DEPARTMENT OF THE ARMY
UNITED STATES ARMY CORPS OF ENGINEERS, TULSA DISTRICT
1645 SOUTH 101 EAST AVENUE
TULSA OK 74128-4609

March 15, 2013

REPLY TO
ATTENTION OF

Planning and Environmental Division
Environmental Analysis and Compliance Branch

TO INTERESTED PARTIES

The Tulsa District has assessed the environmental impacts of associated with planned modifications necessary to correct structural deficiencies of Pine Creek Dam, Pine Creek Reservoir, Oklahoma.

The recommended plans would include: 1) modifications to the dam structure by implementing the following combined measures: construction of a new chimney/vertical filter; construction of a cutoff wall within the dam embankment; modification of the downstream filter on the toe of the dam embankment; and permanent joint repair with a steel sleeve pipe inserted into the release conduit; 2) restrict the top of the conservation pool from 438.00 feet to 433.00 feet above National Geodetic Vertical Datum (NGVD); and 3) remove woody vegetation for the establishment of a woody vegetation free zone 70-feet in width and approximately 28,000 feet-long upstream and downstream of the dike extending from the right abutment of the spillway.

Activities associated with structural modification of the dam would not result in net habitat losses. Activities associated with the restriction of the conservation pool from 438.00 to 433.00 FT-NGVD would impact aquatic resources and would result in a temporary loss of 133.2 aquatic habitat units limited to the period 2010-2018 during which the temporary pool restriction is in place. Activities associated with the removal of woody vegetation and re-establishment of a woody vegetation free zone along the dike would result in a loss of 11.5 habitat units of oak-pine forest, however 15.6 habitat units of grass-forb meadow would be established resulting in an average net increase of 2.1 terrestrial habitat units.

This assessment was prepared in accordance with U.S. Army Corps of Engineers Regulations, Part 230, Policy and Procedures for Implementing the National Environmental Policy Act. It has been determined from the enclosed draft environmental assessment that the project will have no significant adverse effects on the natural or human environment.

The Draft Environmental Assessment is enclosed for your review and comments. Comments should be submitted within 30 days from the date of this letter to the Tulsa District, Corps of Engineers, ATTN: Dr. Tony Clyde, Environmental Analysis and Compliance Branch, 1645 S. 101st East Ave, Tulsa, Oklahoma 74128. Comments can be provided electronically to Tony.Clyde@usace.army.mil.

Sincerely,

Jeff Knack
Acting Chief, Environmental
Analysis and Compliance Branch

Enclosure

DRAFT ENVIRONMENTAL ASSESSMENT
PINE CREEK DAM, OKLAHOMA
DAM SAFETY MODIFICATION
&
INTERIM RISK REDUCTION MEASURE IMPLEMENTATION

Public and Agency Review Copy – Approved for Public Release

U.S. ARMY COPRS OF ENGINEERS **15 March 2013**
TULSA DISTRICT

DRAFT FINDING OF NO SIGNIFICAN IMPACT
Draft Environmental Assessment
Pine Creek Dam, Oklahoma
Dam Safety Modification & Interim Risk Reduction Measure Implementation

In accordance with the National Environmental Policy Act of 1969, including guidelines in 33 Code of Federal Regulations, Part 230, the Tulsa District has assessed the environmental impacts of modifications and risk reduction measures necessary to correct structural and maintenance deficiencies of Pine Creek Dam, Pine Creek Reservoir, Oklahoma.

The recommended plans will result in the construction of a vertical chimney filter and vertical cutoff wall through the existing dam embankment; modification of the downstream filter on the toe of the dam embankment; permanent joint repair of the existing release conduit by lining the conduit with a stainless steel sleeve; restrict the top of the conservation pool from 438.00 feet to 433.00 feet above the National Geodetic Vertical Datum (NGVD); and remove woody vegetation to re-establish a woody vegetation free zone along the dike extending 14,000 linear feet from the right abutment of the spillway with a maximum width of 70 feet from the upstream and downstream toe of the dike.

Federal actions associated with structural modification of Pine Creek Dam would not result in any net habitat losses.

Federal actions associated with the restriction of the conservation pool from 438.00 to 433.00 FT-NGVD would impact aquatic resources and would result in a temporary loss of 133.2 aquatic habitat unities limited to the temporary conservation pool restriction period, 2010-2018.

	Habitat	**Species Model**	**Acres**	**HSI**	**HU**	**Cumulative AAHU**	**Net AAHU**
With-out proposed action	Aquatic – Forage Fish	Gizzard Shad	4559	0.2	911.8	638.3	--
	Aquatic – Limnetic/Littoral Predator	White Crappie	4559	0.6	2735.4	1914.8	--
	Aquatic – Benthic Predator	Channel Catfish	4559	0.87	3966.3	2776.4	--
With-proposed action	Aquatic – Forage Fish	Gizzard Shad	4559	0.2	911.8	603.9	(34.2)
	Aquatic – Limnetic/Littoral Predator	White Crappie	4559	0.6	2735.4	1722.7	(192.0)
	Aquatic – Benthic Predator	Channel Catfish	4559	0.87	3966.3	2603.0	(173.5)
		Average					(133.2)

Federal actions associated with the removal of woody vegetation and re-establishment of a woody vegetation free zone would permanently impact 48 acres of oak-pine forest and permanently benefit 48 acres of grass-forb meadow. Woody vegetation removal would result in a permanent loss of 11.5 terrestrial habitat units associated with the oak-pine forest habitat, however habitat value would increase by an average of 2.1 terrestrial habitat units following woody vegetation removal and establishment of a grass-forb meadow within the woody vegetation free zone.

	Habitat	Species Model	Acres	HSI	HU	Cumulative AAHU	Net AAHU
With-out proposed action	Grass-Forb Meadow	Eastern Cottontail	13	0.32	11.2	6.2	--
	Oak-Pine Forest	Hairy Woodpecker	680	0.66	278.8	179.5	--
With-proposed action	Grass-Forb Meadow	Eastern Cottontail	48	0.74	35.5	21.8	15.6
	Oak-Pine Forest	Hairy Woodpecker	632	0.41	259.1	168.0	(11.5)
		Average					2.1

The draft environmental review of the proposed project, which is documented in the enclosed draft environmental assessment, indicates that no significant adverse environmental impacts on the natural and human environments would result from the proposed actions. Therefore, an environmental impact statement will not be prepared.

_____ _____

Date

COL Michael J. Teague
Commander
U.S. Army Corps of Engineers, Tulsa District

ENVIRONMENTAL ASSESSMENT ORGANIZATION

This Environmental Assessment (EA) evaluates the effects of the interim risk reduction measures (IRRM) and dam safety modification study (DSMS) and implementation of the dam safety modification (DSM) at Pine Creek Reservoir located in McCurtain, Pushmataha, and Choctaw Counties, Oklahoma. This EA will facilitate the decision process regarding the proposed action and alternatives.

SECTION 1	*INTRODUCTION* provides the authority for the proposed action, summarizes the project purpose, provides relevant background information, and describes the scope of the EA.
SECTION 2	*ALTERNATIVES* examines alternatives for implementing the proposed action.
SECTION 3	*PROPOSED ACTION* describes the recommended plan.
SECTION 4	*AFFECTED ENVIRONMENT* describes the existing environmental and socioeconomic setting.
SECTION 5	*IMPACTS OF THE PROPOSED ACTION* identifies the potential environmental and socioeconomic effects of implementing the proposed action and alternatives.
SECTION 6	*FEDERAL, STATE, AND LOCAL AGENCY COORDINATION* provides a listing of individuals and agencies consulted during preparation of the EA.
SECTION 7	*REFERENCES* provides bibliographical information for cited sources.
SECTION 8	*APPLICALBLE ENVIRONMENTAL LAWS* provides a listing of environmental protection statues and other environmental requirements.
SECTION 9	*LIST OF PREPARERS* identifies persons who prepared the document and their areas of expertise.
APPENDICIES	A Coordination/Correspondence B Section 404 Permit C Cultural Resources Coordination D Public Information/Scoping Workshop E Public Comments F Newspaper Public Notice(s)

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ENVIRONMENTAL ASSESSMENT
PINE CREEK DAM, OKLAHOMA
DAM SAFETY MODIFICATION

1.0 INTRODUCTION

1.1 Project Authority

This Environmental Assessment (EA) is being conducted under authority of the Flood Control Act approved July 3, 1968, House Document 170 (Public Law 85-500, 85th Congress, S.3901). This EA was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, Engineering Regulation (ER) 1105-2-100 *USACE Planning Guidance Notebook*, ER 200-2-2 *Proceedures for implementing NEPA*, ER 1110-2-1156 *Safety of Dams-Policy and Procedures*, and 40 CFR Parts 1500-1508 *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act.*

1.2 Project Purpose and Scope

In April 2009, it was determined that Pine Creek Dam had potential structural deficiencies. In April 2010 the USACE, Tulsa District implemented a temporary restriction of the approved March 15 through 30 September seasonal pool plan to limit the seasonal top of conservation pool from elevation 442.50 feet to elevation to 441.90 feet to ensure public safety. Following completion of additional investigations, dye testing, and monitoring of instrumentation installed on the dam in April 2011, structural deficiencies of Pine Creek Dam were re-classified from very high risk to extremely high risk. The change in safety and risk classification by the USACE resulted in a temporary conservation pool restriction to elevation 433.00 feet, a reduction in the top of the conservation pool elevation of 5 feet.

Since April 2010, the USACE has formulated and evaluated dam safety modification and repair alternatives, with the purpose of implementing an alternative that permanently reduces the risk of dam failure that also meets the USACE tolerable risk guidelines. The need for this action is to reduce the probability of dam failure and consequently reduce the potential risk of loss-of-life downstream of the reservoir, and economic and environmental impacts within and downstream of the reservoir. Measures have been developed by the USACE, Tulsa District to assess the ability of each repair alternative to meet project needs and authorized project purposes, as well as criteria established that define the level of acceptable risk (see Section 1.6).

1.3 Public Scoping

The Tulsa District issued a news release on July 12, 2010 announcing a public information briefing on July 20, 2010 to present the results of dam safety studies conducted between October 2009 and July 2010 and provide information to the public and all interested stakeholders related to the lowering of the top of the conservation pool from elevation 438.00 feet to 433.00 feet. Subsequent public meetings were held on May 3, 2011 and July 24, 2012. During the May 3, 2011 public information briefing, the Tulsa District presented information regarding the

implementation of interim risk reduction measures (IRRM) and informed the public and interested stakeholders of the re-classification of Pine Creek Dam from very high risk to extremely high risk due to ongoing dam safety issues. During the July 24, 2012 public information briefing, the Tulsa District provided an update on IRRM implementation, maintenance and replacement of the conduit gates, void investigations, and the status and purpose of the Dam Safety Modification Study (DSMS). News releases and informational slides and handouts provided to the public are provided in Appendix D.

1.4 General Background Information

1.4.1 Project Purpose

The pertinent data information presented in the following sections is taken from the Tulsa District Pertinent Data Book (USACE 2004). The authorized purposes of Pine Creek Lake include flood control, water supply, water quality, fish and wildlife, and recreation. Construction of Pine Creek Dam began in February 1963 and the project was placed in operation in June 1969. The conservation pool filled to elevation 438.00 feet on January 7, 1970. All references to elevation are in feet above the National Geodetic Vertical Datum (NGVD).

1.4.2 Project Location and Description

Pine Creek Dam is located on the Little River at river mile 145.3, approximately 5 miles northwest of Wright City in McCurtain County, Oklahoma (Figure 1.1). The Pine Creek Project occupies portions of McCurtain, Pushmataha, and Choctaw Counties, Oklahoma.

1.4.3 Structural Data

The structure is a rolled, impervious earth-filled dam 7,712 feet long that rises 124 feet above the streambed (Figure 1.2, Figure 1.3). The total length of the dam, dike, and spillway is 22,470 feet. The top of the dam embankment is 32 feet wide with a 24-foot-wide, bituminous-surfaced road.

The spillway consists of an uncontrolled, saddle spillway (Figure 1.4). The spillway is a gravity ogee weir based on firm rock at the right abutment (**Note:** right bank/abutment and left bank/abutment are always from the perspective of looking downstream). The weir crest allows for future gates. The gross spillway weir is 608 feet wide with a concrete sill and apron with a design capacity of 246,600 cubic feet per second (cfs). The outlet works (Figure 1.5) located on the right abutment of the river section includes an intake structure, a 13-foot-diameter conduit, a 48-inch low-flow pipe, and a 36-inch water supply static head line. The conduit is controlled by two 5-foot 8-inch by 13-foot hydraulically operated slide gates operated in tandem. Channel capacity below the dam is 8,000 cfs.

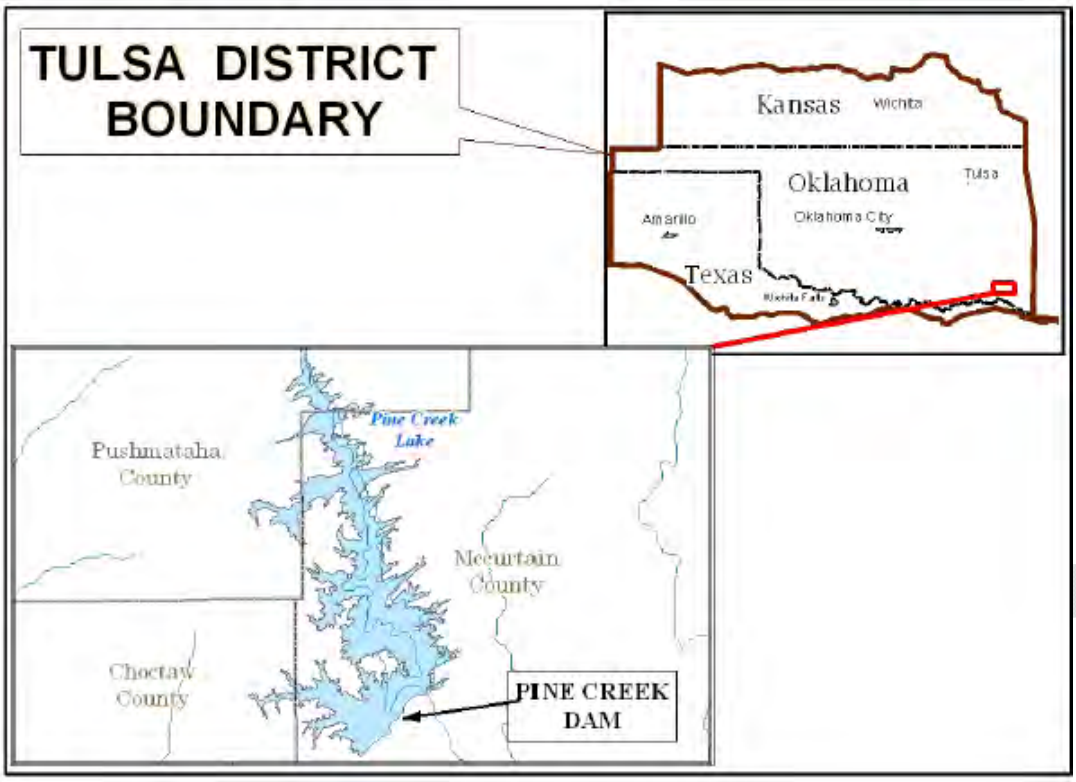

Figure 1.1. Pine Creek Dam vicinity map.

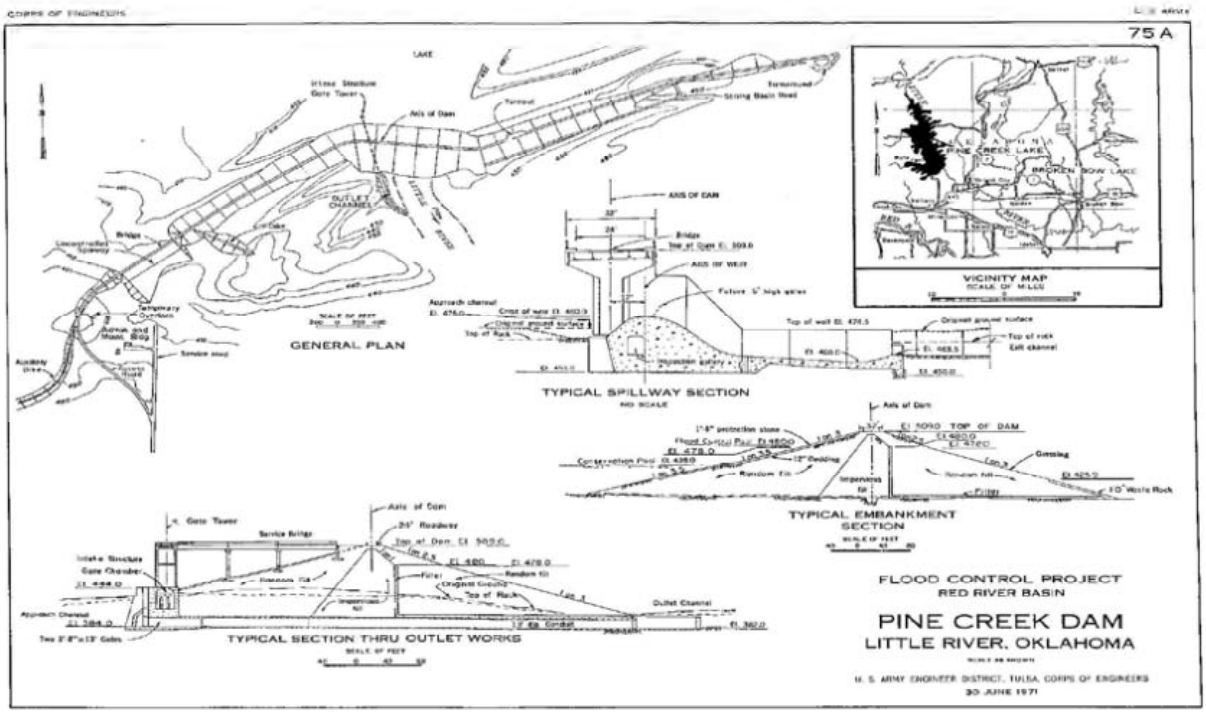

Figure 1.2. Plan view of Pine Creek Dam.

Figure 1.3. Dam Embankment.

Figure 1.4. Uncontrolled spillway.

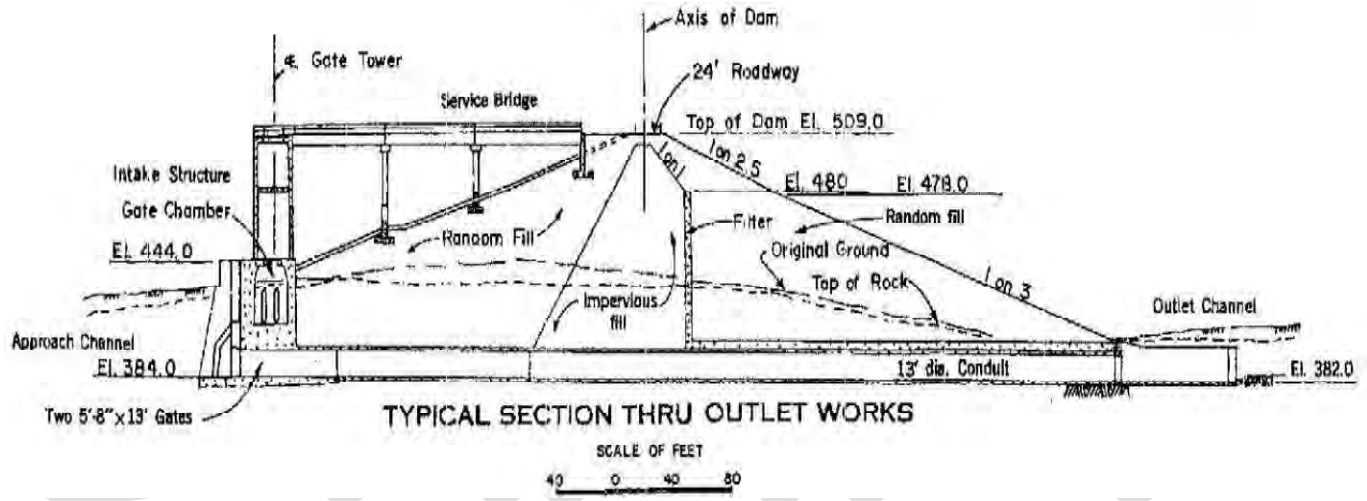

Figure 1.5. Intake structure and typical section through outlet works.

The lower gate tower has a concrete trash rack, a streamlined entrance section, and two 5-foot 8-inch by 13-foot water passageways. Two hydraulically-operated slide gates are installed in tandem in each passageway. A transition section converges the two passageways into a single 13-foot-diameter conduit. The height of the gate tower, from the water passage invert, elevation 384.0 feet, to the top of the service deck is 125 feet. A cylindrical tower with a 26-foot outside diameter extends 65 feet above the base portion to the service deck at elevation 509.0 feet.

A short, flume-type exit structure extends from the conduit section across shale to discharge onto the quartzitic sandstone of the outlet channel. The U-shaped free-standing side walls of the structure extend to elevation 399.0 feet, the height of maximum tailwater. The total length of the exit structure is 52-feet 8-inches. This structure consists of a transition section 47-feet 8-inches long with a U-shaped section 5-feet long at the downstream end.

The conduit is 570-feet 6-inches in length. The invert slopes from elevation 384.0 feet at the transition to elevation 380.0 feet at the exit structure. The conduit is reinforced concrete and of the cut-and-cover type. The concrete monolith joint spacing is 20 feet. The outside diameter of conduit varies from 18 feet at the exit structure to 20 feet under the maximum fill.

1.4.4 Summary of Seasonal Reservoir Operations

Pine Creek Lake is operated as a unit in a multiple-purpose system to best meet authorized project purposes and optimum flood control providing benefits in the Little River Basin and in accordance with releases from Broken Bow Lake, OK and Dequeen Lake, AR.

1.5 History of Dam Seepage

All dams have seepage as impounded water seeks a path of least resistance through the dam and its foundation. Seepage must be controlled to keep a dam safe; if uncontrolled, it can lead to piping, which is the serious condition of internal erosion or movement of water-borne soil materials through a dam. Piping can eventually cause the gradual uncontrolled release of the reservoir or cause a dam to critically fail if not corrected.

Documented seepage along the conduit has occurred since the Pine Creek Dam was completed in June 1969 and has historically been observed emerging behind the wing walls of the outlet works stilling basin. Seepage has been consistent at a rate of 7 to 8 gallons per minute (gpm) with persistent leaks at multiple locations along the conduit upstream and downstream of vertical filter identified in Figure 1.5. Leaking monolith joints were repaired along the conduit in both 1970 and 1976 by drilling grout holes into and through the concrete and pumping cement grout around the exterior of the conduit and into the construction joints (monolith joints). During Periodic Inspection No. 11, conducted by the Tulsa District in September 2009, continued leakage was noted at multiple monolith joints including monolith joints located within the impervious core of the dam as well as within the vertical filter of the dam.

1.6 Recent Risk Analyses

Almost 65 percent of the dams managed by the USACE across the United States are over 30 years old, and 28 percent have reached or exceeded their 50-year design life. Many of these structures are in need of major repair or rehabilitation to ensure their continued safe operations in the future. The foremost concern of the USACE is managing the risks for its dams and protecting the public against the devastation that would be caused by dam failures.

Because the USACE is responsible for the safety of approximately 600 dams, a method was needed to prioritize site-specific dam safety investigations and dam safety improvement investments. To this end, the USACE initiated a Risk Analysis for Dam Safety Program to aid in allocating investments to improve the safety of the large number of dams for which it is responsible. The program has an initial screening-level evaluation called the Screening Portfolio Risk Analysis (SPRA). The SPRA relies on experts to assess the risk of dams in terms of scripted criteria, based upon available information.

Pine Creek Dam was screened by a national risk cadre as part of the FY2009 SPRA. This process rates dam safety by categorizing them in the following five Dam Safety Action Classes (DSAC):

DSAC I	URGENT AND COMPELLING (Unsafe)
DSAC II	URGENT (Unsafe or Potentially Unsafe)

DSAC III	HIGH PRIORITY (Conditionally Unsafe)
DSAC IV	PRIORITY (Marginally Safe)
DSAC V	NORMAL (Safe)

Based upon the FY2009 SPRA, Pine Creek Dam was categorized as DSAC II (Unsafe or Potentially Unsafe). A primary reason for this classification was concern over the structural integrity of the embankment and the potential for failure of the embankment due to seepage and piping along the conduit.

Following completion of additional investigations, dye testing, and monitoring of instrumentation installed on the dam, Pine Creek Dam was re-categorized as DSAC I (Unsafe) on April 19, 2011. A dam with this classification is considered to be critically near failure or at extremely high risk. Critically near failure means progression toward failure is confirmed to be taking place under normal operations from immediately to within a few years without intervention. Extremely high risk means that the combination of life or economic consequences with probability of failure is extremely high. Primary reasons for the current DSAC I classification included failure of embankment due to seepage and piping along the conduit; embankment erosion and potential inadequacy to withstand the probable maximum flood event; total economic consequences of dam failure estimated to be approximately $138,132,000; and rate of piping and seepage through the dam.

1.7 Summary of Interim Risk Reduction Measures (IRRMs)

In response to the risk assessment conducted by the USACE in FY2009 and in FY2011, the Tulsa District implemented various interim risk reduction measures (IRRMs). The primary non-structural IRRM was implementation of an interim water control plan which eliminated the March 15 through September 30 seasonal pool of elevation 442.50 feet and lowered the authorized top of conservation pool from elevation 438.00 feet by 5 feet to elevation 433.00 feet. Lowering the seasonal pool by 9.5 feet and the top of the conservation pool by 5 feet has reduced the hydraulic load on and within the dam to allow risk-improved operating conditions for an interim period until the long-range strategy is developed and implemented, while avoiding significant life and economic impacts within the lake and downstream. Figure 1.6 depicts the elevations for the authorized conservation pool, authorized seasonal pool, and approved IRRM pool restriction.

The Tulsa District has also implemented the following secondary IRRMs to closely monitor the areas of concern and to take rapid action upon evidence of any increase in risk of failure to prevent or reduce the consequences of dam failure.

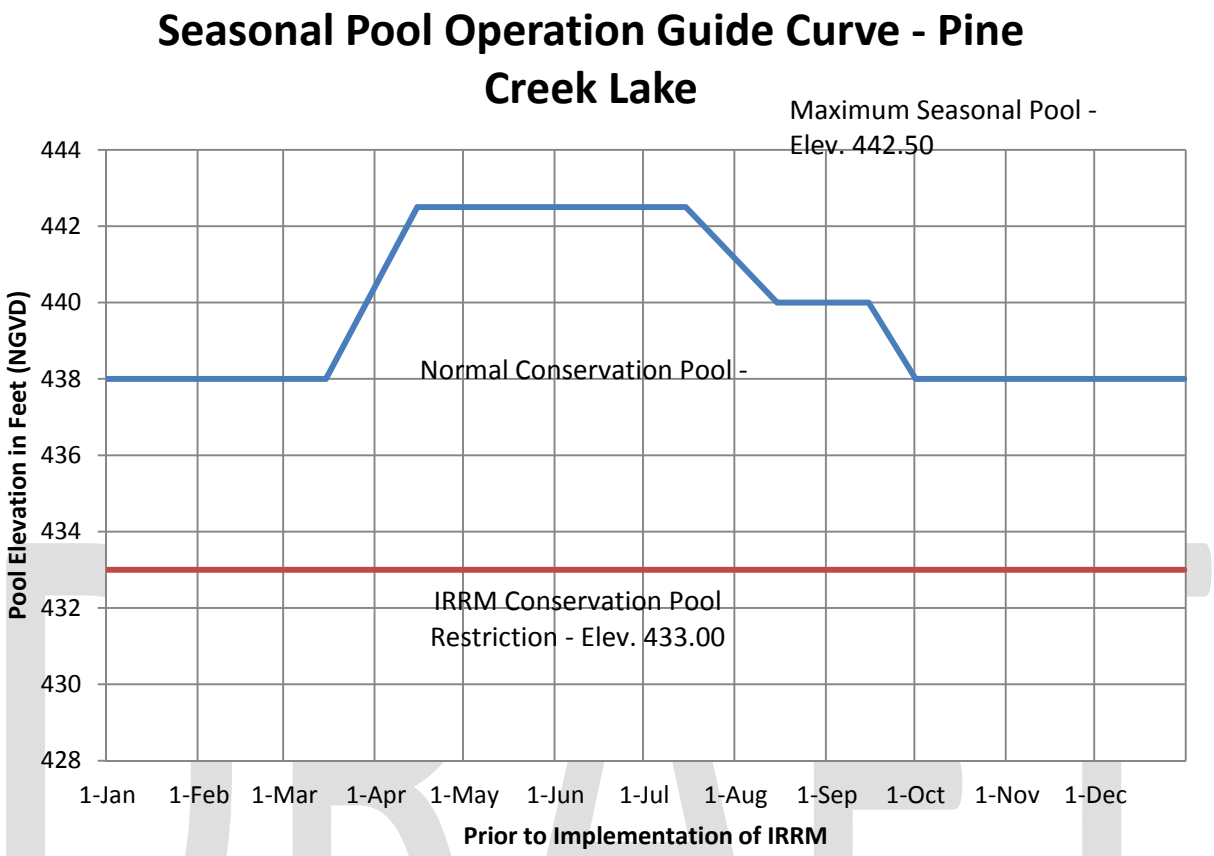

Figure 1.6. Authorized water control plan for Pine Creek Dam.

1.7.1 Non-Structural IRRM

Non-structural IRRM may include any short-term actions to reduce risk without physically modifying the dam or appurtenant structures. The following non-structural IRRM have been implemented.

1. Investigations ($665,000): Geophysical surveys along the conduit, coring into the embankment through the conduit, a dye test, installation of piezometers, cone penetrometer tests, and geotechnical borings have been completed in the vicinity of the conduit.

2. Prepositioning Emergency Stockpiles ($80,000): Emergency stockpiles of rip rap, bedding, gravel, sand, and geotextile have been purchased and stockpiled in accessible locations downstream of the dam.

3. Material Loss Evaluation ($10,000): The upstream depression was investigated with a track hoe. A trench was excavated across the depression to depths ranging from 15 to 17 feet. The embankment material appeared to be well compacted. Embankment fill layers were distinguished by varied colors and elevations were consistent across the trench.

Cracks or voids in the fill were not observed. The depression was determined to be the result of surface disturbance only.

4. Perform Hydraulic Steel Structure Inspection ($5,000): One set of gates consisting of one service gate and one emergency gate, were removed from the gate tower for repair. Inspection and testing of the gates show most of the original welds were defective and replacement of the gates was recommended. A new IRRM has been added to replace both the service and emergency gates.

5. Operational Changes ($10,000): Deviations were approved to lower the pool to an elevation of 433.00 feet from the normal conservation pool of elevation 438.00 feet and seasonal pool for elevation 442.50 feet. This restriction was originally to be in place until the downstream filter was installed (now complete) and the investigation of potential voids was complete.

6. Emergency Action Plan ($10,000): The Tulsa District updated and issued the Pine Creek Dam Emergency Action Plan (EAP) in March 2010. Emergency contacts will be updated as part of the routine dam safety program. Downstream inundation mapping will be completed as part of the ongoing risk assessment. Updated inundation maps will be included in an EAP update once they are complete.

7. Communication Plan ($10,000): An updated communication plan has been developed for the project and communication efforts have been coordinated with District personnel. Risk communication and media training will be implemented for key personnel through the Tulsa District Public Affairs Office (PAO).

8. Increased Surveillance and Monitoring ($5,000): Surveillance and monitoring levels have been revised to:

Weekly	Pools above elevation 420.00 feet
Daily	Pools above elevation 437.00 feet
24-hour	Pools above elevation 443.00 feet

9. Identify Instrumentation Monitoring Thresholds ($10,000): Existing and new piezometers have been automated and thresholds have been established for key piezometers adjacent to the conduit. Automated peizometric levels will be closely monitored during the void verification and filling.

10. Determine Equipment Requirements ($10,000): A small backhoe has been purchased for the project and the project office has verified local contractors will provide equipment and operators during an emergency.

11. Emergency Contracts Plan ($5,000): The lake office has identified local contractors to respond in an emergency using a credit card purchase. If an additional contract is required, the Contracting Chief will execute emergency contracts.

12. Emergency Exercises ($25,000): An emergency exercise with state and local governments was conducted on October 20, 2010. Additional exercises will be held in the future.

13. Fail Safe Communications/Warning System ($25,000): This IRRM has been completed. The project personnel have land phone lines, cellular phone lines, and vehicle and hand held radios with ability to communicate with the District Office. A new 400-foot tower has been constructed at the project office. A portable generator is available and can be used to power a base radio in the project office.

1.7.2 Structural IRRM

Structural IRRM generally require a physical modification to the dam or appurtenant structures that often can be incorporated into the permanent solutions. The following IRRMs have been implemented as structural IRRMs:

1. Inverted Filter ($730,000): An inverted filter consisting of fine filter sand, coarse filter material, bedding material, and rip rap was completed in March 2011. The top elevation of the filter was extended to the estimated top of the void elevation.

2. Vegetation Removal ($20,000): Removal of vegetation on and near the toe drain discharge was completed along with removal of vegetation near the downstream toe of the dam and the upstream slope of the right embankment in April 2011. This IRRM allows improved surveillance and monitoring and access during an emergency.

3. Downstream Access Road ($160,000): Access roads along the downstream toe of the dam have been repaired and constructed along the entire length of the embankment.

4. Void Verification and Filling ($570,000): Voids encountered adjacent to the conduit near the chimney filter have been verified and filled with granular material to reduce the probability of unsatisfactory performance or failure by reducing migration of material surrounding the conduit leading to a piping failure.

5. Replace Service and Emergency Gates ($2,500,000): The existing two service and two emergency gates where in poor condition with failed welds and other deficiencies. New service and emergency gates have been placed on the outlet structure.

2.0 ALTERNATIVES

The Tulsa District formulated several Dam Safety Modification (DSM) alternatives that include non-structural measures and structural modifications, ranging from a "No Action" alternative defined as continued normal operation of the reservoir in its current condition to total removal of the dam. Descriptions of the DSM alternatives are presented below in Section 2.1.

The Tulsa District has also opted to assess, within this environmental assessment, the effects to the human and natural environment associated with the temporary implementation of an Interim Risk Reduction Measure (IRRM) pool restriction to an elevation of 433.00 feet for a period of 10 years (2010 – 2020) and the re-establishment of a minimum 50-foot wide woody vegetation free zone along the upstream and downstream toe of the dike which extends from the right abutment of the spillway for a distance of approximately 14,000 feet to the west-southwest. While these additional activities are actions being taken by the Tulsa District to address dam safety related issues of Pine Creek Dam and Reservoir, the IRRM pool restriction and re-establishment of the woody vegetation free zone along the dike are not actions included in the Dam Safety Modification Study being conducted by the Tulsa District. Descriptions of the alternatives assessed for the IRRM pool restriction action are included in Section 2.2 and descriptions of the alternatives assessed for the re-establishment of a woody vegetation free zone along the dike are included in Section 2.3.

