2019

Oklahoma Lakes Report

Beneficial Use Monitoring Program

EXECUTIVE SUMMARY

It is the intent of this Oklahoma Water Resources Board (OWRB) report to advance concepts and principles of the Oklahoma Comprehensive Water Plan (OCWP). 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 science and effective public policy, the OCWP incorporates a broad range of water resource development and protection strategies substantiated by hard data and supported by Oklahoma citizens. 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 on this information to address specific water supply concerns related to quality and infrastructure.

The Beneficial Use Monitoring Program (BUMP) exists because of the vital economic and social importance of Oklahoma's lakes, streams, wetlands, and aquifer systems, and their need for 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. USAPs establish a consistent method to determine if beneficial uses assigned for individual waters through Oklahoma Water Quality Standards (WQS) are being supported. The OWRB has incorporated the USAP into Oklahoma Administrative Code (OAC) 785:46 to ensure consistent determinations for impairments are made by all agencies conducting monitoring activities. If the BUMP report indicates that a designated beneficial use is impaired, threatened, or otherwise compromised, measures must be taken to mitigate or restore water quality.

To synchronize Oklahoma's water quality monitoring efforts, 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 Rules. 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 an 8-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 – The OWRB conducts sampling on lakes and reservoirs across the State of Oklahoma through a fixed station monitoring approach. This design allows the state's objectives to be met, as well as ensure various sized waterbodies are represented adequately. All lakes 50 surface acres or larger are monitored by OWRB and encompasses 206 individual water bodies. The population is divided into two categories; lakes larger than 500 surface acres and lakes less than 500 surface acres. Sampling is conducted on a quarterly basis, following the hydrologic year, which runs October through September. Over a five-year timeframe, large lakes are sampled twice in non-consecutive years, while smaller lakes are sampled once. During that timeframe, the goal is to sample each lake at least once. Each year, OWRB samples between 35-40 lakes, depending on size. Many of these smaller lakes are municipal water supplies and have not historically been sampled through BUMP.

Many of the 68 large lakes are managed by federal partners including the United States Army Corps of Engineers (USACE) and the Bureau of Reclamation (BOR). The OWRB works with these partner agencies for inclusion of additional information when possible on waterbodies under their management. 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 reservoir's size. Stations are located such that they represent the lacustrine, transitional, and riverine zones of the lake. On many larger reservoirs, additional sites are monitored to include major arms of the reservoir, as appropriate. Water quality parameters have been added to the lakes sampling effort over the years to enhance BUMP's ability to make use support determinations.

Groundwater Monitoring (GMAP) – This program was made possible as result of the 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. The program prioritizes efforts on Oklahoma's 22 major groundwater aquifers, with the baseline phase completed at the conclusion of 2017 and long-term trend monitoring scheduled to begin in 2019. The baseline period focused on 4-6 aquifers per year, beginning in 2013, and assessed concentrations of nutrients, metals and major ion species. Sample size was predicated upon and proportional to the surface area of the aquifer with a general goal of 30 wells per aquifer. Some of the state's larger aquifers exceeded the goal and some of the smaller aquifers were represented by fewer wells (**Table 1**). At the conclusion of the baseline sampling period there were 695 wells sampled from major aquifers in the statewide groundwater quality network, with an additional 31 wells in minor aquifers. In addition, the OWRB's annual groundwater level measurement program nearly doubled in capacity from around 530 to 900 wells and has been spatially redistributed. Also, over the 5-year baseline period, the OWRB installed 33

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.

Table 1. Sample Networks Based on Aquifer Areal Extent

Areal Extent Category	Sample Site Well Density	Sample Sizes Generated
> 5000 km^2	1 well per 150 km^2 (6 Aquifers)	37 – 89
3001 – 5000 km^2	1 well per 100 km^2 (5 aquifers)	33 – 48
1501 – 3000 km^2	1 well per 75 km^2 (6 aquifers)	25 – 33
751 – 1500 km^2	1 well per 50 km^2 (2 aquifers)	16 – 19
≤ 750 km^2	2 aquifers	6 – 10

Intensive Investigations – Historically, occurred in the early years of the program, but no work of this nature has occurred in the last several 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 numerous lakes, streams, and rivers across the state was initiated in the summer and fall of 1998. Lake sampling in connection with BUMP began in July of 1998. Sampling of 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 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. 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 by working with the Secretary of the Environment and Oklahoma Conservation Commission, was able to obtain a one-time federal Clean Water Act (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.

Products of Sampling Efforts

Comprehensive statewide datasets on rivers, streams, and lakes for accurately assessing beneficial use impairments had not existed since 1993. With the implementation of monitoring on a large scale in October of 1998, this was no longer the case. With the availability of data, it is the desire of the OWRB to provide the legislature and professional water managers with a comprehensive and up-to-date document for their review and approval. It is essential for Oklahoma to quantify impacts in a comprehensive and scientific manner and look for trends in water quality to identify waters that are not

meeting their assigned beneficial uses. As a state, we must manage our water resources effectively and direct money to areas with the highest need of protection or remediation to ensure the continuance of good water quality and sufficient quantity to meet our needs well into future. OWRB staff looks forward to conducting the Beneficial Use Monitoring Program to provide the state with the information it needs to make informed decisions that allowing for the effective management our precious water resources.

Every two years, the OWRB analyzes BUMP data to identify if the waters of the state are meeting their assigned beneficial uses. If a lake, stream, or river segment is not meeting its beneficial use, it is submitted for inclusion in the EPA's Integrated Report[1] (303(d) and 305(b)). The latest EPA approved 303(d) list of impaired waters, along with information about the Integrated Report process can be found on the Oklahoma Department of Environmental Quality's website referenced above.

INTRODUCTION

Protecting and improving the water quality of Oklahoma's lakes is vital to the state. Quality of life and economic benefits are both directly connected to maintaining healthy lake ecosystems. Oklahoma has over 200 manmade lakes ranging in size from 50 to over 100,000 surface acres and the beneficial uses of these lakes include, *Public and Private Water Supply*, *Fish and Wildlife Propagation*, *Recreation, Hydropower,* and *Irrigation* (OAC 785:45).

Lakes in Oklahoma also generate millions of dollars for state and local economies each year through recreation activities. Information from the U.S. Army Corps of Engineers provides a snapshot of the recreational and economic benefits of Oklahoma's lakes. In fiscal year 2016 there were over 11 million visitors to USACE recreational resources in Oklahoma and of these there were 3.7 million anglers, 3.5 million boaters, 1.7 million swimmers, and 0.5 million skiers (USACE 2016a). 2016 economic data reported that there was $377 million in visitor spending and 3,379 jobs within 30 miles of a USACE lake (USACE 2016a). At Eufaula Lake alone (Oklahoma's largest lake at 105,500 surface acres), there were a total of 2.2 million visitors with 1 million boaters, 800,000 anglers, 600,000 swimmers, and 100,000 water skiers (USACE 2016b). The economic benefit of Eufaula is reported as nearly $93 million in visitor spending and 778 jobs within 30 miles of the lake (USACE 2016b). Similarly, at Canton Lake (7,900 surface acres), a much smaller lake located in western Oklahoma, only about 250,000 visitors came to the lake with 101,000 sightseers, 56,000 anglers, 39,000 swimmers, and 19,000 water skiers (USACE 2016c). This recreational activity resulted in $5.7 million in visitor spending and 58 jobs within 30 miles of the lake (USACE 2016c). It is clear that lakes in Oklahoma of all sizes are cherished recreational resources and important contributors to the local and state economy.

Oklahoma works to protect and manage its water resources through a number of initiatives, with the Water Quality Standards (WQS) 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

[1] https://www.deq.ok.gov/water-quality-division/watershed-planning/integrated-report/

frameworks. The WQS are located in OAC 785:45 and consist of three components: beneficial uses, criteria to protect beneficial uses, and the Antidegradation Policy. All state agencies work 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.

The Beneficial Use Monitoring Program (BUMP), utilizes assessment protocols to evaluate beneficial use condition, primarily the Use Assessment Protocols (USAP) (OAC 785: Chapter 46, subchapter 15). These protocols facilitate state agencies in directing their time and money to the areas in most need of protection or remediation. The USAP may also 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 serve a vital purpose in refining numerical criteria currently included in the WQS and in developing numerical and narrative criteria for future WQS documents. It is essential that our waters attain their beneficial uses and that WQS implementation protocols are effective. Please see Appendix A for the applicable Oklahoma Administrative Code (OAC) 785:46 related to the USAP.

This report summarizes the annual results of the BUMP. 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.

Historical Background and Problem Definition

Historically, the State of Oklahoma had numerous monitoring programs conducted by several state and federal agencies. Each agency conducted monitoring with some degree of integration and coordination with other state, municipal, or federal programs. Most water quality monitoring programs in Oklahoma are designed to collect information for one specific purpose (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.). As such, information is specific to each programs data quality objectives (DQOs) and is often limited to a small geographic area.

This document describes sampling activities OWRB conducted for lakes and current ongoing efforts for lakes 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

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. Currently, the parameters that are analyzed to determine whether or not there is beneficial use impairment or threat include turbidity, chlorophyll-a, 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. Lakes with relatively poor water quality are identified, but that does not necessarily mean that these lakes have beneficial use impairments. Due to the nature of their watershed and basin morphometry, lakes may manifest a range of water quality conditions. For example, Broken Bow Lake and Great Salt Plains display very different water quality conditions and this is expected 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 the lake bottom sediments being re-suspended 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. 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. This prioritization has led to a variety of in-lake restoration activities and implementation of best management practices in the lake watershed.

For the 2018-2019 sampling season, statewide monitoring identified lakes that had potential beneficial use impairments or threats through the BUMP program. Numeric nutrient criteria for lakes have yet to be promulgated into the WQS, so there is not currently an assessment tool to truly determine which lakes are not supporting their beneficial uses due solely to excess nutrients. The OWRB has previously identified 21 lakes that are listed in the WQS as Nutrient Limited Watersheds (NLWs). 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. 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.

Materials & Methods for Lake Sampling

Data was collected quarterly on 40 lakes across the state from the fall of 2018 through summer of 2019. Sampling all lake sites once per quarter during the sample year was done to ensure seasonality was represented. The number of sampling stations per lake varied depending on lake size and morphology.

In general, 3-5 stations were chosen per lake in order to be representative of the riverine, transitional and lacustrine zones of the waterbody (**Figure 1**).

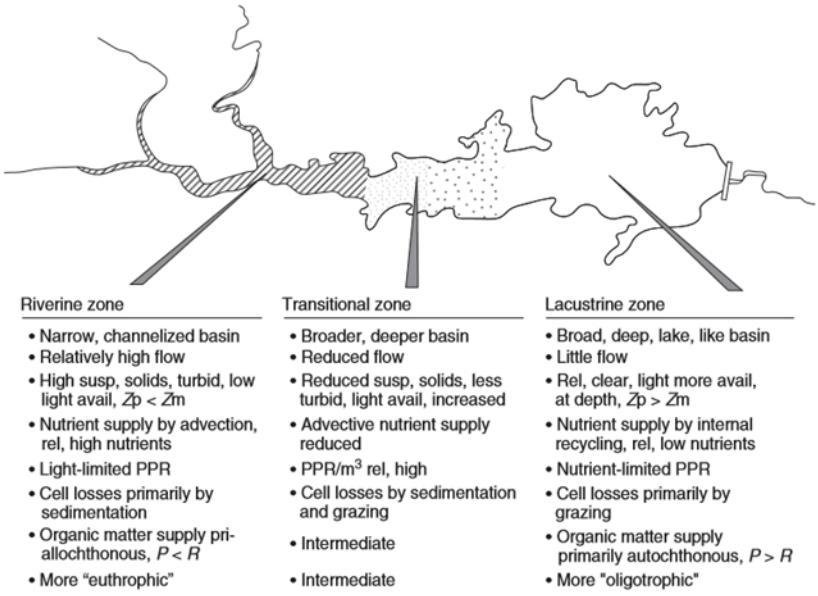


Figure 1. Reservoir water quality zone map with descriptors.

Data for water quality indicators (**Table 2**) was collected following OWRB standard operating procedures (SOPs) for the water quality samples (OWRB, 2018a). Several variables (pH, dissolved oxygen, water temperature, and specific conductance) were monitored *in-situ* utilizing a YSI® multi-parameter sonde. In accordance with manufacturer's specifications and/or published SOP's, all parameters (excluding water temperature which is factory calibrated) were calibrated weekly and verified daily with appropriate standards. Measurements were recorded at each sampling station on the lake in the form of a vertical profile. Vertical profiles were recorded in 1-meter increments from the lake surface to the lake bottom, with additional readings at 0.5 m below the surface and 0.2 m above the lake bottom. During periods with anoxic conditions (dissolved oxygen < 2.0 mg/L) an additional reading was taken 0.5 m above the first depth with measured anoxia in order to narrow down the point of transition.

Data for all other indicators were amassed from water quality samples collected at the lake. Water quality samples were collected via surface grab with water collected from 0.5 m below the lake surface. The sample was collected by completely submerging the bottle, allowing it to fill to the top, and capping the bottle underwater. Each collection included two bottles for general chemistry analyses (one ice preserved and one sulfuric acid preserved), and one bottle for field chemistry and sestonic chlorophyll-a analyses (ice preserved and kept dark). A Van Dorn sampler was used to collect at depth samples near the lake bottom, just above the sediment-water interface. Replicate samples for all parameters were collected at the dam site for Quality Assurance (QA) purposes. The Oklahoma Department of Environmental Quality State Environmental Laboratory (ODEQ-SEL) analyzed samples for the general chemistry parameters listed in **Table 2** in accordance with the ODEQ's Quality Assurance Program Plan

(ODEQ, 2019) and Data Quality Manual (ODEQ, 2018). OWRB personnel measured hardness and alkalinity using Hach® titration protocols, and nephelometric turbidity using a Hach® Portable turbidimeter. Additionally, as part of the field parameters, secchi disk depth (in centimeters) was recorded at all locations as a measure of water clarity.

Table 2. Water Quality Parameters Included in Study

***In-situ* Parameters**		
Dissolved Oxygen (DO)	% DO Saturation	pH
Water Temperature	Specific Conductance	Salinity
Oxidation-Reduction Potential (ORP)	Total Dissolved Solids	
Field Parameters		
Nephelometric Turbidity	Total Alkalinity	Total Hardness
Secchi Disk Depth	Habitat	
General Chemistry Parameters		
Total Kjeldahl Nitrogen	Total Phosphorus	Chlorides
Dissolved Orthophosphorus	Nitrate Nitrogen	Nitrite Nitrogen
Ammonia	Sulfates	Total Dissolved Solids
Biological Parameters		
Chlorophyll-a	Zooplankton	Phytoplankton

Samples for algal chlorophyll-a, as a measure of algal biomass, were collected at all sample sites and processed in accordance with standard procedures outlined (OWRB, 2018b). All chlorophyll-a samples were analyzed by the ODEQ-SEL under the previously mentioned QAPP (ODEQ, 2007). Additionally, phytoplankton and zooplankton samples were also collected on a quarterly basis for taxonomic identification and these collections took place at the dam site. Phytoplankton samples were collected as a surface grab sample, while zooplankton were collected as a tow using a Wisconsin-style plankton net. The length of the tow was specific to each lake, representing the entire depth of the water column. All samples were collected and processed in accordance with standard procedures (OWRB 2013).

Sample Lake Locations

Lakes sampled by the BUMP Lakes staff in 2018-2019 are shown in **Figure 2**. Lake locations are identified on the map and are shaded in different colors based on their calculated TSI values. A total of 40 lakes were sampled during the 2018-2019 sampling year.

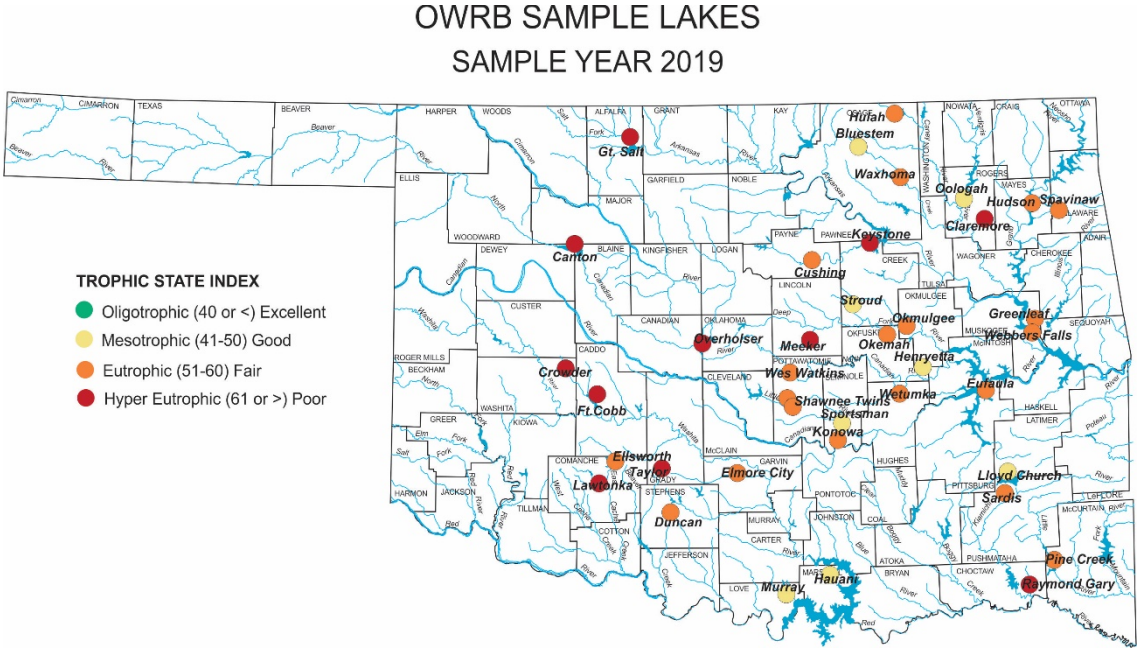


Figure 2. Lakes sampled by the Beneficial Use Monitoring Program in 2018-2019

Lake Data Analysis Protocols

The method of assessing lakes based on their biological response to nutrients is trophic state classification, which indicates the amount of biological activity sustained in a waterbody at a particular time. Lakes that have high nutrient concentrations and productive plant growth are described as eutrophic; whereas, low nutrient concentrations and low plant growth lakes are characterized as oligotrophic (Water on the Web, 2004). Lakes that exhibit moderate levels of nutrients and plant growth are termed mesotrophic. 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. Most indices use one or more variables in the determination of trophic status with varying degrees of applicability to systems. Carlson (1977) developed the most commonly used chlorophyll biomass based trophic status index (TSI) to classify and describe lakes. The Carlson chlorophyll TSI metric (**Equation 1**) has long been used by OWRB to determine lake trophic status.

Equation 1. Carlson's TSI calculation based on chlorophyll-a biomass

$$TSI = 9.81 \, x \, ln(chlorophyll - a) + 30.6$$

In 1998, 1999, and 2000, TSI was calculated using chlorophyll-concentrations from the growing season (spring and summer only). Beginning in sample year 2001, an annualized trophic assessment was made as it was determined to be a more accurate reflection of trophic conditions for each waterbody. In order to make beneficial use determinations, minimum data requirements must be met as listed in OAC 785:46-15-3. Lakes greater than 250 surface acres require a minimum of 20 samples, for lakes with less than 250 surface acres, 10, at minimum, are required. In 2001-2002, sites were added for chlorophyll-a and turbidity collections on lakes greater than 250 surface acres to meet the minimum annual data

requirements. Although data can be aggregated and historical values used, there was a concern in using data 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 condition is minimized (i.e. the effects of a single elevated chlorophyll-a value are minimized in the calculation of the TSI). The derived TSI represents an accurate assessment of the water quality 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 3**. 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 discussion is included in each of the lake summaries as necessary.

Table 3. Lake Trophic State Categories

Trophic State	Carlson TSI Value	Trophic Description
Oligotrophic	$\leq$ 40	Low primary productivity and/or low nutrient levels
Mesotrophic	41-50	Moderate primary productivity with moderate nutrient levels
Eutrophic	51-60	High primary productivity and nutrient rich
Hypereutrophic	$\geq$ 60	Excessive primary productivity and excessive nutrients

Lake Monitoring Results & Discussion

Lake-wide annual average of the chlorophyll-a values were calculated for each lake and used in the final calculation of the TSI. A summary table is included (**Table 4**) to present the number of lakes and appropriate surface acre size for each of the four trophic categories in 2018-2019 as well as the percentages of the total.

Table 4. Summary of Lake Trophic Status Results

Trophic State	Number of Lakes	% of Total Lakes	Surface Area (Acres)	% of Total Surface Acres
Oligotrophic	0	0	0	0
Mesotrophic	8	20	37,360	26
Eutrophic	20	50	48,406	34
Hypereutrophic	12	30	55,680	39
Totals	40	100	141,446	100

As shown in **Table 4**, twelve lakes were hypereutrophic, twenty were eutrophic, eight were mesotrophic, and none were oligotrophic. Of the total 141,446 surface acres sampled, 55,680 were classified hypereutrophic, 48,406 were classified as eutrophic, 37,360 were classified as mesotrophic and zero acres were classified as oligotrophic. TSI results, county, surface area, and volume for lakes sampled in 2018-2019 are listed in **Table 5**.

Table 5. List of Lakes Sampled in Sample Year 2018-2019

Lakes	County	Surface Acres	Capacity (acre-ft)	TSI	Carlson's Trophic Status	Threats or Impairments
Bluestem	Osage	803	17,000	46	Mesotrophic	Turbidity
Canton	Blaine	8,045	111,310	65	Hypereutrophic	Turbidity
Claremore	Rogers	411	7,900	66	Hypereutrophic	Chlor-a
Crowder	Washita	181	2,094	71	Hypereutrophic	Turbidity, Chlor-a
Duncan	Stephens	199	7,200	53	Eutrophic	
Ellsworth	Comanche	5,295	95,200	51	Eutrophic	Turbidity, Chlor-a
Elmore City	Garvin	69	1,554	55	Eutrophic	Dissolved Oxygen
Fort Cobb	Caddo	3,822	80,010	66	Hypereutrophic	Chlor-a
Great Salt Plains	Alfalfa	8,292	31,240	74	Hypereutrophic	Turbidity
Greenleaf	Muskogee	704	14,720	59	Eutrophic	Turbidity, Chlor-a
Hauani	Marshall	218	3,000	44	Mesotrophic	Turbidity
Henryetta	Okmulgee	505	6,600	48	Mesotrophic	Turbidity, Metals
Hudson (1-4)	Mayes	9,850	200,300	59	Eutrophic	
Hudson (5-8)				60	Eutrophic	
Hulah	Osage	3,078	31,160	58	Eutrophic	Turbidity
Humphreys	Stephens	780	14,041	59	Eutrophic	Chlor-a
Keystone (1,2)	Tulsa	23,696	557,600	57	Eutrophic	Turbidity
Keystone (10-12)				66	Hypereutrophic	Turbidity
Keystone (3-5)				58	Eutrophic	Turbidity
Keystone (6-9)				63	Hypereutrophic	Turbidity
Konawa	Seminole	1,321	23,000	58	Eutrophic	
Lawtonka	Comanche	2,368	56,574	62	Hypereutrophic	Chlor-a
Lloyd Church	Latimer	171	3,060	47	Mesotrophic	Turbidity, pH
McMurtry	Noble	1,193	19,733	51	Eutrophic	Turbidity
Meeker	Lincoln	233	1,818	64	Hypereutrophic	Turbidity
Murray	Love	5,458	153,250	41	Mesotrophic	Dissolved Oxygen
Okemah	Okfuskee	704	13,100	52	Eutrophic	
Okmulgee	Okmulgee	629	14,170	53	Eutrophic	
Oologah	Rogers	29,262	553,400	45	Mesotrophic	Turbidity, Dissolved Oxygen
Overholser	Oklahoma	1,548	15,000	67	Hypereutrophic	Turbidity, Sulfates
Pine Creek	McCurtain	4,729	53,750	52	Eutrophic	pH, Dissolved Oxygen
Raymond Gary	Choctaw	273	1,681	62	Hypereutrophic	
RC Longmire	Garvin	919	13,162	58	Eutrophic	
Sardis	Pushmataha	14,556	274,330	52	Eutrophic	Turbidity, pH

Shawnee Twin #1	Pottowatomie	907	22,600	52	Eutrophic	Turbidity
Shawnee Twin #2	Pottowatomie	474	11,400	57	Eutrophic	Turbidity
Spavinaw	Mayes	1,580	38,000	59	Eutrophic	Dissolved Oxygen, Chlor-a
Sportsman	Seminole	365	5,349	44	Mesotrophic	Turbidity
Stroud	Creek	578	8,800	50	Mesotrophic	
Taylor	Grady	195	1,877	69	Hypereutrophic	Turbidity
Waxhoma	Osage	114	2,100	52	Eutrophic	
Webbers Falls	Muskogee	6,616	170,100	61	Hypereutrophic	Turbidity, Enterro/E.Coli
Wes Watkins	Pottowatomie	1,132	14,065	58	Eutrophic	
Wetumka	Hughes	173	1,839	55	Eutrophic	Enterro/E.Coli

The beneficial use support determinations for the lakes sampled were determined following guidelines outlined in the USAP promulgated into OAC 785-46: Subchapter 15[2]. 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 currently approved 303(d) list.

Results of Lakes Sampling Efforts

For the 2018-2019 sample year, OWRB staff collected data from 40 lakes on a quarterly basis, beginning in October of 2018 and concluding the following September. Results of the sampling efforts are summarized below.

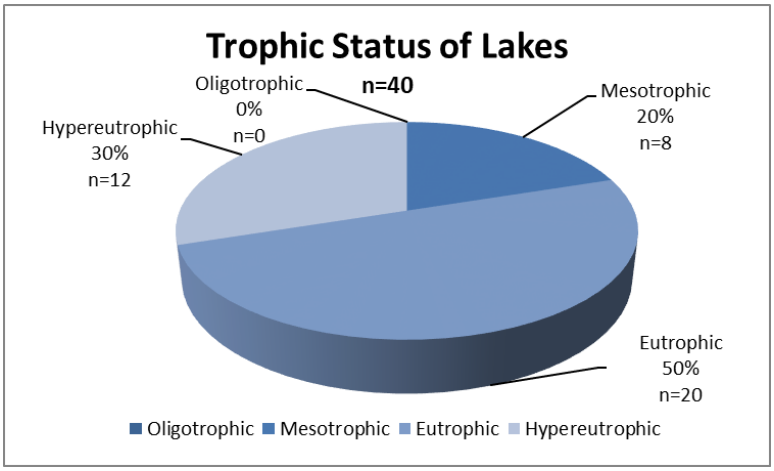


Figure 3. Trophic Status of Lakes for Sample Year 2018-1019

Figure 3. Trophic Status of Lakes for Sample Year 2018-1019 shows 30% of lakes sampled were determined to have serious water quality nutrient concerns based upon their classification as

[2] http://www.owrb.ok.gov/rules/pdf/current/Ch46.pdf

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 affected 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. Thirty-four percent of 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 less than hypereutrophic waters. 50% of lakes sampled were classified as Eutrophic. Mesotrophic waters have a smaller potential for beneficial use impairments and overall are representative of good water quality with low to moderate levels of nutrients, and productivity. Of the lakes sampled, 20% were classified as Mesotrophic. Oligotrophic waters have overly low levels of primary productivity and usually low concentrations of nutrient constituents. In Oklahoma, oligotrophic waters are either exceptionally clear with little nutrient inputs and genuinely good water quality conditions, or quite turbid with poor water clarity due to the absence of sufficient ambient light, inhibiting lake productivity. For sample year 2019, no lakes were classified as oligotrophic. Based on the results for trophic state index calculations, 80% of the waters sampled were exhibiting high to excessive levels of primary productivity and nutrient rich conditions, characteristic of eutrophic and hypereutrophic waterbodies.

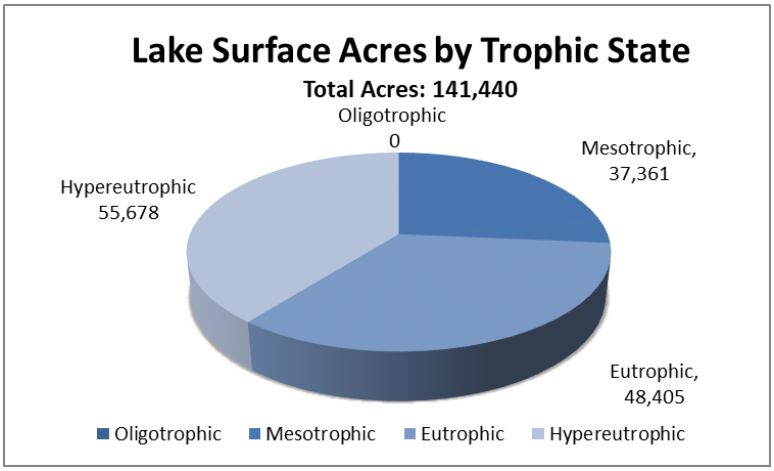


Figure 4. Lake Surface Acres by Trophic Status for Lakes Sampled in 2018-2019

The distribution changes somewhat when accounting for lake surface acres. Results in **Figure 4** and **Figure 5** differ slightly from than **Figure 3**, indicating more large lakes were classified as eutrophic than those designated as mesotrophic and hypereutrophic. Lake trophic status, when broken out by lake surface acres, finds 34% of all surface acres sampled were eutrophic, 27% mesotrophic, 39% hypereutrophic, and 0% oligotrophic. In general, larger lakes in the state have more extensive watersheds and are generally deeper than smaller lakes, which increases the likelihood of beneficial use impairments being present since such a larger surface area is available.

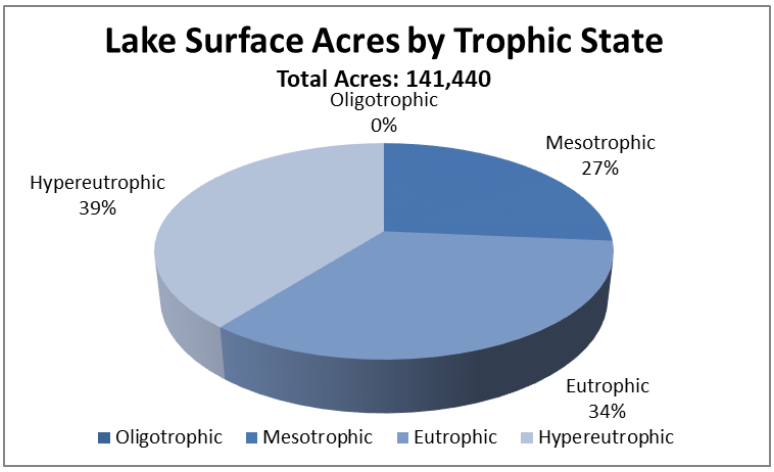


Figure 5. Lake Surface Acres % by Trophic Status for Lakes Sampled in 2018-2019

During stratification, larger/deeper lakes have a greater portion of water column that becomes anoxic for longer periods of time and can increases the potential for nutrient release from sediments. 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 are currently identified by the OWRB as Nutrient-Limited Watersheds (NLW) in WQS. Efforts should be taken to definitively determine if NLW waters are meeting their designated uses through initiation of a nutrient impairment study to determine the presence or absence of nutrient impairments in our NLW lakes. NLW are lakes with a TSI ≥ 62 based on Carlson's classification system using chlorophyll-a as the trophic state indicator.

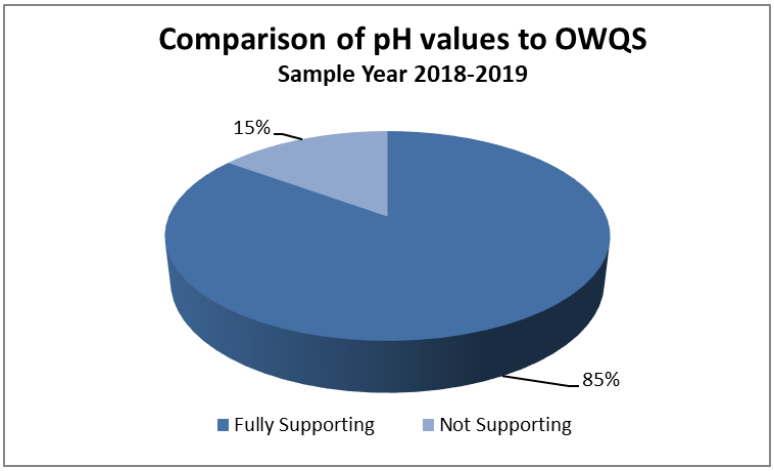


Figure 6. Comparison of pH values to OWQS for Sample Year 2018-2019

pH was collected as an in-situ parameter in the profile data using a multi-parameter sonde. All recorded pH values were compared to WQS for pH between 6.5 to 9 units, listed in OAC 785:45-5[3]. 34 of the 40

[3] http://www.owrb.ok.gov/rules/pdf/current/Ch45.pdf

lakes (85%) sampled in the 2018-2019 sample year were supporting the Fish & Wildlife Propagation (FWP) beneficial use based on their pH values (**Figure 6**).

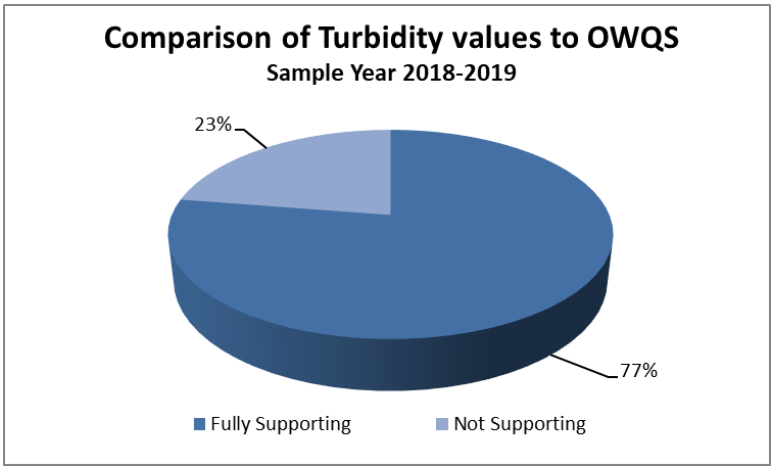


Figure 7. Comparison of Turbidity Values to OWQS for Sample Year 2018-2019

Turbidity, reported in Nephelometric turbidity units (NTU), was measured via HACH turbidimeter for all sampled sites to identify lakes exceeding 25 NTU, as described in WQS. Of the 40 lakes sampled, 9 (23%) were not supporting their FWP beneficial use, while the remaining 31 (77%) were fully supporting based on turbidity values (**Figure 7**).

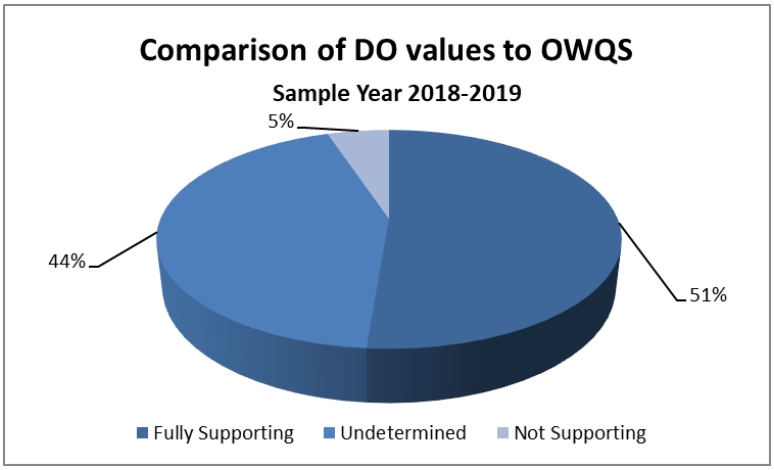


Figure 8. Comparison of Dissolved Oxygen Values to OWQS for Sample Year 2018-2019

Levels of dissolved oxygen (D.O.) were analyzed from vertical profile data to determine if anoxic conditions were present and if lakes were meeting the FWP beneficial use. The USAP lists D.O. violations as values below 2.0 mg/L in more than 70% of the entire water column, undetermined if between 50% and 70% and fully supporting if 50% or less of the water column is below 2.0 mg/L D.O.. Of the 40 lakes sampled, 51% of lakes were supporting the FWP beneficial use based on anoxic conditions, primarily in the summer season (**Figure 8**).

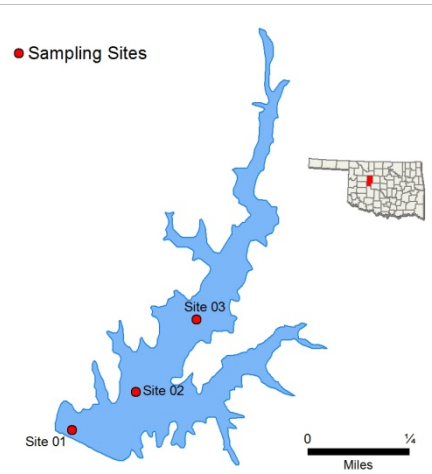
Bacteria samples were not collected during the recreation season of May through September for the current sample year.

When OWRB began collecting water quality data on a quarterly basis in 1998, datasets greatly improved the amount of information available to resource managers. Lakes identified as hypereutrophic should be sampled more frequently than quarterly, especially during warmer months. Lakes listed as NLW's 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 the Integrated Water Quality Report (EPA's 303(d)) that is updated every two years.

Each of the following pages represents a summary of the conditions for a given sample year.

American Horse

Sample Period	Times Visited	Sampling Sites
October 2007 - July 2008	4	5



General

Location	Blaine County	Click map for site data
Impoundment	1966	
Area	100 acres	
Capacity	2,200 acre-feet	
Purposes	Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	13 nephelometric turbidity units (NTU)	Lake-wide average
	Average True Color	54 units	25% of values > OWQS of 70
	Average Secchi Disk Depth	118 cm	
	Water Clarity Rating	good	
	Trophic State Index	38	Previous value = 49
	Trophic Class	oligotrophic	
Profile	Salinity	0.07 - 0.13 ppt	
	Specific Conductivity	151.5 - 274.7 µS/cm	
	pH	7.01 - 8.08 pH units	
	Oxidation-Reduction Potential	-4 to 551 mV	
	Dissolved Oxygen	Up to 60% of water column < 2 mg/L in July	
Nutrients	Surface Total Nitrogen	0.38 mg/L to 1.07 mg/L	
	Surface Total Phosphorus	0.018 mg/L to 0.053 mg/L	
	Nitrogen to Phosphorus Ratio	19:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NEI	NEI							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes

*Standards revision, true color is for permitting purposes only.

