

# AQUIFER BULLETIN

www.bseacd.org

January - April 2007

2007, No. 1

## DISTRICT REMAINS IN CRITICAL STAGE DROUGHT

Figure 1

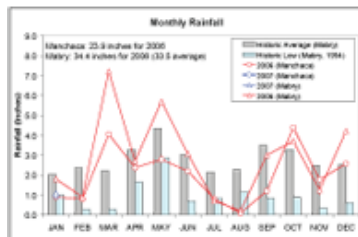
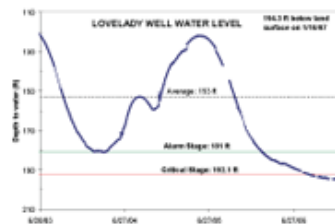
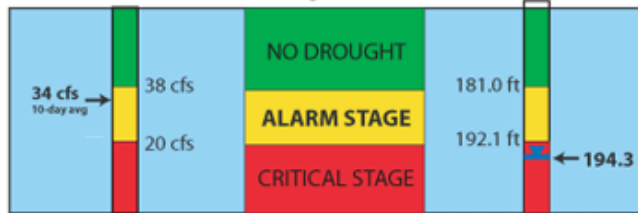
**Drought Status: Critical**  
**Barton Springs/Edwards Aquifer Conservation District**  
 January 10, 2007



**Barton Springs Discharge**  
(cubic feet per second)



**Lovelady Monitor Well**  
Depth to water level (feet)



Drought likely to improve and ease impacts through March 2007 (WCDC).

**DROUGHT RULES**  
 Either Barton Springs OR Lovelady can trigger a drought declaration. However, both Barton Springs AND Lovelady must be above their respective level to exit a drought declaration. There are 2 stages of drought:

- Alarm Stage Drought**  
20% reduction in use
- Critical Stage Drought**  
30% reduction in use  
No lawn irrigation  
Limited outdoor use

Click on the this image for an updated drought figure.

### The 2005-2007 Drought

The BSEACD area (and much of Texas) is experiencing a severe drought that began in the middle of 2005 (Figure 1). Following a year of moderate drought conditions, the BSEACD declared a Critical Stage Drought on September 14, 2006, which initiated the beginning of a required 30% reduction in groundwater pumping from permittees and more restrictions on end users (Figure 2 on pg. 3).

This was the first time the District had declared a Critical Stage Drought since it began making drought declarations in 1991.

see **DROUGHT** on page 2

### ALSO IN THIS ISSUE:

|                            |       |
|----------------------------|-------|
| FROM THE DESK OF THE GM    | P. 5  |
| BSEACD CALENDAR            | P. 6  |
| BSEACD AWARDED GRANT       | P. 6  |
| MEET DIRECTOR CHUCK MURPHY | P. 7  |
| 2007 SCHOLARSHIP CONTEST   | P. 7  |
| FAQS                       | P. 9  |
| NEW GIS SPECIALIST         | P. 10 |
| GARDENING DURING DROUGHT   | P. 11 |
| TCEQ RWH REPORT            | P. 13 |
| TURF GRASS AND DROUGHT     | P. 13 |
| SPRING EDUCATIONAL EVENTS  | P. 14 |
| UPDATED BSEACD MAPS        | P. 16 |
| 2006 CONSERVATION AWARDS   | P. 17 |
| AUSTIN CAVE FESTIVAL       | P. 18 |

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## ***DROUGHT*** Continued from page 1

The current drought comes after one of the wettest years on record (2004), which had a total annual rainfall of 52.3 inches (average is 33.4 inches). So how did this drought develop and worsen into a Critical Stage Drought? Figure 3 on page 4 is a graph summarizing key hydrologic elements that have led up to our Critical Stage declaration.

### **2005: A Drought Develops**

Spring 2005 saw drought conditions develop and persist over the entire state due to a weak "La Niña" weather phenomenon that impacted the jet stream and Texas climate. The U.S. Drought Monitor (<http://drought.unl.edu/dm/monitor.html>) began to signal drought conditions in May 2005, and these conditions only got worse as the year progressed. Most of the state received below average rainfall; Austin received only 22.3 inches (about 63% of its normal rainfall total for 2005). By December 2005, the U.S. Drought Monitor showed most regions in the state in moderate to severe drought, with some regions of the state listed in extreme to exceptional drought.

With decreased rainfall in 2005, the Barton Springs segment of the Edwards Aquifer experienced below average recharge. Onion Creek, the largest contributor of recharge, stopped flowing in late May 2005. By the end of the year, the water level in the Lovelady monitor well had dropped 50 feet from its highest point in May, and Barton Springs flow had dropped from 113 cfs to 38 cfs (average is about 53 cfs). On October 27, 2005, Lovelady and Barton Springs fell below their respective trigger levels, forcing the District to declare a Stage I Drought Alert (Figure 3).

### **2006: Drought Intensifies**

Warmer weather and smaller amounts of rainfall continued throughout the spring and into the summer of 2006. Along with being the warmest year on record for the U.S. and the Austin area (Source: NOAA), 2006 had weak "La Niña" conditions that persisted into 2006, causing drier than normal weather across a good portion of the United States. Although rainfall at Austin's Camp Mabry station was above average, this was not the case for most of Texas and the Edwards Aquifer region. Like many locations in Central Texas, the rain station in Manchaca received only 23.9 inches of rain (~71 % of normal yearly rainfall). By December 2006, the U.S. Drought Monitor showed most regions in the state in severe drought, with large regions of the state listed in extreme to exceptional drought.

The persistent dry conditions in 2006 resulted in very little recharge to the Barton Springs segment of the Edwards Aquifer. Creeks and streams that normally contribute recharge remained dry. Storage and spring flow continued to decrease, and the District declared Alarm Stage Drought on February 6, 2006, requiring a 20% reduction from its users.

By the end of 2006, the water level in the Lovelady well dropped an additional 21 feet, falling below its Critical Stage trigger. Barton Springs flow also decreased to a low of 19 cfs in September (also below its Critical Stage trigger). Minor rains provided some local relief, temporarily elevating spring flow in late 2006 to 30 cfs. However, these rains did little to increase storage in the aquifer. Average discharge at Barton Springs for 2006 was 32.8 cfs, the lowest since the 2000 (30.1 cfs) and 1996 (30.8 cfs) droughts.

see ***DROUGHT*** on pages 3 and 4

**DROUGHT** Continued from page 2

With both indicators of drought below their respective trigger levels, the District declared Critical Stage Drought on September 14, 2006, requiring a 30% reduction from its users (Figure 3).

**Hope for 2007?**

The good news is that "El Niño" conditions have developed in the Pacific Ocean and are predicted to intensify. Owing to this development, the Climate Prediction Center is predicting wetter than normal conditions for the spring of 2007. Accordingly, the National Oceanic and Atmospheric Administration (NOAA) predicts drought conditions will improve and impacts will ease for this part of the country.

Heavy rains on January 13, 2007, resulted in nearly 6 inches of rain over the eastern portion of the recharge zone with lesser amounts over the western portion of the recharge zone. Rainfall amounts over much of the contributing zone were less than 2 inches. Spring flow and water levels in monitor wells rose in response to the rains. By January 18, Barton Springs was flowing at about 85 cfs and the Lovelady monitor well had risen to 191.9 ft below ground surface, 0.2 ft above its Critical Stage drought trigger level. Onion Creek flowed only temporarily, but Barton Creek had a flow of about 26 cfs at Highway 71 on January 18. At the January 25 Board meeting, the District's Board of Directors will review pertinent streamflow and aquifer data as they consider the appropriate drought status for the current conditions.

