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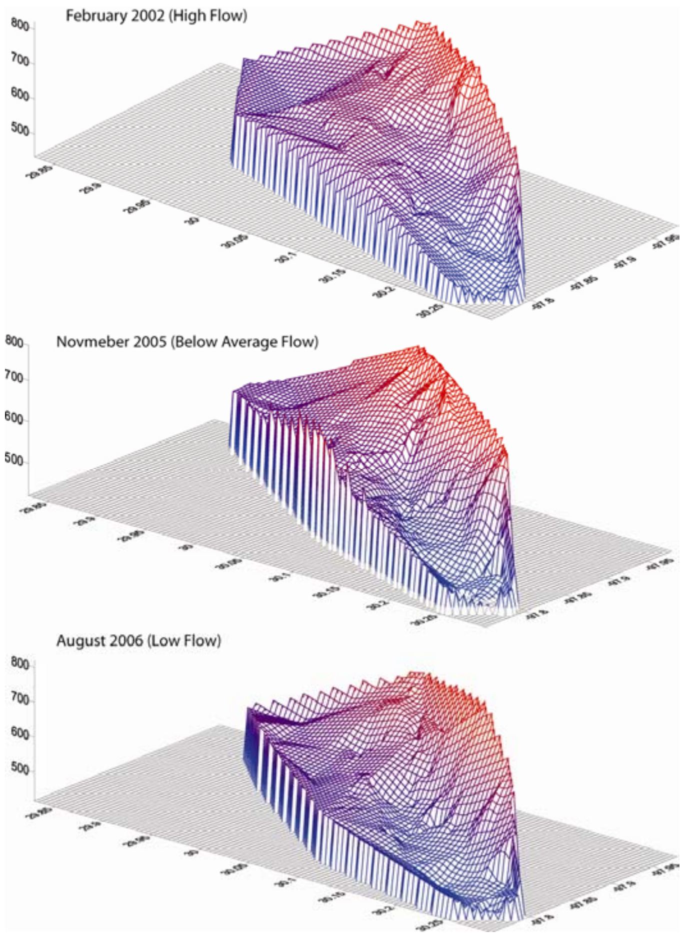
POTENTIOMETRIC MAPS FOR LOW TO HIGH FLOW CONDITIONS, BARTON SPRINGS SEGMENT OF THE EDWARDS AQUIFER, CENTRAL TEXAS



BSEACD Report of Investigations 2007-1201

Barton Springs/Edwards Aquifer Conservation District
1124 Regal Row
Austin, Texas

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Cover. Wireframe potentiometric surface maps for high, below average, and low flow conditions in the Barton Springs segment of the Edwards Aquifer.

POTENTIOMETRIC MAPS FOR LOW TO HIGH FLOW CONDITIONS, BARTON SPRINGS SEGMENT OF THE EDWARDS AQUIFER, CENTRAL TEXAS

Brian B. Hunt, P.G., Brian A. Smith, Ph.D., P.G., and Joe Beery

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ABSTRACT

Potentiometric maps for the karstic Barton Springs segment of the Edwards Aquifer (Barton Springs aquifer) were constructed using data from high, below average, and low flow conditions. These synoptic potentiometric maps document varying hydrologic conditions and stresses and contain a dense set of data (n= 166 to 231) for this relatively small portion of the Edwards Aquifer (155 sq. mi.), allowing detailed examination of hydrogeologic features and phenomena. Results indicate steep gradients within the extremely dynamic aquifer system, with water-level changes from 20 to 100 feet over large portions of the area. Troughs and ridges in the potentiometric surfaces correspond to preferential flow paths (conduits) with contours significantly changing morphology from one aquifer condition to the next. Influence of discrete and diffuse recharge and discrete discharge (pumping) are evident on the potentiometric surfaces. Potentiometric surfaces for these different conditions provide some insight into the dynamic nature of the southern boundary of the aquifer, and the potential for flow from other sources such as the Trinity Aquifer and saline zone of the Edwards. These maps, and associated data sets, are important for calibrations of numerical models and evaluations of sustainable yield. Potentiometric maps are a significant tool for hydrogeologic characterization of the karst flow system in the aquifer, and when combined with dye tracing and other studies, better characterize the dynamic nature of this system.

INTRODUCTION

Groundwater levels and potentiometric surface maps provide critical information about the hydrologic relationships of recharge and discharge to storage within an aquifer, and the direction of groundwater flow. This report and accompanying compact disk contain a compilation of synoptic potentiometric maps from the study area. The purpose of this report is to provide a foundation of information and data for future hydrogeologic investigations and evaluations of water resources in the Barton Springs/Edwards Aquifer Conservation District (District). These maps and data will be useful for computer modeling, sustainable yield determinations, and resource protection.

Location

The study area is located along the Balcones Fault Zone of Central Texas within portions of Travis and Hays Counties (Figure 1).

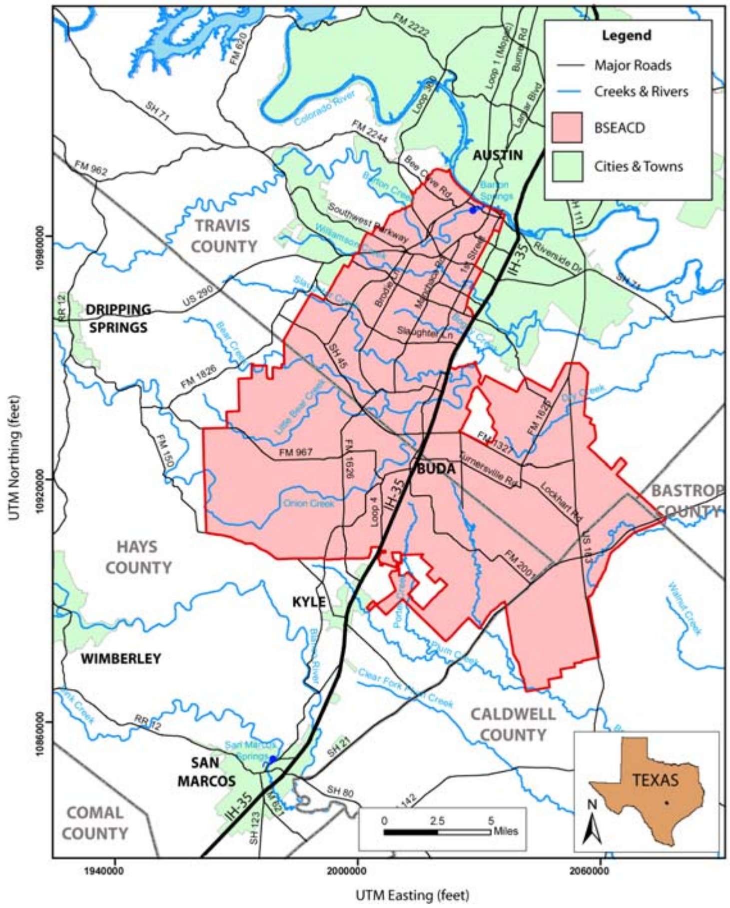


Figure 1. General location map of the District boundaries, rivers, creeks, roads, major cities/towns, springs, and other landmarks.

BACKGROUND

The Edwards Aquifer of Texas is a karst aquifer developed in faulted and fractured Cretaceous-age limestones and dolomites. "Karst is terrain with distinctive hydrology arising from the combination of high rock solubility and well-developed solution channel porosity underground" (Ford, 2004). Karst terrains and aquifers are characterized by sinking streams, sinkholes, caves, springs, and an integrated system of pipe-like conduits that rapidly transport groundwater from recharge features to springs (White, 1988; Todd and Mayes, 2004).

The Edwards Aquifer system lies within the Miocene-age Balcones Fault Zone (BFZ) of Texas. Hydrologic divides separate the Edwards Aquifer into three segments. Ryder (1996) and Lindgren et al. (2004) provide detailed and regional information on the Edwards Aquifer. The smallest segment, the Barton Springs segment of the Edwards Aquifer, is the subject of this paper. Hereafter this segment is referred to as the Barton Springs aquifer. Detailed and regional information on the Trinity Aquifer is presented in Barker et al. (1994).

Barton Springs aquifer

The Barton Springs aquifer is 155 mi^2 in area, with about 80% of the area consisting of unconfined aquifer conditions, although the percentage fluctuates according to hydrologic conditions. The maximum thickness of the Barton Springs aquifer is about 450 feet. The primary discharge point is Barton Springs, located in Barton Creek about ¼ mi upstream of its confluence with the Colorado River (Figure 1). The Barton Springs aquifer is bounded to the north by the Colorado River and by the outcrop and saturated thickness of the Edwards Group to the west. The eastern boundary of the aquifer is the interface between fresh and brackish water (>1,000 mg/L total dissolved solids) and is a complex three dimensional boundary commonly known as the "saline" or bad-water" zone. The saline zone of the Edwards Aquifer is also characterized by a decrease in the relative transmissivity (Flores, 1990). Hovorka et al. (1998) describe this boundary as hydrodynamically controlled rather than separated by a distinct hydrologic barrier, although local fault control was noted. The southern hydrologic divide between the Barton Springs aquifer and the San Antonio segment of the Edwards Aquifer is approximately located between Onion Creek and the Blanco River. This divide may fluctuate according to hydrologic conditions, as supported by potentiometric-surface elevations and recent tracer testing results (LBG-Guyton Associates, 1994; Hunt et al., 2005).

Mapping of the Barton Springs aquifer has delineated geologic faults and several informal stratigraphic members of the Kainer and Person Formations of the Edwards Group (Rose, 1972), each having distinctive hydrogeologic characteristics (Small et al., 1996).

Development of the aquifer was influenced significantly by fracturing and faulting associated with the Miocene-age BFZ and dissolution of limestone and dolomite units by infiltrating meteoric water (Sharp, 1990; Barker et al., 1994; Hovorka et al., 1995). Faults trend predominantly to the northeast and are downthrown to the southeast, with total offset of about 1,100 ft across the study area. As a result of faulting and erosion, the aquifer ranges from about 450 ft at its thickest along the east side, to 0 ft along the west side of the recharge zone (Slade et al., 1986). Dissolution along fractures, faults, and bedding plane partings and within certain lithologic units has created numerous sinkholes, sinking streams, conduits, caves, and springs.

Recharge

The majority (85%) of recharge to the aquifer is derived from streams originating on the contributing zone, located up gradient and primarily west of the recharge zone (Slade et al., 1986). Water flowing onto the recharge zone sinks into numerous caves, sinkholes, and fractures along its six major (ephemeral) losing streams. The remaining recharge (15%) occurs in the upland areas of the recharge zone (Slade et al., 1986). However, current studies indicate that upland recharge may constitute a larger fraction of recharge (Hauwert, 2006). Mean surface recharge should approximately equal mean discharge, or about 53 cfs; however, maximum recharge rates during flooding may approach 400 cfs (Slade et al., 1986). Studies have shown that recharge is highly variable in space and time and focused within discrete features (Smith et al., 2001). For example, Onion Creek is the largest contributor of recharge (34%) with maximum recharge rates up to 160 cfs (Slade et al., 1986). Antioch Cave is located within Onion Creek and is the largest-capacity recharge feature with an average recharge of 46 cfs and a maximum of 95 cfs during one 100-day study (Fieseler, 1998).

Increased recharge due to "urban leakage" from leaking water and wastewater lines is another potential source of water (Jack Sharp, personal communication). Investigations are underway to attempt to calculate the potential amount of urban leakage contribution to the Edwards Aquifer.

The amount of cross-formational flow (sub-surface recharge) occurring through adjacent aquifers is unknown, although it is thought to be relatively small on the basis of water-budget analysis for surface recharge and discharge (Slade et al., 1985). Under drought and low water-level conditions there could be an increased potential for cross-formational flow from the saline zone and the San Antonio segment of the Edwards Aquifer. Current investigations are underway by the District to estimate the potential for cross-formational flow to the aquifer from the Trinity and the saline-zone of the Edwards units. Massei et al. (2007) attribute up to 20% of the increasing conductance at Barton Springs during low flow (2000) conditions to flow from the saline zone. Based on geochemical data Hauwert et al. (2004) estimate that a flow path along the saline zone contributes about 10-20% of flow to Barton Springs.

Groundwater Flow
The Edwards Aquifer is inherently heterogeneous and anisotropic, which strongly influences ground water flow and storage (Slade et al., 1985; Maclay and Small, 1986; Hovorka et al., 1996 and 1998; Hunt et al., 2005). The Edwards Aquifer can be described as a triple porosity and permeability system consisting of matrix, fracture, and conduit porosity (Hovorka et al., 1995; Halihan et al., 2000; Lindgren et al., 2004) reflecting an interaction between rock properties, structural history, and hydrologic evolution (Lindgren et al., 2004). In the Barton Springs aquifer groundwater generally flows west to east across the recharge zone, converging with preferential groundwater flow paths sub parallel to major faulting, and then flowing north toward Barton Springs.

For the Edwards Aquifer Halihan et al., (1999) describe permeability that varies with the direction and scale of measurement and values ranging over nine orders of magnitude. Accordingly, the system is often characterized as having a slow flow system (diffuse or matrix flow) and a fast flow system (fracture/conduit flow). Mean hydraulic conductivities are two orders of magnitude higher in the confined zone compared to the unconfined zone (Lindgren et al., 2004). Similarly, median specific capacity of wells in the Barton Springs aquifer is higher within the confined zone compared to the unconfined zone (Smith and Hunt, 2004). Matrix permeability is dwarfed by fracture and conduit permeability. Fractures may control flow on the well-scale, with conduits controlling flow on the regional scale (Halihan et al., 2000). Ultimately, it is likely that fractures (enlarged by solution) connect the matrix to the conduits. The probability of wells intersecting conduits is very low (Halihan et al., 2000), therefore most wells are influenced by matrix and fracture permeability, rather than conduit permeability, to varying degrees. This is consistent with a study by Hovorka et al (1998) that reported only 1 percent of flow is from the matrix. However, a trend of relatively high matrix permeability is observed on both sides of the freshwater/saline-water boundary. In contrast, the matrix permeability is relatively low for rocks in the outcrop (Hovorka et al., 1998). Groundwater dye-tracing and other studies demonstrate that a significant component of groundwater flow is discrete, occurring in a well integrated network of conduits, caves, and smaller dissolution features (Hauwert et al., 2002a; Hauwert et al., 2002b). Interpreted flow paths from tracer testing generally coincide with troughs in the potentiometric surface and are parallel to the N40E (dominant) and N45W (secondary) fault and fracture trends presented on geologic maps, indicating the structural influence on groundwater flow. Rates of groundwater flow along preferential flow paths, determined from dye tracing, can be as fast as 4 to 7 mi/day under high-flow conditions or about 1 mi/day under low-flow conditions (Hauwert et al., 2002a). Despite the rapid groundwater flow rates within conduits, Kresic (2007) states that, "a disproportionately larger volume of any karst aquifer has relatively low groundwater velocities (laminar flow) through small fissures and rock matrix." Tracer tests have also helped define groundwater basins such as the Cold Springs, Sunset Valley, and Manchaca sub-basins of the Barton Springs aquifer. Traces from 2 features in Onion Creek have demonstrated divergent flow paths that appear to re-converge before discharging at Barton Springs. In one trace, dye injected into Cripple Crawfish Cave on Onion Creek displayed diverging flow paths to Barton and San Marcos Springs (Hunt et al., 2006). This has implications for the groundwater divide separating the Barton Springs and San Antonio segments of the Edwards Aquifer.

Water-Levels and Storage

Water levels in the Edwards Aquifer are very dynamic and heterogeneous. Water levels do not show long-term declines in storage, but generally recover from low to previous high conditions quickly (Smith et al., 2001), typical of many karst systems. Water levels and discharge at the springs respond very quickly to recharge events and then decline at variable rates, influenced by both conduit and matrix permeability and storage (Lindgren et al., 2004; Worthington, 2003). Although most wells show a combined influence of matrix and conduit/fracture flow, a continuum exists with a few wells demonstrating a conduit influence while a few others are influenced more by matrix flow (Hunt et al., 2006). Hovorka et al. (1998) report that the majority of water in storage is within the matrix porosity, and only 5-10% of the water is within conduits.

Pumping

The Barton Springs segment provides water for about 60,000 people and currently has about 7,800 acre-ft/yr (2.5 billion gallons; 11 cfs) of authorized pumping from 94 permit holders. However, in 2007 permitting of the Edwards was effectively capped to 6,100 acre-ft/yr (2.0 billion gallons; 8.5 cfs) under drought conditions (BSEACD, 2007). Groundwater use is characterized as 80% public-supply, 13% industrial (quarry operations), and 7% irrigation (golf courses). The District contains about 1,230 operational wells, with the majority (98%) producing water from the Edwards. Peak pumpage occurs during the summer months (July and August), with up to twice the volume used during that time as during winter months (Hunt et al., 2006).

Trinity Aquifer

The Trinity Aquifer is composed of Cretaceous-age limestones and sandstones that are divided into the Upper, Middle, and Lower Trinity Aquifers. In the BFZ the Edwards Aquifer both overlies and is adjacent to the Trinity Aquifer system. Groundwater quality of the Trinity Aquifer is generally poorer than the Edwards Aquifer containing higher total dissolved solids (TDS) and undesirable constituents such as sulfates. The boundary between fresh and slightly saline (1,000-3,000 mg/l) water is poorly defined for the Trinity Aquifer.

Along the western part of the District, where the Edwards Aquifer is thin, water-supply wells commonly penetrate the lower Edwards units and are completed in the Upper and Middle Trinity aquifers. The Trinity Aquifer supplies water for public-supply and irrigation uses, which amounted to 44.3 million gallons of permitted water in 2005. Many Trinity wells have open-hole, or multiple zone, completion and produce water from the Upper and Middle Trinity Aquifers, with exact water-bearing units difficult to determine.

Upper Trinity Aquifer
The Upper Trinity Aquifer is comprised solely of the Upper Glen Rose Formation. The Upper Glen Rose Formation is composed of 350- to 400-ft thick beds of alternating limestone, dolomite, marl, and shale; gypsum and anhydrite are common. This aquifer satisfies, almost exclusively, domestic and livestock needs with very small (less than 5 gpm) to small (5 to 20 gpm) yields of mineralized water (relative to the Edwards Aquifer) in the Central Texas Hill Country, and within the western portion of the District (DeCook, 1960; Ashworth, 1983; Muller and McCoy, 1987).

Middle Trinity Aquifer
The Middle Trinity Aquifer is composed of (from stratigraphically lowest to highest) the Cow Creek, Hensel, and the Lower Glen Rose Formations. The Cow Creek is a massive, sandy dolomitic limestone. The Hensel is composed of alternating gravel, sand, silt, and shale. The lower Glen Rose Formation is composed of massive fossiliferous limestone and dolomite that grade upward into thin beds of limestone, shale, and marl. The thickness of the Middle Trinity averages about 309 ft (Broun et al., 2007). The Middle Trinity Aquifer yields small to moderate quantities of fresh to moderately saline water (Brune and Duffin, 1983). The Middle Trinity Aquifer in the Hill Country varies from unconfined to confined conditions.

The Lower Trinity
The Lower Trinity Aquifer is separated from the overlying Middle Trinity Aquifer by the Hammett Shale (about 30-60 ft thick). The Lower Trinity Aquifer is composed of the Hosston and overlying Sligo Formations. The Hosston is composed of a conglomerate, sand, siltstone, and shale. The Sligo is composed of limestone and dolomite with local sandy units. The average thickness of the Lower Trinity Aquifer is about 190 ft, however the Lower Trinity Aquifer is rarely fully penetrated and so this may underestimate the thickness (Broun et al., 2007). This aquifer yields small to large amounts of fresh to moderately saline water in the Hill Country (Brune and Duffin, 1983). No wells are known to produce water from the lower Trinity in the District at the time of this report.

POTENTIOMETRIC MAPS

Groundwater flow systems are three-dimensional with lateral and vertical flow components. The lateral and vertical driving force of water in an aquifer at a particular point is hydraulic head, which is the sum of elevation and water pressure divided by the weight density of water (Winter et al., 1999). Hydraulic head is determined by subtracting the measured depth to water from the elevation of the land surface elevation at a well. Water generally flows from high head to low head values, characterizing the flow of an aquifer system (Kresic, 2007).

Lateral flow can be described by determining the hydraulic head in a lateral distribution of wells and contouring lines of equal hydraulic head (or equipotential lines) resulting in a surface referred to as a water table or potentiometric map for unconfined and confined conditions, respectively (Domenico and Schwartz, 1990). This study presents contours of hydraulic head for both confined and unconfined conditions in a single surface, which is referred to as a potentiometric map throughout this report. Potentiometric maps must be attributed to a single aquifer, and this study recognizes, and presents maps for, the Edwards, Upper Trinity, Middle Trinity, and Lower Trinity Aquifer systems.

Vertical flow can be characterized with piezometers (very short screened interval) completed at different depths. Strictly horizontal flow does not exist in aquifer systems (Kresic, 2007). However, at a regional scale it is assumed that significant vertical gradients are absent in the Edwards Aquifer, although this is not likely an accurate assumption at the local scale, especially at recharge or discharge areas. Most wells completed in the Edwards Aquifer are only partially-penetrating in the confined zone and have long screened, or often open hole, intervals. In the unconfined zone, many wells partially penetrate the underlying Upper Trinity Aquifer. Thus, vertical flow cannot be accurately determined within the Edwards Aquifer, although some estimations of vertical flow between the Edwards and Trinity aquifer systems could be made if vertical hydraulic conductivity is known.

Potentiometric maps describe the direction of groundwater flow at a particular moment in time. Additional uses of potentiometric maps, under the right conditions, include calculating (Darcian) flow velocity, gradients, total volumetric flow, or gaining a relative sense of the spatial distribution of transmissivity and hydraulic conductivity. According to Darcy's law, hydraulic gradients can reflect changes in hydraulic conductivity, changes in aquifer thickness, or cross-formational flow (Domenico and Schwartz, 1990; Kresic, 2007).

Influences that impact the hydraulic head and potentiometric surfaces include recharge, discharge (springs and pumping wells), and barometric fluctuations (for confined settings). Observing these influences can lead to a greater understanding of an aquifer system.

Potentiometric Maps in Fractured Karst Aquifers

Potentiometric maps are commonly constructed for karst regions for understanding groundwater flow (see Previous Studies below). However, they should not be used to solely characterize groundwater flow direction or velocity in a karst aquifer. Potentiometric maps should be combined with hydrogeologic mapping and dye trace studies for a more complete understanding of flow within a karst system (Quinlan, 1989; Kresic, 2007). However, as Kresic (2007) points out, "contour maps showing regional flow patterns in karst aquifers may be justified since groundwater flow generally is from recharge areas toward discharge areas and the regional hydraulic gradients will reflect this simple fact." Indeed Quinlan (1989) states that, "it is logical, correct, and conventional to interpret the flow direction of ground water perpendicular to the potentiometric contours and downgradient." Sometimes, however, flow lines appear to be parallel to the contours rather than perpendicular to them, as has been demonstrated in the Edwards Aquifer of Texas (Maclay and Small, 1984; Waterreus and Hammond, 1989). Flow parallel to potentiometric contours has also been documented for the Barton Springs aquifer (Hunt et al., 2006). This type of flow likely reflects two phenomenons: 1) a lack of detailed data in some areas, and 2) refraction of flow due to heterogeneity.

Because flow occurs within fractures, conduits, and the matrix, hydraulic heads may not provide a unique answer to determining flow directions. Hydraulic gradient (head loss/flow distance) is very sensitive to the diameter of fractures and conduits. Conduits have much lower gradients and heads than in the surrounding matrix, therefore flow is convergent to conduits (or divergent depending on aquifer conditions). Convergent flow within karst aquifers are a common attribute and has been well documented in the Edwards Aquifer by the dye tracing work of Hauwert et al. (2002). Depending on the hydrologic conditions, conduits can reverse local gradients and flow directions. This has also been observed in the Barton Springs aquifer (Hunt et al., 2006). During periods of rapid recharge the aquifer can behave similar to bank storage phenomenon in rising surface rivers (Palmer, 2004). Rapid flow through conduits can have an impact on hydraulic head measurements of wells completed in or near such a conduit. "The hydraulic head may go up or down along the same conduit as the cross-sectional area increases or decreases, respectively" (Kresic, 2007).

Previous Studies

Numerous potentiometric maps have been constructed for the study area (Table 1). Only maps with relatively dense data are included within Table 1. In addition to these maps, a recent publication by the Edwards Aquifer Authority (Hamilton et al., 2006) presents maps from the San Antonio segment of the Edwards Aquifer that extend into the Barton Springs segment, but with relatively sparse data.

Table 1. Previously Published Potentiometric Maps

Potentiometric Map Date	# Wells	Barton Springs Mo Avg Flow (cfs)	Data Source	Comments
1956 - Drought of 1956	27	16 - 11	Slade et al., 1986	
1956 - August	24	11	DeCook, 1963	Map between Buda and San Marcos
1956 - Drought of record*	56	11	Smith and Hunt, 2004	Composite drought of record map; used for sustainable yield evaluations
1978 - Spring	41	55-113	Brune and Duffin, 1983	Travis County only
1978 - August	71	22	Senger and Kreitler, 1984; Slade et al., 1986	
1979 - June	18	106	Slade et al., 1986	
1979 & 1981 - June	26	106, 81	Senger and Kreitler, 1984	Composite high flow map
1981 - January	64	49	Slade et al., 1986; Baker et al., 1986	
1993 - July	17	95	Hauwert and Vickers, 1994; Hauwert et al., 2004	Detailed map of the Sunset Valley Area
1993 - March	32	106	Hauwert and Vickers, 1994	
1994 - August & September	42	33-28	Guyton EAA Report 95-01	Study of southern groundwater divide

Table 1. Previously Published Potentiometric Maps

Potentiometric Map Date	# Wells	Barton Springs Mo Avg Flow (cfs)	Data Source	Comments
1994 - January & Febuary	61	52-50	Guyton EAA Report 95-01	Study of southern groundwater divide
1994 - March	31	48	Hauwert and Vickers, 1994	Water quality study
1996 - August through November	67	22-31	Hauwert et al., 2004	Dye Trace Study
1996 - May through November	65	21-31	BSEACD, 1997	Alternative Regional Water Supply Plan
1997 - July through September	9	112-93	Hauwert et al., 2004	Dye Trace Study, Travis County only
1999 - July & August*	99	65-55	Scanlon et al., 2001; Smith et al., 2001	Used to calibrate GAM
1999 - March through June	95	90-69	Hauwert et al., 2004	Dye Trace study
2000 - June & July	105	49-38	Hauwert et al., 2004	Dye Trace study
2001 - June & July*	141	96-88	Smith et al., 2001	EPA-funded grant

*Indicates figure within the report and data provided in appendix

METHODS

The maps presented in this report were constructed from a relatively high density of wells for the study area, greater than one well per square mile. Water-level measurements were collected with either manual measurements or with automated recorders. Manual measurements were most often made with a calibrated electric tape (eline) or, less commonly, a steel tape. Notes were made as to whether the depth-to-water measurements were varying over time, or other factors such as pumping were observed. Automated instruments include pressure transducers with data loggers. Manual measurements are generally accurate to within ±0.1 feet.

Data Compilation, Validation, and Quality Assurance

A systematic quality-assurance review was conducted for this report and data. Data were entered from field sheets into the District's well database. The database was then queried for specific time periods, well construction, and aquifer information. Locations and elevations of LSD data were cross-checked with published topographic maps. Anomalous data were carefully reviewed. Some data were omitted from the datasets if suspected of significant influence from pumping or other errors. Many wells within the Edwards Aquifer, generally the unconfined area, partially penetrate the Trinity Aquifer and have lower heads than surrounding Edwards Wells (BSEACD, 2004). Data was not used in the Edwards potentiometric maps from wells that significantly penetrate the Trinity Aquifer.

For the construction of Trinity potentiometric maps careful examination of well construction is needed. Many wells reported as completed within the Trinity Aquifer are often hybrid completions of the Upper, Middle, and Lower Trinity aquifers. Trinity wells were carefully reviewed and omitted from the datasets if they were deemed to have hybrid completions.

Contouring

All water-level data were grided and then contoured using a linear interpolation algorithm by Golden Software SURFER. The computer-generated contours were then manually reinterpreted to account for hydrogeologic boundaries and experience of the authors. Data were gridded and contoured as a single system to include unconfined and confined settings.

Datums and Coordinates

Water-level measurements are made in reference to a measurement point (MP) at the well head. Commonly, the MP corresponds to the top of casing (TOC). The MP or TOC measurement is subtracted from the depth-to-water measurement to reflect a depth from the land surface datum (LSD). LSD is generally defined as the top of the concrete slab around the casing, or from ground level. All depth to water measurements are from the LSD (in feet). Elevations for LSDs are in feet above mean sea level obtained from USGS topographic maps (10-ft contours), City of Austin topographic maps (2-ft contours), or from surveys. Vertical datums from those maps are either North American Vertical Datum 1929 (NAVD29) or North American Vertical Datum 1988 (NAVD88). Horizontal coordinates are in latitude and longitude. Many of the horizontal coordinates were collected with a Global Positioning System (GPS), or by locating the well on a USGS topographic map, and by survey. Horizontal datums are in World Geodetic System 1984 (WGS84) or North American Datum 1983 (NAD83).