2.1 Dam Safety Modification Study (DSMS) Alternatives

Alternatives for the Dam Safety Modification Study (DSMS) were formulated from eleven structural and non-structural elements initially identified in order to develop alternative Risk Management Plans (RMPs) and include:

Element 1 - Grouting full length of dam
Element 2 - Grouting downstream of the chimney filter
Element 3 - Grouting of the foundation rock
Element 4 - Install new chimney/vertical filter
Element 5 - Install full-depth cutoff wall
Element 5a - Install a modified cutoff wall
Element 6 - Permanently lower the conservation pool to elevation 433.00 feet
Element 7 - Full replacement of the dam embankment
Element 8 - Replacement of the downstream only portion of the dam
Element 9 - Construction of a permanent downstream filter
Element 9a – Construction of a modified downstream filter
Element 10 - Permanent joint repair, new seal and waterstop
Element 11 - Permanent joint repair, steel pipe sleeve in the conduit

Following plan formulation review by the USACE Dam Safety team on June 20 and 21, 2012, Element 5 and Element 9 were modified, creating Element 5a and Element 9a. Element 5a is a modification of the Element 9 cutoff wall so that it could be applied in conjunction with elements

4 and 9a. Element 9a is a modification of the Element 9 permanent downstream filter to allow for reduced construction risk and increased stability of the filter.

ER-1110-2-1156 Safety of Dams – Policy and Procedures, dated October 28, 2011, requires specific structural and non-structural alternatives to be incorporated into DSMS's. In addition, the Tulsa District formulated and evaluated multiple structural and non-structural alternatives. The DSMS alternatives considered are presented in the subsections 2.1.1 through 2.1.15.

2.1.1 No Action Alternative

This alternative would include the continued operation of the reservoir as currently authorized and the "No Action" alternative is defined as making no internal repairs to the dam, regardless of its condition.

2.1.2 Make IRRM Permanent

This alternative would make all non-structural IRRM (Section 1.7.1) and structural IRRM (Section 1.7.2) permanent, including lowering the top of the conservation pool permanently to an elevation of 433.00 feet. No seasonal pool would be authorized. Continued monitoring of piezometers and increased surveillance schedule would be required.

2.1.3 Remove Dam

This alternative would include the removal of Pine Creek Lake Dam to the extent necessary to ensure run-of-river conditions at all times. A significant portion of the embankment would be removed and stable slopes created on what remained of the embankment. The excavated fill would be placed in upland areas and disturbed areas would be re-vegetated.

2.1.4 Replace Dam

This alternative consists of a new dam downstream of the existing Pine Creek Dam on a fully treated foundation. Construction and risk evaluations were based on the original construction quantities and the assumption that the embankment would be rebuilt as originally designed.

2.1.5 Non-Structural Plan 1

This alternative would consist of permanently lowering the top of the conservation pool to an elevation of 384.00 feet and would eliminate the conservation pool, utilizing the reservoir as a flood water detention facility.

2.1.6 Non-Structural Plan 2

This alternative would include improvements of the Emergency Action Plan (EAP) to include emergency broadcast system (EBS) implementation, addition of emergency sirens downstream of the reservoir and dam, and an auto-dial telephone system to notify individuals by phone in the event of a dam failure.

2.1.7 Non-Structural Plan 3

This alternative would include improvements of the Emergency Action Plan (EAP) and acquisition of additional real estate for downstream flowage easements. EAP improvements would include emergency broadcast system (EBS) implementation, addition of emergency sirens downstream of the reservoir and dam, and an auto-dial telephone system to notify individuals by phone in the event of a dam failure. Real estate acquisitions would include approximately 74,456 acres and 266 structures likely to be impacted by a dam failure for a distance of 60 miles downstream of Pine Creek Dam.

2.1.8 Non-Structural Plan 4 + Structural Components of Alternative 7

This alternative would include improvements of the Emergency Action Plan (EAP) and phased implementation of Alternative 7. EAP improvements would include emergency broadcast system (EBS) implementation, addition of emergency sirens downstream of the reservoir and dam, and an auto-dial telephone system to notify individuals by phone in the event of a dam failure. Structural Alternative 7 would include phased implementation of structural Elements 4, 5a, 9a, and 11. Phased implementation would be planned over a four-year period with EAP improvements in fiscal year 2015, implementation of Elements 4 and 5a in fiscal year 2016, implementation of Element 9a in fiscal year 2017, and implementation of Element 11 in fiscal year 2018.

2.1.9 Structural Alternative 1

Alternative 1 would combine Element 5, full-depth cut off wall, and Element 10, permanent joint repair of the conduit with new seal and waterstop.

2.1.10 Structural Alternative 2

Alternative 2 would combine Element 8, downstream embankment replacement, and Element 10, permanent joint repair of the conduit with new seal and waterstop.

2.1.11 Structural Alternative 3

Alternative 3 would combine Element 5, full-depth cutoff wall, and Element 11, permanent joint repair of the conduit with steel pipe sleeve.

2.1.12 Structural Alternative 4

Alternative 4 would combine Element 8, downstream embankment replacement, and Element 11, permanent joint repair of the conduit with steel pipe sleeve.

2.1.13 Structural Alternative 5

Alternative 5 would combine Element 7, upstream and downstream embankment replacement, and Element 11, permanent joint repair of the conduit with steel pipe sleeve.

2.1.14 Structural Alternative 6

Alternative 6 would combine Element 4, new chimney/vertical filter, Element 9, construction of permanent downstream filter, and Element 11, permanent joint repair of the conduit with steel pipe sleeve.

2.1.15 Structural Alternative 7

Alternative 7 would combine Element 4, install new chimney/vertical filter, Element 5a, install modified full-depth cutoff wall, Element 9a, construct modified downstream filter, and Element 11, permanent joint repair of the conduit with steel pipe sleeve.

2.2 IRRM Pool Restriction Alternatives

Because the USACE is responsible to protect public safety, the Tulsa District could not ignore the potential threat posed by a catastrophic failure of Pine Creek Dam as identified by the dam safety studies. In July 2012, as previously noted in this assessment, the District was compelled to lower the elevation of the operating pool as an emergency action to protect public safety until required dam repairs could be identified and completed.

The Council on Environmental Quality's regulations (40 CFR Parts 1500-1508) for implementing the procedural provisions of the National Environmental Policy Act requires Federal agencies to consider the alternative of "No Action", which, for Pine Creek Dam would mean doing nothing and operating the dam normally regardless of the identified safety concerns. However, doing nothing is no longer possible because in 2010 emergency action was taken to lower the pool. Therefore, for the purposes of this EA, the “No Action” alternative is defined as making no internal repairs to the dam, regardless of its condition.

2.2.1 IRRM Pool No Action Alternative

The emergency action taken in July 2010 did reduce the risk of dam failure for the time it will take to make necessary repairs. However, the lowered pool by itself would not meet the USACE tolerable risk guidelines as a long term, permanent fix. Therefore, under the "No Action" alternative as defined above, the District, in lieu of making dam repairs, would have to implement one of the following two options to reduce the risk of dam failure.

2.2.2 IRRM Pool Alternative 1

This alternative would consist of lowering the top of the conservation pool to an elevation of 384.00 feet resulting in eliminating the conservation pool, utilizing the reservoir as a flood water detention facility until the structural deficiencies of Pine Creek Dam can be corrected. At an elevation of 384.00 feet, the surface area of the lake would be reduced from 3,755 surface acres to 15 surface acres and the lake volume would be reduced from 51,792 acre-feet to 13 acre-feet for 10 years and reservoir pool elevations would be expected to be at or above elevation 384.00 feet approximately 60 percent of the time based upon the period of record 1938 - 2007.

2.2.3 IRRM Pool Alternative 2

This alternative would consist of lowering the top of the conservation pool from 438 feet to an elevation of 433.00 feet until the structural deficiencies of Pine Creek Dam can be corrected. At an elevation of 433.00 feet, the surface area of the lake would be reduced from 3,755 surface acres to 2,785 surface acres and the lake volume would be reduced from 51,792 acre-feet to 35,785 acre-feet for 10 years and reservoir pool elevations would be expected to be at or above elevation 433.00 approximately 45 percent of the time based upon the period of record 1938 – 2007.

2.3 Dike Vegetation Removal Alternatives

In August 2009, the Tulsa District dam safety team conducted Period Inspection No. 11(USACE 2009) at Pine Creek Lake. Recommendations with respect to the dike extending from the right abutment of the spillway extending 14,000 feet to the west-southwest included removal of woody vegetation to 50 feet from both the upstream and downstream toe of the dike and 15 feet from the abutments to be in compliance with HQUSACE guidance in ETL 1110-2-571 dated 10 April 2009. As noted in USACE 2009, the quantity of mature trees to be removed from the dike has the potential to be commercially harvested which could be used to offset the cost to the government for completing this work.

2.3.1 Vegetation Removal No Action Alternative

This alternative would include the continued operation of the reservoir as currently authorized. Under the "No Action" alternative, woody vegetation and establishment of a vegetation free zone of 50 feet would not occur and the Pine Creek Project would be not be in compliance with current dam safety guidelines with respect to woody vegetation encroachment on embankments, dikes, and levees. Continued maintenance of an approximately 13 acre grass-forb edge habitat and passive management of approximately 35 acres of oak-pine forest habitat would be continued for the foreseeable future.

2.3.2 Vegetation Removal Alternative 1

This alternative would include the commercial removal of woody vegetation and creation of a vegetation free zone of 50 feet in both the upstream and downstream directions from the toe of the dike. Removal of woody vegetation under this alternative would result in the loss of approximately 2 acres of oak-pine forest habitat and result in an increase of grass-forb edge habitat from approximately 13 acres to approximately 35 acres.

2.3.3 Vegetation Removal Alternative 2

This alternative would include the commercial removal of woody vegetation and creation of a vegetation free zone of 70 feet in both the upstream and downstream directions. Removal of woody vegetation under this alternative would result in a loss of approximately 35 acres of oak-pine forest habitat and result in an increase of grass-forb edge habitat from approximately 13 acres to approximately 48 acres.

2.4 Summary of Formulated Alternatives

All plans are briefly summarized inTable 2.1, Table 2.2, and Table 2.3 below, along with their screening level cost estimates.

2.5 Alternative Assessment

2.5.1 Evaluation Criteria

Formulated alternatives for the DSMS were subjected to a risk-based evaluation in accordance with USACE practice. Comparison criteria used to screen all plans included: completeness, effectiveness, efficiency, acceptability, implementation cost, and economic and environmental impacts. Those DSMS alternatives found to result in acceptable levels of risk were carried forward and compared with each other to determine which plan was most favorable. Formulated alternatives for the IRRM pool restriction and dike vegetation removal were evaluated outside the risk assessment conducted for the DSMS only; otherwise these alternatives were evaluated based upon the above comparison criteria. The individual component plans determined to best address these criteria were selected for recommendation as the preferred plans.

2.5.2 Screening of Formulated Alternatives

Each formulated alternative for the DSMS was screened with respect to system flaws, the associated risk, and comparative implementation cost. System flaws incorporated into the screening process included: hydraulic fracture of the dam embankment, uncontrolled and/or unfiltered exit of water through the conduit joints, uncontrolled and/or unfiltered exit of water through the vertical and horizontal filters, unfiltered exit of water through rock, the annual probability of catastrophic dam failure for each alternative and comparative cost. USACE guidelines require that at least one alternative be formulated to achieve a complete remediation of the individual failure modes (system flaws) being addressed to support the ultimate goal of having an adequately safe dam that meets essential USACE dam safety and tolerable risk guidelines (DSAC V rated dam). The array of DSMS alternatives were evaluated with the ultimate goal of achieving a DSAC V rating for Pine Creek Dam and four alternatives completely address all of the system flaws within the embankment: Dam Replacement, Non-structural Alternative 4 + Phased Structural Alternative 7, Alternative 5, and Alternative 7. A screening matrix summary of the assessed alternatives is presented in Table 2.4.

Risk analyses of DSMS alternatives indicated the “No Action” alternative did not meet the USACE tolerable risk guidelines and non-structural alternatives were able to meet only the minimal measures required to meet the tolerable risk guidelines. The dam removal alternative, while completely reducing the risk of dam failure, resulted in the loss of authorized project purposes and was unable to meet the evaluation criteria identified in Section 2.5.1.

Non-structural alternatives 1, 2, and 3, as well as dam replacement were unable to meet the evaluation criteria identified in Section 2.5.1, and were deemed overly costly and/or could not meet the minimal measures required to meet the tolerable risk guidelines. Non-structural plan 4 + phased implementation of Alternative 7 was developed under the premise that funding might be phased over a number of years, however this alternative would likely exceed tolerable risk guidelines until fiscal year 2017 or beyond, but would require the IRRM 433.00 foot elevation restriction of the conservation pool for an extended period potentially impacting fish and wildlife

and marginal wetlands associated with the authorized conservation pool elevation of elevation 438.00 feet.

Structural alternatives 1, 2, 3, 4, and 6 were unable to meet one or more of the evaluation criteria identified in Section 2.5.1 and/or did not achieve the goal of addressing and remediating all of the system flaws identified even when USACE tolerable risk guidelines were met. Structural alternatives which were able to meet the USACE tolerable risk guidelines included Structural Alternative 5 and 7, however Structural Alternative 5 was unable to meet the all of the USACE evaluation criteria due to the cost of this alternative.

Table 2.1. Summary of formulated alternatives assessed in the Dam Safety Modification Study.

Dam Safety Modification Alternatives	Non-Structural Measures	Structural Measures	Cost
No Action	None	None	$22,900,000
Make IRRM Permanent	Conservation Pool 433 feet; continued monitoring; maintain EAP and communications plans	Inverted filter; downstream access road; void filling; replace emergency gates	$8,800,000
Remove Dam	None	Removal of portions of the embankment	$246,200,000
Replace Dam	None	Construction of new downstream dam	$217,500,000
Non-Structural Plan 1	Lower conservation pool to 384 feet	None	$37,800,000
Non-Structural Plan 2	EAP improvements and inclusion of EBS	None	$9,900,000
Non-Structural Plan 3	EAP improvements, EBS, and real estate acquisition	None	$78,300,000

Alternatives formulated for the IRRM pool restriction and dike vegetation removal were evaluated using the U.S. Fish and Wildlife Service Habitat Evaluation Procedures (HEP) to screen for impacts to aquatic and terrestrial habitat. Terrestrial HEP evaluations employed included the cottontail rabbit and hairy woodpecker models. Aquatic HEP evaluations employed included the gizzard shad, flathead catfish, and white crappie models.

Table 2.1 continued. Summary of formulated alternatives assessed in the Dam Safety Modification Study.

Dam Safety Modification Alternatives	Non-Structural Measures	Structural Measures	Cost
Non-Structural Plan 4 + Phased Structural Alternative 7	EAP improvements, EBS, and real estate acquisition	New chimney/vertical filter; modified cut-off wall; modified downstream filter; permanent joint repair with steel pipe sleeve in conduit	$36,500,000
Structural Alternative 1	None	Full-depth cutoff wall; permanent joint repair with new seal and waterstop	$37,900,000
Structural Alternative 2	None	Replace downstream embankment; permanent joint repair with new seal and waterstop	$33,400,000
Structural Alternative 3	None	Full-depth cutoff wall; permanent joint repair with steel pipe sleeve in conduit	$36,600,000
Structural Alternative 4	None	Replace downstream embankment; permanent joint repair with steel pipe sleeve in conduit	$34,800,000
Structural Alternative 5	None	Full replacement of upstream and downstream embankment; permanent joint repair with new seal and waterstop	$99,800,000
Structural Alternative 6	None	New chimney/vertical filter; permanent downstream filter; permanent joint repair with new seal and waterstop in conduit	$18,400,000
Structural Alternative 7	None	New chimney/vertical filter; modified cutoff wall; modified downstream filter; permanent joint repair with steel sleeve pipe in conduit	$23,400,000

Table 2.2. Summary of formulated IRRM pool restriction and maintenance alternatives assessed.

IRRM Pool Restriction Alternatives	Non-Structural Measures	Structural Measures	Cost
No Action	Continued regular operations of the lake	None	$22,900,000
IRRM Alternative 1	Lower conservation pool to 384 feet	None	$26,598,000
IRRM Alternative 2	Lower conservation pool to 433 feet	None	$6,472,100

Table 2.3. Summary of formulated dike maintenance alternatives.

Dike Vegetation Removal Alternatives	Non-Structural Measures	Structural Measures	Additional O&M Cost
No Action	Continued regular operations of the lake	None	$0
Removal Alternative 1	Commercial removal woody vegetation up to 50 feet from the dike toe	None	$620,000
Removal Alternative 2	Commercial removal woody vegetation up to 70 feet from the dike toe	None	$630,000

Table 2.4. Screening matrix of formulated DSMS alternatives.

Alternative	System Flaws					Annual Probability of Failure	Comparative Cost to Implement
	Hydraulic Fracture	Unfiltered/Deficient Exit					
		Conduit Joints	Deficient Filters		Unfiltered Exit Through Rock		
			Vertical	Horizontal			
No Action						3.76×10^{-3}	$22,900,000
Make IRRM Permanent				X		3.05×10^{-3}	$39,000,000
Remove Dam						N/D	$246,200,000
Replace Dam	X	X	X	X	X	N/D	217,500,000
Non-Structural Plan 1						2.82×10^{-3}	$37,770,000
Non-Structural Plan 2						3.76×10^{-3}	$9,920,000
Non-Structural Plan 3						3.76×10^{-3}	$78,320,000
Non-Structural Plan 4 + Phased Structural Alternative 7	X	X	X	X	X	4.48×10^{-7}	$36,260,000
Structural Alternative 1	X	X				7.68×10^{-7}	$22,090,000
Structural Alternative 2		X	X	X		4.27×10^{-7}	$40,160,000
Structural Alternative 3	X	X				7.68×10^{-7}	$21,950,000
Structural Alternative 4		X	X	X		4.24×10^{-7}	$21,950,000
Structural Alternative 5	X	X	X	X	X	4.55×10^{-7}	$120,440,000
Structural Alternative 6		X	X	X		4.89×10^{-5}	$20,510,000
Structural Alternative 7	X	X	X	X	X	4.48×10^{-7}	$26,930,000

Extremely costly alternatives

Fails to meet all tolerable risk guidelines

3.0 PROPOSED ACTION

3.1 Dam Safety Modification Recommended Alternative

The proposed alternative to complete the Dam Safety Modification (DSM) of Pine Creek Dam is Structural Alternative7. Structural Alternative 7 meets all of the USACE evaluation criteria for completeness, effectiveness, efficiency, acceptability, implementation cost, and economic and environmental impacts. Risk analyses performed by the Tulsa District Dam Safety team indicate only the structural alternatives are able to eliminate system flaws and/or reduce the risk of dam failure such that the Pine Creek Project can safely provide the benefits for which it was authorized by the United States Congress. Structural Alternative 7 meets the USACE risk tolerance guidelines, addresses all system flaws currently identified and allows for the elements comprising this alternative to be implemented several years sooner than Non-structural Plan 4 + Phased Structural Alternative 7 thereby potentially reducing the length of time required for the IRRM conservation pool elevation restriction to 433.00 feet.

3.2 IRRM Pool Restriction Recommended Alternative

The proposed alternative to complete the IRRM pool restriction is IRRM Pool Restriction Alternative 2, top of the conservation pool lowered to elevation 433.00 feet. Implementation of this alternative allows the Pine Creek Project to continue to safely provide the benefits for which it was originally authorized by the United States Congress while dam safety modifications are implemented. The IRRM pool restriction would be required to remain in effect until all DSM elements are completed. Once the DSM is completed, it is anticipated Pine Creek Dam would be reclassified as a DSAC V (NORMAL – Safe) structure and the pool restriction would be rescinded and the approved seasonal pool plan would be reinstated.

3.3 Dike Vegetation Removal Recommended Alternative

The proposed alternative to complete the vegetation removal required by ETL 1110-2-571 is Vegetation Removal Alternative 2. This alternative includes establishing a vegetation free zone 70-feet in width and approximately 28,000 feet-long (14,000 feet-long on both the upstream and downstream sides of the dike) upstream and downstream of the dike. This alternative will allow the Tulsa District meet current USACE guidelines for vegetation management at embankment dams and appurtenant structures. While ETL 1110-2-571 requires a 50-foot zone free of woody vegetation to be established at Pine Creek Lake along the dike, establishment of a 70-foot woody vegetation free zone will allow for the commercial extraction and clearing and grubbing of roots in an efficient and economical manner while providing additional terrestrial habitat management opportunities.

Following the removal of woody vegetation from the project site the impacted area will be planted with a native grass/forb mix. The seed mix will be developed in accordance with the recommendations from the Natural Resources Conservation Service (NRCS) for optimum wildlife habitat on the range conditions found at the site. All seed mix must be comprised of pure live seed (PLS). Table 3.1 describes the recommend types, percent, and application rates of native grass and forb seed for the area. The objective will be to revegetate with and maintain the

area in native herbaceous vegetation for the benefit of wildlife as well as to control erosion and maintain the woody vegetation free zone of the levee toe required by regulation. Special Requirements for Application of the Native Grass / Forb Mix are identified below in Section 3.3.1 through 3.3.3.

3.3.1 Bed Preparation

Prior to seeding, the native grass/forb planting beds will be prepared to maximize success. First, any existing or remaining vegetative growth should treated with an approved herbicide. Nutrients will then be applied per recommendations following a test of representative soils comprised of mixed core samples collected to a depth of 3-inch along the up and down stream sides of the levee. Soils within the planting beds will then be treated with a subsoiler and surface tiller (2 to 4 inches) to ameliorate compaction and incorporate any applied nutrients.

3.3.2 Seeding

The specified native grass and forb seed mixtures will be combined by weight to achieve an amount appropriate for the total size (acres) of the planting beds. This grass/forb seed composite will then be blended with an additional volume of either dampened oat (64 pounds/acre) or annual rye (5 pounds/acre) seed prior to spreading. This moist "carrier" seed will help distribute the native grass/forb seed and serve as a nurse crop.

The combined seed blend (i.e., native grass/forb seed plus nursery crop seed) will then be broadcast during spring (15 March to 15 May) in two alternate directions over the entire bed areas to ensure even coverage. A rake or drag should then be applied to the planting areas to cover the seed with ¼ to ½-inch of soil. The bed surfaces should then be lightly re-compacted with a roller or similar implement to firm the seed into the soil. Mulch, in the form of chopped weed-free straw or lightweight and biodegradable erosion control blanket, will finally be applied to help retain soil moisture during seed germination.

3.3.3 Bed Care

In the first growing season after seeding, weeds within the native grass/forb plant beds will be controlled by frequent mowing to a height of six inches. A flail-type mower is required for this to prevent smothering the seedlings with large clippings. Mowing will occur each time vegetative growth within the beds reaches a height of 12 inches.

Following bed establishment, in mid-spring of the second and third growing season, the native grass/forb plant areas should be mown as low to the ground as possible using a sickle bar. The cuttings must then be raked and removed. The clipping removal step may be accomplished by bailing.

Beginning in mid-spring of the forth growing season, and continuing in mid-spring of each subsequent growing season thereafter, the native grass/forb plant bed will be mown every other year. Mowing will be as low to the ground as possible, using a sickle bar, and will be followed

by raking and removal of clippings. It is acceptable to bail the clipped vegetation. This process should continue for as long as the local flood protection project is authorized.

Table 3.1**.** Types, percent, and application rates for native grass and forb seed composite.

Common Name	Scientific Name	Percent of Mix	Application Rate (PLS/Pounds/Acre)
	Forbs		
Illinois Bundle Flower	*Desmanthus illinoensis*	5	0.19
Maximillian Sunflower	*Helianthus maximilianii*	2	0.07
Partridge Pea	*Chameacrista fasciculata*	3	0.11
Total Forbs/Legumes		10%	0.38
	Grasses		
Big Bluestem	*Andropogon gerardii*	15	0.57
Little Bluestem	*Schizachyrium scoparium*	15	0.57
Switchgrass	*Panicum virgatum*	15	0.57
Indiangrass	*Sorghastrum nutans*	15	0.57
Side-oats Grama	*Bouteloua curtipendula*	15	0.57
Green Sprangletop	*Leptochloa dubia*	15	0.57
Total Grasses		90%	3.42
Total Mix		100%	3.80

4.0 AFFECTED ENVIRONMENT

4.1 Location

Pine Creek Lake is an impoundment of the Little River located in southeast Oklahoma approximately four miles north of Valliant, McCurtain County, Oklahoma. Starting furthest upriver along the Little River to below the Pine Creek Dam small communities include: Ringold and Rufe to the north and east respectively. Downstream, along the Little River, are the communities Wright City and Valliant. Land use in the area is dominated primarily by public recreation. Pine Creek State Park is located along the little River on the north end of the lake. USACE managed recreation areas include Little River, Lost Rapids, Pine Creek, and Turkey Creek. The area also supports large tracts of land for public hunting. The largest industry facility in the area is the International Paper Company in Valliant, Oklahoma which supports a large timber industry.

The area in the immediate vicinity of the dam is relatively steep and forested; the exceptions being a small area at the toe of the dam (currently being used as a staging area for equipment), a small area on the left descending bank used to provide access to the tailrace for fisherman, and an area on the right descending bank used to store repair materials and provide access to the outlet channel.

4.2 Geology and Soils

Bedrock is composed of Paleozoic strata, ranging from Cambrian to Pennsylvanian, except the southern margin of the mountain section where older rocks disappear under overlapping Cretaceous sediments. The rocks of the region, complexly folded and faulted, are predominantly the Stanley Shale of the Mississippian-Pennsylvanian age. However, in the vicinity of the right abutment and throughout the area of the dikes, the underlying strata are of Paluxy sand of Cretaceous age. The Stanley shale is composed of quartzitic sandstone and less resistant shale. The Cretaceous sediments are characterized by fine to medium grained friable sandstone clays and gravel.

Soils of the action area can be divided into two general soil associations, Goldston-Carnasaw-Sacul and the Pickens-Alikchi. The Goldston-Carnasaw-Sacul association is dominate on the southern portions of the lake. The soils of this association are formed under a cover of trees in material weathered from sandstone and shale compromising approximately 31% of the soils in McCurtain County, Oklahoma. These soils are loamy, moderately deep and deep, moderately steep and steep, moderately well drained to excessively well drained, on uplands. These soils have fair suitability from recreation and wildlife. The Pickens-Alikchi association dominates the northern portions of the lake. The soils of this association are formed under a cover of trees in material weathered from horizontally bedded shale compromising 5% of the county's soils. These loamy soils are shallow and moderately deep, nearly level to moderately steep, somewhat excessively drained or poorly drained, on uplands. These soils are suited for late seasonal crops and tame pasture.

4.3 Climate

McCurtain County, Oklahoma is located in extreme southeastern Oklahoma. Elevations range from 90 to 1500 feet MSL. Mean annual precipitation range from 48 to 57 inches. Mean annual air temperature range from 58 to 63 degrees Fahrenheit. Frost free period is between 190-230 days.

4.4 Social and Economic Conditions

4.4.1 Population

The 2010 U.S. Census of Population and Housing indicated that 33,131 people live in McCurtain County, OK. There are approximately 15,533 housing units in the county of which 308 are located in Wright City, OK. Wright City is impacted by a potential dam failure. McCurtain County's population decreased by approximately 3.64% percent between 2000 and 2010. Wright City had a population decrease of approximately 10.14% percent from the same time period. The state of Oklahoma however had a population increase of 8.71 percent between 2000 and 2010. The decline in population in the county can be attributed to a decline in the manufacturing industry resulting in people moving out of the region. McCurtain County lost approximately 1,000 jobs in the manufacturing industry between 2000 and 2010. Table 4.1 shows the population for Wright City, McCurtain County, and the state of Oklahoma.

Table 4.1. McCurtain County, Oklahoma population figures from 1990-2010.

Area Population 1990 - 2010				
	2000	2010	Total Change	% Change
Wright City	848	762	(86)	-10.14%
McCurtain County	34,402	33,151	(1,251)	-3.64%
Oklahoma	3,450,654	3,751,351	300,697	8.71%

Source: U.S. Census Bureau

The population of Wright City is younger than McCurtain County and the state of Oklahoma based on median age. Wright City has a median age of 31.1 compared to the state of Oklahoma of 36.2. McCurtain County has a higher median age of 38.8. Approximately 10.2% of Wright City's population is 65 & over which is lower than McCurtain County 15.5% and the state of Oklahoma 13.5%. Wright City has a larger percentage of residents' age 18 & younger of approximately 29.9%, this compares to McCurtain County of 25.9% and the state of Oklahoma at 24.7%.

The state of Oklahoma and McCurtain County are predominately white at 72.16% and 67.14% respectively. Wright City's main race is white but followed closely is American Indian and Alaska Native. American Indian and Alaska Native are the second most populous race for McCurtain County and state of Oklahoma. Table 4.2 shows a breakdown of the population by age and race.

Table 4.2. Population characteristics by age and race.

Population Comparison 2010				
		Wright City	**McCurtain County**	**Oklahoma**
Population				
	Median Age	31.1	38.8	36.2
	Percentage 65 & older	10.20%	15.50%	13.50%
	Percentage 18 & older	70.1%	74.1%	75.2%
Race				
	White	45.93%	67.14%	72.16%
	African American	3.41%	8.73%	7.40%
	Asian	0.00%	0.34%	1.73%
	American Indian and Alaska Native	39.37%	15.13%	8.58%
	Native Hawaiian and Pacific Islander	0.00%	0.01%	0.12%
	Other	0.26%	2.43%	4.12%
	Two or More	11.02%	6.21%	5.90%

Source: U.S. Census Bureau

4.4.2 Employment and Education

The 2010 Census data provides insight into employment for Wright City, McCurtain County, and the state of Oklahoma for the year 2010. The total employed labor force in Wright City in 2010 was 272 persons and 4.1% of the civilian labor force (an additional 22 persons) reported being unemployed. The Census reported unemployment rates of 6.1% for McCurtain County and 3.9% for the state of Oklahoma.

The primary industry of employment for McCurtain County was manufacturing where approximately 26% of the employed population worked. Health care and social services and Retail trade were the next highest with approximately 20% and 14.8% of the employed population. Table 4.3 shows a breakdown of the labor force by industry for McCurtain County.

Approximately 8,147 persons age three and older are reported as participating in education for McCurtain County. Elementary school has the largest population with 4,061 students attending. Table 4.4 shows the breakdown of student by type of school enrollment.
Of the 21,868 persons in McCurtain County age 25 and over, 81.5% are high school graduates, with 40.7% of those graduates going to at least some level of college or professional school.

4.4.3 Income

The 2010 median household income for Wright City was $32,386 compared to $31,082 for McCurtain County and $42,979 for the state of Oklahoma. Female full- time, year-round workers earned significantly less than male full-time, year-round workers, $15,676 for women compared to $20,139 for men in McCurtain County. Additionally, 21.7% of families reported

living in poverty in Wright City. McCurtain County had 27.7% and the state of Oklahoma had 16.2% living in poverty.

Table 4.3. Employment by industry in McCurtain County, Oklahoma.

Employment by Industry
McCurtain County 2010

Industry	Number	Percent
Agriculture, forestry, fishing and hunting	203	2.59%
Construction	215	2.74%
Manufacturing	2067	26.32%
Wholesale trade	108	1.38%
Retail trade	1162	14.80%
Transportation and warehousing	264	3.36%
Finance and insurance	253	3.22%
Real estate and rental and leasing	62	0.79%
Administrative and support and waste management and remediation services	546	6.95%
Health care and social assistance	1569	19.98%
Accommodation and food services	600	7.64%
Other services (except public administration)	298	3.80%

Source: U.S. Census Bureau

Table 4.4. Population age 3 and over enrolled in school.

Population Age 3 and Over Enrolled in School
McCurtain County 2010

Grades	Enrollment	Percent
Population 3 years and over enrolled in school	8,147	100%
Nursery school, preschool	820	10%
Kindergarten	426	5%
Elementary: grade 1 to grade 4	2,123	26%
Elementary: grade 5 to grade 8	1,938	24%
High school: grade 9 to grade 12	1,924	24%
College, undergraduate	728	9%
Graduate, professional school	188	2%

Source: U.S. Census Bureau

4.4.4 Social Ecology

Wright City has a mix of industrial, commercial, and residential land uses. Surrounding areas also support agriculture. An estimated 296 occupied housing units are in Wright City, while McCurtain County has 13,255 and the state of Oklahoma has 1,421,705. Many residents live in rural areas in McCurtain County. Idabel, OK is the largest city in McCurtain County with a 2010 population of 7,010. Valliant, OK, south of Pine Creek Lake, has a large paper plant that

serves as one of the main employers in the county. Water supplied from the lake is used by this paper plant as its main source of water. Between 2006 – 2010, Pine Creek Lake averaged approximately 270,000 visitors a year.

4.4.5 Executive Order 12898, Environmental Justice

Executive Order 12989 requires each Federal agency to make environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.

Under NEPA, the identification of a disproportionately high and adverse human health or environmental effect on a low-income population, minority population, or Indian tribe does not preclude a proposed agency action from going forward, nor does it necessarily compel a conclusion that a proposed action is environmentally unsatisfactory. Rather, the identification of such an effect serves to heighten agency attention to alternatives (including alternative sites), mitigation strategies, monitoring needs, and preferences expressed by the affected community or population.

Low-income populations in an affected area are identified with the annual statistical poverty thresholds from the Bureau of the Census Reports on Income and Poverty. In identifying low-income populations, agencies may consider as a community either a group of individuals living in geographic proximity to one another, or a set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect.

Minorities are comprised of individual(s) who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic.

Minority populations are identified where either: (a) the minority populations of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis. In identifying minority communities, agencies may consider as a community either a group of individuals living in geographic proximity to one another, or a geographically dispersed/transient set of individuals (such as migrant workers or Native American), where either type of group experiences common conditions of environmental exposure or effect. The selection of the appropriate unit of geographic analysis may be a governing body's jurisdiction, a neighborhood, census tract, or other similar unit that is to be chosen so as to not artificially dilute or inflate the affected minority percentage, as calculated by aggregating all minority persons, meets one of the above-stated thresholds. Population, race, and employment statistics are presented in Table 4.1, Table 4.2, and Table 4.3, respectively.

Disproportionately high and adverse human health effects: When determining whether human health effects are disproportionately high and adverse, agencies are to consider the following three factors to the extent practicable: (a) Whether the health effects, which may be measured in risks and rates, are significant or above generally accepted norms. Adverse health effects may

include bodily impairment, infirmity, illness, or death; and (b) Whether the risk or rate of hazard exposure by a minority population, low-income population, or Indian tribe to an environmental hazard is significant and appreciably exceeds or is likely to appreciably exceed the risk or rate to the general population or other appropriate comparison group; and (c) Whether health effects occur in a minority population, low-income population, or Indian tribe affected by cumulative or multiple adverse exposures from environmental hazards.

