

2007 Streams Report

Beneficial Use Monitoring Program

OKLAHOMA WATER RESOURCES BOARD

Governor
Brad Henry

Chairman
Mark Nichols

Vice-Chairman
Rudy Herrmann

Secretary
F. Ford Drummond

Board Members

Lonnie Farmer
Edward H. Fite
Jack W. Keeley

Kenneth K. Knowles
Linda Lambert
Richard Sevenoaks

OKLAHOMA WATER RESOURCES BOARD

Executive Director – *Duane Smith*

Water Quality Programs Chief – *Derek Smithee*

Monitoring & Assessment Section Head – *Bill Cauthron*

Streams Monitoring Coordinator – *Monty Porter*

Streams Team

Matthew Rollins	Lance Phillips	Jason Childress
Chris Nickel	Jason Murphy	Ty Reidenbaugh
James Teague	Josh Bailey	

Lakes Monitoring Coordinator – *Julie Chambers*

Lakes Team

Krystal Bonsall	Lori Cussner	Darin Martin
-----------------	--------------	--------------

Groundwater Monitoring Coordinator – *Mark Belden*

Groundwater Team

Jason Shiever	Chris Maggard
---------------	---------------

Oklahoma Water Watch Coordinator – *Lynda Williamson*

Water Watch Team

Tamara Williams	Sara Ivey
-----------------	-----------

TABLE OF CONTENTS

TABLE OF CONTENTS	I
LIST OF PLATES	IV
LIST OF TABLES.....	V
EXECUTIVE SUMMARY	VI
Beneficial Use Monitoring Program Goal	vi
Beneficial Use Monitoring Program Components	vii
Program History/Overview	vii
Results of Stream Sampling Efforts	viii
INTRODUCTION	1
Background & Problem Definition.....	2
STREAM MONITORING PROGRAM.....	5
River And Stream Monitoring Overview.....	5
Materials & Methods	5
Stream Data Analysis Protocols	14
Permanent Stream Monitoring Station Results & Discussion	20
UPPER CIMARRON SUB-BASIN	29
Cimarron River near Mocane	30
LOWER CIMARRON SUB-BASIN	32
Cimarron River near Ames	34
Cimarron River Near Buffalo	35
Cimarron River near Dover.....	36
Cimarron River near Guthrie	37
Cimarron River near Oilton.....	38
Cimarron River near Ripley	39
Cimarron River near Waynoka	40
Skeleton Creek near Lovell	41
UPPER ARKANSAS SUB-BASIN	43
Arkansas River near Ralston.....	45
Black Bear Creek at Pawnee.....	46
Chickaskia River near Blackwell.....	47
Salt Fork of the Arkansas near Ingersoll	48
Salt Fork of the Arkansas River near Tonkawa	49

NEOSHO/GRAND SUB-BASIN	51
Big Cabin Creek near Big Cabin.....	53
Bird Creek near Catoosa	54
Caney River near Ramona	55
Elk River near Tiff City, Missouri	56
Honey Creek near Grove.....	57
Neosho River near Chouteau	58
Neosho River near Commerce	59
Neosho River near Connor Bridge	60
Neosho River near Langley	61
Spring Creek near Murphy	62
Spring River near Quapaw	63
Verdigris River near Inola	64
Verdigris River near Keetonville	65
Verdigris River near Lenapah.....	66
Verdigris River near Wagoner	67
CANADIAN SUB-BASIN	69
Brushy Creek near Haileyville	71
Canadian River near Bridgeport.....	72
Canadian River near Calvin.....	73
Canadian River near Konawa.....	74
Canadian River near Purcell.....	75
Canadian River near Taloga.....	76
Canadian River near Whitefield.....	77
Little River near Sasakwa.....	78
BEAVER/NORTH CANADIAN SUB-BASIN.....	81
Beaver River near Beaver	83
Beaver River near Fort Supply	84
Beaver River near Gate.....	85
Beaver River near Guymon.....	86
Beaver River near Laverne.....	87
Beaver River near Turpin	88
Deep Fork River near Beggs	89
Deep Fork River near Stroud.....	90
North Canadian River at Dustin.....	91
North Canadian River near El Reno	92
North Canadian River near Harrah.....	93
North Canadian River near Seiling.....	94
North Canadian River near Shawnee.....	95
North Canadian River near Watonga	96
North Canadian River near Wetumka.....	97
North Canadian River near Woodward.....	98
Wolf Creek near Fort Supply	99
LOWER ARKANSAS SUB-BASIN.....	101
Arkansas River at Bixby	103
Arkansas River near Haskell	104
Arkansas River near Moffett.....	105
Arkansas River near Muskogee (at US 62)	106
Arkansas River near Sand Springs	107
Barren Fork near Eldon	108
Caney Creek near Barber.....	109

Flint Creek near Flint, OK.....	110
Fourche-Maline Creek near Red Oak.....	111
Illinois River near Tahlequah.....	112
Illinois River near Watts.....	113
Lee Creek near Short.....	114
Poteau River near Heavener.....	115
Poteau River near Pocola.....	116
Sager Creek near West Siloam Springs.....	117
NORTH FORK OF THE RED SUB-BASIN.....	119
Elk Creek near Roosevelt.....	121
Elm Fork of the Red near Granite.....	122
North Fork of the Red near Carter.....	123
North Fork of the Red near Headrick.....	124
Salt Fork of the Red River near Elmer.....	125
UPPER RED SUB-BASIN.....	127
East Cache Creek near Walters.....	129
Mud Creek near Courtney.....	130
Red River near Davidson.....	131
Red River near Terral.....	132
Sandy Creek near Eldorado.....	133
Washita River near Alex.....	134
Washita River near Anadarko.....	135
Washita River near Cordell.....	136
Washita River near Durwood.....	137
Washita River near McClure.....	138
Washita River near Pauls Valley.....	139
West Cache Creek near Taylor.....	140
LOWER RED SUB-BASIN.....	142
Blue River near Durant.....	144
Clear Boggy Creek near Caney.....	145
Glover River near Glover.....	146
Kiamichi River near Antlers.....	147
Kiamichi River near Big Cedar.....	148
Kiamichi River near Fort Towson.....	149
Kiamichi River near Tuskahoma.....	150
Little River near Cloudy.....	151
Little River near Holly Creek.....	152
Mountain Fork River near Eagletown.....	153
Mountain Fork River near Smithville.....	154
Muddy Boggy Creek near Atoka.....	155
Muddy Boggy Creek near Unger.....	156
Red River near Harris.....	157
Red River near Hugo.....	158
LITERATURE CITED.....	159
INDEX.....	160

LIST OF PLATES

Plate 57. HUC 1104 - UPPER CIMARRON SUB-BASIN	28
Plate 58. HUC 1105 - LOWER CIMARRON SUB-BASIN	31
Plate 59. HUC 1106 - UPPER ARKANSAS SUB-BASIN	42
Plate 60. HUC 1107 - NEOSHO/GRAND SUB-BASIN	50
Plate 61. HUC 1109 - CANADIAN SUB-BASIN	68
Plate 62. HUC 1110a & 1110b - BEAVER/NORTH CANADIAN SUB-BASIN	79-80
Plate 63. HUC 1111 - LOWER ARKANSAS SUB-BASIN	100
Plate 64. HUC 1112 - NORTH FORK OF THE RED SUB-BASIN	118
Plate 65. HUC 1113 - UPPER RED SUB-BASIN	126
Plate 66. HUC 1114 – LOWER RED SUB-BASIN	141

LIST OF TABLES

Table 1. Permanent Ambient Trend Monitoring Stations and their Beneficial Use Support Status.	x
Table 2. Eight Digit United States Geological Survey HUC Watersheds.	7
Table 3. Permanent Ambient Trend Monitoring Stations.	10
Table 4. Variables Monitored by the BUMP Stream Sampling Program.....	12
Table 5. Permanent Ambient Trend Monitoring Stations and their Beneficial Use Support Status.	24
Table 6. Permanent Ambient Trend Monitoring Stations Located in HUC 1104.....	29
Table 7. Permanent Ambient Trend Monitoring Stations Located in HUC 1105.....	33
Table 8. Permanent Ambient Trend Monitoring Stations Located in HUC 1106.....	44
Table 9. Permanent Ambient Trend Monitoring Stations Located in HUC 1107.....	52
Table 10. Permanent Ambient Trend Monitoring Stations Located in HUC 1109.....	70
Table 11. Permanent Ambient Trend Monitoring Stations Located in HUC 1110.....	82
Table 12. Permanent Ambient Trend Monitoring Stations Located in HUC 1111.....	102
Table 13. Permanent Ambient Trend Monitoring Stations Located in HUC 1112.....	120
Table 14. Permanent Ambient Trend Monitoring Stations Located in HUC 1113.....	128
Table 15. Permanent Ambient Trend Monitoring Stations Located in HUC 1114.....	143

EXECUTIVE SUMMARY

BENEFICIAL USE MONITORING PROGRAM GOAL

The goal of the Beneficial Use Monitoring Program is to document beneficial use impairments, identify impairment sources (if possible), detect water quality trends, provide needed information for the OWQS and facilitate the prioritization of pollution control activities.

The Beneficial Use Monitoring Program exists as a result of the vital economic and social importance of Oklahoma's lakes, streams, wetlands, and aquifers and the associated need for their protection and management. The data contained in this report is scientifically defensible and has been collected and analyzed following procedures outlined in Use Support Assessment Protocols (USAP), developed by Oklahoma's environmental agencies. Specifically, USAPs establish a consistent method to determine if beneficial uses assigned for individual waters through Oklahoma Water Quality Standards (OWQS) are being supported. (Legitimacy of data analyzed following protocols other than those outlined in the USAP must be defended.) If the BUMP report indicates that a designated beneficial use is impaired, threatened, or otherwise compromised, measures must be taken to mitigate or restore the water quality.

Traditionally, the State of Oklahoma has utilized numerous water monitoring programs conducted by individual state and federal agencies. In general, each environmental agency designs and implements its own program with only limited participation from with other state, municipal, or federal entities. These programs collect information for a specific purpose or project (e.g., development of Total Maximum Daily Loads, OWQS process, lake trophic status determination, water quality impact assessments from nonpoint and point source pollution, stream flow measurement, assessment of best management practices, etc.). Therefore, the information is specific to each project's data quality objectives (DQOs) and is often limited to a very small geographic area.

To synchronize Oklahoma's monitoring efforts related to water quality, the State Legislature appropriated funds in 1998 to create the Beneficial Use Monitoring Program under the direction of the Oklahoma Water Resources Board, who maintains Oklahoma's Water Quality Standards. The BUMP brings the OWRB's overall water quality management program full circle. From the promulgation of OWQS, to permitting and enforcement of permits stemming from OWQS-established criteria, to non-point source controls—all agency water quality management activities are intended to work in concert to restore, protect, and maintain designated beneficial uses.

The specific objectives of the BUMP are to detect and quantify water quality trends, document and quantify impairments of assigned beneficial uses, and identify pollution problems before they become a pollution crisis. This report interprets current Oklahoma lake and stream data collected as part of the comprehensive, long-term program, but also includes an assessment of data collected through the Water Board's volunteer water quality monitoring program, Oklahoma Water Watch (OWW). As the program matures, the BUMP report is sure to become one of the most important documents published annually in Oklahoma.

BENEFICIAL USE MONITORING PROGRAM COMPONENTS

- **Monitoring Rivers & Streams** - The BUMP program was created to meet a multitude of surface water monitoring needs. As in the original workplan, monitoring occurs on both lakes and streams. A companion report is available for lakes, which goes into detail on both the methodology and results of the lakes monitoring program. To date, the programs flowing water studies can be divided into four main categories—**Long-Term Fixed Station Monitoring, Probabilistic Monitoring, Short-term Rotating Station Monitoring, and Intensive Investigations**. These portions of the program are discussed in detail within the streams/rivers monitoring report.
- **Fixed Station Groundwater Monitoring** - Limited monitoring as part of this task has occurred in the program. Results of monitoring are presented in this report. OWRB staff has made recommendations in this report related to the scope and magnitude of groundwater monitoring activities that the state should pursue in the future. Any proposed groundwater monitoring efforts will be coordinated with the Oklahoma Department of Environmental Quality (ODEQ) program.
- **Fixed Station Lakes Monitoring** - Quarterly sampling (approximately once every 90 days) of approximately 55-60 lakes annually is currently occurring. This represents approximately a 40% increase in effort over historical BUMP Lake sampling efforts. In general, a minimum of three stations per reservoir, representing the lacustrine zone, transitional zone, and riverine zone are designated for sampling at each lake, with additional sites sampled as needed. Additional water quality parameters and lake sites were added to the lake sampling program beginning in 2001 to aid in making use support determinations.

PROGRAM HISTORY/OVERVIEW

Sampling of the numerous lakes, streams, and rivers across this state was initiated in the summer and fall of 1998. Lake sampling in connection with the Beneficial Use Monitoring Program began in July of 1998. Sampling on numerous streams and rivers began in earnest in November of the same year. The two sampling programs, one for lakes and one for streams had separate starting dates for a number of reasons. First, the OWRB has been conducting a lake-sampling program during the warmer summer months since 1990 as part of the Federal Clean Lakes Program. This historical lake sampling program was funded through federal dollars with the express purpose of determining lake trophic status. The trophic status of a reservoir can range from oligotrophic (low biological productivity) to hyper-eutrophic (excessive biological productivity). In general, the more productive a reservoir, the more water quality problems it is likely to experience. Federal dollars to fund this trophic state assessment of our state's lakes were discontinued in 1994. At that time, the OWRB searched for other funding sources, and through working with the Secretary of the Environment and the Oklahoma Conservation Commission, the Water Board was able to obtain a one time federal 319 nonpoint source grant to continue the lake trophic state assessment program. The OWRB subsequently initiated a quarterly lake sampling program in the spring of 1998 and was able to roll the existing lake program into the BUMP.

For streams, no such comprehensive, statewide sampling effort was ongoing at the time the BUMP was funded. Because of this, the OWRB required a number of months to re-allocate staff

and implement a monitoring regime on streams. In addition, OWRB staff greatly desired input from the other environmental agencies on the placement of stream monitoring stations. The existence of a previous statewide stream-monitoring network greatly aided in sample site selection. This historical ambient trend stream-monitoring network existed from 1975 until 1993 and was implemented by the Oklahoma State Health Department. Although this program did not evaluate sample results through comparison with the OWQS criteria or determine use support, it did provide a framework upon which to build. The historical sampling network sampled streams on a monthly basis from 1975-1986 and on a semi-annual basis from 1987-1993. Based upon the historical program and input from other agencies, the OWRB has established an ambient monitoring network of 100 active permanent stations with numerous rotational sites. Both the permanent and rotational networks are evaluated annually to determine if any stations should be dropped and others added. The Water Resources Board relies heavily on the other state and federal agencies for input into this process. With continued funding it is the desire of BUMP staff to increase the number of permanent sites to 120 to more effectively monitor our stream resources. In addition, monitoring personnel with the OWRB work closely with the other state environmental agencies to avoid duplication of sampling effort (i.e. the Oklahoma Conservation Commission rotating and data gaps sampling initiatives), except on a very limited basis for quality assurance purposes. A very small number of sites that are duplicative in nature do allow for the comparison of results between sampling programs to ensure that sampling protocols and the Use Support Assessment Protocols (USAP - described below) are working effectively and that decisions on support status are being made in a consistent manner.

The OWRB has developed Use Support Assessment Protocols (USAP) for lakes and streams, which are essential if the state is to be consistent in identifying waters that are not meeting their assigned beneficial uses or are threatened. The Water Resources Board has incorporated the USAP into Oklahoma Administrative Code (OAC) 785:46 to ensure that consistent determinations for impairments are made by the all of the monitoring agencies. The state must follow consistent procedures for listing waters as impaired. Using the OWRB Use Support Assessment Protocols, it is possible for OWRB staff to assess whether threats or impairments are present in our waterways. With continued funding, identification of impaired waters will be accomplished on additional waters.

RESULTS OF STREAM SAMPLING EFFORTS

It is essential that Oklahoma quantify impacts in a comprehensive and scientific manner and look for trends in water quality to identify waters that are not meeting their assigned beneficial uses. As a state, we must manage our water resources effectively and direct money to areas in most need of protection or remediation to ensure that we continue to have good quality and sufficient quantity of water to meet our needs well into the 21st century. Comprehensive statewide data sets on rivers and streams for accurately assessing beneficial use impairments has not existed since 1993. With the implementation of monitoring on a large scale in October of 1998, this is no longer the case. With the availability of data, it is the desire of the Oklahoma Water Resources Board to provide the legislature and professional water managers with a comprehensive and up-to-date document for their review and approval. Administrative and Technical staff at the OWRB look forward to conducting the Beneficial Use Monitoring Program far into the future and providing the state of Oklahoma with the information it needs to make informed decisions that allow us to effectively manage our precious water resources.

The BUMP permanent ambient trend stream monitoring sites and their associated beneficial uses are listed in Table 1. Beneficial uses that are not being met are shown in **RED**. Listed next

to the support code indicating that the beneficial use was not being met is the variable code which indicates which water quality variable violated the OWQS criteria. A large number of water bodies are deemed impaired due to their exceedance of the turbidity standard of 10 or 50 nephelometric turbidity units (NTU). The OWQS states that turbidity standards only apply during seasonal base flow conditions. In other words, the criteria should not be applied where normal in-stream conditions exceed the OWQS due to natural processes from a high-flow event. Several “quick” methods are available to assist in the determination of seasonal base flow including the existence of a periphyton line and visual estimation of the degree of flow. However, to reliably determine base flow, a measurement of stream discharge at the time of sampling is needed. This measurement when used in concert with the “quick” methods described above will give a reliable indication of whether the stream is at, below, or above seasonal base flow conditions. Because the BUMP network encompasses the state’s large rivers and streams, discharge is often obtained by comparing stream stage to a continuously updated rating curve. Due to the intense nature of establishing a reliable rating curve, rated discharges are often provisional for a number of months. Therefore, the determination of the previous year’s base flow and consequently eligible turbidity values are also **provisional** at the publication of this report. As of the beginning of 2002, the OWRB was gaging all but 4 permanent station locations. Where permanent water-quality monitoring stations were located near a United States Geological Survey (USGS) stream-flow monitoring station, the information collected by USGS is used to determine if a high-flow event exceeding seasonal base flow had occurred at the time of sampling.

Table 1. Permanent Ambient Trend Monitoring Stations and their Beneficial Use Support Status.

STATION NAME	FWP	PBCR	PPWS	AG	AES
ARKANSAS RIVER, US 64, MOFFETT	S	NS (8)	S	NS (10)	NT
ARKANSAS RIVER, SH 104, HASKELL	NS (18)	NS (8)	N/A	NS (10)	NT
ARKANSAS RIVER, SH 18, RALSTON	NS (5)	NS (8)	S	S	NT
ARKANSAS RIVER, SH 97, SAND SPRINGS	NS (18)	S	N/A	NS (10)	NT
ARKANSAS RIVER, US 62, MUSKOGEE	NS (3)	NS (8)	N/A	NS (10, 11)	T (17)
ARKANSAS RIVER, US 64, BIXBY	S	NS (6, 8)	N/A	NS (10)	NT
BARREN FORK, SH 51, ELDON	S	NS (8)	S	S	NS (14)
BEAVER RIVER, OFF US 64, GUYMON	NS (1)	NS (6, 7, 8)	S	S	NT
BEAVER RIVER, US 83, TURPIN	S	NS (6, 7, 8)	N/A	NS (10, 11)	NT
BEAVER RIVER, SH 23, BEAVER	S	NS (6, 7, 8)	N/A	NS (10, 11, 12)	NT
BEAVER RIVER, US 283, LAVERNE	S	NS (6, 7, 8)	N/A	S	NT
BEAVER RIVER, CR N1650, GATE	S	NS (6, 8)	N/A	NS (10, 11)	NT
BEAVER RIVER, US 183, FORT SUPPLY	S	NS (8)	N/A	S	NT
BIG CABIN CREEK, OFF US 69, BIG CABIN	NS (18)	NS (8)	NS (6)	NS (12)	NT
BIRD CREEK, SH 266, PORT OF CATOOSA	NS (5, 18)	NS (6, 7, 8)	S	NS (12)	T (13)
BLACK BEAR CREEK, SH 18, PAWNEE	NS (3, 5)	NS (6, 8)	S	S	NT
BLUE RIVER, US 70, DURANT	S	NS (8)	S	S	NT
BRUSHY CREEK, OFF US 270, HAILEYVILLE	NS (1, 3, 5, 18)	NS (8)	S	NS (12)	NT
CANADIAN RIVER, SH 2, WHITEFIELD	S	S	S	S	NT
CANADIAN RIVER, US 183, TALOGA	S	NS (8)	N/A	NS (10, 11, 12)	NT
CANADIAN RIVER, US 270, CALVIN	NS (3, 5, 18)	NS (8)	S	NS (10, 12)	T (17)
CANADIAN RIVER, US 377, KONAWA	NS (3, 5, 18)	NS (8)	S	NS (10)	T (17)
CANADIAN RIVER, US 66, BRIDGEPORT	NS (5)	NS (8)	N/A	S	NT
CANADIAN RIVER, US 77, PURCELL	NS (5, 18)	NS (8)	N/A	S	T (13, 17)
CANEY CREEK, OFF SH 100, BARBER	S	NS (8)	S	S	NT
CANEY RIVER, OFF US 75, RAMONA	NS (3, 5)	NS (8)	S	S	T (17)
CHICKASKIA RIVER, US 177, BLACKWELL	NS (5)	NS (6, 8)	S	S	NT
CIMARRON RIVER, OFF SH 8, NEAR AMES	S	NS (7, 8)	N/A	NS (10, 11, 12)	NT
CIMARRON RIVER, SH 34, BUFFALO	S	NS (6, 7, 8)	N/A	NS (10,11)	NT
CIMARRON RIVER, SH 99, OILTON	NS (5)	NS (6, 8)	N/A	NS (10)	NT

STATION NAME	FWP	PBCR	PPWS	AG	AES
CIMARRON RIVER, US 77, GUTHRIE	S	NS (8)	N/A	S	T(17)
CIMARRON RIVER, US 81, DOVER	S	NS (7, 8)	N/A	NS (10, 11)	NT
CIMARRON RIVER, OFF US 64, MOCANE	S	NS (6, 8)	S	S	NT
CIMARRON RIVER, SH 33, RIPLEY	NS (5)	NS (8)	N/A	NS (10)	NT
CIMARRON RIVER, US 281, NEAR WAYNOKA	NS (16)	NS (7)	N/A	NS (10, 11)	NT
CLEAR BOGGY CREEK, OFF US 69, CANEY	NS (3, 5)	NS (8)	S	S	T(17)
DEEP FORK RIVER, OFF SH 16, BEGGS	NS (5, 18)	NS (6, 8)	S	S	NT
DEEP FORK RIVER, US 377, STROUD	NS (3, 5)	NS (6, 8)	NS (9)	S	NT
EAST CACHE CREEK, SH 53, WALTERS	NS (5)	NS (6, 8)	S	NS (10)	NT
ELK CREEK, OFF US 183, ROOSEVELT	NS (5)	NS (6, 8)	S	S	NT
ELK RIVER, SH 43, TIFF CITY (MO)	S	S	S	S	NT
ELM FORK RIVER, SH 9, GRANITE	S	NS (6, 7, 8)	S	NS (11)	NT
FLINT CREEK, US 412, FLINT	S	NS (8)	S	S	NS (14)
FOURCHE-MALINE CREEK, OFF US 270, RED OAK	NS (1, 3)	NS (8)	S	S	NT
GLOVER RIVER, SH 3, GLOVER	NS (3, 5)	S	S	S	NT
HONEY CREEK, OFF SH 25, GROVE	S	NS (8)	S	S	NT
ILLINOIS RIVER, US 59, WATTS	NS (5)	NS (8)	S	S	NS (14)
ILLINOIS RIVER, US 62, TAHLEQUAH	S	NS (8)	S	S	NS (14)
KIAMICHI RIVER, OFF US 271, TUSKAHOMA	NS (3)	NS (8)	S	S	NT
KIAMICHI RIVER, SH 63, BIG CEDAR	NS (3, 4)	NS (8)	S	S	NT
KIAMICHI RIVER, US 271, ANTLERS	NS (3)	NS (8)	S	S	NT
KIAMICHI RIVER, SH 109, FORT TOWSON	NS (2, 3)	NS (8)	S	S	NT
LEE CREEK, SH 101, SHORT	NS (3)	NS (8)	S	S	S
LITTLE RIVER, OFF SH 3, CLOUDY	NS (3, 5)	NS (8)	S	S	NT
LITTLE RIVER, OFF US 70, NEAR HOLLY CREEK	NS (1, 5)	S	S	S	NT
LITTLE RIVER, SH 56, SASAKWA	NS (3, 18)	NS (6, 8)	S	S	NT
MOUNTAIN FORK, SH 4, SMITHVILLE	NS (3, 5)	NS (8)	S	S	NS (14)
MOUNTAIN FORK, US 70, EAGLETOWN	NS (2, 3)	NS (8)	S	S	NT
MUD CREEK, SH 32, COURTNEY	NS (1, 3, 5)	NS (6, 8)	S	S	NT
MUDDY BOGGY CREEK, US 70, UNGER	NS (3, 5, 18)	NS (8)	S	S	NT
MUDDY BOGGY CREEK, US 69, ATOKA	NS (1, 3, 5)	NS (6, 8)	S	S	NT
NEOSHO RIVER, OFF US 66, COMMERCE	NS (3, 5)	NS (8)	S	S	NT

STATION NAME	FWP	PBCR	PPWS	AG	AES
NEOSHO RIVER, OFF SH 137, CONNOR BRIDGE	NS (2, 3, 5)	S	S	S	NT
NEOSHO RIVER, SH 82, LANGLEY	NS (1)	S	S	S	NT
NEOSHO RIVER, US 412, CHOUTEAU	NS (1, 3)	S	S	S	NT
NORTH CANADIAN RIVER, IND. NAT. TPK., DUSTIN	NS (3, 5)	NS (6, 8)	S	S	T (13)
NORTH CANADIAN RIVER, SH 3E, SHAWNEE	NS (3, 4, 5)	NS (8)	N/A	S	T (13, 17)
NORTH CANADIAN RIVER, OFF US 62, HARRAH	NS (dieldrin)	NS (6, 8)	N/A	NS (10)	T (13, 17)
NORTH CANADIAN RIVER, US 270, WATONGA	S	NS (6, 7, 8)	S	S	NT
NORTH CANADIAN RIVER, US 281, SEILING	NS (5)	NS (8)	S	S	NT
NORTH CANADIAN RIVER, US 75, WETUMKA	NS (3, 4, 5)	NS (8)	S	S	T (13, 17)
NORTH CANADIAN RIVER, US 412, WOODWARD	S	NS (8)	N/A	S	NT
NORTH CANADIAN RIVER, US 81, EL RENO	S	NS (6, 8)	S	S	NT
NORTH FORK OF THE RED RIVER, US 62, HEADRICK	NS (5)	NS (8)	S	NS (10, 11)	T (17)
NORTH FORK OF THE RED RIVER, SH 34, CARTER	NS (5)	NS (8)	S	S	NT
POTEAU RIVER, OFF SH 112, POCOLA	NS (3, 5)	NS (8)	S	S	NT
POTEAU RIVER, US 59, HEAVENER	S	S	S	S	NT
RED RIVER, US 183, DAVIDSON	NS (3, 5)	NS (6, 8)	N/A	NS (10, 11, 12)	T (17)
RED RIVER, US 259, HARRIS	NS (5, 18)	S	S	S	NT
RED RIVER, US 271, HUGO	NS (5, 18)	NS (8)	S	NS (10, 11, 12)	NT
RED RIVER, US 81, TERRAL	NS (5)	NS (8)	S	NS (10, 11, 12)	NT
SAGER CREEK, OFF US 412, WEST SILOAM SPRINGS	S	NS (8)	NS (nitrates)	S	T (13, 15)
SALT FORK OF THE ARKANSAS, SH 58, INGERSOLL	NS (5)	NS (6, 7, 8)	S	NS (12)	NT
SALT FORK OF THE ARKANSAS, US 77, TONKAWA	NS (5)	NS (8)	S	S	NT
SALT FORK OF THE RED RIVER, OFF US 283, ELMER	NS (3)	NS (6, 8)	S	S	T (17)
SANDY CREEK, SH 6, ELDORADO	NS (2, 3, 5)	NS (8)	N/A	NS (10, 11, 12)	NT
SKELETON CREEK, SH 74, LOVELL	NS (5, 18)	NS (6, 8)	S	S	NT
SPRING CREEK, OFF US 412, MURPHY	S	S	S	S	NT
SPRING RIVER, OFF SH 137, QUAPAW	NS (2, 3, 5)	NS (8)	S	S	NT
VERDIGRIS RIVER, US 412, INOLA	NS (3, 5)	NS (8)	S	S	NT
VERDIGRIS RIVER, SH 10, LENEPAH	NS (3, 5)	NS (8)	S	S	NT
VERDIGRIS RIVER, SH 20, KEETONVILLE	S	NS (8)	S	S	NT
VERDIGRIS RIVER, SH 51, WAGONER	NS (2, 3, 5)	NS (8)	S	S	NT
WASHITA RIVER, OFF SH 19, ALEX	NS (5)	NS (6, 8)	S	S	T (17)

STATION NAME	FWP	PBCR	PPWS	AG	AES
WASHITA RIVER, SH 152, CORDELL	NS (5, 16)	NS (6, 7, 8)	S	S	NT
WASHITA RIVER, SH 19, PAULS VALLEY	NS (5)	NS (6, 8)	S	S	NT
WASHITA RIVER, SH 33, MCCLURE	NS (5, 16)	NS (6, 7, 8)	S	S	NT
WASHITA RIVER, US 177, DURWOOD	NS (5)	NS (6, 8)	S	S	T (17)
WASHITA RIVER, US 281, ANADARKO	NS (5, 16)	NS (6, 8)	S	S	T (17)
WEST CACHE CREEK, SH 5B, TAYLOR	NS (5)	NS (6, 7, 8)	S	NS (10,11)	NT
WOLF CREEK, OFF US 270, FORT SUPPLY	S	NS (8)	S	S	NT

ASSIGNED OWQS BENEFICIAL USES	
FWP = FISH & WILDLIFE PROPAGATION	PBCR = PRIMARY BODY CONTACT RECREATION
PPWS = PUBLIC AND PRIVATE WATER SUPPLY	AG = AGRICULTURE
AES = AESTHETICS	

SUPPORT CODES		
S—FULLY SUPPORTING	NS—NOT SUPPORTING	N/A—NOT APPLICABLE
NT-NOT THREATENED (NUTRIENTS)	T-THREATENED (NUTRIENTS)	NO DATA—INSUFFICIENT INFO

WATER QUALITY VARIABLES		
1—DISSOLVED OXYGEN	2—METALS (ACUTE)	3—METALS (CHRONIC)
4—PH	5—TURBIDITY	6—FECAL COLIFORM
7— <i>ESCHERICHIA COLI</i>	8— Enterococci	9—METALS
10— TOTAL DISSOLVED SOLIDS	11— CHLORIDES	12— SULFATES
13— TOTAL PHOSPHORUS (TP)	14—TP OK SCENIC RIVER CRITERION	15— NITRITE + NITRATE
16—BIOCRITERIA	17—SESTONIC CHLOROPHYLLL-A (TSI)	18—VISUAL OIL AND GREASE

INTRODUCTION

Protecting Oklahoma's valuable water resources is essential to maintaining the quality of life for all Oklahomans. Used for a myriad of purposes—such as irrigation, hydropower, public/private water supply, navigation, and a variety of recreational activities—the state's surface and groundwaters provide enormous benefits to Oklahoma from both an economic and recreational standpoint.

The National Recreation Lakes Study Commission (NRLSC) estimates that 32,100 people in Oklahoma are employed in support of activities related to our numerous man-made lakes. Also according to the NRLSC, 18,718,000 visitor days are spent on Oklahoma lakes each year and recreation in and around these lakes contributes approximately \$2.2 billion each year to Oklahoma's economy. Of additional value are the recreational benefits associated with our smaller municipal/watershed projects, Oklahoma Department of Wildlife lakes, and rivers and streams throughout the state, which infuse millions into state coffers through fishing, hunting, camping and related activities. (In 1987, the Oklahoma Comprehensive Outdoor Recreation Plan estimated that approximately \$10.7 million was realized through camping and \$15.2 million through hunting/fishing.¹) According to a 2001 federal study, fishing activities alone contribute \$476,019 dollars to Oklahoma's economy, not including the substantial ancillary costs associated with that extremely popular sport.²

In addition to surface waters, abundant groundwaters also fuel the state's economy serving as supply for thousands municipalities, rural water districts, industrial facilities, and agricultural operations. According to the 1995 update of the *Oklahoma Comprehensive Water Plan*, groundwater represents the primary water supply for approximately 300 cities and towns and comprises 60 percent of the total water used in the state each year.³ Groundwater resources also supply approximately 90 percent of the state's irrigation needs.

Oklahoma works to protect and manage its water resources through a number of initiatives, with the Oklahoma Water Quality Standards (OWQS) serving as the cornerstone of the state's water quality management programs. The Oklahoma Water Resources Board (OWRB) is designated by state statute as the agency responsible for promulgating water quality standards and developing or assisting the other environmental agencies with implementation framework. State agencies are responsible for implementing the OWQS as outlined by the OWRB through development of Implementation plans. Protecting our waters is a cooperative effort between many state agencies and because the OWQS are utilized by all agencies and represent a melding of both science and policy, they are an ideal mechanism to assess the effectiveness of our diverse water quality management activities.

The OWQS are housed in OAC 785:45 and consist of three main components: beneficial uses, criteria to protect beneficial uses, and anantidegradation policy. An additional component, which is not directly part of the OWQS but necessary to water resource protection, is a monitoring program. A monitoring program is required in order to ensure that beneficial uses

¹ Oklahoma Statewide Comprehensive Outdoor Recreation Plan (SCORP), 1987.

² U.S. Department of Interior, Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau. *2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation*.

³ Oklahoma Water Resources Board, *Update of the Oklahoma Comprehensive Water Plan*, 1995.

are maintained and protected. If uses are not being maintained, the cause of that impairment must be identified and restoration activities should be implemented to improve water quality such that it can meet its assigned beneficial uses.

In the late 1990's, the need for a protocol to determine beneficial use impairment was identified, which would facilitate state agencies in directing their time and money to the areas in most need of protection or remediation. The OWRB working in close concert with other state environmental agencies and other concerned parties developed Use Support Assessment Protocols (USAP) to be used by all parties for assessing if a water was meeting its assigned beneficial uses. In addition, protocols were developed which could be coupled with a trend monitoring system to detect threatened waters before they become seriously impaired. Data collection efforts connected with protocol development and/or implementation also serves a vital purpose in refining numerical criteria currently included in the OWQS and in developing appropriate numerical and narrative criteria for future OWQS documents. It is essential that our waters meet their assigned uses and that OWQS implementation protocols are appropriate. Please see <http://www.owrb.ok.gov/util/rules/rules.php#ch46> for the applicable Oklahoma Administrative Code OAC 785:46 related to the USAP. Final approval of the USAP occurred in 2000 and the OWRB has constantly worked to refine the existing protocols and pursue the addition or modification of USAP protocols to further enhance its utility and effectiveness.

All state agencies are currently required to implement Oklahoma's Water Quality Standards within the scope of their jurisdiction through the development of an Implementation Plan specific for their agency. This process, called OWQS Implementation, allows the OWQS to be utilized by other state agencies in the performance of their regulatory (statutory) responsibilities to manage water quality or to facilitate best management practice initiatives. The critical fourth component of the OWQS program implementation is monitoring, and is the subject of this report. All sampling activities described and conducted as part of this program were consistent with the Oklahoma USAP. It is also important to note that they are consistent with Environmental Protection Agency (EPA) reporting requirements for the "Integrated Water Quality Monitoring and Assessment Report" and §319 Nonpoint Source (NPS) Assessment.

BACKGROUND & PROBLEM DEFINITION

The State of Oklahoma has historically had numerous monitoring programs conducted by several state and federal agencies. In general, each environmental agency conducts their monitoring programs with some degree of integration and coordination with other state, municipal, or federal programs. Most water quality monitoring programs in Oklahoma are designed and implemented by each agency to collect information for one specific purpose or project (i.e. development of Total Maximum Daily Loads, OWQS process, lake trophic status determination, water quality impacts from point source dischargers, stream flow measurements, document success of best management practices, etc.). Information of this type is very specific to each individual project's data quality objectives (DQOs) and is often limited to a very small geographic area. This document describes sampling activities the OWRB has conducted on streams and rivers across Oklahoma as part of a comprehensive, long-term, statewide Beneficial Use Monitoring Program (BUMP).

The goal of the BUMP is multi-faceted. Primarily, the program is designed is to document beneficial use impairments and to detect and quantify water quality trends. As a result of these activities, the program also strives to identify potential impairment sources. Through these activities, the OWRB provides data and reports that facilitates the prioritization of pollution

control activities and assists water quality managers in identifying pollution problems before they become a pollution crisis.

The BUMP program was created to meet a multitude of surface water monitoring needs. As in the original workplan, monitoring occurs on both lakes and streams. A companion report is available for lakes, which goes into detail on both the methodology and results of the lakes monitoring program. To date, the programs flowing water studies can be divided into four main categories—**Long-Term Fixed Station Monitoring, Probabilistic Monitoring, Short-term Rotating Station Monitoring, and Intensive Investigations.**

The **Long-Term Fixed Station Monitoring** is based largely upon the sixty-seven (67) United States Geological Survey 8-digit hydrologic unit code (HUC) basins present in Oklahoma (Table 2). In general, at least one (1) sample station is located in all of the HUC watersheds with the exception of some of the smaller HUC watersheds adjacent to the state line or in a HUC that does not contain a free flowing stream at some point during the year. After consultation with the other state environmental agencies and over time the OWRB has identified one hundred nineteen (119) fixed stations of which one hundred and one (101) are currently being monitored (Table 3). Data collected include a variety of chemical, biological, and physical parameters. Additionally, the OWRB currently works with several partners including the the USGS, US Army Corp of Engineers, Grand River Dam Authority, and National Weather Service to conduct flow monitoring on most of our fixed station sites that are not part of the Oklahoma/USGS Cooperative Gaging Network. To date, ninety-seven (97) stations have a working stage/discharge rating of which eighty-two of those stations are collecting periodic stage data through a data collection platform (DCP). This cooperative effort will allow for loadings to be calculated, trends to be assessed statewide, and provide much needed data for the Use Support Assessment process. Along with the USGS cost share program, Oklahoma's 319 program, Oklahoma's 314 program and the 303(d)-process will drive sample site locations associated with this task.

The **Probabilistic Monitoring** program is not a new program of the OWRB. It was developed to supplement the BUMP program, and over time has become an integral part of our assessment process. Probabilistic monitoring as a monitoring design is different from fixed station monitoring in several ways. First, site selection is based upon a random sampling of some population. For the OWRB's purposes, several populations may be considered including all rivers and streams of the state (a statewide sampling draw) or all rivers and streams in a particular watershed (a regional sampling draw). The population may also include only certain stream types (e.g., wadeable or non-wadeable streams). From this larger population, a set number of sites are drawn. Secondly, site visitation and monitoring are not completed over a long temporal window. For instance, in the statewide program, sites are visited once, and in the Illinois River Program, sites are visited over 3-4 sampling events. The number of visits becomes dependant on the study objectives. The program has increased functionality when overlaid with the BUMP network. Many of the biological collections made for the random-based programs can be used for making fixed station assessments. Also, because data are collected randomly, bioindicators (e.g., fish) can be compared to levels of stressors (e.g., phosphorus or land use), and broader assumptions about the effect of the stressors on indicators may be made. This can be translated to the fixed station program or standards development to allow for resources to be allocated where they are most needed.

Over the life of the BUMP, **Short-term Rotating Station Monitoring** has occurred on two hundred twenty (220) stream segments. Sample stations and variables monitored are based upon Oklahoma's 303(d) list and input from other state environmental agencies on their

monitoring needs. Variables monitored as part of this program component were specific for each stream segment monitored

The fourth major categories of BUMP studies are **Intensive Investigations**. When a beneficial use impairment is identified, the ODEQ is responsible for prioritizing a TMDL on the waterbody. However, routine monitoring does not always clearly identify the extent or source of the impairment, and intensive monitoring along a stream segment may be required. To date, the OWRB has used BUMP monies in combination with federal Clean Water Act Section 106 and Section 104(b)3 dollars to conduct intensive surveys on water bodies in various parts of the state. These investigations are normally built around permanent monitoring stations and may be more spatially, temporally, and parametrically intensive than traditional BUMP sampling. For example, pesticides, which are not a normal part of the BUMP parametric coverage, are collected at some of the sites. Also, a BUMP station may be on a segment that is over 40 miles in length. These investigations create several stations along the segment and compare results from the various stations to determine if the segment has uniform water quality. These investigations have been performed throughout the state, and electronic reports are available by contacting Monty Porter with the OWRB at 405-530-8800 or maporter@owrb.ok.gov.

STREAM MONITORING PROGRAM

The Stream Beneficial Use Monitoring Program was initiated in November of 1998. The BUMP streams staff began collecting monthly data in November of 1998 and changed to visiting stations on a 5-week schedule in 2003. The results of these activities are presented in the following section. Results of stream sampling efforts are organized by their 4-digit USGS hydrologic unit code (HUC), and stream results are discussed in alphabetical order for each HUC. Each stream station is described individually with a brief narrative outlining the site location and other pertinent information followed by a brief synopsis of data results. All of the current permanent monitoring sites are listed and discussed very briefly.

Several changes have been made for this report and will remain in effect into the foreseeable future. First, data graphs and tables used in past reports will no longer be included in BUMP reports. By their very nature, the graphs and tables did not adequately facilitate the reader's comprehension of the report. In an effort to make the report more useful, the OWRB will provide on the OWRB website complete validated datasets that are used in the decision-making and impairment identification process. Secondly, to meet the new reporting requirements for the state's CWA Integrated Report, the temporal window for the BUMP report has changed. Whereas in recent years the report has covered a five-year period from October through September, all subsequent reports will cover a five-year period from May through April. Therefore, this reporting cycle includes a summary of the data results for the period of record from May 2002 through April 2007. Lastly, the BUMP report will no longer be published annually. Because Oklahoma's Integrated Report is only published in even years (e.g., 2008), subsequent BUMP reports will follow the same schedule, and the next BUMP report will not be published until 2010.

RIVER AND STREAM MONITORING OVERVIEW

Historically, data on rivers and streams across the state has been very sketchy. Over the years, various local, tribal, state, and federal agencies have managed a number of sampling programs. These programs have varied in nature ranging from short-term, site-specific sampling to the former Oklahoma State Department of Health (OSDH) statewide sampling program. However, a comprehensive, statewide ambient trend-monitoring program had not existed since 1989, the last year that the OSDH conducted monthly sampling. Furthermore, a program with the specific intent of documenting statewide beneficial use impairments on a long-term basis had never existed until the Beneficial Use Monitoring Program (BUMP) was started in September of 1998 with subsequent sampling begun in November of the same year. By establishing a monitoring network that evaluates general water quality through the use of an existing framework like the Oklahoma Water Quality Standards, the state of Oklahoma initiated a progressive phase in the long-term assessment of the overall health of our state's streams and rivers.

MATERIALS & METHODS

The Monitoring Network. The BUMP rivers and streams network consists of four major station classifications — permanent ambient trend sites, probabilistic sites, rotating station sites, and

intensive investigation sites. Permanent ambient trend monitoring stations are relatively static within the program. In general, they do not change from year to year and have been chosen to allow for long-term assessment of beneficial uses and water quality trends. Since program inception a small number of sites have been dropped from the program and new sites added to more effectively assess the water quality of our major stream basins. By the nature of the study methodology, probabilistic sites change annually. For comparability purposes, some sites are revisited during subsequent statewide rotations, and some sites may be visited on more than one occasion. Rotating and intensive investigation sites are only actively monitored for a predetermined period of time and for a specific purpose. The majority of this report, and particularly this section, will concentrate solely on the permanent ambient trend monitoring network. Other sites (or groups of sites) have typically been reported on in various reports published by the OWRB but are discussed in a broader context in sections near the end of this report. These specialized reports may be obtained by contacting Monty Porter with the OWRB at 405-530-8800.

With the creation of the permanent monitoring network in September of 1998, OWRB staff established three overarching objectives for the program. First, the network must encompass the entire state. To accomplish this, a commitment was made to locate at least one site in each of the 8-digit USGS hydrologic units (HUC) (Table 2).

Currently, all but four of these 8-digit HUCs have at least one sampling station. A map of the 8-digit USGS HUCs is included as Figure 1. The second objective was that the foundation of the monitoring network should be principally the state's largest rivers, the Arkansas River and the Red River, and their major tributaries, such as the Canadian River and the Washita River. Currently, fifty-nine (59) of the 101 stations currently being monitored (~59%) meet this criterion. These sites are dispersed over 20 different rivers and streams with the majority located on the Arkansas River and several tributaries including the Cimarron River, the Canadian River, the Verdigris River, and Neosho River as well as the Red River and several tributaries including the Washita River, the Kiamichi River, and the Little River. Secondary consideration was given to the major tributaries of rivers such as Canadian River and the Little River. Currently, thirty-six (36) of the 101 sites (~36%) meet this criterion. Further consideration was given to areas of the state (e.g., the Panhandle) that were underrepresented as well as rivers and streams (e.g., The Deep Fork River) that were conspicuously missing from the network. Currently, six (6) of the 101 monitoring stations (~6%) meet one of these criteria. The third and last objective is to seek the continuing advice and input of other state and federal environmental agencies and professionals before making a final determination of network changes and permanent monitoring station locations. In particular, the ODEQ, OCC, and USGS continue to be very helpful in assisting with locating permanent stations.

Operating within these overarching objectives, the staff of the OWRB has selected and performed monitoring on one hundred nineteen (119) permanent ambient trend-monitoring sites since September of 1998 and is currently monitoring 101 permanent stations (Table 3). The placement of a site location necessitates several considerations. Above all, a site must be accessible by vehicle and be safe for sampling personnel and other motorists. It is also essential that a site be located in an area where representative data can be acquired. The OWQS Use Support Assessment Protocols (USAP) set spatial limitations on the data that are collected. In summary, a site can only represent twenty-five stream miles for non-wadable streams and ten stream miles for wadable streams. These limitations may be extended or shortened based upon sources of pollution, influence of other hydrological and/or geological features, and spatial distribution of monitoring sites. Furthermore, a site can only be representative of the waterbody identification number (12 digit HUC number) in which it is

located and the site cannot be located within a regulatory mixing zone. This requires that monitoring sites be selected so that they represent as long a stream reach as possible while maintaining the spatial integrity outlined in USAP. Thirdly, it is important that historical data be considered. Many of the current BUMP permanent monitoring sites were selected from a set of historical monitoring stations that were a part of the OSDH (the environmental Division that conducted the Ambient Program later became part of the ODEQ) Ambient Trend Monitoring Program. Before initial sampling began in 1998, OWRB staff worked closely with the ODEQ to integrate many of the historical sites into the BUMP. Although the historical data from these sites can not be used to assess beneficial uses (USAP sets a temporal limitation of five years), the historical data set benefits the state in assessing long-term water quality trends. Lastly, it is imperative that rivers and streams which have been designated in the OWQS as Outstanding Resource Waters (ORW), High Quality Waters (HQW), or Sensitive Water Supplies (SWS) be given unique consideration even if they do not meet the objectives as outlined. For example, Sager Creek is not a tributary of a major tributary of a major river. However, it is sampled as part of the BUMP because it is classified as an ORW and directly influences Flint Creek, one of the state's scenic rivers. The water quality status of each site is discussed in more detail in the individual HUC narrative sections that follow this section of the report.

Table 2. Eight Digit United States Geological Survey HUC Watersheds.