RESULTS

Tables 2 and 3 list previously unpublished potentiometric maps presented in this study. Figure 2 illustrates the hydrologic conditions of the aquifer based on discharge at Barton Springs during each of the synoptic periods discussed in this report. Potentiometric maps are presented in Figures 3 through 9. Comparisons between these potentiometric maps are included in Figures 10-through 13. Appendix A contains a tabulation of all the data.

Table 2: List of Edwards potentiometric maps in the study.

Figure	Date	# wells	Barton Springs Discharge (cfs)	Comments
Figure 4	2002 - February	172	105-103 (High)	
Figure 5	2002 - November	93	91-98 (High)	Southern divide focused study
Figure 7	2005 - October & November	231	50 to 43 (Below Average)	
Figure 9	2006 - July & August	166	26 to 22 (Low)	

Table 3: List of Trinity potentiometric maps in this study.

Figure	Aquifer	Date	# wells	Hydrologic conditions at Barton Springs
Figure 15	Lower Trinity	2002 - February	5	Below average
Figure 16	Middle Trinity	2005 - October & November	6	Below average
Figure 18	Upper Trinity	2002 - February	7	High flow

General Flow Observations for the Barton Springs aquifer

Potentiometric maps in this study indicate flow from the west to the east in the unconfined zone under steep gradients. Groundwater then moves northeast toward Barton Springs within a broad trough and with lower gradients as groundwater approaches confined conditions. The major source for water along the eastern and confined zones appears to be the southwestern area around Onion Creek and potentially from the saline zone.

Edwards Aquifer High Flow Conditions

Figures 3, 4, and 5 are potentiometric maps representing high flow conditions. Potentiometric troughs along preferential flow paths are pronounced as broad features that extend from San Marcos and Barton Springs. The troughs in the Barton Springs aquifer appear to occur along the west side of the confined boundary (Figures 3 and 4). However, a trough within the confined zone extends along the eastern side of the aquifer from San Marcos Springs north toward the City of Kyle (Figures 3 and 4). Significant mounding due to recharge along Onion Creek is evident in the potentiometric surface during high-flow conditions. For example, Figure 5 shows significant mounding around Antioch Cave. Depressions in the potentiometric surface are evident around pumping centers such as the City of Kyle (Figure 4).

Edwards Aquifer Average Flow Conditions

Figures 6 and 7 are potentiometric maps representing average and below average flow conditions. Compared to high-flow conditions, potentiometric troughs located in the northern portion of the study area become narrower, with steeper gradients, as recharge and flow decrease. In addition, these troughs in the potentiometric surface appear to develop in the confined portion of the aquifer. The trough extending northeast from San Marcos Springs becomes more pronounced compared to high-flow conditions, although these could be enhanced by pumping. Minor depressions in the potentiometric surface are also evident around pumping centers such as the City of Kyle (Figure 7).

Edwards Aquifer Low Flow (Drought) Conditions

Figures 8 and 9 are potentiometric maps representing low flow, or drought, conditions. Figure 8 is the drought of record map from Smith and Hunt (2004) and is a composite map (not truly synoptic) with less data when compared to Figure 9. In Figure 9 troughs in the potentiometric surface are very pronounced with steep gradients. Multiple troughs begin to develop as seen in the 500-ft contour. In addition, troughs develop along known preferential flow paths (conduits) documented by dye tracing, such as the one originating at Antioch Cave (Figure 9). Significant troughs in the potentiometric surface appear to develop in the confined portion of the northern study area.

Edwards Aquifer Potentiometric Map Comparison

Figure 10 is a comparison of the 600-ft contour from the potentiometric maps spanning low to high flow conditions. Significant fluctuation and change of shape in the potentiometric contours occurs from high to low flow conditions. The majority of flow within the boundaries of the Barton Springs aquifer appears to flow toward Barton Springs. However, potentiometric surfaces indicate a southern flow component toward San Marcos Springs at above average flow conditions (> 50 cfs at Barton Springs).

Figure 11 illustrates the change of confined to unconfined conditions through each of the synoptic events. Significant changes in the boundary occur within the middle portion of the study area, particularly between Onion and Slaughter Creeks. Changes in this boundary are much more subdued along the southern groundwater divide and near the spring outlets.

Figure 12 illustrates the change in head from low to high flow conditions. More than 100 ft of head fluctuation occurs from high to low flow conditions along potentiometric troughs in the middle portion of the aquifer. The trend in this area is also coincident with northeast-trending faulting (Figure 13), and in the boundary of confined/unconfined conditions. Minor changes in head occur near the springs and the vicinity of the southern groundwater divide. Major preferential flow paths, inferred from dye tracing (Figure 14), coincide with the western margin of the area of greatest head change. Significant amount of head change occurs along the saline-zone boundary and within the saline zone as well. Thus, the fresh-water zone appears to be in hydraulic communication with the saline-water zone.

Trinity Potentiometric Maps and Edwards-Trinity Connection

Figure 15 illustrates a synoptic event of the Lower Trinity Aquifer relative to the Edwards during high flow conditions. The flow potential is from the Edwards to the Lower Trinity in the western portion of the study area. On the basis of data from other time periods, this relationship appears to persist from low to high flow conditions.

Figure 16 illustrates a synoptic event of the Middle Trinity Aquifer relative to the Edwards during average flow conditions. The flow potential is from the Edwards to the middle Trinity in the western portion of the study area. On the basis of data from other time periods, this relationship appears to persist from low to high flow conditions. Figure 17 is a hydrograph illustrating the Edwards and Middle Trinity water levels over time. A shallow Edwards well (~180 ft deep) was drilled adjacent to a Middle Trinity well (~1000 ft deep) in 2003, effectively creating a nested well pair. Data indicate the potential for flow is downward from the Edwards to the Middle Trinity Aquifer for the period of record in the unconfined portion of the Edwards Aquifer (Figure 17). Trinity water levels do not respond to some recharge events that affect Edwards levels. At other times the response to recharge in the Trinity is out of phase with the Edwards levels.

Figure 18 illustrates a synoptic event of the Upper Trinity Aquifer relative to the Edwards. Potential for flow is generally downward from the Edwards to the Upper Trinity Aquifer under high flow conditions. This condition persists from high to low flow conditions. Water levels of the Edwards and Upper Trinity are very similar in elevation along the western fringe of the Edwards Aquifer (see 800 ft contour, Figure 18), suggesting good hydraulic communication in this area.

Cross Sections

Figures 19 through 21 are geologic cross sections with synoptic water-level data superimposed. Most cross sections show relatively consistent water-level changes from high to low flow conditions, with smaller changes along the western portion of the Edwards Aquifer. However, cross section C to C’ through the area with the greatest head change, reveals a trough formed under low flow conditions, and a mound formed under high-flow conditions.

Heads from the Trinity Aquifer are also displayed, where available, on the cross section. These data support a flow potential from the Edwards toward the various Trinity aquifers in the western portion of the study area.

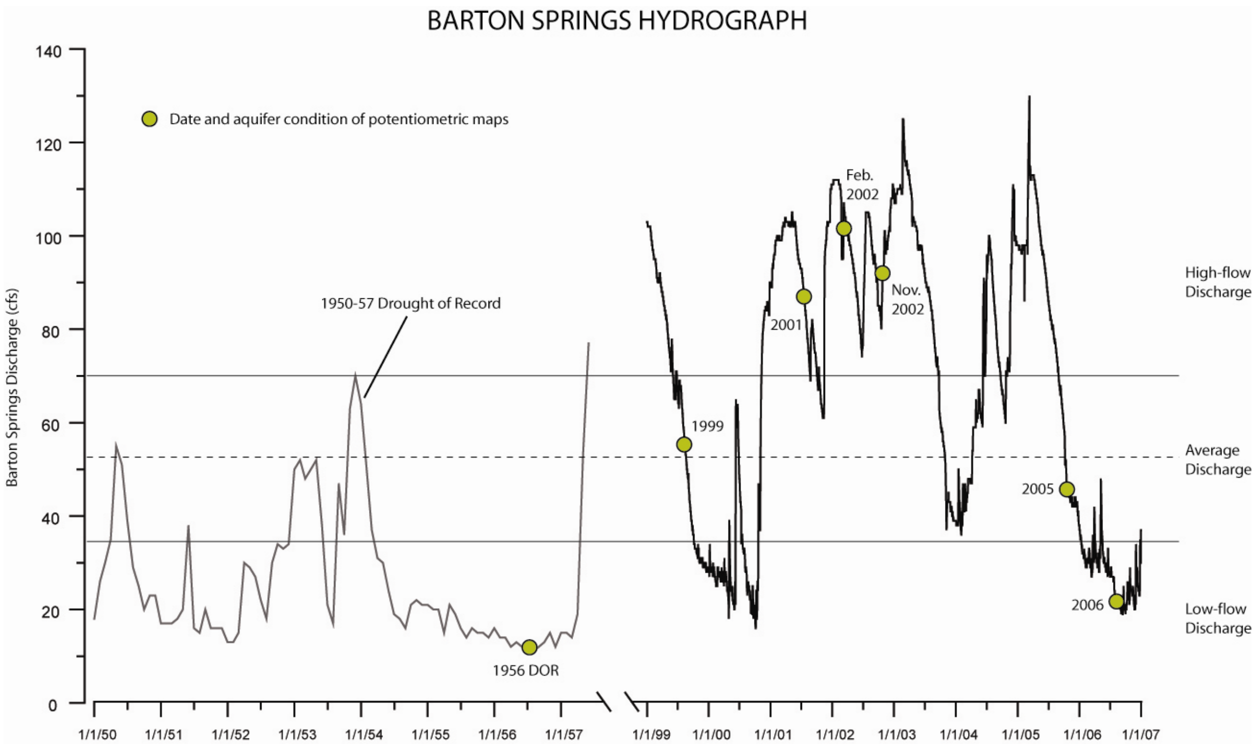


Figure 2: Barton Springs hydrograph denoting dates of synoptic events and relative aquifer conditions. Note the axis break between 1957 and 1999. Solid lines denote 25th and 75th percentiles for the period of record.

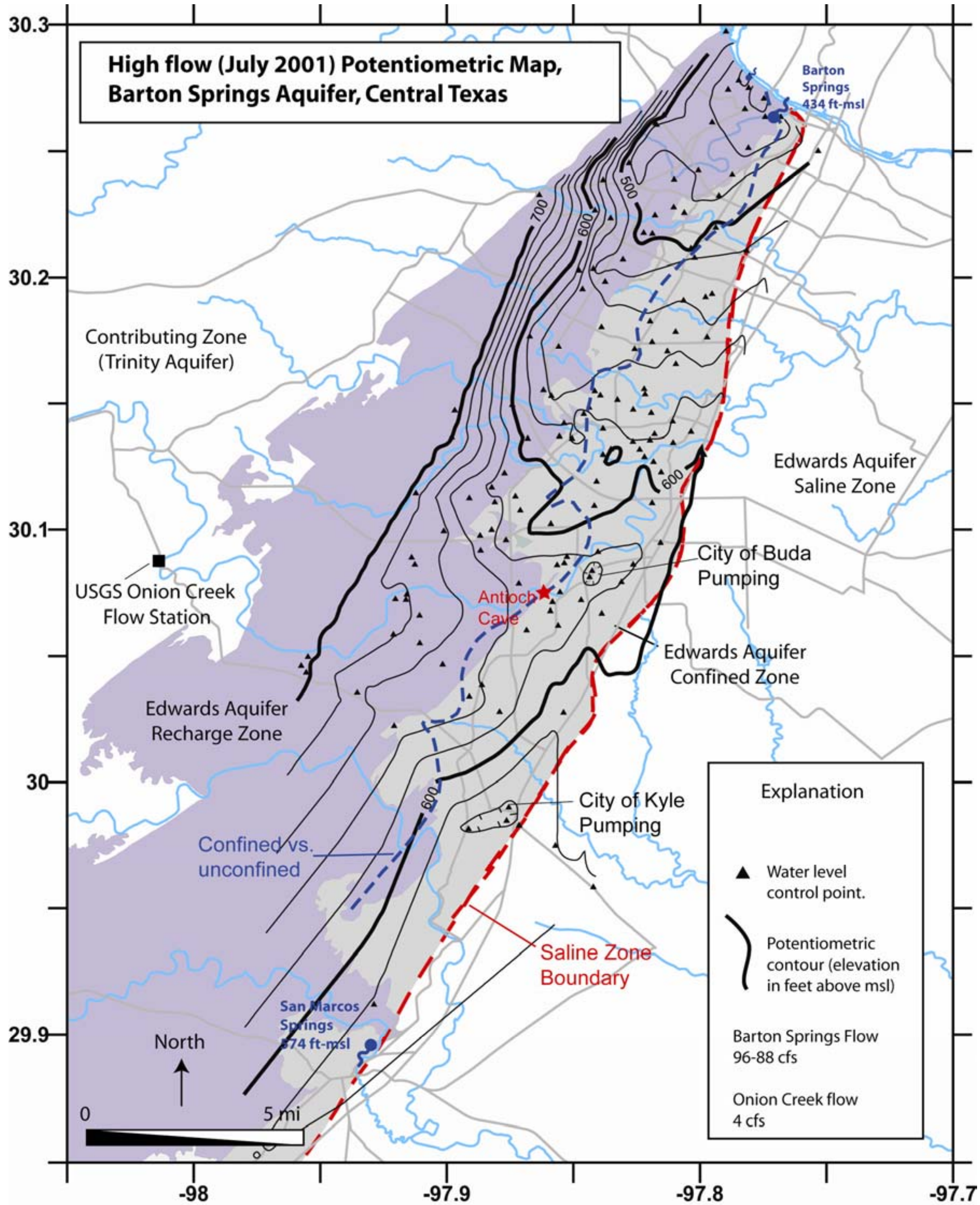


Figure 3: July 2001 potentiometric map under high flow conditions. This map was modified from Smith et al. (2001).

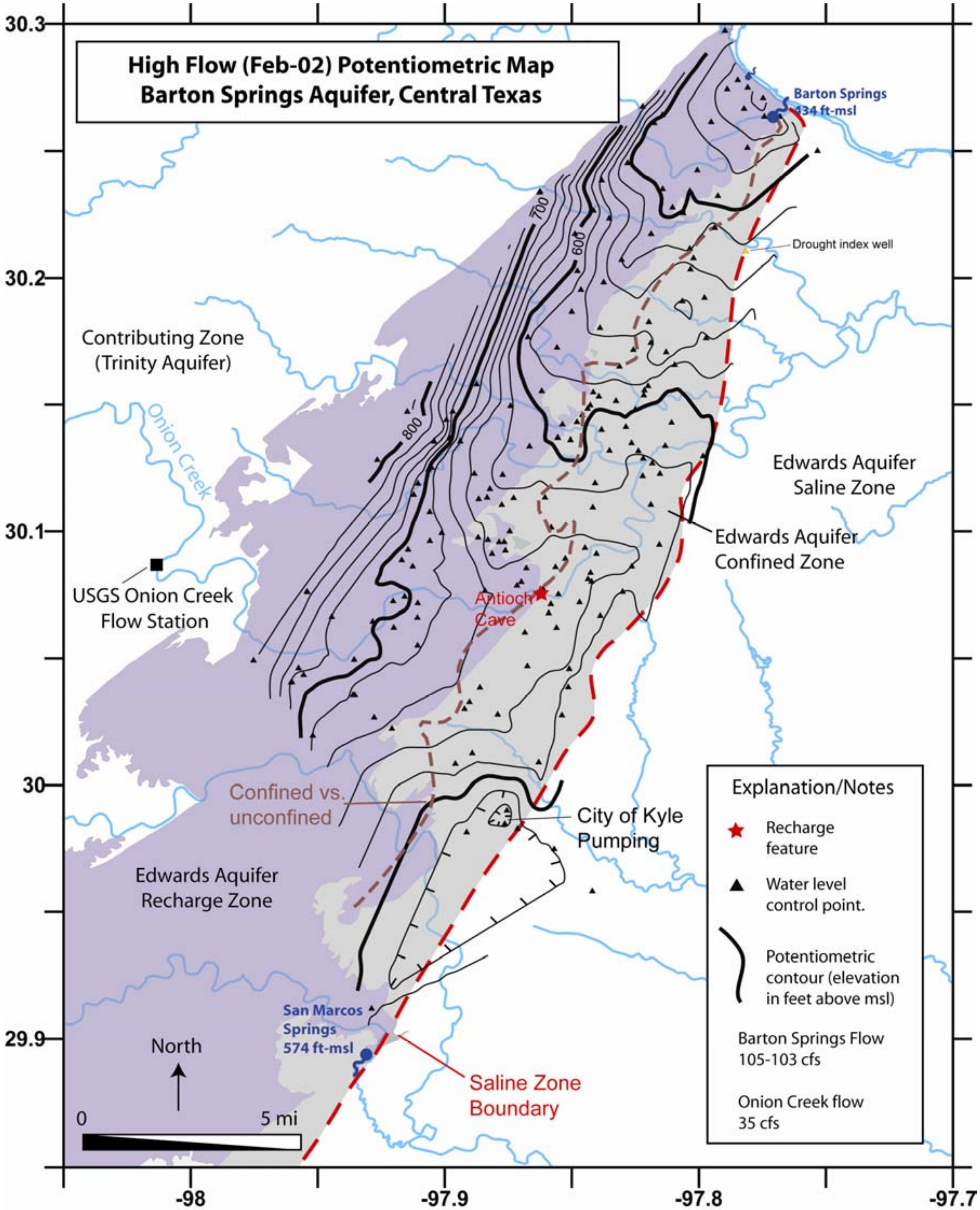


Figure 4: February 2002 potentiometric map under high flow conditions.

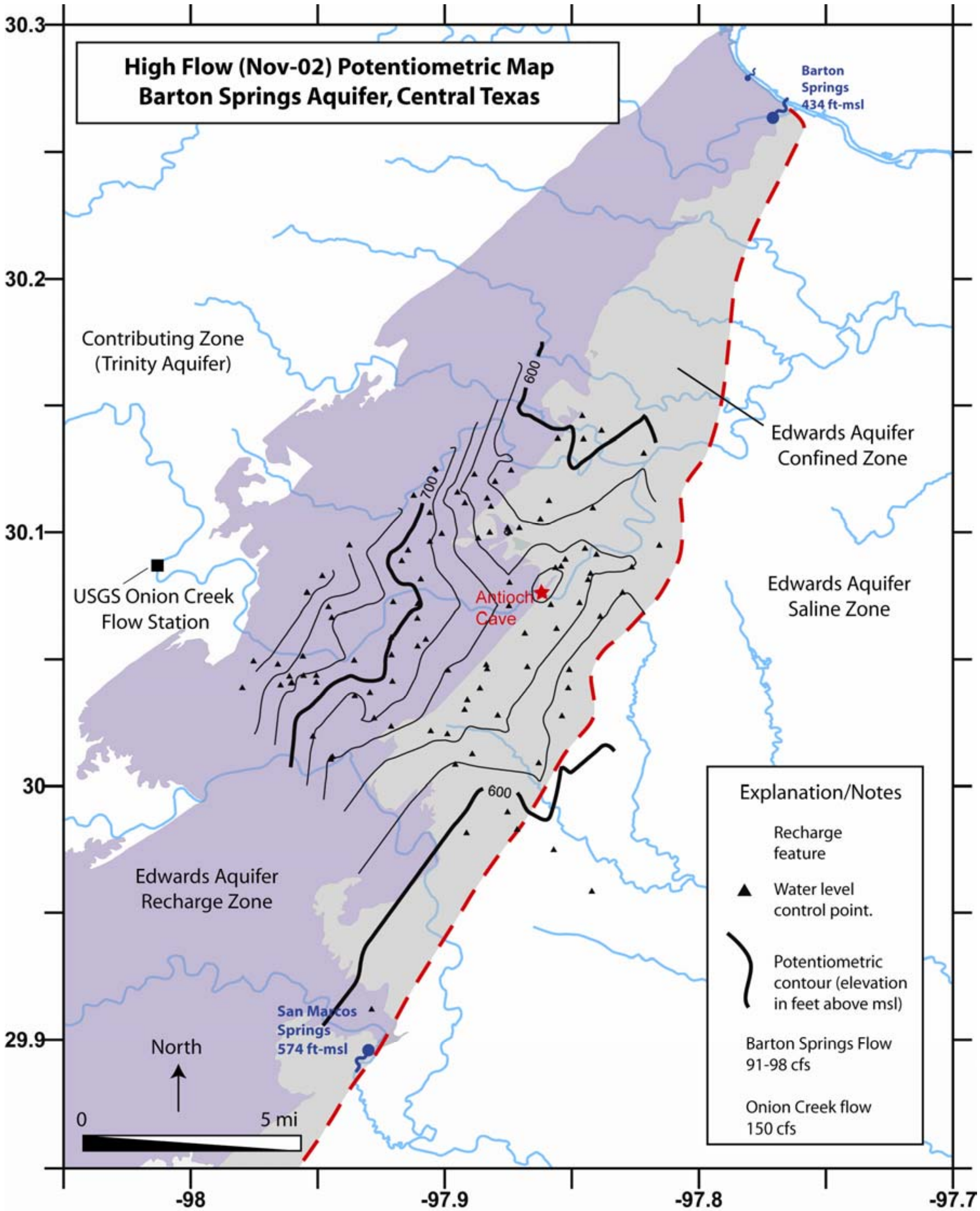


Figure 5: November 2002 potentiometric map of southern groundwater divide under high flow conditions.

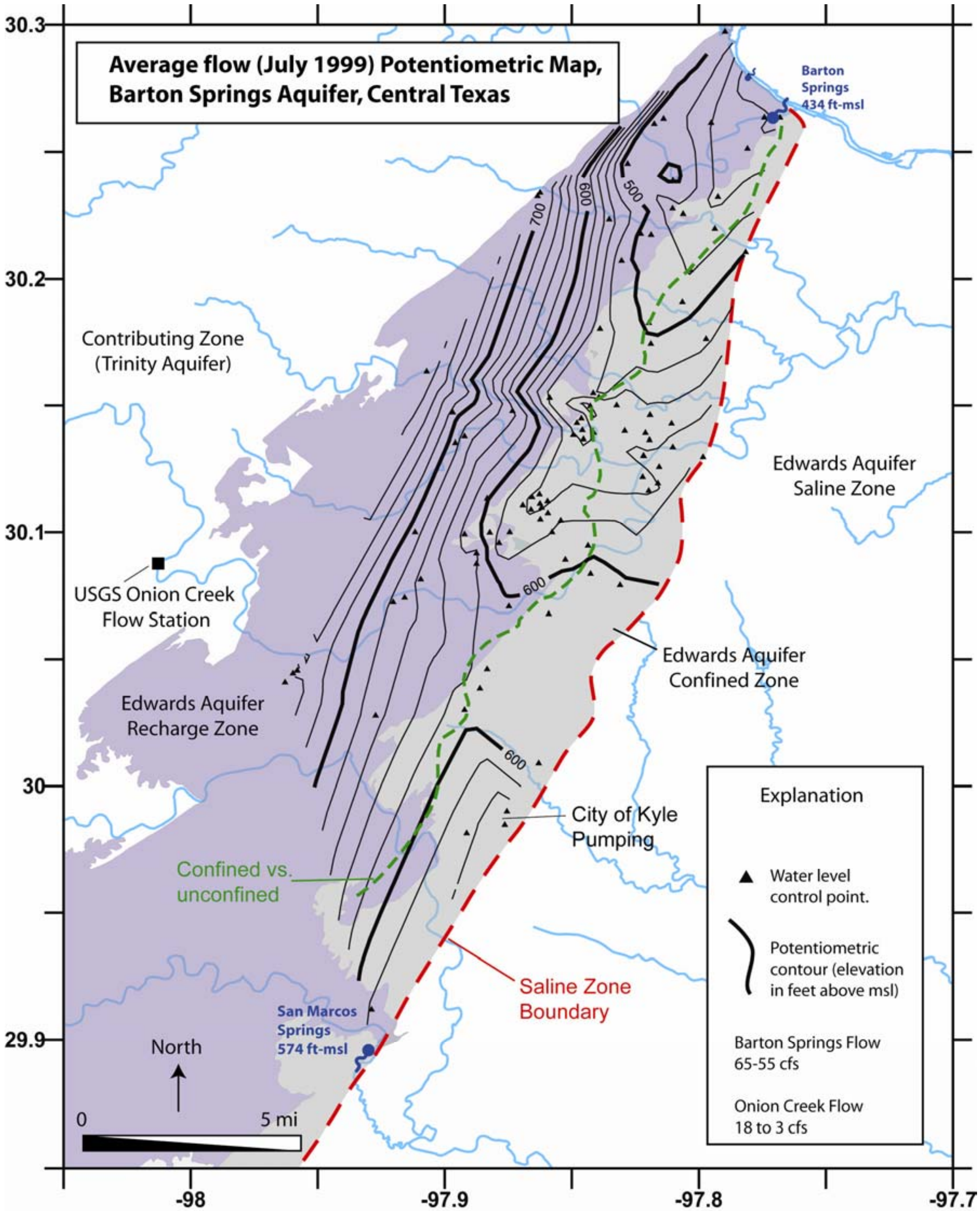


Figure 6: July and August 1999 potentiometric map under average flow conditions.

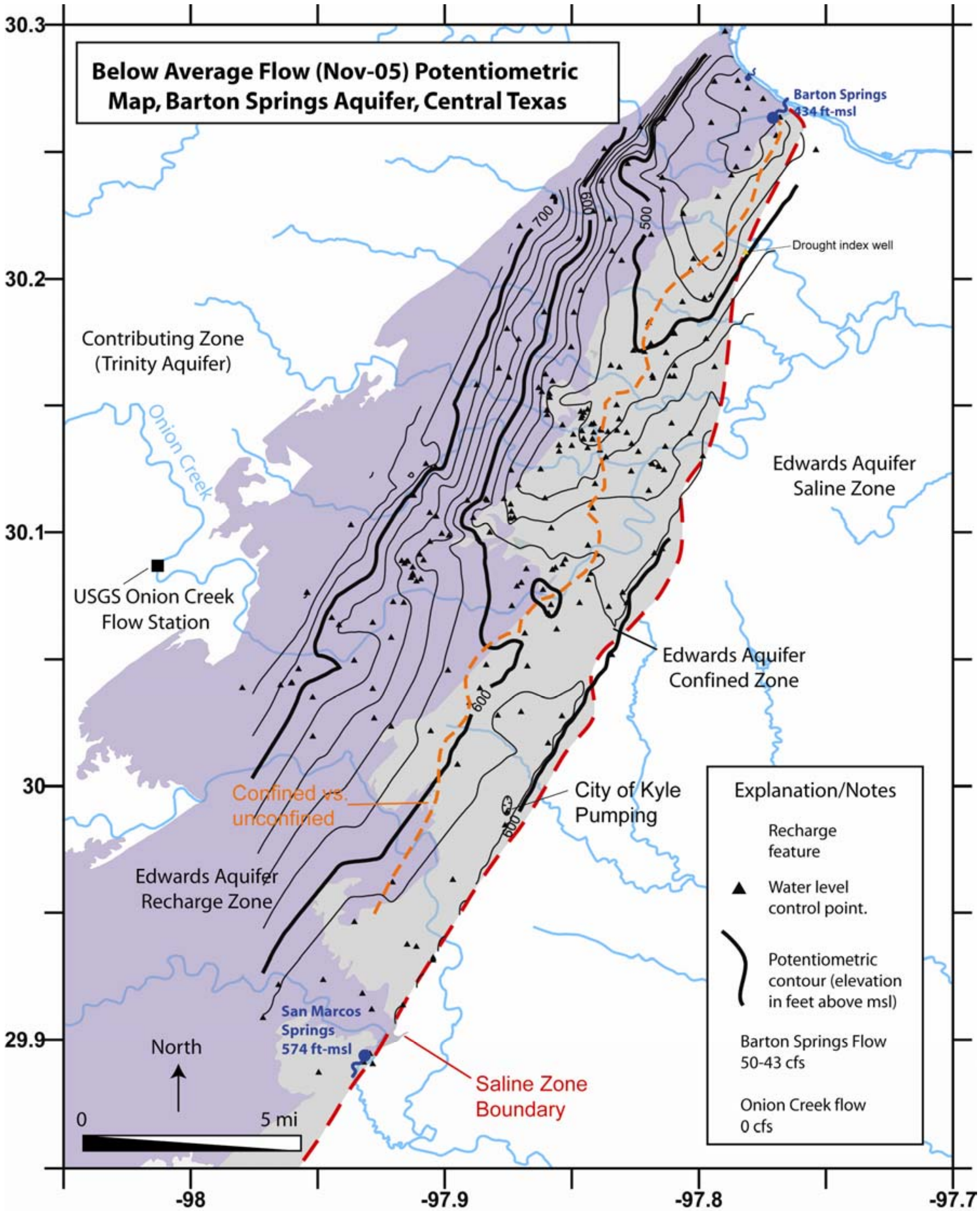


Figure 7: October and November 2005 potentiometric map under below average conditions.

