Barton Springs Edwards Aquifer
CONSERVATION DISTRICT

# AQUIFER BULLETIN

*December 2009*

## Aquifer Reaches Non-Drought Condition

The Barton Springs/Edwards Aquifer Conservation District declared "No Drought" at its December 17, 2009 Board Meeting, ending the 18 months of declared drought that started on June 23, 2008.

We spent about 7 months under Alarm and 11 months under Critical Stage Drought declarations. Figure 1 reflects current drought status.

The BSEACD was not alone in its drought declaration as the drought engulfed the entire state. The Edwards Aquifer Authority in San Antonio and the Hays-Trinity Groundwater Conservation District also issued drought declarations. Indeed, the drought reached historic levels and geographic proportions. At one point, every county in Texas was reporting at least one impact from the drought, with Hays and Travis counties reporting the most impacts across the state. Figure 2 illustrates local hydrologic data for the drought period.

*see AQUIFER STATUS on page 3*

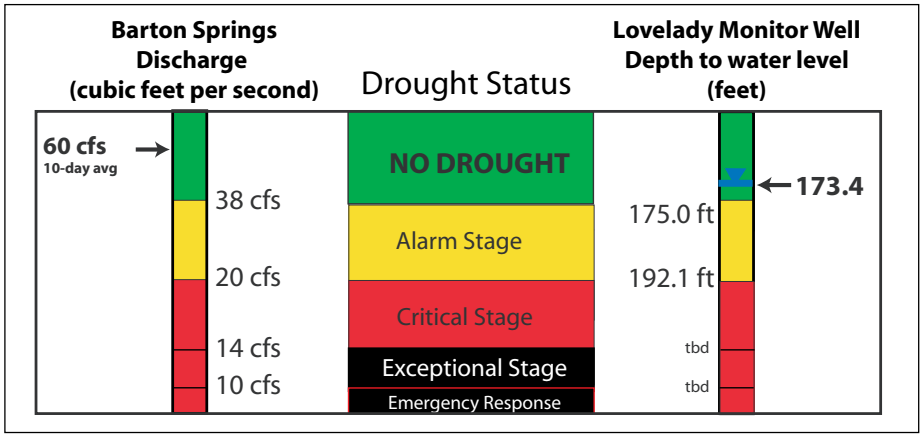


*Figure 1: Status of drought triggers and their respective thresholds, December 29, 2009.*

**IN THIS ISSUE:**



## DROUGHT STATUS


## Local Impacts of Recent Drought

- For two years (from August 2007-2009) the region received below-normal rainfall, totaling only 35.25 inches of rain at Austin/Mabry. That is about 53% of average, and equivalent to the severity experienced during the 1950s drought. Record high temperatures in 2008 and 2009 have also contributed to the intensity of the drought.
- Barton Springs reached about 14 cfs for a few days at the deepest level of the drought (early September 2009). That is the equivalent to the lowest springflow since they began recording daily values 30 years ago in 1978! Old Mill Spring (one of several springs that make up the Barton Springs complex) effectively stopped flowing by September 2009.
- The water level in the Lovelady drought index well reached 197.5 ft (on September 10, 2009), its lowest level since the 1950s drought.
- The LCRA reported Lake Travis was at 50% capacity, with yearly inflows likely to be the lowest ever recorded since it was built in the early 1940s. Accordingly, many USGS stream gauges that have readings reached their all-time low or dipped below their 10th percentile.
- Some older, shallower wells in the Edwards and Trinity aquifers went dry or had yield problems; new wells had to be drilled and many pumps within wells had to be lowered.

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Precinct 1 - Vice President

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## BSEACD PERMITTING SUMMARY (SEPTEMBER 2009 TO DECEMBER 2009)

| Permit Type | Number of Permits | Permitted Pumpage |
|---|---|---|
| Exempt Wells | 0 | N/A |
| NDU General Permit | 0 | 0 |
| Individual Production Permits | 2 | 1.4 Million Gallons/Year* |
| Permit Amendments | 0 | 0 |
| Transport Permits | 0 | 0 |

* This permitted pumpage is from the Middle Trinity aquifer.

**Exempt Wells** - These are low capacity wells used solely for large lot residential or livestock needs. These wells are exempt from permitting but must be registered with the District and meet District Well Construction Standards.

**Nonexempt Domestic Use (NDU) General Permit** – This authorization is for wells that will be used solely for the domestic needs of residences located on small lots where there is no other alternative water source available. This pumpage is subject to drought restrictions, but may be authorized during drought since it is the sole source of domestic supply.

