2015 BASIN HIGHLIGHTS REPORT

AN OVERVIEW OF WATER QUALITY ISSUES THROUGHOUT THE CANADIAN AND RED RIVER BASINS

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the Texas Commission on Environmental Quality

North Groesbeck Creek at FM 1166

Wolf Creek at SH 305

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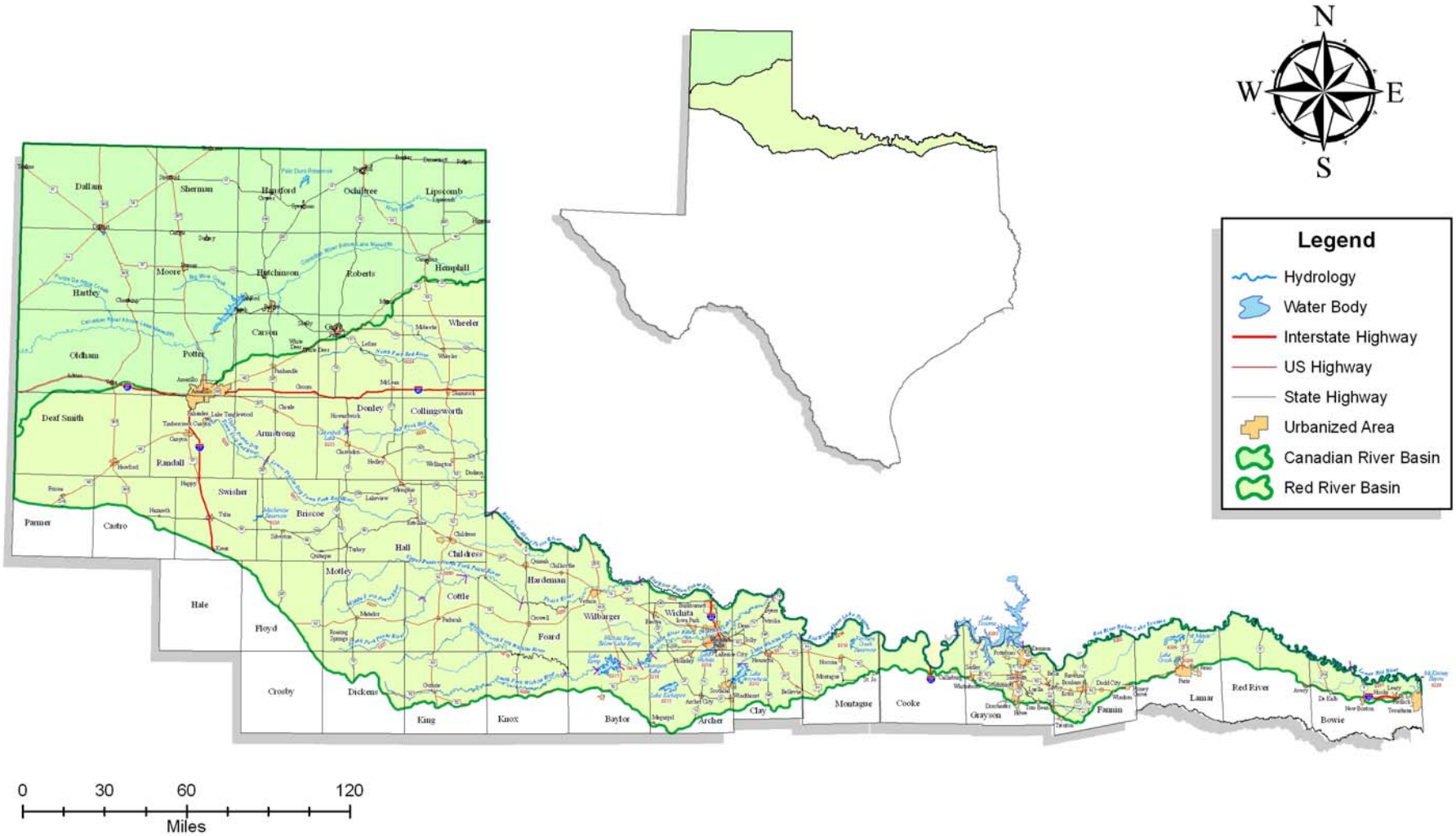


INTRODUCTION

In 1991, the Texas Legislature enacted the Texas Clean Rivers Act (Senate Bill 818) in order to assess water quality for each river basin in the state. From this, the Clean Rivers Program (CRP) was created and has become one of the most successful cooperative efforts between federal, state, and local agencies and the citizens of the State of Texas. It is implemented by the Texas Commission on Environmental Quality (TCEQ) through local partner agencies to achieve the CRP's primary goal of maintaining and improving the water quality in each river basin. The Red River Authority of Texas (Authority) is the partner agency for both the Canadian and Red River Basins.

