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EDWARDS AQUIFER AUTHORITY GENERAL MANAGER'S REPORT

MARCH 2003

inside

AUTHORITY'S WATER WELL METER PROJECT COMPLETED

BY STEVEN D. WALTHOUR, PROGRAM MANAGER—INVESTIGATIONS & MONITORING

- Well Construction Program
- Message from General Manager
- 2002 Aquifer Management Fees
- Edwards Aquifer Optimization Program Update (EAOP)
- Message from Chief Technical Officer
- January Aquifer Level Set All Time Aquifer High
- Observation of Major Earthquakes in Artesian Area Water Wells
- Initial Regular Permits
- February 2003 Board Meeting
- Groundwater Withdrawal Transfers
- Monthly Water Level & Springflow Report
- Calendar of Events



In 1997, the Edwards Aquifer Authority launched the water well meter program. The program required all well owners within the Authority's jurisdictional boundaries to install a meter on their wells to measure groundwater withdrawals from the Edwards Aquifer. Since the inception of the program the Authority has installed 682 water flow meters on irrigation wells at an average cost of \$1,606.36 or approximately \$1,100,000.

The Act requires the Authority purchase, install and maintain measuring devices for permitted irrigation wells in existence before September 1, 1993.

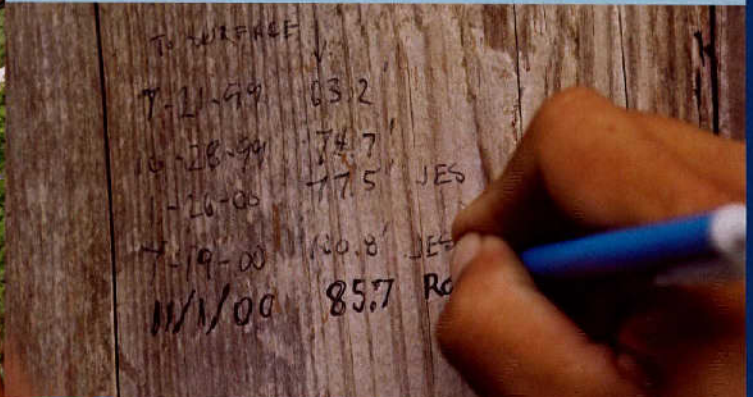
(continued on next page)

Editor: Margaret Garcia
Layout & Design: Lisa Llamas

The General Manager's Report is published monthly.

Our Mission:

The Authority is committed to manage and protect the Edwards Aquifer system and work with others to ensure the entire region of a sustainable, adequate, high quality and cost effective supply of water, now, and in the future.



Authority's Well Meter Project Completed (continued)



Staff will continue to do field inspections of all non-operating irrigation well sites that are not metered because the wells are out of service and not capable of withdrawing water. If an irrigator places these non-operating wells back into service, Authority contractors will then install a meter on that well to measure groundwater withdrawals. In addition, Authority staff will continue to inspect all municipal and industrial wells at least once a year. If a mechanical problem is found the well owner is notified to immediately repair or make necessary adjustments to the meter to ensure it is in proper working order.

With the meter installation complete, the focus of the meter program has shifted to repair and maintenance of the Authority's meters. Authority staff is currently working with the manufacturer's representative to design a program to extend the life of the meters installed and provide guidance to municipal and industrial well owners on the care and maintenance of their meters. In 2002, the Authority spent approximately \$43,952.23 for repairs and maintenance of irrigation flow meters. Authority staff anticipates maintenance costs to rise as the meters age.

Well Construction Program

by Rick Illgner, Groundwater Management Strategies Program Manager

In February, Authority staff issued thirty-three well construction permits. This total includes nineteen Edwards Aquifer domestic well permits, two livestock well permits, and four well plugging permits. In addition, eight permits were issued to drill through the Edwards Aquifer.

EDWARDS AQUIFER AUTHORITY RULES regarding well construction and plugging standards will be considered by the board at the Research and Technology Committee of the board on Wednesday, March 26, 2003 at 2:00 p.m. in the Authority's Conference Center.

For more information regarding the Authority's well construction program contact Jeff Robinson, Regulatory Programs Coordinator, at 210-222-2204.

Message From General Manager *Gregory M. Ellis*

January 2003 marked the beginning of the 78th Session of the Texas State Legislature. Each new legislative session, a number of measures are considered that directly or indirectly impact the operations of the Authority. Every session, Authority staff works with members of the Legislature and others to assess the potential impact of legislation to the Authority and inform legislators of those impacts.

This session of the legislature looks like it will be extremely active in terms of water law. The Authority Staff will work hard to keep members of the legislature informed and to work with bill sponsors, committee members, lobbyists and agencies to draft acceptable language for their bills.

With the help of this publication I will work hard to keep you informed of all activities that may ultimately affect the Authority. If you would like more information contact the Public Affairs Office at (210) 222-2204 or 1-800-292-1047 or visit on the web at www.edwardsaquifer.org.



2002 Aquifer Management Fees

by Brock Curry, Administrative Program Manager

Staff issued 235 invoices for non-agricultural aquifer management fees in December 2002. These invoices, totaling \$9,371,461, are due in full by March 1 unless the permittee elects to pay monthly. As of February 28, 46 elected to pay these fees monthly. Also as of February 28, the Authority has collected a total of \$2,464,303 in non-agricultural aquifer management fees.

