Data Sources and Regional Sampling Issues

Green Country Stormwater Alliance
Tulsa Mohawk Education Auditorium
April 13, 2016
INCOG

Data Sources

- Municipalities (Water/Wastewater Plants, DMRs)
- Oklahoma Department of Environmental Quality (ODEQ)
- Oklahoma Water Resources Board (OWRB)
- Oklahoma Conservation Commission
- Oklahoma Corporation Commission
- Environmental Protection Agency (EPA) (Surf Your Watershed) (STORET)
- United States Geological Survey (USGS)
- Department of Agriculture, Food and Forestry
- MESONET and National Weather Service
- U.S. Army Corps of Engineers
- Universities
- Consultants

Municipalities

- Water and wastewater treatment plants do some testing and dischargers often have to file monthly Discharge Monitoring Reports (DMR). Examples: TSS, pH, BOD_5, whole effluent toxicity testing, metals, Cl_2, flow, bacteria.
- Special studies may have been performed on source or receiving waters for permitting needs. Example: Land application projects may have data for TCLP, organics, metals, PCBs, bacteria, etc. Drinking water sources have been studied.
- Sanitary sewer or industrial bypass reports.

ODEQ

- The 1972 amendments to the Clean Water Act include Section 303(d). The regulations implementing Section 303(d) require states to develop lists of water bodies that do not meet water quality standards and to submit updated lists to the EPA every two years.
- For waterbodies on the 303(d) list, the Clean Water Act requires that a pollutant load reduction plan or Total Maximum Daily Load (TMDL) be developed to correct each impairment.
- This responsibility belongs to ODEQ.

ODEQ

Integrated Water Quality Assessment (Integrated Report) is required every two years under the 1972 amendments to the Clean Water Act.

- ✓ Waterbody identification numbers (ex: OK120410010080_10 Arkansas River)
- ✓ Beneficial uses for each waterbody
- ✓ 303(d) impairments
- ✓ Total Maximum Daily Load (TMDL) status

ODEQ

5 categories used to define a waterbody

Category 1 – Attaining the water quality standard and no use is threatened.

Category 2 – Attaining some of the designated uses; no use is threatened; and insufficient or no data and information is available to determine if the remaining uses are attained or threatened.

Category 3 – Insufficient or no data and information to determine if any designated use is attained.

ODEQ

5 categories used to define a waterbody

Category 4 – Impaired or threatened for one of more designated uses but does not require the development of a TMDL.

4a – TMDL has been completed.

4b – Other pollution control requirements are reasonably expected to result in the attainment of the water quality standard in the near future.

4c – Impairment is not caused by a pollutant.

ODEQ

5 categories used to define a waterbody

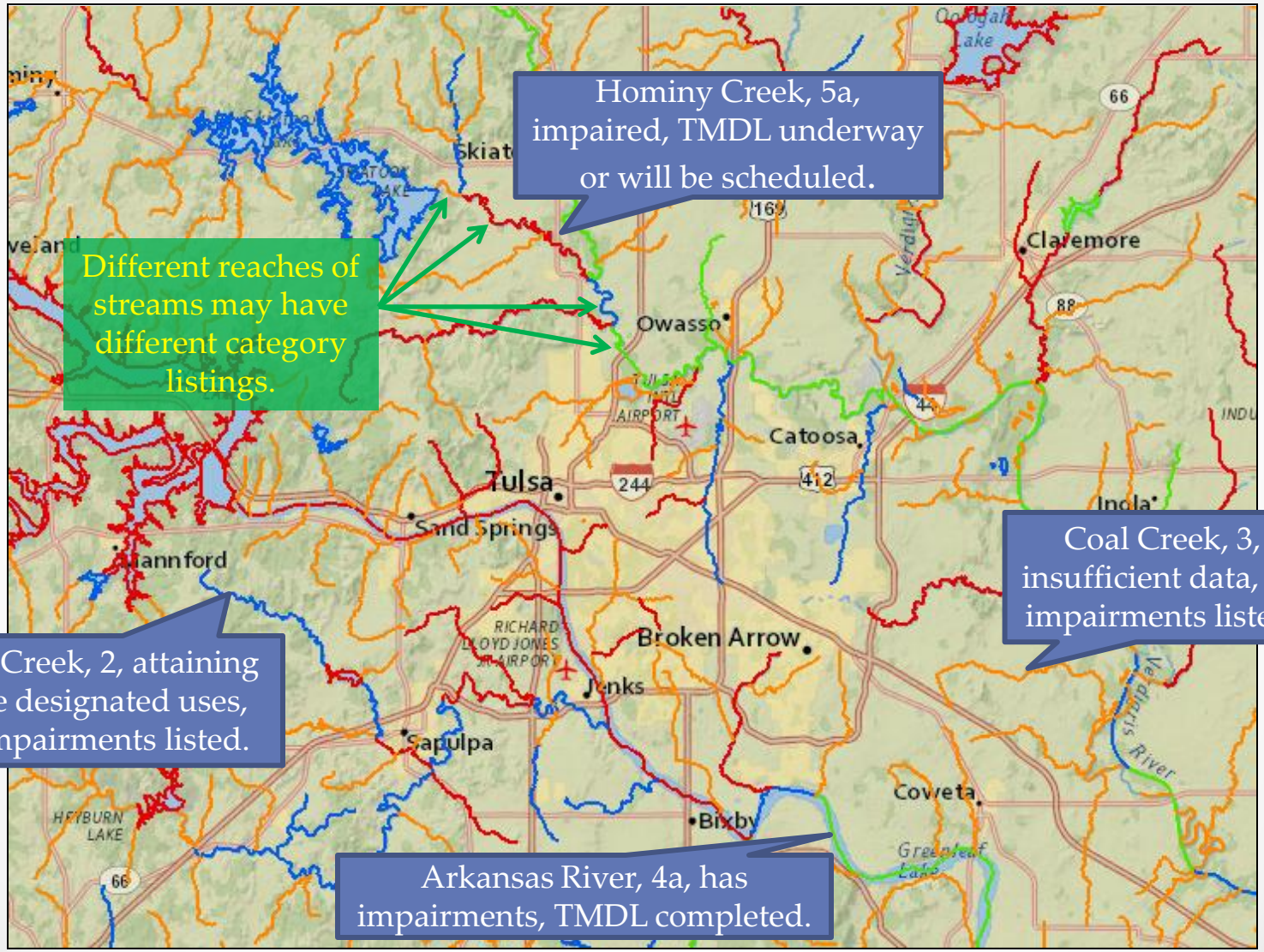
Category 5 – The water quality standard is not attained. The waterbody is impaired or threatened for one or more designated uses by a pollutant(s), and requires a TMDL.

5a – TMDL is underway or will be scheduled.

5b – A review of the water quality standards will be conducted before a TMDL is scheduled.