**Individual Production Permits** – All other new nonexempt wells must have one of these permits to be authorized for pumpage. All new Individual Production Permits are designated as "Conditional" Permits, which means that they are interruptible and subject to 100% curtailment during extreme drought.

**Permit Amendments** – These amendments are required to increase authorized pumpage for existing permittees (permit holders). All new permit amendments are designated as "Conditional" Permits, which means they are subject to 100% curtailment during extreme drought.

**Transport Permits** – These permits are required to authorize the transport of groundwater out of the District. A Transport Permit may only authorize the transport of water permitted under an approved production permit.

*- GUY RIALS, REGULATORY COMPLIANCE TEAM*

## DISTRICT CALENDAR

The Board of Directors usually meets on the 2nd and 4th Thursdays of the month (beginning at 6 p.m) at the District's office at 1124 Regal Row, Austin, TX 78748. However, the meeting schedule and location are subject to change. The agenda for posted meetings can be found on the District website at www.bseacd.org. Please contact the District office at 512-282-8441 with any questions.

| | |
|---|---|
| Jan. 14 & 28 | Board meetings |
| Jan. 18 | Office closed for MLK Day |
| Feb. 11 & 25 | Board meetings |
| Feb. 15 | Office closed for Presidents' Day |
| Mar. 11 & 25 | Board meetings |
| Mar. 13 | Austin Cave Festival |
| Apr. 8 & 22 | Board meetings |

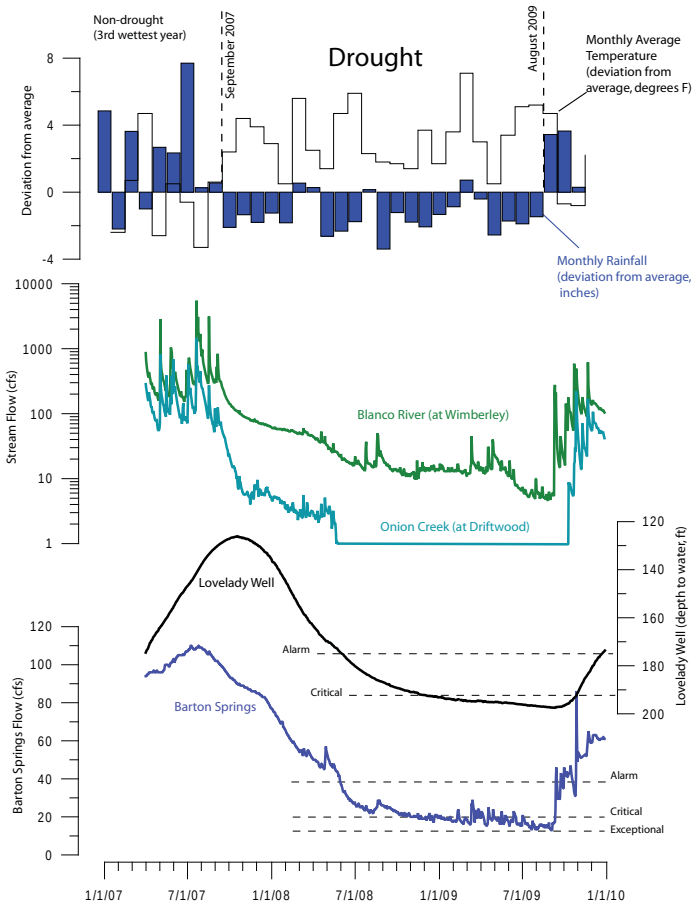



*Figure 2. Chart illustrating various hydrologic data and drought.*

## Aquifer Status (continued from page 1)

At the top of the chart the solid blue bars indicate deviation from monthly rainfall. The black line shows deviation from average monthly temperatures. The middle portion of the graph shows streamflow from the Blanco River and Onion Creek. The chart illustrates the lack of rainfall that results in diminished streamflow and ultimately cessation of streamflow (e.g. Onion Creek's flat line). The lack of rainfall and streamflow results in less recharge and diminished storage (water levels in the Lovelady well) and finally decreasing springflow at Barton Springs.

Although we're out of drought, we're only seeing moderate amounts of recharge. Without above average rainfall over the next few months, the aquifer could be back in drought by next summer.

Find out more about the aquifer status on the District Drought Monitor blog:

***http://droughtmonitor.blogspot.com/***

*- BRIAN HUNT AND BRIAN SMITH, SENIOR HYDROGEOLOGISTS*

## Recharge Enhancement Project on Onion Creek

After waiting more than a year for flow to occur in Onion Creek, the rains that ultimately brought about an end to the drought of 2008-2009 brought two flow events to Antioch Cave. The upgraded intake system at Antioch Cave, which was funded by the Environmental Protection Agency and the Texas Commission on Environmental Quality, was finished in August 2008. The upgraded system consists of a second valve on the vault over Antioch Cave, a large screen to filter out debris from stormwater, a flow meter, a Continuous Water Quality Monitoring Network (CWQMN) system to report water-quality data to an online database at TCEQ, and an automated sampler.