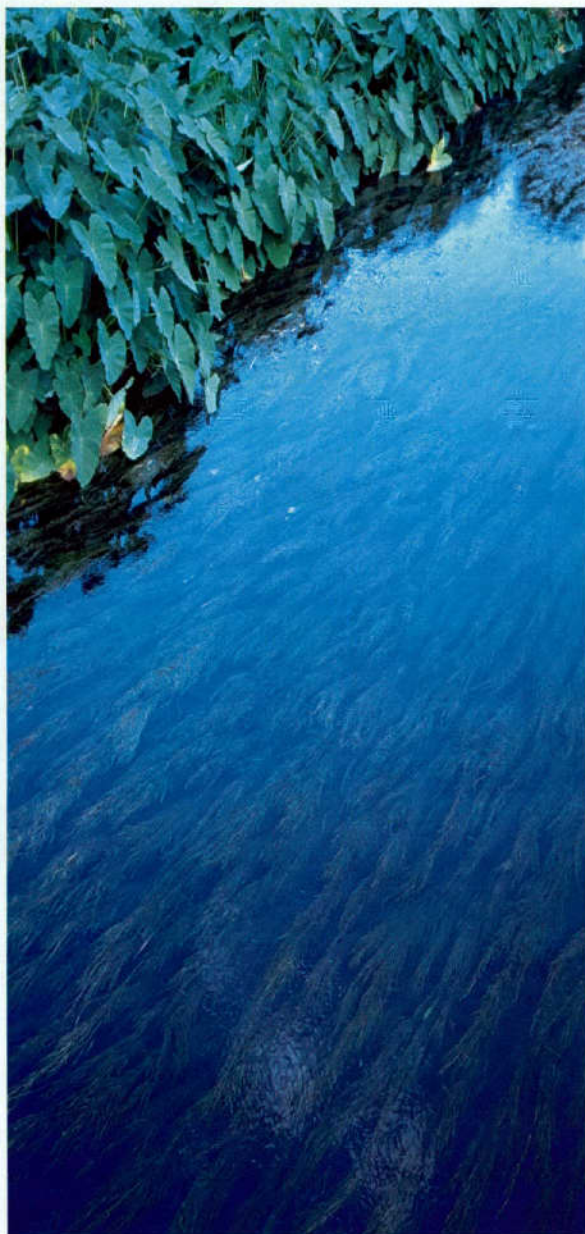
In December, the Authority also issued the 2002 annual use report form for all aquifer users to report their groundwater use. For agricultural users, this report form also serves as an invoice for aquifer management fees - both of which were due by January 31. As of February 28, the Authority has collected \$184,154 from agricultural users based on 92,077 acre-feet of groundwater used in 2002.

In the coming weeks, Authority staff will notify permittees that have not paid their 2002 or 2003 aquifer management fees by March 1.

Edwards Aquifer Optimization Program Update

by John Hoyt, Aquifer Science Program Manager

The basic description and purpose of the Edwards Aquifer Optimization Program (EAOP) is repeated in the following paragraph to provide background information for new readers and to provide a reference for the regular reader. Subsequent paragraphs provide information relevant to the specific report month.



The Edwards Aquifer Authority (the Authority) has undertaken the Edwards Aquifer Optimization Program (EAOP), a comprehensive program for the study and management of the Edwards Aquifer. The EAOP includes a series of seventeen interrelated, mission-directed biologic and hydrogeologic research studies known as the Optimization Technical Studies (OTS). The OTS are designed to evaluate potential technical options for increasing the amount of water stored in the Edwards Aquifer and identify various methods for optimizing the amount of water available for withdrawal. Data and information obtained from the OTS will provide aquifer managers with the tools necessary to make scientifically-sound decisions to benefit aquifer users and preserve the environment supported by the aquifer, including the Comal and San Marcos Springs and downstream aquatic habitats.

In February 2003, the board of directors approved one OTS related item. The Research and Technology (R&T) Committee also considered one OTS-related item in February.

In February, the board voted to approve a one-year renewal for a contract between the Authority and BIO-WEST, Inc. The contract ***Comprehensive and Critical Period Monitoring Program to Evaluate the Effects of Variable Blow on Biological Resources in the Comal and San Marcos Springs Aquatic Ecosystems***, was originally approved by the board in February 2001 and primarily serves to support the development of the Authority's draft Habitat Conservation Plan (HCP) for the spring environments.

In February, the R&T Committee voted to recommend the board approve an amendment to the joint funding agreement (JFA) between the Authority and the United States Geological Survey (USGS) for groundwater modeling services. The amendment, if approved by the board, will extend the JFA performance period and increase the Authority's cooperative funding share from \$219,000 to \$319,000. The JFA was originally approved in April 2000 and is for the development of a computer simulation model of the Edwards Aquifer to be used for aquifer management purposes. The increase in funding and performance time will facilitate construction of the model.

Edwards Aquifer Optimization Program Update (continued)

Other OTS-related studies currently underway or completed:

- Texas wild-rice reproduction.
- Comprehensive and Critical Period Monitoring Program to Evaluate the Effects of Variable Flow on Biological Resources in the Comal and San Marcos Springs Ecosystems.
- Cagle's Map Turtle instream flow and habitat requirements (completed).
- Edwards Aquifer computer model development.
- Improved aquifer parameter estimation for computer model in-put data sets (completed)
- Edwards Aquifer freshwater/saline water interface studies.
- Hydrologic budget analysis of Medina Lake and Diversion Lake for the North Medina County Flow Path Study.
- Analysis of structural controls on the Edwards and Trinity Aquifers interface in the Camp Bullis Quadrangle and surrounding area.
- Development of updated methods for calculating recharge to the Edwards Aquifer (Blanco and Nueces River basins completed).
- Statistical Analysis of Hydrologic Data (completed).
- Edwards Aquifer fracture/conduit study.
- Evaluation of water quality and water quantity benefits of woody species best management practices on selected watersheds in the Edwards Aquifer region.
- Evaluation of augmentation methodologies in support of in-situ refugia at Comal and San Marcos springs.

