AQUIFER BULLETIN

November 2013

The End of Another Groundwater Drought?

With two months of above-average rainfall and two exceptional rain events, the end of the drought in the District is near. Water levels in the the Barton Springs segment of the Edwards Aquifer started edging up in late-September following several moderate rain events (Figure 1). Runoff from rainfall leads to flow in the creeks that cross the recharge zone, which leads to recharge through fractures, sinkholes, and caves in the creek beds. Increasing moisture in the soils brought about the increase in runoff, creek flow, and recharge following each rain event.

With this recharge taking place, the slow rise in the aquifer continued until October 12 and 13 when up to 12 inches of rain occurred over parts of the recharge zone. At the District office in Manchaca, 6.5 inches fell over a 9-hour period from October 12 to 13. Lesser amounts fell on the Edwards Aquifer contributing zone. That was enough to cause water levels in the aquifer to rise about 9 feet since early September.

Figure 1: Small rainfall events leading up to two large events have produced runoff and streamflow that allowed water to enter the aquifer. Groundwater levels at the Lovelady Monitor well have risen about 9 feet since early September.
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**BSEACD PERMITTING SUMMARY**  
(May 2013 - September 2013)

<table>
<thead>
<tr>
<th>Permit Type</th>
<th>Number of Permits</th>
<th>Permitted Pumpage</th>
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<tbody>
<tr>
<td>Exempt Wells</td>
<td>1</td>
<td>N/A</td>
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<tr>
<td>NDU General Permits</td>
<td>3</td>
<td>1,062,000 gal/year</td>
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<tr>
<td>Individual Production Permits</td>
<td>1</td>
<td>35,000,000 gal/year**</td>
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<tr>
<td>Permit Amendments</td>
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<td>0</td>
</tr>
<tr>
<td>Transport Permits</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Exempt Wells** - These are low capacity wells used solely for large tract 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 Permits** – 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 reasonably 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 Trinity and Edwards wells must have one of these permits to be authorized for pumpage. Permits for new Edwards wells are designated as “Class C Conditional” Permits, which means that they are interruptible and subject to 100% curtailment during District-declared drought.

**Permit Amendments** – These amendments are required to alter authorized pumpage for existing permittees (permit holders). Permits for Edwards wells are designated as “Class C Conditional” Permits, which means they are subject to 100% curtailment during District-declared 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.

- KENDALL BELL-ENDERS, REGULATORY COMPLIANCE COORDINATOR

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**DISTRICT CALENDAR**

The Board of Directors usually meets on the 2nd and 4th Thursdays of the month (beginning at 6 pm) 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 at least 72 hours in advance of the meeting. Please contact the District office at 512-282-8441 with any questions.

- Nov. 11  Office closed for Veterans Day
- Nov. 14  Board meeting
- Nov. 28-29  Office closed for Thanksgiving
- Dec. 12  Board meeting
- Dec. 23-27  Office closed for Christmas Holidays
- Jan. 1  Office closed for New Years
- Jan. 9 & 23  Board meetings
- Jan. 20  Office closed for Martin Luther King Day
From the GM’s Desk

I’d like to kick off my first edition by first recognizing my predecessor and former GM, Kirk Holland. Kirk served the District well for eight years by providing the needed leadership to bolster the District’s reputation as a model Groundwater Conservation District. Kirk was a real mentor to me and for that I am grateful. Moving forward, I am excited to dive into some of the many challenges that are on the horizon; I will make a few comments on several of them below. Recently, the Board of Directors recognized some of the most pressing challenges by establishing the District’s FY14 Goals which will determine where we concentrate our energy and resources for the coming year. These goals are now posted on our website under the Records tab along with archived annual reports at www.bseacd.org/records/annual-report-and-annual-financial-audit, and I encourage all of you to review them and monitor our progress.

Hill Country PGMA.

How to best manage groundwater in the area of southwestern Travis County located within the Hill Country Priority Groundwater Management Area (PGMA) that is just west of the District has been a question for decades. The Texas Commission on Environmental Quality has identified annexation by the District as their preferred solution but there are formidable obstacles that would first need to be addressed. The District firmly believes that the groundwater in this area needs to be managed. However, the solution, in whichever form it takes, must be generally supported by the area stakeholders and sufficiently funded and enabled with the appropriate authority to provide effective and functional groundwater management. How this challenge is dealt with, which could significantly affect the District, is currently being considered by the State Office of Administrative Hearings and will continue to be one to watch.

Alternative Water Supplies.