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

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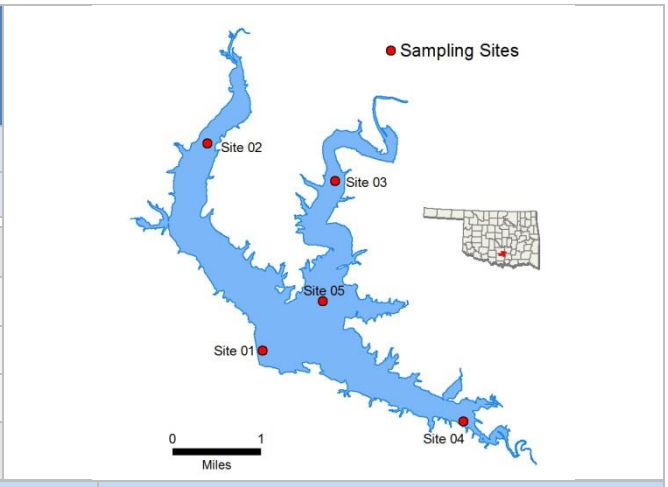
Arbuckle

Sample Period	Times Visited	Sampling Sites
October 2015-July 2016	4	5



General

Location	Murray County	Click map for site data
Impoundment	1967	
Area	2,350 acres	
Capacity	72,400 acre-feet	
Purposes	Water Supply, Flood Control, Fish and Wildlife, and Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	4 NTU	0% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	108 cm	
	Water Clarity Rating	Excellent	
	Chlorophyll-a	14.4 mg/m3	
	Trophic State Index	57	Previous value = 57
	Trophic Class	Eutrophic	
Profile	Salinity	0.11-0.28 ppt	
	Specific Conductivity	229.1-566.2 µS/cm	
	pH	6.82-8.36 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	-60-466.5 mV	
	Dissolved Oxygen	Up to 71% of water column < 2.0 mg/L in Summer	
Nutrients	Surface Total Nitrogen	0.46 mg/L to 0.63 mg/L	
	Surface Total Phosphorus	0.018 mg/L to 0.029 mg/L	
	Nitrogen to Phosphorus Ratio	22:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E.coli	Chlor-a
Fish & Wildlife Propagation	S	S	NS	NEI							
Aesthetics					S	*					
Agriculture							*	*	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply				NEI							

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Notes

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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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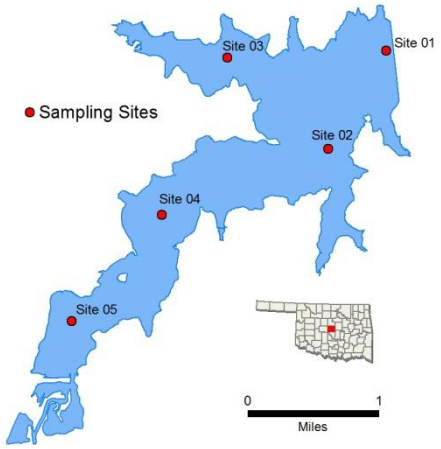
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Arcadia

Sample Period	Times Visited	Sampling Sites
December 2014 - August 2015	4	5



General

Location	Oklahoma County	Click map for site data
Impoundment	1986	
Area	1,820 acres	
Capacity	27,520 acre-feet	
Purposes	Water Supply, Flood Control, Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	7 NTU	0% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	119 cm	
	Water Clarity Rating	Good	
	Chlorophyll-a	25 mg/m3	
	Trophic State Index	62	Previous TSI = 59
	Trophic Class	Hypereutrophic	
Profile	Salinity	0.18 – 0.24 ppt	
	Specific Conductivity	375.2 – 497.4 µS/cm	
	pH	7.04 – 9.00 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	-1.5 to 371.6mV	
	Dissolved Oxygen	Up to 47% of water column < 2 mg/L in Summer	
Nutrients	Surface Total Nitrogen	0.72 mg/L to 1.01 mg/L	
	Surface Total Phosphorus	0.030 mg/L to 0.141 mg/L	
	Nitrogen to Phosphorus Ratio	16:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	S							
Aesthetics					S	S					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											NS

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Notes

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E. coli = Escherichia coli
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Chlor-a = Chlorophyll-a
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µS/cm = microsiemens/cm
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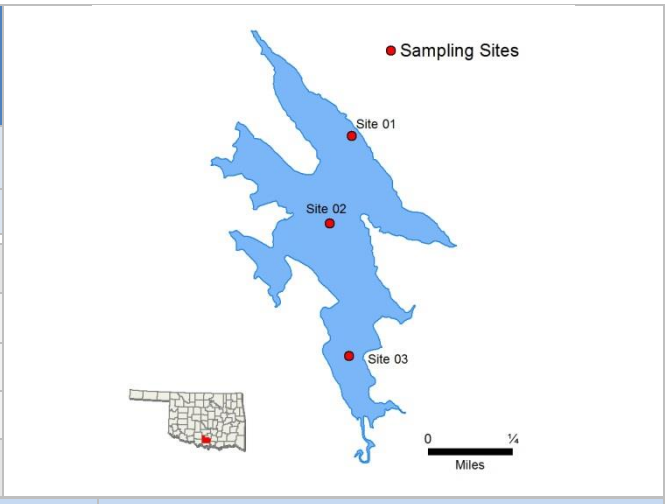
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Ardmore City

Sample Period	Times Visited	Sampling Sites
October 2006 - August 2007	4	5



General

Location	Carter County	Click map for site data
Impoundment	1910	
Area	142 acres	
Capacity	600 acre-feet	
Purposes	Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	10 NTU	100% of values < OWQS of 25 NTU
	Average True Color	25 units	100% of values < OWQS of 70
	Average Secchi Disk Depth	106 cm	
	Water Clarity Rating	excellent	
	Trophic State Index	52	
	Trophic Class	eutrophic	
Profile	Salinity	0.13 – 0.18 ppt	
	Specific Conductivity	278.6 – 365 µS/cm	
	pH	7.16 - 8.85 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	48 to 436 mV	
	Dissolved Oxygen	Up to 63% of water column < 2 mg/L in August	
Nutrients	Surface Total Nitrogen	0.32 mg/L to 0.62 mg/L	
	Surface Total Phosphorus	0.009 mg/L to 0.035 mg/L	
	Nitrogen to Phosphorus Ratio	22:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NEI	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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Notes

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Chlor-a = Chlorophyll-a
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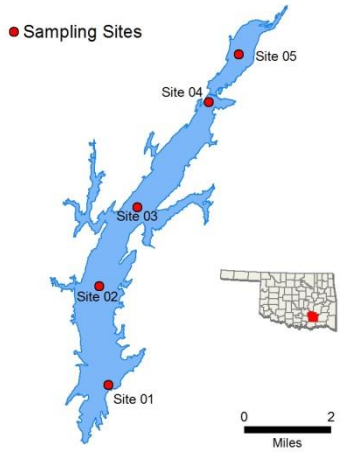
Atoka

Sample Period	Times Visited	Sampling Sites
November 2016 – August 2017	3	5



General

Location	Atoka County	Click map for site data
Impoundment	1964	
Area	5,700 acres	
Capacity	125,000 acre-feet	
Purposes	Water Supply, Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	60 NTU	73% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	38 cm	
	Water Clarity Rating	Poor	
	Chlorophyll-a	10.47 mg/m3	
	Trophic State Index	54	Previous Value = 52
	Trophic Class	Eutrophic	
Profile	Salinity	0.03 – 0.04 ppt	
	Specific Conductivity	62.1 – 115.3 µS/cm	
	pH	6.32 – 7.74 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	219 to 585.5 mV	
	Dissolved Oxygen	Up to 37% of water column <2 mg/L in Summer	
Nutrients	Surface Total Nitrogen	0.41 mg/L to 1.28 mg/L	
	Surface Total Phosphorus	0.040 mg/L to 0.160 mg/L	
	Nitrogen to Phosphorus Ratio	9:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	S							
Aesthetics					S	*					
Agriculture							N/A	N/A	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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Notes

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E. coli = Escherichia coli
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mV = millivolts
Chlor-a = Chlorophyll-a
mg/L = milligrams per liter
µS/cm = microsiemens/cm
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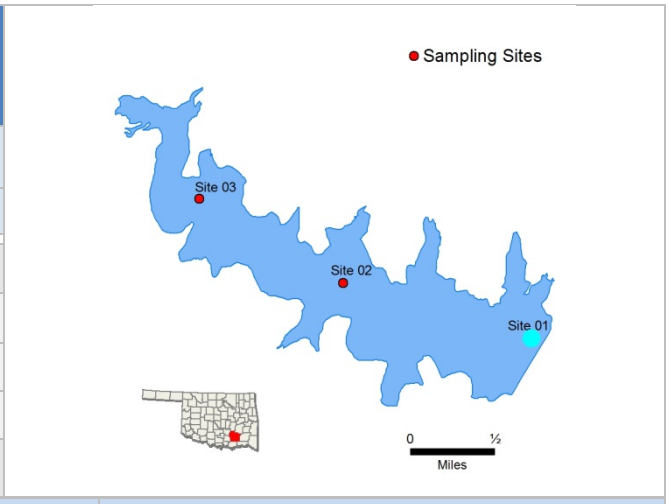
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Bell Cow

Sample Period	Times Visited	Sampling Sites
November 2016 - August 2017	4	3



General

Location	Lincoln County	Click map for site data
Impoundment	1990	
Area	1,153 acres	
Capacity	15,613 acre-feet	
Purposes	Water Supply, Flood Control, Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	14 NTU	8% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	67 cm	
	Water Clarity Rating	Average	
	Chlorophyll-a	19.16 mg/m3	
	Trophic State Index	60	Previous Value = 61
	Trophic Class	Eutrophic	
Profile	Salinity	0.14 - 0.19 ppt	
	Specific Conductivity	293.2 – 384.9 µS/cm	
	pH	7.03 - 8.55 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	41 to 428.8 mV	
	Dissolved Oxygen	Up to 46% of water column < 2 mg/L in Summer	
Nutrients	Surface Total Nitrogen	0.85 mg/L to 1.04 mg/L	
	Surface Total Phosphorus	0.024 mg/L to 0.046 mg/L	
	Nitrogen to Phosphorus Ratio	29:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	NEI	S							
Aesthetics					S	*					
Agriculture							N/A	N/A	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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Notes

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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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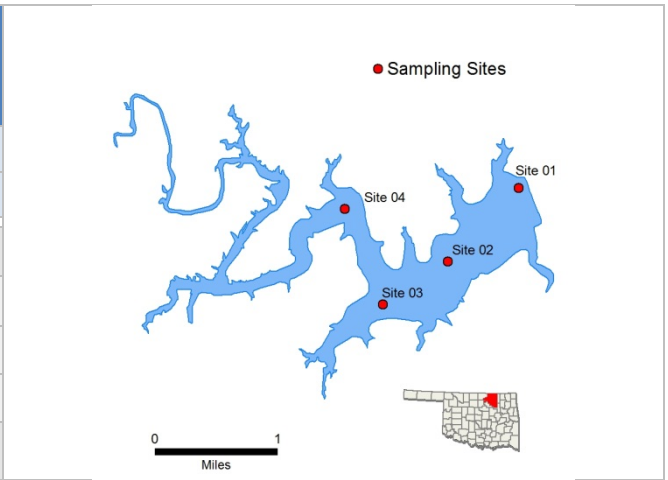
Birch

Sample Period	Times Visited	Sampling Sites
November 2015-August 2016	4	4



General

Location	Osage County
Impoundment	1977
Area	1,137 acres
Capacity	19,200 acre-feet
Purposes	Water Supply, Recreation, Flood Control, Water Quality Control and Fish and Wildlife

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	8 NTU	100% of values < OWQS of 25 NTU
	Average Secchi Disk Depth	62 cm	
	Water Clarity Rating	Good	
	Chlorophyll-a	17.8 mg/m3	
	Trophic State Index	59	Previous value = 49
	Trophic Class	Eutrophic	
Profile	Salinity	0.08 – 0.12 ppt	
	Specific Conductivity	182.5 – 249.4 µS/cm	
	pH	6.17 – 8.43 pH units	
	Oxidation-Reduction Potential	26.8 to 375.7 mV	
	Dissolved Oxygen	Up to 57% of water column < 2.0 mg/L in summer	
Nutrients	Surface Total Nitrogen	0.68 mg/L to 0.81 mg/L	
	Surface Total Phosphorus	0.018 mg/L to 0.026 mg/L	
	Nitrogen to Phosphorus Ratio	35:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	NS	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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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

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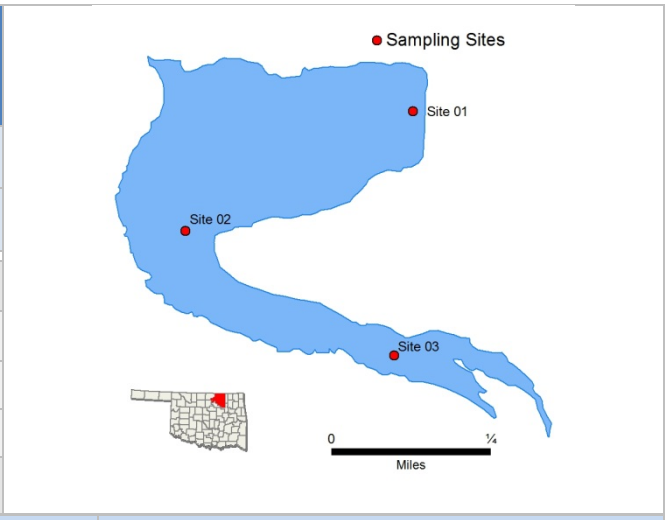
Bixhoma

Sample Period	Times Visited	Sampling Sites
December 2014 – September 2015	4	3



General

Location	Wagoner County	Click map for site data
Impoundment	1965	
Area	110 acres	
Capacity	3,130 acre-feet	
Purposes	Water Supply, Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	4 NTU	0% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	146 cm	
	Water Clarity Rating	Excellent	
	Chlorophyll-a	7 mg/m3	
	Trophic State Index	50	Previous TSI = 45
	Trophic Class	Mesotrophic	
Profile	Salinity	0.02 – 0.11 ppt	
	Specific Conductivity	48.5 – 225 µS/cm	
	pH	5.85 – 8.31 pH units	9.7% values < 6.5 pH units
	Oxidation-Reduction Potential	47.5 – 567.8 mV	
	Dissolved Oxygen	Up to 38% of water column < 2 mg/L in September	
Nutrients	Surface Total Nitrogen	0.31 mg/L to 0.82 mg/L	
	Surface Total Phosphorus	0.005 mg/L to 0.038 mg/L	
	Nitrogen to Phosphorus Ratio	28:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	NS	NS								
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

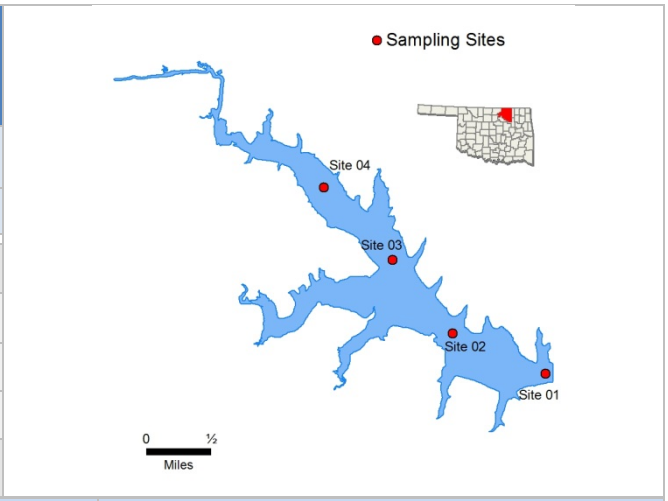
Notes

*Standards revision, true color is for permitting purposes only.

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

Bluestem

Sample Period	Times Visited	Sampling Sites
November 2018 – August 2019	4	4



General

Location	Osage County	Click map for site data
Impoundment	1958	
Area	762 acres	
Capacity	17,000 acre-feet	
Purposes	Water Supply, Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	20 NTU	14% of values > OWQS of 25 NTU (n=14)
	Average Secchi Disk Depth	58 cm	
	Water Clarity Rating	Average	
	Chlorophyll-a	4.62 mg/m3	
	Trophic State Index	46	Previous value = 48
	Trophic Class	Mesotrophic	
Profile	Salinity	0.7 – 0.16 ppt	
	Specific Conductivity	148.1 – 345.5 µS/cm	
	pH	7.15 – 8.40 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	92.5 – 480.9 mV	
	Dissolved Oxygen	Up to 67% of water column < 2.0 mg/L in August	
Nutrients	Surface Total Nitrogen	0.42 mg/L to 0.72 mg/L	
	Surface Total Phosphorus	0.023 mg/L to 0.080 mg/L	
	Nitrogen to Phosphorus Ratio	13:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En terro.& E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	NEI	*							
Aesthetics					S	*					
Agriculture							N/A	N/A	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes

*Standards revision, true color is for permitting purposes only.

* 50-70% range is undetermined for DO.

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

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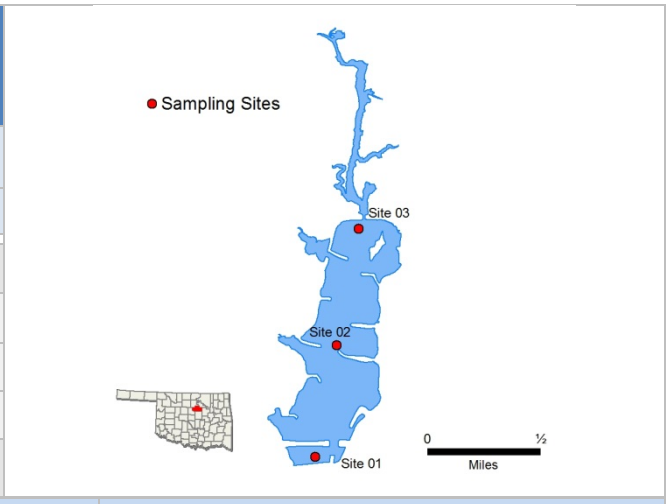
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Boomer

Sample Period	Times Visited	Sampling Sites
October 2014 – July 2015	4	3



General

Location	Payne County	Click map for site data
Impoundment	1932	
Area	260 acres	
Capacity	3,200 acre-feet	
Purposes	Cooling Water and Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	15 NTU	0% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	37 cm	
	Water Clarity Rating	Average	
	Chlorophyll-a	31mg/m3	
	Trophic State Index	64	Previous value = 59
	Trophic Class	Hypereutrophic	
Profile	Salinity	0.18 - 0.25 ppt	
	Specific Conductivity	377.2 – 516 µS/cm	
	pH	7.03 - 8.53 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	82.1 to 440.4 mV	
	Dissolved Oxygen	Up to 43% of water column < 2.0 mg/L in March	
Nutrients	Surface Total Nitrogen	0.95 mg/L to 1.52 mg/L	
	Surface Total Phosphorus	0.041 mg/L to 0.074 mg/L	
	Nitrogen to Phosphorus Ratio	21:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	NS	*							
Aesthetics					S	*					
Agriculture							*	*	S		
Primary Body Contact Recreation										S	NS
Public & Private Water Supply											

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

Notes *Standards revision, true color is for permitting purposes only.

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

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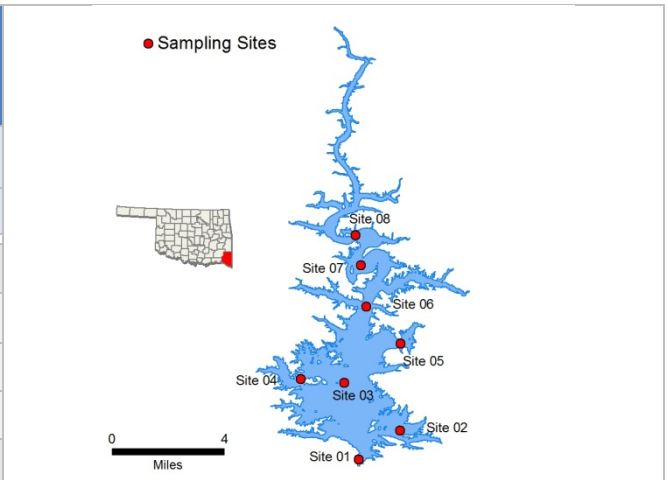
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Broken Bow

Sample Period	Times Visited	Sampling Sites
October 2015 – August 2016	4	8



General

Location	McCurtain County
Impoundment	1970
Area	14,200 acres
Capacity	918,070 acre-feet
Purposes	Flood Control, Hydropower, Water Supply, Recreation, Fish & Wildlife

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	2 NTU	0% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	228 cm	
	Water Clarity Rating	Excellent	
	Chlorophyll-a	5 mg/m3	
	Trophic State Index	46	Previous value = 45
	Trophic Class	Mesotrophic	
Profile	Salinity	0.01 – 0.05 ppt	
	Specific Conductivity	29.6 – 101.1 µS/cm	
	pH	5.49 – 8.05 pH units	78% of values < 6.5 pH units
	Oxidation-Reduction Potential	180 – 491.6 mV	
	Dissolved Oxygen	Up to 74% of water column < 2.0 mg/L in the summer	
Nutrients	Surface Total Nitrogen	0.13 mg/L to 0.44 mg/L	
	Surface Total Phosphorus	0.009 mg/L to 0.022 mg/L	
	Nitrogen to Phosphorus Ratio	25:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	S	NS*	NS	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes

*Slightly acidic conditions are not unusual in this part of the state due to relatively low soil pH and lack of soluble bedrock. *Standards revision, true color is for permitting purposes only.

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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

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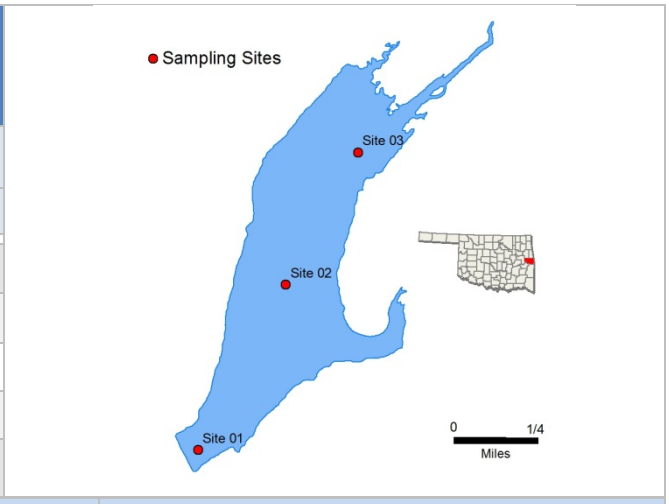
Brushy Creek

Sample Period	Times Visited	Sampling Sites
December 2014 – September 2015	4	3



General

Location	Sequoyah County	Click map for site data
Impoundment	1964	
Area	358 acres	
Capacity	3,258 acre-feet	
Purposes	Flood Control and Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	8 NTU	0% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	79 cm	
	Water Clarity Rating	Good	
	Chlorophyll-a	13 mg/m3	
	Trophic State Index	56	Previous value = 53
	Trophic Class	Eutrophic	
Profile	Salinity	0.02 - 0.09 ppt	
	Specific Conductivity	52.3 – 179.6 µS/cm	
	pH	5.86 - 8.53 pH units	11 (11.6%) values < 6.5 units
	Oxidation-Reduction Potential	49 to 486.4 mV	
	Dissolved Oxygen	Up to 67% of water column < 2 mg/L in June	
Nutrients	Surface Total Nitrogen	0.42 mg/L to 0.89 mg/L	
	Surface Total Phosphorus	0.008 mg/L to 0.038 mg/L	
	Nitrogen to Phosphorus Ratio	21:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	NS	NEI	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											NS

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NS = Not Supporting
NEI = Not Enough Information

Notes

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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

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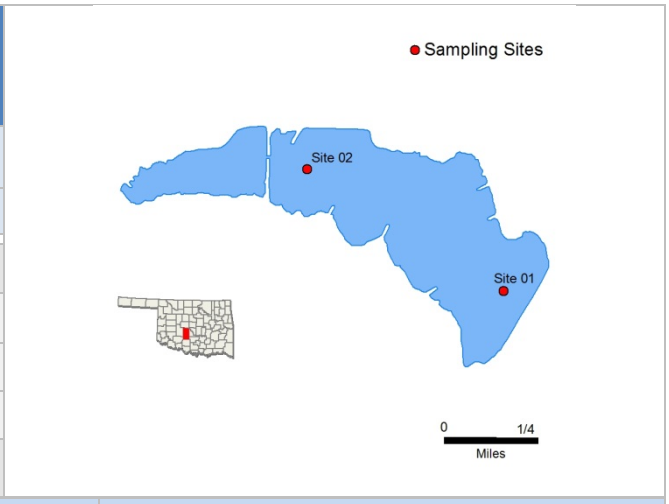
Burtschi

Sample Period	Times Visited	Sampling Sites
November 2005 - August 2006	4	5



General

Location	Grady County	Click map for site data
Impoundment	1958	
Area	180 acres	
Capacity	2,140 acre-feet	
Purposes	Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	11 NTU	100% of values < OWQS of 25 NTU
	Average True Color	18 units	100% of values < OWQS of 70
	Average Secchi Disk Depth	72 cm	
	Water Clarity Rating	good	
	Trophic State Index	63	
	Trophic Class	hypertrophic	
Profile	Salinity	0.53 – 0.67 ppt	
	Specific Conductivity	1011 – 1273 µS/cm	
	pH	7.19 – 10.74 pH units	16% of values were > 9 pH units
	Oxidation-Reduction Potential	42 - 428 mV	
	Dissolved Oxygen	Up to 38% of water column < 2 mg/L in August	
Nutrients	Surface Total Nitrogen	0.92 mg/L to 1.82 mg/L	
	Surface Total Phosphorus	0.027 mg/L to 0.109 mg/L	
	Nitrogen to Phosphorus Ratio	24:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	S								
Aesthetics					S	S					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes

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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

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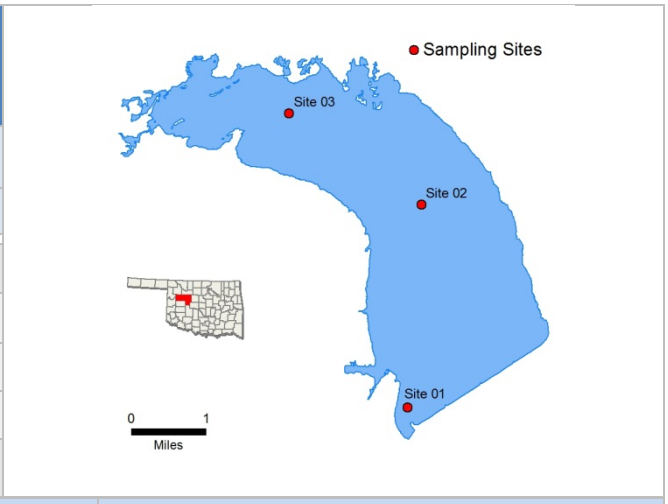
Canton

Sample Period	Times Visited	Sampling Sites
October 2018 - July 2019	4	3



General

Location	Blaine County	Click map for site data
Impoundment	1948	
Area	7,910 acres	
Capacity	111,310 acre-feet	
Purposes	Flood Control, Water Supply, Irrigation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	19 NTU	25% of values > OWQS of 25 NTU (n=12)
	Average Secchi Disk Depth	71 cm	
	Water Clarity Rating	Poor	
	Chlorophyll-a	32.09 mg/m3	
	Trophic State Index	65	Previous value = 56
	Trophic Class	Hypereutrophic	
Profile	Salinity	0.65 – 0.96 ppt	
	Specific Conductivity	1321 – 1886 µS/cm	
	pH	7.13 – 8.38 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	-236.2 – 436.4 mV	
	Dissolved Oxygen	74% of recorded values below 2 mg/L during July	
Nutrients	Surface Total Nitrogen	0.81 mg/L to 1.39 mg/L	
	Surface Total Phosphorus	0.047 mg/L to 0.095 mg/L	
	Nitrogen to Phosphorus Ratio	16:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes

*Standards revision, true color is for permitting purposes only.

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

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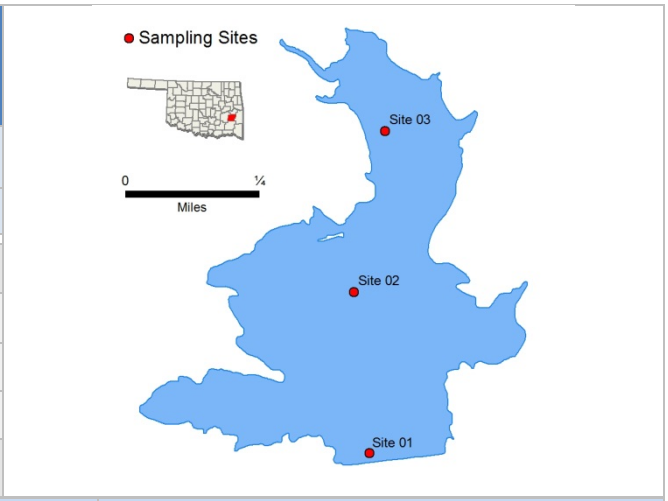
Carl Albert

Sample Period	Times Visited	Sampling Sites
November 2016 - August 2017	4	5



General

Location	Latimer County	Click map for site data
Impoundment	1964	
Area	183 acres	
Capacity	2,739 acre-feet	
Purposes	Water Supply, Flood Control, and Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	5 NTU	All values < 25 NTU
	Average Secchi Disk Depth	125 cm	
	Water Clarity Rating	Excellent	
	Chlorophyll-a	4.25 mg/m3	
	Trophic State Index	45	Previous value = 41
	Trophic Class	Mesotrophic	
Profile	Salinity	0.02 - 0.06 ppt	
	Specific Conductivity	40.9 - 136 µS/cm	
	pH	5.99 - 7.49 pH units	16% of values <6.5 units
	Oxidation-Reduction Potential	86.5 to 594 mV	
	Dissolved Oxygen	Up to 61% of water column < 2 mg/L in August	Occurred at site 1, the dam
Nutrients	Surface Total Nitrogen	0.32 mg/L to 0.45 mg/L	
	Surface Total Phosphorus	0.014 mg/L to 0.023 mg/L	
	Nitrogen to Phosphorus Ratio	22:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	NS	NEI	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes

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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

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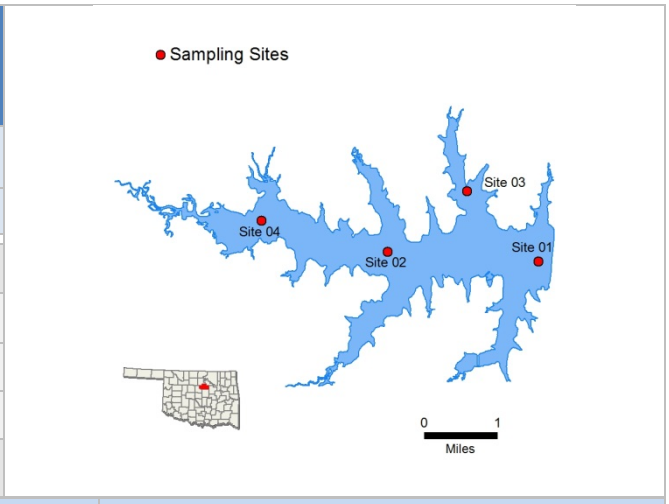
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Carl Blackwell

Sample Period	Times Visited	Sampling Sites
December 2015 – September 2016	4	5



General

Location	Payne County	Click map for site data
Impoundment	1937	
Area	3,370 acres	
Capacity	61,500 acre-feet	
Purposes	Water Supply and Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	25 NTU	63% of values > 25 NTU
	Average Secchi Disk Depth	39 cm	
	Water Clarity Rating	Average	
	Chlorophyll-a	15.4 mg/m3	
	Trophic State Index	57	Previous value = 61
	Trophic Class	Eutrophic	
Profile	Salinity	0.18 – 0.19 ppt	
	Specific Conductivity	367.5 – 398.5 µS/cm	
	pH	7.72 – 8.45 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	193 – 393.3 mV	
	Dissolved Oxygen		All readings > 2.0 mg/L
Nutrients	Surface Total Nitrogen	0.84 mg/L to 092 mg/L	
	Surface Total Phosphorus	0.036 mg/L to 0.056 mg/L	
	Nitrogen to Phosphorus Ratio	22:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	NEI	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											NS

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

Notes

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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

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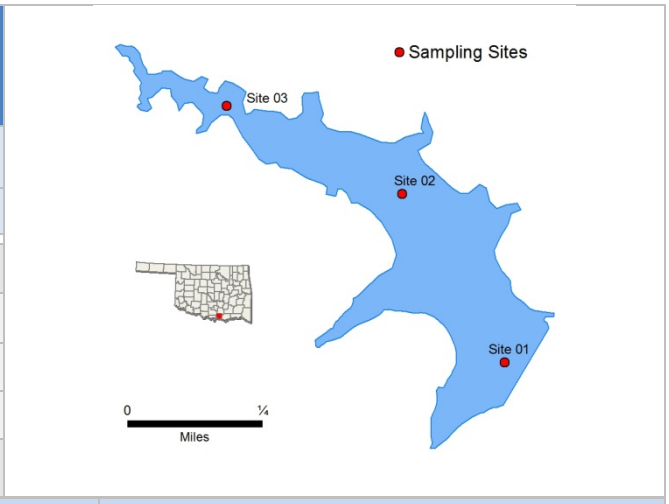
Carter

Sample Period	Times Visited	Sampling Sites
November 2007 - August 2008	4	5



General

Location	Marshall County	Click map for site data
Impoundment	1960	
Area	108 acres	
Capacity	990 acre-feet	
Purposes	Water Supply and Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	7 nephelometric turbidity units (NTU)	All values < 25 NTU
	Average True Color	25 units	All Values < OWQS of 70
	Average Secchi Disk Depth	121 cm	
	Water Clarity Rating	excellent	
	Trophic State Index	40	Previous value = 40
	Trophic Class	oligotrophic	
Profile	Salinity	0.10 - 0.20 ppt	
	Specific Conductivity	212 – 325 µS/cm	
	pH	6.98 – 8.33 pH units	Neutral to slightly alkaline
	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
Nutrients	Surface Total Nitrogen	0.41 mg/L to 0.54 mg/L	
	Surface Total Phosphorus	0.011 mg/L to 0.018 mg/L	
	Nitrogen to Phosphorus Ratio	37:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NEI	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes

*Standards revision, true color is for permitting purposes only.

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

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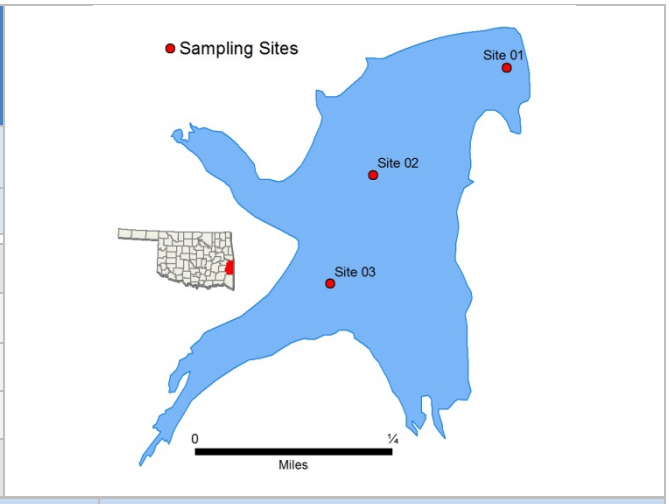
Cedar

Sample Period	Times Visited	Sampling Sites
November 2015 – Sept. 2016	4	5



General

Location	Le Flore County	Click map for site data
Impoundment	1937	
Area	78 acres	
Capacity	1,000 acre-feet	
Purposes	Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	7 NTU	100% of values < OWQS of 25 NTU
	Average Secchi Disk Depth	92 cm	
	Water Clarity Rating	Excellent	
	Chlorophyll-a	25.3 mg/m3	
	Trophic State Index	62	Previous Value=56
	Trophic Class	Hypereutrophic	
Profile	Salinity	0.01– 0.08 ppt	
	Specific Conductivity	31.7 – 170.4 µS/cm	
	pH	5.92 – 7.36 pH units	51.56% < 6.5
	Oxidation-Reduction Potential	-58.9 – 416.9 mV	
	Dissolved Oxygen	Up to 40% of water column < 2 mg/L in summer	
Nutrients	Surface Total Nitrogen	0.56 mg/L to 0.98 mg/L	
	Surface Total Phosphorus	0.023 mg/L to 0.043 mg/L	
	Nitrogen to Phosphorus Ratio	24:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NEI	NS	NS	S							
Aesthetics					S	*					
Agriculture							*	*	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes

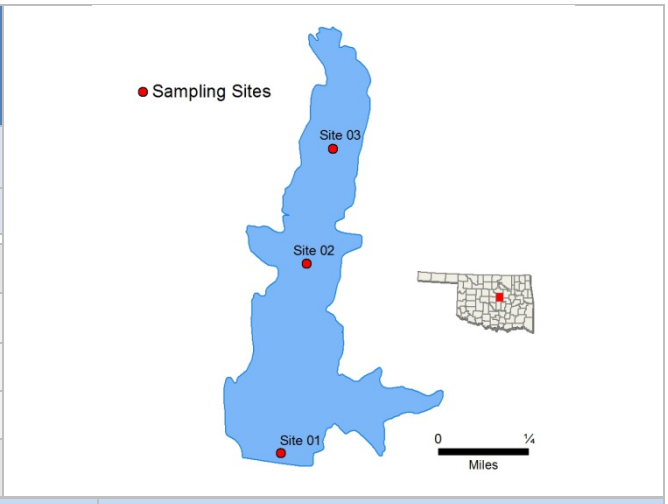
*Standards revision, true color is for permitting purposes only.

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

Chandler

Sample Period	Times Visited	Sampling Sites
November 2016 – August 2017	4	5



General

Location	Lincoln County	Click map for site data
Impoundment	1960	
Area	129 acres	
Capacity	2,778 acre-feet	
Purposes	Water Supply and Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	21 NTU	33% of values > 25 NTU
	Average Secchi Disk Depth	49 cm	
	Water Clarity Rating	Average	
	Chlorophyll-a	24.97 mg/m3	
	Trophic State Index	62	Previous value = 60
	Trophic Class	Eutrophic	
Profile	Salinity	0.14 - 0.20 ppt	
	Specific Conductivity	303.9 – 448.7 µS/cm	
	pH	6.73 – 8.83 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	50.4 to 420.8 mV	
	Dissolved Oxygen	Up to 54% of water column < 2 mg/L in August	At Site 3
Nutrients	Surface Total Nitrogen	0.88 mg/L to 1.08 mg/L	
	Surface Total Phosphorus	0.023 mg/L to 0.062 mg/L	
	Nitrogen to Phosphorus Ratio	24:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	NEI	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											NS

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

Notes

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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
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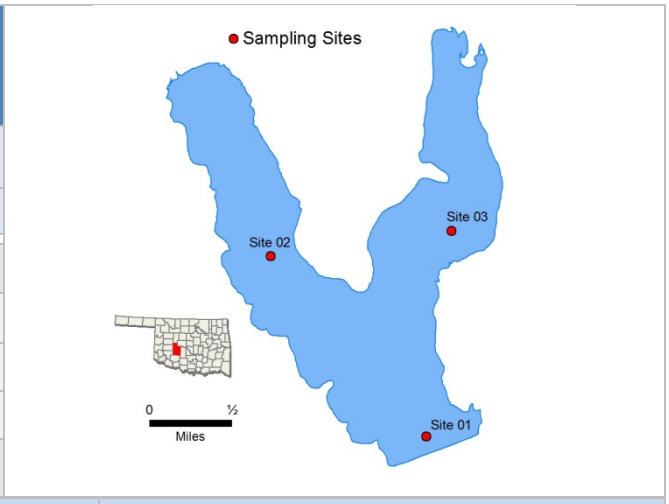
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Chickasha

Sample Period	Times Visited	Sampling Sites
October 2015 – August 2016	4	3



General

Location	Caddo County	Click map for site data
Impoundment	1958	
Area	820 acres	
Capacity	41,080 acre-feet	
Purposes	Water Supply, Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	13 NTU	17% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	35 cm	
	Water Clarity Rating	Fair	
	Chlorophyll-a	54.6 mg/m3	
	Trophic State Index	70	Previous Value=63
	Trophic Class	Hypereutrophic	
Profile	Salinity	1.28 – 1.37 ppt	
	Specific Conductivity	2493 – 2635.5 µS/cm	
	pH	7.82 – 8.48 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	263.6 to 494.9 mV	
	Dissolved Oxygen		All values recorded above 2.0 mg/L
Nutrients	Surface Total Nitrogen	1.58 mg/L to 1.71 mg/L	
	Surface Total Phosphorus	0.042 mg/L to 0.060 mg/L	
	Nitrogen to Phosphorus Ratio	34:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	S	S							
Aesthetics					NEI	S					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes

The lake is currently listed in the Oklahoma Water Quality Standards (WQS) as a Nutrient Limited Watershed (NLW). 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
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

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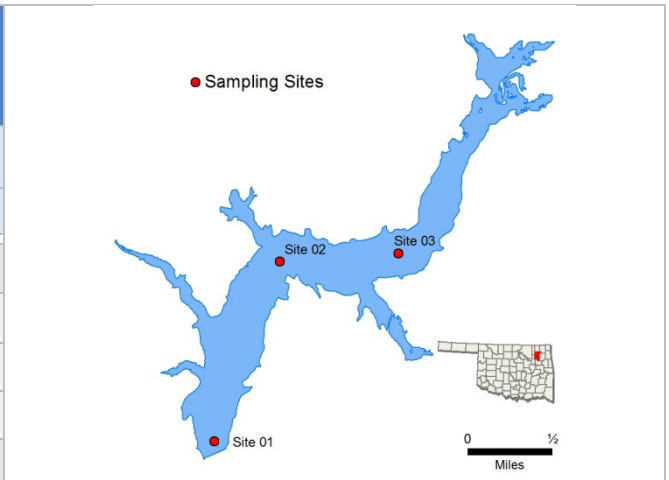
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Claremore

Sample Period	Times Visited	Sampling Sites
October 2018 – July 2019	4	3



General

Location	Rogers County	Click map for site data
Impoundment	1930	
Area	470 acres	
Capacity	7,900 acre-feet	
Purposes	Water Supply, Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	14 NTU	8% of values > OWQS of 25 NTU (n=12)
	Average Secchi Disk Depth	55 cm	
	Water Clarity Rating	Good	
	Chlorophyll-a	38.25 mg/m3	
	Trophic State Index	66	Previous value = 63
	Trophic Class	Hypereutrophic	
Profile	Salinity	0.08– 0.11 ppt	
	Specific Conductivity	181.9 – 238.9 µS/cm	
	pH	6.91 – 8.81 pH units	
	Oxidation-Reduction Potential	38.6 – 481.9 mV	
	Dissolved Oxygen	Up to 35% of water column < 2 mg/L in July	Occurred at site 1, the dam
Nutrients	Surface Total Nitrogen	0.86 mg/L to 1.20 mg/L	
	Surface Total Phosphorus	0.046 mg/L to 0.121 mg/L	
	Nitrogen to Phosphorus Ratio	14:1	Phosphorus Limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NEI	S							
Aesthetics					NEI**	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											NS

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

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

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

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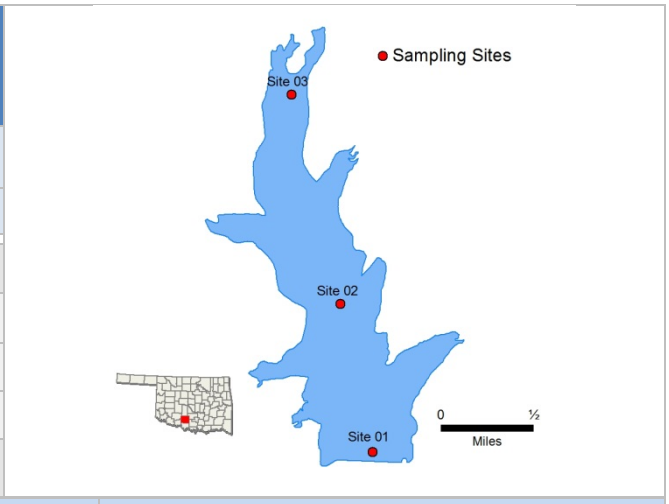
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Clear Creek

Sample Period	Times Visited	Sampling Sites
October 2015 – Sept. 2016	4	3



General

Location	Stephens County	Click map for site data
Impoundment	1948	
Area	722 acres	
Capacity	7,711 acre-feet	
Purposes	Water Supply, Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	7 NTU	100% of values < OWQS of 25 NTU
	Average Secchi Disk Depth	51 cm	
	Water Clarity Rating	Average	
	Chlorophyll-a	21.2 mg/m3	
	Trophic State Index	61	Previous Value=62
	Trophic Class	Hypereutrophic	
Profile	Salinity	0.29 – 0.42 ppt	
	Specific Conductivity	614.2 – 852.8 µS/cm	
	pH	7.17 – 8.26 pH units	
	Oxidation-Reduction Potential	-53 to 364 mV	
	Dissolved Oxygen	Up to 45% of water column < 2 mg/L in August	
Nutrients	Surface Total Nitrogen	0.90 mg/L to 1.04 mg/L	
	Surface Total Phosphorus	0.029 mg/L to 0.058 mg/L	
	Nitrogen to Phosphorus Ratio	23:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	S	S							
Aesthetics					S	*					
Agriculture							NS	NS	NS		
Primary Body Contact Recreation										S	
Public & Private Water Supply											NS

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NS = Not Supporting
NEI = Not Enough Information

Notes

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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

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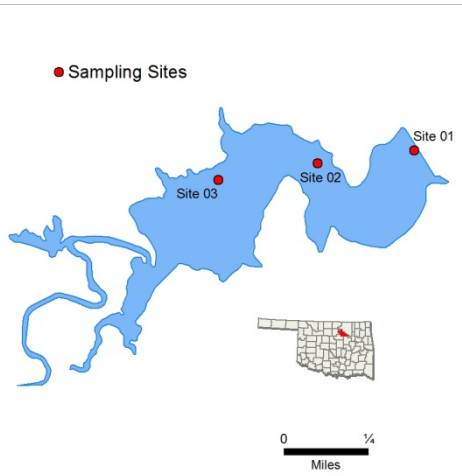
Cleveland City

Sample Period	Times Visited	Sampling Sites
December 2015 – Sept. 2016	4	5



General

Location	Pawnee County	Click map for site data
Impoundment	1936	
Area	159 acres	
Capacity	2,200 acre-feet	
Purposes	Water Supply, Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	14 NTU	100% of values <OWQS of 25 NTU
	Average Secchi Disk Depth	49 cm	
	Water Clarity Rating	Average	
	Chlorophyll-a	14.9 mg/m3	
	Trophic State Index	57	Previous Value=56
	Trophic Class	Eutrophic	
Profile	Salinity	0.08 – 0.16 ppt	
	Specific Conductivity	178.3 – 328.9 µS/cm	
	pH	7.09 – 7.79 pH units	
	Oxidation-Reduction Potential	192.1 to 459.4 mV	
	Dissolved Oxygen		All values recorded above 2.0 mg/L
Nutrients	Surface Total Nitrogen	0.97 mg/L to 1.33 mg/L	
	Surface Total Phosphorus	0.054 mg/L to 0.066 mg/L	
	Nitrogen to Phosphorus Ratio	19:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	S							
Aesthetics					S	S					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes

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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

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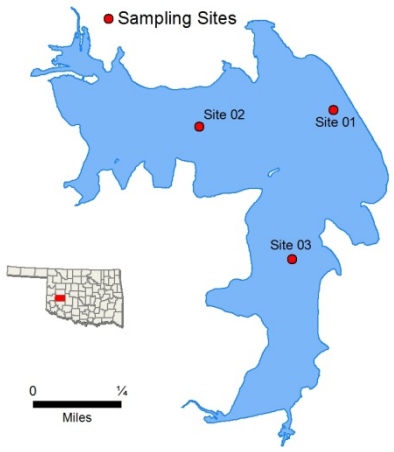
Clinton

Sample Period	Times Visited	Sampling Sites
October 2009 – July 2010	4	5



General

Location	Washita County	Click map for site data
Impoundment	1931	
Area	335 acres	
Capacity	3,980 acre-feet	
Purposes	Water Supply, Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	18 NTU	27% of values > OWQS of 25 NTU
	Average True Color		
	Average Secchi Disk Depth	57 cm	
	Water Clarity Rating	average	
	Trophic State Index	65	Previous = 66
	Trophic Class	hypereutrophic	
Profile	Salinity	0.27 – 0.31 ppt	
	Specific Conductivity	535.2 – 604.5 µS/cm	
	pH	7.52 – 8.23 pH units	Slightly alkaline
	Oxidation-Reduction Potential	-21 – 426 mV	
	Dissolved Oxygen	Up to 43% of water column < 2 mg/L in the summer.	
Nutrients	Surface Total Nitrogen	0.79 mg/L to 1.38 mg/L	
	Surface Total Phosphorus	0.057 mg/L to 0.104 mg/L	
	Nitrogen to Phosphorus Ratio	16:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	S							
Aesthetics					NEI*	*					
Agriculture							S	S	S		
Primary Body Contact Recreation											
Public & Private Water Supply											NS

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

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.
*Standards revision, true color only for permitting purposes.

