

2012 Oklahoma Lakes Report

Beneficial Use Monitoring Program

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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 WQS, and facilitate the prioritization of pollution control activities.

It is the intent of this Oklahoma Water Resources Board (OWRB) report to advance concepts and principles of the Oklahoma Comprehensive Water Plan (OCWP). Consistent with a primary OCWP initiative, this and other OWRB technical studies provide invaluable data crucial to the ongoing management of Oklahoma's water supplies as well as the future use and protection of the state's water resources. Oklahoma's decision-makers rely upon this information to address specific water supply, quality, infrastructure, and related concerns. Maintained by the OWRB and updated every 10 years, the OCWP serves as Oklahoma's official long-term water planning strategy. Recognizing the essential connection between sound science and effective public policy, incorporated in the Water Plan are a broad range of water resource development and protection strategies substantiated by hard data – such as that contained in this report – and supported by Oklahoma citizens.

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 OWRB with input and concurrence of Oklahoma's other environmental agencies. Specifically, USAPs establish a consistent method to determine if beneficial uses assigned for individual waters through Oklahoma Water Quality Standards (WQS) are being supported. The legitimacy of data analyzed following protocols other than those outlined in the USAP (or the Oklahoma Continuing Planning Process (CPP) document where the USAP is silent) for use support determination is not appropriate. 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.

The OWRB has worked diligently to follow the guidelines outlined in the USAP. Recommendations in this report should be consistent with recommendations for the state's 303(d) list. Although certain inconsistencies do exist, every effort has been taken to assure compatibility between the BUMP Report and the 303(d) list. Issues regarding stream/lake segmenting additional data from non-BUMP sources and unique non-representative conditions all affect the impairment decision-making process.

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 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, WQS 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 (BUMP) under the direction of the Oklahoma Water Resources Board, who promulgates the WQS and WQS Implementation Rule. BUMP brings the OWRB's overall water quality management program full circle. From the promulgation of WQS, to permitting and enforcement of permits stemming from WQS-established criteria, to nonpoint 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 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 data collected as part of the comprehensive, long-term program. As the program has matured, the BUMP report has become one of the most important annually published documents in Oklahoma.

Beneficial Use Monitoring Program Components

Monitoring Rivers & Streams - The OWRB is currently monitoring approximately 84 stations on a 6-week rotation. Fixed station monitoring is based largely upon the 84 planning basins as outlined in the Oklahoma Comprehensive water Plan (OCWP). In general, at least one sample station is located at the terminal end of each of the planning basins. The OWRB also conducts on-going special studies as well as 25-30 probabilistic monitoring stations annually.

Fixed Station Load Monitoring – The OWRB is currently working with several partners including the US Geological Survey (USGS), US Army Corps of Engineers (USACE), Grand River Dam Authority (GRDA) and National Weather Service to conduct flow monitoring on all our fixed station sites that are not part of the State of Oklahoma/USGS Cooperative Gaging Network. 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.

Fixed Station Lakes Monitoring – As part of BUMP, the OWRB conducts sampling on lakes and reservoirs across the State of Oklahoma. To accomplish this task, the OWRB has taken a probabilistic survey approach for the lakes monitoring program. This survey design allows the state's objectives to be met as well as ensure various sized waterbodies are represented adequately. The survey population includes all lakes above 50 surface acres, which encompasses approximately 206 different waterbodies. The population is then stratified into two groups – lakes greater than 500 surface acres and those below 500 surface acres. The greater than 500 surface acres group includes 68 lakes, of which approximately one-fifth are monitored annually (quarterly samples) on a randomized draw. They are then monitored again during a subsequent year in the 5-year rotation, so that each lake greater than 50 surface acres is sampled 2 non-consecutive years during each 5 year rotation. The lakes managed by our Federal partners, the USACE and Bureau of Reclamation (BoR) are included in the 68 large lakes. Additionally, ten randomly drawn lakes of less than 500 surface acres are sampled annually (quarterly samples) over the 5 year sample frame. Many of these smaller lakes have not been sampled historically through BUMP and include small municipal water supplies.

The OWRB works with other agencies, such as the USACE, for inclusion of additional information on waterbodies managed by the Corps. Data collected consists primarily of water chemistry, nutrients, and chlorophyll-a information. In general, a minimum of three to five stations per reservoir are sampled depending on the size of the reservoir. Stations are located such that they represent the lacustrine, transitional, and riverine zones of the lake. On many reservoirs, additional sites are monitored, including major arms of the reservoir as appropriate. Water quality parameters have been added to the lakes sampling effort over the years to enhance program ability to make use support determinations.

Fixed Station Groundwater Monitoring – This new program was made possible as result of a \$1,500,000 increase in funding received from the Oklahoma Legislature for water quality/quantity monitoring based on recommendations of the 2012 Update of the Oklahoma Comprehensive Water Plan. These additional monies are being utilized to restore funding levels of the Beneficial Use Monitoring Program as well as to implement the new groundwater program. The new groundwater program prioritizes efforts on Oklahoma's 21 major groundwater aquifers and will be phased in over the next 4 years. This baseline period will focus

on 4-6 aquifers per year and will assess concentrations of nutrients, metals and major ion species. By design, a minimum of 30 wells will be used to collect water quality data from each aquifer. When fully implemented, there will be 750 wells in the statewide groundwater quality network statewide. In addition, the OWRB's annual groundwater level measurement program will be doubled in capacity (from around 530 to 1100 wells) and will be spatially redistributed. For ½ of the water level network, manual measurements will become tri-annual events. Additionally, over the 4 year baseline period, the OWRB plans to install 30-50 continuous water level recorders to obtain daily or hourly measurements that are more sensitive to detecting seasonal changes (brought on by drought or variable climate conditions) than can be obtained by annual measurements. Update: The data collection phase of a groundwater assessment pilot project on the Rush Springs Aquifer was completed in April 2013. Analytical results will be available in July of 2013.

Intensive Investigations – Historically, work occurred in the area in the early years of the program, but no work of this nature has occurred in the last 5-6 years. Work was discontinued to address other monitoring needs as the costs to operate the program have continued to increase since program inception.

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 BUMP 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 had 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 lake can range from oligotrophic (low biological productivity) to hypereutrophic (excessive biological productivity). In general, the more productive a lake is 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 OWRB was able to obtain a one-time federal CWA 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 BUMP.

The OWRB has developed USAPs 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 OWRB 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 has been 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 Lakes Sampling Efforts

Data was collected by the OWRB on a quarterly basis for 33 lakes from the October of 2011 through August of 2012. The results of the sampling efforts are summarized below. As shown in Figure 1, 30% of lakes sampled were determined to have serious water quality nutrient concerns based upon their classification as hypereutrophic. Lakes classified as hypereutrophic have the potential for beneficial use impairments due to low dissolved oxygen concentrations, taste and odor problems, nutrient inputs, excessive productivity, and general lake aesthetics. Hypereutrophic waters are adversely impacted primarily by excessive nutrients and primary productivity and should be monitored intensively in the future to document the presence or absence of "beneficial use impairments." Forty-three percent of the lakes sampled were classified as eutrophic, characterized by high primary productivity and nutrient rich conditions. A eutrophic lake also has the potential for beneficial use impairments, though the potential is less than for hypereutrophic waters. Mesotrophic waters have a small potential for beneficial use impairments and overall are representative of good water quality, low to moderate levels of nutrients, and productivity. Of the lakes sampled, 24% were classified as mesotrophic. Oligotrophic waters have very low levels of primary productivity and usually low concentrations of nutrient constituents. In Oklahoma, oligotrophic waters are either very clear waters with little nutrient inputs and genuinely good water quality conditions, or the waters are very turbid with poor water clarity with the absence of sufficient ambient light inhibiting lake productivity. Only one of the 33 lakes sampled was classified as oligotrophic. Based on the results for trophic state index calculations. 73% of the waters sampled were exhibiting high to excessive levels of primary productivity and nutrient rich conditions characteristic of eutrophic and hypereutrophic waterbodies.

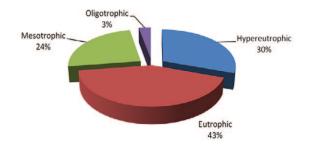


Figure 1 - Trophic Status of Lakes for Sample Year 2011-2012

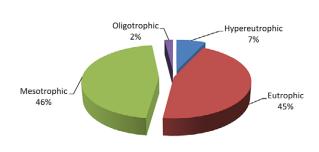


Figure 2. Lake Surface Acres by Trophic Status for Lakes Sampled in 2011-2012

The distribution changes somewhat when the lake surface acres for each are classified into the corresponding trophic status. Results in Figure 2 are different than Figure 1, indicating the lakes classified as eutrophic were larger in surface acres than the lakes classified as mesotrophic and hypereutrophic. Lake trophic status, when broken out by the number of lake surface acres in each trophic state category, finds 45% of all surface acres sampled were eutrophic, 46% mesotrophic, 7% hypereutrophic, and 2% oligotrophic. One of the largest lakes sampled in 2011-2012, Lake Eufaula, was classified as mesotrophic, which skewed the surface acres percentages heavily towards the mesotrophic category. In general, the larger lakes in the state have more extensive watersheds and are generally deeper than smaller lakes, which increase the likelihood of beneficial use impairments being present since a larger surface area is available. During stratification, the larger/deeper lakes have a greater portion of the water column that becomes anoxic for long periods of time, which also increases the potential for nutrient release from sediments. It is obvious that many lakes in Oklahoma are experiencing adverse environmental impacts. However, with the available data it is not possible to adequately assess if lakes are meeting their assigned beneficial uses as they relate to nutrients. At this time, 21 lakes have been identified by the OWRB as "Nutrient-Limited Watersheds" (NLW) in the WQS and efforts should be taken to definitively determine if NLW waters are meeting their uses through initiation of a nutrient impairment study to definitively determine the presence or absence of nutrient impairments in our NLW lakes. NLW are lakes with a TSI ≥ 62, based on Carlson's trophic state classification system and using chlorophyll-a as the trophic state indicator. Lakes sampled as part of BUMP, their trophic status, and potential threats or impairments are listed in Table 1. Information contained in this table represents the most recently approved Integrated Water Quality Monitoring and Assessment Report (2010), which is the State's impaired water list.

Table 1. Lakes Sampled by BUMP with Associated Use Attainment Status.

Lake Name	County	W.Q. Segment #	Last Year Sampled	FWP	PPWS	PBCR	AG	AES
American Horse	Blaine	520620	2007-2008	D.O.				
Arbuckle	Murray	310800	2010-2011	D.O.				
Arcadia	Oklahoma	520710	2006-2007	Turbidity	Chlor-a			
Ardmore City	Carter	310800	2006-2007	D.O.				
Atoka	Atoka	410400	2011-2012	D.O., Turbidity				True Color
Bellcow	Lincoln	520700	2011-2012	Turbidity				
Birch	Osage	121300	2010-2011	pH, D.O.				
Bixhoma	Wagoner	120410	2005-2006	D.O.				
Bluestem	Osage	121300	2011-2012	D.O., Turbidity		Ent.		
Boomer	Payne	620900	2008-2009	D.O., Turbidity		Ent. /		
Broken Bow	McCurtain	410210	2010-2011	pH, D.O				
Brushy Creek	Sequoyah	220200	2007-2008	pH, D.O		Ent.		
Burtschi	Grady	31082002	2005-2006	рН				NLW
Canton	Blaine	720500	2011-2012	Turbidity				
Carl Albert	Latimer	410310	2007-2008	pH, D.O				
Carl Blackwell	Payne	620900	2010-2011	D.O., Turbidity	Chlor-a			True Color
Carter	Marshall	310800	2007-2008	D.O.		Ent.		
Cedar (Mena)	LeFlore	410210 410300	2010-2011	pH, D.O				
Chandler	Lincoln	520700	2007-2008	D.O., Turbidity	Chlor-a	Ent.		
Chickasha	Caddo	310830	2010-2011	D.O.			Sulfates	NLW
Claremore	Rogers	121500	2005-2006	D.O.	Chlor-a			NLW
Clear Creek	Stephens	310810	2010-2011					
Cleveland City	Pawnee	621200	2006-2007	D.O., Turbidity				True Color
Clinton	Washita	310830	2003-2004	Turbidity	Chlor-a			True Color NLW
Coalgate City	Coal	410400	2006-2007	D.O., Turbidity				True Color
Comanche	Stephens	311300	2010-2011	D.O.				
Copan	Washington	121400	2007-2008	D.O., Turbidity	Chlor-a	E. coli		True Color
Crowder	Washita	310830	2005-2006	D.O., Turbidity	Chlor-a			NLW
Cushing Municipal	Payne	620900	2011-2012	Turbidity				True Color
Dave Boyer (Walters)	Cotton	311300	2007-2008	Turbidity				True Color
Dripping Springs	Okmulgee	520700	2011-2012	D.O., Turbidity		Ent.		True Color
Duncan	Stephens	310810	2006-2007					
El Reno	Canadian	520530	2011-2012	Turbidity				NLW
Elk City	Beckham	311500	2005-2006	Turbidity				NLW
Ellsworth	Comanche	311300	2011-2012	D.O., Turbidity	Chlor-a	Ent.		
Elmer Thomas	Comanche	311300	2006-2007	D.O.				
Etling, Carl	Cimarron	720900	2003-2004	Turbidity pH				NLW
Eucha	Delaware	121600	2006-2007	D.O.	Chlor-a			NLW
Eufaula	Haskell	220600 520700 520500	2011-2012	D.O., Turbidity				True Color
Fairfax City	Osage	621200	2010-2011	D.O.				
Fort Cobb	Caddo	310830	2011-2012	Turbidity		Ent.		NLW
Fort Gibson	Cherokee	121600	2006-2007	D.O.				NLW

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Lake Name	County	W.Q. Segment #	Last Year Sampled	FWP	PPWS	PBCR	AG	AES
Fort Supply†	Woodward	720500	2010-2011	Turbidity	Chlor-a			NLW
Foss	Custer	310840	2010-2011					
Frederick	Tillman	311310	2006-2007	Turbidity				True Color
Fuqua	Stephens	310810	2010-2011	Turbidity				
Grand Lake	Mayes	121600	2008-2009	D.O., Turbidity				
Great Salt Plains	Alfalfa	621010	2011-2012	Turbidity		Ent.		NLW
Greenleaf	Muskogee	120400	2011-2012	D.O., Turbidity	Chlor-a			
Guthrie□	Logan	620910	2005-2006		Chlor-a			NLW
Healdton City	Carter	311100	2005-2006	Turbidity				True Color
Hefner	Oklahoma	520520 520530	2010-2011	D.O.				
Henryetta♦	Okmulgee	520700	2011-2012	Turbidity	Lead			True Color
Heyburn	Creek	120420	2010-2011	D.O., Turbidity		Ent.		True Color
Holdenville	Hughes	520800	2006-2007	D.O., Turbidity	Chlor-a			
Hominy Municipal	Osage	121300	2006-2007	D.O.				
Hudson (Bartlesville)	Osage	121400	2011-2012	D.O. Turbidity				
Hudson (Markham Ferry)	Mayes	121600	2011-2012	D.O.				
Hugo	Choctaw	410300	2011-2012	Turbidity				True Color
Hulah	Osage	121400	2011-2012	Turbidity				True Color NLW
Humphreys	Stephens	310810	2011-2012	D.O.	Chlor-a	Ent. / E. coli		
Jean Neustadt	Carter	310800	2011-2012	D.O.				
John Wells	Haskell	220200	2008-2009	D.O.		Ent.		
Kaw	Osage	621210	2007-2008	D.O., Turbidity				
Keystone	Tulsa	621200 620900	2011-2012	D.O., Turbidity				
Konawa	Seminole	520600	2011-2012					
Langston	Logan	620900	2010-2011			Ent.		
Lawtonka	Comanche	311300	2010-2011		Chlor-a			
Liberty	Logan	620910	2005-2006	D.O.	Chlor-a	Ent.		
Lloyd Church	Latimer	220100	2005-2006	pH, D.O				
Lone Chimney	Pawnee	621200	2010-2011	D.O.				
Lugert-Altus	Greer	311500 311510	2010-2011					
Maysville / Wiley Post	McClain	310810	2007-2008	D.O., Turbidity				True Color
McAlester	Pittsburg	220600	2008-2009	Turbidity				True Color
McGee Creek	Atoka	410400	2008-2009	pH, D.O				
McMurtry	Noble	620900	2011-2012	D.O., Turbidity				
Meeker	Lincoln	520700	2008-2009	Turbidity				
Murray	Love	311100	2011-2012	D.O.				
Nanih Waiya	Pushmataha	410310	2007-2008			Ent.		
New Spiro	LeFlore	220100	2005-2006	D.O.	Chlor-a			NLW
Okemah	Okfuskee	520700	2011-2012	D.O., Turbidity				
Okmulgee	Okmulgee	520700	2010-2011	D.O.				

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Lake Name	County	W.Q. Segment #	Last Year Sampled	FWP	PPWS	PBCR	AG	AES
Oologah	Rogers	121510	2011-2012	D.O., Turbidity				
Overholser	Oklahoma	520520 520530	2011-2012	Turbidity			Sulfates	NLW
Ozzie Cobb	Pushmataha	410300	2007-2008	D.O., pH, Turbidity				NLW
Pauls Valley City	Garvin	310810	2007-2008	Turbidity				True Color
Pawhuska	Osage	121600	2007-2008	D.O.			Sulfates	
Pawnee	Pawnee	621200	2006-2007	Turbidity	Chlor-a			True Color
Perry	Noble	621200	2006-2007	Turbidity				True Color
Pine Creek	McCurtain	410210	2010-2011	pH, D.O				
Ponca	Kay	621200	2010-2011	D.O.	Chlor-a	Ent.		
Prague City	Lincoln	520510	2007-2008	D.O.				
Purcell	McClain	520610	2007-2008	D.O.				
Raymond Gary	Choctaw	410300	2008-2009	pH, D.O				
R.C. Longmire	Garvin	310810	2011-2012	D.O.		Ent.		
Robert S. Kerr	Sequoyah	220200	2010-2011	Turbidity				True Color
Rock Creek	Carter	310800	2008-2009	D.O., Turbidity				
Rocky (Hobart)	Washita	311500	2011-2012	Turbidity	Chlor-a	Ent		NLW
Sahoma	Creek	120420	2005-2006	D.O., Turbidity				
Sardis	Pushmataha	410310	2010-2011	D.O., Turbidity		Ent.		
Shawnee Twin #1	Pottawatomie	520510	2010-2011	D.O.				
Shawnee Twin #2	Pottawatomie	520510	2010-2011	D.O., Turbidity				
Shell	Osage	120420	2008-2009	D.O.				
Skiatook	Osage	121300	2011-2012	D.O.				
Sooner	Pawnee	621200	2006-2007	D.O.			Sulfates	
Spavinaw	Mayes	121600	2011-2012	D.O.	Chlor-a			NLW
Sportsman	Seminole	520500	2007-2008	D.O., Turbidity		E. coli		True Color
Stanley Draper	Cleveland	520810	2005-2006	Turbidity				
Stilwell City	Adair	220200	2005-2006	D.O.				
Stroud	Creek	520700	2011-2012	D.O.				
Talawanda #1	Pittsburg	220600	2010-2011	pH, D.O				
Talawanda #2	Pittsburg	220600	2010-2011	D.O.				
Taylor (Marlow)	Grady	310840	2008-2009	Turbidity				NLW
Tecumseh	Pottawatomie	520510	2007-2008	Turbidity				True Color
Tenkiller Ferry	Sequoyah	121700	2011-2012	D.O.	Chlor-a			NLW
Texoma	Bryan	311100 310800	2010-2011	D.O., Turbidity				
Thunderbird	Cleveland	520810	2006-2007	D.O., Turbidity	Chlor-a			NLW
Tom Steed □	Kiowa	311500	2006-2007	Turbidity	Chlor-a			
Vanderwork	Washita	310830	2007-2008	D.O.		Ent.		NLW
Vincent, Lloyd	Ellis	720500	2010-2011	D.O.				
W.R. Holway	Mayes		2010-2011	D.O.				
Waurika	Jefferson	311210	2007-2008	Turbidity	Chlor-a			
Waxhoma	Osage	121300	2005-2006	D.O.				
Wayne Wallace	Latimer	220100	2011-2012	pH, D.O				
Webbers Falls	Muskogee	121400	2010-2011	Turbidity		Ent.		

Table 1. Lakes Sampled by BUMP with Associated Use Attainment Status.

Lake Name	County	W.Q. Segment #	Last Year Sampled	FWP	PPWS	PBCR	AG	AES
Wes Watkins	Pottawatomie	520510	2010-2011					
Wetumka	Hughes	520500	2006-2007	D.O., Turbidity		Ent.		
Wewoka	Seminole	520500	2008-2009	Turbidity				True Color
Wister♣	LeFlore	220100	2010-2011	D.O., pH, Turbidity	Chlor-a	Ent.		True Color NLW
Yahola •	Tulsa	121300	1998-1999					

Symbols:

- † Lake Listed Based Upon 1995 U.S. Army Corps. Of Engineers Intensive Study
- Lake Listed Based Upon OWRB Phase I Clean Lakes Study
- Lake does not fit classic definition of oligotrophy. Inorganic particulates are limiting biological productivity
- Lake was not assessed through the BUMP, but through another OWRB project
- These Lakes will be recommended for NLW listing as part of the next WQS revision process

Acronyms: NLW = Nutrient Limited Water; D.O. = Dissolved Oxygen; ENT. = Enterococci Bacteria

Assigned WQS Beneficial Uses: FWP = Fish & Wildlife Propagation; AES = Aesthetics; PPWS = Public & Private Water Supply; AG = Agriculture;

PBCR = Primary Body Contact Recreation

Note

Red colored parameter entries indicate not supporting.

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 ground waters 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 (ODWC) lakes, and rivers and streams throughout the state, which infuse millions into state economy 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). According to a 2011 federal study, fishing activities alone contribute \$730,503,000 dollars to Oklahoma's economy, not including the substantial ancillary costs associated with that extremely popular sport.

In addition to surface waters, abundant groundwaters also fuel the state's economy, serving as supply for thousands of municipalities, rural water districts, industrial facilities, and agricultural operations. According to the 2012 Update of the Oklahoma Comprehensive Water Plan (OCWP), groundwater represents the primary water supply for hundreds of cities and towns across Oklahoma and comprises 44 percent of the total water used in the state each year. 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 OWQS serving as the cornerstone of the state's water quality management programs. The 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 WQS as outlined by the OWRB through development of implementation plans. Protecting our waters is a cooperative effort between many state agencies, and because the WQS 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 WQS are housed in OAC 785:45 and consist of three main components: beneficial uses, criteria to protect beneficial uses, and an anti-degradation policy. An additional component, which is not directly part of the WQS but necessary to water resource protection, is a monitoring program. A monitoring program is required in order to ensure that beneficial uses 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.

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 WQS Implementation, allows the WQS 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.

With the development of BUMP, the need for protocols to determine beneficial use impairment was identified. Development of these protocols 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 concerned parties, developed USAPs to be used by all parties for assessing if waters were meeting their assigned beneficial uses. In addition, protocols were developed

that 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 WQS and in developing appropriate numerical and narrative criteria for future WQS documents. It is essential that our waters meet their assigned uses and that WQS implementation protocols are appropriate. Please see Appendix A 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 every year since then to refine the existing protocols and pursue the addition or modification of USAP protocols to further enhance its utility and effectiveness.

Work to be performed towards development and implementation of the critical fourth component of the WQS program, monitoring, 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" [305(b) Report and 303(d) list], CWA §319 Nonpoint Source (NPS) Assessment, and §314 Lake Water Quality Assessment (LWQA)

Background and 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, the WQS process, lake trophic status determination, determining water quality impacts from point source dischargers, stream flow measurements, documenting 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 historically conducted for lakes and efforts that are currently ongoing for lakes and streams across Oklahoma as part of a comprehensive, long-term, statewide Beneficial Use Monitoring Program (BUMP). The goal of the BUMP is 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.

LAKES MONITORING PROGRAM

Lake trophic status is important from a water quality perspective because it is an indicator of potential nutrient impacts to a lake. In general, the higher the trophic state index (TSI) of a lake, the more nutrient loading into the system is occurring and the more productive the lake. One outcome of historical trophic assessment activity on Oklahoma's lakes was the prioritization of lakes most in need of remediation. Outcomes have included in-lake restoration activities or implementation of best management practices in the lake watershed. Results from the BUMP sampling effort should be viewed as a means to make relative comparisons between lakes and to determine beneficial use impairments based on USAP, detailed in Oklahoma Administrative Code (OAC) 785:46-15-5. Lakes with relatively poor water quality are identified, but that does not necessarily mean that these lakes have beneficial use impairments. Some lakes, due to the nature of their watershed and basin morphometry, may never attain the water quality of some of the state's more pristine waters. For example, an expectation that Broken Bow Lake and Great Salt Plains can attain the same level of water quality would be unrealistic, because these two lakes exhibit great differences in basin morphometry and substrate material and are located in totally different parts of the state. Soil types such as clays have a very small particle size such that the clay particulates are constantly re-suspended in the lake water column and never settle out, which is evident in some lakes across the state. In addition, the shallow nature of many of our lakes contributes to lake bottom sediments being resuspended in the water column due to wind action. Because so many factors affect the water quality of any given lake, comparing lakes from various parts of the state should only be viewed as a relative comparison.

For the 2011-2012 sampling season, BUMP identified lakes that had beneficial use impairments or threats. However, a data set to truly determine which lakes are not supporting their beneficial uses due to excess nutrients does not currently exist, nor have nutrient criteria for lakes been promulgated into the WQS. The OWRB has previously identified 21 lakes that are listed in the OWQS as NLWs. More intensive work on these lakes is required before a definitive assessment of nutrient impairment or non-support can be made. The OWRB recommends a Nutrient Impairment Study (NIS) be performed on identified NLW lakes. An NLW is defined in the WQS as "a watershed of a waterbody with a designated beneficial use which is adversely affected by excess nutrients as determined by Carlson's TSI (chlorophyll-a) of 62 or greater." If a lake is identified as having a TSI ≥62 based on chlorophyll-a, and the minimum data requirements are met (n=10 on lakes with <250 surface acres; n=20 on lakes with >250 surface acres), it is recommended for listing as an NLW through the WQS setting process. Currently, the parameters that are analyzed to determine whether or not there is beneficial use impairment or threat include turbidity, true color, dissolved oxygen, metals, chloride, sulfates, biological collections, total dissolved solids, and pH values. A brief discussion on lake monitoring procedures and methods is provided below with data results following.

Materials & Methods for Lake Sampling

Data was collected quarterly on 33 lakes across the state from the fall of 2011 through the summer of 2012. Vertical water quality profiles were recorded at one meter intervals from the lake surface to the lake bottom for the following parameters: temperature, pH, dissolved oxygen, salinity, dissolved oxygen % saturation, oxidation-reduction potential (redox), specific conductivity, and total dissolved solids (TDS). A vertical profile was recorded for at least three sites per lake: in the central pool area near the dam (lacustrine zone), in the upper portion of the lake and in the major arms of the water body (riverine zone), and in the area between the lacustrine zone and the riverine zone (transitional zone). Turbidity values for each surface site were measured using a HACH portable turbidimeter. For lakes greater than 250 acres in size with only three routine chemical monitoring stations, additional sample sites have been established to ensure minimum data requirements are met. Secchi disk depths (in centimeters) were determined at all routine water chemistry sample sites. Water quality samples were collected at each site at the surface and

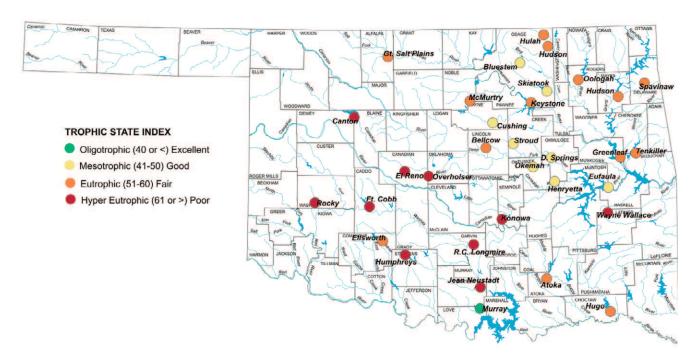


Figure 3. Lakes sampled by the Beneficial Use Monitoring Program in 2011-2012.

one meter from the lake bottom at site 1, the dam, and preserved for analysis of nitrate nitrogen, nitrite nitrogen, ammonia nitrogen, Kjeldahl nitrogen, ortho-phosphorus, total phosphorus, true color, chloride, sulfate, and total alkalinity. OWRB staff calculated total nitrogen based on laboratory-derived values. A Van Dorn sampler was used to collect samples near the lake bottom and grab samples were collected at the lake surface. At the dam site, a churn-splitter was used to split the surface sample for Quality Assurance (QA) purposes. Surface samples were also collected at all sites and analyzed for chlorophyll-a and pheophytin concentrations. Additional chlorophyll-a samples were collected for QA purposes. Filtration and grinding (extraction of the chlorophyll-a collected in a filter with acetone) of the samples was performed immediately upon return to the OWRB lab. All chlorophyll-a samples were filtered, as stated in Standard Methods (APHA 1995), within 24 hours and stored for no more than 30 days in the freezer.

Sample Lake Locations

Lakes sampled by the BUMP Lakes staff in 2011-2012 are shown in Figure 3. Lake locations are identified on the map and are shaded in different colors based on their calculated TSI values.

Lake Data Analysis Protocols

There are numerous methods available for determining the trophic status of lakes. The majority of the trophic state models rely on a mathematical calculation to generate a single numerical value that is then categorized in an assessment hierarchy. Numerous chemical, and in some cases biological data are utilized in the various trophic indices, which characterize the "trophic status" of a water body. Some of the commonly used water quality parameters utilized in trophic state indices include chlorophyll-a, secchi disc depth, total phosphorus, total nitrogen, aquatic macrophytes, organic nitrogen, turbidity, lake user surveys, and hypolimnetic oxygen depletion rates, etc. Most indices use one or more variables in the determination of trophic status with varying degrees of applicability to systems. The OWRB has traditionally used Carlson's Trophic State Index (TSI) (Carlson, 1977) for reporting purposes, utilizing chlorophyll-a concentrations in calculating the lake trophic status. Carlson's TSI equation using chlorophyll-a (in $\mu g/L$) as the trophic status indicator is as follows:

$TSI = 9.81 \times In(chlorophyll-a) + 30.6.$

In 1998, 1999, and 2000, the TSI was calculated using chlorophyll-a concentrations from the growing season (spring and summer only). Beginning in sample year 2001, an annualized trophic assessment was made as this was determined to be a more accurate reflection of trophic conditions for each. In order to make beneficial use determinations, minimum data requirements must be met as listed in OAC 785:46-15-3. A minimum of 20 samples is required on lakes greater than 250 surface acres, and a minimum of 10 samples on lakes with 250 surface acres and less. In 2001-2002, sites were added for chlorophyll-a and turbidity collections on lakes greater than 250 surface acres, in order to meet the minimum data requirements annually. Although data can be aggregated and historical values used, there was a concern in using data that was collected in the summer only as this would bias the data. An analysis of the limnological data collected on lakes is performed to determine the trophic state of each lake monitored. Chlorophyll-a concentrations for each lake sample site are determined and all values are averaged for each lake for all four sampling quarters. This annual chlorophyll-a value is then used in Carlson's TSI equation to determine trophic status of the lake. Through use of this technique the presence of localized trophic conditions are minimized (i.e. the effects of a single elevated chlorophyll-a value is minimized in the calculation of the TSI). The derived TSI represents an accurate assessment of the water quality of the as a whole and individual isolated areas that may be impacted due to eutrophication will be minimized in the reported TSI. A list of lake trophic state categories and corresponding TSI numerical values are displayed in Table 2. There are other descriptive terms and subset categories for trophic status, like dystrophic; however, Carlson's TSI has four major categories and these will be used to describe lake trophic status. Further

Table 2. Lake Trophic State Categories.

Carlson TSI No.	Trophic State	Definition
≤ 40	Oligotrophic	Low primary productivity and/or low nutrient levels
41 - 50	Mesotrophic	Moderate primary productivity with moderate nutrient levels
51 – 60	Eutrophic	High primary productivity and nutrient rich
≥ 61	Hypereutrophic	Excessive primary productivity and excessive nutrients

discussion is included in each of the lake summaries as necessary. As stated earlier, prior to 2001, the TSI was based on growing season (spring and summer) chlorophyll-a concentrations. However, beginning in 2001, all TSI evaluations were based on an annualized chlorophyll-a value for each lake and comparisons to previous TSI calculations will be specified as annual, growing season, or summer only evaluations. Prior to the onset of BUMP collections, lakes were sampled only in the summer and therefore the TSI was typically much higher than the annual assessments that are being done currently.

The beneficial use support determinations for the lakes sampled were determined following guidelines outline in the USAP promulgated into OAC 785-46: Subchapter 15. In general, the USAP states that environmental data must be collected to take seasonal conditions into consideration. A minimum of 20 samples is required on lakes more than 250 surface acres to assess beneficial use support for water quality parameters such as dissolved oxygen, pH and temperature. In addition, data more than ten years old should not be used for use support purposes unless more recent data is not available. A minimum of 10 samples is required on lakes or lake-arms of 250 surface acres or less. Samples may be aggregated to meet the minimum data requirements. For some parameters such as metals, organic compounds, or toxics, fewer samples are required. Toxicants (metals and organics) require a minimum of 5 samples to determine use support, but 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 WQS by two or more orders of magnitude, then the use is determined to be "not supporting".

The USAP also addresses the issue of how the data should be used spatially for lake monitoring. In general, when determining what size area the data is representative of best professional judgment is used. Such things as major tributaries and major lake arms are considered when deciding the extent of the area that the data was applied to. Arms or portions of lake may be treated separately from the main body of a lake, however in most instances OWRB staff chose to deal with the lake as a single unit. Unless it was demonstrated to the contrary, a single site was not considered representative of an entire lake or an arm of the lake that was greater than 250 acres in size.

Default Protocols

USAP outlines the procedures for determining whether a set of data points for a particular variable support, partially 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.

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, turbidity samples collected monthly from January through December are considered unique samples, and consequently, are not aggregated into a single sample for analysis but are considered a fraction of the whole.

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 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 a geometric mean. Use support determination for long-term numerical variables requires a three-step process:

- 1. Samples for a particular variable are aggregated into a geometric mean,
- 2. The geometric mean is compared to the prescribed criterion or screening level, and
- 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.

Because the long-term average compares only one value (the geometric mean) to the prescribed criterion or screening level, it cannot be considered partially supporting. In most instances, at least 10 samples are required to calculate a geometric mean.

Assessment of Fish & Wildlife Propagation Beneficial Use Support

The Fish & Wildlife Propagation (FWP) beneficial use utilizes five different water quality variables to assess use support: dissolved oxygen (D.O.) concentration, toxicants, hydrogen ion activity (pH), and turbidity. For purposes of this report, only D.O., metals concentrations in the water column, pH, and turbidity will be used in the assessment.

The USAP for each parameter as it relates to USAP are located in OAC:45-5-12 and can be found on the OWRB website:

www.owrb.ok.gov/standards

Assessment of Agriculture Beneficial Use Support

The Agriculture 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 geometric mean of the samples using a long-term average numerical protocol. The sample standard for each variable is also compared to each sample using a short-term average numerical protocol. A description of the USAP for the Agriculture beneficial use can be found on the OWRB website:

www.owrb.ok.gov/standards

Assessment of Aesthetics Beneficial Use Support

The Aesthetics beneficial use is assessed using a couple of water quality parameters--true color and nutrients. The sample standard for each variable is compared to the each sample using a short-term average numerical protocol. Criteria are located in OAC 785:45-5-19 which can be found on the OWRB website:

www.owrb.ok.gov/standards

Assessment of Primary Body Contact Recreation (PBCR) Support

The PBCR beneficial use utilizes the following microorganisms to assess use support:, Escherichia coli (E. coli), and enterococci (Ent.). The criteria are located in OAC 785:45-5-16 and can be found on the OWRB website:

www.owrb.ok.gov/standards

Lake Monitoring Results & Discussion

A lake-wide annual average of the chlorophyll-a values was calculated for each lake and used in the final calculation of the TSI. A summary table is included (Table 3) to present the number of lakes and appropriate surface acre size for each of the four trophic categories in 2011-2012 as well as the percentages of the total. As shown in Table 3, ten lakes were hypereutrophic, fourteen were eutrophic, eight were mesotrophic, and one was oligotrophic. Of the total 262,207 surface acres sampled, 17,733 were classified hypereutrophic, 118,742 were classified as eutrophic, 120,004 were classified as mesotrophic and 5,728 acres were classified as oligotrophic. TSI results, county, surface area, and volume for lakes sampled in 2011-2012 are listed in Table 4.

Table 3. Summary of Lake Trophic Status Results

Trophic Status	Number of Lakes	Percent of Total Lakes	Surface Area (Acres)	Percent of Total Surface Acres
Hypereutrophic	10	30%	17,733	7%
Eutrophic	14	42%	118,742	45%
Mesotrophic	8	24%	120,004	46%
Oligotrophic	1	3%	5,728	2%
Totals =	33	100%	262,207	100%

Although TSI based on the chlorophyll-a concentration is used for BUMP, a comparison of TSI values calculated with total phosphorus and secchi disk depth was generated and displayed on Table 5. Data displayed is for the growing season using the various water quality parameters that can be used in calculating Carlson's TSI. The chlorophyll-a and phosphorus TSI calculations were derived through results of regression analysis relating secchi disk depth to the other two variables.

Calculations using secchi disk depth may not be a good parameter to use in highly colored or turbid reservoirs where turbidity is inorganic in nature. Both are common components of Oklahoma lakes. Additionally, phosphorus may not be an accurate variable to use in calculating the TSI in lakes that are not phosphorus-limited or those that are highly turbid due to clay particulates. Carlson (1977) stated chlorophyll-a seems to be the most acceptable parameter to use in calculating TSI, especially during the growing season, and for estimating algal biomass. In accordance with historical calculations at OWRB and Carlson's suggestion to measure chlorophyll-a, rather than secchi disk depth or total phosphorus, it is the variable utilized for BUMP's TSI calculations. The values displayed in Table 5 were calculated using lake-wide annual averages for all three parameters.

Using the chlorophyll-a methodology, four lakes were hypereutrophic, twenty- lakes were eutrophic, ten lakes were mesotrophic, and none were oligotrophic. Using total phosphorus and secchi disk depth in the TSI calculation produced a much different result although classification using these two variables is somewhat comparable to each other. Using the total phosphorus variable for TSI, six lakes were hypereutrophic,

Table 4. List of Lakes Sampled in Sample Year 2011-2012

Lake Name	County	Surface Area (acres)	Volume (ac-ft)	TSI	Year Sampled	Threats or Impairments	Carlson's TSI
Atoka	Atoka	5,700	125,000	58	2012	Chlor-a	Eutrophic
Bellcow	Lincoln	1,153	15,613	59	2012	Turbidity	Eutrophic
Bluestem	Osage	762	17,000	48	2012	Turbidity	Mesotrophic
Canton	Blaine	7,910	111,310	64	2012	Turbidity	Hypereutrophic
Cushing	Payne	591	3,304	50	2012	Turbidity	Mesotrophic
Dripping Springs	Okmulgee	1,150	16,200	46	2012	Turbidity	Mesotrophic
El Reno	Canadian	170	709	73	2012		Hypereutrophic
Ellsworth	Comanche	5,600	95,200	60	2012	Turbidity Chlor-a	Eutrophic
Eufaula	Haskell	105,500	2,314,600	50	2012	Turbidity	Mesotrophic
Ft. Cobb	Caddo	4,100	80,010	68	2012	Chlor-a/NLW	Hypereutrophic
Great Salt Plains	Alfalfa	8,690	31,240	57	2012	NLW	Eutrophic
Greenleaf	Muskogee	920	14,720	54	2012	Chlor-a	Eutrophic
Henryetta	Okmulgee	450	6,600	43	2012	Turbidity	Mesotrophic
Hudson (Bartlesville)	Osage	268	2,776	51	2012		Eutrophic
Hudson (M-F)	Mayes	11,029	200,184	55	2012	D.O. /Turbidity	Eutrophic
Hugo	Choctaw	13,250	157,600	54	2012	Turbidity	Eutrophic
Hulah	Osage	3,570	31,160	52	2012	Turbidity/NLW	Eutrophic
Humphreys	Stephens	882	14,041	65	2012	Chlor-a	Hypereutrophic
Jean Neustadt	Carter	462	6,106	61	2012		Hypereutrophic
Keystone	Tulsa	23,610	557,600	58	2012	Turbidity	Eutrophic
Konowa	Seminole	1,350	23,000	62	2012		Hypereutrophic
McMurtry	Noble	1,155	19,733	51	2012	Turbidity	Eutrophic
Murray	Love	5,728	153,250	37	2012		Oligotrophic
Okemah	Okfuskee	761	13,100	46	2012		Mesotrophic
Oolagah	Rogers	29,460	553,400	51	2012	Turbidity	Eutrophic
Overholser	Oklahoma	1,500	15,000	69	2012	Turbidity/NLW /Chlor-a	Hypereutrophic
R.C. Longmire	Garvin	918	14,424	63	2012	Turbidity/Ent.	Hypereutrophic
Rocky (Hobart)	Washita	347	4,210	68	2012	Turbidity/NLW /Ent.	Hypereutrophic
Skiatook	Osage	10,190	322,700	47	2012	Turbidity	Mesotrophic
Spavinaw	Mayes	1,584	38,000	59	2012	NLW	Eutrophic
Stroud	Creek	600	8,800	46	2012		Mesotrophic
Tenkiller	Sequoyah	12,900	654,100	55	2012	D.O./NLW/ Chlor-a	Eutrophic
Wayne Wallace	Latimer	94	1,746	63	2012	рН	Hypereutrophic

thirteen lakes were eutrophic, thirteen lakes were mesotrophic and two were oligotrophic. Using the secchi disk depth variable for TSI twenty-four lakes were identified as hypereutrophic, none lakes were eutrophic, one lake was mesotrophic and zero lakes were oligotrophic. The TSI values calculated using secchi depth were the highest of the three variables. For example, Heyburn Lake was classified as mesotrophic using chlorophyll-a concentration, eutrophic using total phosphorus as the, and hypereutrophic using secchi disk depth. Most of the TSI values were lowest using the chlorophyll-a concentration; therefore, it seems reasonable to say that this parameter is the most conservative variable to use.

Table 5. Comparison of Methods Used to Calculate Carlson's Trophic State Index for 2011-2012.

58					Trophic State
	Eutrophic	70	Hypereutrophic	86	Hypereutrophic
59	Eutrophic	47	Mesotrophic	77	Hypereutrophic
48	Mesotrophic	41	Mesotrophic	74	Hypereutrophic
64	Hypereutrophic	65	Hypereutrophic	82	Hypereutrophic
50	Mesotrophic	68	Hypereutrophic	80	Hypereutrophic
46	Mesotrophic	27	Oligotrophic	64	Hypereutrophic
60	Eutrophic	63	Hypereutrophic	79	Hypereutrophic
50	Mesotrophic	58	Eutrophic	70	Hypereutrophic
73	Hypereutrophic	85	Hypereutrophic	80	Hypereutrophic
68	Hypereutrophic	67	Hypereutrophic	71	Hypereutrophic
54	Eutrophic	46	Mesotrophic	66	Hypereutrophic
57	Eutrophic	88	Hypereutrophic	90	Hypereutrophic
43	Mesotrophic	74	Hypereutrophic	96	Hypereutrophic
51	Eutrophic	41	Mesotrophic	66	Hypereutrophic
55	Eutrophic	62	Hypereutrophic	65	Hypereutrophic
54	Eutrophic	66	Hypereutrophic	80	Hypereutrophic
52	Eutrophic	64	Hypereutrophic	86	Hypereutrophic
65	Hypereutrophic	52	Eutrophic	70	Hypereutrophic
61	Hypereutrophic	46	Mesotrophic	72	Hypereutrophic
58	Eutrophic	79	Hypereutrophic	75	Hypereutrophic
62	Hypereutrophic	51	Eutrophic	64	Hypereutrophic
51	Eutrophic	41	Mesotrophic	70	Hypereutrophic
37	Oligotrophic	27	Oligotrophic	54	Eutrophic
46	Mesotrophic	30	Oligotrophic	65	Hypereutrophic
51	Eutrophic	62	Hypereutrophic	76	Hypereutrophic
69	Hypereutrophic	83	Hypereutrophic	84	Hypereutrophic
63	Hypereutrophic	52	Eutrophic	77	Hypereutrophic
68	Hypereutrophic	82	Hypereutrophic	80	Hypereutrophic
47	Mesotrophic	43	Mesotrophic	63	Hypereutrophic
59	Eutrophic	40	Oligotrophic	66	Hypereutrophic
46	Mesotrophic	28	Oligotrophic	60	Eutrophic
55	Eutrophic	51	Eutrophic	61	Hypereutrophic
63	Hypereutrophic	33	Oligotrophic	58	Eutrophic
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Results for each of the 130 BUMP lakes from the most recently approved Integrated Report (303(d) list) are listed in Table 1. As stated previously, the OWRB is currently monitoring 30 to 40 lakes with repeat sampling on each scheduled to occur every three years. Prior to 1998, data was only collected once for each lake during the summer months. In 1998, the OWRB began collecting data quarterly. This greatly improved the data set available to resource managers. Lakes that are identified as hypereutrophic should be sampled more often than quarterly, especially during the warmer months. Lakes identified as NLW should also be sampled more intensively to confirm if a water quality threat or impairment is present. Minimum data requirements as listed in USAP were closely followed to make beneficial use determinations. All impairments are listed in Table 1. Toxicity concerns, if present, are listed as provided by the ODEQ as part of their Rotating Lakes Toxics Program and/or through sampling conducted by the OWRB.

The pH was examined and compared to the WQS for pH, 6.5 to 9 units, listed in 785:45-5. Thirty-two of the 33 lakes sampled in the 2011-2012 sampling season were listed as supporting the Fish & Wildlife Propagation (FWP) beneficial use based on pH values and one lake was listed as not supporting (Figure 4).

Turbidity, in Nephelometric turbidity units (NTU), was measured via a HACH turbidimeter for all sites on each lake sampled to identify lakes that exceeded the WQS of 25 NTU. Of the 34 lakes sampled in the 2011-2012 sampling season, 7 lakes were not supporting their FWP beneficial use, 2 did not have enough information and 25 were fully supporting the use based on turbidity values (see Figure 5).

For dissolved oxygen (D.O.) vertical profiles recorded with a Hydrolab® were examined to determine if anoxic conditions were present and whether or not the lake was meeting the FWP beneficial use. The USAP lists D.O. violations as values below 2.0 mg/L in >70% of the entire water column, undetermined if between 50% and 70% of the water column and fully supporting if 50% of the water column is below 2.0 mg/L. Of the 34 lakes sampled in the 2011-2012 sampling season, only one lake was not supporting the FWP beneficial use based on anoxic conditions, primarily in the summer season (See Figure 6.).

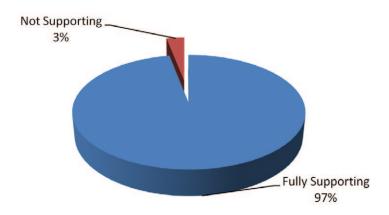


Figure 4. Comparison of pH Values to WQS for Sample Year 2011-2012.

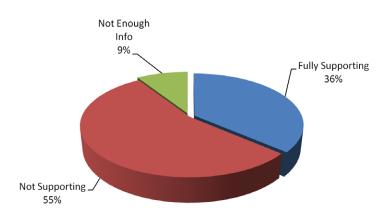


Figure 5. Comparison of Turbidity Values to the WQS for Sample Year 2011-2012.

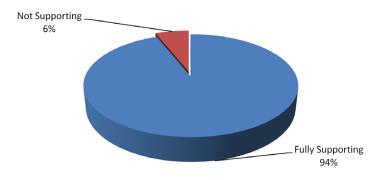


Figure 6. Comparison of Dissolved oxygen Values to the WQS for Sample Year 2011-2012.

Chloride and sulfate water quality parameters were also added to the lake sampling program in year 2003-2004. These additions allow for an assessment of the agriculture beneficial use of our lakes and much like metals sampling is a sampling effort that we plan on continuing into the future. The chloride and sulfate data revealed that 33 of the 34 lakes sampled were supporting the Agriculture beneficial use (See Figure 7).

Bacteria analysis indicated 9 of the lakes sampled were supporting their Primary Body Contact Recreation beneficial use and 25 did not have enough information (See Figure 8).

It is the intent of the OWRB monitoring program to pursue adding additional monitoring parameters to the lake sampling initiative to allow all beneficial uses to be assessed. It is also the OWRB's intent to accomplish this without having to reduce the number of lakes sampled annually.

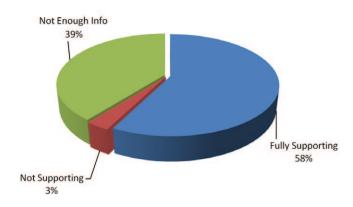


Figure 7. Comparison of Bacteria Values to WQS for Sample Year 2011-2012

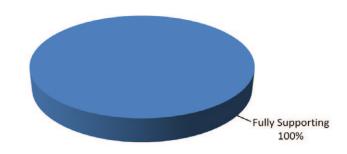


Figure 8. Comparison of Chloride and Sulfate Values to WQS for Sample Year 2011-2012.