If you have questions regarding the studies listed above, please call John Hoyt, Aquifer Science Program Manager, at (210) 222-2204.

Initial Regular Permits

by Rick Illgner, Groundwater Management Strategies Program Manager

In February, Authority staff recommended five Agreed Final Orders with five IRP's to the board for approval. After review Authority directors approved four Agreed Final Orders with four IRP's, one Agreed Final Order, and IRP was tabled to the next board meeting, following a request by the San Antonio Water System. In addition, the board approved six Omnibus Final Orders with eight IRP's.

In addition, Authority staff will meet with special legal counsel at the State Office of Administrative Hearings (SOAH) Offices to set hearing dates for seventeen contested case hearing referred by the board. Fifty-five additional contested cases will be recommend to the board in March for referral to SOAH

To date, the Authority has acted on and completed 842 Initial Regular Permit applications representing approximately 77% of all applications filed with the Authority. The Authority has issued 667 permits and denied 176 permit applications representing 485,257 acre-feet of permitted Edwards Aquifer groundwater withdraw

Message From Chief Technical Officer *Geary M. Schindel*



Beginning in March, the General Manager's Report will feature a monthly column from the Authority's Chief Technical Officer, Geary Schindel, to address technical issues and questions related to the geology and hydrology of the Edwards Aquifer. From time to time, interesting findings from research and data collection programs will be included to help gain a better understanding and insight to the Edwards Aquifer.

Please drop us a line with any technical questions you may have. Your questions may be incorporated in future GM Report articles. Please mail your questions to the Edwards Aquifer Authority, 1615 N. St. Mary's Street, San Antonio, Texas 78215. We look forward to hearing from you.

January Aquifer Levels Set All Time Aquifer Highs

by Geary Schindel, Chief Technical Officer

The J-17 well located at Fort Sam Houston recorded its highest levels for the month of January in 2003. Historically, water levels in the aquifer are highest in the fall and winter months and lowest during the spring and summer months. High fall and winter aquifer levels are attributed to low evaporation and transpiration rates by vegetation; thereby increasing recharge, and by the decrease in demand by agricultural, municipal and industrial users. Throughout J-17's historical record, January's aquifer levels are generally above the annual aquifer average.

In 2002, heavy rainfalls in July and the average to above average rainfall conditions during the fall and early winter for the region have helped maintain high groundwater levels in the aquifer. J-17, located at Fort Sam Houston, has recorded an elevation of 690.0 feet above mean sea level or higher since October 23, 2002. In 2003, January posted the highest levels for the month ever. The 27 highest daily recordings for the month of January were reported in 2003 and the 2003 levels are 31 of the top 33 daily recordings going back through the historical record. Only two January historical records are higher than two days recorded in 2003. The levels recorded at the J-17 well on January 30th and 31st of 1977 rank as the 28th and 29th highest levels ever recorded. If the region receives heavy rains this winter and spring, there is a possibility the aquifer could reach an all time record high. The all time record high for the aquifer of 703.31 feet above mean sea level was recorded on June 14, 1992.

The aquifer is entering the spring with exceptional water level conditions. As long as regional rainfall and temperatures are in the normal range, we expect high aquifer levels to persist through the summer months.

Observation of Major Earthquakes in Artesian Water Wells in the Edwards Aquifer by Geary Schindel, Chief Technical Officer

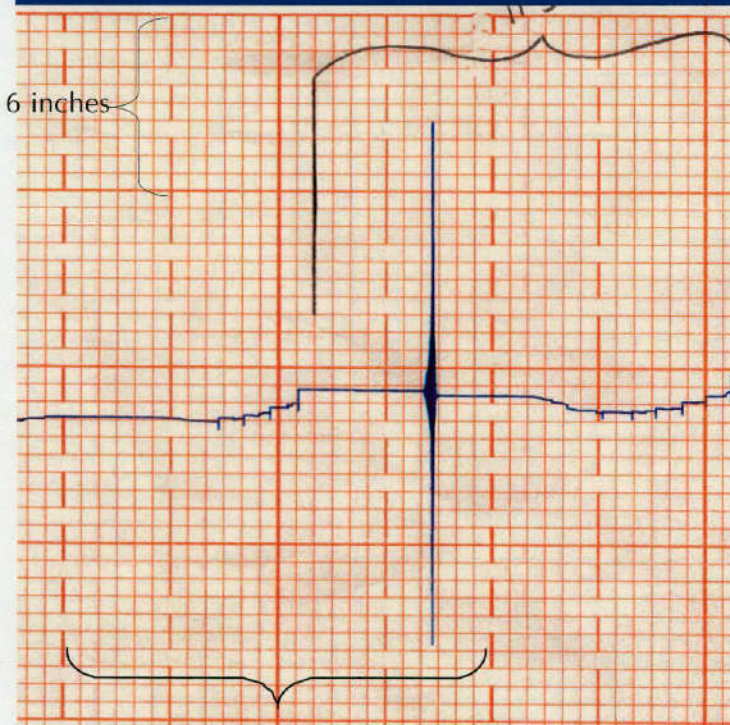
The Authority maintains a regional geologic and hydrologic data collection program, which includes the continuous monitoring of water levels in 40 wells in the aquifer. These wells are equipped with electronic data recorders or use continuous chart recorders. During the November 2002 Alaska earthquake, and the January 2003 Mexico earthquake, a number of wells provided an excellent signature of the event indicating a significant and rapid fluctuation in water level. Earthquakes of the magnitude that occurred in Alaska and Mexico release large amounts of energy and can be recorded with sensitive instruments thousands of miles from their origin. As the pressure wave of the earthquake passes through the confined portions of the aquifer, it causes a slight fluctuation in the aquifer volume, forcing water to rise and fall in monitoring wells.