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

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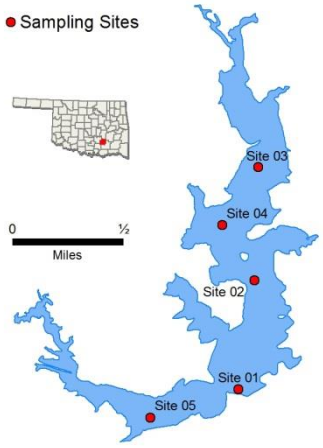
Coalgate City

Sample Period	Times Visited	Sampling Sites
December 2014 – September 2015	4	3



General

Location	Coal County	Click map for site data
Impoundment	1965	
Area	352 acres	
Capacity	3,437 acre-feet	
Purposes	Water Supply, Recreation and Flood Control	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	34 NTU	75% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	38 cm	
	Water Clarity Rating	Poor	
	Chlorophyll-a	11 mg/m3	
	Trophic State Index	54	Previous value = 47
	Trophic Class	Eutrophic	
Profile	Salinity	0.04 – 0.06 ppt	
	Specific Conductivity	92.7 – 136.6 µS/cm	
	pH	6.64– 7.69 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	133.7 to 422.9 mV	
	Dissolved Oxygen	Up to 50% of water column < 2 mg/L in June	
Nutrients	Surface Total Nitrogen	0.65 mg/L to 1.09 mg/L	
	Surface Total Phosphorus	0.030 mg/L to 0.087 mg/L	
	Nitrogen to Phosphorus Ratio	16:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	NS	NS							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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NEI = Not Enough Information

Notes

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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

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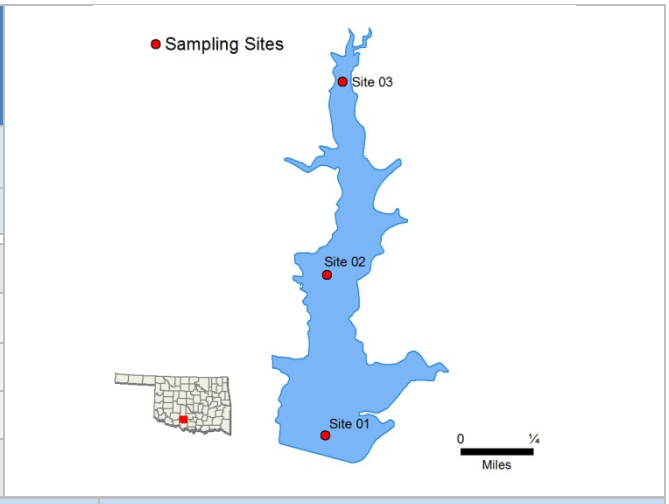
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Comanche

Sample Period	Times Visited	Sampling Sites
December 2010 – August 2011	4	5



General

Location	Stephens County	Click map for site data
Impoundment	1960	
Area	184 acres	
Capacity	2,500 acre-feet	
Purposes	Water Supply and Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	12 NTU	100% of values < OWQS of 25 NTU
	Average Secchi Disk Depth	86	Did not collect for true color
	Water Clarity Rating	Good	
	Chlorophyll-a	8 mg/m3	
	Trophic State Index	50	Previous value = 58
	Trophic Class	Mesotrophic	
Profile	Salinity	0.14 - 0.2 ppt	
	Specific Conductivity	284.8 – 398.1 µS/cm	
	pH	6.9 – 8.89 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	-47 to 427 mV	
	Dissolved Oxygen	50% of water column < 2.0 mg/L in summer	
Nutrients	Surface Total Nitrogen	0.49 mg/L to 0.72 mg/L	
	Surface Total Phosphorus	0.015 mg/L to 0.031 mg/L	
	Nitrogen to Phosphorus Ratio	28:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NEI	S							
Aesthetics					S	*					
Agriculture							*	*	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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Notes

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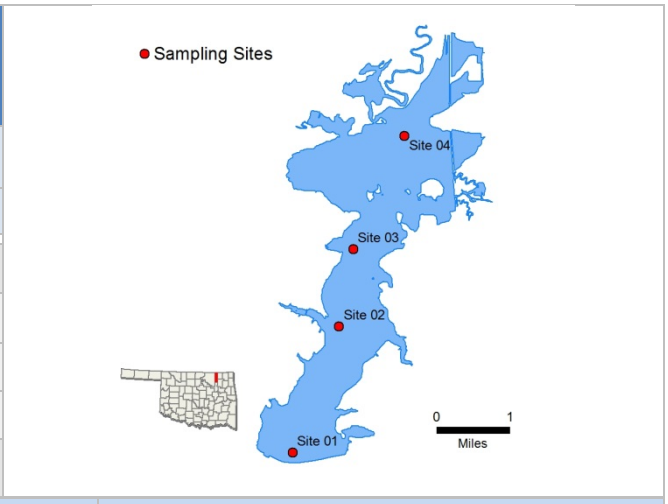
NTU = nephelometric turbidity units
µS/cm = microsiemens per centimeter
E. coli = Escherichia coli
OWQS = Oklahoma Water Quality Standards
mV = millivolts
Chlor-a = Chlorophyll-a
mg/L = milligrams per liter
µS/cm = microsiemens/cm
ppt = parts per thousand
En = Enterococci

Copan

Sample Period	Times Visited	Sampling Sites
November 2014 – August 2015	4	5



General

Location	Washington County	Click map for site data
Impoundment	1983	
Area	4,850 acres	
Capacity	43,400 acre-feet	
Purposes	Flood Control, Water Supply, Water Quality Control, Fish and Wildlife, and Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	117 NTU	100% of values > 25 NTU
	Average Secchi Disk Depth	14 cm	
	Water Clarity Rating	Poor	
	Chlorophyll-a	10 mg/m3	
	Trophic State Index	53	Previous value = 58
	Trophic Class	Eutrophic	
Profile	Salinity	0.09 – 0.15 ppt	
	Specific Conductivity	183.3 – 321 µS/cm	
	pH	7.13 – 7.99 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	40.4 to 523.4 mV	
	Dissolved Oxygen	Up to 40% of water column < 2 mg/L in August	
Nutrients	Surface Total Nitrogen	0.52 mg/L to 1.26 mg/L	
	Surface Total Phosphorus	0.049 mg/L to 0.202 mg/L	
	Nitrogen to Phosphorus Ratio	7:1	Possibly co-limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											NS

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Notes

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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
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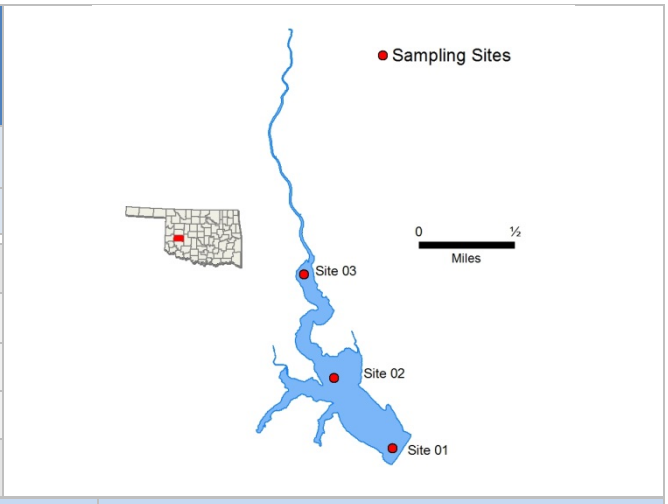
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Crowder

Sample Period	Times Visited	Sampling Sites
October 2018 - July 2019	17	3



General

Location	Washita County	Click map for site data
Impoundment	1959	
Area	158 acres	
Capacity	2,094 acre-feet	
Purposes	Flood Control, Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	29 NTU	33% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	57 cm	
	Water Clarity Rating	Average	
	Chlorophyll-a	59.5 mg/m3	
	Trophic State Index	71	Previous value =67
	Trophic Class	Hypereutrophic	
Profile	Salinity	0.23– 0.81 ppt	
	Specific Conductivity	481.8 – 1598 µS/cm	
	pH	7.06– 8.42 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	-250.8 – 458.2 mV	
	Dissolved Oxygen	Up to 67% of water column < 2 mg/L in July	
Nutrients	Surface Total Nitrogen	0.98 mg/L to 3.29 mg/L	
	Surface Total Phosphorus	0.072 mg/L to 0.284 mg/L	
	Nitrogen to Phosphorus Ratio	14:1	Phosphorus Limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	NEI	S							
Aesthetics					NEI*	S					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											NS

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

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

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

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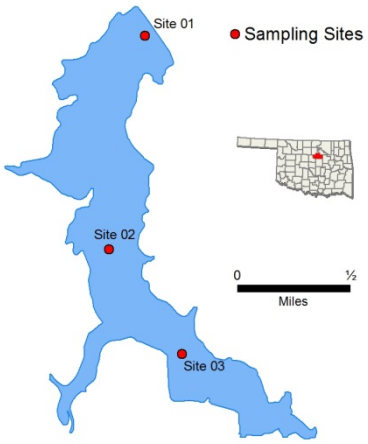
Cushing Municipal

Sample Period	Times Visited	Sampling Sites
October 2016 - July 2017	4	5



General

Location	Payne County	Click map for site data
Impoundment	1950	
Area	591 acres	
Capacity	3,304 acre-feet	
Purposes	Water Supply, Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In situ	Average Turbidity	59 NTU	75% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	29 cm	
	Water Clarity Rating	Poor	
	Chlorophyll-a	11.05 mg/m3	
	Trophic State Index	54	Previous value = 50
	Trophic Class	Eutrophic	
Profile	Salinity	0.11 – 0.21 ppt	
	Specific Conductivity	244 – 440.9 µS/cm	
	pH	7.31– 8.33 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	229 to 436.1 mV	
	Dissolved Oxygen	Up to 9% of water column < 2 mg/L in July	
Nutrients	Surface Total Nitrogen	0.65 mg/L to 1.62 mg/L	
	Surface Total Phosphorus	0.084 mg/L to 0.257 mg/L	
	Nitrogen to Phosphorus Ratio	6:1	Possibly co- limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes

*Standards revision, true color is for permitting purposes only.

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

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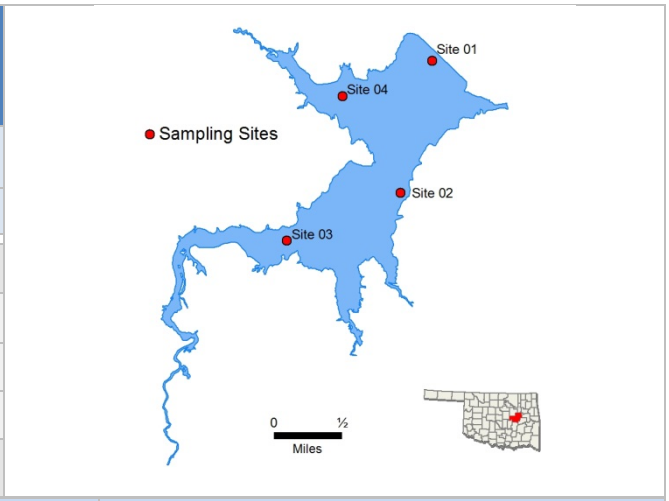
Dripping Springs

Sample Period	Times Visited	Sampling Sites
October 2016 – August 2017	4	5



General

Location	Okmulgee County	Click map for site data
Impoundment	1950	
Area	1,150 acres	
Capacity	16,200 acre-feet	
Purposes	Water Supply, Recreation and Flood Control	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	14 NTU	13% of values < OWQS of 25 NTU
	Average Secchi Disk Depth	90 cm	
	Water Clarity Rating	Good	
	Chlorophyll-a	5.1 mg/m3	
	Trophic State Index	47	Previous value = 50
	Trophic Class	Mesotrophic	
Profile	Salinity	0.04 – 0.07 ppt	
	Specific Conductivity	95.5 – 147 µS/cm	
	pH	6.39– 7.88 pH units	Only 4.5 % of values below 6.5
	Oxidation-Reduction Potential	61 to 488.2 mV	
	Dissolved Oxygen	Up to 60% of water column < 2.0 mg/L in June	
Nutrients	Surface Total Nitrogen	0.36 mg/L to 0.89 mg/L	
	Surface Total Phosphorus	0.016 mg/L to 0.069 mg/L	
	Nitrogen to Phosphorus Ratio	19:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	S							
Aesthetics					S	*					
Agriculture							N/A	N/A	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes

*Standards revision, true color is for permitting purposes only.

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

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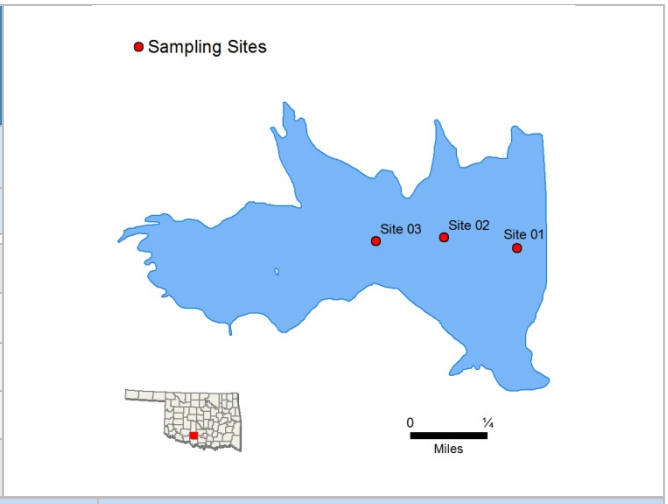
Duncan

Sample Period	Times Visited	Sampling Sites
October 2013 – July 2014	4	5



General

Location	Stephens County	Click map for site data
Impoundment	1937	
Area	500 acres	
Capacity	7,200 acre-feet	
Purposes	Water Supply, Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	11 NTU	100% of values < OWQS of 25 NTU (n=11)
	Average Secchi Disk Depth	97 cm	
	Water Clarity Rating	Good	
	Chlorophyll-a	9.40 mg/m3	
	Trophic State Index	53	Previous value = 60
	Trophic Class	Eutrophic	
Profile	Salinity	0.17 – 0.21 ppt	
	Specific Conductivity	353.8 – 433.8 µS/cm	
	pH	7.10– 8.41 pH units	Slightly Alkaline
	Oxidation-Reduction Potential	-34.4 – 423.10 mV	
	Dissolved Oxygen	Up to 25% of water column < 2 mg/L in July	Occurred at site 1, the dam
Nutrients	Surface Total Nitrogen	0.51 mg/L to 0.84 mg/L	
	Surface Total Phosphorus	0.020 mg/L to 0.042 mg/L	
	Nitrogen to Phosphorus Ratio	23:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	S	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes

*Standards revision, true color is for permitting purposes only.

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

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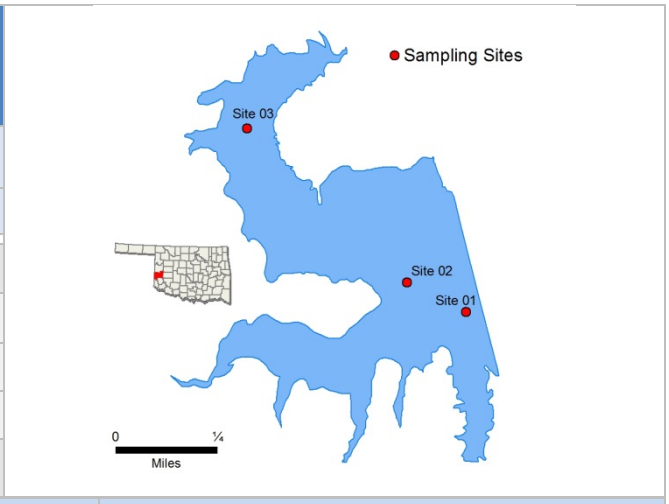
Elk City

Sample Period	Times Visited	Sampling Sites
November 2005 - August 2006	4	5



General

Location	Beckham County	Click map for site data
Impoundment	1970	
Area	240 acres	
Capacity	2,583 acre-feet	
Purposes	Flood Control, Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	15 NTU	100% of values < OWQS of 25 NTU
	Average True Color	26 units	100% of values < OWQS of 70
	Average Secchi Disk Depth	56 cm	
	Water Clarity Rating	Fair to poor	
	Trophic State Index	59	
	Trophic Class	eutrophic	
Profile	Salinity	0.30– 0.39 ppt	
	Specific Conductivity	593.3 – 749.9 µS/cm	
	pH	7.70– 8.49 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	374 - 448 mV	
	Dissolved Oxygen	Up to 22% of water column < 2 mg/L in May	
Nutrients	Surface Total Nitrogen	0.74 mg/L to 1.08 mg/L	
	Surface Total Phosphorus	0.037 mg/L to 0.067 mg/L	
	Nitrogen to Phosphorus Ratio	17:1	Possibly co-limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	S							
Aesthetics					NEI	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

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.
*Standards revision, true color is for permitting purposes only.

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

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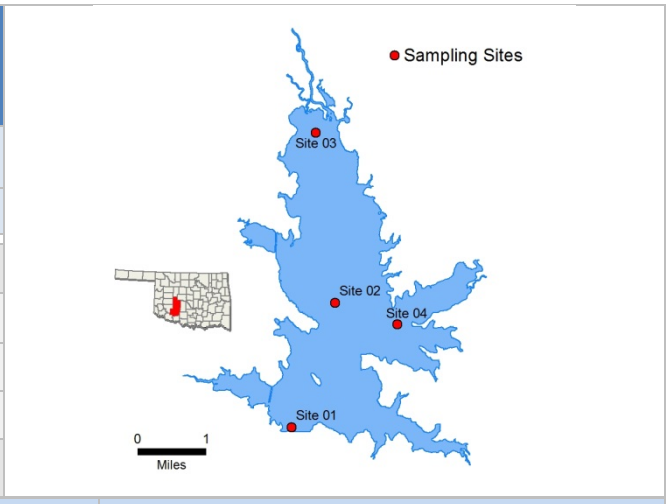
Ellsworth

Sample Period	Times Visited	Sampling Sites
October 2018 – July 2019	4	5



General

Location	Comanche County	Click map for site data
Impoundment	1962	
Area	5,600 acres	
Capacity	95,200 acre-feet	
Purposes	Water Supply, Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	49 NTU	63% of values > OWQS of 25 NTU (n=20)
	Average Secchi Disk Depth	41 cm	
	Water Clarity Rating	Poor	
	Chlorophyll-a	7.87 mg/m3	
	Trophic State Index	51	Previous value = 60
	Trophic Class	Eutrophic	
Profile	Salinity	0.11 – 0.32 ppt	
	Specific Conductivity	241.2 – 661 µS/cm	
	pH	7.4 – 8.36 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	85.6 to 455 mV	
	Dissolved Oxygen	Up to 39% of water column <2 mg/L in July	
Nutrients	Surface Total Nitrogen	0.69 mg/L to 1.73 mg/L	
	Surface Total Phosphorus	0.090 mg/L to 0.398 mg/L	
	Nitrogen to Phosphorus Ratio	7:1	Possibly co - limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	S							
Aesthetics					S	N/A					
Agriculture							N/A	N/A	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											NS

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

Notes: *Standards revision, true color is for permitting purposes only

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

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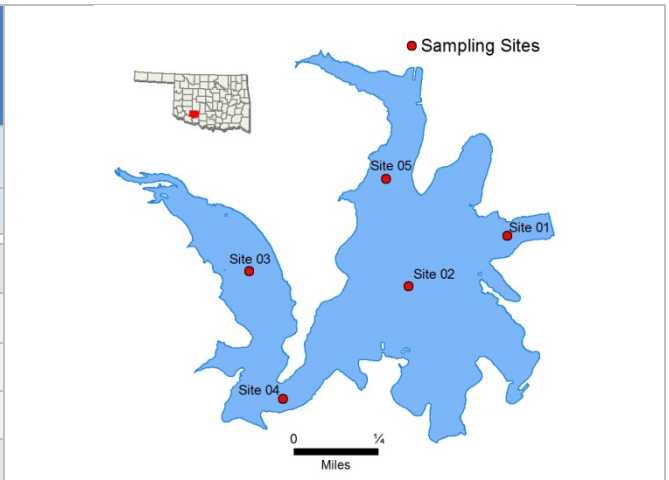
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Elmer Thomas

Sample Period	Times Visited	Sampling Sites
October 2015 – August 2016	4	5



General

Location	Comanche County	Click map for site data
Impoundment		
Area	334 acres	
Capacity	12,000 acre-feet	
Purposes	Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	2 NTU	100% of values < OWQS of 25 NTU
	Average Secchi Disk Depth	209 cm	
	Water Clarity Rating	Excellent	
	Chlorophyll-a	5.1 mg/m3	
	Trophic State Index	47	Previous Value=39
	Trophic Class	Mesotrophic	
Profile	Salinity	0.05 – 0.11 ppt	
	Specific Conductivity	106 – 226.2 µS/cm	
	pH	6.15 – 7.96 pH units	10% of values < 6.5 pH units
	Oxidation-Reduction Potential	36.7 to 575.8 mV	
	Dissolved Oxygen	Up to 74% of water column < 2 mg/L in July	
Nutrients	Surface Total Nitrogen	0.58 mg/L to 0.62 mg/L	
	Surface Total Phosphorus	0.008 mg/L to 0.016 mg/L	
	Nitrogen to Phosphorus Ratio	49:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NS	S							
Aesthetics					S	S					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes

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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

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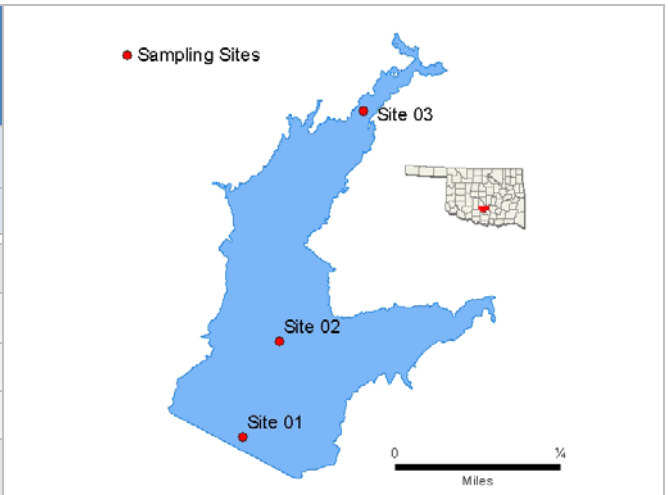
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Elmore City

Sample Period	Times Visited	Sampling Sites
October 2018 – August 2019	4	3



General

Location	Garvin County	Click map for site data
Impoundment	1966	
Area	69 acres	
Capacity	1,554 acre-feet	
Purposes		

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	24 NTU	42% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	49 cm	
	Water Clarity Rating	Excellent	
	Chlorophyll-a	12.20 mg/m3	
	Trophic State Index	55	Previous Value=
	Trophic Class	Eutrophic	
Profile	Salinity	0.07 – 0.12 ppt	
	Specific Conductivity	140 – 258.7 µS/cm	
	pH	6.88 – 8.32 pH units	10% of values < 6.5 pH units
	Oxidation-Reduction Potential	24 to 410.8 mV	
	Dissolved Oxygen	Up to 52% of water column < 2 mg/L in August	
Nutrients	Surface Total Nitrogen	0.81 mg/L to 1.25 mg/L	
	Surface Total Phosphorus	0.050 mg/L to 0.101 mg/L	
	Nitrogen to Phosphorus Ratio	14:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NS	S							
Aesthetics					S	S					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes

*Standards revision, true color is for permitting purposes only

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

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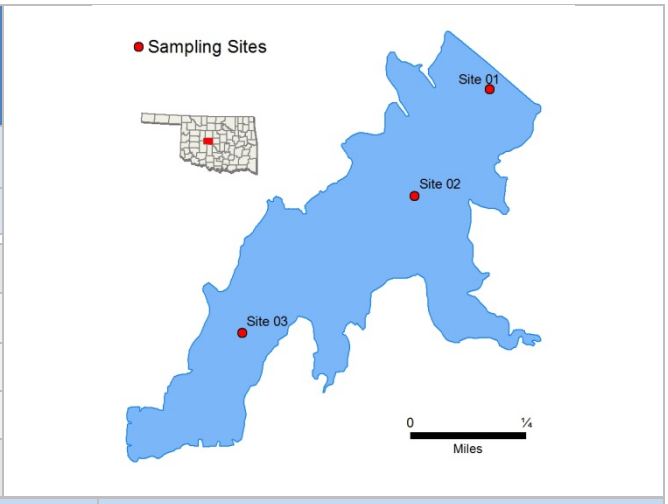
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

El Reno

Sample Period	Times Visited	Sampling Sites
December 2011 - August 2012	4	3



General

Location	Canadian County	Click map for site data
Impoundment	1937	
Area	170 acres	
Capacity	709 acre-feet	
Purposes	Flood Control, Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	36 NTU	50% of values > OWQS of 25 NTU (n=12)
	Average Secchi Disk Depth	25 cm	
	Water Clarity Rating	Poor	
	Chlorophyll-a	20 mg/m3	
	Trophic State Index	78	
	Trophic Class	Hypereutrophic	
Profile	Salinity	0.55 – 0.81 ppt	
	Specific Conductivity	1108 – 1617 µS/cm	
	pH	7.70 – 9.22 pH units	Slightly alkaline
	Oxidation-Reduction Potential	225 to 544 mV	
	Dissolved Oxygen	All data are above screening level of 2.0 mg/L	
Nutrients	Surface Total Nitrogen	1.33 mg/L to 2.69 mg/L	
	Surface Total Phosphorus	0.149 mg/L to 0.441 mg/L	
	Nitrogen to Phosphorus Ratio	7:1	Possibly co-limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	S							
Aesthetics					NEI	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes

**Standards revision, true color is for permitting purposes only
* *Based on the TSI and chlorophyll-a values, lake will be recommended to be considered and NLW.*

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

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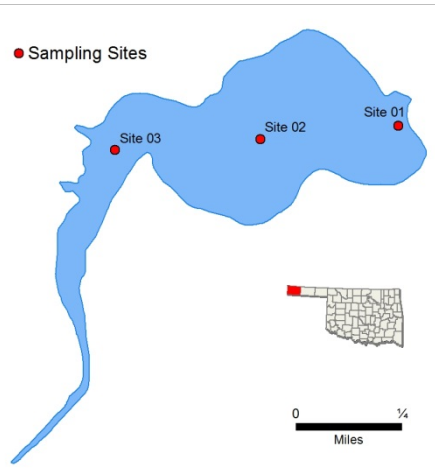
Carl Etling

Sample Period	Times Visited	Sampling Sites
October 2012 – August 2013	4	3



General

Location	Cimarron County	Click map for site data
Impoundment	1958	
Area	159 acres	
Capacity	1717 acre-feet	
Purposes	Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	37 NTU	25% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	26 cm	
	Water Clarity Rating	fair	
	Chlorophyll-a	45 mg/m3	
	Trophic State Index	68	Previous value = 72
	Trophic Class	Hypereutrophic	
Profile	Salinity	0.12 – 0.25 ppt	
	Specific Conductivity	259 – 517 µS/cm	
	pH	6.22 – 8.49 pH units	6% of recorded values < 6.5 pH units
	Oxidation-Reduction Potential	-168 – 194 mV	
	Dissolved Oxygen	Up to 33% < 2mg/L in August	
Nutrients	Surface Total Nitrogen	1.33 mg/L to 2.33 mg/L	
	Surface Total Phosphorus	0.074 mg/L to 0.18 mg/L	
	Nitrogen to Phosphorus Ratio	18:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	NS	S	S							
Aesthetics					NEI	*					
Agriculture							NS	NS	NS		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

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. **Standards revision, true color is for permitting purposes only.

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

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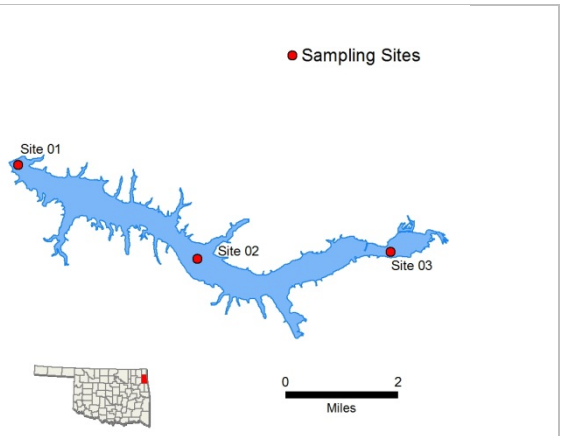
Eucha

Sample Period	Times Visited	Sampling Sites
October 2014 – July 2015	4	3



General

Location	Delaware County	Click map for site data
Impoundment	1952	
Area	2,860 acres	
Capacity	79,600 acre-feet	
Purposes	Water Supply, Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	3 NTU	100% of values < OWQS of 25 NTU
	Average Secchi Disk Depth	104 cm	
	Water Clarity Rating	Excellent	
	Chlorophyll-a	21 mg/m3	
	Trophic State Index	60	Previous value = 55
	Trophic Class	Eutrophic	
Profile	Salinity	0.07 – 0.14 ppt	
	Specific Conductivity	148.2 – 298.5 µS/cm	
	pH	6.62 – 9.12 pH units	Neutral to moderately alkaline
	Oxidation-Reduction Potential	1.6 to 514.6 mV	
	Dissolved Oxygen	Up to 82% of water column < 2 mg/L in July	
Nutrients	Surface Total Nitrogen	0.72 mg/L to 2.94 mg/L	
	Surface Total Phosphorus	0.005 mg/L to 0.059 mg/L	
	Nitrogen to Phosphorus Ratio	68:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NS	S							
Aesthetics					NEI	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											NS

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

Notes

The lake is currently listed as a Nutrient Limited Watershed (NLW) in the Oklahoma Water Quality Standards (WQS) and is considered nutrient threatened.
**Standards revision, true color is for permitting purposes only.

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

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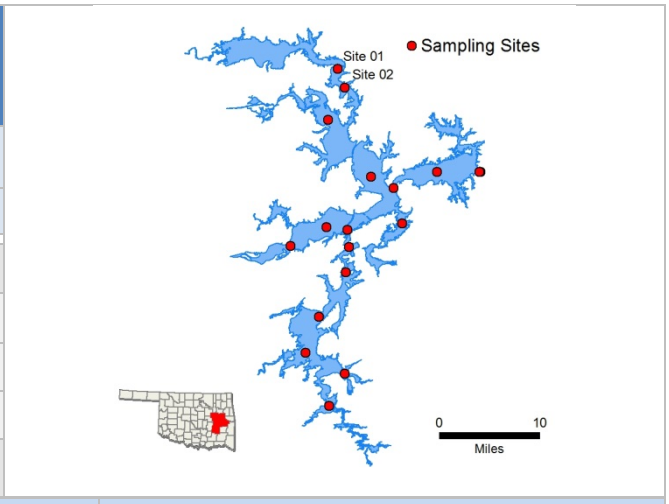
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Eufaula, Deep Fork Arm (1-2)

Sample Period	Times Visited	Sampling Sites
October 2016 – July 2017	4	17



General

Location	Haskell County	Click map for site data
Impoundment	1964	
Area	105,000 acres	
Capacity	2,314,600 acre-feet	
Purposes	Water Supply, Flood Control, Hydropower, Sediment Control	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	32 NTU	63% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	33 cm	
	Water Clarity Rating	Poor	
	Chlorophyll-a	7.15 mg/m3	
	Trophic State Index	50	Previous value = 51
	Trophic Class	Mesotrophic	
Profile	Salinity	0.09 – 0.21 ppt	
	Specific Conductivity	185.7 – 445.6 µS/cm	
	pH	7.05 – 8.32 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	349.2 – 490.6 mV	
	Dissolved Oxygen	Up to 57% of water column <2 mg/L in August	
Nutrients	Surface Total Nitrogen	0.49 mg/L to 0.84 mg/L	
	Surface Total Phosphorus	0.063 mg/L to 0.111 mg/L	
	Nitrogen to Phosphorus Ratio	7:1	Possibly co-limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	NEI	NEI							
Aesthetics					S	*					
Agriculture							N/A	N/A	S		
Primary Body Contact Recreation										NEI	
Public & Private Water Supply											

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

Notes: **Standards revision, true color is for permitting purposes only.

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

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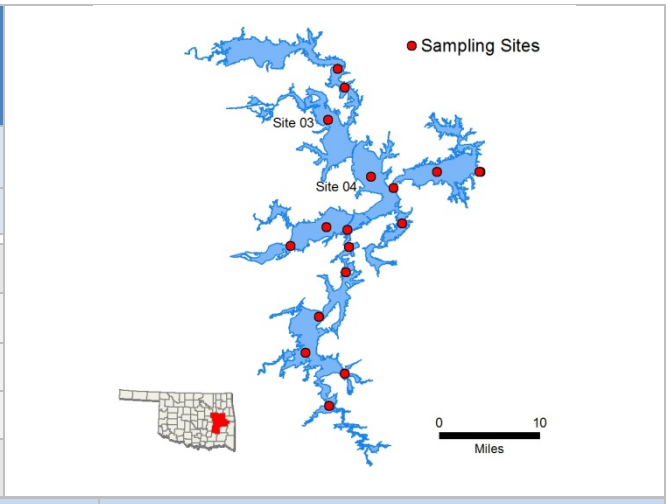
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Eufaula, N. Canadian Arm (3-4)

Sample Period	Times Visited	Sampling Sites
October 2016 – July 2017	4	17



General

Location	Haskell County	Click map for site data
Impoundment	1964	
Area	105,000 acres	
Capacity	2,314,600 acre-feet	
Purposes	Water Supply, Flood Control, Hydropower, Sediment Control	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	26 NTU	38% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	57 cm	
	Water Clarity Rating	Average	
	Chlorophyll-a	14.85 mg/m3	
	Trophic State Index	57	Previous value = 53
	Trophic Class	Eutrophic	
Profile	Salinity	0.17 – 0.28 ppt	
	Specific Conductivity	358.3 – 577.2 µS/cm	
	pH	7.87 – 8.36 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	336.4 – 494.4 mV	
	Dissolved Oxygen	Up to 44% of water column < 2.0 mg/L in August	
Nutrients	Surface Total Nitrogen	0.58 mg/L to 1.31 mg/L	
	Surface Total Phosphorus	0.055 mg/L to 0.133 mg/L	
	Nitrogen to Phosphorus Ratio	9:1	Phosphorus Limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	NEI	NEI							
Aesthetics					S	N/A					
Agriculture							N/A	N/A	S		
Primary Body Contact Recreation										NEI	
Public & Private Water Supply											

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

Notes *Standards revision, true color is for permitting purposes only.

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

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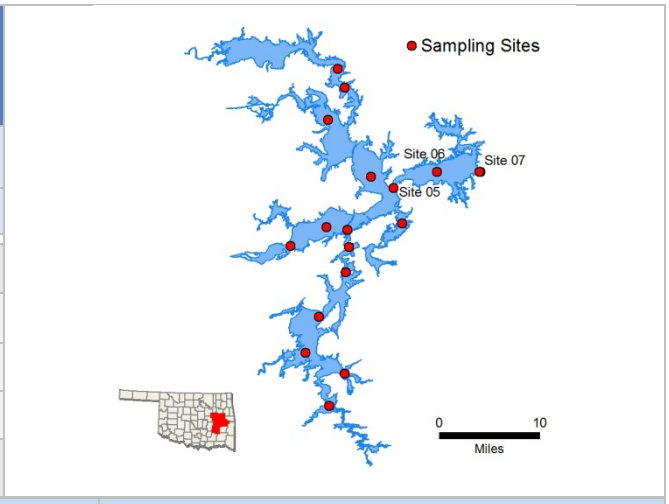
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Eufaula (5-7)

Sample Period	Times Visited	Sampling Sites
October 2016 – July 2017	4	17



General

Location	Haskell County	Click map for site data
Impoundment	1964	
Area	105,000 acres	
Capacity	2,314,600 acre-feet	
Purposes	Water Supply, Flood Control, Hydropower, Sediment Control	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
	Average Turbidity	6 NTU	0% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	114 cm	
	Water Clarity Rating	Excellent	
	Chlorophyll-a	6.26 mg/m3	
	Trophic State Index	49	Previous value = 48
	Trophic Class	Mesotrophic	
Profile	Salinity	0.18 – 0.25 ppt	
Profile	Specific Conductivity	371.3 – 515 µS/cm	
Profile	pH	6.91 – 8.61 pH units	Neutral to slightly alkaline
Profile	Oxidation-Reduction Potential	158.9 – 513.3 mV	
Profile	Dissolved Oxygen	Up to 46% of water column < 2.0 mg/L in August	
Nutrients	Surface Total Nitrogen	0.48 mg/L to 0.67 mg/L	
Nutrients	Surface Total Phosphorus	0.027 mg/L to 0.052 mg/L	
Nutrients	Nitrogen to Phosphorus Ratio	13:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NEI	NEI							
Aesthetics					S	*					
Agriculture							N/A	N/A	S		
Primary Body Contact Recreation										NEI	
Public & Private Water Supply											

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

Notes

*Standards revision, true color is for permitting purposes only.

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

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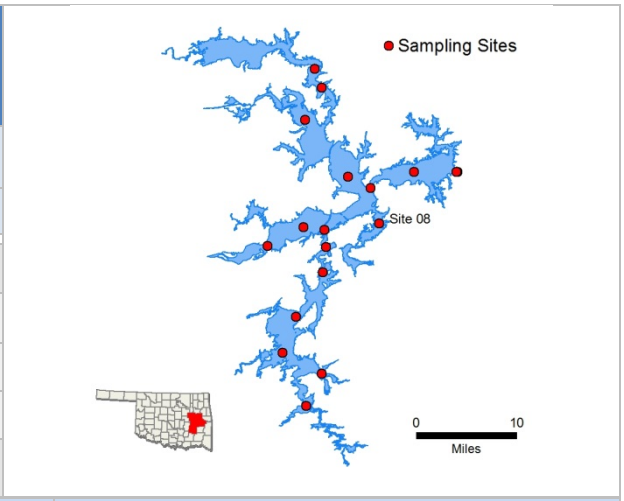
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Eufaula, Longtown Creek Arm (8)

Sample Period	Times Visited	Sampling Sites
October 2016 – July 2017	4	17



General

Location	Haskell County	Click map for site data
Impoundment	1964	
Area	105,000 acres	
Capacity	2,314,600 acre-feet	
Purposes	Water Supply, Flood Control, Hydropower, Sediment Control	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	8 NTU	0% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	87 cm	
	Water Clarity Rating	Good	
	Chlorophyll-a	16.76 mg/m3	
	Trophic State Index	58	Previous value = 52
	Trophic Class	Eutrophic	
Profile	Salinity	0.16 – 0.25 ppt	
	Specific Conductivity	336.1 – 512 µS/cm	
	pH	6.99 – 8.44 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	207.1 – 427.1 mV	
	Dissolved Oxygen	Up to 50% water column <2 mg/L in August	
Nutrients	Surface Total Nitrogen	0.43 mg/L to 0.64 mg/L	
	Surface Total Phosphorus	0.026 mg/L to 0.048 mg/L	
	Nitrogen to Phosphorus Ratio	15:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	NEI	NEI							
Aesthetics					S	*					
Agriculture							N/A	N/A	S		
Primary Body Contact Recreation										NEI	
Public & Private Water Supply											

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

Notes

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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

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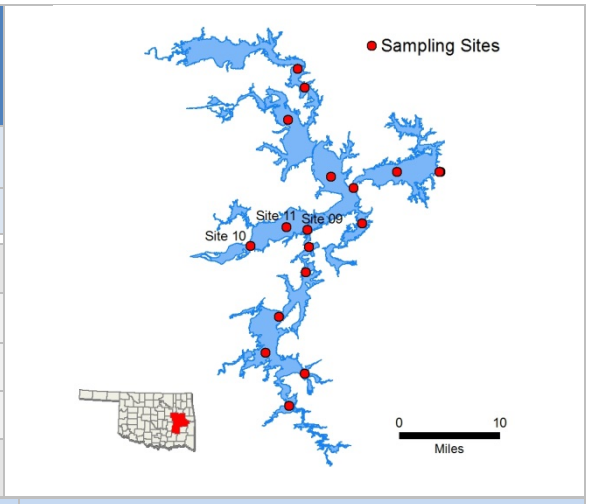
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Eufaula, Canadian River Arm (9-11)

Sample Period	Times Visited	Sampling Sites
October 2016 – July 2017	4	17



General

Location	Haskell County	Click map for site data
Impoundment	1964	
Area	105,000 acres	
Capacity	2,314,600 acre-feet	
Purposes	Water Supply, Flood Control, Hydropower, Sediment Control	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	24 NTU	33% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	52 cm	
	Water Clarity Rating	Fair	
	Chlorophyll-a	5.87 mg/m3	
	Trophic State Index	48	Previous value = 53
	Trophic Class	Mesotrophic	
Profile	Salinity	0.17 – 0.45 ppt	
	Specific Conductivity	349.5 – 908.2 µS/cm	
	pH	7.19 – 8.39 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	193.4 – 416.9 mV	
	Dissolved Oxygen	Up to 42% of water column < 2.0 mg/L in the August	
Nutrients	Surface Total Nitrogen	0.44 mg/L to 1.08 mg/L	
	Surface Total Phosphorus	0.031 mg/L to 0.097 mg/L	
	Nitrogen to Phosphorus Ratio	12:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	NEI	NEI							
Aesthetics					S	*					
Agriculture							N/A	N/A	S		
Primary Body Contact Recreation										NEI	
Public & Private Water Supply											

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

Notes

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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

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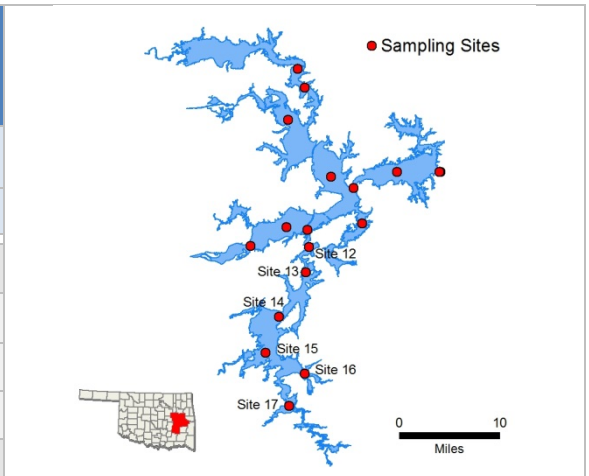
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Eufaula, Gaines Creek Arm (12-17)

Sample Period	Times Visited	Sampling Sites
October 2016 – July 2017	4	17



General

Location	Haskell County	Click map for site data
Impoundment	1964	
Area	105,000 acres	
Capacity	2,314,600 acre-feet	
Purposes	Water Supply, Flood Control, Hydropower, Sediment Control	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	31 NTU	46% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	48 cm	
	Water Clarity Rating	Fair	
	Chlorophyll-a	13.75 mg/m3	
	Trophic State Index	56	Previous value = 49
	Trophic Class	Eutrophic	
Profile	Salinity	0.04 – 0.34 ppt	
	Specific Conductivity	87.6 – 692.1 µS/cm	
	pH	6.5 – 8.21 pH units	
	Oxidation-Reduction Potential	192 – 447.1 mV	
	Dissolved Oxygen	Up to 50% of water column < 2.0 mg/L in August	
Nutrients	Surface Total Nitrogen	0.37 mg/L to 0.77 mg/L	
	Surface Total Phosphorus	0.029 mg/L to 0.107 mg/L	
	Nitrogen to Phosphorus Ratio	9:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	NS	NEI							
Aesthetics					S	N/A					
Agriculture							N/A	N/A	S		
Primary Body Contact Recreation										NEI	
Public & Private Water Supply											

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

Notes

*Standards revision, true color is for permitting purposes only.