*Figure 3. A) Water entering the intake system; B) Water level almost above vault; C) Upgraded intake system during low flow.*

Flow finally occurred at Antioch on September 29, 2009 (Figure 3). The September flow event was of short duration (16 hours), but it demonstrated that all components of the system are functioning as designed. A second flow event occurred on October 27 and 28 with a duration of about 32 hours. Water-quality samples were collected during this flow event and submitted to a laboratory for analysis. We are looking forward to additional flows in Onion Creek to further test the system and to increase the amount of water recharging the aquifer through Antioch Cave. Increased recharge should allow more water to enter storage in the aquifer and delay entry into the next drought the aquifer experiences.

The next part of the project will be to install a multiport monitor well near the cave to monitor flow of water into the aquifer and to determine how stormwater carrying non-point source pollution can move through the aquifer. A second CWQMN system will be installed further upstream on Onion Creek on watershed protection lands owned by the City of Austin. A comparison of water quality between the two CWQMN sites will provide information about how non-point source pollution enters Onion Creek and how it is transported downstream.

*- BRIAN SMITH, SENIOR HYDROGEOLOGIST*

# FROM THE GM'S DESK …

This edition of the GM's column will be a collection of quick-hitters that have accumulated in the recesses of my mind over the past few months.

### *Thanks!*

Mama always told me to start a conversation with a thanks and a compliment. And the District permittees certainly have earned a big "Thank You!" and should be recognized for their concerted efforts to curtail water use during this past severe drought, even when it was most needed. Each month our permittees and their end-users accomplished reductions in aggregate demand that were critical to preserving the aquifer. Despite the drought's severity, very few enforcement actions were needed to ensure compliance with the District's mandated reductions. Without all of their efforts, the water supply for many users in the District could have easily been imperiled. Way to go!

### *What's in a name?*

Some folks still think that all our groundwater management efforts are for the benefit of the flow at Barton Springs in downtown Austin. Or that the only aquifer we regulate is the Edwards Aquifer. While the Edwards is the primary aquifer, whose boundaries were used when the District was founded to establish our geographic jurisdiction, we manage all aquifers in the District, including increasingly the Trinity Aquifers that underlie the Edwards. And our management is preserving and conserving the drinking water supplies of tens of thousands of Central Texans, in addition to the flows at the iconic Barton Springs, which is the natural discharge of the Edwards in this area. We are proud of our District's name and what it stands for, because it stands for more than the words in it.

### *When sound science and policy conflict…*

The District recently joined numerous other political subdivisions that provided the Texas Commission on Environmental Quality (TCEQ) a very strong scientific consensus against direct discharges of treated sewage into the creeks that recharge our primary aquifer. In this stakeholder input process, created by TCEQ and intended to be the basis for possible rule-making, no credible science was offered by anyone that suggested such direct discharges would be innocuous under all reasonably expected conditions.

Nevertheless, TCEQ ignored the science, invoked other political and policy considerations, and proposed rules that would allow such discharges. But the conditions that would apply to such discharges in the draft rules not only don't go far enough to protect water quality under the conditions that will exist in these pristine streams, but they also can be weakened by certain demonstrations by applicants. Furthermore, TCEQ did not take into account the cumulative impacts of multiple discharges on the aquifer, or the indirect impacts of these discharges. We believe there should be first a strong presumption against any direct discharges. Only if absolutely warranted and only if the applicant can show by sound science that water quality will not be impaired by that particular application and additional proposed controls under all conditions, could we then perhaps support an exception being made. As it is now, the science and the policy is backwards. We are asking our legislators to help correct this grievous error made by a state administrative agency. Some of you might want to do the same.

### *New water?*

It has been said that most water management deals with the same water over and over again, just in a different place and time. In a sense that is true, but certainly one exception to that is the creation of new freshwater supplies by producing and removing the salts in brackish or saline groundwater (called desalination). There is a very large resource of brackish groundwater in the eastern part of our District, and extending to the north and south beyond our District for hundreds of miles. Our District, in concert with other public and private entities, is examining the feasibility and will likely be proposing an innovative, pilot- or demonstration-scale production and desalination facility that could provide significant amounts of a truly new drinking water supply to the existing, already strained conventional supplies. It isn't cheap water, compared to, say, the historic Edwards supply, but unlike that supply, it would be available to new users, and with new desalination technologies, it will be comparable in cost to other (increasingly scarce) surface water supplies that must be acquired, pumped long distances, treated, and pumped even further to end users. The District intends to take the lead in looking at all sorts of alternative supplies to preserve and protect the uses and users of the existing groundwater supplies in the District.