A watershed management approach was selected as the best method to manage the state's diverse surface water resources. In order to achieve this, the Authority subdivided each basin into five reaches, or sub-watersheds, divided by natural hydrology and composed of classified segments and unclassified water bodies. The TCEQ identifies each of these classified segments in the Texas Surface Water Quality Standards (TSWQS). Data resulting from the collection and analysis of water samples is used in the development of and compliance with these standards.

An integral part of the CRP is the Basin Highlights Report (BHR). This report is based on quality assured data as utilized in the *Texas Integrated Report* (*IR*). The *IR* is an assessment of historical water quality data and is prepared by the TCEQ every two years, as required under the Federal Clean Water Act (CWA), Sections 305(b) and 303(d), as administered by the Environmental Protection Agency (EPA).

In 2014, the Authority produced the *Basin Summary Report for the Canadian and Red River Basins*, which included an extensive review of technical data and trend analyses based on information from the final *2012 Texas Integrated Report* (*IR*). This year's Basin Highlights Report (BHR) is brief in comparison to the *2014 Basin Summary Report for the Canadian and Red River Basins*, and serves to highlight ongoing environmental phenomena and/or projects impacting water quality within both the Canadian and River Basins. Results from the *Draft 2014 IR* are also presented for both basins. Therefore, it is strongly suggested that the reader view the *2014 Summary Report of the Canadian and Red River Basins* for more in depth information. It may be found on the Authority's website at: **www.rra.texas.gov**.

Beaver Creek at FM 2326

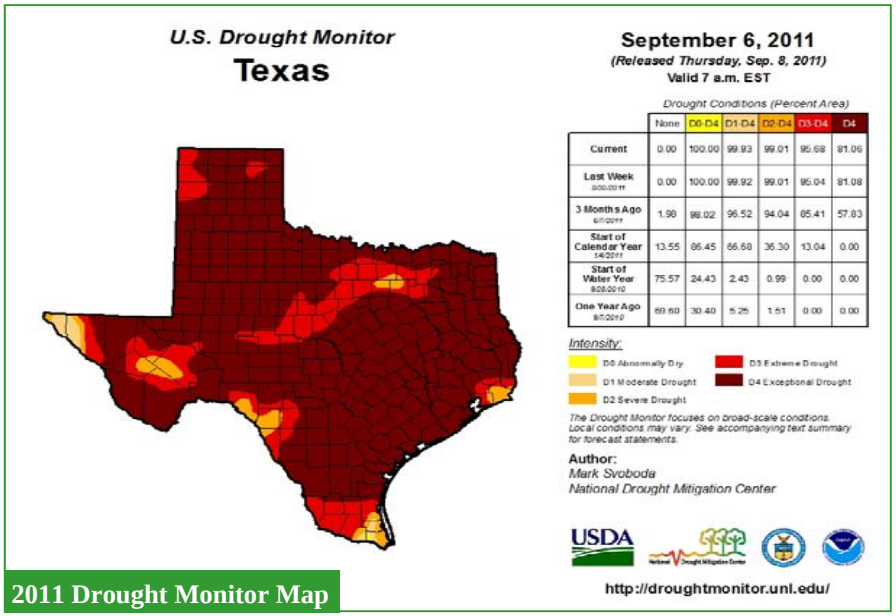
DROUGHT

HISTORY OF DROUGHT IN TEXAS

Texas has seen its fair share of droughts; from the dust bowl in the 1930s to the "Drought of Record" in the 1950's. The current drought conditions are rivaling both of these past incidents. A lack of rain in the state has caused great devastation to crops and livestock alike. Even with irrigation, farmers are having difficulty growing crops. Likewise, ranchers are being forced to sell off their herds, simply because they are unable to support the animal's water and food supplies.