8 Digit HUC Number	Description	8 Digit HUC Number	Description
11040001	Cimarron Headwaters	11100301	Middle North Canadian
11040002	Upper Cimarron	11100302	Lower North Canadian
11040006	Upper Cimarron – Liberal	11100303	Deep Fork
11040007	Crooked	11110101	Polecat – Snake
11040008	Upper Cimarron – Bluff	11110102	Dirty – Greenleaf
11050001	Lower Cimarron – Eagle Chief	11110103	Illinois
11050002	Lower Cimarron – Skeleton	11110104	Robert S. Kerr Reservoir
11050003	Lower Cimarron	11110105	Poteau
11060001	Kaw Lake	11120105	Lower Prairie Dog Town Fk., Red
11060002	Upper Salt Fork – Arkansas	11120202	Lower Salt Fork – Red
11060003	Medicine Lodge	11120302	Middle North Fork – Red
11060004	Lower Salt Fork – Arkansas	11120303	Lower North Fork – Red
11060005	Chickaskia	11120304	Elm Fork – Red
11060006	Black Bear – Red Rock	11130101	Groesbeck – Sandy
11070103	Middle Verdigris	11130102	Blue – China
11070105	Lower Verdigris	11130201	Farmers – Mud
11070106	Caney	11130202	Cache
11070107	Bird	11130203	West Cache
11070205	Middle Neosho	11130208	Northern Beaver
11070206	Grand Lake	11130210	Lake Texoma
11070207	Spring	11130301	Washita Headwaters
11070208	Elk	11130302	Upper Washita
11070209	Lower Neosho	11130303	Middle Washita

8 Digit HUC Number	Description	8 Digit HUC Number	Description
11090103	Rita Blanca	11130304	Lower Washita
11090201	Lower Canadian – Deer	11140101	Bois D’Arc – Island
11090202	Lower Canadian – Walnut	11140102	Blue
11090203	Little	11140103	Muddy Boggy
11090204	Lower Canadian	11140104	Clear Boggy
11100101	Upper Beaver	11140105	Kiamichi
11100102	Middle Beaver	11140106	Pecan – Waterhole
11100103	Coldwater	11140107	Upper Little
11100104	Palo Duro	11140108	Mountain Fork
11100201	Lower Beaver	11140109	Lower Little
11100203	Lower Wolf		

United States Geological Survey 8-Digit Hydrologic Unit Codes for Oklahoma

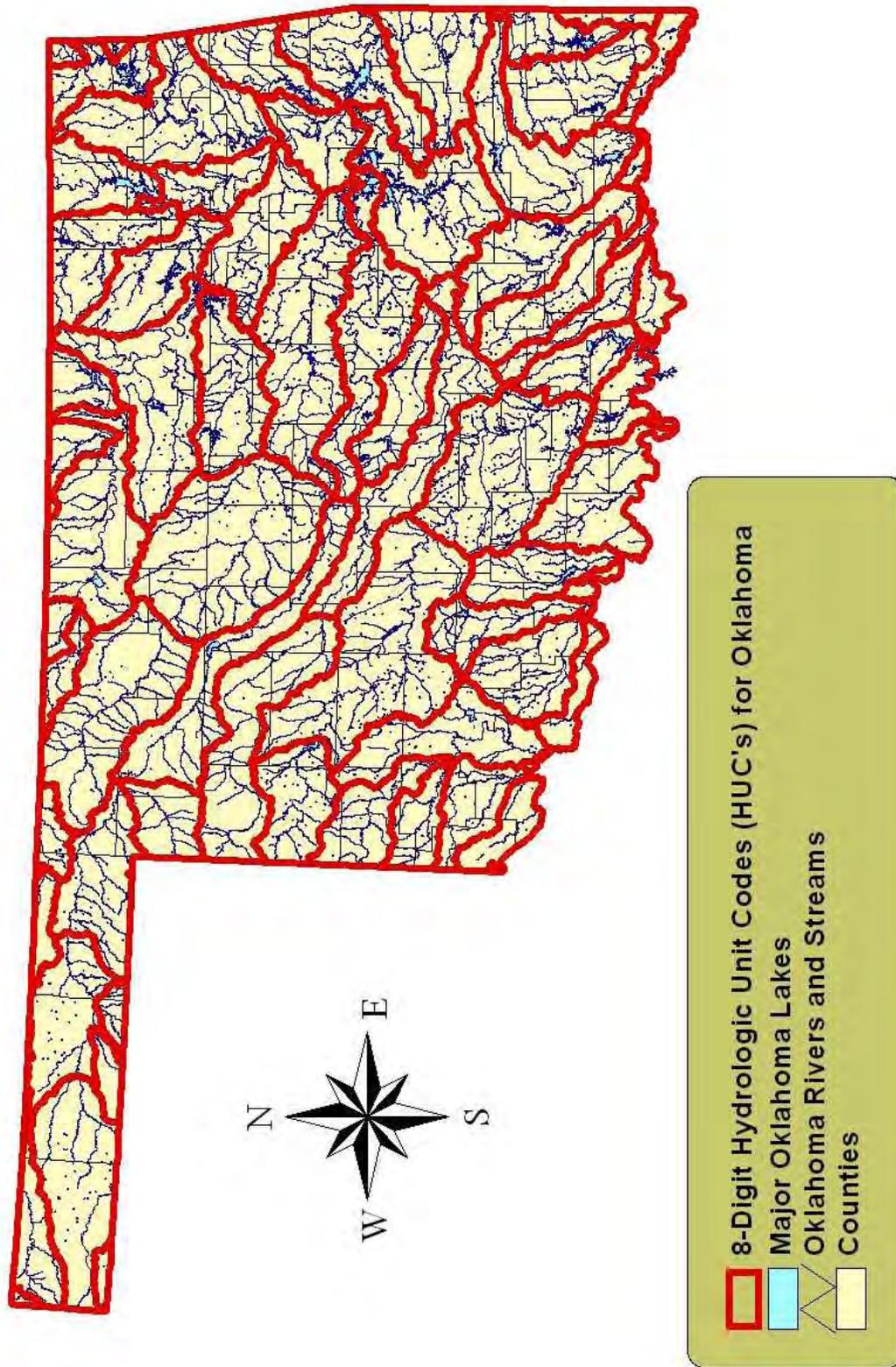


Figure 1. USGS 8-digit Hydrologic Unit Codes for Oklahoma.

Table 3. Permanent Ambient Trend Monitoring Stations.

4-Digit HUC	Waterbody Identification Number	Station Name	County	Status	Discharge Measurement Strategy
1111	120410010080	ARKANSAS RIVER, SH 104, HASKELL	MUSKOGEE	November-98	COOP DCP
1106	621200010200	ARKANSAS RIVER, SH 18, RALSTON	OSAGE	November-98	COOP DCP
1111	120420010130	ARKANSAS RIVER, SH 97, SAND SPRINGS	TULSA	September-99	Stage/Discharge Rating Only
1111	121400010260	ARKANSAS RIVER, US 62, MUSKOGEE	MUSKOGEE	September-99	COOP DCP
1111	120420010010	ARKANSAS RIVER, US 64, BIXBY	TULSA	November-98	Stage/Discharge Rating Only
1111	220200010010	ARKANSAS RIVER, US 64, MOFFETT	SEQUOYAH	November-98	COOP DCP
1111	121700050010	BARREN FORK, SH 51, ELDON	CHEROKEE	November-98	COOP DCP
1110	720500020140	BEAVER RIVER, CR N1650, GATE	BEAVER	October-00	Stage/Discharge Rating Only
1110	720510000150	BEAVER RIVER, OFF US 64, GUYMON	TEXAS	November-98	COOP DCP
1110	720500020290	BEAVER RIVER, SH 23, BEAVER	BEAVER	November-98	COOP DCP
1110	720500020010	BEAVER RIVER, US 183, FORT SUPPLY	HARPER	October-00	OWRB/USACE DCP
1110	720500020010	BEAVER RIVER, US 283, LAVERNE	HARPER	January-03	Stage/Discharge Rating Only
1110	720500020450	BEAVER RIVER, US 83, TURPIN	TEXAS	October-00	Stage/Discharge Rating Only
1107	121600060060	BIG CABIN CREEK, OFF US 69, BIG CABIN	CRAIG	September-99	COOP DCP
1107	121300010010	BIRD CREEK, SH 266, PORT OF CATOOSA	TULSA	November-98	COOP DCP
1106	621200030010	BLACK BEAR CREEK, SH 18, PAWNEE	PAWNEE	November-98	COOP DCP
1114	410600010010	BLUE RIVER, US 70, DURANT	BRYAN	November-98	COOP DCP
1109	220600030020	BRUSHY CREEK, OFF US 270, HAILEYVILLE	PITTSBURG	November-98	Stage/Discharge Rating Only
1109	220300000010	CANADIAN RIVER, SH 2, WHITEFIELD	HASKELL	September-99	COOP DCP
1109	520620020120	CANADIAN RIVER, US 183, TALOGA	DEWEY	November-98	Stage/Discharge Rating Only
1109	220600010119	CANADIAN RIVER, US 270, CALVIN	HUGHES	November-98	COOP DCP
1109	520600010010	CANADIAN RIVER, US 377, KONAWA	SEMINOLE	November-98	OWRB/USACE DCP
1109	520620010050	CANADIAN RIVER, US 66, BRIDGEPORT	BLAIN	November-98	COOP DCP
1109	520610010010	CANADIAN RIVER, US 77, PURCELL	McCLAIN	November-98	COOP DCP
1111	121700040010	CANEY CREEK, OFF SH 100, BARBER	CHEROKEE	September-99	COOP DCP
1107	121400010010	CANEY RIVER, OFF US 75, RAMONA	WASHINGTON	November-98	COOP DCP
1106	621100000010	CHICKASKIA RIVER, US 177, BLACKWELL	KAY	November-98	COOP DCP
1104	620930000010	CIMARRON RIVER, OFF US 64, MOCANE	BEAVER	October-99	Stage/Discharge Rating Only
1105	620900030010	CIMARRON RIVER, SH 33, RIPLEY	PAYNE	October-00	COOP DCP
1105	620910020010	CIMARRON RIVER, SH 34, BUFFALO	WOODS	November-98	COOP DCP
1105	620900010170	CIMARRON RIVER, SH 99, OILTON	CREEK	November-98	COOP DCP
1105	620920020010	CIMARRON RIVER, US 281, WAYNOKA	WOODS	March-08	COOP DCP
1105	620920010010	CIMARRON RIVER, US 412, AMES/ORIENTA	MAJOR	November-98	OWRB/USACE DCP
1105	620910030010	CIMARRON RIVER, US 77, GUTHRIE	LOGAN	November-98	COOP DCP
1105	620910010010	CIMARRON RIVER, US 81, DOVER	KINGFISHER	November-98	COOP DCP
1114	410400030020	CLEAR BOGGY CREEK, OFF US 69, CANEY	ATOKA	November-98	COOP DCP
1110	520700020010	DEEP FORK RIVER, OFF SH 16, BEGGS	OKMULGEE	November-98	COOP DCP
1110	520700040180	DEEP FORK RIVER, US 377, STROUD	LINCOLN	November-98	OWRB/USACE DCP
1113	311300010020	EAST CACHE CREEK, SH 53, WALTERS	COTTON	November-98	COOP DCP
1112	311500030010	ELK CREEK, OFF SH 19, ROOSEVELT	KIOWA	May-06	OWRB DCP
1107	121600030440	ELK RIVER, SH 43, TIFF CITY (MO)	McDONALD	May-99	COOP DCP
1112	311800000010	ELM FORK RIVER, SH 6, GRANITE	GREER	May-06	OWRB/USACE DCP
1111	121700060010	FLINT CREEK, US 412, KANSAS	DELAWARE	November-98	COOP DCP
1111	220100040020	FOURCHE-MALINE CREEK, OFF US 270, RED OAK	LATIMER	November-98	COOP DCP

STREAM MONITORING PROGRAM

4-Digit HUC	Waterbody Identification Number	Station Name	County	Status	Discharge Measurement Strategy
1114	410210080010	GLOVER RIVER, SH 3, GLOVER	MCCURTAIN	November-98	COOP DCP
1107	121600030440	HONEY CREEK, OFF SH 25, GROVE	DELAWARE	November-98	COOP DCP
1111	121700030350	ILLINOIS RIVER, US 59, WATTS	ADAIR	November-98	COOP DCP
1111	121700030010	ILLINOIS RIVER, US 62, TAHLEQUAH	CHEROKEE	November-98	COOP DCP
1114	410310010010	KIAMICHI RIVER, OFF US 271, TUSKAHOMA	PUSHMATAHA	November-98	Stage/Discharge Rating Only
1114	410300010010	KIAMICHI RIVER, SH 109, FORT TOWSON	BRYAN	October-02	Not Rated
1114	410310020010	KIAMICHI RIVER, SH 63, BIG CEDAR	LEFLORE	November-98	COOP DCP
1114	410300030010	KIAMICHI RIVER, US 271, ANTLERS	PUSHMATAHA	November-98	COOP DCP
1111	220200050010	LEE CREEK, SH 101, NEAR SHORT	SEQUOYAH	January-03	COOP DCP
1114	410210020140	LITTLE RIVER, OFF SH 3, CLOUDY	PUSHMATAHA	November-98	OWRB/USACE DCP
1114	410200010200	LITTLE RIVER, OFF US 70, NEAR HOLLY CREEK	MCCURTAIN	October-02	Stage/Discharge Rating Only
1109	520800010010	LITTLE RIVER, SH 56, SASAKWA	SEMINOLE	November-98	COOP DCP
1114	410210060020	MOUNTAIN FORK, SH 4, SMITHVILLE	MCCURTAIN	November-98	COOP DCP
1114	410210040010	MOUNTAIN FORK, US 70, EAGLETOWN	MCCURTAIN	November-98	COOP DCP
1113	311100040010	MUD CREEK, SH 32, COURTNEY	LOVE	November-98	COOP DCP
1114	410400050270	MUDDY BOGGY CREEK, US 69, ATOKA	ATOKA	September-99	Stage/Discharge Rating Only
1114	410400010070	MUDDY BOGGY CREEK, US 70, UNGER	CHOCTAW	July-99	COOP DCP
1107	121600040010	NEOSHO RIVER, OFF SH 137, CONNOR BRIDGE	OTTAWA	November-98	Not Rated
1107	121600040220	NEOSHO RIVER, OFF US 66 , COMMERCE	OTTAWA	October-00	COOP DCP
1107	121600020170	NEOSHO RIVER, SH 82, LANGLEY	MAYES	November-98	COOP DCP
1107	121600010280	NEOSHO RIVER, US 412, CHOUTEAU	MAYES	November-98	COOP DCP
1110	520500010110	NORTH CANADIAN RIVER, IND. NAT. TPK., DUSTIN	MCINTOSH	November-98	Stage/Discharge Rating Only
1110	520510000110	NORTH CANADIAN RIVER, OFF US 62, HARRAH	OKLAHOMA	November-98	COOP DCP
1110	520510000110	NORTH CANADIAN RIVER, SH 3E, SHAWNEE	POTTAWATOMIE	October-00	COOP DCP
1110	720500010010	NORTH CANADIAN RIVER, US 281, SEILING	DEWEY	November-98	COOP DCP
1110	720500010140	NORTH CANADIAN RIVER, US 412, WOODWARD	WOODWARD	October-00	COOP DCP
1110	520510000010	NORTH CANADIAN RIVER, US 75, WETUMKA	HUGHES	September-99	COOP DCP
1110	520530000010	NORTH CANADIAN RIVER, US 81, EL RENO	CANADIAN	November-98	COOP DCP
1112	311510010010	NORTH FORK OF THE RED RIVER, SH 34, CARTER	BECKHAM	November-98	COOP DCP
1112	311500010020	NORTH FORK OF THE RED RIVER, US 62, HEADRICK	TILLMAN	November-98	COOP DCP
1111	220100010010	POTEAU RIVER, OFF SH 112, POCOLA	LEFLORE	November-98	Stage/Discharge Rating Only
1111	220100020010	POTEAU RIVER, US 59, HEAVENER	LEFLORE	November-98	Stage/Discharge Rating Only
1113	311310010010	RED RIVER, US 183, DAVIDSON	TILLMAN	November-98	OWRB/USACE DCP
1114	410100010010	RED RIVER, US 259, HARRIS	MCCURTAIN	November-98	COOP DCP
1114	410400010010	RED RIVER, US 271, HUGO	CHOCTAW	November-98	COOP DCP
1113	311100010190	RED RIVER, US 81, TERRAL	JEFFERSON	November-98	COOP DCP
1111	121700060080	SAGER CREEK, OFF US 412, WEST SILOAM SPRINGS	DELAWARE	November-98	COOP DCP
1106	621010010160	SALT FORK OF THE ARKANSAS, SH 58, INGERSOLL	ALFALFA	November-98	Stage/Discharge Rating Only
1106	621000010010	SALT FORK OF THE ARKANSAS, US 77, TONKAWA	KAY	October-00	COOP DCP
1112	311600020010	SALT FORK OF THE RED RIVER, OFF SH 34, MANGUM	GREER	October-00	COOP DCP
1112	311600020010	SALT FORK OF THE RED RIVER, OFF US 283, ELMER	JACKSON	November-98	COOP DCP
1113	311600010040	SANDY CREEK, SH 6, ELDORADO	JACKSON	November-98	Stage/Discharge Rating Only
1105	620910030010	SKELETON CREEK, SH 74, LOVELL	LOGAN	November-98	COOP DCP
1107	121600010290	SPRING CREEK, OFF US 412, MURPHY	MAYES	November-98	OWRB/USACE DCP
1107	121600070010	SPRING RIVER, OFF SH 137, QUAPAW	OTTAWA	November-98	COOP DCP
1107	121510020010	VERDIGRIS RIVER, SH 10, LENEPAH	NOWATA	November-98	COOP DCP

4-Digit HUC	Waterbody Identification Number	Station Name	County	Status	Discharge Measurement Strategy
1107	121500030010	VERDIGRIS RIVER, SH 20, KEETONVILLE	ROGERS	November-98	COOP DCP
1107	121500010200	VERDIGRIS RIVER, SH 51, WAGONER	WAGONER	September-99	Not Rated
1107	121500020260	VERDIGRIS RIVER, US 412, INOLA	ROGERS	October-00	Not Rated
1113	310810020010	WASHITA RIVER, OFF SH 19, NEAR ALEX	GRADY	January-03	COOP DCP
1113	310830030060	WASHITA RIVER, SH 152, CORDELL	WASHITA	November-98	OWRB DCP
1113	310810010010	WASHITA RIVER, SH 19, PAULS VALLEY	GARVIN	November-98	COOP DCP
1113	310840010010	WASHITA RIVER, SH 33, HAMMON	CUSTER	November-98	COOP DCP
1113	310800020010	WASHITA RIVER, US 177, DURWOOD	CARTER	November-98	COOP DCP
1113	310830010010	WASHITA RIVER, US 281, ANADARKO	CADDO	November-98	COOP DCP
1113	311310020010	WEST CACHE CREEK, SH 5B, TAYLOR	COTTON	November-98	OWRB DCP
1110	720500030040	WOLF CREEK, OFF US 270, FORT SUPPLY	WOODWARD	November-98	OWRB/USACE DCP

Stream Monitoring Variables. The variables that are monitored were chosen to reflect both objectives of the programs — assessment of beneficial uses within the framework of USAP as well as the assessment of general water quality. Even though a variable may not be listed in the OWQS with a specific criterion (e.g., hardness), the variable is an important constituent in analyzing and understanding the general water quality of a particular segment. See Table 4 for a list of monitoring variables.

Table 4. Variables Monitored by the BUMP Stream Sampling Program.

SAMPLE VARIABLES		
General Water Quality Variables – Sampled 8 to 10 times annually		
Dissolved Oxygen (D. O.)	PH	Specific Conductance
Temperature	Oxidation/Reduction Potential	% D. O. Saturation
Salinity	Total Alkalinity	Total Hardness
Chloride	Nephelometric Turbidity	Sulfate
Total Dissolved Solids		
Nutrients – Sampled 8 to 10 times annually		
*Kjeldahl Nitrogen	Ortho-Phosphorus	Total Phosphorus
*Nitrate Nitrogen	*Nitrite Nitrogen	Ammonia Nitrogen
Metals – Sampled as needed		
Arsenic	Cadmium	Chromium
Copper	Lead	Mercury
Nickel	Selenium	Silver
Zinc	Thallium	
Organics – Site specific sampling as needed		
Analysis of Pesticides, Herbicides, Fungicides, and other organics		

SAMPLE VARIABLES		
Bacteriological Communities – Sampled 5-10 times annually (during recreational season)		
Fecal Coliform	<i>Escherichia coli</i>	Enterococci
Biological Communities – Sampled as described below		
Sestonic Chlorophyll-a (10 times annually—site specific)	Benthic Chlorophyll-a (as needed during summer)	Fish (once every 4-5 years)
Benthic Macroinvertebrates (2 summer/2 winter 2 out of every 5 years)	Habitat (sampled with fish and macroinvertebrate sampling)	

*Total nitrogen is calculated by OWRB staff, based upon concentrations for these compounds.

Data for general water quality, nutrient, metals, organics, chlorophyll, and bacteriological variables are collected in one of two ways. Some variables are monitored in-situ utilizing a Hydrolab® Minisonde or YSI® multi-probe instrument. The measurement is taken at the deepest, fastest point of the channel at a depth of at least 0.1 meters and no greater than one-half of the total depth. The data are uploaded from the instrument to a data recorder, transferred manually to a field log sheet, and downloaded to the OWRB monitoring database. These variables include dissolved oxygen (D. O.), %D. O. saturation, water temperature, pH, and specific conductance as well as several calculated parameters such as salinity and total dissolved solids. Data for all other variables are gathered from water quality samples collected at the station. Samples are collected either by suspending a depth-integrating sampler (DH-95 with polyethylene collection bottle) from a bridge, by wading the stream with a DH-81 wadable depth-integrating sampler (polyethylene collection bottle), or in rare cases as a composite or point grab sample. If sampling occurs from a bridge, the sampling is done on the down-stream side of the bridge spanning the stream of interest. Samples are collected using a combination of the depth-integration method and the equal-width increment method. The depth-integration method involves collection of samples from the surface of the water to the bottom of the water column with water collected at a consistent rate on both the descent and the ascent. The equal-width-increments-method allows for collection of a composite sample by sampling with depth-integration at 5 to 10 equal widths across the stream. As each increment is sampled, the water is added to a polyethylene churn splitter. From this composite water sample, water quality variables are monitored in several ways. For laboratory analysis of general water quality variables and nutrients, water is aliquotted from the churn splitter to two (2) 1-liter bottles (one for sulfuric acid/ice preservation and one for ice preservation). If a sample is needed for metals analysis, water is aliquotted into a 1-liter acid washed bottle, preserved with nitric acid, and placed on ice. Sample water for the determination of nephelometric turbidity, total hardness, and total alkalinity is also aliquotted from the splitter churn. Nephelometric turbidity is determined through use of a HACH® Portable turbidimeter. Total hardness and alkalinity are determined using HACH® test kits. All instruments and test kits are calibrated and used according to manufacturer's instructions. Sestonic chlorophyll-a samples are also gathered from the churn and are filtered to a glass fiber filter with subsequent chemical/physical extraction. Samples for organics analysis are collected separately using Teflon and glass containers as opposed to polypropylene. Because organics have an increased affinity for polypropylene, allowing a sample to contact polypropylene sample bottles or churn splitters may cause concentrations to be significantly underestimated. Therefore, a composite sample for organics analysis is collected using a 1-liter Teflon collection bottle. At each increment, water is added to a 2-gallon glass bottle. The laboratory sample is aliquotted by inverting the glass bottle 10 times and dispensing to one-quart or one-pint clear or amber glass jars depending on the type

of organic analysis. The samples are placed on ice for preservation. Bacteriological samples are collected using a composite grab sample method and are aliquoted to 2 100-mL bacteria bottles for laboratory analysis.

Biological data are collected using a variety of methods. In short, fish are typically collected using electrofishing methods in all waters, where water conductivity allows. Seining is used as either a supplement to electrofishing or as the main gear type in waters with high conductivity. Benthic macroinvertebrates are collected by targeting the richest habitats in the waterbody including riffles, streamside vegetation, and woody debris. Collections are then sorted and a subsample taken for taxonomic analysis. Various habitat measures are also included during each biological sampling event. The long form habitat classification is used during fish collections, and staff gather data various instream and riparian characteristics using both quantitative and qualitative methods. A short form habitat classification is used during macroinvertebrate collections that focus on target habitat substrate composition. Benthic chlorophyll-a samples are gathered from the characteristic substrates of the stream.

For a more detailed discussion of water quality sampling procedures, please contact the OWRB for copy of the BUMP Standard Operating Procedures (SOP). The SOP document can be obtained by contacting Monty Porter with the Oklahoma Water Resources Board/Water Quality Programs Division at 405-530-8800 or maporter@owrb.ok.gov or by accessing and downloading the document via the web at the link below.

<http://www.state.ok.us/~owrb/reports/publications.html>

OWRB stream sampling personnel collect water quality data for all variables on permanent ambient trend monitoring stations (Table 3). For other programs or initiatives, the water quality variables analyzed are determined from a 303(d) listed cause code, by the requesting agency (with concurrence by OWRB staff), or to meet grant requirements. Methods used are identical to methods described for the permanent sites.

Quality Assurance/Quality Control (QA/QC). QA/QC will not be discussed in detail in this report. However, for a comprehensive description of field QA/QC methods, please contact Monty Porter with the Oklahoma Water Resources Board/Water Quality Programs Division at 405-530-8800 or maporter@owrb.ok.gov. For laboratory QA/QC methods please contact the Oklahoma Department of Environmental Quality/Customer Services Division at (405) 702-6100. Comprehensive QA/QC validation has been performed on all data collected and utilized for this report.

STREAM DATA ANALYSIS PROTOCOLS

BUMP data collection on streams began in November of 1998. In order to provide a structural framework for data analysis and interpretation within the confines of the OWQS, the program uses the Use Support Assessment Protocols (USAP) promulgated into rule in Oklahoma Administrative Code (OAC) 785:46-15. A detailed explanation of the relationship between the USAP and the data collected on streams and rivers as part of the BUMP is presented below. This explanation is broken down into 8 subsections: Data Requirements, Default Protocols, Assessment of Fish and Wildlife Propagation Support, Assessment of Primary Body Contact Recreation Support, Assessment of Public and Private Water Supply Support, Assessment of Agriculture Support, Assessment of Aesthetics Support, and Assessment of Human Health Support (fish consumption). The latest USAP is included with this document as Appendix A and should provide greater insight into exactly how use support determinations were made for this

report. In addition, OAC 785:45 (Oklahoma Water Quality Standards) and the justification document for the USAP can be obtained by contacting the OWRB/Water Quality Programs Division at (405) 530-8800 or through accessing the documents on the OWRB web page at: <http://www.state.ok.us/~owrb/rules/Rules.html>.

Data Requirements. USAP divides the number of stream miles that can be represented by a single site/station (or spatial coverage) into two categories—non-wadable and wadable streams. Sites/stations can be representative of no more than 25 stream miles on non-wadable streams and 10 stream miles on wadable streams. These limitations can be adjusted based upon existing data, distance between monitoring sites, sources of pollution, and the influence of major hydrological features, such as major tributaries and dams (delineated by 12-digit waterbody identification segments). A definition of what constitutes a wadable and non-wadable stream is not outlined in the USAP, so OWRB staff use federal guidance as well as best professional judgment. Federal 305 (b) guidelines say that no monitoring site/station can be representative of more than 25 stream miles on large streams and rivers. Furthermore, in areas where topography and land use are relatively homogeneous and there are no other significant influences, a single monitoring station can be representative up to 50 to 75 stream miles. Therefore, only two firm guidelines are currently available for determining the spatial coverage of a monitoring site/station:

- 1) The spatial coverage can not extend outside the 12-digit segment in which the monitoring site/station is located except in those instances where it is determined that it is reasonable to do so (e.g., the segment break is not caused by a major hydrological influence).
- 2) No monitoring site/station can be representative of more than 25 stream miles without a scientifically defensible justification.

Accordingly, spatial coverage for the BUMP report on streams will be limited to these two guidelines. The spatial coverage is subject to change dependent upon the language of the latest version of USAP.

USAP sets two limitations on temporal coverage. First, data used in assessments must be collected such that decisions are not biased towards either critical-flow, base-flow, or high-flow conditions. This report uses data collected during all seasons. Secondly, stream data that is more than five years old cannot be used to assess support unless no other data exists or a scientifically defensible reason can be brought forth justifying the use of older data. Generally, sufficient data are present for assessments to be made for the only the 5 years preceding the reporting period. However, in some cases older data may need to be used so that a complete assessment may be made. This report uses no data collected before November of 1998, and most analyses are for data collected between May 1, 2002 and April 30, 2007.

USAP also sets data requirements on the number of samples needed and the magnitude of criteria exceedance for toxicants and dissolved oxygen before a use support determination can be made. The minimum number of samples required to assess use support for all general water quality variables is ten (10). This minimum number of samples is not applicable if data from samples already collected ensures that the use will not be supported. In other words, if a 25% percent exceedance is required to designate a use as not supporting and three (3) of the first five (5) samples collected were in exceedance of the criteria, then sampling can discontinue because you are assured of having >25% of the minimum number of samples exceeding the criteria. The BUMP program collects at least eight samples per year on all general water quality parameters with the exception of bacteria, organics and metals. Toxicants (metals and

organics) require a minimum of five (5) samples to determine use support, however, less than 5 samples can be used to determine if a use is partially supported or not supported. Furthermore, if at least 2 sample concentrations of a toxicant exceed the criteria prescribed in the OWQS by two or more orders of magnitude, then the use is determined to be “not supporting”.

Finally, USAP gives guidance on the treatment of practical quantification limits (PQL), or detection limits. A PQL is the minimum value that a particular test or instrument can “read-to” with an acceptable level of confidence. If a value is determined to be less than the PQL, then it is generally reported as a “less than value” (e.g., variable data point “x” = <2.0 mg/L). In other words, the test or the instrument cannot deliver a value less than the PQL without introducing statistically significant uncertainty to the data. Moreover, when analyzing the data, data point “x” cannot be assigned a value of 2.0 mg/L or 0.0 mg/L because staff would be making an arbitrary determination that would assuredly be either an under estimation or an over estimation of the “true” value. Consequently, the OWRB staff assigns a value that is fifty percent of the PQL (“x” would equal 1.0 mg/L).

Default Protocols. USAP outlines the procedures for determining whether a set of data points for a particular variable **support** or **do not support** a particular beneficial use. These protocols are constructed around two distinct types of numerical variables — short term averages and long term averages. In each case, samples collected for the range of water quality parameters are analyzed and aggregated in different ways. One may note that the USAP has a category called “partially supporting”. Because this classification is not used in the 303(d) listing methodology, it is excluded from this report. Any assessment that would be “partially supporting” is thereby considered “not supporting”. This is in accordance with not only USAP methodology but also Oklahoma’s Continuing Planning Process (CPP) document, which provides supplemental guidance for use support attainment decisions in accordance with USEPA requirements. Furthermore, the CPP classifies water bodies as “impaired” or “not impaired”. These designations are synonymous with the “supporting” and “not supporting”, respectively.

Short-term average numerical variables measure variables with exposure periods of less than seven days (e.g., turbidity or a sample standard for chlorides). In other words, the set of samples that is being analyzed considers each sample as a separate entity. For example, **each** turbidity sample collected monthly from January through December is considered a unique sample, and consequently, every sample is not aggregated into a single sample for analysis but is considered a fraction of the whole. Use support determination for short-term numerical variables requires a three-step process:

1. Each sample exceeding the prescribed criterion or screening level for a particular variable is identified,
2. The number of samples exceeding the prescribed criterion or screening level is divided by the total number of samples collected to obtain a percent exceedance, and
3. The percent exceedance is compared to a range of prescribed percent exceedances to determine use support. The prescribed percent exceedances are:
 - i) Supporting — less than or equal to ten percent (10%),
 - ii) Not supporting — greater than 10%.

Long-term average numerical variables measure variables with exposure periods of greater than or equal to seven days (e.g., yearly mean standard for chlorides). In other words, the **entire** set of samples that is being analyzed is considered a unique entity. For example, chloride samples collected monthly from January through December are aggregated through

the calculation of an arithmetic mean. In most instances, at least ten samples are required to calculate a mean. Use support determination for long-term numerical variables requires a three-step process:

- 1) Samples for a particular variable are aggregated into an arithmetic or geometric mean.
- 2) The mean is compared to the prescribed criterion or screening level.
- 3) Use support is determined to be supporting if the mean is less than the prescribed criterion or screening level or not supporting if the mean is greater than the prescribed criterion or screening level.

So that the reader will fully understand how use support was determined for our rivers and streams for the various beneficial uses assigned to them a short discussion of the OWQS beneficial uses and the Use Support Assessment Protocols (USAP) is included below.

Assessment of Fish and Wildlife Propagation (FWP) Support. The FWP beneficial use utilizes five different water quality variables to assess use support: dissolved oxygen (D.O.) concentration, toxicants, hydrogen ion activity (pH), turbidity, and biological criteria. Only one variable needs to exceed the assessment protocol for the beneficial use to be not supported.

The OWQS 785:45-5-12(g)(1) in a table entitled “Dissolved Oxygen Criteria” prescribes three screening levels for D.O. in streams. Streams are categorized in Appendix C of the OWQS as habitat limited aquatic communities (HLAC), warm water aquatic communities (WWAC), cool water aquatic communities (CWAC), and trout fisheries (TF). The prescribed screening level for each of the categories is: HLAC—4.0mg/l (April 1—June 15) and 3.0 mg/L (June 16—May 31); WWAC—4.0mg/l (June 16—October 15) and 5.0 mg/L (October 16—June 15); and CWAC and TF—5.0mg/l (June 1—October 15) and 6.0 mg/L (October 16—May 31). The protocol for short-term average numerical parameters is used to assess the level of support.

Numerical criteria is prescribed for toxicants in OWQS 785:45-5-12(g)(6)(G) in a table entitled “Numerical Criteria for Toxic Substances”. To determine use support, the protocol for short-term average numerical parameters is used. Sample values must be compared to both acute and chronic criterion. Both criteria need not be exceeded for the variable to be partially supported or not supported.

A numerical range for pH of 6.5 to 9.0 units is prescribed in 785:45-5-12(g)(3) for all aquatic classifications. The protocol for short-term average numerical parameters is used to assess the level of support.

Screening limits are established for turbidity in OWQS 785:45-5-12(g)(7)(A)(i) and (iii). CWAC are assigned a criterion of 10 Nephelometric Turbidity Units (NTU), and all other stream communities are assigned a criterion of 50 NTU. The protocol for short-term average numerical parameters is used to assess the level of support. In OWQS 785:45-5-12(g)(7)(C), it is stated that numerical criteria for turbidity “apply only to seasonal base flow conditions”. Therefore, those measurements that are taken above seasonal base flow are not included in determining support. To determine seasonal base flow, the average discharge for the sampling day is compared to the median flow of the three months surrounding the sampling day. If the station is not part of the USGS stream-flow monitoring program but has an upstream or downstream stream-flow station in close proximity, that station is used to determine whether the station in question is at seasonal base flow. If no proximal stream-flow station exists, stream-flow monitoring stations on other waterbodies that are in close geographical proximity were used to determine whether the station in question is at seasonal base flow. Because discharge data is

not yet available from October of 2001 through September of 2002, use support determinations based on turbidity data are provisional and assessments related to turbidity may be subject to change. Therefore, all turbidity assessments are provisional. Changes will be reported in an addendum to this report. Furthermore, to assist staff in the determination of seasonal base flow at stations that do not have continuous discharge measurements, the OWRB is now collecting discharge measurements at all but four of the permanent monitoring stations. To supplement base flow determination staff uses several anecdotal methods. These methods are only used in concert with another method when determining if base flow conditions existed when the sample was taken. In one method, staff determines flow condition visually by noting whether the flow is minimal, light, moderate, high, or stormwater. Also, beginning in 2002, staff began noting the presence or absence of a periphyton line as well as the color and texture of the periphyton. In most instances, if a periphyton line has been established, flow has not exceeded that level in at least seven days.

Additionally, biological criteria have been promulgated into rule for all but four ecoregions. As fish data are collected on streams throughout the state, an assessment of biological health will be presented in this report. The application of biological criteria requires a three-step process. First, various metrics (e.g., # of sunfish species) are determined on the raw collection data (i.e., species and numbers of each species). From these metrics, an index of biological integrity (IBI) is calculated. Finally, the IBI score is compared to regionally developed scoring ranges, and the site is placed into 1 of 3 biocriteria categories—fully supporting, undetermined, or not supporting. For those regions where biological criteria have yet to be developed, the data are presented in this report, but the site evaluation is left as undetermined. Sites will continue to be referred to as “undetermined” until an alternate protocol for assessing fish and/or benthic macroinvertebrate data is developed.

Assessment of Primary Body Contact Recreation (PBCR) Support. The PBCR beneficial use utilizes 2 different bacteriological classes and one bacteriological species to assess use support: fecal coliform (FC), *Escherichia coli* (*E. coli*), and enterococci (Ent.). The assessment is performed by using the long-term average numerical protocol to compare to a prescribed geometric mean and by using a modified version of the short-term average numerical protocol to compare each sample to a prescribed screening level. The prescribed geometric means (GM) and screening levels (SL) are: FC—GM of 400 colony forming units/mL (cfu/mL) and SL of 400 cfu/mL; *E. coli*—GM of 126 cfu/mL and SL of 235 cfu/mL in scenic rivers and 406 cfu/mL in all other waters; and Ent.—GM of 33 cfu/mL and SL of 61 cfu/mL in scenic rivers and 406 cfu/mL in all other waters. For *E. coli* and Ent., both the SL (only one sample exceedance is necessary) and the GM must be exceeded for the use to not be supported. If all of the samples meet the SL or the GM is met, the use is supported. In the case of FC, the use may only be supported if the GM is met and no greater than 25% of the sample concentrations exceed the SL. If either the GM is exceeded or greater than 25% of the sample concentrations exceed the SL, the use is not supported for FC. The PBCR support is only determined from samples collected during the recreational season from May 1 through September 30 of each year. Only one variable needs to violate the assessment protocol for the beneficial use to be not supported.

The Secondary Body Contact Recreation (SBCR) beneficial use is assessed in a similar fashion. As with the PBCR, the use requires analysis of both individual samples as well as the geometric mean of all samples. The only salient difference between the assessment protocols is the criteria that are used in assessment. For SBCR, the criteria are established at five times PBCR screening limits and geometric mean criteria.

Assessment of Public and Private Water Supply (PPWS) Support. The PPWS beneficial use utilizes toxicant concentrations to assess use support. For purposes of this report, only metals are considered in the toxicant category. Only one variable needs to violate the assessment protocol for the beneficial use to be not supported. In previous reporting years, total coliform bacteria were used to determine use support. This was done in error. The criterion of 5,000 cfu/mL in the OWQS is only applied at the water supply intake point and is not to be applied throughout the waterbody.

Numerical criteria for metals is established in OWQS 785:45-5-10(1) and (6). The short-term numerical average protocol is used to determine use support for both sets of criterion. If a substance has different numerical criteria listed in both tables, the most stringent criterion takes precedence. Furthermore, criteria in both tables need not be exceeded for the use to be not supported.

Assessment of Agriculture (AG) Support. The AG beneficial use utilizes three variables to assess use support: total dissolved solids, chlorides, and sulfates. Numerical criteria for both yearly mean standards and sample standards are located in Appendix F of OAC 785:45. The yearly mean standard for each variable is compared to the arithmetic mean of the samples using a long-term average numerical protocol. The sample standard for each variable is compared to the each sample using a short-term average numerical protocol. Use support assessment for each variable requires a three-step process:

- 1) The sample standard and yearly mean standard for the six digit management segment which encompasses the monitoring must be located in Appendix F of OAC 785:45;
- 2) The geometric mean of the samples is compared to the yearly mean standard (if the geometric mean exceeds the yearly mean standard, the use is not supported and no further analysis is necessary);
- 3) If the geometric mean meets the yearly mean standard, the sample standard is compared to each sample and percent exceedance is calculated (depending on the percent exceedance, the variable is supporting or not supporting). Regardless of the criteria in Appendix F of OAC 785:45, if all TDS samples are less than 750 mg/L and all chloride and sulfate samples are less than 250 mg/L, the AG beneficial use is supported. Only one variable needs to violate the assessment protocol for the beneficial use to be not supported.

Assessment of Aesthetics Support. With the exception of the numerical criterion of 0.037 mg/L of total phosphorus for Oklahoma scenic rivers and 70 Platinum-cobalt units for true color, the OWQS includes only narrative criteria for the aesthetics beneficial use. Furthermore, the USAP only addresses the effect of nutrients and true color. However, narrative criteria in OAC 785:45-3-2(c) requires that nutrients related water quality degradation cannot interfere with the maintenance of any beneficial use protected under OAC 785:46-13-3(a)(1). Because numerical nutrient criteria exists only for scenic rivers, assessments of nutrients on all other rivers and streams do not determine beneficial use support but whether a particular stretch of stream is nutrient-threatened. Therefore, these assessments of nutrients do not utilize any of the default protocols, but revolve around the use of a dichotomous key. The use of the key is a rather involved process and will not be verbally outlined in this report. Please refer to OAC 785:46-15-10 for a detailed discussion of the dichotomous key and how it is applied for use support determination.

The impact of nutrients on streams is related to the growth of phytoplankton. Phytoplankton are autotrophic which means that when light and consumables such as nutrients are available they can convert energy and grow. The available nutrients are total phosphorus and nitrite and nitrate (utilized as a combined nitrogen concentration). Several factors determine if the level of these compounds pose a threat to the health of the stream. Foremost, the size of the stream must be considered. Smaller streams (3rd order or less) tend to be more susceptible to nutrient impacts and, therefore, smaller concentrations have similar effects as larger concentrations in larger streams (greater than 3rd order). Depending on stream order, USAP has established preset threshold values for total phosphorus and nitrate/nitrite. If the median of the sample values exceeds the threshold, the following confounding factors are considered to determine if the excessive nutrients are threatening the health of the stream. The amount of time the nutrient is resident in the stream is proportional to the impact. Therefore, the slope of the topography around the station must be considered. Furthermore, phytoplankton is light dependent for growth. Logic states that low clarity will limit the impact of phytoplankton on the stream and that high clarity will increase the impact of phytoplankton. Consequently, light must be able to penetrate the surface of the water, and water clarity is measured by using a nephelometric turbidity meter or a Secchi disk. Only turbidity readings taken at seasonal base flow are included when calculating the arithmetic mean, and a differentiation is made between inorganic and organic turbidity. High organic turbidity is not considered when light limitation is used as an excluding factor for nutrient threatened waters. On smaller streams, available light is also measured by percent canopy shading. An option to the dichotomous key is the use of Carlson's Trophic State Index (TSI) value (Carlson, 1977) on non-wadeable streams. The mean of sestonic chlorophyll-a data is used to calculate the TSI using the equation: **TSI = 9.81 x ln(chlorophyll-a) + 30.6**. A TSI value of 62 or greater indicates that a nonwadeable waterbody is nutrient threatened.

In 2002, a numerical criterion of 0.037 mg/L of total phosphorus was set for all waterbodies designated as Oklahoma Scenic Rivers. These rivers include the Barren Fork River, Flint Creek, the Illinois River, Lee Creek, Little Lee Creek, and the Mountain Fork River above Broken Bow Reservoir. The current USAP requires that a multi-step process for support determination. First of all, three-month rolling geometrics are calculated for the most immediate 5 years of data available. This data, when possible, should include high flow monitoring events. Once the geometric means are calculated a short-term protocol is used for final assessment. If less than 10% of the three-month geometric means are below 0.037, the station is supporting, but if more than 10% are above the criterion, the station is not supporting.

Assessment of Human Health Support. A new beneficial use was created in 1999 dealing with fish consumption and is housed under the Human Health criteria. The new use deals with fish consumption bans and states that waters that the DEQ has issued a fish consumption ban on will be considered as not supporting it's fish consumption use. Currently the BUMP has sampled several waters to determine fish consumption use support but will not report results until the 2003 report.

PERMANENT STREAM MONITORING STATION RESULTS & DISCUSSION

The results for the permanent monitoring stations are grouped alphabetically within their home 4-digit USGS sub-basin (Table 3). A map of the state with all of the 4-digit HUC basins is included as to aid the reader in finding a particular water body (Figure 2). Each of these sections has a similar arrangement. Immediately following the tab for a particular sub-basin, there is a 1 or 2-page synopsis of the physical, geographical, and hydrological attributes of the

HUC. Included in this description will be a tabular listing of the stations located within the sub-basin.

Following the HUC description will be a detailed 1-2-page analysis of each station. The analysis includes a physical, geographical, and hydrological description of the site. Directly following the descriptive information, a short narrative is included that verifies that monitoring at the site complied with the data requirements outlined in USAP, or, in some instances, an explanation is offered as to why certain data requirements were not followed. For example, several stations in western Oklahoma go dry during the late spring or early summer. Therefore, the assessments for these stations may not be seasonally representative. Next, a comprehensive assessment of each of the prescribed beneficial uses is included. An all-inclusive assessment of the stations can be found in Table 5. Under certain circumstances, a beneficial use may not be assessed for a variety of reasons. The station may be new or inactivated before adequate data was collected for assessment, data may not be available due to laboratory, field, or equipment error, or sometimes data may not be collected due to monetary or personnel constraints. Data used to support all assessment determinations are available in PDF format on the report website. Table 5 lists the BUMP permanent ambient trend stream monitoring sites and their associated beneficial uses. Beneficial uses that are not being met are shown in **RED**. Listed next to the support code indicating that the beneficial use was not being met is the variable code which indicates which water quality variable violated the OWQS criteria. **Because the determination of the previous year's base flow is provisional until all discharge records are finalized, all turbidity values available for use support analysis are provisional at the publication of this report.**

When reviewing Table 5 it is apparent that an inordinate number of water bodies are deemed impaired due to bacteria. Of the 101 stations assessed for Primary Body Contact Recreation (PBCR) or Secondary Body Contact Recreation (SBCR) in this report, ninety (90) stations (or ~90%) are listed as not supporting due to the exceedance of one or more variable. Several explanations may address this inordinate number of non-supporting stations. Primarily, a valid assumption may be that the assessment of data is reflective of reality in many listings. Of the 90 non-supporting stations, thirty-seven (37), or 41%, have multi-variable exceedances. Furthermore, a pattern of consistency can be seen for certain variables at some stations. In other words, exceedances of the applicable screening limits are present in each recreational season during the period of record. Secondly, the high percentage of non-supporting stations may be an artifact of either the OWQS criteria and/or the USAP decision-making process. The criteria used to assess BCR are protective of human health, and rightfully so. However, are all waterbodies assigned BCR recreated to the same extent? In other words, should the same amount of protection apply to all waterbodies? Currently, Oklahoma has a two-tiered system—lakes/scenic rivers and all others—with more stringent criteria applied to lakes and scenic rivers. Additionally, the decision-making process in USAP may be producing some type I errors—assigning non-support status incorrectly. While maintaining the need for protection of human health, the process for assignment and assessment of the PBCR beneficial use needs to be looked over carefully so that water quality management will become more precise and accurate.

It is also imperative that the state continues to refine the minerals criteria found in OAC 45: Appendix F. The process was begun in earnest in 2005 with a major revision to Appendix F criteria, and the assessments in this report reflect these new criteria. However, some management segment values are still extrapolated from minimum data and from stations not necessarily representative of the entire management segment. By using the OWRB's

methodology for the development of site-specific minerals criteria, BUMP data as well as other other water quality monitoring program data may be used to refine inconsistent criteria.

It is essential that Oklahoma quantify impacts in a comprehensive and scientific manner and look for trends in water quality to identify waters that are not meeting their assigned beneficial uses. As a state, we must manage our water resources effectively and direct money to areas in most need of protection or remediation to ensure that we continue to have good quality and sufficient quantity of water to meet our needs well into the 21st century. It is the desire of the Oklahoma Water Resources Board to provide the legislature, the general public and professional water managers with a comprehensive and up-to-date document for their review and approval. Administrative and Technical staff at the OWRB look forward to conducting the Beneficial Use Monitoring Program far into the future and providing the state of Oklahoma with the information it needs to make informed decisions related to the effective management of it's precious water resources.

