

**Bureau of Reclamation  
WaterSMART: Cooperative Watershed Management Program (CWMP) for Fiscal Year 2016**

**Project Title:**           **Lake of the Arbuckles Watershed Group**

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## I. Technical Proposal Executive Summary

The U.S. Department of Interior's (Department) WaterSMART (Sustain and Manage America's Resources for Tomorrow) Program establishes a framework to provide Federal leadership and assistance on the efficient use of water; integrating water and energy policies to support the sustainable use of all natural resources; forming strong diverse partnerships with states, tribes and local entities and coordinating with other department bureaus and offices on water conservation activities. The Cooperative Watershed Management Program (CWMP) contributes to the WaterSMART strategy by providing funding to watershed groups to encourage diverse stakeholders to form local solutions to address their water management needs. The purpose of the CWMP is to improve water quality and ecological resilience, conserve water and reduce conflicts over water through collaborative conservation efforts in the management of local watersheds. Consistent with this purpose, the Chickasaw Nation of Oklahoma is pleased to submit this application for grant funding under the CWMP to establish the **Lake of the Arbuckles Watershed Group** to promote the sustainable use of water resources in the Lake of the Arbuckles watershed. The application information specified in the Department's Funding Opportunity Announcement (FOA) is provided below.

<b>Date:</b>	May 4, 2016
<b>Applicant Name:</b>	Chickasaw Nation
<b>City, County, and State:</b>	Ada, Pontotoc County, Oklahoma

The Lake of the Arbuckles Watershed Group (Watershed Group) will be comprised of a diverse set of stakeholders that will work to collaboratively identify, evaluate and resolve water quantity and quality issues within the Lake of the Arbuckles Watershed. Grant funds will be used to employ a watershed group facilitator and a consultant that will partner with local, state and federal agencies to identify and recruit additional stakeholders that will then work to develop watershed management project concepts. These project activities accomplish the goals of this FOA by establishing a watershed group and the staff required to manage it successfully. The facilitator will assist in developing the Watershed Group mission statement and be responsible for administrative duties of the Watershed Group. The technical consultant will serve as a liaison between the Watershed Group and federal and state agencies to develop mutually beneficial watershed management project concepts. The watershed management project concepts and technical information gathered for the Watershed Group will serve as the foundation for developing a watershed restoration plan. This project has an estimated duration of 18 months.

## II. Background Data

The Lake of the Arbuckles watershed, shown in Figure 1, is located in the State of Oklahoma and within Murray, Garvin and Pontotoc counties. The city of Sulphur is located within the



watershed and the cities of Dougherty, Hickory and Davis are within five miles of watershed boundaries. Dougherty and Davis are west of the watershed and Hickory lies to the east; all three cities are in Murray County. The watershed lies within the boundaries of the Gulf Coast Prairie Landscape Conservation Commission (LCC) and Cross Timbers eco-region defined by the U.S. Environmental Protection Agency (EPA).



**Figure 1. Geographic location of the Lake of the Arbuckles Watershed**

The Lake of the Arbuckles has a surface area of 2,350 acres and a storage capacity of 72,400 acre-feet (ac-ft). The lake was created by the U.S. Bureau of Reclamation (USBR) through construction of the Arbuckle Dam in 1966. Its watershed is delineated by the 10-digit Hydrologic Use Boundary Dataset and covers an area of 88,590 acres. The Lake of the Arbuckles has 36,440 acre feet of capacity assigned to flood control. The USBR estimates that the Arbuckle Project has provided an accumulated \$1,851,000 in flood control benefits from 1950 to 1999. Benefits to infrastructure provided during the 2015 flooding will have significantly increased that amount.

The Lake of the Arbuckles serves as a main water supply source for several municipalities through the Arbuckle Master Conservancy District which also operates and maintains the Arbuckle Lake Dam and water supply infrastructure. The Lake receives groundwater from the

Arbuckle-Simpson Aquifer, which serves as an important supply source for the Chickasaw Nation.

The Chickasaw Nation's legal rights and government roles establish legal, moral and fiduciary responsibilities for the assurance of the long term sustainability of their homeland's water resources, a resource that is fundamental to the sustained health and growth of surrounding communities, today and in the future. The Nation sees the health of the water systems, both natural and man-made, as integral to the long-term economic, environmental and cultural health of the entire region.

### Sources of Water Supply

As shown in Figure 2, Lake of the Arbuckles is fed by five creeks: Rock Creek, Guy Sandy Creek, Wilson Creek, Buckhorn Creek and Travertine Creek. All of these creeks are fed by springs in dry weather with Rock and Travertine creeks having additional flow contributions from artesian springs out of the Arbuckle-Simpson Aquifer.



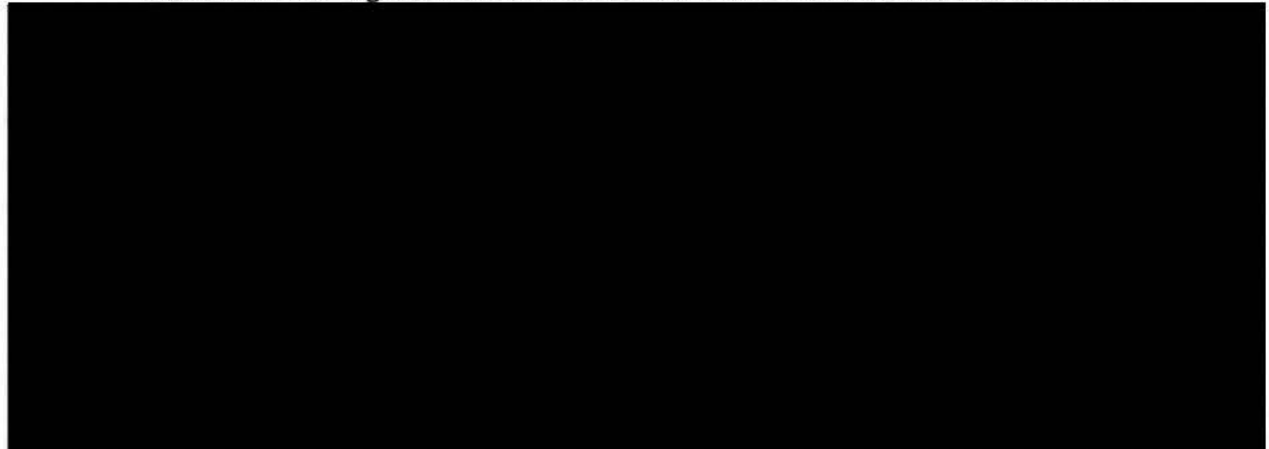
Figure 2. Contributing Creek to the Lake of the Arbuckles



## Water Rights & Uses

Table 1 summarizes the seven existing water rights within the Lake of the Arbuckles Watershed. Five of the rights are vested, having been in existence since 1969. Current water uses for all rights include irrigation, public supply and recreation/fish/wildlife. The 24,000 ac-ft/yr of storage within the Lake of the Arbuckles is allotted to the Arbuckle Master Conservancy District which supplies water to the cities of Ardmore, Davis, Sulphur, Wynnewood and Dougherty.