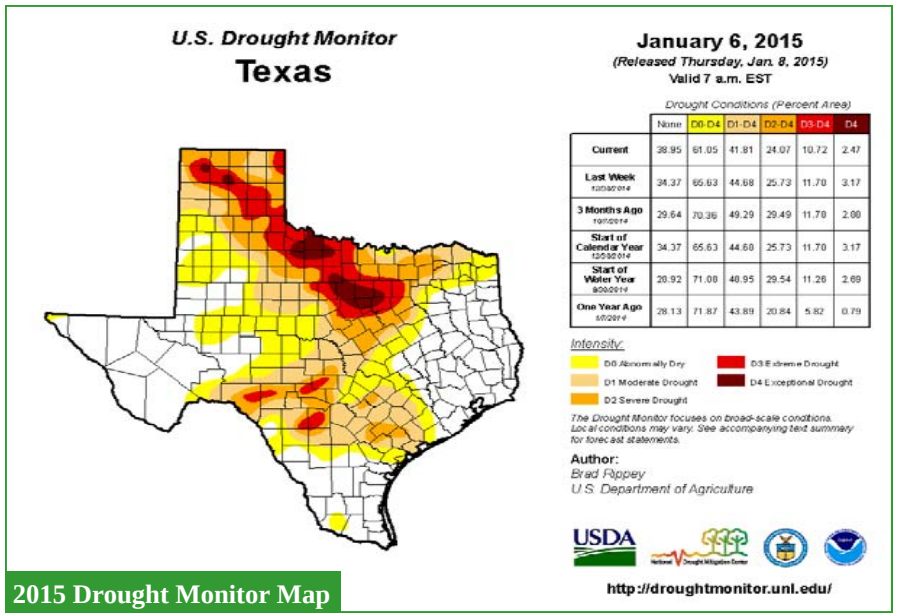
CURRENT TEXAS DROUGHT

According to State Climatologist, John Nielson-Gammon, much of Texas entered drought conditions in the early 2000's. However, beginning in 2011, things took a drastic turn for the worse. Case in point, while the impacts of this drought have begun to lessen in many areas of the United States, Texas is still struggling to cope. According to the national drought monitor, on September 6, 2011, 56.53% of the country was recording no drought conditions, while 11.20% was experiencing an exceptional drought. Comparatively, on August 28, 2012, 22.31% of the country was experiencing no effects of drought, while only 6.04% was deemed to be in exceptional drought. The Texas drought statistics for this time frame are quite startling. On September 6, 2011, 100% of Texas was categorized to be in some form of abnormally dry condition and 81.06% was listed as exceptional drought. These numbers improved on August 28, 2012, 89.79% of Texas was considered abnormally dry and 3.21% was categorized as exceptional conditions. A majority of the exceptional drought conditions are located in west Texas and the Texas Panhandle.



	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	99.93	99.01	95.68	81.06
Last Week 8/30/2011	0.00	100.00	99.92	99.01	95.04	81.08
3 Months Ago 6/7/2011	1.98	98.02	96.52	94.04	85.41	57.83
Start of Calendar Year 1/4/2011	13.55	86.45	66.68	36.30	13.04	0.00
Start of Water Year 9/28/2010	75.57	24.43	2.43	0.99	0.00	0.00
One Year Ago 9/7/2010	69.60	30.40	5.25	1.51	0.00	0.00

2011 Drought Monitor Map



	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	38.95	61.05	41.81	24.07	10.72	2.47
Last Week 12/30/2014	34.37	65.63	44.68	25.73	11.70	3.17
3 Months Ago 10/7/2014	29.64	70.36	49.29	29.49	11.70	2.60
Start of Calendar Year 12/30/2014	34.37	65.63	44.68	25.73	11.70	3.17
Start of Water Year 9/30/2014	28.92	71.08	48.95	29.54	11.26	2.69
One Year Ago 1/7/2014	28.13	71.87	43.89	20.84	5.82	0.79

2015 Drought Monitor Map

CANADIAN RIVER BASIN DROUGHT RELATED ISSUES

While drought conditions have improved dramatically for a large portion of the state, as reflected in the January 6, 2015 U.S. Drought Monitor map for Texas, several portions of both the Canadian and Red River Basins continue to experience moderate to severe drought conditions, while others are still experiencing exceptional drought conditions. This prolonged period of below average rainfall for both basins has forced water providers in both basins to take serious action. In the Texas Panhandle, the Canadian River Municipal Water Authority (CRMWA) has made the transition from utilizing Lake

Meredith as its primary supply of drinking water, to blending lake and ground water, to now exclusively relying on groundwater alone. For prolonged periods of time within the past five years, Lake Meredith has been reported as having a 0.0% capacity by the Texas Water Development Board (TWDB).

RED RIVER BASIN DROUGHT RELATED ISSUES

In north-central Texas, municipalities like Wichita Falls (City) are feeling the water woes as well. In 2011 Wichita Falls set a Texas record for one hundred (100) consecutive days of 100°F plus temperatures. Even worse, since the summer of 2011, the City and its surrounding areas have experienced a total of 200 plus days of 100° F temperatures which have certainly not helped matters. The issue has been further compounded with drastically reduced rainfall. In fact, between 2011 and 2013, the City was approximately thirty (30) inches of rainfall behind average, which equates to a little over one (1) year of average rainfall. As local lake levels approached the twenty-five (25) percent mark during the summer of 2013, it became apparent that something had to be done.

In an effort to decrease the demand on low lake levels, City officials decided to revisit a water reuse program from 1999/2000 which had previously been put on hold. The plan was officially put into place during July 2014. The water reuse program works by transporting treated effluent from the City's River Road Waste Water Treatment Plant directly to the Cypress Water Treatment Plant. TCEQ required the reuse water to be treated by several processes, including coagulation, microfiltration, reverse osmosis, UV, and mixing with reservoir water prior to conventional treatment. To date, the direct potable reuse project has treated and produced an estimated 1 billon gallons of drinking water which would have had to come from the City's three drinking water reservoirs.

While conservation efforts have helped with the water quantity issues in both basins, it will not aid in the water quality battle streams and reservoirs are currently facing. As regular rainfall remains below average, the persistence of the drought is slowly beginning to take its toll on water quality as well. Routine monitoring data collected by the Authority shows a subtle increase in dissolved solid constituents, including chloride, sulfate and total dissolved solids (TDS), since 2011. As water levels continue to decline, these analytes, along with several others, will continue to concentrate in what little water remains. These elevated levels may not only lead to water quality impairments down the road, but also make that water more difficult and costly to treat and utilize as drinking water. Unfortunately, until regular rainfall returns to the area, there is little that can be done to rectify both water quantity and quality issues.