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

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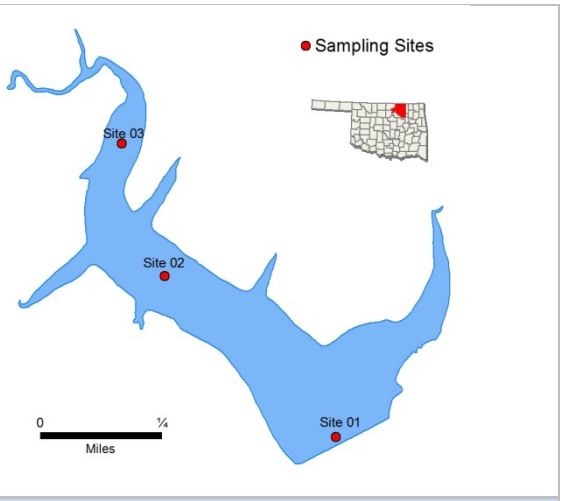
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Fairfax

Sample Period	Times Visited	Sampling Sites
November 2015 – August 2016	4	5



General

Location	Osage County	Click map for site data
Impoundment	1936	
Area	111 acres	
Capacity	1,795 acre-feet	
Purposes	Water Supply, Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	8 NTU	100% of values < OWQS of 25 NTU
	Average Secchi Disk Depth	71 cm	
	Water Clarity Rating	good	
	Chlorophyll-a	12.9 mg/m3	
	Trophic State Index	56	Previous Value= 55
	Trophic Class	Eutrophic	
Profile	Salinity	0.13– 0.18 ppt	
	Specific Conductivity	273.2– 376.20 µS/cm	
	pH	6.95 – 8.13 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	47.2 – 285 mV	
	Dissolved Oxygen	Up to 63% of water column < 2 mg/L in summer	
Nutrients	Surface Total Nitrogen	0.70 mg/L to 0.92 mg/L	
	Surface Total Phosphorus	0.020 mg/L to 0.034 mg/L	
	Nitrogen to Phosphorus Ratio	30:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	S	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											NS

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

Notes

*Standards revision, true color is for permitting purposes only.

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

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Fort Cobb

Sample Period	Times Visited	Sampling Sites
October 2018 - July 2019	4	6

General

Location	Caddo County	Click map for site data
Impoundment	1959	
Area	4,100 acres	
Capacity	80,010 acre-feet	
Purposes	Flood Control, Water Supply, Fish & Wildlife, Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	16 NTU	15% of values > OWQS of 25 NTU (n=20)
	Average Secchi Disk Depth	93 cm	
	Water Clarity Rating	Good	
	Chlorophyll-a	38.02 mg/m3	
	Trophic State Index	66	Previous value = 71
	Trophic Class	Hypereutrophic	
Profile	Salinity	0.12– 0.29 ppt	
	Specific Conductivity	259 – 600 µS/cm	
	pH	7.01– 8.77 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	-244.7 – 414.1 mV	
	Dissolved Oxygen	Up to 64% of water column < 2.0 mg/L in July	
Nutrients	Surface Total Nitrogen	1.23 mg/L to 2.54 mg/L	
	Surface Total Phosphorus	0.200 mg/L to 0.189 mg/L	
	Nitrogen to Phosphorus Ratio	4:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	S	S							
Aesthetics					NEI	N/A					
Agriculture							N/A	N/A	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											NS

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

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.
*Standards revision, true color is for permitting purposes only.

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

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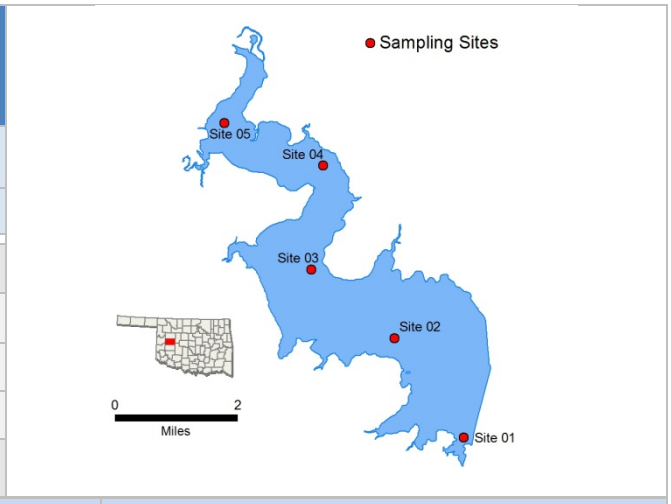
Foss

Sample Period	Times Visited	Sampling Sites
October 2015 – August 2016	4	5



General

Location	Custer County	Click map for site data
Impoundment	1961	
Area	8,800 acres	
Capacity	256,220 acre-feet	
Purposes	Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In-Situ	Average Turbidity	11 NTU	100% of values < OWQS of 25 NTU
	Average Secchi Disk Depth	88 cm	
	Water Clarity Rating	Good	
	Chlorophyll-a	11.8 mg/m3	
	Trophic State Index	55	Previous Value= 54
	Trophic Class	Eutrophic	
Profile	Salinity	1.15– 1.28 ppt	
	Specific Conductivity	2257.6 –2482.1 µS/cm	
	pH	7.5 – 8.26 pH units	
	Oxidation-Reduction Potential	-41 to 446.2 mV	
	Dissolved Oxygen	Up to 38% of water column < 2 mg/L in July	
Nutrients	Surface Total Nitrogen	0.90 mg/L to 1.15 mg/L	
	Surface Total Phosphorus	0.019 mg/L to 0.085 mg/L	
	Nitrogen to Phosphorus Ratio	21:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	NEI							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										NEI	
Public & Private Water Supply				NEI							

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

Notes

*Standards revision, true color is for permitting purposes only.
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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

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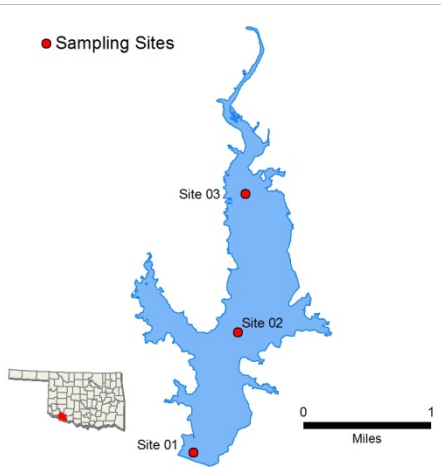
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Frederick

Sample Period	Times Visited	Sampling Sites
December 2014 – September 2015	4	3



General

Location	Tillman County	Click map for site data
Impoundment	1974	
Area	925 acres	
Capacity	9,526 acre-feet	
Purposes	Water Supply, Recreation and Flood Control	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	64 NTU	70% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	25 cm	
	Water Clarity Rating	Poor	
	Chlorophyll-a	7 mg/m3	
	Trophic State Index	50	Previous Value= 55
	Trophic Class	Mesotrophic	
Profile	Salinity	0.09– 0.36 ppt	
	Specific Conductivity	194.7 – 740.4 µS/cm	
	pH	7.02 – 8.38 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	77.8 – 410.3 mV	
	Dissolved Oxygen	Up to 55% of water column < 2 mg/L in June	
Nutrients	Surface Total Nitrogen	0.72 mg/L to 1.67 mg/L	
	Surface Total Phosphorus	0.041 mg/L to 0.157 mg/L	
	Nitrogen to Phosphorus Ratio	10:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes

*Standards revision, true color is for permitting purposes only.

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

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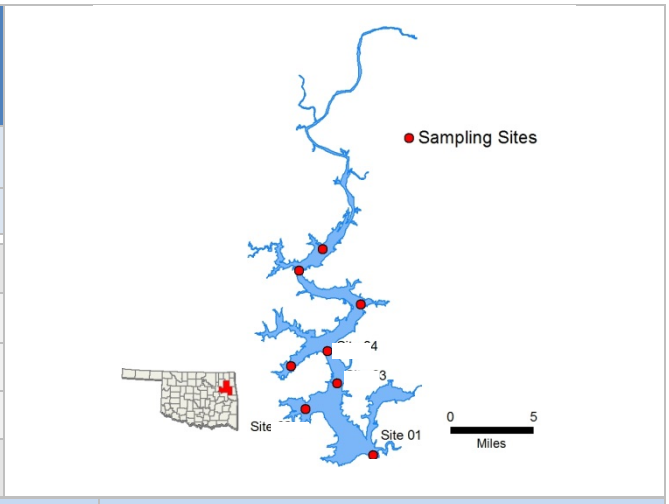
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Ft. Gibson, Lower (1-4)

Sample Period	Times Visited	Sampling Sites
October 2014 – June 2015	4	8



General

Location	Cherokee County	Click map for site data
Impoundment	1953	
Area	14,900 acres	
Capacity	355,200 acre-feet	
Purposes	Hydropower and Flood Control	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	7 NTU	100% of values < OWQS of 25 NTU
	Average Secchi Disk Depth	76 cm	
	Water Clarity Rating	Good	
	Chlorophyll-a	22 mg/m3	
	Trophic State Index	60	Previous value = 60
	Trophic Class	Eutrophic	
Profile	Salinity	0.11 – 0.18 ppt	
	Specific Conductivity	231 – 373.3 µS/cm	
	pH	7.17 – 8.48 pH units	
	Oxidation-Reduction Potential	133.8 to 473.8 mV	
	Dissolved Oxygen	Up to 38% water column < 2 mg/Lin June	
Nutrients	Surface Total Nitrogen	0.64 mg/L to 1.28 mg/L	
	Surface Total Phosphorus	0.070 mg/L to 0.141 mg/L	
	Nitrogen to Phosphorus Ratio	9:1	Phosphorus Limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NS	NEI							
Aesthetics					NEI	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										NEI	
Public & Private Water Supply				NEI							

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

Notes: The lake is currently listed in the Oklahoma Water Quality Standards (WQS) as a Nutrient Limited Watershed (NLW). 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. * Standards revision, color for permitting purposes only.

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

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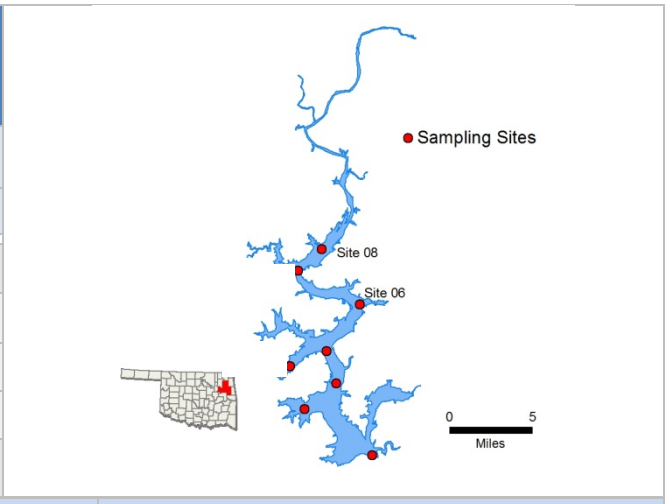
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Ft. Gibson, Upper (5-8)

Sample Period	Times Visited	Sampling Sites
October 2014 – June 2015	4	8



General

Location	Cherokee County	Click map for site data
Impoundment	1953	
Area	14,900 acres	
Capacity	355,200 acre-feet	
Purposes	Hydropower and Flood Control	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	9 NTU	100% of values < OWQS of 25 NTU
	Average Secchi Disk Depth	51 cm	
	Water Clarity Rating	Good	
	Chlorophyll-a	23 mg/m3	
	Trophic State Index	60	Previous value = 61
	Trophic Class	Eutrophic	
Profile	Salinity	0.11– 0.19 ppt	
	Specific Conductivity	235.6 – 387.8 µS/cm	
	pH	7.15 – 8.4 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	220.9 to 393 mV	
	Dissolved Oxygen	Up to 38% of water column < 2 mg/L in June	All data for this sample year above screening level of 2 mg/L
Nutrients	Surface Total Nitrogen	0.68 mg/L to 1.28 mg/L	
	Surface Total Phosphorus	0.081 mg/L to 0.138 mg/L	
	Nitrogen to Phosphorus Ratio	9:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NS	NEI							
Aesthetics					NEI	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										NEI	
Public & Private Water Supply				NEI							

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NS = Not Supporting
NEI = Not Enough Information

Notes: The lake is currently listed in the Oklahoma Water Quality Standards (WQS) as a Nutrient Limited Watershed (NLW). 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
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

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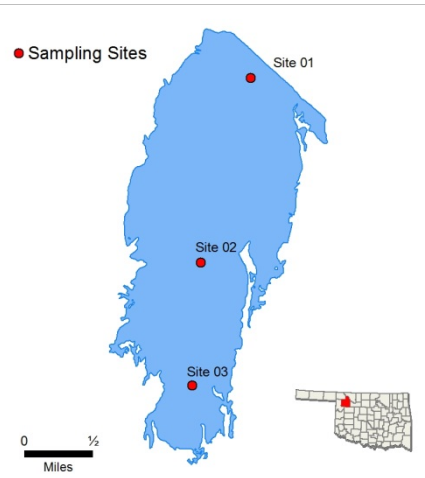
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Ft. Supply

Sample Period	Times Visited	Sampling Sites
October 2015 - August 2016	4	3



General

Location	Woodward County	Click map for site data
Impoundment	1942	
Area	1,820 acres	
Capacity	13,900 acre-feet	
Purposes	Flood Control, Conservation Purposes	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In-Situ	Average Turbidity	53 NTU	100% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	19 cm	
	Water Clarity Rating	Fair to Poor	
	Chlorophyll-a	36.2 mg/m3	
	Trophic State Index	66	Previous value = 60
	Trophic Class	Hypereutrophic	
Profile	Salinity	0.69 – 0.81 ppt	
	Specific Conductivity	1377.4 – 1607.3 µS/cm	
	pH	8.27 – 8.56 pH units	
	Oxidation-Reduction Potential	316.7 to 387.4 mV	
	Dissolved Oxygen		All data are above screening level of 2.0 mg/L
Nutrients	Surface Total Nitrogen	1.35 mg/L to 1.46 mg/L	
	Surface Total Phosphorus	0.095 mg/L to 0.133 mg/L	
	Nitrogen to Phosphorus Ratio	13:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	S							
Aesthetics					NEI	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											NS

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

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.
*Standards revision, true color is for permitting purposes only.
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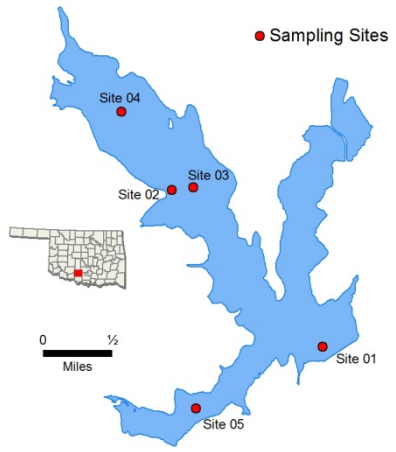
NTU = nephelometric turbidity units
µS/cm = microsiemens per centimeter
E. coli = Escherichia coli
OWQS = Oklahoma Water Quality Standards
mV = millivolts
Chlor-a = Chlorophyll-a
mg/L = milligrams per liter
µS/cm = microsiemens/cm
ppt = parts per thousand
En = Enterococci

Fuqua

Sample Period	Times Visited	Sampling Sites
October 2015 – August 2016	4	5



General

Location	Stephens County	Click map for site data
Impoundment	1953	
Area	1,500 acres	
Capacity	21,100 acre-feet	
Purposes	Water Supply, Recreation and Flood Control	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In-Situ	Average Turbidity	12 NTU	100% of values < OWQS of 25 NTU
	Average Secchi Disk Depth	47 cm	
	Water Clarity Rating	Average	
	Chlorophyll-a	11.7 mg/m3	
	Trophic State Index	55	Previous Value= 52
	Trophic Class	Eutrophic	
Profile	Salinity	0.27– 0.33 ppt	
	Specific Conductivity	569.8– 674.8 µS/cm	
	pH	7.33 – 8.42 pH units	
	Oxidation-Reduction Potential	-3 to 440.1 mV	
	Dissolved Oxygen	Up to 41% of water column < 2 mg/L in summer	
Nutrients	Surface Total Nitrogen	0.50 mg/L to 0.91 mg/L	
	Surface Total Phosphorus	0.022 mg/L to 0.046 mg/L	
	Nitrogen to Phosphorus Ratio	20:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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NEI = Not Enough Information

Notes

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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

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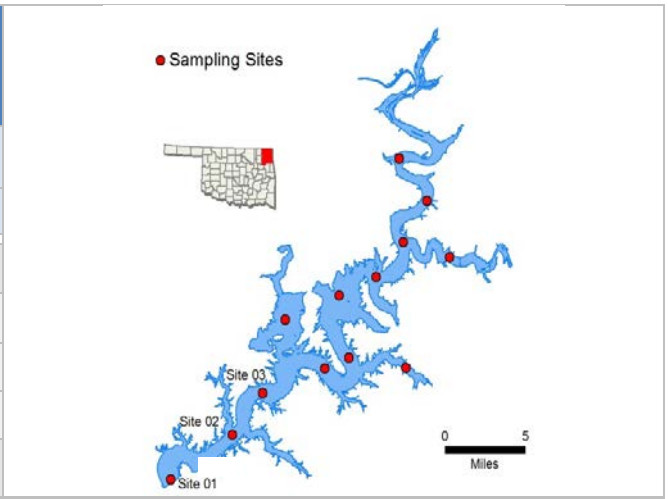
Grand, Lower Lake (1-3)

Sample Period	Times Visited	Sampling Sites
October 2014 – July 2015	4	13



General

Location	Mayes County	Click map for site data
Impoundment	1940	
Area	1,820 acres	
Capacity	13,900 acre-feet	
Purposes	Flood Control, Hydropower	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	3 NTU	100% of values < OWQS of 25 NTU (n=12)
	Average Secchi Disk Depth	191 cm	
	Water Clarity Rating	Excellent	
	Chlorophyll-a	6 mg/m3	
	Trophic State Index	48	Previous value = 56
	Trophic Class	Mesotrophic	
Profile	Salinity	0.10 – 0.17 ppt	
	Specific Conductivity	218.3 – 351.1 µS/cm	
	pH	6.84 – 8.26 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	54.9 to 481.7 mV	
	Dissolved Oxygen	Up to 70% of water column < 2.0 mg/L in July	
Nutrients	Surface Total Nitrogen	0.74 mg/L to 1.96 mg/L	
	Surface Total Phosphorus	0.060 mg/L to 0.168 mg/L	
	Nitrogen to Phosphorus Ratio	14:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NS	NEI							
Aesthetics					S	*					
Agriculture							*	*	S		
Primary Body Contact Recreation										NEI	
Public & Private Water Supply											

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

Notes

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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

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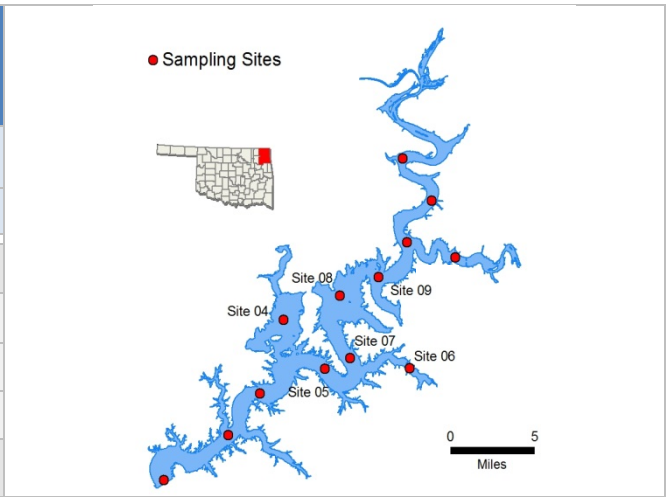
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Grand, Mid Lake (4-9)

Sample Period	Times Visited	Sampling Sites
October 2014 – July 2015	4	13



General

Location	Mayes County	Click map for site data
Impoundment	1940	
Area	1,820 acres	
Capacity	13,900 acre-feet	
Purposes	Flood Control, Hydropower	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	8 NTU	5% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	97 cm	
	Water Clarity Rating	Excellent	
	Chlorophyll-a	16 mg/m3	
	Trophic State Index	58	Previous value = 54
	Trophic Class	Eutrophic	
Profile	Salinity	0.10 – 0.26 ppt	
	Specific Conductivity	219.6 – 542.5 µS/cm	
	pH	6.84 – 8.77 pH units	
	Oxidation-Reduction Potential	21.6 to 458 mV	
	Dissolved Oxygen	Up to 55% of water column < 2.0 mg/L in July	
Nutrients	Surface Total Nitrogen	0.75 mg/L to 2.44 mg/L	
	Surface Total Phosphorus	0.015 mg/L to 0.150 mg/L	
	Nitrogen to Phosphorus Ratio	16:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NS	NEI							
Aesthetics					S	*					
Agriculture							*	*	S		
Primary Body Contact Recreation										NEI	
Public & Private Water Supply				NEI							

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NS = Not Supporting
NEI = Not Enough Information

Notes

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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

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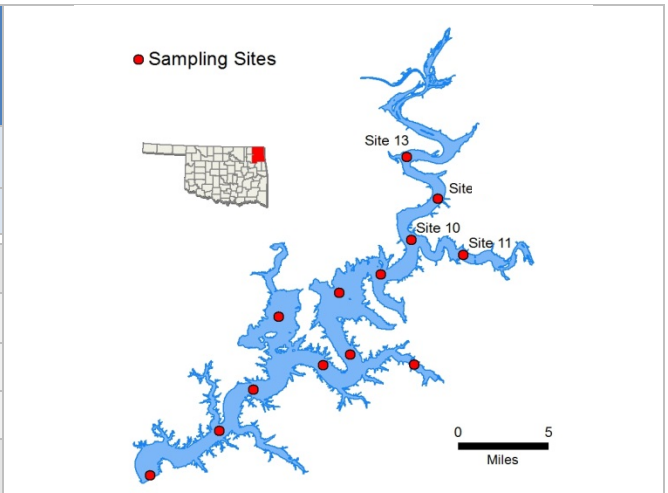
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Grand, Upper Lake (10-13)

Sample Period	Times Visited	Sampling Sites
October 2014 – July 2015	4	13



General

Location	Mayes County	Click map for site data
Impoundment	1940	
Area	1,820 acres	
Capacity	13,900 acre-feet	
Purposes	Flood Control, Hydropower	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	24 NTU	30% of values > OWQS of 25 NTU (n=16)
	Average Secchi Disk Depth	50 cm	
	Water Clarity Rating	Average	
	Chlorophyll-a	18.9 mg/m3	
	Trophic State Index	59	Previous value = 56
	Trophic Class	Eutrophic	
Profile	Salinity	0.11 – 0.17 ppt	
	Specific Conductivity	237.2 – 368.5 µS/cm	
	pH	7.48 – 8.68 pH units	
	Oxidation-Reduction Potential	252 to 453.7 mV	
	Dissolved Oxygen	All data for this sample year are below the screening level of 2 mg/L	
Nutrients	Surface Total Nitrogen	1.22 mg/L to 2.55 mg/L	
	Surface Total Phosphorus	0.049 mg/L to 0.203 mg/L	
	Nitrogen to Phosphorus Ratio	13:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	NEI							
Aesthetics					S	*					
Agriculture							*	*	S		
Primary Body Contact Recreation										NEI	
Public & Private Water Supply				NEI							

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NS = Not Supporting
NEI = Not Enough Information

Notes

*Standards revision, true color is for permitting purposes only.

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
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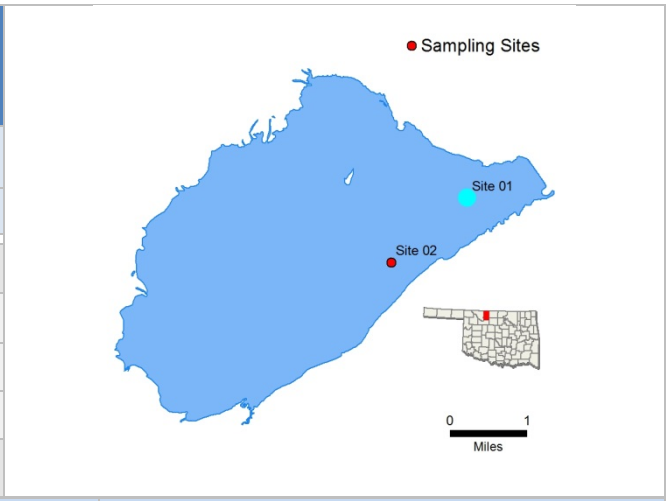
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Great Salt Plains

Sample Period	Times Visited	Sampling Sites
October 2018 – July 2019	4	5



General

Location	Alfalfa County	Click map for site data
Impoundment	1941	
Area	8,690 acres	
Capacity	31,240 acre-feet	
Purposes	Flood Control, Conservation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	105 NTU	100% of values > OWQS of 25 NTU (n=7)
	Average Secchi Disk Depth	15 cm	
	Water Clarity Rating	Poor	
	Chlorophyll-a	84.87 mg/m3	
	Trophic State Index	74	Previous value = 76
	Trophic Class	Hypereutrophic	
Profile	Salinity	1.66– 3.04 ppt	
	Specific Conductivity	3204.8 – 5611.10 µS/cm	
	pH	8.09 – 8.56 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	114.9 – 446.1 mV	
	Dissolved Oxygen		Not stratified at any sampling event
Nutrients	Surface Total Nitrogen	1.23 mg/L to 2.54 mg/L	
	Surface Total Phosphorus	0.200 mg/L to 1.89 mg/L	
	Nitrogen to Phosphorus Ratio	4:1	possibly co-limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	S							
Aesthetics					NEI	*	N/A	N/A			
Agriculture											
Primary Body Contact Recreation										NS	
Public & Private Water Supply											

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NEI = Not Enough Information

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.
*Standards revision, true color is for permitting purposes only.

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

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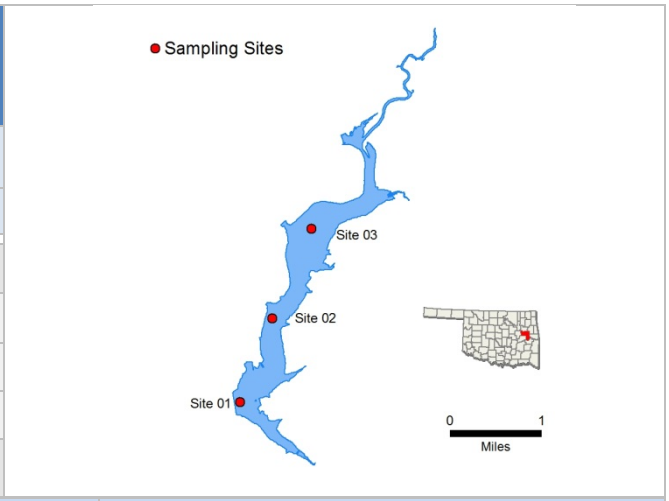
Greenleaf

Sample Period	Times Visited	Sampling Sites
February 2019 – August 2019	4	5



General

Location	Muskogee County	Click map for site data
Impoundment	1939	
Area	920 acres	
Capacity	14,720 acre-feet	
Purposes	Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	7 NTU	100% of values < OWQS of 25 NTU (n=9)
	Average Secchi Disk Depth	97 cm	
	Water Clarity Rating	Good	
	Chlorophyll-a	17.76 mg/m3	
	Trophic State Index	59	Previous value = 58
	Trophic Class	Eutrophic	
Profile	Salinity	0.0– 0.09 ppt	
	Specific Conductivity	0.80 – 162 µS/cm	
	pH	6.26 – 8.11 pH units	33% of recorded values <6.5
	Oxidation-Reduction Potential	48.6 – 4440.5 mV	
	Dissolved Oxygen	Up to 61% of water column < 2 mg/L in August	
Nutrients	Surface Total Nitrogen	0.36 mg/L to 0.77 mg/L	
	Surface Total Phosphorus	0.021 mg/L to 0.037 mg/L	
	Nitrogen to Phosphorus Ratio	18:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	NEI	S							
Aesthetics					S	*					
Agriculture							N/A	N/A	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											NS

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NS = Not Supporting
NEI = Not Enough Information

Notes

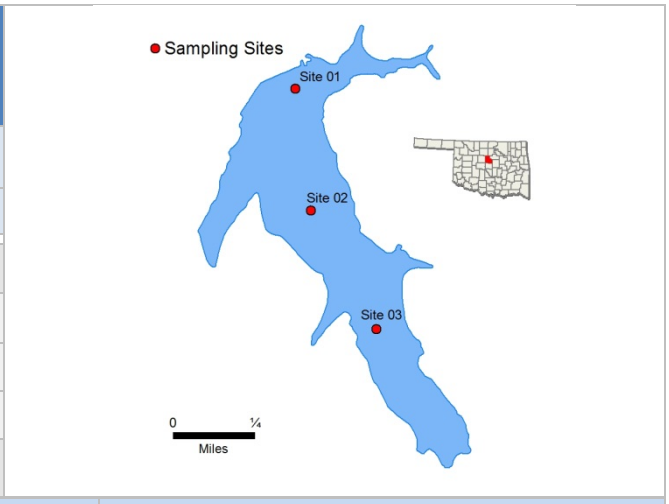
*Standards revision, true color is for permitting purposes only.
* 50-70% range is undetermined for DO.

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

Guthrie

Sample Period	Times Visited	Sampling Sites
November 2015 – August 2016	4	5



General

Location	Logan County	Click map for site data
Impoundment	1919	
Area	274 acres	
Capacity	3,875 acre-feet	
Purposes	Water Supply, Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	14 NTU	100% of values < OWQS of 25 NTU
	Average Secchi Disk Depth	47 cm	
	Water Clarity Rating	Average	
	Chlorophyll-a	60.6 mg/m3	
	Trophic State Index	71	Previous Value= 61
	Trophic Class	Hypereutrophic	
Profile	Salinity	0.28– 0.32 ppt	
	Specific Conductivity	566 – 658 µS/cm	
	pH	7.83 – 8.61 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	73.4 – 294.1 mV	
	Dissolved Oxygen	Up to 25% of water column < 2 mg/L in summer	
Nutrients	Surface Total Nitrogen	0.99 mg/L to 1.81 mg/L	
	Surface Total Phosphorus	0.048mg/L to 0.107 mg/L	
	Nitrogen to Phosphorus Ratio	18:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	S							
Aesthetics					S	S					
Agriculture							S	S	S		
Primary Body Contact Recreation										NS	
Public & Private Water Supply											NS

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

Notes *Standards revision, true color is for permitting purposes only.

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
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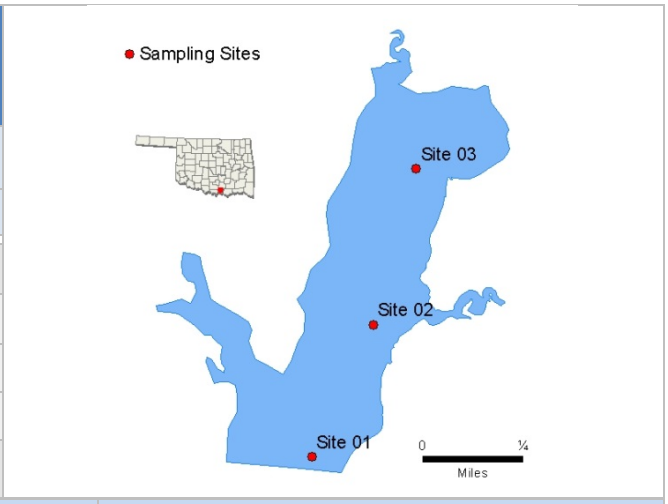
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Hauani

Sample Period	Times Visited	Sampling Sites
October 2018 – August 2019	4	5



General

Location	Marshall County	Click map for site data
Impoundment	1980	
Area	270 acres	
Capacity	3,000 acre-feet	
Purposes		

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	9 NTU	100% of values < OWQS of 25 NTU (n=9)
	Average Secchi Disk Depth	107 cm	
	Water Clarity Rating	Excellent	
	Chlorophyll-a	3.74 mg/m3	
	Trophic State Index	44	Previous value =
	Trophic Class	Mesotrophic	
Profile	Salinity	0.10 - 0.16 ppt	
	Specific Conductivity	217.5 – 329.2 µS/cm	
	pH	6.82 – 8.46 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	8.9 to 422.6 mV	
	Dissolved Oxygen	Up to 48% of water column < 2 mg/L in August	
Nutrients	Surface Total Nitrogen	0.50 mg/L to 0.96mg/L	
	Surface Total Phosphorus	0.016 mg/L to 0.053 mg/L	
	Nitrogen to Phosphorus Ratio	22:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	S							
Aesthetics					NEI	N/A					
Agriculture							N/A	N/A	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply				S							

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

Notes

*Currently, this lake is listed as a Nutrient Limited Watershed (NLW) in the Oklahoma Water Quality Standards (WQS). This means that the lake is considered threatened from nutrients until a more intensive study can confirm the Aesthetics beneficial use non-support status.**Standards revision, true color is for permitting purposes only.

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
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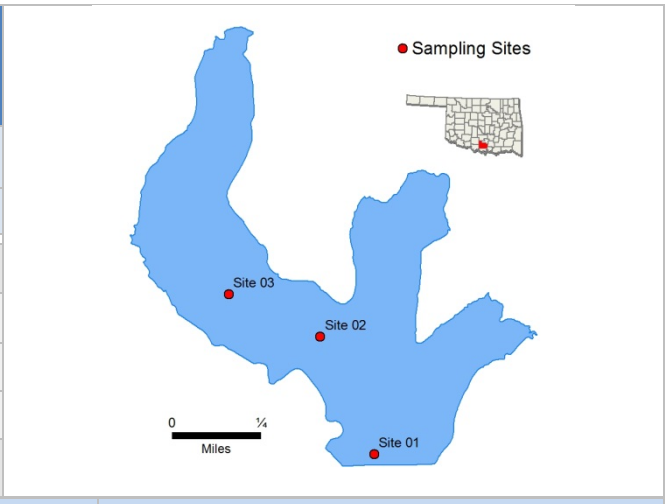
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Healdton

Sample Period	Times Visited	Sampling Sites
November 2005 – August 2006	4	5



General

Location	Carter County	Click map for site data
Impoundment	1979	
Area	370 acres	
Capacity	3,766 acre-feet	
Purposes	Water Supply, Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	29 NTU	100% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	31 cm	
	Water Clarity Rating	Poor	
	Chlorophyll-a	14.8 mg/m3	
	Trophic State Index	57	Previous Value= 49
	Trophic Class	Eutrophic	
Profile	Salinity	0.07– 0.13 ppt	
	Specific Conductivity	143.8 – 278.4 µS/cm	
	pH	7.12 – 8.19 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	23.7 – 415.3 mV	
	Dissolved Oxygen	Up to 40% of water column < 2 mg/L in August	
Nutrients	Surface Total Nitrogen	0.39 mg/L to 0.72 mg/L	
	Surface Total Phosphorus	0.040 mg/L to 0.063 mg/L	
	Nitrogen to Phosphorus Ratio	11:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	NEI							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply				NEI							

S = Fully Supporting
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NEI = Not Enough Information

Notes: *Standards revision, true color is for permitting purposes only.

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

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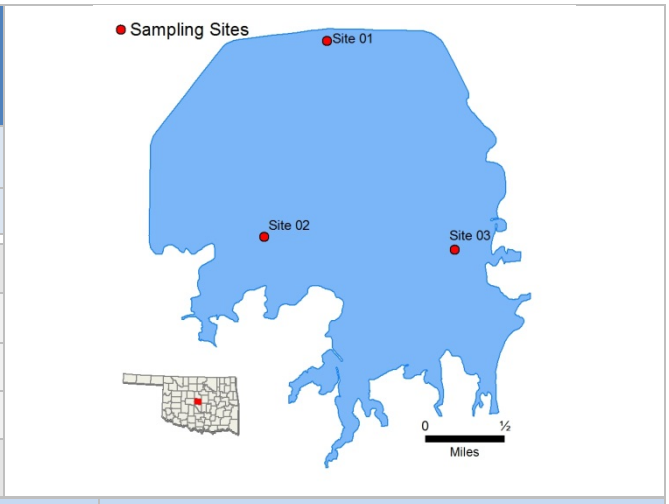
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Hefner

Sample Period	Times Visited	Sampling Sites
October 2015 – August 2016	4	3



General

Location	Oklahoma County	Click map for site data
Impoundment	1947	
Area	2,500 acres	
Capacity	75,000 acre-feet	
Purposes	Water Supply, Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In-Situ	Average Turbidity	8 NTU	100% of values < OWQS of 25 NTU
	Average Secchi Disk Depth	59 cm	
	Water Clarity Rating	Average	
	Chlorophyll-a	52.5 mg/m3	
	Trophic State Index	69	Previous Value= 62
	Trophic Class	Hypereutrophic	
Profile	Salinity	0.46– 0.52 ppt	
	Specific Conductivity	931.7 – 1053.7 µS/cm	
	pH	7.5 – 8.59 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	-85.4 to 388.3 mV	
	Dissolved Oxygen	Up to 47% of water column < 2 mg/L in summer	
Nutrients	Surface Total Nitrogen	1.03 mg/L to 1.24 mg/L	
	Surface Total Phosphorus	0.133mg/L to 0.233 mg/L	
	Nitrogen to Phosphorus Ratio	6:1	Possibly co- limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	S	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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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

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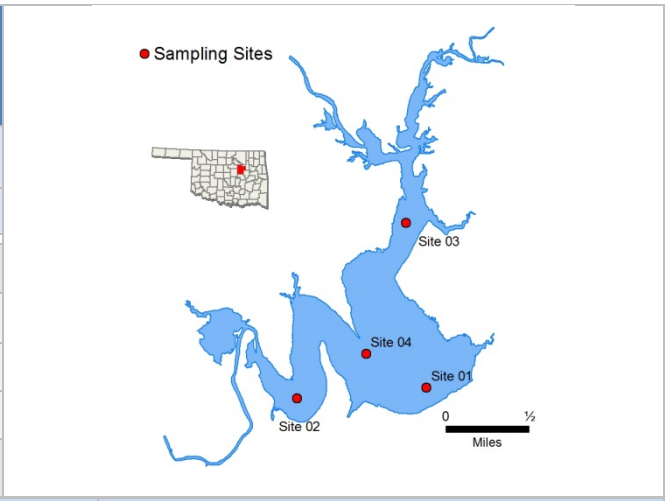
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Heyburn

Sample Period	Times Visited	Sampling Sites
November 2015 - August 2016	4	4



General

Location	Creek County	Click map for site data
Impoundment	1950	
Area	880 acres	
Capacity	7,105 acre-feet	
Purposes	Flood Control and Conservation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In-Situ	Average Turbidity	32 NTU	88% of values > 25 NTU
	Average Secchi Disk Depth	31 cm	
	Water Clarity Rating	Poor	
	Chlorophyll-a	14.6 mg/m3	
	Trophic State Index	57	Previous value = 48
	Trophic Class	Eutrophic	
Profile	Salinity	0.10 – 0.16 ppt	
	Specific Conductivity	209 – 329.9 µS/cm	
	pH	7.22 – 7.99 pH units	
	Oxidation-Reduction Potential	147.6 to 355 mV	
	Dissolved Oxygen	Up to 11% of water column < 2 mg/L in summer	
Nutrients	Surface Total Nitrogen	0.62 mg/L to 0.81 mg/L	
	Surface Total Phosphorus	0.033 mg/L to 0.064 mg/L	
	Nitrogen to Phosphorus Ratio	16:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	NS	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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Notes: *Standards revision, true color is for permitting purposes only.