**Table 1. Water Rights and Uses within the Lake of the Arbuckles Watershed**



## Water Issues

The Lake of the Arbuckles Watershed suffers from several water issues both with respect to quality and quantity. Insufficient and inconsistent water supply is a growing concern in light of the recent Arbuckle-Simpson Hydrology Study, which identified the limitations of the water available from the Arbuckle-Simpson Aquifer. This diminishing groundwater resource will put additional stress on water supply from the Lake of the Arbuckles, which will be compounded by diminished spring flows from the aquifer.

The EPA has defined the Lake of the Arbuckles designated beneficial use groups to include: aesthetic value, agricultural, aquatic life harvesting, recreation and public water supply. Currently, the Arbuckle Lake is on the EPA's list of 303(d) impaired waters due to issues affecting aquatic life harvesting caused by dissolved oxygen. A Total Maximum Daily Load (TMDL) has not been conducted for this watershed, because of lack of funds. Both potable water and ecological health are impacted by impaired water quality.

## Environmental Issues

The Chickasaw National Recreation Area (CNRA), covering an area of 9,899 acres, surrounds the Lake of the Arbuckles and includes a number of springs that attract tourists to the park and

Murray County. In 2012, nearly 1.5 million visitors came to the recreation area and county. However, the drought experienced by all of Oklahoma from 2011 to 2014 ultimately impacted lake levels and streamflow. The visitation rates decreased tourism and have not yet achieved the previous high levels of visitors.

The CNRA lies wholly in the Lake of the Arbuckles watershed. The springs, streams and lakes in the CNRA are significant resources for tourism and recreation, aquatic and terrestrial ecosystems and public water supply. These water resources draw visitors to the park to enjoy water-based recreational activities such as boating, water skiing, sport fishing and swimming and to enjoy the scenic beauty of the Lake. The Lake of the Arbuckles is considered to be one of the best fishing lakes in Oklahoma for catfish, perch, bass and crappie and is a major attraction that boosts the economy of south-central Oklahoma.

The springs, streams and lakes in the Lake of the Arbuckles watershed are partly sustained by groundwater-flow from the Arbuckle-Simpson Aquifer. Unfortunately, the quantity and quality of these water resources are threatened by groundwater withdrawals, land uses such as mining and agriculture, drought and climate change. Lake of the Arbuckles is mesotrophic and phosphorus limited and has periodically not supported the beneficial use of fish and wildlife propagation due to low dissolved oxygen concentrations. Blue-green algae (Cyanobacteria) blooms have occurred in the lake over the last couple of years and have raised concerns about nutrient loading and the lake's trophic status.

Endangered species identified in Murray County by the U.S. Fish & Wildlife Service include the threatened piping plover (*Charadrius melodus*), endangered whooping crane (*Grus americana*), endangered least tern (*Sterna antillarum*) and the candidate sprague's pipit (*Anthus spragueii*).

### III. Project Description

The Chickasaw Nation is seeking funding to establish a Lake of the Arbuckles watershed group. This section provides a detailed description of the approach to establishing the watershed group and the activities the watershed group will conduct to develop membership and capture a diversity of stakeholder participants. The members will identify problems and needs within the Lake of the Arbuckles Watershed and develop a watershed restoration plan.

#### Description of Applicant

The applicant is the Chickasaw Nation, which is a Federally recognized Indian Tribe. The jurisdictional territory is comprised of 13 Counties in South Central Oklahoma. The Chickasaw Nation is economically strong, culturally vibrant and full of energetic people still dedicated to the preservation of family, community and heritage. Since the 1980s, the tribal government has focused most of its efforts on building an economically diverse base to generate funds that will support programs and services to Native American people. Business has flourished, programs and services have grown and the quality of life for all Chickasaws has been greatly enhanced, which is key to the Chickasaw Nation's efforts to pursue self-sufficiency and self-determination.



which in turn helps ensure that Chickasaws stay a united and thriving people. The Chickasaw Nation has a strong working relationship with many Federal agencies including the Bureau of Reclamation and the Corps of Engineers as well as Oklahoma state and local agencies, which will be vital to a collaborative and comprehensive Watershed Group and the successful development of a watershed restoration plan.

### Eligibility of Applicant

The Chickasaw Nation meets the eligibility requirements, as it is an Indian tribe in the western United States directly connected to the Lake of the Arbuckles Watershed; the Arbuckle Lake Watershed lies within the jurisdictional territory of the Chickasaw Nation and is the primary water supply for the municipalities within the Nation's boundaries. In addition, eco-tourism associated with the watershed contributes significantly to the economic stability of Murray County. The Chickasaw Nation is in a position to promote the sustainable use of water resources through collaboration and communication with local, state and federal stakeholders.

### Goals

This application is seeking funding to establish a new Watershed Group for the Lake of the Arbuckles Watershed (Task A). Preliminary goals and objectives of the new watershed group are to improve water quality and ecological resilience, conserve water and reduce conflicts over water through collaborative conservation efforts in the management of this watershed through the ultimate development of a watershed restoration plan for the Lake of the Arbuckles watershed while fulfilling the activity requirements of this FOA.

The objectives of the watershed group are to develop a mission statement for the group and identify short and long-term goals to address water quality and quantity issues. Short-term goals include identifying and prioritizing, by mutual consensus, water quality and availability issues within the Lake of the Arbuckles watershed. The long-term goal is to develop these concepts into a watershed restoration plan.

### Approach

Funding awarded will be used to complete the following eligible activities: Implementation of the four activities will occur in subsequent order to ensure flow between the tasks and completion of objectives.

#### *Task 1 - Establish Watershed Group*

The first activity—establishment of a watershed group—will take approximately three months. This task includes identifying a watershed group coordinator, which will be a representative of the Chickasaw Nation. A watershed group facilitator will also be hired to assist with outreach to stakeholders. Communication has begun with local stakeholders and federal government agencies and these three months will allow time for information gathering, outreach activities to further develop membership of the watershed group and efforts to ensure the diversity of the group. For example, in order to ensure watershed-wide coverage, further investigation



needs to take place to identify local stakeholders, particularly those related to agriculture and industry. This time frame will also allow for structure of meetings to be established and encourage familiarity amongst the group members.

As a self-sustaining, cooperative watershed-wide group that will address water availability and quality issues within the Lake of the Arbuckles Watershed, the proposed Watershed Group will meet the definition of a watershed group as defined in the Cooperative Watershed Management Act. The Watershed Group will represent a diverse array of stakeholders with interests in the watershed including tribal nations, federal and state agencies, commercial industry, local agencies and private property owners. Representatives from these stakeholder groups will identify key water resource issues within the watershed and develop sustainable project concepts, by mutual consensus, for long-term solutions. A focus for the Watershed Group is to serve as a nexus with the USBR for two key reasons: The first is that the Arbuckle Dam was constructed by the USBR. Secondly, the USBR funded the Arbuckle-Simpson Drought Contingency Plan, the primary groundwater source for the Lake of the Arbuckles.

It is anticipated that one Watershed Group meeting will take place under this first activity. At this initial meeting, bylaws and articles of incorporation will be established, an overview of the project goals will be presented, information will be gathered from the stakeholders and the group will work to identify additional stakeholders.

### *Task 2 - Develop Mission Statement*

The second activity, development of a mission statement, will take approximately two months. As this group contains environmental groups and water purveyors, their visions will help form a guideline from which the group will expand. Also, as this project is narrow in scope and the anticipated stakeholder interests have been identified, a two month window offers sufficient opportunity for discussion and to make decisions on a consensus basis.