DATA TABLES FOR SAMPLED LAKES

Α

American Horse	27
Arbuckle	28
Arcadia	29
Ardmore City	30
Atoka	31
Bell Cow	32
Birch	
Bixhoma	
Bluestem	
Boomer	
Broken Bow	
Brushy Creek	
Burstchi	
С	
Canton	40
Carl Albert	41
Carl Blackwell	42
Carl Etling	43
Carter	44
Cedar	45
Chandler	46
Chickasha	
Claremore	48
Clear Creek	
Cleveland City	
Clinton	
Coalgate City	
Comanche	
Copan	
Crowder	
Cushing Municipal	

Dave Boyer (Walters)	57
Dripping Springs	58
Duncan	59
E	
El Reno	60
Elk City	61
Ellsworth	62
Elmer Thomas	63
Eucha	64
Eufaula	65-70
F	
Fairfax City	71
Fort Cobb	
Fort Gibson	
Fort Supply	
Foss	
Frederick	
Fugua	
G	
Grand	79-81
Great Salt Plains	82
Greenleaf	83
Guthrie	84
Н	
Healdton City	85
Hefner	86
Heyburn	87
Holdenville	
Hominy Municipal	
Hudson (Osage County)	
Hudson (Mayes County)	

Hugo	93
Hulah	94
Humphreys	95
J	
Jean Neustadt	96
Jim Hall (Henryetta)	97
John Wells	98
K	
Kaw	99-100
Keystone	101-104
Konawa	105
L	
Langston	106
Lawtonka	107
Liberty	108
Lloyd Church (Wilburton)	109
Lone Chimney	110
Lugert-Altus	111
••	
Managara	440
McAlester	
McGee Creek	
McMurtry	
Meeker	
Murray	116
N	
Nanih Waiya	117
New Spiro	118

Okemah	119
Okmulgee	120
Oologah	121
Overholser	122
Ozzie Cobb	123
Р	
Pauls Valley City	124
Pawhuska	125
Pawnee	126
Perry	127
Pine Creek	128
Ponca	129
Prague City	130
Purcell	131
R	
R.C. Longmire	132
Raymond Gary	133
Robert S. Kerr	134
Rocky (Hobart)	135
S	
Sahoma	136
Sardis	137
Scott King (Rock Creek)	138
Shawnee Twin # 1	139
Shawnee Twin # 2	140
Shell	141
Skiatook	142
Sooner	143
Spavinaw	
Sportsman	145
Stanley Draper	
Stilwell City	
Stroud	

Talawanda No. 1	149
Talawanda No. 2	150
Taylor	151
Tecumseh	152
Tenkiller Ferry	153-154
Texoma	155-158
Thunderbird	159
Tom Steed	160
V	
Vanderwork	161
Vincent	162
W	
W.R. Holway	163
Waurika	164
Waxhoma	165
Wayne Wallace	166
Webbers Falls	167
Wes Watkins	168
Wetumka	169
Wewoka	170
Wiley Post Memorial	171
Wister	172

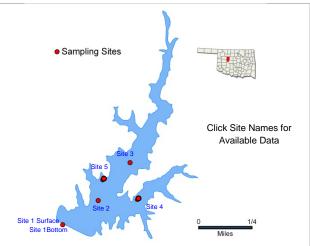
American Horse

NTU = *nephelometric turbidity units*

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter

	Sample Period	d	Times Visited	Sampling Sites				
	October 2007 - July	2008	4	5				
	Location	Blaine Cou	nty	Click map for site data				
<u></u>	Impoundment	1966						
General	Area	100 acres						
5	Capacity	2,200 acre-	feet					
	Purposes	Recreation						



	ı uı	poses	Recreation												
		Parameter (Des	scriptions)	Result					Notes/0	Commen	ts				
		Average Turbidi	ty	13 nep	helometr	ic turbidi	ty units (NTU)	Lake-wi	de avera	ge				
		Average True Co	olor	54 unit	ts				25% of	values >	OWQS	of 70			
		Average Secchi	Disk Depth	118 cm	n										
		Water Clarity Ra	ating	good											
		Trophic State In	dex	38					Previous	s value =	49				
ည		Trophic Class		oligotro	ophic										
Parameters		Salinity		0.07 -	0.13 ppt										
aran	ω	Specific Conduc	tivity	151.5	- 274.7 μ	S/cm									
g,	Profile	рН		7.01 -	8.08 pH ı	units									
	₫.	Oxidation-Reduc	ction Potential	-4 to 5	51 mV										
		Dissolved Oxyge	en	Up to 6	60% of w	ater colu	mn < 2 r	ng/L in							
	ıts	Surface Total Ni	trogen	0.38 m	ng/L to 1.	07 mg/L									
	Nutrients	Surface Total Ph	nosphorus	0.018 (mg/L to (0.053 mg	/L								
	Ž	Nitrogen to Phos	sphorus Ratio	19:1	19:1				Phosphorus limited						
		Click to learn Beneficial Uses	n more about	Turbidity	돐	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
ses	Fish	n & Wildlife Propa	gation	S	S	NS	NEI								
<u></u>	Aes	sthetics						S	NS						
Beneficial Uses	Agr	Agriculture								S	S	S			
ene	Prin	mary Body Contac	t Recreation										NEI		
m	Public & Private Water Supply														
	Λ	S = Fully Supporting IS = Not Supporting IEI = Not Enough In		Lab acc	ident – not	t enough a	lata to mal	ke an ass	essment						

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OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

ppt = parts per thousand

Arbuckle Sample Period Times Visited

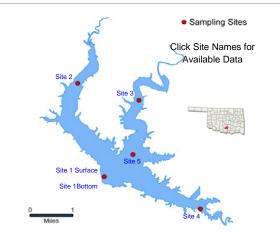
 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

mV = millivolts

Chlor-a = Chlorophyll-a

October 2010-June 20	11	4		5					
Location	Murray	County	С	lick map for site data					
Impoundment	1967	7							
Area	2,350 a	2,350 acres							
Capacity	72,400 acre-feet								
Purposes	Water	er Supply, Flood Control, Fish and Wildlife,							



	Pur	poses	and Recreation		Jillioi, Fi	SII allu VI	/iidille,		Miles								
		Parameter (Des	scriptions)	Result					Notes/0	Commer	ıts						
		Average Turbidit	ty	5 NTU					100% c	of values	< OWQS	of 25 NT	U (n=20))			
		Average Secchi	Disk Depth	177 cm	1												
	Situ	Water Clarity Ra	ating	Excelle	nt												
	드	Chlorophyll-a		7 mg/r	n3												
		Trophic State Inc	dex	50					Previou	s value =	- 59						
ည		Trophic Class		Mesotr	ophic												
Parameters		Salinity		0.03-0.	23 ppt												
ran	a)	Specific Conduc	tivity	88.7-45	54.3 µS/c	m											
g	Profile	pН		6.77-8.	28 pH ui	nits	Neutral to slightly alkaline										
	₫	Oxidation-Reduc	ction Potential	-68-406 mV													
		Dissolved Oxyge	en	Up to 5		ater colum	nn < 2.0 ı	mg/L in									
	S	Surface Total Ni	trogen	0.35 m	g/L to 0.5	7 mg/L											
	Nutrients	Surface Total Ph	nosphorus	0.013 r	0.013 mg/L to 0.027 mg/L												
	N	Nitrogen to Phos	sphorus Ratio	26:1					Phosph	orus limi	ted						
		Click to learn Beneficial Uses	more about	Turbidity	Hd	Dissolved	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E.coli	Chlor-a			
ses	Fish	n & Wildlife Propa	gation	S	S	S	S										
<u></u>	Aes	sthetics						S	*								
Beneficial Uses	Agr	iculture								*	*	S					
ene	Prin	mary Body Contac										S					
m	Pub	olic & Private Wate	er Supply														
	Ν	S = Fully Supporting IS = Not Supporting IEI = Not Enough Int	formation September 1	*Did not collect for these parameters													
		phelometric turbidity			ma Water	Quality St	andards		= milligram			t = parts pe		d			

Sampling Sites

 μ S/cm = microsiemens/cm

Arcadia Times Sample Period Sampling Sites **Visited** 5 October 2006 - August 2007 4 Location Oklahoma County Click map for site data Impoundment 1986 General Area 1,820 acres Capacity 27,520 acre-feet Purposes Water Supply, Flood Control, Recreation

NEI = Not Enough Information

NTU = nephelometric turbidity units

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter



			Olick Cite Natifics for Available Bata												
		Parameter (<u>Descriptions</u>)	Result					Notes/0	Commen	its					
		Average Turbidity	42 NTL	ļ				30% of	values >	OWQS	of 25 NTU				
		Average True Color	53 units	3				10% of	values >	owqs	of 70				
		Average Secchi Disk Depth	67 cm												
		Water Clarity Rating	average	9											
		Trophic State Index	58												
S.		Trophic Class	eutroph	ic											
Parameters		Salinity	0.10 - 0	0.20 ppt											
aran	o)	Specific Conductivity	209.7 -	422 μS/c	cm										
<u>a</u>	Profile	рН	7.32 - 8	3.47 pH u	nits			Neutral to slightly alkaline							
	₫	Oxidation-Reduction Potential	148 to 4	415 mV											
		Dissolved Oxygen	Up to 3 August		ater colum	nn < 2 m	g/L in								
	ts	Surface Total Nitrogen	0.75 mg	g/L to 1.8	5 mg/L										
	Nutrients	Surface Total Phosphorus	0.025 n	ng/L to 0	.231 mg/L	-									
	ž	Nitrogen to Phosphorus Ratio	15:1					Phosphorus limited							
		Click to learn more about Beneficial Uses	Turbidity	된	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ses	Fish	n & Wildlife Propagation	NS	S	S	S									
<u></u>	Aes	sthetics					S	S							
Beneficial Uses	Agr	iculture							S	S	S				
ene	Prir	nary Body Contact Recreation										NEI			
m	Pub	olic & Private Water Supply											NS		
	٨	S = Fully Supporting IS = Not Supporting IS = Not English Information													

OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

ppt = parts per thousand

Ardmore City

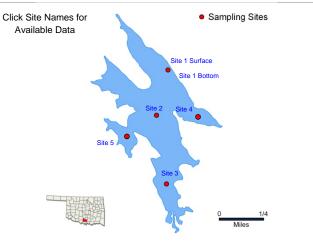
 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

mV = millivolts

Chlor-a = Chlorophyll-a

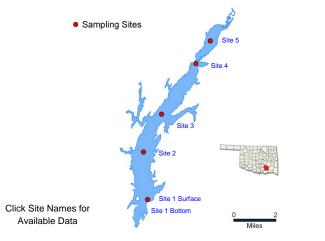
	Sample Period	t	Times Visited	Sampling Sites				
(October 2006 - Augu	st 2007	4	5				
	Location	Carter Cou	nty	Click map for site data				
<u></u>	Impoundment	1910						
General	Area	142 acres						
5	Capacity	600 acre-fe	et					
	Purposes	Recreation	Recreation					



	Pur	poses	Recreation												
		Parameter (Des	scriptions)	Result					Notes/0	Commen	ıts				
		Average Turbidit	ty	10 NTU	J				100% o	f values	< OWQS	of 25 NT	U		
		Average True Co	olor	25 units	3				100% o	f values	< OWQS	of 70			
		Average Secchi	Disk Depth	106 cm											
		Water Clarity Ra	ating	excelle	nt										
		Trophic State Inc	dex	52											
ည		Trophic Class		eutroph	nic										
Parameters		Salinity		0.13 -	0.18 ppt										
ıran	a)	Specific Conduc	tivity	278.6 -	- 365 µS/	cm									
<u> </u>	Profile	pН		7.16 - 8	3.85 pH u	nits			Neutral	to slightl	y alkaline	Э			
	₫.	Oxidation-Reduc	ction Potential	48 to 4	36 mV										
		Dissolved Oxyge	en	Up to 6 August		ater colum	nn < 2 mg	J/L in							
	S	Surface Total Ni	trogen	0.32 m	g/L to 0.6	2 mg/L									
	Nutrients	Surface Total Ph	nosphorus	0.009 r	ng/L to 0.	.035 mg/L	-								
	Z	Nitrogen to Phos	sphorus Ratio	22:1					Phosphorus limited						
		Click to learn Beneficial Uses	more about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
ses	Fish	h & Wildlife Propa	gation	S	S	NS	S								
Beneficial Uses	Aes	sthetics						S	S						
ficia	Agr	iculture								S	S	S			
ene	Prin	Primary Body Contact Recreation											S		
Ď	Pub	olic & Private Wate	er Supply												
	٨	S = Fully Supporting IS = Not Supporting IEI = Not Enough Int	formation sport												
		phelometric turbidity			ma Water	Quality Sta	andards		= milligram			t = parts pe		d	

 $\mu S/cm = microsiemens/cm$

A	Atoka												
	Sample Period	d	Times Visited	Sampling Sites									
No	ovember 2011 - Aug	ust 2012	3	5									
	Location	Atoka Cour	nty	Click map for site data									
<u>a</u>	Impoundment	1964											
General	Area	5,700 acres	3										
ဖြ	Capacity	125,000 ac	re-feet										
	Purposes	Water Supp	oly, Recreation	on									



	ı uı	poses	water Supp	лу,	ny, Necreation												
		Parameter (Des	scriptions)		Result					Notes/0	Commer	nts					
		Average Turbidi	ty		115 NT	Ū				100% o	f values	> OWQS	of 25 NT	U			
		Average Secchi	Disk Depth		17 cm												
	itu	Water Clarity Ra	ating		Poor												
	In Situ	Chlorophyll-a			16 mg/	′m3											
		Trophic State In	dex		58												
ភ		Trophic Class			Eutroph	nic											
Parameters		Salinity			0.05 – 0	0.06 ppt											
ıran	ω.	Specific Conduc	tivity		103 – 1	06 μS/cr	n										
9,	Profile	рН			6.98 – 8	8.27 pH ι	units			All recorded values within standards							
	₫	Oxidation-Reduc	ction Potentia	ıl	192 to	538 mV											
		Dissolved Oxyge	en		All data mg/L	are abo	ve screer	ning level	of 2.0								
	ts	Surface Total Ni	itrogen		0.47 mg	g/L to 1.7	3 mg/L										
	Nutrients	Surface Total Ph	nosphorus		0.047 n	ng/L to 0.	.226 mg/L	-									
	ž	Nitrogen to Phos	sphorus Ratio)	11:1					Phosphorus limited							
		Click to learn m Beneficial Uses	nore about		Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ses	Fish	h & Wildlife Propa	gation		NS*	S	S	S									
ت ت	Aes	sthetics							S	N/A							
ficia	Agr	riculture									N/A	N/A	S				
Beneficial Uses	Prin	mary Body Contac	t Recreation											S			
m	Pub	olic & Private Wate	er Supply												NS		
	Λ	S = Fully Supporting IS = Not Supporting IEI = Not Enough In		Notes	* Althou	gh 100% d		dity sampl	es excee			ment for t	he current :	sample ye	ear		

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OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

NTU = nephelometric turbidity units

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter

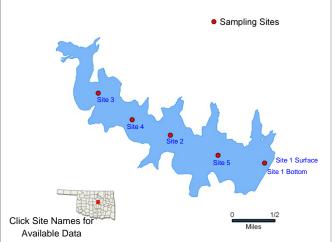
mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

ppt = parts per thousand

Bell Cow Sample Period Times Visited Sampling Sites October 2011 - July 2012 4 3

			-	<u> </u>
	Location	Lincoln Co	unty	Click map for site data
5	Impoundment	1990		
	Area	1,153 acres	3	
,	Capacity	15,613 acr	e-feet	
	Purposes	Water Sup	oly, Flood Co	ontrol, Recreation

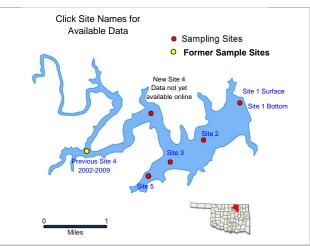


	ı uı	poses	water Suppry,	1 1000 00	Jillioi, IXe	creation	Available Data									
		Parameter (Des	scriptions)	Result					Notes/	Commen	its					
		Average Turbidi	ty	23 NTL	l				50% of	values >	owqs	of 25 NTL	J			
		Average Secchi	Disk Depth	31 cm												
	jįt	Water Clarity Ra	ating	Fair												
	In Situ	Chlorophyll-a		18 mg/	m3											
		Trophic State In	dex	59					Previou	s Value :	= 52					
ပ		Trophic Class		Eutroph	nic											
Parameters		Salinity		0.17 - 0	.21 ppt											
ıran	o.	Specific Conduc	ctivity	359 - 4	29 µS/cm	1										
<u> </u>	Profile	pН		7.27 - 8	.88 pH u	nits			Neutral	to slightl	y alkaline	9				
	<u>~</u>	Oxidation-Redu	ction Potential	52 to 5	36 mV											
		Dissolved Oxyg	en	Up to 6 July	0% of wa	ater colum	nn < 2 mg	J/L in								
	Si	Surface Total N	itrogen	0.93 mg	g/L to 1.1	3 mg/L										
	Nutrients	Surface Total Pl	hosphorus	0.005 n	ng/L to 0.	.043 mg/L	-									
	Ž	Nitrogen to Pho	sphorus Ratio	53:1					Phosphorus limited							
		Click to learn n Beneficial Uses	nore about	Turbidity	된	Dissolved Oxygen	Metals	TSI	True	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
Beneficial Uses	Fish	h & Wildlife Propa	gation	NS	S	*	S									
<u></u>	Aes	sthetics						S	N/A							
ficia	Agr	riculture								N/A	N/A	S				
eue	Prir	mary Body Contac	ct Recreation										S			
m	Pub	olic & Private Wat	er Supply													
	٨	S = Fully Supporting IS = Not Supporting IEI = Not Enough In	formation	*50-70%	6 range is	s not collect undetermi	ined for DO		ole year.							

NTU = nephelometric turbidity units μ S/cm = microsiemens per centimeter E. coli = Escherichia coli

OWQS = Oklahoma Water Quality Standards mV = millivolts Chlor-a = Chlorophyll-a mg/L = milligrams per liter μS/cm = microsiemens/cm ppt = parts per thousand En = Enterococci

Birch **Sample Period Times Visited Sampling Sites** December 2010-September 2011 4 5 Location Osage County Impoundment 1977 General Area 1,137 acres Capacity 19,200 acre-feet Water Supply, Recreation, Flood Control, Water



	Pu	rposes		Recreation, Flood Control, Water I and Fish and Wildlife					Miles						
		Parameter (<u>Descriptions</u>)		Result					Notes/Comments						
		Average Turbidity		10 NTU					100% of values < OWQS of 25 NTU (n=16)						
		Average Secchi Disk Depth		88 cm											
	In Situ	Water Clarity Rating		Good											
	드	Chlorophyll-a		8 mg/m	13										
		Trophic State Inc	Trophic State Index						Previou	s value =	= 53				
ည		Trophic Class		Eutroph	nic										
Parameters		Salinity		0.08 -	0.11 ppt										
ıran	a)	Specific Conductivity		183.3 – 235.6 μS/cm					TDS=12.8 g/L						
g	Profile	рН		6.8 – 8.12 pH units											
	<u>~</u>	Oxidation-Reduc	231 to 519 mV												
		Dissolved Oxyge	Up to 10% of water column < 2.0 mg/L in summer												
	Nutrients	Surface Total Ni	0.51 mg/L to 0.78 mg/L												
		Surface Total Ph	nosphorus	0.014 mg/L to 0.026 mg/L											
	ž	Nitrogen to Phosphorus Ratio		30:1					Phosphorus limited						
		Click to learn Beneficial Uses	more about	Turbidity	Hd	Dissolved Oxygen	Metals	ISI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a	
ses	Fis	Fish & Wildlife Propagation			S	S	S								
<u></u>	Ae	sthetics						S	*						
fici	Agı	Agriculture								*	*	S			
Beneficial Uses	Pri	Primary Body Contact Recreation											S		
М_	Pul	Public & Private Water Supply													
	1	S = Fully Supporting NS = Not Supporting NEI = Not Enough Int	formation \$\sqrt{\qquad \qquad \qqquad \qqquad \qqqqq \qqqqq \qqqqqqqqqqqqqqqqqqqqqq	*Did not collect for these parameters.											

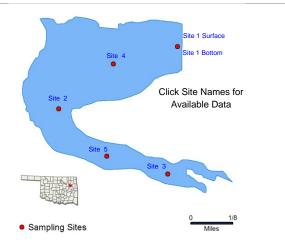
Chlor-a = Chlorophyll-a

 μ S/cm = microsiemens per centimeter mV = millivolts

E. coli = Escherichia coli

 $\mu \tilde{S}/cm = microsiemens/cm$

Bixhoma Times Sampling Sites Sample Period Visited October 2005 - July 2006 5 4 Location Wagoner County Click map for site data 1965 Impoundment General Area 110 acres Capacity 3,130 acre-feet Purposes Water Supply, Recreation



	Fui	poses Water Supply													
		Parameter (<u>Descriptions</u>)	Result					Notes/Comments							
		Average Turbidity	5 NTU					100% of values < OWQS of 25 NTU							
		Average True Color	23 units					100% o	f values	< OWQ	S of 70				
		Average Secchi Disk Depth	146 cm												
		Water Clarity Rating	excelle	nt											
		Trophic State Index	45												
ည		Trophic Class	mesotro	ophic											
Parameters		Salinity	0.01 – 0	0.05 ppt											
aran	ω	Specific Conductivity		47.4 – 127.5 μS/cm											
٣	Profile	рН	6.44 – 8.63 pH units					Only 3 (2.3%) values < 6.5 pH units							
	₫.	Oxidation-Reduction Potential	111 - 482 mV												
		Dissolved Oxygen	Up to 56% of water column < 2 mg/L in the fall & 67% in July												
	Nutrients	Surface Total Nitrogen	0.25 mg/L to 0.45 mg/L												
		Surface Total Phosphorus	0.010 mg/L to 0.026 mg/L												
	Ž	Nitrogen to Phosphorus Ratio	22:1					Phosphorus limited							
		Click to learn more about Beneficial Uses	Turbidity	표	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ses	Fish	h & Wildlife Propagation	S	S	NS										
<u></u>	Aes	sthetics					S	S							
ficia	Agr	iculture							S	S	S				
Beneficial Uses	Prin	mary Body Contact Recreation										S			
M	Pub	olic & Private Water Supply													
	N	S = Fully Supporting IS = Not Supporting IEI = Not Enough Information		ma Watar				- milligram			f – narts no				

NTU = nephelometric turbidity units μ S/cm = microsiemens per centimeter E. coli = Escherichia coli

OWQS = Oklahoma Water Quality Standards mV = millivolts Chlor-a = Chlorophyll-a $mg/L = milligrams per liter \mu S/cm = microsiemens/cm$

ppt = parts per thousand En = Enterococci

Bluestem Times **Sample Period Sampling Sites** Visited December 2011 - July 2012 4 4 Location Osage County Click map for site data 1958 Impoundment General Area 762 acres

17,000 acre-feet

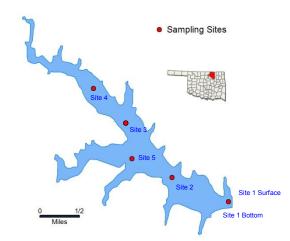
Capacity

 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

mV = millivolts

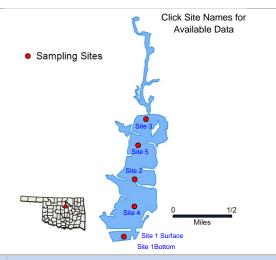
Chlor-a = Chlorophyll-a



	Pur	rposes	Water Supply,	Recreation								l	/				
		Parameter (Descriptions)			Result					Notes/Comments							
	Average Turbidity			28 NTU					25% of values > OWQS of 25 NTU (n=16)								
	Average Secchi Disk Depth			38 cm													
		Water Clarity Rating			е												
		Chlorophyll-a			m3												
		Trophic State Inc	dex	48													
<u>s</u>		Trophic Class		Mesotro	ophic												
Parameters	Salinity		0.00 - 0	0.16 ppt													
ıran	o.	Specific Conductivity		271 – 327 μS/cm													
<u>a</u>	Profile	рН		7.02 – 8.27 pH units													
	4	Oxidation-Reduction Potential		118 - 473 mV													
		Dissolved Oxygen		Up to 67% of water column < 2.0 mg/L in July													
	ts	Surface Total Nitrogen		0.36 mg	g/L to 0.9												
	Nutrients	Surface Total Ph	0.005 mg/L to 0.041 mg/L														
	Ž	Nitrogen to Phosphorus Ratio		44:1					Phosphorus limited								
		Click to learn m Beneficial Uses	oore about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En terro.& E. coli	Chlor-a			
ses	Fish	h & Wildlife Propa	gation	NS	S	*	*										
Š	Aes	sthetics						S	N/A								
Beneficial Uses	Agr	riculture								N/A	N/A	S					
ene	Prir	Primary Body Contact Recreation											S				
m	Pub	Public & Private Water Supply															
	٨	S = Fully Supporting NS = Not Supporting NEI = Not Enough Int	formation § 50	*N/A – parameters not collected in current sample year. * 50-70% range is undetermined for DO.													

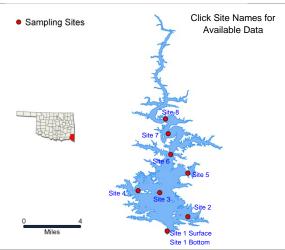
 μ S/cm = microsiemens/cm

Boomer										
	Sample Period	d	Times Visited	Sampling Sites						
ا	November 2008 - Augu	ıst 2009	4	5						
	Location	Payne Cou	nty	Click map for site data						
<u>a</u>	Impoundment	1932								
General	Area	260 acres								
ပ်	Capacity	3,200 acre-	feet							



	Pur	poses	Cooling Water	and Recreation						and the same of th		Site 1 Surface ite 1Bottom			
	Parameter (Descriptions)								Notes/Comments						
	Average Turbidity				IJ				42% of values > OWQS of 25 NTU (n=12)						
	Average True Color Average Secchi Disk Depth								Did not	collect fo	or these	parametei	rs .		
				42 cm											
		Water Clarity Ra	ating	Averag	е										
		Trophic State Inc	dex	59					Previou	s value =	: 51				
Ñ		Trophic Class		Eutrop	hic										
Parameters		Salinity	0.10 - 0	0.21 ppt											
ıran	a)	Specific Conductivity		278 – 4	124.5 µS/	'cm									
P.	Profile	pH		7.17 -	8.26 pH	units									
	₫	Oxidation-Reduction Potential		-19 to 574 mV											
		Dissolved Oxygen		Up to 38% of water column < 2.0 mg/L in August											
	ts	Surface Total Ni	0.49 mg/L to 0.97 mg/L												
	Nutrients	Surface Total Ph	0.010 mg/L to 0.071 mg/L												
	Ž	Nitrogen to Phos	18:1					Phosphorus limited							
		Click to learn Beneficial Uses	more about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a	
ses	Fish & Wildlife Propagation			NS	S	S	*								
eneficial Uses	Aes	sthetics						S	*						
fici	Agriculture									*	*	S			
	Prin	Primary Body Contact Recreation											NEI		
M	Pub	Public & Private Water Supply													
	Λ	S = Fully Supporting IS = Not Supporting IEI = Not Enough Int	*Did not collect for these parameters. The PBCR beneficial use cannot be assessed as minimum data requirement were not met due to QA/QC issues for <i>E.coli</i> .												
μS/c	$NTU = nephelometric turbidity units$ $OWQS = Oklahoma Water Quality Standards$ $mg/L = milligrams per liter$ $\mu S/cm = microsiemens per centimeter$ $mV = millivolts$ $mV = $											1			

Broken Bow Times Sample Period Sampling Sites Visited November 2010 - July 2011 8 4 Location McCurtain County Click map for site data 1970 Impoundment General Area 14,200 acres Capacity 918,070 acre-feet Flood Control Hydropower Water Supply



	Pur	poses	Recreation, Fig	ol, Hydropower, Water Supply, Fish & Wildlife					Miles Site 1 Surface Site 1 Bottom							
		Parameter (Des	criptions)	Result					Notes/0	commer	ıts					
		Average Turbidit	ty	3 NTU					100% o	f values	< OWQS	of 25 NT	U (n=32)			
		Average Secchi	Disk Depth	274 cm)											
	In Situ	Water Clarity Ra	iting	Excelle	ent											
	드	Chlorophyll-a		3 mg/m	13											
		Trophic State Inc	dex	41					Previous	value =	- 46					
ည		Trophic Class		Mesotr	ophic											
Parameters		Salinity		0.0 – 0.01 ppt												
ıran	a \	Specific Conduc	tivity	27.2 - 41.1 μS/cm												
Ра	Profile	рН		5.01 –	7.48 pH	units			79.5% (of values	< 6.50 p	H units				
	ፈ	Oxidation-Reduc	ction Potential	305 - 5	70 mV											
		Dissolved Oxyge	en	Up to 44% of water column < 2.0 mg/L in the summer												
	Si	Surface Total Ni	trogen	0.12 mg/L to 0.36 mg/L												
	Nutrients	Surface Total Ph	nosphorus	0.005 mg/L to 0.017 mg/L												
	Ž	Nitrogen to Phos	sphorus Ratio	27:1					Phosphorus limited							
		Click to learn Beneficial Uses	more about	Turbidity	Hd	Dissolved Oxygen	Metals	ISI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a		
ses	Fish	h & Wildlife Propa	gation	S	NS*	S	S									
Š	Aes	sthetics						S	*							
Beneficial Uses	Agr	riculture								*	*	S				
ene	Prir	Primary Body Contact Recreation											S			
m	Pub	olic & Private Wate	er Supply													
	٨	S = Fully Supporting VS = Not Supporting VEI = Not Enough Inf	formation	soluble causes;	bedrock. I therefore	Because of , the Water	f these cor r Board is	nditions it looking at	s part of the is likely tha the applica *Did not co	t the low publication to the	pH values eveloping	may be du site-specif	ie to natur	al		

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 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

mV = millivolts

Chlor-a = Chlorophyll-a

 μ S/cm = microsiemens/cm

Brushy Creek

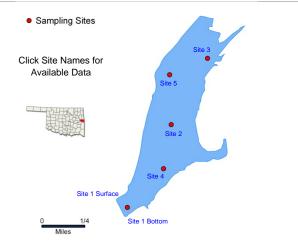
 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

mV = millivolts

Chlor-a = Chlorophyll-a

	Sample Period	b	Visited	Sampling Sites				
	October 2007 - July	2008	4	5				
	Location	Sequoyah	County	Click map for site data				
5	Impoundment	1964						
	Area	358 acres						
5	Capacity	3,258 acre-	e-feet					
	Purposes	Flood Cont	rol and Recre	eation				

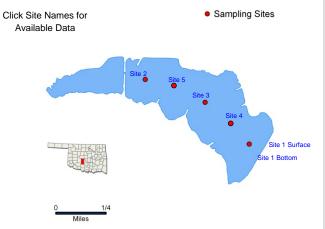


		rposes F	lood Control	and Recreation				Miles							
		Parameter (Descri	ptions)	Result					Notes/0	Commer	ıts				
		Average Turbidity		10 nep	helometi	ric turbidi	ty units ((NTU)	25% of	values >	25 NTU				
		Average True Colo	r	41 uni	ts				25% of	values >	OWQS	of 70			
		Average Secchi Dis	sk Depth	103 cn	n										
		Water Clarity Ratin	g	good											
		Trophic State Index	<	53					Previou	s value =	= 51				
က်		Trophic Class		eutrophic											
Parameters		Salinity		0.00 - 0.10 ppt											
ran	a s	Specific Conductivi	ty	36.3 - 605 µS/cm											
Ра	Profile	рН		6.02 -	8.12 pH	units			Only 7	values <	6.5 unit	:S			
	፭	Oxidation-Reductio	n Potential	33 to 606 mV					,						
		Dissolved Oxygen		Up to 69% of water column < 2 mg/L in July					Occurred at site 1, the dam						
	S	Surface Total Nitro	gen	0.38 mg/L to 0.72 mg/L											
	Nutrients	Surface Total Phos	phorus	0.016 mg/L to 0.050 mg/L											
	Ž	Nitrogen to Phosph	orus Ratio	20:1	20:1					Phosphorus limited					
		Click to learn m Beneficial Uses	ore about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
ses	Fis	sh & Wildlife Propagat	ion	S	S	NS	S								
Ö	Ae	sthetics						S	S						
ficia	Agı	riculture								S	S	S			
Beneficial Uses	Pri	mary Body Contact R	ecreation										S		
m	Pul	blic & Private Water S	Supply												
	1	S = Fully Supporting NS = Not Supporting NEI = Not Enough Inform	nation Solution		ation data red suppo		the peak ii	n color &	turbidity are	e likely du	e to runof	f, therefore	the uses	are	

 μ S/cm = microsiemens/cm

Burtschi

	Sample Period	t	Times Visited	Sampling Sites				
Ν	ovember 2005 - Aug	ust 2006	4	5				
	Location	Grady Cou	nty	Click map for site data				
5	Impoundment	1958						
	Area	180 acres						
	Capacity	2,140 acre-	feet					
	Purposes	Recreation	1					



	Fui	poses Recreation													
		Parameter (<u>Descriptions</u>)	Result					Notes/0	Commen	its					
		Average Turbidity	11 NTU	J				100% o	f values	< OWQS	of 25 NT	U			
		Average True Color	18 units	3				100% o	f values	< OWQS	S of 70				
		Average Secchi Disk Depth	72 cm												
		Water Clarity Rating	good												
		Trophic State Index	63												
ည		Trophic Class	hypertr	ophic											
Parameters		Salinity	0.53 -	0.67 ppt											
aran	ω	Specific Conductivity	1011 –	1011 – 1273 μS/cm											
<u> </u>	Profile	рН	7.19 – 10.74 pH units					16% of	values w	ere > 9 p	oH units				
	₫	Oxidation-Reduction Potential	42 - 42	8 mV											
		Dissolved Oxygen	Up to 3 August	8% of wa	nn < 2 mg	g/L in									
	ts	Surface Total Nitrogen	0.92 m	0.92 mg/L to 1.82 mg/L 0.027 mg/L to 0.109 mg/L											
	Nutrients	Surface Total Phosphorus	0.027 r												
	Ž	Nitrogen to Phosphorus Ratio	24:1	24:1					Phosphorus limited						
		Click to learn more about Beneficial Uses	Turbidity	H.	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ses	Fish	h & Wildlife Propagation	S	S	NS										
	Aes	sthetics					S	S							
ficia	Agr	iculture							S	S	S				
Beneficial Uses	Prin	mary Body Contact Recreation										S			
m	Pub	olic & Private Water Supply													
	N N	S = Fully Supporting IS = Not Supporting IEI = Not Enough Information	S - Oklaho					- milligram			f – narts no				

NTU = nephelometric turbidity units $<math>\mu S/cm = microsiemens per centimeter$ E. coli = Escherichia coli

OWQS = Oklahoma Water Quality Standards mV = millivolts Chlor-a = Chlorophyll-a mg/L = milligrams per liter μS/cm = microsiemens/cm ppt = parts per thousand En = Enterococci

Canton

NTU = nephelometric turbidity units

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter

	Sample Period	d	Visited	Sampling Sites				
Ν	ovember 2011 - Aug	ust 2012	4	3				
	Location	Blaine Cou	nty	Click map for site data				
<u></u>	Impoundment	1948						
General	Area	7,910 acres	3					
5	Capacity	111,310 ac	,310 acre-feet					
	Purposes	Flood Cont	rol, Water Sເ	upply, Irrigation				

Times



	Fui	poses	Flood Control,	oi, water Supply, imgation												
		Parameter (Des	scriptions)	Result					Notes/0	Commer	ıts					
		Average Turbidi	ty	35 NTL	J				75% of	values >	OWQS (of 25 NTL	l (n=12)			
		Average Secchi	Disk Depth	22 cm												
	itu	Water Clarity Ra	ating	Poor												
	In Situ	Chlorophyll-a		29 mg	/m3											
		Trophic State In	dex	64					Previous value = 60							
ည		Trophic Class		Hypere	utrophic											
Parameters		Salinity		0.71 – 0	0.97 ppt											
aran	a)	Specific Conduc	ctivity	1420 –	1920 μS	S/cm										
9,	Profile	рН		7.62-8	.34 pH ι	units			Neutral	to slightl	y alkaline	е				
	₫	Oxidation-Reduc	ction Potential	196 - 5	30 mV											
		Dissolved Oxyge	en	All data are above screening level of 2.0 mg/L												
	ts	Surface Total Ni	itrogen	0.94 mg/L to 1.65 mg/L												
	Nutrients	Surface Total Ph	nosphorus	sphorus 0.048 mg/L to 0.091 mg/L												
	Ž	Nitrogen to Phos	sphorus Ratio	18:1	18:1					Phosphorus limited						
		Click to learn m Beneficial Uses	nore about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a		
Beneficial Uses	Fish	h & Wildlife Propa	gation	NS	S	S	*									
a U	Aes	sthetics						S	N/A							
fici	Agr	riculture								S	S	S				
ene	Prin	mary Body Contac	t Recreation										S			
m	Public & Private Water Supply															
	Λ	S = Fully Supporting IS = Not Supporting IEI = Not Enough In		*N/A – p	arameters	s not collec	cted in cur	rent samp	ole year.							

OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

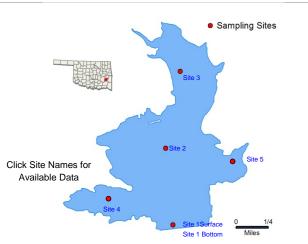
mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

ppt = parts per thousand

Carl Albert

	Sample Period	b	Times Visited	Sampling Sites					
	October 2007 - July	2008	4	5					
	Location	Latimer Co	ounty	Click map for site data					
5	Impoundment	1964	964						
5	Area	183 acres	183 acres						
5	Capacity	2,739 acre-	cre-feet						
	Purposes	Water Supp	oly, Flood Co	ntrol, and Recreation					



	ı uı	poses	vvaler Suppry,	ly, Flood Control, and Recreation			Gite i Bottom									
		Parameter (Des	scriptions)	Result					Notes/0	Commen	ts					
		Average Turbidi	ty	14 nep	helometr	ic turbidit	y units (N	NTU)	All value	es < 25 N	NTU					
		Average True C	olor	72 units	3				50% of	values >	OWQS (of 70				
		Average Secchi	Disk Depth	90 cm												
		Water Clarity Ra	ating	good												
		Trophic State In	dex	41					Previou	s value =	- 41					
ន		Trophic Class		mesoti	ophic											
Parameters		Salinity		0.00 - 0).01 ppt											
aran	συ	Specific Conduc	ctivity		′ μS/cm											
<u> </u>	Profile	рН		5.8 - 7	.32 pH ur	nits			21% of	values <	6.5 units	3				
	₫	Oxidation-Reduc	ction Potential	22 to 553 mV												
		Dissolved Oxyge	en	Up to 62% of water column < 2 mg/L in August					Occurred at site 1, the dam							
	ts	Surface Total Ni	itrogen	0.28 mg/L to 0.49 mg/L												
	Nutrients	Surface Total Ph	nosphorus	0.013 n	ng/L to 0.	031 mg/L	_									
	ž	Nitrogen to Phos	sphorus Ratio	16:1					Phosphorus limited							
		Click to learn Beneficial Uses	n more about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ses	Fish	h & Wildlife Propa	gation	S	NS	NS	*									
<u></u>	Aes	sthetics						S	NS							
ficia	Agr	iculture								S	S	S				
Beneficial Uses	Prin	mary Body Contac	ct Recreation										S			
a	Pub	olic & Private Wate	er Supply													
NE	S = Fully Supporting NS = Not Supporting NEI = Not Enough Information *Not supporting for lead as chronic criteria was							eria was	exceeded	All other to	oxicants a	re fully sup	pporting.			

NTU = nephelometric turbidity units $<math>\mu S/cm = microsiemens per centimeter$ E. coli = Escherichia coli

OWQS = Oklahoma Water Quality Standards mV = millivolts Chlor-a = Chlorophyll-a mg/L = milligrams per liter $\mu S/cm = microsiemens/cm$

ppt = parts per thousand En = Enterococci

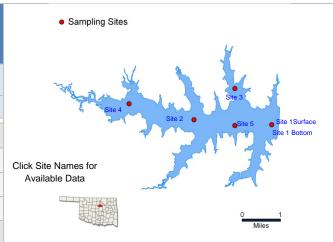
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Carl Blackwell

E. coli = Escherichia coli

Chlor-a = Chlorophyll-a

	Sample Period	t	Times Visited	Sampling Sites					
	November 2010 - July	2011	4	5					
	Location	Payne Cou	nty	Click map for site data					
5	Impoundment	1937							
	Area	3,370 acres	'0 acres						
5	Capacity	61,500 acre	cre-feet						
	Purposes	Water Supp	oly and Recr	reation					



	Fui	poses	vvater Supply	and Rec	nd Recreation										
		Parameter (Des	criptions)	Result					Notes/0	Commer	nts				
		Average Turbidit	у	28 NTL	J				47% of	values >	25 NTL	l			
		Average Secchi	Disk Depth	46 cm											
	<u>i</u> g	Water Clarity Ra	ting	Averag	е										
	In Situ	Chlorophyll-a		8 mg/m	13										
		Trophic State Inc	dex	51					Previou	Previous value = 53					
ည		Trophic Class		Eutroph	nic										
Parameters		Salinity		0.19 – 0.22 ppt											
ıran	ø)	Specific Conduct	tivity	379.3 - 433 μS/cm											
<u> </u>	Profile	рН		6.82 – 8.64 pH units					Neutral	to slightl	ly alkalin	е			
	_₽	Oxidation-Reduc	tion Potential	33 - 49	7 mV										
		Dissolved Oxyge	en	Up to 50% of water column < 2 mg/L in summer											
	ts	Surface Total Nit	trogen	0.47 m	ng/L to 1.:	22 mg/L									
	Nutrients	Surface Total Ph	osphorus	0.023 n	0.023 mg/L to 0.054 mg/L										
	Ž	Nitrogen to Phos	25:1				Phosph	orus limi	ted						
		Click to learn Beneficial Uses	more about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
ses	Fish	h & Wildlife Propaç	gation	NS	S	S	S								
	Aes	sthetics						S	*						
Beneficial Uses	Agr	iculture								S	S	S			
eue	Prir	mary Body Contact	t Recreation										NEI		
m	Pub	olic & Private Wate	er Supply												
	٨	S = Fully Supporting IS = Not Supporting IEI = Not Enough Info	ormation	*Did not	collect for	these par	ameters.								

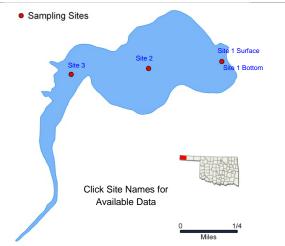
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Carl Etling

 μ S/cm = microsiemens per centimeter mV = millivolts

E. coli = Escherichia coli

	Sample Period	d	Times Visited	Sampling Sites				
	October 2003 – July	2004	4	3				
	Location	Cimarron C	County	Click map for site data				
3	Impoundment	1958						
5	Area	159 acres	159 acres					
Ś	Capacity	1717 acre-	feet					
	Purposes	Recreation						



	Pu	rposes	Recreation											1/4 Miles	
		Parameter (Des	criptions)		Result					Notes/	Commen	its			
		Average Turbidit	ty		65 NTL	J				75% of	values >	owqs	of 25 NTL	J	
		Average True Co	olor		18 units	3				100% c	of values	< OWQS	S of 70		
		Average Secchi	Disk Depth		22 cm										
		Water Clarity Ra	iting		fair										
		Trophic State Inc	dex		72										
ည		Trophic Class			hypere	utrophic									
Parameters		Salinity			0.90 -	1.4 ppt									
aran	ø	Specific Conduc	tivity		1688 –	2596 µS	/cm								
٣	Profile	рН			8.18 – 9	9.42 pH ι	units			28% of	recordec	l values	> 9.0 pH ເ	ınits	
	□	Oxidation-Reduc	ction Potentia	ıl	269– 49	99 mV									
		Dissolved Oxyge							Lake w	ell-mixed	– not st	ratified			
	S	Surface Total Nit	trogen		2.31 mg	g/L to 4.5	1 mg/L								
	Nutrients	Surface Total Ph	nosphorus		0.122 n	ng/L to 0.	.293mg/L								
	Ž	Nitrogen to Phos	sphorus Ratio)	16:1					Phosph	orus limi	ted			
		Click to learn Beneficial Uses	more abou	<u>ıt</u>	Turbidity	Æ	Dissolved Oxygen	Metals	ISI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
ses	Fis	sh & Wildlife Propag	gation		NS	NS	S	S							
Beneficial Uses	Ae	esthetics							NS*	S					
fici	Ag	riculture									S	S	S		
eue	Pri	imary Body Contac	t Recreation											S	
Ш	Pu	blic & Private Wate	er Supply												
	1	S = Fully Supporting NS = Not Supporting NEI = Not Enough Inf	formation	Notes			I in the WC			-			cial use is c status	considered	j

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Chlor-a = Chlorophyll-a

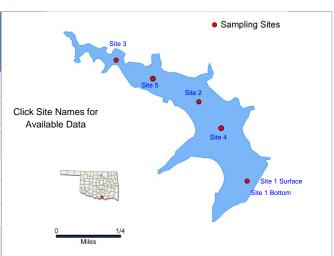
En = Enterococci

 μ S/cm = microsiemens/cm

Carter

	Sample Period	d	Times Visited	Sampling Sites				
	November 2007 - Augu	st 2008	4	5				
	Location	Marshall Co	ounty	Click map for site data				
3	Impoundment	1960						
	Area	108 acres						
5	Capacity	990 acre-fe	feet					
	Purposes	Water Supp	oly and Recr	reation				

E. coli = Escherichia coli



		Parameter (Descriptions)	Result					Notes/0	Commer	nts				
		Average Turbidity	7 neph	elometri	c turbidity	units (N	TU)	All value	es < 25 l	NTU				
		Average True Color	25 units	S				All Valu	es < OW	/QS of 70)			
		Average Secchi Disk Depth	121 cn	า										
		Water Clarity Rating	exceller	nt										
		Trophic State Index	40					Previou	s value =	= 40				
ည		Trophic Class	oligotro	phic										
Parameters		Salinity	0.10 - 0).20 ppt										
ram		Specific Conductivity	212 –	325 µS/c	m									
J B	Profile	pН	6.98 – 8.33 pH units					Neutral	to slight	ly alkalin	e			
	Ţ	Oxidation-Reduction Potential	60 to 557 mV											
		Dissolved Oxygen	Up to 44% of water column < 2 mg/L in August					Occurred at site 1, the dam						
	ts	Surface Total Nitrogen	0.41 m	ng/L to 0	54 mg/L									
	Nutrients	Surface Total Phosphorus	0.011 n	ng/L to 0	.018 mg/	L								
	Z	Nitrogen to Phosphorus Ratio	37:1					Phospho	orus limi	ted				
		Click to learn more about Beneficial Uses	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
SES	Fish	n & Wildlife Propagation	S	S	S	S								
5 =	Aes	sthetics					S	S						
benericiai Uses	Agr	iculture							S	S	S			
₩ ₩	Prin	mary Body Contact Recreation										S		
۵	Pub	olic & Private Water Supply												
	Λ	S = Fully Supporting IS = Not Supporting IEI = Not Enough Information												

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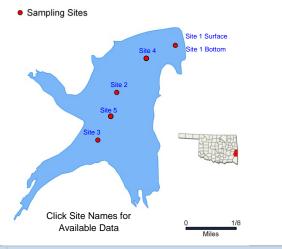
Chlor-a = Chlorophyll-a

C	edar			
	Sample Period	t	Times Visited	Sampling Sites
	February 2011 - July	/ 2011	4	5
	Location	Le Flore C	ounty	Click map for site data
<u>a</u>	Impoundment	1937		
General	Area	78 acres		
ပိ	Capacity	1,000 acre-	feet	

NTU = *nephelometric turbidity units*

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter



	Pur	poses	Recreation						,	Available		0	1/8 Miles			
		Parameter (Des	scriptions)	Result					Notes/0	Commen	its					
		Average Turbidi	ty	6 NTU					100% o	f values	< OWQS	of 25 NT	U			
		Average Secchi	Disk Depth	99 cm												
	In Situ	Water Clarity Ra	ating	Excelle	nt											
	드	Chlorophyll-a		13 mg/ı	m3											
		Trophic State In	dex	56					Previou	s Value=	:53					
S		Trophic Class		Eutroph	nic											
Parameters		Salinity		0.0-0.0	0- 0.04 ppt											
aran	ø.	Specific Conduc	tivity	32.8 –	2.8 – 106.4 μS/cm											
9,	Profile	рН		5.6 - 8.	94 pH ur	nits			51.56%	< 6.5						
	₫	Oxidation-Reduc	ction Potential	-12 - 509 mV												
		Dissolved Oxyge	en	Up to 70% of water column < 2 mg/L in summer												
	ts	Surface Total Ni	trogen	0.18 m	ıg/L to 0.9	97 mg/L										
	Nutrients	Surface Total Ph	nosphorus	0.016 n	ng/L to 0.	.057 mg/L	-									
	ž	Nitrogen to Phos	sphorus Ratio	18:1					Phosphorus limited							
		Click to learn Beneficial Uses	more about	Turbidity	モ	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ses	Fish	n & Wildlife Propa	gation	NEI	NS	S	S									
ڪ ڪ	Aes	sthetics						S	*							
Beneficial Uses	Agr	iculture								*	*	S				
ene	Prin	nary Body Contac	t Recreation										S			
a	Pub	olic & Private Wate	er Supply													
	Ν	E = Fully Supporting IS = Not Supporting IEI = Not Enough In	formation september 1						all turbidity imum data				P beneficia	al use		

OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

mg/L = milligrams per liter

 $\mu S/cm = microsiemens/cm$

ppt = parts per thousand

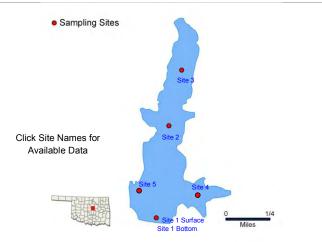
Chandler

NTU = *nephelometric turbidity units*

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter

	Sample Period	t	Times Visited	Sampling Sites				
	October 2007 - July	2008	4	5				
	Location	Lincoln Cou	unty	Click map for site data				
5	Impoundment	1960						
	Area	129 acres	3					
	Capacity	2,778 acre-	e-feet					
	Purposes	Water Supp	pply and Recreation					



	Pur	poses Water Supply	and Rec	reation				Site i Bottorii						
		Parameter (<u>Descriptions</u>)	Result					Notes/0	Commer	nts				
		Average Turbidity	29 nep	helometri	c turbidit	y units (l	NTU)	58% of	values >	→ 25 NTU				
		Average True Color	59 unit	S				25% of	values >	- OWQS	of 70			
		Average Secchi Disk Depth	39 cm											
		Water Clarity Rating	average	Э										
		Trophic State Index	60					Previous value = 50						
ร		Trophic Class	eutroph	nic										
Parameters		Salinity	0.10 - 0	0.18 ppt										
aran	a)	Specific Conductivity	268 – 3	365.7 µS/	cm									
<u> </u>	Profile	рН	7.35 – 8.82 pH units					Neutral	to slight	ly alkalin	е			
	₫	Oxidation-Reduction Potential	23 to 533 mV											
		Dissolved Oxygen	Up to 62% of water column < 2 mg/L in July					Occurr	ed at site	e 1, the d	lam			
	ts	Surface Total Nitrogen	0.82 mg/L to 1.59 mg/L											
	Nutrients	Surface Total Phosphorus	0.036 r	ng/L to 0	.082 mg/	L								
	Ž	Nitrogen to Phosphorus Ratio	27:1					Phospho	orus limit	ted				
		Click to learn more about Beneficial Uses	Turbidity	Hd.	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
ses	Fish	h & Wildlife Propagation	NS	S	NS	S								
<u>≅</u>	Aes	sthetics					S	NS						
ficia	Agr	riculture							S	S	S			
Beneficial Uses	Prin	mary Body Contact Recreation										S		
m	Pub	olic & Private Water Supply											NS	
	N	S = Fully Supporting IS = Not Supporting IEI = Not Enough Information												

OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

mg/L = milligrams per liter

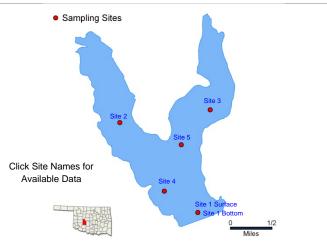
 μ S/cm = microsiemens/cm

ppt = parts per thousand

Chickasha

E. coli = Escherichia coli

	Sample Period	b	Times Visited	Sampling Sites				
	October 2010 - June	2011	4	5				
	Location	Caddo Cou	nty	Click map for site data				
5	Impoundment	1958						
	Area	820 acres	cres					
5	Capacity	41,080 acre	cre-feet					
	Purposes	Water Supp	oly, Recreation	on				



	Fui	poses	vvaler Supply,	Recreation								Miles			
		Parameter (Des	criptions)	Result					Notes/0	Commen	ts				
		Average Turbidit	у	14 NTU	J				1% of v	alues > 0	DWQS o	f 25 NTU			
		Average Secchi	Disk Depth	51 cm											
	In Situ	Water Clarity Ra	ting	Good											
	드	Chlorophyll-a		27 mg/	m3										
		Trophic State Inc	dex	63					Previou	s Value=	62				
S		Trophic Class		Hypere	utrophic										
Parameters		Salinity		1.15 – 1.22 ppt											
aran	a	Specific Conduc	tivity	2140 – 2266 μS/cm											
ä	Profile	pН		7.43 – 8.39 pH units					Neutral	to slightly	y alkalin	e			
	₫	Oxidation-Reduc	tion Potential	349 to 472 mV											
		Dissolved Oxyge	en	All data are above screening level											
	Si	Surface Total Nit	trogen	0.82 mg/L to 1.35 mg/L											
	Nutrients	Surface Total Ph	osphorus	0.032 mg/L to 0.07 mg/L											
	Ž	Nitrogen to Phos	sphorus Ratio	21:1					Phosph	orus limit	ted				
		Click to learn Beneficial Uses	more about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
ses	Fish	n & Wildlife Propaç	gation	S	S	S	S								
ا څ	Aes	thetics						NS	S						
Beneficial Uses	Agri	iculture								NS	S	S			
ene	Prim	nary Body Contac	t Recreation										S		
m	Pub	olic & Private Wate	er Supply												
	N.	= Fully Supporting S = Not Supporting El = Not Enough Inf	ormation Sometimes of the second seco	Watersh	ned (NLW)	. This listin	g means	that the la		dered thre	atened fr	s a Nutrien om nutrien		nore	

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Chlor-a = Chlorophyll-a

C	Claremore											
	Sample Period	d	Times Visited	Sampling Sites								
N	ovember 2005 - Aug	ust 2006	4	5								
	Location	Rogers Co	unty	Click map for site data								
eral	Impoundment	1930										
Jer	Area	470 acres										

7,900 acre-feet

Ger

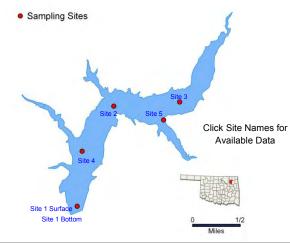
Capacity

NEI = Not Enough Information

NTU = nephelometric turbidity units

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter



	Pur	poses	Water Supp	oly, Recreat	tion				Site .	Dottom			Miles	
		Parameter (Des	scriptions)	Result					Notes/0	Commer	nts			
		Average Turbidit	ty	19 NTU	J				13% of	values >	OWQS	of 25 NTU	ı	
		Average True Co	olor	24units	;				100% o	f values	< OWQ	S of 70		
		Average Secchi	Disk Depth	41 cm										
		Water Clarity Ra	iting	good										
		Trophic State Inc	dex	67										
စ်		Trophic Class		hypere	utrophic									
Parameters		Salinity		0.11-0).12 ppt									
ıran	o)	Specific Conduc	tivity	242 – 2	257.4 µS/	'cm								
<u> </u>	Profile	pН		7.03– 8	3.10 pH	units								
	<u>~</u>	Oxidation-Reduc	ction Potential	252- 45	54 mV									
		Dissolved Oxyge	en	Up to 2 May	Up to 29% of water column < 2 mg/L in May					ed at site	1, the d	am		
	ts	Surface Total Ni	trogen	0.91 m	ng/L to 2.	00 mg/L								
	Nutrients	Surface Total Ph	nosphorus	0.072 r	mg/L to 0	.193 mg/L	-							
	Ž	Nitrogen to Phos	sphorus Ratio	12:1					Phosph	orus Lim	ited			
		Click to learn m Beneficial Uses	ore about	Turbidity	Hd	Dissolved Oxygen	Metals	ISI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
ses	Fish	h & Wildlife Propa	gation	*	S	S	S							
Beneficial Uses	Aes	sthetics						NS**	*					
icia	Agr	riculture								S	S	S		
ene	Prir	mary Body Contac	t Recreation										S	
m	Pub	olic & Private Wate	er Supply											NS
	٨	S = Fully Supporting IS = Not Supporting		and cold	or cannot l	oe made at	this time	as minimu	ım data red	quirement	s were no	eficial use to t met for the ficial use is	is sample	year.

