Bathymetric Survey of Select Dissolved Oxygen Impaired Reservoirs

FY 2016

PROJECT #3 FY16/17 § 106 I-006400-15
TABLE 1 LAKES

PREPARED BY:
OKLAHOMA WATER RESOURCES BOARD

PREPARED FOR:
OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY

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INTRODUCTION

Project

The Oklahoma Water Resources Board (OWRB) was contracted by the Oklahoma Department of Environmental Quality (ODEQ) to conduct hydrographic surveys of four Oklahoma reservoirs impaired for dissolved oxygen. The four reservoirs include Lake of the Arbuckles, Elmer Thomas Lake, Hominy Municipal Lake, and Lake John Wells. The purpose of this project was to produce current elevation-area-capacity tables, to allow for volumetric determination of dissolved oxygen for beneficial use assessment.

Reservoirs

Lake of the Arbuckles

Lake of the Arbuckles is located on Rock Creek, a tributary of the Washita River. It is located in Murray County, approximately six miles southwest of the City of Sulphur **Figure 1**. The Bureau of Reclamation began dam construction in January of 1964 and it was completed in January of 1967. The dam is located at Lat. 34° 25' 50.0" Long. 097° 01' 50.0" in Sec. 31, T1S, R3E. Lake of the Arbuckles' assigned beneficial uses include public and private water supply, flood control, fish and wildlife propagation, and recreation.

Elmer Thomas Lake

Elmer Thomas Lake is located on Medicine Creek on the boundary between Fort Sill Military Reservation and the Wichita Mountain Wildlife Refuge **Figure 2**. It is located in Comanche County, approximately ten miles northwest of the City of Lawton. Elmer Thomas is owned by the U.S. Fish and Wildlife Service. The original earthen dam was built in 1939, and was replaced in 1993 with a new roller-compacted concrete gravity dam. The new dam is located at Lat. 34° 43' 40.0" Long. 098° 30' 50.0" in Sec. 13, T3N, R13W. Elmer Thomas Lake's assigned beneficial uses include public and private water supply, fish and wildlife propagation, and recreation.

Hominy Municipal Lake

Hominy Municipal Lake is located on Claremore Creek in Osage County, approximately one mile west of the City of Hominy **Figure 3**. Hominy municipal is owned by the City of Hominy and was built in 1940. The dam is located at Lat. 36° 24' 29.45" Long. 096° 25' 22.98" in Sec. 2, T22N, R8E. Hominy Municipal Lake's assigned beneficial uses include public and private water supply, fish and wildlife propagation, and recreation.

Lake John Wells

Lake John Wells is located on Sans Bois Creek Tributary in Haskell County, approximately two miles southeast of the City of Stigler **Figure 4**. John Wells is owned by the City of Stigler and was built in 1936. The dam is located at Lat. 35° 13' 46.34" Long. 095° 05' 50.53" in Sec. 29, T9N, R21E. Lake John Wells' assigned beneficial uses include public and private water supply, fish and wildlife propagation, and recreation.

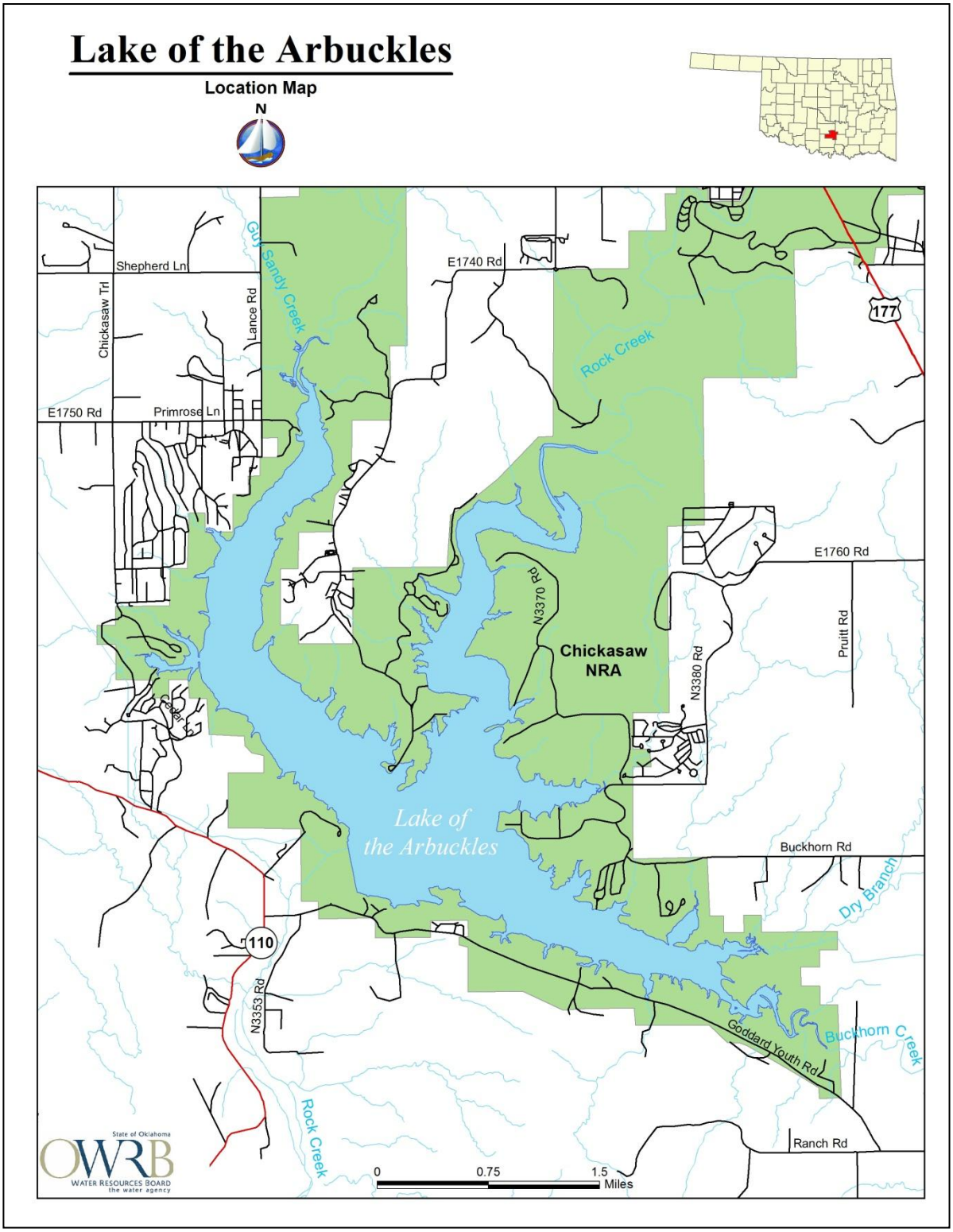

Figure 1: Location map for Lake of the Arbuckles.

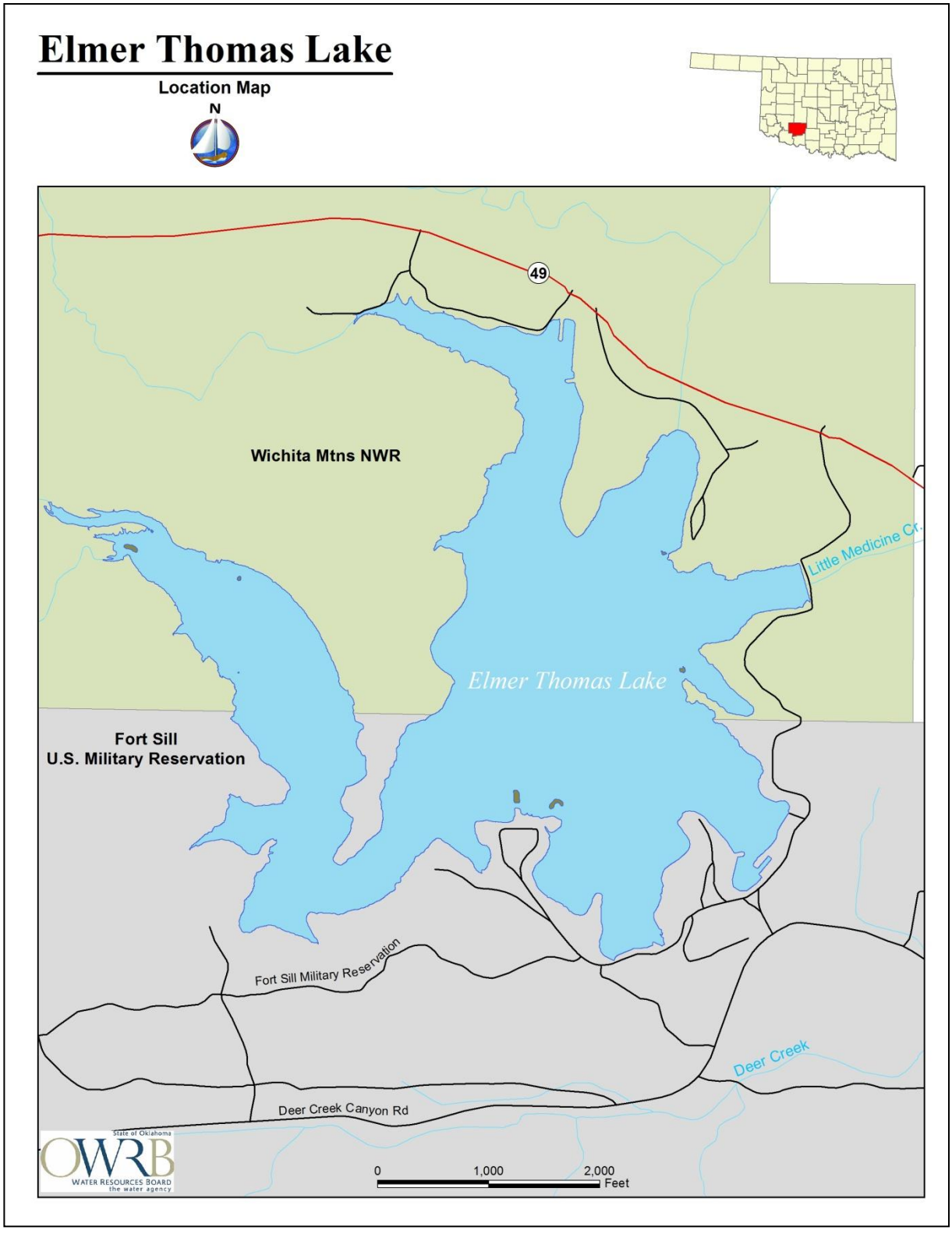

Figure 2: Location map of Elmer Thomas Lake

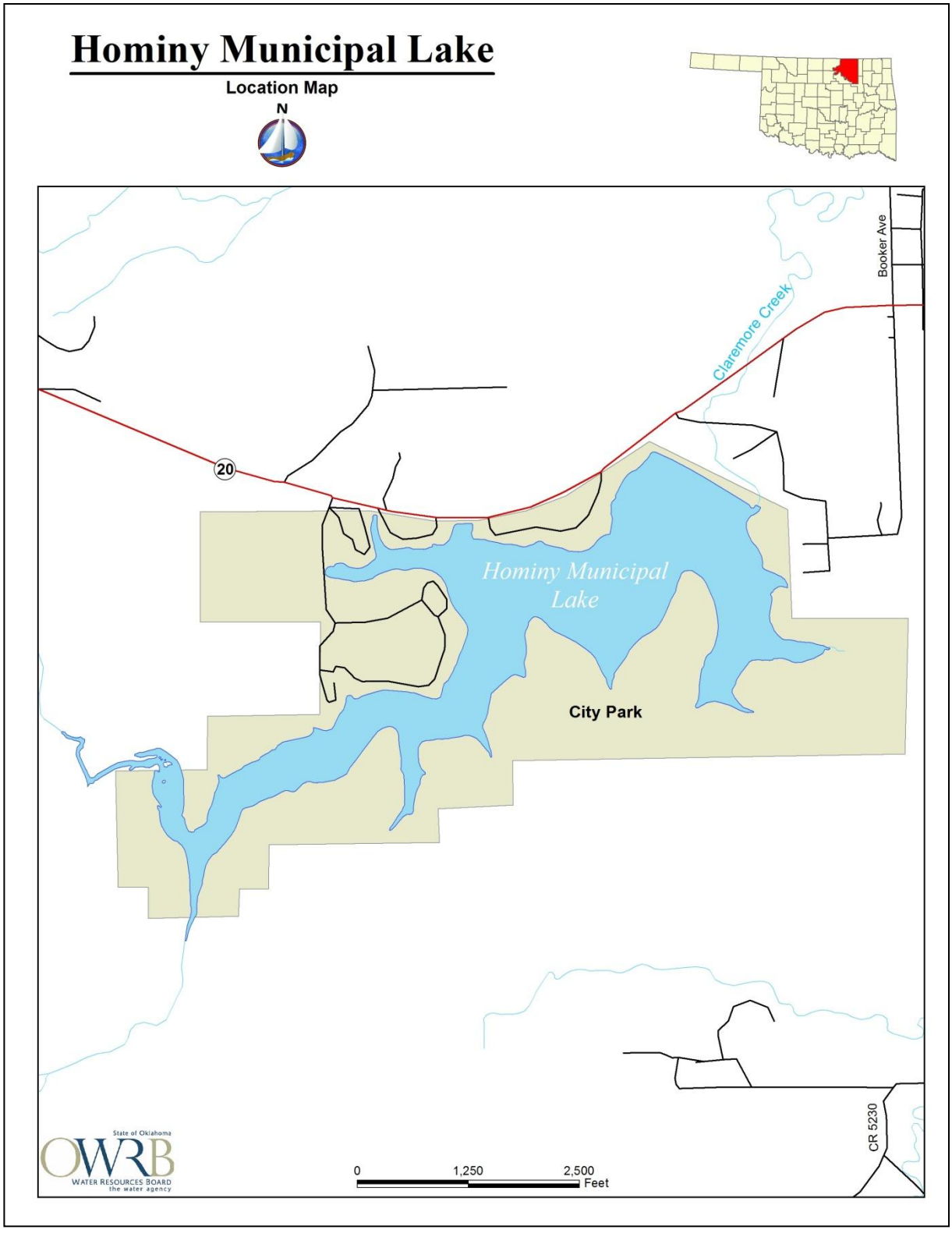

Figure 3: Location map of Hominy Municipal Lake

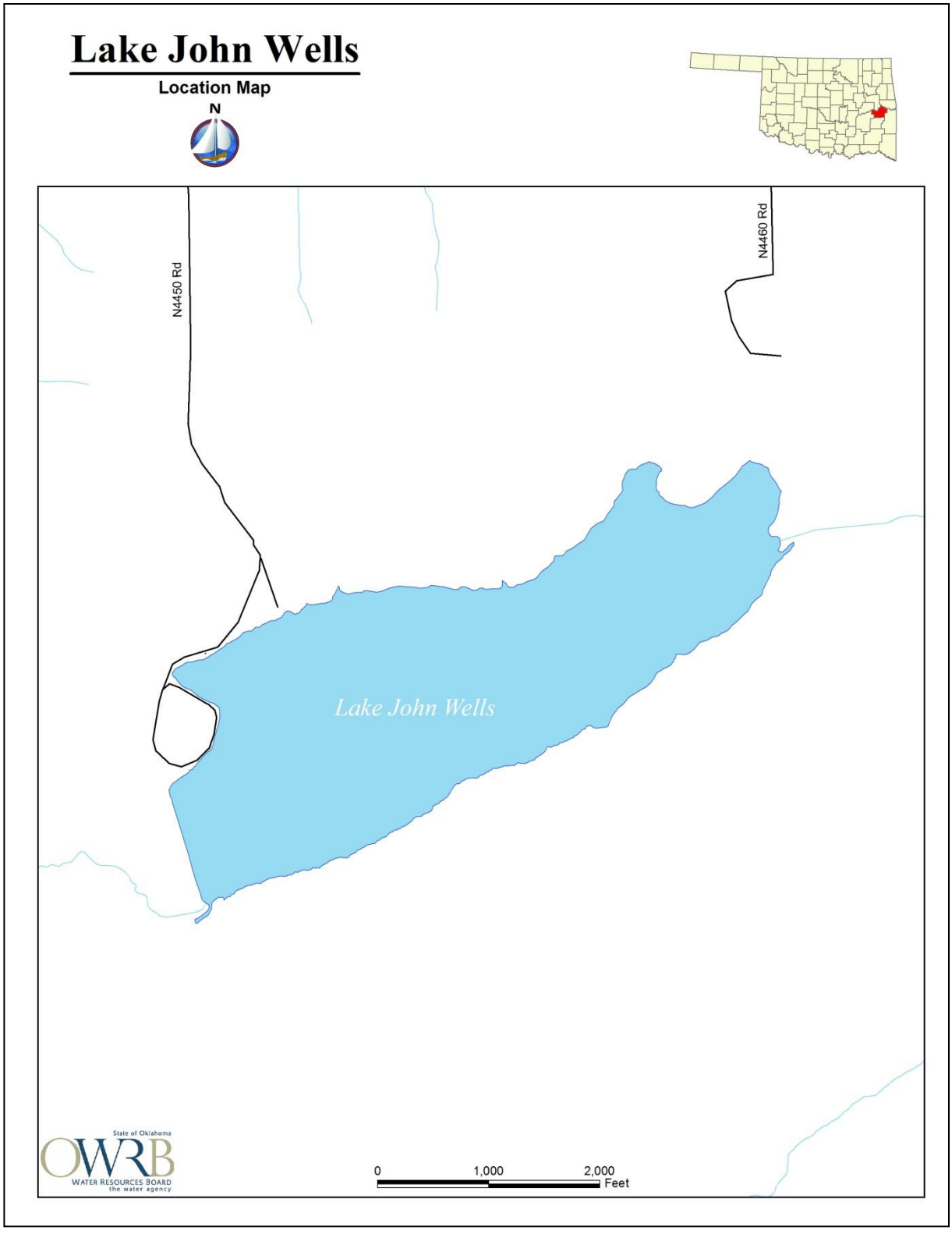

Figure 4: Location map for Lake John Wells

HYDROGRAPHIC SURVEYING PROCEDURES

The process of surveying a reservoir uses a combination of Geographic Positioning System (GPS) and acoustic depth sounding technologies incorporated into a hydrographic survey vessel. As the survey vessel travels across the lake's surface, the echosounder gathers multiple depth readings every second. The depth readings are stored on the survey vessel's on-board computer along with the positional data generated from the vessel's GPS receiver. The collected data files are downloaded daily from the computer and edited upon returning to the office. During editing, data "noise" is removed or corrected and depth readings are converted to elevation readings based on the level elevation recorded on the day the survey was performed. The edited data sets are then thinned to manageable sizes using Hypack's "Sounding Selection-Sort Program" using a 1 or 5 ft sort radius. Using ArcGIS, accurate estimates of area-capacity can then be determined for the lake by building a 3-D model of the reservoir from the sorted data set. The process of completing a hydrographic survey includes four steps: pre-survey planning, field survey, data processing, and model construction.

Pre-Survey Planning

Boundary File

Lake of the Arbuckles

The boundary file for Arbuckle was digitized manually in ArcGIS. The boundary line shapefile was created using a high resolution (30 cm) ESRI basemap aerial orthophoto taken on January, 28 2011. The lake elevation on the day the orthophoto was taken 871.21-870.20 ft NAVD88 based on the USACE monthly lake report for January (http://www.swt-wc.usace.army.mil/chartbin/ARBUJan11.shtml). During volume calculations, this boundary was assigned an elevation of 872.2 ft NAVD88 or the normal pool elevation for Arbuckle. This was done due to this boundary being the best representation of the lake boundary available at or near normal pool elevation.

Elmer Thomas Lake

The boundary for Elmer Thomas Lake was derived from 1-meter DEM lidar data (Cache, OK QL2 LiDAR 2014) downloaded from the USGS National Map 3D Elevation Program (3DEP) website (http://viewer.nationalmap.gov). The lidar raster file (JPEG format) was clipped and converted to a TIFF format, from which the contours were generated. The contour tool available in the ArcGIS Spatial Analyst extension was used to generate contours from the lidar file. A lake boundary line shapefile was created from the 1383.46-ft NAVD88 contour line, the elevation most representative of normal pool elevation of 1383.4 ft NAVD88 for Elmer Thomas Lake. The elevation readings taken on the day of the survey were overlaid to verify the boundary file. The contour lines for two islands were not available from the lidar data. The boundaries for these islands were digitized using ESRI basemap high-resolution (30 cm) imagery dated 6/2/2013.

Hominy Municipal Lake

The boundary file for Hominy Municipal Lake was digitized manually in ArcGIS. This boundary line shapefile was created in ArcGIS software using the 2008 USDA-FSA National Agriculture Imagery Program (NAIP) orthophoto mosaic for Osage County, Oklahoma, as a reference to ensure complete shoreline coverage. The 2008 orthophoto was used as it was the

best match to normal pool. There is no elevation gage data for Hominy Municipal Lake on the day this orthophoto was taken; therefore a normal pool elevation of 850.341 NAVD88 was assigned. Elevation readings taken on the day of the survey were overlaid and used to verify the boundary file.

Lake John Wells

The boundary file for Lake John Wells was digitized manually in ArcGIS. This boundary line shapefile was created in ArcGIS software using the 2015 USDA-FSA National Agriculture Imagery Program (NAIP) orthophoto mosaic for Haskell County, Oklahoma, as a reference to ensure complete shoreline coverage. The 2015 orthophoto was used as it was the best match to normal pool. There is no elevation gage data for Lake John Wells on the day this orthophoto was taken; therefore a normal pool elevation of 646.34 ft NAVD88 was assigned. Elevation readings taken on the day of the survey were overlaid and used to verify the boundary file. Additionally, while survey crews were at the John Wells the opportunity was taken to verify the elevation of normal pool. The overflow dam was checked and as it was just barely flowing over the top, the elevation taken that day (646.34 ft NAVD88) was assumed to be the conservation pool elevation for the purposes of this study.

Hypack Set-up

Hypack software from Hypack, Inc. was used to assign geodetic parameters, import background files, and create virtual track lines (transect and crosscheck). The geodetic parameters assigned were ellipsoid World Geodetic System of 1984 (WGS-84) in State Plane North American Datum of 1983 (NAD-83) Zone OK-3501 Oklahoma North or OK-3502 Oklahoma South, depending on location of the reservoir in regards to Highway Interstate 40 (I40). The distance and depth units used were US Survey Feet. The vertical datum was set to the North American Vertical Datum of 1988 (NAVD88), and any measurements in the National Geodetic Vertical Datum of 1929 (NGVD29) were converted. Vertical datum conversions were done using the National Geodetic Survey (NGS) VERTCON tool (http://www.ngs.noaa.gov/TOOLS/Vertcon/vertcon.html). The survey transects were spaced according to the accuracy required for the specific lake (Table 1) determined by the size and shape of the lake.

Table 1: Summary of track line coverage for all lakes surveyed.

Track Line Coverage				
Lake	Line Spacing	Transect Lines	Stream Lines	Additional QC Lines
Lake of the Arbuckles	250 ft	236	10	0
Elmer Thomas Lake	200 ft	76	3	10
Hominy Municipal Lake	150 ft	79	10	8
Lake John Wells	150 ft	43	0	8

The survey transects within the digitized reservoir boundary ran perpendicular to the original stream channels and tributaries. Stream lines were placed in the stream channels deemed too

small for transect coverage, as well as perpendicular to transect lines down the center of any major lake arms. These stream lines were used for data collection in difficult to navigate areas as well as for quality control (QC) purposes. Additional track lines set perpendicular to the transect lines were added to be used for QC cross check statistics if needed.

Field Survey

Lake Elevation Acquisition

The lake elevations for Elmer Thomas, Hominy Municipal, and John Wells were obtained by collecting positional data over a period of time. Data collection was done using a Trimble Zephyr Geodetic Antenna connected to Trimble 5700 receiver and controlled using Trimble TSCe survey controller. This data was then uploaded to the On-line Positioning Users Service-Rapid Static (OPUS-RS) website. The National Geodetic Survey (NGS) operates the OPUS as a means to provide GPS users with easier access to the National Spatial Reference System (NSRS). OPUS-RS allows users to submit their GPS data files to NGS, where the data is processed to determine a position using NGS computers and software. Each data file that is submitted is processed with respect to at least three Continuously Operating Reference Stations (CORS). All collection and processing of elevation data followed methods covered in full detail in the OWRB Standard Operating Procedures (SOP) for lake elevation measurement found in the approved project Quality Assurance Project Plan (QAPP) (OWRB, 2015).

The lake elevations for Lake of the Arbuckles were taken directly from U.S. Army Corps of Engineers (USACE) gage data (http://www.swt-wc.usace.army.mil/ARBU.lakepage.html). The USACE gage updates hourly allowing for access to hourly reading for all three days surveying Arbuckle. All USACE gage elevations were in NGVD29 and were converted to NAVD88 using the NGS VERTCON tool.

Method

The procedures followed by the OWRB during the hydrographic survey adhere to U.S. Army Corps of Engineers (USACE) standards EM 1110-2-1003 (USACE, 2013) as stated in the approved project QAPP (OWRB, 2015). The quality assurance and quality control (QA/QC) procedures for equipment calibration and operation, field survey, data processing, and accuracy standards are presented in the following sections and covered in more detail in the approved project QAPP (OWRB, 2015).

Technology

The Hydro-survey vessel is an 18-ft aluminum hull with cabin, powered by a single 115-horsepower outboard motor. Equipment used to conduct the survey included: a notebook computer running Hypack's 2014 survey data collection software, Knudsen 1614 Echo Sounder, with a depth resolution of 0.1 ft, Hemisphere R131 receiver with differential global positioning system (DGPS) correction, and an Odom Hydrographics, Inc., DIGIBAR-Pro Profiling Sound Velocimeter.