The watershed group facilitator will organize the stakeholder representatives, coordinate regular meetings and mediate the development of a cohesive vision and mission statement for the Watershed Group. This individual will also serve as a point of contact for the stakeholders to ease communication of water quality/quantity concerns and identify eligibility for future federal and state programs.

The final development of a mission statement for the Watershed Group is anticipated to take one meeting. This meeting will include a review of the project goals, additional information gathering and introduction of any new stakeholders. The mission statement will be finalized and special topics for discussion will be identified for future meetings.

### *Task 3 - Watershed Management Project Concepts*

The third activity, development of watershed management project concepts, will take approximately nine months. This time period will allow the members to identify problems and needs within the Lake of the Arbuckles watershed from existing technical studies, reports and information from local, state and federal organizations as well as local community stakeholders and private organizations. A consultant will be hired to advise on technical issues and to assist in the development of project concepts.

The Watershed Group will meet regularly during the nine month period to identify non-point sources of pollution, brainstorm ideas for improvement and discuss the efficiency and effectiveness of proposed watershed restoration ideas. Special invited speakers will present on topics identified by the Watershed Group. The identification and discussion of these project ideas and management concepts is anticipated to take three meetings.

### *Task 4 - Watershed Restoration Plan*

The fourth activity, development of a watershed restoration plan, will take approximately four months. The development of this plan is crucial, as it will relate to the interests of all stakeholders. This plan will serve as a well-developed guideline for project concept implementation.

The Watershed Group facilitator and consultant will collaborate to develop the final report. The Watershed Group facilitator will be responsible for the non-technical information related to the group participants and meeting minutes. The hired consultant will be responsible for the technical content of the report. Beyond completing the goals of the Watershed Restoration Plan, the intent is to include meaningful projects and goals, eligible for future funding as part of the CWMP Phase II projects, or other sources.

The exploration of these project ideas and conceptual analysis is anticipated to take one meeting. The draft of the watershed restoration plan will be presented at this final meeting as an opportunity for stakeholder input and approval of the plan.

The plan of action for implementing the four activities and the number of planned meetings for each is shown in the Timeline below (Table 2). The total project duration is anticipated to be 18 months.



**Table 2. Project Timeline**

Activity	Project Month																		# of Mtgs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
1) Establish Watershed Group																			1
2) Develop Mission Statement																			1
3) Develop Watershed Management Concepts																			3
4) Develop Watershed Restoration Plan																			1

#### IV. Evaluation Criteria

The following section addresses each evaluation criteria in the order presented in the FOA to assist in review and evaluation of the proposal meeting the goals of the WaterSMART Cooperative Watershed Management Program. There are four main areas in which this proposal will be evaluated: A. Watershed Group Diversity and Geographic Scope, B. Addressing Critical Watershed Needs, C. Implementation and Results and D. Building Resilience to Drought.

##### Evaluation Criterion A: Watershed Group Diversity and Geographic Scope (30 points)

###### *Sub-criterion No. A1. Watershed Group Diversity*

The stakeholders identified to participate in the Watershed Group are comprised of representatives from federal, state and local agencies and organizations. These stakeholder interests include recreation and tourism, the environment, potable water purveyors and industrial water users, livestock grazing, irrigated agriculture production and private property owners.

The Watershed Group will contain a diverse set of stakeholders, including members of the Arbuckle Master Conservancy District (AMCD). The AMCD provides water from the Lake of the Arbuckles to their members, as well as other communities in the region. The member cities include the cities of Wynnewood, Sulphur, Davis and Ardmore. The Wynnewood Refinery, Inc., an industrial water user, is also a member of the AMCD and is identified as a potential member of the Watershed Group. The City of Dougherty used to receive their water supply from the AMCD and is also identified as a potential stakeholder. Dougherty is now getting their water from Murray County RWD #1.

The Lake of the Arbuckles and the Chickasaw National Recreation Area provides a valuable recreation resource with visitors from all parts of the United States, as well as other countries. The National Parks Service and the Nature Conservancy would represent these interests as Watershed Group stakeholders.

Located within the Chickasaw National Recreation Area, the Chickasaw Wildlife Management Area serves the State of Oklahoma's primary objective of the sound management and use of



fish and wildlife resources and would be represented by the Oklahoma Department of Wildlife Conservation.

The Oklahoma Conservation Commission (OCC) monitors the Rock Creek Tributary in the Lake of the Arbuckles Watershed through their Blue Thumb Program. The Oklahoma Conservation Commission's Water Quality Division is responsible for identifying waters impaired by nonpoint source pollution. The OCC Blue Thumb volunteers are expected to participate as stakeholders.

The Mahard Egg Farm is an egg production, livestock grazing and irrigated agriculture producer located in the upstream reaches of the watershed and has been identified as a potential Watershed Group member. Representing agricultural interests, the Mahard Egg Farm also has the potential to help improve water quality in the watershed, as discussed later in this proposal. All of these stakeholders are capable of promoting the sustainable use of the water resources of the Lake of the Arbuckles and improving the functioning condition of the waterbodies through water conservation, improved water quality, ecological resiliency and reduction of water conflicts.

Table 3 provides a preliminary list of potential stakeholders that will be solicited to participate in the Watershed Group. The stakeholders that currently have a working relationship with the Chickasaw Nation are noted in the table. The Chickasaw Nation has collaborated with most of these stakeholders, which will make consensus-based decision-making much easier during Watershed Group activities. The Chickasaw Nation is recognized for community involvement and support of sustainable use of natural resources. This reputation will serve to encourage collaboration with the diverse array of stakeholders across the watershed and aid in resolving potential conflicts.

Additional stakeholders within the watershed will also be identified through the first activity of this project and will include additional private property land owners, land development interests, livestock grazing interests and other irrigated agriculture producers.

Letters of support have been received from the National Park Service - Chickasaw National Recreation Area, Citizens for the Protection of the Arbuckle Simpson Aquifer (CPASA), the City of Sulphur and the Oklahoma Chapter of the Nature Conservancy. These interests support the efforts of the Chickasaw Nation to establish a stakeholder group to address water quality and quantity issues in the Lake of the Arbuckle's watershed. They welcome the opportunity to work proactively with upstream land owners, city managers and the Chickasaw Nation to implement and enhance land-use and water management policies for the watershed.

The letters of support received are noted in Table 3 and are located in Appendix B.

