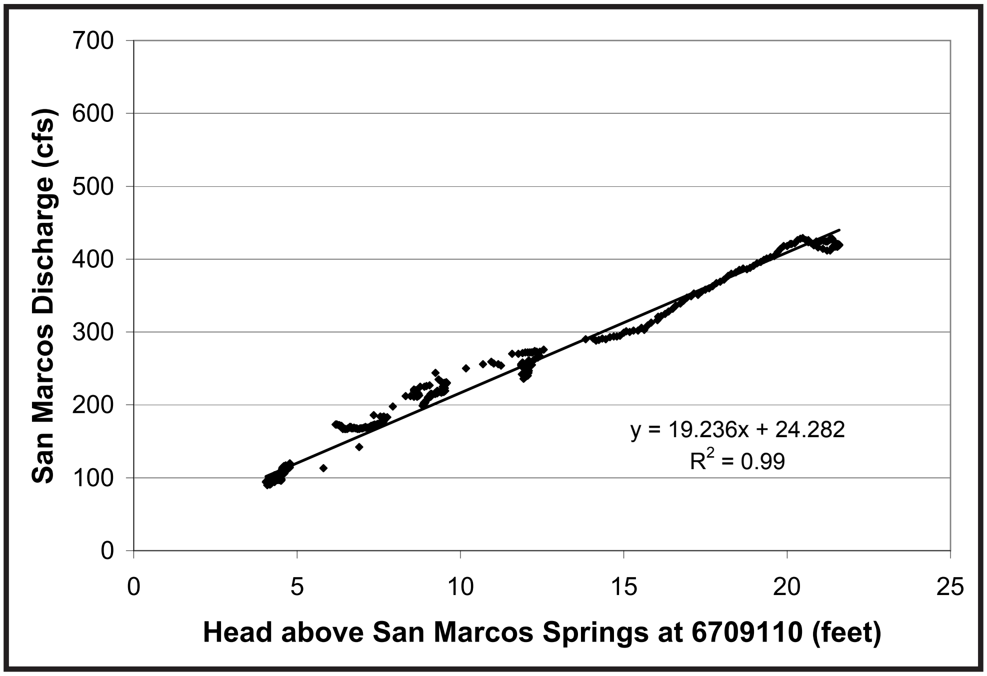


Figure 38. Correlation of the Potentiometric Surface at 6709110 (in feet above San Marcos Springs) and San Marcos Springs Discharge

levels in the Hueco Springs fault block are generally higher than San Marcos Springs elevation, so that area could be contributing water to San Marcos Springs. During low flow conditions, water from the Trinity Aquifer might also contribute flow to San Marcos Springs through interformational flow. The Authority performed tracer tests from Windy and Dakota Ranch caves in the Hueco Springs fault block to San Marcos Springs in October 2005 when springflow was approximately 170 cfs. Although groundwater velocities were calculated at approximately 700 feet per day from Windy Cave to San Marcos Springs, it was less than 100 feet per day from Dakota Ranch Cave to San Marcos Springs. Tracer test data do confirm the contribution of water from the Hueco Springs fault block at spring discharges above 100 cfs.

As shown in Figure 38, the relationship between San Marcos Springs and the Comal Springs fault block is represented by the hydrograph for well 6709110, which is located approximately 5 miles southwest of San Marcos Springs. The well is 634 feet deep in the Comal Springs fault block. Water level changes in the well correlate strongly with San Marcos discharge, and its water level is always higher than the elevation of 573 feet msl. Figure 39 indicates how the well responded to a July 20, 2007, storm event. The water level abruptly rose 10 feet, and specific conductance (SC) declined from 701 µS/cm to 687 µS/cm over a 22-day period. These responses indicate that infiltrating stormwater with lower SC associated with precipitation made its way to the San Marcos area. These responses also suggest that the well is on a highly transmissive flowpath to the springs.

Like the response of well 6709110, water table elevation in Ezell's Cave correlates highly with springflow and is always higher than the elevation of San Marcos Springs (Figure 40). The Authority has measured groundwater velocities of about 2,500 ft/day from Ezell's Cave to the springs using tracers. Velocities are somewhat slower than elsewhere in the aquifer because of the flat gradient. In addition, water levels in the Comal Springs fault block are generally higher than in Ezell's Cave. Water may flow across the San Marcos Springs fault from the Comal

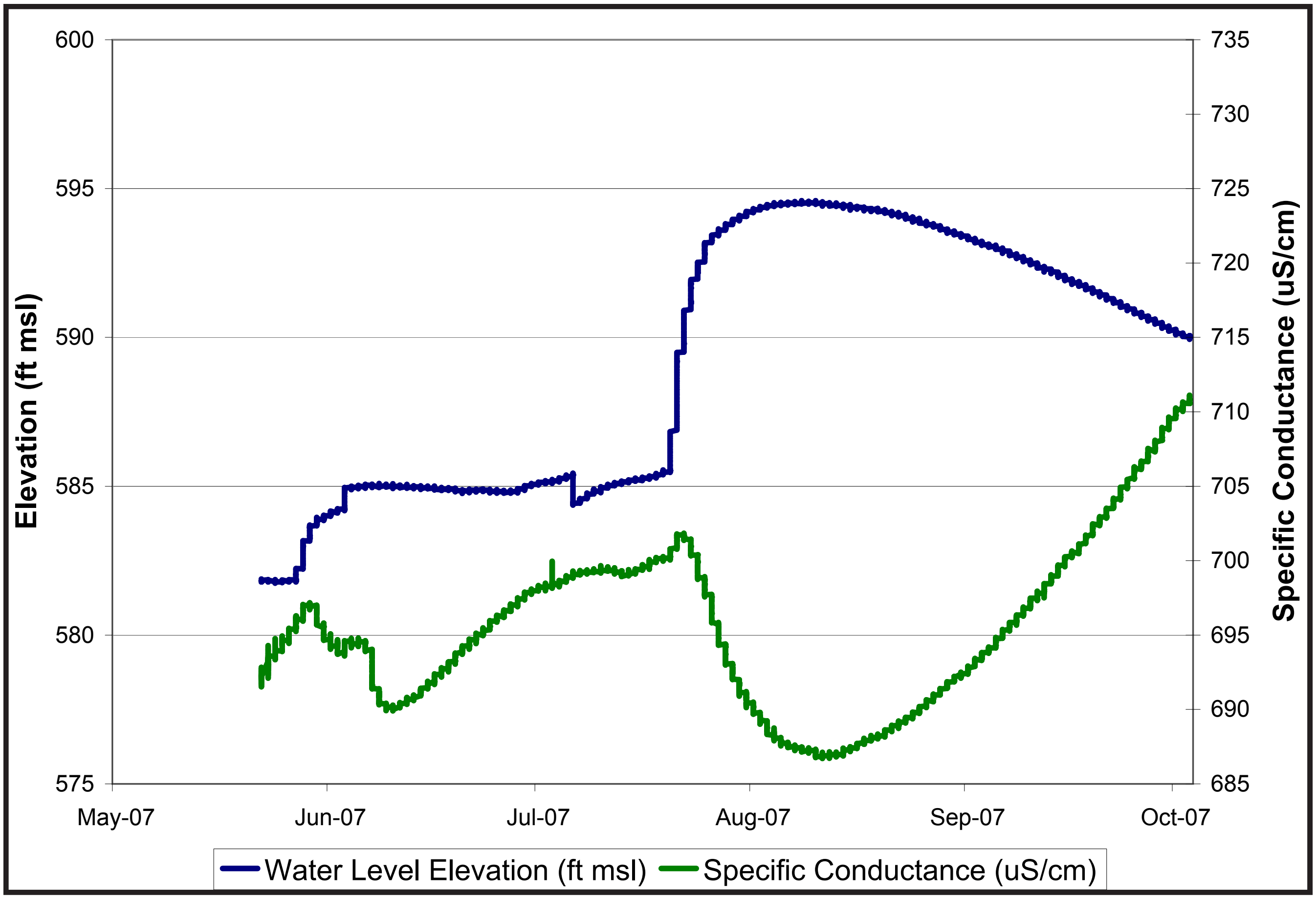


Figure 39. Hydrograph and Specific Conductance Measurements at 6709110

Springs fault block into the Hueco Springs fault block in the area of Ezell's Cave.

Figure 41 shows that Ezell's Cave also responds quickly to stormwater pulses. After the July 20, 2007, storm, water level in the cave abruptly rose six feet. Specific conductance declined sharply, indicating influx of recharge from the storm.

Wells 6823304 and 6816701 also offer insight into the flowpath between Comal and San Marcos springs. Well 6823304 (LCRA well) is in the Artesian fault block less than a mile from Comal Springs. Well 6816701 (Hwy 306 well) is in the Comal Springs fault block approximately three miles northeast of Comal Springs (Figure 8). Water flows upward from the Artesian fault block to the Comal Springs fault block near these two wells. The Comal Springs fault separates the two wells. The top of the Edwards Aquifer is 642 feet below ground at 6823304, according to geophysical logs, and seven feet below ground at 6816701, according to the TWDB groundwater database. Figure 42 compares Comal and San Marcos springs discharge and head differences, with Comal Springs orifice elevation (623 feet msl) at 6823304 and 6816701. The figure shows two recognizable signals, one associated with Comal Springs discharge and the other with San Marcos Springs discharge. Head differences at 6823304 are highly correlated with Comal Springs discharge, which has been established in previous sections. In the second signal, head differences between Comal Springs and water levels at 6816701 are highly correlated with San Marcos Springs discharge. The figure indicates that the head at 6816701 may be higher or lower than the Comal Springs orifice, depending on aquifer conditions in the Comal Springs fault block. Water

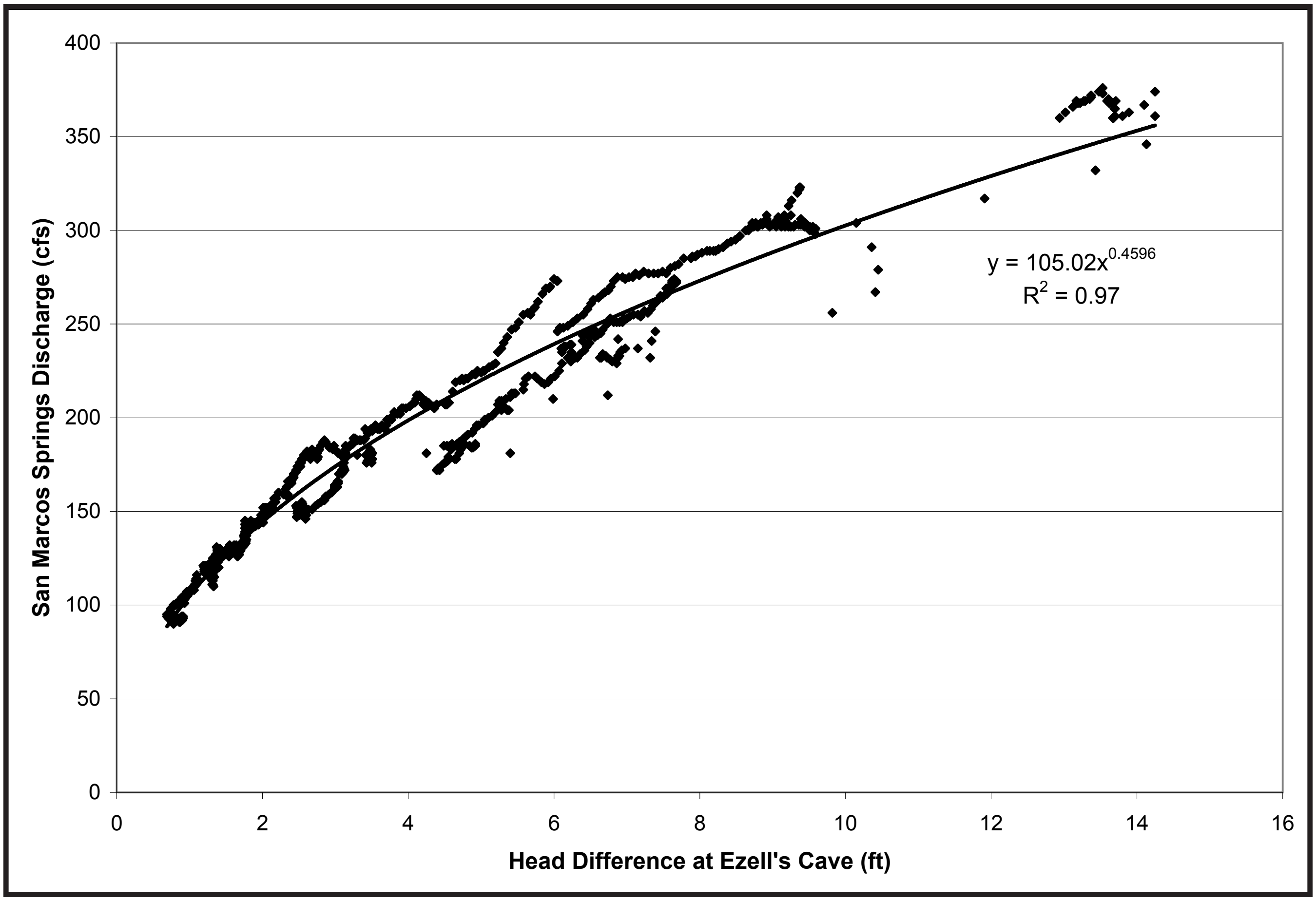


Figure 40. Correlation of the Potentiometric Surface at Ezell's Cave (in feet above San Marcos Springs) and San Marcos Springs Discharge

levels at 6816701 reflect the hydraulic connection between Artesian and Comal Springs fault blocks, which is controlled by rate of recharge from Artesian and Comal Springs fault blocks and rate of discharge from Comal Springs. When the 6816701 water level is lower than the Comal Springs orifice, water flows toward San Marcos. When it is higher than the orifice, water backs up in the fault block, possibly forcing more discharge from orifices in the Comal Springs fault block (for example, Spring Runs 1, 2, and 3).

Figure 42 also indicates that the potentiometric surface (head) in the area of 6816701 hydraulically drives discharge at San Marcos Springs. The head at 6816701 is related directly to San Marcos Springs discharge, which suggests that it is the principal influence on San Marcos Springs discharge. Figure 42 may also indicate proportions of local and regional recharge for San Marcos Springs. From April 2003 until January 2007, the head at 6816701 and San Marcos discharge tracked so closely that virtually all of the water for San Marcos Springs seems to have originated from the Comal Springs fault block. In January 2007, the lines diverged, suggesting that other sources of water such as local recharge contributed to springflow.

Hydraulic conditions in the Comal Springs fault block change when the head at 6816701 is the same as the Comal Springs orifice. Figure 43 indicates the correlation between head difference at 6816701 and Comal Springs orifice elevation. The difference is noticeable between slopes when head difference is negative (below the orifice) and when it is positive (above the orifice). Average discharge at Comal Springs when the head at 6817601 is the same as

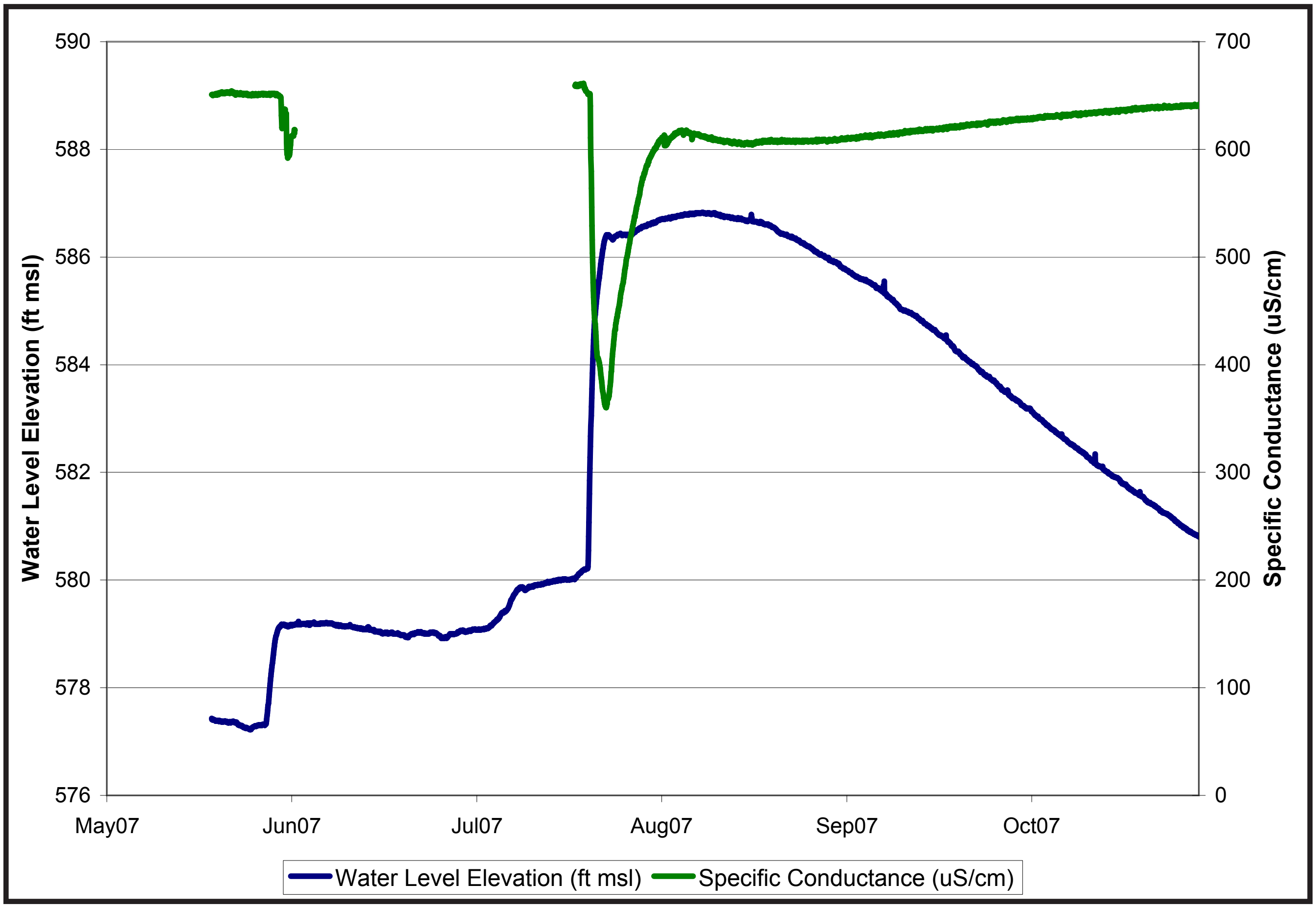


Figure 41. Hydrograph and Specific Conductance Measurements for Ezell's Cave

when the orifice is approximately 376 cfs. This hydraulic connection provides some insight into the low correlation between Comal and San Marcos springs discharge. Connection between the two springs is the net result of the volume of water discharging from Comal Springs and transmissivity of the aquifer in the area of 6816701. Under high-flow conditions, turbulent groundwater flow may also regulate the rate of water that passes by 6816701.

Relationship between the Comal Springs fault block and San Marcos Springs can be shown on a potentiometric surface map. Figure 44 shows the potentiometric surface for the San Marcos Springs area in August 1956. At that time, which predated the stream gauge on the San Marcos River, San Marcos Springs discharge was less than 100 cfs (it was 60 cfs in October 1956). Comal Springs had stopped flowing in June 1956, and spring discharge did not return until November 1956. These contour lines were drawn by Garza (1962) to show the potentiometric surface under low-flow conditions. As Figure 36 indicates, groundwater levels are just above San Marcos Springs elevation (573 feet). The widely spaced contours indicate that the groundwater surface is relatively flat near San Marcos Springs. The north-south alignment of the 680-foot contour indicates an easterly gradient, which would cause groundwater to flow past San Marcos Springs and on to Barton Springs, a scenario that is also consistent with the average water levels in Figure 36. Consequently, the northern springs probably contribute little if any water to total springflow during extreme droughts. Water level in the aquifer near the springs must rise

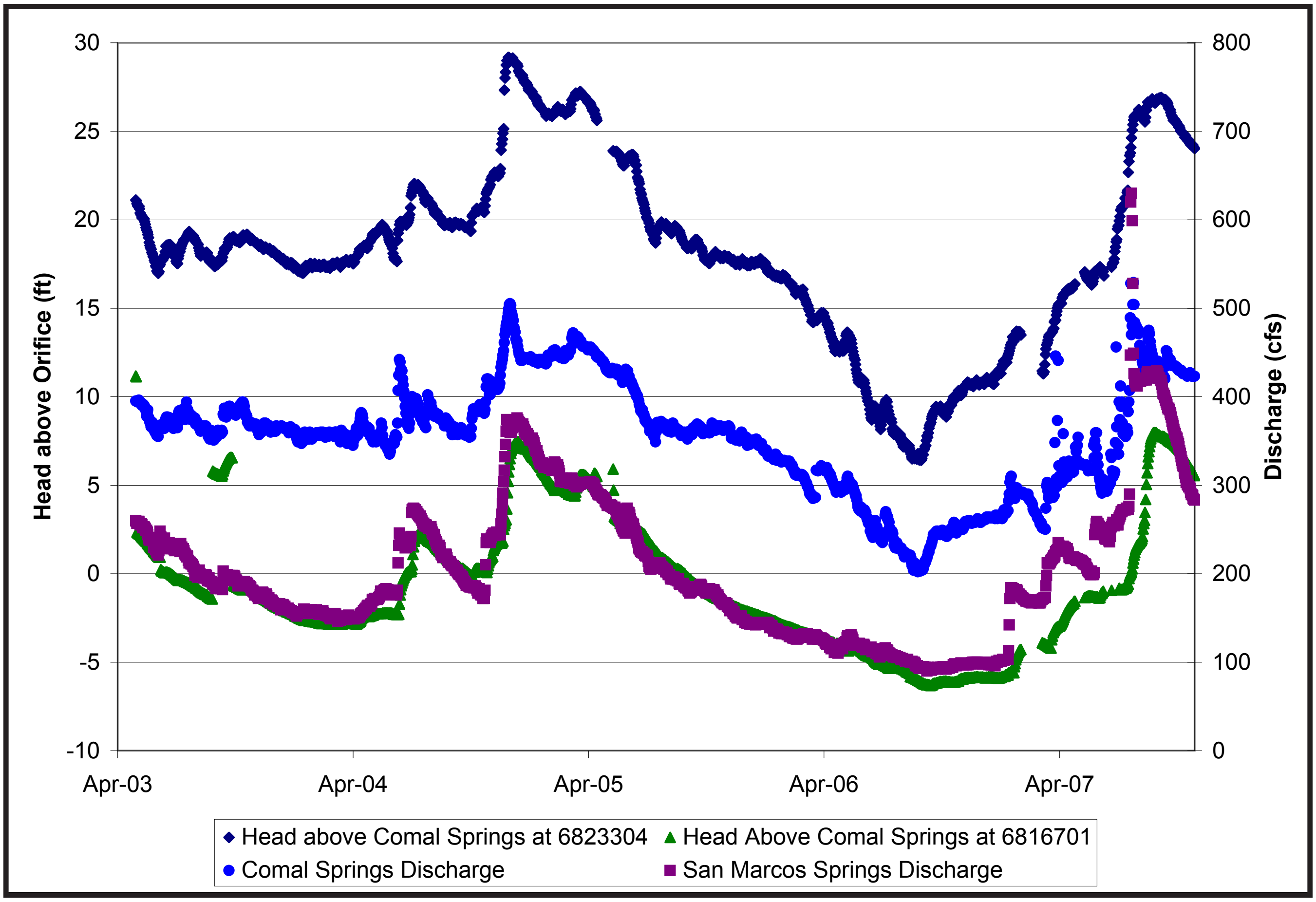


Figure 42. Comparison of Comal and San Marcos Springs Discharge and Water Levels at 6816701 and 6823304

above San Marcos Springs elevation before the northern springs activate. In the Hueco Springs fault block, contours form a groundwater divide along the axis of the Blanco River, meaning that the springs can capture only a fraction of any infiltrating water from the river.

As each potential source of recharge is activated by precipitation, discharge at San Marcos Springs increases. The most continuous source of recharge is groundwater flowing from the Artesian fault block through the Comal Springs fault block. Figure 45 was prepared to estimate the order in which water from potential recharge sources appear at San Marcos Springs. It consists of a cumulative frequency curve for San Marcos Springs discharge as a function of average head difference between J-17 and San Marcos Springs elevation (573 ft) for the period of record (1956–2007). For example, at 200 cfs, average head difference with the J-17 water level is 96 feet (above San Marcos Springs elevation of 573 feet), although measured heads ranged from 75 to 118 feet. Shape of the curve provides some insight into sources of recharge. Each break in slope is interpreted to signal addition of water from one or more sources arriving at the springs. The curve shows breaks in slope at approximately 130 and 200 cfs. The break at 130 cfs is interpreted to be the maximum discharge that the Artesian fault block supplies before other sources begin contributing. As shown in Figure 36, water levels in Comal and Hueco springs fault blocks typically drop below San Marcos Springs elevation (573 ft) at low flows, which precludes local recharge. Between 130 and 200 cfs, it is interpreted that water infiltrated

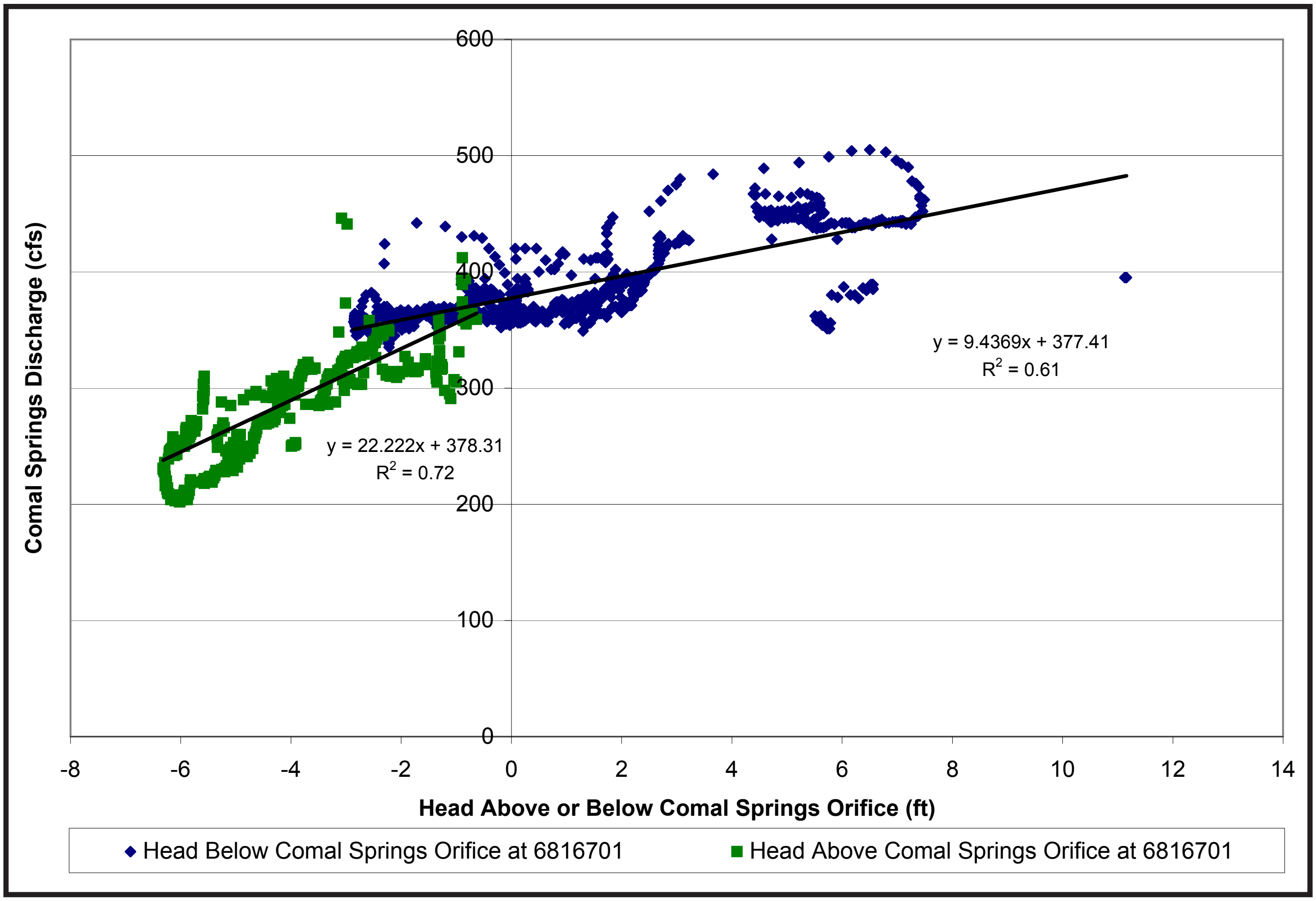


Figure 43. Correlation of the Potentiometric Surface at 6816701 (in feet above or below Comal Springs) and Comal Springs Discharge

from Cibolo Creek and the Guadalupe River flows through Comal and Hueco springs fault blocks to San Marcos Springs. Although there are potential sources in Hays County (for example, the Blanco River), the hydraulic gradient from Comal County would be steeper, which would be more favorable than local sources. Above 200 cfs, many potential sources may be activated, including local streams and the Trinity Aquifer. Local recharge is also enhanced when water infiltrating from Onion Creek creates a groundwater divide northeast of San Marcos Springs. The divide creates a hydraulic gradient toward the southwest and probably activates the northern spring orifices. In addition, contributions from the Artesian and Comal Springs fault blocks will increase proportionately with the head difference with J-17.