United States Geological Survey 4-Digit Hydrologic Unit Codes for Oklahoma

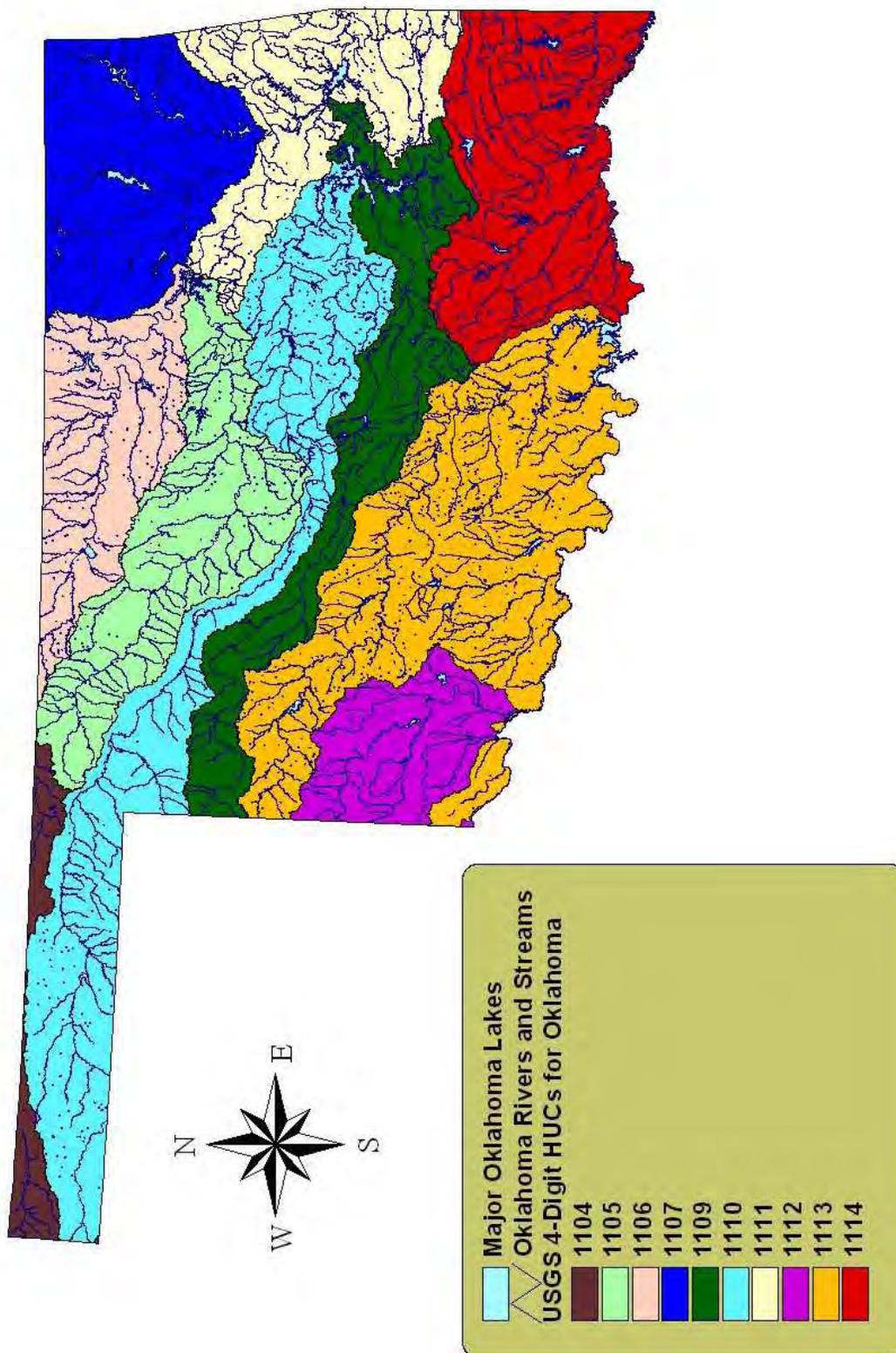


Figure 2. USGS 4-digit HUC basins.

Table 5. Permanent Ambient Trend Monitoring Stations and their Beneficial Use Support Status.

STATION NAME	FWP	PBCR	PPWS	AG	AES
ARKANSAS RIVER, US 64, MOFFETT	S	NS (8)	S	NS (10)	NT
ARKANSAS RIVER, SH 104, HASKELL	NS (18)	NS (8)	N/A	NS (10)	NT
ARKANSAS RIVER, SH 18, RALSTON	NS (5)	NS (8)	S	S	NT
ARKANSAS RIVER, SH 97, SAND SPRINGS	NS (18)	S	N/A	NS (10)	NT
ARKANSAS RIVER, US 62, MUSKOGEE	NS (3)	NS (8)	N/A	NS (10, 11)	T (17)
ARKANSAS RIVER, US 64, BIXBY	S	NS (6, 8)	N/A	NS (10)	NT
BARREN FORK, SH 51, ELDON	S	NS (8)	S	S	NS (14)
BEAVER RIVER, OFF US 64, GUYMON	NS (1)	NS (6, 7, 8)	S	S	NT
BEAVER RIVER, US 83, TURPIN	S	NS (6, 7, 8)	N/A	NS (10, 11)	NT
BEAVER RIVER, SH 23, BEAVER	S	NS (6, 7, 8)	N/A	NS (10, 11, 12)	NT
BEAVER RIVER, US 283, LAVERNE	S	NS (6, 7, 8)	N/A	S	NT
BEAVER RIVER, CR N1650, GATE	S	NS (6, 8)	N/A	NS (10, 11)	NT
BEAVER RIVER, US 183, FORT SUPPLY	S	NS (8)	N/A	S	NT
BIG CABIN CREEK, OFF US 69, BIG CABIN	NS (18)	NS (8)	NS (6)	NS (12)	NT
BIRD CREEK, SH 266, PORT OF CATOOSA	NS (5, 18)	NS (6, 7, 8)	S	NS (12)	T (13)
BLACK BEAR CREEK, SH 18, PAWNEE	NS (3, 5)	NS (6, 8)	S	S	NT
BLUE RIVER, US 70, DURANT	S	NS (8)	S	S	NT
BRUSHY CREEK, OFF US 270, HAILEYVILLE	NS (1, 3, 5, 18)	NS (8)	S	NS (12)	NT
CANADIAN RIVER, SH 2, WHITEFIELD	S	S	S	S	NT
CANADIAN RIVER, US 183, TALOGA	S	NS (8)	N/A	NS (10, 11, 12)	NT
CANADIAN RIVER, US 270, CALVIN	NS (3, 5, 18)	NS (8)	S	NS (10, 12)	T (17)
CANADIAN RIVER, US 377, KONAWA	NS (3, 5, 18)	NS (8)	S	NS (10)	T (17)
CANADIAN RIVER, US 66, BRIDGEPORT	NS (5)	NS (8)	N/A	S	NT
CANADIAN RIVER, US 77, PURCELL	NS (5, 18)	NS (8)	N/A	S	T (13, 17)
CANEY CREEK, OFF SH 100, BARBER	S	NS (8)	S	S	NT
CANEY RIVER, OFF US 75, RAMONA	NS (3, 5)	NS (8)	S	S	T (17)
CHICKASKIA RIVER, US 177, BLACKWELL	NS (5)	NS (6, 8)	S	S	NT
CIMARRON RIVER, OFF SH 8, NEAR AMES	S	NS (7, 8)	N/A	NS (10, 11, 12)	NT
CIMARRON RIVER, SH 34, BUFFALO	S	NS (6, 7, 8)	N/A	NS (10,11)	NT
CIMARRON RIVER, SH 99, OILTON	NS (5)	NS (6, 8)	N/A	NS (10)	NT

STREAM MONITORING PROGRAM

STATION NAME	FWP	PBCR	PPWS	AG	AES
CIMARRON RIVER, US 77, GUTHRIE	S	NS (8)	N/A	S	T(17)
CIMARRON RIVER, US 81, DOVER	S	NS (7, 8)	N/A	NS (10, 11)	NT
CIMARRON RIVER, OFF US 64, MOCANE	S	NS (6, 8)	S	S	NT
CIMARRON RIVER, SH 33, RIPLEY	NS (5)	NS (8)	N/A	NS (10)	NT
CIMARRON RIVER, US 281, NEAR WAYNOKA	NS (16)	NS (7)	N/A	NS (10, 11)	NT
CLEAR BOGGY CREEK, OFF US 69, CANEY	NS (3, 5)	NS (8)	S	S	T(17)
DEEP FORK RIVER, OFF SH 16, BEGGS	NS (5, 18)	NS (6, 8)	S	S	NT
DEEP FORK RIVER, US 377, STROUD	NS (3, 5)	NS (6, 8)	NS (9)	S	NT
EAST CACHE CREEK, SH 53, WALTERS	NS (5)	NS (6, 8)	S	NS (10)	NT
ELK CREEK, OFF US 183, ROOSEVELT	NS (5)	NS (6, 8)	S	S	NT
ELK RIVER, SH 43, TIFF CITY (MO)	S	S	S	S	NT
ELM FORK RIVER, SH 9, GRANITE	S	NS (6, 7, 8)	S	NS (11)	NT
FLINT CREEK, US 412, FLINT	S	NS (8)	S	S	NS (14)
FOURCHE-MALINE CREEK, OFF US 270, RED OAK	NS (1, 3)	NS (8)	S	S	NT
GLOVER RIVER, SH 3, GLOVER	NS (3, 5)	S	S	S	NT
HONEY CREEK, OFF SH 25, GROVE	S	NS (8)	S	S	NT
ILLINOIS RIVER, US 59, WATTS	NS (5)	NS (8)	S	S	NS (14)
ILLINOIS RIVER, US 62, TAHLEQUAH	S	NS (8)	S	S	NS (14)
KIAMICHI RIVER, OFF US 271, TUSKAHOMA	NS (3)	NS (8)	S	S	NT
KIAMICHI RIVER, SH 63, BIG CEDAR	NS (3, 4)	NS (8)	S	S	NT
KIAMICHI RIVER, US 271, ANTLERS	NS (3)	NS (8)	S	S	NT
KIAMICHI RIVER, SH 109, FORT TOWSON	NS (2, 3)	NS (8)	S	S	NT
LEE CREEK, SH 101, SHORT	NS (3)	NS (8)	S	S	S
LITTLE RIVER, OFF SH 3, CLOUDY	NS (3, 5)	NS (8)	S	S	NT
LITTLE RIVER, OFF US 70, NEAR HOLLY CREEK	NS (1, 5)	S	S	S	NT
LITTLE RIVER, SH 56, SASAKWA	NS (3, 18)	NS (6, 8)	S	S	NT
MOUNTAIN FORK, SH 4, SMITHVILLE	NS (3, 5)	NS (8)	S	S	NS (14)
MOUNTAIN FORK, US 70, EAGLETOWN	NS (2, 3)	NS (8)	S	S	NT
MUD CREEK, SH 32, COURTNEY	NS (1, 3, 5)	NS (6, 8)	S	S	NT
MUDDY BOGGY CREEK, US 70, UNGER	NS (3, 5, 18)	NS (8)	S	S	NT
MUDDY BOGGY CREEK, US 69, ATOKA	NS (1, 3, 5)	NS (6, 8)	S	S	NT
NEOSHO RIVER, OFF US 66, COMMERCE	NS (3, 5)	NS (8)	S	S	NT

STATION NAME	FWP	PBCR	PPWS	AG	AES
NEOSHO RIVER, OFF SH 137, CONNOR BRIDGE	NS (2, 3, 5)	S	S	S	NT
NEOSHO RIVER, SH 82, LANGLEY	NS (1)	S	S	S	NT
NEOSHO RIVER, US 412, CHOUTEAU	NS (1, 3)	S	S	S	NT
NORTH CANADIAN RIVER, IND. NAT. TPK., DUSTIN	NS (3, 5)	NS (6, 8)	S	S	T (13)
NORTH CANADIAN RIVER, SH 3E, SHAWNEE	NS (3, 4, 5)	NS (8)	N/A	S	T (13, 17)
NORTH CANADIAN RIVER, OFF US 62, HARRAH	NS (dieldrin)	NS (6, 8)	N/A	NS (10)	T (13, 17)
NORTH CANADIAN RIVER, US 270, WATONGA	S	NS (6, 7, 8)	S	S	NT
NORTH CANADIAN RIVER, US 281, SEILING	NS (5)	NS (8)	S	S	NT
NORTH CANADIAN RIVER, US 75, WETUMKA	NS (3, 4, 5)	NS (8)	S	S	T (13, 17)
NORTH CANADIAN RIVER, US 412, WOODWARD	S	NS (8)	N/A	S	NT
NORTH CANADIAN RIVER, US 81, EL RENO	S	NS (6, 8)	S	S	NT
NORTH FORK OF THE RED RIVER, US 62, HEADRICK	NS (5)	NS (8)	S	NS (10, 11)	T (17)
NORTH FORK OF THE RED RIVER, SH 34, CARTER	NS (5)	NS (8)	S	S	NT
POTEAU RIVER, OFF SH 112, POCOLA	NS (3, 5)	NS (8)	S	S	NT
POTEAU RIVER, US 59, HEAVENER	S	S	S	S	NT
RED RIVER, US 183, DAVIDSON	NS (3, 5)	NS (6, 8)	N/A	NS (10, 11, 12)	T (17)
RED RIVER, US 259, HARRIS	NS (5, 18)	S	S	S	NT
RED RIVER, US 271, HUGO	NS (5, 18)	NS (8)	S	NS (10, 11, 12)	NT
RED RIVER, US 81, TERRAL	NS (5)	NS (8)	S	NS (10, 11, 12)	NT
SAGER CREEK, OFF US 412, WEST SILOAM SPRINGS	S	NS (8)	NS (nitrates)	S	T (13, 15)
SALT FORK OF THE ARKANSAS, SH 58, INGERSOLL	NS (5)	NS (6, 7, 8)	S	NS (12)	NT
SALT FORK OF THE ARKANSAS, US 77, TONKAWA	NS (5)	NS (8)	S	S	NT
SALT FORK OF THE RED RIVER, OFF US 283, ELMER	NS (3)	NS (6, 8)	S	S	T (17)
SANDY CREEK, SH 6, ELDORADO	NS (2, 3, 5)	NS (8)	N/A	NS (10, 11, 12)	NT
SKELETON CREEK, SH 74, LOVELL	NS (5, 18)	NS (6, 8)	S	S	NT
SPRING CREEK, OFF US 412, MURPHY	S	S	S	S	NT
SPRING RIVER, OFF SH 137, QUAPAW	NS (2, 3, 5)	NS (8)	S	S	NT
VERDIGRIS RIVER, US 412, INOLA	NS (3, 5)	NS (8)	S	S	NT
VERDIGRIS RIVER, SH 10, LENEPAH	NS (3, 5)	NS (8)	S	S	NT
VERDIGRIS RIVER, SH 20, KEETONVILLE	S	NS (8)	S	S	NT
VERDIGRIS RIVER, SH 51, WAGONER	NS (2, 3, 5)	NS (8)	S	S	NT
WASHITA RIVER, OFF SH 19, ALEX	NS (5)	NS (6, 8)	S	S	T (17)

STREAM MONITORING PROGRAM

STATION NAME	FWP	PBCR	PPWS	AG	AES
WASHITA RIVER, SH 152, CORDELL	NS (5, 16)	NS (6, 7, 8)	S	S	NT
WASHITA RIVER, SH 19, PAULS VALLEY	NS (5)	NS (6, 8)	S	S	NT
WASHITA RIVER, SH 33, MCCLURE	NS (5, 16)	NS (6, 7, 8)	S	S	NT
WASHITA RIVER, US 177, DURWOOD	NS (5)	NS (6, 8)	S	S	T (17)
WASHITA RIVER, US 281, ANADARKO	NS (5, 16)	NS (6, 8)	S	S	T (17)
WEST CACHE CREEK, SH 5B, TAYLOR	NS (5)	NS (6, 7, 8)	S	NS (10,11)	NT
WOLF CREEK, OFF US 270, FORT SUPPLY	S	NS (8)	S	S	NT

ASSIGNED OWQS BENEFICIAL USES	
FWP = FISH & WILDLIFE PROPAGATION	PBCR = PRIMARY BODY CONTACT RECREATION
PPWS = PUBLIC AND PRIVATE WATER SUPPLY	AG = AGRICULTURE
AES = AESTHETICS	

SUPPORT CODES		
S—FULLY SUPPORTING	NS—NOT SUPPORTING	N/A—NOT APPLICABLE
NT-NOT THREATENED (NUTRIENTS)	T-THREATENED (NUTRIENTS)	NO DATA—INSUFFICIENT INFO

WATER QUALITY VARIABLES		
1—DISSOLVED OXYGEN	2—METALS (ACUTE)	3—METALS (CHRONIC)
4—PH	5—TURBIDITY	6—FECAL COLIFORM
7— <i>ESCHERICHIA COLI</i>	8— Enterococci	9—METALS
10— TOTAL DISSOLVED SOLIDS	11— CHLORIDES	12— SULFATES
13— TOTAL PHOSPHORUS (TP)	14—TP OK SCENIC RIVER CRITERION	15— NITRITE + NITRATE
16—BIOCRITERIA	17—SESTONIC CHLOROPHYLL-A (TSI)	18—VISUAL OIL AND GREASE

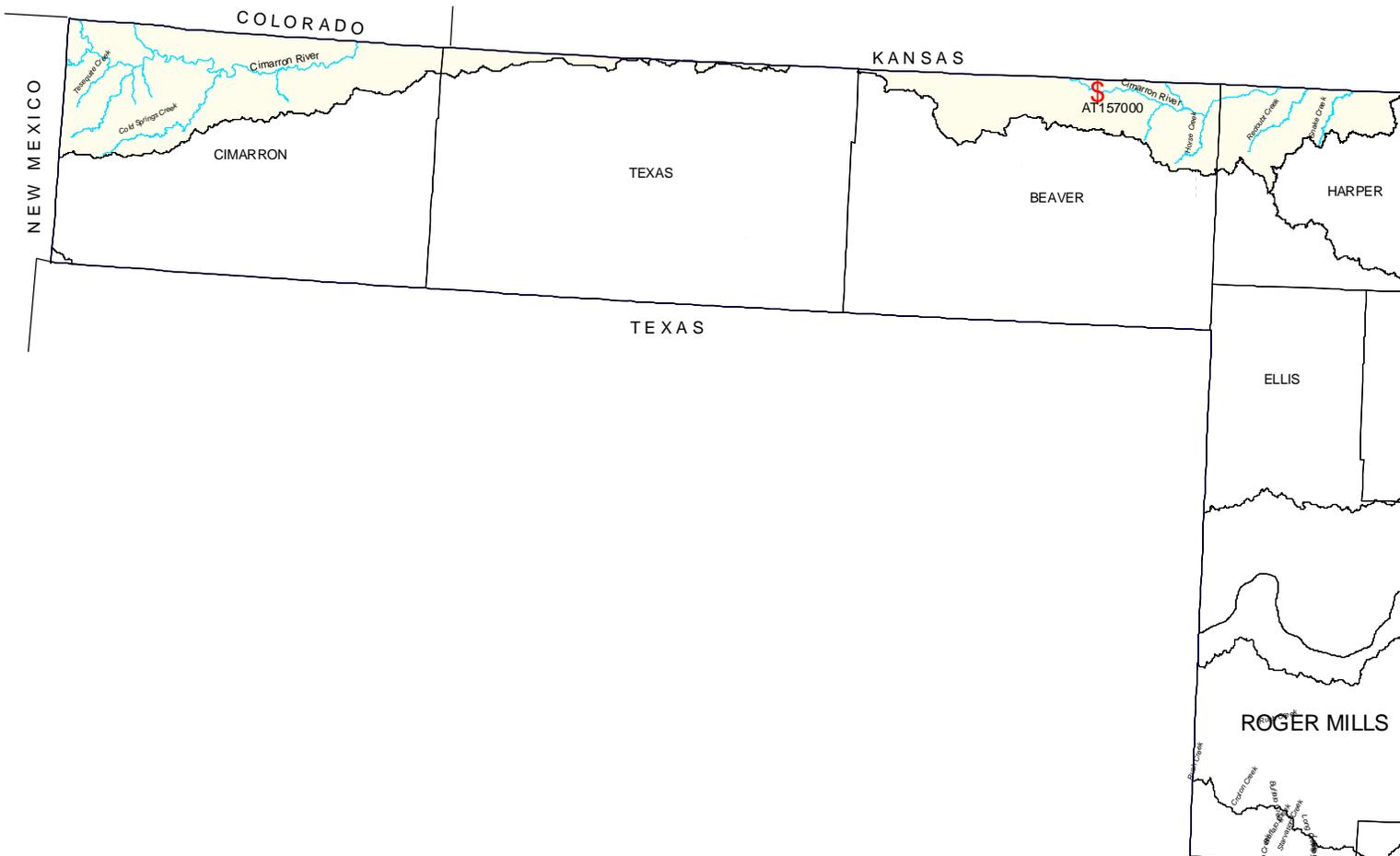


Plate 57
 UPPER CIMARRON SUBBASIN (HUC 1104)
 Water Quality Programs Division
 Oklahoma Water Resources Board

HUC 1104

UPPER CIMARRON SUB-BASIN

The Upper Cimarron sub-basin (4-digit hydrologic unit 1104) is situated in the far northwest portion of the state. It originates in the northwestern portion of Cimarron County and continues along the northern third of the county until exiting at the northwest corner of Texas County. The sub-basin reenters Oklahoma in the upper reaches of Beaver County and terminates in the northwest section of Harper County. No major cities or County seats are located within the sub-basin. Minor cities of note include Kenton and Knowles.

The sub-basin is subdivided into four 8-digit hydrologic units (HUC) within the state. These HUC's are the Cimarron Headwaters (11040001), the Upper Cimarron (11040002), the Upper Cimarron-Liberal (11040006), and the Upper Cimarron-Bluff (11040008). The Cimarron River dominates the sub-basin. Near the headwaters of the Cimarron River, Lake Carl Etling is formed by South Carrizo Creek. The only water quality monitoring station in the sub-basin is AT157000 (Table 6).

The sub-basin is dominated by two major ecoregions. The Southwestern Tablelands are prominent in the far west and appear in portions of Beaver County while the Western High Plains are foremost in the near west, central and eastern portions of the sub-basin. The Central Great Plains touches the sub-basin in the far eastern reaches of Harper County. The primary land usage in the sub-basin is rangeland with open grasslands to the west and east and sand sagebrush in portions of Beaver County. Irrigated croplands are scattered throughout the sub-basin. Other land uses of note include pastureland, woodlands, large farmsteads, and bare exposed rock.

HUC 1104

Table 6. Permanent Ambient Trend Monitoring Stations Located in HUC 1104.

WBID #	STATION #	STATION NAME	STATUS	FS	PS	NS/T	CBD
620930000010	AT157000	CIMARRON RIVER, OFF US 64, MOCANE	ACTIVE 10/99- P	PPWS, FWP, AG, AES	NONE	PBCR	NONE
ASSIGNED OWQS BENEFICIAL USES AND SUPPORT CODES							
PPWS = PUBLIC AND PRIVATE WATER SUPPLY				EWS = EMERGENCY WATER SUPPLY			
FWP = FISH & WILDLIFE PROPAGATION				PBCR = PRIMARY BODY CONTACT RECREATION			
AG = AGRICULTURE				AES = AESTHETICS			
FS = FULLY SUPPORTING				PS = PARTIALLY SUPPORTING			
NS/T = NOT SUPPORTING/THREATENED				CBD = CANNOT BE DETERMINED			

Cimarron River near Mocane

Station AT157000 (620930000010-001AT) is a permanent ambient trend monitoring station located on the Cimarron River in Oklahoma. Situated in the northeastern portion of Beaver County, the site was established northeast of the town of Mocane off of US Highway 64 on County Road 1510. The station is positioned near the upper end of stream segment 620930000010 and is classified within the Upper Cimarron River – Liberal 8 digit HUC watershed (11040006). Water enters the stream system from Kansas and from several tributaries including Cottonwood Creek, Crooked Creek, and Horse Creek, among others.

This station on the Cimarron River has been active for all water quality variables since October of 1999. The following assessment of beneficial uses is based on data collected from May of 2002 through March of 2007. For purposes of reporting, this station is representative of the Cimarron River from its entrance into Oklahoma near Mocane, Oklahoma (97.3276, 36.9679) downstream to its exit from Oklahoma near Englewood, Kansas (97.1739, 36.6243). As per Appendix A, Table 6 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is supported. Dissolved oxygen, pH, turbidity, and toxicants data met the criteria prescribed in the WWAC beneficial use. Fish were collected during the summer of 2005. Based on the Index of Biological Integrity (IBI) outlined in Appendix C of Oklahoma's USAP, the station has a sample composition score of 10 (maximum 30) and fish condition score of 11 (maximum 15) for a total score of 21. However, because biocriteria have not been developed for the Southwest Tablelands ecoregion, no assessment of community biological health can be made at this time. The AG beneficial use is supported for total dissolved solids, chloride, and sulfate. The PBCR beneficial use is not supported. Of the thirty (30) fecal coliform concentrations, eight (8) samples (or 27%) exceeded the prescribed screening level of 400 cfu/100mL. Of the twenty-eight (28) enterococci concentrations, seven (7) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (119.9 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Cimarron River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 1.0 mg/L and 4.65 mg/L, respectively.

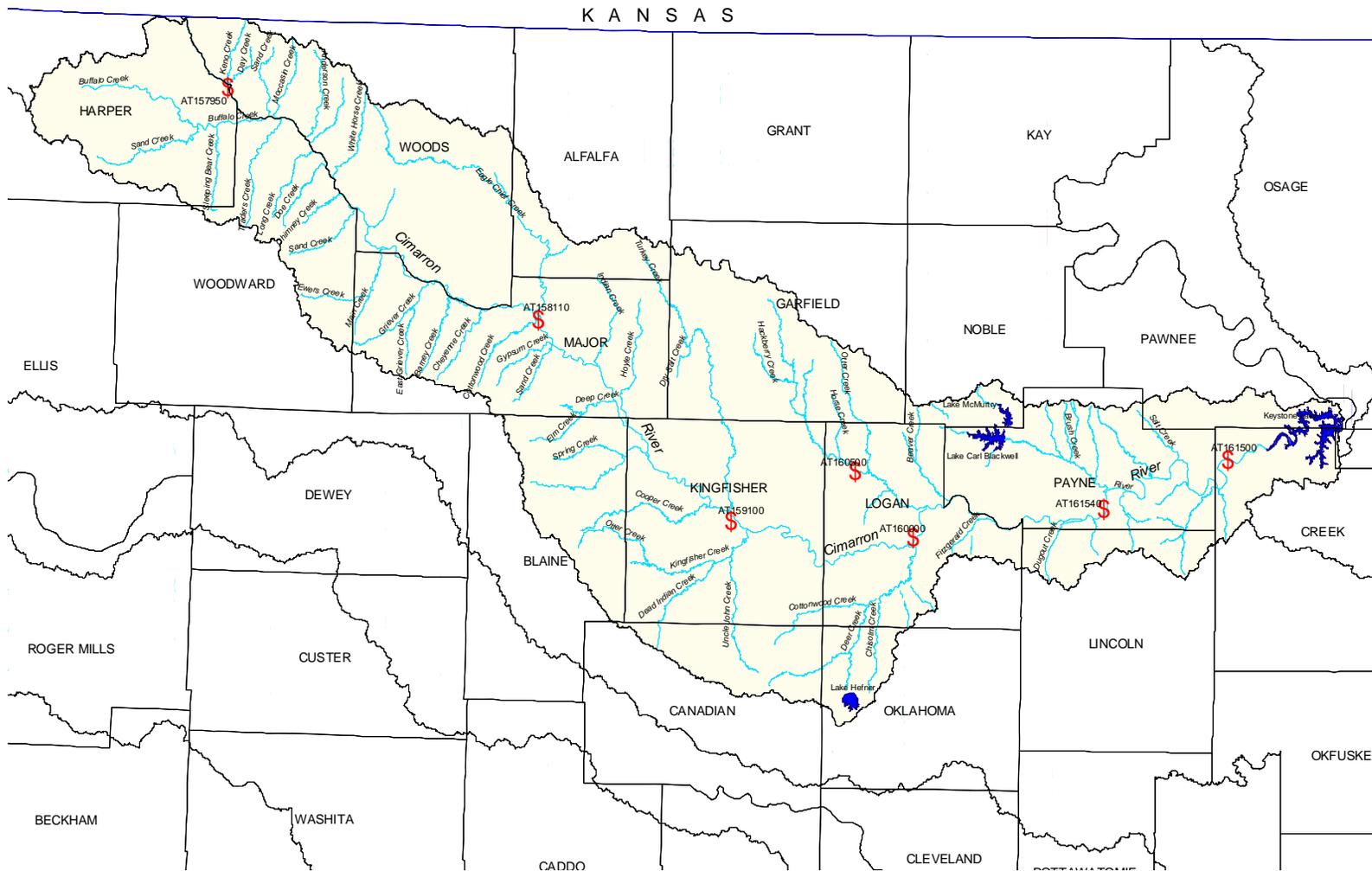


Plate 58
 LOWER CIMARRON SUBBASIN (HUC 1105)
 Water Quality Programs Division
 Oklahoma Water Resources Board

HUC 1105

LOWER CIMARRON SUB-BASIN

The Lower Cimarron sub-basin (4-digit hydrologic unit 1105) is situated in the near northwest and north central portions of the state. It originates in the eastern portion of Harper County, continues eastward through portions of Woodward, Woods, Alfalfa, Major, Garfield, Blaine, Kingfisher, Logan, Noble, Payne, Lincoln, and Pawnee Counties and terminates in the northern part of Creek County. Major cities and county seats located within the sub-basin include Enid, Kingfisher, Guthrie, Stillwater, and north Edmond. Minor cities of note include Buffalo, Fairview, Hennessey, Langston, Cushing, and Drumright.

The sub-basin is subdivided into three 8-digit hydrologic units (HUC) within the state. These HUC's are the Lower Cimarron – Eagle Chief (11050001), the Lower Cimarron – Skeleton (11050002), and the Lower Cimarron (11050003). The major surface water in the sub-basin is the lower Cimarron River. Major tributaries include Buffalo Creek, Eagle Chief Creek, Turkey Creek, Kingfisher Creek, Cottonwood Creek, Skeleton Creek, and Stillwater Creek. Three major lakes are located in the sub-basin—Lake Carl Blackwell formed by Stillwater Creek, Lake McMurtry formed by a tributary of Stillwater Creek, and the Cimarron River Arm of Lake Keystone. Seven permanent water quality-monitoring stations (Table 7) are located in the sub-basin—AT157950, AT158110, AT159100, AT160500, AT160000, AT161450, and AT161500.

The sub-basin is characterized by three ecoregions. The Central Great Plains is the primary ecoregion beginning in the far eastern portion and continuing through the central part of the sub-basin. The Central Oklahoma/Texas Plains represent the eastern quarter (¼) of the sub-basin. The Southwestern Tablelands typify portions of Woodward and Woods Counties. The primary land usage in the sub-basin is rangeland (open grasslands). It dominates the southern portion of the sub-basin from the far western portions through Kingfisher County and is further interspersed throughout the northern portion and in parts of Payne, Creek, and Noble Counties to the east. The secondary land use is cropland, which dominates the north central portion of the sub-basin and is further interspersed in areas to the western, central, and eastern portions. The tertiary land use is pastureland (brushy or mixed) that covers much of Creek Logan, Lincoln and Payne Counties and is further interspersed throughout each of the remaining counties in the sub-basin. Other land uses of note are forestland, rangeland, farmsteads, major urban areas, wetlands, and bare sand channels.

HUC 1105

Table 7. Permanent Ambient Trend Monitoring Stations Located in HUC 1105.

WBID #	STATION #	STATION NAME	STATUS	FS	PS	NS/T	CBD
620910020010	AT158115	CIMARRON RIVER, OFF SH 8, AMES	ACTIVE 11/98-P	AES, FWP	NONE	AG, PBCR	NONE
620920030010	AT157950	CIMARRON RIVER, SH 34, BUFFALO	ACTIVE 11/98-P	FWP, AES	NONE	AG, PBCR	NONE
620910020010	AT159100	CIMARRON RIVER, US 81, DOVER	ACTIVE 11/98-P	AES, FWP	NONE	AG, PBCR	NONE
62092030280	AT160000	CIMARRON RIVER, US 77, GUTHRIE	ACTIVE 11/98-P	AG, FWP	NONE	PBCR, AES	NONE
620900010170	AT161500	CIMARRON RIVER, SH 99, OILTON	ACTIVE 11/98-P	AES	NONE	FWP, PBCR, AG	NONE
620900030010	AT161450	CIMARRON RIVER, SH 33, RIPLEY	ACTIVE 10/00-P	AES	NONE	AG, FWP, PBCR	NONE
620920020010	AT158000	CIMARRON RIVER, US 281, WAYNOKA	ACTIVE 03/03-P	AES	NONE	FWP, AG, PBCR	NONE
620910030010	AT160500	SKELETON CREEK, SH 74, LOVELL	ACTIVE 11/98-P	PPWS, AG, AES	NONE	FWP, PBCR	NONE
ASSIGNED OWQS BENEFICIAL USES AND SUPPORT CODES							
PPWS = PUBLIC AND PRIVATE WATER SUPPLY				EWS = EMERGENCY WATER SUPPLY			
FWP = FISH & WILDLIFE PROPAGATION				PBCR = PRIMARY BODY CONTACT RECREATION			
AG = AGRICULTURE				AES = AESTHETICS			
FS = FULLY SUPPORTING				PS = PARTIALLY SUPPORTING			
NS/T = NOT SUPPORTING/THREATENED				CBD = CANNOT BE DETERMINED			

HUC 1105

Cimarron River near Ames

Station AT158115 (620910020010-004RS) is a permanent ambient trend monitoring station located on the Cimarron River in Oklahoma. This station replaces the Cimarron River near Orienta (AT158110), which was discontinued for safety reasons. The assessment for this segment will not include data from the Orienta station. The Ames station is situated in the southeastern portion of Major county and was established southwest of the city of Ames on a County Road E0550 off of State Highway 8. The station is positioned near the lower end of stream segment 620910020010 and is classified within the Lower Cimarron River - Eagle Chief Creek 8 digit HUC watershed (11050001). Water enters the stream system from several tributaries including Main Creek, Griever Creek, Cheyenne Creek, Eagle Chief Creek, Sand Creek, and Indian Creek, among others.

This station on the Cimarron River has been active for all water quality variables since March of 2003. The following assessment of beneficial uses is based on data collected from March of 2003 through April of 2007. For purposes of reporting, this station is representative of the Cimarron River from the confluence of Main Creek (98.8753, 36.5154) downstream to confluence of the Cimarron River with Deep Creek one mile south of the sampling location. As per Appendix A, Table 6 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Emergency Water Supply (EWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class III Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The WWAC beneficial use is supported. Dissolved oxygen, pH, turbidity, and toxicant samples met the criteria prescribed in the WWAC beneficial use. Fish collected during the summer of 2004 indicate that whether the segment is supporting a healthy biological community is currently indeterminate. Based on the Index of Biological Integrity (IBI) outlined in Appendix C of Oklahoma's USAP, the segment had a sample composition scores of 8 (maximum 30) and fish condition scores of 11 (maximum 15) for a total score of 19. This is between the assigned non-supporting and supporting thresholds of 19-21 for Central Great Plains warm water aquatic communities [OAC 46:15-5(l)]. The AG beneficial use is not supported. Of the thirty-six (36) total dissolved solids concentrations, twenty-one (21) samples (or 58%) exceeded the prescribed sample standards of 10028.0 mg/L, and the mean (11143.9 mg/L) exceeded the yearly mean standard (7437.0 mg/L). Of the 36 chloride concentrations, sixteen (16) samples (or 44%) exceeded the sample standard of 5902.0 mg/L, and the mean (5848.5 mg/L) exceeded the yearly mean standard (4218.0 mg/L). Of the 36 sulfate concentrations, eleven (11) samples (or 31%) exceeded the sample standard of 873.0 mg/L, and the mean (795.1 mg/L) exceeded the yearly mean standard (680.0 mg/L). The PBCR beneficial use is not supported. Of the eighteen (18) *E. coli* concentrations, nine (9) samples exceeded the prescribed screening level of 406 cfu/100mL, and the mean (346.1 cfu/100mL) exceeded the prescribed mean standard of 126 cfu/100mL. Of the 18 enterococci concentrations, two (2) samples exceeded the prescribed screening level of 406 cfu/100mL, and the mean (41.6 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Cimarron River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 1.0 mg/L and 4.65 mg/L, respectively.

Cimarron River Near Buffalo

Station AT157950 (620920030010-001AT) is a permanent ambient trend monitoring station located on the Cimarron River in Oklahoma. Situated in the northwestern portion of Woods County, the site was established east of the town of Buffalo on State Highway 34. The station is positioned near the midpoint of stream segment 620920030010 and is classified within the Lower Cimarron River - Eagle Chief Creek 8 digit HUC watershed (11050001). Water enters the stream system from Kansas and from several tributaries including Keno Creek, Day Creek, Buffalo Creek, and Sand Creek, among others.

This station on the Cimarron River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Cimarron River from entrance into Oklahoma near Buffalo, Oklahoma (99.4562, 36.9996 downstream to confluence of the Cimarron River with Buffalo Creek (99.2166, 36.7869). As per Appendix A, Table 6 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Emergency Water Supply (EWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class III Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The WWAC beneficial use is supported. Dissolved oxygen, pH, turbidity, and toxicant samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is not supported. Of the forty-six (46) total dissolved solids concentrations, ten (10) samples (or 22%) exceeded the sample standard of 14955.0 mg/L, and the mean (11003 mg/L) exceeded the yearly mean standard (10353 mg/L). Of the forty-two (42) chloride concentrations, nine (9) samples (or 21%) exceeded the sample standard of 6556.0 mg/L, and the mean (5246.2 mg/L) exceeded the yearly mean standard (4430 mg/L). Sulfate concentrations met the prescribed segment-specific criterion. The PBCR beneficial use is not supported. Of the eighteen (18) fecal coliform concentrations, six (6) samples (or 33%) exceeded the prescribed screening level of 400 cfu/100mL. Of the 18 enterococci concentrations, seven (7) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (245.8 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. Of the 18 *E. coli* concentrations, fifteen (8) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (2010.4 cfu/100mL) exceeded the prescribed mean standard of 126 cfu/100mL. This segment of the Cimarron River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 1.0 mg/L and 4.65 mg/L, respectively.

HUC 1105

Cimarron River near Dover

Station AT159100 (620910020010-001AT) is a permanent ambient trend monitoring station located on the Cimarron River in Oklahoma. Situated in the central portion of Kingfisher County, the site was established south of the town of Dover on US Highway 81. The station is positioned near the midpoint of stream segment 620910020010 and is classified within the Lower Cimarron River - Skeleton Creek 8 digit HUC watershed (11050002). Water enters the stream system from and from several tributaries including Indian Creek, Deep Creek, Hoyle Creek, Salt Creek, Cooper Creek, Turkey Creek, and Kingfisher Creek, among others.

This station on the Cimarron River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Cimarron River from the confluence of Indian Creek (98.2968, 36.2762) downstream to confluence of the Cimarron River with Kingfisher Creek (97.8787, 35.9308). As per Appendix A, Table 6 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Emergency Water Supply (EWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class III Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The WWAC beneficial use is supported. Dissolved oxygen, pH, turbidity, and toxicant samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is not supported. Of the fifty-two (52) total dissolved solids concentrations, nineteen (19) samples (or 37%) exceeded the prescribed sample standard of 10028 mg/L, and the mean (9287.4 mg/L) exceeded the yearly mean standard (7437 mg/L). Of the forty-three (43) chloride concentrations, ten (10) samples (or 23%) exceeded the prescribed sample standard of 10028 mg/L, and the mean (4296.6 mg/L) exceeded the yearly mean standard (4218 mg/L). Sulfate concentrations met the prescribed segment-specific criteria. The PBCR beneficial use is not supported. Of the twenty-seven (27) *E. coli* concentrations, fourteen samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (488.6 cfu/100mL) exceeded the prescribed mean standard of 126 cfu/100mL. Of the 27 enterococci concentrations, eight (8) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (114 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Cimarron River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 1.0 mg/L and 4.65 mg/L, respectively.

HUC 1105

Cimarron River near Guthrie

Station AT160000 (620910010010-001AT) is a permanent ambient trend monitoring station located on the Cimarron River in Oklahoma. Situated in the central portion of Logan County, the site was established north of the city of Guthrie on US Highway 77. The station is positioned near the upper end of stream segment 620910030280 and is classified within the Lower Cimarron River - Skeleton Creek 8 digit HUC watershed (11050002). Water enters the stream system from several tributaries including Kingfisher Creek, Cottonwood Creek, and Skeleton Creek, among others.

This station on the Cimarron River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Cimarron River from the confluence of Kingfisher Creek (97.8787, 35.9308) downstream to confluence of the Cimarron River with Skeleton Creek (97.3975, 35.9875). As per Appendix A, Table 6 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Emergency Water Supply (EWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class III Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The WWAC beneficial use is supported. Dissolved oxygen, pH, turbidity, and toxicant samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the twenty-four (24) enterococci concentrations, four (4) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (109.2 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Cimarron River is nutrient-threatened. The mean sestonic chlorophyll-a concentration (28.3 mg/M³) produced a TSI of 63, which is at or above the threshold TSI of 62. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 1.0 mg/L and 4.65 mg/L, respectively.

HUC 1105

Cimarron River near Oilton

Station AT161500 (620900010170-001AT) is a permanent ambient trend monitoring station near the terminal end of the Cimarron River in Oklahoma. Situated in the northwestern portion of Creek County, the site was established north of the town of Oilton on State Highway 99. The station is positioned near the midpoint of stream segment 620900010170 and is classified within the Lower Cimarron River 8-digit HUC watershed (11050003). Water enters the stream system from several tributaries including Salt Creek, Skull Creek, Euchee Creek, and Tiger Creek, among others.

This station on the Cimarron River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Cimarron River from the confluence of Salt Creek (96.7212, 36.0928) downstream to confluence of the Cimarron River with Keystone Reservoir (96.4829, 36.1160). As per Appendix A, Table 6 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Emergency Water Supply (EWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class III Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The WWAC beneficial use is not supported. Of the thirty-nine (39) turbidity samples, eight (8) samples (or 21%) exceeded the numerical criteria of 50. Dissolved oxygen, pH, and toxicant samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is not supported. Of the fifty-eight (58) total dissolved solids concentrations, thirteen (13) samples (or 22%) exceeded the prescribed sample standard of 5326 mg/L. Sulfate and chloride concentrations met the prescribed segment-specific criteria. The PBCR beneficial use is not supported. Of the twenty-eight (28) fecal coliform concentrations, 8 samples (or 29%) exceeded the prescribed screening level of 400 cfu/100mL. Of the 28 enterococci concentrations, seven (7) samples exceeded the prescribed screening level of 400 cfu/100mL, and the geometric mean (119.4 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Cimarron River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 1.0 mg/L and 4.65 mg/L, respectively.

HUC 1105

Cimarron River near Ripley

Station AT161450 (620900030010-001AT) is a permanent ambient trend monitoring station located on the Cimarron River in Oklahoma. Situated in the south central portion of Payne County, the site was established south of the town of Ripley on State Highway 33. The station is positioned near the terminal end of stream segment 620900030010 and is classified within the Lower Cimarron River 8 digit HUC watershed (11050003). Water enters the stream system from Skeleton Creek, Beaver Creek, Fitzgerald Creek (Langston Lake), Dugout Creek, and Sand Creek, among others.

This station on the Cimarron River has been active for all water quality variables since October of 2000. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Cimarron River from the confluence of Skeleton Creek (97.3975, 35.9875) downstream to the confluence of the Cimarron River with Stillwater Creek (-96.9149, 36.0230). As per Appendix A, Table 6 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Emergency Water Supply (EWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class III Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The WWAC beneficial use is not supported. Of the sixty-five (65) turbidity samples, nineteen (19) samples (or 29%) exceeded the numerical criteria of 50. Dissolved oxygen, pH, and toxicant samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is not supported. Of the eighty-four (84) total dissolved solids concentrations, twenty-four (24) samples (or 29%) exceeded the prescribed sample standard of 5326 mg/L, and the mean (4235.4 mg/L) exceeded the yearly mean standard (4103 mg/L). Sulfate and chloride concentrations met the prescribed segment-specific criteria. The PBCR beneficial use is not supported. Of the fifty-three (53) enterococci concentrations, eight (8) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (75.0 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Cimarron River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 1.0 mg/L and 4.65 mg/L, respectively.

HUC 1105

Cimarron River near Waynoka

Station AT158000 (620920020010-001RS) is a permanent ambient trend monitoring station located on the Cimarron River in Oklahoma. Situated in the south central portion of Woods County, the site was established south of the town of Waynoka on US Highway 281. The station is positioned near the end of stream segment 620920020010 and is classified within the Lower Cimarron River - Eagle Chief Creek 8 digit HUC watershed (11050001). Water enters the stream system from several tributaries including Traders Creek, Long Creek, Doe Creek, Whitehorse Creek, and Chimney Creek, among others.

This station on the Cimarron River has been active for all water quality variables since March of 2003. The following assessment of beneficial uses is based on data collected from March of 2003 through April of 2007. For purposes of reporting, this station is representative of the Cimarron River from the confluence of the Cimarron River with Buffalo Creek (99.2166, 36.7869) downstream to confluence of the Cimarron River with Main Creek (98.8753, 36.5154). As per Appendix A, Table 6 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Emergency Water Supply (EWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class III Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The WWAC beneficial use is not supported. Fish collected during the summer of 2004 indicate that the segment is not supporting a healthy biological community. Based on the Index of Biological Integrity (IBI) outlined in Appendix C of Oklahoma's USAP, samples from both the Waynoka station had a sample composition score of 6 (maximum 30) and a fish condition score of 11 (maximum 15) for a total score of 17. This is below the non-supporting threshold of 19 for Central Great Plains warm water aquatic communities [OAC 46:15-5(l)]. Dissolved oxygen, pH, and turbidity samples met the criteria prescribed in the WWAC beneficial use. Toxicant data are not available for the station. The AG beneficial use is not supported. Of the thirty-eight (38) total dissolved solids concentrations, thirty (30) samples (or 79%) exceeded the sample standard of 14955.0 mg/L, and the mean (23605.0 mg/L) exceeded the yearly mean standard (10353 mg/L). Of the forty (40) chloride concentrations, thirty-two (32) samples (or 80%) exceeded the sample standard of 6556.0 mg/L, and the mean (13583.9 mg/L) exceeded the yearly mean standard (4430.0 mg/L). Sulfate concentrations met the prescribed segment-specific criterion. The PBCR beneficial use is not supported. Of the ten (10) *E. coli* concentrations, nine (9) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (1499.4 cfu/100mL) exceeded the prescribed mean standard of 126 cfu/100mL. This segment of the Cimarron River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 1.0 mg/L and 4.65 mg/L, respectively.

HUC 1105

Skeleton Creek near Lovell

Station AT160500 (620910030010-001AT) is a permanent ambient trend monitoring station located on Skeleton Creek. Situated in the northwestern portion of Logan County, the site was established east northeast of the city of Lovell on State Highway 74. The station is positioned near the upper end of stream segment 620910030010 and is classified within the Lower Cimarron River - Skeleton Creek 8 digit HUC watershed (11050002). Water enters the stream system from several tributaries including Horse Creek, Otter Creek, and Wolf Creek, among others.

This station on Skeleton Creek has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of Skeleton Creek from the confluence of Spring Creek (-97.7067, 36.1194) downstream to confluence of Skeleton Creek with the Cimarron River (97.3975, 35.9875). As per Appendix A, Table 6 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class II Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the thirty-three (33) turbidity samples, twenty (20) samples (or 61%) exceeded the numerical criteria of 50. Of the forty-six (46) visual site observations, five (5) samples (or 11%) exceeded the median observation value for oil and grease. Dissolved oxygen, pH, and toxicant samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the twenty-seven (27) fecal coliform concentrations, ten (10) samples (or 37%) exceeded the prescribed screening level of 400 cfu/100mL. Of the 27 enterococci concentrations, eleven (11) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (400.8 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of Skeleton Creek is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 1.0 mg/L and 4.65 mg/L, respectively.

