OKLAHOMA
Water News
1st Quarter 2014

Inside

Hot Spot Meetings Help Target Conservation Projects

OWRB and other planning specialists held a series of public meetings in March to share information and obtain feedback on water conservation strategies that could mitigate projected water shortages in Oklahoma's most compromised areas.

Quartz Mountain Resort public meeting on March 12. OWRB Executive Director J.D. Strong explains goals of the state's Water for 2060 initiative and particular efforts to implement conservation strategies in OCWP Hot Spot basins in western and central Oklahoma.

Agriculture producers, water providers, and citizens residing in and around twelve "Hot Spot" planning basins—those determined to have the most significant water supply challenges within the next 50 years—were offered the opportunity to shape actions that could collectively satisfy future water demands and thus avoid substantial water shortages projected in those areas. Input meetings were held in Goodwell, at Quartz Mountain Resort (north of Altus), and in Duncan in March, and will be held in Yukon on April 16.

Investigations conducted for the 2012 Update of the Oklahoma Comprehensive Water Plan (OCWP) indicate that many of the state's 82 watershed planning basins are likely to experience surface water and/or groundwater deficits by 2060. While the magnitude or probability of projected shortages is relatively minor in many areas, each of the dozen Hot Spot basins are facing potentially large and recurring water deficiencies that require more immediate attention. In addition to traditional conservation measures (irrigation efficiencies, plumbing codes, tiered rate structures, educational programs, etc.), planning studies indicate that the use of marginal quality waters and other unconventional sources of supply, along with the regionalization of select water systems, could be particularly promising in circumventing future water crises. These options and their anticipated effectiveness in each planning basin, as determined by more detailed evaluation

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From the Director

From our friends at the Oklahoma Climatological Survey, I just learned that March was the 7th consecutive month—and the 30th out of the last 42—that Oklahoma's statewide average precipitation total dipped below normal. Since this devastating drought began around October 2010, the cumulative statewide precipitation deficit is 29 inches.

There appears to be no end to the drought, which is already responsible for billions of dollars in damages to the state's economy. While all Oklahomans hope and pray that conditions improve, Water Board staff work tirelessly to address an increasing number of drought-related issues. We are processing a record number of permit applications—many within

(continued on page 2)

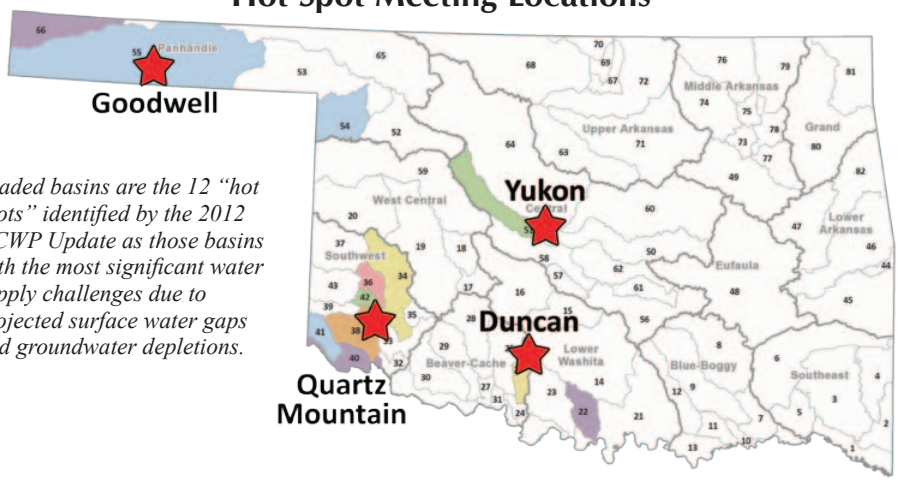
J. D. Strong, Executive Director Oklahoma Water Resources Board

Hot Spot Meetings (continued)

conducted as part of the ongoing OCWP "Water for 2060" initiative, were discussed in detail at the four public meetings.

"In 2006, when we initiated the Water Plan update, our overriding goal was to meet the long-term water needs of every Oklahoman," says J.D. Strong, OWRB Executive Director. "If we can address the looming water supply problems of those citizens and water users at greatest risk—those residing in identified Hot Spots—then we can certainly implement effective strategies wherever water challenges exist in Oklahoma."