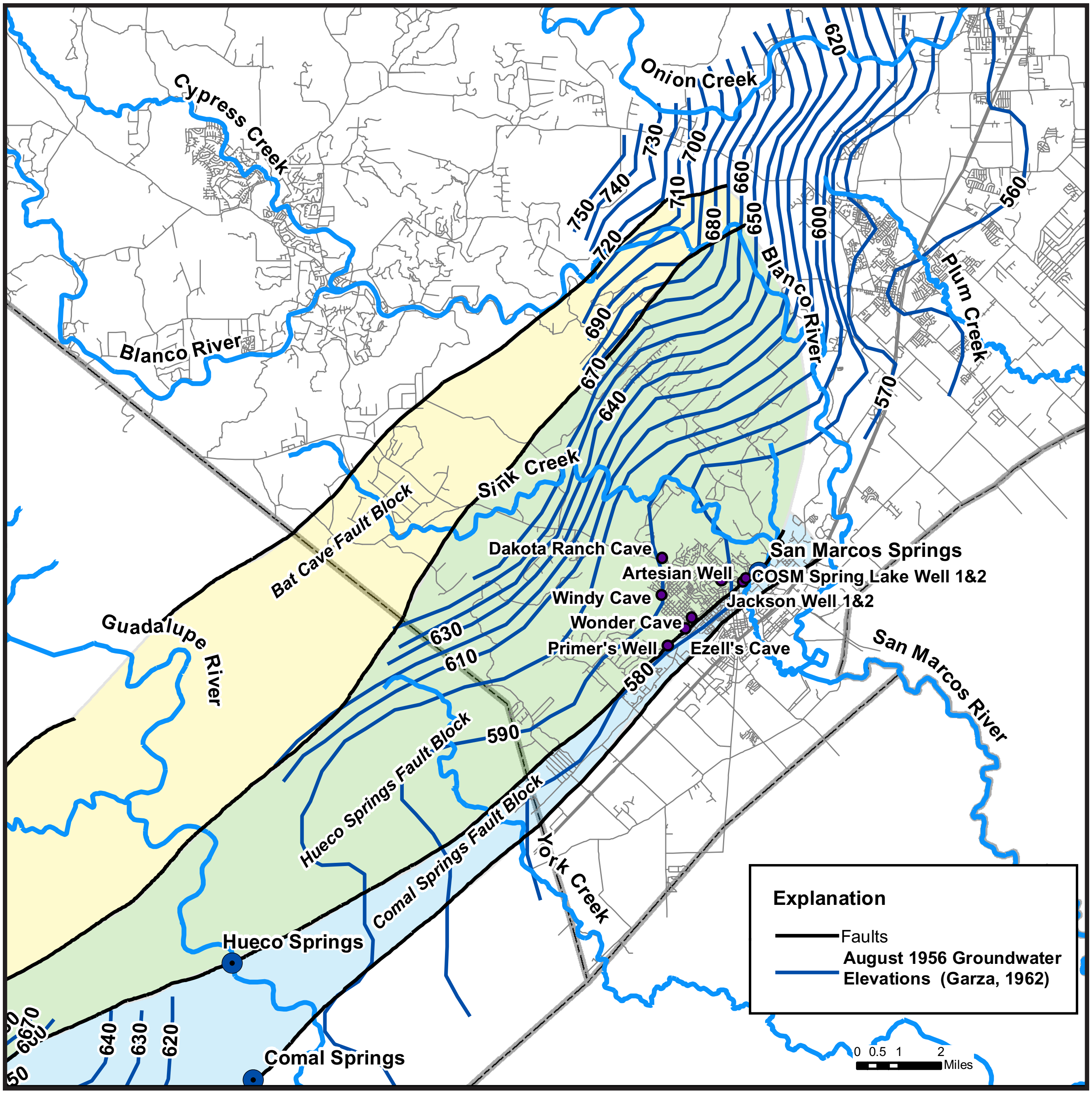


Figure 44. Potentiometric Surface from 1956 in the San Marcos Springs Area

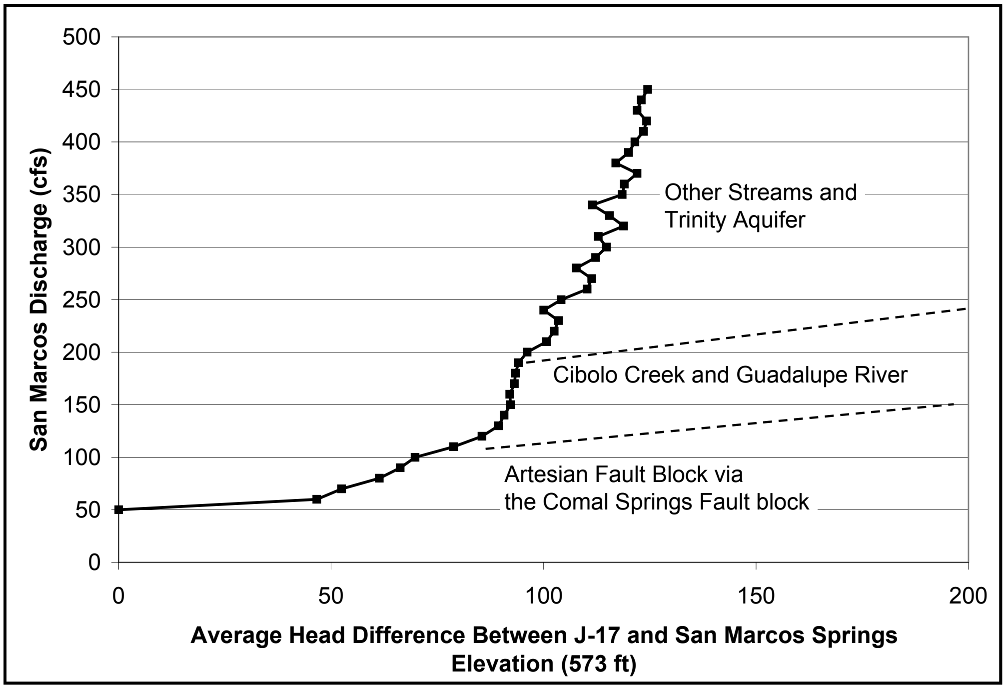


Figure 45. Sources of Recharge to San Marcos Springs

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

San Marcos Springs is hydrologically defined by the sources of water that change with groundwater elevations and aquifer conditions. The main source of water for San Marcos Springs is groundwater from the Comal Springs fault block, which sustains discharges up to approximately 100 cfs. This amount of discharge corroborates with estimates of 50 to 100 cfs by LBG-Guyton Associates (2004). The water originates from the Artesian fault block, and it was the primary source of water during dry conditions such as during 1956 and 2006. At low flows, groundwater levels in the Hueco Springs fault block are below the elevation of San Marcos Springs, and groundwater flows past San Marcos Springs toward the northeast. When wetter conditions generate higher flows, which are more common than low-flow conditions, San Marcos Springs potentially receive water from

- The Artesian fault block via the Comal Springs fault block,
- The Blanco River,
- The Guadalupe River via the Hueco Springs fault block,
- The Guadalupe River via the Comal Springs fault block,
- Cibolo Creek via the Hueco Springs fault block,
- Dry Comal, Sink, Purgatory, York, and Alligator creeks, and
- The Trinity Aquifer.

Geographic distribution of rainfall also influences which sources are activated. In general, the Guadalupe River and Cibolo Creek probably contribute more than the Blanco River, and the Trinity Aquifer contributes a potentially large, but unknown, volume of water, mainly under wet conditions.

The area of contribution for San Marcos Springs can generally be defined as the Comal Springs fault block upgradient of Spring Lake. The Comal Springs fault block is bounded on the northwest by the Hueco Springs fault and on the southeast by the Comal Springs fault and Artesian fault block. Near Comal Springs, the Artesian fault block provides water to Comal Springs and also recharges the Comal Springs fault block. Near San Marcos Springs, the Artesian fault block contains saline water and does not contribute significant volumes of water to San Marcos Springs. Because the Comal Springs fault block extends beneath Cibolo Creek and into Bexar County, it cannot be isolated from the surrounding hydrologic system, especially at low flows (for example, less than 100 cfs). Historically, water from the western portion of the aquifer continued to flow to San Marcos Springs even when Comal Springs stopped flowing and San Marcos springs discharge declined to 59 cfs. Consequently, the upgradient area in Bexar County is a constant source of water, although the potentiometric head varies with climatological conditions.

Although the Artesian fault block ultimately supplies both Comal and San Marcos springs with at least baseflow, their discharges are poorly correlated. As groundwater flows upward from the Artesian fault block into the Comal Springs fault block, the head relationship with the Bexar County Index Well is modified or lost, which is indicated by the low correlation between J-17 water levels and San Marcos Springs discharge. Groundwater flow to San Marcos Springs is regulated by Comal Springs, which releases some of the water that flows into the Comal Springs fault block, and transmissivity of the aquifer.

The purpose of the report is to determine whether there is sufficient technical justification for distinct aquifer management rules for the designation of a San Marcos pool in the San Marcos area regarding critical period management. The principal study questions are:

- Are there hydrogeologic conditions or geologic features that indicate that a significant part of the groundwater system discharging at San Marcos Springs is isolated from the San Antonio Pool (for example, groundwater divide, barrier fault)?
- What is the distance from San Marcos Springs beyond which Edwards Aquifer groundwater withdrawals do not appreciably affect springflow?

Findings of this report clearly indicate that a significant volume of water discharging from San Marcos Springs during low-flow conditions is derived from the westerm portion of the aquifer. Therefore, the study concluded that the San Marcos area is not isolated from other pools.

Results of this study indicate that

- During low-flow conditions (<100 cfs), more than 90 percent of the discharge at San Marcos Springs is derived from the western portion of the aquifer;
- From the western portion of the aquifer, groundwater flows through the Artesian fault block to the Comal Springs fault block then bypasses Comal Springs and discharges at San Marcos Springs;
- At higher discharges, San Marcos Springs is recharged by water infiltrating from Cibolo Creek, Guadalupe River, Dry Comal Creek, Sink Creek, Blanco River, and other streams. Despite the large volume of water that these streams carry at times, they contribute relatively small amounts to San Marcos springflow;
- Well J-17 water levels strongly correlate with discharge at Comal Springs because of the highly transmissive flowpath through the Artesian fault block, but correlate poorly with San Marcos Springs because of the complex flowpath from the Artesian fault block to the Comal Springs fault block;
- When San Marcos Springs discharge is less than 100 cfs, Cibolo Creek, Guadalupe River, Blanco River, and other creeks and streams in Comal and Hays counties contribute a small percentage of water to San Marcos Springs discharge; and
- Because most of the flow at San Marcos Springs is derived from the western portion of the aquifer during low-flow conditions, there is not sufficient technical justification to create a separate San Marcos "Pool."

Recommendations

Given the findings of this report, the following recommendations are made:

- Hays and Comal counties should continue to be included within the San Antonio Pool (Medina, Bexar, Comal, Hays, Atascosa, Guadalupe, and Caldwell counties) for critical period management. Critical period rules for the San Antonio Pool should be based on water levels in the Bexar County Index Well and flows at Comal and San Marcos springs.
- The Authority should establish a "Hays County" Index Well within the Comal Springs fault block near the City of San Marcos. This well's water level should have a strong correlation with discharge at San Marcos Springs.

After collection of a sufficient history of water level data, the well should be evaluated to determine whether it is suitable for calculating critical period trigger levels.

- The Authority will continue to collect hydrogeologic data in Comal and Hays counties to refine its understanding of groundwater flow in the region, as described in the Future Data Needs section.

Future Data Needs

This study was based on existing data collected from the San Marcos Springs hydrologic system by the Authority, the TWDB, the USGS, SAWS, and other agencies and private entities. Although a tremendous amount of information exists about the Edwards Aquifer, only part of it was collected with the objective of identifying sources of water for San Marcos Springs. Using the inventory of existing data and conclusions generated by this report, the Authority will design a data collection program to refine our understanding of San Marcos Springs hydrogeology. The Edwards Aquifer is characterized by dynamic responses to rainfall and anisotropic groundwater conditions. Whereas annual or monthly measurements of water levels or water quality are valuable, daily or more frequent measurements are necessary to characterize or quantify aquifer conditions completely. The focus of additional data will be high-frequency (that is, daily or more frequent) measurements. This section describes additional data that may be collected to verify and quantify the findings of this study.

Water Level Measurements. At least daily water level measurements are needed in all key wells in the study. Most water levels in the TWDB groundwater database were measured less frequently than annually. Daily or more frequent measurements are needed in the following locations: upgradient and downgradient of Hueco, Comal, and San Marcos springs in each fault block adjacent to Cibolo Creek, the Guadalupe River, and the Blanco River; and in the Trinity Aquifer.

Water Quality. Perhaps the greatest data need is high-frequency water quality measurements, especially during precipitation events. Rain events offer an opportunity to trace groundwater flowpaths because they introduce low-conductivity water into the aquifer. Closely spaced (that is, daily to hourly) samples may reveal how groundwater mixes in the aquifer and how fast it travels from recharge areas to the springs. Important parameters are major anions and cations: oxygen, hydrogen, and strontium isotopes and strontium.

Tracer Tests. Additional tracer tests are necessary to verify groundwater flowpaths and velocities to the springs. Successful tracer tests provide empirical knowledge of groundwater flow. Tests are needed during both wet and dry conditions in the aquifer. Tests may be used to investigate the interaction of groundwater with Cibolo Creek, the Guadalupe River, and the Blanco River. Tests are also needed to identify the flowpath from the Artesian fault block to the Comal Springs fault block and to measure the volume of groundwater flow crossing faults near the springs.

River Systems. Rivers near San Marcos Springs carry thousands of cubic feet per second of water, although relatively little of it reaches the springs, which is one of the paradoxes of the Edwards Aquifer hydrologic system. Unlike the western portion of the aquifer, where rivers crossing the recharge zone lose most or all of their flow, the Guadalupe and Blanco rivers and Cibolo Creek, to a certain degree, lose only a small fraction of their flow to the aquifer. Tracer tests and frequent water level measurements are key data for interpreting the hydrologic relationship between rivers and springs.

Fault Blocks. Major fault blocks appear to restrict groundwater movement perpendicular to strike. Existing groundwater elevation measurements show up to 20 ft of head difference across the faults—a point needing further study. Additional data needs include high-frequency groundwater level measurements in pairs of wells that straddle the faults to verify presence of a gradient and tracer tests to quantify any flow that may be occurring.

Groundwater Withdrawals. High-frequency withdrawal measurements are needed to investigate the impact of pumping on springflow. Currently, only monthly or annual withdrawal measurements are required, but more frequent measurements are necessary to characterize effects of pumping on springflow. Important wells are high-capacity wells at cities, quarries, and other water users near the springs.

Geophysical Logs. Geophysical logs are needed at each of the key wells in the study to fill in data gaps in stratigraphy.

Well Survey. Finally, elevation surveys for all key wells must be performed to tie all wells to a common benchmark so that their water levels may be compared. Locations and elevations of many wells in this study were taken from topographic maps. Key wells must be surveyed using a differential survey or survey-grade GPS system.

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APPENDICES

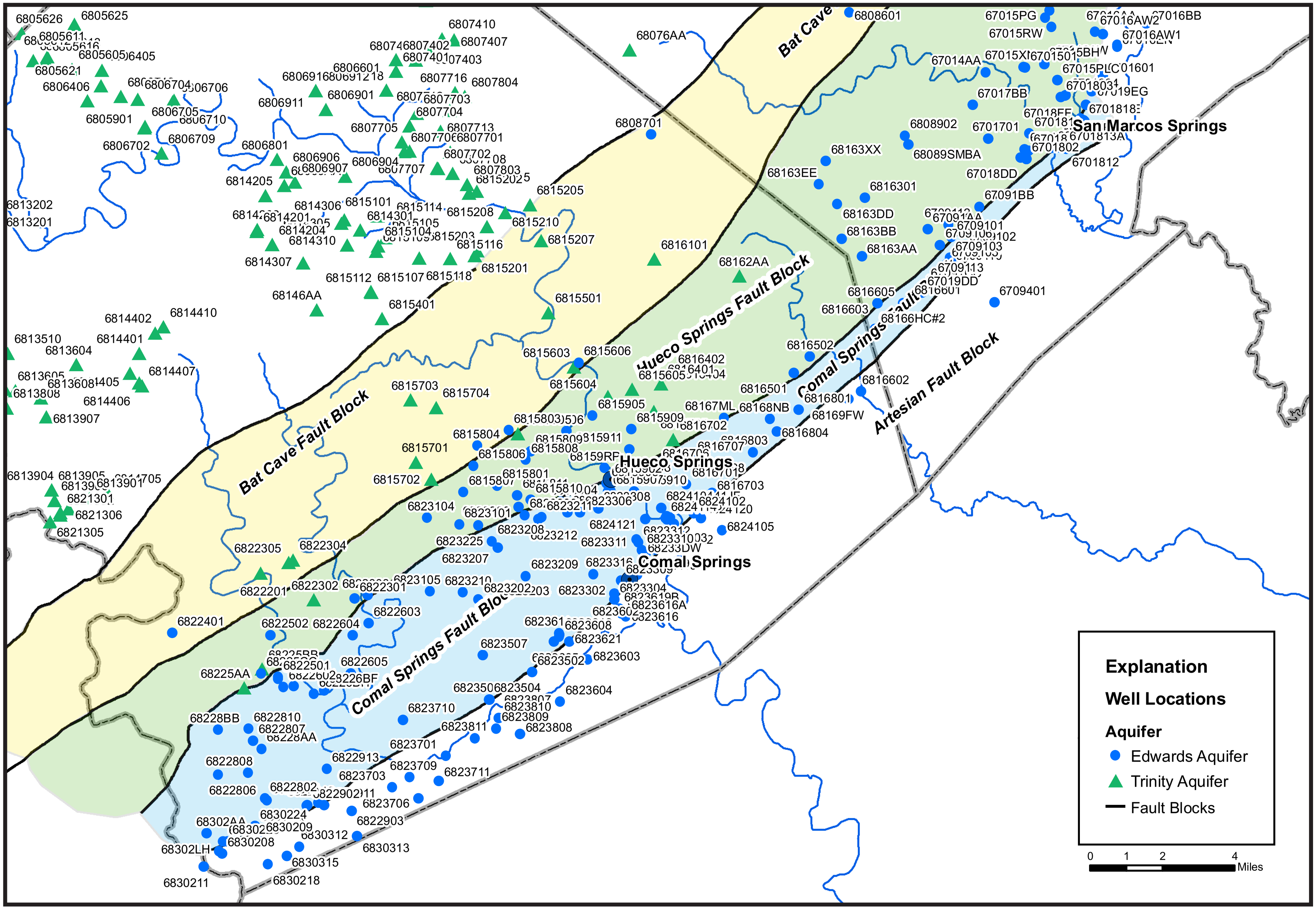

Figure A-1. Well Location Map of Comal Springs

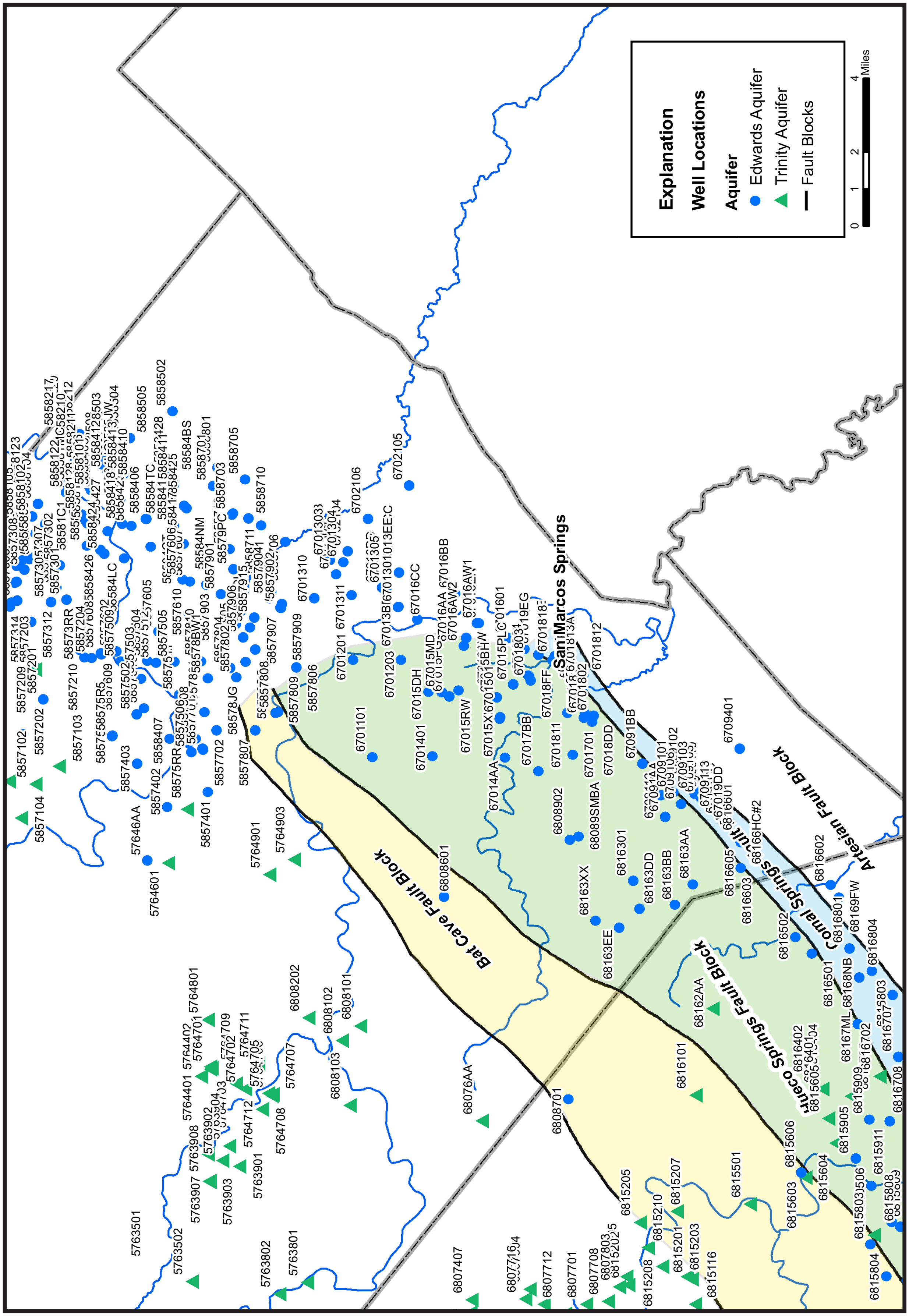

Figure A-2. Well Location Map of San Marcos Springs

Table A-1. Average Water Levels for Different Comal Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
5747501	217HSTN	30.316944	-98.178611	935.3 (2)	935.2 (1)	936.4 (2)	943 (1)
5747502	217HSTN	30.316111	-98.178889	None	None	None	926 (1)
5747801	218GRLH	30.253889	-98.172222	1084.6 (2)	None	None	None
5747901	218GLRSL	30.258889	-98.13	1136.2 (5)	None	1161.8 (1)	1200.3 (2)
5747902	218GLRS	30.258888	-98.129999	1185.1 (17)	None	1199.8 (1)	1201 (6)
5748809	218GLRS	30.254167	-98.051667	None	None	719.2 (1)	None
5755301	218GLRS	30.212778	-98.133056	1017.2 (2)	None	None	None
5755401	218GRHC	30.196111	-98.2125	1088.2 (9)	1037.2 (1)	1050.7 (3)	1075.4 (8)
5755501	218GRCCU	30.201111	-98.199444	1023.2 (3)	None	None	None
5755601	218GRHC	30.184167	-98.146111	1020.4 (4)	None	978.8 (1)	992.6 (3)
5755602	218GLRS	30.206944	-98.129167	None	None	None	940 (1)
5755603	218GLRH	30.202222	-98.161667	1041.1 (4)	None	None	1038.3 (1)
5755605	218GRHC	30.207222	-98.131389	1019 (1)	None	None	None
5755607	218GLRSL	30.184166	-98.13861	967.6 (2)	None	None	956.3 (7)
5755901	218GLRSL	30.1625	-98.133333	1032 (1)	None	None	None
5756101	218GLRS	30.232222	-98.116667	970 (1)	None	None	None
5756201	218GLRSU	30.249167	-98.061389	1017 (1)	None	None	None
5756203	218GLRSU	30.248889	-98.075278	1020 (1)	None	None	None
5756204	218GLRS	30.239444	-98.0525	933.4 (3)	None	None	924.2 (1)
5756302	218GLRS	30.2225	-98.001667	830 (1)	None	None	821.9 (2)
5756303	218GLRS	30.222222	-98.001667	784 (1)	None	None	826.4 (2)
5756402	218GLRSU	30.195556	-98.088333	None	None	None	1155.5 (1)
5756403	218GLRSL	30.198056	-98.088056	None	None	None	1025.1 (1)
5756404	218GLRSU	30.198056	-98.088333	None	None	None	1142.8 (1)
5756405	218GLRSL	30.193611	-98.089167	None	None	None	1031 (1)
5756406	218GLRSL	30.193611	-98.088611	None	None	None	1031.6 (1)
5756407	218GLRSL	30.192778	-98.088611	None	None	None	1075.8 (1)
5756408	218GLRSL	30.191111	-98.090278	None	None	None	1010.5 (1)
5756409	218GLRSL	30.190278	-98.09	None	None	None	1010.3 (1)
5756410	218GLRSL	30.190278	-98.089167	None	None	None	1062.8 (1)
5756411	218GLRSU	30.192222	-98.094444	None	None	None	1139 (1)
5756412	218GLRSU	30.193056	-98.088889	None	None	None	1154 (1)
5756413	218GLRSL	30.193333	-98.087222	None	None	None	1026.5 (1)
5756415	218GLRSU	30.194167	-98.089444	None	None	None	1155.8 (1)
5756416	218GLRSL	30.196111	-98.089167	None	None	None	1027.8 (1)
5756417	218GLRSU	30.198889	-98.087222	None	None	None	1137.4 (1)
5756422	218GLRS	30.200833	-98.088056	None	None	None	1084 (1)
5756424	218GLRSU	30.196389	-98.088889	None	None	None	1154.6 (1)
5756425	218GLRSL	30.1975	-98.088611	None	None	None	1070.4 (1)
5756427	218GLRSL	30.198889	-98.088333	None	None	None	1025.4 (1)
5756428	218GLRSU	30.199722	-98.088333	None	None	None	1147.6 (1)
5756429	218GLRSU	30.199722	-98.088333	None	None	None	1148.5 (1)
5756432	218GLRSL	30.1925	-98.095556	None	None	None	1028 (1)
5756433	218GLRSL	30.192222	-98.098056	None	None	None	1045.6 (1)
5756434	218GLRSL	30.192222	-98.098056	None	None	None	985.4 (1)
5756438	218GLRSU	30.191111	-98.085556	None	None	None	1149 (1)