In order for the Board to declare an end to a drought stage, both Lovelady and Barton Springs must be above their respective drought trigger levels, and have a reasonable prospect of staying above those trigger levels for an extended period of time. For substantial recharge to occur that could take the aquifer out of drought altogether, there will have to be sustained flow in Onion Creek for several months.

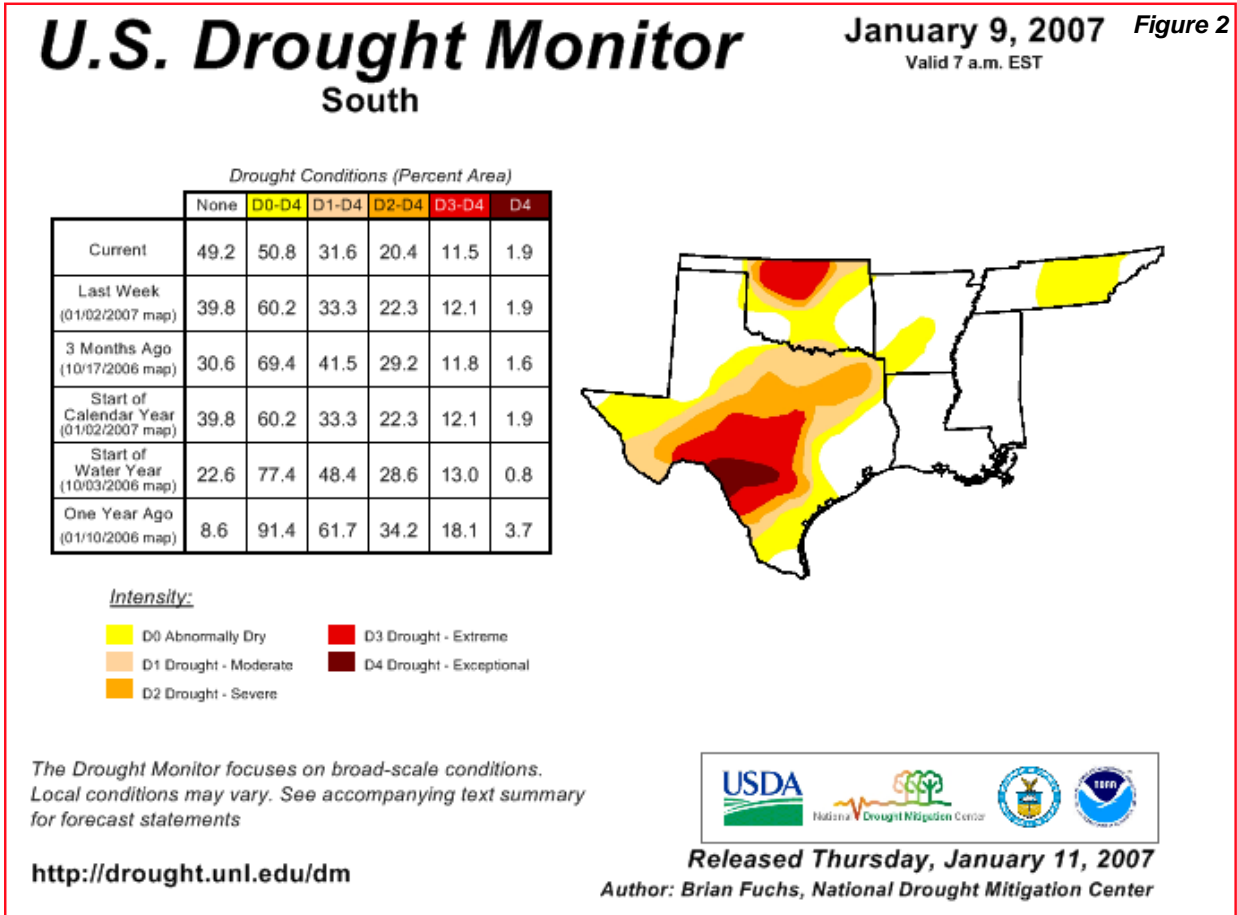


Figure 2: Map of current (January 2007) drought conditions in the region (from the U.S. Drought Monitor). Central Texas is experiencing a severe to extreme drought.

Hydrograph of the 2005-2007 Drought

Figure 3

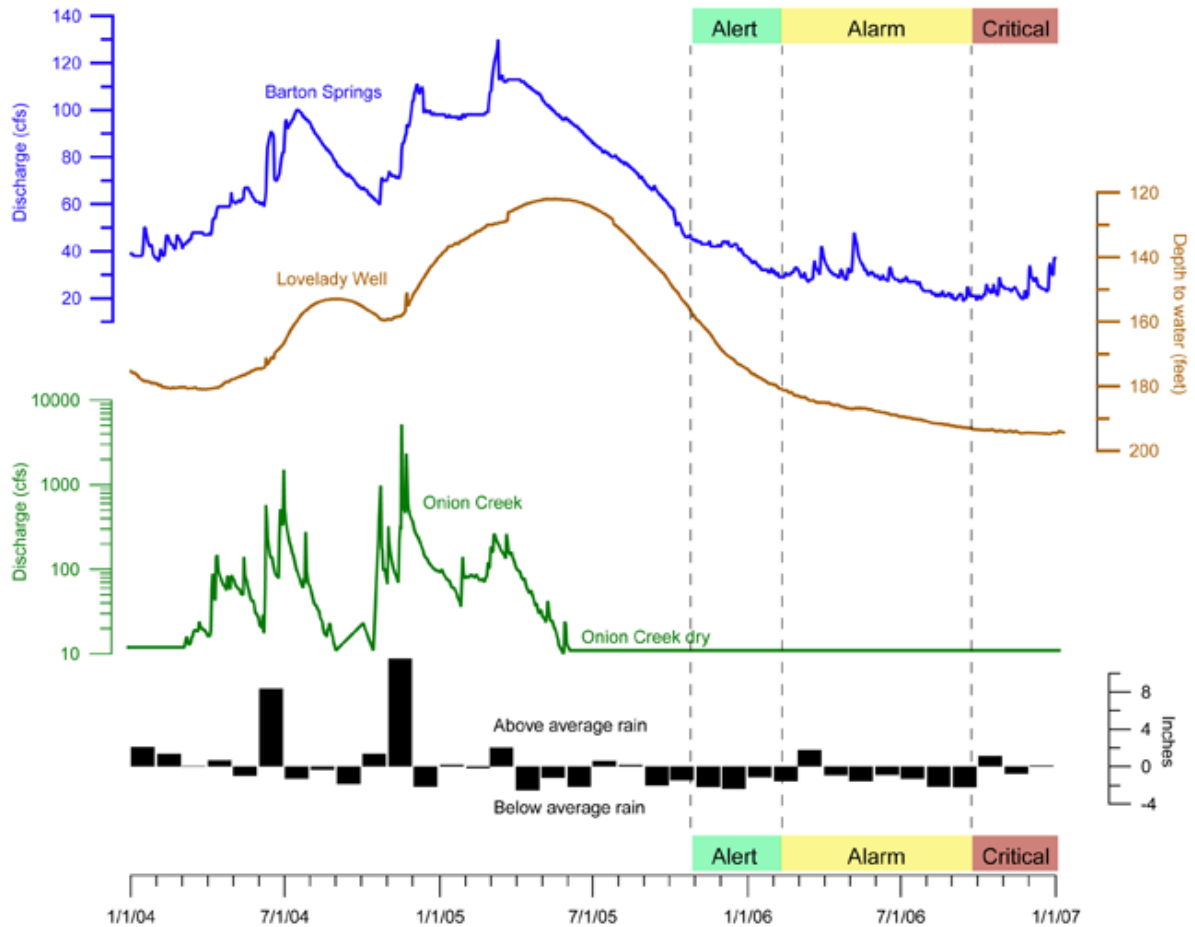


Figure 3: Graph showing key hydrologic elements and drought declarations of the 2005-2007 drought. Due to below average rainfall, Onion Creek ceased flowing and providing recharge to the aquifer. Little recharge coupled with increased pumping, brought water levels and spring flow to their critical stages. Note: "Alert" stage drought was initiated under the District's former drought trigger method and is no longer part of the District's current Drought Trigger Methodology.

