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# EDWARDS AQUIFER AUTHORITY

## GENERAL MANAGER'S REPORT

May 2004

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The General Manager's Report is published monthly.

**Our Mission:**  
The Edwards Aquifer Authority is committed to manage, enhance and protect the Edwards Aquifer system.



### Message from General Manager Gregory M. Ellis

Every summer, residents in the Edwards Aquifer region worry about the possibility of water restrictions. The San Antonio region generally runs the risk of water restrictions when a lack of rainfall and increased demand drive aquifer levels below 650' above mean sea level at the J-17 index well. The J-17 well is the indicator of the water level in the Edwards Aquifer for the San Antonio region.

April turned out to be another wet month for the region with above-average rainfall over much of the drainage area and recharge zone of the Edwards Aquifer. Upwards of 9 inches of rain fell in south-central Bandera County, and the region averaged 4.5 inches of rain as measured by the Authority's remote gauging network. With another month of generous rainfall, the groundwater levels for J-27, Hondo, and J-17 wells and the major springs all consistently increased throughout April. Continued moderate temperatures and good local rainfall allowed pumping for municipal demand to remain stable during the month. It is important to note that we are now entering late spring and summer, and usually the combination of less rainfall and higher temperatures create higher demands for municipal water.

As of May 5th, aquifer levels at J-17 stood at 687.5 feet above mean sea level, more than 22 feet above the historical average for the month of May. The increasing water levels in J-17 throughout April reverses the two previous years when water levels began a steady decline into the spring and summer months. While this trend is certainly healthy for the aquifer system, it came as the result of a very wet first quarter in the region whereas last spring had record dry conditions. If rainfall totals approach average conditions, or fall below average, aquifer levels will certainly begin to decline as summer water demand increases. It is important to remain vigilant and continue the message of conservation and protection. Historical data indicates that Demand Management Conditions can still be reached during the late summer if below normal rainfall occurs for the remainder of the spring and into the hot summer months.

(continued on next page)



## Message from General Manager (continued)

# Gregory M. Ellis

Right now the Edwards Aquifer is in great shape. However, there are conservation measures available that we can all practice now to prevent drought restrictions in the future.

Voluntary conservation measures include:

- Watering limited to after 8 p.m. or before 10 a.m.
- Water waste (watering driveways and streets) is always prohibited
- Water no more than once a week
- Turn off automatic sprinkler system and hand water landscape plants
- Fix sprinkler system and faucet leaks
- Fix all leaks immediately – dripping faucets, running toilets, etc.
- Use the dishwasher and washing machine only with full loads
- Take showers instead of baths
- Take shorter showers
- Report leaks and water waste from water mains
- If you haven't already replaced indoor fixtures with low flow fixtures, do so now
- Use certified water conserving commercial car washes that recycle their water

The Edwards Aquifer Authority continues to work with other regional agencies to cooperatively raise the level of our water conservation messages in an effort to keep drought restrictions at bay for another year. We have an excellent chance of avoiding mandatory water restrictions this year if we all work to watch our water use.

For more information on what you can do to conserve contact the Office of Public Affairs at (210) 222-2204 or at 1-800-292-1047.

## Initial Regular Permits

by Steven D. Walthour, Program Development

In April, Authority directors granted one application for an Initial Regular Permits representing 5,000 acre-feet of Edwards's groundwater withdrawal rights per annum. In addition, Authority directors granted one application for Initial Regular Permits representing 355,910 acre-feet of Edwards's groundwater withdrawal rights per annum and postponed the remaining item until such time alleged enforcement claims may be addressed.

Authority directors also considered staff recommendations to deny two applications for water rights, but postponed action to allow applicants time to resolve pending issues.

In addition, the board considered an interim order for two requests for contested case hearings before the State Office of Administrative Hearings. This interim order was postponed for 30-days because the applicants and parties had entered into settlement negotiations.

To date the Authority has issued final decisions on 931 Initial Regular Permit applications representing approximately 85% of all applications filed with the Authority. The Authority has issued 738 permits and denied 193 permit applications. The Authority has issued a total of 517,373 acre-feet of Edwards Aquifer permitted groundwater withdrawal rights. Approximately 162 permit applications remain, representing approximately 51,148 acre-feet of proposed Edwards' Aquifer groundwater withdrawal rights.