Table A-1. (cont.) Average Water Levels for Different Comal Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
5756439	218GLRSL	30.204167	-98.088333	None	None	None	1027.9 (1)
5756440	218GLRSU	30.207222	-98.089167	None	None	None	1139 (1)
5756442	218GLRSL	30.181667	-98.084444	None	None	None	1007.7 (1)
5756443	218GLRSL	30.184444	-98.085	None	None	None	1006 (1)
5756444	218GLRSL	30.188611	-98.086944	None	None	None	1005.3 (1)
5756447	218GLRSL	30.188889	-98.086389	None	None	None	1001.8 (1)
5756450	218GLRSL	30.171667	-98.090556	None	None	None	941.9 (1)
5756451	218GLRSL	30.167778	-98.093889	None	None	None	963 (1)
5756455	218GLRSL	30.188333	-98.086944	None	None	None	1013 (1)
5756459	218GLRSL	30.191389	-98.091111	None	None	None	1045 (1)
5756461	218GLRSU	30.191667	-98.089722	None	None	None	1131.7 (1)
5756463	218GLRSL	30.183889	-98.093333	None	None	None	1006.2 (1)
5756465	218GLRSL	30.181111	-98.092778	None	None	None	1002.3 (1)
5756466	218GLRSL	30.178056	-98.091667	None	None	None	1006.9 (1)
5756467	218GLRSL	30.183889	-98.09	None	None	None	1005.6 (1)
5756469	218GLRSL	30.1825	-98.088056	None	None	None	1004.4 (1)
5756470	218GLRSL	30.191667	-98.102778	None	None	None	1024 (1)
5756471	218GLRSL	30.179167	-98.085833	None	None	None	1001 (1)
5756472	218GLRSU	30.189444	-98.090556	None	None	None	1131.3 (1)
5756476	218GLRSU	30.197778	-98.086944	None	None	None	1142 (1)
5756501	218GLRSL	30.200278	-98.080556	None	None	None	977.2 (1)
5756502	218GLRSU	30.199722	-98.080833	None	None	None	999.7 (1)
5756503	218GLRSL	30.194722	-98.075556	1027 (1)	None	None	977.7 (1)
5756506	218GLRSU	30.1825	-98.083056	None	None	None	1131.5 (1)
5756507	218GLRSU	30.181944	-98.083333	None	None	None	1133 (1)
5756508	218GLRSL	30.180833	-98.083333	None	None	None	1006.7 (1)
5756509	218GLRSU	30.181111	-98.082778	None	None	None	1133.8 (1)
5756510	218GLRSL	30.188889	-98.082778	None	None	None	1008.3 (1)
5756511	218GLRSL	30.184722	-98.075833	None	None	None	994 (1)
5756513	218GLRSL	30.170278	-98.074167	991.5 (2)	None	None	None
5756516	218GLRSL	30.170556	-98.076944	None	None	None	942.7 (1)
5756517	218CCRK	30.194722	-98.054444	962.5 (1)	None	None	None
5756601	218GLRSL	30.207778	-98.033056	899.4 (2)	None	None	None
5756701	218GLRS	30.141667	-98.100278	1020 (1)	None	None	None
5756702	218HCSH	30.154167	-98.085	959 (2)	911 (1)	896.9 (4)	877 (1)
5756703	218CCRK	30.153611	-98.086111	1017.5 (1)	None	917.4 (2)	930.5 (2)
5756704	218CCRK	30.151389	-98.086944	963.2 (3)	914.5 (2)	923.4 (4)	933.5 (2)
5756705	218GLRS	30.164722	-98.084167	None	None	None	1064.4 (1)
5756707	218GLRSL	30.165	-98.083611	None	None	None	1004.4 (1)
5756708	218GLRSU	30.144722	-98.114444	None	None	None	923 (1)
5756709	218CCRK	30.151389	-98.086944	986.9 (3)	920 (1)	923.1 (2)	963.7 (8)
5756710	218CCRK	30.126389	-98.103889	1029.5 (6)	None	1015.9 (2)	1038.4 (4)
5756711	218CCRK	30.1275	-98.103333	None	None	None	1020 (1)
5756801	218GLRSL	30.163889	-98.07	None	None	None	945.4 (1)
5756902	219SLGH	30.152778	-98.030556	730.9 (1)	None	None	728.1 (2)
5756903	218CCRK	30.134722	-98.008611	895.1 (1)	None	835 (1)	None

Table A-1. (cont.) Average Water Levels for Different Comal Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
5756904	218GLRS	30.153056	-98.030833	918.3 (1)	None	None	None
5762302	218GLRS	30.108611	-98.269722	None	1111.6 (1)	None	None
5763501	218LGRLH	30.065833	-98.189722	968 (2)	None	None	956.6 (1)
5763502	218GLRSL	30.046389	-98.201389	None	None	None	956.4 (1)
5763701	217HSTN	30.037778	-98.241667	919.6 (5)	None	None	876 (1)
5763702	219SLGH	30.039444	-98.235556	964.2 (3)	None	None	939 (1)
5763703	218GRHC	30.037778	-98.241944	969.8 (6)	None	None	968.6 (1)
5763705	217HSTN	30.034722	-98.241111	923.9 (85)	None	None	926.2 (13)
5763801	218CCRK	30.001111	-98.202222	930.1 (4)	None	None	920.2 (2)
5763802	218GLRS	30.011944	-98.207222	934 (2)	None	None	None
5763804	217HSCC	30.034722	-98.177222	947.3 (14)	None	942.6 (1)	948.2 (1)
5763901	218GLRSL	30.0275	-98.149444	930 (1)	None	None	963 (1)
5763902	218GLRSL	30.034166	-98.146666	928.2 (7)	None	935.8 (2)	923.2 (3)
5763903	218GLRSL	30.039444	-98.156111	945.6 (1)	None	None	920.7 (2)
5763904	218CCRK	30.031389	-98.140278	928.3 (6)	None	930.1 (4)	923.3 (3)
5763907	218GLRSL	30.039167	-98.156111	926.5 (1)	None	None	None
5763908	218CCRK	30.039722	-98.143889	None	None	None	801 (1)
5764101	218CCRK	30.123611	-98.104167	976.4 (2)	None	951.9 (1)	994.6 (1)
5764401	218GLRSL	30.042222	-98.108611	920.3 (1)	None	None	915.4 (2)
5764402	218GLRSL	30.042222	-98.108611	None	None	None	919 (1)
5764601	218GLRS	30.054444	-98.011944	904.3 (1)	None	None	None
57646AA	218EDRDA	30.06264	-98.010675	900.7 (1)	None	None	893.7 (1)
5764701	218GLRS	30.038056	-98.105	920 (1)	None	None	None
5764702	218CCRK	30.024999	-98.114444	904.8 (8)	None	898.5 (2)	902.8 (3)
5764703	218CCRK	30.028611	-98.111944	911.6 (2)	None	None	905.1 (2)
5764705	218CCRK	30.015833	-98.116388	824.6 (17)	None	794 (1)	804.6 (11)
5764706	218GLRSL	30.014167	-98.116944	None	None	None	895 (1)
5764707	218CCRK	30.014444	-98.1175	824.5 (4)	None	None	794 (4)
5764708	218GRUH	30.018333	-98.123611	915 (1)	None	None	None
5764709	218GLRSL	30.038611	-98.104167	None	None	None	1012 (1)
5764710	218GLRSL	30.038611	-98.105278	None	None	None	1007.6 (1)
5764711	218GLRSL	30.019722	-98.103056	None	None	831.9 (1)	None
5764712	218GRCCU	30.018333	-98.123611	909.8 (11)	None	913 (1)	918.7 (6)
5764801	218GLRSL	30.039444	-98.083056	932.5 (1)	None	None	918.4 (1)
5764901	218GLRS	30.014722	-98.017499	741.7 (1)	None	None	None
5764903	218GLRSL	30.005	-98.010833	768.3 (2)	None	None	None
5842711	218EDRDA	30.25111	-97.83722	624.1 (3)	None	None	621.8 (1)
5842816	218EDRDA	30.2775	-97.79389	430.6 (3)	None	None	None
5842819	218EDRDA	30.261006	-97.817572	469.4 (4)	None	None	460.3 (1)
5842821	218EDRDA	30.26306	-97.81389	484.7 (3)	None	None	None
5842825	218EDRDA	30.26419	-97.81432	478.3 (3)	None	None	None
58428TW	218EDRDA	30.2614	-97.79518	454.7 (4)	None	None	None
5842913	218EDRDA	30.26667	-97.78222	440.6 (3)	None	None	None
5842915	218EDRDA	30.25121	-97.78089	438.3 (3)	None	None	None
5842927	218EDRDA	30.2507	-97.75393	492.5 (3)	None	None	483.6 (1)
5842928	218EDRDA	30.25631	-97.76955	450.5 (3)	None	None	443.5 (1)

Table A-1. (cont.) Average Water Levels for Different Comal Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
5842931	218EDRDA	30.27083	-97.77472	429.9 (2)	None	None	None
58429CL	218EDRDA	30.27778	-97.78472	433 (3)	None	None	None
58429NC	218EDRDA	30.27083	-97.77472	427.9 (1)	None	None	None
58429SG	218EDRDA	30.27482	-97.78076	440.8 (3)	None	None	None
58429XN	218EDRDA	30.267044	-97.788116	None	None	None	415.6 (1)
5849114	217HSTN	30.229444	-97.997778	785 (1)	None	None	916.5 (1)
5849119	218GLRS	30.218056	-97.989722	720.1 (3)	724.7 (3)	None	777 (6)
5849122	218GLRS	30.220556	-97.999722	978.5 (1)	None	None	None
5849402	218GLRS	30.204167	-97.972778	None	None	None	885 (1)
5849405	218GLRS	30.178056	-97.962778	None	None	None	813.6 (1)
5849406	218GLRS	30.178333	-97.962778	969.8 (1)	None	None	965 (1)
5849407	218GLRS	30.178056	-97.960833	None	None	None	965.9 (1)
5849408	219SLGH	30.207778	-97.973889	None	None	None	715 (1)
5849409	217HSTN	30.206389	-97.974167	None	636 (1)	628 (1)	None
5849410	218TRNT	30.188889	-97.960278	603 (1)	592 (1)	620 (2)	None
5849509	219SLGH	30.172222	-97.944167	None	None	667 (1)	682.4 (1)
5849510	218GLRS	30.166944	-97.939167	807 (1)	None	None	None
5849701	218GLRS	30.128056	-97.985833	None	None	None	964.3 (1)
5849702	218GLRS	30.129444	-97.9925	None	None	None	967.7 (1)
5849703	218GLRSL	30.153611	-97.984444	None	None	None	889.2 (1)
5849704	218GLRSL	30.139444	-97.969167	600 (1)	582 (1)	588 (1)	647.6 (1)
5849705	218GLRSL	30.139722	-97.9675	949.7 (1)	None	666.3 (1)	795.2 (1)
5849706	219SLGH	30.139722	-97.968056	943.2 (1)	None	None	None
5849707	217HSCC	30.138889	-97.958889	None	None	None	758 (1)
5849708	218EDRDA	30.128889	-97.967778	None	None	922.5 (1)	None
5849801	218EDRDA	30.159722	-97.923056	None	None	None	818.2 (1)
5849802	218EDRDA	30.128056	-97.926667	798.8 (1)	None	None	798.3 (1)
5849803	218EDRDA	30.150833	-97.933889	827.9 (1)	None	None	825.7 (1)
5849804	218GLRS	30.156667	-97.941389	None	None	None	843.6 (1)
5849805	218EDRDA	30.1425	-97.950278	None	None	None	916.3 (1)
5849806	218EDRDA	30.1275	-97.933889	None	None	None	860.3 (2)
5849807	218TRNT	30.1475	-97.941944	806 (1)	None	None	None
5849808	218GLRS	30.159722	-97.953056	819.8 (6)	None	763.9 (2)	749.1 (2)
5849901	218EDRDA	30.138611	-97.8825	614.3 (1)	None	None	602.7 (1)
5849902	218EDRDA	30.155	-97.907778	772.3 (1)	None	None	None
5849904	218EDRDA	30.133611	-97.878056	539 (1)	None	None	None
5849910	218EDRDA	30.133056	-97.889722	456 (1)	None	None	None
5849911	218EDRDA	30.133056	-97.889722	629 (1)	None	None	None
5849912	218GLRS	30.133054	-97.888888	None	None	None	535 (1)
5849913	218TRNT	30.1325	-97.889444	685 (1)	None	None	694 (1)
5849914	218TRNT	30.132778	-97.889444	689 (2)	None	None	None
5849916	218EDRDA	30.138611	-97.885	590 (1)	None	None	None
5849917	218EDRDA	30.138888	-97.884999	582 (1)	None	None	None
5849918	218EDRDA	30.138889	-97.885278	None	None	None	538.5 (1)
5849919	218EDRDA	30.138056	-97.892778	565 (1)	None	None	None
5849921	218EDRDA	30.142778	-97.880833	None	592 (1)	None	None

Table A-1. (cont.) Average Water Levels for Different Comal Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
5849922	218EDRDA	30.142499	-97.880554	None	595 (1)	None	585.4 (1)
5849923	218EDRDA	30.1425	-97.881111	None	594 (1)	None	None
5849924	218EDRDA	30.1425	-97.880833	None	592 (1)	None	None
5849926	218EDRDA	30.12513	-97.90517	672 (2)	None	None	None
5849928	218GLRS	30.145277	-97.879721	None	None	None	547.6 (2)
5849931	218EDRDA	30.145	-97.88	None	None	None	545 (1)
5849933	218EDRDA	30.145	-97.88	None	None	None	545 (1)
5849934	218GLRS	30.146944	-97.891944	None	None	None	711 (1)
5849935	218EDRDA	30.145	-97.887222	625.4 (3)	None	None	662.8 (1)
5849937	218EDRDA	30.15801	-97.88745	684.9 (3)	None	None	None
58499AN	218EDRDA	30.16462	-97.87875	654.8 (3)	None	None	None
58499BQ	218EDRDA	30.12583	-97.90361	721.6 (4)	None	None	709.3 (1)
58499QL	218EDRDA	30.12697	-97.90739	741.8 (2)	None	None	None
5850122	218EDRDA	30.23839	-97.83824	534.8 (1)	None	None	None
5850127	218EDRDA	30.22056	-97.87055	721.8 (1)	None	None	722.2 (1)
5850128	218EDRDA	30.21556	-97.84722	629 (1)	None	None	629.6 (1)
58501CH	218EDRDA	30.21071	-97.83421	524.5 (1)	None	None	None
58501GR	218EDRDA	30.22333	-97.83528	551.6 (1)	None	None	552.8 (1)
58501NF	218EDRDA	30.23222	-97.8575	712.1 (1)	None	None	None
58501W2	218EDRDA	30.226407	-97.841465	590.8 (2)	None	None	589.5 (1)
5850211	218EDRDA	30.24524	-97.82803	477.1 (1)	None	None	None
5850212	218EDRDA	30.225449	-97.806189	475.8 (2)	None	None	445.5 (1)
5850216	218EDRDA	30.23222	-97.7925	443 (1)	None	None	431 (1)
5850222	218EDRDA	30.21722	-97.81879	493.1 (1)	None	None	474 (1)
5850231	218EDRDA	30.20944	-97.79195	447.1 (1)	None	None	None
58502H1	218EDRDA	30.23493	-97.81423	480.1 (1)	None	None	473.1 (1)
58502JG	218EDRDA	30.23972	-97.81445	455.6 (1)	None	None	None
5850301	218EDRDA	30.210348	-97.781583	502.6 (2)	None	None	465.5 (1)
58503AS	218EDRDA	30.24389	-97.78528	415.6 (1)	None	None	None
58503RS	218EDRDA	30.24055	-97.78722	444.8 (1)	None	None	None
5850410	218EDRDA	30.18022	-97.8755	640.5 (9)	None	None	None
5850411	218EDRDA	30.1867	-97.84917	540.4 (3)	None	None	540 (1)
5850417	218EDRDA	30.195149	-97.846115	550 (2)	None	None	539.9 (1)
5850419	218EDRDA	30.17303	-97.85028	550.3 (3)	None	None	544 (1)
5850420	218EDRDA	30.18677	-97.86089	611.4 (3)	None	None	None
5850421	218EDRDA	30.17606	-97.87093	644.6 (2)	None	None	643.2 (1)
5850511	218EDRDA	30.17159	-97.82578	501 (1)	None	None	None
5850513	218EDRDA	30.18263	-97.81969	491.3 (1)	None	None	None
5850517	218EDRDA	30.17437	-97.81892	495.8 (1)	None	None	None
5850520	218EDRDA	30.20764	-97.80213	461 (1)	None	None	None
58505A	218EDRDA	30.19084	-97.80651	486.6 (1)	None	None	None
58505BB	218EDRDA	30.17843	-97.80962	508.2 (1)	None	None	None
58505BL	218EDRDA	30.20341	-97.8033	471 (1)	None	None	None
58505CC	218EDRDA	30.17629	-97.79716	517.3 (1)	None	None	None
58505JA	218EDRDA	30.1935	-97.79524	474.6 (1)	None	None	None
58505JV	218EDRDA	30.17072	-97.81287	512.4 (1)	None	None	None

Table A-1. (cont.) Average Water Levels for Different Comal Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
58505TC	218EDRDA	30.17111	-97.82139	507.1 (1)	None	None	None
58505TP	218EDRDA	30.1783	-97.80968	499.1 (1)	None	None	None
58505ZB	218EDRDA	30.20698	-97.83043	506.3 (1)	None	None	501.2 (1)
5850707	218EDRDA	30.14041	-97.83871	507.5 (1)	None	None	None
5850718	218EDRDA	30.1367	-97.84542	516.7 (1)	None	None	None
5850730	218EDRDA	30.14	-97.83833	520.2 (1)	None	None	None
5850731	218EDRDA	30.15297	-97.8587	522.5 (1)	None	None	None
5850734	218EDRDA	30.13417	-97.85	528.8 (1)	None	None	None
5850739	218EDRDA	30.13833	-97.84944	525.6 (1)	None	None	None
5850743	218EDRDA	30.15447	-97.85878	523.6 (1)	None	None	490.9 (1)
5850744	218EDRDA	30.1424	-97.84233	511.3 (1)	None	None	None
5850747	218EDRDA	30.16098	-97.87471	636.3 (1)	None	None	637 (1)
5850748	218EDRDA	30.14617	-97.8597	549.6 (1)	None	None	548.7 (1)
58507AD	218EDRDA	30.129417	-97.836945	None	None	None	502.1 (1)
58507AD2	218EDRDA	30.12967	-97.83661	543.6 (1)	None	None	None
58507BB	218EDRDA	30.16573	-97.8347	511 (1)	None	None	None
58507BG	218EDRDA	30.16221	-97.86037	548.7 (1)	None	None	543.1 (1)
58507CB	218EDRDA	30.13664	-97.84186	508.5 (1)	None	None	None
58507CO	218EDRDA	30.13976	-97.84605	515.4 (1)	None	None	None
58507DF	218EDRDA	30.1483	-97.84378	520.1 (1)	None	None	498.3 (1)
58507DR	218EDRDA	30.14705	-97.84525	515.7 (1)	None	None	493.2 (1)
58507DT	218EDRDA	30.15528	-97.86182	561.7 (1)	None	None	545.8 (1)
58507EJ	218EDRDA	30.13328	-97.84379	524 (1)	None	None	None
58507FS	218EDRDA	30.15954	-97.85764	554.9 (1)	None	None	None
58507GH	218EDRDA	30.14484	-97.84625	523.7 (1)	None	None	None
58507HL	218EDRDA	30.14745	-97.84647	495.9 (1)	None	None	None
58507HR	218EDRDA	30.146484	-97.845032	None	None	None	508.4 (1)
58507LD	218EDRDA	30.13239	-97.83894	518.9 (1)	None	None	None
58507MB	218EDRDA	30.13944	-97.83583	522 (1)	None	None	None
58507ME	218EDRDA	30.14272	-97.84134	505.1 (1)	None	None	None
58507ML	218EDRDA	30.12487	-97.86229	523 (1)	None	None	None
58507MO	218EDRDA	30.13194	-97.855	538.4 (1)	None	None	None
58507PL	218EDRDA	30.14581	-97.84589	532.3 (1)	None	None	510.6 (1)
58507RD	218EDRDA	30.14792	-97.85992	543.7 (1)	None	None	None
58507SC	218EDRDA	30.15687	-97.8631	566.4 (1)	None	None	563.3 (1)
58507SP	218EDRDA	30.13434	-97.85509	525.8 (1)	None	None	None
58507TT	218EDRDA	30.13917	-97.84139	518.4 (1)	None	None	None
58507WC	218EDRDA	30.14209	-97.85368	534 (1)	None	None	515.8 (1)
5850801	218EDRDA	30.14281	-97.81076	587 (2)	None	None	520.2 (1)
5850824	218EDRDA	30.12692	-97.81834	563 (1)	None	None	524.1 (1)
5850827	218EDRDA	30.136389	-97.819443	None	None	None	499 (1)
5850830	218EDRDA	30.16069	-97.81808	502.1 (1)	None	None	None
5850836	218EDRDA	30.145012	-97.813133	None	None	None	517.1 (1)
5850840	218EDRDA	30.13004	-97.79846	572.8 (1)	None	None	None
5850842	218EDRDA	30.15005	-97.83235	515.9 (1)	None	None	None
5850850	218EDRDA	30.1259	-97.8158	559.7 (1)	None	None	None

Table A-1. (cont.) Average Water Levels for Different Comal Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
5850851	218EDRDA	30.12582	-97.81564	561.2 (1)	None	None	None
5850852	218EDRDA	30.16167	-97.81834	501.8 (1)	None	None	None
5850856	218EDRDA	30.13489	-97.82649	536.2 (1)	None	None	501.8 (1)
5850861	218EDRDA	30.14444	-97.83139	513.5 (1)	None	None	None
58508D5	218EDRDA	30.13382	-97.81322	558.1 (1)	None	None	None
58508DB	218EDRDA	30.16142	-97.81152	527.4 (1)	None	None	None
58508JH	218EDRDA	30.13876	-97.80353	560.2 (1)	None	None	None
58508JW	218EDRDA	30.135622	-97.83194	None	None	None	501.6 (1)
58508LB	218EDRDA	30.13907	-97.82839	532.6 (1)	None	None	500.1 (1)
58508LD	218EDRDA	30.16139	-97.80972	524.6 (1)	None	None	None
58508MG	218EDRDA	30.13177	-97.8238	547.3 (1)	None	None	514.6 (1)
58508MU	218EDRDA	30.139999	-97.832222	None	None	None	498.9 (1)
58508SM	218EDRDA	30.16514	-97.79381	555.4 (1)	None	None	None
58508SR	218EDRDA	30.16565	-97.80952	526.4 (1)	None	None	None
58508ST	218EDRDA	30.16503	-97.83125	511.1 (1)	None	None	None
58508XN	218EDRDA	30.146576	-97.824516	None	None	None	485.4 (1)
5857101	218GLRS	30.116944	-97.974444	956.1 (33)	932 (10)	934.6 (11)	943 (27)
5857102	218GLRS	30.106389	-97.975833	None	None	None	917.5 (2)
5857103	218GLRS	30.097222	-97.967778	877.4 (1)	None	None	873 (1)
5857104	218GLRS	30.112222	-97.991111	760 (1)	None	None	None
5857201	218EDRDA	30.103055	-97.937221	762.8 (19)	757.9 (9)	758.9 (6)	768.2 (22)
5857202	218EDRDA	30.111111	-97.953056	877.3 (1)	None	None	883.1 (4)
5857203	218EDRDA	30.105833	-97.923056	763.6 (1)	None	None	758.9 (1)
5857204	218EDRDA	30.083889	-97.918611	663.8 (1)	None	None	None
5857206	218EDRDA	30.123611	-97.921667	None	None	None	800 (1)
5857209	218GLRSL	30.106111	-97.923889	738 (1)	None	None	None
5857210	218EDRDA	30.086667	-97.918333	None	None	None	690 (1)
5857301	218EDRDA	30.09361	-97.892221	634.2 (30)	606 (3)	607.8 (2)	619.1 (11)
5857302	218EDRDA	30.096111	-97.876667	None	595.5 (8)	602 (3)	608 (9)
5857303	218EDRDA	30.113056	-97.8925	635.6 (10)	None	625.3 (3)	625.3 (3)
5857305	218EDRDA	30.099722	-97.893333	608 (1)	None	None	None
5857306	218EDRDA	30.115278	-97.893333	None	None	None	650.1 (1)
5857307	218EDRDA	30.09986	-97.88229	614.4 (4)	None	None	599 (2)
5857308	218EDRDA	30.11	-97.87861	None	None	None	606 (1)
5857309	218EDRDA	30.113889	-97.884444	None	None	None	605 (1)
5857311	218EDRDA	30.113056	-97.8925	643.5 (5)	None	None	None
5857312	218EDRDA	30.1075	-97.902222	624 (1)	None	None	654.2 (1)
5857314	218EDRDA	30.115833	-97.895	634 (1)	None	None	None
5857318	218EDGRU	30.123777	-97.907639	703 (5)	None	None	681.6 (3)
58573GC	218EDRDA	30.097587	-97.88685	620.6 (2)	None	None	590.6 (1)
58573H	218EDRDA	30.11306	-97.88389	590 (1)	None	None	None
58573HF	218EDRDA	30.11308	-97.87675	560.6 (1)	None	None	None
58573RR	218EDRDA	30.08833	-97.915	662.3 (1)	None	None	None
5857401	218GLRS	30.046944	-97.987778	763.5 (7)	751.6 (2)	754.2 (2)	757.1 (3)
5857402	218EDRDA	30.054722	-97.986389	791.4 (3)	None	789.4 (1)	834.2 (4)
5857403	218EDRDA	30.066389	-97.966667	749.7 (1)	None	None	None

Table A-1. (cont.) Average Water Levels for Different Comal Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
5857502	218EDRDA	30.066347	-97.944472	710.7 (2)	None	None	660.5 (1)
5857503	218EDRDA	30.06447	-97.92834	675.8 (2)	None	None	None
5857504	218EDRDA	30.061944	-97.920278	None	None	None	681 (1)
5857505	218EDRDA	30.051389	-97.920833	None	None	None	676.2 (1)
5857506	218EDRDA	30.045	-97.961667	None	None	699.2 (2)	None
5857508	218EDRDA	30.043333	-97.955556	707 (3)	None	None	701.3 (1)
5857509	218EDRDA	30.072403	-97.920314	683.6 (3)	None	None	656 (1)
5857510	218EDRDA	30.06346	-97.94162	674.8 (1)	None	None	None
5857511	218EDRDA	30.0495	-97.935669	698.4 (4)	None	None	686.7 (4)
5857512	218EDGRU	30.058611	-97.92111	None	None	None	660.3 (1)
58575J2	218EDRDA	30.0495	-97.93567	699.9 (1)	None	None	None
58575R5	218EDRDA	30.07601	-97.95407	762.2 (1)	None	None	None
58575R7	218EDRDA	30.07612	-97.95426	762 (1)	None	None	None
58575RR	218EDRDA	30.04613	-97.95755	712.8 (1)	None	None	None
5857602	218EDRDA	30.074167	-97.915833	681.9 (12)	None	659.5 (1)	663.6 (4)
5857605	218EDRD	30.0575	-97.907222	None	None	None	693.1 (1)
5857606	218EDRDA	30.047778	-97.883611	623.5 (3)	None	None	587.2 (1)
5857607	218EDRDA	30.045	-97.884444	1026 (1)	None	None	None
5857608	218EDRDA	30.080277	-97.916666	None	None	None	369.8 (1)
5857609	218EDRDA	30.08	-97.917222	630 (1)	None	None	None
5857610	218EDRDA	30.0456	-97.89873	615.3 (1)	None	None	None
5857701	218EDRDA	30.040448	-97.960592	719.8 (2)	None	None	736.2 (4)
5857702	218EDRDA	30.03865	-97.97967	751.2 (1)	None	None	None
585776F	218EDRDA	30.04068	-97.96017	704.8 (1)	None	None	None
585776G	218EDRDA	30.0405	-97.96049	707.6 (1)	None	None	None
5857801	218EDRDA	30.039722	-97.943611	701.2 (2)	None	None	None
5857802	218EDRDA	30.026944	-97.928056	665.8 (6)	None	None	645.9 (3)
5857804	218EDRDA	30.029444	-97.923889	None	None	None	637.8 (1)
5857806	218EDRDA	30.003333	-97.923889	None	None	None	632.2 (1)
5857807	218EDRDA	30.019722	-97.952222	None	None	None	697.9 (1)
5857808	218EDRDA	30.011667	-97.944444	None	None	659.5 (1)	664.5 (1)
5857809	218EDRDA	30.010833	-97.943889	None	None	None	658.4 (1)
5857810	218EDRDA	30.040833	-97.920556	None	None	None	676.4 (1)
58578BW1	218EDRDA	30.03833	-97.92834	671.2 (1)	None	None	None
58578JG	218EDRDA	30.03494	-97.95198	688.2 (1)	None	None	None
58578SG	218EDRDA	30.02337	-97.92108	637.8 (1)	None	None	None
5857901	218EDRDA	30.03275	-97.8903	606.1 (1)	None	None	618.1 (1)
5857902	218EDRDA	30.008901	-97.895273	618.6 (102)	592.9 (9)	606.5 (18)	608.1 (65)
5857903	218EDRDA	30.038497	-97.886168	614.5 (38)	576.1 (17)	588.8 (20)	596.6 (38)
5857904	218EDRDA	30.013611	-97.8925	None	None	None	608 (2)
5857905	218EDRDA	30.026944	-97.903889	None	None	None	624.6 (1)
5857906	218EDRDA	30.024167	-97.91	None	None	None	643.4 (1)
5857907	218EDRDA	30.019444	-97.915556	None	None	None	623.8 (1)
5857908	218EDRDA	30.009444	-97.896667	636.4 (1)	None	None	593.8 (4)
5857909	218EDDT	30.009167	-97.896944	620.5 (12)	None	586 (2)	603.3 (4)
5857911	218EDRD	30.013056	-97.889444	None	None	601.3 (1)	584.8 (1)