**Summary of Impacts of the 2005-2007 Drought:**

The current drought has had a wide range of impacts throughout the State and the region:

- BSEACD declared a Critical Stage Drought, requiring 30% reduction in use (September 2006);
- Barton and San Marcos Springs experienced their lowest discharges since the 2000 drought;
- 169 public water systems throughout the State required customers to limit use (Source: TCEQ);
- Trinity wells were reportedly going "dry", and Edwards Aquifer wells were experiencing yield problems;
- Edwards Aquifer Authority (San Antonio) declared Stage II drought and conservation measures (September 2006);
- Lake Travis was at 42-year low (December 2006);
- Burn bans were in effect for Travis and Hays Counties (2005-2006); and
- Hay supplies for livestock remained in short supply.

*This article was written jointly by Brian Hunt, P.G. who oversees the District's Monitor Well Network, and Dr. Brian A. Smith, P.G. who is the District's senior hydrogeologist.*

## From the Desk of the General Manager

"What's this business about an 'aquifer cap' that I keep hearing?"

That question, or some variation thereof, is one we are asked a lot these days. And there are at least two good reasons for it. But only one of them correctly pertains to "our" aquifer. Let me explain. I'll address the one that isn't as relevant to us first.

The Edwards Aquifer is a major freshwater aquifer system that stretches across a long, narrow swath of Texas -- from near the Rio Grande in Kinney County, through San Antonio and Austin, northward to near Belton in Bell County ([www.bseacd.org/geology.html](http://www.bseacd.org/geology.html)). It is subdivided into several large, natural basins, called "segments", by groundwater divides (sort of like the Continental Divide, but with subsurface flows) and by natural discharge boundaries (like a river's watershed, but with flow into it from the subsurface). Groundwater doesn't naturally flow across these intra-aquifer boundaries to an appreciable extent. This characteristic allows, even requires, each of these segments to be managed independently, in a way that is responsive to the local segment's hydrogeology, amount and location of demand, mix of users and uses, etc.

The largest segment, by far, is the San Antonio (SA) segment, stretching southward from a groundwater divide near Kyle in Hays County, through San Marcos, New Braunfels, and San Antonio, into Medina County. This segment is not only geographically much larger, but it also has much more groundwater than our segment, the Barton Springs segment. More than one-and-one-half million people use the SA segment of the Edwards Aquifer as a source for both drinking water supply and agricultural irrigation. It is regulated and managed by the Edwards Aquifer Authority (EAA), a large groundwater conservation district located in San Antonio. The SA segment, however, has had such great use for such a long time and affects so many people directly and indirectly that both the Texas Legislature and the courts have intervened in defining how much water EAA can authorize by permits. This intervention takes the form of applying so-called "caps" on permitted use to maintain groundwater levels, protect spring flows, and preserve downstream flows and use. As one might imagine, these statutory caps are at least in part politically derived, rather than scientifically determined. You may have heard recent news reports that Sen. Wentworth of San Antonio (whose Senate district also encompasses much of our own segment) is sponsoring legislation to try to reconcile differences in water supply and demand among various uses under certain conditions that EAA has to manage. One of the vehicles

for accomplishing that goal is adjusting aquifer caps -- in this latest instance, eliminating a previously legislatively mandated reduction in a cap that would have required a reduction in the amount of groundwater authorized for pumping at all times. This is the first reason we hear questions from our constituents about "aquifer caps." But while it concerns the Edwards Aquifer, those specific caps only apply to the San Antonio segment, not the Barton Springs segment.

"Our" aquifer is the Barton Springs (B/S) segment of the Edwards Aquifer. It is just north of the SA segment, extending from the Kyle groundwater divide northward to the Colorado River, which is a regional discharge area for the Edwards Aquifer system. (The Northern segment of the Edwards is to the north of the B/S segment, extending from the north side of the Colorado.) While the Edwards Aquifer is our segment's dominant aquifer system, it is very different in many important ways from the San Antonio segment: the B/S segment is much smaller geographically (155 vs. 3,600 square miles); its annual groundwater withdrawals from wells are just a fraction of that in the SA segment (2.5 billion gallons vs. 150 billion gallons); more of it is used for public water supplies and domestic uses (90% vs. 66%); more of it is discharged as natural springflow than in the SA segment (84% vs. 51%); its natural discharge does not provide a sole water supply for downstream users as does the SA segment; and it is regulated by the Barton Springs/Edwards Aquifer Conservation District near Manchaca, not the EAA in San Antonio. But our segment, that is, "our aquifer" does share one important characteristic with the SA segment: they both have groundwater demand that exceeds the supply that will be available during extreme drought conditions. As the primary agency charged by the State of Texas to conserve, preserve, protect, and enhance this segment, the BSEACD must regulate demand during extreme drought so that sufficient water is available for all authorized uses at that time. We want that regulation to be based on sound science, not politics. We think the approximately 60,000 Texans who depend on it for a water supply would want that too.

We are in the process of proposing to accomplish that by implementing what we call an Extreme Drought Withdrawal Limitation (EDWL), which is a type of cap. This cap would not limit the amount of

see **GM REPORT** on page 6

**GM REPORT** *Continued from page 5*

water that can be used during non-drought conditions, unlike the current situation in the SA segment; rather, it would limit use to a prescribed amount only during extreme drought, like the drought of record in the 1950s. But this is a cap that will change the way the BSEACD manages the groundwater of the District. We are asking folks both inside and outside the District to help with its evaluation and establishment. So now you know the second reason we are hearing that question about caps!

And that's a relevant and valid reason. The District has designed a regulatory vehicle that allows use of the groundwater resource in a much less restricted fashion when groundwater levels are high, and the groundwater is abundant. But we are using our permitting program to ensure that during extreme drought, no more than a certain amount of authorized pumpage of Edwards groundwater will be demanded. This amount will be based on three things: first, sound science, not politics; second, our existing legal authorities to limit certain but not all types of withdrawals; and third, protection of our existing users and uses. Whatever "number" we define to be the Extreme Drought Withdrawal Limitation, it will constitute the smallest amount of pumpage, expressed on an average annual basis (but taking into account monthly variations), that we think can be achieved legally and practically at the most extreme drought condition.

The EDWL cap will minimize the consequences drought has on groundwater users in the District and on sensitive ecosystems, but it cannot protect either from drought's adverse impacts. For that reason, in the future we will be implementing other measures, like fostering substitution and use of alternative water sources for Edwards groundwater during such extreme drought, which ultimately will be reflected in reducing the maximum amount of pumpage in the prevailing EDWL cap. And eventually, by gradually ratcheting that cap downward (as feasible over the years), we will achieve a level of use in our segment of the Edwards that reduces overall potential impacts to a level that is acceptable to all. We are currently conducting various types of studies that will help us ultimately answer what level of pumpage that is. We know it is going to be smaller than it is now - we just don't know how much smaller and when it can be achieved.

That's the story behind the story on "aquifer caps."