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

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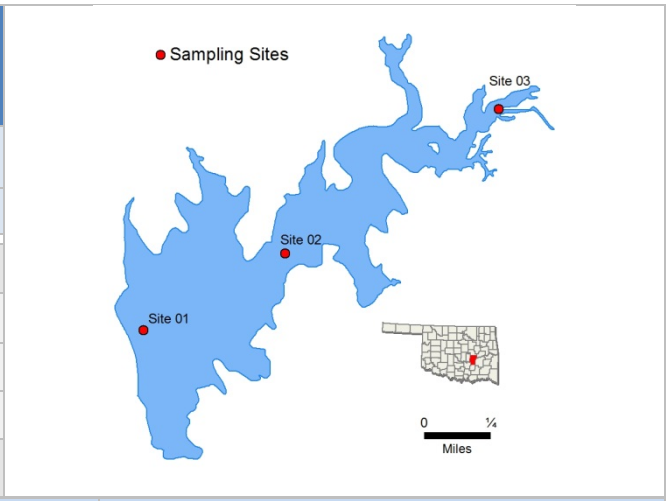
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Holdenville

Sample Period	Times Visited	Sampling Sites
October 2012 - August 2013	4	3



General

Location	Hughes County	Click map for site data
Impoundment	1931	
Area	550 acres	
Capacity	11,000 acre-feet	
Purposes	Water Supply, Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	17 NTU	27% of values > OWQS of 25 NTU (n=11)
	Average Secchi Disk Depth	48 cm	
	Water Clarity Rating	Fair	
	Chlorophyll-a	17 mg/m3	
	Trophic State Index	58	Previous value = 60
	Trophic Class	Eutrophic	
Profile	Salinity	0.14 – 0.19 ppt	
	Specific Conductivity	294 – 398 µS/cm	
	pH	6.51 – 8.37 pH units	
	Oxidation-Reduction Potential	-19 to 351 mV	
	Dissolved Oxygen	Up to 71% of water column < 2 mg/L in August	
Nutrients	Surface Total Nitrogen	0.72 mg/L to 1.37 mg/L	
	Surface Total Phosphorus	0.005 mg/L to 0.036 mg/L	
	Nitrogen to Phosphorus Ratio	88:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	NS	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											NS

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NEI = Not Enough Information

Notes

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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

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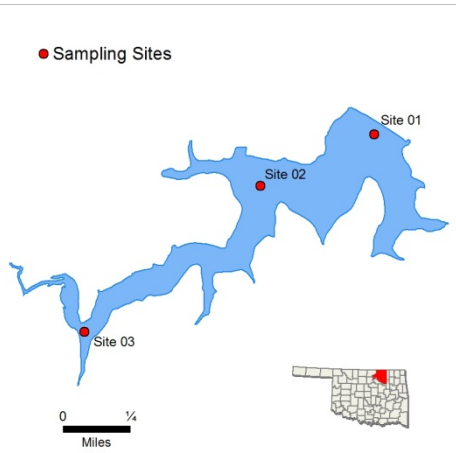
Hominy Municipal

Sample Period	Times Visited	Sampling Sites
November 2006 - August 2007	3	3



General

Location	Osage County	Click map for site data
Impoundment	1940	
Area	165 acres	
Capacity	5,000 acre-feet	
Purposes	Water Supply, Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	9 NTU	100% of values< OWQS of 25 NTU
	Average True Color	35 units	100% of values < OWQS of 70
	Average Secchi Disk Depth	101 cm	
	Water Clarity Rating	excellent	
	Trophic State Index	56	
	Trophic Class	eutrophic	
Profile	Salinity	0.10– 0.14 ppt	
	Specific Conductivity	224 – 297.7 µS/cm	
	pH	7.12 – 8.66 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	-22 - 430 mV	
	Dissolved Oxygen	Up to 62% of water column < 2 mg/L in August	Occurred at sites 1 and 2
Nutrients	Surface Total Nitrogen	0.45 mg/L to 0.98 mg/L	
	Surface Total Phosphorus	0.010 mg/L to 0.028 mg/L	
	Nitrogen to Phosphorus Ratio	34:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NS	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply				S							

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NS = Not Supporting
NEI = Not Enough Information

Notes

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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
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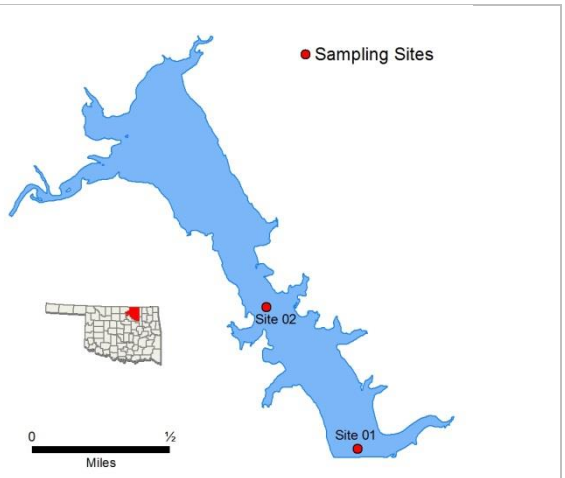
Hudson (Bartlesville)

Sample Period	Times Visited	Sampling Sites
October 2016 – July 2017	4	3



General

Location	Osage County	Click map for site data
Impoundment	1949	
Area	268 acres	
Capacity	2,776 acre-feet	
Purposes	Water Supply, Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	15 NTU	13% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	58 cm	
	Water Clarity Rating	Average	
	Chlorophyll-a	7.06 mg/m3	
	Trophic State Index	50	Previous value = 51
	Trophic Class	Mesotrophic	
Profile	Salinity	0.05 – 0.07 ppt	
	Specific Conductivity	108.7 – 148.6 µS/cm	
	pH	6.69 – 8.51 pH units	
	Oxidation-Reduction Potential	108.7 – 496.8 mV	
	Dissolved Oxygen	Up to 64% of water column < 2.0 mg/L in July	
Nutrients	Surface Total Nitrogen	0.57 mg/L to 1.03 mg/L	
	Surface Total Phosphorus	0.029 mg/L to 0.074 mg/L	
	Nitrogen to Phosphorus Ratio	15:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	S	S							
Aesthetics					S	*					
Agriculture							N/A	N/A	S		
Primary Body Contact Recreation										NEI	
Public & Private Water Supply				S							

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Notes

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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
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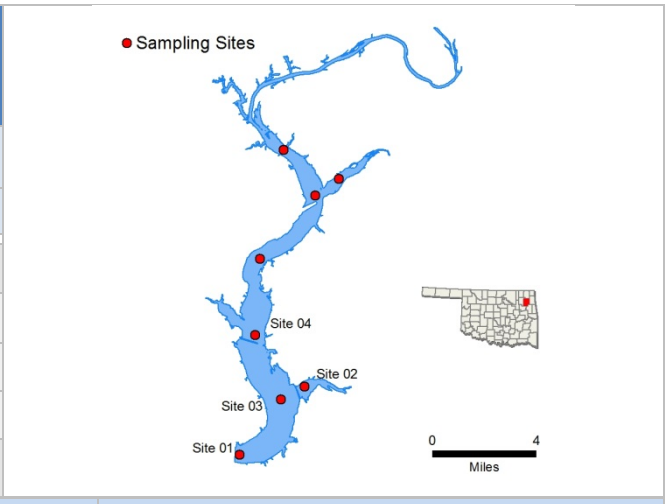
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Hudson, Lower (1-4)

Sample Period	Times Visited	Sampling Sites
October 2018 - July 2019	4	8



General

Location	Mayes County	Click map for site data
Impoundment	1964	
Area	10,900 acres	
Capacity	200,300 acre-feet	
Purposes	Flood Control, Hydropower	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	10 NTU	100% of values< OWQS of 25 NTU (n=15)
	Average Secchi Disk Depth	81 cm	
	Water Clarity Rating	Good	
	Chlorophyll-a	18 mg/m3	
	Trophic State Index	59	Previous value = 60
	Trophic Class	Eutrophic	
Profile	Salinity	0.11 – 0.17 ppt	
	Specific Conductivity	164.7 –290.6 µS/cm	
	pH	7.14 – 8.53 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	299 – 507.8mV	
	Dissolved Oxygen	Up to 12% of water column < 2.0 mg/L in Juy	
Nutrients	Surface Total Nitrogen	0.71 mg/L to 1.84 mg/L	
	Surface Total Phosphorus	0.045 mg/L to 0.184 mg/L	
	Nitrogen to Phosphorus Ratio	10:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	S	NEI							
Aesthetics					S	*					
Agriculture							N/A	N/A	S		
Primary Body Contact Recreation										NEI	
Public & Private Water Supply				NEI							

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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

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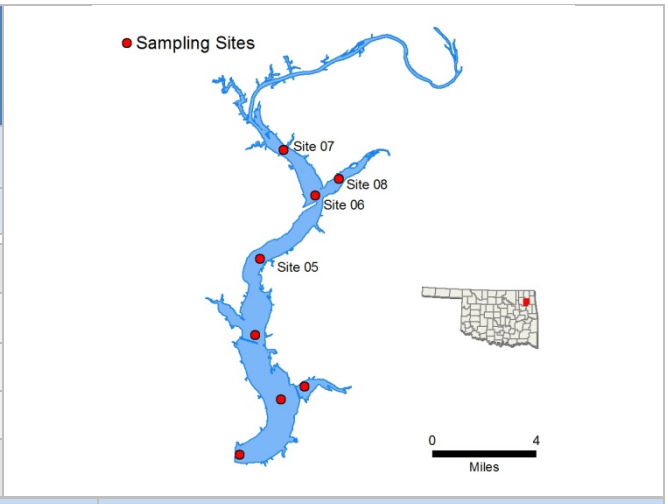
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Hudson, Upper (5-8)

Sample Period	Times Visited	Sampling Sites
October 2018 - July 2019	4	8



General

Location	Mayes County	Click map for site data
Impoundment	1964	
Area	10,900 acres	
Capacity	200,300 acre-feet	
Purposes	Flood Control, Hydropower	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	10 NTU	1000% of values < OWQS of 25 NTU (n=16)
	Average Secchi Disk Depth	67 cm	
	Water Clarity Rating	Good	
	Chlorophyll-a	19 mg/m3	
	Trophic State Index	60	Previous value = 63
	Trophic Class	Eutrophic	
Profile	Salinity	0.11 – 0.17 ppt	
	Specific Conductivity	236.6 – 353.10 µS/cm	
	pH	7.09 – 8.60 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	301.5 – 485 mV	
	Dissolved Oxygen	Up to 100% of water column > 2.0 mg/L in July	
Nutrients	Surface Total Nitrogen	0.80 mg/L to 1.59 mg/L	
	Surface Total Phosphorus	0.058 mg/L to 0.159 mg/L	
	Nitrogen to Phosphorus Ratio	11:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NEI	NEI							
Aesthetics					S	*					
Agriculture							N/A	N/A	S		
Primary Body Contact Recreation										NEI	
Public & Private Water Supply				NEI							

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

Notes: *Standards revision, true color is for permitting purposes only.

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

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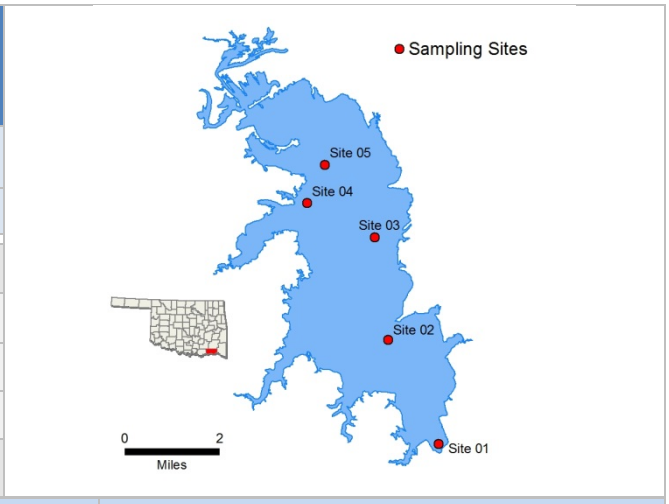
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Hugo

Sample Period	Times Visited	Sampling Sites
November 2016 - August 2017	4	5



General

Location	Choctaw County	Click map for site data
Impoundment	1974	
Area	13,250 acres	
Capacity	157,600 acre-feet	
Purposes	Flood Control, Water Supply, Water Quality Control, Fish and Wildlife, and Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	36 NTU	88% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	37 cm	
	Water Clarity Rating	Poor	
	Chlorophyll-a	14.35 mg/m3	
	Trophic State Index	57	Previous value = 61
	Trophic Class	Eutrophic	
Profile	Salinity	0.02 – 134.9 ppt	
	Specific Conductivity	54.3 – 142.2 µS/cm	
	pH	6.3 – 8.3 pH units	Only 5.3% values < 6.5 pH units
	Oxidation-Reduction Potential	181.8 to 548.5 mV	
	Dissolved Oxygen	Up to 50% of water column < 2 mg/L in August	
Nutrients	Surface Total Nitrogen	0.4 mg/L to 0.76 mg/L	
	Surface Total Phosphorus	0.047 mg/L to 0.082mg/L	
	Nitrogen to Phosphorus Ratio	9:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	NS	S	S							
Aesthetics					S	*					
Agriculture							N/A	N/A	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply				S							

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

Notes: *Standards revision, true color is for permitting purposes only.

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

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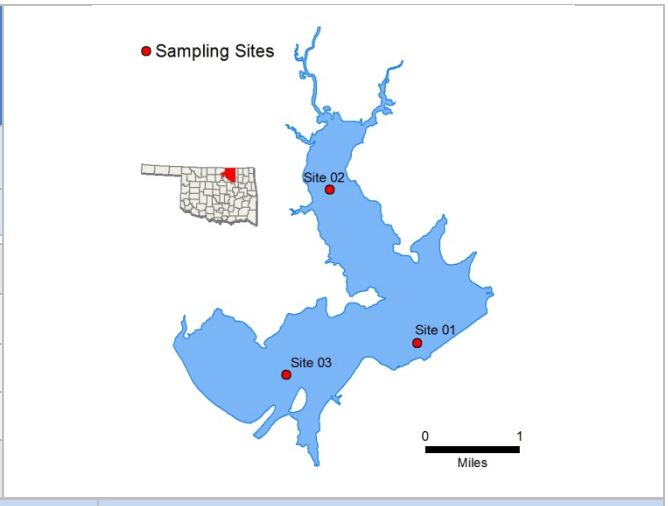
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Hulah

Sample Period	Times Visited	Sampling Sites
November 2018 – August 2019	4	5



General

Location	Osage County	Click map for site data
Impoundment	1951	
Area	3,570 acres	
Capacity	31,160 acre-feet	
Purposes	Flood Control, Water Supply, Low-flow Regulation, and Conservation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	44 NTU	78% of values > OWQS of 25 NTU (n=9)
	Average Secchi Disk Depth	26 cm	
	Water Clarity Rating	Poor	
	Chlorophyll-a	16.77 mg/m3	
	Trophic State Index	58	Previous value = 54
	Trophic Class	Eutrophic	
Profile	Salinity	0.12 - 0.20 ppt	
	Specific Conductivity	258.3 – 418.8 µS/cm	
	pH	7.29 – 8.43 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	177.7 to 427.10 mV	
	Dissolved Oxygen	Up to 35% of water column < 2 mg/L in August	
Nutrients	Surface Total Nitrogen	0.44 mg/L to 1.33 mg/L	
	Surface Total Phosphorus	0.050 mg/L to 0.153 mg/L	
	Nitrogen to Phosphorus Ratio	10:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	S							
Aesthetics					NEI	N/A					
Agriculture							N/A	N/A	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply				S							

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

Notes

*Currently, this lake is listed as a Nutrient Limited Watershed (NLW) in the Oklahoma Water Quality Standards (WQS). This means that the lake is considered threatened from nutrients until a more intensive study can confirm the Aesthetics beneficial use non-support status.**Standards revision, true color is for permitting purposes only.

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

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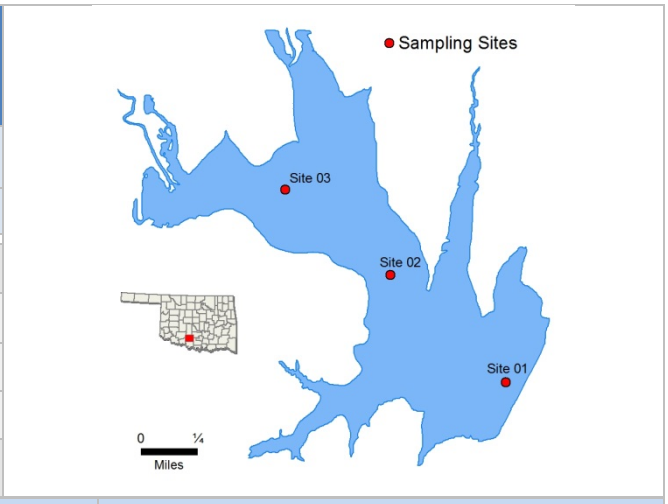
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Humphreys

Sample Period	Times Visited	Sampling Sites
October 2018 – July 2019	4	3



General

Location	Stephens County	Click map for site data
Impoundment	1958	
Area	882 acres	
Capacity	14,041 acre-feet	
Purposes	Water Supply, Flood Control, Recreation	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	7 NTU	100% of values < OWQS of 25 NTU (n=12)
	Average Secchi Disk Depth	115 cm	
	Water Clarity Rating	Excellent	
	Chlorophyll-a	17.39 mg/m3	
	Trophic State Index	59	Previous value = 62
	Trophic Class	Eutrophic	
Profile	Salinity	0.26 – 0.33 ppt	
	Specific Conductivity	542.9 – 680.5 µS/cm	
	pH	7.23 – 8.36pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	-74.10 – 4442.4 mV	
	Dissolved Oxygen	Up to 53% of water column < 2.0 mg/L in July	
Nutrients	Surface Total Nitrogen	0.70 mg/L to 1.01 mg/L	
	Surface Total Phosphorus	0.020 mg/L to 0.061 mg/L	
	Nitrogen to Phosphorus Ratio	24:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	S	S							
Aesthetics					NEI	*					
Agriculture							N/A	N/A	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											NS

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

Notes

*Standards revision, true color is for permitting purposes only. *Based on the TSI this lake will be further reviewed to determine the need to be considered as an NLW water body.

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

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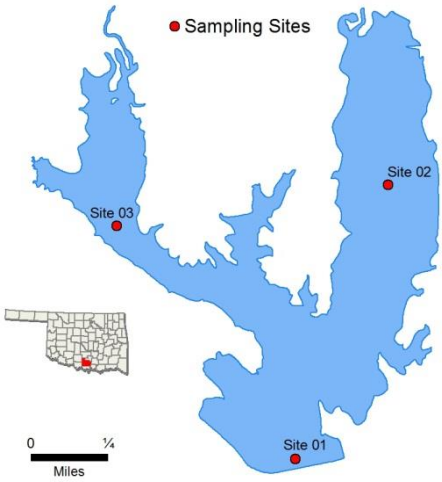
Jean Neustadt

Sample Period	Times Visited	Sampling Sites
December 2016 – September 2017	4	5



General

Location	Carter County
Impoundment	1969
Area	462 acres
Capacity	6,106 acre-feet
Purposes	Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	16 NTU	17% of values > OWQS of 25 NTU (n=12)
	Average Secchi Disk Depth	48 cm	
	Water Clarity Rating	Average	
	Chlorophyll-a	14.23 mg/m3	
	Trophic State Index	57	Previous value = 61
	Trophic Class	Eutrophic	
Profile	Salinity	0.10– 0.14 ppt	
	Specific Conductivity	220.8 – 328.9 µS/cm	
	pH	6.95 – 8.58 pH units	
	Oxidation-Reduction Potential	44 - 456.8 mV	
	Dissolved Oxygen	Up to 54% of water column < 2 mg/L in June	Occurred at site 1, the dam
Nutrients	Surface Total Nitrogen	0.60 mg/L to 1.14 mg/L	
	Surface Total Phosphorus	0.024mg/L to 0.087 mg/L	
	Nitrogen to Phosphorus Ratio	20:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NEI	S							
Aesthetics					S	*					
Agriculture							N/A	N/A	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes

*Standards revision, true color is for permitting purposes only.

* 50-70% range is undetermined for DO.

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

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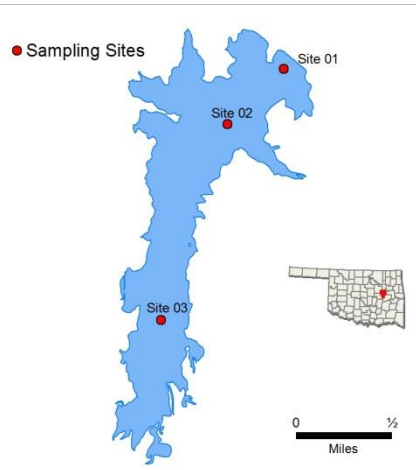
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Jim Hall (Henryetta)

Sample Period	Times Visited	Sampling Sites
October 2018 – September 2019	4	5



General

Location	Okmulgee County
Impoundment	1928
Area	450 acres
Capacity	6,600 acre-feet
Purposes	Water Supply and Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	65 NTU	100% of values > OWQS of 25 NTU (n=9)
	Average Secchi Disk Depth	22 cm	
	Water Clarity Rating	Poor	
	Chlorophyll-a	5.93 mg/m3	
	Trophic State Index	48	Previous value = 44
	Trophic Class	Mesotrophic	
Profile	Salinity	0.04 - 0.05 ppt	
	Specific Conductivity	76.9 –113.9 µS/cm	
	pH	6.32 – 7.45 pH units	9.8% of recorded values <6.5
	Oxidation-Reduction Potential	252 to 502.3 mV	
	Dissolved Oxygen	Up to 17% of water column < 2 mg/L in September	
Nutrients	Surface Total Nitrogen	0.72 mg/L to 1.04 mg/L	
	Surface Total Phosphorus	0.092 mg/L to 0.125 mg/L	
	Nitrogen to Phosphorus Ratio	9:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	NS							
Aesthetics					S	*					
Agriculture							N/A	N/A	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply				NS							

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

Notes

Not supporting for lead as chronic criteria was exceeded. All other toxicants are fully supporting. Standards revision, true color is for permitting purposes only.

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

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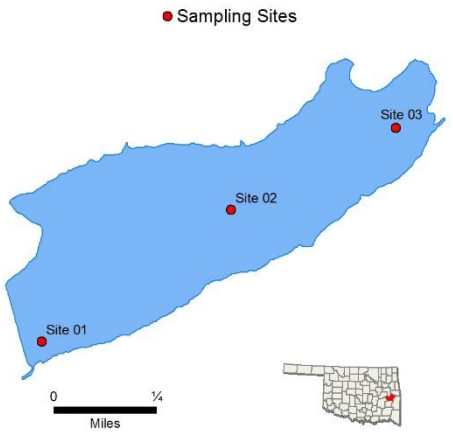
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

John Wells

Sample Period	Times Visited	Sampling Sites
November 2016 – August 2017	4	5



General

Location	Haskell County
Impoundment	1936
Area	194 acres
Capacity	1,352 acre-feet
Purposes	Water Supply, Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	4 NTU	100% of values < OWQS of 25 NTU (n=10)
	Average Secchi Disk Depth	146 cm	
	Water Clarity Rating	Excellent	
	Chlorophyll	5.2 mg/L	
	Trophic State Index	47	Previous value = 45
	Trophic Class	Mesotrophic	
Profile	Salinity	0.03 – 0.08 ppt	
	Specific Conductivity	75.2 – 165.2 µS/cm	
	pH	6.39 – 8.74 pH units	4.8% of values < 6.50 pH
	Oxidation-Reduction Potential	95.2 – 546.3 mV	
	Dissolved Oxygen	Up to 50% of water column < 2.0 mg/L in July	
Nutrients	Surface Total Nitrogen	0.42 mg/L to 0.55 mg/L	
	Surface Total Phosphorus	0.014 mg/L to 0.018 mg/L	
	Nitrogen to Phosphorus Ratio	31:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	S	S							
Aesthetics					S	*					
Agriculture							*	*	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply				S							

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

Notes: Standards revision, true color is for permitting purposes only.

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

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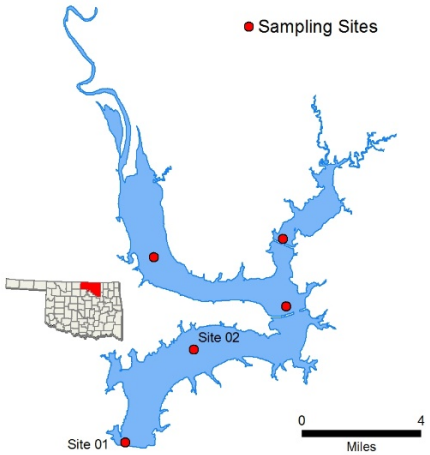
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Kaw (Lower)

Sample Period	Times Visited	Sampling Sites
October 2014 – July 2015	4	5



General

Location	Osage County
Impoundment	1976
Area	17,040 acres
Capacity	428,600 acre-feet
Purposes	Flood Control, Water Supply, Water Quality Control, and Conservation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	9 NTU	100% of values < 25 NTU
	Average Secchi Disk Depth	106 cm	
	Water Clarity Rating	Good	
	Chlorophyll-a	4 mg/m3	
	Trophic State Index	45	Previous value = 52
	Trophic Class	Mesotrophic	
Profile	Salinity	0.23 – 0.60 ppt	
	Specific Conductivity	484.7 – 1189.9 µS/cm	
	pH	6.92 – 8.23 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	120 to 442.4 mV	
	Dissolved Oxygen	Up to 68% of water column < 2 mg/L in July	
Nutrients	Surface Total Nitrogen	0.82 mg/L to 1.69 mg/L	
	Surface Total Phosphorus	0.142 mg/L to 0.245 mg/L	
	Nitrogen to Phosphorus Ratio	7:1	Possibly co-limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	NEI	NEI							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										NEI	
Public & Private Water Supply				NEI							

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NEI = Not Enough Information

Notes: Standards revision, true color is for permitting purposes only.

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

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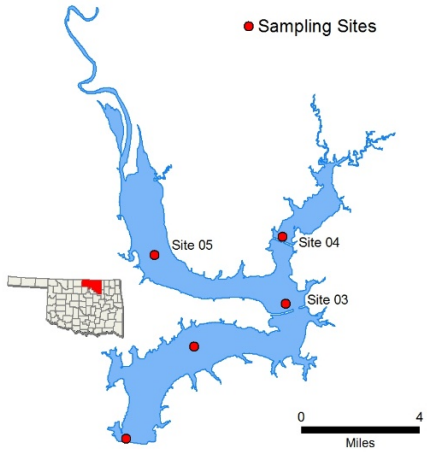
Kaw (Upper)

Sample Period	Times Visited	Sampling Sites
October 2014 – July 2015	4	5



General

Location	Osage County
Impoundment	1976
Area	17,040 acres
Capacity	428,600 acre-feet
Purposes	Flood Control, Water Supply, Water Quality Control, and Conservation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	42 NTU	18% of values > 25 NTU
	Average Secchi Disk Depth	53 cm	
	Water Clarity Rating	Fair	
	Chlorophyll-a	16.5 mg/m3	
	Trophic State Index	58	Previous value = 60
	Trophic Class	Eutrophic	
Profile	Salinity	0.22 – 0.76 ppt	
	Specific Conductivity	465.4 – 1495.4 µS/cm	
	pH	7.20 – 8.49 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	149.9 to 417.6 mV	
	Dissolved Oxygen	Up to 40% of water column < 2 mg/L in July	
Nutrients	Surface Total Nitrogen	0.73 mg/L to 2.76 mg/L	
	Surface Total Phosphorus	0.127 mg/L to 0.455 mg/L	
	Nitrogen to Phosphorus Ratio	6:1	Possibly co- limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	NEI	NEI							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										NEI	
Public & Private Water Supply				NEI							

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NS = Not Supporting
NEI = Not Enough Information

Notes: Standards revision, true color is for permitting purposes only.

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

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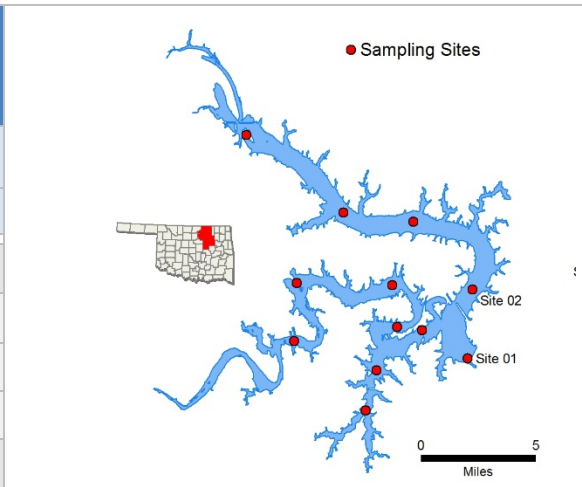
Keystone (1-2)

Sample Period	Times Visited	Sampling Sites
October 2018 – July 2019	4	12



General

Location	Tulsa County
Impoundment	1964
Area	23,610 acres
Capacity	557,600 acre-feet
Purposes	Flood Control, Water Supply, Hydropower, Navigation, Fish & Wildlife

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	75 NTU	50% of values > OWQS of 25 NTU (n=8)
	Average Secchi Disk Depth	42 cm	
	Water Clarity Rating	Average	
	Chlorophyll-a	14.56 mg/m3	
	Trophic State Index	57	Previous value = 54
	Trophic Class	Eutrophic	
Profile	Salinity	0.25 – 1.78 ppt	
	Specific Conductivity	517.5 – 3372.2 µS/cm	
	pH	7.43 – 8.59 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	189.9 – 476.5 mV	
	Dissolved Oxygen	Up to 19% of water column < 2.0 mg/L in July	
Nutrients	Surface Total Nitrogen	1.02 mg/L to 2.10 mg/L	
	Surface Total Phosphorus	0.120mg/L to 0.390 mg/L	
	Nitrogen to Phosphorus Ratio	6:1	Possibly co-limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	NEI	NEI							
Aesthetics					S	N/A					
Agriculture							S	S	S		
Primary Body Contact Recreation										NEI	
Public & Private Water Supply				NEI							

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NS = Not Supporting
NEI = Not Enough Information

Notes *Standards revision, true color is for permitting purposes only

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

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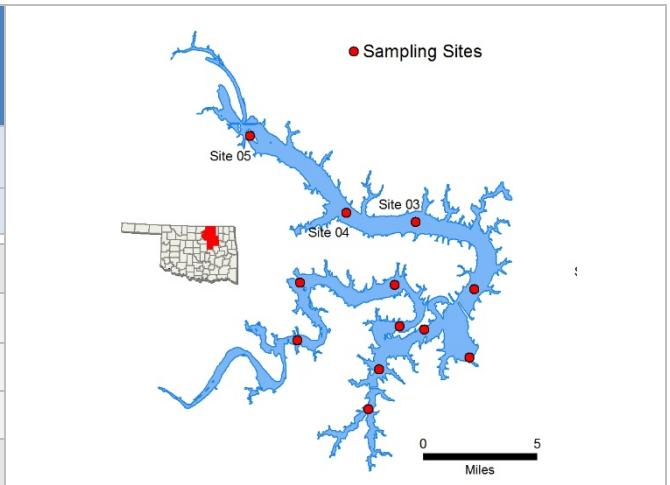
Keystone, Arkansas River Arm (3-5)

Sample Period	Times Visited	Sampling Sites
October 2018 – July 2019	4	12



General

Location	Tulsa County
Impoundment	1964
Area	23,610 acres
Capacity	557,600 acre-feet
Purposes	Flood Control, Water Supply, Hydropower, Navigation, Fish & Wildlife

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	94 NTU	92% of values > OWQS of 25 NTU (n=12)
	Average Secchi Disk Depth	20 cm	
	Water Clarity Rating	Poor	
	Chlorophyll-a	17.17 mg/m3	
	Trophic State Index	58	Previous value = 64
	Trophic Class	Eutrophic	
Profile	Salinity	0.28 – 0.71 ppt	
	Specific Conductivity	567.1 – 1413.5 µS/cm	
	pH	7.5 – 8.61 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	244.5 – 421 mV	
	Dissolved Oxygen		
Nutrients	Surface Total Nitrogen	0.93 mg/L to 2.19 mg/L	
	Surface Total Phosphorus	0.100 mg/L to 0.450 mg/L	
	Nitrogen to Phosphorus Ratio	6:1	Possibly co-limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	NEI							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										NEI	
Public & Private Water Supply				NEI							

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

Notes

Standards revision, true color is for permitting purposes only

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

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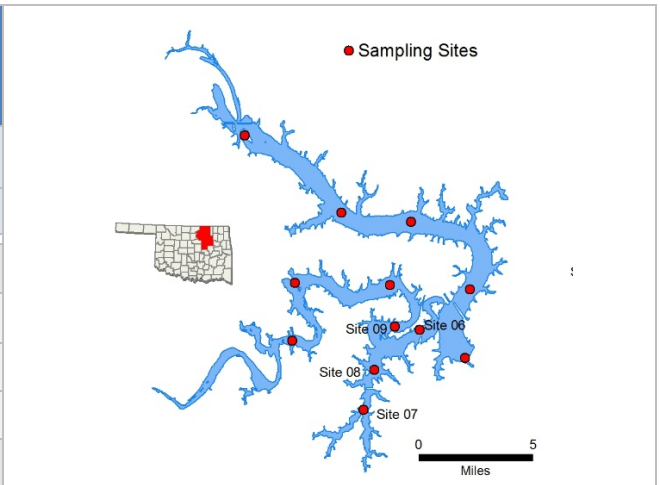
Keystone, Lower Cimarron River Arm (6-9)

Sample Period	Times Visited	Sampling Sites
October 2018 – July 2019	4	12



General

Location	Tulsa County
Impoundment	1964
Area	23,610 acres
Capacity	557,600 acre-feet
Purposes	Flood Control, Water Supply, Hydropower, Navigation, Fish & Wildlife

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Stu	Average Turbidity	25 NTU	13% of values > OWQS of 25 NTU (n=16)
	Average Secchi Disk Depth	52 cm	
	Water Clarity Rating	Average	
	Chlorophyll-a	27.6 mg/m3	
	Trophic State Index	63	Previous value = 60
	Trophic Class	Hypereutrophic	
Profile	Salinity	0.41 – 2.32 ppt	
	Specific Conductivity	846.4 – 4347.9 µS/cm	
	pH	7.28 – 8.56 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	159.9 – 437.4 mV	
	Dissolved Oxygen	Up to 23% of water column < 2.0 mg/L in July	
Nutrients	Surface Total Nitrogen	0.81 mg/L to 1.98 mg/L	
	Surface Total Phosphorus	0.100 mg/L to 0.290 mg/L	
	Nitrogen to Phosphorus Ratio	7:1	Possibly co-limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	NEI	NEI							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										NEI	
Public & Private Water Supply				NEI							

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Notes

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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
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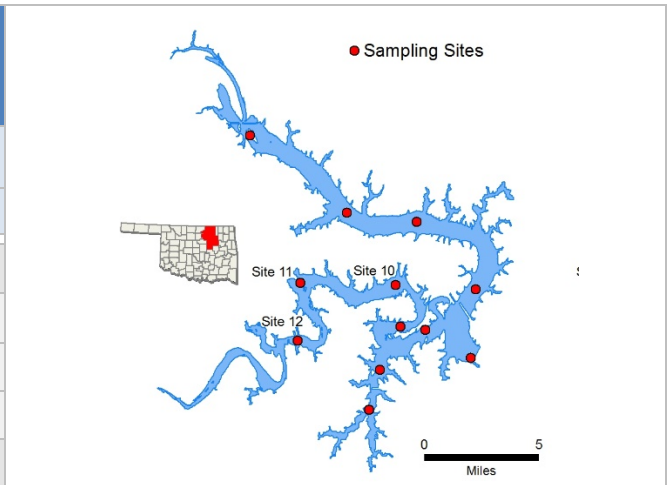
Keystone, Upper Cimarron River Arm (10-12)

Sample Period	Times Visited	Sampling Sites
October 2018 – July 2019	4	12



General

Location	Tulsa County
Impoundment	1964
Area	23,610 acres
Capacity	557,600 acre-feet
Purposes	Flood Control, Water Supply, Hydropower, Navigation, Fish & Wildlife

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	49 NTU	50% of values > OWQS of 25 NTU (n=10)
	Average Secchi Disk Depth	32 cm	
	Water Clarity Rating	Poor	
	Chlorophyll-a	37.17 mg/m3	
	Trophic State Index	66	Previous value = 67
	Trophic Class	Hypereutrophic	
Profile	Salinity	0.81 – 3.07 ppt	
	Specific Conductivity	1625.5– 5697.2 µS/cm	
	pH	7.49 – 8.66 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	185.7 – 439.6 mV	
	Dissolved Oxygen	Up to 34% of water column < 2.0 mg/L in July	
Nutrients	Surface Total Nitrogen	0.81 mg/L to 2.03 mg/L	
	Surface Total Phosphorus	0.140 mg/L to 0.250 mg/L	
	Nitrogen to Phosphorus Ratio	8:1	Possibly co-limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	*	NEI							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										NEI	
Public & Private Water Supply				NEI							

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Notes

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E. coli = Escherichia coli
OWQS = Oklahoma Water Quality Standards
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Chlor-a = Chlorophyll-a
mg/L = milligrams per liter
µS/cm = microsiemens/cm
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En = Enterococci

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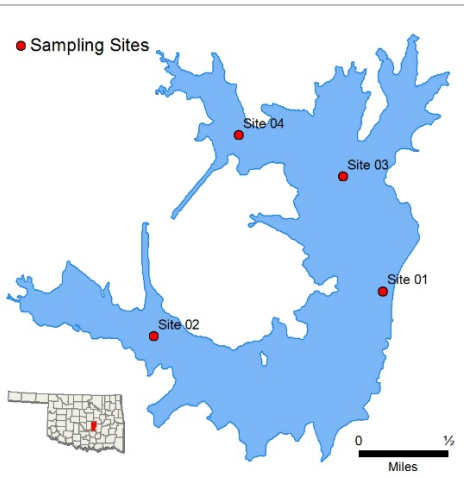
Konawa

Sample Period	Times Visited	Sampling Sites
November 2018 – September 2019	4	3



General

Location	Seminole County
Impoundment	1968
Area	1,350 acres
Capacity	23,000 acre-feet
Purposes	Cooling Water

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	6 NTU	100% of values < OWQS of 25 NTU (n=9)
	Average Secchi Disk Depth	104 cm	
	Water Clarity Rating	Excellent	
	Chlorophyll-a	17 mg/m3	
	Trophic State Index	58	Previous value = 59
	Trophic Class	Eutrophic	
Profile	Salinity	0.28 – 0.36 ppt	
	Specific Conductivity	579.8 – 732.1 µS/cm	
	pH	6.86 – 8.55 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	-101.1 to 501.2 mV	
	Dissolved Oxygen	Up to 40% of water column < 2.0 mg/L in September	
Nutrients	Surface Total Nitrogen	0.73 mg/L to 1.05 mg/L	
	Surface Total Phosphorus	0.025 mg/L to 0.057 mg/L	
	Nitrogen to Phosphorus Ratio	22:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	S	*							
Aesthetics					S	N/A					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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Notes

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µS/cm = microsiemens per centimeter
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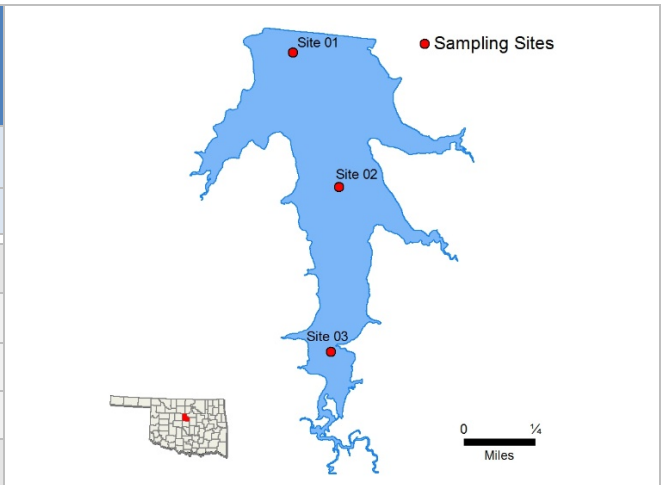
Chlor-a = Chlorophyll-a
mg/L = milligrams per liter
µS/cm = microsiemens/cm
ppt = parts per thousand
En = Enterococci

Langston

Sample Period	Times Visited	Sampling Sites
November 2015 – August 2016	4	5



General

Location	Logan County
Impoundment	1966
Area	304 acres
Capacity	5,792 acre-feet
Purposes	Water Supply, Flood Control, and Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In-Situ	Average Turbidity	6 NTU	100% of values < 25 NTU
	Average Secchi Disk Depth	104 cm	
	Water Clarity Rating	Excellent	
	Chlorophyll-a	5.6 mg/m3	
	Trophic State Index	48	Previous value = 45
	Trophic Class	Mesotrophic	
Profile	Salinity	0.18 – 0.19 ppt	
	Specific Conductivity	372.2 – 393.7 µS/cm	
	pH	7.91 – 8.42 pH units	
	Oxidation-Reduction Potential	150.1 to 336.3 mV	
	Dissolved Oxygen	Up to 27% of water column < 2 mg/L in summer	
Nutrients	Surface Total Nitrogen	0.47 mg/L to 0.54 mg/L	
	Surface Total Phosphorus	0.010 mg/L to 0.019 mg/L	
	Nitrogen to Phosphorus Ratio	38:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	S	S							
Aesthetics					S	S					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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Notes

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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
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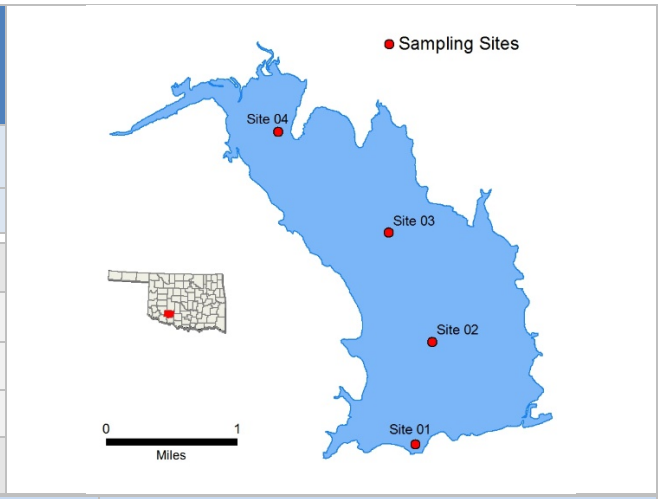
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Lawtonka

Sample Period	Times Visited	Sampling Sites
October 2018 – July 2019	4	5



General

Location	Comanche County
Impoundment	1905
Area	2,398 acres
Capacity	56,574 acre-feet
Purposes	Water Supply, Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In-Situ	Average Turbidity	10 NTU	100% of values <OWQS of 25 NTU
	Average Secchi Disk Depth	94 cm	
	Water Clarity Rating	Excellent	
	Chlorophyll-a	25.82 mg/m3	
	Trophic State Index	62	Previous Value= 62
	Trophic Class	Hypereutrophic	
Profile	Salinity	0.14– 0.17 ppt	
	Specific Conductivity	296.4 – 360.6 µS/cm	
	pH	7.3 – 8.37 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	5.1 – 481.8 mV	
	Dissolved Oxygen	Up to 49% of water column < 2 mg/L in July	
Nutrients	Surface Total Nitrogen	0.57 mg/L to 0.90 mg/L	
	Surface Total Phosphorus	0.021 mg/L to 0.054 mg/L	
	Nitrogen to Phosphorus Ratio	20:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NEI	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											NS

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Notes

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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

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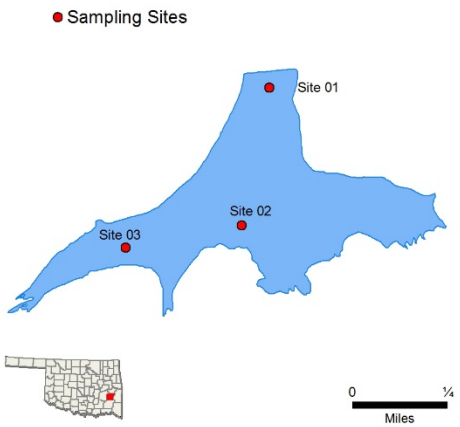
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Lloyd Church (Wilburton)

Sample Period	Times Visited	Sampling Sites
December 2018 – August 2019	4	3



General

Location	Latimer County
Impoundment	1964
Area	160 acres
Capacity	3,060 acre-feet
Purposes	Water Supply, Recreation, Flood Control

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	10 NTU	100% of values < 25 NTU (n=12)
	Average Secchi Depth	99 cm	
	Water Clarity Rating	Excellent	
	Chlorophyll-a	5.3 mg/m3	
	Trophic State Index	47	Previous value = 46
	Trophic Class	Mesotrophic	
Profile	Salinity	0.02 – 0.04 ppt	
	Specific Conductivity	42.6 – 82.6 µS/cm	
	pH	6.05 – 7.48 pH units	40% of values <6.5 pH units
	Oxidation-Reduction Potential	76.1 -596.8 mV	
	Dissolved Oxygen	Up to 53% of water column < 2 mg/L in September	
Nutrients	Surface Total Nitrogen	0.27 mg/L to 0.44 mg/L	
	Surface Total Phosphorus	0.013 mg/L to 0.029 mg/L	
	Nitrogen to Phosphorus Ratio	17:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	NS	NEI	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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Notes

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E. coli = Escherichia coli
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mV = millivolts
Chlor-a = Chlorophyll-a
mg/L = milligrams per liter
µS/cm = microsiemens/cm
ppt = parts per thousand
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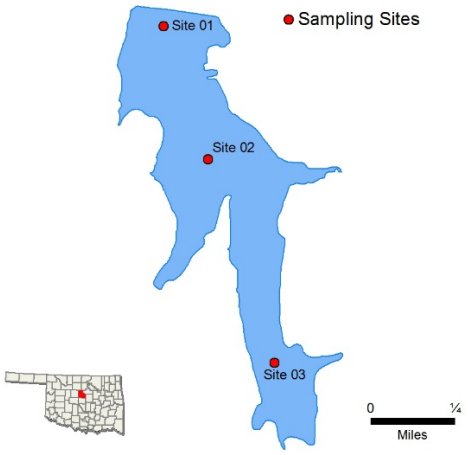
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Liberty

Sample Period	Times Visited	Sampling Sites
November 2015 – August 2016	4	3



General

Location	Logan County
Impoundment	1948
Area	167 acres
Capacity	2,740 acre-feet
Purposes	Water Supply, Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	12 NTU	100% of values < OWQS of 25 NTU
	Average Secchi Disk Depth	52 cm	
	Water Clarity Rating	Average	
	Chlorophyll-a	57.3 mg/m3	
	Trophic State Index	70	Previous Value= 67
	Trophic Class	Hypereutrophic	
Profile	Salinity	0.27 – 0.31 ppt	
	Specific Conductivity	567.7 – 640.1 µS/cm	
	pH	7.57 – 8.65 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	-11.8 - 307.9 mV	
	Dissolved Oxygen	Up to 40% of water column < 2 mg/L in August	
Nutrients	Surface Total Nitrogen	0.78 mg/L to 1.419mg/L	
	Surface Total Phosphorus	0.054 mg/L to 0.080 mg/L	
	Nitrogen to Phosphorus Ratio	17:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	S	S							
Aesthetics					S	S					
Agriculture							S	S	S		
Primary Body Contact Recreation										NS	
Public & Private Water Supply											NS