Table A-1. (cont.) Average Water Levels for Different Comal Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
5857915	218EDRDA	30.019722	-97.901111	None	None	None	591 (1)
58579OL	218EDRDA	30.02159	-97.90551	607.8 (1)	None	None	None
58579PC	218EDRDA	30.02778	-97.87917	576 (1)	None	None	558.7 (1)
5858101	218EDRDA	30.083582	-97.842639	612.5 (245)	562.4 (28)	575.9 (49)	596.1 (187)
5858102	218EDRDA	30.106666	-97.854444	582.7 (1)	None	None	580.5 (1)
5858104	218EDRDA	30.104444	-97.848889	606.9 (36)	565 (1)	553.9 (1)	575.8 (20)
5858105	218EDRDA	30.111389	-97.855833	523 (1)	None	None	None
5858106	218EDRDA	30.084167	-97.841111	647 (4)	None	None	None
5858115	218EDRDA	30.12444	-97.87389	554.9 (1)	None	589.2 (1)	None
5858121	218EDRDA	30.105555	-97.862222	618.6 (2)	None	None	514 (1)
5858122	218EDRDA	30.093333	-97.843611	602.5 (1)	None	None	None
5858123	218EDRDA	30.109431	-97.841731	587 (24)	537.4 (3)	544.8 (16)	584.5 (43)
5858124	218EDRDA	30.11908	-97.84083	542 (1)	None	None	509.4 (1)
5858127	218EDRDA	30.1175	-97.873611	None	None	None	558 (1)
5858128	218EDRDA	30.08725	-97.85361	584 (1)	None	None	None
58581AB	218EDRDA	30.11337	-97.86055	538.5 (1)	None	None	511.3 (1)
58581BC	218EDRDA	30.08509	-97.85768	585 (1)	None	None	None
58581C1	218EDRDA	30.10156	-97.85811	565 (1)	None	None	532.6 (1)
58581DD	218EDRDA	30.11858	-97.87114	536.6 (1)	None	None	None
58581DL	218EDRDA	30.08587	-97.85644	602.3 (1)	None	None	None
58581EH	218EDRDA	30.11096	-97.8741	553.8 (1)	None	None	None
58581JS	218EDRDA	30.10578	-97.87267	561.5 (1)	None	None	None
58581MC	218EDRDA	30.09111	-97.84028	582.4 (1)	None	None	547.6 (1)
58581OS	218EDRDA	30.10535	-97.87415	554.1 (1)	None	None	None
58581RD	218EDRDA	30.10806	-97.87382	555.3 (1)	None	None	None
58581WM	218EDRDA	30.0854	-97.86787	598 (1)	None	None	None
5858202	218EDRDA	30.12459	-97.81374	550.2 (1)	None	None	None
5858210	218EDRDA	30.090556	-97.8225	554 (1)	None	None	None
5858211	218EDRDA	30.086667	-97.830556	610 (1)	None	None	None
5858212	218EDRDA	30.087778	-97.817222	None	None	None	651 (1)
5858217	218EDRDA	30.095278	-97.815833	None	None	None	713 (1)
5858218	218EDRDA	30.095	-97.815833	None	None	None	805 (1)
5858219	218EDRDA	30.09167	-97.8175	705.3 (2)	None	None	554.4 (3)
5858220	218EDRDA	30.09333	-97.81445	602.8 (1)	None	573 (2)	556 (2)
5858403	218EDRDA	30.081667	-97.842778	623.5 (3)	None	600.9 (2)	576.1 (2)
5858406	218EDRDA	30.062036	-97.85602	607.2 (30)	561 (1)	561.9 (2)	587.7 (12)
5858407	218EDRDA	30.053445	-97.955532	None	None	None	593.3 (1)
5858410	218EDRDA	30.066389	-97.838611	588.2 (1)	None	None	585.2 (1)
5858411	218EDRDA	30.050833	-97.840556	601.6 (1)	None	None	None
5858412	218EDRDA	30.076944	-97.834722	None	None	None	605 (1)
5858413	218EDRDA	30.070515	-97.835491	576.6 (1)	None	None	589.5 (1)
5858416	218EDRDA	30.051111	-97.859167	653 (1)	None	None	None
5858417	218EDRDA	30.04723	-97.86748	597.1 (1)	None	None	None
5858418	218EDRDA	30.07129	-97.85825	605.1 (1)	None	None	None
5858422	218EDRDA	30.066389	-97.838889	None	None	None	564.8 (1)
5858423	218EDRDA	30.06781	-97.85912	624.6 (4)	None	614 (1)	None

Table A-1. (cont.) Average Water Levels for Different Comal Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
5858424	218EDRDA	30.07856	-97.87157	601.2 (1)	None	None	None
5858425	218EDRDA	30.046944	-97.850278	603.4 (1)	None	None	None
5858426	218EDRDA	30.08	-97.86987	590.6 (1)	None	None	None
5858427	218EDRDA	30.077171	-97.861324	636.7 (2)	None	None	621.2 (1)
5858428	218EDRDA	30.052222	-97.833333	510 (1)	None	None	525.3 (1)
58584BS	218EDRDA	30.052075	-97.833398	584.2 (1)	None	None	561.7 (2)
58584CT	218EDRDA	30.060197	-97.868471	626.1 (2)	None	None	566.8 (1)
58584HO	218EDRDA	30.07203	-97.84697	593.3 (1)	None	None	558.6 (1)
58584LC	218EDRDA	30.07083	-97.87361	583.2 (1)	None	None	None
58584NM	218EDRDA	30.045963	-97.851353	None	None	None	574.2 (1)
58584SG	218EDRDA	30.08111	-97.84361	583.4 (1)	None	None	545.6 (1)
58584TC	218EDRDA	30.06184	-97.856	595.8 (1)	None	None	562 (1)
5858502	218EDRDA	30.051111	-97.8075	592.6 (1)	None	None	586.5 (1)
5858503	218EDRDA	30.076667	-97.822222	606.3 (1)	None	None	603.2 (1)
5858504	218EDRDA	30.069722	-97.818889	None	580.4 (11)	593.7 (4)	604.4 (18)
5858505	218EDRDA	30.06807	-97.8194	733.2 (2)	None	None	None
5858508	218EDRDA	30.079166	-97.83111	607.7 (3)	None	593.8 (1)	544.6 (1)
5858509	218EDRDA	30.07611	-97.83	580.5 (2)	None	None	None
5858510	218EDRDA	30.079381	-97.82758	None	None	None	573.8 (1)
58585JW	218EDRDA	30.071934	-97.828364	None	None	None	569.8 (1)
5858701	218EDRDA	30.035478	-97.841407	None	None	None	563.4 (1)
5858703	218EDRDA	30.028056	-97.854444	596.9 (25)	590.2 (1)	None	581.9 (9)
5858704	218EDRDA	30.027694	-97.853917	598.1 (21)	None	565.6 (2)	570.8 (11)
5858705	218EDRDA	30.022954	-97.838608	597 (1)	None	None	591.3 (1)
5858706	218EDRDA	30.007222	-97.866944	589.3 (1)	None	None	580.4 (1)
5858710	218EDRDA	30.021667	-97.856389	610 (1)	None	None	None
5858711	218EDRDA	30.016722	-97.859333	588.8 (2)	None	None	556.2 (4)
5858712	218EDRDA	30.02917	-97.87	563.8 (1)	None	None	None
5858801	218EDRDA	30.033635	-97.83316	585.9 (1)	None	None	571.5 (2)
6701101	218EDRDA	29.973889	-97.964722	830 (1)	None	None	None
6701201	218EDRDA	29.981111	-97.920556	None	None	None	595.5 (1)
6701203	218EDRDA	29.962176	-97.920766	578.9 (28)	None	573.6 (2)	571.9 (10)
6701301	218EDRDA	29.96294	-97.89681	564.2 (1)	None	None	561 (1)
6701303	218EDRDA	29.989761	-97.875476	578.8 (60)	None	580.6 (2)	567.1 (16)
6701304	218EDRDA	29.984507	-97.876296	581 (133)	554.4 (12)	571.6 (12)	573.1 (59)
6701305	218EDRDA	29.967777	-97.888333	573.9 (32)	566.4 (1)	572.5 (3)	570.7 (9)
6701307	218EDRDA	29.967778	-97.887222	573 (3)	564.5 (2)	565.6 (2)	567 (2)
6701309	218EDRDA	29.9875	-97.881944	None	None	None	561.4 (2)
6701310	218EDRDA	29.996111	-97.892778	None	None	None	646.6 (1)
6701311	218EDRDA	29.981431	-97.891403	576.4 (69)	None	None	558.4 (6)
67013BB	218EDRDA	29.963238	-97.896931	583.6 (1)	None	None	577 (1)
67013CC	218EDRDA	29.967445	-97.876243	582.1 (1)	None	None	576.9 (1)
67013DD	218EDRDA	29.969406	-97.888119	584.7 (1)	None	None	576.4 (1)
67013EE	218EDRDA	29.962606	-97.881397	582.4 (1)	None	None	577 (1)
6701401	218EDRDA	29.950278	-97.964444	563.1 (7)	576.7 (1)	None	576.8 (1)
67014AA	218EDRDA	29.921595	-97.965442	582.8 (4)	None	None	577.6 (3)

Table A-1. (cont.) Average Water Levels for Different Comal Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
6701501	218EDRDA	29.923332	-97.947221	572.8 (25)	569.1 (9)	572.7 (6)	565.8 (9)
67015BH	218EDRDA	29.924723	-97.938332	None	None	None	600.8 (1)
67015DH	218EDRDA	29.951527	-97.935277	598.9 (1)	None	None	None
67015MD	218EDRDA	29.94628	-97.93557	566 (1)	None	None	None
67015PG	218EDRDA	29.943369	-97.937687	587.2 (1)	None	None	None
67015PL	218EDRDA	29.91819	-97.9324	566.6 (1)	None	None	564.7 (1)
67015PLC	218EDRDA	29.918153	-97.932422	581.9 (1)	None	None	577.2 (1)
67015RD	218EDRDA	29.946171	-97.935688	593.4 (1)	None	None	None
67015RW	218EDRDA	29.939686	-97.934863	583.9 (1)	None	None	577.8 (1)
67015XN	218EDRDA	29.92359	-97.94784	576.2 (1)	None	None	None
6701601	218EDRDA	29.919999	-97.911388	583.3 (1)	None	None	None
67016AA	218EDRDA	29.941081	-97.891585	607.2 (1)	None	None	606.6 (1)
67016AW	218EDRDA	29.9365	-97.91118	561.8 (1)	None	None	None
67016AW1	218EDRDA	29.93141	-97.90462	569.1 (1)	None	None	None
67016AW2	218EDRDA	29.9374	-97.9148	571 (1)	None	None	None
67016BB	218EDRDA	29.940578	-97.890993	607.2 (1)	None	None	607 (1)
67016CC	218EDRDA	29.955556	-97.902794	577.3 (1)	None	None	582.1 (1)
67016EN	218EDRDA	29.93216	-97.90456	573.6 (1)	None	None	None
6701701	218EDRDA	29.895009	-97.964456	576.2 (81)	568.2 (2)	575.6 (4)	572.6 (23)
6701702	218EDRDA	29.896111	-97.965278	577.4 (17)	None	599 (7)	581.1 (24)
67017BB	218EDRDA	29.908596	-97.971539	582.8 (4)	None	None	574.8 (3)
6701802	218EDRDA	29.886667	-97.946944	None	None	None	532 (1)
6701803	218EDRDA	29.911389	-97.930833	None	None	None	577.9 (1)
6701804	218EDRDA	29.912222	-97.928333	572.1 (1)	None	None	None
6701805	218EDRDA	29.886667	-97.946944	590 (1)	None	None	None
6701807	218EDRDA	29.901111	-97.919444	574.5 (35)	None	573.6 (4)	573.2 (28)
6701808	218EDRDA	29.901667	-97.919722	584.9 (22)	581.9 (10)	582 (15)	583.3 (18)
6701809	218EDRDA	29.911919	-97.928774	587.2 (256)	582.9 (17)	583.5 (43)	584.1 (99)
6701810	218EDRDA	29.89	-97.945833	None	585 (1)	None	None
6701811	218EDRDA	29.896944	-97.945556	577 (1)	None	575.5 (1)	None
6701812	218EDRDA	29.890476	-97.928369	577 (35)	None	576 (2)	575.3 (11)
6701813	218EDRDA	29.89113	-97.93188	572.5 (1)	None	None	None
6701813A	218EDRDA	29.891128	-97.929377	576.9 (3)	None	None	575.7 (3)
6701813B	218EDRDA	29.891128	-97.929377	578 (3)	None	None	574.7 (3)
6701816	218EDRDA	29.891111	-97.935	580 (1)	None	None	None
6701817	218EDRDA	29.890556	-97.947778	None	None	694 (1)	None
6701818	218EDRDA	29.901944	-97.920278	None	None	569.7 (1)	None
67018BB	218EDRDA	29.894435	-97.929451	574.9 (3)	None	None	575 (2)
67018CC	218EDRDA	29.893611	-97.932047	574.9 (3)	None	None	574.7 (3)
67018DD	218EDRDA	29.887175	-97.949626	575.7 (3)	None	None	575.4 (2)
67018EE	218EDRDA	29.908167	-97.91931	579.1 (2)	None	None	575.1 (3)
67018FF	218EDRDA	29.902694	-97.921727	579.2 (2)	None	None	575.3 (3)
67019DD	218EDRDA	29.833389	-97.995611	None	None	None	572 (1)
67019EG	218EDRDA	29.91359	-97.91647	579.4 (1)	None	None	576.8 (1)
6702101	218EDRDA	29.981667	-97.865278	None	None	569.2 (1)	None
6702103	218EDRDA	29.989787	-97.873643	588.2 (88)	560.5 (9)	576.6 (18)	575.4 (52)

Table A-1. (cont.) Average Water Levels for Different Comal Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
6702104	218EDRDA	29.982792	-97.871531	574.7 (22)	None	None	548.3 (2)
6702105	218EDRDA	29.9583	-97.842122	578.6 (2)	None	None	570.4 (2)
6702106	218EDRDA	29.974739	-97.857114	574 (2)	None	None	558.8 (2)
6709101	218EDRDA	29.855573	-97.981769	584.8 (1)	None	591 (1)	None
6709102	218EDRDA	29.851111	-97.976111	579.4 (102)	576.6 (6)	577.1 (16)	577.1 (62)
6709103	218EDRDA	29.847222	-97.9825	583.6 (1)	None	None	None
6709105	218EDRDA	29.844789	-97.984182	583.7 (4)	None	None	577.9 (3)
6709106	218EDRDA	29.852433	-97.987157	582.9 (4)	None	None	578.2 (3)
6709107	218EDRDA	29.846111	-97.981944	582.8 (1)	None	None	None
6709110	218EDRDA	29.843581	-97.982247	587.5 (85)	None	None	584.8 (26)
6709112	218EDRDA	29.860556	-97.983056	None	None	None	595 (1)
6709113	218EDRDA	29.838739	-97.990736	585.6 (177)	None	None	583.1 (98)
67091AA	218EDRDA	29.858813	-97.99281	581.3 (3)	None	None	577.9 (3)
67091BB	218EDRDA	29.867635	-97.968828	578.3 (2)	None	None	576 (1)
67091CC	218EDRDA	29.836542	-97.993935	582 (2)	None	None	581.5 (1)
6709401	218EDRDA	29.82925	-97.962364	589.8 (81)	None	None	589 (6)
6805605	218CCRK	29.925556	-98.386944	988.1 (6)	None	990 (1)	988 (2)
6805606	217SLGO	29.925556	-98.388056	1073.6 (1)	None	None	None
6805607	217SLGO	29.928056	-98.393333	1015.1 (1)	None	None	None
6805608	217SLGO	29.928889	-98.396389	1128.2 (2)	None	None	None
6805609	217SLGO	29.931111	-98.394722	1113 (2)	None	None	None
6805610	219SLGH	29.932222	-98.395556	1093.5 (2)	None	None	None
6805611	218TRNT	29.936111	-98.401944	1062.4 (2)	1043.8 (1)	1038.9 (1)	None
6805612	218TRNT	29.934444	-98.408889	1051.7 (2)	1049 (1)	1051 (1)	1205.9 (2)
6805613	218GLRSL	29.930556	-98.398333	1109.8 (2)	None	None	None
6805614	217SLGO	29.926389	-98.395	1111.5 (2)	None	None	None
6805615	217HSTN	29.930556	-98.403056	None	None	None	909.5 (2)
6805616	218GLRS	29.928889	-98.398889	1019.8 (1)	None	None	None
6805619	218GLRSL	29.929167	-98.404722	1083.2 (1)	None	None	None
6805621	218TRNT	29.922222	-98.403889	1065.1 (1)	None	None	None
6805622	218TRNT	29.934167	-98.409722	1064 (1)	1060.6 (1)	1061 (1)	None
6805625	218GLRSL	29.943611	-98.385556	1074.9 (1)	None	None	None
6805626	218GLRSL	29.94	-98.41	None	None	1138 (1)	None
6805627	219SLGH	29.939167	-98.386667	984.5 (1)	None	None	990 (1)
6805629	218GLRSL	29.954722	-98.385833	None	None	None	1076 (1)
6805802	217SLGO	29.883611	-98.418611	1033.8 (1)	None	None	None
6805803	217SLGO	29.883056	-98.417222	962.5 (2)	None	None	None
6805901	218GRHC	29.912778	-98.379722	1047 (1)	None	None	None
6805902	217HSTN	29.897778	-98.414444	941.7 (2)	None	None	None
6806302	218GLRSL	29.963611	-98.2525	None	None	None	930 (1)
6806303	218GLRSL	29.968056	-98.255	None	None	935 (1)	None
6806305	218GLRSL	29.970833	-98.275556	957.5 (1)	None	None	None
6806307	218GLRSL	29.972778	-98.282222	None	None	None	5 (1)
6806404	219SLGH	29.935	-98.345556	1014 (1)	None	1026 (2)	None
6806405	218CCRK	29.925	-98.373056	1022.3 (1)	1022.4 (1)	None	1021.5 (1)
6806406	218CCRK	29.918889	-98.373611	985.4 (1)	None	None	None

Table A-1. (cont.) Average Water Levels for Different Comal Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
6806407	217SLGO	29.932222	-98.374722	None	None	None	960.6 (1)
6806601	218TRNT	29.922778	-98.266389	842.4 (1)	818 (1)	827.7 (1)	None
6806701	217SLGO	29.906389	-98.351944	910.3 (8)	907.5 (1)	911.2 (1)	903.1 (3)
6806702	218GLRSL	29.901944	-98.353611	917.2 (2)	None	None	None
6806704	218CCRK	29.913333	-98.356667	966.8 (2)	967.9 (1)	966.2 (1)	None
6806705	218GLRSL	29.9025	-98.353333	926.8 (2)	909.2 (1)	913.3 (1)	None
6806706	218CCRK	29.912222	-98.339722	None	None	779 (1)	None
6806707	217SLGO	29.910556	-98.364722	949 (1)	None	None	None
6806708	217SLGO	29.914167	-98.367222	948.1 (1)	None	None	None
6806709	218GRHC	29.891667	-98.345833	916.1 (9)	None	909.9 (1)	912.3 (1)
6806710	218GLRSL	29.912222	-98.340556	None	None	None	908 (1)
6806711	218GRHC	29.912778	-98.34	914.2 (2)	None	905.4 (2)	None
6806712	218GLRS	29.914444	-98.364444	1044 (1)	None	None	None
6806801	218GLRS	29.888889	-98.2925	None	None	912.1 (2)	903.1 (2)
6806901	218GLRSL	29.908889	-98.27	None	None	911.8 (1)	896.4 (2)
6806904	218GLRSL	29.881944	-98.261111	None	896 (1)	907.3 (1)	913.9 (1)
6806906	218GLRSU	29.883889	-98.288333	825 (1)	None	None	None
6806907	218GLRSU	29.879722	-98.284444	916 (1)	914.5 (1)	922 (1)	927 (1)
6806911	218TRNT	29.908889	-98.284722	926.2 (1)	908.3 (1)	912.7 (1)	None
6806912	218GLRS	29.916389	-98.274444	905 (1)	None	None	None
6806913	218GLRS	29.916389	-98.274444	885 (1)	None	None	None
68069AA	218EDRDA	29.878417	-98.289278	None	None	None	902.3 (3)
6807401	218GLRSL	29.923889	-98.2375	906.1 (3)	None	None	905.9 (1)
6807402	218GLRSL	29.928611	-98.2375	819.2 (2)	777.5 (1)	825.2 (1)	None
6807403	218GLRSL	29.933611	-98.2225	None	869.2 (1)	882.2 (1)	924 (1)
6807405	218GLRSL	29.928333	-98.228333	None	904 (1)	916.3 (1)	920.5 (1)
6807407	218GLRSL	29.936389	-98.210556	909.1 (138)	878.3 (1)	890.8 (2)	900.5 (23)
6807408	218GLRSL	29.954444	-98.228056	None	None	None	980 (1)
6807409	218GLRSL	29.952222	-98.223333	None	None	None	880 (1)
6807410	218GLRSL	29.936944	-98.216111	None	840 (1)	None	None
6807502	217HSTN	29.9525	-98.169444	None	None	None	879.1 (2)
68076AA	218EDRDA	29.931944	-98.129722	1115 (1)	None	None	1100.5 (3)
6807701	218GLRSL	29.891389	-98.212778	None	None	None	890 (1)
6807702	218GLRSL	29.885	-98.218889	None	None	877 (1)	None
6807703	218GLRSL	29.906944	-98.228056	None	None	898 (2)	887.2 (2)
6807704	218GLRSL	29.901944	-98.231389	899 (1)	None	None	872 (1)
6807705	218GLRSL	29.895556	-98.235	None	None	None	883 (1)
6807706	218GLRSL	29.891667	-98.233889	None	None	917.5 (2)	898 (2)
6807707	218GLRSL	29.891944	-98.231389	None	None	878 (1)	None
6807708	218GLRSL	29.882778	-98.211667	915 (1)	None	None	None
6807712	218GLRSL	29.908056	-98.212778	None	940 (1)	None	None
6807713	218GLRSU	29.899722	-98.217222	None	906.1 (1)	910.2 (1)	918.8 (1)
6807716	218GLRS	29.915278	-98.210278	950 (1)	None	None	None
6807718	218GLRS	29.916389	-98.241944	None	None	914 (1)	None
6807722	218GRHC	29.884722	-98.218333	806 (1)	None	None	None
6807803	218GLRSL	29.878333	-98.205	None	None	None	850 (1)

Table A-1. (cont.) Average Water Levels for Different Comal Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
6807804	218GLRSL	29.913611	-98.205833	None	814.5 (1)	861.5 (1)	861.4 (1)
6807805	218GLRSL	29.875556	-98.200556	None	None	None	865 (1)
6808101	218GRHC	29.979444	-98.086389	715 (1)	None	None	None
6808102	218CCRK	29.986667	-98.092778	721 (15)	616 (1)	725 (1)	716.1 (5)
6808103	218GLRSL	29.983889	-98.122222	813.6 (14)	670 (1)	779.5 (2)	802.5 (2)
6808201	100ALVM	29.983056	-98.043611	775.8 (1)	None	None	None
6808202	218GLRSL	29.999722	-98.0825	830.7 (1)	None	None	None
6808601	218EDRDA	29.946111	-98.028056	787.2 (17)	804.7 (1)	806.8 (1)	774.8 (9)
6808701	218EDRDA	29.897778	-98.12	1032.8 (4)	1031.2 (1)	None	1021.1 (6)
6808902	218EDRDA	29.896466	-98.002893	589.5 (3)	None	558.3 (1)	579.5 (3)
68089SMBA	218EDRDA	29.892942	-98.001344	593.3 (1)	None	None	None
6812302	217HSTN	29.859167	-98.505556	978.8 (8)	None	1006.4 (2)	1008 (2)
6812505	218CCRK	29.821944	-98.551111	None	1107.5 (1)	None	None
6812703	218GLRSL	29.7825	-98.598889	1105 (1)	None	None	None
6812705	218CCRK	29.751111	-98.623889	860.1 (2)	932 (1)	None	None
6812706	217HSCC	29.754722	-98.623056	899.3 (2)	None	882.2 (2)	None
6812801	218GLRSL	29.779444	-98.542778	None	None	None	988 (1)
6812901	218GRHC	29.773611	-98.532222	1023.4 (1)	None	None	1000 (1)
6812902	218GRHC	29.756667	-98.5075	984 (2)	None	None	None
6812903	218GRHC	29.782778	-98.5275	1088.4 (3)	None	1032.4 (1)	1030 (1)
6813101	218GLRSL	29.836944	-98.482777	1202.1 (3)	None	None	None
6813102	218GRHC	29.836944	-98.482499	1090.4 (3)	None	None	None
6813201	218HSCC	29.868611	-98.4175	961.4 (1)	948.1 (1)	952.5 (1)	None
6813202	218HSCC	29.868611	-98.4175	955 (1)	None	None	None
6813206	218GLRS	29.837222	-98.431389	None	958.3 (1)	None	None
6813208	219SLGH	29.839167	-98.458056	962.5 (1)	None	None	None
6813401	218HCSH	29.808056	-98.466389	None	None	964 (1)	1115 (1)
6813502	218GLRS	29.802778	-98.440833	None	None	None	903 (1)
6813503	218GLRSL	29.797222	-98.418611	None	None	907.8 (3)	None
6813504	218GLRSL	29.795833	-98.455556	993.4 (1)	None	None	None
6813505	218GLRSL	29.793333	-98.454722	956.7 (1)	None	None	None
6813506	218HSCC	29.811111	-98.439167	1066 (1)	None	None	None
6813507	218GRHC	29.814444	-98.435556	940 (1)	None	None	None
6813508	218HSCC	29.802222	-98.443333	None	None	None	953 (1)
6813509	218GLRS	29.797222	-98.420833	None	None	None	927 (1)
6813510	218GLRS	29.811667	-98.417222	None	None	None	1070 (1)
6813511	218CCRK	29.796111	-98.4275	None	None	None	925 (1)
6813512	218HSCC	29.799722	-98.426944	919 (1)	None	None	None
6813604	218GLRSL	29.806944	-98.385556	870 (1)	None	None	None
6813605	218GLRS	29.796667	-98.413611	None	None	None	905 (1)
6813608	218GRHC	29.793611	-98.401944	780 (1)	None	None	None
6813701	218GRHC	29.7625	-98.461389	895 (1)	None	None	None
6813702	218GLRS	29.760833	-98.461667	948.2 (2)	None	None	None
6813801	218GRHC	29.765278	-98.448889	915 (1)	None	None	None
6813802	218GRHC	29.766111	-98.444722	840 (1)	None	None	None
6813803	218GRHC	29.759444	-98.45	850 (1)	None	None	None

