



US Army Corps
of Engineers
Tulsa District

*Supplement to the
Final Environmental Statement (FES)
for the Operation and Maintenance Program at
Wister Lake and Poteau River, Oklahoma*



*Draft Supplemental FES
June 2002*

ACRONYMS AND ABBREVIATIONS

AES	Applied Energy Services	NMFS	National Marine Fisheries Service
CAA	Clean Air Act	NOI	Notice of Intent
cfs	cubic feet per second	NRCS	Natural Resource Conservation Service
CEQ	Council on Environmental Quality	NWI	National Wetlands Inventory
CFR	Code of Federal Regulations	NWPs	Nationwide Permits
CWA	Clean Water Act	OAS	Oklahoma Archaeological Society
DEQ	Department of Environmental Quality	OCC	Oklahoma Conservation Commission
EPA	Environmental Protection Agency	ODEQ	Oklahoma Depart of Environmental Quality
ESA	Endangered Species Act	ODWC	Oklahoma Department of Wildlife Conservation
FEMA	Federal Emergency Management Agency	OTRD	Oklahoma Tourism and Recreation Department
FES	Final Environmental Statement	OWRB	Oklahoma Water Resources Board
FY	Fiscal Year	PILT	Payment in Lieu of Taxes
GAP	Gap Analysis Program	PVIA	Poteau Valley Improvement Authority
IICEP	Intergovernmental and Interagency Coordination for Environmental Planning	SIP	State Implementation Plan
mgd	million gallons per day	TMDL	Total Daily Maximum Load
msl	mean sea level	USACE	United States Army Corps of Engineers
mya	million years ago	USDA	United States Department of Agriculture
National Register	National Register of Historic Places	USFWS	United States Fish and Wildlife Service
NAAQS	National Ambient Air Quality Standards	WMA	Wister Wildlife Management Area
NEPA	National Environmental Policy Act	WRDA	Water Resources Development Act
NGVD	National Geodetic Vetical Datum		

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Prepared for
**U.S. Army Corps of Engineers
Tulsa District**

EXECUTIVE SUMMARY

This Supplement to the Final Environmental Statement (FES) for Wister Lake (1973) describes the potential environmental consequences resulting from operating the Wister Lake project with a conservation pool at 478.0 feet and from raising the conservation pool from 471.6 to 478.0 feet. This Supplemental FES has been prepared in compliance with 33 CFR Part 230 and Part 320 and 40 CFR Parts 1500-1508 for implementation of NEPA.

The Wister Lake project was authorized by the Flood Control Act of 1938 and completed in 1949. The project consists of the lake, dam, and downstream stations on the lower Poteau River to its confluence with the Arkansas River in southeastern Oklahoma. It provides substantial flood control, municipal and industrial water supply, flow augmentation, water conservation, and sediment reduction. Wister Lake and its adjacent lands are also used for recreation, hunting, and wildlife management.

PURPOSE AND NEED FOR THE ACTION

The purpose and need for the action are to comply with Water Resources Development Act of 1996 (WRDA 1996). Since 1973, the authorized conservation pool levels at Wister Lake have been changed by federal law, modifying the amount of storage in the lake allocated for flood control, water supply, and other purposes. The 1973 FES evaluated impacts to the environment from operations with a conservation pool level at 471.6 feet. However, impacts to resources in the surrounding area have not been analyzed since the early 1970s. In order to comply with NEPA, this Supplement to the 1973 FES focuses on the impacts associated with maintaining the permanent pool level at 478.0 feet, as directed by Congress, and continuing current management practices. It also examines the historical impacts associated with raising the permanent conservation pool from its original level of 471.6 to 478.0 feet.

PROPOSED ACTION AND ALTERNATIVES

The proposed action is to operate and maintain the Wister Lake project at the congressionally mandated conservation pool level of 478.0 feet and to provide mitigation measures for resources affected by operations. The no-action alternative is to operate and maintain the Wister Lake project at the present conservation pool level of 478.0 feet, however, adverse effects to resources from raising the pool level or operating the project at 478.0 feet would not be mitigated.

The affected environment for this study consists of Wister Lake and surrounding areas below 511.0 feet elevation and the area along the Poteau River within the 100-year floodplain from Wister Dam to its confluence with the Arkansas River near Fort Smith, Arkansas. Flooding of the downstream areas could

be directly affected by storage at Wister Lake and the release of water at the dam into the lower Poteau River.

ENVIRONMENTAL CONSEQUENCES

This Supplemental FES provides an analysis of the potential environmental consequences resulting from implementing the proposed action. Eleven resource categories received an interdisciplinary analysis to identify potential impacts. Table ES-1 summarizes the results of the analysis according to each resource. According to the analysis, adverse effects occurred to biological and cultural resources. Raising the conservation pool to 478.0 feet resulted in a loss of approximately 3,254 acres of wildlife habitat and approximately 300 acres of waterfowl marsh and greentree reservoirs. Raising the conservation pool has inundated at least 10 archaeological sites. Pool fluctuations and wave action between 471.6 and 478.0 feet have disturbed at least 18 sites and may have affected as many as 36 sites.

MITIGATION MEASURES

Mitigation measures would be implemented for those resources that have had negative impacts from the raising of the conservation pool to 478.0 feet. These impacts are limited to biological and cultural resources. Mitigations for biological resources are based on a USFWS resource study and USACE response (Appendix E) and would include reconstruction of greentree reservoirs and reimbursement to the ODWC for construction of new greentree reservoirs. USACE, Tulsa is consulting with the Advisory Council on Historic Preservation, Oklahoma State Historic Preservation Officer, the Caddo Tribe of Oklahoma, and the Wichita and Affiliated Tribes of Oklahoma to develop mitigation measures to minimize adverse effects of the proposed action on historic properties.