# Sulfuric Acid Genesis of the Edwards Aquifer

with Geary M. Schindel, P.G., Chief Technical Officer

The incredible porosity and permeability of the Edwards Aquifer is usually credited to normal karst processes – the dissolution of limestone in weak carbonic acid. Carbonic acid is formed from rainfall absorbing carbon dioxide from the air and from plants and soil. The dissolution process in the Edwards Limestone is readily apparent in the many dissolution features on exposed rock, the presence of caves in the aquifer, and as a thin film which occurs in a glass of water that has been allowed to evaporate. However, in the deeper segments of the aquifer, hydrogen sulfide may be an even more important process in forming the conduits which account for the high porosity in the Edwards.

Sulfuric acid has been noted as an important process in forming some karst systems. Most notably, Carlsbad Caverns and Lechuguilla Cave in the Guadalupe Mountains of New Mexico, both present evidence of a sulfuric acid genesis. Water containing hydrogen sulfide can form from the weathering of minerals or by biogenic processes. When hydrogen sulfide-rich waters become oxidized, they form sulfuric acid. This strong acid readily dissolves carbonate minerals along oxidation zones, such as those that occur along the saline water/fresh water interface in the Edwards Aquifer. This process can form large interconnected conduits such as the Big Room in Carlsbad Caverns.

There is significant evidence of sulfuric acid genesis in the deep Edwards Aquifer including the presence of hydrogen sulfide gas from wells in the saline zone of the aquifer. Saline water chemistry also indicates a high concentration of sulfate and chloride minerals. The fresh water area adjacent to the saline/fresh water boundary also exhibits extremely high permeability associated with dissolution of the Edwards Limestone. There are a number of very high production well fields located adjacent to the saline/fresh water interface. Some of these fields have been in operation for more than 30 years, yet have not resulted in degradation of water quality from infiltration of saline water. Some of the wells located adjacent to the saline/fresh water line are also noted as containing sulfur bacteria and a well developed ecology of specialized aquifer biota including blind catfish.

Dr. Philip Bennett and Dr. Libby Stern with the University of Texas at Austin have done some preliminary studies of the aquifer microbiology and are considering a plan of action for further research. Hopefully, further work on the water chemistry, microbiology and physical properties of the Edwards Aquifer will provide further insight into understanding the formation of the aquifer and allowing us to better manage this important resource.

For further information, I would refer you to Dr. Bennett's web page at [http://www.geo.utexas.edu/faculty\\_research\\_list.htm](http://www.geo.utexas.edu/faculty_research_list.htm) or the web page Speleogenesis and Evolution of Karst Aquifers which is a joint scientific resource of the Commission on Karst Hydrogeology and Speleogenesis of the Union International of Speleology and the Karst Commission of the International Geographic Union at <http://www.speleogenesis.info/>.

*Geary M. Schindel*



# Edwards Aquifer Optimization Program Update

by John Hoyt,  
Program Manager -  
Aquifer Science

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 April 2004, Authority directors approved one OTS related item and approved a contract between the Authority and Todd Engineers for an analysis of recharge and recirculation (R&R). R&R is the concept of an integrated and coordinated approach to water management that combines groundwater and surface water sources and storage units. Under the proposed contract, Todd Engineers will identify R&R alternatives and use computer modeling to evaluate the selected alternatives. The results of the analysis will be provided in a format consistent with that of the South Central Texas Regional Water Planning Group (SCTRWPG).



In addition to the OTS-related item discussed above, the following OTS-related studies are currently underway or have been completed:

#### Biologic Studies

- 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**)

#### Flowpath/Modeling Studies

- Edwards Aquifer computer model development - MODFLOW
- Estimation of hydraulic parameters for the Edwards Aquifer management model – MODFLOW (**completed**)
- Development of management modules for the Edwards Aquifer MODFLOW model

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## Edwards Aquifer Optimization Program Update (continued)

by John Hoyt, Program Manager – Aquifer Science

- Edwards Aquifer freshwater/saline water interface studies
- North Medina County Flow Path Study - Hydrologic budget analysis of Medina Lake and Diversion Lake
- North Medina County Flow Path Study – Helicopter electromagnetic survey in the vicinity of Seco Sinkhole **(completed)**
- North Bexar County Flow Path Study - Analysis of structural controls on the Edwards and Trinity Aquifers interface in the Camp Bullis Quadrangle and surrounding area **(completed)**
- North Bexar County Flow Path Study - Analysis of structural controls on the Edwards and Trinity Aquifers interface in the Helotes Quadrangle
- North Bexar County Flow Path Study – Helicopter electromagnetic survey in the vicinity of Camp Bullis
- Tracer testing of aquifer flowpaths at Comal and San Marcos springs
- Leona Formation geophysical survey **(completed)**
- Development of updated methods for calculating recharge to the Edwards Aquifer (pilot models for the Blanco and Nueces river basins, recharge area, **completed**)
- Statistical Analysis of Hydrologic Data **(completed)**
- Edwards Aquifer fracture/conduit study **(completed)**