Table A-1. (cont.) Average Water Levels for Different Comal Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
6813804	218GRHC	29.765833	-98.443056	870 (1)	None	None	788 (1)
6813805	218GRHC	29.758056	-98.4425	None	None	None	950 (1)
6813806	218GRHC	29.768889	-98.456944	931.7 (12)	None	900.8 (4)	919.1 (6)
6813808	218GLRS	29.789722	-98.417778	None	None	None	945 (1)
6813810	218GRHC	29.773056	-98.438889	942 (2)	None	None	None
6813811	218GRHC	29.773056	-98.438056	972.1 (3)	None	845.4 (1)	None
6813812	218GRHC	29.773056	-98.440833	None	None	None	953 (1)
6813813	218GRHC	29.778611	-98.445278	969.5 (2)	None	None	None
6813814	218GRHC	29.778889	-98.445278	974.8 (2)	None	None	None
6813815	218GRHC	29.777222	-98.428056	None	None	None	950 (1)
6813816	218GRHC	29.764722	-98.45	None	None	843 (1)	None
6813818	218GRHC	29.753056	-98.440278	None	None	612 (1)	None
6813819	218GRHC	29.753333	-98.4375	None	None	810 (1)	None
6813820	218GRHC	29.750556	-98.434167	None	None	None	827 (1)
6813901	218GRHC	29.753611	-98.379722	819 (1)	None	None	None
6813904	218GPSH	29.756667	-98.397222	None	None	None	865 (1)
6813905	218GPSH	29.756667	-98.397222	844 (2)	None	None	None
6813906	218GPSH	29.7525	-98.395833	833.5 (1)	None	None	745 (1)
6813907	218GRHC	29.786111	-98.399444	780 (1)	None	None	None
6814201	218GRHC	29.86	-98.302222	875 (1)	None	None	None
6814202	218GLRSL	29.860833	-98.301944	None	None	None	890 (1)
6814204	218GLRSL	29.854722	-98.295	None	None	None	910 (1)
6814205	218GLRSL	29.874444	-98.298056	None	993 (1)	None	None
6814207	218GPSH	29.854722	-98.295	None	928.8 (1)	930.9 (1)	935.2 (1)
6814301	218GLRSL	29.860278	-98.254444	None	None	None	938 (1)
6814305	218GRHC	29.863056	-98.263056	None	None	None	920 (1)
6814306	218GLRSU	29.864444	-98.261667	None	856.2 (1)	897.3 (1)	898.7 (1)
6814307	218GRHC	29.847222	-98.280833	888.5 (2)	None	None	None
6814310	218GRHC	29.854444	-98.260556	755 (1)	None	None	None
6814401	218GLRSU	29.811389	-98.356667	1105 (1)	None	None	None
6814402	218GRUH	29.819444	-98.349167	865 (1)	None	1075.9 (1)	None
6814405	218GRCCU	29.803333	-98.360833	None	None	None	920 (1)
6814406	218GRCCU	29.799444	-98.356667	845 (1)	None	None	816.8 (1)
6814407	218GRCCU	29.798333	-98.355277	908.8 (45)	None	831.4 (2)	887.2 (1)
6814410	218GLRSU	29.821944	-98.345278	None	None	1101 (1)	None
68146AA	218CCRK	29.828472	-98.274722	989.3 (1)	None	None	937.4 (3)
6814705	218GRCCU	29.755278	-98.371389	800 (1)	None	None	None
6814901	218GLRS	29.773333	-98.276389	1140.6 (3)	None	None	1142.5 (10)
6814902	218GLRS	29.774167	-98.29	1037.6 (12)	None	None	1033.9 (10)
6815101	218GRHC	29.865833	-98.246389	None	None	None	856 (1)
6815104	218GLRSL	29.853889	-98.246111	None	None	780 (1)	None
6815105	218GLRSL	29.857222	-98.242778	None	None	None	780 (1)
6815107	218GLRSU	29.835556	-98.249722	None	None	None	930 (1)
6815109	218GLRSU	29.851667	-98.247222	None	894 (1)	906.8 (1)	913.7 (1)
6815112	218GLRS	29.835278	-98.249444	925 (1)	None	None	None
6815114	218GLRSL	29.863611	-98.231389	930.9 (2)	None	None	900 (1)

Table A-1. (cont.) Average Water Levels for Different Comal Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
6815115	218GLRSU	29.848888	-98.227221	950.4 (99)	915 (1)	942.6 (1)	926.6 (6)
6815116	218GLRSU	29.84861	-98.213055	878.1 (9)	873.4 (1)	884.5 (1)	875.3 (5)
6815118	218GLRSU	29.848889	-98.227222	None	None	None	896 (1)
6815201	218GLRS	29.849722	-98.201667	None	None	None	770 (1)
6815202	218GRHC	29.874722	-98.204167	None	None	883.8 (2)	878 (2)
6815203	218GRHC	29.851667	-98.200556	685 (1)	None	None	None
6815205	218GLRSU	29.87	-98.176111	775 (1)	None	None	None
6815207	218GLRSU	29.855556	-98.171111	900 (1)	957.6 (1)	974.4 (1)	968.1 (1)
6815208	218GRHC	29.861389	-98.196111	None	None	740.8 (2)	875 (1)
6815210	218GRHC	29.866944	-98.1875	717 (1)	None	None	None
6815401	218GLRS	29.824722	-98.244722	934.1 (16)	913.6 (2)	915.1 (1)	934 (8)
6815501	218GLRSU	29.826667	-98.168056	410 (1)	None	None	None
6815603	218GLRS	29.804722	-98.156389	None	None	None	679 (2)
6815604	218GLRS	29.792778	-98.140833	None	None	None	655.8 (2)
6815605	218GLRS	29.795556	-98.129722	None	None	631.6 (1)	633 (2)
6815606	218EDRDA	29.806389	-98.153889	682.5 (4)	None	None	680.5 (5)
6815701	218GLRS	29.766944	-98.229444	702.4 (16)	695.1 (2)	707.3 (1)	710.3 (8)
6815702	218GLRS	29.76	-98.2225	None	None	None	695 (1)
6815703	218GLRS	29.791944	-98.231667	None	None	None	899.5 (2)
6815704	218GLRS	29.788889	-98.22	None	None	None	926.8 (2)
6815801	218EDRDA	29.757222	-98.191944	None	664.6 (1)	None	670.5 (2)
6815802	218EDRDA	29.769722	-98.196389	None	694.8 (1)	None	None
6815803	218EDRDA	29.779444	-98.186389	696.5 (6)	None	None	699.4 (7)
6815804	218EDRDA	29.773333	-98.200833	740 (1)	None	None	735.3 (2)
6815805	218GLRS	29.778056	-98.1825	670 (1)	None	None	673.3 (2)
6815806	218EDRDA	29.765278	-98.202778	695 (1)	None	None	687.1 (2)
6815807	218EDRDA	29.754722	-98.2075	701.3 (3)	None	None	690.7 (5)
6815808	218EDRDA	29.7675	-98.178611	None	None	None	656.4 (2)
6815809	218EDRDA	29.770945	-98.176475	651.5 (8)	None	None	640.7 (8)
6815810	218EDRDA	29.751389	-98.176667	653.4 (2)	None	None	649.1 (4)
6815811	218EDRDA	29.753333	-98.182778	None	None	None	653.3 (2)
6815902	218EDRDA	29.759115	-98.140048	642.6 (8)	650.8 (2)	None	652 (5)
6815903	218EDRDA	29.757778	-98.141667	636.6 (70)	624.3 (8)	628.4 (13)	632.4 (52)
6815904	218EDRDA	29.750556	-98.162778	641.4 (34)	617.2 (3)	628.2 (6)	633.6 (32)
6815905	218EDRDA	29.785	-98.147778	644.3 (4)	640.6 (5)	644 (3)	647.9 (6)
6815906	218EDRDA	29.778889	-98.16	None	632.7 (2)	None	None
6815907	218EDRDA	29.75467	-98.139552	623.7 (7)	None	None	614.4 (7)
6815908	218EDRDA	29.759444	-98.136111	None	None	None	612.9 (2)
6815909	218EDRDA	29.779444	-98.13	None	None	None	631.9 (2)
6815910	218EDRDA	29.754444	-98.128889	None	None	None	609.7 (2)
6815911	218EDRDA	29.771389	-98.131111	None	None	668 (1)	None
6815912	218EDRDA	29.754508	-98.141	642.4 (7)	None	None	634.1 (8)
68159RP	218EDRDA	29.763969	-98.142481	645.2 (1)	None	None	633.6 (2)
6816101	218GLRSU	29.847778	-98.118889	735 (1)	None	None	None
68162AA	218CCRK	29.840752	-98.079869	None	None	None	677.8 (2)
6816301	218EDRDA	29.871667	-98.021667	599.9 (15)	596 (2)	598 (2)	598.1 (6)

Table A-1. (cont.) Average Water Levels for Different Comal Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
68163AA	218EDRDA	29.848212	-98.023251	597.7 (1)	None	None	583.5 (1)
68163BB	218EDRDA	29.855251	-98.03245	643.1 (1)	None	None	639.5 (1)
68163DD	218EDRDA	29.869196	-98.034217	593.1 (1)	None	None	587 (1)
68163EE	218EDRDA	29.87724	-98.042787	729.9 (1)	None	None	701.7 (1)
68163XX	218EDRDA	29.886533	-98.039428	855.3 (1)	None	None	None
6816401	218GLRSU	29.797778	-98.116389	639.7 (10)	626.5 (2)	635.5 (1)	638.3 (10)
6816402	218GLRSU	29.801944	-98.111667	568 (1)	None	None	None
6816403	218GLRSU	29.801944	-98.111667	597 (1)	None	None	None
6816404	218GLRSU	29.802222	-98.111111	None	None	None	582 (1)
6816501	218EDRDA	29.801622	-98.055052	592.7 (13)	None	None	594.8 (2)
6816502	218EDRDA	29.80812	-98.047522	600.1 (1)	None	None	581.9 (1)
6816601	218EDRDA	29.82981	-98.001633	596.7 (1)	None	None	583.7 (1)
6816602	218EDRDA	29.793889	-98.024167	598 (35)	592.3 (2)	591.8 (1)	594.2 (15)
6816603	218EDRDA	29.829228	-98.016213	583.4 (3)	None	None	579.5 (3)
6816605	218EDRDA	29.829167	-98.004444	569.5 (19)	None	None	559.2 (4)
68166HC	218EDRDA	29.818909	-98.017454	590.3 (1)	None	None	582.9 (2)
68166HC#2	218EDRDA	29.81857	-98.01703	604.9 (1)	None	None	599.3 (1)
6816701	218EDRDA	29.757275	-98.104789	621.4 (67)	None	None	616.8 (14)
6816702	218GLRSU	29.775278	-98.110833	642 (42)	629.2 (2)	635.1 (10)	640 (33)
6816703	218EDRDA	29.75366	-98.093118	603.1 (70)	594.7 (16)	596.7 (14)	599.7 (50)
6816704	218EDRDA	29.764167	-98.11	613 (28)	601.8 (8)	606.7 (7)	608.5 (24)
6816705	218GLRS	29.786667	-98.119722	None	None	None	630.7 (2)
6816706	218EDRDA	29.765	-98.118333	None	None	None	612.9 (2)
6816707	218EDRDA	29.767778	-98.101944	612 (1)	None	None	None
6816708	218EDRDA	29.767778	-98.101944	None	None	None	602 (1)
68167ML	218EDRDA	29.783774	-98.087155	None	None	None	603.7 (2)
6816801	218EDRDA	29.786768	-98.052866	603 (216)	585.3 (25)	622 (43)	602.6 (164)
6816803	218EDRDA	29.769918	-98.074103	613.4 (16)	603.6 (2)	None	607.9 (11)
6816804	218EDRDA	29.778056	-98.063056	617.3 (53)	597.3 (14)	601.7 (13)	621.7 (37)
68168NB	218EDRDA	29.783098	-98.066087	616.4 (1)	None	None	608.3 (2)
68169FW	218EDRDA	29.790833	-98.03	602.4 (1)	None	None	597.3 (1)
6819301	218GPSH	29.747778	-98.635833	1174.7 (4)	None	None	None
6819321	218GPSH	29.7475	-98.626667	895 (1)	None	None	None
6819322	218CCRK	29.746944	-98.6275	None	None	None	1084 (1)
6820111	218GRCCU	29.749722	-98.623889	None	None	None	1102 (1)
6821202	218GLRSU	29.748889	-98.443333	None	None	None	824 (1)
6821203	218GLRSU	29.749167	-98.442778	None	None	None	855 (1)
6821204	218GLRSL	29.749167	-98.444167	805 (1)	None	None	None
6821206	218GLRSL	29.746944	-98.451389	None	None	None	803 (1)
6821209	218GLRS	29.738889	-98.438056	None	None	835 (1)	None
6821210	218GLRSU	29.728611	-98.4275	1009.7 (3)	None	None	None
6821211	218GLRSU	29.728611	-98.427778	1012 (2)	None	None	None
6821215	218GRHC	29.734167	-98.426667	882.4 (5)	None	851.2 (1)	840.7 (8)
6821216	218GRHC	29.715833	-98.444167	1011.5 (2)	None	None	None
6821217	218GLRS	29.708889	-98.431667	988.9 (1)	None	None	None
6821301	218GLRSL	29.7475	-98.393333	824 (1)	None	None	858 (1)

Table A-1. (cont.) Average Water Levels for Different Comal Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
6821302	218GRHC	29.746667	-98.393333	None	None	None	810 (1)
6821305	218GLRS	29.743889	-98.398056	None	None	829.6 (1)	None
6821306	218GRCCU	29.749167	-98.389444	None	None	550 (1)	None
6822201	218GLRS	29.722778	-98.301389	805.1 (30)	None	800.4 (2)	801.9 (16)
6822301	218EDRDA	29.712222	-98.258056	678.3 (58)	649.1 (2)	653.2 (11)	663.4 (37)
6822302	218GLRS	29.711944	-98.276944	695.8 (22)	None	677.1 (1)	687.9 (6)
6822303	218EDRDA	29.713611	-98.251944	677.5 (6)	656.5 (3)	645.4 (2)	652.1 (4)
6822304	218GLRSU	29.728056	-98.286389	None	None	None	700 (1)
6822305	218GLRSU	29.726944	-98.288333	None	None	None	750 (1)
6822401	218EDRD	29.698889	-98.341944	None	None	825 (1)	None
6822501	218EDRDA	29.681	-98.293333	678.9 (35)	653.7 (1)	None	658.6 (9)
6822502	218EDRDA	29.697778	-98.296667	690.5 (23)	None	658 (2)	678.1 (8)
6822503	218EDRDA	29.684722	-98.316389	704.4 (3)	None	698.9 (2)	693.6 (2)
6822508	218EDRDA	29.680278	-98.293333	674.4 (4)	None	None	656.5 (1)
68225AA	218CCRK	29.676767	-98.309267	742.4 (1)	None	None	650.6 (2)
68225BB	218CCRK	29.684269	-98.300908	716.9 (1)	None	None	656.4 (2)
68225CC	218EDRDA	29.682472	-98.30111	745.7 (1)	None	None	669 (1)
6822601	218EDRDA	29.677355	-98.286153	685.9 (13)	631.8 (2)	632.7 (2)	651.3 (7)
6822602	218EDRDA	29.676944	-98.290833	646.6 (5)	None	None	636.6 (4)
6822603	218EDRDA	29.702248	-98.251575	691.8 (11)	None	None	656.8 (6)
6822604	218EDRDA	29.6975	-98.258889	659.3 (3)	None	None	648 (4)
6822605	218EDRDA	29.682222	-98.26	662.3 (3)	None	None	656.1 (4)
68226BF	218EDRDA	29.675512	-98.272263	684.2 (1)	None	None	656.5 (2)
68226BH	218EDRDA	29.674056	-98.27697	689.7 (1)	None	None	657 (2)
6822802	218EDRDA	29.632222	-98.299722	662 (5)	None	None	None
6822803	218EDRDA	29.639444	-98.322778	674.1 (4)	None	637.2 (2)	654.3 (3)
6822804	218EDRDA	29.631389	-98.330833	671 (6)	632.4 (1)	None	653.7 (3)
6822805	218EDRDA	29.631389	-98.298889	662.5 (1)	None	None	None
6822806	218EDRDA	29.641944	-98.321111	677 (1)	None	None	None
6822807	218EDRDA	29.655496	-98.305047	692.3 (4)	639.5 (1)	642 (1)	663.4 (3)
6822808	218EDRDA	29.642556	-98.307375	691.1 (2)	None	None	705 (1)
6822810	218EDRDA	29.660271	-98.307088	689.5 (13)	None	None	662.3 (7)
68228AA	218EDRDA	29.652175	-98.30108	703.3 (1)	None	None	668 (3)
68228BB	218EDRDA	29.659919	-98.320965	691.4 (1)	None	None	665.5 (3)
6822902	218EDRDA	29.629403	-98.280323	661.8 (1)	None	None	648.4 (3)
6822903	218EDRDA	29.626944	-98.26	655.3 (11)	None	635.2 (2)	642.6 (15)
6822910	218EDRDA	29.629276	-98.280546	673.7 (1)	None	695 (1)	649.6 (3)
6822911	218EDRDA	29.629444	-98.2725	654.8 (5)	None	None	644.3 (4)
6822912	218EDRDA	29.630378	-98.275263	654.2 (8)	None	None	636.3 (7)
6822913	218EDRDA	29.643888	-98.27111	745.2 (11)	None	None	None
6823101	218EDRDA	29.741667	-98.209444	663.4 (31)	661 (1)	661.2 (11)	661.2 (29)
6823102	218EDRDA	29.726389	-98.225278	764 (19)	None	None	757.4 (16)
6823104	218EDRD	29.74454	-98.224245	706 (8)	None	None	691.1 (4)
6823105	218EDRDA	29.714939	-98.223238	648.6 (6)	None	None	627.7 (4)
6823202	218EDRDA	29.711572	-98.200926	653.7 (29)	None	None	645.3 (5)
6823203	218EDRDA	29.710218	-98.192298	641.6 (1)	None	None	640 (2)

Table A-1. (cont.) Average Water Levels for Different Comal Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
6823206	218EDRDA	29.748611	-98.182222	657.8 (47)	635.4 (2)	637.6 (7)	645.3 (39)
6823207	218EDRDA	29.732222	-98.191944	649.4 (9)	None	None	648.5 (5)
6823208	218EDRDA	29.734902	-98.194447	706.3 (37)	622.4 (5)	637.9 (2)	642.6 (12)
6823209	218EDRDA	29.720789	-98.178998	633.7 (43)	623.7 (3)	625.5 (2)	627.9 (23)
6823210	218EDRDA	29.714517	-98.208046	650.6 (14)	638 (4)	628.9 (2)	643.1 (8)
6823211	218EDRDA	29.74443	-98.171628	643.8 (9)	622.4 (9)	633.5 (3)	635.7 (11)
6823212	218EDRDA	29.743611	-98.173056	638.8 (39)	617.6 (10)	624.9 (11)	630.2 (36)
6823224	218EDRDA	29.710278	-98.191944	659 (1)	None	None	None
6823225	218EDRDA	29.741389	-98.200833	None	637 (1)	None	634.9 (2)
6823226	218EDRDA	29.745278	-98.179444	None	None	None	629.5 (2)
6823302	218EDRDA	29.713574	-98.138355	626.5 (495)	619.6 (77)	621.8 (166)	623.9 (422)
6823304	218EDRDA	29.711111	-98.138333	633.7 (184)	631 (1)	None	631.8 (8)
6823306	218EDRDA	29.746206	-98.153948	633.6 (71)	617.2 (11)	622.6 (17)	626.6 (69)
6823307	218EDRDA	29.746389	-98.159722	640.7 (7)	622.5 (6)	628.8 (3)	633.1 (10)
6823308	218EDRDA	29.747778	-98.145556	632 (18)	617.7 (6)	638.8 (10)	625.4 (26)
6823309	218EDRDA	29.718667	-98.135241	625.8 (15)	619.7 (1)	620.4 (2)	622.6 (10)
6823310	218EDRDA	29.730833	-98.125556	616.4 (20)	606.2 (14)	610 (6)	614.6 (9)
6823311	218EDRDA	29.735278	-98.128056	621 (1)	None	None	574 (2)
6823312	218EDRDA	29.734035	-98.127111	None	None	None	619.8 (3)
6823316	218EDRDA	29.721366	-98.147906	626.8 (43)	615.2 (2)	None	619.4 (11)
6823319	218EDRDA	29.721007	-98.127678	622.3 (7)	None	None	620.5 (8)
68233DW	218EDRDA	29.727165	-98.125307	627.9 (1)	None	None	622.8 (2)
6823502	218EDRD	29.682222	-98.176389	648.9 (8)	None	None	634.2 (5)
6823504	218EDRDA	29.671355	-98.196417	643.6 (11)	None	None	633.4 (6)
6823507	218EDRDA	29.689167	-98.199167	644.1 (18)	621.6 (7)	627.5 (6)	634.3 (5)
6823508	218EDRDA	29.671389	-98.196111	None	None	660 (1)	None
6823602	218EDRDA	29.701877	-98.15112	626 (14)	None	None	620 (10)
6823603	218EDRDA	29.687222	-98.150833	640.5 (16)	None	623.9 (1)	635.1 (6)
6823604	218EDRDA	29.670278	-98.163611	641 (49)	621.2 (2)	624.9 (15)	631.6 (40)
6823605	218EDRDA	29.694444	-98.166389	642 (1)	None	None	None
6823608	218EDRDA	29.696389	-98.163889	None	None	None	633 (1)
6823611	218EDRDA	29.697778	-98.163889	640 (1)	None	None	None
6823612	218EDRDA	29.697222	-98.163611	622 (1)	None	None	None
6823613	218EDRDA	29.697222	-98.163611	None	None	None	605 (1)
6823616	218EDRDA	29.704444	-98.133054	None	None	627.2 (1)	None
6823616A	218EDRDA	29.704343	-98.133076	641.1 (3)	None	None	None
6823617	218EDRDA	29.705589	-98.135057	642.4 (3)	None	627.4 (1)	None
6823618	218EDRDA	29.705833	-98.134444	None	None	627.4 (1)	None
6823619	218EDRDA	29.706667	-98.135833	None	None	629.5 (1)	None
6823619B	218EDRDA	29.70739	-98.136251	640.3 (2)	None	None	None
6823621	218EDRDA	29.694453	-98.159173	642.5 (10)	620.7 (2)	622.8 (1)	633.5 (8)
6823701	218EDRDA	29.648888	-98.216439	656.9 (59)	631.5 (2)	637.1 (7)	640.6 (33)
6823703	218EDRDA	29.636389	-98.241111	None	None	None	656.9 (1)
6823704	211AEDD	29.638056	-98.212222	713.1 (1)	None	None	None
6823705	218EDRDA	29.634722	-98.238056	655.9 (3)	623.4 (1)	629 (2)	640.9 (1)
6823706	218EDRDA	29.631944	-98.229167	680.2 (3)	729.4 (2)	None	730.3 (1)

Table A-1. (cont.) Average Water Levels for Different Comal Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
6823709	218EDRDA	29.64043	-98.233116	663.8 (11)	657.9 (3)	None	658.1 (9)
6823710	218EDRDA	29.663431	-98.236035	656.5 (12)	None	None	641.5 (5)
6823711	218EDRDA	29.638889	-98.219722	720.9 (3)	707.6 (1)	None	None
6823807	218EDRDA	29.666364	-98.171324	648.6 (31)	625.8 (1)	630.4 (1)	639.7 (17)
6823808	218EDRDA	29.6575	-98.182222	648.4 (13)	625.5 (2)	None	637.2 (3)
6823809	218EDRDA	29.659722	-98.193056	None	None	603.2 (1)	None
6823810	218EDRDA	29.663889	-98.191944	608.6 (2)	602.5 (1)	620.8 (1)	None
6823811	218EDRDA	29.655833	-98.203056	None	None	595.7 (1)	None
6824101	112LEON	29.734722	-98.087778	628.7 (1)	None	None	None
6824102	218EDRDA	29.745556	-98.101667	620.7 (6)	615.5 (1)	None	618 (1)
6824103	218EDRDA	29.73111	-98.119443	632 (1)	None	None	None
6824104	218EDRDA	29.74783	-98.116567	613.8 (15)	607.7 (1)	None	611.8 (6)
6824105	218EDRDA	29.738611	-98.088611	630 (45)	634.9 (2)	634.1 (1)	627.2 (19)
6824106	218EDRDA	29.734722	-98.113611	620 (35)	None	None	617.3 (27)
6824114	218EDRDA	29.743611	-98.114444	619.5 (1)	None	None	None
6824115	218EDRDA	29.743889	-98.112222	619.5 (1)	None	None	None
6824117	218EDRDA	29.743056	-98.113889	None	None	None	679.8 (2)
6824118	218EDRDA	29.744444	-98.114167	615.2 (1)	None	None	610 (1)
6824119	218EDRDA	29.729722	-98.123889	622 (1)	None	None	None
6824120	218EDRDA	29.74361	-98.098333	648.2 (9)	None	647.7 (1)	648.1 (8)
6824121	218EDRDA	29.743333	-98.123889	None	None	None	648.7 (1)
6824122	218EDRDA	29.741389	-98.110556	None	None	612.9 (1)	None
68241JF	218EDRDA	29.747824	-98.103859	621.7 (1)	None	None	611.2 (1)
6824405	100ALVM	29.685278	-98.101389	584.4 (1)	None	None	None
6824406	100ALVM	29.685278	-98.1	584.6 (35)	None	None	583.5 (2)
6824407	100ALVM	29.684444	-98.102778	584.6 (35)	None	None	583.3 (2)
6824408	100ALVM	29.678056	-98.104444	588.1 (34)	None	None	587.6 (2)
6824409	100ALVM	29.6875	-98.101389	None	None	None	581.9 (1)
6824410	100ALVM	29.690278	-98.101111	579.7 (1)	None	None	None
6824411	100ALVM	29.6875	-98.108333	581.2 (1)	None	None	None
6830208	218EDDT	29.610218	-98.319579	671.1 (246)	627.1 (8)	636.6 (43)	648.5 (109)
6830209	218EDRDA	29.616111	-98.301944	None	None	None	650.5 (1)
6830211	218EDRDA	29.604959	-98.32818	670.1 (3)	None	None	652.8 (3)
6830216	218EDRDA	29.620556	-98.328889	670.9 (5)	630.9 (1)	638.9 (2)	655.3 (2)
6830218	218EDRDA	29.605833	-98.298611	660.4 (1)	None	None	None
6830224	218EDRDA	29.621111	-98.304444	None	None	None	650 (1)
6830225	218EDRDA	29.620278	-98.304167	668.7 (5)	None	None	None
6830226	218EDRDA	29.615135	-98.317151	659.8 (8)	None	None	646.2 (7)
68302AA	218EDRDA	29.618347	-98.326581	677.2 (3)	None	None	654.9 (3)
68302BB	218EDRDA	29.614971	-98.319088	676.4 (1)	None	None	652.2 (3)
68302LH	218EDRDA	29.611188	-98.320875	675.5 (1)	None	None	651.3 (2)
6830312	218EDRDA	29.612805	-98.283916	663.9 (35)	626.4 (3)	637.9 (2)	645.7 (15)
6830313	218EDRDA	29.616944	-98.2575	619.7 (36)	583 (14)	592.5 (14)	608.1 (27)
6830315	218EDRDA	29.609	-98.289928	669.1 (71)	None	633 (1)	646.6 (3)