Survey

A two-man survey crew was used for the duration of the project. Data collection began at the dam and moved upstream. The survey crew followed the parallel transects created during the

pre-survey planning while collecting depth soundings and positional data. Data was also collected along a path parallel to the shoreline at a distance that was determined by the depth of the water and the draft of the boat – generally a depth of 3 to 5 ft. In areas of the lake that were too narrow for pre-planned transect lines; a zigzag pattern was used to collect data. These areas included small tributaries as well as the upstream section of the reservoir. Similar to the shoreline data collection procedure, upstream data was collected until depths were too shallow for the boat to navigate. All lake surveys followed the aforementioned procedure for survey data collection. Survey dates and water level elevations can be found in Table 2.

Table 2: Summary of water elevations measured or recorded for all survey dates.

Survey Dates and Water Elevations		
Lake	Date	Water Elevations (NAVD88)
Lake of the Arbuckles	05/20/2016	872.70-872.68 ft
	05/21/2016	872.64-872.60 ft
	06/06/2016	873.31-873.22 ft
Elmer Thomas Lake	04/04/2016	1383.20 ft
Hominy Municipal Lake	05/11/2016	849.34 ft
Lake John Wells	03/24/2016	646.37 ft

Quality Assurance/Quality Control

Sound Velocity

The hydrographic surveys followed the quality control procedures presented in the approved QAPP (OWRB, 2015) and summarized in Table 3. While on board the Hydro-survey vessel, the Knudsen 1614 Echo Sounder was calibrated using both a DIGIBAR-Pro Profiling Sound Velocimeter and a bar-check setup. The sound velocimeter measures the speed of sound (SOS) at incremental depths throughout the water column. The factors that influence the SOS—depth, temperature, and salinity—are all taken into account. Deploying the unit involved lowering the probe, which measures the SOS, into the water to the calibration depth mark to allow for acclimation and calibration of the depth sensor. The unit was then gradually lowered at a controlled speed to a depth just above the lake bottom, and then was raised to the surface. The unit collected sound velocity measurements in feet/seconds (ft/sec) at one ft increments on both the deployment and retrieval phases. The data was then reviewed for any erroneous readings, which were then edited out of the sample. The sound velocity corrections were then applied to the raw depth readings during the editing process Bar-Check

The bar-check procedure adheres to USACE methods (USACE, 2013). The bar-check setup used consists of a steel plate attached to two poles that span the width of the boat, and lowered using chains measured and marked in five ft increments. The bar-check setup is lowered initially to five ft from the surface of the water. Taking the five ft depth and subtracting the unmodified depth from the echosounder gives you the static draft or depth of the transducer in reference to the water's surface. This offset was measured and recorded by the Knudsen echosounder using its Bar-Check Mode where the speed of sound at five ft is also entered. The bar-check setup is then lowered to 25 ft to check for variations. Data is collected at both 25 ft and 5 ft depths, and this data processed in order to validate the calibration procedure. The bar-check echograms can be found in Figure 5 for each individual lake and survey date.

Table F- 1 containing Static draft, average SOS, as well as SOS set in the echosounder for all survey dates can be found in **APPENDIX F: Additional Survey Data Tables**.

Table 3: Summary of Relevant Minimum Performance Standards (MPS) and Quality Assurance (QA) Practices for the Hydrographic Survey (USACE, 2002&2013).

Minimum Performance Standards and Quality Assurance Practices for the Hydrographic Survey		
Repeatability (Bias)	0.3 ft	0.5 ft
Standard Deviation (± ft at 95%)	± 0.8 ft	
Resultant Elevation/Depth Accuracy (95%)(15>d<40 ft)	± 2.0 ft	
Horizontal Positioning System Accuracy (95%)	5 m (16 ft)	
Minimum Survey Coverage Density	Not to Exceed 500 ft (150 m)	
Quality Control and Assurance Criteria	--	
➢ Bar-check	1/project	
➢ Sound Velocity QC calibration	2/day	
➢ Squat Test	1/year	
➢ Position calibration QC check	1/project	
From the **2002** version of EM 1110-2-1003	From the **2013** version of EM 1110-2-1003	

Cross-Line Check

Depth observations contain both random errors (σ Random Error) and systematic biases (σ Bias). Biases are often referred to as systematic or external errors and may contain observational blunders. A constant error in tide or stage would be an example of a bias. Biases are reduced as much a possible by using the quality control measures previously discussed. Random errors are those errors present in the measurement system that cannot be easily minimized by further calibration. Examples include echo sounder resolution, water sound velocity variations, tide/staff gage reading resolution, etc. The precision of the observations is a measure of the closeness of a set of measurements--or their internal agreement. Accuracy relates to the closeness of measurements to their true or actual value

Accuracy and precision were assessed utilizing a cross-line check method referenced in the approved QAPP (OWRB, 2015). The cross-line check was performed by collecting depth readings along survey track lines perpendicular to, and intersecting the survey transect lines. Hypack's Cross Check Statistics program was used to assess vertical accuracy and confidence measures of the recorded depths at the points where the lines intersected. This program tabulated and statistically analyzed the depth differences between intersecting points of single beam data. The program provides a report calculating the standard deviation and mean difference. **Table F- 2** containing the results of the cross-line check include the number of QC intersections, arithmetic mean (Bias), and the standard deviation (Random Error) for all four reservoirs can be found in **APPENDIX F: Additional Survey Data Tables**.

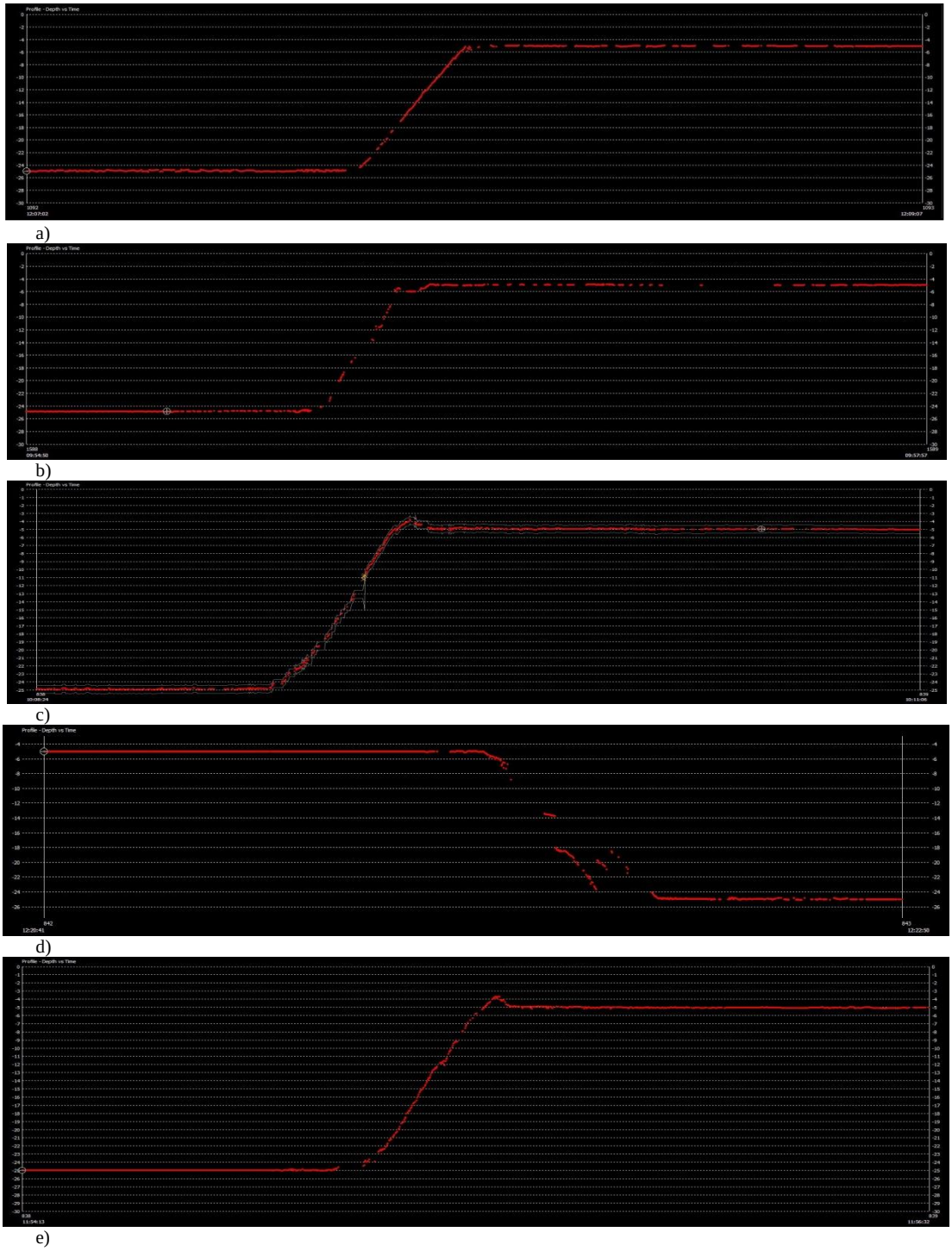

Figure 5: Digital Echogram of All Lake Bar-checks a) Arbuckle 05/20/16 b) Arbuckle 06/06/16 c) Elmer Thomas 04/04/16 d) Hominy Municipal 05/11/16 e) John Wells 03/24/16

Depth Accuracy Calculation

The mean difference and the standard deviation can then be used to calculate the Root Mean Square (RMS) error employing the following calculation. The RMS error estimate is used to

compare relative accuracies of estimates that differ substantially in bias and precision (USACE, 2002). According to the recommended standards in the approved QAPP; the RMS at the 95% confidence level should not exceed a tolerance of ± 2.0 ft for reservoir surveys (hydrography). This simply means that on average, 19 of every 20 observed depths will fall within the specified accuracy tolerance.

$$RMS = \sqrt{\sigma^2_{Randomerror} + \sigma^2_{Bias}}$$

where:

Random error = standard deviation
Bias = mean difference
RMS = Root Mean Square error (68% confidence level)

and:

$$RMS\ (95\%)\ depth\ accuracy = 1.96 \times RMS(68\%)$$

All reservoirs resulted in an RMS of < ±2.0 ft with a 95% confidence level meeting the QAPP's MPS for reservoir surveys. The calculated 95% RMS for all reservoirs can be found in **Table 4**. Additional QC lines were collected on Elmer Thomas; due to the large amount of variation in depth where these lines were collected a large amount of error (95% RMS of ±2.46 ft) was introduced. These lines were removed from the final dataset as they were not necessary for project completion.

Table 4: Calculated Depth Accuracies for all lake surveyed.

Calculated Depth Accuracy	
Lake	RMS at 95% Confidence
Lake of the Arbuckles	±1.0 ft
Elmer Thomas Lake	±1.2 ft
Hominy Municipal Lake	±1.1 ft
Lake John Wells	±0.6 ft

GPS

The GPS system is an advanced high performance geographic data-acquisition tool that uses differential GPS (DGPS) to provide sub-meter positional accuracy on a second-by-second basis. Potential errors are reduced with DGPS because additional data from a reference GPS receiver at a known position are used to correct positions obtained during the survey. Prior to the survey, the settings on the Hemisphere R131 were checked to configure the GPS receiver. To maximize the accuracy of the horizontal positioning, the horizontal mask setting was set to 6 degrees and the MaxDGPSAge was set to 300. The GGA and VTG were both set to 1 Hz. The RTCM option was enabled with all other options disabled. The United States Coast Guard reference station used in the survey is located near Sallisaw, Oklahoma.

Latency Test

A latency test was performed to determine the fixed delay time between the GPS and single beam echo sounder. The timing delay was determined by running reciprocal survey lines over a channel bank. The raw data files were downloaded into Hypack - LATENCY TEST program. The program varies the time delay to determine the "best fit" setting. A position

latency of 0.2 seconds was produced and adjustments were applied to the raw data, Hypack's Single Beam Editor Program, during data processing.

Data Processing

After uploading the collected data to an OWRB desktop, each raw data file was reviewed using the Single Beam Editor program within Hypack. The Single Beam Editor program allowed the user to assign equipment offsets, latency corrections, tide corrections, display the raw data profile, and review/edit all raw depth information. Raw data files are checked for gross inaccuracies that occur during data collection. Data editing is covered in more detail in the approved project QAPP (OWRB, 2015).

Offset correction values for the DGPS were 3.2 ft. starboard and 6.6 ft. forward, with a latency correction factor of 0.2 seconds. The Echosounder was corrected for a 1.0 ft vertical draft. These offsets were applied to all raw data sets. The SOS corrections were applied during editing of raw data using the sound velocity correction files created using the sound velocity tool.

An elevation correction file was produced using the Hypack's Manual Tides program to account for the variance in lake elevation at the time of data collection. Within the Single Beam Editor program, the corrected depths were subtracted from the elevation reading to convert the depth in feet to an elevation

After editing the data for errors and correcting the spatial attributes (offsets and tide corrections), a data reduction scheme was needed due to the large quantity of collected data. To accomplish this, the corrected data was sorted spatially at either a 1 or 5 ft interval using the Sounding Selection program in Hypack. The resultant data was saved and exported out as a xyz.txt file. The Hypack raw and corrected data files for all reservoirs are stored and made available upon request.

GIS Application and Model Construction

Geographic Information Systems (GIS) software was used to process the edited XYZ data collected from the survey. The GIS software used was ArcGIS Desktop, version 10.1, from Environmental Systems Research Institute (ESRI). All of the GIS datasets created are in Oklahoma State Plane Coordinate System (North or South) referenced to the North American Datum 1983. Horizontal and vertical units are in feet. The edited data points in XYZ text file format were converted into a point feature class in an ArcGIS file geodatabase. The point feature class contains the X and Y horizontal coordinates and the elevation and depth values associated with each collected point.

Volumetric and area calculations were derived from a Triangulated Irregular Network (TIN) surface model. The TIN model was created with ArcGIS using the collected survey data points; 2, 5, or 10 ft contours derived from a raster file interpolated from the collected survey data points; and inputs representing the lake boundary at normal pool elevation. The TIN consists of connected data points that form a network of triangles representing the bottom surface of the lake. The lake volume was calculated by slicing the TIN horizontally into planes 0.1 ft thick. The cumulative volume and area of each slice are shown in **APPENDIX A: Area-Capacity Data.**

Contours, depth ranges, and the shaded relief maps were derived from a constructed digital elevation model grid. This grid was created using the ArcGIS Topo to Raster Tool and had a spatial resolution of 1 ft. The contours were created at a 2, 5, or 10 ft interval using the ArcGIS contour tool.

The contour lines were edited to allow for polygon topology and to improve accuracy and general smoothness of the lines. The contour lines were edited visually paying close attention to the channel area, while also ensuring the lines matched the original data set. The contours were then converted to a polygon feature class and attributed to show 2, 5, or 10 ft depth ranges across the lake.

All geographic datasets derived from the survey contain Federal Geographic Data Committee (FGDC) compliant metadata documentation. The metadata describes the procedures and commands used to create the datasets. The GIS metadata file for all reservoirs are located on the DVD entitled *FY16 D.O. Impairment Study Hypack/GIS Metadata.*

RESULTS

Lake of the Arbuckles
Results from the 2016 OWRB survey indicate that Arbuckle encompasses 2358.29 surface acres and contains a cumulative capacity of 71763.19 acre-ft at the normal pool elevation of 872.2 ft (NAVD88). The mean depth for Arbuckle is 30.43 ft, while the deepest point measured was 85.6 ft. Lake maps can be found in **APPENDIX B: Lake of the Arbuckles Maps**.

Elmer Thomas Lake
Results from the 2016 OWRB survey indicate that Elmer Thomas encompasses 334.33 surface acres and contains a cumulative capacity of 7241.19 acre-ft at the normal pool elevation of 1383.4 ft (NAVD88). The average depth for Elmer Thomas is 21.66 ft, while the deepest point measured was 92.8 ft. Lake maps can be found **APPENDIX C: Elmer Thomas Lake Maps**.

Hominy Municipal Lake
Results from the 2016 OWRB survey indicate that Hominy encompasses 195.04 surface acres and contains a cumulative capacity of 4071.78 acre-ft at the normal pool elevation of 850.3 ft (NAVD88). The average depth for Hominy is 20.88 ft, while the deepest point measured was 52.6 ft. Lake maps can be found **APPENDIX D: Hominy Municipal Lake Maps**.

Lake John Wells
Results from the 2016 OWRB survey indicate that John Wells encompasses 226.11 surface acres and contains a cumulative capacity of 3234.67 acre-ft at the normal pool elevation of 646.3 ft (NGVD88). The average depth for John Wells is 14.31 ft, while the deepest point measured was 41.2 ft. Lake maps can be found **APPENDIX E: Lake John Wells Maps**.

SUMMARY and COMPARISON

Table 5 displays areas and volumes calculated at normal pool elevations for both design specifications and the 2016 survey. Percent change was then calculated for area, capacity, and average depth. Caution should be used when directly comparing between the design specifications and the 2016 surveys conducted by the OWRB because different methods were used to collect the data and extrapolate capacity and area. It is the recommendation of the OWRB that additional surveys using the same method used in the 2016 survey be conducted in 10-15 years. By using the 2016 survey figures as a baseline, a future survey would allow for an accurate mean sedimentation rate to be obtained.

Table 5: Areas and Volumes at normal pool elevations for all lakes at design specifications and 2016 survey periods (Poe 1978) (OWRB, 1990).
*** Numbers used for Elmer Thomas are from New Dam Specifications (URSC, 2001).**

Feature	Survey Year		Change (%)
	Design Specifications	2016	
Lake of the Arbuckles			
Area (acres)	2350	2358.29	+0.35
Capacity (acre-ft)	72400	71763.18	-0.88
Mean depth (ft)	30.81	30.43	-1.23
Elmer Thomas Lake			
Area (acres)	334*	334.33	+0.10
Capacity (acre-ft)	8000*	7241.19	-9.49
Mean depth (ft)	23.95*	21.66	-9.56
Hominy Municipal Lake			
Area (acres)	210	195.04	-7.12
Capacity (acre-ft)	5000	4071.78	-18.56
Mean depth (ft)	23.81	20.88	-12.31
Lake John Wells			
Area (acres)	194	226.11	+16.55
Capacity (acre-ft)	1352	3234.67	+139.25
Mean depth (ft)	6.96	14.31	+105.60

Lake of the Arbuckles
The surface area of Arbuckle has increased 8.29 acres or 0.35%. The 2016 survey shows that Arbuckle had an apparent decrease in capacity of 636.82 acre-ft or 0.88%. Average depth for the reservoir has decreased 0.38 ft or 1.23%.

Elmer Thomas Lake
The surface area of Elmer Thomas has increased 0.33 acres or 0.10%. The 2016 survey shows that Elmer Thomas had an apparent decrease in capacity of 758.81 acre-ft or 9.49%. Average depth for the reservoir has decreased 2.29 ft or 9.56%. Elmer Thomas calculations were done using design specifications for the new dam built in 1993 (URSC, 2001).

Hominy Municipal Lake
The surface area of Hominy has decreased 14.96 acres or 7.12%. The 2016 survey shows that Hominy had an apparent decrease in capacity of 928.22 acre-ft or 18.56%. Average depth for

the reservoir has decreased 2.93 ft or 12.31%. Hominy calculations were done using design specifications from a phase I dam inspection report ( ).

Lake John Wells

The surface area of John Wells has increased 32.11 acres or 16.55%. The 2016 survey shows that John Wells had an apparent increase in capacity of 1882.67 acre-ft or 139.25%. Average depth for the reservoir has increased 7.35 ft or 105.60%. Attempts were made to verify the design specification numbers used due to large differences in surface area and capacity, however another reliable documented source was not found.

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APPENDIX A: Area-Capacity Data

Table A- 1: Lake of the Arbuckles Area by 0.1 ft Increments.

Lake of the Arbuckles Area Table
Area in Acres by 0.1 ft Elevation Increments
2016 Survey
Oklahoma Water Resources Board

Elevation in Feet	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
786						0.0001	0.0041	0.0315	0.1323	0.2724
787	0.4498	0.5691	0.6690	0.7709	0.8726	0.9736	1.0711	1.1925	1.3698	1.5974
788	1.8402	2.0123	2.1741	2.3332	2.4920	2.6535	2.8255	3.0196	3.2231	3.4086
789	3.5816	3.7781	4.0812	4.3560	4.6204	4.8712	5.1337	5.4155	5.7432	6.1707
790	6.6199	7.0478	7.5154	8.0103	8.4390	8.8669	9.3250	9.8135	10.3341	10.8940
791	11.4708	12.1162	12.8214	13.6535	14.4223	15.2496	16.1777	17.1570	18.0367	18.8502
792	19.6349	20.3375	21.0443	21.7717	22.4805	23.1439	23.8288	24.5732	25.2866	26.0427
793	26.8309	27.7128	28.6681	29.6016	30.5387	31.5133	32.4994	33.6099	34.7695	35.8545
794	36.9390	38.0745	39.1922	40.2940	41.3473	42.4242	43.5609	44.7662	45.9954	47.1634
795	48.2927	49.4859	50.7891	52.2122	53.7324	55.3711	57.1891	59.0801	60.9783	62.9890
796	65.1350	67.3938	69.8452	72.4552	74.9830	77.4393	79.9082	82.4309	84.9526	87.5113
797	90.0085	92.5052	95.0573	97.7666	100.4351	103.0810	105.7816	108.5076	111.1991	113.9288
798	116.6115	119.3100	122.0739	124.9064	127.9034	130.8371	133.7447	136.6705	139.6475	142.4962
799	145.5035	148.1999	150.6870	153.0961	155.3853	157.5974	159.8045	162.0173	164.2865	166.5512
800	168.8410	171.1265	173.3282	175.6305	177.9841	180.1508	182.0421	183.8490	185.5834	187.2350
801	188.8628	190.3881	191.8563	193.2848	194.6801	196.0918	197.4849	198.8371	200.1422	201.4429
802	202.7381	204.0286	205.3141	206.6161	207.9564	209.3120	210.5955	211.8922	213.4458	214.9282
803	216.3613	217.7663	219.1224	220.4631	221.7665	223.1294	224.5086	225.8470	227.1064	228.2958
804	229.4848	230.7002	231.8589	232.9414	233.9782	234.9998	236.0162	237.0255	238.0315	239.0397
805	240.0130	240.9631	241.9153	242.8594	243.8013	244.7359	245.6506	246.5553	247.4571	248.3710
806	249.2914	250.2328	251.2207	252.2284	253.2166	254.1732	255.1142	256.0367	256.9372	257.8109
807	258.6691	259.5262	260.3899	261.2378	262.0702	262.8970	263.7229	264.5419	265.3588	266.1765
808	266.9946	267.8122	268.6328	269.4464	270.2676	271.1179	271.9965	272.9011	273.8204	274.7481
809	275.6721	276.6123	277.5212	278.4269	279.3693	280.3666	281.4121	282.5111	283.7016	284.8909
810	286.0391	287.1645	288.3237	289.4949	290.7109	291.9685	293.2351	294.5526	295.8885	297.2533
811	298.6129	299.9853	301.4284	302.9392	304.4780	306.0246	307.5638	309.0761	310.6547	312.1921
812	313.7308	315.3012	316.9536	318.6087	320.2356	321.8401	323.4522	325.0629	326.6538	328.2651
813	329.9485	331.6420	333.3329	334.9978	336.6154	338.2215	339.8107	341.4241	343.0149	344.6005
814	346.1495	347.6831	349.2496	350.8024	352.3407	353.9118	355.4945	357.0650	358.6294	360.2250
815	361.8400	363.4825	365.2602	367.0305	368.8403	370.6069	372.2717	373.8453	375.3445	376.8526
816	378.3902	379.9400	381.4833	383.0339	384.5786	386.1572	387.8078	389.4949	391.1278	392.7437
817	394.3725	396.0660	397.7433	399.3689	400.9761	402.5866	404.1766	405.8244	407.4012	408.9618
818	410.5115	412.0426	413.5846	415.1106	416.6346	418.1748	419.7296	421.2838	422.8580	424.4725
819	426.0625	427.6562	429.2646	430.8778	432.5114	434.1807	435.8793	437.5899	439.3302	441.0917
820	442.8558	444.6580	446.4730	448.3100	450.1698	452.0861	454.1130	456.3318	458.3923	460.3928
821	462.4045	464.4412	466.4680	468.4684	470.4428	472.4431	474.4272	476.4145	478.4707	480.5916
822	482.7669	484.9489	487.1507	489.3896	491.6535	494.0279	496.3138	498.6077	500.8940	503.1634
823	505.4926	507.7790	509.9895	512.1708	514.3765	516.5329	518.6803	520.8004	522.9508	525.0806
824	527.2268	529.4674	531.7722	534.1523	536.3745	538.5864	540.7995	543.0243	545.1904	547.3578
825	549.4638	551.5612	553.6738	555.8350	557.9858	560.1282	562.2404	564.3571	566.4646	568.5977
826	570.6362	572.6294	574.6234	576.6320	578.6696	580.7517	582.8219	584.8845	586.9843	589.1630
827	591.4303	593.6728	595.8506	598.0489	600.2600	602.4509	604.6283	606.7823	608.9357	611.1139
828	613.3040	615.5098	617.7449	620.0370	622.3441	624.6645	627.0143	629.3617	631.7434	634.1442
829	636.4827	638.8348	641.2137	643.6340	646.0674	648.5248	651.0445	653.7277	656.4279	659.1401
830	661.8599	664.5273	667.1888	669.9192	672.7321	675.6382	678.6012	681.6166	684.5146	687.3465
831	690.0825	692.7628	695.4490	698.2182	700.9670	703.6664	706.3023	708.9491	711.6466	714.3060
832	716.9895	719.7368	722.4954	725.2410	727.9414	730.6442	733.3657	736.0814	738.7764	741.5017
833	744.2283	746.9522	749.7182	752.4589	755.1458	757.8158	760.5240	763.2210	765.9122	768.6022
834	771.2618	773.9641	776.6760	779.4628	782.2789	785.1550	788.0854	790.9190	793.7547	796.6276
835	799.5463	802.4988	805.5083	808.5452	811.5964	814.5957	817.6039	820.6478	823.7146	826.7726
836	829.8137	832.8857	835.9912	839.1191	842.2751	845.4633	848.7125	851.9118	855.1394	858.3586
837	861.5717	864.7837	868.0053	871.2292	874.4207	877.6407	880.9110	884.1921	887.5461	891.0284
838	894.4579	897.8547	901.2130	904.5038	907.8410	911.1591	914.4430	917.7674	921.1412	924.6368
839	928.0634	931.3716	934.7106	938.1352	941.5949	945.0152	948.4076	951.8385	955.3892	958.9455
840	962.4910	966.0084	969.5987	973.1633	976.7736	980.4545	984.1665	987.8814	991.5552	995.1976
841	998.8455	1002.5487	1006.2846	1010.0665	1013.9090	1017.7018	1021.5008	1025.3155	1029.1829	1033.0659
842	1036.9181	1040.8173	1044.7261	1048.6978	1052.7910	1057.0535	1061.1998	1065.3163	1069.5196	1073.7077
843	1077.8768	1082.0141	1086.1329	1090.2742	1094.3758	1098.5176	1102.6422	1106.8392	1111.0096	1115.3060
844	1119.6313	1123.8959	1128.1136	1132.1826	1136.1990	1140.1925	1143.9983	1147.7373	1151.4756	1155.2302
845	1159.0356	1162.8929	1166.7746	1170.6769	1174.5020	1178.2674	1182.0691	1185.8569	1189.6079	1193.3875
846	1197.1826	1200.9966	1204.7438	1208.5012	1212.1827	1215.8489	1219.4973	1223.1242	1226.7435	1230.3818
847	1234.0590	1237.7954	1241.5896	1245.3713	1249.1741	1253.0290	1256.9364	1260.9056	1264.7989	1268.6785
848	1272.5650	1276.4745	1280.3936	1284.3372	1288.3090	1292.1773	1295.9598	1299.7038	1303.4599	1307.2686
849	1311.1599	1315.1252	1319.2159	1323.3876	1327.6482	1331.9579	1336.1736	1340.4851	1344.7741	1349.0683
850	1353.3661	1357.7654	1362.2215	1366.8883	1371.5245	1376.0410	1380.5853	1385.0296	1389.3875	1393.7063
851	1397.9719	1402.1737	1406.3664	1410.6294	1415.0272	1419.3049	1423.3777	1427.3833	1431.3330	1435.3328
852	1439.2349	1443.1162	1446.9469	1450.7709	1454.6064	1458.4371	1462.2852	1466.1133	1469.9494	1473.7325
853	1477.4653	1481.1780	1484.8782	1488.6457	1492.4564	1496.3300	1500.3622	1504.2941	1508.2046	1512.1022
854	1515.9944	1519.8688	1523.7562	1527.6554	1531.4499	1535.1657	1538.8650	1542.6169	1546.3657	1550.0734
855	1553.7736	1557.4506	1561.1589	1564.8953	1568.6388	1572.3904	1576.0679	1579.7661	1583.5350	1587.4424
856	1591.3129	1595.1936	1599.1023	1602.8849	1606.5802	1610.2693	1613.9365	1617.6138	1621.2489	1624.8769
857	1628.5312	1632.2309	1635.9578	1639.6292	1643.2544	1646.9021	1650.6123	1654.4143	1658.2455	1662.0892
858	1666.0358	1670.0825	1674.1720	1678.2533	1682.1750	1686.0717	1689.9515	1693.8507	1697.7917	1701.8580
859	1705.8916	1709.9405	1713.9946	1718.0572	1722.1128	1726.1592	1730.2395	1734.2979	1738.3866	1742.4818
860	1746.5889	1750.7280	1754.9018	1759.1515	1763.4093	1767.6596	1771.9689	1776.2915	1780.6118	1784.8923
861	1789.0902	1793.3087	1797.6785	1801.8121	1805.9577	1810.1499	1814.3769	1818.7003	1823.1415	1827.7053
862	1832.3201	1836.8153	1841.3366	1845.9312	1850.5152	1855.0574	1859.6546	1864.2194	1868.7341	1873.1696
863	1877.5484	1881.9200	1886.3461	1890.8568	1895.2358	1899.5592	1903.9125	1908.3037	1912.6906	1917.0641
864	1921.4368	1925.7828	1930.1082	1934.4292	1938.7598	1943.0898	1947.4184	1951.7316	1956.0450	1960.3738
865	1964.7268	1969.1105	1973.5687	1978.0565	1982.6928	1987.3449	1991.9763	1996.5778	2001.2358	2005.9365
866	2010.6151	2015.3358	2020.0554	2024.8224	2029.6275	2034.5037	2039.4285	2044.3854	2049.3002	2054.2895
867	2059.4531	2064.7405	2070.0709	2075.3559	2080.5685	2085.8684	2091.2331	2096.5777	2102.0155	2107.4936
868	2112.8651	2118.2472	2123.6898	2129.2155	2134.9272	2140.7719	2146.7446	2152.6874	2158.8067	2164.5650
869	2170.2486	2175.8282	2181.4538	2187.1844	2192.8948	2198.5427	2204.1640	2209.6828	2214.9788	2219.9741
870	2224.8517	2229.6772	2234.4693	2239.1887	2243.8204	2248.3986	2252.9806	2257.5719	2262.1719	2266.7808
871	2271.3996	2276.0273	2280.6630	2285.3069	2289.9591	2294.6194	2299.2879	2303.9646	2308.6495	2313.3426
872	2318.0439	2322.7534	2358.2879							