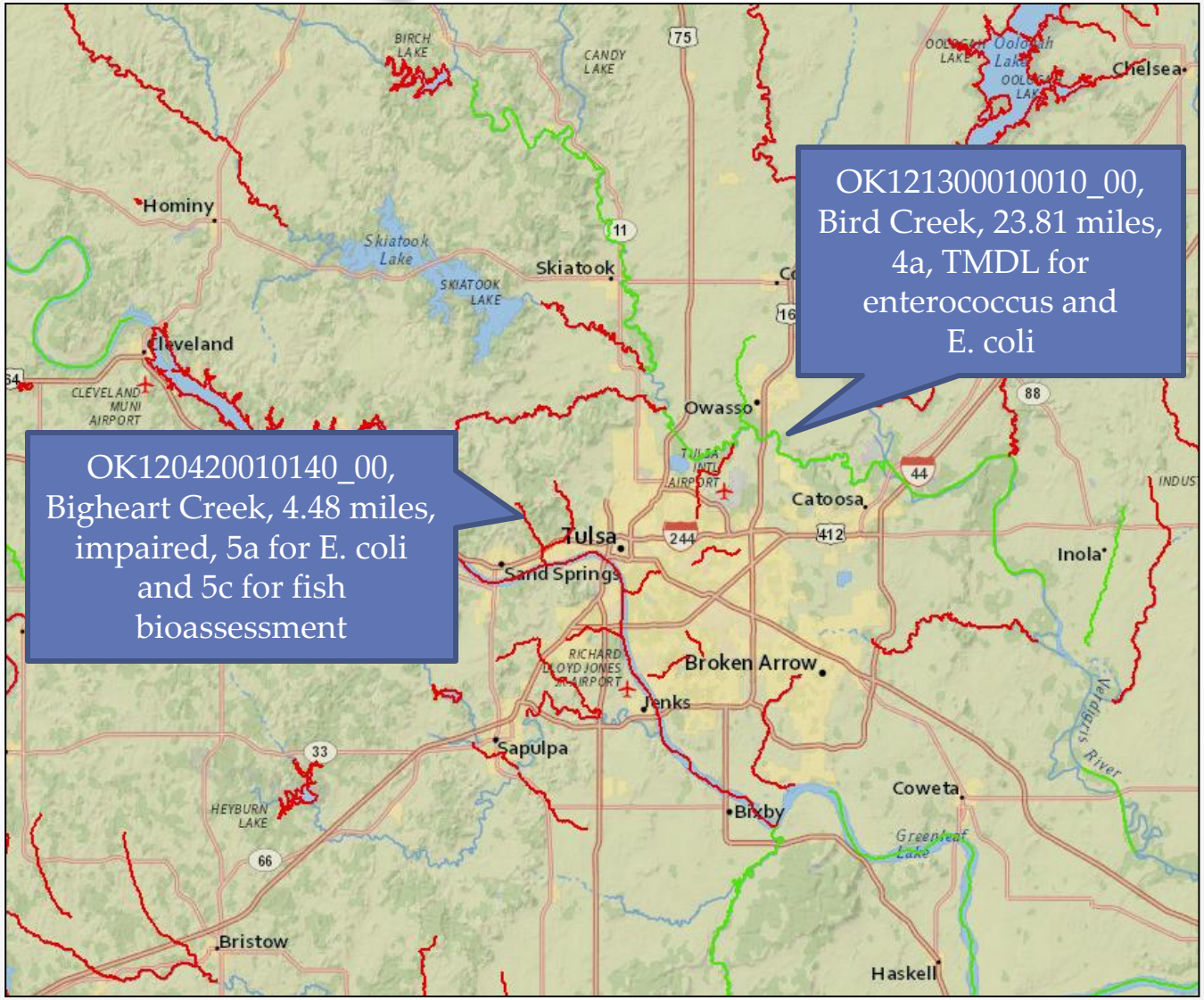
5c – Additional data and information will be collected before a TMDL or review of the water quality standards is scheduled.