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Notes

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Chlor-a = Chlorophyll-a
mg/L = milligrams per liter
µS/cm = microsiemens/cm
ppt = parts per thousand
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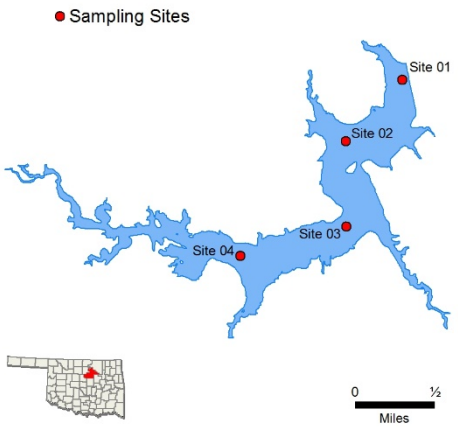
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Lone Chimney

Sample Period	Times Visited	Sampling Sites
December 2015 – Sept. 2016	4	5



General

Location	Pawnee County
Impoundment	1984
Area	550 acres
Capacity	6,200 acre-feet
Purposes	Water Supply, Recreation and Flood Control

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In-Situ	Average Turbidity	10 NTU	100% of values < OWQS of 25 NTU
	Average Secchi Disk Depth	78 cm	
	Water Clarity Rating	Good	
	Chlorophyll-a	10.7 mg/m3	
	Trophic State Index	54	Previous Value=52
	Trophic Class	Eutrophic	
Profile	Salinity	0.13– 0.20 ppt	
	Specific Conductivity	276.1 – 405.4 µS/cm	
	pH	6.89 – 7.97 pH units	
	Oxidation-Reduction Potential	35.4 - 434 mV	
	Dissolved Oxygen	Up to 57% of water column < 2 mg/L in summer	
Nutrients	Surface Total Nitrogen	0.82 mg/L to 1.08 mg/L	
	Surface Total Phosphorus	0.030 mg/L to 0.043 mg/L	
	Nitrogen to Phosphorus Ratio	26:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	NEI								
Aesthetics					S	S					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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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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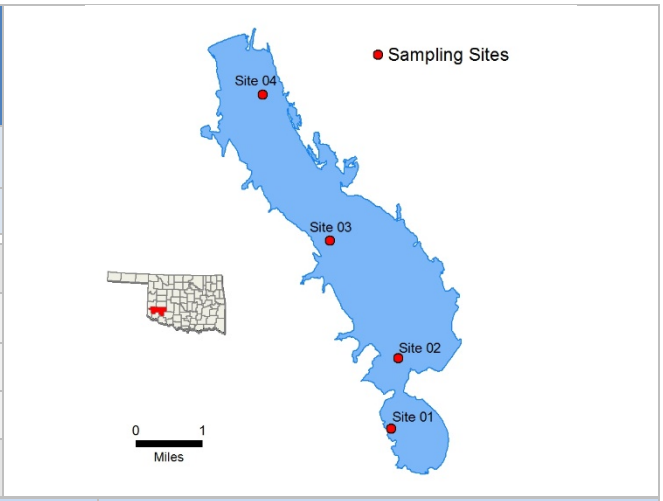
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Lugert-Altus

Sample Period	Times Visited	Sampling Sites
October 2015 - August 2016	2	4



General

Location	Greer County
Impoundment	1947
Area	6,260 acres
Capacity	132,830 acre-feet
Purposes	Water Supply, Flood Control, Irrigation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In-Situ	Average Turbidity	10 NTU	0% of values >OWQS of 25 NTU
	Average Secchi Depth	53 cm	
	Water Clarity Rating	Average	
	Chlorophyll-a	18.7 mg/m3	
	Trophic State Index	59	Previous Value= 51
	Trophic Class	Eutrophic	
Profile	Salinity	1.04 – 1.40 ppt	
	Specific Conductivity	2023.6 –2685.9 µS/cm	
	pH	7.77 – 8.27 pH units	
	Oxidation-Reduction Potential	214.7 – 528.8 mV	
	Dissolved Oxygen		All readings above 2.0 mg/L
Nutrients	Surface Total Nitrogen	0.78mg/L to 0.97 mg/L	
	Surface Total Phosphorus	0.038 mg/L to 0.074 mg/L	
	Nitrogen to Phosphorus Ratio	18:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S								
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										NEI	
Public & Private Water Supply											

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Notes

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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
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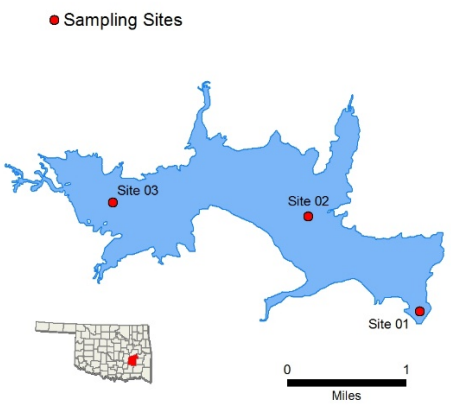
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

McAlester

Sample Period	Times Visited	Sampling Sites
October 2014 – July 2015	4	3



General

Location	Pittsburg County
Impoundment	1930
Area	1,521 acres
Capacity	13,398 acre feet
Purposes	Water Supply and Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	110 NTU	100% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	9 cm	
	Water Clarity Rating	Poor	
	Chlorophyll-a	6 mg/m3	
	Trophic State Index	48	Previous value = 54
	Trophic Class	Mesotrophic	
Profile	Salinity	0.03 – 0.07 ppt	
	Specific Conductivity	74.1 – 154.3 µS/cm	
	pH	6.52 – 7.91 pH units	
	Oxidation-Reduction Potential	60.7 to 504 mV	
	Dissolved Oxygen	Up to 50% of water column < 2.0 mg/L in July	
Nutrients	Surface Total Nitrogen	0.79 mg/L to 1.12 mg/L	
	Surface Total Phosphorus	0.068 mg/L to 0.110 mg/L	
	Nitrogen to Phosphorus Ratio	10:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

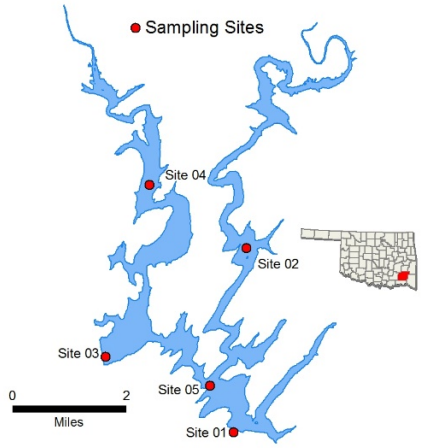
Notes

* Standards revision, true color is for permitting purposes only

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

McGee Creek

Sample Period	Times Visited	Sampling Sites
December 2014 – September 2015	4	5



General

Location	Atoka County
Impoundment	1987
Area	3,810 acres
Capacity	113,930 acre-feet
Purposes	Water Supply, Recreation, Water Quality Control, Flood Control, Fish & Wildlife

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	6 NTU	10% of values < OWQS of 25 NTU (n=20)
	Average Secchi Disk Depth	96 cm	
	Water Clarity Rating	Excellent	
	Chlorophyll-a	7 mg/m3	
	Trophic State Index	50	Previous value = 49
	Trophic Class	Mesotrophic	
Profile	Salinity	0.02 – 0.07 ppt	
	Specific Conductivity	48 – 146.1 µS/cm	
	pH	6.04 – 7.71 pH units	39% of values < 6.5 pH units
	Oxidation-Reduction Potential	29.7 to 519.3 mV	
	Dissolved Oxygen	Up to 76% of water column < 2.0 mg/L in August	Occurred at site 1, the dam
Nutrients	Surface Total Nitrogen	0.36 mg/L to 0.74 mg/L	
	Surface Total Phosphorus	0.005 mg/L to 0.033 mg/L	
	Nitrogen to Phosphorus Ratio	31:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	S	NS*	NS	NEI							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply				NEI							

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

Notes

*Slightly acidic conditions are not unusual in this part of the state due to relatively low soil pH and lack of soluble bedrock. Because of these conditions it is likely that the low pH values may be due to natural causes; therefore the Water Board is looking at the applicability of developing site-specific criteria for waters in the southeastern portion of the state
** Standards revision, true color is for permitting purposes only

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

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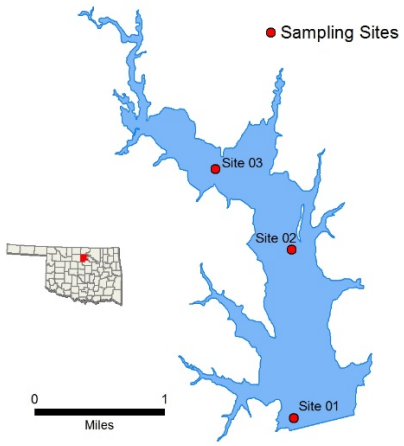
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

McMurtry

Sample Period	Times Visited	Sampling Sites
October 2018 – July 2019	4	3



General

Location	Noble County
Impoundment	1971
Area	1,155 acres
Capacity	19,733 acre feet
Purposes	Water Supply, Flood Control, and Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	18 NTU	17% of values > OWQS of 25 NTU (n=12)
	Average Secchi Disk Depth	52 cm	
	Water Clarity Rating	Average	
	Chlorophyll-a	8.08 mg/m3	
	Trophic State Index	51	Previous value = 49
	Trophic Class	Eutrophic	
Profile	Salinity	0.14 – 0.24 ppt	
	Specific Conductivity	295.4 – 491.3 µS/cm	
	pH	7.251 – 8.36 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	51.8 to 4442 mV	
	Dissolved Oxygen	Up to 66% of water column < 2.0 mg/L in July	
Nutrients	Surface Total Nitrogen	0.50 mg/L to 0.66 mg/L	
	Surface Total Phosphorus	0.019 mg/L to 0.045 mg/L	
	Nitrogen to Phosphorus Ratio	21:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	NEI	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

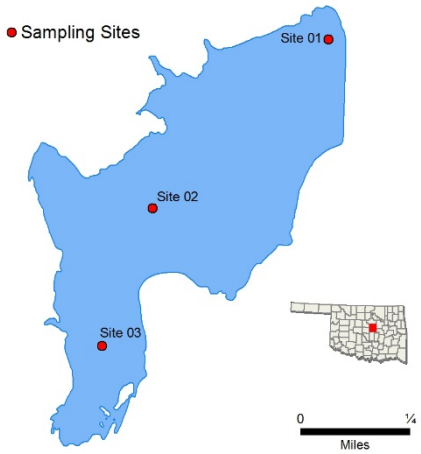
S = Fully Supporting
NS = Not Supporting
NEI = Not Enough Information

*Standards revision, true color is for permitting purposes only

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

Meeker

Sample Period	Times Visited	Sampling Sites
November 2018 – September 2019	4	3



General

Location	Lincoln County
Impoundment	1970
Area	250 acres
Capacity	1,818 acre-feet
Purposes	Water Supply, Recreation, Flood Control

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	93 NTU	100% of values > OWQS of 25 NTU (n=12)
	Average Secchi Disk Depth	21 cm	
	Water Clarity Rating	Poor	
	Chlorophyll-a	28.64 mg/m3	
	Trophic State Index	64	Previous value = 50
	Trophic Class	Hypereutrophic	
Profile	Salinity	0.07 – 0.10 ppt	
	Specific Conductivity	144.0 – 203.7 µS/cm	
	pH	7.06 – 8.38 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	153.2 – 470.8 mV	
	Dissolved Oxygen	All data are above screening level of 2.0 mg/L	
Nutrients	Surface Total Nitrogen	0.455 mg/L to 1.40 mg/L	
	Surface Total Phosphorus	0.045 mg/L to 0.143 mg/L	
	Nitrogen to Phosphorus Ratio	11:1	Phosphorus limited, possibly co-limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	*							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes

*Standards revision, true color is for permitting purposes only

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

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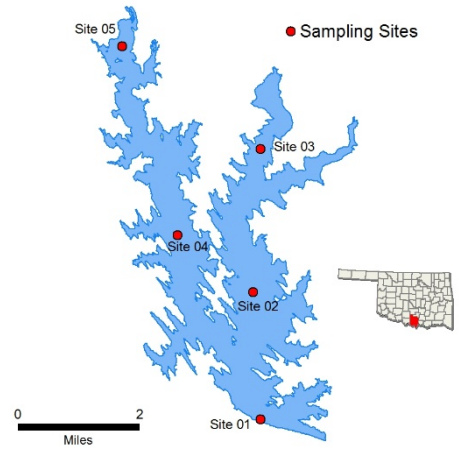
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Murray

Sample Period	Times Visited	Sampling Sites
October 2018 – August 2019	4	5



General

Location	Love County
Impoundment	1937
Area	5,728 acres
Capacity	153,250 acre-feet
Purposes	Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	7 NTU	5% of values > OWQS of 25 NTU (n=20)
	Average Secchi Disk Depth	153 cm	
	Water Clarity Rating	Excellent	
	Chlorophyll-a	2.90 mg/m3	
	Trophic State Index	41	Previous value = 39
	Trophic Class	Mesotrophic	
Profile	Salinity	0.11 – 0.17 ppt	
	Specific Conductivity	233.0 – 348.4 µS/cm	
	pH	7.05 – 8.34 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	39.7 to 415.8 mV	
	Dissolved Oxygen	Up to 67% of water column < 2.0 mg/L in August	
Nutrients	Surface Total Nitrogen	0.275 mg/L to 0.635 mg/L	
	Surface Total Phosphorus	0.010 mg/L to 0.049 mg/L	
	Nitrogen to Phosphorus Ratio	22:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NS	*							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes *Standards revision, true color is for permitting purposes only

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

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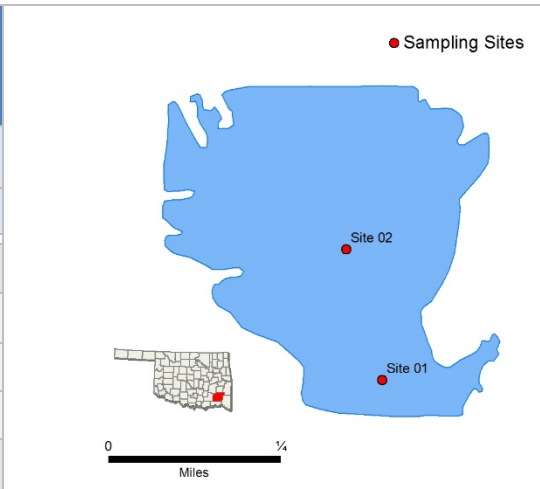
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Nanih Waiya

Sample Period	Times Visited	Sampling Sites
December 2007 – July 2008	4	5



General

Location	Pushmataha County
Impoundment	1958
Area	131 acres
Capacity	1,064 acre feet
Purposes	Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	9 nephelometric turbidity units (NTU)	All values < 25 NTU
	Average True Color	45 units	25% of values > OWQS of 70
	Average Secchi Disk Depth	98 cm	
	Water Clarity Rating	average	
	Trophic State Index	45	Previous value = 45
	Trophic Class	mesotrophic	
Profile	Salinity	0.0 – 0.10 ppt	
	Specific Conductivity	63 – 262 µS/cm	
	pH	6.31 – 8.22 pH units	4 values (6.5%) <6.5 pH units
	Oxidation-Reduction Potential	5 to 576 mV	
	Dissolved Oxygen	Up to 42% of water column < 2 mg/L in August	Occurred at site 1
Nutrients	Surface Total Nitrogen	0.32 mg/L to 0.70 mg/L	
	Surface Total Phosphorus	0.018 mg/L to 0.032 mg/L	
	Nitrogen to Phosphorus Ratio	18:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	S	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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NS = Not Supporting
NEI = Not Enough Information

Notes

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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

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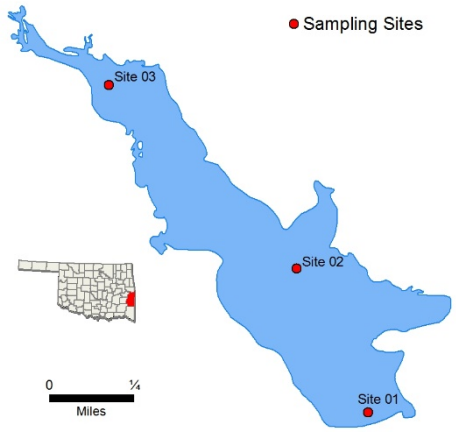
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

New Spiro

Sample Period	Times Visited	Sampling Sites
October 2005 – July 2006	4	5



General

Location	Le Flore County
Impoundment	1960
Area	254 acres
Capacity	2,160 acre-feet
Purposes	Water Supply, Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	18 NTU	8% of values >OWQS of 25 NTU
	Average True Color	26 units	100% of values < OWQS of 70
	Average Secchi Disk Depth	47 cm	
	Water Clarity Rating	good	
	Trophic State Index	68	
	Trophic Class	hypereutrophic	
Profile	Salinity	0.04 – 0.09 ppt	
	Specific Conductivity	106.8 – 155.4 µS/cm	
	pH	7.09 – 9.24 pH units	10% of values > 9.0 pH units
	Oxidation-Reduction Potential	121 - 483 mV	
	Dissolved Oxygen	Up to 33% of water column < 2 mg/L in August	Occurred at site 2
Nutrients	Surface Total Nitrogen	0.98 mg/L to 1.68 mg/L	
	Surface Total Phosphorus	0.076 mg/L to 0.170 mg/L	
	Nitrogen to Phosphorus Ratio	11:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NS	S							
Aesthetics					NEI	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											NS

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NS = Not Supporting
NEI = Not Enough Information

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
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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

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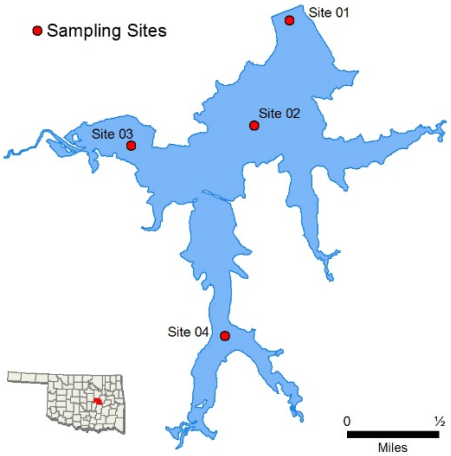
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Okemah

Sample Period	Times Visited	Sampling Sites
November 2018 – September 2019	3	4



General

Location	Okfuskee County
Impoundment	1962
Area	13,100 acre-feet
Capacity	Water Supply, Recreation
Purposes	761 acres

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	13 NTU	13% of values > OWQS of 25 NTU (n=15)
	Average Secchi Disk Depth	82 cm	
	Water Clarity Rating	Good	
	Chlorophyll-a	8.42 mg/m3	
	Trophic State Index	52	Previous value = 54
	Trophic Class	Eutrophic	
Profile	Salinity	0.07 – 0.10 ppt	
	Specific Conductivity	150.6 – 208.8 µS/cm	
	pH	6.76 – 8.14 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	61.5 – 493.9 mV	
	Dissolved Oxygen	Up to 49% of water column < 2 mg/L in September	
Nutrients	Surface Total Nitrogen	0.49 mg/L to 0.95 mg/L	
	Surface Total Phosphorus	0.015 mg/L to 0.058 mg/L	
	Nitrogen to Phosphorus Ratio	21:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NEI	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes

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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

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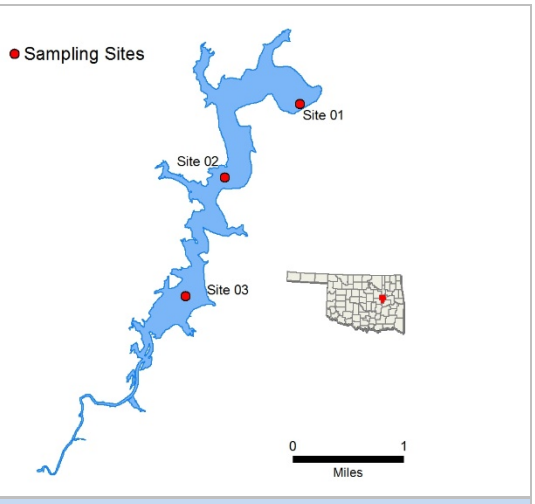
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Okmulgee

Sample Period	Times Visited	Sampling Sites
February 2019 – August 2019	3	3



General

Location	Okmulgee County
Impoundment	1928
Area	668 acres
Capacity	14,170 acre-feet
Purposes	Water Supply, Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In-Situ	Average Turbidity	11 NTU	100% of values < OWQS of 25 NTU
	Average Secchi Disk Depth	72.56	
	Water Clarity Rating	Excellent	
	Chlorophyll-a	9.59 mg/m3	
	Trophic State Index	53	Previous Value= 49
	Trophic Class	Eutrophic	
Profile	Salinity	0.04 – 0.12 ppt	
	Specific Conductivity	83.1 – 249.5 µS/cm	
	pH	6.26 – 8.14 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	-0.20 – 401.9 mV	
	Dissolved Oxygen	Up to 71% of water column < 2 mg/L in June	
Nutrients	Surface Total Nitrogen	0.495 mg/L to 0.65 mg/L	
	Surface Total Phosphorus	0.018 mg/L to 0.040 mg/L	
	Nitrogen to Phosphorus Ratio	20:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	NS	S								
Aesthetics					S	*					
Agriculture							*	*	S		
Primary Body Contact Recreation										NEI	
Public & Private Water Supply				NEI							

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

Notes: *Standards revision, true color is for permitting purposes only

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

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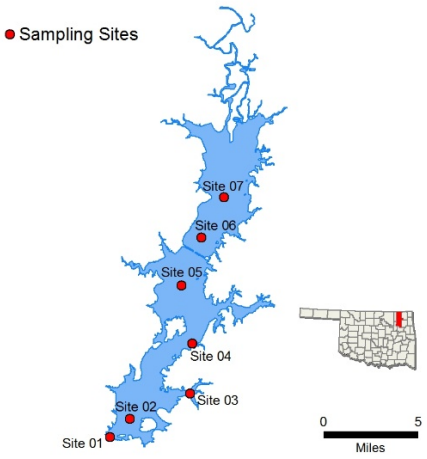
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Oologah

Sample Period	Times Visited	Sampling Sites
October 2018 – July 2019	4	7



General

Location	Rogers County
Impoundment	1963
Area	29,460 acres
Capacity	553,400 acre feet
Purposes	Water Supply, Flood Control, and Navigation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	26 NTU	43% of values > OWQS of 25 NTU (n=27)
	Average Secchi Disk Depth	47.5 cm	
	Water Clarity Rating	Fair	
	Chlorophyll-a	4.36 mg/m3	
	Trophic State Index	45	Previous value = 54
	Trophic Class	Mesotrophic	
Profile	Salinity	0.11 – 0.22 ppt	
	Specific Conductivity	226.0 – 445.7 µS/cm	
	pH	7.13 – 8.16 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	189.8 to 474.9 mV	
	Dissolved Oxygen	Up to 7% of water column < 2 mg/L in August	
Nutrients	Surface Total Nitrogen	0.49 mg/L to 1.15 mg/L	
	Surface Total Phosphorus	0.043 mg/L to 0.152 mg/L	
	Nitrogen to Phosphorus Ratio	8:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	NS	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes

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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

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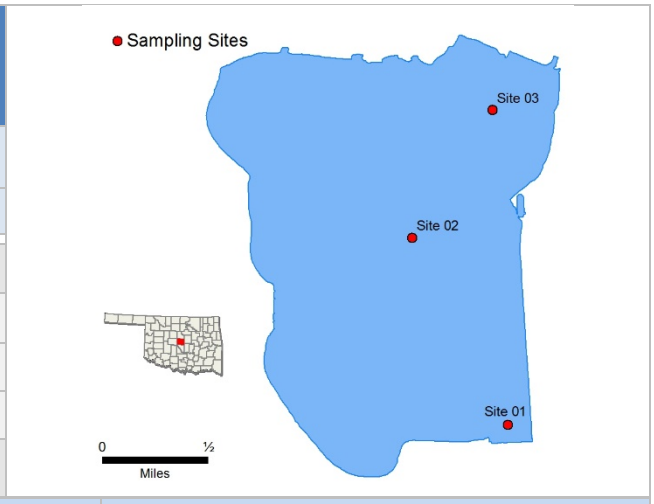
Overholser

Sample Period	Times Visited	Sampling Sites
October 2018 – July 2019	4	3



General

Location	Oklahoma County
Impoundment	1919
Area	1,500 acres
Capacity	15,000 acre-feet
Purposes	Water Supply, Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	18 NTU	33% of values > OWQS of 25 NTU (n=12)
	Average Secchi Disk Depth	49.1 cm	
	Water Clarity Rating	Poor	
	Chlorophyll-a	38.95 mg/m3	
	Trophic State Index	67	Previous value = 68
	Trophic Class	Hypereutrophic	
Profile	Salinity	0.40 – 0.50 ppt	
	Specific Conductivity	811.9 – 1010.4 µS/cm	
	pH	8.41 – 8.75 pH units	Slightly alkaline
	Oxidation-Reduction Potential	189.5 – 425.0 mV	
	Dissolved Oxygen	All data points are above screening level of 2.0 mg/L	Not stratified during any sampling interval
Nutrients	Surface Total Nitrogen	1.095 mg/L to 1.635 mg/L	
	Surface Total Phosphorus	0.057 mg/L to 0.233 mg/L	
	Nitrogen to Phosphorus Ratio	9:1	Possibly co- limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	S							
Aesthetics					NEI	*					
Agriculture							NS	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

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
*Standards revision, true color is for permitting purposes only

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

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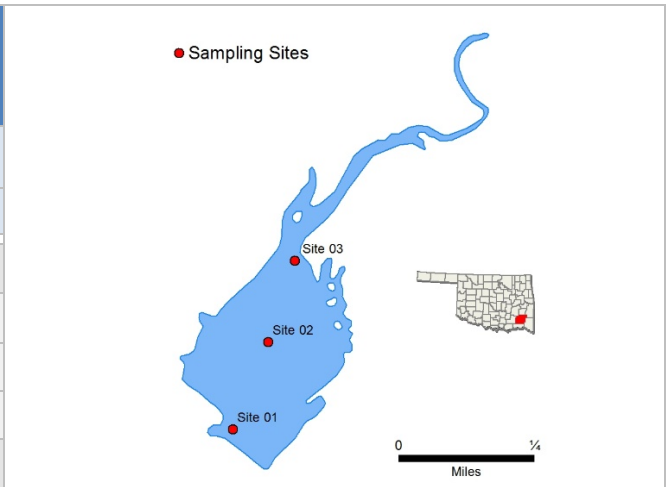
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Ozzie Cobb

Sample Period	Times Visited	Sampling Sites
November 2016 – August 2017	4	5



General

Location	Pushmataha County
Impoundment	1958
Area	116 acres
Capacity	833 acre feet
Purposes	Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	17 NTU	25% of values > 25 NTU (n=12)
	Average Secchi Disk Depth	59 cm	
	Water Clarity Rating	average	
	Chlorophyll	14.51 mg/L	
	Trophic State Index	57	Previous value = 59
	Trophic Class	Eutrophic	
Profile	Salinity	0.02 – 0.05 ppt	
	Specific Conductivity	45.6 – 292.1 µS/cm	
	pH	5.91 – 7.37 pH units	44% of values < 6.5
	Oxidation-Reduction Potential	109.8 to 566.8 mV	
	Dissolved Oxygen	Up to 71% of water column < 2 mg/L in August	Occurred at site 1
Nutrients	Surface Total Nitrogen	0.69 mg/L to 0.97 mg/L	
	Surface Total Phosphorus	0.039 mg/L to 0.071 mg/L	
	Nitrogen to Phosphorus Ratio	15:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	NS	S	S							
Aesthetics					NEI	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes

*Slightly acidic conditions are not unusual in this part of the state due to relatively low soil pH and lack of soluble bedrock. Because of these conditions it is likely that the low pH values may be due to natural causes; therefore the Water Board is looking at the applicability of developing site-specific criteria for waters in the southeastern portion of the state. **This is an NLW waterbody in the OWQS.*

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

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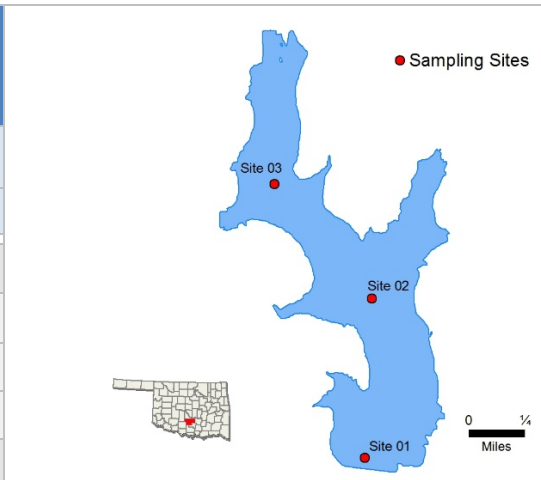
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Pauls Valley City

Sample Period	Times Visited	Sampling Sites
November 2014 – August 2015	4	3



General

Location	Garvin County
Impoundment	1954
Area	750 acres
Capacity	8,730 acre feet
Purposes	Water Supply and Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	32 NTU	50% of values > 25 NTU
	Average Secchi Disk Depth	31 cm	
	Water Clarity Rating	Fair	
	Chlorophyll-a	11 mg/m3	
	Trophic State Index	54	Previous value = 44
	Trophic Class	Eutrophic	
Profile	Salinity	0.07– 0.16 ppt	
	Specific Conductivity	156.2 –333 µS/cm	
	pH	6.98 – 8.22 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	60.3 to 412 mV	
	Dissolved Oxygen	Up to 42% of water column < 2 mg/L in August	
Nutrients	Surface Total Nitrogen	0.36 mg/L to 1.05 mg/L	
	Surface Total Phosphorus	0.005 mg/L to 0.073 mg/L	
	Nitrogen to Phosphorus Ratio	20:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes

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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
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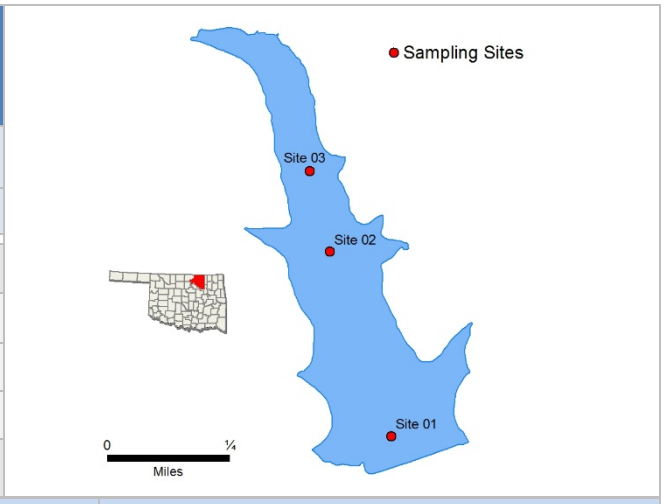
Pawhuska

Sample Period	Times Visited	Sampling Sites
October 2016 – July 2017	4	5



General

Location	Osage County
Impoundment	1936
Area	96 acres
Capacity	3,600 acre feet
Purposes	Water Supply and Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
	Average Turbidity	5 nephelometric turbidity units (NTU)	All values < 25 NTU
	Average Secchi Disk Depth	135 cm	
	Water Clarity Rating	excellent	
	Chlorophyll	4.18 mg/L	
	Trophic State Index	45	Previous value = 41
	Trophic Class	mesotrophic	
Profile	Salinity	0.21 – 0.27 ppt	
Profile	Specific Conductivity	433 – 549.6 µS/cm	
Profile	pH	7.14 – 8.42 pH units	Neutral to slightly alkaline
Profile	Oxidation-Reduction Potential	-17.6 to 524 mV	
Profile	Dissolved Oxygen	Up to 64% of water column < 2 mg/L in July	Occurred at site 1
Nutrients	Surface Total Nitrogen	0.31 mg/L to 0.69 mg/L	
Nutrients	Surface Total Phosphorus	0.010 mg/L to 0.028 mg/L	
Nutrients	Nitrogen to Phosphorus Ratio	29:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NEI	S							
Aesthetics					S	*					
Agriculture							NS	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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Notes

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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
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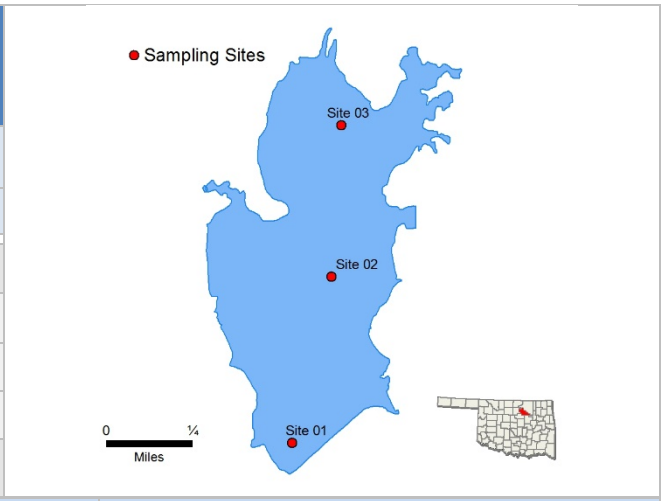
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Pawnee

Sample Period	Times Visited	Sampling Sites
November 2016 – July 2017	4	5



General

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

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	15 NTU	8% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	52 cm	
	Water Clarity Rating	average	
	Chlorophyll	20.01 mg/L	
	Trophic State Index	60	Previous = 59
	Trophic Class	eutrophic	
Profile	Salinity	0.13 – 0.17 ppt	
	Specific Conductivity	275.7 – 350 µS/cm	
	pH	7.24 – 8.51 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	170.9 - 432.1 mV	
	Dissolved Oxygen	Up to 24% of water column < 2 mg/L in October	At site 3
Nutrients	Surface Total Nitrogen	0.92 mg/L to 1.36 mg/L	
	Surface Total Phosphorus	0.041 mg/L to 0.065 mg/L	
	Nitrogen to Phosphorus Ratio	22:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											NS

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

Notes *Standards revision, true color is for permitting purposes only

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
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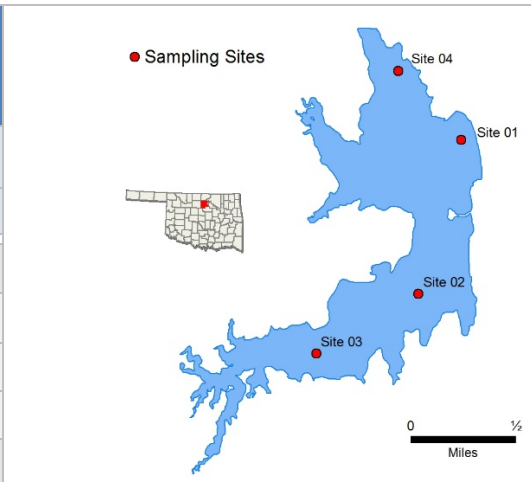
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Perry

Sample Period	Times Visited	Sampling Sites
October 2014 – July 2015	4	5



General

Location	Noble County
Impoundment	1937
Area	614 acres
Capacity	6,892 acre-feet
Purposes	Water Supply, Recreation and Flood Control

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	56 NTU	58% of values > 25 NTU
	Average Secchi Disk Depth	22 cm	
	Water Clarity Rating	Fair	
	Chlorophyll-a	6 mg/m3	
	Trophic State Index	49	Previous value = 48
	Trophic Class	Mesotrophic	
Profile	Salinity	0.14– 0.25 ppt	
	Specific Conductivity	296.1 – 510 µS/cm	
	pH	7.27 – 8.37 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	110.3 - 392.6 mV	
	Dissolved Oxygen	Up to 33% of water column < 2 mg/L in July	
Nutrients	Surface Total Nitrogen	0.61 mg/L to 1.34 mg/L	
	Surface Total Phosphorus	0.035 mg/L to 0.186 mg/L	
	Nitrogen to Phosphorus Ratio	11:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes

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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
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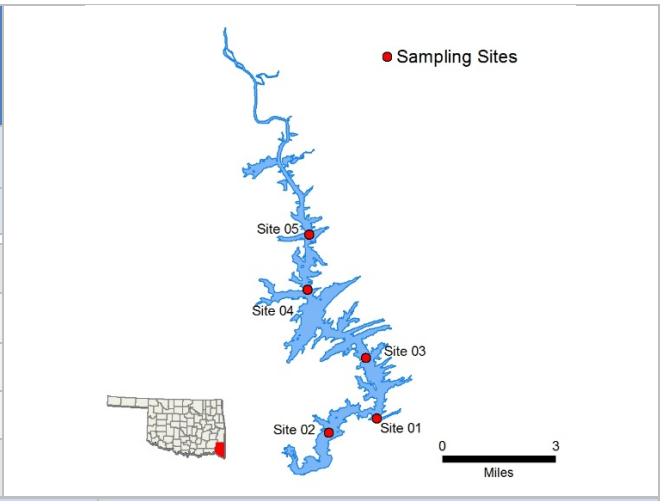
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Pine Creek

Sample Period	Times Visited	Sampling Sites
November 2018 – August 2019	4	5



General

Location	McCurtain County
Impoundment	1969
Area	3,750 acres
Capacity	53,750 acre-feet
Purposes	Water Supply, Flood Control, Water quality Control, Fish and Wildlife, and Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In-Situ	Average Turbidity	23 NTU	5% of Values > OWQS of 25 (n=20)
	Average Secchi Disk Depth	75.7 cm	
	Water Clarity Rating	Average	
	Chlorophyll-a	9.0 mg/m3	
	Trophic State Index	52	Previous value = 62
	Trophic Class	Hypereutrophic	
Profile	Salinity	0.01 – 0.06 ppt	
	Specific Conductivity	25.6 – 123.9 µS/cm	
	pH	5.71 – 8.13 pH units	83% of values < 6.5 pH units
	Oxidation-Reduction Potential	45.1 to 557.9 mV	
	Dissolved Oxygen	Up to 76% of water column < 2 mg/L in August	
Nutrients	Surface Total Nitrogen	0.28 mg/L to 0.67 mg/L	
	Surface Total Phosphorus	0.026 mg/L to 0.042 mg/L	
	Nitrogen to Phosphorus Ratio	15:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	NS	NS	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes

Slightly acidic conditions are common in this part of the state, due to relatively low soil pH and lack of soluble bedrock. Due to these conditions it is likely that the low pH values may be due to natural causes; therefore the Water Board is looking at the applicability of developing site-specific criteria for waters in the southeastern portion of the state. **Standards revision, true color is for permitting purposes only*

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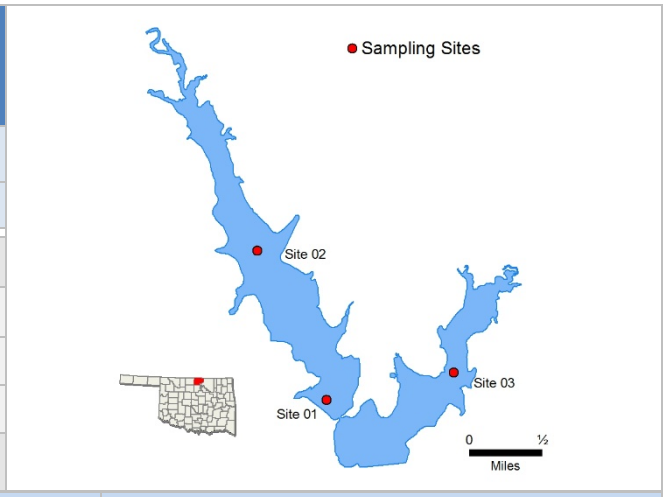
Ponca

Sample Period	Times Visited	Sampling Sites
November 2015 – August 2016	4	5



General

Location	Kay County
Impoundment	1935
Area	805 acres
Capacity	14,440 acre feet
Purposes	Water Supply and Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In-Situ	Average Turbidity	8 NTU	100% of values < OWQS of 25 NTU
	Average Secchi Disk Depth	71 cm	
	Water Clarity Rating	Good	
	Chlorophyll-a	20 mg/m3	
	Trophic State Index	60	Previous value = 56
	Trophic Class	Eutrophic	
Profile	Salinity	0.14 – 0.20 ppt	
	Specific Conductivity	297.2 – 414 µS/cm	
	pH	6.89 – 8.36 pH units	
	Oxidation-Reduction Potential	19.5 to 305 mV	
	Dissolved Oxygen	Up to 58% of water column < 2.0 mg/L in summer	
Nutrients	Surface Total Nitrogen	0.66 mg/L to 0.93 mg/L	
	Surface Total Phosphorus	0.028 mg/L to 0.045 mg/L	
	Nitrogen to Phosphorus Ratio	25:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NS	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											NS

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NEI = Not Enough Information

Notes

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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
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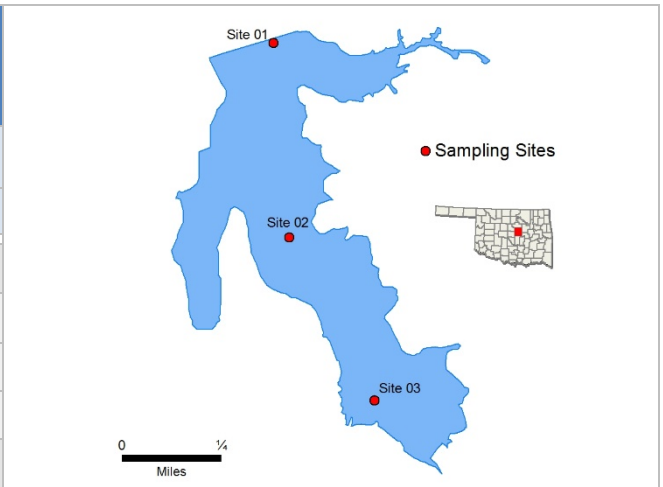
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Prague City

Sample Period	Times Visited	Sampling Sites
November 2007 – August 2008	4	5



General

Location	Lincoln County
Impoundment	84
Area	225 acres
Capacity	2,415 acre feet
Purposes	Water Supply and Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	12 nephelometric turbidity units (NTU)	All values < 25 NTU
	Average True Color	46 units	10% of values > OWQS of 70
	Average Secchi Disk Depth	74 cm	
	Water Clarity Rating	good	
	Trophic State Index	48	Previous value = 52
	Trophic Class	mesotrophic	
Profile	Salinity	0.0 – 0.20 ppt	
	Specific Conductivity	112 – 362 µS/cm	
	pH	6.78 – 8.65 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	-51 to 543 mV	
	Dissolved Oxygen	57 - 63% of water column < 2 mg/L in August	Occurred at sites 1, 4 & 5
Nutrients	Surface Total Nitrogen	0.51 mg/L to 1.17 mg/L	
	Surface Total Phosphorus	0.024 mg/L to 0.057 mg/L	
	Nitrogen to Phosphorus Ratio	25:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NEI	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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Notes

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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

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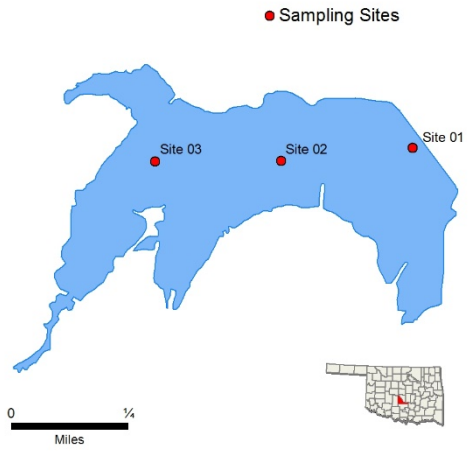
Purcell

Sample Period	Times Visited	Sampling Sites
November 2007 – August 2008	4	5



General

Location	McClain County
Impoundment	1930
Area	150 acres
Capacity	2,600 acre feet
Purposes	Water Supply and Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	14 nephelometric turbidity units (NTU)	All values < 25 NTU
	Average True Color	25 units	All values < OWQS of 70
	Average Secchi Disk Depth	57 cm	
	Water Clarity Rating	good	
	Trophic State Index	51	Previous value = 50
	Trophic Class	eutrophic	
Profile	Salinity	0.19 – 0.23 ppt	
	Specific Conductivity	374 – 462.8 µS/cm	
	pH	7.17 – 8.37 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	18 to 645 mV	
	Dissolved Oxygen	Up to 50% of water column < 2 mg/L in August	Occurred at site 1 & 2
Nutrients	Surface Total Nitrogen	0.60 mg/L to 0.83 mg/L	
	Surface Total Phosphorus	0.018 mg/L to 0.041 mg/L	
	Nitrogen to Phosphorus Ratio	24:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NEI	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										NEI	
Public & Private Water Supply											