The District’s permitting program has evolved over the years in recognition of the limited availability of the freshwater Edwards, particularly during extreme drought when springflows and groundwater supplies are vulnerable. Recognizing this limited availability, the District has broadened its focus to include the evaluation of alternative water supplies such as the underlying Trinity Aquifers, the brackish zone of the Edwards, and reclaimed water (treated effluent). The District has installed two multi-port monitor wells to characterize the Trinity Aquifer and is laying the groundwork for studies of the potential for desalination and aquifer storage and recovery (ASR) projects in the saline Edwards Aquifer. There is also encouraging potential for use of treated effluent to replace Edwards pumping where such use would not affect water quality of existing supplies.

Drought.

And of course, I can’t forget about drought. While we’ve recently received some much needed rains and recharge, the area has been experiencing a long-term drought that, by many measures, may be the worst regional drought ever experienced. Times like this require a substantial level of effort by the District to implement and enforce our drought management program and mandatory pumping curtailments. And although our permittees have answered the call and successfully curtailed pumping, more extreme conditions in the future may warrant more extreme measures. When drought conditions return, and they will, the District and our permittees may be challenged to do extraordinary things to preserve water supplies and springflows.

So, while Kirk’s tenure is concluding and mine is just beginning, the business of the District and the many challenges that remain know no difference. Fortunately, I believe that with the leadership of our Board and the exceptional talent of our staff, we are well equipped to succeed. I very much look forward to the challenge.

- JOHN DUPNIK, GENERAL MANAGER
Droughts and Floods in Central Texas: It’s Always Been the Norm, But Expect Worse

The ongoing drought dominates discussion in many circles of Texas life with its broad impacts on the health and wealth of our society. As many folks know, especially long-time residents, we already live in a climate that is highly variable—often characterized as a series of droughts punctuated by floods. Climate is the long-term variation of temperature and rain (among other variables) for a given region. In contrast, weather is the short-term variation of temperature and rain (among other variables) for a region. Figure 2 illustrates the long-term variation of droughts and floods over the past 110 years as indicated by flow in the Colorado River just east of Austin at the Highway 183 bridge. The chart illustrates that the drought of the 1950s is the worst multi-year drought we’ve experienced, although the lowest mean annual flow on the Colorado River (prior to 2012) occurred in 1917. Floods seem to break a drought in Texas—all too often in a catastrophic way. The highest mean annual flow occurred in 1935, as well as the record peak flow (Figure 1). Fortunately, since 1941 the Highland Lake system has effectively limited peak (flood) flows, and helped extend flows during droughts (such as the 1950s).

Photographs can help us understand the gravity of these devastating natural, and human-influenced, disasters. I was fortunate to discuss iconic photographs of the 1917 drought and the 1935 flood with Dr. [see Droughts and Floods on page 5]
Floods and Droughts
(Continued from p. 4)

Jack Schneider, a long-time resident of Austin. Figure 3 is a photograph that Dr. Schneider’s father took of a young man (his friend Emory Hughes) straddling the Colorado River during the drought of 1917, just upstream of where the Tom Miller Dam is today. There were no dams functioning at that time, so the diminished flows seen in the photo represent actual river flows. We can assume that without the dams, August 2013 low flows would be lower than shown in the picture (Figure 3). Dr. Schneider witnessed the 1935 flood as an 8-year old boy from the south bank of the river along Congress Avenue—similar to the view shown in Figure 4. The devastating floods of 1935 were again repeated in 1936, and then in 1938.

Few residents born after 1941 and living in Austin have experienced the duration and intensity of the droughts and floods shown in these two photographs. They serve as a healthy reminder of what can occur so that we don’t become complacent about these extreme events. During our interview it was clear that these historic natural events helped shape Dr. Schneider’s world view. Today, he’s concerned about “inadequate” water supplies to serve the exploding population that is largely unaware of its natural resources and the changing climate.

The photographs of these two extreme drought and flood events illustrate the variability in our climate over the past 100 years or so. Climate scientists tell us that a changing climate, driven by increasing temperatures, is predicted to exacerbate these types of extreme events (Figure 5). We can no longer look at the 1950s drought as the benchmark for planning, since a changing climate will likely produce increasingly severe droughts—we have to plan for something worse. That also goes for flooding. Our region is the “flash-flood capital of the world”, and climate scientists are predicting an increase in the intensity of rainfall events and hurricanes. This will likely result in floods that our Highland Lake System was not designed to handle.

The good news is that we know enough to take actions to help mitigate and adapt for future droughts and flood events, we know they will happen regardless of climate change—that’s our norm. However, climate scientists warn that we must also reduce greenhouse gases so that we don’t add fuel to the fire. Discussion of the compounding issues of climate variability, population growth, and climate change will help us find solutions to these problems, and allow Central Texas to thrive in a changing climate. Historic photographs can help start the discussion.