ODEQ Data Viewer



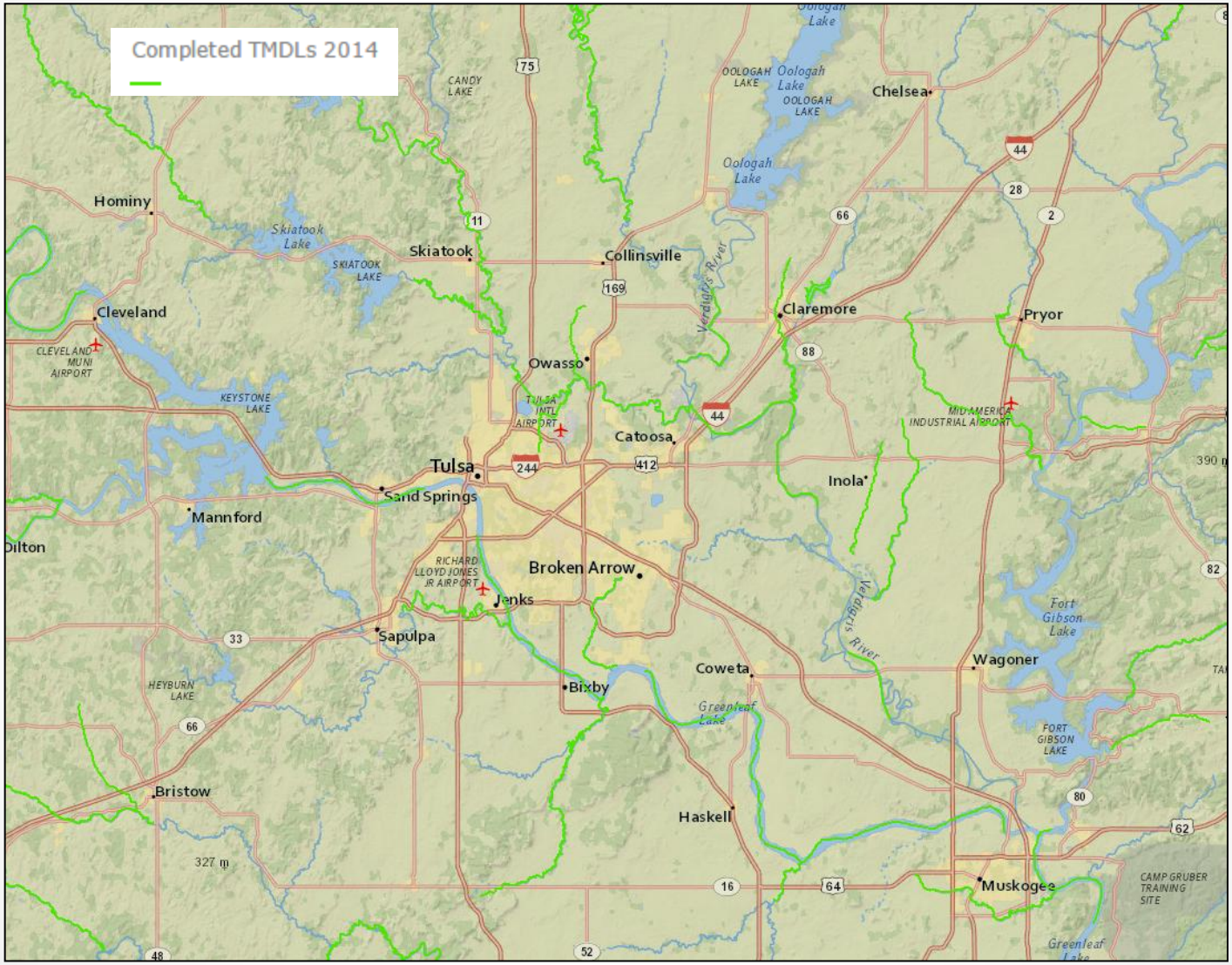
All IR Waterbodies

ODEQ Data Viewer



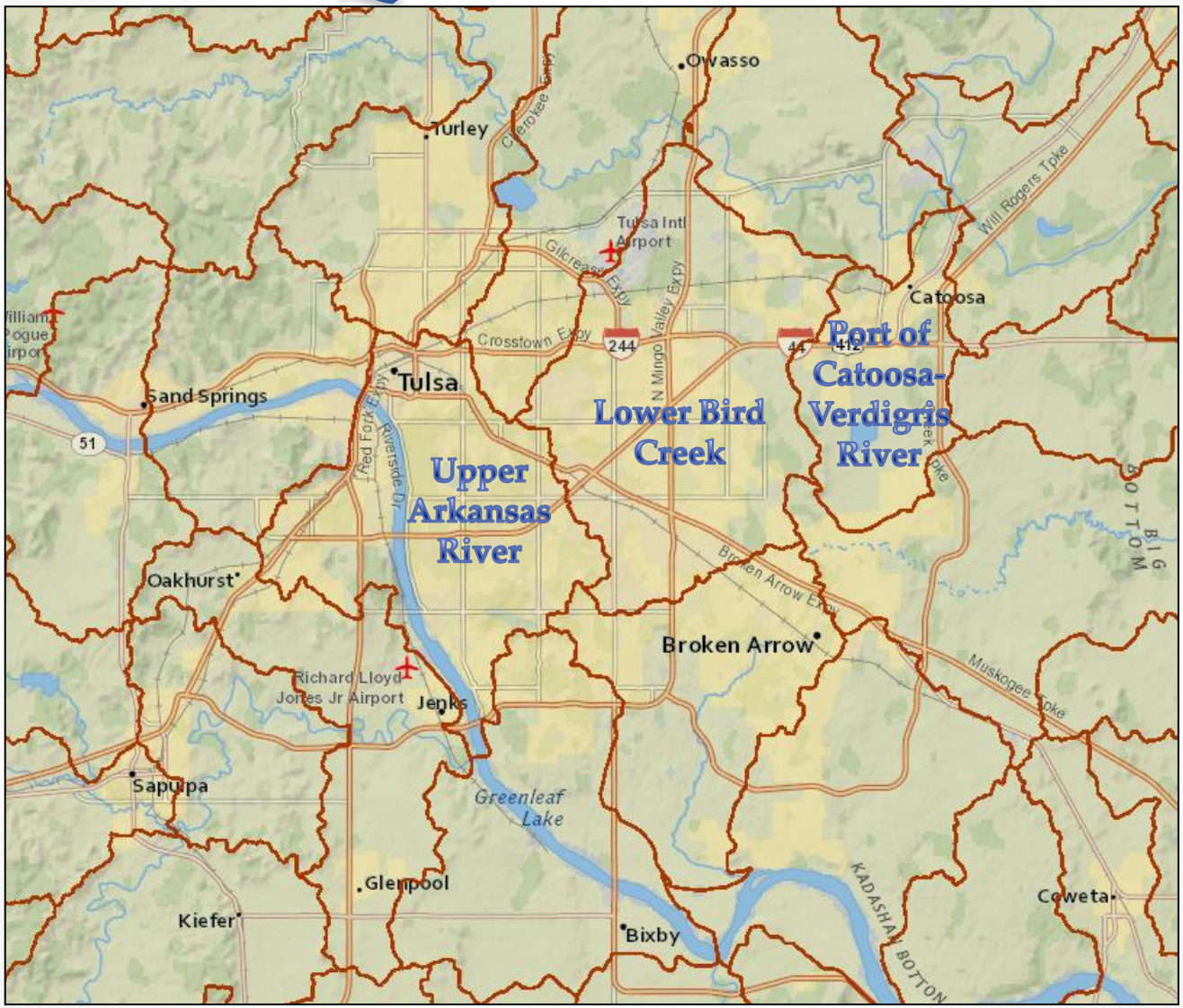
4a (TMDL) and 5 (Impaired) Waterbodies

ODEQ Data Viewer



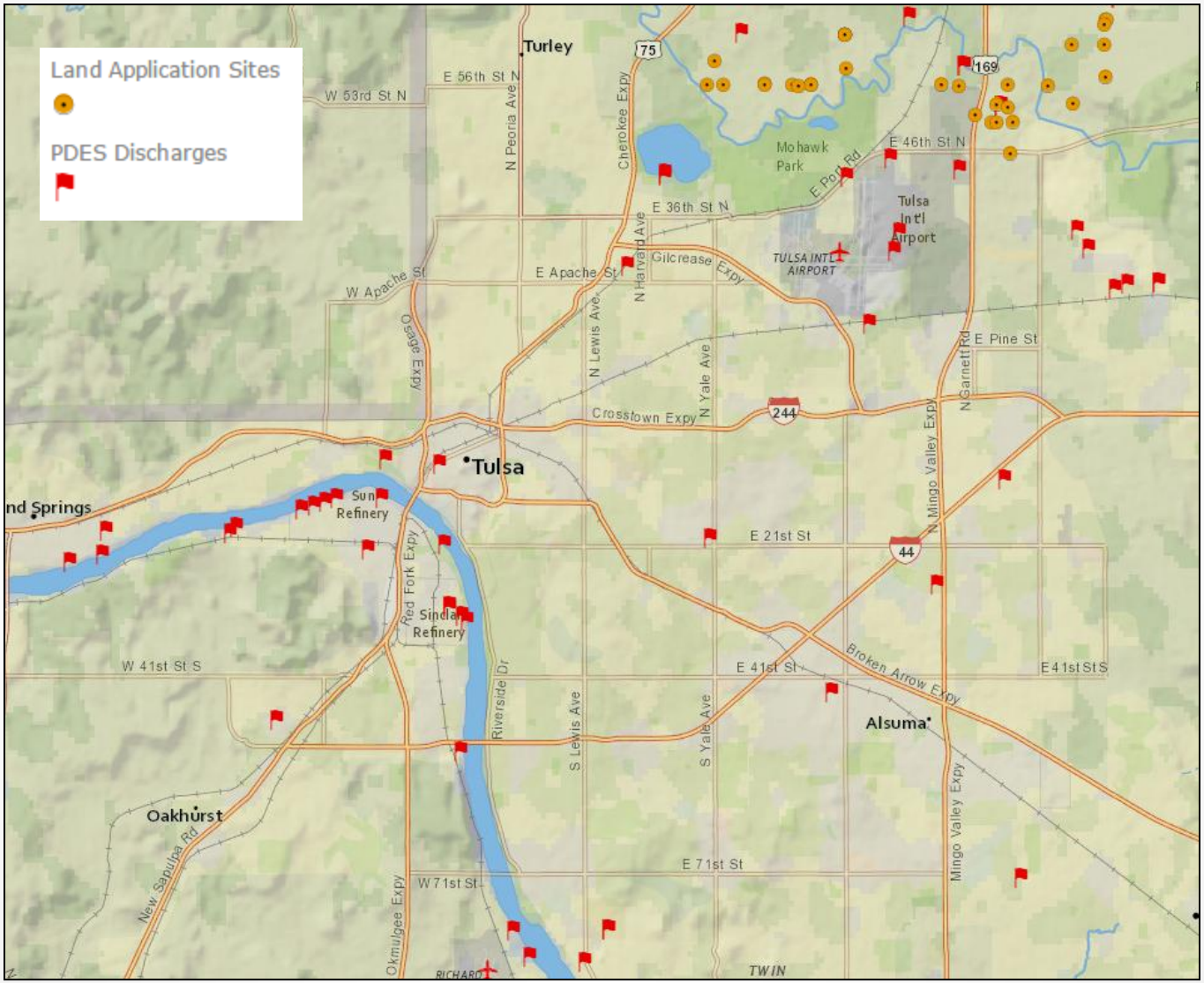
Completed TMDL Waterbodies, 2014

ODEQ Data Viewer



Watersheds

ODEQ Data Viewer



Land Application and PDES Discharge Sites

OWRB

Oklahoma Water Resources Board is responsible for Title 785, Chapter 45, Oklahoma's Water Quality Standards and Chapter 46, Implementation of Oklahoma's Water Quality Standards.

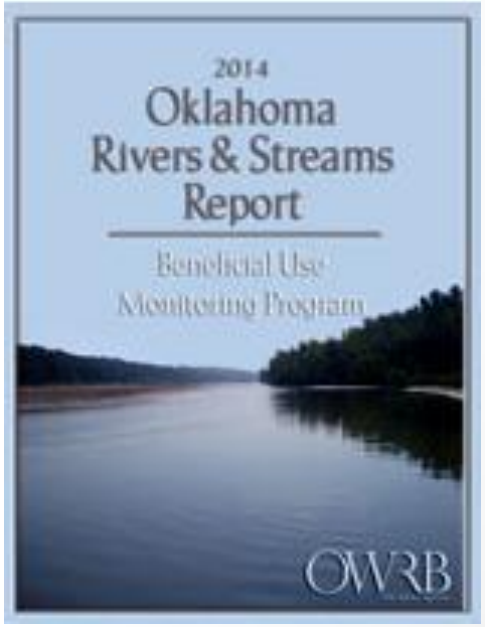
"Under this statute the Oklahoma Water Resources Board is authorized to promulgate rules which establish classifications of uses of water of the state, criteria to maintain and protect such classifications, and other standards or policies pertaining to the quality of such waters [82:1085.30(A)]."