HUC 1105

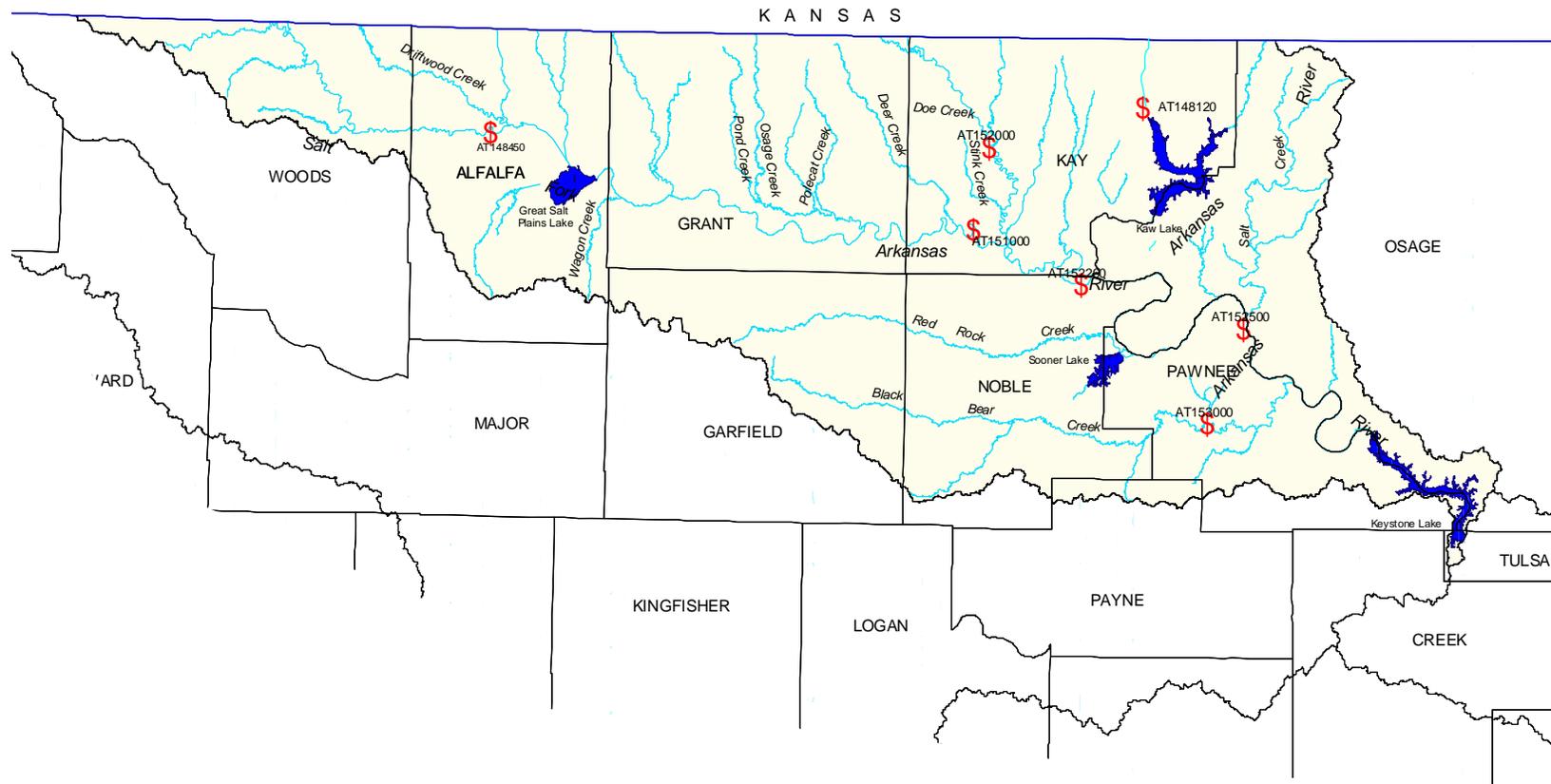


Plate 59
 UPPER ARKANSAS SUBBASIN (HUC 1106)
 Water Quality Programs Division
 Oklahoma Water Resources Board

HUC 1106

UPPER ARKANSAS SUB-BASIN

The Upper Arkansas sub-basin (4-digit hydrologic unit 1106) is situated in the north central portion of the state. It originates in the northeast portion of Woods County, continues eastward through portions of Alfalfa, Grant, Garfield, Kay, Noble, and Payne Counties and terminates in the western part of Osage County and northern one-half ($\frac{1}{2}$) of Pawnee County. Major cities and County seats located within the sub-basin include Alva, Ponca City, Perry, Pawnee, Tonkawa, Blackwell, and Cleveland. Minor cities of note include Cherokee, Medford, and Ralston.

The sub-basin is subdivided into six 8-digit hydrologic units (HUC) within the state. These HUC's are the Kaw Lake (11060001), the Upper Salt Fork of the Arkansas (11060002), the Medicine Lodge (11060003), the Lower Salt Fork of the Arkansas (11060004), the Chickaskia (11060005), and the Black Bear–Red Rock (11060006). The major surface water in the sub-basin is the upper Arkansas River. Major tributaries include the Salt Fork of the Arkansas River, the Chickaskia River, Black Bear Creek, Beaver Creek, Salt Creek, Sand Creek, Pond Creek, Deer Creek, Bois d'Arc Creek, and Red Rock Creek. Three major lakes are located in the sub-basin— the Great Salt Plains Lake formed by the Salt Fork of the Arkansas River, Kaw Lake formed by the Arkansas River and Beaver Creek, Sooner Lake formed by Greasy Creek, and the Arkansas River arm of Keystone Lake. Five active permanent water quality-monitoring stations (Table 8) are located in the sub-basin—AT148450, AT152000, AT151000, AT152500, and AT153000. Two inactive water quality-monitoring stations (AT152260 and AT148120) are located in the sub-basin. These stations were last assessed in the 2001 and 2003 BUMP reports, respectively.

The sub-basin is characterized by four ecoregions. The Central Great Plains is the primary ecoregion beginning in the far western portion and continuing through the east part of the sub-basin. The Central Oklahoma/Texas Plains represent the eastern quarter ($\frac{1}{4}$) of the sub-basin. The Flint Hills characterize the northeast portion of Kay County and part of Osage County. The Southwestern Tablelands typify portions of Woods County. The primary land usage in the sub-basin is cropland. It dominates the central part of the sub-basin from eastern Woods County to the east central parts of Kay and Noble Counties. Cropland is further interspersed through the far western and eastern portions. The secondary land use is rangeland (open grasslands, sand sagebrush, upland shrubs, eastern red cedar, and post oak–blackjack oak). Rangeland dominates the far western and eastern portions of the sub-basin as well the northeastern portion of Alfalfa County and the southern portion of Payne and Pawnee Counties. It is further interspersed throughout the sub-basin. The tertiary land use is forestland (bottomland hardwoods and post oak–blackjack oak) that dominates the eastern portion of Payne County and the north and eastern portions of Pawnee County. Forestland is also present in portions of Kay and Osage Counties. Other land uses of note are pastureland, woodlands, farmsteads, major urban areas, wetlands, and confined animal feeding operations.

Table 8. Permanent Ambient Trend Monitoring Stations Located in HUC 1106.

WBID #	STATION #	STATION NAME	STATUS	FS	PS	NS/T	CBD
621200010200	AT152500	ARKANSAS RIVER, SH 18, RALSTON	ACTIVE 11/98-P	AG, AES, PPWS	NONE	FWP, PBCR	NONE
621200030010	AT153000	BLACK BEAR CREEK, SH 18, PAWNEE	ACTIVE 11/98-P	AG, AES, PPWS	NONE	FWP, PBCR	NONE
621100000010	AT152000	CHICKASKIA RIVER, US 177, BLACKWELL	ACTIVE 11/98-P	AES, PPWS, AG	NONE	FWP,PBCR	NONE
621010010160	AT148450	SALT FORK OF ARKANSAS RIVER, SH 58, INGERSOLL	ACTIVE 11/98-P	AES, PPWS	NONE	AG, FWP, PBCR	NONE
621000010010	AT151000	SALT FORK OF ARKANSAS RIVER, US 77, TONKAWA	ACTIVE 10/00-P	AG, AES, PPWS	NONE	FWP, PBCR	NONE
ASSIGNED OWQS BENEFICIAL USES AND SUPPORT CODES							
PPWS = PUBLIC AND PRIVATE WATER SUPPLY				EWS = EMERGENCY WATER SUPPLY			
FWP = FISH & WILDLIFE PROPAGATION				PBCR = PRIMARY BODY CONTACT RECREATION			
AG = AGRICULTURE				AES = AESTHETICS			
FS = FULLY SUPPORTING				PS = PARTIALLY SUPPORTING			
NS/T = NOT SUPPORTING/THREATENED				CBD = CANNOT BE DETERMINED			

HUC 1106

Arkansas River near Ralston

Station AT152500 (621200010200-001AT) is a permanent ambient trend monitoring station located on the Arkansas River in Oklahoma. Situated in the west central portion of Osage County, the site was established east of the town of Ralston on State Highway 18. The station is positioned near the upper end of stream segment 621200010200 and is classified within the Black Bear - Red Rock Creek 8 digit HUC watershed (11060006). Water enters the stream system from several tributaries including Salt Creek (Fairfax Lake), Black Bear Creek (Pawnee Lake), and Bug Creek, among others.

This station on the Arkansas River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Arkansas River from the confluence of Salt Creek (97.3276, 36.9679) downstream to confluence of the Arkansas River with Keystone Reservoir (97.1739, 36.6243). As per Appendix A, Table 6 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class II Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the thirty-nine (39) turbidity samples, eleven (11) samples (or 28%) exceeded the numerical criteria of 50. Dissolved oxygen, pH, and toxicant data collected during the same period met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the twenty-four (24) enterococci concentrations, six (6) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (100.0 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Arkansas River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 1.0 mg/L and 4.65 mg/L, respectively.

Black Bear Creek at Pawnee

Station AT153000 (621200030010-001AT) is a permanent ambient trend monitoring station located on Black Bear Creek. Situated in the west central portion of Pawnee County, the site was established north of the city of Pawnee on State Highway 18. The station is positioned near the terminal end of stream segment 621200030010 and is classified within the Black Bear - Red Rock Creek 8 digit HUC watershed (11060006). Water enters the stream system from Pawnee Lake and from several tributaries including Cow Creek, Oak Creek, and Camp Creek (Lone Chimney Lake), among others.

This station on Black Bear Creek has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of Black Bear Creek from the confluence of Cow Creek (97.3276, 36.9679) downstream to confluence of Black Bear Creek with the Arkansas River (97.1739, 36.6243). As per Appendix A, Table 6 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class II Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the thirty-eight (38) turbidity samples, eleven (11) samples (or 29%) exceeded the numerical criterion of 50. Of the thirteen (13) toxicant samples collected, two (2) of the lead concentrations (or 15%) exceeded the prescribed, hardness-dependent chronic criteria of 8.83 ug/L. Dissolved oxygen and pH data met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported (). Of the twenty-eight (28) fecal coliform concentrations, nine (9) samples (or 32%) exceeded the prescribed screening level of 400 cfu/100mL. Of the twenty-seven (27) enterococci concentrations, 11 samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (217.3 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of Black Bear Creek is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 1.0 mg/L and 4.65 mg/L, respectively.

Chickaskia River near Blackwell

Station AT152000 (621100000010-001AT) is a permanent ambient trend monitoring station located on the Chickaskia River in Oklahoma. Situated in the west central portion of Kay County, the site was established north of the city of Blackwell on US Highway 177. The station is positioned near the midpoint of stream segment 621100000010 and is classified within the Chickaskia River 8 digit HUC watershed (11060005). Water enters the stream system from Lake Blackwell and from several tributaries including Bluff Creek, Shoo Fly Creek, Doe Creek, Bitter Creek, Stink Creek, and Duck Creek, among others.

This station on the Chickaskia River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. Analysis also includes water quality data provided by the Oklahoma Department of Environmental Quality. For purposes of reporting, this station is representative of the Chickaskia River from the confluence of Bluff Creek (97.3276, 36.9679) downstream to confluence of the Chickaskia River with the Salt Fork of the Arkansas River (97.2442, 36.6233). As per Appendix A, Table 6 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the forty-one (41) turbidity samples, sixteen (16) samples (or 39%) exceeded the numerical criterion of 50. Dissolved oxygen, pH, and toxicant data met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids, chloride and sulfate values. The PBCR beneficial use is not supported. The PBCR beneficial use is not supported. Of the twenty-eight (28) fecal coliform concentrations, eight (8) samples (or 29%) exceeded the prescribed screening level of 400 cfu/100mL. Of the 28 enterococci concentrations, twelve (12) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (306.8 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Chickaskia River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively. Furthermore, the mean sestonic chlorophyll-a concentration (19.6 mg/M³) produced a TSI of 60, which is below the threshold TSI of 62.

Salt Fork of the Arkansas near Ingersoll

Station AT148450 (621010010160-001AT) is a permanent ambient trend monitoring station located on the Salt Fork of the Arkansas River in Oklahoma. Situated in the north central portion of Alfalfa County, the site was established north of the town of Ingersoll on State Highway 58. The station is positioned near the midpoint of stream segment 621010010160 and is classified within the Upper Salt Fork of the Arkansas River 8 digit HUC watershed (11120302). Water enters the stream system from Kansas and from several tributaries including Yellowstone Creek, Greenleaf Creek, and Turkey Creek, among others.

This station on the Salt Fork of the Arkansas River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. Analysis also includes water quality data collected at a variety of stations throughout the segment. Data were collected in cooperation with the Oklahoma Department of Environmental Quality (ODEQ). For purposes of reporting, this station is representative of the Salt Fork River from the confluence of Turkey Creek (98.6673, 36.8149) downstream to confluence of the Salt Fork River with the Medicine Lodge River (98.3265, 36.8333). As per Appendix A, Table 6 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class III Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the thirty-six (26) turbidity samples, ten (10) samples (or 28%) exceeded the numerical criterion of 50. Dissolved oxygen, pH, and toxicant data collected during the same period met the criteria prescribed in the WWAC beneficial use. Fish collected during the summer of 2004 indicate that whether the segment is supporting a healthy biological community is currently indeterminate. Based on the Index of Biological Integrity (IBI) outlined in Appendix C of Oklahoma's USAP, the station has a sample composition score of 10 (maximum 30) and fish condition score of 11 (maximum 15) for a total score of 21. This is between the assigned non-supporting and supporting thresholds of 19-21 for Central Great Plains warm water aquatic communities [OAC 46:15-5(l)]. The AG beneficial use is not supported. Of the forty-five (45) sulfate concentrations, thirty-seven (37) samples (or 82%) exceeded the sample standard of 639.0 mg/L, and the mean (730.5 mg/L) exceeded the yearly mean standard of 495 mg/L. The PBCR beneficial use is not supported. Of the 37 fecal coliform concentrations, twenty-eight (28) samples (or 76%) exceeded the prescribed screening level of 400 cfu/100mL, and the geometric mean (812.9 cfu/100mL) exceeded the prescribed mean standard of 400 cfu/100mL. Of the 37 enterococci concentrations, twenty-three (23) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (1173.4 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. Of the 37 *E. coli* concentrations, eleven (11) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (200.2 cfu/100mL) exceeded the prescribed mean standard of 126 cfu/100mL. This segment of the Salt Fork River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

Salt Fork of the Arkansas River near Tonkawa

Station AT151000 (621000010010-001AT) is a permanent ambient trend monitoring station located on the Salt Fork of the Arkansas River in Oklahoma. Situated in the southwest portion of Kay County, the site was established south of the town of Tonkawa on US Highway 77. The station is positioned near the midpoint of stream segment 621000010010 and is classified within the Lower Salt Fork – Arkansas River 8 digit HUC watershed (11060004). Water enters the stream system from Sand Creek, Pond Creek, and Deer Creek, among others.

This station on the Salt Fork of the Arkansas River has been active for all water quality variables since October of 2000. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. Analysis also includes water quality data collected at a variety of stations throughout the segment. Data were collected in cooperation with the Oklahoma Department of Environmental Quality (ODEQ). For purposes of reporting, this station is representative of the Salt Fork of the Arkansas River from the confluence of Sand Creek (97.9700, 36.7194) downstream to the confluence of the Salt Fork of the Arkansas River with the Chickaskia River (97.2442, 36.6233). As per Appendix A, Table 6 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class III Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the forty-two (42) turbidity samples, fifteen (15) samples (or 36%) exceeded the numerical criterion of 50. The dissolved oxygen, pH, and toxicant data collected during the same period met the criteria prescribed in the WWAC beneficial use. Fish collected during the summer of 2004 indicate that the segment is supporting a healthy biological community. Based on the Index of Biological Integrity (IBI) outlined in Appendix C of Oklahoma's USAP, the station has a sample composition score of 16 (maximum 30) and fish condition score of 11 (maximum 15) for a total score of 27. This is above the assigned supporting threshold of 22 for Central Great Plains warm water aquatic communities [OAC 46:15-5(m)]. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the twenty-seven (27) enterococci concentrations, seventeen (17) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (655.1 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Salt Fork River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 1.0 mg/L and 4.65 mg/L, respectively.

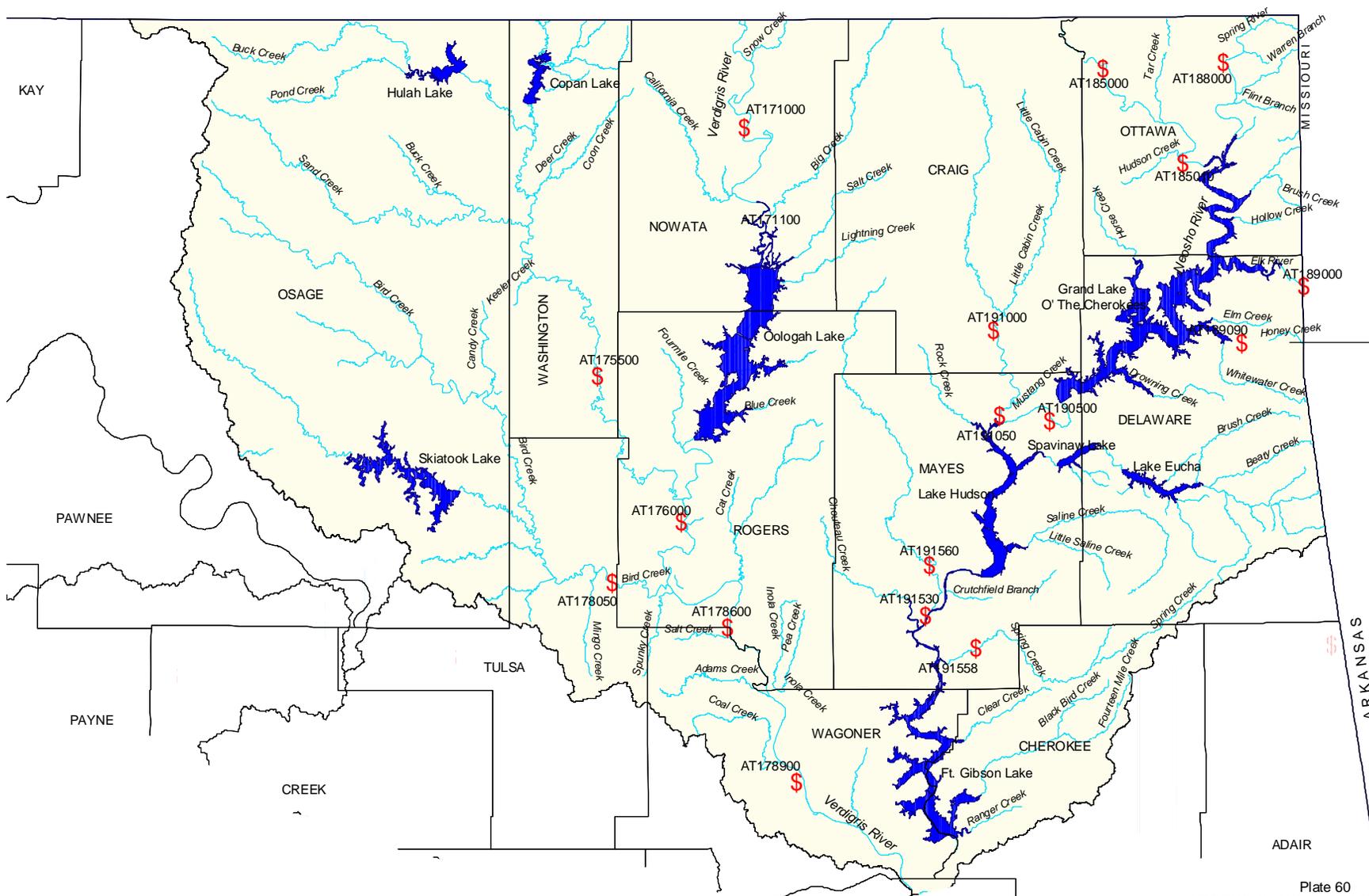


Plate 60
NEOSHO-GRAND SUBBASIN (HUC 1107)
Water Quality Programs Division
Oklahoma Water Resources Board

HUC 1107

NEOSHO/GRAND SUB-BASIN

The Neosho/Grand sub-basin (4-digit hydrologic unit 1107) is situated in the northeast portion of the state. It originates in the west central portion of Osage County, continues eastward through portions of Washington, Tulsa, Nowata, Rogers, Wagoner, Muskogee, Craig, Mayes, and Cherokee Counties and terminates in Ottawa and Delaware Counties. Major cities and County seats located within the basin include Pawhuska, Dewey, Bartlesville, Skiatook, Collinsville, Sperry, Owasso, Tulsa, Nowata, Oologah, Port of Catoosa, Claremore, Pryor, Chouteau, Locust Grove, Wagoner, Fort Gibson, Vinita, Langley, Miami, Grove, and Jay. Minor cities of note include South Coffeyville, Adair, Quapaw, Afton, and Ketchum.

The sub-basin is subdivided into nine 8-digit hydrologic units (HUC) within the state. These HUC's are the Middle Verdigris (11070103), the Lower Verdigris (11070103), the Caney (11070106), the Bird (11070107), the Middle Neosho (11070205), the Grand Lake (11070206), the Spring (11070207), the Elk (11070208), and the Lower Neosho (11070209). The major surface waters in the basin are the Verdigris and Grand/Neosho Rivers. Major tributaries include Caney River, Little Caney River, Spring River, Elk River, Sand Creek, Bird Creek, Big Creek, Dog Creek, Tar Creek, Honey Creek, Big Cabin Creek, Spavinaw Creek, Pryor Creek, and Spring Creek. Nine major lakes are located in the basin—Hulah Lake formed by the Caney River, Copan Lake formed the Little Caney River, Bluestem Lake formed by the headwaters of Bird Creek, Skiatook Lake formed by Hominy Creek, Oologah Lake formed by the Verdigris River, Grand Lake formed by the Neosho, Spring, and Elk Rivers (among other creeks), Lake Eucha formed by Spavinaw Creek, Spavinaw Lake formed by Spavinaw Creek, Lake Hudson formed by the Neosho River and Spavinaw, Rock, and Saline Creek, and Fort Gibson Lake formed by the Neosho River and Clear and Fourteen Mile Creek. Fifteen active permanent water quality-monitoring stations (Table 9) are located in the basin— AT171000, AT175500, AT176000, AT178050, AT178600, AT178900, AT185000, AT185010, AT188000, AT189000, AT189090, AT190500, AT191000, AT191530, and AT191558. Three inactive water quality-monitoring stations (AT171100, AT191050, AT191560) are located in the sub-basin. Stations 171100 and 191050 were last assessed in the 1999 BUMP report while station 191560 was last assessed in the 2000 BUMP report.

The sub-basin is characterized by four ecoregions. The Central Irregular Plains is the primary ecoregion covering the central portion of the sub-basin, the majority of Ottawa and Cherokee Counties, and part of Delaware County. The Central Oklahoma/Texas Plains covers the majority of Osage County and parts of Tulsa and Washington Counties. The Ozark Highlands typify the majority of Delaware County, one-quarter (¼) of Ottawa County, and a small part of western Mayes County. The Boston Mountains ecoregion is represented in a small part of eastern Cherokee County. The primary land usage in the sub-basin is rangeland (open grasslands and woody areas). It dominates the western and north central portions of the sub-basin and is further interspersed throughout the southern, central and east central portions of the sub-basin. The secondary land uses are pastureland and forestland. Pastureland is interspersed throughout the eastern, central, and southern portions of the sub-basin with concentrations in Ottawa, Cherokee, Delaware, Craig, Rogers, Tulsa, and Washington Counties. Forestland (post oak–blackjack oak, hickory, and bottomland hardwoods) is interspersed throughout the entire sub-basin with heavy concentrations in Cherokee and

Delaware Counties. The tertiary land use is cropland with heaviest concentrations in the central and east central portions of the sub-basing. Other land uses of note include farmsteads, major urban areas, wetlands, and confined animal feeding operations.

Table 9. Permanent Ambient Trend Monitoring Stations Located in HUC 1107.

WBID #	STATION #	STATION NAME	STATUS	FS	PS	NS/T	CBD
121600060060	AT191000	BIG CABIN CREEK, OFF US 69, BIG CABIN	ACTIVE 9/99-P	AES	NONE	PBCR, PPWS, FWP, AG	NONE
121300010010	AT178050	BIRD CREEK, SH 266, PORT OF CATOOSA	ACTIVE 11/98-P	AG, PPWS	NONE	AES, FWP, PBCR	NONE
121400010010	AT175500	CANEY RIVER, OFF US 75, RAMONA	ACTIVE 11/98-P	AG, PPWS	NONE	AES, FWP, PBCR	NONE
121600030440	AT189000	ELK RIVER, SH 43, TIFF CITY (MO)	ACTIVE 5/99-P	AG, FWP, AES, PPWS, PBCR	NONE	NONE	NONE
121600030445	AT189090	HONEY CREEK, OFF SH 25, GROVE	ACTIVE 11/98-P	AG, FWP, AES, PPWS	NONE	PBCR	NONE
121600010280	AT191530	NEOSHO RIVER, US 412, CHOUTEAU	ACTIVE 11/98-P	AG, AES, PBCR, PPWS	NONE	FWP	NONE
121600040220	AT185000	NEOSHO RIVER, OFF US 66, COMMERCE	ACTIVE 10/00-P	AG, AES, PPWS	NONE	FWP, PBCR	NONE
121600040010	AT185010	NEOSHO RIVER, OFF SH 137, CONNOR BRIDGE	ACTIVE 11/98-P	AG, AES, PBCR, PPWS	NONE	FWP	NONE
121600020170	AT190500	NEOSHO RIVER, SH 82, LANGLEY	ACTIVE 11/98-P	AG, AES, PBCR, PPWS	NONE	FWP	NONE
121600010290	AT191558	SPRING CREEK, OFF US 412, MURPHY	ACTIVE 11/98-P	AG, FWP, AES, PBCR, PPWS	NONE	NONE	NONE
121600070010	AT188000	SPRING RIVER, OFF SH 137, QUAPAW	ACTIVE 11/98-P	AG, AES, PPWS	NONE	FWP, PBCR	NONE
121500020260	AT178600	VERDIGRIS RIVER, US 412, INOLA	ACTIVE 10/00-P	AG, AES, PPWS	NONE	FWP, PBCR	NONE
121500030010	AT176000	VERDIGRIS RIVER, SH 20, KEETONVILLE	ACTIVE 11/98-P	AG, AES, PPWS, FWP	NONE	PBCR	NONE
121510020010	AT171000	VERDIGRIS RIVER, SH 10, LENEPAH	ACTIVE 11/98-P	AG, AES, PPWS	NONE	FWP, PBCR	NONE
121500010200	AT178900	VERDIGRIS RIVER, SH 51, WAGONER	ACTIVE 9/99-P	AG, AES, PPWS	NONE	FWP, PBCR	NONE
ASSIGNED OWQS BENEFICIAL USES AND SUPPORT CODES							
PPWS = PUBLIC AND PRIVATE WATER SUPPLY				EWS = EMERGENCY WATER SUPPLY			
FWP = FISH & WILDLIFE PROPAGATION				PBCR = PRIMARY BODY CONTACT RECREATION			
AG = AGRICULTURE				AES = AESTHETICS			
FS = FULLY SUPPORTING				PS = PARTIALLY SUPPORTING			
NS/T = NOT SUPPORTING/THREATENED				CBD = CANNOT BE DETERMINED			

HUC 1107

Big Cabin Creek near Big Cabin

Station AT191000 (121600060060-001AT) is a permanent ambient trend monitoring station located on Big Cabin Creek. Situated in the south central portion of Craig county, the site was established northeast of the town of Big Cabin off of US Highway 69 on County Road 310. The station is positioned near the upper end of stream segment 121600060060 and is classified within the Lower Neosho River 8 digit HUC watershed (11070209). Water enters the stream system from several tributaries including Bull Creek, Little Cabin Creek, and White Oak Creek, among others.

This station on Big Cabin Creek has been active for all water quality variables since September of 1999. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of Big Cabin Creek from the confluence of Bull Creek (95.1416, 36.5875) downstream to the confluence of an unnamed tributary at the Mayes County line (95.143, 36.5094). As per Appendix A, Table 1 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is not supported. Of the twenty-seven (27) fecal coliform concentrations, three (3) samples (or 11%) exceeded the prescribed human health criterion of 5,000 cfu/100mL. The WWAC beneficial use is not supported. Dissolved oxygen, pH, turbidity, and toxicant samples met the criteria prescribed in the WWAC beneficial use. However, of the fifty-two (52) visual site observations, six (6) samples (or 12%) exceeded the median observation value for oil and grease. The AG beneficial use is not supported. Of the forty-seven (47) sulfate concentrations, seven (7) samples (or 15%) exceeded the minimum sample standard of 250 mg/L. Total dissolved solids and chlorides are within the prescribed sample standards and yearly means. Although 80% of the TDS concentrations exceeded the sample standard of 294.0 mg/L and the mean (359.7 mg/L) exceeded the yearly mean standard of 253.0 mg/L, these values are below the prescribed minimum values of 750 mg/L and 700 mg/L, respectively. Although 30% of the chloride concentrations exceeded the sample standard of 30.0 mg/L, the values are below the minimum standard of 250 mg/L. The PBCR beneficial use is not supported. Of the twenty-six (26) enterococci concentrations, eight (8) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (156.4 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of Big Cabin Creek is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively. Furthermore, the mean sestonic chlorophyll-a concentration (20.7 mg/M³) produced a TSI of 60, which is below the threshold TSI of 62.

Bird Creek near Catoosa

Station AT178050 (121300010010-001AT) is a permanent ambient trend monitoring station located on Bird Creek. Situated in the northeastern portion of Tulsa County, the site was established west of the Port of Catoosa on State Highway 266. The station is positioned near the terminal end of stream segment 121300010010 and is classified within the Bird Creek 8 digit HUC watershed (11070107). Water enters the stream system from Lake Yahola, Delaware Creek, Flat Rock Creek, Owasso Creek, and Mingo Creek, among others.

This station on Bird Creek has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of Bird Creek from the confluence of Delaware Creek (95.9453, 36.2639) downstream to confluence of Bird Creek with the Verdigris River (95.7261, 36.2210). As per Appendix A, Table 1 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the forty-nine (49) turbidity samples, eight (8) samples (or 16%) exceeded the numerical criteria of 50. Of the sixty-nine visual site observations, seventeen (17) samples (or 25%) exceeded the median observation value for oil and grease. Dissolved oxygen, pH, and toxicant data collected during the same period met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. Although several sulfate concentrations exceeded the sample standard of 65.0 mg/L, no value is above the minimum sample standard of 250 mg/L. The PBCR beneficial use is not supported. Of the twenty-six (26) fecal coliform concentrations, eleven (11) samples (or 42%) exceeded the prescribed screening level of 400 cfu/100mL. Of the twenty-five (25) enterococci concentrations, ten (10) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (185.1 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. Of the 25 *E. coli* concentrations, 8 samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (140.2 cfu/100mL) exceeded the prescribed mean standard of 126 cfu/100mL. This segment of Bird Creek is nutrient-threatened. The median of the segment wide total phosphorus concentration (0.385 mg/L) exceeded the threshold median of 0.36 mg/L and has a mean baseflow mixed organic/inorganic turbidity of 33 NTU. The nitrate/nitrite median value was below the threshold median of 5.0 mg/L. The mean sestonic chlorophyll-a concentration (6.0 mg/M³) produced a TSI of 48, which is below the threshold TSI of 62.

HUC 1107

Caney River near Ramona

Station AT175500 (121400010010-001AT) is a permanent ambient trend monitoring station located on the Caney River in Oklahoma. Situated in the southeastern portion of Washington County, the site was established southeast of the town of Ramona off US Highway 75 on county road 390. The station is positioned between the midpoint and the terminal end of stream segment 121400010010 and is classified within the Caney River 8 digit HUC watershed (11070106). Water enters the stream system from Sand Creek, Keeler Creek, and Rabb Creek, among others.

This station on the Caney River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Caney River from the confluence of Sand Creek (95.9684, 36.7167) downstream to confluence of the Caney River with Rabb Creek (95.8101, 36.4338). As per Appendix A, Table 6 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the twenty-nine (29) turbidity samples, thirteen (13) samples (or 45%) exceeded the numerical criteria of 50. Of the ten (10) toxicant samples collected, three (3) of the lead concentrations (or 30%) exceeded the prescribed hardness-dependant chronic criteria of 5.29 ug/L. Dissolved oxygen and pH samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. Although several sulfate concentrations exceeded the sample standard, all values are below the prescribed minimum standard of 250 mg/L. The PBCR beneficial use is not supported. Of the 29 enterococci concentrations, four (4) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (68.2 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Caney River is nutrient-threatened. The mean sestonic chlorophyll-a concentration (31.7 mg/M³) produced a TSI of 64, which is above the threshold TSI of 62. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

Elk River near Tiff City, Missouri

Station AT189000 (121600030440-001AT) is a permanent ambient trend monitoring station located on the Elk River in Missouri. Situated in the west central portion of McDonald county, the site was established south-southeast of the town of Tiff City on Missouri SH 43. The station is positioned near the midpoint of stream segment 121600030440 and is classified within the Elk River 8 digit HUC watershed (11070208). Water enters the stream system from several tributaries including the Buffalo Creek, among others.

This station on the Elk River has been active for all water quality variables since May of 1999. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Elk River from its entrance into Oklahoma near Tiff City, Missouri (94.2950, 36.5510) downstream to confluence of the Elk River with Grand Lake (94.6177, 36.6250). As per Appendix A, Table 1 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Cool Water Aquatic Community—Fish and Wildlife Propagation (CWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The CWAC beneficial use is supported. Dissolved oxygen, pH, turbidity, and toxicants met the criteria prescribed in the CWAC beneficial use. The AG beneficial use is supported for total dissolved solids (TDS), chlorides, and sulfates. The PBCR beneficial use is supported for fecal coliform, enterococci, and *E. coli*. This segment of the Elk River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively. Furthermore, the mean sestonic chlorophyll-a concentration (3.4 mg/M³) produced a TSI of 43, which is below the threshold TSI of 62.

Honey Creek near Grove

Station AT189090 (121600030290-001AT) is a permanent ambient trend monitoring station located on Honey Creek in Oklahoma. Situated in the northeastern portion of Delaware county, the site was established southeast of the city of Grove off of SH 25 on County Road N4650. The station is positioned near the terminal end of stream segment 121600030445 and is classified within the Grand Lake 8 digit HUC watershed (11070206). Water enters the stream system from Missouri and from several tributaries including the Cave Springs Branch, among others.

This station on Honey Creek has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. Analysis also includes water quality data collected by the United States Geological Survey's Oklahoma Water Science Center. For purposes of reporting, this station is representative of Honey Creek from its entrance into Oklahoma near Southwest City, Missouri (94.6178, 36.5243) downstream to confluence of Honey Creek with Grand Lake (94.7427, 36.5505). As per Appendix A, Table 1 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Cool Water Aquatic Community—Fish and Wildlife Propagation (CWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The CWAC beneficial use is supported. Dissolved oxygen, pH, turbidity, and toxicant samples met the criteria prescribed in the WWAC beneficial use. Fish collected during the summer of 2006 indicate that the segment is supporting a healthy biological community. Based on the Index of Biological Integrity (IBI) outlined in Appendix C of Oklahoma's USAP, the station has a sample composition score of 24 (maximum 30) and fish condition score of 15 (maximum 15) for a total score of 39. This is above the assigned supporting threshold of 37 for Ozark Highland cool water aquatic communities [OAC 46:15-5(j)]. The AG beneficial use is supported for total dissolved solids (TDS), chlorides, and sulfates. Although samples of TDS, chloride, and sulfate exceeded the sample standards and the mean of all chloride values exceeded the yearly mean standard, all values are below the minimum standard standards. The PBCR beneficial use is not supported. Of the twenty-eight (28) enterococci concentrations, eight (8) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (308.3 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of Honey Creek is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.15 mg/L and 2.4 mg/L, respectively.

Neosho River near Chouteau

Station AT191530 (121600010280-001AT) is a permanent ambient trend monitoring station on the Neosho River in Oklahoma. Situated in the south central portion of Mayes County, the site was established east of the city of Chouteau on US Highway 412. The station is positioned near the terminal end of stream segment 121600010280 and is classified within the Lower Neosho River 8-digit HUC watershed (11070209). Water enters the stream system from Lake Hudson and from several tributaries including Crutchfield Branch Creek, Pryor Creek, and Chouteau Creek, among others.

This station on the Neosho River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. Analysis includes continuous dissolved oxygen data collected during 2007 approximately 2.5 miles below Kerr Dam. For purposes of reporting, this station is representative of the Neosho River from the confluence of Lake Hudson (95.1815, 36.2307) downstream to confluence of the Neosho River with Fort Gibson Lake (95.3005, 36.1540). As per Appendix A, Table 1 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the ten (10) toxicant samples collected, two (2) of the lead concentrations (or 20%) exceeded the prescribed hardness-dependant chronic criterion of 4.64 ug/L. The use is also not supported for dissolved oxygen. Only one (1) of the thirty-seven (37) discreet dissolved oxygen collections made at the US 412 site were below the seasonally based dissolved oxygen criteria. However, continuous dissolved oxygen data collected upstream were below the dissolved oxygen screening limit of 4 mg/L during 674 of 5051 (13.3%) of the averaged hourly readings. Turbidity and pH samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is supporting for fecal coliform, *E. coli* and enterococci. This segment of the Neosho River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively. Furthermore, the mean sestonic chlorophyll-a concentration (17.6 mg/M³) produced a TSI of 59, which is below the threshold TSI of 62.

Neosho River near Commerce

Station AT185000 (121600040220-001AT) is a permanent ambient trend monitoring station located on the Neosho River in Oklahoma. Situated in the northwest portion of Ottawa County, the site was established west of the town of Commerce off of US Highway 66 on County Road. The station is positioned near the midpoint of stream segment 121600040220 and is classified within the Lower Verdigris River 8 digit HUC watershed (11070206). Water enters the stream system from Bird Creek, Spunky Creek, Chambers Creek, Dog Creek (Claremore Lake), and Salt Creek, among others.

This station on the Neosho River has been active for all water quality variables since October of 2000. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. Analysis also includes water quality data collected by the United States Geological Survey's Oklahoma Water Science Center. For purposes of reporting, this station is representative of the Neosho River from its entrance into the state of Oklahoma (95.0352, 36.9995) downstream to the confluence of the Neosho River with Elm Creek (94.9286, 36.8907). As per Appendix A, Table 1 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the thirty-five (35) turbidity samples, twelve (12) samples (or 34%) exceeded the numerical criterion of 50. Of the sixteen (16) toxicant samples collected, three (3) of the lead concentrations (or 19%) exceeded the prescribed hardness-dependant chronic criterion of 6.18 ug/L. Of the eighteen (18) chromium samples collected, 3 concentrations (or 17%) exceeded the chronic criterion of 50 ug/L. Dissolved oxygen and pH samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids (TDS), chlorides, and sulfates. Although several TDS and sulfate concentrations exceeded the sample standards, no values were above the minimum standards of 700 mg/L and 250 mg/L, respectively. The PBCR beneficial use is not supported. Of the twenty-four (24) enterococci concentrations, five (5) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (99.9 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Neosho River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 1.0 mg/L and 4.65 mg/L, respectively. Furthermore, the mean sestonic chlorophyll-a concentration (18.6 mg/M³) produced a TSI of 59, which is below the threshold TSI of 62.

Neosho River near Connor Bridge

Station AT185010 (121600040010-001AT) is a permanent ambient trend monitoring station located on the Neosho River in Oklahoma. Situated in the central portion of Ottawa County, the site was established south southeast of the city of Miami off of State Highway 137 on County Road E0145 at Connor Bridge. The station is positioned near the terminal end of stream segment 121600040010 and is classified within the Grand Lake 8 digit HUC watershed (11070206). Water enters the stream system from several tributaries including Tar Creek and Hudson Creek, among others.

This station on the Neosho River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Neosho River from the confluence of an unnamed tributary above the city of Miami, Oklahoma (94.9116, 36.8757) downstream to confluence of the Neosho River with Grand Lake (-94.7866, 36.7919). As per Appendix A, Table 1 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the thirty (30) turbidity samples, five (5) samples (or 17%) exceeded the numerical criterion of 50. Of the twelve (12) toxicant samples collected, three (3) of the lead concentrations (or 25%) exceeded the prescribed hardness-dependant chronic criterion of 6.45 ug/L. Of the sixteen (16) zinc samples collected, two (2) concentrations (or 13%) exceeded the prescribed hardness-dependant acute criterion of 187.24 ug/L. Dissolved oxygen and pH samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids (TDS), chlorides, and sulfates. Although several TDS and sulfate concentrations exceeded the sample standards, no values were above the minimum standards of 700 mg/L and 250 mg/L. The PBCR beneficial use is supported fecal coliform, enterococci, and *E. coli*. This segment of the Neosho River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively. Furthermore, the mean sestonic chlorophyll-a concentration (11.7 mg/M³) produced a TSI of 55, which is below the threshold TSI of 62.

Neosho River near Langley

Station AT190500 (121600020170-001AT) is a permanent ambient trend monitoring station on the Neosho River below Grand Lake and above Lake Hudson. Situated in the northeastern portion of Mayes County, the site was established south of the town of Langley on State Highway 82. The station is positioned near the midpoint of stream segment 121600020170 and is classified within the Lower Neosho River 8-digit HUC watershed (11070209). Water enters the stream system from Grand Lake and several tributaries including Big Cabin Creek, among others.

This station on the Neosho River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. Analysis includes continuous dissolved oxygen data collected during 2006-2007. For purposes of reporting, this station is representative of the Neosho River from the confluence of Grand Lake (95.1426, 36.4415) downstream to confluence of the Neosho River with Lake Hudson (95.0408, 36.4690). As per Appendix A, Table 1 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported for dissolved oxygen. Only three (3) of the forty-six (46) discreet dissolved oxygen collections were below the seasonally based dissolved oxygen criteria. However, continuous dissolved oxygen data were below the dissolved oxygen screening limit of 4 mg/L during 1807 of 9307 (19.4%) of the averaged hourly readings. Turbidity, pH, and toxicant samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids (TDS), chlorides, and sulfates. The PBCR beneficial use is supported for fecal coliform, *E. coli* and enterococci samples. This segment of the Neosho River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively. Furthermore, the mean sestonic chlorophyll-a concentration (5.2 mg/M³) produced a TSI of 47, which is below the threshold TSI of 62.

Spring Creek near Murphy

Station AT191558 (121600010290-001AT) is a permanent ambient trend monitoring station located on Spring Creek. Situated in the south central portion of Mayes County, the site was established east-southeast of the town of Murphy off US Highway 412 near County Road E0610. The station is positioned near the terminal end of stream segment 121600010290 and is classified within the Lower Neosho River 8-digit HUC watershed (11070209). Water enters the stream system from several tributaries including Double Spring Creek and Snake Creek, among others.

This station on Spring Creek has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of Spring Creek from the confluence of Double Spring Creek (94.9929, 36.1043) downstream to confluence of Spring Creek River with Cedar Crest Lake (95.2250, 36.1181). As per Appendix A, Table 1 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Cool Water Aquatic Community—Fish and Wildlife Propagation (CWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The CWAC beneficial use is supported. Dissolved oxygen, pH, turbidity, and toxicant data collected during the same period met the criteria prescribed in the CWAC beneficial use. Fish collected during the summer of 2006 indicate that the segment is supporting a healthy biological community. Based on the Index of Biological Integrity (IBI) outlined in Appendix C of Oklahoma's USAP, the station has a sample composition score of 24 (maximum 30) and fish condition score of 15 (maximum 15) for a total score of 39. This is above the assigned supporting threshold of 35 for Central Irregular Plains cool water aquatic communities [OAC 46:15-5(k)]. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is supported for fecal coliform, *E. coli* and enterococci samples. This segment of Spring Creek is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

Spring River near Quapaw

Station AT188000 (121600070010-001AT) is a permanent ambient trend monitoring station located on Spring River in Oklahoma. Situated in the north central portion of Ottawa County, the site was established east-southeast of the city of Quapaw off of State Highway 137 on County Road E0050. The station is positioned near the midpoint of stream segment 121600070010 and is classified within the Spring River 8 digit HUC watershed (11070207). Water enters the stream system from Kansas and from several tributaries including Five Mile Creek, Devil's Hollow Creek, Warren Branch Creek, and Flint Branch Creek, among others.

This station on the Spring River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. Analysis also includes water quality data collected by the United States Geological Survey's Oklahoma Water Science Center. For purposes of reporting, this station is representative of the Spring River from its entrance into Oklahoma (94.7118, 36.9988) downstream to confluence of the Spring River with Grand Lake (94.7342, 36.8322). As per Appendix A, Table 1 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Cool Water Aquatic Community—Fish and Wildlife Propagation (CWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The CWAC beneficial use is not supported. Of the thirty-seven (37) turbidity samples, thirty (30) samples (or 81%) exceeded the numerical criteria of 10. Of the twenty-two (22) zinc samples, nine (9) of the concentrations (or 41%) exceeded the prescribed hardness-dependant chronic criteria of 146.0 ug/L, and seven (7) of the concentrations (or 32%) exceeded the prescribed hardness-dependant acute criterion of 161.14 ug/L. Of the sixteen (16) lead samples, four (4) of the concentrations (or 25%) exceeded the prescribed hardness-dependant chronic criteria of 5.15 ug/L. Dissolved oxygen and pH samples met the criteria prescribed in the CWAC beneficial use. Fish collected during the summer of 2006 indicate that whether the segment is supporting a healthy biological community is currently indeterminate. Based on the Index of Biological Integrity (IBI) outlined in Appendix C of Oklahoma's USAP, the station has a sample composition score of 20 (maximum 30) and fish condition score of 11 (maximum 15) for a total score of 31. This is between the assigned non-supporting and supporting thresholds of 29 to 34 for Central Irregular Plains cool water aquatic communities [OAC 46:15-5(k)]. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the twenty-five (25) enterococci concentrations, three (3) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (35.6 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Spring River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively. Furthermore, the mean sestonic chlorophyll-a concentration (8.9 mg/M³) produced a TSI of 52, which is below the threshold TSI of 62.

Verdigris River near Inola

Station AT178600 (121500020260-001AT) is a permanent ambient trend monitoring station located on the Verdigris River (McClellan-Kerr Situated in the extreme south central portion of Rogers County, the site was established west of the town of Inola on US Highway 412. The station is positioned near the midpoint of stream segment 121500020260 and is classified within the Lower Verdigris River 8 digit HUC watershed (11070105). Water enters the stream system from Bird Creek, Spunky Creek, Chambers Creek, Dog Creek (Claremore Lake), and Salt Creek, among others.

This station on the Verdigris River has been active for all water quality variables since November of 2000. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Verdigris River from the confluence of Bird Creek (95.7261, 36.2210) downstream to the confluence of the Verdigris River with Adams Creek (95.5510, 36.0673). As per Appendix A, Table 1 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the eleven (11) toxicant samples collected, six (6) of the lead concentrations (or 55%) exceeded the prescribed hardness-dependant chronic criteria of 5.25 ug/L. Of the twenty-nine (29) turbidity samples, six (6) samples (or 21%) exceeded the numerical criterion of 50. Dissolved oxygen and pH samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the eighteen (18) enterococci concentrations, four (4) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (130.3 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Verdigris River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 1.00 mg/L and 4.65 mg/L, respectively. Furthermore, the mean sestonic chlorophyll-a concentration (8.0 mg/M³) produced a TSI of 51, which is below the threshold TSI of 62.

Verdigris River near Keetonville

Station AT176000 (121500030010-001AT) is a permanent ambient trend monitoring station located on the Verdigris River in Oklahoma. Situated in the east central portion of Rogers County, the site was established east of the city of Keetonville on State Highway 20. The station is positioned near the midpoint of stream segment 121500030010 and is classified within the Lower Verdigris River 8-digit HUC watershed (11070105). Water enters the stream system from Oologah Lake and from several tributaries including Fourmile Creek, Caney River, and Bird Creek, among others.