*Elevation and number of measurements

Table A-2. Average Water Levels for Different San Marcos Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
5747501	217HSTN	30.316944	-98.178611	None	936 (3)	937.5 (2)	938.5 (1)
5747502	217HSTN	30.316111	-98.178889	None	None	926 (1)	None
5747801	218GRLH	30.253889	-98.172222	1079.2 (1)	None	1090 (1)	None
5747901	218GLRSL	30.258889	-98.13	1201.2 (3)	None	1109.5 (4)	1201.5 (1)
5747902	218GLRS	30.258888	-98.129999	None	None	1188.4 (22)	1203.8 (2)
5748809	218GLRS	30.254167	-98.051667	None	None	719.2 (1)	None
5755301	218GLRS	30.212778	-98.133056	1019.5 (1)	None	None	1015 (1)
5755401	218GRHC	30.196111	-98.2125	1104.1 (1)	1049.7 (3)	1076.6 (14)	1086.8 (3)
5755501	218GRCCU	30.201111	-98.199444	1034.8 (2)	None	1000 (1)	None
5755601	218GRHC	30.184167	-98.146111	1017.5 (1)	978.8 (1)	1006.3 (5)	1010 (1)
5755602	218GLRS	30.206944	-98.129167	None	None	940 (1)	None
5755603	218GLRH	30.202222	-98.161667	1044.8 (1)	None	1037.7 (3)	1045 (1)
5755605	218GRHC	30.207222	-98.131389	None	None	None	1019 (1)
5755607	218GLRSL	30.184166	-98.13861	None	None	958.8 (9)	None
5755901	218GLRSL	30.1625	-98.133333	None	None	None	1032 (1)
5756101	218GLRS	30.232222	-98.116667	None	None	None	970 (1)
5756201	218GLRSU	30.249167	-98.061389	None	None	1017 (1)	None
5756203	218GLRSU	30.248889	-98.075278	None	None	1020 (1)	None
5756204	218GLRS	30.239444	-98.0525	None	None	933.2 (3)	925 (1)
5756302	218GLRS	30.2225	-98.001667	None	None	824.6 (3)	None
5756303	218GLRS	30.222222	-98.001667	784 (1)	None	826.4 (2)	None
5756402	218GLRSU	30.195556	-98.088333	None	None	1155.5 (1)	None
5756403	218GLRSL	30.198056	-98.088056	None	None	1025.1 (1)	None
5756404	218GLRSU	30.198056	-98.088333	None	None	1142.8 (1)	None
5756405	218GLRSL	30.193611	-98.089167	None	None	1031 (1)	None
5756406	218GLRSL	30.193611	-98.088611	None	None	1031.6 (1)	None
5756407	218GLRSL	30.192778	-98.088611	None	None	1075.8 (1)	None
5756408	218GLRSL	30.191111	-98.090278	None	None	1010.5 (1)	None
5756409	218GLRSL	30.190278	-98.09	None	None	1010.3 (1)	None
5756410	218GLRSL	30.190278	-98.089167	None	None	1062.8 (1)	None
5756411	218GLRSU	30.192222	-98.094444	None	None	1139 (1)	None
5756412	218GLRSU	30.193056	-98.088889	None	None	1154 (1)	None
5756413	218GLRSL	30.193333	-98.087222	None	None	1026.5 (1)	None
5756415	218GLRSU	30.194167	-98.089444	None	None	1155.8 (1)	None
5756416	218GLRSL	30.196111	-98.089167	None	None	1027.8 (1)	None
5756417	218GLRSU	30.198889	-98.087222	None	None	1137.4 (1)	None
5756422	218GLRS	30.200833	-98.088056	None	None	1084 (1)	None
5756424	218GLRSU	30.196389	-98.088889	None	None	1154.6 (1)	None
5756425	218GLRSL	30.1975	-98.088611	None	None	1070.4 (1)	None
5756427	218GLRSL	30.198889	-98.088333	None	None	1025.4 (1)	None
5756428	218GLRSU	30.199722	-98.088333	None	None	1147.6 (1)	None
5756429	218GLRSU	30.199722	-98.088333	None	None	1148.5 (1)	None
5756432	218GLRSL	30.1925	-98.095556	None	None	1028 (1)	None
5756433	218GLRSL	30.192222	-98.098056	None	None	1045.6 (1)	None
5756434	218GLRSL	30.192222	-98.098056	None	None	985.4 (1)	None

Table A-2. (cont.) Average Water Levels for Different San Marcos Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
5756438	218GLRSU	30.191111	-98.085556	None	None	1149 (1)	None
5756439	218GLRSL	30.204167	-98.088333	None	None	1027.9 (1)	None
5756440	218GLRSU	30.207222	-98.089167	None	None	1139 (1)	None
5756442	218GLRSL	30.181667	-98.084444	None	None	1007.7 (1)	None
5756443	218GLRSL	30.184444	-98.085	None	None	1006 (1)	None
5756444	218GLRSL	30.188611	-98.086944	None	None	1005.3 (1)	None
5756447	218GLRSL	30.188889	-98.086389	None	None	1001.8 (1)	None
5756450	218GLRSL	30.171667	-98.090556	None	None	941.9 (1)	None
5756451	218GLRSL	30.167778	-98.093889	None	None	963 (1)	None
5756455	218GLRSL	30.188333	-98.086944	None	None	1013 (1)	None
5756459	218GLRSL	30.191389	-98.091111	None	None	1045 (1)	None
5756461	218GLRSU	30.191667	-98.089722	None	None	1131.7 (1)	None
5756463	218GLRSL	30.183889	-98.093333	None	None	1006.2 (1)	None
5756465	218GLRSL	30.181111	-98.092778	None	None	1002.3 (1)	None
5756466	218GLRSL	30.178056	-98.091667	None	None	1006.9 (1)	None
5756467	218GLRSL	30.183889	-98.09	None	None	1005.6 (1)	None
5756469	218GLRSL	30.1825	-98.088056	None	None	1004.4 (1)	None
5756470	218GLRSL	30.191667	-98.102778	None	None	1024 (1)	None
5756471	218GLRSL	30.179167	-98.085833	None	None	1001 (1)	None
5756472	218GLRSU	30.189444	-98.090556	None	None	1131.3 (1)	None
5756476	218GLRSU	30.197778	-98.086944	None	None	1142 (1)	None
5756501	218GLRSL	30.200278	-98.080556	None	None	977.2 (1)	None
5756502	218GLRSU	30.199722	-98.080833	None	None	999.7 (1)	None
5756503	218GLRSL	30.194722	-98.075556	1027 (1)	None	977.7 (1)	None
5756506	218GLRSU	30.1825	-98.083056	None	None	1131.5 (1)	None
5756507	218GLRSU	30.181944	-98.083333	None	None	1133 (1)	None
5756508	218GLRSL	30.180833	-98.083333	None	None	1006.7 (1)	None
5756509	218GLRSU	30.181111	-98.082778	None	None	1133.8 (1)	None
5756510	218GLRSL	30.188889	-98.082778	None	None	1008.3 (1)	None
5756511	218GLRSL	30.184722	-98.075833	None	None	994 (1)	None
5756513	218GLRSL	30.170278	-98.074167	1013 (1)	None	970 (1)	None
5756516	218GLRSL	30.170556	-98.076944	None	None	942.7 (1)	None
5756517	218CCRK	30.194722	-98.054444	None	None	962.5 (1)	None
5756601	218GLRSL	30.207778	-98.033056	917.7 (1)	None	881 (1)	None
5756701	218GLRS	30.141667	-98.100278	None	None	1020 (1)	None
5756702	218HCSH	30.154167	-98.085	959 (2)	895.2 (4)	897.2 (2)	None
5756703	218CCRK	30.153611	-98.086111	1017.5 (1)	917.4 (2)	930.5 (2)	None
5756704	218CCRK	30.151389	-98.086944	947 (1)	919.7 (5)	930.3 (3)	971.4 (2)
5756705	218GLRS	30.164722	-98.084167	None	None	1064.4 (1)	None
5756707	218GLRSL	30.165	-98.083611	None	None	1004.4 (1)	None
5756708	218GLRSU	30.144722	-98.114444	None	None	923 (1)	None
5756709	218CCRK	30.151389	-98.086944	982.1 (1)	926.7 (3)	956.2 (6)	984.3 (4)
5756710	218CCRK	30.126389	-98.103889	1055.4 (1)	None	1019 (7)	1043.5 (4)
5756711	218CCRK	30.1275	-98.103333	None	None	1020 (1)	None
5756801	218GLRSL	30.163889	-98.07	None	None	945.4 (1)	None

Table A-2. (cont.) Average Water Levels for Different San Marcos Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
5756902	219SLGH	30.152778	-98.030556	None	None	729.1 (3)	None
5756903	218CCRK	30.134722	-98.008611	None	835 (1)	None	895.1 (1)
5756904	218GLRS	30.153056	-98.030833	None	None	None	918.3 (1)
5762302	218GLRS	30.108611	-98.269722	None	1111.6 (1)	None	None
5763501	218LGRLH	30.065833	-98.189722	None	None	964.2 (3)	None
5763502	218GLRSL	30.046389	-98.201389	None	None	956.4 (1)	None
5763701	217HSTN	30.037778	-98.241667	920.8 (2)	876 (1)	921.3 (1)	917.4 (2)
5763702	219SLGH	30.039444	-98.235556	965.9 (2)	939 (1)	None	None
5763703	218GRHC	30.037778	-98.241944	969.5 (1)	None	969.3 (5)	971.5 (1)
5763705	217HSTN	30.034722	-98.241111	923.6 (14)	923.8 (4)	924.8 (49)	923.6 (31)
5763801	218CCRK	30.001111	-98.202222	None	None	926.8 (6)	None
5763802	218GLRS	30.011944	-98.207222	None	None	934 (2)	None
5763804	217HSCC	30.034722	-98.177222	None	None	952.3 (2)	None
5763901	218GLRSL	30.0275	-98.149444	None	None	946.5 (2)	None
5763902	218GLRSL	30.034166	-98.146666	931 (2)	None	928.7 (8)	923.6 (2)
5763903	218GLRSL	30.039444	-98.156111	None	None	929 (3)	None
5763904	218CCRK	30.031389	-98.140278	None	930.1 (4)	925.2 (5)	928.4 (4)
5763907	218GLRSL	30.039167	-98.156111	None	None	926.5 (1)	None
5763908	218CCRK	30.039722	-98.143889	None	None	None	801 (1)
5764101	218CCRK	30.123611	-98.104167	1002.7 (1)	None	951 (2)	994.6 (1)
5764401	218GLRSL	30.042222	-98.108611	None	None	917 (3)	None
5764402	218GLRSL	30.042222	-98.108611	None	None	919 (1)	None
5764601	218GLRS	30.054444	-98.011944	None	None	904.3 (1)	None
57646AA	218EDRDA	30.06264	-98.010675	None	None	893.7 (1)	900.7 (1)
5764701	218GLRS	30.038056	-98.105	None	None	920 (1)	None
5764702	218CCRK	30.024999	-98.114444	905 (1)	895 (1)	903.4 (8)	905.5 (3)
5764703	218CCRK	30.028611	-98.111944	None	None	908.3 (4)	None
5764705	218CCRK	30.015833	-98.116388	834.2 (2)	None	813.5 (25)	828.4 (2)
5764706	218GLRSL	30.014167	-98.116944	None	None	895 (1)	None
5764707	218CCRK	30.014444	-98.1175	853.1 (2)	None	768.1 (3)	821.1 (3)
5764708	218GRUH	30.018333	-98.123611	None	None	915 (1)	None
5764709	218GLRSL	30.038611	-98.104167	None	None	1012 (1)	None
5764710	218GLRSL	30.038611	-98.105278	None	None	1007.6 (1)	None
5764711	218GLRSL	30.019722	-98.103056	None	None	831.9 (1)	None
5764712	218GRCCU	30.018333	-98.123611	909.5 (2)	None	914.9 (10)	910.8 (6)
5764801	218GLRSL	30.039444	-98.083056	None	None	925.5 (2)	None
5764901	218GLRS	30.014722	-98.017499	None	None	741.7 (1)	None
5764903	218GLRSL	30.005	-98.010833	None	None	771.6 (1)	765 (1)
5842711	218EDRDA	30.25111	-97.83722	None	None	623.5 (4)	None
5842816	218EDRDA	30.2775	-97.79389	None	None	430.6 (1)	None
5842819	218EDRDA	30.261006	-97.817572	None	None	459.7 (2)	474 (2)
5842821	218EDRDA	30.26306	-97.81389	None	None	486 (1)	None
5842825	218EDRDA	30.26419	-97.81432	None	None	479.9 (1)	None
58428TW	218EDRDA	30.2614	-97.79518	None	None	455.7 (1)	None
5842913	218EDRDA	30.26667	-97.78222	None	None	441.7 (1)	None

Table A-2. (cont.) Average Water Levels for Different San Marcos Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
5842915	218EDRDA	30.25121	-97.78089	None	None	439.6 (1)	None
5842927	218EDRDA	30.2507	-97.75393	None	None	490.3 (4)	None
5842928	218EDRDA	30.25631	-97.76955	None	None	448.7 (4)	None
5842931	218EDRDA	30.27083	-97.77472	None	None	429.9 (1)	None
58429CL	218EDRDA	30.27778	-97.78472	None	None	433 (1)	None
58429NC	218EDRDA	30.27083	-97.77472	None	None	427.9 (1)	None
58429SG	218EDRDA	30.27482	-97.78076	None	None	440.8 (1)	None
58429XN	218EDRDA	30.267044	-97.788116	None	None	415.6 (1)	None
5849114	217HSTN	30.229444	-97.997778	None	None	916.5 (1)	785 (1)
5849119	218GLRS	30.218056	-97.989722	None	724.7 (3)	768 (8)	678.3 (1)
5849122	218GLRS	30.220556	-97.999722	None	None	978.5 (1)	None
5849402	218GLRS	30.204167	-97.972778	None	None	885 (1)	None
5849405	218GLRS	30.178056	-97.962778	None	None	813.6 (1)	None
5849406	218GLRS	30.178333	-97.962778	969.8 (1)	None	965 (1)	None
5849407	218GLRS	30.178056	-97.960833	None	None	965.9 (1)	None
5849408	219SLGH	30.207778	-97.973889	None	None	715 (1)	None
5849409	217HSTN	30.206389	-97.974167	None	636 (1)	628 (1)	None
5849410	218TRNT	30.188889	-97.960278	None	610.7 (3)	None	603 (1)
5849509	219SLGH	30.172222	-97.944167	None	None	674.7 (2)	None
5849510	218GLRS	30.166944	-97.939167	None	None	807 (1)	None
5849701	218GLRS	30.128056	-97.985833	None	None	964.3 (1)	None
5849702	218GLRS	30.129444	-97.9925	None	None	967.7 (1)	None
5849703	218GLRSL	30.153611	-97.984444	None	None	889.2 (1)	None
5849704	218GLRSL	30.139444	-97.969167	600 (1)	585 (2)	647.6 (1)	None
5849705	218GLRSL	30.139722	-97.9675	None	None	803.7 (3)	None
5849706	219SLGH	30.139722	-97.968056	None	None	943.2 (1)	None
5849707	217HSCC	30.138889	-97.958889	None	None	758 (1)	None
5849708	218EDRDA	30.128889	-97.967778	None	None	922.5 (1)	None
5849801	218EDRDA	30.159722	-97.923056	None	None	818.2 (1)	None
5849802	218EDRDA	30.128056	-97.926667	None	None	798.6 (2)	None
5849803	218EDRDA	30.150833	-97.933889	None	None	826.8 (2)	None
5849804	218GLRS	30.156667	-97.941389	None	None	843.6 (1)	None
5849805	218EDRDA	30.1425	-97.950278	None	None	916.3 (1)	None
5849806	218EDRDA	30.1275	-97.933889	None	None	860.3 (2)	None
5849807	218TRNT	30.1475	-97.941944	None	None	None	806 (1)
5849808	218GLRS	30.159722	-97.953056	828 (1)	763.9 (2)	795.7 (6)	814.4 (1)
5849901	218EDRDA	30.138611	-97.8825	None	None	608.5 (2)	None
5849902	218EDRDA	30.155	-97.907778	None	None	772.3 (1)	None
5849904	218EDRDA	30.133611	-97.878056	None	None	539 (1)	None
5849910	218EDRDA	30.133056	-97.889722	None	None	456 (1)	None
5849911	218EDRDA	30.133056	-97.889722	None	None	None	629 (1)
5849912	218GLRS	30.133054	-97.888888	None	None	535 (1)	None
5849913	218TRNT	30.1325	-97.889444	685 (1)	None	None	694 (1)
5849914	218TRNT	30.132778	-97.889444	685 (1)	None	693 (1)	None
5849916	218EDRDA	30.138611	-97.885	590 (1)	None	None	None

Table A-2. (cont.) Average Water Levels for Different San Marcos Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
5849917	218EDRDA	30.138888	-97.884999	582 (1)	None	None	None
5849918	218EDRDA	30.138889	-97.885278	None	None	538.5 (1)	None
5849919	218EDRDA	30.138056	-97.892778	None	None	None	565 (1)
5849921	218EDRDA	30.142778	-97.880833	None	592 (1)	None	None
5849922	218EDRDA	30.142499	-97.880554	None	595 (1)	585.4 (1)	None
5849923	218EDRDA	30.1425	-97.881111	None	594 (1)	None	None
5849924	218EDRDA	30.1425	-97.880833	None	592 (1)	None	None
5849926	218EDRDA	30.12513	-97.90517	None	None	672 (1)	None
5849928	218GLRS	30.145277	-97.879721	None	None	547.6 (2)	None
5849931	218EDRDA	30.145	-97.88	None	None	545 (1)	None
5849933	218EDRDA	30.145	-97.88	None	None	545 (1)	None
5849934	218GLRS	30.146944	-97.891944	None	None	711 (1)	None
5849935	218EDRDA	30.145	-97.887222	None	None	666.5 (2)	602.9 (2)
5849937	218EDRDA	30.15801	-97.88745	None	None	685.9 (1)	None
58499AN	218EDRDA	30.16462	-97.87875	None	None	654.8 (1)	None
58499BQ	218EDRDA	30.12583	-97.90361	None	None	715.3 (2)	725.8 (1)
58499QL	218EDRDA	30.12697	-97.90739	None	None	742 (1)	None
5850122	218EDRDA	30.23839	-97.83824	None	None	534.8 (1)	None
5850127	218EDRDA	30.22056	-97.87055	None	None	722 (2)	None
5850128	218EDRDA	30.21556	-97.84722	None	None	629.3 (2)	None
58501CH	218EDRDA	30.21071	-97.83421	None	None	524.5 (1)	None
58501GR	218EDRDA	30.22333	-97.83528	None	None	552.2 (2)	None
58501NF	218EDRDA	30.23222	-97.8575	None	None	712.1 (1)	None
58501W2	218EDRDA	30.226407	-97.841465	None	None	589.2 (2)	592.5 (1)
5850211	218EDRDA	30.24524	-97.82803	None	None	477.1 (1)	None
5850212	218EDRDA	30.225449	-97.806189	None	None	451.1 (2)	494.8 (1)
5850216	218EDRDA	30.23222	-97.7925	None	None	437 (2)	None
5850222	218EDRDA	30.21722	-97.81879	None	None	483.6 (2)	None
5850231	218EDRDA	30.20944	-97.79195	None	None	447.1 (1)	None
58502H1	218EDRDA	30.23493	-97.81423	None	None	476.6 (2)	None
58502JG	218EDRDA	30.23972	-97.81445	None	None	455.6 (1)	None
5850301	218EDRDA	30.210348	-97.781583	None	None	480.5 (2)	509.7 (1)
58503AS	218EDRDA	30.24389	-97.78528	None	None	415.6 (1)	None
58503RS	218EDRDA	30.24055	-97.78722	None	None	444.8 (1)	None
5850410	218EDRDA	30.18022	-97.8755	None	None	640.5 (9)	None
5850411	218EDRDA	30.1867	-97.84917	None	None	540.2 (2)	None
5850417	218EDRDA	30.195149	-97.846115	None	None	540.3 (2)	559.3 (1)
5850419	218EDRDA	30.17303	-97.85028	None	None	548.7 (4)	None
5850420	218EDRDA	30.18677	-97.86089	None	None	611.4 (1)	None
5850421	218EDRDA	30.17606	-97.87093	None	None	643.9 (2)	None
5850511	218EDRDA	30.17159	-97.82578	None	None	501 (1)	None
5850513	218EDRDA	30.18263	-97.81969	None	None	491.3 (1)	None
5850517	218EDRDA	30.17437	-97.81892	None	None	495.8 (1)	None
5850520	218EDRDA	30.20764	-97.80213	None	None	461 (1)	None
58505A	218EDRDA	30.19084	-97.80651	None	None	486.6 (1)	None

Table A-2. (cont.) Average Water Levels for Different San Marcos Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
58505BB	218EDRDA	30.17843	-97.80962	None	None	508.2 (1)	None
58505BL	218EDRDA	30.20341	-97.8033	None	None	471 (1)	None
58505CC	218EDRDA	30.17629	-97.79716	None	None	517.3 (1)	None
58505JA	218EDRDA	30.1935	-97.79524	None	None	474.6 (1)	None
58505JV	218EDRDA	30.17072	-97.81287	None	None	512.4 (1)	None
58505TC	218EDRDA	30.17111	-97.82139	None	None	507.1 (1)	None
58505TP	218EDRDA	30.1783	-97.80968	None	None	499.1 (1)	None
58505ZB	218EDRDA	30.20698	-97.83043	None	None	503.8 (2)	None
5850707	218EDRDA	30.14041	-97.83871	None	None	507.5 (1)	None
5850718	218EDRDA	30.1367	-97.84542	None	None	516.7 (1)	None
5850730	218EDRDA	30.14	-97.83833	None	None	520.2 (1)	None
5850731	218EDRDA	30.15297	-97.8587	None	None	522.5 (1)	None
5850734	218EDRDA	30.13417	-97.85	None	None	528.8 (1)	None
5850739	218EDRDA	30.13833	-97.84944	None	None	525.6 (1)	None
5850743	218EDRDA	30.15447	-97.85878	None	None	507.3 (2)	None
5850744	218EDRDA	30.1424	-97.84233	None	None	511.3 (1)	None
5850747	218EDRDA	30.16098	-97.87471	None	None	636.7 (2)	None
5850748	218EDRDA	30.14617	-97.8597	None	None	549.1 (2)	None
58507AD	218EDRDA	30.129417	-97.836945	None	None	502.1 (1)	None
58507AD2	218EDRDA	30.12967	-97.83661	None	None	543.6 (1)	None
58507BB	218EDRDA	30.16573	-97.8347	None	None	511 (1)	None
58507BG	218EDRDA	30.16221	-97.86037	None	None	545.9 (2)	None
58507CB	218EDRDA	30.13664	-97.84186	None	None	508.5 (1)	None
58507CO	218EDRDA	30.13976	-97.84605	None	None	515.4 (1)	None
58507DF	218EDRDA	30.1483	-97.84378	None	None	509.2 (2)	None
58507DR	218EDRDA	30.14705	-97.84525	None	None	504.4 (2)	None
58507DT	218EDRDA	30.15528	-97.86182	None	None	553.8 (2)	None
58507EJ	218EDRDA	30.13328	-97.84379	None	None	524 (1)	None
58507FS	218EDRDA	30.15954	-97.85764	None	None	554.9 (1)	None
58507GH	218EDRDA	30.14484	-97.84625	None	None	523.7 (1)	None
58507HL	218EDRDA	30.14745	-97.84647	None	None	495.9 (1)	None
58507HR	218EDRDA	30.146484	-97.845032	None	None	508.4 (1)	None
58507LD	218EDRDA	30.13239	-97.83894	None	None	518.9 (1)	None
58507MB	218EDRDA	30.13944	-97.83583	None	None	522 (1)	None
58507ME	218EDRDA	30.14272	-97.84134	None	None	505.1 (1)	None
58507ML	218EDRDA	30.12487	-97.86229	None	None	523 (1)	None
58507MO	218EDRDA	30.13194	-97.855	None	None	538.4 (1)	None
58507PL	218EDRDA	30.14581	-97.84589	None	None	521.5 (2)	None
58507RD	218EDRDA	30.14792	-97.85992	None	None	543.7 (1)	None
58507SC	218EDRDA	30.15687	-97.8631	None	None	564.8 (2)	None
58507SP	218EDRDA	30.13434	-97.85509	None	None	525.8 (1)	None
58507TT	218EDRDA	30.13917	-97.84139	None	None	518.4 (1)	None
58507WC	218EDRDA	30.14209	-97.85368	None	None	524.9 (2)	None
5850801	218EDRDA	30.14281	-97.81076	None	None	538.4 (2)	617.4 (1)
5850824	218EDRDA	30.12692	-97.81834	None	None	543.6 (2)	None

Table A-2. (cont.) Average Water Levels for Different San Marcos Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
5850827	218EDRDA	30.136389	-97.819443	None	None	499 (1)	None
5850830	218EDRDA	30.16069	-97.81808	None	None	502.1 (1)	None
5850836	218EDRDA	30.145012	-97.813133	None	None	517.1 (1)	None
5850840	218EDRDA	30.13004	-97.79846	None	None	572.8 (1)	None
5850842	218EDRDA	30.15005	-97.83235	None	None	515.9 (1)	None
5850850	218EDRDA	30.1259	-97.8158	None	None	559.7 (1)	None
5850851	218EDRDA	30.12582	-97.81564	None	None	561.2 (1)	None
5850852	218EDRDA	30.16167	-97.81834	None	None	501.8 (1)	None
5850856	218EDRDA	30.13489	-97.82649	None	None	519 (2)	None
5850861	218EDRDA	30.14444	-97.83139	None	None	513.5 (1)	None
58508D5	218EDRDA	30.13382	-97.81322	None	None	558.1 (1)	None
58508DB	218EDRDA	30.16142	-97.81152	None	None	527.4 (1)	None
58508JH	218EDRDA	30.13876	-97.80353	None	None	560.2 (1)	None
58508JW	218EDRDA	30.135622	-97.83194	None	None	501.6 (1)	None
58508LB	218EDRDA	30.13907	-97.82839	None	None	516.4 (2)	None
58508LD	218EDRDA	30.16139	-97.80972	None	None	524.6 (1)	None
58508MG	218EDRDA	30.13177	-97.8238	None	None	531 (2)	None
58508MU	218EDRDA	30.139999	-97.832222	None	None	498.9 (1)	None
58508SM	218EDRDA	30.16514	-97.79381	None	None	555.4 (1)	None
58508SR	218EDRDA	30.16565	-97.80952	None	None	526.4 (1)	None
58508ST	218EDRDA	30.16503	-97.83125	None	None	511.1 (1)	None
58508XN	218EDRDA	30.146576	-97.824516	None	None	485.4 (1)	None
5857101	218GLRS	30.116944	-97.974444	None	929.6 (7)	949.1 (18)	973.2 (10)
5857102	218GLRS	30.106389	-97.975833	None	None	917.5 (2)	None
5857103	218GLRS	30.097222	-97.967778	None	None	873 (1)	877.4 (1)
5857104	218GLRS	30.112222	-97.991111	None	None	None	760 (1)
5857201	218EDRDA	30.103055	-97.937221	763.4 (2)	757.6 (10)	764.1 (35)	765.6 (8)
5857202	218EDRDA	30.111111	-97.953056	None	None	881.9 (5)	None
5857203	218EDRDA	30.105833	-97.923056	None	None	761.2 (2)	None
5857204	218EDRDA	30.083889	-97.918611	None	None	663.8 (1)	None
5857206	218EDRDA	30.123611	-97.921667	None	None	800 (1)	None
5857209	218GLRSL	30.106111	-97.923889	None	None	738 (1)	None
5857210	218EDRDA	30.086667	-97.918333	None	None	690 (1)	None
5857301	218EDRDA	30.09361	-97.892221	653.2 (3)	610.2 (3)	626.8 (19)	646.4 (8)
5857302	218EDRDA	30.096111	-97.876667	None	596.8 (9)	605.2 (9)	612.4 (2)
5857303	218EDRDA	30.113056	-97.8925	642.4 (2)	625.2 (1)	630.8 (11)	629.2 (2)
5857305	218EDRDA	30.099722	-97.893333	None	None	608 (1)	None
5857306	218EDRDA	30.115278	-97.893333	None	None	650.1 (1)	None
5857307	218EDRDA	30.09986	-97.88229	None	None	595.4 (4)	637 (2)
5857308	218EDRDA	30.11	-97.87861	None	None	606 (1)	None
5857309	218EDRDA	30.113889	-97.884444	None	None	605 (1)	None
5857311	218EDRDA	30.113056	-97.8925	None	None	638.3 (1)	644.8 (4)
5857312	218EDRDA	30.1075	-97.902222	None	None	639.1 (2)	None
5857314	218EDRDA	30.115833	-97.895	None	None	634 (1)	None
5857318	218EDGRU	30.123777	-97.907639	708.2 (1)	None	685.7 (4)	702.9 (3)