OWRB BUMP Program

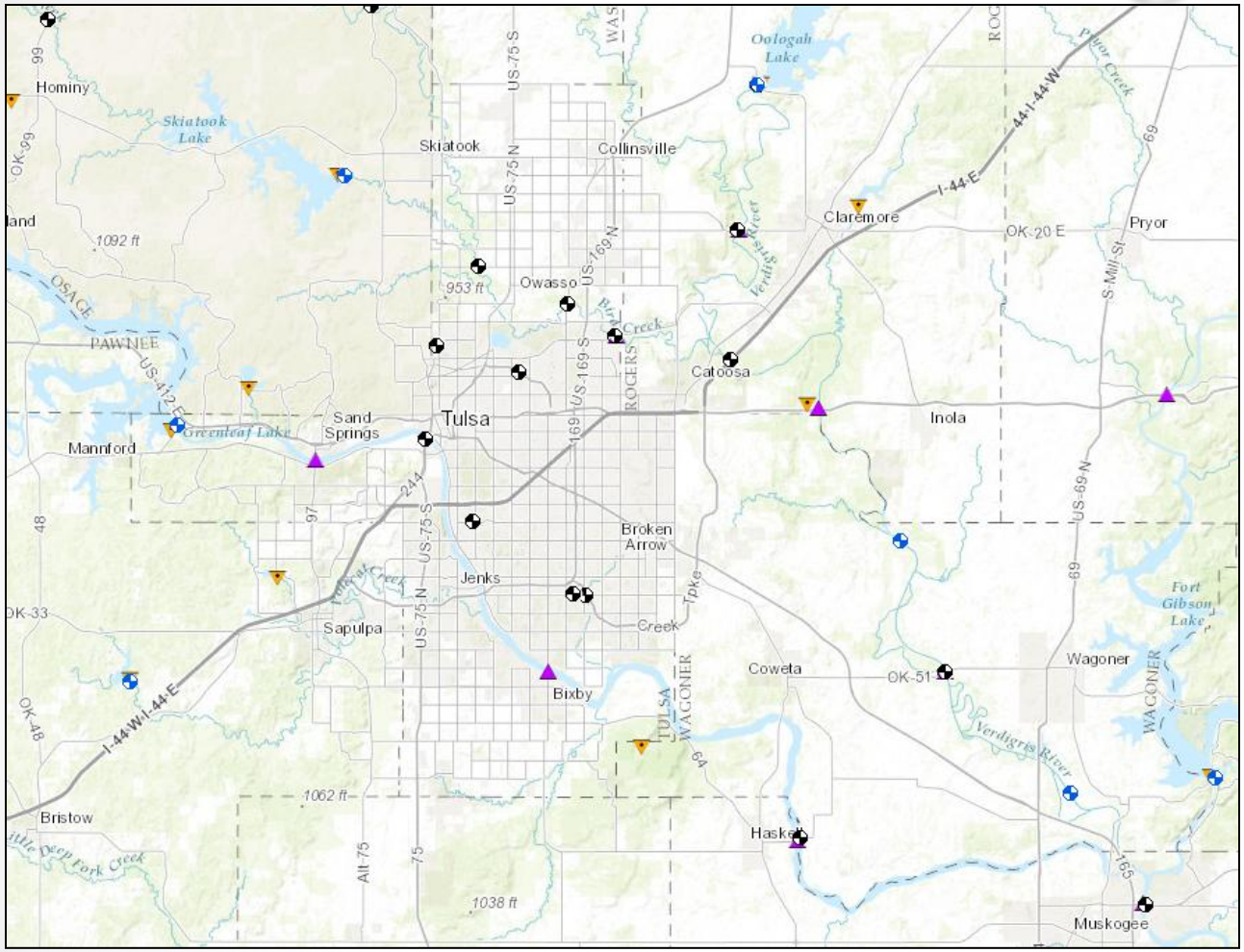
More than 100 rivers and streams are monitored through the Beneficial Use Monitoring Program (BUMP) every year.

A few of the rivers on this list are:

- Arkansas River
- Bird Creek
- Deep Fork River
- Illinois River
- Verdigris River



OWRB Monitoring Sites



OWRB BUMP data for Bird Creek at Port of Catoosa

Water Temperature
Turbidity
pH
Dissolved Oxygen
Hardness
Total Dissolved Solids
Specific Conductivity
Chloride
Sulfate
Total Phosphorus
Total Nitrogen
Nitrate/Nitrite
Chlorophyll A
Enterococcus
E. coli

Bird Creek at Port of Catoosa

Sample Record	Times Visited	Station ID
November 1998 - Current	151	121300010010-001AT

Stream Data

County	Tulsa	View Site Data
Location	Northwest of the Town of Catoosa on State Highway 266	
Latitude/Longitude	36.22311412, -95.81921244	
Planning Watershed	Middle Arkansas (8-digit HUC - 11070107)	

Parameters

	Parameter (Descriptions)	n	Mean	Median	Min./Max	p25/p75	Comments
In-Situ	Water Temperature (°C)	130	17.6	17.4	2.8/31	10.6/24.5	
	Turbidity (NTU)	130	81	32	6/1000	21/74	
	pH (units)	130	7.58	7.59	6.88/9.12	7.38/7.75	
	Dissolved Oxygen (mg/L)	129	8.21	7.62	3.17/19.26	6.4/9.68	
	Hardness (mg/L)	130	133	128	58/294	108/158	
Minerals	Total Dissolved Solids (mg/L)	55	232	235	64/358	184/275	
	Specific Conductivity (uS/cm)	129	404	400	26/1570	316/477	
	Chloride (mg/L)	120	41	38	<5/219	28/49	
	Sulfate (mg/L)	120	44	38	19/293	29/46	
Nutrients	Total Phosphorus (mg/L)	133	0.393	0.370	<0.05/0.953	0.25/0.495	
	Total Nitrogen (mg/L)	134	2.97	2.79	0.82/8.16	1.99/3.91	
	Nitrate/Nitrite (mg/L)	135	1.97	1.83	0.16/6.9	0.81/2.93	
	Chlorophyll A (mg/m^3)	68	7.7	5.6	1.7/86.4	3.7/8.1	TSI=50.6
Bacteria	Enterococcus (cfu/100ml)(*-Geo. Mn.)	28	4285.8	127.8	<10/73000	30/757	Mean> OWQS
	E. Coli (cfu/100ml)(*-Geo. Mn.)	28	903.7	76.0	<10/17329	41.4/420.8	Mean> OWQS

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	Sulfates	Nitrates	Chlorides	Total Dissolved Solids	Bacteria	Bio. Fish	Bio. BMI	Sediment
Fish & Wildlife Propagation	S	S	S	S						S	S	S
Aesthetics												S
Agriculture					S		S	S				
Primary Body Contact Recreation									NS			
Public & Private Water Supply				S		S			S			
Fish Consumption				S								