### **Recharge Enhancement Studies**

- Range management – paired watershed study at Honey Creek and Government Canyon State Natural areas
- Range management – augmenting aquifer recharge through brush management
- Evaluation of augmentation methodologies in support of in-situ refugia at Comal and San Marcos springs

If you have questions regarding the EAOP or studies listed above, please call John Hoyt, Program Manager – Aquifer Science.

## Aquifer Management Fees

by Brock Curry, Program Manager – Administration

On January 13, staff issued 294 non-agricultural aquifer management fee invoices based on authorized use for 2004. These invoices were based on an aquifer management fee rate of \$29.00 per acre-foot. As of April 30, the Authority has collected \$3,677,875 or 39% of the budgeted amount. Aquifer management fees totaling \$25,414 from 16 pumpers are considered delinquent.

Aquifer management fees for 2003 agricultural use were due January 31. As set forth in the Edwards Aquifer Authority Act, the aquifer management fee rate for agricultural users is \$2.00 per acre-foot. As of April 30, the Authority has received reports from 650 agricultural users totaling 82,533 acre-feet of groundwater used in 2003. To date, the Authority has collected \$163,048 in aquifer management fee revenue or 82% of the amount budgeted.

If you have questions regarding the aquifer management fees, please call Brock Curry, Program Manager – Administration.



## Real-time Precipitation Gauging System

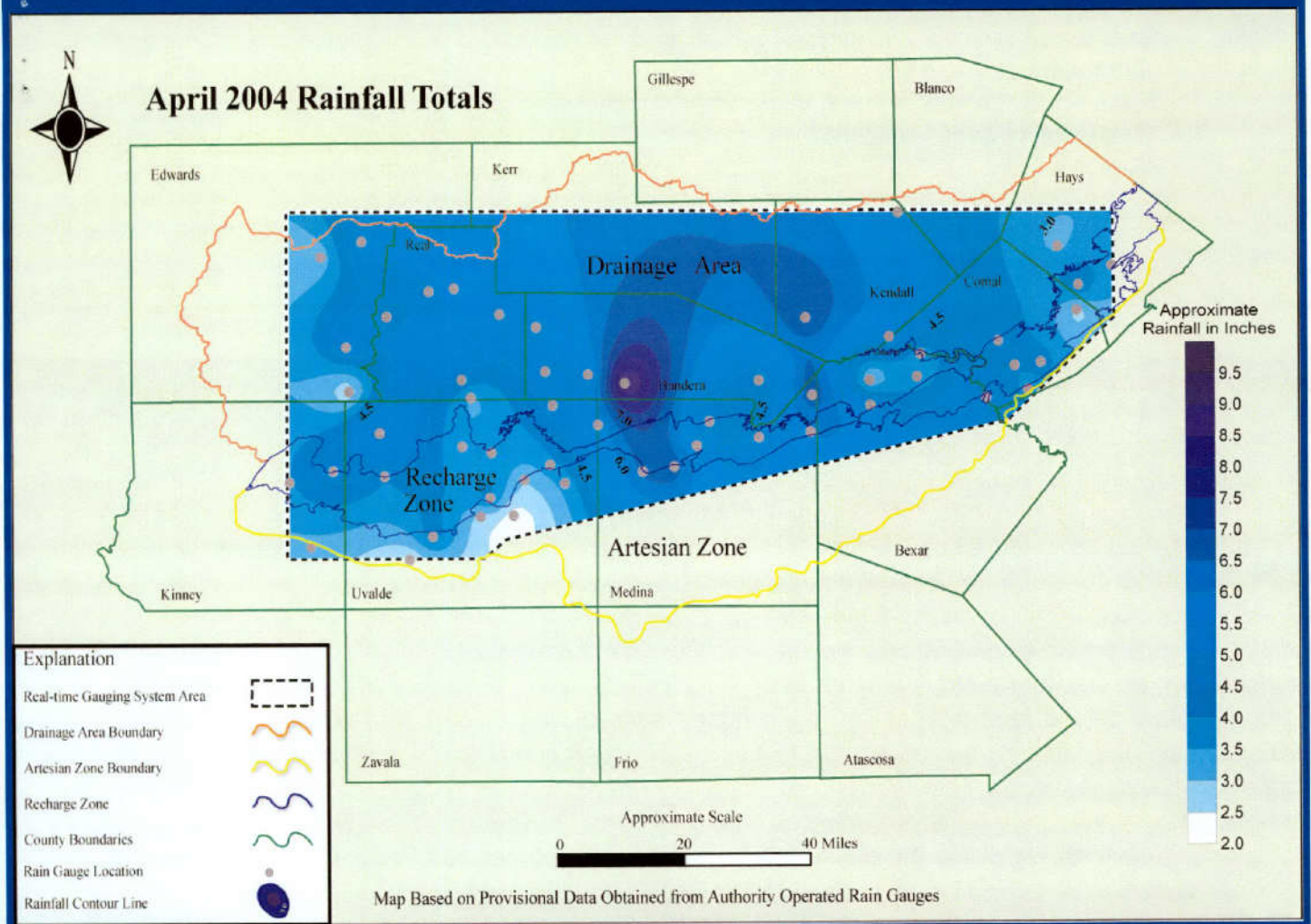
by Earl Parker, Program Manager – Investigations and Monitoring