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OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

**The lake is listed in the WQS as a NLW indicating that the Aesthetics beneficial use is considered

mg/L = milligrams per liter

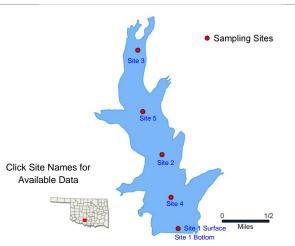
 μ S/cm = microsiemens/cm

threatened by nutrients until studies can be conducted to confirm non-support status

ppt = parts per thousand

Clear Creek

	Sample Period	t	Times Visited	Sampling Sites				
D	ecember 2010 - Aug	ust 2011	4	5				
	Location	Stephens C	County	Click map for site data				
<u>v</u>	Impoundment	1948						
General	Area	722 acres						
5	Capacity	7,711 acre-	e-feet					
	Purposes	Water Supp	oly, Recreation	on				



	Pur	poses	Water Supply,	Recreati	on				Site 1 Bottom							
		Parameter (Des	criptions)	Result					Notes/Comments 100% of values < OWQS of 25 NTU							
		Average Turbidit	у	11 NTU	J				100% o	f values	< OWQS	of 25 NT	U			
		Average Secchi	Disk Depth	65 cm												
	In Situ	Water Clarity Ra	ting	Averag	е											
	므	Chlorophyll-a		17 mg/	m3											
		Trophic State Inc	dex	59					Previou	s Value=	:58					
ร		Trophic Class		Eutroph	nic											
Parameters		Salinity		0.3 – 0.	.35 ppt											
aran	συ	Specific Conduct	tivity	588.3 -	- 687.6 µ	S/cm										
<u> </u>	Profile	рН		5.92 –	7.37 pH ւ	7 pH units Neutral to slightly alkaline 3 mV of water column < 2 mg/L in 0 0.99 mg/L										
	₫.	Oxidation-Reduc	tion Potential	-101 to	438 mV											
		Dissolved Oxyge	en	Up to 2 summe		ater colum	nn < 2 mo	g/L in								
	ts	Surface Total Nit	trogen	0.7 mg/	/L to 0.99	mg/L										
	Nutrients	Surface Total Ph	osphorus	0.023 n	ng/L to 0.	.053 mg/L	-									
	Z	Nitrogen to Phos	phorus Ratio	23:1					Phosph	orus limi	ted					
		Click to learn Beneficial Uses	more about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ses	Fish	n & Wildlife Propag	gation	S	S	S	S									
Beneficial Uses	Aes	sthetics						S	*							
fici	Agr	iculture								S	S	S				
ene	Prin	mary Body Contact	t Recreation										NEI			
m	Pub	olic & Private Wate	er Supply													
	Ν	S = Fully Supporting IS = Not Supporting IEI = Not Enough Inf	ormation \$30			cial use ca * Did not co			s minimum eter.	data requ	uirement v	vere not me	et due to (QA/QC		

NTU = nephelometric turbidity units μ S/cm = microsiemens per centimeter E. coli = Escherichia coli

OWQS = Oklahoma Water Quality Standards Chlor-a = Chlorophyll-a

 $mg/L = milligrams per liter \ \mu S/cm = microsiemens/cm$

ppt = parts per thousand En = Enterococci

mV = millivolts

Cleveland City

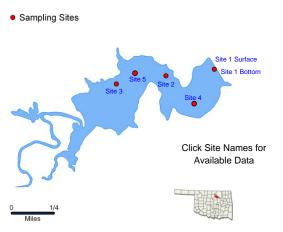
NTU = nephelometric turbidity units

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter

	Sample Period	d	Visited	Sampling Sites					
N	ovember 2006 - Aug	ust 2007	4	5					
	Location	Pawnee Co	ounty	Click map for site data					
ত	Impoundment	1936	1936						
dener	Area	159 acres							
ב פ	Capacity	2,200 acre-	feet						
	Purposes	Water Supp	oly, Recreation	on					

Times



	Pur	poses	Water Supp	ly,	Recreati	on				Willes				44.4	
		Parameter (Des	scriptions)		Result					Notes/0	Commen	its			
		Average Turbidit	ty		17 NTL	ı				8% of v	alues >C	WQS of	25 NTU		
		Average True Co	olor		63 units	3				25% of	values >	owqs	of 70		
		Average Secchi	Disk Depth		56 cm										
		Water Clarity Ra	ating		average	€									
		Trophic State Inc	dex		56										
S.		Trophic Class			eutroph	ic									
Parameters		Salinity			0.08 – 0).11 ppt									
ıran	a)	Specific Conduc	tivity		173.3 –	235.3 µ	S/cm								
<u> </u>	Profile	pН			6.93 – 8	3.64 pH ι	units			Neutral	to slightl	y alkalin	е		
	Ē	Oxidation-Reduc	ction Potentia	I	82 to 43	38 mV									
		Dissolved Oxyge	en		Up to 7 May	0% of wa	ater colum	nn < 2 m	g/L in						
	ts	Surface Total Ni		0.85 mg	g/L to 1.2	24 mg/L									
	Nutrients	Surface Total Ph	nosphorus		0.021 n	ng/L to 0.	.050 mg/L	-							
	Z	Nitrogen to Phos	sphorus Ratio		30:1					Phosph	orus limi	ted			
		Click to learn Beneficial Uses	more abou	<u>t</u>	Turbidity	된	Dissolved Oxygen	Metals	ISI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
ses	Fish	h & Wildlife Propa	gation		S	S	NS	S							
Beneficial Uses	Aes	sthetics							S	S					
ficia	Agr	riculture									S	S	S		
ene	Prir	mary Body Contac											NEI		
m	Pub	olic & Private Wate	er Supply												
	٨	S = Fully Supporting VS = Not Supporting VEI = Not Enough Int	formation	Notes	issues fo	or enteroc		eak repoi	ted in col	as minimum lor is due to icial use.					QA/QC

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OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

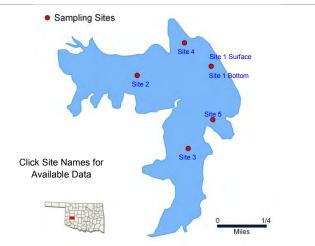
mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

ppt = parts per thousand

Clinton

	Sample Period	t	Times Visited	Sampling Sites					
	October 2003 – July	2004	4	5					
	Location	Washita Co	ounty	Click map for site data					
3	Impoundment	1931	931						
	Area	335 acres	335 acres						
5	Capacity	3,980 acre-	feet						
	Purposes	Water Supp	oly, Recreation	on					



	Pur	poses vvate	er Supply,	Recreati	Ori									
		Parameter (<u>Descriptio</u>	ns)	Result					Notes/0	Commen	its			
		Average Turbidity		67 NTL	J				100% o	f values	> OWQS	of 25 NT	U	
		Average True Color		36 unit	ts				15% of	values >	OWQS (of 70		
		Average Secchi Disk D	Depth	23 cm										
		Water Clarity Rating		poor										
		Trophic State Index		66										
SIS		Trophic Class		hypere	utrophic									
Parameters		Salinity		0.23 –	0.33 ppt									
arar	<u>o</u>	Specific Conductivity		460.4 –	- 642.9 μ	S/cm								
٩	Profile	рН		8.00 –	8.74 pH ւ	ınits			Slightly	alkaline				
	<u>-</u>	Oxidation-Reduction P	otential	149 – 5	34 mV									
		Dissolved Oxygen							Lake we	ell-mixed	- not str	atified		
	ts	Surface Total Nitrogen	l	1.36 m	g/L to 3.0	6 mg/L								
	Nutrients	Surface Total Phospho	orus	0.089 n	ng/L to 0.	244 mg/L	_							
	Z	Nitrogen to Phosphoru	s Ratio	13:1					Phosph	orus limi	ted			
		Click to learn more ab Beneficial Uses	<u>oout</u>	Turbidity	된	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Beneficial Uses	Fish	n & Wildlife Propagation		NS	S	S	S							
a U	Aes	sthetics						NS*	NS					
fici	Agr	sthetics								S	S	S		
ene	Prin	mary Body Contact Recr	eation										NS**	
m	Pub	olic & Private Water Sup	ply											NS
	N	S = Fully Supporting IS = Not Supporting IEI = Not Enough Informatio	Notes Notes	threaten	ed by nutr	ients until	studies ca	in be cond	ting that the ducted to c r enteroco	onfirm nor	n-support	cial use is o	considered	

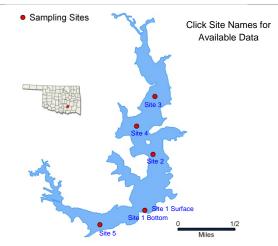
NTU = nephelometric turbidity units μ S/cm = microsiemens per centimeter E. coli = Escherichia coli

OWQS = Oklahoma Water Quality Standards mV = millivoltsChlor-a = Chlorophyll-a

mg/L = milligrams per liter μ S/cm = microsiemens/cm ppt = parts per thousand En = Enterococci

Coalgate City Sample Period October 2006 - July 2007 Times Visited Sampling Sites

	October 2000 July	2001	T	<u> </u>
	Location	Coal Count	у	Click map for site data
5	Impoundment	1965		
	Area	352 acres		
	Capacity	3,437 acre-	feet	
	_			



	Pur	poses	Water Supply,	Recreati	on and F	lood Con	trol				Site 5		Miles	
		Parameter (Des	criptions)	Result					Notes/0	Commen	its			
		Average Turbidit	У	92 NTU	J				85% of	values >	OWQS (of 25 NTU	l	
		Average True Co	olor	249 uni	its				100% o	f values :	> OWQS	of 70		
		Average Secchi	Disk Depth	26 cm										
		Water Clarity Ra	ting	poor										
		Trophic State Inc	dex	47										
ន		Trophic Class		mesotre	ophic									
Parameters		Salinity		0.01 –	0.02 ppt									
aran	συ	Specific Conduct	tivity	47.1 –	72.7 µS/c	m								
<u> </u>	Profile	рН		6.32-8	3.03 pH u	nits			Only 8 (8%) of v	ales < 6.	5 pH units	3	
	₫.	Oxidation-Reduc	ction Potential	230 to	445 mV									
		Dissolved Oxyge	en	Up to 7 July	1% of wa	iter colum	nn < 2 mç	g/L in	Occurr	ed at site	2			
	ts	Surface Total Nit	trogen	0.90 m	g/L to 1.4	3 mg/L								
	Nutrients	Dissolved Oxygen Surface Total Nitrogen Surface Total Phosphorus Nitrogen to Phosphorus Ratio		0.061 n	ng/L to 0.	155 mg/L	-							
	ž	Nitrogen to Phos	sphorus Ratio	13:1					Phosph	orus limi	ted			
		Click to learn Beneficial Uses	more about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
ses	Fish	n & Wildlife Propag	gation	NS	S	NS	S							
<u></u>	Aes	thetics						S	NS					
Beneficial Uses	Agr	iculture								S	S	S		
ene	Prin	nary Body Contac	t Recreation										NEI	
a	Pub	olic & Private Wate	er Supply											
	N	= Fully Supporting S = Not Supporting El = Not Enough Inf	iormation Sometime So		CR benefic or fecal co		nnot be as	ssessed a	s minimum	data requ	uirement v	vere not me	et due to (QA/QC

NTU = nephelometric turbidity units $\mu S/cm = microsiemens per centimeter$ E. coli = Escherichia coli OWQS = Oklahoma Water Quality Standards mV = millivolts Chlor-a = Chlorophyll-a mg/L = milligrams per liter μS/cm = microsiemens/cm ppt = parts per thousand En = Enterococci

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Sampling Sites Comanche **Times** Sampling Sites Sample Period Visited December 2010 - August 2011 5 Location Stephens County Click map for site data Impoundment 1960 General Click Site Names for Available Data Area 184 acres Capacity 2,500 acre-feet Water Supply and Recreation **Purposes Notes/Comments** Parameter (Descriptions) Result Average Turbidity 12 NTU 100% of values < OWQS of 25 NTU Average Secchi Disk Depth 86 Did not collect for true color Situ Water Clarity Rating Good Chlorophyll-a 8 mg/m3 **Trophic State Index** 50 Previous value = 58 **Trophic Class** Mesotrophic **Parameters** Salinity 0.14 - 0.2 ppt $284.8 - 398.1 \,\mu\text{S/cm}$ Specific Conductivity Profile рΗ 6.9 - 8.89 pH units Neutral to slightly alkaline Oxidation-Reduction Potential -47 to 427 mV 50% of water column < 2.0 mg/L in Dissolved Oxygen summer Surface Total Nitrogen 0.49 mg/L to 0.72 mg/L **Nutrients** Surface Total Phosphorus 0.015 mg/L to 0.031 mg/L Nitrogen to Phosphorus Ratio 28:1 Phosphorus limited Total Dissolved Solids Dissolved Chlorides Turbidity Sulfates Click to learn more about Chlor-a Metals En & E. coli True Beneficial Uses $\overline{\Sigma}$ H **Beneficial Uses** S S S S Fish & Wildlife Propagation **Aesthetics** S Agriculture S Primary Body Contact Recreation S Public & Private Water Supply S = Fully SupportingNotes *Did not collect for these parameters NS = Not Supporting NEI = Not Enough Information

OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

NTU = nephelometric turbidity units

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter

mg/L = milligrams per liter

µS/cm = microsiemens/cm

ppt = parts per thousand

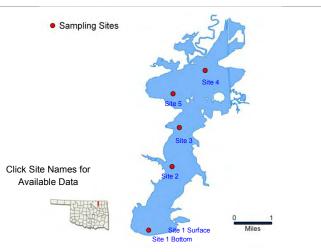
C	opan							
	Sample Period	d	Times Visited	Sampling Sites				
	October 2007 - July	2008	4	5				
	Location	Washingtor	County	Click map for site data				
<u>a</u>	Impoundment	1983						
General	Area	4,850 acres	4,850 acres					
ပိ	Capacity	43,400 acre-feet						
	Purnoses	Flood Cont	rol, Water Su	upply, Water Quality				

Purposes

NTU = nephelometric turbidity units

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter



	Pui	rposes	Control, Fis	sh a	nd Wildli	fe, and R	ecreation	1		Site 1 Bottom							
		Parameter (Des	scriptions)		Result					Notes/0	Commer	nts					
		Average Turbidi	ty		46 nepl	nelometri	c turbidity	y units (N	TU)	80% of	values >	25 NTU					
		Average True C	olor		123 uni	ts				60% of	values >	OWQS (of 70				
		Average Secchi	Disk Depth		32 cm												
		Water Clarity Ra	ating		average	9											
		Trophic State In	dex		60					Previou	s value =	= 51					
SIS		Trophic Class			eutroph	ic											
Parameters		Salinity			0.07 - 0	.14 ppt											
arar	a	Specific Conduc	tivity		152.2 –	286.8 μ	S/cm										
<u>a</u>	Profile	pН			6.95 – 8	3.33 pH ι	units			Neutral to slightly alkaline							
	•	Oxidation-Reduc	ction Potentia	al	230 to 486 mV												
		Dissolved Oxyge	en		44% of	water co	lumn < 2	mg/L in .	July	Occurr	ed at site	1, the d	am				
	ts S	Surface Total Ni	trogen		0.49 m	g/L to 1.2	24 mg/L										
	Nutrients	Surface Total Ph	nosphorus		0.034 n	0.034 mg/L to 0.160 mg/L											
	Z	Nitrogen to Phos	sphorus Ratio)	10:1					Phosph	orus limi	ted					
		Click to learn m Beneficial Uses	nore about		Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ses	Fisl	h & Wildlife Propa	gation		NS	S	S	S									
<u></u>	Aes	sthetics							S	NS							
ficia	Agr	riculture									S	S	S				
Beneficial Uses	Prir	mary Body Contac	t Recreation											NEI			
m	Pul	blic & Private Wate	er Supply											NS			
	٨	S = Fully Supporting NS = Not Supporting NEI = Not Enough In	formation	Notes		CR cannot enterocod		sed as mir	nimum da	ta requiren	nents were	e not met o	due to QA/	QC issues	for E.		

OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

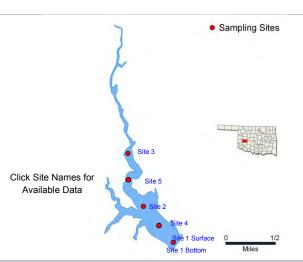
ppt = parts per thousand En = Enterococci

Crowder **Times** Sampling Sites **Sample Period Visited** 5 November 2005 - August 2006 4 Location Washita County Click map for site data Impoundment 1959 General Area 158 acres Capacity 2,094 acre-feet **Purposes** Flood Control, Recreation

NTU = nephelometric turbidity units

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter



		Parameter (<u>Descriptions</u>)	Result												
		Average Turbidity	9 NTU					100% o	f values	< OWQS	of 25 NT	U			
		Average True Color	17 units	3				100% o	f values	< OWQ	S of 70				
		Average Secchi Disk Depth	65 cm												
		Water Clarity Rating	average	е											
		Trophic State Index	57												
હ		Trophic Class	eutroph	nic											
Parameters		Salinity	0.38-0).57 ppt											
ıran	a)	Specific Conductivity	744 – 1	088 μS/c	m										
<u> </u>	Profile	pH	7.03– 8	3.34 pH u	nits			Neutral to slightly alkaline							
	₫.	Oxidation-Reduction Potential	275- 44	15 mV											
		Dissolved Oxygen	Up to 3 May	7.5% of v	water colu	ımn < 2 r	ng/L in	Occurre	ed at site	s 1 and	2				
	ts	Surface Total Nitrogen	0.54 m	g/L to 0.9	3 mg/L										
	Nutrients	Surface Total Phosphorus	0.026	mg/L to 0	.053 mg/	L									
	Ž	Nitrogen to Phosphorus Ratio	21:1					Phosphorus Limited							
		Click to learn more about Beneficial Uses	Turbidity	표	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ses	Fish	h & Wildlife Propagation	S	S	S	S									
<u></u>	Aes	sthetics					NS*	S							
ficia	Agr	iculture							S	S	S				
Beneficial Uses	Prin	Primary Body Contact Recreation										S			
m	Pub	olic & Private Water Supply											NS		
	Ν	S = Fully Supporting IS = Not Supporting IEI = Not Enough Information						ng that the ducted to c			ial use is co status	onsidered			

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OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

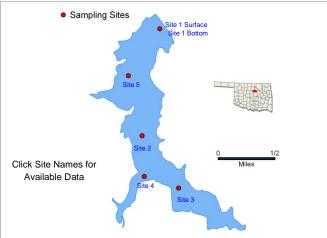
mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

ppt = parts per thousand

Cushing Municipal

	Sample Period	k	Times Visited	Sampling Sites
	October 2011 - July	2012	4	5
	Location	Payne Cou	nty	Click map for site data
<u>.</u>	Impoundment	1950		
5	Area	591 acres		
ב ס	Capacity	3,304 acre-	feet	
	Purposes	Water Supp	oly, Recreation	on



	Pur	poses	Water Supply,	Recreati	on										
		Parameter (Des	criptions)	Result					Notes/0	Commen	its				
		Average Turbidit	у	44 NTU	I				92% of	values >	OWQS (of 25 NTL	J		
		Average Secchi	Disk Depth	25 cm											
		Water Clarity Ra	ting	Poor											
		Chlorophyll-a		7 mg/r	n3										
		Trophic State Inc	dex	50					Previou	s value =	: 50				
ည		Trophic Class		Mesotro	ophic										
Parameters		Salinity		0.15 – 0	0.19 ppt										
ıran	4	Specific Conduc	tivity	324 – 4	02 μS/cr	n									
P.	Profile	рН		7.32–8	.20 pH u	nits			Neutral to slightly alkaline						
	ፈ	Oxidation-Reduc	ction Potential	335 to 6	613 mV										
		Dissolved Oxyge	en	Up to 1 July	7% of wa	iter colum	nn < 2 mg	g/L in							
	ts	Surface Total Nit	trogen	0.56 mg	g/L to 1.1	2 mg/L									
	Nutrients	Surface Total Ph	osphorus	0.038 m	ng/L to 0.	113 mg/L	_								
	Ž	Nitrogen to Phos	sphorus Ratio	10:1					Phosph	orus limi	ted				
		Click to learn m Beneficial Uses	ore about	Turbidity	된	Dissolved Oxygen	Metals	TSI	True	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
Beneficial Uses	Fish	n & Wildlife Propag	gation	NS	S	S	S								
<u>_</u> _	Aes	sthetics						S	N/A						
ficia	Agr	riculture								N/A	N/A	S			
ene	Prir	mary Body Contac	t Recreation										S		
<u> </u>	Pub	olic & Private Wate	er Supply												
	٨	S = Fully Supporting IS = Not Supporting IEI = Not Enough Inf	iormation spon	*N/A – p	arameters	s not colled	cted in cur	rent samp	ole year.						

NTU = *nephelometric turbidity units* μ S/cm = microsiemens per centimeter E. coli = Escherichia coli

OWQS = Oklahoma Water Quality Standards

mg/L = milligrams per liter μ S/cm = microsiemens/cm ppt = parts per thousand En = Enterococci

mV = millivoltsChlor-a = Chlorophyll-a

Dave Boyer (Walters)

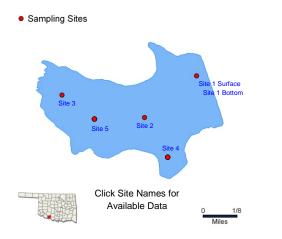
 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

mV = millivolts

Chlor-a = Chlorophyll-a

	Sample Period	d	Visited	Sampling Sites
	October 2007 – July	2008	4	5
	Location	Cotton Cou	nty	Click map for site data
<u>.</u>	Impoundment	1936		
<u>a</u>	Area	148 acres		
ช 5	Capacity	861 acre fe	et	
	Purposes	Water Sup	ply, and Rec	reation



	Pur	poses	Water Supply, and Recreation										MACROSTON			
		Parameter (Des	scriptions)	Result					Notes/0	commen	its					
		Average Turbidit	ty	98 nepl	nelometri	c turbidity	units (N	TU)	75% of	values >	25 NTU					
		Average True Co	olor	166 uni	ts				75% of	values >	OWQS	of 70				
		Average Secchi	Disk Depth	21 cm												
		Water Clarity Ra	ating	poor												
		Trophic State Inc	dex	51					Previou	s value =	= 52					
S		Trophic Class		eutroph	ic											
Parameters		Salinity		0.12 – 0	0.17 ppt											
arar	ø	Specific Conduc	tivity	253.8 -	· 353 µS/	cm										
ä	pH pH			7.92 – 8.34 pH units						to slightl	y alkalin	е				
	₫.	Oxidation-Reduc	ction Potential	376 to												
		Dissolved Oxyge						All value	es >7 mg	ı/L						
	Ŋ	Surface Total Ni	trogen	0.47 mg/L to 1.19 mg/L												
	Nutrients	Surface Total Ph	nosphorus	0.029 mg/L to 0.138 mg/L												
	Z	Nitrogen to Phos	sphorus Ratio	10:1				Phosphorus limited								
		Click to learn Beneficial Uses	more about	Turbidity	된	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ses	Fisl	h & Wildlife Propa	gation	NS	S	S	S									
Beneficial Uses	Aes	sthetics						S	NS							
ficia	Agr	riculture								S	S	S				
eue	Prir	mary Body Contac	t Recreation										NEI			
m	Puk	olic & Private Wate	er Supply													
	٨	S = Fully Supporting IS = Not Supporting IEI = Not Enough Int														
		phelometric turbidity			ma Water	Quality Sta	andards		= milligram			t = parts pe		d		

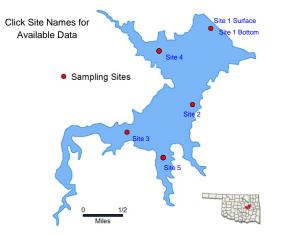
 μ S/cm = microsiemens/cm

Dripping Springs

 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

	Sample Period	t	Times Visited	Sampling Sites					
	October 2011 - July	2012	4	5					
	Location	Okmulgee	County	Click map for site data					
<u></u>	Impoundment	1950							
General	Area	1,150 acres	es						
9	Capacity	16,200 acre	cre-feet						
	Purposes	Water Supp	oly, Recreation	on and Flood Control					



	Fui	poses	water Supply,	Recreation and Flood Control											
		Parameter (Des	scriptions)	Result					Notes/0	Commen	its				
		Average Turbidi	ty	9 NTU					100% c	f values	< OWQS	of 25 NT	U (n=12)		
		Average Secchi	Disk Depth	76 cm											
		Water Clarity Ra	ating	Good											
		Chlorophyll-a		5 mg/	m3										
		Trophic State In	dex	46					Previous value = 54						
		Trophic Class		Mesotr	ophic										
etel		Salinity		0.06 –	0.09 ppt										
Parameters		Specific Conduc	tivity	122 – 1	192µS/cm)									
Ра	pH Outdation Reduction Retartion				7.99 pH u	nits			Only 3.	54% of va	alues bel	low 6.5			
	Oxidation-Reduction Potential				633.8 m										
	Dissolved Oxygen			Up to 57% of water column < 2.0 mg/L in July											
	S	Surface Total Ni	Surface Total Nitrogen			0.28 mg/L to 0.73 mg/L									
	Nutrients	Surface Total Ph	nosphorus	0.005 mg/L to 0.005 mg/L											
	N	Nitrogen to Phos	sphorus Ratio	107:1					Phosphorus limited						
		Click to learn m Beneficial Uses	nore about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
ses	Fish	h & Wildlife Propa	gation	S	S	*	*								
Š	Aes	sthetics						S	N/A						
icia	Agr	riculture								N/A	N/A	S			
Beneficial Uses	Prir	mary Body Contac	t Recreation										NS		
m	Puk	olic & Private Wate	er Supply												
	٨	S = Fully Supporting IS = Not Supporting IEI = Not Enough In	formation Square			s not collec undetermi			ole year.						
		phelometric turbidity			ma Water	Quality Sta	andards		= milligram			t = parts pe		d	

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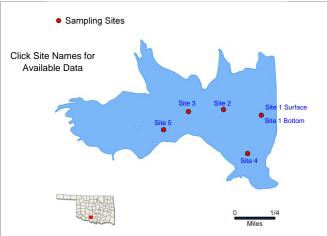
mV = millivolts

Chlor-a = Chlorophyll-a

 μ S/cm = microsiemens/cm

Duncan

	Sample Period	t	Times Visited	Sampling Sites					
N	ovember 2006 - Aug	ust 2007	4	5					
	Location	Stephens (County	Click map for site data					
৳	Impoundment	1937							
פופו	Area	500 acres	00 acres						
ָ פֿל	Capacity	7,200 acre-	e-feet						
	Purposes	Water Supp	oly, Recreation	on					



	Pur	poses Water Supply,	Recreati	on											
		Parameter (<u>Descriptions</u>)	Result					Notes/0	Commer	ıts					
		Average Turbidity	15 NTU	J				100% o	f values	< OWQS	of 25 NT	U			
		Average True Color	34 units	S				15% of	values >	owqs	of 70				
		Average Secchi Disk Depth	58 cm												
		Water Clarity Rating	averag	е											
		Trophic State Index	57												
ត		Trophic Class	eutroph	nic											
Parameters		Salinity	0.12 -	0.24 ppt											
aran	a	Specific Conductivity	244.5 -	- 472.2 μ	S/cm										
<u> </u>	Profile	рН	7.32–8	Only 13	(7.8%)	of values	< 6.5 pH	units							
	₫	Oxidation-Reduction Potential	95 to 426 mV												
		Dissolved Oxygen	Up to 2 August	2% of wa	nn < 2 m(g/L in	Occurr	ed at site	2						
	ts	Surface Total Nitrogen	0.59 m	g/L to 0.8	4 mg/L										
	Nutrients	Surface Total Phosphorus	0.016 mg/L to 0.039 mg/L												
	ž	Nitrogen to Phosphorus Ratio	26:1					Phosphorus limited							
		Click to learn more about Beneficial Uses	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ses	Fish	n & Wildlife Propagation	S	S	S	S									
<u>≅</u>	Aes	sthetics					S	NS							
ficia	Agr	iculture							S	S	S				
Beneficial Uses	Prin	mary Body Contact Recreation										NEI			
8	Pub	olic & Private Water Supply													
	Ν	S = Fully Supporting IS = Not Supporting IEI = Not Enough Information	The PBCR beneficial use cannot be assessed as minimum data requirement were not met due to QA/QC issues for fecal coliform and enterococci.								QA/QC				

NTU = nephelometric turbidity units $<math>\mu S/cm = microsiemens per centimeter$ E. coli = Escherichia coli

OWQS = Oklahoma Water Quality Standards mV = millivolts Chlor-a = Chlorophyll-a mg/L = milligrams per liter μS/cm = microsiemens/cm ppt = parts per thousand En = Enterococci

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EIReno Sample Period December 2011 - August 2012 Times Visited Sampling Sites 3

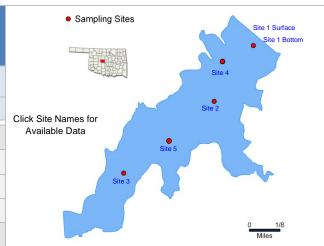
	Location	Canadian	County	Click map for site data					
5	Impoundment	1937							
	Area	500 acres							
5	Capacity	7,200 acre-	feet						
	Purposes	Flood Control, Recreation							

 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

mV = millivolts

Chlor-a = Chlorophyll-a



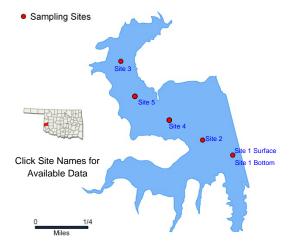
	Purposes Flood Cont Parameter (Descriptions)		Flood Control,	Recreati	ion				~				Miles					
		Parameter (Des	scriptions)				Notes/0	Commer	ıts									
		Average Turbidit	ty	36 NTU	J				50% of	values >	OWQS	of 25 NTL	J (n=12)					
		Average Secchi	Disk Depth	25 cm														
	jįt	Water Clarity Ra	iting	Poor														
	In Situ	Chlorophyll-a		20 mg	ı/m3													
		Trophic State Inc	dex	78														
ည		Trophic Class		Hypere	utrophic													
Parameters		Salinity		0.55 –	0.81 ppt													
ıran	Specific Conductivity			1108 –	1617 µS	/cm												
P	Profile	рН		7.70 – 9.22 pH units						alkaline								
	ፈ	Oxidation-Reduc	ction Potential	225 to 544 mV														
		Dissolved Oxyge	en	All data mg/L	All data are above screening level of 2.0 mg/L													
	ts	Surface Total Ni	trogen	1.33 mg/L to 2.69 mg/L														
	Nutrients	Surface Total Ph	0.149 mg/L to 0.441 mg/L															
	ž	Nitrogen to Phos	sphorus Ratio	7:1					Possibly co-limited									
		Click to learn m Beneficial Uses	oore about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a				
ses	Fish	h & Wildlife Propa	gation	NS	S	S	S											
Š	Aes	sthetics						NS	N/A									
ficia	Agriculture									S	S	S						
Beneficial Uses	Prir	mary Body Contac	t Recreation										NEI					
m	Pub	olic & Private Wate	er Supply															
	٨	S = Fully Supporting IS = Not Supporting IEI = Not Enough Int	formation spot			s not colled SI and chlo				ecommen	ded to be	to be considered and NLW.						
		phelometric turbidity		= Oklaho	ma Water	Quality St	andards		= milligram			t = parts pe		d				

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 μ S/cm = microsiemens/cm

Elk City

	Sample Period	d	Times Visited	Sampling Sites
Ν	ovember 2005 - Aug	ust 2006	4	5
	Location	Beckham C	County	Click map for site data
<u>a</u>	Impoundment	1970		
General	Area	240 acres		
ပ္	Capacity	2,583 acre-	feet	
	Purposes	Flood Con	trol. Recreati	on



	Pur	poses	Flood Control	, Recreat	ion				Mile	es						
		Parameter (Des	criptions)	Result					Notes/0	Commen	ts					
		Average Turbidit	у	15 NTL	J				100% o	f values	< OWQS	of 25 NT	U			
		Average True Co	olor	26 units	3				100% o	f values	< OWQS	S of 70				
		Average Secchi	Disk Depth	56 cm												
		Water Clarity Ra	ting	Fair to	poor											
		Trophic State Inc	dex	59												
<u>s</u>		Trophic Class		eutroph	nic											
Parameters		Salinity		0.30-0).39 ppt											
ıran	a)	Specific Conduc	tivity	593.3 -	- 749.9 μ	S/cm										
<u> </u>	Profile	рН		7.70– 8	3.49 pH ι	units			Neutral	to slightl	y alkaline	e				
	₫	Oxidation-Reduc	tion Potential	374 - 448 mV												
		Dissolved Oxyge	en	Up to 2 May	2% of wa	ater colum	nn < 2 m(g/L in								
	ıts	Surface Total Nit	trogen	0.74 m	ng/L to 1.0	08 mg/L										
	Nutrients	Surface Total Ph	osphorus	0.037 mg/L to 0.067 mg/L												
	ž	Nitrogen to Phos	17:1					Possibly co-limited								
		Click to learn Beneficial Uses	more about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
Beneficial Uses	Fish	n & Wildlife Propag	gation	S	S	S	S									
a C	Aes	sthetics						NS*	S							
ficia	Agr	iculture								S	S	S				
ene	Prir	mary Body Contac	t Recreation										S			
<u> </u>	Public & Private Water Supply															
	٨	S = Fully Supporting IS = Not Supporting IEI = Not Enough Inf	Formation Something Someth						ing that the ducted to c			ial use is co status	onsidered			

NTU = nephelometric turbidity units $\mu S/cm = microsiemens per centimeter$ E. coli = Escherichia coli OWQS = Oklahoma Water Quality Standards mV = millivolts Chlor-a = Chlorophyll-a mg/L = milligrams per liter μS/cm = microsiemens/cm ppt = parts per thousand En = Enterococci

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Ellsworth Times **Sample Period** Sampling Sites Visited November 2011 - August 2012 4 5 Location Comanche County Click map for site data 1962 Impoundment General Area 5,600 acres Capacity 95,200 acre-feet

NTU = *nephelometric turbidity units*

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter



	Pur	poses	Water Supply,									A.					
		Parameter (Des	scriptions)	Result					Notes/	Commen	its						
		Average Turbidi	ty	31 NTL	J				56% of	values >	OWQS	of 25 NTU	l (n=20)				
		Average Secchi	Disk Depth	27 cm													
	In Situ	Water Clarity Ra	ating	Poor													
	<u>=</u>	Chlorophyll-a		20 mg	/m3												
		Trophic State In	dex	60					Previou	Previous value = 54							
S		Trophic Class		Eutroph	nic												
Parameters		Salinity		0.25 – 0	0.30 ppt												
aran	ω.	Specific Conduc	tivity	520 – 6	607 μS/cr	n											
٣	Profile	рН		7.79 – 8.88 pH units						alkaline							
	<u>~</u>	Oxidation-Reduc	ction Potential	-129 to	349 mV												
	Dissolved Oxygen All data are above screening le mg/L					ing level	of 2.0										
	Surface Total Nitrogen 0.95 r			0.95 mg	g/L to 1.4	7 mg/L											
	Nutrients	Surface Total Ph	nosphorus	0.039 n	ng/L to 0.	.098 mg/L	-										
	ž	Nitrogen to Phos	sphorus Ratio	20:1					Phosphorus limited								
		Click to learn m Beneficial Uses	nore about	Turbidity	H.	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a			
ses	Fish	n & Wildlife Propa	gation	NS	S	S	*										
a U	Aes	sthetics						S	N/A								
fici	Agr	Agriculture								N/A	N/A	S					
Beneficial Uses	Prir	Primary Body Contact Recreation											S				
m	Pub	olic & Private Wate	er Supply											NS			
	٨	S = Fully Supporting IS = Not Supporting IEI = Not Enough In		*N/A – p	parameters	s not collec	cted in cur	rent samp	ole year.								

OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

mg/L = milligrams per liter

 $\mu \tilde{S}/cm = microsiemens/cm$

ppt = parts per thousand

Elmer Thomas

NTU = nephelometric turbidity units

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter

	Sample Period	t	Times Visited	Sampling Sites
	October 2006 - July	2007	4	5
	Location	Comanche	County	Click map for site data
5	Impoundment			
	Area	334 acres		
, i	Capacity	12,000 acre	e-feet	
	Purposes	Recreation		



	Purposes Recreation														
		Parameter (Desc	criptions)	Result					Notes/0	Commen	its				
		Average Turbidity	/	2 NTU					100% o	f values	< OWQS	of 25 NT	U		
		Average True Co	lor	27 units	3				100% o	f values	< OWQS	of 70			
		Average Secchi [Disk Depth	175 cm											
		Water Clarity Rat	ing	excelle	ent										
		Trophic State Ind	ex	39											
ត		Trophic Class		oligotro	phic										
Parameters		Salinity		0.01 – 0	0.07 ppt										
aran	ω	Specific Conduct	ivity	36.2 –	150.6 µS	/cm									
<u>a</u>	Profile	рН		5.43 – 8	8.13 pH ι	ınits			38 (15.4	1%) of va	lues < 6.	5 pH unit	S		
	₫.	Oxidation-Reduct	tion Potential	41 to 52											
		Dissolved Oxyge	n	Up to 7 July	6% of wa	iter colum	nn < 2 mç	g/L in	Occurr	ed at site	s 1 and 2	2			
	ts	Surface Total Nitrogen 0.31 mg/L to 0.63 mg/L													
	Nutrients	Surface Total Pho	osphorus	0.005 mg/L to 0.015 mg/L											
	ž	Nitrogen to Phos	phorus Ratio	46:1					Phosphorus limited						
		Click to learn Beneficial Uses	more about	Turbidity	Hd	Dissolved Oxygen	Metals	ISI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
ses	Fish	n & Wildlife Propag	ation	S	NS	NS	S								
<u>ء</u>	Aes	sthetics						S	S						
Beneficial Uses	Agr	iculture								S	S	S			
ene	Prin	nary Body Contact	Recreation										NEI		
a	Pub	Public & Private Water Supply													
	N	E = Fully Supporting IS = Not Supporting IEI = Not Enough Info	ormation	The PBCR beneficial use cannot be assessissues for <i>E. coli</i> and fecal coliform.					s minimum	data requ	uirement v	vere not me	et due to (QA/QC	

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OWQS = Oklahoma Water Quality Standards

mV = millivolts

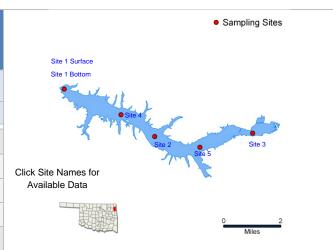
Chlor-a = Chlorophyll-a

mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

ppt = parts per thousand

Ε	Eucha												
	Sample Period	d	Times Visited	Sampling Sites									
N	ovember 2006 - Aug	ust 2007	4	5									
	Location	Delaware C	County	Click map for site data									
<u>a</u>	Impoundment	1952											
General	Area	2,860 acres											
Ö	Capacity	79,600 acre	e-feet										



	Parameter (Des Average Turbidit Average True Co Average Secchi Water Clarity Ra	blor Disk Depth	Result 4 NTU 14 units					Notes/C	ommen	ts					
	Average True Co Average Secchi Water Clarity Ra	olor Disk Depth	14 units	3											
	Average Secchi Water Clarity Ra	Disk Depth							100% of values < OWQS of 25 NTU						
	Water Clarity Ra			•				100% of	values •	< OWQS	of 70				
			151 cm												
		iting	excelle	ent											
	Trophic State Inc	dex	50												
	Trophic Class		mesotre	ophic											
	Salinity		0.07 – 0.14 ppt												
	Specific Conduct	tivity	168.2 -	- 296.3 μ	S/cm										
	pH		7.15 –	3.76 pH ι	units			Neutral	to slightly	y alkalin	e				
	Oxidation-Reduc	ction Potential	63 to 5	00 mV											
	Dissolved Oxyge	en			ater colum	n < 2 m	g/L in	Occurre	ed at site	s 1, the	dam				
O.	Surface Total Nit	trogen	0.36 mg	g/L to 3.2	26 mg/L										
	Surface Total Ph	nosphorus	0.007 mg/L to 0.050 mg/L												
2	Nitrogen to Phos	sphorus Ratio	71:1					Phosphorus limited							
	Click to learn Beneficial Uses	more about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ish	& Wildlife Propag	gation	S	S	NS	S									
est	thetics						NS	S							
gri	culture								S	S	S				
rim	nary Body Contact	t Recreation										S			
ubl	lic & Private Wate	er Supply													
NS	S = Not Supporting	formation §							(NLW) in	the Okla	homa Wate	r Quality			
r	gri im ub Ni	Salinity Specific Conduct pH Oxidation-Reduct Dissolved Oxyge Surface Total Ni Surface Total Ph Nitrogen to Phose Click to learn Beneficial Uses Sh & Wildlife Propagathetics griculture imary Body Contact ublic & Private Wate S = Fully Supporting NS = Not Supporting NEI = Not Enough Interpretation	Salinity Specific Conductivity pH Oxidation-Reduction Potential Dissolved Oxygen Surface Total Nitrogen Surface Total Phosphorus Nitrogen to Phosphorus Ratio Click to learn more about Beneficial Uses Sh & Wildlife Propagation esthetics griculture imary Body Contact Recreation ublic & Private Water Supply S = Fully Supporting NS = Not Supporting NEI = Not Enough Information ephelometric turbidity units OWQS	Salinity Specific Conductivity pH 7.15 – 8 Oxidation-Reduction Potential Dissolved Oxygen Surface Total Nitrogen Surface Total Phosphorus Nitrogen to Phosphorus Ratio Click to learn more about Beneficial Uses Sh & Wildlife Propagation Sthetics griculture imary Body Contact Recreation ublic & Private Water Supply S = Fully Supporting NS = Not Supporting NE = Not Enough Information ephelometric turbidity units OWQS = Oklahoo Oxidation-Reduction Potential 63 to 56 Up to 7 August 7.15 – 8 0.007 m 0.007 m Salinity The lake Standard OWQS = Oklahoo OWQS = Oklahoo OND TOTAL ON TOTA	Salinity Specific Conductivity pH 7.15 – 8.76 pH to 7.15 – 8.76 pH to 7.15 – 8.76 pH to 7.15 of Ward August Surface Total Nitrogen Surface Total Phosphorus Nitrogen to Phosphorus Ratio Click to learn more about Beneficial Uses State & Wildlife Propagation State & Wildlife Propagation Sesthetics Griculture Imary Body Contact Recreation Iblic & Private Water Supply S = Fully Supporting NS = Not Supporting NS = Not Supporting NEI = Not Enough Information Supplementation Supplementation OWQS = Oklahoma Water OWQS = Oklahoma Water	Salinity Specific Conductivity PH 7.15 – 8.76 pH units Oxidation-Reduction Potential Dissolved Oxygen Surface Total Nitrogen Surface Total Phosphorus Nitrogen to Phosphorus Ratio Click to learn more about Beneficial Uses Sh & Wildlife Propagation Stathetics Griculture imary Body Contact Recreation ublic & Private Water Supply S = Fully Supporting NS = Not Supporting NS = Not Supporting NE Not Enough Information Rephelometric turbidity units OWQS = Oklahoma Water Quality State 168.2 - 296.3 µS/cm 7.15 - 8.76 pH units 63 to 500 mV Up to 71% of water column August 0.36 mg/L to 0.050 mg/L 71:1 Power P	Salinity Specific Conductivity pH 7.15 – 8.76 pH units Oxidation-Reduction Potential Dissolved Oxygen Surface Total Nitrogen Surface Total Phosphorus Nitrogen to Phosphorus Ratio Click to learn more about Beneficial Uses Sh & Wildlife Propagation Surface Total Recreation sh & Wildlife Propagation Sethetics priculture imary Body Contact Recreation ublic & Private Water Supply S = Fully Supporting NS = Not Supporting NS = Not Supporting NE Not Enough Information SOWQS = Oklahoma Water Quality Standards OWQS = Oklahoma Water Quality Standards	Salinity Specific Conductivity pH 7.15 – 8.76 pH units Oxidation-Reduction Potential Dissolved Oxygen Up to 71% of water column < 2 mg/L in August Surface Total Nitrogen Surface Total Phosphorus Nitrogen to Phosphorus Ratio Click to learn more about Beneficial Uses Sh & Wildlife Propagation S S NS S Stathetics Picture Imary Body Contact Recreation Inblic & Private Water Supply S = Fully Supporting NS = Not S	Salinity Dissolved Oxygen Dissolved Oxygen Surface Total Nitrogen Surface Total Phosphorus Nitrogen to Phosphorus Ratio Click to learn more about Beneficial Uses Sh & Wildlife Propagation Sh & Wildlife Propagation Sh & Wildlife Propagation Sephelometric turbidity units Oxoga Surface Surface	Salinity Dissolved Oxygen Dissolved Oxygen Surface Total Nitrogen Surface Total Phosphorus Nitrogen to Phosphorus Ratio Click to learn more about Beneficial Uses Sh & Wildlife Propagation Surface Total Recreation Surface Total Recreation Surface Total Recreation The lake is currently listed as a Nutrient Limited Watershed (NLW) in Standards (WQS) and is considered nutrient threatened.	Salinity Specific Conductivity 168.2 – 296.3 µS/cm pH 7.15 – 8.76 pH units Neutral to slightly alkaling Oxidation-Reduction Potential 63 to 500 mV Up to 71% of water column < 2 mg/L in August Surface Total Nitrogen 0.36 mg/L to 3.26 mg/L Surface Total Phosphorus 0.007 mg/L to 0.050 mg/L Nitrogen to Phosphorus Ratio 71:1 Phosphorus limited Click to learn more about Beneficial Uses Standards (WQS) and is considered nutrient threatened. The lake is currently listed as a Nutrient Limited Watershed (NLW) in the Okla Standards (WQS) and is considered nutrient threatened.	Salinity Specific Conductivity 168.2 – 296.3 µS/cm pH 7.15 – 8.76 pH units Neutral to slightly alkaline Oxidation-Reduction Potential 63 to 500 mV Dissolved Oxygen Up to 71% of water column < 2 mg/L in August Surface Total Nitrogen Surface Total Phosphorus 0.007 mg/L to 0.050 mg/L Nitrogen to Phosphorus Ratio 71:1 Phosphorus limited Click to learn more about Beneficial Uses S NS S sethetics NS S spriculture S S S S simary Body Contact Recreation ublic & Private Water Supply S = Fully Supporting NS = Not Enough Information Oxidation-Reduction 168 is currently listed as a Nutrient Limited Watershed (NLW) in the Oklahoma Water Standards (WQS) and is considered nutrient threatened.	Salinity Specific Conductivity 168.2 - 296.3 µS/cm 7.15 - 8.76 pH units Neutral to slightly alkaline Oxidation-Reduction Potential Oxidation-Reductio		

 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

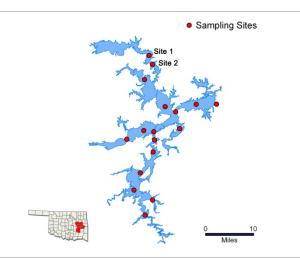
mV = millivolts

Chlor-a = Chlorophyll-a

 $\mu S/cm = microsiemens/cm$

Eufaula, Deep Fork Arm (1-2)

	Sample Period	t	Times Visited	Sampling Sites				
	January 2012 – July	2012	3	17				
	Location	Haskell Co	unty	Click map for site data				
<u>ख</u>	Impoundment	1964						
General	Area	105,000 acres						
Ger	Capacity	2,314,600 acre-feet						
	Purposes	Water Supp Sediment C		ntrol, Hydropower,				



		Parameter (Descriptions)	Result	t				Notes/0	Commer	its					
		Average Turbidity	55 NT	U				50% of	values >	OWQS	of 25 NTL	J (n=6)			
		Average Secchi Disk Depth	21 cm												
	Situ	Water Clarity Rating	Poor												
	드	Chlorophyll-a	8 mg/	/m3											
		Trophic State Index	51												
S		Trophic Class	Eutrop	hic											
Parameters		Salinity	0.10 -	0.19 ppt											
ıran	a)	Specific Conductivity	205 –	411 µS/cr	n										
-G	Profile	pH	5.61 –	8.02pH u	nits			Only 3.	54% of v	alues be	low 6.5 pH	d units			
	_₽	Oxidation-Reduction Potential	292 –4	192 mV											
		Dissolved Oxygen	All data	a are abo	ve screer	ning level	of 2.0								
	S	Surface Total Nitrogen	0.77 m	ng/L to 1.5	66 mg/L										
	Nutrients	Surface Total Phosphorus	0.029	0.029 mg/L to 0.138 mg/L											
	Z	Nitrogen to Phosphorus Ratio	14:1	14:1					Phosphorus limited						
		Click to learn more about Beneficial Uses	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a		
ses	Fisl	h & Wildlife Propagation	NS	S	S	*									
 	Aes	sthetics					S	N/A							
ficia	Agr	riculture							N/A	N/A	S				
Beneficial Uses	Prir	mary Body Contact Recreation										NEI			
m	Puk	blic & Private Water Supply													
	٨	S = Fully Supporting NS = Not Supporting NEI = Not Enough Information	and an		nt of the F	WP benefi	cial use c	annot be m			requiremen e year.	its were no	ot met		

NTU = nephelometric turbidity units $\mu S/cm = microsiemens per centimeter$ E. coli = Escherichia coli

OWQS = Oklahoma Water Quality Standards mV = millivolts Chlor-a = Chlorophyll-a mg/L = milligrams per liter μS/cm = microsiemens/cm ppt = parts per thousand En = Enterococci

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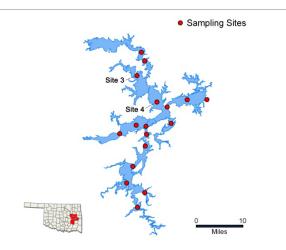
Eufaula, N. Canadian Arm (3-4)

	Sample Period	t	Times Visited	Sampling Sites					
	January 2012 – July	2012	3	17					
	Location	Haskell Co	unty	Click map for site data					
<u>ia</u>	Impoundment	1964	1964						
General	Area	105,000 ac	cres						
ဗီ	Capacity	2,314,600 acre-feet							
	Purposes	Water Supply, Flood Control, Hydropower, Sediment Control							

NTU = *nephelometric turbidity units*

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter



		Sediment Cor	trol											
		Parameter (<u>Descriptions</u>)	Result					Notes/	Commen	its				
		Average Turbidity	23 NTL	J				50% of	values >	OWQS	of 25 NTL	J (n=6)		
		Average Secchi Disk Depth	43 cm											
	Situ	Water Clarity Rating	Poor											
	<u>=</u>	Chlorophyll-a	6 mg/r	m3										
		Trophic State Index	48					Previous value = 55						
ত		Trophic Class	Mesotro	ophic										
Parameters		Salinity	0.15 –	0.22 ppt										
aran	ω	Specific Conductivity	316 – 4	64 μS/cr	n									
٣	Profile	рН	5.44 – 8	5.44 – 8.39 pH units					4% of va	lues are	below 6.5			
	₫	Oxidation-Reduction Potential	121 – 5	00 mV										
		Dissolved Oxygen	Up to 2 July	5% of wa	ater colum	nn < 2.0 r	mg/L in							
	ts	Surface Total Nitrogen	0.66 mg	g/L to 2.0	4 mg/L									
	Nutrients	Surface Total Phosphorus	0.017 n	0.017 mg/L to 0.112 mg/L										
	Ž	Nitrogen to Phosphorus Ratio	20:1	20:1					Phosphorus Limited					
		Click to learn more about Beneficial Uses	Turbidity	표	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a	
Beneficial Uses	Fis	h & Wildlife Propagation	NS	S	S	*								
<u></u>	Aes	sthetics					S	N/A						
ficia	Agı	riculture							N/A	N/A	S			
ene	Prir	mary Body Contact Recreation										NEI		
M	Pul	blic & Private Water Supply												
	S = Fully Supporting NS = Not Supporting NEI = Not Enough Information Although 38% of values exceeded the OWQS and an assessment of the FWP beneficial use *N/A – parameters not collected in current san							annot be n	the minim nade for th	num data i nis sample	equiremen eyear.	its were no	ot met	

OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

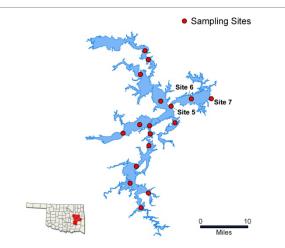
ppt = parts per thousand

Eufaula (5-7)

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter

	Sample Period	d	Visited	Sampling Sites				
	January 2012 – July	2012	3	17				
	Location	Haskell Co	unty	Click map for site data				
3	Impoundment	1964						
5	Area	105,000 ac	cres					
	Capacity	2,314,600 a) acre-feet					
	Purposes	Water Supp Sediment C	ply, Flood Control, Hydropower, Control					



		•	Sediment Con													
		Parameter (Des	criptions)	Result					Notes/	Commen	its					
		Average Turbidit	у	6 NTU					100% c	of values	< OWQS	of 25 NT	U (n=9)			
		Average Secchi	Disk Depth	101 cm												
		Water Clarity Ra	ting	Excelle	nt											
		Chlorophyll-a		8 mg/r	m3											
		Trophic State Inc	dex	51					Previou	s value =	= 55					
က်		Trophic Class		Eutroph	nic											
ete		Salinity		0.15 – 0	0.19 ppt											
Parameters		Specific Conduct	tivity	317 – 4	·11 μS/c	m										
Ра	Profile	рН		5.58 – 8	3.43 pH ι	units			Only 0.	54% of v	alues be	low 6.5 pH	l units			
	Ę	Oxidation-Reduc	ction Potential	97 – 461 mV												
		Dissolved Oxyge	en	Up to 4 July	8% of wa	ater colum	nn < 2.0 ı	mg/L in								
	ဟ	Surface Total Nit	trogen	0.56 mg	0.56 mg/L to 1.00 mg/L											
	Nutrients	Surface Total Ph	osphorus	0.005 mg/L to 0.050 mg/L												
	Ž	Nitrogen to Phos	sphorus Ratio	50:1				Phosphorus limited								
		Click to learn m Beneficial Uses	ore about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a		
ses	Fis	sh & Wildlife Propag	gation	S	S	S	*									
Beneficial Uses	Ae	sthetics						S	N/A							
ficia	Ag	riculture								N/A	N/A	S				
ene	Pri	mary Body Contact	t Recreation										NEI			
m	Pul	blic & Private Wate	er Supply													
	1	S = Fully Supporting NS = Not Supporting NEI = Not Enough Info	formation	*N/A – parameters not collected in current sample year.												

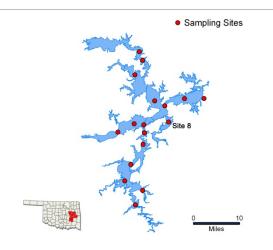
mV = millivolts

Chlor-a = Chlorophyll-a

 μ S/cm = microsiemens/cm

Eufaula, Longtown Creek Arm (8)

	Sample Period	t	Times Visited	Sampling Sites					
	January 2012 – July	2012	3	17					
	Location	Haskell Co	unty	Click map for site data					
<u>a</u>	Impoundment	1964							
General	Area	105,000 acres							
ပ္	Capacity								
	Purposes	Water Supp Control	ontrol, Hydropower, Sediment						



		Control												
		Parameter (<u>Descriptions</u>)	Result					Notes/	Commen	its				
		Average Turbidity	6 NTU					100% c	of values	< OWQS	of 25 NT	U (n=3)		
		Average Secchi Disk Depth	85 cm											
	Situ	Water Clarity Rating	Good											
	미	Chlorophyll-a	7 mg/r	n3										
		Trophic State Index	50					Previous value = 58						
S.		Trophic Class	Mesotr	ophic										
Parameters		Salinity	0.14 -	0.19 ppt										
aran	ω.	Specific Conductivity	n											
<u>a</u>	Profile	рН	5.84 –	8.64 pH ι	units			Only 7%	% of value	es below	6.5 pH u	nits		
	₫	Oxidation-Reduction Potential	197 – 4	144 mV										
		Dissolved Oxygen	All data mg/L	a above s	creening	level of	2.0							
	ts	Surface Total Nitrogen	0.53 m	g/L to 0.8	9 mg/L									
	Nutrients	Surface Total Phosphorus	0.005 r	0.005 mg/L to 0.014 mg/L										
	Ž	Nitrogen to Phosphorus Ratio	75:1					Phosphorus limited						
		Click to learn more about Beneficial Uses	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a	
ses	Fish	n & Wildlife Propagation	NS	S	S	*								
	Aes	ethetics					S	N/A						
ficia	Agr	iculture							N/A	N/A	S			
Beneficial Uses	Prin	mary Body Contact Recreation										NEI		
m	Pub	olic & Private Water Supply												
	Ν	S = Fully Supporting IS = Not Supporting IEI = Not Enough Information	and an : **N/A -	Although all values were less than the OWQS and an assessment of the FWP beneficial use **N/A – parameters not collected in current sa					the minim nade for th	num data i nis sample	requiremer e year.	its were no	ot met	

OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

NTU = *nephelometric turbidity units*

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter

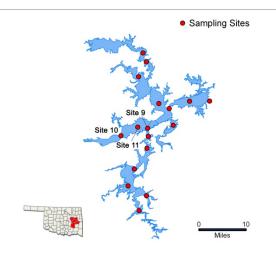
mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

ppt = parts per thousand

Eufaula, Canadian River Arm (9-11)

	Sample Period	d	Times Visited	Sampling Sites					
	January 2012 - July	2012	3	17					
	Location	Haskell Co	unty	Click map for site data					
5	Impoundment	1964							
	Area	105,000 ac	,000 acres						
	Capacity	2,314,600 a	acre-feet						
	Purposes	Water Supp Control	oly, Flood Co	ontrol, Hydropower, Sediment					
	D (D	t (!)	D = = 14						



		Parameter (Descriptions)	Result					Notes/Comments							
		,													
		Average Turbidity	25 NTU						33% of values > OWQS of 25 NTU (n=9)						
		Average Secchi Disk Depth	46 cm												
		Water Clarity Rating	Fair to Poor												
		Chlorophyll-a	8 mg/m3												
		Trophic State Index	50						Previous value = 57						
ย		Trophic Class	Eutroph	nic											
Parameters		Salinity	0.14 – 0.26 ppt												
aran	ø)	Specific Conductivity	308 - 5	539 µS/cı	m										
<u>م</u> ا	Profile	рН	5.26 – 8	3.76 pH u	units			Only 5.49% of values below 6.5 pH units							
	₫	Oxidation-Reduction Potential	128 – 4	77 mV											
		Dissolved Oxygen	Up to 2 the July		iter colum	nn < 2.0 r	ng/L in								
	ts	Surface Total Nitrogen	0.50 mg	g/L to 1.1	5 mg/L										
	Nutrients	Surface Total Phosphorus	0.016 m	ng/L to 0.	.078 mg/L	-									
	Ž	Nitrogen to Phosphorus Ratio	20:1					Phosphorus limited							
		Click to learn more about Beneficial Uses	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a		
ses	Fish	n & Wildlife Propagation	NS	S	S	*									
a U	Aes	ethetics					S	N/A							
fici	Agr	iculture							N/A	N/A	S				
Beneficial Uses	Prin	mary Body Contact Recreation										NEI			
m	Pub	olic & Private Water Supply													
	Ν	S = Fully Supporting IS = Not Supporting IEI = Not Enough Information	*N/A – p	arameters	s not collec	cted in cur	rent samp	le year.							