S = Fully Supporting
NS = Not Supporting
NEI = Not Enough Information

Notes

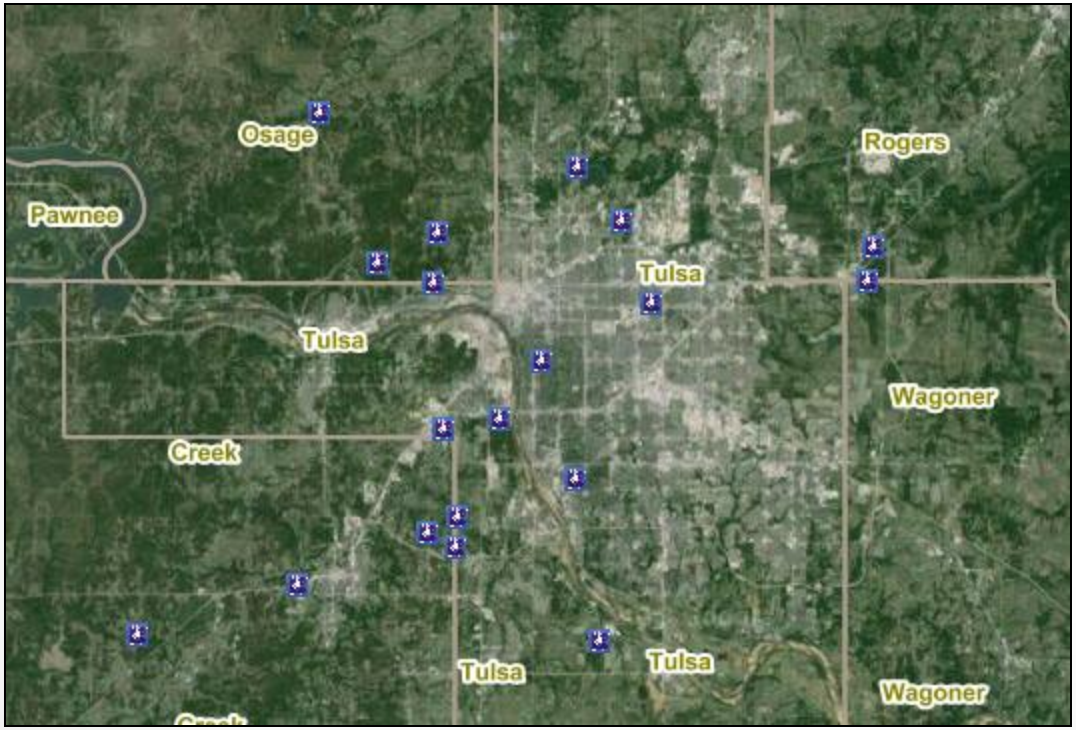
Sampling and Assessment by the **Oklahoma Water Resources Board** – 3800 Classen Blvd, Oklahoma City, OK, 73118 – 405.530.8800 – http://www.owrb.ok.gov

Oklahoma Conservation Commission

- The Oklahoma Conservation Commission's Water Quality Division is responsible for identifying waters impaired by nonpoint source pollution.
- Once problems are identified, they work to prioritize and implement projects to reduce the pollutants and improve water quality.
- The data they collect is stored in the national water quality STORET database found at www.epa.gov.

Oklahoma Conservation Commission

Blue Thumb volunteers monitor around 100 streams in Oklahoma for benthic macroinvertebrates, fish, chemical constituents and do physical assessments of stream conditions.



Blue Thumb sites around the Tulsa area.

Oklahoma Conservation Commission

Statewide Rotating Basin Monitoring Program (RBMP)

- The Water Quality Division monitors small feeder streams on a rotational basis for chemical, physical and biological parameters.
- 250 priority streams in five watershed basins are monitored for two years. Using this rotation, all basins and 250 streams are monitored every five years.

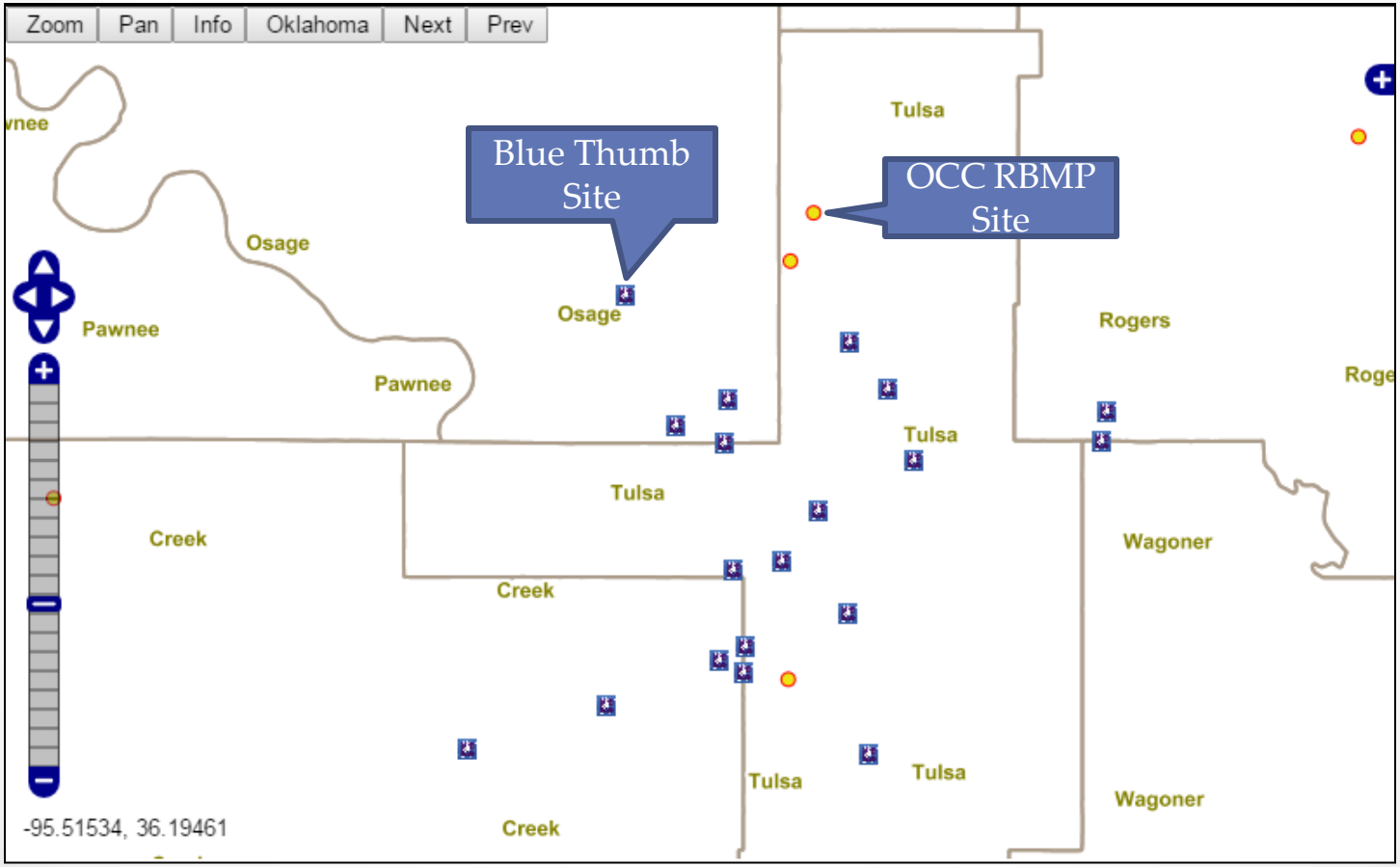
Oklahoma Conservation Commission

Group 1		Group 2		Group 3		Group 4		Group 5	
Upper Canadian Neosho-Grand		Upper North Canadian Upper Arkansas Cimarron		Lower North Canadian Lower Canadian Lower Arkansas		Washita Upper Red		Lower Red	
Streams List		Streams List		Streams List		Streams List		Streams List	
2001-2002	Report	2002-2003	Report	2003-2004	Report	2004-2005	Report	2005-2006	Report
2006-2007	Report	2007-2008	Report	2008-2009	Report	2009-2010	Report	2010-2011	Report
2011-2012	Report	2012-2013	Report	2013-2014	*Underway*	2014-2015	*Underway*	2015-2016	

Rotating Basin Monitoring Program

Oklahoma Conservation Commission

Oklahoma's Interactive Stream Health Map



RBMP is Rotating Basin Monitoring Program

Oklahoma Corporation Commission

The Corporation Commission regulates public utilities, except those under municipal or federal jurisdiction or exempt from regulation; oil and gas drilling, production and environmental protection; the safety aspects of motor carrier, rail and pipeline transportation and the environmental integrity of petroleum storage tank systems.