### *A five-inning baseball game?*

Groundwater conservation districts across the state, including ours, are collaborating diligently with other districts in Texas Water Development Board-defined Groundwater Management Areas (GMAs), intent on producing a set of Desired Future Conditions (DFCs) for the relevant aquifers in the GMAs under a joint regional groundwater planning effort. This is an involved, time-consuming process and not entirely under the GMAs' control, but the GMAs have programmed their efforts to reach a consensus on reasonable DFCs by the statutory deadline of September 1, 2010.

However, there are those interests in the state that are apparently threatened by the implications of DFCs arrived at in this rational fashion and who, instead of choosing to be part of the collaborative process and solution, are now declaring the process "broken", or otherwise not likely to result in a set of rational DFCs of any kind. They point to the fact that there have been relatively few DFCs established yet as evidence of their assertions. They must be the same folks who, when playing in a pick-up baseball game and leading after five innings, then pick up their bat, ball, and glove, maintain the game is over, declare victory, and go home! Let's give the process a chance. And we need to keep in mind that it is designed to be an iterative process; an expectation that it is going to be perfect and without a glitch here and there the first time around is an unrealistic standard. But we are doing our best to achieve that standard.

The District welcomes input from readers on the topics discussed in this column; email ***feedback@bseacd.org***.

*- KIRK HOLLAND, GM*

# Congratulations,
## Groundwater Stewardship Award Winners!

With the aquifer in District-declared drought for over 16 months, the Barton Springs/Edwards Aquifer Conservation District's Board of Directors was especially pleased to celebrate exemplary efforts to conserve and protect the groundwater resources of the District.

At this year's Groundwater Stewardship Awards luncheon hosted by the District at the Bowie High School Culinary Arts Cafe, the District honored the following awardees:


## 2010 Winners

*Permittee of the Year:* **Jack Hays High School**
Jack Hays High School has made significant efforts to reduce water use and proactively communicate to keep the District informed of major projects. They had a perfect compliance history during the 16 months of District-declared drought with an average pumpage 57% below the required targets.

*Water Quality Protection:* **American Youthworks, Environmental Corps**
The American Youthworks, Environmental Corps was nominated for their work to preserve and protect the Barton Creek watershed. In the past year they coordinated with 150 volunteers to remove invasive species, improve trail systems and reduce erosion, and restore native vegetation in many of the City of Austin's Water Quality Protection Lands.

*Research:* **City of Austin Salamander Conservation Program**
The Salamander Conservation Program was nominated for their work managing the Barton Springs Salamander both in the captive breeding program and in the wild, documenting the life cycle, and preserving the habitat and viability of the endangered Barton Springs salamander population.

*Water Conservation:* **Slaughter Creek Acres Water Supply**
The Slaughter Creek Acres Water Supply System has followed and enforced all User Drought Contingency Plan requirements and has maintained pumpage well below the amounts allowed with 30% mandatory reductions during Critical Drought Stage. Resident involvement in community meetings regarding their water supply and per capita water use under 70 gallons per person per day show concern and understanding of the issues facing the Edwards Aquifer during the current drought.

*Education:* **KXAN Austin News, First Warning Weather Team**
The KXAN Austin News, First Warning Weather Team has provided exceptional coverage of the Barton Springs segment of the Edwards Aquifer. Weather reports consistently relate precipitation events to aquifer recharge and drought status. The KXAN Weather Team educates viewers of the significance of Barton Springs discharge, one of the primary drought stage triggers for the Barton Springs segment of the Edwards Aquifer, in their water levels reports.

Read more about the Groundwater Stewardship Awards:
***http://www.bseacd.org/events/groundwater_stewardship_awards***

## Updates to the District's Rules and Bylaws

In the previous edition of the *Aquifer Bulletin*, we included an article detailing the comprehensive rule package that was in the works at the time. We are happy to report that those changes were officially adopted by the District Board of Directors on September 10, 2009.

These new rules will allow the District to more effectively manage extreme drought conditions while also enabling the District to recognize the other aquifers of the District, namely the middle and lower Trinity, and manage them accordingly. Much of the details of these rule changes were provided in the previous Aquifer Bulletin. Below is brief summary of the high points.