Hot Spot Meeting Locations



Shaded basins are the 12 "hot spots" identified by the 2012 OCWP Update as those basins with the most significant water supply challenges due to projected surface water gaps and groundwater depletions.

From the Director (continued)

days of receipt—and responding to dozens of citizen complaints.

Fortunately for particularly hard-hit areas of western Oklahoma, on March 20, the Oklahoma Emergency Drought Relief Commission awarded more than $1 million to the community water systems of Altus, Guymon, Hollis, and Tipton. These Emergency Drought Relief grants, which were made available through Governor Fallin's drought declaration in those respective counties last October, should at least temper local impacts through implementation of much-needed drought mitigation and related water projects. In addition to the Governor's leadership, this critically important funding received strong support from Senators Mike Schulz, Don Barrington, and Bryce Marlatt, as well as State Representatives Don Armes, Charles Ortega, and Gus Blackwell, whose districts are currently facing exceptional drought-related problems.

Speaking of Sen. Shulz, his Drought Proof Communities Act of 2014 (Senate Bill 1430) has passed the Senate and has been referred to the House Appropriation and Budget Committee. The proposed act would improve the OWRB's ability to provide financial assistance to small communities with aging and deteriorating water infrastructure. Monies appropriated through the act to the OWRB's Financial Assistance Program would be expended solely for the benefit of public systems serving fewer than 7,000 customers with priority afforded to municipalities or rural water districts serving less than 1,750 customers. Available monies may also be expended for community efforts to identify drought vulnerabilities and implement various water conservation strategies, including system water loss audits, implementation of water reuse, and related measures.

In February, Water for 2060 Advisory Council members heard from Fred Fischer, a Panhandle irrigator and member of the Oklahoma Panhandle Agriculture and Irrigation Association. Joined by Jerry Wiebe, fellow Panhandle irrigator and council member, and Mark Nichols, former OWRB chairman from the Lugert-Altus Irrigation District, the three gentlemen provided impressive examples of conservation measures that are collectively resulting in significantly reduced water usage. The crop irrigation sector, which is responsible for almost 40 percent of statewide water use, will play a major role in achieving our statewide goal of consuming no more fresh water in 2060 than we consume today. OWRB staff and partners attending last month's "Hot Spot" meeting in Goodwell were also afforded an opportunity to tour Mr. Fischer's state-of-the-art farming operation.

The Hot Spot meetings, hosted by the OWRB in March and April, provided us with invaluable public input as we research the most effective ways to address anticipated water supply deficits in our most water-challenged areas. I've been pleasantly surprised that so many Oklahoma citizens are open to expansion of water recycling and reuse projects. These projects have tremendous promise in reducing Oklahoma's water footprint and will no doubt be well-represented in the Water for 2060 Advisory Council's final report to the Governor and Legislature in 2015.

Center-pivot irrigation systems retrofitted with low-impact nozzles (see inset) positioned just above the crop, such as on this farm near Guymon, significantly reduce evaporative losses.

OWRB Financing Programs Receive Another Top Rating

OWRB bonds sold on February 25 received an "AAA" rating from all three major ratings services: Moody's, Standard & Poor's, and Fitch. Citing a number of program and oversight credit strengths in both ratings, the rating services also reaffirmed the AAA rating of the OWRB's current outstanding debt totaling approximately $581 million.

The three ratings agencies praised the OWRB for its "strong" and "experienced" financial program management, its "sound" underwriting standards, its "extremely strong" program reserves, and the programs' "excellent history of borrower repayment" with "no loans in default."

The OWRB remains the only entity in Oklahoma to hold an AAA rating from all three major ratings services on all financial obligations. Because of the excellent ratings, the OWRB bonds of approximately $56.1 million will command a low interest rate from bond buyers.

"This rating is a boon to our borrowers," says Joe Freeman, chief of the agency's Financial Assistance Division. "Because we can provide loans to Oklahoma communities and rural water districts at lower interest rates than from conventional financing sources, it helps them maintain lower water and sewer rates for their customers."

The February sale of revenue bonds, which specifically supports the state's Clean Water State Revolving Fund (CWSRF) and Drinking Water State Revolving Fund (DWSRF) programs, also helps Oklahoma meet its projected multi-billion dollar water and wastewater project financing requirement. Recent passage of SQ 764 also authorizes the OWRB to issue up to $300 million of state general obligation bonds to address that need.