Table ES-1 Impacts from Proposed Action

Resource Chapter	<i>Potential Impacts of Proposed Action</i>	<i>No Action</i>
Hydrology and Water Supply	<ul style="list-style-type: none"> • Increase in conservation pool level to 478.0. • Minimal change in water flow releases. • Minimal change in downstream flooding. • No change to surface or groundwater. • Minor loss in flood control storage (37,532 acre/feet). • Increase in available conservation storage. 	Same
Water Quality	<ul style="list-style-type: none"> • Raising conservation pool has a negligible effect on water quality. 	Same
Air Quality	<ul style="list-style-type: none"> • No change in air quality. 	Same
Biological Resources	<ul style="list-style-type: none"> • Inundation of 3,254 acres of terrestrial wildlife habitat. • Increase of 3,254 acres of aquatic habitat for waterfowl and fisheries. • Loss of 288 acres of waterfowl marsh and greentree reservoirs. • Disturbance and relocation of wetlands and increase of approximately 6,000 acres of open water. • Loss of 2,600 acres of habitat over 100 years. • Increase in the inundation frequency of the original floodplain adjacent to Wister Lake. • <i>Mitigation Measures:</i> reimbursal for loss of greentree reservoirs and construction of new reservoirs. 	Same Impact/No Mitigations
Land Use	<ul style="list-style-type: none"> • Potential increase in recreation use. 	Same
Recreation	<ul style="list-style-type: none"> • Temporary inundation of lower elevation picnic facilities and boat ramps. 	Same
Socioeconomics	<ul style="list-style-type: none"> • Minimal loss of grazing revenue. • No change to socioeconomics. 	Same
Transportation	<ul style="list-style-type: none"> • Temporary flooding of roads. 	Same
Cultural Resources	<ul style="list-style-type: none"> • 18 sites disturbed or destroyed and 10 sites submerged within the 471.6 to 478 level. 18 unevaluated sites may be affected. • 32 sites potentially effected by shoreline erosion between 478 and 485 feet. • 19 sites disturbed or in poor condition above 485 feet elevation by recreational use, vandalism. • <i>Mitigation Measures:</i> On-going consultation would identify appropriate mitigation measures. 	Same Impact/No Mitigations
Hazardous, Toxic, Radioactive Wastes	<ul style="list-style-type: none"> • No change in current operations, will remain in compliance. 	Same
Environmental Justice	<ul style="list-style-type: none"> • No disproportional affects to minorities or low-income populations. 	Same
Protection of Children	<ul style="list-style-type: none"> • Proposed action does not represent health or safety risks to children. 	Same
Cumulative Impacts	<ul style="list-style-type: none"> • No cumulative effects anticipated from other ongoing or proposed actions. 	Same

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CHAPTER 1

PURPOSE AND NEED FOR THE ACTION

1.1 INTRODUCTION

The Wister Lake project was authorized by the Flood Control Act of 1938 and completed in 1949. The project consists of the lake, dam, and downstream stations on the lower Poteau River to its confluence with the Arkansas River. It provides substantial flood control and a municipal and industrial water supply, with additional uses for flow augmentation, water conservation, and sediment reduction. Wister Lake and its adjacent lands are also used for recreation and wildlife management. The lake, dam, and downstream Poteau River are located in southeastern Oklahoma in Le Flore County (Figure 1.1-1). As originally authorized with a conservation pool elevation of 471.6 feet National Geodetic Vertical Datum (NGVD), the lake contained 27,000 acre-feet of water storage within 4,000 surface acres (USACE 1973). Since 1974, the lake's conservation pool has been raised four times, either seasonally or permanently, principally to increase water supply and enhance recreation. The Water Resources Development Act of 1996 (WRDA 1996) instructed the United States Army Corps of Engineers (USACE) to permanently raise the conservation pool to its present elevation, 478.0 feet (NGVD).

Under the National Environmental Policy Act (NEPA) of 1969, environmental documentation addressing the operation and maintenance of the Wister Lake project was prepared and filed on November 19, 1973 (USACE 1973). NEPA was enacted to establish a national policy for the protection of the environment. It requires federal agencies to review their program or activity to determine what effect it has on the environment. The results of that review are published in an environmental document, either an Environmental Impact Statement or Environmental Assessment. The *Wister Lake Final Environmental Statement* (FES), an environmental impact statement, addressed the operation of the lake at a conservation pool level of 471.6 feet. No additional environmental documentation to assess the environmental effects of pool level increases has been produced. Although the pool raises were required by Congress, budgetary constraints impeded the associated environmental impact analysis.

This document, as a supplement to the 1973 Final Environmental Statement (FES), analyzes the impacts and presents recommendations for mitigating the effects of operating the system at the current pool level of 478.0 feet and the historical effects of raising the conservation pool level from 471.6 to 478.0 feet. The effects of this action are examined on environmental, social, cultural, and economic resources of the study area. Resources that will be evaluated include hydrology, geology and soils, water quality, air quality, biological resources, land use, socioeconomic, recreation, transportation, and cultural resources. In addition, environmental justice and protection of children will be evaluated.