***Management Zones:***

- Establishes new Management Zones (MZs) including: 1) the Western Freshwater Edwards MZ, the Eastern Freshwater Edwards MZ, the Saline Edwards MZ, the Trinity Outcrop MZ, the Middle Trinity MZ, and the Lower Trinity MZ;
- Includes additional rules and exceptions specific to each management zone;

***Drought Stages:***

- Creates a new "Exceptional Drought Stage" as the third and most severe drought stage, requiring 40% curtailment of monthly pumpage;
- Moves the existing Emergency Response Period (ERP) to be triggered deeper within the new Exceptional Drought Stage;
- Adds a requirement for cessation of pumpage during an ERP for non-public water supply permittees including non-agricultural irrigation and industrial permits;

***Permits:***

- Creates a new Temporary Transfer Permit to allow the transfer of a portion of unused pumpage between certain historical permit holders during an Exceptional Drought Stage;
- Creates a new General Permits section with new permits by rule that authorize 1) drilling and production from Test Wells, 2) the temporary transfer of authorized pumpage during extreme drought, and 3) the reservation of retired historical Edwards aquifer pumpage for ecological spring flows; and
- Adds a new designation for Trinity aquifer wells that serve as alternative supplies to currently permitted freshwater Edwards wells.

Again, this is just a brief summary. We encourage anyone interested to view the final version of the District Rules and Bylaws, including these and other changes, for more details. The updated document can be accessed on our website at:

***http://www.bseacd.org/about_us/framework_policies.***

As always, please feel free to contact us at ***feedback@bseacd.org*** if you have any questions.

*- JOHN DUPNIK, SENIOR REGULATORY COMPLIANCE SPECIALIST*

## Regulatory Compliance Reminder for District Permittees

The new rules include new drought rules that are not reflected in current permittee User Drought Contingency Plans (UDCPs).

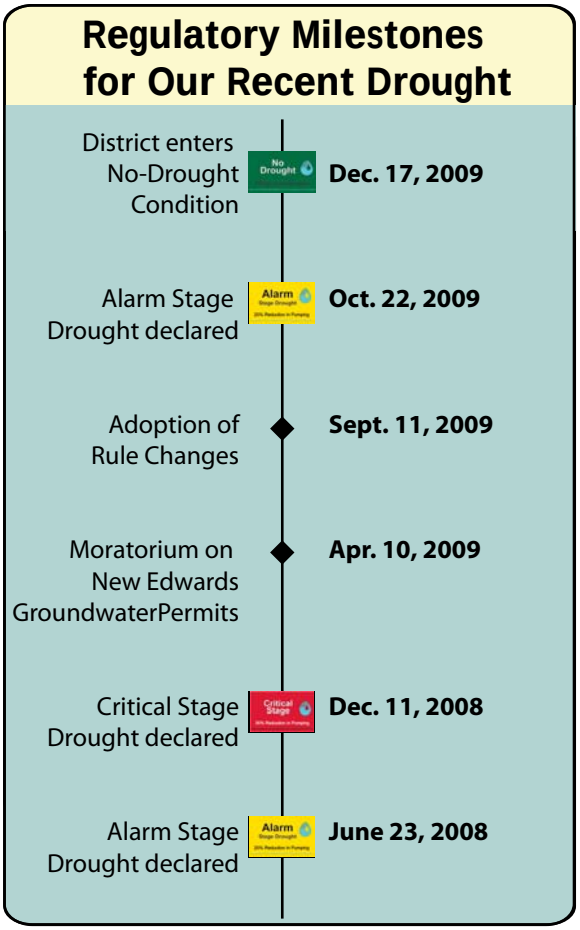
As a result, all permittees must update their UDCPs to incorporate these new requirements. This update is a mandatory requirement of all District permittees and those who have not submitted updated plans should do so as soon as possible. It is important to note that permits with outdated plans will not be renewed at the end of the permit term.

Please also note that all Public Water Systems must plan to file these update plans with the TCEQ immediately upon approval of the District UDCP.