"For more than 30 years, the OWRB's financial programs have benefitted Oklahoma water users by providing water districts and communities with a stable resource for financing water and wastewater projects," said OWRB Executive Director J.D. Strong. "We take our commitment to serving Oklahoma's water needs very seriously, and the funds generated by these bonds are important to that mission."

In addition to the CWSRF and DWSRF programs, the OWRB also administers a third program for waste water and drinking water treatment loans—the State Revenue Bond Loan Program. In November 2013, Standard & Poor's reaffirmed the AAA rating on that program as well.

Gov. Fallin Urges Water Conservation as Drought Continues

Dry conditions persist across Oklahoma and impact water availability throughout the state. In January, Governor Mary Fallin continued to encourage all Oklahomans to implement water conservation practices that can help to ensure future water availability.

"Low water levels due to drought are having serious effects on our economy, and are particularly harmful to communities that rely on Oklahoma lakes for tourism and recreation," said Fallin. "Industries as diverse as tourism, agriculture, and energy are all directly affected by the state's water supply.

Drought conditions are particularly accute in southwest Oklahoma where sustained, exceptionally dry conditions have lead to record low lake levels in the Red River System.

"It's important that the state government, municipalities, and individuals do everything in their power to conserve water. Residents in all corners of the state have a major impact on water levels. As we examine ways to make state government more efficient in its water use, I am continuing to encourage all Oklahomans to consider common-sense water conservation. Things as simple as fixing leaks around the house and limiting the amount you water your lawn can help to preserve our reservoirs and lakes," Fallin pointed out.

A list of conservation techniques is available on the OWRB website.

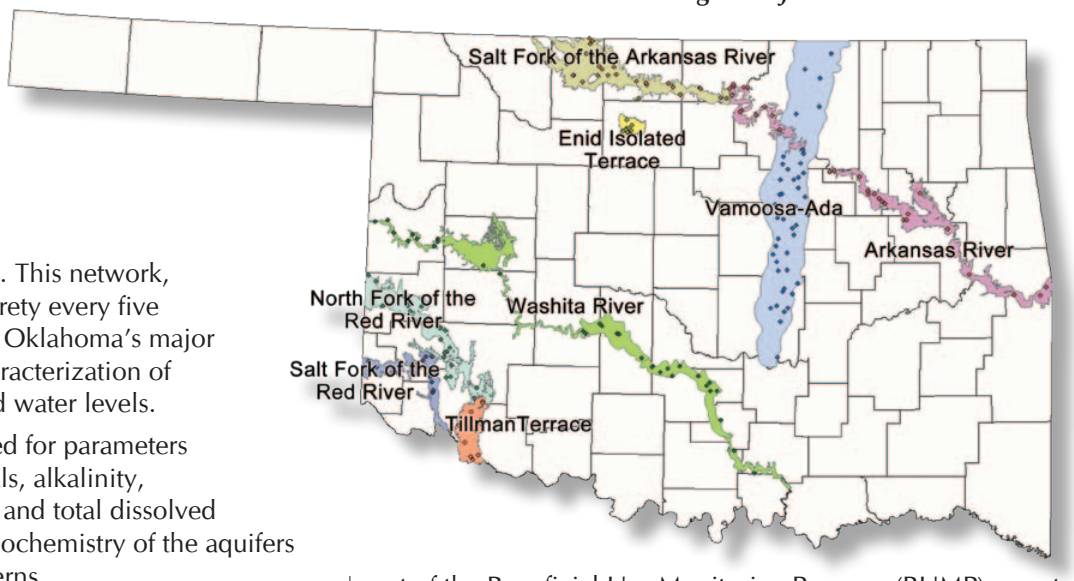
Fallin said she will continue to monitor lake levels and the drought across the state and work with stakeholders to take measures to reduce utilization of fresh water. State agencies are working with water managers to coordinate approaches to address water challenges across the state.

"Oklahoma has been blessed with outstanding water resources," Fallin added. "We must take steps now to make sure that these will be available in the future to allow our state to continue to prosper."

Fallin has tasked Secretary of Energy and Environment Michael Teague to work with the state's water agencies to expedite development of best practices for water reuse and recycling, a priority recommendation of the 2012 Oklahoma Comprehensive Water Plan. These strategies will provide additional tools to water users that allow the state to meet its goal of using no more fresh water in 2060 than it did in 2012.