The data presented were collected using a Steven's Model 871, continuous chart recorder placed in well J-17 located at Ft. Sam Houston, and in well J-27, in Uvalde. Both wells are within the artesian portion of the aquifer and have a long history of continuous water elevation monitoring.

ALASKA EARTHQUAKE—November 3, 2002

On November 3, 2002, an earthquake with a magnitude of 7.9 struck central Alaska. The earthquake was centered approximately 75 miles south of Fairbanks, and 176 miles north of Anchorage. The quake occurred at 4:12 PM CST, and was the largest earthquake recorded in 2002, and one of the largest recorded on US soil. The quake occurred along the Denali fault and resulted in maximum offsets of 22 feet. Fortunately, there were no reported fatalities and minimal damage was reported attesting to the low population density of this area of Alaska.

Figure 1: Uvalde Index Well (J-27): November 3, 2002



24 hrs.

Figure 1 is a graph of groundwater elevation (stage height) for well J-27 (Uvalde Index Well) for November 3. The horizontal (X-axis) in the graph represents time and the vertical (Y axis) represents groundwater elevation. The area between each vertical line on the X-axis is equal to one hour. The area between the horizontal lines on the Y-axis is equal to $6/10^{\text{th}}$ of an inch (The distance between 10 horizontal lines in 6 inches). The small changes in water elevation (< 2 inches) each day is caused by the influence of nearby municipal wells as they turn on and off to meet demands in the city of Uvalde.

The earthquake is indicated by the large vertical line on the chart. The change in water elevation indicates a total oscillation of just under 18 inches. The time resolution on the chart is insufficient to determine the exact time of arrival of the pressure wave from the earthquake.

Observation of Major Earthquakes in Artesian Water Wells in the Edwards Aquifer *(continued)*

**FIGURE 2: Bexar County Index Well (J-17)
November 3, 2002**

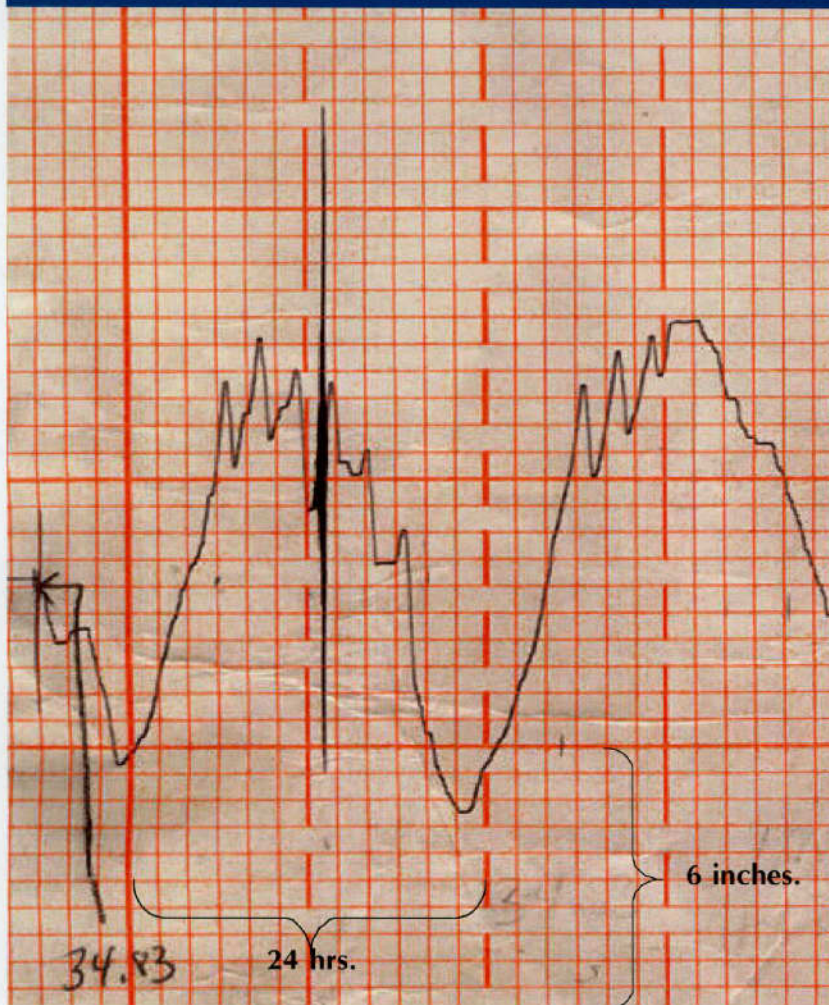


Figure 2 is a graph of groundwater elevations for well J-17 (San Antonio Index Well) also for the time period covering the Alaska earthquake. The horizontal (X-axis) in the graph is time and the vertical (Y axis) is groundwater elevation. The area between each vertical line on the X-axis is equal to two hours. The area between the horizontal lines on the Y-axis is equal to $6/10^{\text{th}}$ of an inch (The distance between 10 horizontal lines is 6 inches). The saw tooth appearance of the graph shows fluctuations of more than a foot per day indicates the influence of municipal and industrial wells in the San Antonio pumping center.

The highest water elevations occur in the evening and the lowest levels occurring near morning and mid day as demand increases. The earthquake is indicated by the large vertical line on the chart. The change in water elevation indicates a total oscillation of just over 12 inches. Again, the time resolution on the chart is insufficient to determine the exact time of arrival of the pressure wave of the earthquake.