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

OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

NTU = *nephelometric turbidity units*

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter

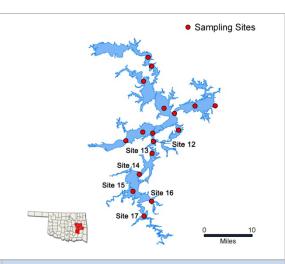
mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

ppt = parts per thousand

Eufaula, Gaines Creek Arm (12-17)

	Sample Period	t	Times Visited	Sampling Sites						
	January 2012 – July	2012	3	17						
	Location	Haskell Co	unty	Click map for site data						
<u>ত</u>	Impoundment	1964								
<u> </u>	Area	105,000 acres								
	Capacity	2,314,600 acre-feet								
	Purposes	Water Supp Control	oly, Flood Co	ontrol, Hydropower, Sediment						



		Parameter (Descriptions)	Result					Notes/Comments							
		Average Turbidity	61 NTU	J				67% of values > OWQS of 25 NTU (n=18)							
		Average Secchi Disk Depth	33 cm												
	In Situ	Water Clarity Rating	Poor	Poor											
	드	Chlorophyll-a	7 mg/m3												
		Trophic State Index	50					Previous value = 55							
હ		Trophic Class	Mesotrophic												
Parameters		Salinity	0.03 -	0.03 – 0.21 ppt											
ıran	a)	Specific Conductivity	67 – 43	2 μS/cm											
<u> </u>	Profile	рН	6.71 –	8.12 pH ι	units										
	Ē	Oxidation-Reduction Potential	150 – 4	82 mV											
		Dissolved Oxygen	Up to 5 the sun		iter colum	nn < 2.0 ı	mg/L in								
	S	Surface Total Nitrogen	0.46 m	g/L to 1.6	8 mg/L										
	Nutrients	Surface Total Phosphorus	0.009 mg/L to 0.227 mg/L												
	Ž	Nitrogen to Phosphorus Ratio	14:1					Phosphorus limited							
		Click to learn more about Beneficial Uses	Turbidity	표	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a		
ses	Fish	h & Wildlife Propagation	NS	S	S	*									
a U	Aes	sthetics					S	N/A							
fici	Agr	riculture							N/A	N/A	S				
Beneficial Uses	Prir	mary Body Contact Recreation										NEI			
m	Pub	olic & Private Water Supply													
	٨	S = Fully Supporting IS = Not Supporting IEI = Not Enough Information	*N/A – p	parameters	s not collec	cted in cur	rent samp	ole year.							
NTU	l = ne	NTU = nephelometric turbidity units											d		

 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

mV = millivolts

Chlor-a = Chlorophyll-a

 μ S/cm = microsiemens/cm

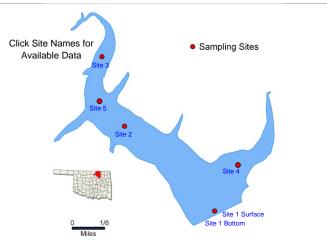
Fairfax

NTU = *nephelometric turbidity units*

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter

	Sample Period	t	Visited	Sampling Sites					
M	arch 2011 – Septem	per 2011	4	5					
	Location	Osage Cou	unty	Click map for site data					
5	Impoundment	1936							
	Area	111 acres							
5	Capacity	1,795 acre-feet							
	Purposes	Water Supp	oly, Recreation	on					



	Pur	poses Water Supply	, Recreat	ion				Miles							
		Parameter (<u>Descriptions</u>)	Result					Notes/0	Commer	nts					
		Average Turbidity	11 NTU	J				100% of values < OWQS of 25 NTU							
		Average Secchi Disk Depth	87 cm												
	jţţ	Water Clarity Rating	good	good											
	In Situ	Chlorophyll-a	12 mg/	12 mg/m3											
		Trophic State Index	55					Previou	s Value=	= 57					
<u>s</u>		Trophic Class	Eutrop	hic											
nete		Salinity	0.12-0).2 ppt											
Parameters	a)	Specific Conductivity	243.9 -	- 400.4 µ											
	Profile	pH	7.08 –	8.36 pH ι			Neutral to slightly alkaline								
	₫	Oxidation-Reduction Potential	-23 – 4	73 mV											
		Dissolved Oxygen	Up to 40% of water column < 2 mg/L in summer												
	ts	Surface Total Nitrogen	0.46 m	g/L to 0.7	3 mg/L										
	Nutrients	Surface Total Phosphorus	0.025 r	mg/L to 0.	.033 mg/L	_									
	Ž	Nitrogen to Phosphorus Ratio	22:1	22:1					Phosphorus limited						
		Click to learn more about Beneficial Uses	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ses	Fish	h & Wildlife Propagation	NEI	S	S	S									
ğ	Aes	sthetics					S	*							
ficia	Agr	riculture							S	S	S				
Beneficial Uses	Prin	mary Body Contact Recreation										NEI			
m	Pub	olic & Private Water Supply													
	N	S = Fully Supporting NS = Not Supporting NEI = Not Enough Information	*Did not cannot l	*Did not collect for this parameter. Although all turbidity values are <25 NTU, The FWP beneficial use cannot be assessed for this sample year as minimum data requirements were not met. The PBCR use cannot be assessed as minimum data requirements were not met due to QA/QC issue for Enterocci.											

mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

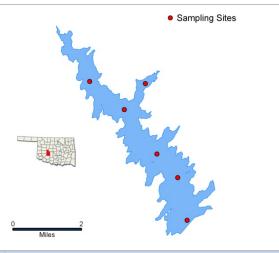
ppt = parts per thousand

Ft. Cobb												
	Sample Period	d	Times Visited	Sampling Sites								
De	ecember 2011 - Aug	ust 2012	4	6								
	Location	Caddo Cou	nty	Click map for site data								
<u>ia</u>	Impoundment	1959										
General	Area	4,100 acres	3									
Ge	Capacity	80,010 acre	e-feet									

NTU = *nephelometric turbidity units*

 μ S/cm = microsiemens per centimeter E. coli = Escherichia coli

Flood Control, Water Supply, Fish & Wildlife,



	Purposes Recreation					арріу, і із	SII & VVIIGI			Mile	S					
		Parameter (Des	scriptions)		Result					Notes/Comments						
		Average Turbidity			14 NTL	J			5% of values > OWQS of 25 NTU (n=20)							
		Average Secchi Disk Depth			48 cm											
	In Situ	Water Clarity Ra	ating		Average											
	<u>=</u>	Chlorophyll-a			43 mg/m3											
		Trophic State Index			68				Previou	s value =	= 65					
စ်		Trophic Class			Hypere	utrophic										
Parameters		Salinity).30 ppt										
ıran	ø)	Specific Conduc		531 – 606 μS/cm												
9,	Profile	рН			7.47– 9.54 pH units					Only 2.76% of values > 9 pH units						
	ਾ	Oxidation-Reduc	ction Potentia	l	151 – 5	64 mV										
		Dissolved Oxyge	en		All data mg/L	above s	creening	level of 2	2.0							
	ts	Surface Total Ni	trogen		1.16 m	ng/L to 2.2	20 mg/L									
	Nutrients	Surface Total Ph	nosphorus		0.015 n	ng/L to 0.	163 mg/L	-								
	Ž	Nitrogen to Phosphorus Ratio			19:1					Phosphorus limited						
		Click to learn m Beneficial Uses	nore about		Turbidity	풘	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
ses	Fisl	h & Wildlife Propa	gation		S	S	S	*								
a C	Aes	Aesthetics							NS*	N/A						
fici	Agr	griculture									N/A	N/A	S			
Beneficial Uses	Prir	mary Body Contac	t Recreation											S		
m	Puk	olic & Private Wate	er Supply												NS	
	٨	S = Fully Supporting IS = Not Supporting IEI = Not Enough Int	Notes	nutrients	until studies		ducted to c	onfirm non	-support sta		ial use is c	onsidered thi	reatened by	,		

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ppt = parts per thousand

Ft. Gibson, Lower (1-4)

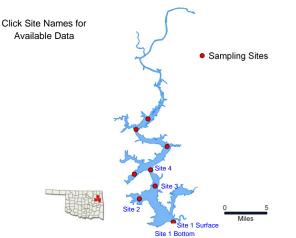
E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter

mV = millivolts

Chlor-a = Chlorophyll-a

	Sample Period	t	Times Visited	Sampling Sites					
	October 2006 - July	2007	4	8					
	Location	Cherokee C	County	Click map for site data					
a	Impoundment	1953							
General	Area	14,900 acre	es						
စ္	Capacity	355,200 ac	acre-feet						
	Purposes	Hydropowe	r and Flood	Control					



	. u	rposes	Tiyuropowei	and Floc	d Flood Control				Site 1 Surface Site 1 Bottom							
		Parameter (Des	criptions)	Resu	ılt				Notes/0	Commer	nts					
		Average Turbidit	у	7 NT	U				100% o	f values	< OWQS	of 25 NT	U			
		Average True Co	olor	32 ur	nits				100% o	f values	< OWQS	of 70				
		Average Secchi	Disk Depth	86 cr	n											
		Water Clarity Ra	ting	good												
		Trophic State Inc	dex	60												
က		Trophic Class		eutro	phic											
Parameters		Salinity		0.07-	- 0.15 ppt											
ram		Specific Conduct	tivity	168.8	168.8 – 303.9 μS/cm											
Ра	Profile	рН		6.26	6.26 – 8.79 pH units					values <	6.5 pH เ	units				
	፭	Oxidation-Reduc	tion Potential	mV												
		Dissolved Oxyge	en	Up to July	82% of wa	ater colun	nn < 2 m	g/L in	Occurr	ed at site	3					
	S.	Surface Total Nit	rogen	0.62	mg/L to 1.4	43 mg/L										
	Nutrients	Surface Total Ph	osphorus	0.038	0.038 mg/L to 0.125 mg/L											
	Ž	Nitrogen to Phosphorus Ratio							Phosph	orus limi	ted					
		Click to learn Beneficial Uses	more about	Turbidity	Hd	Dissolved Oxygen	Metals	IST	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
es	Fis	h & Wildlife Propag	gation	S	NS	NS	S									
Beneficial Uses	Aes	sthetics						NS	S							
icia	Agı	riculture								S	S	S				
enef	Priı	mary Body Contact	t Recreation										S			
m	Pul	blic & Private Wate														
	1	S = Fully Supporting NS = Not Supporting NEI = Not Enough Info	ormation	y Water	ake is current shed (NLW) sive study ca). This listir	ng means	that the la	ike is consi	dered thre	eatened fr			nore		

 μ S/cm = microsiemens/cm

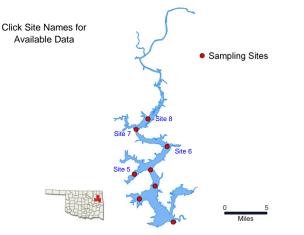
Ft. Gibson, Lower (5-8)

NTU = *nephelometric turbidity units*

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter

	Sample Period	t	Times Visited	Sampling Sites					
	October 2006 - July	2007	4	8					
	Location	Cherokee C	County	Click map for site data					
<u>a</u>	Impoundment	1953	53						
General	Area	14,900 acre	es						
ပ်	Capacity	355,200 ac	acre-feet						
	Purposes	Hydropowe	r and Flood (Control					



	Fui	poses Hydropower a	na Fiooa	Control			-							
		Parameter (<u>Descriptions</u>)	Result					Notes/0	Commen	its				
		Average Turbidity	10 NTU	J				100% o	f values	< OWQS	of 25 NT	Ū		
		Average True Color	33 unit	S				100% o	f values	< OWQS	of 70			
		Average Secchi Disk Depth	73 cm											
		Water Clarity Rating	good											
		Trophic State Index	61											
ည		Trophic Class	hypere	utrophic										
Parameters		Salinity	0.07-0).15 ppt										
aran	ø.	Specific Conductivity	164.9 -	- 351.1 µ	S/cm									
<u>a</u>	Profile	рН	6.04 – 8.91 pH units					16.5% (of values	< 6.5 pH	l units			
	ਾ	Oxidation-Reduction Potential	mV											
		Dissolved Oxygen	Up to 7 July	9% of wa	ater colum	nn < 2 m(g/L in	Occurre	ed at site	6				
	ts	Surface Total Nitrogen	0.62 mg/L to 1.50 mg/L											
	Nutrients	Surface Total Phosphorus	0.034 r	0.034 mg/L to 0.261 mg/L										
	ž	Nitrogen to Phosphorus Ratio	8:1					Phosphorus limited						
		Click to learn more about Beneficial Uses	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
ses	Fish	h & Wildlife Propagation	S	NS	NS	S								
Š	Aes	sthetics					NS	S						
ficia	Agr	riculture							S	S	S			
Beneficial Uses	Prir	mary Body Contact Recreation										S		
m	Pub	olic & Private Water Supply												
	٨	S = Fully Supporting IS = Not Supporting IEI = Not Enough Information	Watersh	ned (NLW)	. This listin	ng means	that the la	er Quality S ke is consi- ficial use n	dered thre	eatened fr			nore	

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 μ S/cm = microsiemens/cm

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mV = millivolts

Chlor-a = Chlorophyll-a

ppt = parts per thousand

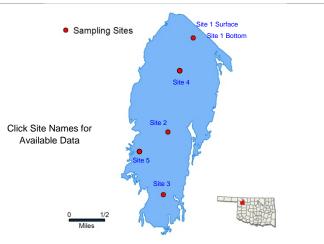
Ft. Supply

NTU = *nephelometric turbidity units*

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter

	Sample Period	t	Times Visited	Sampling Sites				
ı	November 2010 - Jul	y 2011	4	5				
	Location	Woodward	County	Click map for site data				
ਰ	Impoundment	1942						
	Area	1,820 acres	acres					
ָ פֿל	Capacity	13,900 acr	cre-feet					
	Purposes	Flood Cont	rol, Conserva	ation Purposes				



	ı uı	poses	1 1000 Conti	Oi,	Conservation Fulposes												
		Parameter (Des	scriptions)		Result					Notes/0	Commer	nts					
		Average Turbidi	ty		59 NTL	J				53% of	values >	OWQS	of 25 NTL	J			
		Average Secchi	Disk Depth		26 cm												
	In-Situ	Water Clarity Ra	ating		Fair to	Poor											
	드	Chlorophyll-a			18 mg/r	m3											
		Trophic State In	dex		59					Previou	s value =	= 58					
ပ်		Trophic Class			Eutroph	nic											
Parameters		Salinity			0.51 – 0	0.64 ppt											
ıran	o)	Specific Conduc	tivity		983 – 1	217 µS/	cm										
<u> </u>	Profile	pН			7.53 – 1	10.36 pF	l units			Only 2.2% of values > 9 pH units							
	₫	Oxidation-Reduc	ction Potentia	ı	212 – 6	17 mV											
		Dissolved Oxyge	en		All data mg/L	are abo	ve screer	ning level	of 2.0								
	ts	Surface Total Ni	trogen		0.5 mg	/L to 1.3	7 mg/L										
	Nutrients	Surface Total Pr	nosphorus		0.037 n	ng/L to 0.	.119 mg/L	-									
	Ž	Nitrogen to Phos	sphorus Ratio		11:1					Possibly co-limited							
		Click to learn Beneficial Uses	n more abou	<u>t</u> _	Turbidity	Ha	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a		
ses	Fish	h & Wildlife Propa	gation		NS	S	S	S									
ڪ ڪ	Aes	sthetics							NS*	*							
Beneficial Uses	Agr	riculture									S	S	S				
ene	Prin	Primary Body Contact Recreation												NEI			
m	Pub	Public & Private Water Supply													NS		
	Λ	S = Fully Supporting NS = Not Supporting NEI = Not Enough Information			*Did not collect for these parameters. *The lake is listed in the WQS as a NLW indicating that the Aesthetics beneficial use is considered threatened by nutrients until studies can be conducted to confirm non-support status. The PBCR beneficial use cannot be assessed as minimum data requirement were not met due to QA/QC issues for <i>E.coli</i> and enterococci.												

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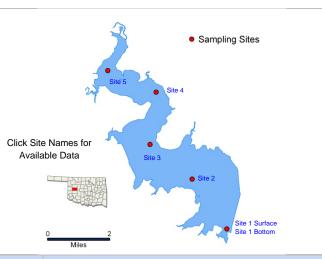
 μ S/cm = microsiemens/cm

ppt = parts per thousand

F	Foss											
	Sample Period	d	Times Visited	Sampling Sites								
	October 2010 – July	2011	4	5								
	Location	Custer Cou	nty	Click map for site data								
ā	Impoundment	1961	1961									
General	Area	8,800 acres	3									
စီ	Capacity	256,220 ac	cre-feet									

 μ S/cm = microsiemens per centimeter mV = millivolts

E. coli = Escherichia coli

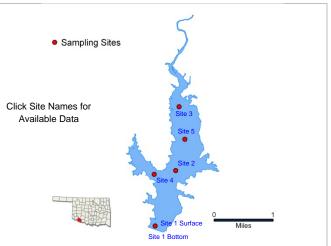


	Pur	poses	Recreation					Miles	2			Site 1 Bottom			
		Parameter (Des	scriptions)	Result					Notes/0	Commer	nts				
		Average Turbidit	ty	11 NTU	J				5% of v	alues > (OWQS o	f 25 NTU			
		Average Secchi	Disk Depth	98 cm											
	In-Situ	Water Clarity Ra	nting	Good											
	느	Chlorophyll-a		7 mg/m	13										
		Trophic State Inc	dex	49					Previou	s Value=	= 52				
ទ		Trophic Class		Mesotr	ophic										
Parameters		Salinity		1.07– 1	1.23 ppt										
ıran	a)	Specific Conduc	tivity	1994 –2297 μS/cm											
Pa	Profile	pН		6.69 – 8.28 pH units											
	ቯ	Oxidation-Reduc	ction Potential	234– 6	63 mV										
		Dissolved Oxyge	en	Up to 5	50% < 2 n	ng/L in su	mmer								
		Surface Total Ni	trogen	0.46 m	g/L to 0.7	72 mg/L									
	Nutrients				0.011 mg/L to 0.038 mg/L										
	lutri	Surface Total Ph	<u> </u>	0.011 mg/L to 0.038 mg/L											
	Z	Nitrogen to Phos	sphorus Ratio	26:1					Phosphorus limited						
		Click to learn Beneficial Uses	more about	Turbidity	Hd	Dissolved Oxygen	Metals	ISI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
ses	Fish	h & Wildlife Propa	gation	S	S	S	S								
Beneficial Uses	Aes	sthetics						S	*						
fici	Agr	iculture								S	S	S			
ene	Prin	mary Body Contac	t Recreation										NEI		
m	Pub	olic & Private Wate	er Supply												
	٨	S = Fully Supporting IS = Not Supporting IEI = Not Enough Int	formation §						eneficial u for <i>E.coli</i> a			sed as min	imum data	ı	
		phelometric turbidity			ma Water	Quality Sta	andards		= milligram			t = parts pe		d	

Chlor-a = Chlorophyll-a

 μ S/cm = microsiemens/cm

Frederick Times Sample Period Sampling Sites Visited November 2006 - August 2007 5 4 Location Tillman County Click map for site data 1974 Impoundment General Area 925 acres Capacity 9,526 acre-feet



	Pur	poses	Water Supply,	Recreati	on and F	lood Con	trol				Site 1 Sotto	Surface	Miles		
		Parameter (Des	scriptions)	Result					Notes/0	Commer	nts				
		Average Turbidit	ty	59 NTU	J				100% o	f values	> OWQS	of 25 NT	U		
		Average True Co	olor	83 unit	5				50% of	values >	OWQS	of 70			
		Average Secchi	Disk Depth	26 cm											
		Water Clarity Ra	ating	poor											
		Trophic State Inc	dex	57											
S		Trophic Class		eutroph	nic										
Parameters		Salinity		0.12-0).31 ppt										
ıram	a v	Specific Conduc	tivity	245.5 -	- 614 µS/	cm									
Ра	Profile	рН		7.61 –	8.61 pH ւ	units			Neutral	to slightl	y alkalin	е			
	₫.	Oxidation-Reduc	ction Potential	47 – 39	94 mV										
		Dissolved Oxyge	en	Up to 36% of water column < 2 mg/L in August											
	ts	Surface Total Ni	trogen	0.74 m	g/L to 1.0	9 mg/L									
	Nutrients	Surface Total Ph	nosphorus	0.023 r	0.023 mg/L to 0.069 mg/L										
	ž	Nitrogen to Phos	sphorus Ratio	21:1					Phosphorus limited						
		Click to learn Beneficial Uses	more about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
ses	Fish	h & Wildlife Propa	gation	NS	S	S	S								
Š	Aes	sthetics						S	NS						
Beneficial Uses	Agr	Agriculture								S	S	S			
ene	Prir	mary Body Contac	t Recreation										S		
m	Pub	olic & Private Wate	er Supply												
	٨	S = Fully Supporting IS = Not Supporting IEI = Not Enough Int	formation September 1												
	TU = nephelometric turbidity units OWQS = Oklahoma Water Quality Standards Som = microsiomens per centimeter mV = millivolts								= milligram			t = parts pe		d	

 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

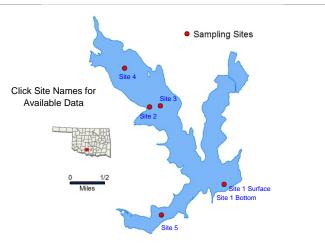
mV = millivolts

Chlor-a = Chlorophyll-a

 μ S/cm = microsiemens/cm

Fuqua

	Sample Period	t	Times Visited	Sampling Sites				
D	ecember 2010 - Aug	ust 2011	4	5				
	Location	Stephens C	County	Click map for site data				
<u></u>	Impoundment	1953						
<u>D</u>	Area	1,500 acres	3					
5	Capacity	21,100 acre	cre-feet					
	Purposes	Water Supp	oly, Recreation	on and Flood Control				



	Pur	rposes	Water Supply,	Recreati	on and F	lood Con	trol									
		Parameter (Des	criptions)	Result					Notes/0	Commen	its					
		Average Turbidit	у	14 NTL	J				11% of	values >	OWQS (of 25 NTL	J (n=20)			
		Average Secchi	Disk Depth	87 cm												
	In-Situ	Water Clarity Ra	ting	Averag	е											
	흐	Chlorophyll-a		14 mg/ı	m3											
		Trophic State Inc	dex	57					Previou	s Value=	: 52					
S		Trophic Class		Eutroph	nic											
Parameters		Salinity		0.27- 0).33 ppt											
aran	ω	Specific Conduc	tivity	529.4 -	- 647.5 μ	S/cm										
٩	Profile	рН		6.69 – 8	8.74 pH ι	units										
	₫	Oxidation-Reduc	tion Potential	-89 - 43												
		Dissolved Oxyge	en	Up to 4 summe		ater colum	nn < 2 mg	g/L in								
	ts	Surface Total Ni	trogen	0.33 mg/L to 0.97 mg/L												
	Nutrients	Surface Total Ph	osphorus	0.010 n	0.010 mg/L to 0.047 mg/L											
	Ž	Nitrogen to Phos	phorus Ratio	27:1				Phosphorus limited								
		Click to learn Beneficial Uses	more about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ses	Fisl	h & Wildlife Propa	gation	NS	S	S	S									
<u>=</u>	Aes	sthetics						S	*							
ficia	Agriculture							S	S	S						
Beneficial Uses	Primary Body Contact Recreation										NEI					
m	Public & Private vvater Supply															
	S = Fully Supporting NS = Not Supporting NEI = Not Enough Information The PBCR beneficial use cannot be assessed as issues for enterococci. * did not collect for these particles are included in the particles are inc								uirement v	were not m	et due to	QA/QC				

NTU = nephelometric turbidity units μ S/cm = microsiemens per centimeter E. coli = Escherichia coli

OWQS = Oklahoma Water Quality Standards Chlor-a = Chlorophyll-a

mg/L = milligrams per liter

ppt = parts per thousand En = Enterococci

mV = millivolts

 $\mu S/cm = microsiemens/cm$

Sampling Sites Grand, Lower Lake (1-3) **Times** Sample Period Sampling Sites Visited October 2008 - July 2009 4 13 Location Mayes County Click map for site data Click Site Names for Impoundment 1940 General Available Data 1.820 acres Area Capacity 13,900 acre-feet Flood Control, Hydropower **Purposes** Parameter (Descriptions) Result **Notes/Comments** 6 NTU Average Turbidity 100% of values < OWQS of 25 NTU (n=12) Average True Color Did not collect for true color Average Secchi Disk Depth 110 cm Water Clarity Rating Excellent 56 **Trophic State Index** Previous value = 50 **Trophic Class** Eutrophic **Parameters** Salinity 0.10 - 0.20 ppt Specific Conductivity $208 - 369 \mu S/cm$ Profile 6.76 - 8.63 pH units рΗ Oxidation-Reduction Potential 68 - 591 mV Up to 53% of water column in the Fall & Dissolved Oxygen up to 68% < 2.0 mg/L in July Surface Total Nitrogen 0.73 mg/L to 1.68 mg/L Surface Total Phosphorus 0.028 mg/L to 0.092mg/L Nitrogen to Phosphorus Ratio 17:1 Phosphorus limited Dissolved Oxygen Chlorides Click to learn more about Turbidity Sulfates Chlor-a Beneficial Uses \overline{S} 핑 **Beneficial Uses** S S Fish & Wildlife Propagation NS **Aesthetics** S S Agriculture NEI **Primary Body Contact Recreation** Public & Private Water Supply S = Fully Supporting*Did not collect for these parameters NS = Not Supporting NEI = Not Enough Information

OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

NTU = *nephelometric turbidity units*

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter

mg/L = milligrams per liter

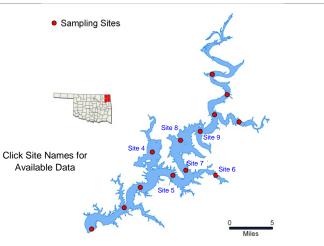
µS/cm = microsiemens/cm

ppt = parts per thousand

Grand, Mid Lake (4-9)

E. coli = Escherichia coli

	Sample Period	d	Times Visited	Sampling Sites				
	October 2008 - July	2009	4	13				
	Location	Mayes Co	unty	Click map for site data				
5	Impoundment	1940						
	Area	1,820 acres	res					
5	Capacity	13,900 acr	acre-feet					
	Purposes	Flood Cont	rol, Hydropov	wer				



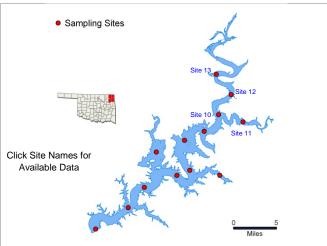
	Pur	poses	Flood Control,	Hydropo	<u> </u>				Miles								
		Parameter (Des	scriptions)	Result					Notes/0	Commen	its						
		Average Turbidit	ty	14 NTL	J				17% of	values >	owqs	of 25 NTU	(n=24)				
		Average True Co	olor						Did not	collect fo	or true co	olor					
		Average Secchi	Disk Depth	63 cm													
		Water Clarity Ra	nting	Averag	e to good	t											
		Trophic State Inc	dex	60					Previous value = 60								
<u>s</u>		Trophic Class		Eutroph	nic												
Parameters		Salinity		0.10 - 0	0.20 ppt												
ıram	a)	Specific Conduc	tivity	247 – 3	83 µS/c	m											
Ъ	Profile	рН		7.02 – 8	8.84 pH	units											
	፵	Oxidation-Reduc	ction Potential	134 – 4	85 mV												
		Dissolved Oxyge	en	Up to 5 July	nn < 2.0 r	ng/L in	Occurred at site 7										
	ts	Surface Total Ni	face Total Nitrogen			0.72 mg/L to 2.18 mg/L											
	Nutrients	Surface Total Ph	0.038 n	ng/L to 0	.147 mg/l	-											
	Z	Nitrogen to Phos	15:1					Phosph	orus limi	ted							
		Click to learn Beneficial Uses	more about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a			
Beneficial Uses	Fish	n & Wildlife Propa	gation	NS	S	NS	*										
a U	Aes	sthetics						S	*								
fici	Agr	iculture								*	*	S					
ene	Prin	mary Body Contac	t Recreation										NEI				
m	Pub	olic & Private Wate	er Supply														
	Λ	S = Fully Supporting NS = Not Supporting NEI = Not Enough Information			*Did not collect for these parameters												
μS/c	m = n	phelometric turbidity nicrosiemens per ce	ntimeter mV = m			Quality St	andards		= milligram n = microsie			t = parts pe = Enteroco		d			

Chlor-a = Chlorophyll-a

Grand, Upper Lake (10-13)

E. coli = Escherichia coli

	Sample Period	d	Times Visited	Sampling Sites				
	October 2008 - July	2009	4	13				
	Location	Mayes Cou	unty	Click map for site data				
5	Impoundment	1940						
5	Area	1,820 acres	acres					
5	Capacity	13,900 acr	0 acre-feet					
	Purposes	Flood Cont	rol, Hydropo	wer				



	Pur	poses	Flood Control,	Hydropo	wer						The state of the s	0_	Miles			
		Parameter (Des	scriptions)	Result					Notes/0	Commen	its					
		Average Turbidit	ty	32 NTL	J				67% of	values >	OWQS	of 25 NTU	l (n=16)			
		Average True Co	olor						Did not	collect fo	or true co	olor				
		Average Secchi	Disk Depth	35 cm												
		Water Clarity Ra	iting	Averag	е											
		Trophic State Inc	dex	59					Previous	s value =	62					
S		Trophic Class		Eutroph	nic											
Parameters		Salinity		0.10 - 0	0.25 ppt											
ıram	a \	Specific Conduc	tivity	251 – 5	500.7 μS	/cm										
Ъ	Profile	рН		7.16 – 8	8.29 pH	units										
	ሷ	Oxidation-Reduc	ction Potential	175 – 4	77 mV											
		Dissolved Oxyge	en	Up to 3 August		ater colum	nn < 2.0 r	ng/L in								
	S	Surface Total Ni	trogen	0.71 m	g/L to 1.	94 mg/L										
	Nutrients	Surface Total Pr	0.032 n	ng/L to 0	.192 mg/L	-										
	Ž	Nitrogen to Phos	sphorus Ratio	12:1					Phosphorus limited							
		Click to learn Beneficial Uses	more about	Turbidity	Hď	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a		
ses	Fish	h & Wildlife Propa	gation	NS	S	S	*									
eneficial Uses	Aes	sthetics						S	*							
fici	Agr	riculture								*	*	S				
ene	Prir	mary Body Contac	t Recreation										NEI			
Ď	Pub	olic & Private Wate	er Supply													
	٨	S = Fully Supporting NS = Not Supporting NEI = Not Enough Information		*Did not	ameters											
μS/c	ITU = nephelometric turbidity units S/cm = microsiemens per centimeter Chlora = Chlorophylla								= milligram n = microsie			t = parts pe = Enteroco		d		

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Chlor-a = Chlorophyll-a

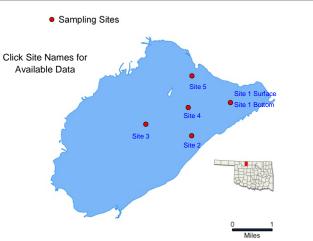
Great Salt Plains

NTU = *nephelometric turbidity units*

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter

	Sample Period	d	Times Visited	Sampling Sites				
	February 2012 – Ma	y 2012	2	5				
	Location	Alfalfa Cou	unty	Click map for site data				
5	Impoundment	1941						
	Area	8,690 acres	390 acres					
	Capacity	31,240 acr	240 acre-feet					
	Purposes	Flood Con	trol, Conserv	ation				



	Pui	poses Flood Cor	itroi	, Conservation				Miles								
		Parameter (<u>Descriptions</u>)		Result					Notes/	Commer	its					
		Average Turbidity		289 NT	Ū				100% c	of values	> OWQS	of 25 NT	U (n=4)			
		Average Secchi Disk Depth		13 cm												
	Situ	Water Clarity Rating		Poor												
	드	Chlorophyll-a		15 mg/	m3											
		Trophic State Index		57					Previous value = 71							
S		Trophic Class		Eutroph	nic											
Parameters		Salinity		3.57– 1	0.08 ppt											
aran	a	Specific Conductivity		6543 –	17,185	uS/cm										
ğ	Profile	pH		8.03 – 8	8.35 pH	units										
	_	Oxidation-Reduction Potentia	al	93 – 49	00 mV											
		Dissolved Oxygen							Not str	atified at	any sam	npling eve	nt			
	ıts	Surface Total Nitrogen		1.56 m	g/L to 3.	75 mg/L										
	Nutrients	Surface Total Phosphorus		0.091 mg/L to 0.676 mg/L												
	Ž	Nitrogen to Phosphorus Rati	0	7:1					possibly co-limited							
		Click to learn more about Beneficial Uses		Turbidity	Hd	Dissolved Oxygen	Metals	ISI	True	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ses	Fish	h & Wildlife Propagation		NS*	S	S	S									
Beneficial Uses	Aes	sthetics						NS*	N/A	N/A	N/A					
fici	Agr	riculture														
ene	Prin	mary Body Contact Recreation											NEI			
a	Pub	olic & Private Water Supply														
	N	IS = Not Supporting	Notes	threaten ** Due to	ed by nution of the contract o	rients until er condition	S = Fully Supporting NS = Not Supporting NEI = Not Enough Information *The lake is listed in the WQS as a NLW indicating that the Aesthetics beneficial use is consider threatened by nutrients until studies can be conducted to confirm non-support status. ** Due to low water conditions the lake was only sampled twice during the current sample year. *N/A - parameters not collected in current sample year.* Min. data requirements not met for two									

OWQS = Oklahoma Water Quality Standards

mV = millivoltsChlor-a = Chlorophyll-a mg/L = milligrams per liter

 $\mu \tilde{S}/cm = microsiemens/cm$

ppt = parts per thousand En = Enterococci

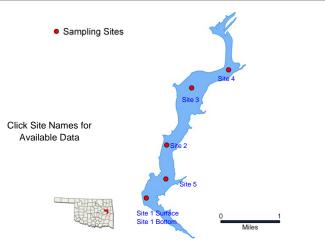
Greenleaf

NTU = *nephelometric turbidity units*

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter

	Sample Period	d	Times Visited	Sampling Sites				
No	ovember 2011 – Aug	ust. 2012	4	5				
	Location	Muskogee	Muskogee County Click map for site					
a	Impoundment	1939						
neral	Area	920 acres						
Ge	Capacity	14,720 acr	e-feet					



	Purposes Recreation		1							actual .			Miles		
		Parameter (Des	criptions)		Result					Notes/	Commer	nts			
		Average Turbidit	ty		12 NTU	J				8% of v	/alues >	OWQS o	f 25 NTU	(n=12)	
		Average Secchi	Disk Depth		67 cm										
	In Situ	Water Clarity Ra	iting		Good										
	드	Chlorophyll-a			11 mg/	/m3									
		Trophic State Inc	dex		54					Previou	s value =	= 52			
Ñ		Trophic Class			Eutrop	hic									
Parameters		Salinity			0.06-0).12 ppt									
aran	ω.	Specific Conductivity 146 – 243 µS/cm													
٣	pH 6.8					6.89 – 8.65 pH units									
	ā	Oxidation-Reduc	ction Potentia	al	22 – 427 mV										
		Dissolved Oxyge	en		Up to 5 May	57% of wa	ater colum	n < 2 m	g/L in						
	ts	Surface Total Ni	trogen		0.45 m	ng/L to 1.	28 mg/L								
	Nutrients	Surface Total Ph	nosphorus		0.006 mg/L to 0.030 mg/L										
	Ž	Nitrogen to Phos	sphorus Ratio)	42:1					Phosphorus limited					
		Click to learn m Beneficial Uses	ore about		Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
ses	Fish	h & Wildlife Propa	gation		S	S	•	S							
E C	Aes	sthetics							S	N/A					
ficia	Agr	riculture									N/A	N/A	S		
Beneficial Uses	Prir	mary Body Contac	t Recreation											S	
m	Pub	olic & Private Wate	er Supply												NS
	٨	S = Fully Supporting NS = Not Supporting NEI = Not Enough Information			*N/A – parameters not collected in current sample *50-70% range is undetermined for DO.					ole year.					

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mV = millivolts

Chlor-a = Chlorophyll-a

mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

ppt = parts per thousand

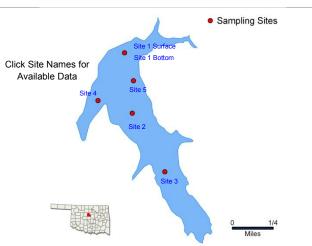
Guthrie

NTU = *nephelometric turbidity units*

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter

	Sample Period	d	Times Visited	Sampling Sites				
	October 2005 – July	2006	4	5				
	Location	Logan Cou	ınty	Click map for site data				
5	Impoundment	1919						
	Area	274 acres	acres					
5	Capacity	3,875 acre	75 acre-feet					
	Purposes	Water Supp	oly, Recreati	on				



	Pur	poses Water Supply	y, I												
		Parameter (<u>Descriptions</u>)		Result					Notes/0	Commer	nts				
		Average Turbidity		19 NTU	J				20% of	values >	owqs	of 25 NTL	J		
		Average True Color		21 units	3				100% o	f values	< OWQS	of 70			
		Average Secchi Disk Depth		52 cm											
		Water Clarity Rating		Averag	e to good	I									
		Trophic State Index		61											
SIS		Trophic Class		hypere	utrophic										
Parameters		Salinity		0.32- 0	.43 ppt										
arar	a	Specific Conductivity		623.1 – 821 µS/cm											
<u>a</u>	Profile	рН		7.78 – 8	3.21 pH u	ınits			Neutral to slightly alkaline						
	<u>Ф</u>	Oxidation-Reduction Potential		357 – 4	70 mV										
		Dissolved Oxygen							Not stra	atified du	ıring any	sampling	interval		
	ts.	Surface Total Nitrogen		0.61 mg/L to 1.33 mg/L											
	Nutrients	Surface Total Phosphorus		0.041m	g/L to 0.1	103 mg/L									
	Z	Nitrogen to Phosphorus Ratio		15:1					Phosphorus limited						
		Click to learn more about Beneficial Uses		Turbidity	Hd	Dissolved Oxygen	Metals	ISI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
ses	Fish	h & Wildlife Propagation		S*	S	S	S								
ے ا	Aes	sthetics						S	S						
ficia	Agr	iculture								S	S	S			
Beneficial Uses	Prin	mary Body Contact Recreation											S		
m	Pub	Public & Private Water Supply												NS	
	Ν	S = Fully Supporting NS = Not Supporting NEI = Not Enough Information			* Although 20% of the collected turbidity values e data suggest that the peak in turbidity, which occ therefore the lake will be listed as supporting its F										

OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

ppt = parts per thousand

Healdton

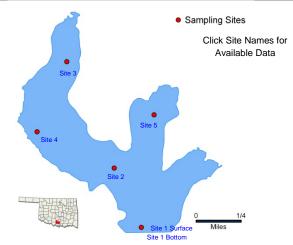
NTU = nephelometric turbidity units

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter

	Sample Period	d	Times Visited	Sampling Sites					
N	ovember 2005 – Aug	ust 2006	4	5					
	Location	Carter Cou	ınty	Click map for site data					
<u></u>	Impoundment	1979							
	Area	370 acres	res						
	Capacity	3,766 acre	re-feet						
	Purposes	Water Supp	oly, Recreati	on					

Times



	Pur	poses	Water Supply,	Recreat							S	Site 1 Surface ite 1 Bottom	Miles			
		Parameter (Des	scriptions)	Result					Notes/0	ommen	its					
		Average Turbidit	ty	48 NTL	J				100% o	f values	> OWQS	of 25 NT	Ū			
		Average True Co	olor	159 uni	ts				100% o	fvalues	> OWQS	of 70				
		Average Secchi	Disk Depth	34 cm												
		Water Clarity Ra	ating	poor												
		Trophic State Inc	dex	49												
S		Trophic Class		mesotro	ophic											
Parameters		Salinity		0.13-0	.19 ppt											
aran	_O	Specific Conduc	tivity	275.6 -	- 378.5 μ	S/cm										
<u> </u>	Profile	pН		7.05 –	7.86 pH ւ	units			Neutral	to slightl	y alkaline	e				
	_ ₫	Oxidation-Reduc	ction Potential	304 – 450 mV												
		Dissolved Oxyge	en		Up to 33% of water column < 2 mg/L in August											
	ts	Surface Total Ni	trogen	0.59 mg	g/L to 0.9	4 mg/L										
	Nutrients	Surface Total Ph	nosphorus	0.043 mg/L to 0.100 mg/L												
	Ž	Nitrogen to Phosphorus Ratio		11:1					Phosphorus limited							
		Click to learn Beneficial Uses	more about	Turbidity	Ha	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ses	Fish	h & Wildlife Propa	gation	NEI*	S	S	S									
Beneficial Uses	Aes	sthetics						S	NEI*							
ficia	Agr	riculture								S	S	S				
ene	Prir	mary Body Contac	t Recreation										NEI*			
m	Public & Private Water Supply															
	S = Fully Supporting NS = Not Supporting NEI = Not Enough Information * Due to inclement weather conditions all si cannot be made for turbidity, true color or be							all sites c or bacter	ould not be	sample i num data	n May, the requireme	erefore an ents were r	assessme not met.	nt		

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Chlor-a = Chlorophyll-a

mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

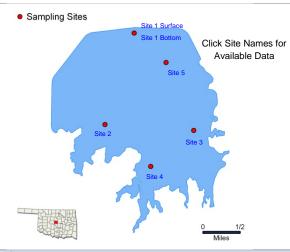
ppt = parts per thousand

Н	Hefner										
	Sample Period	t	Times Visited	Sampling Sites							
	October 2010 – June	e 2011	4	5							
	Location	Oklahoma (County	Click map for site data							
ā	Impoundment	1947									
General	Area	2,500 acre	S								
စ်	Capacity 75,000 acre-feet										

NTU = nephelometric turbidity units

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter



	Pur	poses	Water Supply, Recreation						MOTHER TO		•		Miles			
		Parameter (Des	criptions)	Result					Notes/0	Commen	its					
		Average Turbidit	у	9 NTU					100% o	f values	< OWQS	of 25 NT	U			
		Average Secchi	Disk Depth	67 cm												
	In-Situ	Water Clarity Ra	ting	Good												
	<u>-</u>	Chlorophyll-a		26 mg/	m3											
		Trophic State Inc	dex	63					Previou	s Value=	: 63					
ร		Trophic Class		Hypere	utrophic											
Parameters		Salinity		0.55-0).65 ppt											
aran	ø.	Specific Conduct	tivity	1042 –	1237 µS	/cm										
٣	pH 7.76 – 8.63 pH units							Neutral to slightly alkaline								
	_	Oxidation-Reduc	tion Potential	317 – 5												
		Dissolved Oxyge	en	Up to 6		er columr	n < 2 mg/	L in								
	ts	Surface Total Nit	rogen	0.75 m	g/L to 1.0	4 mg/L										
	Nutrients	Surface Total Ph	osphorus	0.054m	ng/L to 0.	104 mg/L										
	ž	Nitrogen to Phos	phorus Ratio	12:1	12:1					Phosphorus limited						
		<u>Click to learn</u> <u>Beneficial Uses</u>	more about	Turbidity	Hd	Dissolved Oxygen	Metals	ISI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ses	Fish	n & Wildlife Propag	gation	S	S	S	S									
Beneficial Uses	Aes	thetics						NS	*							
fici	Agr	iculture								S	S	S				
ene	Prin	nary Body Contact	t Recreation										NEI			
m	Pub	olic & Private Wate	er Supply													
	Ν	= Fully Supporting S = Not Supporting El = Not Enough Info	ormation \$\frac{\sqrt{\sqrt{\text{6}}}{\text{c}}}{\text{C}}\$						s minimum ter not colle		uirement v	vere not me	et due to (QA/QC		

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mV = millivolts

Chlor-a = Chlorophyll-a

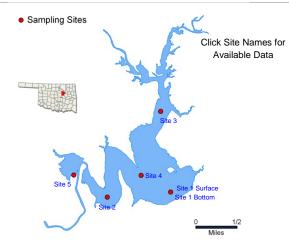
mg/L = milligrams per liter

 $\mu S/cm = microsiemens/cm$

ppt = parts per thousand

Н	eyburn			
	Sample Period	d	Times Visited	Sampling Sites
	December 2010 - July	/ 2011	4	5
	Location	Creek Cou	nty	Click map for site data
ā	Impoundment	1950		
General	Area	880 acres		
ဗ	Capacity	7,105 acre-	feet	

Flood Control and Conservation



In-Situ	Parameter (Description of the Control of the Contro	isk Depth	Result 53 NTU 59 cm Fair						commen values >		(n=16)				
In-Situ	Average Secchi D Water Clarity Ratio Chlorophyll-a	isk Depth	59 cm					42% of	values >	· 25 NTU	(n=16)				
In-Situ	Water Clarity Rational Chlorophyll-a							42% of values > 25 NTU (n=16)							
In-Situ	Chlorophyll-a	ng	Fair					75% of	values >	OWQS	of 70				
S-ul															
	Trophic State Inde		6 mg/m	13											
	opo Glateac	ex	49					Previous value = 49							
	Trophic Class		Mesotro	phic											
	Salinity		0.08 - 0).16 ppt											
	Specific Conductiv	vity			S/cm										
otile	pH		6.64 – 7.74 pH units					Neutral							
בֿ	Oxidation-Reducti	ion Potential	215 to 607 mV												
	Dissolved Oxygen	1	Up to 60% of water column < 2 mg/L in summer												
တ	Surface Total Nitro	ogen	0.27 mg	g/L to 0.9	97 mg/L										
trient	Surface Total Pho	sphorus	0.009 mg/L to 0.087 mg/L												
Ž	Nitrogen to Phosp	horus Ratio	13:1					Phospho	orus limit	red					
	Click to learn r Beneficial Uses	more about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
Fish	& Wildlife Propaga	ation	NS	S	S	S									
۹es	thetics						S	*							
Agri	culture								S	S	S				
Prim	nary Body Contact	Recreation										NEI			
Pub	lic & Private Water	Supply													
N.	S = Not Supporting	rmation sept								be asses	sed as min	imum data	à		
A P P	ish es: gri	Salinity Specific Conduction pH Oxidation-Reduction Dissolved Oxyger Surface Total Nitro Surface Total Photo Nitrogen to Phosp Click to learn in Beneficial Uses ish & Wildlife Propagatesthetics griculture rimary Body Contact ublic & Private Water S = Fully Supporting NS = Not Supporting	Salinity Specific Conductivity pH Oxidation-Reduction Potential Dissolved Oxygen Surface Total Nitrogen Surface Total Phosphorus Nitrogen to Phosphorus Ratio Click to learn more about Beneficial Uses ish & Wildlife Propagation esthetics griculture rimary Body Contact Recreation ublic & Private Water Supply S = Fully Supporting NS = Not Supporting NS = Not Supporting NEI = Not Enough Information	Salinity Specific Conductivity pH 6.64 - Oxidation-Reduction Potential Dissolved Oxygen Surface Total Nitrogen Surface Total Phosphorus Nitrogen to Phosphorus Ratio Click to learn more about Beneficial Uses ish & Wildlife Propagation esthetics griculture rimary Body Contact Recreation ublic & Private Water Supply S = Fully Supporting NS = Not Supporting NS = Not Supporting NS = Not Supporting NS = Not Enough Information Oxidation-Reductivity 181.2 - 6.64 - 0.07 mg 0.09 mg 13:1 NS NS *Did no requirem *Did	Salinity Specific Conductivity PH 6.64 – 7.74 pH to 6.64 – 7.74 pH to 6.64 – 7.74 pH to 6.69 fm summer Dissolved Oxygen Surface Total Nitrogen Surface Total Phosphorus Nitrogen to Phosphorus Ratio Click to learn more about Beneficial Uses ish & Wildlife Propagation esthetics griculture rimary Body Contact Recreation ublic & Private Water Supply S = Fully Supporting NS = Not Supporting NEI = Not Enough Information	Salinity Specific Conductivity pH 6.64 - 7.74 pH units Oxidation-Reduction Potential Dissolved Oxygen Surface Total Nitrogen Surface Total Phosphorus Nitrogen to Phosphorus Ratio Click to learn more about Beneficial Uses ish & Wildlife Propagation esthetics griculture rimary Body Contact Recreation ublic & Private Water Supply Specific Conductivity 181.2 - 323.6 µS/cm 6.64 - 7.74 pH units 215 to 607 mV Up to 60% of water colusummer 0.27 mg/L to 0.97 mg/L 0.009 mg/L to 0.087 mg/ 13:1 Click to learn more about Beneficial Uses ish & Wildlife Propagation which is para requirement were not met during the para requirement wer	Salinity Specific Conductivity 181.2 – 323.6 µS/cm pH 6.64 – 7.74 pH units Oxidation-Reduction Potential Dissolved Oxygen Up to 60% of water column < 2 msummer Surface Total Nitrogen Surface Total Phosphorus O.009 mg/L to 0.97 mg/L Nitrogen to Phosphorus Ratio Click to learn more about Beneficial Uses ish & Wildlife Propagation NS S S S S S S S S S S S S	Salinity Specific Conductivity PH 6.64 - 7.74 pH units Oxidation-Reduction Potential Dissolved Oxygen Up to 60% of water column < 2 mg/L in summer Surface Total Nitrogen O.27 mg/L to 0.97 mg/L Surface Total Phosphorus O.009 mg/L to 0.087 mg/L Nitrogen to Phosphorus Ratio 13:1 Click to learn more about Beneficial Uses ish & Wildlife Propagation NS S S S S S S S S S S S S	Salinity Specific Conductivity 181.2 – 323.6 µS/cm pH 6.64 – 7.74 pH units Neutral Oxidation-Reduction Potential Dissolved Oxygen Up to 60% of water column < 2 mg/L in summer Surface Total Nitrogen Surface Total Phosphorus Nitrogen to Phosphorus Ratio Click to learn more about Beneficial Uses ish & Wildlife Propagation esthetics spriculture rimary Body Contact Recreation ublic & Private Water Supply Salinity 0.08 - 0.16 ppt 181.2 – 323.6 µS/cm 0.64 – 7.74 pH units Neutral Oxidation-Reduction Potential 215 to 607 mV Up to 60% of water column < 2 mg/L in summer 0.27 mg/L to 0.97 mg/L 13:1 Phospho Ph	Salinity Specific Conductivity 181.2 - 323.6 µS/cm 6.64 - 7.74 pH units Neutral Oxidation-Reduction Potential Dissolved Oxygen Surface Total Nitrogen Surface Total Phosphorus Nitrogen to Phosphorus Ratio Click to learn more about Beneficial Uses Ish & Wildlife Propagation esthetics griculture rimary Body Contact Recreation ublic & Private Water Supply *Did not collect for this parameter. The PBCR beneficial use cannot requirement were not met due to QA/QC issues for enterococci.	Salinity Specific Conductivity 181.2 – 323.6 µS/cm pH 6.64 – 7.74 pH units Neutral Oxidation-Reduction Potential Dissolved Oxygen Up to 60% of water column < 2 mg/L in summer Surface Total Nitrogen 0.27 mg/L to 0.97 mg/L Surface Total Phosphorus 0.009 mg/L to 0.087 mg/L Nitrogen to Phosphorus Ratio 13:1 Phosphorus limited Click to learn more about Beneficial Uses physical Section Sectio	Salinity Specific Conductivity 181.2 – 323.6 μS/cm pH 6.64 – 7.74 pH units Neutral Oxidation-Reduction Potential Dissolved Oxygen Up to 60% of water column < 2 mg/L in summer Surface Total Nitrogen 0.27 mg/L to 0.97 mg/L Surface Total Phosphorus 0.009 mg/L to 0.087 mg/L Nitrogen to Phosphorus Ratio 13:1 Phosphorus limited Click to learn more about Beneficial Uses In a book of water column < 2 mg/L in summer Dissolved Oxygen Up to 60% of water column < 2 mg/L in summer 0.27 mg/L to 0.97 mg/L Nitrogen to Phosphorus Ratio 13:1 Phosphorus limited Click to learn more about Beneficial Uses S S S S S S S S S S S S S S S S S S S	Salinity Specific Conductivity 181.2 – 323.6 µS/cm PH 6.64 – 7.74 pH units Neutral Oxidation-Reduction Potential Dissolved Oxygen Up to 60% of water column < 2 mg/L in summer Surface Total Nitrogen 0.27 mg/L to 0.97 mg/L Surface Total Phosphorus 0.009 mg/L to 0.087 mg/L Nitrogen to Phosphorus Ratio 13:1 Phosphorus limited Click to learn more about Beneficial Uses ish & Wildlife Propagation NS S S S S S S S S NEI S S S NEI S S S NEI S S S NEI S S S S NEI S S S S S S S S S S S S S		

NTU = nephelometric turbidity units $\mu S/cm$ = microsiemens per centimeter $E.\ coli$ = $Escherichia\ coli$

Purposes

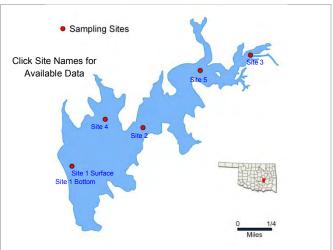
OWQS = Oklahoma Water Quality Standards mV = millivolts Chlor-a = Chlorophyll-a mg/L = milligrams per liter $\mu S/cm = microsiemens/cm$ ppt = parts per thousand En = Enterococci

Holdenville

NTU = nephelometric turbidity units

 μ S/cm = microsiemens per centimeter E. coli = Escherichia coli

	Sample Period	t	Times Visited	Sampling Sites						
	October 2006 - July	2007	4	5						
	Location	Hughes Co	unty	Click map for site data						
5	Impoundment	1931	1931							
	Area	550 acres								
	Capacity	11,000 acre	e-feet							
	Purposes	Water Supp	oly, Recreation	on						



		Parameter (Descriptions)	F	Result					Notes/0	Commer	nts					
		Average Turbidity	1	6 NTL	J				20% of	values >	OWQS	of 25 NTU	J			
		Average True Color	4	2 units	3				100% o	f values	< OWQS	of 70				
		Average Secchi Disk Depth	7	'5 cm												
		Water Clarity Rating	Δ	Averag	e to good	I										
		Trophic State Index	6	0												
က		Trophic Class	е	eutroph	nic											
Parameters		Salinity	0	0.06–).19 ppt											
ıram	a \	Specific Conductivity	1	41.6 –	- 391.7 µS	S/cm										
Pa	Profile	рН	6	6.10 – 8	8.26 pH ι	ınits			11% of values < 6.5 pH units							
	፫	Oxidation-Reduction Potential	2	2 - 435	mV											
		Dissolved Oxygen		Jp to 8 Iuly	3% of wa	iter colum	nn < 2 mg	g/L in								
	ts	Surface Total Nitrogen	0).57 m	g/L to 1.0	1 mg/L										
	Nutrients	Surface Total Phosphorus	0	0.015 mg/L to 0.067 mg/L												
	Ž	Nitrogen to Phosphorus Ratio	2	21:1						Phosphorus limited						
		Click to learn more about Beneficial Uses		Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ses	Fish	n & Wildlife Propagation		NEI	NS	NS	S									
Š	Aes	thetics						S	S							
icia	Agri	iculture								S	S	S				
Beneficial Uses	Prin	nary Body Contact Recreation											NEI			
m	Pub	olic & Private Water Supply												NS		
	Ν	E = Fully Supporting IS = Not Supporting IEI = Not Enough Information	re ge	Although 20% of the samples collected in 2006- requirements were not met therefore assessment cannot be made at this time.										ial		

mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

OWQS = Oklahoma Water Quality Standards

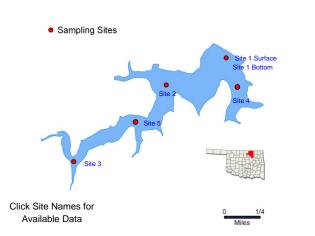
mV = millivolts

Chlor-a = Chlorophyll-a

ppt = parts per thousand

Hominy Municipal

	Sample Period	b	Times Visited	Sampling Sites
Ν	ovember 2006 - Aug	ust 2007	3	3
	Location	Osage Cou	unty	Click map for site data
<u></u>	Impoundment	1940		
General	Area	165 acres		
5	Capacity	5,000 acre-	feet	
	Purposes	Water Supp	oly, Recreation	on



	Pur	rposes	Nater Supply,	Recreati									Miles		
		Parameter (Descri	iptions)	Result					Notes/0	Commen	its				
		Average Turbidity		9 NTU					100% o	f values<	OWQS	of 25 NTl	J		
		Average True Colo	or	35 units	3				100% o	f values	< OWQS	of 70			
		Average Secchi Di	sk Depth	101 cm	ı										
		Water Clarity Ratin	ng	excelle	nt										
		Trophic State Inde	x	56											
ည		Trophic Class		eutroph	nic										
Parameters		Salinity		0.10-0).14 ppt										
aran	a)	Specific Conductiv	ity	224 – 2	297.7 μS/	cm									
<u>"</u>	Profile	рН		7.12 –	8.66 pH ι	units			Neutral to slightly alkaline						
	₫	Oxidation-Reduction	on Potential	-22 - 43	30 mV										
		Dissolved Oxygen		Up to 6 August		ater colum	nn < 2 mo	g/L in	Occurr	ed at site	s 1 and 2	2			
	ts	Surface Total Nitro	gen	0.45 m	g/L to 0.9	8 mg/L									
	Nutrients	Surface Total Phos	sphorus	0.010 n	0.010 mg/L to 0.028 mg/L										
	ž	Nitrogen to Phosph	norus Ratio	34:1	34:1				Phosphorus limited						
		Click to learn m Beneficial Uses	nore about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
ses	Fish	h & Wildlife Propaga	tion	NEI	S	NS	S								
<u>≅</u>	Aes	sthetics						S	NEI						
ficia	Agr	iculture								S	S	S			
Beneficial Uses	Prin	mary Body Contact F	Recreation										S		
M	Pub	olic & Private Water													
	٨	S = Fully Supporting IS = Not Supporting IEI = Not Enough Infor	mation	_			-		es were bel assessed a					-	

NTU = nephelometric turbidity units µS/cm = microsiemens per centimeter E. coli = Escherichia coli

OWQS = Oklahoma Water Quality Standards mV = millivolts Chlor-a = Chlorophyll-a mg/L = milligrams per liter μS/cm = microsiemens/cm ppt = parts per thousand En = Enterococci

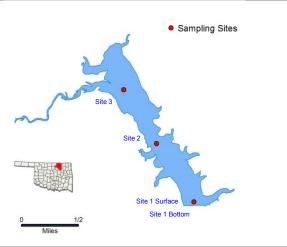
Sampling and Assessment by the Oklahoma Water Resources Board – 3800 Classen Blvd, Oklahoma City, OK, 73118 – 405.530.8800 – http://www.owrb.ok.gov

Hudson (Bartlesville)

 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

	Sample Period	t l	Times Visited	Sampling Sites				
1	November 2011 – Ju	ly 2012	4	3				
	Location	Osage Cou	nty	Click map for site data				
<u>छ</u>	Impoundment	1949						
General	Area	268 acres						
ၓ္	Capacity	2,776 acre-feet						
	Purposes	Water Supply, Recreation						



		Parameter (<u>Descriptions</u>)	Result					Notes/Comments						
		Average Turbidity	11 NTU	J				100% c	of values	< OWQS	of 25 NTU	J (n=8)		
		Average Secchi Disk Depth	66 cm											
	뎙	Water Clarity Rating	Averag	е										
	In Situ	Chlorophyll-a	8 mg/ı	m3										
		Trophic State Index	51					Previous value = 58						
က်		Trophic Class	Eutropl	hic										
Parameters		Salinity	0.08 – 0.15 ppt											
ran		Specific Conductivity	172 – 3	313 µS/cr	n									
Pa	Profile	рН	5.99 – 8.22 pH units					Only 5.2	22% of va	alues < 6	3.5 pH uni	ts		
	ፚ	Oxidation-Reduction Potential	75 – 495 mV											
		Dissolved Oxygen	Up to 5	50% of wa	ater colum	ın < 2.0 ı	mg/L in							
	S.	Surface Total Nitrogen	0.62 m	g/L to 0.9	98 mg/L									
	Nutrients	Surface Total Phosphorus	0.005 r	0.005 mg/L to 0.021 mg/L										
	Ž	Nitrogen to Phosphorus Ratio	60:1					Phosph	orus limi	ted				
		Click to learn more about Beneficial Uses	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a	
ses	Fis	sh & Wildlife Propagation	S	S	S	*								
Beneficial Uses	Ae	esthetics					S	N/A						
ficia	Ag	priculture							N/A	N/A	S			
ene	Pri	imary Body Contact Recreation										NEI		
m	Pu	ıblic & Private Water Supply												
	1	S = Fully Supporting NS = Not Supporting NEI = Not Enough Information	*N/A – µ	parameter	s not collec	ted in cur	rent samp	ole year.						