Table A-2. (cont.) Average Water Levels for Different San Marcos Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
58573GC	218EDRDA	30.097587	-97.88685	None	None	596.9 (2)	638 (1)
58573H	218EDRDA	30.11306	-97.88389	None	None	590 (1)	None
58573HF	218EDRDA	30.11308	-97.87675	None	None	560.6 (1)	None
58573RR	218EDRDA	30.08833	-97.915	None	None	662.3 (1)	None
5857401	218GLRS	30.046944	-97.987778	None	None	756 (3)	769.1 (2)
5857402	218EDRDA	30.054722	-97.986389	794 (1)	None	818.7 (6)	794 (1)
5857403	218EDRDA	30.066389	-97.966667	None	None	749.7 (1)	None
5857502	218EDRDA	30.066347	-97.944472	None	None	671.9 (2)	738 (1)
5857503	218EDRDA	30.06447	-97.92834	None	None	675.8 (2)	None
5857504	218EDRDA	30.061944	-97.920278	None	None	None	681 (1)
5857505	218EDRDA	30.051389	-97.920833	None	None	None	676.2 (1)
5857506	218EDRDA	30.045	-97.961667	None	None	699.2 (2)	None
5857508	218EDRDA	30.043333	-97.955556	None	None	703.8 (3)	710.9 (1)
5857509	218EDRDA	30.072403	-97.920314	None	None	657.9 (2)	695.5 (2)
5857510	218EDRDA	30.06346	-97.94162	None	None	674.8 (1)	None
5857511	218EDRDA	30.0495	-97.935669	702.8 (2)	None	686.7 (4)	694.1 (2)
5857512	218EDGRU	30.058611	-97.92111	None	None	660.3 (1)	None
58575J2	218EDRDA	30.0495	-97.93567	None	None	699.9 (1)	None
58575R5	218EDRDA	30.07601	-97.95407	None	None	762.2 (1)	None
58575R7	218EDRDA	30.07612	-97.95426	None	None	762 (1)	None
58575RR	218EDRDA	30.04613	-97.95755	None	None	712.8 (1)	None
5857602	218EDRDA	30.074167	-97.915833	696.6 (1)	659.5 (1)	670.1 (12)	699.8 (3)
5857605	218EDRD	30.0575	-97.907222	None	None	None	693.1 (1)
5857606	218EDRDA	30.047778	-97.883611	None	None	606 (3)	639.7 (1)
5857607	218EDRDA	30.045	-97.884444	None	None	None	1026 (1)
5857608	218EDRDA	30.080277	-97.916666	None	None	369.8 (1)	None
5857609	218EDRDA	30.08	-97.917222	None	None	630 (1)	None
5857610	218EDRDA	30.0456	-97.89873	None	None	615.3 (1)	None
5857701	218EDRDA	30.040448	-97.960592	None	730.4 (1)	726.8 (3)	736.7 (2)
5857702	218EDRDA	30.03865	-97.97967	None	None	751.2 (1)	None
585776F	218EDRDA	30.04068	-97.96017	None	None	704.8 (1)	None
585776G	218EDRDA	30.0405	-97.96049	None	None	707.6 (1)	None
5857801	218EDRDA	30.039722	-97.943611	None	None	None	701.8 (1)
5857802	218EDRDA	30.026944	-97.928056	None	None	651.4 (6)	674.7 (3)
5857804	218EDRDA	30.029444	-97.923889	None	None	None	637.8 (1)
5857806	218EDRDA	30.003333	-97.923889	None	None	None	632.2 (1)
5857807	218EDRDA	30.019722	-97.952222	None	None	None	697.9 (1)
5857808	218EDRDA	30.011667	-97.944444	None	659.5 (1)	None	664.5 (1)
5857809	218EDRDA	30.010833	-97.943889	None	None	None	658.4 (1)
5857810	218EDRDA	30.040833	-97.920556	None	None	None	676.4 (1)
58578BW1	218EDRDA	30.03833	-97.92834	None	None	671.2 (1)	None
58578JG	218EDRDA	30.03494	-97.95198	None	None	688.2 (1)	None
58578SG	218EDRDA	30.02337	-97.92108	None	None	637.8 (1)	None
5857901	218EDRDA	30.03275	-97.8903	None	None	612.1 (2)	None
5857902	218EDRDA	30.008901	-97.895273	643.7 (9)	595 (10)	608.2 (126)	628.4 (42)

Table A-2. (cont.) Average Water Levels for Different San Marcos Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
5857903	218EDRDA	30.038497	-97.886168	None	578.5 (19)	604.1 (49)	621.6 (18)
5857904	218EDRDA	30.013611	-97.8925	None	None	587.7 (1)	628.2 (1)
5857905	218EDRDA	30.026944	-97.903889	None	None	None	624.6 (1)
5857906	218EDRDA	30.024167	-97.91	None	None	None	643.4 (1)
5857907	218EDRDA	30.019444	-97.915556	None	None	None	623.8 (1)
5857908	218EDRDA	30.009444	-97.896667	None	573.6 (1)	590 (2)	629.1 (2)
5857909	218EDDT	30.009167	-97.896944	640.7 (3)	586 (2)	606.4 (11)	633.2 (2)
5857911	218EDRD	30.013056	-97.889444	None	None	593 (2)	None
5857915	218EDRDA	30.019722	-97.901111	None	None	591 (1)	None
58579OL	218EDRDA	30.02159	-97.90551	None	None	607.8 (1)	None
58579PC	218EDRDA	30.02778	-97.87917	None	None	567.4 (2)	None
5858101	218EDRDA	30.083582	-97.842639	643.7 (20)	567.4 (44)	597.9 (264)	625.5 (102)
5858102	218EDRDA	30.106666	-97.854444	None	None	581.6 (2)	None
5858104	218EDRDA	30.104444	-97.848889	None	559.4 (2)	598.4 (24)	626.8 (7)
5858105	218EDRDA	30.111389	-97.855833	None	None	523 (1)	None
5858106	218EDRDA	30.084167	-97.841111	650.1 (1)	None	646 (3)	None
5858115	218EDRDA	30.12444	-97.87389	None	None	572.1 (2)	None
5858121	218EDRDA	30.105555	-97.862222	None	None	514 (1)	618.6 (2)
5858122	218EDRDA	30.093333	-97.843611	None	None	602.5 (1)	None
5858123	218EDRDA	30.109431	-97.841731	626.9 (1)	544.3 (16)	578 (61)	620 (8)
5858124	218EDRDA	30.11908	-97.84083	None	None	525.7 (2)	None
5858127	218EDRDA	30.1175	-97.873611	None	None	558 (1)	None
5858128	218EDRDA	30.08725	-97.85361	None	None	584 (1)	None
58581AB	218EDRDA	30.11337	-97.86055	None	None	524.9 (2)	None
58581BC	218EDRDA	30.08509	-97.85768	None	None	585 (1)	None
58581C1	218EDRDA	30.10156	-97.85811	None	None	548.8 (2)	None
58581DD	218EDRDA	30.11858	-97.87114	None	None	536.6 (1)	None
58581DL	218EDRDA	30.08587	-97.85644	None	None	602.3 (1)	None
58581EH	218EDRDA	30.11096	-97.8741	None	None	553.8 (1)	None
58581JS	218EDRDA	30.10578	-97.87267	None	None	561.5 (1)	None
58581MC	218EDRDA	30.09111	-97.84028	None	None	565 (2)	None
58581OS	218EDRDA	30.10535	-97.87415	None	None	554.1 (1)	None
58581RD	218EDRDA	30.10806	-97.87382	None	None	555.3 (1)	None
58581WM	218EDRDA	30.0854	-97.86787	None	None	598 (1)	None
5858202	218EDRDA	30.12459	-97.81374	None	None	550.2 (1)	None
5858210	218EDRDA	30.090556	-97.8225	None	None	554 (1)	None
5858211	218EDRDA	30.086667	-97.830556	None	None	610 (1)	None
5858212	218EDRDA	30.087778	-97.817222	None	None	None	651 (1)
5858217	218EDRDA	30.095278	-97.815833	None	None	713 (1)	None
5858218	218EDRDA	30.095	-97.815833	None	None	805 (1)	None
5858219	218EDRDA	30.09167	-97.8175	None	None	614.8 (5)	None
5858220	218EDRDA	30.09333	-97.81445	None	573 (2)	571.6 (3)	None
5858403	218EDRDA	30.081667	-97.842778	623.5 (1)	None	588.5 (4)	623.5 (2)
5858406	218EDRDA	30.062036	-97.85602	631.1 (3)	561.6 (3)	590.9 (29)	624 (10)
5858407	218EDRDA	30.053445	-97.955532	None	None	593.3 (1)	None

Table A-2. (cont.) Average Water Levels for Different San Marcos Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
5858410	218EDRDA	30.066389	-97.838611	None	None	586.7 (2)	None
5858411	218EDRDA	30.050833	-97.840556	None	None	601.6 (1)	None
5858412	218EDRDA	30.076944	-97.834722	None	None	605 (1)	None
5858413	218EDRDA	30.070515	-97.835491	None	None	583.1 (2)	None
5858416	218EDRDA	30.051111	-97.859167	None	None	None	653 (1)
5858417	218EDRDA	30.04723	-97.86748	None	None	597.1 (1)	None
5858418	218EDRDA	30.07129	-97.85825	None	None	605.1 (1)	None
5858422	218EDRDA	30.066389	-97.838889	None	None	564.8 (1)	None
5858423	218EDRDA	30.06781	-97.85912	None	None	609.8 (3)	641.5 (2)
5858424	218EDRDA	30.07856	-97.87157	None	None	601.2 (1)	None
5858425	218EDRDA	30.046944	-97.850278	None	None	603.4 (1)	None
5858426	218EDRDA	30.08	-97.86987	None	None	590.6 (1)	None
5858427	218EDRDA	30.077171	-97.861324	None	None	614.6 (2)	665.4 (1)
5858428	218EDRDA	30.052222	-97.833333	None	525.3 (1)	510 (1)	None
58584BS	218EDRDA	30.052075	-97.833398	None	None	569.2 (3)	None
58584CT	218EDRDA	30.060197	-97.868471	None	None	583.5 (2)	652 (1)
58584HO	218EDRDA	30.07203	-97.84697	None	None	575.9 (2)	None
58584LC	218EDRDA	30.07083	-97.87361	None	None	583.2 (1)	None
58584NM	218EDRDA	30.045963	-97.851353	None	None	574.2 (1)	None
58584SG	218EDRDA	30.08111	-97.84361	None	None	564.5 (2)	None
58584TC	218EDRDA	30.06184	-97.856	None	None	578.9 (2)	None
5858502	218EDRDA	30.051111	-97.8075	None	None	589.6 (2)	None
5858503	218EDRDA	30.076667	-97.822222	None	None	604.7 (2)	None
5858504	218EDRDA	30.069722	-97.818889	None	579.8 (10)	600.7 (21)	613 (2)
5858505	218EDRDA	30.06807	-97.8194	None	None	730.3 (1)	736 (1)
5858508	218EDRDA	30.079166	-97.83111	None	None	588.3 (4)	608 (1)
5858509	218EDRDA	30.07611	-97.83	None	None	580.5 (2)	None
5858510	218EDRDA	30.079381	-97.82758	None	None	573.8 (1)	None
58585JW	218EDRDA	30.071934	-97.828364	None	None	569.8 (1)	None
5858701	218EDRDA	30.035478	-97.841407	None	None	563.4 (1)	None
5858703	218EDRDA	30.028056	-97.854444	None	590.2 (1)	602.1 (2)	624.3 (2)
5858704	218EDRDA	30.027694	-97.853917	612 (3)	557.5 (3)	583.3 (22)	604.8 (6)
5858705	218EDRDA	30.022954	-97.838608	None	None	594.2 (2)	None
5858706	218EDRDA	30.007222	-97.866944	None	None	584.9 (2)	None
5858710	218EDRDA	30.021667	-97.856389	610 (1)	None	None	None
5858711	218EDRDA	30.016722	-97.859333	None	549.1 (1)	562.1 (4)	605 (1)
5858712	218EDRDA	30.02917	-97.87	None	None	563.8 (1)	None
5858801	218EDRDA	30.033635	-97.83316	None	None	576.3 (3)	None
6701101	218EDRDA	29.973889	-97.964722	None	None	None	830 (1)
6701201	218EDRDA	29.981111	-97.920556	None	None	595.5 (1)	None
6701203	218EDRDA	29.962176	-97.920766	563.4 (2)	553.3 (1)	575.8 (27)	584.9 (10)
6701301	218EDRDA	29.96294	-97.89681	None	None	562.6 (2)	None
6701303	218EDRDA	29.989761	-97.875476	588.3 (14)	None	569.2 (46)	585.5 (18)
6701304	218EDRDA	29.984507	-97.876296	595.2 (10)	554.8 (12)	573.5 (130)	585 (64)
6701305	218EDRDA	29.967777	-97.888333	573.1 (3)	569.3 (3)	572.3 (29)	576.1 (10)

Table A-2. (cont.) Average Water Levels for Different San Marcos Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
6701307	218EDRDA	29.967778	-97.887222	None	None	None	580.6 (1)
6701309	218EDRDA	29.9875	-97.881944	None	None	535.2 (1)	587.6 (1)
6701310	218EDRDA	29.996111	-97.892778	None	None	None	646.6 (1)
6701311	218EDRDA	29.981431	-97.891403	588.1 (11)	550 (1)	569.8 (35)	577.1 (28)
67013BB	218EDRDA	29.963238	-97.896931	None	None	577 (1)	583.6 (1)
67013CC	218EDRDA	29.967445	-97.876243	None	None	576.9 (1)	582.1 (1)
67013DD	218EDRDA	29.969406	-97.888119	None	None	576.4 (1)	584.7 (1)
67013EE	218EDRDA	29.962606	-97.881397	None	None	577 (1)	582.4 (1)
6701401	218EDRDA	29.950278	-97.964444	None	None	570.2 (5)	555.7 (3)
67014AA	218EDRDA	29.921595	-97.965442	None	571.8 (1)	580.4 (4)	585.3 (2)
6701501	218EDRDA	29.923332	-97.947221	579.7 (3)	570.3 (2)	568.9 (21)	572.6 (10)
67015BH	218EDRDA	29.924723	-97.938332	None	None	600.8 (1)	None
67015DH	218EDRDA	29.951527	-97.935277	598.9 (1)	None	None	None
67015MD	218EDRDA	29.94628	-97.93557	None	None	566 (1)	None
67015PG	218EDRDA	29.943369	-97.937687	None	None	None	587.2 (1)
67015PL	218EDRDA	29.91819	-97.9324	None	None	565.6 (2)	None
67015PLC	218EDRDA	29.918153	-97.932422	None	None	577.2 (1)	581.9 (1)
67015RD	218EDRDA	29.946171	-97.935688	593.4 (1)	None	None	None
67015RW	218EDRDA	29.939686	-97.934863	None	None	577.8 (1)	583.9 (1)
67015XN	218EDRDA	29.92359	-97.94784	None	None	576.2 (1)	None
6701601	218EDRDA	29.919999	-97.911388	None	None	None	583.3 (1)
67016AA	218EDRDA	29.941081	-97.891585	None	None	606.6 (1)	607.2 (1)
67016AW	218EDRDA	29.9365	-97.91118	None	None	561.8 (1)	None
67016AW1	218EDRDA	29.93141	-97.90462	None	None	569.1 (1)	None
67016AW2	218EDRDA	29.9374	-97.9148	None	None	571 (1)	None
67016BB	218EDRDA	29.940578	-97.890993	None	None	607 (1)	607.2 (1)
67016CC	218EDRDA	29.955556	-97.902794	None	None	582.1 (1)	577.3 (1)
67016EN	218EDRDA	29.93216	-97.90456	None	None	573.6 (1)	None
6701701	218EDRDA	29.895009	-97.964456	None	567.6 (1)	574.2 (71)	577.8 (37)
67017BB	218EDRDA	29.908596	-97.971539	None	569.9 (1)	578.3 (4)	586.3 (2)
6701802	218EDRDA	29.886667	-97.946944	None	None	532 (1)	None
6701803	218EDRDA	29.911389	-97.930833	None	None	577.9 (1)	None
6701804	218EDRDA	29.912222	-97.928333	None	None	572.1 (1)	None
6701805	218EDRDA	29.886667	-97.946944	None	None	590 (1)	None
6701808	218EDRDA	29.901667	-97.919722	None	581.9 (12)	583.1 (30)	586.6 (12)
6701809	218EDRDA	29.911919	-97.928774	591.8 (51)	582.2 (16)	584.3 (217)	587.2 (116)
6701810	218EDRDA	29.89	-97.945833	None	585 (1)	None	None
6701811	218EDRDA	29.896944	-97.945556	None	None	576.3 (2)	None
6701812	218EDRDA	29.890476	-97.928369	580.2 (8)	None	575.4 (31)	577.5 (9)
6701813	218EDRDA	29.89113	-97.93188	None	None	572.5 (1)	None
6701813A	218EDRDA	29.891128	-97.929377	None	575.3 (1)	575.8 (3)	577.5 (2)
6701813B	218EDRDA	29.891128	-97.929377	None	574.3 (1)	575.5 (3)	578.7 (2)
6701816	218EDRDA	29.891111	-97.935	None	None	580 (1)	None
6701817	218EDRDA	29.890556	-97.947778	None	None	694 (1)	None
6701818	218EDRDA	29.901944	-97.920278	None	569.7 (1)	None	None

Table A-2. (cont.) Average Water Levels for Different San Marcos Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
67018BB	218EDRDA	29.894435	-97.929451	None	574.3 (1)	574.8 (3)	576.1 (1)
67018CC	218EDRDA	29.893611	-97.932047	None	574.3 (1)	574.5 (4)	576.3 (1)
67018DD	218EDRDA	29.887175	-97.949626	None	574.3 (1)	575.5 (3)	577 (1)
67018EE	218EDRDA	29.908167	-97.91931	None	574.3 (1)	575.5 (2)	579.1 (2)
67018FF	218EDRDA	29.902694	-97.921727	None	574.5 (1)	575.8 (2)	579.2 (2)
67019DD	218EDRDA	29.833389	-97.995611	None	None	572 (1)	None
67019EG	218EDRDA	29.91359	-97.91647	None	None	578 (2)	None
6702103	218EDRDA	29.989787	-97.873643	None	575.1 (11)	584.6 (59)	595.3 (36)
6702104	218EDRDA	29.982792	-97.871531	577.4 (2)	548.5 (1)	570.1 (15)	581 (6)
6702105	218EDRDA	29.9583	-97.842122	None	569.4 (1)	574.3 (2)	580 (1)
6702106	218EDRDA	29.974739	-97.857114	None	556.9 (1)	566.1 (2)	576.6 (1)
6709101	218EDRDA	29.855573	-97.981769	None	None	591 (1)	584.8 (1)
6709102	218EDRDA	29.851111	-97.976111	597.3 (8)	576 (7)	576.7 (128)	580.5 (39)
6709103	218EDRDA	29.847222	-97.9825	None	None	583.6 (1)	None
6709105	218EDRDA	29.844789	-97.984182	None	577 (1)	578.7 (3)	585.2 (3)
6709106	218EDRDA	29.852433	-97.987157	None	577.1 (1)	579 (3)	584.1 (3)
6709107	218EDRDA	29.846111	-97.981944	None	None	None	582.8 (1)
6709110	218EDRDA	29.843581	-97.982247	594.6 (5)	577 (1)	585.5 (69)	588.5 (36)
6709112	218EDRDA	29.860556	-97.983056	None	None	595 (1)	None
6709113	218EDRDA	29.838739	-97.990736	592.6 (12)	577.3 (1)	583.7 (226)	588.7 (36)
67091AA	218EDRDA	29.858813	-97.99281	None	576.8 (1)	578.6 (3)	582.5 (2)
67091BB	218EDRDA	29.867635	-97.968828	None	None	576.9 (2)	578.9 (1)
67091CC	218EDRDA	29.836542	-97.993935	None	581.5 (1)	580.3 (1)	583.6 (1)
6709401	218EDRDA	29.82925	-97.962364	591 (13)	589.3 (1)	588.9 (36)	590.1 (37)
6805605	218CCRK	29.925556	-98.386944	1007.5 (1)	990 (1)	988.2 (5)	978.2 (2)
6805606	217SLGO	29.925556	-98.388056	1073.6 (1)	None	None	None
6805607	217SLGO	29.928056	-98.393333	1015.1 (1)	None	None	None
6805608	217SLGO	29.928889	-98.396389	None	None	1126.5 (1)	1130 (1)
6805609	217SLGO	29.931111	-98.394722	None	None	1113 (2)	None
6805610	219SLGH	29.932222	-98.395556	None	None	1120 (1)	1067.1 (1)
6805611	218TRNT	29.936111	-98.401944	1055.8 (1)	1041.3 (2)	1069.1 (1)	None
6805612	218TRNT	29.934444	-98.408889	1051.7 (2)	1050 (2)	1205.9 (2)	None
6805613	218GLRSL	29.930556	-98.398333	None	None	1110 (1)	1109.7 (1)
6805614	217SLGO	29.926389	-98.395	None	None	1115 (1)	1108 (1)
6805615	217HSTN	29.930556	-98.403056	None	None	909.5 (2)	None
6805616	218GLRS	29.928889	-98.398889	1019.8 (1)	None	None	None
6805619	218GLRSL	29.929167	-98.404722	1083.2 (1)	None	None	None
6805621	218TRNT	29.922222	-98.403889	1065.1 (1)	None	None	None
6805622	218TRNT	29.934167	-98.409722	None	1060.8 (2)	None	1064 (1)
6805625	218GLRSL	29.943611	-98.385556	None	None	None	1074.9 (1)
6805626	218GLRSL	29.94	-98.41	None	None	1138 (1)	None
6805627	219SLGH	29.939167	-98.386667	984.5 (1)	None	None	990 (1)
6805629	218GLRSL	29.954722	-98.385833	None	None	1076 (1)	None
6805802	217SLGO	29.883611	-98.418611	1033.8 (1)	None	None	None
6805803	217SLGO	29.883056	-98.417222	980 (1)	None	945 (1)	None

Table A-2. (cont.) Average Water Levels for Different San Marcos Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
6805901	218GRHC	29.912778	-98.379722	None	None	1047 (1)	None
6805902	217HSTN	29.897778	-98.414444	1018.4 (1)	None	865 (1)	None
6806302	218GLRSL	29.963611	-98.2525	None	None	930 (1)	None
6806303	218GLRSL	29.968056	-98.255	None	None	935 (1)	None
6806305	218GLRSL	29.970833	-98.275556	None	None	None	957.5 (1)
6806307	218GLRSL	29.972778	-98.282222	None	None	5 (1)	None
6806404	219SLGH	29.935	-98.345556	None	1026 (2)	None	1014 (1)
6806405	218CCRK	29.925	-98.373056	1022.3 (1)	1022.4 (1)	1021.5 (1)	None
6806406	218CCRK	29.918889	-98.373611	985.4 (1)	None	None	None
6806407	217SLGO	29.932222	-98.374722	None	None	960.6 (1)	None
6806601	218TRNT	29.922778	-98.266389	None	822.8 (2)	None	842.4 (1)
6806701	217SLGO	29.906389	-98.351944	911 (2)	909.4 (2)	907.8 (7)	907.6 (2)
6806702	218GLRSL	29.901944	-98.353611	925.5 (1)	None	909 (1)	None
6806704	218CCRK	29.913333	-98.356667	966.4 (1)	967.1 (2)	None	967.2 (1)
6806705	218GLRSL	29.9025	-98.353333	926.8 (1)	911.3 (2)	None	926.7 (1)
6806706	218CCRK	29.912222	-98.339722	None	None	779 (1)	None
6806707	217SLGO	29.910556	-98.364722	949 (1)	None	None	None
6806708	217SLGO	29.914167	-98.367222	948.1 (1)	None	None	None
6806709	218GRHC	29.891667	-98.345833	930.2 (1)	None	913.4 (8)	915 (2)
6806710	218GLRSL	29.912222	-98.340556	None	None	908 (1)	None
6806711	218GRHC	29.912778	-98.34	None	905.4 (2)	907 (1)	921.5 (1)
6806712	218GLRS	29.914444	-98.364444	None	None	1044 (1)	None
6806801	218GLRS	29.888889	-98.2925	None	912.1 (2)	888 (1)	918.3 (1)
6806901	218GLRSL	29.908889	-98.27	None	911.8 (1)	881 (1)	911.8 (1)
6806904	218GLRSL	29.881944	-98.261111	None	901.6 (2)	None	913.9 (1)
6806906	218GLRSU	29.883889	-98.288333	None	None	None	825 (1)
6806907	218GLRSU	29.879722	-98.284444	None	918.3 (2)	916 (1)	927 (1)
6806911	218TRNT	29.908889	-98.284722	None	910.5 (2)	None	926.2 (1)
6806912	218GLRS	29.916389	-98.274444	None	None	None	905 (1)
6806913	218GLRS	29.916389	-98.274444	None	None	885 (1)	None
68069AA	218EDRDA	29.878417	-98.289278	None	901 (1)	903 (2)	None
6807401	218GLRSL	29.923889	-98.2375	None	None	909.3 (3)	896.3 (1)
6807402	218GLRSL	29.928611	-98.2375	None	801.4 (2)	None	819.2 (2)
6807403	218GLRSL	29.933611	-98.2225	None	875.7 (2)	None	924 (1)
6807405	218GLRSL	29.928333	-98.228333	None	910.1 (2)	None	920.5 (1)
6807407	218GLRSL	29.936389	-98.210556	916.4 (29)	888.1 (2)	903.8 (75)	908.5 (58)
6807408	218GLRSL	29.954444	-98.228056	None	None	980 (1)	None
6807409	218GLRSL	29.952222	-98.223333	None	None	880 (1)	None
6807410	218GLRSL	29.936944	-98.216111	None	840 (1)	None	None
6807502	217HSTN	29.9525	-98.169444	None	869.2 (1)	None	889 (1)
68076AA	218EDRDA	29.931944	-98.129722	None	1099.6 (1)	1100.9 (2)	1115 (1)
6807701	218GLRSL	29.891389	-98.212778	None	None	890 (1)	None
6807702	218GLRSL	29.885	-98.218889	None	None	877 (1)	None
6807703	218GLRSL	29.906944	-98.228056	None	898 (2)	875 (1)	899.3 (1)
6807704	218GLRSL	29.901944	-98.231389	None	None	885.5 (2)	None

Table A-2. (cont.) Average Water Levels for Different San Marcos Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
6807705	218GLRSL	29.895556	-98.235	None	None	883 (1)	None
6807706	218GLRSL	29.891667	-98.233889	None	917.5 (2)	883 (1)	913 (1)
6807707	218GLRSL	29.891944	-98.231389	None	None	878 (1)	None
6807708	218GLRSL	29.882778	-98.211667	None	None	None	915 (1)
6807712	218GLRSL	29.908056	-98.212778	None	940 (1)	None	None
6807713	218GLRSU	29.899722	-98.217222	None	908.2 (2)	None	918.8 (1)
6807716	218GLRS	29.915278	-98.210278	None	None	950 (1)	None
6807718	218GLRS	29.916389	-98.241944	None	914 (1)	None	None
6807722	218GRHC	29.884722	-98.218333	None	None	806 (1)	None
6807803	218GLRSL	29.878333	-98.205	None	None	850 (1)	None
6807804	218GLRSL	29.913611	-98.205833	None	838 (2)	None	861.4 (1)
6807805	218GLRSL	29.875556	-98.200556	None	None	865 (1)	None
6808101	218GRHC	29.979444	-98.086389	None	None	715 (1)	None
6808102	218CCRK	29.986667	-98.092778	733.5 (2)	616 (1)	718 (14)	720.1 (5)
6808103	218GLRSL	29.983889	-98.122222	796.5 (2)	699.5 (2)	816 (10)	814.3 (5)
6808201	100ALVM	29.983056	-98.043611	None	None	None	775.8 (1)
6808202	218GLRSL	29.999722	-98.0825	None	None	None	830.7 (1)
6808601	218EDRDA	29.946111	-98.028056	None	None	775.9 (18)	796.3 (6)
6808701	218EDRDA	29.897778	-98.12	1037.8 (1)	1031.2 (1)	1024.4 (9)	None
6808902	218EDRDA	29.896466	-98.002893	None	564.8 (2)	583.3 (3)	593 (2)
68089SMBA	218EDRDA	29.892942	-98.001344	None	None	None	593.3 (1)
6812302	217HSTN	29.859167	-98.505556	931.2 (2)	1008.4 (2)	981.2 (4)	1013.8 (4)
6812505	218CCRK	29.821944	-98.551111	None	1107.5 (1)	None	None
6812703	218GLRSL	29.7825	-98.598889	None	None	None	1105 (1)
6812705	218CCRK	29.751111	-98.623889	860.1 (2)	932 (1)	None	None
6812706	217HSCC	29.754722	-98.623056	None	882.2 (2)	927 (1)	871.6 (1)
6812801	218GLRSL	29.779444	-98.542778	None	None	988 (1)	None
6812901	218GRHC	29.773611	-98.532222	None	None	1011.7 (2)	None
6812902	218GRHC	29.756667	-98.5075	None	None	984 (2)	None
6812903	218GRHC	29.782778	-98.5275	1105 (2)	1030 (1)	1032.4 (1)	1055.2 (1)
6813101	218GLRSL	29.836944	-98.482777	1202.2 (2)	None	1201.8 (1)	None
6813102	218GRHC	29.836944	-98.482499	1096.3 (2)	None	1078.7 (1)	None
6813201	218HSCC	29.868611	-98.4175	None	950.3 (2)	None	961.4 (1)
6813202	218HSCC	29.868611	-98.4175	None	None	None	955 (1)
6813206	218GLRS	29.837222	-98.431389	None	958.3 (1)	None	None
6813208	219SLGH	29.839167	-98.458056	None	None	None	962.5 (1)
6813401	218HCSH	29.808056	-98.466389	None	964 (1)	1115 (1)	None
6813502	218GLRS	29.802778	-98.440833	None	None	None	903 (1)
6813503	218GLRSL	29.797222	-98.418611	None	907.8 (3)	None	None
6813504	218GLRSL	29.795833	-98.455556	993.4 (1)	None	None	None
6813505	218GLRSL	29.793333	-98.454722	956.7 (1)	None	None	None
6813506	218HSCC	29.811111	-98.439167	None	None	1066 (1)	None
6813507	218GRHC	29.814444	-98.435556	None	None	940 (1)	None
6813508	218HSCC	29.802222	-98.443333	None	None	None	953 (1)
6813509	218GLRS	29.797222	-98.420833	None	None	927 (1)	None