COLIMA, MEXICO EARTHQUAKE— January 21, 2003

On January 21, 2003, an earthquake with a magnitude of 7.8 struck west-central Mexico. The quake occurred at 8:06 PM CST. The earthquake was centered approximately 30 miles east-southeast of Manzanillo, Colima, and 310 miles west of Mexico City. The quake occurred near the juncture of three tectonic plates: the North American Plate, the Rivera Plate, and the Cocos Plate. The quake resulted in 28 fatalities and widespread damage throughout Mexico City.

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Observation of Major Earthquakes in Artesian Water Wells in the Edwards Aquifer (continued)

**FIGURE 3: Uvalde County Index Well (J-27):
January 21, 2003**

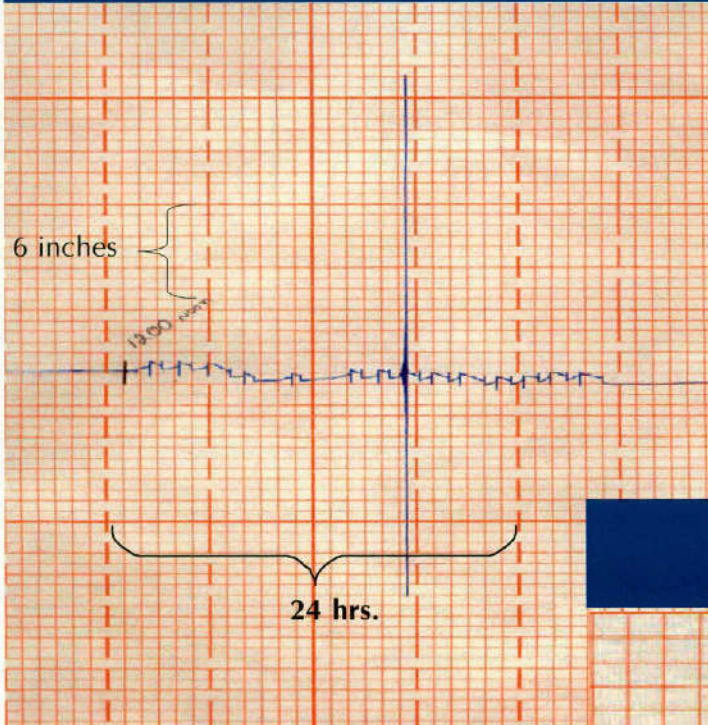


Figure 3 is a graph of groundwater elevations for well J-27 (Uvalde Index Well) for January 21. The scale on the chart is the same as Figure 1.

The change in water elevation indicates a total oscillation of just under 30 inches.

**FIGURE 4: Bexar County Index Well (J-17)
January 21, 2003**

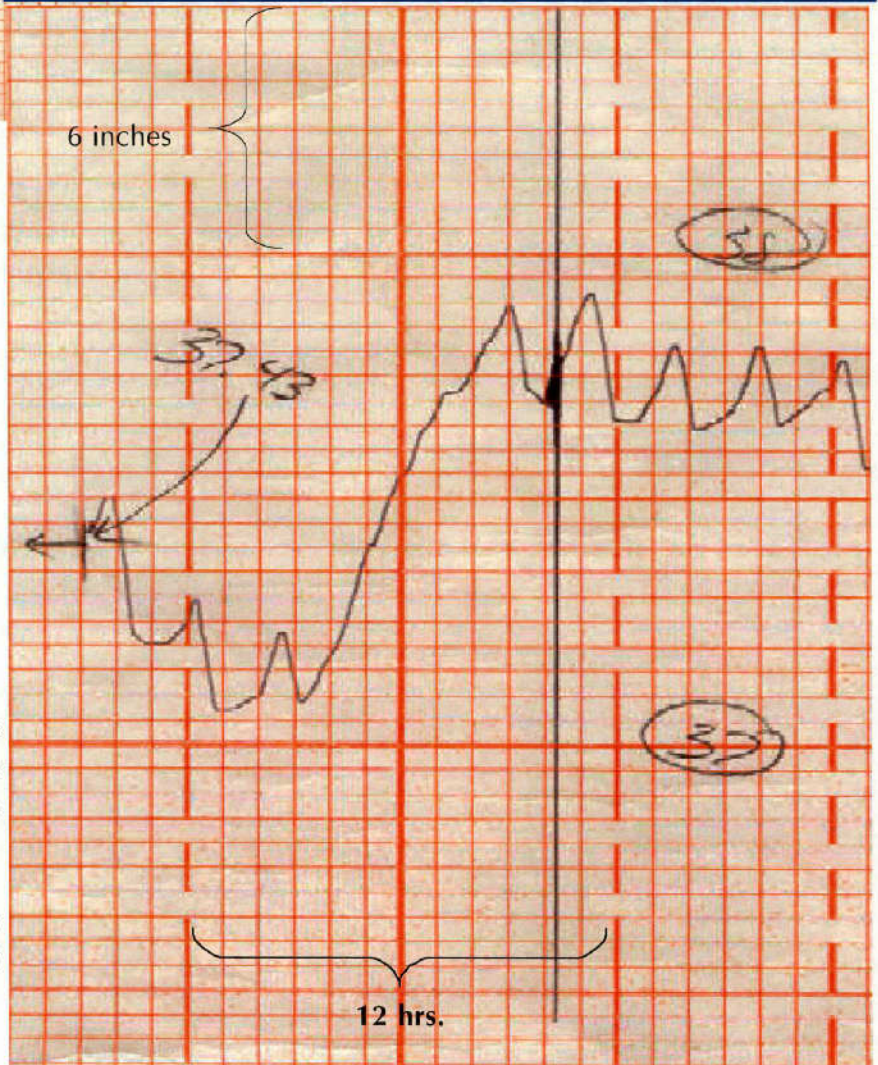


Figure 4 is a graph of groundwater elevations for well J-17 (Bexar County Index Well) for January 21. The scale on the chart is the same as Figure 1.