The Authority operates 65 "real-time" precipitation gauges that transmit data to the Authority office every 6 minutes. The rain gauges are generally located over the Edwards Aquifer Recharge Zone and Drainage Area. Acquired data are used in aquifer recharge calculations, precipitation enhancement program evaluations, and a variety of research projects.

The attached map of April 2004 rainfall totals, as recorded by the real-time gauging system, indicates that rainfall was well above average across the gauging system area. The long-term average for rainfall in the month of April ranges from 2.36 inches in Uvalde up to 3.29 inches in San Marcos. The average amount of rainfall recorded by the system gauges in April 2004 was 4.5 inches. The highest monthly total in April 2004 was 9.3 inches and was recorded in south central Bandera County. The lowest monthly total in April 2004 was 2.14 inches and was recorded near Knippa. Monthly totals exceeding 4 inches were recorded over wide area with the highest monthly totals being recorded in the central portion of the gauging system area.

If you have questions regarding the attached map or the Authority's real-time precipitation gauging system, please call Earl Parker, Program Manager - Investigations and Monitoring.

## April 2004 Rainfall Totals





## April 2004 Board Meeting

by Margaret Garcia, Program Manager – Public Affairs

### Authority Directors Initiate Process to Hire New General Manager

At their regular monthly meeting held Tuesday, April 13, 2004, the Edwards Aquifer Authority Board of Directors voted to begin the process of filling the General Manager position. In March, Authority General Manager Gregory M. Ellis, announced his intent to resign and has agreed to remain with the Authority until a successor is named. Authority staff will now issue a request for proposals for an Executive Search Firm to assist with the hiring process.

In other action, Authority directors voted to modify the director single-member district lines in Atascosa County, Comal County, Guadalupe County and Hays County (District

11 only.) This review was prompted by the 2003 congressional re-districting process and changes made to voter precinct lines by these counties. Authority staff will submit these modifications to the U.S. Department of Justice for approval.

Authority directors also approved a \$330,000 contract between the Authority and Todd Engineers for the analysis of recharge and recirculation (R&R) aquifer management strategy. The proposed analysis of R&R is to provide information for an integrated and coordinated approach to water management. The study will analyze management strategies as to optimize the availability of water to users in the Edwards Aquifer pumping region during a repeat of the drought of record and to address water requirements of endangered species at Comal Springs and San Marcos Springs.

In other business, Authority directors adopted an omnibus final order granting one groundwater withdrawal permit representing approximately 355 acre-feet of Edwards Aquifer groundwater withdrawal rights. The board also approved an agreed final order and permit for one applicant who had previously filed a protest on their proposed permit. After further review of the applicant's files, all parties to this contested permit proposal agreed on a proposed permit amount when the applicant provided additional documentation to substantiate their claim for more Edwards groundwater than originally proposed by staff. This agreed final order represents approximately 5,000 acre-feet of Edwards groundwater.