- BRIAN HUNT, SENIOR HYDROGEOLOGIST

Figure 3: Photograph of Mr. Emory Hughes (16) straddles the Colorado River in Austin Texas in 1917. Mr. Hughes is wearing his St. Edwards ROTC uniform. The photograph was taken by Mr. Schneider about where Enfield Road meets the river. Photography courtesy of the Schneider Family and the Austin History Center.

Figure 4: Photograph looking north along Congress Avenue during the flood of June, 1935. Photograph courtesy of the Austin History Center PICA 22060. The two-story house in the foreground still stands today as an engineering office (907 S Congress Ave). The two-story structure, in the middle of the picture surrounded by flood waters, was called Ward Body Shop at the time of the flood. Today, the building (220 S Congress Ave) contains various commercial tenants.

Figure 5: (Left) Chart schematically represents our climate (dashed line) that is a long-term average of weather (short-term) events such as temperature and rainfall. (Right) Chart schematically represents increasingly extreme weather events and a changing climate in the future. Climate scientists say we’ve already begun changing the climate significantly. This figure is modified from Catherine Hayhoe (Texas Tech University).
The Texas Department of Transportation (TxDOT) is working with the Central Texas Regional Mobility Authority (Mobility Authority), and regulatory agencies to study a possible solution for improving mobility in the rapidly growing area of northern Hays and southern Travis counties. This combined effort includes an environmental study of a transportation route, known as SH 45 SW, between MoPac and FM 1626 (www.sh45sw.com). The study will consider environmental impacts, constraints, the needs of drivers, and concerns of surrounding neighbors. Potential impacts from construction and operation will be evaluated.

Many of these roadway projects, particularly SH 45 SW, have been the center of much debate and controversy owing to funding and environmental concerns which have caused the projects to stall. This most recent evaluation of SH 45 SW kicked off with the environmental study that began in June 2013. A final decision about whether or not to build the project is anticipated in 2015. The study will present the evaluation of potential impacts from construction and operation of the project.

Our role as a District is to serve as a key stakeholder on the project’s technical working groups during the environmental review and design phases of each project. This role was memorialized back in 1990 when the District entered into an agreement (known as the Consent Decree) that committed TxDOT to build SH45 SW in a manner that minimizes any negative impacts to the aquifer. With this project being located over an environmentally sensitive area, we place a strong emphasis on encouraging local transportation authorities to take this role seriously and to construct the highway in an environmentally and prudent fashion. At the District we feel that it is important that this roadway project be designed to protect the aquifer from potential effects of the highway construction and subsequent use.

Regional transportation authorities are collaborating on a number of transportation projects in the greater Austin metroplex. Within the District’s contributing and recharge zones there are specific projects that may be of interest to local citizens. The District’s website provides additional information as a resource if you would like to follow these projects.

NDU wells must be equipped with a meter and the permittee is required to submit monthly meter readings, as all permittees do. NDU permittees are obligated to adopt and implement a User Drought Contingency Plan (UDCP), which is a commitment to comply with mandatory drought curtailments. The UDCP establishes a baseline monthly permitted pumpage volume and target monthly volumes and mandatory conservation provisions for each drought stage. NDU permittees are also required to prepare, adopt and implement User Conservation Plans (UCP) that promotes and encourages conservation measures year around (e.g. water efficient landscape practices and installation of water saving devices).

NDU permittees must provide written notice prior to any sale or lease of the well covered by the permit. It is important that the District maintain accurate and current well owner information in order to better serve our groundwater community and to continue to provide notification of potential groundwater contamination, drought conditions, and District updates.

- KENDALL BELL-ENDERS, REGULATORY COMPLIANCE COORDINATOR AND SHANNON DeLONG, ADMINISTRATIVE SPECIALIST
The Texas Hill Country is famed for its natural beauty. The Hill Country is right in our backyard—in some cases in the front yard, too. There is a growing trend to incorporate drought-hearty natives into residential landscapes. Homeowners who have weathered the several recent droughts and complied with the associated water restrictions have begun to embrace the beauty and toughness that native Texas plants can offer; however, some Homeowner Associations (HoAs) require healthy, water-intensive lawns as part of their codes, covenants, and restrictions. During drought, homeowners often face watering restrictions that make those thirsty lawns unsustainable.

In the past regular session, the Texas Legislature passed a water conservation measure as Senate Bill 198, which states that HoAs will no longer be able to ban drought-resistant landscapes. This new law went into effect on September 1, 2013.

Some HoAs have deed restrictions in place which require complete or near-complete sodding of front and side yards with turf grass that must be maintained through frequent watering; or if they lack such explicit restrictions, produce similar results by means of their architectural control committees whose approval must be granted before a homeowner can make substantial revisions to a landscape.