Table A- 2: Lake of the Arbuckles Capacity by 0.1 ft Increments.

Lake of the Arbuckles Capacity Table
Volume in Acre-Feet by 0.1 ft Elevation Increments
2016 Survey
Oklahoma Water Resources Board

Elevation in Feet	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
786							0.0000	0.0001	0.0015	0.0089
787	0.0288	0.0656	0.1167	0.1788	0.2508	0.3329	0.4253	0.5275	0.6403	0.7679
788	0.9157	1.0883	1.2812	1.4905	1.7159	1.9571	2.2144	2.4882	2.7802	3.0924
789	3.4243	3.7736	4.1413	4.5338	4.9553	5.4044	5.8789	6.3791	6.9063	7.4635
790	8.0586	8.6985	9.3818	10.1094	10.8861	11.7087	12.5738	13.4831	14.4398	15.4469
791	16.5080	17.6257	18.8043	20.0508	21.3741	22.7775	24.2603	25.8308	27.4975	29.2577
792	31.1024	33.0277	35.0264	37.0954	39.2360	41.4490	43.7305	46.0784	48.4986	50.9916
793	53.5572	56.2007	58.9262	61.7454	64.6591	67.6657	70.7682	73.9685	77.2727	80.6923
794	84.2244	87.8630	91.6143	95.4778	99.4524	103.5347	107.7232	112.0216	116.4375	120.9761
795	125.6347	130.4072	135.2955	140.3081	145.4573	150.7536	156.2075	161.8348	167.6477	173.6510
796	179.8479	186.2532	192.8785	199.7378	206.8535	214.2264	221.8476	229.7143	237.8314	246.2004
797	254.8239	263.7003	272.8256	282.2029	291.8430	301.7537	311.9288	322.3716	333.0865	344.0717
798	355.3281	366.8558	378.6508	390.7201	403.0670	415.7075	428.6446	441.8740	455.3937	469.2096
799	483.3173	497.7145	512.4030	527.3479	542.5378	557.9632	573.6123	589.4828	605.5735	621.8886
800	638.4309	655.1988	672.1979	689.4210	706.8673	724.5466	742.4575	760.5676	778.8635	797.3356
801	815.9769	834.7821	853.7456	872.8577	892.1159	911.5139	931.0525	950.7317	970.5482	990.4973
802	1010.5766	1030.7857	1051.1241	1071.5912	1092.1873	1112.9144	1133.7779	1154.7736	1175.8973	1197.1618
803	1218.5816	1240.1463	1261.8529	1283.6976	1305.6772	1327.7887	1350.0328	1372.4153	1394.9332	1417.5821
804	1440.3524	1463.2412	1486.2503	1509.3788	1532.6197	1555.9660	1579.4149	1602.9658	1626.6179	1650.3707
805	1674.2245	1698.1774	1722.2262	1746.3701	1770.6090	1794.9420	1819.3690	1843.8884	1868.4988	1893.1994
806	1917.9906	1942.8737	1967.8495	1992.9218	2018.0944	2043.3670	2068.7366	2094.2008	2119.7585	2145.4075
807	2171.1450	2196.9691	2222.8789	2248.8747	2274.9562	2301.1217	2327.3701	2353.7011	2380.1144	2406.6094
808	2433.1862	2459.8447	2486.5851	2513.4073	2540.3111	2567.2967	2594.3656	2621.5212	2648.7659	2676.1018
809	2703.5304	2731.0513	2758.6655	2786.3726	2814.1698	2842.0592	2870.0455	2898.1341	2926.3295	2954.6398
810	2983.0699	3011.6166	3040.2766	3069.0508	3097.9416	3126.9512	3156.0854	3185.3453	3214.7343	3244.2558
811	3273.9133	3303.7067	3333.6362	3363.7063	3393.9242	3424.2951	3454.8201	3485.4997	3516.3319	3547.3183
812	3578.4604	3609.7567	3641.2074	3672.8198	3704.5984	3736.5408	3768.6447	3800.9090	3833.3350	3865.9211
813	3898.6665	3931.5770	3964.6566	3997.9050	4031.3224	4064.9031	4098.6450	4132.5466	4166.6082	4200.8303
814	4235.2111	4269.7491	4304.4405	4339.2871	4374.2900	4409.4475	4444.7590	4480.2297	4515.8580	4551.6426
815	4587.5850	4623.6884	4659.9540	4696.3907	4733.0054	4769.7981	4806.7716	4843.9154	4881.2223	4918.6819
816	4956.2916	4994.0536	5031.9700	5070.0413	5108.2672	5146.6478	5185.1839	5223.8812	5262.7465	5301.7783
817	5340.9718	5380.3273	5419.8485	5459.5397	5499.3951	5539.4126	5579.5900	5619.9277	5660.4287	5701.0902
818	5741.9084	5782.8823	5824.0101	5865.2913	5906.7262	5948.3134	5990.0538	6031.9489	6073.9996	6116.2064
819	6158.5724	6201.0992	6243.7851	6286.6309	6329.6380	6372.8073	6416.1412	6459.6448	6503.3182	6547.1637
820	6591.1846	6635.3819	6679.7574	6724.3139	6769.0528	6813.9766	6859.0887	6904.3974	6949.9196	6995.6575
821	7041.5967	7087.7365	7134.0786	7180.6244	7227.3716	7274.3172	7321.4614	7368.8050	7416.3468	7464.0903
822	7512.0429	7560.2104	7608.5968	7657.2013	7706.0283	7755.0799	7804.3638	7853.8812	7903.6271	7953.6022
823	8003.8051	8054.2375	8104.9019	8155.7905	8206.8988	8258.2261	8309.7717	8361.5326	8413.5063	8465.6944
824	8518.0958	8570.7106	8623.5442	8676.6057	8729.9026	8783.4295	8837.1768	8891.1463	8945.3376	8999.7488
825	9054.3765	9109.2175	9164.2690	9219.5305	9275.0059	9330.6971	9386.6027	9442.7207	9499.0509	9555.5918
826	9612.3444	9669.3070	9726.4704	9783.8329	9841.3956	9899.1602	9957.1311	10015.3099	10073.6953	10132.2884
827	10191.0944	10250.1245	10309.3799	10368.8564	10428.5505	10488.4662	10548.6018	10608.9559	10669.5266	10730.3125
828	10791.3145	10852.5355	10913.9759	10975.6382	11037.5270	11099.6459	11161.9962	11224.5797	11287.3984	11350.4528
829	11413.7477	11477.2790	11541.0447	11605.0468	11669.2890	11733.7740	11798.5032	11863.4808	11928.7199	11994.2277
830	12060.0058	12126.0561	12192.3760	12258.9613	12325.8161	12392.9478	12460.3662	12528.0768	12596.0885	12664.3958
831	12732.9899	12801.8614	12871.0042	12940.4147	13010.0978	13080.0573	13150.2900	13220.7885	13291.5506	13362.5804
832	13433.8783	13505.4423	13577.2788	13649.3893	13721.7768	13794.4362	13867.3653	13940.5657	14014.0381	14087.7812
833	14161.7945	14236.0812	14310.6399	14385.4730	14460.5826	14535.9632	14611.6112	14687.5282	14763.7155	14840.1721
834	14916.8980	14993.8912	15071.1524	15148.6841	15226.4907	15304.5772	15382.9487	15461.6107	15540.5613	15619.7948
835	15699.3139	15779.1220	15859.2239	15939.6237	16020.3264	16101.3335	16182.6431	16264.2527	16346.1650	16428.3827
836	16510.9077	16593.7369	16676.8714	16760.3150	16844.0699	16928.1396	17012.5263	17097.2344	17182.2658	17267.6184
837	17353.2933	17439.2898	17525.6079	17612.2472	17699.2096	17786.4922	17874.0950	17962.0222	18050.2772	18138.8633
838	18227.7923	18317.0668	18406.6829	18496.6368	18586.9230	18677.5395	18768.4897	18859.7700	18951.3802	19043.3249
839	19135.6126	19228.2508	19321.2225	19414.5262	19508.1681	19602.1546	19696.4855	19791.1566	19886.1681	19981.5287
840	20077.2458	20173.3179	20269.7425	20366.5227	20463.6608	20561.1569	20659.0179	20757.2486	20855.8512	20954.8234
841	21054.1611	21153.8630	21253.9316	21354.3735	21455.1897	21556.3891	21657.9698	21759.9301	21862.2705	21964.9949
842	22068.1079	22171.6067	22275.4937	22379.7705	22484.4408	22589.5147	22695.0046	22800.9198	22907.2445	23013.9860
843	23121.1475	23228.7275	23336.7219	23445.1293	23553.9502	23663.1826	23772.8275	23882.8852	23993.3595	24104.2515
844	24215.5661	24327.3136	24439.4892	24552.0915	24665.1072	24778.5263	24892.3472	25006.5578	25121.1448	25236.1053
845	25351.4406	25467.1534	25583.2493	25699.7324	25816.6052	25933.8649	26051.5037	26169.5192	26287.9161	26406.6893
846	26525.8385	26645.3671	26765.2760	26885.5635	27006.2267	27127.2615	27248.6628	27370.4303	27492.5612	27615.0548
847	27737.9107	27861.1326	27984.7244	28108.6939	28233.0417	28357.7686	28482.8781	28608.3763	28734.2680	28860.5543
848	28987.2277	29114.2898	29241.7419	29369.5851	29497.8215	29626.4537	29755.4791	29884.8862	30014.6698	30144.8275
849	30275.3633	30406.2839	30537.5982	30669.3137	30801.4438	30933.9949	31066.9751	31200.3815	31334.2141	31468.4770
850	31603.1691	31738.2906	31873.8463	32009.8443	32146.2996	32283.2199	32420.5981	32558.4293	32696.7118	32835.4327
851	32974.5880	33114.1725	33254.1801	33394.6069	33535.4555	33676.7374	33818.4565	33960.5915	34103.1299	34246.0656
852	34389.3993	34533.1279	34677.2455	34821.7490	34966.6348	35111.9037	35257.5559	35403.5920	35550.0120	35696.8152
853	35843.9998	35991.5600	36139.4923	36287.7949	36436.4703	36585.5249	36734.9633	36884.7967	37035.0291	37185.6529
854	37336.6686	37488.0735	37639.8665	37792.0476	37944.6190	38097.5753	38250.9067	38404.6077	38558.6816	38713.1314
855	38867.9528	39023.1456	39178.7064	39334.6367	39490.9391	39647.6157	39804.6683	39962.0911	40119.8825	40278.0466
856	40436.5950	40595.5330	40754.8583	40914.5730	41074.6736	41235.1469	41395.9897	41557.1999	41718.7774	41880.7211
857	42043.0274	42205.6974	42368.7351	42532.1444	42695.9248	42860.0689	43024.5764	43189.4513	43354.7020	43520.3351
858	43686.3513	43852.7565	44019.5622	44186.7744	44354.3958	44522.4181	44690.8304	44859.6315	45028.8214	45198.4030
859	45368.3850	45538.7724	45709.5639	45880.7606	46052.3633	46224.3719	46396.7856	46569.6049	46742.8320	46916.4658
860	47090.5094	47264.9623	47439.8280	47615.1091	47790.8111	47966.9396	48143.4927	48320.4734	48497.8872	48675.7319
861	48854.0078	49032.7074	49211.8250	49391.3775	49571.3522	49751.7404	49932.5450	50113.7713	50295.4239	50477.5143
862	50660.0557	50843.0603	51026.5174	51210.4241	51394.7870	51579.6102	51764.8889	51950.6244	52136.8183	52323.4663
863	52510.5626	52698.0985	52886.0718	53074.4844	53263.3455	53452.6512	53642.3907	53832.5640	54023.1744	54214.2242
864	54405.7119	54597.6372	54789.9983	54982.7929	55176.0196	55369.6792	55563.7715	55758.2970	55953.2547	56148.6434
865	56344.4641	56540.7190	56737.4104	56934.5437	57132.1251	57330.1614	57528.6629	57727.6304	57927.0575	58126.9476
866	58327.3067	58528.1338	58729.4309	58931.2002	59133.4439	59336.1657	59539.3715	59743.0677	59947.2594	60151.9432
867	60357.1214	60562.8072	60769.0164	60975.7573	61183.0310	61390.8266	61599.1492	61808.0046	62017.3955	62227.3234
868	62437.8011	62648.8181	62860.3743	63072.4702	63285.1146	63498.3202	63712.1043	63926.4795	64141.4521	64357.0286
869	64573.2018	64789.9420	65007.2466	65225.1097	65443.5407	65662.5450	65882.1170	66102.2527	66322.9464	66544.1817
870	66765.9315	66988.1731	67210.8998	67434.1081	67657.7906	67881.9418	68106.5529	68331.6217	68557.1493	68783.1364
871	69009.5840	69236.4929	69463.8642	69691.6986	69919.9970	70148.7603	70377.9891	70607.6844	70837.8470	71068.4776
872	71299.5772	71531.1464	71763.1862							

Table A- 3: Elmer Thomas Lake Area by 0.1 ft Increments.

Elmer Thomas Lake Area Table Area in Acres by 0.1 ft Elevation Increments 2016 Survey Oklahoma Water Resources Board										
Elevation in Feet	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
1290								0.0000	0.0000	0.0000
1291	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002
1292	0.0002	0.0003	0.0003	0.0003	0.0004	0.0005	0.0005	0.0006	0.0007	0.0008
1293	0.0009	0.0010	0.0012	0.0013	0.0014	0.0016	0.0018	0.0020	0.0022	0.0025
1294	0.0027	0.0030	0.0032	0.0035	0.0037	0.0040	0.0043	0.0046	0.0049	0.0052
1295	0.0055	0.0058	0.0061	0.0064	0.0067	0.0070	0.0074	0.0077	0.0080	0.0083
1296	0.0087	0.0090	0.0094	0.0097	0.0100	0.0104	0.0108	0.0111	0.0115	0.0118
1297	0.0122	0.0125	0.0129	0.0133	0.0136	0.0140	0.0143	0.0147	0.0151	0.0154
1298	0.0158	0.0162	0.0165	0.0169	0.0173	0.0177	0.0181	0.0184	0.0188	0.0192
1299	0.0196	0.0200	0.0204	0.0208	0.0213	0.0217	0.0221	0.0225	0.0230	0.0234
1300	0.0239	0.0243	0.0247	0.0252	0.0256	0.0260	0.0265	0.0269	0.0274	0.0278
1301	0.0282	0.0287	0.0291	0.0296	0.0300	0.0305	0.0309	0.0314	0.0318	0.0322
1302	0.0327	0.0331	0.0336	0.0340	0.0345	0.0349	0.0354	0.0359	0.0363	0.0368
1303	0.0372	0.0377	0.0382	0.0387	0.0391	0.0396	0.0401	0.0406	0.0411	0.0416
1304	0.0421	0.0426	0.0431	0.0436	0.0442	0.0447	0.0452	0.0457	0.0462	0.0467
1305	0.0472	0.0478	0.0483	0.0488	0.0493	0.0499	0.0504	0.0509	0.0515	0.0520
1306	0.0526	0.0531	0.0536	0.0542	0.0547	0.0553	0.0558	0.0564	0.0569	0.0575
1307	0.0580	0.0586	0.0591	0.0597	0.0602	0.0608	0.0614	0.0619	0.0625	0.0631
1308	0.0636	0.0642	0.0648	0.0654	0.0659	0.0665	0.0671	0.0677	0.0682	0.0688
1309	0.0694	0.0700	0.0706	0.0712	0.0717	0.0723	0.0729	0.0735	0.0741	0.0747
1310	0.0753	0.0759	0.0765	0.0771	0.0777	0.0782	0.0788	0.0794	0.0800	0.0806
1311	0.0812	0.0818	0.0825	0.0831	0.0837	0.0843	0.0849	0.0858	0.0874	0.0904
1312	0.0943	0.0991	0.1054	0.1141	0.1244	0.1420	0.1624	0.1856	0.2180	0.2520
1313	0.2889	0.3182	0.3462	0.3755	0.4106	0.4533	0.5003	0.5447	0.5943	0.6258
1314	0.6539	0.6823	0.7115	0.7412	0.7717	0.8036	0.8361	0.8706	0.9074	0.9477
1315	0.9953	1.0566	1.1327	1.2288	1.3247	1.4148	1.5015	1.5858	1.6669	1.7430
1316	1.8136	1.8768	1.9329	1.9852	2.0391	2.0899	2.1351	2.1775	2.2185	2.2572
1317	2.2939	2.3299	2.3658	2.4016	2.4367	2.4707	2.5035	2.5364	2.5695	2.6027
1318	2.6356	2.6681	2.7004	2.7324	2.7646	2.7971	2.8299	2.8629	2.8963	2.9301
1319	2.9648	3.0000	3.0351	3.0701	3.1049	3.1391	3.1731	3.2076	3.2428	3.2791
1320	3.3167	3.3548	3.3937	3.4337	3.4753	3.5177	3.5618	3.6086	3.6587	3.7135
1321	3.7736	3.8404	3.9129	3.9900	4.0715	4.1557	4.2422	4.3309	4.4212	4.5121
1322	4.6017	4.6896	4.7757	4.8599	4.9457	5.0338	5.1218	5.2123	5.3065	5.4059
1323	5.5096	5.6155	5.7260	5.8394	5.9539	6.0691	6.1887	6.3123	6.4398	6.5757
1324	6.7247	6.8714	7.0183	7.1660	7.3133	7.4618	7.6096	7.7575	7.9071	8.0574
1325	8.2077	8.3606	8.5154	8.6756	8.8561	9.0389	9.2163	9.4015	9.5964	9.7945
1326	9.9812	10.1772	10.4021	10.6743	10.9278	11.1834	11.4341	11.6940	11.9426	12.1795
1327	12.4090	12.6382	12.8572	13.0629	13.2414	13.4043	13.5599	13.7132	13.8646	14.0141
1328	14.1631	14.3108	14.4587	14.6081	14.7619	14.9226	15.0870	15.2545	15.4243	15.5986
1329	15.7768	15.9598	16.1452	16.3331	16.5235	16.7162	16.9083	17.0975	17.2874	17.4808
1330	17.6785	17.8833	18.0868	18.2866	18.4833	18.6806	18.8784	19.0776	19.2857	19.4831
1331	19.6786	19.8725	20.0660	20.2605	20.4621	20.6609	20.8598	21.0594	21.2577	21.4585
1332	21.6628	21.8657	22.0732	22.2891	22.5168	22.7500	22.9768	23.2104	23.4367	23.6624
1333	23.8876	24.1233	24.3757	24.6363	24.9010	25.1634	25.4294	25.7164	26.0090	26.3251
1334	26.6556	26.9692	27.2613	27.5234	27.7616	27.9918	28.2175	28.4523	28.6898	28.9487
1335	29.1877	29.4244	29.6650	29.9203	30.1991	30.4636	30.7270	30.9936	31.2614	31.5299
1336	31.7978	32.0677	32.3351	32.6026	32.8716	33.1407	33.4086	33.6755	33.9439	34.2169
1337	34.4944	34.7793	35.0791	35.3784	35.6811	35.9884	36.3065	36.6337	36.9683	37.3014
1338	37.6346	37.9684	38.3027	38.6307	38.9563	39.2843	39.6118	39.9367	40.2579	40.5797
1339	40.9045	41.2303	41.5575	41.8894	42.2161	42.5405	42.8633	43.2030	43.5650	43.9349
1340	44.3006	44.6608	45.0147	45.3684	45.7240	46.0812	46.4379	46.7957	47.1542	47.5149
1341	47.8806	48.2524	48.6291	49.0132	49.4054	49.8056	50.2217	50.6276	51.0434	51.4457
1342	51.8424	52.2322	52.6161	53.0020	53.3891	53.7770	54.1676	54.5632	54.9616	55.3621
1343	55.7647	56.1725	56.5873	57.0074	57.4346	57.8659	58.3013	58.7309	59.1626	59.5944
1344	60.0204	60.4406	60.8570	61.2719	61.6866	62.1027	62.5189	62.9316	63.3399	63.7502
1345	64.1624	64.5770	64.9886	65.3977	65.8080	66.2151	66.6217	67.0303	67.4441	67.8656
1346	68.2912	68.7199	69.1507	69.5771	70.0049	70.4337	70.8607	71.2871	71.7151	72.1479
1347	72.5794	73.0090	73.4384	73.8713	74.3054	74.7409	75.1784	75.6199	76.0607	76.5094
1348	76.9597	77.3992	77.8347	78.2685	78.6972	79.1274	79.5583	79.9868	80.4113	80.8325
1349	81.2538	81.6750	82.0943	82.5144	82.9374	83.3617	83.7810	84.2017	84.6183	85.0319
1350	85.4464	85.8632	86.2786	86.6979	87.1177	87.5403	87.9641	88.3834	88.8123	89.2523
1351	89.6940	90.1456	90.5963	91.0430	91.4902	91.9427	92.3917	92.8438	93.2978	93.7453
1352	94.1933	94.6450	95.0965	95.5476	95.9994	96.4511	96.9046	97.3549	97.8040	98.2570
1353	98.7173	99.1873	99.6721	100.1528	100.6164	101.0724	101.5262	101.9775	102.4313	102.8862
1354	103.3406	103.7904	104.2389	104.6847	105.1311	105.5801	106.0292	106.4778	106.9274	107.3768
1355	107.8273	108.2796	108.7352	109.1930	109.6534	110.1182	110.5907	111.0733	111.5690	112.0844
1356	112.6183	113.1516	113.6837	114.2041	114.7206	115.2391	115.7595	116.2809	116.8027	117.3251
1357	117.8418	118.3595	118.8830	119.3990	119.9133	120.4212	120.9224	121.4212	121.9204	122.4232
1358	122.9270	123.4327	123.9385	124.4402	124.9388	125.4372	125.9343	126.4302	126.9260	127.4224
1359	127.9195	128.4169	128.9159	129.4152	129.9175	130.4263	130.9406	131.4603	131.9884	132.5262
1360	133.0707	133.6143	134.1325	134.6382	135.1450	135.6428	136.1436	136.6549	137.1549	137.6565
1361	138.1705	138.6839	139.1970	139.7102	140.2253	140.7433	141.2620	141.7786	142.2932	142.8095
1362	143.3276	143.8480	144.3643	144.8814	145.4045	145.9360	146.4797	147.0211	147.5639	148.1120
1363	148.6676	149.2301	149.8066	150.3953	150.9927	151.6025	152.2226	152.8431	153.4553	154.0657
1364	154.6767	155.2885	155.9102	156.5254	157.1449	157.7690	158.3948	159.0089	159.6142	160.2208
1365	160.8350	161.4653	162.1106	162.7654	163.4199	164.0831	164.7581	165.4483	166.1347	166.8172
1366	167.5036	168.1877	168.8745	169.5617	170.2484	170.9359	171.6275	172.3237	173.0288	173.7381
1367	174.4537	175.1754	175.9006	176.6292	177.3583	178.0913	178.8371	179.5832	180.3312	181.0719
1368	181.8156	182.5668	183.3186	184.0710	184.8225	185.5814	186.3510	187.1252	187.9021	188.6826
1369	189.4621	190.2305	190.9824	191.7326	192.4828	193.2322	193.9858	194.7476	195.5212	196.3098
1370	197.1023	197.8994	198.7014	199.5021	200.3013	201.0940	201.8866	202.6756	203.4758	204.2821
1371	205.0884	205.8948	206.7055	207.5242	208.3425	209.1636	209.9930	210.8354	211.6720	212.5267
1372	213.3984	214.2917	215.1964	216.1244	217.0421	217.9413	218.8353	219.7287	220.6389	221.5549
1373	222.4623	223.3736	224.2874	225.2056	226.1295	227.0545	227.9921	228.9396	229.8899	230.8504
1374	231.8249	232.8134	233.8126	234.8210	235.8447	236.8873	237.9404	238.9944	240.0502	241.1166
1375	242.1935	243.2905	244.4052	245.5283	246.6681	247.8221	248.9910	250.1732	251.4001	252.6392
1376	253.8552	255.0789	256.3189	257.5412	258.7274	259.9017	261.0673	262.2272	263.3893	264.5784
1377	265.7618	266.9517	268.1596	269.3583	270.5750	271.7906	273.0628	274.3471	275.5886	276.7854
1378	277.9628	279.1237	280.2548	281.3719	282.4721	283.5361	284.5634	285.5899	286.6410	287.6832
1379	288.7212	289.7579	290.7901	291.8305	292.9086	293.9851	295.0399	296.0730	297.1281	298.2449
1380	299.4057	300.5634	301.4876	302.3812	303.2742	304.1680	305.0627	305.9583	306.8549	307.7524
1381	308.6509	309.5503	310.4507	311.3520	312.2542	313.1574	314.0615	314.9665	315.8725	316.7794
1382	317.6873	318.5961	319.5058	320.4165	321.3281	322.2407	323.1542	324.0686	324.9840	325.9003
1383	326.8175	327.7357	328.6549	329.5749	334.3312					