The change in water elevation indicates a total oscillation of just under 28 inches.

February 2003 Board Meeting

by Margaret Garcia, Public Affairs Program Manager

At their regular monthly board meeting held Tuesday, February 11, 2003, Edwards Aquifer Authority directors approved a settlement offer for the City of Kyle in the amount of \$68,278.32. A portion of this settlement will fund a *Surface Water Supply Augmentation* project. This project will improve the city's water distribution system and create opportunities for broader distribution of surface water, thereby reducing the City of Kyle's dependency on Edwards Aquifer groundwater. The board also approved settlement offers for 14 other permittees and applicants who violated the Authority's rules in 2001. These violations include failing to report Edwards Aquifer groundwater use and over pumping groundwater.

In addition, Authority directors approved final rules to create a Groundwater Trust. EDWARDS AQUIFER AUTHORITY RULES ch. 711, subch. N. (Groundwater Trust) allow the Authority to purchase or lease groundwater withdrawal rights, and either make them available to small industries or hold them in trust as a means to reduce aquifer demand. These rules will take effect on February 21, 2003.

The board also approved an agreed final order for four initial regular permits for applicants who had previously filed protests on their proposed permits. After further review of the applicants' files, all parties agreed the applicants provided additional documentation to substantiate their claims for more Edwards groundwater than originally proposed by staff. This agreed final order represents approximately 2,116 acre-feet of Edwards groundwater. In addition, Authority directors adopted an omnibus final order approving six initial regular permits representing approximately 3,205 acre-feet of Edwards Aquifer groundwater withdrawal rights.

Authority directors also received a technical presentation from Eugene Habiger, General USAF (Ret.), President/CEO San Antonio Water System (SAWS), regarding revised population projections and the impact to SAWS water supply and demand planning. The board also voted to renew a contract with BIO/WEST, Inc. to evaluate the effects of variable springflow on ecosystems in the Comal and San Marcos springs. The data from this monitoring effort is the most comprehensive information that have been collected on these ecosystems and will provide significant support in the Authority's efforts to develop a Habitat Conservation Plan. The board approved the original contract in February

Groundwater Withdrawal Transfers

by Rick Illgner, Groundwater Management Strategies Program Manager

Authority staff continues to receive notices of Edwards Aquifer groundwater right transfers from Initial Regular Permit (IRP) holders, and applicants of an Initial Regular Permit with interim authorization status. In February, Authority staff processed 22 partial sales and lease transfers representing 653.500 acre-feet in Edwards Aquifer groundwater withdrawal rights. Since the inception of the transfer program, Authority staff has processed 777 partial sales and lease transfers representing 137,599.205 acre-feet of groundwater withdrawal rights since transfers have been available. Of the 777 partial sale and lease transfers completed, only 589 are currently active representing 106,271.530 acre-feet. Active transfers include 61 sub-leased transfers representing 10,089.980 acre-feet. In addition, Authority staff processed 6 change of ownership or miscellaneous transfers representing 1,980.691 acre-feet.

Monthly Water Level & Springflow Report

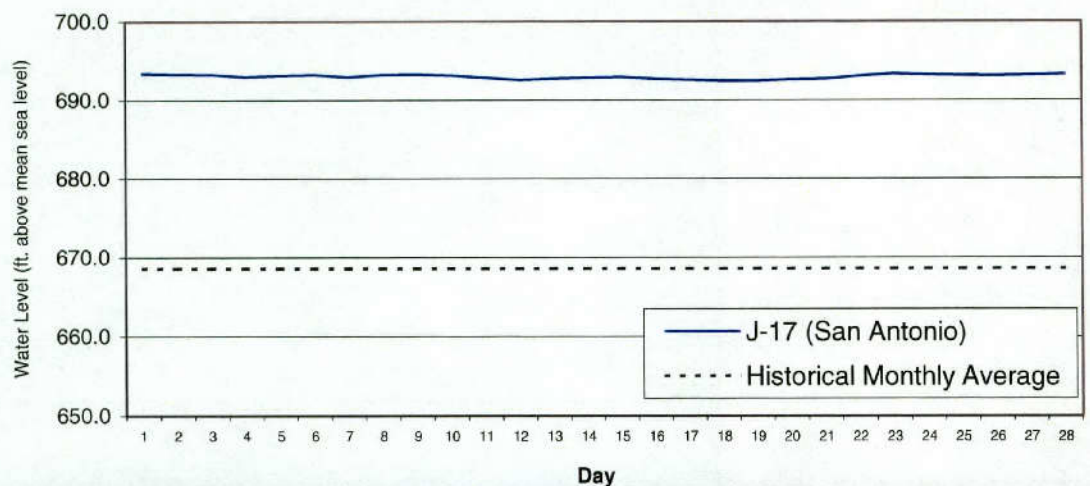
Aquifer levels can be viewed on the Authority's website at
www.edwardsaquifer.org

J-17 (San Antonio) Index Well—February 2003

The J-17 index well level average dropped 0.9 feet from 693.9' above mean sea level (msl) in January to 693.0' msl in February.

The February 2003 high of 693.4' is 11.1 feet above the February 2002 high of 682.3' msl. The J-17 historical monthly average for February is 668.6' msl.