Canadian and Red River Basin Reservoirs (as of 1/9/2015)

Reservoir Name	Percent Full
Lake Meredith	5.0
Lake Arrowhead	19.4
Greenbelt Lake	12.0
Lake Kemp	27.0
Lake Kickapoo	28.3
Lake Nocona	32.0
Lake Texoma	85.1

Lake Wichita Boat Ramp

RECREATIONAL USE ATTAINABILITY ANALYSIS STUDIES

WHAT IS AN RUAA?

A Recreational Use Attainability Analysis (RUAA) is a specific type of Use Attainability Analysis (UAA) focused on determining whether or not the presumed/assigned use of a particular water body is actually appropriate for the said water body.

Prior to June 2010, only two (2) categories of recreational use existed in Texas, Primary and Noncontact Recreation. The 2010 revision to the Texas Surface Water Quality Standards (TSWQS) was expanded to include four categories. As a result, the *TSWQS* defines four (4) recreational use designations which include:

1. **Primary Contact Recreation 1** - Activities that are presumed to involve a significant risk of ingestion of water (e.g., wading by children, swimming, water skiing, diving, tubing, surfing, and the following whitewater activities: kayaking, canoeing, and rafting).
2. **Secondary Contact Recreation 1** - Activities that commonly occur but have limited body contact incidental to shoreline activity (e.g., fishing, canoeing, kayaking, rafting and motor boating). These activities are presumed to pose a less significant risk of water ingestion than primary contact recreation but more than secondary contact recreation 2.
3. **Secondary Contact Recreation 2** - Activities with limited body contact incidental to shoreline activity (e.g. fishing, canoeing, kayaking, rafting and motor boating) that are presumed to pose a less significant risk of water ingestion than secondary contact recreation 1. These activities occur less frequently than secondary contact recreation 1 due to physical characteristics of the water body or limited public access.
4. **Noncontact Recreation** - Activities that do not involve a significant risk of water ingestion, such as those with limited body contact incidental to shoreline activity, including birding, hiking, and biking. Noncontact recreation use may also be assigned where primary and secondary contact recreation activities should not occur because of unsafe conditions, such as ship and barge traffic.

HOW RUAAs CAN AFFECT WATER QUALITY STANDARDS

In Texas, bacteriological water quality standards are applied to a water body based on the assigned recreational use. When recreation uses were originally presumed/assigned, almost all water bodies in Texas were presumed to be Primary Contact Recreation 1. Unfortunately, this classification is actually very inappropriate for many of the shallow meandering streams existing throughout much of the Canadian and Red River Basins. So what does all of this mean in regards to water quality?

Water bodies whose assigned use is Primary Contact Recreation 1 are held to a much more stringent bacteriological standard. The following details each recreational use, along with the corresponding Texas Water Quality Standard for *E. coli* bacteria:

1. **Primary Contact Recreation 1** - 126 MPN Geomean
2. **Secondary Contact Recreation 1** - 630 MPN Geomean
3. **Secondary Contact Recreation 2** - 1,030 MPN Geomean
4. **Noncontact Recreation** - 2,060 MPN Geomean

The logic behind the hierarchy of bacteriological standards based on recreational use stems from the fact that it may not be appropriate to hold a water body whose average stream channel depth is less than one foot with limited public access to the same standard as a water body where Primary Contact Recreation activities such as tubing, and water skiing are actually possible and do occur. In order to change a water body's assigned recreational use, a RUAA must be conducted.

THE RUAA PROCESS

The RUAA process can be broken down into four major processes. First, a public meeting is held to outline the project and solicit any pertinent information from interested stakeholders. Second, field studies are conducted twice during "peak" times when recreational

activities would most likely occur. These are accompanied by research, including reviewing old newspapers, Internet searches, and interviews with landowners and/or other stakeholders in the area.

After the data has been collected, another public meeting to outline the study findings is held prior to the draft report being published for public comment. Lastly, after the public comment period is closed, and any comments have been addressed, the report is finalized and submitted to the TCEQ for review.

The results of the RUAA merely document the presence, absence, type and frequency of recreational activity. It is at the discretion of the TCEQ to interpret the data presented in an RUAA and determine whether or not a recreational use change, and subsequent water quality standard change(s) are appropriate.

CANADIAN AND RED RIVER BASIN RUAAs

Beginning in 2008, the TCEQ began evaluating Recreations Uses throughout Texas, however, the first RUAAs in both the Canadian and Red River Basins did not take place until early 2013. The Texas Institute of Applied Environmental Research (TIAER), at Tarleton State University in Stephenville, Texas, was contracted through the Texas State Soil and Water Conservation Board (TSSWCB) to perform RUAAs on four unclassified segments within the Canadian and Red River Basins.