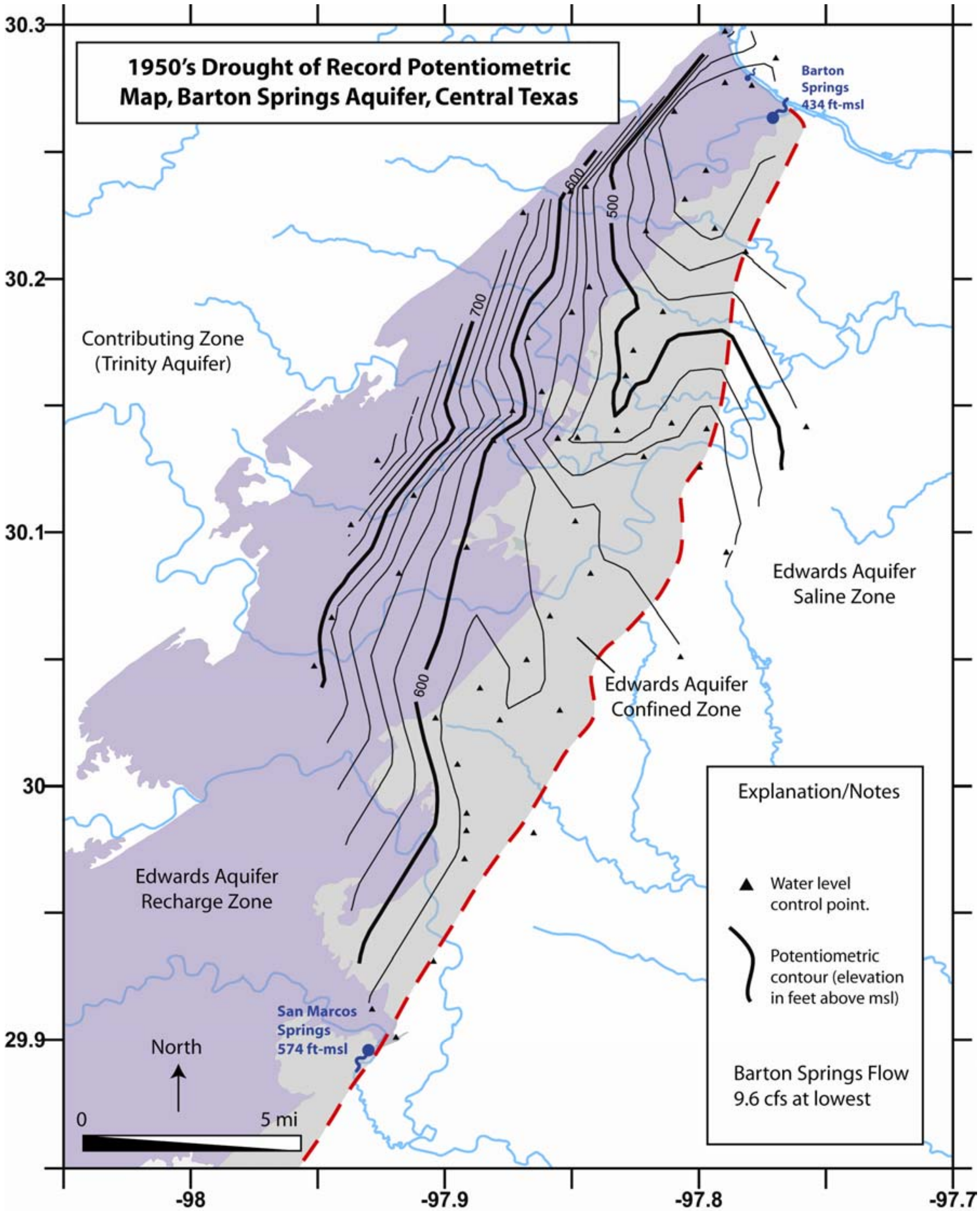


Figure 8: 1950's potentiometric map under drought of record conditions. This map was modified from Smith and Hunt (2004). Onion Creek flow was not gauged during this time but is inferred to have been dry.

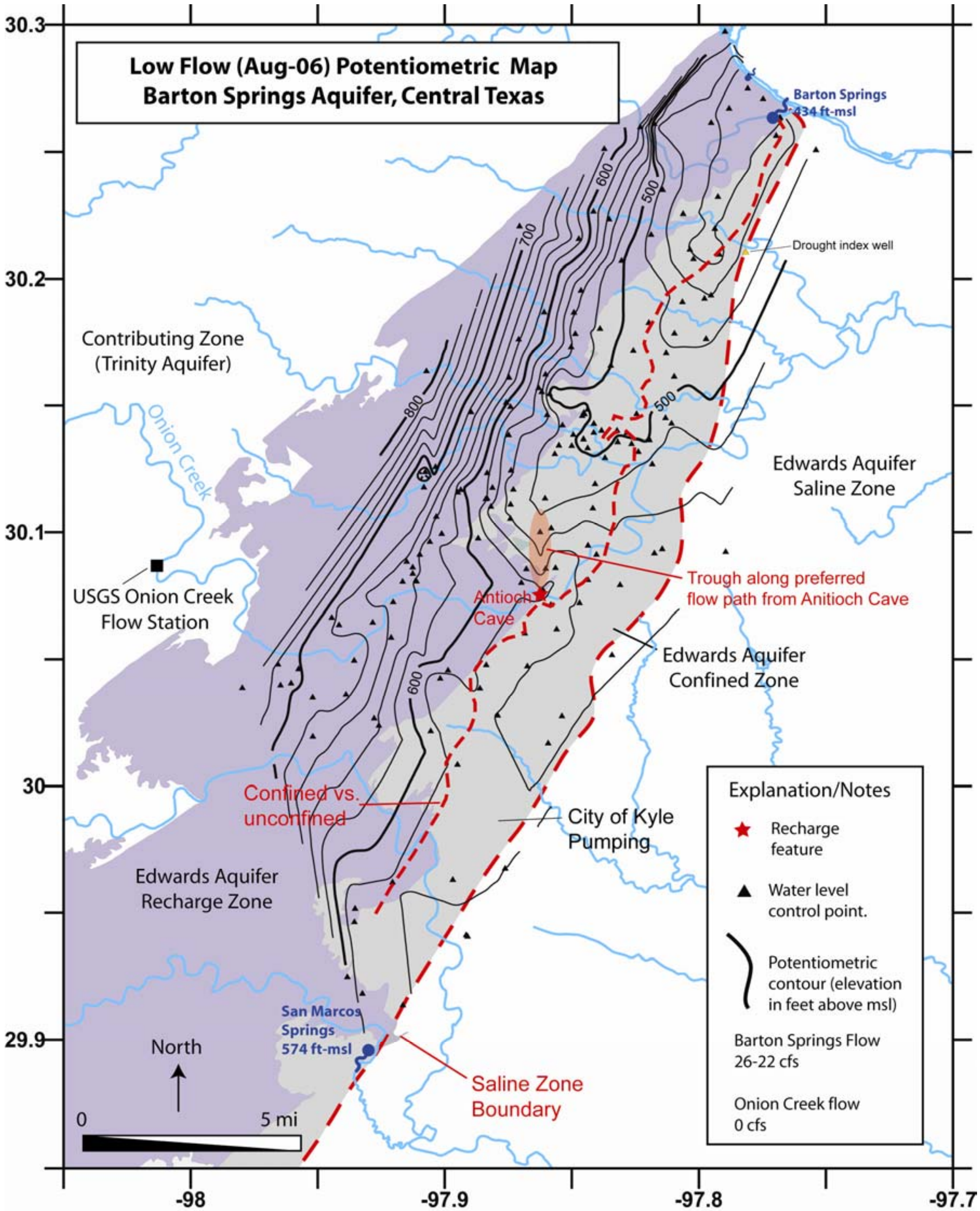


Figure 9: July and August 2006 potentiometric map under low flow, or drought, conditions.

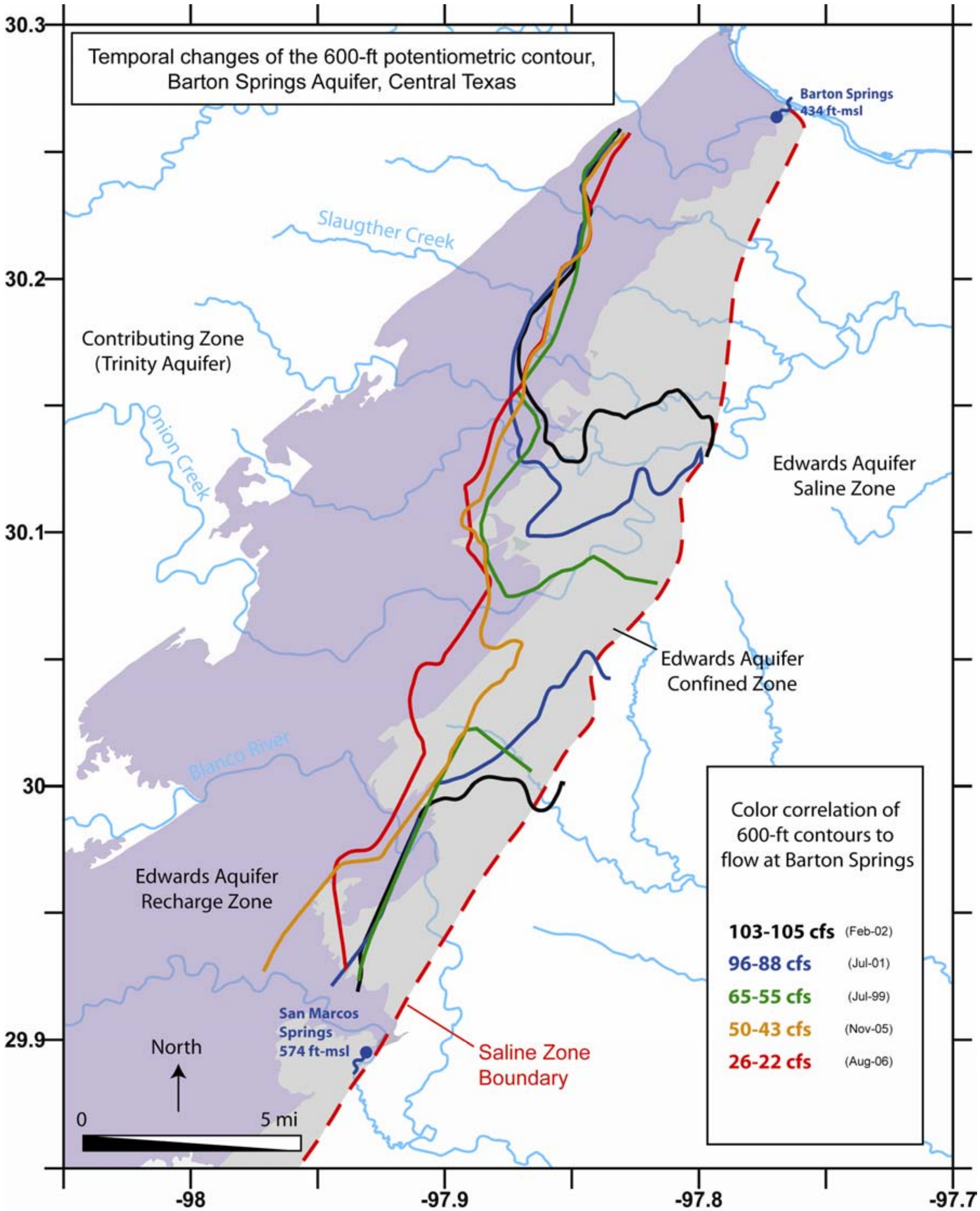


Figure 10: Comparison of 600-ft potentiometric map contours spanning low to high flow conditions.

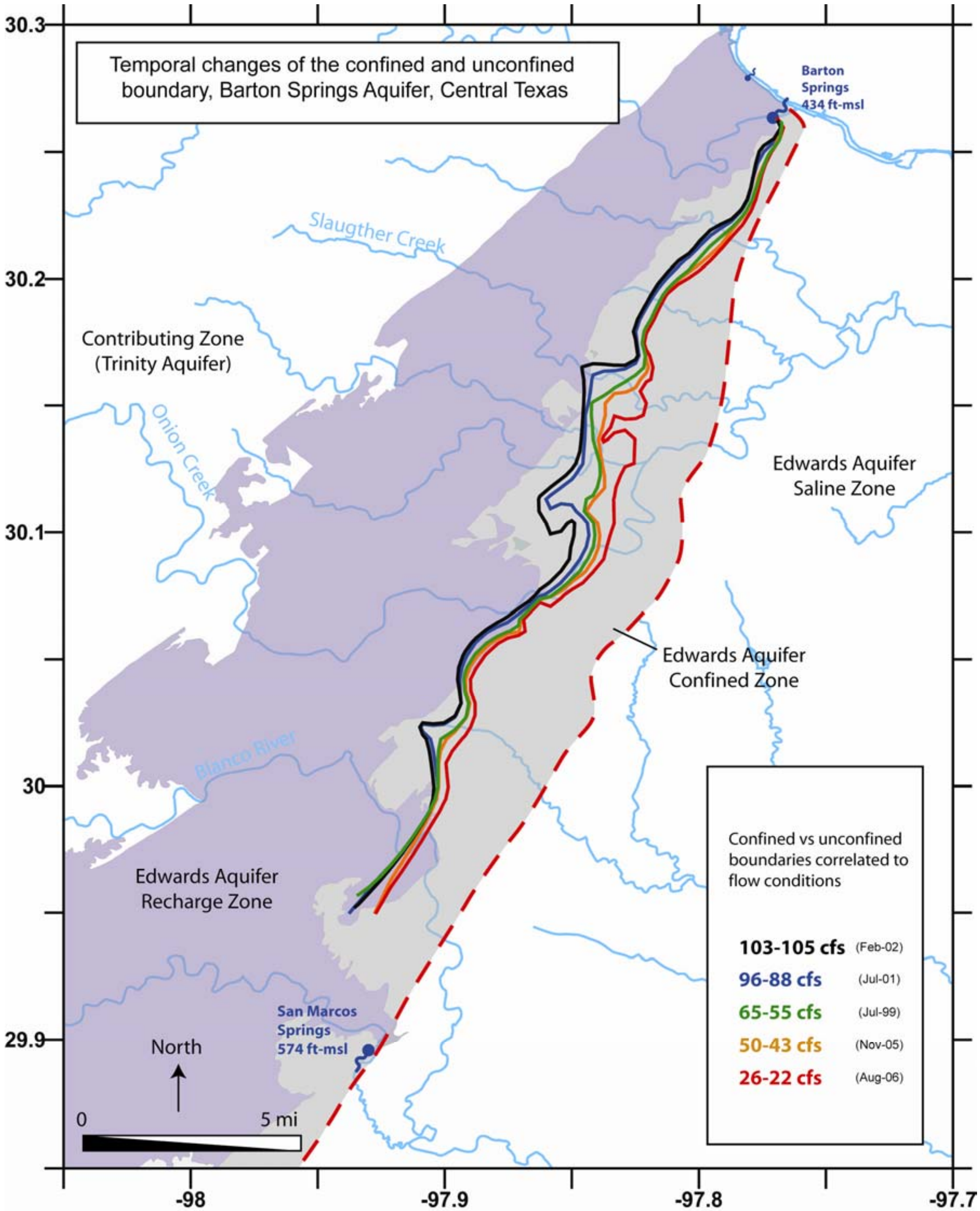


Figure 11: Map illustrating the change of confined to unconfined conditions under varying aquifer conditions.

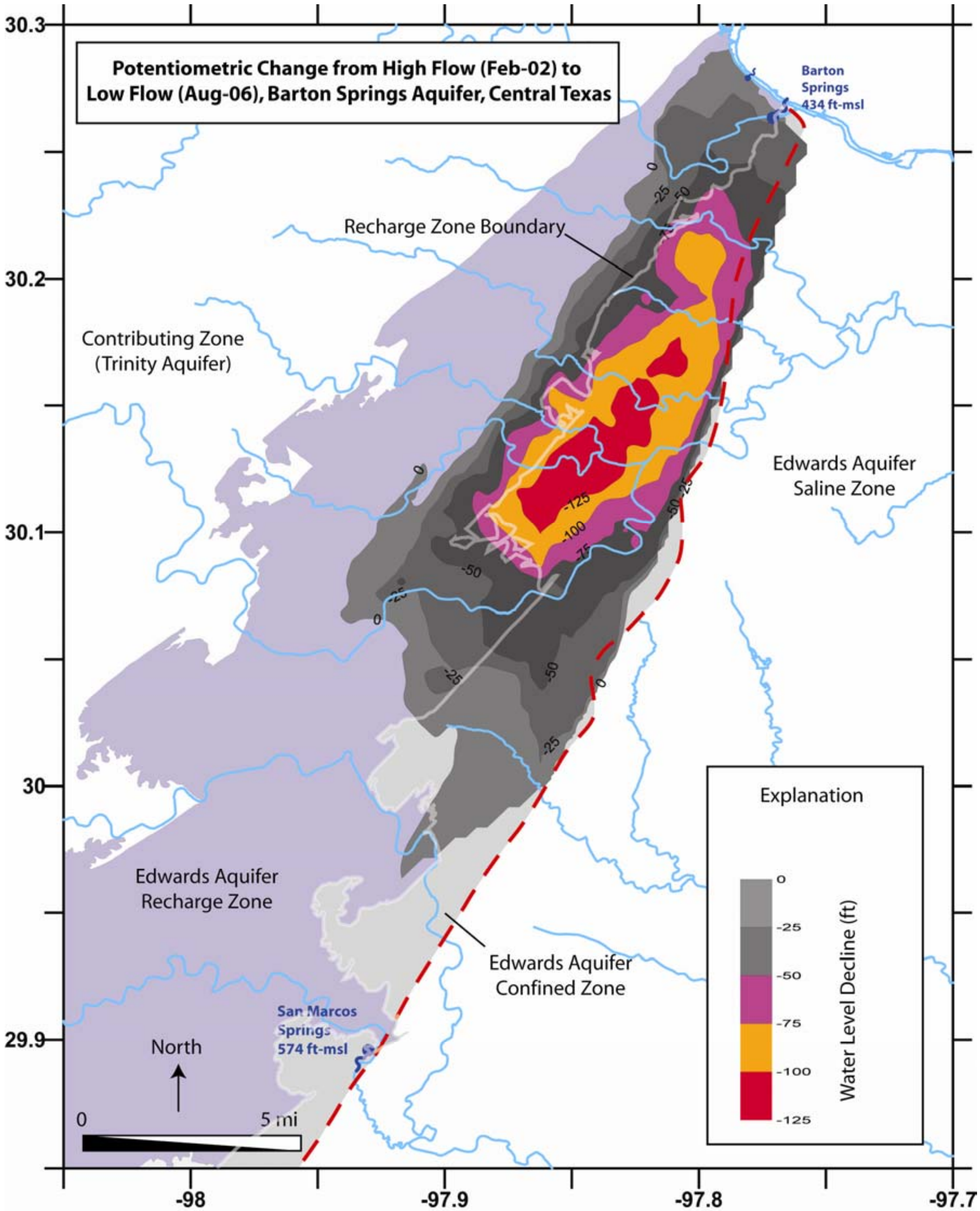


Figure 12: Map illustrating the change in head from low flow to high flow aquifer conditions.

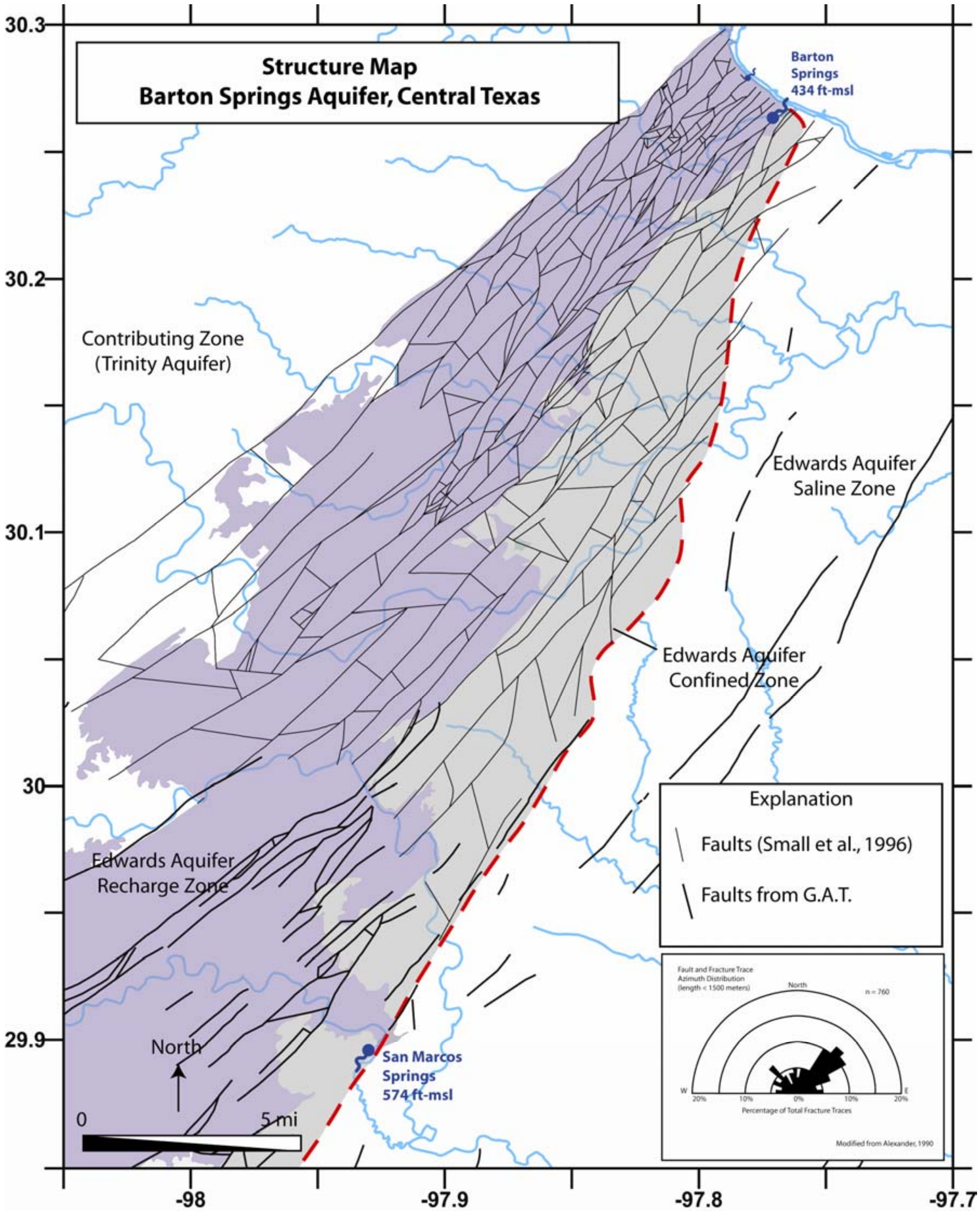


Figure 13. Map of faults in the Edwards Aquifer. Note the Rose Diagram from Alexander (1990) indicating a strong NE structural grain. Source of faults from Small et al. (1996) and the G.A.T. (Geologic Atlas of Texas).

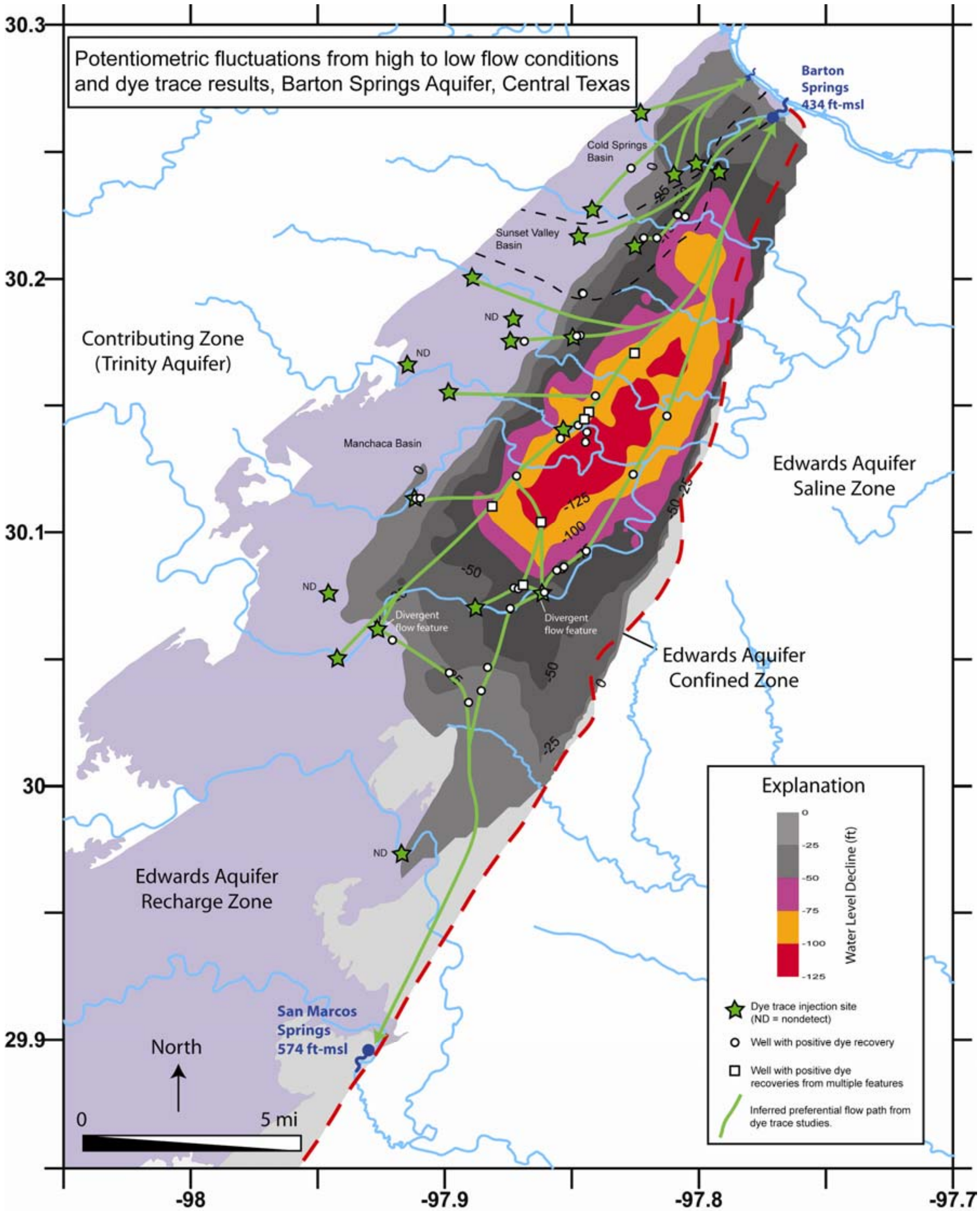


Figure 14: Map illustrating the change in head from low flow to high flow aquifer conditions and dye trace results. Dye trace results summarized from Hauwert et al., 2002 and Hunt et al., 2006.

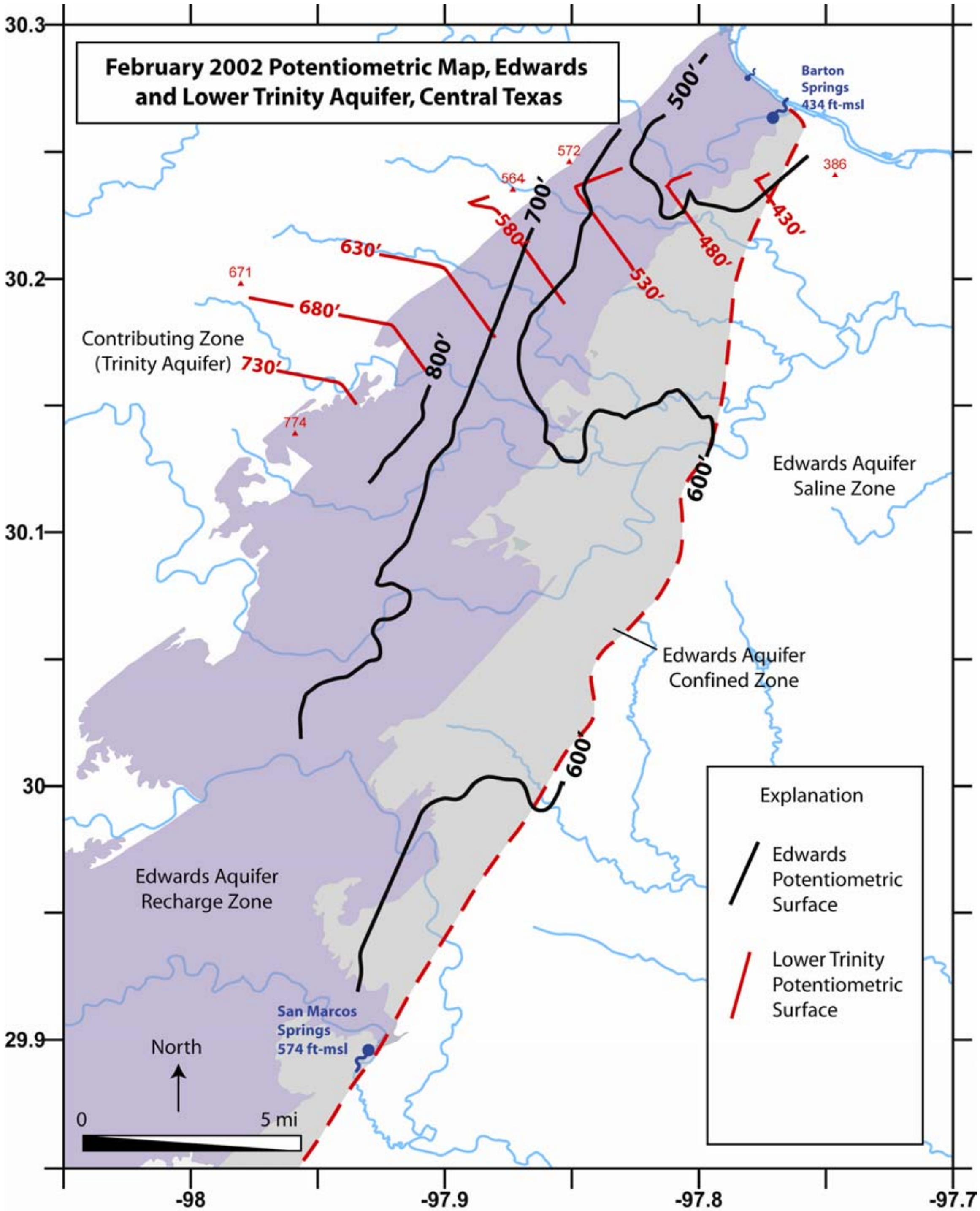


Figure 15: Composite Edwards and Lower Trinity potentiometric map, February 2002.