**Table 3. Preliminary List of Stakeholders of the Lake of the Arbuckles Watershed Group**

<b>Category</b>	<b>Stakeholder</b>	<b>Note</b>
<b>Tribal</b>	Chickasaw Nation	
<b>Federal</b>	Chickasaw National Recreation Area/National Park Service	LS,WR
<b>Federal</b>	South Central Climate Science Center	WR
<b>Federal</b>	Environmental Protection Agency	WR
<b>Federal</b>	Gulf Coast Prairie Landscape Conservation Cooperative	WR
<b>Federal</b>	U.S. Fish & Wildlife Survey	WR
<b>Federal</b>	U.S. Geological Survey	WR
<b>Federal</b>	National Resource Conservation Service	WR
<b>Federal</b>	U.S. Army Corps of Engineers	WR
<b>Federal</b>	U.S. Department of Agriculture	WR
<b>Federal</b>	Bureau of Indian Affairs	WR
<b>State</b>	Oklahoma Conservation Commission	WR
<b>State</b>	Oklahoma Climatological Survey	
<b>State</b>	Oklahoma Department of Environmental Quality	WR
<b>State</b>	Oklahoma Department of Wildlife Conservation	WR
<b>State</b>	Oklahoma Rural Water Association	WR
<b>State</b>	Oklahoma Water Resource Board	WR
<b>Environmental</b>	Nature Conservancy Oklahoma Chapter	LS,WR
<b>Environmental</b>	Sierra Club	
<b>Local</b>	Arbuckle Master Conservancy District	WR
<b>Local</b>	City of Sulphur	LS,WR
<b>Local</b>	City of Dougherty	WR
<b>Local</b>	City of Davis	WR
<b>Local</b>	City of Wynnewood	WR
<b>Local</b>	Wynnewood Refinery, Inc	
<b>Local</b>	Mahard Egg Farm	
<b>Local</b>	OCC Blue Thumb Program Monitors	
<b>Local</b>	Citizens for the Protection of the Arbuckle Simpson Aquifer (CPASA)	LS,WR

*Note: LS – Letter of Support; WR – Working Relationship*

#### *Sub-criterion No. A2. Geographic Scope*

The geographic extent of stakeholders discussed in the previous section are shown in Figure 3. The Watershed Group coordinator and facilitator will ensure that the diversity of the Watershed Group members represents the full geographic scope of the watershed through partnering with local, state and federal agencies to identify and recruit additional stakeholders.

These outreach efforts will include public meetings, digital newsletters and recruitment of new members through social media.

Some proposed members of the Watershed Group are located outside of the watershed but rely on the water resources of the Lake of the Arbuckles. The Chickasaw National Recreation Area and Wildlife Management Area comprise a significant area of the lower watershed. The City of Sulphur is a mid-basin stakeholder and another stakeholder has been identified in the upstream reaches of the watershed (Mahard Egg Farm, Inc.). It is anticipated that through planned outreach efforts, additional upstream and headwater stakeholders will be identified.

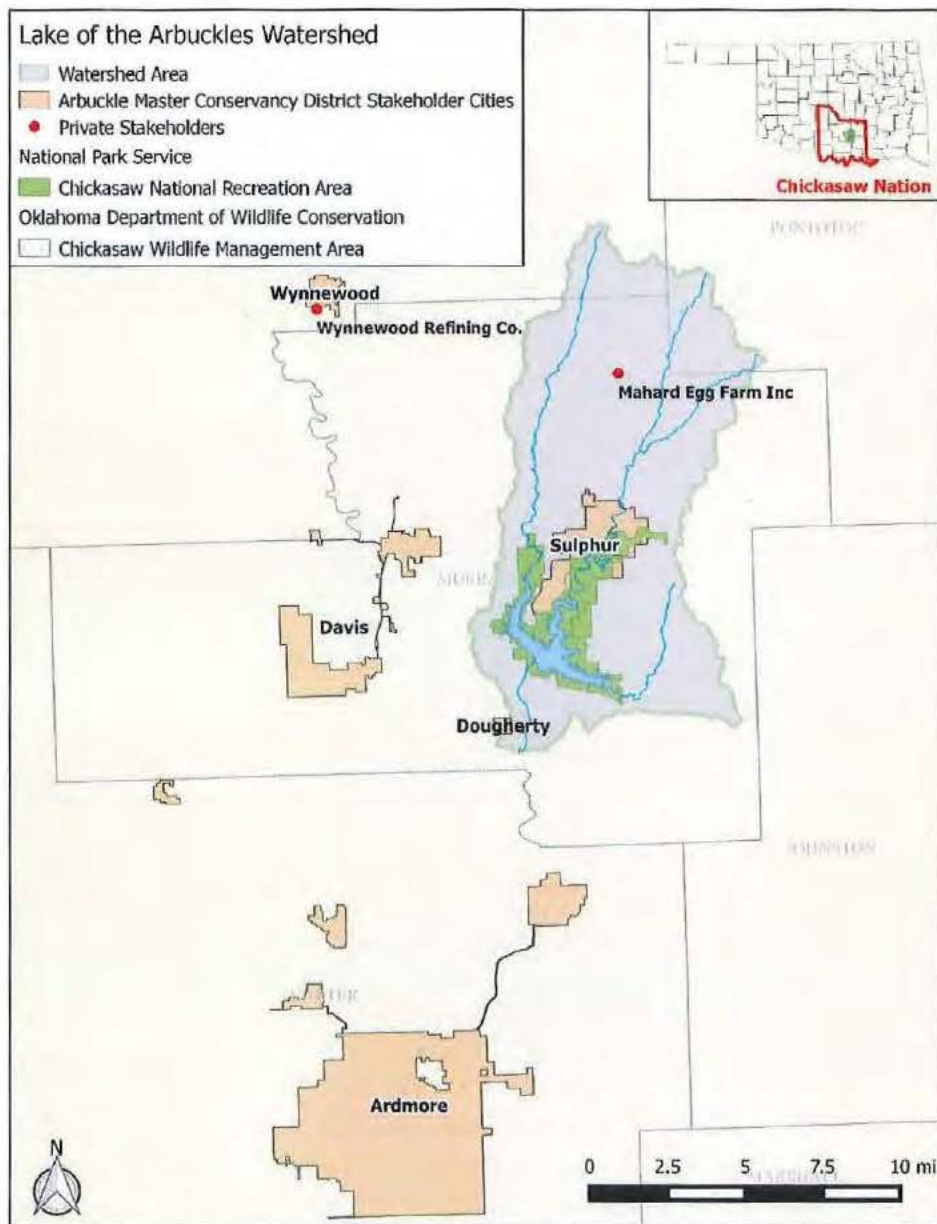


Figure 3. Geographic Extent of Identified Stakeholders



## Evaluation Criterion B: Addressing Critical Watershed Needs (30 points)

### *Sub-criterion No. B1. Critical Watershed Needs or Issues*

The Lake of the Arbuckles watershed is facing critical issues regarding water quantity through increased resource demands, drought impacts and water quality from non-point source pollution.

#### *Water Quantity*

The Arbuckle-Simpson aquifer, which underlies more than 500 square miles in south central Oklahoma, is the principal water source for the City of Sulphur. The aquifer is also the source of a number of important springs in the region, including those in the Chickasaw National Recreation Area. Local residents, citizens' groups and the National Park Service are concerned that large-scale withdrawals of water from the Arbuckle-Simpson Aquifer will cause groundwater levels to decline, which will result in declining flows in streams and springs. Adding to this concern are recent drought impacts that have seriously reduced spring flows. The Bureau of Reclamation is currently supporting the Choctaw and Chickasaw Nations with preparation of a Regional Drought Contingency Plan for the Arbuckle-Simpson Aquifer.

#### *Water Quality*

The Oklahoma Department of Environmental Quality 2014 Integrated Water Quality Assessment report includes the Lake of the Arbuckles on the 303(d) list for not meeting dissolved oxygen standards. The reservoir does not support Fish and Wildlife Propagation which is the suitability of a waterbody to support a full range of fish and wildlife. A TMDL has not yet been conducted for the lake. It is included on the TMDL priority list for 2019.