This agency keeps records concerning:

- Oil and gas drilling and well location information
- Petroleum storage tank information
- Petroleum pipeline information

Environmental Protection Agency (EPA)

Surf Your Watershed

Example: I entered Tulsa and received:

Drainage Basin/HUC: 11110101 – Polecat-Snake

(Data provided by STORET)

Organization Id	Organization Name	Start Date	End Date	Station Count	Characteristic Group Type Counts	Result Count	Results
OKCONCOM_WQX	Oklahoma Conservation Commission	10-JUN-2002	23-JUN-2014	11	Biological(253) Biological, Macroinvertebrates(35) Nutrient(568) Other(220) Physical(1354)	2430	Get Results
OKCORCOM	Oklahoma Corporation Commission	09-FEB-1998	13-SEP-2005	31	Metal(127) Nutrient(23) Other(163) Pesticide(12) Physical(135)	460	Get Results
OKDEQ	Oklahoma Dept. of Environmental Quality	23-JUN-1997	14-OCT-2005	1	Biological(10) Biological, Macroinvertebrates(4) Metal(14) PCB(6) Pesticide(42) Physical(28)	104	Get Results
				43		**2994**	

EPA

Polecat-Snake Watershed -- 11110101

Polecat-Snake

Watershed Profile

Watershed Name: Polecat-Snake
USGS Cataloging Unit: 11110101
OK 1st Congressional District
OK 2nd Congressional District
OK 3rd Congressional District

Citizen-based Groups at work in this watershed (Provided by Adopt your Watershed)

Water quality monitoring data from this watershed (Provided by STORET)

Environmental Websites Involving this Watershed

Assessments of Watershed Health

- Impaired Water for this watershed
- *Assessed Waters by Watershed*
  - Oklahoma

Information provided by the United States Geological Survey (USGS) EXIT Disclaimer

- Stream Flow (Source: USGS)
- Science in Your Watershed
- Water use data (1985-2000): Information about the amount of water used and how it is used.
- Selected USGS Abstracts

Places Involving this Watershed

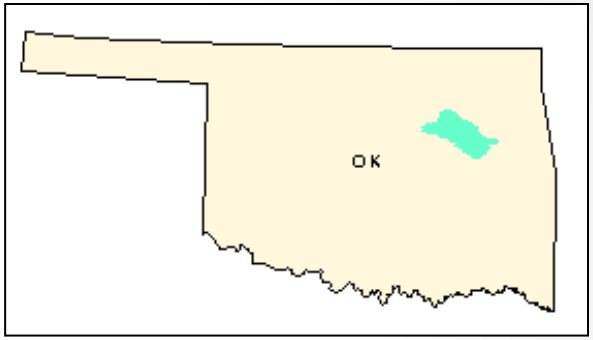
Counties:
- Creek
- Muskogee
- Okmulgee
- Osage
- Tulsa
- Wagoner

National Estuary Programs:
- None

States:
- Oklahoma

Other Watersheds Upstream:
- Black Bear-Red Rock
- Lower Verdigris

Other Watersheds Downstream:
- Dirty-Greenleaf



EPA

Select “Impaired Water for this Watershed”

NOTE: Click on the underlined "Waterbody Name" to view a Waterbody report.

Waterbody Name	Waterbody ID	Location	Waterbody Type	Size	Units	State TMDL Development Status
Arkansas River	OK120420010130_00	Sh 19, Sand Springs.	River	12.65	miles	TMDL needed
Arkansas River	OK120420010010_00	Us 64, Bixby	River	16.74	miles	TMDL needed
Arkansas River	OK120420010130_00	Sh 19, Sand Springs.	River	12.65	miles	TMDL needed
Arkansas River	OK120420010010_10	Us 64, Bixby	River	7.32	miles	TMDL needed
Arkansas River	OK120420010010_00	Us 64, Bixby	River	16.74	miles	TMDL needed
Arkansas River	OK120420010010_10	Us 64, Bixby	River	7.32	miles	TMDL needed
Bigheart Creek	OK120420010140_00	Huc: 11110101 Formerly Blackboy Creek	River	4.48	miles	TMDL needed
Bigheart Creek	OK120420010140_00	Huc: 11110101 Formerly Blackboy Creek	River	4.48	miles	TMDL needed
Childres Creek	OK120420020160_00	Huc: 11110101	River	7.18	miles	TMDL needed
Childres Creek	OK120420020160_00	Huc: 11110101	River	7.18	miles	TMDL needed
Cloud Creek	OK120410010100_00	From The Confl. With The Arkansas River Upstream To The Confl. With Cane Creek. S22t15nr16e	River	4.77	miles	TMDL needed
Cloud Creek	OK120410010100_00	From The Confl. With The Arkansas River Upstream To The Confl. With Cane Creek. S22t15nr16e	River	4.77	miles	TMDL needed
Crow Creek	OK120420010090_00	Huc: 11110101	River	2.99	miles	TMDL needed
Crow Creek	OK120420010090_00	Huc: 11110101	River	2.99	miles	TMDL needed
Fred Creek	OK120420010060_00	Huc: 11110101	River	2.87	miles	TMDL needed
Fred Creek	OK120420010060_00	Huc: 11110101	River	2.87	miles	TMDL needed
Haikey Creek	OK120410010210_00	Huc: 11110101	River	10.9	miles	TMDL needed
Haikey Creek	OK120410010210_00	Huc: 11110101	River	10.9	miles	TMDL needed
Harlow Creek	OK120420010170_00	Huc: 11110101	River	5.69	miles	TMDL needed
Harlow Creek	OK120420010170_00	Huc: 11110101	River	5.69	miles	TMDL needed
Heyburn Lake	OK120420020300_00	Huc: 11110101	Freshwater Lake	880	acres	TMDL needed
Heyburn Lake	OK120420020300_00	Huc: 11110101	Freshwater Lake	880	acres	TMDL needed
Little Joe Creek, Unnamed Trib Of	OK120420010340_00	Tulsa - Lafortune Park	River	2.19	miles	TMDL needed
Mooser Creek	OK120420010070_00	Huc: 11110101	River	3.79	miles	TMDL needed
Mooser Creek	OK120420010070_00	Huc: 11110101	River	3.79	miles	TMDL needed
Nickel Creek	OK120420020040_00	Huc: 11110101	River	12.29	miles	TMDL needed
Nickel Creek	OK120420020040_00	Huc: 11110101	River	12.29	miles	TMDL needed
Polecat Creek	OK120420020050_00	Huc: 11110101	River	7.682	miles	TMDL needed
Polecat Creek	OK120420020050_00	Huc: 11110101	River	7.682	miles	TMDL needed
Rock Creek	OK120420020060_00	Huc: 11110101	River	4.05	miles	TMDL needed
Sahoma Lake	OK120420020130_00	Huc: 11110101	Freshwater Lake	312	acres	TMDL needed
Sahoma Lake	OK120420020130_00	Huc: 11110101	Freshwater Lake	312	acres	TMDL needed