UDCP templates are available on the District website at:

***http://www.bseacd.org/regulatory_info/drought_management***

## Regulatory Milestones for Our Recent Drought



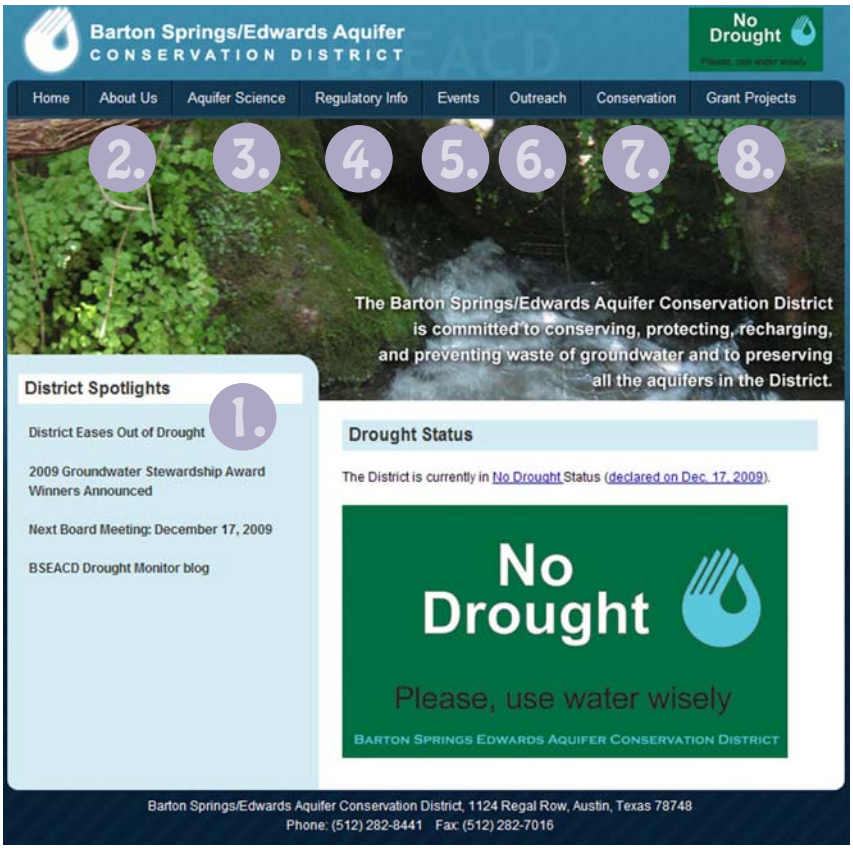



*Figure 4: New District home page annotated with types and location of information (www. BSEACD.org)*

## New District Website

SAME LOCATION.
NEW LOOK.
MORE INFORMATION!

If you've visited the District website recently, you may have noticed a new look! At the beginning of November we launched a new website with a content management system that lets us keep the site more up-to-date with pertinent information.

**www.BSEACD.org**

| 1. District Spotlights | 2. About Us | 3. Aquifer Science | 4. Regulatory Info | 5. Events | 6. Outreach | 7. Conservation | 8. Grant Projects |
|---|---|---|---|---|---|---|---|
| This column showcases upcoming events and recent news and provides links to Drought Monitor Blog, Board Meeting announcements and agendas, and press releases. | The About Us section has information about the District, how it was formed, what the governing framework and policies are that enable the District to manage, protect, and conserve the groundwater resources within its boundaries. It also contains information on the Board of Directors, District Staff, and collaborating organizations. | The Aquifer Science section provides a geologic overview of the aquifers, drought stage status, links to real-time precipitation, stream flow, water level data, and research and reports relevant to groundwater resources in the District. | Geared towards District permittees, the Regulatory Info section covers steps for permitting and registering wells, guidelines for well construction, mandatory drought pumping limitations, and enforcement processes for non-compliant permittees. | The Events section promotes upcoming events and commends past accomplishments in the District. Annual events include creek cleanups, the Austin Cave Festival, Scholarships, Groundwater Stewardship Awards, and Groundwater to the Gulf. | The Outreach section chronicles District press releases, current and archived newsletters, and maps. | The Conservation section serves as a resource for indoor and outdoor water conservation strategies, watering schedules, water-wise landscaping, and rainwater harvesting projects. | The Grant Projects tab summarizes information about current grant projects. Current projects are the Habitat Conservation Plan for the endangered species at Barton Springs and the Onion Creek Recharge Enhancement project. |

# Learning Opportunities for All Ages

*Teachers and Educators*

## Groundwater to the Gulf: Summer Institute for Central Texas Educators

This 3-day, field-trip based institute emphasizes techniques for teaching water-based curricula to students in grades 4 through 8. Participants will follow the path of water in Central Texas from its origins to its final destination in the Gulf of Mexico. Visit local field sites and learn about groundwater, river systems, and bays and estuaries with local experts.
Educators earn 22 continuing education credits.


*Figure 5: Groundwater to the Gulf 2010 flyer.*

FREE for educators.