Authority directors also denied one application based on a recommendation received from the State Office of Administrative Hearings. The administrative law judge found that the Elm Creek Owners Association did not file its application by the deadline of December 30, 1996, as required by the Authority's rules and the document submitted on March 1, 1994 did not satisfy the requirements for filing an Initial Regular Permit Application. This action by the board represents the judicial authority granted to it by the Texas Legislature. The applicant may appeal the board's decision to state district court.

## April 2004 Board Meeting

by Margaret Garcia, Program Manager – Public Affairs



In April, Wendy McCarville joined the Authority's Investigations and Monitoring Team as Field Representative. Wendy holds a Bachelor of Science degree in Resources and Environmental studies from Texas State University in San Marcos. Prior to coming to the Authority, Wendy worked for Boral Material Technologies for one year as a Quality Coordinator where she managed fly ash technical database and tested fly ash for ASTM standards. Wendy also worked for Veeder Root, formerly Tanknology, as a Permitting Coordinator and Hazardous Waste Tracking Manager for four years where she maintained hazardous waste database and handled environmental compliance for ExxonMobil.



## Well Construction Program

by Rick Illgner, Program Manager – Groundwater Management Strategies

In April, Authority staff issued 26 well construction and plugging permits. This total includes 8 exempt Edwards Aquifer domestic well permits, 1 exempt Edwards Aquifer livestock well permit, 1 non-exempt municipal permit, 4 plugging permit, and 12 "drill through" the Edwards Aquifer permits.

For more information regarding the Authority's Well Construction Program contact Jeff Robinson, Regulatory Programs Coordinator.

## Groundwater Withdrawal Transfers

by Rick Illgner, Program Manager – Groundwater Management Strategies

In April, Authority staff processed 26 partial sales and lease transfers representing 4793.520 acre-feet in Edwards Aquifer groundwater withdrawal rights. Since the inception of the transfer program, Authority staff has processed 1041 partial sales and lease transfers representing 192367.633 acre-feet of groundwater withdrawal rights. Of the 1041 partial sale and lease transfers completed, only 757 are currently active representing 138988.917 acre-feet. Active transfers include 122 sub-leased transfers representing 27353.332 acre-feet.

In addition, Authority staff processed 8 changes of ownership or miscellaneous transfers representing 4352.260 acre-feet of Edwards Aquifer groundwater.

### April 2004 Transfer Table Summary

Transfer Description	Number of Transfers	Acre-Feet
April (4/1/04 - 4/31/04) Transfers (Partial Sales, Leases, Sub-leases, and Re-sales)	26	4793.520
April (4/1/04 - 4/31/04) 100% Change of Ownership (Sale of Place of Use) or Miscellaneous Transfers	8	4352.260
Total Number of Transfers (Partial Sales, Leases, and Sub-leases, and Re-sales) Completed as of 4/31/04	1041	192367.633
Total Number of <b>Active</b> Transfers (Partial Sales, Leases, Sub-leases, and Re-sales) as of 4/31/04	757	138988.917
Total Number of <b>Active Sub-leased</b> Transfers as of 4/31/04	122	27353.332
Total Number of <b>Active Re-sale</b> Transfers as of 4/31/04	104	3505.392

Transfer forms are located at the Authority's main office located at 1615 N. St. Mary's Street. For more information, contact Naomi Esquivel, Program Associate.



## Precipitation Enhancement Program

by Rick Illgner, Program Manager – Groundwater Management Strategies

In March, Authority directors renewed a contract with the Southwest Texas Rain Enhancement Program for the operation of the Authority's 2004 Precipitation Enhancement Program. The Southwest Texas Rain Enhancement Association (SWTREA) will perform cloud-seeding for the Authority over Uvalde County at a cost of \$37,951 or 4 cents an acre. In addition, the Authority is currently in the third year of a three-year contract (\$86,825) with the South Texas Weather Modification Association (STWMA), managed by the Evergreen Underground Water Conservation District. The STWMA will perform cloud-seeding for the Authority in Bandera, Bexar, and Medina counties (3,120,000 acres). The SWTREA and STWMA seasons began May 1 and will continue through October 31, 2004. A review of last year's Precipitation Enhancement Program showed that the number of seed days increased and the apparent benefit from increased rainfall over the target area also increased for the 2003 season.

For more information on this program contact Robert Burns, Permits Coordinator.