The Mahard Egg Farm has been fined by the U.S. Environmental Protection Agency (EPA) and the U.S. Justice Department (DOJ) and will pay a \$1.9 million penalty to resolve claims that the company violated the Clean Water Act (CWA) at its egg production facilities in Texas and Oklahoma. The company will also spend approximately \$3.5 million on remedial measures to ensure compliance with the law and protect the environment and people's health.

Mahard's violations have resulted in significant amounts of pollutant discharge to surface waters. Pollutants associated with their poultry operations include nutrients (nitrogen and phosphorus), pathogens and organic enrichment which results in low dissolved oxygen levels. One of their facilities is located in the upper reach of the Arbuckle Lake watershed.

Arbuckle Lake's 303(d) status, lack of TMDL and identified non-point source pollution contributions highlight the need for a local group to address issues at the watershed scale, especially as it relates to potable water supply and impact on the recreational value of the lake.

The Oklahoma Conservation Commission monitors the Rock Creek Tributary at two locations in the Lake of the Arbuckles Watershed through their Blue Thumb Program. The town of Sulphur



has grown in population with development resulting in increased impervious surface runoff from streets, the nearby turnpike and parking lots. The Blue Thumb monitors habitat, biological, chemical and bacteriological assessments and have indicated fish and bug collections that are missing a few of the sensitive species that live in the creek, raising concern for increasing pollution problems. Elevated nutrient concentrations have also been observed.

The Blue Thumb monitors also noted that drought could be the cause of the declines in fish scores. They observed a downward trend in habitat and water quality during the recent 2011-2014 drought. Nutrient loading and climate variability, including increased occurrence of drought and warming are pressures that can change ecosystem dynamics that threaten diversity of fish species of the reservoir.

These critical water quantity and quality issues within the watershed can be addressed by the activities of a new Watershed Group through the identification of watershed management project concepts and the development of a restoration plan. The project coordinator will work with other federal, state and local agencies, non-governmental organizations and other affected stakeholders to discuss what additional critical issues, if any, are also affecting the watershed.

#### *Subcriterion No. B2. Watershed Group Contributions that Address Watershed Needs or Issues*

The Lake of the Arbuckles Watershed Group will be comprised of a diverse set of stakeholders who will work collaboratively to identify, evaluate and resolve water quantity and quality issues within the Lake of the Arbuckles Watershed.

A primary outreach strategy includes leveraging existing working relationships that the Choctaw Nation has with stakeholders in the watershed to create a forum that will enhance collaboration. The Chickasaw Nation is recognized for community involvement and support of sustainable use of natural resources. This reputation will serve to encourage collaboration with the diverse array of stakeholders across the watershed and aid in resolving potential conflicts.

Though the known water management issues critical to the watershed are fairly well documented, information will be gathered about additional issues through outreach to the identified stakeholders, including federal and state agencies.

Grant funds will be used to hire a technical consultant that will assist in the development of the watershed management project concepts and provide technical services such as gathering data from existing studies, mapping and presenting findings and recommendations to the group. The technical support provided by the consultant will ensure that project concepts developed and approved by the watershed group, to address those critical issues in the watershed, will be effective and have a positive impact on the conditions of the watershed. The technical consultant will serve as a liaison between the Watershed Group and federal and state agencies to develop mutually beneficial watershed management project concepts.

A project facilitator will also be hired and will ensure that the focus of the projects concepts will remain aligned with the identified Mission Statement and provide analysis for, but not limited to, the following water management strategies:

- Implementation of existing plans
- Enhanced water conservation
- Improved water quality
- Improved water quantity
- Drought resiliency
- Ecological resiliency
- Reduced potential for water conflicts

### Evaluation Criterion C: Implementation and Results (30 Points)

#### *Subcriterion No. C1—Understanding of and Ability to Meet Program Requirements*

The Lake of the Arbuckles Watershed Group will implement planned activities within an 18-month timeframe. An estimated schedule (timeline) that shows the stages and duration of the proposed work, including major tasks, milestones and dates, is shown in Table 2, in the Project Description section of the Technical Report.

The ultimate result of the establishment of the Watershed Group is to develop a Watershed Based Restoration Plan. In accordance with this, a plan for implementing the proposed scope of work is presented with the following objectives that must be met to complete each of the four activities:

#### *Task 1 – Establish Watershed Group*

- Objective 1 – Form skeleton group with key stakeholders
- Objective 2 – Perform outreach activities to complete Watershed Group with representatives from local groups
- Objective 3 – Establish bylaws and articles of incorporation

#### *Task 2 – Develop Mission Statement*

- Objective 4 – Identify and discuss intersection of stakeholder interests
- Objective 5 – Formulate a mission and vision for Watershed Group

#### *Task 3 – Develop Watershed Management Project Concepts*

- Objective 6 – Identify critical water resource issues in private and public sectors
- Objective 7 – Identify sources and potential solutions of water resource issues
- Objective 8 – Prioritize water resource issues
- Objective 9 – Develop watershed project concept for top ranked water resource issues



#### *Task 4 – Develop Watershed Restoration Plan*

- Objective 10 – Develop outline of watershed restoration plan based on watershed project concepts
- Objective 11 – Implement process and evaluation needed to develop watershed restoration plan
- Objective 12 – Fully develop watershed restoration plan into final report for stakeholder approval

Part of the cost of this project will be shared by the Chickasaw Nation, who will provide the project manager and the project facilitator through in-kind services. The budget proposal lists the cost for each task and these in-kind dollar amounts in Appendix E.

It is anticipated that there will be some challenges with bringing all stakeholders to the table to discuss issues and develop solutions. For example, stakeholders that are currently impacting water quality in the basin and have been cited and fined by regulators may not be enthusiastic about participating. In these cases, our approach to encouraging participation is to present a plan for improving public relations for the stakeholder and identify resources and strategies to assist with operating challenges that are impacting the watershed.

It is also anticipated that a large collaborative effort, bringing together many different interests with varying schedules, will be challenging. Sharing technical information with a large group of diverse stakeholders and organization representatives can also be difficult. These challenges will be eased by using modern technology to schedule meetings and share information. A Watershed Group website will be used to post all relevant documents and reference information that is pertinent to accomplishing the objectives of the Watershed Group and the ultimate goal of developing a Watershed Restoration Plan. Additionally, this website will be used to organize and schedule meetings and post upcoming agendas, meeting locations and times.

The Choctaw Nation has developed a web-based tool called Correlate (<http://aquastrategies.correlate.ene.com/>) that is currently used to share information among participants in their regional water planning process. This platform includes database information, maps, documents and links to other resources that are made easily accessible through an internet browser. This same tool will be employed to maintain communication and information transfer with the Lake of the Arbuckles Watershed Group Stakeholders.

The Choctaw Nation has invested a significant amount of time and money working through regional water planning issues. The Choctaw and Chickasaw Regional Water Plan (CCRWP) includes seven essential principles of focus: Urban, Towns & Rural, Agriculture, Tourism, Drought Preparedness, Sustainability and Unity. The CCRWP effort is based on cooperation, engagement and community participation.