*Kirk Holland, P.G. is the District's General Manager.*

## District Awarded TCEQ/EPA Grant Award for Water Quality and Enhanced Recharge

On June 7, 2006, BSEACD staff was notified by TCEQ that the District had been awarded a 319(h) grant to enhance the quality of water recharging the aquifer. Funding for 319(h) grants comes from EPA for projects involving the study and reduction of nonpoint source pollution. The total amount of funding to be provided by the EPA will be \$335,000. The District will provide \$223,000 worth of in-kind services. Using past 319(h) grant funds, the District installed a BMP (Best Management Practice) structure over Antioch Cave on Onion Creek in 1997. The current grant plan calls for upgrading the BMP at Antioch and installation of a BMP over another recharge feature within the District. Continuous water quality monitoring network (CWQMN) systems will be installed at each BMP in addition to automated systems to open and close valves that will minimize the amount of sediment and pollutant-laden stormwater from entering the aquifer at these recharge features. To locate a site for a second BMP, an evaluation will be conducted to determine where the most sediment and pollutant reduction can be achieved. A contract is currently being prepared by TCEQ that should be ready for signing by late February.

*Dr. Brian A. Smith, P.G. is the District's senior hydrogeologist.*

### District Calendar

The Board of Directors usually meets on the 2nd and 4th Thursdays of the month beginning at 6 p.m. **However, the meeting schedule is subject to change.** Please contact the District office at 512-282-8441 or the website at [www.bseacd.org](http://www.bseacd.org) for more information about upcoming meetings of the Board as well as advisory committee meetings. The agenda for posted meetings can be found on the District website. Most Board Meetings and Work Sessions are held at the District's office at 1124 Regal Row, Austin, TX 78748.

|                 |           |                                   |
|-----------------|-----------|-----------------------------------|
| January 25      | 6:00 p.m. | Board Meeting                     |
| February 8 & 22 | 6:00 p.m. | Board Meeting                     |
| February 20     |           | Office Closed for Presidents' Day |
| March 2         |           | Scholarship Essays Due            |
| March 8 & 22    | 6:00 p.m. | Board Meeting                     |
| April 12 & 26   | 6:00 p.m. | Board Meeting                     |

## Meet Chuck Murphy, Director of Precinct 1

District staff had another opportunity to visit "up close and personal" with one of our Directors recently. This is one in a series of interviews with the District's Directors that are being included in issues of this newsletter. These dialogues are proving to be of great interest to District groundwater users and other constituents. In this issue, we interview Mr. Chuck Murphy, Director of Precinct 1, which includes most of the District in Hays County, from Buda west. Chuck is a long-time resident of Buda and a former member of the Buda City Council. His four-year elected term runs through May 2008.

**Staff: Chuck, we know that your work involves "resource planning" at Freescale's Oak Hill facility. What does all that entail?**

**Chuck Murphy:** My job involves all aspects of supply chain planning for our product portfolio of telecomm sets. For quite a while, I traveled internationally throughout the year, talking to suppliers, customers, and our offshore manufacturing facilities. But it's much less now, which is better for me, for my family, and for the District.

**Staff: What else would you like folks to know about you?**

**CM:** Well, my wife Daphne and I have two boys, one a junior at UT and another in fourth grade. Being a husband and dad keeps me busy enough, but I am also an avid two-wheeler - I love to mountain bike and road bike using pedal power, often with family members; I also have a motorcycle that sets my spirit free! But underlying all of that, I have a strong sense of civic duty - it's just an integral part of who I am.

**Staff: Why did you choose to run for election to the Board of the District in the first place? What prepared you to do so?**

**CM:** My public service began when I got involved in water and wastewater issues for the City of Buda, more or less because at that time there wasn't anyone else doing it. Educating myself in the policies and the politics of municipal government eventually led to my running and being elected a Buda City Councilmember (2001-2003). I first became aware of some groundwater supply management issues in that role. One of my most notable accomplishments as a public servant was working to set a renewed Master Plan with the focus of improving Buda's infrastructure in water, wastewater management, and storm water drainage. Later, Dr. Kent Butler, who was one of the original champions of and a consultant for the District and the City of Buda, suggested that I could continue to apply what I learned in municipal water/ wastewater management and its relationship to growth management by joining the BSEACD Board. This reinforced what I was hearing during that time from my friend Jim Camp, who was retiring from the District Board. So I ran for Director of District Precinct 1 and was elected to the District Board in 2004.

**Staff: What's the first thing that comes to mind about what you know now that you probably didn't at that time?**

**CM:** I really had no idea about the hydrogeology of this area, and especially about how complex aquifers are and how they work.

**Staff: Chuck, you have been an outspoken advocate for conjunctive use of groundwater - alternative water. What does that mean, and why is it important?**

*MURPHY Continued on page 8*

## 2007 Groundwater Essay Contest

The Barton Springs/ Edwards Aquifer Conservation District is now soliciting applications and essays for its 2007 Groundwater Essay Contest. Two essays will be selected as winning entries by an independent evaluation panel, and the authors will each receive a \$1,500 scholarship to the college, community college, or training institution of his/her choice.

Essays must generally discuss groundwater issues, which may include but are not limited to non-point source pollution and pollution prevention, water conservation, or hydrogeology. While essays must focus on groundwater issues, applicants do not have to be planning a career path in a water-related field.

Applicants must be high school seniors currently enrolled in one of the seven school districts overlapped by District boundaries (Austin, Eanes, Dripping Springs, Hays Consolidated, Del Valle, Bastrop, and Lockhart), or an accredited private school located within the boundaries of those school districts. Those individuals who have acquired a GED within the last six months are also eligible. In addition, essay contest winners must plan to use the scholarship money for the 2007-2008 school year; funds will be provided directly to the selected institution.

For contest rules and applications, please visit: [www.bseacd.org/scholarship\\_program.htm](http://www.bseacd.org/scholarship_program.htm) or call (512) 282-8441.

Essays and applications must be received by Friday, March 2, 2007 by 5 p.m.



**CM:** My advocacy is largely based on my belief that community viability really depends on development, and in this area water basically determines the ability of a community to grow - power and construction of other infrastructure are easy compared to access to water. But there is a physical limit on how much firm-yield groundwater is available, so without conjunctive use, there would be a limit imposed on community growth and the opportunities that it creates. I think groundwater can provide most of the current demand most of the time, but even now we need to supplement with alternative sources for drought periods. And of course, future needs should plan solely on water supplies other than groundwater.

**Staff:** Besides that, what, in your opinion, are the one or two other big challenges facing the District at this time?

**CM:** We need to help foster a cultural change in mindsets toward water re-use at all scales, from individual households to aquifer storage and recharge (ASR) systems. Re-use is really enhancement of supply. It includes using rainwater collection systems to enhance supplies, and also using water use optimization schemes in large commercial and industrial facilities. Purple pipe, or wastewater recovery is a viable solution for industrial cooling, rock washing, and dust suppression. Our policies should foster re-use, even if our financial resources and statutory authorities don't allow us to subsidize those things financially.

**Staff:** So, if you could wave a magic wand and have things be different, other than an unlimited groundwater resource, what would be the first thing you would want to change right now?

**CM:** I feel strongly that more responsibility and authority should be granted to GCDs in general, and our District in particular, from the Legislature in order for us to deal better with the myriad issues facing us. I think that includes the ability to prevent and abate water pollution within the District. It probably makes more sense for Districts such as ours to be a taxing entity or a prescribed part of ad valorem taxation, rather than relying on water use fees as we currently do; from a societal perspective, fair taxation benefits all folks. But that sort of change is not likely to happen anytime soon!

**Staff:** Gazing into your crystal ball, how do you see the District being different in 5 to 10 years from now?

**CM:** Well, I think we will be headquartered in a different location, one that is better able to serve staff and constituents alike. But fundamentally, I think we are well positioned from both staff resources and programmatic viewpoints to meet the future.