## Monthly Water Level & Springflow Report

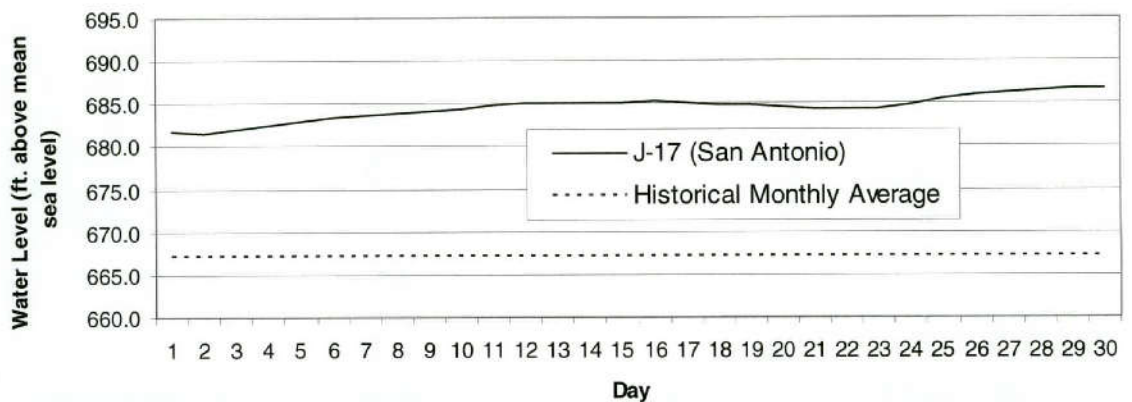
Aquifer levels can be viewed on the Authority's web site at [www.edwardsaquifer.org](http://www.edwardsaquifer.org)

### J-17 (San Antonio) Index Well – April 2004

The J-17 index well level average in April 2004 was 684.5' above mean sea level (msl) - up 2.8 feet from last month's average of 681.7' msl. The April 2004 high was 686.8' (Apr. 30) and the low was 681.5' (Apr. 2), a range of 5.3 feet.

The April 2004 average is 17.5 feet above the J-17 historical monthly average for April of 667.0' msl.

J-17 (San Antonio) Index Well -  
April 2004



### J-17 (San Antonio) Index Well – Combined Historic Record for Two Wells: 1932-2003

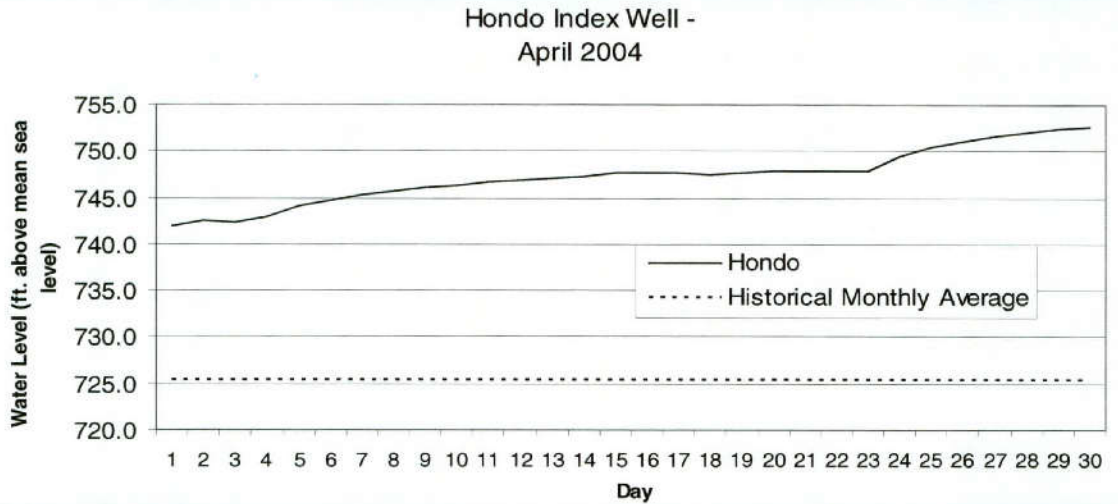
	April 2004	April 2003	Historical Record	
<b>Maximum</b>	686.8	691.2	June 14, 1992	703.3
<b>Minimum</b>	681.5	684.4	August 17, 1956	612.5
<b>Average</b>	684.5	688.3	April (1932-2003)	667.0



## Hondo Index Well – April 2004

The Hondo index well level average in April 2004 was 747.3' above mean sea level (msl) - up 7.5 feet from last month's average of 739.8' msl. The April 2004 high was 752.7' (Apr. 30) and the low was 741.9' (Apr. 1), a range of 10.8 feet.