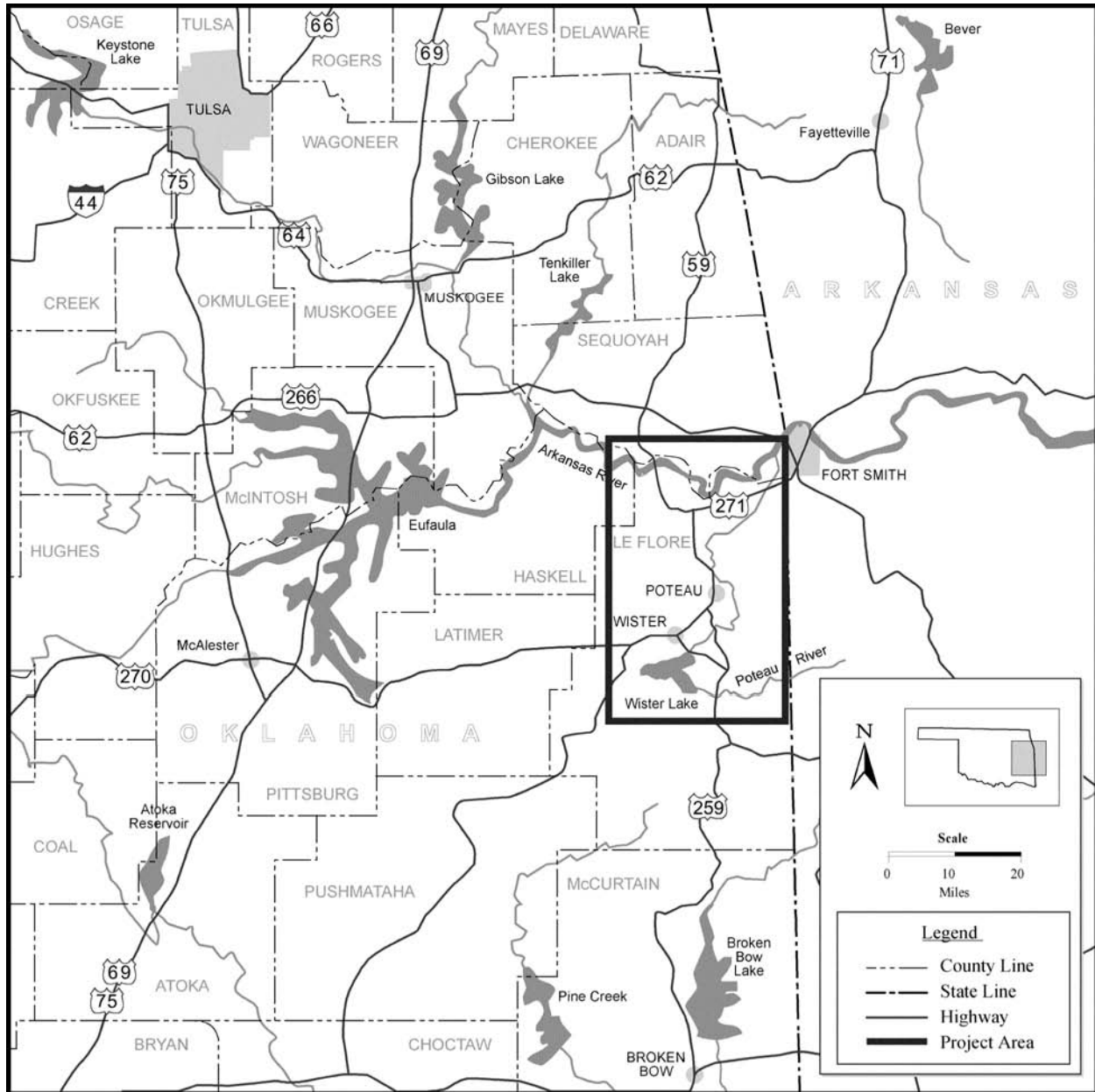


Figure 1.1-1 Regional Location of Project Area

NEPA regulations (Section 1502.14(d)) also require that the alternatives analysis include the no-action alternative. In this case, the no action alternative examines the effects of operating the Wister Lake project with a conservation pool at 478.0 feet but does not contain measures to mitigate past or present impacts to resources.

Environmental analyses addressing the management of the reservoir with a conservation pool at 471.6 are covered under the Final Environmental Statement, Operation and Maintenance Program, Wister Lake,

Poteau River, Oklahoma (USACE 1973). This supplemental FES will examine effects from raising the conservation pool to its present level, as well as on-going environmental effects from the operation of the Wister Lake project. This supplemental FES, when combined with the original environmental statement, will assess all environmental effects from the creation of Wister Lake to the present-day operations of the Wister Lake project .

1.2 LOCATION AND DESCRIPTION OF THE AFFECTED AREA

The affected environment for this study consists of Wister Lake and surrounding areas within an elevation of 511.0 feet and the area within the 100-year floodplain along the Poteau River from Wister Dam to its confluence with the Arkansas River near Fort Smith, Arkansas. Flooding and water storage at the lake and the downstream area are directly affected by storage at Wister Lake and the release of water at the dam into the lower Poteau River.

The Poteau River originates in western Arkansas, flows west into Oklahoma, and then turns north to empty into the Arkansas River near Fort Smith. The river basin is roughly triangular, containing approximately 1,888 square miles, 933 square miles of which drain into Wister Dam. The basin topography is rough, varying from low, rounded hills in the north and northeast to high, mountainous ridges in the central and southern portions of the watershed.

Wister Lake (Figure 1.2-1) has 7,386 acres of surface area, with an average depth of 7.5 feet, and 100 miles of shoreline (USACE 1993). The lake is formed by damming the Poteau River below its convergence with the Fourche Maline Creek, approximately 2 miles south of Wister, 7 miles northwest of Heavener, and 47 miles southwest of Fort Smith, Arkansas. Structures include a 5,700-foot-long earthfill embankment and a 2,400-foot-long earth dike. A 600-foot concrete chute spillway is located between the dike and the embankment. There are six vertical lift gates to regulate flood control releases through the outlet works. Total length of the dam, including spillway and dike, is 8,700 feet.

Operations, maintenance, and management activities (USACE 1979) of the Wister Lake project include the following:

- *Flood Control, Water Supply, and Reservoir Regulation.* Wister Lake provides flood protection for the valley below the dam and added protection along the Arkansas River. The maximum discharge that can occur through the outlet works currently without causing downstream flooding is 7,200 cubic feet per second (cfs). Since 1949, flood control along the Wister Lake system has prevented over \$117 million in damage. The lake also supplies water to the surrounding communities, with a dependable yield of 20 million gallons per day and storage of 14,000 acre-feet.

- *Maintenance of Project with Related Structures and Facilities.* Structures and facilities are maintained in accordance with the *Maintenance Manual, Wister Dam and Reservoir* (USACE 1956). These structures and facilities include the earthen dam, spillway, control works, buildings and grounds, water supply, sewage, electrical system, communications equipment, and vehicles.
- *Land Resource Management.* Lands around the lake have been subdivided into several types—project operations, recreation (high and low density), natural area, wildlife management, reserve forest land, intensive forest management, and fish and wildlife lands. The Oklahoma Department of Wildlife Conservation has license to 33,428 acres for wildlife management and the state of Oklahoma leases 3,000 acres for a state park. Lands may be used for agriculture only on an interim basis, if such use does not deter from operational use, recreation use, or wildlife habitat.
- *Recreation Management.* The recreation management program is focused on the zoning of project lands and water management to provide both fish and wildlife benefits and the operation and maintenance of recreation areas and facilities. It is estimated that the park has more than 375,000 visitors each year.

1.3 BACKGROUND AND PREVIOUS ENVIRONMENTAL DOCUMENTATION

Table 1.2-1 lists the relevant federal laws establishing the reservoir and the conservation pool levels as well as related operations actions. As constructed in 1949, the permanent conservation pool for Wister Lake was 471.6 feet. The original study examining the environmental effects of operating and maintaining the Wister Lake project with the conservation pool at 471.6 feet was published in 1973 (USACE 1973). This environmental statement identified adverse environmental effects from the management of the facility for flood control, resources (forest and wildlife), and recreation. These effects included the following: 1) soil erosion or compaction due to recreational use, traffic in unauthorized areas, and wave action and pool fluctuation on the shoreline; 2) damage or loss of vegetation due to pool fluctuation, mowing, or construction; and 3) alterations to the natural environment from development and construction. The adverse effects were mitigated by planting water tolerant trees and establishing erosion-retarding groundcover along the shoreline, placing rock revetments along the banks of the river immediately below the dam, and zoning of recreation areas to reduce traffic in sensitive areas.

Other adverse effects that could not be completely mitigated included the requirement of a longer time period for the downstream flow to return to normal water levels, (increasing chances of overages in the spillway and downstream flooding), and adverse and irreversible effects on archaeological sites from fluctuating water levels. Alternatives to the management of the Wister Lake project, such as ceasing

flood control or not maintaining recreation facilities, were judged either to be unfeasible or to lead to greater environmental effects than current operations. Therefore these alternatives were not analyzed (USACE 1976).