**Staff:** Is there anything else that you would want to say to the District staff? To your constituents in Precinct 1? To all those who live and work in the District?

**CM:** To the staff especially, but really to all: the Board wants to be proactive in resolving issues before they become intractable problems. To my constituents: the Board wants to budget for the "right science," to be able to address natural systems' policies from a strong scientific base. And to all, I want to assure everyone that the District wants to continue to increase its service to the community and in what it does for them; we want to be a positive force in the community that relies less on regulatory demands and more on facilitating needed change.

**Staff:** And finally, if you had to choose one or two words that describe how you feel about the District, what would they be?

**CM:** "Steward" is probably it - "stewardship before regulation." I feel like the District is a steward for the public - less a state agency, and more a member of the local community. We are also a representative of the community to state agencies and its institutions. We are the first line of defense in resolving problems with the resource in the community and on behalf of the community. And I'm proud to say that as a Director of BSEACD, I feel like I am able to live my personal credo: "It's not hard to be a public servant if you always do the right thing."



## FAQs From October's Town Hall Meetings

Last October, the District held town hall-type meetings in Sunset Valley and Buda, to get input from all interested parties on the District's proposed rule changes in response to the ongoing drought. Both town hall meetings were well attended, and we hope the information exchange was as beneficial to the attendees as it was to us. On behalf of the District Board of Directors, the District staff would like to offer thanks for all those who took time to attend, and for the valuable input and insight that were offered.

In the meetings, there were several questions, topics, and recurring themes that seemed paramount to participants. These questions and our responses are provided below, and may be especially useful to all those who were not able to attend. These questions and answers may very well lead to more questions, so please feel free to contact our office for more information.

### **Q: Why isn't everyone subject to the same water use restrictions placed upon District groundwater users?**

**A:** Water uses from sources other than groundwater wells within the District's jurisdictional boundaries are not regulated by the District and may have different drought triggers and restrictions. The majority of homeowners within the City of Austin, for example, have water supplied by the City, whose source is the surface water reservoirs of the Highland Lakes. These reservoirs have a larger overall storage capacity and typically replenish quicker than our segment of the Edwards Aquifer. As a result, these surface water reservoirs tend to maintain adequate supply for longer periods of time and therefore have their own sets of drought triggers and water use restrictions. This can be very confusing at times; for instance, an area supplied by City water can be directly adjacent to an area supplied by District groundwater.

In addition, some users are near larger property owners who have their own well, which may be exempt from permitting and its restrictions. The District encourages water conservation by all users regardless of water source, and we require all groundwater users (whether authorized by an individual production permit, supplied by a permittee, or exempt from permits) not to waste water, especially during drought.

### **Q: Are there any alternate water sources available to my water supplier or me?**

**A:** The District strongly encourages supplementing fresh Edwards Aquifer groundwater use with other water sources such as surface water. This is referred to as conjunctive use. Implementing conjunctive use, however, may be problematic or logistically unfeasible to some water suppliers at this time. Feasibility of conjunctive use

for an individual water supply system will depend on several factors including: availability of alternate sources, availability of sufficient infrastructure, cost of providing any needed infrastructure, and/or the typically higher costs of raw surface water, its treatment, and distribution. Recognizing these obstacles, the District is actively exploring ways to encourage and even incentivize the implementation of conjunctive use.

At the individual end-user level, the District also encourages users to supplement their water demands with rainwater harvesting. If you are interested in rainwater harvesting, please visit the District's website at [www.bseacd.org/conservation.html](http://www.bseacd.org/conservation.html) or contact the District office at 512-282-8441 for more information.

### **Q: Can my water utility cut my water off?**

**A:** All District-permitted public water systems are required, by District and State regulations, to implement the water use restrictions of their respective User Drought Contingency Plans (UDCPs) and enforce against violations of these restrictions during District declared drought. Different types of systems have various enforcement options available to them, which include assessing fines, installing flow restrictors, or disconnecting service. District permittees typically do not have to resort to such drastic measures as disconnecting service, but for some repeated and very egregious cases of excessive use, this may be a water supplier's only option for enforcing their UDCP and achieving compliance with their mandated monthly pumpage limits. The District enforces its monthly pumpage limits on its permittees, and noncompliant permittees are subject to some substantial fines and penalties.

### **Q: How can I protect my property (foundations, pools, trees, etc.) from drought-induced damage if all outdoor water use is prohibited during Critical Stage Drought?**

**A:** When Critical Stage Drought was declared back in September, the District Board of Directors recognized that some minimal amount of outdoor water use should be allowed for certain purposes. In response to these concerns, the Board unilaterally amended all UDCPs to allow for minimum and essential outdoor water use by allowing attended watering with a hand-held hose fitted with an automatic shut-off device. All end-users, however, are still required to stay within the volume of water use permitted in their respective UDCPs. Critical stage drought could be a harbinger of a long-term groundwater shortage, and all users must adjust their lifestyles and related decision-making to accommodate the prospect of that condition, not the other way around.

see **FAQ** on page 10

**Q: Why does the District continue to permit water for new development?**

This is not actually the case. When the Sustainable Yield Study was completed in 2004, the District realized that it could no longer permit any additional firm yield water and expect to manage a Drought of Record-type scenario while maintaining flow at Barton Springs and water levels in wells on the western side of the Aquifer. As a result, the District Board of Directors implemented Conditional Permitting with the adoption of new rules in September of 2004. All new permits or permit amendments approved after this date would be for conditional or interruptible pumpage. In other words, any new development that requested to pump Edwards Aquifer groundwater would be requesting a Conditional Permit, which could be subject to curtailment (up to 100%) as ordered by the Board during extreme drought conditions. Some District permittees have had some available water for new users under their authorized pumpage limits, but generally such supplies are no longer available. In addition, the District is prohibited by its Rules from issuing any new permits or permit amendments involving increased water use with an effective use date before the District has emerged completely from a declared drought. There have been no new permits issued by the District with such an effective date since February 6, 2005.

**Q: Why doesn't the District further restrict uses such as industrial/commercial use or use for irrigation of soccer fields or golf courses?**

**A:** Currently, State law does not allow the District to discriminate or prioritize with regard to water use restrictions during drought on the basis of type of use, as long as the use meets the definition of beneficial use. All District permittees have to be able to demonstrate that their use qualifies as beneficial use in order to obtain a permit.

Like the District-permitted public water suppliers, all other permittees must have and implement a UDCP that is based on the type of use for which they are permitted. These other types of uses are subject to, and must comply with, the same levels of overall pumpage reductions that the public water suppliers are subject to during District-declared drought.

*John Dupnik, P.G. is the District's regulatory compliance team leader.*

## District Welcomes New GIS Specialist

Nathanael Banda joined the BSEACD team in late 2006 as a part-time GIS Specialist.

Mr. Banda graduated in May 2006 from Texas State University with a B.S. in physical geography, minor in geology, and a Certification in GIS. Nathanael was named Outstanding Graduating Senior by unanimous vote of the Department of Geography faculty in April 2006. While in school, he was a member of the geography honors society and served in several leadership positions around campus including as an RA and Hall student president.

Mr. Banda's other work experiences include GIS and surface water flow modeling work for the Nature Conservancy Blanco River Project and managing Tursus Texas, his commercial cleaning business.

Nathanael lives in San Marcos and enjoys kayaking, snorkeling the San Marcos River, mountain biking, cooking, aquariums, hunting, and fishing.



## How Your Landscape Can Survive the Next Drought

Despite cooler temperatures and recent rains, the District remains in a Critical Stage Drought. District groundwater users are still required to heed water restrictions that include cessation of watering lawns with unattended sprinklers, washing cars, and other outdoor uses with groundwater. However, the Board of Directors continues to allow District groundwater users to irrigate small lawn areas, shrubbery, trees and foundations with hand-held hoses with automatic shutoffs.