Disproportionately high and adverse environmental effects: When determining whether environmental effects are disproportionately high and adverse, agencies are to consider the following three factors to the extent practicable: (a) Whether there is or will be an impact on the natural or physical environment that significantly and adversely affects a minority population, low-income population, or Indian tribe. Such effects may include ecological, cultural, human health, economic, or social impacts on minority communities, low-income communities, or Indian tribes when those impacts are interrelate to impacts on the natural or physical environment; and (b) Whether environmental effects are significant and are or may be having an adverse impact on minority populations, low-income populations, or Indian tribes that appreciably exceeds or is likely to appreciably exceed those on the general population or other appropriate comparison group; and (c) Whether the environmental effects occur or would occur in a minority population, low-income population, or Indian tribe affected by cumulative or multiple adverse exposure from environmental hazards.

4.4.6 Executive Order 13045, Protection of Children from Environmental Health and Safety Risks

On 21 April 1997, President Clinton issued Executive Order 13045 (EO 13045), Protection of Children From Environmental Health Risks and Safety Risks, which notes that children often suffer disproportionately from environmental health and safety risks, due in part to a child's size and maturing bodily systems. The executive order defines environmental health and safety risks as risks to health or to safety that are attributable to products or substances that the child is likely to come in contact with or ingest (such as the air we breathe, the food we eat, the water we drink or use for recreations, the soil we live on, and the products we use or are exposed to). Executive Order 13045 requires Federal agencies, to the extent permitted by law and mission, to identify and assess environmental health and safety risks that may affect children disproportionately. The Order further requires Federal agencies to ensure that its policies, programs, activities, and standards address these disproportionate risks. Executive Order 13045 is addressed in this NEPA document to examine the effects this action will have on children.

4.5 Natural Resources

4.5.1 Topography

Pine Creek Dam is located in the Ouachita Mountains, in a region of southeastern Oklahoma with moderate to high relief on the Little River, approximately four miles north of Valliant in McCurtain County, Oklahoma. Elevation is the basin range from a streambed elevation of 397 feet above means sea level (MSL) at the dam to 439 feet MSL at the confluence of the lake and the Little River. The banks of the Little River are steep with cut banks being common along the

reach above the lake. Pine Creek, a large tributary to the Little River, enters the lake from the east and is relative flat and marshy.

4.5.2 Hydrology

Pine Creek Lake is located in the Little River watershed, within Hydrologic Unit Code (HUC) 111401070306, which is part of the lower Red River sub-basin in the Arkansas-White-Red Region. The Little River originates in southern portion of LeFlore County, Oklahoma. The river flows westward through eastern portions of Pushmatah County then southwardly into McCurtain County. It then turns southeasterly and enters Arkansas where is flows through Millwood Lake before entering the Red River just west of Fulton, Arkansas. Principle tributaries of the Little River in Oklahoma include the Glover and Mountain Fork, which join in McCurtain County. In Arkansas, it receives the Rolling Fork and Cossatot River from the north in Sevier County and the Saline River from the north in Howard County.

4.5.3 Terrestrial Resources

Pine Creek Lake is situated in the western Ouachita Mountains of southeastern Oklahoma. The Ouachita Mountains are characteristically underlain by folded, sedimentary rocks of Paleozoic age. Oak–hickory–shortleaf pine forest is native on uplands; it contrasts with the oak–hickory forest of the Boston Mountains and Ozark Highlands to the north and the oak savanna or prairie of drier areas to the west. The Ouachita Mountains remains mostly forested, but pastureland and hayland occur in wider valleys. Logging and recreation are major land uses. The low mountains, hills, and valleys of the Western Ouachitas are covered with oak–hickory–pine forest, and largely underlain by sandstone and shale. Ridgetop elevations and forest density generally decline westward. Logging, recreation, and woodland grazing are the main land uses; commercial pine plantations occur. This area contains one of the greatest concentrations of imperiled or critically imperiled, aquatic and terrestrial species in mid-North America (Woods et al. 2005). The more common trees of the area are shortleaf yellow pine *(Pinus echinata)*, loblolly pine *(Pinus taeda)*, white oak *(Quercus alba)*, blackjack oak *(Quercus marilandica)*, post oak *(Quercus stellata)*, spotted oak *(Quercus shumardii)*, willow oak *(Quercus phellos)*, black locust *(Robinia pseudo-acacia)*, black hickory *(Carya texana)*, basswood *(Tilia americana)*, and sugar maple *(Acer saccharum)*. Huckleberry *(Vaccinium pallidum)*, mock orange *(Philadelphus pubescens)*, pink azelea *(Rhododendron prinophyllum)*, gooseberry *(Ribes* sp.), bladdernut *(Staphylea trifolia)*, and spice bush *(Lindera benzoin)*, are the more common herbs and shrubs. Big bluestem *(Andropogon gerardii)*, is common over the entire type, particularly the drier portions.

The oak-pine association on the uplands and bottom land hardwoods along the stream courses provide outstanding habitat for many forms of wildlife. Whitetailed Deer (*Odocoileus virginianus*) and wild turkey (*Meleagris gallapavo*) are the only big game animals hunted in the area. As mentioned previously, deer populations in southeast Oklahoma had been steadily increasing over the last several decades. The area is sparsely settled and although the lands are privately owned, free hunting access is permitted on designated areas of the project (USACE 1976). A complete list of amphibians, reptiles, birds, and mammal species occurring within the lake can be found in section 2.48 of the U.S. Army Corps of Engineers, Final Environmental

Statement, Broken Bow, Mountain Fork, Oklahoma; Pine Creek lake, Little River, Oklahoma; and Millwood Lake, Little River, Arkansas Operations and Maintenance Program (USACE 1976).

4.5.4 Aquatic Resources

4.5.4.1 Limnology

Pine Creek Lake was last assessed by the Oklahoma Water Resources Board (OWRB) during the 2010-2011 Beneficial Use Monitoring Program (BUMP) assessment(OWRB 2011). Designated beneficial uses of Pine Creek Lake include Fish and Wildlife Propagation, Aesthetics, Agriculture, Primary Body Contact Recreation, and Public & Private Water Supply. Based upon data collected in 2010-2011 (OWRB 2011), Pine Creek Lake is classified as a eutrophic lake and that the trophic state of the reservoir and has been relatively consistent when compared to the 2003-2004(OWRB 2007), 2007-2008(OWRB 2008), 2008-2009(OWRB 2009), and 2010-2011 (OWRB 2011) BUMP assessments. The trophic state of a reservoir is a measure of algal growth and productivity of a waterbody and the higher the trophic state index value the greater the primary (algal) productivity and nutrient concentrations of a waterbody are and is generally indicative of deteriorating water quality.

Historically, the OWRB has reported that Pine Creek Lake has not met the Fish and Wildlife Propagation (FWP), warm water aquatic community designated beneficial use in 2003-2004 and 2007-2008 owing to exceedances of the State of Oklahoma Water Quality Standards (WQS), Title 785, Chapter 45 for turbidity, dissolved oxygen, and pH ((OWRB 2007). During the 2007-2008 BUMP assessment the OWRB reported both the FWP and the Aesthetics designated beneficial uses were not supported due to exeedances of the WQS for pH (FWP), dissolved oxygen (FWP), and true color (Asethics). The most recent assessment conducted between November 2010 and July 2011 again reported exceedances of the WQS for pH and dissolved oxygen indicating continuing water quality deterioration in Pine Creek Lake is continuing to limit the FWP designated beneficial use. Additionally, the Oklahoma Department of Environmental Quality (DEQ) reported under the Clean Water Act that Pine Creek Lake was impaired or threatened for one or more designated uses by a pollutant and requires a TMDL (DEQ 2010). In compliance with Section 303(d) of the Clean Water Act and 40 CFR 130.7, the DEQ reported Pine Creek Lake as an impaired waterbody and documented the impairment to be caused by dissolved oxygen and pH impairing the FWP, warm water aquatic community beneficial use and by enterococcus impairing the Primary Body Contact Recreation beneficial use. USACE and OWRB water quality data indicates that all other designated beneficial uses are currently supported.

The most recent water quality assessment of Pine Creek Lake conducted by the Tulsa District was in 1999 (USACE 2002). The USACE (2002) study indicated the reservoir was low in chloride and sulfate. The reservoir has a limited buffering capacity and is classified as “soft water owing to low alkalinities and total hardness values less than 75 mg/l (as $CaCO_3$), respectively. Thermal stratification is observed throughout a majority of the reservoir during the summer with an entrenched anoxic (dissolved oxygen below 2.0 mg/l) zone below 12 feet in depth for much of the summer (June – September). Nutrient values (nitrogen and phosphorous) are seasonably variable but can be elevated at times with nitrogen-to-phosphorus ratios (N:P)

supporting a hypothesis of possible nitrogen limitation within the reservoir. OWRB BUMP reports published between 2007 and 2011 indicated loadings of total phosphorus continue to increase with the N:P ratio decreasing from 25 (OWRB 2007) to 16 (OWRB 2011) over the past 7 years. Nitrogen limitation in reservoirs is generally considered to be conducive to excessive aquatic plant growth (algae, emergent macrophytes, and submergent macrophytes).

Pine Creek Lake provides important reservoir habitat for a variety of fish species and other aquatic organisms. The lake is regionally significant in terms of recreational use, but more importantly it is integral to the surrounding ecosystem.

The aquatic habitat includes vital zooplankton communities with species of rotifers, nauplii, copepods and cladocerans. Zooplankton are most abundant in summer and spring and least abundant in fall, corresponding with high algal productivity. A diverse group of benthic macroinvertebrates are also present. These include worms, leeches, chironomids, clams, mussels, snails, mayflies, caddisflies, alderflies, and beetles.

4.5.4.2 Fisheries

Pine Creek is a relative clear and deep impoundment supporting a productive fishery. As in most large lakes in this area game fish provide outstanding fishing. The high ratio of shoreline to water provides for a strong forage base for many species of game and non-game fish. A complete list of fish species occurring within the lake can be found in section 2.47 of the U.S. Army Corps of Engineers, Final Environmental Statement, Broken Bow, Mountain Fork, Oklahoma; Pine Creek lake, Little River, Oklahoma; and Millwood Lake, Little River, Arkansas Operations and Maintenance Program. 1976.

Survival, growth, and reproduction of the near-shore (littoral zone) species depend upon many habitat conditions (amount of cover, water clarity, presence of algae and vegetation, and prey availability). Various habitat features including water temperature and oxygen stratification patterns, algal productivity, water clarity, forage availability, metals concentrations, and other open water habitat conditions also affect the open water (pelagic) species.

The lake also serves as important resource to the regional economy through recreational fishing. The largemouth bass (*Micropterus salmoides*), spotted bass (*Micropterus punctatus*), and smallmouth bass (*Micropterus dolomieui*) are recreationally important species that occur in the lake. Other important fish species supported by Pine Creek Lake habitat include channel catfish (*Ictalurus punctatus*), crappie (*Pomoxis* sp.), bluegill (*Lepomis macrochirus*), and white bass (*Morone chrysops*). Some of the more common aquatic species include a variety of shiners (*Notropis* sp.), darters (*Etheostoma* sp., *Percina* sp.), sunfishes (*Lepomis* sp.), and several species of gar (*Lepisosteus* sp.). In stratified water bodies, such as Pine Creek Lake, desirable sport fish such as largemouth bass, channel catfish, crappie, bluegill sunfish, and white bass that normally inhabit the cooler hypolimnion cannot survive there because of the low DO levels. As a result, eutrophication adversely affects the production of desirable fish species. Rough fish, such as carp (*Cyprinus* sp.), gar, drum (*Aplodinotus* sp.) and shad (*Dorosoma* sp.), that can tolerate lower dissolved oxygen levels and higher water temperatures dominate the fish production characteristic of eutrophic waterbodies.

The Oklahoma Department of Wildlife Conservation (ODWC) has periodically stocked sport fish species into Pine Creek Lake since 1983. Sport fish species which have been stocked between 1983 and 2008 include: smallmouth bass, threadfin shad, channel catfish, blue catfish, saugeye, and Florida strain largemouth bass(ODWC 2009). Major sport fish species actively managed by the ODWC were last assessed using gill nets in the fall of 2008 and by electrofishing in the spring of 2009. 2008-2009 results (ODWC 2009) included:

1. Largemouth bass: Since 2001, total largemouth bass abundance has increased in the ≥ 14-inch length group and abundance was within acceptable levels for the ≤ 8-inch and 8- to 12-inch length groups. Relative weights, that is the weight of the fish sampled compared to the standard weight of a fish of the same length, were below desired levels in length groups less than 14-inches and met acceptable levels in groups greater than 14-inches.

2. Spotted bass: Abundance of spotted bass is ranked low and as decreased from a moderate abundance ranking since surveys conducted in 2001 and 2003. Relative weights are below acceptable levels in most length categories with the exception of the ≤ 8-inch length category.

3. Saugeye: Changes in sampling methodology preclude comparisons between 2008 gillnet results and historical abundance data with regard to saugeye abundance, however 2004-2005 (ODWC 2005) survey results indicate that abundance is slowly increasing but is below the minimum acceptable value for a quality fishery.

4. Crappie (black and white): Changes in sampling methodology preclude comparisons between 2008 gillnet results and historical data with regard to crappie abundance, however 2004-2005 (ODWC 2005) survey results indicate a decrease in abundance in comparison to the 2001 sample year (ODWC 2001). Relative weights for crappie observed during the 2008-2009 survey were above the acceptable range for all length groups.

5. White bass: Changes in sampling methodology preclude comparisons between 2008 gillnet results and historical data with regard to white bass abundance, however 2004-2005 (ODWC 2005) survey results indicate a white bass abundance was below the minimum value for a quality fishery and size-specific white bass were below desired levels in all length groups. The 2008 survey results indicate relative weights were observed at satisfactory levels in all size groups with the exception of those white bass less than 8-inches in length.

6. Channel catfish: Changes in sampling methodology preclude comparisons between 2008 gill net results and historical data with regard to channel catfish abundance, however 2005 gillnet results (ODWC 2005) indicate abundance above the minimum acceptable level for a quality fishery and that total catch substantially increased compared to previous surveys from 1987-2001. Relative weights were acceptable in groups ≥ 12- and 16-inches and below acceptable values in the 8- to 16-inch and less than 12-inch groups.

7. Flathead catfish: Only one (1) flathead catfish was collected during the fall 2009 survey and abundance criteria do not exist for flathead catfish using gillnetting catch rates. 2005 survey

results indicate size-specific flathead catfish abundance below desired levels in all length groups.

8. Blue catfish: No blue catfish were collected during the 2009 survey.

In 2002, the USACE(USACE 2002) reported the metals (arsenic, cadmium, chromium, copper, iron, manganese, lead, mercury, nickel, and zinc) concentrations were not found to be present at levels of critical concern with regard to human health, however since the last Tulsa District water quality survey of Pine Creek Lake the Oklahoma DEQ has issued a fish consumption advisory (DEQ 2012) due to elevated levels of mercury in fish tissues observed in July 2008 and October 2009 by the DEQ (Table 4.5). The existing consumption advisory effects both the general population and the sensitive population. The sensitive population is defined as children under 15 and women of childbearing age (15-45 years of age). The general population is defined as men older than 15 and women older than 45.

Table 4.5. Mercury consumption advisory currently in effect for Pine Creek Lake.

	Sensitive Population		**General Populations**	
	2 meals per month	No meals per month	2 meals per month	No meals per month
Black Crappie	10 inches and over			
Channel Catfish	21-30 inches	30 inches and over	30 inches and over	
Largemouth Bass	Less than 13 inches	13 inches and over	13-19 inches	19 inches and over
Saugeye	13-19 inches	19 inches and over	19 inches and over	
Spotted Bass	11-14 inches and over	14 inches and over	14-17 inches and over	
White Bass	12 inches and over			
White Crappie	10 inches and over			

From: Oklahoma Department of Environmental Quality

4.5.4.3 Wetlands

Emergent aquatic vegetation occurs in the shallow water areas of Pine Creek Lake. The main areas of emergent aquatic vegetation are where the Little River and Pine Creek enter the upper end and the southwest end respectively. There is also a small forested wetland area on the south upstream side of the south levee. Other than these shallow water and fringe areas, no other wetlands are known to be located in the project area.

4.5.5 Prime and Unique Farmland

According to the U.S. Department of Agriculture (USDA), the definition of "prime farmland" is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and that is available for these uses. It has the combination of soil properties, growing season, and moisture supply needed to produce sustained high yields of crops in an economic manner if it is treated and managed according to acceptable farming methods. In general, prime farmland has an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, an acceptable level of acidity or alkalinity, an acceptable content of salt or sodium, and few or no rocks. Its soils are permeable to water and air. Prime farmland is not excessively eroded or saturated with water for long periods of time, and it either does not flood frequently during the growing season or is protected from flooding. No prime farmland exists in the project area on public lands and waters managed by the USACE.

4.5.6 Wild and Scenic Rivers

Pursuant to the Wild and Scenic River Act (Public Law 90-542), Wild River Areas are defined as those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. Scenic river areas are defined as those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads. Neither the Little River nor Pine Creek are listed as wild and scenic rivers.

4.5.7 Executive Order 13112, Invasive Species

On February 3, 1999, President Clinton issued Executive Order 13112 (EO 13112), Invasive Species, which notes that invasive species annually cause significant economic, ecological, and alien species whose introduction does or is likely to cause economic and environmental harm or harm to human health. EO 13112 requires Federal agencies to not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the United States; and that all feasible and prudent measure to minimize risk or harm will be taken in conjunction with the actions. EO 13112 is addressed in this NEPA document to incorporate measure that will prevent the inadvertent spread of exotic and invasive species. These preventive measures are described in Section 5.4.6.

4.5.8 Executive Order 13186, Responsibility of Federal Agencies to Protect Migratory Birds

On January 10, 2001, President Clinton issued Executive Order 13186 (EO 13186), Responsibility of Federal Agencies to Protect Migratory Birds, which notes that migratory bird conventions impose substantive obligations on the United States for the conservation of migratory birds and their habitats. EO 13186 requires, in part, Federal agencies to integrate conservation principles, measures, and practices into agency activities and prevent or abate the pollution or detrimental alteration of the Environment for the benefit of migratory birds, as practicable.

Partners in Flight identifies Pine Creek Lake as being located in the West Gulf Coastal Plain (Partners in Flight, 2012) with the uplands dominated by pines and bottomlands by hardwood forest. Priority bird popultions within the West Gulf Coastal Plain assocated with pine forests and grasslands include: red-cockaded woodpecker, Bewick's wren, Henslow's sparrow, Bachman's sparrow, American kestrel, brown-headed nuthatch, chuck-will's-widow, sissor-tailed flycatcher, prairie warbler. Priority bird populations within the West Gulf Coastal Plain associated with hardwood forests include: swallow-tailed kite, Swainson's warbler, Kentucky warbler, prothonotary warbler, worm-eating warbler, hooded warbler, white-eyed vireo.

4.6 Threatened and Endangered Species

The District, in response to Section 7 of the Endangered Species Act, requested information from the U.S. Fish and Wildlife Service (USFWS) Oklahoma Ecological Services Field Office regarding the presence of threatened or endangered species or their habitat within the project area. The USFWS responded with letters dated October 16, 2012 directing the District to obtain an official species list from the USFWS Information, Planning, and Conservation System (IPaC) web site (USFWS 2012). Copies of these letters are contained in Appendix A. According to the USFWS IPaC web site and the Oklahoma Department of Wildlife Conservation there are eleven federally-listed threatened and endangered species found in McCurtain County, Oklahoma as well as one state-listed threatened species (Table 4.6).

The Interior least tern nests along large rivers in Oklahoma, including the Arkansas River. These terns favor islands or sandbars along large rivers for nesting. The sand must be mostly clear of vegetation to be used by terns. Shallow water is preferred for fishing, and water levels must remain low enough so that nests stay dry. Interior least terns arrive at breeding sites in late April to early June where they typically spend four to five months. The terns nest in small colonies on exposed salt flats, sand bars, or beaches. Nests are small scrapes in the sand and typically contain two to three eggs. The young are fairly mobile soon after hatching. Both parents feed the young, traveling four or more miles from the breeding colony to find small fish that make up the major part of their diet, and remain with the young until fall migration (USFWS, 2012).

The Piping plover, a small shorebird, nests on sandy beaches or sand bars along oceans, lakes, or rivers along the Atlantic coast, the Northern Great Plains, and around the Great Lakes. They winter along the southern Atlantic and Gulf coasts, and in the Bahamas and West Indies, and migrate through Oklahoma each spring and fall (USFWS, 2012).

The Ouachita rock pocketbook, previously known as Wheeler's pearly mussel, is a large (reaching approximately 110 mm in length) freshwater mussel with a silky, chestnut brown to black shell (USFWS 1991). In Oklahoma the Ouachita rock pocketbook is believed to inhabit the Kiamichi River. Ortman (1921) and Isely (1924) reported specimens being collected in the Kiamichi River, Pushmataha County, Oklahoma, near Antlers and Tuskahoma, respectively. Few other records were reported until recently. Valentine and Stansbery (1971) reported the mussel from the Kiamichi River at Spencerville Crossing, Choctaw County, Oklahoma, a site since flooded by Hugo Reservoir. Review of museum records added two additional localities in the Little River (White Cliffs, Little River County, Arkansas) and the Kiamichi River (1.9 kilometers south of Clayton, Pushmataha County, Oklahoma) (USFWS 1991).

The scaleshell mussel is a relatively small freshwater mussel with a thin, fragile shell and faint green rays. It grows to about one to four inches in length. The inside of the shell is pinkish white or light purple and highly iridescent. The scaleshell gets its name from the scaly appearance of the shell, which is only seen in females. Scaleshells historically occurred across most of the eastern United States. During the last 50 years this species became increasingly rare within a reduced range. Of the 55 historical populations, 14 remain scattered within the Mississippi River basin in Arkansas, Missouri, and Oklahoma (USFWS 2010).

Winged mapleleaf mussels grow up to four inches long. They have thick shells that are greenish brown, chestnut, or dark brown in color. Their shell, like that of a few other native freshwater mussel species, has several rows of bumps running from the hinge (umbo) to the edge of the shell (Hornback and Hove 2008). Winged mapleleaf are found in riffles with clean gravel, sand, or rubble bottoms and in clear, high quality water. In the past, it may also have been found in large rivers and streams on mud, mud-covered gravel, and gravel bottoms. In Oklahoma the winged mapleleaf occurs in the Little River.

The rabbitsfoot is a medium-sized to large mussel that reaches about six inches in length. The rabbitsfoot was an exceptionally wide-ranging species, known from 139 streams in 15 states. Populations persist in 49 streams in 13 states, however, thousands of miles of the species' historically available habitat no longer supports rabbitsfoot and the total range reduction and overall population loss likely exceeds 90%. Of the remaining populations only 10 are considered to be large enough to remain viable in the long-term. The rabbitsfoot occurs in a variety of flowing water habitats including small to medium-sized streams and some larger navigable rivers. It usually occurs in shallow areas along the bank and adjacent runs and shoals where the water velocity is reduced, although specimens have been reported in 9-12 feet of water. Bottom substrates generally include sand and gravel (NatureServe 2012).

The leopard darter is a member of the Percidae family. It grows to approximately 3 inches, and typically lives less than two years, but can live up to 3-4 years. The leopard darter diet includes aquatic insects and microcrustaceans. The leopard darter prefers swift shoal areas in moderate to large streams. In these streams, it is most frequently found in gravel areas with some sand intermixed. It also occurs along the borders of stream channels. From May to February, this species prefers large, quiet pools with a rubble and boulder substrate. The leopard darter is endemic to streams in the Little River drainage of Oklahoma and Arkansas (Miller and Robinson 1973). Historically, the leopard darter was found throughout most of the upland large stream habitats of the Little River Drainage of Arkansas and Oklahoma.

The black-sided darter is a small, streamlined fish approximately 3.5 inches in length. Its body is a yellowish-olive color with seven or eight horizontal blotches running along each side. It also has a dark spot at the base of its tail fin. It feeds on small aquatic invertebrates. It is is found in clear, gravel-bottom, perennial streams in eastern Oklahoma along the state line with Arkansas. The Black-sided Darter is found in Lee Creek, and some of the tributary streams to the Poteau and Mountain Fork rivers. This species tends to occur in low densities in Oklahoma, which is at the southwestern edge of its geographic range, so it is difficult to locate during stream surveys and its current and historic ranges are poorly known. Historic records exist for the Black-sided Darter in Pushmataha and McCurtain counties (Miller and Robinson 1973).

Harperella is an annual herb with slender, erect stems, up to 48 inches high. The roots are shallow, diffuse-fibrous, and the plants have a faint scent of dill. Unlike those of the more common members of this genus, the leaves of *P. nodosum* are reduced to hollow, quill-like structures. Broad clusters of small white flowers bloom mostly in July and August. Near rivers, fluctuating water levels often knock over the flowering stems, depositing the seeds in wet or moist soil near the site of the fallen flower. Harperella occurs in three habitat types: rocky/gravelly shoals or cracks in bedrock outcrops beneath the water surface in clear, swift-flowing streams; edges of intermittent pineland ponds or low, wet savannah meadows on the Coastal Plain; and granite outcrop seeps. In all habitat-types, the species occurs in a narrow range of water depths; it is intolerant of deep water and of conditions that are too dry. However, the plants readily tolerate periodic, moderate flooding - something to which few potential competitors are adapted (NatureServe 2012).

The American burying beetle is currently known to occur in over 20 counties of eastern Oklahoma. The beetle has been found in various types of habitat including oak-pine woodlands, open fields, oak-hickory forest, open grasslands, and edge habitat. Research indicates that American burying beetles are feeding habitat generalists. American burying beetles are nocturnal and have a life span of about one year. American burying beetles enter an inactive period underground when the nighttime low temperatures are 60°F or below. This typically occurs from mid-September through late-May in Oklahoma. Once the nighttime low temperatures are consistently (at least five consecutive days) above 60°F, American burying beetles become active (USFWS, 2012).

The American alligator can be distinguished from the crocodile by its head shape and color. The crocodile has a narrower snout, and unlike the alligator, has lower jaw teeth that are visible even when its mouth is shut. In addition, adult alligators are black, while crocodiles are brownish in color. Alligators live in wetlands, vital habitat that holds the key to their continued survival. Alligators depend on wetlands—and in some ways wetlands depend on them. As predators at the top of the food chain, they help control numbers of rodents and other animals that might overtax the marshland vegetation. In Oklahoma the American alligator is known to occur in south-eastern portions of McCurtain County (USFWS, 2012).

McCurtain County, Oklahoma is within the documented range of the American burying beetle and there is potential habitat within the project area that may support Harperella. While the current presence of both of these species has not been confirmed within the project area, suitable habitat may exist. Ground disturbance and decreased lake water levels associated with the proposed actions may impact areas with potentially suitable habitat. Suitable habitats for all other federal-listed endangered and threatened species are unlikely to occur within the project area given the life history requirements of these species. Suitable habitat for the state-listed threatened black-sided darter is unlikely to occur within the project area. This species tends to occur in low densities in Oklahoma; which is at the southwestern edge of its geographic range. This species is found in clear, gravel-bottom, perennial streams in eastern Oklahoma along the state line with Arkansas and suitable habitat is not likely to occur within a lake ecosystem such as Pine Creek Lake.

Table 4.6. Federally- and State-listed endangered, threatened, candidate, recovered, and proposed species potentially affected by the proposed project occurring in McCurtain County, Oklahoma.

Scientific Name	Common Name	Federal Status	Oklahoma State Status
Birds			
Sterna antillarum	Interior least tern	E	
Picoides borealis	Red-Cockaded Woodpecker	E	
Charadrius melodus	Piping plover	T	
Clams			
Arkansia wheeleri	Ouachita Rock pocketbook	E	
Leptodea leptodon	Scaleshell mussel	E	
Quadrula fragosa	Winged Mapleleaf	E	
Quadrula cylindrical spp. cylindrica	Rabbitsfoot	C	
Fish			
Percina pantherina	Leopard darter	T	
Percina maculate	Black-sided Darter		T
Flowering Plants			
Ptilimnium nodosum	Harperella	E	
Invertebrates			
Nicrophorus americanus	American burying beetle	E	
Reptiles			
Alligator mississippiensis	American Alligator	T	

Federal Status: E – Endangered; T – Threatened; C – Candidate Taxa
Oklahoma State Status: E – Endangered; T – Threatened

4.7 Cultural Resources

Archaeological sites representative of the Early Archaic Period through the Middle and Late Archaic, Woodland, Caddoan, and Historic Periods are known in the larger vicinity of Pine Creek Reservoir in southeastern Oklahoma. This culture-historical sequence falls generally within the overall sequence that has been established for southeastern Oklahoma and northeastern Texas. Many archaeological sites in this area have undisturbed, deeply-buried deposits; many are comprised of multi-component prehistoric and/or historic occupations. A number of cultural resources investigations, including archaeological survey and excavation, were conducted incident to the construction of Pine Creek Reservoir. In the larger regional area there are hundreds of archaeological sites and historic standing structures on record with the Oklahoma Archeological Survey (OAS).

Archaeological reconnaissance efforts undertaken specifically in the Pine Creek Reservoir area by the Army Corps of Engineers have resulted in the identification of 67 archaeological sites, seven of which are eligible for listing on the National Register of Historic Places (NRHP). Some of these archaeological investigations were conducted prior to reservoir impoundment, and archaeological sites were identified at elevations now under normal conservation pool.

However, a number of archaeological sites were also identified at elevations above what is now conservation pool as well. While these archaeological sites represent the current base of recorded properties in the immediate vicinity of the project area, it is important to note that other archaeological sites may be present but as yet unrecorded.

Tulsa District has determined the Area of Potential Effect (APE) for this project to consist of three primary components, including (1) the dam structure itself and all associated construction features such as roads, pipelines, electric lines, staging areas, and borrow areas; (2) the reservoir drawdown footprint, which extends entirely around the lake from elevation 438 ft. to 433 ft., plus an appropriate horizontal distance buffer at and above the 438 ft. normal conservation pool; and (3) a distance of 50 feet perpendicular to and away from the toe of the reservoir levee for its entire length on both sides, plus an additional 20 feet buffer to accommodate additional vegetation clearing, vehicle movement, and materials and vegetation staging.

4.8 Air Quality

The primary legislation governing federal air quality is the Clean Air Act Amendments (CAAA) of 1990. The CAAA delegates primary responsibility for clean air to the US Environmental Protection Agency (USEPA). The USEPA published a conformity rule on November 30, 1993, requiring all federal actions to conform to appropriate State Implementation Plans (SIPs) established to improve ambient air quality. Areas are classified as either “attainment” or “nonattainment” with respect to state and federal ambient air quality standards. The classifications are made by comparing actual monitored air pollutant concentrations to state and federal standards. The Conformity Rule applies to Federal actions in non-attainment areas. McCurtain County is in attainment and meets National Ambient Air Quality Standards (NAAQS) for all criteria pollutants designated in the Clean Air Act. Consequently, a conformity determination is not required.

NAAQS currently exist for six criteria pollutants: carbon monoxide, lead, nitrogen dioxide, ozone, sulfur dioxide, particulate matter less than 10 micrometers in size, and particulate matter less than 2.5 micrometers in size (USEPA 2012). The Oklahoma Department of Environmental Quality (ODEQ) monitors air quality stations for both criteria pollutants and air toxins. As previously noted, McCurtain County is in attainment for all criteria pollutants. (Table 4.7).

4.9 Hazardous, Toxic, or Radiological Waste (HTRW)

Potential for discovery of hazardous material at the Pine Creek project area was evaluated through examination of historic and current land use, review of environmental data bases, and visual observations. The potential for HTRW discovery and significant problems related to HTRW during project construction is believed to be low. Land use adjacent to the project area is primarily agricultural, wildlife habitat, and recreation. These lands have not been subject to intensive industrial development or other land use activities with associated potential for significant contamination. A query of the U.S. Environmental Protection Agency’s (EPA) Envirofacts Data Warehouse (USEPA 2012) for zip code 74764 indicated two EPA-regulated facilities exist near the project area. One of these facilities is a permitted hazardous waste handler; both are permitted to discharge to water, and are monitored for air releases. These

facilities handle forestry products and water treatment chemicals with the potential for surface and air emissions releases.

Table 4.7. National Ambient Air Quality Standards for criteria pollutants (carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), lead (Pb), particulate matter less than 2.5 micrometers ($PM_{2.5}$), particulate matter less than 10 micrometers (PM_{10}), and sulfur dioxide (SO_2) and attainment status of Air Quality Control Regions (AQCR) 022, McCurtain County, Oklahoma.

Pollutant	Type of Average	Primary Standard	Secondary Standard	Designation (2012) OK[1]
CO	8-hour	9 ppm	None	Unclassifiable/Attainment
	1-hour	35 ppm		
NO_2	Annual Arithmetic Average	53 ppb	Same as Primary	Unclassifiable/Attainment
	1-hour	100 ppb	None	
O_3	8-hour	0.075 ppm	Same as Primary	Unclassifiable/Attainment
	1-hour	0.12 ppm	Same as Primary	Unclassifiable/Attainment
Pb	Rolling 3-Month Average	0.15 ug/m^3	Same as Primary	Not reported
$PM_{2.5}$	Annual Arithmetic Average	15.0 ug/m^3	Same as Primary	Unclassifiable/Attainment
PM_{10}	24-hour	150 ug/m_3	Same as Primary	Not reported
SO_2	Annual Arithmetic Average	0.03 ppm	0.5 ppm/3-hour	Better than national standards
	24-hour	0.14 ppm		
	1-hour	75 ppb	None	

1. AQCR 022 (40 CFR § 81.337)

4.10 Recreation

Pine Creek Lake is one of multiple USACE reservoir project in southeast Oklahoma with Sardis Lake located approximately 35 miles to the northwest, Broken Bow Lake located approximately 23 miles to the east, and Hugo Lake located approximately 20 miles to the west of Pine Creek Lake. The lake offers diverse recreational opportunities on the 26,178 acres of land and 4,980 acres of water including camping, boating, fishing, hunting, picnicking, swimming, and hiking. 2,050 acres of land are licensed to the Oklahoma Tourism and Recreation Department and comprise the Pine Creek State Park and 10,280 acres of land and water licensed to the Oklahoma Department of Wildlife Conservation. Recreational facilities available to the public at Pine Creek Lake include 9 recreation areas, 197 camping sites, 3 playgrounds, 2 designated swimming areas, 1 mile of designated hiking trails, and 7 boat ramps. Recreation visitation activities for 2010, the most recent year available, published on the USACE "Value to the Nation" Fast Facts web page (USACE 2010) indicate that angling is, by far, the most popular recreational activity (39.1 % of total person-trips) at Pine Creek Lake. Table 4.8 presents an estimated breakdown of the type of recreation activities occurring at Pine Creek Lake based on

person-trips per year. Water dependent recreational activities (i.e., angling, swimming, boating, and water skiing) make up 70% of all recreational use.

Table 4.8. Recreational activities at Pine Creek Lake.