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

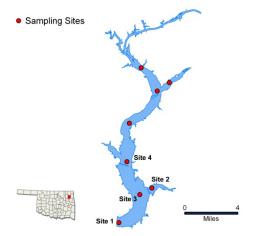
mV = millivolts

Chlor-a = Chlorophyll-a

 μ S/cm = microsiemens/cm

Hudson, Lower (1-4)

	Sample Period	d	Visited	Sampling Sites					
	October 2011 - July	2012	4	8					
	Location	Mayes Cou	inty	Click map for site data					
5	Impoundment	1964							
	Area	10,900 acre) acres						
5	Capacity	200,300 ac	acre-feet						
	Purposes	Flood Cont	rol, Hydropo	wer					



	Pur	poses	Flood Control,	Hyaropo	wer											
		Parameter (Des	Notes/0	Commer	its											
		Average Turbidit	ty	10 NTL	J				6% of \	/alues< 0	DWQS of	25 NTU (n=16)			
		Average Secchi	Disk Depth	89 cm												
	itu	Water Clarity Ra	iting	Good												
	In Situ	Chlorophyll-a		10 mg	/m3											
		Trophic State Inc	dex	53					Previous value = 54							
က		Trophic Class		Eutroph	nic											
Parameters		Salinity	alinity 0.06 – 0.13 ppt													
ran	a	Specific Conduc	tivity	137 – 2	279 μS/cr	n										
P _a	Profile	рН	6.99 – 8.63 pH units													
	4	Oxidation-Reduc	ction Potential	110 – 458mV												
		Dissolved Oxyge	en	Up to 9 July	0% of wa	ater colun	nn < 2.0 r	ng/L in								
	ts	Surface Total Ni	trogen	0.45 m	0.45 mg/L to 2.01 mg/L											
	Nutrients	Surface Total Ph	nosphorus	0.010 n	0.010 mg/L to 0.126 mg/L											
	Z	Nitrogen to Phos	sphorus Ratio	17:1					Phosph	orus limi	ted					
		Click to learn m Beneficial Uses	nore about	Turbidity	Hd.	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a		
ses	Fish	h & Wildlife Propa	gation	S	S	NS	*									
<u></u>	Aes	sthetics						S	N/A							
ficia	Agr	riculture								N/A	N/A	S				
Beneficial Uses	Prin	mary Body Contac	t Recreation										NEI			
Ď	Pub	olic & Private Wate	er Supply													
	Ν	S = Fully Supporting IS = Not Supporting IEI = Not Enough Int	formation spoon	*N/A – parameters not collected in current sample year.												
μS/c	m = n	phelometric turbidity nicrosiemens per ce Escherichia coli	ntimeter mV = m			Quality St	andards		= milligram n = microsi			t = parts pe = Enteroco		d		

Chlor-a = Chlorophyll-a

E. coli = Escherichia coli

Hudson, Upper (5-8)

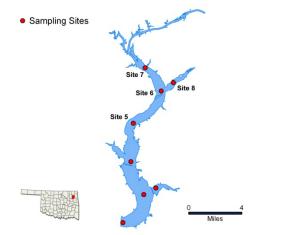
 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

mV = millivolts

Chlor-a = Chlorophyll-a

	Sample Period	d	Visited	Sampling Sites				
	October 2011 - July	2012	4	8				
	Location	Mayes Cou	inty	Click map for site data				
5	Impoundment	1964						
	Area	10,900 acre	acres					
5	Capacity	200,300 ac	acre-feet					
	Purposes	Flood Control, Hydropower						



		· uij	poses	Flood Control,	Пушоро	WEI											
			Parameter (Des	scriptions)	Result					Notes/Comments							
	ı		Average Turbidi	ty	26 NTL	J				25% of	values<	OWQS o	f 25 NTU	(n=16)			
	ı		Average Secchi	Disk Depth	50 cm												
		ita	Water Clarity Ra	ating	Averag	е											
		In Situ	Chlorophyll-a		14 mg	/m3											
	ı		Trophic State In	dex	56					Previou	s value =	: 54					
ပ်	ı		Trophic Class		Eutroph	nic											
Parameters			Salinity		0.10 -	0.12 ppt											
ıran		as a	Specific Conduc	tivity	212 – 2	257 μS/cr	n										
Pa		Profile	рН		7.21 – 8	8.78 pH ւ	units										
	ľ	בֿ	Oxidation-Reduc	ction Potential	237 – 4	60mV											
			Dissolved Oxyge	en	Up to 3 July	6% of wa	ater colum	n < 2.0 r	mg/L in								
	Nutrients	Surface Total Ni	trogen	0.47 m	g/L to 2.0	7 mg/L											
		trient	Surface Total Ph	nosphorus	0.034 n	34 mg/L to 0.143 mg/L											
		Ž	Nitrogen to Phos	sphorus Ratio	15:1					Phosph	orus limi	ted					
			Click to learn m Beneficial Uses	nore about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a		
ses	ı	Fish	n & Wildlife Propa	gation	S	S	S	*									
Beneficial Uses	,	Aes	thetics						S	N/A							
ficia	,	Agri	iculture								N/A	N/A	S				
ene	1	Prin	nary Body Contac	t Recreation										NEI			
m	1	Pub	olic & Private Wate	er Supply													
		N	= Fully Supporting S = Not Supporting EI = Not Enough Ini		*N/A – p	parameters	s not collec	cted in cur	rent samp	ole year.							

 μ S/cm = microsiemens/cm

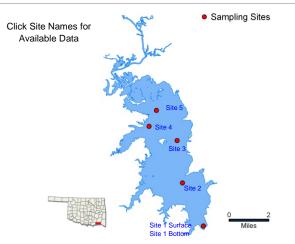
Hugo

 $NTU = nephelometric\ turbidity\ units$

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter

Sample Period	t	Times Visited	Sampling Sites
December 2011 - Augu	st 2012	4	5
Location	Choctaw C	County	Click map for site data
Impoundment	1974		
Area	13,250 acre	es	
Capacity	157,600 ac	re-feet	
Purposes			
	Location Impoundment Area Capacity	Impoundment 1974 Area 13,250 acre Capacity 157,600 acre Flood Cont	December 2011 - August 2012 4 Location Choctaw County Impoundment 1974 Area 13,250 acres Capacity 157,600 acre-feet Flood Control Water St



		Control, Fish a	sh and Wildlife, and Recreation Result											
		Parameter (Descriptions)	Result					Notes/0	Commen	its				
		Average Turbidity	61 NTL	J				90% of	values >	OWQS	of 25 NTL	J (n=20)		
		Average Secchi Disk Depth	25 cm											
	In Situ	Water Clarity Rating	Poor											
	드	Chlorophyll-a	11 mg/	′m3										
		Trophic State Index	54					Previous value = 54						
હ		Trophic Class	Eutropl	nic										
Parameters		Salinity	0.02 - 0).05 ppt										
aran	a)	Specific Conductivity	37 – 11	4 μS/cm										
<u> </u>	Profile	рН	6.59 –	8.21 pH ւ	units			Neutral						
	Ē	Oxidation-Reduction Potential	191 to 456 mV											
		Dissolved Oxygen	All data are above screening level of 2.0 mg/L											
	ts	Surface Total Nitrogen	0.68 m	g/L to 1.5	4 mg/L									
	Nutrients	Surface Total Phosphorus	0.016 n	ng/L to 0.	.127 mg/L	_								
	Ž	Nitrogen to Phosphorus Ratio	14:1					Phosph	orus limi	ted				
		Click to learn more about Beneficial Uses	Turbidity	Hď	Dissolved Oxygen	Metals	TSI	True	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
ses	Fish	n & Wildlife Propagation	NS	S	S	S								
Beneficial Uses	Aes	ethetics					S	N/A						
fici	Agri	iculture							N/A	N/A	S			
ene	Prin	mary Body Contact Recreation										NEI		
m	Pub	olic & Private Water Supply												
	Ν	S = Fully Supporting IS = Not Supporting IEI = Not Enough Information	* The P *N/A – p	BCR cann parameters	ot be asse s not colled	essed as n eted in cur	ninimum d rent samp	data require ole year.	ements we	ere not me	et due to Q	4/QC issu	es	

OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

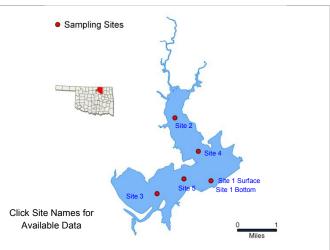
ppt = parts per thousand

H	ulah							
	Sample Period	d	Times Visited	Sampling Sites				
	November 2011 – July	y 2012	4	5				
	Location	Osage Co	unty	Click map for site data				
<u>a</u>	Impoundment	1951						
General	Area	3,570 acres	es					
စ်	Capacity							

Purposes

E. coli = Escherichia coli

Flood Control, Water Supply, Low-flow



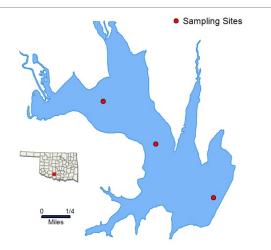
	Fui	poses	Regulation, an	d Conse	rvation											
		Parameter (Des	scriptions)	Result					Notes/Comments							
		Average Turbidi	ty	78 NTU	J				100% c	of values	> OWQS	of 25 NT	U (n=12)			
		Average Secchi	Disk Depth	17 cm												
	Situ	Water Clarity Ra	ating	Poor												
	n S	Chlorophyll-a		9 mg/r	n3											
		Trophic State In	dex	52					Previou	s value =	= 55					
હ		Trophic Class		Eutropl	hic											
Parameters		Salinity		0.10 - 0	0.16 ppt											
ıran	a)	Specific Conduc	tivity	202 – 3	347 µS/cr	n										
<u>a</u>	Profile	pН		7.41 –	8.29 pH ւ	units										
	Ē	Oxidation-Reduc	ction Potential	269 to	514 mV											
		Dissolved Oxyge	en	All data mg/L	a are abo	ve screer	ning level	of 2.0								
	ts	Surface Total Ni	itrogen	0.66 m	g/L to 1.1	2 mg/L										
	Nutrients	Surface Total Ph	nosphorus	0.018 r	ng/L to 0.	.132 mg/l	=									
	Ž	Nitrogen to Phos	sphorus Ratio	13:1					Phosphorus limited							
		Click to learn m Beneficial Uses	nore about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ses	Fish	h & Wildlife Propa	gation	NS	S	S	S									
Ö	Aes	sthetics						NS	N/A							
icia	Agr	ciculture								N/A	N/A	S				
Beneficial Uses	Prin	mary Body Contac	t Recreation										NEI			
m	Pub	olic & Private Wate	er Supply													
	Λ	S = Fully Supporting IS = Not Supporting IEI = Not Enough In	formation spot	Standar study ca	rds (WQS) an confirm	. This mea	ns that the etics bene	e lake is d ficial use	considered non-suppo	threatene		ahoma Wat trients until				
μS/c	m = n	phelometric turbidity nicrosiemens per ce	entimeter $mV = m$	$QS = Oklahoma\ Water\ Quality\ Standards$ $mg/L = milligrams\ per\ liter$ $ppt = parts\ per\ tho$ $\mu S/cm = microsiemens/cm$ $En = Enterococci$									d			

Chlor-a = Chlorophyll-a

Humphreys

	Sample Period	d	Visited	Sampling Sites					
C	October 2011 – Augu	st 2012	4	3					
	Location	Stephens C	County	Click map for site data					
<u>a</u>	Impoundment	1958							
eneral	Area	10,900 acre	es						
Ge	Capacity	200,300 acre-feet							
	Purposes	Water Supp	oly, Flood Co	ntrol, Recreation					

Times



		Parameter (<u>Descriptions</u>)	Result					Notes/Comments							
		Average Turbidity	10 NTU	J				100% c	of values	< OWQS	of 25 NT	U (n=12))		
		Average Secchi Disk Depth	49 cm												
	Ē	Water Clarity Rating	Averag	е											
	In Situ	Chlorophyll-a	32 mg	/m3											
		Trophic State Index	65					Previou	s value :	= 63					
હ		Trophic Class	Hypere	utrophic											
Parameters		Salinity	0.29 –	0.38 ppt											
ıran	o)	Specific Conductivity	602 – 7	75 μS/cr	n										
<u> </u>	Profile	рН	5.44 –	8.68 pH (units										
-	Ē	Oxidation-Reduction Potential	-54 – 5	36 mV											
		Dissolved Oxygen	Up to 3 August		ater colum	n < 2.0 r	mg/L in								
	ts.	Surface Total Nitrogen	1.23 m	g/L to 1.6	32 mg/L										
	Nutrients	Surface Total Phosphorus	0.005 n	ng/L to 0	.061 mg/L	-									
	Ž	Nitrogen to Phosphorus Ratio	51:1					Phosphorus limited							
		Click to learn more about Beneficial Uses	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a		
ses	Fish	h & Wildlife Propagation	S	S	S	*									
Š	Aes	sthetics					NS	N/A							
Beneficial Uses	Agr	iculture							N/A	N/A	S				
ene	Prin	mary Body Contact Recreation										S			
Ď	Pub	olic & Private Water Supply											NS		
	٨	S = Fully Supporting IS = Not Supporting IS = Not Supporting	N/A – pa *With a water bo	TSI of 63	not collect this lake w	ted in curr vill be furth	ent samp ner review	le year. ved to deter	mine the	need to b	e considere	ed as an N	1LW		

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Chlor-a = Chlorophyll-a

mV = millivolts

OWQS = Oklahoma Water Quality Standards

NEI = *Not Enough Information*

NTU = *nephelometric turbidity units*

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter

mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

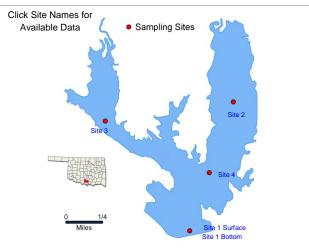
ppt = parts per thousand

Jean Neustadt

 μ S/cm = microsiemens per centimeter mV = millivolts

E. coli = Escherichia coli

	Sample Period	d	Times Visited	Sampling Sites						
ا	November 2011 - Jul	y 2012	4	5						
	Location	Carter Cou	ınty	Click map for site data						
<u>,</u>	Impoundment	1969	969							
General	Area	462 acres								
ပ္	Capacity	6,106 acre-								
	Purposes	Recreation								



		Parameter (Descriptions)	Result					Notes/Comments							
		Average Turbidity	17 NTU	J				8% of v	values >	OWQS o	f 25 NTU	(n=12)			
		Average Secchi Disk Depth	44 cm												
	Situ	Water Clarity Rating	Averag	е											
	ln S	Chlorophyll-a	23 mg	/m3											
		Trophic State Index	61					Previous value = 58							
ည		Trophic Class	Eutropl	nic											
Parameters		Salinity	0.13-0).20 ppt											
ram		Specific Conductivity	271 – 4	l06 μS/cr	n										
Pa	Profile	pH	6.70 –	9 pH unit	:S										
	ڇّ	Oxidation-Reduction Potential	-27 - 5	38 mV											
		Dissolved Oxygen	Up to 6	7% of wa	nn < 2 m	g/L in	Occurred at site 1, the dam								
	S	Surface Total Nitrogen	0.69 m	g/L to 1.5	59 mg/L										
	Nutrients	Surface Total Phosphorus	0.005m	ng/L to 0.	039 mg/L										
	Nut	Nitrogen to Phosphorus Ratio	61:1					Phosph	orus limi	ted					
		Click to learn more about Beneficial Uses	Turbidity	Hd	Dissolved Oxygen	Metals	ISI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ses	Fis	sh & Wildlife Propagation	S	S	*	S									
Beneficial Uses	Aes	sthetics					S	N/A							
icia	Agı	riculture							N/A	N/A	S				
enef	Prir	mary Body Contact Recreation										NEI			
m	Pul	blic & Private Water Supply													
	/	S = Fully Supporting NS = Not Supporting NEI = Not Enough Information			not collect			le year.							

Chlor-a = Chlorophyll-a

 μ S/cm = microsiemens/cm

Jim Hall (Henryetta)

	Sample Period	t	Times Visited	Sampling Sites					
	2012		4	5					
	Location	Okmulgee	County	Click map for site data					
ਰ ਹ	Impoundment	1928							
	Area	450 acres	450 acres						
5	Capacity	6,600 acre-	feet						
	Purposes	Water Supp	oly and Recre	eation					



	ı uı	poses	vvater ouppr	and Recreation					9							
		Parameter (Des	scriptions)	Result					Notes/Comments							
		Average Turbidi	ty	132 NT	ΓU				100% of values > OWQS of 25 NTU (n=12)							
		Average Secchi	Disk Depth	8 cm												
	텵	Water Clarity Ra	ating	Poor												
	In Situ	Chlorophyll-a		3 mg/r	m3											
		Trophic State In	dex	43					Previou	s Value	= 45					
ည		Trophic Class		Mesotr	ophic											
Parameters		Salinity		0.04 - 0	0.05 ppt											
ıran	a	Specific Conduc	tivity	87 – 11	11 μS/cm											
g	Profile	pН		6.50 –	8.04 pH ւ	units										
	<u>~</u>	Oxidation-Redu	ction Potential	298 to	637 mV											
		Dissolved Oxygo	en	Up to 1 July	1% of wa	ater colun	nn < 2 mg	g/L in								
	ts	Surface Total N	itrogen	1.19 m	g/L to 1.3	6 mg/L										
	Nutrients	Surface Total Pl	nosphorus	0.088 r	0.088 mg/L to 0.192 mg/L											
	Ž	Nitrogen to Pho	sphorus Ratio	10:1					Phosph	orus limi	ted					
		Click to learn n Beneficial Uses	nore about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ses	Fisl	h & Wildlife Propa	gation	NS	S	S										
<u>=</u>	Aes	sthetics						S	N/A							
fici	Agr	riculture								N/A	N/A	S				
Beneficial Uses	Prir	mary Body Contac	t Recreation										NEI**			
m	Pul	blic & Private Wate	er Supply													
	\ \	S = Fully Supporting NS = Not Supporting NEI = Not Enough In		**The PBCR cannot be assessed as minimum data requirements were not met due to QA/QC issues for parameters *N/A – parameters not collected in current sample year.								es for all				

NTU = nephelometric turbidity units μ S/cm = microsiemens per centimeter E. coli = Escherichia coli

OWQS = Oklahoma Water Quality Standards Chlor-a = Chlorophyll-a

mg/L = milligrams per liter μ S/cm = microsiemens/cm ppt = parts per thousand En = Enterococci

mV = millivolts

John Wells Sample Period Times Visited Sampling Sites

 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

mV = millivolts

Chlor-a = Chlorophyll-a

October 2008 – July 2009 4 5

Location Haskell County Click map for site data

Impoundment 1936

Area 194 acres

Capacity 1,352 acre-feet



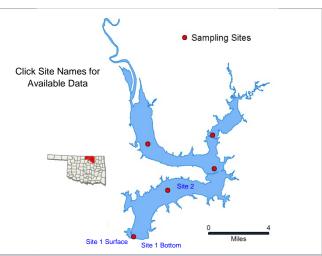
	Pur	poses	Water Supply,	Recreat						0 1/4 Miles							
		Parameter (Des	scriptions)	Result					Notes/0	Commer	its						
		Average Turbidit	ty	3 NTU					100% o	f values	< OWQS	of 25 NT	U (n=12)				
		Average True Co	olor						Did not	collect fo	or true co	lor					
		Average Secchi	Disk Depth	180 cm	ı												
		Water Clarity Ra	ating	Excelle	nt												
		Trophic State Inc	dex	45					Previous value = 46								
ည		Trophic Class		Mesotr	ophic												
Parameters		Salinity		0.02 -	0.10 ppt												
ıran	a)	Specific Conduc	tivity	73 – 20)7.5 µS/d	m											
Ъ	Profile	рН		6.3 – 9	.13 pH ur	nits			1% of v	alues < 6	6.50 and	2.38% > 9	9.00 pH ι	units			
	፵	Oxidation-Reduc	ction Potential	-35 – 503 mV													
		Dissolved Oxyge	en	Up to 50% of water column < 2.0 mg/L in July													
	ts	Surface Total Ni	trogen	0.30 m	g/L to 0.5	4 mg/L											
	Nutrients	Surface Total Ph	nosphorus	0.005 mg/L to 0.014 mg/L													
	Z	Nitrogen to Phos	sphorus Ratio	43:1					Phosphorus limited								
		Click to learn Beneficial Uses	more about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a			
ses	Fish	h & Wildlife Propag	gation	S	S	S	*										
Š	Aes	sthetics						S	*								
ficia	Agr	iculture								*	*	S					
Beneficial Uses	Prin	mary Body Contac	t Recreation										S				
m	Pub	olic & Private Wate	er Supply														
	N	S = Fully Supporting IS = Not Supporting IEI = Not Enough Int	formation	*Did not	collect for	these par	ameters										

 μ S/cm = microsiemens/cm

Kaw (Lower)										
Sample Period Times Visited Sampling Sites										
	October 2007 – July	2008	4	5						
	Location	Osage Cou	inty	Click map for site data						
<u>a</u>	Impoundment	1976	1976							
General	Area	17,040 acres								
ပ္ပ	Capacity	428,600 ac	re-feet							

E. coli = Escherichia coli

Flood Control, Water Supply, Water Quality



	Pur	rposes Control, an			ion		,		:	Site 1 Surface	Site 1 Botto	m	Miles		
		Parameter (<u>Descriptions</u>)		Result	Result					Commer	nts				
		Average Turbidity		18 nep	helometri	ic turbidity	y units (N	ITU)	25% of	values >	25 NTU				
		Average True Color		75 unit	S				25% of	values >	owqs	of 70			
		Average Secchi Disk Depth		66 cm											
		Water Clarity Rating		averag	e										
		Trophic State Index		42					Previous value = 56 (lake-wide average)						
Sic		Trophic Class		mesotr	ophic										
Parameters		Salinity		0.21 - ().58 ppt										
ara	<u>0</u>	Specific Conductivity		416.2 -	- 1100 µS	S/cm									
<u>Ф</u>	Profile	рН		6.97 –	8.38 pH ı	units			Neutral	to slightl	y alkalin	е			
	Δ.	Oxidation-Reduction Potentia	al	103 to 487 mV				Ŭ,							
		Dissolved Oxygen		Up to 2	Up to 24% of water column < 2 mg/L					d at site	1, the d	am			
	ts	Surface Total Nitrogen		1.08 m	1.08 mg/L to 2.46 mg/L										
	Nutrients	Surface Total Phosphorus		0.168 mg/L to 0.223 mg/L											
	Ž	Nitrogen to Phosphorus Ratio	10:1				Phosph	orus limi	ted						
		Click to learn more about Beneficial Uses	<u>ıt</u>	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
ses	Fish	h & Wildlife Propagation		NEI	S	S	S								
<u> </u>	Aes	sthetics						S	NEI						
Beneficial Uses	Agr	riculture								S	S	S			
ene	Prin	mary Body Contact Recreation											S		
Ď	Pub	olic & Private Water Supply													
	٨	S = Fully Supporting NS = Not Supporting NEI = Not Enough Information	Notes	Although 25% of values exceeded the OWQS for turbidity and true color, the minimum data requirements were not met and an assessment of the FWP and Aesthetics beneficial use cannot be made for this sample year.											
μS/c	m = r	microsiemens per centimeter mV	= n	= Oklaho nillivolts		Quality St	andards		= milligram n = microsie			t = parts pe n = Enteroco		d	

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Chlor-a = Chlorophyll-a

Kaw (Upper)

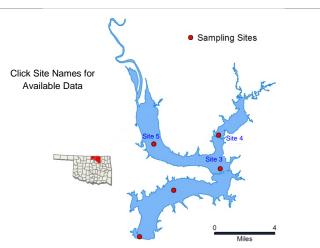
 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

mV = millivolts

Chlor-a = Chlorophyll-a

	Sample Period	t		imes isited		Sampling Sites			
	October 2007 – July	2008		4		5			
	Location	Osage County				Click map for site data			
<u></u>	Impoundment	1976							
	Area	17,040 acres							
ם פ	Capacity	428,600 acre-feet							
	Purposes	Flood Control, Water Supply, Water Quality Control, and Conservation							
				_					



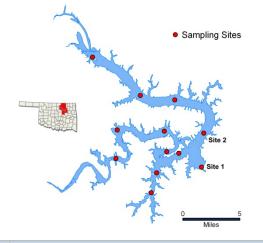
	Pur	poses	Control, an	d C	onservat	ion								ivilles		
		Parameter (Des	scriptions)		Result					Notes/0	ommen	its				
		Average Turbidi	ty		27 nepl	nelometri	c turbidity	/ units (N	TU)	50% of	values >	25 NTU				
		Average True Co	olor		81 units	3				67% of	values >	owqs	of 70			
		Average Secchi	Disk Depth		35 cm											
		Water Clarity Ra	ating		poor											
		Trophic State In	dex		53					Previous value = 56 (lake-wide average)						
SIS		Trophic Class			eutroph	nic										
Parameters		Salinity			0.16 - 0.65 ppt											
arar	Ð	Specific Conduc	tivity		332.2– 1233 μS/cm											
<u>a</u>	pH				7.09 – 8.54 pH units				Neutral	to slightl	y alkalin	е				
	_	Oxidation-Reduc	al	103 to 487 mV												
		Dissolved Oxyge	en		Up to 2	4% of wa	ater colum	nn < 2 mg	g/L	Occurre	d at site	1, the d	am			
	Si	Surface Total Ni	trogen		1.14 mg/L to 2.64 mg/L											
	Nutrients	Surface Total Ph	nosphorus		0.119 n	ng/L to 0.	.263 mg/L	-								
	N	Nitrogen to Phos	sphorus Ratio)	9:1					Phosphorus limited						
		Click to learn Beneficial Uses	more abou	<u>ıt</u>	Turbidity	된	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
ses	Fish	n & Wildlife Propa	gation		NEI	S	S	S								
Beneficial Uses	Aes	sthetics							S	NEI						
ficia	Agr	iculture									S	S	S			
eue	Prir	nary Body Contac	t Recreation											S		
m	Pub	olic & Private Wate	er Supply													
	٨	S = Fully Supporting IS = Not Supporting IEI = Not Enough Ini		Notes	requiren		e not met a						he minimun eneficial use		e made	
		phelometric turbidity			= Oklaho	ma Water	Quality Sta	andards		= milligram			t = parts pe		d	

 μ S/cm = microsiemens/cm

Keystone (1-2)

	Sample Period	0	Visited	Sampling Sites				
No	ovember 2011 – Aug	ust 2012	4	12				
ral	Location	Tulsa Cour	nty	Click map for site data				
	Impoundment	1964						
<u>a</u>	Δ.	00.040						

Times



Location	Tulsa County	Click map for site data					
Impoundment	1964						
Area	23,610 acres						
Capacity	557,600 acre-	acre-feet					
Purposes	Flood Control, Navigation, Fis		pply, Hydropower, fe				
Parameter (Des	scriptions)	Result					

		Parameter (Descriptions)							Commen	ıts			
		Average Turbidity	29 NTU	J				25% of	values >	OWQS	of 25 NTL	J (n=8)	
		Average Secchi Disk Depth	50 cm										
	jįt	Water Clarity Rating	Averag	е									
	In Situ	Chlorophyll-a	7 mg/i	m3									
		Trophic State Index	49					Previous value = 57					
ပ		Trophic Class	Mesotr	ophic									
Parameters		Salinity	021 – 1	1.42 ppt									
ıran	a	Specific Conductivity	434 – 2	2734 μS/	cm								
Pa	Profile	pH	7.38 –	8.42 pH ւ	units								
	፩	Oxidation-Reduction Potential	59 – 54	15mV									
		Dissolved Oxygen	Up to 4 August		iter colum	nn < 2.0 r	ng/L in						
	S	Surface Total Nitrogen	0.83 m	g/L to 1.4	mg/L								
	Nutrients	Surface Total Phosphorus	0.085 mg/L to 0.207 mg/L										
	Ž	Nitrogen to Phosphorus Ratio	8:1				Possibly co-limited						
		Click to learn more about Beneficial Uses	Turbidity	된	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
ses	Fish	h & Wildlife Propagation	NS	S	S	*							
Beneficial Uses	Aes	sthetics					S	N/A					
ficia	Agr	riculture							NEI	NEI	S		
ene	Prir	mary Body Contact Recreation										NEI	
m	Pub	olic & Private Water Supply											
S = Fully Supporting NS = Not Supporting NEI = Not Enough Information N/A - parameters not collected in current sample year. Although 50% of the value an assessment of the Fish & Wildlife Propagation (FWP) beneficial use cannominimum data requirements are not being met.								values exc cannot be	ceeded 2 made as	5 NTU,			

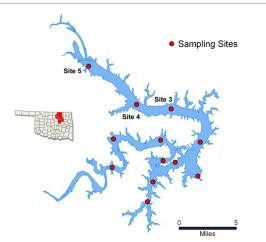
NTU = *nephelometric turbidity units* μ S/cm = microsiemens per centimeter E. coli = Escherichia coli

OWQS = Oklahoma Water Quality Standards mV = millivoltsChlor-a = Chlorophyll-a

mg/L = milligrams per liter μ S/cm = microsiemens/cm ppt = parts per thousand En = Enterococci

Keystone, Arkansas River Arm (3-5)

	Sample Period	d	Times Visited	Sampling Sites				
No	ovember 2011 – Aug	ust 2012	4	12				
	Location	Tulsa Cour	nty	Click map for site data				
<u>a</u>	Impoundment	1964						
ner	Area	23,610 acres						
General	Capacity	557,600 acre-feet						
	Purposes		rol, Water Sເ Fish & Wildl	upply, Hydropower, life				



	i ui	Navigation, Fi	sh & Wild	llife									
		Parameter (<u>Descriptions</u>)	Result					Notes/Co	mments				
		Average Turbidity	125 NT	U				75% of va	lues > O	WQS of	25 NTU ((n=12)	
		Average Secchi Disk Depth	24 cm										
	In Situ	Water Clarity Rating	Poor										
	드	Chlorophyll-a	18 mg	/m3									
		Trophic State Index	59					Previous value = 61					
စ်		Trophic Class	Eutropl	hic									
Parameters		Salinity	0.26 -	0.88 ppt									
aran	Φ	Specific Conductivity	551 – 1	743 µS/0	m								
<u>a</u>	Profile	рН	7.60 – 8.46 pH units										
	₫	Oxidation-Reduction Potential	206 – 5	525 mV									
		Dissolved Oxygen	Up to 2 July	2% of wa	ater colum	nn < 2.0 mg/	/L in						
	ts	Surface Total Nitrogen	0.93 m	0.93 mg/L to 3.99 mg/L									
	Nutrients	Surface Total Phosphorus	0.107	0.107 mg/L to 0.480 mg/L									
	ž	Nitrogen to Phosphorus Ratio	8:1					Possibly co-limited					
		Click to learn more about Beneficial Uses	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
ses	Fis	sh & Wildlife Propagation	NS	S	S	*							
al C	Aes	sthetics					S	N/A					
fici	Agı	riculture							NEI	NEI	S		
Beneficial Uses	Prir	mary Body Contact Recreation										NEI	
m	Public & Private Water Supply												
AITI	S = Fully Supporting NS = Not Supporting NEI = Not Enough Information N/A - parameters not collected in current sample year.												

NTU = nephelometric turbidity units µS/cm = microsiemens per centimeter E. coli = Escherichia coli OWQS = Oklahoma Water Quality Standards mV = millivolts Chlor-a = Chlorophyll-a mg/L = milligrams per liter μS/cm = microsiemens/cm ppt = parts per thousand En = Enterococci

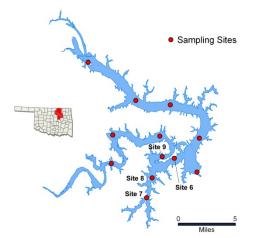
Keystone, Lower Cimarron River Arm (6-9)

NTU = *nephelometric turbidity units*

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter

	Sample Period	d	Visited	Sampling Sites			
No	ovember 2011 – Aug	ust 2012	4	12			
	Location	Tulsa Coun	nty	Click map for site data			
<u>a</u>	Impoundment	1964					
General	Area	23,610 acres					
ပ္ပ	Capacity	557,600 acre-feet					
	Purposes		rol, Water Su	ipply, Hydropower,			



	Pui	rposes Navig	ation, Fi	sh & Wild	life								villes		
		Parameter (Description	ns)	Result					Notes/Co	mments	:				
		Average Turbidity		28 NTL	I				31% of va	alues > C	WQS of	f 25 NTU	(n=14)		
		Average Secchi Disk De	epth	47 cm											
	Stu	Water Clarity Rating		Fair											
	<u>=</u>	Chlorophyll-a		11 mg	/m3										
		Trophic State Index		54					Previous \	/alue = 5	57				
ত		Trophic Class		Eutroph	nic										
Parameters		Salinity		0.24 -	1.22 ppt										
aran	a)	Specific Conductivity		507 – 2	394 µS/0	m									
<u> </u>	Profile	pH		7.60 – 8	3.74 pH ι	units									
	ਾ	Oxidation-Reduction Po	tential	188 – 4	45 mV										
		Dissolved Oxygen		Up to 8 August		er columi	n < 2.0 mg/l	_ in							
	ts	Surface Total Nitrogen		0.67 mg	g/L to 1.7	'2 mg/L									
	Nutrients	Surface Total Phosphor	us	0.067 mg/L to 0.204 mg/L											
	Ž	Nitrogen to Phosphorus	Ratio	10:1					Phosphorus limited or Possibly co-limited						
		Click to learn more about	<u>out</u>	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
Beneficial Uses	Fisl	h & Wildlife Propagation		NS	S	S	*								
<u></u>	Aes	sthetics						S	N/A						
ficia	Agr	riculture								NEI	NEI	S			
ene	Primary Body Contact Recrea		ation										NEI		
m	Public & Private Water Supply														
	S = Fully Supporting NS = Not Supporting NEI = Not Enough Information *Did not collect for these parameters.														

OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

ppt = parts per thousand

Keystone, Upper Cimarron River Arm (10-12)

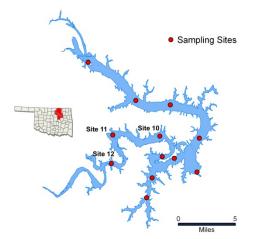
 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

mV = millivolts

Chlor-a = Chlorophyll-a

	Sample Period	d	Times Visited	Sampling Sites				
No	ovember 2011 – Aug	ust 2012	4	12				
	Location	Tulsa Cour	nty	Click map for site data				
<u>ख</u>	Impoundment	1964						
General	Area	23,610 acres						
Ger	Capacity	557,600 acre-feet						
	Purposes	Flood Cont	rol, Water Su	upply, Hydropower,				



	Purposes Navigation, Fish & Wildlife						,						Miles		
		Parameter (Des	criptions)	Result					Notes/Co	mments	3				
		Average Turbidit	у	306 NT	U				67% of values > OWQS of 25 NTU (n=9)						
		Average Secchi	Disk Depth	16 cm											
ırs	Situ	Water Clarity Ra	ting	Poor											
	므	Chlorophyll-a		34 mg/	/m3										
		Trophic State Inc	dex	65					Previous value = 60						
		Trophic Class		Hypere	utrophic										
Parameters		Salinity		028 – 3	3.68 ppt										
ıran	a)	Specific Conduc	tivity	576 – 6	6762 µS/0	cm									
<u> </u>	Profile	рH		7.56 –	8.82 pH :	units			Neutral to	slightly	alkaline				
	<u>~</u>	Oxidation-Reduc	tion Potential	66 – 40	05 mV										
		Dissolved Oxyge	en	Up to 6 August		ater colum	nn < 2.0 m	ng/L in							
	Ŋ	Surface Total Nit	trogen	1.14 m	g/L to 3.7	74 mg/L									
	Nutrients	Surface Total Ph	osphorus	0.098	mg/L to 0).696 mg/	L								
	Ž	Nitrogen to Phos	sphorus Ratio	7:1					Possibly	co-limited	d				
	Click to learn more about Beneficial Uses			Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a	
ses	Fis	h & Wildlife Propag	gation	NS	S	*	*								
ے ت	Aes	sthetics						S	N/A						
ficia	Agı	riculture								NEI	NEI	S			
Beneficial Uses	Pri	mary Body Contac	t Recreation										NEI		
m	Public & Private Water Supply														
	1	S = Fully Supporting NS = Not Supporting NEI = Not Enough Inf	ormation Solution	(FWP) *Did no	beneficial t collect fo	use cann or these pa	ot be mad rameters.	e, as mi	U an assess nimum data					tion	
	*50-70% range is undetermined for DO. *NTU = nephelometric turbidity units OWQS = Oklahoma Water Quality Standards mg/L = milligrams per liter ppt = parts per thousand us/om = migrapiomena per ceptimeter my/ = milligrams per liter ppt = parts per thousand														

 μ S/cm = microsiemens/cm

Sample Period Times Visited November 2011 – August 2012 Location Seminole County Click map for site dates

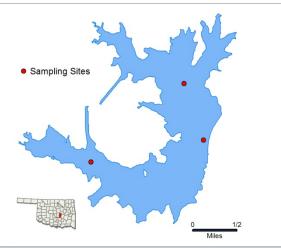
 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

mV = millivolts

Chlor-a = Chlorophyll-a

enerai	Location	Seminole C	County	Click map for site data					
	Impoundment	1968							
	Area	1,350 acres	3						
5	Capacity	23,000 acre	e-feet						
	Purposes	Cooling Wa	Cooling Water						



		Parameter (Descriptions)	Result					Notes/Comments										
		Average Turbidity	7 NTU					100% o	f values	< OWQS	of 25 NT	U (n=12)						
		Average Secchi Disk Depth	75 cm															
	텵	Water Clarity Rating	Good															
	In Situ	Chlorophyll-a	24 mg/	/m3														
		Trophic State Index	62					Previous value = 54										
စ်		Trophic Class	Hypere	utrophic														
ete		Salinity	0.57 –	0.64 ppt														
ram		Specific Conductivity	1144 –	1297 µS	/cm													
Pa Ba	ofile	рН	8.02 –	8.77 pH :	units													
	© <u>=</u>																	
		Dissolved Oxygen			ater colum	n < 2.0 ı	mg/L in											
	Ŋ	Surface Total Nitrogen	0.85 m	g/L to 1.4	15 mg/L													
	rient	Surface Total Phosphorus	0.007 r	ng/L to 0	.037 mg/L	-												
	Z	Nitrogen to Phosphorus Ratio	42:1					Phosph	orus limi	ted								
		Click to learn more about Beneficial Uses	Turbidity	Hd	Dissolved Oxygen	Metals	ISI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a					
ses	Fis	sh & Wildlife Propagation	S	S	S	*												
Beneficial Uses	Ae	esthetics					S	N/A										
ficia	Ag	griculture							S	S	S							
ene	Pri	imary Body Contact Recreation										S						
m	Pu	ublic & Private Water Supply																
		S = Fully Supporting NS = Not Supporting NEI = Not Enough Information	The PB				d not sup	porting for e	enterococ	ci as 1 (10	0%) of the v	ne values exceeded						

 μ S/cm = microsiemens/cm

Langston

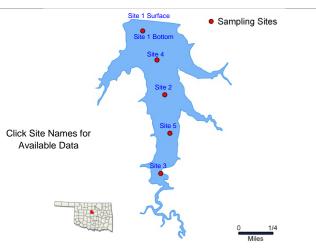
 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

mV = millivolts

Chlor-a = Chlorophyll-a

	Sample Period	t	Times Visited	Sampling Sites					
	November 2010 – July	y 2011	4	5					
	Location	Logan Cou	inty	Click map for site data					
5	Impoundment	1966							
	Area	304 acres							
5	Capacity	5,792 acre-feet							
	Purposes	Water Supp	ply, Flood Control, and Recreation						



	P	urposes	vvater Supply,	Flood Co	introi, an	a Recrea	tion		Willes								
		Parameter (Des	criptions)	Result					Notes/0	Commen	ıts						
		Average Turbidit	ty	13 NTU					5% of values > 25								
		Average Secchi	Disk Depth	73 cm													
	ji E	Water Clarity Ra	iting	Average	9												
	In-Situ	Chlorophyll-a		4 mg/m3													
		Trophic State Inc	dex	45					Previous value = 44								
ပ		Trophic Class		Mesotro	phic												
Parameters		Salinity	0.16 – 0).19 ppt													
	4	Specific Conduc	tivity	325.2 –	384.3 µ	S/cm											
Pa	Profile	рН	6.49 – 8.54 pH units					Only 0.97% of values < 6.5 pH units									
	٦	Oxidation-Reduc	ction Potential	-104 to	518 mV												
		Dissolved Oxyge	en	Up to 40 summe		ater colum	nn < 2 mg	g/L in									
	ţ	Surface Total Nitrogen 0.27 mg/L to 0.64 mg/L															
	Nutrients	Surface Total Ph	nosphorus	0.011 m	ng/L to 0.	014 mg/L	-										
	Z	Nitrogen to Phos	sphorus Ratio	41:1					Phosph	orus limi	ted						
		Click to learn Beneficial Uses	more about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a			
ses	Fi	ish & Wildlife Propag	gation	S	S	S	S										
Beneficial Uses	Ae	esthetics						S	S								
ficia	Αg	griculture								S	S	S					
ene	Pr	rimary Body Contac	t Recreation										S				
m	Pι	ublic & Private Wate	er Supply														
		S = Fully Supporting NS = Not Supporting NEI = Not Enough Int	formation 8														
	NTU = nephelometric turbidity units																

 μ S/cm = microsiemens/cm

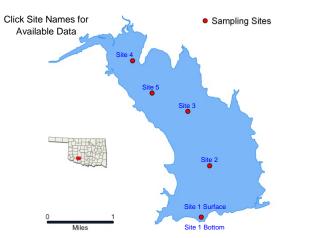
Lawtonka

NTU = nephelometric turbidity units

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter

	Sample Period	t	Times Visited	Sampling Sites					
De	ecember 2010 – Aug	ust 2011	4	5					
	Location	Comanche	County	Click map for site data					
5	Impoundment	1905							
	Area	2,398 acres	S						
5	Capacity	56,574 acre	e-feet						
	Purposes	Water Supp	er Supply, Recreation						



	Pur	poses vvater Supply			ivilles			Site i Bottom									
		Parameter (<u>Descriptions</u>)	Result					Notes/0	Commer	its							
		Average Turbidity	7 NTU					100% o	f values	<owqs< td=""><td>of 25 NTI</td><td>J</td><td></td></owqs<>	of 25 NTI	J					
		Average Secchi Disk Depth	130 cm	1													
	situ	Water Clarity Rating	Excelle	ent													
	In-Situ	Chlorophyll-a	13 mg/	/m3													
		Trophic State Index	56					Previous Value= 60									
ည		Trophic Class	Eutrop	hic													
Parameters		Salinity	0.16- 0).21 ppt													
aran	συ	Specific Conductivity	326.9 -	- 422.1 µ	S/cm												
ď	Profile	рН	6.55 –	8.73 pH ι	units												
	₫.	Oxidation-Reduction Potential		456 mV													
		Dissolved Oxygen	Up to 6	66% of wa er	ater colum	nn < 2 m(g/L in										
	ts	Surface Total Nitrogen	0.35 m	g/L to 0.8	8 mg/L												
	Nutrients	Surface Total Phosphorus	0.015n	ng/L to 0.0	030 mg/L												
	Ž	Nitrogen to Phosphorus Ratio	22:1					Phosph	orus limi	ted							
		Click to learn more about Beneficial Uses	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a				
ses	Fish	n & Wildlife Propagation	S	S	S	S											
<u>ه</u>	Aes	sthetics					S	*									
Beneficial Uses	Agr	iculture							*	*	S						
eue	Prin	mary Body Contact Recreation										S					
m	Pub	olic & Private Water Supply											NS				
	Ν	S = Fully Supporting IS = Not Supporting IEI = Not Enough Information	*Did no	t collect for	these par	ameters											

OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

ppt = parts per thousand

Liberty **Times Sample Period** Sampling Sites **Visited** October 2005 - July 2006 4 3 Location Logan County Click map for site data Impoundment 1948 General Area 167 acres

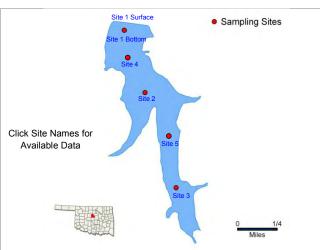
2,740 acre-feet

Capacity

NTU = nephelometric turbidity units

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter



	Purposes Water Supply, Recreation									附			Miles		
	Parameter (<u>Descriptions</u>)				lt				Notes/0	Commer	nts				
		Average Turbidit	ty	21 NT	U				16.7% of values > OWQS of 25 NTU						
		Average True Co	olor	20 un	its				100% of values < OWQS of 70						
	Average Secchi Disk Depth														
	Water Clarity Rating			good											
		Trophic State Inc	dex	67											
ည	Trophic Class		hyper	eutrophic											
Parameters		Salinity			- 0.30 ppt										
ıran	a ,	Specific Conduc	tivity	439.1	– 580.5 µ	S/cm									
Ъ	Profile	pН	·	7.94 –	- 8.48 pH	units			Neutral	to slightl	y alkalin	e			
	₽.	Oxidation-Reduc	ction Potential	404-5	44 mV										
		Dissolved Oxyge	en												
	Ŋ	Surface Total Ni	trogen	0.82 r	ng/L to 1.	19mg/L									
	Nutrients	Surface Total Ph	nosphorus	0.056	mg/L to ().110 mg/	L								
	Ž	Nitrogen to Phos	sphorus Ratio	16:1					Phosph	orus limi	ted				
		Click to learn m	nore about	Turbidity	Ha.	Dissolved Oxygen	Metals	ISI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
ses	Fish	h & Wildlife Propa	gation	NS	S	S	S								
Beneficial Uses	Aes	sthetics						S	S						
ficia	Agr	riculture								S	S	S			
ene	Prir	mary Body Contac	t Recreation										S		
m	Pub	Public & Private Water Supply												NS	
	٨	S = Fully Supporting VS = Not Supporting VEI = Not Enough Inteller	formation	Notes											

OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

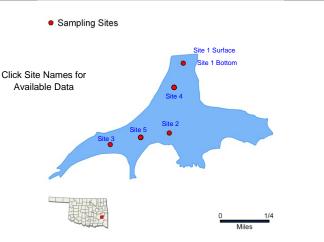
mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

ppt = parts per thousand

Lloyd Church (Wilburton)

	Sample Period	t	Times Visited	Sampling Sites
No	ovember 2005 – Aug	ust 2006	4	3
	Location	Latimer Co	unty	Click map for site data
<u>a</u>	Impoundment	1964		
General	Area	160 acres		
ပ္	Capacity	3,060 acre	-feet	
	Purposes	Water Supp	oly, Recreati	on, Flood Control



	Pur	poses	Water Supply,	Recreat	ion, Floo	d Control							Miles	
		Parameter (Des	scriptions)	Result					Notes/0	Commer	its			
		Average Turbidi	ty	14 NTU	J				25% of	values >	owqs (of 25 NTU	J	
		Average True Co	olor	79 units	S				75% of	values >	owqs (of 70		
		Average Secchi	Disk Depth	64 cm										
		Water Clarity Ra	ating	good										
		Trophic State In	dex	45										
ຣັ		Trophic Class		mesotr	ophic									
Parameters		Salinity		0.0 – 0	.01 ppt									
aran	a)	Specific Conduc	tivity	25.4 –	71.9 µS/	cm								
<u> </u>	Profile	рН		5.9 – 7	.51 pH ur	nits			26% of	values <	6.5 pH u	nits		
	ਾ	Oxidation-Reduc	ction Potential	79 -503	3 mV									
		Dissolved Oxyge	en	Up to 62% of water column < 2 mg/L in August										
	ıts	Surface Total Ni	trogen	0.15 m	g/L to 0.5	7 mg/L								
	Nutrients	Surface Total Ph	nosphorus	0.020 mg/L to 0.043 mg/L										
	ž	Nitrogen to Phos	sphorus Ratio	12:1					Phosph	orus limi	ted			
		Click to learn Beneficial Uses	n more about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
ses	Fisl	h & Wildlife Propa	gation	S	NS	NS	S							
<u></u>	Aes	sthetics						S	NS					
Beneficial Uses	Agr	ciculture								S	S	S		
ene	Prir	mary Body Contac	t Recreation										S	
a	Puk	olic & Private Wate	er Supply											
	٨	S = Fully Supporting IS = Not Supporting IEI = Not Enough In		seasona	al storm ev	rainfall da ents, there) beneficia	efore Lloyd	t that the	peak in tur Lake will be	bidity, whi e listed as	ch occurre supportin	ed in March g its Fish 8	n is likely o & Wildlife	due to

NTU = *nephelometric turbidity units* μ S/cm = microsiemens per centimeter E. coli = Escherichia coli

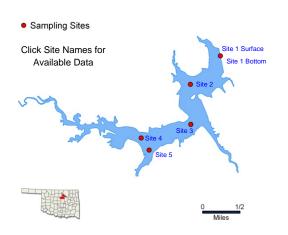
OWQS = Oklahoma Water Quality Standards

mg/L = milligrams per liter $\mu S/cm = microsiemens/cm$ ppt = parts per thousand En = Enterococci

mV = millivoltsChlor-a = Chlorophyll-a

Lone Chimney

	Sample Period	t	Times Visited	Sampling Sites
١	lovember 2010 – Jur	ne 2011	4	5
	Location	Pawnee Co	ounty	Click map for site data
ਰ ਹ	Impoundment	1984		
	Area	550 acres		
, ק	Capacity	6,200 acre-	feet	
	Purposes	Water Supp	oly, Recreation	on and Flood Control



	ı uı	poses	water Suppry,	Result Note:											
		Parameter (Des	scriptions)	Result					Notes/0	Commen	its				
		Average Turbidi	ty	15 NTL	l				1% of v	alues >C	WQS of	25 NTU			
		Average Secchi	Disk Depth	67 cm											
	it	Water Clarity Ra	ating	Good											
	In-Situ	Chlorophyll-a		10 mg/r	m3										
		Trophic State In	dex	53					Previou	s Value=	:53				
ည		Trophic Class		Eutroph	nic										
Parameters		Salinity		0.1-0.	14 ppt										
ıran	ø	Specific Conduc	ctivity	223.2 –	290.9 μ	S/cm			TDS= 152 g/L						
<u> </u>	Profile	рН		6.78 – 8	3.24 pH ι	units									
	죠	Oxidation-Reduc	ction Potential	64 - 44	9 mV										
		Dissolved Oxyge	en		Up to 50% of water column < 2 mg/L in summer										
	ts	Surface Total Ni	trogen	0.59 mg	g/L to 0.7	'4 mg/L									
	Nutrients	Surface Total Ph	nosphorus	0.018 n	ng/L to 0.	.034 mg/L	-								
	Ž	Nitrogen to Phos	sphorus Ratio	19:1					Phosph	orus limi	ted				
		Click to learn Beneficial Uses	n more about	Turbidity	된	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
ses	Fisl	h & Wildlife Propa	gation	S	S	S									
<u>=</u>	Aes	sthetics						S	S						
Beneficial Uses	Agr	riculture								S	S	S			
ene	Prir	mary Body Contac	t Recreation										S		
m	Puk	olic & Private Wate	er Supply												
N/T/	٨	S = Fully Supporting NS = Not Supporting NEI = Not Enough Inc.	formation			0									