Table A- 4: Elmer Thomas Lake Capacity by 0.1 ft Increments.

Elmer Thomas Lake Capacity Table Volume in Acre-Feet by 0.1 ft Elevation Increments 2016 Survey Oklahoma Water Resources Board										
Elevation in Feet	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
1290								0.0000	0.0000	0.0000
1291	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001
1292	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004
1293	0.0005	0.0006	0.0007	0.0008	0.0009	0.0011	0.0012	0.0014	0.0016	0.0018
1294	0.0020	0.0023	0.0026	0.0029	0.0032	0.0036	0.0040	0.0044	0.0048	0.0053
1295	0.0058	0.0063	0.0069	0.0075	0.0081	0.0088	0.0095	0.0102	0.0109	0.0117
1296	0.0125	0.0134	0.0143	0.0152	0.0161	0.0171	0.0181	0.0192	0.0203	0.0214
1297	0.0226	0.0238	0.0250	0.0263	0.0276	0.0289	0.0303	0.0317	0.0332	0.0347
1298	0.0362	0.0378	0.0394	0.0410	0.0427	0.0444	0.0461	0.0479	0.0497	0.0516
1299	0.0535	0.0555	0.0574	0.0595	0.0615	0.0636	0.0658	0.0680	0.0702	0.0725
1300	0.0748	0.0772	0.0796	0.0820	0.0845	0.0870	0.0896	0.0923	0.0949	0.0976
1301	0.1004	0.1032	0.1060	0.1089	0.1119	0.1149	0.1179	0.1209	0.1241	0.1272
1302	0.1304	0.1337	0.1370	0.1403	0.1437	0.1471	0.1506	0.1541	0.1577	0.1613
1303	0.1649	0.1686	0.1724	0.1762	0.1800	0.1839	0.1878	0.1918	0.1958	0.1999
1304	0.2041	0.2083	0.2125	0.2168	0.2211	0.2255	0.2299	0.2344	0.2390	0.2436
1305	0.2482	0.2529	0.2577	0.2625	0.2673	0.2722	0.2772	0.2822	0.2873	0.2924
1306	0.2976	0.3028	0.3081	0.3134	0.3188	0.3243	0.3298	0.3353	0.3409	0.3466
1307	0.3523	0.3581	0.3639	0.3698	0.3757	0.3817	0.3878	0.3939	0.4001	0.4063
1308	0.4126	0.4189	0.4253	0.4317	0.4383	0.4448	0.4514	0.4581	0.4649	0.4716
1309	0.4785	0.4854	0.4924	0.4994	0.5065	0.5136	0.5208	0.5281	0.5354	0.5428
1310	0.5502	0.5577	0.5653	0.5729	0.5806	0.5883	0.5961	0.6040	0.6119	0.6199
1311	0.6279	0.6360	0.6441	0.6524	0.6606	0.6690	0.6774	0.6858	0.6944	0.7030
1312	0.7119	0.7211	0.7308	0.7410	0.7519	0.7639	0.7771	0.7923	0.8097	0.8298
1313	0.8533	0.8803	0.9107	0.9440	0.9800	1.0193	1.0624	1.1101	1.1623	1.2196
1314	1.2807	1.3446	1.4114	1.4811	1.5538	1.6294	1.7082	1.7901	1.8754	1.9643
1315	2.0570	2.1541	2.2566	2.3659	2.4838	2.6116	2.7486	2.8944	3.0488	3.2115
1316	3.3820	3.5599	3.7445	3.9350	4.1310	4.3322	4.5388	4.7500	4.9657	5.1855
1317	5.4093	5.6369	5.8681	6.1028	6.3412	6.5831	6.8285	7.0772	7.3292	7.5845
1318	7.8431	8.1050	8.3702	8.6387	8.9103	9.1851	9.4632	9.7446	10.0292	10.3172
1319	10.6085	10.9032	11.2014	11.5032	11.8085	12.1172	12.4294	12.7450	13.0641	13.3866
1320	13.7127	14.0424	14.3760	14.7134	15.0548	15.4002	15.7499	16.1038	16.4623	16.8257
1321	17.1942	17.5685	17.9492	18.3368	18.7319	19.1349	19.5463	19.9662	20.3948	20.8324
1322	21.2790	21.7348	22.1993	22.6726	23.1544	23.6447	24.1436	24.6514	25.1681	25.6940
1323	26.2296	26.7754	27.3316	27.8986	28.4769	29.0665	29.6677	30.2805	30.9056	31.5431
1324	32.1938	32.8589	33.5387	34.2332	34.9424	35.6663	36.4051	37.1587	37.9270	38.7102
1325	39.5085	40.3217	41.1501	41.9939	42.8533	43.7298	44.6245	45.5373	46.4681	47.4179
1326	48.3875	49.3763	50.3841	51.4127	52.4660	53.5464	54.6520	55.7828	56.9392	58.1212
1327	59.3274	60.5569	61.8091	63.0840	64.3802	65.6956	67.0280	68.3762	69.7399	71.1188
1328	72.5127	73.9216	75.3453	76.7838	78.2371	79.7055	81.1897	82.6902	84.2072	85.7412
1329	87.2923	88.8610	90.4478	92.0530	93.6769	95.3197	96.9817	98.6630	100.3633	102.0825
1330	103.8209	105.5788	107.3569	109.1554	110.9741	112.8126	114.6708	116.5488	118.4465	120.3646
1331	122.3030	124.2611	126.2387	128.2356	130.2519	132.2880	134.3442	136.4202	138.5162	140.6320
1332	142.7678	144.9239	147.1003	149.2972	151.5152	153.7554	156.0187	158.3051	160.6144	162.9469
1333	165.3018	167.6793	170.0797	172.5045	174.9551	177.4320	179.9353	182.4648	185.0219	187.6080
1334	190.2245	192.8735	195.5550	198.2668	201.0063	203.7707	206.5584	209.3689	212.2022	215.0594
1335	217.9411	220.8481	223.7787	226.7331	229.7122	232.7180	235.7513	238.8107	241.8968	245.0095
1336	248.1491	251.3154	254.5088	257.7289	260.9758	264.2495	267.5501	270.8776	274.2318	277.6127
1337	281.0207	284.4563	287.9199	291.4126	294.9355	298.4884	302.0719	305.6865	309.3335	313.0135
1338	316.7270	320.4738	324.2540	328.0676	331.9143	335.7936	339.7056	343.6504	347.6279	351.6376
1339	355.6795	359.7537	363.8605	367.9999	372.1722	376.3775	380.6154	384.8855	389.1886	393.5269
1340	397.9019	402.3137	406.7618	411.2456	415.7648	420.3193	424.9096	429.5356	434.1972	438.8947
1341	443.6281	448.3979	453.2045	458.0485	462.9305	467.8514	472.8118	477.8132	482.8557	487.9393
1342	493.0638	498.2282	503.4320	508.6745	513.9553	519.2749	524.6332	530.0304	535.4669	540.9431
1343	546.4593	552.0156	557.6124	563.2503	568.9300	574.6521	580.4170	586.2255	592.0771	597.9717
1344	603.9096	609.8904	615.9135	621.9784	628.0849	634.2328	640.4222	646.6533	652.9259	659.2395
1345	665.5940	671.9896	678.4265	684.9049	691.4242	697.9845	704.5857	711.2275	717.9101	724.6337
1346	731.3992	738.2070	745.0575	751.9511	758.8875	765.8666	772.8885	779.9532	787.0606	794.2107
1347	801.4039	808.6403	815.9197	823.2420	830.6075	838.0163	845.4686	852.9646	860.5045	868.0885
1348	875.7169	883.3904	891.1085	898.8702	906.6753	914.5237	922.4149	930.3492	938.3264	946.3464
1349	954.4086	962.5129	970.6593	978.8478	987.0782	995.3508	1003.6658	1012.0229	1020.4221	1028.8631
1350	1037.3457	1045.8696	1054.4350	1063.0421	1071.6909	1080.3817	1089.1145	1097.8898	1106.7072	1115.5668
1351	1124.4700	1133.4173	1142.4093	1151.4464	1160.5285	1169.6551	1178.8267	1188.0435	1197.3051	1206.6123
1352	1215.9645	1225.3614	1234.8033	1244.2904	1253.8225	1263.3999	1273.0224	1282.6902	1292.4032	1302.1611
1353	1311.9641	1321.8128	1331.7079	1341.6507	1351.6422	1361.6807	1371.7652	1381.8951	1392.0703	1402.2907
1354	1412.5566	1422.8680	1433.2245	1443.6260	1454.0722	1464.5630	1475.0985	1485.6790	1496.3043	1506.9746
1355	1517.6898	1528.4500	1539.2553	1550.1060	1561.0024	1571.9447	1582.9332	1593.9686	1605.0517	1616.1837
1356	1627.3662	1638.6011	1649.8897	1661.2314	1672.6258	1684.0720	1695.5700	1707.1199	1718.7219	1730.3760
1357	1742.0825	1753.8409	1765.6509	1777.5130	1789.4272	1801.3928	1813.4096	1825.4768	1837.5940	1849.7611
1358	1861.9782	1874.2457	1886.5637	1898.9323	1911.3513	1923.8202	1936.3390	1948.9076	1961.5258	1974.1936
1359	1986.9111	1999.6781	2012.4950	2025.3616	2038.2781	2051.2447	2064.2618	2077.3302	2090.4501	2103.6225
1360	2116.8482	2130.1280	2143.4623	2156.8499	2170.2883	2183.7775	2197.3169	2210.9061	2224.5461	2238.2365
1361	2251.9771	2265.7685	2279.6112	2293.5053	2307.4506	2321.4475	2335.4959	2349.5961	2363.7482	2377.9518
1362	2392.2069	2406.5138	2420.8726	2435.2832	2449.7455	2464.2597	2478.8266	2493.4473	2508.1224	2522.8516
1363	2537.6353	2552.4743	2567.3691	2582.3208	2597.3308	2612.4001	2627.5297	2642.7209	2657.9743	2673.2892
1364	2688.6653	2704.1024	2719.6007	2735.1605	2750.7823	2766.4657	2782.2114	2798.0195	2813.8898	2829.8210
1365	2845.8127	2861.8654	2877.9803	2894.1589	2910.4027	2926.7119	2943.0870	2959.5289	2976.0392	2992.6184
1366	3009.2660	3025.9821	3042.7666	3059.6197	3076.5416	3093.5320	3110.5912	3127.7194	3144.9169	3162.1845
1367	3179.5227	3196.9323	3214.4137	3231.9674	3249.5939	3267.2933	3285.0657	3302.9122	3320.8331	3338.8289
1368	3356.8991	3375.0434	3393.2625	3411.5567	3429.9263	3448.3709	3466.8910	3485.4875	3504.1614	3522.9126
1369	3541.7419	3560.6492	3579.6340	3598.6947	3617.8304	3637.0412	3656.3269	3675.6878	3695.1244	3714.6377
1370	3734.2291	3753.8997	3773.6497	3793.4798	3813.3899	3833.3801	3853.4499	3873.5990	3893.8271	3914.1345
1371	3934.5224	3954.9909	3975.5401	3996.1700	4016.8815	4037.6748	4058.5501	4079.5079	4100.5491	4121.6745
1372	4142.8842	4164.1804	4185.5647	4207.0390	4228.6049	4250.2633	4272.0126	4293.8514	4315.7796	4337.7978
1373	4359.9076	4382.1085	4404.4002	4426.7833	4449.2579	4471.8246	4494.4838	4517.2360	4540.0825	4563.0240
1374	4586.0609	4609.1945	4632.4264	4655.7576	4679.1892	4702.7223	4726.3587	4750.1001	4773.9468	4797.8990
1375	4821.9573	4846.1227	4870.3967	4894.7812	4919.2779	4943.8874	4968.6119	4993.4525	5018.4105	5043.4886
1376	5068.6906	5094.0156	5119.4621	5145.0319	5170.7252	5196.5388	5222.4703	5248.5187	5274.6835	5300.9641
1377	5327.3625	5353.8796	5380.5151	5407.2708	5434.1467	5461.1433	5488.2614	5515.5032	5542.8740	5570.3711
1378	5597.9901	5625.7277	5653.5822	5681.5512	5709.6327	5737.8252	5766.1260	5794.5311	5823.0387	5851.6502
1379	5880.3665	5909.1867	5938.1107	5967.1381	5996.2688	6025.5055	6054.8503	6084.3017	6113.8573	6143.5171
1380	6173.2853	6203.1674	6233.1666	6263.2699	6293.4633	6323.7461	6354.1182	6384.5797	6415.1308	6445.7714
1381	6476.5018	6507.3220	6538.2320	6569.2320	6600.3222	6631.5025	6662.7730	6694.1340	6725.5854	6757.1273
1382	6788.7599	6820.4832	6852.2974	6884.2025	6916.1986	6948.2858	6980.4642	7012.7340	7045.0951	7077.5477
1383	7110.0919	7142.7278	7175.4555	7208.2750	7241.1865					

Table A- 5: Hominy Municipal Lake Area by 0.1 ft Increments.

Hominy Municipal Lake Area Table Area in Acres by 0.1 ft Elevation Increments 2016 Survey Oklahoma Water Resources Board										
Elevation in Feet	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
797								0.0010	0.0045	0.0158
798	0.0454	0.0802	0.1113	0.1408	0.1683	0.1964	0.2254	0.2550	0.2857	0.3183
799	0.3521	0.3879	0.4261	0.4672	0.5109	0.5578	0.6084	0.6600	0.7179	0.7817
800	0.8446	0.9036	0.9555	1.0013	1.0430	1.0841	1.1244	1.1650	1.2083	1.2529
801	1.2973	1.3429	1.3906	1.4398	1.4908	1.5414	1.5914	1.6419	1.6941	1.7453
802	1.7950	1.8395	1.8856	1.9319	1.9783	2.0270	2.0765	2.1271	2.1789	2.2332
803	2.2888	2.3471	2.4110	2.4860	2.5848	2.7069	2.8363	2.9627	3.0827	3.1930
804	3.2958	3.3977	3.5025	3.6108	3.7343	3.8682	4.0038	4.1393	4.2806	4.4168
805	4.5500	4.6763	4.8003	4.9295	5.0585	5.1962	5.3444	5.4925	5.6502	5.8231
806	6.0144	6.2186	6.4171	6.6082	6.8020	6.9842	7.1456	7.3069	7.4736	7.6406
807	7.8164	7.9948	8.1733	8.3502	8.5311	8.7149	8.8983	9.0852	9.2763	9.4746
808	9.6824	9.8906	10.1066	10.3262	10.5512	10.7805	11.0135	11.2496	11.4919	11.7379
809	11.9907	12.2575	12.5477	12.8711	13.1903	13.4863	13.7652	14.0348	14.3006	14.5692
810	14.8433	15.1237	15.4083	15.6982	15.9993	16.3087	16.6316	16.9677	17.3107	17.6536
811	17.9924	18.3062	18.6088	18.9019	19.1915	19.4824	19.7740	20.0609	20.3375	20.6071
812	20.8712	21.1287	21.3827	21.6342	21.8863	22.1366	22.3830	22.6281	22.8748	23.1239
813	23.3782	23.6412	23.9131	24.1936	24.4637	24.7320	24.9982	25.2632	25.5230	25.7859
814	26.0501	26.3304	26.6175	26.9026	27.1884	27.4713	27.7602	28.0691	28.3786	28.7170
815	29.0798	29.4765	29.8800	30.2307	30.5576	30.8765	31.1697	31.4528	31.7287	31.9999
816	32.2684	32.5364	32.8112	33.0997	33.3971	33.6925	33.9872	34.2900	34.6008	34.9136
817	35.2341	35.5620	35.8972	36.2434	36.6064	36.9741	37.3478	37.7290	38.1107	38.4990
818	38.8983	39.3160	39.7551	40.2056	40.6564	41.0905	41.5161	41.9425	42.3725	42.8077
819	43.2478	43.6595	44.0712	44.4774	44.8852	45.2885	45.6987	46.1086	46.5217	46.9377
820	47.3508	47.7579	48.1599	48.5585	48.9561	49.3504	49.7360	50.1209	50.5079	50.8999
821	51.2892	51.6831	52.0838	52.4883	52.8958	53.3036	53.7073	54.1077	54.5098	54.9107
822	55.3205	55.7330	56.1439	56.5563	56.9708	57.3906	57.8142	58.2420	58.6748	59.1223
823	59.5808	60.0564	60.5429	61.0309	61.5187	62.0393	62.5841	63.1366	63.6902	64.2708
824	64.8515	65.4433	66.0547	66.6868	67.3083	67.8704	68.4326	69.0320	69.6958	70.3763
825	71.0141	71.6138	72.1748	72.7269	73.2724	73.8175	74.3643	74.9151	75.4501	75.9789
826	76.5127	77.0552	77.6253	78.2156	78.8005	79.3928	79.9939	80.6040	81.2291	81.8986
827	82.5833	83.2339	83.8491	84.4666	85.0723	85.6867	86.3315	86.9999	87.6930	88.3890
828	89.1123	89.8157	90.5086	91.1733	91.8304	92.5336	93.2718	93.9891	94.6972	95.3375
829	95.9150	96.4794	97.0196	97.5595	98.1019	98.6423	99.1525	99.6455	100.1269	100.6009
830	101.0719	101.5477	102.0208	102.4910	102.9637	103.4353	103.9107	104.3881	104.8707	105.3449
831	105.8117	106.2799	106.7431	107.2013	107.6604	108.1195	108.5853	109.0527	109.5715	110.0752
832	110.5732	111.0763	111.5736	112.0775	112.5728	113.0641	113.5410	114.0220	114.4859	114.9695
833	115.5032	116.0636	116.5975	117.1103	117.6088	118.0957	118.5872	119.0758	119.5502	120.0106
834	120.4623	120.9021	121.3390	121.7631	122.1857	122.5993	123.0012	123.3970	123.7928	124.1875
835	124.5815	124.9765	125.3721	125.7694	126.1716	126.5823	127.0090	127.4678	127.9404	128.4162
836	128.9018	129.4055	129.9013	130.3845	130.8672	131.3533	131.8394	132.3250	132.8120	133.2941
837	133.7751	134.2500	134.7262	135.2078	135.6824	136.1264	136.5650	137.0060	137.4492	137.8959
838	138.3482	138.8053	139.2681	139.7362	140.2062	140.6788	141.1559	141.6402	142.1327	142.6350
839	143.1437	143.6584	144.1796	144.7039	145.2309	145.7619	146.3104	146.8644	147.4323	148.0036
840	148.5673	149.1336	149.7034	150.2840	150.8436	151.3970	151.9352	152.4590	152.9785	153.4903
841	154.0032	154.4990	154.9906	155.4697	155.9547	156.4419	156.9339	157.4435	157.9508	158.4416
842	158.9181	159.3859	159.8511	160.3039	160.7450	161.1816	161.6277	162.0769	162.5267	162.9960
843	163.4763	163.9737	164.4761	164.9402	165.3959	165.8340	166.2650	166.6889	167.1074	167.5214
844	167.9365	168.3838	168.9501	169.3783	169.7869	170.2011	170.6167	171.0229	171.4224	171.8157
845	172.2052	172.5850	172.9625	173.3535	173.7456	174.1199	174.4925	174.8669	175.2659	175.6681
846	176.0554	176.4340	176.8088	177.1709	177.5352	177.8957	178.2469	178.5987	178.9609	179.3231
847	179.6852	180.0473	180.4094	180.7714	181.1333	181.4952	181.8571	182.2189	182.5807	182.9424
848	183.3041	183.6657	184.0273	184.3888	184.7503	185.1118	185.4732	185.8345	186.1958	186.5571
849	186.9183	187.2795	187.6406	188.0017	188.3627	188.7237	189.0847	189.4456	189.8064	190.1672
850	190.5280	190.8887	191.2494	195.0352						

Table A- 6: Hominy Municipal Lake Capacity by 0.1 ft Increments.