To date, TIAER has completed RUAAs in one (1) Unclassified Water Body in the Canadian River Basin, 0101A-Dixon Creek, and three (3) Unclassified Water Bodies in the Red River Basin, 0214B-Buffalo Creek, 0230A-Paradise Creek, and 0299A-Sweetwater Creek. At the time of this publication, the results of these studies had been finalized and submitted to TCEQ.

TIAER's report did suggest that recreational activities in all four segments was minimal due to lack of water, lack of public access points, or a combination of both.

Currently, TIAER is conducting five (5) additional RUAAs which include Unclassified Water Bodies 0201A-Mud Creek, 0202A-Bois d'Arc Creek, 0202F-Choctaw Creek, 0202G-Smith Creek, and 0202K-Iron Ore Creek. For more information on the current RUAA projects being performed by TIAER, please visit: **http://tiaer.tarleton.edu/ruaa/index.html**.

Impairment Outcomes Based on Potential Recreational Criteria Classification

Waterbody	Segment	Basin	Primary 1	Secondary 1	Secondary 2
Dixon Creek	0101A	Canadian	Yes	No	No
Buffalo Creek	0214B	Red	Yes	No	No
Paradise Creek	0230A	Red	Yes	No	No
Sweetwater Creek	0299A	Red	No	No	No
Mud Creek	0201A	Red	Yes	No	No
Bois d'Arc Creek	0202A	Red	No	No	No
Choctaw Creek	0202F	Red	Yes	No	No
Smith Creek	0202G	Red	Yes	No	No
Iron Ore Creek	0202K	Red	Yes	No	No

ZEBRA MUSSELS

ORIGIN

Native to Russia, the zebra mussel (*Dreissena polymorpha*) were first introduced into North American waters as seemingly innocent hitchhikers in the ballasts of ships entering Lake St. Clair, Michigan in the late 1980's. Once established, the species quickly spread throughout the Great Lakes, eventually infiltrating some thirty (30) states and more than 600 lakes and reservoirs to date, according to recent data from the United States Geological Survey. In the beginning it was thought that southern waters were too warm for the zebra mussel to survive and reproduce, but this highly adaptive species has found a way.

Zebra Mussels

TRANSPORTATION

This infestation is thought to have been carried to Texas waters via boats and other aquatic recreational equipment. Once attached, zebra mussels can be transported to other water bodies unknowingly, as adults can survive out of water for several days. Additionally, zebra mussel larvae are microscopic, free floating organisms easily transported through dams, utility pipelines and even live wells.

TEXAS BOUND

In April 2009, the first established colonies were reported in Lake Texoma in the Red River Basin. Soon after the Lake Texoma discovery, colonies were also reported in Sister Grove Creek in the Trinity River Basin, which feeds Lake Lavon. Finally, on July 17, 2012, zebra mussel colonies were also confirmed in Lake Ray Roberts.

CURRENT POPULATIONS AND STUDIES

Zebra mussels grow to a maximum diameter of around two inches and are identified by their triangular shape. Although they commonly have a stripe-like pattern, they can be solid white to dark brown in color. Due to their filtration eating habits, they can easily out-compete native algae and other aquatic plants by rapidly depleting any and all available nutrients within the water column. In turn, native species of fish and other aquatic life, which would have fed on this aquatic vegetation, are out-competed. Zebra mussels can spawn in water temperatures above 54°F and can produce over one million eggs in a spawning season. Their colonization traits make the zebra mussel highly destructive to water lines and pipes. They are notorious for colonizing in public and private water structures and piping, which can disrupt or even stop the flow of water.

Zebra mussels have been documented in the following Texas lakes:

Texas Lake/Reservoir	Year First Discovered
1. Lake Texoma	2009
2. Lake Ray Roberts	2012
3. Lake Lewisville	2013
4. Lake Bridgeport	2013
5. Lake Lavon	2013
6. Lake Belton	2013
7. Lake Waco	2014

In 2010, the United States Geological Survey (USGS) began an intensive zebra mussel monitoring program to help document the spread of this highly invasive species. As of 2012, the USGS is currently monitoring nine (9) Texas Lakes (Lake Texoma, Ray Roberts, Lake, Lake Lewisville, Grapevine Lake, Lavon Lake, Ray Hubbard

Lake, Lake Tawakoni, Lake Fork Reservoir, and Lake Palestine). The monitoring program consists of four key components, which include:

1. SCUBA diving
2. Water sample collection
3. Artificial substrate sampling
4. Water quality sampling

In addition to the routine water quality sampling, the USGS also has water-quality sondes to measure and record temperature, dissolved oxygen concentration, specific conductance and pH, as well as loggers to monitor and record the temperature every 15 minutes at 5-foot depth intervals.

Zebra mussel colony on a boat prop

IMPACT

Zebra mussels may have a rather innocent appearance, but established populations are anything but. Despite out-competing native aquatic vegetation and fish species, zebra mussels negatively affect recreational activities and public and private properties.