Table 1.2-1. Laws and Conservation Pool Height for Wister Lake

<i>Year</i>	<i>Action</i>	<i>Conservation Pool Elevation</i>
1938	Flood Control Act passed (Public Law 761); approved construction of dam on Poteau River	
1946-1949	Construction of Wister Lake Dam	471.6 feet (permanent)
1973	Operation and maintenance of Wister Lake project	471.6 feet (permanent)
1974	Operational plan implemented to raise Wister Lake's seasonal pool to 478.0 feet	471.6 feet (permanent) 478.0 feet (seasonal)
1976	Conservation pool level rise to 478.0 from June to December	471.6 feet (permanent) 478.0 feet (seasonal)
1983	Public Law 98-63 directed raising the permanent conservation pool to 474.6 feet and seasonal level to 478.0 feet	474.6 feet (permanent) 478.0 feet (seasonal)
1987	Continue operation of the seasonal pool	474.6 feet (permanent) 478.0 feet (seasonal)
1994	Raise conservation pool from January to May	475.5 feet (permanent) 478.0 feet (seasonal)
1996	Water Resources Development Act (Section 339) permanently raised conservation pool level to 478.0 feet	478.0 feet (permanent)
1997	Notice of Intent to produce supplement to the FES published in Federal Register; public scoping meeting held	478.0 feet (permanent)
2001	Environmental analysis of Wister Lake project resumed	478.0 feet (permanent)

In 1983, *Public Law 98-63* directed the Chief of Engineers to make permanent changes to the conservation pool level at Wister Lake: "Funds for the Wister Lake project, Oklahoma, authorized pursuant to the Flood Control Act of 1938 shall be used to reduce sedimentation impacts by raising the level of the conservation pool permanently by 3 feet and seasonally by an additional 3.4 feet...."

In 1996 the USACE was instructed to raise the conservation pool to 478.0 feet. In the Water Resources Development Act (1996), Section 339 states...

The Secretary (of the Army) shall maintain a minimum conservation pool level of 478 feet at the Wister Lake project in Le Flore County, Oklahoma, authorized by section 4 of the Act entitled 'An Act authorizing the construction of certain public works on rivers and harbors for flood control, and for other purposes' approved June 28, 1938 (52 Stat. 1218). Notwithstanding title I of the Water Resources Development Act of 1986 (33 U.S.C. 2211 et seq.) or any other provision of law, any increase in water supply yield that results from the pool level of 478 feet shall be treated as unallocated water supply until such time as a user enters into a contract for the supply under such applicable laws concerning cost-sharing as are in effect on the date of the contract.

As a result of the directive, USACE conducted a public meeting to solicit concerns about the establishment of the conservation pool at 478.0 feet and began the NEPA process described in this document. Before additional NEPA procedures were completed, the conservation pool was raised to 478.0 feet, as mandated by Congress. Environmental impact analyses were resumed in May 2001.

1.4 PURPOSE AND NEED FOR THE ACTION

The proposed action is to operate and maintain the Wister Lake project at the congressionally mandated conservation pool level of 478.0 feet, to analyze the effects of raising the conservation pool from 471.6 feet to 478.0 feet, and provide mitigation measures for losses to resources affected by the project. The purpose and need for the action are to comply with WRDA 1996. Since 1973, the authorized conservation pool levels at Wister Lake have been changed by federal law, modifying the amount of storage in the lake allocated for flood control, water supply, and other purposes. The 1973 FES evaluated impacts to the environment from operations with a conservation pool level at 471.6 feet. However, impacts to resources in the surrounding area have not been analyzed since the early 1970s. In order to comply with NEPA, this Supplement to the 1973 FES focuses on the impacts associated with maintaining the permanent pool level at 478.0 feet, as directed by WRDA 1996, and continuing current management practices. It also examines the historical impacts associated with raising the permanent conservation pool from its original level of 471.6 to 478.0 feet. The no-action alternative also examines the operation and maintenance of the conservation pool at 478.0 feet as the pool level is congressionally mandated. However, with the no-action alternative, mitigation would not be undertaken for resource losses from past and present operation of the Wister Lake project.

1.5 PUBLIC INVOLVEMENT AND ISSUES

The scoping phase of the environmental analysis process provides opportunities for government agencies, interest groups, and the general public to learn about the proposed action and alternatives. The scoping process also helps USACE identify alternative approaches for meeting the proposal's need and provides an avenue for public input into the resource analysis performed in the draft Supplemental FES.

Official notification of the scoping period began with the publication of the Notice of Intent (NOI) on March 17, 1997, in the *Federal Register* (see Appendix A). Twenty letters from the Intergovernmental and Interagency Coordination of Environmental Planning (IICEP) were sent outlining the USACE proposal and announcing a scoping workshop. Recipients of the IICEP correspondence included federal, state, and local agencies; local elected officials, and interested citizens and groups. The public workshop on the project was conducted on September 30, 1997.

In response to the NOI and IICEP notification, two letters were received, one each from the U.S. Fish and Wildlife Service (USFWS) and the Oklahoma Archeological Society (OAS). The USFWS would like the following issues addressed:

1. Mitigation for adverse impacts to terrestrial wildlife habitat caused by the 1974 and 1983 rises in Wister Lake pool levels.
2. Implementation of a lake-level management plan to benefit both terrestrial and aquatic habitat values on the Wister Wildlife Management Area.

The OAS noted three concerns:

1. There are a number of declared National Register-eligible sites at the lake that would be adversely affected from erosion by lake-level increases.
2. There are a number of sites within the increased pool level to 478.0 feet that have not been evaluated for eligibility. If they were determined eligible for the National Register, then these too would suffer adverse impacts due to raising the pool level at the lake.
3. The actual shoreline affected by the increase has not been comprehensively surveyed for archaeological resources. Thus, unrecorded sites could be disturbed by this flood pool change.

Twenty-one people attended the public workshop. Issues of concern to the public included cultural resources, natural resources (wildlife and vegetation), and transportation.

Additional IICEP letters were sent out to federal, state, and local agencies; Native American Tribes; and congressional representatives in July 2001, when the environmental analysis resumed for this Supplemental FES. The letters announced the preparation of a supplemental environmental statement and asked for comments or questions about the project. Responses were received from the Chickasaw Nation, the Natural Resources Conservation Service (NRCS), the USFWS, the Poteau Valley Improvement Authority (PVIA), Oklahoma State Representative Kenneth Corn, and Oklahoma State Senator Larry Dickerson. The PVIA, Representative Corn, and Senator Dickerson favored the pool at 478.0 feet in order to meet future water supplies for the area. The NRCS was concerned about the environmental effects to wetlands and to fish and wildlife habit from lowering the pool to 471.6 feet. The USFWS identified two federally listed species with the potential to occur at Wister Lake, the American burying beetle and the bald eagle. The Chickasaw Nation did not know of any culturally sensitive or sacred sites in the area. These comments and others derived from scoping were used in preparing this Supplemental FES.