Hominy Municipal Lake Capacity Table Volume in Acre-Feet by 0.1 gt Elevation Increments 2016 Survey Oklahoma Water Resources Board										
Elevation in Feet	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
797								0.0000	0.0000	0.0003
798	0.0012	0.0042	0.0105	0.0201	0.0327	0.0482	0.0664	0.0875	0.1115	0.1385
799	0.1687	0.2022	0.2392	0.2799	0.3245	0.3734	0.4268	0.4851	0.5485	0.6173
800	0.6922	0.7736	0.8610	0.9540	1.0519	1.1541	1.2605	1.3709	1.4854	1.6040
801	1.7271	1.8546	1.9866	2.1232	2.2648	2.4113	2.5629	2.7195	2.8812	3.0480
802	3.2200	3.3970	3.5787	3.7649	3.9558	4.1513	4.3516	4.5567	4.7669	4.9822
803	5.2028	5.4289	5.6606	5.8985	6.1432	6.3965	6.6610	6.9381	7.2282	7.5305
804	7.8443	8.1689	8.5035	8.8485	9.2040	9.5712	9.9513	10.3449	10.7520	11.1730
805	11.6079	12.0562	12.5176	12.9914	13.4779	13.9773	14.4899	15.0170	15.5588	16.1158
806	16.6893	17.2811	17.8926	18.5245	19.1757	19.8463	20.5357	21.2423	21.9649	22.7038
807	23.4595	24.2323	25.0228	25.8313	26.6574	27.5015	28.3638	29.2444	30.1436	31.0616
808	31.9991	32.9569	33.9355	34.9353	35.9569	37.0007	38.0672	39.1569	40.2701	41.4071
809	42.5686	43.7549	44.9672	46.2072	47.4780	48.7812	50.1152	51.4779	52.8679	54.2847
810	55.7281	57.1987	58.6970	60.2236	61.7789	63.3637	64.9790	66.6259	68.3058	70.0197
811	71.7679	73.5504	75.3655	77.2113	79.0869	80.9916	82.9253	84.8881	86.8799	88.8999
812	90.9472	93.0212	95.1212	97.2468	99.3976	101.5737	103.7748	106.0008	108.2514	110.5265
813	112.8264	115.1515	117.5024	119.8800	122.2853	124.7182	127.1780	129.6645	132.1777	134.7170
814	137.2823	139.8741	142.4930	145.1405	147.8165	150.5210	153.2540	156.0155	158.8067	161.6290
815	164.4836	167.3733	170.3009	173.2692	176.2751	179.3146	182.3863	185.4889	188.6200	191.7792
816	194.9657	198.1791	201.4193	204.6866	207.9820	211.3069	214.6614	218.0453	221.4591	224.9036
817	228.3793	231.8866	235.4264	238.9992	242.6061	246.2485	249.9276	253.6436	257.3974	261.1894
818	265.0198	268.8895	272.8001	276.7535	280.7514	284.7946	288.8820	293.0124	297.1853	301.4010
819	305.6600	309.9629	314.3083	318.6949	323.1224	327.5906	332.0992	336.6485	341.2389	345.8704
820	350.5434	355.2578	360.0133	364.8093	369.6452	374.5209	379.4364	384.3907	389.3836	394.4149
821	399.4854	404.5948	409.7433	414.9316	420.1602	425.4294	430.7394	436.0900	441.4807	446.9116
822	452.3826	457.8941	463.4468	469.0406	474.6756	480.3519	486.0700	491.8302	497.6330	503.4787
823	509.3685	515.3035	521.2852	527.3151	533.3938	539.5213	545.6987	551.9298	558.2158	564.5572
824	570.9550	577.4111	583.9257	590.5005	597.1375	603.8376	610.5969	617.4118	624.2843	631.2198
825	638.2241	645.2938	652.4255	659.6153	666.8603	674.1602	681.5145	688.9235	696.3876	703.9060
826	711.4775	719.1020	726.7803	734.5140	742.3060	750.1568	758.0664	766.0357	774.0654	782.1569
827	790.3129	798.5371	806.8284	815.1826	823.5983	832.0754	840.6131	849.2140	857.8802	866.6151
828	875.4191	884.2945	893.2410	902.2574	911.3415	920.4916	929.7094	938.9994	948.3628	957.7969
829	967.2994	976.8622	986.4823	996.1573	1005.8862	1015.6691	1025.5067	1035.3965	1045.3365	1055.3252
830	1065.3617	1075.4453	1085.5762	1095.7547	1105.9803	1116.2530	1126.5730	1136.9402	1147.3551	1157.8180
831	1168.3288	1178.8867	1189.4911	1200.1425	1210.8397	1221.5828	1232.3718	1243.2069	1254.0888	1265.0201
832	1276.0024	1287.0349	1298.1173	1309.2497	1320.4323	1331.6649	1342.9468	1354.2771	1365.6554	1377.0809
833	1388.5534	1400.0765	1411.6550	1423.2883	1434.9737	1446.7098	1458.4951	1470.3292	1482.2124	1494.1439
834	1506.1220	1518.1457	1530.2136	1542.3259	1554.4810	1566.6785	1578.9178	1591.1979	1603.5178	1615.8773
835	1628.2763	1640.7147	1653.1927	1665.7101	1678.2671	1690.8641	1703.5017	1716.1810	1728.9047	1741.6750
836	1754.4928	1767.3586	1780.2740	1793.2395	1806.2539	1819.3164	1832.4275	1845.5872	1858.7954	1872.0523
837	1885.3576	1898.7111	1912.1124	1925.5611	1939.0578	1952.6026	1966.1932	1979.8278	1993.5063	2007.2290
838	2020.9962	2034.8084	2048.6660	2062.5697	2076.5199	2090.5170	2104.5612	2118.6529	2132.7926	2146.9812
839	2161.2195	2175.5084	2189.8484	2204.2403	2218.6845	2233.1812	2247.7307	2262.3342	2276.9929	2291.7077
840	2306.4794	2321.3081	2336.1931	2351.1349	2366.1345	2381.1910	2396.3031	2411.4699	2426.6896	2441.9615
841	2457.2850	2472.6598	2488.0849	2503.5596	2519.0826	2534.6537	2550.2736	2565.9423	2581.6611	2597.4308
842	2613.2505	2629.1186	2645.0338	2660.9957	2677.0036	2693.0561	2709.1524	2725.2928	2741.4780	2757.7081
843	2773.9841	2790.3076	2806.6799	2823.1027	2839.5736	2856.0906	2872.6522	2889.2572	2905.9049	2922.5948
844	2939.3262	2956.0991	2972.9146	2989.7824	3006.6990	3023.6573	3040.6566	3057.6976	3074.7797	3091.9020
845	3109.0639	3126.2650	3143.5045	3160.7820	3178.0975	3195.4527	3212.8460	3230.2767	3247.7446	3265.2510
846	3282.7978	3300.3841	3318.0086	3335.6708	3353.3698	3371.1050	3388.8766	3406.6838	3424.5260	3442.4040
847	3460.3182	3478.2686	3496.2552	3514.2781	3532.3371	3550.4323	3568.5638	3586.7314	3604.9352	3623.1752
848	3641.4513	3659.7636	3678.1121	3696.4968	3714.9176	3733.3745	3751.8677	3770.3969	3788.9623	3807.5638
849	3826.2015	3844.8752	3863.5851	3882.3311	3901.1132	3919.9315	3938.7858	3957.6762	3976.6027	3995.5653
850	4014.5640	4033.5988	4052.6696	4071.7765						

Table A- 7: Lake John Wells Area by 0.1 ft Increments.

Lake John Wells Area Table Area in Acres by 0.1 ft Elevation Increments 2016 Survey Oklahoma Water Resources Board										
Elevation in Feet	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
605		0.0000	0.0001	0.0004	0.0025	0.0071	0.0133	0.0223	0.0336	0.0481
606	0.0651	0.0839	0.1006	0.1153	0.1286	0.1411	0.1538	0.1691	0.1825	0.1960
607	0.2112	0.2290	0.2481	0.2690	0.2938	0.3276	0.3678	0.4139	0.4633	0.5146
608	0.5686	0.6240	0.6776	0.7313	0.7850	0.8393	0.8936	0.9461	0.9988	1.0517
609	1.1062	1.1560	1.2061	1.2560	1.3056	1.3572	1.4102	1.4622	1.5137	1.5654
610	1.6173	1.6695	1.7226	1.7799	1.8398	1.9012	1.9639	2.0286	2.0973	2.1673
611	2.2430	2.3301	2.4216	2.5121	2.6032	2.6953	2.7853	2.8756	2.9680	3.0656
612	3.1738	3.2909	3.4148	3.5605	3.7463	3.9328	4.1234	4.3074	4.5071	4.6978
613	4.8772	5.0379	5.1915	5.3389	5.4821	5.6209	5.7565	5.8935	6.0364	6.1870
614	6.3378	6.4836	6.6221	6.7526	6.8797	7.0078	7.1323	7.2480	7.3628	7.4747
615	7.5864	7.7013	7.8175	7.9376	8.0672	8.2059	8.3355	8.4647	8.5945	8.7279
616	8.8721	9.0263	9.1945	9.3779	9.5733	9.7785	9.9965	10.2186	10.4472	10.6947
617	10.9576	11.2317	11.5104	11.7949	12.0907	12.3866	12.6712	12.9539	13.2456	13.5431
618	13.8517	14.1747	14.5106	14.8418	15.1808	15.5262	15.8512	16.1639	16.4695	16.7632
619	17.0523	17.3477	17.6531	17.9630	18.2772	18.5991	18.9214	19.2496	19.5890	19.9556
620	20.3655	20.8018	21.3503	21.8839	22.3823	22.8818	23.4013	23.9358	24.4725	24.9864
621	25.4806	25.9845	26.4774	26.9705	27.4645	27.9674	28.4859	29.0406	29.6756	30.3333
622	30.9963	31.6729	32.3429	33.0168	33.7072	34.4180	35.1236	35.7984	36.4600	37.1160
623	37.7478	38.3521	38.9332	39.5137	40.1048	40.7079	41.2930	41.8670	42.4536	43.0489
624	43.6686	44.3136	44.9412	45.5607	46.1922	46.8384	47.5009	48.2173	48.9677	49.6494
625	50.3237	51.0447	51.8108	52.5600	53.3237	54.1061	54.8998	55.7044	56.5415	57.3694
626	58.1712	58.9888	59.7941	60.6009	61.3752	62.1244	62.8384	63.5557	64.2481	64.9349
627	65.6441	66.3837	67.1601	68.0917	68.9874	69.8408	70.6434	71.4387	72.2183	72.9828
628	73.7364	74.4705	75.1755	75.9028	76.6476	77.3989	78.2059	79.0652	79.9474	80.8118
629	81.6812	82.5856	83.5043	84.4217	85.3250	86.1956	87.0287	87.7908	88.5532	89.3327
630	90.1176	90.9172	91.7217	92.4804	93.2071	93.9327	94.6425	95.3338	96.0037	96.6741
631	97.3741	98.1132	98.8629	99.6296	100.4459	101.3124	102.2176	103.1316	104.0259	104.8831
632	105.6990	106.5573	107.3983	108.2365	109.0916	109.9429	110.8222	111.7212	112.6506	113.6849
633	114.6555	115.5974	116.5824	117.5707	118.5649	119.4882	120.3639	121.2045	122.0170	122.8255
634	123.6263	124.3872	125.1164	125.8259	126.5622	127.3220	128.0737	128.8337	129.5863	130.3480
635	131.1183	131.8859	132.6661	133.4498	134.2774	135.1298	135.9808	136.8585	137.7169	138.5638
636	139.4039	140.2744	141.1804	142.0824	142.9987	143.9365	144.8974	145.8726	146.8545	147.8277
637	148.7439	149.7189	150.7122	151.7197	152.7794	153.8327	154.8642	155.9308	157.0968	158.2700
638	159.3550	160.4629	161.6015	162.7006	163.8123	164.8866	165.9196	167.0107	168.0827	169.1269
639	170.1213	171.0819	172.0228	172.9748	173.9528	174.9157	175.8646	176.7945	177.7565	178.7069
640	179.6797	180.6561	181.6242	182.5961	183.5614	184.5015	185.4380	186.3800	187.3418	188.2930
641	189.2511	190.1979	191.1814	192.1779	193.1902	194.1962	195.1996	196.1798	197.1321	198.0757
642	199.0276	199.9689	200.9026	201.8284	202.7411	203.6289	204.5075	205.3811	206.2727	207.1529
643	207.9966	208.7909	209.5629	210.1754	210.6793	211.1827	211.6876	212.1945	212.7033	213.2142
644	213.7271	214.2421	214.7592	215.2785	215.7999	216.3234	216.8490	217.3767	217.9065	218.4385
645	218.9725	219.5087	220.0470	220.5874	221.1299	221.6746	222.2213	222.7702	223.3211	223.8742
646	224.4295	224.9868	225.5462	226.1078						

Table A- 8: Lake John Wells Capacity by 0.1 ft Increments.

Lake John Wells Capacity Table Volume in Acre-Feet b 0.1 ft Elevation Increments 2016 Survey Oklahoma Water Resources Board										
Elevation in Feet	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
605		0.0000	0.0000	0.0000	0.0001	0.0006	0.0016	0.0034	0.0061	0.0102
606	0.0158	0.0233	0.0325	0.0433	0.0555	0.0690	0.0837	0.0998	0.1174	0.1363
607	0.1567	0.1787	0.2025	0.2284	0.2564	0.2875	0.3222	0.3612	0.4051	0.4540
608	0.5081	0.5678	0.6328	0.7033	0.7791	0.8603	0.9469	1.0389	1.1362	1.2387
609	1.3466	1.4597	1.5777	1.7009	1.8289	1.9620	2.1005	2.2441	2.3929	2.5468
610	2.7060	2.8703	3.0399	3.2150	3.3960	3.5830	3.7762	3.9758	4.1821	4.3953
611	4.6158	4.8443	5.0819	5.3286	5.5843	5.8493	6.1233	6.4063	6.6985	7.0001
612	7.3120	7.6352	7.9704	8.3188	8.6841	9.0681	9.4708	9.8923	10.3331	10.7933
613	11.2722	11.7680	12.2795	12.8061	13.3472	13.9024	14.4713	15.0538	15.6502	16.2613
614	16.8876	17.5287	18.1841	18.8529	19.5344	20.2289	20.9360	21.6550	22.3856	23.1275
615	23.8805	24.6448	25.4208	26.2085	27.0086	27.8225	28.6495	29.4895	30.3425	31.2086
616	32.0884	32.9833	33.8942	34.8227	35.7701	36.7377	37.7266	38.7372	39.7705	40.8273
617	41.9098	43.0192	44.1563	45.3216	46.5157	47.7396	48.9925	50.2737	51.5836	52.9230
618	54.2926	55.6938	57.1281	58.5957	60.0966	61.6321	63.2012	64.8020	66.4337	68.0954
619	69.7862	71.5061	73.2561	75.0369	76.8488	78.6926	80.5686	82.4771	84.4189	86.3957
620	88.4116	90.4697	92.5746	94.7377	96.9510	99.2140	101.5280	103.8948	106.3153	108.7885
621	111.3117	113.8850	116.5082	119.1806	121.9023	124.6737	127.4962	130.3720	133.3072	136.3081
622	139.3743	142.5076	145.7085	148.9764	152.3128	155.7185	159.1960	162.7422	166.3552	170.0342
623	173.7777	177.5830	181.4475	185.3696	189.3505	193.3912	197.4914	201.6493	205.8653	210.1404
624	214.4758	218.8748	223.3377	227.8628	232.4504	237.1017	241.8185	246.6039	251.4630	256.3943
625	261.3927	266.4606	271.6034	276.8220	282.1159	287.4873	292.9375	298.4675	304.0797	309.7756
626	315.5524	321.4106	327.3495	333.3696	339.4686	345.6439	351.8920	358.2118	364.6022	371.0612
627	377.5900	384.1911	390.8680	397.6304	404.4849	411.4268	418.4513	425.5555	432.7384	439.9986
628	447.3348	454.7453	462.2278	469.7812	477.4088	485.1108	492.8905	500.7535	508.7043	516.7424
629	524.8668	533.0804	541.3844	549.7809	558.2683	566.8446	575.5064	584.2477	593.0648	601.9589
630	610.9314	619.9831	629.1152	638.3256	647.6101	656.9672	666.3960	675.8950	685.4618	695.0957
631	704.7977	714.5721	724.4206	734.3453	744.3484	754.4364	764.6126	774.8804	785.2379	795.6847
632	806.2135	816.8266	827.5242	838.3058	849.1723	860.1235	871.1615	882.2886	893.5064	904.8242
633	916.2410	927.7537	939.3622	951.0699	962.8767	974.7798	986.7728	998.8515	1011.0128	1023.2547
634	1035.5779	1047.9787	1060.4540	1073.0011	1085.6202	1098.3146	1111.0842	1123.9298	1136.8507	1149.8475
635	1162.9207	1176.0710	1189.2985	1202.6040	1215.9899	1229.4603	1243.0158	1256.6575	1270.3867	1284.2007
636	1298.0989	1312.0829	1326.1554	1340.3187	1354.5724	1368.9192	1383.3603	1397.8987	1412.5350	1427.2700
637	1442.0987	1457.0206	1472.0426	1487.1636	1502.3883	1517.7198	1533.1542	1548.6932	1564.3445	1580.1134
638	1595.9952	1611.9855	1628.0888	1644.3043	1660.6297	1677.0654	1693.6053	1710.2508	1727.0058	1743.8660
639	1760.8290	1777.8893	1795.0446	1812.2945	1829.6408	1847.0843	1864.6238	1882.2568	1899.9841	1917.8073
640	1935.7266	1953.7431	1971.8572	1990.0682	2008.3759	2026.7792	2045.2763	2063.8670	2082.5530	2101.3343
641	2120.2119	2139.1842	2158.2527	2177.4207	2196.6890	2216.0583	2235.5287	2255.0976	2274.7632	2294.5235
642	2314.3787	2334.3287	2354.3722	2374.5088	2394.7375	2415.0562	2435.4632	2455.9574	2476.5402	2497.2116
643	2517.9695	2538.8091	2559.7275	2580.7163	2601.7591	2622.8522	2643.9957	2665.1898	2686.4347	2707.7305
644	2729.0776	2750.4760	2771.9261	2793.4279	2814.9818	2836.5880	2858.2466	2879.9578	2901.7220	2923.5392
645	2945.4097	2967.3338	2989.3116	3011.3433	3033.4291	3055.5693	3077.7641	3100.0136	3122.3182	3144.6779
646	3167.0931	3189.5639	3212.0905	3234.6732						

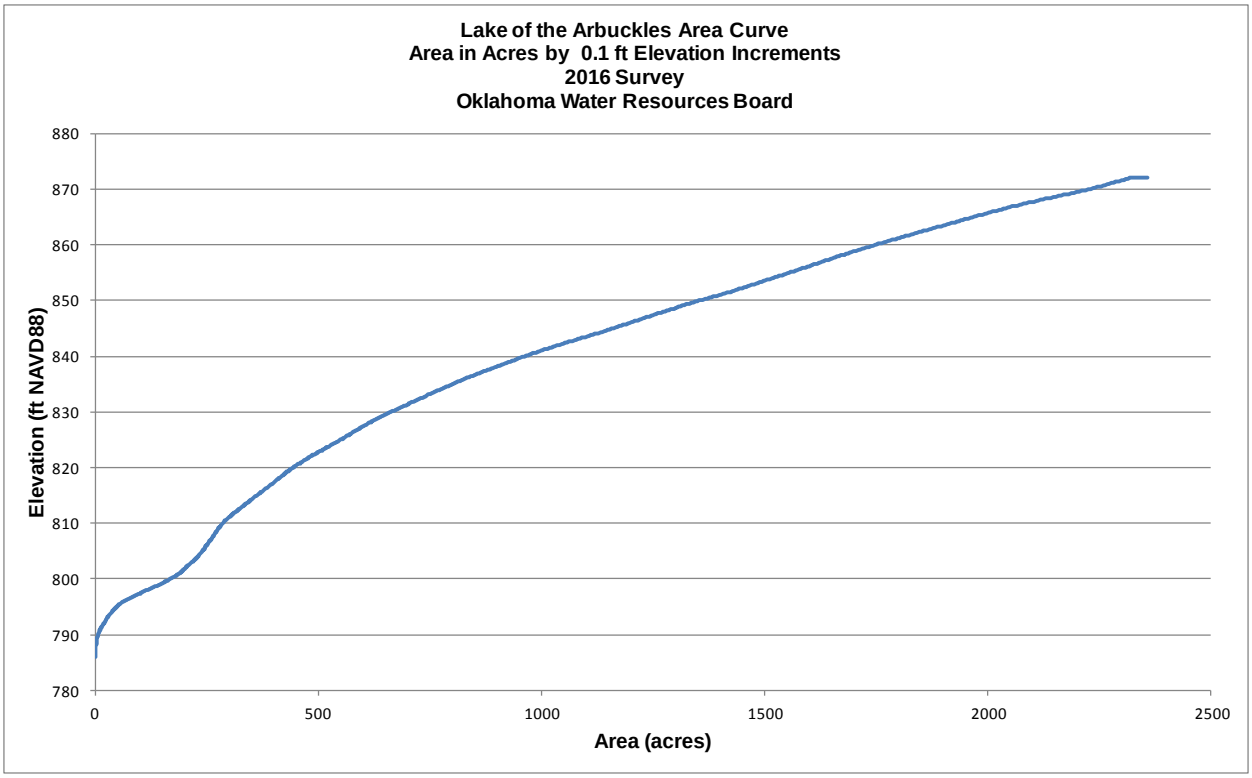

Figure A- 1: Area Curve for Lake of the Arbuckles.

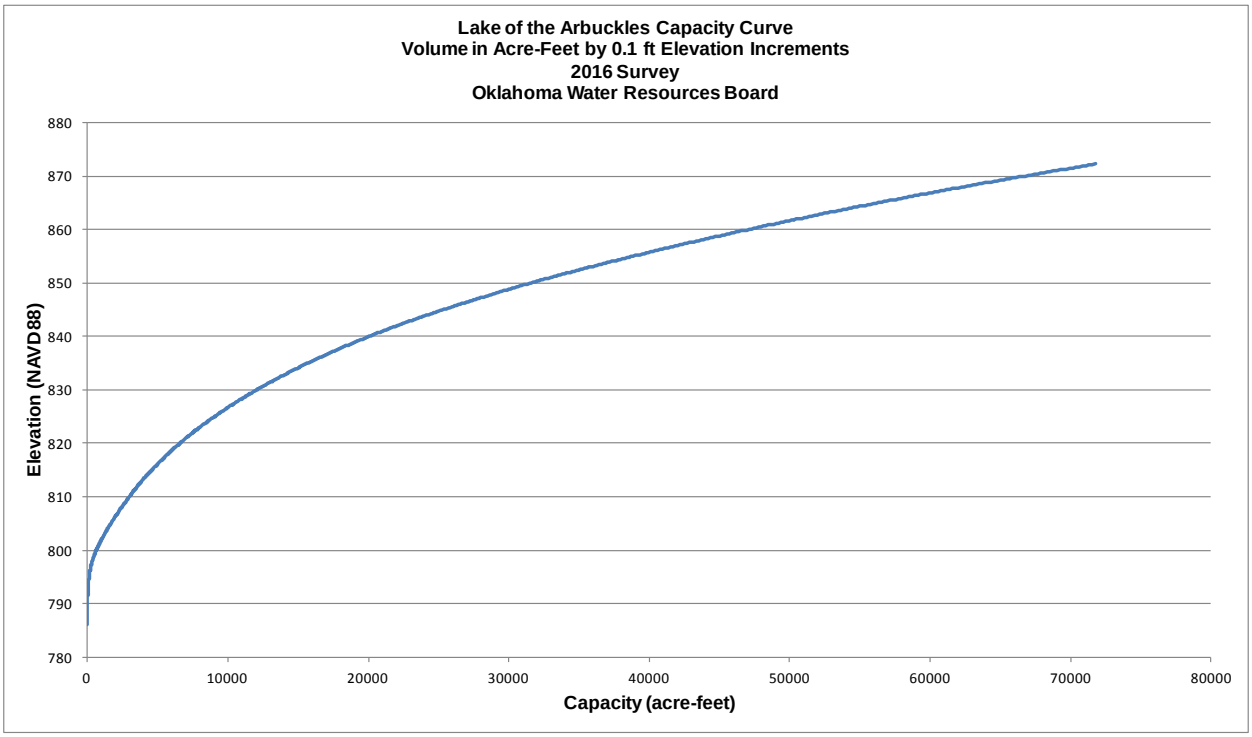

Figure A- 2: Cumulative Capacity Curve for Lake of the Arbuckles.

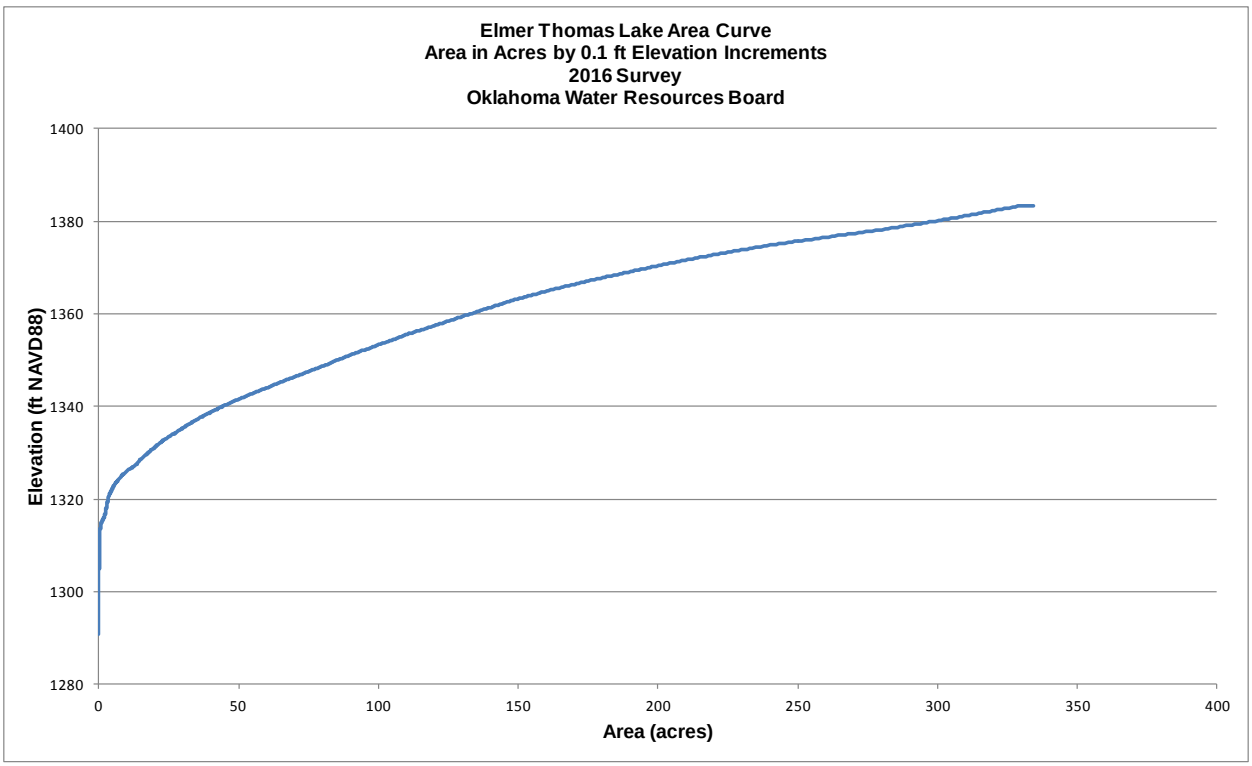

Figure A- 3: Area Curve for Elmer Thomas Lake.