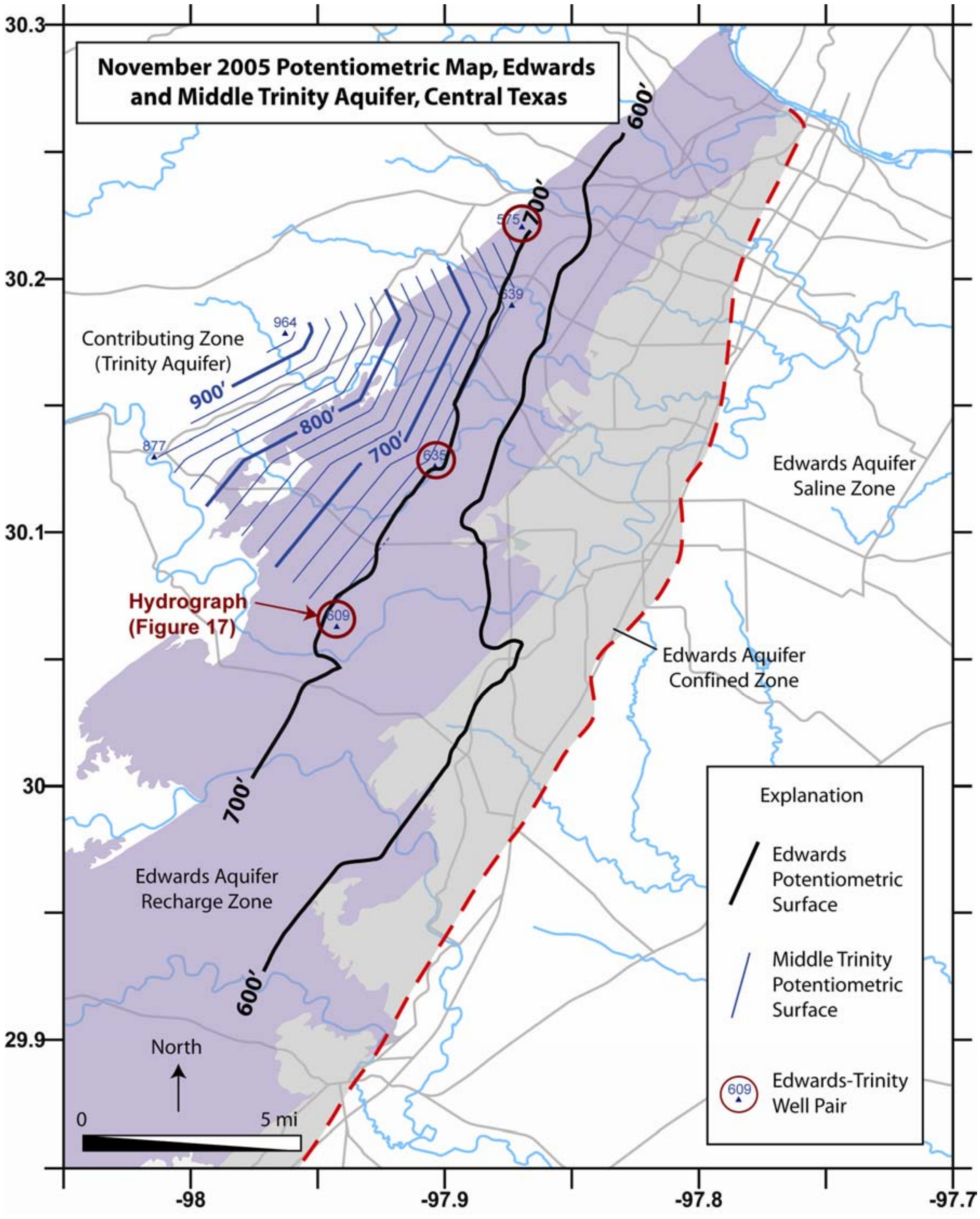


Figure 16: Composite Edwards and Middle Trinity potentiometric map.

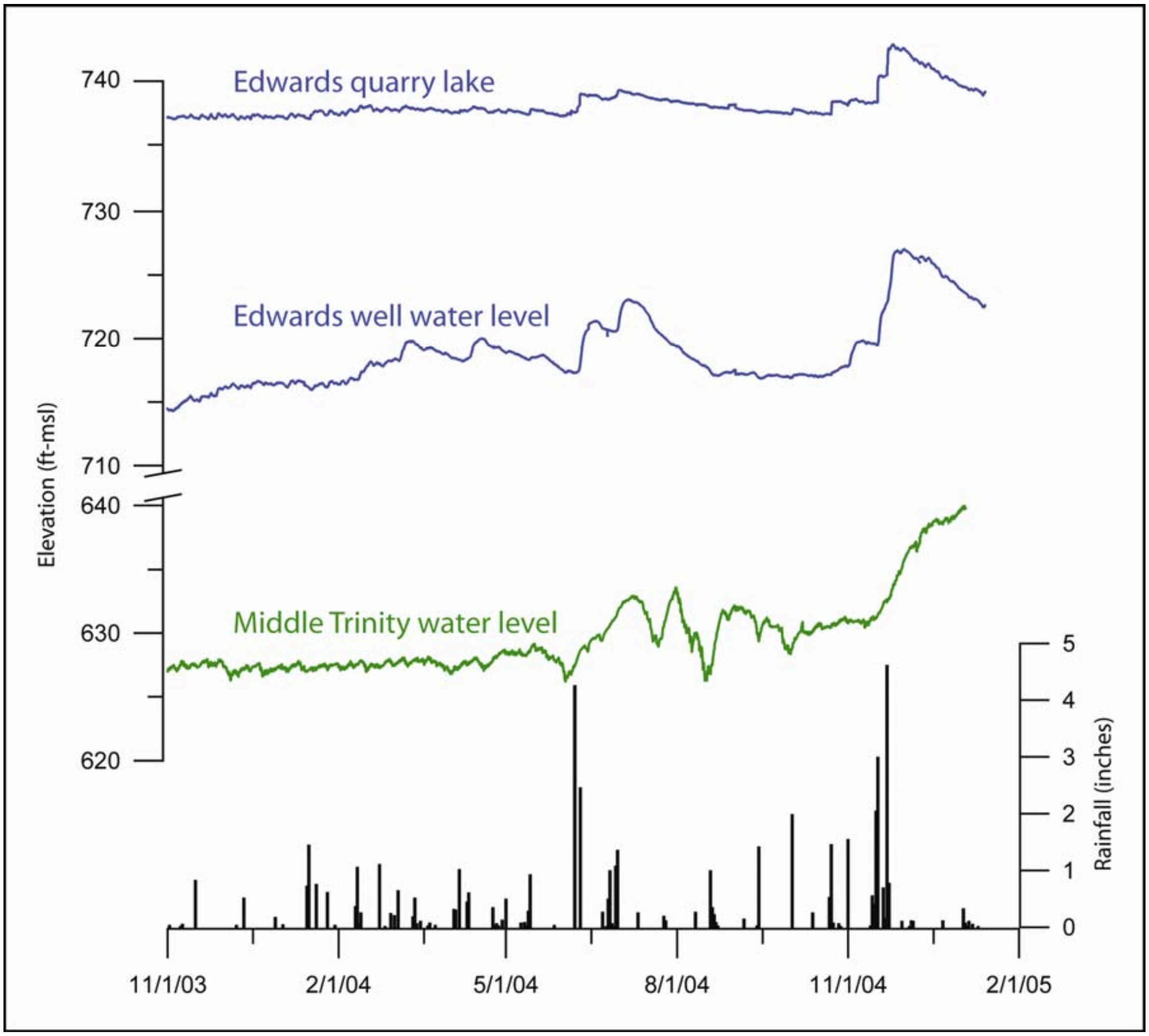


Figure 17: Edwards-Trinity hydrograph from the Wentzel (Borheim) Quarry, located in the Edwards Aquifer recharge zone in Hays County. The quarry lake is located very close to the Edwards well. Similar hydrologic responses between the well and quarry lake suggest that the lake represents the water table of the aquifer. The Middle Trinity well is located adjacent to the Edwards well. Data indicate the potential for flow is downward from the Edwards to the Middle Trinity Aquifer for the period of record in the unconfined portion of the Edwards Aquifer. Water levels in the Trinity well appear to be influenced by localized pumping.

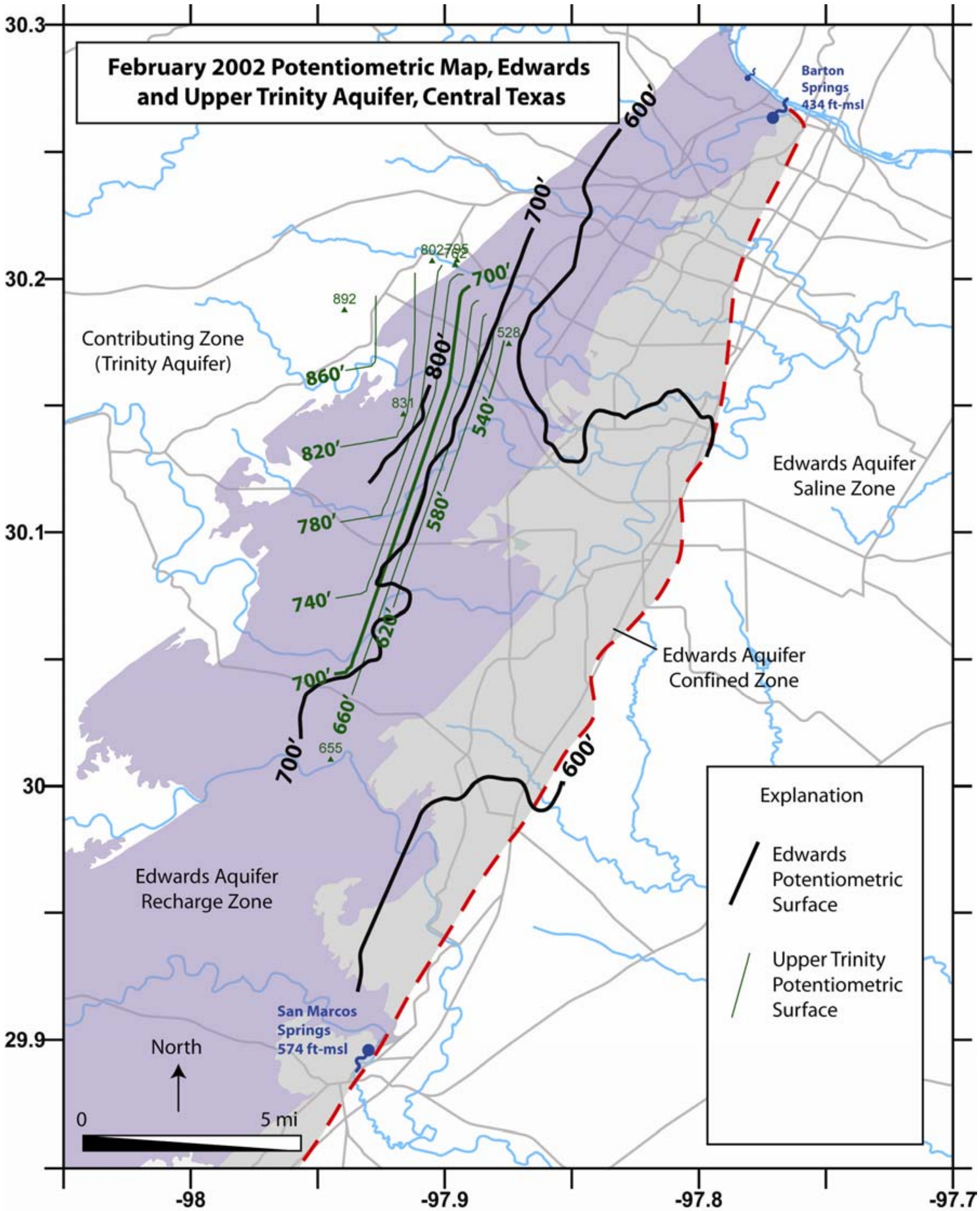
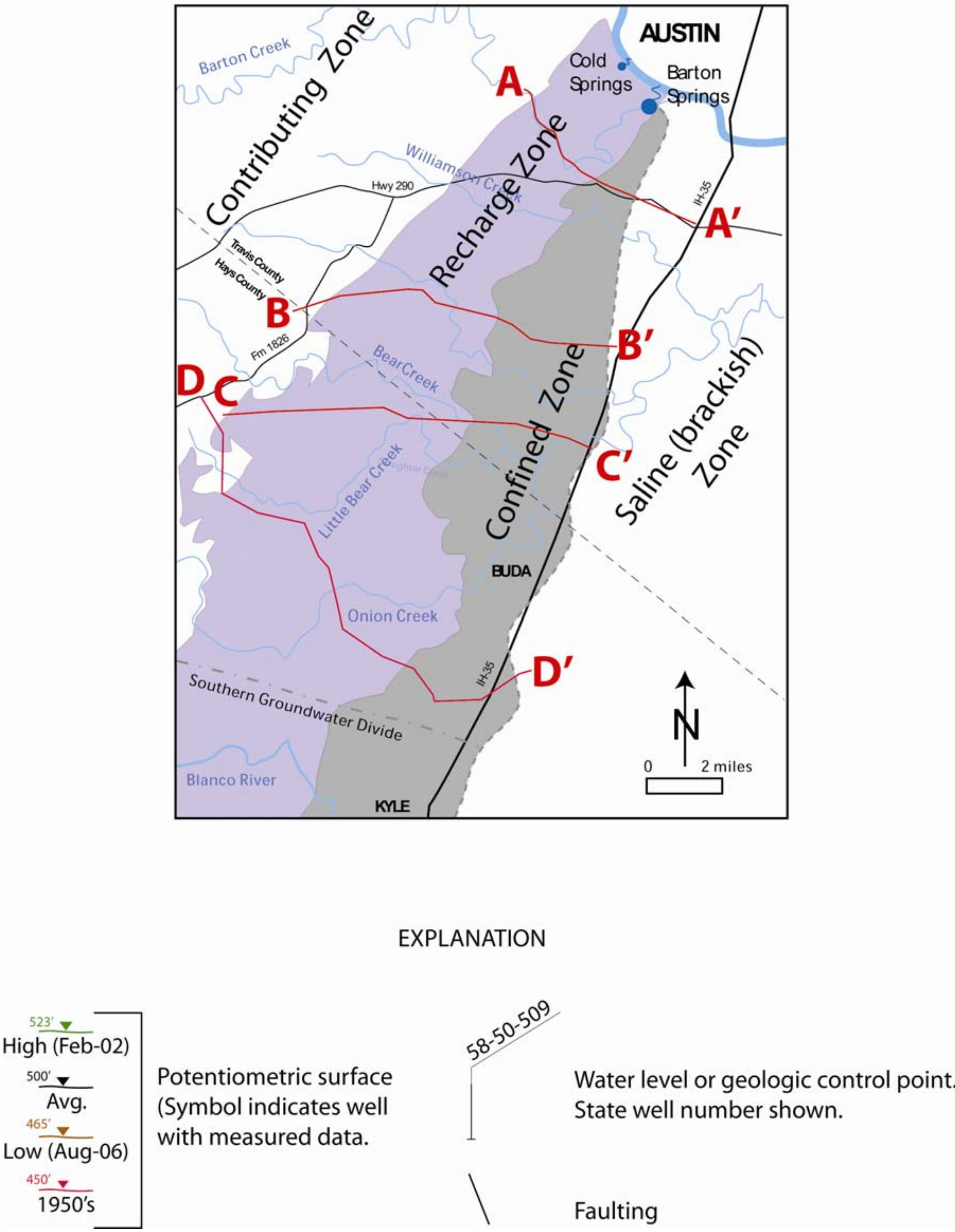


Figure 18: Composite Edwards and Upper Trinity potentiometric map.


AUSTIN
Cold Springs
Barton Springs
Barton Creek
Contributing Zone
Recharge Zone
Confined Zone
Saline (brackish) Zone
Williamson Creek
Hwy 290
IH-35
Travis County
Hays County
Fm 1826
BearCreek
Little Bear Creek
Onion Creek
BUDA
Southern Groundwater Divide
Blanco River
KYLE
A
A'
B
B'
C
C'
D
D'
N
0
2 miles
EXPLANATION
523'
High (Feb-02)
500'
Avg.
465'
Low (Aug-06)
450'
1950's
Potentiometric surface (Symbol indicates well with measured data.
58-50-509
Water level or geologic control point. State well number shown.
Faulting

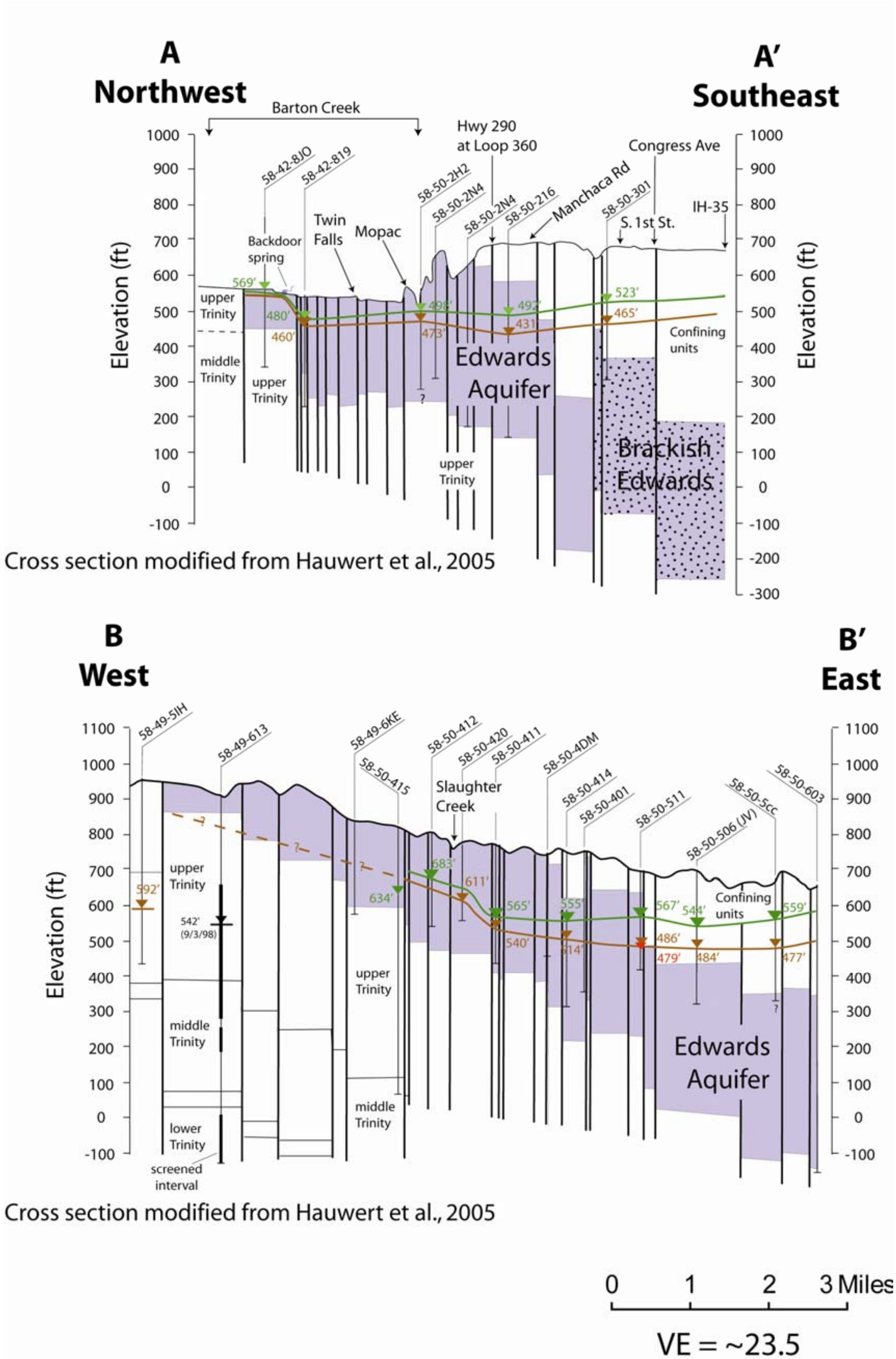


Figure 19. Cross sections A-A' and B-B'.

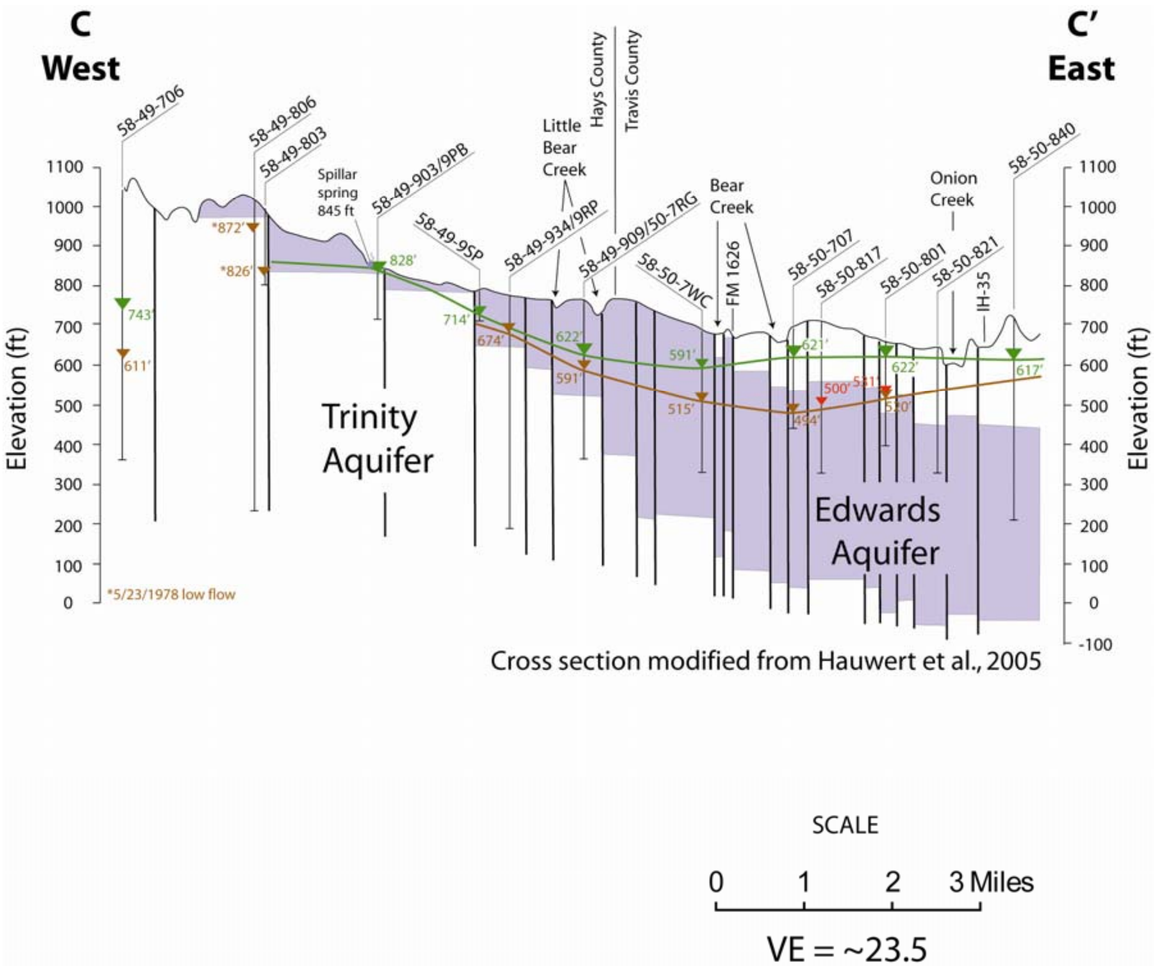


Figure 20. Cross section C-C' along the middle of the Barton Springs aquifer. Note the pronounced trough and then mound that develop from low to high flow conditions, respectively.

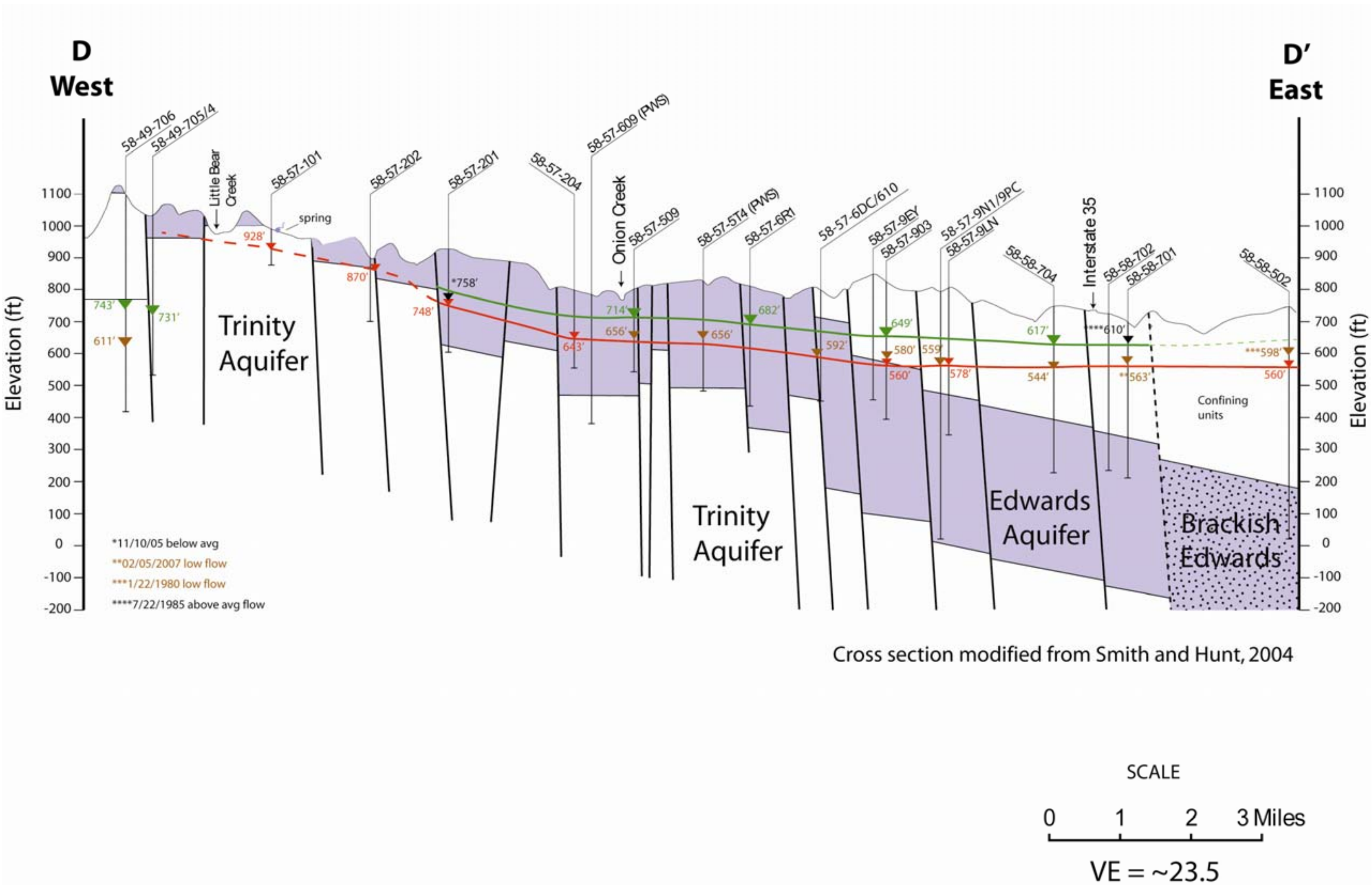


Figure 21. Cross section D-D' near the southern groundwater divide of the Barton Springs aquifer.