This station on the Verdigris River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Verdigris River from the confluence of Oologah Lake (95.4226, 36.6794) downstream to confluence of the Verdigris River with Bird Creek (95.7261, 36.2210). As per Appendix A, Table 1 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is supported. Dissolved oxygen, pH, turbidity, and toxicant samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the fifteen (15) enterococci concentrations, three (3) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (114.9 cfu/mL) exceeded the prescribed mean standard of 33 cfu/mL. This segment of the Verdigris River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively. Furthermore, the mean sestonic chlorophyll-a concentration (5.1 mg/M³) produced a TSI of 47, which is below the threshold TSI of 62.

Verdigris River near Lenapah

Station AT171000 (121510020010-001AT) is a permanent ambient trend monitoring station near the upper end of the Verdigris River in Oklahoma. Situated in the north central portion of Nowata County, the site was established east of the town of Lenapah on State Highway 10. The station is positioned near the terminal end of stream segment 121510020010 and is classified within the Middle Verdigris River 8 digit HUC watershed (11070103). Water enters the stream system from Kansas and from several tributaries including Onion Creek, Snow Creek, and California Creek, among others.

This station on the Verdigris River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Verdigris River from entrance into Oklahoma near Coffeyville, Kansas (95.5890, 36.9993) downstream to confluence of the Verdigris River with California Creek (95.6142, 36.7567). As per Appendix A, Table 1 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the thirteen (13) toxicant samples collected, two (2) of the lead concentrations (or 15%) exceeded the prescribed hardness-dependant chronic criteria of 5.84 ug/L. Of the twenty-nine (29) turbidity samples, seven (7) samples (or 24%) exceeded the numerical criterion of 50. Dissolved oxygen and pH samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the sixteen (16) enterococci concentrations, two (2) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (395.6 cfu/mL) exceeded the prescribed mean standard of 33 cfu/mL. This segment of the Verdigris River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 1.0 mg/L and 4.65 mg/L, respectively. Furthermore, the mean sestonic chlorophyll-a concentration (11.5 mg/M³) produced a TSI of 55, which is below the threshold TSI of 62.

Verdigris River near Wagoner

Station AT178900 (121500010200-001AT) is a permanent ambient trend monitoring station near the lower end of the Verdigris River (McClellan-Kerr Navigational System) in Oklahoma. Situated in the central portion of Wagoner County, the site was established west of the city of Wagoner on State Highway 51. The station is positioned near the midpoint of stream segment 121500010200 and is classified within the Lower Verdigris River 8 digit HUC watershed (11070105). Water enters the stream system from several tributaries including Adams Creek (Newt Graham Lake), Inola Creek, Pea Creek, Coal Creek, and Coal Creek near Wagoner, among others.

This station on the Verdigris River has been active for all water quality variables since September of 1999. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Verdigris River the confluence of Adams Creek (95.5510, 36.0673) downstream to its confluence with the Arkansas River (95.3073, 35.7983). As per Appendix A, Table 1 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the eleven (11) lead samples collected, eight (8) of the concentrations (or 73%) exceeded the prescribed hardness-dependant chronic criteria of 4.73 ug/L. Of the 11 copper samples, four (4) of the concentrations (36%) exceeded the prescribed hardness-dependant chronic criteria of 16.70 ug/L, and two (2) of the concentrations (or 19%) exceeded the prescribed hardness-dependant acute criterion of 25.74 ug/L. Of the twenty-eight (28) turbidity samples, five (5) samples (or 18%) exceeded the numerical criterion 50. Dissolved oxygen and pH samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the twenty (20) enterococci concentrations, six (6) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (154.8 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of Verdigris River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively. Furthermore, the mean sestonic chlorophyll-a concentration (5.4 mg/M³) produced a TSI of 47, which is below the threshold TSI of 62.

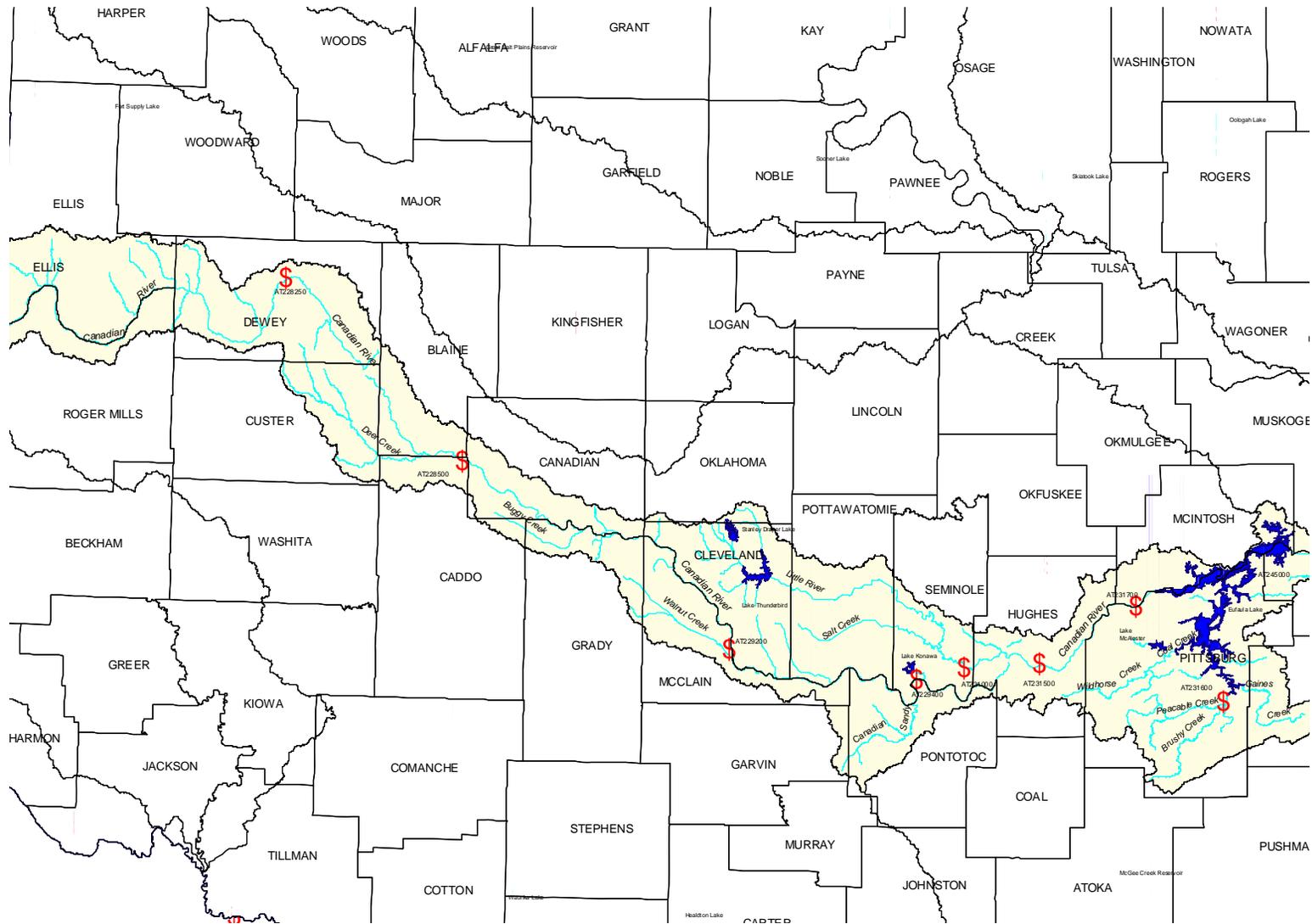


Plate 61
 CANADIAN SUBBASIN (HUC 1109)
 Water Quality Programs Division
 Oklahoma Water Resources Board

HUC 1109

CANADIAN SUB-BASIN

The Canadian sub-basin (4-digit hydrologic unit 1109) begins in the central west and runs to the east central portion of the state. It originates in the southern portion of Ellis and the northern portion of Roger-Mills Counties, continues eastward through portions of Ellis, Roger Mills, Dewey, Custer, Blaine, Caddo, Canadian, Grady, Cleveland, McClain, Pottawatomie, Pontotoc, Seminole, Hughes, McIntosh, and Muskogee Counties and terminates in Pittsburg, Haskell, and Latimer Counties. Major cities and County seats located within the basin include Arnett, Taloga, Weatherford, Mustang, Moore, Norman, Noble, Oklahoma City, Purcell, Ada, Tecumseh, Holdenville, McAlester, and Stigler. Minor cities of note include Newcastle, Lexington, Konawa, and Hartshorne.

The basin is subdivided into five 8-digit hydrologic units (HUC) within the state. These HUC's are the Rita Blanca (11090103), the Lower Canadian–Deer (11090201), the Lower Canadian–Walnut (11090202), the Little (11090203), and the Lower Canadian (11090204). The major surface water in the basin is the Canadian River. Major tributaries include Little River, Deer Creek, Walnut Creek, Canadian Sandy Creek, Salt Creek, Coal Creek, Gaines Creek, and Brushy Creek. Five major lakes are located in the basin—Lake Stanley Draper formed by East Elm Creek, Lake Thunderbird formed by the Little River, Lake Konawa formed by Jumper Creek, Lake McAlester formed by a tributary of Coal Creek, and the lower half of Lake Eufaula formed by the Canadian River and Coal, Brushy, and Gaines Creeks (among others). Eight permanent water quality-monitoring stations (Table 10) are located in the basin—AT228250, AT228500, AT229200, AT229400, AT231000, AT231500, AT231600, and AT245000. One inactive water quality-monitoring station (AT231700) is located in the sub-basin. This station was last assessed in the 2000 BUMP report.

The basin is characterized by five ecoregions. The Central Great Plains is one of two primary ecoregions beginning in western Dewey County and continuing to eastern Cleveland and McClain Counties. The other primary ecoregion is the Central Oklahoma/Texas Plains beginning where the Central Great Plains ends and continues through the majority of Pittsburg and McIntosh counties. The Southwestern Tablelands cover an area beginning in the west and ending in the western part of Dewey County. The Arkansas Valley covers the rest of McIntosh, the eastern portions of Pittsburg County, and parts of Haskell and Latimer Counties. The Ouachita Mountains extend over the bottom part of Pittsburg and Latimer Counties. The primary land usage in the sub-basin is rangeland (open grasslands and woody areas). It dominates the western portion of the sub-basin, is prevalent in the central and east central portions, and is further interspersed throughout the remainder of the sub-basin. The secondary land use is pastureland, which is prevalent in the central and eastern portions. The tertiary land uses are cropland and forestland (post oak–blackjack oak and bottomland hardwoods). Cropland is prevalent in the west central portion of the sub-basin and is interspersed throughout the remainder of the sub-basin. Forestland is prevalent in the east central and eastern portions of the sub-basin. Other land uses of note are woodlands, bottom woodlands, farmsteads, major urban areas, and confined animal feeding operations.

Table 10. Permanent Ambient Trend Monitoring Stations Located in HUC 1109.

WBID #	STATION #	STATION NAME	STATUS	FS	PS	NS/T	CBD
220600030010	AT231600	BRUSHY CREEK, OFF US 270, HAILEYVILLE	ACTIVE 11/98-P	AES, PPWS	NONE	AG, FWP, PBCR	NONE
520610010050	AT228500	CANADIAN RIVER, US 66, BRIDGEPORT	ACTIVE 11/98-P	AES, AG	NONE	FWP, PBCR	NONE
220600010119	AT231500	CANADIAN RIVER, US 270, CALVIN	ACTIVE 11/98-P	PPWS	NONE	AES, AG, FWP, PBCR	NONE
520600010010	AT229400	CANADIAN RIVER, US 377, KONAWA	ACTIVE 11/98-P	PPWS, AG	NONE	FWP, AES, PBCR	NONE
520610010010	AT229200	CANADIAN RIVER, US 77, PURCELL	ACTIVE 11/98-P	AG	NONE	FWP, AES, SBCR	NONE
520620020010	AT228250	CANADIAN RIVER, US 183, TALOGA	ACTIVE 11/98-P	AES, FWP	NONE	AG, PBCR	NONE
220300000010	AT245000	CANADIAN RIVER, SH 2, WHITEFIELD	ACTIVE 9/99-P	AG, FWP, AES, PPWS, PBCR	NONE	NONE	NONE
520800010010	AT231000	LITTLE RIVER, SH 56, SASAKWA	ACTIVE 11/98-P	AG, AES, PPWS	NONE	FWP, PBCR	NONE
ASSIGNED OWQS BENEFICIAL USES AND SUPPORT CODES							
PPWS = PUBLIC AND PRIVATE WATER SUPPLY				EWS = EMERGENCY WATER SUPPLY			
FWP = FISH & WILDLIFE PROPAGATION				PBCR = PRIMARY BODY CONTACT RECREATION			
AG = AGRICULTURE				AES = AESTHETICS			
FS = FULLY SUPPORTING				PS = PARTIALLY SUPPORTING			
NS/T = NOT SUPPORTING/THREATENED				CBD = CANNOT BE DETERMINED			

HUC 1109

Brushy Creek near Haileyville

Station AT231600 (220600030010-001AT) is a permanent ambient trend monitoring station located on Brushy Creek. Situated in the east central portion of Pittsburg County, the site was established north of the town of Haileyville off of US Highway 270 on County Road 1480. The station is positioned near the terminal end of stream segment 220600030010 and is classified within the Lower Canadian River 8 digit HUC watershed (11090204). Water enters the stream system from several tributaries including Elm Creek, Peaceable Creek (Brown Lake Watershed) and Blue Creek (Hartshorne Lake), among others.

This station on Brushy Creek has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through March of 2007. For purposes of reporting, this station is representative of Brushy Creek from the confluence of Elm Creek (95.7520, 34.6870) downstream to confluence of Brushy Creek with Lake Eufaula (95.5844, 34.8904). As per Appendix A, Table 2 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the thirty-seven (37) turbidity samples, sixteen (16) samples (or 43%) exceeded the numerical criteria of 50. Of the fourteen (14) toxicant samples collected, four (4) of the lead concentrations (or 29%) exceeded the prescribed, hardness-dependent chronic criteria of 3.86 ug/L (). Of the forty-seven (47) dissolved oxygen samples, nine (9) samples (or 19%) were below the prescribed screening level. Furthermore, of the 47 visual site observations, fifteen (15) samples (or 32%) exceeded the median observation value for oil and grease. The pH samples met the criterion prescribed in the WWAC beneficial use. The AG beneficial use is not supported. Of the forty-five (45) sulfate concentrations, seven (7) samples (or 16%) exceeded the sample standard of 255.0 mg/L. The TDS and chloride values met the segment-specific criterion. The PBCR beneficial use is not supported. Of the twenty-three (23) enterococci concentrations, three (3) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (59.9 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of Brushy Creek is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

HUC 1109

Canadian River near Bridgeport

Station AT228500 (520610020150-001AT) is a permanent ambient trend monitoring station located on the Canadian River in Oklahoma. Situated in the northeastern portion of Caddo County, the site was established east of the town of Bridgeport on US Highway 66. The station is positioned near the upper end of stream segment 520610020150 and is classified within the Lower Canadian River - Walnut Creek 8 digit HUC watershed (11090202). Water enters the stream system from several tributaries including Lariat Creek, Canyon View Creek, Powder Face Creek, and Buggy Creek, among others.

This station on the Canadian River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from June of 2002 through March of 2007. For purposes of reporting, this station is representative of the Canadian River from the confluence of Deer Creek (98.4737, 35.5580) downstream to confluence of the Canadian River with Buggy Creek (97.8950, 35.3450). As per Appendix A, Table 5 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Emergency Water Supply (EWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The WWAC beneficial use is not supported. Of the thirty-two (32) turbidity samples, eight (8) samples (or 25%) exceeded the numerical criterion of 50. Dissolved oxygen, pH, and toxicants samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the twenty-seven (27) enterococci concentrations, six (6) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (134.2 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Canadian River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively. Furthermore, the mean sestonic chlorophyll-a concentration (19.9 mg/M³) produced a TSI of 60, which is below the threshold TSI of 62.

Canadian River near Calvin

Station AT231500 (220600010119-001AT) is a permanent ambient trend monitoring station between the midpoint and the lower end of the Canadian River in Oklahoma. Situated in the central portion of Hughes County, the site was established north of the town of Calvin on US Highway 270. The station is positioned near the upper end of stream segment 220600010119 and is classified within the Lower Canadian River - Walnut Creek 8 digit HUC watershed (11090202). Water enters the stream system from several tributaries including Big Creek, Salt Creek, Spring Creek, Coal Creek, and Gobbler Creek, among others.

This station on the Canadian River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Canadian River from below the confluence of the Little River (96.3637, 34.9962) downstream to confluence of the Canadian River with Eufaula Lake (95.8391, 35.1899). As per Appendix A, Table 2 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the twelve (12) toxicant samples collected, two (2) of the lead concentrations (or 17%) exceeded the prescribed, hardness-dependent chronic criteria of 13.57 ug/L. Of the twenty-five (26) turbidity samples, five (5) samples (or 20%) exceeded the numerical criteria of 50. Furthermore, of the forty-eight (48) visual site observations, six (6) samples (or 13%) exceeded the median observation value for oil and grease. Dissolved oxygen and pH samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is not supporting. Of the 48 total dissolved solids concentrations, fifteen (15) samples (or 31%) exceeded the prescribed sample standard of 1053.0 mg/L. Of the forty-five (45) sulfate concentrations, nine (9) samples (or 20%) exceeded the prescribed sample standard of 255.0 mg/L. Chloride values met the prescribed segment-specific criteria. The PBCR beneficial use is not supported. Of the thirty (30) enterococci concentrations, seven (7) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (98.4 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Canadian River is nutrient-threatened. The mean sestonic chlorophyll-a concentration (33.2 mg/M³) produced a TSI of 65, which is above the threshold TSI of 62. However, the total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

Canadian River near Konawa

Station AT229400 (520600010010-001AT) is a permanent ambient trend monitoring station located on the Canadian River in Oklahoma. Situated in the southeastern portion of Seminole County, the site was established east of the town of Konawa on US Highway 377. The station is positioned near the upper end of stream segment 520600010010 and is classified within the Lower Canadian River - Walnut Creek 8 digit HUC watershed (11090202). Water enters the stream system from and from several tributaries including Canadian Sandy Creek, Jumper Creek, and the Little River, among others.

This station on the Canadian River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Canadian River from the confluence of Canadian Sandy Creek (96.7007, 34.8651) downstream to confluence of the Little River with the Canadian River (96.3637, 34.9962). As per Appendix A, Table 5 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the thirty-one (31) turbidity samples, samples (7) samples (or 23%) exceeded the numerical criterion of 50. Of the twelve (12) toxicant samples collected, three (3) of the lead concentrations (or 25%) exceeded the prescribed, hardness-dependent chronic criteria of 14.65 ug/L. Furthermore, of the forty-eight (48) visual site observations, six (6) samples (or 13%) exceeded the median observation value for oil and grease. Dissolved oxygen and pH samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the twenty-nine (29) enterococci concentrations, seven (7) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (120.0 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Canadian River is nutrient-threatened. The mean sestonic chlorophyll-a concentration (32.4 mg/M³) produced a TSI of 65, which is above the threshold TSI of 62. However, the total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

HUC 1109

Canadian River near Purcell

Station AT229200 (520610010010-001AT) is a permanent ambient trend monitoring station located on the Canadian River in Oklahoma. Situated in the east central portion of McClain County, the site was established east of the city of Purcell on US Highway 77. The station is positioned near the midpoint of stream segment 520610010010 and is classified within the Lower Canadian River - Walnut Creek 8 digit HUC watershed (11090202). Water enters the stream system from several tributaries including Cow Creek, Pond Creek, and Walnut Creek, among others.

This station on the Canadian River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Canadian River from the confluence of Cow Creek (-97.6291, 35.3154) downstream to confluence of Walnut Creek with the Canadian River (-97.8950, 35.3450). As per Appendix A, Table 5 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 2) Agriculture—Class II Irrigation (AG), and 3) Secondary Body Contact—Recreation (SBCR).

The WWAC beneficial use is not supported. Of the twenty-eight (28) turbidity samples, five (4) samples (or 18%) exceeded the numerical criterion of 50. Of the sixty (60) visual site observations, eleven (11) samples (or 18%) exceeded the median observation value for oil and grease. Dissolved oxygen, pH, and toxicant samples met the criteria prescribed in the HLAC beneficial use. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The SBCR beneficial use is not supported. Of the sixteen (16) enterococci concentrations, four (4) samples exceeded the prescribed screening level of 2030 cfu/100mL, and the geometric mean (391.0 cfu/100mL) exceeded the prescribed mean standard of 165 cfu/100mL. This segment of the Canadian River is nutrient-threatened. The median of the total phosphorus concentrations (0.476 mg/L) exceeded the threshold median of 0.36 mg/L, and the station was not light limited with a mean organic turbidity was 66 NTU. The mean sestonic chlorophyll-a concentration (44.0 mg/M³) produced a TSI of 68, which is above the threshold TSI of 62. The nitrate/nitrite median values were below the threshold median of 5.0 mg/L, respectively.

Canadian River near Taloga

Station AT228250 (520620020010-001AT) is a permanent ambient trend monitoring station located on the Canadian River in Oklahoma. Situated in the north central portion of Dewey County, the site was established north of the town of Taloga on US Highway 183. The station is positioned near the upper end of stream segment 520620020010 and is classified within the Lower Canadian River - Deer Creek 8 digit HUC watershed (11090201). Water enters the stream system from several tributaries including Turkey Creek, Red Creek, Gyp Creek, Trail Creek, Lone Creek, Squirrel Creek, and Deer Creek, among others.

This station on the Canadian River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected May of 2002 through March of 2007. Data is not included for all typical sampling months because of the ephemeral nature of this section of the Canadian River. For purposes of reporting, this station is representative of the Canadian River from the confluence of Turkey Creek (99.3783, 36.0127) downstream to confluence of Deer Creek with the Canadian River (98.4737, 35.5580). As per Appendix A, Table 5 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Emergency Water Supply (EWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class II Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The WWAC beneficial use is supported. Dissolved oxygen, pH, turbidity, and toxicant samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is not supported. Of the thirty-eight (38) total dissolved solids concentrations, five (5) samples (or 13%) exceeded the sample standard of 1849.0 mg/L, and the mean (1569.6 mg/L) exceeded the yearly mean standard (1458 mg/L). Of the thirty-four (34) chloride concentrations, nine (9) samples (or 26%) exceeded the sample standard of 488.0 mg/L, and the mean (520.4 mg/L) exceeded the yearly mean standard (336 mg/L). Of the 34 sulfate concentrations, 5 samples (or 15%) exceeded the sample standard of 724.0 mg/L. The PBCR beneficial use is not supported. Of the twelve (12) enterococci concentrations, four (4) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (102.2 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Canadian River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

Canadian River near Whitefield

Station AT245000 (220300000010-001AT) is a permanent ambient trend monitoring station near the lower end of the Canadian River in Oklahoma. Situated in the northwestern portion of Haskell County, the site was established north of the town of Whitefield on State Highway 2. The station is positioned between the upper end and the midpoint of stream segment 2203 00000010 and is classified within the Lower Canadian River 8 digit HUC watershed (11090204). Water enters the stream system from Eufaula Lake and several tributaries including Emachaya Creek and Taloka Creek, among others.

This station on the Canadian River has been active for all water quality variables since September of 1999. The following assessment of beneficial uses is based on data collected from May 2002 through March of 2007. For purposes of reporting, this station is representative of the Canadian River from the confluence with Lake Eufaula (95.3582, 35.3065) downstream to the Canadian River's confluence with Robert S. Kerr Reservoir (95.0776, 35.4325). As per Appendix A, Table 2 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is supported. Dissolved oxygen, pH, turbidity, and toxicant samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is supported for fecal coliform, *E. coli* and enterococci. This segment of the Canadian River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

Little River near Sasakwa

Station AT231000 (520800010010-001AT) is a permanent ambient trend monitoring station located on the Little River. Situated in the southeastern portion of Seminole County, the site was established north-northeast of the town of Sasakwa on State Highway 56. The station is positioned near the midpoint of stream segment 520800010010 and is classified within the Little River 8 digit HUC watershed (11090203). Water enters the stream system from several tributaries including Salt Creek and Bird Creek, among others.

This station on the Little River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from October of 2001 through of September 2006. For purposes of reporting, this station is representative of the Little River from the confluence of Salt Creek (96.6130, 35.0213) downstream to confluence of the Little River with the Canadian River (96.3637, 34.9962). As per Appendix A, Table 5 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the thirteen (13) lead samples collected, three (3) of the concentrations (or 23%) exceeded the prescribed, hardness-dependent chronic criteria of 11.26 ug/L. Of the forty-six (46) visual site observations, eight (8) samples (or 17%) exceeded the median observation value for oil and grease. Dissolved oxygen, pH, and turbidity samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the twenty-nine (29) fecal coliform concentrations, 8 samples (or 28%) exceeded the prescribed screening level of 400 cfu/100mL. Of the 29 enterococci concentrations, six (6) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (115.2 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Little River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

HUC 1110

BEAVER/NORTH CANADIAN SUB-BASIN

The Beaver/North Canadian sub-basin (4-digit hydrologic unit 1110) is situated in the Panhandle, northwest, and central portions of the state. It originates in Cimarron County, continues eastward through portions of Texas, Beaver, Harper, Ellis, Woodward, Major, Dewey, Blaine, Canadian, Oklahoma, Logan, Lincoln, Pottawatomie, Seminole, Creek, Okfuskee, Hughes, and Okmulgee Counties and terminates in the central part of McIntosh County. Major cities and County seats located within the basin include Boise City, Guymon, Beaver, Woodward, Watonga, El Reno, Yukon, Oklahoma City, Midwest City, Del City, Choctaw, Harrah, Edmond, Chandler, Shawnee, Tecumseh, Seminole, Bristow, Okemah, Wewoka, Okmulgee, Henryetta, and Eufaula. Minor cities of note include Goodwell, Laverne, Shattuck, Seiling, Meeker, Stroud, Prague, Wetumka, and Beggs.

The sub-basin is subdivided into nine 8-digit hydrologic units (HUC) within the state. These HUC's are the Upper Beaver (11100101), the Middle Beaver (11100102), the Coldwater (11100103), the Palo Duro (11100104), the Lower Beaver (11100201), the Lower Wolf (11100203), the Middle North Canadian (11100301), the Lower North Canadian (11100302), and the Deep Fork (11100303). The major surface water in the sub-basin is the Beaver/North Canadian River. Major tributaries include Goff Creek, Palo Duro Creek, Kiowa Creek, Clear Creek, Wolf Creek, Wewoka Creek, the Deep Fork River, and Little Deep Fork Creek. Ten major lakes are located in the sub-basin—Optima Lake formed by the Beaver River and Coldwater Creek, Fort Supply Lake formed by Wolf Creek, Canton Lake formed by the North Canadian River, Lake Overholser formed by the North Canadian River, Lake Hefner, Lake Arcadia formed by the Deep Fork River, Wes Watkins Lake formed by North Deer Creek, the Shawnee Twin Lakes, Bell Cow Lake formed by Bell Cow Creek, and the upper portion of Eufaula Lake formed by the North Canadian and Deep Fork Rivers. Sixteen active permanent water quality-monitoring stations (Table 11) are located in the basin—AT232500, AT233900, AT234000, AT234200, AT234400 (recently reactivated), AT234450, AT237050, AT237500, AT238000, AT239500, AT241550, AT241700, AT242000, AT242200, AT242500, and AT243500. Three inactive water quality-monitoring stations (AT233750, AT234250, AT234300) are located in the sub-basin and were last assessed in the 2000 BUMP report. The Laverne station will not be assessed in this report due to lack of data.

The basin is characterized by five ecoregions. The Western High Plains cover all Cimarron County, most of Texas County, and half of Beaver County. The Southwestern Tablelands begin in Texas County and terminate in Ellis and Woodward Counties. The Central Great Plains begins in Ellis County and terminates in western Oklahoma County. The Central Oklahoma/Texas Plains begin in eastern Oklahoma County and end in western Okmulgee and McIntosh Counties. The Central Irregular Plains cover eastern Okmulgee and McIntosh Counties. The primary land usage in the sub-basin is rangeland (open grasslands and woody areas). It is prevalent throughout the sub-basin with areas of concentration west central and central portions. The secondary land use is cropland, which is prevalent in the western and central portions and is interspersed throughout the eastern portion. The tertiary land uses is pastureland (brushy or mixed) and forestland (post oak, blackjack oak and bottomland hardwoods). Pastureland is prevalent in the eastern portion and is interspersed through the rest

of the sub-basin. Forestland is prevalent in the eastern part of the sub-basin. Other land uses of note are farmsteads, major urban areas, wetlands, and confined animal feeding operations.

Table 11. Permanent Ambient Trend Monitoring Stations Located in HUC 1110.

WBID #	STATION #	STATION NAME	STATUS	FS	PS	NS/T	CBD
720500020290	AT234000	BEAVER RIVER, SH 23, BEAVER	ACTIVE 11/98-P	FWP, AES	NONE	AG, PBCR	NONE
720500020010	AT234450	BEAVER RIVER, US 183, FORT SUPPLY	ACTIVE 10/00-P	AG, FWP, AES	NONE	PBCR	NONE
720500020140	AT234200	BEAVER RIVER, CR N1650, GATE	ACTIVE 10/00-P	FWP, AES	NONE	AG, PBCR	NONE
720510000190	AT232500	BEAVER RIVER, OFF US 64, GUYMON	ACTIVE 11/98-P	AG, AES, PPWS	NONE	FWP, PBCR	NONE
720500020010	AT234400	BEAVER RIVER, US 283, LAVERNE	ACTIVE 11/98-P	AG, FWP, AES	NONE	PBCR	NONE
720500020450	AT233900	BEAVER RIVER, US 83, TURPIN	ACTIVE 10/00-P	FWP, AES	NONE	AG, PBCR	NONE
520700020010	AT243500	DEEP FORK RIVER, OFF SH 16, BEGGS	ACTIVE 11/98-P	AG, AES, PPWS	NONE	FWP, PBCR	NONE
520700040010	AT242500	DEEP FORK RIVER, US 377, STROUD	ACTIVE 11/98-P	AG, AES	NONE	FWP, PBCR	NONE
520500010110	AT242200	NORTH CANADIAN RIVER, IND. NAT. TPK., DUSTIN	ACTIVE 11/98-P	AG, PPWS	NONE	FWP, PBCR, AES	NONE
520530000010	AT239500	NORTH CANADIAN RIVER, US 81, EL RENO	ACTIVE 11/98-P	AG, FWP, AES, PPWS	NONE	PBCR	NONE
520520000010	AT241550	NORTH CANADIAN RIVER, OFF US 62, HARRAH	ACTIVE 11/98-P	NONE	NONE	PBCR, AES, FWP, AG	NONE
720500010010	AT238000	NORTH CANADIAN RIVER, US 281, SEILING	ACTIVE 11/98-P	AG, AES, PPWS	NONE	PBCR, FWP	NONE
520510000110	AT241700	NORTH CANADIAN RIVER, SH 3E, SHAWNEE	ACTIVE 10/00-P	AG	NONE	FWP, PBCR, AES	NONE
520530000010	AT239300	NORTH CANADIAN RIVER, US 270, WATONGA	ACTIVE 1/03-P	AG, FWP, AES, PPWS	NONE	PBCR	NONE
520510000010	AT242000	NORTH CANADIAN RIVER, US 75, WETUMKA	ACTIVE 9/99-P	AG, PPWS	NONE	FWP, PBCR, AES	NONE
720500010140	AT237500	NORTH CANADIAN RIVER, US 412, WOODWARD	ACTIVE 10/00-P	AG, FWP, AES	NONE	PBCR	NONE
720500030010	AT237050	WOLF CREEK, OFF US 270, FORT SUPPLY	ACTIVE 11/98-P	AG, FWP, AES, PPWS	NONE	PBCR	NONE
ASSIGNED OWQS BENEFICIAL USES AND SUPPORT CODES							
PPWS = PUBLIC AND PRIVATE WATER SUPPLY				EWS = EMERGENCY WATER SUPPLY			
FWP = FISH & WILDLIFE PROPAGATION				PBCR = PRIMARY BODY CONTACT RECREATION			
AG = AGRICULTURE				AES = AESTHETICS			
FS = FULLY SUPPORTING				PS = PARTIALLY SUPPORTING			
NS/T = NOT SUPPORTING/THREATENED				CBD = CANNOT BE DETERMINED			

HUC 1110

Beaver River near Beaver

Station AT234000 (720500020290-001AT) is a permanent ambient trend monitoring station located on the Beaver River in Oklahoma. Situated in the north central portion of Beaver County, the site was established north of the city of Beaver on state highway 23. The station is positioned near the midpoint of stream segment 720500020290 and is classified within the Middle Beaver River 8 digit HUC watershed (11100102). Water enters the stream system from several tributaries including Willow Creek, Sixmile Creek, Home Creek, and Clear Creek, among others.

This station on the Beaver River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from June 2002 through March of 2007. For purposes of reporting, this station is representative of the Beaver River from below the confluence of Sharp Creek (100.8064, 36.7972) downstream to below the confluence of Clear Creek with the Beaver River (100.4400, 36.8169). As per Appendix A, Table 7 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 2) Agriculture—Class III Irrigation (AG), and 3) Primary Body Contact—Recreation (PBCR).

The WWAC beneficial use is supported. Dissolved oxygen, pH, turbidity, and toxicant data met the criteria prescribed in the WWAC beneficial use. Fish were collected during the summer of 2006. Based on the Index of Biological Integrity (IBI) outlined in Appendix C of Oklahoma's USAP, the station has a sample composition score of 9 (maximum 30) and fish condition score of 11 (maximum 15) for a total score of 20. However, because biocriteria have not been developed for the Southwestern Tablelands ecoregion, no assessment of community biological health can be made at this time. The AG beneficial use is not supported. Of the thirty-four (34) total dissolved solids concentrations, thirty-one (31) samples (or 91%) exceeded the sample standard of 3010.0 mg/L, and the mean (5111.8 mg/L) exceeded the yearly mean standard (2442 mg/L). Of the thirty (30) chloride concentrations, twenty-eight (28) samples (or 93%) exceeded the sample standard of 945.0 mg/L, and the mean (2062.7 mg/L) exceeded the yearly mean standard (735 mg/L). Of the 30 sulfate concentrations, five (5) samples (or 17%) exceeded the sample standard of 977.0 mg/L. The PBCR beneficial use is not supported. Of the eighteen (18) fecal coliform concentrations, eight (8) samples (or 44%) exceeded the prescribed screening level of 400 cfu/100mL; however the geometric mean (338.7 cfu/100mL) did not exceed the prescribed mean standard of 400 cfu/mL. Of the 18 *E. coli* concentrations, six (6) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (235.2 cfu/100mL) exceeded the prescribed mean standard of 126 cfu/100mL. Of the 18 enterococci concentrations, 8 samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (293.3 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Beaver River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

HUC 1110

Beaver River near Fort Supply

Station AT234450 (720500020010-002AT) is a permanent ambient trend monitoring station located on the Beaver River in Oklahoma. Situated in the extreme northwest corner of Woodward County, the site was established northwest of the town of Fort Supply on US Highway 183. The station is positioned near the terminal end of stream segment 720500020010 and is classified within the Lower Beaver River 8 digit HUC watershed (11100201). Water enters the stream system from Clear Creek and Otter Creek, among others.

This station on the Beaver River has been active for all water quality variables since October of 2000. The following assessment of beneficial uses is based on data collected from May of 2002 through March of 2007. For purposes of reporting, this station is representative of the Beaver River from the confluence of Clear Creek (99.7681, 36.6469) downstream to the confluence of Wolf Creek with the Beaver River (99.5019, 36.5886). As per Appendix A, Table 7 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 2) Agriculture—Class III Irrigation (AG), and 3) Primary Body Contact—Recreation (PBCR).

The WWAC beneficial use is supported. Dissolved oxygen, pH, turbidity, and toxicant data met the criteria prescribed in the WWAC beneficial use. Fish were collected during the summer of 2006. Based on the Index of Biological Integrity (IBI) outlined in Appendix C of Oklahoma's USAP, the station has a sample composition score of 15 (maximum 30) and fish condition score of 11 (maximum 15) for a total score of 26. However, because biocriteria have not been developed for the Southwestern Tablelands ecoregion, no assessment of community biological health can be made at this time. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the twenty-one (21) enterococci concentrations, six (6) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (256.3 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Beaver River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

Beaver River near Gate

Station AT234200 (720500020140-001AT) is a permanent ambient trend monitoring station located on the Beaver River in Oklahoma. Situated in the east central portion of Beaver County, the site was established south of the town of Gate on County Road 1650N. The station is positioned near the terminal end of stream segment 720500020140 and is classified within the Lower Beaver River 8 digit HUC watershed (11100201). Water enters the stream system from Clear Creek, Duck Pond Creek, and Mexico Creek (Evans Chambers Lake), among others.

This station on the Beaver River has been active for all water quality variables since October of 2000. The following assessment of beneficial uses is based on data collected from May of 2003 through March of 2007. Data is not included for all typical sampling months because of the ephemeral nature of this section of the Beaver River. For purposes of reporting, this station is representative of the Beaver River from the confluence of Clear Creek (100.4400, 36.8169) downstream to the confluence of the Beaver River with Kiowa Creek (99.9060, 36.7591). As per Appendix A, Table 7 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 2) Agriculture—Class III Irrigation (AG), and 3) Primary Body Contact—Recreation (PBCR).

The WWAC beneficial use is supported. Dissolved oxygen, pH, and turbidity data met the criteria prescribed in the WWAC beneficial use. Fish were collected during the summer of 2006. Based on the Index of Biological Integrity (IBI) outlined in Appendix C of Oklahoma's USAP, the station has a sample composition score of 9 (maximum 30) and fish condition score of 11 (maximum 15) for a total score of 20. However, because biocriteria have not been developed for the Southwestern Tablelands ecoregion, no assessment of community biological health can be made at this time. The AG beneficial use is not supported. Of the twenty-four (24) total dissolved solids concentrations, six (6) samples (or 25%) exceeded the sample standard of 3010.0 mg/L, and the mean (2548.6 mg/L) exceeded the yearly mean standard (2442 mg/L). Of the twenty-two (22) chloride concentrations, nine (9) samples (or 41%) exceeded the sample standard of 945.0 mg/L, and the mean (1066.9 mg/L) exceeded the yearly mean standard (735 mg/L). Sulfate values met the segment-specific criterion. The PBCR beneficial use is not supported. Of the twelve (12) enterococci concentrations, six (6) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (164.8 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. Of the 12 fecal coliform concentrations, 6 samples (or 50%) exceeded the prescribed screening level of 400 cfu/100mL. This segment of the Beaver River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

Beaver River near Guymon

Station AT232500 (720510000190-001AT) is a permanent ambient trend monitoring station located on the Beaver River in Oklahoma. Situated in the central portion of Texas County, the site was established west of the city of Guymon off of US Highway 64 on County Road 40. The station is positioned near the midpoint of stream segment 720510000190 and is classified within the Upper Beaver River 8 digit HUC watershed (11100101). Water enters the stream system from several tributaries including Sand Creek, Tepee Creek, Dry Sand Creek, and Goff Creek, among others.

This station on the Beaver River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from June of 2002 through March of 2007. For purposes of reporting, this station is representative of the Beaver River from the confluence of Sand Creek (101.7692, 36.5976) downstream to confluence of Goff Creek with the Beaver River (101.4709, 36.7255). As per Appendix A, Table 7 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the fifty (50) dissolved oxygen concentrations, six (6) samples (or 12%) were below the prescribed screening level for a WWAC. The pH, turbidity, and toxicant data met the criteria prescribed in the WWAC beneficial use. Fish were collected during the summer of 2005. Based on the Index of Biological Integrity (IBI) outlined in Appendix C of Oklahoma's USAP, the station has a sample composition score of 14 (maximum 30) and fish condition score of 11 (maximum 15) for a total score of 25. However, because biocriteria have not been developed for the Western High Plains ecoregion, no assessment of community biological health can be made at this time. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the twenty-two (22) enterococci concentrations, eight (8) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (1841.6 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. Of the 22 *E. coli* concentrations, seven (7) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (299.3 cfu/100mL) exceeded the prescribed mean standard of 126 cfu/100mL. Of the twenty-three (23) fecal coliform concentrations, eleven (11) samples (or 48%) exceeded the prescribed screening level of 400 cfu/100mL. This segment of the Beaver River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

Beaver River near Laverne

Station AT234400 is a permanent ambient trend monitoring station located on the Beaver River in Oklahoma. Situated in the west central portion of Harper County, the site was established north of the town of Laverne on US Highway 283. The station is positioned near the upper end of stream segment 720500020010 and is classified within the Lower Beaver River 8 digit HUC watershed (11100201). Water enters the stream system from several tributaries including Kiowa Creek, among others.

This station on the Beaver River became active for all water quality variables in November of 1998. The station was discontinued in September of 2000 and replaced with another station, the Beaver River at Fort Supply (AT234450). Because the Fort Supply station may not be representative of this section of the Beaver River, the Laverne station has been reactivated. The following assessment of beneficial uses is based on data collected from July of 2003 through March of 2007. For purposes of reporting, this station is representative of the Beaver River from the confluence of Kiowa Creek (99.9060, 36.7591) downstream to confluence of Wolf Creek with the Beaver River (99.5019, 36.5886). As per Appendix A, Table 7 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 2) Agriculture—Class III Irrigation (AG), and 3) Primary Body Contact—Recreation (PBCR).

The WWAC beneficial use is supported. Dissolved oxygen, pH, turbidity, and toxicant data collected during the same period met the criteria prescribed in the WWAC beneficial use. Fish were collected during the summer of 2006. Based on the Index of Biological Integrity (IBI) outlined in Appendix C of Oklahoma's USAP, the station has a sample composition score of 16 (maximum 30) and fish condition score of 11 (maximum 15) for a total score of 27. However, because biocriteria have not been developed for the Southwestern Tablelands ecoregion, no assessment of community biological health can be made at this time. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the seventeen (17) fecal coliform concentrations, eight (8) samples (or 47%) exceeded the prescribed screening level of 400 cfu/100mL. Of the 17 *E. coli* concentrations, four (4) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (150.2 cfu/100mL) exceeded the prescribed mean standard of 126 cfu/100mL. Of the 17 Enterococci concentrations, two (2) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (116.4 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Beaver River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

HUC 1110

Beaver River near Turpin

Station AT233900 (720500020450-001AT) is a permanent ambient trend monitoring station located on the Beaver River in Oklahoma. Situated in the west central portion of Beaver County, the site was established south of the town of Turpin on US Highway 83. The station is positioned near the terminal end of stream segment 720500020450 and is classified within the Middle Beaver River 8 digit HUC watershed (11100102). Water enters the stream system from Optima Lake and from several tributaries including Fulton Creek (Palo Duro Creek), Bull Creek, and Jackson Creek, among others.

This station on the Beaver River has been active for all water quality variables since October of 2000. The following assessment of beneficial uses is based on data collected from June of 2002 through March of 2007. For purposes of reporting, this station is representative of the Beaver River from just downstream of Optima Lake (101.0968, 36.6651) downstream to the confluence of the Beaver River with Sharp Creek (100.8064, 36.7972). As per Appendix A, Table 7 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 2) Agriculture—Class III Irrigation (AG), and 3) Primary Body Contact—Recreation (PBCR).

The WWAC beneficial use is supported. Dissolved oxygen, pH, turbidity, and toxicant data met the criteria prescribed in the WWAC beneficial use. Fish were collected during the summer of 2006. Based on the Index of Biological Integrity (IBI) outlined in Appendix C of Oklahoma's USAP, the station has a sample composition score of 5 (maximum 30) and fish condition score of 10 (maximum 15) for a total score of 15. However, because biocriteria have not been developed for the Southwestern Tablelands ecoregion, no assessment of community biological health can be made at this time. The AG beneficial use is not supported. Of the forty (40) total dissolved solids concentrations, thirty-nine (39) samples (or 98%) exceeded the sample standard of 3010.0 mg/L, and the mean (6011.6 mg/L) exceeded the yearly mean standard (2442 mg/L). Of the thirty-six (36) chloride concentrations, 36 samples (or 100%) exceeded the sample standard of 945.0 mg/L, and the mean (2461.4 mg/L) exceeded the yearly mean standard (735 mg/L). Sulfate values met the segment-specific criterion. The PBCR beneficial use is not supported. Of the nineteen (19) fecal coliform concentrations, ten (10) samples (or 53%) exceeded the prescribed screening level of 400 cfu/100mL, and the geometric mean (471.9 cfu/100mL) exceeded the prescribed mean standard of 400 cfu/100mL. Of the 19 enterococci concentrations, 10 samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (281.7 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. Of the 19 *E. coli* concentrations, nine (9) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (261.6 cfu/100mL) exceeded the prescribed mean standard of 126 cfu/100mL. This segment of the Beaver River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

Deep Fork River near Beggs

Station AT243500 (520700020010-001AT) is a permanent ambient trend monitoring station located on the Deep Fork River in Oklahoma. Situated in the west central portion of Okmulgee County, the site was established south of the town of Beggs off State Highway 16 on County Road N3900. The station is positioned near the terminal end of stream segment 520700020010 and is classified within the Deep Fork River 8 digit HUC watershed (11110303). Water enters the stream system from Todd Lake and from several tributaries including Buckeye Creek (Okemah Lake), Nuyaka Creek, Little Deep Fork Creek, and Salt Creek, among others.

This station on the Deep Fork River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Deep Fork River from the confluence of Buckeye Creek (96.2682, 35.6225) downstream to confluence of Salt Creek with the Deep Fork River (96.0242, 35.5887). As per Appendix A, Table 5 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class II Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the twenty-five (25) turbidity samples, sixteen (16) samples (or 64%) exceeded the numerical criteria of 50. Of the forty-seven (47) visual site observations, five (5) samples (or 11%) exceeded the median observation value for oil and grease. Dissolved oxygen, pH, and toxicant data met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the twenty-seven (27) enterococci concentrations, six (6) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (133.3 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. Of the twenty-eight (28) fecal coliform concentrations, nine (9) samples (or 32%) exceeded the prescribed screening level of 400 cfu/100mL. This segment of the Deep Fork River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

Deep Fork River near Stroud

Station AT242500 (520700040010-001AT) is a permanent ambient trend monitoring station located on the Deep Fork River in Oklahoma. Situated in the east central portion of Lincoln County, the site was established south of the city of Stroud on US Highway 377. The station is positioned near the terminal end of stream segment 520700040010 and is classified within the Deep Fork River 8 digit HUC watershed (11100303). Water enters the stream system from Browns Lake and Lake Todd and from several tributaries including Quapaw Creek, Robinson Creek, Dry Creek, Deer Creek, and Grayhorse Creek, among others.

This station on the Deep Fork River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Deep Fork River from the confluence of Quapaw Creek (96.8059, 35.6287) downstream to confluence of Todd Lake with the Deep Fork River (96.6220, 35.6554). As per Appendix A, Table 5 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class II Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is not supported. Of the eleven (11) chromium samples collected, two (2) of the concentrations (or 18%) exceeded the prescribed of 50 ug/L. The WWAC beneficial use is not supported. Of the 11 lead samples collected, 2 of the concentrations (or 18%) exceeded the prescribed, hardness-dependant chronic criterion of 10.45 ug/L. Of the 11 chromium samples collected, 2 of the concentrations (or 18%) exceeded the prescribed chronic criterion of 50 ug/L. Of the twenty-eight (28) turbidity samples, seven (7) samples (or 25%) exceeded the numerical criteria of 50. Dissolved oxygen and pH samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the twenty-nine (29) enterococci concentrations, ten (10) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (252.9 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. Of the thirty (30) fecal coliform concentrations, 10 samples (or 33%) exceeded the prescribed screening level of 400 cfu/100mL. This segment of the Deep Fork River is not nutrient-threatened. Although the median of the total phosphorus concentrations (0.366 mg/L) exceeded the threshold median of 0.36 mg/L, the station is light-limited with a median inorganic baseflow turbidity of 45 NTU. The nitrate/nitrite median value was below the threshold median of 5.0 mg/L.

HUC 1110

North Canadian River at Dustin

Station AT242200 (520500010110-001AT) is a permanent ambient trend monitoring station located on the North Canadian River. Situated in the west central portion of McIntosh County, the site was established on the Indian Nation Turnpike. The station is positioned near the upper end of stream segment 520500010110 and is classified within the Lower North Canadian River 8 digit HUC watershed (11100302). Water enters the stream system from Wewoka Creek (Lake Wewoka), Alabama Creek, and Bad Creek, among others.