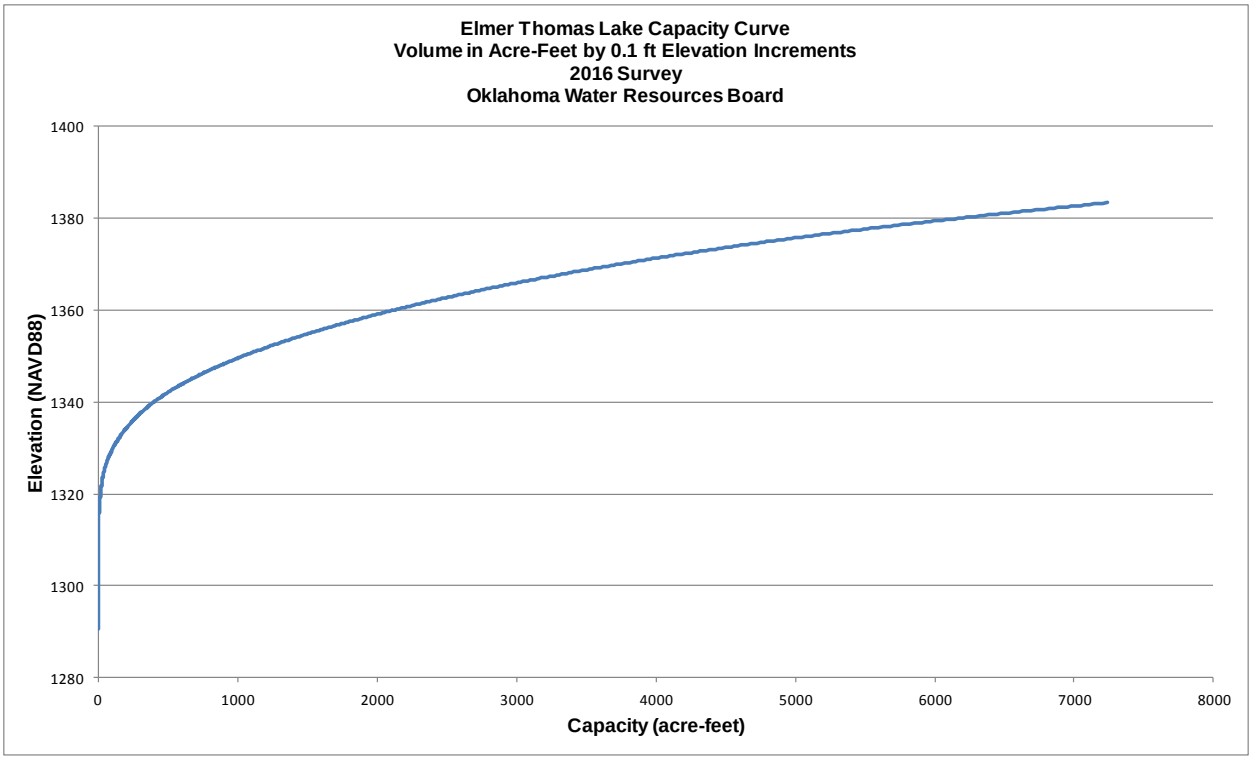

Figure A- 4: Cumulative Capacity Curve for Elmer Thomas Lake.

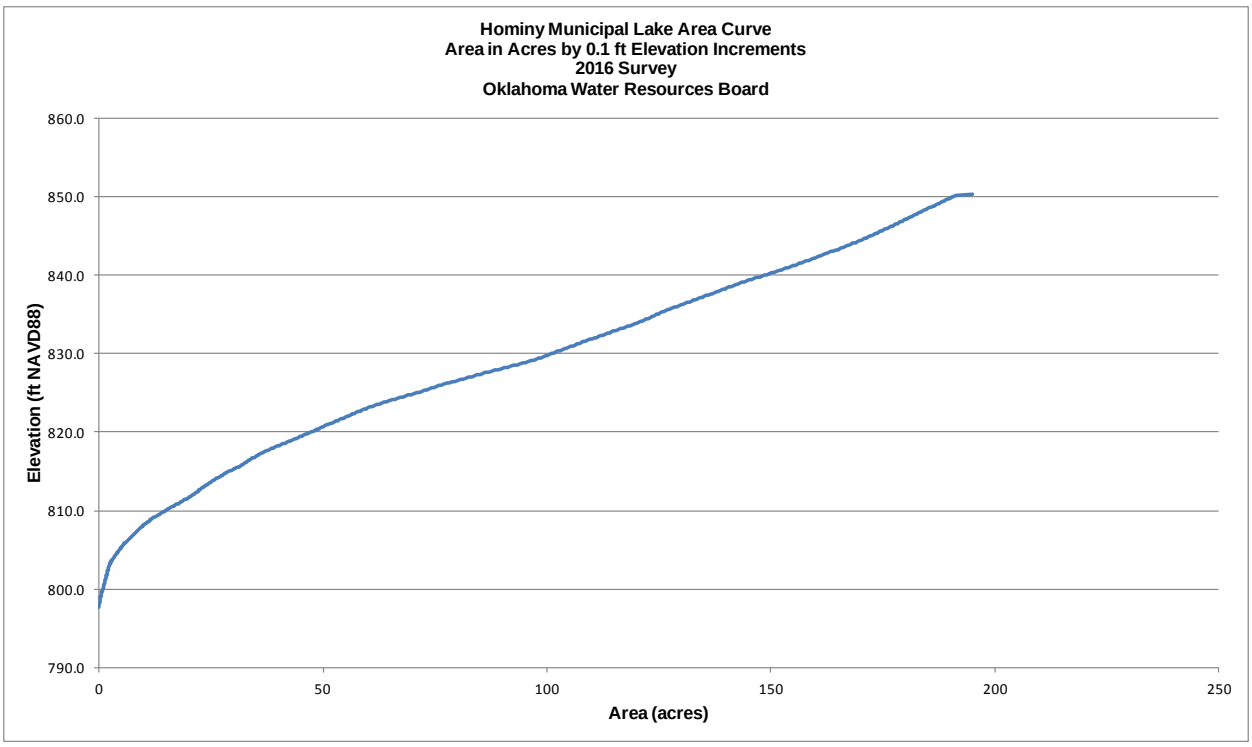

Figure A- 5: Area Curve for Hominy Municipal Lake.

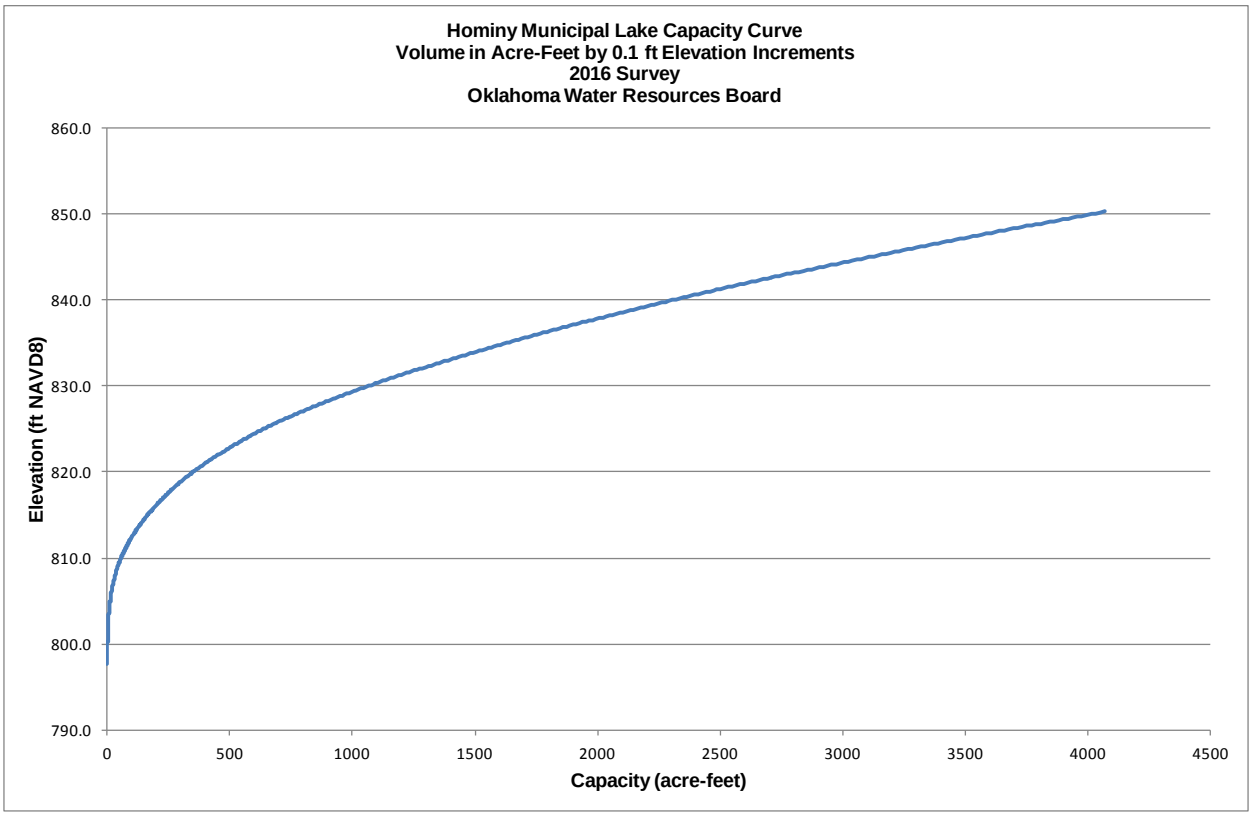

Figure A- 6: Cumulative Capacity Curve for Hominy Municipal Lake.

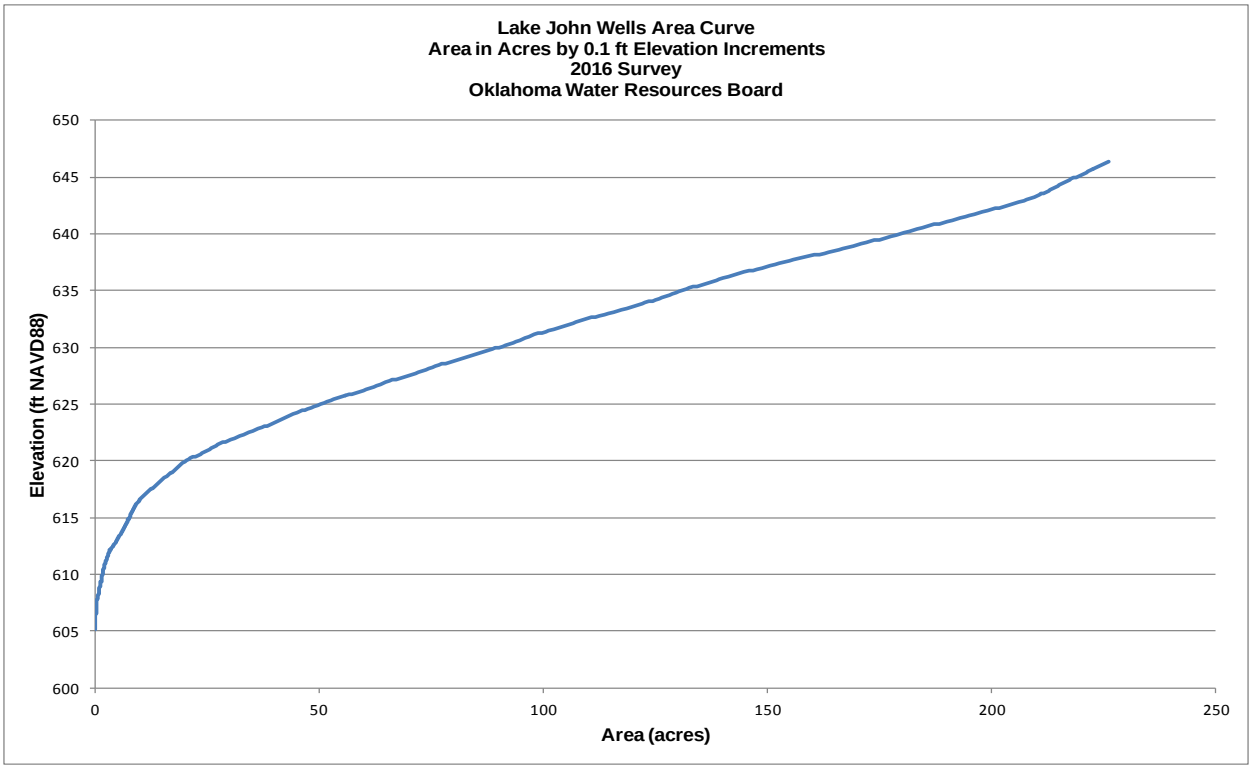

Figure A- 7: Area Curve for Lake John Wells.

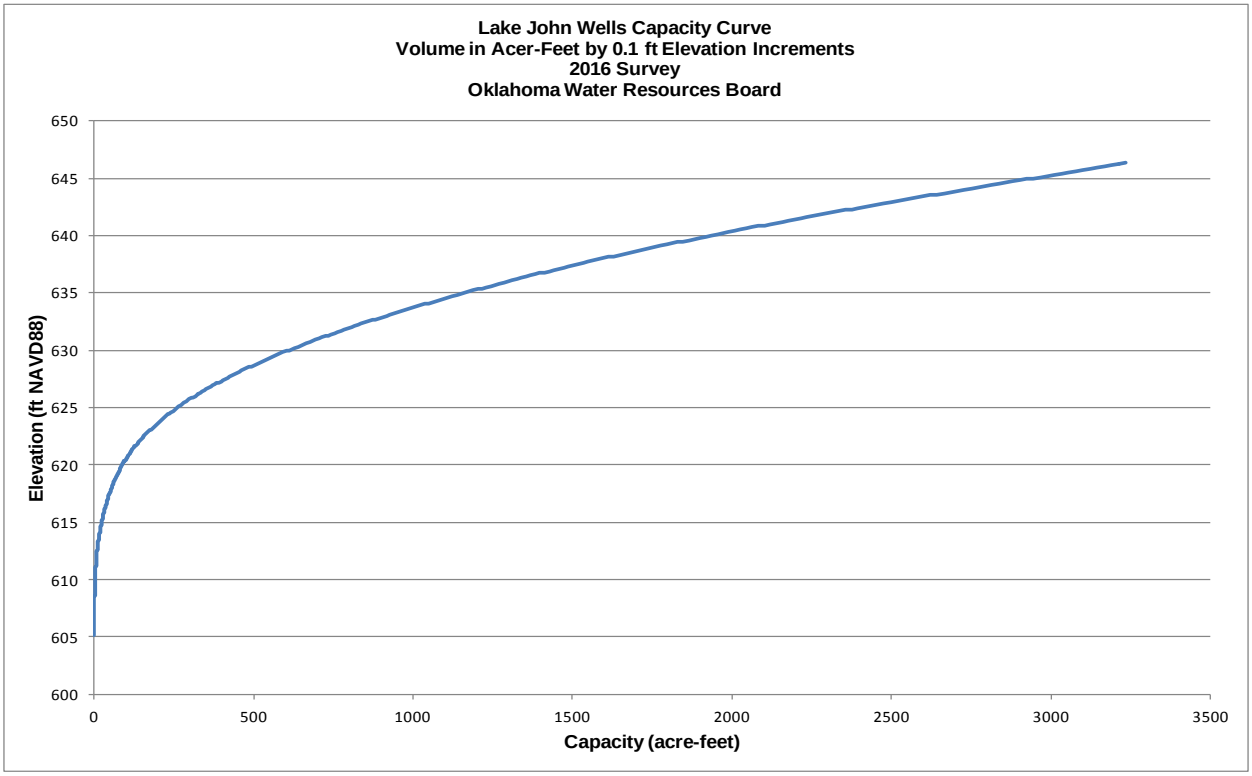

Figure A- 8: Cumulative Capacity Curve for Lake John Wells.

APPENDIX B: Lake of the Arbuckles Maps

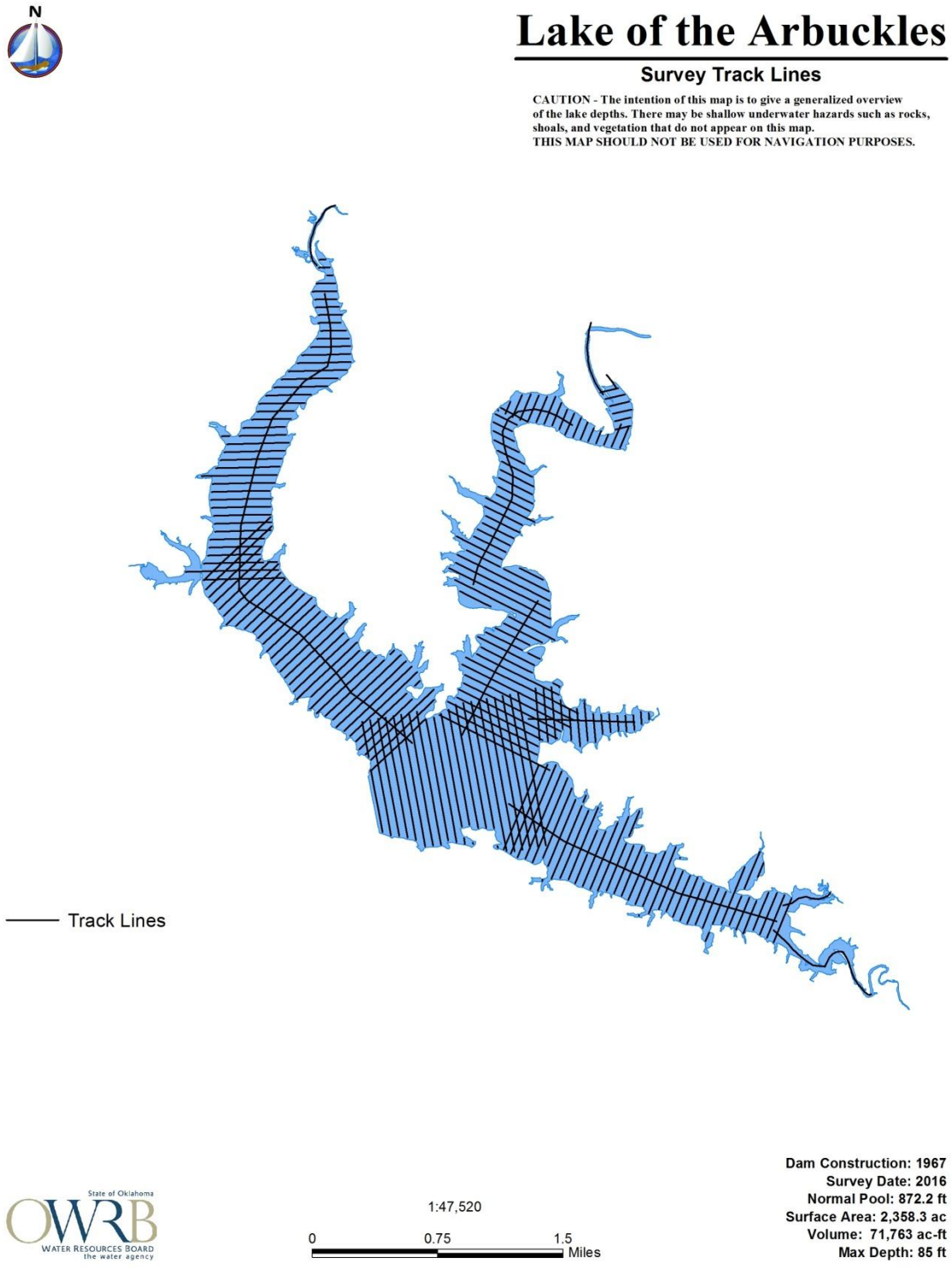

Figure B- 1: Lake of the Arbuckles Survey Track Lines.

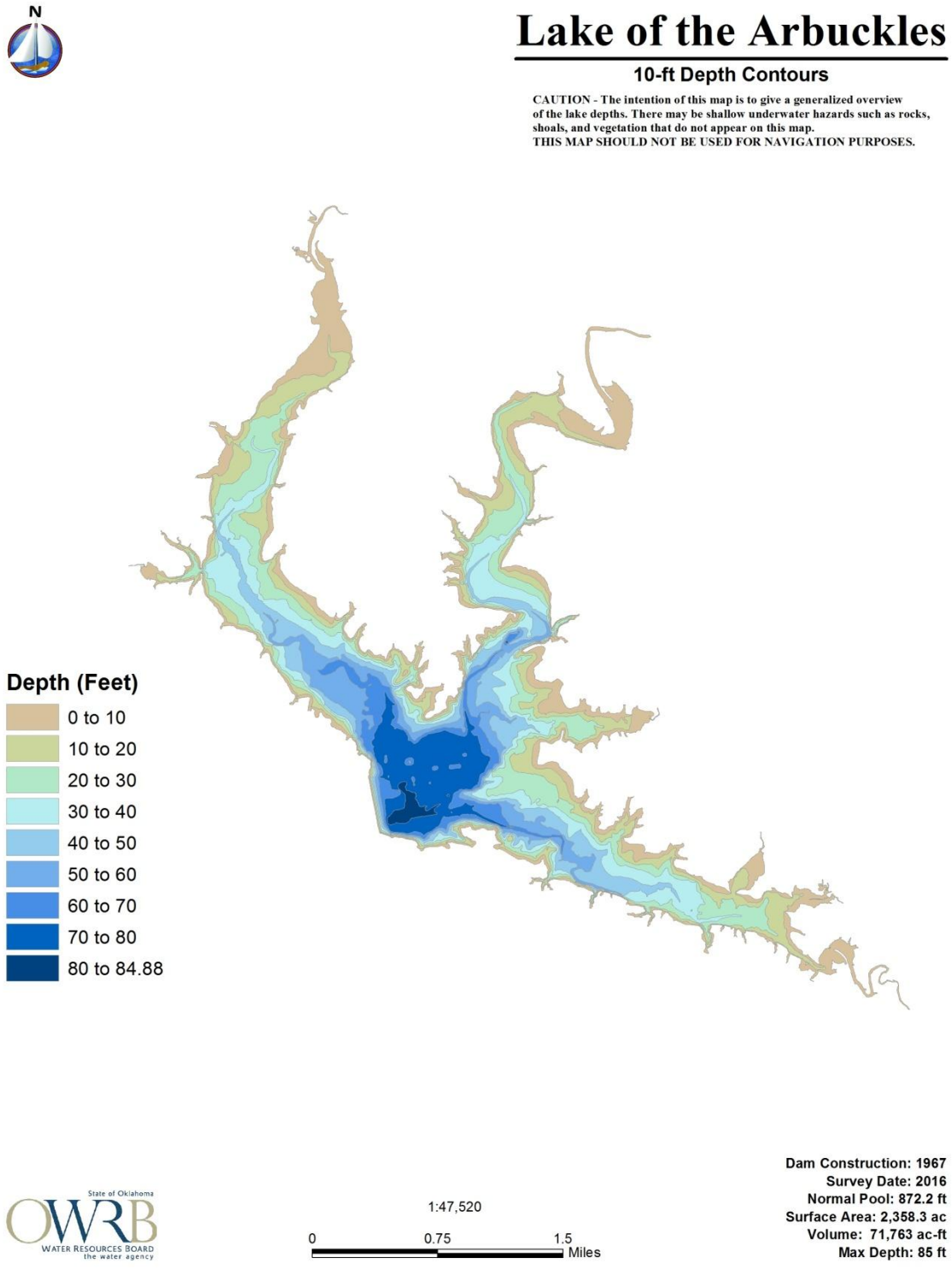

Figure B- 2: Lake of the Arbuckles Contour Map with 10 ft Intervals.

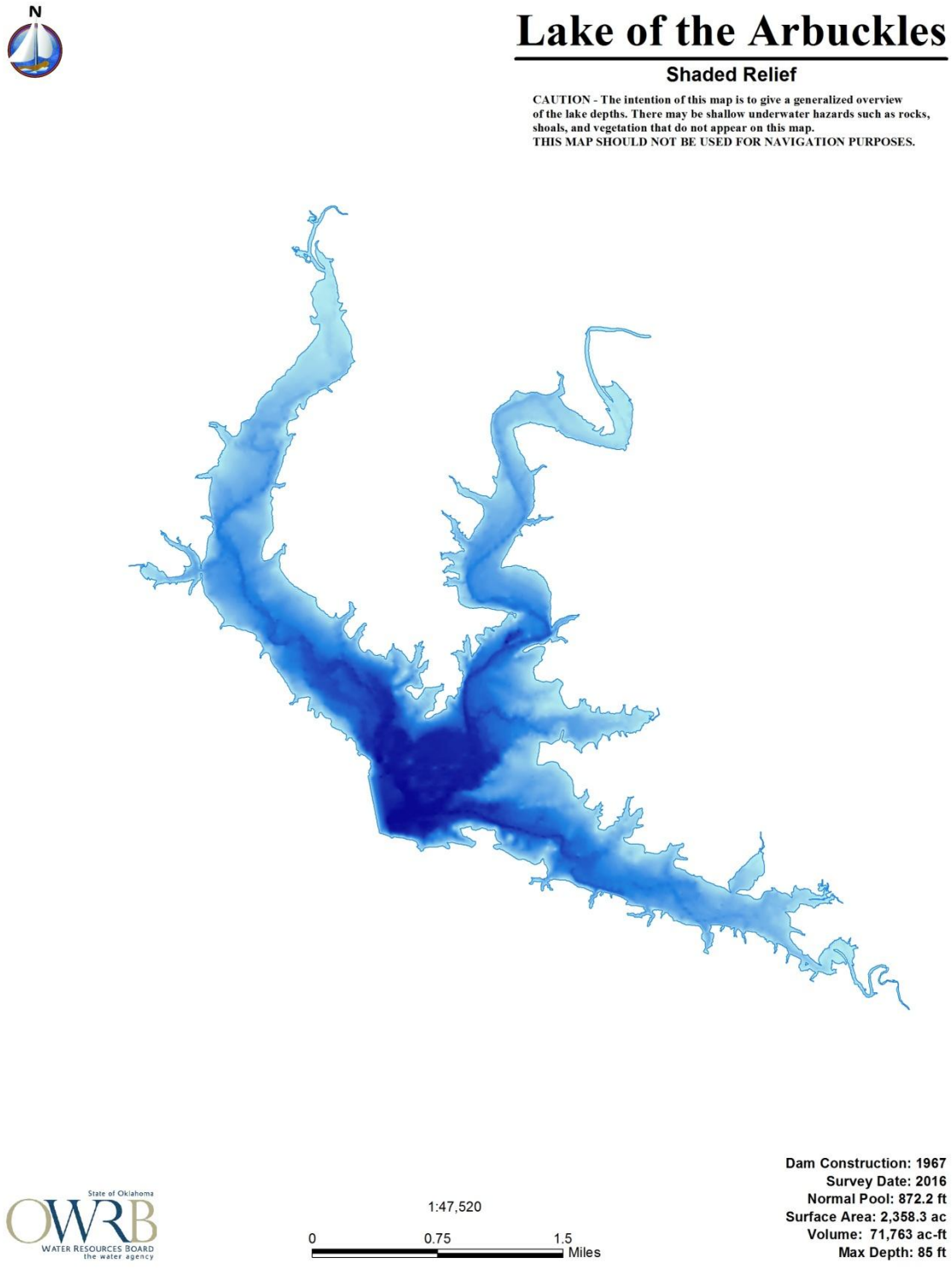

Figure B- 3: Lake of the Arbuckles Shaded Relief Map.