### *Subcriterion No. C2—Building on Relevant Federal, State, or Regional Planning Efforts*

The proposed activities of the watershed group will complement many other water-related ongoing or recently-completed efforts in the watershed by federal, state and local organizations. Some of the more relevant initiatives are described below:

The **Choctaw and Chickasaw** Regional Water Plan will provide communities with the tools and foundations to develop long-term strategies to protect, and if necessary, restore, the integrity of water resources in southeast Oklahoma. The goal of the Choctaw and Chickasaw Regional Water Plan is to build on available water resource data and to perform a careful review and science-based assessment of policy alternatives that will ensure that the region's water resources are sustainably developed and managed for the health and benefit of current and future generations.

The **Bureau of Reclamation** has funded the development of the Arbuckle-Simpson Aquifer Drought Contingency Plan (DCP), work on which has recently commenced. In close proximity to the Lake of the Arbuckles watershed, the Arbuckle Simpson Aquifer covers approximately 500 miles and is the principal source of water for more than 100,000 people. Water from this unique feature supplies water for mining and irrigation and is the source for nearly 100 known springs that are culturally important and generate approximately \$100 million in tourism revenues per year. The area experienced an exceptional drought from 2010 until the spring of 2015, causing significant economic hardship and requiring emergency actions, such as hauling water and drilling emergency wells. A wide range of regional stakeholders, representing numerous sectors, will support the drought planning process. The plan will identify mitigation and response actions that can be implemented at the local and regional levels. The Chickasaw Nation is managing this project.

The Bureau of Reclamation also recently completed an appraisal investigation for the Sulphur Pipeline Regional Rural Water Supply Project to evaluate the potential of constructing a pipeline from Lake of the Arbuckles to the City of Sulphur to serve as a regional water supply. Lake of the Arbuckles was constructed by the Bureau of Reclamation. The lake currently supplies water to Ardmore, Davis, the Southern Oklahoma Water Corporation (SOWC), Wynnewood and the Wynnewood Refinery. The permanent population dependent on public water supply in the area is currently over 50,000 residents; however, at the peak of the tourist season, the population is much higher. The City of Sulphur has a 1,997 ac-ft water allocation from the Lake of the Arbuckles, but has not yet used any of their allocation. The present value of the total projected costs for the water pipeline and water treatment plant is estimated at \$19 to \$21 million.

Every five years, the **Arbuckle Master Conservancy District** (AMCD) develops, in cooperation with the Bureau of Reclamation, a Water Management and Conservation Plan. The latest version is currently under development.



The **Oklahoma Department of Wildlife Conservation (ODWC)** has prepared a Lake of the Arbuckles Fisheries Management Plan that has five objectives, including:

- Maintaining the largemouth bass population
- Maintaining crappie trap netting catch rates
- Addressing aquatic nuisance species through monitoring efforts and public outreach, including the need to provide area managers and/or constituency groups with information that will educate the public regarding aquatic nuisance species
- Protecting and enhancing aquatic habitats to benefit important sportfish and their associated prey species
- Conducting a public outreach highlighting the ODWC's management efforts on Lake Arbuckle and Coordinating the fisheries management activities and results with the Chickasaw National Recreation Area staff

Completely surrounding Lake of the Arbuckles, the **Chickasaw National Recreation Area** managers attempt to “balance the competing demands of its dual mission: providing for a fulfilling visitor experience and preserving the natural resources found in the park, especially the park's *raison d'être*—the area's unique spring waters.”

Oklahoma's Nonpoint Source Management Program and Nonpoint Source Assessment Report does not yet include the Arbuckle Lake Watershed as a priority watershed, because impairments are based on the 1998 303(d) list and the plan has not been updated to include the dissolved oxygen impairment of the lake. The development of a Watershed Restoration Plan by the Watershed Group will be a valuable resource to the **Oklahoma Department of Environmental Quality (ODEQ)** staff during the development of the next update of their NPS Management Plan.

The Oklahoma Comprehensive Water Plan, recently completed by the **Oklahoma Water Resources Department (OWRB)**, contains a wealth of data and policy recommendations for the state and individual watershed planning regions. One of the more interesting recommendations, codified in state law with the passage of House Bill 3055 in 2012, is a statewide goal of consuming no more fresh water in 2060 than was consumed in 2010. The legislation emphasizes the desire to use education and incentives, rather than mandates or regulatory mechanisms, to achieve this goal, which will necessarily involve cooperation and collaboration across the state.

#### Evaluation Criterion D: Building Resilience to Drought (10 points).

Beginning in 2010, large portions of the south central United States experienced an exceptional drought that lasted until early 2015 (see Figure 6). Below average rainfall for the duration, combined with prolonged high temperatures (including the highest average annual temperatures ever recorded for Oklahoma or any state in the nation in 2011), severely depleted the region's stream and spring flow. In September 2011, the whole region, and much

of Oklahoma, was in an exceptional drought situation (see Figure 7). Lake of the Arbuckles, which serves the communities of Ardmore, Davis and Wynnewood and is fed by springs and streams originating in the Arbuckle Simpson Aquifer, was nearly nine (9) feet below normal conservation pool in April 2015 before spring rains brought some relief, eclipsing the previous minimum lake level by a considerable margin. Interestingly, the weather in 2015 was so wet that the lake experienced another new record, this time related to maximum lake elevation—all within the same year.

The effects of this drought were felt throughout the state, specifically by the stakeholders of the Lake of the Arbuckles Watershed and the reservoir itself. Though tourism is the *third* largest industry in Oklahoma, it is the largest industry in southeast and south-central Oklahoma. The tourism industry in this region is based on the abundant water resources. The Bureau of Reclamation did an evaluation of the economic impact of the Chickasaw National Recreation Area and Lake of the Arbuckles, combined, to the local economy and estimated the value at approximately \$100 million per year.

Low lake levels reduce the number of visitors to the region and cause significant financial consequences. The recent multi-year drought deeply affected water levels in the Lake of the Arbuckles and caused concern about lost recreational opportunities and future water availability. Although recent rains have brought the region out of drought, the four years prior caused water levels at the lake to reach record lows. The low lake levels restricted boating in some areas of the lake and forced some boat ramps to close.

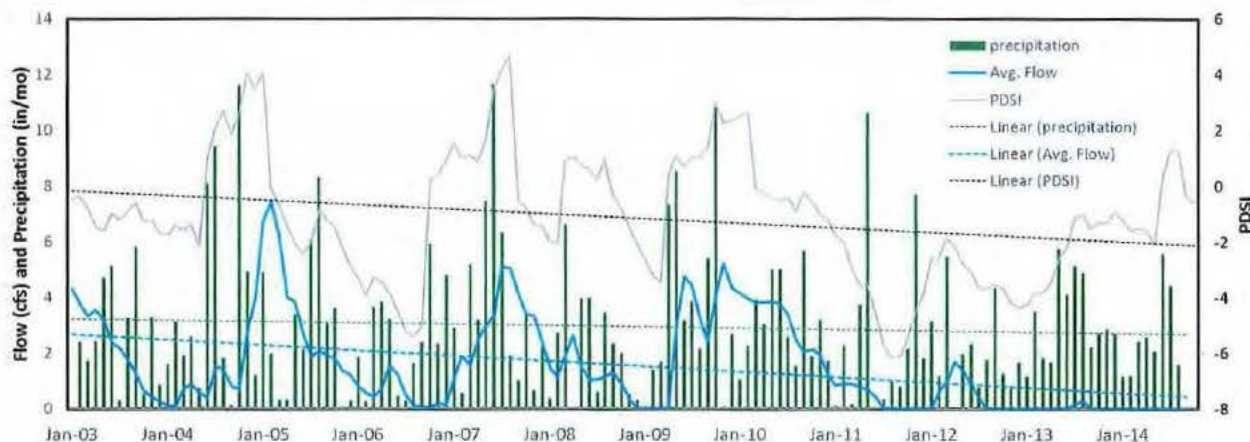
During the drought, popular swimming holes in the Chickasaw NWA were closed, including Little Niagara (see Figure 4).