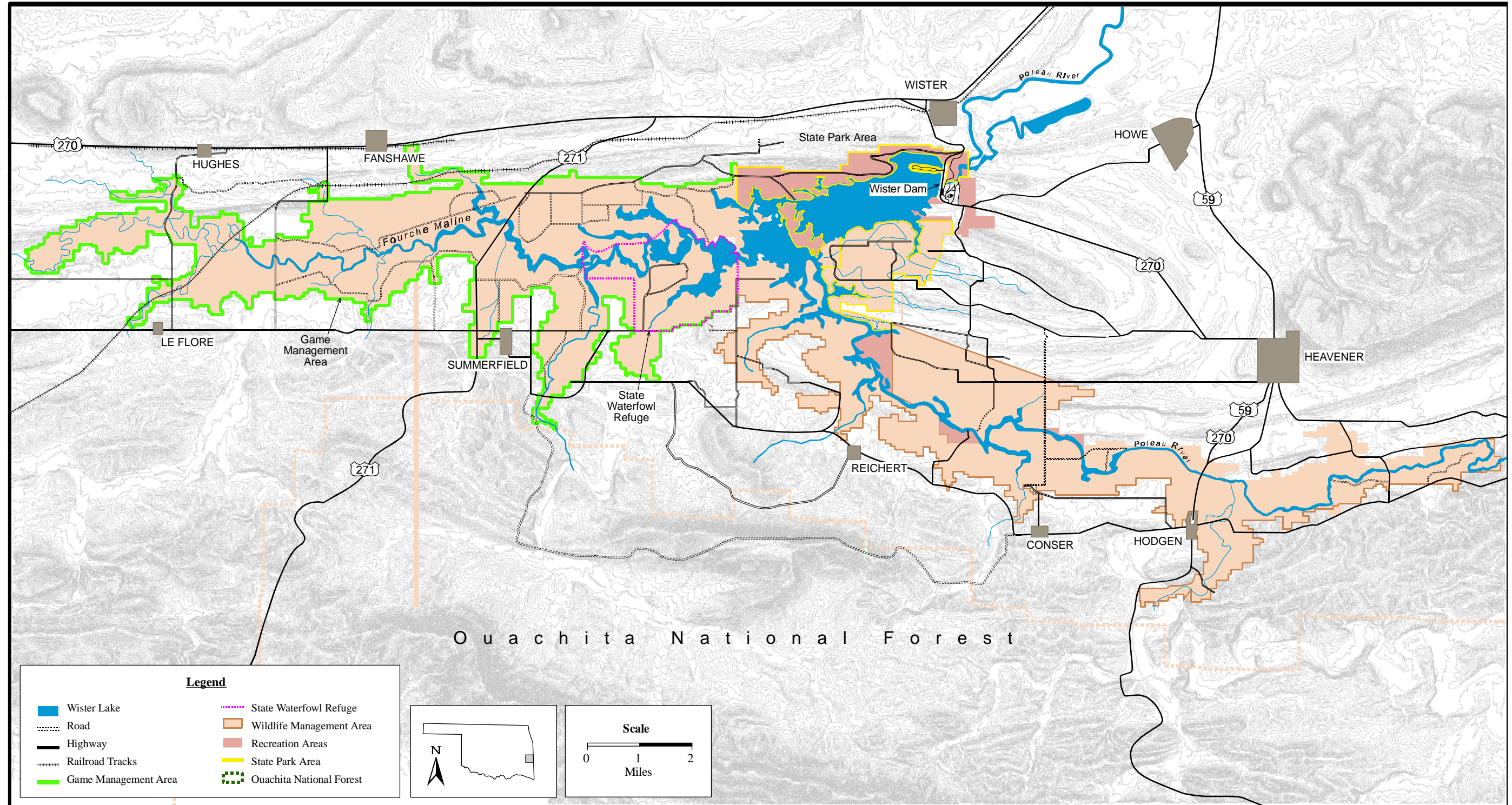


Figure 1.2-1 Wister Lake and Facilities

CHAPTER 2

DESCRIPTION OF ALTERNATIVES

This chapter presents a description of the proposed action and no-action alternative. The proposed action involves maintaining the current operation and management of the Wister Lake project with the conservation pool at 478.0 feet, analyzing historical effects of raising the conservation pool from 471.6 to 478.0 feet, and mitigating for past and present resource loss.

Chapter 2 includes a discussion of the characteristics of the Wister Lake project, including its functions, procedures, and resources, as well as the characteristics of the downstream area along the Poteau River from Wister Dam to the Arkansas River. It discusses reasons for selecting the proposed action and the alternatives considered but not carried forward.

2.1 CURRENT OPERATIONS AT 478.0 FEET AND HISTORIC POOL CHANGES (PROPOSED ACTION)

The proposed action is to operate and maintain the Wister Lake project at a conservation pool level of 478.0 feet and undertake measures to mitigate, or reduce, effects to resources from raising the pool level and from operating it at the current level. The following section describes current operating procedures and the history of conservation pool levels at Wister Lake.

At the congressionally mandated pool elevation of 478.0 feet mean sea level (msl), Wister Lake is a 7,386-acre body of water (Figure 2.1-1) with a shoreline length of 115 miles. The lake has a mean depth of 7.5 feet and a maximum depth of 44 feet. About 933 square miles of watershed drain into the lake above the dam, and the Poteau River runs approximately 61 miles between the dam and the confluence with the Arkansas River (USACE 1993) .

Wister Lake Project

Wister Lake project's primary function is flood control as part of the comprehensive plan for control of floods in the Arkansas River and its tributaries in Arkansas and Oklahoma. Flood control responsibilities include protecting lands in the Poteau River Valley below the dam. The estimated flood damages prevented by the Wister Lake project have a cumulative total of over \$117 million. The lake also functions as the local water supplier, provides water downstream during low-flow periods, and stores water for later use. In addition, the area around Wister Lake is used for public recreation, hunting, and wildlife management.