DISCUSSION

Potentiometric maps presented in this report generally agree with previously published potentiometric maps and studies of groundwater flow in the aquifer. One of the biggest differences from previously published maps and this study is the relatively dense set of data in this study, allowing more detailed maps of the aquifer system and identification of unique hydrologic features.

Potentiometric maps provide good insight into the boundaries of the aquifer system. The southern groundwater divide, located between Onion Creek and the Blanco River, when compared with dye tracing results (Hunt et al., 2006) indicate the divide may be hydrodynamic in nature, rather than a distinct hydrologic barrier. This is similar to the conclusions of LBG-Guyton Associates (1994). Gradients throughout the aquifer change from high to low flow conditions. Increased gradients, and therefore potential for flow, from the western portion of the aquifer and the saline zone are increased under low-flow conditions.

Unique hydrologic features observed on the potentiometric contour maps include linear features, such as troughs and ridges, and localized features, such as mounds and depressions. Troughs in the potentiometric surface are often associated with preferential flow paths, or conduits (Hauwert et al., 2002). Ridges in the potentiometric surface also appear, at least during active recharge conditions, to define preferential flow paths in the confined zone (Hunt et al., 2006). Mounding in the potentiometric surface is most evident over the losing (recharging) streams, such as Onion Creek, which contribute the majority of recharge to the aquifer system (Figures 4 and 5). Depressions in the potentiometric surface can be the result of local- to regional-scale pumping (Figure 3). However, many factors, such as the vertical and lateral distribution of hydraulic properties, can influence heads and therefore potentiometric contours. Vertical and lateral hydraulic properties of the Edwards and Trinity Aquifers are influenced by fractures, faults, conduits and hydrostratigraphic units. Anomalous potentiometric contours can be explained by those factors, each contributing to the heterogeneity and anisotropy of the aquifer. Ultimately, the maps limited in describing flow by the granularity, or lack of, data.

Preceding hydrologic conditions, and not the season or year, are most critical to the contours on the potentiometric maps (Figures 4 and 5; Slade et al., 1986). This is due to the fact that the Edwards Aquifer is a very dynamic system and fully recovers from impacts of drought and pumping during times of moderate to high recharge. This is also apparent on the springflow hydrographs of Barton Springs (Figure 2). However, as the stress of pumping increases with increasing demand, those stresses should be increasingly observed on the potentiometric map. For example, dewatering in the area north of Onion Creek and south of Slaughter is apparent in this study as aquifer conditions vary from high to low. This was noted by Smith and Hunt (2004) to be an area of concern for groundwater availability during drought conditions and increasing pumping.

The recent (August 2006) low flow potentiometric map, which was constructed at the lowest point after a year-long drought, is very similar to the potentiometric map representing the 1950's 7-year drought of record (DOR) (see Figures 8 and 9, 19 through 21). The similarity of water levels in Figures 8 and 9 suggests that current pumping under a moderate drought induces groundwater elevations similar to the DOR. However, there is an apparent discontinuity between these maps and their corresponding springflow. For example, despite reaching historic low water levels in August 2006, discharge at Barton Springs only dropped to 19 cfs (even with 8 cfs of pumping), which is not the equivalent 1950's DOR discharge of 10 cfs, which had less than 1 cfs of pumping at that time. This apparent discontinuity may be due to increased urban leakage in the urbanized portion of the study area that may be augmenting springflow during drought (Garcia-Fresca, 2004; Sharp et al., 2007). Further study is needed to understand this apparent phenomenon.

This study has demonstrated that potentiometric maps should be combined with other studies to properly characterize flow in this aquifer. In particular, for a karst aquifer, tracer studies are critical to understanding groundwater flow. Tracer studies have identified radial and divergent flows that are not evident on the potentiometric maps. Additionally, sub-groundwater basins of the aquifer (e.g. Cold Springs, Sunset Valley, and Manchaca) identified by dye tracing are not apparent on potentiometric maps (Hauwert et al., 2002).

Trinity Aquifer potentiometric maps (Figures 15 through 18) and cross sections (Figures 19 through 21) presented in this study contain very limited data. These figures may represent only local conditions or relationships. However, the maps consistently indicate a vertical potential for flow from the Edwards Aquifer toward the underlying Trinity Aquifer in the western portion of the Edwards Aquifer regardless of hydrologic conditions. In the eastern, confined portions of the Edwards Aquifer, flow potentials might be reversed from the Trinity to the Edwards. Geochemical studies indicate contribution of flow from the Trinity to the Edwards (Slade et al., 1986; Senger and Kreitler, 1984). More data are needed to better characterize the flow potential under varying spatial and temporal conditions.

These maps will provide a foundation for a better understanding of groundwater flow within the Edwards and Trinity Aquifers. Since the maps presented in this study span the hydrologic cycle from low to high flow conditions, the data could be critical for the calibration of numerical groundwater models. In addition, the refinement of the aquifer boundaries has implications for the calculation of water budgets due to revisions to the boundaries or sub-surface potential for flow.

CONCLUSIONS

- Water levels are very dynamic and in some areas fluctuate more than 100 ft between the high and low flow conditions in the Barton Springs aquifer.

- Influences of discrete recharge and discrete discharge (pumping) are evident on potentiometric surfaces.

- Troughs and ridges in the potentiometric surfaces correspond to preferential flow paths (conduits) with significant changes in contours from high to low flow conditions.

- Heads vary similarly within the fresh-water and saline-water zones indicating hydraulic communication between the zones.

- Potentiometric surfaces over these varying hydrologic conditions provide insight into the dynamic nature of the southern boundary of the aquifer.

- Vertical potential for flow in the western outcrop area of the Edwards is from the Edwards Aquifer to the Trinity Aquifer, on the basis of potentiometric maps and nested well pairs.

- Tracer studies have identified radial and divergent flows that are not evident on the potentiometric maps. Potentiometric maps are a significant tool for characterization of the flow system in the aquifer, and when combined with dye tracing and other studies, the complexity of this system can be better understood.

ACKNOWLEDGEMENTS

District staff, Joe Beery, Stefani Campbell, John Dupnik, Ron Fieseler, Brian Hunt, Mark Mathis, Beckie Morris, and Brian Smith collected data for maps in this report. City of Austin staff David Johns and Nico Hauwert also provided critical data. Edwards Aquifer Authority, Texas Water Development Board, U.S. Geological Survey, and the Hays Trinity Groundwater Conservation District also provided data. Kirk Holland, P.G., General Manager of the District, provided additional technical and editorial review of this report.

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Appendices: Potentiometric Data

A-1: 1950's Drought of record

A-1 1950's Drought of record composite data

SWN	DDLat	DDLong	LSD Elev	Date	Meas WL	MPH	WL Elev	Comment
58-42-607	30.30139	-97.77194	580.00	1/1/1951	145.60	0.00	434.40	
58-42-619	30.29722	-97.78972	490.00			0	490.00	Bee Springs
58-42-809	30.26583	-97.80972	720.00	2/16/1949	298.90	0.00	421.10	
58-42-901	30.27583	-97.77917	530.00	3/7/1955	108.80	0.00	421.20	
58-42-903	30.26330	-97.77124	458.15	3/15/1957	33.64	0.00	424.51	
58-42-910	30.27695	-97.78972	570.00	2/1/1955	142.00	0.00	428.00	
58-42-914	30.26368	-97.77082	433.90			0	433.90	Main Barton Springs
58-42-924	30.28667	-97.76972	600.00	8/1/1949	156.60	0.00	443.40	
58-49-802	30.12825	-97.92657	937.91	1/26/1981	136.20	-0.85	800.86	
58-49-904	30.13611	-97.88084	785.00	4/10/1980	191.00	0.00	594.00	Under drought of record, elevation must be lower than measured
58-42-916	30.27959	-97.78043	426.60			0	426.60	Cold Springs
58-50-101	30.22583	-97.86916	810.00	3/19/1952	139.26	0.00	670.74	
58-50-104	30.23611	-97.84444	760.00	6/25/1940	232.13	0.00	527.87	
58-50-105	30.23417	-97.85056	810.00	10/4/1939	228.80	0.00	581.20	
58-50-201	30.21958	-97.79373	657.81	3/9/1956	225.52	0.00	432.29	
58-50-205	30.23111	-97.80556	685.00	9/5/1939	254.12	0.00	430.88	
58-50-208	30.21861	-97.82083	700.00	3/1/1955	242.00	0.00	458.00	
58-50-218	30.24250	-97.79723	567.00	8/1/1978	126.00	0.00	441.00	
58-50-301	30.21035	-97.78159	658.66	8/31/1956	199.20	0.00	459.46	
58-50-406	30.19674	-97.84316	830.82	8/11/1978	298.26	0.00	532.56	
58-50-411	30.18670	-97.85000	782.41	8/18/1978	227.46	0.00	554.95	
58-50-416	30.17660	-97.86723	775.00	7/9/2001	201.40	0.00	573.60	Water Level adjusted for change in head (34 ft) from well 5850702.
58-50-502	30.18694	-97.81416	742.00	8/31/1956	255.28	0.00	486.72	
58-50-511	30.17159	-97.82578	698.59	6/30/1956	220.00	0.00	478.59	
58-50-701	30.13722	-97.84778	685.00	11/29/1949	169.55	0.00	515.45	
58-50-702	30.14778	-97.87334	765.00	8/31/1956	138.91	0.00	626.09	
58-50-704	30.13694	-97.85555	727.00	8/14/1978	202.33	-0.70	523.97	
58-50-7DT	30.15528	-97.86182	755.00	7/9/2001	185.45	0.00	569.55	Water Level adjusted for change in head (34 ft) from well 5850702.
58-50-801	30.14281	-97.81076	663.82	8/29/1956	132.68	0.00	531.14	
58-50-804	30.16159	-97.82873	704.40	2/10/1949	210.54	0.00	493.86	
58-50-808	30.12556	-97.79972	708.00	6/27/1939	148.51	0.00	559.49	
58-50-814	30.14056	-97.79694	630.00	3/21/1955	77.40	0.00	552.60	
58-50-817	30.14000	-97.83222	700.00	1/1/1956	200.00	0.00	500.00	
58-50-839	30.12972	-97.82166	625.00	8/14/1978	77.36	0.00	547.64	
58-50-902	30.14139	-97.75777	680.00	11/1/1954	200.00	0.00	480.00	
58-57-201	30.10278	-97.93694	925.00	12/28/1982	176.60	0.00	748.40	
58-57-204	30.08361	-97.91805	800.00	12/5/1950	157.40	0.00	642.60	Water Level adjusted for change in head (-6 ft) from well 5850702.
58-57-301	30.09389	-97.89139	882.00	8/28/1956	287.20	0.00	594.80	
58-57-3DB	30.11445	-97.91221	810.30	9/15/1999	143.79	0.00	666.51	Under drought of record, elevation must be lower than lowest measured
58-57-502	30.06635	-97.94447	890.00	5/24/1978	214.48	0.00	675.52	

A-1 1950's Drought of record composite data								
SWN	DDLat	DDLong	LSD Elev	Date	Meas WL	MPH	WL Elev	Comment
58-57-5JM	30.04722	-97.95139	868.80	3/31/1952	158.73	0.00	710.07	
58-57-902	30.00833	-97.89500	815.00	8/29/1956	247.63	0.00	567.37	
58-57-903	30.03850	-97.88617	824.02	8/28/1956	263.88	0.00	560.14	
58-57-905	30.02667	-97.90361	870.00	1/3/1951	289.30	0.00	580.70	Water Level adjusted for change in head (-21 ft) from well 5857903
58-57-9LN	30.02583	-97.87833	800.20	3/27/1952	222.10	0.00	578.10	Water Level adjusted for change in head (-21 ft) from well 5857903
58-58-101	30.08358	-97.84264	708.67	8/28/1956	146.64	0.00	562.03	
58-58-104	30.10417	-97.84861	730.00	10/24/1950	162.90	0.00	567.10	Water Level adjusted for change in head (-18 ft) from well 5858101
58-58-301	30.09194	-97.78917	734.00	8/29/1956	179.61	0.00	554.39	
58-58-4JH	30.06694	-97.85861	742.60	3/27/1952	166.62	0.00	575.98	Water Level adjusted for change in head (-5 ft) from well 5858101
58-58-4PR	30.04972	-97.86777	780.10	11/8/1950	189.77	0.00	590.33	Water Level adjusted for change in head (-24 ft) from well 5857903
58-58-502	30.05083	-97.80722	742.00	1/9/1951	181.60	0.00	560.40	Water Level adjusted for change in head (-6 ft) from well 5858301
58-58-7LN	30.02972	-97.85472	755.90	2/26/1952	184.03	0.00	571.87	Water Level adjusted for change in head (-20 ft) from well 5857903
67-01-3CC	29.97111	-97.89222	720.90	3/26/1952	146.40	0.00	574.50	
67-01-3OG	29.98228	-97.89149	776.10	3/26/1952	201.80	0.00	574.30	
67-01-3WL	29.98917	-97.89139	784.30	8/31/1954	210.30	0.00	574.00	
67-01-6EN	29.93083	-97.90444	670.00	3/26/1952	99.09	0.00	570.91	
67-01-801	29.89472	-97.93028	574.00			0	574.00	San Marcos Springs
67-01-807	29.90083	-97.91917	607.00	2/2/1940	36.11	0.00	570.89	
67-01-809	29.91195	-97.92861	602.47	11/14/1950	27.87	0.00	574.60	
67-02-101	29.98139	-97.86500	680.00	3/26/1952	111.70	0.00	568.30	

A-2: July and August 1999 Average Flow

A-2 July and August 1999 Average Flow Data								
SWN	DDLat	DDLong	LSD Elev	Date	Meas WL	MPH	WL Elev	Comment
58-42-619	30.29722	-97.78972	490.00			0.00	490.00	Bee Springs
58-42-819	30.26101	-97.81757	684.00	16-Aug-99	218.00	0.00	466.00	
58-42-821	30.26306	-97.81389	740.00	20-Jul-99	244.00	0.00	496.00	
58-42-8TW	30.26140	-97.79518	632.00	20-Jul-99	173.00	0.00	459.00	
58-42-914	30.26368	-97.77082	433.90			0.00	433.90	Main Barton Springs
58-42-915	30.25121	-97.78089	653.00	14-Jul-99	207.00	-1.94	444.06	
58-42-920	30.26356	-97.77422	446.32			0.00	446.32	Upper Barton Springs
58-42-921	30.26428	-97.77017	434.60			0.00	434.60	Eliza
58-42-922	30.26354	-97.76807	434.77			0.00	434.77	Old Mill Springs
58-49-916	30.27959	-97.78043	426.60			0.00	426.60	Cold Springs
58-49-919	30.13778	-97.89222	757.00	5-Aug-99	86.00	-1.89	669.11	
58-49-9BC	30.16342	-97.90713	807.00	27-Aug-99	11.00	0.00	796.00	
58-49-9SP	30.14721	-97.89689	767.00	13-Aug-99	56.00	-0.50	710.50	
58-49-9WH	30.13528	-97.89584	765.00	4-Aug-99	78.00	0.00	687.00	
58-50-123	30.23252	-97.86346	845.00	29-Jul-99	130.00	-1.80	713.20	
58-50-1C1	30.23389	-97.86250	813.00	16-Aug-99	103.00	0.00	710.00	
58-50-1GR	30.22333	-97.83528	731.00	16-Aug-99	178.00	-1.90	551.10	
58-50-201	30.21958	-97.79373	658.00	20-Jul-99	190.00	0.00	468.00	
58-50-207	30.21760	-97.82285	713.00	27-Aug-99	217.00	-0.75	495.25	
58-50-211	30.24524	-97.82803	680.00	21-Jul-99	199.00	-0.70	480.30	
58-50-212	30.22548	-97.80618	679.00	20-Jul-99	211.00	0.00	468.00	
58-50-215	30.22764	-97.81035	681.00	20-Jul-99	211.00	0.00	470.00	
58-50-216	30.23222	-97.79250	690.00	20-Jul-99	236.00	0.00	454.00	
58-50-222	30.21722	-97.81879	695.00	4-Aug-99	203.00	0.00	492.00	
58-50-2DS	30.23863	-97.81022	673.00	20-Jul-99	163.00	0.00	510.00	
58-50-301	30.21035	-97.78159	659.00	26-Jul-99	159.00	0.00	500.00	
58-50-414	30.18028	-97.83889	763.00	1-Jul-99	235.00	0.00	528.00	
58-50-513	30.18263	-97.81969	752.00	19-Aug-99	257.00	0.00	495.00	
58-50-517	30.17437	-97.81892	684.00	16-Aug-99	180.00	-2.10	501.90	
58-50-5A	30.19084	-97.80651	747.00	19-Aug-99	254.00	-2.00	491.00	
58-50-5BL	30.20341	-97.80330	703.00	19-Aug-99	225.00	0.00	478.00	
58-50-5CC	30.17629	-97.79716	714.00	16-Aug-99	200.00	0.00	514.00	
58-50-5ZB	30.20698	-97.83043	716.00	26-Aug-99	212.00	0.00	504.00	

A-2 July and August 1999 Average Flow Data								
SWN	DDLat	DDLong	LSD Elev	Date	Meas WL	MPH	WL Elev	Comment
58-50-702	30.14778	-97.87334	765.00	7/9/1958	117.00	0.00	648.00	added this representative (above avg) wl data, BS flow at 84 cfs at time of measurement
58-50-718	30.13670	-97.84542	694.00	5-Aug-99	156.00	-0.90	537.10	
58-50-731	30.15297	-97.85870	737.00	5-Aug-99	208.00	-1.36	527.64	
58-50-739	30.13833	-97.84944	683.00	19-Jul-99	136.00	0.00	547.00	
58-50-742	30.15485	-97.84156	761.00	26-Aug-99	238.00	-1.00	522.00	
58-50-7DM	30.15316	-97.83937	729.00	24-Aug-99	212.00	-0.70	516.30	
58-50-7RV	30.14485	-97.84625	680.00	24-Aug-99	157.00	-1.60	521.40	
58-50-7SJ	30.14305	-97.84801	675.00	24-Aug-99	150.00	-2.00	523.00	
58-50-7T	30.14028	-97.84583	650.00	16-Aug-99	130.00	-2.45	517.55	
58-50-7TT	30.13917	-97.84139	655.00	19-Jul-99	112.00	0.00	543.00	
58-50-7WM	30.14972	-97.84275	739.00	24-Aug-99	164.00	0.00	575.00	
58-50-801	30.14281	-97.81076	664.00	19-Jul-99	110.00	-1.50	552.50	
58-50-810	30.13361	-97.81028	629.00	19-Jul-99	58.00	0.00	571.00	
58-50-827	30.13639	-97.81944	682.00	14-Jul-99	136.00	-1.35	544.65	
58-50-838	30.13915	-97.82104	675.00	14-Jul-99	124.00	0.00	551.00	
58-50-840	30.12972	-97.79833	710.00	24-Aug-99	126.00	0.00	584.00	
58-50-842	30.15005	-97.83235	698.00	5-Aug-99	141.00	-1.50	555.50	
58-50-846	30.13027	-97.82185	626.00	26-Jul-99	50.00	0.00	576.00	
58-50-847	30.13015	-97.82169	620.00	29-Jul-99	51.00	-1.80	567.20	
58-50-851	30.12582	-97.81564	622.00	29-Jul-99	42.00	0.00	580.00	
58-50-855	30.14624	-97.81927	659.00	14-Jul-99	111.00	-2.85	545.15	
58-50-8RR	30.14000	-97.82917	692.00	22-Aug-99	168.00	0.00	524.00	
58-50-8SL	30.14625	-97.81918	658.00	14-Jul-99	106.00	-2.85	549.15	
58-57-305	30.09917	-97.89222	811.00	21-Jul-99	197.00	-1.15	612.85	
58-57-307	30.09986	-97.88229	791.00	21-Jul-99	200.00	-1.58	589.42	
58-57-313	30.11333	-97.88333	805.00	21-Jul-99	202.00	-1.65	601.35	
58-57-3AW	30.09572	-97.87863	774.00	10-Aug-99	203.00	-1.60	569.40	
58-57-3MK	30.08750	-97.88750	810.00	21-Jul-99	189.00	-1.75	619.25	
58-57-3RA	30.10000	-97.91167	823.00	21-Jul-99	133.00	-1.08	688.92	
58-57-3TH	30.09167	-97.88750	820.00	21-Jul-99	193.00	0.00	627.00	
58-57-4SB	30.04445	-97.95972	900.00	19-Jul-99	190.00	0.00	710.00	
58-57-5BM	30.04556	-97.95805	910.00	19-Jul-99	164.00	-1.60	744.40	
58-57-5CR	30.07240	-97.92031	797.00	21-Jul-99	120.00	-1.05	675.95	
58-57-602	30.07421	-97.91580	798.00	21-Jul-99	127.00	-1.00	670.00	
58-57-6BF	30.04611	-97.88333	820.00	19-Jul-99	208.00	-1.75	610.25	
58-57-6DS	30.08139	-97.90945	790.00	21-Jul-99	134.00	-1.65	654.35	
58-57-7JG	30.04089	-97.96284	940.00	22-Jul-99	180.00	0.00	760.00	
58-57-8CL	30.02778	-97.92722	832.00	22-Jul-99	166.00	0.00	666.00	
58-57-903	30.03850	-97.88617	824.00	19-Jul-99	212.00	0.00	612.00	
58-57-9A	30.03000	-97.89222	833.00	26-Jul-99	223.00	-2.05	607.95	
58-58-101	30.08358	-97.84264	709.00	19-Jul-99	107.00	0.00	602.00	
58-58-102	30.10459	-97.85434	748.00	14-Jul-99	167.00	-1.30	579.70	
58-58-107	30.10889	-97.86604	780.00	5-Aug-99	220.00	-1.60	558.40	
58-58-114	30.11503	-97.86271	815.00	14-Jul-99	256.00	-2.20	556.80	
58-58-118	30.11386	-97.86561	813.00	5-Aug-99	255.00	-1.50	556.50	
58-58-119	30.11065	-97.86930	810.00	5-Aug-99	249.00	-1.25	559.75	
58-58-120	30.11127	-97.86252	784.00	5-Aug-99	229.00	-1.86	553.14	
58-58-121	30.10503	-97.86236	760.00	5-Aug-99	198.00	-1.47	560.53	
58-58-122	30.09472	-97.84361	714.00	19-Jul-99	114.00	-1.00	599.00	
58-58-1EG	30.10000	-97.87444	755.00	21-Jul-99	186.00	-0.85	568.15	
58-58-1O1	30.11228	-97.85956	763.00	21-Jul-99	206.00	0.00	557.00	
58-58-1O2	30.10972	-97.86188	770.00	21-Jul-99	209.00	0.00	561.00	
58-58-1O3	30.10751	-97.85941	755.00	22-Jul-99	179.00	0.00	576.00	
58-58-1PS	30.08919	-97.85257	748.00	21-Jul-99	150.00	-1.32	596.68	
58-58-1RG	30.10000	-97.85778	745.00	21-Jul-99	164.00	-1.50	579.50	
58-58-208	30.11639	-97.81976	666.00	5-Aug-99	105.00	-2.20	558.80	
58-58-209	30.11934	-97.81612	647.00	5-Aug-99	91.00	-1.90	554.10	
58-58-2PM	30.12187	-97.82211	661.00	31-Aug-99	112.00	-1.60	547.40	
58-58-423	30.06781	-97.85912	745.00	15-Jul-99	131.00	-1.60	612.40	
58-58-4L	30.07083	-97.87473	740.00	19-Jul-99	136.00	-1.50	602.50	
58-58-508	30.07917	-97.83099	731.00	19-Jul-99	125.00	-1.70	604.30	
58-58-7SH	30.00889	-97.86305	722.00	22-Jul-99	106.00	-1.95	614.05	
67-01-303	29.99000	-97.87556	719.23	7/31/1999	172.39	0.00	546.84	
67-01-304	29.984722	-97.876389	717.55	8/24/1999	167.88	0.00	549.67	
67-01-311	29.98139	-97.89139	768.00	8/15/1999	204.65	0.00	563.35	
67-01-801	29.89472	-97.93028	574.00			0.00	574.00	San Marcos Springs
67-01-809	29.91192	-97.92877	601.27	7/16/1999	25.17	0.00	576.10	

A-3: June and July 2001 High Flow

A-3 June and July 2001 High Flow data								
SWN	DDLat	DDLong	LSD Elev		Meas WL	MPH	WL Elev	Comment
58-42-619	30.29722	-97.78972	490.00			0.00	490.00	Bee Springs
58-42-819	30.26101	-97.81757	683.58	7/23/01	217.55	0.00	466.03	
58-42-825	30.26419	-97.81432	735.00	7/3/01	240.48	0.00	494.52	
58-42-8G3	30.26040	-97.81711	674.19	7/3/01	202.39	-2.20	469.60	
58-42-8TW	30.26140	-97.79518	631.66	7/12/01	169.00	0.00	462.66	
58-42-903	30.26330	-97.77124	458.15	7/12/01	26.43	0.00	431.72	
58-42-913	30.26667	-97.78222	546.60	7/12/01	102.26	0.00	444.34	
58-42-914	30.26368	-97.77082	433.90			0.00	433.90	Main Barton Springs
58-42-915	30.25121	-97.78089	653.00	6/19/01	199.95	-1.94	451.11	
58-42-920	30.26356	-97.77422	446.32			0.00	446.32	Upper Barton Springs
58-42-921	30.26428	-97.77017	434.60			0.00	434.60	Eliza
58-42-922	30.26354	-97.76807	434.77			0.00	434.77	Old Mill Springs
58-42-927	30.25000	-97.75333	505.00	7/5/01	7.44	0.00	497.56	
58-42-9CL	30.27778	-97.78472	610.00	7/11/01	170.00	0.00	440.00	
58-42-9NC	30.27083	-97.77472	505.00	7/12/01	74.38	-1.00	429.62	
58-42-9SG	30.27482	-97.78076	569.00	7/11/01	125.15	0.00	443.85	
58-42-9WT	30.27417	-97.78889	620.00	7/11/01	175.73	0.00	444.27	
58-49-916	30.27959	-97.78043	426.60			0.00	426.60	Cold Springs
58-49-9BG	30.13663	-97.89807	777.23	7/6/01	70.89	-2.00	704.34	
58-49-9SP	30.14721	-97.89689	767.28	7/12/01	55.16	-0.50	711.62	
58-50-122	30.23839	-97.83824	740.00	7/6/01	198.59	-0.25	541.16	
58-50-123	30.23252	-97.86346	844.76	6/25/01	125.68	-1.80	717.28	
58-50-1GR	30.22333	-97.83528	731.00	7/6/01	175.78	-1.90	553.32	
58-50-1W2	30.22640	-97.84147	744.16	7/23/01	151.30	0.00	592.86	
58-50-201	30.21958	-97.79373	657.81	7/9/01	153.26	0.00	504.55	
58-50-211	30.24524	-97.82803	680.00	6/22/01	206.00	-0.70	473.30	
58-50-212	30.22548	-97.80618	679.39	7/23/01	197.49	0.00	481.90	
58-50-214	30.21136	-97.80354	705.55	7/3/01	212.94	0.00	492.61	
58-50-215	30.22764	-97.81035	680.91	6/20/01	198.30	0.00	482.61	
58-50-216	30.23222	-97.79250	690.00	6/25/01	212.36	0.00	477.64	
58-50-217	30.24239	-97.80061	568.63	6/15/01	91.70	0.00	476.93	
58-50-221	30.22545	-97.80619	679.10	7/3/01	193.04	0.00	486.06	
58-50-222	30.21722	-97.81879	694.91	6/22/01	196.50	0.00	498.41	
58-50-2DS	30.23863	-97.81022	672.58	7/3/01	177.31	0.00	495.27	
58-50-2FF	30.21750	-97.82222	704.00	7/9/01	219.34	-1.00	483.66	
58-50-2W1	30.22445	-97.81778	704.00	7/9/01	225.90	0.00	478.10	
58-50-301	30.21035	-97.78159	658.66	7/23/01	137.12	0.00	521.54	
58-50-3RS	30.24055	-97.78722	690.00	7/5/01	216.97	0.00	473.03	
58-50-414	30.18028	-97.83889	762.66	7/6/01	215.24	0.00	547.42	
58-50-416	30.17660	-97.86723	775.00	7/9/01	201.40	-0.20	573.40	
58-50-417	30.19536	-97.84640	812.63	6/22/01	260.43	0.00	552.20	
58-50-418	30.19833	-97.83746	846.72	7/9/01	311.41	-2.25	533.06	
58-50-4DW	30.17250	-97.85583	752.00	7/9/01	210.40	-2.50	539.10	
58-50-4MT	30.20278	-97.84778	780.00	7/9/01	195.72	-2.54	581.74	
58-50-511	30.17159	-97.82578	698.59	6/20/01	140.40	-0.60	557.59	
58-50-513	30.18263	-97.81969	751.53	7/6/01	207.38	0.00	544.15	
58-50-517	30.17437	-97.81892	683.96	7/3/01	129.39	-2.10	552.47	
58-50-520	30.20764	-97.80213	704.75	6/20/01	184.63	0.00	520.12	
58-50-5A	30.19084	-97.80651	746.56	7/6/01	203.90	-2.00	540.66	
58-50-5BB	30.17843	-97.80962	730.00	7/11/01	178.00	0.00	552.00	
58-50-5BL	30.20341	-97.84212	692.00	7/11/01	176.00	0.00	516.00	
58-50-5CC	30.17629	-97.79716	713.80	7/9/01	170.39	0.00	543.41	
58-50-5JA	30.19350	-97.79524	711.11	7/11/01	184.95	0.00	526.16	
58-50-5JV	30.17072	-97.81287	694.39	7/11/01	137.40	0.00	556.99	
58-50-5M1	30.16565	-97.80952	665.00	7/9/01	97.02	-0.10	567.88	
58-50-5PN	30.19222	-97.79778	687.00	7/11/01	149.30	-1.50	536.20	
58-50-5ZB	30.20698	-97.83043	715.94	7/5/01	206.23	0.00	509.71	
58-50-704	30.13694	-97.85555	727.00	6/26/01	135.60	-0.70	590.70	
58-50-730	30.14000	-97.83833	683.00	7/6/01	98.55	0.00	584.45	
58-50-731	30.15297	-97.85870	736.51	6/26/01	178.35	-1.36	556.80	
58-50-742	30.15485	-97.84156	761.47	7/5/01	195.91	-1.00	564.56	
58-50-7BW	30.13192	-97.83516	654.73	6/5/01	48.14	0.00	606.59	
58-50-7CD	30.12972	-97.83833	645.00	7/6/01	52.90	0.00	592.10	
58-50-7DF	30.14830	-97.84378	727.79	7/9/01	154.32	0.00	573.47	
58-50-7DM	30.15316	-97.83937	728.52	7/5/01	161.04	-0.70	566.78	
58-50-7DT	30.15528	-97.86182	755.00	7/9/01	185.45	-2.00	567.55	
58-50-7LC	30.13611	-97.86806	745.00	7/9/01	152.60	0.00	592.40	
58-50-7PC	30.13605	-97.85053	712.00	7/6/01	136.65	0.00	575.35	