J-17 (San Antonio) Index Well -
February 2003



J-17 (San Antonio) Index Well—Combined Record for Two Wells: 1932-2002

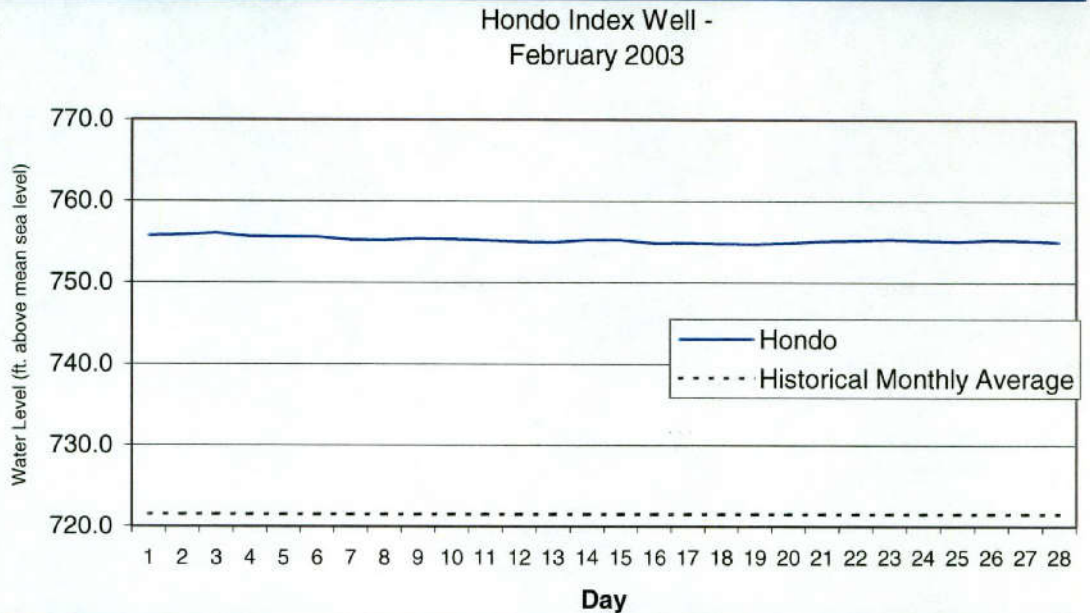
	February 2003	February 2002	Historical Record	
Maximum	693.4	682.3	June 14, 1992	703.3
Minimum	692.5	678.3	August 17, 1956	612.5
Average	693.0	680.7	Feb. (1932-2002)	668.6

Hondo Index Well—February 2003

The Hondo index well level average dropped 1.5 feet from 756.8' msl in January to 755.3' msl in February.

The February 2003 high of 756.1' msl is 23.8 feet above the February 2002 high of 732.3' msl.

The Hondo Well historical monthly average for February is 721.5' msl.



Hondo Index Well—Historical Record: 1986-2002

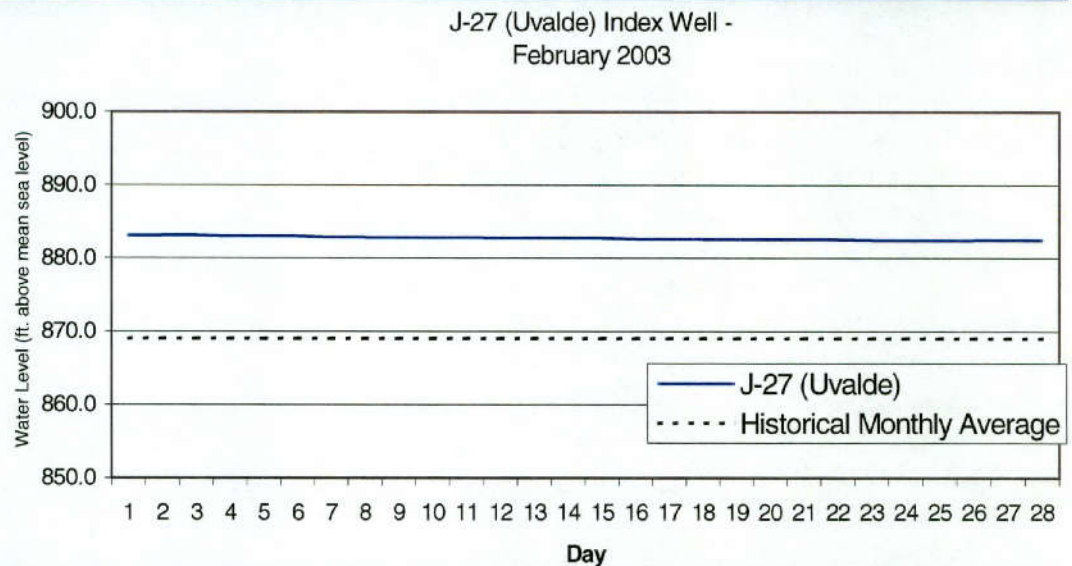
	February 2003	February 2002	Historical Record	
Maximum	756.1	732.3	June 14, 1992	779.0
Minimum	754.8	724.0	June 29, 1990	651.0
Average	755.3	728.2	Feb. (1986-2002)	721.5

J-27 (Uvalde) Index Well—February 2003

The J-27 index well level average dropped 0.5 feet from 883.2' msl in January to 882.7' msl in February.

The February 2003 high of 883.2' msl is 5.6 feet above the February 2002 high of 877.6' msl.

The Uvalde Well historical monthly average for February is 869.0' msl.