GMAP Adds Eight Aquifers for Year Two Sampling

Baseline Network of Groundwater Monitoring Sites for 2014



The OWRB's Groundwater Monitoring and Assessment Program (GMAP) is now entering its second year of sampling and will add wells in eight additional aquifers (see map) to its baseline network. This network, which will be sampled in its entirety every five years, will include wells in all of Oklahoma's major aquifers, providing a general characterization of regional groundwater quality and water levels.

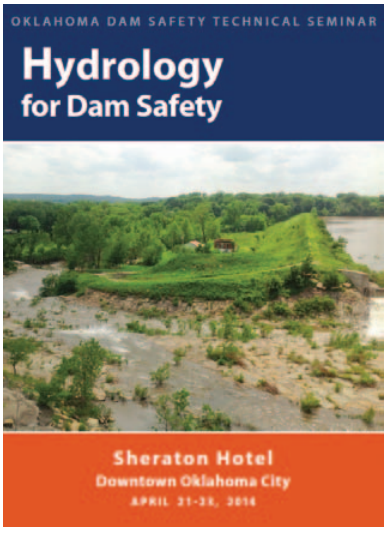
Water samples are being analyzed for parameters such as nutrients, dissolved metals, alkalinity, hardness, dissolved oxygen, pH, and total dissolved solids, from which the natural geochemistry of the aquifers can be assessed to identify concerns.

The first year of sampling included more than 200 wells in the Ogallala, Canadian River, Washita River, Elk City, Rush Springs, Gerty Sand and Garber-Wellington aquifers.

Data collected through the program will be made available to the public in a variety of formats, including a yearly report as part of the Beneficial Use Monitoring Program (BUMP) report available on the OWRB website.

GMAP was initiated in 2013 through money appropriated by the Oklahoma Legislature and Governor as a result of a priority recommendation of the Oklahoma Comprehensive Water Plan (OCWP).

OWRB to Host Hydrology for Dam Safety Seminar



The OWRB will host a technical seminar on "Hydrology for Dam Safety" at the Sheraton Hotel in Oklahoma City on April 21-23.

The three-day course will provide participants with the necessary background to understand and perform hydrologic analysis for dam safety studies.

Participants will gain an understanding of how to develop the probable maximum precipitation for a particular region and model-based predictions of the probable maximum flood. HEC-HMS computer modeling will be used to demonstrate hydrologic principles and analysis techniques.

Featured instructors include Dr. Baxter Vieux, OU Professor and expert in dam design and construction, specializing in radar rainfall and distributed hydrologic modeling, and Dr. Jonathan Looper, expert in hydrologic/hydraulic modeling using GIS and radar rainfall.

For registration information visit www.owrb.ok.gov/damsafety.

OWRB Dam Safety Program

The Oklahoma Dam Safety Act is administered by the Oklahoma Water Resources Board (OWRB) through its Dam Safety Program. The goal of the program is to ensure the safety of more than 4,600 dams in the state with a focus on dams that could impact downstream life and property. Inspections are required for all jurisdictional size dams based on hazard-potential classification:

Hazard-Potential Classification	Risk Involved with Dam Failure	Inspection Frequency
High	probable loss of human life	annually, by a registered professional engineer
Significant	no probable loss of human life but can cause economic loss or disruption of lifeline facilities	every three years, by a registered professional engineer
Low	no probable loss of human life and low economic losses	every five years by the dam owner to review hazard classification

In addition, owners of high hazard dams are required to have an emergency action plan (EAP) in place. Copies of the EAP must be submitted to local law enforcement agencies and emergency management officials. OWRB staff require submittal and subsequent approval of plans and specifications prior to all new dam construction and modifications to existing dams.

The OWRB coordinates periodic training sessions and workshops for dam owners and engineers to update them on pertinent dam safety issues and regulations. Schedules are posted at **www.owrb.ok.gov**.

Water-Smart Landscaping Tips

Spring is here and it's time to consider a "water-smart" landscape.

PLANTS

Plan ahead for a water-smart landscape.
Whether you're designing a new landscape or rethinking your current one, plan your landscape for water-efficiency.