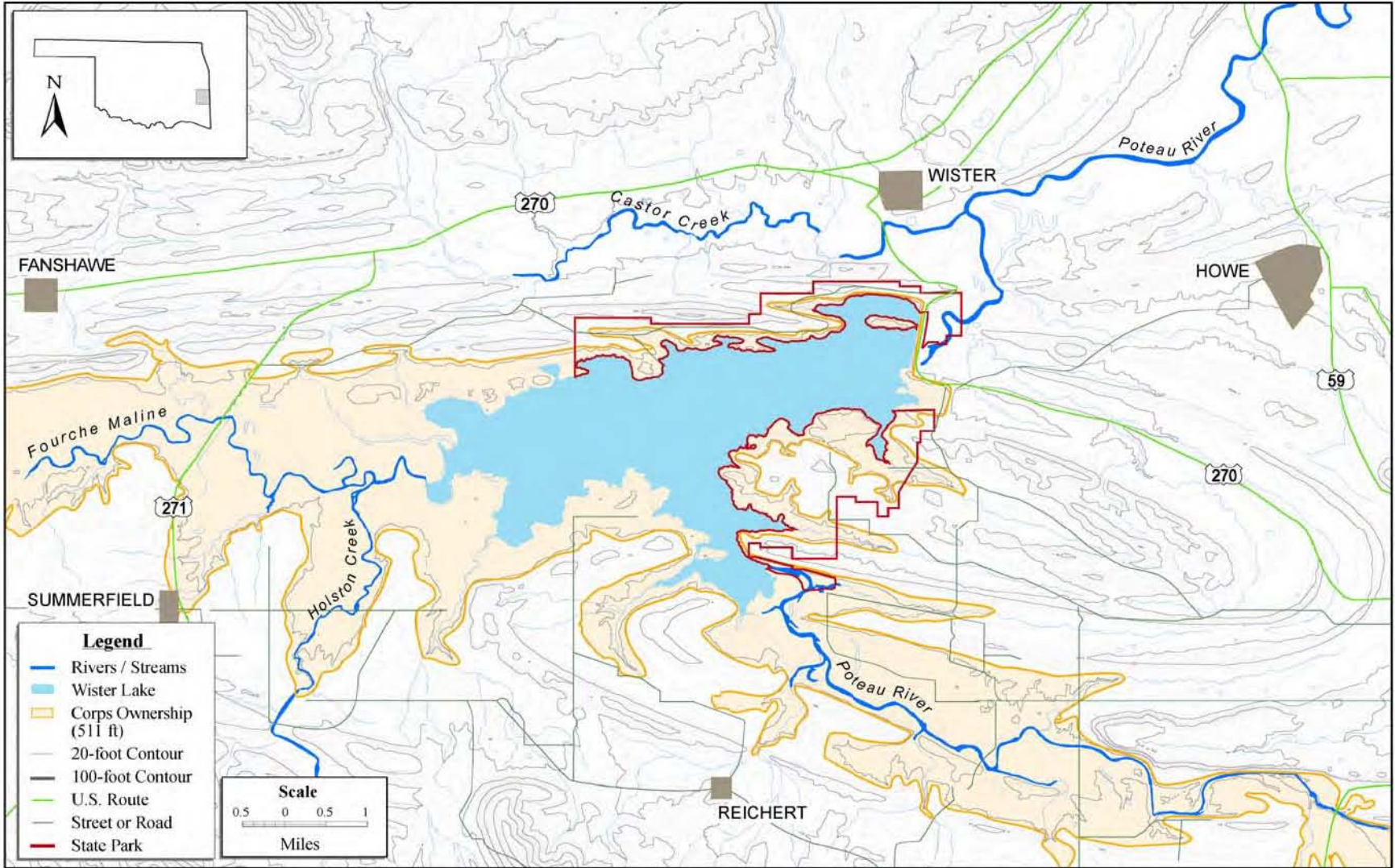


Figure 2.1-1 Current Conditions at Wister Lake Conservation Pool at 478 Feet

The Wister Lake project (USACE 1979) contains the following facilities (Figure 2.1-2).

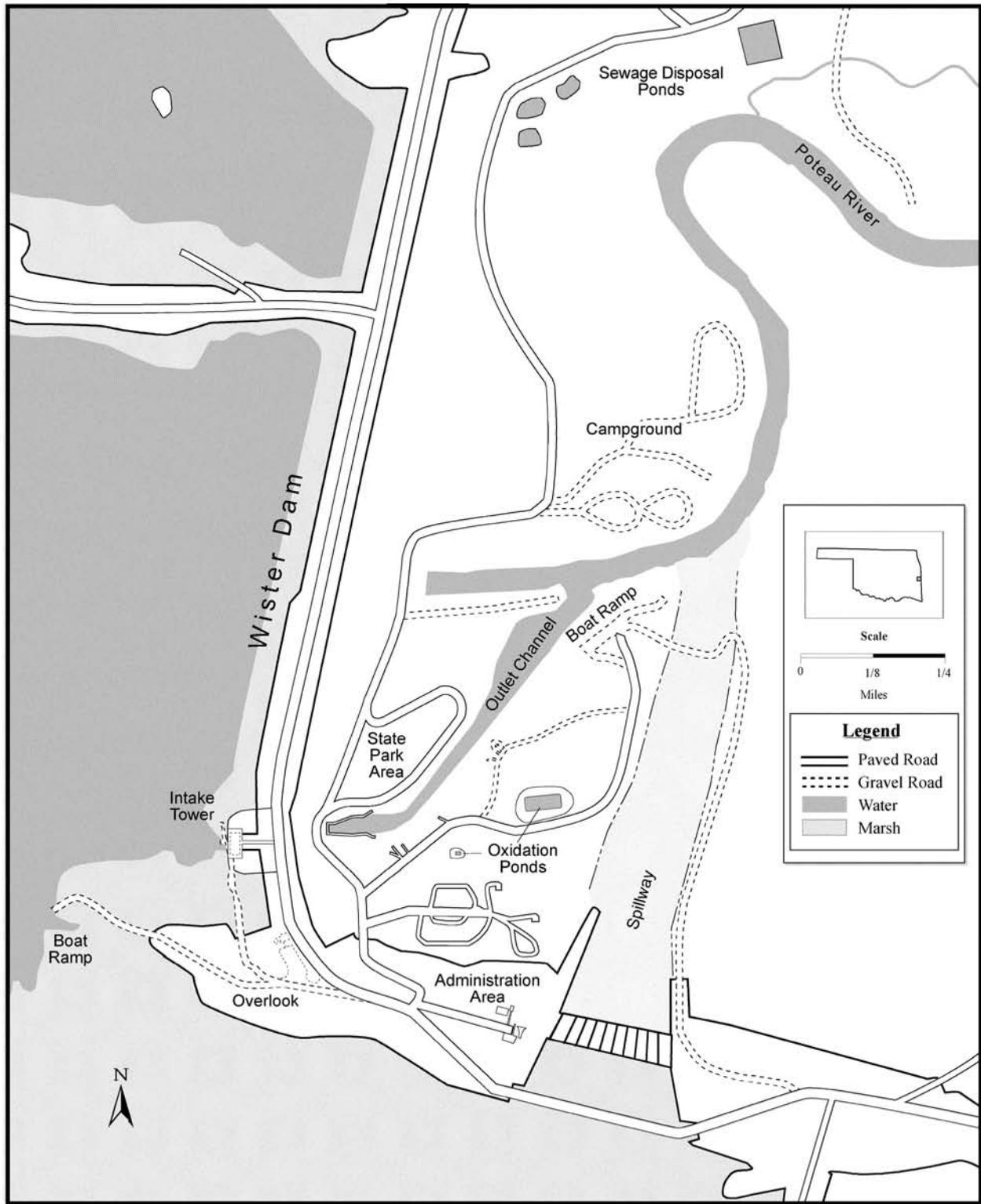


Figure 2.1-2 Wister Dam Site

Embankment: a rolled, earth-filled structure extending across the valley floor. It has a crest length of 5,700 feet and an average height of 68 feet above the valley floor. A paved roadway crosses the top of the dam. A dike near the spillway is designed similar to the main embankment, with a crest length of 2,400 feet and a maximum height of 40 feet.

Spillway: an uncontrolled, chute-type, concrete structure with a modified, broad-crested weir. The spillway crest is 502.5 feet and 600 feet long. The spillway discharges into the river channel about 1,800 feet below the dam.