Activity	Percentage
Angling	39.1
Sightseeing	16.8
Swimming	14.5
Boating	12
Picnicking	10.7
Hunting	2.3
Camping	1.0
Water skiing	0.3
Other	3.4
TOTAL	100.0

Source: Value to the Nation (USACE 2010)

Average visitor days at Pine Creek Lake are shown in Table 4.9. These values represent all the types of recreational activities shown in Table 4.8. As noted in this table the largest number of visitor days occurs during the warmer months of the recreation season, June through September.

Table 4.9. Average annual visitor days at Pine Creek Lake, October 2001 – September 2010.

Month	Average Visitor Days
October	18,215
November	11,538
December	1,359
January	1,212
February	1,640
March	3,313
April	6,994
May	13,423
June	197,855
July	165,361
August	50,990
September	51,674

5.0 IMPACTS OF THE PROPOSED ACTION

A summary of the environmental and social impacts of the "No Action" alternative and the recommended alternatives are presented in Tables 5.1, 5.2, 5.3, and 5.4, Impact Assessment Matrices.

5.1 "No Action" Future Conditions

5.1.1 Social and Economic Conditions

5.1.1.1 Population

Due to current economic conditions, it is expected that the population of McCurtain County will continue to decline, while the overall population of Oklahoma will increase. The median age of the population will increase as the younger population seeks educational and employment opportunities elsewhere. The racial make-up will remain similar to its current composition. Under a rare event, a dam breach would cause mass evacuations of the floodplain. An event like this would result in a potential population decline in the region since displaced residents would seek a new location to live.

5.1.1.2 Employment and Education

The trend of outsourcing manufacturing is likely to continue, which will decrease the availability of employment opportunities. As the population continues to decline, it is estimated that fewer education jobs will be required in the region. However as the age of the population increases, health care related job opportunities will increase. A dam breach event would substantially impact the employment in the McCurtain County. One of the largest employers, a paper plant in Valliant, OK, would be significantly impacted since Pine Creek supplies water to the plant. Without water supplied, the plant would have to shut down. Approximately 1000 jobs in McCurtain County are associated directly with paper plant operations, however economic impacts resulting from the loss of the plant have not been determined.

5.1.1.3 Income

The median household income for Wright City and McCurtain County will remain lower than the state of Oklahoma. The income gap between males and females will remain the same and the poverty level for Wright City and McCurtain County will continue to be higher than the state of Oklahoma. Under a dam breach event, the flood would cause significant property damage and displacement of employment establishments would result in a decline of income for McCurtain County.

5.1.1.4 Social Ecology

Without the project, the possibility of a dam breach is above tolerable risk guidelines. The result of a dam breach would cause substantial flood damage and potential for significant life loss.

Table 5.1. DSMS (X), IRRM Pool Restriction (♦), and woody vegetation removal (●) "No Action" Impact Assessment Matrix.

Name of Parameter	Magnitude of Probable Impact						
	Increasing Beneficial Impact			No Appreciable Effect	Increasing Adverse Impact		
	Significant	Substantial	Minor		Minor	Substantial	Significant
A. Social Effects							
1. Noise Levels				X, ♦, ●			
2. Aesthetic Values				♦,●			X
3. Recreational Opportunities				♦,●			X
4. Transportation				♦,●		X	
5. Public Health and Safety				♦,●			X
6. Community Cohesion (Sense of Unity)				♦,●			X
7. Community Growth and Development				♦,●		X	
8. Business and Home Relocations				♦,●		X	
9. Existing/Potential Land Use				♦,●			X
10. Controversy				♦,●			X
B. Economic Effects							
1. Property Values				♦,●			
2. Tax Revenues				♦,●			X
3. Public Facilities and Services				♦	●		X
4. Regional Growth				♦,●			X
5. Employment				♦,●		X	
6. Business Activity				♦,●		X	
7. Farmland/Food Supply				X, ♦,●			X
8. Flooding Effects				♦	●		X
C. Natural Resource Effects							
1. Air Quality				X, ♦,●			
2. Terrestrial Habitat				♦,●		X	
3. Wetlands				♦,●			X
4. Aquatic Habitat				♦,●			X
5. Habitat Diversity and Interspersion				♦,●		X	
6. Biological Productivity				♦,●			X
7. Surface Water Quality				♦,●		X	
8. Water Supply				♦,●			X
9. Groundwater				X			
10. Soils				♦,●			
11. Threatened and Endangered Species				♦,●			X
D. Cultural Resources							
1. Historic Architectural Values			●	♦		X	
2. Pre-Historic & Historic Archeological Values				♦,●			X

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Table 5.2. DSMS Impact Assessment Matrix for the recommended alternative (structural alternative 7).

Name of Parameter	Magnitude of Probable Impact						
	Increasing Beneficial Impact			No Appreciable Effect	Increasing Adverse Impact		
	Significant	Substantial	Minor		Minor	Substantial	Significant
A. Social Effects							
1. Noise Levels				X			
2. Aesthetic Values				X			
3. Recreational Opportunities	X						
4. Transportation	X						
5. Public Health and Safety		X					
6. Community Cohesion (Sense of Unity)		X					
7. Community Growth and Development		X					
8. Business and Home Relocations			X				
9. Existing/Potential Land Use				X			
10. Controversy					X		
B. Economic Effects							
1. Property Values				X			
2. Tax Revenues				X			
3. Public Facilities and Services				X			
4. Regional Growth			X				
5. Employment		X					
6. Business Activity			X				
7. Farmland/Food Supply				X			
8. Flooding Effects	X						
C. Natural Resource Effects							
1. Air Quality				X			
2. Terrestrial Habitat				X			
3. Wetlands				X			
4. Aquatic Habitat				X			
5. Habitat Diversity and Interspersion				X			
6. Biological Productivity				X			
7. Surface Water Quality				X			
8. Water Supply	X						
9. Groundwater				X			
10. Soils				X			
11. Threatened and Endangered Species				X			
D. Cultural Resources							
1. Historic Architectural Values					X		
2. Pre-Historic & Historic Archeological Values				X			

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Table 5.3. IRRM Pool Restriction Impact Assessment Matrix for the recommended alternative.

Name of Parameter	Magnitude of Probable Impact						
	Increasing Beneficial Impact			No Appreciable Effect	Increasing Adverse Impact		
	Significant	Substantial	Minor		Minor	Substantial	Significant
A. Social Effects							
1. Noise Levels				X			
2. Aesthetic Values						X	
3. Recreational Opportunities						X	
4. Transportation				X			
5. Public Health and Safety					X		
6. Community Cohesion (Sense of Unity)					X		
7. Community Growth and Development				X			
8. Business and Home Relocations				X			
9. Existing/Potential Land Use				X			
10. Controversy					X		
B. Economic Effects							
1. Property Values				X			
2. Tax Revenues					X		
3. Public Facilities and Services						X	
4. Regional Growth					X		
5. Employment				X			
6. Business Activity					X		
7. Farmland/Food Supply				X			
8. Flooding Effects				X			
C. Natural Resource Effects							
1. Air Quality				X			
2. Terrestrial Habitat				X			
3. Wetlands					X		
4. Aquatic Habitat					X		
5. Habitat Diversity and Interspersion					X		
6. Biological Productivity					X		
7. Surface Water Quality					X		
8. Water Supply				X			
9. Groundwater					X		
10. Soils				X			
11. Threatened and Endangered Species				X			
D. Cultural Resources							
1. Historic Architectural Values					X		
2. Pre-Historic & Historic Archeological Values						X	

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Table 5.4. Woody Vegetation Free Zone Impact Assessment Matrix for the recommended alternative.

Name of Parameter	Magnitude of Probable Impact						
	Increasing Beneficial Impact			No Appreciable Effect	Increasing Adverse Impact		
	Significant	Substantial	Minor		Minor	Substantial	Significant
A. Social Effects							
1. Noise Levels				X			
2. Aesthetic Values				X			
3. Recreational Opportunities				X			
4. Transportation				X			
5. Public Health and Safety				X			
6. Community Cohesion (Sense of Unity)				X			
7. Community Growth and Development				X			
8. Business and Home Relocations				X			
9. Existing/Potential Land Use				X			
10. Controversy				X			
B. Economic Effects							
1. Property Values				X			
2. Tax Revenues				X			
3. Public Facilities and Services			X				
4. Regional Growth				X			
5. Employment				X			
6. Business Activity				X			
7. Farmland/Food Supply				X			
8. Flooding Effects				X			
C. Natural Resource Effects							
1. Air Quality				X			
2. Terrestrial Habitat				X			
3. Wetlands				X			
4. Aquatic Habitat				X			
5. Habitat Diversity and Interspersion				X			
6. Biological Productivity				X			
7. Surface Water Quality				X			
8. Water Supply				X			
9. Groundwater				X			
10. Soils				X			
11. Threatened and Endangered Species				X			
D. Cultural Resources							
1. Historic Architectural Values					X		
2. Pre-Historic & Historic Archeological Values					X		

Under such an extreme event, project purposes would be impacted and would cause significant environmental and cultural resources issues.

5.2 Future with-Action Conditions

5.2.1 Social and Economic Conditions

5.2.1.1 Population

Population trends of the past decade would continue in the region. Limited job opportunities would continue to be linked to future population dynamics in the area. Construction would create short-term employment opportunities. Dam Safety measures would reduce the probability of dam failure, associated property loss, and potential for mass evacuations.

5.2.1.2 Employment

Construction activities would cause a short-term increase in employment opportunities. With the project, the associated failure risk would decrease including the potential for loss in employment in the region in the case of a dam failure. Employment trends of the past decade would continue in the region.

5.2.1.3 Income

Construction related expenditures would temporarily increase area income. With the project, the probability of dam failure and associated economic losses, including losses from income, would be reduced. Income trends of the past decade would continue to be the same in the region.

5.2.1.4 Social Ecology

With the project, the social trends of the past decade would continue. Construction would temporarily disrupt traffic on N4470 diverting approximately 400 vehicles a day. Recreation activities would be temporarily disrupted to accommodate the construction. Dam Safety measures would reduce the probability of dam failure and associated disruption to social activities in the region. By providing protection for a potential dam breach, the measure enhances the health and safety of the populating living in the area. The temporary pool restriction would be lifted and the lake would return to its original operating levels.

5.2.1.5 Executive Order 12898, Environmental Justice

Executive Order 12898 requires federal agencies to identify and address disproportionately high and adverse human health and environmental effects of federal programs, policies, and activities on minority and low-income populations. Federal agencies are directed to ensure that federal programs or activities do not result, either directly or indirectly, in discrimination on the basis of race, color or national origin. Federal agencies are required to provide opportunities for input in the NEPA process from affected communities and to evaluate significant and adverse environmental effects of proposed federal actions on minority or low income communities during the preparation of federal environmental documents. The proposed project was evaluated in accordance with E.O. 12898 and it has been determined there is no adverse impact to minority and low-income populations for the reasons that minority and low-income populations do not comprise more than 50% of the total population (Table 4.2). Under a catastrophic failure scenario, minority and low-income populations would be significantly adversely impacted through the loss of approximately 1000 jobs, representing one-half the manufacturing jobs

available in McCurtain County (Table 4.3), directly tied to water supply provided by Pine Creek Lake.

5.2.1.6 Executive Order 13045, Protection of Children from Environmental Health and Safety Risks

Executive Order 13045 requires that federal agencies make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children. Federal agencies are directed to ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health and safety risks. The proposed project was evaluated in accordance with E.O. 13045. The review conducted for this EA indicates, at present, low to moderate environmental health risk to children due related to several factors. Factors contributing to environmental health risk to children include; extremely low lake levels at designated public swimming beaches, limited accesses at established public access points to the reservoir (e.g., courtesy docks, boat ramps), and a longer-term trend of increasing phosphorus loadings into the reservoir.

Conservation pool elevations below and elevation of 438.00 feet present environmental health risk to children at all access points around the reservoir. At these access points (i.e., swim beaches, boat ramps, courtesy docks), children could be exposed to hazardous conditions including grounded courtesy docks, inadequate boat ramp access to the reservoir, as well as previously unknown obstructions and hazards (e.g., standing timber, crevasses, unstable soil) not generally encountered at lake elevations greater than 438.00 feet. Additionally, the smaller volume of the reservoir at elevations below 438.00 feet could lead to the concentrating of nutrients (nitrogen and phosphorous) with a potential for nuisance and harmful algae blooms to occur including blue-green algae blooms which could occur at cellular densities high enough to merit administrative action (WHO 1999, Oklahoma State Law Section 2301 of Title74) and capable of producing neurotoxins (nerve toxins) and hepatotoxins (liver toxins). Symptoms experienced due to acute exposure to neurotoxins could possibly include muscle cramps, twitching, paralysis, cardiac or respiratory failure, death in animals (WHO 1999, NOAA 2009). It is recommended that information regarding possible adverse health effects related to primary and secondary water contact be posted at public facilities if conditions allow for the development of nuisance and harmful algae blooms because children are considered to be at greater risk from harmful algae blooms because children generally consume larger amounts of water while swimming and have lower body weights than adults.

5.2.2 Natural Resources

The Habitat Evaluation Procedure (HEP) methodology was used to assess the current and future quality of the habitat in the Pine Creek Project Area under the proposed alternatives. HEP is an environmental accounting process developed to appraise habitat suitability for fish and wildlife species in the face of potential change (USFWS, 1980a, b; 1981). Designed to predict the response of habitat parameters in a quantifiable fashion, HEP is an objective, reliable, and well-documented process used nationwide to generate environmental outputs for all levels of proposed projects and monitoring operations in the natural resources arena. When applied correctly, HEP provides an impartial look at environmental effects, and delivers measurable

products to the user for comparative analysis.

In HEP, a Habitat Suitability Index (HSI) is a mathematically derived value that evaluates the ability of key habitat components to supply the life requisites of selected representative species of fish and wildlife. Evaluation involves using the same key habitat components to compare existing habitat conditions and optimum habitat conditions for the species of interest. Optimum conditions are those associated with the highest potential densities of the species within a defined area. The HSI value obtained from this comparison then becomes an index to the carrying capacity for that species. The index ranges from 0.0 (zero) to 1.0 (one), and is linearly related to carrying capacity. HSI values are obtained for individual species through use of documented models employing measurable key habitat variables. Derived HSIs are multiplied by the area of available habitat (acres) to obtain Habitat Units (HUs) for individual species. The HUs are used in the HEP system for comparative purposes. Changes in HUs represent potential impacts from proposed actions. These changes are annualized (Average Annual Habitat Units [AAHUs]) in order to be comparable with benefit/cost analyses (USFWS, 1980a). The evaluation species form the basis for the HEP analysis. An evaluation species may be a single species, a group of species, species life stage, or a species life requisite. The methodology for HEP suggests utilizing one of the following approaches when selecting species for HEP evaluation: 1) selection of a species with high public interest or high economic value, and/or 2) selection of species to provide a broader ecological perspective of an area.

Future impacts were projected as change from baseline conditions over a 50-year period of analysis in the HEP assessments. NEPA regulations require consideration of the No Action Alternative during the formulation of plans. The Without Project descriptions should adequately describe the future, if no action is taken. Without Project conditions are not "before-and-after" comparisons, they are future oriented. In developing acreage projections for the Future without Project it was assumed that land use adjacent to the project area would not change. Most Federal agencies use annualization as a means to display benefits and costs. Federal projects are evaluated over a period of time referred to as the "period of analysis". This is defined as that period between the time that the project becomes operational and the projected end of the project life. In HEP, HUs are annualized by calculating cumulative HUs between target years and then summing across all years in the period of analysis and dividing the total (cumulative HU) by the number of years in the life of the project. The formula for calculating cumulative HUs between target years is:

$$Cumulative\ HU = (\mathrm{T2} - \mathrm{T1})\left[\frac{\mathrm{A_1H_1} + \mathrm{A_2H_2}}{3} + \frac{\mathrm{A_2H_1} + \mathrm{A_1H_2}}{6}\right]$$

where T_1 = first target year of time interval,
T_2 = last target year of time interval,
A_1 = area of habitat at T_1,
A_2 = area of habitat at T_2,
H_1 = HSI at T_1,
H_2 = HSI at T_2, and
3 and 6 = constants derived from integration of HSI times

Area for the interval between any two target years.

The results of this calculation are referred to as Average Annual Habitat Units (AAHUs).

Actions being assessed with HEP include the IRRM pool restriction to elevation 433.00 feet and the removal of woody vegetation along the dike to a distance of 70 feet from the dike tow. Impacts being assesses with HEP relative to the IRRM pool restriction to elevation 433.00 are associated with the period between 2010 and 2018 when the pool will be restricted from the authorized top of conservation pool, elevation 438.00 feet, to elevation 433.00 feet, which results in decrease in reservoir surface area from 4559 surface-acres to 2785 surface-acres. Impacts being assessed with HEP relative to the removal of woody vegetation and re-establishment of woody vegetation free zone are associated with the conversion of 48 acres of oak-pine forest to grass-forb meadow habitat. The conversion of oak-pine forest to grass-forb meadow results in a net increase of 35 acres of grass-forb meadow habitat.

5.2.2.1 Terrestrial Resources

The proposed Dam Safety Modification (DSM) of Pine Creek Dam would result in no impact to terrestrial resources. All activities associated with the DSM of Pine Creek Dam are structural in nature and would be limited to maintenance and repair activities of the embankment and conduit structures. The Interim Risk Reduction Measure (IRRM) pool restriction would result in no impact to terrestrial resources under the future without- and with-proposed action conditions.

HSI species models selected to analyze terrestrial habitat along the dike included the Eastern cottontail (Allen 1984) representing the grass-forb habitat immediately along the dike and the hairy woodpecker (Sousa 1987) representing the oak-pine forest habitat. These terrestrial models required data describing the number of large snags, diameter at breast height of overstory trees, percent canopy cover of all trees, percent overstory pine cover, percent shrub crown cover, and the percent canopy closure of persistent herbaceous vegetations.

The proposed removal of woody vegetation along the dike extending approximately 14,000 feet from the right abutment of the spillway structure would result in the average net loss of 2.1 Average Annualized Habitat Units (AAHU) over the 50-year project life of the woody vegetation removal. Habitat losses would not result in the loss of designated critical habitat for threatened or endangered species or other species of concern. Future without- and with-proposed action habitat values, cumulative AAHU's and net AAHU's are provided in Table 5.1. The 48 acres adjacent to the dike toe is shown in Figure 5.1.

Table 5.5. Calculation of Habitat Suitability Index (HSI) scores and Cumulative Average Annualized Habitat Units (AAHU) for without- and with-proposed action conditions for the terrestrial environment and Net AAHU for with-proposed action conditions.

	Habitat	Species Model	Acres	HSI	HU	Cumulative AAHU	Net AAHU
With-out proposed action	Grass-Forb Meadow	Eastern Cottontail	13	0.32	11.2	6.2	--
	Oak-Pine Forest	Hairy Woodpecker	680	0.66	278.8	179.5	--
With-proposed action	Grass-Forb Meadow	Eastern Cottontail	48	0.74	35.5	21.8	15.6
	Oak-Pine Forest	Hairy Woodpecker	632	0.41	259.1	168.0	(11.5)
		Average					2.1

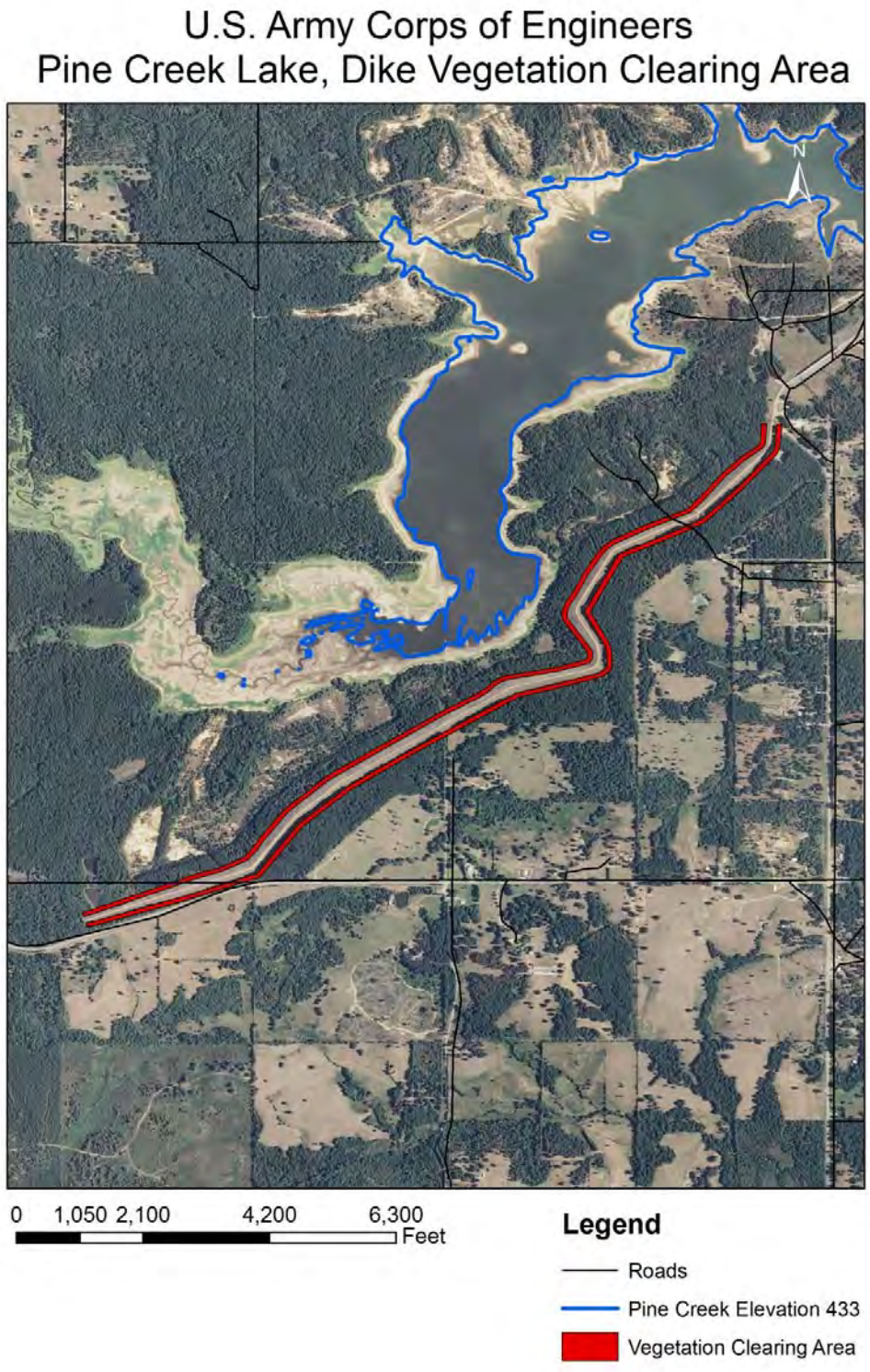

Figure 5.1. Area identified for removal of woody vegetation along the toe of the Pine Creek dike.

5.2.2.2 Aquatic Resources

The proposed DSM of Pine Creek Dam could result in significant impacts to the within reservoir and downstream aquatic resources under the without-action recommended alternative, under a dam failure scenario. Impacts would include loss of the 69,000 surface-acre reservoir at elevation 442 feet and could result in substantial changes in the morphological characteristics of the Little River downstream of Pine Creek Dam for a distance of up to 60 stream miles. Under the with-proposed DSM recommended alternative, structural deficiencies of the embankment and conduit structures would be addressed and no significant impact to the in-reservoir and downstream aquatic resources would occur.

The proposed removal of woody vegetation along the dike extending approximately 14,000 feet from the right abutment of the spillway structure would not result in impacts to aquatic resources under both the without- and the with-proposed recommended alternative.

HSI species models to analyze aquatic habitat in Pine Creek Lake include three models representing aquatic species. Species models included the gizzard shad (Williamson and Nelson, 1985), the channel catfish (McMahon and Terrell, 1982), and the white crappie(Edwards, et al. 1982). The white crappie is representative of the important recreational fisheries. The white crappie was selected over other recreational game fish (such as large or smallmouth bass) because of it sensitivity to changes in dissolved oxygen and an existing approved HEP model which reflects that sensitivity. The channel catfish is also an important recreational fish and incorporation of this species into the HEP model provides a broader ecological perspective as the channel catfish utilizes a different ecological niche than the white crappie. The gizzard shad, while not a desirable game fish, is an important food source for recreational fishes such as largemouth bass and channel catfish and provides a broader ecological perspective as gizzard shad tend to favor open water conditions and utilize the open water regions Pine Creek Lake more so than white crappie or channel catfish.

The IRRM pool restriction to elevation 433.00 feet would result in the average net loss of 133.2 AAHU over the 50-year project life of the reservoir following completion of the DSM and a return of the top of the conservation pool to elevation 438.00 feet and seasonal pool operations with a top of conservation pool of elevation 442.50 feet from March 15 through September 30 each year. Aquatic habitat losses resulting from this action would be limited to the period July 2010 through the anticipated end of construction of the dam safety modification in 2018. Top of pool elevations for the seasonal pool (442 feet), conservation pool (438.00 feet) and IRRM restricted pool (433.00 feet) are shown in Figures 5.2 through 5.4.

Aquatic habitat losses would not result in the loss of designated critical habitat for threatened or endangered species or other species of concern. Future without- and with-proposed action habitat values, cumulative AAHU's and net AAHU's are provided in Table 5.2.

Currently impacts to aquatic resources due to additives included in grout mix design are unknown and not quantified. Any additives incorporated into grout mix designs for grouting purposes included in the selected alternative will be assessed, with regard to aquatic resources impacts, during the design and specifications phase prior to initiation of construction. If

additives incorporated into grout mix designs during construction are shown to result in impacts to aquatic resources, a supplement to the existing Environmental Assessment will be prepared by the Tulsa District at that time.

Table 5.6. Calculation of Habitat Suitability Index (HSI) scores, Cumulati Average Annualized Habitat Units (AAHU) for without- and with-proposed action conditions for the aquatic environment and Net AAHU for with-proposed action conditions.

	Habitat	Species Model	Acres	HSI	HU	Cumulative AAHU	Net AAHU
With-out proposed action	Aquatic – Forage Fish	Gizzard Shad	4559	0.2	911.8	638.3	--
	Aquatic – Limnetic/Littoral Predator	White Crappie	4559	0.6	2735.4	1914.8	--
	Aquatic – Benthic Predator	Channel Catfish	4559	0.87	3966.3	2776.4	--
With-proposed action	Aquatic – Forage Fish	Gizzard Shad	4559	0.2	911.8	603.9	(34.2)
	Aquatic – Limnetic/Littoral Predator	White Crappie	4559	0.6	2735.4	1722.7	(192.0)
	Aquatic – Benthic Predator	Channel Catfish	4559	0.87	3966.3	2603.0	(173.5)
		Average					(133.2)

Note: Net AAHU losses are limited to the period 2010-2018 during which the IRRM pool restriction is in place. Following completion of DSM construction, the IRRM pool restriction would be recinded.

5.2.2.3 Wetlands

Wetlands are generally lands which are saturated with water such that the water saturation influences soil development as well as the plant communities associated with wetland areas. Wetlands geo-referenced data layers were obtained from the National Wetlands Inventory (NWI) maintained by the U.S. Fish and Wildlife Service (USFWS 2012) to evaluate the extent to which freshwater emergent and freshwater forested/shrub wetlands could be impacted by the recommended alternatives. Fringe wetland areas around Pine Creek Lake included in the NWI database are identified in Figure 5.5.

Wetland features surrounding the reservoir would not be impacted by maintenance and repair activities associated with the Dam Safety Modification recommended alternative for the dam embankment and conduit. Additionally, wetland features surrounding the reservoir would not be impacted by wood vegetation removal maintenance activities along the 14,000 feet of dike extending from the right abutment of the spillway structure, however contractors engaged in removing woody vegetation along the tow of the dike would be required to limit vegetation removal activities to only 50 feet of the tow at the extreme western end of the dike due to the

existence of wetland features associated with an existing freshwater pond at that location (Figure 5.6.

As indicated in Figure 5.5, the vast majority of palustrine forested and shrub wetlands are located along the margins of the authorized conservation pool (438.00 feet). These reservoir fringe wetlands areas, identified on the NWI, consist of historic upland forested areas which are seasonally inundated to provide habitat for fish spawning, nursery, and recruitment areas and are not comprised by bottomland hardwoods or bottomland conifers. Due to the nature of these NWI designated wetlands (i.e., comprised of former upland forested areas), long-term detrimental adverse impacts are considered to be ephemeral in nature and would not result in a significant impact to these areas. The current NWI designated forested wetlands are well established and would be capable of withstanding extended periods between inundation events. The Pine Creek elevation-duration calculations (POR 1938-2007) updated as part of the DSMS by the Tulsa District in 2011, indicate that while the IRRM pool restriction of 433.00 feet is in effect, top of pool elevations of 442.00 feet and 438.00 feet could occur 8 % and 18 % of the time, respectively, allowing for less frequent but periodic inundation of NWI designated forested and shrub wetlands.

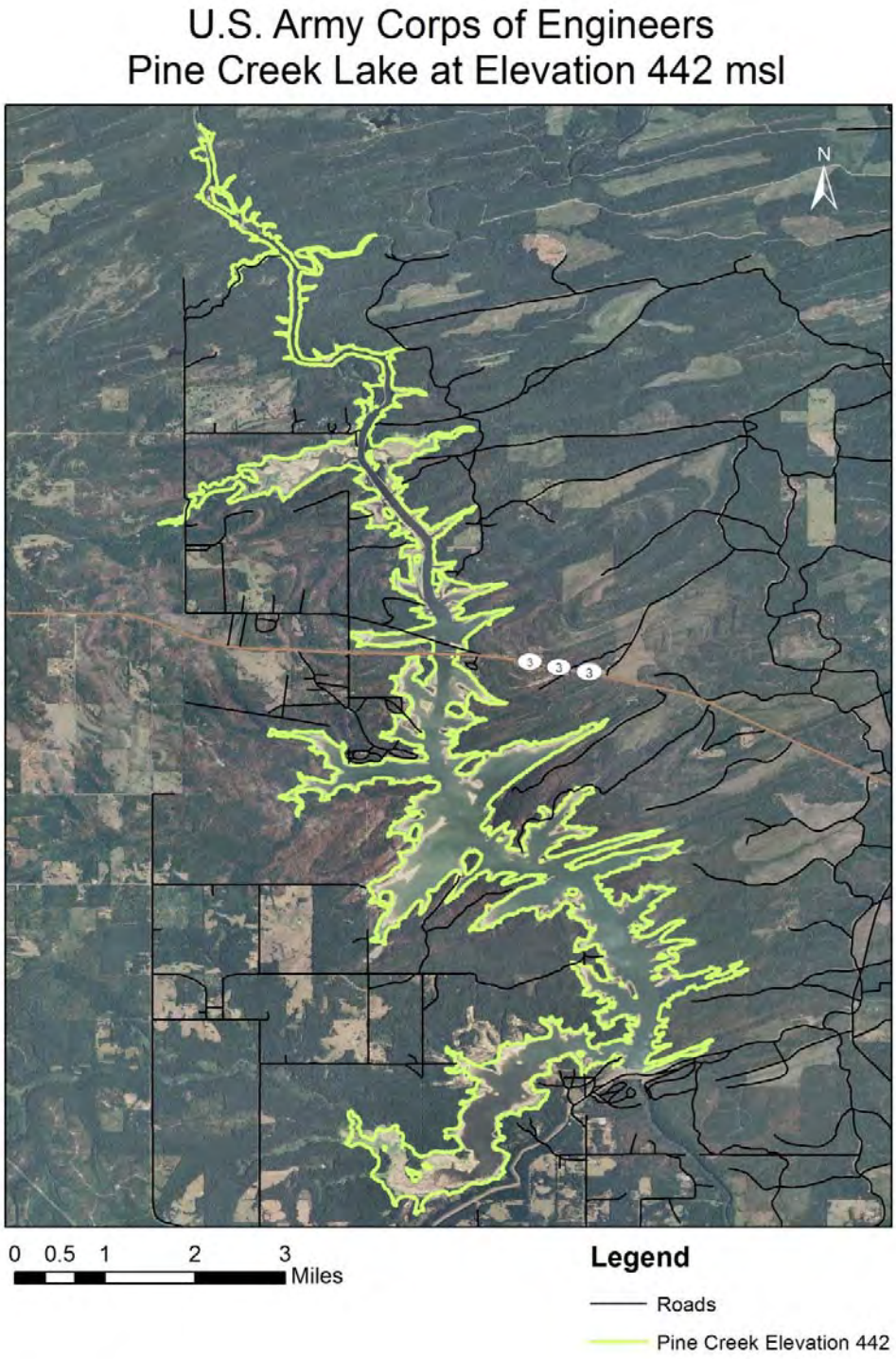

Figure 5.2. Areal extent of Pine Creek Lake at elevation 442.00 feet NVGD.