Boats, piers, buoys, and practically anything with a hard substrate left in a zebra mussel infested water body is a prime spot for them to colonize. Zebra mussels have been seen inside boat engines and cooling systems, clogging lines and causing engines to malfunction. Once encrusted on the bottom of a boat or other recreational water craft, their removal can be expensive, if even possible.

TEXAS LEGISLATIVE ACTION

To limit further outbreaks of this highly invasive species, the Texas Legislature has created multiple control measures through the Texas Parks and Wildlife Department (TPWD). TPWD has focused on public outreach programs and publications to help prevent the transportation of the zebra mussel to other water bodies. TPWD lists preventative measures on their website, **http://www.tpwd.state.tx.us/fishboat/boat/protect_water/**. TPWD's focus is on **cleaning**, **draining**, and **drying**.

1. **Cleaning -** involves a thorough process for decontaminating watercraft and water equipment with water over 140°F to kill any mussels and larva (veligers) that may have become attached.
2. **Draining -** requires all boats to thoroughly drain all water from cooling systems and bilge pumps. This step also suggests emptying all bait buckets and live wells.
3. **Drying -** is recommended for all equipment used in infested water for seven to ten days after being removed from the water.

To date, many attempts have been made to eradicate this species, including chemicals and manual cleaning, but nothing has had a substantial impact.

ADDITIONAL INFORMATION

For additional information on zebra mussels and preventative measures, please visit the following websites:

1. Texas Invasive
   http://texasinvasives.org/zebramussels/
2. TPWD Zebra Mussels
   https://tpwd.texas.gov/newsmedia/releases/news_roundup/zebra_mussels/
3. North Texas Municipal Water District
   https://www.ntmwd.com/invasives_zebra_mussels.html

CANADIAN AND RED RIVER BASINS WATER QUALITY OVERVIEW AND HIGHLIGHTS

CANADIAN RIVER BASIN WATER QUALITY OVERVIEW

Over the duration of the past year not much has changed in the Canadian River Basin. While much of the area remains in exceptional drought conditions, the Authority field staff have witnessed a subtle decline in dissolved solids concentrations over the past twelve months. However, overall conditions remain impacted by the prolonged drought and have crippled the Authority's efforts to expand monitoring in the basin. Until regular rainfall returns to the area, it is likely many of the water quality issues identified as impairments and/or concerns will be difficult to discern due to the limited amount of water available to assess.

RED RIVER BASIN WATER QUALITY OVERVIEW

Unlike several other parts of the state, much of the Red River Basin remained in severe to exceptional drought during much of 2014. Despite a reprieve from 100°C temperatures (24 days compared to 100 days during 2011) during the summer months, the lack of consistent rainfall continued to compound water quality issues throughout the basin.

As evident during the Authority's in-depth assessment of water quality in the *2014 Basin Summary Report*, several segments showed increasing concentrations of dissolved solids. Analyses for these analytes in the three drinking water reservoirs utilized by the City of Wichita Falls, including Lakes Kemp, Kickapoo and Arrowhead, show significant increases in dissolved solids concentrations. The Authority has continued to closely monitor these reservoirs during 2014 and data still shows these concentrations to be increasing.

In fact, the *2014 Draft IR* has four (4) new listings for dissolved solids within the Red River Basin (refer to **pages 14-15** for a complete listing of water quality impairments in the Red River Basin). Should the drought continue to persist, it is likely this number will increase even more during the *2016 IR*, as the assessment period will include even more data from the years the basin has been in severe to exceptional drought conditions.

DRAFT 2014 TEXAS IR OVERVIEW

Every two years the TCEQ assesses water bodies throughout the entire state using quality assured data over a seven year period. The *Draft 2014 IR* covers the time period from December 1, 2005 through November 30, 2012. Outcomes from this assessment result in three (3) potential classifications for every analyte:

1. **Meets/Supports** - sufficient water quality data was available to assess and yielded results supporting Texas Surface Water Quality Standards and/or results supporting water quality screening levels, or no concerns.
2. **Impairment** - sufficient water quality data was available to assess and yielded results which did not meet Texas Surface Water Quality Standards.
3. **Concern** - water quality data not meeting corresponding screening levels can result in one of two types of concerns:
   A. Concern for near non-attainment of the water quality Standard
   B. Concern for water quality based on screening levels

The *Draft 2014 IR* includes evaluations of twelve (12) water bodies in the Canadian River Basin, of which only five (5), or 41.7% are categorized as being impaired for one or more parameters. In the Red River Basin, sixty-one (61) water bodies were evaluated, of which only seventeen (17), or 27.9% are categorized as being impaired for one or more parameters. Additionally, the Canadian River Basin saw no segments removed from their impaired status, while the Red River Basin had three (3). However, both basins did receive new impaired listings, the Canadian added one (1), and the Red added five (5). As in years past, the predominant impairments for both the basins continues to be bacteria (*E. coli*) and dissolved solids (chloride, sulfate and Total Dissolved Solids). Of the eleven (11) impairments in the Canadian River Basin, seven (7), or 63.6% fall into one of these categories. In the Red River Basin, nineteen (19), or 82.6% of the twenty-three (23) impairments fell into one of the same categories.