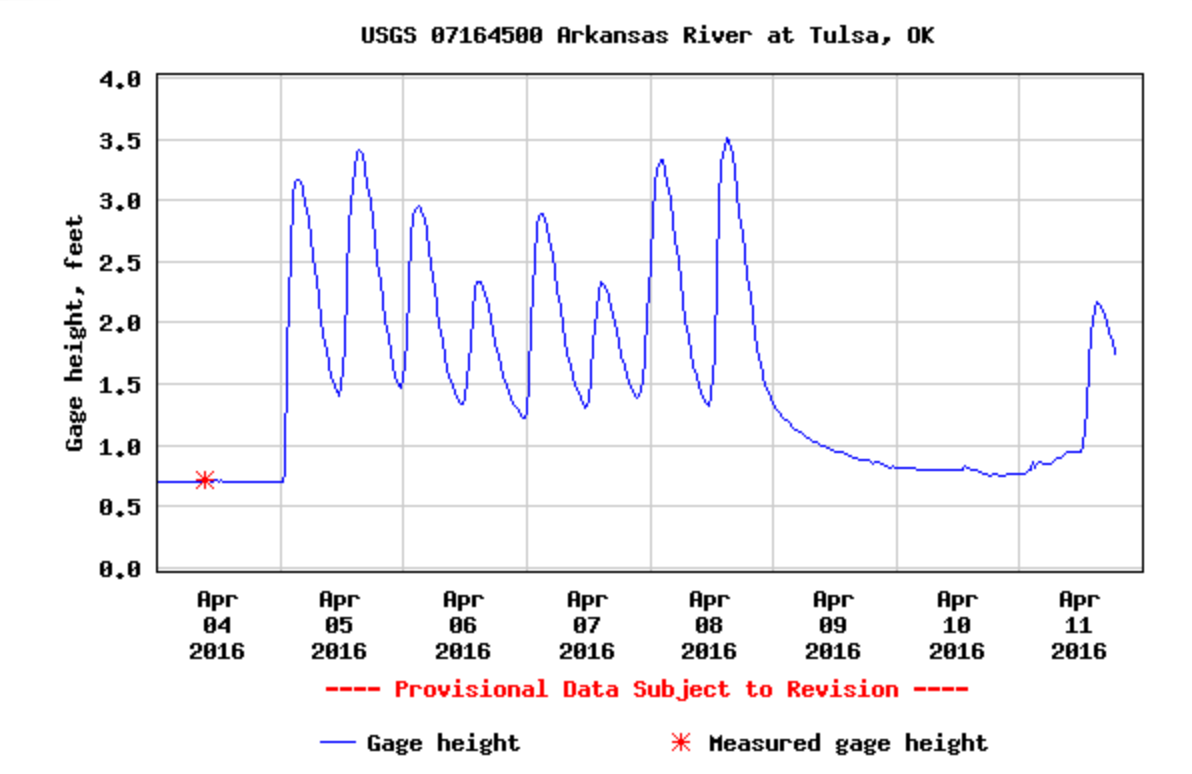
EPA

- STORET refers overall to “STORage and RETrieval”, an electronic data system for water quality monitoring data developed by EPA.
- The STORET Data Warehouse is refreshed with new data submitted weekly.
- To make your search easier, know you waterbody ID and HUC (USGS watershed designation).

- HUC is a hydrologic unit code with HUC 6 or 8 being larger watersheds and HUC 12 being a more local sub-watershed.

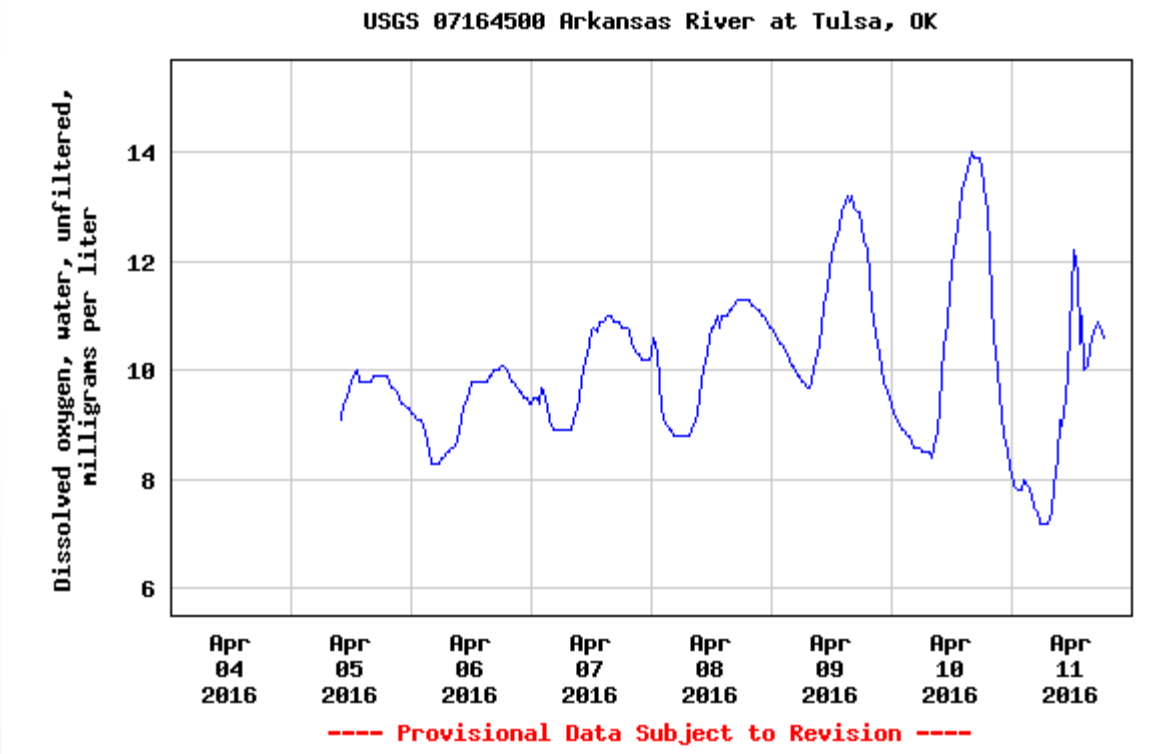
U.S. Geological Survey

Real-time streamflow data



U.S. Geological Survey

Real-time analytical data



Oklahoma Department of Agriculture, Food and Forestry (ODAFF)

Under the heading of Water Quality & Pesticides

Publications

- Protecting Groundwater From Pesticides
- Pesticide Management Plan(Coming Soon)
- Statewide Groundwater Monitoring Report
- High Plains Monitoring Report
- Pesticide Leachability Chart
- Oklahoma Pesticide Concerns List

Laws and Rules

- Clean Water Act
- Oklahoma Combined Pesticide Law and Rule

Web Links

Federal

- Environmental Protection Agency
- EPA-National Water Assessment Database
- EPA-Region 6
- EPA-Office of Water
- EPA-Pesticides Information
- EPA-Pesticide Fate Database
- EPA-Maximum Contaminate Levels
- United States Department of Agriculture-Water Quality
- United States Geological Service-NAWQA Pesticide National Synthesis Project

State

- Oklahoma Department of Environmental Quality-Water Division
- Oklahoma Water Resources Board
- Oklahoma Conservation Commission Water Quality

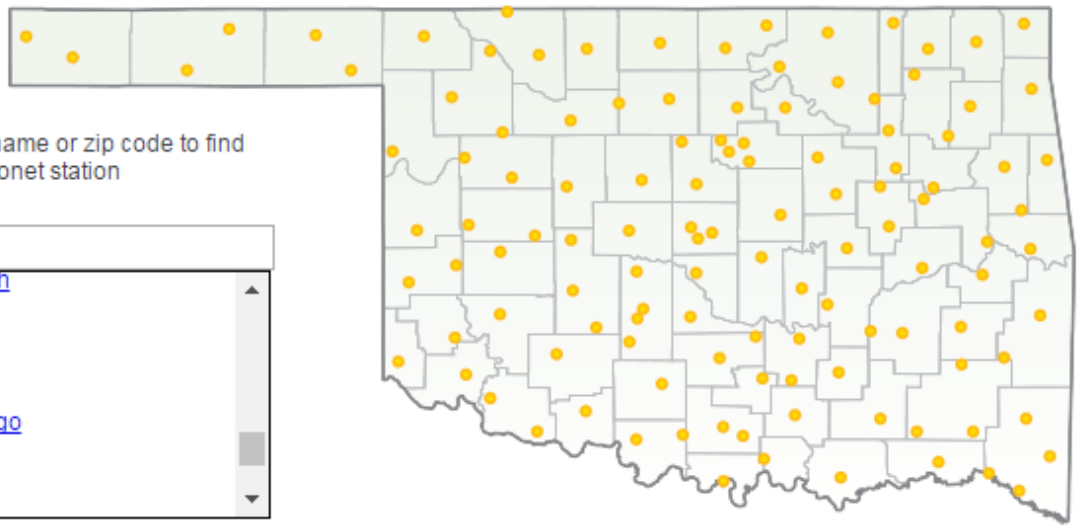
Mesonet

Mesonet is a good source for local weather. Click on the Weather and/or Agriculture Tab.