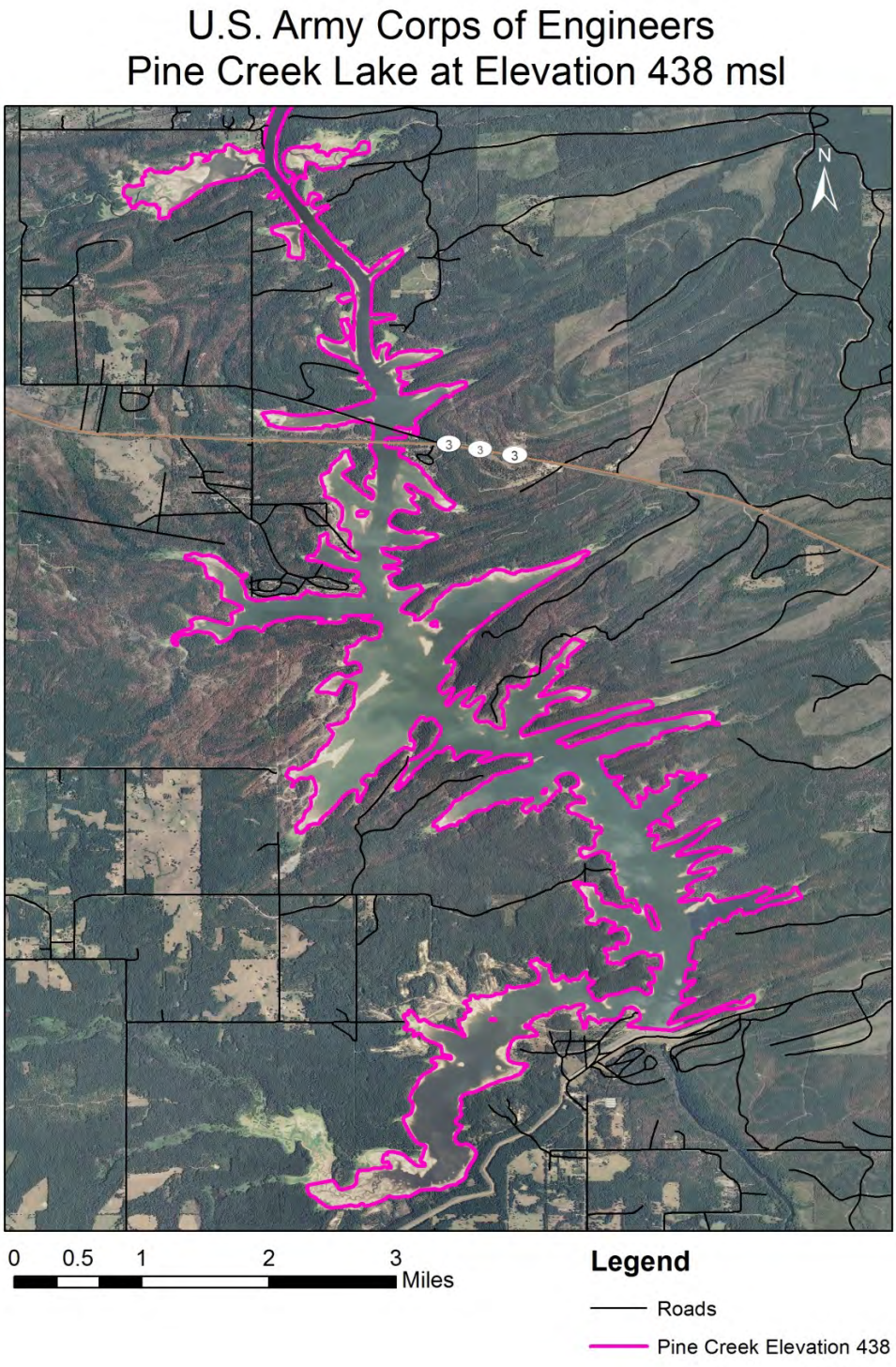

Figure 5.3. Areal extent of Pine Creek Lake at elevation 438.00 feet NVGD

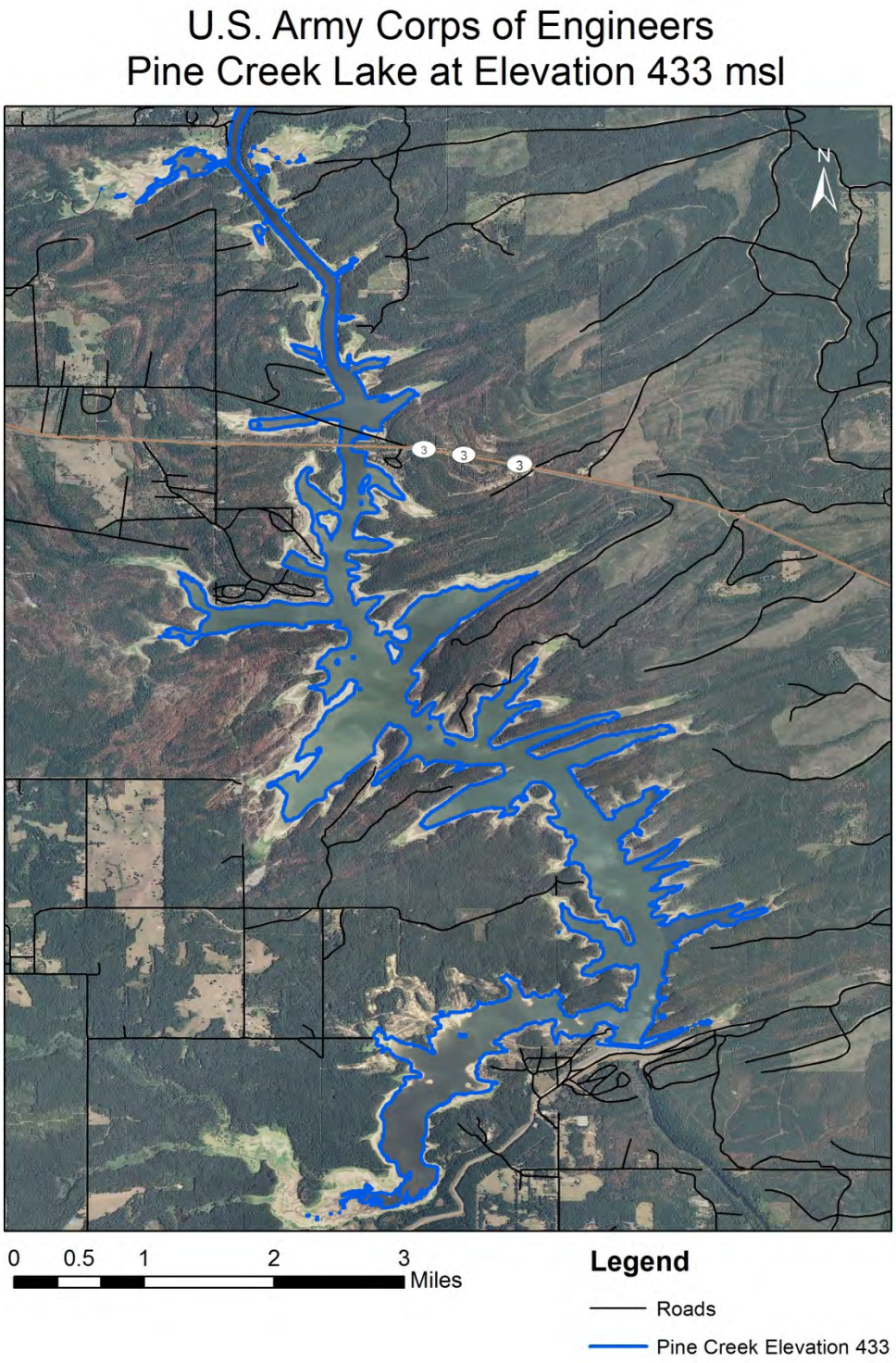

Figure 5.4. Areal extent of Pine Creek Lake at elevation 433.00 feet NVGD.

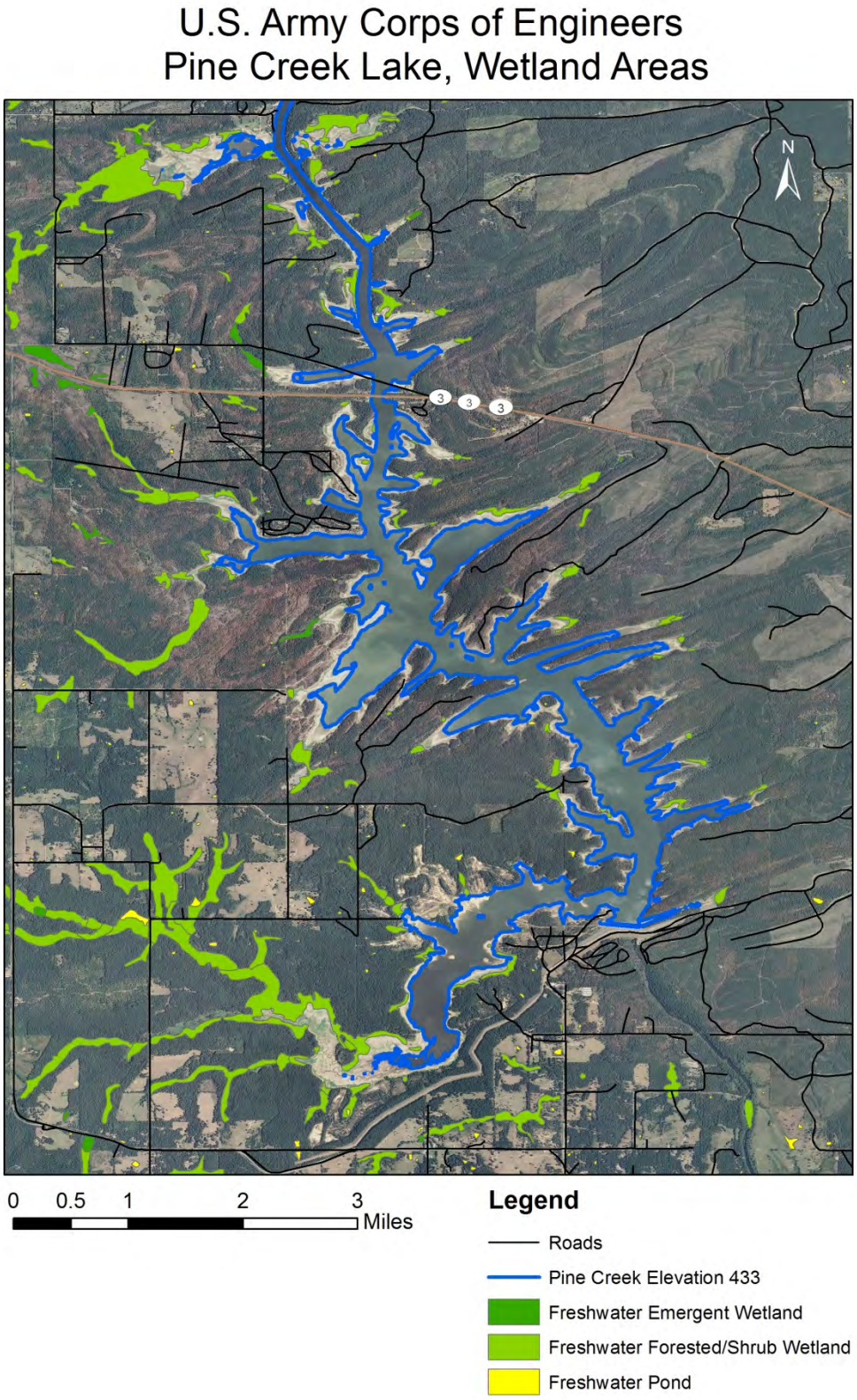

Figure 5.5. Wetland areas included in the USFWS, NWI, Pine Creek Lake.

Figure 5.6. Woody vegetation adjacent to a freshwater pond feature at western upstream end of the Pine Creek dike.

Figure 5.7. Herbaceous vegetation adjacent to a freshwater pond feature at the western upstream end of the Pine Creek dike.

5.2.4 Prime and Unique Farmland

There would be no significant impact on prime farmland located within the Pine Creek Lake area.

5.2.5 Wild and Scenic Rivers

There are no streams within the project area that are classified as wild and scenic pursuant to the Federal Wild and Scenic Rivers Act, Public Law 90-542.

5.2.6 Executive Order 13112, Invasive Species

Species of exotic or invasive plants and animals have the potential to be transported into or out of the PUA expansion area by the equipment to be used by the contractor. Executive Order 13112 requires Federal agencies to not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the United States; and that all feasible and prudent measures to minimize risk or harm will be taken in conjunction with the actions. The potential exists at this project for the transport of species covered under this Executive Order. Plant and animal species classified as invasive include: bull thistle (*Cirsium vulgare*), Chinaberry (*Melia azedarch*), Chinese privet (*Ligustrum sinense*), curly dock (*Rumex crispus*), field bindweed (*Convolvulus arvensis*), Japanese honeysuckle (*Lonicera japonica*), Japanese privet (*Ligustrum japonicum*), Johnson grass (*Sorghum halepense*), marijuana (*Canabis sativa*), multiflora rose (*Rosa multiflora*), musk thistle (*Carduus nutans*), Chinese lespedeza (*Sericea lespedeza*), sheep sorrel (*Rumex acetosella*), tall fescue (*Schedonorus arundinaceus*), five-stamen tamarisk (*Tamarix chinensis*), red imported fire ant (*Solenopsis invicta*), and wild boar (*Sus scrofa*).

The introduction and spread of exotic and invasive species is a major concern with the use of heavy equipment for this project. Therefore, the contract specifications for this project will include the following condition. All equipment brought on site will be thoroughly washed to remove dirt, seeds, and plant parts. Any equipment that has been in any body of water within 30 days of its arrival at the work site will be thoroughly cleaned with hot water (hotter than 40° C or 104°F) and dried for a minimum of five days before being used at the Pine Creek Lake project site. In addition, before transporting equipment from the project site all visible mud, plants, and fish/animals will be removed, all water will be eliminated, and the equipment will be thoroughly cleaned. Anything that had come in contact with water at this or other construction sites will be cleaned and dried following the above procedure.

5.2.7 Executive Order 13186, Responsibility of Federal Agencies to Protect Migratory Birds

While many of the priority bird populations identified as at risk to habitat loss and land use change by *Partners in Flight* (2012), no significant habitat loss or impact would occur to these migratory bird populations within the project area.

5.2.8 Threatened and Endangered Species

There are no federally listed threatened and endangered species which would be impacted by the IRRM top of conservation pool restriction of 433.00 feet. Soil disturbing activities associated

with woody vegetation removal along the toe of the dike and with maintenance and repair activities associated with DSM of the dam embankment and conduit could impact the American burying beetle (ABB) and Harperella. According to the most current 2012 ABB survey results available from the USFWS Oklahoma Ecological Services Field Office no beetles were found to be present (USFWS 2012). Prior to initiation of soil disturbing activities along the dike and the embankment, the Tulsa District will coordinate ABB survey efforts and data collection under the conditions of the most current Biological Opinion in effect at that time. At present, no surveys have been conducted for Harperella on Federal lands managed at Pine Creek Lake. Prior to start of maintenance activities associated with the DSM and removal of woody vegetation the USACE will consult with the USFWS in accordance with Section 7 of the Endangered Species Act and in compliance with the most recent Biological Opinion in effect at that time.

5.2.9 Cultural Resources

The IRRM pool restriction currently in effect, DSM, and woody vegetation removal alternatives all have the potential to impact cultural resources. Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) requires agencies to evaluate the impacts of federal undertakings on historic properties, which include prehistoric and historic archaeological sites, and historic standing structures. Section 106 requires the identification of all historic properties, which emphasizes an evaluation of eligibility for listing on the National Register of Historic Places (NRHP). Agencies must then determine which historic properties (those eligible for listing on the NRHP) will be adversely impacted. Section 106 requires that agencies resolve adverse effects to these properties. Plans for resolving adverse effects are determined through consultation with the Oklahoma State Historic Preservation Office (SHPO and the Oklahoma Archeological Survey (OAS), potentially the Advisory Council on Historic Preservation (ACHP), and appropriate and interested Native American tribes and other interested parties.

In order to comply with Section 106 requirements, Tulsa District has entered into Section 106 consultation with the Advisory Council on Historic Preservation, Oklahoma State Historic Preservation Office, Oklahoma Archeological Survey, Caddo Nation of Oklahoma, and Choctaw Nation of Oklahoma. Tulsa District is in the process of drafting and executing a Programmatic Agreement (PA) with these signatories, which will guide compliance with Section 106. The PA will outline Tulsa District responsibilities in the identification and evaluation of historic properties, and the resolution of adverse effects to historic properties if necessary. Copies of cultural resources correspondence and a copy of the draft PA are included in Appendix C of this EA.

5.2.10 Air Quality

Air quality within the area would not be negatively impacted as a result of this project. There would be minor temporary air emissions during the construction phase of the project; this would not likely adversely affect the air quality. This area is currently in attainment with the Clean Air Act (as amended).

5.2.11 Hazardous, Toxic, or Radiological Waste (HTRW)

Based on the findings of the HTRW survey discussed in Section 4.10, the potential for discovery and significant problems related to HTRW during project construction or operation is believed to be low for all alternatives assessed.

During construction activities associated with these Federal actions, a Spill Prevention Plan will be prepared prior to the start of construction detailing the handling and storage of all fuels, waste oils, and solvents. All personnel briefed on the implementation and responsibilities of this plan to reduce any potential adverse impacts to surface water resources during all phases of construction.

5.2.12 Recreation

Maintenance and repair activities associated with the DSM of the dam embankment and conduit and woody vegetation removal along the toe of the dike would have no significant adverse impact on recreation at Pine Creek Lake as these activities are limited to the dam structure itself. Additionally, forest edge habitat would be improved due to the 35 acre net increase in grass-forb habitat along the upstream and downstream toe of the dike affording greater opportunities for wildlife viewing and hunting activities.

Impacts to recreation resulting from the IRRM top of conservation pool restriction to elevation 433.00 feet would be substantial. Comparisons of monthly average visitor days between October 2001 through September 2010 and monthly average visitor days between October 2011 through September 2012 indicate monthly average visitor days have generally decreased since the IRRM top of conservation pool restriction of 433.00 feet was put in place in July 2010. Overall, the number of annual average visitor days has decreased by 31.7 % during the October 2011 through September 2012 period (Table 5.7). While impacts to water related activities would be substantial throughout the period of time the IRRM pool restriction is in place, boat access to the lake is still available due to an extension of two boat ramps in 2010. Additionally, the public would have access to other activities not impacted by lower lake elevations including, camping, hiking, fishing, picnicking, and wildlife viewing.

Table 5.7. Percent difference in monthly average visitor days between 2001-2010 and 2011-2012.

Month	Average Visitor Days (2001-2010)	Average Visitor Days (2011-2012)[1]	Percent Difference
October	18,215	14,856	(18.4)
November	11,538	6,869	(40.4)
December	1,359	1,003	(20.2)
January	1,212	786	(35.1)
February	1,640	1,532	(6.6)
March	3,313	4,209	27.0
April	6,994	10,513	50.3
May	13,423	10,403	(22.5)
June	197,855	162,220	(18.0)
July	165,361	71,049	(57.0)
August	50,990	61,137	(54.1)

September	51,674	59,314	(42.3)
Yearly Average Total	591,243	403874	(31.7)

1. IRRM top of conservation pool restriction in effect

6.0 FEDERAL, STATE, AND LOCAL AGENCY COORDINATION

The Draft Environmental Assessment (EA) was coordinated with the following agencies having legislative and administrative responsibilities for environmental protection. A copy of the correspondence from the agencies that provided comments and planning assistance for preparation of the draft EA are in the appendices. The mailing list for the 15-day public review period for this draft EA is in Appendix A.

U.S. Fish and Wildlife Service
Oklahoma Department of Wildlife Conservation
Oklahoma Water Resources Board
Oklahoma Conservation Commission
Oklahoma Tourism and Recreation Department
Oklahoma Department of Environmental Quality
Natural Resources Conservation Service
Oklahoma State Historic Preservation Officer
U.S. Army Corps of Engineers, Tulsa District Regulatory Office
Caddo Nation of Oklahoma
Choctaw Nation of Oklahoma
Oklahoma Archeological Survey

7.0 REFERENCES

Allen, A. W. *Habitat suitability index models: Eastern cottontail.* Washington, D.C.: U.S. Fish and Wildlife Service, 1984, 23.

DEQ. *Hook, Line & Supper: Healthy Fish Consumption in Oklahoma.* 2012. http://www.deq.state.ok.us/CSDnew/fish/index.htm (accessed October 23, 2012).

DEQ. *Water Quality in Oklahoma: 2012 Integrated Report.* Oklahoma City: Oklahoma Department of Environmental Quality, 2010.

Edwards, E A, D A Krieger, G Gebhart, and O E Maughan. *Habitat suitability index models: White crappie.* Washington, D.C.: U.S. Fish and Wildlife Service, 1982, 22.

Flight, Partners in. *Partners in Flight Physiographic Areas Plans.* 2012. http://www.partnersinflight.org/bcps/pl_42sum.htm (accessed November 2, 2012).

Hornback, D.J. and M.C. Hove. *Habitat requirements of the winged mapleleaf mussel: potential habitat degradation and decline in the St. Croix River.* St. Paul, MN: Macalester College, 2008.

Isely, F. P. "The Freshwater mussel fauna of eastern Oklahoma." *Proc. Okla. Acad. Sci* 4 (1924): 43-118.

McMahon, Thomas E, and James W Terrell. *Habitat suitability index models: channel catfish.* Washington, D.C.: U.S. Fish and Wildlife Service, 1982.

Miller, R. J. and H. W. Robinson. *The Fishes of Oklahoma.* Stillwate, OK: Oklahoma State University Press, 1973.

NatureServe. *NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1.* 2012. http://www.natureserve.org/explorer (accessed October 18, 2012).

ODWC. *Survey and Recommendations - Pine Creek Reservoir, Grant No. F 44-D-20.* Oklahoma City, Oklahoma: Oklahoma Department of Wildlife Conservation , 2005.

ODWC. *Survey Results and Management Recommendations - Pine Creek Reservoir, Project No. F-68-D-4.* Oklahoma City, Oklahoma: Oklahoma Department of Wildlife Conservation, 2009.
ODWC. *Surveys and Recommendations - Pine Creek Reservoir.* Oklahoma City, Oklahoma: Oklahoma Department of Wildlife Conservation, 2001.

Ortmann, A. E. "A new locality for Arkansia wheeleri Ortman & Walker." *Nautilus* 34, no. 4 (1921): 141.

OWRB. *2007 Report of the Oklahoma Beneficial Use Monitoring Program.* Government Report, Oklahoma City: Oklahoma Water Resources Board, 2007.

OWRB. *2007-2008 Oklahoma Lakes Report Beneficial Use Monitoring Program.* Oklahoma City: Oklahoma Water Resources Board, 2008.

OWRB. *2008-2009 Oklahoma Lakes Report, Beneficial Use Monitoring Program.* Oklahoma City: Oklahoma Water Resources Borad, 2009.

OWRB. *2010-2011 Oklahoma Lakes Report, Beneficial Use Monitoring Program.* Oklahoma City: Oklahoma Water Resource Board, 2011.

Sousa, P.J. *Habitat suitability index models: hairy woodpecker.* Washington, D.C.: U.S. Fish and Wildlife Service, 1987, 19.

USACE. *Final Environmental Statement, Broken Bow, Mountain Fork, Oklahoma; Pine Creek Lake, Little River, Oklahoma; and Millwood Lake, Little River, Arkansas Operations and Matenance Program.* Tulsa, Oklahoma: Tulsa District, 1976.

USACE. *Pine Creek Lake, Little River Oklahoma: Periodic Inspection No. 11, Embankment, Outlet Works, and Spillway.* Tulsa: USACE, 2009.

USACE. *Tulsa District Pertinent Data Book.* U.S. Army Corps of Engineers, Tulsa District, 2004.

—. *Value to the Nation: Lake Leve Report PINE CREEK LAKE.* 2010. http://www.corpsresults.us/recreation/fastfacts/lake.cfml?LakeID=341 (accessed October 26, 2012).

USACE. *Water Quality Report, Pine Creek Lake, Oklahoma, 2000.* U.S. Army Corps of Engineers, Tulsa District, 2002.

USEPA. *AirData: Access to air Pollution Data.* 2012. http://www.epa.gov/air/data/index.html (accessed October 22, 2012).

—. *EnviroMapper for Envirofacts.* 2012. http://www.epa.gov/emefdata/em4ef.home (accessed October 17, 2012).

USFWS. *American Burying Beetle: Additional Information.* U.S. Fish and Wildlife Service. 2012. http://www.fws.gov/southwest/es/oklahoma/ABB_Add_Info.htm (accessed November 1, 2012).

—. *County Occurrences of Oklahoma Federally-Listed Endangered, Threatend, Proposed and Canidate Species: Information, Planning, and Conservation System (IPaC).* 2012. http://ecos.fws.gov/ipac/ (accessed October 17, 2012).

USFWS. *Endangered and threatened wildlife and plants; final rule to list the Oauchita Rock-Pocketbook (Mussel) as an endangered species.* Federal Register 56(205): 54950-54957, 1991.

USFWS. *Habitat as a Basis for Environmental Assessment.* Ecological Service Manual 101, Washington, D.C.: U.S. Fish and Wildlife Service, 1980.

USFWS. *Habitat Evaluation Proceedure (HEP).* Ecological Service Manual 102, Washington, D.C.: U.S. Fish and Wildlife Service, 1980.

—. *Information, Planning, and Conservation System.* 2012. http://www.fws.gov/ipac/ (accessed October 17, 2012).

—. *National Wetlands Inventory.* U.S. Fish and Wildlife Service. 2012. http://www.fws.gov/wetlands/index.html (accessed October 17, 2012).

USFWS. *Scaleshell mussel recovery plan (Leptodea leptodon).* Fort Snelling, MN: U.S. Fish and Wildlife Service, 2010, 127.

USFWS. *Species Profilie of hte American alligator (Alligator mississippiensis).* Atlanta, Georgia: U.S. Fish and Wildlife Service, Southeastern Region, 2008.

USFWS. *Standards for the Development of Habitat Suitability Index Models.* Ecological Service Manual 103, Washington, D.C.: U.S. Fish and Wildlife Service, 1981.

Valentine, B.D. and D. H. Stansbery. "An introduction to the naiades fo the Lake Texoma region, Oklahoma, with notes on the Red River fauna (Mollusca: Unionidae)." *Sterkiana* 42 (1971): 1-40.

Wetzel, Robert G. *Limnology, 2nd Ed.* Saunders College Publishing, 1983.

Williamson, K L, and P C Nelson. *Habitat suitability index models and instream flow suitability curves: Gizzard shad.* Washington, D.C.: U.S. Fish and Wildlife Service, 1985, 33.

Woods, A.J., Omernik, J.M., Butler, D.R., Ford, J.G., Henley, J.E., Hoagland, B.W., Arndt, D.S., and Moran, B.C. *Ecoregions of Oklahoma.* Reston, Virginia: U.S. Geological Survey, 2005.

8.0 APPLICABLE FEDERAL LAWS

Table 8.1. Relationship of Plans to Federal Environmental Protection Statutes and Other Environmental Requirements

Policies	Compliance of Alternatives
Archeological and Historic Preservation Act, 1974, as amended, 16 U.S.C. 469, et seq.	All plans in partial compliance
Clean Air Act, as amended, 42 U.S.C. 7609, et seq.	All plans in full compliance
Clean Water Act, 1977, as amended (Federal Water Pollution Control Act, 33 U.S.C. 1251, et seq.	All plans in full compliance
Endangered Species Act, 1973, as amended, 16 U.S.C. 1531, et seq.	All plans in full compliance
Federal Water Project Recreation Act, as amended, 16 U.S.C. 460-1-12, et seq.	All plans in full compliance
Fish and Wildlife Coordination Act, as amended, 16 U.S.C. 661, et seq.	All plans in full compliance
Land and Water Conservation Fund Act, 1965, as amended, 16 U.S.C. 4601, et seq.	All plans in full compliance
National Historic Preservation Act, 1966, as amended, 16 U.S.C. 470a, et seq.	All plans in partial compliance
National Environmental Policy Act, as amended, 42 U.S.C. 4321, et seq.	All plans in full compliance
Native American Graves Protection and Repatriation Act, 1990, 25 U.S.C. 3001-13, et seq.	All plans in partial compliance
Rivers and Harbors Act, 33 U.S.C. 401, et seq.	N/A
Watershed Protection and Flood Prevention Act, 16 U.S.C. 1001, et seq.	N/A
Wild and Scenic Rivers Act, as amended, 16 U.S.C. 1271, et seq.	N/A
Water Resources Planning Act, 1965	N/A
Floodplain Management (E.O. 11988)	All plans in full compliance
Protection of Wetlands (E.O. 11990)	All plans in full compliance
Environmental Justice (E.O. 12898)	All plans in full compliance
Protection of Children (E.O. 13045)	All plans in full compliance
Invasive Species (E.O. 13112)	All plans in full compliance
Protection of Migratory Birds (E.O. 13186)	All plans in full compliance
Farmland Protection Policy Act, 7 U.S.C. 4201, et seq.	All plans in full compliance

Note: Full compliance – Having met all requirements of the statutes, Executive Orders, or other environmental requirements for the current stage of planning.

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DEPARTMENT OF THE ARMY
UNITED STATES ARMY CORPS OF ENGINEERS, TULSA DISTRICT
1645 SOUTH 101 EAST AVENUE
TULSA OK 74128-4609

REPLY TO
ATTENTION OF

October 9, 2012

Planning and Environmental Division
Environmental Analysis and Compliance Branch

Ms. Dixie Bounds
Field Supervisor
U.S. Fish & Wildlife Service
9014 East 21st Street
Tulsa, Oklahoma 74129-1428

Dear Ms. Bounds,

The Tulsa District is in the process of developing an Environmental Assessment (EA) for the removal of approximately 48 acres of forested vegetation along the dam embankment and the permanent repair of Pine Creek Dam located in Pushmataha, McCurtain, and Choctaw Counties, on the Little River, in southeast Oklahoma.

In April 2009, it was determined that Pine Creek Dam had potential structural deficiencies. Following completion of additional investigations, dye testing, and monitoring of instrumentation installed on dam, in April 2011, structural deficiencies of Pine Creek Dam were re-classified from very high risk to extremely high risk. As a result of the identified structural deficiencies, in April 2010, the Tulsa District lowered the March 15 through September 30 seasonal pool elevation from 442.50 feet to 441.9 feet and in July 2010, the Tulsa District lowered the top of the conservation pool elevation to 433.0 feet. The top of the authorized conservation pool is 438.0 feet.

Since October 2010, the District has implemented a number non-structural and structural interim risk reduction measures (IRRM) approved in the IRRM Plan, and has formulated and evaluated a number of permanent repair alternatives.

In accordance with Section 7 of the Endangered Species Act, we request your comments on the presence of endangered or threatened species or their habitat in the vicinity of Pine Creek Dam, Pushmataha, McCurtain, and Choctaw Counties, Oklahoma on the Little River. Please find enclosed a map of the reservoir and project lands.

If you have any questions on this matter, please contact Dr. Tony Clyde at 918-669-7556 or Tony.Clyde@usace.army.mil.

We would appreciate receiving your comments within 10 days of the date of this letter.

Sincerely,

Stephen L. Nolen
Chief, Planning and Environmental
Division

Enclosure

DEPARTMENT OF THE ARMY
UNITED STATES ARMY CORPS OF ENGINEERS, TULSA DISTRICT
1645 SOUTH 101 EAST AVENUE
TULSA OK 74128-4609

REPLY TO
ATTENTION OF

October 9, 2012

Planning and Environmental Division
Environmental Analysis and Compliance Branch

Mr. Steve Thompson
Executive Director
Oklahoma Department of Environmental Quality
P.O. Box 1677
Oklahoma City, Oklahoma 73101-1677

Dear Mr. Thompson,

The Tulsa District is in the process of developing an Environmental Assessment (EA) for the removal of approximately 48 acres of forested vegetation along the dam embankment and the permanent repair of Pine Creek Dam located in Pushmataha, McCurtain, and Choctaw Counties, on the Little River, in southeast Oklahoma.

In April 2009, it was determined that Pine Creek Dam had potential structural deficiencies. Following completion of additional investigations, dye testing, and monitoring of instrumentation installed on dam, in April 2011, structural deficiencies of Pine Creek Dam were re-classified from very high risk to extremely high risk. As a result of the identified structural deficiencies, in April 2010, the Tulsa District lowered the March 15 through September 30 seasonal pool elevation from 442.50 feet to 441.9 feet and in July 2010, the Tulsa District lowered the top of the conservation pool elevation to 433.0 feet. The top of the authorized conservation pool is 438.0 feet.

Since October 2010, the District has implemented a number non-structural and structural interim risk reduction measures (IRRM) approved in the IRRM Plan, and has formulated and evaluated a number of permanent repair alternatives.

We would appreciate receiving any pertinent information or concerns you may have regarding this Federal action. Please find enclosed a map of the reservoir and project lands.

If you have any questions on this matter, please contact Dr. Tony Clyde at 918-669-7556 or Tony.Clyde@usace.army.mil.

We would appreciate receiving your comments within 10 days of the date of this letter.

Sincerely,

Stephen L. Nolen
Chief, Planning and Environmental
Division

Enclosure

DEPARTMENT OF THE ARMY
UNITED STATES ARMY CORPS OF ENGINEERS, TULSA DISTRICT
1645 SOUTH 101 EAST AVENUE
TULSA OK 74128-4609

REPLY TO
ATTENTION OF

October 9, 2012

Planning and Environmental Division
Environmental Analysis and Compliance Branch

Mr. Richard Hatcher
Executive Director
Oklahoma Department of Wildlife Conservation
P.O. Box 53465
Oklahoma City, Oklahoma 73152

Dear Mr. Hatcher,

The Tulsa District is in the process of developing an Environmental Assessment (EA) for the removal of approximately 48 acres of forested vegetation along the dam embankment and the permanent repair of Pine Creek Dam located in Pushmataha, McCurtain, and Choctaw Counties, on the Little River, in southeast Oklahoma.

In April 2009, it was determined that Pine Creek Dam had potential structural deficiencies. Following completion of additional investigations, dye testing, and monitoring of instrumentation installed on dam, in April 2011, structural deficiencies of Pine Creek Dam were re-classified from very high risk to extremely high risk. As a result of the identified structural deficiencies, in April 2010, the Tulsa District lowered the March 15 through September 30 seasonal pool elevation from 442.50 feet to 441.9 feet and in July 2010, the Tulsa District lowered the top of the conservation pool elevation to 433.0 feet. The top of the authorized conservation pool is 438.0 feet.

Since October 2010, the District has implemented a number non-structural and structural interim risk reduction measures (IRRM) approved in the IRRM Plan, and has formulated and evaluated a number of permanent repair alternatives.

We would appreciate receiving any pertinent information or concerns you may have regarding state-listed plan threatened, endangered, and species-of-concern potentially found in and around the Pine Creek Dam vicinity. Please find enclosed a map of the reservoir and project lands.

If you have any questions on this matter, please contact Dr. Tony Clyde at 918-669-7556 or Tony.Clyde@usace.army.mil.

We would appreciate receiving your comments within 10 days of the date of this letter.

Sincerely,

Stephen L. Nolen
Chief, Planning and Environmental
Division

Enclosure

DEPARTMENT OF THE ARMY
UNITED STATES ARMY CORPS OF ENGINEERS, TULSA DISTRICT
1645 SOUTH 101 EAST AVENUE
TULSA OK 74128-4609

October 9, 2012

REPLY TO
ATTENTION OF

Planning and Environmental Division
Environmental Analysis and Compliance Branch

Mr. Ron L. Hilliard
State Conservationist
Oklahoma Natural Resources Conservation Service
100 USDA, Suite 206
Stillwater, Oklahoma 74074-2655

Dear Mr. Hilliard,

The Tulsa District is in the process of developing an Environmental Assessment (EA) for the removal of approximately 48 acres of forested vegetation along the dam embankment and the permanent repair of Pine Creek Dam located in Pushmataha, McCurtain, and Choctaw Counties, on the Little River, in southeast Oklahoma.

In April 2009, it was determined that Pine Creek Dam had potential structural deficiencies. Following completion of additional investigations, dye testing, and monitoring of instrumentation installed on dam, in April 2011, structural deficiencies of Pine Creek Dam were re-classified from very high risk to extremely high risk. As a result of the identified structural deficiencies, in April 2010, the Tulsa District lowered the March 15 through September 30 seasonal pool elevation from 442.50 feet to 441.9 feet and in July 2010, the Tulsa District lowered the top of the conservation pool elevation to 433.0 feet. The top of the authorized conservation pool is 438.0 feet.

Since October 2010, the District has implemented a number non-structural and structural interim risk reduction measures (IRRM) approved in the IRRM Plan, and has formulated and evaluated a number of permanent repair alternatives.

We would appreciate receiving any pertinent information or concerns you may have regarding this Federal action. Please find enclosed a map of the reservoir and project lands.