This station on the North Canadian River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the North Canadian River from the confluence of Wetumka Creek (96.1690, 35.2556) downstream to confluence of the North Canadian River with Lake Eufaula (95.8105, 35.4048). As per Appendix A, Table 5 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the twenty-eight (28) turbidity samples, sixteen (18) samples (or 57%) exceeded the numerical criterion of 50. Of the eight (8) lead samples collected, four (4) of the concentrations (or 80% of the required 5) exceeded the prescribed, hardness-dependant chronic criteria of 8.18 ug/L. Dissolved oxygen and pH samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the twenty-six (26) fecal coliform concentrations, 8 samples (or 31%) exceeded the prescribed screening level of 400 cfu/100mL. Of the twenty-five (25) enterococci concentrations, 8 samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (133.3 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100 mL. This segment of the North Canadian River is nutrient-threatened. The median of the segment wide total phosphorus concentrations (0.512 mg/L) exceeded the threshold median of 0.36 mg/L and has a mean baseflow organic turbidity of 85 NTU. The nitrate/nitrite median value was below the threshold median of 5.0 mg/L.

North Canadian River near El Reno

Station AT239500 (520530000010-001AT) is a permanent ambient trend monitoring station located on the North Canadian River. Situated in the central portion of Canadian County, the site was established within the city of El Reno on US Highway 81. The station is positioned between the midpoint and the lower end of stream segment 520530000010 and is classified within the Middle North Canadian River 8 digit HUC watershed (11100301). Water enters the stream system from several tributaries including Sixmile Creek, Purcell Creek, and Shell Creek, among others.

This station on the Canadian River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. Analysis also includes water quality data collected by the United States Geological Survey's Oklahoma Water Science Center. For purposes of reporting, this station is representative of the North Canadian River from where it intersects the Canadian/Blaine County Line (98.3134, 35.7180) downstream to confluence of the North Canadian River with Lake Overholser (97.6776, 35.5370). As per Appendix A, Table 5 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is supported. Dissolved oxygen, pH, turbidity, and toxicant samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the seventy-seven (77) fecal coliform concentrations, twenty-two (22) samples (or 29%) exceeded the prescribed screening level of 400 cfu/100mL. Of the twenty-three (23) enterococci concentrations, six (6) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (163.4 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the North Canadian River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively. Furthermore, the mean sestonic chlorophyll-a concentration (14.3 mg/M³) produced a TSI of 57, which is below the threshold TSI of 62.

North Canadian River near Harrah

Station 241550 (520510000110-001AT) is a permanent ambient trend monitoring station located on the North Canadian River. Situated in the southeastern portion of Oklahoma County, the site was established east of the city of Harrah on US Highway 62. The station is positioned near the lower end of stream segment 520520000010 and is classified within the Lower North Canadian River 8 digit HUC watershed (11100302). Water enters the stream system from Lake Overholser and Horseshoe Lake and from several tributaries including Mustang Creek, Crooked Oak Creek, Crutch Creek, and Choctaw Creek, among others.

This station on the Canadian River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. Analysis also includes water quality data collected by the United States Geological Survey's Oklahoma Water Science Center. For purposes of reporting, this station is representative of the North Canadian River from the confluence of Crooked Oak Creek (97.4604, 35.4684) downstream to the confluence of an unnamed tributary near Horseshoe Lake with the North Canadian River (97.1797, 35.5027). As per Appendix A, Table 5 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Emergency Water Supply (EWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The WWAC beneficial use is not supported. Of the twenty (20) dieldrin samples, three (3) sample concentrations (or 15%) exceeded the numerical criterion of 0.001 ug/L. Dissolved oxygen, pH, and turbidity samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is not supported. Of the one hundred ten (110) total dissolved solids samples, twenty-five (25) samples (or 23%) exceeded the sample standard of 700 mg/L. The PBCR beneficial use is not supported. Of the eighty-one (81) fecal coliform concentrations, thirty-four (34) samples (or 42%) exceeded the prescribed screening level of 400 cfu/100mL. Of the twenty-nine (29) enterococci concentrations, twelve (12) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (376.3 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the North Canadian River is nutrient-threatened. The median of the total phosphorus concentrations (1.176 mg/L) exceeded the threshold median of 0.36 mg/L, and has a mean baseflow organic turbidity of 25 NTU. Moreover, the mean sestonic chlorophyll-a concentration (40.3 mg/M³) produced a TSI of 67, which is above the threshold TSI of 62. The nitrate/nitrite median value was below the threshold median of 5.0 mg/L.

North Canadian River near Seiling

Station AT238000 (720500010010-001AT) is a permanent ambient trend monitoring station located on the North Canadian River. Situated in the southwestern portion of Major County, the site was established north of the town of Seiling on US Highway 281. The station is positioned near the midpoint of stream segment 720500010010 and is classified within the Middle North Canadian River 8 digit HUC watershed (11100301). Water enters the stream system from several tributaries including Bent Creek, Deep Creek, and Cheyenne Creek, among others.

This station on the North Canadian River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. Analysis also includes water quality data collected at a variety of stations throughout the segment. Data were collected in cooperation with the Oklahoma Department of Environmental Quality (ODEQ). For purposes of reporting, this station is representative of the North Canadian River from the confluence of an unnamed tributary near Mutual, Oklahoma (99.0817, 36.2638) downstream to confluence of the North Canadian River with Canton Lake (98.6641, 36.1355). As per Appendix A, Table 7 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class III Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the forty-nine (49) turbidity samples, seven (7) samples (or 14%) exceeded the numerical criterion of 50. Dissolved oxygen, pH, and toxicant samples met the criteria prescribed in the WWAC beneficial use. Fish collected during the summer of 2006 indicate that the segment is supporting a healthy biological community. Based on the Index of Biological Integrity (IBI) outlined in Appendix C of Oklahoma's USAP, the station has a sample composition score of 16 (maximum 30) and fish condition score of 11 (maximum 15) for a total score of 27. This is above the assigned supporting threshold of 22 for Central Great Plains warm water aquatic communities [OAC 46:15-5(l)]. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the twenty-two (22) enterococci concentrations, eight (8) samples exceeded the prescribed screening level of 406cfu/100mL, and the geometric mean (256.3 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the North Canadian River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 1.0 mg/L and 4.65 mg/L, respectively.

North Canadian River near Shawnee

Station AT241700 (520510000110-005AT) is a permanent ambient trend monitoring station located on the North Canadian River in Oklahoma. Situated in the extreme northeast corner of Pottawatomie County, the site was established east of the city of Shawnee off of Interstate 40. In October of 2002, the station was moved to the state highway 3E bridge to facilitate the gathering of discharge data. The station is positioned near the terminal end of stream segment 520510000110 and is classified within the Lower North Canadian River 8 digit HUC watershed (11100302). Water enters the stream system from Shawnee Twin Reservoirs and Tecumseh Lake and from several tributaries including North Deer Creek (Wes Watkins Lake), among others.

This station on the North Canadian River has been active for all water quality variables since October of 2000. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. Analysis also includes water quality data collected at a variety of stations throughout the segment. Data were collected in cooperation with the Oklahoma Department of Environmental Quality (ODEQ). For purposes of reporting, this station is representative of the North Canadian River from the confluence of an unnamed tributary near Horseshoe Lake (97.1797, 35.5027) downstream to the confluence of Turkey Creek with the North Canadian River (96.632, 35.3922). As per Appendix A, Table 7 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Emergency Water Supply (EWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The WWAC beneficial use is not supported. Of the sixty-four (64) turbidity samples, thirty-three (14) samples (or 52%) exceeded the numerical criterion of 50. Of the ninety-six (96) pH values, eighteen (18) samples (or 19%) exceed the maximum criterion of 9.0 units. Of the eleven (11) lead samples collected, four (4) of the concentrations (or 37%) exceeded the prescribed, hardness-dependant chronic criterion of 9.25 ug/L. Dissolved oxygen and organics samples met the criteria prescribed in the WWAC beneficial use. Fish collected during the summer of 2005 indicate that whether the segment is supporting a healthy biological community is currently indeterminate. Based on the Index of Biological Integrity (IBI) outlined in Appendix C of Oklahoma's USAP, the station has a sample composition score of 13 (maximum 30) and fish condition score of 11 (maximum 15) for a total score of 24. This is between the assigned non-supporting and supporting thresholds of 20-25 for Central Oklahoma/Texas Plains warm water aquatic communities [OAC 46:15-5(l)]. The AG beneficial use is supported for total dissolved solids (TDS), chlorides, and sulfates. The PBCR beneficial use is not supported. Of the seventy-three (73) enterococci concentrations, twenty (20) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (207.7 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the North Canadian River is nutrient-threatened. The median of the total phosphorus concentrations (0.864 mg/L) exceeded the threshold median of 0.36 mg/L, and has a mean mixed (inorganic/organic) turbidity of 57 NTU. Furthermore, the mean sestonic chlorophyll-a concentration (111.1 mg/M³) produced a TSI of 77, which is above the threshold TSI of 62. The nitrate/nitrite median value was below the threshold median of 5.0 mg/L.

HUC 1110

North Canadian River near Watonga

Station AT239300 (520530000010-002AT) is a permanent ambient trend monitoring station located on the North Canadian River. Situated in the central portion of Blaine County, the site was established south of the town of Watonga on US Highway 270. The station is positioned between the upper end and the midpoint of stream segment 520530000010 and is classified within the Middle North Canadian River 8 digit HUC watershed (11100301). Water enters the stream system from several tributaries including Canton Lake, Minnehaha Creek, Ninemile Creek, and Weavers Creek, among others.

This station on the North Canadian River has been active for all water quality variables since January of 2003. The following assessment of beneficial uses is based on data collected from January of 2003 through April of 2007. For purposes of reporting, this station is representative of the North Canadian River from the Canton Lake dam near Canton, Oklahoma (98.6019, 36.0813) downstream to where it intersects the Canadian/Blaine County Line (98.3134, 35.7180). As per Appendix A, Table 5 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class III Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is supported. Dissolved oxygen, pH, turbidity, and toxicant samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the sixteen (16) fecal coliform concentrations, eleven (11) samples (or 69%) exceeded the prescribed screening level of 400 cfu/100mL and the geometric mean (993.2 cfu/100mL) exceeded the prescribed mean standard of 400 cfu/100mL. Of the seventeen (17) enterococci concentrations, six (6) samples exceeded the prescribed screening level of 406cfu/100mL, and the geometric mean (211.2 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. Of the 17 *E. coli* concentrations, 11 samples exceeded the prescribed screening level of 406cfu/100mL, and the geometric mean (441.4 cfu/100mL) exceeded the prescribed mean standard of 126 cfu/100mL. This segment of the North Canadian River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 1.0 mg/L and 4.65 mg/L, respectively.

North Canadian River near Wetumka

Station AT242000 (520510000010-001AT) is a permanent ambient trend monitoring station located on the North Canadian River. Situated in the north central portion of Hughes County, the site was established northeast of the city of Wetumka on US Highway 75. The station is positioned near the upper end of stream segment 520510000010 and is classified within the Lower North Canadian River 8 digit HUC watershed (11100302). Water enters the stream system Cohee Lake and Lake Wetumka and from several tributaries including Turkey Creek, Sand Creek, Flat Rock Creek, among others.

This station on the North Canadian River has been active for all water quality variables since September of 1999. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. Analysis also includes water quality data collected at a variety of stations throughout the segment. Data were collected in cooperation with the Oklahoma Department of Environmental Quality (ODEQ). For purposes of reporting, this station is representative of the North Canadian River from the confluence of Sand Creek (96.3996, 35.3964) downstream to above the confluence of Wewoka Creek with the North Canadian River (96.1690, 35.2556). As per Appendix A, Table 5 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the forty-eight (48) segment wide turbidity samples, thirty-one (31) samples (or 65%) exceed the numerical criteria of 50. Of the twelve (12) lead samples collected, four (4) of the concentrations (or 33%) exceeded the prescribed, hardness-dependant chronic criterion of 8.01 ug/L. Of the eighty-five (85) pH values, twelve (12) samples (or 14%) exceed the maximum criterion of 9.0 units. Dissolved oxygen samples met the criteria prescribed in the WWAC beneficial use. Fish collected during the summer of 2005 indicate that whether the segment is supporting a healthy biological community is currently indeterminate. Based on the Index of Biological Integrity (IBI) outlined in Appendix C of Oklahoma's USAP, the station has a sample composition score of 9 (maximum 30) and fish condition score of 11 (maximum 15) for a total score of 20. This is between the assigned non-supporting and supporting thresholds of 20-25 for Central Oklahoma/Texas Plains warm water aquatic communities [OAC 46:15-5(I)]. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the forty-three (43) enterococci concentrations, eleven (11) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (124.6 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the North Canadian River is nutrient-threatened. The median of the segment wide total phosphorus concentrations (0.576 mg/L) exceeded the threshold median of 0.36 mg/L and has a mean baseflow organic turbidity of 86 NTU. Furthermore, the mean sestonic chlorophyll-a concentration (112.2 mg/M³) produced a TSI of 77, which is above the threshold TSI of 62. The nitrate/nitrite median value was below the threshold median of 5.0 mg/L.

North Canadian River near Woodward

Station AT237500 (720500010140-001AT) is a permanent ambient trend monitoring station located on the North Canadian River in Oklahoma. Situated in the center portion of Woodward County, the site was established east of the city of Woodward on US Highway 412. The station is positioned near the terminal end of stream segment 720500010140 and is classified within the Middle North Canadian River 8 digit HUC watershed (11100301). Water enters the stream system from Clear Creek and Otter Creek, among others.

This station on the North Canadian River has been active for all water quality variables since October of 2000. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Beaver River from the confluence of Wolf Creek (99.5019, 36.5886) downstream to the confluence of an unnamed tributary near Mutual, Oklahoma (99.0817, 36.2638). As per Appendix A, Table 7 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 2) Agriculture—Class III Irrigation (AG), and 3) Primary Body Contact—Recreation (PBCR).

The WWAC beneficial use is supported. Dissolved oxygen, pH, turbidity, and toxicant data met the criteria prescribed in the WWAC beneficial use. Fish collected during the summer of 2006 indicate that whether the segment is supporting a healthy biological community is currently indeterminate. Based on the Index of Biological Integrity (IBI) outlined in Appendix C of Oklahoma's USAP, the station has a sample composition score of 8 (maximum 30) and fish condition score of 11 (maximum 15) for a total score of 19. This is between the assigned non-supporting and supporting thresholds of 19-21 for Central Great Plains warm water aquatic communities [OAC 46:15-5(l)]. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the twenty-three (23) enterococci concentrations, nine (9) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (270.7 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the North Canadian River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 1.0 mg/L and 4.65 mg/L, respectively.

Wolf Creek near Fort Supply

Station AT237050 (720500030010-001AT) is a permanent ambient trend monitoring station located on Wolf Creek in Oklahoma. Situated in the west central portion of Woodward County, the site was established south of the town of Fort Supply off US Highway 270. The station is positioned near the terminal end of stream segment 720500030010 and is classified within the Lower Wolf Creek 8 digit HUC watershed (11100203). Water enters the stream system from Texas and from several tributaries including Twenty-five Mile Creek, Little Wolf Creek, and Sixteen-mile Creek, among others.

This station on Wolf Creek has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of Wolf Creek from the confluence of Twenty-five Mile Creek (99.7333, 36.3337) downstream to confluence of Wolf Creek with Fort Supply Reservoir (99.5762, 36.5094). As per Appendix A, Table 7 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is supported. Dissolved oxygen, pH, turbidity, and toxicant data collected during the same period met the criteria prescribed in the WWAC beneficial use. Fish collected during the summer of 2006 indicate that the segment is supporting a healthy biological community. Based on the Index of Biological Integrity (IBI) outlined in Appendix C of Oklahoma's USAP, the station has a sample composition score of 14 (maximum 30) and fish condition score of 9 (maximum 15) for a total score of 23. This is above the assigned supporting threshold of 22 for Central Great Plains warm water aquatic communities [OAC 46:15-5(l)]. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the twenty-three (23) enterococci concentrations, six (6) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (138.0 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of Wolf Creek is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

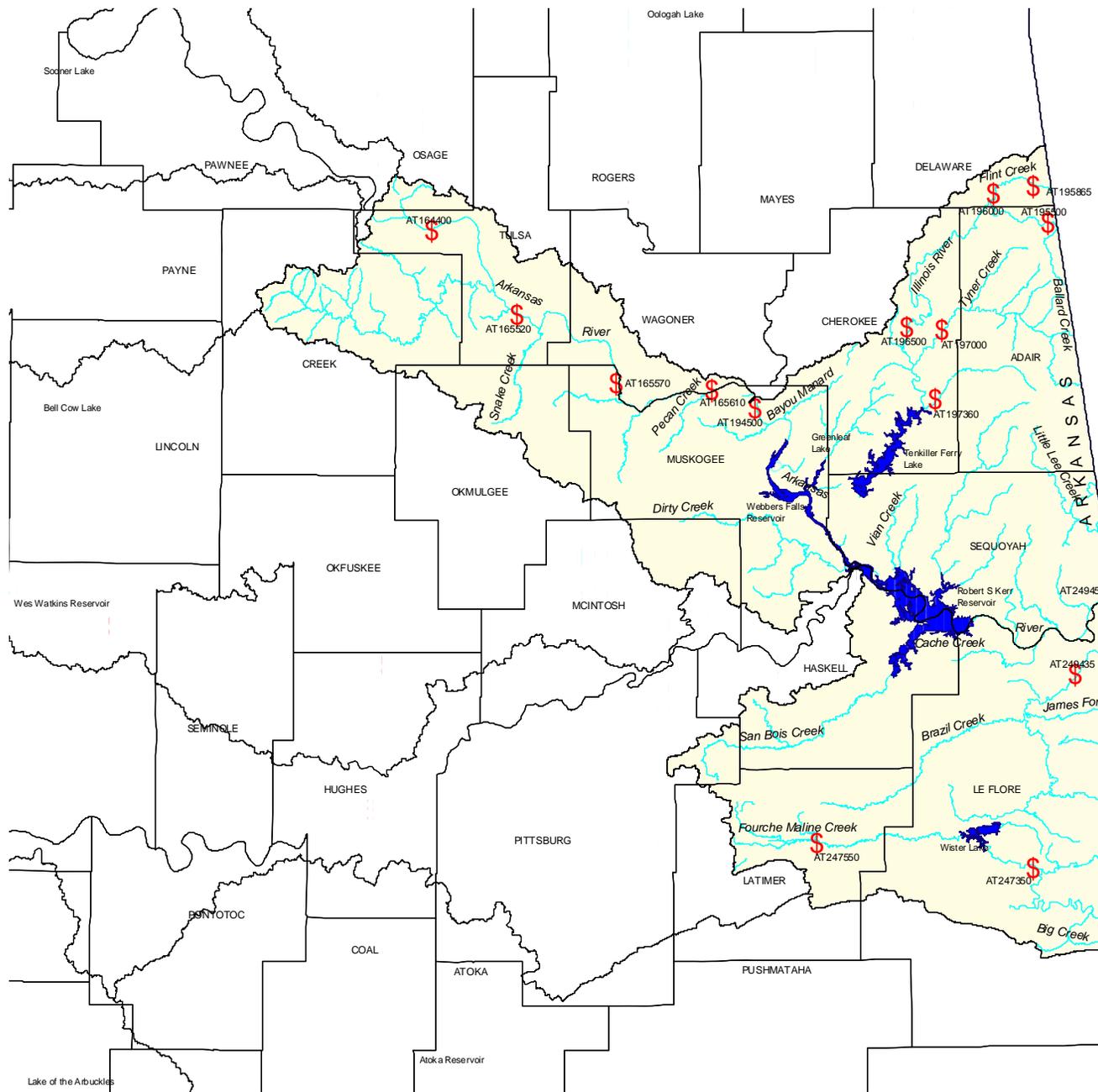


Plate 63
 LOWER ARKANSAS SUBBASIN (HUC 1111)
 Water Quality Programs Division
 Oklahoma Water Resources Board

HUC 1111

LOWER ARKANSAS SUB-BASIN

The Lower Arkansas sub-basin (4-digit hydrologic unit 1111) is situated in the central eastern portion of the state. It originates in the western portion of Creek and Tulsa Counties, continues eastward through portions of Okmulgee, Wagoner, Muskogee, McIntosh, Cherokee, Delaware, Haskell, and Latimer Counties, and terminates in the eastern parts of Adair, Sequoyah, and LeFlore Counties. Major cities and County seats located within the basin include Sand Springs, Tulsa, Broken Arrow, Sapulpa, Jenks, Glenpool, Bixby, Coweta, Muskogee, Tahlequah, Stillwell, Sallisaw, Wilburton, and Poteau. Minor cities of note include Kellyville, Haskell, Checotah, Warner, Gore, Roland, Heavener, and Spiro.

The basin is subdivided into five 8-digit hydrologic units (HUC) within the state. These HUC's are the Polecat–Snake (11110101), the Dirty–Greenleaf (11110102), the Illinois (11110103), the Robert S. Kerr Reservoir (11110104), and the Poteau (11110105). The major surface water in the basin is the lower Arkansas River (McClellan-Kerr Navigational System). Major tributaries include the Illinois River, the Poteau River, Polecat Creek, Bayou Manard, Greenleaf Creek, Sager Creek, Flint Creek, Barren Fork, Caney Creek, Dirty Creek, Sallisaw Creek, Big Skin Bayou, Lee Creek, Cache Creek, San Bois Creek, Brazil Creek, Fourche-Maline Creek, Caston Creek, Black Fork, and James Fork. Five major lakes are located in the basin—Heyburn Lake formed by Polecat Creek, Webbers Falls Reservoir formed by the Arkansas River and Greenleaf Creek, Tenkiller Ferry Lake formed by the Illinois River and Caney Creek, Robert S. Kerr Reservoir formed by the Arkansas River and several tributaries, and Wister Lake formed by the Poteau River and Fourche-Maline Creek. Fifteen active permanent monitoring stations (Table 12) are located in the basin—AT164400, AT165520, AT165570, AT194500, AT195500, AT195865, AT196000, AT196500, AT197000, AT197360, AT247350, AT247550, AT249435, AT249453, and AT249800. Station AT249800, Lee Creek near Short, was added in the beginning of 2003 and will not be assessed in this report due to lack of data. One inactive water quality-monitoring station (AT165610) is located in the sub-basin. This station was last assessed in the 2000 BUMP Report.

The basin is characterized by five ecoregions. The Central Irregular Plains begins in eastern Okmulgee County, covers the majority of Muskogee County, and continues through parts of McIntosh, Delaware, Sequoyah and eastern Cherokee Counties. The Ozark Highlands begins in Delaware County, continuing through the northern one-half ($\frac{1}{2}$) of Adair County, and is also in northern Cherokee County. The Boston Mountains begin in eastern Cherokee County, continue through the southern one-half ($\frac{1}{2}$) of Adair County, and end in northern Sequoyah County. The Arkansas Valley covers the southern three-quarters ($\frac{3}{4}$) of Sequoyah County, southeast Muskogee County, Haskell County, the northern one-half ($\frac{1}{2}$) of Latimer County, and the northern one-third of LeFlore County. The Ouachita Mountains cover the southern one-half ($\frac{1}{2}$) of Latimer County and the southern two-thirds of LeFlore County. The primary land uses in the sub-basin are forestland (post oak–blackjack oak, hickory–oak, bottomland hardwoods, and shortleaf pine) and pastureland (brushy and mixed). Forestland is prevalent throughout the sub-basin with concentrations in the central, northeast and southeast portions. Pastureland is prevalent in the northwest and central eastern portions. Rangeland (post – blackjack oak scrub and open grasslands) is the secondary land use. It is prevalent in the western portion of the sub-basin and is interspersed throughout the central and eastern portions. The tertiary land use

is cropland in the northern portion of the sub-basin. Other land uses of note are farmsteads, major urban areas, wetlands, and confined animal feeding operations.

Table 12. Permanent Ambient Trend Monitoring Stations Located in HUC 1111.

WBID #	STATION #	STATION NAME	STATUS	FS	PS	NS/T	CBD
120420010010	AT165520	ARKANSAS RIVER, US 64, BIXBY	ACTIVE 11/98-P	AES	NONE	FWP, AG, PBCR	NONE
120410010080	AT165570	ARKANSAS RIVER, SH 104, HASKELL	ACTIVE 11/98-P	AES	NONE	AG, PBCR, FWP	NONE
220200010010	AT249453	ARKANSAS RIVER, US 64, MOFFETT	ACTIVE 11/98-P	FWP, AES, PPWS, PBCR	NONE	AG	NONE
121410010260	AT194500	ARKANSAS RIVER, US 62, MUSKOGEE	ACTIVE 9/99-P	NONE	NONE	AG, FWP, AES PBCR	NONE
120420010130	AT164400	ARKANSAS RIVER, SH 97, SAND SPRINGS	ACTIVE 9/99-P	AES, PBCR	NONE	AG, FWP	NONE
121700050010	AT197000	BARREN FORK, SH 51, ELDON	ACTIVE 11/98-P	AG, FWP, PPWS	NONE	PBCR, AES	NONE
121700040010	AT197360	CANEY CREEK, OFF SH 100, BARBER	ACTIVE 9/99-P	AG, FWP, AES, PPWS	NONE	PBCR	NONE
121700060010	AT196000	FLINT CREEK, US 412, FLINT	ACTIVE 11/98-P	AG, FWP, PPWS	NONE	PBCR, AES	NONE
220100040020	AT247550	FOURCHE-MALINE CREEK, OFF US 270, RED OAK	ACTIVE 11/98-P	AG, AES, PPWS	NONE	FWP, PBCR	NONE
121700030010	AT196500	ILLINOIS RIVER, US 62, TAHLEQUAH	ACTIVE 11/98-P	AG, FWP, PPWS	NONE	AES, PBCR	NONE
121700030350	AT195500	ILLINOIS RIVER, US 59, WATTS	ACTIVE 11/98-P	AG, PPWS	NONE	FWP, PBCR, AES	NONE
220200050010	AT249800	LEE CREEK, SH 101, SHORT	ACTIVE 1/03-P	AG, AES, PPWS	NONE	FWP, PBCR	NONE
220100020010	AT247350	POTEAU RIVER, US 59, HEAVENER	ACTIVE 11/98-P	AG, FWP, AES, PBCR, PPWS	NONE	NONE	NONE
220100010010	AT249435	POTEAU RIVER, OFF SH 112, POCOLA	ACTIVE 11/98-P	AG, AES, PPWS	NONE	FWP, PBCR	NONE
121700060080	AT195865	SAGER CREEK, OFF US 412, WEST SILOAM SPRINGS	ACTIVE 11/98-P	AG, FWP	NONE	PPWS, AES, PBCR	NONE
ASSIGNED OWQS BENEFICIAL USES AND SUPPORT CODES							
PPWS = PUBLIC AND PRIVATE WATER SUPPLY				EWS = EMERGENCY WATER SUPPLY			
FWP = FISH & WILDLIFE PROPAGATION				PBCR = PRIMARY BODY CONTACT RECREATION			
AG = AGRICULTURE				AES = AESTHETICS			
FS = FULLY SUPPORTING				PS = PARTIALLY SUPPORTING			
NS/T = NOT SUPPORTING/THREATENED				CBD = CANNOT BE DETERMINED			

HUC 1111

Arkansas River at Bixby

Station AT165520 (120420010010-001AT) is a permanent ambient trend monitoring station near the midpoint of the Arkansas River in Oklahoma. Situated in the south central portion of Tulsa County, the site was established within the city of Bixby on US Highway 64. The station is positioned near the terminal end of stream segment 120420010010 and is classified within the Polecat - Snake Creek 8 digit HUC watershed (11110101). Water enters the stream system from Polecat Creek (Sahoma Reservoir and Heyburn Lake), Posey Creek, and Duck Creek, among others.

This station on the Arkansas River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Arkansas River from above the city of Tulsa (-96.0569, 36.1392) downstream to confluence of the Arkansas River with Snake Creek (-95.8344, 35.9305). As per Appendix A, Table 1 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Emergency Water Supply (EWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Secondary Body Contact (2)—Recreation (PBCR).

The WWAC beneficial use is not supported. Dissolved oxygen, pH, turbidity, and toxicant samples met the criteria prescribed in the WWAC beneficial use. However, of the fifty-six (56) visual site observations, eleven (11) samples (or 20%) exceeded the median observation value for oil and grease. The AG beneficial use is not supported. Of the fifty-eight (58) total dissolved solids concentrations, twelve (12) of the samples (or 20%) exceeded the sample standard of 1782 mg/L. Chlorides and sulfates are within the prescribed sample standards and yearly means. The PBCR beneficial use is not supported. Of the 43 (forty-three) fecal coliform concentrations, seventeen (17) samples (or 40%) exceeded the prescribed screening level of 400 cfu/100mL. Of the 43 Enterococci concentrations, 4 samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (82.6 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Arkansas River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

Arkansas River near Haskell

Station AT165570 (120410010080-001AT) is a permanent ambient trend monitoring station near the midpoint of the Arkansas River in Oklahoma. Situated in the northeastern portion of Muskogee County, the site was established east of the town of Haskell on State Highway 104. The station is positioned near the midpoint of stream segment 120410010080 and is classified within the Polecat - Snake Creek 8 digit HUC watershed (11110101). Water enters the stream system from several tributaries including Snake Creek, Ash Creek, Cloud Creek, and Pecan Creek, among others.

This station on the Arkansas River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Arkansas River from the confluence of Snake Creek (95.8344, 35.9305) downstream to confluence of the Arkansas River with Pecan Creek (95.4348, 35.7990). As per Appendix A, Table 6 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Emergency Water Supply (EWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Secondary Body Contact (2)—Recreation (PBCR).

The WWAC beneficial use is not supported. Dissolved oxygen, pH, turbidity and toxicant samples met the criteria prescribed in the WWAC beneficial use. However, of the forty-nine (49) visual site observations, eight (8) samples (or 16%) exceeded the median observation value for oil and grease. The AG beneficial use is not supported. Of the forty-eight (48) total dissolved solids concentrations, ten (10) of the samples (or 21%) exceeded the sample standard of 1782 mg/L. Chlorides and sulfates are within the prescribed sample standards and yearly means. The PBCR beneficial use is not supported. Of the 28 Enterococci concentrations, 2 samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (38.6 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Arkansas River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

Arkansas River near Moffett

Station AT249453 (220200010010-001AT) is a permanent ambient trend monitoring station located on the Arkansas River (Kerr-McClellan Navigational System) in Oklahoma. Situated in the southeastern portion of Sequoyah County, the site was established east of the town of Moffett on State Highway 64. The station is positioned at the terminal end of stream segment 220200010010 and is classified within the Robert S. Kerr Reservoir 8 digit HUC watershed (11110104). Water enters the stream system from several tributaries including Onion Creek, Cache Creek, Big Skin Bayou, Camp Creek, and the Poteau River, among others.

This station on the Arkansas River has been listed on the ambient trend network since November of 1998 but has only been active for all water quality variables since September of 1999 because of access difficulties. The following assessment of beneficial uses is based on data collected from May of 2002 through March of 2007. For purposes of reporting, this station is representative of the Arkansas River from confluence of Onion Creek (94.6744, 35.3006) downstream to its exit from Oklahoma near Moffett, Oklahoma (94.4340, 35.3865). As per Appendix A, Table 2 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is supported. Dissolved oxygen, pH, turbidity, and toxicant samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is not supported. Of the thirty-five (35) total dissolved solids concentrations, eight (8) of the samples (or 23%) exceeded the minimum sample standard of 700 mg/L. Chlorides and sulfates are within the prescribed sample standards and yearly means. The PBCR beneficial use is supported. This segment of the Arkansas River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively. Furthermore, the mean sestonic chlorophyll-a concentration (9.3 mg/M³) produced a TSI of 53, which is below the threshold TSI of 62.

Arkansas River near Muskogee (at US 62)

Station AT194500 (121400010260-001AT) is a permanent ambient trend monitoring station located on the Arkansas River (McClellan-Kerr Navigational System) in Oklahoma. Situated in the east central portion of Muskogee County, the site was established east of the city of Muskogee on US Highway 62. The station is positioned near the upper end of stream segment 121400010260 and is classified within the Dirty-Greenleaf Creek 8 digit HUC watershed (11110102). Water enters the stream system from several tributaries including the Verdigris River, the Neosho River (Fort Gibson Reservoir), Coody Creek, and Bayou Manard, among others.

This station on the Arkansas River has been active for all water quality variables since September of 1999. The following assessment of beneficial uses is based on data collected from May of 2002 through March of 2007. For purposes of reporting, this station is representative of the Arkansas River from the confluence of the Verdigris River (-95.3073, 35.7983) downstream to the Arkansas River's confluence with Webber's Falls Reservoir (-95.2275, 35.7036). As per Appendix A, Table 1 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Emergency Water Supply (EWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The WWAC beneficial use is not supported. Of the ten (10) lead samples collected, two (2) of the concentrations (or 20%) exceeded the prescribed hardness-dependant chronic criteria of 6.69 ug/L. Dissolved oxygen, pH, and turbidity samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is not supported. Of the thirty-seven (37) total dissolved solids concentrations, ten (10) of the samples (or 27%) exceeded the minimum sample standard of 700 mg/L. Of the thirty-five (35) chloride concentrations, ten (10) of the samples (or 29%) exceeded the minimum sample standard of 250 mg/L. Sulfates are within the prescribed sample standards and yearly means. The PBCR beneficial use is not supported. Of the eighteen (18) enterococci concentrations, three (3) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (80.2 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Arkansas River is nutrient-threatened. The mean sestonic chlorophyll-a concentration (25.1 mg/M³) produced a TSI of 62. However, the total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

Arkansas River near Sand Springs

Station AT164400 (120420010130-001AT) is a permanent ambient trend monitoring station located on the Arkansas River in Oklahoma. Situated in the west central portion of Tulsa County, the site was established within the city of Sand Springs on State Highway 97. The station is positioned near the terminal end of stream segment 120420010130 and is classified within the Polecat - Snake Creek 8 digit HUC watershed (11110101). Water enters the stream system from Keystone Lake and from several tributaries including Shell Creek (Shell Lake), among others.

This station on the Arkansas River has been active for all water quality variables since September of 1999. The following assessment of beneficial uses is based on data collected from October of 2001 through August of 2006. For purposes of reporting, this station is representative of the Arkansas River from Keystone Reservoir (96.2528, 36.1504) downstream to above the city of Tulsa (96.0569, 36.1392). As per Appendix A, Table 1 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Emergency Water Supply (EWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Secondary Body Contact (2)—Recreation (PBCR).

The WWAC beneficial use is not supported. Dissolved oxygen, pH, turbidity, and toxicant samples met the criteria prescribed in the WWAC beneficial use. However, of the forty-six (46) visual site observations, seven (7) samples (or 15%) exceeded the median observation value for oil and grease. The AG beneficial use is not supported. Of the forty-seven (47) total dissolved solids concentrations, eleven (11) of the samples (or 23%) exceeded the sample standard of 1867 mg/L. Chlorides and sulfates are within the prescribed sample standards and yearly means. The PBCR beneficial use is supported for fecal coliform, enterococci, and *E. coli* concentrations. This segment of the Arkansas River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

Barren Fork near Eldon

Station AT197000 (121700050010-001AT) is a permanent ambient trend monitoring station located on the Barren Fork River in Oklahoma. Situated in the east central portion of Cherokee County, the site was established west of the town of Eldon on State Highway 51. The station is positioned near the terminal end of stream segment 121700050010 and is classified within the Illinois River 8 digit HUC watershed (11110103). Water enters the stream system from Arkansas and from several tributaries including Green Creek (Westville Reservoir), England Hollow Creek, Scraper Hollow Creek, Peacheater Creek, Dennison Hollow Creek, and Tyner Creek, among others.

This station on the Barren Fork River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May 2002 through April of 2007. Analysis also includes water quality data collected by the United States Geological Survey's Oklahoma Water Science Center. For purposes of reporting, this station is representative of the Barren Fork River from the confluence of Green Creek (94.6506, 35.9495) downstream to confluence of the Barren Fork River with the Illinois River (94.9142, 35.8510). As per Appendix A, Table 1 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Cool Water Aquatic Community—Fish and Wildlife Propagation (CWAC), 3) Agriculture—Class I Irrigation (AG), 4) Primary Body Contact—Recreation (PBCR), and 5) Aesthetics. The Barren Fork is also designated as a scenic river.

The PPWS beneficial use is supported. The CWAC beneficial use is supported. Dissolved oxygen, pH, turbidity, and toxicant samples met the criteria prescribed in the CWAC beneficial use. Fish collected during the summer of 2005 indicate that the segment is supporting a healthy biological community. Based on the Index of Biological Integrity (IBI) outlined in Appendix C of Oklahoma's USAP, the station has a sample composition score of 24 (maximum 30) and fish condition score of 15 (maximum 15) for a total score of 39. This is above the assigned supporting threshold of 37 for Ozark Highland cool water aquatic communities [OAC 46:15-5(j)]. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the fifty-five (55) enterococci concentrations, twenty-one (21) samples exceeded the prescribed screening level of 61 cfu/100mL, and the geometric mean (45.2 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. The aesthetics beneficial use is impaired for total phosphorus. Of the fifty-one (51) 3-month rolling geometric means calculated from total phosphorus samples (c), eighteen (18) geometric means (or 35%) exceed the prescribed scenic river total phosphorus criterion of 0.037mg/L.

Caney Creek near Barber

Station AT197360 (121700040010-001AT) is a permanent ambient trend monitoring station located on Caney Creek. Situated in the southeastern portion of Cherokee County, the site was established north-northeast of the town of Barber off of State Highway 100 on Welling Road. The station is positioned near the terminal end of stream segment 121700040010 and is classified within the Illinois River 8 digit HUC watershed (11110103). Water enters the stream system from several tributaries.

This station on Caney Creek has been active for all water quality variables since September of 1999. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. Analysis also includes water quality data collected by the United States Geological Survey's Oklahoma Water Science Center. For purposes of reporting, this station is representative of Caney Creek from the confluence of the Mulberry Hollow Tributary west of Stilwell, Oklahoma (94.7059, 35.8417) downstream to confluence of Caney Creek with Tenkiller Reservoir (94.8631, 35.7788). As per Appendix A, Table 1 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Cool Water Aquatic Community—Fish and Wildlife Propagation (CWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The CWAC beneficial use is supported. Dissolved oxygen, pH, turbidity, and toxicant samples met the criteria prescribed in the CWAC beneficial use. Fish collected during the summer of 2003 indicate that the segment is supporting a healthy biological community. Based on the Index of Biological Integrity (IBI) outlined in Appendix C of Oklahoma's USAP, the station has a sample composition score of 24 (maximum 30) and fish condition score of 15 (maximum 15) for a total score of 39. This is above the assigned supporting threshold of 37 for Boston Mountain cool water aquatic communities [OAC 46:15-5(j)]. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the fifty-four (54) enterococci concentrations, six (6) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (53 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of Caney Creek is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

Flint Creek near Flint, OK

Station AT196000 (121700060010-001AT) is a permanent ambient trend monitoring station located on Flint Creek in Oklahoma. Situated in the southeastern portion of Delaware County, the site was established east of the town of Flint on US Highway 412. The station is positioned near the terminal end of stream segment 121700060010 and is classified within the Illinois River 8 digit HUC watershed (11110103). Water enters the stream system from Arkansas and from several tributaries including Sager Creek, among others.

This station on Flint Creek has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. Analysis also includes water quality data collected by the United States Geological Survey's Oklahoma Water Science Center. For purposes of reporting, this station is representative of Flint Creek from the confluence of an unlisted tributary (94.6318, 36.2169) downstream to a point above Flint Creek's intersection with US Highway 412 (94.7076, 36.1863). As per Appendix A, Table 1 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Cool Water Aquatic Community—Fish and Wildlife Propagation (CWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR), and 5) Aesthetics. Flint Creek is also designated as a scenic river.

The PPWS beneficial use is supported. The CWAC beneficial use is supported. Dissolved oxygen, pH, turbidity, and toxicant samples met the criteria prescribed in the CWAC beneficial use. Fish collected during the summer of 2003 indicate that the segment is supporting a healthy biological community. Based on the Index of Biological Integrity (IBI) outlined in Appendix C of Oklahoma's USAP, the station has a sample composition score of 24 (maximum 30) and fish condition score of 15 (maximum 15) for a total score of 39. This is above the assigned supporting threshold of 37 for Ozark Highland cool water aquatic communities [OAC 46:15-5(j)]. The AG beneficial use is supported for total dissolved solids (TDS), chlorides, and sulfates. Although several TDS concentrations are above the sample standard and the mean exceeded the yearly mean standard, no value is above the prescribed minimum value of 700 mg/L. The PBCR beneficial use is not supported. Of the forty-six (46) enterococci concentrations, twenty-four (24) samples exceeded the prescribed screening level of 61 cfu/100mL, and the geometric mean (81.1 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. The aesthetics beneficial use is impaired for total phosphorus. All 3-month rolling geometric means calculated from total phosphorus samples as well as all phosphorus samples exceeded the prescribed scenic river total phosphorus criterion of 0.037mg/L.

Fourche-Maline Creek near Red Oak

Station AT247550 (220100040020-001AT) is a permanent ambient trend monitoring station located on Fourche-Maline Creek. Situated in the east central portion of Latimer county, the site was established southwest of the town of Red Oak off of US Highway 270 on Craven Road. The station is positioned between the upper end and the midpoint of stream segment 220100040020 and is classified within the Poteau River 8 digit HUC watershed (11110105). Water enters the stream system from several tributaries including Coon Creek (Coon Creek Lake), Bandy Creek, Little Fourche-Maline Creek, and Spring Creek, among others.

This station on Fourche-Maline Creek has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. Analysis also includes water quality data collected by the United States Geological Survey's Oklahoma Water Science Center. For purposes of reporting, this station is representative of Fourche-Maline Creek from the confluence of Coon Creek (95.3566, 34.9726) downstream to confluence of Spring Creek with Fourche-Maline Creek (95.1338, 34.9026). As per Appendix A, Table 2 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the seventy-five (75) dissolved oxygen concentrations, twenty-three (23) samples (or 31%) were below the screening level. Of the sixteen (16) lead samples collected, twelve (12) of the concentrations (or 75%) exceeded the prescribed hardness-dependant chronic criteria of 1.33 ug/L. The pH and turbidity samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the twenty-four (24) enterococci concentrations, three (3) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (115.8 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of Fourche-Maline Creek is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

Illinois River near Tahlequah

Station AT196500 (121700030010-001AT) is a permanent ambient trend monitoring station located on the Illinois River in Oklahoma. Situated in the east central portion of Cherokee County, the site was established east of the city of Tahlequah on US Highway 62. The station is positioned near the upper end of stream segment 121700030010 and is classified within the Illinois River 8 digit HUC watershed (11110103). Water enters the stream system from several tributaries including Tahlequah Creek, among others.

This station on the Illinois River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. Analysis also includes water quality data collected by the United States Geological Survey's Oklahoma Water Science Center. For purposes of reporting, this station is representative of the Illinois River from the confluence of an unlisted tributary near Ellerville, Oklahoma (94.9221, 36.0094) downstream to confluence of Tahlequah Creek with the Illinois River (94.9445, 35.8860). As per Appendix A, Table 1 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Cool Water Aquatic Community—Fish and Wildlife Propagation (CWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR), and 5) Aesthetics. The Illinois River is also designated as a scenic river.

The PPWS beneficial use is supported. The CWAC beneficial use is supported. Dissolved oxygen, pH, turbidity, and toxicant data met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids (TDS), chlorides, and sulfates. The PBCR beneficial use is not supported. Of the forty-five (45) enterococci concentrations, sixteen (16) samples exceeded the prescribed screening level of 61 cfu/100mL, and the geometric mean (44.0 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. The aesthetics beneficial use is impaired for total phosphorus. Of the fifty-three (53) 3-month rolling geometric means calculated from total phosphorus samples, fifty (50) geometric means (or 94%) exceeded the prescribed scenic river total phosphorus criterion of 0.037mg/L.

Illinois River near Watts

Station AT195500 (121700030350-001AT) is a permanent ambient trend monitoring station located on the Illinois River in Oklahoma. Situated in the northeastern portion of Adair County, the site was established north of the city of Watts on US Highway 59. The station is positioned near the upper end of stream segment 121700030350 and is classified within the Illinois River 8 digit HUC watershed (11110103). Water enters the stream system from Arkansas and several tributaries including Ballard Creek and Flint Creek, among others.

This station on the Illinois River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from October of 2001 through September of 2006. Analysis also includes water quality data collected by the United States Geological Survey's Oklahoma Water Science Center. For purposes of reporting, this station is representative of the Illinois River from its entrance into Oklahoma near Watts, Oklahoma (94.5551, 36.1189) downstream to confluence of Flint Creek with the Illinois River (94.7210, 36.1744). As per Appendix A, Table 1 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Cool Water Aquatic Community—Fish and Wildlife Propagation (CWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR), and 5) Aesthetics. The Illinois River is also designated as a scenic river.

The PPWS beneficial use is supported. The CWAC beneficial use is not supported. Of the forty-five (45) turbidity samples, ten (10) samples (or 22%) exceeded the numerical criterion of 10. Dissolved oxygen, pH, and toxicant samples met the criteria prescribed in the CWAC beneficial use. The AG beneficial use is supported for total dissolved solids (TDS), chlorides, and sulfates. Although several TDS concentrations exceeded the sample standard and the mean exceeded the yearly mean standard, all values are below the prescribed minimum value of 700 mg/L. The PBCR beneficial use is not supported. Of the forty-four (44) enterococci concentrations, fifteen (15) samples exceeded the prescribed screening level of 61 cfu/100mL, and the geometric mean (49.4 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. The aesthetics beneficial use is impaired for total phosphorus. Of the fifty-three (53) 3-month rolling geometric means calculated from total phosphorus samples, 53 geometric means (or 100%) exceed the prescribed scenic river total phosphorus criterion of 0.037mg/L.

Lee Creek near Short

Station AT249800 (220200050010-001AT) is a permanent ambient trend monitoring station located on Lee Creek in Oklahoma. Situated in the northeastern portion of Sequoyah County, the site was established east of the town of Short on State Highway 101. The station is positioned near the midpoint of stream segment 220200050010 and is classified within the Robert S. Kerr Reservoir 8 digit HUC watershed (11110104). Water enters the stream system from Arkansas and from several tributaries including Little Lee Creek, Briar Creek, and Webber Creek among others.

This station on Lee Creek has been active for all water quality variables since January of 2003. The following assessment of beneficial uses is based on data collected from January of 2003 through April of 2007. Analysis also includes water quality data collected by the United States Geological Survey's Arkansas Water Science Center. For purposes of reporting, this station is representative of Lee Creek from its entrance into Oklahoma near Uniontown, Arkansas (94.4682, 35.6109) downstream to the terminus of the stream section at the 420 ft. elevation level (94.4554, 35.5099). As per Appendix A, Table 2 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Cool Water Aquatic Community—Fish and Wildlife Propagation (CWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR), and 5) Aesthetics. This portion of Lee Creek is also designated as a scenic river.

The PPWS beneficial use is supported. The CWAC beneficial use is not supported. Of the four (4) lead samples collected, three (3) of the concentrations (or 60% of the required minimum of 5 samples) exceeded the hardness-specific chronic criteria of 0.97 ug/L. Dissolved oxygen, pH, and turbidity data met the criteria prescribed in the CWAC beneficial use. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the thirty-eight (38) enterococci concentrations, ten (10) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (40.9 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. The aesthetics beneficial use is not impaired for total phosphorus. Of the forty-eight (48) 3-month rolling geometric means calculated from total phosphorus samples, none of the geometric means (or 0%) exceed the prescribed scenic river total phosphorus criterion of 0.037mg/L.

Poteau River near Heavener

Station AT247350 (220100020010-001AT) is a permanent ambient trend monitoring station located on the Poteau River in Oklahoma. Situated in the central portion of LeFlore County, the site was established south of the city of Heavener on US Highway 59. The station is positioned near the midpoint of stream segment 220100020010 and is classified within the Poteau River 8 digit HUC watershed (11110105). Water enters the stream system from Arkansas and from several tributaries including Oil Branch, Black Fork Creek, and Conser Creek, among others.