J-27 (Uvalde) Index Well Historical Record: 1940-2002

	February 2003	February 2002	Historical Record	
Maximum	883.2	877.6	June 15, 1987	889.0
Minimum	882.4	876.3	April 13, 1957	811.0
Average	882.7	877.1	Feb. (1940-2002)	869.0

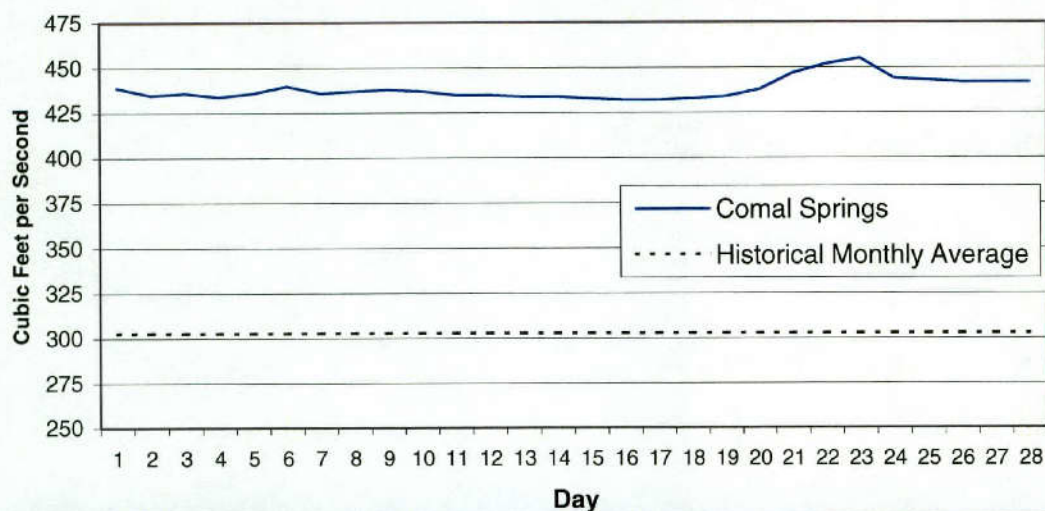
Comal Springs—February 2003

The Comal springflow reached a maximum flow of 455 cubic feet per second (cfs) on February 23rd.

The minimum flow occurred on February 16th at 432 cfs.

The February 2003 average was 438 cfs, which was 135.3 cfs above the historical monthly average of 302.7 cfs.

Comal Springs -
February 2003



Comal Springs Historical Record: 1927-2002

	February 2003	February 2002	Historical Record	
Maximum	455	392	October 14, 1973	534.0
Minimum	432	374	August 8, 1956	0.0
Average	438	385	Feb. (1927-2002)	302.7

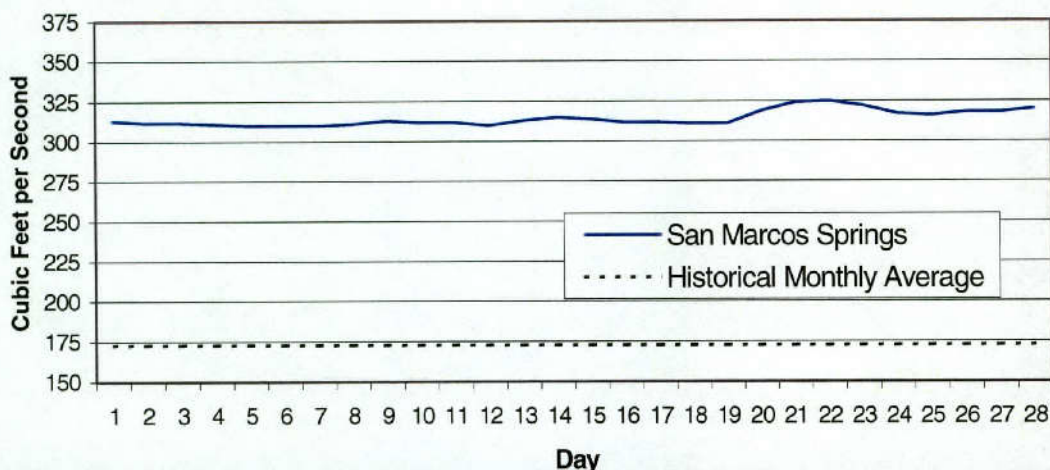
San Marcos Springs—February 2003

The San Marcos springflow reached a maximum flow of 325 cfs on February 22nd.

The minimum flow occurred on February 5th at 310 cfs.

The February 2003 average was 314 cfs, which was 141.3 cfs above the historical monthly average of 172.7 cfs.

San Marcos Springs -
February 2003



San Marcos Springs Historical Record: 1956-2002

	February 2003	February 2002	Historical Record	
Maximum	325	298	March 12, 1992	451.0
Minimum	310	276	August 15, 1956	46.0
Average	314	286	Feb. (1956-2002)	172.7



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CALENDAR OF EVENTS FOR MARCH & APRIL

MARCH

Tues. 3/11	3PM	Board Meeting, Edwards Aquifer Authority Conference Center, 1615 N. St. Mary's Street San Antonio, Texas
Tues. 3/25	10 AM 11 AM 1 PM	Habitat Conservation Plan Work Group Aquifer Management Planning Committee Permits Committee
Wed. 3/26	11 AM 2 PM	Finance/Administrative Committee R&T Committee

APRIL

Tues. 4/8	3PM	Board Meeting, Edwards Aquifer Authority Conference Center, 1615 N. St. Mary's Street San Antonio, Texas
Tues. 4/22	10 AM 11 AM 1 PM	Habitat Conservation Plan Work Group Aquifer Management Planning Committee Permits Committee
Wed. 4/23	11 AM 2 PM	Finance/Administrative Committee R&T Committee
Fri. 4/25		Authority Offices Closed—Battle of Flowers

Authority meeting times & dates are subject to change.

Visit our website at www.edwardsaquifer.org for up-to-the minute information on meeting times and dates.