If you have any questions on this matter, please contact Dr. Tony Clyde at 918-669-7556 or Tony.Clyde@usace.army.mil.

If you have any questions on this matter, please contact Dr. Tony Clyde at 918-669-7556 or Tony.Clyde@usace.army.mil.

We would appreciate receiving your comments within 10 days of the date of this letter.

Sincerely,

Stephen L. Nolen
Chief, Planning and Environmental
Division

Enclosure

DEPARTMENT OF THE ARMY
UNITED STATES ARMY CORPS OF ENGINEERS, TULSA DISTRICT
1645 SOUTH 101 EAST AVENUE
TULSA OK 74128-4609

REPLY TO
ATTENTION OF

October 9, 2012

Planning and Environmental Division
Environmental Analysis and Compliance Branch

Mr. J.D. Stong
Executive Director
Oklahoma Water Resources Board
3800 N. Classen
Oklahoma City, Oklahoma 73118

Dear Mr. Strong,

The Tulsa District is in the process of developing an Environmental Assessment (EA) for the removal of approximately 48 acres of forested vegetation along the dam embankment and the permanent repair of Pine Creek Dam located in Pushmataha, McCurtain, and Choctaw Counties, on the Little River, in southeast Oklahoma.

In April 2009, it was determined that Pine Creek Dam had potential structural deficiencies. Following completion of additional investigations, dye testing, and monitoring of instrumentation installed on dam, in April 2011, structural deficiencies of Pine Creek Dam were re-classified from very high risk to extremely high risk. As a result of the identified structural deficiencies, in April 2010, the Tulsa District lowered the March 15 through September 30 seasonal pool elevation from 442.50 feet to 441.9 feet and in July 2010, the Tulsa District lowered the top of the conservation pool elevation to 433.0 feet. The top of the authorized conservation pool is 438.0 feet.

Since October 2010, the District has implemented a number non-structural and structural interim risk reduction measures (IRRM) approved in the IRRM Plan, and has formulated and evaluated a number of permanent repair alternatives.

We would appreciate receiving any pertinent information or concerns you may have regarding this Federal action. Please find enclosed a map of the reservoir and project lands.

If you have any questions on this matter, please contact Dr. Tony Clyde at 918-669-7556 or Tony.Clyde@usace.army.mil.

If you have any questions on this matter, please contact Dr. Tony Clyde at 918-669-7556 or Tony.Clyde@usace.army.mil.

We would appreciate receiving your comments within 10 days of the date of this letter.

Sincerely,

Stephen L. Nolen
Chief, Planning and Environmental
Division

Enclosure

DEPARTMENT OF THE ARMY
UNITED STATES ARMY CORPS OF ENGINEERS, TULSA DISTRICT
1645 SOUTH 101 EAST AVENUE
TULSA OK 74128-4609

October 9, 2012

REPLY TO
ATTENTION OF

Planning and Environmental Division
Environmental Analysis and Compliance Branch

Ms. Deby Snodgrass
Executive Director
Oklahoma Tourism and Recreation Department
120 N. Robinson, 6th Floor
Oklahoma City, Oklahoma 73102

Dear Ms. Snodgrass,

The Tulsa District is in the process of developing an Environmental Assessment (EA) for the removal of approximately 48 acres of forested vegetation along the dam embankment and the permanent repair of Pine Creek Dam located in Pushmataha, McCurtain, and Choctaw Counties, on the Little River, in southeast Oklahoma.

In April 2009, it was determined that Pine Creek Dam had potential structural deficiencies. Following completion of additional investigations, dye testing, and monitoring of instrumentation installed on dam, in April 2011, structural deficiencies of Pine Creek Dam were re-classified from very high risk to extremely high risk. As a result of the identified structural deficiencies, in April 2010, the Tulsa District lowered the March 15 through September 30 seasonal pool elevation from 442.50 feet to 441.9 feet and in July 2010, the Tulsa District lowered the top of the conservation pool elevation to 433.0 feet. The top of the authorized conservation pool is 438.0 feet.

Since October 2010, the District has implemented a number non-structural and structural interim risk reduction measures (IRRM) approved in the IRRM Plan, and has formulated and evaluated a number of permanent repair alternatives.

We would appreciate receiving any pertinent information or concerns you may have regarding this Federal action. Please find enclosed a map of the reservoir and project lands.

If you have any questions on this matter, please contact Dr. Tony Clyde at 918-669-7556 or Tony.Clyde@usace.army.mil.

If you have any questions on this matter, please contact Dr. Tony Clyde at 918-669-7556 or Tony.Clyde@usace.army.mil.

We would appreciate receiving your comments within 10 days of the date of this letter.

Sincerely,

Stephen L. Nolen
Chief, Planning and Environmental
Division

Enclosure

Clyde, Tony SWT

From: Jennifer_Nicholson@fws.gov
Sent: Tuesday, October 16, 2012 12:04 PM
To: Clyde, Tony SWT
Subject: Refer to Website - Project: 2010-I-0475 CE repair of Pine Creek Lake Dam
Attachments: 2010I0475_20121017_PineCreekDam_IN.pdf

Dr. Clyde,

Thank you for your letter (attached) requesting an endangered species review in regard to the proposed project identified above.

The Oklahoma Ecological Services Field Office has developed measures to streamline the Endangered Species consultation process and other requests for technical assistance. The information you have requested is available on our website at:
<http://www.fws.gov/southwest/es/Oklahoma/OKESFO%20Permit%20Home.htm>.
<http://www.fws.gov/southwest/es/Oklahoma/OKESFO%20Permit%20Home.htm>

Please review these streamlining measures. We are confident they will adequately address your request. For assistance in navigating the website, please contact Luke Bell at 918-581-7458, ext. 252.

Sincerely,

Jennifer Nicholson
STEP - Office Clerk
U.S. Fish and Wildlife Service
9014 E. 21st Street
Tulsa, OK 74129
(918) 382-4501

OKLAHOMA CONSERVATION COMMISSION

Responsible Care For Oklahoma's Natural Resources

October 25, 2012

Stephen L. Nolen
Chief, Planning and Environmental Division
Department of the Army
United States Army Corps of Engineers, Tulsa District
1645 South 101 East Avenue
Tulsa, Oklahoma 74128-4609

RE: Pine Creek Dam Forested Vegetation Removal

Dear Mr. Nolen:

The Commission appreciates the invitation to comment on this project. We also fully appreciate and understand the need for maintenance and risk reduction as it relates to dams. The USACE has a monumental task in the planning for flood prevention, risk management, water storage, and other associated interests that revolve around the District's reservoirs.

The Conservation Commission has no specific concerns surrounding the removal of the 48 acres of forested vegetation along the dam embankment and the permanent repair of Pine Creek Dam. The Commission understands the need for these activities and realizes that the USACE has the expertise necessary to complete these activities. We respectfully request that disturbance associated with this activity be minimized and soil conservation measures be utilized, especially near wetland and riparian areas. The Commission also understands that the USACE fully understands these concerns and consistently address these situations.

Again, we appreciate the opportunity to offer comments on this project.

Sincerely,

Brooks K Tramell

Brooks Tramell
Director of Monitoring, Assessment and Wetlands Programs
Water Quality Division
Oklahoma Conservation Commission

Cc: Shanon Phillips, Water Quality Division Director, Oklahoma Conservation Commission

APPENDIX B
SECTION 404 PERMIT

CESWT-PE-E 25 October 2012

MEMORANDUM FOR CESWT-RO

SUBJECT: 404 Permit requirements for the Pine Creek Dam Safety Modification Study (DSMS), Interim Risk Reduction Measure (IRRM) pool restriction to 433 feet NVGD, and woody vegetation removal from 30,000 linear feet of dike, McCurtain County, Oklahoma.

1. The Tulsa District has begun assessing the impacts associated with maintenance activities at Pine Creek Dam, McCurtain County, Oklahoma. Authorization for this effort is the Flood Control Act approved July 3, 1968, House Document 170 (Public Law 85-500, 85th Congress, S.3901).

2. Multiple alternatives, including “No Action” alternatives, have been assessed for each component of this action and are included in Exhibit 1. The selected alternatives include:

   A. Maintenance and repair of the Pine Creek Dam embankment which includes construction of a cutoff wall and construction of a vertical filter perpendicular to the conduit; construction of a horizontal toe filter; conduit joint repairs with a steel pipe sleeve placed in the conduit.
   B. A temporary deviation to reduce the top of the conservation pool from 438 feet NVGD to 433 feet NVGD and suspending the SWD approved 15 March through 30 September seasonal pool plan of 422.5 feet NVGD.
   C. Maintenance and removal of woody vegetation along the dike which extends approximately 14,000 feet to the west-southwest from the right abutment of the spillway. A woody vegetation free zone extending 70 feet from the toe of the dike would be established per USACE guidelines contained in ETL 1110-2-571.

3. A memo from your office is request concerning the need for a Department of the Army permit pursuant to Section 404 of the Clean Water Act. No fill material generated by these activities will be placed within the conservation pool of Pine Creek Lake. It is anticipated that any spoils generated during the maintenance and repair of the embankment will be placed on the downstream face of the embankment and re-vegetated in accordance with USACE guidelines contained in ETL 1110-2-571.

4. Exhibits 2-6 contain illustrations of Pine Creek Lake at elevation 433 feet, 438 feet, 442 feet, vegetation clearing area, and emergent and forested wetlands from the NWI.

5. If you need further information please contact Dr. Tony Clyde, x7556.

STEPHEN L. NOLEN
Chief, Planning and Environmental
Division

Enclosures

EXHIBIT 1

Table 2.1. Summary of formulated alternatives assessed in the Dam Safety Modification Study.

Dam Safety Modification Alternatives	Non-Structural Measures	Structural Measures	Cost
No Action	None	None	$22,900,000
Make IRRM Permanent	Conservation Pool 433 feet; continued monitoring; maintain EAP and communications plans	Inverted filter; downstream access road; void filling; replace emergency gates	$39,000,000
Remove Dam	None	Removal of portions of the embankment	$246,200,000
Replace Dam	None	Construction of new downstream dam	$217,500,000
Non-Structural Plan 1	Lower conservation pool to 384 feet	None	$37,770,000
Non-Structural Plan 2	EAP improvements and inclusion of EBS	None	$9,920,000
Non-Structural Plan 3	EAP improvements, EBS, and real estate acquisition	None	$78,320,000

Table 2.1 continued. Summary of formulated alternatives assessed in the Dam Safety Modification Study.

Dam Safety Modification Alternatives	Non-Structural Measures	Structural Measures	Cost
Non-Structural Plan 4 + Phased Structural Alternative 7	EAP improvements, EBS, and real estate acquisition	New chimney/vertical filter; modified cut-off wall; modified downstream filter; permanent joint repair with steel pipe sleeve in conduit	$36,260,000
Structural Alternative 1	None	Full-depth cutoff wall; permanent joint repair with new seal and waterstop	$22,090,000
Structural Alternative 2	None	Replace downstream embankment; permanent joint repair with new seal and waterstop	$40,160,000
Structural Alternative 3	None	Full-depth cutoff wall; permanent joint repair with steel pipe sleeve in conduit	$21,950,000
Structural Alternative 4	None	Replace downstream embankment; permanent joint repair with steel pipe sleeve in conduit	$40,830,000
Structural Alternative 5	None	Full replacement of upstream and downstream embankment; permanent joint repair with new seal and waterstop	$120,440,000
Structural Alternative 6	None	New chimney/vertical filter; permanent downstream filter; permanent joint repair with new seal and waterstop in conduit	$20,510,000
Structural Alternative 7	None	New chimney/vertical filter; modified cutoff wall; modified downstream filter; permanent joint repair with steel sleeve pipe in conduit	$26,930,000

Table 2.2. Summary of formulated IRRM pool restriction and maintenance alternatives assessed.

	Non-Structural Measures	Structural Measures	Cost
IRRM Pool Restriction Alternatives			
No Action	Continued regular operations of the lake	None	22,900,000
IRRM Alternative 1	Lower conservation pool to 384 feet	None	$26,598,000
IRRM Alternative 2	Lower conservation pool to 433 feet	None	$6,472,100
Dike Vegetation Removal Alternatives			
No Action	Continued regular operations of the lake	None	$0
Removal Alternative 1	Commercial removal woody vegetation up to 50 feet from the dike toe	None	$20,000
Removal Alternative 2	Commercial removal woody vegetation up to 70 feet from the dike toe	None	$20,000

EXHIBIT 2

U.S. Army Corps of Engineers
Pine Creek Lake at Elevation 433 msl

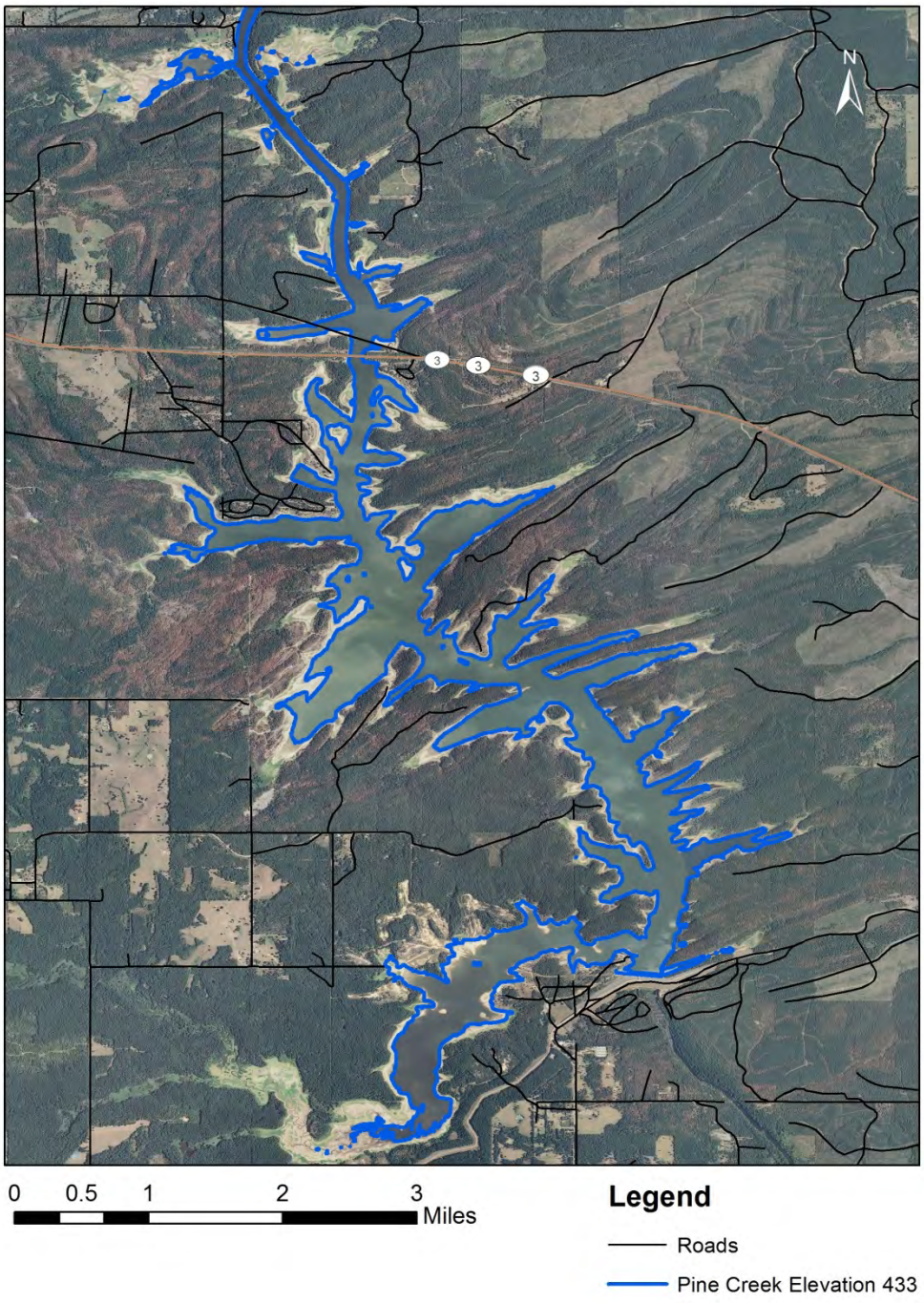


EXHIBIT 3

U.S. Army Corps of Engineers
Pine Creek Lake at Elevation 438 msl

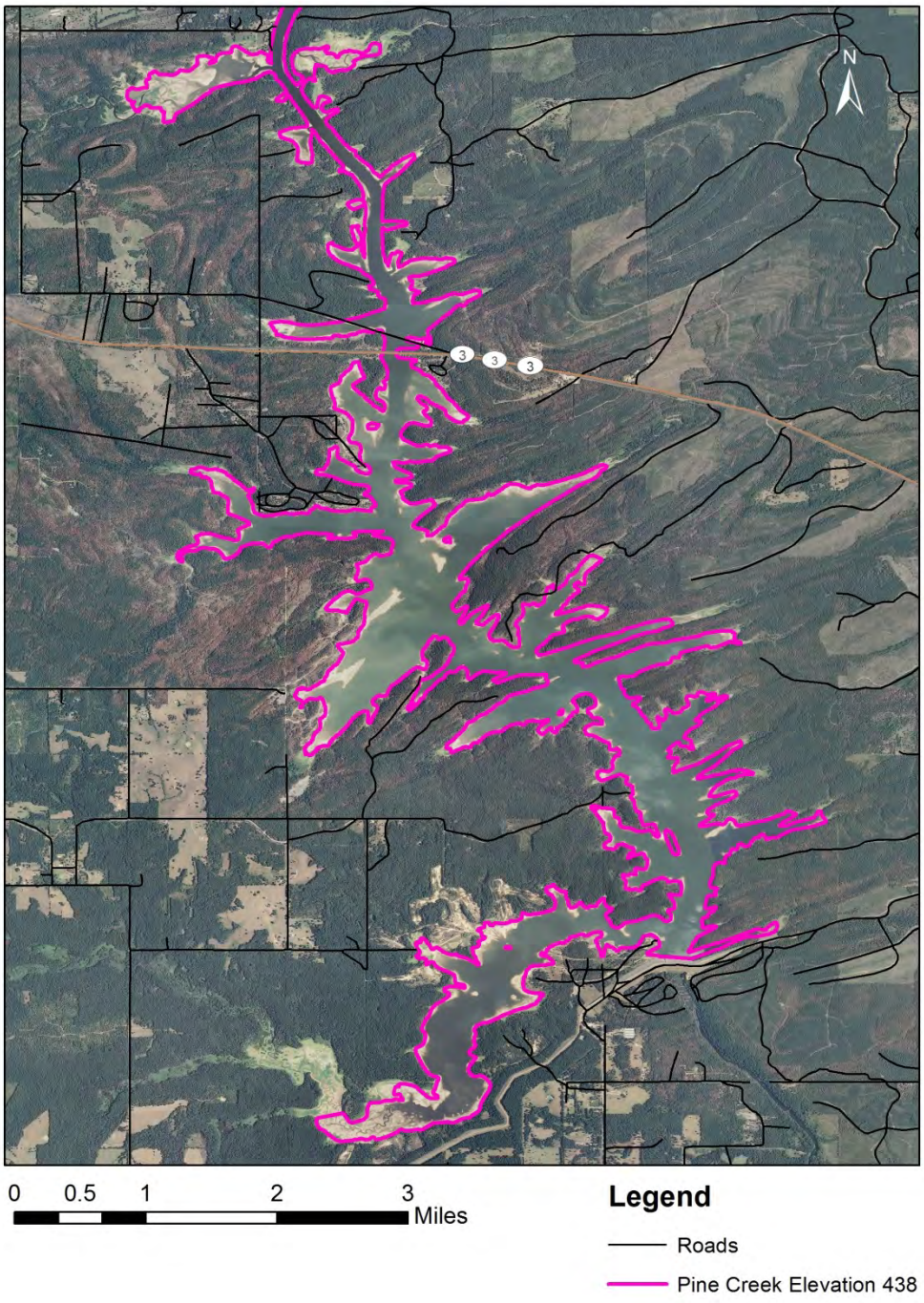


EXHIBIT 4

U.S. Army Corps of Engineers
Pine Creek Lake at Elevation 442 msl

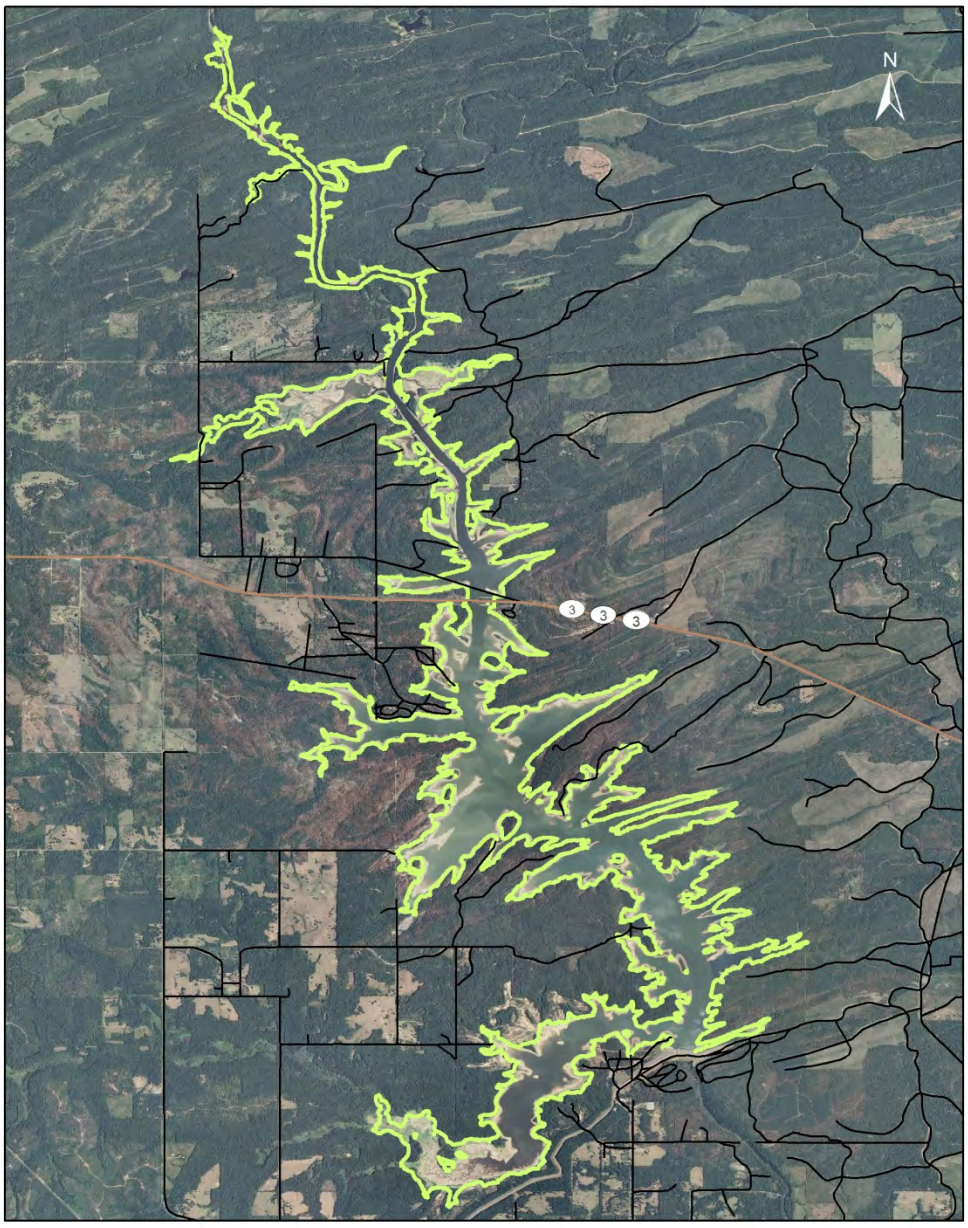


EXHIBIT 5

U.S. Army Corps of Engineers
Pine Creek Lake, Dike Vegetation Clearing Area

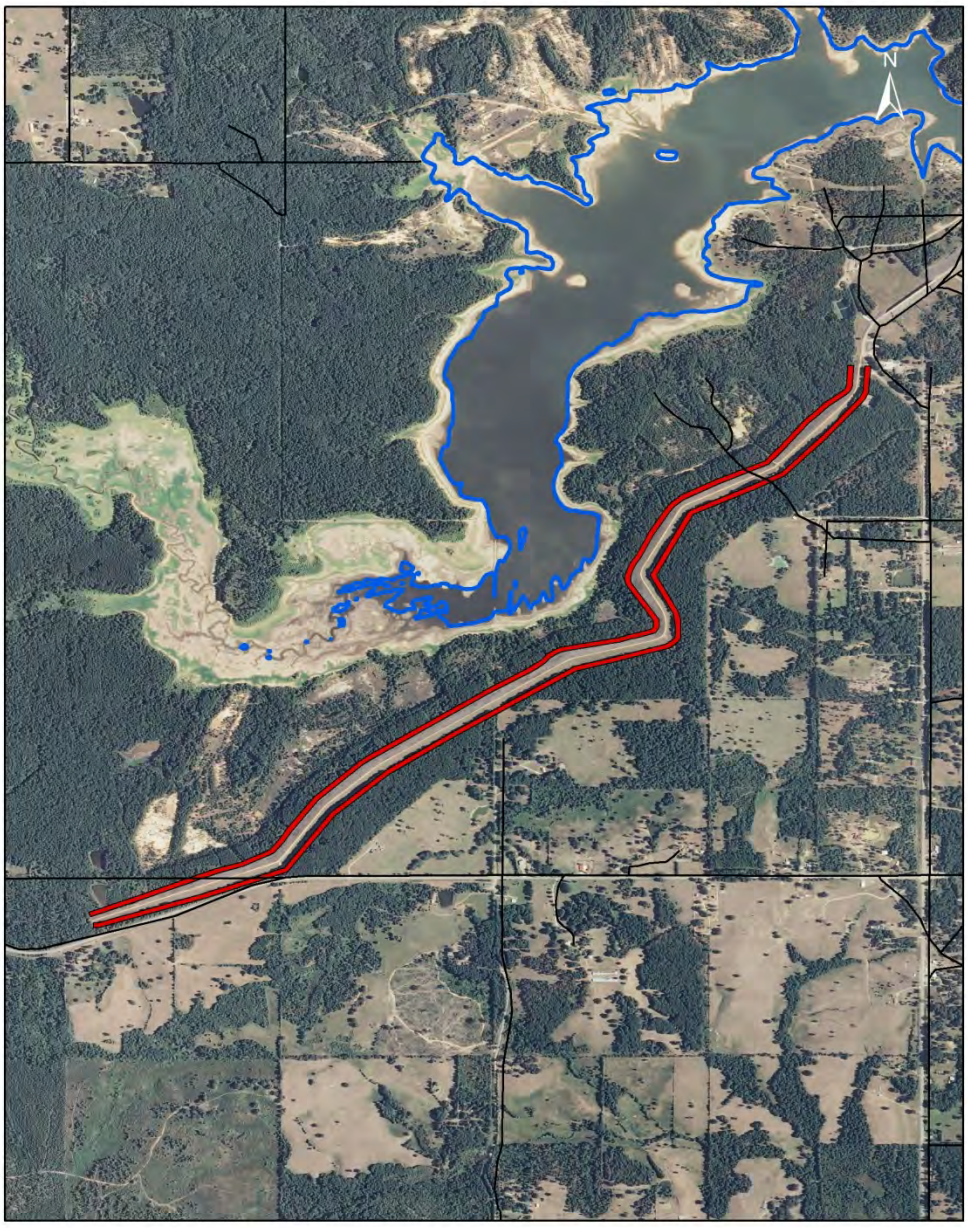
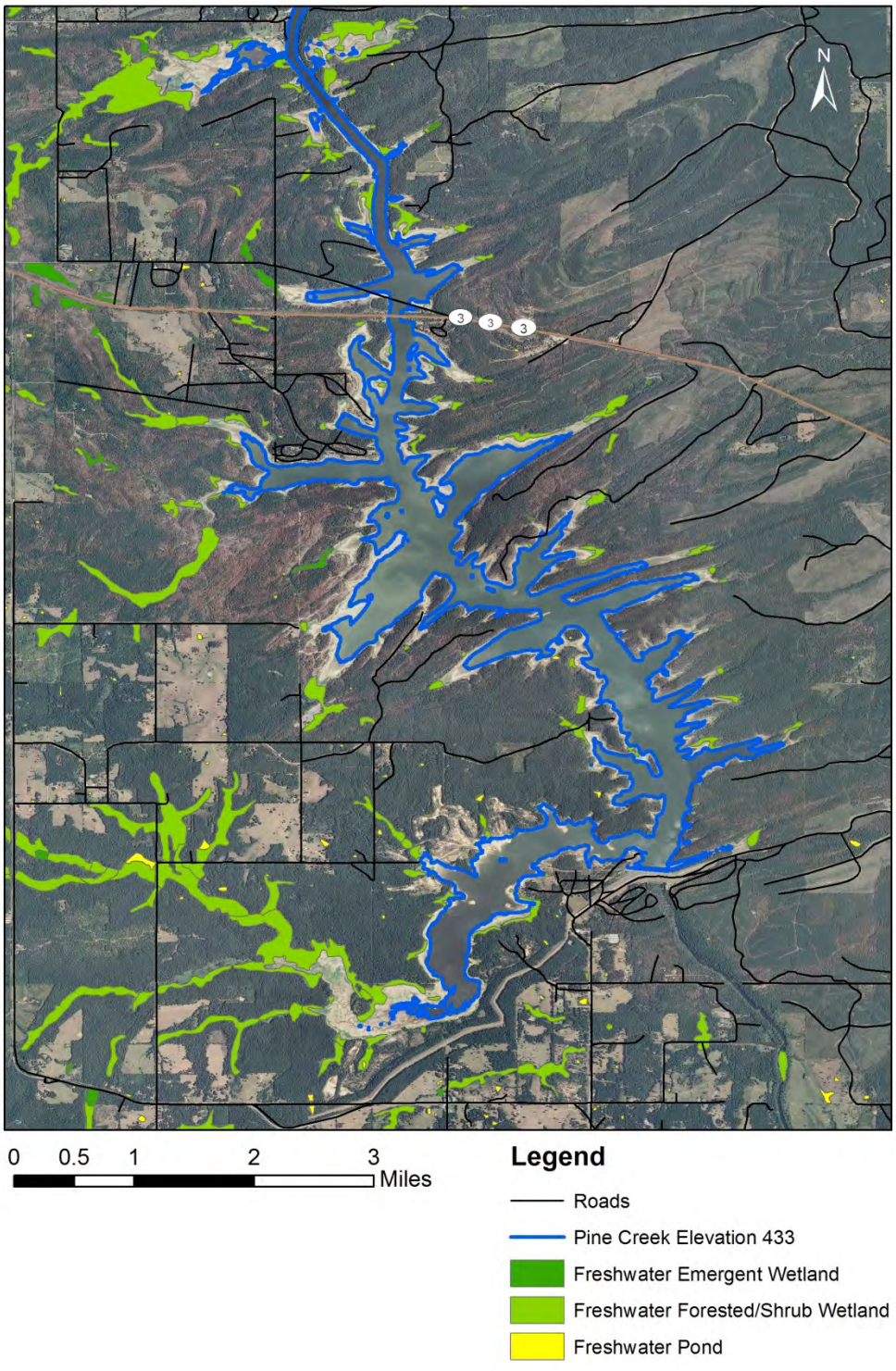


EXHIBIT 6

U.S. Army Corps of Engineers
Pine Creek Lake, Wetland Areas



CESWT-RO 16 November 2012

MEMORANDUM FOR CESWT-PE-E (Dr. Tony Clyde)

SUBJECT: 404 Permit requirements for the Pine Creek Dam Safety Modification Study, Interim Risk Reduction Measure pool restriction to 433 feet National Geodetic Vertical Datum (NGVD), and woody vegetation removal from 30,000 linear feet of dike, McCurtain County, Oklahoma.

1. Please reference your subject memo dated 25 Oct 2012, regarding the above listed project.

2. Concerning alternative B, temporary deviation to reduce the top of the conservation pool from 438 feet NGVD to 433 feet NGVD and suspending the SWD approved 15 March through 30 September seasonal pool plan of 422.5 feet NGVD; and alternative C, for maintenance and removal of woody vegetation along the dike which extends approximately 14,000 feet to the west-southwest from the right abutment of the spillway; the provided information does not indicate that a placement of dredged or fill material will be required, permanently or temporarily, into any "waters of the United States," including jurisdictional wetlands. Therefore, these proposals are not subject to regulation pursuant to Section 404 of the Clean Water Act (CWA), and a Department of the Army (DA) permit will not be required. Should your method of construction necessitate such a discharge into an aquatic area or tributary stream, we suggest that you resubmit that portion of your project so that we may determine whether an individual DA permit will be required. Although Section 404 CWA authorization is not required, this does not preclude the possibility that a real estate interest or other federal, state, or local permits may be required.

3. Concerning alternative A, maintenance and repair of the Pine Creek Dam embankment which includes construction of a cutoff wall and construction of a vertical filter perpendicular to the conduit; construction of a horizontal toe filter; conduit joint repairs with a steel pipe sleeve placed in the conduit; the proposed activity falls within the scope of the Nationwide Permit (NWP) for Maintenance Activities, provided the conditions therein are met. This permit was issued pursuant to Section 404 of the Clean Water Act and is enclosed for your reference.

4. This NWP is scheduled to expire on March 18, 2017. It is incumbent on you to remain informed of changes to the NWPs. The U.S. Army Corps of Engineers will issue a public notice announcing the changes as they occur. Furthermore, if you commence, or are under contract to commence, the activity before the date the NWP is modified or revoked, you will have 12 months from the date of the modification or revocation to complete the activity under the present terms and conditions of this NWP.

4. Your permit has been assigned Identification Number SWT-2012-870; please refer to this number during future correspondence. If you have any questions or you cannot comply with the conditions listed in the enclosed permit, contact Mr. Shane Charlson at 918 669 7395.