Registration opens: **Mar. 1, 2010.**
For more information visit:
***http://www.bseacd.org/events/g2g***

*High School Students (11th and 12th grade)*

## 2010 College Scholarship Essay Contest

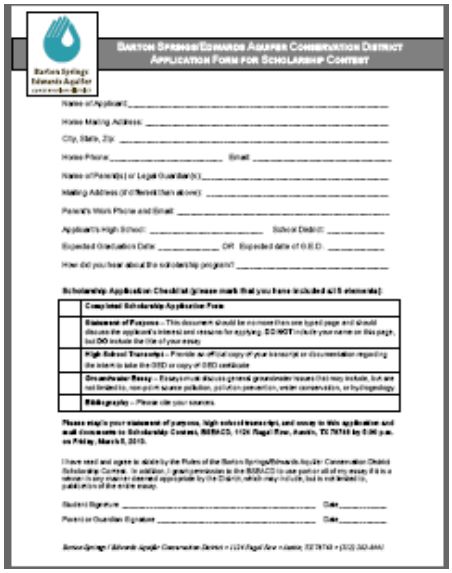



*Figure 6: College Scholarship Application form.*

One essay will be selected as the winning entry by an independent evaluation panel, and the author will receive a $1,500 scholarship to the college, community college, or training institution of his/her choice. Essays must discuss groundwater issues and applicants must reside in one of the seven school districts overlapping the District boundary. Students attending public, private, or home schools are welcome to apply. The seven independent school districts are: Austin, Eanes, Dripping Springs, Hays Consolidated, Del Valle, Bastrop, and Lockhart.

Deadline for submissions: **5:00pm, Friday, Mar. 5, 2010.**
For complete details visit:
***http://www.bseacd.org/events/scholarships***

*Elementary and Middle School Students (ages 9-15)*

## 2010 Aquatic Sciences Camp Scholarships Essay/Artwork Contest

The Camp scholarship contest is open to children ages 9 through 15 who reside in one of the seven school districts within the District's boundaries. Students attending public, private, or home schools are welcome to apply. These seven independent school districts are: Austin, Eanes, Dripping Springs, Hays Consolidated, Del Valle, Bastrop, and Lockhart.

*Figure 7: Photos from Aquatic Science Camp.*

Interested students must submit an application and a 1-page essay/artwork entitled "Why I want to attend the Aquatic Science Adventure Camp!" Scholarship winners will be chosen in a random drawing; only completed applications with essays will be eligible.

Deadline for submissions: **5:00pm, Friday, Apr. 2, 2010.**
For complete details visit:
***http://www.bseacd.org/events/scholarships***

*Families and General Public*

## 2010 Austin Cave Festival Village of Western Oaks Karst Preserve

Each year, the District and the Texas Cave Management Association hold the Austin Cave Festival at the Village of Western Oaks Karst Preserve to educate local residents about the importance and sensitivity of the aquifer and its recharge features. The festival includes short cave trips in Get Down and Live Oak Caves, vertical ropes courses, flintknapping demonstrations, hands-on activities for children, prizes, and story-times. Booth presenters from local organizations provide valuable conservation information and resources. This year's cave festival will be during Groundwater Awareness Week, Saturday, March 13, 2010 from 9-3.

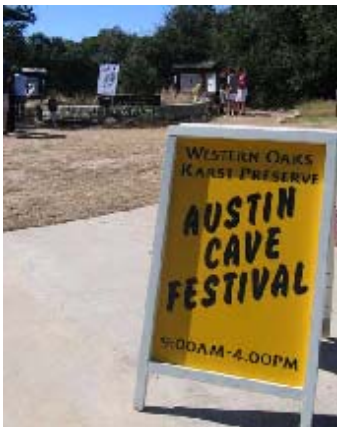



*Figure 8: Austin Cave Festival at Village of Western Oaks Karst Preserve.*

For more information visit:
***http://www.bseacd.org/events/austin_cave_festival***

## Fall Garden Report

Beginning in August this year, we saw an increase in rainfall. The rains saturated the soils, then runoff flowed into creeks and started recharging the aquifer. The rain-soaked soils benefited the plants in the native gardens at District Headquarters, too. The summer's modest blooms turned into gaudy displays of color that deserve some press.

**BLOOMERS:**

The Rock Rose was covered with fuscia flowers. Two clusters of Pink Skullcap in the bed out near the street (one just under the District sign) burst with pink glory. The butterflies loved the Lantana and Sage (Figure 9). The Rock Rose, Pink Scullcap, and Lantana died back with the first frost.

The Mexican Bush Sage grew to nearly 3 feet tall with spectacular purple blooms (Figure 10). The Four Nerve Daisy (low carpet of dense thin-bladed leaves with yellow daisy-like flowers) continues to do well even after a few freezes (Figure 11). And the Fall Aster… still looks like the floral equivalent of a purple Fourth of July firework display.