Outlet works: twin, semi-elliptical conduits, gate tower, gates, and associated facilities, which are located in the valley near the right abutment of the dam. The gate tower is a concrete structure with six 7- by 12-foot tractor-type, vertical lift gates. Flow regulation is provided by means of a 30-inch-diameter conduit with centerline elevation at 450.0 feet. A 12-inch intake with two 8-inch outlets is provided for water supply connections,

All lands below the approximate elevation of 511.0 feet were purchased by the USACE. These lands, from the top of the conservation pool at 478.0, encompass most of the areas subject to reservoir effects, including the backwater of the 50-year flood event in the upper reaches of the reservoir. Elevations of the features of Wister Lake dam and reservoir (USACE 1993) are presented in Table 2.1-1.

Table 2.1-1 Characteristics of Wister Lake under the Proposed Action

<i>Feature</i>	<i>Elevation (feet, msl)</i>	<i>Storage (acre-feet)</i>
Top of dam	527.5	--
USACE land	511.0	--
Top of spillway	502.5	--
Top of conservation pool	478.0	--
Flood control storage	478.0-502.5	365,960
Conservation storage	478.0-468.8	46,557
Sediment pool	Below 468.8	--

Downstream areas are subject to overflow during periods of high water. The overflow area on the Poteau River varies in width from about 1.3 to 1.5 miles in the lower reach. The 100-year floodplain below Wister dam encompasses roughly 45,600 acres.

There are three basic reasons for floods in the downstream area between the dam and the confluence with the Arkansas River.

1. Excessive rainfall in tributaries downstream cause water to back up along the lower Poteau River. These floods can occur whether or not water is released from Wister Lake and are independent of the operations at the Wister Lake project.
2. Water levels exceed the height of the spillway and water flows into the lower Poteau River. In 1987, it was estimated that the flood levels would exceed the height of the spillway (502.5 feet) once in 10 years.
3. A large amount of precipitation falls more than once within a 30-day period. Because of restrictions on the amount of water that can be released downstream, the minimum length of time necessary to empty the flood control storage is 30.6 days. Excessive precipitation on more than one occasion during a 30-day period can result in water over the spillway and flooding along the margins of the lake and downstream of the dam.

Downstream overflow areas include rural and urban lands. The urban lands subject to flood damage are located in Poteau, Oklahoma. Rural properties potentially affected by flood damages include farms and livestock facilities. The principal crops grown in the downstream floodplains are wheat, sorghum, and soybeans.

Historical Changes in the Pool Elevation

As originally constructed, the reservoir at Wister Lake had a conservation pool at 471.6 feet. At this level the conservation pool contained 27,000 acre-feet of water storage and had a surface area of 4,000 acres (Figure 2.1-3). Between 471.6 feet and the top of the spillway at 502.5 feet, there were over 400,000 acre-feet of floodwater storage (Table 2.1-2).

Since 1973, the pool level has been raised four times (see section 1.2), either through an operational plan (1974, 1976) or through federal laws (1983, 1996). The current elevation for the conservation pool is 478.0 feet for all months of the year. However, the conservation pool has been raised to 478.0 feet between June and December since 1976. The pool levels were raised by accumulating inflowing water in the reservoir until the appropriate pool level was reached.

Table 2.1-2 Changes in Water Capacity Storage at 471.6 and 478.0 Feet

<i>Capacity Water Storage</i>	<i>471.6 Feet</i>	<i>478.0 Feet</i>	<i>Difference in Storage (acre-feet)</i>
Conservation storage	9,025	46,557	+37,532
Flood control storage	403,492	365,960	-37,532

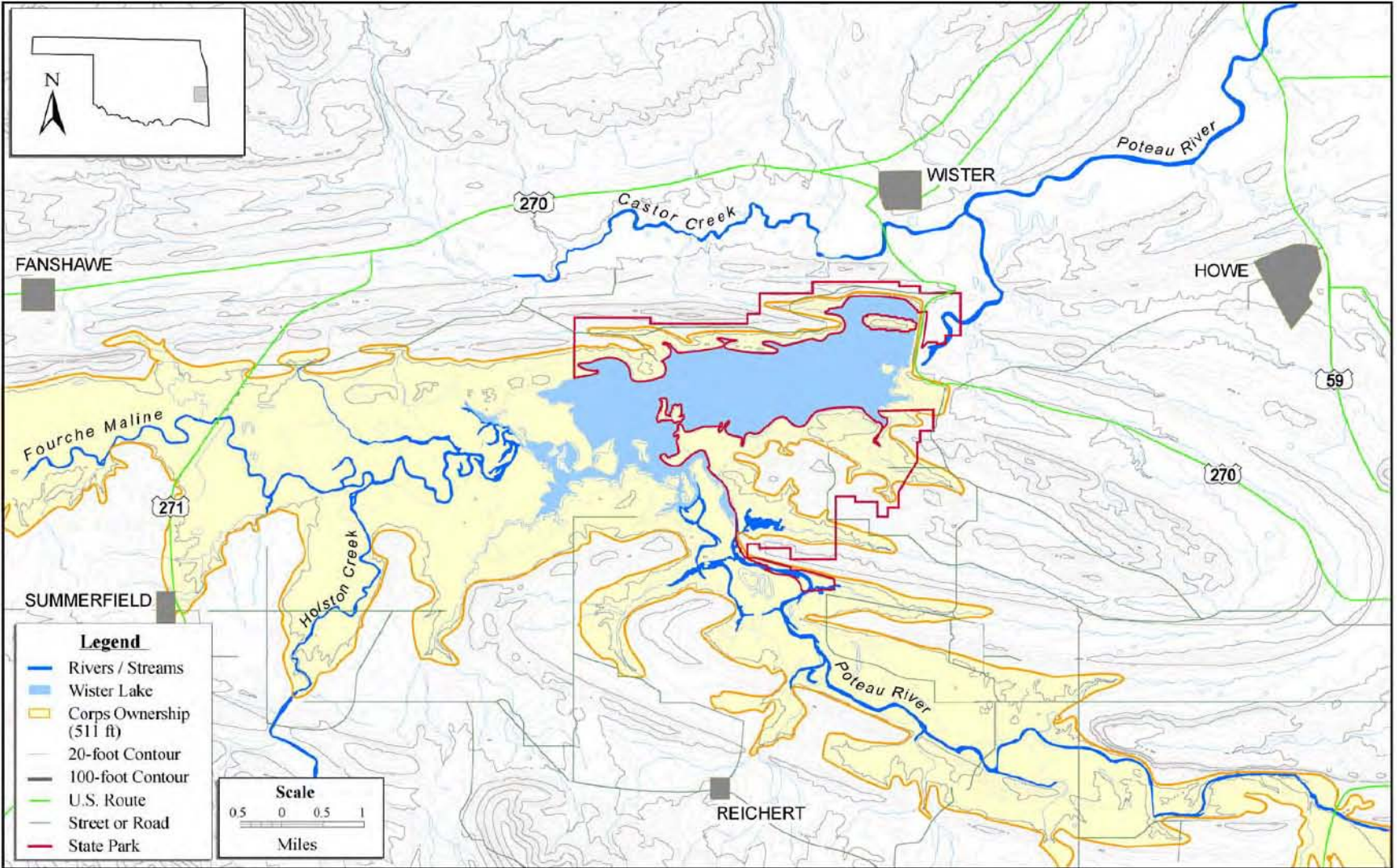


Figure 2.1-3 Wister Lake Conservation Pool at 471.6 Feet

During each of the raises in the pool, the following effects potentially occurred to resources along the shore and in the downstream area.