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Notes

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E. coli = Escherichia coli
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Chlor-a = Chlorophyll-a
mg/L = milligrams per liter
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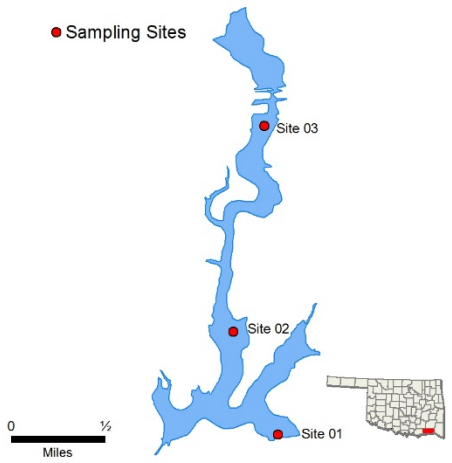
Raymond Gary

Sample Period	Times Visited	Sampling Sites
November 2018 – August 2019	4	3



General

Location	Choctaw County
Impoundment	1956
Area	263 acres
Capacity	1,681 acre-feet
Purposes	Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	13 NTU	0% of values > OWQS of 25 NTU (n=11)
	Average Secchi Disk Depth	51.4 cm	
	Water Clarity Rating	Average	
	Chlorophyll-a	23.44 mg/m3	
	Trophic State Index	62	Previous value = 55
	Trophic Class	Hypereutrophic	
Profile	Salinity	0.03 – 0.12 ppt	
	Specific Conductivity	58.7 – 254.8 µS/cm	
	pH	6.44 – 7.54 pH units	9.3% of values < 6.5 (n=43)
	Oxidation-Reduction Potential	173.2 to 499.9 mV	
	Dissolved Oxygen	100% of water column < 2 mg/L in June	
Nutrients	Surface Total Nitrogen	0.33 mg/L to 0.895 mg/L	
	Surface Total Phosphorus	0.032 mg/L to 0.069 mg/L	
	Nitrogen to Phosphorus Ratio	13:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NEI	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										NEI	
Public & Private Water Supply											

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

Notes

*Standards revision, true color is for permitting purposes only

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

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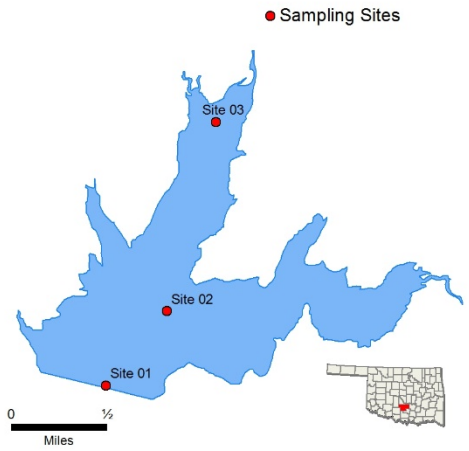
R.C. Longmire

Sample Period	Times Visited	Sampling Sites
November 2018 – August 2019	4	3



General

Location	Garvin County
Impoundment	1989
Area	935 acres
Capacity	13,162 acre feet
Purposes	Navigation, Hydropower, and Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	10 NTU	0% of values > OWQS of 25 NTU (n=12)
	Average Secchi Disk Depth	65.9 cm	
	Water Clarity Rating	Fair	
	Chlorophyll-a	15.7 mg/m3	
	Trophic State Index	58	Previous value = 58
	Trophic Class	Eutrophic	
Profile	Salinity	0.11 – 0.16 ppt	
	Specific Conductivity	242.8 – 380.9 µS/cm	
	pH	6.85 – 8.75 pH units	
	Oxidation-Reduction Potential	54.5 to 464.8 mV	
	Dissolved Oxygen	Up to 56% of water column < 2 mg/L in June	
Nutrients	Surface Total Nitrogen	0.78 mg/L to 1.155 mg/L	
	Surface Total Phosphorus	0.027 mg/L to 0.050 mg/L	
	Nitrogen to Phosphorus Ratio	24:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NEI	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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Notes

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E. coli = Escherichia coli
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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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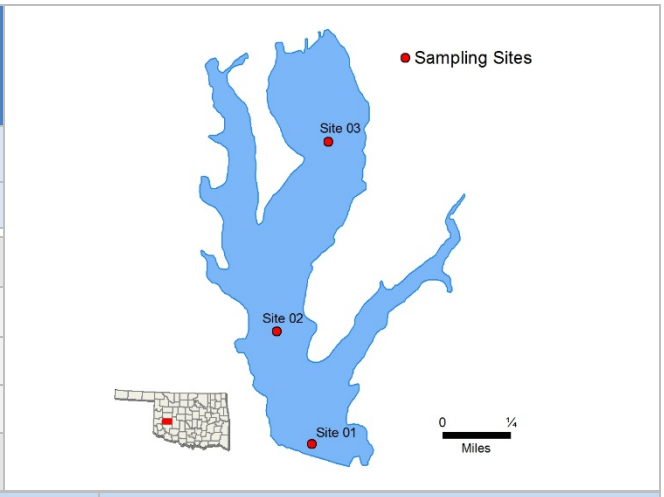
Rocky (Hobart)

Sample Period	Times Visited	Sampling Sites
March 2017 – September 2017	3	3



General

Location	Washita County
Impoundment	1933
Area	347 acres
Capacity	4,210 acre-feet
Purposes	Water Supply, Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	43 NTU	67% of values > OWQS of 25 NTU (n=9)
	Average Secchi Disk Depth	27 cm	
	Water Clarity Rating	Poor	
	Chlorophyll-a	82.39 mg/m3	
	Trophic State Index	74	Previous value = 68
	Trophic Class	Hypereutrophic	
Profile	Salinity	0.19 – 0.44 ppt	
	Specific Conductivity	406.8 – 897.7 µS/cm	
	pH	7.74 – 8.74 pH units	
	Oxidation-Reduction Potential	250.2 to 449.6 mV	
	Dissolved Oxygen	All data are above screening level of 2.0 mg/L	
Nutrients	Surface Total Nitrogen	1.11 mg/L to 1.86 mg/L	
	Surface Total Phosphorus	0109 mg/L to 0.247 mg/L	
	Nitrogen to Phosphorus Ratio	9:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S								
Aesthetics					NEI	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply				S							NS

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NEI = Not Enough Information

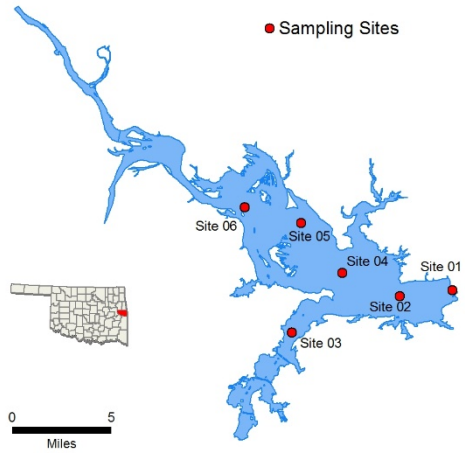
Notes

* *Standards revision, true color is for permitting purposes only
*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.

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

Robert S. Kerr

Sample Period	Times Visited	Sampling Sites
November 2015 – September 2016	4	6



General

Location	Sequoyah County
Impoundment	1970
Area	43,800 acres
Capacity	525,700 acre feet
Purposes	Navigation, Hydropower, and Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In-Situ	Average Turbidity	28NTU	42% of values > 25 NTU
	Average Secchi Depth	36 cm	
	Water Clarity Rating	Fair	
	Chlorophyll-a	17.9 mg/m3	
	Trophic State Index	59	Previous value = 56
	Trophic Class	Eutrophic	
Profile	Salinity	0.19– 0.44 ppt	
	Specific Conductivity	402.6 – 888.8 µS/cm	
	pH	7.66 – 8.26 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	-9.2.8 to 356.1 mV	
	Dissolved Oxygen	All data are above screening level of 2.0 mg/L	
Nutrients	Surface Total Nitrogen	0.61mg/L to 0.98 mg/L	
	Surface Total Phosphorus	0.062 mg/L to 0.172 mg/L	
	Nitrogen to Phosphorus Ratio	6:1	Possibly co- limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	NEI							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										NEI	
Public & Private Water Supply				NEI							

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Notes

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E. coli = Escherichia coli
OWQS = Oklahoma Water Quality Standards
mV = millivolts
Chlor-a = Chlorophyll-a
mg/L = milligrams per liter
µS/cm = microsiemens/cm
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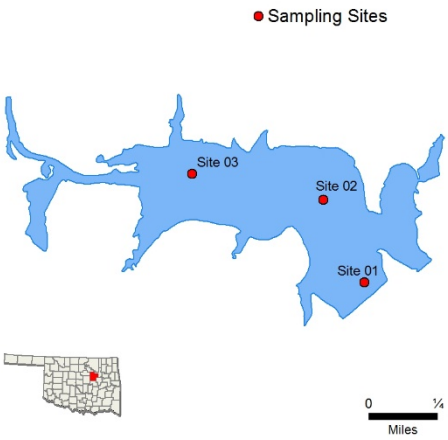
Sahoma

Sample Period	Times Visited	Sampling Sites
November 2015	4	5



General

Location	Creek County
Impoundment	1947
Area	312 acres
Capacity	4,850 acre-feet
Purposes	Water Supply, Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	96NTU	100% of values < OWQS of 25 NTU
	Average Secchi Depth	85 cm	100% of values < OWQS of 70
	Water Clarity Rating	Good	
	Chlorophyll-a	5.2 mg/m3	
	Trophic State Index	47	Previous value = 51
	Trophic Class	Mesotrophic	
Profile	Salinity	0.08 – 0.08 ppt	
	Specific Conductivity	170.9 - 174.6 µS/cm	
	pH	7.36– 7.69 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	149.8 – 212.9 mV	
	Dissolved Oxygen	All data are above screening level of 2.0 mg/L	
Nutrients	Surface Total Nitrogen	0.79 mg/L to 0.82 mg/L	
	Surface Total Phosphorus	0.020 mg/L to 0.027 mg/L	
	Nitrogen to Phosphorus Ratio	36:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	NS	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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Notes

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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
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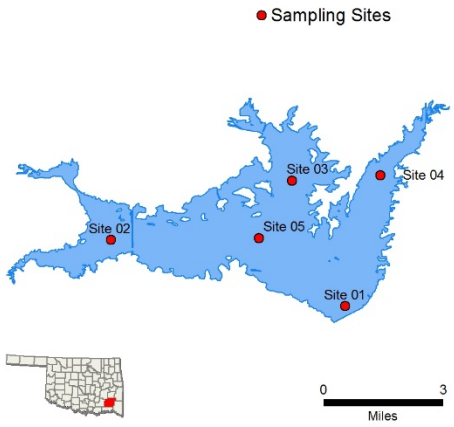
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Sardis

Sample Period	Times Visited	Sampling Sites
November 2018 – August 2019	4	5



General

Location	Pushmataha County
Impoundment	1970
Area	13,610 acres
Capacity	274,330 acre feet
Purposes	Flood Control, Waters Supply, Fish and Wildlife, and Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In-Situ	Average Turbidity	21 NTU	22% of values > 18 NTU
	Average Secchi Disk Depth	51.8 cm	
	Water Clarity Rating	Average	
	Chlorophyll-a	8.86 mg/m3	
	Trophic State Index	62	Previous value = 52
	Trophic Class	Hypereutrophic	
Profile	Salinity	0.02 – 0.03 ppt	
	Specific Conductivity	40.6 – 73.4 µS/cm	
	pH	5.88 – 7.69 pH units	Only 27.9% of values < 6.5 pH units
	Oxidation-Reduction Potential	255.1 to 550.7 mV	
	Dissolved Oxygen	Up to 37% of water column < 2 mg/L in August	
Nutrients	Surface Total Nitrogen	0.34 mg/L to 0.535 mg/L	
	Surface Total Phosphorus	0.028 mg/L to 0.051 mg/L	
	Nitrogen to Phosphorus Ratio	12:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	NS	NEI	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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E. coli = Escherichia coli
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Chlor-a = Chlorophyll-a
mg/L = milligrams per liter
µS/cm = microsiemens/cm
ppt = parts per thousand
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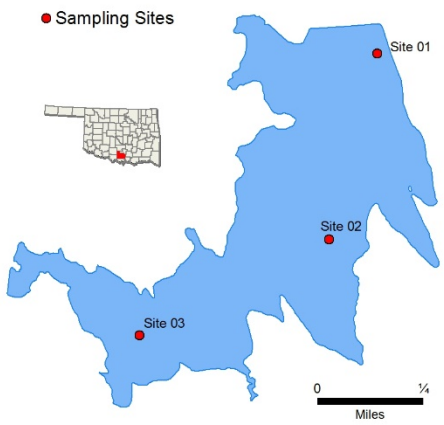
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Scott King (Rock Creek)

Sample Period	Times Visited	Sampling Sites
October 2008 – July 2009	4	5



General

Location	Carter County
Impoundment	1979
Area	248 acres
Capacity	3,588 acre-feet
Purposes	Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	9 NTU	100% of values < OWQS of 25 NTU (n=12)
	Average True Color		Did not collect for true color
	Average Secchi Disk Depth	80 cm	
	Water Clarity Rating	Good	
	Trophic State Index	51	Previous value = 48
	Trophic Class	Eutrophic	
Profile	Salinity	0.10 – 0.15 ppt	
	Specific Conductivity	278.8 – 307 µS/cm	
	pH	6.96 – 8.53 pH units	
	Oxidation-Reduction Potential	-10 to 461 mV	
	Dissolved Oxygen	Up to 50% of water column < 2.0 mg/L in July	
Nutrients	Surface Total Nitrogen	0.55 mg/L to 0.80 mg/L	
	Surface Total Phosphorus	0.009 mg/L to 0.026 mg/L	
	Nitrogen to Phosphorus Ratio	39:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NEI	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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Notes

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mg/L = milligrams per liter
µS/cm = microsiemens/cm
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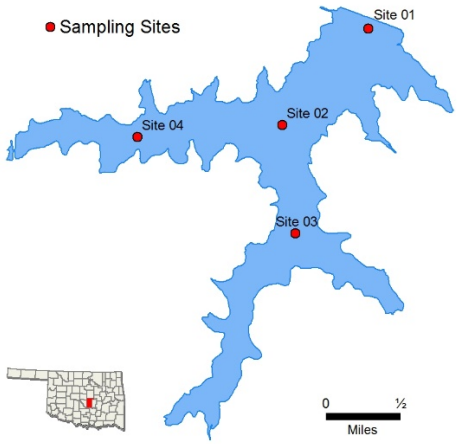
Shawnee Twin No. 1

Sample Period	Times Visited	Sampling Sites
November 2018 – September 2019	4	4



General

Location	Pottawatomie County
Impoundment	1935
Area	1,336 acres
Capacity	22,600 acre-feet
Purposes	Water Supply, Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In-Situ	Average Turbidity	12 NTU	100% of values < OWQS of 25 NTU
	Average Secchi Disk Depth	74.2 cm	
	Water Clarity Rating	Good	
	Chlorophyll-a	8.93 mg/m3	
	Trophic State Index	52	Previous Value = 47
	Trophic Class	Eutrophic	
Profile	Salinity	0.09 – 0.13 ppt	
	Specific Conductivity	195.2 – 277.1 µS/cm	
	pH	7.10 – 8.27 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	45.1 to 468.0 mV	
	Dissolved Oxygen	Up to 30% of water column < 2 mg/L in September	
Nutrients	Surface Total Nitrogen	0.375 mg/L to 0.765 mg/L	
	Surface Total Phosphorus	0.012 mg/L to 0.026 mg/L	
	Nitrogen to Phosphorus Ratio	31:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	NEI	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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Notes

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E. coli = Escherichia coli
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Chlor-a = Chlorophyll-a
mg/L = milligrams per liter
µS/cm = microsiemens/cm
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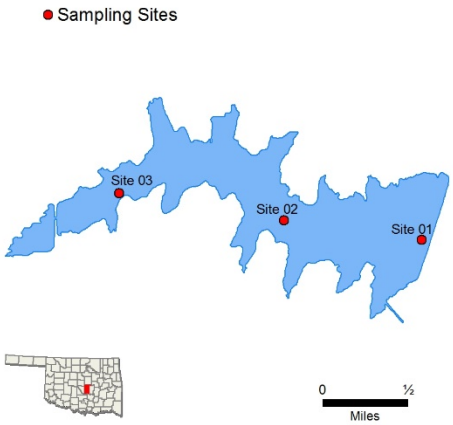
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Shawnee Twin No. 2

Sample Period	Times Visited	Sampling Sites
November 2018 – September2019	4	3



General

Location	Pottawatomie County
Impoundment	1960
Area	1,100 acres
Capacity	11,400 acre feet
Purposes	Waters Supply and Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In-Situ	Average Turbidity	11 NTU	100% of values < OWQS of 25 NTU
	Average Secchi Disk Depth	72.7 cm	
	Water Clarity Rating	Good	
	Chlorophyll-a	15.01 mg/m3	
	Trophic State Index	57	Previous value = 48
	Trophic Class	Eutrophic	
Profile	Salinity	0.09 – 0.15 ppt	
	Specific Conductivity	195.9 – 313.5 µS/cm	
	pH	6.92 – 8.31 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	55.1 to 438.4 mV	
	Dissolved Oxygen	Up to 35% of water column < 2 mg/L in September	
Nutrients	Surface Total Nitrogen	0.505 mg/L to 0.84 mg/L	
	Surface Total Phosphorus	0.012 mg/L to 0.032 mg/L	
	Nitrogen to Phosphorus Ratio	35:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	NEI	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										NEI	
Public & Private Water Supply											

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Notes

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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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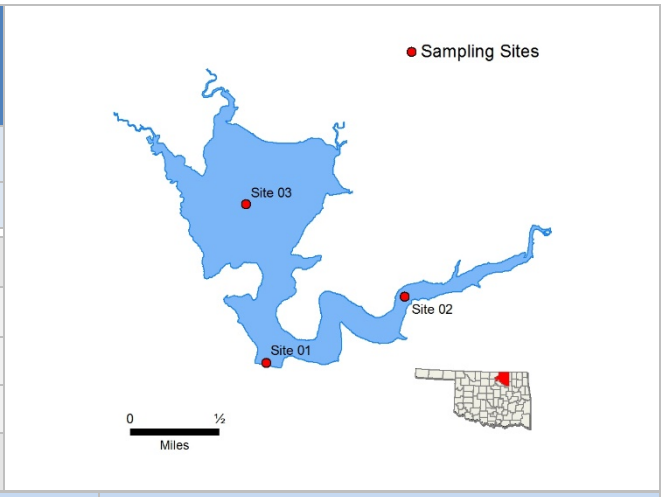
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Shell

Sample Period	Times Visited	Sampling Sites
October 2012 – August 2013	4	3



General

Location	Osage County
Impoundment	1922
Area	573 acres
Capacity	9,500 acre-feet
Purposes	Water Supply, Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	8 NTU	100% of values < OWQS of 25 NTU (n=12)
	Average Secchi Disk Depth	73 cm	
	Water Clarity Rating	Good	
	Chlorophyll-a	10 mg/m3	
	Trophic State Index	54	Previous value = 55
	Trophic Class	Eutrophic	
Profile	Salinity	0.10 – 0.16 ppt	
	Specific Conductivity	204 – 334 µS/cm	
	pH	6.59 – 8.39 pH units	
	Oxidation-Reduction Potential	-96 to 223 mV	
	Dissolved Oxygen	Up to 59% of water column < 2.0 mg/L in August	
Nutrients	Surface Total Nitrogen	0.89 mg/L to 1.21 mg/L	
	Surface Total Phosphorus	0.005 mg/L to 0.036 mg/L	
	Nitrogen to Phosphorus Ratio	66:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	S	NEI							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply				NEI							

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Notes

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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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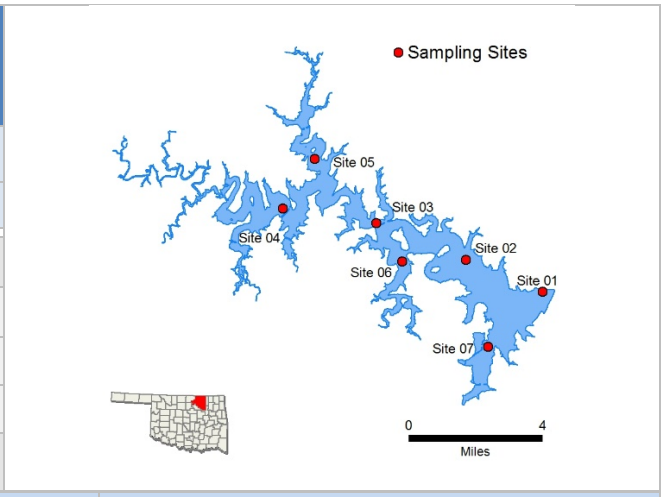
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Skiatook

Sample Period	Times Visited	Sampling Sites
October 2016 – July 2017	3	7



General

Location	Osage County
Impoundment	1984
Area	10,190 acres
Capacity	322,700 acre-feet
Purposes	Flood Control, Water Supply, Water Quality Control, Recreation and Fish & Wildlife

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	6 NTU	0% of values > OWQS of 25 NTU (n=28)
	Average Secchi Disk Depth	115 cm	
	Water Clarity Rating	Excellent	
	Chlorophyll-a	6.96 mg/m3	
	Trophic State Index	50	Previous value = 51
	Trophic Class	Mesotrophic	
Profile	Salinity	0.12 – 0.14 ppt	
	Specific Conductivity	207.2 – 287.1 µS/cm	
	pH	6.75 – 8.15 pH units	
	Oxidation-Reduction Potential	20.7 to 459.3 mV	
	Dissolved Oxygen	Up to 67% of water column < 2.0 mg/L in August	At site 3
Nutrients	Surface Total Nitrogen	0.34 mg/L to 0.58 mg/L	
	Surface Total Phosphorus	0.010 mg/L to 0.036 mg/L	
	Nitrogen to Phosphorus Ratio	20:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NEI	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply				S							

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

Notes

*Standards revision, true color is for permitting purposes only
* 50-70% range is undetermined for DO.

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

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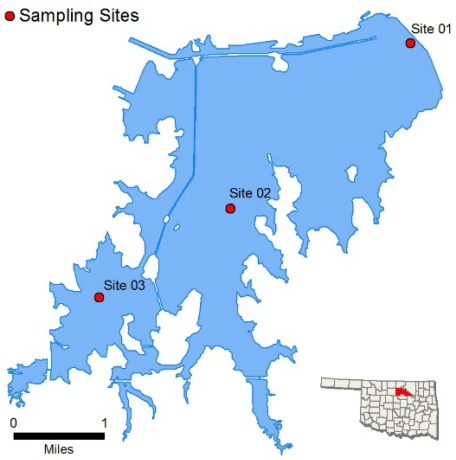
Sooner

Sample Period	Times Visited	Sampling Sites
October 2014 - July 2015	4	3



General

Location	Pawnee County
Impoundment	1972
Area	5,400 acres
Capacity	149,000 acre-feet
Purposes	Cooling Water

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	3 NTU	100% of values < OWQS of 25 NTU
	Average Secchi Disk Depth	194 cm	
	Water Clarity Rating	Excellent	
	Chlorophyll-a	3 mg/m3	
	Trophic State Index	43	Previous value = 41
	Trophic Class	Mesotrophic	
Profile	Salinity	1.22 – 1.28 ppt	
	Specific Conductivity	2372.70 – 2475 µS/cm	
	pH	7.44 – 8.41 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	174.7 to 434.9 mV	
	Dissolved Oxygen	Up to 20% of water column < 2.0 mg/L in July	
Nutrients	Surface Total Nitrogen	0.49 mg/L to 0.69 mg/L	
	Surface Total Phosphorus	0.007 mg/L to 0.023 mg/L	
	Nitrogen to Phosphorus Ratio	46:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NEI	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes

*Standards revision, true color is for permitting purposes only

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

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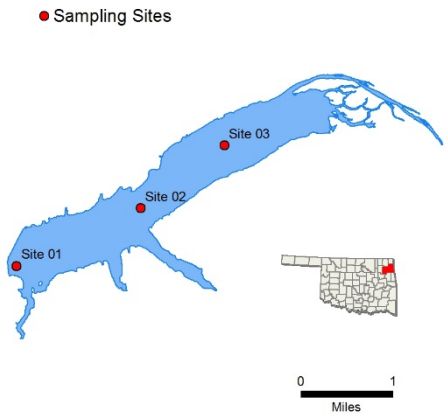
Spavinaw

Sample Period	Times Visited	Sampling Sites
October 2018 – July 2019	4	3



General

Location	Mayes County
Impoundment	1924
Area	1,584 acres
Capacity	38,000 acre-feet
Purposes	Water Supply, Recreation, Fish & Wildlife

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	5 NTU	100% of values < OWQS of 25 NTU (n=12)
	Average Secchi Disk Depth	112.5 cm	
	Water Clarity Rating	Good	
	Chlorophyll-a	18.60 mg/m3	
	Trophic State Index	59	Previous value = 62
	Trophic Class	Eutrophic	
Profile	Salinity	0.07 – 0.13 ppt	
	Specific Conductivity	146.2 – 277.0 µS/cm	
	pH	6.82 – 8.88 pH units	
	Oxidation-Reduction Potential	-19.6 to 535.8 mV	
	Dissolved Oxygen	Up to 54% of water column < 2.0 mg/L in July	
Nutrients	Surface Total Nitrogen	0.56 mg/L to 1.63 mg/L	
	Surface Total Phosphorus	0.016 mg/L to 0.041 mg/L	
	Nitrogen to Phosphorus Ratio	32:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NS	*							
Aesthetics					NEI*	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											NS

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

Notes

**Standards revision, true color is for permitting purposes only
*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.

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

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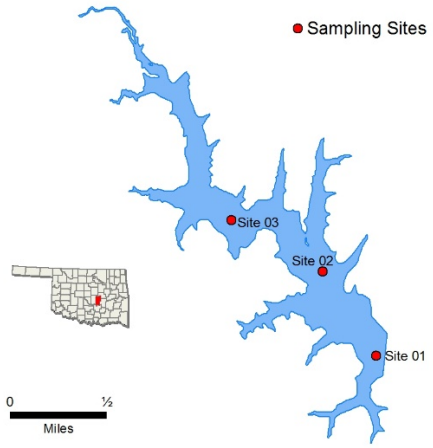
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Sportsman

Sample Period	Times Visited	Sampling Sites
November 2018 – September 2019	4	5



General

Location	Seminole County
Impoundment	1958
Area	354 acres
Capacity	5,349 acre feet
Purposes	Waters Supply and Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	13 NTU	8% of values > OWQS of 25 NTU (n=12)
	Average Secchi Disk Depth	90.8 cm	
	Water Clarity Rating	Good	
	Chlorophyll-a	3.74 mg/m3	
	Trophic State Index	44	Previous value = 47
	Trophic Class	Mesotrophic	
Profile	Salinity	0.09 – 0.28 ppt	
	Specific Conductivity	187.0 – 582.6 µS/cm	
	pH	6.52 – 8.35 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	96.9 to 489.1 mV	
	Dissolved Oxygen	Up to 57% of water column < 2 mg/L in September	
Nutrients	Surface Total Nitrogen	0.37 mg/L to 0.675 mg/L	
	Surface Total Phosphorus	0.013 mg/L to 0.037 mg/L	
	Nitrogen to Phosphorus Ratio	23:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	NEI	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes *Standards revision, true color is for permitting purposes only

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

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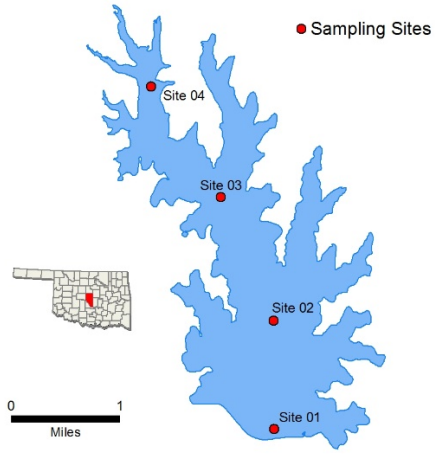
Stanley Draper

Sample Period	Times Visited	Sampling Sites
October 2015 – August 2016	4	5



General

Location	Cleveland County
Impoundment	1962
Area	2,900 acres
Capacity	100,000 acre-feet
Purposes	Water Supply, Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	8 NTU	100% of values < OWQS of 25 NTU
	Average Secchi Disk Depth	104 cm	
	Water Clarity Rating	Excellent	
	Chlorophyll-a	2.7 mg/m3	
	Trophic State Index	40	Previous value = 36
	Trophic Class	Oligotrophic	
Profile	Salinity	0.05 – 0.06 ppt	
	Specific Conductivity	108.7 – 132.7 µS/cm	
	pH	6.81 – 8.34 pH units	
	Oxidation-Reduction Potential	176.1 – 463.7 mV	
	Dissolved Oxygen	Up to 62% of water column < 2 mg/L in August	
Nutrients	Surface Total Nitrogen	0.26 mg/L to 0.55 mg/L	
	Surface Total Phosphorus	0.010 mg/L to 0.015 mg/L	
	Nitrogen to Phosphorus Ratio	31:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes *Standards revision, true color is for permitting purposes only

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

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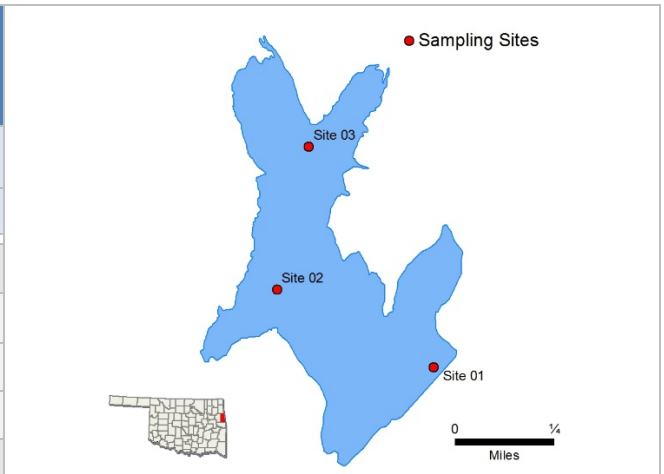
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Stilwell City

Sample Period	Times Visited	Sampling Sites
December 2015 – October 2016	3	5



General

Location	Adair County
Impoundment	1965
Area	188 acres
Capacity	3,110 acre-feet
Purposes	Water Supply, Recreation, Flood Control

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	14 NTU	33% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	69 cm	100% of values < OWQS of 70
	Water Clarity Rating	Average	
	Chlorophyll-a	9.6mg/m3	
	Trophic State Index	53	Previous value = 54
	Trophic Class	Eutrophic	
Profile	Salinity	0.06 – 0.12 ppt	
	Specific Conductivity	117.3 – 249.5 µS/cm	
	pH	6.74 – 8.03 pH units	
	Oxidation-Reduction Potential	64 – 459 mV	
	Dissolved Oxygen	Up to 54% of water column < 2 mg/L in October	Occurred at site 1, the dam
Nutrients	Surface Total Nitrogen	0.63 mg/L to 1.24 mg/L	
	Surface Total Phosphorus	0.027 mg/L to 0.281 mg/L	
	Nitrogen to Phosphorus Ratio	7:1	Possibly co- limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	NS	S							
Aesthetics					S	S					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes *Standards revision, true color is for permitting purposes only

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
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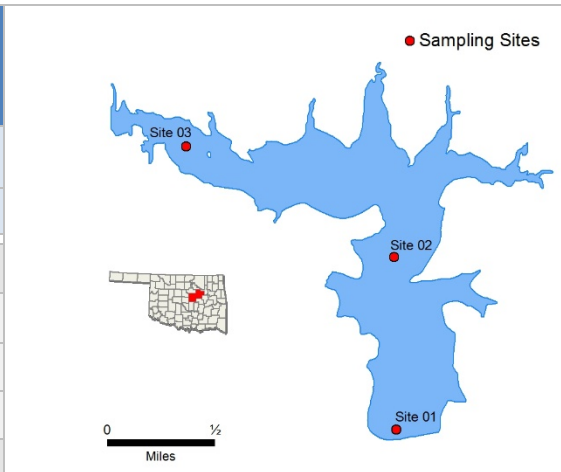
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Stroud

Sample Period	Times Visited	Sampling Sites
October 2018 – July 2019	4	3



General

Location	Creek County
Impoundment	1968
Area	600 acres
Capacity	8,800 acre-feet
Purposes	Water Supply, Recreation, Flood Control

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	12 NTU	8% of values > OWQS of 25 NTU (n=12)
	Average Secchi Disk Depth	74.8 cm	
	Water Clarity Rating	Good	
	Chlorophyll-a	7.10 mg/m3	
	Trophic State Index	50	Previous value = 45
	Trophic Class	Mesotrophic	
Profile	Salinity	0.09 – 0.1 ppt	
	Specific Conductivity	180.9 – 213.9 µS/cm	
	pH	7.03 – 8.34 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	84.0 – 485.7 mV	
	Dissolved Oxygen	Up to 53% of water column < 2 mg/L in July	
Nutrients	Surface Total Nitrogen	0.47 mg/L to 0.79 mg/L	
	Surface Total Phosphorus	0.014 mg/L to 0.044 mg/L	
	Nitrogen to Phosphorus Ratio	26:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	S	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes *Standards revision, true color is for permitting purposes only

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

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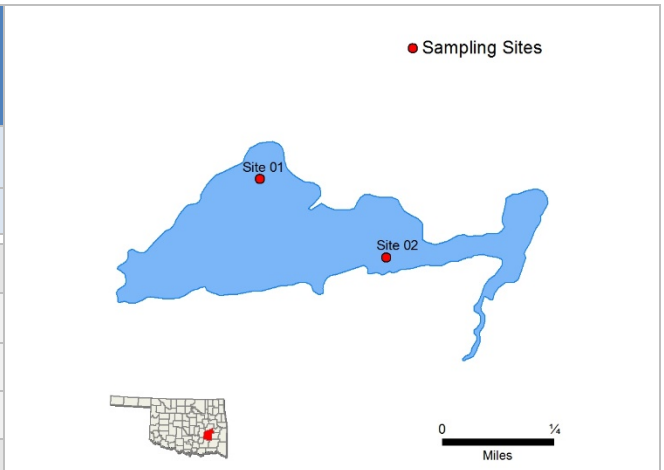
Talawanda No. 1

Sample Period	Times Visited	Sampling Sites
December 2015 – Sept. 2016	4	5



General

Location	Pittsburg County
Impoundment	1902
Area	91 acres
Capacity	12,000 acre feet
Purposes	Waters Supply and Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In-Situ	Average Turbidity	4 NTU	100% of Values < OWQS of 25 NTU
	Average Secchi Disk Depth	120 cm	
	Water Clarity Rating	Excellent	
	Chlorophyll-a	5.8 mg/m3	
	Trophic State Index	48	Previous value = 47
	Trophic Class	Mesotrophic	
Profile	Salinity	0.03 – 0.08 ppt	
	Specific Conductivity	65.1 – 178 µS/cm	
	pH	6.51 – 7.69 pH units	10.53% of values < 6.5 pH units
	Oxidation-Reduction Potential	172.6 to 373.5 mV	
	Dissolved Oxygen	Up to 44% of water column < 2 mg/L in summer	
Nutrients	Surface Total Nitrogen	0.47 mg/L to 0.58 mg/L	
	Surface Total Phosphorus	0.017 mg/L to 0.021 mg/L	
	Nitrogen to Phosphorus Ratio	28:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	NS	NEI	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes *Standards revision, true color is for permitting purposes only

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

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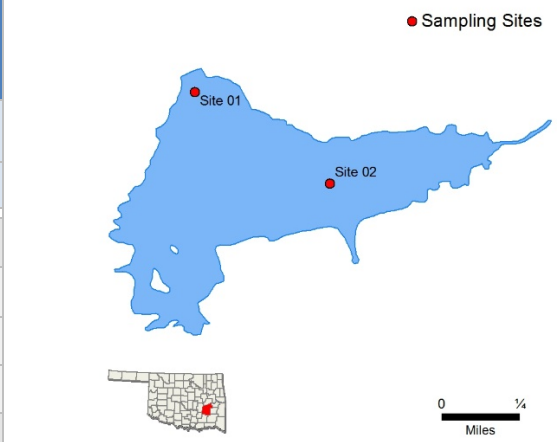
Talawanda No. 2

Sample Period	Times Visited	Sampling Sites
December 2015 – Sept. 2016	4	5



General

Location	Pittsburg County
Impoundment	1924
Area	195 acres
Capacity	2,750 acre feet
Purposes	Waters Supply and Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In-Situ	Average Turbidity	4 NTU	100% of Values < OWQS of 25 NTU
	Average Secchi Disk Depth	136 cm	
	Water Clarity Rating	Excellent	
	Chlorophyll-a	2.6 mg/m3	
	Trophic State Index	40	Previous value = 44
	Trophic Class	Mesotrophic	
Profile	Salinity	0.04 – 0.07 ppt	
	Specific Conductivity	83.6 – 156.8 µS/cm	
	pH	6.30 – 7.7 pH units	6.82% of values < 6.5 pH units
	Oxidation-Reduction Potential	192.9 to 451 mV	
	Dissolved Oxygen	Up to 55% of water column < 2 mg/L in summer	
Nutrients	Surface Total Nitrogen	0.30 mg/L to 0.33 mg/L	
	Surface Total Phosphorus	0.010 mg/L to 0.013 mg/L	
	Nitrogen to Phosphorus Ratio	30:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	NS	NEI	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes *Standards revision, true color is for permitting purposes only

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

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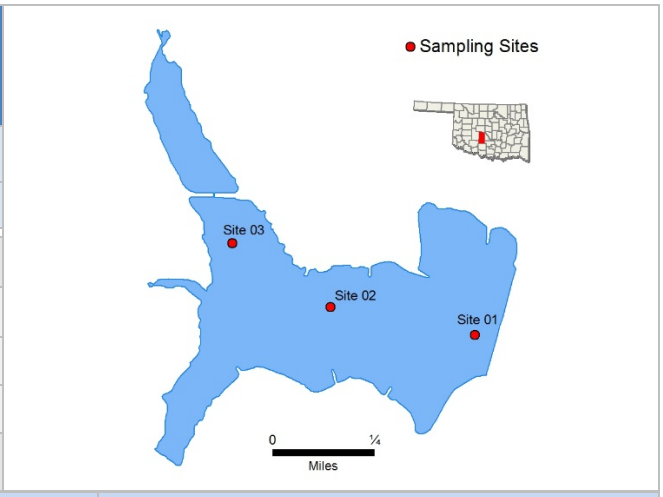
Taylor

Sample Period	Times Visited	Sampling Sites
October 2018 – July 2019	4	3



General

Location	Grady County
Impoundment	1960
Area	227 acres
Capacity	1,877 acre feet
Purposes	Waters Supply, Flood Control, and Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	13 NTU	100% of values < OWQS of 25 NTU (n=12)
	Average Secchi Disk Depth	52.4 cm	
	Water Clarity Rating	Average	
	Chlorophyll-a	51.32 mg/m3	
	Trophic State Index	69	Previous value = 68
	Trophic Class	Hypereutrophic	
Profile	Salinity	0.21 – 0.30 ppt	
	Specific Conductivity	432.9 – 620.8 µS/cm	
	pH	7.49 – 8.97 pH units	
	Oxidation-Reduction Potential	31.7 to 444.6 mV	
	Dissolved Oxygen	Up to 15% of water column <2 mg/L in July	
Nutrients	Surface Total Nitrogen	1.315 mg/L to 1.935 mg/L	
	Surface Total Phosphorus	0.078 mg/L to 0.181 mg/L	
	Nitrogen to Phosphorus Ratio	14:1	Phosphorus limited,

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	*							
Aesthetics					NEI	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

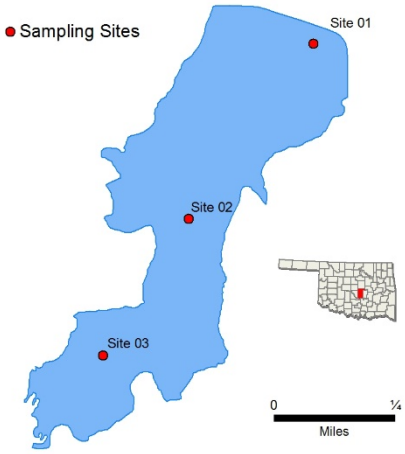
Notes

**Standards revision, true color is for permitting purposes only
*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.

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

Tecumseh

Sample Period	Times Visited	Sampling Sites
October 2007 – July 2008	4	5



General

Location	Pottawatomie County
Impoundment	1934
Area	127 acres
Capacity	1,118 acre feet
Purposes	Waters Supply, and Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	132 nephelometric turbidity units (NTU)	All values > 25 NTU
	Average True Color	244 units	All values > OWQS of 70
	Average Secchi Disk Depth	11 cm	
	Water Clarity Rating	poor	
	Trophic State Index	49	Previous value = 57
	Trophic Class	mesotrophic	
Profile	Salinity	0.00 – 0.10 ppt	
	Specific Conductivity	105.6 – 141 µS/cm	
	pH	7.08 – 7.60 pH units	Neutral
	Oxidation-Reduction Potential	337 to 537 mV	
	Dissolved Oxygen		D.O. always > 5.0 mg/L
Nutrients	Surface Total Nitrogen	1.01 mg/L to 1.55 mg/L	
	Surface Total Phosphorus	0.066 mg/L to 0.131 mg/L	
	Nitrogen to Phosphorus Ratio	12:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes

*Standards revision, true color is for permitting purposes only

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

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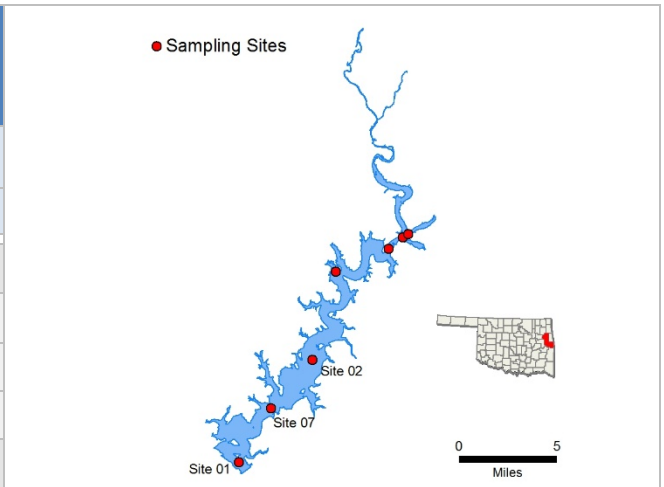
Tenkiller (1,2,7)

Sample Period	Times Visited	Sampling Sites
October 2016 – July 2017	4	7



General

Location	Sequoyah County
Impoundment	1953
Area	12,900 acres
Capacity	654,100 acre-feet
Purposes	Flood Control, Hydropower

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	3 NTU	100% of values < OWQS of 25 NTU
	Average Secchi Disk Depth	215 cm	
	Water Clarity Rating	Excellent	
	Chlorophyll-a	7.77 mg/m3	
	Trophic State Index	51	Previous value = 56
	Trophic Class	Eutrophic	
Profile	Salinity	0.08 – 0.12 ppt	
	Specific Conductivity	165.1 – 254.9 µS/cm	
	pH	6.48– 8.71 pH units	
	Oxidation-Reduction Potential	68.9-465.5 mV	
	Dissolved Oxygen	Up to 79% of water column < 2 mg/L	
Nutrients	Surface Total Nitrogen	0.25 mg/L to 0.99 mg/L	
	Surface Total Phosphorus	0.010 mg/L to 0.021 mg/L	
	Nitrogen to Phosphorus Ratio	31:1	Possibly co-limited for this sample year

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NS	NEI							
Aesthetics					NEI	*					
Agriculture							N/A	N/A	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply				NEI							

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

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.*

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

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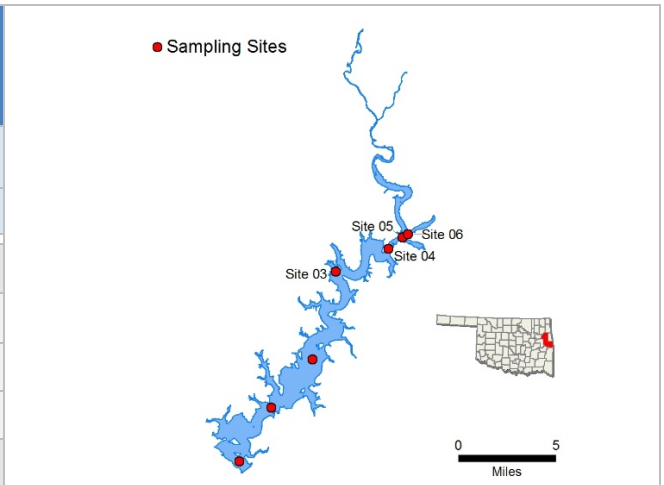
Tenkiller, Illinois River Arm (3-6)

Sample Period	Times Visited	Sampling Sites
October 2016 – July 2017	4	7



General

Location	Sequoyah County
Impoundment	1953
Area	12,900 acres
Capacity	654,100 acre-feet
Purposes	Flood Control, Hydropower

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	28 NTU	19% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	66 cm	
	Water Clarity Rating	Average	
	Chlorophyll-a	21.7 mg/m3	
	Trophic State Index	61	Previous value = 59
	Trophic Class	Hypereutrophic	
Profile	Salinity	0.07 – 0.15 ppt	
	Specific Conductivity	154.4 – 316 µS/cm	
	pH	6.81 – 8.9 pH units	
	Oxidation-Reduction Potential	98.2-422.3 mV	
	Dissolved Oxygen	Up to 70% of water column < 2 mg/L at site 3.	
Nutrients	Surface Total Nitrogen	0.33 mg/L to 2.49 mg/L	
	Surface Total Phosphorus	0.022 mg/L to 0.232 mg/L	
	Nitrogen to Phosphorus Ratio	14:1	Possibly co- limited for this sample year

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NEI	NEI							
Aesthetics					NEI	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply				NEI							NS

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

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.