NTU = nephelometric turbidity units $\mu S/cm = microsiemens per centimeter$ E. coli = Escherichia coli

OWQS = Oklahoma Water Quality Standards mV = millivolts Chlor-a = Chlorophyll-a mg/L = milligrams per liter μS/cm = microsiemens/cm ppt = parts per thousand En = Enterococci

Lugert-Altus

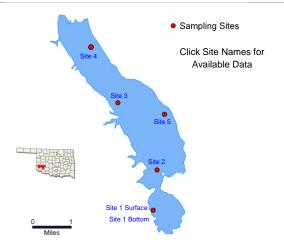
 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

mV = millivolts

Chlor-a = Chlorophyll-a

	Sample Period	t	Times Visited	Sampling Sites
De	ecember 2010 – Aug	ust 2011	4	5
	Location	Greer Cour	nty	Click map for site data
<u>ख</u>	Impoundment	1947		
General	Area	6,260 acres	S	
ဗီ	Capacity	132,830 ac	re-feet	
	Purposes	Water Supp	oly, Flood Co	ntrol, Irrigation



	Pur	poses	vvater Supp	y, F100	a Co	ontroi, irri	igation			Mille	15				
		Parameter (Des	scriptions)	Res	sult					Notes/0	Commer	nts			
		Average Turbidit	ty	21	NTL	J				11% of	values >	OWQS o	of 25 NTU		
		Average Secchi	Depth	64	cm										
	itu	Water Clarity Ra	ating	Fai	r										
	In-Situ	Chlorophyll-a		16	mg/ı	m3									
		Trophic State Inc	dex	58						Previou	s Value=	= 59			
กั		Trophic Class		Eut	roph	nic									
Parameters		Salinity		1.2	3 –	1.64 ppt									
aran	Φ	Specific Conduc	tivity	229	95 –	3037 µS/	'cm								
g,	Profile	рН		7.6	5 – 8	8.43 pH ι	units								
	₫.	Oxidation-Reduc	ction Potential	257	7 - 4	43 mV									
		Dissolved Oxyge	en	All	data	are abo	ve screer	ning level							
	S	Surface Total Ni	trogen	0.1	mg/l	L to 0.99	mg/L								
	Nutrients	Surface Total Ph	nosphorus	0.0	25 n	ng/L to 0.	.080 mg/l	_							
	Nutr	Nitrogen to Phos	<u> </u>	17:		<u> </u>				Dhaanh	orus limi	to d			
		Nitrogen to Prios	spriorus Ralio	17.	<u>'</u>					Phosph	orus IIIII	tea			
		Click to learn Beneficial Uses	more about	- Sign		Ħ.	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
ses	Fish	h & Wildlife Propa	gation	N	S	S	S								
Beneficial Uses	Aes	sthetics							S	*					
ficia	Agr	riculture									S	S	S		
ene	Prir	mary Body Contac											NEI		
Ď	Pub	olic & Private Wate													
	٨	S = Fully Supporting IS = Not Supporting IEI = Not Enough Int	formation	*This parameter not collected for.											
		phelometric turbidity		QS = Ok		ma Water	Quality St	andards		= milligram			t = parts pe		d

 μ S/cm = microsiemens/cm

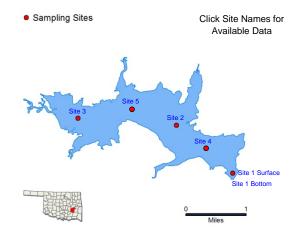
McAlester Times **Sample Period Sampling Sites** Visited 4 3 November 2008 - July 2009 Location Pittsburg County Click map for site data Impoundment 1930 General 1,521 acres Area Capacity 13,398 acre feet

 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

mV = millivolts

Chlor-a = Chlorophyll-a



	Pur	rposes	Water Sup	ply a	and Recr	eation								Miles	
		Parameter (Des	scriptions)		Result					Notes/0	Commer	ıts			
		Average Turbidit	ty		34 NTL	J				50% of	values >	OWQS	of 25 NTL	J (n=12)	
		Average True Co	olor							Did not	collect fo	or true co	lor		
		Average Secchi	Disk Depth		38 cm										
		Water Clarity Ra	ating		Averag	е									
		Trophic State Inc	dex		54					Previou	s value =	= 50			
<u>s</u>		Trophic Class			Eutroph	nic									
Parameters		Salinity			0.00 - 0	0.07 ppt									
ram		Specific Conduc	tivity		97.6 – 151.2 μS/cm										
Ра	Profile	pН			6.72 –	7.64 pH ι	units								
	4	Oxidation-Reduc	ction Potentia	al	74 to 5	14 mV									
		Dissolved Oxyge	en		Up to 4 July	2% of wa	ater colun	nn < 2.0 r	ng/L in						
	t)	Surface Total Ni	trogen		0.43 mg	g/L to 0.9	1 mg/L								
	Nutrients	Surface Total Ph	nosphorus		0.006 n	ng/L to 0.	.082 mg/l	-							
	Ž	Nitrogen to Phos	sphorus Rati	0	15:1					Phosph	orus limi	ted			
		Click to learn Beneficial Uses	more abou	<u>ıt</u>	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
ses	Fis	h & Wildlife Propa	gation		NS	S	S	*							
Ď	Aes	sthetics							S	*					
icia	Agı	riculture									*	*	S		
Beneficial Uses	Prir	mary Body Contac	t Recreation											NEI	
m	Pul	blic & Private Wate	er Supply												
		S = Fully Supporting NS = Not Supporting NEI = Not Enough Int	formation	Notes	*Did not The PB0 issues fo	CR benefic	these par	ameters nnot be as	ssessed a	s minimum	ı data req	uirement v	vere not me	et due to (QA/QC

 μ S/cm = microsiemens/cm

McGee Creek

Sample Period

NS = Not Supporting

NTU = *nephelometric turbidity units*

E. coli = Escherichia coli

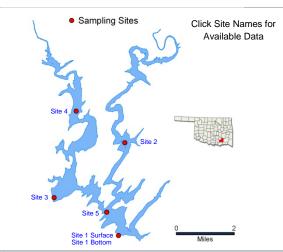
 μ S/cm = microsiemens per centimeter

NEI = Not Enough Information

	•		visitea	. •					
1	November 2008 – Augu	ıst 2009	4	5					
	Location	Atoka Cour	nty	Click map for site data					
	Impoundment	1987							
	Area	3,810 acres	3						
	Capacity	113,930 ac	113,930 acre-feet						
	Purposes			on, Water Quality Fish & Wildlife					

Times

Sampling Sites



		, ,	,											
		Parameter (<u>Descriptions</u>)	Result					Notes/Comments						
		Average Turbidity	4 NTU					100% o	f values	< OWQS	of 25 NT	U (n=20)		
		Average True Color						Did not	collect fo	or true co	lor			
		Average Secchi Disk Depth	149 cm	1										
		Water Clarity Rating	Excelle	ent										
		Trophic State Index	46					Previou	s value =	= 43				
ည		Trophic Class	Mesotr	ophic										
Parameters		Salinity	0.00 -	0.04 ppt										
ran	a)	Specific Conductivity	52.2 –	97.1 µS/c	m									
L _e	Profile	pН	5.71 –	7.56 pH ւ	units			41% of	values <	6.50 pH	units			
	₫	Oxidation-Reduction Potential	-6 to 54	14 mV										
		Dissolved Oxygen	Up to 7 August		ater colum	ın < 2.0 ı	ng/L in	Occurre	d at site	1, the da	am			
	ts	Surface Total Nitrogen	0.29 m	g/L to 0.6	1 mg/L									
	Nutrients	Surface Total Phosphorus	0.005 r	ng/L to 0.	023 mg/L	-								
	Ž	Nitrogen to Phosphorus Ratio	30:1					Phosph	orus limi	ted				
		Click to learn more about Beneficial Uses	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a	
es	Fish	n & Wildlife Propagation	S	NS*	NS	*								
Us	Aes	sthetics					S	*						
cia	Agr	iculture							*	*	S			
Beneficial Uses	Prin	mary Body Contact Recreation										S		
Be	Pub	olic & Private Water Supply												
	S	S = Fully Supporting									ely low soil may be du			

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2012 Lakes Report - Beneficial Use Monitoring Program - Oklahoma Water Resources Board

waters in the southeastern portion of the state *Did not collect for these parameters

OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

causes; therefore the Water Board is looking at the applicability of developing site-specific criteria for

mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

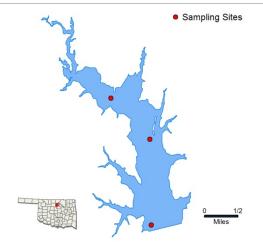
ppt = parts per thousand

McMurtry

NTU = *nephelometric turbidity units*

 μ S/cm = microsiemens per centimeter E. coli = Escherichia coli

	Sample Period		Times Visited	Sampling Sites
	October 2011 – July	2012	4	3
	Location	Noble Cour	nty	Click map for site data
5	Impoundment	1971		
	Area	1,155 acres	3	
5	Capacity	19,733 acre	e feet	
	Purposes	Water Supp	oly, Flood Co	ontrol, and Recreation



		poses	water Suppry,	1 1000 00	Jillioi, aii	a recorca	uon									
		Parameter (Des	scriptions)	Result					Notes/0	Commen	its					
		Average Turbidi	ty	20 NTL	J				42% of	values >	OWQS	of 25 NTU	l (n=12)			
		Average Secchi	Disk Depth	52 cm												
	itu	Water Clarity Ra	ating	Averag	е											
	In Situ	Chlorophyll-a		8 mg/m3												
		Trophic State In	dex	51					Previou	s value =	= 55					
S.		Trophic Class		Eutroph	nic											
Parameters		Salinity		0.17 – 0	0.23 ppt											
ıran	a)	Specific Conduc	ctivity	354 – 4	79 µS/cn	n										
a	Profile	рН		7.18 – 8	3.41 pH ւ	units										
	죠	Oxidation-Redu	ction Potential	55 to 6	7 mV											
		Water Clarity Rating Chlorophyll-a Trophic State Index Trophic Class Salinity Specific Conductivity pH Oxidation-Reduction Potent Dissolved Oxygen Surface Total Nitrogen Surface Total Phosphorus Nitrogen to Phosphorus Ra		Up to 5 July	0% of wa	ater colum	nn < 2.0 r	ng/L in								
	ts	Surface Total N	itrogen	0.57 mg	g/L to 0.7	'8 mg/L										
	Nutrients	Average Secchi Disk Depth Water Clarity Rating Chlorophyll-a Trophic State Index Trophic Class Salinity Specific Conductivity pH Oxidation-Reduction Potenti Dissolved Oxygen Surface Total Nitrogen Surface Total Phosphorus Nitrogen to Phosphorus Rat Click to learn more about Beneficial Uses the Wildlife Propagation Sthetics Ficulture The propagation Sthetics Ficulture The propagation Sthetics Ficulture The propagation Strick Private Water Supply See Fully Supporting See Not Supporting See Not Supporting See Not Supporting See Not Enough Information		0.005 n	ng/L to 0.	.030 mg/L	-									
	Ž			49:1					Phosph	orus limi	ted					
		Click to learn n Beneficial Uses	nore about	Turbidity	五	Dissolved Oxygen	Metals	ISI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a		
ses	Fisl	h & Wildlife Propa	gation	NS	S	S	S									
Beneficial Uses	Aes	sthetics						S	N/A							
fici	Agr									N/A	N/A	S				
ene	Prir	mary Body Contac	ct Recreation										S			
m	Puk	olic & Private Wate	er Supply													
A ITI	٨	IS = Not Supporting IEI = Not Enough In		* N/A – į	parameter	s not colle	cted in cur	rrent samı	ole year.							

OWQS = Oklahoma Water Quality Standards

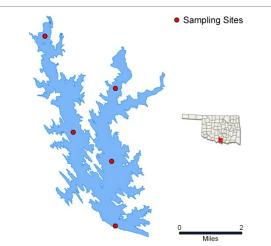
mV = millivoltsChlor-a = Chlorophyll-a mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

ppt = parts per thousand

Meeker Sampling Sites Times **Sample Period Sampling Sites** Visited 4 October 2008 - July 2009 5 Location Lincoln County Click map for site data Impoundment 1970 General Click Site Names for Available Data Area 250 acres Capacity 1,818 acre-feet Purposes Water Supply, Recreation, Flood Control Parameter (Descriptions) Result **Notes/Comments** Average Turbidity 143 NTU 100% of values > OWQS of 25 NTU (n=12) Average True Color Did not collect for true color Average Secchi Disk Depth 10 cm Water Clarity Rating Poor **Trophic State Index** 50 Previous value = 50 **Trophic Class** Mesotrophic **Parameters** Salinity 0.10 - 0.11 ppt Specific Conductivity $208.9 - 231.5 \mu S/cm$ 7.33 - 8.37 pH units Oxidation-Reduction Potential 213 to 468 mV All data are above screening level of 2.0 Dissolved Oxygen mg/L 0.73 mg/L to 1.07 mg/L Surface Total Nitrogen **Nutrients** Surface Total Phosphorus 0.062 mg/L to 0.105 mg/L Nitrogen to Phosphorus Ratio 11:1 Phosphorus limited, possibly co-limited Dissolved Oxygen Total Dissolved Solids Chlorides Turbidity Sulfates Click to learn more about Metals ∞ <u>≔</u> Beneficial Uses $\overline{\mathbb{S}}$ 핑 **Beneficial Uses** Fish & Wildlife Propagation NS S S **Aesthetics** S S Agriculture Primary Body Contact Recreation S Public & Private Water Supply S = Fully Supporting NS = Not Supporting *Did not collect for these parameters NEI = Not Enough Information *NTU* = *nephelometric turbidity units* OWQS = Oklahoma Water Quality Standards mg/L = milligrams per liter ppt = parts per thousand μ S/cm = microsiemens per centimeter mV = millivolts μ S/cm = microsiemens/cm En = Enterococci E. coli = Escherichia coli Chlor-a = Chlorophyll-a

Murray Times Sample Period **Sampling Sites** Visited November 2011 - July 2012 4 5 Location Love County Click map for site data Impoundment 1937 General Area 5,728 acres Capacity 153,250 acre-feet



	Pur	rposes	Recreation								-	0	Miles 2	
		Parameter (Des	scriptions)	Result					Notes/0	Commen	its			
		Average Turbidit	ty	6 NTU					100% c	f values	< OWQS	of 25 NT	U (n=20)	
		Average Secchi	Disk Depth	141 cm	ı									
	it.	Water Clarity Ra	ating	Excelle	nt									
	In Situ	Chlorophyll-a		2 mg/n	n3									
		Trophic State Inc	dex	37					Previou	s value =	= 37			
S		Trophic Class		Oligotro	ophic									
Parameters		Salinity		0.14 –	0.18 ppt									
aran	ω	Specific Conduc	tivity	299 – 3	868 µS/cr	n								
<u>a</u>	Profile	pН		7.54 – 9	9.53 pH ι	units			Only 8%	% of value	es > 9 pł	d units		
		Oxidation-Reduc	ction Potential		549 mV									
		Dissolved Oxyge	en	Up to 4 July	8% of wa	ater colum	nn < 2.0 r	mg/L in						
	ts	Surface Total Ni	trogen	0.28 m	g/L to 0.6	1 mg/L								
	Nutrients	Surface Total Ph	nosphorus	0.005 n	ng/L to 0	.005 mg/L	-							
	ž	Nitrogen to Phos	sphorus Ratio	79:1					Phosph	orus limi	ted			
		Click to learn m Beneficial Uses	nore about	Turbidity	표	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
ses	Fisl	h & Wildlife Propa	gation	S	S	S	*							
<u> </u>	Aes	sthetics						S	N/A					
Beneficial Uses	Agr	riculture								N/A	N/A	S		
ene	Prir	mary Body Contac	t Recreation										NEI	
m	Puk	blic & Private Wate	er Supply											
	٨	S = Fully Supporting NS = Not Supporting NEI = Not Enough Int	formation \$\frac{\gamma}{2}\$	* N/A – į	parameter	rs not colle	cted in cu	rrent sam	ple year.					

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 μ S/cm = microsiemens per centimeter E. coli = Escherichia coli

mV = millivolts

Chlor-a = Chlorophyll-a

 μ S/cm = microsiemens/cm

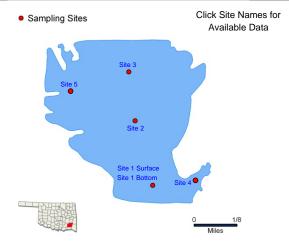
Nanih Waiya

NTU = nephelometric turbidity units

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter

	Sample Period	d	Times Visited	Sampling Sites
	December 2007 – July	y 2008	4	5
	Location	Pushmatah	a County	Click map for site data
<u></u>	Impoundment	1958		
	Area	131 acres		
	Capacity	1,064 acre	feet	
	Purposes	Recreation		



		Parameter (Des	scriptions)	Result						Notes/Comments						
		Average Turbidi	ty	9 nephe	elometric	turbidity	units (NT	U)	All value	es < 25 N	NTU					
		Average True C	olor	45 units	5				25% of	values >	OWQS (of 70				
		Average Secchi	Disk Depth	98 cm												
		Water Clarity Ra	ating	average	9											
		Trophic State In	dex	45					Previou	s value =	- 45					
ဟ		Trophic Class		mesotro	ophic											
Parameters		Salinity		0.0 – 0.	10 ppt											
ram		Specific Conduc	ctivity	63 – 262 μS/cm												
Ра	Profile	pН		6.31 – 8.22 pH units						s (6.5%)	<6.5 pH	units				
	<u>r</u>	Oxidation-Reduc	ction Potential	5 to 576	6 mV											
		Dissolved Oxyge	en	Up to 42% of water column < 2 mg/L in August						Occurred at site 1						
	ts	Surface Total Ni	itrogen	0.32 mg	g/L to 0.7	'0 mg/L										
	Nutrients	Surface Total Ph	hosphorus	0.018 mg/L to 0.032 mg/L												
	Z	Nitrogen to Phos	sphorus Ratio	18:1					Phosph	orus limi	ted					
		Click to learn Beneficial Uses	n more about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ses	Fish	n & Wildlife Propa	gation	S	S	S	S									
) E	Aes	sthetics						S	NS							
Beneficial Uses	Agr	iculture							S	S	S					
ene	Prin	mary Body Contac										S				
m	Pub	olic & Private Wate	er Supply													
	Λ	S = Fully Supporting IS = Not Supporting IEI = Not Enough In	formation september 1													

OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

mg/L = milligrams per liter

 $\mu S/cm = microsiemens/cm$

ppt = parts per thousand

New Spiro Times Sample Period Sampling Sites **Visited** October 2005 - July 2006 5 4 Le Flore County Location Click map for site data Impoundment 1960 General Area 254 acres Capacity 2,160 acre-feet

Water Supply, Recreation

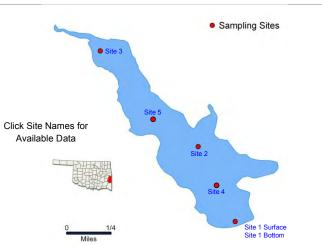
Purposes

NEI = Not Enough Information

NTU = nephelometric turbidity units

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter



			(Descriptions) Result Notes/Comments											
		Parameter (<u>Descriptions</u>)	Result					Notes/0	Commer	nts				
		Average Turbidity	18 NTU	J				8% of v	alues >C	DWQS of	25 NTU			
		Average True Color	26 unit	S				100% o	f values	< OWQ	S of 70			
		Average Secchi Disk Depth	47 cm											
		Water Clarity Rating	good											
		Trophic State Index	68											
ည		Trophic Class	hypere	utrophic										
Parameters		Salinity	0.04 -	0.09 ppt										
ıran	a)	Specific Conductivity	106.8 -	- 155.4 μ	S/cm									
Б	Profile	pH	7.09 –	9.24 pH	units			10% of	values >	9.0 pH :	units			
	₫.	Oxidation-Reduction Potential	121 - 4											
		Dissolved Oxygen	Up to 3 August	to 33% of water column < 2 mg/L in gust				Occurre	ed at site	2				
	ts	Surface Total Nitrogen	0.98 m	g/L to 1.6	88 mg/L									
	Nutrients	Surface Total Phosphorus	0.076 mg/L to 0.170 mg/L											
	Ž	Nitrogen to Phosphorus Ratio	11:1					Phosphorus limited						
		Click to learn more about Beneficial Uses	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
ses	Fish	n & Wildlife Propagation	S	NS	S	S								
	Aes	sthetics					NS*	S						
Beneficial Uses	Agr	iculture							S	S	S			
ene	Prir	mary Body Contact Recreation										S		
m	Pub	olic & Private Water Supply											NS	
	٨	S = Fully Supporting IS = Not Supporting US = Not Enough Information						ting that the			cial use is c	onsidered	i	

OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

threatened by nutrients until studies can be conducted to confirm non-support status

mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

ppt = parts per thousand

Okemah **Times Sample Period** Sampling Sites **Visited** October 2011 - July 2012 5 4 Location Okfuskee County Click map for site data Impoundment General Area 13,100 acre-feet Capacity Water Supply, Recreation

761 acres

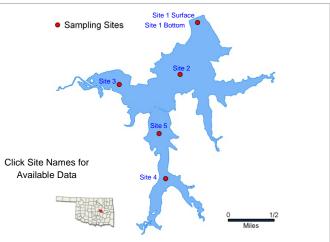
Purposes

 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

mV = millivolts

Chlor-a = Chlorophyll-a

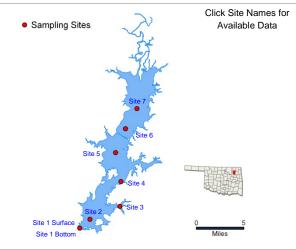


	Fui	poses	701 acres														
		Parameter (Des	scriptions)	Result					Notes/0	Commen	its						
		Average Turbidit	ty	10 NTU	J				100% c	f values	< OWQS	of 25 NT	U (n=15)	,			
		Average Secchi	Disk Depth	72 cm													
	itu	Water Clarity Ra	ating	Good													
	In Situ	Chlorophyll-a		5 mg/r	n3												
		Trophic State Inc	dex	46					Previou	s value =	= 46						
က်		Trophic Class		Mesotr	ophic												
Parameters		Salinity		0.10-0).14ppt												
ram		Specific Conduc	tivity	209 –3	07 μS/cm	1											
Ра	Profile	pН		6.79 –	8.08 pH เ	units											
	Ţ	Oxidation-Reduc	ction Potential	138.5	- 565 mV	,											
		Dissolved Oxyge	en	Up to 4 July	0% of wa	ater colum	nn < 2 mg	g/L in									
	S	Surface Total Ni	itrogen	0.46 mg/L to 0.70 mg/L													
	Nutrients	Surface Total Ph	nosphorus	0.005 mg/L to 0.013 mg/L													
	N	Nitrogen to Phos	sphorus Ratio	91:1					Phosphorus limited								
		Click to learn m Beneficial Uses	nore about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a			
ses	Fish	h & Wildlife Propa	gation	S	S	S	S										
Beneficial Uses	Aes	sthetics						S	N/A								
ficia	Agr	riculture								N/A	N/A	S					
ene	Prin	mary Body Contac	t Recreation										S				
m	Pub	olic & Private Wate	er Supply														
	Ν	S = Fully Supporting IS = Not Supporting IEI = Not Enough Inteller		N/A – parameters not collected in current sample year.													
NTU	l = ne _l	phelometric turbidity	units OWQS	= Oklaho	ma Water	Quality Sta	andards	mg/L	= milligram	s per liter	ppi	t = parts pe		d			

 μ S/cm = microsiemens/cm

Okmulgee Sampling Sites **Times** Sampling Sites Sample Period Visited November 2010 - June 2011 5 Location **Okmulgee County** Click map for site data Impoundment 1928 General Area 668 acres Capacity 14,170 acre-feet Click Site Names for Water Supply, Recreation Available Data **Purposes** Parameter (Descriptions) Result **Notes/Comments** 8 NTU Average Turbidity 100% of values < OWQS of 25 NTU Average Secchi Disk Depth 116 In-Situ Water Clarity Rating Excellent Chlorophyll-a 6 mg/m3 **Trophic State Index** 48 Previous Value= 46 **Trophic Class** Mesotrophic **Parameters** Salinity 0.05-0.06 ppt Specific Conductivity $118.6 - 136.9 \mu S/cm$ **Profile** 6.18-7.62 pH units рΗ 12% of values < 6.5 pH units Oxidation-Reduction Potential 270 - 441 mV Up to 54% of water column < 2 mg/L in Dissolved Oxygen summer Surface Total Nitrogen 0.29 mg/L to 0.56 mg/L Surface Total Phosphorus 0.010 mg/L to 0.030 mg/L Nitrogen to Phosphorus Ratio 25:1 Phosphorus limited Dissolved Solids Dissolved Chlorides Enterro. & E. coli Click to learn more about Turbidity Sulfates Chlor-a True Beneficial Uses \overline{S} 핑 **Beneficial Uses** Fish & Wildlife Propagation S S NS S **Aesthetics** S S Agriculture NEI Primary Body Contact Recreation Public & Private Water Supply S = Fully SupportingNotes *Did not collect for this parameter NS = Not Supporting NEI = Not Enough Information ppt = parts per thousand NTU = nephelometric turbidity units OWQS = Oklahoma Water Quality Standards mg/L = milligrams per liter μ S/cm = microsiemens per centimeter mV = millivolts μ S/cm = microsiemens/cm En = Enterococci E. coli = Escherichia coli Chlor-a = Chlorophyll-a

O	ologah								
	Sample Period	t	Times Visited	Sampling Sites					
	February 2012 – Augu	st 2012	4	7					
	Location	Rogers Co	unty	Click map for site data					
<u>a</u>	Impoundment	1963	53						
General	Area	29,460 acre	cres						
စ္	Capacity	553,400 ac	re feet						
	Purposes	Water Supp	oly, Flood Co	ntrol, and Navigation					



		Parameter (Descriptions)	Result					Notes/Comments							
		Average Turbidity	39 NTL	J				57% of	values >	OWQS	of 25 NTL	J (n=21)			
		Average Secchi Disk Depth	33 cm												
	itu	Water Clarity Rating	Poor												
	In Situ	Chlorophyll-a	8 mg/n	า3											
		Trophic State Index	51					Previous value = 54							
ပ်		Trophic Class	Eutroph	nic											
Parameters		Salinity	0.12 –	0.21 ppt											
ıram	a)	Specific Conductivity	254- 43	84 μS/cm											
g.	Profile	pН	7.44 – 8	8.73 pH ι	units			Neutral	to slightl	y alkalin	е				
	ሷ	Oxidation-Reduction Potential	134 to	582 mV											
		Dissolved Oxygen	All data are above the screening level of 2 mg/L												
	S	Surface Total Nitrogen	0.22 mg/L to 1.46 mg/L												
	Nutrients	Surface Total Phosphorus	0.005 n	ng/L to 0.	-										
	Š	Nitrogen to Phosphorus Ratio	14:1				Phosphorus limited								
		Click to learn more about Beneficial Uses	Turbidity	된	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ses	Fish	h & Wildlife Propagation	NS	S	S	S									
<u> </u>	Aes	sthetics					S	N/A							
Beneficial Uses	Agr	iculture							N/A	N/A	S				
eue	Prin	mary Body Contact Recreation										S			
B	Pub	olic & Private Water Supply													
NITI	N	S = Fully Supporting IS = Not Supporting IEI = Not Enough Information	* N/A – parameters not collected in current sample year.												

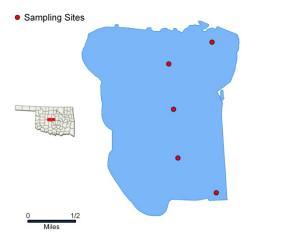
NTU = nephelometric turbidity units μ S/cm = microsiemens per centimeter E. coli = Escherichia coli

OWQS = Oklahoma Water Quality Standards mV = millivolts Chlor-a = Chlorophyll-a mg/L = milligrams per liter μS/cm = microsiemens/cm ppt = parts per thousand En = Enterococci

0	verhols	er					
	Sample Period	d	Times Visited	Sampling Sites			
De	ecember 2011 – Aug	ust 2012	4	5			
	Location	Oklahoma	County	Click map for site data			
<u>a</u>	Impoundment	1919					
General	Area	1,500 acre	res				
ၓ	Capacity	15,000 acre-feet					
	Purposes	Water Supp	oly, Recreation	on			

NTU = nephelometric turbidity units $\mu S/cm = microsiemens per centimeter$

E. coli = Escherichia coli



	Pur	poses W	Vater Supply	, Recreati	on				Mile	s				
		Parameter (Descrip	ptions)	Result					Notes/0	Commen	its			
		Average Turbidity		42 NTU	J				91% of	values >	OWQS	of 25 NTU	(n=11)	
		Average Secchi Dis	sk Depth	19 cm										
	In Situ	Water Clarity Rating	g	Poor										
	드	Chlorophyll-a		49 mg/	/m3									
		Trophic State Index	(69					Previou	s value =	= 67			
SIS		Trophic Class		Hypere	utrophic									
Parameters		Salinity		0.52 -	0.72 ppt									
arar	a	Specific Conductivi	ty	1051 –	1449 μ	S/cm								
ă	Profile	рН		8.14– 8	8.88 pH u	nits								
	_	Oxidation-Reductio	n Potential	225 - 4	82 mV									
		Dissolved Oxygen							Not stra	tified du	ring any	sampling i	nterval	
	ts	Surface Total Nitrog	gen	1.2 mg	/L to 2.14	mg/L								
	Nutrients	Surface Total Phos	phorus	0.152 r	ng/L to 0.	.427 mg/L	-							
	Ž	Nitrogen to Phosph	orus Ratio	6:1					Possibly	/ co- limi	ted			
		Click to learn more Beneficial Uses	e about_	Turbidity	Hď	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
ses	Fish	n & Wildlife Propagat	ion	NS	S	S	S							
a U	Aes	thetics						NS*	N/A					
ficia	Agr	iculture								S	S	S		
Beneficial Uses	Prin	nary Body Contact R	ecreation										S	
m	Pub	olic & Private Water S	Supply											
	Ν	= Fully Supporting S = Not Supporting El = Not Enough Inforn	mation S	threater	ed by nuti		studies ca	n be cond	ducted to co			cial use is c status	onsidered	

OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

 $mg/L = milligrams per liter \ \mu S/cm = microsiemens/cm$

ppt = parts per thousand En = Enterococci

Ozzie Cobb

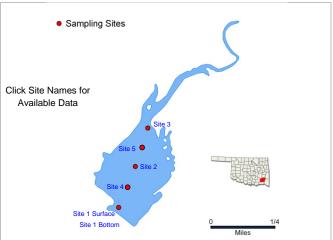
 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

mV = millivolts

Chlor-a = Chlorophyll-a

	Sample Period	b	Visited	Sampling Sites
1	November 2007 – Augu	ıst 2008	4	5
	Location	Pushmatah	a County	Click map for site data
5	Impoundment	1958		
5	Area	116 acres		
5	Capacity	833 acre fe	et	
	Purposes	Recreation		

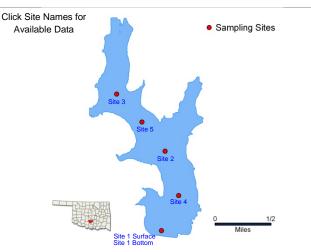


	Pur	poses	Recreation	Power						Bottom		V	Miles			
		Parameter (Des	scriptions)	Result	•				Notes/0	Commen	its					
		Average Turbidit	ty	12 nep	helometr	ic turbidity	units (N	ITU)	All value	es < 25 N	NTU					
		Average True Co	olor	51 unit	s				25% of values > OWQS of 70							
		Average Secchi	Disk Depth	56 cm												
		Water Clarity Ra	ating	averag	е											
		Trophic State Inc	dex	59					Previou	s value =	= 55					
ဟ		Trophic Class		eutropl	hic											
Parameters		Salinity		0.00 -	0.20 ppt											
J	a	Specific Conduc	ctivity	50.6 - 3	311 µS/cı	m										
ך מ	Profile	рН		6.32 –	7.96 pH	units			7 (13%)	of value	s < 6.5					
	₽.	Oxidation-Reduc	ction Potential	15 to 5	15 to 543 mV											
		Dissolved Oxyge	en	Up to 5	Occurred at site 1											
	Si	Surface Total Ni	0.47 m	0.47 mg/L to 0.94 mg/L												
	Nutrients	Surface Total Ph	nosphorus	0.034 ı	0.034 mg/L to 0.072 mg/L											
	Ž	Nitrogen to Phos	sphorus Ratio	17:1					Phosph	orus limi	ted					
		Click to learn Beneficial Uses	more about	Turbidity	된	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
S C C C C C C C C C C C C C C C C C C C	Fish	h & Wildlife Propa	gation	S	NS	S	S									
) =	Aes	sthetics						NS*	NS							
pelleliciai Oses	Agr	riculture								S	S	S				
<u> </u>	Prir	mary Body Contac	t Recreation										S			
۵	Pub	olic & Private Wate	er Supply													
	٨	S = Fully Supporting JS = Not Supporting JEI = Not Enough Int		soluble causes,	bedrock. I therefore	Because of the Water	these co Board is	nditions it looking at	is likely tha the applica	t the low p	oH values eveloping	ely low soil may be du site-specifi the OWQS	ie to natui c criteria t	ral		

 $\mu S/cm = microsiemens/cm$

Pauls Valley City

	Sample Period	t	Times Visited	Sampling Sites					
	October 2007 – July	2008	4	5					
	Location	Garvin Cou	unty	Click map for site data					
<u>ਹ</u>	Impoundment	1954	954						
General	Area	750 acres							
ב פ	Capacity	8,730 acre	feet						
	Purposes	Water Supp	oly and Recre	eation					



		Parameter (Descriptions)	Result					Notes/Comments						
		Average Turbidity	43 nepl	nelometri	c turbidity	y units (N	TU)	80% of	values >	25 NTU				
		Average True Color	126 uni	ts				75% of	values >	OWQS	of 70			
		Average Secchi Disk Depth	37 cm											
		Water Clarity Rating	poor											
		Trophic State Index	50					Previous value = 49						
ည		Trophic Class	mesotro	ophic										
Parameters		Salinity	0.10 - 0	0.12 ppt										
ran	a.	Specific Conductivity	206.9 -	271 µS/d	cm									
Ра	Profile	рН	7.14 – 8	3.59 pH ι	units			Neutral	to slightl	y alkalin	e			
	ᇫ	Oxidation-Reduction Potential	82 to 494 mV											
		Dissolved Oxygen	Up to 4 July	4% of wa	ater colum	nn < 2 mg	g/L in	Occurred at site 1						
	Ŋ	Surface Total Nitrogen	0.44 m	g/L to 0.9	8 mg/L									
	Nutrients	Surface Total Phosphorus	0.018 n	ng/L to 0.	.078 mg/L	_								
	Ž	Nitrogen to Phosphorus Ratio	17:1					Phosph	orus limi	ted				
		Click to learn more about Beneficial Uses	Turbidity	된	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
ses	Fisl	h & Wildlife Propagation	NS	S	S	S								
<u> </u>	Aes	sthetics					S	NS						
Beneficial Uses	Agr	riculture							S	S	S			
ene	Prir	mary Body Contact Recreation										S		
m	Puk	olic & Private Water Supply												
	٨	S = Fully Supporting IS = Not Supporting IEI = Not Enough Information												

NTU = nephelometric turbidity units $\mu S/cm = microsiemens per centimeter$ E. coli = Escherichia coli OWQS = Oklal mV = millivolts mV = millivolts Chlor-a = Chlor

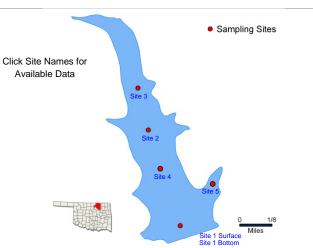
OWQS = Oklahoma Water Quality Standards mV = millivolts Chlor-a = Chlorophyll-a $mg/L = milligrams per liter \mu S/cm = microsiemens/cm$

ppt = parts per thousand En = Enterococci

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

Pawhuska

	Sample Period	d	Times Visited	Sampling Sites				
	October 2007 – July	2008	4	5				
	Location	Osage Cou	unty	Click map for site data				
ਰ	Impoundment	1936						
	Area	96 acres						
, de	Capacity	3,600 acre	00 acre feet					
	Purposes	Water Supp	oly and Recre	eation				



	Pur	poses	Water Supply	ply and Recreation Result					Site 1 Surface Site 1 Bottom						
		Parameter (Des	scriptions)	Result					Notes/0	Commer	ıts				
		Average Turbidit	ty	3 neph	elometric	turbidity	units (NT	U)	All valu	es < 25 N	NTU				
		Average True Co	olor	21 unit	S				All valu	es < OW	QS of 70)			
		Average Secchi	Disk Depth	195 cm	1										
		Water Clarity Ra	nting	excelle	nt										
		Trophic State Inc	dex	41					Previou	s value =	= 39				
S		Trophic Class		mesotr	ophic										
Parameters		Salinity		0.15 –	0.27 ppt										
aran	_O	Specific Conduc	tivity	311.1 -	- 523.1 µ	S/cm									
P	Profile	рН		6.91 –	Neutral	to slightl	y alkaline	Э							
	_ ₫	Oxidation-Reduc	ction Potential	-114 to	485 mV										
		Dissolved Oxyge	en	Up to 5 July	54% of wa	ater colum	nn < 2 m(g/L in	Occurred at site 1						
	ts	Surface Total Ni	0.24 m	g/L to 0.4	6 mg/L										
	Nutrients	Surface Total Ph	0.005 r	0.005 mg/L to 0.009 mg/L											
	ž	Nitrogen to Phos	sphorus Ratio	51:1					Phosph	orus limi	ted				
		Click to learn Beneficial Uses	more about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
ses	Fish	n & Wildlife Propa	gation	S	S	NS	S								
	Aes	sthetics					S	S							
Beneficial Uses	Agr	Agriculture								S	S	S			
ene	Prir	Primary Body Contact Recreation											NEI		
m	Public & Private Water Supply														
	٨	S = Fully Supporting IS = Not Supporting IEI = Not Enough Inf	The PBCR cannot be assessed as minimum data requirements were not met due coli and fecal coliform.						due to QA/	QC issues	s for E.				

NTU = nephelometric turbidity units μ S/cm = microsiemens per centimeter E. coli = Escherichia coli

OWQS = Oklahoma Water Quality Standards

mg/L = milligrams per liter $\mu S/cm = microsiemens/cm$ ppt = parts per thousand En = Enterococci

mV = millivoltsChlor-a = Chlorophyll-a

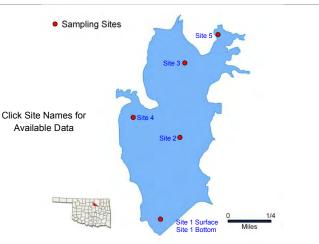
Pawnee **Times** Sampling Sites **Sample Period** Visited 4 November 2006 - August 2007 5 Location Pawnee County Click map for site data General

Impoundment 1932 Area 257 acres Capacity 3,855 acre-feet Purposes Water Supply, Recreation

NTU = *nephelometric turbidity units*

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter



	ı uı	poses	Descriptions) Result							Notes/Comments							
		Parameter (Des	scriptions)	Result			Notes/0	Commen	its								
		Average Turbidi	ty		22 NTL	J				30% of	values >	> OWQS	of 25 NTI	J			
		Average True C	olor		66 units	3				50% of	values >	> OWQS	of 70				
		Average Secchi	Disk Depth		44 cm												
		Water Clarity Ra	Vater Clarity Rating average rophic State Index 59														
		Trophic State In	dex		59												
ည		Trophic Class			eutroph	iic											
Parameters		Salinity			0.09-0	.16 ppt											
aran	ω	Specific Conduc	ctivity		205.9 –	- 331 μS/	cm										
<u> </u>	Profile	рН			7.25 –	3.69 pH	units			Neutral	to slightl	y alkaline	е				
	Ē	Oxidation-Reduc	ction Potentia	al	73 - 50	06 mV											
		Dissolved Oxyge	en		Up to 3 August		iter colum	nn < 2 mg	g/L in	Occurr	ed at site	es 1 & 2					
	ts	Surface Total Nitrogen 0.80 mg/L to					25 mg/L										
	Nutrients	Surface Total Phosphorus			0.023 n	ng/L to 0.	060 mg/L	-									
	Z	Nitrogen to Phos	sphorus Ratio)	24:1					Phosph	orus limi	ted					
		Click to learn m Beneficial Uses	nore about		Turbidity	핍	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ses	Fish	n & Wildlife Propa	gation		S	S	S	S									
Ď	Aes	sthetics							S	S							
Beneficial Uses	Agr	Agriculture							S	S	S						
ene	Primary Body Contact Recreation										S						
m	Fubile & Filvate Water Supply										NS						
	N	S = Fully Supporting IS = Not Supporting IEI = Not Enough In	formation	Notes	Available flow and rainfall data suggest the due to seasonal storm events, therefore P Propagation (FWP) and Aesthetics benefit				e Pawnee	Lake will							

mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

ppt = parts per thousand

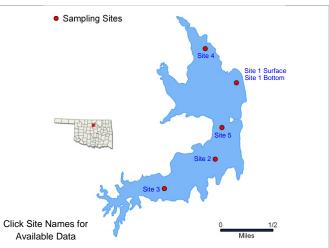
Perry

NTU = nephelometric turbidity units

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter

	Sample Period	d	Visited	Sampling Sites					
Ν	ovember 2006 - Aug	ust 2007	4	5					
	Location	Noble Cour	Noble County Click map for si						
<u>ल</u>	Impoundment	1937							
General	Area	614 acres							
5	Capacity	6,892 acre	92 acre-feet						
	Purposes	Water Supp	oly, Recreation	on and Flood Control					



		Parameter (Descriptions)	Result					Notes/0	Commer	nts					
		Average Turbidity	75 NTU	J				100% o	f values	> OWQ	S of 25 N	ΓU			
		Average True Color	143 un	its				50% of	values >	> OWQS	of 70				
		Average Secchi Disk Depth	22 cm												
		Water Clarity Rating	poor												
		Trophic State Index	48												
ร		Trophic Class	mesotr	ophic											
Parameters		Salinity	0.08-0).21 ppt											
aran	ø.	Specific Conductivity	181.9 -	- 415 μS/	cm										
<u> </u>	Profile	рН	6.90 – 8.19 pH units						to slightl	y alkaline	Э				
	₫	Oxidation-Reduction Potential	339 - 435mV												
		Dissolved Oxygen	Up to 36% of water column < 2 mg/L in August												
	ts	Surface Total Nitrogen	0.50 m	ng/L to 1.0	35 mg/L										
	Nutrients	Surface Total Phosphorus	0.027 r	ng/L to 0.	.253 mg/L	-									
	ž	Nitrogen to Phosphorus Ratio	9:1					Phosph	orus limi	ted					
		Click to learn more about Beneficial Uses	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ses	Fish	n & Wildlife Propagation	NS	S	S	S									
Š	Aes	sthetics					S	NS							
ficia	Agr	iculture							S	S	S				
Beneficial Uses	Prin	mary Body Contact Recreation										S			
m	Pub	olic & Private Water Supply													
	Ν	S = Fully Supporting IS = Not Supporting IEI = Not Enough Information	Available flow and rainfall data suggest that the peduce to seasonal storm events, therefore Pawnee L Propagation (FWP) and Aesthetics beneficial uses				e Lake will								

mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

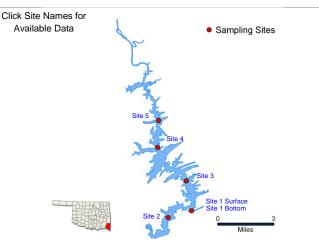
ppt = parts per thousand

Pine Creek

E. coli = Escherichia coli

Chlor-a = Chlorophyll-a

	Sample Period	b	Times Visited	Sampling Sites					
	November 2010 – July	y 2011	4	5					
	Location	Mc Curtain	County	Click map for site data					
<u></u>	Impoundment	1969							
D	Area	3,750 acres	3						
ם ס	Capacity	53,750 acre	53,750 acre feet						
	Purposes			ntrol, Water quality e, and Recreation					



	Pur	poses	Control, Fish a	nd Wildli	fe, and R	ecreation	า [้]		Notes/Comments							
		Parameter (Des	scriptions)	Result					Notes/0	Commer	nts					
		Average Turbidit	ty	13 NTU	J				100% o	f Values	< OWQ	S of 25				
		Average Secchi	Disk Depth	67 cm												
	itu	Water Clarity Ra														
	In-Situ	Chlorophyll-a		16 mg/	m3											
		Trophic State Inc	dex	58					Previou	s value =	= 53					
စ		Trophic Class		Eutropl	nic											
Parameters		Salinity		0.0 – 0	.03 ppt											
ıran	a \	Specific Conduc	tivity	34.4 – 190.8 μS/cm												
Ъ	Profile	рН		5.34 – 8.49 pH units						of values	< 6.5					
	₫.	Oxidation-Reduc	ction Potential	-23 to 5	500 mV											
		Dissolved Oxyge	en	Up to 7		ater colum	nn < 2 mg	g/L in								
	ts	Surface Total Ni	trogen	0.27 m	g/L to 0.7											
	Nutrients	Surface Total Ph	nosphorus	0.021 r	ng/L to 0	.060 mg/L	_									
	Ž	Nitrogen to Phos	sphorus Ratio	16:1					Phosph	orus limi	ted					
		Click to learn Beneficial Uses	more about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ses	Fish	h & Wildlife Propa	gation	S	NS	NS	S									
<u>=</u>	Aes	sthetics						S	*							
ficia	Agr	iculture								*	*	S				
Beneficial Uses	Prir	mary Body Contac	t Recreation										NEI			
m	Pub	olic & Private Wate	er Supply													
	٨	S = Fully Supporting IS = Not Supporting IEI = Not Enough Inf	formation \$\frac{\sqrt{\sq}}}}}}}}}}}}} \signt\sqrt{\sq}}}}}}}}}}}} \simptintiles \sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sq}}}}}}}}} \sqrt{\sqrt{\sqrt{\sq}}}}}}}} \sqrt{\sqrt{\sqrt{\sqrt{\sq}\sqrt{\sq}}}}}}}}} \sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\s	soluble therefor	bedrock. L e the Wate	Due to thes er Board is	se conditio s looking a	ns it is lik the appl	ely that the	low pH v developing	alues maj	v low soil pl y be due to cific criteria	natural ca	auses;		
NTU = nephelometric turbidity units $OWQS$ = Oklahoma Water Quality Standards mg/L = milligrams per liter ppt = parts per the pS/cm = microsiemens per centimeter mV = millivolts mS/cm = microsiemens/cm mV = mS/cm = microsiemens/cm mV = mS/cm =											d					

Ponca Times **Sample Period Sampling Sites** Visited 4 5 November 2010 - July 2011 Location Kay County Click map for site data Impoundment 1935 General 805 acres Area

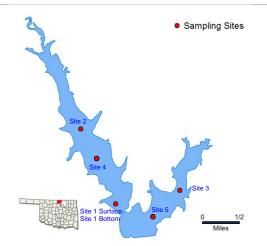
14,440 acre feet

Capacity

NTU = *nephelometric turbidity units*

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter



	Pur	poses	Water Supp	ly a	and Recr	eation					Sile 1 B	olion		Miles		
		Parameter (Des	scriptions)		Result					Notes/0	Commer	nts				
		Average Turbidit	ty		11NTU					5% of v	alues <	OWQS o	f 25 NTU			
		Average Secchi	Disk Depth		78 cm											
	itu	Water Clarity Ra	ating		Good											
	In-Situ	Chlorophyll-a			15 mg/	m3										
		Trophic State Inc	dex		57					Previou	s value :	= 61				
ភ		Trophic Class			Eutropl	nic										
Parameters		Salinity			0.17 –	0.19 ppt										
ıran	a)	Specific Conduc	tivity		340 – 3	0 – 376.8 μS/cm										
<u> </u>	Profile	рН			7.11 –	8.49 pH ι	units									
	₫	Oxidation-Reduc	ction Potentia	I	167 to	504 mV										
		Dissolved Oxyge	en		Up to 3 summe		ater colum	mg/L in								
	ts	Surface Total Ni	trogen		0.49 m	g/L to 0.8	31 mg/L									
	Nutrients	Surface Total Ph	nosphorus		0.019 r	ng/L to 0.	.046 mg/L	-								
	Ž	Nitrogen to Phos	sphorus Ratio)	20:1					Phosph	orus limi	ted				
		Click to learn Beneficial Uses	more abou	<u>t</u> _	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a	
ses	Fish	h & Wildlife Propa	gation		S	S	NS	*								
Š	Aes	sthetics							S	*						
ficia	Agr	riculture									S	S	S			
Beneficial Uses	Prin	mary Body Contac	t Recreation											NEI		
m	Pub	olic & Private Wate	er Supply								NS					
	٨	S = Fully Supporting VS = Not Supporting VEI = Not Enough Intel VEI = Not E	formation	Notes	The PB	*Did not collect for these parameters The PBCR beneficial use cannot be assessed as m issues for <i>E.coli</i> and enterococci.				s minimum	data req	uirement v	were not me	et due to (QA/QC	

OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

ppt = parts per thousand

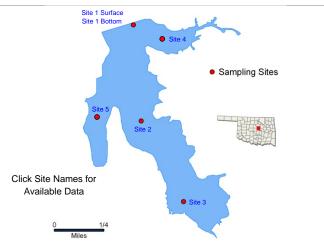
Prague City

NTU = nephelometric turbidity units

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter

	Sample Period	d	Visited	Sampling Sites						
1	November 2007 – Augu	ıst 2008	4	5						
	Location	Lincoln Co	unty	Click map for site data						
3	Impoundment	84	4							
	Area	225 acres	25 acres							
5	Capacity	2,415 acre	feet							
	Purnoses	Water Sun	alv and Recre	aation						



	Pur	poses Water Sup	ply	and Recr	eation				Miles						
		Parameter (<u>Descriptions</u>)		Result					Notes/0	Commen	its				
		Average Turbidity		12 nepl	helometri	c turbidity	units (N	ITU)	All value	es < 25 N	NTU				
		Average True Color		46 units	3				10% of	values >	owqs	of 70			
		Average Secchi Disk Depth		74 cm											
		Water Clarity Rating		good											
		Trophic State Index		48					Previou	s value =	= 52				
ร		Trophic Class		mesotre	ophic										
Parameters		Salinity		0.0 - 0.0	.20 ppt										
aran	συ	Specific Conductivity		112 – 3	862 μS/cn	n									
<u> </u>	Profile	рН		6.78 – 8.65 pH units					Neutral	to slightl	y alkaline	е			
	₫.	Oxidation-Reduction Potent	-51 to 543 mV												
		Dissolved Oxygen		57 - 63 August	% of wate	i < 2 mg/	L in	Occurre	d at site	s 1, 4 & 5	5				
	ts	Surface Total Nitrogen		0.51 m	g/L to 1.1	7 mg/L									
	Nutrients	Surface Total Phosphorus		0.024 n	ng/L to 0.	.057 mg/L	-								
	ž	Nitrogen to Phosphorus Rat	io	25:1					Phosph	orus limi	ted				
		Click to learn more abo Beneficial Uses	<u>ut</u>	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
ses	Fish	n & Wildlife Propagation		S	S	NS	S								
<u>≅</u>	Aes	sthetics						S	NS						
ficia	Agr	iculture								S	S	S			
Beneficial Uses	Prin	mary Body Contact Recreation	1										NEI		
m	Pub	olic & Private Water Supply													
	Ν	S = Fully Supporting NS = Not Supporting NEI = Not Enough Information			The PBCR cannot be assessed as minimum da coli.				ta requiren	ents were	e not met (due to QA/	QC issues	for E.	

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OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

mg/L = milligrams per liter

 $\mu S/cm = microsiemens/cm$

ppt = parts per thousand

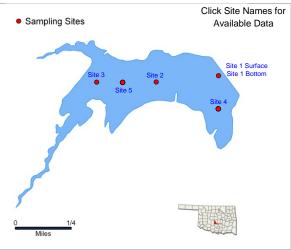
Purcell Times Sample Period Sampling Sites Visited November 2007 - August 2008 5 4 Location McClain County Click map for site data Impoundment 1930 General Area 150 acres Capacity 2,600 acre feet

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter

mV = millivolts

Chlor-a = Chlorophyll-a



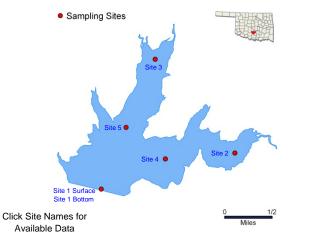
	Pur	poses	Water Supply	ly and Recreation						0 1/4 Miles						
		Parameter (Des	scriptions)	Result					Notes/0	Commer	its					
		Average Turbidit	ty	14 nep	helometr	ic turbidity	/ units (N	ITU)	All value	es < 25 N	NTU					
		Average True Co	olor	25 unit	s				All value	es < OW	QS of 70)				
		Average Secchi	Disk Depth	57 cm												
		Water Clarity Ra	ating	good												
		Trophic State Inc	dex	51						s value =	= 50					
ည		Trophic Class		eutroph	nic											
Parameters		Salinity		0.19 –	0.23 ppt											
ran	a \	Specific Conduc	tivity	374 – 4	162.8 µS/	'cm										
T B	Profile	рН		7.17 –	8.37 pH :	units			Neutral	to slightl	y alkalin	е				
	₽	Oxidation-Reduc	ction Potential	18 to 6	645 mV											
		Dissolved Oxyge	en	Up to 5		ater colum	nn < 2 m(g/L in	Occurred at site 1 & 2							
	ts	Surface Total Ni	trogen	0.60 m	g/L to 0.8	33 mg/L										
	Nutrients	Surface Total Ph	nosphorus	0.018 r	ng/L to 0	.041 mg/L	-									
	Ž	Nitrogen to Phos	sphorus Ratio	24:1					Phosph	orus limi	ted					
		Click to learn Beneficial Uses	more about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ses	Fish	h & Wildlife Propa	gation	S	S	NS	S									
<u> </u>	Aes	sthetics					S	S								
Beneticial Uses	Agr	iculture							S	S	S					
ene	Prin	mary Body Contac	t Recreation										NEI			
ń	Pub	olic & Private Wate	er Supply													
	٨	S = Fully Supporting IS = Not Supporting IEI = Not Enough Int	formation spoon	The PBCR cannot be assessed as minimum data coli and fecal coliform.						ents were	e not met	due to QA/	QC issues	s for E.		