Please note that the *2014 IR* is a draft and changes may occur before the report becomes final.

Canadian River Basin
Draft 2014 Integrated Report Summary Table

Water Body ID	Water Body Description	Impairments	Year First Listed
0101	Canadian River Below Lake Meredith	Bacteria (*E. coli)*	2012
0101A	Dixon Creek	Bacteria (*E. coli)*	2000
0101A	Dixon Creek	Depressed Dissolved Oxygen	2000
0101A	Dixon Creek	Selenium in Water	2010
0101B	Rock Creek	None	-
0101C	White Deer Creek	None	-
0102	Lake Meredith	Mercury in Edible Fish Tissue	2002
0102	Lake Meredith	Chloride	2006
0102	Lake Meredith	Sulfate	2006
0102	Lake Meredith	Total Dissolved Solids (TDS)	2006
0102A	Big Blue Creek	None	-
0103	Canadian River Above Lake Meredith	Chloride	2006
0103A	East Amarillo Creek	None	-
0103C	Unnamed Tributary to West Amarillo Creek	None	-
0105	Rita Blanca Lake	pH	2006
0105	Rita Blanca Lake	Chloride	2014
0199A	Palo Duro Reservoir	None	-
0104	Wolf Creek	None	-
0199B	Kiowa Creek	None	-

Red River Basin
Draft 2014 Integrated Report Summary Table

Water Body ID	Water Body Description	Impairments	Year First Listed
0201	Lower Red River	None	-
0201A	Mud Creek	Bacteria (*E. coli*)	2002
0201A	Mud Creek	Depressed Dissolved Oxygen	2006
0202	Red River Below Lake Texoma	None	-
0202A	Bois D' Arc Creek	None	Bacteria - Delisted 2014
0202C	Pecan Bayou	None	-
0202D	Pine Creek	None	-
0202E	Post Oak Creek	None	-
0202F	Choctaw Creek	Bacteria (*E. coli*)	2010
0202G	Smith Creek	Bacteria (*E. coli*)	2006
0202H	Big Pine Creek	None	-
0202I	Little Pine Creek	Depressed Dissolved Oxygen	2014
0202J	Sand Creek	None	-
0202K	Iron Ore Creek	Bacteria (*E. coli*)	2010
0202L	Honey Grove Creek	None	-
0202M	Lake Bonham	None	-
0203	Lake Texoma	None	-
0203A	Big Mineral Creek	None	-
0204	Red River Above Lake Texoma	None	-
0204B	Moss Lake	None	-
0205	Red River Below Pease River	None	Bacteria - Delisted 2014
0205A	Wildhorse Creek	None	-
0206	Red River Above Pease River	None	
0206B	South Groesbeck Creek	Bacteria (*E. coli*)	2006
0207	Lower Prairie Dog Town Fork Red River	Bacteria (*E. coli*)	2006
0207A	Buck Creek	None	-
0208	Lake Crook	None	-
0209	Pat Mayse Lake	None	-
0210	Farmers Creek Reservoir	None	-
0211	Little Wichita River	Sulfate	2010
0211	Little Wichita River	Total Dissolved Solids (TDS)	2010
0211	Little Wichita River	Depressed Dissolved Oxygen	1996
0211	Little Wichita River	Chloride	2012
0211A	East Fork Little Wichita River	None	-

Red River Basin
Draft 2014 Integrated Report Summary Table

Water Body ID	Water Body Description	Impairments	Year First Listed
0212	Lake Arrowhead	None	-
0212A	Little Wichita River Above Lake Arrowhead	None	-
0213	Lake Kickapoo	None	-
0214	Wichita River Below Diversion Lake Dam	Bacteria (*E. coli)*	2006
0214A	Beaver Creek	Bacteria (*E. coli)*	2006
0214B	Buffalo Creek	Bacteria (*E. coli)*	2010
0214C	Holliday Creek	None	-
0214D	Gordon Lake	None	-
0214E	Wichita Valley Irrigation Project	None	-
0214F	Unnamed Tributary of Buffalo Creek	None	-
0215	Diversion Lake	None	-
0216	Wichita River Below Lake Kemp	None	-
0217	Lake Kemp	None	-
0218	Wichita/North Fork Wichita River	None	-
0218A	Middle Fork Wichita River	None	-
0219	Lake Wichita	Chloride	2014
0219	Lake Wichita	Sulfate	2014
0219	Lake Wichita	Total Dissolved Solids (TDS)	2014
0219A	Holliday Creek Above Lake Wichita	None	-
0220	Upper Pease / North Fork Pease River	None	-
0221	Middle Fork Pease River	None	-
0222	Salt Fork Red River	Bacteria (*E. coli)*	2010
0222A	Lelia Lake Creek	None	-
0223	Greenbelt Lake	None	-
0224	North Fork Red River	None	-
0224A	McClellan Creek	Bacteria (*E. coli)*	2010
0226	South Fork Wichita River	None	-
0228	Mackenzie Reservoir	Total Dissolved Solids (TDS)	2014
0229	Upper Prairie Dog Town Fork Red River	pH	2006
0229A	Lake Tanglewood	None	-
0230	Pease River	None	-
0230A	Paradise Creek	Bacteria (*E. coli)*	2006
0299A	Sweetwater Creek	None	Bacteria - Delisted 2014