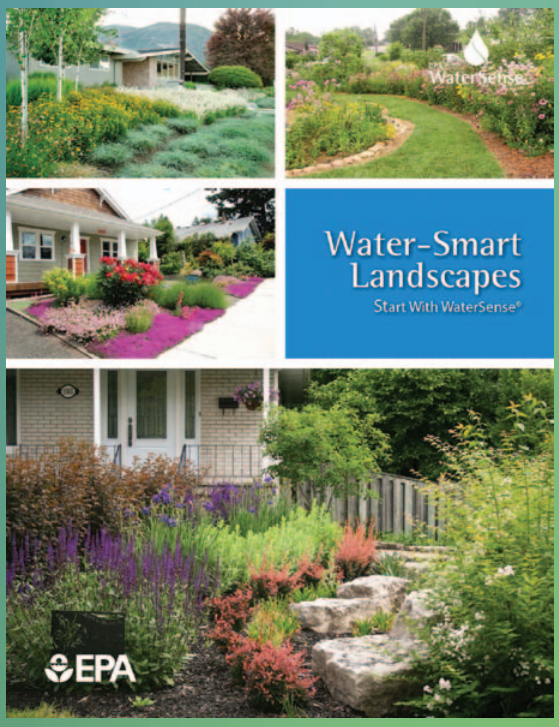
Use low water-using and native plants.
Once established, these plants require little water beyond normal rainfall and minimum fertilizer.

Group plants according to their water needs.
Grouping vegetation with similar watering needs into specific "hydrozones" reduces water use.

Recognize site conditions and plant appropriately.
Be mindful of a site's soil type and exposure to the sun and wind, and then choose plants that are appropriate.

Place turfgrass strategically.
Turfgrass receives the highest percentage of irrigation water in traditional landscapes and homeowners commonly overwater grass areas. To reduce outdoor water use, plant turfgrass only where it has a practical function, such as a play area. Choose drought-tolerant turfgrass types that don't use a lot of water.

Minimize steep slopes.
Slopes have higher potential for erosion and runoff.

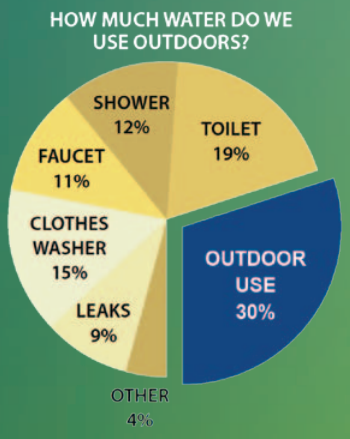


For more specific information, download the "Water-Smart Landscapes" guide from EPA's WaterSense website at www.epa.gov/watersense/outdoor/landscaping_tips.html.

SOIL

Aerate your soil.
Aerating with a simple lawn aerator can increase the infiltration of water into the ground, improving water flow to the plant's root zone and reducing runoff.

Use mulch around shrubs and garden plants.
This will help to reduce evaporation, inhibit weed growth, moderate soil temperature, and prevent erosion.



Grasscycle.
Leave the grass clippings on your lawn after you mow. They will quickly decompose and release valuable nutrients back into the soil.

Keep your soil healthy.
Healthy soils effectively cycle nutrients, minimize runoff, retain water, and absorb excess nutrients, sediments and pollutants. Have your soil tested for nutrient content, pH, soil composition, and organic matter content. Contact the Oklahoma Cooperative Extension Service to learn about soil testing services.

MAINTENANCE

Raise your lawn mower cutting height.
Raise your lawn mower blade. Longer grass promotes deeper root growth, minimizes weed growth and reduces evaporation.

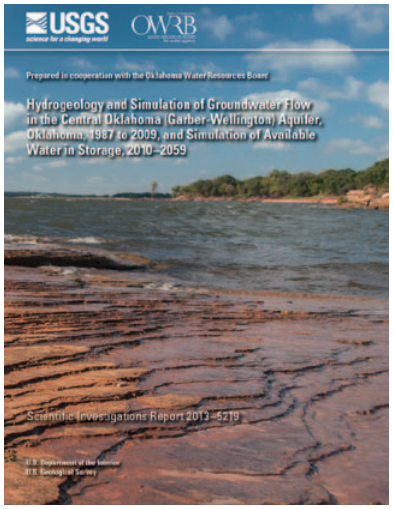
Provide regular maintenance.
Replace mulch around shrubs and garden plants, remove weeds and thatch as necessary.