 μ S/cm = microsiemens/cm

R.C. Longmire

	Sample Period	d	Visited	Sampling Sites					
١	November 2011 – Augu	st 2012	4	5					
	Location	Garvin Cou	inty	Click map for site data					
5	Impoundment	1989							
	Area	935 acres	935 acres						
5	Capacity	13,162 acre	3,162 acre feet						
	Purposes	Navigation	, Hydropowe	er, and Recreation					

Times



	Pur	poses	Navigation, H	, Hydropower, and Recreation Available Data Result Notes/Comm									Miles		
		Parameter (Des	scriptions)	Result					Notes/	Commen	its				
		Average Turbidit	ty	28 NTU	J				42% of	values >	OWQS	of 25 NTU	l (n=12)		
		Average Secchi	Disk Depth	31 cm					All valu	es < OW	QS of 70				
	Situ	Water Clarity Ra	ating	Poor											
	드	Chlorophyll-a		28 mg/	m3										
		Trophic State Inc	dex	63					Previou	s value =	= 57				
ည		Trophic Class		Hypere	utrophic										
Parameters		Salinity		0.14 – 0	018 ppt										
ıran	a)	Specific Conduc	tivity	305 – 3	89 µS/cr	n									
9,	Profile	рН		7.41 – 8	7.41 – 8.51 pH units										
	互	Oxidation-Reduc	ction Potential	65 to 54	45 mV										
		Dissolved Oxyge	en	Up to 1 August		iter colum	nn < 2mg	/L in	Occurre	ed at site	1				
	ts	Surface Total Ni	trogen	1.04 mg	g/L to 1.8	2 mg/L									
	Nutrients	Surface Total Ph	nosphorus	0.006 n	ng/L to 0.	.060 mg/L	-								
	Ž	Nitrogen to Phos	sphorus Ratio	49:1					Phosph	orus limi	ted				
		Click to learn more about Beneficial Uses		Turbidity	표	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
Beneficial Uses	Fisl	h & Wildlife Propa	gation	NS	S	S	S								
a C	Aes	sthetics						S	N/A						
fici	Agr	riculture								N/A	N/A	S			
ene	Prir	mary Body Contac	t Recreation										NEI		
Ш	Pub	olic & Private Wate	er Supply												
	٨	S = Fully Supporting IS = Not Supporting IEI = Not Enough Inf	formation sep	* N/A – µ	parameter	s not colle	cted in cu	rrent sam _l	ple year.						

NTU = *nephelometric turbidity units* μ S/cm = microsiemens per centimeter E. coli = Escherichia coli

OWQS = Oklahoma Water Quality Standards

mg/L = milligrams per liter μ S/cm = microsiemens/cm ppt = parts per thousand En = Enterococci

mV = millivoltsChlor-a = Chlorophyll-a

Raymond Gary Sampling Sites Times **Sample Period Sampling Sites** Visited 4 November 2008 - August 2009 5 **Choctaw County** Location Click map for site data Impoundment 1956 General Area 263 acres 1,681 acre feet Capacity Click Site Names for Purposes Recreation Available Data Parameter (Descriptions) Result **Notes/Comments** Average Turbidity **11 NTU** 100% of values < OWQS of 25 NTU (n=11) Average True Color Did not collect for true color Average Secchi Disk Depth 55 cm Water Clarity Rating Average **Trophic State Index** 55 Previous value = 55 **Trophic Class** Eutrophic **Parameters** Salinity 0.00 - 0.49 pptSpecific Conductivity $69.3 - 936.2 \,\mu\text{S/cm}$ 6.61 - 7.83 pH units Oxidation-Reduction Potential 83 to 521 mV Up to 67% of water column < 2.0 mg/L in Dissolved Oxygen Occurred at site 1, the dam June Surface Total Nitrogen 0.30 mg/L to 0.82 mg/L **Nutrients** Surface Total Phosphorus 0.005 mg/L to 0.048 mg/L Nitrogen to Phosphorus Ratio 17:1 Phosphorus limited Dissolved Oxygen Chlorides Turbidity Sulfates Click to learn more about Metals Beneficial Uses $\overline{\mathbb{S}}$ 핑 **Beneficial Uses** Fish & Wildlife Propagation S S NS **Aesthetics** S S Agriculture Primary Body Contact Recreation NEI Public & Private Water Supply S = Fully Supporting *Did not collect for these parameters NS = Not Supporting The PBCR beneficial use cannot be assessed as minimum data requirement were not met due to QA/QC NEI = Not Enough Information issues for E.coli. *NTU* = *nephelometric turbidity units* OWQS = Oklahoma Water Quality Standards mg/L = milligrams per liter ppt = parts per thousand μ S/cm = microsiemens per centimeter mV = millivoltsEn = Enterococci μ S/cm = microsiemens/cm

Chlor-a = Chlorophyll-a

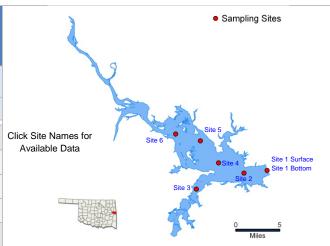
E. coli = Escherichia coli

Robert S. Kerr

 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

	Sample Period	t	Visited	Sampling Sites
١	November 2010 – Jun	e 2011	4	6
	Location	Sequoyah	County	Click map for site data
	Impoundment	1970		
	Area	43,800 acre	es	
	Capacity	525,700 ac	re feet	
	Purposes	Navigation	, Hydropowe	r, and Recreation
	Location Impoundment Area Capacity	Sequoyah 1970 43,800 acre 525,700 ac	County es	Click map for s



	Pι	urposes	Navigation, H	ydropowe	er, and R	ecreation							Miles			
		Parameter (Des	criptions)	Result					Notes/Comments 63% of values > 25 NTU (n=24)							
		Average Turbidit	У	30 NTL	J				63% of	values >	25 NTU	(n=24)				
		Average Secchi	Depth	57 cm					All value	es > OW	QS of 70)				
	In-Situ	Water Clarity Ra	ting	Fair												
	<u> </u>	Chlorophyll-a		11 mg/ı	m3											
		Trophic State Inc	dex	54					Previous value = 50							
ပ		Trophic Class		Eutroph	nic											
Parameters		Salinity		0.09-0	.93 ppt											
ıran	4	Specific Conduc	tivity	190.2 –	-1754 μ	S/cm										
Ъ	Profile	рН		7.25 – 8.52 pH units						to slightl	y alkalin	е				
	٦	Oxidation-Reduc	ction Potential	301 to 448 mV												
		Dissolved Oxyge	en	All data mg/L	are abo	ve screen	ing level	of 2.0								
	ts	Surface Total Ni	trogen	0.26 mg/L to 1.12 mg/L												
	Nutrients	Surface Total Ph	osphorus	0.048 mg/L to 0.124mg/L												
	Ž	Nitrogen to Phos	sphorus Ratio	9:1					Phosph	orus limi	ted					
		Click to learn Beneficial Uses	more about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ses	Fis	sh & Wildlife Propag	gation	NS	S	S	S									
Beneficial Uses	Ae	esthetics						S	*							
ficia	Αç	griculture								S	S	S				
ene	Pr	rimary Body Contac	t Recreation										NEI			
m	Pι	ublic & Private Wate	er Supply													
		S = Fully Supporting NS = Not Supporting NEI = Not Enough Inf	ormation Sec			r this parar C issues fo				sessed as	s minimur	m data requ	irements v	vere not		
	U = n	nephelometric turbidity	units OWQS		ma Water	Quality Sta	andards		= milligram			t = parts pe		d		

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mV = millivolts

Chlor-a = Chlorophyll-a

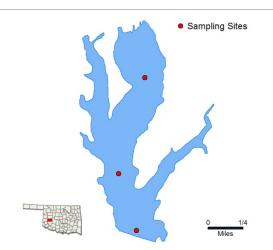
 μ S/cm = microsiemens/cm

Rocky

NTU = nephelometric turbidity units

 μ S/cm = microsiemens per centimeter E. coli = Escherichia coli

	Sample Period		Times Visited	Sampling Sites						
No	ovember 2011 –Septen	nber 2012	4	3						
	Location	Washita Co	ounty	Click map for site data						
5	Impoundment	1933	933							
	Area	347 acres	347 acres							
	Capacity	4,210 acre	4,210 acre-feet							
	Purposes	Water Supp	oly, Recreation	on						



		Parameter (<u>Descriptions</u>)	Res	ult					Notes/Comments 58% of values > OWQS of 25 NTU (n=12)						
		Average Turbidity	83 N	ITU					58% of	values >	OWQS	of 25 NTU	J (n=12)		
		Average Secchi Disk Depth	25 c	m											
	itu	Water Clarity Rating	Poo	r											
	In Situ	Chlorophyll-a	46 n	ng/n	n3										
		Trophic State Index	68						Previou	s value =	= 73				
ည		Trophic Class	Нур	ereu	ıtrophic										
Parameters		Salinity	0.22	: – 0	.31 ppt										
ıran	a	Specific Conductivity	448	- 63	31 µS/cn	n									
Pa	Profile	рН	7.87	_ 8	.98 pH u	ınits									
	<u>~</u>	Oxidation-Reduction Potential	360	to 5	23 mV										
		Dissolved Oxygen	All d mg/l		are abov	ve screer	ning level	of 2.0							
	ts	Surface Total Nitrogen	1.59	mg.	/L to 3.6	6 mg/L									
	Nutrients	Surface Total Phosphorus	017	0171 mg/L to 0.316 mg/L											
	Z	Nitrogen to Phosphorus Ratio	11:1						Phosph	orus limi	ted				
		Click to learn more about Beneficial Uses	Turbidity		Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a	
ses	Fish	n & Wildlife Propagation	NS	3	S	S	*								
) E	Aes	sthetics						NS*	N/A						
ficia	Agr	iculture								N/A	N/A	S			
Beneficial Uses	Prin	mary Body Contact Recreation											S		
m	Pub	olic & Private Water Supply												NS	
	Ν	S = Fully Supporting IS = Not Supporting IEI = Not Enough Information	*N/A – parameters not collected in current sample year. *Currently, the lake is listed as a Nutrient Limited Watershed (NLW) in the Oklahoma Water Quality Standards (WQS). This listing means that the lake is considered threatened from nutrients until a more intensive study can confirm the Aesthetics beneficial use non-support status.												

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OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

ppt = parts per thousand

Sahoma **Times Sample Period Sampling Sites Visited** November 2005 - August 2006 5 4 Location Creek County Click map for site data Impoundment 1947 General

312 acres

4,850 acre-feet

Area

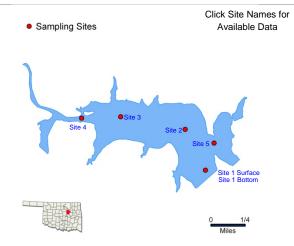
Capacity

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter

mV = millivolts

Chlor-a = Chlorophyll-a



	Pur	poses	Water Supply,	Recreati	on				Notes/Comments							
		Parameter (Des	criptions)	Result					Notes/0	Commer	nts					
		Average Turbidit	ty	9 NTU					100% o	f values	< OWQS	of 25 NT	U			
		Average True Co	olor	30 units	3				100% o	f values	< OWQS	of 70				
		Average Secchi	Disk Depth	73 cm												
		Water Clarity Ra	iting	Fair												
		Trophic State Inc	dex	51												
ည		Trophic Class		eutroph	nic											
Parameters		Salinity		0.08 – 0	0.09 ppt											
ıran	a \	Specific Conduc	tivity	184.1 –	- 203.1 μ	ıS/cm										
g	Profile	рН		7.02-7	'.80 pH u	nits			Neutral to slightly alkaline							
	ቯ	Oxidation-Reduc	ction Potential	125 - 4	51 mV											
		Dissolved Oxyge	en	Up to 6 May	9% of wa	ater colum	nn < 2 m	g/L in	Occurre	d at site	1, the da	am				
	S	Surface Total Ni	trogen	0.58 m	g/L to 0.	74 mg/L										
	Nutrients	Surface Total Ph	nosphorus	0.023 n	ng/L to 0	.039 mg/L	-									
	Ž	Nitrogen to Phos	sphorus Ratio	22:1					Phosph	orus limi	ted					
		Click to learn Beneficial Uses	more about	Turbidity	Hď	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ses	Fish	n & Wildlife Propa	gation	S	S	NS	S									
Ö	Aes	sthetics						S	S							
Beneficial Uses	Agr	iculture								S	S	S				
ene	Prin	nary Body Contac	t Recreation										S			
m	Pub	olic & Private Wate	er Supply													
	Ν	S = Fully Supporting IS = Not Supporting IEI = Not Enough Int	formation spon													
		phelometric turbidity			ma Water	Quality Sta	andards		= milligram			t = parts pe		d		

 μ S/cm = microsiemens/cm

S	ardis			
	Sample Period	d	Times Visited	Sampling Sites
	November 2010 – July	y 2011	4	5
	Location	Pushmatah	a County	Click map for site data
<u>a</u>	Impoundment	1970		
era	Area	13 610 acre	25	

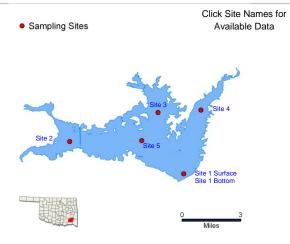
274,330 acre feet

Capacity

NTU = nephelometric turbidity units

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter



	ام	Jaoney	21 1,000 4010 1	, Waters Supply, Fish and Wildlife,						B D		0	3			
	Pur	poses	Flood Control, and Recreation		Supply, F	ish and W	/ildlife,		4				Miles			
		Parameter (Des	scriptions)	Result					Notes/0	commen	its					
		Average Turbidit	ty	16 NT	J				21% of	values >	25 NTU	(n=20)				
		Average Secchi	Disk Depth	81 cm					30% of	values >	OWQS	of 70				
	jţţ	Water Clarity Ra	iting	Averag	je											
	In-Situ	Chlorophyll-a		9 mg/m	13											
		Trophic State Inc	dex	52					Previou	s value =	= 46					
ပ		Trophic Class		Eutrop	hic											
Parameters		Salinity		0.01 –	0.02 ppt											
ıran	a)	Specific Conduc	tivity	49.4 –	71.8 µS/	cm										
<u>۾</u>	Profile	рН		5.5 – 7	.77 pH ur	nits			35.7% of values < 6.5 pH units							
	Ē	Oxidation-Reduc	ction Potential	288 to	570 mV											
		Dissolved Oxyge	en	Up to 4		ater colum	nn < 2 mg	g/L in								
	ts	Surface Total Ni	trogen	0.16 m	g/L to 0.4	7 mg/L										
	Nutrients	Surface Total Ph	0.012 mg/L to 0.04 mg/L													
	Ž	Nitrogen to Phos	sphorus Ratio	16:1	16:1					Phosphorus limited						
		Click to learn Beneficial Uses	more about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ses	Fish	h & Wildlife Propag	gation	S	NS	S	S									
Ö	Aes	sthetics						S	*							
ficia	Agr	iculture								*	*	S				
Beneficial Uses	Prir	mary Body Contac	t Recreation										NEI			
m	Pub	olic & Private Wate	er Supply													
	٨	S = Fully Supporting IS = Not Supporting IEI = Not Enough Inf	formation September 1	Available rainfall data suggest that the peak in to seasonal storm events, therefore Sardis Lak (FWP) and Aesthetics beneficial use for these					e will be liste	ed as sup	porting its	Fish & Wil	dlife Prop			

OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

ppt = parts per thousand

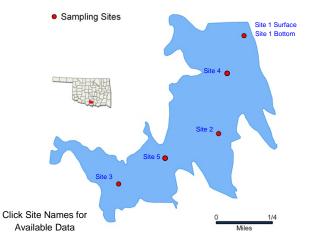
Scott King (Rock Creek)

NTU = *nephelometric turbidity units*

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter

	Sample Period		Visited	Sampling Sites
	October 2008 – July	2009	4	5
	Location	Carter Cou	ınty	Click map for site data
5	Impoundment	1979		
	Area	248 acres		
	Capacity	3,588 acre	-feet	
	Purposes	Recreation		



	٠ ٣.	p0303	recication						Avallat	Die Data				Miles		
		Parameter (Des	scriptions)		Result					Notes/0	Commen	ıts				
		Average Turbidi	ty		9 NTU					100% c	f values	< OWQS	of 25 NT	U (n=12)		
		Average True C	olor							Did not	collect fo	or true co	lor			
		Average Secchi	Disk Depth		80 cm											
		Water Clarity Ra	ating		Good											
		Trophic State In	dex		51					Previou	s value =	= 48				
S.		Trophic Class			Eutroph	nic										
Parameters		Salinity			0.10 – 0	0.15 ppt										
aran	ø	Specific Conduc	ctivity		278.8 –	· 307 μS/	cm									
9	Profile	рН			6.96 – 8	3.53 pH ι	units									
	□	Oxidation-Redu	ction Potentia	al	-10 to 4											
		Dissolved Oxyg	en		Up to 5 July	0% of wa	ater colum	nn < 2.0 r	ng/L in							
	ts	Surface Total Ni	itrogen		0.55 mg	g/L to 0.8	0 mg/L									
	Surface Total Phosphorus				0.009 m	ng/L to 0.	.026 mg/L	-								
	Ž	Nitrogen to Phos)	39:1					Phosphorus limited							
		Click to learn Beneficial Uses	n more abou	<u>1t</u>	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a	
ses	Fish	ish & Wildlife Propagation			S	S	S	*								
Š	Aes	Aesthetics							S	*						
ficia	Agr	riculture									*	*	S			
Beneficial Uses	Primary Body Contact Recreation													NEI		
m	Public & Private Water Supply															
	٨	S = Fully Supporting JS = Not Supporting JEI = Not Enough In		Notes	The PB0				sessed a	s minimum	ı data requ	uirement v	vere not me	et due to (QA/QC	

OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

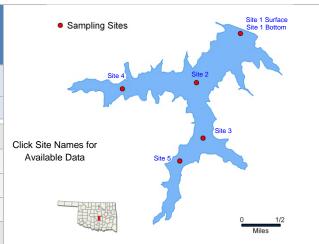
ppt = parts per thousand

Shawnee Twin No. 1

 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

	Sample Period	t	Times Visited	Sampling Sites					
1	November 2010 – Ju	ly 2011	4	5					
	Location	Pottawaton	nie County	Click map for site data					
<u></u>	Impoundment	1935	1935						
	Area	1,336 acres	3						
, ק	Capacity	22,600 acre-feet							
	Purposes	Water Supp	oly, Recreation	on					



	Parameter (Descriptions)				Result													
			Parameter (Des	scriptions)	Result					Notes/Comments 100% of value < OWQS of 25 NTU								
			Average Turbidit	ty	13 NTU	ı				100% o	f value <	owqs	of 25 NT	J				
			Average Secchi	Disk Depth	103 cm													
		In-Situ	Water Clarity Ra	iting	Average	е												
	ľ	<u>-</u> -	Chlorophyll-a		5 mg/m	3												
			Trophic State Inc	dex	46					Previou	s Value=	:41						
ည			Trophic Class		Mesotro	ophic												
Parameters			Salinity		0.11 – 0	0.13 ppt												
ıran		a)	Specific Conduc	tivity	161.7 -	- 268.2	µS/cm											
g G	ŀ	Profile	рН		7.32 – 8	7.32 – 8.57 pH units												
	ľ	Ī	Oxidation-Reduc	ction Potential	180 to 4	102 mV												
			Dissolved Oxyge	en	Up to 3 summe		ater colum	nn < 2 mg	g/L in									
		S	Surface Total Ni	trogen	0.26 m	g/L to 0.	5 mg/L											
		Nutrients	Surface Total Ph	0.008 mg/L to 0.014 mg/L														
	1	Z	Nitrogen to Phos	sphorus Ratio	30:1					Phosph	orus limi	ted						
			Click to learn Beneficial Uses	more about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a			
ses	ı	-isł	n & Wildlife Propa	gation	S	S	S	S										
Beneficial Uses	Fish & Wildlife Propagation Aesthetics								S	*								
ficia	Agriculture										*	*	S					
ene	Primary Body Contact Recreation													S				
a	F	⊃ub	olic & Private Wate	er Supply														
		Λ	S = Fully Supporting S = Not Supporting S = Not Enough Inf	formation september 1	*Did not	collect for	these par	ameters.										
			phelometric turbidity			ma Water	Quality Sta	andards		= milligram			t = parts pe		t			

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mV = millivolts

Chlor-a = Chlorophyll-a

 μ S/cm = microsiemens/cm

Shawnee Twin No. 2

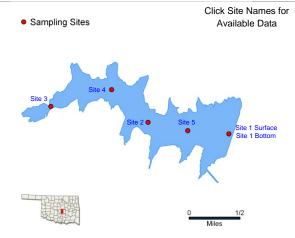
 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

mV = millivolts

Chlor-a = Chlorophyll-a

	Sample Period	t	Times Visited	Sampling Sites				
	November 2010 – July	/ 2011	4	5				
	Location	Pottawaton County	nie	Click map for site data				
General	Impoundment	1960						
	Area	1,100 acres	3					
ပိ	Capacity	11,400 acre	re feet					
	Purposes	Waters Sup	ply and Rec	creation				



	Pui	rposes	Waters Supply	y and Recreation											
		Parameter (Des	scriptions)	Result					Notes/0	Commer	ıts				
		Average Turbidit	ty	12 NTU	J				11% of values > OWQS of 25 NTU						
		Average Secchi	Disk Depth	80 cm											
	ij	Water Clarity Ra	nting	Good											
	In-Situ	Chlorophyll-a		9 mg/m	13										
		Trophic State Inc	dex	52					Previou	s value =	= 43				
ည		Trophic Class		Eutrophic											
Parameters		Salinity		0.1 – 0.	.15 ppt										
ıran		Specific Conduc	tivity	224.6 -	- 301.6 μ	S/cm			TDS= 1	60 g/L					
Ра	Profile	рН		7.21 –	7.21 – 8.69 pH units										
	4	Oxidation-Reduc	ction Potential	-67 to 4	151 mV										
		Dissolved Oxyge	en	Up to 4 summe		ater colum	nn < 2 m	g/L in							
	v	Surface Total Ni	trogen	0.35 m	g/L to 2.0	00 mg/L									
	Nutrients	Surface Total Ph	nosphorus	0.010 mg/L to 0.026 mg/L											
	Ž	Nitrogen to Phos	sphorus Ratio	36:1					Phosph	orus limi	ted				
		Click to learn Beneficial Uses	more about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
ses	Fis	h & Wildlife Propa	gation	NS	S	S	S								
Beneficial Uses	Aes	sthetics						S	*						
ficia	Agı	riculture								*	*	S			
ene	Priı	mary Body Contac	t Recreation										NEI		
m	Pul	blic & Private Wate	er Supply												
	1	S = Fully Supporting NS = Not Supporting NEI = Not Enough Int	formation Section	*Did not	t collect fo	r these par	ameters.								

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 $\mu S/cm = microsiemens/cm$

Shell

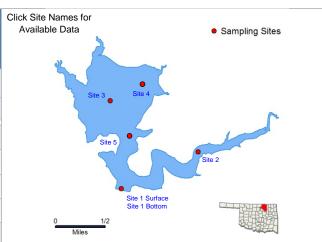
 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

mV = millivolts

Chlor-a = Chlorophyll-a

	Sample Period		Times Visited	Sampling Sites
1	November 2008 – Augu	ıst 2009	4	5
	Location	Osage Cou	inty	Click map for site data
5	Impoundment	1922		
	Area	573 acres		
	Capacity	9,500 acre	-feet	
	Purposes	Water Supp	oly, Recreation	on



	Pui	poses	Water Supply	Recreat	ion											
		Parameter (Des	criptions)	Result					Notes/0	Commer	ıts					
		Average Turbidit	у	11 NTU	J				100% of values < OWQS of 25 NTU (n=12)							
		Average True Co	olor						Did not	Did not collect for true color						
		Average Secchi	Disk Depth	67 cm	37 cm											
		Water Clarity Ra	ting	Averag	е											
		Trophic State Inc	dex	55					Previou	s value =	= 53					
ည		Trophic Class		Eutrop	hic											
Parameters		Salinity		0.07 -	0.10 ppt											
ıran	σ.	Specific Conduct	tivity	130 – 1	196 μS/cr	n										
<u> </u>	Profile	рН		6.33 –	6.33 – 8.58 pH units					% of valu	ies < 6.5	0 pH units	3			
	□	Oxidation-Reduc	tion Potential	-17 to 5	507 mV											
		Dissolved Oxyge	en	Up to 6 August		ater colum	nn < 2.0 ı	mg/L in	Occurre	ed at site	1, the da	am				
	Si	Surface Total Nit	trogen	0.72 m	0.72 mg/L to 0.94 mg/L											
	Nutrients	Surface Total Ph	osphorus	0.022 r	ng/L to 0	.038 mg/L	-									
	Z	Nitrogen to Phos	sphorus Ratio	28:1					Phosph	orus limi	ted					
		Click to learn Beneficial Uses	more about	Turbidity	Hď	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a		
ses	Fish	h & Wildlife Propaç	gation	S	S	NS	*									
Beneficial Uses	Aes	sthetics						S	*							
icia	Agr	riculture								*	*	S				
ene	Prir	mary Body Contac	t Recreation										S			
m	Pub	olic & Private Wate	er Supply													
	٨	S = Fully Supporting NS = Not Supporting NEI = Not Enough Inf	ormation S	*Did not	collect for	r these par	ameters									

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 μ S/cm = microsiemens/cm

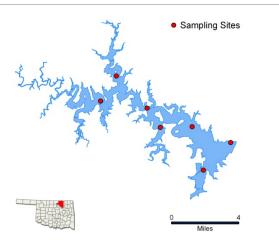
Skiatook Times **Sample Period Sampling Sites** Visited 4 7 October 2011 - July 2012 Location Osage County Click map for site data Impoundment 1984 General Area 10,190 acres Capacity 322,700 acre-feet Flood Control, Water Supply, Water Quality Purposes Control. Recreation and Fish & Wildlife

 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

mV = millivolts

Chlor-a = Chlorophyll-a



									Notes/Comments							
			Parameter (<u>Descriptions</u>)	Resu	t				Notes/0	Commen	its					
			Average Turbidity	21 NT	Ū				14% of	values >	OWQS	of 25 NTU	l (n=28)			
			Average Secchi Disk Depth	82 cm	ı											
		itu	Water Clarity Rating	Good												
		In Situ	Chlorophyll-a	5 mg/	m3											
			Trophic State Index	47					Previou	s value =	- 48					
Ų	2		Trophic Class	Meso	rophic											
Parameters			Salinity	0.09 -	- 0.24 ppt											
ran		4	Specific Conductivity	192 –	192 – 486 μS/cm											
<u> </u>		Profile	рН	6.72-	8.61 pH u	ınits										
	ľ	<u>~</u>	Oxidation-Reduction Potential	100 to	520 mV											
			Dissolved Oxygen	Up to July	65% of wa	ater colun	nn < 2.0 r	ng/L in								
		S	Surface Total Nitrogen	0.28 r	0.28 mg/L to 1.31 mg/L											
		Nutrients	Surface Total Phosphorus	0.005	0.005 mg/L to 0.114 mg/L											
		Ž	Nitrogen to Phosphorus Ratio	39:1	39:1					Phosphorus limited						
		Click to learn more about Beneficial Uses			五	Dissolved Oxygen	Metals	ISI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a		
ses	ı	Fish	n & Wildlife Propagation	NS	S	*	*									
Beneficial Uses	,	Aes	sthetics					S	N/A							
ficis	,	Agri	iculture							N/A	N/A	S				
ene	J	Prin	nary Body Contact Recreation										S			
m	I	Pub	olic & Private Water Supply													
		N	S = Fully Supporting IS = Not Supporting IEI = Not Enough Information		- <i>parametei</i>)% range is				ple year.							

 μ S/cm = microsiemens/cm

Sooner

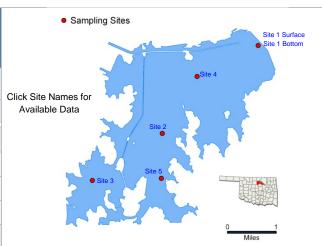
 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

mV = millivolts

Chlor-a = Chlorophyll-a

	Sample Period	d	Times Visited	Sampling Sites					
Ν	ovember 2006 - Aug	ust 2007	4	5					
	Location	Pawnee Co	ounty	Click map for site data					
<u></u>	Impoundment	1972							
General	Area	5,400 acres							
Gen	Capacity	149,000 ad							
	Purposes	Cooling Wa	nter						



		Parameter (Des	scriptions)	Result											
					Result Notes/Comments										
		Average Turbidit	ty	6 NTU					100% o	f values	< OWQS	S of 25 N	ΓU		
		Average True C	olor	20 units	6				100% of values < OWQS of 70						
		Average Secchi	Disk Depth	115 cm											
		Water Clarity Ra	ating	excelle	excellent										
		Trophic State In	dex	46											
ပ		Trophic Class		mesotrophic											
Parameters		Salinity		0.54 – 1.10 ppt											
ram	<u>.</u>	Specific Conduc	tivity	1039 –	2066 μS	/cm									
Ра	Profile	pН		7.21 – 8	3.46 pH	units			Neutral	to slightly	y alkaline				
	7	Oxidation-Reduc	ction Potential	269 - 4	85 mV										
		Dissolved Oxyge	en	Up to 52% of water column < 2 mg/L in August					Occurr	ed at site	s 1 and	4			
	Ŋ	Surface Total Ni	trogen	0.46 mg	g/L to 0.6	9 mg/L									
	Nutrients	Surface Total Ph	nosphorus	0.007 n	ng/L to 0.	.027 mg/L	-								
	Ž	Nitrogen to Phos	sphorus Ratio	38:1					Phosph	orus limit	ed				
		Click to learn Beneficial Uses	n more about	Turbidity	Hď	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
ses	Fish	a & Wildlife Propa	gation	S	S	NS	S								
Beneficial Uses	Aes	thetics						S	S						
icia	Agri	culture								NS*	S	S			
nef	Primary Body Contact Recreation												NEI**		
å	Pub	lic & Private Wate	er Supply												
	N.	= Fully Supporting S = Not Supporting EI = Not Enough In		not supp	orted. ** [Due to min	imum data	requiren	above the nents not be 2006-2007.	eing met ,				lered	

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2012 Lakes Report - Beneficial Use Monitoring Program - Oklahoma Water Resources Board

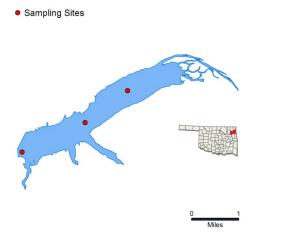
 μ S/cm = microsiemens/cm

Spavinaw

NTU = *nephelometric turbidity units*

 μ S/cm = microsiemens per centimeter E. coli = Escherichia coli

	Sample Period		Visited	Sampling Sites					
	October 2011 – July	2012	4	3					
	Location	Mayes Co	unty	Click map for site data					
5	Impoundment	1924							
	Area	1,584 acres							
5	Capacity	38,000 acre	re-feet						
	Purposes	Water Supply, Recreation, Fish & Wildlife							



		' '' '		,					IVIIIeS						
		Parameter (<u>Descriptions</u>)	Result					Notes/	Commer	nts					
		Average Turbidity	8 NTU					100% (100% of values < OWQS of 25 NTU (n=12)						
		Average Secchi Disk Depth	65 cm												
	<u>it</u>	Water Clarity Rating	Averag	е											
	In Situ	Chlorophyll-a	19 mg/	/m3											
		Trophic State Index	59					Previou	ıs value =	= 57					
ည		Trophic Class	Eutrop	hic											
Parameters		Salinity	0.06 -	0.12 ppt											
ıran	4	Specific Conductivity	141 – 2	257 µS/cr	n										
- G	Profile	pН	6.33 –	8.83 pH ւ	units			Only 4	.34% of \	/alues be	elow 6.5 p	H units			
	<u> </u>	Oxidation-Reduction Potential	53 to 5	31 mV											
		Dissolved Oxygen	Up to 6 July	67% of wa	ater colun	nn < 2.0 ı	mg/L in								
	ts	Surface Total Nitrogen	0.61 m	g/L to 1.2	29 mg/L										
	Nutrients	Surface Total Phosphorus	0.005 r	mg/L to 0.	.013 mg/l	_									
	ž	Nitrogen to Phosphorus Ratio	67:1					Phosphorus limited							
		Click to learn more about Beneficial Uses	Turbidity	Hd.	Dissolved	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a		
ses	Fish	h & Wildlife Propagation	S	S	*	*									
Beneficial Uses	Aes	sthetics					NS*	N/A							
ficia	Agr	iculture							N/A	N/A	S				
ene	Prir	mary Body Contact Recreation										S			
m	Pub	olic & Private Water Supply											NS		
	٨	S = Fully Supporting IS = Not Supporting IEI = Not Enough Information	*Curren	collect for tly, the lak ds (WQS) range is	e is listed : . This listin	as a Nutrie	hat the la	d Watersho ke is consi	ed (NLW) dered thre	in the Okl eatened.	ahoma Wa	ter Quality	/		

OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

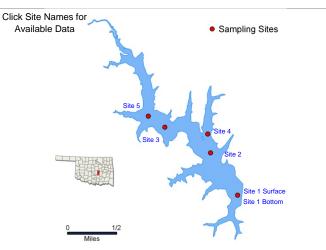
mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

ppt = parts per thousand

Sportsman

	Sample Period	d	Times Visited	Sampling Sites				
	October 2007 – July	2008	4	5				
	Location	Seminole	County	Click map for site data				
<u></u>	Impoundment	1958						
General	Area	354 acres						
ဗီ	Capacity	5,349 acre feet						
	Purposes	Waters Sup	pply and Rec	reation				



	Turposos Tvatoro Suppry and Nooroadion																
		Parameter (Des	scriptions)	Result	t				Notes/0	Commer	ıts						
		Average Turbidi	ty	23 nep	helometr	ic turbidity	units (N	TU)	25% of	values >	25 NTU						
		Average True C	olor	82 unit	S				25% of	values >	owqs	of 70					
		Average Secchi	Disk Depth	76 cm													
		Water Clarity Ra	ating	averag	je												
		Trophic State In	dex	43					Previous value = 40								
ပ္ပ		Trophic Class		mesoti	ophic												
Parameters		Salinity		0.06 -	0.12 ppt												
'am		Specific Conduc	tivitv		– 251.2 _L	ıS/cm											
Pal	Profile	pH	•		'.93 pH ui				Neutral								
	풀	Oxidation-Reduc	ction Potential	37 to 5	•												
		Dissolved Oxyge	en		60% of wa	ater colum	nn < 2 m	g/L in	Occurre	ed at site	1						
				July													
	nts	Surface Total Ni	trogen	0.43 m	g/L to 0.7	71 mg/L											
	Nutrients	Surface Total Ph	nosphorus	0.010	mg/L to 0	.062 mg/L	_										
	ž	Nitrogen to Phos	sphorus Ratio	23:1	23:1					orus limi	ted						
		Click to learn Beneficial Uses	more about	Turbidity	摄	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a			
ses	Fis	sh & Wildlife Propa	gation	S	S	NS	S										
j =	Ae	esthetics						S	S								
Beneficial Uses	Ag	riculture								S	S	S					
ene	Pri	imary Body Contac										NEI					
m	Pu	ıblic & Private Wate	er Supply														
	1	S = Fully Supporting NS = Not Supporting NEI = Not Enough Ini	formation	season Propag	al storm et ation (FWI	ents, there	efore Spor thetics be	tsman La neficial us	ike will be li se for these	sted as s	upporting	its Fish & V	Vildlife	•			

NTU = nephelometric turbidity units $\mu S/cm = microsiemens per centimeter$ E. coli = Escherichia coli OWQS = Oklal mV = millivolts mV = millivolts Chlor-a = Chlor

OWQS = Oklahoma Water Quality Standards mV = millivolts Chlor-a = Chlorophyll-a

 $mg/L = milligrams per liter \mu S/cm = microsiemens/cm$

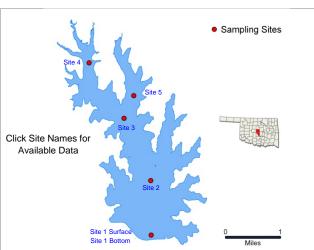
ppt = parts per thousand En = Enterococci

Stanley Draper

 μ S/cm = microsiemens per centimeter mV = millivolts

E. coli = Escherichia coli

	Sample Period	t	Visited	Sampling Sites				
No	ovember 2005 – Aug	ust 2006	4	5				
	Location	Cleveland	County	Click map for site data				
<u>ख</u>	Impoundment	1962						
General	Area	2,900 acres						
ဗီ	Capacity	100,000 acre-feet						
	Purposes	Water Supply, Recreation						



	ı uı	rposes Water Supply	, Necreau	OH				Site 1 Bottom Miles									
		Parameter (<u>Descriptions</u>)	Result					Notes/0	Commen	its							
		Average Turbidity	7 NTU					100% o	f values	< OWQS	of 25 NT	U					
		Average True Color	28 units	6				100% of values < OWQS of 70									
		Average Secchi Disk Depth	133 cm														
		Water Clarity Rating	good														
		Trophic State Index	40														
ည		Trophic Class	oligotro	phic													
Parameters		Salinity	0.03 -	0.09 ppt													
ıran	o o	Specific Conductivity	95 – 19	1.5 µS/c	m												
g.	Profile	pH	6.90 -	8.18 pH	units												
	<u>~</u>	Oxidation-Reduction Potential	356 - 4	45 mV													
		Dissolved Oxygen	Up to 5 August		ater colum	nn < 2 m	g/L in	Occurre	d at site	1, the da	am						
:	Ŋ	Surface Total Nitrogen	0.16 m	g/L to 0.3	3 mg/L												
	Nutrients	Surface Total Phosphorus	0.010 n	0.010 mg/L to 0.015 mg/L													
	Z	Nitrogen to Phosphorus Ratio	20:1					Phosph	orus limi	ted							
		Click to learn more about Beneficial Uses	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a				
ses	Fis	sh & Wildlife Propagation	S	S	NS	S											
Beneficial Uses	Aes	sthetics					S	S									
ficia	Agı	riculture							S	S	S						
ene	Prir	mary Body Contact Recreation										S					
m	Pul	blic & Private Water Supply															
	/	S = Fully Supporting NS = Not Supporting NEI = Not Enough Information															

Chlor-a = Chlorophyll-a

 $\mu S/cm = microsiemens/cm$

Stilwell City

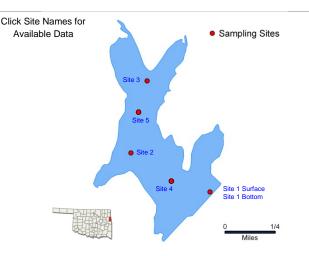
 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

mV = millivolts

Chlor-a = Chlorophyll-a

	Sample Period	k	Visited	Sampling Sites					
(October 2005 – Augu	st 2006	3	5					
	Location	Adair Cour	Adair County Click m						
ਰ	Impoundment	1965							
	Area	188 acres							
5	Capacity	3,110 acre-feet							
	Purposes	Water Supp	oly, Recreation	on, Flood Control					



		Parameter (Descriptions)	Result					Notes/0	Commer	nts							
		Average Turbidity	6 NTU					100% o	f values	< OWQS	of 25 NT	U					
		Average True Color	14 units	3				100% o	f values	< OWQS	of 70						
		Average Secchi Disk Depth	161 cm														
		Water Clarity Rating	excelle	nt													
		Trophic State Index	54														
S		Trophic Class	eutroph	iic													
Parameters		Salinity	0.07 – 0	0.14 ppt													
ram		Specific Conductivity		· 297.2 μ	S/cm												
P a	Profile	pH		8.53 pH													
	F.	Oxidation-Reduction Potential	88 – 45	•													
		Dissolved Oxygen	Up to 6 August		ater colum	n < 2 m	g/L in	Occurre	ed at site	1, the da	, the dam						
	Ŋ	Surface Total Nitrogen	0.32 mg	g/L to 0.8	88 mg/L												
	Nutrients	Surface Total Phosphorus	0.019 n	ng/L to 0	.044 mg/L												
	Z	Nitrogen to Phosphorus Ratio	20:1	20:1					orus limi	ted							
		Click to learn more about Beneficial Uses	Turbidity	Ħ.	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a				
ses	Fish	h & Wildlife Propagation	S	S	NS	S											
Ö =	Aes	sthetics					S	S									
Beneticial Uses	Agr	riculture							S	S	S						
el el	Prir	mary Body Contact Recreation										S					
ň	Pub	olic & Private Water Supply															
	٨	S = Fully Supporting NS = Not Supporting NEI = Not Enough Information															

 $\mu S/cm = microsiemens/cm$

Stroud

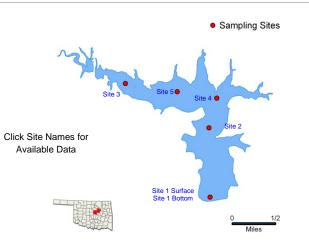
 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

mV = millivolts

Chlor-a = Chlorophyll-a

	Sample Period	d	Times Visited	Sampling Sites				
С	ecember 2011 – Sep	ot. 2012	4	5				
	Location	Creek Cou	nty	Click map for site data				
5	Impoundment	1968						
	Area	600 acres						
5	Capacity	8,800 acre-feet						
	Purposes	Water Supp	oly, Recreation	on, Flood Control				



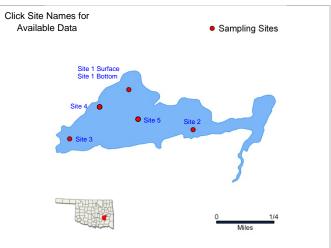
	Pur	poses	water Supply,	Recreation, Flood Control														
		Parameter (Des	criptions)	Result					Notes/0	Commen	ıts							
		Average Turbidit	ty	6 NTU					100% o	f values	< OWQS	of 25 NT	U (n=12)					
		Average Secchi	Disk Depth	101 cm	1													
	itu	Water Clarity Ra	iting	Excelle	ent													
	In Situ	Chlorophyll-a		5 mg/r	m3													
		Trophic State Inc	dex	46					Previou	s value =	= 41							
က		Trophic Class		Mesotr	ophic													
Parameters		Salinity		0.12 –	0.13 ppt													
ram		Specific Conduc	tivity		279 µS/cr	n												
Pa	Profile	pH	<u> </u>		8.40 pH													
	P.	Oxidation-Reduc	ction Potential		138 mV													
		Dissolved Oxyge	en	Up to 1 Septen		ater colum	nn < 2 mg	g/L in										
		Surface Total Ni	troaen		g/L to 0.6	67 ma/L												
	Nutrients	Surface Total Ph				.008 mg/L												
	lutri	Surface Total Pr	iospriorus	0.0051	ng/∟ to u	.006 mg/L	-											
	Z	Nitrogen to Phos	sphorus Ratio	104:1					Phosphorus limited									
		Click to learn m Beneficial Uses	oore about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a				
ses	Fish	h & Wildlife Propa	gation	S	S	S	S											
Beneficial Uses	Aes	sthetics						S	S									
ficia	Agr	riculture								S	S	S						
ene	Prir	mary Body Contac	t Recreation										S					
m	Pub	olic & Private Wate	er Supply															
	٨	S = Fully Supporting IS = Not Supporting IEI = Not Enough Int	formation spoon	* This page reflects the current sample year only.														
		phelometric turbidity			ma Water	Quality Sta	andards		= milligram			t = parts pe		d				

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 μ S/cm = microsiemens/cm

Talawanda No. 1

	Sample Period	t	Visited	Sampling Sites					
	December 2010 – July	y 2011	4	5					
	Location	Pittsburg (County	Click map for site data					
5	Impoundment	1902	02						
5	Area	91 acres							
5	Capacity	12,000 acre	e feet						
	Purposes	Waters Sup	oply and Rec	reation					



		Parameter (Descriptions)	Result					Notes/Comments									
		Average Turbidity	3 NTU								S of 25 NT	U					
		Average Secchi Disk Depth	153 cm	1													
	‡	Water Clarity Rating	Excelle														
	In-Situ	Chlorophyll-a	5 mg/m	13													
	-	Trophic State Index	47					Previou	s value =	= 42							
10		Trophic Class	Mesotre	ophic				11011040 1440 = 12									
Parameters																	
ame		Salinity Specific Conductivity		0.07 ppt	lam												
Para	e iii	Specific Conductivity		152.1 µS				10.53% of values < 6.5 pH units									
_	Profile	pH		7.75 pH ι	units			10.53%	of value	s < 6.5 p	H units						
		Oxidation-Reduction Potential	-34 to 4		ater colum	nn - 2 m	ı/l in										
		Dissolved Oxygen	summe		ater coluir	111 < 2 1110	J/ L II I										
	Ŋ	Surface Total Nitrogen	0.41 m	g/L to 0.6	55 mg/L												
	ient	Surface Total Phosphorus	0.009 n	ng/L to 0.	.016 mg/L	_											
	Nutrients	Nitrogen to Phosphorus Ratio	39:1					Phoenh	orue limi	tad							
		Nitrogen to i nosphorus reato	33.1			I		Phosphorus limited									
		Click to learn more about Beneficial Uses	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a				
ses	Fis	h & Wildlife Propagation	S	NS	S	S											
Š	Aes	sthetics					S	*									
ficia	Agı	riculture							*	*	S						
Beneficial Uses	Priı	mary Body Contact Recreation										S					
m	Pul	blic & Private Water Supply															
	1	S = Fully Supporting NS = Not Supporting NEI = Not Enough Information															

NTU = nephelometric turbidity units $\mu S/cm = microsiemens per centimeter$ E. coli = Escherichia coli OWQS = Oklal mV = millivolts mV = millivolts Chlor-a = Chlor

OWQS = Oklahoma Water Quality Standards mV = millivolts Chlor-a = Chlorophyll-a $mg/L = milligrams per liter \mu S/cm = microsiemens/cm$

ppt = parts per thousand En = Enterococci

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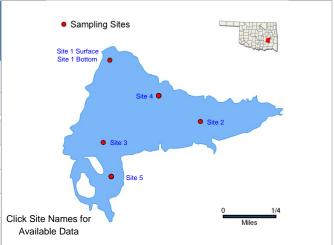
Talawanda No. 2

NTU = nephelometric turbidity units

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter

	Sample Period	t	Times Visited	Sampling Sites					
	December 2010 – July	y 2011	4	5					
	Location	Pittsburg (County	Click map for site data					
<u>a</u>	Impoundment	1924							
General	Area	195 acres							
ပ္ပ	Capacity	2,750 acre	feet						
	Purposes	Waters Sup	Naters Supply and Recreation						



		Parameter (Descriptions)	Result					Notes/0	Commer	its					
		Average Turbidity	6 NTU					100% o	f Values	< OWQS	S of 25 NT	TU			
		Average Secchi Disk Depth	123 cm	1											
	Situ	Water Clarity Rating	Excelle	nt											
	In-Situ	Chlorophyll-a	4 mg/m	13											
		Trophic State Index	44					Previou	s value =	= 45					
ပ		Trophic Class	Mesotre	ophic											
Parameters		Salinity	0.04 -	0.06 ppt											
ıran	a)	Specific Conductivity	99.7 –	141.2 μS	S/cm										
<u> </u>	Profile	рН	6.42 –	8.06 pH ւ	units			6.82%	of values	< 6.5 pH	l units				
	Ē	Oxidation-Reduction Potential	-48 to 4	186 mV											
		Dissolved Oxygen	Up to 5 summe		ater colum	nn < 2 mo	g/L in								
	ts	Surface Total Nitrogen	0.19 m	g/L to 0.3	7 mg/L										
	Nutrients	Surface Total Phosphorus	0.006 n	ng/L to 0.	.013 mg/L	-									
	ž	Nitrogen to Phosphorus Ratio	31:1					Phosph	orus limi	ted					
		Click to learn more about Beneficial Uses	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ses	Fish	n & Wildlife Propagation	S	S	S	S									
<u></u>	Aes	ethetics					S	S							
ficia	Agr	iculture							S	S	S				
Beneficial Uses	Prin	nary Body Contact Recreation										NEI			
Ш	Pub	olic & Private Water Supply													
	N	S = Fully Supporting IS = Not Supporting IEI = Not Enough Information		The PBCR beneficial use cannot be ass met due to QA/QC issues for <i>E. coli</i> .				or this sam	ole year a	s minimur	m data requ	uirement v	vere not		

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OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

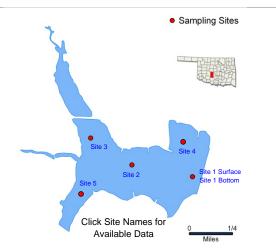
ppt = parts per thousand

T	Taylor												
	Sample Period		Times Visited	Sampling Sites									
	October 2008 – July	2009	4	5									
	Location	Grady Coul	nty	Click map for site data									
ā	Impoundment	1960											
General	Area	227 acres											
စီ	Capacity	1,877 acre	feet										

NTU = *nephelometric turbidity units*

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter



	Pur	poses	Waters Supply	, Flood C	Control, a	nd Recrea	ation		Available Data O 1/4 Miles							
		Parameter (Des	scriptions)	Result					Notes/0	Commen	its					
		Average Turbidit	ty	14 NTL	J				8% of v	alues > 0	DWQS o	f 25 NTU	(n=12)			
		Average True Co	olor						Did not	collect fo	or true co	olor				
		Average Secchi	Disk Depth	48 cm												
		Water Clarity Ra	ating	Averag	е											
		Trophic State Inc	dex	68					Previou	s value =	= 64					
ပ္		Trophic Class		Hypere	utrophic											
Parameters		Salinity		0.23 – 0	0.30 ppt											
ıran	ø)	Specific Conduc	tivity	461.2 -	· 553 μS/	cm										
<u>a</u>	Profile	рН		8.05 – 8	3.51 pH ι	units										
	₫	Oxidation-Reduc	ction Potential	315 to 5	583 mV											
		Dissolved Oxyge	en	All data mg/L	are abo	ve screen	ing level	of 2.0								
	ts	Surface Total Ni	trogen	0.85 mg	g/L to 1.5	66 mg/L										
	Nutrients	Surface Total Ph	nosphorus	0.067 mg/L to 0.223 mg/L												
	Ž	Nitrogen to Phos	sphorus Ratio	10:1					Phosphorus limited, possibly co-limited				nited			
		Click to learn Beneficial Uses	more about	Turbidity	된	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a		
Beneficial Uses	Fish	h & Wildlife Propa	gation	S	S	S	*									
a U	Aes	sthetics						NS*	*							
fici	Agr	riculture								*	*	S				
ene	Prin	mary Body Contac	t Recreation										S			
m	Pub	olic & Private Wate	er Supply													
	Λ	S = Fully Supporting NS = Not Supporting NEI = Not Enough Information			klahoma V	Vater Qual	ity Standa	rds (WQS	rently, the lake is listed as a Nutrient Limited Watershed (NLW) WQS). This listing means that the lake is considered threatened can confirm the Aesthetics beneficial use non-support status.					eatened		

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mV = millivolts

Chlor-a = Chlorophyll-a

mg/L = milligrams per liter

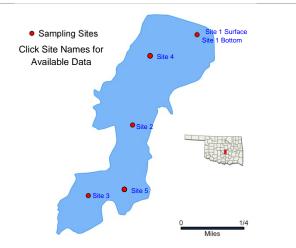
 μ S/cm = microsiemens/cm

ppt = parts per thousand

T	Tecumseh											
	Sample Period	d	Times Visited	Sampling Sites								
	October 2007 – July	2008	4	5								
	Location	Pottawaton	nie County	Click map for site data								
ā	Impoundment	1934										
General	Area	127 acres										
စ္ခ	Capacity	1,118 acre	feet									
	Purposes	Waters Sup	ply, and Red	creation								

 μ S/cm = microsiemens per centimeter mV = millivolts

E. coli = Escherichia coli



	Fui	poses	Waters Suppl	y, and Re	creation							Viles			
		Parameter (Desc	criptions)	Result					Notes/C	ommen	its				
		Average Turbidity	•	132 ne	phelome	tric turbidi	ty units (NTU)	All value	es > 25 N	NTU				
		Average True Col	lor	244 un	its				All value	es > OW	QS of 70)			
		Average Secchi D	Disk Depth	11 cm											
		Water Clarity Rati	ing	poor											
		Trophic State Inde	ex	49					Previous	s value =	= 57				
SLIS		Trophic Class		mesotr	ophic										
Parameters		Salinity		0.00 -	0.10 ppt										
arar	a	Specific Conduction	vity	105.6 -	- 141 μS/	/cm									
ď	Profile	pН		7.08 – 7.60 pH units					Neutral						
	₫.	Oxidation-Reduct	ion Potential	337 to	537 mV										
		Dissolved Oxyger	า						D.O. alv	vays > 5	.0 mg/L				
	Ń	Surface Total Nitr	rogen	1.01 m	g/L to 1.5	55 mg/L									
	Nutrients	Surface Total Pho	osphorus	0.066 r	0.066 mg/L to 0.131 mg/L										
	N	Nitrogen to Phosp	ohorus Ratio	12:1	12:1				Phosphorus limited						
		Click to learn I Beneficial Uses	more about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
ses	Fish	n & Wildlife Propaga	ation	NS	S	S	*								
Beneficial Uses	Aes	sthetics						S	NS						
ficia	Agr	iculture								S	S	S			
eue	Prin	mary Body Contact	Recreation										NEI**		
m	Pub	olic & Private Water	Supply												
	Ν	S = Fully Supporting IS = Not Supporting IEI = Not Enough Info	rmation	*Not sup **The P		not be asse			exceeded. A					es for E.	

Chlor-a = Chlorophyll-a

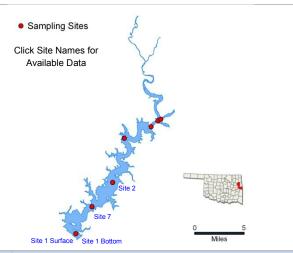
 μ S/cm = microsiemens/cm

T	Tenkiller (1,2,7)											
	Sample Period	d	Times Visited	Sampling Sites								
No	ovember 2011 – Aug	ust 2012	4	7								
	Location	Sequoyah (County	Click map for site data								
<u>a</u>	Impoundment	1953										
General	Area	12,900 acres										
ပ္	Capacity	654,100 acre-feet										
	Purposes	Flood Cont	ntrol, Hydropower									

NTU = nephelometric turbidity units

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter mV = millivolts



		p 0 0 0 0	1 1000 00111	,	Trydropower					Site 1 Surface * Site 1 Bottom						
		Parameter (Des	scriptions)		Result					Notes/	Commen	its				
		Average Turbidi	ty		5 NTU					100% c	f values	< OWQS	of 25 NT	U (n=11)		
		Average Secchi	Disk Depth		138 cm											
	itu	Water Clarity Ra	ating		Excelle	nt										
	In Situ	Chlorophyll-a			8 mg/m	13										
		Trophic State In	dex		51					Previou	s value =	= 53				
ည		Trophic Class			Eutroph	nic										
Parameters		Salinity			0.08 – 0).13 ppt										
aran	d)	Specific Conduc	tivity		177 – 2	78 µS/cn	n									
g	Profile	pН			6.56 –	9.02 pH	units			Only 0.	54% of re	ecorded	values > 9	pH units	3	
	<u>~</u>	Oxidation-Reduc	ction Potentia	al	124-574	4mV										
		Dissolved Oxyge	en		Up to 7	nn < 2 mg	g/L in									
	ts	Surface Total Ni	trogen		0.40 mg	g/L to 1.4	6 mg/L									
	Nutrients	Surface Total Ph	nosphorus		0.005 m	0.005 mg/L to 0.016 mg/L										
	Ž	Nitrogen to Phos	sphorus Ratio)	124:1					Phosphorus limited						
		Click to learn m Beneficial Uses	nore about		Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
ses	Fisl	h & Wildlife Propa	gation		S	S	NS	S								
<u>≅</u>	Aes	sthetics							NS	N/A						
fici	Agr	riculture									N/A	N/A	S			
Beneficial Uses	Prir	mary Body Contac	t Recreation											S		
m	Pub	olic & Private Wate	er Supply												S	
	٨	S = Fully Supporting JS = Not Supporting JEI = Not Enough Ini		Notes	*The lake is listed in the WQS as a NLW indicating that the Aesthetics beneficial use is considered threatened by nutrients until studies can be conducted to confirm non-support status. *N/A – parameters not collected in current sample year.											