Over the summer months, many of us lost parts (if not large portions) of our turfgrass to extreme heat and lack of rain. Under current restrictions, this spring may not be the ideal time to try to reestablish lost vegetation due to limits on household water use. Nevertheless, lack of water does not have to keep us out of the garden when spring fever hits.

Spend the season planning and designing a new water-wise landscape that replaces water-guzzling turf grass with beautiful Texas plants, low-water use turf varieties, and hardscapes. Install your hardscape areas this spring and wait until fall to add your plant material. Fall is the ideal planting time in Central Texas, owing to cooler temperatures and expected increased rainfall. Your new landscape, if properly established, will be more likely to withstand inevitable future drought conditions.

Not sure how to get started on your new landscape? Visit the District's website for a step-by-step guide that will take you through the process of evaluating your current landscape, designing a new layout, selecting plants, and maintaining your new investment ([www.bseacd.org/conservation.html](http://www.bseacd.org/conservation.html)). The conservation section of our website also includes information on rainwater harvesting installation, incentives, and exemptions; links to area plant guides; and other pertinent water conservation measures that you can use around the house to stretch your water budget. In addition, keep these essential tips in mind:

- **Start with good soil and don't skimp!**

Make sure to start with at least 4 to 6 inches of healthy soil. For a small fee, you can have your soil tested by Texas A&M (<http://soiltesting.tamu.edu/>). Make sure to properly stabilize your soil to keep it from running off during heavy rains into nearby storm drains, which lead to our creeks.

- **Plant native plants and trees and reduce the amount of turfgrass in your landscape.**

Native plants thrive in our climate and soils and require very little water and maintenance if established correctly.

- **Group plants that have similar moisture requirements and water less often and more deeply.** Less frequent, deeper watering helps prevent shallow root systems, which dry out more quickly during drought. In addition, this watering regime prevents root suffocation from water-logged soil.

- **Mulch at least twice a year!**

A 3-inch layer of organic mulch protects plants by covering and shading soil, minimizing water evaporation, inhibiting weed growth, and reducing soil erosion.

- **Aerate turf with a plug aerator twice a year to encourage deeper root growth.** Follow aeration with a 1/8 to 1/4-inch of sand and compost top dressing.

Need more ideas or have questions about water-wise landscaping? Please do not hesitate to call the District at 512-282-8441.

Other related links:

**Can a water-wise landscape save me money?**

[www.lcra.org/docs/water\\_hill\\_country\\_landscape.pdf](http://www.lcra.org/docs/water_hill_country_landscape.pdf)

**Where can I buy native plants?**

[www.bseacd.org/graphics/waterwise\\_resources.pdf](http://www.bseacd.org/graphics/waterwise_resources.pdf)

**Read about the Rainwater Harvesting Evaluation Committee Final Report for the 80th Texas Legislature:**

[www.twdb.state.tx.us/iwt/rainwater/docs/RainwaterCommitteeFinalReport.pdf](http://www.twdb.state.tx.us/iwt/rainwater/docs/RainwaterCommitteeFinalReport.pdf)

**Read the Assessment of Water Conservation in Texas from Texas Water Development Board for 80th Legislature:**

[www.twdb.state.tx.us/publications/reports/TWDBTSSWCB\\_80th.pdf](http://www.twdb.state.tx.us/publications/reports/TWDBTSSWCB_80th.pdf)

Also, visit our Events section on page 14 for a list of related upcoming events.

*Jennee Galland is the District's outreach and education team leader.*

**GARDENING** Continued on page 12

In this series of photos, one can see how dramatically a landscape can change with just the removal of a small amount of turfgrass. The plants in this garden were installed in February 2004; the last photo was taken in April 2006. Notice how granite mulch was added to finish out the garden, and how large stones were installed to stabilize the plantings from washing away during heavy rains.



The District would like to thank Cathy Nordstrom from Sans Souci Gardens for the use of these photographs and her assistance with this article.

## Texas Water Development Board Submits Report On Rainwater Harvesting Potential and Guidelines For Texas

The Texas Water Development Board (TWDB) has submitted a report entitled "Rainwater Harvesting Potential and Guidelines for Texas" to the 80th Texas Legislature. The report was prepared by an interagency Rainwater Harvesting Evaluation Committee that was constituted as a result of House Bill 2430 passed by the 79th Texas Legislature.

The committee was required to study the potential for rainwater harvesting in Texas, and to develop minimum water quality guidelines and treatment methods for indoor use of harvested rainwater. The committee was also required to recommend ways in which rainwater could be used in conjunction with existing municipal water systems, and ways to further promote rainwater harvesting.

The committee's four members represented the Texas Water Development Board (TWDB), Texas Commission on Environmental Quality (TCEQ), Texas Department of State Health Services (TDSHS), and the Texas Section of the American Water Works Association (AWWA).

In addition to developing water quality guidelines and treatment methods, the committee submitted 10 recommendations in its report for promoting rainwater harvesting in Texas.

Some of the key recommendations include:

- requiring all new state buildings exceeding 10,000 square feet in roof area to include rainwater harvesting in their design;
- developing incentive programs to encourage rainwater harvesting in new residential, commercial and industrial facilities in the state;
- considering new legislative appropriations to help provide matching funds for rainwater harvesting demonstration projects statewide; and
- directing state agencies to require facilities using both public water supplies and harvested rainwater for indoor purposes, to use the rainwater only for non-potable purposes.



The full report is available on the TWDB website:  
[www.twdb.state.tx.us/iwt/rainwater/docs/RainwaterCommitteeFinalReport.pdf](http://www.twdb.state.tx.us/iwt/rainwater/docs/RainwaterCommitteeFinalReport.pdf)

## Local Turfgrasses Put to the Test

The Rio Grande Basin Initiative and the San Antonio Water System (SAWS) have teamed up to construct a 5,000 square foot, 60-day drought simulator, which will test 25 common area turfgrasses for their ability to survive and recuperate from drought conditions.

The study is sponsored by the SAWS and the Turfgrass Producers Association, and results from the first year should be available in a couple of months.

For more information, please visit:

<http://riogrande.tamu.edu/newsletters/Outcomes/outcomes-v5n4.pdf>

<http://agnews.tamu.edu/dailynews/stories/AGEN/Nov2406a.htm>

<http://itc.tamu.edu/rainout.php>



*Photo courtesy of the Irrigation Technology Center*

## Spring Educational Events

### BALCONES CANYONLANDS PRESERVE 2007 HIKE AND LECTURE SERIES

Take advantage of a rare opportunity to visit one of the most unique urban preserve systems in the country. Due to capacity limits for these outdoor events, pre-registration is required unless otherwise noted on schedule.



For information about a specific event, please visit [www.balconescanyonlands.org](http://www.balconescanyonlands.org) or contact the partner agency hosting the event.

February 10, 2007

9:00 a.m. to 11:00 a.m.

#### **Native Plants of Central Texas with Bill Carr**

The Crossings, 13500 FM 2769

The location of Travis County along several natural regions results in a diversity of more than 1,500 species of plants. This overview will include information about the geology and vegetation of three ecoregions in the county with ultimate focus on some of the rarer plants. No pre-registration.

March 10, 2007

8:00 a.m. to 10:00 a.m.

#### **Golden-cheeked warblers - Are they here yet?**

Join us for a hike in the Texas Hill Country to experience the many plant, bird, and other animal species that reside in Golden-cheeked Warbler habitat. Are they here yet? We'll find out! Presented by the Travis Audubon Society.