ANDREW R. COMMER
Chief, Regulatory Office

Nationwide Permit 3
Maintenance

(a) The repair, rehabilitation, or replacement of any previously authorized, currently serviceable structure, or fill, or of any currently serviceable structure or fill authorized by 33 CFR 330.3, provided that the structure or fill is not to be put to uses differing from those uses specified or contemplated for it in the original permit or the most recently authorized modification. Minor deviations in the structure's configuration or filled area, including those due to changes in materials, construction techniques, requirements of other regulatory agencies, or current construction codes or safety standards that are necessary to make the repair, rehabilitation, or replacement are authorized. Any stream channel modification is limited to the minimum necessary for the repair, rehabilitation, or replacement of the structure or fill; such modifications, including the removal of material from the stream channel, must be immediately adjacent to the project or within the boundaries of the structure or fill. This NWP also authorizes the repair, rehabilitation, or replacement of those structures or fills destroyed or damaged by storms, floods, fire or other discrete events, provided the repair, rehabilitation, or replacement is commenced, or is under contract to commence, within two years of the date of their destruction or damage. In cases of catastrophic events, such as hurricanes or tornadoes, this two-year limit may be waived by the district engineer, provided the permittee can demonstrate funding, contract, or other similar delays.
(b) This NWP also authorizes the removal of accumulated sediments and debris in the vicinity of existing structures (e.g., bridges, culverted road crossings, water intake structures, etc.) and/or the placement of new or additional riprap to protect the structure. The removal of sediment is limited to the minimum necessary to restore the waterway in the vicinity of the structure to the approximate dimensions that existed when the structure was built, but cannot extend farther than 200 feet in any direction from the structure. This 200 foot limit does not apply to maintenance dredging to remove accumulated sediments blocking or restricting outfall and intake structures or to maintenance dredging to remove accumulated sediments from canals associated with outfall and intake structures. All dredged or excavated materials must be deposited and retained in an area that has no waters of the United States unless otherwise specifically approved by the district engineer under separate authorization. The placement of new or additional riprap must be the minimum necessary to protect the structure or to ensure the safety of the structure. Any bank stabilization measures not directly associated with the structure will require a separate authorization from the district engineer.
(c) This NWP also authorizes temporary structures, fills, and work necessary to conduct the maintenance activity. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be revegetated, as appropriate.
(d) This NWP does not authorize maintenance dredging for the primary purpose of navigation. This NWP does not authorize beach restoration. This NWP does not authorize new stream channelization or stream relocation projects.

Notification: For activities authorized by paragraph (b) of this NWP, the permittee must submit a pre-construction notification to the district engineer prior to commencing the activity (see general condition 31). The pre-construction notification must include information regarding the original design capacities and configurations of the outfalls, intakes, small impoundments, and canals. (Sections 10 and 404)

Note: This NWP authorizes the repair, rehabilitation, or replacement of any previously authorized structure or fill that does not qualify for the Clean Water Act Section 404(f) exemption for maintenance.

This NWP is authorized pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 401 et seq) and Section 404 of the Clean Water Act (33 U.S.C. 1344). The effective date for this NWP (33 CFR 330), GCs, and definitions is March 19, 2012, as published in the Federal Register (77 FR 10184). The NWP, GCs, and definitions expire on March 18, 2017.

Nationwide Permit General Conditions

Note: To qualify for NWP authorization, the prospective permittee must comply with the following general conditions, as applicable, in addition to any regional or case-specific conditions imposed by the division engineer or district engineer. Prospective permittees should contact the appropriate Corps district office to determine if regional conditions have been imposed on an NWP. Prospective permittees should also contact the appropriate Corps district office to determine the status of

Clean Water Act Section 401 water quality certification for an NWP. Every person who may wish to obtain permit authorization under one or more NWPs, or who is currently relying on an existing or prior permit authorization under one or more NWPs, has been and is on notice that all of the provisions of 33 CFR §§ 330.1 through 330.6 apply to every NWP authorization. Note especially 33 CFR § 330.5 relating to the modification, suspension, or revocation of any NWP authorization.

1. Navigation. (a) No activity may cause more than a minimal adverse effect on navigation.
(b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States.
(c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.
2.Aquatic Life Movements. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species.
3. Spawning Areas. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.
4. Migratory Bird Breeding Areas. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.
5. Shellfish Beds. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48, or is a shellfish seeding or habitat restoration activity authorized by NWP 27.
6. Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).
7. Water Supply Intakes. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.
8. Adverse Effects From Impoundments. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.
9. Management of Water Flows. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).
10. Fills Within 100-Year Floodplains. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.
11. Equipment. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.
12. Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.
13. Removal of Temporary Fills. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.
14. Proper Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.
15. Single and Complete Project. The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

16. Wild and Scenic Rivers. No activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or study river (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service).

17. Tribal Rights. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

18. Endangered Species.

(a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed.

(b) Federal agencies should follow their own procedures for complying with the requirements of the ESA. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will review the documentation and determine whether it is sufficient to address ESA compliance for the NWP activity, or whether additional ESA consultation is necessary.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species or designated critical habitat, the pre-construction notification must include the name(s) of the endangered or threatened species that might be affected by the proposed work or that utilize the designated critical habitat that might be affected by the proposed work. The district engineer will determine whether the proposed activity "may affect" or will have "no effect" to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps' determination within 45 days of receipt of a complete pre-construction notification. In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the project, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification the proposed activities will have "no effect" on listed species or critical habitat, or until Section 7 consultation has been completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(d) As a result of formal or informal consultation with the FWS or NMFS the district engineer may add species-specific regional endangered species conditions to the NWPs.

(e) Authorization of an activity by a NWP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the U.S. FWS or the NMFS, The Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word "harm" in the definition of "take" means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

(f) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the U.S. FWS and NMFS or their world wide web pages at http://www.fws.gov/ or http://www.fws.gov/ipac and http://www.noaa.gov/fisheries.html respectively.

19. Migratory Birds and Bald and Golden Eagles. The permittee is responsible for obtaining any "take" permits required under the U.S. Fish and Wildlife Service's regulations governing compliance with the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection Act. The permittee should contact the appropriate local office of the U.S. Fish and Wildlife Service to determine if such "take" permits are required for a particular activity.

20. Historic Properties.

(a) In cases where the district engineer determines that the activity may affect properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

(b) Federal permittees should follow their own procedures for complying with the requirements of Section 106 of the National Historic Preservation Act. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will review the documentation and determine whether it

is sufficient to address section 106 compliance for the NWP activity, or whether additional section 106 consultation is necessary.
(c) Non-federal permittees must submit a pre-construction notification to the district engineer if the authorized activity may have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties may be affected by the proposed work or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of or potential for the presence of historic resources can be sought from the State Historic Preservation Officer or Tribal Historic Preservation Officer, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). When reviewing pre-construction notifications, district engineers will comply with the current procedures for addressing the requirements of Section 106 of the National Historic Preservation Act. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted and these efforts, the district engineer shall determine whether the proposed activity has the potential to cause an effect on the historic properties. Where the non-Federal applicant has identified historic properties on which the activity may have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects or that consultation under Section 106 of the NHPA has been completed.
(d) The district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA Section 106 consultation is required. Section 106 consultation is not required when the Corps determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR §800.3(a)). If NHPA section 106 consultation is required and will occur, the district engineer will notify the non-Federal applicant that he or she cannot begin work until Section 106 consultation is completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.
(e) Prospective permittees should be aware that section 110k of the NHPA (16 U.S.C. 470h-2(k)) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of Section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.
21. Discovery of Previously Unknown Remains and Artifacts. If you discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, you must immediately notify the district engineer of what you have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.
22. Designated Critical Resource Waters. Critical resource waters include, NOAA-managed marine sanctuaries and marine monuments, and National Estuarine Research Reserves. The district engineer may designate, after notice and opportunity for public comment, additional waters officially designated by a state as having particular environmental or ecological significance, such as outstanding national resource waters or state natural heritage sites. The district engineer may also designate additional critical resource waters after notice and opportunity for public comment.
(a) Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, and 52 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.
(b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, and 38, notification is required in accordance with general condition 31, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.
23. Mitigation. The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that adverse effects on the aquatic environment are minimal:

(a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site).
(b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal.
(c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse effects of the proposed activity are minimal, and provides a project-specific waiver of this requirement. For wetland losses of 1/10-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in minimal adverse effects on the aquatic environment. Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR part 332.
(1) The prospective permittee is responsible for proposing an appropriate compensatory mitigation option if compensatory mitigation is necessary to ensure that the activity results in minimal adverse effects on the aquatic environment.
(2) Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, wetland restoration should be the first compensatory mitigation option considered.
(3) If permittee-responsible mitigation is the proposed option, the prospective permittee is responsible for submitting a mitigation plan. A conceptual or detailed mitigation plan may be used by the district engineer to make the decision on the NWP verification request, but a final mitigation plan that addresses the applicable requirements of 33 CFR 332.4(c)(2) – (14) must be approved by the district engineer before the permittee begins work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation (see 33 CFR 332.3(k)(3)).
(4) If mitigation bank or in-lieu fee program credits are the proposed option, the mitigation plan only needs to address the baseline conditions at the impact site and the number of credits to be provided.
(5) Compensatory mitigation requirements (e.g., resource type and amount to be provided as compensatory mitigation, site protection, ecological performance standards, monitoring requirements) may be addressed through conditions added to the NWP authorization, instead of components of a compensatory mitigation plan.
(d) For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation, such as stream rehabilitation, enhancement, or preservation, to ensure that the activity results in minimal adverse effects on the aquatic environment.
(e) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2-acre, it cannot be used to authorize any project resulting in the loss of greater than 1/2-acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that a project already meeting the established acreage limits also satisfies the minimal impact requirement associated with the NWPs.
(f) Compensatory mitigation plans for projects in or near streams or other open waters will normally include a requirement for the restoration or establishment, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, riparian areas may be the only compensatory mitigation required. Riparian areas should consist of native species. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. If it is not possible to establish a riparian area on both sides of a stream, or if the waterbody is a lake or coastal waters, then restoring or establishing a riparian area along a single bank or shoreline may be sufficient. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.
(g) Permittees may propose the use of mitigation banks, in-lieu fee programs, or separate permittee-responsible mitigation. For activities resulting in the loss of marine or estuarine resources, permittee-responsible compensatory mitigation may be environmentally preferable if there are no mitigation banks or in-lieu fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee. For permittee-responsible mitigation, the special conditions of the NWP verification must clearly indicate the party or parties responsible for the implementation and performance of the compensatory mitigation project, and, if required, its long-term management.
(h) Where certain functions and services of waters of the United States are permanently adversely affected, such as the conversion of a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse effects of the project to the minimal level.

24. Safety of Impoundment Structures. To ensure that all impoundment structures are safely designed, the district engineer may require non-Federal applicants to demonstrate that the structures comply with established state dam safety criteria or have been designed by qualified persons. The district engineer may also require documentation that the design has been independently reviewed by similarly qualified persons, and appropriate modifications made to ensure safety.
25. Water Quality. Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA Section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.
26. Coastal Zone Management. In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.
27. Regional and Case-By-Case Conditions. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.
28. Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.
29. Transfer of Nationwide Permit Verifications. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:
"When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below."

_____
(Transferee)

_____
(Date)

30. Compliance Certification. Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include:
(a) A statement that the authorized work was done in accordance with the NWP authorization, including any general, regional, or activity-specific conditions;
(b) A statement that the implementation of any required compensatory mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(l)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and
(c) The signature of the permittee certifying the completion of the work and mitigation.
31. Pre-Construction Notification.
(a) Timing. Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, if the PCN is determined to be incomplete, notify the prospective permittee within that 30 day period to request the additional information necessary to make the PCN complete. The request must specify the information needed to make the PCN complete. As a general rule, district engineers will request additional information

necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either:
(1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or
(2) 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or in the vicinity of the project, or to notify the Corps pursuant to general condition 20 that the activity may have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that there is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or Section 106 of the National Historic Preservation (see 33 CFR 330.4(g)) has been completed. Also, work cannot begin under NWPs 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee may not begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).
(b) Contents of Pre-Construction Notification: The PCN must be in writing and include the following information:
(1) Name, address and telephone numbers of the prospective permittee;
(2) Location of the proposed project;
(3) A description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause, including the anticipated amount of loss of water of the United States expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. The description should be sufficiently detailed to allow the district engineer to determine that the adverse effects of the project will be minimal and to determine the need for compensatory mitigation. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the project and when provided results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed activity (e.g., a conceptual plan), but do not need to be detailed engineering plans);
(4) The PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many waters of the United States. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate;
(5) If the proposed activity will result in the loss of greater than 1/10-acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse effects are minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.
(6) If any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, for non-Federal applicants the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed work or utilize the designated critical habitat that may be affected by the proposed work. Federal applicants must provide documentation demonstrating compliance with the Endangered Species Act; and
(7) For an activity that may affect a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, for non-Federal applicants the PCN must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property. Federal applicants must provide documentation demonstrating compliance with Section 106 of the National Historic Preservation Act.
(c) Form of Pre-Construction Notification: The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is a PCN and must include all of the information required in paragraphs (b)(1) through (7) of this general condition. A letter containing the required information may also be used.

(d) Agency Coordination: (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse environmental effects to a minimal level.
(2) For all NWP activities that require pre-construction notification and result in the loss of greater than 1/2-acre of waters of the United States, for NWP 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52 activities that require pre-construction notification and will result in the loss of greater than 300 linear feet of intermittent and ephemeral stream bed, and for all NWP 48 activities that require pre-construction notification, the district engineer will immediately provide (e.g., via e-mail, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (U.S. FWS, state natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Office (THPO), and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will have 10 calendar days from the date the material is transmitted to telephone or fax the district engineer notice that they intend to provide substantive, site-specific comments. The comments must explain why the agency believes the adverse effects will be more than minimal. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the pre-construction notification. The district engineer will fully consider agency comments received within the specified time frame concerning the proposed activity's compliance with the terms and conditions of the NWPs, including the need for mitigation to ensure the net adverse environmental effects to the aquatic environment of the proposed activity are minimal. The district engineer will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5.
(3) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act.
(4) Applicants are encouraged to provide the Corps with either electronic files or multiple copies of pre-construction notifications to expedite agency coordination.

District Engineer's Decision
1. In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. For a linear project, this determination will include an evaluation of the individual crossings to determine whether they individually satisfy the terms and conditions of the NWP(s), as well as the cumulative effects caused by all of the crossings authorized by NWP. If an applicant requests a waiver of the 300 linear foot limit on impacts to intermittent or ephemeral streams or of an otherwise applicable limit, as provided for in NWPs 13, 21, 29, 36, 39, 40, 42, 43, 44, 50, 51 or 52, the district engineer will only grant the waiver upon a written determination that the NWP activity will result in minimal adverse effects. When making minimal effects determinations the district engineer will consider the direct and indirect effects caused by the NWP activity. The district engineer will also consider site specific factors, such as the environmental setting in the vicinity of the NWP activity, the type of resource that will be affected by the NWP activity, the functions provided by the aquatic resources that will be affected by the NWP activity, the degree or magnitude to which the aquatic resources perform those functions, the extent that aquatic resource functions will be lost as a result of the NWP activity (e.g., partial or complete loss), the duration of the adverse effects (temporary or permanent), the importance of the aquatic resource functions to the region (e.g., watershed or ecoregion), and mitigation required by the district engineer. If an appropriate functional assessment method is available and practicable to use, that assessment method may be used by the district engineer to assist in the minimal adverse effects determination. The district engineer may add case-specific special conditions to the NWP authorization to address site-specific environmental concerns.
2. If the proposed activity requires a PCN and will result in a loss of greater than 1/10-acre of wetlands, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for projects with smaller impacts. The district engineer will consider any proposed compensatory mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects to the aquatic environment of the proposed activity are minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects on the aquatic environment are minimal, after considering mitigation, the district engineer will notify the permittee and include any activity-specific conditions in the NWP verification the district engineer deems necessary. Conditions for compensatory mitigation requirements must comply with the appropriate provisions at 33 CFR 332.3(k). The district engineer must approve the final mitigation plan before

the permittee commences work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the proposed compensatory mitigation plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure no more than minimal adverse effects on the aquatic environment. If the net adverse effects of the project on the aquatic environment (after consideration of the compensatory mitigation proposal) are determined by the district engineer to be minimal, the district engineer will provide a timely written response to the applicant. The response will state that the project can proceed under the terms and conditions of the NWP, including any activity-specific conditions added to the NWP authorization by the district engineer.

3. If the district engineer determines that the adverse effects of the proposed work are more than minimal, then the district engineer will notify the applicant either: (a) That the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (b) that the project is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level; or (c) that the project is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse effects occur to the aquatic environment, the activity will be authorized within the 45-day PCN period, with activity-specific conditions that state the mitigation requirements. The authorization will include the necessary conceptual or detailed mitigation or a requirement that the applicant submit a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level. When mitigation is required, no work in waters of the United States may occur until the district engineer has approved a specific mitigation plan or has determined that prior approval of a final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation.

Further Information

1. District Engineers have authority to determine if an activity complies with the terms and conditions of an NWP.
2. NWPs do not obviate the need to obtain other federal, state, or local permits, approvals, or authorizations required by law.
3. NWPs do not grant any property rights or exclusive privileges.
4. NWPs do not authorize any injury to the property or rights of others.
5. NWPs do not authorize interference with any existing or proposed Federal project.

Definitions

Best management practices (BMPs): Policies, practices, procedures, or structures implemented to mitigate the adverse environmental effects on surface water quality resulting from development. BMPs are categorized as structural or non-structural.

Compensatory mitigation: The restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

Currently serviceable: Useable as is or with some maintenance, but not so degraded as to essentially require reconstruction.

Direct effects: Effects that are caused by the activity and occur at the same time and place.

Discharge: The term "discharge" means any discharge of dredged or fill material.

Enhancement: The manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.

Ephemeral stream: An ephemeral stream has flowing water only during, and for a short duration after, precipitation events in a typical year. Ephemeral stream beds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.

Establishment (creation): The manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area.

High Tide Line: The line of intersection of the land with the water's surface at the maximum height reached by a rising tide. The high tide line may be determined, in the absence of actual data, by a line of oil or scum along shore objects, a more or less continuous deposit of fine shell or debris on the foreshore or berm, other physical markings or characteristics, vegetation lines, tidal gages, or other suitable means that delineate the general height reached by a rising tide. The line encompasses spring high tides and other high tides that occur with periodic frequency but does not include storm surges in which there is a departure

from the normal or predicted reach of the tide due to the piling up of water against a coast by strong winds such as those accompanying a hurricane or other intense storm.

Historic Property: Any prehistoric or historic district, site (including archaeological site), building, structure, or other object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria (36 CFR part 60).

Independent utility: A test to determine what constitutes a single and complete non-linear project in the Corps regulatory program. A project is considered to have independent utility if it would be constructed absent the construction of other projects in the project area. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed even if the other phases were not built can be considered as separate single and complete projects with independent utility.

Indirect effects: Effects that are caused by the activity and are later in time or farther removed in distance, but are still reasonably foreseeable.

Intermittent stream: An intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

Loss of waters of the United States: Waters of the United States that are permanently adversely affected by filling, flooding, excavation, or drainage because of the regulated activity. Permanent adverse effects include permanent discharges of dredged or fill material that change an aquatic area to dry land, increase the bottom elevation of a waterbody, or change the use of a waterbody. The acreage of loss of waters of the United States is a threshold measurement of the impact to jurisdictional waters for determining whether a project may qualify for an NWP; it is not a net threshold that is calculated after considering compensatory mitigation that may be used to offset losses of aquatic functions and services. The loss of stream bed includes the linear feet of stream bed that is filled or excavated. Waters of the United States temporarily filled, flooded, excavated, or drained, but restored to pre-construction contours and elevations after construction, are not included in the measurement of loss of waters of the United States. Impacts resulting from activities eligible for exemptions under Section 404(f) of the Clean Water Act are not considered when calculating the loss of waters of the United States.

Non-tidal wetland: A non-tidal wetland is a wetland that is not subject to the ebb and flow of tidal waters. The definition of a wetland can be found at 33 CFR 328.3(b). Non-tidal wetlands contiguous to tidal waters are located landward of the high tide line (i.e., spring high tide line).

Open water: For purposes of the NWPs, an open water is any area that in a year with normal patterns of precipitation has water flowing or standing above ground to the extent that an ordinary high water mark can be determined. Aquatic vegetation within the area of standing or flowing water is either non-emergent, sparse, or absent. Vegetated shallows are considered to be open waters. Examples of "open waters" include rivers, streams, lakes, and ponds.

Ordinary High Water Mark: An ordinary high water mark is a line on the shore established by the fluctuations of water and indicated by physical characteristics, or by other appropriate means that consider the characteristics of the surrounding areas (see 33 CFR 328.3(e)).

Perennial stream: A perennial stream has flowing water year-round during a typical year. The water table is located above the stream bed for most of the year. Groundwater is the primary source of water for stream flow. Runoff from rainfall is a supplemental source of water for stream flow.

Practicable: Available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

Pre-construction notification: A request submitted by the project proponent to the Corps for confirmation that a particular activity is authorized by nationwide permit. The request may be a permit application, letter, or similar document that includes information about the proposed work and its anticipated environmental effects. Pre-construction notification may be required by the terms and conditions of a nationwide permit, or by regional conditions. A pre-construction notification may be voluntarily submitted in cases where pre-construction notification is not required and the project proponent wants confirmation that the activity is authorized by nationwide permit.

Preservation: The removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area or functions.

Re-establishment: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions.

Rehabilitation: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.
Restoration: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: re-establishment and rehabilitation.
Riffle and pool complex: Riffle and pool complexes are special aquatic sites under the 404(b)(1) Guidelines. Riffle and pool complexes sometimes characterize steep gradient sections of streams. Such stream sections are recognizable by their hydraulic characteristics. The rapid movement of water over a course substrate in riffles results in a rough flow, a turbulent surface, and high dissolved oxygen levels in the water. Pools are deeper areas associated with riffles. A slower stream velocity, a streaming flow, a smooth surface, and a finer substrate characterize pools.
Riparian areas: Riparian areas are lands adjacent to streams, lakes, and estuarine-marine shorelines. Riparian areas are transitional between terrestrial and aquatic ecosystems, through which surface and subsurface hydrology connects riverine, lacustrine, estuarine, and marine waters with their adjacent wetlands, non-wetland waters, or uplands. Riparian areas provide a variety of ecological functions and services and help improve or maintain local water quality. (See general condition 23.)
Shellfish seeding: The placement of shellfish seed and/or suitable substrate to increase shellfish production. Shellfish seed consists of immature individual shellfish or individual shellfish attached to shells or shell fragments (i.e., spat on shell). Suitable substrate may consist of shellfish shells, shell fragments, or other appropriate materials placed into waters for shellfish habitat.
Single and complete linear project: A linear project is a project constructed for the purpose of getting people, goods, or services from a point of origin to a terminal point, which often involves multiple crossings of one or more waterbodies at separate and distant locations. The term "single and complete project" is defined as that portion of the total linear project proposed or accomplished by one owner/developer or partnership or other association of owners/developers that includes all crossings of a single water of the United States (i.e., a single waterbody) at a specific location. For linear projects crossing a single or multiple waterbodies several times at separate and distant locations, each crossing is considered a single and complete project for purposes of NWP authorization. However, individual channels in a braided stream or river, or individual arms of a large, irregularly shaped wetland or lake, etc., are not separate waterbodies, and crossings of such features cannot be considered separately.
Single and complete non-linear project: For non-linear projects, the term "single and complete project" is defined at 33 CFR 330.2(i) as the total project proposed or accomplished by one owner/developer or partnership or other association of owners/developers. A single and complete non-linear project must have independent utility (see definition of "independent utility"). Single and complete non-linear projects may not be "piecemealed" to avoid the limits in an NWP authorization.
Stormwater management: Stormwater management is the mechanism for controlling stormwater runoff for the purposes of reducing downstream erosion, water quality degradation, and flooding and mitigating the adverse effects of changes in land use on the aquatic environment.
Stormwater management facilities: Stormwater management facilities are those facilities, including but not limited to, stormwater retention and detention ponds and best management practices, which retain water for a period of time to control runoff and/or improve the quality (i.e., by reducing the concentration of nutrients, sediments, hazardous substances and other pollutants) of stormwater runoff.
Stream bed: The substrate of the stream channel between the ordinary high water marks. The substrate may be bedrock or inorganic particles that range in size from clay to boulders. Wetlands contiguous to the stream bed, but outside of the ordinary high water marks, are not considered part of the stream bed.
Stream channelization: The manipulation of a stream's course, condition, capacity, or location that causes more than minimal interruption of normal stream processes. A channelized stream remains a water of the United States.
Structure: An object that is arranged in a definite pattern of organization. Examples of structures include, without limitation, any pier, boat dock, boat ramp, wharf, dolphin, weir, boom, breakwater, bulkhead, revetment, riprap, jetty, artificial island, artificial reef, permanent mooring structure, power transmission line, permanently moored floating vessel, piling, aid to navigation, or any other manmade obstacle or obstruction.
Tidal wetland: A tidal wetland is a wetland (i.e., water of the United States) that is inundated by tidal waters. The definitions of a wetland and tidal waters can be found at 33 CFR 328.3(b) and 33 CFR 328.3(f), respectively. Tidal waters rise and fall in a predictable and measurable rhythm or cycle due to the gravitational pulls of the moon and sun. Tidal waters end where the rise and fall of the water surface can no longer be practically measured in a predictable rhythm due to masking by other waters, wind, or other effects. Tidal wetlands are located channelward of the high tide line, which is defined at 33 CFR 328.3(d).
Vegetated shallows: Vegetated shallows are special aquatic sites under the 404(b)(1) Guidelines. They are areas that are permanently inundated and under normal circumstances have rooted aquatic vegetation, such as seagrasses in marine and estuarine systems and a variety of vascular rooted plants in freshwater systems.

Waterbody: For purposes of the NWPs, a waterbody is a jurisdictional water of the United States. If a jurisdictional wetland is adjacent – meaning bordering, contiguous, or neighboring – to a waterbody determined to be a water of the United States under 33 CFR 328.3(a)(1)-(6), that waterbody and its adjacent wetlands are considered together as a single aquatic unit (see 33 CFR 328.4(c)(2)). Examples of "waterbodies" include streams, rivers, lakes, ponds, and wetlands.

ADDITIONAL INFORMATION

Information about the U.S. Army Corps of Engineers regulatory program, including nationwide permits, may also be accessed at http://swt.usace.army.mil/Missions/Regulatory/NationwidePermitProgram.aspx or http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits.aspx.

CLEAN WATER ACT (CWA) SECTION 401 WATER QUALITY CERTIFICATION (WQC) FOR 404 NATIONWIDE PERMITS (NWPS) IN OKLAHOMA

April 20, 2012

The Corps has denied NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, and 52 in Critical Resource Waters (CRWs) (See General Condition (GC) 22). The Oklahoma Department of Environmental Quality (ODEQ) has denied WQC for NWPs 3, 13, 18, 41, 45, 46, 51 and 52 in (CRWs); and 34, 48, 49 and 50 in all waters.

Tulsa District regional conditions require a Pre-Construction Notification (PCN) in all CRWs (See back of this sheet for details). The Corps will review PCN requests for verification of work for the NWPs denied WQC by ODEQ. If the proposed activity is determined to be within the parameters a NWP, a provisional NWP would be granted conditionally upon the applicant receiving an individual WQC from ODEQ. For NWPs 16 and 20, the Corps will coordinate with ODEQ under GC 31.

The Corps has determined the following WQC standard conditions issued by the ODEQ on April 9, 2012 pursuant to Section 401 of the CWA, are acceptable for CWA Section 404 NWPs.

1. All spills of fuel or other pollutants in excess of five gallons shall be reported to the ODEQ, within twenty-four (24) hours, to the pollution prevention hotline at 1-800-522-0206.

2. All fueling and servicing of vehicles and equipment shall be done above the Ordinary High Water Mark

3. The permittee shall provide access to the property for ODEQ inspection purposes.

4. Any material and fuels used in the project shall be stored and/or stockpiled above the Ordinary High Water Mark and shall be removed from a likely flood zone prior to any predicted flood.

5. If a stormwater discharge permit for construction activities is required, one can be obtained from the ODEQ at (405) 702-8100.

6. If the project is located on or may affect water impaired for turbidity and/or sediment, Best Management Practices and other controls shall be selected and implemented in order to control soil erosion and maintain compliance with Water Quality Standards (Oklahoma Administrative Code, Chapter 45). The permittee shall maintain sufficient records to document the type of practices implemented to maintain compliance with this condition, during the term of the permit. A copy of the current EPA-approved list of impaired waters [303(d) list] can be viewed at http://www.deq.state.ok.us/wqdnew/305b_303d/index.html

7. For any project involving bank stabilization, the permittee shall consider installing bioengineering practices in lieu of structural practices (riprap) to minimize impacts to the aquatic resource and enhance aquatic habitat.

For Nationwide Permit 16, discharges associated with Upland Contained Disposal Areas, the WQC is conditioned as follows: the discharge shall not contain a Total Suspended Solids (TSS) concentration of greater than 45 mg/L daily maximum and shall maintain a pH between 6.5 and 9.0. The TSS daily maximum shall be monitored by grab sample collected at least once a year during discharge. The limits and monitoring may be waived on a site-specific basis through implementation of an ODEQ approved set of BMPs. The BMPs shall be submitted and approved by the ODEQ prior to commencing any discharge.

Note 1: This WQC supersedes all previous WQCs for NWPs in the State of Oklahoma.

Note 2: CRWs are Outstanding Resource Waters (ORWs) and their watersheds, and High Quality Waters (HQWs) designated by the State of Oklahoma in Appendix A of the Water Quality Standards (OAC 785, Chapter 45). The ORWs include all waters in the supporting watersheds; HQWs do not. Both ORWs and HQWs include adjacent wetlands. The current list of CRWs is available on the Corps website: http://www.swt.usace.army.mil/permits/NPP.cfm.

Note 3: WQC is not required for the following NWPs issued under the sole authority of Section 10 of the Rivers and Harbors Act of 1899: NWPs 1, 2, 8, 9, 10, 11, 24, 28, and 35.

NATIONWIDE PERMIT REGIONAL CONDITIONS
IN OKLAHOMA WITHIN TULSA DISTRICT
April 20, 2012

All discharges and activities proposed for authorization under any nationwide permit (NWP) into the waters of the United States (U.S.) listed below, including adjacent wetlands; applicants shall notify the Tulsa District Engineer (DE) in accordance with NWP General Condition (GC) 31 *Pre-Construction Notification* (PCN):

a. **Pitcher Plant Bogs:** Wetlands typically characterized by an organic surface soil layer and include vegetation such as pitcher plants (*Sarracenia* sp.), sundews (*Drosera* sp.), and sphagnum moss (Sphagnum sp.).

b. **Cypress-Tupelo Swamps**: Wetlands comprised predominantly of bald cypress trees (Taxodium distichum), and water tupelo trees (Nyssa aquatica), that are occasionally or regularly flooded by fresh water. Common associates include red maple (Acer rubrum), swamp privet (Forestiera acuminata), green ash (Fraxinus pennsylvanica) and water elm (Planera aquatica). Associated herbaceous species include lizard's tail (Saururus cernuus), water mermaid weed (Proserpinaca spp.), buttonbush (Cephalanthus occidentalis) and smartweed (Polygonum spp.). (Eyre, F. H. Forest Cover Types of the United States and Canada. 1980. Society of American Foresters, 5400 Grosvenor Lane, Bethesda, Maryland 20814-2198. Library of Congress Catalog Card No. 80-54185)

c. **Designated Critical Resource Waters (CRWs)**: CRWs are Outstanding Resource Waters (ORWs) and their watersheds, and High Quality Waters (HQWs) designated by the State of Oklahoma in Appendix A of the Water Quality Standards (OAC 785, Chapter 45). The ORWs include all waters in the supporting watersheds; HQWs do not. Both ORWs and HQWs include adjacent wetlands. The current list of CRWs is available on the Corps website: http://www.swt.usace.army.mil/permits/NPP.cfm (See GC 22 *Designated CRWs*).

NOTE: 1 (See GC 18) for Endangered Species –
Oklahoma USFWS webpage: http://www.fws.gov/southwest/es/Oklahoma/endsp_fedact.htm

NOTE: 2 (See GC 20) for Historic Properties - State Historic Preservation Offices
Oklahoma Archeological Survey webpage: www.ou.edu/cas/archsur/
Oklahoma Historical Society webpage: www.okhistory.org

Expires: March 18, 2017

APPENDIX C
CULTURAL RESOURCES COORDINATION

DEPARTMENT OF ARMY
CORPS OF ENGINEERS, TULSA DISTRICT
TULSA, OKLAHOMA 74128-4609

November 6, 2012

Planning and Environmental Division

Mr. Reid Nelson, Director
Office of Federal Agency Programs
Advisory Council on Historic Preservation
1100 Pennsylvania Ave., NW, Suite 803
Washington, DC 20004

Dear Mr. Nelson:

This letter is to invite the participation of the Advisory Council on Historic Preservation (ACHP) in the development of a Programmatic Agreement (PA). The proposed PA would address Section 106 procedures for the long-term drawdown of Pine Creek Reservoir in order to repair significant structural problems within the reservoir dam. The U.S. Army Corps of Engineers, Tulsa District, owns and operates Pine Creek Reservoir, which is located in McCurtain County, southeastern Oklahoma.

In 2010, Tulsa District began investigating seepage problems associated with the Pine Creek Reservoir dam. In late 2010, it was determined that the seepage problems were serious in nature and that the dam was structurally at risk when the reservoir was at normal conservation pool. The pool was subsequently lowered approximately five feet in elevation as a precautionary measure. This drawdown was initially viewed as temporary while the District investigated the extent of the damage within the dam.

Dam safety investigations conducted throughout 2011 and 2012 have resulted in development of a suite of engineering alternatives to address the dam's deficiencies. These alternatives will be analyzed in a forthcoming National Environmental Policy Act (NEPA) document, which will begin as an Environmental Assessment (EA). Ultimately, we acknowledge that an Environmental Impact Assessment may be necessary.

All of the engineering alternatives developed to date appear to require an extended, long-term drawdown of the reservoir to approximately five feet below normal conservation pool, which is the current level. At present, a conservative estimate of the length of the drawdown would be a minimum of five years and perhaps as many as 10.

Tulsa District proposes to enter into a Programmatic Agreement (PA) in order to address the effects of the long-term drawdown on historic properties that may be located within the drawdown zone (normal conservation pool minus current reservoir elevation). The PA would guide Tulsa District's compliance with

Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended). Additionally, the PA would briefly reference Native American Graves Protection and Repatriation Act (NAGPRA) procedures because of the potential for exposure and subsequent identification of human remains within the drawdown zone.

Pine Creek Reservoir is within the pre-contact range of the Caddo Nation of Oklahoma, and is located within the historic treaty lands of the Choctaw Nation of Oklahoma. Therefore, tribal consultation has been initiated with these two Native American tribes and they have been invited as signatories to the PA. Finally, required signatories will also include the Oklahoma State Historic Preservation Office (SHPO) and the Oklahoma Archeological Survey (OAS).

At your earliest convenience, please advise Tulsa District on your willingness to participate in the drafting of the proposed PA. We look forward to working with you. If you have any questions, please contact Mr. Ken Shingleton at 918-669-7661.