Minimize or eliminate fertilizer.
Fertilizer encourages thirsty new growth, increasing your landscape's dependence upon additional water. Minimize or eliminate the use of fertilizer where possible, or use products that contain "natural organic" or "slow-release" ingredients that feed plants slowly and evenly.

WATER FOR 2060
EFFICIENCY · CONSERVATION · RECYCLING · REUSE

Garber-Wellington Hydrology Study Report Now Available

The Garber-Wellington Aquifer Water Management Study report is now available on the website of the U.S. Geological Survey (USGS). The report compiles data that will assist the OWRB in determining the amount of water that can be withdrawn from the groundwater basin, .



The study was coordinated by the OWRB with federal assistance from the USGS and Bureau of Reclamation. The Association of Central Oklahoma Governments (ACOG), Oklahoma Geological Survey (OGS), Tinker Air Force Base, and other state and federal agencies also contributed the investigation.

Initiated in 2008, the Garber-Wellington Study included a characterization of the geohydrology of the aquifer and construction of a digital groundwater flow model to simulate various water management strategies. Eventually, the OWRB will utilize this information to determine the Garber-Wellington's maximum annual yield and the amount of water that may be allocated to permitted water users (referred to as the equal proportionate share or EPS). Until the final EPS determination is made and approved by the Board, users will continue to be issued temporary permits for two acre-feet of water per acre annually.

The Garber-Wellington aquifer, also referred to as the Central Oklahoma aquifer, underlies about 3,000 square miles in central Oklahoma and is used for municipal, industrial, commercial, agricultural, and domestic water supplies.

With the exception of Oklahoma City, all the major communities in central Oklahoma rely either solely or partly on groundwater from this aquifer. In addition to these municipalities, more than 20,000 homeowners use well water from the aquifer for household or yard use. With a population of approximately 1 million over the aquifer, which is expected to increase 30 percent by 2060, sufficient water supply for the future is a major concern of water planners and managers.

Study results indicate that in the 169 wells analyzed, the aquifer's water level declined an average of 3.75 feet during the period of 1987 to 2009. Annual groundwater use in 2008, including domestic use and permitted use reported to the OWRB, was estimated to be about 52,000 acre-feet. Annual average recharge to the aquifer was estimated to be 1.84 inches per year from 1987 through 2009.

The Rush Springs Hydrologic Investigation, a similar priority study of note, is in its final year. Since 2011, staff have been collecting water levels from groundwater wells and compiling other data to help develop an associated groundwater-flow model. The Rush Springs Hydrologic Investigation is part of the Upper Washita Basin Study (UWBS) being conducted in cooperation with the Bureau of Reclamation.

Water Quality Improving at Thunderbird

Recently collected data (2013 to present) indicate a noticeable and significant improvement in water quality at Lake Thunderbird. Dissolved oxygen levels have increased and algae levels have declined. Consequently, lake water quality now complies with the state's dissolved oxygen standard and has demonstrated significant improvement in both its ecology and drinking water supply.

Declining water quality has historically been the dominant trend at Lake Thunderbird. The lake suffers from eutrophication, in part due to the introduction of human by-products into the watershed. The resulting overload of nitrogen and phosphorus has lead to increased algae growth and depleted oxygen levels—the major causes of taste and odor problems for drinking water.

The OWRB began monitoring water quality at the lake in 2000 through its Beneficial Use Monitoring Program (BUMP). Data analyses resulted in a Category 5 (303d list) classification of the lake in the State's Integrated Report, which cites excessive turbidity, low dissolved oxygen, and excessive Chlorophyll-a as the primary impairments.