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
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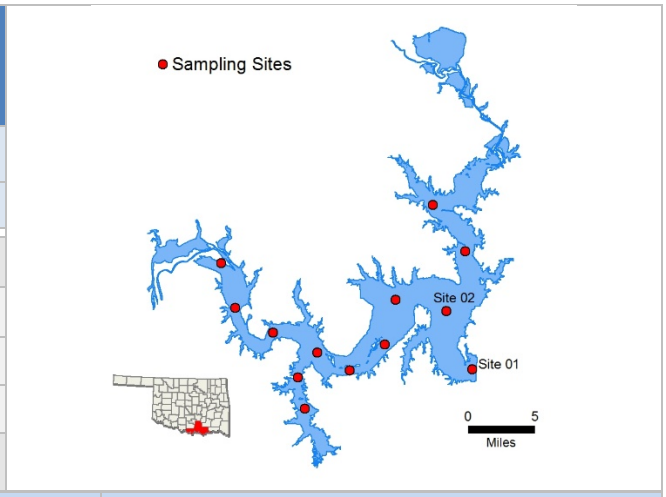
Texoma (1-2)

Sample Period	Times Visited	Sampling Sites
December 2015 – Sept. 2016	4	13



General

Location	Bryan County
Impoundment	1944
Area	88,000 acres
Capacity	2,643,000 acre-feet
Purposes	Flood Control, Waters Supply, Hydropower, Low-flow Regulation, and Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In-Situ	Average Turbidity	4 NTU	100% of values < OWQS of 25 NTU
	Average Secchi Disk Depth	117 cm	
	Water Clarity Rating	Excellent	
	Chlorophyll-a	6.8 mg/m3	
	Trophic State Index	49	Previous value = 53
	Trophic Class	Mesotrophic	
Profile	Salinity	0.59 – 1.40 ppt	
	Specific Conductivity	1202.3 – 2715.1 µS/cm	
	pH	7.11 – 8.43 pH units	
	Oxidation-Reduction Potential	-85.9 to 341.3 mV	
	Dissolved Oxygen	Up to 40% of water column < 2.0 mg/L in summer	
Nutrients	Surface Total Nitrogen	0.54 mg/L to 0.71 mg/L	
	Surface Total Phosphorus	0.033 mg/L to 0.043 mg/L	
	Nitrogen to Phosphorus Ratio	17:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NEI	NEI							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										NEI	
Public & Private Water Supply				NEI							

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Notes

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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

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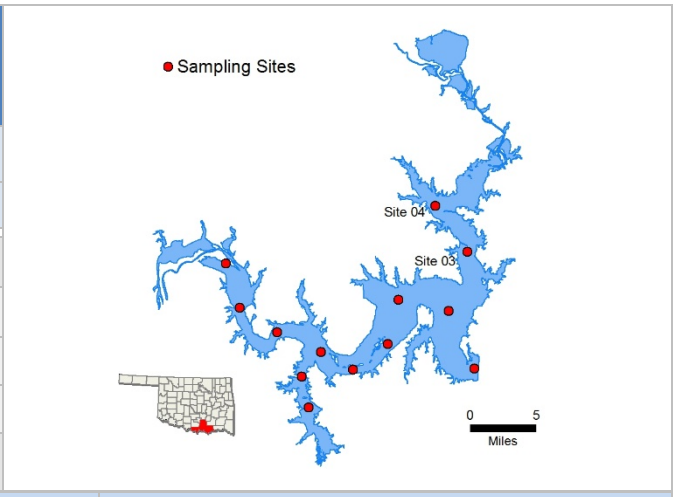
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Texoma Lower Washita River Arm (3-4)

Sample Period	Times Visited	Sampling Sites
December 2015 – Sept. 2016	4	13



General

Location	Bryan County
Impoundment	1944
Area	88,000 acres
Capacity	2,643,000 acre-feet
Purposes	Flood Control, Waters Supply, Hydropower, Low-flow Regulation, and Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In-Situ	Average Turbidity	5 NTU	100% of values < OWQS of 25 NTU
	Average Secchi Disk Depth	96 cm	Did not collect for true color
	Water Clarity Rating	Good	
	Chlorophyll-a	9mg/m3	
	Trophic State Index	5	Previous value = 56
	Trophic Class	Eutrophic	
Profile	Salinity	0.31 – 0.73 ppt	
	Specific Conductivity	639.9 – 1453.7 µS/cm	
	pH	7.48 – 8.48 pH units	
	Oxidation-Reduction Potential	54.9 to 274.9mV	
	Dissolved Oxygen	Up to 41% of water column < 2.0 mg/L in summer	
Nutrients	Surface Total Nitrogen	0.54 mg/L to 0.71 mg/L	
	Surface Total Phosphorus	0.031 mg/L to 0.041 mg/L	
	Nitrogen to Phosphorus Ratio	17:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NS	NEI							
Aesthetics					S	*					
Agriculture							NS	S	S		
Primary Body Contact Recreation										NEI	
Public & Private Water Supply				NEI							

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NS = Not Supporting
NEI = Not Enough Information

Notes

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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
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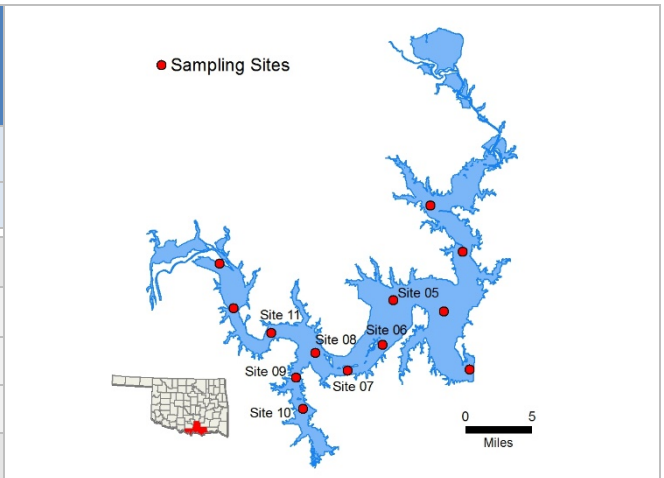
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Texoma Lower Red River Arm (5-11)

Sample Period	Times Visited	Sampling Sites
December 2015 – Sept. 2016	4	13



General

Location	Bryan County
Impoundment	1944
Area	88,000 acres
Capacity	2,643,000 acre-feet
Purposes	Flood Control, Waters Supply, Hydropower, Low-flow Regulation, and Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In-Situ	Average Turbidity	14 NTU	21% of Values > OWQS of 25 NTU
	Average Secchi Disk Depth	67 cm	
	Water Clarity Rating	Good	
	Chlorophyll-a	11 mg/m3	
	Trophic State Index	54	Previous value = 60
	Trophic Class	Eutrophic	
Profile	Salinity	0.29 – 1.72 ppt	
	Specific Conductivity	586.9 – 3298.3 µS/cm	
	pH	7.41 – 8.57 pH units	
	Oxidation-Reduction Potential	110.4 to 397.6 mV	
	Dissolved Oxygen	Up to 22% of water column < 2.0 mg/L in summer	
Nutrients	Surface Total Nitrogen	0.53 mg/L to 0.98 mg/L	
	Surface Total Phosphorus	0.030 mg/L to 0.079 mg/L	
	Nitrogen to Phosphorus Ratio	15:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NEI	NEI							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										NEI	
Public & Private Water Supply				NEI							

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NS = Not Supporting
NEI = Not Enough Information

Notes: *Standards revision, true color is for permitting purposes only

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

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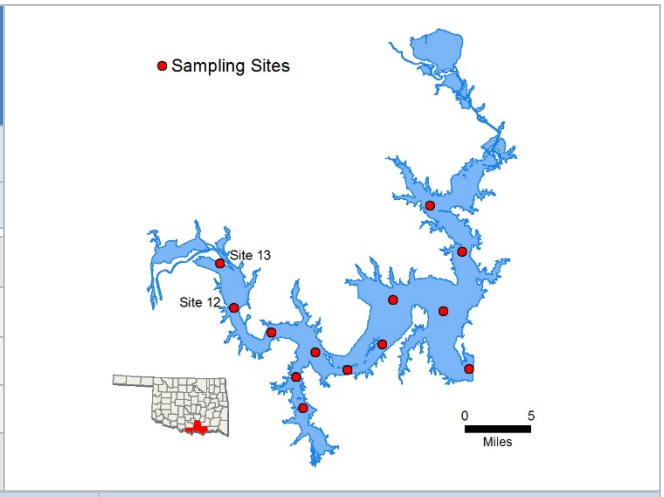
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Texoma Upper Red River Arm (12-13)

Sample Period	Times Visited	Sampling Sites
December 2015 – Sept. 2016	4	13



General

Location	Bryan County
Impoundment	1944
Area	88,000 acres
Capacity	2,643,000 acre-feet
Purposes	Flood Control, Waters Supply, Hydropower, Low-flow Regulation, and Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In-Situ	Average Turbidity	46 NTU	50% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	27 cm	
	Water Clarity Rating	Fair to Poor	
	Chlorophyll-a	13.6 mg/m3	
	Trophic State Index	56	Previous value = 69
	Trophic Class	Eutrophic	
Profile	Salinity	0.43 – 1.84 ppt	
	Specific Conductivity	872.2 – 3534.3 µS/cm	
	pH	7.79 – 8.50 pH units	
	Oxidation-Reduction Potential	276.9to 374.2 mV	
	Dissolved Oxygen		All values above screening level of 2 mg/L
Nutrients	Surface Total Nitrogen	0.0.66 mg/L to 1.79 mg/L	
	Surface Total Phosphorus	0.040 mg/L to 0.167 mg/L	
	Nitrogen to Phosphorus Ratio	11:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	NEI							
Aesthetics					S*	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										NEI	
Public & Private Water Supply				NEI							

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

Notes

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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

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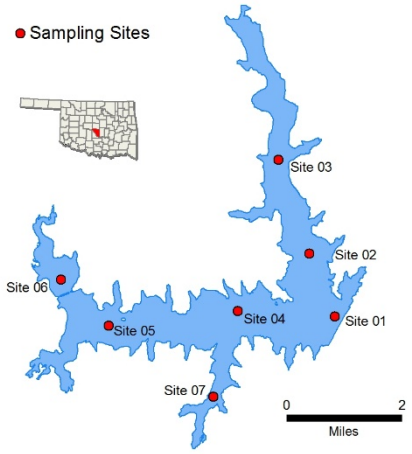
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Thunderbird

Sample Period	Times Visited	Sampling Sites
October 2014 – July 2015	4	7



General

Location	Cleveland County
Impoundment	1965
Area	6,070 acres
Capacity	119,600 acre-feet
Purposes	Flood Control, Water Supply, Recreation, Fish & Wildlife

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	14 NTU	4% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	59 cm	
	Water Clarity Rating	Average	
	Chlorophyll-a	21 mg/m3	
	Trophic State Index	61	Previous value = 56
	Trophic Class	Hypereutrophic	
Profile	Salinity	0.13 – 0.26 ppt	
	Specific Conductivity	281.5 – 530 µS/cm	
	pH	7.14 – 8.68 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	90.2 to 454 mV	
	Dissolved Oxygen	Up to 67% of water column < 2 mg/L in July	Occurred at sites 1, the dam
Nutrients	Surface Total Nitrogen	0.80 mg/L to 1.27 mg/L	
	Surface Total Phosphorus	0.018 mg/L to 0.064 mg/L	
	Nitrogen to Phosphorus Ratio	23:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	NS	S							
Aesthetics					NEI*	S					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											NS

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

Notes

* The lake is listed in the Oklahoma Water Quality Standards (WQS) as a Nutrient Limited watershed (NLW). 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
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

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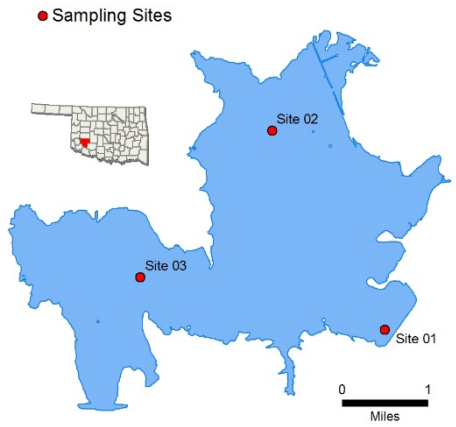
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Tom Steed

Sample Period	Times Visited	Sampling Sites
December 2014 – Sept. 2015	4	3



General

Location	Kiowa County
Impoundment	1975
Area	6,400 acres
Capacity	88,970 acre-feet
Purposes	Flood Control, Water Supply, Recreation, Fish & Wildlife

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	35 NTU	67% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	27 cm	
	Water Clarity Rating	poor	
	Chlorophyll-a	10 mg/m3	
	Trophic State Index	53	Previous value = 58
	Trophic Class	Eutrophic	
Profile	Salinity	0.22 – 0.64 ppt	
	Specific Conductivity	456.4 – 1281 µS/cm	
	pH	7.62 – 8.53 pH units	
	Oxidation-Reduction Potential	299 to 449 mV	
	Dissolved Oxygen		All data for this sample year below the screening level of 2 mg/L
Nutrients	Surface Total Nitrogen	0.79 mg/L to 1.35 mg/L	
	Surface Total Phosphorus	0.070 mg/L to 0.202 mg/L	
	Nitrogen to Phosphorus Ratio	8:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	S							
Aesthetics					NEI	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											NS

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NS = Not Supporting
NEI = Not Enough Information

Notes *Standards revision, true color is for permitting purposes only

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

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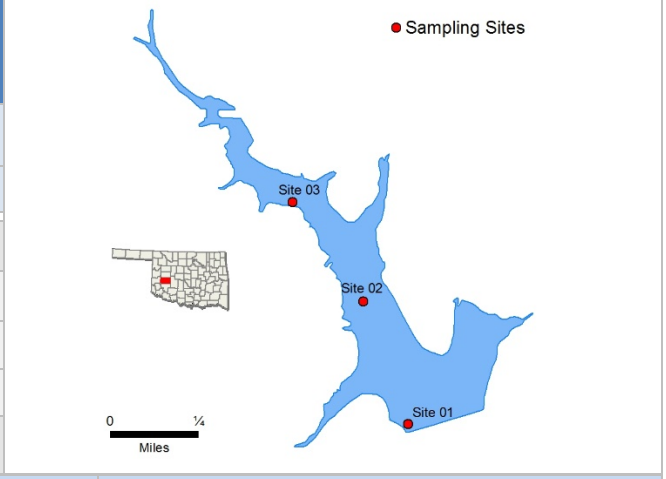
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Vanderwork

Sample Period	Times Visited	Sampling Sites
October 2007 – July 2008	4	5



General

Location	Washita County
Impoundment	1968
Area	135 acres
Capacity	1,578 acre-feet
Purposes	Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
	Average Turbidity	9 nephelometric turbidity units (NTU)	All values < 25 NTU
	Average True Color	17 units	All values < OWQS of 70
	Average Secchi Disk Depth	59 cm	
	Water Clarity Rating	good	
	Trophic State Index	64	Previous value = 60
	Trophic Class	hypereutrophic	
Profile	Salinity	0.83 - 1.01 ppt	
Profile	Specific Conductivity	1568 – 1896 µS/cm	
Profile	pH	7.2 – 8.18 pH units	Neutral to slightly alkaline
Profile	Oxidation-Reduction Potential	-116 to 530 mV	
Profile	Dissolved Oxygen	Up to 50% of water column < 2 mg/L in June	Occurred at site 1
Nutrients	Surface Total Nitrogen	0.87 mg/L to 1.75 mg/L	
Nutrients	Surface Total Phosphorus	0.041 mg/L to 0.100 mg/L	
Nutrients	Nitrogen to Phosphorus Ratio	18:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NEI	S							
Aesthetics					NEI	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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NS = Not Supporting
NEI = Not Enough Information

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
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

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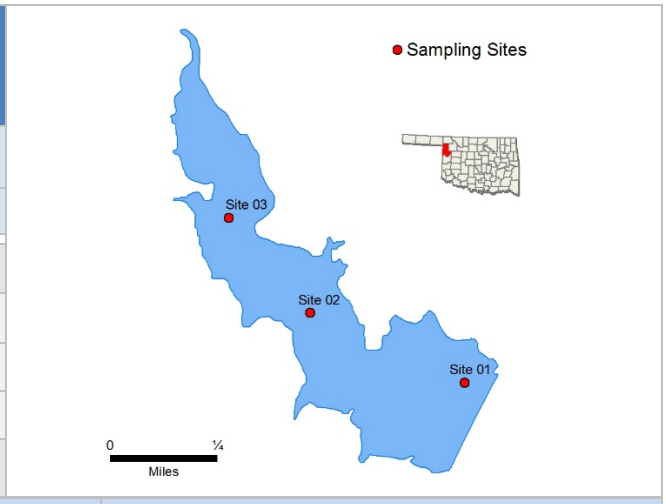
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Vincent

Sample Period	Times Visited	Sampling Sites
November 2010 – July 2011	4	5



General

Location	Ellis County
Impoundment	1961
Area	160 acres
Capacity	2,579 acre feet
Purposes	Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In-Situ	Average Turbidity	14 NTU	100% of Values < OWQS of 25 NTU
	Average Secchi Disk Depth	63 cm	
	Water Clarity Rating	Good	
	Chlorophyll-a	8 mg/m3	
	Trophic State Index	51	Previous value = 46
	Trophic Class	Eutrophic	
Profile	Salinity	0.43 – 0.48 ppt	
	Specific Conductivity	833.1 - 928 µS/cm	
	pH	7.14 – 8.19 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	-50 to 490 mV	
	Dissolved Oxygen	Up to 45 % < 2 mg/L in summer	
Nutrients	Surface Total Nitrogen	0.27 mg/L to 0.55 mg/L	
	Surface Total Phosphorus	0.015 mg/L to 0.028 mg/L	
	Nitrogen to Phosphorus Ratio	21:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NEI	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes

*Standards revision, true color is for permitting purposes only.

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
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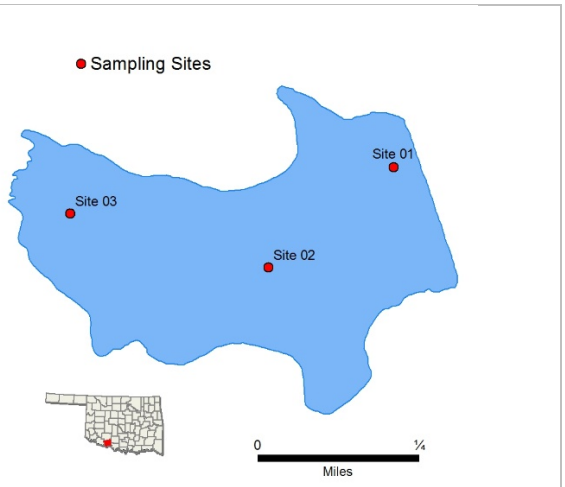
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Dave Boyer (Walters)

Sample Period	Times Visited	Sampling Sites
December 2016 – September 2017	4	5



General

Location	Cotton County
Impoundment	1936
Area	148 acres
Capacity	861 acre feet
Purposes	Water Supply, and Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
	Average Turbidity	69 NTU	100% of values > 25 NTU
	Average Secchi Disk Depth	19 cm	
	Water Clarity Rating	poor	
	Chlorophyll	10.42 mg/L	
	Trophic State Index	54	Previous value = 51
	Trophic Class	eutrophic	
Profile	Salinity	0.14 – 0.15 ppt	
Profile	Specific Conductivity	286.6 – 312.8 µS/cm	
Profile	pH	7.62 – 8.2 pH units	Neutral to slightly alkaline
Profile	Oxidation-Reduction Potential	213.1 – 453.5 mV	
Profile	Dissolved Oxygen		All values > 2 mg/L
Nutrients	Surface Total Nitrogen	0.88 mg/L to 1.18 mg/L	
Nutrients	Surface Total Phosphorus	0.109 mg/L to 0.158 mg/L	
Nutrients	Nitrogen to Phosphorus Ratio	8:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											NS

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

Notes

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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
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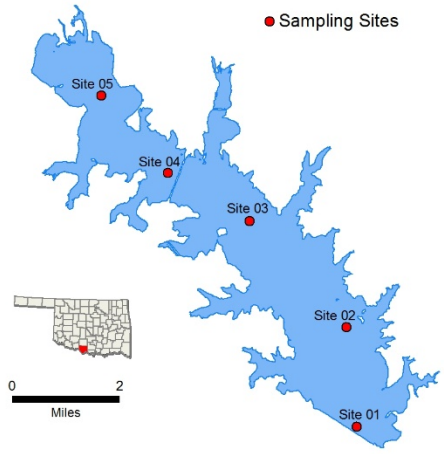
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Waurika

Sample Period	Times Visited	Sampling Sites
December 2014 – August 2015	4	5



General

Location	Jefferson County
Impoundment	1977
Area	10,100 acres
Capacity	203,100 acre feet
Purposes	Flood Control, Irrigation, Water Supply, Water Quality Control, Fish and Wildlife, and

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	20 NTU	25% of values > 25 NTU
	Average Secchi Disk Depth	53 cm	
	Water Clarity Rating	Fair	
	Chlorophyll-a	15 mg/m3	
	Trophic State Index	57	Previous value = 61
	Trophic Class	Eutrophic	
Profile	Salinity	0.16 – 0.40 ppt	
	Specific Conductivity	329.7 – 821 µS/cm	
	pH	6.85 – 8.45 pH units	
	Oxidation-Reduction Potential	75.3 to 518 mV	
	Dissolved Oxygen	Up to 43% of water column < 2.0 mg/L in June	
Nutrients	Surface Total Nitrogen	0.61 mg/L to 1.24 mg/L	
	Surface Total Phosphorus	0.106 mg/L to 0.351 mg/L	
	Nitrogen to Phosphorus Ratio	5:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	S							
Aesthetics					*	S					
Agriculture							S	S	S		
Primary Body Contact Recreation										NEI	
Public & Private Water Supply											NS

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Notes

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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
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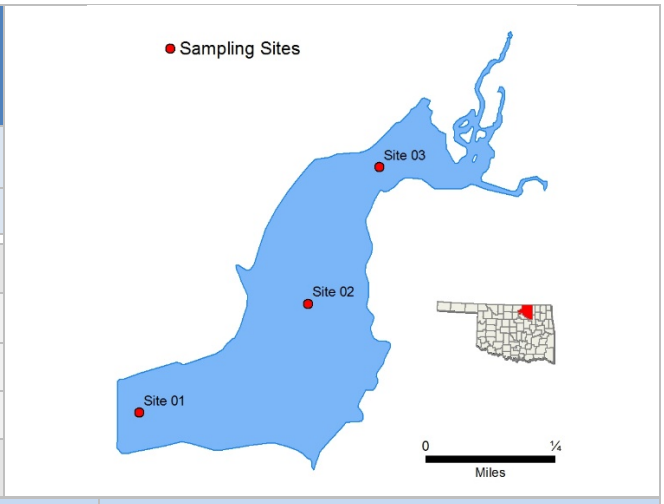
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Waxhoma

Sample Period	Times Visited	Sampling Sites
November 2018 – August 2019	4	3



General

Location	Osage County
Impoundment	1955
Area	197 acres
Capacity	2,100 acre-feet
Purposes	Water Supply, Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	12 NTU	25% of values > OWQS of 25 NTU (n=12)
	Average Secchi Disk Depth	111.6 cm	
	Water Clarity Rating	Excellent	
	Cholorophyll-a	8.95 mg/m3	
	Trophic State Index	52	Previous Value = 49
	Trophic Class	Eutrophic	
Profile	Salinity	0.03 – 0.06 ppt	
	Specific Conductivity	60.3 – 136.5 µS/cm	
	pH	6.57 – 8.06 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	139.2 – 483.7 mV	
	Dissolved Oxygen	Up to 69% of water column < 2 mg/L in August	
Nutrients	Surface Total Nitrogen	0.495 mg/L to 0.78 mg/L	
	Surface Total Phosphorus	0.017 mg/L to 0.061 mg/L	
	Nitrogen to Phosphorus Ratio	21:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NEI	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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Notes

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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
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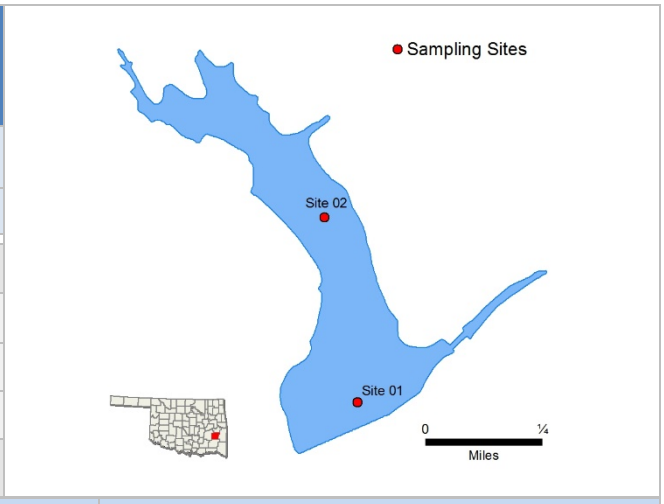
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

Wayne Wallace

Sample Period	Times Visited	Sampling Sites
November 2016 – August 2017	4	5



General

Location	Latimer County
Impoundment	1969
Area	94 acres
Capacity	1,746 acre feet
Purposes	Flood Control and Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
	Average Turbidity	6 NTU	100% of values < OWQS of 25 NTU (n=6)
	Average Secchi Disk Depth	90 cm	
	Water Clarity Rating	Good	
	Chlorophyll-a	13.75 mg/m3	
	Trophic State Index	56	Previous value = 63
	Trophic Class	Eutrophic	
Profile	Salinity	0.02 – 0.04 ppt	
Profile	Specific Conductivity	53.1 – 83.1 µS/cm	
Profile	pH	5.94 – 7.61 pH units	9.8% of recorded values are < 6.5 pH units
Profile	Oxidation-Reduction Potential	231.9 – 573.3 mV	
Profile	Dissolved Oxygen	Up to 40% of water column < 2 mg/L in August	
Nutrients	Surface Total Nitrogen	0.38 mg/L to 0.64 mg/L	
Nutrients	Surface Total Phosphorus	0.017 mg/L to 0.031 mg/L	
Nutrients	Nitrogen to Phosphorus Ratio	20:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	NS	NS	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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Notes

Slightly acidic conditions are common in this part of the state, due to relatively low soil pH and lack of soluble bedrock. Due to these conditions it is likely that the low pH values may be due to natural causes; therefore the Water Board is looking at the applicability of developing site-specific criteria for waters in the southeastern portion of the state. * Standards revision, true color is for permitting purposes only.

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µS/cm = microsiemens per centimeter
E. coli = Escherichia coli
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Chlor-a = Chlorophyll-a
mg/L = milligrams per liter
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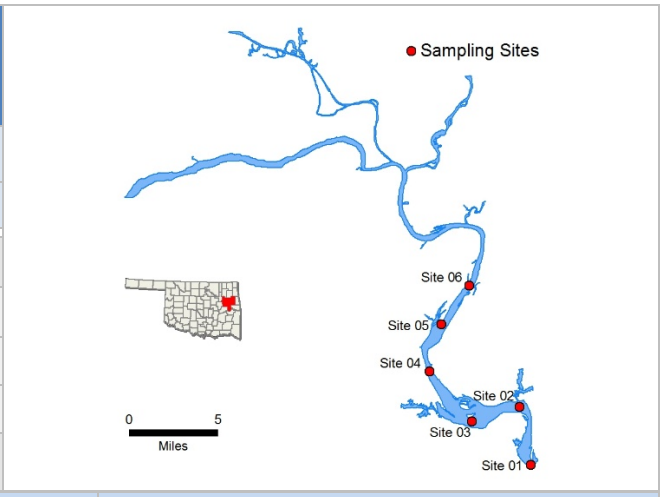
Webbers Falls

Sample Period	Times Visited	Sampling Sites
February 2019	1**	6



General

Location	Muskogee County	Click map for site data
Impoundment	1965	
Area	11,600 acres	
Capacity	170,100 acre-feet	
Purposes	Navigation, Hydropower	

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In-Situ	Average Turbidity	16 NTU	0% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	56.2 cm	
	Water Clarity Rating	Poor	
	Chlorophyll-a	21.22 mg/m3	
	Trophic State Index	61	Previous value = 52
	Trophic Class	Hypereutrophic	
Profile	Salinity	0.26 – 0.49 ppt	
	Specific Conductivity	528.1 – 997.3 µS/cm	
	pH	8.07 – 8.20 pH units	
	Oxidation-Reduction Potential	395.5 – 409.0 mV	
	Dissolved Oxygen	All data are above screening level of 2.0 mg/L	
Nutrients	Surface Total Nitrogen	1.25 mg/L to 1.48 mg/L	
	Surface Total Phosphorus	0.144 mg/L to 0.154 mg/L	
	Nitrogen to Phosphorus Ratio	10:1	Possibly co-limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										NS	
Public & Private Water Supply											

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NEI = Not Enough Information

Notes

*Standards revision, true color is for permitting purposes only.
**Only one visit in SY19 due to extreme flooding

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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
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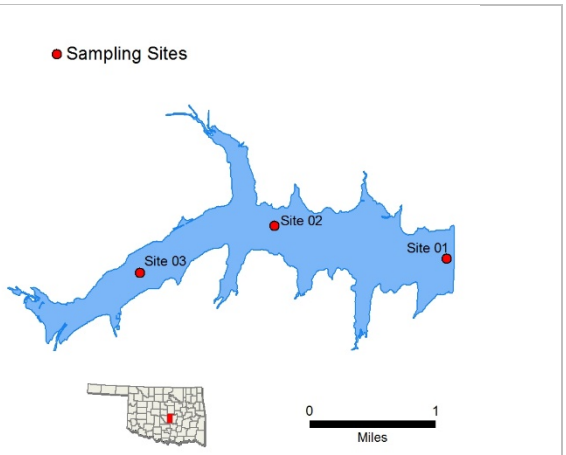
Wes Watkins

Sample Period	Times Visited	Sampling Sites
November 2018 – September 2019	3	3



General

Location	Pottawatomie County
Impoundment	1997
Area	1,142 acres
Capacity	14,065 acre-feet
Purposes	Water Supply, Recreation, Flood Control

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In-Situ	Average Turbidity	101 NTU	50% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	40.4 cm	
	Water Clarity Rating	Fair	
	Chlorophyll-a	16.46 mg/m3	
	Trophic State Index	58	Previous Value= 62
	Trophic Class	Eutrophic	
Profile	Salinity	0.06 – 0.14 ppt	
	Specific Conductivity	134.1 – 295.1 µS/cm	
	pH	6.82 – 8.55 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	101.3 – 484.1 mV	
	Dissolved Oxygen	Up to 41% of water column < 2 mg/L in September	
Nutrients	Surface Total Nitrogen	0.675 mg/L to 1.79 mg/L	
	Surface Total Phosphorus	0.031 mg/L to 0.216 mg/L	
	Nitrogen to Phosphorus Ratio	16:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NEI	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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NEI = Not Enough Information

Notes

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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

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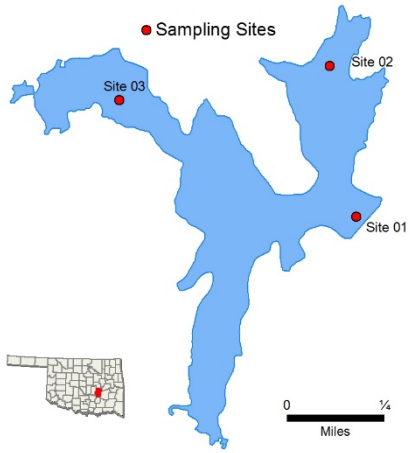
Wetumka

Sample Period	Times Visited	Sampling Sites
November 2018 – September 2019	4	3



General

Location	Hughes County
Impoundment	1939
Area	169 acres
Capacity	1,839 acre-feet
Purposes	Water Supply, Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In-Situ	Average Turbidity	16 NTU	25% of values > OWQS of 25 NTU
	Average Secchi Disk Depth	64.2 cm	
	Water Clarity Rating	Fair	
	Chlorophyll-a	12.31 mg/m3	
	Trophic State Index	55	Previous Value= 53
	Trophic Class	Eutrophic	
Profile	Salinity	0.05 – 0.13 ppt	
	Specific Conductivity	101.4 – 283.2 µS/cm	
	pH	6.64 – 7.82 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	48.0 – 473.0 mV	
	Dissolved Oxygen	Up to 52% of water column < 2 mg/L in September	
Nutrients	Surface Total Nitrogen	0.525 mg/L to 0.895 mg/L	
	Surface Total Phosphorus	0.025 mg/L to 0.062 mg/L	
	Nitrogen to Phosphorus Ratio	20:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NEI	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										NS	
Public & Private Water Supply											

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NS = Not Supporting
NEI = Not Enough Information

Notes

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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

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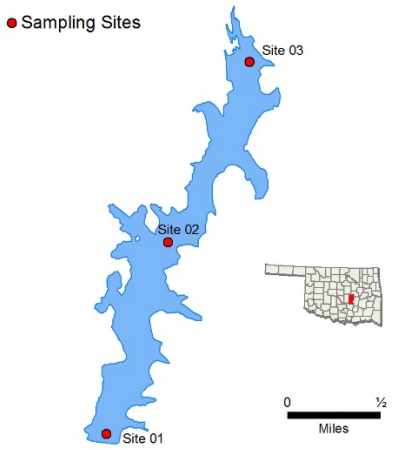
Wewoka

Sample Period	Times Visited	Sampling Sites
October 2014 – July 2015	4	5



General

Location	Seminole County
Impoundment	1925
Area	371 acres
Capacity	3,301 acre-feet
Purposes	Water Supply, Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
	Average Turbidity	18 NTU	17% of values > 25 NTU
	Average Secchi Disk Depth	41 cm	
	Water Clarity Rating	Fair	
	Chlorophyll-a	12 mg/m3	
	Trophic State Index	55	Previous value = 55
	Trophic Class	Eutrophic	
Profile	Salinity	0.04 – 0.11 ppt	
Profile	Specific Conductivity	95.9 – 225.1 µS/cm	
Profile	pH	6.64 – 7.91 pH units	
Profile	Oxidation-Reduction Potential	123.8 - 505 mV	
Profile	Dissolved Oxygen	Up to 38% of water column < 2.0 mg/L in July	
Nutrients	Surface Total Nitrogen	0.67 mg/L to 0.93 mg/L	
Nutrients	Surface Total Phosphorus	0.018 mg/L to 0.079 mg/L	
Nutrients	Nitrogen to Phosphorus Ratio	19:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	S	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											NS

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NEI = Not Enough Information

Notes

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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

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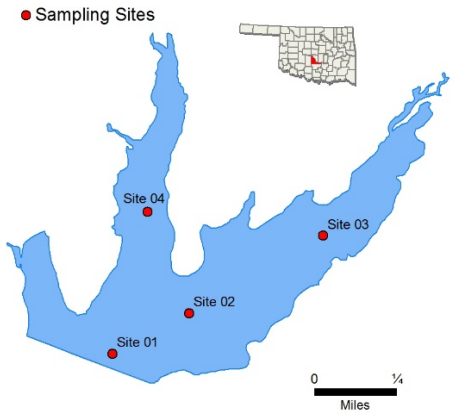
Wiley Post Memorial (Maysville)

Sample Period	Times Visited	Sampling Sites
October 2012 – August 2013	4	4



General

Location	McClain County
Impoundment	1971
Area	302 acres
Capacity	2,086 acre feet
Purposes	Water Supply, Flood Control, and Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In Situ	Average Turbidity	36 NTU	54% of values > 25 NTU
	Average Secchi Disk Depth	27 cm	
	Water Clarity Rating	Poor	
	Chlorophyll-a	17 mg/m3	
	Trophic State Index	58	Previous value = 51
	Trophic Class	Eutrophic	
Profile	Salinity	0.16 – 0.26 ppt	
	Specific Conductivity	347 – 533 µS/cm	
	pH	6.88 – 8.58 pH units	Neutral to slightly alkaline
	Oxidation-Reduction Potential	86 to 320 mV	
	Dissolved Oxygen	Up to 40% of water column < 2 mg/L in August	Occurred at site 4
Nutrients	Surface Total Nitrogen	0.85 mg/L to 1.62 mg/L	
	Surface Total Phosphorus	0.074 mg/L to 0.176 mg/L	
	Nitrogen to Phosphorus Ratio	12:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	S	NEI	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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

Notes

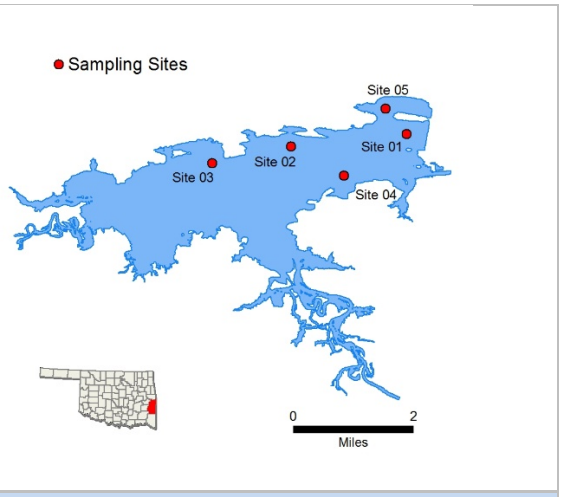
*Standards revision, true color is for permitting purposes only

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

Wister

Sample Period	Times Visited	Sampling Sites
November 2015 – Sept. 2016	4	5



General

Location	LeFlore County
Impoundment	1949
Area	7,333 acres
Capacity	62,360 acre feet
Purposes	Flood Control, Water Supply, Low flow Regulation, and Conservation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In-Situ	Average Turbidity	22 NTU	30% of values < OWQS 25 NTU
	Average Secchi Disk Depth	44 cm	
	Water Clarity Rating	Fair	
	Chlorophyll-a	24 mg/m3	
	Trophic State Index	62	Previous value =60
	Trophic Class	Hypereutrophic	
Profile	Salinity	0.03 – 0.04 ppt	
	Specific Conductivity	75.7 – 87 µS/cm	
	pH	6.45 – 7.49 pH units	2 % of Values < 6.5 pH units
	Oxidation-Reduction Potential	23 to 332.2 mV	
	Dissolved Oxygen		All readings above 2 mg/L
Nutrients	Surface Total Nitrogen	0.54 mg/L to 0.66 mg/L	
	Surface Total Phosphorus	0.037 mg/L to 0.062 mg/L	
	Nitrogen to Phosphorus Ratio	12:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	En & E. coli	Chlor-a
Fish & Wildlife Propagation	NS	NS	NEI	S							
Aesthetics					NEI*	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											NS

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NEI = Not Enough Information

Notes

*Standards revision, true color is for permitting purposes only. *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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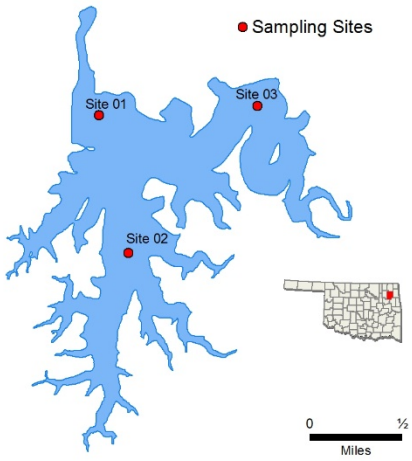
Bathy map available: http://www.owrb.ok.gov/maps/PMG/owrbdata_Bathy.html

W.R. Holway

Sample Period	Times Visited	Sampling Sites
November 2015 – August 2016	4	5



General

Location	Mayes County
Impoundment	1968
Area	712 acres
Capacity	48,000 acre-feet
Purposes	Water Supply, Hydropower, Recreation

Parameters

	Parameter (Descriptions)	Result	Notes/Comments
In-Situ	Average Turbidity	2 NTU	100% of Values < OWQS of 25
	Average Secchi Disk Depth	147 cm	
	Water Clarity Rating	Excellent	
	Chlorophyll-a	18.9 mg/m3	
	Trophic State Index	59	Previous Value= 56
	Trophic Class	Eutrophic	
Profile	Salinity	0.09 – 0.22 ppt	
	Specific Conductivity	201.8 – 451.2 µS/cm	
	pH	6.66 – 9.00 pH units	
	Oxidation-Reduction Potential	128.5 to 514 mV	
	Dissolved Oxygen	Up to 48% of water column < 2 mg/L in summer	
Nutrients	Surface Total Nitrogen	0.41 mg/L to 0.59mg/L	
	Surface Total Phosphorus	0.042 mg/L to 0.067 mg/L	
	Nitrogen to Phosphorus Ratio	9:1	Phosphorus limited

Beneficial Uses

Click to learn more about Beneficial Uses	Turbidity	pH	Dissolved Oxygen	Metals	TSI	True Color	Sulfates	Chlorides	Total Dissolved Solids	Enterro. & E. coli	Chlor-a
Fish & Wildlife Propagation	S	S	NS	S							
Aesthetics					S	*					
Agriculture							S	S	S		
Primary Body Contact Recreation										S	
Public & Private Water Supply											

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Notes

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NTU = nephelometric turbidity units
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APPENDIX A

Oklahoma's Use Support Assessment Protocols

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

http://www.owrb.ok.gov/util/rules/pdf_rul/current/Ch46.pdf#page=18