April 14, 2007

7:00 a.m. to 9:00 a.m.

#### **Birding at the Basin**

Join us for this morning hike on a few of the 2.5 miles of trails in the Wild Basin Wilderness Preserve and this guided opportunity to look and listen for these colorful endangered warblers that breed exclusively in the mature oak and juniper woodlands of Central Texas. Presented by Wild Basin Wilderness Preserve.

May 12, 2007

8:00 a.m. to 10:00 a.m.

#### **Guided Hike at Hamilton Pool Preserve**

Guided interpretive tour of Hamilton Pool Preserve. See unique plants and native wildlife like canyon mock orange and, possibly, Golden-cheeked Warblers. Presented by Travis County's BCP Staff.

### SHEFFIELD EDUCATION CENTER FAMILY PROGRAMMING FOR SPRING 2007

[www.ci.austin.tx.us/splash](http://www.ci.austin.tx.us/splash)

All events happen at Zilker Park at Sheffield Education Center located at the Barton Springs Bathhouse. Call 478-3170 for more information.

March 22, 2007

9:30 a.m. to 4:00 p.m

#### **Deep Down Underground Caving Day**

This event is for young school kids in the morning, and families in the afternoon. Explore the fragile world of caves with activities, animals, crawls and scavenger hunts.

March 24, 2007

11:00 a.m. to 2:00 p.m

#### **Austin Nature Days- Salamander at the Springs**

Visit Eliza springs and see salamanders in their native habitat.

March 31, 2007

11:00 a.m. to 2:00 p.m

#### **Austin Nature Days- Mini Geo**

Attend porch presentations and learn about the rocks of the area. A map for a special geo walk is provided for visitors.

April 22, 2007

10:00 a.m. to 2:00 p.m

#### **Earth Day with Water Rangers**

Visit stations that show details about the water quality of springs and creeks.

May 11 and 12, 2007

9:00 a.m. to 2:00 p.m.

#### **Mother Earth Day at the Springs**

Celebrate Earth Day with music and fun on the park's hillside.



see **EVENTS** continued on page 15

**EVENTS** Continued from page 14

**TREE TALK AND WINTER WALK  
THE LADY BIRD JOHNSON WILDFLOWER CENTER**

Saturday, January 27, 2007  
9:00 a.m. to 5:00 p.m.

Tree Talk & Winter Walk is an opportunity to rediscover the beauty of Central Texas trees and shrubs. This one-day plant sale boasts over 50 species of native trees and shrubs that you can purchase to enhance your home landscape. The event includes family activities, organized walks, talks, and demonstrations to give you the knowledge and skills you need to enhance your landscape.

More at  
[www.wildflower.org](http://www.wildflower.org)



**TEXAS THE STATE OF SPRINGS  
February 15, 2007 at 8:00 p.m. on PBS**

The latest video documentary from TPWD about water resources, "Texas - The State of Springs", will air at 8 p.m. on Thursday, February 15th on all Public Broadcasting Service (PBS) stations in the state. This year's documentary will examine the historical decline of springs across the state and explore current groundwater and land use issues that impact spring flow.

More information to follow at  
[www.texasstateofwater.org](http://www.texasstateofwater.org)

**AUSTIN NATURE DAYS  
APRIL 2007**

Join the District as we help celebrate the third annual Austin Nature Day Event. This event is patterned after the successful Austin Museum Day, and brings over twenty Austin area environmental and cultural organizations together to celebrate the city's beauty, vitality, and diversity of natural landscapes and resources. Throughout April, organizations will offer over two dozen programs and events. For more information on all Nature Day activities, visit:  
[www.austinnaturedays.org](http://www.austinnaturedays.org)



**CLEAN SWEEP 2007  
KEEP AUSTIN BEAUTIFUL**

Saturday, March 31, 2007  
Cleanup: 9:00 a.m. to 11:00 a.m.  
Volunteer Party: 11:30 a.m. to 2:00 p.m.

Be a part of Austin's BIGGEST citywide cleanup! Volunteer for a group cleanup site or organize your own cleanup. KAB will provide all of the cleanup supplies.

All volunteers are invited to a family friendly party after the cleanup at Waterloo Park with free lunch, a free t-shirt, a climbing wall, live music, and kid's activities.

[www.keeпаustinbeautiful.org](http://www.keeпаustinbeautiful.org)

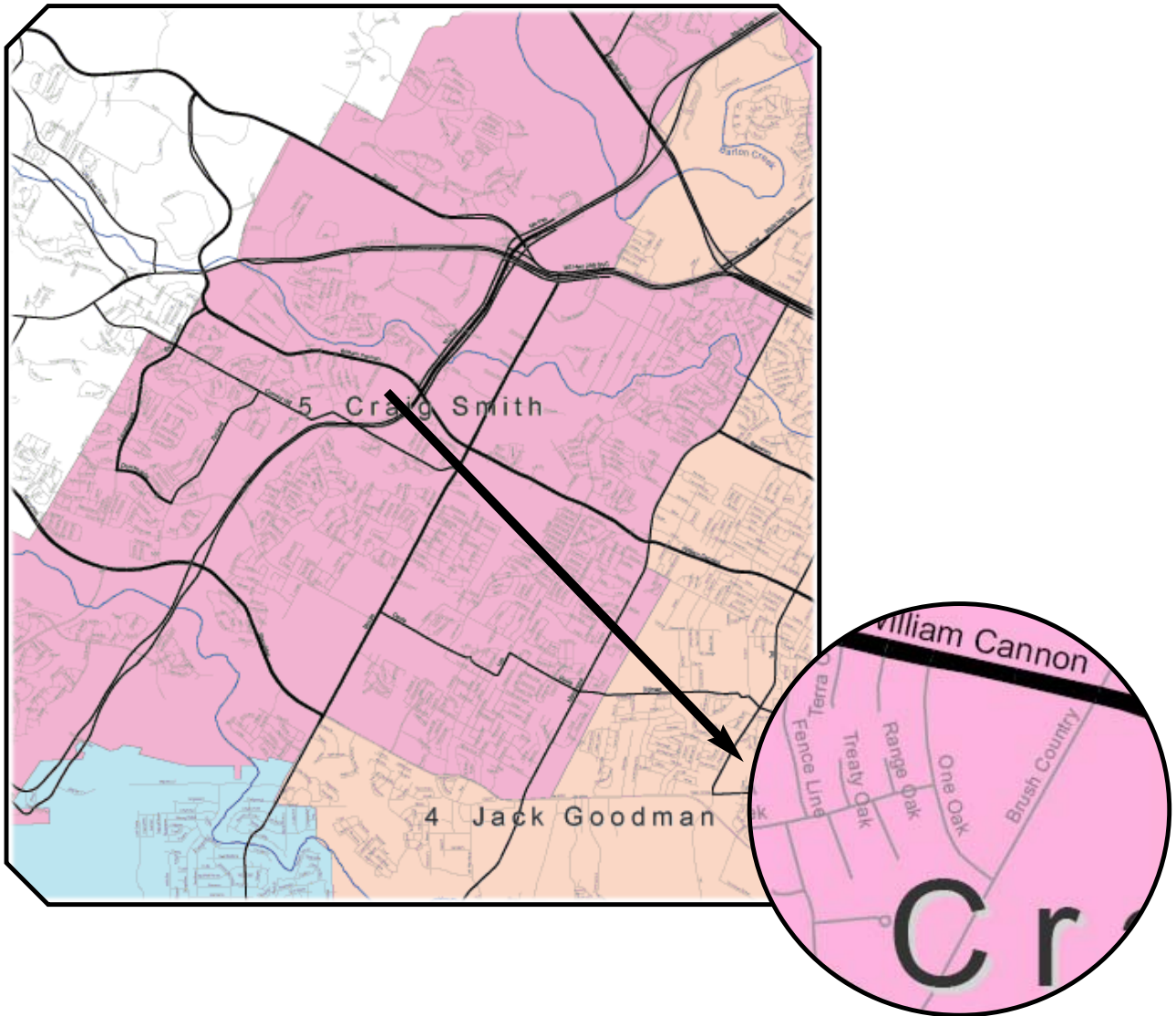
**GREEN GARDENING FESTIVAL  
ZILKER BOTANICAL GARDEN**

Get ready for spring at the third annual Green Garden Festival on Sunday, February 26, 2006 from 1:00 p.m. to 4:30 p.m. at Zilker Botanical Garden (2220 Barton Springs Road). You'll find talks and tips to help you create and maintain a yard that is attractive, cost saving AND earth-friendly. The festival will include outdoor demonstrations, kids activities, and booths.