Under SB 198, HoAs can no longer enforce provisions that prevent a homeowner from installing a drought-resistant, water-efficient landscape. However, they are allowed to adopt guidelines for what kind of water-saving landscapes are acceptable, and they are still allowed to require prior approval of proposed changes to their residents’ landscapes, as long as they do not “unreasonably restrict” water-conserving landscapes.

The traditional goal of an HoA is to coordinate a consistent, appealing look and feel to the neighborhood and protect associated property values and quality of life for its residents. Allowing residents to incorporate more drought-tolerant landscape solutions means that the landscapes will survive and even thrive when much less water is available. A more sustainable, beautiful landscape—regardless of rainfall—is an asset to any homeowner and neighborhood.

The District is collaborating with the Clean Water Fund to host a workshop for area HoAs to discuss a variety of drought-tolerant landscape options, water conservation techniques, and examples of HoA codes and covenants that encourage water conservation and while preserving a positive neighborhood aesthetic (Figures 7-9).

Join us in early 2014 for the HoA Landscaping Codes Workshop. Contact Robin Gary for more information or sign up for the Friends of the Aquifers email list to receive updates (email rhgary@bseacd.org with ‘subscribe’ in the subject line).

- ROBIN GARY, SENIOR PUBLIC INFORMATION AND EDUCATION COORDINATOR
- DAVID FOSTER, CLEAN WATER FUND
At its September 26, 2013, meeting, the Board of Directors of the Barton Springs/Edwards Aquifer Conservation District selected its 2013 Groundwater Stewardship Award winners. The District presents these stewardship awards every two years to deserving individuals, organizations, companies or agencies that have invested notable effort towards the protection and conservation of water resources in the District.

The Board and staff are recognizing the following exemplary efforts to conserve and protect the groundwater resources of the area:

**Water Conservation Award**  
**Halley Ortiz, Hays County Resident**  
Halley Ortiz and her husband, Thomas, practice and share their experiences from striving to live a sustainable lifestyle in Central Texas. They’ve set up a vigorous square-foot gardening system to help feed the family and have written about the healthier and less expensive results. Their native landscaping and rainwater harvesting efforts allow the family to use far less water than that required by their water system in the depths of the drought. Halley is outspoken about the need to conserve our valuable water resources as individuals and as a community.

**Education Award**  
**Jill Harding, Bowie High School**  
Jill Harding is a long-time science teacher at Bowie High School and is the Science Department Chair and a past Faculty Sponsor for the Science Club. This summer she helped coordinate restoration efforts at Bowie’s cave and physically helped with excavation to make it a safer and more feasible educational venue. Her passion, teaching abilities, and thoughtfulness have inspired many students to seek careers in the sciences.

**Research Award**  
**Corinne Wong, Jenna Kromann, and Jay Banner, UT-Austin**  
Dr. Corinne Wong, graduate student Jenna Kromann, and Dr. Jay Banner conducted a significant study of the hydraulic connection between the Edwards and Middle Trinity Aquifers. Using geochemical data for these aquifers and an intervening aquitard (Upper Trinity), they confirmed earlier studies that there is minimal potential for flow between the Edwards and Middle Trinity Aquifers. This is important for determining if the Middle Trinity Aquifer can be managed separately from the Edwards Aquifer. Results were published in an article titled, "Investigating Groundwater Flow Between Edwards and Trinity Aquifers in Central Texas" in the peer-reviewed journal, Groundwater.

**Water Quality Protection Award**  
**Shield Ranch**  
The Shield Ranch is located within the Contributing Zone of the Barton Springs segment of the Edwards Aquifer. They have done an excellent job of managing their 6,000 acre ranch with obvious benefits to runoff quality and quantity. They have a very low stocking rate of cattle with rotation, they have an active ecological stewardship program, they work to restore the fundamental components of a healthy ecosystem on the land, work to protect riparian communities, work to protect endangered species, and almost all of their acreage is covered by a conservation easement with the City of Austin (WQPL) or the Nature Conservancy of Texas. The Shield Ranch demonstrates a commitment to managing the land as highly responsible stewards.

**Innovation Award**  
**Joe Vickers, The Wellspec Company**  
Joe Vickers of the Wellspec Company has demonstrated a continued commitment and dedication to protecting groundwater resources by incorporating innovative practices and research that have greatly improved the overall understanding of the hydrogeology and well construction in the District. Mr. Vickers is always quick to offer his expertise. He has been actively engaged in District stakeholder groups and committees, and his input has been invaluable to the District. The quality of his consulting work is exemplary, as are his overall knowledge and communication skills.

Nominations were made by members of the public and District staff, and the nominees were evaluated and winners selected by the District’s Board of Directors.