The April 2004 average is 22.0 feet above the Hondo Well historical monthly average for April of 725.3' msl.

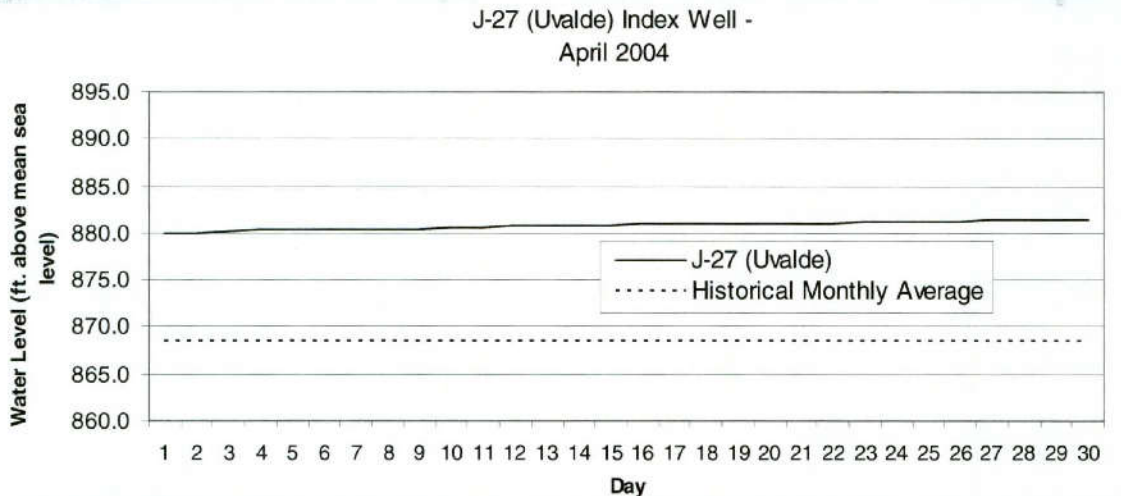


<b>Hondo Index Well – Historic Record: 1986-2003</b>				
	<b>April 2004</b>	<b>April 2003</b>	<b>Historical Record</b>	
<b>Maximum</b>	752.7	752.9	June 14, 1992	779.0
<b>Minimum</b>	741.9	738.5	June 29, 1990	651.0
<b>Average</b>	747.3	747.5	April (1986-2003)	725.3

## J-27 (Uvalde) Index Well – April 2004

The J-27 index well level average in April 2004 was 880.8' above mean sea level (msl) - up 1.3 feet from last month's average of 879.5' msl. The April 2004 high was 881.5' (Apr. 30) and the low was 880.0' (Apr. 1), a range of 1.5 feet.

The April 2004 average is 12.4 feet above the J-27 historical monthly average for April of 868.4' msl.



<b>J-27 (Uvalde) Index Well – Historic Record: 1940-2003</b>				
	<b>February 2004</b>	<b>February 2003</b>	<b>Historical Record</b>	
<b>Maximum</b>	881.5	882.6	June 15, 1987	889.0
<b>Minimum</b>	880.0	880.6	April 13, 1957	811.0
<b>Average</b>	880.0	881.3	April (1940-2003)	868.4

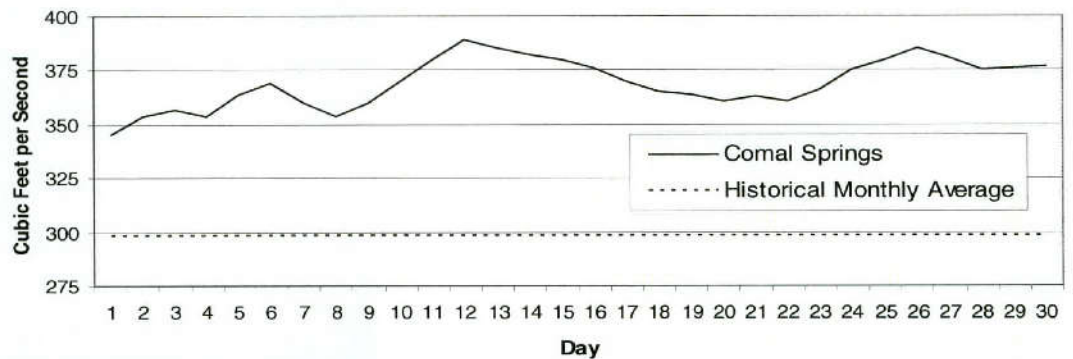


## Comal Springs – April 2004

Comal springflow averaged 369 cubic feet per second (cfs) in April 2004 - up 14 cfs from last month's average of 355 cfs. Comal springflow ranged from a maximum of 389 cfs (Apr. 12) to a minimum of 345 cfs (Apr. 1), a range of 44 cfs.