**Figure 4—Little Niagara swimming hole during the height of the drought.**





Antelope Springs, located within the Chickasaw National Recreation Area, has continuous flow monitoring. Figure 5 shows precipitation, the flow rate of Antelope Springs and the Palmer Drought Severity Index (PDSI) for the time period of January 2003 to October 2014. The spring stopped flowing in mid-2012 and did not start flowing again until the rainfall in May 2015. The Lake of the Arbuckles is largely fed through springs in the watershed and Antelope Springs is indicative of the state of the aquifer across the region. An analysis of the time series of flow and PDSI indicates an alarming trend, with the two being closely correlated (see Figure 5).



**Figure 5. Trends in precipitation, spring flow and PDSI for Antelope Springs.**

Despite all the water emergencies that occurred during this past drought, most communities did not implement any formal water curtailment or conservation. The City of Ardmore, which uses water from the Lake of the Arbuckles, implemented odd/even watering and eventually went to hand-only watering of shrubbery, but even these larger cities do not have formal drought management plans and none of the smaller ones do.



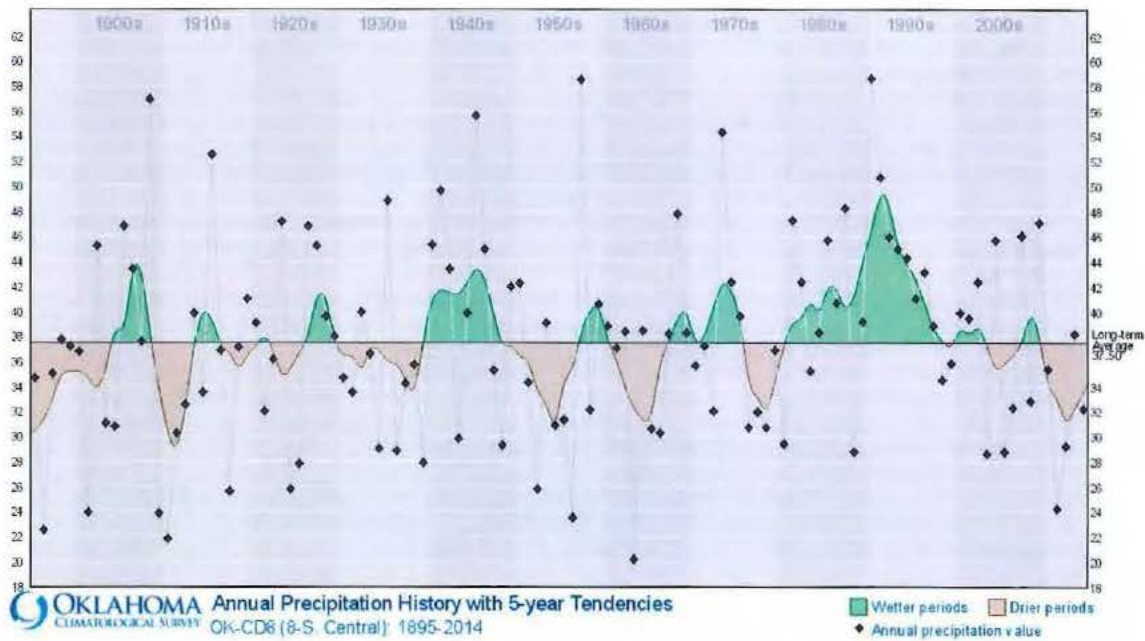


Figure 6. Historical annual precipitation for the South Central region of Oklahoma

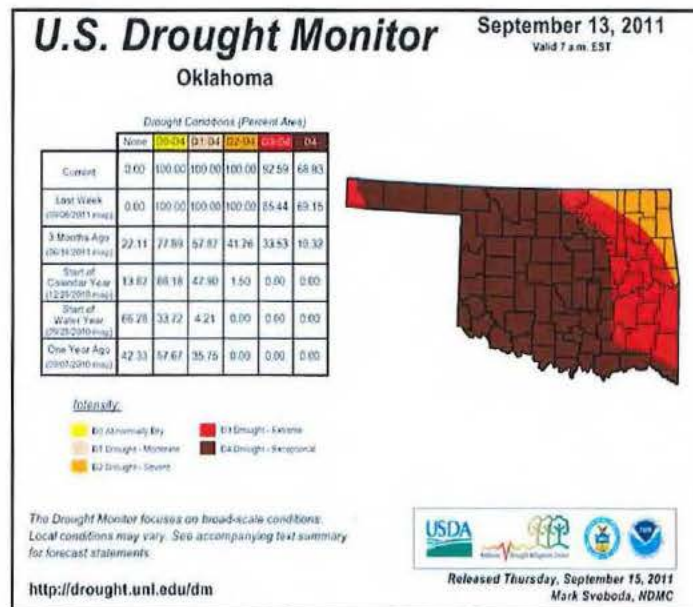


Figure 7. Drought Monitor assessment for September 13, 2011

The Watershed Group's activities will help build a resilience to drought by analyzing recent drought impacts and developing plans to mitigate, or adapt to, drought conditions. The costs and impacts of implementing water management strategies will be estimated to help stakeholders prioritize activities and become educated on what can be done to restore and preserve the watershed. Sustainability, a key word in the Choctaw and Chickasaw Water Resources Plan (CCRWP), will help focus this project. Becoming resilient to drought involves not only an exercise in determining how to increase water supply and reduce demand for water users, but also investigating ways to mitigate and adapt to changing conditions in the watershed.

Nearby, the Bureau of Reclamation is funding the development of a regional Drought Contingency Plan for the users of the Arbuckle-Simpson Aquifer. The lessons learned there, as well as the data collected and the strategies developed, will be shared with the Arbuckle Lake Watershed Group, where common interests and collaborative solutions may evolve.



## V. APPENDIX

- A. Required Permits or Approvals (not applicable)
- B. Letters of Support
- C. Tribal Authority to Apply Letter
- D. Assurances
- E. Budget Proposal
- F. Mandatory Federal Forms

## Appendix B

### Letters of Support





Mr. Darren Olson  
Bureau of Reclamation  
Financial Assistance Services  
Mail Code: 84-27852  
PO Box 25007  
Denver, CO 80225

May 4, 2016

Re: Bureau of Reclamation  
Water Smart: Cooperative Watershed Management Program Grants for FY 2016  
Funding Opportunity: R16-FOA-DO-008

Dear Mr. Olson:

We are pleased to support the Chickasaw Nation on a proposal to establish a watershed stakeholder group to address water quality and quantity issues in the Lake of the Arbuckle's watershed. The long term goal would be the development of a watershed restoration plan which can be submitted to the Oklahoma Conservation Commission for approval. This study should be completed in two years. We would be willing to serve on the task force to help develop this watershed plan.