A-3 June and July 2001 High Flow data								
SWN	DDLat	DDLong	LSD Elev	Date	Meas WL	MPH	WL Elev	Comment
58-50-7PL	30.14581	-97.84589	717.22	7/9/01	131.76	0.00	585.46	
58-50-7RG	30.14939	-97.87416	766.11	7/9/01	165.58	-2.39	598.14	
58-50-7WC	30.14209	-97.85368	700.00	7/6/01	119.36	-1.96	578.68	
58-50-7WC	30.14209	-97.85368	700.00	7/6/01	119.36	-1.96	578.68	
58-50-801	30.14281	-97.81076	663.82	7/9/01	82.67	-1.50	579.65	
58-50-820	30.12883	-97.82195	628.00	7/6/01	27.20	0.00	600.80	
58-50-824	30.12692	-97.81834	636.18	7/6/01	36.06	0.00	600.12	
58-50-825	30.13447	-97.81059	604.99	7/6/01	21.72	-0.60	582.67	
58-50-840	30.12972	-97.79833	710.00	7/9/01	107.59	0.00	602.41	
58-50-855	30.14624	-97.81927	658.84	6/27/01	87.50	-2.85	568.49	
58-50-856	30.13489	-97.82649	660.00	7/6/01	80.51	0.00	579.49	
58-50-860	30.15361	-97.82166	675.00	7/6/01	112.40	0.00	562.60	
58-50-8D4	30.13783	-97.81794	652.00	7/6/01	74.86	0.00	577.14	
58-50-8GJ2	30.15569	-97.82201	682.00	7/6/01	118.12	0.00	563.88	
58-50-8IV	30.13542	-97.81973	638.07	6/5/01	57.08	0.00	580.99	
58-50-8JH	30.13876	-97.80353	630.77	7/6/01	34.78	0.00	595.99	
58-50-8JO	30.14750	-97.82639	677.00	7/6/01	104.88	0.00	572.12	
58-50-8MG	30.13177	-97.82380	626.60	7/6/01	40.85	0.00	585.75	
58-50-8PR	30.15142	-97.83259	690.12	7/9/01	118.43	0.00	571.69	
58-57-302	30.09578	-97.87664	767.00	7/6/01	160.60	0.00	606.40	
58-57-307	30.09986	-97.88229	790.51	6/21/01	162.71	-1.58	626.22	
58-57-311	30.11246	-97.89114	857.70	6/21/01	243.00	0.00	614.70	
58-57-3AM	30.08610	-97.91260	799.90	7/6/01	124.81	-2.00	673.09	
58-57-3CC	30.11676	-97.88226	776.67	7/6/01	161.04	-2.00	613.63	
58-57-3CG	30.08889	-97.91389	810.00	7/6/01	140.08	-1.60	668.32	
58-57-3DB	30.11445	-97.91221	810.35	6/27/01	123.55	-1.60	685.20	
58-57-3EC	30.11082	-97.88107	829.97	7/6/01	202.00	-1.10	626.87	
58-57-3GC	30.09758	-97.88686	824.50	7/23/01	201.76	0.00	622.74	
58-57-3NB	30.09937	-97.90118	833.03	7/6/01	167.45	-1.30	664.28	
58-57-3RK	30.09167	-97.88667	805.00	7/6/01	169.43	0.00	635.57	
58-57-3TM	30.12238	-97.87721	734.03	7/6/01	121.31	0.00	612.72	
58-57-508	30.04346	-97.95557	879.93	7/6/01	175.35	-1.30	703.28	
58-57-5CR	30.07240	-97.92031	796.53	7/10/01	108.47	-1.05	687.01	
58-57-5DT	30.04967	-97.95486	875.00	7/6/01	172.82	0.00	702.18	
58-57-5RR	30.04613	-97.95755	900.00	7/6/01	188.02	-1.60	710.38	
58-57-5T4	30.05853	-97.92112	828.30	7/10/01	143.92	-1.95	682.43	
58-57-602	30.07421	-97.91580	798.18	7/23/01	116.58	-1.00	680.60	
58-57-6IC	30.04667	-97.90166	795.00	6/27/01	140.85	-2.32	651.83	
58-57-6M3	30.07214	-97.91615	785.72	7/10/01	104.32	0.00	681.40	
58-57-6R1	30.05508	-97.91069	805.12	7/10/01	138.24	-1.70	665.18	
58-57-6RB	30.04667	-97.90166	795.00	6/27/01	139.37	-2.32	653.31	
58-57-6RR	30.06606	-97.91080	840.15	7/10/01	159.39	-2.20	678.56	
58-57-8DJ	30.02222	-97.92083	862.00	7/10/01	212.37	0.00	649.63	
58-57-8RM	30.03547	-97.93542	842.00	7/6/01	180.71	-1.70	659.59	
58-57-903	30.03850	-97.88617	824.02	7/9/01	185.95	0.00	638.07	
58-57-913	30.03389	-97.89111	849.00	7/6/01	194.68	-1.10	653.22	
58-57-9PC	30.02778	-97.87917	805.00	7/6/01	173.73	-1.40	629.87	
58-58-101	30.08358	-97.84264	708.67	7/6/01	93.80	0.00	614.87	
58-58-123	30.10943	-97.84173	700.89	7/23/01	105.20	-2.80	592.89	
58-58-124	30.11908	-97.84083	714.97	7/6/01	122.55	-2.00	590.42	
58-58-1DL	30.08587	-97.85644	759.75	7/6/01	131.37	0.00	628.38	
58-58-1GB	30.10762	-97.87096	798.00	7/6/01	190.19	-1.60	606.21	
58-58-1JE	30.08667	-97.85361	750.00	7/6/01	116.01	-1.60	632.39	
58-58-1LB	30.10222	-97.85889	745.00	7/6/01	153.34	0.00	591.66	
58-58-1MC	30.09111	-97.84028	700.00	7/6/01	78.38	-0.70	620.92	
58-58-1PS	30.08919	-97.85257	747.53	7/6/01	123.60	-1.32	622.61	
58-58-1PW	30.11315	-97.87292	773.00	7/6/01	158.94	0.00	614.06	
58-58-211	30.08611	-97.82639	703.00	7/6/01	75.29	0.00	627.71	
58-58-216	30.12277	-97.81532	685.33	6/22/01	98.75	-1.30	585.28	
58-58-218	30.09472	-97.81555	688.00	7/9/01	74.47	-0.80	612.73	
58-58-2KS	30.11056	-97.81889	670.00	7/6/01	64.60	0.00	605.40	
58-58-406	30.06203	-97.85601	752.79	7/6/01	116.71	-0.85	635.23	
58-58-410	30.06683	-97.83882	755.00	7/6/01	147.26	-1.90	605.84	
58-58-418	30.07129	-97.85825	731.05	7/6/01	88.97	-0.40	641.68	
58-58-423	30.06781	-97.85912	745.00	6/22/01	104.17	-1.60	639.23	
58-58-424	30.07856	-97.87157	744.00	6/27/01	106.75	-2.00	635.25	
58-58-4CT	30.06020	-97.86847	735.17	7/23/01	103.06	-0.30	631.81	
58-58-4HO	30.07203	-97.84697	725.00	7/6/01	94.49	-1.25	629.26	
58-58-4ML	30.07515	-97.85528	699.32	7/6/01	74.36	-1.80	623.16	
58-58-4SG	30.08111	-97.84361	710.00	7/1/01	92.78	0.00	617.22	

A-3 June and July 2001 High Flow data								
SWN	DDLat	DDLong	LSD Elev	Date	Meas WL	MPH	WL Elev	Comment
58-58-508	30.07917	-97.83099	731.45	6/25/01	101.94	-1.70	627.81	
58-58-704	30.02750	-97.85389	746.00	7/6/01	162.46	-0.34	583.20	
67-01-303	29.99000	-97.87556	719.23	7/1/01	163.84	0.00	555.39	
67-01-304	29.98472	-97.87639	717.55	6/13/01	168.69	0.00	548.86	
67-01-311	29.98143	-97.89140	768.00	7/23/01	209.05	0.00	558.95	
67-01-801	29.89472	-97.93028	574.00			0.00	574.00	San Marcos Springs
67-01-809	29.91192	-97.92877	601.27	7/1/01	23.55	0.00	577.72	
67-02-104	29.98278	-97.87139	680.00	8/5/01	112.10	0.00	567.90	
67-02-104	29.98279	-97.87153	674.32	7/23/01	110.13	0.00	564.19	
67-02-105	29.95830	-97.84212	646.70	7/23/01	67.61	0.00	579.09	
67-02-106	29.97474	-97.85712	678.28	7/23/01	97.43	0.00	580.85	
67-09-113	29.83874	-97.99074	704.73	7/23/01	123.26	0.00	581.47	
67-09-401	29.82925	-97.96236	642.51	7/23/01	50.42	0.00	592.09	

A-4: February 2002 High Flow

A-4 February 2002 High Flow data								
SWN	DDLat	DDLong	LSD Elev	Date	Meas WL	MPH	WL Elev	Comment
58-42-619	30.29722	-97.78972	490.00			0	490.00	Bee Springs
58-42-819	30.26101	-97.81757	683.58	04-Feb-02	203.33	0.00	480.25	
58-42-825	30.26419	-97.81432	735.00	04-Feb-02	236.78	0.00	498.22	
58-42-8JO	30.26748	-97.82214	723.89	08-Feb-02	155.20	0.00	568.69	
58-42-8TW	30.26140	-97.79518	631.66	01-Feb-02	164.81	0.00	466.85	
58-42-903	30.26330	-97.77124	458.15	04-Feb-02	24.98	0.00	433.17	
58-42-913	30.26667	-97.78222	546.60	06-Feb-02	100.15	0.00	446.45	
58-42-914	30.26368	-97.77082	433.90			0	433.90	Main Barton Springs
58-42-915	30.25121	-97.78089	653.00	06-Feb-02	187.89	1.94	467.05	
58-42-920	30.26356	-97.77422	446.32			0	446.32	Upper Barton Springs
58-42-921	30.26428	-97.77017	434.60			0	434.60	Eliza
58-42-922	30.26354	-97.76807	434.77			0	434.77	Old Mill Springs
58-42-927	30.25000	-97.75333	505.00	05-Feb-02	2.70	0.00	502.30	
58-42-9CL	30.27778	-97.78472	610.00	04-Feb-02	160.87	0.00	449.13	
58-42-9NC	30.27083	-97.77472	505.00	04-Feb-02	74.48	1.00	431.52	
58-42-9SG	30.27482	-97.78076	569.00	04-Feb-02	122.51	0.00	446.49	
58-42-9WT	30.27417	-97.78889	620.00	04-Feb-02	170.53	0.00	449.47	
58-49-802	30.12825	-97.92657	937.91	11-Feb-02	126.70	0.85	812.06	
58-49-916	30.27959	-97.78043	426.60			0	426.60	Cold Springs
58-49-926	30.12513	-97.90517	800.00	30-Jan-02	118.14	0.00	681.86	
58-49-937	30.15801	-97.88745	777.56	07-Feb-02	90.80	1.30	688.06	
58-49-9BG	30.13663	-97.89807	777.23	08-Feb-02	58.78	2.00	720.45	
58-49-9DW	30.13556	-97.89389	750.00	08-Feb-02	103.67	1.60	647.93	
58-49-9PA	30.14388	-97.89935	831.50	06-Feb-02	64.09	0.50	767.91	
58-49-9PB	30.14714	-97.91476	841.00	06-Feb-02	14.40	1.00	827.60	
58-49-9PC	30.13553	-97.90419	849.85	06-Feb-02	93.70	0.85	757.00	
58-49-9SP	30.14721	-97.89689	767.28	04-Feb-02	53.36	0.50	714.42	
58-50-122	30.23839	-97.83824	740.00	01-Feb-02	192.28	0.25	547.97	
58-50-1C1	30.23389	-97.86250	813.26	06-Feb-02	94.60	0.00	718.66	
58-50-1C4	30.23361	-97.86278	815.88	07-Feb-02	96.42	0.00	719.46	
58-50-1GR	30.22333	-97.83528	731.00	07-Feb-02	168.54	1.90	564.36	
58-50-1ML	30.21720	-97.84880	747.00	07-Feb-02	145.10	0.00	601.90	
58-50-1W2	30.22640	-97.84147	744.16	04-Feb-02	150.27	1.45	595.34	
58-50-201	30.21958	-97.79373	657.81	07-Feb-02	131.79	0.00	526.02	
58-50-211	30.24524	-97.82803	680.00	01-Feb-02	182.12	0.00	497.88	
58-50-212	30.22548	-97.80618	679.39	04-Feb-02	175.93	0.00	503.46	
58-50-214	30.21136	-97.80354	705.55	01-Feb-02	189.55	0.00	516.00	
58-50-215	30.22764	-97.81035	680.91	05-Feb-02	189.89	0.00	491.02	
58-50-216	30.23222	-97.79250	690.00	04-Feb-02	198.15	0.00	491.85	
58-50-217	30.24239	-97.80061	568.63	04-Feb-02	70.53	1.80	499.90	
58-50-222	30.21722	-97.81879	694.91	07-Feb-02	188.00	0.00	506.91	
58-50-2H1	30.23493	-97.81423	689.46	16-Jan-02	191.21	0.00	498.25	
58-50-301	30.21035	-97.78159	658.66	04-Feb-02	135.06	0.00	523.60	
58-50-411	30.18670	-97.85000	782.41	07-Feb-02	218.90	1.50	565.01	
58-50-414	30.18028	-97.83889	762.66	07-Feb-02	206.75	0.00	555.91	
58-50-416	30.17660	-97.86723	775.00	07-Feb-02	196.00	0.20	579.20	
58-50-417	30.19536	-97.84640	812.63	04-Feb-02	250.20	0.00	562.43	
58-50-418	30.19833	-97.83746	846.72	07-Feb-02	304.84	2.25	544.13	
58-50-4DW	30.17250	-97.85583	752.00	07-Feb-02	183.60	2.50	570.90	
58-50-4MT	30.20278	-97.84778	780.00	07-Feb-02	190.68	2.54	591.86	
58-50-511	30.17159	-97.82578	698.59	06-Feb-02	131.70	0.00	566.89	
58-50-513	30.18263	-97.81969	751.53	06-Feb-02	197.25	0.00	554.28	
58-50-517	30.17437	-97.81892	683.96	06-Feb-02	114.85	0.00	569.11	
58-50-520	30.20764	-97.80213	704.75	01-Feb-02	169.40	0.00	535.35	

A-4 February 2002 High Flow data								
SWN	**DDLat**	**DDLong**	**LSD Elev**	**Date**	**Meas WL**	**MPH**	**WL Elev**	**Comment**
58-50-5A	30.19084	-97.80651	746.56	06-Feb-02	185.17	2.00	563.39	
58-50-5BL	30.20341	-97.80330	703.30	01-Feb-02	153.85	0.00	549.45	
58-50-5CC	30.17629	-97.79716	713.80	06-Feb-02	155.12	0.00	558.68	
58-50-5JV	30.17072	-97.81287	694.39	08-Feb-02	150.47	0.00	543.92	
58-50-5M1	30.16565	-97.80952	665.00	06-Feb-02	77.84	0.10	587.26	
58-50-5PN	30.19222	-97.79778	687.00	01-Feb-02	134.90	0.00	552.10	
58-50-5ZB	30.20698	-97.83043	715.94	07-Feb-02	201.05	0.00	514.89	
58-50-704	30.13694	-97.85555	727.00	06-Feb-02	131.18	0.00	595.82	
58-50-707	30.14000	-97.83833	683.00	06-Feb-02	61.69	0.00	621.31	
58-50-742	30.15485	-97.84156	761.47	30-Jan-02	180.04	1.00	582.43	
58-50-7BW	30.13192	-97.83516	654.73	06-Feb-02	37.00	0.00	617.73	
58-50-7CW	30.13361	-97.86667	740.00	06-Feb-02	133.66	0.00	606.34	
58-50-7DF	30.14830	-97.84378	727.79	06-Feb-02	143.44	0.00	584.35	
58-50-7DM	30.15316	-97.83937	728.52	30-Jan-02	141.86	0.70	587.36	
58-50-7DT	30.15528	-97.86182	755.00	08-Feb-02	170.75	2.00	586.25	
58-50-7PC	30.13605	-97.85053	712.00	06-Feb-02	126.12	0.00	585.88	
58-50-7PL	30.14581	-97.84589	717.22	08-Feb-02	125.80	0.00	591.42	
58-50-7RG	30.14939	-97.87416	766.11	08-Feb-02	146.75	2.39	621.75	
58-50-7SJ	30.14305	-97.84801	675.00	06-Feb-02	89.51	2.00	587.49	
58-50-7WC	30.14209	-97.85368	700.00	07-Feb-02	110.28	1.96	591.68	
58-50-7WM	30.14972	-97.84275	738.91	23-Jan-02	144.61	0.00	594.30	
58-50-7WM	30.14972	-97.84275	738.91	30-Jan-02	142.40	0.00	596.51	
58-50-801	30.14281	-97.81076	663.82	04-Feb-02	42.83	1.50	622.49	
58-50-820	30.12883	-97.82195	628.00	06-Feb-02	0.00	0.00	628.00	
58-50-824	30.12692	-97.81834	636.18	06-Feb-02	12.36	0.00	623.82	
58-50-829	30.15731	-97.82000	669.97	08-Feb-02	89.10	2.00	582.87	
58-50-840	30.12972	-97.79833	710.00	06-Feb-02	92.14	0.00	617.86	
58-50-856	30.13489	-97.82649	660.00	05-Feb-02	49.82	0.00	610.18	
58-50-860	30.15361	-97.82166	675.00	06-Feb-02	84.50	0.00	590.50	
58-50-8CW	30.14110	-97.82874	696.00	07-Feb-02	92.80	1.00	604.20	
58-50-8D5	30.13382	-97.81322	618.96	06-Feb-02	17.45	0.00	601.51	
58-50-8GJ	30.15560	-97.82142	682.00	06-Feb-02	105.00	2.00	579.00	
58-50-8KF	30.14806	-97.82500	680.00	06-Feb-02	80.92	1.60	600.68	
58-50-8MG	30.13177	-97.82380	626.60	04-Feb-02	8.00	0.00	618.60	
58-50-8PR	30.15142	-97.83259	690.12	06-Feb-02	100.20	0.00	589.92	
58-50-8ST	30.16503	-97.83125	705.00	07-Feb-02	130.77	0.00	574.23	
58-57-2RR	30.08858	-97.91692	789.89	06-Feb-02	107.24	2.00	684.65	
58-57-302	30.09578	-97.87664	767.00	05-Feb-02	141.50	0.00	625.50	
58-57-313	30.11333	-97.88333	805.00	08-Feb-02	184.35	0.00	620.65	
58-57-3AM	30.08610	-97.91260	799.90	06-Feb-02	113.62	0.00	686.28	
58-57-3AW	30.09572	-97.87863	774.08	06-Feb-02	146.55	1.60	629.13	
58-57-3BA	30.11889	-97.91055	810.00	06-Feb-02	98.64	0.00	711.36	
58-57-3BF	30.10760	-97.90590	849.71	08-Feb-02	166.55	1.30	684.46	
58-57-3BL	30.09111	-97.88139	780.00	01-Feb-02	153.85	0.00	626.15	
58-57-3BN	30.11047	-97.87758	820.00	08-Feb-02	189.41	0.00	630.59	
58-57-3CC	30.11676	-97.88226	776.67	06-Feb-02	154.27	0.00	622.40	
58-57-3CR	30.12278	-97.88834	870.00	08-Feb-02	234.48	1.00	636.52	
58-57-3DB	30.11445	-97.91221	810.35	06-Feb-02	98.04	1.60	713.91	
58-57-3GC	30.09758	-97.88686	824.50	04-Feb-02	177.60	0.00	646.90	
58-57-3GO	30.09664	-97.88301	790.00	06-Feb-02	156.61	2.00	635.39	
58-57-3H	30.11278	-97.88667	806.00	11-Feb-02	182.60	2.00	625.40	
58-57-3JO	30.09240	-97.87614	765.27	05-Feb-02	131.74	0.00	633.53	
58-57-3NB	30.09937	-97.90118	833.03	06-Feb-02	152.14	2.00	682.89	
58-57-3RC	30.12444	-97.90639	800.00	06-Feb-02	91.85	1.92	710.07	
58-57-3RF	30.09618	-97.90588	850.00	06-Feb-02	163.92	2.00	688.08	
58-57-3SD	30.09278	-97.91444	830.00	06-Feb-02	138.96	1.55	692.59	
58-57-3TM	30.12238	-97.87721	734.03	06-Feb-02	124.01	0.00	610.02	
58-57-4BD	30.04917	-97.97528	920.00	07-Feb-02	130.13	1.30	791.17	
58-57-502	30.06635	-97.94447	890.00	06-Feb-02	172.90	0.50	717.60	
58-57-503	30.06447	-97.92834	810.00	07-Feb-02	112.70	0.50	697.80	
58-57-504	30.06210	-97.92007	821.00	27-Feb-02	130.30	0.00	690.70	
58-57-508	30.04346	-97.95557	879.93	07-Feb-02	169.10	0.00	710.83	
58-57-509	30.07240	-97.92031	796.53	16-Jan-02	83.37	1.05	714.21	was 58-57-5CR
58-57-5J2	30.04950	-97.93567	913.48	04-Feb-02	200.43	1.49	714.54	
58-57-5R5	30.07601	-97.95407	960.00	06-Feb-02	193.85	0.85	767.00	
58-57-5R7	30.07612	-97.95426	960.00	06-Feb-02	194.55	0.40	765.85	
58-57-5RR	30.04613	-97.95755	900.00	07-Feb-02	174.29	1.60	727.31	
58-57-602	30.07421	-97.91580	798.18	04-Feb-02	95.50	1.00	703.68	
58-57-6K1	30.07645	-97.88418	790.80	05-Feb-02	128.91	0.00	661.89	
58-57-6R1	30.05508	-97.91069	805.12	08-Feb-02	124.95	2.00	682.17	
58-57-6RF	30.07161	-97.91065	802.37	08-Feb-02	102.19	0.00	700.18	
58-57-6RR	30.06606	-97.91080	840.15	08-Feb-02	153.15	0.00	687.00	
58-57-76F	30.04068	-97.96017	940.00	04-Feb-02	229.96	0.00	710.04	

A-4 February 2002 High Flow data								
SWN	DDLat	DDLong	LSD Elev	Date	Meas WL	MPH	WL Elev	Comment
58-57-76G	30.04050	-97.96049	940.00	04-Feb-02	215.12	0.00	724.88	
58-57-802	30.02667	-97.92778	838.00	04-Feb-02	160.43	0.00	677.57	
58-57-807	30.01944	-97.95194	887.00	04-Feb-02	212.00	0.00	675.00	
58-57-8DJ	30.02222	-97.92083	862.00	05-Feb-02	207.46	0.00	654.54	
58-57-8RM	30.03547	-97.93542	842.00	07-Feb-02	178.26	0.00	663.74	
58-57-8TH	30.03555	-97.93611	910.00	07-Feb-02	232.51	0.00	677.49	
58-57-901	30.03275	-97.89030	836.91	05-Feb-02	184.04	0.00	652.87	
58-57-902	30.00833	-97.89584	814.00	04-Feb-02	184.42	0.00	629.58	
58-57-903	30.03850	-97.88617	824.02	04-Feb-02	174.90	0.00	649.12	
58-57-911	30.01250	-97.88917	831.00	04-Feb-02	198.95	0.00	632.05	
58-57-9A	30.03000	-97.89222	833.00	04-Feb-02	185.97	0.00	647.03	
58-57-9PC	30.02778	-97.87917	805.00	04-Feb-02	160.01	0.00	644.99	
58-58-101	30.08358	-97.84264	708.67	04-Feb-02	60.71	0.00	647.96	
58-58-123	30.10943	-97.84173	700.89	05-Feb-02	74.90	2.80	628.79	
58-58-124	30.11908	-97.84083	714.97	05-Feb-02	99.62	0.00	615.35	
58-58-1AB	30.11337	-97.86055	770.00	05-Feb-02	142.90	0.00	627.10	
58-58-1C1	30.10156	-97.85811	747.00	05-Feb-02	113.42	2.00	635.58	
58-58-1DL	30.08587	-97.85644	759.75	05-Feb-02	100.87	0.00	658.88	
58-58-1EG	30.10000	-97.87444	755.00	08-Feb-02	125.30	0.00	629.70	
58-58-1KM	30.09347	-97.84483	715.60	05-Feb-02	71.40	1.50	645.70	
58-58-1MC	30.09111	-97.84028	700.00	05-Feb-02	55.30	0.00	644.70	
58-58-1PS	30.08919	-97.85257	747.53	05-Feb-02	101.91	1.32	646.94	
58-58-1PW	30.11315	-97.87292	773.00	06-Feb-02	145.86	0.00	627.14	
58-58-1WM	30.08540	-97.86787	768.80	05-Feb-02	124.92	0.00	643.88	
58-58-211	30.08611	-97.82639	703.00	05-Feb-02	57.48	0.00	645.52	
58-58-216	30.12277	-97.81532	685.33	07-Feb-02	61.08	1.30	625.55	
58-58-218	30.09472	-97.81555	688.00	05-Feb-02	56.05	1.50	633.45	
58-58-2KS	30.11056	-97.81889	670.00	07-Feb-02	42.90	0.00	627.10	
58-58-2PM	30.12187	-97.82211	661.18	06-Feb-02	40.68	1.60	622.10	
58-58-406	30.06203	-97.85601	752.79	05-Feb-02	100.44	0.70	653.05	
58-58-410	30.06683	-97.83882	755.00	07-Feb-02	130.24	1.90	626.66	
58-58-417	30.04694	-97.86750	764.00	05-Feb-02	112.77	0.00	651.23	
58-58-418	30.07129	-97.85825	731.05	05-Feb-02	73.82	0.40	657.63	
58-58-423	30.06781	-97.85912	745.00	05-Feb-02	91.96	0.00	653.04	
58-58-424	30.07856	-97.87157	744.00	05-Feb-02	90.12	0.00	653.88	
58-58-4BL	30.08000	-97.86987	734.51	05-Feb-02	85.23	0.00	649.28	
58-58-4CT	30.06020	-97.86847	735.17	04-Feb-02	82.16	0.30	653.32	
58-58-4DD	30.07717	-97.86132	714.95	05-Feb-02	52.55	2.00	664.40	
58-58-4HO	30.07203	-97.84697	725.00	05-Feb-02	77.47	0.00	647.53	
58-58-4ML	30.07515	-97.85528	699.32	05-Feb-02	52.63	1.80	648.49	
58-58-4MM	30.08013	-97.84224	710.00	05-Feb-02	68.43	0.00	641.57	
58-58-4NM	30.04582	-97.85100	754.00	07-Feb-02	113.13	0.00	640.87	
58-58-4SG	30.08111	-97.84361	710.00	05-Feb-02	67.20	0.00	642.80	
58-58-509	30.07611	-97.83000	712.34	05-Feb-02	98.20	1.83	615.97	
58-58-704	30.02750	-97.85389	746.00	12-Feb-02	128.71	0.00	617.29	
58-58-709	30.03860	-97.85139	765.00	07-Feb-02	150.64	0.42	614.78	
58-58-7SH	30.00889	-97.86305	722.00	04-Feb-02	90.56	0.00	631.44	
67-01-303	29.99000	-97.87556	719.23	1/31/2002	169.24	0.00	549.99	
67-01-304	29.984722	-97.876389	717.55	1/14/2002	165.60	0.00	551.95	
67-01-311	29.98139	-97.89139	768.00	29-Jan-02	196.47	0.00	571.53	
67-01-801	29.89472	-97.93028	574.00			0	574.00	San Marcos Springs
67-01-809	29.91192	-97.92877	601.27	2/5/2002	20.59	0.00	580.68	
67-02-104	29.98278	-97.87139	680.00	29-Jan-02	105.99	0.00	574.01	
67-02-105	29.97472	-97.85694	647.00	29-Jan-02	67.10	0.00	579.90	
67-02-106	29.95806	-97.84194	678.00	29-Jan-02	95.95	0.00	582.05	