This station on the Poteau River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through of April of 2007. For purposes of reporting, this station is representative of the Poteau River from its entrance into Oklahoma near Loving, Oklahoma (94.4493, 34.8849) downstream to confluence of the Poteau River with Lake Wister (94.7561, 34.9035). As per Appendix A, Table 2 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is supported. Dissolved oxygen, pH, turbidity, and toxicant samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids (TDS), chlorides, and sulfates. Although sever TDS and sulfate concentrations exceeded the sample standards, no values were above the minimum standards of 700 mg/L and 250 mg/L. The PBCR beneficial use is supported for fecal coliform, enterococci, and *E. coli*. This segment of the Poteau River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

Poteau River near Pocola

Station AT249435 (220100010010-001AT) is a permanent ambient trend monitoring station located on the Poteau River in Oklahoma. Situated in the northeastern portion of LeFlore County, the site was established west of the city of Pocola off of State Highway 112 on County Road E1220. The station is positioned near the midpoint of stream segment 220100010010 and is classified within the Poteau River 8 digit HUC watershed (11110105). Water enters the stream system from New Spiro Lake and from several tributaries including Brazil Creek, James Fork Creek, and Wells Creek, among others.

This station on the Poteau River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Poteau River from the confluence of Brazil Creek (94.6538, 35.1510) downstream to confluence of the Poteau River with the Arkansas River (94.4331, 35.3850). As per Appendix A, Table 2 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the thirty-five (35) turbidity samples, twenty-three (23) samples (or 63%) exceeded the numerical criterion of 50. Of the nineteen (19) copper samples collected, six (6) concentrations (or 32%) exceeded the prescribed, hardness-dependant chronic criteria of 7.25 ug/L. Of the sixteen (16) lead samples collected, fifteen (15) concentrations (or 94%) exceeded the prescribed, hardness-dependant chronic criteria of 1.36 ug/L. Dissolved oxygen and pH samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids (TDS), chlorides, and sulfates. Although several of the TDS and sulfate concentrations exceeded the sample standards and the mean (41.0 mg/L) of sulfate exceeded the yearly mean standard, the values are below the minimum sample standards of 700 mg/L and 250 mg/L. The PBCR beneficial use is not supported. Of the forty-three (43) enterococci concentrations, four (4) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (67.8 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Poteau River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

Sager Creek near West Siloam Springs

Station AT195865 (121700060080-001AT) is a permanent ambient trend monitoring station located on Sager Creek in Oklahoma. Situated in the southeastern portion of Delaware County, the site was established north of the town of West Siloam Springs off of US Highway 412 on County Road D0565. The station is positioned near the midpoint of stream segment 121700060080 and is classified within the Illinois River 8 digit HUC watershed (11110103). Water enters the stream system from Arkansas.

This station on Sager Creek has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. Analysis also includes water quality data collected by the United States Geological Survey's Oklahoma Water Science Center. For purposes of reporting, this station is representative of Sager Creek from its entrance into Oklahoma near West Siloam Springs, Oklahoma (94.5680, 36.1923) downstream to confluence of Sager Creek with Flint Creek (94.5757, 36.1974). As per Appendix A, Table 1 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Cool Water Aquatic Community—Fish and Wildlife Propagation (CWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is not supported. Of the forty-six (46) nitrate concentrations, nine (9) samples (or 20%) exceeded the numerical criterion of 10.0 mg/L. The CWAC beneficial use is supported. Dissolved oxygen, pH, turbidity, and toxicant samples met the criteria prescribed in the CWAC beneficial use. Fish collected during the summer of 2003 indicate that the segment is supporting a healthy biological community. Based on the Index of Biological Integrity (IBI) outlined in Appendix C of Oklahoma's USAP, the station has a sample composition score of 26 (maximum 30) and fish condition score of 15 (maximum 15) for a total score of 41. This is above the assigned supporting threshold of 37 for Ozark Highland cool water aquatic communities [OAC 46:15-5(j)]. The AG beneficial use is supported for total dissolved solids (TDS), chlorides, and sulfates. Although several TDS, chloride, and sulfate concentrations exceeded the sample standards of 197.0 mg/L and all exceeded the yearly mean standards, all values were below the minimum sample standards of 700 mg/L and 250 mg/L, respectively. The PBCR beneficial use is not supported. Of the 46 enterococci concentrations, fourteen (14) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (83 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of Sager Creek is nutrient-threatened. The median of the total phosphorus samples (1.294 mg/L) exceeded the prescribed threshold median of 0.150 mg/L, and the median of the nitrate/nitrite samples (8.236 mg/L) exceeded the prescribed threshold median of 2.40 mg/L. The station is not light-limited with a mean mixed turbidity of 2 NTU and less than 80% canopy coverage.

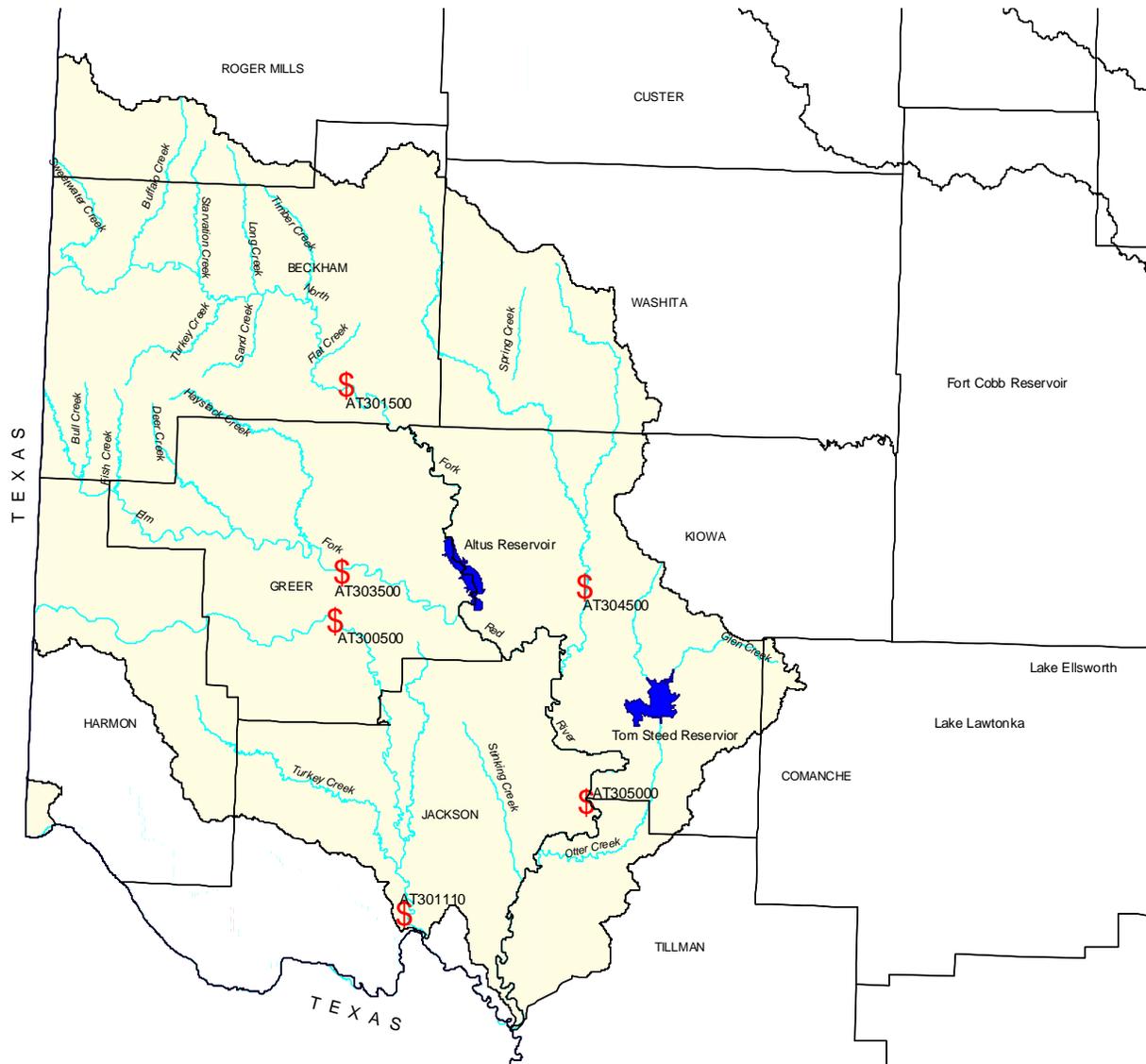


Plate 64
 NORTH FORK OF THE RED SUBBASIN (HUC 1112)
 Water Quality Programs Division
 Oklahoma Water Resources Board

HUC 1112

NORTH FORK OF THE RED SUB-BASIN

The North Fork of the Red sub-basin (4-digit hydrologic unit 1112) is situated in the southwestern tip of the state. It originates in the western portions of Roger Mills, Beckham and Harmon Counties, continues eastward through portions of Greer, Washita, Kiowa, Jackson, and Tillman Counties and terminates in the northeastern tip of Comanche County. Major cities and County seats located within the basin include Elk City, Sayre, Mangum, Altus, and Hobart. Minor cities of note include Granite, Lone Wolf, Duke, Headrick, and Snyder.

The basin is subdivided into five 8-digit hydrologic units (HUC) within the state. These HUC's are the Lower Prairie Dog Town Fork of the Red (11120105), the Lower Salt Fork of the Red (11120202), the Middle North Fork of the Red (11120302), Lower North Fork of the Red (11120303), and Elm Fork of the Red (11120304). The major surface water in the sub-basin is the North Fork of the Red River. Major tributaries include the Elm Fork of the Red River, the Salt Fork of the Red River, Elk Creek, Turkey Creek, and Otter Creek. Two major lakes are located in the basin—Altus Reservoir formed by the North Fork of the Red River and Tom Steed Reservoir formed by Otter Creek. Five permanent water quality-monitoring stations (Table 13) are located in the basin—AT301110, AT301500, AT303500, AT304500, and AT305000.

The sub-basin is characterized by two ecoregions. The Central Great Plains are the primary ecoregion covering all but a small portion of the sub-basin. The Southwestern Tablelands cover a small portion of the east central portion in Beckham, Greer, and Harmon Counties. The primary land usage in the sub-basin is cropland. It dominates the central south and central east portions of the sub-basin and is interspersed throughout the remainder of the sub-basin. The secondary land use is rangeland (open grassland and mesquite) that dominates the southern part of Beckham County and is prevalent in other southern portions of the sub-basin. It is interspersed throughout the remainder of the sub-basin. The tertiary land use is pastureland, which is dominant in northeastern Greer County and is sparsely interspersed throughout the remainder of the sub-basin. Other land uses of note are woodlands, bottom woodlands, farmsteads, major urban areas, and confined animal feeding operations.

Table 13. Permanent Ambient Trend Monitoring Stations Located in HUC 1112.

WBID #	STATION #	STATION NAME	STATUS	FS	PS	NS/T	CBD
311500030010	AT304500	ELK CREEK, OFF US 183, ROOSEVELT	ACTIVE 11/98-P	AG, AES, PPWS	NONE	FWP, PBCR	NONE
311800000010	AT303500	ELM FORK RIVER, SH 9, GRANITE	ACTIVE 11/98-P	AES, FWP, PPWS	NONE	AG, PBCR	NONE
311510010010	AT301500	NORTH FORK OF THE RED RIVER, SH 34, CARTER	ACTIVE 11/98-P	AG, AES, PPWS	NONE	FWP, PBCR	NONE
311500010020	AT305000	NORTH FORK OF THE RED RIVER, US 62, HEADRICK	ACTIVE 11/98-P	PPWS	NONE	AG, AES, FWP, PBCR	NONE
311600020010	AT301110	SALT FORK OF THE RED RIVER, OFF US 283, ELMER	ACTIVE 11/98-P	AG, PPWS	NONE	AES, FWP, PBCR	NONE
ASSIGNED OWQS BENEFICIAL USES AND SUPPORT CODES							
PPWS = PUBLIC AND PRIVATE WATER SUPPLY				EWS = EMERGENCY WATER SUPPLY			
FWP = FISH & WILDLIFE PROPAGATION				PBCR = PRIMARY BODY CONTACT RECREATION			
AG = AGRICULTURE				AES = AESTHETICS			
FS = FULLY SUPPORTING				PS = PARTIALLY SUPPORTING			
NS/T = NOT SUPPORTING/THREATENED				CBD = CANNOT BE DETERMINED			

Elk Creek near Roosevelt

Station 311500030010-002AT is a permanent ambient trend monitoring station located on Elk Creek and replaces station number AT304500 (311500030010-001AT). Situated in the south central portion of Kiowa County, the site was established west of the city of Roosevelt off of State Highway 19 on County Road N2160. The station is positioned near the terminus of stream segment 311500030010 and is classified within the Lower North Fork of the Red River 8 digit HUC watershed (11120303). Water enters the stream system from Lake Elk City and from several tributaries including Little Elk Creek (Lake Hobart), among others.

A station on Elk Creek has been active for all water quality variables since November of 1998. The original station near Hobart was deactivated in the spring of 2006. The new site near Roosevelt was established to accommodate future stream gaging and water quality sampling needs as well accessibility issues. The data from the Hobart site will be combined with data from the Roosevelt site and will continue to be used in the assessment of Elk Creek. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of Elk Creek from the confluence of Little Elk Creek (99.1214, 35.0008) downstream to confluence of Elk Creek with the North Fork of the Red River (99.1488, 34.7985). As per Appendix A, Table 3 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class II Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the forty-four (44) turbidity samples, nineteen (19) samples (or 43%) exceeded the numerical criteria of 50. Dissolved oxygen, pH, and toxicant samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the twenty-two (22) enterococci concentrations, seven (7) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (248.2 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. Of the twenty-one (21) fecal coliform concentrations, six (6) samples (or 29%) exceeded the prescribed screening level of 406 mg/100mL. This segment of Elk Creek is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

Elm Fork of the Red near Granite

Station 31180000010-002AT is a permanent ambient trend monitoring station located on the Elm Fork of the Red River in Oklahoma and replaces station number AT303500 (31180000010-001AT). Situated in the east central portion of Greer County, the site was established south of the town of Granite on State Highway 6. The station is positioned near the lower end of stream segment 31180000010 and is classified within the Elm Fork of the Red River 8 digit HUC watershed (11120304). Water enters the stream system from Texas and from several tributaries including Deer Creek and Haystack Creek, among others.

A station on the Elm Fork of the Red River has been active for all water quality variables since November of 1998. The original station near Mangum was deactivated in the spring of 2006. The new site near Granite was established to accommodate future stream gaging and water quality sampling needs as well accessibility issues. The data from the Mangum site will be combined with data from the Granite site and will continue to be used in the assessment of the Elm Fork of the Red River. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Elm Fork of the Red River from the confluence of Deer Creek (99.6855, 34.9722) downstream to confluence of the Elm Fork of the Red River with the North Fork of the Red River (99.3173, 34.8714). As per Appendix A, Table 3 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class III Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is supported. Dissolved oxygen, pH, turbidity, and toxicant samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is not supported chlorides. Of the eighty-eight (88) total dissolved solids samples, seventy-seven (77) samples (or 88%) exceeded the sample standard of 1356 mg/L, and the mean of all samples (12859.5 mg/L) exceeded the yearly mean standard of 9875 mg/L. The total dissolved solids and sulfate samples met the prescribed criteria. The PBCR beneficial use is not supported. Of the twenty-five (25) fecal coliform concentrations, nine (9) samples (or 36%) exceeded the prescribed screening level of 400 cfu/100mL. Of the 25 enterococci concentrations, seven (7) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (232.4 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. Of the 25 *E. coli* concentrations, twenty-one (21) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (1158.3 cfu/100mL) exceeded the prescribed mean standard of 126 cfu/100mL. This segment of the Elm Fork of the Red River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

North Fork of the Red near Carter

Station AT301500 (311510010010-001AT) is a permanent ambient trend monitoring station located on the North Fork of the Red River in Oklahoma. Situated in the southeastern portion of Beckham County, the site was established south of the town of Carter on State Highway 34. The station is positioned between the upper end and the midpoint of stream segment 311510010010 and is classified within the Middle North Fork of the Red River 8 digit HUC watershed (11120302). Water enters the stream system from several tributaries including Timber Creek and Flat Creek, among others.

This station on the North Fork of the Red River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. Analysis also includes water quality data collected by the United States Geological Survey's Oklahoma Water Science Center. For purposes of reporting, this station is representative of the North Fork of the Red River from the confluence of Timber Creek (99.5759, 35.2753) downstream to confluence of the North Fork of the Red River with Altus Reservoir (99.3413, 34.9715). As per Appendix A, Table 3 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class III Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the thirty-nine (39) turbidity samples, six (6) samples (or 15%) exceeded the numerical criterion of 50. Dissolved oxygen, pH, and toxicant samples met the criteria prescribed in the WWAC beneficial use. Fish collected during the summer of 2005 indicate that whether the segment is supporting a healthy biological community is currently indeterminate. Based on the Index of Biological Integrity (IBI) outlined in Appendix C of Oklahoma's USAP, the station has a sample composition score of 8 (maximum 30) and fish condition score of 11 (maximum 15) for a total score of 19. This is between the assigned non-supporting and supporting thresholds of 19-21 for Central Great Plains warm water aquatic communities [OAC 46:15-5(m)]. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the eighteen (18) enterococci concentrations, one (1) sample exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (51.2 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the North Fork of the Red River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

North Fork of the Red near Headrick

Station AT305000 (311500010020-001AT) is a permanent ambient trend monitoring station located on the North Fork of the Red River in Oklahoma. Situated on the border of Jackson and Tillman counties, the site was established east of the town of Headrick on US Highway 62. The station is positioned near the midpoint of stream segment 31150010020 and is classified within the Lower North Fork of the Red River 8 digit HUC watershed (11120303). Water enters the stream system from several tributaries including Elk Creek, Otter Creek (Tom Steed Reservoir), and Stinking Creek, among others.

This station on the North Fork of the Red River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the North Fork of the Red River from the confluence of Elk Creek (99.1488, 34.7985) downstream to confluence of Stinking Creek with the North Fork of the Red River (99.2009, 34.5282). As per Appendix A, Table 3 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class III Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the thirty-six (36) turbidity samples, four (4) samples (or 11%) exceeded the numerical criterion of 50. Dissolved oxygen, pH, and toxicant samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is not supported. Of the sixty (60) total dissolved solids concentrations, fifty-two (52) samples (or 87%) exceeded the sample standard of 2284.0 mg/L, and the mean (5493.5 mg/L) exceeded the yearly mean standard (1777 mg/L). Of the fifty-eight (58) chloride concentrations, fifty-five (55) samples (or 95%) exceeded the sample standard of 353.0 mg/L, and the mean (2531.4 mg/L) exceeded the yearly mean standard (243 mg/L). Sulfate samples met the prescribed, site-specific criteria. The PBCR beneficial use is not supported. Of the twenty-one (21) enterococci concentrations, 4 samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (117.8 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the North Fork of the Red River is nutrient-threatened. The mean sestonic chlorophyll-a concentration (35.8 mg/M³) produced a TSI of 66, which is above the threshold TSI of 62. However, the total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

Salt Fork of the Red River near Elmer

Station AT301110 (311600020010-002AT) is a permanent ambient trend monitoring station located on the Salt Fork of the Red River in Oklahoma. Situated in the south central portion of Jackson County, the site was established west of the town of Elmer off of US Highway 283 on County Road E1750. The station is positioned near the terminal end of stream segment 311600020010 and is classified within the Lower Salt Fork of the Red River 8 digit HUC watershed (11120202). Water enters the stream system from several tributaries including Texas, Lake Hall, Bitter Creek and Turkey Creek, among others.

This station on the Salt Fork of the Red River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from October of 2001 through September of 2006. Analysis also includes data from station AT300500 (311600020010-001AT). This is a permanent ambient trend monitoring station located on the Salt Fork of the Red River in the south central portion of Greer County on State Highway 34 south of the town of Mangum. The station is positioned near the midpoint of stream segment 311600020010. Because there is no statistical difference between the data collected at each station, the Mangum station will be discontinued in June 2008, and the Elmer station assessment will continue to combine data for the 2 segments in all future BUMP reports. For purposes of reporting, this station is representative of the Salt Fork of the Red River from the confluence of Bitter Creek (99.3923, 34.5751) downstream to confluence of the Salt Fork of the Red River with the Red River (99.3549, 34.4497). As per Appendix A, Table 3 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class III Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the twenty-five (25) selenium samples collected, three (3) of the concentrations (or 12%) exceeded the prescribed chronic criteria of 5 ug/L. Dissolved oxygen, pH, and turbidity samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported total dissolved solids, chloride, and sulfate values. The PBCR beneficial use is not supported. Of the forty (40) fecal coliform concentrations, nineteen (19) samples (or 48%) exceeded the prescribed screening level of 400 cfu/100mL. Of the 40 enterococci concentrations, fifteen (15) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (261.6 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Salt Fork of the Red River is nutrient-threatened. The mean sestonic chlorophyll-a concentration (47.5 mg/M³) produced a TSI of 68, which is above the threshold TSI of 62. However, the total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

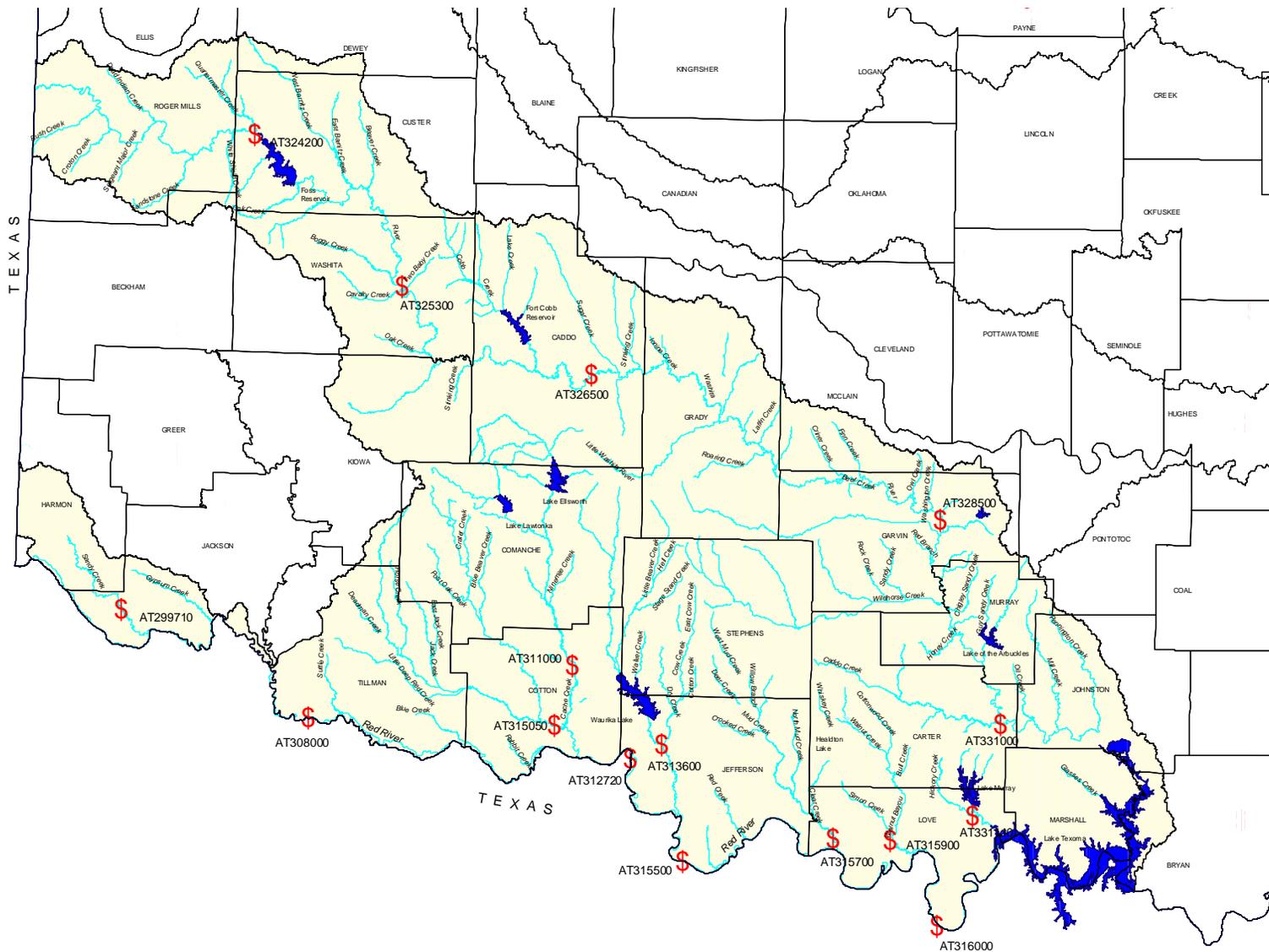


Plate 65
 UPPER RED SUBBASIN (HUC 1113)
 Water Quality Programs Division
 Oklahoma Water Resources Board

HUC 1113

UPPER RED SUB-BASIN

The Upper Red sub-basin (4-digit hydrologic unit 1113) is situated in the southwestern portion of the state. It originates in the western portion of Roger Mills County, continues eastward through portions of Beckham, Dewey, Custer, Washita, Kiowa, Caddo, Comanche, Tillman, Cotton, Grady, Stephens, Jefferson, McClain, Garvin, Murray, Pontotoc, Carter, Johnston, and Love Counties and terminates in the western part of Marshall and Bryan Counties, briefly touching Harmon and Jackson Counties. Major cities and County seats located within the basin include Cheyenne, Hollis, Arapaho, Clinton, Frederick, Anadarko, Lawton, Walters, Chickasha, Marlow, Duncan, Waurika, Lindsay, Pauls Valley, Sulphur, Lone Grove, Ardmore, Marietta, Madill, and Tishomingo. Minor cities of note include Hammon, Fort Cobb, Binger, Rush Springs, Davis, and Wynnewood.

The basin is subdivided into eleven 8-digit hydrologic units (HUC) within the state. These HUC's are the Groesbeck–Sandy (11130101), the Blue–China (11130102), the Farmer's–Mud (11130201), the Cache (11130202), the West Cache (11130203), the Northern Beaver (11130208), the Lake Texoma (11130210), the Washita Headwaters (11130301), the Upper Washita (11130302), the Middle Washita (11130303), and the Lower Washita (11130304). The major surface water in the basin is the upper Red River. Major tributaries include the Prairie Dog Town Fork of the Red River, the Washita River, the Little Washita River, Barnitz Creek, Cobb Creek, Bitter Creek, Rush Creek, Wildhorse Creek, Rock Creek, Caddo Creek, Mill Creek, Sandy Creek, Deep Red Creek, West Cache Creek, East Cache Creek, Cow Creek, Beaver Creek, Mud Creek, Walnut Bayou, and Hickory Creek. Eight major lakes are located in the basin—Foss Reservoir formed by the Washita River, Fort Cobb Reservoir formed by Cobb Creek, Lake Ellsworth formed by East Cache Creek, Lake Lawtonka formed by Medicine Creek, Waurika Lake formed by Beaver Creek, Lake of the Arbuckles formed by Rock Creek, Lake Murray formed by Anadarche Creek, and Lake Texoma formed by the Red and Washita Rivers and Hickory Creek. Thirteen active permanent water quality-monitoring stations (Table 14) are located in the basin—AT299710, AT308000, AT311000, AT312720, AT315050, AT315500, AT315700, AT324200, AT325300, AT326500, AT328100, AT328500, and AT331000 as well as four inactive water quality-monitoring stations (AT313600, AT315900, AT316000, AT331110). Stations AT315900 and AT331110 were last assessed in the 2000 BUMP report while station AT316000 was last assessed in the 1999 BUMP report. Station AT313600 was last assessed in the 2003 BUMP report. Station AT328100, Washita River near Alex, will not be included in this report due to lack of data.

The basin is characterized by three ecoregions. The Central Great Plains is the primary ecoregion beginning in the western portion of Roger Mills County and continuing through the western parts of Grady, Stephens, and Jefferson Counties. The Central Oklahoma/Texas Plains begins in the eastern parts of Grady, Stephens, and Jefferson Counties and continues eastward over the rest of the sub-basin. The Southwestern Tablelands typify portions of Roger Mills, Custer, and Beckham Counties. The primary land usage in the sub-basin is rangeland (open grasslands, mesquite, and other woody areas). It is prevalent in the western, southern and central portions of the sub-basin and is interspersed throughout the sub-basin. The secondary land use is cropland, which dominates the southwestern portion and is interspersed throughout the sub-basin. The tertiary land uses are pastureland (brushy or mixed) and

forestland (post oak–blackjack oak, hickory–oak, and bottomland hardwoods). Other land uses of note are woodlands, bottom woodlands, farmsteads, major urban areas, and wetlands.

Table 14. Permanent Ambient Trend Monitoring Stations Located in HUC 1113.

WBID #	STATION #	STATION NAME	STATUS	FS	PS	NS/T	CBD
311300010020	AT311000	EAST CACHE CREEK, SH 53, WALTERS	ACTIVE 11/98-P	AES, PPWS	NONE	AG, FWP, PBCR	NONE
311100040010	AT315700	MUD CREEK, SH 32, COURTNEY	ACTIVE 11/98-P	AG, AES, PPWS	NONE	FWP, PBCR	NONE
311310010010	AT308000	RED RIVER, US 183, DAVIDSON	ACTIVE 11/98-P	NONE	NONE	AG, FWP, AES, PBCR	NONE
311100010190	AT315500	RED RIVER, US 81, TERRAL	ACTIVE 11/98-P	AES, PPWS	NONE	AG, FWP, PBCR	NONE
311600010040	AT299710	SANDY CREEK, SH 6, ELDORADO	ACTIVE 11/98-P	AES	NONE	AG, FWP, SBCR	NONE
310810020010	AT328100	WASHITA RIVER, OFF SH 19, ALEX	ACTIVE 1/03-P	AG, PPWS	NONE	FWP, PBCR, AES	NONE
310830010010	AT326500	WASHITA RIVER, US 281, ANADARKO	ACTIVE 11/98-P	AG, PPWS	NONE	AES, FWP, PBCR	NONE
310830030010	AT325300	WASHITA RIVER, SH 152, CORDELL	ACTIVE 11/98-P	AG, AES, PPWS	NONE	FWP, PBCR	NONE
310800020010	AT331000	WASHITA RIVER, US 177, DURWOOD	ACTIVE 11/98-P	AG, PPWS	NONE	FWP, AES, PBCR	NONE
310840010010	AT324200	WASHITA RIVER, OFF SH 33, McCLURE	ACTIVE 11/98-P	AG, AES, PPWS	NONE	FWP, PBCR	NONE
310810010010	AT328500	WASHITA RIVER, SH 19, PAULS VALLEY	ACTIVE 11/98-P	AG, AES, PPWS	NONE	FWP, PBCR	NONE
311310020010	AT315050	WEST CACHE CREEK, SH 5B, TAYLOR	ACTIVE 11/98-P	AES, PPWS	NONE	AG, FWP, PBCR	NONE
ASSIGNED OWQS BENEFICIAL USES AND SUPPORT CODES							
PPWS = PUBLIC AND PRIVATE WATER SUPPLY				EWS = EMERGENCY WATER SUPPLY			
FWP = FISH & WILDLIFE PROPAGATION				PBCR = PRIMARY BODY CONTACT RECREATION			
AG = AGRICULTURE				AES = AESTHETICS			
FS = FULLY SUPPORTING				PS = PARTIALLY SUPPORTING			
NS/T = NOT SUPPORTING/THREATENED				CBD = CANNOT BE DETERMINED			

East Cache Creek near Walters

Station AT311000 (311300010020-001AT) is a permanent ambient trend monitoring station located on East Cache Creek. Situated in the northeastern portion of Cotton County, the site was established east of the town of Walters on State Highway 53. The station is positioned near the terminal end of stream segment 311300010020 and is classified within the Cache Creek 8 digit HUC watershed (11130202). Water enters the stream system from Dave Boyer Lake, Walters Lake, and Temple Lake and from several tributaries including Snake Creek, among others.

This station on East Cache Creek has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of East Cache Creek from the confluence of Medicine Creek (98.3764, 34.6747) downstream to confluence of East Cache Creek with Cache Creek (98.3070, 34.2066). As per Appendix A, Table 7 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the thirty-seven (37) turbidity samples, seventeen (17) samples (or 46%) exceeded the numerical criteria of 50. Dissolved oxygen, pH, and toxicant samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is not supported for total dissolved solids (TDS). Of the fifty (50) total dissolved solids samples, seven (7) samples exceeded the sample standard of 560 mg/L, and the mean of all samples (483.5 mg/L) exceeded the yearly mean standard of 472 mg/L. Additionally, at least one TDS sample exceeds the minimum sample standard of 700 mg/L. Although some sulfate and chloride samples exceeded the sample standard and the chloride mean exceeded the yearly mean standard, no chloride or sulfate values exceeded the minimum sample standard of 250 mg/L. The PBCR beneficial use is not supported. Of the twenty-five (25) fecal coliform concentrations, eleven (11) samples (or 44%) exceeded the prescribed screening level of 400 cfu/100mL, and the geometric mean (459.3 cfu/100mL) exceeded the prescribed mean standard of 400 cfu/100mL. Of the 25 enterococci concentrations, thirteen (13) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (502.7 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of East Cache Creek is not nutrient-threatened. Although the median of the total phosphorus concentrations (1.565 mg/L) exceeded the threshold median of 0.36 mg/L, the station is light-limited due to a mean inorganic turbidity of 51 NTU. The nitrate/nitrite median value was below the threshold median of 5.0 mg/L.

Mud Creek near Courtney

Station AT315700 (311100040010-001AT) is a permanent ambient trend monitoring station located on Mud Creek. Situated in the southwestern portion of Love County, the site was established west of the town of Courtney on State Highway 32. The station is positioned near the terminal end of stream segment 311100040010 and is classified within the Farmer's - Mud Creek 8 digit HUC watershed (11130201). Water enters the stream system from several tributaries including Crooked Creek, Negro Creek, North Mud Creek, and Clear Creek, among others.

This station on Mud Creek has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of Mud Creek from the confluence of Crooked Creek (97.7102, 34.2055) downstream to confluence of Mud Creek with the Red River (97.4740, 33.9120). As per Appendix A, Table 3 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the thirty-two (32) turbidity samples, twenty-three (23) samples (or 72%) exceeded the numerical criterion of 50. Of the forty-seven (47) dissolved oxygen samples, six (6) samples (or 13%) were below the prescribed WWAC screening levels. Of the twelve (12) lead samples, two (2) samples (or 17%) exceeded the hardness-dependent chronic criterion of 8.31 ug/L. The pH samples met the criteria prescribed in the WWAC beneficial use. Fish collected during the summer of 2005 indicate that whether the segment is supporting a healthy biological community is currently indeterminate. Based on the Index of Biological Integrity (IBI) outlined in Appendix C of Oklahoma's USAP, the station has a sample composition score of 13 (maximum 30) and fish condition score of 7 (maximum 15) for a total score of 20. This is between the assigned non-supporting and supporting thresholds of 20-25 for Central Oklahoma/Texas Plains warm water aquatic communities [OAC 46:15-5(l)]. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the twenty-six (26) fecal coliform concentrations, eight (8) samples (or 31%) exceeded the prescribed screening level of 400 cfu/100mL. Of the 26 enterococci concentrations, ten (10) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (170.5 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of Mud Creek is not nutrient-threatened. Although the median of the total phosphorus concentrations (0.422 mg/L) exceeded the threshold median of 0.36 mg/L, the station is light-limited with a median inorganic baseflow turbidity of 86 NTU. The nitrate/nitrite median value was below the threshold median of 5.0 mg/L.

Red River near Davidson

Station AT308000 (311310010010-001AT) is a permanent ambient trend monitoring station located on the Red River in Oklahoma. Situated in the southwestern portion of Tillman County, the site was established south of the town of Davidson on US Highway 183. The station is positioned between the upper end and the midpoint of stream segment 311310010010 and is classified within the Blue Creek - China Creek 8 digit HUC watershed (11130102). Water enters the stream system from several tributaries including the North Fork of the Red River, Suttle Creek, Blue Creek, and Rabbit Creek, among others.

This station on the Red River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Red River from the confluence of the North Fork of the Red River (99.2096, 34.3326) downstream to above the confluence of Cache Creek with the Red River (98.2686, 34.1324). As per Appendix A, Table 3 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Emergency Water Supply (EWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The WWAC beneficial use is not supported. Of the sixteen (16) selenium samples collected, four (4) concentrations (or 25%) exceeded the prescribed chronic criteria of 5 ug/L. Of the thirty-four (34) turbidity samples, eleven (11) samples (or 32%) exceeded the numerical criteria of 50. Dissolved oxygen and pH samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is not supported. Of the fifty-three (53) total dissolved solids (TDS) concentrations, 53 samples (or 100%) exceeded the sample standard of 151 mg/L (most exceeded the minimum sample standard of 700 mg/L), and the mean (5470.9 mg/L) exceeded the yearly mean standard (126 mg/L). Of the fifty (50) chloride concentrations, forty-eight (48) samples (or 96%) exceeded the sample standard of 285 mg/L, and the mean (2077.9 mg/L) exceeded the prescribed yearly mean standard (187 mg/L). Of the 50 sulfate concentrations, 50 samples (or 100%) exceeded the sample standard of 118 mg/L (most exceeded the minimum sample standard of 250 mg/L), and the mean (1093.8 mg/L) exceeded the yearly mean standard (79 mg/L). The PBCR beneficial use is not supported. Of the twenty-three (23) fecal coliform concentrations, eight (8) samples (or 35%) exceeded the prescribed screening level of 400 cfu/100mL. Of the 23 enterococci concentrations, five (5) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (101.4 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Red River is nutrient-threatened. The mean sestonic chlorophyll-a concentration (41.7 mg/M³) produced a TSI of 67, which is above the threshold TSI of 62. Although the median of the total phosphorus concentrations (0.374 mg/L) exceeded the threshold median of 0.36 mg/L, the station is light-limited with a median inorganic baseflow turbidity of 94 NTU. The nitrate/nitrite median value was below the threshold median of 5.0 mg/L.

Red River near Terral

Station AT315500 (311100010190-001AT) is a permanent ambient trend monitoring station located on the Red River in Oklahoma. Situated in the south central portion of Jefferson County, the site was established south of the town of Terral on US Highway 81. The station is positioned near the upper end of stream segment 311100010190 and is classified within the Farmer's - Mud Creek 8 digit HUC watershed (11130201). Water enters the stream system from several tributaries Fleetwood Creek and Red Creek, among others.

This station on the Red River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. Analysis also includes water quality data collected at the Red River near Burkburnett station by the United States Geological Survey's Texas Water Science Center. For purposes of reporting, this station is representative of the Red River from below the confluence of Beaver Creek (97.9465, 33.9913) downstream to above the confluence of Mud Creek with the Red River (97.4741, 33.9121). As per Appendix A, Table 3 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the twenty-seven (27) turbidity samples, fifteen (15) samples (or 56%) exceeded the numerical criterion of 50. Dissolved oxygen, pH, and toxicant data collected during the same period met the criteria prescribed in the WWAC beneficial use. Fish collected during the summer of 2005 indicate that whether the segment is supporting a healthy biological community is currently indeterminate. Based on the Index of Biological Integrity (IBI) outlined in Appendix C of Oklahoma's USAP, the station has a sample composition score of 14 (maximum 30) and fish condition score of 11 (maximum 15) for a total score of 25. This is between the assigned non-supporting and supporting thresholds of 20-25 for Central Oklahoma/Texas Plains warm water aquatic communities [OAC 46:15-5(l)]. The AG beneficial use is not supported. Of the sixty-six (66) total dissolved solids (TDS) concentrations, nine (9) samples (or 14%) exceeded the sample standard of 5722 mg/L. Of the forty-four (44) sulfate concentrations, twenty-one (21) samples (or 48%) exceeded the sample standard of 666 mg/L, and the mean (629.6 mg/L) exceeded the yearly mean standard (485 mg/L). Of the 44 chloride concentrations, fifteen (15) samples (or 34%) exceeded the sample standard of 1384 mg/L, and the mean (1284.5 mg/L) exceeded the yearly mean standard (1007 mg/L). The PBCR beneficial use is not supported. Of the twenty-five (25) enterococci concentrations, four (4) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (53.7 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Red River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

Sandy Creek near Eldorado

Station AT299710 (311600010040-001AT) is a permanent ambient trend monitoring station located on Sandy Creek. Situated in the southwestern portion of Jackson County, the site was established west of the town of Eldorado on State Highway 6. The station is positioned near the terminal end of stream segment 311600010040 and is classified within the Groesbeck Creek - Sandy Creek 8 digit HUC watershed (11130101). Water enters the stream system from several tributaries including Lebos Creek, among others.

This station on Sandy Creek has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of Sandy Creek from the confluence of Lebos Creek (99.8453, 34.6414) downstream to confluence of Sandy Creek with the Red River (99.5800, 34.4166). As per Appendix A, Table 3 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Emergency Water Supply (EWS), 2) Habitat Limited Aquatic Community—Fish and Wildlife Propagation (HLAC), 3) Agriculture—Class I Irrigation (AG), and 4) Secondary Body Contact—Recreation (SBCR).

The HLAC beneficial use is not supported. Of the twelve (12) selenium samples collected, ten (10) of the concentrations (or 83%) exceeded the prescribed chronic criteria of 5 ug/L, and six (6) of the concentrations (or 50%) exceeded the prescribed acute criteria of 20 ug/L. Of the forty-one (41) turbidity samples, twenty-one (21) samples (or 51%) exceeded the numerical criterion of 50. Dissolved oxygen and pH samples met the criteria prescribed in the HLAC beneficial use. The AG beneficial use is not supported. Of the forty-eight (48) total dissolved solids concentrations, forty-three (43) samples (or 90%) exceeded the sample standard of 3969.0 mg/L, and the mean (5370.2 mg/L) exceeded the yearly mean standard of 3331 mg/L. Of the forty-seven (47) chloride concentrations, forty-five (45) samples (or 96%) exceeded the sample standard of 910.0 mg/L, and the mean (1822.4 mg/L) exceeded the yearly mean standard of 668 mg/L. Of the 47 sulfate concentrations, fifteen (15) samples (or 32%) exceeded the sample standard of 1935.0 mg/L, and the mean (1746.6 mg/L) exceeded the yearly mean standard of 1586 mg/L. The SBCR beneficial use is not supported. Of the fourteen (14) enterococci concentrations, two (2) samples exceeded the prescribed screening level of 2030 cfu/100mL, and the geometric mean (551.3 cfu/100mL) exceeded the prescribed mean standard of 165 cfu/100mL. This segment of Sandy Creek is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

Washita River near Alex

Station AT328100 (310810020010-001AT) is a permanent ambient trend monitoring station located on the Washita River in Oklahoma. Situated in the east central portion of Grady County, the site was established north of the city of Alex off of State Highway 19. The station is positioned near the upper end of stream segment 310810020010 and is classified within the Middle Washita River 8 digit HUC watershed (11130303). Water enters the stream system from Public Service Lake 3 and from several tributaries including Dry Creek, Winter Creek, Roaring Creek, Laflin Creek, Colbert Creek, and Criner Creek among others.

This station on the Washita River has been active for all water quality variables since January of 2003. The following assessment of beneficial uses is based on data collected from January of 2003 through April of 2007. For purposes of reporting, this station is representative of the Washita River from the confluence of Dry Creek (97.7927, 34.9614) downstream to confluence of Beef Creek with the Washita River (97.3902, 34.8169). As per Appendix A, Table 3 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the twenty-three (23) turbidity samples, six (6) samples (or 26%) exceeded the numerical criterion of 50. Dissolved oxygen, pH, and toxicant samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids, chlorides and sulfates. The PBCR beneficial use is not supported. Of the twenty (20) fecal coliform concentrations, nine (9) samples (or 45%) exceeded the prescribed screening level of 400 cfu/100mL. Of the 20 enterococci concentrations, 6 samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (210.3 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Washita River is nutrient-threatened. The mean sestonic chlorophyll-a concentration (35.1 mg/M³) produced a TSI of 66, which is above the threshold TSI of 62. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

Washita River near Anadarko

Station AT326500 (310830010010-001AT) is a permanent ambient trend monitoring station located on the Washita River in Oklahoma. Situated in the east central portion of Caddo County, the site was established south of the city of Anadarko on US Highway 281. The station is positioned between the midpoint and the lower end of stream segment 310830010010 and is classified within the Upper Washita River 8 digit HUC watershed (11130302). Water enters the stream system from Public Service Lake 3 and from several tributaries including Spring Creek, Cobb Creek (Fort Cobb Reservoir), Sugar Creek, Delaware Creek, and Spring Creek (Lake Chickasha), among others.

This station on the Washita River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. Analysis also includes water quality data collected at a variety of stations throughout the segment. Data were collected in cooperation with the Oklahoma Department of Environmental Quality (ODEQ). For purposes of reporting, this station is representative of the Washita River from the confluence of Cobb Creek (98.4279, 35.0906) downstream to confluence of Spring Creek with the Washita River (98.1065, 35.1017). As per Appendix A, Table 3 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the forty-six (46) turbidity samples, eleven (11) samples (or 24%) exceeded the numerical criteria of 50. Dissolved oxygen, pH, and toxicant samples met the criteria prescribed in the WWAC beneficial use. Fish collected during the summer of 2004 indicate that the segment is not supporting a healthy biological community. Based on the Index of Biological Integrity (IBI) outlined in Appendix C of Oklahoma's USAP, the station has a sample composition score of 5 (maximum 30) and fish condition score of 11 (maximum 15) for a total score of 16. This is below the assigned non-supporting threshold of 18 for Central Great Plains warm water aquatic communities [OAC 46:15-5(m)]. The AG beneficial use is supported for total dissolved solids, chloride, and sulfate samples. The PBCR beneficial use is not supported. Of the twenty-six (26) fecal coliform concentrations, eight (8) samples (or 31%) exceeded the prescribed screening level of 400 cfu/100mL. Of the 26 enterococci concentrations, twelve (12) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (278.2 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Washita River is nutrient-threatened. The mean sestonic chlorophyll-a concentration (25.4 mg/M³) produced a TSI of 62.4, which is above the threshold TSI of 62. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

Washita River near Cordell

Station AT325300 (310830030010-001AT) is a permanent ambient trend monitoring station located on the Washita River in Oklahoma. Situated in the east central portion of Washita County, the site was established east of the city of Cordell on State Highway 152. The station is positioned between the midpoint and the lower end of stream segment 310830030010 and is classified within the Upper Washita River 8 digit HUC watershed (11130302). Water enters the stream system from several tributaries including Barnitz Creek, Beaver Creek, Boggy Creek, Cavalry Creek, and Two Baby Creek, among others.

This station on the Washita River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. Analysis also includes water quality data collected at a variety of stations throughout the segment. Data were collected in cooperation with the Oklahoma Department of Environmental Quality (ODEQ). For purposes of reporting, this station is representative of the Washita River from the confluence of Barnitz Creek (99.0098, 35.5336) downstream to confluence of Two Baby Creek with the Washita River (98.8382, 35.2761). As per Appendix A, Table 3 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the eighty-two (82) turbidity samples, twenty-nine (29) samples (or 35%) exceeded the numerical criterion of 50. Dissolved oxygen, pH, and toxicant data collected during the same period met the criteria prescribed in the WWAC beneficial use. Fish collected during the summer of 2005 at one of the sites in the segment indicate that the segment is not supporting a healthy biological community. Based on the Index of Biological Integrity (IBI) outlined in Appendix C of Oklahoma's USAP, the station has a sample composition score of 6 (maximum 30) and fish condition score of 9 (maximum 15) for a total score of 15. This is below the assigned non-supporting threshold of 18 for Central Great Plains warm water aquatic communities [OAC 46:15-5(m)]. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the seventy-eight (78) fecal coliform concentrations, thirty-six (36) samples (or 46%) exceeded the prescribed screening level of 400 cfu/100mL, and the geometric mean (450.6 cfu/100mL) exceeded the prescribed mean standard of 400 cfu/100mL. Of the 78 enterococci concentrations, thirty-two (32) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (314.0 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. Of the 78 *E. coli* concentrations, fourteen (14) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (135.8 cfu/100mL) exceeded the prescribed mean standard of 126 cfu/100mL. This segment of the Washita River is not nutrient-threatened. The mean sestonic chlorophyll-a concentration (17.9 mg/M³) produced a TSI of 59, which is below the threshold TSI of 62. Additionally, the total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

Washita River near Durwood

Station AT331000 (310800020010-001AT) is a permanent ambient trend monitoring station located on the Washita River in Oklahoma. Situated in the east central portion of Carter County, the site was established north of the town of Durwood on US Highway 177. The station is positioned near the terminal end of stream segment 310800020010 and is classified within the Middle Washita River 8 digit HUC watershed (11130303). Water enters the stream system from several tributaries including Rock Creek (Arbuckle Reservoir), Caddo Creek (Lake Jean Neustadt, Rock Creek Reservoir, Lake Ardmore, and the Ardmore City Lake), Oil Creek, Mill Creek, and Pennington Creek, among others.