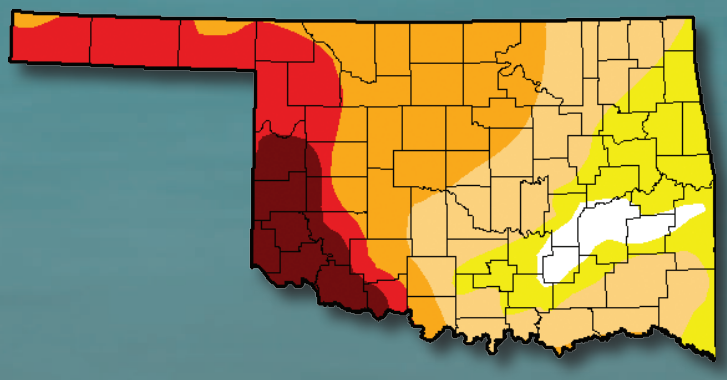
In 2008, in an effort to reverse this trend, a lake restoration project was initiated through a partnership between the OWRB and Central Oklahoma Master Conservancy District (COMCD), which manages the dam and maintains and operates the raw drinking water lines to the cities of Norman, Del City, and Midwest City. Historical BUMP data were used to create a reservoir response model, serving to highlight both the long-term benefits of nutrient reductions in the watershed and the immediate benefits that in-lake management could provide. This information was in turn utilized by COMCD to obtain funding through the American Recovery and Reinvestment Act of 2009 for the purchase of a supersaturated dissolved oxygen (SDOX) injection unit, which functions to mitigate high sediment phosphorous loads by oxygenating the hypolimnion (isolated deep waters), especially around the water supply intake.

Other lake restoration projects resulting from the partnership have included shoreline planting to establish aquatic habitat and decrease shoreline erosion, stormwater controls, and numerous additional activities focused on reducing nonpoint source pollution from the watershed.

More information about Lake Thunderbird can be found in the final project report, now available on the OWRB's website at **www.owrb.ok.gov/studies/reports/reports.php**.

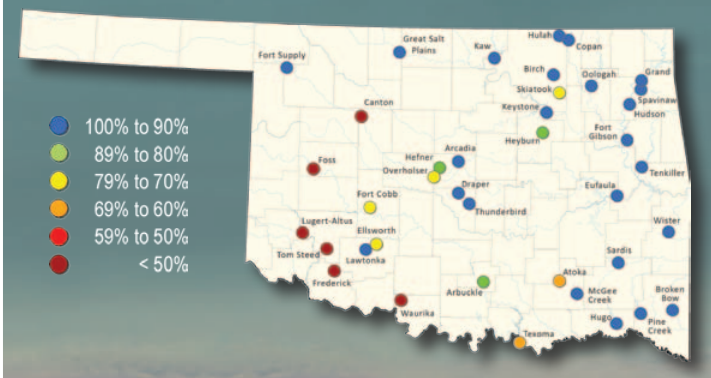
Drought Update

U.S. Drought Monitor
April 1, 2014

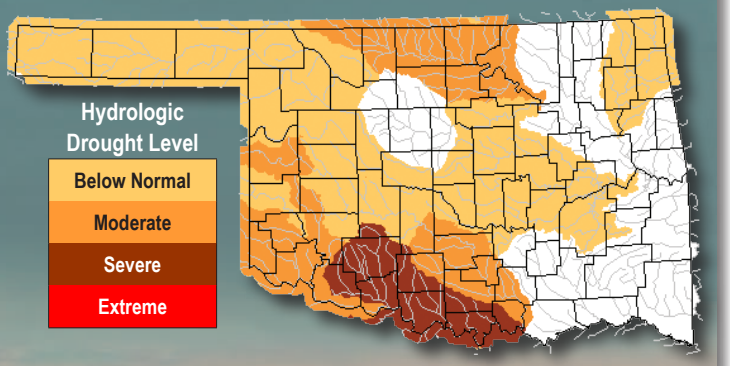


Drought Intensity & Percent of State in Drought Category	
Abnormally Dry	95.95
Moderate Drought	77.48
Severe Drought	50.67
Extreme Drought	24.03
Exceptional Drought	8.61