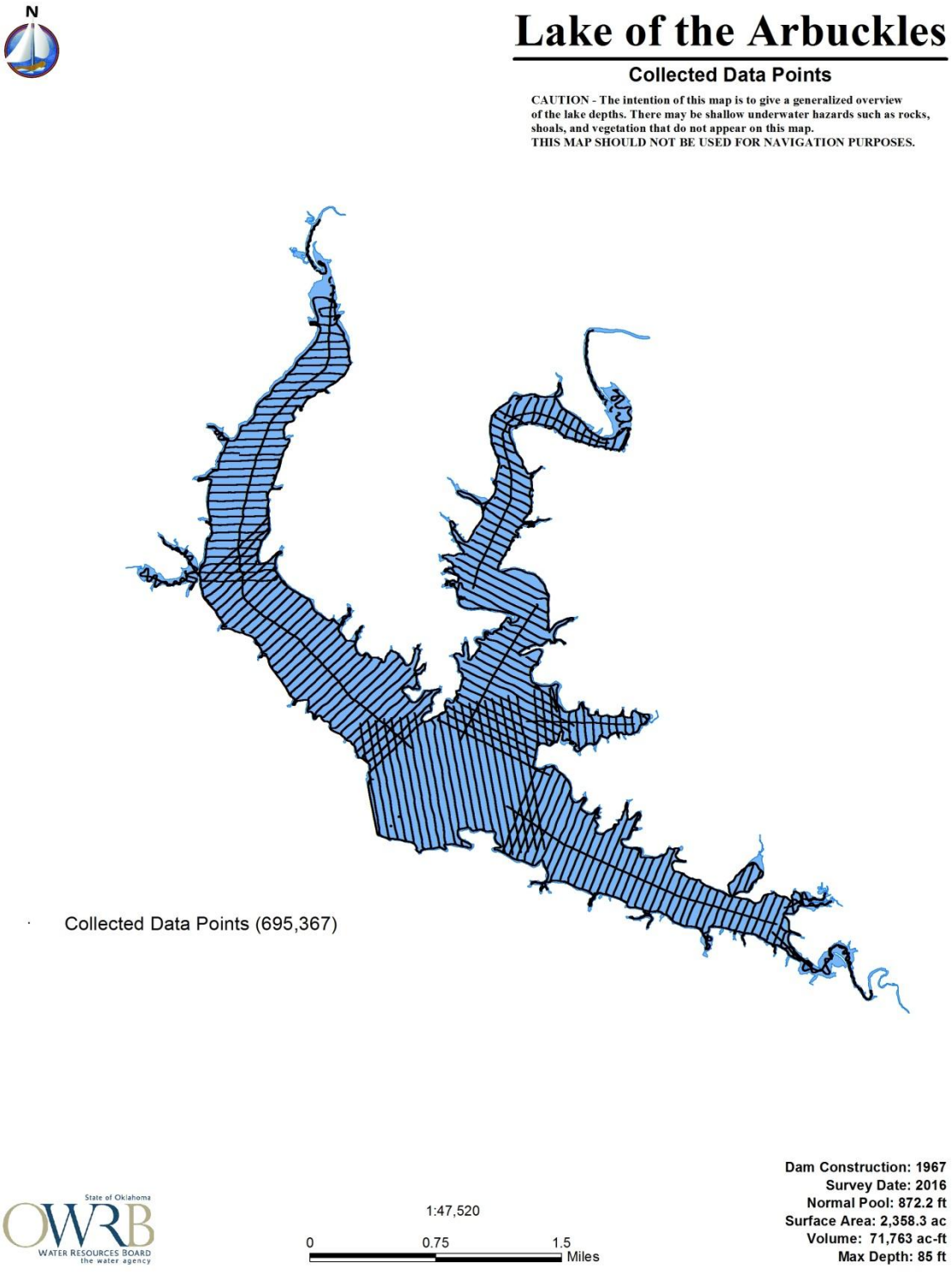

Figure B- 4: Lake of the Arbuckles Collected Data Points Map.

APPENDIX C: Elmer Thomas Lake Maps

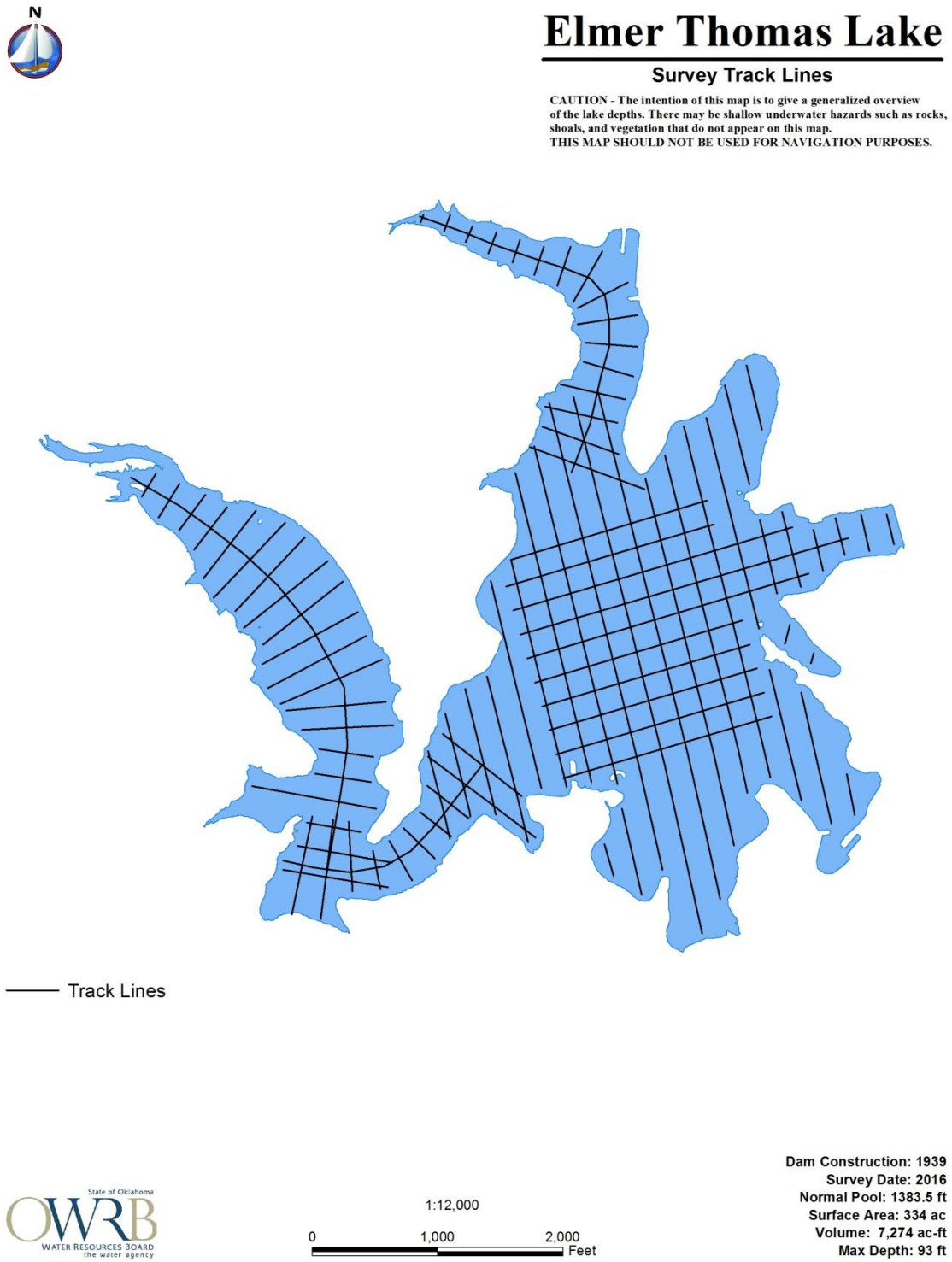

Figure C- 1: Elmer Thomas Lake Survey Track Lines Map.

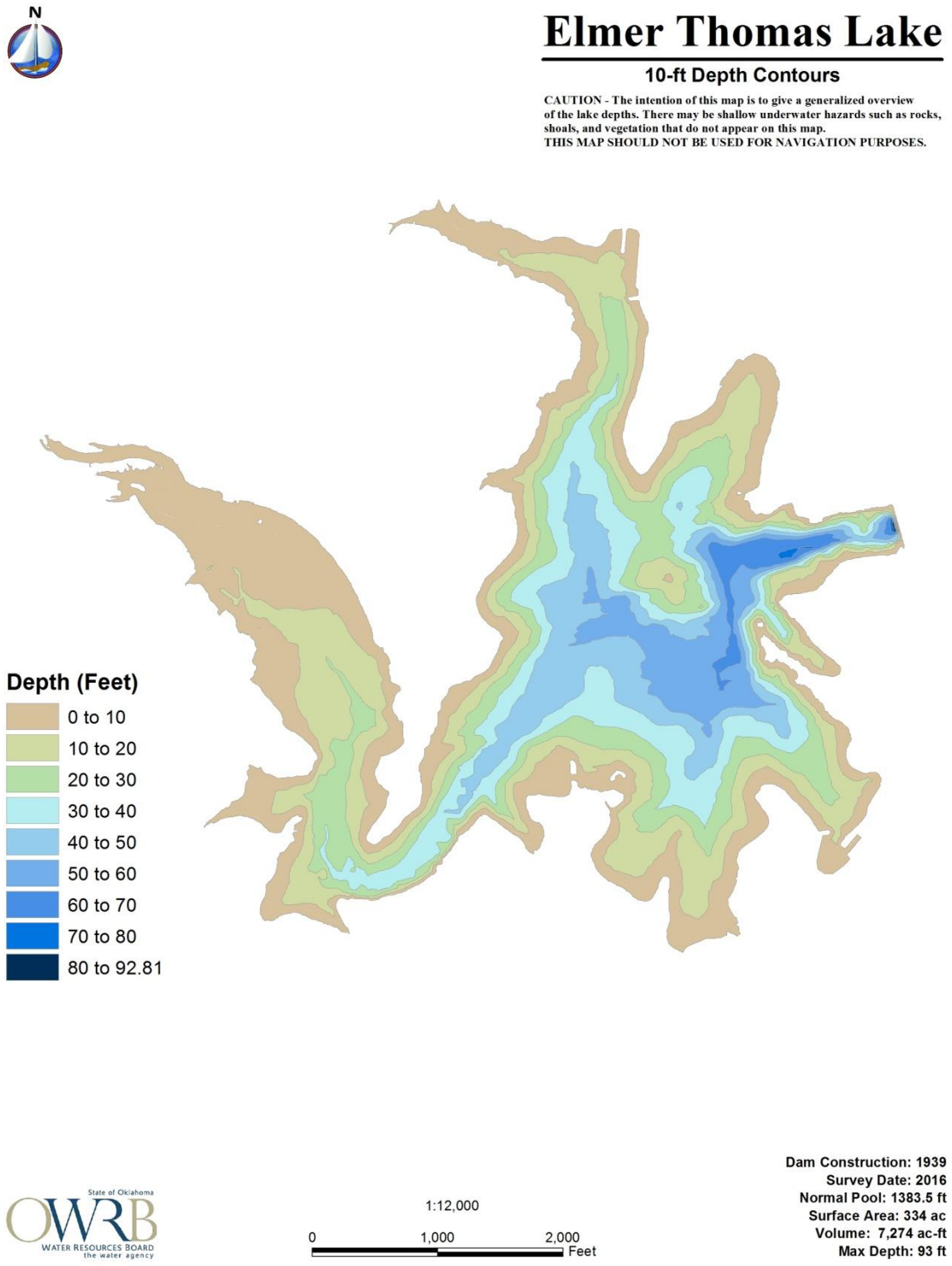

Figure C- 2: Elmer Thomas Lake Contour Map with 10 ft Intervals.

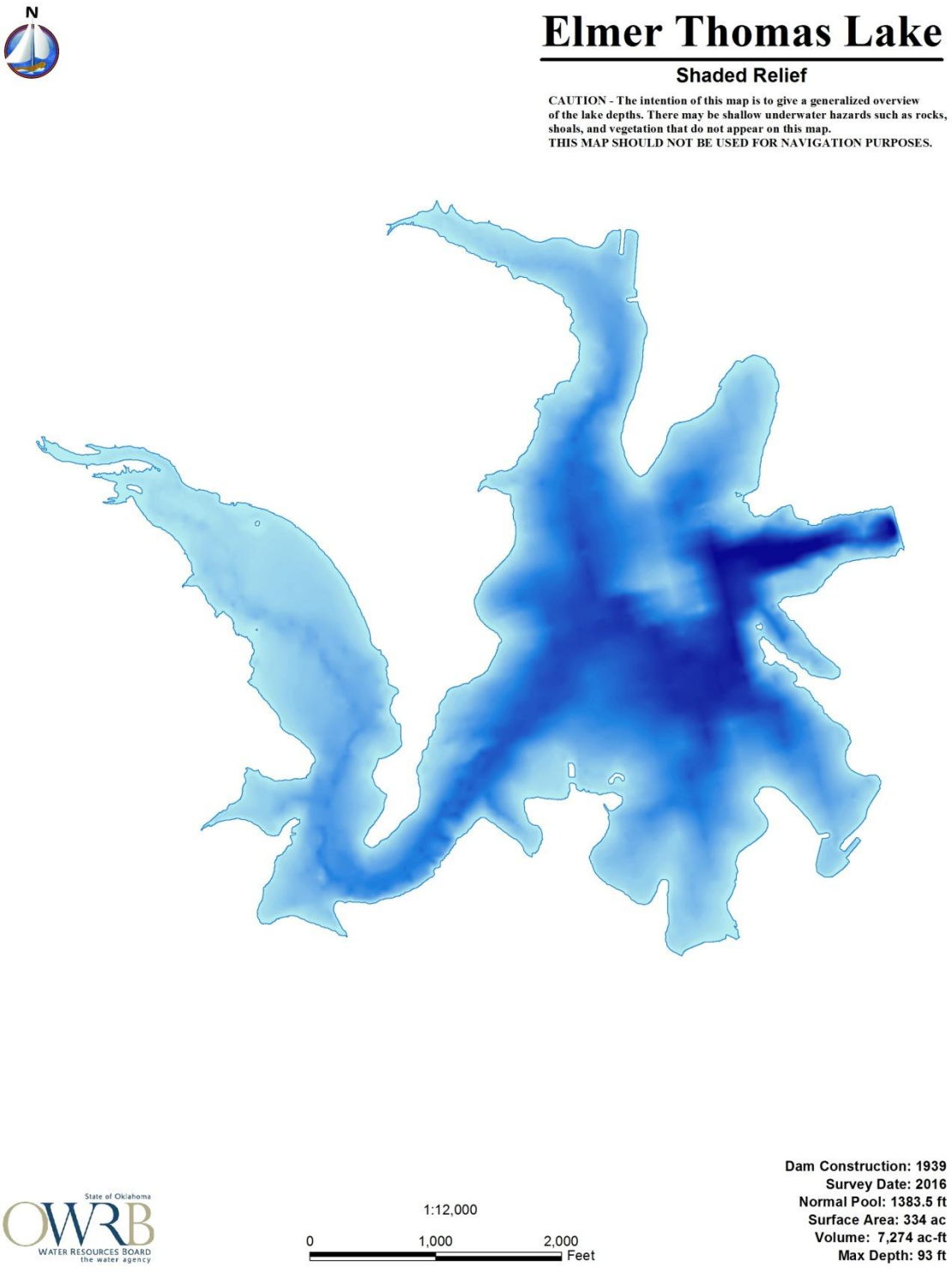

Figure C- 3: Elmer Thomas Lake Shaded Relief Map.

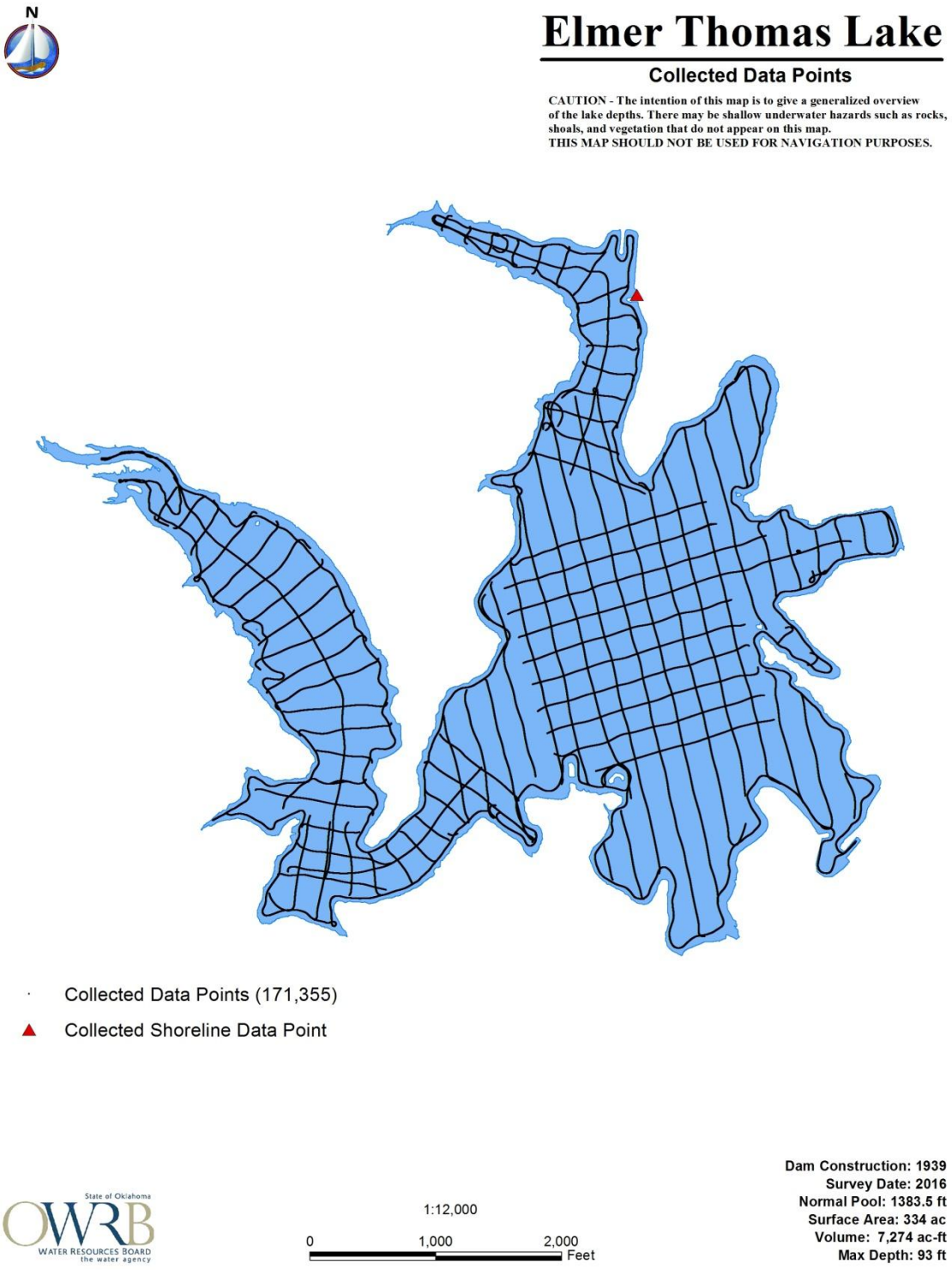

Figure C- 4: Elmer Thomas Lake Collected Data Points Map.

APPENDIX D: Hominy Municipal Lake Maps

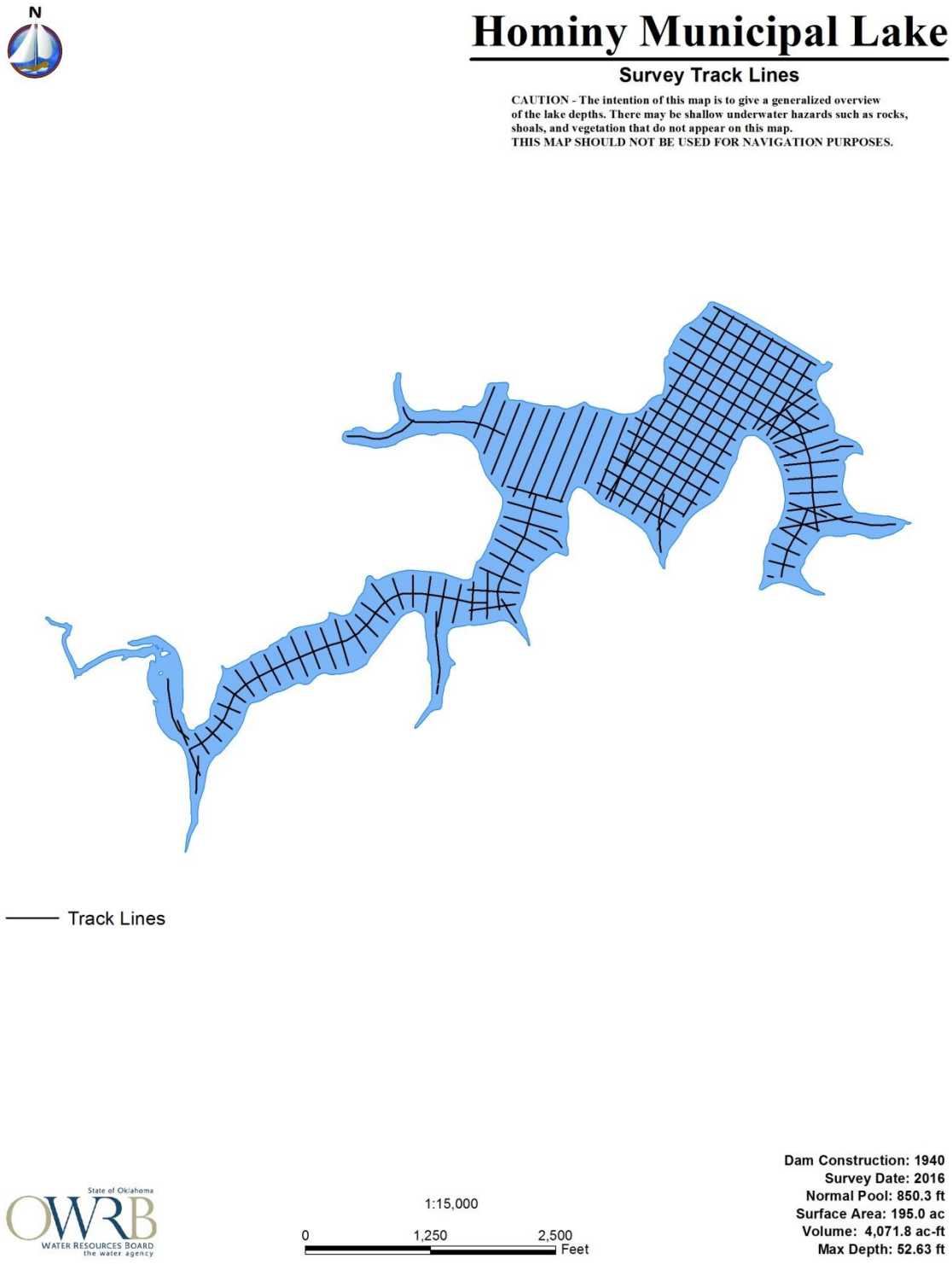

Figure D- 1: Hominy Municipal Lake Survey Track Lines Map.