Sincerely,

*Keith Mann*  
City Manager



Protect Our Water, Protect Our Future

Citizens for the Protection of the Arbuckle Simpson Aquifer  
P.O. Box 882  
Tishomingo, OK 73460  
580-920-6156

Mr. Darren Olson  
Bureau of Reclamation  
Financial Assistance Services  
Mail Code: 84-27852  
PO Box 25007  
Denver, CO 80225

May 4, 2016

Re: Bureau of Reclamation  
Water Smart: Cooperative Watershed Management Program Grants for FY 2016  
Funding Opportunity: R16-FOA-DO-008

Dear Mr. Olson:

We are pleased to support the Chickasaw Nation on a proposal to establish a watershed stakeholder group to address water quality and quantity issues in the Lake of the Arbuckle's watershed. The long-term goal would be the development of a watershed restoration plan that can be submitted to the Oklahoma Conservation Commission for approval. This study should be completed in two years. We would be willing to serve on the task force to help develop this watershed plan.

Sincerely,

Amy Anne Ford, President



April 15<sup>th</sup>, 2016

Mr. Darren Olson  
Bureau of  
Reclamation Financial  
Assistance Services  
Mail Code: 84-27852  
PO Box 25007  
Denver, CO 80225

Re: Bureau of Reclamation Water Smart: Cooperative Watershed  
Management Program Grants for FY 2016 Funding Opportunity: R16-  
FOA-DO-008

Dear Mr. Olson,

We are pleased to support the Chickasaw Nation on a proposal to establish a watershed stakeholder group to address water quality and quantity issues in the Lake of the Arbuckle's watershed. The long-term goal would be the development of a watershed restoration plan that can be submitted to the Oklahoma Conservation Commission for approval. This study should be completed in two years.

The Nature Conservancy is a non-profit organization dedicated to conserving the lands and waters on which all life depends. Our **vision** is a world where the diversity of life thrives, and people act to conserve nature for its own sake and its ability to fulfill our needs and enrich our lives. We would be willing to serve on the task force to help develop this watershed plan.

Sincerely,



Mike Fuhr  
State Director, Oklahoma  
The Nature Conservancy



# Arbuckle Master Conservancy District

STEVEN R. JOLLY  
District Manager

P.O. Box 753  
Davis, Oklahoma 73030  
580/369-3121  
580/369-3202 Fax

April 20, 2016

Mr. Darren Olson  
Bureau of Reclamation  
Financial Assistance Services  
Mail Code: 84-27852  
PO Box 25007  
Denver, CO 80225

Re: Bureau of Reclamation  
Water Smart: Cooperative Watershed Management Program Grants for FY 2016  
Funding Opportunity: R16-FOA-DO-008

Dear Mr. Olson:

We are pleased to support the Chickasaw Nation on a proposal to establish a watershed stakeholder group to address water quality issues in the Lake of the Arbuckle's watershed. The long term goal would be the development of a watershed restoration plan which can be submitted to the Oklahoma Conservation Commission for approval. This study should be completed in two years. Arbuckle Master Conservancy District holds the water rights for this project and is dedicated to protect and preserve the reservoir. I would be more than willing to serve on the task force to help develop this watershed plan with the Chickasaw Nation.

Sincerely,



Steven R. Jolly  
District Manager

## DIRECTORS

JOHN PERRY - Wynnewood  
STEVE CHILTON  
Wynnewood Refining Co.

DEBBIE THOMSON - Davis  
BOBBYE GOWAN - Sulphur

SAM W. BRIMER - Ardmore  
CHRIS SANDVICK - Ardmore  
SCOTT CHAPMAN - Ardmore





United States Department of the Interior  
NATIONAL PARK SERVICE  
Chickasaw National Recreation Area  
901 W. 1st Street  
Sulphur, Oklahoma 73086



IN REPLY REFER TO:

A38-15 (CHIC)

April 6, 2016

Mr. Darren Olson  
Bureau of Reclamation  
Financial Assistance Services  
Mail Code: 84-27852  
PO Box 25007  
Denver, CO 80225

Re: Bureau of Reclamation  
Water Smart: Cooperative Watershed Management Program Grants for FY 2016  
Funding Opportunity: R16-FOA-DO-008

Dear Mr. Olson,

I am writing to support the Chickasaw Nation's Water Smart proposal to establish a watershed stakeholder group to address water quality and quantity issues in the Lake of the Arbuckle's watershed. The long-term goal would be the development of a watershed restoration plan that could be submitted to the Oklahoma Conservation Commission for approval. I believe this project will greatly benefit Chickasaw National Recreation Area and surrounding communities that rely on the Lake of the Arbuckles and its watershed for water supply and recreation. We would be willing to serve on the task force to help develop this watershed plan.

Originally known as Sulphur Springs Reservation, and later renamed Platt National Park, the park was established in 1902 to protect the unique mineral and freshwater springs along Travertine and Rock Creeks. With the addition of Lake of the Arbuckles in 1976, the park became Chickasaw National Recreation Area (Chickasaw NRA). Throughout the legislative history of Chickasaw NRA, the principal purpose of the park has been the preservation of water resources and the provision of public use and recreation.

Chickasaw NRA lies wholly in the Lake of the Arbuckles watershed. The springs, streams, and lakes in Chickasaw NRA are significant resources for tourism and recreation, aquatic and terrestrial ecosystems, and public water supply. These water resources draw many of the 1.2

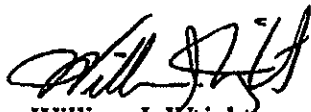
million visitors to the park annually to enjoy water-recreational activities such as boating, water skiing, sport fishing, and swimming, and to enjoy the scenic beauty of the lake. The Lake of the Arbuckles is considered to be one of the best fishing lakes in Oklahoma for catfish, perch, bass, and crappie and is a major attraction that boosts the economy of south-central Oklahoma.

The springs, streams, and lakes in the Lake of the Arbuckles watershed are sustained by groundwater-flow from the Arbuckle-Simpson aquifer. Unfortunately, the quantity and quality of these water resources are threatened by groundwater withdrawals, land uses such as mining and agriculture, drought, and climate change. Lake of the Arbuckles is mesotrophic and phosphorus limited and has periodically not supported the beneficial use of fish and wildlife propagation due to low dissolved oxygen concentrations. Blue-green algae (Cyanobacteria) blooms have occurred in the lake over the last couple of years and have raised concerns about nutrient loading and the lake's trophic status.

National Park Service (NPS) policy is to perpetuate surface waters and groundwater as integral components of park aquatic and terrestrial ecosystems. In addition, NPS policy is to determine the quality of park surface and groundwater resources and avoid, whenever possible, the pollution or other types of degradation of park waters by human activities occurring within and outside of parks.

As Superintendent of Chickasaw NRA, I fully support the efforts of the Chickasaw Nation to establish a stakeholder group to address water quality and quantity issues in the Lake of the Arbuckle's watershed. We welcome the opportunity to work proactively with upstream land owners, city managers, and the Chickasaw Nation to implement and enhance land-use and water-management policies for this watershed.

Sincerely,



William J. Wright  
Superintendent



## Appendix C

### Tribal Authority to Apply Letter (in lieu of Tribal Resolution)







## Appendix E

### Budget Proposal



Chickasaw Nation Budget Proposal FY2016  
WaterSMART: Cooperative Watershed Management Program (CWMP)