- Local Weather
- Radar
- Air Temperature
- Rainfall
- Wind
- Dewpoint & Humidity
- Pressure
- Solar Radiation & Satellite
- Soil Temperature
- Soil Moisture
- Ground Water
- Station Plots
- Station Meteograms
- Past Data & Files
- Advisories
- Upper Air

Type in city name or zip code to find nearest Mesonet station

Tahlequah
Talala
Talihina
Tipton
Tishomingo
Tulsa
Valliant



National Weather Service

PRELIMINARY LOCAL CLIMATOLOGICAL DATA (WS FORM: F-6)

STATION: TULSA OKLAHOMA
MONTH: MARCH
YEAR: 2016
LATITUDE: 36 12 N
LONGITUDE: 95 54 W

TEMPERATURE IN F:							:PCPN:	SNOW:		WIND			:SUNSHINE:		SKY		:PK WND	
1	2	3	4	5	6A	6B	7	8	9	10	11	12	13	14	15	16	17	18
									12Z	AVG	MX	2MIN						
DY	MAX	MIN	AVG	DEP	HDD	CDD	WTR	SNW	DPTH	SPD	SPD	DIR	MIN	PSBL	S-S	WX	SPD	DR
1	61	41	51	5	14	0	0.35	0.0	0	10.5	30	150	M	M	3	138	43	150
2	66	36	51	4	14	0	0.00	0.0	0	12.5	31	170	M	M	5		42	180
3	66	42	54	7	11	0	0.00	0.0	0	10.9	33	340	M	M	3		41	340
4	72	34	53	5	12	0	0.00	0.0	0	8.0	20	170	M	M	6		25	180
5	75	40	58	10	7	0	0.00	0.0	0	6.0	14	50	M	M	3		18	60
6	77	47	62	14	3	0	0.00	0.0	0	16.9	35	170	M	M	8		43	190
7	69	59	64	16	1	0	0.33	0.0	0	22.2	40	170	M	M	10	13	55	170
8	63	54	59	10	6	0	1.04	0.0	0	10.4	35	120	M	M	8	13	45	140
9	63	51	57	8	8	0	0.10	0.0	0	4.8	13	360	M	M	10	12	17	20
10	66	53	60	11	5	0	0.00	0.0	0	10.6	21	40	M	M	8		26	360
11	65	45	55	5	10	0	0.13	0.0	0	7.7	15	90	M	M	9	1	19	80
12	67	53	60	10	5	0	T	0.0	0	5.2	10	90	M	M	8	1	13	170
13	71	52	62	12	3	0	0.09	0.0	0	6.8	16	350	M	M	8	138	20	130
14	81	46	64	13	1	0	0.00	0.0	0	8.4	22	150	M	M	2	12	27	170
15	76	50	63	12	2	0	0.00	0.0	0	13.4	31	320	M	M	3		40	320
16	67	42	55	4	10	0	0.00	0.0	0	3.3	13	320	M	M	4		15	320
17	72	42	57	5	8	0	0.00	0.0	0	4.2	13	10	M	M	5	8	18	20
18	57	41	49	-3	16	0	T	0.0	0	13.1	28	10	M	M	8		38	10
19	58	31	45	-7	20	0	0.00	0.0	0	11.2	26	330	M	M	2		35	340
20	53	32	43	-9	22	0	0.00	0.0	0	9.3	22	350	M	M	1		30	340
21	67	35	51	-2	14	0	0.00	0.0	0	15.9	28	190	M	M	2		37	180
22	75	51	63	10	2	0	0.00	0.0	0	21.9	36	170	M	M	8		44	170
23	82	54	68	15	0	3	0.00	0.0	0	23.9	37	190	M	M	5	8	45	190
24	61	41	51	-3	14	0	0.00	0.0	0	14.9	26	270	M	M	5		34	270
25	65	34	50	-4	15	0	0.00	0.0	0	7.0	20	140	M	M	4		25	140
26	74	47	61	7	4	0	T	0.0	0	10.3	22	350	M	M	6		28	160
27	60	40	50	-5	15	0	0.06	0.0	0	10.1	24	330	M	M	6	13	29	340
28	69	31	50	-5	15	0	0.00	0.0	0	6.6	17	140	M	M	2		20	130
29	74	44	59	4	6	0	0.00	0.0	0	15.3	26	150	M	M	7		35	140
30	77	64	71	15	0	6	0.76	0.0	0	13.0	32	160	M	M	8	13X	44	160
31	70	51	61	5	4	0	0.00	0.0	0	12.2	25	300	M	M	3		31	300
SM	2119	1383			267	9	2.86	0.0		346.5			M		170			
AV	68.4	44.6								11.2	FASTST		M	M	5		MAX(MPH)	
									MISC ---->	#	40	170				#	55	170

Tulsa District U.S. Army Corps of Engineers

- Daily Report of Reservoir Conditions
- Lake Information Recording (text-only)
- Real-time Gage Data for Reservoirs and Stream Gages
- Real-time Gage Data for All Stations
- Real-time Hydropower Data for Power Projects
- Southwestern Power Administration Hydropower Release Schedule
- Calculated Evaporation at Tulsa District Lakes
- Historical Power Generation
- Station Quality Assurance and Maintenance

Tulsa District U.S. Army Corps of Engineers

SHEF ID: SPEO2 Bird Creek, Sperry, OK
STATION TYPE: STREAM GAGE
Regulation Limits: Stage = 21.00, Flow = 10997

(Cen)	PRECIP INCHES GOES	STAGE FEET GOES	STAGE(2) FEET GOES	RIV-FLOW CFS GOES	WTR-TEMP DEG-F GOES	DIS-OXY MG/L GOES	PH PH GOES	CONDUCT US/CM GOES	BAT-LOAD VOLTS GOES
04/11 02:00	0.61	1.89	1.87	155	66.20	8.51	7.91	371	12.57
04/11 03:00	0.37	1.94	1.93	186	66.11	8.52	7.95	368	12.49
04/11 04:00	0.44	2.03	2.02	225	65.70	8.59	7.93	364	12.49
04/11 05:00	0.01	2.13	2.11	258	65.16	8.68	7.88	361	12.49
04/11 06:00	0.00	2.32	2.30	329	64.56	8.78	7.87	355	12.41
04/11 07:00	0.00	2.79	2.78	610	64.40	8.81	7.88	355	12.41
04/11 08:00	0.00	3.61	3.61	1104	63.88	8.90	7.91	401	12.41
04/11 09:00	0.00	4.73	4.77	1817	63.81	8.91	7.84	537	12.57
04/11 10:00	0.00	5.67	5.77	2363	62.98	9.06	7.73	384	12.65
04/11 11:00	0.00	6.48	6.56	2825	62.65	9.12	7.70	404	12.65
04/11 12:00	0.00	7.21	7.24	3232	61.81	9.28	7.59	298	13.05
04/11 13:00	0.00	7.84	7.91	3581	62.51	9.15	7.57	309	13.21
04/11 14:00	0.00	8.28	8.33	3820	63.32	9.00	7.55	329	13.29
04/11 15:00	0.00	8.48	8.52	3929	62.58	9.14	7.60	240	13.84
04/11 16:00	0.00	8.45	8.46	3912	62.98	9.07	7.59	253	13.84
04/11 17:00	0.00	8.18	8.27	3766	63.43	8.98	7.57	306	13.37
04/11 18:00	0.00	7.92	7.96	3625	64.38	8.82	7.61	362	12.97
04/11 19:00	0.00	7.57	7.61	3435	64.17	8.85	7.62	321	12.97
04/11 20:00	----	----	----	----	----	----	----	----	----
04/11 21:00	----	----	----	----	----	----	----	----	----
04/11 22:00	----	----	----	----	----	----	----	----	----
04/11 23:00	----	----	----	----	----	----	----	----	----
04/12 00:00	----	----	----	----	----	----	----	----	----
04/12 01:00	----	----	----	----	----	----	----	----	----

Questions?
"In three words I can sum up everything
I've learned about life. It goes on."
Robert Frost