**SHRUBS/BUSHES:**

The Flame Acanthus drooped with the weight of its leaves and bright red flowers. It attracted hummingbirds and butterflies. Red and black, spiked caterpillars took over the Passion Vine (Figure). Both the Flame Acanthus and Passion Vine went dormant after the first freeze.

There is a veritable waterfall of Ponyfoot to the right of the Inland Sea Oats (which had gorgeous silvery seeds that have fallen or been relocated). The Side Oats Gramma (Texas' official state grass) is certainly making Texas proud! And just a few weeks ago, Blue Bonnets started popping up between the Side Oats Gramma and the Passion Vine.

The native gardens were installed by my predecessor, Jennee Galland, and volunteers with the Texas Master Naturalist, Capital Area Chapter. They contain a variety of native, drought-tolerant plants carefully selected so there is always something in bloom. Even during the recent drought, the plants were watered sparingly, by hand, once a week using water from our 1500-gallon rainwater harvesting system—which never went dry. Please stop by if you're curious or if you'd like to see plants that do well with minimal maintenance!

*- ROBIN GARY, PUBLIC INFORMATION AND EDUCATION COORDINATOR*

*Figure 9: Purple blooms of Fall Aster, Orange blooms of Lantana, and a cascade of Ponyfoot.*

*Figure 10: (On left) Mexican Bush Sage in front of a cántaro-shaped rain barrel; (On right) Side Oats Gramma the state grass of Texas.*

*Figure 11: Yellow blooms of Four Nerve Daisy.*

## Winter Gardening?

Yes, I hear you laughing. The weather outside—*some seem to think*—is frightful, and the fire inside is so delightful. But now is a fantastic time to prepare your landscape for the year to come.

While we're out of drought but with Central Texas heat and dry conditions fresh on the mind, strategic planning takes on new meaning. What can we do to ensure a beautiful and enjoyable landscape that can withstand our grueling droughts?

**A LOT!!**

**See some of the tips below and visit the links provided for more information.**


*Figure 12: Drought stage flag and rain barrel at District Headquarters.*

## Tips to Drought-Proof Your Landscape...

### Research native and drought-tolerant plants

Native plants bloom naturally in Central Texas and provide food and habitat for native animals. They have the added bonus of being adapted to long dry spells and high temperatures. Stop by District Headquarters to see what's in bloom in our native landscaping. Visit the Native and Adapted Landscape Plant Guide online:

***http://www.ci.austin.tx.us/growgreen/pg_pdfs.htm*.**

### Convert a section of your yard to a native turf

Capitalize on an area that suffered because of the recent drought and replace it with a native lawn. Research at the Ladybird Johnson Wildflower Center shows native turf requires less mowing, less water and less weeding while still providing a beautiful lawn. Visit the Native Plant Homeowner Inspiration Gardens and the Turf Experimental Gardens at the Wildflower Center or read on at

***http://www.wildflower.org/nativelawns/***.

### Add a rain barrel as an alternative water source for your garden

Plants love it when it rains. Install a rain barrel or water tank to stockpile that water for use in dry times. District Headquarters has 2 65-gallon rain barrels (Figure 12) and a 1500-gallon rainwater harvesting system, so we can practice what we teach. Stop by for a tour! Visit our Rainwater Harvesting resource page at

***http://www.bseacd.org/conservation/rainwater_harvesting***.

## Drought Stages and Triggers

Barton Springs Discharge (cubic ft per sec)

Lovelady Mon. Well Depth to water (ft)

**No Drought**
Please, use water wisely
Barton Springs Edwards Aquifer Conservation District

Use Water Wisely

38 cfs — 175 ft

**Alarm**
**Stage Drought**
20% Reduction in Pumping

Restrict Outdoor Watering

Target Monthly Water Budget:
Per person: less than 4,000 gallons
Family of 4: less than 16,000 gallons

20 cfs — 192.1 ft

**Critical**
**Stage Drought**
30% Reduction in Pumping

Stop Outdoor Irrigation

Target Monthly Water Budget:
Per person: less than 3,000 gallons
Family of 4: less than 12,000 gallons

14 cfs — TBD

**Exceptional**
**Stage Drought**
40% reduction in pumping

Minimize ALL Water Use

Water Suppliers shift to alternate water sources.

Target Monthly Water Budget:
Per person: less than 2,000 gallons
Family of 4: less than 8,000 gallons

10 cfs — TBD

**Emergency Response**
No non-essential watering

Stop non-essential Water Use

No outdoor watering.
Restrict and reduce indoor water use