Sincerely,

Jeff Knack
Chief, Planning and Environmental Division

Preserving America's Heritage

December 13, 2012

Mr. Kenneth L. Shingleton
Archaeologist
Corps of Engineers
Tulsa District
1645 South 101 East Avenue
Tulsa, OK 4128

REF: Proposed Stream Erosion Project at Spiro Mound Group Site
Proposed Repairs to Pine County Reservoir Dam

Dear Mr. Shingleton:

We have received the additional information we requested in our November 15, 2012 letters to you on the referenced undertakings. After discussing these projects you in a telephone conversation on December 13, we have concluded that Appendix A, Criteria for Council Involvement in Reviewing Individual Section 106 Cases of our regulations "Protection of Historic Properties (36 CFR Part 800) does not apply to these undertakings. Accordingly, we do not believe that our participation in consultation to resolve adverse effects is needed. However, if we receive a request for participation from the Oklahoma State Historic Preservation Officer (SHPO), a Tribal Historic Preservation Officer (THPO) or other consulting party, we may reconsider this decision. Additionally, should circumstances change and you determine that our participation is required, please notify us.

Pursuant to 36 CFR 800.6(b)(1)(iv), you will need to file the final Memoranda of Agreement (MOAs) and related documentation with the ACHP at the conclusion of the consultation process. The filing of the MOAs and documentation with the ACHP is required in order to complete the requirements of Section 106 of the National Historic Preservation Act.

Thank you for providing us with the information. If you have any questions, please contact Dr. Tom McCulloch at 202-606-8554.

Sincerely,

Tom M

Caroline Hall
Assistant Director
Federal Property Management Section
Office of Federal Agency Programs

ADVISORY COUNCIL ON HISTORIC PRESERVATION

1100 Pennsylvania Avenue NW, Suite 803 • Washington, DC 20004
Phone: 202-606-8503
• Fax: 202-606-8647 • achp@achp.gov • www.achp.gov

PROGRAMMATIC AGREEMENT

AMONG

THE U.S. ARMY CORPS OF ENGINEERS, TULSA DISTRICT, THE OKLAHOMA STATE HISTORIC PRESERVATION OFFICE, THE CADDO NATION OF OKLAHOMA, AND THE CHOCTAW NATION OF OKLAHOMA

REGARDING COMPLIANCE WITH SECTION 106 OF THE NATIONAL HISTORIC PRESERVATION ACT OF 1966 (AS AMENDED) FOR THE PINE CREEK RESERVOIR DAM SAFETY MODIFICATION PROJECT, McCURTAIN COUNTY, OKLAHOMA

WHEREAS, the U.S. Army Corps of Engineers, Tulsa District (hereafter, Tulsa District) owns and operates Pine Creek Reservoir, which is located on the Little River in McCurtain County, southeastern Oklahoma; and

WHEREAS, structures associated with Pine Creek Reservoir and integral to its function include the dam and an attached levee, which together function to impound the reservoir at normal conservation pool (438 ft. amsl.) and at top of flood control pool (480 ft. amsl.), respectively; and

WHEREAS, the Pine Creek dam has been determined to be at a significant risk of failure because of structural deficiencies that have developed over time, and that modification of the dam will be necessary in order to correct deficiencies and reduce the risk of dam failure; and

WHEREAS, the Pine Creek dam structurally extends to the west in the form of a levee which impounds a portion of the reservoir as it fills to the top of flood control pool, and that in order to meet appropriate engineering regulations the levee requires removal of woody vegetation along both sides for a distance of 50 feet from its toe; and

WHEREAS, because the Pine Creek dam was determined to be structurally deficient and at risk of failure, the reservoir pool was dropped five feet from normal conservation pool (438 ft. amsl.) to an elevation of 433 ft. amsl., as a precautionary measure; and

WHEREAS, the drawdown of Pine Creek Reservoir to 433 ft. amsl. was initially viewed as a temporary measure while the extent and nature of damage to the dam was evaluated and while engineering alternatives to modify the structure were developed; and

WHEREAS, all reasonable engineering alternatives to modify the Pine Creek dam and reduce its associated risk of failure include the continued drawdown of the reservoir to 433 ft. amsl., and that as an evaluation of these alternatives, Tulsa District now views the reservoir drawdown to be a long-term, multi-year measure; and

WHEREAS, one reasonable engineering alternative being considered is the "No Action" alternative, which would require the reservoir drawdown to 433 ft. amsl to be considered permanent; and

WHEREAS, Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) and its implementing regulation 36 CFR Part 800 require Tulsa District to ensure that historic properties are identified, and that adverse effects to those historic properties are identified and resolved; and

WHEREAS, Tulsa District has determined the Area of Potential Effect (APE) for this project to consist of three primary components (see Attachment), including (1) the dam structure itself and all associated construction features such as roads, pipelines, electric lines, staging areas, and borrow areas; (2) the reservoir drawdown footprint, which extends entirely around the lake from elevation 438 ft. amsl. to 433 ft. amsl., plus an appropriate horizontal distance buffer at and above the 438 ft. amsl. normal conservation pool; and (3) a distance of 50 feet perpendicular to and away from the toe of the reservoir levee for its entire length on both sides, plus an additional 20 feet buffer to accommodate additional vegetation clearing, vehicle movement, and materials and vegetation staging; and additionally each component of the APE shall include the full horizontal and vertical extent of any identified cultural or historic resources intersected by or adjacent to any of the above listed project component boundaries and associated impact areas; and

WHEREAS, prior to contact with Europeans, the Little River drainage in southeastern Oklahoma was occupied by ancestors of the Caddo Nation of Oklahoma (hereafter, Caddo Nation) and thus may retain historic properties of importance to the Caddo Nation; and

WHEREAS, as part of treaty lands within historic Indian Territory, the Little River drainage in southeastern Oklahoma is historically a part of the resident Choctaw Nation of Oklahoma (hereafter, Choctaw Nation), and thus may retain historic properties of importance to the Choctaw Nation; and

WHEREAS, the Caddo Nation of Oklahoma and the Choctaw Nation of Oklahoma both have NHPA 101(d)(2) Tribal Historic Preservation Offices (THPO) and have been invited to sign this Programmatic Agreement (hereafter, PA); and

WHEREAS, the effects of this undertaking on historic properties cannot be fully determined prior to commencement of the undertaking; and

WHEREAS, Tulsa District has consulted with the Oklahoma State Historic Preservation Office (SHPO), the Oklahoma Archeological Survey (OAS), and the Advisory Council on Historic Preservation (ACHP) in accordance with Section 106 of the National Historic Preservation Act, 16 U.S.C. 470 (NHPA), as amended, and its implementing regulations (36 CFR Part 800.6(b)(1)) to resolve potential adverse effects on these historic properties; and

WHEREAS, the SHPO and OAS have entered into a cooperative agreement under which OAS provides special services to the SHPO in the Section 106 review process. OAS maintains the inventory of Oklahoma's prehistoric resources and provides professional services to the SHPO in prehistoric archeology. OAS reviews federal undertakings for possible impacts on prehistoric archaeological resources and provides written comments as the SHPO's official representative. Accordingly, OAS has been invited to concur in this PA; and

WHEREAS the ACHP has decided not to participate in consultation regarding this Project at this time, but may re-enter consultation at any time, particularly functioning to resolve potential disputes between Tulsa District , SHPO, and/or other Signatories to this PA; and

WHEREAS, Tulsa District and SHPO agree that it is advisable to accomplish compliance with Section 106 through the development and execution of this PA in accordance with 36 CFR 800.6 and 36 CFR 800.14(b)(3); and

NOW, THEREFORE, Tulsa District , SHPO, the Caddo Nation of Oklahoma, and the Choctaw Nation of Oklahoma agree that upon the Tulsa District decision to proceed with the Undertaking, Tulsa District shall ensure that the following stipulations are implemented in order to take into account the effects of the Pine Creek Dam Reservoir Safety Modification Project on historic properties as required by Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended), and that these stipulations shall govern the Project and all of its parts until this PA expires or is terminated.

STIPULATIONS

Tulsa District shall ensure that the following measures will be carried out. All work conducted under this PA will be performed in a manner consistent with the Secretary of the Interior's "Standards and Guidelines for Archeology and Historic Preservation" (48 FR 44716-44740; September 23, 1983), as amended, or the Secretary of the Interior's "Standards for the Treatment of Historic Properties" (36 CFR 68), as appropriate.

I. IDENTIFICATION OF HISTORIC PROPERTIES.

A. ARCHAEOLOGICAL INVESTIGATIONS. Tulsa District will conduct a complete archaeological investigation, in multi-year phases if necessary because of funding, of the entire Area of Potential Effect (APE) associated with this project. Investigations and associated results will be coordinated as appropriate to the Section 106 process. Investigation methods will include, but not be limited to, pedestrian survey conducted at appropriate intervals and excavation of shovel tests at appropriate intervals, including screening of excavated material where appropriate. In certain instances subsurface testing will be conducted by 1X1 meter excavation units, soil coring, or backhoe trenching. Additionally, archival research may be necessary to establish chain of title or to establish historical significance to support National Register eligibility determinations for sites dating to the historic period.

B. NATIONAL REGISTER ELIGIBILITY EVALUATIONS AND DETERMINATIONS. When archeological or historic resources are identified within the APE, their eligibility for inclusion in the National Register of Historic Places (NRHP) will be assessed using the criteria outlined in 36 CFR Part 60. If in the event an archeological or historic resource is intersected by the limits of a project element or adjacent to the APE boundary, the entire property will be considered when determining National Register eligibility of that property. In some instances, information beyond that readily available from survey and archival research may be necessary to complete an eligibility determination. In these instances, additional work in the form of subsurface test excavations or further archival research may be necessary. The actual amount of work conducted will vary from resource to resource, but it must obtain data sufficient to allow an independent assessment as to whether a resource can or cannot be expected to address the research questions set forth in the Research Design.

In addition to archeological and historic resources, non-archeological resources will be identified within the APE as well. Non-archeological resources may consist of, but not be limited to, historic standing structures (e.g., Pine Creek Reservoir Dam), Traditional Cultural Properties (TCP's), Sacred Sites, and historic landscapes. TCP's and Sacred Sites will be identified through consultation with the Caddo Nation of Oklahoma and the Choctaw Nation of Oklahoma. Historic standing structures should be documented in accordance with guidance in the SHPO's "Review and Compliance Manual."

Should Tulsa District, SHPO, the Caddo Nation of Oklahoma, and the Choctaw Nation of Oklahoma agree that a property is or is not eligible for the National Register, such consensus shall be deemed conclusive for the purpose of this PA. Should Tulsa District or SHPO disagree regarding the eligibility of a property, Tulsa District shall obtain a determination of eligibility from the Keeper of the National Register pursuant to 36 CFR 63. Resources determined to be ineligible for inclusion in the NRHP shall require no further protection or evaluation. Archeological or historic resources that are eligible for listing on the NRHP are "historic properties," consistent with terminology defined in 36 CFR Part 800.16. Until resources have been conclusively determined to the eligible or not eligible for the NRHP, they will be treated as though they are eligible.

II. DETERMINATION OF ADVERSE EFFECT. Tulsa District shall make a reasonable and good faith effort to evaluate the effect of the undertaking on historic properties in the APE. Tulsa District and SHPO shall apply the criteria of adverse effect to historic properties within the APE in accordance with 36 CFR 800.5.

III. RESOLUTION OF ADVERSE EFFECT. Tulsa District shall consult with the SHPO to resolve adverse effects in accordance with 36 CFR 800.6. Tulsa District will consult with all signatories to develop and evaluate alternatives or modifications to the undertaking that could avoid or minimize the adverse effects, with preference to avoidance if possible. Adverse effects to historic properties that cannot be avoided will be mitigated in order to offset the loss of those properties. Tulsa District shall prepare a historic properties treatment plan (Plan) that describes the mitigation measures the District proposes to resolve the undertaking's adverse effects and shall provide this Plan

for review and comment to SHPO and other consulting parties. All parties will have 30 calendar days in which to provide a written response to Tulsa District. The Plan shall include, as appropriate, excavation and recordation strategies; work and report schedules; and curation of artifacts and records. It shall specify at a minimum: a) the historic property or properties where data recovery is to be conducted; b) the excavation or recordation that will be performed; c) the methods to be used; and d) the methods to be used in analysis, data management, and dissemination of data, including a schedule of work and report submission.

If Tulsa District and SHPO fail to agree on how adverse effects will be resolved, the District shall request that the ACHP join the consultation and provide the Council and all consulting parties with documentation pursuant to 36 CFR 800.11(g).

IV. CURATION AND DISPOSITION OF RECOVERED MATERIALS, RECORDS, AND REPORTS.

A. CURATION. Tulsa District shall ensure that all archaeological materials and records that result from identification, evaluation, and treatment efforts conducted under this PA are ultimately accessioned into the Sam Noble Oklahoma Museum of Natural History in Norman and curated to 36 CFR Part 79 standards.

B. REPORTS. Tulsa District shall provide copies of final technical reports of investigations to the signatories and consulting parties. The signatories and consulting parties shall withhold from the public all site location information and other data that may be of a confidential or sensitive nature pursuant to 36 CFR 800.11(c).

C. ANNUAL REPORT. Tulsa District will provide an annual status report on implementation of the PA to SHPO and other Signatories.

V. TECHNICAL REPRESENTATIVES OF THE SIGNATORIES.

The parties to this PA will designate technical representatives which will communicate to fulfill the terms outlined in order to comply with the Section 106 process. Technical representatives will conduct consultation required to establish determinations of eligibility for the National Register, determinations of adverse effect, and the methods for resolving adverse effects to historic properties.

VI. EXECUTION AND APPLICABILITY OF THIS AGREEMENT.

This Agreement will go into effect when signed by Tulsa District, and SHPO, and when an executed version is received by the Advisory Council on Historic Preservation (ACHP).

VII. TREATMENT OF HUMAN REMAINS.

A. PRIOR CONSULTATION. Tulsa District shall comply with the Native American Graves Protection and Repatriation Act (NAGPRA) and its associated regulation, 43 CFR

Part 10. If Tulsa District's investigations conducted pursuant to Stipulation I of this PA indicate a high likelihood that human remains may be encountered, Tulsa District shall develop a treatment plan (e.g., NAGPRA Plan of Action) for these remains in consultation with the Caddo Nation and the Choctaw Nation. Tulsa District shall ensure that these Nations are afforded a reasonable opportunity to identify concerns, provide advice on identification and evaluation, and participate in the resolution of adverse effects in compliance with the terms of this PA and all related federal laws.

B. INADVERTENT DISCOVERY. Tulsa District shall comply with the Native American Graves Protection and Repatriation Act (NAGPRA) and its associated regulation, 43 CFR Part 10. Immediately upon the inadvertent discovery of human remains during historic properties investigations or construction activities conducted pursuant to this PA, Tulsa District shall ensure that all ground disturbing activities cease in the vicinity of the human remains and any associated grave goods, and that the site is secured from further disturbance or vandalism. Within 48 hours of the discovery, Tulsa District shall initiate consultation with SHPO, the Caddo Nation, and the Choctaw Nation to resolve adverse effects. Because of the sensitivity of inadvertent discovery issues, no information about site locations or burial contents will be provided to the media.

VIII. INADVERTENT DISCOVERIES OF HISTORIC PROPERTIES.

If historic resources (aside from pre-contact burials or other human remains discussed in Stipulation VII) are inadvertently discovered during any activities directly related to modification of the dam or the associated levee or if there are other unanticipated effects on historic properties within the proposed reservoir area, Tulsa District shall ensure that all construction activity ceases within a reasonable distance of the find, ensure the area is secured and the historic property is protected, and will notify SHPO within 48 hours of discovery. Tulsa District and SHPO will consult and formulate an appropriate course of action to address the effect on the discovery, consistent with a forthcoming, defendable determination of National Register eligibility.

IX. PROFESSIONAL QUALIFICATIONS.

All investigations specified in this PA shall be carried out by principal investigators meeting the pertinent professional qualifications of the Secretary of the Interior's (SOI) *Professional Qualification Standards* (36 CFR Part 61) in a discipline appropriate for the task and the nature of the historic properties.

X. DISPUTE RESOLUTION.

Should any signatory or concurring party to this PA object at any time to any actions proposed or the manner in which the terms of this PA are implemented, the objector is encouraged to consult the other signatories in resolving the objection. If that objector determines that such objection cannot be resolved, Tulsa District shall perform the following tasks.

A. CONSULT ACHP. Forward all documentation relevant to the dispute, including proposed resolution, to the ACHP. The ACHP shall provide the agency with its advice on the resolution of the objection within thirty (30) days of receiving adequate documentation. Prior to reaching a final decision on the dispute, the agency shall prepare a written response that takes into account advice or comments regarding the dispute from the ACHP, signatories and concurring parties, and provide them with a copy of this written response. The agency will then proceed according to its final decision.

B. FINAL DECISION. If the ACHP does not provide its advice regarding the dispute within the thirty (30) day time period, the agency may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, Tulsa District shall prepare a written response that takes into account any timely comments regarding the dispute from the signatories and concurring parties to the PA, and provide them and the ACHP with a copy of such written response.

XI. ANTI-DEFICIENCY ACT.

It is understood that the implementation of this Agreement is subject to Federal and State anti-deficiency statutes.

XII. DURATION, AMENDMENT, WITHDRAWAL, AND TERMINATION.

A. DURATION. Unless terminated or amended as outlined below, this PA shall remain in effect for a period of 10 years from the date that the PA goes into effect and may be extended for a second, five-year term with the written concurrence of all of the signatories. During the time in which this PA is in effect, relevant portions of this PA will be superseded, if appropriate, by future revisions to 36 CFR Part 800 or other federal historic preservation law or regulation.

B. AMENDMENT. If any signatory to the PA determines that the Agreement cannot be fulfilled or that modification of the Agreement is warranted, that signatory shall consult with the other signatories to seek amendment of the Agreement. The Agreement may be amended after consultation among the signatories and all parties agree in writing with such amendment.

C. WITHDRAWAL. Any signatory may withdraw their involvement in this Agreement by providing 30 days written notice to the other parties, provided that the parties will consult during this period to seek amendments or other actions that would prevent withdrawal. Withdrawal of Tulsa District or SHPO will invalidate the PA.

D. TERMINATION. This Agreement will be fully terminated if Tulsa District or SHPO provide notice of termination and after 30 days or more of unsuccessful consultations to amend the Agreement. This Agreement may also be terminated by the implementation of a subsequent Programmatic Agreement per 36 CFR Part 800 that explicitly supersedes this Agreement.

XIII. COMPLIANCE WITH 36 CFR PART 800.

Execution of this Programmatic Agreement and implementation of its terms is evidence that U.S. Army Corps of Engineers, Tulsa District has taken into account the effects of the agency's undertakings on historic properties and has afforded the ACHP an opportunity to comment.

SIGNATORIES

COL Michael J. Teague
Commander
U.S. Army Corps of Engineers, Tulsa District

_____

Dr. Bob Blackburn
Oklahoma State Historic Preservation Officer

INVITED SIGNATORIES

_____

Chairperson Brenda Shemayme Edwards
Caddo Nation of Oklahoma

_____

Chief Gregory E. Pyle
Choctaw Nation of Oklahoma

CONCURRING PARTY

_____

Dr. Robert L. Brooks, Director
Oklahoma Archeological Survey

APPENDIX D
PUBLIC INFORMATION/SCOPING WORKSHOPS

NEWS RELEASE

U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT

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Release No. 33
For Immediate Release:
July 12, 2010

Contact:
Ross Adkins, 918-669-7365
Ross.adkins@usace.army.mil

Pine Creek Dam Public Information Briefing Scheduled

TULSA – U.S. Army Corps of Engineers officials with the Tulsa District have scheduled a public meeting to present current status and future plans regarding Pine Creek Dam. The public meeting will be held Tuesday, July 20, at the Valliant Community Center, beginning at 6:00 p.m. The center is located at 311 Johnston Street, Valliant, Okla.

As a result of recent studies conducted by the U.S. Army Corps of Engineers, dam safety concerns have been identified which have required changes in the operation of the dam to ensure continued public safety. The seasonal pool has already been eliminated, lowering the pool level from elevation 442.5 to 438. An additional lowering of the pool is planned to elevation 433.

With the support of the federal congressional delegation, additional Pine Creek funding has been secured to perform required investigations and to design and construct interim remedial measures to address immediate concerns. These interim remedial actions may allow the Corps to raise the pool back to normal conservation pool elevation of 438 while permanent repairs are developed and additional funding is received.

Seepage at Pine Creek Dam was noted upon first filling in 1969. The Corps has done grouting two times to address this issue and has always monitored the seepage. Following last year's record high water, a depression was observed on the embankment. Follow-on testing indicated potential voids and soft materials in the fill material surrounding the conduit, a large reinforced concrete tube through the earthen dam through which water releases are made. Non-toxic dye tests were recently performed to trace the movement of water through the dam. Dye was detected at monitoring points within the embankment and the seepage areas on the downstream toe of the dam. Seepage of water through the dam is expected, but the tests indicate seepage water is moving through the dam faster than would be expected.

Corps personnel have taken several interim risk reduction measures which include increased inspections, monitoring, lowering of pool from 442.5 to the normal conservation pool of 438, sealing of joints in the conduit, and additional instrumentation.

Public safety is the number one priority for the Tulsa District. The Corps' Dam Safety Program seeks to ensure that Corps owned and operated dams do not present unacceptable risks to people, property, or the environment.

Pine Creek Dam was placed into operation in 1969. The lake serves the citizens of Oklahoma providing benefits such as water supply, water quality, fish and wildlife, recreation, and flood risk management. The Corps of Engineers wants to ensure that the 41-year-old project will continue to safely provide those important services into the future.

For more information contact the Public Affairs Office at 918-669-7366. The public is encouraged to visit the district's website, www.swt.usace.army, Facebook site, www.facebook.com/usacetulsa or Twitter, www.twitter.com/usacetulsa for the latest information.

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NEWS RELEASE

U.S. ARMY CORPS OF ENGINEERS **BUILDING STRONG®**
TULSA DISTRICT

Release No. 40
For Immediate Release:
May 3, 2011

Contact:
Mary Beth Hudson, 918-669-7361
Mary.b.hudson@usace.army.mil

Pine Creek Dam Public Information Briefing Scheduled

TULSA –U.S. Army Corps of Engineers officials with the Tulsa District have scheduled a public meeting to present the revised status and future plans regarding Pine Creek Dam. The public meeting will be held Tuesday, May 17, at the Valliant Community Center, beginning at 6:00 p.m. The center is located at 311 Johnston Street, Valliant, Okla. Col. Michael Teague, district commander, will present the new classification and future plans.

Because of ongoing safety issues, the Corps of Engineers has redesignated Pine Creek Dam from *very high risk* to *extremely high risk*. This does not mean that Pine Creek is in imminent danger of failing, according to Col. Teague.

"We are committed to keeping the people in the area of Pine Creek Dam informed," he said. "Investigations are ongoing, and several interim risk reduction measures have been taken. This rating actually speeds up the process to find and implement fixes," he added. "It allows Pine Creek to move towards the front of the line as the agency makes it annual resource distribution decisions."

Corps of Engineers has already done the following:

- Installed equipment that provides real-time monitoring of the water pressure within the dam and water levels downstream of the dam.
- Built inspection roads and removed vegetation to allow for better monitoring of the dam.
- Stockpiled materials for use in an emergency.
- Designed and installed a downstream filter to prevent movement of embankment materials along the conduit.

Public safety is the number one priority for the Tulsa District. The Corps' Dam Safety Program seeks to ensure that Corps owned and operated dams do not present unacceptable risks to people, property, or the environment.

Wade Anderson, dam safety engineer for Tulsa District, said the evaluation and work at Pine Creek dam continues. Part of that will be the replacement of all the flood control gates. He said that dam safety investigations noted soft materials and a void in the embankment material surrounding the conduit, and that plans are underway to further investigate and fill the void. The plans include drilling borings from the surface of the dam down to the conduit and backfilling any voids with sand. The sand fill will serve as a filter to reduce further movement of embankment materials with the seepage through the dam.

Taking advantage of the lowered lake level needed for the dam safety investigations, a new boat dock was installed at Little River Park, and new docks and ramps were installed at Pine Creek Cove and Lost Rapids Park. Restoring the lake to normal pool levels will be addressed, and a decision made, after the voids in the embankment are filled.

Pine Creek Dam was placed into operation in 1969. The lake serves the citizens of Oklahoma providing benefits such as water supply, water quality, fish and wildlife, recreation, and flood risk management. The Corps of Engineers

wants to ensure that the 42-year-old project will continue to safely provide those important services into the future. The public is encouraged to visit the district's website, www.swt.usace.army, or Facebook site, www.facebook.com/usacetulsa, for the latest information.

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U.S. ARMY CORPS OF ENGINEERS – TULSA DISTRICT
1645 S. 101 East Ave.
Tulsa, OK 74128-4609
www.swt.usace.army.mil

NEWS RELEASE

U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT

BUILDING STRONG®

News Release No.15
For Immediate Release:
July 16, 2012

Contact:
Mary Beth Hudson, 918-669-7361
Cell – 918-606-8491

Pine Creek dam information briefing scheduled

TULSA – Col. Michael Teague, Tulsa District commander, will present an update to federal and state congressional offices and stakeholders regarding the dam safety work at Pine Creek dam. This meeting is open to the public and will be held Tuesday, July 24, 2012, at the Valliant Community Center, beginning at 2:30 p.m. The center is located at 311 Johnston Street, Valliant, Okla.

Wade Anderson, Dam Safety Center director, said the evaluation work at Pine Creek dam continues. All of the interim risk reduction measures have been completed; gate replacement was finished last month. The void identified in the embankment material surrounding the conduit has been further investigated and backfilled with sand. Also, instrumentation was installed to monitor for signs of material movement/loss. After the gates were replaced, the conduit was inspected; deteriorating joint repair and new seepage through conduit joints was observed. Additional observations of abnormal instrumentation results within the area of the backfilled void have led to a decision to extend the current normal pool restriction at elevation 433 through June 2013 and possibly through the end of construction of a permanent risk reduction measure. Conservation measures have been implemented to help ensure availability of water for all project purposes during the drought.

A Dam Safety Modification study is currently being performed for Pine Creek. The purposes of the Dam Safety Modification study are the determination or update of the baseline risk estimate and identification, evaluation, justification, and recommendation of long-term risk reduction remedial measures.

The area of concern identified by the baseline risk assessment was movement of embankment material along and into the conduit due to high water pressures in the embankment. The Tulsa District is developing alternative measures to reduce water pressures and movement of embankment materials at the Pine Creek dam. Each alternative measure is currently being evaluated to determine the best measure(s) to address the concerns with the dam. The next milestone in the Dam Safety Modification study process is to select an alternative measure or combination of measures by July 31, 2012, for review and approval by U.S. Army Corps of Engineers Headquarters.

Pine Creek Dam was placed into operation in 1969. The lake serves the citizens of Oklahoma providing benefits such as water supply, water quality, fish and wildlife, recreation, and flood risk management. The Corps of Engineers wants to ensure that the 42-year-old project will continue to safely provide those important services into the future. The public is encouraged to click on the Hot Topics button on Tulsa District's website http://www.swt.usace.army.mil for information on Pine Creek dam safety activities.

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US Army Corps of Engineers ®

Pine Creek Dam

July 24, 2012

HISTORY:

Pine Creek Dam was authorized by the Flood Control Act of 1958 for the purposes of flood control, water supply, water quality, fish and wildlife, and recreation. The dam is located on the Little River about five miles northeast of Wright City, Oklahoma. Construction began in February 1963. The project became operational in June 1969 and reached conservation elevation of 438 feet in January 1970.

TYPE OF STRUCTURE:

The structure is an impervious earth-filled dam, 7,712 feet long that rises 124 feet above the streambed. Total length of the dam, dike and spillway is 22,470 feet. The ungated, saddle spillway is based on firm rock at the right abutment, with a design capacity of 246,600 cubic feet per second. Channel capacity below the dam is 8,000 cubic feet per second.

LAKE DATA:

FEATURE	*ELEVATION (feet above sea level)*
Top of Dam	509
Maximum Pool	503
Spillway Crest	480
Top of Conservation Pool	438
Top of Inactive Pool	414

BENEFITS:

Flood Control: Pine Creek Dam has the capacity to store 412,000 acre-feet of flood waters between elevations 438 to 480 feet, and a total of 968,210 acre-feet at a maximum pool level of 503. For Fiscal Year 2011, Pine Creek prevented $747,900 in flood damages. A total of $66,167,100 in flood damages have been prevented during the history of the project through 2011.

Water Supply: International Paper has the right to 40.85 percent of storage between 414.00 and 443.50. Other entities have uncontracted surface water rights in Little River below Pine Creek Dam, including City of Valliant, Weyerhauser, H-Five Inc., Idabel PWA, and McCurtain County RWD #1. Approximately 47 cfs is necessary to meet existing water supply contract requirements.

Water Quality: Conservation pool includes 21,160 acre-feet for water quality control, which requires a minimum of 18 cfs.

Recreation and Fish and Wildlife: 199,400 people visited Pine Creek in 2011 for recreation. The Corps operates six parks on the lake. There are no marinas or other privately operated concessions on the lake. The Oklahoma Department of Wildlife Conservation has a license to 10,280 acres of land and water to use as a state Game Management Area.

ISSUES:

Seepage at Pine Creek Dam was first noted in the 1970s. The Corps has grouted twice to address this issue and has continued to monitor the seepage. After the 2009 record high water event, a depression developed on the upstream slope of the embankment.

Routine inspection and studies noted suspected voids in the fill material surrounding the conduit, so further monitoring and more vigorous investigations were made. Non-toxic dye tests were performed to trace the movement of waters through the dam. Dye was detected at monitoring points within the embankment. (Flow of water through the dam is normal but is much faster than expected.) Recommendations resulted in the need to bring the lake five feet below top of the conservation pool at elevation 433 while further investigations and interim risk reduction measures are completed. Potential impacts are being assessed and mitigated to the maximum extent possible, while also pursuing opportunities for improvements while the lake is lower than normal.

CURRENT STATUS:

All interim risk reduction measures have been completed. After the gates were replaced, inspection inside the conduit revealed deteriorating joint repair and new joint seepage. Additional observations of abnormal instrumentation results have led to the decision to maintain the current pool restriction.

FUTURE ACTIONS:

A dam safety modification study is currently being performed to determine or update the baseline risk estimate and identify, evaluate, justify, and recommend long-term risk reduction remedial measures.

Permanent actions to fully address dam safety concerns could take three to five years depending on appropriated funds availability. These actions should ensure full project performance for many future decades.

With the pool lowered to 433 feet, the remaining conservation storage can meet the combined water quality and water supply release of 65 cubic feet per second (cfs) even through the drought of record. In June of this year, after meeting with International Paper, U. S. Fish and Wildlife Service, and Oklahoma Water Resources Board, Tulsa District reduced the release to 55 cfs in order to conserve water during the current drought.

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Q 1 When will the lake level return to normal?
Evidence of deteriorating joint repair and new seepage through joints as well as abnormal instrumentation results have led to the decision to extend the current pool restriction of 433 feet through July 2013 and possibly through the end of construction of a permanent risk reduction measure.

Q 2 Will releases meet downstream requirements for water quality and water supply?
Yes. With the pool lowered to an elevation of 433 feet, the remaining conservation storage can meet the combined water quality and water supply release of 65 cubic feet per second (cfs) even through the drought of record. On June 14, 2012, after meeting with federal, state, and local stakeholders, the Pine Creek release was reduced to 55 cfs to conserve water during the current drought.

Q 3 If flows are maintained to meet downstream requirements, how much will it lower the lake level?
During the drought of record, over an approximate 2-year period, the release of 65 cfs would drop the pool to near elevation 414, top of inactive pool. From historical modeling, it appears that 28 percent of the time, the pool elevation will be at or above 433. In fact, 80 percent of the time, the pool will be above elevation 432.

Q 4 What is the plan for further lowering the lake?
The lake will continued to be operated for a top of conservation pool of 433 feet. However, when the pool approaches elevation 438, Tulsa District will utilize the low flow pipes to make releases that will continue to lower the pool to elevation 433. When the lake level is at or below 438, Tulsa District Hydrology and Hydraulics personnel will have weekly (or more frequent) coordination with the Dam Safety Officer in making decisions on what release rate to use based on antecedent soil conditions, predicted rainfall, drawdown rate and any other criteria the safety officer deems appropriate. When the lake is below 433 feet, conservation measures will be considered in order to lessen any impacts due to drought.

Q 5 When will permanent repairs be made?
A Dam Safety Modification Study began in Fiscal Year 2011 to further evaluate the issues of the dam, determine the risks of intolerable performance, and recommend repairs. Completion of this study will take approximately 2 years. Completion of the modification is expected in approximately 5 years.

Q 6 Will we still have boating and fishing access to the lake during construction and lower pool levels?
Yes. All ramps are usable down to elevation 420, however, at 433-432 elevation, the Lost Rapids and Little River North Ramp waters are inaccessible to the main body of the lake. The only usable courtesy dock is Pine Creek Cove East ramp to elevation 430. Caution is advised because lower lake levels expose hazards that were covered and hidden at higher lake levels.

Q 7 Will the dam be safe if there's a flood?
Yes, with the precautions we are taking.

Q 8 Will the current operations of the lake change?
Significant rainfall in the watershed will require flood control operations. The available channel capacity would first be made available to Pine Creek. The remaining channel capacity would be given to Broken Bow Lake and DeQueen Lake. If significant distress is observed at the dam, releases from Pine Creek may be increased regardless of any downstream flooding already occurring. Current operation limits releases from Pine Creek Lake while flooding is occurring downstream. Prior to making these releases or any flows that may add to flooding downstream, local emergency management officials will be notified.

Q 9 Are boating and skiing safe at the lower levels?
People will have to be more cautious in the upstream areas and coves, but the open areas of the lake near and around the dam (deeper areas) will be safe for skiing and boating.

Q 10 Has the fishery or access to the lake improved while the pool has been drawn down?
Yes. We extended boatramps and repaired and extended the one at Pine Creek Cove. The Oklahoma Department of Wildlife Conservation made improvements to the fish habitat on the lake, including brush piles and "spider blocks." The ODWC also planted millet on the exposed mudflats during the draw down which will improve the duck hunting and provide cover for young fry.

Q 11 How will the conservation pool restrictions impact water quality?
Water quality impacts will be dependent, in part, upon the amount and timing of rainfall. Within the reservoir, the restriction of the conservation pool could allow for the concentration of nutrients within a smaller volume of water creating favorable conditions for nuisance algae blooms impacting oxygen availability for aquatic life, and creating taste and odor problems for municipal water supply providers.

Q 12 How will the pool restrictions impact aquatic life?
Within the reservoir, pool restriction will result in an overall increase in warmer shallow water areas. This limits the amount of cooler, oxygenated water that generally occurs in deeper waters that fish and other aquatic organisms often prefer as a thermal refuge to help control body temperatures. If nuisance algae blooms become an issue within the reservoir, surface waters could experience low dissolved oxygen concentrations during overnight hours. Decreases in the amount of cooler water for refuge and large decreases in dissolved oxygen concentrations during overnight periods could create a highly stressful environment for fish and other aquatic organisms. Downstream impacts to aquatic life would result if the conservation pool elevation falls below 414 feet. Impacts could include reduced flow, increasing water temperatures within Pine Creek downstream of the dam, and lower dissolved oxygen concentrations.

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APPENDIX E
PUBLIC COMMENTS

APPENDIX F
NEWSPAPER PUBLIC NOTICE(S)