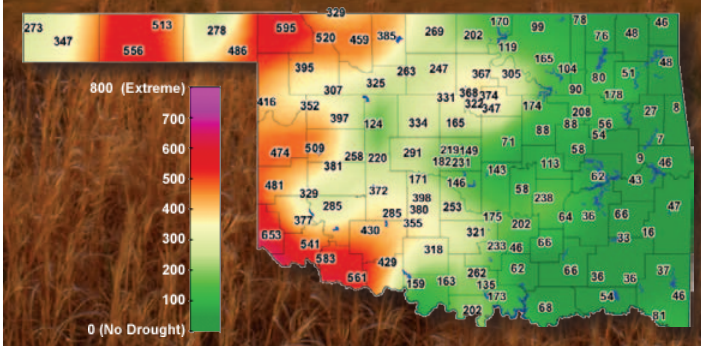
Reservoir Storage
April 1, 2014



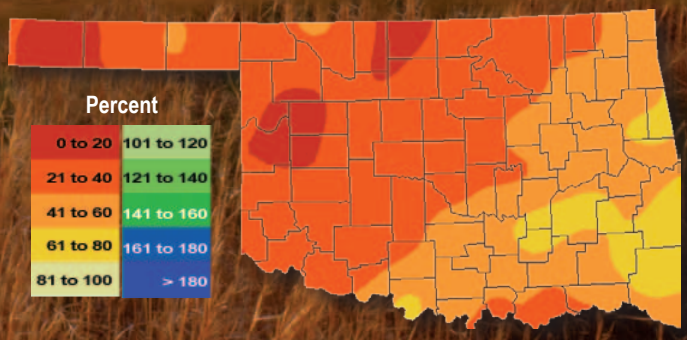
Streamflow (7-Day Average)
March 31, 2014



Keetch-Byram Drought Index
March 31, 2014



Percent of Normal Precipitation
Last 90 Days (January 1 through March 31)



Data obtained from the National Drought Mitigation Center, U.S. Geological Survey, U.S. Army Corps of Engineers and Oklahoma Climatological Survey. For more drought information, and to obtain updated information on Oklahoma's drought and moisture conditions, go to www.owrb.ok.gov/drought.

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Protecting and enhancing the quality of life for Oklahomans by managing and improving the state's water resources to ensure clean and reliable water supplies, a strong economy, and a safe and healthy environment.

1st Quarter 2014

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E-mail comments, questions, or article submissions to pubinfo@owrb.ok.gov or call us at (405) 530-8800.

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Financial Assistance Program Update

Loans & Grants Approved as of March 18, 2014

FAP Loans—360 for $901,465,000
The OWRB's Financial Assistance Program (FAP), created by the State Legislature in 1979, provides loans for water and wastewater system improvements in Oklahoma. The tremendous popularity of the bond loan program is due, in part, to extended payoff periods of up to 30 years at very competitive interest rates, averaging approximately 4.762 percent since 1986.

CWSRF Loans—280 for $1,232,479,409
The Clean Water State Revolving Fund (CWSRF) loan program was created in 1988 to provide a renewable financing source for communities to use for their wastewater infrastructure needs. The CWSRF program is Oklahoma's largest self-supporting wastewater financing effort, providing low-interest loans to communities in need.

DWSRF Loans—164 for $868,303,300
The Drinking Water State Revolving Fund (DWSRF) loan program is an initiative of the OWRB and Oklahoma Department of Environmental Quality to assist municipalities and rural water districts in the construction and improvement of drinking water systems. These projects are often mandated for communities to obtain compliance with increasingly stringent federal standards related to the treatment of drinking water.

REAP Grants—604 for $51,969,016
The Rural Economic Action Plan (REAP) Program was created by the State Legislature in 1996. REAP grants, used for water/wastewater system improvements, target primarily rural communities with populations of 7,000 or less, but priority is afforded to those with fewer than 1,750 inhabitants.

Emergency Grants—566 for $33,776,351
Emergency grants, limited to $100,000, are awarded to correct situations constituting a threat to life, health, or property and are an indispensable component of the agency's financial assistance strategy.

Drought Response Program Grants—6 totaling $418,848
Through the OWRB's Drought Response Program, funding is available for communities in most dire need during state drought emergencies declared by the Governor. A maximum of $300,000 is diverted from existing OWRB Emergency Grant funds to establish the Program.

Total Loans/Grants Approved: 1,981 for $3,088,411,924
Estimated Savings: $1,055,769,900
Applicants eligible for water/wastewater project financial assistance vary according to the specific program's purpose and requirements, but include towns and other municipalities with proper legal authority, various districts established under Title 82 of Oklahoma Statutes (rural water, master/water conservancy, rural sewage, and irrigation districts), counties, public works authorities, and/or school districts. Applications for agency financial assistance programs are evaluated individually by agency staff. Those meeting specific program requirements are recommended by staff for approval at monthly meetings of the nine-member Water Board.

For more information, call 405-530-8800 or go to www.owrb.ok.gov/financing.