This station on the Washita River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. Analysis also includes water quality data collected by the United States Geological Survey's Oklahoma Water Science Center. For purposes of reporting, this station is representative of the Washita River from the confluence of Rock Creek (97.0411, 34.3847) downstream to confluence of Oil Creek with the Washita River (96.8850, 34.2442). As per Appendix A, Table 3 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the twenty-eight (28) turbidity samples, twelve (12) samples (or 43%) exceeded the numerical criterion of 50. Dissolved oxygen, pH, and toxicant samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the twenty-three (23) fecal coliform concentrations, ten (10) samples (or 43%) exceeded the prescribed screening level of 400 cfu/100mL. Of the 23 enterococci concentrations, six (6) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (96.1 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Washita River is nutrient-threatened. The mean sestonic chlorophyll-a concentration (26.7 mg/M³) produced a TSI of 63, which is above the threshold TSI of 62. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

Washita River near McClure

Station AT324200 (310840010010-002AT) is a permanent ambient trend monitoring station and replaces station number AT324200 (310840010010-001AT). Situated in the east central portion of Custer County, the site was established near the town of McClure on off of State Highway 33. The station is positioned near the terminus of stream segment 310840010010 and is classified within the Washita Headwaters 8 digit HUC watershed (11130301). Water enters the stream system from several tributaries including Sandstone Creek, White Shield Creek, and Quartermaster Creek, among others.

A station on the Washita River has been active for all water quality variables since November of 1998. The original station west of Hammon was deactivated in the winter of 2006. The new site near McClure was established as part of intensive survey of the upper Washita River in cooperation with the Oklahoma Department of Environmental Quality (ODEQ). When data from the two stations were found to be comparable, the McClure station became the representative BUMP station because of the presence of a long-term data collection platform that accommodates stream gaging needs for the Washita above Foss Reservoir. The data from the two sites will be combined, and data from the original Hammon site will continue to be used in the assessment of the Washita River. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Washita River from the confluence of Sandstone Creek (99.5017, 35.6007) downstream to confluence of the Washita River with Foss Lake (99.3057, 35.6566). As per Appendix A, Table 3 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the forty-nine (49) turbidity samples, twelve (12) samples (or 24%) exceeded the numerical criterion of 50. Dissolved oxygen, pH, and toxicant samples met the criteria prescribed in the WWAC beneficial use. Fish were collected during the summer of 2005 indicate that the segment is not supporting a healthy biological community. Based on the Index of Biological Integrity (IBI) outlined in Appendix C of Oklahoma's USAP, the station has a sample composition score of 6 (maximum 30) and fish condition score of 11 (maximum 15) for a total score of 17. Even though the station is partially in the Southwest Tablelands Region, part of the watershed is contained in the Central Great Plains ecoregion, and the biocriteria developed for this ecoregion will be used in lieu of a more exact assessment. This is below the assigned lower boundary of the indeterminate threshold of 19 for Central Great Plains warm water aquatic communities [OAC 46:15-5(l)]. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the fifty-five (55) fecal coliform concentrations, thirty (30) samples (or 55%) exceeded the prescribed screening level of 400 cfu/100mL, and the geometric mean (476.2 cfu/100mL) exceeded the prescribed mean standard of 400 cfu/100mL. Of the 55 enterococci concentrations, twenty-seven (27) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (413.5 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. Of the 55 *E. coli* concentrations, nine (9) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (127.3 cfu/100mL) exceeded the prescribed mean standard of 126 cfu/100mL. This segment of the Washita River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

Washita River near Pauls Valley

Station AT328500 (310810010010-001AT) is a permanent ambient trend monitoring station located on the Washita River in Oklahoma. Situated in the north central portion of Garvin county, the site was established northeast of the city of Pauls Valley on State Highway 19. The station is positioned near the midpoint of stream segment 310810010010 and is classified within the Middle Washita River 8 digit HUC watershed (11130303). Water enters the stream system from Wiley Post Memorial Lake and from several tributaries including Beef Creek, Owl Creek, Washington Creek (Pauls Valley Lake), Peavine Creek, Cherokee Sandy Creek (R. C. Longmire Lake), and Wildhorse Creek, among others.

This station on the Washita River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Washita River from the confluence of Beef Creek (97.3902, 34.8169) downstream to confluence of Wildhorse Creek with the Washita River (97.1650, 34.5321). As per Appendix A, Table 3 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the thirty (30) turbidity samples, twenty (20) samples (or 67%) exceeded the numerical criteria of 50. Dissolved oxygen, pH, and toxicant samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates (d and e). The PBCR beneficial use is not supported. Of the twenty-five (25) fecal coliform concentrations, seven (7) samples (or 28%) exceeded the prescribed screening level of 400 cfu/100mL. Of the 25 enterococci concentrations, 7 samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (158.7 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Washita River is not nutrient-threatened. Although the median of the total phosphorus concentrations (0.397 mg/L) exceeded the threshold median of 0.36 mg/L, the station is light-limited with a median inorganic baseflow turbidity of 105 NTU. The nitrate/nitrite median value was below the threshold median of 5.0 mg/L.

West Cache Creek near Taylor

Station AT315050 (311310020010-001AT) is a permanent ambient trend monitoring station located on West Cache Creek. Situated in the south central portion of Cotton County, the site was established north of the town of Taylor on State Highway 5B. The station is positioned near the terminal end of stream segment 311310020010 and is classified within the West Cache Creek 8 digit HUC watershed (11130203). Water enters the stream system from several tributaries including Deep Red Creek (Lake Frederick and Whites Lake), among others.

This station on West Cache Creek has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of West Cache Creek from the confluence of Deep Red Creek (98.3800, 34.2154) downstream to confluence of West Cache Creek with Cache Creek (98.3070, 34.2066). As per Appendix A, Table 3 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the thirty-three (33) turbidity samples, eight (8) samples (or 24%) exceeded the numerical criteria of 50. Dissolved oxygen, pH, and toxicant samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is not supported. Of the forty-three (43) total dissolved solid sample concentrations, 43 samples (or 100%) exceeded the prescribed sample standard of 151 mg/L (greater than 25% exceeded the minimum sample standard of 700 mg/L), and the mean (744.8 mg/L) exceeds the prescribed yearly mean standard of 126 mg/L. Of the forty-one (41) chloride sample concentrations, nine (7) samples (or 22%) exceeded the prescribed sample standard of 285 mg/L, and the mean (233.2 mg/L) exceeds the prescribed yearly mean standard of 187 mg/L. Several sulfate values were above the sample standard of 118 mg/L, but no sample exceeded the prescribed minimum standard of 250 mg/L. The PBCR beneficial use is not supported. Of the twenty (20) fecal coliform concentrations, 7 samples (or 35%) exceeded the prescribed screening level of 400 cfu/100mL, and the geometric mean (474.1 cfu/100mL) exceeded the prescribed mean standard of 400 cfu/100mL. Of the 20 enterococci concentrations, 8 samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (371.8 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. Of the 20 *E. coli* concentrations, four (4) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (127.8 cfu/100mL) exceeded the prescribed mean standard of 126 cfu/100mL. This segment of West Cache Creek is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

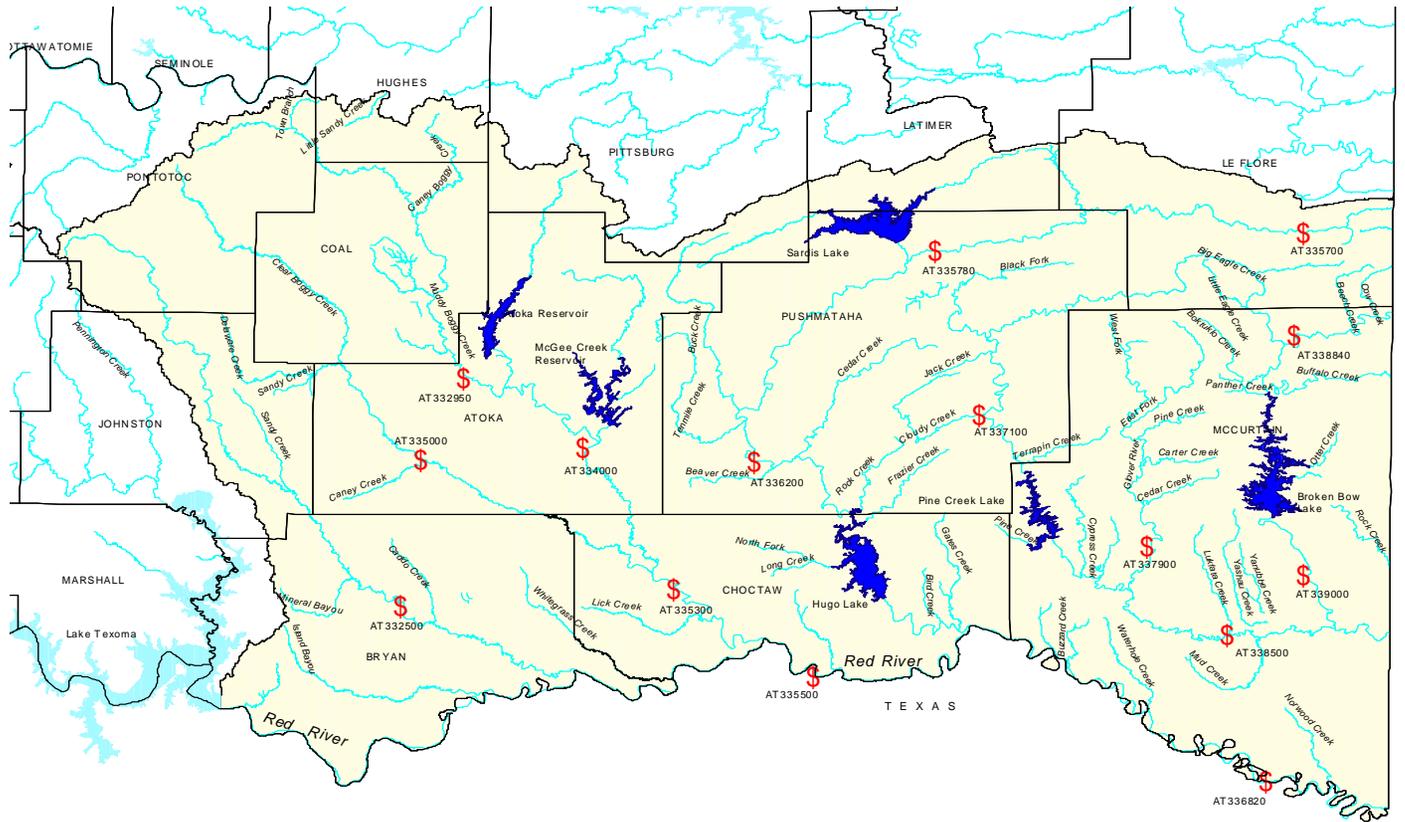


Plate 66
 LOWER RED SUBBASIN (HUC 1114)
 Water Quality Programs Division
 Oklahoma Water Resources Board

HUC 1114

LOWER RED SUB-BASIN

The Lower Red sub-basin (4-digit hydrologic unit 1114) is situated in the southeastern portion of the state. It originates in the central portion of Pontotoc County, continues eastward through portions of Murray, Johnston, Bryan, Hughes, Coal, Atoka, Pittsburg, Latimer, Pushmataha, and Choctaw Counties, and terminates in the eastern parts of LeFlore and McCurtain Counties. Major cities and County seats located within the basin include Coalgate, Atoka, Durant, Antlers, Hugo, Broken Bow, and Idabel. Minor cities of note include Kiowa, Fort Towson, Rattan, Clayton, Talihina, Smithville, and Valliant.

The basin is subdivided into nine 8-digit hydrologic units (HUC) that are all contained wholly within the state. These HUC's are the Bois D'Arc-Island (11140101), the Blue (11140102), the Muddy Boggy (11140103), the Clear Boggy (11140104), the Kiamichi (11140105), the Pecan-Waterhole (11140106), the Upper Little (11140107), the Mountain Fork (11140108), and Lower Little (11140109). The major surface water in the basin is the lower Red River. Major tributaries include the Blue River, the Kiamichi River, the Little River, the Glover River, the Mountain Fork River, Island Bayou, Whitegrass Creek, Clear Boggy Creek, Muddy Boggy Creek, Jackfork Creek, Cedar Creek, Buzzard Creek, Black Fork, Lukfata Creek, and Big Eagle Creek. Six major lakes are located in the basin—Atoka Reservoir formed by North Boggy Creek, McGee Creek Reservoir formed by McGee Creek, Sardis Lake formed by Jackfork and Buffalo Creeks, Hugo Lake formed by the Kiamichi River, Pine Creek Lake formed by the Little River, and Broken Bow Lake formed by the Mountain Fork River. Fourteen active permanent water quality-monitoring stations (Table 15) are located in the basin—AT332500, AT332950, AT335000, AT335300, AT335500, AT335700, AT335780, AT336200, AT336820, AT337100, AT337900, AT338000, AT338840, and AT339000. Two inactive water quality-monitoring stations (AT334000 and AT338500) are located in the sub-basin. Station AT334000 was last assessed in the 1999 BUMP report. Station 338500, Little River near Idabel, was last included in the 2003 BUMP report, but will not be assessed further. Because the station is located within a regulatory mixing zone, the OWRB cannot support previously collected data and will not include in future federal and state lists. Station AT338000, Little River near Holly Creek, was begun in the beginning of 2003 and will replace the Idabel station. However, it will not be assessed in this report due to lack of data.

The basin is characterized by three ecoregions. The Central Oklahoma/Texas Plains is the primary ecoregion beginning in the northwestern portion and continuing through the southern one-half ($\frac{1}{2}$) of the sub-basin. The Ouachita Mountains cover the remainder of the northern one-half ($\frac{1}{2}$) of the sub-basin. The South Central Plains cover the southeastern quarter ($\frac{1}{4}$) of the McCurtain County. The primary land usage in the sub-basin is forestland (shortleaf pine, loblolly pine, pine plantations, and oak-hickory). It dominates the central and most of the eastern portions and is further interspersed throughout the sub-basin. The secondary land use is pastureland (brushy and mixed) that dominates parts of the western portion of the sub-basin and is interspersed throughout the sub-basin with areas of concentration in Pushmataha and southern McCurtain Counties. The tertiary land use is rangeland (open grasslands and woody areas) that is prevalent in the northwestern portion and is interspersed throughout the central and southern portions of the sub-basin. Other land uses of note are cropland, bottom woodlands, farmsteads, major urban areas, wetlands, and confined animal feeding operations.

Table 15. Permanent Ambient Trend Monitoring Stations Located in HUC 1114.

WBID #	STATION #	STATION NAME	STATUS	FS	PS	NS/T	CBD
410600010010	AT332500	BLUE RIVER, US 70, DURANT	ACTIVE 11/98-P	AG, FWP, PPWS	NONE	AES, PBCR	NONE
410400030010	AT335000	CLEAR BOGGY CREEK, OFF US 69, CANEY	ACTIVE 11/98-P	AG, PPWS	NONE	AES, FWP, PBCR	NONE
410210080010	AT337900	GLOVER RIVER, SH 3, GLOVER	ACTIVE 11/98-P	AG, AES, PBCR, PPWS	NONE	FWP	NONE
410300030010	AT336200	KIAMICHI RIVER, US 271, ANTLERS	ACTIVE 11/98-P	AG, AES, PPWS	NONE	FWP, PBCR	NONE
410310020010	AT335700	KIAMICHI RIVER, SH 63, BIG CEDAR	ACTIVE 11/98-P	AG, AES, PPWS	NONE	FWP, PBCR	NONE
410300010010	AT336710	KIAMICHI RIVER, SH 109, FORT TOWSON	ACTIVE 02/02-P	AG, AES, PPWS	NONE	PBCR, FWP	NONE
410310010010	AT335780	KIAMICHI RIVER, OFF US 271, TUSKAHOMA	ACTIVE 11/98-P	AG, AES, PPWS	NONE	FWP, PBCR	NONE
410210020140	AT337100	LITTLE RIVER, OFF SH 3, CLOUDY	ACTIVE 11/98-P	AG, AES, PPWS	NONE	FWP, PBCR	NONE
410200010200	AT338000	LITTLE RIVER, OFF US 70, HOLLY CREEK	ACTIVE 11/03-P	AG, AES, PPWS, PBCR	NONE	FWP	NONE
410210040010	AT339000	MOUNTAIN FORK, US 70, EAGLETOWN	ACTIVE 11/98-P	AG, AES, PPWS	NONE	FWP, PBCR	NONE
410210060010	AT338840	MOUNTAIN FORK, SH 4, SMITHVILLE	ACTIVE 11/98-P	AG, PPWS	NONE	FWP, AES, PBCR	NONE
410400050270	AT332950	MUDDY BOGGY CREEK, US 69, ATOKA	ACTIVE 9/99-P	AG, AES, PPWS	NONE	FWP, PBCR	NONE
410400010070	AT335300	MUDDY BOGGY CREEK, US 70, UNGER	ACTIVE 7/99-P	AG, AES, PPWS	NONE	FWP, PBCR	NONE
410100010010	AT336820	RED RIVER, US 259, HARRIS	ACTIVE 11/98-P	AG, AES, PBCR, PPWS	NONE	FWP	NONE
410400010010	AT335500	RED RIVER, US 271, HUGO	ACTIVE 11/98-P	AES, PPWS	NONE	AG, FWP, PBCR	NONE

ASSIGNED OWQS BENEFICIAL USES AND SUPPORT CODES

PPWS = PUBLIC AND PRIVATE WATER SUPPLY	EWS = EMERGENCY WATER SUPPLY
FWP = FISH & WILDLIFE PROPAGATION	PBCR = PRIMARY BODY CONTACT RECREATION
AG = AGRICULTURE	AES = AESTHETICS
FS = FULLY SUPPORTING	PS = PARTIALLY SUPPORTING
NS/T = NOT SUPPORTING/THREATENED	CBD = CANNOT BE DETERMINED

HUC 1114

Blue River near Durant

Station AT332500 (410600010010-001AT) is a permanent ambient trend monitoring station located on the Blue River. Situated in the central portion of Bryan County, the site was established east of the city of Durant on US Highway 70. The station is positioned between the upper end and midpoint of stream segment 410600010010 and is classified within the Blue River 8 digit HUC watershed (11140102). Water enters the stream system from several tributaries including Mineral Bayou and Caddo Creek, among others.

This station on the Blue River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Blue River from the confluence of Mineral Bayou (96.3357, 34.0462) downstream to confluence of the Blue River with the Red River (95.9356, 33.8879). As per Appendix A, Table 4 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is supported. Dissolved oxygen, pH, turbidity, and toxicant samples met the criteria prescribed in the WWAC beneficial use. Fish collected during the summer of 2005 indicate that the segment is supporting a healthy biological community. Based on the Index of Biological Integrity (IBI) outlined in Appendix C of Oklahoma's USAP, the station has a sample composition score of 20 (maximum 30) and fish condition score of 11 (maximum 15) for a total score of 31. This is above the assigned supporting threshold of 26 for Central Oklahoma/Texas Plains warm water aquatic communities [OAC 46:15-5(l)]. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the twenty-three (23) enterococci concentrations, five (5) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (568.3 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. Of the 23 fecal coliform concentrations, six (6) samples (or 26%) exceeded the prescribed screening level of 406 cfu/100mL. This segment of the Blue River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively. Furthermore, the mean sestonic chlorophyll-a concentration (5.0 mg/M³) produced a TSI of 46, which is below the threshold TSI of 62.

Clear Boggy Creek near Caney

Station AT175500 (121400010010-001AT) is a permanent ambient trend monitoring station located on the Caney River in Oklahoma. Situated in the southeastern portion of Washington County, the site was established southeast of the town of Ramona off US Highway 75 on county road 390. The station is positioned between the midpoint and the terminal end of stream segment 121400010010 and is classified within the Caney River 8 digit HUC watershed (11070106). Water enters the stream system from Sand Creek, Keeler Creek, and Rabb Creek, among others.

This station on the Caney River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Caney River from the confluence of Sand Creek (95.9684, 36.7167) downstream to confluence of the Caney River with Rabb Creek (95.8101, 36.4338). As per Appendix A, Table 6 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the twenty-nine (29) turbidity samples, thirteen (13) samples (or 45%) exceeded the numerical criteria of 50. Of the ten (10) toxicant samples collected, three (3) of the lead concentrations (or 30%) exceeded the prescribed hardness-dependant chronic criteria of 5.29 ug/L. Dissolved oxygen and pH samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. Although several sulfate concentrations exceeded the sample standard, all values are below the prescribed minimum standard of 250 mg/L. The PBCR beneficial use is not supported. Of the 29 enterococci concentrations, four (4) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (68.2 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Caney River is nutrient-threatened. The mean sestonic chlorophyll-a concentration (31.7 mg/M³) produced a TSI of 64, which is above the threshold TSI of 62. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

Glover River near Glover

Station AT337900 (410210080010-001AT) is a permanent ambient trend monitoring station located on the Glover River. Situated in the east central portion of McCurtain County, the site was established west of the town of Glover on State Highway 3. The station is positioned near the midpoint end of stream segment 410210080010 and is classified within the Upper Little River 8 digit HUC watershed (11140107). Water enters the stream system from several tributaries including Pine Creek, Beeman Creek, Carter Creek, Shell Rock Creek, Cedar Creek, and Colbert Creek, among others.

This station on the Glover River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Glover River from the confluence of the West Fork and the East Fork (94.9352, 34.3092) downstream to confluence of the Glover River with the Little River (94.9379, 34.0192). As per Appendix A, Table 7 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Cool Water Aquatic Community—Fish and Wildlife Propagation (CWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The CWAC beneficial use is not supported. Of the eleven (11) lead samples collected, five (5) of the concentrations (or 46%) exceeded the hardness-specific chronic criteria of 0.47 ug/L. Of the thirty-six (36) turbidity samples, eight (8) samples (or 22%) exceeded the numerical criteria of 10. The dissolved oxygen and pH samples met the criterion prescribed in the CWAC beneficial use. Fish were collected during the summer of 2005. Based on the Index of Biological Integrity (IBI) outlined in Appendix C of Oklahoma's USAP, the station has a sample composition score of 22 (maximum 30) and fish condition score of 15 (maximum 15) for a total score of 37. However, because biocriteria have not been developed for cool water aquatic communities in the Ouachita Mountains ecoregion, no assessment of community biological health can be made at this time. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is supported for fecal coliform, enterococci, and *E.coli*. This segment of the Glover River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively. Furthermore, the mean sestonic chlorophyll-a concentration (2.2 mg/M³) produced a TSI of 38, which is below the threshold TSI of 62.

Kiamichi River near Antlers

Station AT336200 (410300030010-001AT) is a permanent ambient trend monitoring station located on the Kiamichi River in Oklahoma. Situated in the southwestern portion of Pushmataha County, the site was established north of the town of Antlers on US Highway 271. The station is positioned near the midpoint of stream segment 410300030010 and is classified within the Kiamichi River 8 digit HUC watershed (11140105). Water enters the stream system from several tributaries including Lily Pond Creek, Buck Creek, Tenmile Creek, Cedar Creek, and Duck Creek, among others.

This station on the Kiamichi River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Kiamichi River from below the confluence of Caney Creek (95.5955, 34.3819) downstream to below the confluence of Duck Creek with the Kiamichi River (95.4968, 34.2398). As per Appendix A, Table 4 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the fifteen (15) lead samples collected, 15 of the concentrations (or 100%) exceeded the hardness-specific chronic criteria of 0.61 ug/L. Of the fourteen (14) copper samples collected, two (2) of the concentrations (or 29%) exceeded the hardness-specific chronic criterion of 4.22 ug/L. Dissolved oxygen, pH and turbidity samples met the criteria prescribed in the WWAC beneficial use. Fish collected during the summer of 2005 indicate that the segment is supporting a healthy biological community. Based on the Index of Biological Integrity (IBI) outlined in Appendix C of Oklahoma's USAP, the station has a sample composition score of 26 (maximum 30) and fish condition score of 13 (maximum 15) for a total score of 39. This is above the assigned supporting threshold of 35 for Ouachita Mountain warm water aquatic communities [OAC 46:15-5(h)]. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the twenty-four (24) enterococci concentrations, four (4) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (48.9 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Kiamichi River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively. Furthermore, the mean sestonic chlorophyll-a concentration (10.7 mg/M³) produced a TSI of 54, which is below the threshold TSI of 62.

Kiamichi River near Big Cedar

Station AT335700 (410310020010-001AT) is a permanent ambient trend monitoring station located on the Kiamichi River in Oklahoma. Situated in the southeastern portion of LeFlore County, the site was established east of the town of Big Cedar on State Highway 63. The station is positioned near the upper end of stream segment 410310020010 and is classified within the Kiamichi River 8 digit HUC watershed (11140105). Water enters the stream system from Arkansas and from several tributaries including Pigeon Creek and Billy Creek, among others.

This station on the Kiamichi River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Kiamichi River from its entrance into Oklahoma near Fogel, Arkansas (97.4561, 34.6783) downstream to above the confluence of Rock Creek with the Kiamichi River (95.0157, 34.6813). As per Appendix A, Table 4 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the thirteen (13) lead samples collected, nine (9) of the concentrations (or 69%) exceeded the hardness-specific chronic criteria of 0.32 ug/L. Of the forty-six (46) pH concentrations, six (6) of the samples (or 13%) were below the minimum standard of 6.5 units. Dissolved oxygen and turbidity samples met the criteria prescribed in the WWAC beneficial use. Fish collected during the summer of 2005 indicate that whether the segment is supporting a healthy biological community is currently indeterminate. Based on the Index of Biological Integrity (IBI) outlined in Appendix C of Oklahoma's USAP, the station has a sample composition score of 20 (maximum 30) and fish condition score of 13 (maximum 15) for a total score of 33. This is between the assigned non-supporting and supporting thresholds of 25-34 for Ouachita Mountain warm water aquatic communities [OAC 46:15-5(h)]. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the twenty-three (23) enterococci concentrations, three (3) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (55.5 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Kiamichi River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 1.0 mg/L and 4.65 mg/L, respectively.

Kiamichi River near Fort Towson

Station AT336710 (410300010010-002AT) is a permanent ambient trend monitoring station located on the Kiamichi River in Oklahoma. Situated in the southeastern portion of Choctaw County, the site was established south of the town of Ft. Towson on State Highway 109. The station is positioned between the midpoint and the terminal end of stream segment 410300010010 and is classified within the Kiamichi River 8 digit HUC watershed (11140105). Water enters the stream system from several tributaries including Hugo Lake and Bird Creek, among others.

This station on the Kiamichi River has been active for all water quality variables since February of 2002. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Kiamichi River from below the Hugo Lake Dam (95.3829, 34.0097) downstream to confluence of the Kiamichi River with the Red River (95.2297, 33.9616). As per Appendix A, Table 4 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the eleven (11) lead samples collected, 11 of the concentrations (or 100%) exceeded the hardness-specific chronic criteria of 1.08 ug/L, and two (2) concentrations (or 18%) exceeded the hardness-specific acute criteria of 27.8 ug/L. Dissolved oxygen, pH, and turbidity samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. Although several sulfate concentrations exceeded the sample standard of 28 mg/L, the values are below the prescribed minimum standard of 250 mg/L. The PBCR beneficial use is not supported. Of the twenty-four (24) enterococci concentrations, 2 samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (33.7 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Kiamichi River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

Kiamichi River near Tuskahoma

Station AT335780 (410310010010-001AT) is a permanent ambient trend monitoring station located on the Kiamichi River in Oklahoma. Situated in the northeastern portion of Pushmataha County, the site was established south of the town of Tuskahoma off of US Highway 271 on Tuskahoma School Road. The station is positioned near the lower end of stream segment 410310010010 and is classified within the Kiamichi River 8 digit HUC watershed (11140105). Water enters the stream system from several tributaries including Rock Creek (Lake Talihina and Lake Carl Albert), Albion Creek, Cedar Creek, Dry Creek, and Jackfork Creek (Sardis Lake), among others.

This station on the Kiamichi River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Kiamichi River from the confluence of Rock Creek (95.0157, 34.6813) downstream to confluence of Jackfork Creek with the Kiamichi River (95.3354, 34.5973). As per Appendix A, Table 4 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the sixteen (16) lead samples collected, fourteen (14) of the concentrations (or 88%) exceeded the hardness-specific acute criteria of 0.44 ug/L. Dissolved oxygen, pH, and turbidity samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids (TDS), chlorides, and sulfates. Although several sulfate concentrations exceeded the sample standard of 18 mg/L, the values are below the prescribed minimum standard of 250 mg/L. The PBCR beneficial use is not supported. Of the twenty-one (21) enterococci concentrations, two (2) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (54.8 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Kiamichi River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

Little River near Cloudy

Station AT337100 (410210020140-001AT) is a permanent ambient trend monitoring station located on the Little River in Oklahoma. Situated in the southeastern portion of Pushmataha County, the site was established east-northeast of the town of Cloudy off of State Highway 3 on Cloudy Road. The station is positioned near the midpoint of stream segment 410210020140 and is classified within the Upper Little River 8 digit HUC watershed (11140107). Water enters the stream system from several tributaries including Watson Creek, Jack Creek, Cloudy Creek, Houston Creek, and Terrapin Creek, among others.

This station on the Little River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from October of 2001 through September of 2006. For purposes of reporting, this station is representative of the Little River from the confluence of Watson Creek (95.1730, 34.4522) downstream to the confluence of the Little River with Pine Creek Lake (95.1293, 34.2264). As per Appendix A, Table 4 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Cool Water Aquatic Community—Fish and Wildlife Propagation (CWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The CWAC beneficial use is not supported. Of the thirteen (13) lead samples collected, 13 of the concentrations (or 100%) exceeded the hardness-specific chronic criterion of 0.24 ug/L. Of the twenty-four (24) turbidity samples, six (6) samples (or 25%) exceeded the numerical criterion of 10. Dissolved oxygen and pH data collected during the same period met the criteria prescribed in the CWAC beneficial use. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the 24 enterococci concentrations, five (5) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (69.2 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Little River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively. Furthermore, the mean sestonic chlorophyll-a concentration (4.3 mg/M³) produced a TSI of 45, which is below the threshold TSI of 62.

Little River near Holly Creek

Station AT338000 (410200010200-002AT) is a permanent ambient trend monitoring station located on the Little River in Oklahoma. Situated in the south central portion of McCurtain County, the site was established south of the township of Holly Creek off of US Highway 70. The station is positioned near the lower end of stream segment 410200010200 and is classified within the Upper Little River 8 digit HUC watershed (11140107). Water enters the stream system from several tributaries including the Glover River, Boktuklo Creek, Holly Creek, Lukfata Creek, Yashua Creek, Mud Creek, and Yanubee Creek, among others.

This station on the Little River has been active for all water quality variables since November of 2003. The following assessment of beneficial uses is based on data collected from November 2003 through April of 2007. For purposes of reporting, this station is representative of the Little River from the confluence of the Glover River (94.9379, 34.0192) downstream to confluence of Yanubee Creek with the Little River (94.6887, 33.9443). As per Appendix A, Table 4 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Cool Water Aquatic Community—Fish and Wildlife Propagation (CWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The CWAC beneficial use is not supported. Of the twenty-one (21) turbidity samples, nine (9) samples (or 43%) were above the screening level of 10 NTU. Of the thirty (30) dissolved oxygen samples, seven (7) samples (or 23%) were below the screening level. The pH and toxicant samples met the prescribed criterion. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is supported for fecal coliform, *E. coli* and enterococci data. This segment of the Little River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

Mountain Fork River near Eagletown

Station AT339000 (410210040010-001AT) is a permanent ambient trend monitoring station located on the Mountain Fork River in Oklahoma. Situated in the east central portion of McCurtain County, the site was established west of the town of Eagletown on US Highway 70. The station is positioned near the upper end of stream segment 410210040010 and is classified within the Mountain Fork River 8 digit HUC watershed (11140108). Water enters the stream system from several tributaries including Cooper Creek, Lick Creek, and Luksuklo Creek, among others.

This station on the Mountain Fork River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Mountain Fork River from the confluence of Cooper Creek (94.6195, 34.0567) downstream to confluence of the Mountain Fork River with the Little River (94.5755, 33.9518). As per Appendix A, Table 4 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Cool (Trout) Water Aquatic Community—Fish and Wildlife Propagation (CWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The CWAC (Trout Fishery) beneficial use is not supported. Of the twelve (12) lead samples collected, three (3) of the concentrations (or 25%) exceeded the hardness-specific acute criterion of 5.40 ug/L, and eleven (11) of the lead concentrations (or 92%) exceeded the hardness-specific chronic criterion of 0.21 ug/L. Of the twelve (12) cadmium samples collected, four (4) of the concentrations (or 33%) exceeded the hardness-specific acute criterion of 0.35 ug/L, and five (5) of the cadmium concentrations (or 42%) exceeded the hardness-specific chronic criterion of 0.21 ug/L. Dissolved oxygen, pH, and turbidity data met the criteria prescribed in the CWAC beneficial use. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the twenty-six (26) enterococci concentrations, 4 samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (87.7 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Mountain Fork River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

Mountain Fork River near Smithville

Station AT338750 (410210060010-001AT) is a permanent ambient trend monitoring station located on the Mountain Fork River in Oklahoma. Situated in the northeastern portion of McCurtain County, the site was established east of the town of Smithville on State Highway 4. The station is positioned near the midpoint of stream segment 410210060010 and is classified within the Mountain Fork River 8 digit HUC watershed (11140108). Water enters the stream system from Arkansas and from several tributaries including Cow Creek, Beech Creek, Big Eagle Creek, Boktuklo Creek, and Buffalo Creek, among others.

This station on the Mountain Fork River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Mountain Fork River from its entrance into Oklahoma near Hatfield, Arkansas (94.4616, 34.4971) downstream to confluence of the Mountain Fork River with Broken Bow Reservoir (94.6869, 34.3617). As per Appendix A, Table 4 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Cool Water Aquatic Community—Fish and Wildlife Propagation (CWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR), and 5) Aesthetics. This portion of the Mountain Fork is also designated as a scenic river.

The PPWS beneficial use is supported. The CWAC beneficial use is not supported. Of the eleven (11) lead samples collected, ten (10) of the concentrations (or 91%) exceeded the hardness-specific chronic criteria of 0.30 ug/L. Of the eleven (11) copper samples collected, two (2) of the concentrations (or 18%) exceeded the hardness-specific acute criteria of 2.63 ug/L. Of the forty (40) turbidity samples, eleven (11) samples (or 28%) exceeded the numerical criterion of 10. Dissolved oxygen and pH data met the criteria prescribed in the CWAC beneficial use. Fish were collected during the summer of 2005. Based on the Index of Biological Integrity (IBI) outlined in Appendix C of Oklahoma's USAP, the station has a sample composition score of 24 (maximum 30) and fish condition score of 15 (maximum 15) for a total score of 39. However, because biocriteria have not been developed for cool water aquatic communities in the Ouachita Mountains ecoregion, no assessment of community biological health can be made at this time. The AG beneficial use is supported, for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is not supported. Of the forty (40) enterococci concentrations, nine (9) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (36.0 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. The aesthetics beneficial use is impaired for total phosphorus. Of the forty-three (43) 3-month rolling geometric means calculated from total phosphorus samples, five (5) geometric means (or 12%) exceed the prescribed scenic river total phosphorus criterion of 0.037mg/L.

Muddy Boggy Creek near Atoka

Station AT332950 (410400050270-001AT) is a permanent ambient trend monitoring station near the upper end of Muddy Boggy Creek. Situated in the north central portion of Atoka County, the site was established north of the town of Atoka on US Highway 69. The station is positioned near the midpoint of stream segment 410400050270 and is classified within the Muddy Boggy Creek 8 digit HUC watershed (11140103). Water enters the stream system from several tributaries including Caney Creek, Brier Creek, Coal Creek, and North Boggy Creek (Atoka Reservoir), Campbell Creek, August Creek, and Wilson Creek, among others.

This station on Muddy Boggy Creek has been active for all water quality variables since September of 1999. The following assessment of beneficial uses is based on data collected from May of 2002 through of April of 2007. For purposes of reporting, this station is representative of Muddy Boggy Creek from the confluence of Caney Creek (96.1923, 34.5354) downstream to above the confluence of North Boggy Creek with Muddy Boggy Creek (96.0620, 34.3781). As per Appendix A, Table 4 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the thirty-two (32) turbidity samples, eleven (11) samples (or 34%) exceeded the numerical criterion of 50. Of the forty-nine (49) dissolved oxygen samples, six (6) concentrations (or 12%) were below the prescribed screening level. Of the seventeen (17) lead samples collected, nine (9) of the concentrations (or 53%) exceeded the prescribed hardness-dependant chronic criteria of 2.58 ug/L . The pH samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids (TDS), chlorides, and sulfates. Although several sulfate concentrations exceeded the sample standard of 78.0 mg/L, all values are below the minimum value of 250 mg/L. The PBCR beneficial use is not supported. Of the twenty-eight (28) fecal coliform concentrations, 9 samples (or 32%) exceeded the prescribed screening level of 400 cfu/100mL. Of the 28 enterococci concentrations, seven (7) samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (121.9 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of Muddy Boggy Creek is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively. Furthermore, the mean sestonic chlorophyll-a concentration (10.6 mg/M³) produced a TSI of 54, which is below the threshold TSI of 62.

Muddy Boggy Creek near Unger

Station AT335300 (410400010070-001AT) is a permanent ambient trend monitoring station near the lower end of Muddy Boggy Creek. Situated in the west central portion of Choctaw County, the site was established east of the town of Unger on US Highway 70. The station is positioned near the upper end of stream segment 410400010070 and is classified within the Muddy Boggy Creek 8 digit HUC watershed (11140103). Water enters the stream system from several tributaries including Clear Boggy Creek, Lick Creek, Bokchito Creek, and Hanubby Creek, among others.

This station on Muddy Boggy Creek has been active for all water quality variables since July of 1999. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of Muddy Boggy Creek from the confluence of Clear Boggy Creek (95.7990, 34.0565) downstream to confluence of Muddy Boggy Creek with the Red River (95.5989, 33.9412). As per Appendix A, Table 4 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the twenty-nine (29) turbidity samples (c), eleven (11) samples (or 38%) exceeded the numerical criterion of 50. Of the fourteen (14) lead samples collected, four (4) of the concentrations (or 29%) exceeded the prescribed hardness-dependant chronic criteria of 4.59 ug/L. Of the forty-nine (49) visual site observations, six (6) samples (or 12%) exceeded the median observation value for oil and grease. The dissolved oxygen and pH samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids (TDS), chlorides, and sulfates. Although several TDS and sulfate samples exceed the prescribed sample standards, all of the samples are below the minimum prescribed sample standards of 700 mg/L and 250 mg/L, respectively. The PBCR beneficial use is not supported. Of the twenty-one (21) enterococci concentrations, 4 samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (71.0 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Muddy Boggy Creek is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively. Furthermore, the mean sestonic chlorophyll-a concentration (8.8mg/M³) produced a TSI of 52, which is below the threshold TSI of 62.

Red River near Harris

Station AT336820 (410100010010-001AT) is a permanent ambient trend monitoring station located on the Red River in Oklahoma. Situated in the southeastern portion of McCurtain County, the site was established south of the town of Harris on US Highway 259. The station is positioned near the terminal end of stream segment 410100010010 and is classified within the Pecan Creek - Waterhole Creek 8 digit HUC watershed (11140106). Water enters the stream system from Hugo Lake, Lake Raymond Gary, and Ward Lake and from several tributaries including Garland Creek, Buzzard Creek, Waterhole Creek, and Norwood Creek (Ward Lake), among others.

This station on the Red River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Red River from below the confluence of the Kiamichi River (95.2272, 33.9625) downstream to where the Red River exits Oklahoma (94.4868, 33.6374). As per Appendix A, Table 4 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class II Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the twenty-eight (28) turbidity samples, five (5) samples (or 18%) exceeded the numerical criterion of 50. Of the forty-nine (49) visual site observations, six (6) samples (or 12%) exceeded the median observation value for oil and grease. Dissolved oxygen, pH, and toxicant samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is supported for total dissolved solids, chlorides, and sulfates. The PBCR beneficial use is supported for fecal coliform, *E. coli* and enterococci samples. This segment of the Red River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

Red River near Hugo

Station AT335500 (410400010010-001AT) is a permanent ambient trend monitoring station located on the Red River in Oklahoma. Situated in the south central portion of Choctaw County, the site was established south of the city of Hugo on US Highway 271. The station is positioned near the midpoint of stream segment 410400010010 and is classified within the Bois D'Arc - Island Creek 8 digit HUC watershed (11140101). Water enters the stream system from several tributaries including the Blue River, Whitegrass Creek, the Muddy Boggy River, Horse Creek, and the Kiamichi River, among others.

This station on the Red River has been active for all water quality variables since November of 1998. The following assessment of beneficial uses is based on data collected from May of 2002 through April of 2007. For purposes of reporting, this station is representative of the Red River from the confluence of the Blue River (95.9356, 33.8879) downstream to confluence of the Kiamichi River with the (95.2300, 33.9615). As per Appendix A, Table 4 of OAC 785:45, this water quality management segment is assigned the following designated beneficial uses: 1) Public and Private Water Supply (PPWS), 2) Warm Water Aquatic Community—Fish and Wildlife Propagation (WWAC), 3) Agriculture—Class I Irrigation (AG), and 4) Primary Body Contact—Recreation (PBCR).

The PPWS beneficial use is supported. The WWAC beneficial use is not supported. Of the twenty-eight (28) turbidity samples, four (4) samples (or 14%) exceeded the numerical criterion of 50. Of the forty-five (45) visual site observations, five (5) samples (or 11%) exceeded the median observation value for oil and grease. Dissolved oxygen, pH, and toxicant samples met the criteria prescribed in the WWAC beneficial use. The AG beneficial use is not supported. Of the forty-seven (47) total dissolved solids (TDS) concentrations, 45 samples (or 96%) exceeded the sample standard of 331 mg/L (most exceeded the minimum sample standard of 700 mg/L), and the mean (762.6 mg/L) exceeded the yearly mean standard (259 mg/L). Of the forty-four (44) chloride concentrations, thirty-nine (39) samples (or 87%) exceeded the sample standard of 101 mg/L (most exceeded the minimum sample standard of 250 mg/L), and the mean (220.9 mg/L) exceeded the prescribed yearly mean standard (72 mg/L). Of the 44 sulfate concentrations, forty-two (42) samples (or 95%) exceeded the sample standard is 78 mg/L (most exceeded the minimum sample standard of 250 mg/L), and the mean (159.6 mg/L) exceeded the yearly mean standard (78 mg/L). The PBCR beneficial use is not supported. Of the twenty-nine (29) enterococci concentrations, 5 samples exceeded the prescribed screening level of 406 cfu/100mL, and the geometric mean (46.0 cfu/100mL) exceeded the prescribed mean standard of 33 cfu/100mL. This segment of the Red River is not nutrient-threatened. The total phosphorus and nitrate/nitrite median values were below the threshold medians of 0.36 mg/L and 5.0 mg/L, respectively.

LITERATURE CITED

- APHA. 1995. Standard methods for the examination of water and wastewater. 19th ed. American Public Health Association, Washington D.C.
- Carlson, R.E. 1977. "A trophic state index for lakes". *Limnology and Oceanography*. 22:361-369.
- Hounslow, A.W., 1995, *Water Quality Data Analysis and Interpretation*: Lewis Publishers, Boca Raton, FL.
- Mueller, D.K., Hamilton, P.S., Helsel, D.R., Hitt, K.J., and Ruddy, B.C., 1995, *Nutrients in Ground Water and Surface Water of the United States--An Analysis of Data Through 1992*: U.S. Geological Survey Water-Resources Investigations Report 95-4031, 74 p.
- Oklahoma Department of Tourism and Recreation. "Oklahoma Statewide Comprehensive Outdoor Recreation Plan - This Land is Your Land". 1987. 216pp.
- Oklahoma Water Resources Board. "Oklahoma Water Atlas". May 1990. 360pp.
- Oklahoma Water Resources Board. "Update of the Oklahoma Comprehensive Water Plan 1995". February 1997. 148pp.
- Oklahoma Water Resources Board. "Use Support Assessment Protocols". December 2001-2002. OAC 785:46
- United States Environmental Protection Agency. "The Lake and Reservoir Restoration Guidance Manual". August 1990. 326pp.
- Wetzel, Robert G. "Limnology – Second Edition". 1983. 767pp.

INDEX

A

Arkansas River at Bixby	103
Arkansas River near Haskell	104
Arkansas River near Moffett	105
Arkansas River near Muskogee (at US 62)	106
Arkansas River near Ralston	45
Arkansas River near Sand Springs	107

B

Baron Fork near Eldon	108
Beaver River near Beaver	83
Beaver River near Fort Supply	84
Beaver River near Gate	85
Beaver River near Guymon	86
Beaver River near Laverne	87
Beaver River near Turpin	88
Big Cabin Creek near Big Cabin	53
Bird Creek near Catoosa	54
Black Bear Creek at Pawnee	46
Blue River near Durant	144
Brushy Creek near Haileyville	71

C

Canadian River near Bridgeport	72
Canadian River near Calvin	73
Canadian River near Konawa	74
Canadian River near Purcell	75
Canadian River near Taloga	76
Canadian River near Whitefield	77
Caney Creek near Barber	109
Caney River near Ramona	55
Chickaskia River near Blackwell	47
Cimarron River near Ames	34
Cimarron River Near Buffalo	35
Cimarron River near Dover	36
Cimarron River near Guthrie	37
Cimarron River near Mocane	30
Cimarron River near Oilton	38
Cimarron River near Ripley	39
Cimarron River near Waynoka	40
Clear Boggy Creek near Caney	145

D

Deep Fork River near Beggs	89
Deep Fork River near Stroud	90

E

East Cache Creek near Walters	129
Elk Creek near Roosevelt	121
Elk River near Tiff City, Missouri	56
Elm Fork of the Red near Granite	122

F

Flint Creek near Flint, OK	110
Fourche-Maline Creek near Red Oak	111

G

Glover River near Glover	146
--------------------------------	-----

H

Honey Creek near Grove	57
------------------------------	----

I

Illinois River near Tahlequah	112
Illinois River near Watts	113

K

Kiamichi River near Antlers	147
Kiamichi River near Big Cedar	148
Kiamichi River near Fort Towson	149
Kiamichi River near Tuskahoma	150

L

Lee Creek near Short	114
Little River near Cloudy	151
Little River near Holly Creek	152
Little River near Sasakwa	78

M

Mountain Fork River near Eagletown	153
Mountain Fork River near Smithville	154
Mud Creek near Courtney	130
Muddy Boggy Creek near Atoka	155
Muddy Boggy Creek near Unger	156

N

Neosho River near Chouteau	58
Neosho River near Commerce	59
Neosho River near Connor Bridge	60
Neosho River near Langley	61

North Canadian River at Dustin	91
North Canadian River near El Reno	92
North Canadian River near Harrah	93
North Canadian River near Seiling	94
North Canadian River near Shawnee	95
North Canadian River near Watonga	96
North Canadian River near Wetumka	97
North Canadian River near Woodward	98
North Fork of the Red near Carter	123
North Fork of the Red near Headrick	124

P

Poteau River near Heavener	115
Poteau River near Pocola	116

R

Red River near Davidson	131
Red River near Harris	157
Red River near Hugo	158
Red River near Terral	132

S

Sager Creek near West Siloam Springs	117
Salt Fork of the Arkansas near Ingersoll	48
Salt Fork of the Arkansas River near Tonkawa	49
Salt Fork of the Red River near Elmer	125
Sandy Creek near Eldorado	133
Skeleton Creek near Lovell	41
Spring Creek near Murphy	62
Spring River near Quapaw	63

V

Verdigris River near Inola	64
Verdigris River near Keetonville	65
Verdigris River near Lenap	66
Verdigris River near Wagoner	67

W

Washita River near Alex	134
Washita River near Anadarko	135
Washita River near Cordell	136
Washita River near Durwood	137
Washita River near McClure	138
Washita River near Pauls Valley	139
West Cache Creek near Taylor	140
Wolf Creek near Fort Supply	99