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OWQS = Oklahoma Water Quality Standards

Chlor-a = Chlorophyll-a

mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

ppt = parts per thousand En = Enterococci

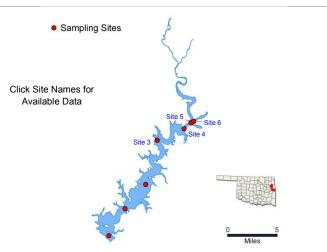
Tenkiller, Illinois River Arm (3-6)

NTU = *nephelometric turbidity units*

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter

	Sample Period	t	Times Visited	Sampling Sites					
No	ovember 2011 – Aug	ust 2012	4	7					
	Location	Sequoyah (County	Click map for site data					
<u></u>	Impoundment	1953	953						
General	Area	12,900 acre	es						
5	Capacity	654,100 ac	54,100 acre-feet						
	Purposes	Flood Cont	rol, Hydropov	wer					



	ı uı	poses	Flood Cont	ıoı,	Пушторо	WCI				Miles					
		Parameter (Des	scriptions)		Result					Notes/0	Commer	ıts			
		Average Turbidi	ty		14 NTU	J				14% of	values <	OWQS	of 25 NTU	(n=16)	
		Average Secchi	Disk Depth		56 cm										
		Water Clarity Ra	ating		Averag	е									
		Chlorophyll-a			16 mg/	′m3									
		Trophic State In	dex		58					Previou	s value =	= 59			
હ		Trophic Class			Eutroph	nic									
Parameters		Salinity			0.09 –	0.13 ppt									
aran	a	Specific Conduc	tivity		197 – 2	275 µS/cr	n								
ğ	Profile	рН			7.47 – 9.01 pH units						66% of re	ecorded	values are	: > 9 pH ι	units
	₫.	Oxidation-Redu	ction Potentia	ıl		36-567mV									
		Dissolved Oxyge	en		Up to 5 August	Up to 50% of water column < 2 mg/L in August									
	ts	Surface Total N	itrogen		0.50 m	g/L to 3.4	3 mg/L								
	Nutrients	Surface Total Pl	nosphorus		0.005 r	0.005 mg/L to 0.097 mg/L									
	ž	Nitrogen to Pho	sphorus Ratio)	51:1					Phosphorus limited					
		Click to learn m Beneficial Uses	nore about		Turbidity	풘	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
ses	Fish	h & Wildlife Propa	gation		NS	S	S	S							
<u></u>	Aes	sthetics							NS	N/A					
ficia	Agr	riculture									N/A	N/A	S		
Beneficial Uses	Prin	mary Body Contac	t Recreation											S	
Ď	Pub	olic & Private Wate	er Supply												NS
	Λ	S = Fully Supporting NS = Not Supporting NEI = Not Enough Information							LW indicating that the Aesthetics beneficial use is considered can be conducted to confirm non-support status.						

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OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

ppt = parts per thousand

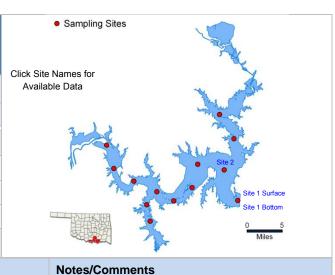
Texoma (1-2) Times Sample Period **Sampling Sites** Visited 4 October 2010 - June 2011 13 Location **Bryan County** Click map for site data Impoundment 1944 General 88,000 acres Area Capacity 2,643,000 acre-feet Flood Control, Waters Supply, Hydropower, Purposes Low-flow Regulation, and Recreation Parameter (Descriptions) Result

 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

mV = millivolts

Chlor-a = Chlorophyll-a

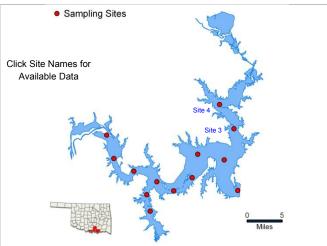


		Average Turbidity	5 NTU					100% c	f values	< OWQS	of 25 NT	U		
		Average Secchi Disk Depth	142 cm											
	In-Situ	Water Clarity Rating	Excelle	nt										
	흐	Chlorophyll-a	8 mg/m	3										
		Trophic State Index	51					Previous value = 56						
ទ		Trophic Class	Eutroph	nic										
Parameters		Salinity	0.9 – 1.	02 ppt										
aran	ω.	Specific Conductivity	1698 -	1908 µS/	cm									
ď	Profile	рН	7.16 – 8	3.47 pH u	ınits									
	₫.	Oxidation-Reduction Potential	255 to 4	122 mV										
		Dissolved Oxygen	Up to 1 summe		iter colun	nn < 2.0 r	ng/L in							
	ts	Surface Total Nitrogen	0.45 mg	g/L to 0.6	6 mg/L									
	Nutrients	Surface Total Phosphorus	0.018 n	ng/L to 0.	038 mg/l	_								
	N	Nitrogen to Phosphorus Ratio	19:1					Phosph	orus limi	ted				
		Click to learn more about Beneficial Uses	Turbidity	핊	Dissolved Oxygen	Metals	ISI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a	
ses	Fish	h & Wildlife Propagation	NEI	S	S	NEI								
Beneficial Uses	Aes	sthetics					S	*						
ficia	Agr	iculture							NEI	NEI	S			
ene	Prin	mary Body Contact Recreation										NEI		
m	Pub	olic & Private Water Supply												
	Ν	S = Fully Supporting IS = Not Supporting IEI = Not Enough Information	and an a	ugh all values were less than the OWQS for turbidity, the minimum data requirements were not met an assessment of the FWP beneficial use cannot be made for this sample year. *Did not collect for eparameters.										
NTU	NTU = nephelometric turbidity units OWQS = Oklahoma Water Quality Standards mg/L = milligrams per liter ppt = parts per thousand													

 μ S/cm = microsiemens/cm

Texoma Lower Washita River Arm (3-4)

	Sample Period		Visited	Sampling Sites					
	October 2010 – June	2011	4	13					
	Location	Bryan Cour	nty	Click map for site data					
ਰ	Impoundment	1944							
	Area	88,000 acre	8,000 acres						
5	Capacity	2,643,000 a	00 acre-feet						
	Purposes		rol, Waters S ation, and Re	Supply, Hydropower, Low- ecreation					



	Fui	poses	flow Regulation	n, and Re	ecreation											
		Parameter (Desc	criptions)	Result					Notes/0	Commen	ts					
		Average Turbidity	у	8 NTU					100% o	f values	< OWQS	of 25 NT	U			
		Average Secchi [Disk Depth	105 cm					Did not	collect fo	r true col	or				
	In-Situ	Water Clarity Rat	ting	Excelle	nt											
	드	Chlorophyll-a		10 mg/r	m3											
		Trophic State Ind	lex	53					Previous value = 56							
စ်		Trophic Class		Eutroph	nic											
Parameters		Salinity		0.73 – 1	1.01 ppt											
aran	a	Specific Conduct	tivity	1388 - 1	1899 µS/d	cm										
<u>a</u>	Profile	рН		7.49 – 8	3.35 pH u	nits										
	₫.	Oxidation-Reduct	tion Potential	299 to 4	413 mV											
		Dissolved Oxyge	n	Up to 9 summe		er column	n < 2.0 mg	g/L in								
	Si	Surface Total Nit	rogen	0.46 mg	g/L to 0.6	4 mg/L										
	Nutrients	Surface Total Pho	osphorus	0.024 m	ng/L to 0.	035 mg/L	-									
	Ž	Nitrogen to Phos	phorus Ratio	18:1					Phosphorus limited							
		Click to learn mo Beneficial Uses	ore about	Turbidity	듄	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a		
es	Fish	h & Wildlife Propag	gation	NEI	S	S	NEI									
SO	Aes	sthetics						S	*							
Beneficial Uses	Agr	riculture								NEI	NEI	S				
nef	Prin	mary Body Contact	Recreation										NEI			
a	Pub	olic & Private Water	r Supply													
	Ν	S = Fully Supporting NS = Not Supporting NEI = Not Enough Information			Although all values were less than the OWQS for turbidity, the minimum data requirements were not met and an assessment of the FWP beneficial use cannot be made for this sample year. *Did not collect for these parameters. Although 63% of Chloride samples exceeded sample standard, an assessment for the Ag beneficial use cannot be made for Chlorides and Sulfates, as minimum data requirements are not being met.									t for or the		

mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

NTU = *nephelometric turbidity units*

E. coli = Escherichia coli

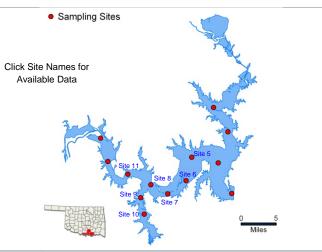
 μ S/cm = microsiemens per centimeter

ppt = parts per thousand

Texoma Lower Red River Arm (5-11)

E. coli = Escherichia coli

	Sample Period		Visited	Sampling Sites					
	October 2010 – June	2011	4	13					
	Location	Bryan Cour	nty	Click map for site data					
<u>ਰ</u>	Impoundment	1944							
	Area	88,000 acre	88,000 acres						
5	Capacity	2,643,000 a	acre-feet						
	Purposes			Supply, Hydropower, and Recreation					



	Low-now Regulation, and Recreation							,							
		Parameter (<u>Descriptions</u>)	Result					Notes/	Commer	nts					
		Average Turbidity	9 NTU					100% c	f Values	< OWQ	S of 25 NT	ΓU			
		Average Secchi Disk Depth	87 cm												
	In-Situ	Water Clarity Rating	Good												
	<u>-</u>	Chlorophyll-a	45 mg/ı	m3											
		Trophic State Index	59					Previous value = 59							
ည		Trophic Class	Eutroph	nic											
Parameters		Salinity	0.00 -	1.56 ppt											
ıran	a)	Specific Conductivity	33.2 – 2	2897 μS	/cm										
_g	Profile	рН	7.10 – 8	7.10 – 8.63 pH units											
	₫	Oxidation-Reduction Potential	172 to 437 mV												
		Dissolved Oxygen	Up to 3 summe		ater colum	nn < 2.0 r	ng/L in								
	S	Surface Total Nitrogen	0.42 mg	g/L to 0.8	88 mg/L										
	Nutrients	Surface Total Phosphorus	0.024 n	ng/L to 0.	.065 mg/L	_									
	Ž	Nitrogen to Phosphorus Ratio	15:1					Phosph	orus limi	ted					
		Click to learn more about Beneficial Uses	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a		
ses	Fish	n & Wildlife Propagation	S	S	S	NEI									
<u>ا</u> ت	Aes	ethetics					S	*							
fici	Agr	iculture							S	S	S				
Beneficial Uses	Prin	mary Body Contact Recreation										NEI			
m	Pub	olic & Private Water Supply													
	٨	S = Fully Supporting IS = Not Supporting IEI = Not Enough Information	*Did not collect for these parameters												
μS/c	m = n	microsiemens per centimeter $mV = m$			Quality St	andards		= milligram n = microsi			t = parts pe = Enteroco		7		

Chlor-a = Chlorophyll-a

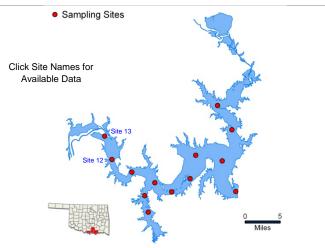
Texoma Upper Red River Arm (12-13)

NTU = *nephelometric turbidity units*

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter

	Sample Period		Times Visited	Sampling Sites						
	October 2010 – June	2011	4	13						
	Location	Bryan Cour	nty	Click map for site data						
<u>.</u>	Impoundment	1944								
General	Area	88,000 acre	es							
5	Capacity	2,643,000 acre-feet								
	Purposes		trol, Waters Supply, Hydropower, Regulation, and Recreation							



		Low-now regu		10 1100100	20011			Notes/Comments								
		Parameter (<u>Descriptions</u>)	Result					Notes/	Commen	nts						
		Average Turbidity	40 NTL					21% of	values >	OWQS	of 25 NTL	J				
		Average Secchi Disk Depth	27 cm					Did not	collect fo	or true co	olor					
	itu	Water Clarity Rating	Fair to	Poor												
	In-Situ	Chlorophyll-a	84 mg/r	m3												
		Trophic State Index	66					Previous value = 63								
ပ်		Trophic Class	Hypere	utrophic												
Parameters		Salinity	1.21 – 1	1.77 ppt												
arar	a	Specific Conductivity	2262 - 3	3271 µS/0	cm											
a	Profile	рН	8.06 – 8	3.58 pH u	ınits											
	_	Oxidation-Reduction Potential 355 to 413 mV														
		Dissolved Oxygen	All data mg/L	are abov	e screer	ing level	of 2.0									
	ts	Surface Total Nitrogen	0.75 mg	g/L to 1.0	3 mg/L											
	Nutrients	Surface Total Phosphorus	0.055 n	ng/L to 0.	115mg/L											
	Ž	Nitrogen to Phosphorus Ratio	10:1					Phosphorus limited								
		Click to learn more about Beneficial Uses	Turbidity	Hd	Dissolved Oxygen	Metals	ISI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a			
Beneficial Uses	Fish	n & Wildlife Propagation	NS	S	S	NEI										
ਲ 	Aes	sthetics					NS*	*								
5	Agr	iculture							NEI	NEI	S					
ene	Prin	mary Body Contact Recreation										NEI				
n	Pub	olic & Private Water Supply														
	Λ	s = Fully Supporting IS = Not Supporting IEI = Not Enough Information	met and		sment of th						ata requirei mple year.					

OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

mg/L = milligrams per liter

 $\mu S/cm = microsiemens/cm$

ppt = parts per thousand

Thunderbird

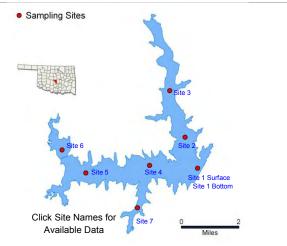
NEI = *Not Enough Information*

NTU = nephelometric turbidity units

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter

	Sample Period	d	Times Visited	Sampling Sites						
	October 2006 - June	2007	4	7						
	Location	Cleveland	County	Click map for site data						
5	Impoundment	1965								
	Area	6,070 acres	3							
	Capacity	119,600 acre-feet								
	Purposes	Flood Cont Wildlife	rol, Water Su	upply, Recreation, Fish &						



		Wildlife													
		Parameter (<u>Descriptions</u>)	Result					Notes/0	Commer	nts					
		Average Turbidity	28 NTL	J				46% of	values >	owqs	of 25 NTI	J			
		Average True Color	32 units	5				7% of values >OWQS of 70							
		Average Secchi Disk Depth	53 cm												
		Water Clarity Rating	average	Э											
		Trophic State Index	57												
<u>s</u>		Trophic Class	eutroph	eutrophic											
Parameters		Salinity	0.18 – 0	0.23 ppt											
ıran	o)	Specific Conductivity	367.5 –	-460.9 μ	S/cm										
<u> </u>	Profile	pH	7.28 – 8	3.57 pH	units			Neutral to slightly alkaline							
	<u>~</u>	Oxidation-Reduction Potential	95 - 447 mV												
		Dissolved Oxygen	Up to 4 June	7% of wa	ater colum	nn < 2 m	g/L in	Occurre	ed at site	s 1, the	dam				
	ts	Surface Total Nitrogen	0.59 mg	g/L to 1.1	8 mg/L										
	Nutrients	Surface Total Phosphorus	0.023 n	ng/L to 0	.429 mg/L	-									
	Ž	Nitrogen to Phosphorus Ratio	13:1					Phosphorus limited							
		Click to learn more about Beneficial Uses	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ses	Fish	h & Wildlife Propagation	NS	S	S	S									
Š	Aes	sthetics					NS*	S							
Beneficial Uses	Agr	riculture							S	S	S				
ene	Prir	mary Body Contact Recreation										S			
m	Pub	olic & Private Water Supply											NS		
	S = Fully Supporting NS = Not Supporting (NLW). This listing means that the lake is consumated to the supporting means that the lake is consumated.						e is consid	dered threa	tened fror	as a Nut n nutrient	rient Limited s until a mo	d watersh ore intensi	ed ve study		

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

OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

can confirm the Aesthetics beneficial use non-support status.

mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

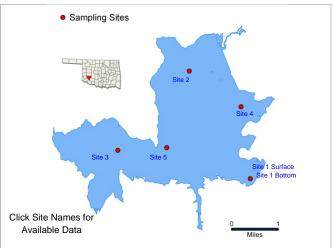
ppt = parts per thousand

Tom Steed

E. coli = Escherichia coli

Chlor-a = Chlorophyll-a

Times Visited Sampling Sites		Sample Period					
7 4 5	November 2006 - July 2007						
a County Click map for site da	Location Kiowa Cour						
	Impoundment	5					
) acres	Area						
'0 acre-feet	88,970 acre-feet						
d Control, Water Supply, Recreation, Fish ife		Purposes Flood Cont Wildlife					
o acres 70 acre-feet I Control, Water Supply, Recreation,	acres 0 acre	Impoundment Area Capacity					



		11													
		Parameter (<u>Descriptions</u>)	Result					Notes/0	Commen	its					
		Average Turbidity	30 NTL	J				50% of	values >	- OWQS	of 25 NTI	J			
		Average True Color	40 units	5				100% o	f values	< OWQ	S of 70				
		Average Secchi Disk Depth	57 cm												
		Water Clarity Rating	average	е											
		Trophic State Index	55												
ဖွ		Trophic Class	eutroph	nic											
Parameters		Salinity	0.37 –	0.52ppt											
ran	4	Specific Conductivity	722.9 – 1001 µS/cm												
Ба	Profile	рН	7.70 – 8.55 pH units					Neutral	to slightl	y alkalin	9				
	ቯ	Oxidation-Reduction Potential	277 - 3	399 mV											
		Dissolved Oxygen	Up to 25% of water column < 2 mg/L in July					Occurr	ed at site	s 1, the	dam				
	Ŋ	Surface Total Nitrogen	0.59 m	g/L to 1.0)4 mg/L										
	Nutrients	Surface Total Phosphorus	0.038 mg/L to 0.108 mg/L												
	Z	Nitrogen to Phosphorus Ratio	12:1					Phosph	orus limi	ted					
		Click to learn more about Beneficial Uses	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ses	Fish	n & Wildlife Propagation	NS	S	S	S									
ž	Aes	ethetics					S	S							
icia	Agr	iculture							S	S	S				
Beneficial Uses	Prin	nary Body Contact Recreation										S			
ă	Pub	olic & Private Water Supply													
	٨	S = Fully Supporting IS = Not Supporting IEI = Not Enough Information													
μS/c	m = n	microsiemens per centimeter $mV = m$	S = Oklahoma Water Quality Standards mg/L = millig millivolts μS/cm = mid a = Chlorophyll-a								t = parts pe = Enteroco		r		

Vanderwork

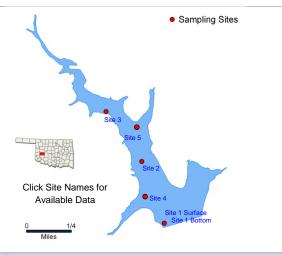
 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

mV = millivolts

Chlor-a = Chlorophyll-a

	Sample Period	d	Times Visited	Sampling Sites				
	October 2007 – July	2008	4	5				
	Location	Washita C	ounty	Click map for site data				
5	Impoundment	1968						
	Area	135 acres						
	Capacity	1,578 acre feet						
	Purposes	Recreation						



	Purposes Recreation									Miles							
		Parameter (Des	scriptions)		Result					Notes/0	ommer	nts					
		Average Turbidit	ty		9 neph	elometric	turbidity	units (NT	Ū)	All value	es < 25 N	NTU					
		Average True Co	olor		17 unit	S				All value	es < OW	QS of 70)				
		Average Secchi	Disk Depth		59 cm												
		Water Clarity Ra	iting		good												
		Trophic State Inc	dex		64					Previous value = 60							
ည	Trophic Class hypereutrophic																
Parameters		Salinity			0.83 - 1	I.01 ppt											
ıran	Specific Conductivity					1568 – 1896 μS/cm											
Pa	Profile Hq					.18 pH ui	nits			Neutral	to slightl	y alkalin	e				
	Oxidation-Reduction Potential -116 to 530 mV																
		Dissolved Oxyge	en		Up to 5 June	0% of wa	ater colum	nn < 2 m	g/L in	Occurre	d at site	1					
	S	Surface Total Nit	trogen		0.87 m	g/L to 1.7	75 mg/L										
	Nutrients	Surface Total Ph	nosphorus		0.041 mg/L to 0.100 mg/L												
	Z	Nitrogen to Phos	sphorus Ratio)	18:1					Phosph	orus limi	ted					
		Click to learn Beneficial Uses	more abou	<u>ıt</u>	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ses	Fish	h & Wildlife Propag	gation		S	S	S	S									
Beneficial Uses	Aes	sthetics							NS	S							
ficia	Agr	iculture									S	S	S				
ene	Prin	mary Body Contac	t Recreation											NEI			
m	Pub	olic & Private Wate	er Supply														
	٨	S = Fully Supporting IS = Not Supporting IEI = Not Enough Inf	formation	Notes	The lake is listed as a Nutrient Limited Watershed (NLW) in the Oklahoma Water Quality Standards (WQS). This listing means that the lake is considered threatened from nutrients until a more intensive study can confirm the Aesthetics beneficial use non-support status.												
	NTU = nephelometric turbidity units OWQS = Oklahoma Water Quality Standards mg/L = milligrams per liter ppt = parts per thousand																

 $\mu S/cm = microsiemens/cm$

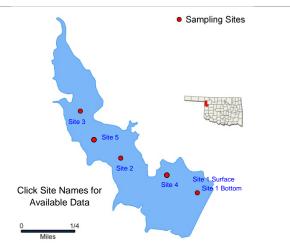
Vincent											
	Sample Period	d	Times Visited	Sampling Sites							
	November 2010 – July	y 2011	4	5							
	Location	Ellis Count	у	Click map for site data							
<u>a</u>	Impoundment	1961									
General	Area	160 acres									
ၓ	Capacity	2,579 acre feet									
	' '	, , , , , , , , , , , , , , , , , , ,									

 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

mV = millivolts

Chlor-a = Chlorophyll-a

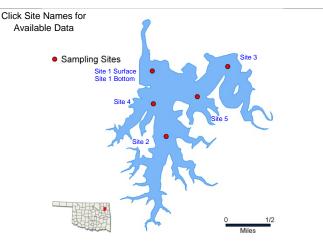


	Pur	poses	Recreation						Miles						
		Parameter (Des	scriptions)	Result					Notes/0	ommen	its				
		Average Turbidit	ty	14 NTU	J				100% o	f Values	< OWQ	S of 25 NT	Ū		
		Average Secchi	Disk Depth	63 cm											
	In-Situ	Water Clarity Ra	nting	Good											
	흐	Chlorophyll-a		8 mg/m	13										
		Trophic State Inc	dex	51					Previous value = 46						
S		Trophic Class		Eutrophic											
Parameters		Salinity		0.43 -	0.48 ppt										
aran	ω	Specific Conduc	tivity	833.1 - 928 μS/cm											
٣	Profile	рН		7.14 – 8.19 pH units					Neutral	to slightl	y alkalin	e			
	₫	Oxidation-Reduc	ction Potential	-50 to 4	-50 to 490 mV										
		Dissolved Oxyge	en	Up to 4	5 % < 2	mg/L in su	ımmer								
	(0	Surface Total Ni	trogen	0.27 m	g/L to 0.5	55 mg/L									
	ient	Surface Total Ph	nosphorus	0 015 n	na/L to 0	028 ma/l									
	Nutrients		<u> </u>	0.015 mg/L to 0.028 mg/L					5	,					
		Nitrogen to Phos	sphorus Ratio	21:1					Phosphorus limited						
		Click to learn Beneficial Uses	more about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
ses	Fish	h & Wildlife Propa	gation	S	S	S	S								
Beneficial Uses	Aes	sthetics						S	S						
ficia	Agr	iculture								S	S	S			
eue	Prir	mary Body Contac	t Recreation										NEI		
m	Pub	olic & Private Wate	er Supply												
	٨	S = Fully Supporting IS = Not Supporting IEI = Not Enough Inf	formation \$\frac{\sqrt{\sq}}}}}}}}}}}}} \sqrt{\sq}}}}}}}}}}}} \simptintiles \sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sq}}}}}}}}} \sqrt{\sqrt{\sqrt{\sq}}}}}}}} \sqrt{\sqrt{\sqrt{\sqrt{\sq}\sqrt{\sq}}}}}}}}}} \egictinnumindes} \sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sq}}}}}}}}}}	The PBCR cannot be assessed as minimum data requirements were not met due QA/QC issue with enterococci.											
	NTU = nephelometric turbidity units OWQS = Oklahoma Water Quality Standards mg/L = milligrams per liter ppt = parts per thousand														

 μ S/cm = microsiemens/cm

W.R. Holway

	Sample Period	t	Times Visited	Sampling Sites					
M	arch 2011 – Septem	per 2011	4	5					
	Location	Mayes Cou	nty	Click map for site data					
<u>8</u>	Impoundment	1968							
General	Area	712 acres							
9	Capacity	48,000 acre	e-feet						
	Purposes	Water Supply, Hydropower, Recreation							



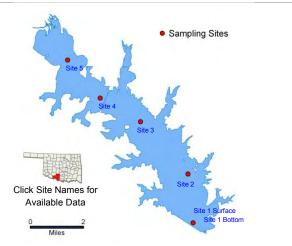
	ı uı	rposes vvater Supply	, nyurop	Hydropower, Recreation										
		Parameter (<u>Descriptions</u>)	Result					Notes/0	Commen	ts				
		Average Turbidity	4 NTU					100% o	f Values	< OWQS	S of 25			
		Average Secchi Disk Depth	198 cm	ı										
	it	Water Clarity Rating	Excelle	nt										
	In-Situ	Chlorophyll-a	13 mg/	m3										
		Trophic State Index	56					Previou	s Value=	58				
S		Trophic Class	Eutrop	nic										
Parameters		Salinity	0.10 -	0.14 ppt										
aran	ω	Specific Conductivity	215.4 -	283 µS/c	m									
g,	Profile	pН	7.10 –	9.01 pH ι	ınits			0.30%	of Values	> 9 pH ı	units			
	□	Oxidation-Reduction Potential	308 to	600 mV										
		Dissolved Oxygen	Up to 4	5% of wa er	iter colum	nn < 2 mg	g/L in							
	ts	Surface Total Nitrogen	0.45 m	g/L to 1.1	8 mg/L									
	Nutrients	Surface Total Phosphorus	0.051 r	ng/L to 0.	066 mg/L	-								
	Ž	Nitrogen to Phosphorus Ratio	14:1					Phosph	orus limi	ted				
		Click to learn more about Beneficial Uses	Turbidity	풘	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
ses	Fisl	h & Wildlife Propagation	S	S	S	S								
<u></u>	Aes	sthetics					S	*						
ficia	Agr	riculture							*	*	S			
Beneficial Uses	Prir	mary Body Contact Recreation										NEI		
m	Puk	blic & Private Water Supply												
	S = Fully Supporting NS = Not Supporting NEI = Not Enough Information *Did not collect for these parameters													

NTU = nephelometric turbidity units $<math>\mu S/cm = microsiemens per centimeter$ E. coli = Escherichia coli

OWQS = Oklahoma Water Quality Standards mV = millivolts Chlor-a = Chlorophyll-a mg/L = milligrams per liter μS/cm = microsiemens/cm ppt = parts per thousand En = Enterococci

Waurika

	Sample Period	t l	Times Visited	Sampling Sites					
	October 2007 – July	2008	4	5					
	Location	Jefferson C	County	Click map for site data					
ਰ	Impoundment	1977							
	Area	10,100 acre	cres						
, de	Capacity	203,100 ac	acre feet						
	Purposes			, Water Supply, Water d Wildlife, and					



		Quality Contro	ol, Fish and Wildlife, and											
		Parameter (<u>Descriptions</u>)	Result					Notes/0	Commen	its				
		Average Turbidity	34 nep	helometri	c turbidity	units (N	ITU)	45% of	values >	25 NTU				
		Average True Color	63 units	S				10% of	values >	OWQS (of 70			
		Average Secchi Disk Depth	51 cm											
		Water Clarity Rating	averag	е										
		Trophic State Index	54					Previou	s value =	= 60				
<u>s</u>		Trophic Class	eutroph	nic										
Parameters		Salinity	0.19 –	0.35 ppt										
aran	ω.	Specific Conductivity	389.3 -	- 353 µS/	cm									
<u> </u>	Profile	pH	7.57 –	8.59 pH ւ	ınits			Neutral	to slightl	y alkaline)			
	Ē	Oxidation-Reduction Potential	228 to	507 mV										
		Dissolved Oxygen	Up to 2 July	7% of wa	iter colun	nn , 2 mg	/L in	Occurred at site 1, the dam						
	Si	Surface Total Nitrogen	0.53 m	g/L to 1.0	9 mg/L									
	Nutrients	Surface Total Phosphorus	0.063 n	ng/L to 0.	154 mg/L	-								
	Ž	Nitrogen to Phosphorus Ratio	8:1					Phosph	orus limi	ted				
		Click to learn more about Beneficial Uses	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
ses	Fish & Wildlife Propagation NS S				S	S								

	Click to learn more about Beneficial Uses	Turbidity	표	Dissolved Oxygen	Metals	ISI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
ses	Fish & Wildlife Propagation	NS	S	S	S							
\supset	Aesthetics					S	S					
<u></u>	Agriculture							S	S	S		
Beneficial	Primary Body Contact Recreation										S	
m	Public & Private Water Supply											NS
	S = Fully Supporting NS = Not Supporting NEI = Not Enough Information											

NS = Not Supporting*NEI* = *Not Enough Information*

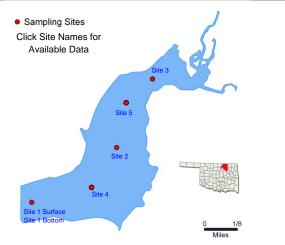
> OWQS = Oklahoma Water Quality Standards mV = millivoltsChlor-a = Chlorophyll-a

mg/L = milligrams per liter μ S/cm = microsiemens/cm ppt = parts per thousand En = Enterococci

NTU = nephelometric turbidity units μ S/cm = microsiemens per centimeter E. coli = Escherichia coli

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

Waxhoma **Times Sample Period Sampling Sites** Visited 5 October 2005 - August 2006 4 Location Osage County Click map for site data Impoundment 1955 General Area 197 acres Capacity 2,100 acre-feet Purposes Water Supply, Recreation



	i dij	poses Water Supply,	recicali	ecreation								Miles		
		Parameter (<u>Descriptions</u>)	Result					Notes/0	Commen	ts				
		Average Turbidity	5 NTU					100% of values < OWQS of 25 NTU						
		Average True Color	18 units	S				100% c	f values «	< OWQS	S of 70			
		Average Secchi Disk Depth	153 cm	l										
		Water Clarity Rating	excelle	nt										
		Trophic State Index	45											
ည		Trophic Class	mesotr	ophic										
Parameters		Salinity	0.09 -	09 – 0.11 ppt										
ıran	ø)	Specific Conductivity	187.6 – 231.6 µS/cm											
<u> </u>	Profile	рН	6.77 –	8.77 pH	units			Neutral	to slightly	y alkalin	e			
	₫.	Oxidation-Reduction Potential	135 – 4	138 mV										
		Dissolved Oxygen	nn < 2 m	g/L in										
	Si	Surface Total Nitrogen	0.15 m	g/L to 0.4	l9 mg/L									
	Nutrients	Surface Total Phosphorus	0.011m	ng/L to 0.	023 mg/L									
	Ž	Nitrogen to Phosphorus Ratio	14:1					Phosph	orus limit	ed				
		Click to learn more about Beneficial Uses	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
ses	Fish	h & Wildlife Propagation	S	S	NS	S								
Beneficial Uses	Aes	sthetics					S	S						
icia	Agri	iculture							NS *	S	S			
nef	Prin	mary Body Contact Recreation										S		
m	Pub	olic & Private Water Supply												
	N	S = Fully Supporting US = Not Supporting UEI = Not Enough Information	*Sampling in 2005-2006 found the Agriculture beneficial use not supported based on numerical criteria for sulfates located in OAC 785:45 – Appendix F.											

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

 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

mV = millivolts

Chlor-a = Chlorophyll-a

En = Enterococci

 μ S/cm = microsiemens/cm

Wayne Wallace

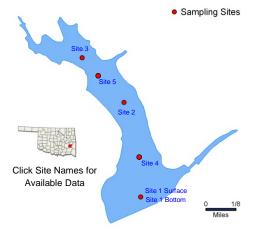
 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

mV = millivolts

Chlor-a = Chlorophyll-a

	Sample Period	d	Visited	Sampling Sites			
	February 2012 – Augu	st 2012	4	5			
	Location	Latimer Co	unty	Click map for site data			
<u></u>	Impoundment	1969					
	Area	94 acres					
	Capacity	1,746 acre	re feet				
	Purposes	Flood Cont	rol and Recre	eation			



		iposes		Posult										
		Parameter (Des	scriptions)	Result					Notes/0	Commen	ts			
		Average Turbidi	ty	6 NTU					100% o	f values	< OWQS	of 25 NT	U (n=6)	
		Average Secchi	Disk Depth	115 cm	ı									
		Water Clarity Ra	ating	Excelle	ent									
		Chlorophyll-a		27 mg/	/m3									
		Trophic State In	dex	63					Previou	s value =	= 48			
ပ်		Trophic Class		Hypere	ypereutrophic									
Parameters		Salinity		0.02 -	02 – 0.07 ppt									
ram		Specific Conduc	tivity	56 – 15	53.5 µS/c	m								
Pal	Profile	pH							14.5% (of recorde	ed value	s are < 6.	5 pH unit	:S
	풀	Oxidation-Reduc	ction Potential	51 to 4										
		Dissolved Oxyge	en	Up to 6		ater colum	n < 2 m	g/L in						
	-	Surface Total Ni	trogen	0.48 m	g/L to 0.5	59 mg/L								
	Nutrients	Surface Total Ph				.014 mg/L								
	Eti		•	0.0031	ilg/L to 0	.014 IIIg/L	-							
	_	Nitrogen to Phos	sphorus Ratio	74:1					Phosph	orus limi	ted			
		Click to learn m Beneficial Uses	nore about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
ses	Fis	h & Wildlife Propa	gation	S	NS	*	S							
Š	Aes	sthetics						NS	N/A					
Beneficial Uses	Agı	riculture								N/A	N/A	S		
enef	Prir	mary Body Contac	t Recreation										S	
m	Pul	blic & Private Wate	er Supply											
	٨	S = Fully Supporting NS = Not Supporting NEI = Not Enough In		soluble therefor	bedrock. L e the Wate	Due to thes er Board is	e condition looking a	ns it is lik t the appl	ely that the	low pH va developing	alues may g site-spe	low soil plus do not be due to cific criteria	natural ca	auses;

 μ S/cm = microsiemens/cm

Webbers Falls

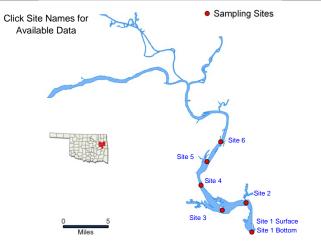
 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

mV = millivolts

Chlor-a = Chlorophyll-a

	Sample Period		Times Visited	Sampling Sites				
1	November 2010 – Augu	ıst 2011	4	6				
	Location	Muskogee	County	Click map for site data				
5	Impoundment	170						
	Area	11,600 acre	es					
	Capacity	170,100 ac	acre-feet					
	Purposes	Navigation,	Hydropowei					



	٠. ٣	irposes	Navigation,	y	aropowo	!				Miles Site 1 Bottom						
		Parameter (Des	scriptions)		Result					Notes/0	Commen	its				
		Average Turbidi	ty		13 NTL	J				100% o	f values	< OWQS	of 25 NT	U (n=17))	
		Average Secchi	Disk Depth		63 cm											
	Ę	Water Clarity Ra	ating		Averag	e										
	In-Situ	Chlorophyll-a			27 mg/r	m3										
		Trophic State In	dex		63					Previou	s value =	= 55				
ဖွ		Trophic Class			Hypere	utrophic										
Parameters		Salinity			0.21 – 0	0.79 ppt										
ram		Specific Conduc	ctivity		422.1 - 1490 μS/cm											
Ра	Profile	pH			7.52 – 9	9.07 pH ı	units			0.45%	of Values	s > 9 pH :	units			
	7	Oxidation-Redu	ction Potentia	al	276 - 4	58 mV										
		Dissolved Oxygo	en		All data are above screening level of 2.0 mg/L											
	10	Surface Total Ni	trogen			g/L to 1.3	3 mg/L									
	Nutrients	Surface Total Pl	nosphorus		0 101 n	na/L to 0	.166 mg/L									
	Z Ctr.					19/12 10 0	. 100 1119/1	_								
		Nitrogen to Phos	sphorus Ratio)	7:1					Phosph	orus limi	ted, poss	sibly co-lin	nited		
		<u>Click to learn</u> <u>Beneficial Uses</u>	n more abou	<u>ıt</u>	Turbidity	Ħ	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a	
ses	Fis	sh & Wildlife Propa	gation		NEI	S	S	S								
Beneficial Uses	Ae	esthetics						S	*							
fici	Ag	griculture									S	S	S			
ene	Pri	imary Body Contac	t Recreation											NEI		
m	Pu	ıblic & Private Wate	er Supply													
	1	S = Fully Supporting NS = Not Supporting NEI = Not Enough In		Notes				•		NTU, an as uirements			/P beneficia	al use car	not be	

 μ S/cm = microsiemens/cm

Wes Watkins

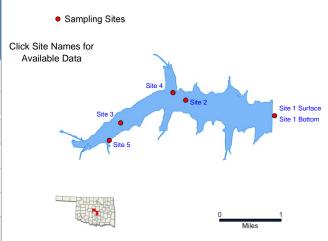
 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

mV = millivolts

Chlor-a = Chlorophyll-a

	Sample Period	t	Times Visited	Sampling Sites			
١	lovember 2010 – Jur	ne 2011	3	5			
	Location	Pottawaton	nie County	Click map for site data			
<u></u>	Impoundment	1997					
General	Area	1,142 acres	3				
5	Capacity	14,065 acre	acre-feet				
	Purposes	Water Supp	oly, Recreation	on, Flood Control			

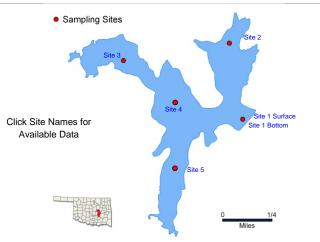


	Parameter (Description of the Company) Average Secchi I Water Clarity Rate Chlorophyll-a	y Disk Depth	18 NTU						commen	its					
niio-lii	Average Secchi I Water Clarity Rat	Disk Depth	65 cm	J											
	Water Clarity Rat	<u> </u>						16% of v	values >	OWQS (of 25 NTU	l			
	•	ting													
	Chlorophyll-a		Good												
			13 mg/	m3											
	Trophic State Ind	lex	56					Previous Values= 53							
	Trophic Class		Eutrop	hic											
	Salinity		0.11 –	0.16 ppt											
ט	Specific Conduct	ivity	231.5 -	- 336.1 µ	S/cm										
5	pН		6.91 –	8.83 pH ı	units										
	Oxidation-Reduc	tion Potential	18 - 45	9 mV											
	Dissolved Oxyge	n	Up to 45 % < 2 mg/L in summer												
ņ	Surface Total Nit	rogen	0.69 m	g/L to 1.1	2 mg/L										
D	Surface Total Ph	osphorus	0.033 r	ng/L to 0	.050 mg/L	-									
2	Nitrogen to Phos	phorus Ratio	25:1					Phosph	orus limit	ted					
	Click to learn Beneficial Uses	more about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ïsh	& Wildlife Propag	gation	S*	S	S	S									
est	thetics						S	*							
gri	culture								*	*	S				
rim	nary Body Contact	Recreation										NEI			
ubl	lic & Private Wate	r Supply													
NS	S = Not Supporting	ormation											ample		
e Pr	est grid im s Ni	Salinity Specific Conduct pH Oxidation-Reduct Dissolved Oxyge Surface Total Nit Surface Total Ph Nitrogen to Phos Click to learn Beneficial Uses Sh & Wildlife Propage esthetics griculture timary Body Contact ablic & Private Wate S = Fully Supporting NS = Not Supporting NEI = Not Enough Info	Salinity Specific Conductivity pH Oxidation-Reduction Potential Dissolved Oxygen Surface Total Nitrogen Surface Total Phosphorus Nitrogen to Phosphorus Ratio Click to learn more about Beneficial Uses Sh & Wildlife Propagation esthetics griculture imary Body Contact Recreation ablic & Private Water Supply S = Fully Supporting NS = Not Supporting NEI = Not Enough Information ephelometric turbidity units OWQS	Salinity Specific Conductivity pH 6.91 – Oxidation-Reduction Potential Dissolved Oxygen Surface Total Nitrogen Surface Total Phosphorus Nitrogen to Phosphorus Ratio Click to learn more about Beneficial Uses Sth & Wildlife Propagation State of the surface Total Recreation State o	Salinity Specific Conductivity pH 6.91 – 8.83 pH of the second	Salinity Specific Conductivity Specific Conductivity pH 6.91 – 8.83 pH units Oxidation-Reduction Potential Dissolved Oxygen Up to 45 % < 2 mg/L in su Surface Total Nitrogen Surface Total Phosphorus Nitrogen to Phosphorus Ratio Click to learn more about Beneficial Uses Sh & Wildlife Propagation S* S S S S *Although 16% of the values seasonal rain events. The lai year. Specific Conductivity 231.5 – 336.1 µS/cm 6.91 – 8.83 pH units 18 - 459 mV Up to 45 % < 2 mg/L in su 0.033 mg/L to 0.050 mg/L 25:1 **Although 16% of the values seasonal rain events. The lai year. S *Although 16% of the values seasonal rain events. The lai year. **Epily Supporting NE Not Enough Information **Epile Not Enough Information **OWQS = Oklahoma Water Quality States Not Supporting of the power o	Salinity Dissolved Oxygen Surface Total Nitrogen Surface Total Phosphorus Nitrogen to Phosphorus Ratio Click to learn more about Beneficial Uses Sh & Wildlife Propagation Sh & Private Water Supply Sh = Not Supporting NS = Not Supporting NS = Not Supporting NE Not Enough Information Sh & Water Supply Sh & Wildlife Vivale Water Supply Sh & Wildlife Propagation Sh & Sh	Salinity Dissolved Coxygen Dissolved Oxygen D	Salinity 0.11 – 0.16 ppt Specific Conductivity 231.5 – 336.1 µS/cm pH 6.91 – 8.83 pH units Oxidation-Reduction Potential 18 - 459 mV Dissolved Oxygen Up to 45 % < 2 mg/L in summer Surface Total Nitrogen 0.69 mg/L to 1.12 mg/L Surface Total Phosphorus 0.033 mg/L to 0.050 mg/L Nitrogen to Phosphorus Ratio 25:1 Phosphorus Click to learn more about Beneficial Uses Striculture Imary Body Contact Recreation Iblic & Private Water Supply S = Fully Supporting NS = Not Supporti	Salinity Dissolved Oxygen Dissolved Oxygen Up to 45 % < 2 mg/L in summer Surface Total Nitrogen Surface Total Phosphorus Oxidation-Reduction Potential Surface Total Phosphorus Oxidation-Reduction Potential 18 - 459 mV Dissolved Oxygen Up to 45 % < 2 mg/L in summer Surface Total Phosphorus Oxidation-Reduction Potential 18 - 459 mV Dissolved Oxygen Up to 45 % < 2 mg/L in summer Surface Total Phosphorus Oxidation-Reduction Potential Oxidation-Reduction Potential 18 - 459 mV Dissolved Oxygen Up to 45 % < 2 mg/L Surface Total Phosphorus Oxidation-Reduction Potential Oxidation-Reduction Potenti	Salinity Specific Conductivity 231.5 – 336.1 µS/cm 6.91 – 8.83 pH units Oxidation-Reduction Potential Dissolved Oxygen Up to 45 % < 2 mg/L in summer Surface Total Nitrogen 0.69 mg/L to 1.12 mg/L Surface Total Phosphorus 0.033 mg/L to 0.050 mg/L Nitrogen to Phosphorus Ratio Click to learn more about Beneficial Uses S** S** S** S** S** S** ** **	Salinity Specific Conductivity 231.5 – 336.1 μS/cm pH 6.91 – 8.83 pH units Oxidation-Reduction Potential 18 - 459 mV Dissolved Oxygen Up to 45 % < 2 mg/L in summer Surface Total Nitrogen Surface Total Phosphorus 0.69 mg/L to 1.12 mg/L Surface Total Phosphorus 0.033 mg/L to 0.050 mg/L Nitrogen to Phosphorus Ratio 25:1 Phosphorus limited Click to learn more about Beneficial Uses sh & Wildlife Propagation S* S S S shiethetics S* S S similary Body Contact Recreation while & Private Water Supply S = Fully Supporting NS = Not Supporting NS =	Salinity Specific Conductivity 231.5 – 336.1 µS/cm pH 6.91 – 8.83 pH units Oxidation-Reduction Potential 18 - 459 mV Dissolved Oxygen Up to 45 % < 2 mg/L in summer Surface Total Nitrogen Surface Total Phosphorus 0.033 mg/L to 0.050 mg/L Nitrogen to Phosphorus Ratio 25:1 Phosphorus limited Click to learn more about Beneficial Uses Sh & Wildlife Propagation S* S S S sthetics sh Wildlife Propagation S* S S S shifted September of the Values exceeded 25 NTU, available rainfall data suggests this is likely due to seasonal rain events. The lake is therefore considered supporting the FWP beneficial use for this significant curbicity units OWQS = Oklahoma Water Quality Standards mg/L = milligrams per liter ppt = parts per thousance position of the part of the p		

 μ S/cm = microsiemens/cm

Wetumka

	Sample Period	t	Times Visited	Sampling Sites				
	October 2006 - July	2007	4	5				
	Location	Hughes Co	unty	Click map for site data				
3	Impoundment	1939						
5	Area	169 acres	S					
5	Capacity	1839 acre-f	e-feet					
	Purposes	Water Sup	ply, Recreati	on				



	ı uı	Purposes water Supply, Recreation						- v							
		Parameter (Descriptions)	Result					Notes/Comments							
		Average Turbidity	18 NTU					8% of values >OWQS of 25 NTU							
		Average True Color	58 units					58% of	values >	- OWQS	of 70				
		Average Secchi Disk Depth	59 cm												
		Water Clarity Rating	fair												
		Trophic State Index	53												
ည		Trophic Class	eutroph	nic											
Parameters		Salinity	0.03 -	0.08 ppt											
aran	ω	Specific Conductivity	92.4 –	173.3 µS	/cm										
<u>a</u>	Profile	pH	6.49 –	7.90 pH	units			Only 2 values < 6.5 pH units							
	颪	Oxidation-Reduction Potential	298 - 4	161 mV											
		Dissolved Oxygen	Up to 6	57% of wa	of water column < 2 mg/L in				Occurred at site 1, the dam						
	ts	Surface Total Nitrogen	0.52 m	g/L to 1.3	5 mg/L										
	Nutrients	Surface Total Phosphorus	0.022 mg/L to 0.088 mg/L												
	Ž	Nitrogen to Phosphorus Ratio	13:1	3:1				Phosphorus limited							
		Click to learn more about Beneficial Uses	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a		
ses	Fisl	h & Wildlife Propagation	S	S	NS	S									
<u></u>	Aes	sthetics					S	NS							
Beneficial Uses	Agr	riculture							S	S	S				
	Prir	mary Body Contact Recreation										NEI			
	Puk	blic & Private Water Supply													
	٨	S = Fully Supporting NS = Not Supporting NEI = Not Enough Information		CR cannot liform and			imum dat	ta requirem	ents were	e not met	due to QA/	QC issues	s for		

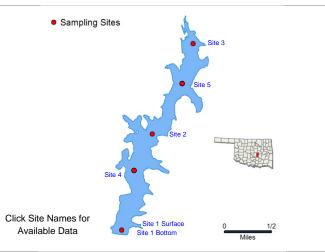
NTU = nephelometric turbidity units $<math>\mu S/cm = microsiemens per centimeter$ E. coli = Escherichia coli

OWQS = Oklahoma Water Quality Standards mV = millivolts Chlor-a = Chlorophyll-a mg/L = milligrams per liter μS/cm = microsiemens/cm ppt = parts per thousand En = Enterococci

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

Wewoka **Times Sample Period Sampling Sites Visited** November 2008 - August 2009 5 4 Location Seminole County Click map for site data 1925 Impoundment General Area 371 acres Capacity 3,301 acre-feet Water Supply Recreation

E. coli = Escherichia coli

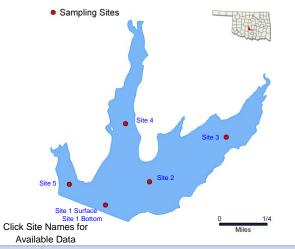


	Pui	poses	vvater Supply,	Recreation							One i Bottom		Miles	_	
		Parameter (Des	Result					Notes/Comments							
	Average Turbidity			31 NTU					58% of values > OWQS of 25 NTU (n=12)						
	Average True Color								Did not	collect fo	or true co	lor			
		Average Secchi	33 cm												
		Water Clarity Ra	Average												
		Trophic State Inc	56					Previous	s value =	: 55					
S		Trophic Class		Eutroph	nic										
Parameters	Salinity				0.08 – 0.12 ppt										
ran	4	Specific Conduct	135 – 2	135 – 254.1 μS/cm											
T B	Profile	рН	6.64 –	7.90 pH	units										
	ፈ	Oxidation-Reduc	20 - 47	7 mV											
		Dissolved Oxyge	n	Up to 2 August		ater colum	nn < 2.0 i	mg/L in							
	Si	Surface Total Nit	rogen	0.58 mg	g/L to 0.8	88 mg/L									
	Nutrients	Surface Total Ph	osphorus	0.016 n	ng/L to 0	.078 mg/L	-								
	N	Nitrogen to Phos	16:1					Phosph	Phosphorus limited						
		Click to learn Beneficial Uses	more about	Turbidity	Hd	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a	
ses	Fish & Wildlife Propagation			NS	S	S	*								
Š ₩	Aes	Aesthetics						S	*						
	Agr	Agriculture								*	*	S			
Beneficial Uses	Prin	mary Body Contact	Recreation										S		
	Pub	olic & Private Wate													
	Λ	S = Fully Supporting IS = Not Supporting IEI = Not Enough Info	*Did not	collect for	these par	ameters									

Chlor-a = Chlorophyll-a

Wiley Post Memorial (Maysville)

	Sample Period	d	Times Visited	Sampling Sites				
1	November 2007 – Augu	ıst 2008	4	5				
general	Location	McClain Co	ounty	Click map for site data				
	Impoundment	1971						
	Area	302 acres						
	Capacity	2,086 acre feet						
	Purposes	Water Supp	oly, Flood Co	ntrol, and Recreation				



	Purposes water Supp		vvater Supply,	, Flood Control, and Recreation Availa					able Data				Willes		
	Parameter (<u>Descriptions</u>)			Result					Notes/Comments						
		Average Turbidi	79 nephelometric turbidity units (NTU)					100% of values > 25 NTU							
	Average True Color			223 units					100% of values > OWQS of 70						
		Average Secchi Disk Depth		16 cm											
	Water Clarity Rating			poor											
	Trophic State Index			51					Previou	s value =	= 57				
ည	Trophic Class			eutrophic											
Parameters		Salinity		0.10 – 0.20 ppt											
aran	ω	Specific Conductivity		280 – 349.9 μS/cm											
٣	Profile	рН	7.24 – 8.41 pH units					Neutral to slightly alkaline							
	<u> </u>	Oxidation-Redu	246 to 664 mV												
		Dissolved Oxyg	en	Up to 50% of water column < 2 mg/L in August					Occurred at site 4						
	Nutrients	Surface Total Nitrogen 0.66 mg/L to 1.28													
		Surface Total Pl	nosphorus	0.081 mg/L to 0.159 mg/L											
	ž	Nitrogen to Pho	sphorus Ratio	9:1					Phosphorus limited						
		Click to learn Beneficial Uses	n more about	Turbidity	된	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a	
ses	Fish & Wildlife Propagation		NS	S	S	S									
<u></u>	Aes	Aesthetics						S	NS						
ficia	Agı	Agriculture								S	S	S			
Beneficial Uses	Pri	Primary Body Contact Recreation											NEI		
	Pul	Public & Private Water Supply													
	1	S = Fully Supporting NS = Not Supporting NEI = Not Enough Information			CR cannot fecal colife	sed as mir	nimum dat	a requirem	ents were	e not met (due to QA/	QC issues	for E.		

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

OWQS = Oklahoma Water Quality Standards

mV = millivolts

Chlor-a = Chlorophyll-a

NTU = *nephelometric turbidity units*

E. coli = Escherichia coli

 μ S/cm = microsiemens per centimeter

mg/L = milligrams per liter

 μ S/cm = microsiemens/cm

ppt = parts per thousand

Wister Sampling Sites Times **Sample Period Sampling Sites** Visited 4 November 2010 - July 2011 5 Location LeFlore County Click map for site data Impoundment 1949 General Click Site Names for Available Data Area 7,333 acres Capacity 62.360 acre feet Flood Control, Water Supply, Low flow Purposes Regulation, and Conservation Parameter (Descriptions) Result **Notes/Comments** Average Turbidity **17 NTU** 100% of values < OWQS 25 NTU Average Secchi Disk Depth 54 cm Water Clarity Rating Average Chlorophyll-a 14 mg/m3 **Trophic State Index** 57 Previous value = 62 **Trophic Class** Eutrophic **Parameters** Salinity 0.01 - 0.04 ppt Specific Conductivity $53.9 - 112.8 \mu S/cm$ 6.04 - 8.64 pH units 24.1 % of Values < 6.5 pH units Oxidation-Reduction Potential 32 to 493 mV Up to 30% of water column < 2.0 mg/L in Dissolved Oxygen spring Surface Total Nitrogen 0.29 mg/L to 0.67 mg/L **Nutrients** Surface Total Phosphorus 0.036 mg/L to 0.063 mg/L Nitrogen to Phosphorus Ratio 9:1 Phosphorus limited Total Dissolved Dissolved Chlorides Oxygen Turbidity Sulfates Click to learn more about Metals Beneficial Uses $\overline{\Omega}$ Hd **Beneficial Uses** Fish & Wildlife Propagation S S S NS **Aesthetics** NS* S Agriculture Primary Body Contact Recreation NEI Public & Private Water Supply *Did not collect for these parameters. *Currently, the lake is listed as a Nutrient Limited Watershed (NLW) S = Fully Supporting NS = Not Supporting in the Oklahoma Water Quality Standards (WQS). This listing means that the lake is considered threatened *NEI* = *Not Enough Information* from nutrients until a more intensive study can confirm the Aesthetics beneficial use non-support status. NTU = nephelometric turbidity units OWQS = Oklahoma Water Quality Standards mg/L = milligrams per liter ppt = parts per thousand

 μ S/cm = microsiemens per centimeter

E. coli = Escherichia coli

mV = millivolts

Chlor-a = Chlorophyll-a

 μ S/cm = microsiemens/cm

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APPENDIX A

OKLAHOMA'S USE SUPPORT ASSESSMENT PROTOCOLS

[UNOFFICIAL]

Amendments effective as of 07/01/2013

TITLE 785. OKLAHOMA WATER RESOURCES BOARD CHAPTER 46. IMPLEMENTATION OF OKLAHOMA'S WATER QUALITY STANDARDS SUBCHAPTER 15. USE SUPPORT ASSESSMENT PROTOCOLS

Available online:

www.owrb.ok.gov/util/rules/pdf_rul/current/Ch46.pdf