A-5: November 2002 High Flow Potentiometric Map of Southern Groundwater Divide area

A-5: November 2002 High Flow data, Southern Divide area								
SWN	DDLat	DDLong	LSD Elev	Date	Meas WL	MPH	WL Elev	Comment
58502H1	30.23493	-97.81423	689.46	11/14/02	194.83	0.00	494.63	
58502H2	30.23541	-97.81300	686.32	11/14/02	182.85	-1.10	504.57	
5850704	30.13694	-97.85555	727.00	11/18/02	113.00	-0.70	614.70	
5850718	30.13670	-97.84542	693.92	11/18/02	103.94	-0.85	590.83	
5850730	30.14000	-97.83833	683.00	11/18/02	92.80	-0.80	591.00	
58507PL	30.14581	-97.84589	717.22	11/18/02	128.60	-1.00	589.62	
5850858	30.13111	-97.82166	630.00	11/18/02	14.35	-2.30	617.95	
58572FR	30.09482	-97.93754	926.00	11/27/02	189.65	-0.60	736.95	
58572RR	30.08858	-97.91692	789.89	11/18/02	110.00	-2.00	681.89	
5857307	30.09986	-97.88229	790.51	11/18/02	168.05	-1.58	624.04	

A-5: November 2002 High Flow data, Southern Divide area

SWN	DDLat	DDLong	LSD Elev	Date	Meas WL	MPH	WL Elev	Comment
5857313	30.11333	-97.88333	805.00	11/18/02	189.95	-1.65	616.70	
5857314	30.11571	-97.89501	899.79	11/18/02	267.40	-2.35	634.74	
58573BF	30.10760	-97.90590	849.71	11/18/02	167.37	-1.30	683.64	
58573CR	30.12278	-97.88834	870.00	11/18/02	239.43	-1.00	631.57	
58573DB	30.11445	-97.91221	810.35	11/21/02	90.47	-1.60	721.48	
58573DD	30.11010	-97.88184	820.00	11/18/02	186.02	-1.25	635.23	
58573GC	30.09758	-97.88686	824.50	11/18/02	186.91	0.00	637.59	
58573KP	30.11150	-97.89209	861.08	11/18/02	217.12	-2.20	646.16	
58573LU	30.11994	-97.88019	771.57	11/18/02	158.35	-1.00	614.22	
58573NB	30.09937	-97.90118	833.03	11/18/02	157.00	-1.30	677.33	
58573RF	30.09618	-97.90588	850.00	11/18/02	169.32	-1.20	681.88	
58573SD	30.09278	-97.91444	830.00	11/18/02	139.65	-1.55	691.90	
58573TA	30.10167	-97.87527	775.00	11/19/02	144.70	-1.45	631.75	
58574AT	30.04320	-97.96113	915.12	11/27/02	180.00	-1.40	736.52	
58574BD	30.04917	-97.97528	920.00	11/20/02	152.08	-1.30	769.22	
58574R2	30.04792	-97.96568	908.91	11/27/02	158.00	-0.30	751.21	
5857502	30.06635	-97.94447	890.00	11/27/02	171.52	-0.50	718.98	
5857505	30.05164	-97.92097	857.01	11/26/02	161.40	-1.25	696.86	
5857508	30.04346	-97.95557	879.93	11/20/02	164.10	-1.30	717.13	
58575CR	30.07240	-97.92031	796.53	11/18/02	82.63	-1.05	714.95	
58575CY	30.04352	-97.95052	874.97	11/20/02	159.40	-1.05	716.62	
58575J2	30.04950	-97.93567	913.48	11/20/02	197.96	-1.49	717.01	
58575JB	30.05111	-97.95583	865.00	11/20/02	129.60	-1.21	736.61	
58575R3	30.07041	-97.94576	918.93	11/27/02	191.53	-0.85	728.25	
58575R4	30.08269	-97.94820	887.19	11/27/02	116.70	-1.00	771.49	
58575R5	30.07601	-97.95407	960.00	11/27/02	193.80	-0.85	767.05	
58575R7	30.07612	-97.95426	960.00	11/27/02	194.50	-0.40	765.90	
58575T4	30.05853	-97.92112	828.30	11/18/02	129.80	-1.95	700.45	
5857605	30.05777	-97.90743	809.07	11/26/02	124.60	0.00	684.47	
5857606	30.04773	-97.88367	820.38	11/19/02	173.00	-0.70	648.08	
58576BF	30.04611	-97.88333	820.00	11/25/02	173.50	-1.75	648.25	
58576DS	30.08139	-97.90945	790.00	11/18/02	96.45	-1.65	695.20	
58576R1	30.05508	-97.91069	805.12	11/27/02	122.22	-1.70	684.60	
58576RF	30.07161	-97.91065	802.37	11/27/02	102.27	-2.00	702.10	
58576RH	30.04560	-97.89873	803.40	11/21/02	147.40	-2.35	658.35	
58576RR	30.06606	-97.91080	840.15	11/27/02	149.85	-2.20	692.50	
5857701	30.03969	-97.96465	931.00	11/20/02	207.00	-2.02	726.02	
5857702	30.03865	-97.97967	949.17	11/20/02	187.10	-0.40	762.47	
585776F	30.04068	-97.96017	940.00	11/20/02	228.74	-0.75	712.01	
585776G	30.04050	-97.96049	940.00	11/20/02	213.78	-0.20	726.42	
5857802	30.02667	-97.92778	838.00	11/20/02	156.58	0.00	681.42	
5857807	30.01944	-97.95194	887.00	11/20/02	208.90	0.00	678.10	
5857808	30.01139	-97.94417	738.00	11/20/02	72.50	-0.70	666.20	
5857809	30.01032	-97.94487	738.00	11/20/02	81.50	-0.45	656.95	
5857810	30.04117	-97.92059	817.58	11/26/02	122.90	-1.10	695.78	
58578CY	30.04081	-97.95053	914.48	11/20/02	203.00	-1.21	712.69	
58578RM	30.03547	-97.93542	842.00	11/20/02	170.51	-1.70	673.19	
58578RP	30.03674	-97.92944	865.00	11/20/02	174.44	-1.45	692.01	
58578SG	30.02337	-97.92108	875.04	11/20/02	212.25	-1.05	663.84	
58578WM	30.01085	-97.94485	750.00	11/20/02	83.78	-0.70	666.92	
5857902	30.00833	-97.89584	814.00	11/19/02	197.02	0.00	616.98	
5857903	30.03850	-97.88617	824.02	11/19/02	178.82	0.00	645.20	
5857911	30.01250	-97.88917	831.00	11/19/02	200.02	-0.30	631.28	
5857913	30.03389	-97.89111	849.00	11/25/02	206.00	-1.10	644.10	
58579A	30.03000	-97.89222	833.00	11/19/02	189.76	-2.05	645.29	
58579MW	30.02038	-97.89897	840.00	11/21/02	196.40	-2.30	645.90	
58579OL	30.02159	-97.90551	865.00	11/20/02	217.60	-0.30	647.70	
58579PC	30.02778	-97.87917	805.00	11/19/02	161.73	-1.40	644.67	
5858101	30.08358	-97.84264	708.67	11/18/02	68.28	0.00	640.39	
5858115	30.12444	-97.87389	730.00	11/18/02	131.35	-1.60	600.25	
5858121	30.10503	-97.86236	760.07	11/18/02	146.56	-1.47	614.98	
5858123	30.10943	-97.84173	700.89	11/18/02	82.35	-2.80	621.34	
58581BT	30.11235	-97.85900	765.00	11/19/02	157.23	-1.65	609.42	
58581dL	30.08587	-97.85644	759.75	11/19/02	95.82	-0.40	664.33	
58581EG	30.10000	-97.87444	755.00	11/21/02	137.92	-0.85	617.93	
58581JK	30.08645	-97.85426	754.34	11/19/02	91.70	-0.50	663.14	
58581KM	30.09347	-97.84483	715.60	11/19/02	70.35	-1.50	646.75	
58581MC	30.09111	-97.84028	700.00	11/19/02	59.00	-0.70	641.70	
58581PS	30.08919	-97.85257	747.53	11/19/02	103.60	-1.32	645.25	
58581TW	30.10164	-97.87061	790.68	11/19/02	168.30	-1.65	624.03	

A-5: November 2002 High Flow data, Southern Divide area								
SWN	DDLat	DDLong	LSD Elev	Date	Meas WL	MPH	WL Elev	Comment
5858211	30.08611	-97.82639	703.00	11/19/02	59.50	-1.35	644.85	
5858218	30.09472	-97.81555	688.00	11/19/02	59.00	-0.80	629.80	
5858406	30.06203	-97.85601	752.79	11/19/02	103.20	-0.85	650.44	
5858410	30.06683	-97.83882	755.00	11/19/02	134.65	-1.90	622.25	
5858417	30.04694	-97.86750	764.00	11/19/02	116.55	-1.50	648.95	
5858418	30.07129	-97.85825	731.05	11/19/02	77.04	-0.40	654.41	
58584CT	30.06020	-97.86847	735.17	11/19/02	86.70	-1.13	649.60	
58584CW	30.08006	-97.87452	740.00	11/21/02	98.00	-1.60	643.60	
58584HO	30.07203	-97.84697	725.00	11/19/02	79.65	-1.25	646.60	
58584L	30.07083	-97.87473	740.00	11/21/02	87.10	-1.50	654.40	
58584NM	30.04582	-97.85100	754.00	11/19/02	141.80	-1.28	613.48	
58584SG	30.08111	-97.84361	710.00	11/19/02	67.57	0.00	642.43	
5858509	30.07611	-97.83000	712.34	11/19/02	95.08	-1.83	619.09	
5858704	30.02750	-97.85389	746.00	11/19/02	137.30	-0.34	609.04	
5858709	30.03860	-97.85139	765.00	11/19/02	156.77	-0.42	608.65	
58587SH	30.00889	-97.86305	722.00	11/19/02	93.60	-1.95	630.35	
67-01-303	29.98972	-97.87527	715.00	11/15/02	133.90	0.00	581.10	
67-01-311	29.98143	-97.89140	770.52	11/14/02	176.73	0.00	593.79	
67-02-104	29.98279	-97.87153	674.32	11/14/02	87.77	0.00	586.55	
67-02-105	29.95830	-97.84212	646.70	11/14/02	65.90	0.00	580.80	
67-02-106	29.97474	-97.85712	678.28	11/14/02	92.06	0.00	586.22	
67-09-113	29.83874	-97.99074	704.73	11/14/02	115.24	0.00	589.49	
67-09-401	29.82925	-97.96236	642.51	11/14/02	48.85	0.00	593.66	
67-01-809	29.91192	-97.92877	601.27	11/15/02	18.59	0.00	582.68	

A-6: October and November 2005 Below Average

A-6: October and November 2005 below average flow data								
SWN	DDLat	DDLong	LSD Elev	Date	Meas WL	MPH	WL Elev	Comment
58-42-619	30.29722	-97.78972	490.00				490.00	Bee Springs
58-42-711	30.25111	-97.83722	785.00	10/31/05	161.52	-1.80	621.68	
58-42-811	30.25972	-97.82306	593.44			0.00	593.44	
58-42-816	30.27750	-97.79389	620.00	11/1/05	189.35	0.00	430.65	
58-42-819	30.26101	-97.81757	683.58	10/31/05	222.55	-1.94	459.09	
58-42-821	30.26306	-97.81389	740.00	10/31/05	256.00	-2.00	482.00	
58-42-825	30.26419	-97.81432	735.00	11/1/05	257.53	-2.45	475.02	
58-42-8TW	30.26140	-97.79518	631.66	10/31/05	177.91	-2.00	451.75	
58-42-913	30.26667	-97.78222	546.60	10/31/05	106.50	-1.60	438.50	
58-42-914	30.26368	-97.77082	433.90				433.90	Main Barton Springs
58-42-915	30.25121	-97.78089	653.00	11/1/05	215.38	-1.94	435.68	
58-42-921	30.26428	-97.77017	434.60				434.60	Eliza
58-42-922	30.26354	-97.76807	434.77				434.77	Old Mill Springs
58-42-927	30.25070	-97.75393	505.00	11/1/05	12.50	0.00	492.50	
58-42-928	30.25631	-97.76955	580.00	10/29/05	129.51	0.00	450.49	
58-42-9CL	30.27778	-97.78472	610.00	11/1/05	177.00	0.00	433.00	
58-42-9NC	30.27083	-97.77472	505.00	10/31/05	76.11	-1.00	427.89	
58-42-9SG	30.27482	-97.78076	569.00	11/1/05	128.20	0.00	440.80	
58-49-916	30.27959	-97.78043	426.60				426.60	Cold Springs
58-49-926	30.12513	-97.90517	794.24	10/4/05	122.50	-0.22	671.52	
58-49-937	30.15801	-97.88745	777.56	11/2/05	93.38	-1.30	682.88	
58-49-9AN	30.16462	-97.87875	825.00	11/3/05	170.25	0.00	654.75	
58-49-9BQ	30.12583	-97.90361	787.38	11/1/05	68.18	-0.90	718.30	
58-49-9QL	30.12697	-97.90739	754.57	11/1/05	12.98	0.00	741.59	
58-50-122	30.23839	-97.83824	740.00	11/3/05	205.25	0.00	534.75	
58-50-127	30.22056	-97.87055	835.00	10/31/05	113.25	0.00	721.75	
58-50-128	30.21556	-97.84722	745.00	10/31/05	113.00	-2.96	629.04	
58-50-1CH	30.21071	-97.83421	720.47	11/3/05	196.02	0.00	524.45	
58-50-1GR	30.22333	-97.83528	731.00	11/1/05	177.54	-1.90	551.56	
58-50-1NF	30.23222	-97.85750	835.00	11/1/05	121.40	-1.50	712.10	
58-50-1W2	30.22640	-97.84147	744.16	10/31/05	153.75	-1.45	588.96	
58-50-211	30.24524	-97.82803	680.00	11/3/05	202.22	-0.70	477.08	
58-50-212	30.22548	-97.80618	674.00	10/31/05	215.51	-1.70	456.79	
58-50-216	30.23222	-97.79250	690.00	10/31/05	243.85	-3.17	442.98	
58-50-222	30.21722	-97.81879	694.91	10/31/05	199.52	-2.30	493.09	
58-50-231	30.20944	-97.79195	655.00	11/1/05	205.79	-2.15	447.06	
58-50-2H1	30.23493	-97.81423	689.46	10/31/05	209.32	0.00	480.14	
58-50-2JG	30.23972	-97.81445	693.00	11/1/05	235.40	-2.00	455.60	
58-50-301	30.21035	-97.78159	658.66	11/1/05	161.85	-1.35	495.46	
58-50-3AS	30.24389	-97.78528	670.00	11/1/05	253.38	-1.00	415.62	
58-50-3RS	30.24055	-97.78722	690.00	11/1/05	245.22	0.00	444.78	
58-50-410	30.18022	-97.87550	783.00	11/3/05	142.60	-0.25	640.15	

A-6: October and November 2005 below average flow data								
SWN	DDLat	DDLong	LSD Elev	Date	Meas WL	MPH	WL Elev	Comment
58-50-411	30.18670	-97.84917	770.00	11/1/05	228.05	-1.50	540.45	
58-50-417	30.19536	-97.84640	804.00	11/1/05	261.70	-1.70	540.60	
58-50-419	30.17303	-97.85028	752.00	11/3/05	201.69	0.00	550.31	
58-50-420	30.18677	-97.86089	775.00	11/2/05	160.44	-3.20	611.36	
58-50-421	30.17606	-97.87093	785.00	11/7/05	140.45	0.00	644.55	
58-50-511	30.17159	-97.82578	698.59	11/1/05	195.75	-1.85	500.99	
58-50-513	30.18263	-97.81969	751.53	11/3/05	259.68	-0.60	491.25	
58-50-517	30.17437	-97.81892	683.96	10/31/05	186.10	-2.10	495.76	
58-50-520	30.20764	-97.80213	704.75	11/3/05	243.80	0.00	460.95	
58-50-521	30.19222	-97.79778	687.00	11/8/05	209.40	-1.85	475.75	
58-50-5A	30.19084	-97.80651	746.56	10/27/05	257.91	-2.00	486.65	
58-50-5BB	30.17843	-97.80962	730.00	10/31/05	221.80	0.00	508.20	
58-50-5BL	30.20341	-97.80330	703.30	10/31/05	232.32	0.00	470.98	
58-50-5CC	30.17629	-97.79716	713.80	10/31/05	196.50	0.00	517.30	
58-50-5JA	30.19350	-97.79524	711.11	10/31/05	236.55	0.00	474.56	
58-50-5JV	30.17072	-97.81287	694.39	10/31/05	182.00	0.00	512.39	
58-50-5TC	30.17111	-97.82139	690.00	10/31/05	181.39	-1.50	507.11	
58-50-5TP	30.17830	-97.80968	730.00	10/31/05	230.88	0.00	499.12	
58-50-5ZB	30.20698	-97.83043	715.94	11/3/05	209.60	0.00	506.34	
58-50-707	30.14041	-97.83871	670.00	10/28/05	162.49	0.00	507.51	
58-50-718	30.13670	-97.84542	693.92	10/28/05	176.35	-0.90	516.67	
58-50-730	30.14000	-97.83833	683.00	10/28/05	162.00	-0.80	520.20	
58-50-731	30.15297	-97.85870	736.51	11/4/05	212.67	-1.36	522.48	
58-50-734	30.13417	-97.85000	714.00	10/28/05	183.00	-2.15	528.85	
58-50-739	30.13833	-97.84944	683.00	10/28/05	155.41	-2.00	525.59	
58-50-743	30.15447	-97.85878	733.88	11/4/05	208.30	-1.95	523.63	
58-50-744	30.14240	-97.84233	654.00	10/28/05	142.69	0.00	511.31	
58-50-747	30.16098	-97.87471	800.00	11/2/05	160.25	-3.47	636.28	
58-50-748	30.14617	-97.85970	720.00	11/2/05	170.44	0.00	549.56	
58-50-7AD2	30.12967	-97.83661	650.00	11/1/05	104.90	-1.55	543.55	
58-50-7BB	30.16573	-97.83470	714.10	10/31/05	202.00	-1.10	511.00	
58-50-7BG	30.16221	-97.86037	762.00	11/4/05	211.75	-1.52	548.73	
58-50-7CB	30.13664	-97.84186	660.00	10/28/05	148.31	-3.20	508.49	
58-50-7CO	30.13976	-97.84605	692.00	10/28/05	176.55	0.00	515.45	
58-50-7DF	30.14830	-97.84378	727.79	10/28/05	205.85	-1.85	520.09	
58-50-7DR	30.14705	-97.84525	712.00	10/28/05	196.30	0.00	515.70	
58-50-7DT	30.15528	-97.86182	755.00	11/4/05	191.30	-2.00	561.70	
58-50-7EJ	30.13328	-97.84379	688.00	10/28/05	164.00	0.00	524.00	
58-50-7FS	30.15954	-97.85764	750.00	11/4/05	194.30	-0.80	554.90	
58-50-7GH	30.14484	-97.84625	682.00	10/28/05	156.65	-1.63	523.72	
58-50-7HL	30.14745	-97.84647	699.00	10/28/05	202.10	-1.00	495.90	
58-50-7LD	30.13239	-97.83894	630.00	10/28/05	109.64	-1.50	518.86	
58-50-7MB	30.13944	-97.83583	690.00	11/1/05	165.40	-2.60	522.00	
58-50-7ME	30.14272	-97.84134	676.00	10/28/05	170.43	-0.50	505.07	
58-50-7ML	30.12487	-97.86229	695.00	10/28/05	171.35	-0.60	523.05	
58-50-7MO	30.13194	-97.85500	711.82	10/28/05	171.58	-1.80	538.44	
58-50-7PL	30.14581	-97.84589	717.22	10/28/05	183.90	-1.00	532.32	
58-50-7RD	30.14792	-97.85992	760.07	11/4/05	216.34	0.00	543.73	
58-50-7SC	30.15687	-97.86310	755.00	11/2/05	186.63	-2.00	566.37	
58-50-7SP	30.13434	-97.85509	700.00	10/28/05	174.19	0.00	525.81	
58-50-7TT	30.13917	-97.84139	660.00	10/28/05	140.08	-1.56	518.36	
58-50-7WC	30.14209	-97.85368	702.00	11/2/05	166.00	-1.96	534.04	
58-50-801	30.14281	-97.81076	663.82	11/1/05	105.70	-1.50	556.62	
58-50-817	30.14000	-97.83222	700.00	11/7/05	177.65	-1.65	520.70	
58-50-824	30.12692	-97.81834	636.18	11/1/05	73.14	0.00	563.04	
58-50-830	30.16069	-97.81808	687.00	11/2/05	182.82	-2.10	502.08	
58-50-840	30.13004	-97.79846	710.00	11/2/05	135.50	-1.75	572.75	
58-50-842	30.15005	-97.83235	697.94	10/31/05	180.50	-1.50	515.94	
58-50-845	30.12406	-97.82665	650.00	11/8/05	93.67	0.00	556.33	
58-50-850	30.12590	-97.81580	620.87	11/1/05	59.81	-1.35	559.71	
58-50-851	30.12582	-97.81564	621.76	11/1/05	60.57	0.00	561.19	
58-50-852	30.16167	-97.81834	690.00	10/31/05	186.72	-1.50	501.78	
58-50-856	30.13489	-97.82649	660.00	11/1/05	122.08	-1.75	536.17	
58-50-861	30.14444	-97.83139	704.00	10/27/05	188.71	-1.80	513.49	
58-50-8D5	30.13382	-97.81322	618.96	11/1/05	60.85	0.00	558.11	
58-50-8DB	30.16142	-97.81152	650.00	10/31/05	121.03	-1.60	527.37	
58-50-8JH	30.13876	-97.80353	630.77	10/27/05	70.52	0.00	560.25	
58-50-8LB	30.13907	-97.82839	685.00	10/27/05	152.36	0.00	532.64	
58-50-8LD	30.16139	-97.80972	663.00	10/31/05	135.92	-2.50	524.58	
58-50-8MG	30.13177	-97.82380	626.60	11/1/05	78.30	-1.00	547.30	
58-50-8SM	30.16514	-97.79381	656.00	10/31/05	100.65	0.00	555.35	
58-50-8SR	30.16565	-97.80952	665.00	11/1/05	138.47	-0.10	526.43	
58-50-8ST	30.16503	-97.83125	705.00	10/31/05	193.67	-0.25	511.08	

A-6: October and November 2005 below average flow data								
SWN	DDLat	DDLong	LSD Elev	Date	Meas WL	MPH	WL Elev	Comment
58-57-201	30.10278	-97.93694	925.00	11/10/05	167.00	0.00	758.00	
58-57-2RR	30.08858	-97.91692	789.89	11/10/05	143.23	-2.00	644.66	
58-57-307	30.09986	-97.88229	790.51	11/4/05	209.00	-1.58	579.93	
58-57-311	30.11246	-97.89114	857.70	11/10/05	236.41	0.00	621.29	
58-57-312	30.10611	-97.90334	868.00	11/10/05	215.00	-1.45	651.55	
58-57-3AM	30.08610	-97.91260	799.90	11/10/05	147.25	-2.00	650.65	
58-57-3BF	30.10760	-97.90590	849.71	11/10/05	176.03	-1.30	672.38	
58-57-3DB	30.11445	-97.91221	810.35	11/10/05	120.13	-1.60	688.62	
58-57-3EG	30.10563	-97.88880	788.62	11/10/05	222.71	-1.60	564.31	
58-57-3GC	30.09758	-97.88686	824.50	11/1/05	221.25	0.00	603.25	
58-57-3H	30.11306	-97.88389	805.00	11/1/05	213.00	-2.00	590.00	
58-57-3HF	30.11308	-97.87675	802.00	10/28/05	239.40	-2.00	560.60	
58-57-3JC	30.08750	-97.91583	803.00	11/10/05	140.94	-1.00	661.06	
58-57-3JF	30.09114	-97.90984	828.00	11/10/05	178.03	-2.45	647.52	
58-57-3JP	30.11254	-97.88333	805.00	11/10/05	213.94	-3.50	587.56	
58-57-3KD	30.08833	-97.91444	820.00	11/10/05	174.18	-1.60	644.22	
58-57-3KF	30.09861	-97.89833	835.00	11/10/05	187.23	0.00	647.77	
58-57-3NB	30.09937	-97.90118	833.03	11/10/05	178.33	-2.00	652.70	
58-57-3ON	30.08889	-97.90833	800.00	11/10/05	173.45	-1.60	624.95	
58-57-3RF	30.09618	-97.90588	826.00	11/10/05	188.45	-1.20	636.35	
58-57-3RR	30.08833	-97.91500	805.00	11/1/05	142.67	0.00	662.33	
58-57-502	30.06635	-97.94447	890.00	11/2/05	206.18	-0.50	683.32	
58-57-503	30.06447	-97.92834	810.00	11/2/05	135.25	-0.50	674.25	
58-57-509	30.07240	-97.92031	781.00	11/1/05	120.59	-0.60	659.81	
58-57-510	30.06346	-97.94162	865.00	11/2/05	186.28	-3.90	674.82	
58-57-512	30.05853	-97.92112	828.30	11/10/05	154.35	-1.95	672.00	
58-57-5J2	30.04950	-97.93567	913.48	11/1/05	212.05	-1.49	699.94	
58-57-5R5	30.07601	-97.95407	960.00	11/2/05	196.90	-0.85	762.25	
58-57-5R7	30.07612	-97.95426	960.00	11/2/05	197.60	-0.40	762.00	
58-57-5RR	30.04613	-97.95755	900.00	11/2/05	185.12	-2.10	712.78	
58-57-606	30.04773	-97.88367	820.38	11/4/05	214.00	-0.70	605.68	
58-57-610	30.04560	-97.89873	803.40	11/4/05	185.73	-2.35	615.32	
58-57-6DS	30.08139	-97.90945	790.00	11/10/05	135.50	-1.65	652.85	
58-57-6JC	30.08055	-97.91111	782.00	11/10/05	134.79	-1.60	645.61	
58-57-6KW	30.08278	-97.91250	785.00	11/10/05	127.70	-1.80	655.50	
58-57-6M3	30.07214	-97.91615	790.00	11/10/05	120.08	-1.50	668.42	
58-57-6MZ	30.08361	-97.91261	790.00	11/10/05	132.47	-1.80	655.73	
58-57-6SI	30.08194	-97.91333	790.00	11/10/05	139.95	-1.50	648.55	
58-57-701	30.03969	-97.96465	931.00	11/3/05	210.02	-0.90	720.08	
58-57-702	30.03865	-97.97967	949.17	11/3/05	197.60	-0.40	751.17	
58-57-76F	30.04068	-97.96017	940.00	11/2/05	235.25	0.00	704.75	
58-57-76G	30.04050	-97.96049	940.00	11/2/05	232.20	-0.20	707.60	
58-57-802	30.02667	-97.92778	838.00	11/15/05	189.50	0.00	648.50	
58-57-807	30.01944	-97.95194	887.00	11/15/05	214.30	0.00	672.70	
58-57-8BW1	30.03833	-97.92834	851.00	11/3/05	177.84	-2.00	671.16	
58-57-8JG	30.03494	-97.95198	856.00	11/3/05	167.45	-0.30	688.25	
58-57-8SG	30.02337	-97.92108	875.04	11/2/05	236.17	-1.05	637.82	
58-57-901	30.03275	-97.89030	836.91	11/1/05	229.22	-1.60	606.09	
58-57-902	30.00833	-97.89500	815.00	11/2/05	219.50	0.00	595.50	
58-57-903	30.03851	-97.88618	826.80	11/2/05	220.30	-0.70	605.80	
58-57-9OL	30.02159	-97.90551	865.00	11/2/05	256.91	-0.30	607.79	
58-57-9PC	30.02778	-97.87917	800.36	11/2/05	223.00	-1.34	576.02	
58-58-101	30.08358	-97.84263	707.84	11/2/05	126.83	-1.15	579.86	
58-58-115	30.12444	-97.87389	730.00	11/4/05	173.54	-1.60	554.86	
58-58-122	30.09472	-97.84361	714.00	11/8/05	139.90	-1.00	573.10	
58-58-123	30.10943	-97.84173	712.00	11/1/05	138.60	-2.80	570.60	
58-58-124	30.11908	-97.84083	714.97	11/1/05	171.00	-2.00	541.97	
58-58-128	30.08725	-97.85361	748.46	10/28/05	163.00	-1.50	583.96	
58-58-1AB	30.11337	-97.86055	770.00	11/1/05	230.40	-1.10	538.50	
58-58-1BC	30.08509	-97.85768	743.00	10/28/05	157.32	-0.73	584.95	
58-58-1C1	30.10156	-97.85811	747.00	11/1/05	181.10	-0.95	564.95	
58-58-1DD	30.11858	-97.87114	755.00	10/28/05	216.67	-1.78	536.55	
58-58-1DL	30.08587	-97.85644	759.75	10/28/05	157.00	-0.40	602.35	
58-58-1EH	30.11096	-97.87410	807.00	10/28/05	251.61	-1.60	553.79	
58-58-1JS	30.10578	-97.87267	798.00	10/28/05	234.40	-2.10	561.50	
58-58-1MC	30.09111	-97.84028	700.00	11/2/05	116.94	-0.70	582.36	
58-58-1OS	30.10535	-97.87415	791.00	10/28/05	234.95	-2.00	554.05	
58-58-1PS	30.08919	-97.85257	747.53	11/7/05	164.72	-1.32	581.49	
58-58-1RD	30.10806	-97.87382	837.00	10/28/05	279.58	-2.10	555.32	
58-58-1WM	30.08540	-97.86787	768.80	10/28/05	170.81	0.00	597.99	
58-58-202	30.12459	-97.81374	651.13	10/31/05	100.95	0.00	550.18	
58-58-208	30.11639	-97.81976	666.31	11/10/05	107.61	-1.75	556.95	
58-58-219	30.09167	-97.81750	684.00	11/8/05	108.75	-0.93	574.32	