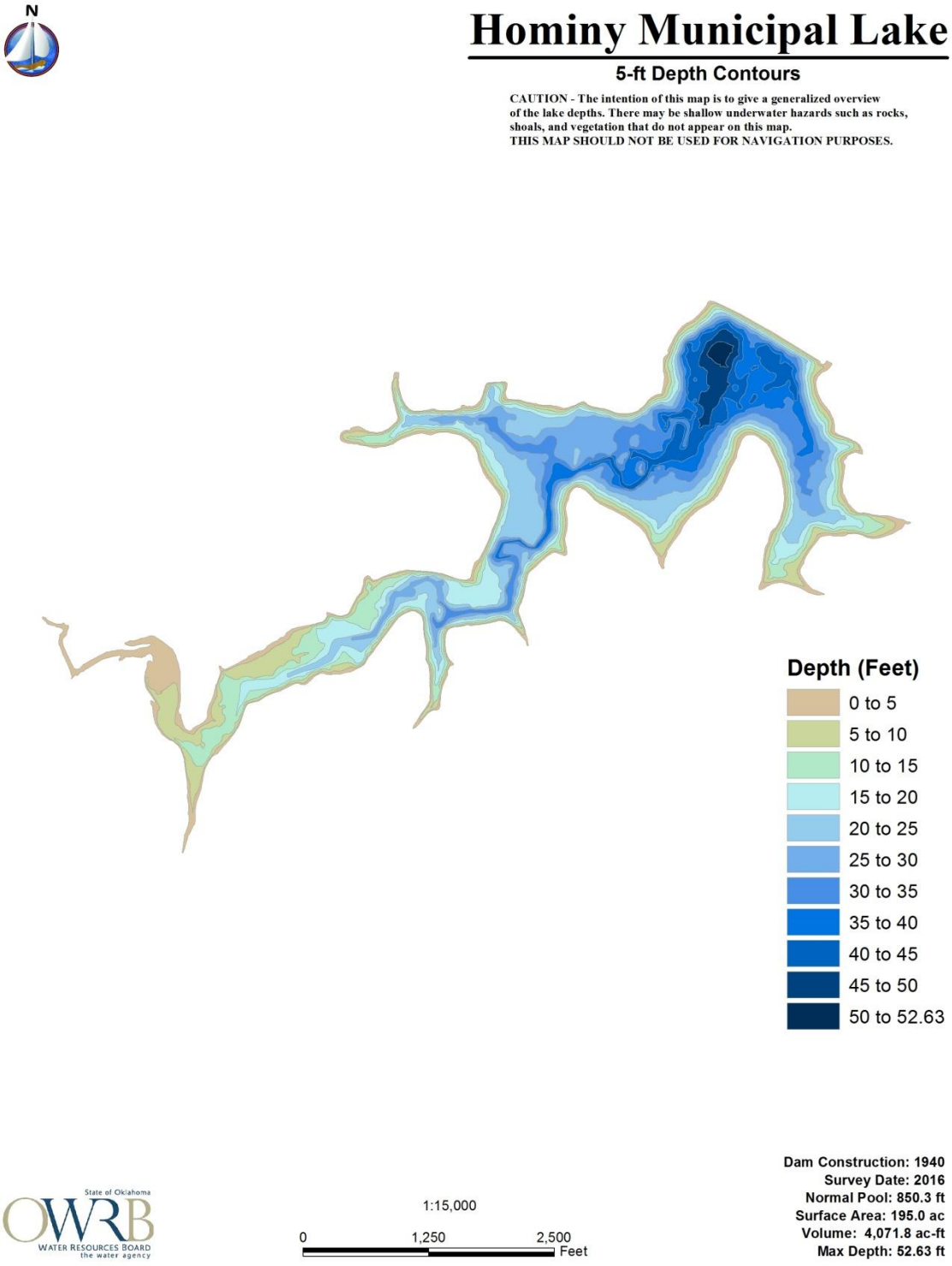

Figure D- 2: Hominy Municipal Lake Contour Map with 5 ft Intervals.

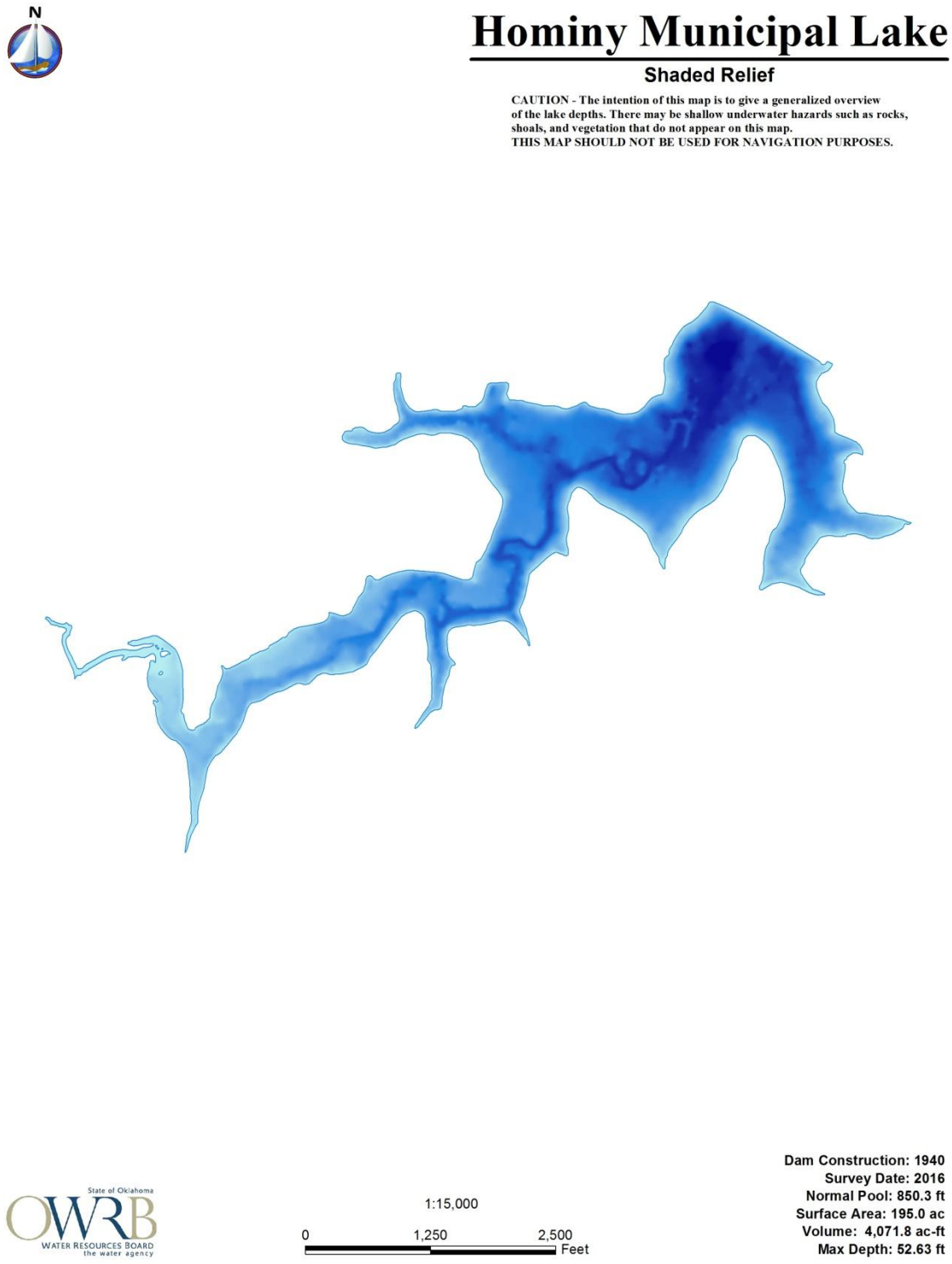

Figure D- 3: Hominy Municipal Lake Shaded Relief Map.

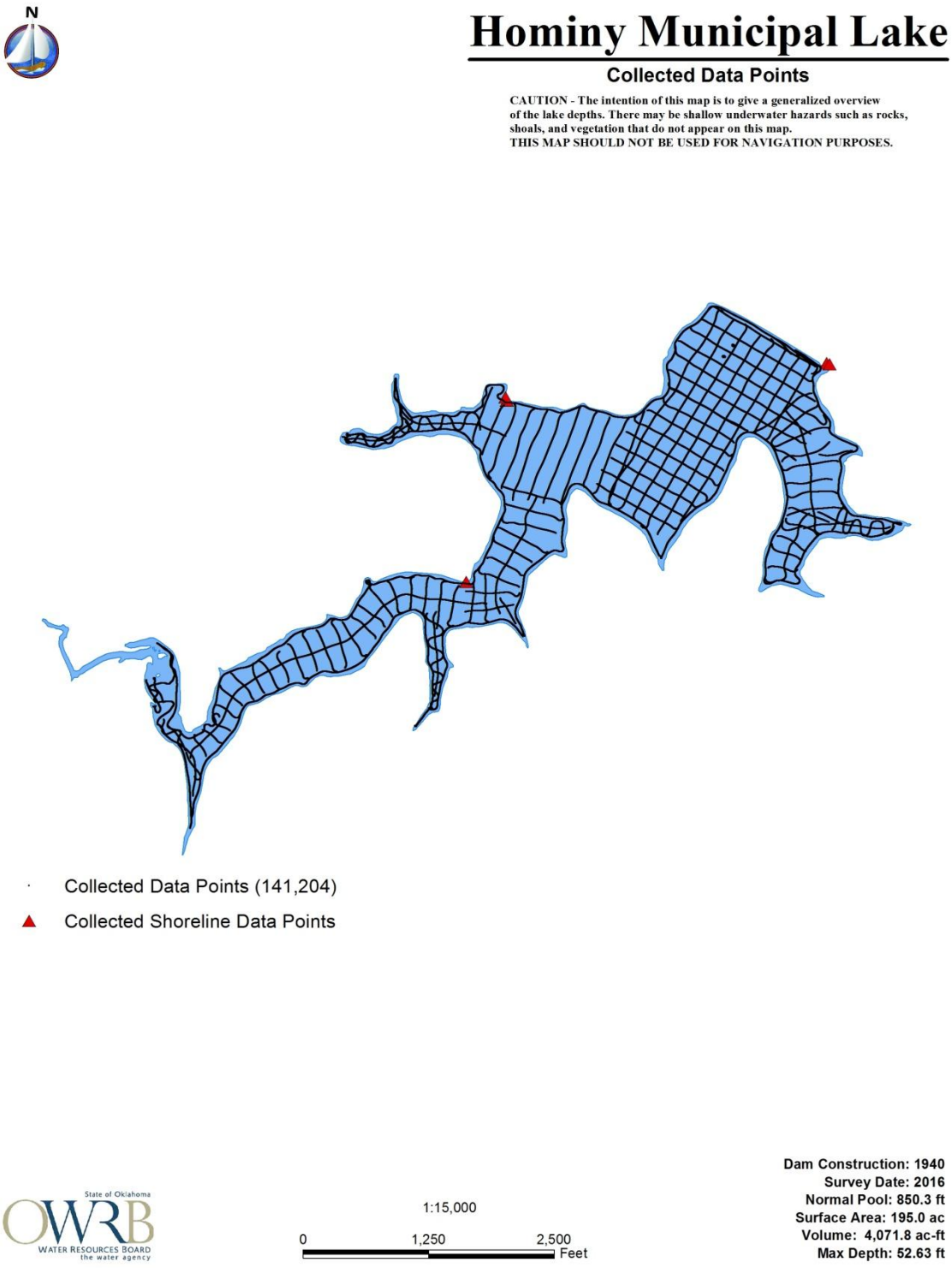

Figure D- 4: Hominy Municipal Lake Collected Data Points Map.

APPENDIX E: Lake John Wells Maps

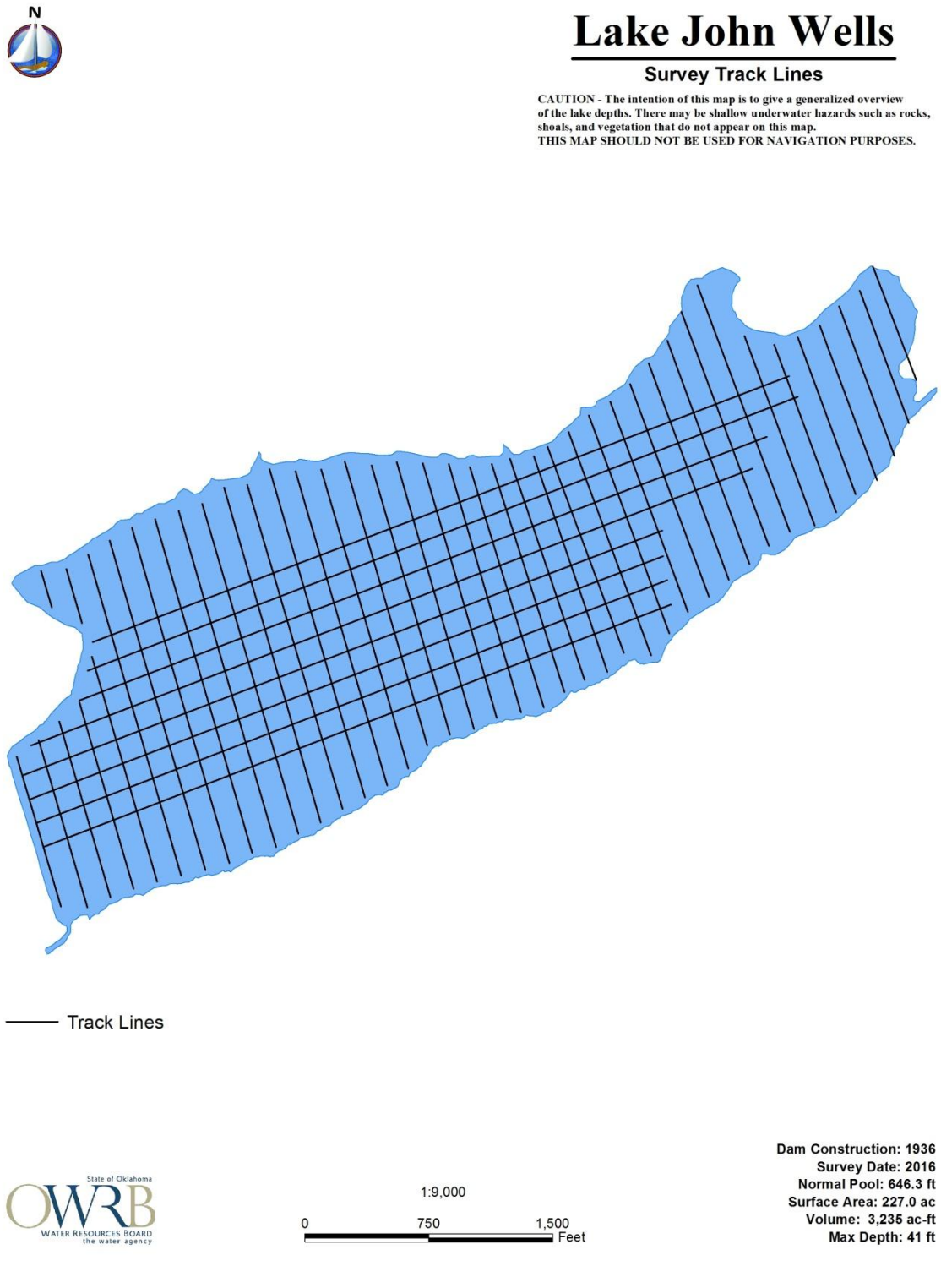

Figure E- 1: Lake John Wells Survey Track Lines Map.

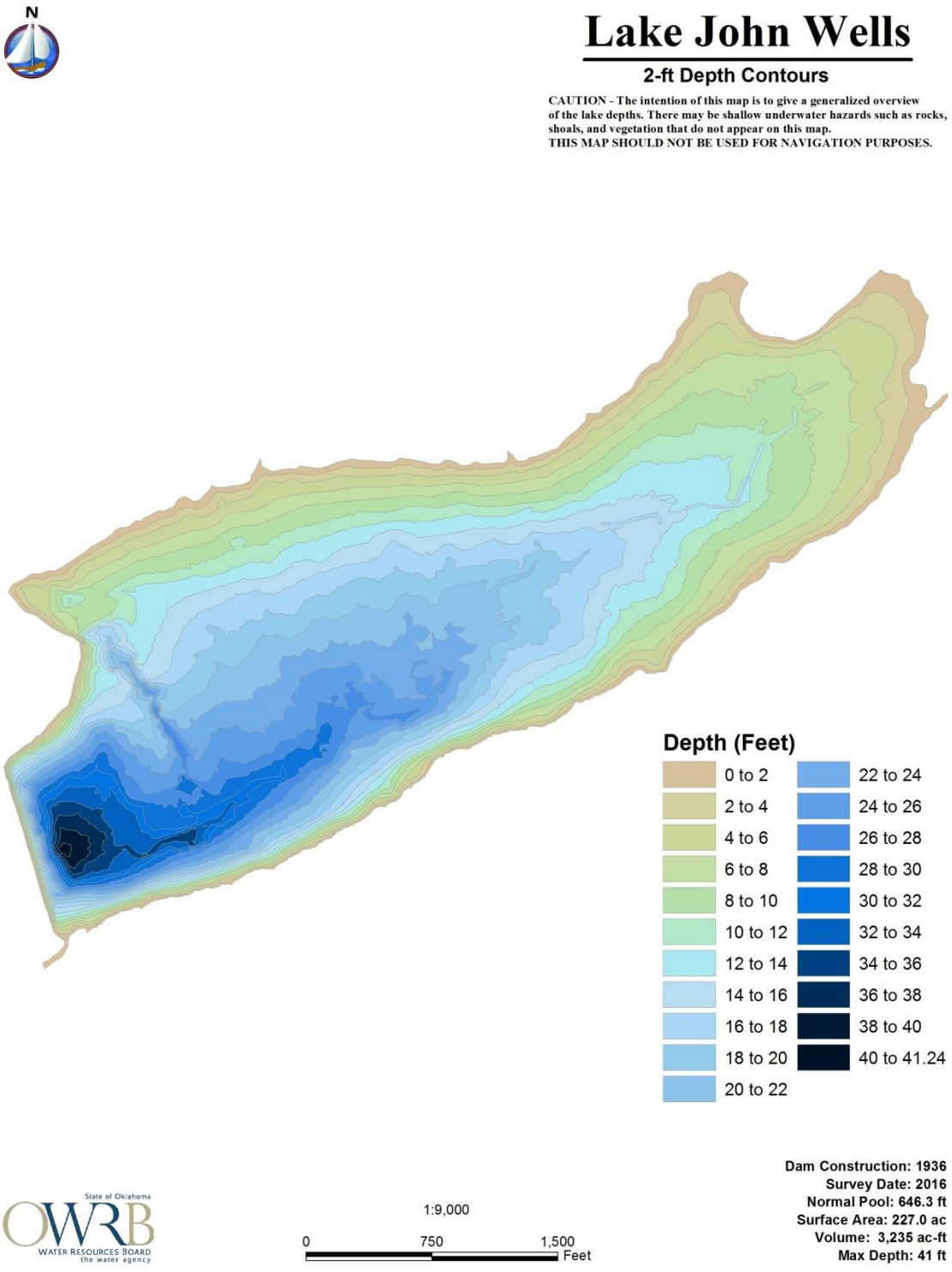

Figure E- 2: Lake John Wells Contour Map with 2 ft Intervals.

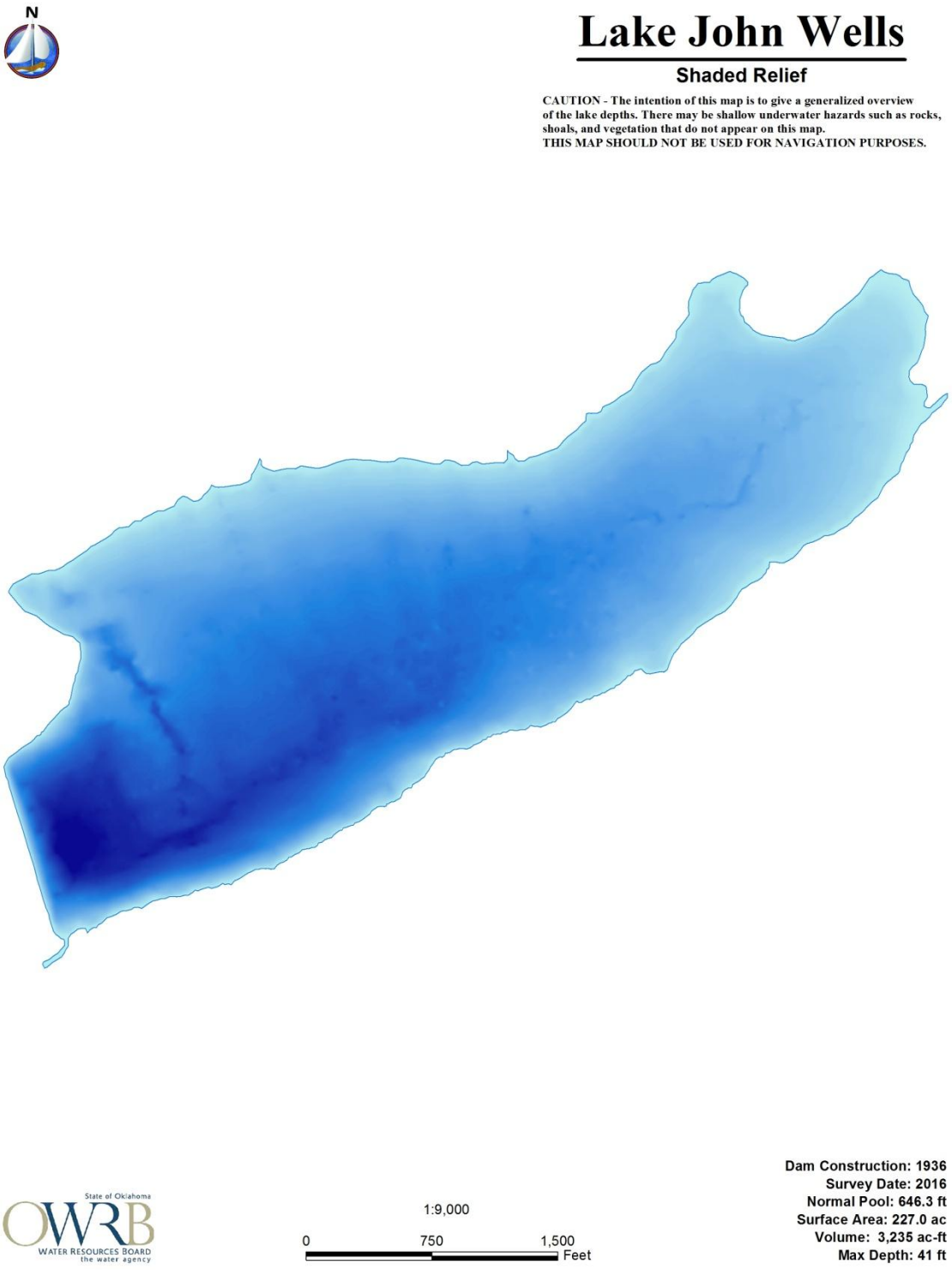

Figure E- 3: Lake John Wells Shaded Relief Map.

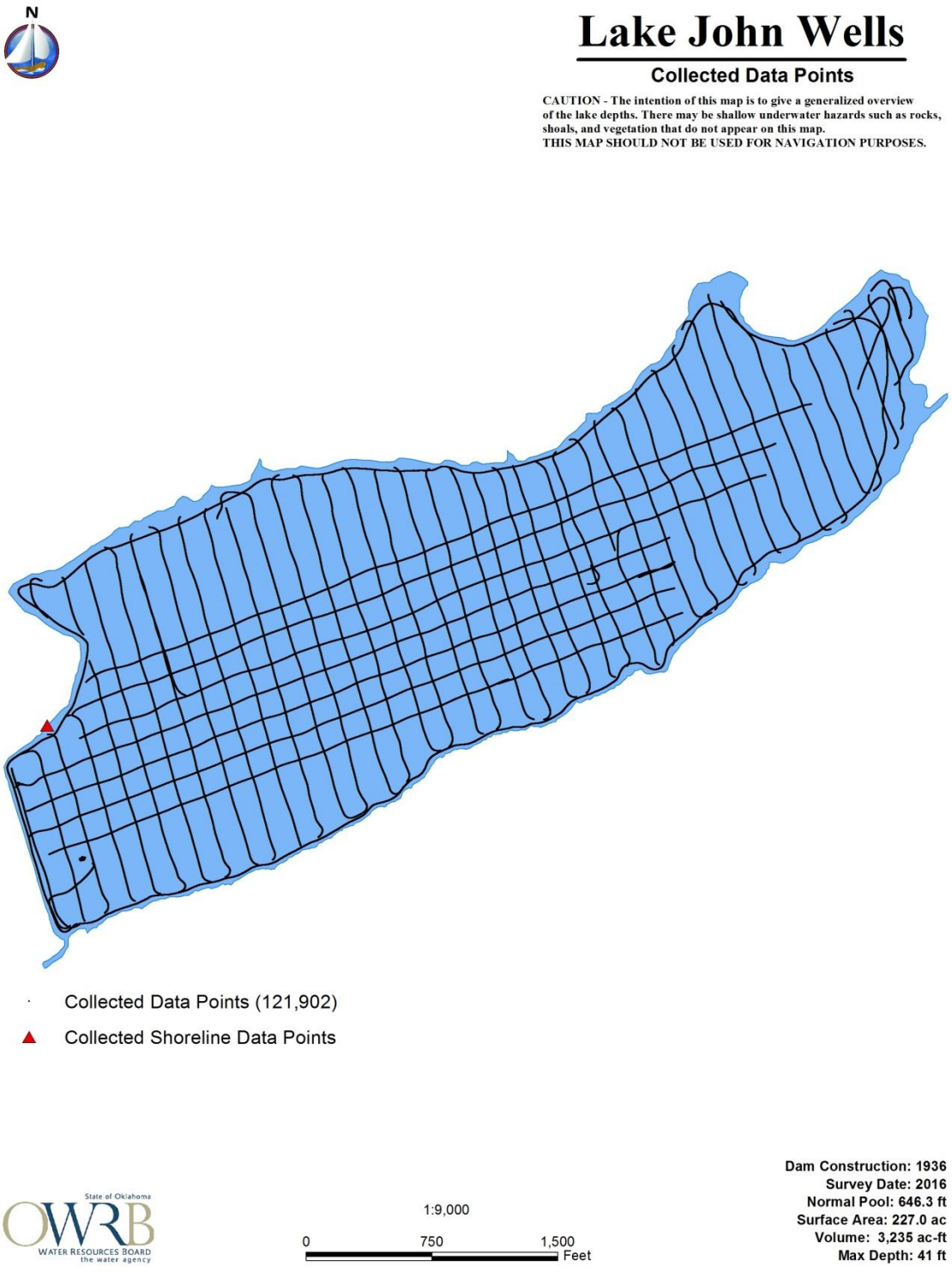

Figure E- 4: Lake John Wells Collected Data Points Map.

APPENDIX F: Additional Survey Data Tables.

Table F- 1: Survey offsets used during the calibration and editing process.

Survey Offsets					
Lake	Arbuckle (5/20-5/21)	Arbuckle (6/6)	Elmer Thomas	Hominy	John Wells
Static Draft (ft)	1.0	1.0	1.0	1.0	1.0
Average SOS (m/s)	1478.59	1484.38	1472.18	1463.04	1461.38
Echosounder SOS (m/s)	1484.07	1497.79	1490.47	1464.87	1463.65

Table F- 2: Cross check statistic results showing accuracy of the survey data sets.

Cross Check Statistics				
Lake	Arbuckle	Elmer Thomas	Hominy	John Wells
# of Intersections	158	72	138	204
Arithmetic Mean (ft)	0.161	0.089	0.084	0.035
Standard Deviation (ft)	0.506	0.605	0.537	0.321