For directions, more information, and parking info:  
[www.ci.austin.tx.us/greengarden/festival\\_pr.htm](http://www.ci.austin.tx.us/greengarden/festival_pr.htm)



## Updated Maps From the District



The District is pleased to announce that three of its most requested maps have been updated and uploaded to our website. The District boundary, precinct, and geology maps now include current road information, which is labeled for your convenience. Interested viewers will now be able to pinpoint exact locations in relation to recharge boundaries, District precinct boundaries, and geology.

Maps can be viewed at: [www.bseacd.org/maps2.html](http://www.bseacd.org/maps2.html)

To view these maps, you must have a PDF (Portable Document Format) reader, such as Adobe Acrobat Reader, installed on your computer system. If you do not have Adobe Acrobat or are unfamiliar with PDF files, you may download the reader from Adobe at [www.adobe.com/products/acrobat/readstep2.html](http://www.adobe.com/products/acrobat/readstep2.html).



## Leaders in Conservation Recognized

On November 3, 2006, the Barton Springs/ Edwards Aquifer Conservation District awarded their 2006 Conservation Awards at a luncheon hosted by The Bowie High School Culinary Arts program. Each year, the District presents these awards to deserving individuals, organizations, companies or agencies that have excelled in efforts to protect and conserve water resources in the Barton Springs segment of the Edwards Aquifer. In addition to the District's regular recognitions, this year's luncheon included three new water conservation awards that highlighted some of the extraordinary steps taken by concerned citizens, builders/ land developers, and permittees during Critical Stage Drought.

BSEACD congratulates the following recipients who were chosen from a record number of submissions:



### **Water Conservation by an Aquifer End-User: Milberg Certified Organic Farm**

Tim Miller, owner of Milberg Certified Organic Farm, has dry-land farmed outside of Kyle for seventeen years without needing to pump from the aquifer. He has developed a series of trenches (2 miles), ponds, and cisterns to capture and hold rainwater; ponds to control runoff; and carries out water saving activities like mulching, terracing, and composting.

### **Water Conservation: Water Supplier or Permittee: St. Andrew's Episcopal School**

St. Andrew's Episcopal School and landscape contractor Richard Fidal of Texasclapes, Inc. use drought-resistant plant material, efficient watering systems, and hands-on management to minimize water use on the 75-acre campus.



### **Research: Suzanne Pierce**

Suzanne Pierce has prepared a groundwater decision support system (GWDSS) for the Barton Springs segment of the Edwards Aquifer as part of her dissertation work in the Jackson School of Geosciences at The University of Texas at Austin. The GWDSS incorporates the Barton Springs Groundwater Availability Model (GAM), a PowerSim version of the GAM, an optimization program, and a graphical user interface to provide easy access by users. The GWDSS will provide a common tool for groundwater scientists, aquifer policy makers, and various stakeholders as they formulate and evaluate policies regarding the use of the aquifer and determine its sustainable yield under alternate conditions.

### **Education: LCRA's Water Conservation Group**

The Lower Colorado River Authority's Hill Country Landscape Option program is helping people all over Central Texas make water-wise and native plant choices. Through its print materials, website, and workshops, LCRA offers informative guidance to developers, builders, master gardeners, master naturalists, and new residents in the contributing zone of the Barton Springs segment. In addition to spreading these materials to over 1000 people last year, LCRA has placed demonstration gardens in two new developments and is working with seven developments to adopt some or all of their recommended landscaping guidelines.

### **Water Conservation by a Builder/ Developer and the 2006 Innovation Award:**

#### **The Circle C Fire/ EMS Station Design Team/ Alan Barr, Architect**

Alan Barr, Stewardship, Inc., Urban Design Group, and Winterowd Associates, Inc. designed the new Circle C fire station with a 17,000-gallon rainwater harvesting system, native and drought-tolerant plants, and exceptional green building techniques that earned it a LEED (Leadership in Energy and Environmental Design) Silver Rating. Only 8.7% of the site has impervious cover and the stormwater treatment design exceeds the EPA's Best Management Practices requirements by removing 95% of the Total Suspended Solids and 98% of the Total Phosphorus.

## The Austin Cave Festival Celebrates Five Years With New Activities and Presenters

Each year, the Barton Springs/ Edwards Aquifer Conservation District (BSEACD) and the Texas Cave Management Association (TCMA) hold the Austin Cave Festival at the Village of Western Oaks Karst Preserve to educate local residents about the importance and sensitivity of the Edwards Aquifer and its recharge features. The Barton Springs segment of the Edwards Aquifer remains in Critical Stage Drought, and the Cave Festival focused on easy and effective steps residents can take to save water and protect water quality. This year's festival attracted over 1400 visitors from all over Austin and included short cave trips in Get Down and Live Oak Caves, live bats for viewing, flintknapping demonstrations, hands-on activities for children, three Halloween storytimes, and tree-climbing demonstrations. Booth presenters from the following organizations provided the public with valuable information and resources:

Austin Science and Nature Center  
The Barton Springs / Edwards Aquifer Conservation District  
The Bureau of Economic Geology - University of Texas at Austin  
City of Austin Water Conservation Department  
City of Austin Water Utility Department's Wildlands Conservation Division  
City of Austin Watershed Protection and Development Review Department  
Flintknapping with J.C. Pollard  
Geology with Bill Rader from Holt, Rinehart, and Winston  
Keep Austin Beautiful  
The Lady Bird Johnson Wildflower Center  
Lower Colorado River Authority  
Splash! Into the Edwards Aquifer Exhibit at the Sheffield Education Center  
Rainwater Harvesting with Allan Standen  
Texas Cave Management Association  
Travis County Balcones Canyonlands Preserve  
Tree Information from Guy LeBlanc with Arbor Vitae Tree Care

The Festival also included a drawing for prizes donated by local organizations like the Wildflower Center, the Barton Springs / Edwards Aquifer Conservation District, and the Splash! Into the Edwards Aquifer Exhibit at Barton Springs Pool. BSEACD purchased a 75-gallon rainbarrel from the City of Austin's Water Conservation Department and were pleased to present it to drawing winner Patrick Fortner and his family.

BSEACD and TCMA would like to thank all the organizations that helped make this year's Cave Festival Event possible. We would also like to thank Maudie's Hacienda on Brodie Lane for donating lunch for the Festival's presenters and volunteers for the third straight year ([www.maudies.com](http://www.maudies.com)).

Village of Western Oaks Karst Preserve is located in South Austin just west of Mopac at Davis Lane. It encompasses approximately nine acres in the recharge zone of the Barton Springs segment of the Edwards Aquifer. Despite its small size, the preserve contains six karst features including one that is habitat for cave-dwelling species of concern and one that recharges, or contributes water to, the Aquifer. The preserve is open year round and is handicap accessible.