A-6: October and November 2005 below average flow data								
SWN	DDLat	DDLong	LSD Elev	Date	Meas WL	MPH	WL Elev	Comment
58-58-220	30.09333	-97.81445	693.00	11/8/05	109.80	-1.50	581.70	
58-58-413	30.07051	-97.83549	752.43	11/1/05	174.73	-1.08	576.62	
58-58-417	30.04723	-97.86748	763.07	11/4/05	164.51	-1.50	597.06	
58-58-418	30.07129	-97.85825	731.05	11/2/05	125.53	-0.40	605.12	
58-58-423	30.06781	-97.85912	745.00	11/2/05	143.10	-1.60	600.30	
58-58-424	30.07856	-97.87157	744.00	11/4/05	140.78	-2.00	601.22	
58-58-426	30.08000	-97.86987	734.51	11/4/05	141.90	-2.00	590.61	
58-58-427	30.07717	-97.86132	709.43	11/4/05	99.45	-2.00	607.98	
58-58-4BS	30.05167	-97.83417	692.00	11/2/05	107.08	-0.75	584.17	
58-58-4CT	30.06020	-97.86848	734.80	11/2/05	133.57	-1.13	600.10	
58-58-4HO	30.07203	-97.84697	725.00	11/2/05	130.47	-1.25	593.28	
58-58-4LC	30.07083	-97.87361	710.00	11/4/05	125.83	-1.00	583.17	
58-58-4SG	30.08111	-97.84361	710.00	11/2/05	126.60	0.00	583.40	
58-58-4TC	30.06184	-97.85600	748.00	11/2/05	152.15	0.00	595.85	
58-58-505	30.06807	-97.81940	753.20	11/2/05	21.90	-1.00	730.30	
58-58-509	30.07611	-97.83000	712.34	11/2/05	142.22	-1.83	568.29	
58-58-5JW	30.07193	-97.82836	736.99	11/8/05	155.79	-3.75	577.45	
58-58-704	30.02750	-97.85389	746.00	11/2/05	173.96	-0.34	571.70	
58-58-711	30.01677	-97.85932	696.62	11/2/05	122.07	-1.95	572.60	
58-58-712	30.02917	-97.87000	780.00	11/4/05	216.17	0.00	563.83	
67-01-203	29.96194	-97.92056	691.00	11/3/05	104.10	-1.00	585.90	
67-01-301	29.96294	-97.89681	679.00	11/3/05	113.79	-1.00	564.21	
67-01-303	29.98976	-97.87547	719.24	10/24/05	165.92	-1.10	552.22	
67-01-304	29.98451	-97.87630	717.55	10/24/05	154.98	-0.25	562.32	
67-01-4AA	29.92159	-97.96544	724.88	10/24/05	144.18	-0.90	579.80	
67-01-5MD	29.94628	-97.93557	755.00	11/3/05	187.68	-1.30	566.02	
67-01-5PL	29.91819	-97.93240	660.00	11/3/05	91.40	-2.05	566.55	
67-01-5XN	29.92359	-97.94784	685.00	11/3/05	108.30	-0.50	576.20	
67-01-6AW	29.93650	-97.91118	760.00	11/3/05	197.15	-1.00	561.85	
67-01-6AW1	29.93141	-97.90462	675.00	11/3/05	105.50	-0.40	569.10	
67-01-6AW2	29.93740	-97.91480	790.00	11/3/05	218.32	-0.70	570.98	
67-01-6EN	29.93216	-97.90456	670.00	11/3/05	95.75	-0.70	573.55	
67-01-7BB	29.90860	-97.97154	767.83	10/24/05	188.13	-0.77	578.93	
67-01-801	29.89472	-97.93028	574.00		0.00	0.00	574.00	San Marcos Springs
67-01-809	29.91192	-97.92877	601.27	11/3/05	26.83	0.00	574.44	
67-01-812	29.89048	-97.92837	580.89	10/25/05	4.70	-2.89	573.30	
67-01-813	29.89113	-97.93188	581.12	10/25/05	5.51	-3.08	572.53	
67-01-8BB	29.89444	-97.92945	585.03	10/26/05	10.05	-1.25	573.73	
67-01-8CC	29.89361	-97.93204	632.70	10/26/05	57.47	-2.12	573.11	
67-01-8DD	29.88717	-97.94962	750.96	10/26/05	175.39	-1.00	574.57	
67-01-9EG	29.91359	-97.91647	650.00	11/3/05	69.80	-0.85	579.35	

A-7: July and August 2006 Low Flow

A-7: July and August 2006 low flow data								
SWN	DDLat	DDLong	LSD Elev	Date	Meas WL	MPH	WL Elev	Comment
58-42-619	30.29722	-97.78972	490.00		0.00		490.00	Bee Springs (flowing?)
58-42-711	30.25111	-97.83722	785.00	7/26/06	161.35	-1.80	621.85	
58-42-811	30.25972	-97.82306	593.44			0.00	593.44	
58-42-819	30.26101	-97.81757	683.58	7/26/06	221.30	-1.94	460.34	
58-42-8TW	30.26140	-97.79518	631.66	8/11/06	185.03	-2.00	444.63	
58-42-914	30.26368	-97.77082	433.90		0.00		433.90	Main Barton Springs
58-42-921	30.26428	-97.77017	434.60		0.00		434.60	Eliza
58-42-922	30.26354	-97.76807	434.77		0.00		434.77	Old Mill Springs (trickle flow)
58-42-927	30.25070	-97.75393	505.00	7/31/06	21.40	0.00	483.60	
58-42-928	30.25631	-97.76955	580.00	7/19/06	136.52	0.00	443.48	
58-42-9NC	30.27083	-97.77472	505.00	10/31/05	76.11	-1.00	427.89	
58-42-9SG	30.27482	-97.78076	569.00	8/15/06	131.68	0.00	437.32	
58-42-9XN	30.26704	-97.78812	617.00	7/31/06	199.24	-2.20	415.56	
58-49-916	30.27959	-97.78043	426.60		0.00		426.60	Cold Springs
58-49-9BQ	30.12583	-97.90361	787.38	7/25/06	77.15	-0.90	709.33	
58-49-9RP	30.14727	-97.88963	783.90	8/30/06	110.10	0.00	673.80	
58-49-9SR	30.16354	-97.90721	824.10			0.00	824.10	
58-49-9TO	30.15106	-97.87583	770.90	8/19/06	171.50	0.00	599.40	
58-50-127	30.22056	-97.87055	835.00	7/26/06	112.80	0.00	722.20	
58-50-128	30.21556	-97.84722	745.00	7/26/06	112.45	-2.96	629.59	
58-50-1GR	30.22333	-97.83528	731.00	7/26/06	176.33	-1.90	552.77	
58-50-1W2	30.22640	-97.84147	744.16	7/26/06	153.24	-1.45	589.47	
58-50-201	30.21958	-97.79373	657.81	8/11/06	219.64	0.00	438.17	
58-50-212	30.22548	-97.80618	674.00	7/26/06	226.82	-1.70	445.48	
58-50-214	30.21136	-97.80354	705.55	8/11/06	266.55	0.00	439.00	

A-7: July and August 2006 low flow data								
SWN	DDLat	DDLong	LSD Elev	Date	Meas WL	MPH	WL Elev	Comment
58-50-216	30.23222	-97.79250	690.00	7/26/06	255.80	-3.17	431.03	
58-50-222	30.21722	-97.81879	694.91	7/26/06	218.60	-2.30	474.01	
58-50-231	30.20944	-97.79195	655.00	8/11/06	221.23	-2.15	431.62	
58-50-2H1	30.23493	-97.81423	689.46	7/26/06	216.39	0.00	473.07	
58-50-301	30.21035	-97.78159	658.66	7/26/06	191.80	-1.35	465.51	
58-50-411	30.18670	-97.84917	770.00	7/26/06	228.53	-1.50	539.97	
58-50-414	30.18028	-97.83889	762.66	8/2/06	248.18	0.00	514.48	
58-50-417	30.19536	-97.84640	804.00	7/26/06	262.36	-1.70	539.94	
58-50-419	30.17303	-97.85028	752.00	7/27/06	208.00	0.00	544.00	
58-50-420	30.18677	-97.86089	775.00	8/2/06	160.35	-3.20	611.45	
58-50-421	30.17606	-97.87093	785.00	7/27/06	141.80	0.00	643.20	
58-50-4MC	30.17826	-97.84862	745.22	8/2/06	219.50	-1.54	524.18	
58-50-511	30.17159	-97.82578	698.59	8/2/06	210.65	-1.85	486.09	
58-50-513	30.18263	-97.81969	751.53	8/2/06	267.00	-0.60	483.93	
58-50-520	30.20764	-97.80213	704.75	8/11/06	263.51	0.00	441.24	
58-50-521	30.19222	-97.79778	687.00	8/11/06	220.40	-1.85	464.75	
58-50-5A	30.19084	-97.80651	746.56	8/2/06	269.30	-2.00	475.26	
58-50-5BB	30.17843	-97.80962	730.00	8/2/06	258.04	0.00	471.96	
58-50-5CC	30.17629	-97.79716	713.80	8/2/06	237.15	0.00	476.65	
58-50-5JA	30.19350	-97.79524	711.11	8/11/06	250.55	0.00	460.56	
58-50-5JV	30.17072	-97.81287	694.39	8/2/06	210.10	0.00	484.29	
58-50-5ZB	30.20698	-97.83043	715.94	7/28/06	214.76	0.00	501.18	
58-50-718	30.13670	-97.84542	693.92	8/16/06	200.70	-0.90	492.32	
58-50-730	30.14000	-97.83833	683.00	8/15/06	188.15	-0.80	494.05	could be 58-50-707
58-50-734	30.13417	-97.85000	714.00	8/16/06	210.01	-2.15	501.84	
58-50-739	30.13833	-97.84944	683.00	8/16/06	176.53	-2.00	504.47	
58-50-743	30.15447	-97.85878	733.88	7/28/06	241.05	-1.95	490.88	
58-50-747	30.16098	-97.87471	800.00	7/27/06	159.49	-3.47	637.04	
58-50-748	30.14617	-97.85970	720.00	7/27/06	171.33	0.00	548.67	
58-50-7AD	30.12942	-97.83694	640.00	7/28/06	136.35	-1.55	502.10	
58-50-7BB	30.16573	-97.83470	714.10	8/2/06	214.02	-1.10	498.98	
58-50-7BG	30.16221	-97.86037	762.00	7/25/06	217.39	-1.52	543.09	
58-50-7DF	30.14830	-97.84378	727.79	7/28/06	227.61	-1.85	498.33	
58-50-7DR	30.14705	-97.84525	712.00	7/28/06	218.84	0.00	493.16	
58-50-7DT	30.15528	-97.86182	755.00	7/28/06	207.18	-2.00	545.82	
58-50-7EJ	30.13328	-97.84379	688.00	8/16/06	191.35	0.00	496.65	
58-50-7HR	30.14648	-97.84503	734.00	7/28/06	223.78	-1.80	508.42	
58-50-7ME	30.14272	-97.84134	676.00	8/16/06	195.61	-0.50	479.89	
58-50-7PL	30.14581	-97.84589	717.22	7/28/06	205.60	-1.00	510.62	
58-50-7RG	30.14939	-97.87416	766.11	8/19/06	173.13	-2.39	590.59	
58-50-7SC	30.15687	-97.86310	755.00	7/28/06	189.74	-2.00	563.26	
58-50-7SP	30.13434	-97.85509	700.00	8/16/06	192.23	0.00	507.77	
58-50-7TT	30.13917	-97.84139	660.00	8/16/06	166.60	-1.56	491.84	
58-50-7TY	30.13095	-97.85670	693.00	8/16/06	184.29	-1.45	507.26	
58-50-7WC	30.14209	-97.85368	702.00	7/26/06	184.24	-1.96	515.80	
58-50-7XN	30.13821	-97.87484	728.00	8/19/06	177.71	0.00	550.29	
58-50-801	30.14281	-97.81076	663.82	7/28/06	142.07	-1.50	520.25	
58-50-824	30.12692	-97.81834	636.18	7/28/06	112.08	0.00	524.10	
58-50-827	30.13639	-97.81944	682.00	7/28/06	181.60	-1.35	499.05	
58-50-836	30.14501	-97.81313	661.85	7/28/06	142.60	-2.20	517.05	
58-50-856	30.13489	-97.82649	660.00	7/28/06	156.45	-1.75	501.80	
58-50-8JW	30.13562	-97.83194	683.00	7/28/06	179.90	-1.50	501.60	
58-50-8LB	30.13907	-97.82839	685.00	7/28/06	184.87	0.00	500.13	
58-50-8LD	30.16139	-97.80972	663.00	8/15/06	171.80	-2.50	488.70	
58-50-8MG	30.13177	-97.82380	626.60	7/28/06	111.00	-1.00	514.60	
58-50-8MU	30.14000	-97.83222	700.00	7/28/06	201.10	0.00	498.90	
58-50-8XN	30.14658	-97.82452	670.00	7/28/06	184.60	0.00	485.40	
58-57-312	30.10611	-97.90334	868.00	8/19/06	227.28	-1.45	639.27	
58-57-313	30.11333	-97.88333	805.00	8/19/06	216.05	-1.65	587.30	
58-57-317	30.11772	-97.90820	805.00	8/2/06	101.05	0.00	703.95	
58-57-318	30.12378	-97.90764	800.00	7/21/06	128.37	-1.92	669.71	
58-57-3AM	30.08610	-97.91260	799.90	8/22/06	153.95	-2.00	643.95	
58-57-3DD	30.11010	-97.88184	820.00	8/19/06	271.28	-1.25	547.47	
58-57-3GC	30.09758	-97.88686	824.50	7/31/06	233.93	0.00	590.57	
58-57-3H	30.11306	-97.88389	805.00	8/2/06	232.50	-2.00	570.50	
58-57-3HO	30.12341	-97.88333	772.00	8/18/06	187.30	-1.50	583.20	
58-57-3JF	30.09114	-97.90984	828.00	8/22/06	187.05	-2.45	638.50	
58-57-3NB	30.09937	-97.90118	833.03	8/19/06	189.13	-2.00	641.90	
58-57-3RF	30.09618	-97.90588	826.00	8/19/06	197.91	-1.20	626.89	
58-57-3RR	30.08833	-97.91500	805.00	8/2/06	147.48	0.00	657.52	
58-57-3XN	30.11759	-97.88125	771.00	8/18/06	194.28	0.00	576.72	
58-57-3Z2	30.11573	-97.89489	899.74	8/2/06	284.45	-2.00	613.29	
58-57-3Z4	30.11672	-97.89369	869.08	8/2/06	267.19	-2.50	599.39	

A-7: July and August 2006 low flow data								
SWN	DDLat	DDLong	LSD Elev	Date	Meas WL	MPH	WL Elev	Comment
58-57-4R2	30.04797	-97.96564	908.91	8/3/06	192.30	-0.30	716.31	
58-57-502	30.06635	-97.94447	890.00	8/3/06	209.30	-0.50	680.20	
58-57-503	30.06447	-97.92834	810.00	8/9/06	135.38	-0.50	674.12	
58-57-509	30.07240	-97.92031	781.00	7/25/06	124.35	-0.60	656.05	was 58-57-5CR
58-57-510	30.06346	-97.94162	865.00	8/3/06	187.41	-3.90	673.69	
58-57-511	30.04950	-97.93567	913.48	7/21/06	216.45	-1.49	695.54	
58-57-512	30.05853	-97.92112	828.30	6/28/06	169.70	-1.95	656.65	was 58-57-5T4
58-57-5RR	30.04613	-97.95755	900.00	8/3/06	198.80	-2.10	699.10	
58-57-606	30.04773	-97.88367	820.38	8/22/06	244.95	-0.70	574.73	
58-57-608	30.08045	-97.91660	793.18	6/28/06	176.20	-1.60	615.38	
58-57-610	30.04560	-97.89873	803.40	8/22/06	208.80	-2.35	592.25	
58-57-6JC	30.08055	-97.91111	782.00	8/22/06	138.18	-1.60	642.22	
58-57-6MZ	30.08361	-97.91261	790.00	8/22/06	135.92	-1.80	652.28	
58-57-6XN	30.04236	-97.90179	825.00	8/21/06	265.00	0.00	560.00	
58-57-701	30.03969	-97.96465	931.00	8/3/06	219.80	-0.90	710.30	
58-57-702	30.03865	-97.97967	949.17	8/3/06	199.90	-0.40	748.87	
58-57-76G	30.04050	-97.96049	940.00	8/3/06	218.59	-0.20	721.21	
58-57-802	30.02667	-97.92778	838.00	8/2/06	192.90	0.00	645.10	
58-57-807	30.01944	-97.95194	887.00	8/2/06	214.85	0.00	672.15	
58-57-8DC	30.03601	-97.93889	900.00	8/30/06	213.60	-1.60	684.80	
58-57-8HR	30.02378	-97.92594	825.00	8/2/06	182.53	-1.30	641.17	
58-57-8JG	30.03494	-97.95198	856.00	8/3/06	170.80	-0.30	684.90	
58-57-902	30.00833	-97.89500	815.00	7/31/06	241.86	0.00	573.14	
58-57-903	30.03851	-97.88618	826.80	7/28/06	246.30	-0.70	579.80	
58-57-9OL	30.02159	-97.90551	865.00	8/3/06	281.82	-0.30	582.88	
58-57-9PC	30.02778	-97.87917	800.36	7/31/06	240.27	-1.34	558.75	
58-58-115	30.12444	-97.87389	730.00	8/2/06	188.14	-1.60	540.26	
58-58-122	30.09472	-97.84361	714.00	8/22/06	158.08	-1.00	554.92	
58-58-123	30.10943	-97.84173	712.00	7/28/06	173.08	-2.80	536.12	
58-58-124	30.11908	-97.84083	714.97	7/28/06	203.56	-2.00	509.41	
58-58-1AB	30.11337	-97.86055	770.00	7/28/06	257.63	-1.10	511.27	
58-58-1C1	30.10156	-97.85811	747.00	7/28/06	213.50	-0.95	532.55	
58-58-1DH	30.11685	-97.87302	770.00	8/17/06	253.55	-1.50	514.95	
58-58-1DL	30.08587	-97.85644	759.75	8/22/06	179.38	-0.40	579.97	
58-58-1EH	30.11096	-97.87410	807.00	8/22/06	270.28	-1.60	535.12	
58-58-1JG	30.10000	-97.86250	735.00	8/16/06	207.85	0.00	527.15	
58-58-1MC	30.09111	-97.84028	700.00	7/28/06	151.75	-0.70	547.55	
58-58-1OS	30.10535	-97.87415	791.00	8/16/06	250.08	-2.00	538.92	
58-58-1PM	30.08556	-97.86028	762.00	8/22/06	220.25	-2.00	539.75	
58-58-1WM	30.08540	-97.86787	768.80	8/22/06	199.50	0.00	569.30	
58-58-219	30.09167	-97.81750	684.00	7/28/06	141.11	-0.93	541.96	
58-58-220	30.09333	-97.81445	693.00	7/28/06	140.30	-1.50	551.20	
58-58-301	30.092221	-97.789444	734.00	8/17/06	173.52	-2.30	558.18	
58-58-417	30.04723	-97.86748	763.07	8/21/06	201.05	-1.50	560.52	
58-58-418	30.07129	-97.85825	731.05	8/22/06	167.75	-0.40	562.90	
58-58-426	30.08000	-97.86987	734.51	8/22/06	148.40	-2.00	584.11	
58-58-427	30.07717	-97.86132	709.43	8/22/06	120.00	-2.00	587.43	
58-58-4BS	30.05167	-97.83417	692.00	7/31/06	134.92	-0.75	556.33	
58-58-4CT	30.06020	-97.86848	734.80	7/28/06	166.86	-1.13	566.81	
58-58-4HO	30.07203	-97.84697	725.00	7/28/06	165.20	-1.25	558.55	
58-58-4SG	30.08111	-97.84361	710.00	7/28/06	164.41	0.00	545.59	
58-58-4TC	30.06184	-97.85600	748.00	7/28/06	186.05	0.00	561.95	
58-58-508	30.07917	-97.83099	731.45	6/21/06	175.40		556.05	
58-58-704	30.02750	-97.85389	746.00	7/31/06	201.25	-0.34	544.41	
58-58-711	30.01677	-97.85932	696.62	7/25/06	144.10	-1.95	550.57	
67-01-203	29.96194	-97.92056	691.00	7/24/06	112.40	-1.00	577.60	
67-01-301	29.96294	-97.89681	679.00	7/24/06	116.98	-1.00	561.02	
67-01-3AT	29.96739	-97.87622	697.00	8/30/06	121.10	-2.00	573.90	
67-01-5BH	29.92472	-97.93833	712.30	7/24/06	111.00	-0.50	600.80	
67-01-5MD	29.94628	-97.93557	755.00	8/3/06	190.42	-1.30	563.28	
67-01-5MW	29.95156	-97.93530	770.00	8/2/06	203.23	-0.70	566.07	
67-01-5PL	29.91819	-97.93240	660.00	7/24/06	93.28	-2.05	564.67	
67-01-6XN1	29.94111	-97.89156	630.00	8/2/06	27.10	-2.00	600.90	
67-01-6XN2	29.94058	-97.89103	630.00	8/2/06	26.44	-1.50	602.06	
67-01-801	29.89472	-97.93028	574.00		0.00	0.00	574.00	San Marcos Springs
67-01-9EG	29.91359	-97.91647	650.00	7/24/06	72.40	-0.85	576.75	

A-8: Trinity Potentiometric Data

A-8: Trinity Potentiometric Data																	
SWN	**Inferred Aquifer**	**DDLat**	**DDLong**	**MP**	**LSD**	**Date 99**	**DLW 99**	**WL Elev 99**	**Date 2002**	**DWL 2002**	**WL Elev 2002**	**Date 2005**	**DWL (ft) 2005**	**WL Elev 2005**	**Date 2006**	**DWL (ft) 2006**	**WL Elev (ft) 2006**
5849406	Middle	30.17833	-97.96278	-1.00	1015.00							11/08/05	49.75	8/13/06	49.93	964.07	
5849509	Lower	30.1722222	-97.9441667	-1.60	978.00							12/19/05	360.82	615.58			
5849511	Middle	30.19397	-97.92458	-1.35	991.46				2/13/02	220.20	769.91			08/02/06	350.10	640.01	
5849601	Upper	30.20537	-97.89588	-2.6	796				2/13/02	32.10							
5849602	Upper	30.20708	-97.89520	-2.5	805				2/13/02	7.58							
5849603	Upper	30.20679	-97.90495	0	827				2/13/02	24.79							
5849604	Middle	30.20650	-97.90521	-0.28	827.07				2/13/02	140.92	685.87						
5849606	Upper	30.17507	-97.90086	0	885	9/24/99	122.96										
5849608	Middle	30.19938	-97.87556	0.00	838.52	6/22/99	175.21	663.31									
5849609	Upper & Middle	30.17917	-97.89750	0.00	870.00	6/22/99	148.71	721.29									
5849704	Middle	30.13828	-97.96912	0.00	974.25				2/19/02	242.68	731.57						
5849706	Middle	30.14570	-97.96701	-2.45	981.96				2/19/02	236.20	743.31			08/02/06	367.98	611.53	
5849707	Middle & Lower	30.13875	-97.95889	-1.75	1093.00	2/19/02	317.05	774.20									
5849903	Upper	30.14644	-97.91629	-0.5	837				2/11/02	5.39	831.39						
5849913	Middle	30.13278	-97.88944	-2.10	827.00	8/5/99	224.00	600.90									
5849918	Upper	30.13778	-97.89261	-1.69	769	8/5/99	107.90										
5849925	Upper & Middle	30.12594	-97.90382	-1.35	789.86				2/3/02	150.92	637.59	11/01/05	153.26	635.25	08/01/06	170.00	618.51
5849928	Middle	30.14532	-97.87984	-1.45	745.00	8/5/99	210.45	533.10							06/26/06	184.75	558.80

A-8: Trinity Potentiometric Data

SWN	Inferred Aquifer	DDLat	DDLong	MP	LSD	Date 99	DLW 99	WL Elev 99	Date 2002	DWL 2002	WL Elev 2002	Date 2005	DWL (ft) 2005	WL Elev 2005	Date 2006	DWL (ft) 2006	WL Elev (ft) 2006
5849933	Upper	30.14515	-97.87982	-2	745	8/5/99	265.52										
5850120	Lower	30.23497	-97.87321	0.00	832.00				2/13/02	268.45	563.55	09/24/05	289.37	542.63	08/01/06	332.95	499.05
5850121	Middle	30.22018	-97.86961	-2.00	830.00				2/7/02	244.40	583.60	10/31/05	252.55	575.45	07/26/06	255.63	572.37
5850125	Lower	30.24594	-97.85099	-0.90	843.60				02/01/02	270.29	572.41				07/26/06	326.25	516.45
5850409	Upper	30.17428	-97.87479	-0.70	714.50	8/9/99	182.13	531.68	2/7/02	185.93	527.87	11/03/05	181.98	531.82	07/26/06	185.60	528.20
5850415	Middle	30.18944	-97.87361	0.00	830.00				2/7/02	195.14	634.86	10/05/05	190.62	639.38			
5851102	Lower	30.24055	-97.74639	0.00	530.00				2/4/02	143.78	386.22						
5857507	Upper & Middle (+/- Ked)	30.06358	-97.94252	-3.20	837.00				2/6/02	198.10	635.70	11/02/05	224.53	609.27	08/03/06	235.38	598.42
5857809	Upper	30.01032	-97.94487	-0.45	738				2/4/02	82.80		11/15/05	84.60	652.95			
57569CB	Middle	30.12961	-98.01430	-2.40	963.13				4/3/02	60.00	900.73	11/08/05	83.56	877.17	08/13/06	125.46	835.27
58494FR	Lower	30.19806	-97.98028	-2.00	1083.00				3/8/02	410.00	671.00						
58495F1	Upper	30.18761	-97.93945	0	953				2/19/02	60.65							
58495F2	Middle	30.18816	-97.94017	-1.20	938.76				2/19/02	65.30	872.26						
58495IH	Middle	30.18180	-97.92930	-1.45	966.36										08/02/06	372.50	592.41
58495KR	Middle	30.18748	-97.93740	-0.95	924.72				2/19/02	42.48	881.29						
58495MH	Middle & Lower	30.17986	-97.94807	-0.95	954.73							11/08/05	331.85	621.93	08/13/06	372.25	581.53
58495RW	Middle	30.18431	-97.93494	-1.70	930.54				2/19/02	48.50	880.34						
58496BM	Middle	30.20053	-97.90720	-0.15	936.02				2/13/02	263.55	672.32						
58496H2	Upper & Middle	30.20702	-97.89436	-0.10	808.71				2/13/02	203.40	605.21						

A-8: Trinity Potentiometric Data

SWN	Inferred Aquifer	DDLat	DDLong	MP	LSD	Date 99	DLW 99	WL Elev 99	Date 2002	DWL 2002	WL Elev 2002	Date 2005	DWL (ft) 2005	WL Elev 2005	Date 2006	DWL (ft) 2006	WL Elev (ft) 2006
58496H4	Upper & Middle	30.20554	-97.90504	-2.15	823.12				2/13/02	220.90	600.07						
58497G4	Middle	30.13838	-97.96915	-1.70	963.16				2/19/02	277.60	683.86						
58574AR	Upper	30.04639	-97.97472	-1.40	956.00	7/22/99	224.18	730.42									
58574R1	Upper	30.05237	-97.99522	0.00	1013.52	9/22/99	216.00	797.52									

Compact Disk

The compact disk contains digital copies of all maps and figures in this report and a simple Microsoft® Excel-based database with potentiometric data.