- Inundation of low-lying acreage on the shoreline with subsequent loss of vegetation, habitat, archaeological sites, grazing leases, and recreational areas
- Pool fluctuations along the new shoreline causing erosion
- Increase in flooding
- Increase in fisheries habitat
- Increase in water storage
- Increase in water recreation availability

Impacts to resources associated with raising pool levels are analyzed in detail under the proposed action. These effects would primarily occur between 471.6 and 478.0 feet around Wister Lake. Measures for mitigating these effects are described at the end of chapter 4.

Current Project Procedures

Procedures for release of flood waters, water supply, and water quality were the same for the conservation pool at 471.6 and at 478.0 feet (USACE 1974).

Flood Control Procedures. The Wister Lake project, operated to provide optimum flood reduction from the dam to the mouth of the Poteau River, is coordinated with the flood control operation of the existing system of lakes on the Arkansas River and its tributaries to Van Buren, Arkansas. The normal procedures provide that certain stages or discharges are not to be exceeded, when practicable, at specified locations below the dam. The stages have been selected because of the likelihood of structural loss above the identified stage. The regulating stations, selected regulation stages, and the corresponding discharges are shown in Table 2.1-3.

Table 2.1-3 Regulating Stages and Stations

<i>Station</i>	<i>River</i>	<i>Regulating Stage (feet)</i>	<i>Regulating Discharge (cfs)</i>
Wister Outflow	Poteau	7.85	7,200
Poteau	Poteau	20	7,823
Panama	Poteau	29	11,496
Van Buren	Arkansas	22	105,000 – 150,000

Factors determining the size of the releases are general climatic conditions, season of the year with respect to probability of floods, and status of crops on low-lying farmlands. The procedures for the release of water from Wister Lake are as follows:

- When the lake level is at or below the seasonal pool level and no flooding is imminent, then release is equal to inflow or the downstream water right requirement.
- When the lake level is at or below seasonal pool level and flood estimates indicate water volume will exceed the available conservation capacity, releases may be made, which when combined with local inflow below the dam, would not produce flooding (i.e., would not exceed the regulating stages in Table 2.1-3).
- When the lake level rises above the seasonal pool level, regulated releases will be made at the maximum rate permissible, but will not produce flows exceeding 7,200 cfs when combined with local inflow. As the precipitation accumulates, the decision to release water is determined by using the height of the water at the downstream regulating stages. If the pool level is at or exceeds 502.5 feet, then discharge will occur at the maximum amount allowable (not to exceed 2,000 cfs in six hours).

At times, the Poteau River basin below the dam does flood despite these procedures. However, flooding associated with water releases from Wister Dam should only occur in extreme flood events when the water goes over the spillway.

Water Supply. As a water supply storage, Wister Lake serves a tri-county area of approximately 40,000 people (USACE 1993). The total water supply available is about 14,000 acre-feet, with a dependable yield of 20 million gallons per day (mgd). The remaining storage of 8 mgd is reserved for sediment accumulation and other conservation purposes. Water supply storage in Wister Lake is under contract and assigned to specified users (Table 2.1-4).

Table 2.1-4 Wister Lake Water Supply Storage Contracts

<i>User</i>	<i>Allocated Storage (acre-feet)</i>	<i>Yield (mgd)</i>
Heavener Utilities Authority	1,600	2.28
Poteau Valley Improvement Authority	4,800	6.85
AES Shady Point, Inc.	7,253	10.36
Total	13,653	19.49

(USACE 2001)

Low-flow Procedures. To satisfy the existing water rights downstream from Wister Lake in low-flow periods, the following procedures were approved in 1957. When the lake level is below the seasonal pool level, up to a maximum of 12 cfs will be released to satisfy the water rights applied for by Poteau, Panama, and Wister. All excess inflows will be stored in the lake until needed.

Water Quality. Releases made during low flows to meet downstream water rights are usually adequate to maintain water quality. Additional requests to release water are handled on a case-by-case basis.

Land Management. Approximately 3,000 acres around the lake have been leased to the state of Oklahoma for state parks. There are five state park areas and three public-use areas around the lake. Recreational facilities consist of roads, cottages, parking areas, trails, boat ramps, picnic developments, and water and sanitary facilities. Concession facilities operated by private interests supply food, bait, and fishing and hunting supplies. An average of 375,000 visitors use the facilities at Wister Lake every year.

Approximately 3,500 acres of the lake and surrounding area are a designated state wildlife refuge. In addition, the ODWC has license to 27,000 acres of lake easement for public use, primarily for upland game management. The nearby Ouachita National Forest comprises 234,326 acres of the lake watershed and is also used for recreation.

In addition to recreation, the USACE administers grazing leases and has leased most of the mineral rights. The mineral rights have not been developed, however.

When the conservation pool is at 478.0 feet, the following effects potentially occur to cultural resources along the shore and in the downstream area.

- Temporary inundation from flood waters.
- Pool fluctuations along the shoreline causing erosion.
- Siltation and burial of resources.

Measures for mitigating these effects (if applicable) are described under the appropriate resource discussions.

2.2 NO-ACTION ALTERNATIVE

The no action alternative reflects the status quo, or baseline conditions. Under no action, the Wister Lake project would continue to operate using current procedures, however, adverse effects to resources from operations or from raising the pool level to its present height would not be mitigated.

2.3 ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD

In the reconnaissance study for the Wister Lake project (USACE 1993), the feasibility of several alternative conservation pool levels were evaluated:

- elevations of 474.6 feet with a seasonal fluctuation to 478.0 feet
- 474.6 feet with no seasonal fluctuation
- 474.6 feet with a year-to-year change in the seasonal fluctuations of the conservation pool

Operating the Wister Lake project with a conservation pool below 478.0 feet would not comply with WRDA 1996. Seasonal fluctuations in the conservation pool were eliminated from consideration because they provide little benefit to fish and wildlife resources. A more stable pool level was considered more favorable to wildlife habitat than increases and declines of seasonal pool operation. A conservation pool at 474.6 feet would only increase water supply by 6,000 acre-feet but not substantially improve flood control. These alternatives were removed from further consideration because they would not meet identified needs or legal requirements.