The April 2004 average was 71.1 cfs above the historical monthly average of 297.9 cfs.

Comal Springs -  
April 2004



### Comal Springs Historic Record: 1927-2003

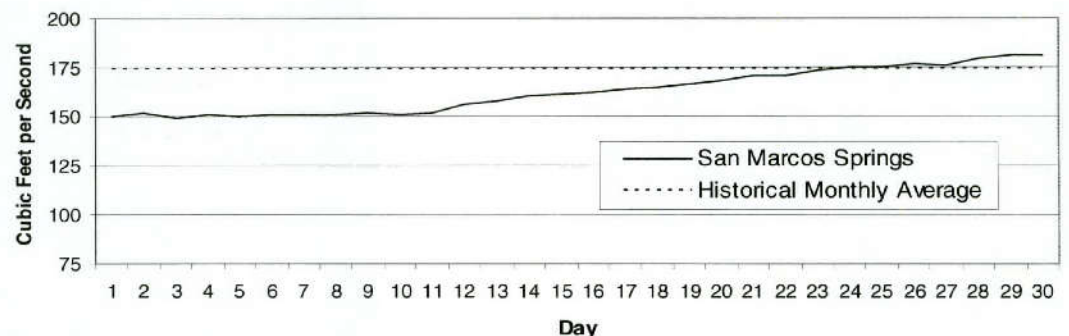
	April 2004	April 2003	Historical Record	
<b>Maximum</b>	389	419	October 14, 1973	534.0
<b>Minimum</b>	345	395	August 8, 1956	0.0
<b>Average</b>	369	408	April (1927-2003)	297.9

## San Marcos Springs – April 2004

San Marcos springflow averaged 163 cfs in April 2004 - up 13 cfs from last month's average of 150 cfs. San Marcos springflow ranged from a maximum of 181 cfs (Apr. 30) to a minimum of 149 cfs (Apr. 3), a range of 32 cfs.

The April 2004 average was 11.2 cfs below the historical monthly average of 174.2 cfs.

San Marcos Springs -  
April 2004



### San Marcos Springs Historic Record: 1956-2003

	April 2004	April 2003	Historical Record	
<b>Maximum</b>	181	290	March 12, 1992	451.0
<b>Minimum</b>	149	259	August 15, 1956	46.0
<b>Average</b>	163	277	April (1956-2003)	174.2





**EDWARDS AQUIFER**  
AUTHORITY

1615 N. St. Mary's Street  
San Antonio, Texas 78215

210.222.2204 or 1.800.292.1047  
[www.edwardsaquifer.org](http://www.edwardsaquifer.org)

## BE AQUIFER AWARE

### CALENDAR OF EVENTS FOR MAY & JUNE

MAY

Tues. 5/11	1 PM 3 PM	Special Board Meeting Board Meeting, Edwards Aquifer Authority, Conference Center 1615 N. St. Mary's Street, San Antonio, Texas
Tues. 5/25	11 AM 1 PM 2 PM	Aquifer Management Planning Committee Permits Committee Legislative Committee
Wed. 5/26	11AM 1:30 PM	Finance/Administrative Committee R&T Committee
Fri. 5/31		Memorial Day Holiday, EAA Offices Closed

JUNE

Mon. 6/7	12 PM	Executive Committee
Tues. 6/8	3 PM	Board Meeting, Edwards Aquifer Authority, Conference Center 1615 N. St. Mary's Street, San Antonio, Texas
Tues. 6/22	11 AM 1 PM 2 PM	Aquifer Management Planning Committee Permits Committee Legislative Committee
Wed. 6/23	11AM 1:30 PM	Finance/Administrative Committee R&T Committee

**Authority meeting times & dates are subject to change.**

Visit our website at [www.edwardsaquifer.org](http://www.edwardsaquifer.org) for up-to-the minute information on meeting times and dates.