PUBLIC INVOLVEMENT AND STAKEHOLDER PARTICIPATION

The Authority is proud to participate in several programs, including Regional Water Planning (Area B), the Chloride Control Project, the Red River Valley Association, and so many more. Below are just a few ways you can become involved in water quality decisions that may affect you. Individuals interested in attending or participating in any of these committees and/or meetings can request more information by calling (940) 723-8697.

BASIN ADVISORY COMMITTEE

The Basin Advisory Committee (BAC), also known as the Steering Committee, is the driving force that assists in determining the water quality priorities of the CRP in the Canadian and Red River Basins. Representatives from the public, municipal, county, state and federal government, industry, business, agriculture, environmental, education, civic organizations, and others comprise the membership of the BAC. Annual meetings are held in Amarillo and Wichita Falls and are open, friendly, casual, and informative.

Wichita Falls Basin Advisory Committee Meeting

Educational Outreach

EDUCATION

An important program sponsored by the Authority is the distribution of the *Major Rivers* educational program to schools within both basins. *Major Rivers* is a water education curriculum designed by the Texas Water Development Board and the Lower Colorado River Authority and teaches students about Texas' major water resources. Since 1998, the Authority has provided this curriculum to over 10,000 students in the Canadian and Red River Basins.

Since 2010, Midwestern State University students enrolled in environmental science courses are invited to the Authority's Environmental Services Laboratory for a tour and to witness real-world application topics they had covered in both lecture and labs. This is a good opportunity to promote interest in the environmental sciences and to get the word out about the Clean Rivers Program.

COORDINATION AND COOPERATION WITH OTHER BASIN ENTITIES

The Authority coordinates collection and monitoring efforts with other basin entities by holding annual Coordinated Monitoring Meetings (CMM). Entities that have been included in these meetings

are the TCEQ, USGS, CRMWA, City of Sherman, TPWD, TSSWCB, the North Texas Municipal Water District, Oklahoma Department of Environmental Quality, and the U.S. Army Corps of Engineers. Goals of this meeting are to coordinate sites, parameters of concern, and data collection frequency. The CMM solicits input from all entities involved in monitoring in order to create monitoring schedules that reduce duplicative efforts, maximizing the funds available for the program.

Educational Outreach at Earth Day

WATERSHED ACTION PLANNING (WAP)

The Watershed Action Planning (WAP) process is a tool created by TCEQ to help coordinate, document and track progress on the State's water quality initiatives, specifically those water bodies with long standing 303(d) impairments. This tool was created with three objectives in mind:

1. Engage stakeholders more fully in determining strategies that restore water quality;
2. Improve access to state agencies' water quality management decisions and increase transparency of decision-making;
3. Improve accountability of state agencies' commitments to improve water quality.

The Authority has chosen to incorporate this process into its annual Coordinated Monitoring Meeting. The first attempt was made by the Authority at the 2012 CMM and was a great success. The Authority plans to continue hosting both the WAP and CMM as one meeting.

ENVIRONMENTAL SERVICES LABORATORY

The Authority's laboratory achieved official National Environmental Laboratory Accreditation Program (NELAP) accreditation in 2008. This insures that all samples tested comply with national standards of acceptance. NELAP quality assured data is used by the TCEQ in developing and revising water quality standards and evaluating whether those standards are met. Since the laboratory's initial NELAP accreditation, it has been audited by TCEQ in 2010, 2012 and is scheduled for another audit in 2015. The Authority's laboratory is currently accredited to perform analyses in both drinking and wastewater matrices, as well as solids.

The Authority's laboratory participated in the TCEQ's Extended Holding Time Study for *E. coli* bacteria in the spring and summer of 2009, as well as the most recent study, which took place during 2011 -2012. The aim of the bacteria project was to help regulators determine the effects of an extended holding time when making quantitative determinations of indicator bacteria like *E. coli*. Extended holding times are occasionally used during surface water quality monitoring events, since it is not always feasible to return samples to the laboratory for analysis and meet the required eight (8) hour holding time.

Results of this study helped get EPA's approval of a thirty (30) hour holding time for *E. coli* beginning in August 2014.

CONCLUSION

Both the Canadian and Red River Basins are currently facing persistent drought conditions, which have had a detrimental impact on water quality. Now more than ever, it is imperative that water quality monitoring continue to help readily identify problematic areas. Once identified, a cooperative approach to resolving these issues amongst basin entities will be essential to not only preserve, but enhance water quality throughout both basins.

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