Table A-2. (cont.) Average Water Levels for Different San Marcos Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
6813510	218GLRS	29.811667	-98.417222	None	None	None	1070 (1)
6813511	218CCRK	29.796111	-98.4275	None	None	925 (1)	None
6813512	218HSCC	29.799722	-98.426944	None	None	919 (1)	None
6813604	218GLRSL	29.806944	-98.385556	None	None	870 (1)	None
6813605	218GLRS	29.796667	-98.413611	None	None	905 (1)	None
6813608	218GRHC	29.793611	-98.401944	None	None	780 (1)	None
6813701	218GRHC	29.7625	-98.461389	None	None	895 (1)	None
6813702	218GLRS	29.760833	-98.461667	None	None	948.2 (2)	None
6813801	218GRHC	29.765278	-98.448889	None	None	None	915 (1)
6813802	218GRHC	29.766111	-98.444722	None	None	840 (1)	None
6813803	218GRHC	29.759444	-98.45	None	None	850 (1)	None
6813804	218GRHC	29.765833	-98.443056	None	None	829 (2)	None
6813805	218GRHC	29.758056	-98.4425	None	None	950 (1)	None
6813806	218GRHC	29.768889	-98.456944	None	903 (2)	907.7 (12)	950 (8)
6813808	218GLRS	29.789722	-98.417778	None	None	945 (1)	None
6813810	218GRHC	29.773056	-98.438889	985.1 (1)	None	None	899 (1)
6813811	218GRHC	29.773056	-98.438056	988.2 (2)	None	845.4 (1)	940 (1)
6813812	218GRHC	29.773056	-98.440833	None	None	953 (1)	None
6813813	218GRHC	29.778611	-98.445278	1024.1 (1)	None	915 (1)	None
6813814	218GRHC	29.778889	-98.445278	1024.7 (1)	None	None	925 (1)
6813815	218GRHC	29.777222	-98.428056	None	None	None	950 (1)
6813816	218GRHC	29.764722	-98.45	None	None	843 (1)	None
6813818	218GRHC	29.753056	-98.440278	None	612 (1)	None	None
6813819	218GRHC	29.753333	-98.4375	None	None	810 (1)	None
6813820	218GRHC	29.750556	-98.434167	None	None	827 (1)	None
6813901	218GRHC	29.753611	-98.379722	None	None	None	819 (1)
6813904	218GPSH	29.756667	-98.397222	None	None	865 (1)	None
6813905	218GPSH	29.756667	-98.397222	None	None	802 (1)	886 (1)
6813906	218GPSH	29.7525	-98.395833	None	None	745 (1)	833.5 (1)
6813907	218GRHC	29.786111	-98.399444	None	None	780 (1)	None
6814201	218GRHC	29.86	-98.302222	None	None	875 (1)	None
6814202	218GLRSL	29.860833	-98.301944	None	None	890 (1)	None
6814204	218GLRSL	29.854722	-98.295	None	None	910 (1)	None
6814205	218GLRSL	29.874444	-98.298056	None	993 (1)	None	None
6814207	218GPSH	29.854722	-98.295	None	929.9 (2)	None	935.2 (1)
6814301	218GLRSL	29.860278	-98.254444	None	None	938 (1)	None
6814305	218GRHC	29.863056	-98.263056	None	None	920 (1)	None
6814306	218GLRSU	29.864444	-98.261667	None	876.8 (2)	None	898.7 (1)
6814307	218GRHC	29.847222	-98.280833	None	None	None	888.5 (2)
6814310	218GRHC	29.854444	-98.260556	None	None	None	755 (1)
6814401	218GLRSU	29.811389	-98.356667	None	None	1105 (1)	None
6814402	218GRUH	29.819444	-98.349167	None	1075.9 (1)	865 (1)	None
6814405	218GRCCU	29.803333	-98.360833	None	None	None	920 (1)
6814406	218GRCCU	29.799444	-98.356667	None	None	816.8 (1)	845 (1)
6814407	218GRCCU	29.798333	-98.355277	None	831.4 (2)	905.3 (36)	919.3 (10)

Table A-2. (cont.) Average Water Levels for Different San Marcos Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
6814410	218GLRSU	29.821944	-98.345278	None	1101 (1)	None	None
68146AA	218CCRK	29.828472	-98.274722	None	929.8 (1)	941.2 (2)	989.3 (1)
6814705	218GRCCU	29.755278	-98.371389	None	None	None	800 (1)
6815101	218GRHC	29.865833	-98.246389	None	None	856 (1)	None
6815104	218GLRSL	29.853889	-98.246111	None	None	780 (1)	None
6815105	218GLRSL	29.857222	-98.242778	None	780 (1)	None	None
6815107	218GLRSU	29.835556	-98.249722	None	None	930 (1)	None
6815109	218GLRSU	29.851667	-98.247222	None	900.4 (2)	None	913.7 (1)
6815112	218GLRS	29.835278	-98.249444	None	None	925 (1)	None
6815114	218GLRSL	29.863611	-98.231389	930.9 (2)	None	900 (1)	None
6815115	218GLRSU	29.848888	-98.227221	961.7 (23)	928.8 (2)	940.1 (34)	949.3 (48)
6815116	218GLRSU	29.84861	-98.213055	None	879 (2)	877.1 (11)	876.9 (3)
6815118	218GLRSU	29.848889	-98.227222	None	None	896 (1)	None
6815201	218GLRS	29.849722	-98.201667	None	None	770 (1)	None
6815202	218GRHC	29.874722	-98.204167	None	883.8 (2)	868 (1)	888 (1)
6815203	218GRHC	29.851667	-98.200556	None	None	685 (1)	None
6815205	218GLRSU	29.87	-98.176111	775 (1)	None	None	None
6815207	218GLRSU	29.855556	-98.171111	None	966 (2)	900 (1)	968.1 (1)
6815208	218GRHC	29.861389	-98.196111	None	740.8 (2)	None	875 (1)
6815210	218GRHC	29.866944	-98.1875	None	None	717 (1)	None
6815401	218GLRS	29.824722	-98.244722	None	None	922.5 (17)	951.5 (9)
6815501	218GLRSU	29.826667	-98.168056	None	None	410 (1)	None
6815603	218GLRS	29.804722	-98.156389	None	None	679 (2)	None
6815604	218GLRS	29.792778	-98.140833	None	None	655.8 (2)	None
6815605	218GLRS	29.795556	-98.129722	None	631.6 (1)	633 (2)	None
6815606	218EDRDA	29.806389	-98.153889	684.2 (1)	None	681 (8)	None
6815701	218GLRS	29.766944	-98.229444	None	690.4 (1)	701.6 (18)	712.5 (8)
6815702	218GLRS	29.76	-98.2225	None	None	695 (1)	None
6815703	218GLRS	29.791944	-98.231667	None	None	899.5 (2)	None
6815704	218GLRS	29.788889	-98.22	None	None	926.8 (2)	None
6815801	218EDRDA	29.757222	-98.191944	None	664.6 (1)	670.5 (2)	None
6815803	218EDRDA	29.779444	-98.186389	697.3 (1)	None	695.2 (11)	730.6 (1)
6815804	218EDRDA	29.773333	-98.200833	None	None	736.9 (3)	None
6815805	218GLRS	29.778056	-98.1825	None	None	673.3 (2)	670 (1)
6815806	218EDRDA	29.765278	-98.202778	None	None	689.7 (3)	None
6815807	218EDRDA	29.754722	-98.2075	705.8 (1)	None	693.1 (7)	None
6815808	218EDRDA	29.7675	-98.178611	None	None	656.4 (2)	None
6815809	218EDRDA	29.770945	-98.176475	648 (1)	None	639.7 (13)	686.6 (2)
6815810	218EDRDA	29.751389	-98.176667	None	None	650.5 (6)	None
6815811	218EDRDA	29.753333	-98.182778	None	None	653.3 (2)	None
6815902	218EDRDA	29.759115	-98.140048	None	651.7 (2)	647.7 (10)	640.7 (3)
6815903	218EDRDA	29.757778	-98.141667	641 (4)	624.4 (16)	633.5 (93)	638 (30)
6815904	218EDRDA	29.750556	-98.162778	None	None	640.9 (17)	644.5 (9)
6815905	218EDRDA	29.785	-98.147778	None	639.5 (3)	644.2 (7)	646.5 (8)
6815906	218EDRDA	29.778889	-98.16	None	632.6 (1)	None	None

Table A-2. (cont.) Average Water Levels for Different San Marcos Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
6815907	218EDRDA	29.75467	-98.139552	620.6 (1)	None	617.1 (12)	640.5 (1)
6815908	218EDRDA	29.759444	-98.136111	None	None	612.9 (2)	None
6815909	218EDRDA	29.779444	-98.13	None	None	631.9 (2)	None
6815910	218EDRDA	29.754444	-98.128889	None	None	609.7 (2)	None
6815911	218EDRDA	29.771389	-98.131111	None	None	668 (1)	None
6815912	218EDRDA	29.754508	-98.141	646 (1)	636 (1)	636.6 (11)	642.3 (2)
68159RP	218EDRDA	29.763969	-98.142481	None	639 (1)	628.2 (1)	645.2 (1)
6816101	218GLRSU	29.847778	-98.118889	None	None	735 (1)	None
68162AA	218CCRK	29.840752	-98.079869	None	None	677.8 (2)	None
6816301	218EDRDA	29.871667	-98.021667	None	None	596.1 (13)	607.4 (6)
68163AA	218EDRDA	29.848212	-98.023251	597.7 (1)	None	583.5 (1)	None
68163BB	218EDRDA	29.855251	-98.03245	643.1 (1)	None	639.5 (1)	None
68163DD	218EDRDA	29.869196	-98.034217	None	None	587 (1)	593.1 (1)
68163EE	218EDRDA	29.87724	-98.042787	729.9 (1)	None	701.7 (1)	None
68163XX	218EDRDA	29.886533	-98.039428	855.3 (1)	None	None	None
6816401	218GLRSU	29.797778	-98.116389	None	615.4 (1)	636.8 (13)	641.7 (9)
6816402	218GLRSU	29.801944	-98.111667	568 (1)	None	None	None
6816403	218GLRSU	29.801944	-98.111667	597 (1)	None	None	None
6816404	218GLRSU	29.802222	-98.111111	None	None	None	582 (1)
6816501	218EDRDA	29.801622	-98.055052	None	None	591.6 (9)	595.1 (6)
6816502	218EDRDA	29.80812	-98.047522	None	None	581.9 (1)	600.1 (1)
6816601	218EDRDA	29.82981	-98.001633	596.7 (1)	None	583.7 (1)	None
6816602	218EDRDA	29.793889	-98.024167	601.1 (4)	592.2 (3)	595.6 (37)	600.1 (9)
6816603	218EDRDA	29.829228	-98.016213	None	578.2 (1)	580.4 (3)	584.7 (2)
6816605	218EDRDA	29.829167	-98.004444	None	None	561.7 (13)	577.5 (8)
68166HC	218EDRDA	29.818909	-98.017454	None	580.9 (1)	584.9 (1)	590.3 (1)
68166HC#2	218EDRDA	29.81857	-98.01703	None	None	599.3 (1)	604.9 (1)
6816701	218EDRDA	29.757275	-98.104789	624.1 (7)	613.5 (1)	618.7 (39)	622.4 (34)
6816702	218GLRSU	29.775278	-98.110833	None	628.9 (9)	639.7 (55)	645.4 (23)
6816703	218EDRDA	29.75366	-98.093118	611.1 (2)	596.6 (6)	602.1 (34)	605.2 (17)
6816705	218GLRS	29.786667	-98.119722	None	None	630.7 (2)	None
6816706	218EDRDA	29.765	-98.118333	None	None	612.9 (2)	None
6816707	218EDRDA	29.767778	-98.101944	None	None	None	612 (1)
6816708	218EDRDA	29.767778	-98.101944	None	None	602 (1)	None
68167ML	218EDRDA	29.783774	-98.087155	None	595.2 (1)	612.1 (1)	None
6816801	218EDRDA	29.786768	-98.052866	617.9 (11)	616.9 (32)	603.7 (235)	603.7 (82)
6816803	218EDRDA	29.769918	-98.074103	616.6 (1)	605.2 (2)	609.5 (20)	615 (6)
6816804	218EDRDA	29.778056	-98.063056	None	596.7 (4)	608.6 (14)	609.8 (11)
68168NB	218EDRDA	29.783098	-98.066087	None	None	608.3 (2)	616.4 (1)
68169FW	218EDRDA	29.790833	-98.03	None	None	597.3 (1)	602.4 (1)
6819301	218GPSH	29.747778	-98.635833	1199.3 (1)	None	1138 (1)	1180.8 (2)
6819321	218GPSH	29.7475	-98.626667	None	None	895 (1)	None
6819322	218CCRK	29.746944	-98.6275	None	None	1084 (1)	None
6820111	218GRCCU	29.749722	-98.623889	None	None	1102 (1)	None
6821202	218GLRSU	29.748889	-98.443333	None	None	824 (1)	None

Table A-2. (cont.) Average Water Levels for Different San Marcos Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
6821203	218GLRSU	29.749167	-98.442778	None	None	855 (1)	None
6821204	218GLRSL	29.749167	-98.444167	None	None	None	805 (1)
6821206	218GLRSL	29.746944	-98.451389	None	None	803 (1)	None
6821209	218GLRS	29.738889	-98.438056	None	None	835 (1)	None
6821210	218GLRSU	29.728611	-98.4275	1011.4 (2)	None	None	None
6821211	218GLRSU	29.728611	-98.427778	1012 (2)	None	None	None
6821215	218GRHC	29.734167	-98.426667	None	None	840.7 (10)	895.4 (4)
6821216	218GRHC	29.715833	-98.444167	1011.5 (2)	None	None	None
6821217	218GLRS	29.708889	-98.431667	988.9 (1)	None	None	None
6821301	218GLRSL	29.7475	-98.393333	None	None	858 (1)	824 (1)
6821302	218GRHC	29.746667	-98.393333	None	None	810 (1)	None
6821305	218GLRS	29.743889	-98.398056	None	829.6 (1)	None	None
6821306	218GRCCU	29.749167	-98.389444	None	None	550 (1)	None
6822201	218GLRS	29.722778	-98.301389	None	802.5 (2)	802.5 (31)	806.8 (15)
6822301	218EDRDA	29.712222	-98.258056	None	652.4 (10)	667.2 (63)	688.4 (23)
6822302	218GLRS	29.711944	-98.276944	None	None	690.6 (16)	706.6 (5)
6822303	218EDRDA	29.713611	-98.251944	699.1 (1)	657.9 (2)	653.7 (1)	None
6822304	218GLRSU	29.728056	-98.286389	None	None	None	700 (1)
6822305	218GLRSU	29.726944	-98.288333	None	None	750 (1)	None
6822401	218EDRD	29.698889	-98.341944	None	825 (1)	None	None
6822501	218EDRDA	29.681	-98.293333	696.3 (1)	None	667.8 (29)	685.4 (15)
6822502	218EDRDA	29.697778	-98.296667	None	None	683.2 (16)	696.3 (11)
6822508	218EDRDA	29.680278	-98.293333	669.4 (1)	None	671.1 (4)	None
68225AA	218CCRK	29.676767	-98.309267	None	630.5 (1)	670.7 (1)	742.4 (1)
68225BB	218CCRK	29.684269	-98.300908	None	650.3 (1)	662.5 (1)	716.9 (1)
68225CC	218EDRDA	29.682472	-98.30111	None	None	669 (1)	745.7 (1)
6822601	218EDRDA	29.677355	-98.286153	None	661.5 (1)	676.6 (4)	692.2 (7)
6822602	218EDRDA	29.676944	-98.290833	650.3 (1)	None	641.1 (8)	None
6822603	218EDRDA	29.702248	-98.251575	683.2 (2)	662.8 (1)	665.9 (10)	715.8 (4)
6822604	218EDRDA	29.6975	-98.258889	None	None	652.8 (7)	None
6822605	218EDRDA	29.682222	-98.26	None	None	658.8 (7)	None
68226BF	218EDRDA	29.675512	-98.272263	None	656.4 (1)	656.6 (1)	684.2 (1)
68226BH	218EDRDA	29.674056	-98.27697	None	656.2 (1)	657.7 (1)	689.7 (1)
6822802	218EDRDA	29.632222	-98.299722	670.8 (1)	None	657.3 (2)	662.4 (2)
6822805	218EDRDA	29.631389	-98.298889	None	None	662.5 (1)	None
6822806	218EDRDA	29.641944	-98.321111	None	None	None	677 (1)
6822807	218EDRDA	29.655496	-98.305047	702.5 (1)	647 (3)	672.9 (3)	689.2 (2)
6822808	218EDRDA	29.642556	-98.307375	None	None	701.5 (2)	684.2 (1)
6822810	218EDRDA	29.660271	-98.307088	692 (3)	661.9 (1)	671 (12)	702.5 (4)
68228AA	218EDRDA	29.652175	-98.30108	None	663.4 (1)	670.2 (2)	703.3 (1)
68228BB	218EDRDA	29.659919	-98.320965	None	667.2 (1)	664.6 (2)	691.4 (1)
6822902	218EDRDA	29.629403	-98.280323	None	645.1 (1)	650 (2)	661.8 (1)
6822903	218EDRDA	29.626944	-98.26	None	638.8 (3)	645.5 (19)	656.2 (6)
6822910	218EDRDA	29.629276	-98.280546	None	671.2 (2)	650.8 (2)	673.7 (1)
6822911	218EDRDA	29.629444	-98.2725	660.6 (1)	None	648.8 (8)	None

Table A-2. (cont.) Average Water Levels for Different San Marcos Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
6822912	218EDRDA	29.630378	-98.275263	657.4 (1)	647.3 (1)	640.2 (11)	670.4 (2)
6822913	218EDRDA	29.643888	-98.27111	752.2 (5)	None	736.6 (4)	744.8 (2)
6823101	218EDRDA	29.741667	-98.209444	None	660.9 (10)	661.1 (43)	663.3 (11)
6823104	218EDRD	29.74454	-98.224245	713 (2)	692.5 (1)	698.6 (7)	701.6 (2)
6823105	218EDRDA	29.714939	-98.223238	651.9 (1)	None	633.6 (8)	681.5 (1)
6823202	218EDRDA	29.711572	-98.200926	790.1 (1)	None	645.8 (17)	650.9 (16)
6823203	218EDRDA	29.710218	-98.192298	None	499.1 (1)	640 (2)	641.6 (1)
6823206	218EDRDA	29.748611	-98.182222	625.5 (1)	633.2 (11)	650 (64)	669.7 (14)
6823207	218EDRDA	29.732222	-98.191944	None	None	647 (8)	651.8 (6)
6823208	218EDRDA	29.734902	-98.194447	650.3 (1)	617.9 (4)	643.9 (24)	728 (27)
6823209	218EDRDA	29.720789	-98.178998	627.7 (2)	619.8 (3)	626.6 (10)	627.1 (1)
6823210	218EDRDA	29.714517	-98.208046	662.6 (2)	638.2 (3)	644.4 (11)	665.3 (3)
6823211	218EDRDA	29.74443	-98.171628	647.3 (1)	618.7 (7)	636.6 (15)	640.2 (9)
6823212	218EDRDA	29.743611	-98.173056	None	612.5 (2)	638.3 (18)	639.2 (11)
6823224	218EDRDA	29.710278	-98.191944	None	None	659 (1)	None
6823225	218EDRDA	29.741389	-98.200833	None	637 (1)	634.9 (2)	None
6823226	218EDRDA	29.745278	-98.179444	None	None	629.5 (2)	None
6823302	218EDRDA	29.713574	-98.138355	628.5 (27)	621.3 (96)	624.6 (655)	626.6 (230)
6823304	218EDRDA	29.711111	-98.138333	632.3 (34)	631.6 (1)	631.8 (40)	634.6 (117)
6823306	218EDRDA	29.746206	-98.153948	640.9 (2)	619.4 (15)	630.1 (80)	633.5 (24)
6823307	218EDRDA	29.746389	-98.159722	None	617.5 (4)	633.3 (13)	637.2 (9)
6823308	218EDRDA	29.747778	-98.145556	None	615 (4)	655.7 (6)	633.4 (7)
6823309	218EDRDA	29.718667	-98.135241	626.4 (1)	622.1 (1)	623.3 (11)	627.5 (2)
6823310	218EDRDA	29.730833	-98.125556	None	605.1 (4)	615.1 (18)	616 (12)
6823311	218EDRDA	29.735278	-98.128056	None	None	574 (2)	621 (1)
6823312	218EDRDA	29.734035	-98.127111	None	617 (1)	621.3 (2)	None
6823316	218EDRDA	29.721366	-98.147906	630.8 (9)	618 (3)	622.3 (25)	626.7 (19)
6823319	218EDRDA	29.721007	-98.127678	621.4 (1)	622 (1)	620.5 (11)	625.5 (2)
68233DW	218EDRDA	29.727165	-98.125307	None	622.2 (1)	623.4 (1)	627.9 (1)
6823502	218EDRD	29.682222	-98.176389	655.9 (3)	None	638.6 (9)	646.7 (1)
6823504	218EDRDA	29.671355	-98.196417	648.9 (2)	636 (1)	636.4 (10)	645.4 (4)
6823507	218EDRDA	29.689167	-98.199167	None	619.3 (5)	641.2 (19)	637.7 (3)
6823508	218EDRDA	29.671389	-98.196111	None	660 (1)	None	None
6823602	218EDRDA	29.701877	-98.15112	628.2 (2)	631.8 (1)	619.8 (16)	632.1 (5)
6823603	218EDRDA	29.687222	-98.150833	None	623.9 (1)	638.6 (15)	640 (7)
6823604	218EDRDA	29.670278	-98.163611	None	None	636.4 (17)	639.8 (9)
6823605	218EDRDA	29.694444	-98.166389	None	None	None	642 (1)
6823608	218EDRDA	29.696389	-98.163889	None	633 (1)	None	None
6823611	218EDRDA	29.697778	-98.163889	None	None	640 (1)	None
6823612	218EDRDA	29.697222	-98.163611	None	None	622 (1)	None
6823613	218EDRDA	29.697222	-98.163611	None	None	605 (1)	None
6823616	218EDRDA	29.704444	-98.133054	None	627.2 (1)	None	None
6823616A	218EDRDA	29.704343	-98.133076	None	None	637.7 (1)	642.8 (2)
6823617	218EDRDA	29.705589	-98.135057	None	627.4 (1)	640.1 (1)	643.6 (2)
6823618	218EDRDA	29.705833	-98.134444	None	627.4 (1)	None	None

Table A-2. (cont.) Average Water Levels for Different San Marcos Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
6823619	218EDRDA	29.706667	-98.135833	None	629.5 (1)	None	None
6823619B	218EDRDA	29.70739	-98.136251	None	None	None	640.3 (2)
6823621	218EDRDA	29.694453	-98.159173	648 (2)	625.3 (3)	634.8 (13)	644.4 (3)
6823701	218EDRDA	29.648888	-98.216439	665.4 (8)	634.6 (4)	646.3 (65)	656 (24)
6823703	218EDRDA	29.636389	-98.241111	None	None	656.9 (1)	None
6823706	218EDRDA	29.631944	-98.229167	731.6 (1)	729.4 (1)	729.9 (2)	654.5 (2)
6823709	218EDRDA	29.64043	-98.233116	673.1 (2)	658.7 (3)	658.2 (15)	667.7 (3)
6823710	218EDRDA	29.663431	-98.236035	672.6 (1)	639.3 (1)	647.5 (10)	659.7 (5)
6823711	218EDRDA	29.638889	-98.219722	749.3 (1)	None	707 (3)	None
6823807	218EDRDA	29.666364	-98.171324	647 (2)	631.8 (4)	644.1 (33)	651.2 (11)
6823808	218EDRDA	29.6575	-98.182222	663.2 (1)	624 (1)	641.9 (11)	648.7 (5)
6823809	218EDRDA	29.659722	-98.193056	None	603.2 (1)	None	None
6823810	218EDRDA	29.663889	-98.191944	657.3 (1)	620.8 (1)	581.2 (2)	None
6823811	218EDRDA	29.655833	-98.203056	None	None	595.7 (1)	None
6824102	218EDRDA	29.745556	-98.101667	None	None	618.4 (4)	621 (4)
6824103	218EDRDA	29.73111	-98.119443	None	None	None	632 (1)
6824104	218EDRDA	29.74783	-98.116567	622.1 (1)	613.6 (1)	611.1 (14)	615.9 (6)
6824105	218EDRDA	29.738611	-98.088611	635.1 (5)	628.5 (3)	628.5 (44)	630.4 (15)
6824114	218EDRDA	29.743611	-98.114444	None	None	None	619.5 (1)
6824115	218EDRDA	29.743889	-98.112222	None	None	None	619.5 (1)
6824117	218EDRDA	29.743056	-98.113889	None	None	679.8 (2)	None
6824118	218EDRDA	29.744444	-98.114167	None	None	610 (1)	615.2 (1)
6824119	218EDRDA	29.729722	-98.123889	None	None	None	622 (1)
6824120	218EDRDA	29.74361	-98.098333	648.3 (2)	646.9 (1)	648.1 (13)	648.2 (2)
6824121	218EDRDA	29.743333	-98.123889	None	None	648.7 (1)	None
6824122	218EDRDA	29.741389	-98.110556	None	612.9 (1)	None	None
68241JF	218EDRDA	29.747824	-98.103859	None	None	611.2 (1)	621.7 (1)
6824405	100ALVM	29.685278	-98.101389	None	None	584.4 (1)	None
6824406	100ALVM	29.685278	-98.1	585.4 (1)	None	583.7 (20)	585.4 (16)
6824407	100ALVM	29.684444	-98.102778	585.2 (1)	None	583.7 (20)	585.5 (16)
6824408	100ALVM	29.678056	-98.104444	588.1 (1)	None	587.8 (19)	588.4 (16)
6824409	100ALVM	29.6875	-98.101389	None	None	581.9 (1)	None
6824410	100ALVM	29.690278	-98.101111	None	None	579.7 (1)	None
6824411	100ALVM	29.6875	-98.108333	None	None	581.2 (1)	None
6830208	218EDDT	29.610218	-98.319579	680.1 (49)	636.3 (27)	654.4 (210)	668.3 (121)
6830209	218EDRDA	29.616111	-98.301944	None	None	650.5 (1)	None
6830211	218EDRDA	29.604959	-98.32818	None	650.9 (1)	659 (3)	670.4 (2)
6830218	218EDRDA	29.605833	-98.298611	None	None	660.4 (1)	None
6830224	218EDRDA	29.621111	-98.304444	None	None	650 (1)	None
6830225	218EDRDA	29.620278	-98.304167	682.7 (1)	None	659.1 (2)	671.3 (2)
6830226	218EDRDA	29.615135	-98.317151	668.9 (1)	648.5 (1)	648.9 (11)	673.4 (2)
68302AA	218EDRDA	29.618347	-98.326581	None	651.2 (1)	661.8 (3)	679.9 (2)
68302BB	218EDRDA	29.614971	-98.319088	None	649.5 (1)	653.5 (2)	676.4 (1)
68302LH	218EDRDA	29.611188	-98.320875	None	642.8 (1)	659.9 (1)	675.5 (1)
6830312	218EDRDA	29.612805	-98.283916	672 (5)	635 (5)	653 (33)	666.1 (12)

Table A-2. (cont.) Average Water Levels for Different San Marcos Springs Discharges

Well number	Aquifer	Latitude	Longitude	Greater than 300 cfs	Less than 100 cfs*	100 to 200 cfs*	200 to 300 cfs*
6830313	218EDRDA	29.616944	-98.2575	None	580 (4)	614.3 (18)	613.8 (12)
6830315	218EDRDA	29.609	-98.289928	676.1 (15)	648 (1)	663.6 (32)	668.6 (27)
*Elevation and number of measurements							